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Final

Remedial Investigation/Human Health Risk Assessment for Site 7

Naval Amphibious Base Little Creek
Virginia Beach, Virginia

Volume II – Appendices

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Appendix A
Excerpts from the 1994 RI/FS

Appendix A.1

1994 RI Text Excerpts

2.5.1 Site 7 - Amphibious Base Landfill

Initial Assessment Study

The IAS recognized that almost every type of waste generated at the base was received at the Amphibious Base Landfill. It was recommended that nine groundwater monitoring wells, fully penetrating the uppermost water-bearing zone, be installed around the perimeter of the landfill. Two groundwater level monitoring points were recommended for installation into the landfill itself. Two surface water samples also were recommended, along with a detailed reconnaissance of the landfill to identify any visible signs of contamination and establish the boundaries of the disposal area. Concerns of the IAS included the delineation of the landfill, especially the southern boundary, and its closest approach to the Lake Smith Reservoir.

Round 1 Verification Step

Based upon the findings of the IAS, the RVS was performed in 1986. Samples collected during this phase included nine groundwater samples from monitoring wells, five surface water samples, and five sediment samples. Sample locations are shown on Figure 2-7. A summary of the results of sampling are provided in Tables 2-1 and 2-2.

Volatile organic compounds (VOCs) were not detected in any of the groundwater samples. Base neutral compounds were detected at low levels in three monitoring wells, LC7-GW4, LC7-GW8, and LC7-GW9. Acid extractable compounds and pesticides/PCBs also were not detected in the groundwater samples. Low levels of several metals, including cadmium, total chromium, selenium, silver, thallium, and zinc, were detected in all of the groundwater samples. Oil and grease also were detected in all nine groundwater samples at levels ranging from 3,000 ppb to 47,000 ppb.

VOCs were not detected in any of the surface water samples, but low levels were detected in all of the sediment samples. Base neutral compounds were only detected in two sediment samples, while acid extractable compounds were only detected in two surface water samples. Pesticides/PCBs were detected in two sediment samples. Low levels of metals were detected in all of the surface water and sediment samples except LC7-SW1. Oil and grease also were detected in all ten surface water and sediment samples at levels ranging from 297 μg/l to 20,000 μg/l.

The RVS report suggested that little or no contamination was leaving the landfill at that time, although the source of elevated concentrations of constituents in the cove was not determined. The RVS recommended a second round of samples be collected from the nine monitoring wells and five surface water locations. Also, three additional surface water samples be collected further from the landfill shoreline and one surface water sample from the drainage east of the landfill to assist in determining the source of the surface water contamination.

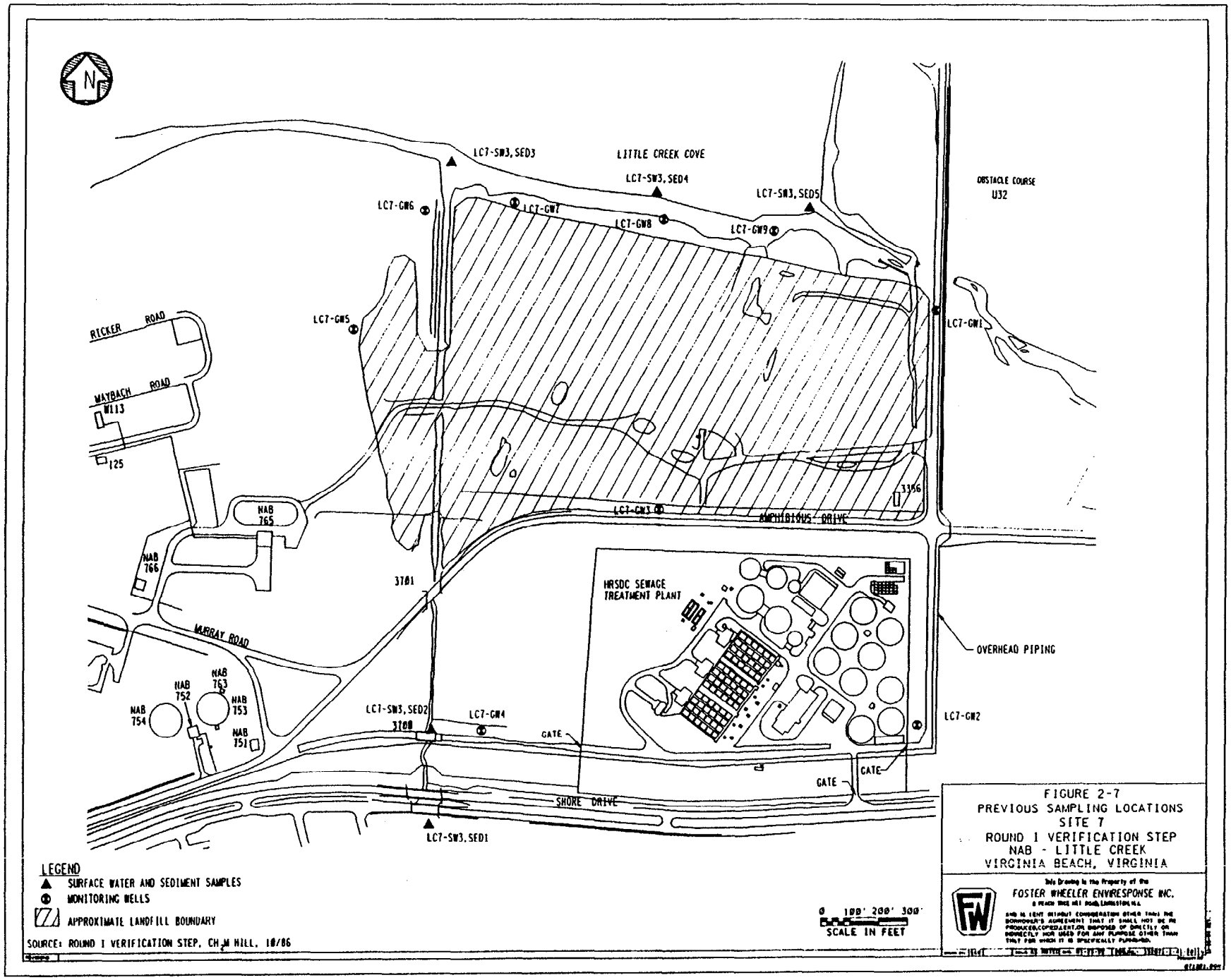

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TABLE 2-1

SUMMARY OF ANALYTICAL RESULTS FOR GROUNDWATER SAMPLES
SITE 7: AMPHIBIOUS BASE LANDFILL
NAB LITTLE CREEK
VIRGINIA BEACH, VIRGINIA
ROUND 1 VERIFICATION STEP
OCTOBER 1986

PARAMETER	LC7-GW1	LC7-GW2	LC7-GW3	LC7-GW4	LC7-GW5	LC7-GW6	LC7-GW7	LC7-GW8	LC7-GW9
VOLATILE ORGANIC COMPOUNDS									
BASE/NEUTRAL COMPOUNDS									
TOTAL SATURATED HYDROCARBONS								330	250
ACENAPHTHENE				16					
BIS(2-ETHYLEXYL)PHTHALATE				19					
ACID EXTRACTABLE COMPOUNDS									
PESTICIDES/PCBS									
METALS									
CADMIUM									7
CHROMIUM (TOTAL)									9
SELENIUM							23	21	27
SILVER			1	1	3	4	10	9	14
THALLIUM									
ZINC	10	20	90	410	30	40	50	80	260
OIL AND GREASE	6,000	8,000	6,000	8,000	3,000	10,000	35,000	25,000	47,000

NOTES:
All results in parts per million (ppm)
Black indicates compound was not detected

TABLE 2-2

SUMMARY OF ANALYTICAL RESULTS FOR SURFACE WATER AND SEDIMENT SAMPLES
SITE 7: AMPHIBIOUS BASE LANDFILL
NAB LITTLE CREEK
VIRGINIA BEACH, VIRGINIA
ROUND 1 VERIFICATION STEP
OCTOBER 1986

PARAMETER	LC7-SW1	LC7-SW2	LC7-SW3	LC7-SW4	LC7-SW5	LC7-SED1	LC7-SED2	LC7-SED3	LC7-SED4	LC7-SED5
VOLATILE ORGANIC COMPOUNDS										
METHYLENE CHLORIDE						23	73	21	96	43
ACETONE						16	16	27	16	
CARBONE DISULFIDE								2.2	2.2	
CHLOROFORM						4.6	13		3.2	1.9
BROMODICHLOROMETHANE						1.1	2.7			
TOLUENE									2.6	
BASE/NEUTRAL COMPOUNDS										
TOTAL SATURATED HYDROCARBONS									45	130
ACENAPHTHENE										
BIS(2-ETHYLHEXYL)PHTHALATE										
ACID EXTRACTABLE COMPOUNDS										
PHENOLS		1.8	2.0							
PESTICIDES/PCBS										
CHLORDANE							0.018			0.012
DDD							0.0028			0.0041
DDE							0.0024			0.0029
PCB 1260							0.033			
METALS										
ANTIMONY			30							
ARSENIC		24	7			19.6	4.8	30.7	34	15.6
BERYLLIUM								0.6	0.7	0.3
CHROMIUM (TOTAL)			9	6	5	12.2	5	14.4	19.9	8.2
COPPER		50	50			5.2	11.6	33.9	11.6	11.5
LEAD		4	31	26	22	4.3	12.7	30.3	20.7	16.4
NICKEL			200			6.3	5	19.9	19	10
SELENIUM			40	95	53					
SILVER		2	20	31	31					
THALLIUM			130	128	111	0.37	0.64	0.64	1.4	1.6
ZINC		30	110	60	30	124	28.2	135	53	56
OIL AND GREASE	20,000	8,000	5,000	9,000	9,000	207	567	2,206	536	1,306

NOTES:
Surface water results (SW) are in parts per billion (ppb)
Sediment results (SED) are in parts per million (ppm)
Blank indicates compound was not detected

Interim Remedial Investigation Study

An IRI was performed in December 1990 and January 1991. Additional and expanded sampling was performed in order to confirm the results obtained in the RVS. The locations of the samples collected during the IRI are provided on Figure 2-8. The results of the IRI sampling are provided in Tables 2-3 and 2-4. Groundwater samples were collected from the existing monitoring wells at the site. A total of nine monitoring wells had been installed at Site 7 during the RVS. During the IRI, however, only eight of the wells were found; monitoring wells LC7-GW5 could not be located. It was suggested in the IRI that construction had damaged or removed the well. A total of nine surface water samples were collected from Site 7. Surface water samples were collected from the canal west of the site, the small creek northeast of the site, and Little Creek Cove.

VOCs were not detected in any of the groundwater samples. Base neutral and acid extractable compounds were only detected in LC7-GW4, with a level of 3 μg/l for naphthalene. Pesticides/PCBs and total petroleum hydrocarbons (TPH) were not detected in any of the groundwater samples. Total organic carbon (TOC) and total organic halogens (TOX) were detected in seven of the groundwater samples. Anions, including chloride, sulfate, and alkalinity, were detected in eight of the groundwater samples. Unfiltered samples for metals analysis were collected from all nine monitoring wells, and filtered samples were collected from three of the wells in March 1991. Metals were detected in all of the unfiltered and filtered groundwater samples.

VOCs, base neutral and acid extractable compounds, pesticides/PCBs, and TPH were not detected in any of the surface water samples. TOC and TOX were detected in five of the surface water samples. Anions, including chloride, sulfate, and alkalinity, were detected in all nine of the surface water samples. Unfiltered samples for metals analysis were collected from all of the surface water locations, and filtered samples were collected from two of the surface water locations. Metals were detected in all of the unfiltered and filtered surface water samples.

The IRI concluded the constituent detected in LC7-GW4 is not the result of migration from the landfill area, since the well is located south-southwest of the landfill and the hydraulic gradient in this area is to the north. The IRI suggests cause of this constituent is road run-off, asphaltic fill and debris, treated wood, or localized dumping of tar or other asphaltic products.

Based on the results of the RVS and IRI, the IRI report concluded that the landfill is not releasing contaminants to the groundwater and additional characterization or remediation is not warranted. The IRI recommended that the status of the landfill, with regard to Virginia regulations, be determined. Also, in order to complete a risk assessment, a limited program of soil sampling should be performed in the bare areas currently used for staging.

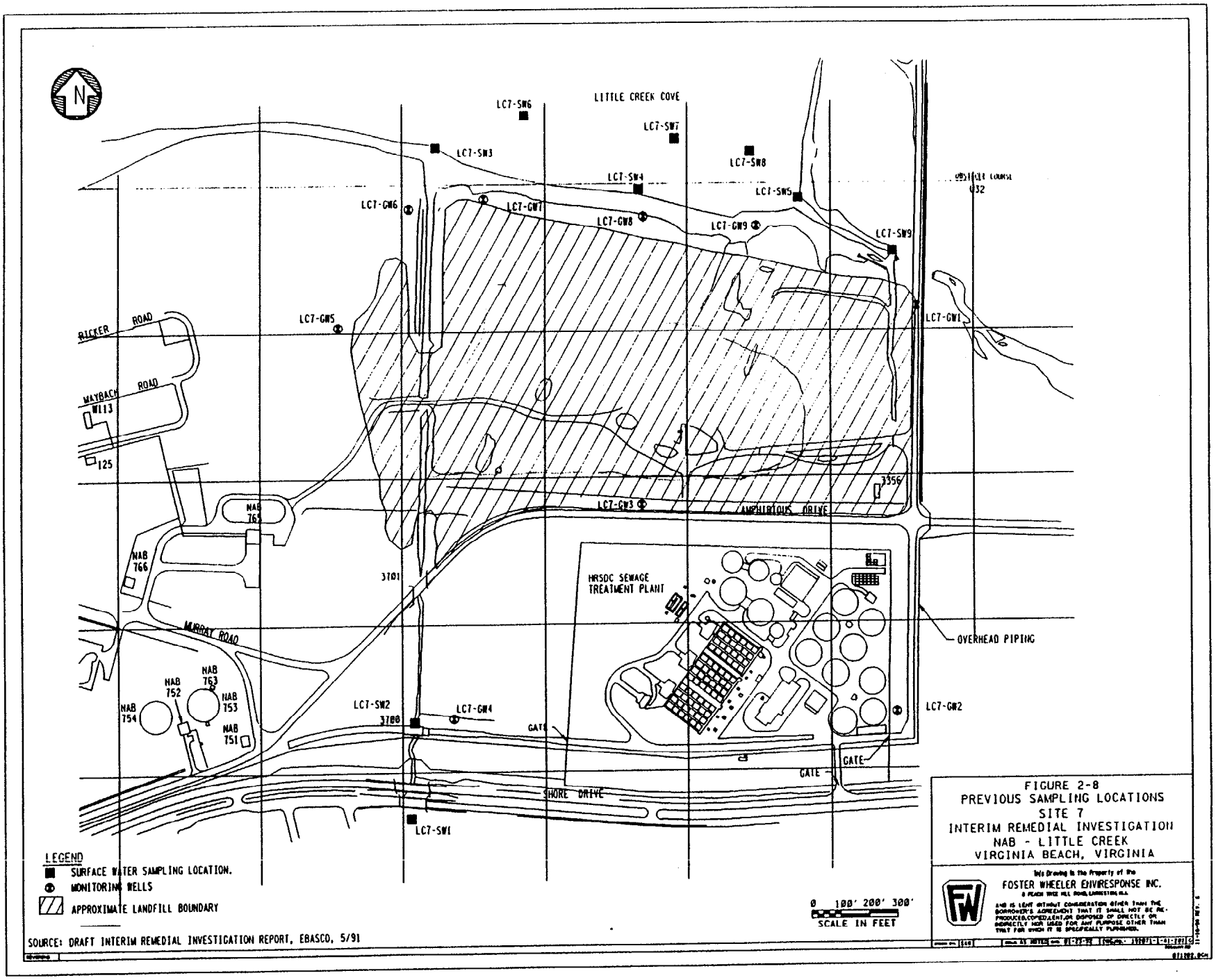

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TABLE 2-3

SUMMARY OF ANALYTICAL RESULTS FOR GROUNDWATER SAMPLES
SITE 7: AMPHIBIOUS BASE LANDFILL
NAB LITTLE CREEK
VIRGINIA BEACH, VIRGINIA
INTERIM REMEDIAL INVESTIGATION
DECEMBER 1990 - JANUARY 1991

PARAMETER	LC7-GW1	LC7-GW2	LC7-GW3	LC7-GW3(F)	LC7-GW4	LC7-GW4(F)	LC7-GW5	LC7-GW6	LC7-GW6(F)	LC7-GW7	LC7-GW8	LC7-GW9
VOLATILE ORGANIC COMPOUNDS (ug/l)				NA		NA			NA			
TOTAL PETROLEUM HYDROCARBONS (mg/l)				NA		NA	NA		NA			
ETHYLENE DIBROMIDE (ug/l)				NA		NA			NA			
BASE/NEUTRAL AND ACID EXTRACTABLE COMPOUNDS (ug/l)												
NAPHTHALENE				NA	3.J	NA			NA			
TOTAL ORGANIC CARBON (ug/l)	14.6	16.9	NA	NA	NA	NA	20.9	19.1	NA	15.3	14.9	13
TOTAL ORGANIC HALOGENS (ug/l)	27.9	72.4	NA	NA	NA	NA	49.4	51.3	NA	67.5	124	175
PESTICIDES AND PCBs (ug/l)				NA		NA			NA			
IONS (mg/l)												
CHLORIDE	325	19	225	NA	84	NA	NA	491	NA	11,300	10,400	12,300
SULFATE	11	24	352	NA	622	NA	NA	664	NA	390	614	1,770
ALKALINITY	146	219	53	NA	54	NA	NA	721	NA	1,410	1,270	901
METALS (ug/l)												
ARSENIC	6.6 J	24	16		26		NA	55			3.8	
BERYLLIUM		1.6	9				NA					
CADMIUM			31		7		NA				5	
CHROMIUM (TOTAL)	19	23	191		28		NA	27		7.5	1.5	6.9
COPPER			181				NA					
LEAD	17	20	96				NA			11		16
NICKEL			165				NA	162				
THALLIUM			2.4				NA			3.9		3.1
ZINC	85J	117	1,760	352	146		NA	106	21.5			
ALUMINUM	23,600	37,000	341,000		33,500		NA	31,300				
BARIUM	9	20	603		90		NA	21				
CALCIUM	9,110	26,700	61,700	52,900	150,000	142,000	NA	151,000	110,000	324,000	298,000	347,000
COBALT		11	60				NA	78				
IRON	29,400	73,000	235,000	6,800	133,000	1,350	NA	64,900	11,000			26,400
MAGNESIUM	16,200 J	6,020	47,000	24,800	32,500	27,600	NA	157,000	107,000	53,600	439,000	857,000
MANGANESE	180	393	2,210	1,190	1,250	810	NA	1,640	1,420			1,100
POTASSIUM	11,600	5,490	24,300	10,500	22,400	17,300	NA	24,100	21,500	144,000	163,000	180,000
SODIUM	115,000	9,440	81,900	60,800	124,000	138,000	NA	509,000	454,000	4,527,000	4,530,000	5,680,000
VANADIUM			449	4			NA					
CYANIDE (ug/l)			NA	NA		NA	NA	10	NA			

NOTES:
Results are in units specified
Blank indicates compound was not detected
J indicates an estimated concentration
(F) indicates a filtered sample collected in March 1991
NA indicates not analyzed

TABLE 2-4

SUMMARY OF ANALYTICAL RESULTS FOR SURFACE WATER SAMPLES
SITE 7: AMPHIBIOUS BASE LANDFILL
NAB LITTLE CREEK
VIRGINIA BEACH, VIRGINIA
INTERIM REMEDIAL INVESTIGATION
DECEMBER 1990 – JANUARY 1991

PARAMETER	LC7-SW1	LC7-SW2	LC7-SW3	LC7-SW3 (F)	LC7-SW4	LC7-SW5	LC7-SW6	LC7-SW6 (F)	LC7-SW7	LC7-SW8	LC7-SW9
VOLATILE ORGANIC COMPOUNDS (ug/l)				NA			NA	NA	NA	NA	NA
TOTAL PETROLEUM HYDROCARBONS (mg/l)				NA			NA	NA	NA	NA	NA
ETHYLENE DIBROMIDE (ug/l)				NA			NA	NA	NA	NA	NA
BASE/NEUTRAL AND ACID EXTRACTABLE COMPOUNDS (ug/l)				NA			NA	NA	NA	NA	NA
TOTAL ORGANIC CARBON (mg/l)	4.44	3.99	3.9	NA	2.44	2.9	NA	NA	NA	NA	NA
TOTAL ORGANIC HALOGENS (ug/l)	131	53.3	89.9	NA	80	59.1	NA	NA	NA	NA	NA
PESTICIDES AND PCBs (ug/l)				NA			NA	NA	NA	NA	NA
IONS (mg/l)											
CHLORIDE	20	78	3,570	NA	4,270	4,090	8,430	NA	9,710	8,820	3,340
SULFATE	27	55	549	NA	590	613	1,260	NA	1,300	1,300	525
ALKALINITY	41	78	51	NA	46	68	69	NA	78	74	78
METALS (ug/l)											
ARSENIC		13									
THALLIUM			2.4								
CALCIUM	16,200	25,700	102,000	104,000	86,500	147,000	182,000	182,000	197,000	167,000	81,900
COBALT											
IRON		6,000	589	601	533	294					915
MAGNESIUM	4,700	13,200	306,000	311,000	256,000	45,200	552,000 J	554,000 J	590,000	497,000	226,000
MANGANESE	19	533	33	33	31	16	7	6	4	8	62
POTASSIUM	2,900	3,670	446,000	88,000	69,000	98,700	109,000	128,000	129,000	125,000	61,500
SODIUM	10,900	49,300	1,203,700	2,050,000	1,850,000	28,100	3,710,000	3,890,000	4,000,000	3,840,000	3,840,000
CYANIDE (ug/l)						NA	NA	NA	NA	NA	NA

NOTES:
All results in parts per billion (ppb)
Blank indicates compound was not detected
J indicates an estimated concentration
(F) indicates a filtered sample
NA indicates not analyzed

3.0 FIELD INVESTIGATION

The field investigation and sampling activities were conducted at Sites 7, 9, 10, 11, 12, and 13 from May 11, 1993 through July 30, 1993. Surface and subsurface soil, sediment, surface water, and groundwater samples were collected for chemical analysis. Additional sampling was performed to determine physical characteristics of the sites and possible tidal influences.

All analytical samples were shipped via Federal Express to Ceimic Corporation, of Narragansett, Rhode Island for analysis. All stainless steel sampling implements, excluding drilling equipment, were decontaminated prior to sampling according to the following steps:

- Alconox/low phosphate detergent wash with a tap water rinse,
- 10% nitric acid wash followed be a deionized water rinse,
- Pesticide grade acetone wash followed by a deionized water rinse,
- Air drying, and
- Aluminum foil wrap.

All soil borings and monitoring well installations were performed by McCallum, Inc. of Chesapeake, Virginia. Drilling equipment, including hollow stem augers, split-spoon samplers, and drill rods, was decontaminated with high pressure steam between each soil boring. Split-spoon samplers were decontaminated between samples by a detergent wash and rinse with potable water. The decontamination was performed to minimize the potential for cross-contamination. Decontamination fluids were collected in 55-gallon steel drums, labelled, and secured for proper disposal.

The following sections provide the methodologies used to characterize each site at NAB Little Creek.

3.1 Site 7 - Amphibious Base Landfill

The Amphibious Base Landfill is approximately 38 acres in size and located in the south-central portion of the installation. Field activities at this site included a tidal survey, surface soil sampling, soil borings and subsurface soil sampling, monitoring well installation, groundwater sampling, surface water and sediment sampling, shelby tube sampling, and surveying. Table 3-1 provides a sampling summary for Site 7. Figure 3-1 provides a site map with sample locations for Site 7.

3.1.1 Tidal Survey

Staff gauges were installed in the canals on the east and west sides of the landfill, as shown on Figure 3-1. A tidal survey was performed for approximately 30 days, gathering data from the groundwater monitoring wells, canals, and Little Creek Cove. The water level measurements were collected using In-Situ data loggers and pressure transducers. Pressure transducers were placed in wells LC7-GW1, LC7-GW3, LC7-GW6, LC7-GW7, and LC7-GW8, and the two staff gauges, 7SG-1 and 7SG-2. The

TABLE 3-1

SAMPLING SUMMARY
SITE 7 – AMPHIBIOUS BASE LANDFILL
NAB LITTLE CREEK
VIRGINIA BEACH, VIRGINIA

MEDIA	SAMPLE DESIGNATION	SAMPLE LOCATION	TOTAL NUMBER OF SAMPLES PER MEDIA	LABORATORY ANALYSIS
SURFACE SOIL	07-SS-101 07-SS-102 07-SS-103 07-SS-104 07-SS-105 07-SS-106 07-SS-107 07-SS-108	7SS-101 7SS-102 7SS-103 7SS-104 7SS-105 7SS-106 7SS-107 7SS-108	8	TCL/TAL TPH TOC
SURFACE SOIL SHELBY TUBES	07ST-101 07ST-102 07ST-103 07ST-104 LC7-ST1D	7ST-101 7ST-102 7ST-103 7ST-104 LC7-SB1D	5	Grain Size Hydraulic Conductivity
SEDIMENT	07-SED-101 07-SED-102 07-SED-103 07-SED-104 07-SED-105 07-SED-106	LC7-SED101 LC7-SED102 LC7-SED103 LC7-SED104 LC7-SED105 LC7-SED106	6	TCL VOCs TAL metals TOC Anions
GROUNDWATER Not analyzed for VOC	07GW-101 07GW-102 07GW-103 07GW-104 07GW-105 07GW-106 07GW-107 07GW-108 07GW-109	LC7-GW1 LC7-GW2 LC7-GW3 LC7-GW4 LC7-GW5 LC7-GW6 LC7-GW7 LC7-GW8 LC7-GW9	9	TCL VOCs TAL metals (total and dissolved) Anions missing 2,3,4,6,7,8,9
SURFACE WATER	07SW-101 07SW-102 07SW-103 07SW-104 07SW-105 07SW-106	LC7-SW101 LC7-SW102 LC7-SW103 LC7-SW104 LC7-SW105 LC7-SW106	6	TCL VOCs, TAL metals (total) Anions
SUBSURFACE SOIL	07-SB-101D 07-SB-103D 07-SB-105D 07-SB-6D 07-SB-9D	LC7-SB1D LC7-SB3D LC7-GW5 LC7-SB6D LC7-SB9D	6	TCL/TAL TPH

NOTES:
1) TCL/TAL indicates Target Compound List/Target Analyte List
2) TCL/TAL includes Volatile Organic Compounds (VOCs), Semivolatile Organic Compounds (SVOCs), Pesticides/PCBs, Metals, and Cyanide
3) TAL analysis for water samples can be either filtered to determine dissolved metal content or unfiltered to determine total metal content. Analysis is noted as either dissolved or total.
4) TPH indicates Total Petroleum Hydrocarbons
5) TOC indicates Total Organic Carbon
6) Anions include chloride, sulfate, and alkalinity.

pressure transducers were then connected to the HERMIT 1000C™ data logger and elevation changes within the wells were measured to the nearest 0.0001-foot at 15 minute intervals using the HERMIT 1000C™ linear sampling schedule. The data gathered will assist in determining groundwater and surface water flow directions, groundwater to surface water discharge zones, tidal influences on both surface water and groundwater, and times at which groundwater to surface water discharge is greatest. Appendix D provides further details regarding the tidal survey.

3.1.2 Surface Soil Samples

Eight surface soil samples were collected at Site 7. The sample locations are provided on Figure 3-1. Samples were collected from the bare areas atop the landfill to determine the absence or presence of constituents of concern. The soil samples were collected at depths ranging from 0 to 6 inches. The area to be sampled was first cleared of any grass, twigs, or stones. A decontaminated stainless steel spoon was used to place the sample directly into a pre-cleaned sample container supplied by the laboratory. The surface soil samples were analyzed for Target Compounds List/Target Analyte List (TCL/TAL) parameters, TOC, and TPH. Appendix E provides soil descriptions for the surface soil samples. Appendix G provides the chain-of-custody documentation for the surface soil samples.

3.1.3 Soil Borings

Five soil borings were advanced at Site 7, at the locations provided on Figure 3-1. The borings were drilled using 4 ½-inch inside diameter (ID) hollow-stem augers, and were advanced to depths ranging from 20 to 40 feet below ground surface. Soil cuttings generated during drilling activities were placed in 55-gallon steel drums, labelled, and stored on-site.

Continuous split-spoon soil samples were obtained from each soil boring. Samples were collected using standard penetration tests following ASTM D 1586 Guidelines. This method was conducted using a 2-foot long, 2-inch ID split spoon sampler. Soil samples were visually classified by the on-site FWES geologist and descriptions were recorded on a Soil Boring Log. The soil classification is based on the Unified Soil Classification System (USCS). Other relevant information, such as evidence of contamination, moisture content, and blow counts, was recorded on the Soil Boring Log. Appendix B provides the Soil Boring Logs for Site 7.

One soil sample was collected from each boring and analyzed for TCL/TAL and TPH. Appendix G provides the chain-of-custody documentation for the subsurface soil samples. The split spoon samplers were decontaminated between each use. The soil samples and drill cuttings were screened in the field using a photoionization device (PID). The ambient air was monitored using the PID during drilling operations as a health and safety precaution. Each boring was abandoned using a cement/bentonite slurry following the completion of all sampling activities.

The purpose of the soil boring program was to investigate the need for the installation of additional monitoring wells and obtain accurate data on the nature, depth, and thickness of the geologic material beneath the site. Based on field observations, it was determined that installation of deep monitoring wells, screened below 30 feet, were not needed. Therefore, only one of the borings was converted into a shallow monitoring well, screened from 2.8 to 12.8 feet. This well, LC7-GW5, was installed as a replacement well for a monitoring well that could not be located.

3.1.4 Monitoring Well Installation

Monitoring well LC7-GW5 was constructed of 4-inch ID Schedule 40, flush-joint and threaded PVC casing, with a 10-foot long section of 0.010-inch slotted screen. A medium-grain sand pack extended from below the screen to a minimum of 1 foot above the top of the screen. Bentonite pellets were placed above the sand pack and hydrated with potable water. The monitoring well was fitted with a protective steel locking casing, four protective steel posts, and a 3-foot square concrete pad for protection from vehicular traffic. Table 3-8 contains a summary of monitoring well construction details. Appendix C provides a detailed description and diagram of the newly installed monitoring well at Site 7 and of the pre-existing wells.

Following well installation activities, the monitoring well was developed, using a centrifugal pump, until the groundwater was essentially sediment-free. The well was developed by pumping at a rate of approximately one gallon per minute. The water recovered was containerized in 55-gallon steel drums. The drums were stored at the monitoring well for use during the groundwater sampling, and secured for proper disposal.

3.1.5 Groundwater Samples

Groundwater samples were collected from all existing monitoring wells at Site 7. Groundwater flow at Site 7 is tidally influenced as discussed in Section 4. Therefore, sampling was scheduled to coincide with low tide periods so that the groundwater quality was not impacted by surface water inflow. Prior to sampling, a minimum of three well casing volumes was purged from each well by hand bailing to ensure the collection of a groundwater sample representative of the aquifer of concern. Purging was considered complete when periodic readings of pH, temperature, and conductivity stabilized. The temperature, pH, and conductivity were measured using a field meter and recorded in the field logbook. Purge water was containerized in 55-gallon steel drums and secured for proper disposal. Groundwater samples were collected from the wells using disposable polyethylene bottom loading bailers. The samples were transferred into laboratory prepared sample containers by pouring water from the bailer into the appropriate sample containers, slowly to minimize volatilization, and immediately stored on ice. Samples were collected from each well and analyzed for TCL VOCs, TAL Metals, and anions. Two TAL metals samples were collected from each well. One sample remained unfiltered while the other was field filtered using a disposable field filtration unit with a 0.45 micron filter. Appendix G provides the chain-of-custody documentation that accompanied the groundwater samples.

3.1.6 Surface Water and Sediment Samples

Six surface water and six sediment samples were collected at Site 7. The locations of these samples are provided on Figure 3-1. The samples were collected under worst case conditions, i.e., low tide based on information collected during the tidal survey, to minimize the effect of tidal surface water inflow and dilution. Three of the sampling locations were at upstream locations, and two sampling locations were downstream of the landfill in the west canal. One surface water and sediment sample also was collected from the east canal. The surface water and sediment sampling was conducted sequentially. Sampling progressed from downstream locations to upstream locations, and the surface water sample was collected first. Sampling personnel were careful not to disturb the bottom sediment or create any unnecessary agitation at the sampling location. Both the surface water and sediment samples were collected near the shoreline, with the sediment sample being collected from the uppermost 6 inches of sediment using a decontaminated stainless steel spoon. The volatile sample for the sediment was collected first, and the remaining sample was homogenized in a decontaminated stainless steel bowl before being placed into the laboratory supplied containers. The surface water and sediment samples were analyzed for TCL VOCs, TAL metals, and anions. The sediment samples were also analyzed for TOC. Appendix G provides the chain-of-custody documentation that accompanied the surface water and sediment samples.

3.1.7 Shelby Tube Samples

Four shelby tube samples were collected between 0.0 and 2.0 feet below ground surface (bgs) to characterize the geotechnical and hydraulic properties of the landfill cover materials. The samples were tested for grain size and hydraulic conductivity. An additional shelby tube was collected at the bottom of the soil boring 07-SB-05 to ascertain the nature of the confining layer underlying the site. This sample also was analyzed for grain size and hydraulic conductivity. Appendix H provides the shelby tube analysis.

3.1.8 Survey

All new and existing groundwater monitoring wells, and surface soil and shelby tube sample locations, were surveyed by Hoggard-Eure Associates of Portsmouth, Virginia. Elevations of the top of casing and concrete well pad were surveyed for each monitoring well.

3.2 Site 9 - Driving Range Landfill

The Driving Range Landfill is approximately 6 acres in size and located in the northeast portion of the installation. Field activities at these sites included a tidal survey, groundwater sampling, surface soil sampling, shelby tube sampling, and surveying. Table 3-2 provides a sampling summary for Site 9. Figure 3-2 presents a site map with sample locations for Site 9.

4.0 PHYSICAL CHARACTERISTICS

Physical data obtained during the field program have been used to characterize each site under investigation. Results from the field program are presented below by site. In addition, data from the previous investigations; IAS ('84), RVS ('86), and IRI ('91) are used whenever applicable to supplement the findings obtain during this investigation.

4.1 Site 7 - Amphibious Base Landfill

Results of the physical characterization for Site 7 are presented below.

4.1.1 Site Topography, Drainage, and Surface Features

Site 7 is nearly rectangularly shaped and covers approximately 38 acres based on a east-west length of 1,800 feet and an average north-south width of 900 feet, as shown on Figure 3-1. However, based on a review of historical aerial photographs, the fill-containing portion of the site is approximately 30 acres in area and does not extend south of Amphibious Drive. A chain link fence borders the site to the east, south, and west where respectively, Helicopter Road, Amphibious Drive and, a tank farm and munitions storage area are located. Little Creek Cove borders the northern side of the site. Locked gates controls access to the entire site.

The site is mounded in the center and relatively flat around the edges. Ground elevations range from 1.8 feet above msl at monitoring well LC7-GW7, located approximately 60 feet from Little Creek Cove on the north-west corner of the landfill, to 12.7 feet above msl at surface soil sample location 7SS-102, located in the south-central portion of the landfill. There is a drop in elevations between the central portion of the site and the north, east and west margins of the site. Particularly along the northern margin of the site, there is a 4 to 6 foot drop in elevation from the upper surface of the active landfill to the tidal area bordering Little Creek Cove.

Sediment sampling locations are lower in elevation than the 7SS-102 location, but they reflect channel bottoms sampled during low tide. The lowest sediment elevations occur along the northern boundary of the site.

The majority of the visible fill material appears to be construction debris, primarily concrete. This debris is also visible on the northern edge of the landfill where it protrudes from the landfill side slope.

Tidal channels are located on the east and west sides of the site. The low lying tidal area on the north side of the site becomes inundated at high tide, with water approaching to within a few feet of the edge of the landfill.

Surface water on the site appears to either pond on the landfill, or infiltrate into the fill. A small amount of surface run-off may occur at the northern edge of the landfill, with the water draining towards the low-lying tidal area.

The central portion of the landfill is sparsely vegetated due to past vehicular traffic. The surrounding less-trafficked areas are densely vegetated with grasses and trees. The tidal area is heavily vegetated with reeds and swamp grass.

4.1.2 Surface Soils

A total of eight surface soil samples and four shelby tube samples were collected at Site 7. Sample locations are presented on Figure 3-1. Descriptive field logs of the surface soil samples are given in Appendix E.

The shelby tube samples were collected from the 0-2 foot interval at four locations on the landfill. Shelby tubes are undisturbed samples, and were obtained to ascertain the physical properties of the landfill cap. The undisturbed samples were analyzed by McCallum Testing Laboratories, Inc. of Chesapeake, Virginia for Hydrometer/Grain size by ASTM D 422, Atterberg Limits Tests by ASTM D 4318, Specific Gravity of Soils Test by ASTM D 854, and Constant Head Permeability Tests by ASTM D 854.

Sample 07ST-101 consists of a grayish brown silty, clayey sand. Under the Unified Soil Classification (USC) system, the sample is classified as SC: SANDS with greater than 12 percent inorganic clay fines. Sieve analysis showed the sample consisting of 70.6 percent sand and 18.8 percent silt and 10.6 percent clay. The specific gravity of the sample is 2.63 and the coefficient of permeability is 2.0×10^{-3} cm/sec (5.7 ft/day). Other testing provided a liquid limit of 21, a plastic limit of 13, and a plasticity index of 8.

Sample 07ST-102 consists of a very dark grey silty, fine to coarse sand and fly ash, with gravel, glass and traces of organics. The sample is classified under USC as SM: SANDS with greater than 12 percent inorganic silt fines. Sieve analysis showed the sample consisting of 53.8 percent sand, 17.1 percent silt, 4.5 percent clay, and 24.6 percent other material (organics and fill). The specific gravity of the sample is 2.30 and the coefficient of permeability is 7.3×10^{-4} cm/sec (2.1 ft/day). The liquid limit, plastic limit, and plasticity index tests were not performed on sample 07ST-102.

Sample 07ST-103 consists of a dark brown silty, fine to medium sand with clay lenses and organics. The sample is classified under USC as SM: SANDS with greater than 12 percent inorganic silt fines. Sieve analysis showed the sample consisting of 60.6 percent sand and 28.3 percent silt and 11.1 percent clay. The specific gravity of the sample is 2.56 and the coefficient of permeability is 6.1×10^{-5} cm/sec (0.2 ft/day). Other testing provided a liquid limit of 13, a plastic limit of 13, and a plasticity index of 0.

Sample 07ST-104 consists of a grayish brown silty, clayey fine sand. The sample is classified under USC as SC: SAND with greater than 12 percent inorganic clay fines. Sieve analysis showed the sample

consisting of 71.7 percent sand and 21.5 percent silt and 6.8 percent clay. The specific gravity of the sample is 2.66 and the coefficient of permeability is 2.9 X 10^{-4} cm/sec (0.8 ft/day). Other testing provided a Liquid Limit of 21, a Plastic Limit of 13, and a Plasticity Index of 8.

Appendix F provides the results of the analysis of the physical properties of the shelby tube samples.

4.1.3 Geology

Drilling activities permitted observation of the thickness and extent of the uppermost, undisturbed natural materials and depth to water. No borings were advanced into the landfill itself during this investigation. Data from the drilling program provided additional information on site geology to close data gaps identified in existing reports. A geologic log was prepared for the five soil borings; 07-SB-01D, 07-SB-03D, 07-SB-05D, 07-SB-06D and 07-SB-09D, drilled during this investigation and is presented in Appendix B. Soil boring 07-SB-05D was converted into monitoring well LC7-GW5. A subsurface shelby tube sample was collected at boring LC7-SB-1D and the physical results are discussed later in this section.

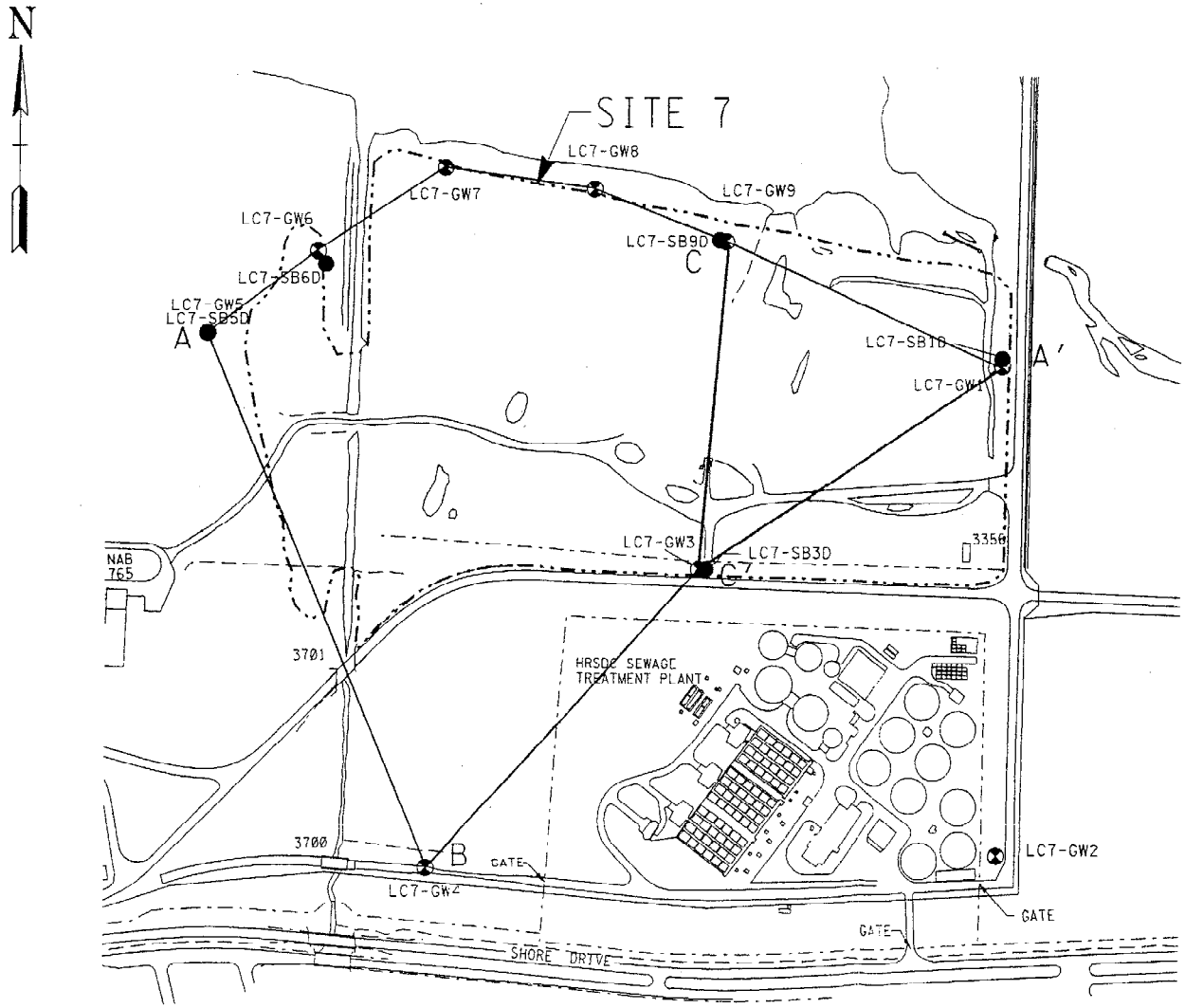
All five borings encountered a thin surface layer of either sand or sand with clay lenses, followed at varying depths by a clay layer of undetermined thickness. Sand is present at the surface in all the monitoring wells. This surface sand layer is thickest towards the south and west, and pinches out towards the east and northeast. The sand layer is interspersed with thin clay layers and lenses. The sand/clay layer is thickest at LC7-GW2 (16 feet thick) and pinches out beneath the sand to the north. The sand and sand/clay layers interfinger in the northeast in borings LC7-GW5 and LC7-SB-3D.

The clay layer is present at depth beneath the sand layer at all monitoring well and soil boring locations. The clay layer appears homogeneous. The thickness of the clay layer was not determined however the minimum clay thickness penetrated was greater than five feet. Boring LC7-SB-9D encountered the thickest section of clay. Clay was first detected at eight feet bgs and continued for 32 feet to a total depth of 40 feet bgs in this boring.

A subsurface shelby tube sample was collected within the clay at boring LC7-SB-1D. Physical analysis showed the sample consisting of 99.3 percent clay. Other testing provided a liquid limit of 47, a plastic limit of 22, and a plasticity index of 25. The sample was not analyzed for specific gravity. The coefficient of permeability of this sample was 2.9 X 10^{-8} cm/sec (8.2 x 10^{-5} ft/day). The sample is classified under USC as CL: Inorganic slightly plastic CLAYS and/or medium plastic to plastic CLAYS.

4.1.4 Stratigraphy

Geologic data is presented on three cross-sections. Figure 4-1 presents the locations of the three cross sections, and the cross sections are presented on Figures 4-2, 4-3, 4-4 and 4-5. Geologic logs from existing monitoring wells were used to supplement the data obtained from the drilling program conducted



LEGEND

A A' CROSS SECTION LINE AND ENDPOINTS

SITE BOUNDARY

LC7-GW1 EXISTING MONITORING WELL

LC7-SB1D SOIL BORING LOCATION

GRAPHIC SCALE

0 300' 600' 900'

1" = 300'-0"

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FIGURE 4-1

PLAN OF
GEOLOGICAL CROSS SECTIONS
SITE 7
NAB - LITTLE CREEK
VIRGINIA BEACH, VIRGINIA

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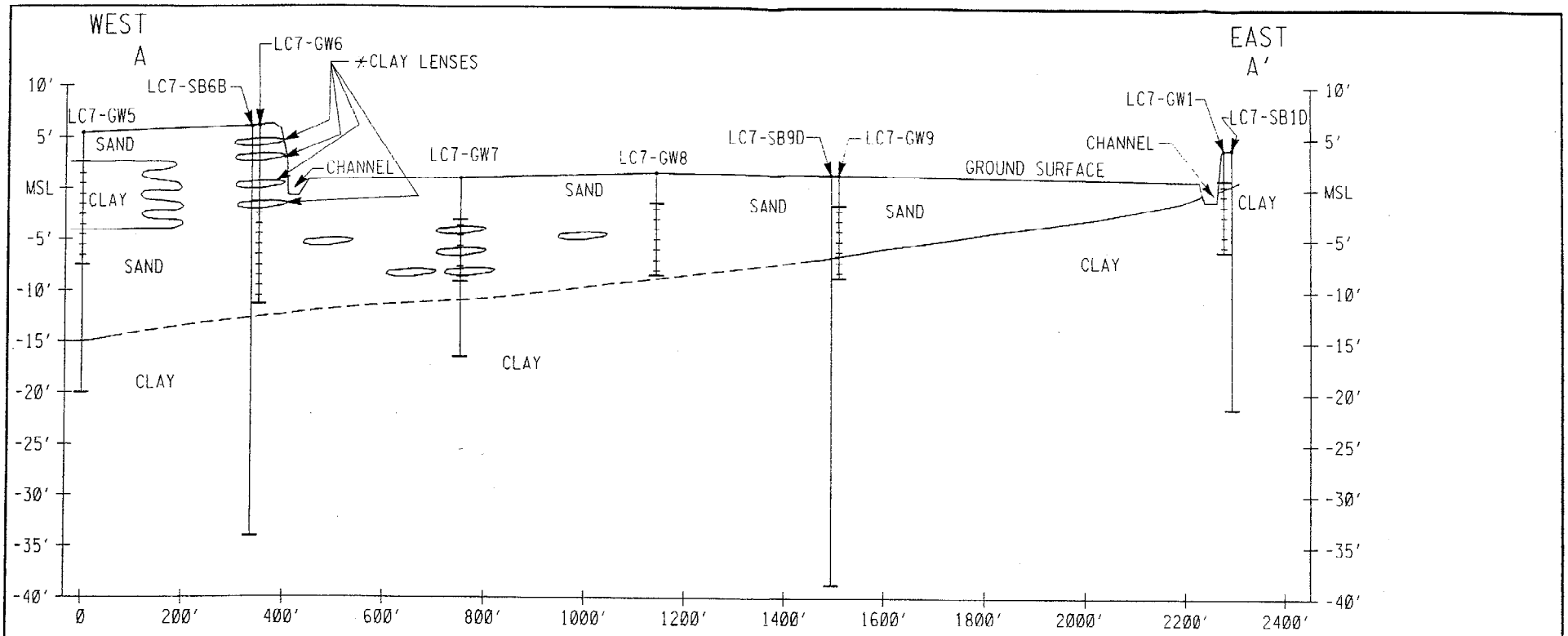

SECTION A-A'

MSL = MEAN SEA LEVEL
* CLAY LENSES ARE NOT EXACT DEPTHS
LENSES EXIST THROUGHOUT UNIT.

GRAPHIC SCALE

0 200' 400' 600'
HORIZONTAL: 1" = 200'-0"
0 10' 20' 30'
VERTICAL: 1" = 10'-0"

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FIGURE 4-2

GEOLOGICAL CROSS SECTION
SECTION A-A'
SITE 7
NAB - LITTLE CREEK
VIRGINIA BEACH, VIRGINIA

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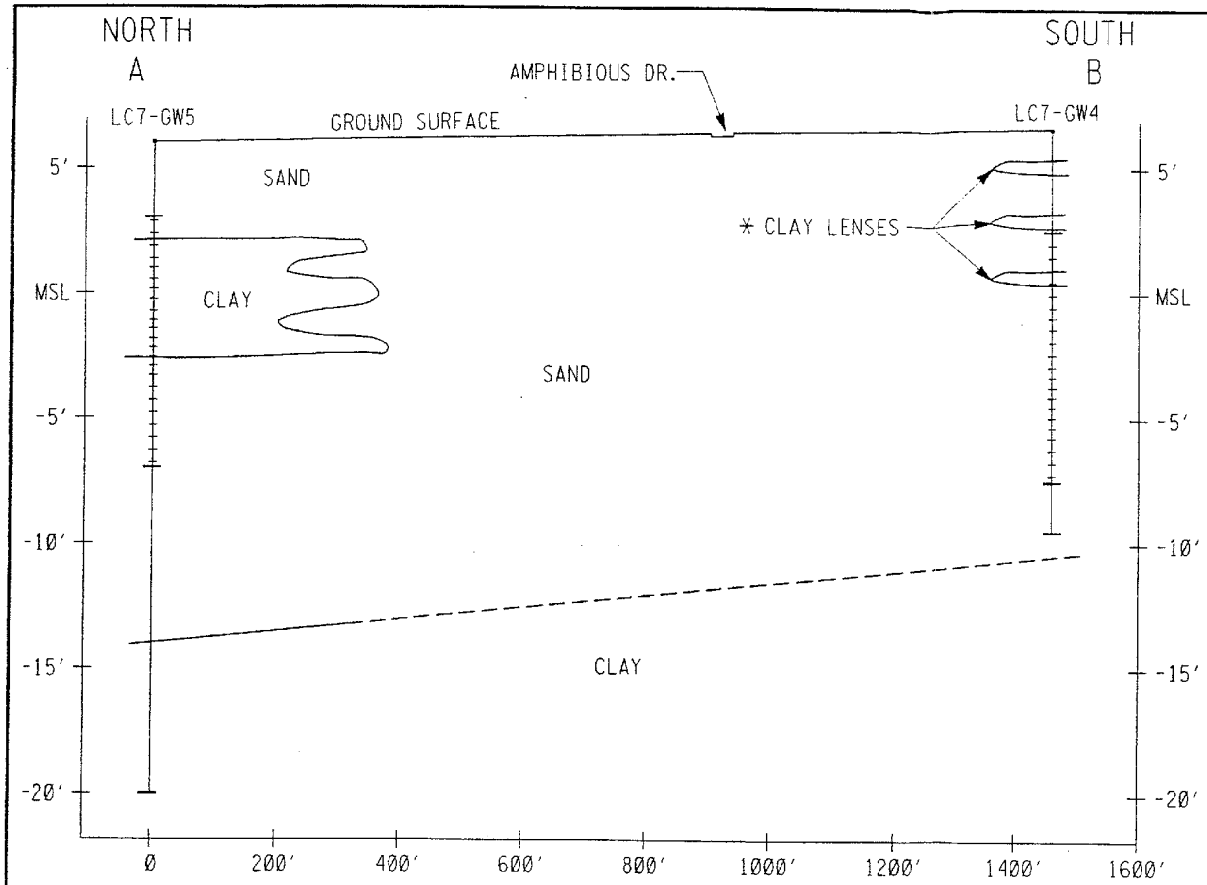

SECTION A-B

MSL = MEAN SEA LEVEL
* CLAY LENSES ARE NOT EXACT DEPTHS
LENSES EXIST THROUGHOUT UNIT.

GRAPHIC SCALE

0 200' 400' 600'
HORIZONTAL: 1"=200'-0"
0 5' 10' 15'
VERTICAL: 1"=5'-0"

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FIGURE 4-3

GEOLOGICAL CROSS SECTION
SECTION A-B
SITE 7
NAB - LITTLE CREEK
VIRGINIA BEACH, VIRGINIA

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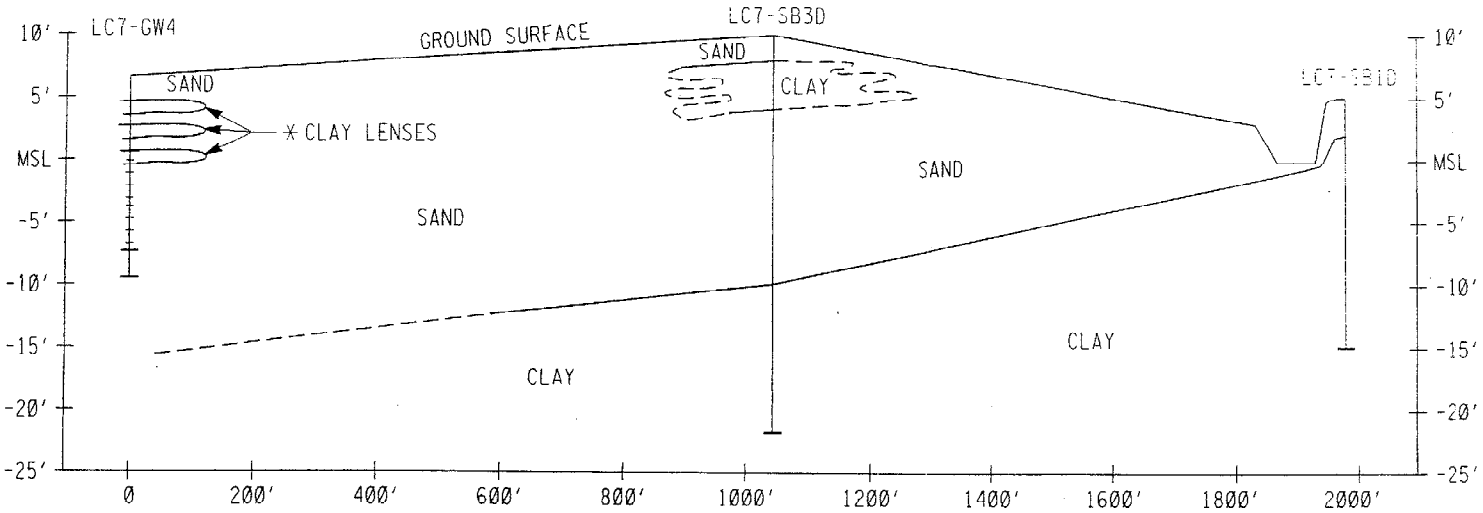

SECTION B-A'

MSL= MEAN SEA LEVEL
* CLAY LENSES ARE NOT EXACT DEPTHS
LENSES EXIST THROUGHOUT UNIT.

GRAPHIC SCALE

0 200' 400' 600'
HORIZONTAL: 1"=200'-0"
0 10' 20' 30'
VERTICAL: 1"=10'-0"

REV.	DATE	DESCRIPTION	APPR.
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FIGURE 4-4

GEOLOGICAL CROSS SECTION
SECTION B-A'
SITE 7
NAB - LITTLE CREEK
VIRGINIA BEACH, VIRGINIA

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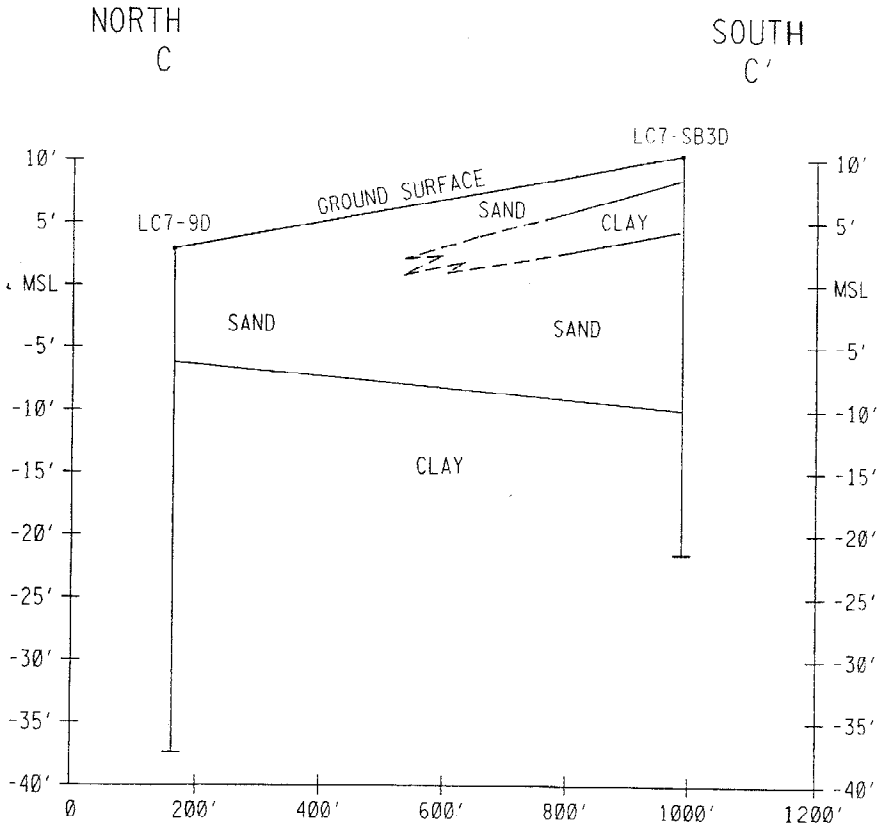

SECTION C-C'

MSL= MEAN SEA LEVEL

GRAPHIC SCALE

0 200' 400' 600

HORIZONTAL: 1"=200'-0"

0 10' 20' 30'

VERTICAL: 1"=10'-0"

REV.	DATE	DESCRIPTION	APPR.
A	10-29-93	DRAFT TO LANTDIV	

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FIGURE 4-5

GEOLOGICAL CROSS SECTION
SECTION C-C'
SITE 7
NAB - LITTLE CREEK
VIRGINIA BEACH, VIRGINIA

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during this investigation in making the subsurface interpretations. It should be noted that geologic logs for the existing wells were constructed using split spoon sample data collected at varying intervals, typically on a five foot interval, versus the continuous split spoon sampling employed during this investigation. Geologic contacts were primarily interpolated from data collected during this investigation.

General site stratigraphy consists of fill overlying unconsolidated natural soil and sediment. Fill covers a large percentage of the site with construction debris appearing to be the primary component of recent fill. Because no borings were advanced on top of the active landfill, the thickness of the fill is unknown. At the northern edge of the landfill, the visible fill side slope is 4-6 feet thick. The increase in elevation towards the center of the site may indicate greater fill thickness towards the center of the landfill.

The soil borings appear to confirm that the undisturbed natural soil underlying the site can be classified as part of the Columbia Formation. The Columbia Formation is characterized by the presence of oxidized clays, silts, sands, and gravels.

4.1.5 Hydrogeology

Groundwater beneath the site is located in the fill and undisturbed natural soils and sediment. Monitoring wells on Site 7 were installed within the shallow water table aquifer. During water sampling performed as part of this study, water level data was recorded for the monitoring wells at the site. Long term water level monitoring data was obtained in monitoring wells LC7-GW1, LC7-GW3, LC7-GW6, LC7-GW7, AND LC7-GW8, as well as staff gauges LC7-SG1 and LC7-SG2. During this investigation, the following were established:

- Depth to groundwater,
- Groundwater flow patterns, and
- Groundwater hydraulic gradients

4.1.5.1 Water Level Data

Depth to water was measured in each monitoring well at synoptic intervals. Depth to water and water surface elevation data are summarized in Table 4-1.

On July 1, 1993, groundwater elevations ranged 0.53 feet msl in LC7-GW8 to 7.08 feet msl in LC7-GW4. Groundwater flow is to the north - northeast towards Little Creek Cove. The IRI investigation found that groundwater flowed to the north - northwest towards Little Creek Cove. This minor difference in flow direction may be attributed to both tidal fluctuations and changes in precipitation patterns in the time period preceding each study. The groundwater contours for the shallow water table aquifer are presented on Figure 4-6, 4-7 and 4-8 which incorporates groundwater levels recorded on July 1, 1993, May 11, 1993 and June 10, 1993, respectively, for all existing wells except LC7-GW1 for which June 29, 1993 water level data was used. The average hydraulic gradient across the site calculated using

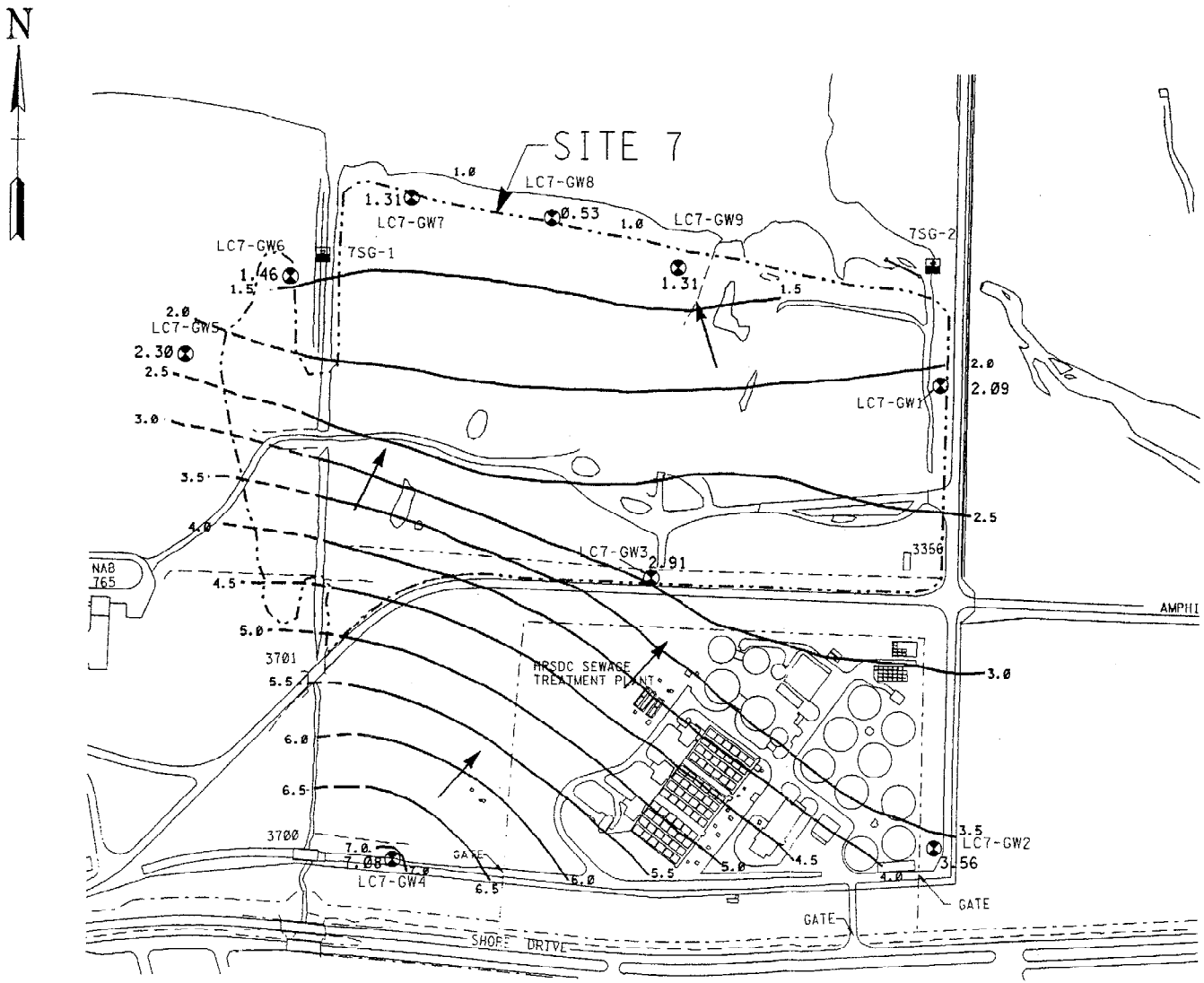
TABLE 4-1

GROUNDWATER ELEVATIONS
ABOVE MSL
SITE 7 – AMPHIBIOUS BASE LANDFILL
NAVAL AMPHIBIOUS BASE – LITTLE CREEK
VIRGINIA BEACH, VIRGINIA

MONITORING WELL NUMBER	DATE MEASURED	MEASURING POINT ABOVE MSL (FT)	DEPTH TO WATER (FT)	WATER LEVEL ABOVE MSL (FT)
LC7-GW1	5/11/93	8.38	5.71	2.67
	5/25/93		5.91	2.47
	6/10/93		5.68	2.70
	6/29/93	GROUND 5'	6.29	2.09
LC7-GW2	7/01/93	11.88	8.32	3.56
LC7-GW3	5/11/93	12.19	7.12	5.07
	5/25/93		7.95	4.24
	6/10/93	~~Grnd 10'~~	8.17	4.02
	7/01/93	GROUND 18'	9.28	2.91
LC7-GW4	7/01/93	9.11	2.03	7.08
LC7-GW5	7/16/93	8.80	8.25	0.55
	7/29/93	GROUND 6'	6.50	2.30
LC7-GW6	5/11/93	9.25	7.42	1.83
	5/25/93		7.67	1.58
	6/10/93		7.78	1.47
	7/01/93	GROUND 6'	7.79	1.46
LC7-GW7	5/11/93	4.72	3.21	1.51
	5/25/93		3.22	1.50
	6/10/93		3.32	1.40
	7/1/93		3.41	1.31
LC7-GW8	5/11/93	4.94	3.25	1.69
	5/25/93		3.45	1.49
	6/10/93		3.54	1.40
	7/1/93		4.41	0.53
LC7-GW9	7/1/93	5.55	4.28	1.27

NOTES:

MSL indicates Mean Sea Level



LEGEND:

- SITE BOUNDARY
- LC7-GW1 2.09 — EXISTING GROUNDWATER MONITORING WELL LOCATIONS WITH GROUNDWATER ELEVATION. (LEVEL IN LC7-GW5 FROM 7/29/93 AND LEVEL IN LC7-GW2 FROM 6/29/93.
- 7SG-2 — STAFF GAUGE
- 2.5 — LINES OF EQUAL GROUNDWATER ELEVATION
- GROUNDWATER FLOW DIRECTION

GRAPHIC SCALE

0 300' 600' 900'

1" = 300'-0"

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FIGURE 4-6

GROUNDWATER CONTOUR MAP
JULY 1, 1993
SITE 7
NAB - LITTLE CREEK
VIRGINIA BEACH, VIRGINIA

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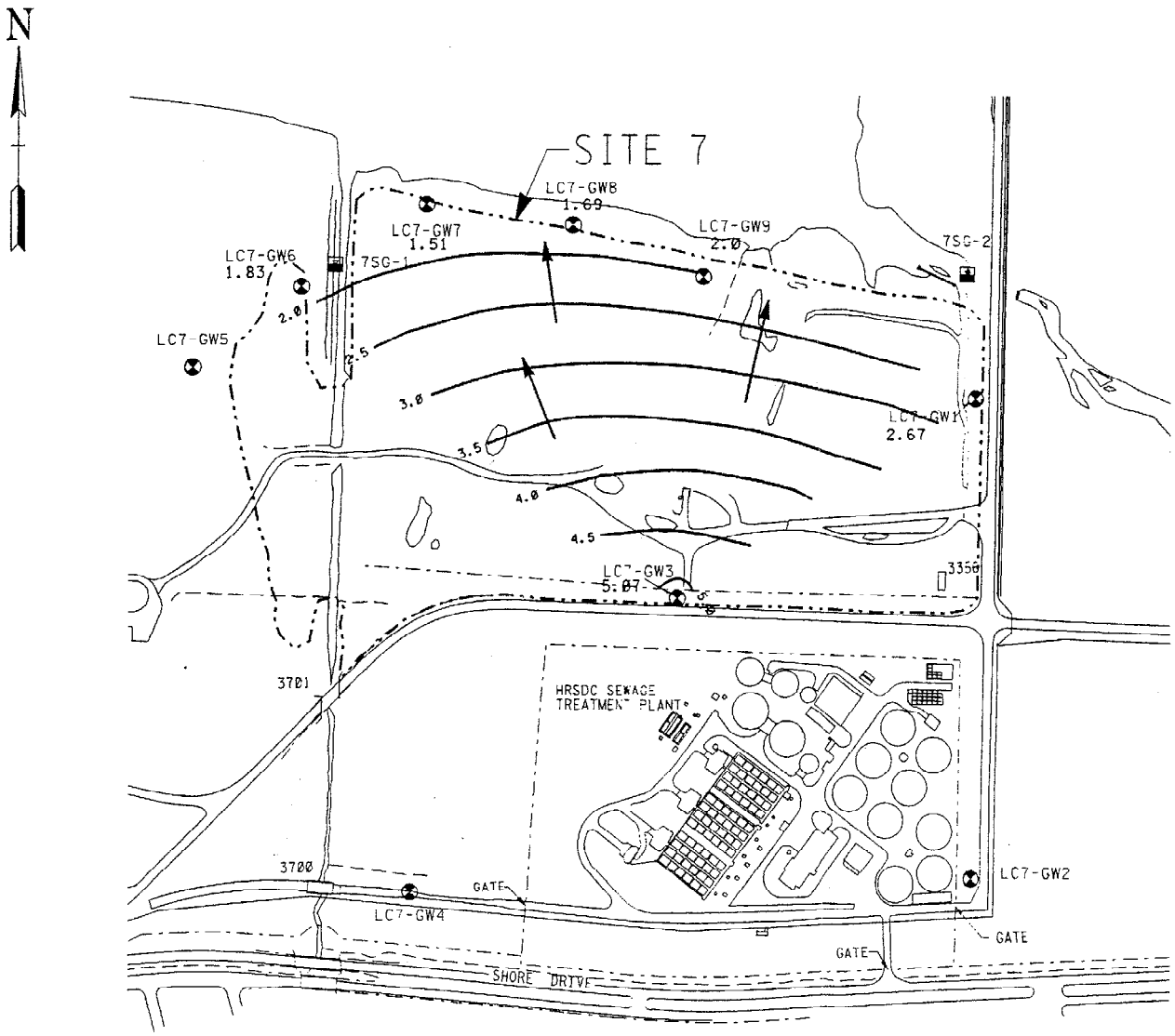

LEGEND:

- SITE BOUNDARY
- LC7-GW1 2.09 — EXISTING GROUNDWATER MONITORING WELL LOCATIONS WITH GROUNDWATER ELEVATION.
- 7SG-2 — STAFF GAUGE
- 2.5 — LINES OF EQUAL GROUNDWATER ELEVATION
- GROUNDWATER FLOW DIRECTION

GRAPHIC SCALE

0 300' 600' 900'

1" = 300'-0"

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FIGURE 4-7

GROUNDWATER CONTOUR MAP
MAY 11, 1993
SITE 7
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VIRGINIA BEACH, VIRGINIA

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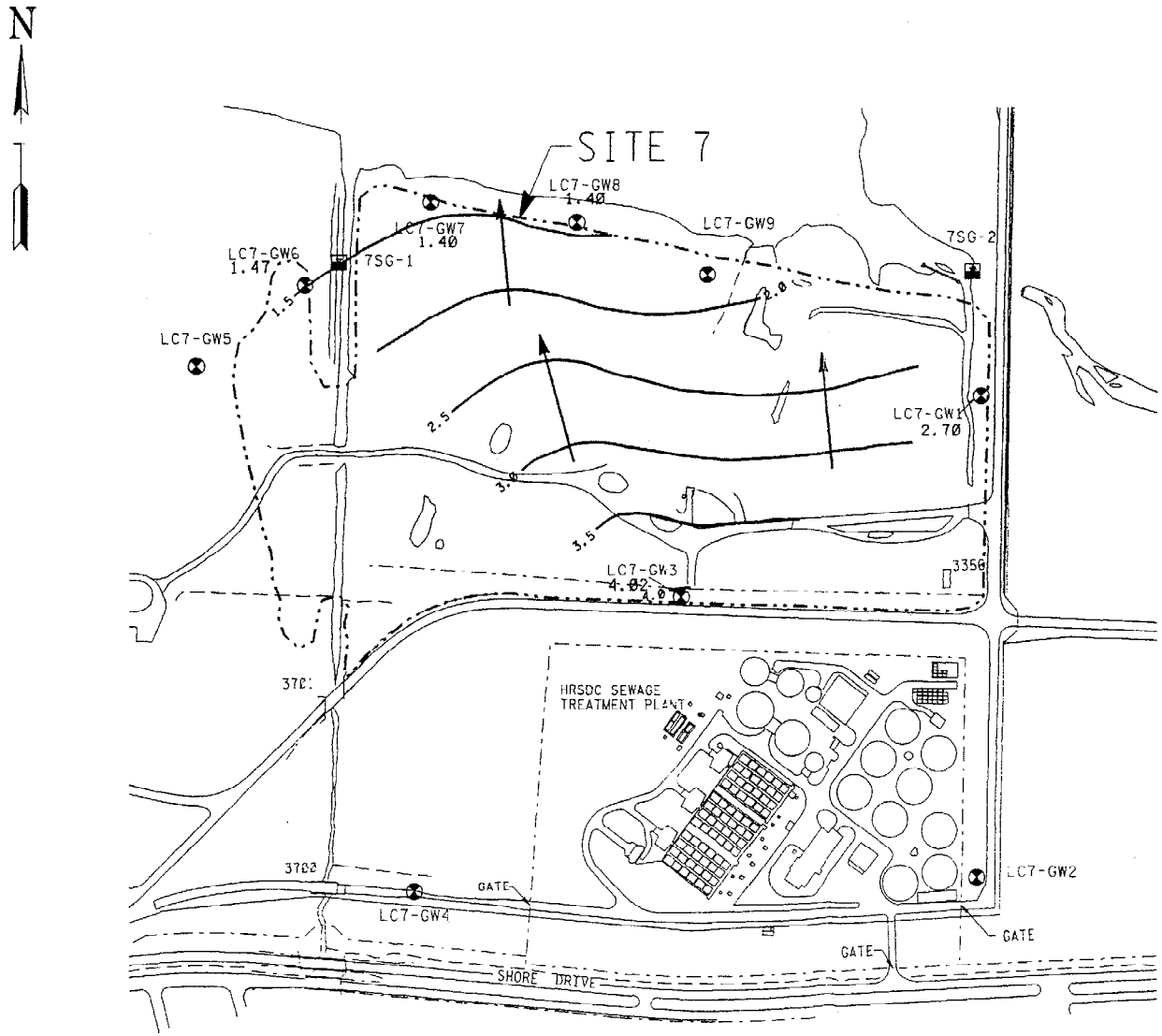

LEGEND:

- SITE BOUNDARY
- LC7-GW1 2.09 — EXISTING GROUNDWATER MONITORING WELL LOCATIONS WITH GROUNDWATER ELEVATION.
- 7SG-2 — STAFF GAUGE
- 2.5 — LINES OF EQUAL GROUNDWATER ELEVATION
- GROUNDWATER FLOW DIRECTION

GRAPHIC SCALE

0 300' 600' 900'

1" = 300'-0"

REV.	DATE	DESCRIPTION	APPR.
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FIGURE 4-8

GROUNDWATER CONTOUR MAP
JUNE 10, 1993
SITE 7
NAB - LITTLE CREEK
VIRGINIA BEACH, VIRGINIA

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Figure 4-6 is 1.1 x 10^{-2} feet/foot. The IRI investigation provided a hydraulic gradient of 1.8 X 10^{-3} feet/foot.

4.1.5.2 Long Term Water Level Data

A Hermit™ 1000C data logger was used to record data from transducers installed in monitoring wells LC7-GW1, LC7-GW3, LC7-GW6, LC7-GW7, and LC7-GW8. Two transducers were also installed in Little Creek Cove at staff gauges LC7-SG1 and LC7-SG2. Staff gauge LC7-SG1 was installed in the tidal channel near the western edge of the site. Staff gauge LC7-SG2 was installed adjacent to Helicopter Road, at the confluence of the tidal channel and Little Creek Cove. The transducers were installed on May 11, 1993 and left to record water level data until June 10, 1993. The purpose of the long term water level monitoring was to ascertain if tides in Little Creek Cove effected the shallow water table level beneath Site 7, and if there is an effect, how the tidal changes impact time of sampling and groundwater contour maps. Monitoring wells LC7-GW7 and LC7-GW8 were chosen because of their proximity to the shoreline, LC7-GW1 and LC7-GW6 provided data from the east and west sides of the site near tidal channels, and LC7-GW3 provides data from the south side of site farthest from the cove and tidal channels. Appendix D provides graphical representation of the data recorded. Start times on each graph are reference to the start of the first data logger installed on May 11, 1993, which recorded data from monitoring well LC7-GW6 and staff gauge LC7-SG1.

The long term water level data recorded in the five monitoring wells indicate varied amounts of change due to tidal influence. Monitoring wells near Little Creek Cove; LC7-GW6, LC7-GW7, and LC7-GW8, exhibited the most tidal influence, with a daily tidal fluctuations of nearly one foot. The monitoring wells furthest from Little Creek Cove (LC7-GW1 and LC7-GW3) showed little tidal influence, with the greatest daily tidal fluctuation being approximately 0.1 feet.

There are a number of trends to note on the hydrographs. First, there is the lessening in the degree of fluctuation when moving from west to east as can be seen observed in the hydrographs for monitoring wells LC7-GW6, LC7-GW7, LC7-GW8 and LC7-GW1, respectively. This change in fluctuations appears to be related to the thickness of the uppermost sand layer screened by each well. Among these four monitoring wells, the sand is thicknesses at LC7-GW6 and thins as one moves towards LC7-GW1 where the sand is almost absent. It appears that the sand permits rapid pressure head changes in response to a rising tide. In addition, the changing water levels support the interpretation on cross section A-A' shown on Figure 4-2. Second, there is little change in water level elevations at LC7-GW3 even though the sand layer is present at this monitoring well. This indicates that the pressure changes associated with the tide has a limited effect as one moves away from the cove, as would be expected.

Additional conclusions from the tidal and groundwater hydrograph data were also made. The hydrographs indicate that time of sampling is important for the five wells located along the northwest portion of Site 7, LC7-GW6, LC7-GW7, and LC7-GW8, and probably LC-GW5 and LC-GW9. These wells should be sampled at low tides to obtain a representative sample and avoid sampling mixed groundwater and surface water. These wells were sampled at low tide for this investigation. Gradients

and flow direction shown on groundwater contour maps are very dependent on the time of measurement of groundwater elevations in the monitoring wells. Synoptic water level measurements should be taken as close as possible to present the most accurate groundwater contour map. As could be expected, groundwater to surface water discharge zones, and the rate of groundwater discharge, both change in response to tidal changes. Groundwater to surface water discharge zones shift slightly inland onto the low lying areas bordering the northern portion of the site with a rising tide. The rate of groundwater discharge increases and decreases in response to a low and high tide respectively. Samples collected during low tide, as during this investigation, will sample constituents of concern during periods of maximum groundwater discharge.

In addition to the tidal fluctuations, all monitoring wells displayed rise in water levels during periods of heavy rainfall. The most notable occurrence came during the period of May 31, 1993 to June 6, 1993 when 2.95 inches of rainfall was recorded by the National Oceanic and Atmospheric Administration (NOAA) at Norfolk Airport. This indicates that precipitation is infiltrating the ground surface and recharging groundwater. The water level increase also occurs during a period of relatively higher tides, with high tides above three feet and greater, for the area from May 28, 1993 to June 6, 1993.

Water levels recorded at staff gauges LC7-SG1 and LC7-SG2 displayed relatively constant tidal fluctuations with only very slight increases in water level observed after periods of rainfall. A sinusoidal pattern associated with lunar phases is observable on the 30 day staff gage hydrographs.

4.2 Site 9 - Driving Range Landfill

Data collected during the field program are used to characterize Site 9. Previous investigations of the site include IAS ('84), RVS ('86), and IRI ('91). Data from these studies are used whenever applicable. Results of the physical characterization are presented in the following.

4.2.1 Site Topography, Drainage, and Surface Features

Site 9 encompasses approximately 7.8 acres based on a length of 800 feet and an average width of 425 feet, as shown on Figure 3-2. Site 9 is used as a golf driving range. It is bordered on the west by Hewitt Drive; on the south by high fencing and on the east by a wooded area. Directly to the west of the wooded area are mounds of soil along the east side of the driving range. A chain link fence oriented east to west cuts along the approximate northern border of the site. The fence surrounds the combat training area and controls access to the beach and dune area located north of Site 9. Site 9 is nearly rectangular shaped, with dimensions of 800 feet long in the east-west direction and a maximum width of 450 feet in the north-south direction.

The site is relatively level with an average elevation of approximately 9.0 feet above msl. Surveyed ground elevations of the monitoring wells near or on the site, range from 5.8 feet above msl at

5.0 NATURE AND EXTENT OF CONSTITUENTS OF CONCERN

Soil and water samples were collected from each site at Little Creek to characterize the natural chemical composition of these sites and constituents of concern. The samples were analyzed by Ceimic Laboratories of Pittsburgh, Pennsylvania and the results were validated by Heartland Environmental Services of St. Peters, Missouri. The data evaluation and quality assurance was conducted by FWES and is presented in Section 5.2. The Data Validation Report is included in Appendix J.

Our discussion of the chemical findings has been divided in the following manner for each site: surface soil, subsurface soil, groundwater, and surface water and sediment. In this way, the data is presented in the manner in which it is often found in the environment, from remaining source area through potential pathways.

Subsurface soil data represents source areas and often provides an indication of any remaining constituents of concern that still exist. Subsurface sampling often provides data on worst case conditions. Surface soil data represents potential direct contact pathways through surface exposure. The surface soil data frequently will identify those areas where constituents of concern may lie uncovered. Groundwater data identifies those constituents which have dissolved into the saturated zone and may migrate with groundwater flow from the area of concern. Surface water and sediment data often represents the potential ingestion pathway through the food chain and bioaccumulation. In addition, surface water data often indicates releases of constituents of concern into the environment, and sediment data often represents their accumulation.

Organic data will be presented in three groupings: volatile organic compounds (VOCs), semi-volatile organic compounds (SVOCs), and pesticides and polychlorinated biphenyls (PCBs). The TAL parameters represent inorganic constituents of concern, including 23 metals and cyanide. A summary of the characteristics, concentrations, and horizontal extent of the impact to various media is presented in this section.

5.1 Summary of Analytical Results

5.1.1 Site 7 - Amphibious Base Landfill

Surface Soil

Eight surface soil samples were collected from 0 - 6 inches below ground surface. These samples were analyzed for Target Compound List (TCL) volatile organic compounds (VOCs), semi-volatile organic compounds (SVOCs), pesticides, and polychlorinated biphenyls (PCBs); Target Analyte List (TAL) metals and cyanide; total petroleum hydrocarbons (TPH); and total organic carbon (TOC).

VOCs were detected at two of the eight surface soil sampling locations at Site 7. Table 5-1 presents a summary of VOCs detected in surface soil samples and associated quality control samples. Methylene chloride was detected only in sample 07-SS-102 at a concentration of 6 μg/kg (J). Acetone was detected in two samples at concentrations of 11 μg/kg in 07-SS-109 (duplicate of 07-SS-102) and 12 μg/kg in 07-

SS-105. This detection may be attributable to sample handling in the laboratory, since acetone is a common laboratory contaminant. The highest total VOCs were detected at 12 μg/kg at 07-SS-105. Tentatively identified compounds (TICs) were detected only in sample 07-SS-105 and totalled 35 μg/kg (J).

SVOCs were detected at all eight surface soil sampling locations at Site 7. Table 5-2 presents a summary of SVOCs detected in surface soil samples and associated quality control samples. Bis (2-ethylhexyl) phthalate was detected in all eight samples at concentrations ranging from 47 μg/kg (J) in 07-SS-108 to 190 μg/kg in 07-SS-106. Pyrene was detected in six of eight samples at concentrations ranging from 52 μg/kg (J) in 07-SS-104 to 1,600 μg/kg in 07-SS-101. Phenanthrene and Fluoranthene were detected in four of eight surface soil samples. Phenanthrene was detected at concentrations ranging from 39 μg/kg (J) in 07-SS-106 to 830 μg/kg in 07-SS-101. Fluoranthene was detected at concentrations ranging from 46 μg/kg (J) in 07-SS-107 to 1,300 μg/kg in 07-SS-101.
Anthracene, benzo (a) anthracene, chrysene, benzo (b) fluoranthene, and benzo (a) pyrene were each detected in two of eight surface soil samples. Anthracene was detected at concentrations of 51 μg/kg (J) in 07-SS-105 and 220 μg/kg (J) in 07-SS-101. Benzo (a) anthracene was detected at concentrations of 110 μg/kg (J) in 07-SS-105 and 710 μg/kg in 07-SS-101. Chrysene was detected at concentrations of 82 μg/kg (J) in 07-SS-105 and 390 μg/kg in 07-SS-101. Benzo (b) fluoranthene was detected at concentrations of 100 μg/kg (J) in 07-SS-105 and 510 μg/kg in 07-SS-101. Benzo (a) pyrene was detected at concentrations of 57 μg/kg (J) in 07-SS-105 and 450 μg/kg in 07-SS-101.

Fluorene, butylbenzylphthalate, benzo (k) fluoranthene, indeno (1,2,3-cd) pyrene, and benzo (g,h,i) perylene were detected only in sample 07-SS-101 at 60 μg/kg (J), 58 μg/kg (J), 380 μg/kg, 230 μg/kg (J), and 210 μg/kg (J), respectively. 2-Methylnaphthalene was detected only in 07-SS-107 at a concentration of 62 μg/kg (J).

The highest total of SVOCs detected was at 7,098 μg/kg (J) at 07-SS-101. SVOC TICs were detected at all eight sampling locations. The highest total SVOC TICs was detected at 6,568 μg/kg (J) at 07-SS-107.

Pesticides were detected at only one of eight surface soil sampling locations. Sample 07-SS-103 contained 4,4'-DDT at a concentration of 3.8 μg/kg (J) and alpha-Chlordane at a concentration of 5.1 μg/kg (J). **PCBs** were detected in three of eight surface soil samples. Aroclor-1260 was detected in three samples at concentrations ranging from 130 μg/kg (J) to 3,500 μg/kg (J) in 07-SS-107. Table 5-3 presents a summary of pesticides and PCBs detected in surface soil samples and associated quality control samples.

TAL metals were detected at all eight surface soil sampling locations. **Cyanide** was not detected in any of the eight surface soil sampling locations. Table 5-4 presents a summary of TAL metals and cyanide detected in surface soil samples and associated quality control samples.

The following metals were detected at all eight surface soil sampling locations: aluminum, arsenic, barium, calcium, chromium, copper, iron, lead, magnesium, manganese, potassium, vanadium, and zinc. Arsenic was detected in concentrations ranging from 0.86 mg/kg (B) in 07-SS-102 to 3.5 mg/kg in 07-SS-

108. Barium was detected in concentrations ranging from 8.8 mg/kg (B) in 07-SS-106 to 93.9 mg/kg in 07-SS-104. Chromium was detected in concentrations ranging from 4.6 mg/kg in 07-SS-105 to 26.5 mg/kg in 07-SS-104. Copper was detected in concentrations ranging from 4.5 mg/kg (J) in 07-SS-102 to 78.2 mg/kg (J) in 07-SS-104. Lead was detected in concentrations ranging from 5.5 mg/kg (J) in 07-SS-105 to 638 mg/kg (J) in 07-SS-104. Manganese was detected in concentrations ranging from 18.1 mg/kg (J) in 07-SS-105 to 470 mg/kg (J) in 07-SS-104. Vanadium was detected in concentrations ranging from 7.4 mg/kg (B) in 07-SS-106 to 202 mg/kg in 07-SS-101. Zinc was detected in concentrations ranging from 12.6 mg/kg in 07-SS-105 to 405 mg/kg in 07-SS-103.

Cobalt and nickel were detected in seven of the eight soil samples. Cobalt was detected in concentrations ranging from 0.75 mg/kg (B) in 07-SS-102 to 6.1 mg/kg (B) in 07-SS-103. Nickel was detected in concentrations ranging from 3.4 mg/kg (B) in 07-SS-108 to 18.0 mg/kg in 07-SS-104.

Beryllium was detected in four of eight surface soil samples at concentrations ranging from 0.23 mg/kg (B) in 07-SS-106 to 0.65 mg/kg (B) in 07-SS-103. Cadmium was detected in two samples at concentrations ranging from 0.65 mg/kg (B) in 07-SS-108 to 1.4 mg/kg in 07-SS-104. Sodium was detected in two samples in concentrations ranging from 227 mg/kg (B) in 07-SS-103 to 262 mg/kg (B) in 07-SS-108. Mercury was detected only in 07-SS-108 at a concentration of 0.07 mg/kg (B).

TOC was detected in all eight surface soil sampling locations. Table 5-5 presents a summary of TOC detected in surface soil samples and associated quality control samples.

TPH was detected in only one of the eight surface soil sampling locations. Table 5-6 presents a summary of TPH detected in surface soil samples and associated quality control samples.

Subsurface Soil

Five subsurface soil samples were collected immediately above the water table from depths ranging from 0 to 9 feet below ground surface. These samples were analyzed for VOCs, SVOCs, pesticides, and PCBs; TAL metals and cyanide; and TPH.

VOCs were detected at three of the five subsurface soil sampling locations. Acetone was detected in two of the three subsurface samples at concentrations ranging from 56 μg/kg (J) in 07-SB-101D to 80 μg/kg in 07-SB-110 (duplicate of 07-SB-103D). Methylene chloride and 2-Butanone were detected only in 07-SB-101D at concentrations of 3 μg/kg (J) and 9 μg/kg (J), respectively. The detection of these three compounds may be attributable to sample handling in the laboratory, since they are common laboratory contaminants. Tetrachloroethene was detected in only 07-SB-105D at a concentration of 7 μg/kg (J). The highest concentration of total VOCs was detected at 07-SB-110 (duplicate of 07-SB-103D) at a concentration of 80 μg/kg. VOC TICs were not detected at any of the five subsurface soil sampling locations. Table 5-7 presents a summary of VOCs detected in subsurface soil samples and associated quality control samples.

SVOCs were detected at two of the five subsurface soil sampling locations. 1,4-Dichlorobenzene was detected only in 07-SB-103D at a concentration of 38 μg/kg (J). Bis (2-Ethylhexyl) phthalate was detected only in sample 07SB6D at a concentration of 100 μg/kg (J). The highest total SVOCs were detected at 07SB6D at a concentration of 100 μg/kg (J). SVOC TICs were detected at all five subsurface soil sampling locations; the highest total concentration detected was 1,830 μg/kg (J) at 07-SB-101D. Table 5-8 presents a summary of semi-volatile compounds detected in subsurface soil samples at Site 7.

No **pesticides** or **PCBs** were detected at the five subsurface soil sampling locations. Table 5-9 presents a summary of pesticides and PCBs detected in subsurface soil samples and associated quality control samples.

TAL metals were detected in all five of the subsurface soil sampling locations at Site 7. Table 5-10 presents a summary of TAL metals and cyanide detected in subsurface soil samples and associated quality control samples.

The following TAL metals were detected in all five subsurface soil samples collected at Site 7: aluminum, arsenic, barium, beryllium, cadmium, calcium, chromium, cobalt, copper, iron, lead, magnesium, manganese, nickel, potassium, vanadium, and zinc. Arsenic was detected in concentrations ranging from 1.3 mg/kg (J) in 07-SB-103D to 5.1 mg/kg (J) in 07-SB-105D. Barium was detected in concentrations ranging from 5.4 mg/kg (B) in 07SB9D to 46.1 mg/kg in 07-SB-103D. Beryllium was detected in concentrations ranging from 0.27 mg/kg (B) in 07-SB-101 to 0.44 mg/kg (B) in 07SB6D. Cadmium was detected in concentrations ranging from 1.1 mg/kg (J) in 07SB6D and 07SB9D to 2.2 mg/kg in 07-SB-110 (duplicate of 07-SB-103D). Chromium was detected in concentrations ranging from 4.7 mg/kg in 07SB9D to 18.8 mg/kg in 07-SB-105D. Cobalt was detected in concentrations ranging from 2.3 mg/kg (B) in 07-SB-101 to 5.1 mg/kg (B) in 07SB9D. Copper was detected in concentrations ranging from 2.6 mg/kg in 07SB6D to 6.9 mg/kg in 07-SB-105D. Lead was detected in concentrations ranging from 3.5 mg/kg (J) in 07SB6D to 8.4 mg/kg (J) in 07-SB-103D. Manganese was detected in concentrations ranging from 17.4 mg/kg in 07SB9D to 48.9 mg/kg in 07-SB-101D. Nickel was detected in concentrations ranging from 5.2 mg/kg (B) in 07-SB-105D to 8.9 mg/kg in 07SB9D. Vanadium was detected in concentrations ranging from 5.3 mg/kg (B) in 07SB6D to 24.0 mg/kg in 07-SB-110 (duplicate 07-SB-110). Zinc was detected in concentrations ranging from 15.5 mg/kg in 07-SB-105D to 58.0 mg/kg in 07SB9D.

Sodium was detected in four of the five subsurface soil sampling locations at Site 7. Mercury was detected only in 07-SB-103D at a concentration 0.07 mg/kg (B). All data for antimony was rejected through data validation and is therefore unusable. Cyanide was not detected in any of the five subsurface soil samples collected from Site 7. Table 5-10 presents a summary of the TAL metals and cyanide detected in subsurface soil and associated quality control samples for Site 7.

TPHs were detected in two of five subsurface soil sampling locations. Table 5-11 presents a summary of TPHs detected in subsurface soil samples and associated quality control samples for Site 7.

Groundwater

Nine groundwater samples were collected from groundwater monitoring wells on Site 7. Groundwater samples were analyzed for VOCs, TAL total and dissolved metals, and anions.

Nine groundwater samples were collected for VOC analysis; only seven of these samples were analyzed by the laboratory. As a result of a sample identification discrepancy, analytical holding times for two samples were exceeded previous to the resolution of this discrepancy. Of the seven groundwater samples analyzed only one contained any VOCs. Acetone was detected in 07-GW-104 at a concentration of 8 μg/l (J), which may be attributable to sample handling in the laboratory. VOC TICs were not detected at any of the groundwater sampling locations. Table 5-12 contains a summary of volatile organic compounds detected in groundwater samples at Site 7.

Total and dissolved TAL metals were detected in all nine of the groundwater samples. Table 5-13 presents a summary of TAL total and dissolved metals detected in groundwater samples and associated quality control samples at Site 7.

The following TAL metals were detected in all nine groundwater samples collected at Site 7: total aluminum, total and dissolved barium, total and dissolved calcium, total and dissolved magnesium, total and dissolved manganese, total and dissolved potassium, and total and dissolved sodium. Total barium was detected at concentrations ranging from 33.7 μg/l (B) in 07-GW-106 to 754 μg/l in 07-GW-103. Dissolved barium was detected at concentrations ranging from 8.1 μg/l (B) in 07-GW-101 to 101 μg/l (B) in 07-GW-103. Total manganese was detected at concentrations ranging from 114 μg/l in 07-GW-108 to 1,930 μg/l in 07-GW-103. Dissolved manganese was detected at concentrations ranging from 46.2 μg/l in 07-GW-101 to 1,270 μg/l in 07-GW-05.

Dissolved aluminum was detected in two samples. Total iron was detected in eight of nine groundwater samples; dissolved iron was detected in six groundwater samples.

Total copper was detected in seven of nine groundwater samples at concentrations ranging from 4.7 μg/l (B) in 07-GW-106 to 226 μg/l in 07-GW-103. Dissolved copper was detected in five of nine groundwater samples in concentrations ranging from 2.1 μg/l (B) in 07-GW-101 to 8.3 μg/l (B) in 07-GW-109.

Total lead was detected in six of nine groundwater samples at concentrations ranging from 4.3 μg/l (J) in 07-GW-106 to 177 μg/l (J) in 07-GW-103. Dissolved lead was not detected in any groundwater sample.

Total arsenic was detected in five of nine groundwater samples at concentrations ranging from 7.8 μg/l (J) in 07-GW-105 to 50.6 μg/l in 07-GW-102. Dissolved arsenic was detected in four of nine groundwater samples at concentrations ranging from 2.5 μg/l (B) in 07-GW-105 to 16.1 μg/l in 07-GW-106.

Total cobalt was detected in five of nine groundwater samples at concentrations ranging from 3.8 μg/l (B) in 07-GW-109 to 121 μg/l in 07-GW-103. Dissolved cobalt was detected in three of nine

groundwater samples at concentrations ranging from 3.5 μg/l (B) in 07-GW-101 to 24.6 μg/l (B) in 07-GW-103.

Total chromium was detected in four of nine groundwater samples at concentrations ranging from 5.9 μg/l (J) in 07-GW-105 to 360 μg/l in 07-GW-103. Dissolved chromium was not detected in any groundwater sample from Site 7. Total vanadium was detected in three of nine groundwater samples at concentrations ranging from 43.2 μg/l (B) in 07-GW-102 to 634 μg/l in 07-GW-103. Dissolved vanadium was not detected in eight of the nine groundwater samples. The vanadium data for 07-GW-105 was rejected through data validation and is unusable. Total zinc was detected in four of nine groundwater samples at concentrations ranging from 37.7 μg/l in 07-GW-106 to 1,620 μg/l in 07-GW-103. Dissolved zinc was detected in two of nine groundwater samples at concentrations of 34.9 μg/l in 07-GW-109 to 307 μg/l in 07-GW-103.

Total beryllium was detected in three of the nine groundwater samples at concentrations ranging from 1.9 μg/l (B) in 07-GW-105 to 11.0 μg/l in 07-GW-103. Dissolved beryllium was detected only in 07-GW-105 at a concentration of 1.1 μg/l (B). Total cadmium was detected in three of the nine groundwater samples at concentrations ranging from 4.4 μg/l (B) in 07-GW-109 to 37.6 μg/l in 07-GW-103. Dissolved cadmium was not detected in any of the nine groundwater samples. Total mercury was detected in two of the nine groundwater samples at concentrations of 0.18 μg/l (B) in 07-GW-102 and 0.27 μg/l in 07-GW-103. Dissolved mercury was detected in two of the nine groundwater samples at a concentration of 0.15 μg/l (B) in 07-GW-101 and 07-GW-106. Total nickel was detected in two of the nine groundwater samples at concentrations of 35.7 μg/l (B) in 07-GW-106 and 176 μg/l in 07-GW-103. Dissolved nickel was not detected in any of the nine groundwater samples.

A summary of **anions** detected in groundwater samples in presented in Table 5-14.

Surface Water

Six surface water samples and one duplicate were collected at Site 7. These samples were analyzed for VOCs, TAL metals, and anions.

VOCs were detected in three of the six surface water samples. Acetone was detected in three of six surface water samples at concentrations ranging from 15 μg/l in 07-GW-103 to 31 μg/l in 07-GW-105, which may be attributable to sample handling in the laboratory. TICs were not detected at any of the surface water sampling locations. Table 5-15 presents a summary of VOCs detected in surface water samples and associated quality control samples.

TAL metals were detected in all six surface water samples collected at Site 7. Table 5-16 presents a summary of TAL metals detected in surface water samples and associated quality control samples at Site 7.

The following metals were detected in all six surface water samples: barium, calcium, iron, magnesium, manganese, potassium, and sodium. Barium was detected at concentrations ranging from 17.50 μg/l (B)

in 07-SW-101 to 36.80 μg/l (B) in 07-SW-102. Manganese was detected in concentrations ranging from 83.9 μg/l in 07-SW-103 to 344 μg/l in 07-SW-106.

Arsenic and aluminum were detected in five of the six surface water samples. Arsenic was detected at concentrations ranging from 2.40 μg/l (B) in 07-SW-101 to 10.30 μg/l in 07-SW-102.

Cobalt, and copper were detected in four of the six surface water samples. Cobalt was detected in concentrations ranging from 3.40 μg/l (B) in 07-SW-103 and its duplicate, 07-SW-107, to 5.6 μg/l (B) in 07-SW-104. Copper was detected in concentrations ranging from 5.3 μg/l (B) in 07-SW-103 to 14.10 μg/l (B) in 07-SW-102.

Zinc was detected in three of the six surface water samples at concentrations ranging from 30.8 μg/l in 07-SW-104 to 70.5 μg/l in 07-SW-105. Lead was detected in three of the six surface water samples at concentrations ranging from 3.20 μg/l (J) in 07-SW-105 and 50.00 μg/l (J) in 07-SW-104. The data for thallium was rejected through data validation and is unusable. Table 5-16 presents a summary of TAL metals detected in surface water samples and associated quality control samples for Site 7.

Table 5-17 presents a summary of anions detected in surface water samples and associated quality control samples.

Sediment

Six sediment samples were collected from creek in association with the surface water sample at Site 7. These samples were analyzed for VOCs, TAL metals and cyanide, anions, and TOC.

VOCs were detected in three of the six sediment sampling locations. Table 5-18 presents a summary of VOCs detected in sediment samples and associated quality control samples at Site 7. 2-Butanone was detected in three of six sediment samples at concentrations ranging from 12 μg/kg (J) in 07-SED-104 to 65 μg/kg in 07-SED-102. Toluene was detected in two of the six sediment samples at concentrations of 1 μg/kg (J) in 07-SED-104 and 5 μg/kg (J) in 07-SED-102. Methylene chloride, acetone, and carbon disulfide were detected only in 07-SED-102 at concentrations of 7 μg/kg (J), 370 μg/kg (J), and 4 μg/kg (J), respectively. The detection of these three compounds and 2-butanone may be attributable to sample handling in the laboratory. The highest total concentration of VOCs detected in sediment was 451 μg/kg (J) at 07-SED-102. VOC TICs were only detected 07-SED-102 at a concentration of 33 μg/kg (J).

TAL metals were detected in all six of the sediment samples from Site 7. Table 5-19 presents a summary of TAL metals and cyanide detected in sediment samples and associated quality control samples.

The following TAL metals were detected in all six sediment samples: aluminum, arsenic, barium, chromium, copper, iron, lead, magnesium, manganese, potassium, and sodium. Arsenic was detected in concentrations ranging from 1.2 mg/kg (B) in 07-SED-106 to 8.6 mg/kg in 07-SED-102. Barium was detected in concentrations ranging from 1.6 mg/kg (B) in 07-SED-106 to 23.8 mg/kg (B) in 07-SED-102. Chromium was detected in concentrations ranging from 1.5 mg/kg (J) in 07-SED-106 to 10.1 mg/kg (J)

in 07-SED-102. Copper was detected in concentrations ranging from 0.89 mg/kg (B) in 07-SED-106 to 42.9 mg/kg in 07-SED-102. Lead was detected in concentrations ranging from 1.7 mg/kg (J) in 07-SED-106 to 31.1 mg/kg in 07-SED-102. Manganese was detected in concentrations ranging from 2.7 mg/kg (B) in 07-SED-106 to 67.2 mg/kg in 07-SED-102.

Calcium, nickel, vanadium, and zinc were detected in five of the six sediment samples. Nickel was detected at concentrations ranging from 3.3 mg/kg (B) in 07-SED-104 to 7.6 mg/kg (B) in 07-SED-102. Vanadium was detected at concentrations ranging from 5.4 mg/kg (B) in 07-SED-107 (duplicate of 07-SED-103) to 23.2 mg/kg in 07-SED-102. Zinc was detected at concentrations ranging from 29.5 mg/kg in 07-SED-104 to 213 mg/kg in 07-SED-102.

Cobalt was detected in four of the six sediment samples at concentrations ranging from 0.94 mg/kg (J) in 07-SED-107 (duplicate of 07-SED-103) to 3.4 mg/kg (J) in 07-SED-102. Cobalt was not detected in 07-SED-103. Cadmium was detected in three of the six sediment samples at concentrations ranging from 2.3 mg/kg in 07-SED-104 to 3.1 mg/kg in 07-SED-102. Beryllium was detected in two of the six sediment samples at concentrations of 0.28 mg/kg (B) in 07-SED-101 and 0.42 mg/kg (B) in 07-SED-104. Silver was detected only in 07-SED-101 at a concentration of 0.75 mg/kg (J).

Cyanide was not detected in any of the six sediment samples.

Table 5-20 presents a summary of **anions** detected in sediment samples and associated quality control samples.

TOC was detected in all six sediment samples collected form Site 7. Table 5-21 presents a summary of TOC detected in sediment samples and associated quality control samples at Site 7.

5.1.2 Site 9 - Driving Range Landfill

Surface Soils

Six surface soil samples and one duplicate were collected from Site 9. These samples were analyzed for TCL VOCs, SVOCs, pesticides and PCBs; TAL metals and cyanide; TPHs; and TOC.

VOCs were detected in five of the six all surface soil sample locations at Site 9. Table 5-22 presents a summary of VOCs detected in surface soil samples and associated quality control samples at Site 9. Toluene was detected in five of the six surface soil samples at concentrations ranging from 3 μg/kg (J) in 09-SS-105 to 19 μg/kg in 09-SS-101. Acetone was detected in four of the six surface soil samples at concentrations ranging from 14 μg/kg (J) in 09-SS-101 to 26 μg/kg in 09-SS-105. Total VOCs ranged from 15 μg/kg in 09-SS-102 to 33 μg/kg in 09-SS-101. VOC TICs were identified in three of the six samples at total concentrations ranging from 7 μg/kg (J) in 09-SS-106 to 42 μg/kg (J) in 09-SS-101.

SVOCs were detected in two of the surface soil sample locations at Site 9. Table 5-23 presents a summary of SVOCs detected in surface soil samples and associated quality control samples at Site 9.

TABLE 5-1

SUMMARY OF VOLATILE ORGANIC COMPOUNDS
DETECTED IN SURFACE SOIL SAMPLES
AND ASSOCIATED QUALITY CONTROL SAMPLES
SITE 7 - AMPHIBIOUS BASE LANDFILL
NAVAL AMPHIBIOUS BASE - LITTLE CREEK
VIRGINIA BEACH, VIRGINIA
MAY 13, 1993

SAMPLE LOCATION/NUMBER SAMPLE MATRIX UNITS	07-SS-101 Soil ug/kg	07-SS-102 Soil ug/kg	07-SS-109 (Duplicate 07-SS-102) Soil ug/kg	07-SS-103 Soil ug/kg	07-SS-104(1) Soil ug/kg	07-SS-105 Soil ug/kg
VOLATILE ORGANIC COMPOUNDS (VOCs):						
Methylene Chloride	ND	6 J	ND	ND	ND	ND
Acetone	ND	ND	11	ND	ND	12
TOTAL VOCs:	ND	6 J	11	ND	ND	12
TOTAL TICs:	ND	ND	ND	ND	ND	35 J

SAMPLE LOCATION/NUMBER SAMPLE MATRIX UNITS	07-SS-106 Soil ug/kg	07-SS-107 Soil ug/kg	07-SS-108 Soil ug/kg	Trip Blank-3 Water ug/L
VOLATILE ORGANIC COMPOUNDS (VOCs):				
Methylene Chloride	ND	ND	ND	ND
Acetone	ND	ND	ND	ND
TOTAL VOCs:	ND	ND	ND	ND
TOTAL TICs:	ND	ND	ND	ND

NOTES:
ND indicates compound was not detected
ug/kg indicates micrograms per kilogram
ug/L indicates micrograms per liter
J indicates an estimated value.
TICs indicates tentatively identified compounds
(1) indicates matrix spike/matrix spike duplicate (MS/MSD) sample was collected with this sample.

TABLE 5-2

SUMMARY OF SEMI-VOLATILE ORGANIC COMPOUNDS
DETECTED IN SURFACE SOIL SAMPLES
AND ASSOCIATED QUALITY CONTROL SAMPLES
SITE 7 – AMPHIBIOUS BASE LANDFILL
NAVAL AMPHIBIOUS BASE – LITTLE CREEK
VIRGINIA BEACH, VIRGINIA
MAY 13, 1993

SAMPLE LOCATION/NUMBER	07-SS-101	07-SS-102	07-SS-109 (Duplicate 07-SS-102)	07-SS-103	07-SS-104(1)
SAMPLE MATRIX	Soil	Soil	Soil	Soil	Soil
UNITS	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg
SEMI-VOLATILE ORGANIC COMPOUNDS (SVOCs):					
2-Methylnaphthalene	ND	ND	ND	ND	ND
Fluorene	60 J	ND	ND	ND	ND
Phenanthrene	830	ND	ND	ND	ND
Anthracene	220 J	ND	ND	ND	ND
Fluoranthene	1,300	ND	ND	ND	ND
Pyrene	1,600	ND	ND	62 J	52 J
Butylbenzylphthalate	58 J	ND	ND	ND	ND
Benzo (a) anthracene	710	ND	ND	ND	ND
Chrysene	390	ND	ND	ND	ND
bis (2-Ethylhexyl) phthalate	150 J	ND	58 J	120 J	140 J
Benzo (b) fluoranthene	510	ND	ND	ND	ND
Benzo (k) fluoranthene	380	ND	ND	ND	ND
Benzo (a) pyrene	450	ND	ND	ND	ND
Indeno (1,2,3-cd) pyrene	230 J	ND	ND	ND	ND
Benzo (g,h,i) perylene	210 J	ND	ND	ND	ND
TOTAL SVOCs:	7,098 J	ND	58 J	182 J	192 J
TOTAL TICs:	1,444 J	962 J	640 J	1,718 J	1,508 J

SAMPLE LOCATION/NUMBER	07-SS-105	07-SS-106	07-SS-107	07-SS-108
SAMPLE MATRIX	Soil	Soil	Soil	Soil
UNITS	ug/kg	ug/kg	ug/kg	ug/kg
SEMI-VOLATILE ORGANIC COMPOUNDS (SVOCs):				
2-Methylnaphthalene	ND	ND	62 J	ND
Fluorene	ND	ND	ND	ND
Phenanthrene	190 J	39 J	52 J	ND
Anthracene	51 J	ND	ND	ND
Fluoranthene	240 J	76 J	46 J	ND
Pyrene	250 J	88 J	120 J	ND
Butylbenzylphthalate	ND	ND	ND	ND
Benzo (a) anthracene	110 J	ND	ND	ND
Chrysene	82 J	ND	ND	ND
bis (2-Ethylhexyl) phthalate	56 J	190 J	180 J	47 J
Benzo (b) fluoranthene	100 J	ND	ND	ND
Benzo (k) fluoranthene	ND	ND	ND	ND
Benzo (a) pyrene	57 J	ND	ND	ND
Indeno (1,2,3-cd) pyrene	ND	ND	ND	ND
Benzo (g,h,i) perylene	ND	ND	ND	ND
TOTAL SVOCs:	1,136 J	393 J	460 J	47 J
TOTAL TICs:	430 J	431 J	6,568 J	1,990 J

NOTES:

ND indicates compound was not detected.
ug/kg indicates micrograms per kilogram.
J indicates an estimated value.
TICs indicates tentatively identified compounds.
(1) indicates matrix spike/matrix spike duplicate (MS/MSD) sample was collected with this sample.
Equipment rinsate and field blank in common with Site 11.

TABLE 5-3

SUMMARY OF PESTICIDES AND PCBs
DETECTED IN SURFACE SOIL SAMPLES
AND ASSOCIATED QUALITY CONTROL SAMPLES
SITE 7 – AMPHIBIOUS BASE LANDFILL
NAVAL AMPHIBIOUS BASE – LITTLE CREEK
VIRGINIA BEACH, VIRGINIA
MAY 13, 1993

SAMPLE LOCATION/NUMBER	07-SS-101	07-SS-102	07-SS-109 (Duplicate 07-SS-102)	07-SS-103	07-SS-104(1)	07-SS-105
SAMPLE MATRIX	Soil	Soil	Soil	Soil	Soil	Soil
UNITS	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg
PESTICIDES						
4,4'-DDT	ND	ND	ND	3.8 J	ND	ND
alpha-Chlordane	ND	ND	ND	5.1 J	ND	ND
PCBs:						
Aroclor-1260	ND	ND	ND	ND	920	ND
TOTAL PCBs:	ND	ND	ND	ND	920	ND

SAMPLE LOCATION/NUMBER	07-SS-106	07-SS-107	07-SS-108
SAMPLE MATRIX	Soil	Soil	Soil
UNITS	ug/kg	ug/kg	ug/kg
PESTICIDES			
4,4'-DDT	ND	ND	ND
alpha-Chlordane	ND	ND	ND
PCBs:			
Aroclor-1260	130 J	3,500 J	ND
TOTAL PCBs:	130 J	3,500 J	ND

NOTES:
ND indicates compound was not detected.
ug/kg indicates micrograms per kilogram.
J indicates an estimated value.
(1) indicates matrix spike/matrix spike duplicate (MS/MSD) sample was collected with this sample.
Equipment rinsate and field blank in common with Site 11.

TABLE 5-4

SUMMARY OF TAL METALS AND CYANIDE
DETECTED IN SURFACE SOIL SAMPLES
AND ASSOCIATED QUALITY CONTROL SAMPLES
SITE 7 – AMPHIBIOUS BASE LANDFILL
NAVAL AMPHIBIOUS BASE – LITTLE CREEK
VIRGINIA BEACH, VIRGINIA
MAY 13, 1993

SAMPLE LOCATION/NUMBER	07-SS-101		07-SS-102		07-SS-109 (Duplicate 07-SS-102)		07-SS-103		07-SS-104(1)		07-SS-105	
SAMPLE MATRIX	Soil		Soil		Soil		Soil		Soil		Soil	
UNITS	mg/kg		mg/kg		mg/kg		mg/kg		mg/kg		mg/kg	
TAL METALS AND CYANIDE:												
Aluminum	3,410		3,650		3,320		4,970		6,240		3,850	
Arsenic	2.2		0.86	B	1.9		2.0		2.3		1.2	B
Barium	12.1	B	20.0	B	15.0	B	44.4		93.9		11.3	B
Beryllium	ND		ND		ND		0.65	B	0.43	B	ND	
Cadmium	ND		ND		ND		ND		1.4		ND	
Calcium	843	J	541	J	585	J	2,450		2,120		162	B
Chromium	8.3		6.8		6.5		11.3		26.5		4.6	
Cobalt	1.4	B	0.75	B	0.80	B	6.1	B	5.9	B	ND	
Copper	32.8	J	4.5	J	5.0	J	68.0	J	78.2	J	5.2	J
Iron	6,290	J	4,360	J	5,420	J	10,200	J	14,800	J	3,040	J
Lead	24.1	J	47.8	J	38.6	J	58.0	J	638	J	5.5	J
Magnesium	799	J	502	J	567	J	2,320		3,210		251	B
Manganese	50.8	J	33.8	J	55.0	J	184	J	470	J	18.1	J
Mercury	ND		ND		ND		ND		ND		ND	
Nickel	6.8	B	4.3	B	ND		16.1		18.0		ND	
Potassium	563	J	362	J	383	J	2,080		2,970		236	B
Sodium	ND		ND		ND		227	B	ND		ND	
Vanadium	202		9.3		10.1		39.5		36.7		7.8	B
Zinc	64.2		23.3		25.0		405		320		12.6	
Cyanide	ND		ND		ND		ND		ND		ND	

NOTES:

ND indicates compound was not detected.
mg/kg indicates milligrams per kilogram.
B indicates compound detected in lab blank.
J indicates an estimated value.
(1) indicates matrix spike/matrix spike duplicate (MS/MSD) sample was collected with this sample.
Equipment rinsate and field blank in common with Site 11.

TABLE 5-4 (CONTINUED)

SUMMARY OF TAL METALS AND CYANIDE
DETECTED IN SURFACE SOIL SAMPLES
AND ASSOCIATED QUALITY CONTROL SAMPLES
SITE 7 – AMPHIBIOUS BASE LANDFILL
NAVAL AMPHIBIOUS BASE – LITTLE CREEK
VIRGINIA BEACH, VIRGINIA
MAY 13, 1993

SAMPLE LOCATION/NUMBER	07-SS-106		07-SS-107		07-SS-108	
SAMPLE MATRIX	Soil		Soil		Soil	
UNITS	mg/kg		mg/kg		mg/kg	
TAL METALS AND CYANIDE:						
Aluminum	2,510		2,200		2,880	
Arsenic	1.6	B	2.1		3.5	
Barium	8.8	B	25.1	B	11.4	B
Beryllium	0.23	B	0.47	B	ND	
Cadmium	ND		ND		0.65	B
Calcium	483	J	2,100		206	J
Chromium	4.8		9.2		9.5	
Cobalt	0.91	B	1.5	B	1.1	B
Copper	8.8	J	20.9	J	7.7	J
Iron	3,550	J	3,460	J	7,330	J
Lead	7.6	J	98.9	J	18.8	J
Magnesium	419	J	362	J	630	J
Manganese	29.4	J	26.4	J	26.1	J
Mercury	ND		ND		0.07	B
Nickel	7.3		10.4		3.4	B
Potassium	400	J	277	B	762	J
Sodium	ND		ND		262	B
Vanadium	7.4	B	10.5		13.4	
Zinc	41.3		95.2		17.6	
Cyanide	ND		ND		ND	

NOTES:

ND indicates compound was not detected.

mg/kg indicates milligrams per kilogram.

B indicates compound detected in lab blank.

J indicates an estimated value.

(1) indicates matrix spike/matrix spike duplicate (MS/MSD) sample was collected with this sample.

Equipment rinsate and field blank in common with Site 11.

TABLE 5-5

SUMMARY OF TOTAL ORGANIC CARBON
DETECTED IN SURFACE SOIL SAMPLES
AND ASSOCIATED QUALITY CONTROL SAMPLES
SITE 7 – AMPHIBIOUS BASE LANDFILL
NAVAL AMPHIBIOUS BASE – LITTLE CREEK
VIRGINIA BEACH, VIRGINIA
MAY 13, 1993

SAMPLE LOCATION/NUMBER SAMPLE MATRIX UNITS	07-SS-101 Soil mg/kg	07-SS-102 Soil mg/kg	07-SS-109 (Duplicate 07-SS-102) Soil mg/kg	07-SS-103 Soil mg/kg	07-SS-104[1] Soil mg/kg	07-SS-105 Soil mg/kg
TOTAL ORGANIC CARBON:	4,900 J	6,870 J	8,450 J	17,600 J	15,700 J	3,300 J

SAMPLE LOCATION/NUMBER SAMPLE MATRIX UNITS	07-SS-106 Soil mg/kg	07-SS-107 Soil mg/kg	07-SS-108 Soil mg/kg
TOTAL ORGANIC CARBON:	6,120 J	50,000 J	11,300 J

NOTES:

ND indicates compound was not detected.

mg/kg indicates milligrams per kilogram.

J indicates an estimated value.

(1) indicates matrix spike/matrix spike duplicate (MS/MSD) sample was collected with this sample.

Equipment rinsate and field blank in common with Site 11.

TABLE 5-6

SUMMARY OF TOTAL PETROLEUM HYDROCARBONS
DETECTED IN SURFACE SOIL SAMPLES
AND ASSOCIATED QUALITY CONTROL SAMPLES
SITE 7 – AMPHIBIOUS BASE LANDFILL
NAVAL AMPHIBIOUS BASE – LITTLE CREEK
VIRGINIA BEACH, VIRGINIA
MAY 13, 1993

SAMPLE LOCATION/NUMBER	07-SS-101	07-SS-102	07-SS-109 (Duplicate 07-SS-102)	07-SS-103	07-SS-104(1)	07-SS-105
SAMPLE MATRIX	Soil	Soil	Soil	Soil	Soil	Soil
UNITS	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
TOTAL PETROLEUM HYDROCARBONS:	ND	ND	ND	1,300	ND	ND

SAMPLE LOCATION/NUMBER	07-SS-106	07-SS-107	07-SS-108
SAMPLE MATRIX	Soil	Soil	Soil
UNITS	mg/kg	mg/kg	mg/kg
TOTAL PETROLEUM HYDROCARBONS:	ND	ND	ND

NOTES:

ND indicates compound was not detected.

mg/kg indicates milligrams per kilogram.

(1) indicates matrix spike/matrix spike duplicate (MS/MSD) sample was collected with this sample.

Equipment rinsate and field blank in common with Site 11.

TABLE 5-7

SUMMARY OF VOLATILE ORGANIC COMPOUNDS
DETECTED IN SUBSURFACE SOIL SAMPLES
AND ASSOCIATED QUALITY CONTROL SAMPLES
SITE 7 – AMPHIBIOUS BASE LANDFILL
NAVAL AMPHIBIOUS BASE – LITTLE CREEK
VIRGINIA BEACH, VIRGINIA
JULY 14-16, 1993

SAMPLE LOCATION/NUMBER	07-SB-101D	07-SB-103D	07-SB-110 (Duplicate 07-SB-103D)	07-SB-105D(1)	07SB86D	07SB89D
SAMPLE MATRIX	Soil	Soil	Soil	Soil	Soil	Soil
UNITS	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg
VOLATILE ORGANIC COMPOUNDS (VOCs):						
Methylene Chloride	3 J	ND	ND	ND	ND	ND
Acetone	56 J	79	80	ND	ND	ND
Chloroform	ND	ND	ND	ND	ND	ND
2-Butanone	9 J	ND	ND	ND	ND	ND
Tetrachloroethene	ND	ND	ND	7 J	ND	ND
TOTAL VOCs:	68 J	79	80	7 J	ND	ND
TOTAL TICs:	ND	ND	ND	ND	ND	ND

SAMPLE LOCATION/NUMBER	07-ERB-05	07-ERB-06	07-ERB-07	07-FB-05	07-TB-06 7/14/93	07-TB-07 7/16/93
SAMPLE MATRIX	Water	Water	Water	Water	Water	Water
UNITS	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
VOLATILE ORGANIC COMPOUNDS (VOCs):						
Methylene Chloride	6 J	ND	ND	6 J	5 J	ND
Acetone	14 B	21 B	ND	15 B	ND	ND
Chloroform	ND	4 J	4 J	ND	ND	ND
2-Butanone	ND	ND	ND	ND	ND	ND
Tetrachloroethene	ND	ND	ND	ND	ND	ND
TOTAL VOCs:	20 JB	25 JB	4 J	21 JB	5 J	ND
TOTAL TICs:	ND	30 J	ND	ND	ND	22 J

NOTES:
ND indicates compound was not detected.
ug/kg indicates micrograms per kilogram.
ug/L indicates micrograms per liter.
B indicates compound detected in lab blank.
J indicates an estimated value.
D indicates sample taken in deep boring. All samples taken above water table.
TICs indicates tentatively identified compounds.
(1) indicates a matrix spike/matrix spike duplicate (MS/MSD) sample was collected with this sample.
ERB indicates equipment rinsate blank
FB indicates field blank
TB indicates trip blank

TABLE 5-8

SUMMARY OF SEMI-VOLATILE ORGANIC COMPOUNDS
DETECTED IN SUBSURFACE SOIL SAMPLES
AND ASSOCIATED QUALITY CONTROL SAMPLES
SITE 7 - AMPHIBIOUS BASE LANDFILL
NAVAL AMPHIBIOUS BASE - LITTLE CREEK
VIRGINIA BEACH, VIRGINIA
JULY 14-16, 1993

SAMPLE LOCATION/NUMBER	07-SB-101D	07-SB-103D	07-SB-110 (Duplicate 07-SB-103D)	07-SB-105D(1)	07SB6D
SAMPLE MATRIX	Soil	Soil	Soil	Soil	Soil
UNITS	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg
SEMI-VOLATILE ORGANIC COMPOUNDS (SVOCs):					
1,4-Dichlorobenzene	ND	38 J	ND	ND	ND
bis (2-Ethylhexyl) phthalate	ND	ND	ND	ND	100 J
TOTAL SVOCs:	ND	38 J	ND	ND	100 J
TOTAL TICs:	1,830 J	228 J	154 J	260 J	73 J

SAMPLE LOCATION/NUMBER	07SB9D	07-ERB-05	07-ERB-06	07-ERB-07	07-FB-05
SAMPLE MATRIX	Soil	Water	Water	Water	Water
UNITS	ug/kg	ug/L	ug/L	ug/L	ug/L
SEMI-VOLATILE ORGANIC COMPOUNDS (SVOCs):					
1,4-Dichlorobenzene	ND	ND	ND	ND	ND
bis (2-Ethylhexyl) phthalate	ND	ND	1 J	ND	ND
TOTAL SVOCs:	ND	ND	ND	ND	ND
TOTAL TICs:	198 J	10 J	9 J	18 J	12 J

NOTES:

ND indicates compound was not detected.
ug/kg indicates micrograms per kilogram.
ug/L indicates micrograms per liter.
J indicates an estimated value.
TICs indicates tentatively identified compounds.
D indicates sample taken in deep boring. All samples taken above water table.
(1) indicates a matrix spike/matrix spike duplicate (MS/MSD) sample was collected with this sample.
ERB indicates equipment rinsate blank
FB indicates field blank

TABLE 5-9

SUMMARY OF PESTICIDES AND PCBs
DETECTED IN SUBSURFACE SOIL SAMPLES
AND ASSOCIATED QUALITY CONTROL SAMPLES
SITE 7 – AMPHIBIOUS BASE LANDFILL
NAVAL AMPHIBIOUS BASE – LITTLE CREEK
VIRGINIA BEACH, VIRGINIA
JULY 14-16, 1993

SAMPLE LOCATION/NUMBER SAMPLE MATRIX UNITS	07-SB-101D Soil ug/kg	07-SB-103D Soil ug/kg	07-SB-110 (Duplicate 07-SB-103D) Soil ug/kg	07-SB-105(1) Soil ug/kg	07SB6D Soil ug/kg
PESTICIDES:	ND	ND	ND	ND	ND
PCBs:	ND	ND	ND	ND	ND
TOTAL PCBs:	ND	ND	ND	ND	ND

SAMPLE LOCATION/NUMBER SAMPLE MATRIX UNITS	07SB9D Soil ug/kg	07-ERB-05 Water ug/L	07-ERB-06 Water ug/L	07-ERB-07 Water ug/L	07-FB-05 Water ug/L
PESTICIDES:	ND	ND	ND	ND	ND
PCBs:	ND	ND	ND	NA	ND
TOTAL PCBs:	ND	ND	ND	ND	ND

NOTES:

ND indicates compound was not detected
NA indicates Not Analyzed
ug/kg indicates micrograms per kilogram
ug/L indicates micrograms per liter
(1) indicates a matrix spike/matrix spike duplicate (MS/MSD) sample was collected with this sample
ERB indicates equipment rinsate blank.
FB indicates field blank

TABLE 5-10

SUMMARY OF TAL METALS AND CYANIDE
DETECTED IN SUBSURFACE SOIL SAMPLES
AND ASSOCIATED QUALITY CONTROL SAMPLES
SITE 7 – AMPHIBIOUS BASE LANDFILL
NAVAL AMPHIBIOUS BASE – LITTLE CREEK
VIRGINIA BEACH, VIRGINIA
JULY 14-16, 1993

SAMPLE LOCATION/NUMBER	07-SB-101D		07-SB-103D		07-SB-110 (Duplicate 07-SB-103D)		07-SB-105D		07SB6D	
SAMPLE MATRIX	Soil		Soil		Soil		Soil		Soil	
UNITS	mg/kg		mg/kg		mg/kg		mg/kg		mg/kg	
TAL METALS AND CYANIDE:										
Aluminum	6,130		18,900		18,700		13,500		2,830	
Antimony	R		R		R		R		R	
Arsenic	3.4	J	1.3	J	1.3	J	5.1	J	2.4	J
Barium	15.0	B	46.1		43.3		28.6	B	7.6	B
Beryllium	0.27	B	0.31	B	0.28	B	0.33	B	0.44	B
Cadmium	1.9	J	1.0	J	2.2		1.5	J	1.1	J
Calcium	418	B	257	B	279	B	402	B	425	B
Chromium	9.7		15.8		18.7		18.8		5.5	
Cobalt	2.3	B	3.1	B	3.4	B	3.0	B	2.6	B
Copper	4.0	B	4.8	B	5.6		6.9		2.6	B
Iron	8,530		11,200		12,000		13,000		4,860	
Lead	6.4	J	8.4	J	7.5	J	5.6	J	3.5	J
Magnesium	1,440		834	J	805	J	952	J	752	J
Manganese	48.9		42.1		43.9		24.8		44.5	
Mercury	ND		0.07	B	ND		ND		ND	
Nickel	5.3	B	8.1	B	6.9	B	5.2	B	5.4	B
Potassium	922		556	B	592	B	639	B	496	B
Sodium	287	B	140	B	139	B	210	B	ND	
Vanadium	10.8		21.7		24.0		21.8		5.3	B
Zinc	17.6		16.6		16.9		15.5		27.8	
Cyanide	ND		ND		ND		ND		ND	

NOTES:
ND indicates compound was not detected
mg/kg indicates milligrams per kilogram
ug/L indicates micrograms per liter
B indicates compound detected in lab blank
J indicates an estimated value.
R indicates data rejected and unusable.
D indicates sample taken from deep boring. All samples taken above water table.
ERB indicates equipment rinsate blank
FB indicates field blank

TABLE 5-10 (CONTINUED)

SUMMARY OF TAL METALS AND CYANIDE
DETECTED IN SUBSURFACE SOIL SAMPLES
AND ASSOCIATED QUALITY CONTROL SAMPLES
SITE 7 – AMPHIBIOUS BASE LANDFILL
NAVAL AMPHIBIOUS BASE – LITTLE CREEK
VIRGINIA BEACH, VIRGINIA
JULY 14-16, 1993

SAMPLE LOCATION/NUMBER	07SB9D		07-ERB-05		07-ERB-06		07-ERB-07	07-FB-05
SAMPLE MATRIX UNITS	Soil mg/kg		Water ug/L		Water ug/L		Water ug/L	Water ug/L
TAL METALS AND CYANIDE:								
Aluminum	4,320		ND		ND		ND	ND
Antimony	R		R		R		R	R
Arsenic	1.9	J	ND		R		R	ND
Barium	5.4	B	3.0	B	R		R	ND
Beryllium	0.42	B	ND		R		R	ND
Cadmium	1.1	J	ND		R		R	ND
Calcium	218	B	ND		R		R	ND
Chromium	4.7		ND		R		R	ND
Cobalt	5.1	B	ND		R		R	ND
Copper	2.9	B	ND		R		R	ND
Iron	3,730		ND		R		R	ND
Lead	3.9	J	3.2		R		R	ND
Magnesium	636	B	ND		R		R	ND
Manganese	17.4		2.0	B	1.0	B	ND	ND
Mercury	ND		ND		ND		ND	ND
Nickel	8.9		ND		ND		ND	ND
Potassium	477	B	ND		ND		ND	ND
Sodium	1,450		ND		ND		ND	ND
Vanadium	6.1	B	ND		ND		ND	ND
Zinc	58.0		ND		ND		ND	ND
Cyanide	ND		ND		ND		ND	ND

NOTES:
ND indicates compound was not detected
mg/kg indicates milligrams per kilogram
ug/L indicates micrograms per liter
B indicates compound detected in lab blank
J indicates an estimated value.
R indicates data rejected and unusable.
D indicates sample taken from deep boring. All samples taken above water table.
ERB indicates equipment rinsate blank
FB indicates field blank

TABLE 5-11

SUMMARY OF TOTAL PETROLEUM HYDROCARBONS
DETECTED IN SUBSURFACE SOIL SAMPLES
AND ASSOCIATED QUALITY CONTROL SAMPLES
SITE 7 – AMPHIBIOUS BASE LANDFILL
NAVAL AMPHIBIOUS BASE – LITTLE CREEK
VIRGINIA BEACH, VIRGINIA
JULY 14-16, 1993

SAMPLE LOCATION/NUMBER SAMPLE MATRIX UNITS	07-SB-101D Soil mg/kg	07-SB-103D Soil mg/kg	07-SB-110 (Duplicate 07-SB-103D) Soil mg/kg	07-SB-105D(1) Soil mg/kg	07SB6D Soil mg/kg
TOTAL PETROLEUM HYDROCARBONS:	ND	ND	ND	ND	59 J

SAMPLE LOCATION/NUMBER SAMPLE MATRIX UNITS	07SB9D Soil mg/kg	07-ERB-05 Water ug/L	07-ERB-06 Water ug/L	07-ERB-07 Water ug/L	07-FB-05 Water ug/L
TOTAL PETROLEUM HYDROCARBONS:	54 J	NA	NA	NA	NA

NOTES:
ND indicates compound was not detected
NA indicates sample was not analyzed
mg/kg indicates milligrams per kilogram
J indicates an estimated value.
D indicates sample taken from deep boring. All samples taken above water table.
(1) indicates a matrix spike/matrix spike duplicate (MS/MSD) sample was collected with this sample.
ERB indicates equipment rinsate blank
FB indicates field blank

TABLE 5-12

SUMMARY OF VOLATILE ORGANIC COMPOUNDS
DETECTED IN GROUNDWATER SAMPLES
AND ASSOCIATED QUALITY CONTROL SAMPLES
SITE 7 – AMPHIBIOUS BASE LANDFILL
NAVAL AMPHIBIOUS BASE – LITTLE CREEK
VIRGINIA BEACH, VIRGINIA
JULY 1 & 2, 1993

SAMPLE LOCATION/NUMBER SAMPLE MATRIX UNITS	07-GW-101 Water ug/L	07-GW-102 Water ug/L	07-GW-103 Water ug/L	07-GW-104 Water ug/L	07-GW-105 * Water ug/L
VOLATILE ORGANIC COMPOUNDS (VOCs):					
Acetone	NA	ND	NA	8 J	ND
TOTAL VOCs:	NA	ND	NA	8 J	ND
TOTAL TICs:	NA	ND	NA	ND	ND

SAMPLE LOCATION/NUMBER SAMPLE MATRIX UNITS	07-GW-106 Water ug/L	07-GW-107 Water ug/L	07-GW-108 Water ug/L	07-GW-109 Water ug/L	07-TB-P2-104 Water ug/L
VOLATILE ORGANIC COMPOUNDS (VOCs):					
Acetone	ND	ND	ND	ND	18
TOTAL VOCs:	ND	ND	ND	ND	18
TOTAL TICs:	ND	ND	ND	ND	ND

NOTES:
ND indicates compound was not detected
ug/L indicates micrograms per liter
TB indicates trip blank
NA indicates sample was not analyzed by the laboratory.
J indicates an estimated value.
TICs indicates tentatively identified compounds.
* indicates sample collected on July 29, 1993.
Equipment rinsate and field blank shared with Background Well samples.
Trip Blank, matrix spike/matrix spike duplicate (MS/MSD), and blind duplicate sample for sample 07-GW-105 shared with Site 13.
MS/MSD and blind duplicate sample shared with Site 7 Surface Water samples.

TABLE 5-13

SUMMARY OF TAL TOTAL AND DISSOLVED METALS AND CYANIDE
DETECTED IN GROUNDWATER SAMPLES
AND ASSOCIATED QUALITY CONTROL SAMPLES
SITE 7 – AMPHIBIOUS BASE LANDFILL
NAVAL AMPHIBIOUS BASE – LITTLE CREEK
VIRGINIA BEACH, VIRGINIA
JULY 1 & 2, 1993

SAMPLE LOCATION/NUMBER SAMPLE MATRIX UNITS	07-GW-101 Water ug/L		07-GW-102 Water ug/L		07-GW-103 Water ug/L		07-GW-104 Water ug/L		07-GW-105 * Water ug/L		07-GW-106 Water ug/L	
TAL TOTAL METALS AND CYANIDE:												
Aluminum	18,000	J	23,300	J	330,000	J	117	J	4,590	J	7,740	J
Arsenic	8.0	J	50.6		20.5		ND		7.8	J	30.2	
Barium	52.7	B	60.1	B	754		41.9	B	36.2	B	33.7	B
Beryllium	ND		2.7	B	11.0		ND		1.9	B	ND	
Cadmium	ND		8.3		37.6		ND		ND		ND	
Calcium	7,960		42,400		50,300		109,000		125,000		120,000	
Chromium	13.8	J	29.7	J	360		ND		5.9	J	ND	
Cobalt	4.8	B	20.2	B	121		ND		ND		28.3	B
Copper	7.3	B	32.7		226		ND		38.3		4.7	B
Iron	17,600	J	98,300	J	224,000	J	4,800	J	63,000	J	22,300	J
Lead	9.9	J	15.6	J	177	J	ND		20.7	J	4.3	J
Magnesium	16,500		8,340		39,400		16,200		108,000		108,000	
Manganese	132		225		1,930		697		1,300		1,170	
Mercury	ND		0.18	B	0.27		ND		ND		ND	
Nickel	ND		ND		176		ND		ND		35.7	B
Potassium	13,300		7,810	J	29,500	J	15,100	J	10,700		20,000	J
Sodium	142,000		50,000		56,900		86,600		206,000		428,000	
Thallium	ND		R		R		R		R		R	
Vanadium	30.5	B	43.2	B	634		ND		ND		ND	
Zinc	42.9		77.4		1,620		ND		ND		37.7	
Cyanide	NA		NA		NA		NA		ND		NA	
TAL DISSOLVED METALS:												
Aluminum	ND		ND		272		ND		19.2	J	ND	
Arsenic	3.2	B	ND		3.4	B	ND		2.5	B	16.1	
Barium	8.1	B	16.8	B	101	B	32.0	B	17.2	B	24.0	B
Beryllium	ND		ND		ND		ND		1.1	B	ND	
Calcium	6,250		44,300		36,200		106,000		124,000		110,000	
Cobalt	3.5	B	6.6	B	24.6	B	ND		ND		ND	
Copper	2.1	B	3.1	B	3.1	B	ND		ND		ND	
Iron	1,070	J	605		8,360		ND		38,300	J	13,400	
Magnesium	11,300		7,110		15,000		18,800		111,000		98,900	
Manganese	46.2		129		955		621		1,270		1,070	
Mercury	0.15	B	ND		ND		ND		ND		0.15	B
Nickel	ND		ND		ND		ND		ND		ND	
Potassium	9,730		6,770		11,800		16,400		10,200		18,000	
Selenium	ND		ND		ND		ND		ND		ND	
Sodium	123,000		60,000		54,700		115,000		237,000		403,000	
Vanadium	ND		ND		ND		ND		R		ND	
Zinc	ND		ND		307		ND		ND		ND	

NOTES:

ND indicates compound was not detected
NA indicates compound was not analyzed
ug/L indicates micrograms per liter
B indicates compound detected in lab blank
J indicates an estimated value
R indicates data rejected and unusable
* indicates sample collected on July 29, 1993
ERB indicates equipment rinsate blank
FB indicates field blank
Equipment rinsate and field blank shared with the Background Well samples
Matrix spike/matrix spike duplicate (MS/MSD) and blind duplicate sample for sample 07GW05 shared with Site 13
MS/MSD and blind duplicate sample shared with Site 7 Surface Water samples

TABLE 5-13 (CONTINUED)

SUMMARY OF TAL TOTAL AND DISSOLVED METALS AND CYANIDE
DETECTED IN GROUNDWATER SAMPLES
AND ASSOCIATED QUALITY CONTROL SAMPLES
SITE 7 – AMPHIBIOUS BASE LANDFILL
NAVAL AMPHIBIOUS BASE – LITTLE CREEK
VIRGINIA BEACH, VIRGINIA
JULY 1 & 2, 1993

SAMPLE LOCATION/NUMBER SAMPLE MATRIX UNITS	07-GW-107 Water ug/L	07-GW-108 Water ug/L	07-GW-109 Water ug/L	07GWERB Water ug/L	07GWFB Water ug/L
TAL TOTAL METALS AND CYANIDE:					
Aluminum	225 J	929 J	1,060 J	ND	ND
Arsenic	ND	ND	ND	ND	ND
Barium	47.6 B	42.2 B	75.9 B	ND	ND
Beryllium	ND	ND	ND	ND	ND
Cadmium	ND	ND	4.4 B	ND	ND
Calcium	257,000	272,000	263,000	ND	ND
Chromium	ND	ND	ND	ND	ND
Cobalt	ND	ND	3.8 B	ND	ND
Copper	ND	5.9 B	17.7 B	ND	ND
Iron	ND	1,720 J	24400 J	18.9 J	27.6 J
Lead	ND	103 J	ND	ND	ND
Magnesiuim	380,000	393,000	596,000	ND	ND
Manganese	268	114	754	ND	1.7 B
Mercury	ND	ND	ND	ND	ND
Nickel	ND	ND	ND	ND	ND
Potassium	153,000 J	143,000 J	220,000 J	ND	ND
Sodium	3,570,000	3,520,000	5,430,000	ND	ND
Thallium	R	R	R	R	R
Vanadium	ND	ND	ND	ND	ND
Zinc	ND	ND	ND	ND	ND
Cyanide	NA	NA	NA	NA	NA
TAL DISSOLVED METALS:					
Aluminum	ND	ND	ND	ND	ND
Arsenic	ND	ND	ND	ND	ND
Barium	46.2 B	45.0 B	47.6 B	ND	ND
Beryllium	ND	ND	ND	ND	ND
Calcium	255,000	288,000	236,000	ND	ND
Cobalt	ND	ND	ND	ND	ND
Copper	2.8	ND	8.3 B	ND	ND
Iron	ND	ND	9,350	ND	ND
Magnesiuim	375,000	397,000	520,000	ND	ND
Manganese	258	117	620	ND	ND
Mercury	ND	ND	ND	ND	ND
Nickel	ND	ND	ND	ND	ND
Potassium	152,000	149,000	192,000	ND	ND
Selenium	ND	2.4 J	ND	ND	ND
Sodium	3,550,000	3,580,000	4,680,000	ND	ND
Vanadium	ND	ND	ND	ND	ND
Zinc	ND	ND	34.9	ND	ND

NOTES:

ND indicates compound was not detected
NA indicates compound was not analyzed
ug/L indicates micrograms per liter
B indicates compound detected in lab blank
J indicates an estimated value
R indicates data rejected and unusable
* indicates sample collected on July 29, 1993
ERB indicates equipment rinsate blank
FB indicates field blank
Equipment rinsate and field blank shared with the Background Well samples
Matrix spike/matrix spike duplicate (MS/MSD) and blind duplicate sample for sample 07GW05 shared with Site 13
MS/MSD and blind duplicate sample shared with Site 7 Surface Water samples

TABLE 5-14

SUMMARY OF ANIONS
DETECTED IN GROUNDWATER SAMPLES
AND ASSOCIATED QUALITY CONTROL SAMPLES
SITE 7 – AMPHIBIOUS BASE LANDFILL
NAVAL AMPHIBIOUS BASE – LITTLE CREEK
VIRGINIA BEACH, VIRGINIA
JULY 1 & 2, 1993

SAMPLE LOCATION/NUMBER SAMPLE MATRIX UNITS	07-GW-101 Water mg/L	07-GW-102 Water mg/L	07-GW-103 Water mg/L	07-GW-104 Water mg/L	07GW105 * Water mg/L
ANIONS:					
Bicarbonate Alkalinity	90.0	44.5	16.5	308	513
Alkalinity	90.0	44.5	16.5	308	513
Chloride	287	49.2	122	180	145
Sulfate	ND	55.7	205	18.5	933

SAMPLE LOCATION/NUMBER SAMPLE MATRIX UNITS	07-GW-106 Water mg/L	07-GW-107 Water mg/L	07-GW-108 Water mg/L	07-GW-109 Water mg/L
ANIONS:				
Bicarbonate Alkalinity	810	980	938	943
Alkalinity	810	980	938	943
Chloride	637	9,150	20,500	46,500
Sulfate	660	913	953	1,320

NOTES:
ND indicates compound was not detected
mg/L indicates milligrams per liter
Bicarbonate alkalinity value calculated from total and phenolphthalein alkalinity
* indicates sample was collected on July 29, 1993.
Equipment Rinsate and Field Blank are shared with the Background Well samples
Matrix spike/matrix spike duplicate (MS/MSD) and blind duplicate samples for sample 07GW05 are in common with Site 13
MS/MSD and blind duplicate samples for the remaining samples are in common with Site 7 Surface Water samples

TABLE 5-15

SUMMARY OF VOLATILE ORGANIC COMPOUNDS
DETECTED IN SURFACE WATER SAMPLES
AND ASSOCIATED QUALITY CONTROL SAMPLES
SITE 7 - AMPHIBIOUS BASE LANDFILL
NAVAL AMPHIBIOUS BASE - LITTLE CREEK
VIRGINIA BEACH, VIRGINIA
JULY 1, 1993

SAMPLE LOCATION/NUMBER	07-SW-101	07-SW-102	07-SW-103	07-SW-107(1) (Duplicate 07-SW-103)	07-SW-104	07-SW-105	07-SW-106	07-TB-P2-104
SAMPLE MATRIX	Water	Water	Water	Water	Water	Water	Water	Water
UNITS	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
VOLATILE ORGANIC COMPOUNDS (VOCs):								
Acetone	ND	17	15	17	ND	31	ND	18
TOTAL VOCs:	ND	17	15	17	ND	31	ND	18
TOTAL TICs:	ND	ND	ND	ND	ND	ND	ND	ND

NOTES:

ND indicates compound was not detected
ug/L indicates micrograms per liter
TICs indicates tentatively identified compounds
(1) indicates matrix spike/matrix spike duplicate (MS/MSD) sample was collected with this sample.
TB indicates trip blank

TABLE 5-16

SUMMARY OF TAL TOTAL METALS
DETECTED IN SURFACE WATER SAMPLES
AND ASSOCIATED QUALITY CONTROL SAMPLE
SITE 7 – AMPHIBIOUS BASE LANDFILL
NAVAL AMPHIBIOUS BASE – LITTLE CREEK
VIRGINIA BEACH, VIRGINIA
JULY 1, 1993

SAMPLE LOCATION/NUMBER	07-SW-101		07-SW-102		07-SW-103		07-SW-107(1) (Duplicate 07-SW-03)		07-SW-104		07-SW-105		07-SW-106	
SAMPLE MATRIX	Water		Water		Water		Water		Water		Water		Water	
UNITS	ug/L		ug/L		ug/L		ug/L		ug/L		ug/L		ug/L	
TAL TOTAL METALS:														
Aluminum	417	J	1,690	J	388	J	1,080	J	735	J	1,210	J	ND	
Arsenic	2.4	B	10.3		ND		ND		9	B	7	B	9.9	B
Barium	17.5	B	36.8	B	28.3	B	34.5	B	24.1	B	34.9	B	20.2	B
Calcium	125,000		86,500		159,000		182,000		51,100		80,500		22,300	
Cobalt	ND		4.7	B	3.4	B	3.4	B	5.6	B	5.1	B	ND	
Copper	ND		14.1	B	5.3	B	6.3	B	8.5	B	6.8	B	ND	
Iron	1,620	J	6,890	J	1,010	J	1,600	J	5,210	J	5,510	J	3,020	J
Lead	ND		5.1	J	ND		ND		50	J	3.2	J	ND	
Magnesium	298,000		190,000		403,000		457,000		37,400		146,000		28,000	
Manganese	156		306		83.9		91.6		322		193		334	
Potassium	109,000	J	72,800	J	155,000	J	181,000	J	15,900	J	54,100	J	8,800	J
Sodium	2,530,000		1,630,000		3,710,000		4,250,000		235,000		1,210,000		184,000	
Thallium	R		R		R		R		R		R		R	
Zinc	ND		55.3		ND		ND		30.8		70.5		ND	

NOTES:

ND indicates compound was not detected

ug/L indicates micrograms per liter

B indicates compound detected in lab blank

J indicates an estimated value.

R indicates data rejected and unusable.

(1) indicates matrix spike/matrix spike duplicate (MS/MSD) sample was collected with this sample.

TABLE 5-17

SUMMARY OF ANIONS
DETECTED IN SURFACE WATER SAMPLES
AND ASSOCIATED QUALITY CONTROL SAMPLES
SITE 7 – AMPHIBIOUS BASE LANDFILL
NAVAL AMPHIBIOUS BASE – LITTLE CREEK
VIRGINIA BEACH, VIRGINIA
JULY 1, 1993

SAMPLE LOCATION/NUMBER	07-SW-101	07-SW-102	07-SW-103	07-SW-107(1) (Duplicate 07-SW-103)	07-SW-104	07-SW-105	07-SW-106
SAMPLE MATRIX	Water	Water	Water	Water	Water	Water	Water
UNITS	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
ANIONS:							
Alkalinity	113	117	85.5	101	134	131	78.5
Bicarbonate Alkalinity	113	117	85.5	101	134	131	78.5
Chloride	21,000	7,620	19,700	10,000	1,050	6,250	700
Sulfate	1,010	585	1,380	1,400	177	695	118

NOTES:
ND indicates compound was not detected
mg/L indicates milligrams per liter
(1) indicates matrix spike/matrix spike duplicate (MS/MSD) sample was collected with this sample.

TABLE 5-18

SUMMARY OF VOLATILE ORGANIC COMPOUNDS
DETECTED IN SEDIMENT SAMPLES
AND ASSOCIATED QUALITY CONTROL SAMPLES
SITE 7 -- AMPHIBIOUS BASE LANDFILL
NAVAL AMPHIBIOUS BASE -- LITTLE CREEK
VIRGINIA BEACH, VIRGINIA
JULY 1, 1993

SAMPLE LOCATION/NUMBER	07-SED-101[1]	07-SED-102	07-SED-103	07-SED-107 (Duplicate 06-SED-103)	07-SED-104
SAMPLE MATRIX	Soil	Soil	Soil	Soil	Soil
UNITS	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg
VOLATILE ORGANIC COMPOUNDS (VOCs):					
Methylene Chloride	ND	7 J	ND	ND	ND
Acetone	ND	370 J	ND	ND	ND
Carbon Disulfide	ND	4 J	ND	ND	ND
2-Butanone	ND	65	ND	19	12 J
Toluene	ND	5 J	ND	ND	1 J
TOTAL VOCs:	ND	451 J	ND	19	13 J
TOTAL TICs:	ND	33 J	ND	ND	ND

SAMPLE LOCATION/NUMBER	07-SED-105	07-SED-106	07-SED-RB101	07-TB-P2-104
SAMPLE MATRIX	Soil	Soil	Water	Water
UNITS	ug/kg	ug/kg	ug/L	ug/L
VOLATILE ORGANIC COMPOUNDS (VOCs):				
Methylene Chloride	ND	ND	ND	ND
Acetone	ND	ND	ND	18
Carbon Disulfide	ND	ND	ND	ND
2-Butanone	ND	ND	ND	ND
Toluene	ND	ND	ND	ND
TOTAL VOCs:	ND	ND	ND	18
TOTAL TICs:	ND	ND	ND	ND

NOTES:

ND indicates compound was not detected
ug/kg indicates micrograms per kilogram
ug/L indicates micrograms per liter
J indicates an estimated value.
TICs indicates tentatively identified compounds.
(1) indicates a matrix spike/matrix spike duplicate (MS/MSD) sample was collected with this sample.
RB indicates equipment rinsate blank
TB indicates trip blank.

TABLE 5-19

SUMMARY OF TAL METALS AND CYANIDE
DETECTED IN SEDIMENT SAMPLES
AND ASSOCIATED QUALITY CONTROL SAMPLES
SITE 7 – AMPHIBIOUS BASE LANDFILL
NAVAL AMPHIBIOUS BASE – LITTLE CREEK
VIRGINIA BEACH, VIRGINIA
JULY 1, 1993

SAMPLE LOCATION/NUMBER	07-SED-101(1)	07-SED-102	07-SED-103	07-SED-107 (Duplicate 07-SED-103)	07-SED-104	07-SED-105	07-SED-106	07-SED-RB101
SAMPLE MATRIX	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Water
UNITS	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	ug/L
TAL METALS AND CYANIDE:								
Aluminum	3,290	6,520	2,670	2,080	938	1,380	221	ND
Arsenic	3.9	8.6	2.7	1.8 B	2.9	1.8 B	1.2 B	ND
Barium	10.0 B	23.8 B	8.4 B	7.0 B	4.3 B	6.3 B	1.6 B	ND
Beryllium	0.28 B	ND	ND	ND	0.42 B	ND	ND	ND
Cadmium	2.4	3.1	ND	ND	2.3	ND	ND	ND
Calcium	479 B	1,120 B	1,500	385 B	214 B	394 B	ND	ND
Chromium	8.4 J	10.1 J	5.7 J	7.4 J	5.6 J	3.9 J	1.5 J	5.4 B
Cobalt	2.5 J	3.4 J	ND	0.94 J	ND	0.95 J	ND	ND
Copper	12.3	42.9	11.7	10.1	7.3	17.5	0.89 B	4.9 B
Iron	7,860	14,200	4,850	3,760	10,100	4,030	1,060	ND
Lead	9.1 J	31.1	9.3 J	7.8 J	4.7 J	12.6 J	1.7 J	ND
Magnesium	1,240 B	2,680	866 B	867 B	261 B	504 B	78.7 B	ND
Manganese	30.6	67.2	21.4	17.1	8.9	16.8	2.7 B	2.0 B
Nickel	4.7 B	7.6 B	3.6 B	4.6 B	3.3 B	4.0 B	ND	ND
Potassium	674 B	1,350 B	487 B	465 B	140 B	274 B	45.3 B	ND
Silver	0.75 J	ND	ND	ND	ND	ND	ND	ND
Sodium	2,340	5,160	1,340	2,700	399 B	628 B	299 B	ND
Vanadium	9.0 B	23.2	5.8 B	5.4 B	10.2	9.1 B	ND	ND
Zinc	36.8	213	41.2	35.5	29.5	37.2	ND	ND
Cyanide	ND	ND	ND	ND	ND	ND	ND	ND

NOTES:

ND indicates compound was not detected
mg/kg indicates milligrams per kilogram
ug/L indicates micrograms per liter
B indicates compound detected in lab blank
J indicates an estimated value.
(1) indicates matrix spike/matrix spike duplicate (MS/MSD) sample was collected with this sample.
RB indicates equipment rinsate blank

TABLE 5-20

SUMMARY OF ANIONS
DETECTED IN SEDIMENT SAMPLES
AND ASSOCIATED QUALITY CONTROL SAMPLES
SITE 7 - AMPHIBIOUS BASE LANDFILL
NAVAL AMPHIBIOUS BASE - LITTLE CREEK
VIRGINIA BEACH, VIRGINIA
JULY 1, 1993

SAMPLE LOCATION/NUMBER	07-SED-101(1)	07-SED-102	07-SED-103	07-SED-107 (Duplicate 07-SED-103)	07-SED-104
SAMPLE MATRIX	Soil	Soil	Soil	Soil	Soil
UNITS	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
ANIONS:					
Alkalinity	ND	ND	102	631	ND
Bicarbonate Alkalinity	ND	ND	102	631	ND
Chloride	3,050	7,530	1,870	3,810	634
Sulfate	722	1,160	893	810	140

SAMPLE LOCATION/NUMBER	07-SED-105	07-SED-106	07-SED-RB101
SAMPLE MATRIX	Soil	Soil	Water
UNITS	mg/kg	mg/kg	mg/L
ANIONS:			
Alkalinity	ND	ND	ND
Bicarbonate Alkalinity	ND	ND	ND
Chloride	1,060	552	2.8
Sulfate	177	ND	ND

NOTES:
ND indicates compound was not detected
mg/kg indicates milligrams per kilogram
mg/L indicates milligrams per liter
(1) indicates matrix spike/matrix spike duplicate (MS/MSD) sample was collected with this sample.
RB indicates equipment rinsate blank

TABLE 5-21

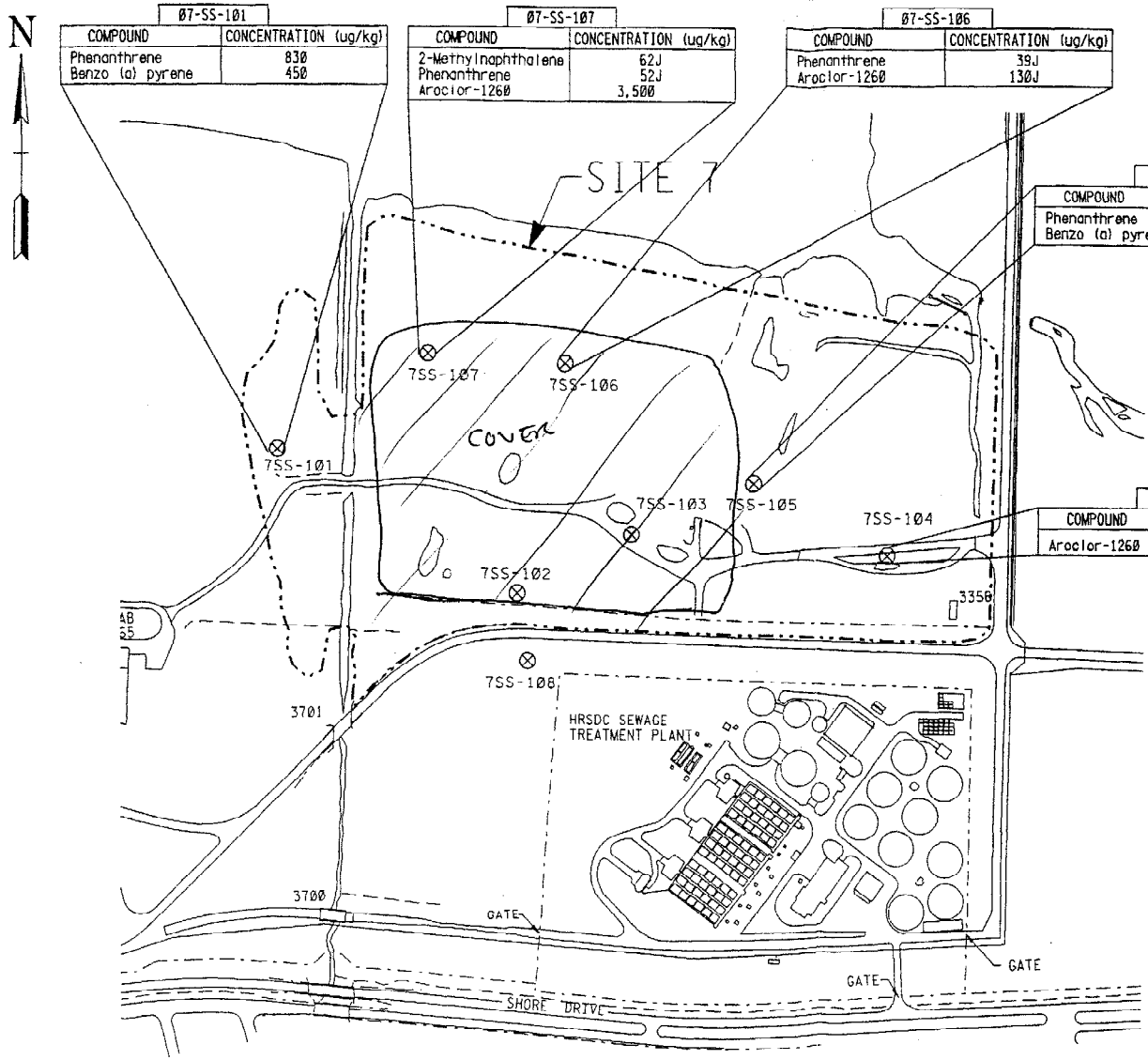
SUMMARY OF TOTAL ORGANIC CARBON
DETECTED IN SEDIMENT SAMPLES
AND ASSOCIATED QUALITY CONTROL SAMPLES
SITE 7 – AMPHIBIOUS BASE LANDFILL
NAVAL AMPHIBIOUS BASE – LITTLE CREEK
VIRGINIA BEACH, VIRGINIA
JULY 1, 1993

SAMPLE LOCATION/NUMBER SAMPLE MATRIX UNITS	07-SED-101(1) Soil mg/kg	07-SED-102 Soil mg/kg	07-SED-103 Soil mg/kg	07-SED-107 (Duplicate 07-SED-103) Soil mg/kg	07-SED-104 Soil mg/kg
TOTAL ORGANIC CARBON:	5,140	21,400	7,100	6,020	963

SAMPLE LOCATION/NUMBER SAMPLE MATRIX UNITS	07-SED-105 Soil mg/kg	07-SED-106 Soil mg/kg	07-SED-RB101 Water mg/L
TOTAL ORGANIC CARBON:	906	373	NA

NOTES:

ND indicates compound was not detected
NA indicates sample was not analyzed
mg/kg indicates milligrams per kilogram
mg/L indicates milligrams per liter
(1) indicates matrix spike/matrix spike duplicate (MS/MSD) sample was collected with this sample.
RB indicates equipment rinsate blank



07-SS-101

COMPOUND	CONCENTRATION (ug/kg)
Phenanthrene	830
Benzo (a) pyrene	450

07-SS-107

COMPOUND	CONCENTRATION (ug/kg)
2-Methylnaphthalene	62J
Phenanthrene	52J
Aroclor-1260	3,500

07-SS-106

COMPOUND	CONCENTRATION (ug/kg)
Phenanthrene	39J
Aroclor-1260	130J

07-SS-105

COMPOUND	CONCENTRATION (ug/kg)
Phenanthrene	190J
Benzo (a) pyrene	57J

07-SS-104

COMPOUND	CONCENTRATION (ug/kg)
Aroclor-1260	920

NOTES:

1. ug/kg indicates micrograms per kilogram.
2. J indicates an estimated value.

LEGEND

⊗ 7SS-105 SURFACE SOIL SAMPLE

GRAPHIC SCALE

0 300' 600' 900'

1" = 300'-0"

REV.	DATE	DESCRIPTION	APPR.
A	10-29-93	DRAFT TO LANTDIV	

REVISIONS

FIGURE 5-1
SEMI-VOLITILE ORGANICS AND
PCB's IN
SURFACE SOIL
SITE 7
NAB - LITTLE CREEK
VIRGINIA BEACH, VIRGINIA

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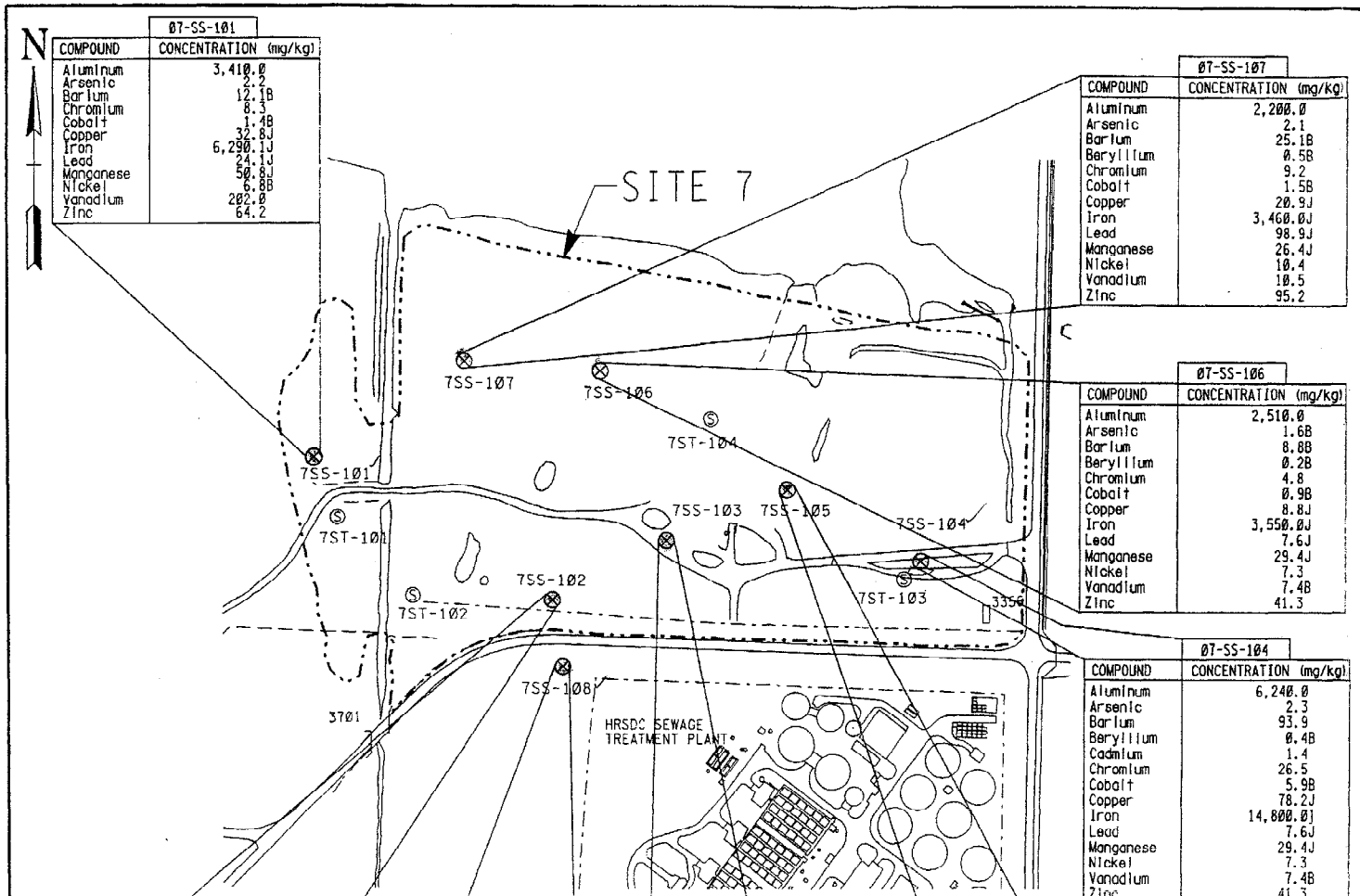

07-SS-101	
COMPOUND	CONCENTRATION (mg/kg)
Aluminum	3,410.0
Arsenic	2.2
Barium	12.1B
Chromium	8.3
Cobalt	1.4B
Copper	32.8J
Iron	6,290.1J
Lead	24.1J
Manganese	50.8J
Nickel	6.8B
Vanadium	202.0
Zinc	64.2

07-SS-107	
COMPOUND	CONCENTRATION (mg/kg)
Aluminum	2,200.0
Arsenic	2.1
Barium	25.1B
Beryllium	0.5B
Chromium	9.2
Cobalt	1.5B
Copper	20.9J
Iron	3,460.0J
Lead	98.9J
Manganese	26.4J
Nickel	10.4
Vanadium	10.5
Zinc	95.2

07-SS-106	
COMPOUND	CONCENTRATION (mg/kg)
Aluminum	2,510.0
Arsenic	1.6B
Barium	8.8B
Beryllium	0.2B
Chromium	4.8
Cobalt	0.9B
Copper	8.8J
Iron	3,550.0J
Lead	7.6J
Manganese	29.4J
Nickel	7.3
Vanadium	7.4B
Zinc	41.3

07-SS-104	
COMPOUND	CONCENTRATION (mg/kg)
Aluminum	6,240.0
Arsenic	2.3
Barium	93.9
Beryllium	0.4B
Cadmium	1.4
Chromium	26.5
Cobalt	5.9B
Copper	78.2J
Iron	14,800.0J
Lead	7.6J
Manganese	29.4J
Nickel	7.3
Vanadium	7.4B
Zinc	41.3

07-SS-102	
COMPOUND	CONCENTRATION (mg/kg)
Aluminum	3,650.0
Arsenic	1.9
Barium	20.0B
Chromium	6.8
Cobalt	0.8B
Copper	5.0J
Iron	5,240.0J
Lead	47.8J
Manganese	55.0J
Nickel	4.3B
Vanadium	10.1
Zinc	25.0

07-SS-108	
COMPOUND	CONCENTRATION (mg/kg)
Aluminum	2,880.0
Arsenic	3.5
Barium	11.4B
Cadmium	0.7B
Chromium	9.5
Cobalt	1.1B
Copper	7.7J
Iron	7,330.0J
Lead	18.8J
Manganese	26.1J
Nickel	3.4
Vanadium	13.4
Zinc	17.6

07-SS-103	
COMPOUND	CONCENTRATION (mg/kg)
Aluminum	4,970.0
Arsenic	2.0
Barium	44.4
Beryllium	0.7B
Chromium	11.3
Cobalt	6.1B
Copper	68.0J
Iron	10,200.0J
Lead	58.0J
Manganese	184.0J
Nickel	16.1
Vanadium	39.5
Zinc	405.0

07-SS-105	
COMPOUND	CONCENTRATION (mg/kg)
Aluminum	3,850.0
Arsenic	1.2B
Barium	11.3B
Chromium	8.3
Copper	5.2J
Iron	3,040.0J
Lead	5.5J
Manganese	18.1J
Vanadium	7.8B
Zinc	12.6

NOTES:

1. ug/kg indicates micrograms per kilogram.
2. J indicates an estimated value.
3. B indicates compound detected in lab blank.

LEGEND

⊗ SURFACE SOIL SAMPLE
7SS-105

GRAPHIC SCALE

0 300' 600' 900'
1" = 300'-0"

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REVISIONS

FIGURE 5-2

TAL METALS IN SURFACE SOIL
SITE 7
NAB - LITTLE CREEK
VIRGINIA BEACH, VIRGINIA

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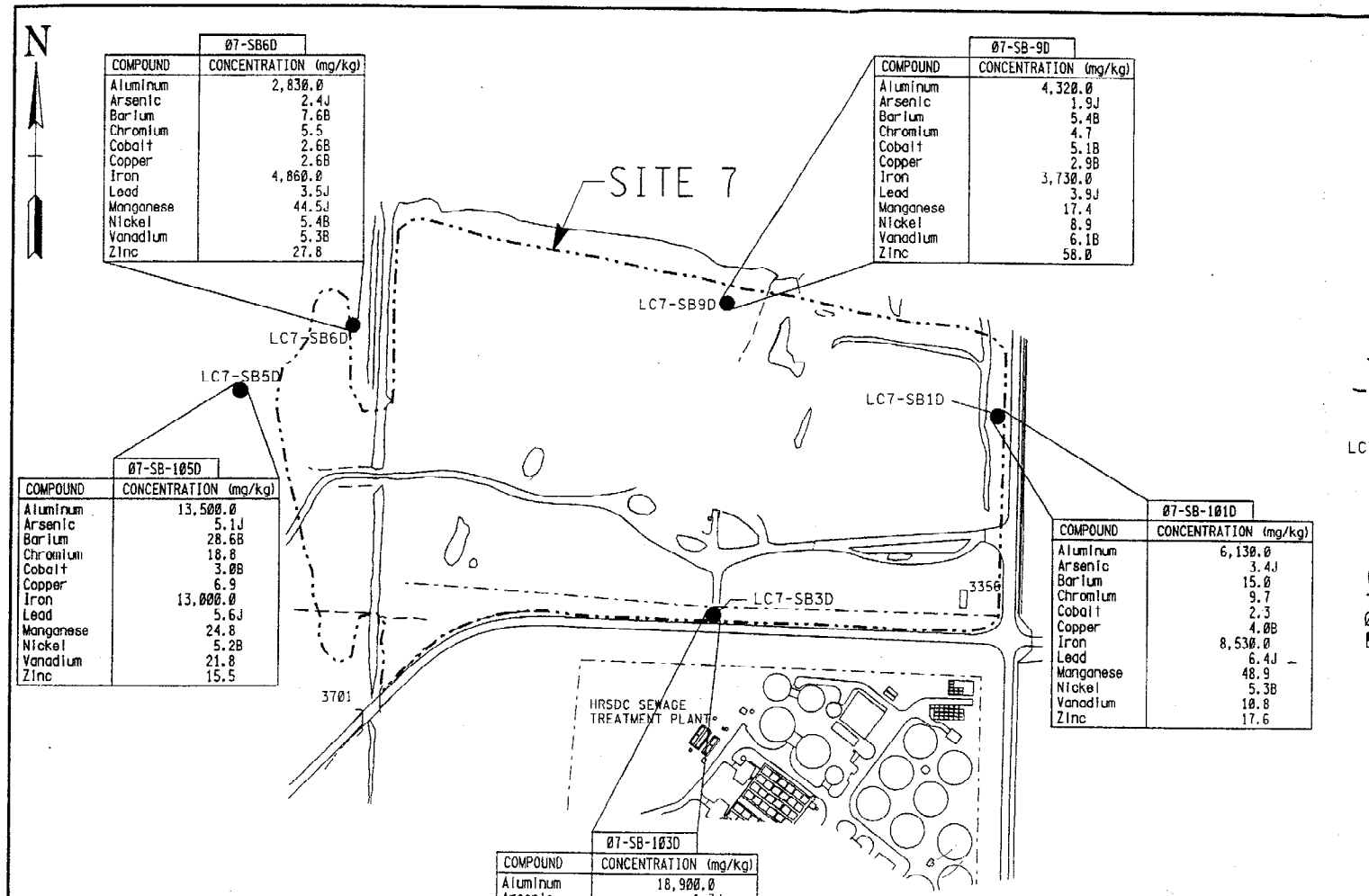

07-SB6D	
COMPOUND	CONCENTRATION (mg/kg)
Aluminum	2,830.0
Arsenic	2.4J
Barium	7.6B
Chromium	5.5
Cobalt	2.6B
Copper	2.6B
Iron	4,860.0
Lead	3.5J
Manganese	44.5J
Nickel	5.4B
Vanadium	5.3B
Zinc	27.8

07-SB-9D	
COMPOUND	CONCENTRATION (mg/kg)
Aluminum	4,320.0
Arsenic	1.9J
Barium	5.4B
Chromium	4.7
Cobalt	5.1B
Copper	2.9B
Iron	3,730.0
Lead	3.9J
Manganese	17.4
Nickel	8.9
Vanadium	6.1B
Zinc	58.0

07-SB-105D	
COMPOUND	CONCENTRATION (mg/kg)
Aluminum	13,500.0
Arsenic	5.1J
Barium	28.6B
Chromium	18.8
Cobalt	3.0B
Copper	6.9
Iron	13,000.0
Lead	5.6J
Manganese	24.8
Nickel	5.2B
Vanadium	21.8
Zinc	15.5

07-SB-101D	
COMPOUND	CONCENTRATION (mg/kg)
Aluminum	6,130.0
Arsenic	3.4J
Barium	15.0
Chromium	9.7
Cobalt	2.3
Copper	4.0B
Iron	8,530.0
Lead	6.4J
Manganese	48.9
Nickel	5.3B
Vanadium	10.8
Zinc	17.6

07-SB-103D	
COMPOUND	CONCENTRATION (mg/kg)
Aluminum	18,900.0
Arsenic	1.3J
Barium	43.3
Chromium	18.7
Cobalt	3.4B
Copper	5.6B
Iron	12,000.0
Lead	8.4J
Manganese	43.9
Nickel	8.1B
Vanadium	21.7
Zinc	16.6

NOTES:

1. mg/kg indicates milligrams per kilogram.
2. J indicates an estimated value.
3. B indicates compound detected in lab blank.

LEGEND

SITE BOUNDARY

SOIL BORING
LC7-SB3D

GRAPHIC SCALE

0 300' 600' 900'

1" = 300' -0"

REV.	DATE	DESCRIPTION	APPR.
A	10-29-93	DRAFT TO LANTDIV	

REVISIONS

FIGURE 5-3

TAL METALS IN SUBSURFACE SOIL

SITE 7

NAB - LITTLE CREEK
VIRGINIA BEACH, VIRGINIA

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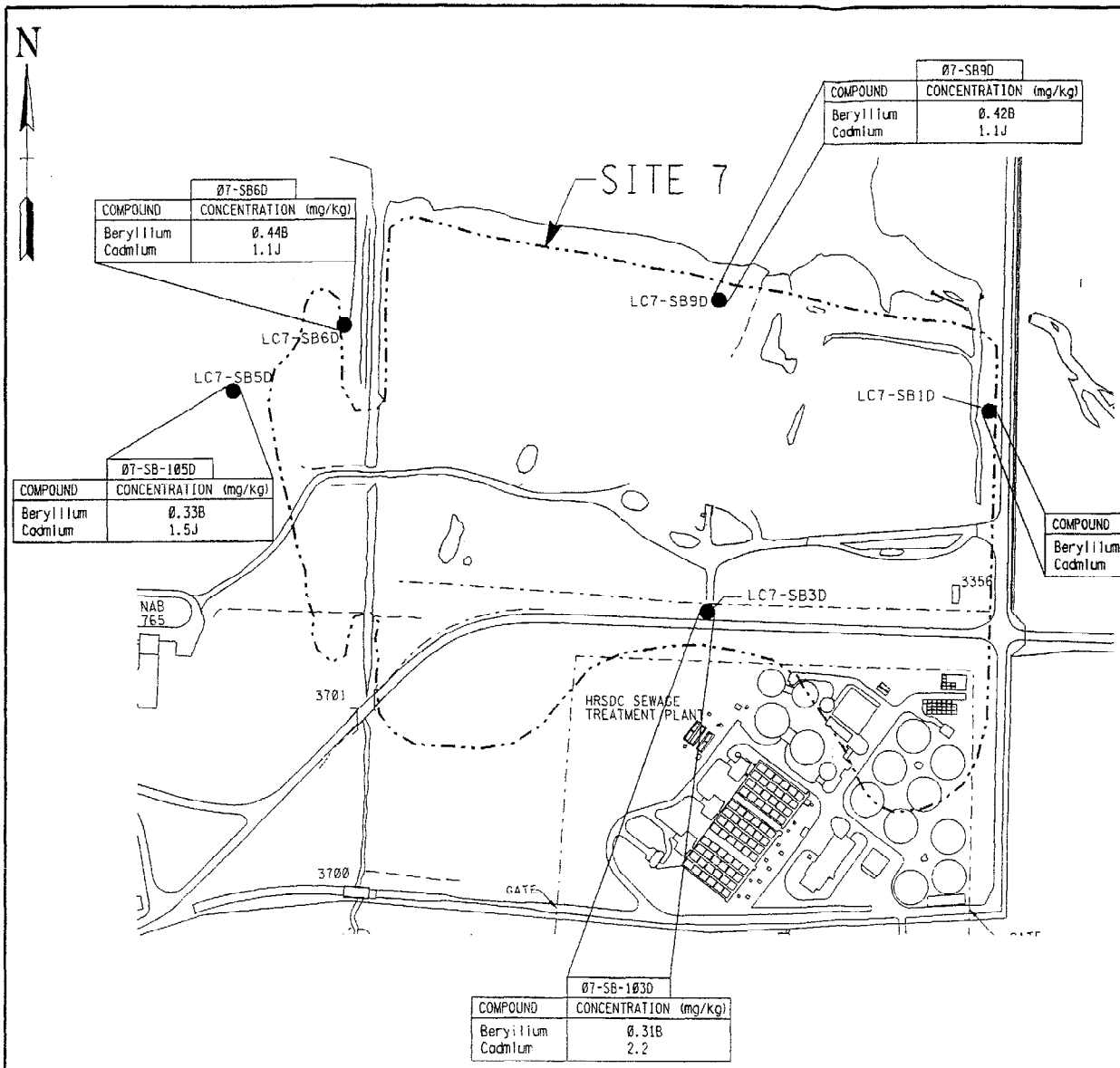

07-SB9D	
COMPOUND	CONCENTRATION (mg/kg)
Beryllium	0.42B
Cadmium	1.1J

07-SB6D	
COMPOUND	CONCENTRATION (mg/kg)
Beryllium	0.44B
Cadmium	1.1J

07-SB-105D	
COMPOUND	CONCENTRATION (mg/kg)
Beryllium	0.33B
Cadmium	1.5J

07-SB-101D	
COMPOUND	CONCENTRATION (mg/kg)
Beryllium	0.27B
Cadmium	1.9J

07-SB-103D	
COMPOUND	CONCENTRATION (mg/kg)
Beryllium	0.31B
Cadmium	2.2

NOTES:

1. mg/kg indicates milligrams per kilogram.
2. J indicates an estimated value.
3. B indicates compound detected in lab blank.

LEGEND

SITE BOUNDARY

SOIL BORING
LC7-SB3D

GRAPHIC SCALE

0 300' 600' 900'

1" = 300' - 0"

REV.	DATE	DESCRIPTION	APPR.
A	10-29-93	DRAFT TO LANTDIV	

REVISIONS

FIGURE 5-3

TAL METALS IN SUBSURFACE SOIL

SITE 7

NAB - LITTLE CREEK
VIRGINIA BEACH, VIRGINIA

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APPROVED BY:			192071-4-48-0744	A

CAD Rev No
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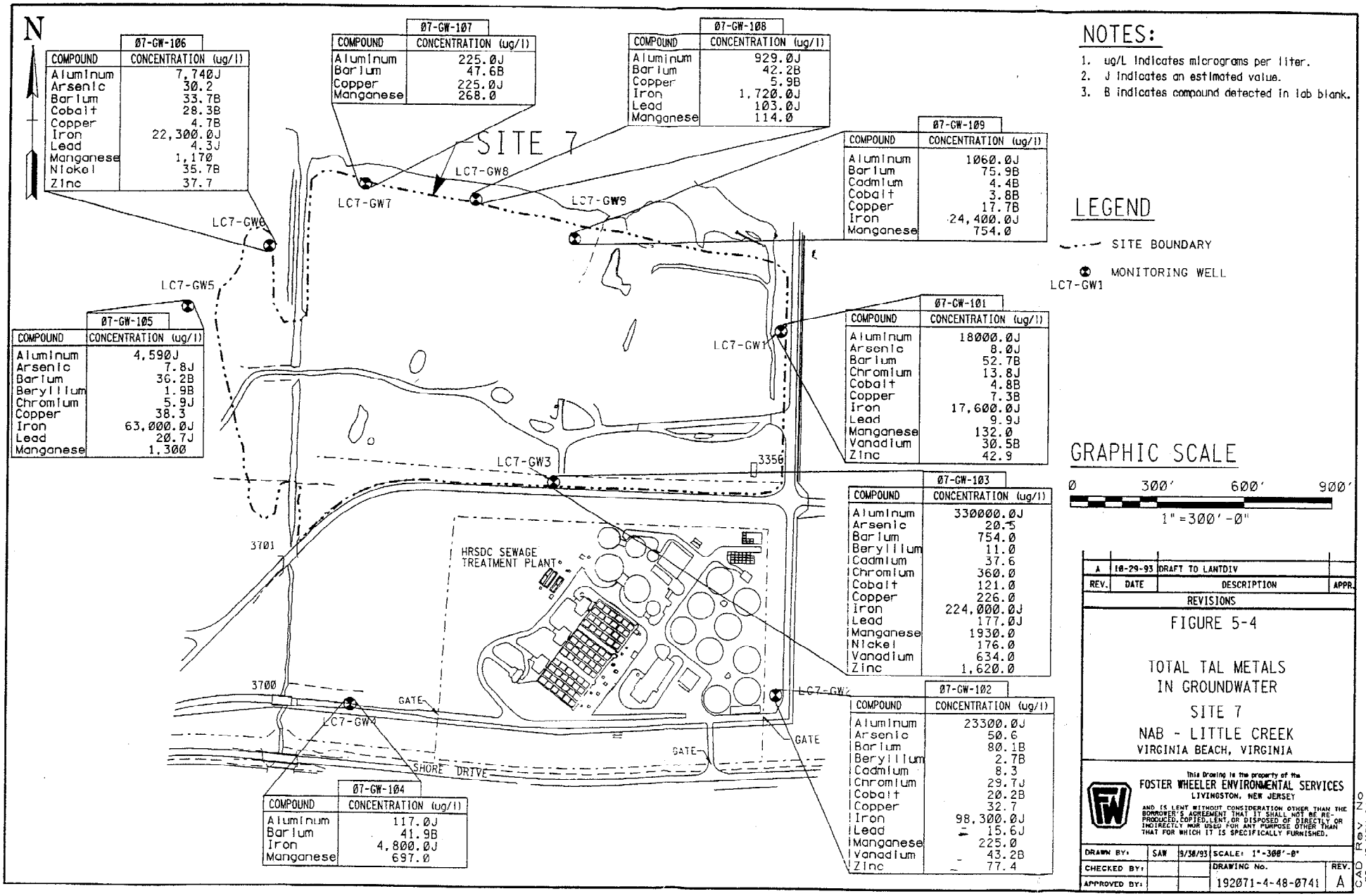


07-GW-106	
COMPOUND	CONCENTRATION (ug/l)
Aluminum	7,740J
Arsenic	30.2
Barium	33.7B
Cobalt	28.3B
Copper	4.7B
Iron	22,300.0J
Lead	4.3J
Manganese	1,170
Nickel	35.7B
Zinc	37.7

07-GW-107	
COMPOUND	CONCENTRATION (ug/l)
Aluminum	225.0J
Barium	47.6B
Copper	225.0J
Manganese	268.0

07-GW-108	
COMPOUND	CONCENTRATION (ug/l)
Aluminum	929.0J
Barium	42.2B
Copper	5.9B
Iron	1,720.0J
Lead	103.0J
Manganese	114.0

07-GW-109	
COMPOUND	CONCENTRATION (ug/l)
Aluminum	1060.0J
Barium	75.9B
Cadmium	4.4B
Cobalt	3.8B
Copper	17.7B
Iron	24,400.0J
Manganese	754.0

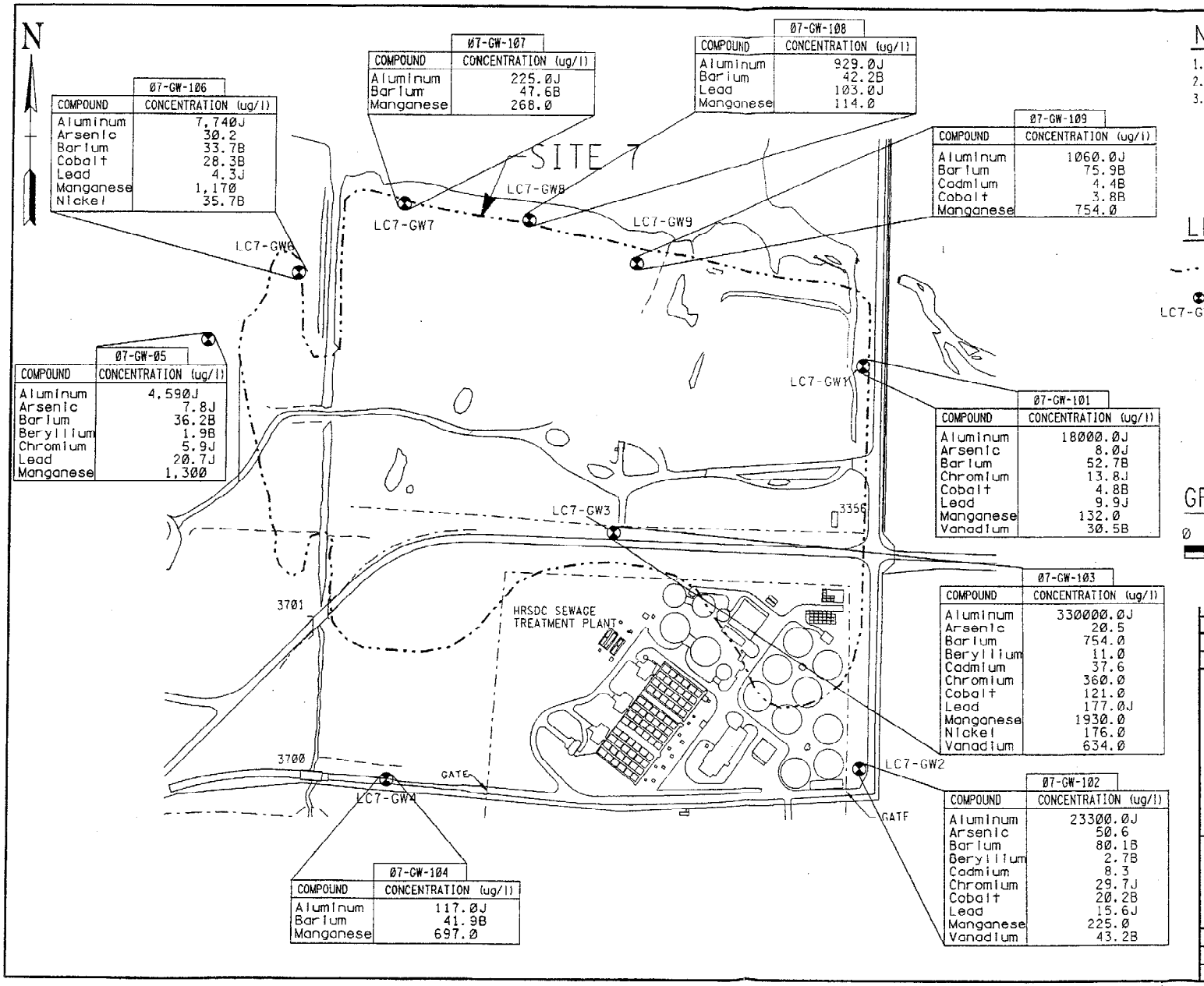
07-GW-105	
COMPOUND	CONCENTRATION (ug/l)
Aluminum	4,590J
Arsenic	7.8J
Barium	36.2B
Beryllium	1.9B
Chromium	5.9J
Copper	38.3
Iron	63,000.0J
Lead	20.7J
Manganese	1,300

07-GW-101	
COMPOUND	CONCENTRATION (ug/l)
Aluminum	18000.0J
Arsenic	8.0J
Barium	52.7B
Chromium	13.8J
Cobalt	4.8B
Copper	7.3B
Iron	17,600.0J
Lead	9.9J
Manganese	132.0
Vanadium	30.5B
Zinc	42.9

07-GW-103	
COMPOUND	CONCENTRATION (ug/l)
Aluminum	330000.0J
Arsenic	20.5
Barium	754.0
Beryllium	11.0
Cadmium	37.6
Chromium	360.0
Cobalt	121.0
Copper	226.0
Iron	224,000.0J
Lead	177.0J
Manganese	1930.0
Nickel	176.0
Vanadium	634.0
Zinc	1,620.0

07-GW-102	
COMPOUND	CONCENTRATION (ug/l)
Aluminum	23300.0J
Arsenic	50.6
Barium	80.1B
Beryllium	2.7B
Cadmium	8.3
Chromium	29.7J
Cobalt	20.2B
Copper	32.7
Iron	98,300.0J
Lead	15.6J
Manganese	225.0
Vanadium	43.2B
Zinc	77.4

07-GW-104	
COMPOUND	CONCENTRATION (ug/l)
Aluminum	117.0J
Barium	41.9B
Iron	4,800.0J
Manganese	697.0



07-GW-106	
COMPOUND	CONCENTRATION (ug/l)
Aluminum	7,740J
Arsenic	30.2
Barium	33.7B
Cobalt	28.3B
Lead	4.3J
Manganese	1,170
Nickel	35.7B

07-GW-107	
COMPOUND	CONCENTRATION (ug/l)
Aluminum	225.0J
Barium	47.6B
Manganese	268.0

07-GW-108	
COMPOUND	CONCENTRATION (ug/l)
Aluminum	929.0J
Barium	42.2B
Lead	103.0J
Manganese	114.0

07-GW-109	
COMPOUND	CONCENTRATION (ug/l)
Aluminum	1060.0J
Barium	75.9B
Cadmium	4.4B
Cobalt	3.8B
Manganese	754.0

07-GW-05	
COMPOUND	CONCENTRATION (ug/l)
Aluminum	4,590J
Arsenic	7.8J
Barium	36.2B
Beryllium	1.9B
Chromium	5.9J
Lead	20.7J
Manganese	1,300

07-GW-101	
COMPOUND	CONCENTRATION (ug/l)
Aluminum	18000.0J
Arsenic	8.0J
Barium	52.7B
Chromium	13.8J
Cobalt	4.8B
Lead	9.9J
Manganese	132.0
Vanadium	30.5B

07-GW-103	
COMPOUND	CONCENTRATION (ug/l)
Aluminum	330000.0J
Arsenic	20.5
Barium	754.0
Beryllium	11.0
Cadmium	37.6
Chromium	360.0
Cobalt	121.0
Lead	177.0J
Manganese	1930.0
Nickel	176.0
Vanadium	634.0

07-GW-102	
COMPOUND	CONCENTRATION (ug/l)
Aluminum	23300.0J
Arsenic	50.6
Barium	80.1B
Beryllium	2.7B
Cadmium	8.3
Chromium	29.7J
Cobalt	20.2B
Lead	15.6J
Manganese	225.0
Vanadium	43.2B

07-GW-104	
COMPOUND	CONCENTRATION (ug/l)
Aluminum	117.0J
Barium	41.9B
Manganese	697.0

NOTES:

1. ug/L indicates micrograms per liter.
2. J indicates an estimated value.
3. B indicates compound detected in lab blank.

LEGEND

SITE BOUNDARY

MONITORING WELL LC7-GW1

GRAPHIC SCALE

0 300' 600' 900'

1" = 300'-0"

REV.	DATE	DESCRIPTION	APPR.
A	10-29-93	DRAFT TO LANTDIV	

REVISIONS

FIGURE 5-4

TOTAL TAL METALS IN GROUNDWATER

SITE 7

NAB - LITTLE CREEK

VIRGINIA BEACH, VIRGINIA

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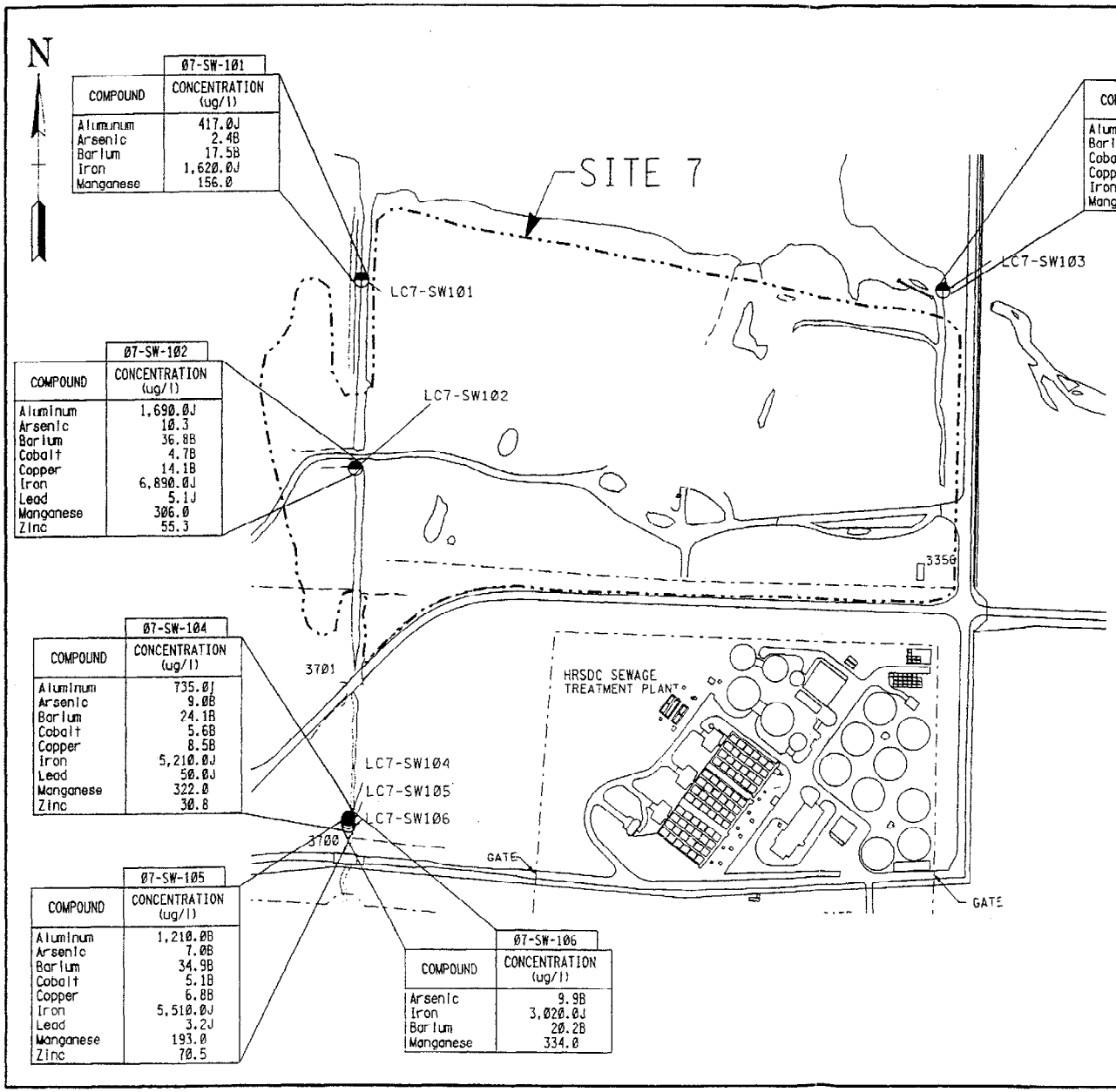

07-SW-101	
COMPOUND	CONCENTRATION (ug/l)
Aluminum	417.0J
Arsenic	2.4B
Barium	17.5B
Iron	1,620.0J
Manganese	156.0

07-SW-102	
COMPOUND	CONCENTRATION (ug/l)
Aluminum	1,690.0J
Arsenic	10.3
Barium	36.8B
Cobalt	4.7B
Copper	14.1B
Iron	6,890.0J
Lead	5.1J
Manganese	306.0
Zinc	55.3

07-SW-103	
COMPOUND	CONCENTRATION (ug/l)
Aluminum	1,080.0J
Barium	34.5B
Cobalt	3.4B
Copper	6.3B
Iron	1,600.0J
Manganese	91.6

07-SW-104	
COMPOUND	CONCENTRATION (ug/l)
Aluminum	735.0J
Arsenic	9.0B
Barium	24.1B
Cobalt	5.6B
Copper	8.5B
Iron	5,210.0J
Lead	50.0J
Manganese	322.0
Zinc	30.8

07-SW-105	
COMPOUND	CONCENTRATION (ug/l)
Aluminum	1,210.0B
Arsenic	7.0B
Barium	34.9B
Cobalt	5.1B
Copper	6.8B
Iron	5,510.0J
Lead	3.2J
Manganese	193.0
Zinc	70.5

07-SW-106	
COMPOUND	CONCENTRATION (ug/l)
Arsenic	9.9B
Iron	3,020.0J
Barium	20.2B
Manganese	334.0

NOTES:

1. ug/L indicates micrograms per liter.
2. J indicates an estimated value.
3. B indicates compound detected in lab blank.

LEGEND

SITE BOUNDARY

SURFACE WATER SAMPLE
LC7-SW106

GRAPHIC SCALE

0 300' 600' 900'

1" = 300'-0"

REV.	DATE	DESCRIPTION	APPR.
A	10-29-93	DRAFT TO LANTDIV	

REVISIONS

FIGURE 5-5

TOTAL TAL METALS IN SURFACE WATER
SITE 7
NAB - LITTLE CREEK
VIRGINIA BEACH, VIRGINIA

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APPROVED BY:			

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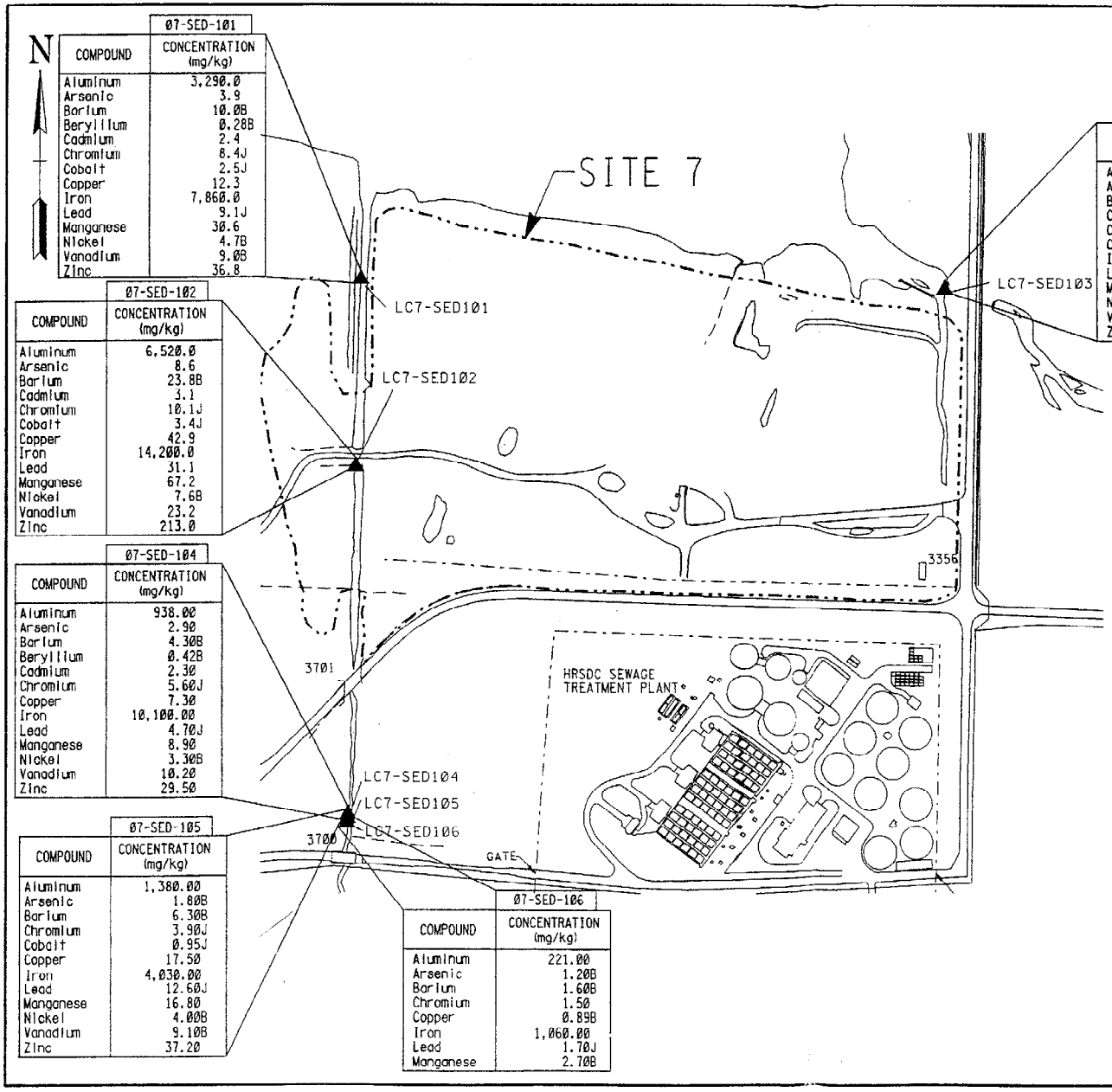

07-SED-101	
COMPOUND	CONCENTRATION (mg/kg)
Aluminum	3,290.0
Arsenic	3.9
Barium	10.0B
Beryllium	0.28B
Cadmium	2.4
Chromium	8.4J
Cobalt	2.5J
Copper	12.3
Iron	7,860.0
Lead	9.1J
Manganese	30.6
Nickel	4.7B
Vanadium	9.0B
Zinc	36.8

07-SED-102	
COMPOUND	CONCENTRATION (mg/kg)
Aluminum	6,520.0
Arsenic	8.6
Barium	23.8B
Cadmium	3.1
Chromium	10.1J
Cobalt	3.4J
Copper	42.9
Iron	14,200.0
Lead	31.1
Manganese	67.2
Nickel	7.6B
Vanadium	23.2
Zinc	213.0

07-SED-104	
COMPOUND	CONCENTRATION (mg/kg)
Aluminum	938.00
Arsenic	2.90
Barium	4.30B
Beryllium	0.42B
Cadmium	2.30
Chromium	5.60J
Copper	7.30
Iron	10,100.00
Lead	4.70J
Manganese	8.90
Nickel	3.30B
Vanadium	10.20
Zinc	29.50

07-SED-105	
COMPOUND	CONCENTRATION (mg/kg)
Aluminum	1,380.00
Arsenic	1.80B
Barium	6.30B
Chromium	3.90J
Cobalt	0.95J
Copper	17.50
Iron	4,030.00
Lead	12.60J
Manganese	16.80
Nickel	4.00B
Vanadium	9.10B
Zinc	37.20

07-SED-106	
COMPOUND	CONCENTRATION (mg/kg)
Aluminum	221.00
Arsenic	1.20B
Barium	1.60B
Chromium	1.50
Copper	0.89B
Iron	1,060.00
Lead	1.70J
Manganese	2.70B

07-SED-103	
COMPOUND	CONCENTRATION (mg/kg)
Aluminum	2,670.00
Arsenic	2.70
Barium	8.40B
Chromium	7.40J
Cobalt	0.94
Copper	11.70
Iron	4,850.00
Lead	9.30J
Manganese	21.40
Nickel	4.50B
Vanadium	5.80B
Zinc	41.20

NOTES:

1. mg/kg indicates milligrams per kilogram.
2. J indicates an estimated value.
3. B indicates compound detected in lab blank.

LEGEND

SITE BOUNDARY

SEDIMENT SAMPLE

GRAPHIC SCALE

0 300' 600' 900'

1" = 300' - 0"

REV.	DATE	DESCRIPTION	APPR.
A	10-29-93	DRAFT TO LANTDIV	

REVISIONS

FIGURE 5-6

TAL METALS IN SEDIMENT

SITE 7

NAB - LITTLE CREEK

VIRGINIA BEACH, VIRGINIA

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6.1.2.1 Site 7

The Amphibious Base Landfill (Site 7) consists of a former base landfill, covering approximately 30 acres, which received all wastes produced at NAB Little Creek. Five environmental media were investigated at Site 7 during this effort. These included surface soil, subsurface soil, groundwater, surface water and sediment. Since surface water and sediment were applicable media at this site, fish consumption was also considered a medium of possible health risk. Table 6.1 provides a summary of the COC selection and evaluation process for all media at Site 7.

Surface Soils

A total of 8 surface soil samples were collected during the RI. Sixteen COCs were identified from inorganics (14 compounds), PCBs (1 compound), and semi-volatile organics (2 compounds).

Inorganics evaluated, which were detected in 20% or more of the samples and exceed the screening levels or are present in other media include arsenic, beryllium, iron, lead, manganese, nickel, vanadium and zinc. Aluminum, barium, cadmium, chromium, cobalt, and copper are retained for evaluation due to its presence in other exposure pathway including groundwater, and sediment. The semi-volatiles evaluated include phenanthrene and benzo(a)pyrene. The PCB evaluated was Aroclor-1260.

Lead is identified as a COC and was evaluated using the Integrated Exposure Uptake Biokinetic (IEUBK) Model. The human health risk analysis performed for lead is discussed in Section 6.6.7.

Compounds that exhibited a detection frequency of less than 20% and met the screening levels included methylene chloride, 2-methyl naphthalene, fluorene, butylbenzyl phthalate, 4,4'-DDT, benzo(k)fluoranthene, indeno(1,2,3-pyrene), benzo(g,h,i)perylene, alpha-chlordane, and mercury.

Common laboratory contaminants include acetone, methylene chloride and bis(2)ethylhexphthalate.

Compounds detected below the risk based screening levels include acetone, methylene chloride, bis(2)ethylhexphthalate, fluorene, anthracene, butylbenzene phthalate,benzo (a) anthracene, chrysene, benzo (b) fluorenthene, benzo (k) fluorenthene, indeno(1,2,3-pyrene), benzo(g,h,i)perylene, 4,4'-DDT, alpha-chlordane, fluoranthene, pyrene, and mercury.

Compounds readily occurring naturally, such as in or near brackish water, included calcium, magnesium, potassium and sodium.

Subsurface Soils

A total of 5 subsurface soil samples were collected during the RI. Two COCs were identified from inorganics when compared to the average concentration of typical soils from literatures (Bowen, H.J.M., 1979, Ure, et. al., 1983, Parr, et. al., 1983 and Shaklette, et. al., 1971). COCs identified were further

TABLE 6.1
CHEMICALS OF CONCERN SELECTION CRITERIA
SITE 7
NAVAL AMPHIBIOUS BASE– LITTLE CREEK
VIRGINIA BEACH, VIRGINIA

Constituent	Media	Selection Criteria Not Met						Retained for Evaluation		
		Detection Frequency	Fact. Unavail. Bkg. Const.	Common Laboratory Contaminant	Federal & State Standards	Health Advisory	Risk Based Screening Levels	Detection Frequency	Criteria Met	Detected Otherwise/ Hist. Pres.
Methylene chloride	Surface soil			X			X			
	Subsurface soil			X			X			
	Sediment			X			X			
Acetone	Surface soil			X			X			
	Subsurface soil			X			X			
	Surface water			X			X			
	Ground water			X			X			
	Sediment			X			X			
	Biota (fish)			X						
Butanone, 2–	Subsurface soil			X						
	Sediment			X						
Carbon disulfide	Subsurface soil			X						
	Sediment			X			X			
Toluene	Sediment						X			
Tetrachloro– ethene	Subsurface soil	X								
Dichloro– benzene, 1,4–	Subsurface soil	X								
Bis (2) ethyl hexphthlate	Surface soil			X			X			
	Subsurface soil			X			X			
Methyl naphthalene, 2–	Surface soil	X	X							
Fluorene	Surface soil						X			
Phenanthrene	Surface soil							X		
Anthracene	Surface soil						X			
Fluoranthene	Surface soil						X			
Pyrene	Surface soil						X			
Butylbenzyl phthalate	Surface soil	X		X			X			
Benzo (a) anthracene	Surface soil						X			
Chrysene	Surface soil						X			
Benzo (b) fluorenthene	Surface soil						X			
Benzo (k) fluorenthene	Surface soil	X					X			

TABLE 6.1, CONTINUED
CHEMICALS OF CONCERN SELECTION CRITERIA
SITE 7
NAVAL AMPHIBIOUS BASE– LITTLE CREEK
VIRGINIA BEACH, VIRGINIA

Constituent	Media	Selection Criteria Not Met						Retained for Evaluation		
		Detection Frequency	Fact. Unavail. Bkg. Const.	Common Laboratory Contaminant	Federal & State Standards	Health Advisory	Risk Based Screening Levels	Detection Frequency	Criteria Met	Detected Otherwise/ Hist. Pres.
Benzo (a) pyrene	Surface soil							X	X	
Indeno (1,2,3–cd pyrene)	Surface soil	X					X			
Benzo (g,h,i) perylene	Surface soil	X					X			
DDT, 4,4'–	Surface soil	X					X			
Chlordane, alpha	Surface soil	X					X			
Arochlor–1260	Surface soil							X	X	
Aluminum	Surface soil							X		X
	Subsurface soil							X		X
	Surface water							X		X
	Ground water							X	X	
	Sediment							X		X
	Biota (fish)		X							
Arsenic	Surface soil							X	X	
	Subsurface soil							X	X	
	Surface water							X		X
	Ground water							X	X	
	Sediment							X	X	
	Biota (fish)							X	X	
Barium	Surface soil							X		X
	Subsurface soil							X		X
	Surface water							X		X
	Ground water							X	X	
	Sediment							X		X
	Biota (fish)		X							
Beryllium	Surface soil							X	X	
	Subsurface soil							X	X	
	Ground water							X	X	
	Sediment							X	X	
Cadmium	Surface soil							X		X
	Subsurface soil							X		X
	Ground water							X	X	
	Sediment							X		X

TABLE 6.1, CONTINUED
CHEMICALS OF CONCERN SELECTION CRITERIA
SITE 7
NAVAL AMPHIBIOUS BASE– LITTLE CREEK
VIRGINIA BEACH, VIRGINIA

Constituent	Media	Selection Criteria Not Met						Retained for Evaluation		
		Detection Frequency	Fact. Unavail. Bkg. Const.	Common Laboratory Contaminant	Federal & State Standards	Health Advisory	Risk Based Screening Levels	Detection Frequency	Criteria Met	Detected Otherwise/ Hist. Pres.
Calcium	Surface soil		X							
	Subsurface soil		X							
	Ground water		X							
	Sediment		X							
Chromium	Surface soil							X		X
	Subsurface soil							X		X
	Ground water							X	X	
	Sediment							X		X
Cobalt	Surface soil							X		X
	Subsurface soil							X		X
	Surface water							X		X
	Ground water							X		X
	Sediment							X		X
	Biota (fish)		X							
Copper	Surface soil							X		X
	Subsurface soil							X		X
	Surface water							X		X
	Ground water							X	X	
	Sediment							X		X
	Biota (fish)						X			
Iron	Surface soil							X	X	
	Subsurface soil							X	X	
	Surface water							X	X	
	Ground water							X	X	
	Sediment							X	X	
	Biota (fish)		X							
Lead	Surface soil							X		
	Subsurface soil							X		
	Surface water							X	X	
	Ground water							X	X	
	Sediment							X	X	
	Biota (fish)							X	X	
Magnesium	Surface soil		X							
	Subsurface soil		X							
	Surface water		X							
	Ground water		X							
	Sediment		X							
	Biota (fish)		X							

TABLE 6.1, CONTINUED
CHEMICALS OF CONCERN SELECTION CRITERIA
SITE 7
NAVAL AMPHIBIOUS BASE– LITTLE CREEK
VIRGINIA BEACH, VIRGINIA

Constituent	Media	Selection Criteria Not Met						Retained for Evaluation		
		Detection Frequency	Fact. Unavail. Bkg. Const.	Common Laboratory Contaminant	Federal & State Standards	Health Advisory	Risk Based Screening Levels	Detection Frequency	Criteria Met	Detected Otherwise/ Hist. Pres.
Manganese	Surface soil							X	X	
	Subsurface soil							X	X	
	Surface water							X	X	
	Ground water			X						
	Sediment							X	X	
	Biota (fish)		X							
Mercury	Surface soil						X			
	Subsurface soil		X				X			
	Ground water					X	X			
Nickel	Surface soil							X		X
	Subsurface soil							X		X
	Ground water							X	X	
	Sediment							X		X
Potassium	Surface soil		X							
	Subsurface soil		X							
	Surface water		X							
	Ground water		X							
	Sediment		X							
	Biota (fish)		X							
Silver	Sediment	X					X			
Sodium	Surface soil		X							
	Subsurface soil		X							
	Surface water		X							
	Ground water		X							
	Sediment		X							
	Biota (fish)		X							
Vanadium	Surface soil							X	X	
	Subsurface soil							X		X
	Ground water							X	X	
	Sediment							X		X
Zinc	Surface soil							X		X
	Subsurface soil							X		X
	Surface water							X		X
	Ground water							X	X	
	Sediment							X		X
	Biota (fish)						X			

TABLE 6.1, CONTINUED
CHEMICALS OF CONCERN SELECTION CRITERIA
SITE 7
NAVAL AMPHIBIOUS BASE– LITTLE CREEK
VIRGINIA BEACH, VIRGINIA

Constituent	Media	Selection Criteria Not Met						Retained for Evaluation		
		Detection Frequency	Fact. Unavail. Bkg. Const.	Common Laboratory Contaminant	Federal & State Standards	Health Advisory	Risk Based Screening Levels	Detection Frequency	Criteria Met	Detected Otherwise/ Hist. Pres.
Alkalinity	Subsurface soil		X							
	Surface water		X							
	Ground water		X							
	Sediment		X							
	Biota (fish)		X							
Bicarbonate alkalinity	Subsurface soil		X							
	Surface water		X							
	Ground water		X							
	Sediment		X							
	Biota (fish)		X							
Chloride	Subsurface soil		X							
	Surface water		X							
	Ground water		X							
	Sediment		X							
	Biota (fish)		X							
Sulfate	Subsurface soil		X							
	Surface water		X							
	Ground water		X							
	Sediment		X							
	Biota (fish)		X							

"X" denotes criteria satisfied.

evaluated for possible transport and mobility to the groundwater which is discussed in Section 6.1.3.4. The COCs identified include, beryllium and cadmium. Aluminum, arsenic, barium, chromium, copper, lead, manganese, nickel, vanadium and zinc were detected below the median typical chemical concentration in soil.

Chemicals detected in the subsurface soils were also evaluated due to a possible future scenario, where the subsurface soils are brought to the surface and made available for direct contact. Table 6.1 shows the summary of the COC selection and evaluation process for the future scenario of the subsurface soils. A total of 14 inorganics were identified as COC.

Inorganics evaluated, which were detected in 20% or more of the samples and exceed the screening levels or are present in other media include arsenic, beryllium, iron, lead, and manganese. Aluminum, barium, cadmium, chromium, cobalt, copper, nickel, vanadium, and zinc are retained for evaluation due to its presence in other exposure pathway including groundwater and sediments.

Lead is identified as a COC and was evaluated using the Integrated Exposure Uptake Biokinetic (IEUBK) Model. The human health risk analysis performed for lead is discussed in Section 6.6.7.

Compounds detected below the risk based screening levels include acetone, methylene chloride, 2-butanone, tetrachloroethene, 1,4-dichlorobenzene, bis(2)ethylhexphthalate, and mercury.

Common laboratory contaminants include acetone, methylene chloride and 2-butanone, and bis(2)ethylhexphthalate.

Compounds readily occurring naturally, such as in or near brackish water, included calcium, magnesium, potassium and sodium.

Groundwater

A total of 9 groundwater total and dissolved samples were collected during the RI. From the total groundwater samples, seventeen COCs were identified including 13 inorganics and four anions. The high concentrations of the anions (alkalinity, chloride and sulfates) detected in this environmental medium supports the assumption that the shallow aquifer available is not potable for drinking water source.

Table 6.1 shows the summary of the COC selection and evaluation process for the total groundwater samples. Inorganics evaluated include aluminum, arsenic, barium, beryllium, cadmium, chromium, copper, iron, lead, nickel, vanadium, and zinc. Cobalt was retained for evaluation due to its presence in the sediments exposure pathway.

Lead is identified as a COC and was evaluated using the Integrated Exposure Uptake Biokinetic (IEUBK) Model. The human health risk analysis performed for lead is discussed in Section 6.6.7.

From the dissolved groundwater samples, nine inorganic COCs were identified. The inorganics evaluated include arsenic, beryllium, iron, mercury, and zinc. Aluminum, barium, cobalt, and copper are retained

for evaluation due to its presence in the other exposure pathway including total groundwater samples and sediments.

The anions were not evaluated due to its nontoxic and noncarcinogenic nature.

Compounds that exhibited a detection frequency of less than 20% included acetone.

Common laboratory contaminants include acetone.

Mercury was detected below USEPA screening values in a limited number of samples.

Acetone was also detected below USEPA screening values.

Compounds readily occurring naturally, such as in or near brackish water, included calcium, magnesium, potassium and sodium. Manganese was detected below the site specific groundwater background concentrations presented in Section 5.

Surface Water

A total of 6 surface water samples were collected during the RI. Nine COCs were identified from inorganics, and four anions.

Inorganics evaluated include arsenic, beryllium, copper, iron, lead and manganese. Aluminum, barium, cobalt, and zinc are retained for evaluation due to its presence in other exposure pathway including groundwater and sediment.

Due to unavailable reference doses and cancer slope factor, the anions were not evaluated.

Lead is identified as a COC and was evaluated using the Integrated Exposure Uptake Biokinetic (IEUBK) Model. The human health risk analysis performed for lead is discussed in Section 6.6.7.

Common laboratory contaminants include acetone.

Acetone was detected below USEPA screening values.

Compounds readily occurring naturally, such as in or near brackish water, included calcium, magnesium, potassium and sodium.

Sediment

A total of 6 sediment samples were collected during the RI. Fourteen COCs were identified from inorganics, and two anions after comparing the sediments concentrations to the residential soils concentration from USEPA Region III Risk-Based Concentration Table.

Inorganics evaluated include aluminum, arsenic, barium, beryllium, cadmium, chromium, cobalt, copper, lead, manganese, nickel, vanadium and zinc.

Lead is identified as a COC and was evaluated using the Integrated Exposure Uptake Biokinetic (IEUBK) Model. The human health risk analysis performed for lead is discussed in Section 6.6.7.

Common laboratory contaminants include acetone, methylene chloride, carbon disulfide and 2-butanone.

Toluene was below all regulatory criteria.

Carbon disulfide and toluene were detected below USEPA's screening level.

Silver was detected at a detection frequency of less than 20%.

Compounds readily occurring naturally, such as in or near brackish water, included calcium, magnesium, potassium and sodium.

Fish

Site 7 fish concentration values were calculated using constituents detected in surface waters. Note that concentrations for inorganics are based on unfiltered samples. A total of 6 surface water samples were collected during the RI. Fish concentrations were calculated based on the maximum detected concentration of each applicable compound and a representative bioconcentration factor (BCF) for that compound. The BCFs used provides a measure of extent of chemical partitioning at equilibrium between fish tissue and water medium. Nine COCs were identified and only arsenic was retained for evaluation. The other COCs including aluminum, barium, cobalt, iron, manganese, and four anions were not evaluated due to unavailable bioconcentration factors. Copper and zinc were below USEPA's screening level for fish.

Lead is identified as a COC and was evaluated using the Integrated Exposure Uptake Biokinetic (IEUBK) Model. The human health risk analysis performed for lead is discussed in Section 6.6.7.

6.1.2.2 Site 9

The Driving Range Landfill (Site 9) currently consists of a driving range covering approximately 6 acres. As discussed in Chapter 2, Site 9 was previously a trench-type landfill for the base and subsequent disposal site for the base's incinerator ash and noncombustible material. Two environmental media were investigated during this effort at Site 9 including surface soil and groundwater. Table 6.2 provides a summary of the COC selection and evaluation process for all media at Site 9.

Surface Soils

A total of 6 surface soil samples were collected during the RI. Seven COCs were identified from

TABLE 6.10

MATRIX OF POTENTIAL EXPOSURE – CURRENT AND FUTURE LAND USE

SITE 7

NAVAL AMPHIBIOUS BASE – LITTLE CREEK

VIRGINIA BEACH VIRGINIA

Exposure Medium		CURRENT LAND USE SCENARIO: Trespasser Population	Worker Population	Recreational Population	FUTURE LAND USE SCENARIO: Resident Population
Surface Soil:	Ingestion	YES	YES	-----	YES
	Dermal Contact	YES	YES	-----	YES
Groundwater:	Ingestion	-----	-----	-----	YES*
	Dermal Contact	-----	-----	-----	YES*
	Inhalation	-----	-----	-----	YES*
Surface Water:	Ingestion	YES	-----	-----	YES
	Dermal Contact	YES	-----	-----	YES
Sediments:	Ingestion	YES	-----	-----	YES
	Dermal Contact	YES	-----	-----	YES
Fish:	Ingestion	YES	-----	YES	YES

* Exposure frequency is reduced to recreational/trespasser population (children = 14 days/year; adult = 28 days/year).

USEPA considers to be generally acceptable (USEPA, 1989). A value of 1.0 is used for examination of the HI. The hazard index is calculated by comparing estimated chronic daily intakes with threshold levels below which there is minimal potential for noncarcinogenic health effects. Any HI equal to or exceeding 1.0 suggests that noncarcinogenic health effects are possible. HI values below 1.0 suggest that systemic adverse health effects should not occur subsequent to exposure.

The estimated potential risks and hazard indices are discussed by site and media in the following subsections. Base COC determination comparisons and the subsequent quantitative risk calculations for specific COCs are provided in Appendix N.

6.6 Potential Health Risks from Exposure To COCs

Current and future land-use risks presented in the following sections were calculated due to the contamination detected at Sites 7, 9, 10, 11, 12 and 13. Tables 6.20 through 6.46 show the summary of the calculated risk in each site. The tables present only the highest exposed receptor, which is the trespasser population and worker adult in the current scenario, and resident population in the future scenario.

Risk associated with the groundwater pathway future scenario was conservatively calculated for resident population even though this pathway will not be a source of ingestion or dermal contact. The calculated risk assumes that a resident child/adult receptor will be exposed to a lesser frequency where a possibility of incidentally tapping into the groundwater, and making it available for contact and ingestion. The exposure frequency would be 14 days per year for resident child, and 28 days per year for resident adult. The complete calculation of risks of all exposed receptor in each site can be found in Appendix N.

6.6.1 Site 7

Current and future land-use risks presented in the following sections were calculated using the contaminants detected in Site 7. These calculations were based on the COCs specified in the COC Selection Criteria provided in Table 6.1 in Section 6.1.2.1.

Surface Soil

Table 6.20 presents the carcinogenic and noncarcinogenic risks associated with potential current exposure to COCs, Table 6.21 presents the carcinogenic and noncarcinogenic risks associated with potential future exposure to COCs detected in Site 7 surface soils.

Ingestion

Current Scenario

The total HI for trespasser child (0.0941) was well below unity. This suggests that systemic health effects

TABLE 6.20
SURFACE SOIL INGESTION AND DERMAL CONTACT RISKS
CURRENT SCENARIO
SITE 7
NAVAL AMPHIBIOUS BASE – LITTLE CREEK
VIRGINIA BEACH, VIRGINIA

Ingestion

Compound	Trespasser Child		Trespasser Adult		Worker Adult	
	HI	ICR	HI	ICR	HI	ICR
Phenanthrene	1.46E−05	--	3.14E−06	--	1.40E−05	--
Benzo (a)−pyrene	--	1.44E−07	--	1.54E−07	--	5.74E−07
Aroclor−1260	--	1.18E−06	--	1.27E−06	--	4.71E−06
Aluminum	1.10E−03	--	2.36E−04	--	1.05E−03	--
Arsenic	5.97E−03	2.68E−07	1.28E−03	2.88E−07	5.71E−03	1.07E−06
Barium	6.86E−04	--	1.47E−04	--	6.56E−04	--
Beryllium	6.65E−05	1.23E−07	1.42E−05	1.31E−07	6.36E−05	4.88E−07
Cadmium	1.43E−03	--	3.07E−04	--	1.37E−03	--
Chromium	2.71E−03	--	5.81E−04	--	2.59E−03	--
Cobalt	5.20E−05	--	1.11E−05	--	4.97E−05	--
Copper	1.08E−03	--	2.31E−04	--	1.03E−03	--
Iron	1.70E−02	--	3.65E−03	--	1.63E−02	--
Manganese	4.81E−02	--	1.03E−02	--	4.60E−02	--
Nickel	4.60E−04	--	9.86E−05	--	4.40E−04	--
Vanadium	1.48E−02	--	3.16E−03	--	1.41E−02	--
Zinc	6.90E−04	--	1.48E−04	--	6.60E−04	--
TOTAL	**9.41E−02**	**1.72E−06**	**2.02E−02**	**1.84E−06**	**9.01E−02**	**6.84E−06**

Dermal Contact

Compound	Trespasser Child		Trespasser Adult		Worker Adult	
	HI	ICR	HI	ICR	HI	ICR
Phenanthrene	1.33E−06	–	1.82E−06	–	1.62E−05	–
Benzo (a)−pyrene	--	1.31E−08	--	8.95E−08	--	6.66E−07
Aroclor−1260	--	6.45E−07	--	4.40E−06	--	3.28E−05
Aluminum	1.00E−05	–	1.37E−05	–	1.22E−04	–
Arsenic	5.43E−05	2.44E−09	7.42E−05	1.67E−08	6.62E−04	1.24E−07
Barium	6.24E−06	–	8.53E−06	–	7.61E−05	–
Beryllium	6.05E−07	1.11E−09	8.26E−07	7.61E−09	7.38E−06	5.67E−08
Cadmium	1.30E−05	–	1.78E−05	–	1.59E−04	–
Chromium	2.47E−05	–	3.37E−05	–	3.01E−04	–
Cobalt	4.73E−07	–	6.46E−07	–	5.77E−06	–
Copper	9.81E−06	–	1.34E−05	–	1.20E−04	–
Iron	1.55E−04	–	2.12E−04	–	1.89E−03	–
Manganese	4.37E−04	–	5.97E−04	–	5.33E−03	–
Nickel	4.19E−06	–	5.72E−06	–	5.11E−05	–
Vanadium	1.34E−04	–	1.83E−04	–	1.64E−03	–
Zinc	6.28E−06	–	8.58E−06	–	7.66E−05	–
TOTAL	**8.58E−04**	**6.62E−07**	**1.17E−03**	**4.52E−06**	**1.05E−02**	**3.36E−05**

HI – Hazard Index ICR – Incremental Cancer Risk

TABLE 6.21
SURFACE SOIL INGESTION AND DERMAL CONTACT RISKS
FUTURE SCENARIO
SITE 7
NAVAL AMPHIBIOUS BASE – LITTLE CREEK
VIRGINIA BEACH, VIRGINIA

Ingestion

Compound	Resident Child		Resident Adult	
	HI	ICR	HI	ICR
Phenanthrene	3.66E−04	--	3.92E−05	--
Benzo (a)−pyrene	--	3.60E−06	--	1.93E−06
Aroclor−1260	--	2.95E−05	--	1.58E−05
Aluminum	2.75E−02	--	2.95E−03	--
Arsenic	1.49E−01	6.71E−06	1.60E−02	3.60E−06
Barium	1.72E−02	--	1.84E−03	--
Beryllium	1.66E−03	3.06E−06	1.78E−04	1.64E−06
Cadmium	3.58E−02	--	3.84E−03	--
Chromium	6.78E−02	--	7.26E−03	--
Cobalt	1.30E−03	--	1.39E−04	--
Copper	2.69E−02	--	2.89E−03	--
Iron	4.26E−01	--	4.57E−02	--
Manganese	1.20E+00	--	1.29E−01	--
Nickel	1.15E−02	--	1.23E−03	--
Vanadium	3.69E−01	--	3.95E−02	--
Zinc	1.73E−02	--	1.85E−03	--
TOTAL	**2.35E+00**	**4.29E−05**	**2.52E−01**	**2.30E−05**

Dermal Contact

Compound	Resident Child		Resident Adult	
	HI	ICR	HI	ICR
Phenanthrene	3.33E−05	–	2.27E−05	–
Benzo (a)−pyrene	--	3.28E−07	--	1.12E−06
Aroclor−1260	--	1.61E−05	--	5.51E−05
Aluminum	2.50E−04	–	1.71E−04	–
Arsenic	1.36E−03	6.11E−08	9.27E−04	2.09E−07
Barium	1.56E−04	–	1.07E−04	–
Beryllium	1.51E−05	2.79E−08	1.03E−05	9.52E−08
Cadmium	3.26E−04	–	2.22E−04	–
Chromium	6.17E−04	–	4.21E−04	–
Cobalt	1.18E−05	–	8.08E−06	–
Copper	2.45E−04	–	1.67E−04	–
Iron	3.88E−03	–	2.65E−03	–
Manganese	1.09E−02	–	7.47E−03	–
Nickel	1.05E−04	–	7.15E−05	–
Vanadium	3.36E−03	–	2.29E−03	–
Zinc	1.57E−04	–	1.07E−04	–
TOTAL	**2.14E−02**	**1.65E−05**	**1.46E−02**	**5.65E−05**

HI – Hazard Index ICR – Incremental Cancer Risk

TABLE 6.21 (CONTINUED)
SUBSURFACE SOIL INGESTION AND DERMAL CONTACT RISKS
FUTURE SCENARIO
SITE 7
NAVAL AMPHIBIOUS BASE – LITTLE CREEK
VIRGINIA BEACH, VIRGINIA

Ingestion

Compound	Resident Child		Resident Adult	
	HI	ICR	HI	ICR
Aluminum	8.33E−02	--	8.93E−03	--
Arsenic	2.17E−01	9.78E−06	2.33E−02	5.24E−06
Barium	8.42E−03	--	9.02E−04	--
Beryllium	1.13E−03	2.07E−06	1.21E−04	1.11E−06
Cadmium	5.63E−02	--	6.03E−03	--
Chromium	4.81E−02	--	5.15E−03	--
Cobalt	1.09E−03	--	1.16E−04	--
Copper	2.38E−03	--	2.55E−04	--
Iron	5.54E−01	--	5.94E−02	--
Manganese	1.25E−01	--	1.34E−02	--
Nickel	5.69E−03	--	6.10E−04	--
Vanadium	4.38E−02	--	4.70E−03	--
Zinc	2.47E−03	--	2.65E−04	--
TOTAL	1.15E+00	1.19E−05	1.23E−01	6.35E−06

Dermal Contact

Compound	Resident Child		Resident Adult	
	HI	ICR	HI	ICR
Aluminum	7.58E−04	–	5.18E−04	–
Arsenic	1.98E−03	8.90E−08	1.35E−03	3.04E−07
Barium	7.66E−05	–	5.23E−05	–
Beryllium	1.02E−05	1.89E−08	6.99E−06	6.44E−08
Cadmium	5.12E−04	–	3.50E−04	–
Chromium	4.37E−04	–	2.99E−04	–
Cobalt	9.89E−06	–	6.75E−06	–
Copper	2.16E−05	–	1.48E−05	–
Iron	5.04E−03	–	3.44E−03	–
Manganese	1.14E−03	–	7.77E−04	–
Nickel	5.18E−05	–	3.54E−05	–
Vanadium	3.99E−04	–	2.72E−04	–
Zinc	2.25E−05	–	1.54E−05	–
TOTAL	1.05E−02	1.08E−07	7.14E−03	3.68E−07

HI – Hazard Index ICR – Incremental Cancer Risk

will not occur subsequent to ingestion of surface soil. The ICR for child exposed incidentally to soil was 1.72×10^{-6}, and falls within USEPA's target cancer risk range of 10^{-4} to 10^{-6}.

The total HI for trespasser adult (2.02×10^{-2}) also did not exceed unity. The ICR calculated for trespasser adult exposed to soil via ingestion was 1.84×10^{-6}, and falls within USEPA's target cancer risk range.

The total HI for worker adult (0.0901) also did not exceeded unity. This suggests systemic health effects will not occur subsequent to ingestion of surface soil. The ICR for worker adult exposed incidentally to soil was 6.84×10^{-6}, and falls within USEPA's target cancer risk range of 10^{-4} to 10^{-6}.

Future Scenario

The total HI for resident child (2.35) exceeded unity. This suggests that systemic health effects may occur subsequent to exposure. The ICR for child exposed incidentally to soil was 4.29×10^{-5}, and falls within the USEPA's target cancer risk range of 10^{-4} to 10^{-6}.

The total HI for resident adult (0.252) did not exceed unity. This suggests systemic health effects are not expected to occur subsequent to ingestion of surface soil. The ICR calculated for resident adult exposed to soil via ingestion was 2.30×10^{-5}, and falls within USEPA's target risk range.

Dermal Contact

Current Scenario

The total HI for trespasser child (8.58×10^{-4}) was well below unity, suggesting that noncarcinogenic adverse health effects will not occur subsequent to dermal contact with soil. The calculated ICR, 6.62×10^{-7}, falls below the acceptable risk range of 10^{-4} to 10^{-6}.

The total HI for trespasser adult (1.17×10^{-3}) was also below unity, suggesting that noncarcinogenic adverse health effects will not occur. The calculated ICR of 4.52×10^{-6}, falls within the acceptable risk range of 10^{-4} to 10^{-6}.

The total HI for worker adult (1.05×10^{-2}) was also below unity, suggesting that noncarcinogenic adverse health effects will not occur subsequent to dermal contact with soil. The calculated ICR, 3.36×10^{-5}, falls within the acceptable risk range.

Future Scenario

The total HI for resident child (0.0214) was below unity, suggesting that noncarcinogenic adverse health effects are not expected to occur subsequent to dermal contact with soil. The calculated ICR, 1.65×10^{-5}, falls within the acceptable risk range of 10^{-4} to 10^{-6}.

The total HI for resident adult (1.46×10^{-2}) was also below unity, suggesting that noncarcinogenic adverse health effects are not expected to occur. The calculated ICR of 5.65×10^{-5}, falls within the acceptable risk

range of 10^{-4} to 10^{-6}.

Subsurface Soil

Table 6.21 also presents the carcinogenic and noncarcinogenic risks associated with potential future exposure to COCs detected in Site 7 subsurface soils. This pathway was evaluated due to a possible future scenario where the subsurface soils are brought to the surface and available for direct contact.

Future Scenario

Ingestion

The total HI for resident child (1,15) exceeded unity, suggesting that noncarcinogenic adverse health effects may occur subsequent to subsoil ingestion. The calculated ICR, 1.19×10^{-5}, falls within the acceptable risk range of 10^{-4} to 10^{-6}.

The total HI for resident adult (0.123) was also below unity, suggesting that noncarcinogenic adverse health effects are not expected to occur. The calculated ICR of 6.35×10^{-6}, falls within the acceptable risk range of 10^{-4} to 10^{-6}.

Dermal Contact

The total HI for resident child (1.05×10^{-2}) was below unity, suggesting that noncarcinogenic adverse health effects are not expected to occur subsequent to dermal contact with subsoil. The calculated ICR, 1.08×10^{-7}, falls below the acceptable risk range of 10^{-4} to 10^{-6}.

The total HI for resident adult (7.14×10^{-3}) was also below unity, suggesting that noncarcinogenic adverse health effects are not expected to occur. The calculated ICR of 3.68×10^{-7}, falls below the acceptable risk range of 10^{-4} to 10^{-6}.

Groundwater

Table 6.22 presents the carcinogenic and noncarcinogenic risks associated with potential future exposure to COCs detected in Site 7 groundwater total and dissolved metals.

Ingestion

Future Scenario

Groundwater Total Metals:

The total HI for resident child (3.33) exceeds unity. This suggests that systemic health effects may occur subsequent to exposure. The ICR for resident child exposed incidentally to groundwater was 2.98×10^{-5}, which falls within the USEPA's target cancer risk range of 10^{-4} to 10^{-6}.

TABLE 6.22
GROUNDWATER INGESTION, DERMAL CONTACT AND INHALATION RISKS
FUTURE SCENARIO
SITE 7
NAVAL AMPHIBIOUS BASE – LITTLE CREEK
VIRGINIA BEACH, VIRGINIA

Ingestion

Compound	Resident Child*		Resident Adult*	
	HI	ICR	HI	ICR
Aluminum	2.91E−01	--	2.49E−04	--
Arsenic	4.31E−01	1.94E−05	3.70E−04	8.32E−08
Barium	2.75E−02	--	2.36E−05	--
Beryllium	5.63E−03	1.04E−05	4.82E−06	4.44E−08
Cadmium	1.92E−01	--	1.65E−04	--
Chromium	1.84E−01	--	1.58E−04	--
Cobalt	5.16E−03	--	4.42E−06	--
Copper	1.56E−02	--	1.34E−05	--
Iron	1.91E+00	--	1.64E−03	--
Nickel	2.25E−02	--	1.93E−05	--
Vanadium	2.32E−01	--	1.99E−04	--
Zinc	1.38E−02	--	1.18E−05	--
TOTAL	**3.33E+00**	**2.98E−05**	**2.85E−03**	**1.28E−07**

Dermal Contact

Compound	Resident Child*		Resident Adult*	
	HI	ICR	HI	ICR
Aluminum	2.12E−03	–	2.87E−03	–
Arsenic	3.14E−03	1.41E−07	4.25E−03	9.57E−07
Barium	2.01E−04	–	2.71E−04	–
Beryllium	4.10E−05	7.55E−08	5.55E−05	5.11E−07
Cadmium	1.40E−03	–	1.90E−03	–
Chromium	1.34E−03	–	1.81E−03	–
Cobalt	3.75E−05	–	5.08E−05	–
Copper	1.13E−04	–	1.54E−04	–
Iron	1.39E−02	–	1.88E−02	–
Nickel	1.64E−04	–	2.22E−04	–
Vanadium	1.69E−03	–	2.28E−03	–
Zinc	6.03E−05	–	8.17E−05	–
TOTAL	**2.42E−02**	**2.17E−07**	**3.28E−02**	**1.47E−06**

* Exposed as trespasser/recreational.

HI = Hazard Index

ICR = Incremental Cancer Risk

TABLE 6.22 (CONTINUED)
GROUNDWATER INGESTION, DERMAL CONTACT AND INHALATION RISKS
FUTURE SCENARIO
SITE 7
NAVAL AMPHIBIOUS BASE – LITTLE CREEK
VIRGINIA BEACH, VIRGINIA

Ingestion

Compound	Resident Child*		Resident Adult*	
Total Dissolve Metals	HI	ICR	HI	ICR
Aluminum	2.40E−04	--	2.06E−07	--
Arsenic	1.37E−01	6.18E−06	1.18E−04	2.65E−08
Barium	3.69E−03	--	3.16E−06	--
Beryllium	5.63E−04	1.04E−06	4.82E−07	4.44E−09
Cobalt	1.05E−03	--	8.99E−07	--
Copper	5.72E−04	--	4.90E−07	--
Iron	3.26E−01	--	2.80E−04	--
Mercury	1.28E−03	--	1.10E−06	--
Zinc	2.62E−03	--	2.24E−06	--
TOTAL	**4.74E−01**	**7.21E−06**	**4.06E−04**	**3.09E−08**

Dermal Contact

Compound	Resident Child*		Resident Adult*	
Total Dissolve Metals	HI	ICR	HI	ICR
Aluminum	1.75E−06	–	2.36E−06	–
Arsenic	9.99E−04	4.50E−08	1.35E−03	3.04E−07
Barium	2.69E−05	–	3.64E−05	–
Beryllium	4.10E−06	7.55E−09	5.55E−06	5.11E−08
Cobalt	7.63E−06	–	1.03E−05	–
Copper	4.16E−06	–	5.64E−06	–
Iron	2.38E−03	–	3.22E−03	–
Mercury	9.31E−06	–	1.26E−05	–
Zinc	1.14E−05	–	1.55E−05	–
TOTAL	**3.44E−03**	**5.25E−08**	**4.66E−03**	**3.55E−07**

* Exposed as trespasser/recreational.

HI = Hazard Index

ICR = Incremental Cancer Risk

The total HI for resident adult ($2.98x10^{-3}$) does not exceed unity. This suggests systemic health effects are not expected to occur subsequent to exposure. The ICR calculated for resident adult exposed to groundwater via ingestion was $1.28x10^{-7}$, which falls below USEPA's target risk range.

Groundwater Dissolved Metals:

The total HI for resident child (0.474) does not exceed unity. This suggests that systemic health effects are not expected to occur subsequent to exposure. The ICR for resident child exposed incidentally to groundwater was $7.21x10^{-6}$, which falls within the USEPA's target cancer risk range of 10^{-4} to 10^{-6}.

The total HI for resident adult ($4.06x10^{-4}$) does not exceed unity. This suggests systemic health effects are not expected to occur subsequent to exposure. The ICR calculated for resident adult exposed to groundwater via ingestion was $3.09x10^{-8}$, which falls below USEPA's target risk range.

Dermal Contact

Future Scenario

Groundwater Total Metals:

The total HI for resident child (0.0242) was below unity, suggesting that noncarcinogenic adverse health effects are not expected to occur subsequent to dermal contact with groundwater. The calculated ICR, $2.17x10^{-7}$, falls below the acceptable risk range of 10^{-4} to 10^{-6}.

The total HI for resident adult (0.0328) was also below unity, suggesting that noncarcinogenic adverse health effects are not expected to occur. The calculated ICR of $1.47x10^{-6}$, falls within the acceptable risk range of 10^{-4} to 10^{-6}.

Groundwater Dissolved Metals:

The total HI for resident child ($3.44x10^{-3}$) was below unity, suggesting that noncarcinogenic adverse health effects are not expected to occur subsequent to dermal contact with groundwater. The calculated ICR, $5.25x10^{-8}$, falls below the acceptable risk range of 10^{-4} to 10^{-6}.

The total HI for resident adult ($4.66x10^{-3}$) was also below unity, suggesting that noncarcinogenic adverse health effects are not expected to occur. The calculated ICR of $3.55x10^{-7}$, falls below the acceptable risk range of 10^{-4} to 10^{-6}.

Inhalation

No carcinogenic or noncarcinogenic inhalation exposure risks were calculated via this pathway due to only metals being present as COCs in this media.

Surface Water

Table 6.23 presents the carcinogenic and noncarcinogenic risks associated with potential current exposure to COCs, Table 6.24 presents the carcinogenic and noncarcinogenic risks associated with potential future exposure to COCs detected in Site 7 surface water.

Ingestion

Current Scenario

The total HI for trespasser child (16.1) exceeds unity. This suggests that systemic health effects may occur subsequent to exposure. The ICR for child exposed incidentally to surface water was 1.98×10^{-4}, exceeds USEPA's target cancer risk range of 10^{-4} to 10^{-6}.

The total HI for trespasser adult (3.45×10^{-3}) does not exceed unity. This suggests that systematic health are not expected to occur subsequent to exposure. The ICR calculated for trespasser adult exposed to surface water via ingestion was 2.12×10^{-7}, and falls below USEPA's target cancer risk range.

Future Scenario

The total HI for resident child (16.1) exceeds unity. This suggests that systemic health effects may occur subsequent to exposure. The ICR for child exposed incidentally to surface water was 1.98×10^{-4}, and exceeds the USEPA's target cancer risk range of 10^{-4} to 10^{-6}.

The total HI for resident adult (3.45×10^{-3}) does not exceed unity. This suggests systemic health effects are not expected to occur subsequent to exposure. The ICR calculated for resident adult exposed to surface water via ingestion was 2.12×10^{-7}, falls below the USEPA's target risk range.

Dermal Contact

Current Scenario

The total HI for trespasser child (0.0586) was well below unity, suggesting that noncarcinogenic adverse health effects will not occur subsequent to dermal contact with surface water. The calculated ICR, 7.19×10^{-7}, falls below the acceptable risk range of 10^{-4} to 10^{-6}.

The total HI for trespasser adult (3.96×10^{-2}) was also below unity, suggesting that noncarcinogenic adverse health effects will not occur. The calculated ICR of 2.43×10^{-6}, falls within the acceptable risk range of 10^{-4} to 10^{-6}.

TABLE 6.24
SURFACE WATER INGESTION AND DERMAL CONTACT RISKS
FUTURE SCENARIO
SITE 7
NAVAL AMPHIBIOUS BASE – LITTLE CREEK
VIRGINIA BEACH, VIRGINIA

Ingestion

	Resident Child		Resident Adult	
Compound	HI	ICR	HI	ICR
Aluminum	7.45E−02	--	1.60E−05	--
Arsenic	4.39E+00	1.98E−04	9.41E−04	2.12E−07
Barium	6.72E−02	--	1.44E−05	--
Cobalt	1.19E−02	--	2.56E−06	--
Copper	4.86E−02	--	1.04E−05	--
Iron	2.94E+00	--	6.29E−04	--
Manganese	8.54E+00	--	1.83E−03	--
Zinc	3.00E−02	--	6.44E−06	--
TOTAL	**1.61E+01**	**1.98E−04**	**3.45E−03**	**2.12E−07**

Dermal Contact

	Resident Child		Resident Adult	
Compound	HI	ICR	HI	ICR
Aluminum	2.71E−04	–	1.84E−04	–
Arsenic	1.60E−02	7.19E−07	1.08E−02	2.43E−06
Barium	2.45E−04	–	1.66E−04	–
Cobalt	4.34E−05	–	2.94E−05	–
Copper	1.77E−04	–	1.20E−04	–
Iron	1.07E−02	–	7.24E−03	–
Manganese	3.11E−02	–	2.10E−02	–
Zinc	6.56E−05	–	4.44E−05	–
TOTAL	**5.86E−02**	**7.19E−07**	**3.96E−02**	**2.43E−06**

HI – Hazard Index
ICR – Incremental Cancer Risk

Future Scenario

The total HI for resident child (0.0586) was well below unity, suggesting that noncarcinogenic adverse health effects will not occur subsequent to dermal contact with surface water. The calculated ICR, 7.19×10^{-7}, falls below the acceptable risk range of 10^{-4} to 10^{-6}.

The total HI for resident adult (3.96×10^{-2}) was also below unity, suggesting that noncarcinogenic adverse health effects will not occur. The calculated ICR of 2.43×10^{-6}, falls within the acceptable risk range of 10^{-4} to 10^{-6}.

Sediment

Table 6.25 presents the carcinogenic and noncarcinogenic risks associated with potential current exposure to COCs, Table 6.26 presents the carcinogenic and noncarcinogenic risks associated with potential future exposure to COCs detected in Site 7 sediment.

Ingestion

Current Scenario

The total HI for trespasser child (0.0269) falls below unity. This suggests that systemic health effects are not expected to occur subsequent to exposure. The ICR for child exposed incidentally to sediment was 3.68×10^{-7}, and falls below USEPA's target cancer risk range of 10^{-4} to 10^{-6}.

The total HI for trespasser adult (5.77×10^{-3}) falls below unity. This suggests that systematic health are not expected to occur subsequent to exposure. The ICR calculated for trespasser adult exposed to sediment via ingestion was 3.94×10^{-7}, and falls below USEPA's target cancer risk range.

Future Scenario

The total HI for resident child (0.0269) does not exceed unity. This suggests that systemic health effects are not expected to occur subsequent to exposure. The ICR for child exposed incidentally to sediment was 3.68×10^{-7}, and falls below USEPA's target cancer risk range of 10^{-4} to 10^{-6}.

The total HI for resident adult (5.77×10^{-3}) falls below unity. This suggests that systematic health will not occur subsequent to exposure. The ICR calculated for resident adult exposed to sediment via ingestion was 3.94×10^{-7}, and falls below USEPA's target cancer risk range.

Dermal Contact

Current Scenario

The total HI for trespasser child (4.90×10^{-4}) was well below unity, suggesting that noncarcinogenic adverse health effects will not occur subsequent to dermal contact with sediment. The calculated ICR,

TABLE 6.25
SEDIMENT INGESTION AND DERMAL CONTACT RISKS
CURRENT SCENARIO
SITE 7
NAVAL AMPHIBIOUS BASE – LITTLE CREEK
VIRGINIA BEACH, VIRGINIA

Ingestion

	Trespasser Child		Trespasser Adult	
Compound	HI	ICR	HI	ICR
Aluminum	5.75E−04	--	1.23E−04	--
Arsenic	7.33E−03	3.30E−07	1.57E−03	3.53E−07
Barium	8.69E−05	--	1.86E−05	--
Beryllium	2.05E−05	3.77E−08	4.38E−06	4.04E−08
Cadmium	1.59E−03	--	3.40E−04	--
Chromium	5.17E−04	--	1.11E−04	--
Cobalt	1.45E−05	--	3.11E−06	--
Copper	2.96E−04	--	6.34E−05	--
Iron	1.19E−02	--	2.56E−03	--
Manganese	3.44E−03	--	7.36E−04	--
Nickel	9.72E−05	--	2.08E−05	--
Vanadium	8.47E−04	--	1.82E−04	--
Zinc	1.82E−04	--	3.89E−05	--
TOTAL	**2.69E−02**	**3.68E−07**	**5.77E−03**	**3.94E−07**

Dermal Contact

	Trespasser Child		Trespasser Adult	
Compound	HI	ICR	HI	ICR
Aluminum	1.05E−05	–	1.43E−05	–
Arsenic	1.33E−04	6.00E−09	1.82E−04	4.10E−08
Barium	1.58E−06	–	2.16E−06	–
Beryllium	3.72E−07	6.86E−10	5.08E−07	4.69E−09
Cadmium	2.89E−05	–	3.94E−05	–
Chromium	9.40E−06	–	1.28E−05	–
Cobalt	2.64E−07	–	3.60E−07	–
Copper	5.38E−06	–	7.35E−06	–
Iron	2.17E−04	–	2.97E−04	–
Manganese	6.25E−05	–	8.54E−05	–
Nickel	1.77E−06	–	2.42E−06	–
Vanadium	1.54E−05	–	2.11E−05	–
Zinc	3.30E−06	–	4.51E−06	–
TOTAL	**4.90E−04**	**6.69E−09**	**6.69E−04**	**4.57E−08**

HI – Hazard Index

ICR – Incremental Cancer Risk

TABLE 6.26
SEDIMENT INGESTION AND DERMAL CONTACT RISKS
FUTURE SCENARIO
SITE 7
NAVAL AMPHIBIOUS BASE – LITTLE CREEK
VIRGINIA BEACH, VIRGINIA

Ingestion

	Resident Child		Resident Adult	
Compound	HI	ICR	HI	ICR
Aluminum	5.75E−04	--	1.23E−04	--
Arsenic	7.33E−03	3.30E−07	1.57E−03	3.53E−07
Barium	8.69E−05	--	1.86E−05	--
Beryllium	2.05E−05	3.77E−08	4.38E−06	4.04E−08
Cadmium	1.59E−03	--	3.40E−04	--
Chromium	5.17E−04	--	1.11E−04	--
Cobalt	1.45E−05	--	3.11E−06	--
Copper	2.96E−04	--	6.34E−05	--
Iron	1.19E−02	--	2.56E−03	--
Manganese	3.44E−03	--	7.36E−04	--
Nickel	9.72E−05	--	2.08E−05	--
Vanadium	8.47E−04	--	1.82E−04	--
Zinc	1.82E−04	--	3.89E−05	--
TOTAL	**2.69E−02**	**3.68E−07**	**5.77E−03**	**3.94E−07**

Dermal Contact

	Resident Child		Resident Adult	
Compound	HI	ICR	HI	ICR
Aluminum	1.05E−05	–	1.43E−05	–
Arsenic	1.33E−04	6.00E−09	1.82E−04	4.10E−08
Barium	1.58E−06	–	2.16E−06	–
Beryllium	3.72E−07	6.86E−10	5.08E−07	4.69E−09
Cadmium	2.89E−05	–	3.94E−05	–
Chromium	9.40E−06	–	1.28E−05	–
Cobalt	2.64E−07	–	3.60E−07	–
Copper	5.38E−06	–	7.35E−06	–
Iron	2.17E−04	–	2.97E−04	–
Manganese	6.25E−05	–	8.54E−05	–
Nickel	1.77E−06	–	2.42E−06	–
Vanadium	1.54E−05	–	2.11E−05	–
Zinc	3.30E−06	–	4.51E−06	–
TOTAL	**4.90E−04**	**6.69E−09**	**6.69E−04**	**4.57E−08**

HI – Hazard Index
ICR – Incremental Cancer Risk

$6.69x10^{-9}$, falls below the acceptable risk range of 10^{-4} to 10^{-6}.

The total HI for trespasser adult ($6.69x10^{-4}$) was also below unity, suggesting that noncarcinogenic adverse health effects will not occur. The calculated ICR of $4.57x10^{-8}$, falls below the acceptable risk range of 10^{-4} to 10^{-6}.

Future Scenario

The total HI for resident child ($4.90x10^{-4}$) was well below unity, suggesting that noncarcinogenic adverse health effects will not occur subsequent to dermal contact with sediment. The calculated ICR, $6.69x10^{-9}$, falls below the acceptable risk range of 10^{-4} to 10^{-6}.

The total HI for resident adult ($6.69x10^{-4}$) was also below unity, suggesting that noncarcinogenic adverse health effects will not occur. The calculated ICR of $4.57x10^{-8}$, falls below the acceptable risk range of 10^{-4} to 10^{-6}.

Fish

Table 6.27 presents the carcinogenic and noncarcinogenic risks associated with potential current exposure via fish ingestion to COCs, Table 6.28 presents the carcinogenic and noncarcinogenic risks associated with potential future exposure via fish ingestion to COCs detected in Site 7 .

Ingestion

Current Scenario

The total HI for trespasser child (0.627) falls below unity. This suggests that systemic health effects will not occur subsequent to exposure. The ICR for child exposed incidentally via fish ingestion was $2.82x10^{-5}$, which falls within USEPA's target cancer risk range of 10^{-4} to 10^{-6}.

The total HI for trespasser adult (0.134) falls below unity. This suggests that systematic health will not occur subsequent to exposure. The ICR calculated for trespasser adult exposed via fish ingestion was $3.03x10^{-5}$, which falls within USEPA's target cancer risk range.

Future Scenario

The total HI for resident child (0.627) falls below unity. This suggests that systemic health effects will not occur subsequent to exposure. The ICR for child exposed incidentally via fish ingestion was $2.82x10^{-5}$, which falls within USEPA's target cancer risk range of 10^{-4} to 10^{-6}.

The total HI for resident adult (0.134) falls below unity. This suggests that systematic health will not occur subsequent to exposure. The ICR calculated for resident adult exposed via fish ingestion was $3.03x10^{-5}$, which falls within USEPA's target cancer risk range.

TABLE 6.27
FISH INGESTION RISKS
CURRENT SCENARIO
SITE 7
NAVAL AMPHIBIOUS BASE – LITTLE CREEK
VIRGINIA BEACH, VIRGINIA

Ingestion

	Trespasser Child		Trespasser Adult	
Compound	HI	ICR	HI	ICR
Arsenic	6.27E−01	2.82E−05	1.34E−01	3.03E−05
TOTAL	**6.27E−01**	**2.82E−05**	**1.34E−01**	**3.03E−05**

HI – Hazard Index
ICR – Incremental Cancer Risk

TABLE 6.28
FISH INGESTION RISKS
FUTURE SCENARIO
SITE 7
NAVAL AMPHIBIOUS BASE – LITTLE CREEK
VIRGINIA BEACH, VIRGINIA

Ingestion

Compound	Resident Child		Resident Adult	
	HI	ICR	HI	ICR
Arsenic	6.27E−01	2.82E−05	1.34E−01	3.03E−05
TOTAL	6.27E−01	2.82E−05	1.34E−01	3.03E−05

HI – Hazard Index
ICR – Incremental Cancer Risk

6.8 Ecological Risk Evaluation

The risks to wildlife at each site can not be quantified with confidence because relevant field data are not available. A qualitative screening evaluation is presented here, and may be used as a basis for future study. Two evaluations are be made: an evaluation of chemical exposure to wildlife at each site, and an evaluation of habitat loss and wildlife displacement caused by remedial activities.

The first evaluation was performed on sites 7 and 12 where open water and sediments were found. Here, federal and Virginia water quality criteria and National Oceanic and Atmospheric Administration sediment screening values were compared to observed chemical concentrations. Site 7, which contains esturaine intertidal wetlands, was assumed to be a salt water environment, and site 12, which contains a flooded drainage canal, was assumed to be a fresh water environment. The other sites do not contain open water, and were not subject to this evaluation.

The Department of Conservation and Recreation (1990) reported that two tracts of wetlands exist in and around Site 7. The first is a 6.2 emergent wetland fringe dominated by saltwater cordgrass, and is located south of Little Creek Cove. The U.S. Fish and Wildlife Service designated this area as a regularly flooded, estuarine, intertidal, emergent wetland dominated by narrow-leaved, persistent vegetation. Most of this wetland is within Site 7. A small portion of another wetland is within the boundary of site seven. This wetland is east of Welicopter Road and southeast of Little Creek Cone. The U.S. Fish and Wildlife service describes this wetland as an irregularly flooded, estuarine, intertidal, emergent wetlands dominated by narrow-leaved persistent vegetation.

At site 7, copper exceeded the acute and chronic standards, lead exceeded the chronic standards, and zinc exceeded the Virginia chronic standards. At site 12, cadmium, chromium, copper, and zinc exceeded the acute and chronic standards, mercury exceeded the chronic standards, beryllium exceeded the Virginia acute standard, and iron and nickel exceeded the Virginia chronic standards. Exceeded standards suggest that these chemicals may enter the food chain and cause adverse acute and chronic effects on some resident wildlife. The evaluation for site 7 is shown in Table 6.53, and the evaluation for site 12 is shown in Table 6.54.

A similar evaluation for sediment was performed. At site 7, zinc was determined to be a possible contaminant. At site 12, lead and zinc were determined to be probable contaminants, and mercury was determined to be a possible contaminant. Exceeded thresholds suggest that these chemicals may enter the food chain and cause adverse acute and chronic effects on some resident wildlife. The evaluation for site 7 is shown in Table 6.55, and the evaluation for site 12 is shown in Table 6.56.

The evaluation for wildlife displacement is based on Section 6.9, Conclusions and Recommendations, where the possibility for displacement exists where a recommendation to remediate the site is made. Remediation is not recommended for Sites 9, 10, and 11, and so, an evaluation on wildlife displacement was not performed. The evaluation is based on Department of Conservation and Recreation (1990), which inventoried rare, threatened, and endangered species on the base. The report also listed animal species which were observed at the base.

TABLE 6.53
AMBIENT WATER QUALITY CRITERIA AND STATE OF VIRGINIA SURFACE WATER STANDARDS FOR
SELECT CHEMICALS DETECTED IN SURFACE WATER
SITE 7
NAVAL AMPHIBIOUS BASE – LITTLE CREEK
VIRGINIA BEACH, VIRGINIA

Chemical	Federal Ambient Water Quality Criteria				State of Virginia Water Standards				Maximum Detected Value (ug/l)	Frequency of Detection	Number of Exceedances of Criteria
	Fresh		Marine		Fresh		Marine				
	Acute (ug/l)	Chronic (ug/l)	Acute (ug/l)	Chronic (ug/l)	Acute (ug/l)	Chronic (ug/l)	Acute (ug/l)	Chronic (ug/l)			
INORGANICS (ppm):											
Arsenic	360 m	190 m	69 m	36 m	360	190	69	36	10.3	71%	0/5
Copper	18 e,m	12 e,m	2.9 m	2.9 m	4.8 *	3.6	2.9	2.9	14.1	71%	7/5
Iron	--	--	--	--	--	1000	--	--	6890	100%	1/7
Lead	82 e,m	3.2 e,m	220 m	8.5 m	13.9 *	0.56 *	220	8.5	50.0	43%	5/3
Zinc	120 e,m	110 e,m	95 m	86 m	6.5 *	47	95	58	70.5	43%	3/3

Notes:

* Based on the minimum hardness permitted.

e – Freshwater aquatic life criteria for these metals are expressed as a function of total hardness (mg/l), and as a function of the pollutant's water effect ratio. Values provided correspond to a total hardness of 100 mg/L and a water effect ratio of 1.0.

m – Criteria for these metals are expressed as a function of the water effect ratio, 1.0.

TABLE 6.55
SEDIMENT QUALITY CRITERIA AND MAXIMUM CONCENTRATIONS
FOR SELECT CHEMICALS DETECTED IN SEDIMENTS
SITE 7
NAVAL AMPHIBIOUS BASE – LITTLE CREEK
VIRGINIA BEACH, VIRGINIA

Chemical	NOAA Concentrations (1)		Maximum Detected Value	Frequency of Detection (2)	Evaluation Results (3)
	ER–L	ER–M			
INORGANICS (ppm):					
Arsenic	33	85	8.6	100%	Unlikely
Cadmium	5	9	3.1	43%	Unlikely
Chromium	80	145	10.1	100%	Unlikely
Copper	70	390	42.9	100%	Unlikely
Lead	35	110	31.1	100%	Unlikely
Nickel	30	50	7.6	86%	Unlikely
Silver	1	2.2	0.8	14%	Unlikely
Zinc	120	270	213.0	86%	Possible

Notes:

(1) Region IV Waste Management Division Sediment Screening Values for Hazardous Waste Sites. Based on effects Range – Low effects Range – High Values from: Long, Edward R., and Lee G. Morgan. 1990. The potential for biological effects of sediment–sorbed contaminants tested in the National Status and Trends Program. NOAA Technical Memorandum NOS OMA 52. Office of Oceanography and Marine Assessment, Seatle, WA.
NOAA – National Oceanic and Atmospheric Administration
ER–L – Effective Low Range
ER–M – Effective Medium Range

(2) Does not include duplicate sample.

(3) If sediment concentrations are above the ER–M, adverse health effects on biota are are considered Probable. If sediment concentrations are between ER–L and ER–M, adverse health effects on biota are Possible. If contaminant are below the ER–L, adverse health effects are considered Unlikely.

Rare plant species and rare animal species were found at the site. The plant species, *Lechea maritima* var. *virginica* (Virginia beach pinweed), *Quercus incana* (blue jack oak), and *Tillandsia usneoides* (Spanish moss), were observed in areas other than the designated sites and within sites 9 and 10. The impact of remedial activities is expected to be minimal since remedial activities at sites 9 and 10 are not recommended. Nesting *Sterna antillarum* (least tern) were observed and specimens of *Peromyscus leucopus easti* (Pungo mouse) were captured. These two species are found at or near the dunes east of Little Creek Channel. The impact of remedial activities is expected to be minimal since remedial activities at sites 9 and 10 are not recommended.

An abundance of other, nonthreatened mammal, bird, reptile, amphibian, and fish species were observed at the base. The potential for their displacement varies by site, since each site contains different habitats. Site 7 contains open water, wetlands, and mixed forest. Remediation of surface soil and surface water may include vegetation, soil, and sediment removal. This may displace a wide variety of mammal, bird, reptile and amphibian species, since it may be a relatively productive area. Site 12 contains a filled drainage canal, and some trees and brush. Remediation of this site may displace amphibians, reptiles, as well as birds and mammals which live in edge and brush habitats. Site 13 contains a mixed forest. Remediation of this site, where vegetation clearing and soil excavation may occur, may displace mammal, bird, and reptile species.

A quantitative study, including field sampling, may be required to evaluate ecological impacts more precisely and accurately.

6.9 Conclusions and Recommendations

This risk assessment suggests that carcinogenic and noncarcinogenic risks exist at sites 7, 12, and 13 for a number of media, pathways, and receptors. These risks are summarized below, and are detailed in Section 6.6.

As discussed in Section 6.5, risks are characterized and evaluated by comparing indices to standard values. Cancer risks are expressed in the incremental cancer risk (ICR), and are said to be evident when the ICR is greater than or equal to $1x10^{-4}$. Noncancer risks are expressed in the hazard index (HI), and are said to be evident when the (HI) exceeds 1.

Site 7

Conclusion

Lead concentrations detected in the surface soil, groundwater, and surface water in Site 7 pose a health risk for children from 0 to 84 months of age. The IEUBK model results showed that there is a high probability (92.6%) that child blood levels exceed (geometric mean of 20.4 μg/dL) EPA's blood level of concern.

Current Scenario

The only risk in the current scenario appears to be via surface water ingestion, where the HI was exceeded by the trespasser child (16.1). For this receptor, arsenic, iron and manganese appear to dominate. However, the hazard index calculated for iron is a conservative result due to the use of the derived RfD of iron as discussed in Section 6.7.3. Only the trespasser adult exceeded the ICR (1.98×10^{-4}), with arsenic being the controlling pollutant.

Future Scenario

A number of health risks exist in the future scenario. The resident child HI for ingestion of surface soil was exceeded (2.35). Here, manganese, iron and vanadium were the dominating chemicals. In the subsurface soil ingestion pathway shows an HI exceedance (1.15) for resident child. This exceedance is greatly dominated by arsenic, and to a lesser degree by iron. In the groundwater ingestion pathway, the resident child receptor exceeded the HI (3.33), where iron and arsenic dominate. Finally, in the surface water ingestion pathway, the resident child exceeded both the HI (16.1) and the ICR (1.98×10^{-4}). Arsenic, iron, and manganese significantly contribute to the index exceedances. In all exceedances involving iron, it should be noted that the hazard index calculated for iron is a conservative result due to the use of the derived RfD of iron as discussed in Section 6.7.3.

Recommendations

Site 7 remedial activates should seek to reduce several metals specifically lead, and aroclor-1260 when present in the surface water, groundwater, and surface soil. Additional investigations may be undertaken to confirm these findings, augment this study, and accurately delineate the location of the risk controlling chemicals for design purposes.

Site 9

Conclusion

Lead concentrations detected in the surface soil and groundwater in Site 9 shows no evidence of a health risk for children from 0 to 84 months of age. The IEUBK model results showed that there is a high probability (99.03%) that child blood levels will be below (geometric mean of 3.4 μg/dL) EPA's blood level of concern.

Current Scenario

Health risks are not evident in Site 9 since neither the HI nor the ICR were exceeded for each pathway and receptor.

7.6 Remedial Alternatives for Site 7

Affected media for Site 7 are soils, groundwater, and surface water. SVOCs and PCBs have been detected in surface soils; TAL metals are the constituents of concern in surface soils, groundwater, surface water, and sediments. Metals in detected in sediments do not pose any human health risks, therefore no remedial option has been evaluated for sediments.

As part of the Best Management Practice, NAB Little Creek has already undertaken various activities at the site to reduce any adverse human exposure to the constituents of concern. The site access has been limited, and loose materials at the site have been removed. The base plans to add topsoil to the existing surface of the landfill and plant and maintain a grass area.

General response actions applicable to soils at Site 7 are the following:

- No Action,
- Limited Action,
- Containment, and
- Removal followed by Treatment and/or Disposal.

It is important to grasp the magnitude of the waste soil volume prior to determining the feasibility of each action. The total volume of the contaminated fill at the site is estimated to be 1.2 million cubic yards, using an average fill height of 15 feet for the entire 50 acre area. This is more likely an upper bound of the estimate, and geophysical investigation may have to be undertaken if accurate determination of fill boundaries becomes necessary. The hot spots at the site may only constitute approximately 5 acres, which is equivalent of 120,000 cy using an average height of 15 feet. Hot spots consist of localized areas where PCBs or SVOCs have been detected and former dumping areas which have not been sampled. In such a case, removal of contaminated soil at the hot spot areas may potentially cost up to an estimated $36 million using an average cost of $300 a cy for removal, transportation, and disposal.

Therefore, in-situ treatment options such as stabilization, soil flushing, and vacuum extraction can all be applied to localized hot spots, but their application to the entire site will require extensive chemical and geological characterization of the site. Since restoration of site soils to background levels is not an RAO, removal and treatment alternatives can be eliminated; their extremely high costs do not provide any added benefit to human health and the environment, except the permanent removal of contamination source at the site. Removal and/or Treatment alternative will be considered only for localized hot spots.

The No Action alternative will be evaluated for all sites as a baseline for comparison with other alternatives.

The general response actions for groundwater will consist of:

- Limited Action,
- Containment Options, and
- Collection and Treatment.

At this time, additional hydrological characterization using pump tests, slug tests, and subsurface grain analysis will be required for the evaluation of treatment options.

The remediation efforts for the surface water is driven by the fact the Little Creek Cove and the East and West canals are heavily tidally influenced. In this scenario, collection and treatment of surface water is not practical. The remediation efforts should focus on Limited Action and Containment, in conjunction with the response actions for groundwater. Therefore the applicable general response action are:

- Limited Action, and
- Containment.

Remedial Alternatives Development: Remedial alternatives have been initially developed for each media of concern. Each remedial alternative is described below.

7.6.1 Soils

Remedial alternatives for soils at Site 7 were developed based on the GRAs and site-specific physical and chemical characteristics. Remedial alternatives for soils will address constituents which equal or exceed the risk factor of 1×10^{-6}. Remedial alternatives which may meet or exceed the RAOs for soils at Site 7 are categorized as follows:

- Alternative 1A - No Action/Deed Restrictions
- Alternative 2A - Limited Action
- Alternative 3A - Capping
- Alternative 4A - In-Situ Treatment by Chemical Fixation at Hot Spots
- Alternative 5A - Excavation and Off-site Disposal of Soils at Selected Hot Spots

Remedial alternatives for soils were screened using the screening criteria presented in Section 7.2.2. The screening results for soil remedial alternatives are presented in Table 7-2.

Alternative 1A - No Action/Deed Restrictions

Implementation of this alternative entails administratively limiting use of the site. This is accomplished by imposing restrictions on the property deed.

Effectiveness. In the short-term, this alternative would be very effective because it would require minimal worker exposure. In the long-term, this alternative would be ineffective because it doesn't address future potential risks that may be posed by the constituents of concern. It is unlikely that this alternative would comply with chemical-specific ARARs.

Implementability. Implementation of this alternative would require no construction. The technical feasibility is traditional. The administrative feasibility is elementary.

TABLE 7-2

SOIL REMEDIAL ALTERNATIVES SCREENING

SITE 7: AMPHIBIOUS BASE LANDFILL

NAVAL AMPHIBIOUS BASE LITTLE CREEK

VIRGINIA BEACH, VIRGINIA

ALTERNATIVES	Implementability				Effectiveness			
	Time to Construct	Technical Feasibility	Administrative Feasibility	Site Disturbance	Short Term	Long Term	Compliance w/ARARs	Cost
1A:No Action/Deed Restrictions	Short	Traditional	Elementary	Little	Effective	Ineffective	None	Lowest
2A: Limited Action	Short	Traditional	Elementary	Moderate	Effective	Moderate	Moderate	Low
3A:Containment/ Capping	Average	Traditional	Moderate	Moderate	Moderate	Moderate	Near Full	Medium
4A:In-situ Treatment/Chemical Fixation	Average	Innovative	Moderate	Moderate	Moderate	Moderate	Unknown	Medium
5A:Excavation and Offsite Disposal	Long	Traditional	Moderate	Extreme	Ineffective	High	Full	High

Cost. This alternative would provide the lowest cost of all soil remedial alternatives.

Alternative 2A - Limited Action

Implementation of this alternative entails all administrative measures to be taken as part of alternative 1A, and adding a topsoil and vegetative layer to the open surfaces of the landfill. Such measures are planned as part of the landfill management program at the base. The topsoil layer would be two to four inches thick, and the vegetative cover will be monitored and maintained on a periodic basis. An additional measure which may accompany the deed restriction includes construction of a perimeter fence, to inhibit entrance onto the site. Such a fence is already present at portions of the site. It will need further fortifications.

Effectiveness. In the short-term, this alternative would be effective because no intrusive activities are planned at the site. In the long-term, this alternative would be moderately effective because it addresses the most critical exposure routes of future potential risks, namely inhalation and dermal contact. It is likely that this alternative would comply with most chemical-specific ARARs.

Implementability. Implementation of this alternative would require a short construction duration. The technical feasibility is traditional. The administrative feasibility is elementary. Disturbance to the site would be moderate during the spreading of topsoil and construction of a perimeter fence. However, the disturbance will not be intrusive and no fugitive emissions of constituents of concern are anticipated.

Cost. This alternative would provide a low cost soil containment alternative.

Alternative 3A - Capping

This is a containment measure for both media, groundwater and soil. It prevents infiltration into groundwater, eliminates dermal contact risk scenario with site soils, and mitigates volatile emissions from the landfill. A cap can be constructed of a single layer or multi-layer. Construction detail for each type of cap are presented in Appendix O. The evaluation of this alternative is described in Section 7.6.3. However, Table 7-2 incorporates alternative ranking by criteria, for ready reference.

Alternative 4A - In-situ Treatment by Chemical Fixation of Hot Spot Soils

Implementation of this alternative entails introducing the targeted constituents of concern with a chemical reagent that will react and immobilize the constituents. The chemical reaction immobilizes targeted constituents by enveloping them within molecules of the reagent.

Effectiveness. In the short-term, this alternative would be moderately effective due to the reaction time of the soils and constituents of concern to the treatment reagent. In the long-term, this alternative would be moderately effective due to the potential for concentrations of constituents of concern to remain stabilized; however, there is a potential for its failure. This alternative may or may not fully comply with ARARs, depending on acceptance of the technology, since concentrations of constituents of concern would remain in the soil encapsulated by the chemical reagent.

Implementability. Implementation of this alternative would require an average construction duration. The technical feasibility is considered innovative. The administrative feasibility is moderate. Disturbance to the site would be moderate.

Cost. The cost to implement this alternative would be medium to high, when compared to other remedial alternatives for soil. Higher costs may result simply because of the large area to be covered.

Alternative 5A - Excavation and Off-site Disposal of Selected Hot Spot Soils

Implementation of this alternative entails excavating soils in the hot spots containing constituents of concern and transporting them off-site for permanent disposal at a permitted TSD facility. The constituents of concern may be treated prior to transportation to the off-site TSD facility to reduce potential liabilities associated with the constituents of concern. It is impractical to implement this alternative at the entire site.

Effectiveness. In the short-term, this alternative would be ineffective due to the short-term effect on site workers and possible pollution of nearby areas. In the long-term, this alternative would be very effective because constituents of concern would be removed. This alternative may or may not fully comply with ARARs, depending on the potentially hazardous side effects intrinsic to widespread excavation of a former landfill.

Implementability. Implementation of this alternative would require a long construction duration. The technical feasibility is considered traditional. The administrative feasibility is moderate. Disturbance to the site would be extreme.

Cost. The cost to implement this alternative would be high when compared to other remedial alternatives for soil.

7.6.2 Surface Water

Remedial alternatives for Site 7 surface water and sediments were developed based on the GRAs and site-specific physical and chemical characteristics. Treatment of surface water is not deemed necessary since TAL metals are the only constituent of concern at this time; and the water is not used as a potable source. Remedial alternatives which may meet or exceed the RAOs for surface water at Site 7 are categorized as follows:

- Alternative 1B - No Action/Institutional Controls and Monitoring
- Alternative 2B - Runon Prevention, Runoff Interception
- Alternative 3B - Surface Controls, Vertical Barriers, and Collection

Remedial alternatives for surface water were screened using the screening criteria presented in Section 7.2.2. The screening results for surface water remedial alternatives are provided in Table 7-3.

TABLE 7-3

SURFACE WATER REMEDIAL ALTERNATIVES SCREENING

SITE 7 : AMPHIBIOUS BASE LANDFILL

NAVAL AMPHIBIOUS BASE LITTLE CREEK

VIRGINIA BEACH, VIRGINIA

ALTERNATIVES	Implementability				Effectiveness			
	Time to Construct	Technical Feasibility	Administrative Feasibility	Site Disturbance	Short Term	Long Term	Compliance w/ARARs	Cost
1B:No Action/Institutional Controls	Short	Traditional	Elementary	Little	High	Ineffective	None	Lowest
2B:Runon and Runoff Control/Treatment	Average	Traditional	Moderate	Moderate	Ineffective	Moderate	Near-full	Medium
3B:Isolation/Collection	Long	Traditional	Moderate	Extreme	Ineffective	High	Full	High

Alternative 1B - No Action/Institutional Controls and Monitoring

The no action alternative entails administratively controlling the use of surface water. This can be accomplished by imposing restrictions on the use of the surface water bodies impacted by constituents of concern. Additional measures which may accompany restricted use include the establishment of a surface water monitoring program.

Effectiveness. In the short-term, this alternative would be very effective because it would require minimal worker exposure. In the long-term, this alternative would be ineffective because it doesn't address future potential risks that may be posed by the constituents of concern. It is unlikely that this alternative would comply with ARARs.

Implementability. Implementation of this alternative would require a short construction duration. The technical feasibility is traditional. The administrative feasibility is elementary. Disturbance to the site would be little, if staff gauges were installed.

Cost. This alternative would provide the lowest cost of all surface water remedial alternatives.

Alternative 2B - Runon Prevention, Runoff Interception, and Treatment

Implementation of this alternative entails construction of an integrated surface water management system to control storm water. Storm water runon, which would have the potential to become contaminated, is prevented by constructing trenches around the area of concern. Separate trenches are constructed to collect runoff from the area of concern, and may be combined with subsurface collection and treatment systems. In the event of a capped landfill, implementation of this alternative is not expected to be a major operation, since the existing surface water contamination does not warrant one.

Effectiveness. In the short-term, this alternative would be ineffective because it would require significant worker exposure and produce undesirable site conditions until the completion of construction. In the long-term, this alternative would be moderately effective because while it would be designed to collect and treat constituents of concern in the surface water, it would require an indefinite period of operation due to open body waters having continual exposure to the constituent source. This alternative may achieve near-full compliance with all ARARs.

Implementability. Implementation of this alternative would require an average construction duration. The technical feasibility is traditional, except possibly for the treatment technology. The administrative feasibility is moderate. Disturbance to the site would be moderate.

Cost. This alternative would be medium in cost compared to other surface water remedial alternatives.

Alternative 3B - Surface Controls, Vertical Barriers, and Collection

Implementation of this alternative entails construction of both surface controls, such as runon and runoff trenches, and vertical barriers with a collection system. The vertical barriers separate surface water containing constituents of concern from surface water not containing constituents of concern.

Effectiveness. In the short-term, this alternative would be ineffective because it would require significant worker exposure and produce undesirable site conditions until the completion of construction. In the long-term, this alternative would be very effective because it would be designed to both collect and treat constituents of concern in the surface water, and eliminate future contact of the constituent source with open water bodies. This alternative may achieve full compliance with all ARARs.

Implementability. Implementation of this alternative would require long construction duration. The technical feasibility is traditional, except possibly for the treatment technology. The administrative feasibility is moderate. Disturbance to the site would be extreme.

Cost. This alternative would be high in cost compared to other surface water remedial alternatives.

7.6.3 Groundwater

Remedial alternatives for Site 7 groundwater were developed based on the GRAs and site-specific physical and chemical characteristics. Remedial alternatives which may meet or exceed the RAOs for groundwater at Site 7 are categorized as follows:

- Alternative 1C - No Action/Institutional Controls and Monitoring
- Alternative 2C - Landfill Cap
- Alternative 3C - Landfill Cap with Vertical Barriers
- Alternative 4C - Landfill Cap with Vertical Barriers, Pumping & Treatment by Chemical Precipitation, Discharge to POTW

Remedial alternatives for groundwater were screened using the screening criteria presented in Section 7.2.2. The screening results for groundwater remedial alternatives are provided in Table 7-4.

Alternative 1C - No Action/Institutional Controls and Monitoring

The no action alternative entails administratively controlling the use of groundwater. This can be accomplished by imposing restrictions on the use of the groundwater impacted by constituents of concern. Additional measures which may accompany restricted use include the establishment of a groundwater monitoring program.

Effectiveness. In the short-term, this alternative would be very effective because it would require minimal worker exposure. In the long-term, this alternative may be moderately effective because constituents of concern may dissipate below levels of concern if original concentrations are low and the

TABLE 7-4

GROUNDWATER REMEDIAL ALTERNATIVES SCREENING

SITE 7 : ABPHIBIOUS BASE LANDFILL

NAVAL AMPHIBIOUS BASE LITTLE CREEK

VIRGINIA BEACH, VIRGINIA

ALTERNATIVES	Implementability				Effectiveness			
	Time to Construct	Technical Feasibility	Administrative Feasibility	Site Disturbance	Short Term	Long Term	Compliance w/ARARs	Cost
1C:No Action/Institutional Controls	Short	Traditional	Elementary	Little	High	Moderate	None	Lowest
2C:Landfill Cap	Average	Traditional	Moderate	Moderate	Moderate	Moderate	Near-full	Medium
3C:Landfill Cap/Vertical Barriers	Long	Modern	Moderate	Extreme	Ineffective	Moderate	Near-full	Medium/High
4C:3C plus Chemical Precipitation	Long	Modern	Difficult	Extreme	Ineffective	High	Full	High

constituent source is remediated. This alternative is not expected to comply with chemical-specific ARARs.

Implementability. Implementation of this alternative would require a short construction duration. The technical feasibility is traditional. The administrative feasibility is elementary. Disturbance to the site would be little if a monitoring well system were installed.

Cost. This alternative would provide the lowest cost of all groundwater remedial alternatives.

Alternative 2C - Capping

Implementation of this alternative entails covering the surface of areas of concern with an impermeable landfill cap. The cap prevents surface water infiltration, through soils containing constituents of concern, which could potentially carry constituents of concern to the groundwater. Construction details of the different cap types are presented in Appendix O. This alternative represents a passive remedial method because it eliminates the source of the constituents of concern and does not actively treat the groundwater already containing constituents of concern.

Effectiveness. In the short-term, this alternative would be ineffective because it would require significant worker exposure and would not provide any short-term benefit to the groundwater. In the long-term, this alternative may be less than moderately effective. Depending on original concentrations, constituents of concern in groundwater may dissipate below levels of concern even if the constituent source is not remediated, because the cap would eliminate hydrologic contact with the surface. However, this alternative would be ineffective in eliminating subsurface hydrologic contact with the constituent source. Tidal influences from the adjacent creek, and consequentially fluctuating groundwater levels in this area, could cause continual impact of the constituents of concern in the groundwater. This alternative is expected to achieve near-full compliance with ARARs.

Implementability. Implementation of this alternative would require a medium construction duration. The technical feasibility is traditional to modern, depending upon the cap system selected. The administrative feasibility is moderate. Disturbance to the site would be moderate to extreme.

Cost. This alternative would be medium in cost compared to other groundwater remedial alternatives.

Alternative 3C - Landfill Cap with Vertical Barriers

Implementation of this alternative entails covering the areas of concern in both the horizontal and vertical planes. Construction of a landfill cap prevents surface water infiltration, through soils containing constituents of concern, which could potentially carry constituents of concern vertically to the groundwater.

Construction of vertical barriers prevents subsurface water infiltration, through soils containing constituents of concern, which could potentially carry constituents of concern horizontally to the groundwater. Adding vertical barriers to a landfill cap provides a more comprehensive containment

system. Typical vertical barrier is a slurry wall, as described in Appendix O. The slurry wall is keyed into a clay layer at the bottom, and together they can make a perfect seal to prevent the migration of contaminants. Thickness of the clay layer beneath Site 7 varies; but is estimated to be at least 15 feet thick. This layer lies between 8 ft bgs to 20 ft bgs. Therefore, construction of slurry walls is technically feasible and can be effective to prevent outward migration of contaminated groundwater.

This alternative represents a passive remedial method because it eliminates the source of the constituents of concern and does not actively treat the groundwater already containing constituents of concern.

Effectiveness. In the short-term, this alternative would be ineffective because it would require significant worker exposure and would not provide any short-term benefit to the groundwater. In the long-term, this alternative may be moderately effective, depending on original concentrations. By eliminating both surface and subsurface hydrologic contact with the constituent source, constituents of concern may naturally attenuate below levels of concern, even if the constituent source is not remediated. This alternative is expected to achieve near-full compliance with ARARs.

Implementability. Implementation of this alternative would require a long construction duration. The technical feasibility is traditional to modern, depending upon the cap and vertical barrier system selected. The administrative feasibility is moderate. Disturbance to the site would be extreme.

Cost. This alternative would be medium to high in cost compared to other groundwater remedial alternatives.

Alternative 4C - Landfill Cap with Vertical Barriers, Pumping & Treatment by Chemical Precipitation, Discharge to Publicly Owned Treatment Works (POTW)

Implementation of this alternative entails construction of a comprehensive containment system followed by recovery and treatment of groundwater containing constituents of concern, and discharge of treated groundwater to a local POTW. Treatment of the groundwater by chemical precipitation entails pumping groundwater to the surface and removing constituents of concern in a closed treatment system. Constituents of concern are treated to concentrations corresponding with acceptable levels set by the local POTW for discharge to the sanitary sewer plant or acceptable levels established by ARARs for discharge to the ground surface.

Effectiveness. In the short-term, this alternative would be ineffective because it would require significant worker exposure and would not provide any short-term benefit to the groundwater. In the long-term, this alternative may be very effective. This alternative would comply with all ARARs; however, it would require consent by the local POTW to discharge.

Implementability. Implementation of this alternative would require a long construction duration. The technical feasibility is modern. The administrative feasibility is difficult, since discharge to POTW is becoming almost unacceptable. Disturbance to the site would be extreme.

Cost. This alternative would be high in cost compared to groundwater remedial alternatives 1C through 3C.

7.6.4 Recommendations

With the evaluation of general response actions and process options selected for each media, the following remedial alternatives can be formulated for Site 7:

Alternative 7.1 : No Further Action

Alternative 7.2 : Limited Action which will consist of Deed Restrictions, Site Control including Fencing, and preparation of a topsoil & vegetative cover on the open surfaces of the landfill.

Alternative 7.3 : A single-layer cap on the landfill; monitor groundwater and surface water quality; institutional controls such as warning signs prohibiting fishing, groundwater usage, etc.

Alternative 7.4 : All of alternative 7.3; Groundwater containment measure such as a slurry wall around the entire landfill to prevent further migration of groundwater constituents of concern.

Alternative 7.5 : All of alternative 7.3; Removal of surface and subsurface soils from around the hot spots.

A groundwater pumping and treatment option has not been evaluated, since the RAOs for the site do not dictate restoration of groundwater quality.

The detailed analysis of alternative will be conducted in the expanded FS subsequent to additional investigations, if any. Based on the preliminary analysis of remedial alternatives, alternative 7.2 is the recommended alternative for Site 7. However, if alternative 7.4 or 7.5 is to be selected, the extent of the hot spots may have to be further defined through additional sampling and analysis. At this time, continued groundwater monitoring and institutional controls are identified as interim remedial measures at the site. These measures should be implemented until a final remedy is selected after an expanded FS.

7.7 Remedial Alternatives for Site 9

Surface soil and groundwater sampling at Site 9 have revealed no constituent of concern at levels posing potential risks to human health and the environment. Section 5.1 indicates that no VOCs have been detected in groundwater; but exceedances of Arsenic, Cadmium, Iron, Lead, Manganese, and Zinc above VSWCB's groundwater criteria have been observed. However, risk evaluation in Section 6.0 indicates no risk from their presence. In addition, the maximum level of As detected at Site 9 groundwater, 7.9 ug/kg, is well below the levels seen in the background monitoring wells at the site, which are up to 16 ug/kg. Therefore, development or evaluation of remedial alternatives is not deemed necessary at Site 9.

ug/L ?

8.0 CONCLUSIONS AND RECOMMENDATIONS

The conclusions have been classified as physical nature of the site and chemical nature of the site. Chemical nature of the site is also quantified by risk analysis. Recommendations are based on the preliminary FS analysis conducted in Section 7.0.

8.1 Site 7 : Amphibious Base Landfill

Physical Characteristics

Shelby tube samples collected between 0-2 feet showed a coefficient of permeability between 2.0 X 10^{-3} cm/sec (5.7 ft/day) and 6.1 X 10^{-5} cm/sec (0.2 ft/day); a landfill cap usually requires the permeability coefficient of the order of 10^{-8} cm/sec.

All five borings drilled encountered a thin surface layer of either sand or sand with clay lenses, followed by a clay layer of undetermined thickness at varying depths. The clay layer appears homogeneous. The thickness of the clay layer was not determined however the minimum clay thickness penetrated was greater than five feet. A subsurface shelby tube sample was collected within the clay which showed the 99.3 percent clay and a coefficient of permeability of 2.9 X 10^{-8} cm/sec (8.2 x 10^{-5} ft/day). The soil borings appear to confirm that the undisturbed natural soil underlying the site can be classified as part of the Columbia Formation.

Groundwater flow is to the north - northeast towards Little Creek Cove. The average hydraulic gradient across the site is 1.1 x 10^{-2} feet/foot. The long term water level data recorded in the five monitoring wells indicate varied amounts of change due to tidal influence. Monitoring wells near Little Creek Cove exhibited the most tidal influence, with daily tidal fluctuations of nearly one foot. The monitoring wells farthest from Little Creek Cove showed little tidal influence, with the greatest daily tidal fluctuation being approximately 0.1 feet.

Additional conclusions from the tidal and groundwater hydrograph data were also made. The hydrographs indicated that time of sampling is important for the five wells located along the northwest portion of Site 7, LC7-GW6, LC7-GW7, and LC7-GW8, and probably LC-GW5 and LC-GW9. These wells should be sampled at low tides to obtain a representative sample and avoid sampling mixed groundwater and surface water. These wells were sampled at low tide for this investigation. Groundwater to surface water discharge zones, and the rate of groundwater discharge, both change in response to tidal changes. With a rising tide, groundwater to surface water discharge zones shift slightly inland onto the low lying areas bordering the northern portion of the site. The rate of groundwater discharge increases and decreases in response to a low and high tide respectively. Samples collected during low tide, as during this investigation, will sample constituents of concern during periods of maximum groundwater discharge.

Water levels recorded at staff gauges LC7-SG1 and LC7-SG2 displayed relatively constant tidal fluctuations with only very slight increases in water level observed after periods of rainfall. A sinusoidal pattern associated with lunar phases is observable on the 30 day staff gage hydrographs.

Chemical

Affected media for Site 7 are surface soils, groundwater, and surface water. SVOCs and PCBs have been detected in surface soils; TAL metals are the constituents of concern in surface soils, groundwater, surface water. TAL metals detected in sediments do not pose any human health risks.

Risk Assessment

Lead concentrations detected in the surface soil, groundwater, and surface water in Site 7 pose a health risk for children from 0 to 84 months of age. The IEUBK model results showed that there is a high probability (92.6%) that child blood levels exceed (geometric mean of 20.4 μg/dL) EPA's blood level of concern.

Current Scenario

The only risk in the current scenario appears to be via surface water ingestion, where the HI was exceeded by the trespasser child (16.1). For this receptor, arsenic, iron and manganese appear to dominate. However, HI calculated for iron is a conservative result due to the use of the derived RfD of iron as discussed in Section 6.7.3. Only the trespasser adult exceeded the ICR (1.98×10^{-4}), with arsenic being the controlling pollutant.

Future Scenario

A number of health risks exist in the future scenario. The resident child HI for ingestion of surface soil was exceeded (2.35). Here, manganese, iron and vanadium were the dominating chemicals. In the subsurface soil ingestion pathway shows an HI exceedance (1.15) for resident child. This exceedance is greatly dominated by arsenic, and to a lesser degree by iron. In the groundwater ingestion pathway, the resident child receptor exceeded the HI (3.33), where iron and arsenic dominate. Finally, in the surface water ingestion pathway, the resident child exceeded both the HI (16.1) and the ICR (1.98×10^{-4}). Arsenic, iron, and manganese significantly contribute to the index exceedances.

FS Recommendations

Based on the preliminary analysis of remedial alternatives, the recommendation is for a Limited Action Alternative consisting of preparation of a topsoil & vegetative cover on the open surface of the landfill, monitoring groundwater and surface water quality, and institutional controls such as fencing, warning signs, and deed restrictions.

At this juncture, it should be reiterated that this FS analysis is conducted with the view that the Site 7 and other IR sites will continue to operate within the Navy installation jurisdiction. In the event that the base gets listed for closure, the sites would be reevaluated under the Base Realignment and Closure Act (BRAC).

8.2 Site 9 - Driving Range Landfill

Physical Characteristics

Three different types of surface soils and sediment were observed at Site 9. These included sand, clayey silty sand, and sand with cobbles. The sand ranged from fine to coarse in size based on visual classification. The coefficient of permeability of the shelby tube sample were 7.2 X 10^{-3} cm/sec and 3.6 X 10^{-2} cm/sec.

No drilling activities were performed at Site 9 during this investigation. Groundwater flows from the inland areas across the site to the northeast towards Sicily Beach 1 and Chesapeake Bay. The bay is located approximately 600 feet north of the northern border of Site 9. The flow across Site 9 appears to be northeast from a slight groundwater drainage divide which approximately parallels Hewitt Drive. The average hydraulic gradient across the site calculated from the June 28, 1993 water level data, is 1.3 x 10^{-3} feet/foot.

The long term water level data recorded in the two monitoring wells indicated only slight influences from daily tidal effects. Monitoring Well LC9-GW5 indicates a daily tidal fluctuation less than 0.05 feet and Monitoring Well LC9-GW6 indicates a daily tidal fluctuation range of 0.05 to 0.25 feet.

Risk Assessment

Lead concentrations detected in the surface soil and groundwater in Site 9 shows no evidence of a health risk for children from 0 to 84 months of age. The IEUBK model results showed that there is a high probability (99.03%) that child blood levels will be below (geometric mean of 3.4 μg/dL) EPA's blood level of concern.

Current Scenario

Health risks are not evident in Site 9 since neither the HI nor the ICR were exceeded for each pathway and receptor.

Future Scenario

The resident child HI for ingestion of surface soil was exceeded (1.05). Here, manganese and iron were the dominating chemicals; however, the calculated toxicological indices overestimate risks due conservative assumptions for both metals.

Appendix A.2

Soil and Monitoring Well Logs

FOSTER WHEELER ENVIRONMENTAL SERVICES
TEST BORING LOG

BORING NO.: 07 - SB - 06 D
PROJECT NO./NAME: 4-22-00-192071 / NAB - Little Creek
GEOLOGIST/OFFICE: M. Evans / Livingston, NJ

DATE: 7/14/93
LOCATION: Site 7 - Sanitary Landfill
DRILLING CONTRACTOR: McCallum, Inc.
DRILLER: Tom Jones

DRILLING EQUIPMENT/METHOD: ATV Rig / Hollow Stem Auger **SIZE/TYPE OF BIT:** 4 1/4" ID
SAMPLE METHOD: Continuous split-spoon **START/FINISH DATE:** 7/14/93 - 7/14/93

WELL INSTALLED? YES___ **NO** X **SCREEN:**_____ **LENGTH:**_____ ___**TO**___ **FEET**

REMARKS:_____

DEPTH (FT)	SAMPLE NO. AND TYPE	RECOVERY (FT)	PENETRATION RESISTANCE BLOWS/6"	SAMPLE DESCRIPTION	PID READING (PPM)
0-2	01	1.58	2-3-4-5	Grass, roots, M-F dry, loose, moderately well sorted brown SAND. Trace CLAY.	-
2-4	02	1.41	5-5-5-4	Tan M-F dry moderately well sorted SAND. Some shell fragments. Lower 2" trace damp.	-
4-6	03	1.58	2-1-1-0	Top 5" brown trace damp M-F SAND. 11" light brown, moist M-F SAND.	-
6-8	04	1.41	2-1-1-2	Upper 2" tan M-F SAND with a trace of silt, moist. At 2" pine needle layer, then orangish brown bands of VF SAND with some silt. Next 3" F-VF SAND with a trace of silt, saturated. Lower 10" wet gray F-VF SAND with a trace of silt. Bottom 5" saturated.	-
8-10	05	1.58	1-1-0-1	Top 5" brown orange mottled M-F SAND. Moist, wood fragments. Lower 14" wet gray F-VF SAND with a trace of silty clay.	-
10-12	06	1.16	5-2-3-4	Top 3", slough, brown, dry M-F SAND, next 2" gray M-F SAND with trace silty clay. Lower 9" light gray loose M-F SAND. Very little silt.	-
12-14	07	1.33	4-4-4-5	Top 4" VF SAND with some silt. Next 6" saturated gray loose moderately sorted M-F SAND. Lower 6" graduated to tan loose moderately sorted M-F SAND.	-

FOSTER WHEELER ENVIRONMENTAL SERVICES
TEST BORING LOG

BORING NO.: 07 - SB - 06 D
PROJECT NO./NAME: 4-22-00-192071 / NAB - Little Creek
GEOLOGIST/OFFICE: M. Evans / Livingston, NJ

DATE: 7/14/93
LOCATION: Site 7 - Sanitary Landfill
DRILLING CONTRACTOR: McCallum, Inc.
DRILLER: Tom Jones

DEPTH (FT)	SAMPLE NO. AND TYPE	RECOVERY (FT)	PENETRATION RESISTANCE BLOWS/6"	SAMPLE DESCRIPTION	PID READING (PPM)
14-16	08	1.75	4-4-7-6	Top 3" slough. Lower 18" moderately sorted tan, wet M-VF SAND with a trace of silt.	-
16-18	09	2.00	4-5-5-6	Top 10" gray saturated moderately sorted M-F SAND, trace C sand, very little fines. Lower 14" tan saturated moderately sorted M-VF SAND.	-
18-20	10	2.00	2-2-2-2	Top 4" slough. Orange moderately sorted M-F SAND. Lower 20" light gray soft CLAY with occasional orangish mottles. Sand lenses at 13", trace F-VF SANDY SILT.	-
20-22	11	2.00	3-3-3-3	Top 5" brown to tan M-F SAND. Lower 19" very soft gray CLAY with orange mottles. Trace M-F orange SAND.	-
22-24	12	1.91	2-2-3-3	Top 1" slough. Remainder gray soft CLAY mottled yellowish brown. Occasional peat lenses at lower 9".	-
24-26	13	2.00	4-4-4-4	Soft to medium firm gray CLAY with some orangish brown peat lenses.	-
26-28	14	2.00	3-4-5-6	SAME as previous spoon.	-
28-30	15	2.00	5-5-5-6	SAME as previous spoon.	-
30-32	16	2.00	5-5-5-2	Top 3" slough, very soft gray CLAY with some M-F silty sand. Remaining 21" firm gray CLAY with orange and brown mottles.	-
32-34	17	2.00	7-11-12-11	Top 13" gray soft CLAY. Remainder tan M-F SANDY CLAY, with some iron concretions.	-

FOSTER WHEELER ENVIRONMENTAL SERVICES
TEST BORING LOG

BORING NO.: 07 - SB - 06 D
PROJECT NO./NAME: 4-22-00-192071 / NAB - Little Creek
GEOLOGIST/OFFICE: M. Evans / Livingston, NJ

DATE: 7/14/93
LOCATION: Site 7 - Sanitary Landfill
DRILLING CONTRACTOR: McCallum, Inc.
DRILLER: Tom Jones

DEPTH (FT)	SAMPLE NO. AND TYPE	RECOVERY (FT)	PENETRATION RESISTANCE BLOWS/6"	SAMPLE DESCRIPTION	PID READING (PPM)
34-36	18	2.00	5-6-7-9	Top 6" slough, saturated light brown poorly sorted VC-M SAND. Lower 18" light gray CLAY with tan mottles. Trace of brown M-F SAND stringers.	-
36-38	19	2.00	5-5-5-7	Top 8" saturated slough, poorly sorted C-M SAND. Remainder firm gray CLAY with orangish brown mottles.	-
38-40	20	2.00	5-7-7-5	Top 13.5" slough, saturated brown poorly sorted C-F SAND. Remainder firm greenish gray CLAY.	-

FOSTER WHEELER ENVIRONMENTAL SERVICES
TEST BORING LOG

BORING NO.: 07 - SB - 09 D
PROJECT NO./NAME: 4-22-00-192071 / NAB - Little Creek
GEOLOGIST/OFFICE: M. Schmidt / Livingston, NJ

DATE: 7/13/93
LOCATION: Site 7 - Sanitary Landfill
DRILLING CONTRACTOR: McCallum, Inc.
DRILLER: Tom Jones

DRILLING EQUIPMENT/METHOD: ATV Rig / Hollow Stem Auger
SIZE/TYPE OF BIT: 4 1/4" ID
SAMPLE METHOD: Continuous split-spoon
START/FINISH DATE: 7/13/93 - 7/13/93

WELL INSTALLED? YES___ NO_X_ SCREEN:_____ LENGTH:_____ ___TO___ FEET

REMARKS:_____

DEPTH (FT)	SAMPLE NO. AND TYPE	RECOVERY (FT)	PENETRATION RESISTANCE BLOWS/6"	SAMPLE DESCRIPTION	PID READING (PPM)
0-2	01	1.00	2-1-2-2	Top 1" brown top soil, then brown and gray F SILTY SAND, then gray silty F-M SAND. Trace of M-C sand.	- -
2-4	02	1.50	3-5-3-3	Entire spoon brown to gray silty F-M SAND. Change to F-VF SAND at 1'. Brown, less fines last 6".	-
4-6	03	None	WOH	Trace of F-VF SAND but most washed out.	-
6-8	04	1/2"	WOH	Gray VF SAND with some silt.	-
8-10	05	1.10	WOH	Top 1" fall-in, then 9" gray CLAY with trace of VF SAND, then rest same with little F sand.	-
10-12	06	1.50	1-0-1-0	Top 3" gray CLAY with a lot of F sand, then gray CLAY with a trace F sand and trace organics.	-
12-14	07	1.00	WOH	Top 3" gray CLAY with some F SAND and trace of organics, then rest grey CLAY with some F SAND.	-
14-16	08	2.00	WOH	Alternating 2-3" thick bands of gray CLAY with some F SAND and gray SAND with some silt.	-
16-18	09	2.00	WOH	Top 6" gray CLAY with trace VF SAND and trace organics, then 1' solid dry gray CLAY, then last 6" same as first 6".	-
18-20	10	2.00	WOH	Solid gray CLAY, dry.	-

FOSTER WHEELER ENVIRONMENTAL SERVICES
TEST BORING LOG

BORING NO.: 07 - SB - 01 D
PROJECT NO./NAME: 4-22-00-192071 / NAB - Little Creek
GEOLOGIST/OFFICE: M. Schmidt / Livingston, NJ

DATE: 7/16/93
LOCATION: Site 7 - 15' N of GW-1
DRILLING CONTRACTOR: McCallum, Inc.
DRILLER: Tom Jones

DRILLING EQUIPMENT/METHOD: ATV Rig / Hollow Stem Auger
SIZE/TYPE OF BIT: 4 1/4" ID
SAMPLE METHOD: Continuous split-spoon
START/FINISH DATE: 7/15/93 - 7/15/93

WELL INSTALLED? YES___ NO X SCREEN:_____ LENGTH:_____ ___TO___ FEET

REMARKS: Very close to water in Little Creek Cove.

DEPTH (FT)	SAMPLE NO. AND TYPE	RECOVERY (FT)	PENETRATION RESISTANCE BLOWS/6"	SAMPLE DESCRIPTION	PID READING (PPM)
0-2	01	1.50	5-4-3-3	Top 5" Brown top soil and organics, then light to dark brown VF-F SAND with trace of fines.	-
2-4	02	1.80	3-1-1-0	Top 8" same as bottom of previous spoon, then 4" gray CLAY with some F SAND, then rest gray CLAY with trace F SAND. Last 6" wet.	-
4-6	03	1.00	WOH	Entire spoon gray CLAY with some VF SAND. Wet.	-
6-8	04	1.80	WOH	Entire spoon soft gray CLAY with trace VF SAND.	-
8-10	05	2.00	WOH	Solid gray CLAY with trace VF SAND and trace shell fragments.	-
10-12	06	2.00	WOH	Entire spoon same as last. Shelby tube sample not taken - fell out.	-
12-14	07	2.00	WOH	Entire spoon same as last. Shelby tube sample not taken - fell out.	-
14-16	08	2.00	WOH	Entire spoon solid gray CLAY.	-
16-18	09	2.00	WOH/12-1-1	Same as previous spoon.	-
18-20	10			Shelby tube sample.	-

FOSTER WHEELER ENVIRONMENTAL SERVICES
TEST BORING LOG

BORING NO.: 07 - SB - 03 D
PROJECT NO./NAME: 4-22-00-192071 / NAB - Little Creek
GEOLOGIST/OFFICE: M. Schmidt / Livingston, NJ

DATE: 7/15/93
LOCATION: Site 7 - 10' E of LC7-GW3
DRILLING CONTRACTOR: McCallum, Inc.
DRILLER: Tom Jones

DRILLING EQUIPMENT/METHOD: ATV Rig / Hollow Stem Auger **SIZE/TYPE OF BIT:** 4 1/4" ID
SAMPLE METHOD: Continuous split-spoon **START/FINISH DATE:** 7/15/93 - 7/15/93

WELL INSTALLED? YES___ **NO** X **SCREEN:**_____ **LENGTH:**_____ ___**TO**___ **FEET**

REMARKS: Sample taken from 4-6' interval. Duplicate sample 07-SB-110(1138).

DEPTH (FT)	SAMPLE NO. AND TYPE	RECOVERY (FT)	PENETRATION RESISTANCE BLOWS/6"	SAMPLE DESCRIPTION	PID READING (PPM)
0-2	01	1.50	14-14-12-15	Top 4" top soil with organics, then 3" coarse SAND and small GRAVEL, then 9" tan F-M SAND, rest black silty F-M SAND.	-
2-4	02	1.50	9-8-5-7	Top 2" same as bottom of last spoon, then grading into gray to brown CLAY with a trace of F SAND and trace of C SAND. Also, trace of organics.	-
4-6	03	1.60	2-2-2-2	Entire spoon, gray and brown mottled CLAY with trace F SAND and organics. Last 3" wet.	-
6-8	04	2.00	4-5-4-6	Top 2" same as last then grading 3" gray clayey F-M SAND, then grading into tan F-M SAND with trace of fines.	-
8-10	05	1.00	3-4-6-9	Entire spoon, brown clean F-M SAND with trace of fines.	-
10-12	06	2.00	8-10-10-10	Entire spoon same as last.	-
12-14	07	1.70	5-4-4-5	Same as last.	-
14-16	08	2.00	4-4-6-5	Same as last with trace C SAND and trace M GRAVEL.	-
16-18	09	2.00	3-2-5-5	Entire spoon brown F-M SAND with trace of fines and trace C SAND.	-
18-20	10	2.00	3-4-3-2	Entire spoon brown F-M SAND with some fines, trace C SAND and F GRAVEL. Trace of organics. Last 1" some shell fragments.	-

FOSTER WHEELER ENVIRONMENTAL SERVICES
TEST BORING LOG

BORING NO.: 07 - SB - 03 D
PROJECT NO./NAME: 4-22-00-192071 / NAB - Little Creek
GEOLOGIST/OFFICE: M. Schmidt / Livingston, NJ

DATE: 7/15/93
LOCATION: Site 7 - 10' E of LC7-GW3
DRILLING CONTRACTOR: McCallum, Inc.
DRILLER: Tom Jones

DEPTH (FT)	SAMPLE NO. AND TYPE	RECOVERY (FT)	PENETRATION RESISTANCE BLOWS/6"	SAMPLE DESCRIPTION	PID READING (PPM)
20-22	11	1.70	3-1-2-2	Top 3" gray and tan mottled CLAY with some F SAND and some shell fragments, then 7" green CLAY with some F SAND, rest gray CLAY with trace F SAND and trace organics.	-
22-24	12	2.00	WOH/18-2	Entire spoon gray CLAY.	-
24-26	13	2.00	1-1-1-1	Same as previous spoon.	-
26-28	14	2.00	3-2-2-1	Entire spoon gray CLAY with trace of shell fragments and VF SAND stringer at 18".	-
28-30	15	2.00	WOH/12-2-1	Entire spoon gray CLAY with trace of shell fragments.	-
30-32	16	2.00	1-2-2-1	Same as last with a 2" lens of gray CLAY with some F SAND at 12".	-

FOSTER WHEELER ENVIRONMENTAL SERVICES
TEST BORING LOG

BORING NO.: 07 - SB - 05 D
PROJECT NO./NAME: 4-22-00-192071 / NAB - Little Creek
GEOLOGIST/OFFICE: M. Schmidt / Livingston, NJ

DATE: 7/15/93
LOCATION: Site 7 - 200' S of Magazine 14
DRILLING CONTRACTOR: McCallum, Inc.
DRILLER: Tom Jones

DRILLING EQUIPMENT/METHOD: ATV Rig / Hollow Stem Auger
SIZE/TYPE OF BIT: 4 1/4" ID
SAMPLE METHOD: Continuous split-spoon
START/FINISH DATE: 7/15/93 - 7/15/93

WELL INSTALLED? YES_X_ NO___ SCREEN:_____ LENGTH:_____ ___TO___ FEET

REMARKS: Sample taken from 7-9' interval. MS/MSD sample collected

DEPTH (FT)	SAMPLE NO. AND TYPE	RECOVERY (FT)	PENETRATION RESISTANCE BLOWS/6"	SAMPLE DESCRIPTION	PID READING (PPM)
0-2	01	1.00	2-3-2-2	Top 4" top soil and organics, then 6" gray and brown mottled VF SILTY SAND, rest gray and brown CLAY with some VF SAND.	-
2-4	02	1.00	2-2-2-2	Gray VF SILTY SAND with large amount of organics. Bottom 3" wood/root - like material. Last 6" damp.	-
4-6	03	0.80	2-2-2-3	Brown and gray mottled CLAY with some VF SAND and some organics.	-
6-8	04	1.50	3-4-5-4	Top 6" brown and gray mottled CLAY with some organics, then brown and gray mottled VF SANDY CLAY with trace of organics.	-
8-10	05	1.70	2-2-4-2	Top 2" gray CLAY with some organics and trace VF SAND, then 1" red CLAY with trace VF SAND, then gray and brown mottled VF SANDY CLAY grading into a F-M SILTY SAND. Last 6" wet.	-
10-12	06	2.00	3-6-7-7	Top 2" same as bottom of last spoon, then 2" F-C SILTY SAND, then F-M SAND with trace fines.	-
12-14	07	1.20	2-3-5-6	Top 6" brown F-M SAND with trace fines grading into clean F-M SAND.	-

FOSTER WHEELER ENVIRONMENTAL SERVICES
TEST BORING LOG

BORING NO.: 07 - SB - 105 D
PROJECT NO./NAME: 4-22-00-192071 / NAB - Little Creek
GEOLOGIST/OFFICE: M. Schmidt / Livingston, NJ

DATE: 7/15/93
LOCATION: Site 7 - 200' S of Magazine 14
DRILLING CONTRACTOR: McCallum, Inc.
DRILLER: Tom Jones

DEPTH (FT)	SAMPLE NO. AND TYPE	RECOVERY (FT)	PENETRATION RESISTANCE BLOWS/6"	SAMPLE DESCRIPTION	PID READING (PPM)
14-16	08	2.00	4-7-8-10	Entire spoon F SAND with trace of fines.	-
16-18	09	2.00	2-4-8-8	Top 18" same as above, then brownish reddish VF-F SAND with some fines and 1/8" thick gray CLAY lenses every 1".	-
18-20	10	2.00	4-6-5-4	Top 10" VF-F SAND with trace C SAND and some fines grading into red/brown VF SILTY SAND.	-
20-22	11	2.00	3-3-4-4	Top 1" brown/red VF-F SAND with some fines, then rest gray and brown mottled CLAY with some F-M SAND.	-
22-24	12	2.00	2-3-4-4	Top 1.5' washed-in sand, then rest gray and brown mottled CLAY with trace F SAND.	-
24-26	13	2.00	3-4-5-5	Entire spoon gray and brown mottled CLAY with trace F SAND.	-

FOSTER WHEELER ENVIRONMENTAL SERVICES
TEST BORING LOG

BORING NO.: 07 - SB - 09 D
PROJECT NO./NAME: 4-22-00-192071 / NAB - Little Creek
GEOLOGIST/OFFICE: M. Schmidt / Livingston, NJ

DATE: 7/13/93
LOCATION: Site 7 - Sanitary Landfill
DRILLING CONTRACTOR: McCallum, Inc.
DRILLER: Tom Jones

DEPTH (FT)	SAMPLE NO. AND TYPE	RECOVERY (FT)	PENETRATION RESISTANCE BLOWS/6"	SAMPLE DESCRIPTION	PID READING (PPM)
20-22	11	2.00	WOH/12-1-1	Same as previous spoon.	-
22-24	12	2.00	WOH	Same as previous spoon, but with the F SAND stringers at 1' and 18".	-
24-26	13	2.00	WOH/12-1-1	Entire spoon gray CLAY with a shell at 14".	-
26-28	14	2.00	WOH/12-2-1	Entire spoon gray CLAY with some F SAND.	-
28-30	15	2.00	WOH	Entire spoon gray CLAY with traces F SAND and occasional F SAND stringers.	-
30-32	16	2.00	3-2-2-1	Top 18" gray CLAY with trace of F SAND and occasional F SAND stringers, then two 2" wood segments with gray CLAY with some F SAND.	-
32-34	17	2.00	WOH	Top 8" gray CLAY, then gray CLAY with some F SAND and some organics.	-
34-36	18	2.00	WOH/18"-3	Top 20" gray F SANDY CLAY with trace of organics, then dark grey F SANDY CLAY.	-
36-38	19	2.00	WOH	Top 18" dark gray F SANDY CLAY, then 2" gray CLAY with some F SAND, then 2" gray F SANDY CLAY, then 2" light gray CLAY with some F SAND.	
38-40	20	2.00	3-4-4-4	Entire spoon mottled green and brown clay.	-

PROJECT NUMBER	BORING NUMBER	
W20368	LC7-GW1	SHEET OF

SOIL BORING LOG

PROJECT CONFIRMATION STUDY LOCATION LITTLE CREEK

ELEVATION 5.70 DRILLING CONTRACTOR ATEC

DRILLING METHOD AND EQUIPMENT AUGER

WATER LEVEL AND DATE 5', 4/18/86 START FINISH LOGGER SEXTON

ELEVATION	DEPTH BELOW SURFACE (FT)	SAMPLE INTERVAL	SAMPLE TYPE AND NUMBER	SAMPLE RECOVERY (FT)	STANDARD PENETRATION TEST RESULTS 6"-6"-6" (N)	SOIL DESCRIPTION: NAME, GRADATION OR PLASTICITY, PARTICLE SIZE DISTRIBUTION, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY, USCS GROUP SYMBOL	SYMBOLIC LOG	WELL CONSTRUCTION: 2 inch PVC
		0-2	S1	1.8	3-4-4-4	F-M sand w/some clay; yel. brown (10YR5/4)-yel. orange(10YR6/6) dry-moist		GROUT; BENTONITE
	5	4-6	S2	2.0	1-0-0-0			SAND
	10	9-11	S3	2.0	1-0-0-0	Clay; gr. black(5GY2/1); soft; sicky; wet shell fragments at 9'		
	15	14-16	S4	2.0	1-0-0-0			
	20							

PROJECT NUMBER	BORING NUMBER	
W20368	LC7-GW2	SHEET OF

SOIL BORING LOG

PROJECT CONFIRMATION STUDY LOCATION LITTLE CREEK

ELEVATION 9.97' DRILLING CONTRACTOR ATEC

DRILLING METHOD AND EQUIPMENT AUGER

WATER LEVEL AND DATE 5', 4/17/86 START FINISH LOGGER SEXTON

ELEVATION	DEPTH BELOW SURFACE (FT)	SAMPLE INTERVAL	SAMPLE TYPE AND NUMBER	SAMPLE RECOVERY (FT)	STANDARD PENETRATION TEST RESULTS 6"-6"-6" (N)	SOIL DESCRIPTION: NAME, GRADATION OR PLASTICITY, PARTICLE SIZE DISTRIBUTION, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY, USCS GROUP SYMBOL	SYMBOLIC LOG	WELL CONSTRUCTION: 2 inch PVC
		0-2	S1	1.4	2-5-14-14			GROUT
	5	4-6	S2	1.4	7-7-6-9	F-C sand; yell. brown(10YR5/4) -pale yel(10YR6/2); some occasional clay; wet		BENTONITE
	10	9-11	S3	1.4	1-3-3-3			SAND
	15	14-16	S4	2.0	2-4-4-6			
						F-M sand; w/some silt; yel. brown(10YR5/4)		
	20	19-21	S5	1.7	3-3-5-8			
						As above, but with shell fragments.		
	25							

PROJECT NUMBER	BORING NUMBER	
W20368	LC7-GW3	SHEET OF

SOIL BORING LOG

PROJECT CONFIRMATION STUDY LOCATION LITTLE CREEK

ELEVATION 10.27' DRILLING CONTRACTOR ATEC

DRILLING METHOD AND EQUIPMENT AUGER

WATER LEVEL AND DATE 5', 4/17/86 START FINISH LOGGER SEXTON

ELEVATION	DEPTH BELOW SURFACE (FT)	SAMPLE INTERVAL	SAMPLE TYPE AND NUMBER	SAMPLE RECOVERY (FT)	STANDARD PENETRATION TEST RESULTS 6"-6"-6" (N)	SOIL DESCRIPTION: NAME, GRADATION OR PLASTICITY, PARTICLE SIZE DISTRIBUTION, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY, USCS GROUP SYMBOL	SYMBOLIC LOG	WELL CONSTRUCTION: 2 inch PVC
		0-2	S1	1.4	7-5-12-14	F-sand w/some gravel; br. black (5YR2/1); sl. moist		GROUT
	5	4-6	S2	2.0	3-3-3-3	Fine sandy clay; olive gr(5Y4/1)-yel brown(10YR4/2); wet at 5'		BENTONITE
	10	9-11	S3	1.8	3-4-5-8	F-M sand w/some c. sand and clay; yel. orange(10YR6/6); wet		SAND
	15	14-16	S4	2.0	3-4-7-9			
	20							

PROJECT NUMBER	BORING NUMBER	
W20368	LC7-GW4	SHEET OF

SOIL BORING LOG

PROJECT CONFIRMATION STUDY LOCATION LITTLE CREEK

ELEVATION 6.69' DRILLING CONTRACTOR ATEC

DRILLING METHOD AND EQUIPMENT AUGER

WATER LEVEL AND DATE 2', 4/21/86 START FINISH LOGGER SEXTON

ELEVATION	DEPTH BELOW SURFACE (FT)	SAMPLE INTERVAL	SAMPLE TYPE AND NUMBER	SAMPLE RECOVERY (FT)	STANDARD PENETRATION TEST RESULTS 6"-6"-6" (N)	SOIL DESCRIPTION: NAME, GRADATION OR PLASTICITY, PARTICLE SIZE DISTRIBUTION, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY, USCS GROUP SYMBOL	SYMBOLIC LOG	WELL CONSTRUCTION: 2 inch PVC
		0-2	S1	1.4	7-5-4-7	F-M sand w/clay patches; yel. brown (10YR5/4)-olive gray(5Y61); some shell fragments at 5'		GROUT; BENTONITE
	5	4-6	S2	2.0	2-5-8-10			SAND
	10	9-11	S3	1.6	2-3-1-1	Fine silty sand; gray(N5)-olive gray(5Y5/2); shell fragments.		
	15	14-16	S4	1.7	2-3-1-0			
	20							

PROJECT NUMBER	BORING NUMBER	
W20368	LC7-GW5	SHEET OF

SOIL BORING LOG

PROJECT CONFIRMATION STUDY LOCATION LITTLE CREEK

ELEVATION 6.84' DRILLING CONTRACTOR ATEC

DRILLING METHOD AND EQUIPMENT AUGER

WATER LEVEL AND DATE 4', 4/17/86 START FINISH LOGGER DRONFIELD

ELEVATION	DEPTH BELOW SURFACE (FT)	SAMPLE INTERVAL	SAMPLE TYPE AND NUMBER	SAMPLE RECOVERY (IN)	STANDARD PENETRATION TEST RESULTS 6"-6"-6" (N)	SOIL DESCRIPTION: NAME, GRADATION OR PLASTICITY, PARTICLE SIZE DISTRIBUTION, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY, USCS GROUP SYMBOL	SYMBOLIC LOG	WELL CONSTRUCTION (2 inch PVC)
		0-1.5	S1	12	1-1-1	Clayey sand; gray(N5)-yel. brown(10YR5/4); moist, sl. plastic; sl. sticky		GROUT
						Fine silty sand; gray(N4), wet some roots		
		3.5-5	S2	8	1-2-3			BENTONITE
	5							
						Sandy clay; gray(N3)-gr. gray(5G6/1); soft to sl. plastic; wet		
		8.5-10	S3	1	1-2-0	Root blocking spoon at 8.5'		SAND
	10							
		13.5-15	S4	14	2-3-5	F-C sand w/some gravel; gray(N5); wet		
	15							
	20							

PROJECT NUMBER	BORING NUMBER	
W20368	LC7-GW6	SHEET OF

SOIL BORING LOG

PROJECT CONFIRMATION STUDY LOCATION LITTLE CREEK

ELEVATION 6.74' DRILLING CONTRACTOR ATEC

DRILLING METHOD AND EQUIPMENT AUGER

WATER LEVEL AND DATE 5', 4/21/86 START FINISH LOGGER DRONFIELD

ELEVATION	DEPTH BELOW SURFACE (FT)	SAMPLE INTERVAL	SAMPLE TYPE AND NUMBER	SAMPLE RECOVERY (IN)	STANDARD PENETRATION TEST RESULTS 6"-6"-6" (N)	SOIL DESCRIPTION: NAME, GRADATION OR PLASTICITY, PARTICLE SIZE DISTRIBUTION, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY, USCS GROUP SYMBOL	SYMBOLIC LOG	WELL CONSTRUCTION: 2 inch PVC
		0-1.5	S1	17	1-2-2	F-M sand w/clay in layers; gray(N4) - brown(10YR5/4) moist-wet		GROUT
	5	3.5-5	S2	12	2-2-1			BENTONITE
	10	8.5-10	S3	15	2-2-3	F-M sand w/some f. gravel; gr. gray(5GY6/1)-yel. orange (10YR6/6); wet; some recent shell fragments (not typical Yorktown formation)		SAND
	15	13.5-15	S4	18	3-4-5			
	20							

PROJECT NUMBER	BORING NUMBER	
W20368	LC7-GW7	SHEET OF

SOIL BORING LOG

PROJECT CONFIRMATION STUDY LOCATION LITTLE CREEK

ELEVATION 1.96' DRILLING CONTRACTOR ATEC

DRILLING METHOD AND EQUIPMENT AUGER

WATER LEVEL AND DATE 2', 4/22/86 START FINISH LOGGER DRONFIELD

ELEVATION	DEPTH BELOW SURFACE (FT)	SAMPLE INTERVAL	SAMPLE TYPE AND NUMBER	SAMPLE RECOVERY (IN)	STANDARD PENETRATION TEST RESULTS 6"-6"-6" (N)	SOIL DESCRIPTION: NAME, GRADATION OR PLASTICITY, PARTICLE SIZE DISTRIBUTION, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY, USCS GROUP SYMBOL	SYMBOLIC LOG	WELL CONSTRUCTION: 2 inch PVC
		0-1.5	S1	16	1-1-2	F-C sand; gray(N4-N6); roots; wet		GROUT
								BENTONITE
		3.5-5	S2	0	1-0-0			SAND
	5					Clay w/some silt and sand; gray(N4); very fluid at 3-5'; sticky; sl. plastic elsewhere; wet		
		8.5-10	S3	13	1-0-0			
	10							
		13.5-15	S4	10	1-0-0			
	15							
	20							

PROJECT NUMBER	BORING NUMBER	
W20368	LC7-GW8	SHEET OF

SOIL BORING LOG

PROJECT CONFIRMATION STUDY LOCATION LITTLE CREEK

ELEVATION 2.25' DRILLING CONTRACTOR ATEC

DRILLING METHOD AND EQUIPMENT AUGER

WATER LEVEL AND DATE 2', 4/22/86 START FINISH LOGGER DRONFIELD

ELEVATION	DEPTH BELOW SURFACE (FT)	SAMPLE INTERVAL	SAMPLE TYPE AND NUMBER	SAMPLE RECOVERY (IN)	STANDARD PENETRATION TEST RESULTS 6"-6"-6" (N)	SOIL DESCRIPTION: NAME, GRADATION OR PLASTICITY, PARTICLE SIZE DISTRIBUTION, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY, USCS GROUP SYMBOL	SYMBOLIC LOG	WELL CONSTRUCTION: 2 inch PVC
		0-1.5	S1	13	2-0-1	F-M sand; gray(N6-N4); roots; wet; clay at bottom		GROUT; BENTONITE
	5	3.5-5	S2	24	1-0-0	Silty clay w/some sand; v. soft-sl. soft, sl. sticky; gr. gray(5GY4/1)		SAND
		8.5-10	S3	24	1-0-0			
	10							
	15							

WELL CONSTRUCTION LOG
(UNCONSOLIDATED)

Project NAB-Little Creek CTO-0042 Well 07-MW-05D

Location Site 7 - Sanitary Landfill

Town/City Virginia Beach

County N/A State Virginia

Permit No. N/A

Land-Surface Elevation and Datum 6.10 feet

Installation Date (s) 7/15/93

Drilling Method 4 1/4" hollow stem auger

Drilling Contractor McCallum

Drilling Fluid N/A

Development Technique(s) and Dates (s) Pump - 7/15/93

Water Removed During Development 30 gallons

Static Depth to Water 5.78 feet below top of casing

Pumping Depth to Water N/A feet below top of casing

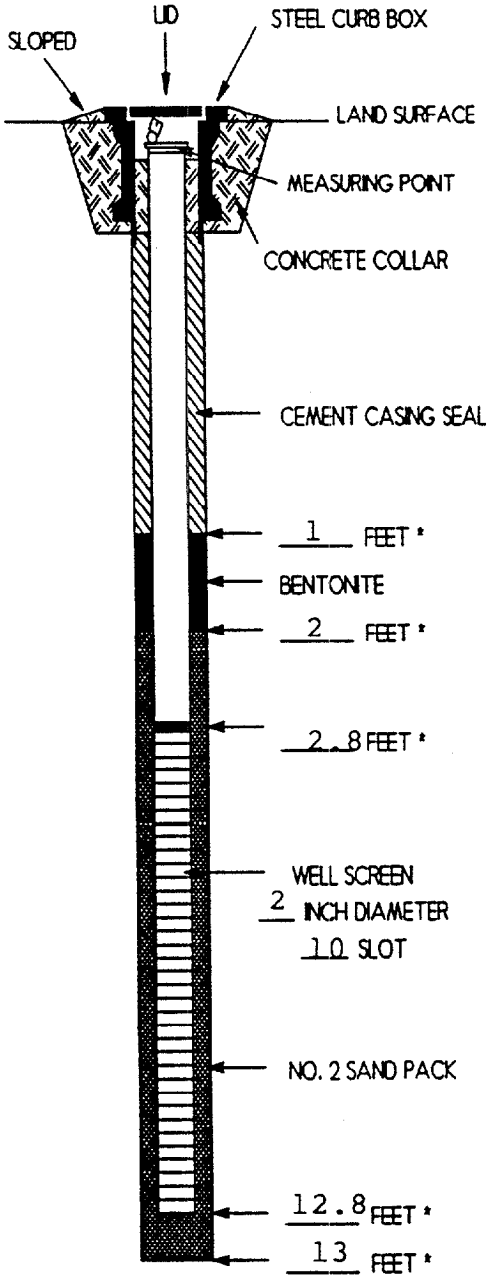
Total Pumping Duration 45 minutes

Yield 0.75 gpm

Well Purpose Groundwater monitoring

Remarks

Geologist/# M. Schmidt



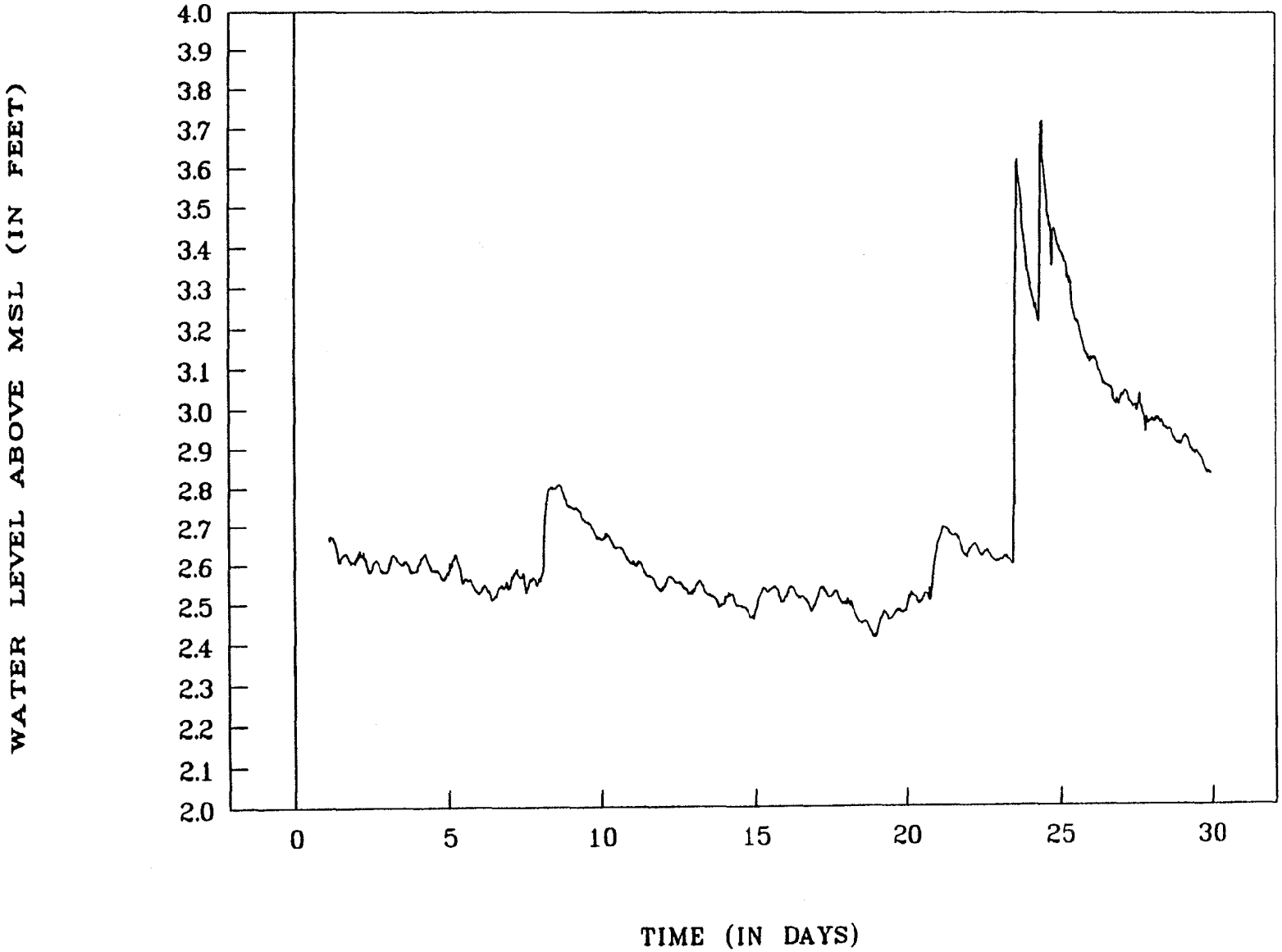
* DEPTH BELOW LAND SURFACE

Appendix A.3

Water Level Data

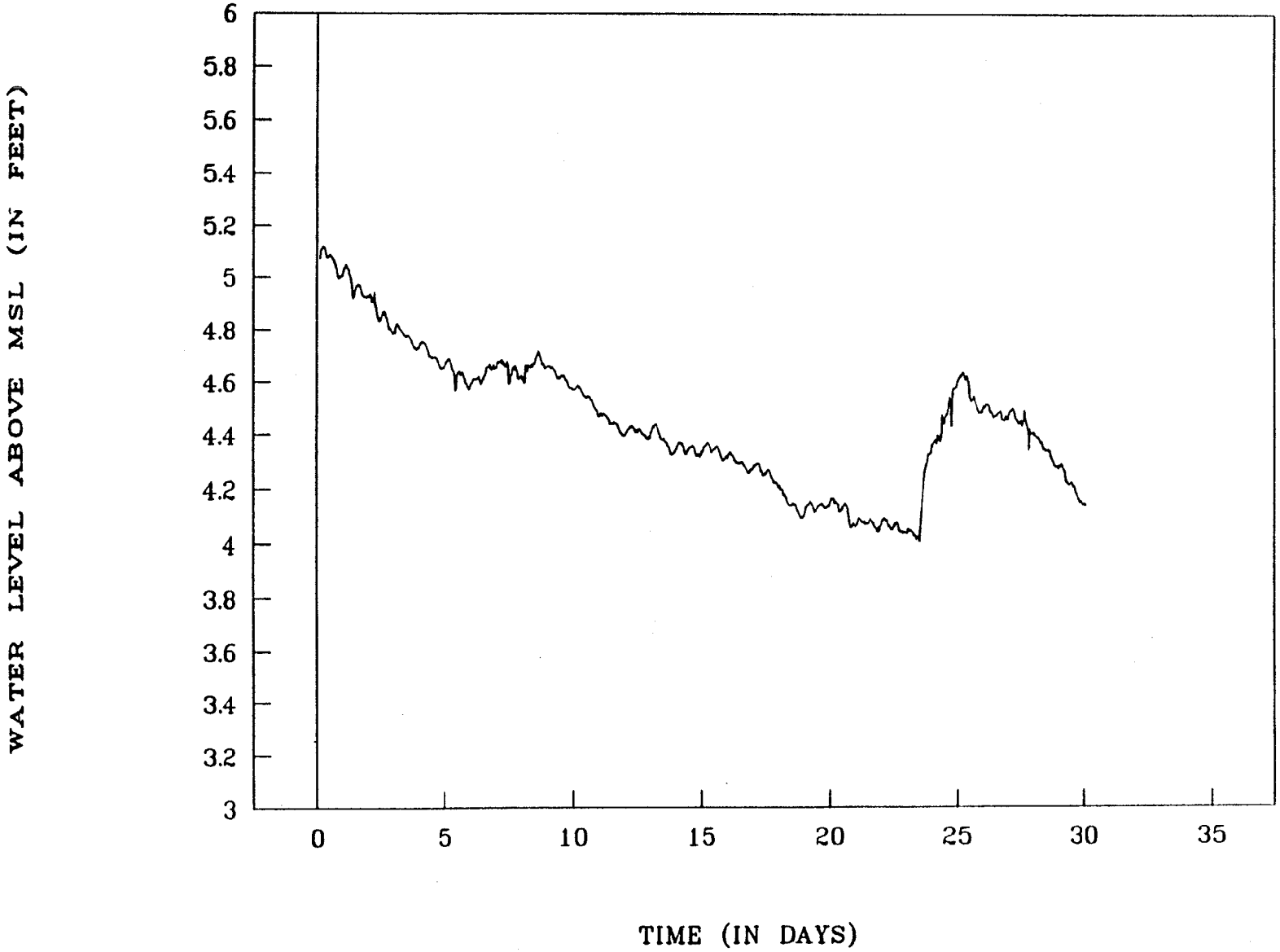
LITTLE CREEK RI/FS

SITE 7 MONITORING WELL GW1



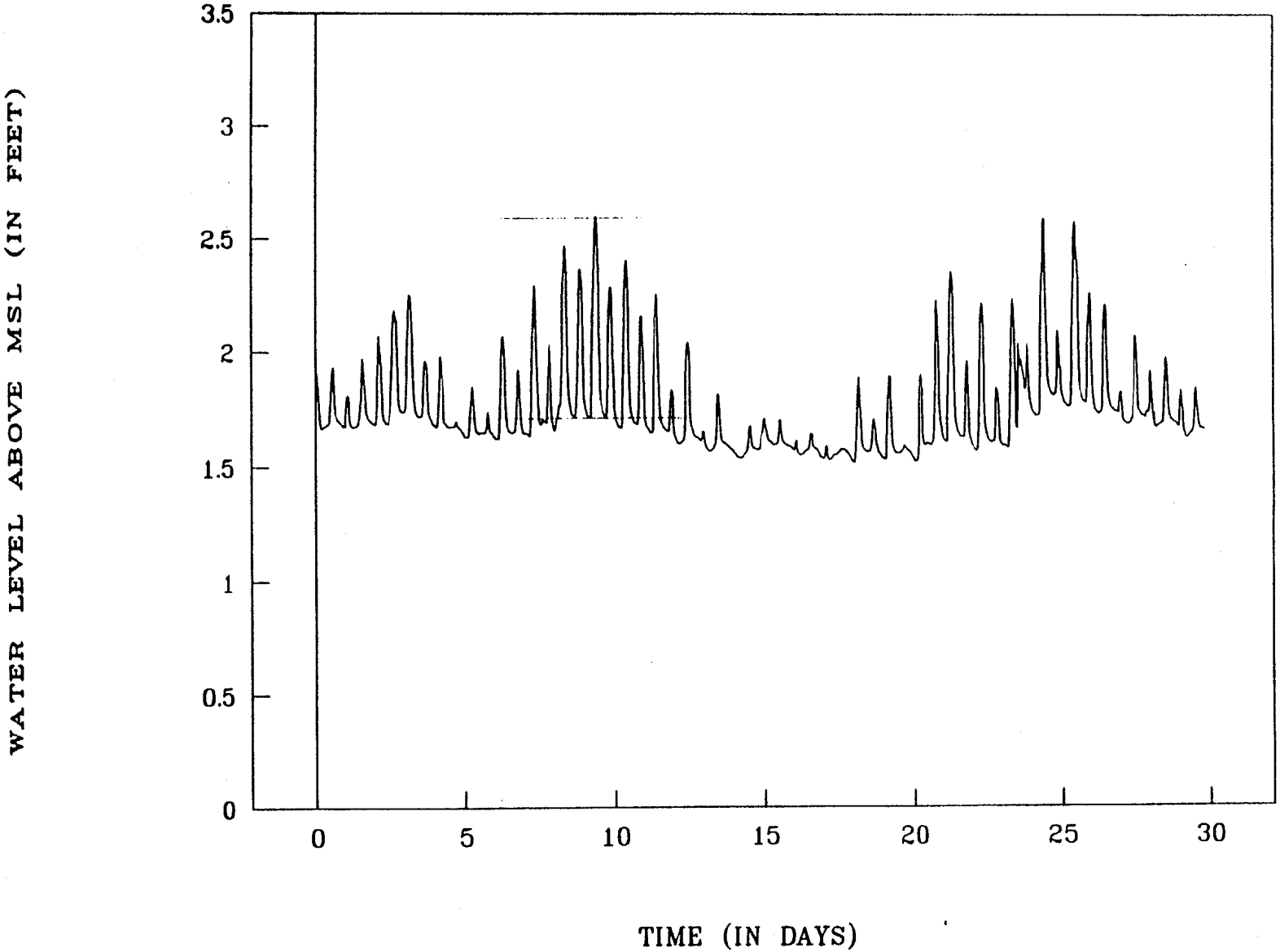
LITTLE CREEK RI/FS

SITE 7 MONITORING WELL GW3



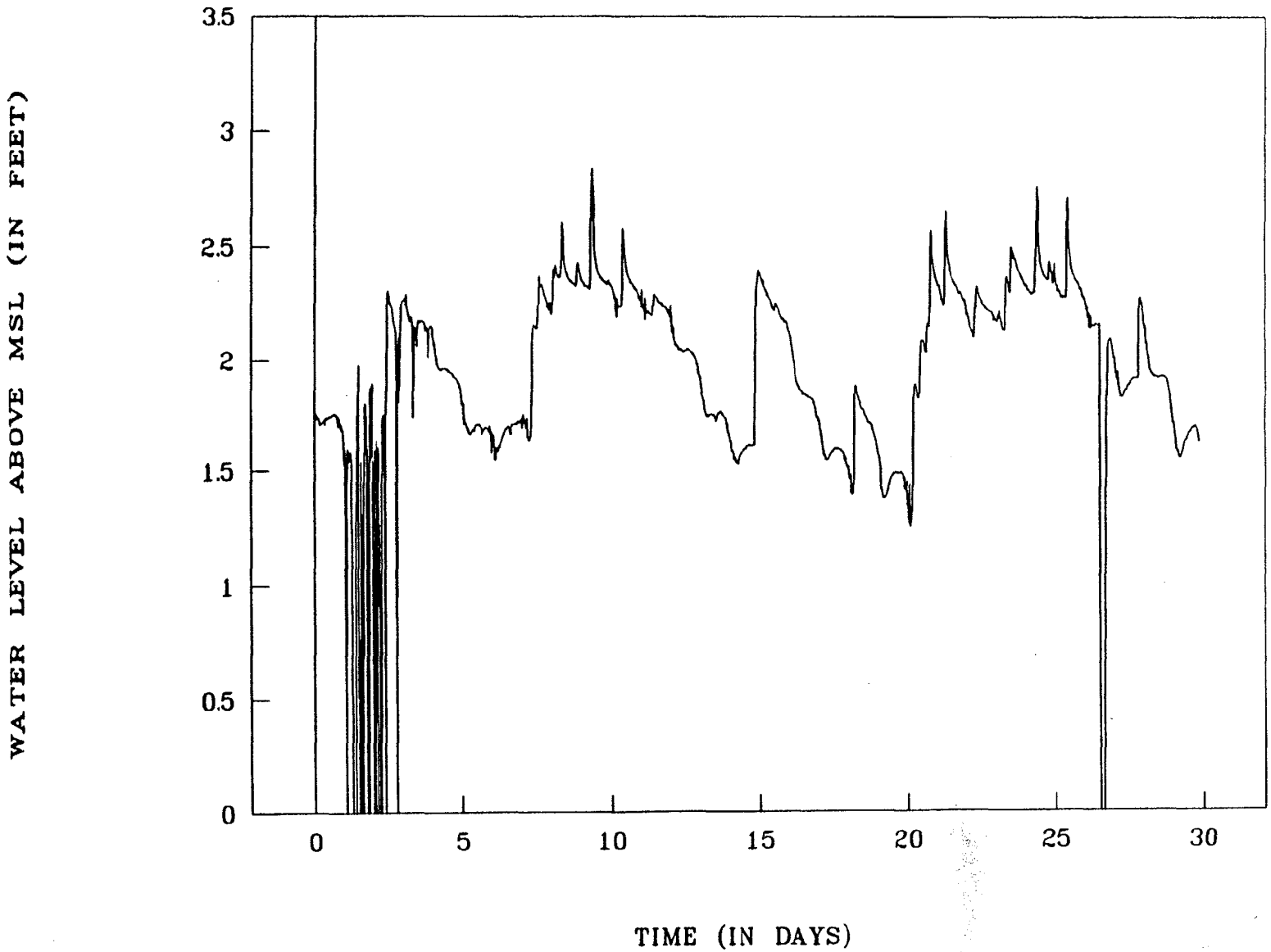
LITTLE CREEK RI/FS

SITE 7 MONITORING WELL GW6



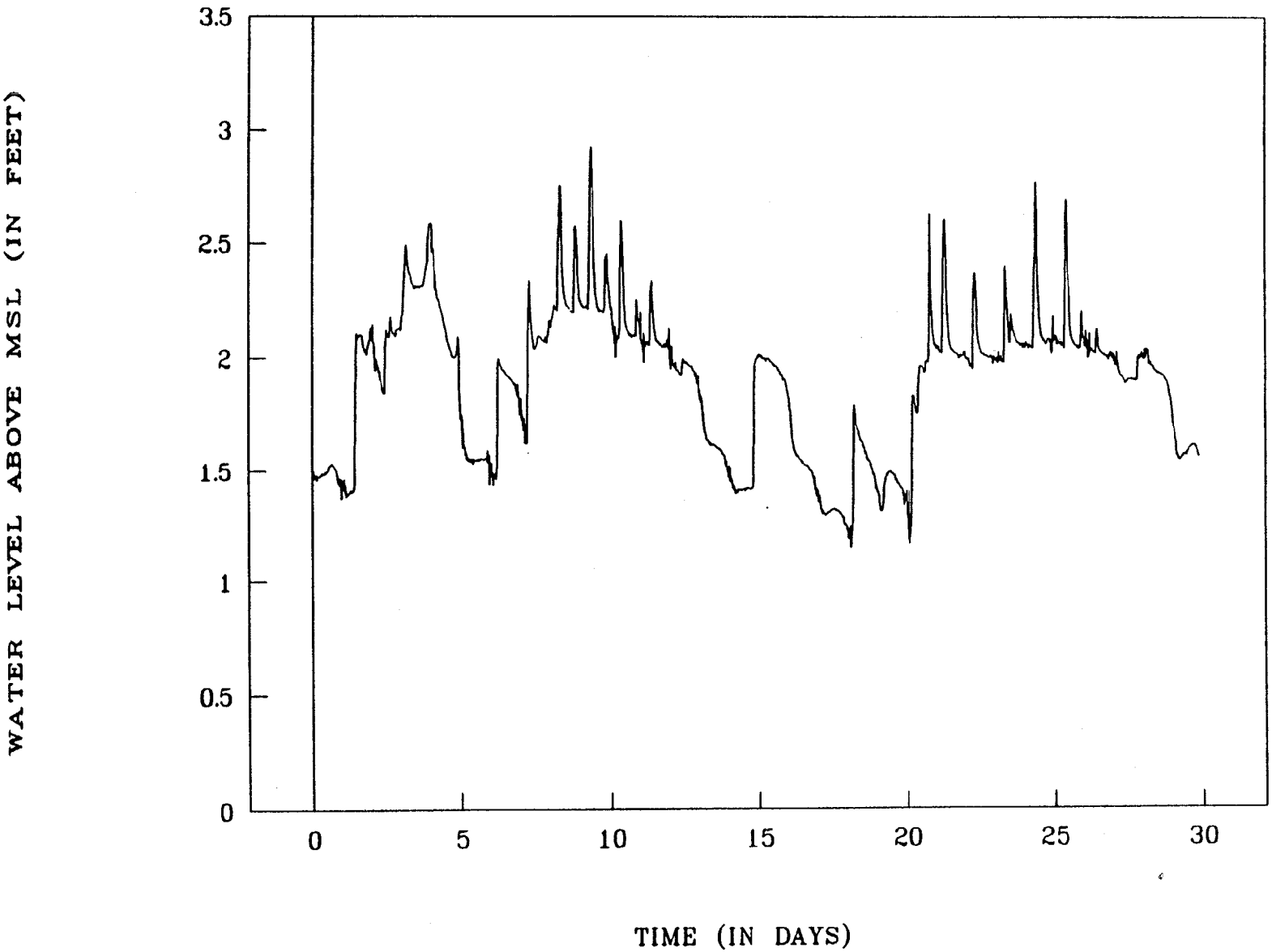
LITTLE CREEK RI/FS

SITE 7 MONITORING WELL GW8



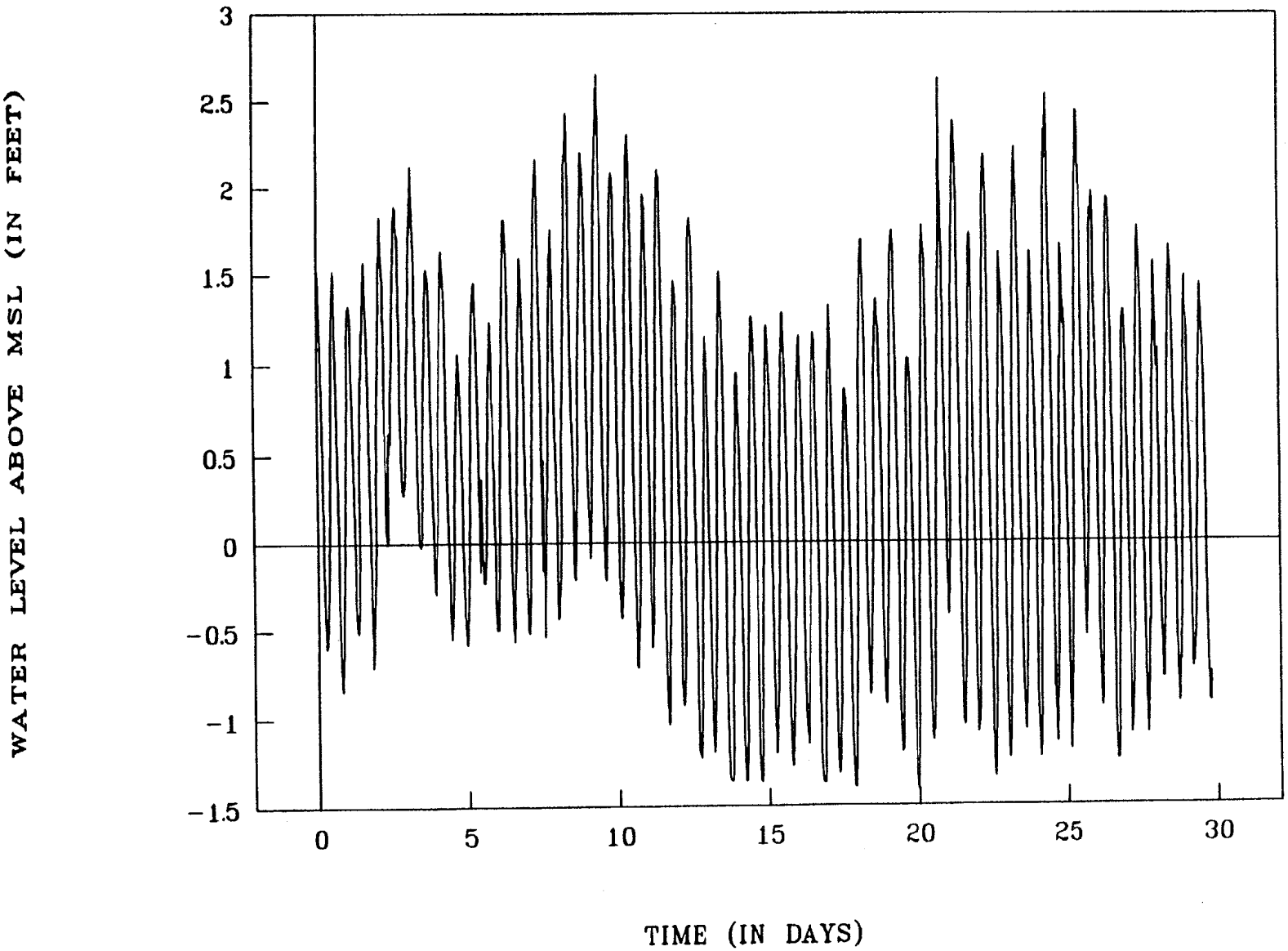
LITTLE CREEK RI/FS

SITE 7 MONITORING WELL GW7



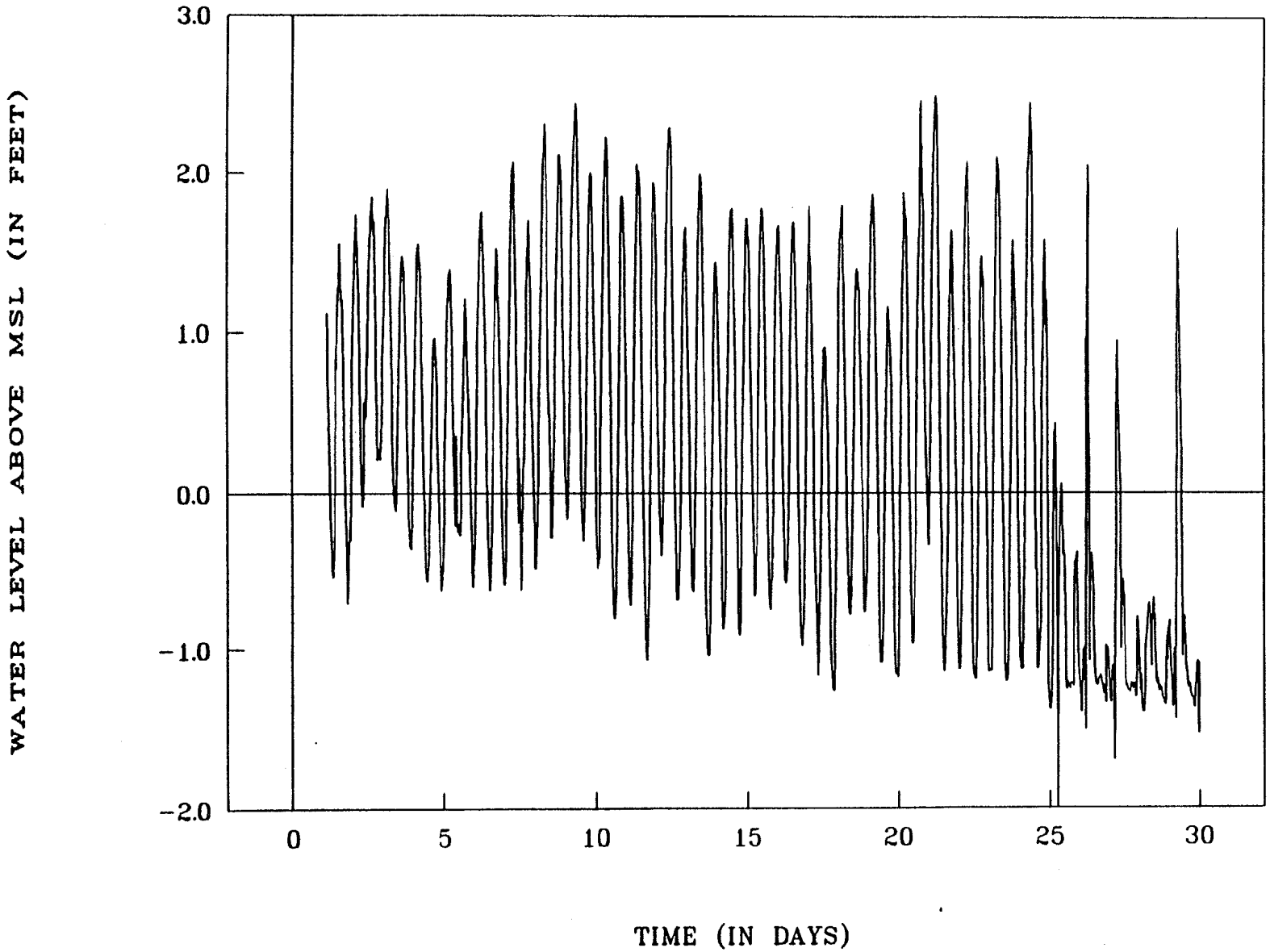
LITTLE CREEK RI/FS

SITE 7 STAFF GAUGE SG1



LITTLE CREEK RI/FS

SITE 7 STAFF GAUGE SG-2



Appendix A.4

Surface Soil Sample Descriptions

SURFACE SOIL SAMPLE DESCRIPTIONS

SURFACE SOIL SAMPLE NUMBER	SURFACE SOIL SAMPLE DESCRIPTION
07SS-101	Bare spot off small road in the "ear" of the landfill: 1" brown silty F SAND with some organics, then brown-orange silty F SAND with fill material.
07SS-102	South side of landfill between dirt road and tree line: 1" brown silty F SAND with some organics, then brown-orange silty F SAND with fill material and some GRAVEL.
07SS-103	Middle of second island in landfill road, heading east: greyish-brown silty F SAND with GRAVEL
07SS-104	Island in landfill road by Helicopter Road: greyish-brown silty F SAND with gravel. Fragments of black beauty on the soil surface.
07SS-105	Northeast portion of the leveled fill area: tan silty M-F SAND.
07SS-106	Middle of north side of fill area, beyond the base of the new fill: brown silty F SAND.
07SS-107	Northwest corner of fill area, beyond base of new fill: 4" of dark grey silty F SAND, then white M-F SAND.
07SS-108	Portion of fill area south of Amphibious Drive, approximately 60 feet west of the sewage treatment plant and approximately 50 feet from Amphibious Drive: 2" of brown silty F SAND, then light grey F sandy CLAY.
07SS-109 (Duplicate of 07SS-102)	South side of landfill between dirt road and tree line: 1" brown silty F SAND with some organics, then brown-orange silty F SAND with fill material and some GRAVEL.
09SS-101	200' east, 134' south of north fence/parking lot corner: 0 - 1/2" is silty, clayey SAND crust, then 1/2 - 3" clayey SAND.
09SS-102	140' east, 77' north of south fence/parking lot corner: 0 - 2" is clayey, silty light brown SAND grading into F SAND with cobbles.

Appendix A.5

Shelby Tube Analysis

McCallum Testing Laboratories, Inc.
1808 HAYWARD AVENUE
P.O. Box 13337
CHESAPEAKE, VIRGINIA 23325-0266
(804) 420-2520

Our File Number 93-1188
Client's Order No.
Client's Req'n No.
Date 6/7/93

REPORT ON SOIL

Lab. No. 34-9 Chesapeake, Va.
Sample of Proposed Use
Sample No. 07ST-103/UD-9 From Navy Clean UST Site Characterization #CTO-~~0163~~ 0042
Depth Taken Depth From 0' to 2'
Depth of Cut Height of Fill Represents
Submitted by Foster Wheeler Enviresponse, Inc.
Sampled 5/12/93 Received

MECHANICAL ANALYSIS (ASTM D 422)

COARSE AGGREGATE

SIEVE ANALYSIS		TOTAL % PASSING	
3"-2"	%	3"	%
2"-1½"	%	2"	%
1½"-1"	%	1½"	%
1"-¾"	%	1"	%
¾"-½"	%	¾"	%
½"-3/8"	%	½"	%
3/8"-#4	%	3/8"	%
Passing #4	%	#4	%

SOIL MORTAR

SIEVE ANALYSIS		TOTAL % PASSING	
Coarse Sand #4-#10	1.5 %	# 4	100.0 %
Medium Sand #10-#40	25.9 %	# 10	98.5 %
Fine Sand #40-#200	33.2 %	# 40	72.6 %
Silt #200—0.005 mm	28.3 %	#100	50.7 %
Clay-Smaller than 0.005 mm	11.1 %	#200	39.4 %
Colloids-Smaller than 0.001 mm	%		

OTHER TEST DATA

Liquid Limit 13 (ASTM D 4318) Water Content as Received 15.6 (ASTM D 2216) %
Plastic Limit 13 (ASTM D 4318) Plasticity Index 0 (ASTM D 4318) Loss on Ignition (corrected) %
Specific Gravity 2.56 (ASTM D 854) Coefficient of permeability 6.1×10^{-5} cm/sec. (ASTM D 2434
Classification SM (ASTM D 2487) H.R.B.

Remarks: Sample Contained

Visual Description of Sample: Dark brown silty fine to medium sand with clay lenses and organics

Insitu Wet Unit Weight (pcf): 124.8

Insitu Dry Unit Weight (pcf): 108.0

Lab. No.

Our letters and reports are for the exclusive use of the client to whom they are addressed. The use of our name must receive our prior written approval. Our letters and reports apply only to the sample tested and/or inspected and are not necessarily indicative of the qualities of apparently identical or similar products.

McCALLUM
TESTING LABORATORIES INC.
Subsurface Exploration • Geotechnical Engineering

September 9, 1993

Foster Wheeler Enviresponse, Inc.
8 Peach Tree Hill Road
Livington, NJ 07039

Subject: Laboratory Test Results
Little Creek Amphibious Base
Virginia Beach, Virginia
S.O. No. 19042-62-SVZ
MTL Project 93-1270

Gentlemen:

Attached are the results of laboratory tests performed on an undisturbed sample of cap material taken from Site #7 at the Little Creek Amphibious Base. Included in this report are results of a Percent Finer Than a #200 Sieve Test (ASTM D 1140), an Atterberg Limits Test (ASTM D 4318) and a Permeability Test (ASTM D 5084).

Should you have any questions concerning this report, please contact this office at your convenience.

Very truly yours,

McCALLUM TESTING LABORATORIES, INC.

Douglas S. Kinloch, P.E.
Chief Engineer

COMMONWEALTH OF VIRGINIA
DOUGLAS S. KINLOCH
No. 7992
PROFESSIONAL ENGINEER

Post-It™ brand fax transmittal memo 7671	# of pages ▸ 2
To Nitin Apte	From
Co.	Co. MTL
Dept.	Phone # 420-2520
Fax # 201-535-2423	Fax # 424-2874

McCallum Testing Laboratories, Inc.
1808 HAYWARD AVENUE
P.O. Box 13337
CHESAPEAKE, VIRGINIA 23325-0266
(804) 420-2520

Our File Number 93-1270
Client's Order No.
Client's Req'n No.
Date 9/8/93

REPORT ON SOIL

Lab. No. 61 Chesapeake, Va.
Sample of Soil Cap Material Proposed Use
Sample No. From Little Creek, S.O. No. 19042-62-SVZ, Site #7
Depth Taken Depth From to
Depth of Cut Height of Fill Represents
Submitted by Foster Wheeler Enviresponse, Inc.
Sampled Received 6/28/93

MECHANICAL ANALYSIS

COARSE AGGREGATE

SIEVE ANALYSIS		TOTAL % PASSING	
3"-2"	%	3"	%
2"-1½"	%	2"	%
1½"-1"	%	1½"	%
1"-¾"	%	1"	%
¾"-½"	%	¾"	%
½"-3/8"	%	½"	%
3/8"-#4	%	3/8"	%
Passing #4	%	#4	%

SOIL MORTAR

SIEVE ANALYSIS		TOTAL % PASSING	
Course Sand #4-#10	%	# 4	%
Medium Sand #10-#40	%	# 10	%
Fine Sand #40-#200	%	# 40	%
Silt #200—0.005 mm	%	#100	%
Clay-Smaller than 0.005 mm	%	#200	99.3 %
Colloids-Smaller than 0.001 mm	%		

OTHER TEST DATA

Liquid Limit 47 (ASTM D 4318) Water Content as Received 46.8 (ASTM D 2216) %
Plastic Limit 22 (ASTM D 4318) Plasticity Index 25 (ASTM D 4318) Loss on Ignition (corrected) %
Specific Gravity N/A (ASTM D 854) Coefficient of permeability 2.9×10^{-8} cu.cm./sec.
Classification CL (ASTM D 2487) H.R.B.

Remarks: Sample Contained

Lab. No.

... they are addressed. The use of our name must receive our prior written approval. Our letters ... similar products.

Appendix A.6

Risk Tables

CONSTITUENTS DETECTED IN SURFACE SOIL SAMPLES
SITE 7
NAVAL AMPHIBIOUS BASE – LITTLE CREEK
VIRGINIA BEACH, VIRGINIA

Constituent	Frequency of Detection	Range of Detected Concentrations (ug/kg)	Residential Soil Concentration (ug/kg) [a]	Potential Concern
VOLATILES				
Methylene chloride	1 / 8	6 j	8.50E+03	NO
Acetone	2 / 8	11 – 12	7.80E+05	NO
SEMI–VOLATILES				
2–Methyl naphthalene	1 / 8	62 j		NO
Fluorene	1 / 8	60 j	3.10E+05	NO
Phenanthrene	4 / 8	39 – 830		YES
Anthracene	2 / 8	51 – 220 j	2.30E+06	NO
Fluoranthene	4 / 8	46 – 1300	3.10E+05	NO
Pyrene	6 / 8	52 – 1600	2.30E+05	NO
Butylbenzyl phthalate	1 / 8	58 j	1.60E+06	NO
Benzo (a) anthracene	2 / 8	110 – 710	8.80E+02	NO
Chrysene	2 / 8	82 – 390	8.80E+04	NO
Bis (2) ethylhexphthalate	8 / 8	47 – 190 j	4.60E+03	NO
Benzo (b) fluoranthene	2 / 8	100 – 510	8.80E+02	NO
Benzo (k) fluoranthene	1 / 8	380	8.80E+03	NO
Benzo (a) pyrene	2 / 8	57 – 450	8.80E+01	YES
Indeno (1,2,3–cd)pyrene	1 / 8	230 j	8.80E+02	NO
Benzo (g,h,i) perylene	1 / 8	210 j		NO
PCBs & PESTICIDES				
4,4'–DDT	1 / 8	3.8 j	1.90E+03	NO
Alpha–chlordane	1 / 8	5.1 j	4.90E+02	NO
Aroclor–1260	3 / 8	130 – 3500 j	8.30E+01	YES

Notes:

a. Residential Soil Concentration values obtained from July 11, 1994 USEPA Region III Risk–Based Concentration Table using a target hazard quotient of 0.1 and a target cancer risk of 1e–06.

CONSTITUENTS DETECTED IN SURFACE SOIL SAMPLES
SITE 7
NAVAL AMPHIBIOUS BASE – LITTLE CREEK
VIRGINIA BEACH, VIRGINIA

Constituent	Frequency of Detection	Range of Detected Concentrations (ug/kg)	Residential Soil Concentration (ug/kg) [a]	Potential Concern
INORGANICS				
Aluminum	8 / 8	2200000 – 6240000	2.30E+07	YES
Arsenic	8 / 8	860 b – 3500	3.70E+02	YES
Barium	8 / 8	8800 b – 93900	5.50E+05	YES
Beryllium [b]	4 / 8	230 b – 650 b	1.50E+02	YES
Cadmium	2 / 8	650 b – 1400	3.90E+04	YES
Calcium	8 / 8	162000 – 2450000		NO
Chromium	8 / 8	4600 – 26500	3.90E+04	YES
Cobalt [b]	7 / 8	5900 b – 6100 b	4.70E+05	YES
Copper	8 / 8	4500 – 78200 j	2.90E+05	YES
Iron	8 / 8	3040000 – 1E+07 j		YES
Lead	8 / 8	5500 – 638000 j		YES *
Magnesium	8 / 8	251000 – 3210000		NO
Manganese	8 / 8	18100 – 470000 j	3.90E+04	YES
Mercury	1 / 8	70	2.30E+03	NO
Nickel	7 / 8	3400 – 18000	1.60E+05	YES
Potassium	8 / 8	236000 – 2970000 b		NO
Sodium	2 / 8	227000 b – 262000		NO
Vanadium	8 / 8	7400 b – 202000	5.50E+04	YES
Zinc	8 / 8	12600 – 405000	2.30E+06	YES

Notes:

a. Residential Soil Concentration values obtained from July 11, 1994 USEPA Region III Risk–Based Concentration Table except for aluminum where it is obtained from the January 11, 1994 RBC Table using a target hazard quotient of 0.1 and a target cancer risk of 1e–06.

* Health risk analysis to be performed will use the Integrated Exposure Uptake Biokinetic (IEUBK) Model.

b. Constituent concentration is five times greater than the maximum detected in blank (b).

SUMMARY OF CHRONIC DAILY INTAKE (CDI) AND POTENTIAL NONCARCINOGENIC
AND CARCINOGENIC RISK FROM INGESTION OF SURFACE SOIL
SITE 7

CURRENT SCENARIO
SOIL – INGESTION
TRESPASSER CHILD

CHEMICAL	CS mg/kg	IR mg/d	FI	EF d/y	ED y	CF kg/mg	BW kg	ATnc d	ATc d	CDInc mg/kg/d	CDIc mg/kg/d	RfD mg/kg/d	CSF (mg/kg/d)-1	HI	CR	% CONTRIB NC RISK	% CONTRIB CARC RISK
Phenanthrene	6.30E-01	200	1	14	6	1E-06	15	2190	25550	4.24E-07	3.64E-08	2.90E-02	--	1.46E-05	--	0.02%	0.00%
Benzo (a)-pyrene	4.50E-01	200	1	14	6	1E-06	15	2190	25550	2.30E-07	1.97E-08	--	7.30E+00	--	1.44E-07	0.00%	8.39%
Aroclor-1260	3.50E+00	200	1	14	6	1E-06	15	2190	25550	1.79E-06	1.53E-07	--	7.70E+00	--	1.18E-06	0.00%	68.83%
Aluminum	6.24E+03	200	1	14	6	1E-06	15	2190	25550	3.19E-03	2.74E-04	2.90E+00	--	1.10E-03	--	1.17%	0.00%
Arsenic	3.50E+00	200	1	14	6	1E-06	15	2190	25550	1.79E-06	1.53E-07	3.00E-04	1.75E+00	5.97E-03	2.68E-07	6.34%	15.64%
Barium	9.39E+01	200	1	14	6	1E-06	15	2190	25550	4.80E-05	4.12E-06	7.00E-02	--	6.86E-04	--	0.73%	0.00%
Beryllium	6.50E-01	200	1	14	6	1E-06	15	2190	25550	3.32E-07	2.85E-08	5.00E-03	4.30E+00	6.65E-05	1.23E-07	0.07%	7.14%
Cadmium	1.40E+00	200	1	14	6	1E-06	15	2190	25550	7.16E-07	6.14E-08	5.00E-04	--	1.43E-03	--	1.52%	0.00%
Chromium	2.65E+01	200	1	14	6	1E-06	15	2190	25550	1.36E-05	1.16E-06	5.00E-03	--	2.71E-03	--	2.88%	0.00%
Cobalt	6.10E+00	200	1	14	6	1E-06	15	2190	25550	3.12E-06	2.67E-07	6.00E-02	--	5.20E-05	--	0.06%	0.00%
Copper	7.82E+01	200	1	14	6	1E-06	15	2190	25550	4.00E-05	3.43E-06	3.71E-02	--	1.08E-03	--	1.15%	0.00%
Iron	1.00E+04	200	1	14	6	1E-06	15	2190	25550	5.11E-03	4.38E-04	3.00E-01	--	1.70E-02	--	18.11%	0.00%
Manganese	4.70E+02	200	1	14	6	1E-06	15	2190	25550	2.40E-04	2.06E-05	5.00E-03	--	4.81E-02	--	51.07%	0.00%
Nickel	1.80E+01	200	1	14	6	1E-06	15	2190	25550	9.21E-06	7.89E-07	2.00E-02	--	4.60E-04	--	0.49%	0.00%
Vanadium	2.02E+02	200	1	14	6	1E-06	15	2190	25550	1.03E-04	8.85E-06	7.00E-03	--	1.48E-02	--	15.68%	0.00%
Zinc	4.05E+02	200	1	14	6	1E-06	15	2190	25550	2.07E-04	1.78E-05	3.00E-01	--	6.90E-04	--	0.73%	0.00%
TOTAL														9.41E-02	1.72E-06	100.00%	100.00%

SUMMARY OF CHRONIC DAILY INTAKE (CDI) AND POTENTIAL NONCARCINOGENIC
AND CARCINOGENIC RISK FROM INGESTION OF SURFACE SOIL
SITE 7

CURRENT SCENARIO
SOIL – INGESTION
TRESPASSER ADULT

CHEMICAL	CS mg/kg	IR mg/d	FI	EF d/y	ED y	CF kg/mg	BW kg	ATnc d	ATc d	CDInc mg/kg/d	CDIc mg/kg/d	RfD mg/kg/d	CSF (mg/kg/d)-1	HI	CR	% CONTRIB NC RISK	% CONTRIB CARC RISK
Phenanthrene	8.30E-01	100	1	28	30	1E-06	70	10950	25550	9.10E-08	3.90E-08	2.90E-02	--	3.14E-06	--	0.02%	0.00%
Benzo (a)-pyrene	4.50E-01	100	1	28	30	1E-06	70	10950	25550	4.93E-08	2.11E-08	--	7.30E+00	--	1.54E-07	0.00%	8.39%
Aroclor-1260	3.50E+00	100	1	28	30	1E-06	70	10950	25550	3.84E-07	1.64E-07	--	7.70E+00	--	1.27E-06	0.00%	68.83%
Aluminum	6.24E+03	100	1	28	30	1E-06	70	10950	25550	6.84E-04	2.93E-04	2.90E+00	--	2.36E-04	--	1.17%	0.00%
Arsenic	3.50E+00	100	1	28	30	1E-06	70	10950	25550	3.84E-07	1.64E-07	3.00E-04	1.75E+00	1.28E-03	2.88E-07	6.34%	15.64%
Barium	9.39E+01	100	1	28	30	1E-06	70	10950	25550	1.03E-05	4.41E-06	7.00E-02	--	1.47E-04	--	0.73%	0.00%
Beryllium	6.50E-01	100	1	28	30	1E-06	70	10950	25550	7.12E-08	3.05E-08	5.00E-03	4.30E+00	1.42E-05	1.31E-07	0.07%	7.14%
Cadmium	1.40E+00	100	1	28	30	1E-06	70	10950	25550	1.53E-07	6.58E-08	5.00E-04	--	3.07E-04	--	1.52%	0.00%
Chromium	2.65E+01	100	1	28	30	1E-06	70	10950	25550	2.90E-06	1.24E-06	5.00E-03	--	5.81E-04	--	2.88%	0.00%
Cobalt	6.10E+00	100	1	28	30	1E-06	70	10950	25550	6.68E-07	2.86E-07	6.00E-02	--	1.11E-05	--	0.06%	0.00%
Copper	7.82E+01	100	1	28	30	1E-06	70	10950	25550	8.57E-06	3.67E-06	3.71E-02	--	2.31E-04	--	1.15%	0.00%
Iron	1.00E+04	100	1	28	30	1E-06	70	10950	25550	1.10E-03	4.70E-04	3.00E-01	--	3.65E-03	--	18.11%	0.00%
Manganese	4.70E+02	100	1	28	30	1E-06	70	10950	25550	5.15E-05	2.21E-05	5.00E-03	--	1.03E-02	--	51.07%	0.00%
Nickel	1.80E+01	100	1	28	30	1E-06	70	10950	25550	1.97E-06	8.45E-07	2.00E-02	--	9.86E-05	--	0.49%	0.00%
Vanadium	2.02E+02	100	1	28	30	1E-06	70	10950	25550	2.21E-05	9.49E-06	7.00E-03	--	3.16E-03	--	15.68%	0.00%
Zinc	4.05E+02	100	1	28	30	1E-06	70	10950	25550	4.44E-05	1.90E-05	3.00E-01	--	1.48E-04	--	0.73%	0.00%
TOTAL														2.02E-02	1.84E-06	100.00%	100.00%

SUMMARY OF CHRONIC DAILY INTAKE (CDI) AND POTENTIAL NONCARCINOGENIC
AND CARCINOGENIC RISK FROM INGESTION OF SURFACE SOIL
SITE 7

CURRENT SCENARIO
SOIL – INGESTION
WORKER ADULT

CHEMICAL	CS mg/kg	IR mg/d	FI	EF d/y	ED y	CF kg/mg	BW kg	ATnc d	ATc d	CDInc mg/kg/d	CDIc mg/kg/d	RfD mg/kg/d	CSF (mg/kg/d)-1	HI	CR	% CONTRIB NC RISK	% CONTRIB CARC RISK
Phenanthrene	8.30E-01	50	1	250	25	1E-06	70	9125	25550	4.06E-07	1.45E-07	2.90E-02	--	1.40E-05	--	0.02%	0.00%
Benzo (a)-pyrene	4.50E-01	50	1	250	25	1E-06	70	9125	25550	2.20E-07	7.86E-08	--	7.30E+00	--	5.74E-07	0.00%	8.39%
Aroclor-1260	3.50E+00	50	1	250	25	1E-06	70	9125	25550	1.71E-06	6.12E-07	--	7.70E+00	--	4.71E-06	0.00%	68.83%
Aluminum	6.24E+03	50	1	250	25	1E-06	70	9125	25550	3.05E-03	1.09E-03	2.90E+00	--	1.05E-03	--	1.17%	0.00%
Arsenic	3.50E+00	50	1	250	25	1E-06	70	9125	25550	1.71E-06	6.12E-07	3.00E-04	1.75E+00	5.71E-03	1.07E-06	6.34%	15.64%
Barium	9.39E+01	50	1	250	25	1E-06	70	9125	25550	4.59E-05	1.64E-05	7.00E-02	--	6.56E-04	--	0.73%	0.00%
Beryllium	6.50E-01	50	1	250	25	1E-06	70	9125	25550	3.18E-07	1.14E-07	5.00E-03	4.30E+00	6.36E-05	4.88E-07	0.07%	7.14%
Cadmium	1.40E+00	50	1	250	25	1E-06	70	9125	25550	6.85E-07	2.45E-07	5.00E-04	--	1.37E-03	--	1.52%	0.00%
Chromium	2.65E+01	50	1	250	25	1E-06	70	9125	25550	1.30E-05	4.63E-06	5.00E-03	--	2.59E-03	--	2.88%	0.00%
Cobalt	6.10E+00	50	1	250	25	1E-06	70	9125	25550	2.98E-06	1.07E-06	6.00E-02	--	4.97E-05	--	0.06%	0.00%
Copper	7.82E+01	50	1	250	25	1E-06	70	9125	25550	3.83E-05	1.37E-05	3.71E-02	--	1.03E-03	--	1.15%	0.00%
Iron	1.00E+04	50	1	250	25	1E-06	70	9125	25550	4.89E-03	1.75E-03	3.00E-01	--	1.63E-02	--	18.11%	0.00%
Manganese	4.70E+02	50	1	250	25	1E-06	70	9125	25550	2.30E-04	8.21E-05	5.00E-03	--	4.60E-02	--	51.07%	0.00%
Nickel	1.80E+01	50	1	250	25	1E-06	70	9125	25550	8.81E-06	3.15E-06	2.00E-02	--	4.40E-04	--	0.49%	0.00%
Vanadium	2.02E+02	50	1	250	25	1E-06	70	9125	25550	9.88E-05	3.53E-05	7.00E-03	--	1.41E-02	--	15.68%	0.00%
Zinc	4.05E+02	50	1	250	25	1E-06	70	9125	25550	1.98E-04	7.08E-05	3.00E-01	--	6.60E-04	--	0.73%	0.00%
TOTAL														9.01E-02	6.84E-06	100.00%	100.00%

SUMMARY OF CHRONIC DAILY INTAKE (CDI) AND POTENTIAL NONCARCINOGENIC
AND CARCINOGENIC RISK FROM DERMAL CONTACT WITH SURFACE SOIL
SITE 7

CURRENT SCENARIO
SOIL – DERMAL
TRESPASSER CHILD

CHEMICAL	CS mg/kg	SA cm^2	AF mg/cm^2	ABS	EF d/y	ED y	CF kg/mg	BW kg	ATnc d	ATc d	CDInc mg/kg/d	CDIc mg/kg/d	RfD mg/kg/d	CSF (mg/kg/d)-1	HI	CR	% CONTRIB NC RISK	% CONTRIB CARC RISK
Phenanthrene	8.30E-01	1820	1	0.01	14	6	1E-06	15	2190	25550	3.86E-08	3.31E-09	2.90E-02	--	1.33E-06	-	0.16%	0.00%
Benzo (a)-pyrene	4.50E-01	1820	1	0.01	14	6	1E-06	15	2190	25550	2.09E-08	1.80E-09	--	7.30E+00	--	1.31E-08	0.00%	1.98%
Aroclor-1260	3.50E+00	1820	1	0.06	14	6	1E-06	15	2190	25550	9.77E-07	8.38E-08	--	7.70E+00	--	6.45E-07	0.00%	97.48%
Aluminum	6.24E+03	1820	1	0.001	14	6	1E-06	15	2190	25550	2.90E-05	2.49E-06	2.90E+00	--	1.00E-05	-	1.17%	0.00%
Arsenic	3.50E+00	1820	1	0.001	14	6	1E-06	15	2190	25550	1.63E-08	1.40E-09	3.00E-04	1.75E+00	5.43E-05	2.44E-09	6.33%	0.37%
Barium	9.39E+01	1820	1	0.001	14	6	1E-06	15	2190	25550	4.37E-07	3.75E-08	7.00E-02	--	6.24E-06	-	0.73%	0.00%
Beryllium	6.50E-01	1820	1	0.001	14	6	1E-06	15	2190	25550	3.03E-09	2.59E-10	5.00E-03	4.30E+00	6.05E-07	1.11E-09	0.07%	0.17%
Cadmium	1.40E+00	1820	1	0.001	14	6	1E-06	15	2190	25550	6.52E-09	5.58E-10	5.00E-04	--	1.30E-05	-	1.52%	0.00%
Chromium	2.65E+01	1820	1	0.001	14	6	1E-06	15	2190	25550	1.23E-07	1.06E-08	5.00E-03	--	2.47E-05	-	2.88%	0.00%
Cobalt	6.10E+00	1820	1	0.001	14	6	1E-06	15	2190	25550	2.84E-08	2.43E-09	6.00E-02	--	4.73E-07	-	0.06%	0.00%
Copper	7.82E+01	1820	1	0.001	14	6	1E-06	15	2190	25550	3.64E-07	3.12E-08	3.71E-02	--	9.81E-06	-	1.14%	0.00%
Iron	1.00E+04	1820	1	0.001	14	6	1E-06	15	2190	25550	4.65E-05	3.99E-06	3.00E-01	--	1.55E-04	-	18.08%	0.00%
Manganese	4.70E+02	1820	1	0.001	14	6	1E-06	15	2190	25550	2.19E-06	1.87E-07	5.00E-03	--	4.37E-04	-	51.00%	0.00%
Nickel	1.80E+01	1820	1	0.001	14	6	1E-06	15	2190	25550	8.38E-08	7.18E-09	2.00E-02	--	4.19E-06	-	0.49%	0.00%
Vanadium	2.02E+02	1820	1	0.001	14	6	1E-06	15	2190	25550	9.40E-07	8.06E-08	7.00E-03	--	1.34E-04	-	15.66%	0.00%
Zinc	4.05E+02	1820	1	0.001	14	6	1E-06	15	2190	25550	1.88E-06	1.62E-07	3.00E-01	--	6.28E-06	-	0.73%	0.00%
TOTAL															8.58E-04	6.62E-07	100.00%	100.00%

SUMMARY OF CHRONIC DAILY INTAKE (CDI) AND POTENTIAL NONCARCINOGENIC
AND CARCINOGENIC RISK FROM DERMAL CONTACT WITH SURFACE SOIL
SITE 7

CURRENT SCENARIO
SOIL – DERMAL
TRESPASSER ADULT

CHEMICAL	CS mg/kg	SA cm^2	AF mg/cm^2	ABS	EF d/y	ED y	CF kg/mg	BW kg	ATnc d	ATc d	CDInc mg/kg/d	CDIc mg/kg/d	RfD mg/kg/d	CSF (mg/kg/d)-1	HI	CR	% CONTRIB NC RISK	% CONTRIB CARC RISK
Phenanthrene	8.30E-01	5800	1	0.01	28	30	1E-06	70	10950	25550	5.28E-08	2.26E-08	2.90E-02	--	1.82E-06	–	0.16%	0.00%
Benzo (a)-pyrene	4.50E-01	5800	1	0.01	28	30	1E-06	70	10950	25550	2.86E-08	1.23E-08	--	7.30E+00	--	8.95E-08	0.00%	1.98%
Aroclor-1260	3.50E+00	5800	1	0.06	28	30	1E-06	70	10950	25550	1.33E-06	5.72E-07	--	7.70E+00	--	4.40E-06	0.00%	97.48%
Aluminum	6.24E+03	5800	1	0.001	28	30	1E-06	70	10950	25550	3.97E-05	1.70E-05	2.90E+00	--	1.37E-05	–	1.17%	0.00%
Arsenic	3.50E+00	5800	1	0.001	28	30	1E-06	70	10950	25550	2.22E-08	9.53E-09	3.00E-04	1.75E+00	7.42E-05	1.67E-08	6.33%	0.37%
Barium	9.39E+01	5800	1	0.001	28	30	1E-06	70	10950	25550	5.97E-07	2.56E-07	7.00E-02	--	8.53E-06	–	0.73%	0.00%
Beryllium	6.50E-01	5800	1	0.001	28	30	1E-06	70	10950	25550	4.13E-09	1.77E-09	5.00E-03	4.30E+00	8.26E-07	7.61E-09	0.07%	0.17%
Cadmium	1.40E+00	5800	1	0.001	28	30	1E-06	70	10950	25550	8.90E-09	3.81E-09	5.00E-04	--	1.78E-05	–	1.52%	0.00%
Chromium	2.65E+01	5800	1	0.001	28	30	1E-06	70	10950	25550	1.68E-07	7.22E-08	5.00E-03	--	3.37E-05	–	2.88%	0.00%
Cobalt	6.10E+00	5800	1	0.001	28	30	1E-06	70	10950	25550	3.88E-08	1.66E-08	6.00E-02	--	6.46E-07	–	0.06%	0.00%
Copper	7.82E+01	5800	1	0.001	28	30	1E-06	70	10950	25550	4.97E-07	2.13E-07	3.71E-02	--	1.34E-05	–	1.14%	0.00%
Iron	1.00E+04	5800	1	0.001	28	30	1E-06	70	10950	25550	6.36E-05	2.72E-05	3.00E-01	--	2.12E-04	–	18.08%	0.00%
Manganese	4.70E+02	5800	1	0.001	28	30	1E-06	70	10950	25550	2.99E-06	1.28E-06	5.00E-03	--	5.97E-04	–	51.00%	0.00%
Nickel	1.80E+01	5800	1	0.001	28	30	1E-06	70	10950	25550	1.14E-07	4.90E-08	2.00E-02	--	5.72E-06	–	0.49%	0.00%
Vanadium	2.02E+02	5800	1	0.001	28	30	1E-06	70	10950	25550	1.28E-06	5.50E-07	7.00E-03	--	1.83E-04	–	15.66%	0.00%
Zinc	4.05E+02	5800	1	0.001	28	30	1E-06	70	10950	25550	2.57E-06	1.10E-06	3.00E-01	--	8.58E-06	–	0.73%	0.00%
TOTAL															1.17E-03	4.52E-06	100.00%	100.00%

SUMMARY OF CHRONIC DAILY INTAKE (CDI) AND POTENTIAL NONCARCINOGENIC
AND CARCINOGENIC RISK FROM DERMAL CONTACT WITH SURFACE SOIL
SITE 7

CURRENT SCENARIO
SOIL – DERMAL
WORKER ADULT

CHEMICAL	CS mg/kg	SA cm^2	AF mg/cm^2	ABS	EF d/y	ED y	CF kg/mg	BW kg	ATnc d	ATc d	CDInc mg/kg/d	CDIc mg/kg/d	RfD mg/kg/d	CSF (mg/kg/d)-1	HI	CR	% CONTRIB NC RISK	% CONTRIB CARC RISK
Phenanthrene	8.30E-01	5800	1	0.01	250	25	1E-06	70	9125	25550	4.71E-07	1.68E-07	2.90E-02	--	1.62E-05	-	0.16%	0.00%
Benzo (a)-pyrene	4.50E-01	5800	1	0.01	250	25	1E-06	70	9125	25550	2.55E-07	9.12E-08	--	7.30E+00	--	6.66E-07	0.00%	1.98%
Aroclor-1260	3.50E+00	5800	1	0.06	250	25	1E-06	70	9125	25550	1.19E-05	4.26E-06	--	7.70E+00	--	3.28E-05	0.00%	97.48%
Aluminum	6.24E+03	5800	1	0.001	250	25	1E-06	70	9125	25550	3.54E-04	1.26E-04	2.90E+00	--	1.22E-04	-	1.17%	0.00%
Arsenic	3.50E+00	5800	1	0.001	250	25	1E-06	70	9125	25550	1.99E-07	7.09E-08	3.00E-04	1.75E+00	6.62E-04	1.24E-07	6.33%	0.37%
Barium	9.39E+01	5800	1	0.001	250	25	1E-06	70	9125	25550	5.33E-06	1.90E-06	7.00E-02	--	7.61E-05	-	0.73%	0.00%
Beryllium	6.50E-01	5800	1	0.001	250	25	1E-06	70	9125	25550	3.69E-08	1.32E-08	5.00E-03	4.30E+00	7.38E-06	5.67E-08	0.07%	0.17%
Cadmium	1.40E+00	5800	1	0.001	250	25	1E-06	70	9125	25550	7.95E-08	2.84E-08	5.00E-04	--	1.59E-04	-	1.52%	0.00%
Chromium	2.65E+01	5800	1	0.001	250	25	1E-06	70	9125	25550	1.50E-06	5.37E-07	5.00E-03	--	3.01E-04	-	2.88%	0.00%
Cobalt	6.10E+00	5800	1	0.001	250	25	1E-06	70	9125	25550	3.46E-07	1.24E-07	6.00E-02	--	5.77E-06	-	0.06%	0.00%
Copper	7.82E+01	5800	1	0.001	250	25	1E-06	70	9125	25550	4.44E-06	1.58E-06	3.71E-02	--	1.20E-04	-	1.14%	0.00%
Iron	1.00E+04	5800	1	0.001	250	25	1E-06	70	9125	25550	5.68E-04	2.03E-04	3.00E-01	--	1.89E-03	-	18.08%	0.00%
Manganese	4.70E+02	5800	1	0.001	250	25	1E-06	70	9125	25550	2.67E-05	9.53E-06	5.00E-03	--	5.33E-03	-	51.00%	0.00%
Nickel	1.80E+01	5800	1	0.001	250	25	1E-06	70	9125	25550	1.02E-06	3.65E-07	2.00E-02	--	5.11E-05	-	0.49%	0.00%
Vanadium	2.02E+02	5800	1	0.001	250	25	1E-06	70	9125	25550	1.15E-05	4.09E-06	7.00E-03	--	1.64E-03	-	15.66%	0.00%
Zinc	4.05E+02	5800	1	0.001	250	25	1E-06	70	9125	25550	2.30E-05	8.21E-06	3.00E-01	--	7.66E-05	-	0.73%	0.00%
TOTAL															1.05E-02	3.36E-05	100.00%	100.00%

SUMMARY OF CHRONIC DAILY INTAKE (CDI) AND POTENTIAL NONCARCINOGENIC
AND CARCINOGENIC RISK FROM INGESTION OF SURFACE SOIL
SITE 7

FUTURE SCENARIO
SOIL -- INGESTION
RESIDENT CHILD

CHEMICAL	CS mg/kg	IR mg/d	FI	EF d/y	ED y	CF kg/mg	BW kg	ATnc d	ATc d	CDInc mg/kg/d	CDIc mg/kg/d	RfD mg/kg/d	CSF (mg/kg/d)-1	HI	CR	% CONTRIB NC RISK	% CONTRIB CARC RISK
Phenanthrene	8.30E-01	200	1	350	6	1E-06	15	2190	25550	1.06E-05	9.10E-07	2.90E-02	--	3.66E-04	--	0.02%	0.00%
Benzo (a)-pyrene	4.50E-01	200	1	350	6	1E-06	15	2190	25550	5.75E-06	4.93E-07	--	7.30E+00	--	3.60E-06	0.00%	8.39%
Aroclor-1260	3.50E+00	200	1	350	6	1E-06	15	2190	25550	4.47E-05	3.84E-06	--	7.70E+00	--	2.95E-05	0.00%	68.83%
Aluminum	6.24E+03	200	1	350	6	1E-06	15	2190	25550	7.98E-02	6.84E-03	2.90E+00	--	2.75E-02	--	1.17%	0.00%
Arsenic	3.50E+00	200	1	350	6	1E-06	15	2190	25550	4.47E-05	3.84E-06	3.00E-04	1.75E+00	1.49E-01	6.71E-06	6.34%	15.64%
Barium	9.39E+01	200	1	350	6	1E-06	15	2190	25550	1.20E-03	1.03E-04	7.00E-02	--	1.72E-02	--	0.73%	0.00%
Beryllium	6.50E-01	200	1	350	6	1E-06	15	2190	25550	8.31E-06	7.12E-07	5.00E-03	4.30E+00	1.66E-03	3.06E-06	0.07%	7.14%
Cadmium	1.40E+00	200	1	350	6	1E-06	15	2190	25550	1.79E-05	1.53E-06	5.00E-04	--	3.58E-02	--	1.52%	0.00%
Chromium	2.65E+01	200	1	350	6	1E-06	15	2190	25550	3.39E-04	2.90E-05	5.00E-03	--	6.78E-02	--	2.88%	0.00%
Cobalt	6.10E+00	200	1	350	6	1E-06	15	2190	25550	7.80E-05	6.68E-06	6.00E-02	--	1.30E-03	--	0.06%	0.00%
Copper	7.82E+01	200	1	350	6	1E-06	15	2190	25550	1.00E-03	8.57E-05	3.71E-02	--	2.69E-02	--	1.15%	0.00%
Iron	1.00E+04	200	1	350	6	1E-06	15	2190	25550	1.28E-01	1.10E-02	3.00E-01	--	4.26E-01	--	18.11%	0.00%
Manganese	4.70E+02	200	1	350	6	1E-06	15	2190	25550	6.01E-03	5.15E-04	5.00E-03	--	1.20E+00	--	51.07%	0.00%
Nickel	1.80E+01	200	1	350	6	1E-06	15	2190	25550	2.30E-04	1.97E-05	2.00E-02	--	1.15E-02	--	0.49%	0.00%
Vanadium	2.02E+02	200	1	350	6	1E-06	15	2190	25550	2.58E-03	2.21E-04	7.00E-03	--	3.69E-01	--	15.68%	0.00%
Zinc	4.05E+02	200	1	350	6	1E-06	15	2190	25550	5.18E-03	4.44E-04	3.00E-01	--	1.73E-02	--	0.73%	0.00%
TOTAL														2.35E+00	4.29E-05	100.00%	100.00%

SUMMARY OF CHRONIC DAILY INTAKE (CDI) AND POTENTIAL NONCARCINOGENIC
AND CARCINOGENIC RISK FROM INGESTION OF SURFACE SOIL
SITE 7

FUTURE SCENARIO
SOIL – INGESTION
RESIDENT ADULT

CHEMICAL	CS mg/kg	IR mg/d	FI	EF d/y	ED y	CF kg/mg	BW kg	ATnc d	ATc d	CDInc mg/kg/d	CDIc mg/kg/d	RfD mg/kg/d	CSF (mg/kg/d)-1	HI	CR	% CONTRIB NC RISK	% CONTRIB CARC RISK
Phenanthrene	8.30E-01	100	1	350	30	1E-06	70	10950	25550	1.14E-06	4.87E-07	2.90E-02	--	3.92E-05	--	0.02%	0.00%
Benzo (a)-pyrene	4.50E-01	100	1	350	30	1E-06	70	10950	25550	6.16E-07	2.64E-07	--	7.30E+00	--	1.93E-06	0.00%	8.39%
Aroclor-1260	3.50E+00	100	1	350	30	1E-06	70	10950	25550	4.79E-06	2.05E-06	--	7.70E+00	--	1.58E-05	0.00%	68.83%
Aluminum	6.24E+03	100	1	350	30	1E-06	70	10950	25550	8.55E-03	3.66E-03	2.90E+00	--	2.95E-03	--	1.17%	0.00%
Arsenic	3.50E+00	100	1	350	30	1E-06	70	10950	25550	4.79E-06	2.05E-06	3.00E-04	1.75E+00	1.60E-02	3.60E-06	6.34%	15.64%
Barium	9.39E+01	100	1	350	30	1E-06	70	10950	25550	1.29E-04	5.51E-05	7.00E-02	--	1.84E-03	--	0.73%	0.00%
Beryllium	6.50E-01	100	1	350	30	1E-06	70	10950	25550	8.90E-07	3.82E-07	5.00E-03	4.30E+00	1.78E-04	1.64E-06	0.07%	7.14%
Cadmium	1.40E+00	100	1	350	30	1E-06	70	10950	25550	1.92E-06	8.22E-07	5.00E-04	--	3.84E-03	--	1.52%	0.00%
Chromium	2.65E+01	100	1	350	30	1E-06	70	10950	25550	3.63E-05	1.56E-05	5.00E-03	--	7.26E-03	--	2.88%	0.00%
Cobalt	6.10E+00	100	1	350	30	1E-06	70	10950	25550	8.36E-06	3.58E-06	6.00E-02	--	1.39E-04	--	0.06%	0.00%
Copper	7.82E+01	100	1	350	30	1E-06	70	10950	25550	1.07E-04	4.59E-05	3.71E-02	--	2.89E-03	--	1.15%	0.00%
Iron	1.00E+04	100	1	350	30	1E-06	70	10950	25550	1.37E-02	5.87E-03	3.00E-01	--	4.57E-02	--	18.11%	0.00%
Manganese	4.70E+02	100	1	350	30	1E-06	70	10950	25550	6.44E-04	2.76E-04	5.00E-03	--	1.29E-01	--	51.07%	0.00%
Nickel	1.80E+01	100	1	350	30	1E-06	70	10950	25550	2.47E-05	1.06E-05	2.00E-02	--	1.23E-03	--	0.49%	0.00%
Vanadium	2.02E+02	100	1	350	30	1E-06	70	10950	25550	2.77E-04	1.19E-04	7.00E-03	--	3.95E-02	--	15.68%	0.00%
Zinc	4.05E+02	100	1	350	30	1E-06	70	10950	25550	5.55E-04	2.38E-04	3.00E-01	--	1.85E-03	--	0.73%	0.00%
TOTAL														2.52E-01	2.30E-05	100.00%	100.00%

SUMMARY OF CHRONIC DAILY INTAKE (CDI) AND POTENTIAL NONCARCINOGENIC
AND CARCINOGENIC RISK FROM DERMAL CONTACT WITH SURFACE SOIL
SITE 7

FUTURE SCENARIO
SOIL -- DERMAL
RESIDENT CHILD

CHEMICAL	CS mg/kg	SA cm^2	AF mg/cm^2	ABS	EF d/y	ED y	CF kg/mg	BW kg	ATnc d	ATc d	CDInc mg/kg/d	CDIc mg/kg/d	RfD mg/kg/d	CSF (mg/kg/d)-1	HI	CR	% CONTRIB NC RISK	% CONTRIB CARC RISK
Phenanthrene	8.30E-01	1820	1	0.01	350	6	1E-06	15	2190	25550	9.66E-07	8.28E-08	2.90E-02	--	3.33E-05	-	0.16%	0.00%
Benzo (a)-pyrene	4.50E-01	1820	1	0.01	350	6	1E-06	15	2190	25550	5.24E-07	4.49E-08	--	7.30E+00	--	3.28E-07	0.00%	1.98%
Aroclor-1260	3.50E+00	1820	1	0.06	350	6	1E-06	15	2190	25550	2.44E-05	2.09E-06	--	7.70E+00	--	1.61E-05	0.00%	97.46%
Aluminum	6.24E+03	1820	1	0.001	350	6	1E-06	15	2190	25550	7.26E-04	6.22E-05	2.90E+00	--	2.50E-04	-	1.17%	0.00%
Arsenic	3.50E+00	1820	1	0.001	350	6	1E-06	15	2190	25550	4.07E-07	3.49E-08	3.00E-04	1.75E+00	1.36E-03	6.11E-08	6.33%	0.37%
Barium	9.39E+01	1820	1	0.001	350	6	1E-06	15	2190	25550	1.09E-05	9.36E-07	7.00E-02	--	1.56E-04	-	0.73%	0.00%
Beryllium	6.50E-01	1820	1	0.001	350	6	1E-06	15	2190	25550	7.56E-08	6.48E-09	5.00E-03	4.30E+00	1.51E-05	2.79E-08	0.07%	0.17%
Cadmium	1.40E+00	1820	1	0.001	350	6	1E-06	15	2190	25550	1.63E-07	1.40E-08	5.00E-04	--	3.26E-04	-	1.52%	0.00%
Chromium	2.65E+01	1820	1	0.001	350	6	1E-06	15	2190	25550	3.08E-06	2.64E-07	5.00E-03	--	6.17E-04	-	2.88%	0.00%
Cobalt	6.10E+00	1820	1	0.001	350	6	1E-06	15	2190	25550	7.10E-07	6.08E-08	6.00E-02	--	1.18E-05	-	0.06%	0.00%
Copper	7.82E+01	1820	1	0.001	350	6	1E-06	15	2190	25550	9.10E-06	7.80E-07	3.71E-02	--	2.45E-04	-	1.14%	0.00%
Iron	1.00E+04	1820	1	0.001	350	6	1E-06	15	2190	25550	1.16E-03	9.97E-05	3.00E-01	--	3.88E-03	-	18.08%	0.00%
Manganese	4.70E+02	1820	1	0.001	350	6	1E-06	15	2190	25550	5.47E-05	4.69E-06	5.00E-03	--	1.09E-02	-	51.00%	0.00%
Nickel	1.80E+01	1820	1	0.001	350	6	1E-06	15	2190	25550	2.09E-06	1.80E-07	2.00E-02	--	1.05E-04	-	0.49%	0.00%
Vanadium	2.02E+02	1820	1	0.001	350	6	1E-06	15	2190	25550	2.35E-05	2.01E-06	7.00E-03	--	3.36E-03	-	15.66%	0.00%
Zinc	4.05E+02	1820	1	0.001	350	6	1E-06	15	2190	25550	4.71E-05	4.04E-06	3.00E-01	--	1.57E-04	-	0.73%	0.00%
TOTAL															2.14E-02	1.65E-05	100.00%	100.00%

SUMMARY OF CHRONIC DAILY INTAKE (CDI) AND POTENTIAL NONCARCINOGENIC
AND CARCINOGENIC RISK FROM DERMAL CONTACT WITH SURFACE SOIL
SITE 7

FUTURE SCENARIO
SOIL – DERMAL
RESIDENT ADULT

CHEMICAL	CS mg/kg	SA cm^2	AF mg/cm^2	ABS	EF d/y	ED y	CF kg/mg	BW kg	ATnc d	ATc d	CDInc mg/kg/d	CDIc mg/kg/d	RfD mg/kg/d	CSF (mg/kg/d)-1	HI	CR	% CONTRIB NC RISK	% CONTRIB CARC RISK
Phenanthrene	8.30E-01	5800	1	0.01	350	30	1E-06	70	10950	25550	6.59E-07	2.83E-07	2.90E-02	--	2.27E-05	-	0.16%	0.00%
Benzo (a)-pyrene	4.50E-01	5800	1	0.01	350	30	1E-06	70	10950	25550	3.58E-07	1.53E-07	--	7.30E+00	--	1.12E-06	0.00%	1.98%
Aroclor-1260	3.50E+00	5800	1	0.06	350	30	1E-06	70	10950	25550	1.67E-05	7.15E-06	--	7.70E+00	--	5.51E-05	0.00%	97.48%
Aluminum	6.24E+03	5800	1	0.001	350	30	1E-06	70	10950	25550	4.96E-04	2.12E-04	2.90E+00	--	1.71E-04	-	1.17%	0.00%
Arsenic	3.50E+00	5800	1	0.001	350	30	1E-06	70	10950	25550	2.78E-07	1.19E-07	3.00E-04	1.75E+00	9.27E-04	2.09E-07	6.33%	0.37%
Barium	9.39E+01	5800	1	0.001	350	30	1E-06	70	10950	25550	7.46E-06	3.20E-06	7.00E-02	--	1.07E-04	-	0.73%	0.00%
Beryllium	6.50E-01	5800	1	0.001	350	30	1E-06	70	10950	25550	5.16E-08	2.21E-08	5.00E-03	4.30E+00	1.03E-05	9.52E-08	0.07%	0.17%
Cadmium	1.40E+00	5800	1	0.001	350	30	1E-06	70	10950	25550	1.11E-07	4.77E-08	5.00E-04	--	2.22E-04	-	1.52%	0.00%
Chromium	2.65E+01	5800	1	0.001	350	30	1E-06	70	10950	25550	2.11E-06	9.02E-07	5.00E-03	--	4.21E-04	-	2.88%	0.00%
Cobalt	6.10E+00	5800	1	0.001	350	30	1E-06	70	10950	25550	4.85E-07	2.08E-07	6.00E-02	--	8.08E-06	-	0.06%	0.00%
Copper	7.82E+01	5800	1	0.001	350	30	1E-06	70	10950	25550	6.21E-06	2.66E-06	3.71E-02	--	1.67E-04	-	1.14%	0.00%
Iron	1.00E+04	5800	1	0.001	350	30	1E-06	70	10950	25550	7.95E-04	3.41E-04	3.00E-01	--	2.65E-03	-	18.08%	0.00%
Manganese	4.70E+02	5800	1	0.001	350	30	1E-06	70	10950	25550	3.73E-05	1.60E-05	5.00E-03	--	7.47E-03	-	51.00%	0.00%
Nickel	1.80E+01	5800	1	0.001	350	30	1E-06	70	10950	25550	1.43E-06	6.13E-07	2.00E-02	--	7.15E-05	-	0.49%	0.00%
Vanadium	2.02E+02	5800	1	0.001	350	30	1E-06	70	10950	25550	1.60E-05	6.88E-06	7.00E-03	--	2.29E-03	-	15.66%	0.00%
Zinc	4.05E+02	5800	1	0.001	350	30	1E-06	70	10950	25550	3.22E-05	1.38E-05	3.00E-01	--	1.07E-04	-	0.73%	0.00%
TOTAL															1.46E-02	5.65E-05	100.00%	100.00%

CONSTITUENTS DETECTED IN SUBSURFACE SOIL SAMPLES
SITE 7
NAVAL AMPHIBIOUS BASE – LITTLE CREEK
VIRGINIA BEACH, VIRGINIA

Constituent	Frequency of Detection	Range of Detected Concentrations (ug/kg)	Typical Soil Conc. (ug/kg) [a]	Federal MCL (ug/l) [b]	Tap Water (ug/l) [c]	Health Advisory (ug/l) [d]	Virginia Water Stds. (ug/l) [e]	Potential Concern
VOLATILES								
Methylene chloride	1 / 5	3 j		4.7	4.1			NO
Acetone	2 / 5	56 – 80			370			NO
2-Butanone	1 / 5	9 j						NO
Tetrachloroethene	1 / 5	7 j		0.8	1.1	5	318	NO
SEMI-VOLATILES								
1,4-Dichlorobenzene	1 / 5	38 j		400	0.44	75	400	NO
Bis (2) ethylhexphthalate	1 / 5	100 j		1.8	4.8			NO
INORGANICS								
Aluminum	5 / 5	2E+06 – 1.89E+07	7.10E+07		11000			NO
Arsenic	5 / 5	1300 j – 5.10E+03 j	1.10E+04	0.018	0.038	50	50	NO
Barium	5 / 5	5400 b – 4.61E+04	5.00E+05		260	2000	2000	NO
Beryllium [f]	5 / 5	270 b – 4.40E+02 b	3.00E+02		0.016	4		YES
Cadmium	5 / 5	11000 j – 2.20E+03	5.00E+02		18	5	16	YES
Calcium	5 / 5	218000 – 4.25E+05	2.40E+07					NO
Chromium	5 / 5	4700 – 1.88E+04	1.00E+05		18	100	170	NO
Cobalt [f]	5 / 5	2300 b – 5.10E+03 b	8.00E+03		220			NO
Copper	5 / 5	2600 – 6.90E+03	3.00E+04		140	1300	1300	NO
Iron	5 / 5	4E+06 – 1.30E+07 j	4.00E+07				300	NO
Lead	5 / 5	3500 – 8.40E+03 j	2.90E+04			0	15	NO
Magnesium	5 / 5	636000 – 1.44E+06	5.00E+06					NO
Manganese	5 / 5	17400 – 4.89E+04	1.00E+06		18		50	NO
Mercury	1 / 5	70 b	9.80E+01	0.14	1.1	2	0.144	NO
Nickel	5 / 5	5200 b – 8.90E+03	5.00E+04	610	73	100	607	NO
Potassium	5 / 5	477000 – 9.22E+05	1.40E+07					NO
Sodium	4 / 5	139000 – 1.45E+06	5.00E+06					NO
Vanadium	5 / 5	5300 b – 2.40E+04	1.00E+05		26			NO
Zinc	5 / 5	15500 – 5.80E+04	9.00E+04		1100		5000	NO

Notes:

a. Typical median concentration of inorganics in soils obtained from the following sources:
Bowen, H.J.M., Environmental Chemistry of the Elements. Academic Press, New York, 1979.

Ure, A. M., et. al., "Environmental Constituents of Soils" Environmental Chemistry, Vol. 2, pp94–204 ed H.J.M. Bowen, Royal Society of Chemistry, Burlingtonhouse, London, U.K. 1983.

Parr, James F., Marsh, Paul B., Kla, Joanne M., Land Treatment of Hazardous Wastes, Agricultural Environmental Quality Institute, Agricultural Research Service, OSDA, Beltsville, Maryland, Noyes Data Corporation, Park Ridge, New Jersey, 1983.

Shaklette, H.T. et al., Elemental Composition of Surficial Material in the Conterminous United States, USGS Professions1 Paper 574–D–1971.

b. MCL concentration values represent US Federal Maximum Contaminant Level for potable water supplies.

c. Tap Water Concentration values obtained from July 11, 1994 USEPA Region III Risk-Based Concentration Table except for aluminum which is obtained from the January 7, 1994 RBC Table using a target hazard quotient of 0.1 and a target cancer risk of 1e–06.

d. Health Advisory Concentration values obtained from December 1993 USEPA Office of Water publication "Drinking Water Regulations and Health Advisories."

e. Virginia Water Standards for public water supplies.

f. Constituent concentration is five times greater than the maximum detected in blank (b).

CONSTITUENTS DETECTED IN SUBSURFACE SOIL SAMPLES
SITE 7
NAVAL AMPHIBIOUS BASE – LITTLE CREEK
VIRGINIA BEACH, VIRGINIA

Constituent	Frequency of Detection	Range of Detected Concentrations (ug/kg)	Typical Soil Conc. (ug/kg) [a]	Residential Soil Concentration (ug/kg) [b]	Potential Concern
VOLATILES					
Methylene chloride	1 / 5	3 j		8.50E+03	NO
Acetone	2 / 5	56 – 80		7.80E+05	NO
2-Butanone	1 / 5	9 j			NO
Tetrachloroethene	1 / 5	7 j		1.20E+04	NO
SEMI-VOLATILES					
1,4-Dichlorobenzene	1 / 5	38 j		2.70E+04	NO
Bis (2) ethylhexphthalate	1 / 5	100 j			NO
INORGANICS					
Aluminum	5 / 5	2E+06 – 1.89E+07	7.10E+07	2.30E+07	YES
Arsenic	5 / 5	1300 j – 5.10E+03 j	1.10E+04	3.70E+02	YES
Barium	5 / 5	5400 b – 4.61E+04	5.00E+05	5.50E+05	YES
Beryllium [c]	5 / 5	270 b – 4.40E+02 b	3.00E+02	1.50E+02	YES
Cadmium	5 / 5	11000 j – 2.20E+03	5.00E+02	3.90E+04	YES
Calcium	5 / 5	218000 – 4.25E+05	2.40E+07		NO
Chromium	5 / 5	4700 – 1.88E+04	1.00E+05	3.90E+04	YES
Cobalt [c]	5 / 5	2300 b – 5.10E+03 b	8.00E+03	4.70E+05	YES
Copper	5 / 5	2600 – 6.90E+03	3.00E+04	2.90E+05	YES
Iron	5 / 5	4E+06 – 1.30E+07 j	4.00E+07		YES
Lead	5 / 5	3500 – 8.40E+03 j	2.90E+04		YES*
Magnesium	5 / 5	636000 – 1.44E+06	5.00E+06		NO
Manganese	5 / 5	17400 – 4.89E+04	1.00E+06	3.90E+04	YES
Mercury	1 / 5	70 b	9.80E+01	2.30E+03	NO
Nickel	5 / 5	5200 b – 8.90E+03	5.00E+04	1.60E+05	YES
Potassium	5 / 5	477000 – 9.22E+05	1.40E+07		NO
Sodium	4 / 5	139000 – 1.45E+06	5.00E+06		NO
Vanadium	5 / 5	5300 b – 2.40E+04	1.00E+05	5.50E+04	YES
Zinc	5 / 5	15500 – 5.80E+04	9.00E+04	2.30E+06	YES

Notes:

a. Typical median concentration of inorganics in soils obtained from the following sources:
Bowen, H.J.M., Environmental Chemistry of the Elements. Academic Press, New York, 1979.

Ure, A. M., et. al., "Environmental Constituents of Soils" Environmental Chemistry, Vol. 2, pp94–204 ed H.J.M. Bowen, Royal Society of Chemistry, Burlingtonhouse, London, U.K. 1983.

Parr, James F., Marsh, Paul B., Kla, Joanne M., Land Treatment of Hazardous Wastes, Agricultural Environmental Quality Institute, Agricultural Research Service, OSDA, Beltsville, Maryland, Noyes Data Corporation, Park Ridge, New Jersey, 1983.

Shaklette, H.T. et al., Elemental Composition of Surficial Material in the Conterminous United States, USGS Professions1 Paper 574–D–1971.

b. Residential Soil Concentration values obtained from July 11, 1994 USEPA Region III Risk-Based Concentration Table except for aluminum where it is obtained from the January 11, 1994 RBC Table using a target hazard quotient of 0.1 and a target cancer risk of 1e–06.

c. Constituent concentration is five times greater than the maximum detected in blank (b).

* Health risk analysis to be performed will use the Integrated Exposure Uptake Biokinetic (IEUBK) Model.

SUMMARY OF CHRONIC DAILY INTAKE (CDI) AND POTENTIAL NONCARCINOGENIC
AND CARCINOGENIC RISK FROM INGESTION OF SUBSURFACE SOIL
SITE 7

FUTURE SCENARIO
SUBSURFACE SOIL – INGESTION
RESIDENT CHILD

CHEMICAL	CS mg/kg	IR mg/d	FI	EF d/y	ED y	CF kg/mg	BW kg	ATnc d	ATc d	CDInc mg/kg/d	CDIc mg/kg/d	RfD mg/kg/d	CSF (mg/kg/d)-1	HI	CR	% CONTRIB NC RISK	% CONTRIB CARC RISK
Aluminum	1.69E+04	200	1	350	6	1E-06	15	2190	25550	2.42E-01	2.07E-02	2.90E+00	--	8.33E-02	--	7.25%	0.00%
Arsenic	5.10E+00	200	1	350	6	1E-06	15	2190	25550	6.52E-05	5.59E-06	3.00E-04	1.75E+00	2.17E-01	9.76E-06	18.92%	82.51%
Barium	4.61E+01	200	1	350	6	1E-06	15	2190	25550	5.89E-04	5.05E-05	7.00E-02	--	8.42E-03	--	0.73%	0.00%
Beryllium	4.40E-01	200	1	350	6	1E-06	15	2190	25550	5.63E-06	4.82E-07	5.00E-03	4.30E+00	1.13E-03	2.07E-06	0.10%	17.49%
Cadmium	2.20E+00	200	1	350	6	1E-06	15	2190	25550	2.81E-05	2.41E-06	5.00E-04	--	5.63E-02	--	4.90%	0.00%
Chromium	1.88E+01	200	1	350	6	1E-06	15	2190	25550	2.40E-04	2.06E-05	5.00E-03	--	4.81E-02	--	4.18%	0.00%
Cobalt	5.10E+00	200	1	350	6	1E-06	15	2190	25550	6.52E-05	5.59E-06	6.00E-02	--	1.09E-03	--	0.09%	0.00%
Copper	6.90E+00	200	1	350	6	1E-06	15	2190	25550	8.82E-05	7.56E-06	3.71E-02	--	2.38E-03	--	0.21%	0.00%
Iron	1.30E+04	200	1	350	6	1E-06	15	2190	25550	1.66E-01	1.42E-02	3.00E-01	--	5.54E-01	--	48.22%	0.00%
Manganese	4.89E+01	200	1	350	6	1E-06	15	2190	25550	6.25E-04	5.36E-05	5.00E-03	--	1.25E-01	--	10.88%	0.00%
Nickel	8.90E+00	200	1	350	6	1E-06	15	2190	25550	1.14E-04	9.75E-06	2.00E-02	--	5.69E-03	--	0.50%	0.00%
Vanadium	2.40E+01	200	1	350	6	1E-06	15	2190	25550	3.07E-04	2.63E-05	7.00E-03	--	4.38E-02	--	3.81%	0.00%
Zinc	5.60E+01	200	1	350	6	1E-06	15	2190	25550	7.42E-04	6.36E-05	3.00E-01	--	2.47E-03	--	0.22%	0.00%
TOTAL														1.15E+00	1.19E-05	100.00%	100.00%

SUMMARY OF CHRONIC DAILY INTAKE (CDI) AND POTENTIAL NONCARCINOGENIC
AND CARCINOGENIC RISK FROM INGESTION OF SUBSURFACE SOIL
SITE 7

FUTURE SCENARIO
SUBSURFACE SOIL -- INGESTION
RESIDENT ADULT

CHEMICAL	CS mg/kg	IR mg/d	FI	EF d/y	ED y	CF kg/mg	BW kg	ATnc d	ATc d	CDInc mg/kg/d	CDIc mg/kg/d	RfD mg/kg/d	CSF (mg/kg/d)-1	HI	CR	% CONTRIB NC RISK	% CONTRIB CARC RISK
Aluminum	1.89E+04	100	1	350	30	1E-06	70	10950	25550	2.59E-02	1.11E-02	2.90E+00	--	8.93E-03	--	7.25%	0.00%
Arsenic	5.10E+00	100	1	350	30	1E-06	70	10950	25550	6.99E-06	2.99E-06	3.00E-04	1.75E+00	2.33E-02	5.24E-06	18.92%	82.51%
Barium	4.61E+01	100	1	350	30	1E-06	70	10950	25550	6.32E-05	2.71E-05	7.00E-02	--	9.02E-04	--	0.73%	0.00%
Beryllium	4.40E-01	100	1	350	30	1E-06	70	10950	25550	6.03E-07	2.58E-07	5.00E-03	4.30E+00	1.21E-04	1.11E-06	0.10%	17.49%
Cadmium	2.20E+00	100	1	350	30	1E-06	70	10950	25550	3.01E-06	1.29E-06	5.00E-04	--	6.03E-03	--	4.90%	0.00%
Chromium	1.88E+01	100	1	350	30	1E-06	70	10950	25550	2.58E-05	1.10E-05	5.00E-03	--	5.15E-03	--	4.18%	0.00%
Cobalt	5.10E+00	100	1	350	30	1E-06	70	10950	25550	6.99E-06	2.99E-06	6.00E-02	--	1.16E-04	--	0.09%	0.00%
Copper	6.90E+00	100	1	350	30	1E-06	70	10950	25550	9.45E-06	4.05E-06	3.71E-02	--	2.55E-04	--	0.21%	0.00%
Iron	1.30E+04	100	1	350	30	1E-06	70	10950	25550	1.78E-02	7.63E-03	3.00E-01	--	5.94E-02	--	48.22%	0.00%
Manganese	4.69E+01	100	1	350	30	1E-06	70	10950	25550	6.70E-05	2.87E-05	5.00E-03	--	1.34E-02	--	10.88%	0.00%
Nickel	8.90E+00	100	1	350	30	1E-06	70	10950	25550	1.22E-05	5.23E-06	2.00E-02	--	6.10E-04	--	0.50%	0.00%
Vanadium	2.40E+01	100	1	350	30	1E-06	70	10950	25550	3.29E-05	1.41E-05	7.00E-03	--	4.70E-03	--	3.81%	0.00%
Zinc	5.80E+01	100	1	350	30	1E-06	70	10950	25550	7.95E-05	3.41E-05	3.00E-01	--	2.65E-04	--	0.22%	0.00%
TOTAL														1.23E-01	6.35E-06	100.00%	100.00%

SUMMARY OF CHRONIC DAILY INTAKE (CDI) AND POTENTIAL NONCARCINOGENIC
AND CARCINOGENIC RISK FROM DERMAL CONTACT WITH SUBSURFACE SOIL
SITE 7

FUTURE SCENARIO
SUBSURFACE SOIL – DERMAL
RESIDENT CHILD

CHEMICAL	CS mg/kg	SA cm^2	AF mg/cm^2	ABS	EF d/y	ED y	CF kg/mg	BW kg	ATnc d	ATc d	CDInc mg/kg/d	CDIc mg/kg/d	RfD mg/kg/d	CSF (mg/kg/d)-1	HI	CR	% CONTRIB NC RISK	% CONTRIB CARC RISK
Aluminum	1.89E+04	1820	1	0.001	350	6	1E-06	15	2190	25550	2.20E-03	1.88E-04	2.90E+00	--	7.58E-04	-	7.25%	0.00%
Arsenic	5.10E+00	1820	1	0.001	350	6	1E-06	15	2190	25550	5.93E-07	5.09E-08	3.00E-04	1.75E+00	1.98E-03	8.90E-08	18.92%	82.51%
Barium	4.61E+01	1820	1	0.001	350	6	1E-06	15	2190	25550	5.36E-06	4.60E-07	7.00E-02	--	7.66E-05	-	0.73%	0.00%
Beryllium	4.40E-01	1820	1	0.001	350	6	1E-06	15	2190	25550	5.12E-08	4.39E-09	5.00E-03	4.30E+00	1.02E-05	1.89E-08	0.10%	17.49%
Cadmium	2.20E+00	1820	1	0.001	350	6	1E-06	15	2190	25550	2.56E-07	2.19E-08	5.00E-04	--	5.12E-04	-	4.90%	0.00%
Chromium	1.88E+01	1820	1	0.001	350	6	1E-06	15	2190	25550	2.19E-06	1.87E-07	5.00E-03	--	4.37E-04	-	4.18%	0.00%
Cobalt	5.10E+00	1820	1	0.001	350	6	1E-06	15	2190	25550	5.93E-07	5.09E-08	6.00E-02	--	9.89E-06	-	0.09%	0.00%
Copper	6.90E+00	1820	1	0.001	350	6	1E-06	15	2190	25550	8.03E-07	6.88E-08	3.71E-02	--	2.16E-05	-	0.21%	0.00%
Iron	1.30E+04	1820	1	0.001	350	6	1E-06	15	2190	25550	1.51E-03	1.30E-04	3.00E-01	--	5.04E-03	-	48.22%	0.00%
Manganese	4.89E+01	1820	1	0.001	350	6	1E-06	15	2190	25550	5.69E-06	4.88E-07	5.00E-03	--	1.14E-03	-	10.88%	0.00%
Nickel	8.90E+00	1820	1	0.001	350	6	1E-06	15	2190	25550	1.04E-06	8.88E-08	2.00E-02	--	5.18E-05	-	0.50%	0.00%
Vanadium	2.40E+01	1820	1	0.001	350	6	1E-06	15	2190	25550	2.79E-06	2.39E-07	7.00E-03	--	3.99E-04	-	3.81%	0.00%
Zinc	5.80E+01	1820	1	0.001	350	6	1E-06	15	2190	25550	6.75E-06	5.78E-07	3.00E-01	--	2.25E-05	-	0.22%	0.00%
TOTAL															1.05E-02	1.08E-07	100.00%	100.00%

SUMMARY OF CHRONIC DAILY INTAKE (CDI) AND POTENTIAL NONCARCINOGENIC
AND CARCINOGENIC RISK FROM DERMAL CONTACT WITH SUBSURFACE SOIL
SITE 7

FUTURE SCENARIO
SUBSURFACE SOIL – DERMAL
RESIDENT ADULT

CHEMICAL	CS mg/kg	SA cm^2	AF mg/cm^2	ABS	EF d/y	ED y	CF kg/mg	BW kg	ATnc d	ATc d	CDInc mg/kg/d	CDIc mg/kg/d	RfD mg/kg/d	CSF (mg/kg/d)-1	HI	CR	% CONTRIB NC RISK	% CONTRIB CARC RISK
Aluminum	1.89E+04	5800	1	0.001	350	30	1E-06	70	10950	25550	1.50E-03	6.44E-04	2.90E+00	--	5.18E-04	–	7.25%	0.00%
Arsenic	5.10E+00	5800	1	0.001	350	30	1E-06	70	10950	25550	4.05E-07	1.74E-07	3.00E-04	1.75E+00	1.35E-03	3.04E-07	18.92%	82.51%
Barium	4.61E+01	5800	1	0.001	350	30	1E-06	70	10950	25550	3.66E-06	1.57E-06	7.00E-02	--	5.23E-05	–	0.73%	0.00%
Beryllium	4.40E-01	5800	1	0.001	350	30	1E-06	70	10950	25550	3.50E-08	1.50E-08	5.00E-03	4.30E+00	6.99E-06	6.44E-08	0.10%	17.49%
Cadmium	2.20E+00	5800	1	0.001	350	30	1E-06	70	10950	25550	1.75E-07	7.49E-08	5.00E-04	--	3.50E-04	–	4.90%	0.00%
Chromium	1.88E+01	5800	1	0.001	350	30	1E-06	70	10950	25550	1.49E-06	6.40E-07	5.00E-03	--	2.99E-04	–	4.18%	0.00%
Cobalt	5.10E+00	5800	1	0.001	350	30	1E-06	70	10950	25550	4.05E-07	1.74E-07	6.00E-02	--	6.75E-06	–	0.09%	0.00%
Copper	6.90E+00	5800	1	0.001	350	30	1E-06	70	10950	25550	5.48E-07	2.35E-07	3.71E-02	--	1.48E-05	–	0.21%	0.00%
Iron	1.30E+04	5800	1	0.001	350	30	1E-06	70	10950	25550	1.03E-03	4.43E-04	3.00E-01	--	3.44E-03	–	48.22%	0.00%
Manganese	4.89E+01	5800	1	0.001	350	30	1E-06	70	10950	25550	3.89E-06	1.67E-06	5.00E-03	--	7.77E-04	–	10.88%	0.00%
Nickel	8.90E+00	5800	1	0.001	350	30	1E-06	70	10950	25550	7.07E-07	3.03E-07	2.00E-02	--	3.54E-05	–	0.50%	0.00%
Vanadium	2.40E+01	5800	1	0.001	350	30	1E-06	70	10950	25550	1.91E-06	8.17E-07	7.00E-03	--	2.72E-04	–	3.81%	0.00%
Zinc	5.80E+01	5800	1	0.001	350	30	1E-06	70	10950	25550	4.61E-06	1.97E-06	3.00E-01	--	1.54E-05	–	0.22%	0.00%
TOTAL															7.14E-03	3.68E-07	100.00%	100.00%

CONSTITUENTS DETECTED IN GROUNDWATER SAMPLES
SITE 7
NAVAL AMPHIBIOUS BASE – LITTLE CREEK
VIRGINIA BEACH, VIRGINIA

Constituent	Frequency of Detection	Range of Detected Concentrations (ug/l)	Federal MCL (ug/l) [a]	Tap Water (ug/l) [b]	Health Advisory (ug/l) [c]	Virginia Ground Water Stds. (ug/l) [d]	Potential Concern
VOLATILES							
Acetone	1 / 9	8.0 j		370			NO
INORGANICS							
Aluminum	9 / 9	117 – 330000.0 j		11000			YES
Arsenic	5 / 9	7.8 – 50.6	0.018	0.038	50	50	YES
Barium	9 / 9	33.7 b – 754.0		260	2000	1000	YES
Beryllium	3 / 9	1.9 b – 11.0		0.016	4		YES
Cadmium	3 / 9	4.4 b – 37.6		18	5	0.4	YES
Calcium	9 / 9	7960.0 – 283000.0					NO
Chromium[1]	4 / 9	5.9 – 360.0		18	100	50	YES
Cobalt	5 / 9	3.8 b – 121.0		220			YES
Copper	7 / 9	4.7 b – 226.0		140	1300	1000	YES
Iron	9 / 9	1720 – 224000.0 j					YES
Lead	6 / 9	4.3 – 177.0 j				50	YES *
Magnesium	9 / 9	8340.0 – 596000.0					NO
Manganese	9 / 9	114.0 – 1930.0		18			NO
Mercury	2 / 9	0.18 b – 0.27	0.14	1.1	2	0.05	NO
Nickel	2 / 9	35.7 b – 176.0	610	73	100		YES
Potassium	9 / 9	7810 – 220000.0 j					NO
Sodium	9 / 9	50000.0 – 5.4E+06				270000	NO
Vanadium	3 / 9	43.2 b – 634.0		26			YES
Zinc	4 / 9	37.7 – 1620.0		1100		50	YES
ANIONS							
Alkalinity	9 / 9	16500.0 – 980000.0				30000	YES
Bicarbonate alkalinity	9 / 9	16500.0 – 980000.0					YES
Chloride	9 / 9	49200.0 – 4.65E+07				50000	YES
Sulfate	8 / 9	18500.0 – 1.32E+06				50000	YES

Notes:

a. Federal MCL concentration values represent US Federal Maximum Contaminant Level for potable water supplies.

b. Tap Water Concentration values obtained from July 11, 1994 USEPA Region III Risk-Based Concentration Table except for aluminum which is obtained from the Januray 7, 1994 RBC Table using a target hazard quotient of 0.1.

c. Health Advisory Concentration values obtained from December 1993 USEPA Office of Water publication "Drinking Water Regulations and Health Advisories."

d. Virginia Groundwater Standards Applicable Statewide.

* Health risk analysis to be performed will use the Integrated Exposure Uptake Biokinetic (IEUBK) Model.

SUMMARY OF CHRONIC DAILY INTAKE (CDI) AND POTENTIAL NONCARCINOGENIC
AND CARCINOGENIC RISK FROM INGESTION OF GROUNDWATER
SITE 7

FUTURE SCENARIO
GROUNDWATER – INGESTION
RESIDENT (EXPOSED AS TRESPASSER/RECREATIONAL) CHILD

CHEMICAL	CW ug/L	CR L/d	EF d/y	ED y	CF mg/ug	BW kg	ATnc d	ATc d	CDInc mg/kg/d	CDIc mg/kg/d	RfD mg/kg/d	CSF (mg/kg/d)-1	HI	CR	% CONTRIB NC RISK	% CONTRIB CARC RISK
Aluminum	3.30E+05	1	14	6	1E-03	15	2190	25550	8.44E-01	7.23E-02	2.90E+00	--	2.91E-01	--	8.74%	0.00%
Arsenic	5.06E+01	1	14	6	1E-03	15	2190	25550	1.29E-04	1.11E-05	3.00E-04	1.75E+00	4.31E-01	1.94E-05	12.95%	65.18%
Barium	7.54E+02	1	14	6	1E-03	15	2190	25550	1.93E-03	1.65E-04	7.00E-02	--	2.75E-02	--	0.83%	0.00%
Beryllium	1.10E+01	1	14	6	1E-03	15	2190	25550	2.81E-05	2.41E-06	5.00E-03	4.30E+00	5.63E-03	1.04E-05	0.17%	34.82%
Cadmium	3.76E+01	1	14	6	1E-03	15	2190	25550	9.61E-05	8.24E-06	5.00E-04	--	1.92E-01	--	5.77%	0.00%
Chromium	3.60E+02	1	14	6	1E-03	15	2190	25550	9.21E-04	7.89E-05	5.00E-03	--	1.84E-01	--	5.53%	0.00%
Cobalt	1.21E+02	1	14	6	1E-03	15	2190	25550	3.09E-04	2.65E-05	6.00E-02	--	5.16E-03	--	0.15%	0.00%
Copper	2.26E+02	1	14	6	1E-03	15	2190	25550	5.78E-04	4.95E-05	3.71E-02	--	1.56E-02	--	0.47%	0.00%
Iron	2.24E+05	1	14	6	1E-03	15	2190	25550	5.73E-01	4.91E-02	3.00E-01	--	1.91E+00	--	57.34%	0.00%
Nickel	1.76E+02	1	14	6	1E-03	15	2190	25550	4.50E-04	3.86E-05	2.00E-02	--	2.25E-02	--	0.68%	0.00%
Vanadium	6.34E+02	1	14	6	1E-03	15	2190	25550	1.62E-03	1.39E-04	7.00E-03	--	2.32E-01	--	6.96%	0.00%
Zinc	1.62E+03	1	14	6	1E-03	15	2190	25550	4.14E-03	3.55E-04	3.00E-01	--	1.38E-02	--	0.41%	0.00%
TOTAL													3.33E+00	2.98E-05	100.00%	100.00%

SUMMARY OF CHRONIC DAILY INTAKE (CDI) AND POTENTIAL NONCARCINOGENIC
AND CARCINOGENIC RISK FROM INGESTION OF GROUNDWATER
SITE 7

FUTURE SCENARIO
GROUNDWATER – INGESTION
RESIDENT (EXPOSED AS TRESPASSER/RECREATIONAL) ADULT

CHEMICAL	CW ug/L	CR L/d	EF d/y	ED y	CF mg/ug	BW kg	ATnc d	ATc d	CDInc mg/kg/d	CDIc mg/kg/d	RfD mg/kg/d	CSF (mg/kg/d)-1	HI	CR	% CONTRIB NC RISK	% CONTRIB CARC RISK
Aluminum	3.30E+05	2	28	30	1E-06	70	10950	25550	7.23E-04	3.10E-04	2.90E+00	--	2.49E-04	--	8.74%	0.00%
Arsenic	5.06E+01	2	28	30	1E-06	70	10950	25550	1.11E-07	4.75E-08	3.00E-04	1.75E+00	3.70E-04	8.32E-08	12.95%	65.18%
Barium	7.54E+02	2	28	30	1E-06	70	10950	25550	1.65E-06	7.08E-07	7.00E-02	--	2.36E-05	--	0.83%	0.00%
Beryllium	1.10E+01	2	28	30	1E-06	70	10950	25550	2.41E-08	1.03E-08	5.00E-03	4.30E+00	4.82E-06	4.44E-08	0.17%	34.82%
Cadmium	3.76E+01	2	28	30	1E-06	70	10950	25550	8.24E-08	3.53E-08	5.00E-04	--	1.65E-04	--	5.77%	0.00%
Chromium	3.60E+02	2	28	30	1E-06	70	10950	25550	7.89E-07	3.38E-07	5.00E-03	--	1.58E-04	--	5.53%	0.00%
Cobalt	1.21E+02	2	28	30	1E-06	70	10950	25550	2.65E-07	1.14E-07	6.00E-02	--	4.42E-06	--	0.15%	0.00%
Copper	2.26E+02	2	28	30	1E-06	70	10950	25550	4.95E-07	2.12E-07	3.71E-02	--	1.34E-05	--	0.47%	0.00%
Iron	2.24E+05	2	28	30	1E-06	70	10950	25550	4.91E-04	2.10E-04	3.00E-01	--	1.64E-03	--	57.34%	0.00%
Nickel	1.76E+02	2	28	30	1E-06	70	10950	25550	3.86E-07	1.65E-07	2.00E-02	--	1.93E-05	--	0.68%	0.00%
Vanadium	6.34E+02	2	28	30	1E-06	70	10950	25550	1.39E-06	5.96E-07	7.00E-03	--	1.99E-04	--	6.96%	0.00%
Zinc	1.62E+03	2	28	30	1E-06	70	10950	25550	3.55E-06	1.52E-06	3.00E-01	--	1.18E-05	--	0.41%	0.00%
TOTAL													2.85E-03	1.28E-07	100.00%	100.00%

SUMMARY OF CHRONIC DAILY INTAKE (CDI) AND POTENTIAL NONCARCINOGENIC AND CARCINOGENIC RISK FROM DERMAL CONTACT WITH GROUNDWATER
SITE 7

FUTURE SCENARIO
GROUNDWATER -- DERMAL
RESIDENT (EXPOSED AS TRESPASSER/RECREATIONAL) CHILD

CHEMICAL	CW ug/L	SA cm^2	PC cm/hr	ET hr/d	EF d/y	ED y	CF L mg/cm^3 ug	BW kg	ATnc d	ATc d	CDInc mg/kg/d	CDIc mg/kg/d	RfD mg/kg/d	CSF (mg/kg/d)-1	HI	CR	% CONTRIB NC RISK	% CONTRIB CARC RISK
Aluminum	3.30E+05	7280	0.001 ***	0.2	14	6	1E-06	15	2190	25550	6.14E-03	5.27E-04	2.90E+00	--	2.12E-03	-	8.75%	0.00%
Arsenic	5.06E+01	7280	0.001 ***	0.2	14	6	1E-06	15	2190	25550	9.42E-07	8.07E-08	3.00E-04	1.75E+00	3.14E-03	1.41E-07	12.97%	65.16%
Barium	7.54E+02	7280	0.001 ***	0.2	14	6	1E-06	15	2190	25550	1.40E-05	1.20E-06	7.00E-02	--	2.01E-04	-	0.83%	0.00%
Beryllium	1.10E+01	7280	0.001 ***	0.2	14	6	1E-06	15	2190	25550	2.05E-07	1.76E-08	5.00E-03	4.30E+00	4.10E-05	7.55E-08	0.17%	34.82%
Cadmium	3.76E+01	7280	0.001 ***	0.2	14	6	1E-06	15	2190	25550	7.00E-07	6.00E-08	5.00E-04	--	1.40E-03	-	5.78%	0.00%
Chromium	3.60E+02	7280	0.001 ***	0.2	14	6	1E-06	15	2190	25550	6.70E-06	5.74E-07	5.00E-03	--	1.34E-03	-	5.54%	0.00%
Cobalt	1.21E+02	7280	0.001 ***	0.2	14	6	1E-06	15	2190	25550	2.25E-06	1.93E-07	6.00E-02	--	3.75E-05	-	0.16%	0.00%
Copper	2.26E+02	7280	0.001 ***	0.2	14	6	1E-06	15	2190	25550	4.21E-06	3.61E-07	3.71E-02	--	1.13E-04	-	0.47%	0.00%
Iron	2.24E+05	7280	0.001 ***	0.2	14	6	1E-06	15	2190	25550	4.17E-03	3.57E-04	3.00E-01	--	1.39E-02	-	57.44%	0.00%
Nickel	1.76E+02	7280	0.001 ***	0.2	14	6	1E-06	15	2190	25550	3.28E-06	2.81E-07	2.00E-02	--	1.64E-04	-	0.68%	0.00%
Vanadium	6.34E+02	7280	0.001 ***	0.2	14	6	1E-06	15	2190	25550	1.18E-05	1.01E-06	7.00E-03	--	1.69E-03	-	6.97%	0.00%
Zinc	1.62E+03	7280	0.0006 *	0.2	14	6	1E-06	15	2190	25550	1.81E-05	1.55E-06	3.00E-01	--	6.03E-05	-	0.25%	0.00%
TOTAL															2.42E-02	2.17E-07	100.00%	100.00%

* Chemical specific dermal permeability constant-estimated value, USEPA, 1992
** Chemical specific dermal permeability constant-measured, USEPA, 1992
*** Chemical specific dermal permeability constant-default value, USEPA, 1992
**** Chemical specific dermal permeability constant (PC) not available. Used water PC, USEPA, 1992.

SUMMARY OF CHRONIC DAILY INTAKE (CDI) AND POTENTIAL NONCARCINOGENIC
AND CARCINOGENIC RISK FROM DERMAL CONTACT WITH GROUNDWATER
SITE 7

FUTURE SCENARIO
GROUNDWATER – DERMAL
RESIDENT (EXPOSED AS TRESPASSER/RECREATIONAL) ADULT

CHEMICAL	CW ug/L	SA cm^2	PC cm/hr	ET hr/d	EF d/y	ED y	CF L mg/cm^3 ug	BW kg	ATnc d	ATc d	CDInc mg/kg/d	CDIc mg/kg/d	RfD mg/kg/d	CSF (mg/kg/d)-1	HI	CR	% CONTRIB NC RISK	% CONTRIB CARC RISK
Aluminum	3.30E+05	23000	0.001 ***	0.2	28	30	1E-06	70	10950	25550	8.32E-03	3.56E-03	2.90E+00	--	2.87E-03	-	8.75%	0.00%
Arsenic	5.06E+01	23000	0.001 ***	0.2	28	30	1E-06	70	10950	25550	1.28E-06	5.47E-07	3.00E-04	1.75E+00	4.25E-03	9.57E-07	12.97%	65.18%
Barium	7.54E+02	23000	0.001 ***	0.2	28	30	1E-06	70	10950	25550	1.90E-05	8.14E-06	7.00E-02	--	2.71E-04	-	0.83%	0.00%
Beryllium	1.10E+01	23000	0.001 ***	0.2	28	30	1E-06	70	10950	25550	2.77E-07	1.19E-07	5.00E-03	4.30E+00	5.55E-05	5.11E-07	0.17%	34.82%
Cadmium	3.76E+01	23000	0.001 ***	0.2	28	30	1E-06	70	10950	25550	9.48E-07	4.06E-07	5.00E-04	--	1.90E-03	-	5.78%	0.00%
Chromium	3.60E+02	23000	0.001 ***	0.2	28	30	1E-06	70	10950	25550	9.07E-06	3.89E-06	5.00E-03	--	1.81E-03	-	5.54%	0.00%
Cobalt	1.21E+02	23000	0.001 ***	0.2	28	30	1E-06	70	10950	25550	3.05E-06	1.31E-06	6.00E-02	--	5.08E-05	-	0.16%	0.00%
Copper	2.26E+02	23000	0.001 ***	0.2	28	30	1E-06	70	10950	25550	5.70E-06	2.44E-06	3.71E-02	--	1.54E-04	-	0.47%	0.00%
Iron	2.24E+05	23000	0.001 ***	0.2	28	30	1E-06	70	10950	25550	5.65E-03	2.42E-03	3.00E-01	--	1.88E-02	-	57.44%	0.00%
Nickel	1.76E+02	23000	0.001 ***	0.2	28	30	1E-06	70	10950	25550	4.44E-06	1.90E-06	2.00E-02	--	2.22E-04	-	0.68%	0.00%
Vanadium	6.34E+02	23000	0.001 ***	0.2	28	30	1E-06	70	10950	25550	1.60E-05	6.85E-06	7.00E-03	--	2.28E-03	-	6.97%	0.00%
Zinc	1.62E+03	23000	0.0006 *	0.2	28	30	1E-06	70	10950	25550	2.45E-05	1.05E-05	3.00E-01	--	8.17E-05	-	0.25%	0.00%
TOTAL															3.28E-02	1.47E-06	100.00%	100.00%

* Chemical specific dermal permeability constant – estimated value, USEPA, 1992
** Chemical specific dermal permeability constant – measured, USEPA, 1992
*** Chemical specific dermal permeability constant – default value, USEPA, 1992
**** Not available chemical specific dermal permeability constant (PC). Used PC of water, USEPA 1988

CONSTITUENTS DETECTED IN GROUNDWATER SAMPLES
SITE 7
NAVAL AMPHIBIOUS BASE – LITTLE CREEK
VIRGINIA BEACH, VIRGINIA

Constituent	Frequency of Detection	Range of Detected Concentrations (ug/l)	Federal MCL (ug/l) [a]	Tap Water (ug/l) [b]	Health Advisory (ug/l) [c]	Virginia Ground Water Stds. (ug/l) [d]	Potential Concern
TOTAL DISSOLVE METALS							
INORGANICS							
Aluminum	2 / 9	19.2 – 272.0 j		11000			YES
Arsenic	4 / 9	2.5b – 16.1	0.018	0.038	50	50	YES
Barium [e]	9 / 9	8.1 b – 101.0 b		260	2000	1000	YES
Beryllium	1 / 9	1.1 b		0.016	4		YES
Calcium	9 / 9	6250.0 – 288000.0					NO
Cobalt [e]	3 / 9	3.5 b – 24.6 b		220			YES
Copper [e]	5 / 9	2.1 b – 8.3 b		140	1300	1000	YES
Iron	6 / 9	605.0 – 38300.0 j					YES
Magnesium	9 / 9	7110.0 – 520000.0					NO
Manganese	9 / 9	46.2 – 1070.0		18			NO
Mercury [e]	2 / 9	0.15 b – 0.15 b	0.14	1.1	2	0.05	YES
Potassium	9 / 9	6770.0 – 192000.0					NO
Sodium	9 / 9	54700.0 – 4.7E+06				270000	NO
Zinc	2 / 9	34.9 – 307.0		1100		50	YES

Notes:

a. Federal MCL concentration values represent US Federal Maximum Contaminant Level for potable water supplies.

b. Tap Water Concentration values obtained from July 11, 1994 USEPA Region III Risk–Based Concentration Table except for aluminum which is obtained from the Januray 7, 1994 RBC Table using a target hazard quotient of 0.1.

c. Health Advisory Concentration values obtained from December 1993 USEPA Office of Water publication "Drinking Water Regulations and Health Advisories."

d. Virginia Groundwater Standards Applicable Statewide.

e. Constituent concentration is five times greater than the maximum detected in blank (b).

SUMMARY OF CHRONIC DAILY INTAKE (CDI) AND POTENTIAL NONCARCINOGENIC
AND CARCINOGENIC RISK FROM INGESTION OF GROUNDWATER
SITE 7

FUTURE SCENARIO
GROUNDWATER – INGESTION
RESIDENT (EXPOSED AS TRESPASSER/RECREATIONAL) CHILD

CHEMICAL	CW ug/L	CR L/d	EF d/y	ED y	CF mg/ug	BW kg	ATnc d	ATc d	CDInc mg/kg/d	CDIc mg/kg/d	RfD mg/kg/d	CSF (mg/kg/d)−1	HI	CR	% CONTRIB NC RISK	% CONTRIB CARC RISK
TOTAL DISSOLVE METALS																
Aluminum	2.72E+02	1	14	6	1E−03	15	2190	25550	6.96E−04	5.96E−05	2.90E+00	--	2.40E−04	--	0.05%	0.00%
Arsenic	1.61E+01	1	14	6	1E−03	15	2190	25550	4.12E−05	3.53E−06	3.00E−04	1.75E+00	1.37E−01	6.18E−06	28.97%	85.63%
Barium	1.01E+02	1	14	6	1E−03	15	2190	25550	2.58E−04	2.21E−05	7.00E−02	--	3.69E−03	--	0.78%	0.00%
Beryllium	1.10E+00	1	14	6	1E−03	15	2190	25550	2.81E−06	2.41E−07	5.00E−03	4.30E+00	5.63E−04	1.04E−06	0.12%	14.37%
Cobalt	2.46E+01	1	14	6	1E−03	15	2190	25550	6.29E−05	5.39E−06	6.00E−02	--	1.05E−03	--	0.22%	0.00%
Copper	8.30E+00	1	14	6	1E−03	15	2190	25550	2.12E−05	1.82E−06	3.71E−02	--	5.72E−04	--	0.12%	0.00%
Iron	3.83E+04	1	14	6	1E−03	15	2190	25550	9.79E−02	8.39E−03	3.00E−01	--	3.26E−01	--	68.92%	0.00%
Mercury	1.50E−01	1	14	6	1E−03	15	2190	25550	3.84E−07	3.29E−08	3.00E−04	--	1.28E−03	--	0.27%	0.00%
Zinc	3.07E+02	1	14	6	1E−03	15	2190	25550	7.85E−04	6.73E−05	3.00E−01	--	2.62E−03	--	0.55%	0.00%
TOTAL													4.74E−01	7.21E−06	100.00%	100.00%

SUMMARY OF CHRONIC DAILY INTAKE (CDI) AND POTENTIAL NONCARCINOGENIC
AND CARCINOGENIC RISK FROM INGESTION OF GROUNDWATER
SITE 7

FUTURE SCENARIO
GROUNDWATER – INGESTION
RESIDENT (EXPOSED AS TRESPASSER/RECREATIONAL) ADULT

CHEMICAL	CW ug/L	CR L/d	EF d/y	ED y	CF mg/ug	BW kg	ATnc d	ATc d	CDInc mg/kg/d	CDIc mg/kg/d	RfD mg/kg/d	CSF (mg/kg/d)-1	HI	CR	% CONTRIB NC RISK	% CONTRIB CARC RISK
TOTAL DISSOLVE METALS																
Aluminum	2.72E+02	2	28	30	1E-06	70	10950	25550	5.96E-07	2.55E-07	2.90E+00	--	2.06E-07	--	0.05%	0.00%
Arsenic	1.61E+01	2	28	30	1E-06	70	10950	25550	3.53E-08	1.51E-08	3.00E-04	1.75E+00	1.18E-04	2.65E-08	28.97%	85.63%
Barium	1.01E+02	2	28	30	1E-06	70	10950	25550	2.21E-07	9.49E-08	7.00E-02	--	3.16E-06	--	0.78%	0.00%
Beryllium	1.10E+00	2	28	30	1E-06	70	10950	25550	2.41E-09	1.03E-09	5.00E-03	4.30E+00	4.82E-07	4.44E-09	0.12%	14.37%
Cobalt	2.46E+01	2	28	30	1E-06	70	10950	25550	5.39E-08	2.31E-08	6.00E-02	--	8.99E-07	--	0.22%	0.00%
Copper	8.30E+00	2	28	30	1E-06	70	10950	25550	1.82E-08	7.80E-09	3.71E-02	--	4.90E-07	--	0.12%	0.00%
Iron	3.83E+04	2	28	30	1E-06	70	10950	25550	8.39E-05	3.60E-05	3.00E-01	--	2.80E-04	--	68.92%	0.00%
Mercury	1.50E-01	2	28	30	1E-06	70	10950	25550	3.29E-10	1.41E-10	3.00E-04	--	1.10E-06	--	0.27%	0.00%
Zinc	3.07E+02	2	28	30	1E-06	70	10950	25550	6.73E-07	2.88E-07	3.00E-01	--	2.24E-06	--	0.55%	0.00%
TOTAL													4.06E-04	3.09E-08	100.00%	100.00%

SUMMARY OF CHRONIC DAILY INTAKE (CDI) AND POTENTIAL NONCARCINOGENIC
AND CARCINOGENIC RISK FROM DERMAL CONTACT WITH GROUNDWATER
SITE 7

FUTURE SCENARIO
GROUNDWATER – DERMAL
RESIDENT (EXPOSED AS TRESPASSER/RECREATIONAL) ADULT

CHEMICAL	CW ug/L	SA cm^2	PC cm/hr	ET hr/d	EF d/y	ED y	CF L mg/cm^3 ug	BW kg	ATnc d	ATc d	CDInc mg/kg/d	CDIc mg/kg/d	RfD mg/kg/d	CSF (mg/kg/d)-1	HI	CR	% CONTRIB NC RISK	% CONTRIB CARC RISK
TOTAL DISSOLVE METALS																		
Aluminum	2.72E+02	23000	0.001 ***	0.2	28	30	1E-06	70	10950	25550	6.86E-06	2.94E-06	2.90E+00	--	2.36E-06	-	0.05%	0.00%
Arsenic	1.61E+01	23000	0.001 ***	0.2	28	30	1E-06	70	10950	25550	4.06E-07	1.74E-07	3.00E-04	1.75E+00	1.35E-03	3.04E-07	29.03%	85.63%
Barium	1.01E+02	23000	0.001 ***	0.2	28	30	1E-06	70	10950	25550	2.55E-06	1.09E-06	7.00E-02	--	3.64E-05	-	0.78%	0.00%
Beryllium	1.10E+00	23000	0.001 ***	0.2	28	30	1E-06	70	10950	25550	2.77E-08	1.19E-08	5.00E-03	4.30E+00	5.55E-06	5.11E-08	0.12%	14.37%
Cobalt	2.46E+01	23000	0.001 ***	0.2	28	30	1E-06	70	10950	25550	6.20E-07	2.66E-07	6.00E-02	--	1.03E-05	-	0.22%	0.00%
Copper	8.30E+00	23000	0.001 ***	0.2	28	30	1E-06	70	10950	25550	2.09E-07	8.97E-08	3.71E-02	--	5.64E-06	-	0.12%	0.00%
Iron	3.83E+04	23000	0.001 ***	0.2	28	30	1E-06	70	10950	25550	9.65E-04	4.14E-04	3.00E-01	--	3.22E-03	-	69.07%	0.00%
Mercury	1.50E-01	23000	0.001 ***	0.2	28	30	1E-06	70	10950	25550	3.78E-09	1.62E-09	3.00E-04	--	1.26E-05	-	0.27%	0.00%
Zinc	3.07E+02	23000	0.0006 *	0.2	28	30	1E-06	70	10950	25550	4.64E-06	1.99E-06	3.00E-01	--	1.55E-05	-	0.33%	0.00%
TOTAL															4.66E-03	3.55E-07	100.00%	100.00%

* Chemical specific dermal permeability constant – estimated value, USEPA, 1992
** Chemical specific dermal permeability constant – measured, USEPA, 1992
*** Chemical specific dermal permeability constant – default value, USEPA, 1992
**** Not available chemical specific dermal permeability constant (PC). Used PC of water, USEPA 1988

SUMMARY OF CHRONIC DAILY INTAKE (CDI) AND POTENTIAL NONCARCINOGENIC
AND CARCINOGENIC RISK FROM DERMAL CONTACT WITH GROUNDWATER
SITE 7

FUTURE SCENARIO
GROUNDWATER – DERMAL
RESIDENT (EXPOSED AS TRESPASSER/RECREATIONAL) CHILD

CHEMICAL	CW ug/L	SA cm^2	PC cm/hr	ET hr/d	EF d/y	ED y	CF L mg/cm^3 ug	BW kg	ATnc d	ATc d	CDInc mg/kg/d	CDIc mg/kg/d	RfD mg/kg/d	CSF (mg/kg/d)-1	HI	CR	% CONTRIB NC RISK	% CONTRIB CARC RISK
TOTAL DISSOLVE METALS																		
Aluminum	2.72E+02	7280	0.001 ***	0.2	14	6	1E-06	15	2190	25550	5.06E-06	4.34E-07	2.90E+00	--	1.75E-06	-	0.05%	0.00%
Arsenic	1.61E+01	7280	0.001 ***	0.2	14	6	1E-06	15	2190	25550	3.00E-07	2.57E-08	3.00E-04	1.75E+00	9.99E-04	4.50E-08	29.03%	85.63%
Barium	1.01E+02	7280	0.001 ***	0.2	14	6	1E-06	15	2190	25550	1.88E-06	1.61E-07	7.00E-02	--	2.69E-05	-	0.78%	0.00%
Beryllium	1.10E+00	7280	0.001 ***	0.2	14	6	1E-06	15	2190	25550	2.05E-08	1.76E-09	5.00E-03	4.30E+00	4.10E-06	7.55E-09	0.12%	14.37%
Cobalt	2.46E+01	7280	0.001 ***	0.2	14	6	1E-06	15	2190	25550	4.58E-07	3.93E-08	6.00E-02	--	7.63E-06	-	0.22%	0.00%
Copper	8.30E+00	7280	0.001 ***	0.2	14	6	1E-06	15	2190	25550	1.55E-07	1.32E-08	3.71E-02	--	4.16E-06	-	0.12%	0.00%
Iron	3.83E+04	7280	0.001 ***	0.2	14	6	1E-06	15	2190	25550	7.13E-04	6.11E-05	3.00E-01	--	2.38E-03	-	69.07%	0.00%
Mercury	1.50E-01	7280	0.001 ***	0.2	14	6	1E-06	15	2190	25550	2.79E-09	2.39E-10	3.00E-04	--	9.31E-06	-	0.27%	0.00%
Zinc	3.07E+02	7280	0.0006 *	0.2	14	6	1E-06	15	2190	25550	3.43E-06	2.94E-07	3.00E-01	--	1.14E-05	-	0.33%	0.00%
TOTAL															3.44E-03	5.25E-08	100.00%	100.00%

* Chemical specific dermal permeability constant–estimated value, USEPA, 1992
** Chemical specific dermal permeability constant–measured, USEPA, 1992
*** Chemical specific dermal permeability constant–default value, USEPA, 1992
**** Chemical specific dermal permeability constant (PC) not available. Used water PC, USEPA, 1992.

CONSTITUENTS DETECTED IN SURFACE WATER SAMPLES
SITE 7
NAVAL AMPHIBIOUS BASE – LITTLE CREEK
VIRGINIA BEACH, VIRGINIA

Constituent	Frequency of Detection	Range of Detected Concentrations (ug/l)	Federal MCL (ug/l) [a]	Tap Water (ug/l) [b]	Health Advisory (ug/l) [c]	Virginia Water Stds. (ug/l) [d]	Potential Concern
VOLATILES							
Acetone	3 / 6	15.0 – 31.0		370			NO
INORGANICS							
Aluminum	5 / 6	388 j – 1690.0 j		11000			YES
Arsenic	5 / 6	2.4 b – 10.3	0.018	0.038	50	50	YES
Barium [e]	6 / 6	17.5 b – 36.8 b		260	2000	2000	YES
Calcium	6 / 6	22300 – 1.8E+05					NO
Cobalt [e]	4 / 6	3.4 b – 5.6 b		220			YES
Copper [e]	4 / 6	5.3 b – 14.1 b		140	1300	1300	YES
Iron	6 / 6	1010 j – 6890.0 j				300	YES
Lead	3 / 6	3.2 j – 50.0 j				15	YES *
Magnesium	6 / 6	28000 – 4.6E+05					NO
Manganese	6 / 6	83.9 – 334.0		18		50	YES
Potassium	6 / 6	8800 j – 1.8E+05 j					NO
Sodium	6 / 6	184000 – 4.3E+06					NO
Zinc	3 / 6	30.8 – 70.5			1100	5000	YES
ANIONS							
Alkalinity	6 / 6	78500.0 – 1.3E+05					YES
Bicarbonate alkalinity	6 / 6	78500.0 – 1.3E+05					YES
Chloride	6 / 6	7.0E+05 – 2.1E+07				250000	YES
Sulfate	6 / 6	1.2E+05 – 1.4E+06				250000	YES

Notes:

a. Federal MCL concentration values represent USFederal Maximum Contaminant Level for potable water supplies.

b. Tap Water Concentration values obtained from July 11, 1994 USEPA Region III Risk–Based Concentration Table except for aluminum which is obtained from the January 7, 1994 RBC table.

c. Health Advisory Concentration values obtained from December 1993 USEPA Office of Water publication "Drinking Water Regulations and Health Advisories."

d. Virginia Water Standards for public water supplies.

* Health risk analysis to be performed will use the Integrated Exposure Uptake Biokinetic (IEUBK) Model.

e. Constituent concentration is five times greater than the maximum detected in blank (b).

SUMMARY OF CHRONIC DAILY INTAKE (CDI) AND POTENTIAL NONCARCINOGENIC
AND CARCINOGENIC RISK FROM INGESTION OF SURFACE WATER
SITE 7

CURRENT SCENARIO
SURFACE WATER – INGESTION
TRESPASSER CHILD

CHEMICAL	CW ug/L	CR L/d	EF d/y	ED y	CF mg/ug	BW kg	ATnc d	ATc d	CDInc mg/kg/d	CDIc mg/kg/d	RfD mg/kg/d	CSF (mg/kg/d)−1	HI	CR	% CONTRIB NC RISK	% CONTRIB CARC RISK
Aluminum	1.69E+03	2	350	6	1E−03	15	2190	25550	2.16E−01	1.85E−02	2.90E+00	--	7.45E−02	--	0.46%	0.00%
Arsenic	1.03E+01	2	350	6	1E−03	15	2190	25550	1.32E−03	1.13E−04	3.00E−04	1.75E+00	4.39E+00	1.98E−04	27.27%	100.00%
Barium	3.68E+01	2	350	6	1E−03	15	2190	25550	4.71E−03	4.03E−04	7.00E−02	--	6.72E−02	--	0.42%	0.00%
Cobalt	5.60E+00	2	350	6	1E−03	15	2190	25550	7.16E−04	6.14E−05	6.00E−02	--	1.19E−02	--	0.07%	0.00%
Copper	1.41E+01	2	350	6	1E−03	15	2190	25550	1.80E−03	1.55E−04	3.71E−02	--	4.86E−02	--	0.30%	0.00%
Iron	6.89E+03	2	350	6	1E−03	15	2190	25550	8.81E−01	7.55E−02	3.00E−01	--	2.94E+00	--	18.24%	0.00%
Manganese	3.34E+02	2	350	6	1E−03	15	2190	25550	4.27E−02	3.66E−03	5.00E−03	--	8.54E+00	--	53.05%	0.00%
Zinc	7.05E+01	2	350	6	1E−03	15	2190	25550	9.01E−03	7.73E−04	3.00E−01	--	3.00E−02	--	0.19%	0.00%
TOTAL													1.61E+01	1.98E−04	100.00%	100.00%

SUMMARY OF CHRONIC DAILY INTAKE (CDI) AND POTENTIAL NONCARCINOGENIC
AND CARCINOGENIC RISK FROM INGESTION OF SURFACE WATER
SITE 7

CURRENT SCENARIO
SURFACE WATER – INGESTION
TRESPASSER ADULT

CHEMICAL	CW ug/L	CR L/d	EF d/y	ED y	CF mg/ug	BW kg	ATnc d	ATc d	CDInc mg/kg/d	CDIc mg/kg/d	RfD mg/kg/d	CSF (mg/kg/d)-1	HI	CR	% CONTRIB NC RISK	% CONTRIB CARC RISK
Aluminum	1.69E+03	2	350	30	1E-06	70	10950	25550	4.63E-05	1.98E-05	2.90E+00	--	1.60E-05	--	0.46%	0.00%
Arsenic	1.03E+01	2	350	30	1E-06	70	10950	25550	2.82E-07	1.21E-07	3.00E-04	1.75E+00	9.41E-04	2.12E-07	27.27%	100.00%
Barium	3.68E+01	2	350	30	1E-06	70	10950	25550	1.01E-06	4.32E-07	7.00E-02	--	1.44E-05	--	0.42%	0.00%
Cobalt	5.60E+00	2	350	30	1E-06	70	10950	25550	1.53E-07	6.58E-08	6.00E-02	--	2.56E-06	--	0.07%	0.00%
Copper	1.41E+01	2	350	30	1E-06	70	10950	25550	3.86E-07	1.66E-07	3.71E-02	--	4.04E-05	--	0.30%	0.00%
Iron	6.89E+03	2	350	30	1E-06	70	10950	25550	1.89E-04	8.09E-05	3.00E-01	--	6.29E-04	--	18.24%	0.00%
Manganese	3.34E+02	2	350	30	1E-06	70	10950	25550	9.15E-06	3.92E-06	5.00E-03	--	1.83E-03	--	53.05%	0.00%
Zinc	7.05E+01	2	350	30	1E-06	70	10950	25550	1.93E-06	8.28E-07	3.00E-01	--	6.44E-06	--	0.19%	0.00%
TOTAL													3.45E-03	2.12E-07	100.00%	100.00%

SUMMARY OF CHRONIC DAILY INTAKE (CDI) AND POTENTIAL NONCARCINOGENIC
AND CARCINOGENIC RISK FROM DERMAL CONTACT WITH SURFACE WATER
SITE 7

CURRENT SCENARIO
SURFACE WATER – DERMAL
TRESPASSER CHILD

CHEMICAL	CW ug/L	SA cm^2	PC cm/hr	ET hr/d	EF d/y	ED y	CF L mg/cm^3 ug	BW kg	ATnc d	ATc d	CDInc mg/kg/d	CDIc mg/kg/d	RfD mg/kg/d	CSF (mg/kg/d)-1	HI	CR	% CONTRIB NC RISK	% CONTRIB CARC RISK
Aluminum	1.69E+03	7280	0.001 ***	2.6	350	6	1E-06	15	2190	25550	7.87E-04	6.74E-05	2.90E+00	--	2.71E-04	–	0.46%	0.00%
Arsenic	1.03E+01	7280	0.001 ***	2.6	350	6	1E-06	15	2190	25550	4.79E-06	4.11E-07	3.00E-04	1.75E+00	1.60E-02	7.19E-07	27.29%	100.00%
Barium	3.68E+01	7280	0.001 ***	2.6	350	6	1E-06	15	2190	25550	1.71E-05	1.47E-06	7.00E-02	--	2.45E-04	–	0.42%	0.00%
Cobalt	5.60E+00	7280	0.001 ***	2.6	350	6	1E-06	15	2190	25550	2.61E-06	2.23E-07	6.00E-02	--	4.34E-05	–	0.07%	0.00%
Copper	1.41E+01	7280	0.001 ***	2.6	350	6	1E-06	15	2190	25550	6.56E-06	5.62E-07	3.71E-02	--	1.77E-04	–	0.30%	0.00%
Iron	6.89E+03	7280	0.001 ***	2.6	350	6	1E-06	15	2190	25550	3.21E-03	2.75E-04	3.00E-01	--	1.07E-02	–	18.25%	0.00%
Manganese	3.34E+02	7280	0.001 ***	2.6	350	6	1E-06	15	2190	25550	1.55E-04	1.33E-05	5.00E-03	--	3.11E-02	–	53.09%	0.00%
Zinc	7.05E+01	7280	0.0006 *	2.6	350	6	1E-06	15	2190	25550	1.97E-05	1.69E-06	3.00E-01	--	6.56E-05	–	0.11%	0.00%
TOTAL															5.86E-02	7.19E-07	100.00%	100.00%

* Chemical specific dermal permeability constant – estimated, USEPA, 1992
** Chemical specific dermal permeability constant – measured, USEPA, 1992
*** Chemical specific dermal permeability constant – default value, USEPA, 1992
**** Chemical specific dermal permeability constant (PC) not available. Used water PC, USEPA, 1992.

SUMMARY OF CHRONIC DAILY INTAKE (CDI) AND POTENTIAL NONCARCINOGENIC
AND CARCINOGENIC RISK FROM DERMAL CONTACT WITH SURFACE WATER
SITE 7

CURRENT SCENARIO
SURFACE WATER – DERMAL
TRESPASSER ADULT

CHEMICAL	CW ug/L	SA cm^2	PC cm/hr	ET hr/d	EF d/y	ED y	CF L mg/cm^3 ug	BW kg	ATnc d	ATc d	CDInc mg/kg/d	CDIc mg/kg/d	RfD mg/kg/d	CSF (mg/kg/d)-1	HI	CR	% CONTRIB NC RISK	% CONTRIB CARC RISK
Aluminum	1.69E+03	23000	0.001 ***	2.6	350	30	1E-06	70	10950	25550	5.32E-04	2.28E-04	2.90E+00	--	1.84E-04	–	0.46%	0.00%
Arsenic	1.03E+01	23000	0.001 ***	2.6	350	30	1E-06	70	10950	25550	3.25E-06	1.39E-06	3.00E-04	1.75E+00	1.08E-02	2.43E-06	27.29%	100.00%
Barium	3.68E+01	23000	0.001 ***	2.6	350	30	1E-06	70	10950	25550	1.16E-05	4.97E-06	7.00E-02	--	1.66E-04	–	0.42%	0.00%
Cobalt	5.60E+00	23000	0.001 ***	2.6	350	30	1E-06	70	10950	25550	1.76E-06	7.56E-07	6.00E-02	--	2.94E-05	–	0.07%	0.00%
Copper	1.41E+01	23000	0.001 ***	2.6	350	30	1E-06	70	10950	25550	4.44E-06	1.90E-06	3.71E-02	--	1.20E-04	–	0.30%	0.00%
Iron	6.89E+03	23000	0.001 ***	2.6	350	30	1E-06	70	10950	25550	2.17E-03	9.30E-04	3.00E-01	--	7.24E-03	–	18.25%	0.00%
Manganese	3.34E+02	23000	0.001 ***	2.6	350	30	1E-06	70	10950	25550	1.05E-04	4.51E-05	5.00E-03	--	2.10E-02	–	53.09%	0.00%
Zinc	7.05E+01	23000	0.0006 *	2.6	350	30	1E-06	70	10950	25550	1.33E-05	5.71E-06	3.00E-01	--	4.44E-05	–	0.11%	0.00%
TOTAL															3.96E-02	2.43E-06	100.00%	100.00%

* Chemical specific dermal permeability constant – estimated, USEPA, 1992
** Chemical specific dermal permeability constant – measured, USEPA, 1992
*** Chemical specific dermal permeability constant – default value, USEPA, 1992
**** Chemical specific dermal permeability constant (PC) not available. Used water PC, USEPA, 1992.

SUMMARY OF CHRONIC DAILY INTAKE (CDI) AND POTENTIAL NONCARCINOGENIC
AND CARCINOGENIC RISK FROM INGESTION OF SURFACE WATER
SITE 7

FUTURE SCENARIO
SURFACE WATER – INGESTION
RESIDENT CHILD

CHEMICAL	CW ug/L	CR L/d	EF d/y	ED y	CF mg/ug	BW kg	ATnc d	ATc d	CDInc mg/kg/d	CDIc mg/kg/d	RfD mg/kg/d	CSF (mg/kg/d)-1	HI	CR	% CONTRIB NC RISK	% CONTRIB CARC RISK
Aluminum	1.69E+03	2	350	6	1E-03	15	2190	25550	2.16E-01	1.85E-02	2.90E+00	--	7.45E-02	--	0.46%	0.00%
Arsenic	1.03E+01	2	350	6	1E-03	15	2190	25550	1.32E-03	1.13E-04	3.00E-04	1.75E+00	4.39E+00	1.98E-04	27.27%	100.00%
Barium	3.68E+01	2	350	6	1E-03	15	2190	25550	4.71E-03	4.03E-04	7.00E-02	--	6.72E-02	--	0.42%	0.00%
Cobalt	5.60E+00	2	350	6	1E-03	15	2190	25550	7.16E-04	6.14E-05	6.00E-02	--	1.19E-02	--	0.07%	0.00%
Copper	1.41E+01	2	350	6	1E-03	15	2190	25550	1.80E-03	1.55E-04	3.71E-02	--	4.86E-02	--	0.30%	0.00%
Iron	6.89E+03	2	350	6	1E-03	15	2190	25550	8.81E-01	7.55E-02	3.00E-01	--	2.94E+00	--	18.24%	0.00%
Manganese	3.34E+02	2	350	6	1E-03	15	2190	25550	4.27E-02	3.66E-03	5.00E-03	--	8.54E+00	--	53.05%	0.00%
Zinc	7.05E+01	2	350	6	1E-03	15	2190	25550	9.01E-03	7.73E-04	3.00E-01	--	3.00E-02	--	0.19%	0.00%
TOTAL													1.61E+01	1.98E-04	100.00%	100.00%

SUMMARY OF CHRONIC DAILY INTAKE (CDI) AND POTENTIAL NONCARCINOGENIC
AND CARCINOGENIC RISK FROM INGESTION OF SURFACE WATER
SITE 7

FUTURE SCENARIO
SURFACE WATER – INGESTION
RESIDENT ADULT

CHEMICAL	CW ug/L	CR L/d	EF d/y	ED y	CF mg/ug	BW kg	ATnc d	ATc d	CDInc mg/kg/d	CDIc mg/kg/d	RfD mg/kg/d	CSF (mg/kg/d)-1	HI	CR	% CONTRIB NC RISK	% CONTRIB CARC RISK
Aluminum	1.69E+03	2	350	30	1E-06	70	10950	25550	4.63E-05	1.98E-05	2.90E+00	--	1.60E-05	--	0.46%	0.00%
Arsenic	1.03E+01	2	350	30	1E-06	70	10950	25550	2.82E-07	1.21E-07	3.00E-04	1.75E+00	9.41E-04	2.12E-07	27.27%	100.00%
Barium	3.68E+01	2	350	30	1E-06	70	10950	25550	1.01E-06	4.32E-07	7.00E-02	--	1.44E-05	--	0.42%	0.00%
Cobalt	5.60E+00	2	350	30	1E-06	70	10950	25550	1.53E-07	6.58E-08	6.00E-02	--	2.56E-06	--	0.07%	0.00%
Copper	1.41E+01	2	350	30	1E-06	70	10950	25550	3.86E-07	1.66E-07	3.71E-02	--	1.04E-05	--	0.30%	0.00%
Iron	6.89E+03	2	350	30	1E-06	70	10950	25550	1.89E-04	8.09E-05	3.00E-01	--	6.29E-04	--	18.24%	0.00%
Manganese	3.34E+02	2	350	30	1E-06	70	10950	25550	9.15E-06	3.92E-06	5.00E-03	--	1.83E-03	--	53.05%	0.00%
Zinc	7.05E+01	2	350	30	1E-06	70	10950	25550	1.93E-06	8.28E-07	3.00E-01	--	6.44E-06	--	0.19%	0.00%
TOTAL													3.45E-03	2.12E-07	100.00%	100.00%

SUMMARY OF CHRONIC DAILY INTAKE (CDI) AND POTENTIAL NONCARCINOGENIC
AND CARCINOGENIC RISK FROM DERMAL CONTACT WITH SURFACE WATER
SITE 7

FUTURE SCENARIO
SURFACE WATER – DERMAL
RESIDENT CHILD

CHEMICAL	CW ug/L	SA cm^2	PC cm/hr	ET hr/d	EF d/y	ED y	CF L mg/cm^3 ug	BW kg	ATnc d	ATc d	CDInc mg/kg/d	CDIc mg/kg/d	RfD mg/kg/d	CSF (mg/kg/d)-1	HI	CR	% CONTRIB NC RISK	% CONTRIB CARC RISK
Aluminum	1.69E+03	7280	0.001 ***	2.6	350	6	1E-06	15	2190	25550	7.87E-04	6.74E-05	2.90E+00	--	2.71E-04	-	0.46%	0.00%
Arsenic	1.03E+01	7280	0.001 ***	2.6	350	6	1E-06	15	2190	25550	4.79E-06	4.11E-07	3.00E-04	1.75E+00	1.60E-02	7.19E-07	27.29%	100.00%
Barium	3.68E+01	7280	0.001 ***	2.6	350	6	1E-06	15	2190	25550	1.71E-05	1.47E-06	7.00E-02	--	2.45E-04	-	0.42%	0.00%
Cobalt	5.60E+00	7280	0.001 ***	2.6	350	6	1E-06	15	2190	25550	2.61E-06	2.23E-07	6.00E-02	--	4.34E-05	-	0.07%	0.00%
Copper	1.41E+01	7280	0.001 ***	2.6	350	6	1E-06	15	2190	25550	6.56E-06	5.62E-07	3.71E-02	--	1.77E-04	-	0.30%	0.00%
Iron	6.89E+03	7280	0.001 ***	2.6	350	6	1E-06	15	2190	25550	3.21E-03	2.75E-04	3.00E-01	--	1.07E-02	-	18.25%	0.00%
Manganese	3.34E+02	7280	0.001 ***	2.6	350	6	1E-06	15	2190	25550	1.55E-04	1.33E-05	5.00E-03	--	3.11E-02	-	53.09%	0.00%
Zinc	7.05E+01	7280	0.0006 *	2.6	350	6	1E-06	15	2190	25550	1.97E-05	1.69E-06	3.00E-01	--	6.56E-05	-	0.11%	0.00%
TOTAL															5.86E-02	7.19E-07	100.00%	100.00%

* Chemical specific dermal permeability constant – estimated, USEPA, 1992
** Chemical specific dermal permeability constant – measured, USEPA, 1992
*** Chemical specific dermal permeability constant – default value, USEPA, 1992
**** Chemical specific dermal permeability constant (PC) not available. Used water PC, USEPA, 1992.

SUMMARY OF CHRONIC DAILY INTAKE (CDI) AND POTENTIAL NONCARCINOGENIC
AND CARCINOGENIC RISK FROM DERMAL CONTACT WITH SURFACE WATER
SITE 7

FUTURE SCENARIO
SURFACE WATER – DERMAL
RESIDENT ADULT

CHEMICAL	CW ug/L	SA cm^2	PC cm/hr	ET hr/d	EF d/y	ED y	CF L mg/cm^3 ug	BW kg	ATnc d	ATc d	CDInc mg/kg/d	CDIc mg/kg/d	RfD mg/kg/d	CSF (mg/kg/d)-1	HI	CR	% CONTRIB NC RISK	% CONTRIB CARC RISK
Aluminum	1.69E+03	23000	0.001 ***	2.6	350	30	1E-06	70	10950	25550	5.32E-04	2.28E-04	2.90E+00	--	1.84E-04	–	0.46%	0.00%
Arsenic	1.03E+01	23000	0.001 ***	2.6	350	30	1E-06	70	10950	25550	3.25E-06	1.39E-06	3.00E-04	1.75E+00	1.08E-02	2.43E-06	27.29%	100.00%
Barium	3.68E+01	23000	0.001 ***	2.6	350	30	1E-06	70	10950	25550	1.16E-05	4.97E-06	7.00E-02	--	1.66E-04	–	0.42%	0.00%
Cobalt	5.60E+00	23000	0.001 ***	2.6	350	30	1E-06	70	10950	25550	1.76E-06	7.56E-07	6.00E-02	--	2.94E-05	–	0.07%	0.00%
Copper	1.41E+01	23000	0.001 ***	2.6	350	30	1E-06	70	10950	25550	4.44E-06	1.90E-06	3.71E-02	--	1.20E-04	–	0.30%	0.00%
Iron	6.89E+03	23000	0.001 ***	2.6	350	30	1E-06	70	10950	25550	2.17E-03	9.30E-04	3.00E-01	--	7.24E-03	–	18.25%	0.00%
Manganese	3.34E+02	23000	0.001 ***	2.6	350	30	1E-06	70	10950	25550	1.05E-04	4.51E-05	5.00E-03	--	2.10E-02	–	53.09%	0.00%
Zinc	7.05E+01	23000	0.0006 *	2.6	350	30	1E-06	70	10950	25550	1.33E-05	5.71E-06	3.00E-01	--	4.44E-05	–	0.11%	0.00%
TOTAL															3.96E-02	2.43E-06	100.00%	100.00%

* Chemical specific dermal permeability constant – estimated, USEPA, 1992
** Chemical specific dermal permeability constant – measured, USEPA, 1992
*** Chemical specific dermal permeability constant – default value, USEPA, 1992
**** Chemical specific dermal permeability constant (PC) not available. Used water PC, USEPA, 1992

CONSTITUENTS DETECTED IN SEDIMENT SAMPLES
SITE 7
NAVAL AMPHIBIOUS BASE – LITTLE CREEK
VIRGINIA BEACH, VIRGINIA

Constituent	Frequency of Detection	Range of Detected Concentrations (mg/kg)			Residential Soil Conc. (mg/kg) [a]	Potential Concern
VOLATILES						
Methylene chloride	1 / 6		7E-03 j		8.50E+01	NO
Acetone	1 / 6		4E-01 j		7.80E+02	NO
Carbon disulfide	1 / 6		4E-03 j		7.80E+02	NO
2-Butanone	3 / 6	0.012 j	–	7E-02		NO
Toluene	2 / 6	0.001 j	–	5E-03 j	1.60E+03	NO
INORGANICS						
Aluminum	6 / 6	221	–	6520.0	2.30E+04	YES
Arsenic	6 / 6	1.2 b	–	8.6	3.70E-01	YES
Barium [b]	6 / 6	1.6 b	–	23.8 b	5.50E+02	YES
Beryllium [b]	2 / 6	0.28 b	–	0.4 b	1.50E-01	YES
Cadmium	3 / 6	2.3	–	3.1	3.90E+01	YES
Calcium	5 / 6	214	–	1500.0		NO
Chromium	6 / 6	1.5 j	–	10.1 j	3.90E+01	YES
Cobalt	4 / 6	0.94 j	–	3.4 j	4.70E+02	YES
Copper	6 / 6	0.89	–	42.9	2.90E+02	YES
Iron	6 / 6	1060	–	1.4E+04		YES
Lead	6 / 6	1.7 j	–	31.1		YES*
Magnesium	6 / 6	78.7	–	2660.0		NO
Manganese	6 / 6	2.7 b	–	67.2	3.90E+01	YES
Nickel [b]	5 / 6	3.3 b	–	7.6 b	1.60E+02	YES
Potassium	6 / 6	45.3	–	1350.0		YES
Silver	1 / 6		0.8 j		3.90E+01	NO
Sodium	6 / 6	299	–	5160.0		YES
Vanadium	5 / 6	5.4 b	–	23.2	5.50E+01	YES
Zinc	5 / 6	29.5	–	213.0	2.30E+03	YES
ANIONS						
Alkalinity	2 / 6	0.10	–	6.3E-01		YES
Bicarbonate alkalinity	2 / 6	0.10	–	6.3E-01		YES
Chloride	6 / 6	0.55	–	7.5E+00		YES
Sulfate	5 / 6	0.14	–	1.2E+00		YES

Notes:

a. Residential Soil Concentration values obtained from July 11, 1994 USEPA Region III Risk-Based Concentration Table except for aluminum where it is obtained from the January 11, 1994 RBC Table using a target hazard quotient of 0.1 and a target cancer risk of 1e-06.

b. Constituent concentration is five times greater than the maximum detected in blank (b).

* Health risk analysis to be performed will use the Integrated Exposure Uptake Biokinetic (IEUBK) Model.

SUMMARY OF CHRONIC DAILY INTAKE (CDI) AND POTENTIAL NONCARCINOGENIC
AND CARCINOGENIC RISK FROM INGESTION OF SEDIMENT
SITE 7

CURRENT SCENARIO
SEDIMENT – INGESTION
TRESPASSER ADULT

CHEMICAL	CS mg/kg	IR mg/d	FI	EF d/y	ED y	CF kg/mg	BW kg	ATnc d	ATc d	CDInc mg/kg/d	CDIc mg/kg/d	RfD mg/kg/d	CSF (mg/kg/d)−1	HI	CR	% CONTRIB NC RISK	% CONTRIB CARC RISK
Aluminum	6.52E+03	50	1	28	30	1E−06	70	10950	25550	3.57E−04	1.53E−04	2.90E+00	--	1.23E−04	--	2.14%	0.00%
Arsenic	8.60E+00	50	1	28	30	1E−06	70	10950	25550	4.71E−07	2.02E−07	3.00E−04	1.75E+00	1.57E−03	3.53E−07	27.23%	89.74%
Barium	2.38E+01	50	1	28	30	1E−06	70	10950	25550	1.30E−06	5.59E−07	7.00E−02	--	1.86E−05	--	0.32%	0.00%
Beryllium	4.00E−01	50	1	28	30	1E−06	70	10950	25550	2.19E−08	9.39E−09	5.00E−03	4.30E+00	4.38E−06	4.04E−08	0.08%	10.26%
Cadmium	3.10E+00	50	1	28	30	1E−06	70	10950	25550	1.70E−07	7.28E−08	5.00E−04	--	3.40E−04	--	5.89%	0.00%
Chromium	1.01E+01	50	1	28	30	1E−06	70	10950	25550	5.53E−07	2.37E−07	5.00E−03	--	1.11E−04	--	1.92%	0.00%
Cobalt	3.40E+00	50	1	28	30	1E−06	70	10950	25550	1.86E−07	7.98E−08	6.00E−02	--	3.11E−06	--	0.05%	0.00%
Copper	4.29E+01	50	1	28	30	1E−06	70	10950	25550	2.35E−06	1.01E−06	3.71E−02	--	6.34E−05	--	1.10%	0.00%
Iron	1.40E+04	50	1	28	30	1E−06	70	10950	25550	7.67E−04	3.29E−04	3.00E−01	--	2.56E−03	--	44.33%	0.00%
Manganese	6.72E+01	50	1	28	30	1E−06	70	10950	25550	3.68E−06	1.58E−06	5.00E−03	--	7.36E−04	--	12.77%	0.00%
Nickel	7.60E+00	50	1	28	30	1E−06	70	10950	25550	4.16E−07	1.78E−07	2.00E−02	--	2.08E−05	--	0.36%	0.00%
Vanadium	2.32E+01	50	1	28	30	1E−06	70	10950	25550	1.27E−06	5.45E−07	7.00E−03	--	1.82E−04	--	3.15%	0.00%
Zinc	2.13E+02	50	1	28	30	1E−06	70	10950	25550	1.17E−05	5.00E−06	3.00E−01	--	3.89E−05	--	0.67%	0.00%
TOTAL														5.77E−03	3.94E−07	100.00%	100.00%

SUMMARY OF CHRONIC DAILY INTAKE (CDI) AND POTENTIAL NONCARCINOGENIC
AND CARCINOGENIC RISK FROM INGESTION OF SEDIMENT
SITE 7

CURRENT SCENARIO
SEDIMENT – INGESTION
TRESPASSER CHILD

CHEMICAL	CS mg/kg	IR mg/d	FI	EF d/y	ED y	CF kg/mg	BW kg	ATnc d	ATc d	CDInc mg/kg/d	CDIc mg/kg/d	RfD mg/kg/d	CSF (mg/kg/d)-1	HI	CR	% CONTRIB NC RISK	% CONTRIB CARC RISK
Aluminum	6.52E+03	100	1	14	6	1E-06	15	2190	25550	1.67E-03	1.43E-04	2.90E+00	--	5.75E-04	--	2.14%	0.00%
Arsenic	8.60E+00	100	1	14	6	1E-06	15	2190	25550	2.20E-06	1.88E-07	3.00E-04	1.75E+00	7.33E-03	3.30E-07	27.23%	89.74%
Barium	2.38E+01	100	1	14	6	1E-06	15	2190	25550	6.09E-06	5.22E-07	7.00E-02	--	8.69E-05	--	0.32%	0.00%
Beryllium	4.00E-01	100	1	14	6	1E-06	15	2190	25550	1.02E-07	8.77E-09	5.00E-03	4.30E+00	2.05E-05	3.77E-08	0.08%	10.26%
Cadmium	3.10E+00	100	1	14	6	1E-06	15	2190	25550	7.93E-07	6.79E-08	5.00E-04	--	1.59E-03	--	5.89%	0.00%
Chromium	1.01E+01	100	1	14	6	1E-06	15	2190	25550	2.58E-06	2.21E-07	5.00E-03	--	5.17E-04	--	1.92%	0.00%
Cobalt	3.40E+00	100	1	14	6	1E-06	15	2190	25550	8.69E-07	7.45E-08	6.00E-02	--	1.45E-05	--	0.05%	0.00%
Copper	4.29E+01	100	1	14	6	1E-06	15	2190	25550	1.10E-05	9.40E-07	3.71E-02	--	2.96E-04	--	1.10%	0.00%
Iron	1.40E+04	100	1	14	6	1E-06	15	2190	25550	3.58E-03	3.07E-04	3.00E-01	--	1.19E-02	--	44.33%	0.00%
Manganese	6.72E+01	100	1	14	6	1E-06	15	2190	25550	1.72E-05	1.47E-06	5.00E-03	--	3.44E-03	--	12.77%	0.00%
Nickel	7.60E+00	100	1	14	6	1E-06	15	2190	25550	1.94E-06	1.67E-07	2.00E-02	--	9.72E-05	--	0.36%	0.00%
Vanadium	2.32E+01	100	1	14	6	1E-06	15	2190	25550	5.93E-06	5.08E-07	7.00E-03	--	8.47E-04	--	3.15%	0.00%
Zinc	2.13E+02	100	1	14	6	1E-06	15	2190	25550	5.45E-05	4.67E-06	3.00E-01	--	1.82E-04	--	0.67%	0.00%
TOTAL														2.69E-02	3.68E-07	100.00%	100.00%

SUMMARY OF CHRONIC DAILY INTAKE (CDI) AND POTENTIAL NONCARCINOGENIC
AND CARCINOGENIC RISK FROM DERMAL CONTACT WITH SEDIMENT
SITE 7

FUTURE SCENARIO
SEDIMENT – DERMAL
RESIDENT ADULT

CHEMICAL	CS mg/kg	SA cm^2	AF mg/cm^2	ABS	EF d/y	ED y	CF kg/mg	BW kg	ATnc d	ATc d	CDInc mg/kg/d	CDIc mg/kg/d	RfD mg/kg/d	CSF (mg/kg/d)-1	HI	CR	% CONTRIB NC RISK	% CONTRIB CARC RISK
Aluminum	6.52E+03	5800	1	0.001	28	30	1E-06	70	10950	25550	4.14E-05	1.78E-05	2.90E+00	--	1.43E-05	–	2.14%	0.00%
Arsenic	8.60E+00	5800	1	0.001	28	30	1E-06	70	10950	25550	5.47E-06	2.34E-06	3.00E-04	1.75E+00	1.82E-04	4.10E-06	27.23%	89.74%
Barium	2.38E+01	5800	1	0.001	28	30	1E-06	70	10950	25550	1.51E-07	6.48E-08	7.00E-02	--	2.16E-06	–	0.32%	0.00%
Beryllium	4.00E-01	5800	1	0.001	28	30	1E-06	70	10950	25550	2.54E-09	1.09E-09	5.00E-03	4.30E+00	5.08E-07	4.69E-09	0.08%	10.26%
Cadmium	3.10E+00	5800	1	0.001	28	30	1E-06	70	10950	25550	1.97E-06	8.44E-09	5.00E-04	--	3.94E-05	–	5.89%	0.00%
Chromium	1.01E+01	5800	1	0.001	28	30	1E-06	70	10950	25550	6.42E-06	2.75E-06	5.00E-03	--	1.28E-05	–	1.92%	0.00%
Cobalt	3.40E+00	5800	1	0.001	28	30	1E-06	70	10950	25550	2.16E-06	9.26E-09	6.00E-02	--	3.60E-07	–	0.05%	0.00%
Copper	4.29E+01	5800	1	0.001	28	30	1E-06	70	10950	25550	2.73E-07	1.17E-07	3.71E-02	--	7.35E-06	–	1.10%	0.00%
Iron	1.40E+04	5800	1	0.001	28	30	1E-06	70	10950	25550	8.90E-05	3.81E-05	3.00E-01	--	2.97E-04	–	44.33%	0.00%
Manganese	6.72E+01	5800	1	0.001	28	30	1E-06	70	10950	25550	4.27E-07	1.83E-07	5.00E-03	--	8.54E-05	–	12.77%	0.00%
Nickel	7.60E+00	5800	1	0.001	28	30	1E-06	70	10950	25550	4.83E-06	2.07E-06	2.00E-02	--	2.42E-06	–	0.36%	0.00%
Vanadium	2.32E+01	5800	1	0.001	28	30	1E-06	70	10950	25550	1.47E-07	6.32E-08	7.00E-03	--	2.11E-05	–	3.15%	0.00%
Zinc	2.13E+02	5800	1	0.001	28	30	1E-06	70	10950	25550	1.35E-06	5.80E-07	3.00E-01	--	4.51E-06	–	0.67%	0.00%
TOTAL															6.69E-04	4.57E-06	100.00%	100.00%

SUMMARY OF CHRONIC DAILY INTAKE (CDI) AND POTENTIAL NONCARCINOGENIC
AND CARCINOGENIC RISK FROM DERMAL CONTACT WITH SEDIMENT
SITE 7

FUTURE SCENARIO
SEDIMENT – DERMAL
RESIDENT CHILD

CHEMICAL	CS mg/kg	SA cm^2	AF mg/cm^2	ABS	EF d/y	ED y	CF kg/mg	BW kg	ATnc d	ATc d	CDInc mg/kg/d	CDIc mg/kg/d	RfD mg/kg/d	CSF (mg/kg/d)-1	HI	CR	% CONTRIB NC RISK	% CONTRIB CARC RISK
Aluminum	6.52E+03	1820	1	0.001	14	6	1E-06	15	2190	25550	3.03E-05	2.60E-06	2.90E+00	--	1.05E-05	-	2.14%	0.00%
Arsenic	8.60E+00	1820	1	0.001	14	6	1E-06	15	2190	25550	4.00E-08	3.43E-09	3.00E-04	1.75E+00	1.33E-04	6.00E-09	27.23%	89.74%
Barium	2.38E+01	1820	1	0.001	14	6	1E-06	15	2190	25550	1.11E-07	9.49E-09	7.00E-02	--	1.58E-06	-	0.32%	0.00%
Beryllium	4.00E-01	1820	1	0.001	14	6	1E-06	15	2190	25550	1.86E-09	1.60E-10	5.00E-03	4.30E+00	3.72E-07	6.86E-10	0.08%	10.26%
Cadmium	3.10E+00	1820	1	0.001	14	6	1E-06	15	2190	25550	1.44E-08	1.24E-09	5.00E-04	--	2.89E-05	-	5.89%	0.00%
Chromium	1.01E+01	1820	1	0.001	14	6	1E-06	15	2190	25550	4.70E-08	4.03E-09	5.00E-03	--	9.40E-06	-	1.92%	0.00%
Cobalt	3.40E+00	1820	1	0.001	14	6	1E-06	15	2190	25550	1.58E-08	1.36E-09	6.00E-02	--	2.64E-07	-	0.05%	0.00%
Copper	4.29E+01	1820	1	0.001	14	6	1E-06	15	2190	25550	2.00E-07	1.71E-08	3.71E-02	--	5.38E-06	-	1.10%	0.00%
Iron	1.40E+04	1820	1	0.001	14	6	1E-06	15	2190	25550	6.52E-05	5.58E-06	3.00E-01	--	2.17E-04	-	44.33%	0.00%
Manganese	6.72E+01	1820	1	0.001	14	6	1E-06	15	2190	25550	3.13E-07	2.68E-08	5.00E-03	--	6.25E-05	-	12.77%	0.00%
Nickel	7.60E+00	1820	1	0.001	14	6	1E-06	15	2190	25550	3.54E-08	3.03E-09	2.00E-02	--	1.77E-06	-	0.36%	0.00%
Vanadium	2.32E+01	1820	1	0.001	14	6	1E-06	15	2190	25550	1.08E-07	9.25E-09	7.00E-03	--	1.54E-05	-	3.15%	0.00%
Zinc	2.13E+02	1820	1	0.001	14	6	1E-06	15	2190	25550	9.91E-07	8.50E-08	3.00E-01	--	3.30E-06	-	0.67%	0.00%
TOTAL															4.90E-04	6.69E-09	100.00%	100.00%

SUMMARY OF CHRONIC DAILY INTAKE (CDI) AND POTENTIAL NONCARCINOGENIC
AND CARCINOGENIC RISK FROM DERMAL CONTACT WITH SEDIMENT
SITE 7

CURRENT SCENARIO
SEDIMENT – DERMAL
TRESPASSER ADULT

CHEMICAL	CS mg/kg	SA cm^2	AF mg/cm^2	ABS	EF d/y	ED y	CF kg/mg	BW kg	ATnc d	ATc d	CDInc mg/kg/d	CDIc mg/kg/d	RfD mg/kg/d	CSF (mg/kg/d)-1	HI	CR	% CONTRIB NC RISK	% CONTRIB CARC RISK
Aluminum	6.52E+03	5800	1	0.001	28	30	1E-06	70	10950	25550	4.14E-05	1.78E-05	2.90E+00	--	1.43E-05	-	2.14%	0.00%
Arsenic	8.60E+00	5800	1	0.001	28	30	1E-06	70	10950	25550	5.47E-08	2.34E-08	3.00E-04	1.75E+00	1.82E-04	4.10E-08	27.23%	89.74%
Barium	2.38E+01	5800	1	0.001	28	30	1E-06	70	10950	25550	1.51E-07	6.48E-08	7.00E-02	--	2.16E-06	-	0.32%	0.00%
Beryllium	4.00E-01	5800	1	0.001	28	30	1E-06	70	10950	25550	2.54E-09	1.09E-09	5.00E-03	4.30E+00	5.08E-07	4.69E-09	0.08%	10.26%
Cadmium	3.10E+00	5800	1	0.001	28	30	1E-06	70	10950	25550	1.97E-08	8.44E-09	5.00E-04	--	3.94E-05	-	5.89%	0.00%
Chromium	1.01E+01	5800	1	0.001	28	30	1E-06	70	10950	25550	6.42E-08	2.75E-08	5.00E-03	--	1.28E-05	-	1.92%	0.00%
Cobalt	3.40E+00	5800	1	0.001	28	30	1E-06	70	10950	25550	2.16E-08	9.26E-09	6.00E-02	--	3.60E-07	-	0.05%	0.00%
Copper	4.29E+01	5800	1	0.001	28	30	1E-06	70	10950	25550	2.73E-07	1.17E-07	3.71E-02	--	7.35E-06	-	1.10%	0.00%
Iron	1.40E+04	5800	1	0.001	28	30	1E-06	70	10950	25550	8.90E-05	3.81E-05	3.00E-01	--	2.97E-04	-	44.33%	0.00%
Manganese	6.72E+01	5800	1	0.001	28	30	1E-06	70	10950	25550	4.27E-07	1.83E-07	5.00E-03	--	8.54E-05	-	12.77%	0.00%
Nickel	7.60E+00	5800	1	0.001	28	30	1E-06	70	10950	25550	4.83E-08	2.07E-08	2.00E-02	--	2.42E-06	-	0.36%	0.00%
Vanadium	2.32E+01	5800	1	0.001	28	30	1E-06	70	10950	25550	1.47E-07	6.32E-08	7.00E-03	--	2.11E-05	-	3.15%	0.00%
Zinc	2.13E+02	5800	1	0.001	28	30	1E-06	70	10950	25550	1.35E-06	5.80E-07	3.00E-01	--	4.51E-06	-	0.67%	0.00%
TOTAL															6.69E-04	4.57E-08	100.00%	100.00%

SUMMARY OF CHRONIC DAILY INTAKE (CDI) AND POTENTIAL NONCARCINOGENIC
AND CARCINOGENIC RISK FROM DERMAL CONTACT WITH SEDIMENT
SITE 7

CURRENT SCENARIO
SEDIMENT – DERMAL
TRESPASSER CHILD

CHEMICAL	CS mg/kg	SA cm^2	AF mg/cm^2	ABS	EF d/y	ED y	CF kg/mg	BW kg	ATnc d	ATc d	CDInc mg/kg/d	CDIc mg/kg/d	RfD mg/kg/d	CSF (mg/kg/d)-1	HI	CR	% CONTRIB NC RISK	% CONTRIB CARC RISK
Aluminum	6.52E+03	1820	1	0.001	14	6	1E-06	15	2190	25550	3.03E-05	2.60E-06	2.90E+00	--	1.05E-05	-	2.14%	0.00%
Arsenic	8.60E+00	1820	1	0.001	14	6	1E-06	15	2190	25550	4.00E-08	3.43E-09	3.00E-04	1.75E+00	1.33E-04	6.00E-09	27.23%	89.74%
Barium	2.38E+01	1820	1	0.001	14	6	1E-06	15	2190	25550	1.11E-07	9.49E-09	7.00E-02	--	1.58E-06	-	0.32%	0.00%
Beryllium	4.00E-01	1820	1	0.001	14	6	1E-06	15	2190	25550	1.86E-09	1.60E-10	5.00E-03	4.30E+00	3.72E-07	6.86E-10	0.08%	10.26%
Cadmium	3.10E+00	1820	1	0.001	14	6	1E-06	15	2190	25550	1.44E-08	1.24E-09	5.00E-04	--	2.89E-05	-	5.89%	0.00%
Chromium	1.01E+01	1820	1	0.001	14	6	1E-06	15	2190	25550	4.70E-08	4.03E-09	5.00E-03	--	9.40E-06	-	1.92%	0.00%
Cobalt	3.40E+00	1820	1	0.001	14	6	1E-06	15	2190	25550	1.58E-08	1.36E-09	6.00E-02	--	2.64E-07	-	0.05%	0.00%
Copper	4.29E+01	1820	1	0.001	14	6	1E-06	15	2190	25550	2.00E-07	1.71E-08	3.71E-02	--	5.38E-06	-	1.10%	0.00%
Iron	1.40E+04	1820	1	0.001	14	6	1E-06	15	2190	25550	6.52E-05	5.58E-06	3.00E-01	--	2.17E-04	-	44.33%	0.00%
Manganese	6.72E+01	1820	1	0.001	14	6	1E-06	15	2190	25550	3.13E-07	2.68E-08	5.00E-03	--	6.25E-05	-	12.77%	0.00%
Nickel	7.60E+00	1820	1	0.001	14	6	1E-06	15	2190	25550	3.54E-08	3.03E-09	2.00E-02	--	1.77E-06	-	0.36%	0.00%
Vanadium	2.32E+01	1820	1	0.001	14	6	1E-06	15	2190	25550	1.08E-07	9.25E-09	7.00E-03	--	1.54E-05	-	3.15%	0.00%
Zinc	2.13E+02	1820	1	0.001	14	6	1E-06	15	2190	25550	9.91E-07	8.50E-08	3.00E-01	--	3.30E-06	-	0.67%	0.00%
TOTAL															4.90E-04	6.69E-09	100.00%	100.00%

SUMMARY OF CHRONIC DAILY INTAKE (CDI) AND POTENTIAL NONCARCINOGENIC
AND CARCINOGENIC RISK FROM INGESTION OF SEDIMENT
SITE 7

FUTURE SCENARIO
SEDIMENT – INGESTION
RESIDENT CHILD

CHEMICAL	CS mg/kg	IR mg/d	FI	EF d/y	ED y	CF kg/mg	BW kg	ATnc d	ATc d	CDInc mg/kg/d	CDIc mg/kg/d	RfD mg/kg/d	CSF (mg/kg/d)-1	HI	CR	% CONTRIB NC RISK	% CONTRIB CARC RISK
Aluminum	6.52E+03	100	1	14	6	1E-06	15	2190	25550	1.67E-03	1.43E-04	2.90E+00	--	5.75E-04	--	2.14%	0.00%
Arsenic	8.60E+00	100	1	14	6	1E-06	15	2190	25550	2.20E-06	1.88E-07	3.00E-04	1.75E+00	7.33E-03	3.30E-07	27.23%	89.74%
Barium	2.38E+01	100	1	14	6	1E-06	15	2190	25550	6.09E-06	5.22E-07	7.00E-02	--	8.69E-05	--	0.32%	0.00%
Beryllium	4.00E-01	100	1	14	6	1E-06	15	2190	25550	1.02E-07	8.77E-09	5.00E-03	4.30E+00	2.05E-05	3.77E-08	0.08%	10.26%
Cadmium	3.10E+00	100	1	14	6	1E-06	15	2190	25550	7.93E-07	6.79E-08	5.00E-04	--	1.59E-03	--	5.89%	0.00%
Chromium	1.01E+01	100	1	14	6	1E-06	15	2190	25550	2.58E-06	2.21E-07	5.00E-03	--	5.17E-04	--	1.92%	0.00%
Cobalt	3.40E+00	100	1	14	6	1E-06	15	2190	25550	8.69E-07	7.45E-08	6.00E-02	--	1.45E-05	--	0.05%	0.00%
Copper	4.29E+01	100	1	14	6	1E-06	15	2190	25550	1.10E-05	9.40E-07	3.71E-02	--	2.96E-04	--	1.10%	0.00%
Iron	1.40E+04	100	1	14	6	1E-06	15	2190	25550	3.58E-03	3.07E-04	3.00E-01	--	1.19E-02	--	44.33%	0.00%
Manganese	6.72E+01	100	1	14	6	1E-06	15	2190	25550	1.72E-05	1.47E-06	5.00E-03	--	3.44E-03	--	12.77%	0.00%
Nickel	7.60E+00	100	1	14	6	1E-06	15	2190	25550	1.94E-06	1.67E-07	2.00E-02	--	9.72E-05	--	0.36%	0.00%
Vanadium	2.32E+01	100	1	14	6	1E-06	15	2190	25550	5.93E-06	5.08E-07	7.00E-03	--	8.47E-04	--	3.15%	0.00%
Zinc	2.13E+02	100	1	14	6	1E-06	15	2190	25550	5.45E-05	4.67E-06	3.00E-01	--	1.82E-04	--	0.67%	0.00%
TOTAL														2.69E-02	3.68E-07	100.00%	100.00%

SUMMARY OF CHRONIC DAILY INTAKE (CDI) AND POTENTIAL NONCARCINOGENIC
AND CARCINOGENIC RISK FROM INGESTION OF SEDIMENT
SITE 7

FUTURE SCENARIO
SEDIMENT – INGESTION
RESIDENT ADULT

CHEMICAL	CS mg/kg	IR mg/d	FI	EF d/y	ED y	CF kg/mg	BW kg	ATnc d	ATc d	CDInc mg/kg/d	CDIc mg/kg/d	RfD mg/kg/d	CSF (mg/kg/d)-1	HI	CR	% CONTRIB NC RISK	% CONTRIB CARC RISK
Aluminum	6.52E+03	50	1	28	30	1E-06	70	10950	25550	3.57E-04	1.53E-04	2.90E+00	--	1.23E-04	--	2.14%	0.00%
Arsenic	8.60E+00	50	1	28	30	1E-06	70	10950	25550	4.71E-07	2.02E-07	3.00E-04	1.75E+00	1.57E-03	3.53E-07	27.23%	89.74%
Barium	2.38E+01	50	1	28	30	1E-06	70	10950	25550	1.30E-06	5.59E-07	7.00E-02	--	1.86E-05	--	0.32%	0.00%
Beryllium	4.00E-01	50	1	28	30	1E-06	70	10950	25550	2.19E-08	9.39E-09	5.00E-03	4.30E+00	4.38E-06	4.04E-08	0.08%	10.26%
Cadmium	3.10E+00	50	1	28	30	1E-06	70	10950	25550	1.70E-07	7.28E-08	5.00E-04	--	3.40E-04	--	5.89%	0.00%
Chromium	1.01E+01	50	1	28	30	1E-06	70	10950	25550	5.53E-07	2.37E-07	5.00E-03	--	1.11E-04	--	1.92%	0.00%
Cobalt	3.40E+00	50	1	28	30	1E-06	70	10950	25550	1.86E-07	7.98E-08	6.00E-02	--	3.11E-06	--	0.05%	0.00%
Copper	4.29E+01	50	1	28	30	1E-06	70	10950	25550	2.35E-06	1.01E-06	3.71E-02	--	6.34E-05	--	1.10%	0.00%
Iron	1.40E+04	50	1	28	30	1E-06	70	10950	25550	7.67E-04	3.29E-04	3.00E-01	--	2.56E-03	--	44.33%	0.00%
Manganese	6.72E+01	50	1	28	30	1E-06	70	10950	25550	3.68E-06	1.58E-06	5.00E-03	--	7.36E-04	--	12.77%	0.00%
Nickel	7.60E+00	50	1	28	30	1E-06	70	10950	25550	4.16E-07	1.78E-07	2.00E-02	--	2.08E-05	--	0.36%	0.00%
Vanadium	2.32E+01	50	1	28	30	1E-06	70	10950	25550	1.27E-06	5.45E-07	7.00E-03	--	1.82E-04	--	3.15%	0.00%
Zinc	2.13E+02	50	1	28	30	1E-06	70	10950	25550	1.17E-05	5.00E-06	3.00E-01	--	3.89E-05	--	0.67%	0.00%
TOTAL														5.77E-03	3.94E-07	100.00%	100.00%

CONSTITUENTS DETECTED IN SURFACE WATER SAMPLES
SITE 7
AVAILABLE FOR FISH CONSUMPTION
NAVAL AMPHIBIOUS BASE – LITTLE CREEK
VIRGINIA BEACH, VIRGINIA

Constituent	Frequency of Detection	Range of Detected Concentrations (ug/l)			Federal MCL (ug/l) [a]	Tap Water (ug/l) [b]	Health Advisory (ug/l) [c]	Virginia Water Stds. (ug/l) [d]	Potential Concern
VOLATILES									
Acetone	3 / 6	15.0	–	31.0		370			NO
INORGANICS									
Aluminum	5 / 6	388 j	–	1690.0 j		11000			YES
Arsenic	5 / 6	2.4 b	–	10.3	0.018	0.038	50	50	YES
Barium [e]	6 / 6	17.5 b	–	36.8 b		260	2000	2000	YES
Calcium	6 / 6	22300	–	1.8E+05					NO
Cobalt [e]	4 / 6	3.4 b	–	5.6 b		220			YES
Copper [e]	4 / 6	5.3 b	–	14.1 b		140	1300	1300	YES
Iron	6 / 6	1010 j	–	6890.0 j				300	YES
Lead	3 / 6	3.2 j	–	50.0 j				15	YES *
Magnesium	6 / 6	28000	–	4.6E+05					NO
Manganese	6 / 6	83.9	–	334.0		18		50	YES
Potassium	6 / 6	8800 j	–	1.8E+05 j					NO
Sodium	6 / 6	184000	–	4.3E+06					NO
Zinc	3 / 6	30.8	–	70.5			1100	5000	YES
ANIONS									
Alkalinity	6 / 6	78500.0	–	1.3E+05					YES
Bicarbonate alkalinity	6 / 6	78500.0	–	1.3E+05					YES
Chloride	6 / 6	7.0E+05	–	2.1E+07				250000	YES
Sulfate	6 / 6	1.2E+05	–	1.4E+06				250000	YES

Notes:

a. Federal MCL concentration values represent USFederal Maximum Contaminant Level for potable water supplies.

b. Tap Water Concentration values obtained from July 11, 1994 USEPA Region III Risk–Based Concentration Table except for aluminum which is obtained from the January 7, 1994 RBC table.

c. Health Advisory Concentration values obtained from December 1993 USEPA Office of Water publication "Drinking Water Regulations and Health Advisories."

d. Virginia Water Standards for public water supplies.

* Health risk analysis to be performed will use the Integrated Exposure Uptake Biokinetic (IEUBK) Model.

e. Constituent concentration is five times greater than the maximum detected in blank (b).

CONSTITUENTS CONCENTRATION IN FISH
SITE 7
NAVAL AMPHIBIOUS BASE – LITTLE CREEK
VIRGINIA BEACH, VIRGINIA

Constituent	Maximum Detected Concentrations (ug/l)	Maximum Detected Concentrations (mg/l)	Bioconcentration Factor* (l/kg)	Fish Concentration (mg/kg)	Fish Criteria (mg/kg) **	Potential Concern
INORGANICS						
Aluminum	1690 j	1.69E+00 j	--	--	--	YES ***
Arsenic	10.3	1.03E-02	44	4.53E-01	1.80E-03	YES
Barium	36.8 b	3.68E-02 b	--	--	9.50E+00	YES ***
Cobalt	5.6 b	5.60E-03 b	--	--	8.10E+00	YES ***
Copper	14.1 b	1.41E-02 b	200	2.82E+00 b	5.00E+00	NO
Iron	6890 j	6.89E+00 j	--	--	--	YES ***
Lead	50.0 j	5.00E-02 j	49	2.45E+00 j	--	YES ****
Manganese	334.0	3.34E-01	--	--	6.80E-01	YES ***
Zinc	70.5	7.05E-02	47	3.31E+00	4.10E+01	NO

* Source: USEPA Superfund Public Health Evaluation Manual, EPA/540/1-86/060, October 1986

** Fish Concentration values obtained from July 11, 1994 USEPA Region III Risk-Based Concentration Table.

*** Not evaluated due to unavailable bioconcentration factor for fish.

**** Health risk analysis to be performed will use the Integrated Exposure Uptake Biokinetic (IEUBK) Model.

SUMMARY OF CHRONIC DAILY INTAKE (CDI) AND POTENTIAL NONCARCINOGENIC
AND CARCINOGENIC RISK FROM INGESTION OF FISH
SITE 7

FUTURE SCENARIO
FISH – INGESTION
RESIDENT CHILD

CHEMICAL	FC mg/kg	IR g/d	FI	EF d/y	ED y	CF kg/g	BW kg	ATnc d	ATc d	CDInc mg/kg/d	CDIc mg/kg/d	RfD mg/kg/d	CSF (mg/kg/d)-1	HI	CR	% CONTRIB NC RISK	% CONTRIB CARC RISK
Arsenic	4.53E-01	6.5	1	350	6	1E-03	15	2190	25550	1.88E-04	1.61E-05	3.00E-04	1.75E+00	6.27E-01	2.82E-05	100.00%	100.00%
TOTAL														6.27E-01	2.82E-05	100.00%	100.00%

FUTURE SCENARIO
FISH – INGESTION
RESIDENT ADULT

CHEMICAL	FC mg/kg	IR g/d	FI	EF d/y	ED y	CF kg/g	BW kg	ATnc d	ATc d	CDInc mg/kg/d	CDIc mg/kg/d	RfD mg/kg/d	CSF (mg/kg/d)-1	HI	CR	% CONTRIB NC RISK	% CONTRIB CARC RISK
Arsenic	4.53E-01	6.5	1	350	30	1E-03	70	10950	25550	4.03E-05	1.73E-05	3.00E-04	1.75E+00	1.34E-01	3.03E-05	100.00%	100.00%
TOTAL														1.34E-01	3.03E-05	100.00%	100.00%

SUMMARY OF CHRONIC DAILY INTAKE (CDI) AND POTENTIAL NONCARCINOGENIC
AND CARCINOGENIC RISK FROM INGESTION OF FISH
SITE 7

CURRENT SCENARIO
FISH – INGESTION
RECREATIONAL CHILD

CHEMICAL	FC mg/kg	IR g/d	FI	EF d/y	ED y	CF kg/g	BW kg	ATnc d	ATc d	CDInc mg/kg/d	CDIc mg/kg/d	RfD mg/kg/d	CSF (mg/kg/d)-1	HI	CR	% CONTRIB NC RISK	% CONTRIB CARC RISK
Arsenic	4.53E-01	6.5	1	14	9	1E-03	36	2190	25550	4.71E-06	4.03E-07	3.00E-04	1.75E+00	1.57E-02	7.06E-07	100.00%	100.00%
TOTAL														1.57E-02	7.06E-07	100.00%	100.00%

CURRENT SCENARIO
FISH – INGESTION
RECREATIONAL ADULT

CHEMICAL	FC mg/kg	IR g/d	FI	EF d/y	ED y	CF kg/g	BW kg	ATnc d	ATc d	CDInc mg/kg/d	CDIc mg/kg/d	RfD mg/kg/d	CSF (mg/kg/d)-1	HI	CR	% CONTRIB NC RISK	% CONTRIB CARC RISK
Arsenic	4.53E-01	6.5	1	28	30	1E-03	70	10950	25550	3.23E-06	1.38E-06	3.00E-04	1.75E+00	1.08E-02	2.42E-06	100.00%	100.00%
TOTAL														1.08E-02	2.42E-06	100.00%	100.00%

SUMMARY OF CHRONIC DAILY INTAKE (CDI) AND POTENTIAL NONCARCINOGENIC
AND CARCINOGENIC RISK FROM INGESTION OF FISH
SITE 7

CURRENT SCENARIO
FISH – INGESTION
TRESPASSER CHILD

CHEMICAL	FC mg/kg	IR g/d	FI	EF d/y	ED y	CF kg/g	BW kg	ATnc d	ATc d	CDInc mg/kg/d	CDIc mg/kg/d	RfD mg/kg/d	CSF (mg/kg/d)-1	HI	CR	% CONTRIB NC RISK	% CONTRIB CARC RISK
Arsenic	4.53E-01	6.5	1	350	6	1E-03	15	2190	25550	1.88E-04	1.61E-05	3.00E-04	1.75E+00	6.27E-01	2.82E-05	100.00%	100.00%
TOTAL														6.27E-01	2.82E-05	100.00%	100.00%

CURRENT SCENARIO
FISH – INGESTION
TRESPASSER ADULT

CHEMICAL	FC mg/kg	IR g/d	FI	EF d/y	ED y	CF kg/g	BW kg	ATnc d	ATc d	CDInc mg/kg/d	CDIc mg/kg/d	RfD mg/kg/d	CSF (mg/kg/d)-1	HI	CR	% CONTRIB NC RISK	% CONTRIB CARC RISK
Arsenic	4.53E-01	6.5	1	350	30	1E-03	70	10950	25550	4.03E-05	1.73E-05	3.00E-04	1.75E+00	1.34E-01	3.03E-05	100.00%	100.00%
TOTAL														1.34E-01	3.03E-05	100.00%	100.00%

SUMMARY OF CHRONIC DAILY INTAKE (CDI) AND POTENTIAL NONCARCINOGENIC
AND CARCINOGENIC RISK FROM INGESTION OF FISH
SITE 7

FUTURE SCENARIO
FISH – INGESTION
RECREATIONAL CHILD

CHEMICAL	FC mg/kg	IR g/d	FI	EF d/y	ED y	CF kg/g	BW kg	ATnc d	ATc d	CDInc mg/kg/d	CDIc mg/kg/d	RfD mg/kg/d	CSF (mg/kg/d)-1	HI	CR	% CONTRIB NC RISK	% CONTRIB CARC RISK
Arsenic	4.53E-01	6.5	1	14	9	1E-03	36	2190	25550	4.71E-06	4.03E-07	3.00E-04	1.75E+00	1.57E-02	7.06E-07	100.00%	100.00%
TOTAL														1.57E-02	7.06E-07	100.00%	100.00%

FUTURE SCENARIO
FISH – INGESTION
RECREATIONAL ADULT

CHEMICAL	FC mg/kg	IR g/d	FI	EF d/y	ED y	CF kg/g	BW kg	ATnc d	ATc d	CDInc mg/kg/d	CDIc mg/kg/d	RfD mg/kg/d	CSF (mg/kg/d)-1	HI	CR	% CONTRIB NC RISK	% CONTRIB CARC RISK
Arsenic	4.53E-01	6.5	1	28	30	1E-03	70	10950	25550	3.23E-06	1.38E-06	3.00E-04	1.75E+00	1.08E-02	2.42E-06	100.00%	100.00%
TOTAL														1.08E-02	2.42E-06	100.00%	100.00%

IEUBK MODEL OPTIONS
SITE - 7

Parameter	Default Option	User Defined Option
Air		
Outdoor air lead concentration ($\mu g/m^3$)	0.10	0.00
Ratio of indoor to outdoor air lead concentration (%)	30	00
Time outdoors (hours/day)		
Age =		
0-1 year (0-11 mo)	1	1
1-2 years (12-23 mo)	2	2
2-3 years (24-35 mo)	3	3
3-7 years (36-83 mo)	4	4
Ventilation rate (m^2/day)		
Age =		
0-1 year (0-11 mo)	2	2
1-2 years (12-23 mo)	3	3
2-3 years (24-35 mo)	5	5
3-4 years (36-47 mo)	5	5
4-5 years (48-59 mo)	5	5
5-6 years (60-71 mo)	7	7
6-7 years (72-84 mo)	7	7
Lung absorption (%)	32	00
Dietary lead intake ($\mu g/m^3$)		
Age =		
0-1 year (0-11 mo)	5.53	0.00
1-2 years (12-23 mo)	5.78	0.00
2-3 years (24-35 mo)	6.49	0.00
3-4 years (36-47 mo)	6.24	0.00
4-5 years (48-59 mo)	6.01	0.00
5-6 years (60-71 mo)	6.34	0.00
6-7 years (72-84 mo)	7.00	0.00
Alternate Diet Sources		
Concentration (μg Pb/g)		
home-grown fruits	0	0.000
home-grown vegetables	0	0.000
fish from fishing	0	0.950
game from hunting	0	0.000
Percent of food class (%)		
home-grown fruits	0	0
home-grown vegetables	0	0
fish from fishing	0	100
game from hunting	0	0

IEUBK MODEL OPTIONS

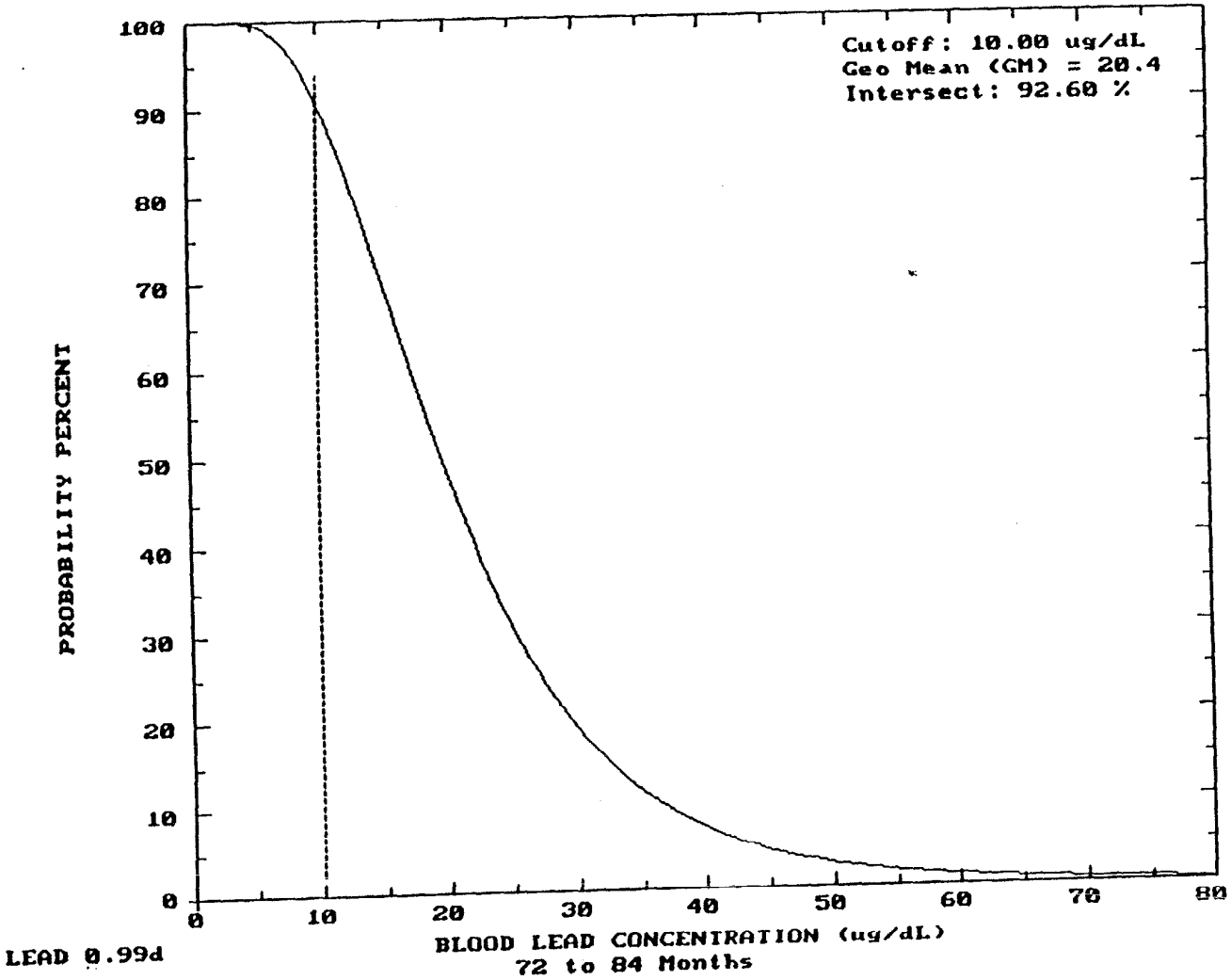
SITE - 7 (Continued)

Parameter	Default Option	User Defined Option
Bioavailability For All Gut Absorption Pathways		
Total lead Absorption (at low intake)		
diet	50	50
drinking water	50	50
soil	30	30
dust	30	30
alternate source	0	0
Fraction of lead absorbed at high intake		
diet	0.2	0.2
drinking water	0.2	0.2
soil	0.2	0.2
dust	0.2	0.2
alternate source	0.2	0.2
Maternal-to-Newborn Lead Exposure		
Mother's blood lead level at time of birth	2.5	2.5
Geometric standard deviation for blood lead (GSD)	1.6	1.6
Blood lead level of concern	10	10

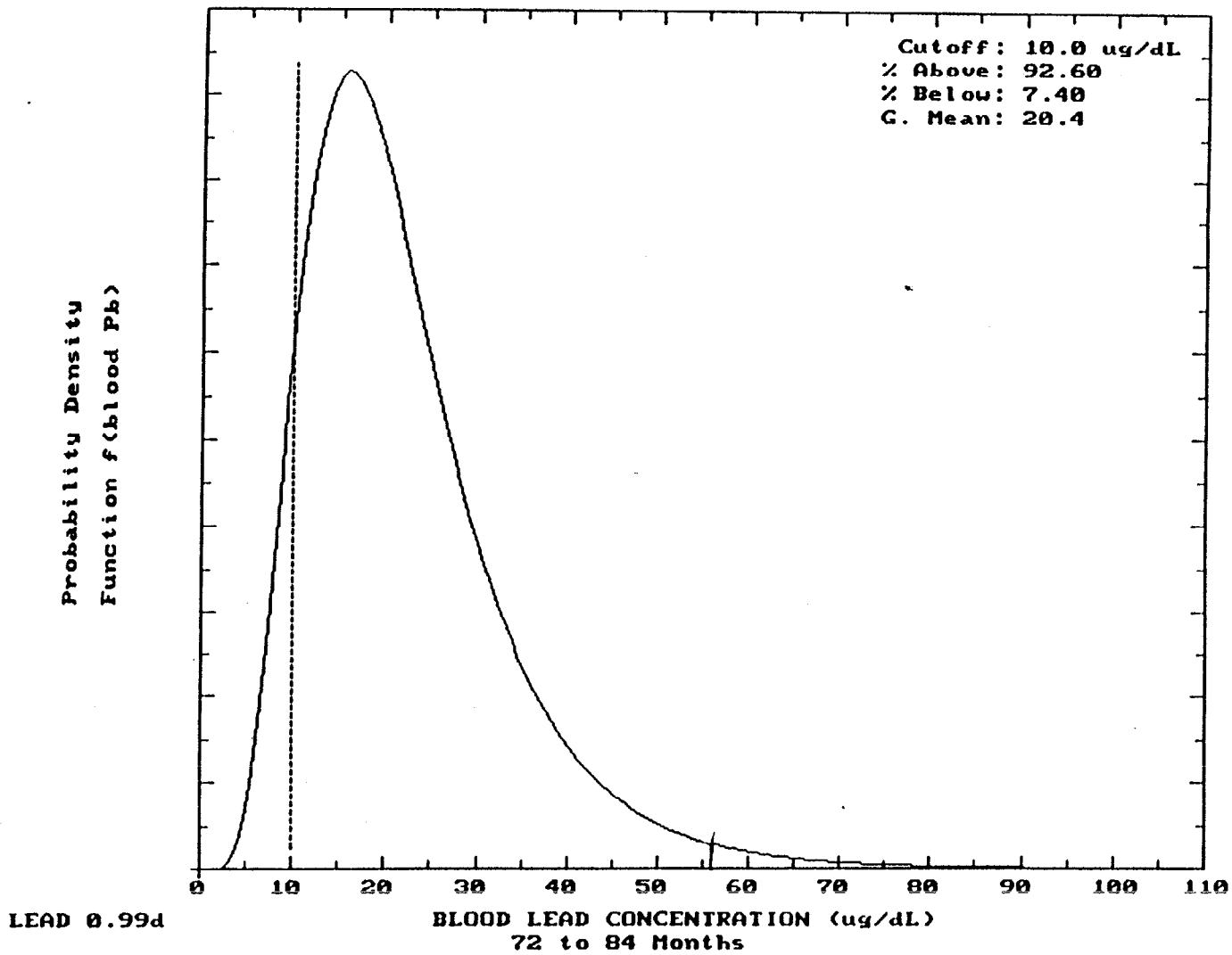
IEUBK MODEL OPTIONS

SITE - 7 (Continued)

Parameter	Default Option	User Defined Option
Drinking Water		
Lead concentration in drinking water (μg/L)	4	45.50
Ingestion rate (liters/day)		
Age =		
0-1 year (0-11 mo)	0.20	2
1-2 years (12-23 mo)	0.50	2
2-3 years (24-35 mo)	0.52	2
3-4 years (36-47 mo)	0.53	2
4-5 years (48-59 mo)	0.55	2
5-6 years (60-71 mo)	0.58	2
6-7 years (72-84 mo)	0.59	2
Soil/Dust		
Concentration		
Soil	200	104.1
Dust	200	104.1
Soil ingestion as percent of total soil and dust ingestion	45	45
Soil/Dust lead concentration (μg/g)		
Age =		
0-1 year (0-11 mo)	0.085	0.085
1-2 years (12-23 mo)	0.135	0.135
2-3 years (24-35 mo)	0.135	0.135
3-4 years (36-47 mo)	0.135	0.135
4-5 years (48-59 mo)	0.100	0.100
5-6 years (60-71 mo)	0.090	0.090
6-7 years (72-84 mo)	0.085	0.085
Dust lead concentration (μg/g)		
Age =	0.0	0.0
1-2 years (12-23 mo)	0.0	0.0
2-3 years (24-35 mo)	0.0	0.0
3-4 years (36-47 mo)	0.0	0.0
4-5 years (48-59 mo)	0.0	0.0
5-6 years (60-71 mo)	0.0	0.0
6-7 years (72-84 mo)	0.0	0.0



Site 7
Figure N-1



Site 7
Figure N-2

Appendix B
Round 5 Long-Term Monitoring Letter Report

CH2M HILL
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Virginia Beach, VA
23455
Tel 757.460.0429
Fax 757.460.4592

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June 29, 2001

01-KML-309

Commander
LANTNAVFACENGCOM
Attention: Code EV22DH, Ms. Dawn Hayes
Lafayette River Annex, Building A
6505 Hampton Boulevard
Norfolk, VA 23508-1211

Subject: NAB-Little Creek, Site 7 Round 5 Long Term Monitoring Letter Report
Contract No. N62470-95-D-6007
Navy CLEAN II Program
Contract Task Order 0148

Dear Ms. Hayes:

This long-term-monitoring letter report documents activities and results of the fifth round of post-remedial-action groundwater, surface water, and sediment sampling at Site 7 (The Amphibious Base Landfill), Naval Amphibious Base (NAB) Little Creek, Virginia Beach, Virginia. The base location map is provided as Figure 1. The location of Site 7 is shown in Figure 2. CH2M HILL conducted this round of sampling on February 26-28, and March 1, 2, and 8 of 2001.

In addition, the sampling program was modified to include a one time event to collect samples to fill data gaps for ecological risk assessment and the revised human health risk assessment. The additional sampling consisted of three co-located surface and subsurface soil samples. All sample locations are shown in Figure 3.

All sampling activities were performed in accordance with the *Revised Project Plans for the Long-Term Monitoring Program at Site 7 (Rounds 5 through 10), NAB Little Creek, Virginia Beach, Virginia* (CH2M HILL, February 2001).

Groundwater Monitoring Activities

The groundwater monitoring wells were gauged on February 26, 2001 to determine static water levels. Table 1 shows the water level elevations calculated from the recorded depth to water measurements. Figure 4 shows the estimated piezometric surface of Site 7.

The fifth round of groundwater sampling took place on February 26 and 27, 2001. Groundwater samples were collected from six existing monitoring wells at Site 7: LS07-MW01, LS07-MW03, LS07-MW06, LS07-MW07, LS07-MW08, and LS07-MW09 (See Figure 3). All samples were collected from wells that have been previously developed, thus not requiring redevelopment prior to

sampling. All groundwater samples were collected with a peristaltic pump using a low-flow purge rate.

Low flow purging involves removing groundwater from the well at a rate (< 1000 mL per minute) such that the water level in the well does not decrease significantly, assuring that groundwater, rather than standing column water, is collected. The purge continues until water quality parameters stabilize within 10 percent after three consecutive readings. The water quality parameters were measured with a Horiba U-22 Water Quality Meter, and included pH, dissolved oxygen, specific conductance, and temperature. Daily calibrations of the Horiba U-22 were performed to ensure accurate measurements. The dissolved oxygen measurements appear anomalous. Table 2 includes the final stabilized field parameters reached prior to sample collection for each monitoring well.

TABLE 1
WATER LEVEL MEASUREMENTS
SEMIANNUAL MONITORING ROUND 5
FEBRUARY 26, 2001
SITE 7
NAB LITTLE CREEK

Monitoring Well	Measuring Point Elevation (ft above msl)	Depth to Water (ft below measuring point)	Water Level Elevation (ft above msl)
LS07-MW01	8.38	5.52	2.86
LS07-MW03	12.19	7.44	4.75
LS07-MW06	9.25	7.26	1.99
LS07-MW07	4.72	2.75	1.97
LS07-MW08	4.94	2.88	2.06
LS07-MW09	5.55	3.56	1.99

All groundwater samples from Site 7 were analyzed for TCL organics (volatiles, semivolatiles, pesticides, and PCBs), total TAL metals, dissolved TAL metals, and cyanide.

All groundwater samples were placed in containers and preserved according to the protocol established in the Revised Project Plans as presented in Table 3.

Purged groundwater and decontamination water generated from the sampling activities were contained in a properly labeled 55-gallon drum. The investigation derived waste (IDW) was characterized and disposed of by C&M Industries, Inc.

TABLE 2
STABILIZED GROUNDWATER FIELD PARAMETERS
SEMIANNUAL MONITORING ROUND 5
SITE 7
NAB LITTLE CREEK

Monitoring Well	pH (pH units)	Specific Conductance (umho/cm)	Dissolved Oxygen (mg/L)	Temperature (Degrees Celsius)
LS07-MW01	6.95	3.16	0.0	11.0
LS07-MW03	5.40	0.222	0.0	15.3
LS07-MW06	6.67	3.28	0.0	13.4
LS07-MW07	7.52	27.8	0.0	8.89
LS07-MW08	2.28	28.4	0.0	9.02
LS07-MW09	7.08	33.2	2.28	9.40

TABLE 3
REQUIRED CONTAINERS, PRESERVATIVES, AND HOLDING TIMES FOR WATER SAMPLES
SEMIANNUAL MONITORING ROUND 5
SITE 7
NAB LITTLE CREEK

Analysis	Sample Container	Preservative	Holding Time	Volume of Sample Collected
TCL Volatiles	Three 40-ml glass vial w/teflon lined cap	HCl to pH <2; Cool to 4°C	14 days	Fill completely; no air bubbles
TCL Semivolatiles	Two 1-liter amber glass bottles	Cool to 4°C	7 days to extraction; 40 days to analysis	Fill to shoulder
TCL Pesticides/PCBs	Two 1-liter amber glass bottles	Cool to 4°C	7 days to extraction; 40 days to analysis	Fill to shoulder
TAL Metals (total or dissolved)	1-liter polyethylene bottle	HNO_3 to pH <2; Cool to 4°C	6 months	Fill to shoulder
TAL Cyanide	1-liter bottle	NaOH to pH > 12; Cool to 4°C	14 days	Fill to shoulder
Hardness (surface water only)	250 ml bottle, plastic or glass	HNO_3 to pH <2; Cool to 4°C	6 months	Fill to shoulder

Surface Water and Sediment Sampling Activities

The fifth round of surface water and sediment sampling was conducted on February 28 and March 1, 2, and 8, 2001. The following surface water samples were collected from the seven locations previously sampled at Site 7: LS07-SW201, LS07-SW202, LS07-SW203, LS07-SW204, LS07-SW205, LS07-SW206, and LS07-SW207 (See Figure 3). Also, these sediment samples were collected at the same locations as the surface water samples: LS07 SD201, LS07-SD202, LS07-SD203, LS07-SD204, LS07-SD205, LS07-SD206, and LS07-SD207 (See Figure 3).

To better characterize chemical concentrations in the drainage canal, since almost all of the exceedances of ecological sediment and surface water screening values occurred at three existing sampling locations in the canal (LS07-SW/SD202, 203, and 204), the following locations were added as part of the Round 5 monitoring event and future LTM sampling efforts:

- Two locations in a small "pond" just south of the sampling locations LS07-SW/SD206 and LS07-SW/SD207, one in the southwest corner abutting the landfill (LS07-SW/SD209) and the second at the outlet of the pond (LS07-SW/SD208), to evaluate the impacts to this pond.
- One sample near the end of the drainage swale located along the southern edge of the landfill (LS07-SW/SD210).
- Three locations in the drainage canal present along the western site boundary, the first (LS07-SW/SD211) about midway between sampling locations 201 and 202, the second where the drainage swale enters the canal (LS07-SW/SD212), and the third (LS07-SW/SD213) just north of Shore Drive.

Surface water and sediment samples were both analyzed for TCL organics (semivolatiles, pesticides, and PCBs), and for total TAL inorganics (metals and cyanide). Additionally, surface water samples were analyzed for TCL volatiles, dissolved TAL metals, and hardness, and sediment samples were analyzed for total organic carbon (TOC) and grain size distribution. The grain size distributions are included in Appendix D.

All surface water and sediment samples were placed in containers and preserved according to the Revised Project Plans as summarized in Table 3 and 4 respectively.

Surface and Subsurface Soil Sampling Activities

Three additional surface soil samples were obtained on February 28, 2001 to provide additional data for the revised human health risk assessment (HHRA) to be conducted at Site 7. Four of the eight previously obtained sample locations were covered during the 1997 remedial action. Due to the low number of soil (co-located surface and subsurface) samples, and because data from two of these samples indicated exceedances of RBC for PAH and PCBs, these additional samples were collected to fill potential data gaps.

As illustrated on Figure 3, two samples were collected in the "ear" on the west side of the landfill where surface storage activities had traditionally taken place, and one near the former entrance road and weigh station on the east side of the landfill. All soil samples were analyzed for TAL metals and cyanide, TCL SVOCs, and TCL pesticides/PCBs.

All surface and subsurface soil samples were placed in containers and preserved according to the Revised Project Plans as presented in Table 3 and 4 respectively.

TABLE 4
REQUIRED CONTAINERS, PRESERVATIVES, AND HOLDING TIMES FOR SOLID SAMPLES
SEMIANNUAL MONITORING ROUND 5
SITE 7
NAB LITTLE CREEK

Analysis	Sample Container	Preservative	Holding Time	Volume of Sample Collected
TCL Semivolatiles	8-oz glass jar with Teflon-lined cap	Cool to 4°C	14 days to extraction; 40 days to analysis	Fill completely
TAL Pesticides/PCBs	Two 4-oz glass jars with Teflon-lined cap	Cool to 4°C	14 days	Fill completely
TAL Inorganics	4-oz glass jar with Teflon-lined cap	None	6 months; 28 days for mercury	Fill to shoulder
Total Organic Carbon (TOC)	8-oz glass jar with Teflon-lined cap	Cool to 4°C	24 hours	Fill to shoulder

Sampling Results

The laboratory that performed the analyses of the samples collected during Round 5 was selected from the Navy CLEAN II Basic Order Agreement (BOA) list. Appendix A lists the Round 5 analytical parameters. Detected analytical results for the groundwater, surface water, sediment, and surface and subsurface soil samples are presented in Tables 5, 6, 7, and 8 respectively.

Note that if a constituent was not detected in any of the samples, it does not appear in the tables. If a constituent is detected in at least one location for a given media, all the results for that compound are listed in the table. The sample results flagged with a "U" show that the compound was not detected in that sample, and the concentration beside the "U" is the detection limit achieved for the compound in that sample. Complete analytical results with data validation qualifiers for all constituents are found in Appendix B.

Analytical results were validated using EPA Region III Modifications to the National Functional Guidelines. The data validation report summary is in Appendix C.

Groundwater

A summary of constituents detected during the Round 5 sampling activities are presented in Table 5. One volatile organic compound, acetone, was detected at low levels (<10 ug/L) in three samples. Three semivolatile organic compounds: hexachlorobenzene, hexachlorobutadiene, and hexachloroethane were detected in the sample from monitoring well LS07-MW07. Only hexachlorobenzene was found at a concentration above the detection limit. No pesticides or PCBs were detected in the groundwater. Fourteen total metals and fifteen dissolved metals were detected in the six groundwater samples.

Surface Water

Table 6 summarizes the constituents detected in the surface water during the Round 5 monitoring. The volatile organic compounds: acetone and chloroform were detected in two samples at low

concentrations (estimated below detection limits). No semivolatile organic compounds were detected in the surface water. No pesticides or PCBs were detected in the surface water. Nineteen total metals and sixteen dissolved metals were detected in the surface water samples.

Sediment

A summary of constituents detected in the sediment during Round 5 monitoring at Site 7 is presented in Table 7. Semivolatile organic compounds, most notably polynuclear aromatic hydrocarbons (PAHs), were detected in seven of the thirteen sediment samples at estimated concentrations below detection limits. Eight pesticides/PCBs were detected in the thirteen samples analyzed. The majority of the detections were at sample station LS07-SD202, where five of the eight pesticides/PCBs detected were reported. The most notable detection at this sample station was Aroclor-1260, which was detected at a concentration of 260 ug/kg. Endrin and 4,4'-DDT were also detected at levels estimated to be above the detection limit. Additionally, 4,4'-DDD was detected at concentrations above the detection limit in three samples. The remaining pesticide/PCB detections were at or below the detection limit.

Twenty-one metals were detected in the thirteen sediment samples. The sediment samples were also analyzed for Wet Chemistry (percent solids, TOC, and pH), and grain size analysis. The grain size distribution curves are presented in Appendix D.

Surface and Subsurface Soil

Table 8 summarizes the constituents detected in surface and subsurface samples collected at Site 7. Three semivolatile organic compounds were detected in one of the surface soil samples (LS07-SS201). All three detections were polynuclear aromatic hydrocarbons (PAHs) and were found at concentrations significantly below the detection limit. These results were confirmed by a duplicate sample (LS07-SS01P). No other semivolatile organic compounds were detected in any other surface or subsurface sample. Seven pesticides/PCBs were found in two of the subsurface soil samples and one of the surface soil samples. The results of sample location LS07-SS/SB203 identified six of the seven detected pesticides/PCBs. The highest of these detections were Aroclor-1254 and Aroclor-1260, each of which were detected at a concentration of 110 ug/kg. Twenty-two metals were detected among the three surface and three subsurface soil samples.

Summary

The fifth round of long-term-monitoring has been completed at NAB Little Creek, Site 7. This letter report documents the sampling activities and presents the results of the groundwater, surface water, and sediment sampling. In addition, co-located surface and subsurface soil samples were collected (one-time event) to fill data gaps for ecological risk assessment and the revised human health risk assessment.

These data will utilized in the revised Site 7 RI/FS including the revised human health risk assessment and the ecological risk assessment. The next round of Site 7 long term monitoring is scheduled for September 2001. An annual monitoring report will be prepared to present a data evaluation of the Site 7 data generated during 2001.

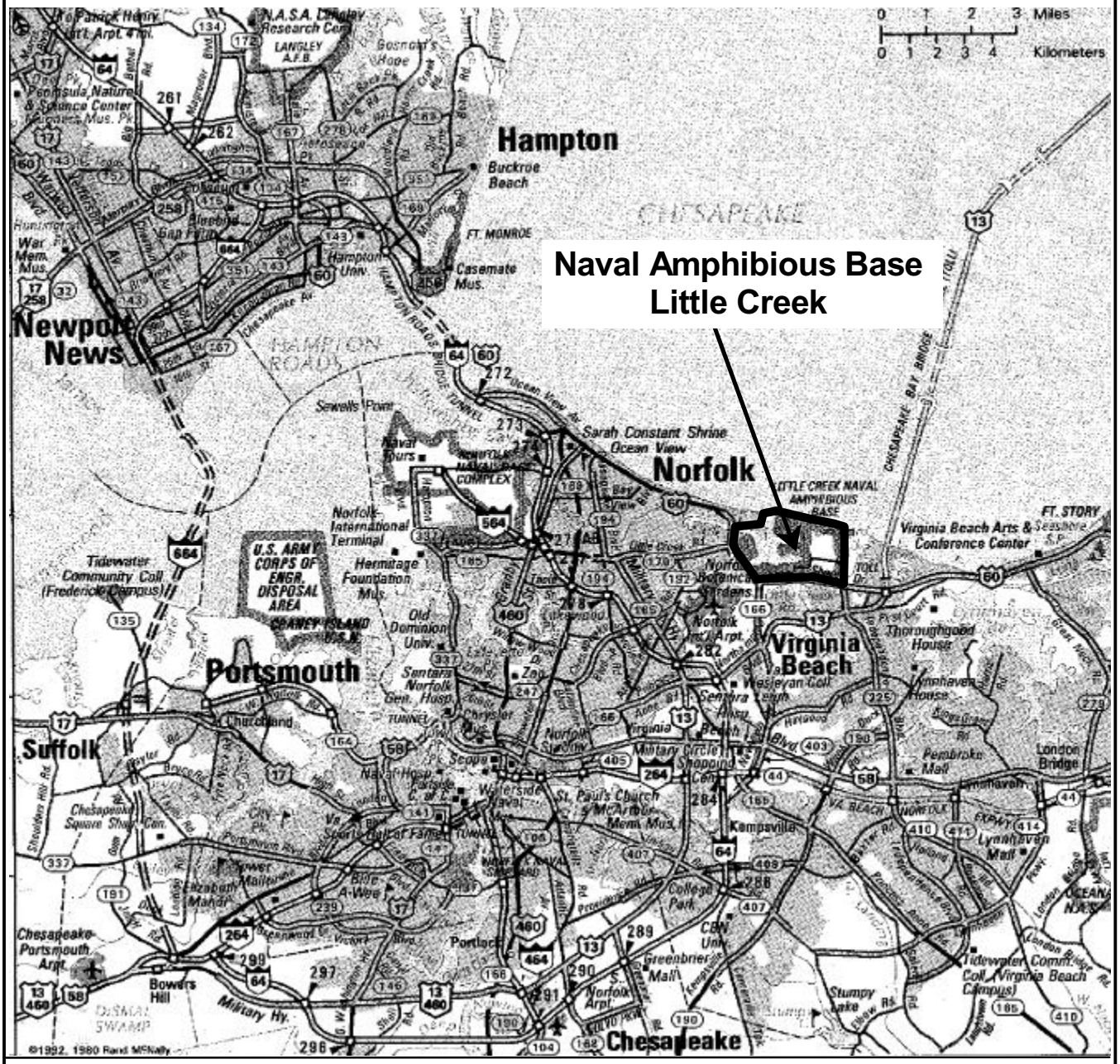
If you have any questions, please do not hesitate to contact me at (757) 460-3734 ext. 17.

Sincerely,

CH2M HILL

Matt Louth
Activity Manager

Cc: Ms. Mary Cooke/ RPM EPA (2 copies)
Mr. Robert Weld/VADEQ (1 copy)
Mr. Randy Sawyer/WNSTN (1 copy)
Ms. Stephanie McManus/ NAB Little Creek (1 copy)
Ms. Donna Caldwell/CH2M HILL/HRO (1 copy)
Ms. Ann West/CH2M HILL/WDC (1 copy)



Source: Rand McNally

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Figure 1
Base Location Map
NAB Little Creek
Virginia Beach, Virginia

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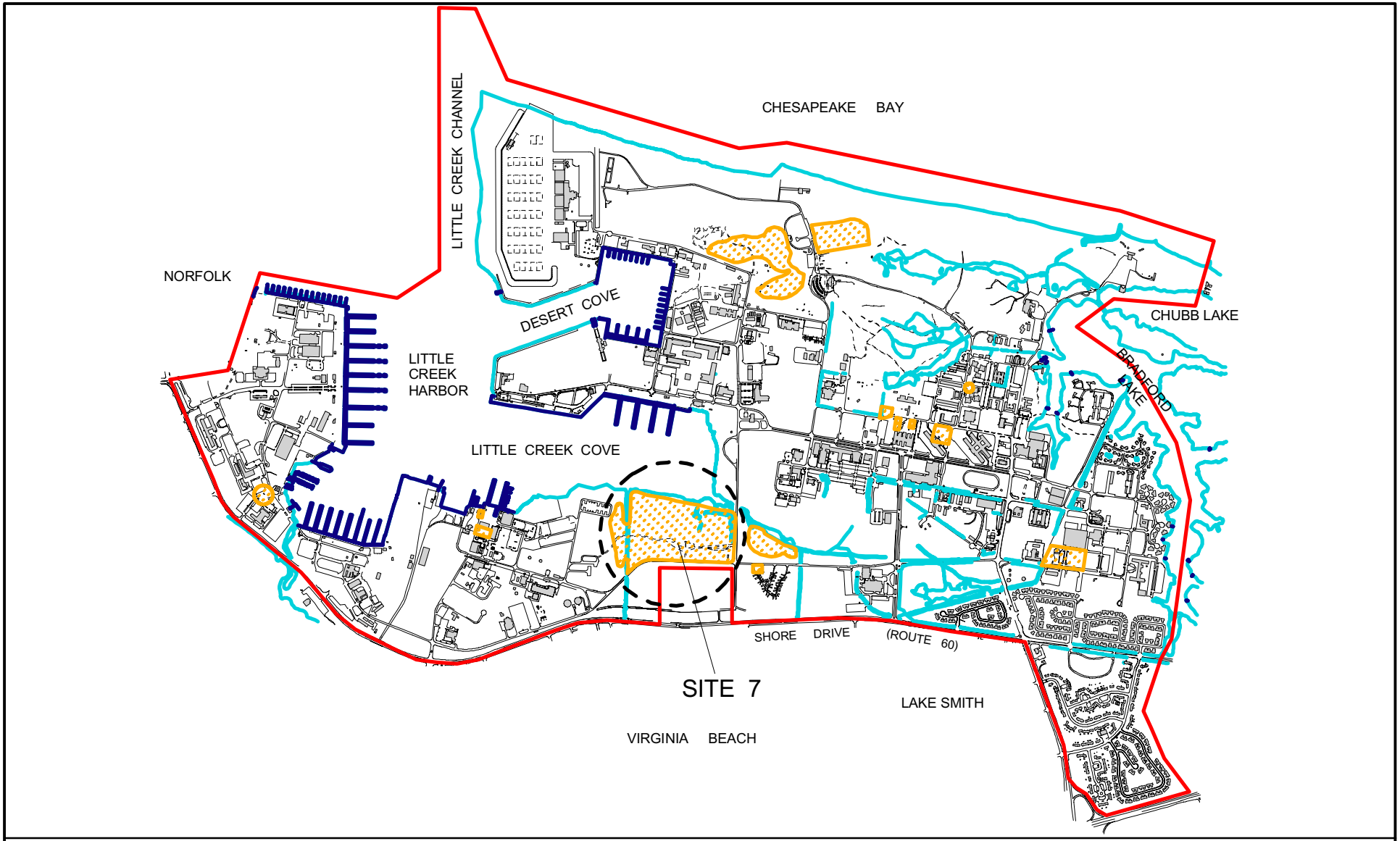

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0 800 1600 Feet

Figure 2
Site 7 Location Map
NAB Little Creek
Virginia Beach, Virginia

CH2MHILL

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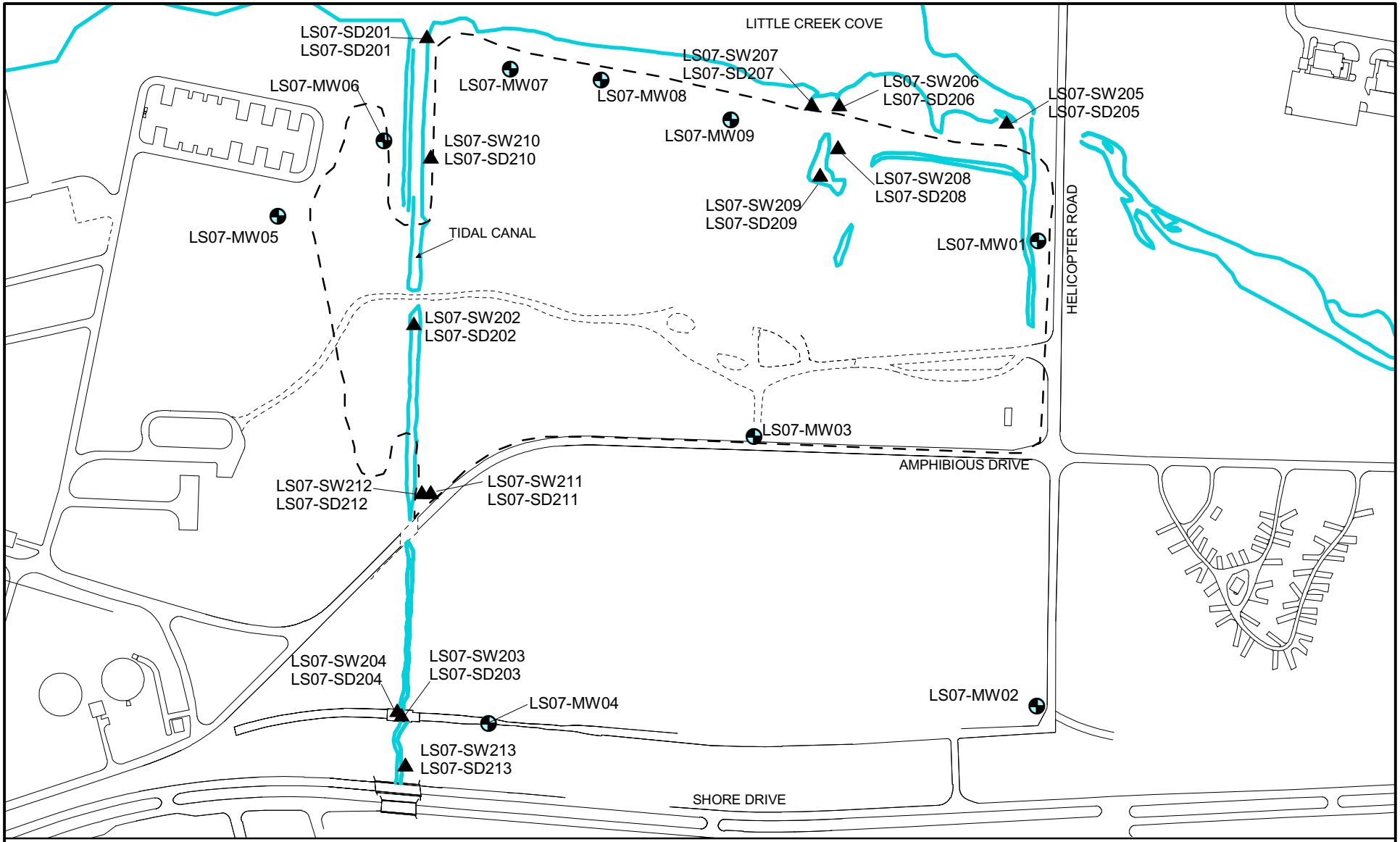

LEGEND

- ▲ Surface Water and Sediment Sampling Location
- ⊕ Groundwater Data Collection Point
- ----- Site Boundary

N

0 200 400 Feet

Figure 3
Site 7 - Media Sampling
Locations For LTM Round 5
Naval Amphibious Base Little Creek
Virginia Beach, Virginia

CH2MHILL

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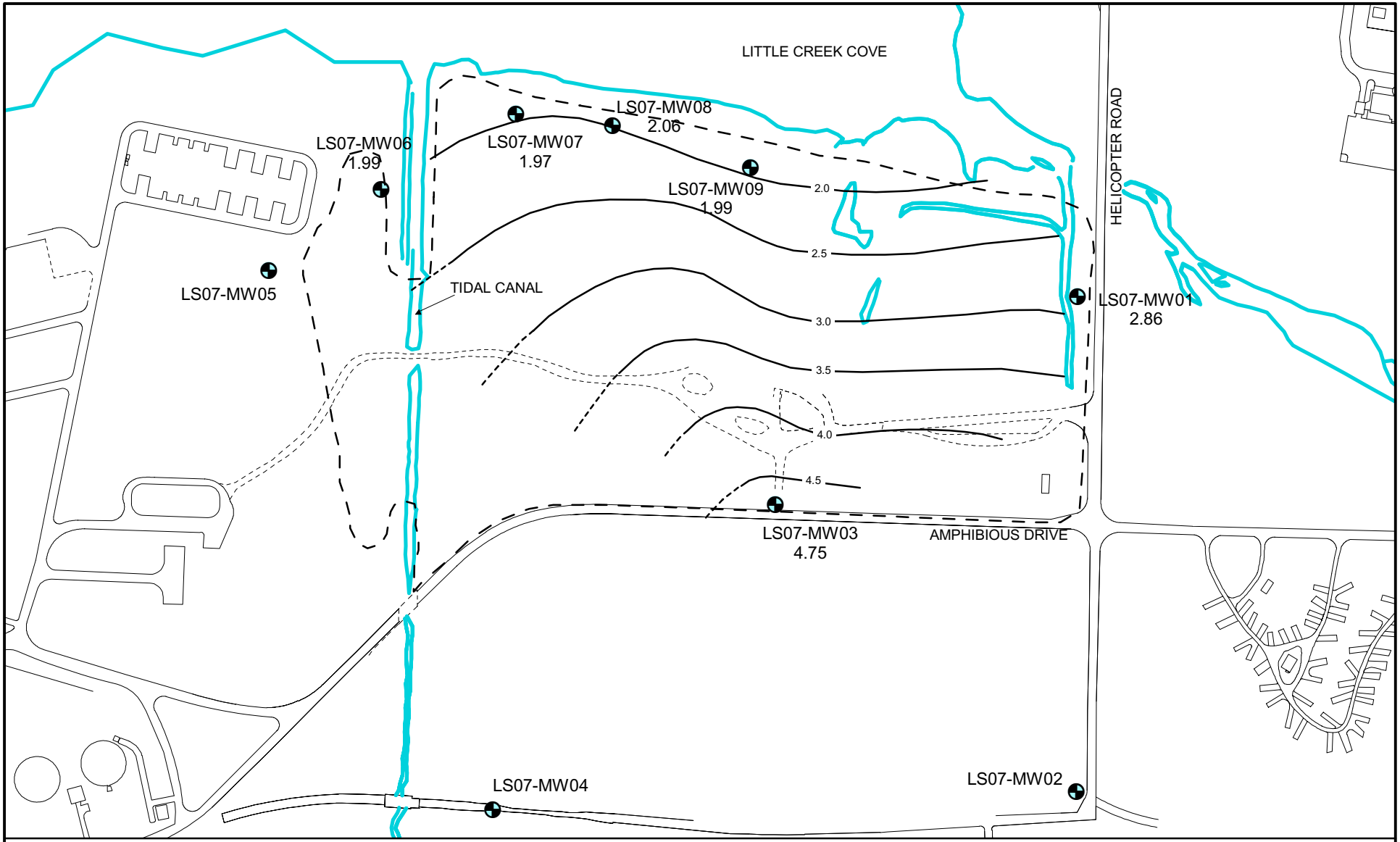

LEGEND

- Site Boundary
- LS07-MW01 (2.95) Groundwater Monitoring Point (Existing Monitoring Well)
- Groundwater Flow Direction
- 1.0 Groundwater Contour (Dashed Where Inferred)

N

0 200 400 Feet

Figure 4
Site 7 - Estimated Piezometric Surface
February 26, 2001
NAB Little Creek
Virginia Beach, Virginia

CH2MHILL

Table 5
NAB Little Creek
Navy CLEAN II CTO-148, Long Term Monitoring Plan
Round 5, Detected Analytical Results for Site 7 Groundwater

Station ID	LS07-MW01		LS07-MW03		LS07-MW06				LS07-MW07		LS07-MW08		LS07-MW09	
Sample ID	LS07-MW01-01A		LS07-MW03-01A		LS07-MW06-01A		LS07-MW06P-01A		LS07-MW07-01A		LS07-MW08-01A		LS07-MW09-01A	
Sample Date	02/26/01		02/26/01		02/26/01		02/26/01		02/27/01		02/27/01		02/27/01	
Chemical Name														
Volatile Organic Compounds (UG/L)														
Acetone	10	U	10	U	6	J	10	U	10	U	7	J	10	J
Semivolatile Organic Compounds (UG/L)														
Hexachlorobenzene	10	UJ	10	UJ	10	UJ	10	UJ	48	L	10	U	10	U
Hexachlorobutadiene	10	UJ	10	UJ	10	UJ	10	UJ	6	L	10	U	10	U
Hexachloroethane	10	UJ	10	UJ	10	UJ	10	UJ	2	L	10	U	10	U
Total Metals (UG/L)														
Arsenic	4.2	U	4.2	U	18.8		17.6		4.2	U	4.2	U	4.2	U
Barium	3.5	J	28.6	J	16	J	16.2	J	53.4	J	34.1	J	71.4	J
Cadmium	0.6	U	0.6	U	0.6	U	0.6	U	0.6	U	0.66	J	0.6	U
Calcium	8,180		25,000		133,000		133,000		296,000		266,000		271,000	
Chromium	0.5	U	23.4		0.5	U	0.5	U	2.4	J	0.78	J	0.5	U
Cobalt	0.7	U	9.2	J	2	J	1.9	J	1.3	J	0.7	U	0.7	U
Iron	3,450	K	8,260	K	11,500	K	11,400	K	88.4	B	30.9	B	39,800	K
Magnesium	14,500		10,600		113,000		113,000		625,000		583,000		777,000	
Manganese	51.8		565		1,410		1,420		189		120		799	
Mercury	0.08	J	0.08	J	0.06	U	0.08	J	0.06	U	0.07	U	0.08	J
Nickel	1.4	J	7.9	J	1.3	U	1.3	U	1.8	J	1.5	J	1.3	U
Potassium	11,600	J	9,040	J	25,600	J	25,600	J	282,000	J	272,000	J	346,000	J
Sodium	138,000		47,700	B	306,000		309,000		4,380,000		4,110,000		5,790,000	
Zinc	19	J	162		12.4	J	31.6	L	1.1	UL	1.1	UL	1.1	UL
Dissolved Metals (UG/L)														
Arsenic	4.2	U	4.2	U	17.3		16.1		4.2	U	4.2	U	4.2	U
Barium	3.4	J	29.3	J	16	J	14	J	54.2	J	37.9	J	69.4	J
Cadmium	0.6	U	0.6	U	0.6	U	0.6	U	0.6	U	0.6	U	0.73	J
Calcium	8,000		27,300		132,000		116,000		298,000		301,000		262,000	
Chromium	0.9	J	0.5	U	0.56	J	0.5	U	1.3	J	1.7	J	0.5	U
Cobalt	0.7	U	9.2	J	1.5	J	1.3	J	0.7	U	0.7	U	0.7	U

NA - Not analyzed
B - Blank contamination
J - Estimated
K - Biased high
L - Biased low

U, UJ, UL - Undetected

Table 5
NAB Little Creek
Navy CLEAN II CTO-148, Long Term Monitoring Plan
Round 5, Detected Analytical Results for Site 7 Groundwater

Station ID	LS07-MW01		LS07-MW03		LS07-MW06		LS07-MW06		LS07-MW07		LS07-MW08		LS07-MW09	
Sample ID	LS07-MW01-01A		LS07-MW03-01A		LS07-MW06-01A		LS07-MW06P-01A		LS07-MW07-01A		LS07-MW08-01A		LS07-MW09-01A	
Sample Date	02/26/01		02/26/01		02/26/01		02/26/01		02/27/01		02/27/01		02/27/01	
Chemical Name														
Copper	11.3	J	5.1	B	1.7	B	5.4	B	1.1	B	2	B	2.3	B
Iron	3,660	L	7,940	L	11,500	L	10,100	L	21.7	B	36.2	B	39,300	L
Magnesium	13,300		11,700		111,000		96,900		633,000		624,000		732,000	
Manganese	53		603		1,400		1,230		197		145		767	
Mercury	0.06	U	0.09	J	0.07	U	0.06	U	0.06	U	0.07	J	0.07	J
Nickel	2.8	J	8	J	2.2	J	2	J	1.3	U	2.3	J	1.7	J
Potassium	11,100	J	9,750	J	24,800	J	20,900	J	282,000	J	298,000	J	329,000	J
Sodium	128,000		57,700		299,000		265,000		4,460,000		4,470,000		5,420,000	
Zinc	182	J	220	J	54.6	J	144	J	2.4	B	57.9	B	33.2	B

NA - Not analyzed
B - Blank contamination
J - Estimated
K - Biased high
L - Biased low

U, UJ, UL - Undetected

Table 6
NAB Little Creek
Navy CLEAN II CTO-148, Long Term Monitoring Plan
Round 5, Detected Analytical Results for Site 7 Surface Water

Station ID	LS07-SW201		LS07-SW202		LS07-SW203				LS07-SW204		LS07-SW205		LS07-SW206		LS07-SW207	
Sample ID	LS07-SW201-01A		LS07-SW202-01A		LS07-SW203-01A		LS07-SW203P-01A		LS07-SW204-01A		LS07-SW205-01A		LS07-SW206-01A		LS07-SW207-01A	
Sample Date	03/01/01		03/02/01		03/01/01		03/01/01		03/02/01		03/01/01		03/02/01		03/02/01	
Chemical Name																
Volatile Organic Compounds (UG/L)																
Acetone	10	U	10	U	10	U	10	U	5	J	10	U	10	U	10	U
Chloroform	10	U	10	U	10	U	10	U	5	J	10	U	10	U	10	U
Total Metals (UG/L)																
Aluminum	15.1	U	243	B	47.4	B	83.4	B	395		112	B	30.5	B	17.8	B
Arsenic	4.2	U	4.2	U	7.2	J	7.7	J	6.6	J	4.2	U	4.2	U	4.2	U
Barium	15.7	J	15.4	J	20.3	J	21.6	J	72.4	J	14.9	J	14.3	J	10.2	J
Beryllium	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U
Cadmium	0.6	U	0.63	J	0.6	U	0.6	U	0.6	U	0.6	U	0.6	U	0.67	J
Calcium	234,000		160,000		28,400		30,200		73,800		186,000		229,000		165,000	
Chromium	1.6	J	2.8	J	0.87	J	1.8	J	5.9	J	1.8	J	1.3	J	1.5	J
Cobalt	1.1	J	0.7	J	2.3	J	2.5	J	4.2	J	1.1	J	0.7	U	1.1	J
Cyanide	0.65	UL	0.65	UL	0.65	UL	0.65	UL	6	L	0.65	UL	0.65	UL	0.65	UL
Iron	267	B	574		2,960		3,000		5,350		590		190	B	134	B
Lead	1.7	UL	1.7	UL	1.7	UL	3.5	L	2.4	J	1.7	UL	1.7	UL	1.7	UL
Magnesium	757,000		507,000		35,700		38,300		119,000		594,000		726,000		537,000	
Manganese	0.1	U	39.8		329		350		164		21		0.1	U	0.1	U
Mercury	6.9	L	0.07	B	0.08	R	0.07	R	0.08	R	0.07	R	0.07	R	0.07	R
Nickel	1.9	J	2.1	J	1.3	U	1.7	J	5	J	2.2	J	1.3	U	1.6	J
Potassium	384,000		269,000		15,500		16,900		60,200		315,000		378,000		284,000	
Sodium	5,640,000		3,730,000		251,000		268,000		1,100,000		4,390,000		5,550,000		3,970,000	
Vanadium	0.7	U	0.7	U	1.1	J	1.1	J	4.3	J	0.7	U	0.7	U	0.7	U
Zinc	1.1	UL	22.3	B	62		48.1		280		9.3	B	1.1	UL	2.5	B
Dissolved Metals (UG/L)																
Arsenic	4.2	U	4.2	U	6.7	J	5.7	J	4.2	U	4.2	U	4.2	U	4.2	U
Barium	16.8	J	20.7	J	21.3	J	17.8	J	64.4	J	15.4	J	14.2	J	14.7	J
Calcium	249,000		229,000		30,400		24,900		70,400		197,000		227,000		246,000	
Chromium	0.75	J	0.87	J	0.5	U	17.1		0.51	J	0.67	J	0.9	J	0.82	J
Cobalt	1.2	J	0.7	U	2.1	J	1.7	J	5.7	J	0.7	U	0.7	U	0.7	U
Copper	2.8	B	1.2	B	2.2	B	3.7	B	2.6	B	1.9	B	2.6	B	2	B
Iron	128	B	85.3	B	2,440	K	2,080	K	669	K	21	B	66.7	B	61.2	B
Lead	1.7	UL	1.7	UL	3.5	L	1.7	UL	1.7	UL	1.7	UL	1.7	UL	1.7	UL

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Table 6
NAB Little Creek
Navy CLEAN II CTO-148, Long Term Monitoring Plan
Round 5, Detected Analytical Results for Site 7 Surface Water

Station ID	LS07-SW201		LS07-SW202		LS07-SW203		LS07-SW203		LS07-SW204		LS07-SW205		LS07-SW206		LS07-SW207	
Sample ID	LS07-SW201-01A		LS07-SW202-01A		LS07-SW203-01A		LS07-SW203P-01A		LS07-SW204-01A		LS07-SW205-01A		LS07-SW206-01A		LS07-SW207-01A	
Sample Date	03/01/01		03/02/01		03/01/01		03/01/01		03/02/01		03/01/01		03/02/01		03/02/01	
Chemical Name																
Magnesium	793,000		715,000		38,400		31,500		63,900		629,000		724,000		781,000	
Manganese	0.1	U	43.1		349		289		80.3		15.5		0.1	U	0.1	U
Mercury	0.07	U	0.07	U	0.07	U	0.08	U	0.08	J	0.08	U	0.07	U	0.07	U
Nickel	2.4	J	2.2	J	1.8	J	10.3	J	6.7	J	1.8	J	3	J	1.5	J
Potassium	335,000		372,000		16,600		13,000		33,300		328,000		371,000		395,000	
Silver	1.1	B	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
Sodium	5,940,000	K	5,450,000	K	259,000	K	214,000	K	850,000	K	4,620,000	K	5,470,000	K	5,950,000	K
Vanadium	0.7	U	0.7	U	0.7	U	0.83	J	3.9	J	0.7	U	0.7	U	0.7	U
Zinc	14.8	B	24.2	J	62.4	J	78.7	J	397	J	1.1	U	41.2	J	1.1	U

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Table 6
NAB Little Creek
Navy CLEAN II CTO-148, Long Term Monitoring Plan
Round 5, Detected Analytical Results for Site 7 Surface Water

Station ID	LS07-SW208		LS07-SW209		LS07-SW210		LS07-SW211		LS07-SW212		LS07-SW213			
Sample ID	LS07-SW208-01A		LS07-SW209-01A		LS07-SW210-01A		LS07-SW211-01A		LS07-SW212-01A		LS07-SW213-01A		LS07-SW213P-01A	
Sample Date	03/08/01		03/08/01		03/02/01		03/08/01		03/08/01		03/08/01		03/08/01	
Chemical Name														
Volatile Organic Compounds (UG/L)														
Acetone	10	U	10	U	7	J	10	U	4	J	10	U	10	U
Chloroform	10	U	10	U	4	J	10	U	10	U	10	U	10	U
Total Metals (UG/L)														
Aluminum	143	B	516		117	B	280	B	1,050		297	B	301	B
Arsenic	4.2	U	4.2	U	4.3	J	8.2	J	8.7	J	7.8	J	9.4	J
Barium	17.2	J	12	J	32.7	J	41.2	J	46.3	J	30.4	J	36.8	J
Beryllium	0.1	U	0.1	U	0.1	U	0.1	U	0.14	J	0.1	U	0.1	U
Cadmium	0.6	U	0.6	U	0.6	U	0.6	U	0.6	U	0.6	U	0.6	U
Calcium	182,000		72,100		164,000		70,200		99,800		48,600		65,800	
Chromium	2.1	J	1.9	J	1.4	J	1.7	J	3.7	J	2	J	1.4	J
Cobalt	0.76	J	0.7	U	2.2	J	3.1	J	3.5	J	2.6	J	3.4	J
Cyanide	NA		1.3	B	0.65	UL	0.65	U	0.65	U	0.65	U	0.65	U
Iron	353	B	840	J	708		3,280	J	4,360	J	2,750	J	2,870	J
Lead	1.7	U	1.7	U	1.7	UL	1.7	U	2.6	B	1.7	U	1.7	U
Magnesium	576,000		218,000		482,000		150,000		229,000		105,000		145,000	
Manganese	4.7	B	10	J	66.4		361		331		331		387	
Mercury	0.08	J	0.07	U	0.07	R	0.07	U	0.08	J	0.07	U	0.07	U
Nickel	2.5	B	2.1	B	2	J	1.7	B	2.6	B	2.3	B	2.8	B
Potassium	309,000	J	124,000	J	261,000		84,600	J	135,000	J	56,900	J	81,700	J
Sodium	4,370,000	K	1,690,000	K	3,670,000		1,160,000	K	1,750,000	K	794,000	K	1,100,000	K
Vanadium	0.7	U	1	J	0.7	U	1.4	J	4	J	1.2	J	1.5	J
Zinc	1.1	UL	17.7	B	84		33.6	B	52.9	B	18.5	B	25.8	B
Dissolved Metals (UG/L)														
Arsenic	4.2	U	4.2	U	4.2	U	6.2	J	4.3	J	5.7	J	7.1	J
Barium	15.6	J	11.8	J	34.9	J	44.2	J	43.2	J	35.7	J	35.9	J
Calcium	171,000		73,100		182,000		82,300		115,000		70,000		71,500	
Chromium	0.5	U	1.3	J	1.7	J	0.84	J	1.2	J	1.2	J	1.2	J
Cobalt	1.1	J	0.7	U	3.4	J	3.6	J	2.8	B	3.4	J	3.2	J
Copper	4.7	B	3.3	B	3.4	B	2.6	B	2.8	J	2.7	B	2.4	B
Iron	116	B	45	B	66.4	B	1,860		183	B	1,540		1,580	
Lead	1.7	U	1.7	U	1.7	UL	1.7	U	1.7	U	1.7	U	1.7	U

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Table 6
NAB Little Creek
Navy CLEAN II CTO-148, Long Term Monitoring Plan
Round 5, Detected Analytical Results for Site 7 Surface Water

Station ID	LS07-SW208		LS07-SW209		LS07-SW210		LS07-SW211		LS07-SW212		LS07-SW213			
Sample ID	LS07-SW208-01A		LS07-SW209-01A		LS07-SW210-01A		LS07-SW211-01A		LS07-SW212-01A		LS07-SW213-01A		LS07-SW213P-01A	
Sample Date	03/08/01		03/08/01		03/02/01		03/08/01		03/08/01		03/08/01		03/08/01	
Chemical Name														
Magnesium	533,000		220,000		523,000		176,000		269,000		156,000		158,000	
Manganese	2	B	6	B	81.5		390	J	321	J	375	J	382	J
Mercury	0.06	U	0.07	U	0.07	U	0.07	U	0.07	U	0.12	J	0.08	J
Nickel	1.7	B	2	B	4	J	1.8	B	2.4	B	1.8	B	1.7	B
Potassium	284,000	J	128,000	J	276,000		101,000	J	158,000	J	87,800	J	88,600	J
Silver	0.5	U	0.5	U	0.5	U	0.54	J	0.5	U	0.57	J	0.67	J
Sodium	3,980,000	K	1,680,000	K	3,940,000	K	1,310,000	K	2,100,000	K	1,200,000	K	1,200,000	K
Vanadium	0.7	U	0.7	U	1.2	J	0.7	U	0.7	U	0.7	U	0.7	U
Zinc	1.1	UL	21	B	99.6	J	18.6	B	18.4	B	18.3	B	18.5	B

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Table 7
NAB Little Creek
Navy CLEAN II CTO-148, Long Term Monitoring Plan
Round 5, Detected Analytical Results for Site 7 Sediment

Station ID	LS07-SD201	LS07-SD202	LS07-SD203		LS07-SD204	LS07-SD205	LS07-SD206	LS07-SD207	LS07-SD208		LS07-SD209
Sample ID	LS07-SD201-01A	LS07-SD202-01A	LS07-SD203-01A	LS07-SD203P-01A	LS07-SD204-01A	LS07-SD205-01A	LS07-SD206-01A	LS07-SD207-01A	LS07-SD208-01A	LS07-SD208P-01A	LS07-SD209-0
Sample Date	03/01/01	03/02/01	03/01/01	03/01/01	03/02/01	03/01/01	03/02/01	03/02/01	03/08/01	03/08/01	03/08/01
Chemical Name											
Semivolatile Organic Compounds (UG/KG)											
4-Methylphenol	810 U	1,000 U	2,300 U	2,300 U	11,000 U	440 U	130 J	2,300 U	1,400 U	NA	2,300
Anthracene	810 U	1,000 U	2,300 U	2,300 U	11,000 U	440 U	170 J	2,300 U	1,400 U	NA	2,300
Benzaldehyde	810 U	1,000 U	2,300 U	2,300 U	11,000 U	440 U	130 J	2,300 U	1,400 U	NA	2,300
Benzo(a)anthracene	200 J	210 J	2,300 U	2,300 U	11,000 U	440 U	110 J	2,300 U	1,400 U	NA	2,300
Benzo(a)pyrene	150 J	170 J	2,300 U	2,300 U	11,000 U	440 U	950 U	2,300 U	1,400 U	NA	2,300
Benzo(b)fluoranthene	190 J	190 J	2,300 U	2,300 U	11,000 U	45 J	950 U	2,300 U	190 J	NA	2,300
Benzo(g,h,i)perylene	110 J	1,000 U	2,300 U	2,300 U	11,000 U	440 U	950 U	2,300 U	1,400 U	NA	2,300
Benzo(k)fluoranthene	180 J	140 J	2,300 U	2,300 U	11,000 U	440 U	100 J	2,300 U	150 J	NA	2,300
Chrysene	290 J	320 J	2,300 U	2,300 U	11,000 U	440 U	200 J	2,300 U	210 J	NA	2,300
Fluoranthene	380 J	360 J	2,300 U	2,300 U	11,000 U	58 J	260 J	2,300 U	580 J	NA	490
Indeno(1,2,3-cd)pyrene	100 J	1,000 U	2,300 U	2,300 U	11,000 U	440 U	950 U	2,300 U	1,400 U	NA	2,300
Phenanthrene	120 J	200 J	2,300 U	2,300 U	11,000 U	440 U	950 U	2,300 U	1,400 U	NA	2,300
Pyrene	340 J	330 J	2,300 U	2,300 U	11,000 U	72 J	210 J	2,300 U	440 J	NA	370
bis(2-Ethylhexyl)phthalate	87 B	460 J	2,300 U	2,300 U	11,000 U	370 B	120 B	2,300 U	1,400 U	NA	2,300
Pesticide/Polychlorinated Biphenyls (UG/KG)											
4,4'-DDD	4 U	5.2 U	15	12	23	4.4 U	4.8 U	4.6 U	7.1 U	NA	4.6
4,4'-DDE	4 U	5.2 U	4.6 U	4.7 U	13 J	4.4 U	4.8 U	4.6 U	7.1 U	NA	4.6
4,4'-DDT	4 U	14 J	4.6 U	4.7 U	5.3 U	4.4 U	4.8 U	4.6 U	7.1 U	NA	4.6
Aroclor-1260	40 U	260	46 U	47 U	53 U	44 U	48 U	46 U	71 U	NA	46
Endosulfan I	2.1 U	2.9 J	2.3 U	2.4 U	2.7 U	2.3 U	2.5 U	2.3 U	3.6 U	NA	2.4
Endrin	4 U	20 J	4.6 U	4.7 U	5.3 U	4.4 U	4.8 U	4.6 U	7.1 U	NA	4.6
Endrin ketone	4 U	5.2 U	4.6 U	4.7 U	5.3 U	4.4 U	4.8 U	4.6 U	7.1 U	NA	4.6
gamma-Chlordane	2.1 U	3.1	2.3 U	2.4 U	2.7 U	2.3 U	2.5 U	2.3 U	3.6 U	NA	2.4
Total Metals (MG/KG)											
Aluminum	1,530	5,880	4,130	3,310	3,390	1,840	2,660	490	8,510	NA	3,810
Antimony	0.714 R	2.9 J	0.797 R	0.862 R	0.722 R	0.77 R	0.67 R	0.738 R	1.21 R	NA	0.82
Arsenic	2.4 B	8.1	5.2	5.2	6.7	2.2 B	2.8	0.97 B	6.5 K	NA	3.2
Barium	7.2 J	20.2 J	16.9 J	14.4 J	21.9 J	4.4 J	5.5 J	1.6 B	17 J	NA	11.5
Calcium	898 J	1,500 B	821 J	729 J	942 B	661 J	894 B	149 B	1,180 J	NA	2,720
Chromium	3.8	13.1	8.9	7.4	10.2	4.3	5.8	1.5 J	15.9 L	NA	8.6
Cobalt	0.91 B	4.2 J	2.5 J	2.1 J	2.1 J	0.84 B	1.2 J	0.21 B	3.6 J	NA	1.8
Copper	11 J	3,060 J	24.5 J	22.6 J	39.8 J	11.2 J	14.7 J	3.6 J	34.4 L	NA	17.5
Iron	3,090	13,900	7,240	6,430	7,660	3,350	3,990	727	13,300	NA	7,400
Lead	6.3 J	172 J	10.6 J	9.4 J	21.9 J	5.4 J	6 J	2 J	21.9 J	NA	11.5
Magnesium	611 J	1,830 B	991 J	702 J	895 J	783 J	954 B	356 B	2,680 L	NA	1,200
Manganese	19.9	80	45.6	36.2	64.2	18.3	26.4	4.5 B	68 L	NA	50.5
Mercury	0.02 R	0.03 R	0.03 R	0.03 R	0.03 R	0.03 R	0.03 R	0.03 R	0.12 J	NA	0.08
Nickel	2.4 B	50.7 L	8.3 J	8 J	28.8 L	2.4 B	2.8 B	0.92 B	10 J	NA	5.1
Potassium	367 J	1,170 B	596 J	454 J	392 B	422 J	636 B	196 B	1,990 J	NA	893
Selenium	0.796 UL	0.974 UL	0.99 J	0.961 UL	0.805 UL	0.858 UL	0.77 J	0.822 UL	1.5 B	NA	0.914

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Table 7
NAB Little Creek
Navy CLEAN II CTO-148, Long Term Monitoring Plan
Round 5, Detected Analytical Results for Site 7 Sediment

Station ID	LS07-SD201	LS07-SD202	LS07-SD203		LS07-SD204	LS07-SD205	LS07-SD206	LS07-SD207	LS07-SD208		LS07-SD209
Sample ID	LS07-SD201-01A	LS07-SD202-01A	LS07-SD203-01A	LS07-SD203P-01A	LS07-SD204-01A	LS07-SD205-01A	LS07-SD206-01A	LS07-SD207-01A	LS07-SD208-01A	LS07-SD208P-01A	LS07-SD209-0
Sample Date	03/01/01	03/02/01	03/01/01	03/01/01	03/02/01	03/01/01	03/02/01	03/02/01	03/08/01	03/08/01	03/08/01
Chemical Name											
Silver	0.163 U	0.57 J	0.182 U	0.197 U	0.44 J	1.2 J	0.153 U	0.169 U	0.8 J	NA	0.188
Sodium	1,850 J	2,740 B	870 B	846 B	962 B	2,120 J	2,320 B	2,120 B	10,600 B	NA	5,010
Thallium	1.04 U	1.27 U	1.3 J	1.3 J	1.05 U	1.12 U	0.976 U	1.8 J	1.76 UL	NA	1.2
Vanadium	6 J	30.7	29.5	30	195	5.4 J	6.7 J	1.7 J	21.9 L	NA	11.6
Zinc	32.7 L	188 L	45.7 L	43.4 L	104 L	38.2 L	38.5 L	8.7 B	137 L	NA	79.1
Wet Chemistry (MG/KG)											
% Solids	18.4	25.7	7.3	7	11.2	8.1	17.8	3.3	48	59.1	26.7
Total organic carbon (TOC)	5,950	15,100	21,100	25,000	23,700	4,520	4,380	2,690	23,300	NA	11,600
pH	7.85	7.86	7.07	7.22	7.38	7.67	7.23	6.89	7.79	NA	7.53

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Table 7
NAB Little Creek
Navy CLEAN II CTO-148, Long Term Monitoring Plan
Round 5, Detected Analytical Results for Site 7 Sediment

Station ID		LS07-SD210		LS07-SD211		LS07-SD212		LS07-SD212		LS07-SD213	
Sample ID	1A	LS07-SD210-01A		LS07-SD211-01A		LS07-SD212-01A		LS07-SD212P-01A		LS07-SD213-01A	
Sample Date		03/02/01		03/08/01		03/08/01		03/08/01		03/08/01	
Chemical Name											
Semivolatile Organic Compounds (UG/KG)											
4-Methylphenol	U	2,700	U	2,400	U	930	U	2,200	U	430	U
Anthracene	U	2,700	U	2,400	U	930	U	2,200	U	430	U
Benzaldehyde	U	2,700	U	2,400	U	930	U	2,200	U	430	U
Benzo(a)anthracene	U	2,700	U	2,400	U	930	U	570	J	430	U
Benzo(a)pyrene	U	2,700	U	2,400	U	930	U	570	J	430	U
Benzo(b)fluoranthene	U	2,700	U	2,400	U	930	U	570	J	430	U
Benzo(g,h,i)perylene	U	2,700	U	2,400	U	930	U	2,200	U	430	U
Benzo(k)fluoranthene	U	2,700	U	2,400	U	930	U	540	J	430	U
Chrysene	U	2,700	U	2,400	U	110	J	730	J	430	U
Fluoranthene	J	2,700	U	2,400	U	140	J	1,100	J	430	U
Indeno(1,2,3-cd)pyrene	U	2,700	U	2,400	U	930	U	250	J	430	U
Phenanthrene	U	2,700	U	2,400	U	120	J	680	J	430	U
Pyrene	J	2,700	U	2,400	U	150	J	1,000	J	430	U
bis(2-Ethylhexyl)phthalate	U	2,700	U	2,400	U	930	U	2,200	U	430	U
Pesticide/Polychlorinated Biphenyls (UG/KG)											
4,4'-DDD	U	5.3	UJ	4.8	U	4.7	U	4.5	U	4.2	U
4,4'-DDE	U	5.3	UJ	4.8	U	4.7	U	4.5	U	4.2	U
4,4'-DDT	U	5.3	UJ	4.8	U	4.7	U	4.5	U	4.2	U
Aroclor-1260	U	53	UJ	48	U	44	J	51	J	42	U
Endosulfan I	U	2.7	UJ	2.5	U	2.4	U	2.3	U	2.2	U
Endrin	U	5.3	UJ	4.8	UL	4.7	U	4.5	U	4.2	U
Endrin ketone	U	5.3	UJ	12		4.7	U	4.5	U	4.2	U
gamma-Chlordane	U	2.7	UJ	2.5	U	2.4	U	2.3	U	2.2	U
Total Metals (MG/KG)											
Aluminum		8,430		2,210		4,490		3,350		3,880	
Antimony	R	0.949	R	0.723	R	0.867	R	0.863	R	0.636	R
Arsenic	K	6.5		5.3	K	8	K	7.5	K	4.5	K
Barium	J	14.6	J	8.1	J	15.9	J	14.1	J	11.9	J
Calcium	L	1,350	B	519	J	866	J	883	J	149	J
Chromium	L	15.4		6.8	L	12	L	14.1	L	4.4	L
Cobalt	J	3.5	J	2	J	2.8	J	2.6	J	2.4	J
Copper	L	15.9	J	30.5	L	46.6	L	47.9	L	5.5	L
Iron		13,700		6,840		11,300		9,830		3,160	
Lead	J	9.4	J	27.7	J	29.6	J	55.4	J	7.6	J
Magnesium	L	2,640	B	684	J	1,080	J	937	J	321	J
Manganese	L	102		33.9	L	56.1	L	53.4	L	13.7	L
Mercury	J	0.04	R	0.1	B	0.1	B	0.1	B	0.06	B
Nickel	J	8.3	J	10	L	9.5	J	8.2	J	2.6	J
Potassium	J	1,670	B	476	J	764	J	593	J	188	B
Selenium	UL	1.2	J	0.805	UL	0.966	UL	0.961	UL	0.708	UL

NA - Not analyzed
B - Blank contamination
J - Estimated
K - Biased high
L - Biased low

R - Unusable
U, UJ, UL - Undetected

Table 7
NAB Little Creek
Navy CLEAN II CTO-148, Long Term Monitoring Plan
Round 5, Detected Analytical Results for Site 7 Sediment

Station ID		LS07-SD210		LS07-SD211		LS07-SD212		LS07-SD212		LS07-SD213	
Sample ID	1A	LS07-SD210-01A		LS07-SD211-01A		LS07-SD212-01A		LS07-SD212P-01A		LS07-SD213-01A	
Sample Date		03/02/01		03/08/01		03/08/01		03/08/01		03/08/01	
Chemical Name											
Silver	R	0.217	U	0.165	R	0.198	R	0.197	R	0.145	R
Sodium	B	3,650	B	3,940	B	4,000	B	3,900	B	2,340	B
Thallium	J	1.38	U	1.05	UL	1.26	UL	1.26	UL	0.926	UL
Vanadium	J	19.8		18.2	L	24.9	L	24.2	L	8.7	J
Zinc	L	39.2	L	110	L	174	L	164	L	11.4	L
Wet Chemistry (MG/KG)											
% Solids		70.3		11.2		17.9		NA		19.5	
Total organic carbon (TOC)		9,410		10,300		29,300		11,300		3,660	
pH		7.38		7.62		7.54		7.45		6.16	

NA - Not analyzed
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L - Biased low

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U, UJ, UL - Undetected

Table 8
NAB Little Creek
Navy CLEAN II CTO-148, Long Term Monitoring Plan
Round 5, Detected Analytical Results for Site 7 Surface and Subsurface Soil

Station ID	LS07-SB201		LS07-SB202		LS07-SB203		LS07-SS201		LS07-SS201		LS07-SS202		LS07-SS203	
Sample ID	LS07-SB201-02		LS07-SB202-02		LS07-SB203-02		LS07-SS201-00		LS07-SS201P-00		LS07-SS202-00		LS07-SS203-00	
Sample Date	02/28/01		02/28/01		02/28/01		02/28/01		02/28/01		02/28/01		02/28/01	
	Subsurface Soil Samples						**Surface Soil Samples**							
Chemical Name														
Semivolatile Organic Compounds (UG/KG)														
Benzo(b)fluoranthene	4,300	U	350	U	2,000	U	50	J	80	J	360	U	420	U
Benzo(k)fluoranthene	4,300	U	350	U	2,000	U	400	U	45	J	360	U	420	U
Chrysene	4,300	U	350	U	2,000	U	45	J	70	J	360	U	420	U
Pesticide/Polychlorinated Biphenyls (UG/KG)														
4,4'-DDD	4.6		3.5	U	20		3.8	U	4.3	U	3.6	U	4.2	U
4,4'-DDE	10		3.5	U	5.8	J	3.8	U	4.3	U	3.6	U	4.2	U
Aroclor-1242	50		35	U	41	U	38	U	43	U	36	U	42	U
Aroclor-1254	42	U	35	U	110		38	U	43	U	36	U	60	
Aroclor-1260	42	U	35	U	110		38	U	43	U	36	U	99	J
alpha-Chlordane	2.2	U	1.8	U	16		2	U	2.2	U	1.9	U	20	
gamma-Chlordane	2.2	U	1.8	U	15		2	U	2.2	U	1.9	U	15	
Total Metals (MG/KG)														
Aluminum	7,510		1,450		4,170		6,180		4,660		2,070		5,800	
Antimony	0.809	UL	0.556	UL	1.3	J	1.1	J	0.841	UL	0.647	UL	1.9	J
Arsenic	3.8	B	1.7	B	3.5	B	4.1		4.6		2.3	B	3.7	B
Barium	54.6		3.8	J	76.3		24.3	J	18.6	J	7.8	J	31.1	J
Beryllium	2.3		0.032	U	2.8		0.21	B	0.15	B	0.037	U	0.47	B
Calcium	2,470		1,180		1,590		441	J	426	J	515	J	400	J
Chromium	21.7	J	3.3	J	22.4	J	14	J	11	J	4.8	J	13.4	J
Cobalt	9.2	J	0.89	B	14.8		2	J	1.4	J	0.62	B	1.7	J
Copper	747	J	3.5	J	396	J	37.9	J	32.8	J	6.5	J	55.4	J
Cyanide	0.07	U	0.07	U	0.08	U	0.07	U	0.07	U	0.09	J	0.09	U
Iron	21,800		1,950		12,300		8,840		7,910		3,310		7,540	
Lead	218	J	2.1	J	289	J	41.9	J	40	J	11.8	J	143	J
Magnesium	1,170	L	295	J	475	J	949	J	795	J	435	J	369	J
Manganese	133	K	26.2	K	126	K	34.9	K	27.9	K	19.6	K	28	K
Mercury	0.03	J	0.02	U	0.12		0.03	U	0.03	U	0.03	J	0.2	
Nickel	43.6		2.9	B	116		6.8	J	5.7	J	2.2	B	12.1	
Potassium	1,080	J	237	B	213	B	666	J	631	J	434	J	276	B

NA - Not analyzed
B - Blank contamination
J - Estimated
K - Biased high
L - Biased low

U, UL - Undetected

Table 8
NAB Little Creek
Navy CLEAN II CTO-148, Long Term Monitoring Plan
Round 5, Detected Analytical Results for Site 7 Surface and Subsurface Soil

Station ID	LS07-SB201		LS07-SB202		LS07-SB203		LS07-SS201				LS07-SS202		LS07-SS203	
Sample ID	LS07-SB201-02		LS07-SB202-02		LS07-SB203-02		LS07-SS201-00		LS07-SS201P-00		LS07-SS202-00		LS07-SS203-00	
Sample Date	02/28/01		02/28/01		02/28/01		02/28/01		02/28/01		02/28/01		02/28/01	
	Subsurface Soil Samples						**Surface Soil Samples**							
Chemical Name														
Selenium	0.902	UL	0.619	UL	0.8	J	0.93	J	0.937	UL	0.721	UL	0.834	UL
Sodium	515	J	53.8	B	784	J	422	J	300	J	132	B	116	B
Thallium	1.18	U	0.81	U	0.984	U	1.20	U	1.23	U	1	J	1.09	U
Vanadium	23.5		4	J	14.7		26		23		10		21.6	
Zinc	806		14.7	B	1,540		55.2		48.4	B	13.2	B	146	

NA - Not analyzed
B - Blank contamination
J - Estimated
K - Biased high
L - Biased low

U, UL - Undetected

Appendix A
Analytical Parameters

TABLE A-1
Analytical Parameters

Volatile Organic Compounds on Target Compound List (TCL)		
Acetone	Chloromethane	4-Methyl-2-Pentenone
Benzene	Dibromochloromethane	Methylene Chloride
Bromoform	1,1-Dichloroethane	Styrene
Bromodichloromethane	1,2-Dichloroethane	1,1,2,2-Tetrachloroethane
Bromomethane	1,1-Dichloroethene	Tetrachloroethene
2-Butanone	1,2-Dichloroethene (total)1,2-	Toluene
Carbon Disulfide	Dichloropropane	1,1,1-Trichloroethane
Carbon Tetrachloride	cis-1,3-Dichloropropene	1,1,2-Trichloroethane
Chlorobenzene	trans-1,3 Dichloropropene	Trichloroethene
Chloroethane	Ethylbenzene	Vinyl Chloride
Chloroform	2-Hexanone	Xylenes (total)

Semivolatile Organic Compounds on Target Compound List (TCL)		
1,2-Dichlorobenzene	4-Chloro-3-methylphenol	4-Bromophenyl-phenylether
1,3-Dichlorobenzene	2-Methylnaphthalene	Hexachlorobenzene
1,4-Dichlorobenzene	Hexachlorocyclopentadiene	Pentachlorophenol
Phenol	2,4,6-Trichlorophenol	Phenanthrene
bis-(2-Chloroethyl)ether	2,4,5-Trichlorophenol	Anthracene
2-Chlorophenol	2-Chloronaphthalene	Di-n-butylphthalate
2-Methylphenol	2-Nitroaniline	Carbazole
2,2'-oxybis(1-Chloropropane)	Dimethylphthalate	Fluoranthene
4-Methylphenol	Acenaphthylene	Pyrene
N-Nitroso-di-n-propylamine	2,6-Dinitrotoluene	Butylbenzylphthalate
Hexachloroethane	3-Nitroaniline	3,3'-Dichlorobenzidine
Nitrobenzene	Acenaphthene 2,4-Dinitrophenol	Benzo(a)anthracene
Isophorone	4-Nitrophenol	Chrysene
2-Nitrophenol	Dibenzofuran	bis-(2-Ethylhexyl)phthalate
2,4-Dimethylphenol	2,4-Dinitrotoluene	Di-n-octylphthalate
bis-(2-Chloroethoxy)methane	Diethylphthalate	Benzo(b)fluoranthene
2,4-Dichlorophenol	4-Chlorophenyl-phenylether	Benzo(k)fluoranthene
1,2,4-Trichlorobenzene	Fluorene	Benzo(a)pyrene
Naphthalene	4-Nitroaniline	Indeno(1,2,3-cd)pyrene
4-Chloroaniline	4,6-Dinitro-2-methylphenol	Dibenz(a,h)anthracene
Hexachlorobutadiene	N-Nitrosodiphenylamine	Benzo(g,h,i)perylene

Inorganics on Target Analyte List (TAL)		
Aluminum	Cobalt	Nickel
Antimony	Copper	Potassium
Arsenic	Cyanide	Selenium
Barium	Iron	Silver
Beryllium	Lead	Sodium
Cadmium	Magnesium	Thallium
Calcium	Manganese	Vanadium
Chromium	Mercury	Zinc

Appendix B
Analytical Results

Table B-1
NAB Little Creek
Navy CLEAN II CTO-148, Long Term Monitoring Plan
Round 5, Analytical Results for Site 7 Groundwater

Station ID	LS07-MW01		LS07-MW03		LS07-MW06		LS07-MW06		LS07-MW07		LS07-MW08		LS07-MW09	
Sample ID	LS07-MW01-01A		LS07-MW03-01A		LS07-MW06-01A		LS07-MW06P-01A		LS07-MW07-01A		LS07-MW08-01A		LS07-MW09-01A	
Sample Date	02/26/01		02/26/01		02/26/01		02/26/01		02/27/01		02/27/01		02/27/01	
Chemical Name														
Volatile Organic Compounds (UG/L)														
1,1,1-Trichloroethane	10	U	10	U	10	U	10	U	10	U	10	U	10	U
1,1,2,2-Tetrachloroethane	10	U	10	U	10	U	10	U	10	U	10	U	10	U
1,1,2-Trichloro-1,2,2-trifluoroethane(Freon-113)	10	U	10	U	10	U	10	U	10	U	10	U	10	U
1,1,2-Trichloroethane	10	U	10	U	10	U	10	U	10	U	10	U	10	U
1,1-Dichloroethane	10	U	10	U	10	U	10	U	10	U	10	U	10	U
1,1-Dichloroethene	10	U	10	U	10	U	10	U	10	U	10	U	10	U
1,2,4-Trichlorobenzene	10	U	10	U	10	U	10	U	10	U	10	U	10	U
1,2-Dibromo-3-chloropropane	10	U	10	U	10	U	10	U	10	U	10	U	10	U
1,2-Dibromoethane	10	U	10	U	10	U	10	U	10	U	10	U	10	U
1,2-Dichlorobenzene	10	U	10	U	10	U	10	U	10	U	10	U	10	U
1,2-Dichloroethane	10	U	10	U	10	U	10	U	10	U	10	U	10	U
1,2-Dichloropropane	10	U	10	U	10	U	10	U	10	U	10	U	10	U
1,3-Dichlorobenzene	10	U	10	U	10	U	10	U	10	U	10	U	10	U
1,4-Dichlorobenzene	10	U	10	U	10	U	10	U	10	U	10	U	10	U
2-Butanone	10	U	10	U	10	U	10	U	10	U	10	U	10	U
2-Hexanone	10	U	10	U	10	U	10	U	10	U	10	U	10	U
4-Methyl-2-pentanone	10	U	10	U	10	U	10	U	10	U	10	U	10	U
Acetone	10	U	10	U	6	J	10	U	10	U	7	J	10	J
Benzene	10	U	10	U	10	U	10	U	10	U	10	U	10	U
Bromodichloromethane	10	U	10	U	10	U	10	U	10	U	10	U	10	U
Bromoform	10	U	10	U	10	U	10	U	10	U	10	U	10	U
Bromomethane	10	U	10	U	10	U	10	U	10	U	10	U	10	U
Carbon disulfide	10	U	10	U	10	U	10	U	10	U	10	U	10	U
Carbon tetrachloride	10	U	10	U	10	U	10	U	10	U	10	U	10	U
Chlorobenzene	10	U	10	U	10	U	10	U	10	U	10	U	10	U
Chloroethane	10	U	10	U	10	U	10	U	10	U	10	U	10	U
Chloroform	10	U	10	U	10	U	10	U	10	U	10	U	10	U
Chloromethane	10	U	10	U	10	U	10	U	10	U	10	U	10	U
Cumene	10	U	10	U	10	U	10	U	10	U	10	U	10	U
Cyclohexane	10	U	10	U	10	U	10	U	10	U	10	U	10	U
Dibromochloromethane	10	U	10	U	10	U	10	U	10	U	10	U	10	U
Dichlorodifluoromethane(Freon-12)	10	U	10	U	10	U	10	U	10	U	10	U	10	U

NA - Not analyzed
B - Blank contamination
J - Estimated
K - Biased high
L - Biased low

R - Unusable
U - Undetected
UJ - Undetected, estimated limit
UL - Undetected, limit biased low

Table B-1
NAB Little Creek
Navy CLEAN II CTO-148, Long Term Monitoring Plan
Round 5, Analytical Results for Site 7 Groundwater

Station ID	LS07-MW01		LS07-MW03		LS07-MW06				LS07-MW07		LS07-MW08		LS07-MW09	
Sample ID	LS07-MW01-01A		LS07-MW03-01A		LS07-MW06-01A		LS07-MW06P-01A		LS07-MW07-01A		LS07-MW08-01A		LS07-MW09-01A	
Sample Date	02/26/01		02/26/01		02/26/01		02/26/01		02/27/01		02/27/01		02/27/01	
Chemical Name														
Ethylbenzene	10	U	10	U	10	U	10	U	10	U	10	U	10	U
Methyl acetate	10	U	10	U	10	U	10	U	10	U	10	U	10	U
Methyl-tert-butyl ether (MTBE)	10	U	10	U	10	U	10	U	10	U	10	U	10	U
Methylcyclohexane	10	U	10	U	10	U	10	U	10	U	10	U	10	U
Methylene chloride	10	U	1	B	10	U	10	U	1	B	6	B	2	B
Styrene	10	U	10	U	10	U	10	U	10	U	10	U	10	U
Tetrachloroethene	10	U	10	U	10	U	10	U	10	U	10	U	10	U
Toluene	10	U	10	U	10	U	10	U	10	U	10	U	10	U
Trichloroethene	10	U	10	U	10	U	10	U	10	U	10	U	10	U
Trichlorofluoromethane(Freon-11)	10	U	10	U	10	U	10	U	10	U	10	U	10	U
Vinyl chloride	10	U	10	U	10	U	10	U	10	U	10	U	10	U
Xylene, total	10	U	10	U	10	U	10	U	10	U	10	U	10	U
cis-1,2-Dichloroethene	10	U	10	U	10	U	10	U	10	U	10	U	10	U
cis-1,3-Dichloropropene	10	U	10	U	10	U	10	U	10	U	10	U	10	U
m- and p-Xylene	10	U	10	U	10	U	10	U	10	U	10	U	10	U
o-Xylene	10	U	10	U	10	U	10	U	10	U	10	U	10	U
trans-1,2-Dichloroethene	10	U	10	U	10	U	10	U	10	U	10	U	10	U
trans-1,3-Dichloropropene	10	U	10	U	10	U	10	U	10	U	10	U	10	U
Semivolatile Organic Compounds (UG/L)														
1,1-Biphenyl	10	UJ	10	UJ	10	UJ	10	UJ	10	UL	10	U	10	U
2,2'-Oxybis(1-chloropropane)	10	UJ	10	UJ	10	UJ	10	UJ	10	UL	10	U	10	U
2,4,5-Trichlorophenol	25	UJ	25	UJ	25	UJ	25	UJ	25	UL	25	U	25	U
2,4,6-Trichlorophenol	10	UJ	10	UJ	10	UJ	10	UJ	10	UL	10	U	10	U
2,4-Dichlorophenol	10	UJ	10	UJ	10	UJ	10	UJ	10	UL	10	U	10	U
2,4-Dimethylphenol	10	UJ	10	UJ	10	UJ	10	UJ	10	UL	10	U	10	U
2,4-Dinitrophenol	25	UJ	25	UJ	25	UJ	25	UJ	25	UL	25	U	25	U
2,4-Dinitrotoluene	10	UJ	10	UJ	10	UJ	10	UJ	10	UL	10	U	10	U
2,6-Dinitrotoluene	10	UJ	10	UJ	10	UJ	10	UJ	10	UL	10	U	10	U
2-Chloronaphthalene	10	UJ	10	UJ	10	UJ	10	UJ	10	UL	10	U	10	U
2-Chlorophenol	10	UJ	10	UJ	10	UJ	10	UJ	10	UL	10	U	10	U
2-Methylnaphthalene	10	UJ	10	UJ	10	UJ	10	UJ	10	UL	10	U	10	U
2-Methylphenol	10	UJ	10	UJ	10	UJ	10	UJ	10	UL	10	U	10	U
2-Nitroaniline	25	UJ	25	UJ	25	UJ	25	UJ	25	UL	25	U	25	U

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J - Estimated
K - Biased high
L - Biased low

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U - Undetected
UJ - Undetected, estimated limit
UL - Undetected, limit biased low

Table B-1
NAB Little Creek
Navy CLEAN II CTO-148, Long Term Monitoring Plan
Round 5, Analytical Results for Site 7 Groundwater

Station ID	LS07-MW01		LS07-MW03		LS07-MW06				LS07-MW07		LS07-MW08		LS07-MW09	
Sample ID	LS07-MW01-01A		LS07-MW03-01A		LS07-MW06-01A		LS07-MW06P-01A		LS07-MW07-01A		LS07-MW08-01A		LS07-MW09-01A	
Sample Date	02/26/01		02/26/01		02/26/01		02/26/01		02/27/01		02/27/01		02/27/01	
Chemical Name														
2-Nitrophenol	10	UJ	10	UJ	10	UJ	10	UJ	10	UL	10	U	10	U
3,3'-Dichlorobenzidine	10	UJ	10	UJ	10	UJ	10	UJ	10	UL	10	U	10	U
3-Nitroaniline	25	UJ	25	UJ	25	UJ	25	UJ	25	UL	25	U	25	U
4,6-Dinitro-2-methylphenol	25	UJ	25	UJ	25	UJ	25	UJ	25	UL	25	U	25	U
4-Bromophenyl-phenylether	10	UJ	10	UJ	10	UJ	10	UJ	10	UL	10	U	10	U
4-Chloro-3-methylphenol	10	UJ	10	UJ	10	UJ	10	UJ	10	UL	10	U	10	U
4-Chloroaniline	10	UJ	10	UJ	10	UJ	10	UJ	10	UL	10	U	10	U
4-Chlorophenyl-phenylether	10	UJ	10	UJ	10	UJ	10	UJ	10	UL	10	U	10	U
4-Methylphenol	10	UJ	10	UJ	10	UJ	10	UJ	10	UL	10	U	10	U
4-Nitroaniline	25	UJ	25	UJ	25	UJ	25	UJ	25	UL	25	U	25	U
4-Nitrophenol	25	UJ	25	UJ	25	UJ	25	UJ	25	UL	25	U	25	U
Acenaphthene	10	UJ	10	UJ	10	UJ	10	UJ	10	UL	10	U	10	U
Acenaphthylene	10	UJ	10	UJ	10	UJ	10	UJ	10	UL	10	U	10	U
Acetophenone	10	UJ	10	UJ	10	UJ	10	UJ	10	UL	10	U	10	U
Anthracene	10	UJ	10	UJ	10	UJ	10	UJ	10	UL	10	U	10	U
Atrazine	10	UJ	10	UJ	10	UJ	10	UJ	10	UL	10	U	10	U
Benzaldehyde	10	UJ	10	UJ	10	UJ	10	UJ	10	UL	10	UJ	10	U
Benzo(a)anthracene	10	UJ	10	UJ	10	UJ	10	UJ	10	UL	10	U	10	U
Benzo(a)pyrene	10	UJ	10	UJ	10	UJ	10	UJ	10	UL	10	U	10	U
Benzo(b)fluoranthene	10	UJ	10	UJ	10	UJ	10	UJ	10	UL	10	U	10	U
Benzo(g,h,i)perylene	10	UJ	10	UJ	10	UJ	10	UJ	10	UL	10	U	10	U
Benzo(k)fluoranthene	10	UJ	10	UJ	10	UJ	10	UJ	10	UL	10	U	10	U
Butylbenzylphthalate	10	UJ	10	UJ	10	UJ	10	UJ	10	UL	10	U	10	U
Caprolactam	10	UJ	10	UJ	10	UJ	10	UJ	10	UL	10	U	10	U
Carbazole	10	UJ	10	UJ	10	UJ	10	UJ	10	UL	10	U	10	U
Chrysene	10	UJ	10	UJ	10	UJ	10	UJ	10	UL	10	U	10	U
Di-n-butylphthalate	10	UJ	10	UJ	10	UJ	10	UJ	10	UL	10	U	10	U
Di-n-octylphthalate	10	UJ	10	UJ	10	UJ	10	UJ	10	UL	10	U	10	UJ
Dibenz(a,h)anthracene	10	UJ	10	UJ	10	UJ	10	UJ	10	UL	10	U	10	U
Dibenzofuran	10	UJ	10	UJ	10	UJ	10	UJ	10	UL	10	U	10	U
Diethylphthalate	10	UJ	10	UJ	10	UJ	10	UJ	10	UL	10	U	10	U
Dimethyl phthalate	10	UJ	10	UJ	10	UJ	10	UJ	10	UL	10	U	10	U
Fluoranthene	10	UJ	10	UJ	10	UJ	10	UJ	10	UL	10	U	10	U
Fluorene	10	UJ	10	UJ	10	UJ	10	UJ	10	UL	10	U	10	U

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Table B-1
NAB Little Creek
Navy CLEAN II CTO-148, Long Term Monitoring Plan
Round 5, Analytical Results for Site 7 Groundwater

Station ID	LS07-MW01		LS07-MW03		LS07-MW06				LS07-MW07		LS07-MW08		LS07-MW09	
Sample ID	LS07-MW01-01A		LS07-MW03-01A		LS07-MW06-01A		LS07-MW06P-01A		LS07-MW07-01A		LS07-MW08-01A		LS07-MW09-01A	
Sample Date	02/26/01		02/26/01		02/26/01		02/26/01		02/27/01		02/27/01		02/27/01	
Chemical Name														
Hexachlorobenzene	10	UJ	10	UJ	10	UJ	10	UJ	48	L	10	U	10	U
Hexachlorobutadiene	10	UJ	10	UJ	10	UJ	10	UJ	6	L	10	U	10	U
Hexachlorocyclopentadiene	10	UJ	10	UJ	10	UJ	10	UJ	10	UL	10	U	10	U
Hexachloroethane	10	UJ	10	UJ	10	UJ	10	UJ	2	L	10	U	10	U
Indeno(1,2,3-cd)pyrene	10	UJ	10	UJ	10	UJ	10	UJ	10	UL	10	U	10	U
Isophorone	10	UJ	10	UJ	10	UJ	10	UJ	10	UL	10	U	10	U
Naphthalene	10	UJ	10	UJ	10	UJ	10	UJ	10	UL	10	U	10	U
Nitrobenzene	10	UJ	10	UJ	10	UJ	10	UJ	10	UL	10	U	10	U
Pentachlorophenol	25	UJ	25	UJ	25	UJ	25	UJ	25	UL	25	U	25	U
Phenanthrene	10	UJ	10	UJ	10	UJ	10	UJ	10	UL	10	U	10	U
Phenol	10	UJ	10	UJ	10	UJ	10	UJ	10	UL	10	U	10	U
Pyrene	10	UJ	10	UJ	10	UJ	10	UJ	10	UL	10	U	10	U
bis(2-Chloroethoxy)methane	10	UJ	10	UJ	10	UJ	10	UJ	10	UL	10	U	10	U
bis(2-Chloroethyl)ether	10	UJ	10	UJ	10	UJ	10	UJ	10	UL	10	U	10	U
bis(2-Ethylhexyl)phthalate	10	UJ	10	UJ	10	UJ	10	UJ	10	UL	10	U	10	U
n-Nitroso-di-n-propylamine	10	R	10	UJ	10	UJ	10	UJ	10	UL	10	U	10	U
n-Nitrosodiphenylamine	10	UJ	10	UJ	10	UJ	10	UJ	10	UL	10	U	10	U
Pesticide/Polychlorinated Biphenyls (UG/L)														
Aroclor-1016	1	UJ	1.1	UJ	1	UJ	1	UJ	1	U	1	U	1	U
Aroclor-1221	2	UJ	2.1	UJ	2	UJ	2.1	UJ	2	U	2	U	2	U
Aroclor-1232	1	UJ	1.1	UJ	1	UJ	1	UJ	1	U	1	U	1	U
Aroclor-1242	1	UJ	1.1	UJ	1	UJ	1	UJ	1	U	1	U	1	U
Aroclor-1248	1	UJ	1.1	UJ	1	UJ	1	UJ	1	U	1	U	1	U
Aroclor-1254	1	UJ	1.1	UJ	1	UJ	1	UJ	1	U	1	U	1	U
Aroclor-1260	1	UJ	1.1	UJ	1	UJ	1	UJ	1	U	1	U	1	U
Total Metals (UG/L)														
Aluminum	88.6	B	156	B	54.5	B	65.2	B	64.6	B	19.4	B	15.1	U
Antimony	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U
Arsenic	4.2	U	4.2	U	18.8		17.6		4.2	U	4.2	U	4.2	U
Barium	3.5	J	28.6	J	16	J	16.2	J	53.4	J	34.1	J	71.4	J
Beryllium	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U
Cadmium	0.6	U	0.6	U	0.6	U	0.6	U	0.6	U	0.66	J	0.6	U

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Table B-1
NAB Little Creek
Navy CLEAN II CTO-148, Long Term Monitoring Plan
Round 5, Analytical Results for Site 7 Groundwater

Station ID	LS07-MW01		LS07-MW03		LS07-MW06				LS07-MW07		LS07-MW08		LS07-MW09	
Sample ID	LS07-MW01-01A		LS07-MW03-01A		LS07-MW06-01A		LS07-MW06P-01A		LS07-MW07-01A		LS07-MW08-01A		LS07-MW09-01A	
Sample Date	02/26/01		02/26/01		02/26/01		02/26/01		02/27/01		02/27/01		02/27/01	
Chemical Name														
Calcium	8,180		25,000		133,000		133,000		296,000		266,000		271,000	
Chromium	0.5	U	23.4		0.5	U	0.5	U	2.4	J	0.78	J	0.5	U
Cobalt	0.7	U	9.2	J	2	J	1.9	J	1.3	J	0.7	U	0.7	U
Copper	2.6	B	2	B	0.95	B	1.5	B	0.86	B	1.5	B	0.7	U
Cyanide	0.65	U	0.65	U	0.65	U	0.65	U	0.65	U	0.65	U	0.65	U
Iron	3,450	K	8,260	K	11,500	K	11,400	K	88.4	B	30.9	B	39,800	K
Lead	1.7	UL	1.7	UL	1.7	UL	1.7	UL	1.7	UL	1.7	UL	1.7	UL
Magnesium	14,500		10,600		113,000		113,000		625,000		583,000		777,000	
Manganese	51.8		565		1,410		1,420		189		120		799	
Mercury	0.08	J	0.08	J	0.06	U	0.08	J	0.06	U	0.07	U	0.08	J
Nickel	1.4	J	7.9	J	1.3	U	1.3	U	1.8	J	1.5	J	1.3	U
Potassium	11,600	J	9,040	J	25,600	J	25,600	J	282,000	J	272,000	J	346,000	J
Selenium	4.8	U	4.8	U	4.8	U	4.8	U	4.8	U	4.8	U	4.8	U
Silver	0.63	B	0.5	U	0.5	U	0.5	U	1.5	B	0.5	U	0.5	U
Sodium	138,000		47,700	B	306,000		309,000		4,380,000		4,110,000		5,790,000	
Thallium	6.2	U	6.2	U	6.2	U	6.2	U	6.2	U	6.2	U	6.2	U
Vanadium	2	B	1.1	B	0.81	B	0.72	B	2	B	0.87	B	0.7	U
Zinc	19	J	162		12.4	J	31.6	L	1.1	UL	1.1	UL	1.1	UL
Dissolved Metals (UG/L)														
Aluminum	70.7	B	158	B	49.3	B	59.4	B	15.1	U	19.1	B	65.8	B
Antimony	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U
Arsenic	4.2	U	4.2	U	17.3		16.1		4.2	U	4.2	U	4.2	U
Barium	3.4	J	29.3	J	16	J	14	J	54.2	J	37.9	J	69.4	J
Beryllium	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U
Cadmium	0.6	U	0.6	U	0.6	U	0.6	U	0.6	U	0.6	U	0.73	J
Calcium	8,000		27,300		132,000		116,000		298,000		301,000		262,000	
Chromium	0.9	J	0.5	U	0.56	J	0.5	U	1.3	J	1.7	J	0.5	U
Cobalt	0.7	U	9.2	J	1.5	J	1.3	J	0.7	U	0.7	U	0.7	U
Copper	11.3	J	5.1	B	1.7	B	5.4	B	1.1	B	2	B	2.3	B
Iron	3,660	L	7,940	L	11,500	L	10,100	L	21.7	B	36.2	B	39,300	L
Lead	1.7	UL	1.7	UL	1.7	UL	1.7	UL	1.7	UL	1.7	UL	1.7	UL
Magnesium	13,300		11,700		111,000		96,900		633,000		624,000		732,000	
Manganese	53		603		1,400		1,230		197		145		767	

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Table B-1
NAB Little Creek
Navy CLEAN II CTO-148, Long Term Monitoring Plan
Round 5, Analytical Results for Site 7 Groundwater

Station ID	LS07-MW01		LS07-MW03		LS07-MW06		LS07-MW06		LS07-MW07		LS07-MW08		LS07-MW09	
Sample ID	LS07-MW01-01A		LS07-MW03-01A		LS07-MW06-01A		LS07-MW06P-01A		LS07-MW07-01A		LS07-MW08-01A		LS07-MW09-01A	
Sample Date	02/26/01		02/26/01		02/26/01		02/26/01		02/27/01		02/27/01		02/27/01	
Chemical Name														
Mercury	0.06	U	0.09	J	0.07	U	0.06	U	0.06	U	0.07	J	0.07	J
Nickel	2.8	J	8	J	2.2	J	2	J	1.3	U	2.3	J	1.7	J
Potassium	11,100	J	9,750	J	24,800	J	20,900	J	282,000	J	298,000	J	329,000	J
Selenium	4.8	U	4.8	U	4.8	U	4.8	U	4.8	U	4.8	U	4.8	U
Silver	0.5	U	0.5	U	0.5	U	0.5	U	0.58	B	0.5	U	0.57	B
Sodium	128,000		57,700		299,000		265,000		4,460,000		4,470,000		5,420,000	
Thallium	6.2	U	6.2	U	6.2	U	6.2	U	6.2	U	6.2	U	6.2	U
Vanadium	1.7	B	0.73	B	0.7	U	0.7	U	0.75	B	0.7	U	0.71	B
Zinc	182	J	220	J	54.6	J	144	J	2.4	B	57.9	B	33.2	B

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Table B-2
NAB Little Creek
Navy CLEAN II CTO-148, Long Term Monitoring Plan
Round 5, Analytical Results for Site 7 Surface Water

Station ID	LS07-SW201		LS07-SW202		LS07-SW203				LS07-SW204		LS07-SW205		LS07-SW206		LS07-SW207	
Sample ID	LS07-SW201-01A		LS07-SW202-01A		LS07-SW203-01A		LS07-SW203P-01A		LS07-SW204-01A		LS07-SW205-01A		LS07-SW206-01A		LS07-SW207-01A	
Sample Date	03/01/01		03/02/01		03/01/01		03/01/01		03/02/01		03/01/01		03/02/01		03/02/01	
Chemical Name																
Volatile Organic Compounds (UG/L)																
1,1,1-Trichloroethane	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U
1,1,2,2-Tetrachloroethane	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U
1,1,2-Trichloro-1,2,2-trifluoroethane(Freon-113)	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U
1,1,2-Trichloroethane	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U
1,1-Dichloroethane	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U
1,1-Dichloroethene	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U
1,2,4-Trichlorobenzene	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U
1,2-Dibromo-3-chloropropane	10	R	10	R	10	R	10	R	10	R	10	R	10	R	10	R
1,2-Dibromoethane	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U
1,2-Dichlorobenzene	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U
1,2-Dichloroethane	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U
1,2-Dichloropropane	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U
1,3-Dichlorobenzene	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U
1,4-Dichlorobenzene	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U
2-Butanone	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U
2-Hexanone	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U
4-Methyl-2-pentanone	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U
Acetone	10	U	10	U	10	U	10	U	5	J	10	U	10	U	10	U
Benzene	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U
Bromodichloromethane	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U
Bromoform	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U
Bromomethane	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U
Carbon disulfide	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U
Carbon tetrachloride	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U
Chlorobenzene	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U
Chloroethane	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U
Chloroform	10	U	10	U	10	U	10	U	5	J	10	U	10	U	10	U
Chloromethane	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U
Cumene	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U
Cyclohexane	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U
Dibromochloromethane	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U
Dichlorodifluoromethane(Freon-12)	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U
Ethylbenzene	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U

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NAB Little Creek
Navy CLEAN II CTO-148, Long Term Monitoring Plan
Round 5, Analytical Results for Site 7 Surface Water

Station ID	LS07-SW201		LS07-SW202		LS07-SW203				LS07-SW204		LS07-SW205		LS07-SW206		LS07-SW207	
Sample ID	LS07-SW201-01A		LS07-SW202-01A		LS07-SW203-01A		LS07-SW203P-01A		LS07-SW204-01A		LS07-SW205-01A		LS07-SW206-01A		LS07-SW207-01A	
Sample Date	03/01/01		03/02/01		03/01/01		03/01/01		03/02/01		03/01/01		03/02/01		03/02/01	
Chemical Name																
Methyl acetate	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U
Methyl-tert-butyl ether (MTBE)	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U
Methylcyclohexane	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U
Methylene chloride	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U
Styrene	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U
Tetrachloroethene	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U
Toluene	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U
Trichloroethene	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U
Trichlorofluoromethane(Freon-11)	10	UJ	10	U	10	UJ	10	UJ	10	U	10	UJ	10	U	10	U
Vinyl chloride	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U
Xylene, total	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U
cis-1,2-Dichloroethene	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U
cis-1,3-Dichloropropene	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U
m- and p-Xylene	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U
o-Xylene	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U
trans-1,2-Dichloroethene	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U
trans-1,3-Dichloropropene	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U
Total Metals (UG/L)																
Aluminum	15.1	U	243	B	47.4	B	83.4	B	395		112	B	30.5	B	17.8	B
Antimony	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U
Arsenic	4.2	U	4.2	U	7.2	J	7.7	J	6.6	J	4.2	U	4.2	U	4.2	U
Barium	15.7	J	15.4	J	20.3	J	21.6	J	72.4	J	14.9	J	14.3	J	10.2	J
Beryllium	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U
Cadmium	0.6	U	0.63	J	0.6	U	0.6	U	0.6	U	0.6	U	0.6	U	0.67	J
Calcium	234,000		160,000		28,400		30,200		73,800		186,000		229,000		165,000	
Chromium	1.6	J	2.8	J	0.87	J	1.8	J	5.9	J	1.8	J	1.3	J	1.5	J
Cobalt	1.1	J	0.7	J	2.3	J	2.5	J	4.2	J	1.1	J	0.7	U	1.1	J
Copper	3.6	B	3.9	B	2.9	B	3.3	B	5.6	B	3.9	B	2.6	B	3.7	B
Cyanide	0.65	UL	0.65	UL	0.65	UL	0.65	UL	6	L	0.65	UL	0.65	UL	0.65	UL
Iron	267	B	574		2,960		3,000		5,350		590		190	B	134	B
Lead	1.7	UL	1.7	UL	1.7	UL	3.5	L	2.4	J	1.7	UL	1.7	UL	1.7	UL
Magnesium	757,000		507,000		35,700		38,300		119,000		594,000		726,000		537,000	
Manganese	0.1	U	39.8		329		350		164		21		0.1	U	0.1	U
Mercury	6.9	L	0.07	B	0.08	R	0.07	R	0.08	R	0.07	R	0.07	R	0.07	R

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NAB Little Creek
Navy CLEAN II CTO-148, Long Term Monitoring Plan
Round 5, Analytical Results for Site 7 Surface Water

Station ID	LS07-SW201		LS07-SW202		LS07-SW203				LS07-SW204		LS07-SW205		LS07-SW206		LS07-SW207	
Sample ID	LS07-SW201-01A		LS07-SW202-01A		LS07-SW203-01A		LS07-SW203P-01A		LS07-SW204-01A		LS07-SW205-01A		LS07-SW206-01A		LS07-SW207-01A	
Sample Date	03/01/01		03/02/01		03/01/01		03/01/01		03/02/01		03/01/01		03/02/01		03/02/01	
Chemical Name																
Nickel	1.9	J	2.1	J	1.3	U	1.7	J	5	J	2.2	J	1.3	U	1.6	J
Potassium	384,000		269,000		15,500		16,900		60,200		315,000		378,000		284,000	
Selenium	4.8	U	4.8	U	4.8	U	4.8	U	4.8	U	4.8	U	4.8	U	4.8	U
Silver	0.7	B	0.51	B	0.53	B	0.5	U	0.64	B	1.1	B	0.5	U	0.87	B
Sodium	5,640,000		3,730,000		251,000		268,000		1,100,000		4,390,000		5,550,000		3,970,000	
Thallium	6.2	U	6.2	U	6.2	U	6.2	U	6.2	U	6.2	U	6.2	U	6.2	U
Vanadium	0.7	U	0.7	U	1.1	J	1.1	J	4.3	J	0.7	U	0.7	U	0.7	U
Zinc	1.1	UL	22.3	B	62		48.1		280		9.3	B	1.1	UL	2.5	B
Dissolved Metals (UG/L)																
Aluminum	89.5	B	17.6	B	78.7	B	38.2	B	105	B	15.9	B	79.6	B	34.5	B
Antimony	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U
Arsenic	4.2	U	4.2	U	6.7	J	5.7	J	4.2	U	4.2	U	4.2	U	4.2	U
Barium	16.8	J	20.7	J	21.3	J	17.8	J	64.4	J	15.4	J	14.2	J	14.7	J
Beryllium	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U
Cadmium	0.6	U	0.6	U	0.6	U	0.6	U	0.6	U	0.6	U	0.6	U	0.6	U
Calcium	249,000		229,000		30,400		24,900		70,400		197,000		227,000		246,000	
Chromium	0.75	J	0.87	J	0.5	U	17.1		0.51	J	0.67	J	0.9	J	0.82	J
Cobalt	1.2	J	0.7	U	2.1	J	1.7	J	5.7	J	0.7	U	0.7	U	0.7	U
Copper	2.8	B	1.2	B	2.2	B	3.7	B	2.6	B	1.9	B	2.6	B	2	B
Iron	128	B	85.3	B	2,440	K	2,080	K	669	K	21	B	66.7	B	61.2	B
Lead	1.7	UL	1.7	UL	3.5	L	1.7	UL	1.7	UL	1.7	UL	1.7	UL	1.7	UL
Magnesium	793,000		715,000		38,400		31,500		63,900		629,000		724,000		781,000	
Manganese	0.1	U	43.1		349		289		80.3		15.5		0.1	U	0.1	U
Mercury	0.07	U	0.07	U	0.07	U	0.08	U	0.08	J	0.08	U	0.07	U	0.07	U
Nickel	2.4	J	2.2	J	1.8	J	10.3	J	6.7	J	1.8	J	3	J	1.5	J
Potassium	335,000		372,000		16,600		13,000		33,300		328,000		371,000		395,000	
Selenium	4.8	U	4.8	U	4.8	U	4.8	U	4.8	U	4.8	U	4.8	U	4.8	U
Silver	1.1	B	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
Sodium	5,940,000	K	5,450,000	K	259,000	K	214,000	K	850,000	K	4,620,000	K	5,470,000	K	5,950,000	K
Thallium	6.2	U	6.2	U	6.2	U	6.2	U	6.2	U	6.2	U	6.2	U	6.2	U
Vanadium	0.7	U	0.7	U	0.7	U	0.83	J	3.9	J	0.7	U	0.7	U	0.7	U
Zinc	14.8	B	24.2	J	62.4	J	78.7	J	397	J	1.1	U	41.2	J	1.1	U

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B - Blank contamination
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L - Biased low

R - Unusable
U - Undetected
UJ - Undetected, estimated limit
UL - Undetected, limit biased low

Table B-2
NAB Little Creek
Navy CLEAN II CTO-148, Long Term Monitoring Plan
Round 5, Analytical Results for Site 7 Surface Water

Station ID	LS07-SW208		LS07-SW209		LS07-SW210		LS07-SW211		LS07-SW212		LS07-SW213			
Sample ID	LS07-SW208-01A		LS07-SW209-01A		LS07-SW210-01A		LS07-SW211-01A		LS07-SW212-01A		LS07-SW213-01A		LS07-SW213P-01A	
Sample Date	03/08/01		03/08/01		03/02/01		03/08/01		03/08/01		03/08/01		03/08/01	
Chemical Name														
Volatile Organic Compounds (UG/L)														
1,1,1-Trichloroethane	10	U	10	U	10	U	10	U	10	U	10	U	10	U
1,1,2,2-Tetrachloroethane	10	U	10	U	10	U	10	U	10	U	10	U	10	U
1,1,2-Trichloro-1,2,2-trifluoroethane(Freon-113)	10	U	10	U	10	U	10	U	10	U	10	U	10	U
1,1,2-Trichloroethane	10	U	10	U	10	U	10	U	10	U	10	U	10	U
1,1-Dichloroethane	10	U	10	U	10	U	10	U	10	U	10	U	10	U
1,1-Dichloroethene	10	U	10	U	10	U	10	U	10	U	10	U	10	U
1,2,4-Trichlorobenzene	10	U	10	U	10	U	10	U	10	U	10	U	10	U
1,2-Dibromo-3-chloropropane	10	R	10	R	10	R	10	R	10	R	10	R	10	R
1,2-Dibromoethane	10	U	10	U	10	U	10	U	10	U	10	U	10	U
1,2-Dichlorobenzene	10	U	10	U	10	U	10	U	10	U	10	U	10	U
1,2-Dichloroethane	10	U	10	U	10	U	10	U	10	U	10	U	10	U
1,2-Dichloropropane	10	U	10	U	10	U	10	U	10	U	10	U	10	U
1,3-Dichlorobenzene	10	U	10	U	10	U	10	U	10	U	10	U	10	U
1,4-Dichlorobenzene	10	U	10	U	10	U	10	U	10	U	10	U	10	U
2-Butanone	10	U	10	U	10	U	10	U	10	U	10	U	10	U
2-Hexanone	10	U	10	U	10	U	10	U	10	U	10	U	10	U
4-Methyl-2-pentanone	10	U	10	U	10	U	10	U	10	U	10	U	10	U
Acetone	10	U	10	U	7	J	10	U	4	J	10	U	10	U
Benzene	10	U	10	U	10	U	10	U	10	U	10	U	10	U
Bromodichloromethane	10	U	10	U	10	U	10	U	10	U	10	U	10	U
Bromoform	10	U	10	U	10	U	10	U	10	U	10	U	10	U
Bromomethane	10	U	10	U	10	U	10	U	10	U	10	U	10	U
Carbon disulfide	10	U	10	U	10	U	10	U	10	U	10	U	10	U
Carbon tetrachloride	10	U	10	U	10	U	10	U	10	U	10	U	10	U
Chlorobenzene	10	U	10	U	10	U	10	U	10	U	10	U	10	U
Chloroethane	10	U	10	U	10	U	10	U	10	U	10	U	10	U
Chloroform	10	U	10	U	4	J	10	U	10	U	10	U	10	U
Chloromethane	10	U	10	U	10	U	10	U	10	U	10	U	10	U
Cumene	10	U	10	U	10	U	10	U	10	U	10	U	10	U
Cyclohexane	10	U	10	U	10	U	10	U	10	U	10	U	10	U
Dibromochloromethane	10	U	10	U	10	U	10	U	10	U	10	U	10	U
Dichlorodifluoromethane(Freon-12)	10	U	10	U	10	U	10	U	10	U	10	U	10	U
Ethylbenzene	10	U	10	U	10	U	10	U	10	U	10	U	10	U

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Table B-2
NAB Little Creek
Navy CLEAN II CTO-148, Long Term Monitoring Plan
Round 5, Analytical Results for Site 7 Surface Water

Station ID	LS07-SW208		LS07-SW209		LS07-SW210		LS07-SW211		LS07-SW212		LS07-SW213			
Sample ID	LS07-SW208-01A		LS07-SW209-01A		LS07-SW210-01A		LS07-SW211-01A		LS07-SW212-01A		LS07-SW213-01A		LS07-SW213P-01A	
Sample Date	03/08/01		03/08/01		03/02/01		03/08/01		03/08/01		03/08/01		03/08/01	
Chemical Name														
Methyl acetate	10	U	10	U	10	U	10	U	10	U	10	U	10	U
Methyl-tert-butyl ether (MTBE)	10	U	10	U	10	U	10	U	10	U	10	U	10	U
Methylcyclohexane	10	U	10	U	10	U	10	U	10	U	10	U	10	U
Methylene chloride	10	U	10	U	10	U	10	U	10	U	10	U	10	U
Styrene	10	U	10	U	10	U	10	U	10	U	10	U	10	U
Tetrachloroethene	10	U	10	U	10	U	10	U	10	U	10	U	10	U
Toluene	10	U	10	U	10	U	10	U	10	U	10	U	10	U
Trichloroethene	10	U	10	U	10	U	10	U	10	U	10	U	10	U
Trichlorofluoromethane(Freon-11)	10	U	10	U	10	U	10	U	10	U	10	U	10	U
Vinyl chloride	10	U	10	U	10	U	10	U	10	U	10	U	10	U
Xylene, total	10	U	10	U	10	U	10	U	10	U	10	U	10	U
cis-1,2-Dichloroethene	10	U	10	U	10	U	10	U	10	U	10	U	10	U
cis-1,3-Dichloropropene	10	U	10	U	10	U	10	U	10	U	10	U	10	U
m- and p-Xylene	10	U	10	U	10	U	10	U	10	U	10	U	10	U
o-Xylene	10	U	10	U	10	U	10	U	10	U	10	U	10	U
trans-1,2-Dichloroethene	10	U	10	U	10	U	10	U	10	U	10	U	10	U
trans-1,3-Dichloropropene	10	U	10	U	10	U	10	U	10	U	10	U	10	U
Total Metals (UG/L)														
Aluminum	143	B	516		117	B	280	B	1,050		297	B	301	B
Antimony	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U
Arsenic	4.2	U	4.2	U	4.3	J	8.2	J	8.7	J	7.8	J	9.4	J
Barium	17.2	J	12	J	32.7	J	41.2	J	46.3	J	30.4	J	36.8	J
Beryllium	0.1	U	0.1	U	0.1	U	0.1	U	0.14	J	0.1	U	0.1	U
Cadmium	0.6	U	0.6	U	0.6	U	0.6	U	0.6	U	0.6	U	0.6	U
Calcium	182,000		72,100		164,000		70,200		99,800		48,600		65,800	
Chromium	2.1	J	1.9	J	1.4	J	1.7	J	3.7	J	2	J	1.4	J
Cobalt	0.76	J	0.7	U	2.2	J	3.1	J	3.5	J	2.6	J	3.4	J
Copper	4	B	5	B	3.7	B	3.7	B	8.3	B	4.7	B	4.9	B
Cyanide	NA		1.3	B	0.65	UL	0.65	U	0.65	U	0.65	U	0.65	U
Iron	353	B	840	J	708		3,280	J	4,360	J	2,750	J	2,870	J
Lead	1.7	U	1.7	U	1.7	UL	1.7	U	2.6	B	1.7	U	1.7	U
Magnesium	576,000		218,000		482,000		150,000		229,000		105,000		145,000	
Manganese	4.7	B	10	J	66.4		361		331		331		387	
Mercury	0.08	J	0.07	U	0.07	R	0.07	U	0.08	J	0.07	U	0.07	U

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Table B-2
NAB Little Creek
Navy CLEAN II CTO-148, Long Term Monitoring Plan
Round 5, Analytical Results for Site 7 Surface Water

Station ID	LS07-SW208		LS07-SW209		LS07-SW210		LS07-SW211		LS07-SW212		LS07-SW213		
Sample ID	LS07-SW208-01A		LS07-SW209-01A		LS07-SW210-01A		LS07-SW211-01A		LS07-SW212-01A		LS07-SW213-01A		LS07-SW213P-01A	
Sample Date	03/08/01		03/08/01		03/02/01		03/08/01		03/08/01		03/08/01		03/08/01	
Chemical Name														
Nickel	2.5	B	2.1	B	2	J	1.7	B	2.6	B	2.3	B	2.8	B
Potassium	309,000	J	124,000	J	261,000		84,600	J	135,000	J	56,900	J	81,700	J
Selenium	4.8	U	4.8	U	4.8	U	4.8	U	4.8	U	4.8	U	4.8	U
Silver	0.92	B	0.51	B	0.5	U	0.5	U	0.5	U	0.5	U	0.56	B
Sodium	4,370,000	K	1,690,000	K	3,670,000		1,160,000	K	1,750,000	K	794,000	K	1,100,000	K
Thallium	6.2	U	6.2	U	6.2	U	6.2	U	6.2	U	6.2	U	6.2	U
Vanadium	0.7	U	1	J	0.7	U	1.4	J	4	J	1.2	J	1.5	J
Zinc	1.1	UL	17.7	B	84		33.6	B	52.9	B	18.5	B	25.8	B
Dissolved Metals (UG/L)														
Aluminum	15.1	U	74.6	B	57.3	B	28.9	B	17	B	41.2	B	44.1	B
Antimony	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U
Arsenic	4.2	U	4.2	U	4.2	U	6.2	J	4.3	J	5.7	J	7.1	J
Barium	15.6	J	11.8	J	34.9	J	44.2	J	43.2	J	35.7	J	35.9	J
Beryllium	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U
Cadmium	0.6	U	0.6	U	0.6	U	0.6	U	0.6	U	0.6	U	0.6	U
Calcium	171,000		73,100		182,000		82,300		115,000		70,000		71,500	
Chromium	0.5	U	1.3	J	1.7	J	0.84	J	1.2	J	1.2	J	1.2	J
Cobalt	1.1	J	0.7	U	3.4	J	3.6	J	2.8	B	3.4	J	3.2	J
Copper	4.7	B	3.3	B	3.4	B	2.6	B	2.8	J	2.7	B	2.4	B
Iron	116	B	45	B	66.4	B	1,860		183	B	1,540		1,580	
Lead	1.7	U	1.7	U	1.7	UL	1.7	U	1.7	U	1.7	U	1.7	U
Magnesium	533,000		220,000		523,000		176,000		269,000		156,000		158,000	
Manganese	2	B	6	B	81.5		390	J	321	J	375	J	382	J
Mercury	0.06	U	0.07	U	0.07	U	0.07	U	0.07	U	0.12	J	0.08	J
Nickel	1.7	B	2	B	4	J	1.8	B	2.4	B	1.8	B	1.7	B
Potassium	284,000	J	128,000	J	276,000		101,000	J	158,000	J	87,800	J	88,600	J
Selenium	4.8	U	4.8	U	4.8	U	4.8	U	4.8	U	4.8	U	4.8	U
Silver	0.5	U	0.5	U	0.5	U	0.54	J	0.5	U	0.57	J	0.67	J
Sodium	3,980,000	K	1,680,000	K	3,940,000	K	1,310,000	K	2,100,000	K	1,200,000	K	1,200,000	K
Thallium	6.2	U	6.2	U	6.2	U	6.2	U	6.2	U	6.2	U	6.2	U
Vanadium	0.7	U	0.7	U	1.2	J	0.7	U	0.7	U	0.7	U	0.7	U
Zinc	1.1	UL	21	B	99.6	J	18.6	B	18.4	B	18.3	B	18.5	B

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Table B-3
NAB Little Creek
Navt CLEAN CTO-148, Long Term Monitoring Plan
Round 5, Analytical Data for Site 7 Sediment

Station ID	LS07-SD201		LS07-SD202		LS07-SD203		LS07-SD203		LS07-SD204		LS07-SD205		LS07-SD206		LS07-SD207	
Sample ID	LS07-SD201-01A		LS07-SD202-01A		LS07-SD203-01A		LS07-SD203P-01A		LS07-SD204-01A		LS07-SD205-01A		LS07-SD206-01A		LS07-SD207-01A	
Sample Date	03/01/01		03/02/01		03/01/01		03/01/01		03/02/01		03/01/01		03/02/01		03/02/01	
Chemical Name																
Semivolatile Organic Compounds (UG/KG)																
1,1-Biphenyl	810	U	1,000	U	2,300	U	2,300	U	11,000	U	440	U	950	U	2,300	U
2,2'-Oxybis(1-chloropropane)	810	U	1,000	U	2,300	U	2,300	U	11,000	U	440	U	950	U	2,300	U
2,4,5-Trichlorophenol	2,000	U	2,600	U	5,700	U	5,800	U	26,000	U	1,100	U	2,400	U	5,700	U
2,4,6-Trichlorophenol	810	U	1,000	U	2,300	U	2,300	U	11,000	U	440	U	950	U	2,300	U
2,4-Dichlorophenol	810	U	1,000	U	2,300	U	2,300	U	11,000	U	440	U	950	U	2,300	U
2,4-Dimethylphenol	810	U	1,000	U	2,300	U	2,300	U	11,000	U	440	U	950	U	2,300	U
2,4-Dinitrophenol	2,000	U	2,600	U	5,700	U	5,800	U	26,000	U	1,100	U	2,400	U	5,700	U
2,4-Dinitrotoluene	810	U	1,000	U	2,300	U	2,300	U	11,000	U	440	U	950	U	2,300	U
2,6-Dinitrotoluene	810	U	1,000	U	2,300	U	2,300	U	11,000	U	440	U	950	U	2,300	U
2-Chloronaphthalene	810	U	1,000	U	2,300	U	2,300	U	11,000	U	440	U	950	U	2,300	U
2-Chlorophenol	810	U	1,000	U	2,300	U	2,300	U	11,000	U	440	U	950	U	2,300	U
2-Methylnaphthalene	810	U	1,000	U	2,300	U	2,300	U	11,000	U	440	U	950	U	2,300	U
2-Methylphenol	810	U	1,000	U	2,300	U	2,300	U	11,000	U	440	U	950	U	2,300	U
2-Nitroaniline	2,000	U	2,600	U	5,700	U	5,800	U	26,000	U	1,100	U	2,400	U	5,700	U
2-Nitrophenol	810	U	1,000	U	2,300	U	2,300	U	11,000	U	440	U	950	U	2,300	U
3,3'-Dichlorobenzidine	810	U	1,000	U	2,300	U	2,300	U	11,000	U	440	U	950	U	2,300	U
3-Nitroaniline	2,000	U	2,600	U	5,700	U	5,800	U	26,000	U	1,100	U	2,400	U	5,700	U
4,6-Dinitro-2-methylphenol	2,000	U	2,600	U	5,700	U	5,800	U	26,000	U	1,100	U	2,400	U	5,700	U
4-Bromophenyl-phenylether	810	U	1,000	U	2,300	U	2,300	U	11,000	U	440	U	950	U	2,300	U
4-Chloro-3-methylphenol	810	U	1,000	U	2,300	U	2,300	U	11,000	U	440	U	950	U	2,300	U
4-Chloroaniline	810	U	1,000	U	2,300	U	2,300	U	11,000	U	440	U	950	U	2,300	U
4-Chlorophenyl-phenylether	810	U	1,000	U	2,300	U	2,300	U	11,000	U	440	U	950	U	2,300	U
4-Methylphenol	810	U	1,000	U	2,300	U	2,300	U	11,000	U	440	U	130	J	2,300	U
4-Nitroaniline	2,000	U	2,600	U	5,700	U	5,800	U	26,000	U	1,100	U	2,400	U	5,700	U
4-Nitrophenol	2,000	U	2,600	U	5,700	U	5,800	U	26,000	U	1,100	U	2,400	U	5,700	U
Acenaphthene	810	U	1,000	U	2,300	U	2,300	U	11,000	U	440	U	950	U	2,300	U
Acenaphthylene	810	U	1,000	U	2,300	U	2,300	U	11,000	U	440	U	950	U	2,300	U
Acetophenone	810	U	1,000	U	2,300	U	2,300	U	11,000	U	440	U	950	U	2,300	U
Anthracene	810	U	1,000	U	2,300	U	2,300	U	11,000	U	440	U	170	J	2,300	U
Atrazine	810	U	1,000	U	2,300	U	2,300	U	11,000	U	440	U	950	U	2,300	U
Benzaldehyde	810	U	1,000	U	2,300	U	2,300	U	11,000	U	440	U	130	J	2,300	U
Benzo(a)anthracene	200	J	210	J	2,300	U	2,300	U	11,000	U	440	U	110	J	2,300	U

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Table B-3
NAB Little Creek
Navt CLEAN CTO-148, Long Term Monitoring Plan
Round 5, Analytical Data for Site 7 Sediment

Station ID	LS07-SD201		LS07-SD202		LS07-SD203				LS07-SD204		LS07-SD205		LS07-SD206		LS07-SD207	
Sample ID	LS07-SD201-01A		LS07-SD202-01A		LS07-SD203-01A		LS07-SD203P-01A		LS07-SD204-01A		LS07-SD205-01A		LS07-SD206-01A		LS07-SD207-01A	
Sample Date	03/01/01		03/02/01		03/01/01		03/01/01		03/02/01		03/01/01		03/02/01		03/02/01	
Chemical Name																
Benzo(a)pyrene	150	J	170	J	2,300	U	2,300	U	11,000	U	440	U	950	U	2,300	U
Benzo(b)fluoranthene	190	J	190	J	2,300	U	2,300	U	11,000	U	45	J	950	U	2,300	U
Benzo(g,h,i)perylene	110	J	1,000	U	2,300	U	2,300	U	11,000	U	440	U	950	U	2,300	U
Benzo(k)fluoranthene	180	J	140	J	2,300	U	2,300	U	11,000	U	440	U	100	J	2,300	U
Butylbenzylphthalate	810	U	1,000	U	2,300	U	2,300	U	11,000	U	440	U	950	U	2,300	U
Caprolactam	810	U	1,000	U	2,300	U	2,300	U	11,000	U	440	U	950	U	2,300	U
Carbazole	810	U	1,000	U	2,300	U	2,300	U	11,000	U	440	U	950	U	2,300	U
Chrysene	290	J	320	J	2,300	U	2,300	U	11,000	U	440	U	200	J	2,300	U
Di-n-butylphthalate	810	U	1,000	U	2,300	U	2,300	U	11,000	U	440	U	950	U	2,300	U
Di-n-octylphthalate	810	UJ	1,000	UJ	2,300	UJ	2,300	UJ	11,000	UJ	440	UJ	950	UJ	2,300	UJ
Dibenz(a,h)anthracene	810	U	1,000	U	2,300	U	2,300	U	11,000	U	440	U	950	U	2,300	U
Dibenzofuran	810	U	1,000	U	2,300	U	2,300	U	11,000	U	440	U	950	U	2,300	U
Diethylphthalate	810	U	1,000	U	2,300	U	2,300	U	11,000	U	440	U	950	U	2,300	U
Dimethyl phthalate	810	U	1,000	U	2,300	U	2,300	U	11,000	U	440	U	950	U	2,300	U
Fluoranthene	380	J	360	J	2,300	U	2,300	U	11,000	U	58	J	260	J	2,300	U
Fluorene	810	U	1,000	U	2,300	U	2,300	U	11,000	U	440	U	950	U	2,300	U
Hexachlorobenzene	810	U	1,000	U	2,300	U	2,300	U	11,000	U	440	U	950	U	2,300	U
Hexachlorobutadiene	810	U	1,000	U	2,300	U	2,300	U	11,000	U	440	U	950	U	2,300	U
Hexachlorocyclopentadiene	810	U	1,000	U	2,300	U	2,300	U	11,000	U	440	U	950	U	2,300	U
Hexachloroethane	810	U	1,000	U	2,300	U	2,300	U	11,000	U	440	U	950	U	2,300	U
Indeno(1,2,3-cd)pyrene	100	J	1,000	U	2,300	U	2,300	U	11,000	U	440	U	950	U	2,300	U
Isophorone	810	U	1,000	U	2,300	U	2,300	U	11,000	U	440	U	950	U	2,300	U
Naphthalene	810	U	1,000	U	2,300	U	2,300	U	11,000	U	440	U	950	U	2,300	U
Nitrobenzene	810	U	1,000	U	2,300	U	2,300	U	11,000	U	440	U	950	U	2,300	U
Pentachlorophenol	2,000	U	2,600	U	5,700	U	5,800	U	26,000	U	1,100	U	2,400	U	5,700	U
Phenanthrene	120	J	200	J	2,300	U	2,300	U	11,000	U	440	U	950	U	2,300	U
Phenol	810	U	1,000	U	2,300	U	2,300	U	11,000	U	440	U	950	U	2,300	U
Pyrene	340	J	330	J	2,300	U	2,300	U	11,000	U	72	J	210	J	2,300	U
bis(2-Chloroethoxy)methane	810	U	1,000	U	2,300	U	2,300	U	11,000	U	440	U	950	U	2,300	U
bis(2-Chloroethyl)ether	810	U	1,000	U	2,300	U	2,300	U	11,000	U	440	U	950	U	2,300	U
bis(2-Ethylhexyl)phthalate	87	B	460	J	2,300	U	2,300	U	11,000	U	370	B	120	B	2,300	U
n-Nitroso-di-n-propylamine	810	U	1,000	U	2,300	U	2,300	U	11,000	U	440	U	950	U	2,300	U
n-Nitrosodiphenylamine	810	U	1,000	U	2,300	U	2,300	U	11,000	U	440	U	950	U	2,300	U

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Table B-3
NAB Little Creek
Navt CLEAN CTO-148, Long Term Monitoring Plan
Round 5, Analytical Data for Site 7 Sediment

Station ID	LS07-SD201		LS07-SD202		LS07-SD203				LS07-SD204		LS07-SD205		LS07-SD206		LS07-SD207	
Sample ID	LS07-SD201-01A		LS07-SD202-01A		LS07-SD203-01A		LS07-SD203P-01A		LS07-SD204-01A		LS07-SD205-01A		LS07-SD206-01A		LS07-SD207-01A	
Sample Date	03/01/01		03/02/01		03/01/01		03/01/01		03/02/01		03/01/01		03/02/01		03/02/01	
Chemical Name																
Pesticide/Polychlorinated Biphenyls (UG/KG)																
4,4'-DDD	4	U	5.2	U	15		12		23		4.4	U	4.8	U	4.6	U
4,4'-DDE	4	U	5.2	U	4.6	U	4.7	U	13	J	4.4	U	4.8	U	4.6	U
4,4'-DDT	4	U	14	J	4.6	U	4.7	U	5.3	U	4.4	U	4.8	U	4.6	U
Aldrin	2.1	U	2.7	U	2.3	U	2.4	U	2.7	U	2.3	U	2.5	U	2.3	U
Aroclor-1016	40	U	52	U	46	U	47	U	53	U	44	U	48	U	46	U
Aroclor-1221	81	U	100	U	92	U	96	U	110	U	90	U	97	U	92	U
Aroclor-1232	40	U	52	U	46	U	47	U	53	U	44	U	48	U	46	U
Aroclor-1242	40	U	52	U	46	U	47	U	53	U	44	U	48	U	46	U
Aroclor-1248	40	U	52	U	46	U	47	U	53	U	44	U	48	U	46	U
Aroclor-1254	40	U	52	U	46	U	47	U	53	U	44	U	48	U	46	U
Aroclor-1260	40	U	260		46	U	47	U	53	U	44	U	48	U	46	U
Dieldrin	4	U	5.2	U	4.6	U	4.7	U	5.3	U	4.4	U	4.8	U	4.6	U
Endosulfan I	2.1	U	2.9	J	2.3	U	2.4	U	2.7	U	2.3	U	2.5	U	2.3	U
Endosulfan II	4	U	5.2	U	4.6	U	4.7	U	5.3	U	4.4	U	4.8	U	4.6	U
Endosulfan sulfate	4	U	5.2	U	4.6	U	4.7	U	5.3	U	4.4	U	4.8	U	4.6	U
Endrin	4	U	20	J	4.6	U	4.7	U	5.3	U	4.4	U	4.8	U	4.6	U
Endrin aldehyde	4	U	5.2	U	4.6	U	4.7	U	5.3	U	4.4	U	4.8	U	4.6	U
Endrin ketone	4	U	5.2	U	4.6	U	4.7	U	5.3	U	4.4	U	4.8	U	4.6	U
Heptachlor	2.1	U	2.7	U	2.3	U	2.4	U	2.7	U	2.3	U	2.5	U	2.3	U
Heptachlor epoxide	2.1	U	2.7	U	2.3	U	2.4	U	2.7	U	2.3	U	2.5	U	2.3	U
Methoxychlor	21	U	27	U	23	U	24	U	27	U	23	U	25	U	23	U
Toxaphene	210	U	270	U	230	U	240	U	270	U	230	U	250	U	230	U
alpha-BHC	2.1	U	2.7	U	2.3	U	2.4	U	2.7	U	2.3	U	2.5	U	2.3	U
alpha-Chlordane	2.1	U	2.7	U	2.3	U	2.4	U	2.7	U	2.3	U	2.5	U	2.3	U
beta-BHC	2.1	U	2.7	U	2.3	U	2.4	U	2.7	U	2.3	U	2.5	U	2.3	U
delta-BHC	2.1	U	2.7	U	2.3	U	2.4	U	2.7	U	2.3	U	2.5	U	2.3	U
gamma-BHC (Lindane)	2.1	U	2.7	UL	2.3	U	2.4	U	2.7	U	2.3	U	2.5	U	2.3	U
gamma-Chlordane	2.1	U	3.1		2.3	U	2.4	U	2.7	U	2.3	U	2.5	U	2.3	U
Total Metals (MG/KG)																
Aluminum	1,530		5,880		4,130		3,310		3,390		1,840		2,660		490	
Antimony	0.714	R	2.9	J	0.797	R	0.862	R	0.722	R	0.77	R	0.67	R	0.738	R
Arsenic	2.4	B	8.1		5.2		5.2		6.7		2.2	B	2.8		0.97	B

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Table B-3
NAB Little Creek
Navt CLEAN CTO-148, Long Term Monitoring Plan
Round 5, Analytical Data for Site 7 Sediment

Station ID	LS07-SD201		LS07-SD202		LS07-SD203		LS07-SD203		LS07-SD204		LS07-SD205		LS07-SD206		LS07-SD207	
Sample ID	LS07-SD201-01A		LS07-SD202-01A		LS07-SD203-01A		LS07-SD203P-01A		LS07-SD204-01A		LS07-SD205-01A		LS07-SD206-01A		LS07-SD207-01A	
Sample Date	03/01/01		03/02/01		03/01/01		03/01/01		03/02/01		03/01/01		03/02/01		03/02/01	
Chemical Name																
Barium	7.2	J	20.2	J	16.9	J	14.4	J	21.9	J	4.4	J	5.5	J	1.6	B
Beryllium	0.05	B	0.29	B	0.32	B	0.26	B	0.14	B	0.044	U	0.04	B	0.042	U
Cadmium	0.082	U	0.1	U	0.091	U	0.099	U	0.083	U	0.088	U	0.077	U	0.084	U
Calcium	898	J	1,500	B	821	J	729	J	942	B	661	J	894	B	149	B
Chromium	3.8		13.1		8.9		7.4		10.2		4.3		5.8		1.5	J
Cobalt	0.91	B	4.2	J	2.5	J	2.1	J	2.1	J	0.84	B	1.2	J	0.21	B
Copper	11	J	3,060	J	24.5	J	22.6	J	39.8	J	11.2	J	14.7	J	3.6	J
Cyanide	0.07	UL	0.1	UL	0.09	UL	0.09	UL	0.08	UL	0.08	UL	0.08	UL	0.08	UL
Iron	3,090		13,900		7,240		6,430		7,660		3,350		3,990		727	
Lead	6.3	J	172	J	10.6	J	9.4	J	21.9	J	5.4	J	6	J	2	J
Magnesium	611	J	1,830	B	991	J	702	J	895	J	783	J	954	B	356	B
Manganese	19.9		80		45.6		36.2		64.2		18.3		26.4		4.5	B
Mercury	0.02	R	0.03	R	0.03	R	0.03	R	0.03	R	0.03	R	0.03	R	0.03	R
Nickel	2.4	B	50.7	L	8.3	J	8	J	28.8	L	2.4	B	2.8	B	0.92	B
Potassium	367	J	1,170	B	596	J	454	J	392	B	422	J	636	B	196	B
Selenium	0.796	UL	0.974	UL	0.99	J	0.961	UL	0.805	UL	0.858	UL	0.77	J	0.822	UL
Silver	0.163	U	0.57	J	0.182	U	0.197	U	0.44	J	1.2	J	0.153	U	0.169	U
Sodium	1,850	J	2,740	B	870	B	846	B	962	B	2,120	J	2,320	B	2,120	B
Thallium	1.04	U	1.27	U	1.3	J	1.3	J	1.05	U	1.12	U	0.976	U	1.8	J
Vanadium	6	J	30.7		29.5		30		195		5.4	J	6.7	J	1.7	J
Zinc	32.7	L	188	L	45.7	L	43.4	L	104	L	38.2	L	38.5	L	8.7	B
Wet Chemistry (MG/KG)																
% Solids	18.4		25.7		7.3		7		11.2		8.1		17.8		3.3	
Total organic carbon (TOC)	5,950		15,100		21,100		25,000		23,700		4,520		4,380		2,690	
pH	7.85		7.86		7.07		7.22		7.38		7.67		7.23		6.89	

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Table B-3
NAB Little Creek
Navt CLEAN CTO-148, Long Term Monitoring Plan
Round 5, Analytical Data for Site 7 Sediment

Station ID	LS07-SD208				LS07-SD209		LS07-SD210		LS07-SD211		LS07-SD212				LS07-SD213	
Sample ID	LS07-SD208-01A		LS07-SD208P-01A		LS07-SD209-01A		LS07-SD210-01A		LS07-SD211-01A		LS07-SD212-01A		LS07-SD212P-01A		LS07-SD213-01A	
Sample Date	03/08/01		03/08/01		03/08/01		03/02/01		03/08/01		03/08/01		03/08/01		03/08/01	
Chemical Name																
Semivolatile Organic Compounds (UG/KG)																
1,1-Biphenyl	1,400	U	NA		2,300	U	2,700	U	2,400	U	930	U	2,200	U	430	U
2,2'-Oxybis(1-chloropropane)	1,400	U	NA		2,300	U	2,700	U	2,400	U	930	U	2,200	U	430	U
2,4,5-Trichlorophenol	3,500	U	NA		5,700	U	6,700	U	6,100	U	2,300	U	5,500	U	1,100	U
2,4,6-Trichlorophenol	1,400	U	NA		2,300	U	2,700	U	2,400	U	930	U	2,200	U	430	U
2,4-Dichlorophenol	1,400	U	NA		2,300	U	2,700	U	2,400	U	930	U	2,200	U	430	U
2,4-Dimethylphenol	1,400	U	NA		2,300	U	2,700	U	2,400	U	930	U	2,200	U	430	U
2,4-Dinitrophenol	3,500	U	NA		5,700	U	6,700	U	6,100	U	2,300	U	5,500	U	1,100	U
2,4-Dinitrotoluene	1,400	U	NA		2,300	U	2,700	U	2,400	U	930	U	2,200	U	430	U
2,6-Dinitrotoluene	1,400	U	NA		2,300	U	2,700	U	2,400	U	930	U	2,200	U	430	U
2-Chloronaphthalene	1,400	U	NA		2,300	U	2,700	U	2,400	U	930	U	2,200	U	430	U
2-Chlorophenol	1,400	U	NA		2,300	U	2,700	U	2,400	U	930	U	2,200	U	430	U
2-Methylnaphthalene	1,400	U	NA		2,300	U	2,700	U	2,400	U	930	U	2,200	U	430	U
2-Methylphenol	1,400	U	NA		2,300	U	2,700	U	2,400	U	930	U	2,200	U	430	U
2-Nitroaniline	3,500	U	NA		5,700	U	6,700	U	6,100	U	2,300	U	5,500	U	1,100	U
2-Nitrophenol	1,400	U	NA		2,300	U	2,700	U	2,400	U	930	U	2,200	U	430	U
3,3'-Dichlorobenzidine	1,400	U	NA		2,300	U	2,700	U	2,400	U	930	U	2,200	U	430	U
3-Nitroaniline	3,500	U	NA		5,700	U	6,700	U	6,100	U	2,300	U	5,500	U	1,100	U
4,6-Dinitro-2-methylphenol	3,500	U	NA		5,700	U	6,700	U	6,100	U	2,300	U	5,500	U	1,100	U
4-Bromophenyl-phenylether	1,400	U	NA		2,300	U	2,700	U	2,400	U	930	U	2,200	U	430	U
4-Chloro-3-methylphenol	1,400	U	NA		2,300	U	2,700	U	2,400	U	930	U	2,200	U	430	U
4-Chloroaniline	1,400	U	NA		2,300	U	2,700	U	2,400	U	930	U	2,200	U	430	U
4-Chlorophenyl-phenylether	1,400	U	NA		2,300	U	2,700	U	2,400	U	930	U	2,200	U	430	U
4-Methylphenol	1,400	U	NA		2,300	U	2,700	U	2,400	U	930	U	2,200	U	430	U
4-Nitroaniline	3,500	U	NA		5,700	U	6,700	U	6,100	U	2,300	U	5,500	U	1,100	U
4-Nitrophenol	3,500	U	NA		5,700	U	6,700	U	6,100	U	2,300	U	5,500	U	1,100	U
Acenaphthene	1,400	U	NA		2,300	U	2,700	U	2,400	U	930	U	2,200	U	430	U
Acenaphthylene	1,400	U	NA		2,300	U	2,700	U	2,400	U	930	U	2,200	U	430	U
Acetophenone	1,400	U	NA		2,300	U	2,700	U	2,400	U	930	U	2,200	U	430	U
Anthracene	1,400	U	NA		2,300	U	2,700	U	2,400	U	930	U	2,200	U	430	U
Atrazine	1,400	UJ	NA		2,300	UJ	2,700	U	2,400	UJ	930	UJ	2,200	UJ	430	UJ
Benzaldehyde	1,400	U	NA		2,300	U	2,700	U	2,400	U	930	U	2,200	U	430	U
Benzo(a)anthracene	1,400	U	NA		2,300	U	2,700	U	2,400	U	930	U	570	J	430	U

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Table B-3
NAB Little Creek
Navt CLEAN CTO-148, Long Term Monitoring Plan
Round 5, Analytical Data for Site 7 Sediment

Station ID	LS07-SD208		LS07-SD209	LS07-SD210	LS07-SD211	LS07-SD212		LS07-SD213
Sample ID	LS07-SD208-01A	LS07-SD208P-01A	LS07-SD209-01A	LS07-SD210-01A	LS07-SD211-01A	LS07-SD212-01A	LS07-SD212P-01A	LS07-SD213-01A
Sample Date	03/08/01	03/08/01	03/08/01	03/02/01	03/08/01	03/08/01	03/08/01	03/08/01
Chemical Name								
Benzo(a)pyrene	1,400 U	NA	2,300 U	2,700 U	2,400 U	930 U	570 J	430 U
Benzo(b)fluoranthene	190 J	NA	2,300 U	2,700 U	2,400 U	930 U	570 J	430 U
Benzo(g,h,i)perylene	1,400 U	NA	2,300 U	2,700 U	2,400 U	930 U	2,200 U	430 U
Benzo(k)fluoranthene	150 J	NA	2,300 U	2,700 U	2,400 U	930 U	540 J	430 U
Butylbenzylphthalate	1,400 U	NA	2,300 U	2,700 U	2,400 U	930 U	2,200 U	430 U
Caprolactam	1,400 U	NA	2,300 U	2,700 U	2,400 U	930 U	2,200 U	430 U
Carbazole	1,400 U	NA	2,300 U	2,700 U	2,400 U	930 U	2,200 U	430 U
Chrysene	210 J	NA	2,300 U	2,700 U	2,400 U	110 J	730 J	430 U
Di-n-butylphthalate	1,400 U	NA	2,300 U	2,700 U	2,400 U	930 U	2,200 U	430 U
Di-n-octylphthalate	1,400 U	NA	2,300 U	2,700 UJ	2,400 U	930 U	2,200 U	430 U
Dibenz(a,h)anthracene	1,400 U	NA	2,300 U	2,700 U	2,400 U	930 U	2,200 U	430 U
Dibenzofuran	1,400 U	NA	2,300 U	2,700 U	2,400 U	930 U	2,200 U	430 U
Diethylphthalate	1,400 U	NA	2,300 U	2,700 U	2,400 U	930 U	2,200 U	430 U
Dimethyl phthalate	1,400 U	NA	2,300 U	2,700 U	2,400 U	930 U	2,200 U	430 U
Fluoranthene	580 J	NA	490 J	2,700 U	2,400 U	140 J	1,100 J	430 U
Fluorene	1,400 U	NA	2,300 U	2,700 U	2,400 U	930 U	2,200 U	430 U
Hexachlorobenzene	1,400 U	NA	2,300 U	2,700 U	2,400 U	930 U	2,200 U	430 U
Hexachlorobutadiene	1,400 U	NA	2,300 U	2,700 U	2,400 U	930 U	2,200 U	430 U
Hexachlorocyclopentadiene	1,400 U	NA	2,300 U	2,700 U	2,400 U	930 U	2,200 U	430 U
Hexachloroethane	1,400 U	NA	2,300 U	2,700 U	2,400 U	930 U	2,200 U	430 U
Indeno(1,2,3-cd)pyrene	1,400 U	NA	2,300 U	2,700 U	2,400 U	930 U	250 J	430 U
Isophorone	1,400 U	NA	2,300 U	2,700 U	2,400 U	930 U	2,200 U	430 U
Naphthalene	1,400 U	NA	2,300 U	2,700 U	2,400 U	930 U	2,200 U	430 U
Nitrobenzene	1,400 U	NA	2,300 U	2,700 U	2,400 U	930 U	2,200 U	430 U
Pentachlorophenol	3,500 U	NA	5,700 U	6,700 U	6,100 U	2,300 U	5,500 U	1,100 U
Phenanthrene	1,400 U	NA	2,300 U	2,700 U	2,400 U	120 J	680 J	430 U
Phenol	1,400 U	NA	2,300 U	2,700 U	2,400 U	930 U	2,200 U	430 U
Pyrene	440 J	NA	370 J	2,700 U	2,400 U	150 J	1,000 J	430 U
bis(2-Chloroethoxy)methane	1,400 U	NA	2,300 U	2,700 U	2,400 U	930 U	2,200 U	430 U
bis(2-Chloroethyl)ether	1,400 U	NA	2,300 U	2,700 U	2,400 U	930 U	2,200 U	430 U
bis(2-Ethylhexyl)phthalate	1,400 U	NA	2,300 U	2,700 U	2,400 U	930 U	2,200 U	430 U
n-Nitroso-di-n-propylamine	1,400 U	NA	2,300 U	2,700 U	2,400 U	930 U	2,200 U	430 U
n-Nitrosodiphenylamine	1,400 U	NA	2,300 U	2,700 U	2,400 U	930 U	2,200 U	430 U

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K - Biased high
L - Biased low

R - Unusable
U - Undetected
UJ - Undetected, estimated limit
UL - Undetected, limit biased low

Table B-3
NAB Little Creek
Navt CLEAN CTO-148, Long Term Monitoring Plan
Round 5, Analytical Data for Site 7 Sediment

Station ID	LS07-SD208		LS07-SD209	LS07-SD210	LS07-SD211	LS07-SD212		LS07-SD213
Sample ID	LS07-SD208-01A	LS07-SD208P-01A	LS07-SD209-01A	LS07-SD210-01A	LS07-SD211-01A	LS07-SD212-01A	LS07-SD212P-01A	LS07-SD213-01A
Sample Date	03/08/01	03/08/01	03/08/01	03/02/01	03/08/01	03/08/01	03/08/01	03/08/01
Chemical Name								
Pesticide/Polychlorinated Biphenyls (UG/KG)								
4,4'-DDD	7.1 U	NA	4.6 U	5.3 UJ	4.8 U	4.7 U	4.5 U	4.2 U
4,4'-DDE	7.1 U	NA	4.6 U	5.3 UJ	4.8 U	4.7 U	4.5 U	4.2 U
4,4'-DDT	7.1 U	NA	4.6 U	5.3 UJ	4.8 U	4.7 U	4.5 U	4.2 U
Aldrin	3.6 U	NA	2.4 U	2.7 UJ	2.5 U	2.4 U	2.3 U	2.2 U
Aroclor-1016	71 U	NA	46 U	53 UJ	48 U	47 U	45 U	42 U
Aroclor-1221	140 U	NA	93 U	110 UJ	98 U	95 U	91 U	86 U
Aroclor-1232	71 U	NA	46 U	53 UJ	48 U	47 U	45 U	42 U
Aroclor-1242	71 U	NA	46 U	53 UJ	48 U	47 U	45 U	42 U
Aroclor-1248	71 U	NA	46 U	53 UJ	48 U	47 U	45 U	42 U
Aroclor-1254	71 U	NA	46 U	53 UJ	48 U	47 U	45 U	42 U
Aroclor-1260	71 U	NA	46 U	53 UJ	48 U	44 J	51 J	42 U
Dieldrin	7.1 U	NA	4.6 U	5.3 UJ	4.8 U	4.7 U	4.5 U	4.2 U
Endosulfan I	3.6 U	NA	2.4 U	2.7 UJ	2.5 U	2.4 U	2.3 U	2.2 U
Endosulfan II	7.1 U	NA	4.6 U	5.3 UJ	4.8 U	4.7 U	4.5 U	4.2 U
Endosulfan sulfate	7.1 U	NA	4.6 U	5.3 UJ	4.8 U	4.7 U	4.5 U	4.2 U
Endrin	7.1 U	NA	4.6 U	5.3 UJ	4.8 UL	4.7 U	4.5 U	4.2 U
Endrin aldehyde	7.1 U	NA	4.6 U	5.3 UJ	4.8 U	4.7 U	4.5 U	4.2 U
Endrin ketone	7.1 U	NA	4.6 U	5.3 UJ	12	4.7 U	4.5 U	4.2 U
Heptachlor	3.6 U	NA	2.4 U	2.7 UJ	2.5 U	2.4 U	2.3 U	2.2 U
Heptachlor epoxide	3.6 U	NA	2.4 U	2.7 UJ	2.5 U	2.4 U	2.3 U	2.2 U
Methoxychlor	36 U	NA	24 U	27 UJ	25 U	24 U	23 U	22 U
Toxaphene	360 U	NA	240 U	270 UJ	250 U	240 U	230 U	220 U
alpha-BHC	3.6 U	NA	2.4 U	2.7 UJ	2.5 U	2.4 U	2.3 U	2.2 U
alpha-Chlordane	3.6 U	NA	2.4 U	2.7 UJ	2.5 U	2.4 U	2.3 U	2.2 U
beta-BHC	3.6 U	NA	2.4 U	2.7 UJ	2.5 U	2.4 U	2.3 U	2.2 U
delta-BHC	3.6 U	NA	2.4 U	2.7 UJ	2.5 U	2.4 U	2.3 U	2.2 U
gamma-BHC (Lindane)	3.6 U	NA	2.4 U	2.7 UJ	2.5 UL	2.4 U	2.3 U	2.2 U
gamma-Chlordane	3.6 U	NA	2.4 U	2.7 UJ	2.5 U	2.4 U	2.3 U	2.2 U
Total Metals (MG/KG)								
Aluminum	8,510	NA	3,810	8,430	2,210	4,490	3,350	3,880
Antimony	1.21 R	NA	0.82 R	0.949 R	0.723 R	0.867 R	0.863 R	0.636 R
Arsenic	6.5 K	NA	3.2 K	6.5	5.3 K	8 K	7.5 K	4.5 K

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Table B-3
NAB Little Creek
Navt CLEAN CTO-148, Long Term Monitoring Plan
Round 5, Analytical Data for Site 7 Sediment

Station ID	LS07-SD208		LS07-SD209	LS07-SD210	LS07-SD211	LS07-SD212		LS07-SD213
Sample ID	LS07-SD208-01A	LS07-SD208P-01A	LS07-SD209-01A	LS07-SD210-01A	LS07-SD211-01A	LS07-SD212-01A	LS07-SD212P-01A	LS07-SD213-01A
Sample Date	03/08/01	03/08/01	03/08/01	03/02/01	03/08/01	03/08/01	03/08/01	03/08/01
Chemical Name								
Barium	17 J	NA	11.5 J	14.6 J	8.1 J	15.9 J	14.1 J	11.9 J
Beryllium	0.32 B	NA	0.1 B	0.31 B	0.2 B	0.29 B	0.22 B	0.05 B
Cadmium	0.21 B	NA	0.1 B	0.108 U	0.083 U	0.099 U	0.099 U	0.073 U
Calcium	1,180 J	NA	2,720 L	1,350 B	519 J	866 J	883 J	149 J
Chromium	15.9 L	NA	8.6 L	15.4	6.8 L	12 L	14.1 L	4.4 L
Cobalt	3.6 J	NA	1.8 J	3.5 J	2 J	2.8 J	2.6 J	2.4 J
Copper	34.4 L	NA	17.5 L	15.9 J	30.5 L	46.6 L	47.9 L	5.5 L
Cyanide	0.12 U	NA	0.1 U	0.11 UL	0.08 U	0.09 U	0.09 U	0.07 U
Iron	13,300	NA	7,400	13,700	6,840	11,300	9,830	3,160
Lead	21.9 J	NA	11.5 J	9.4 J	27.7 J	29.6 J	55.4 J	7.6 J
Magnesium	2,680 L	NA	1,200 L	2,640 B	684 J	1,080 J	937 J	321 J
Manganese	68 L	NA	50.5 L	102	33.9 L	56.1 L	53.4 L	13.7 L
Mercury	0.12 J	NA	0.08 J	0.04 R	0.1 B	0.1 B	0.1 B	0.06 B
Nickel	10 J	NA	5.1 J	8.3 J	10 L	9.5 J	8.2 J	2.6 J
Potassium	1,990 J	NA	893 J	1,670 B	476 J	764 J	593 J	188 B
Selenium	1.5 B	NA	0.914 UL	1.2 J	0.805 UL	0.966 UL	0.961 UL	0.708 UL
Silver	0.8 J	NA	0.188 R	0.217 U	0.165 R	0.198 R	0.197 R	0.145 R
Sodium	10,600 B	NA	5,010 B	3,650 B	3,940 B	4,000 B	3,900 B	2,340 B
Thallium	1.76 UL	NA	1.2 J	1.38 U	1.05 UL	1.26 UL	1.26 UL	0.926 UL
Vanadium	21.9 L	NA	11.6 J	19.8	18.2 L	24.9 L	24.2 L	8.7 J
Zinc	137 L	NA	79.1 L	39.2 L	110 L	174 L	164 L	11.4 L
Wet Chemistry (MG/KG)								
% Solids	48	59.1	26.7	70.3	11.2	17.9	NA	19.5
Total organic carbon (TOC)	23,300	NA	11,600	9,410	10,300	29,300	11,300	3,660
pH	7.79	NA	7.53	7.38	7.62	7.54	7.45	6.16

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Table B-4
NAB Little Creek
Navy CLEAN II CTO-148, Long Term Monitoring Plan
Round 5, Analytical Results for Site 7 Surface and Subsurface Soil

Station ID	LS07-SB201		LS07-SB202		LS07-SB203		LS07-SS201				LS07-SS202		LS07-SS203	
Sample ID	LS07-SB201-02		LS07-SB202-02		LS07-SB203-02		LS07-SS201-00		LS07-SS201P-00		LS07-SS202-00		LS07-SS203-00	
Sample Date	02/28/01		02/28/01		02/28/01		02/28/01		02/28/01		02/28/01		02/28/01	
Chemical Name														
Semivolatile Organic Compounds (UG/KG)														
1,1-Biphenyl	4,300	U	350	U	2,000	U	400	U	440	U	360	U	420	U
2,2'-Oxybis(1-chloropropane)	4,300	U	350	U	2,000	U	400	U	440	U	360	U	420	U
2,4,5-Trichlorophenol	11,000	U	870	U	5,100	U	1,000	U	1,100	U	910	U	1,100	U
2,4,6-Trichlorophenol	4,300	U	350	U	2,000	U	400	U	440	U	360	U	420	U
2,4-Dichlorophenol	4,300	U	350	U	2,000	U	400	U	440	U	360	U	420	U
2,4-Dimethylphenol	4,300	U	350	U	2,000	U	400	U	440	U	360	U	420	U
2,4-Dinitrophenol	11,000	U	870	U	5,100	U	1,000	U	1,100	U	910	U	1,100	U
2,4-Dinitrotoluene	4,300	U	350	U	2,000	U	400	U	440	U	360	U	420	U
2,6-Dinitrotoluene	4,300	U	350	U	2,000	U	400	U	440	U	360	U	420	U
2-Chloronaphthalene	4,300	U	350	U	2,000	U	400	U	440	U	360	U	420	U
2-Chlorophenol	4,300	U	350	U	2,000	U	400	U	440	U	360	U	420	U
2-Methylnaphthalene	4,300	U	350	U	2,000	U	400	U	440	U	360	U	420	U
2-Methylphenol	4,300	U	350	U	2,000	U	400	U	440	U	360	U	420	U
2-Nitroaniline	11,000	U	870	U	5,100	U	1,000	U	1,100	U	910	U	1,100	U
2-Nitrophenol	4,300	U	350	U	2,000	U	400	U	440	U	360	U	420	U
3,3'-Dichlorobenzidine	4,300	U	350	U	2,000	U	400	U	440	U	360	U	420	U
3-Nitroaniline	11,000	U	870	U	5,100	U	1,000	U	1,100	U	910	U	1,100	U
4,6-Dinitro-2-methylphenol	11,000	U	870	U	5,100	U	1,000	U	1,100	U	910	U	1,100	U
4-Bromophenyl-phenylether	4,300	U	350	U	2,000	U	400	U	440	U	360	U	420	U
4-Chloro-3-methylphenol	4,300	U	350	U	2,000	U	400	U	440	U	360	U	420	U
4-Chloroaniline	4,300	U	350	U	2,000	U	400	U	440	U	360	U	420	U
4-Chlorophenyl-phenylether	4,300	U	350	U	2,000	U	400	U	440	U	360	U	420	U
4-Methylphenol	4,300	U	350	U	2,000	U	400	U	440	U	360	U	420	U
4-Nitroaniline	11,000	U	870	U	5,100	U	1,000	U	1,100	U	910	U	1,100	U
4-Nitrophenol	11,000	U	870	U	5,100	U	1,000	U	1,100	U	910	U	1,100	U
Acenaphthene	4,300	U	350	U	2,000	U	400	U	440	U	360	U	420	U
Acenaphthylene	4,300	U	350	U	2,000	U	400	U	440	U	360	U	420	U
Acetophenone	4,300	U	350	U	2,000	U	400	U	440	U	360	U	420	U
Anthracene	4,300	U	350	U	2,000	U	400	U	440	U	360	U	420	U
Atrazine	4,300	UJ	350	UJ	2,000	UJ	400	UJ	440	UJ	360	UJ	420	UJ
Benzaldehyde	4,300	U	350	U	2,000	U	400	U	440	U	360	U	420	U
Benzo(a)anthracene	4,300	U	350	U	2,000	U	400	U	440	U	360	U	420	U
Benzo(a)pyrene	4,300	U	350	U	2,000	U	400	U	440	U	360	U	420	U

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Table B-4
NAB Little Creek
Navy CLEAN II CTO-148, Long Term Monitoring Plan
Round 5, Analytical Results for Site 7 Surface and Subsurface Soil

Station ID	LS07-SB201		LS07-SB202		LS07-SB203		LS07-SS201				LS07-SS202		LS07-SS203	
Sample ID	LS07-SB201-02		LS07-SB202-02		LS07-SB203-02		LS07-SS201-00		LS07-SS201P-00		LS07-SS202-00		LS07-SS203-00	
Sample Date	02/28/01		02/28/01		02/28/01		02/28/01		02/28/01		02/28/01		02/28/01	
Chemical Name														
Benzo(b)fluoranthene	4,300	U	350	U	2,000	U	50	J	80	J	360	U	420	U
Benzo(g,h,i)perylene	4,300	U	350	U	2,000	U	400	U	440	U	360	U	420	U
Benzo(k)fluoranthene	4,300	U	350	U	2,000	U	400	U	45	J	360	U	420	U
Butylbenzylphthalate	4,300	U	350	U	2,000	U	400	U	440	U	360	U	420	U
Caprolactam	4,300	U	350	U	2,000	U	400	U	440	U	360	U	420	U
Carbazole	4,300	U	350	U	2,000	U	400	U	440	U	360	U	420	U
Chrysene	4,300	U	350	U	2,000	U	45	J	70	J	360	U	420	U
Di-n-butylphthalate	4,300	U	350	U	2,000	U	400	U	440	U	360	U	420	U
Di-n-octylphthalate	4,300	U	350	U	2,000	U	400	U	440	U	360	U	420	U
Dibenz(a,h)anthracene	4,300	U	350	U	2,000	U	400	U	440	U	360	U	420	U
Dibenzofuran	4,300	U	350	U	2,000	U	400	U	440	U	360	U	420	U
Diethylphthalate	4,300	U	350	U	2,000	U	400	U	440	U	360	U	420	U
Dimethyl phthalate	4,300	U	350	U	2,000	U	400	U	440	U	360	U	420	U
Fluoranthene	4,300	U	350	U	2,000	U	400	U	440	U	360	U	420	U
Fluorene	4,300	U	350	U	2,000	U	400	U	440	U	360	U	420	U
Hexachlorobenzene	4,300	U	350	U	2,000	U	400	U	440	U	360	U	420	U
Hexachlorobutadiene	4,300	U	350	U	2,000	U	400	U	440	U	360	U	420	U
Hexachlorocyclopentadiene	4,300	U	350	U	2,000	U	400	U	440	U	360	U	420	U
Hexachloroethane	4,300	U	350	U	2,000	U	400	U	440	U	360	U	420	U
Indeno(1,2,3-cd)pyrene	4,300	U	350	U	2,000	U	400	U	440	U	360	U	420	U
Isophorone	4,300	U	350	U	2,000	U	400	U	440	U	360	U	420	U
Naphthalene	4,300	U	350	U	2,000	U	400	U	440	U	360	U	420	U
Nitrobenzene	4,300	U	350	U	2,000	U	400	U	440	U	360	U	420	U
Pentachlorophenol	11,000	U	870	U	5,100	U	1,000	U	1,100	U	910	U	1,100	U
Phenanthrene	4,300	U	350	U	2,000	U	400	U	440	U	360	U	420	U
Phenol	4,300	U	350	U	2,000	U	400	U	440	U	360	U	420	U
Pyrene	4,300	U	350	U	2,000	U	400	U	440	U	360	U	420	U
bis(2-Chloroethoxy)methane	4,300	U	350	U	2,000	U	400	U	440	U	360	U	420	U
bis(2-Chloroethyl)ether	4,300	U	350	U	2,000	U	400	U	440	U	360	U	420	U
bis(2-Ethylhexyl)phthalate	4,300	U	100	B	2,000	U	400	U	440	U	360	U	170	B
n-Nitroso-di-n-propylamine	4,300	UL	350	UL	2,000	UL	400	UL	440	UL	360	UL	420	UL
n-Nitrosodiphenylamine	4,300	U	350	U	2,000	U	400	U	440	U	360	U	420	U
Pesticide/Polychlorinated Biphenyls (UG/KG)														
4,4'-DDD	4.6		3.5	U	20		3.8	U	4.3	U	3.6	U	4.2	U

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Table B-4
NAB Little Creek
Navy CLEAN II CTO-148, Long Term Monitoring Plan
Round 5, Analytical Results for Site 7 Surface and Subsurface Soil

Station ID	LS07-SB201		LS07-SB202		LS07-SB203		LS07-SS201				LS07-SS202		LS07-SS203	
Sample ID	LS07-SB201-02		LS07-SB202-02		LS07-SB203-02		LS07-SS201-00		LS07-SS201P-00		LS07-SS202-00		LS07-SS203-00	
Sample Date	02/28/01		02/28/01		02/28/01		02/28/01		02/28/01		02/28/01		02/28/01	
Chemical Name														
4,4'-DDE	10		3.5	U	5.8	J	3.8	U	4.3	U	3.6	U	4.2	U
4,4'-DDT	4.2	U	3.5	U	4.1	U	3.8	U	4.3	U	3.6	U	4.2	U
Aldrin	2.2	U	1.8	U	2.1	U	2	U	2.2	U	1.9	U	2.2	U
Aroclor-1016	42	U	35	U	41	U	38	U	43	U	36	U	42	U
Aroclor-1221	86	U	70	U	82	U	77	U	88	U	74	U	86	U
Aroclor-1232	42	U	35	U	41	U	38	U	43	U	36	U	42	U
Aroclor-1242	50		35	U	41	U	38	U	43	U	36	U	42	U
Aroclor-1248	42	U	35	U	41	U	38	U	43	U	36	U	42	U
Aroclor-1254	42	U	35	U	110		38	U	43	U	36	U	60	
Aroclor-1260	42	U	35	U	110		38	U	43	U	36	U	99	J
Dieldrin	4.2	U	3.5	U	4.1	U	3.8	U	4.3	U	3.6	U	4.2	U
Endosulfan I	2.2	U	1.8	U	2.1	U	2	U	2.2	U	1.9	U	2.2	U
Endosulfan II	4.2	U	3.5	U	4.1	U	3.8	U	4.3	U	3.6	U	4.2	U
Endosulfan sulfate	4.2	U	3.5	U	4.1	U	3.8	U	4.3	U	3.6	U	4.2	U
Endrin	4.2	U	3.5	U	4.1	U	3.8	U	4.3	U	3.6	U	4.2	U
Endrin aldehyde	4.2	U	3.5	U	4.1	U	3.8	U	4.3	U	3.6	U	4.2	U
Endrin ketone	4.2	U	3.5	U	4.1	U	3.8	U	4.3	U	3.6	U	4.2	U
Heptachlor	2.2	U	1.8	U	2.1	U	2	U	2.2	U	1.9	U	2.2	U
Heptachlor epoxide	2.2	U	1.8	U	2.1	U	2	U	2.2	U	1.9	U	2.2	U
Methoxychlor	22	U	18	U	21	U	20	U	22	U	19	U	22	U
Toxaphene	220	U	180	U	210	U	200	U	220	U	190	U	220	U
alpha-BHC	2.2	U	1.8	U	2.1	U	2	U	2.2	U	1.9	U	2.2	U
alpha-Chlordane	2.2	U	1.8	U	16		2	U	2.2	U	1.9	U	20	
beta-BHC	2.2	U	1.8	U	2.1	U	2	U	2.2	U	1.9	U	2.2	U
delta-BHC	2.2	U	1.8	U	2.1	U	2	U	2.2	U	1.9	U	2.2	U
gamma-BHC (Lindane)	2.2	UL	1.8	U	2.1	U	2	U	2.2	U	1.9	U	2.2	U
gamma-Chlordane	2.2	U	1.8	U	15		2	U	2.2	U	1.9	U	15	
Total Metals (MG/KG)														
Aluminum	7,510		1,450		4,170		6,180		4,660		2,070		5,800	
Antimony	0.809	UL	0.556	UL	1.3	J	1.1	J	0.841	UL	0.647	UL	1.9	J
Arsenic	3.8	B	1.7	B	3.5	B	4.1		4.6		2.3	B	3.7	B
Barium	54.6		3.8	J	76.3		24.3	J	18.6	J	7.8	J	31.1	J
Beryllium	2.3		0.032	U	2.8		0.21	B	0.15	B	0.037	U	0.47	B
Cadmium	0.092	U	0.064	U	0.08	B	0.094	U	0.096	U	0.074	U	0.2	B

NA - Not analyzed
B - Blank contamination
J - Estimated
K - Biased high
L - Biased low

U - Undetected
UJ - Undetected, estimated limit
UL - Undetected, limit biased low

Table B-4
NAB Little Creek
Navy CLEAN II CTO-148, Long Term Monitoring Plan
Round 5, Analytical Results for Site 7 Surface and Subsurface Soil

Station ID	LS07-SB201		LS07-SB202		LS07-SB203		LS07-SS201				LS07-SS202		LS07-SS203	
Sample ID	LS07-SB201-02		LS07-SB202-02		LS07-SB203-02		LS07-SS201-00		LS07-SS201P-00		LS07-SS202-00		LS07-SS203-00	
Sample Date	02/28/01		02/28/01		02/28/01		02/28/01		02/28/01		02/28/01		02/28/01	
Chemical Name														
Calcium	2,470		1,180		1,590		441	J	426	J	515	J	400	J
Chromium	21.7	J	3.3	J	22.4	J	14	J	11	J	4.8	J	13.4	J
Cobalt	9.2	J	0.89	B	14.8		2	J	1.4	J	0.62	B	1.7	J
Copper	747	J	3.5	J	396	J	37.9	J	32.8	J	6.5	J	55.4	J
Cyanide	0.07	U	0.07	U	0.08	U	0.07	U	0.07	U	0.09	J	0.09	U
Iron	21,800		1,950		12,300		8,840		7,910		3,310		7,540	
Lead	218	J	2.1	J	289	J	41.9	J	40	J	11.8	J	143	J
Magnesium	1,170	L	295	J	475	J	949	J	795	J	435	J	369	J
Manganese	133	K	26.2	K	126	K	34.9	K	27.9	K	19.6	K	28	K
Mercury	0.03	J	0.02	U	0.12		0.03	U	0.03	U	0.03	J	0.2	
Nickel	43.6		2.9	B	116		6.8	J	5.7	J	2.2	B	12.1	
Potassium	1,080	J	237	B	213	B	666	J	631	J	434	J	276	B
Selenium	0.902	UL	0.619	UL	0.8	J	0.93	J	0.937	UL	0.721	UL	0.834	UL
Silver	0.185	U	0.127	U	0.154	U	0.189	U	0.192	U	0.148	U	0.171	U
Sodium	515	J	53.8	B	784	J	422	J	300	J	132	B	116	B
Thallium	1.18	U	0.81	U	0.984	U	1.20	U	1.23	U	1	J	1.09	U
Vanadium	23.5		4	J	14.7		26		23		10		21.6	
Zinc	806		14.7	B	1,540		55.2		48.4	B	13.2	B	146	

NA - Not analyzed
B - Blank contamination
J - Estimated
K - Biased high
L - Biased low

U - Undetected
UJ - Undetected, estimated limit
UL - Undetected, limit biased low

Appendix C
Data Validation Summaries
(Included in the Original Letter Report)

Appendix D
Grain Size Distribution Results
For Sediment Samples
(Included in the Original Letter Report)

Appendix C
Round 6 Long-Term Monitoring Letter Report

March 28, 2002

163738.LT.AR
01-PAL-164

Commander
LANTNAVFACENGCOM
Attention: Code EV22-DMH, Ms. Dawn Hayes, P.E.
Lafayette Annex, Building A
6505 Hampton Boulevard
Norfolk, VA 23511-2699

Subject: Navy CLEAN II Program
Contract No. N62470-95-D-6007
Contract Task Order 0210
Long Term Monitoring Round 6 Letter Report
NAB-Little Creek Site 7

Dear Ms. Hayes:

This long-term-monitoring letter report documents activities and results of the sixth round of post-remedial-action groundwater, surface water, and sediment sampling at Site 7 (The Amphibious Base Landfill), Naval Amphibious Base (NAB) Little Creek, Virginia Beach, Virginia. The base location map is provided as Figure 1. The location of Site 7 within the base is shown in Figure 2.

This sampling event is the sixth round of a five-year semi-annual long term monitoring program for Site 7. The long-term monitoring program has been established to monitor groundwater, surface water, and sediment quality at Site 7 due to the former use of the site and its proximity to the Chesapeake Bay and other surface nearby water bodies. CH2M HILL conducted this sixth round of sampling on September 10-13, and September 20, 2001. All sampling activities were conducted in accordance with the Revised Project Plans for the Long-Term Monitoring Program at Site 7 (Rounds 5 to 10) (CH2M HILL, February, 2001). All sample locations are shown in Figure 3.

Groundwater Monitoring Activities

The groundwater monitoring wells were gauged on September 10, 2001. Table 1 shows the water level elevations calculated from the recorded depth to water measurements. Figure 4 shows the estimated piezometric surface of Site 7.

Groundwater samples were collected from six existing monitoring wells at Site 7: LS07-MW01, LS07-MW03, LS07-MW06, LS07-MW07, LS07-MW08, and LS07-MW09 (See Figure 3). All samples were collected from wells that have been previously developed, thus the wells were not re-

developed prior to sampling. All groundwater samples were collected with a peristaltic pump using a low-flow purge rate.

Low flow purging involves removing groundwater from the well at a rate (generally 300 to 400 mL/min) such that the water level in the well does not decrease significantly, assuring that groundwater, rather than standing column water, is collected. To verify the water level is not decreasing, the water level is monitored with a water level indicator during purging and sampling. The purging continues until water quality parameters stabilize within 10 percent after three consecutive readings. The water quality parameters were measured with a Horiba U-22 Water Quality Meter, and included pH, specific conductance, dissolved oxygen (DO), and temperature. Daily calibrations of the Horiba U-22 were performed to ensure accurate measurements. Table 2 includes the final stabilized field parameters reached prior to sample collection for each monitoring well.

All groundwater samples from Site 7 were analyzed for TCL organics (volatiles, semivolatiles, pesticides, and PCBs), total TAL metals, dissolved TAL metals, and cyanide.

All groundwater samples were placed in containers and preserved according to Navy protocol as noted in Table 3.

Purged groundwater from the monitoring wells was contained on site in 5-gallon buckets and transferred to appropriately labeled 55-gallon drums for disposal. CH2M HILL subcontracted out the disposal of IDW material in the investigation-derived waste (IDW) drums after completion of the sampling event.

Surface Water and Sediment Sampling Activities

The sixth round of surface water and sediment sampling was conducted on September 11,13, and 20, 2001. Surface water and sediment samples were collected from seven locations previously sampled at Site 7: LS07-SW/SD201, LS07-SW/SD202, LS07-SW/SD203, LS07-SW/SD204, LS07-SW/SD205, LS07-SW/SD206, and LS07-SW/SD207. In addition, the following locations have been added to the LTM sampling efforts (See Figure 3):

- Two locations in a small “pond” just south of the sampling locations LS07-SW/SD206 and LS07-SW/SD207, one in the southwest corner abutting the landfill (LS07-SW/SD209) and the second at the outlet of the pond (LS07-SW/SD208), to evaluate the impacts to this pond.
- One sample near the end of the drainage swale located along the southern edge of the landfill (LS07-SW/SD210).
- Three locations in the drainage canal present along the western site boundary, the first (LS07-SW/SD211) about midway between sampling locations 201 and 202, the second where the drainage swale enters the canal (LS07-SW/SD212), and the third (LS07-SW/SD213) just north of Shore Drive.
- Surface water samples were analyzed for TCL VOCs and total and dissolved TAL metals, plus cyanide. Sediment samples were analyzed for TCL SVOCs, pesticides/PCBs, TAL metals and cyanide, total organic carbon (TOC), pH, and grain size distribution. The grain size distributions may be found in Appendix D.

All surface water and sediment samples were placed in containers and preserved according to Navy protocol as presented in Tables 3 and 4, respectively.

Sampling Results

The laboratory that performed the analyses of the samples collected during Round 6 is approved by the Navy for the CLEAN II project. Appendix A lists the analytical parameters and reporting limits for the analyses completed in Round 6. Table 5 shows the detected analytical results for the groundwater samples at Site 7, Table 6 shows the surface water detected analytical results, and Table 7 shows the sediment detected analytical results. Note that if a constituent was not detected in any of the samples, it does not appear in the tables. If a constituent is detected in at least one location for a given media, all the results for that compound are listed in the table. The sample results flagged with a "U" show that the compound was not detected in that sample, and the concentration beside the "U" is the detection limit achieved for the compound in that sample. Complete results with validation qualifiers for all constituents are found in Appendix B.

Analytical results were validated using EPA Region III Modifications to the National Functional Guidelines. The data validation report summary is in Appendix C.

Groundwater

Groundwater samples were obtained from six monitoring wells during the sixth round of sampling as part of the LTM Plan at the Site 7 Landfill. The detected concentrations of analytes in groundwater from round six are summarized in Table 5.

Volatile Organic Compounds

All monitoring wells were sampled for TCL VOCs during Round six. The only detected VOCs were 2-butanone in LS07-MW08 at 1 μg/L, and toluene in LS07-MW01 and its duplicate sample at 2 μg/L.

Semivolatile Organic Compounds

All monitoring wells were sampled for TCL SVOCs during round six. The only detected SVOCs were Di-n-butylphthalate and bis(2-Ethyhexyl)phthalate. Di-n-butylphthalate was detected in LS07-MW01 at 12 μg/L, LS07-MW07 at 1.9 μg/L, LS07-MW08 at 5.6 μg/L, and LS07-MW09 at 4 μg/L. Bis(2-Ethylhexyl)phthalate was detected in LS07-MW09 and LS07-MW01P, a duplicate sample for LS07-MW01 at an estimated 1 μg/L.

Total and Dissolved Metals

Seventeen total metals were detected at least once in the six monitoring wells sampled. Barium, calcium, magnesium, manganese, potassium, and sodium were detected in all of the monitoring wells. Arsenic was only detected in LS07-MW06 at a concentration of 27.5 μg/L. Nickel was found in the monitoring wells LS07-MW03 and LS07-MW08 at estimated concentrations of 5.1 μg/L and 12.5 μg/L, respectively. Zinc was detected at 89.6 mg/L in LS07-MW03 but below 4.3 μg/L in the other two monitoring wells in which it was detected.

Sixteen dissolved metals were detected at least once in the six monitoring wells sampled. Lead was detected in the dissolved metal sample from LS07-MW07 at 1.5 µg/L, but was not detected in any of the total metals samples. Chromium was detected in four and copper was detected in one of the monitoring wells in the total metals analysis, but not in any of the filtered samples. Arsenic was also only detected in the filtered sample from LS07-MW06 at a concentration of 22 µg/L.

Surface Water

Table 6 presents analytes detected in the surface water during Round 6 sampling at Site 7. The following paragraphs provide information about which analytes were detected in the surface water samples.

Volatile Organic Compounds

Concentrations of volatile organic compounds were detected LS07-SW202, LS07-SW203, LS07-SW204, LS07-SW205, LS07-SW210, and LS07-MW212. 1,1,2,2-TCA was detected at an estimated concentration of 1 µg/L in LS07-SW203. Acetone was detected in LS07-SW203, LS07-SW204, LS07-SW205, and LS07-SW212, with the maximum detection concentration in monitoring well LS07-SW203 at 4 µg/L. Detections of methyl-tert-butyl ether (MTBE) and toluene were both found in LS07-SW202 at and estimated concentration of 1 µg/L. MTBE was also found in LS07-SW210 at an estimated 2.1 µg/L, and methylene chloride was detected at an estimated 2 mg/L in LS07-SW212.

Total and Dissolved Metals

The following analytes were detected in all surface water samples: barium, calcium, magnesium, manganese, and sodium. Eighteen total metals were detected in at least of the surface water samples collected at Site 7. Aluminum was detected in all but one (LS07-SW203) surface water sample. Arsenic was detected in four of the samples and had a maximum concentration estimated at 6.9 µg/L in LS07-SW203. Lead was detected in six of the surface water samples and had a maximum concentration of 4.2 µg/L in LS07-SW209. Silver was only detected in one sample (LS07-SW 207) at an estimated 1.4 µg/L.

Sixteen dissolved metals were detected in the surface water samples collected at Site 7. Only antimony and silver was detected in the total samples and not the dissolved samples.

Sediment

Table 7 presents analytes detected in the sediment during Round 6 sampling at Site 7. All sediment samples were analyzed for grain size; the particle size distribution graphs are presented in Appendix D. The results of wet chemistry analyses (% solids, TOC, and pH) are also included in Table 7. The following paragraphs provide information about which analytes were detected in the sediment samples.

Semivolatile Organic Compounds

Concentrations of SVOCs in sediment were detected in all but the following samples: LS07-SD201, LS07-SD206, and LS07-SD207. A total of 22 SVOCs were detected in the sediment samples collected at Site 7. Eighteen of these were detected in the duplicate sample for LS07-SD204. Nearly

all of the detected concentrations are estimated below the laboratory detection limit. The following SVOCs were detected at concentrations above detection limits in the duplicate for LS07-SD204: acetophenone (also LS07-SD208), benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, chrysene, flouranthene, phenanthrene, and pyrene.

Pesticides and Polychlorinated Biphenyls (PCBs)

Three pesticides and one PCB were detected in the sediment samples collected at Site 7. The pesticides 4,4'-DDD, 4, 4'-DDE, and 4,4'-DDT were detected in samples LS07-SD203 and LS07-SD204 (and its duplicate) at concentrations estimated below the detection limit. The only exceptions were 4,4'-DDD at 13 µg/kg and 4,4'-DDE at 7.1 µg/kg in sample LS07-SD203, which are above the detection limit of 4.7 µg/kg.

The detected PCB, Aroclor 1260, was found in the duplicate sample for LS07-SD202, LS07-SD208, and LS07-SD209 at 120 µg/kg, 74, µg/kg, and 100 µg/kg, respectively.

Metals

All twenty three of the TAL metals were detected in at least one of the sediment samples collected at Site 7. With the exception of antimony, selenium, and thallium, nearly all constituents were detected in each of the samples. Table 7 provides a complete summary of the metals results for the sediment samples.

Quality Assurance/Quality Control (QA/QC)

The complete results of the QA/QC data can be found in Table 8. One VOC, one SVOC, one PCB, ten total metals, and twelve dissolved metals were found in these samples. The volatile organic compound MTBE was found in both trip blanks and in the field blank at concentrations ranging from 1.0 to 1.2 µg/L. The semi-volatile organic compound di-n-butyl phthalate had a concentration of 2.00 µg/L in an equipment blank sample. The only detection of a PCB occurred in an equipment blank and the field blank samples. Both concentrations of endrin aldehyde were estimated below the laboratory detection limit. Several metals, both total and dissolved, were detected in the equipment and field blank samples.

Statistical Analyses

The complete set of groundwater data obtained through Round 6 of the long-term monitoring program at Site 7 was compiled to perform statistical analyses in accordance with the Virginia Solid Waste Management Regulations (VSWMR), Part V, 9 VAC 20-80-250, Appendix 5.4 (Statistical Test Methods). Data were compared to the VWWMR Appendix 5.5 list of parameters for detection monitoring. VSWMR calls for EPA SW846 analytical methods; however, the groundwater samples collected at Site 7 were analyzed under the EPA's Contract Laboratory Program (CLP) methodology for Target Analyte List (TAL) inorganics and Target Compound List (TCL) organics. The detected constituents were then compared to the Appendix 5.5 list of parameters, and statistics were performed on these analytes. All of the detected parameters were part of the Appendix 5.5 list.

The statistical method used to analyze the long-term data obtained at Site 7 was an Analysis of Variance (ANOVA) based on ranks followed by multiple comparisons procedures to identify

statistically significant evidence of contamination, as described by A(2) in Appendix 5.4 of the VSWMR. A summary of the statistical analyses, including a technical memorandum outlining the statistical methodologies used and its associated figures and tables are included as Appendix E.

The results of the statistical analyses show that among the 20 parameters analyzed, the upgradient concentrations in monitoring well LS07-MW03 are commonly elevated above cross- or down-gradient concentrations. The one exception to this trend is barium, which is elevated in the down-gradient monitoring wells, specifically LS07-MW09, which had a concentration of 174 µg/L. The base-wide background value for barium as determined in the pending Final Background Investigation for NAB Little Creek (CH2M HILL) is 130 µg/L. All remaining detections of barium in Site 7 monitoring wells were below this established background level. The MCL for barium is 2,000 µg/L, the EPA Region III tap water RBC is 2,600 µg/L, and the Virginia Groundwater Quality Standard (Statewide) is 1,000 µg/L.

Summary

The sixth round of long-term-monitoring has been completed at NAB Little Creek, Site 7. This letter report documents the sampling activities and presents the results of the groundwater, surface water, and sediment sampling at Site 7, the Amphibious Base Landfill, in accordance with the long-term-monitoring plan.

Based upon the findings of the statistical analyses according to VSWMR, the landfill shows only one statistically significant increase (SSI) between up- and down-gradient groundwater constituents. The concentration of this SSI (barium, LS07-MW09) is well below applicable regulatory criteria (MCL, RBC, VA GWQS) and only slightly above the basewide background value. The groundwater quality data available at Site 7 through six rounds of the long-term monitoring indicate that site conditions are stable over the study period, and that changes observed are generally attributable to fluctuations in laboratory reporting limits, not analyte concentrations. As such, the status of the long-term monitoring program at Site 7 should be re-evaluated to determine if it may be possible continue the long term monitoring program in accordance with the Phase I monitoring program for sanitary landfills per VSWMR while the site is being evaluated under the CERCLA process.

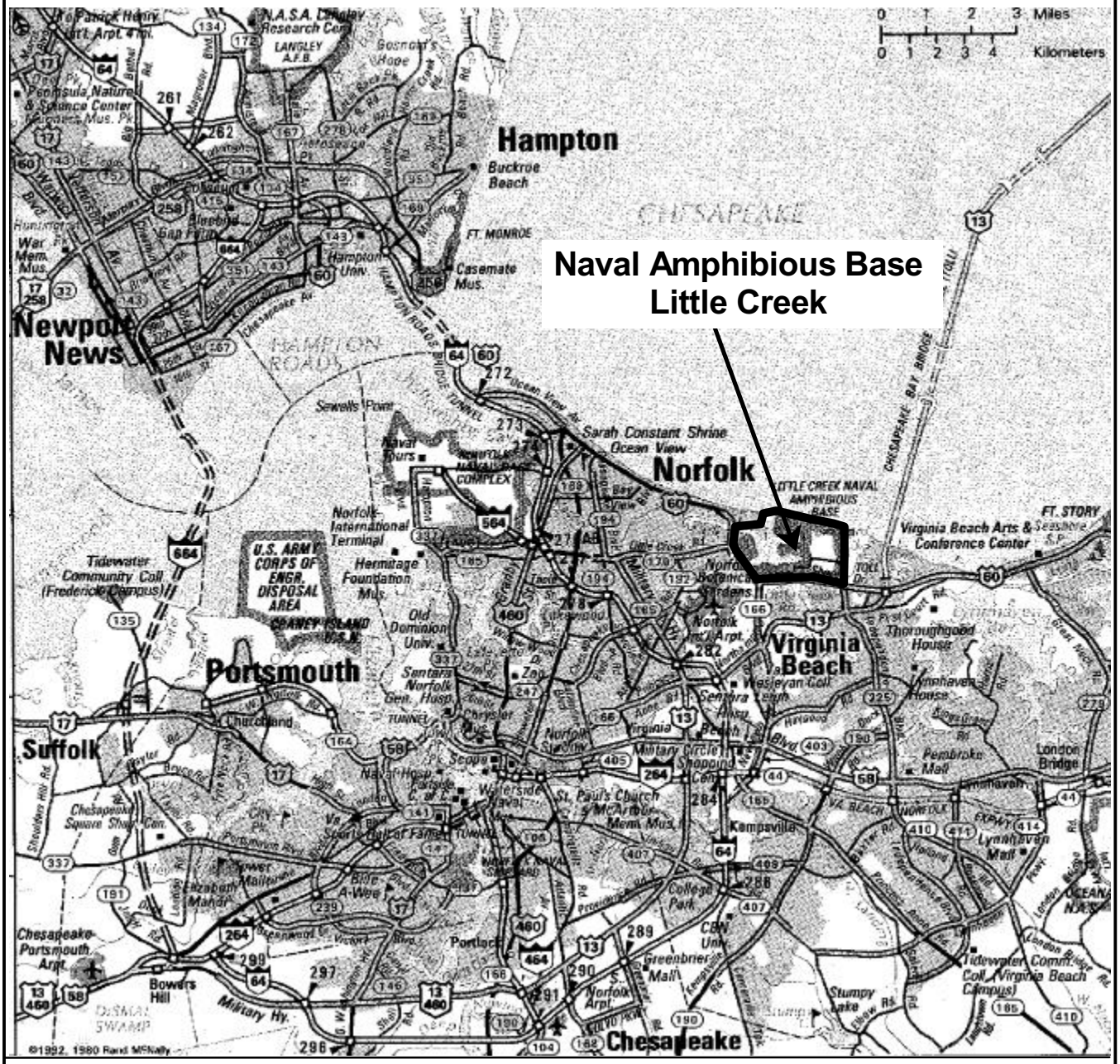
If you have any questions please do not hesitate to call Matt Louth at (757) 460-3734, extension 17.

Sincerely,

CH2M HILL

Matt Louth
Activity Manager

Cc: Ms. Mary Cooke/RPM EPA (2 copies)
Mr. Robert Weld/VADEQ (1 copy)
Mr. Randy Sawyer/WNSTN (1 copy)
Ms. Stephanie McManus/ NAB Little Creek (1 copy)
Mr. Paul Landin/CH2M HILL-VBO (1copy)
Ms. Kim Henderson/CH2M HILL-VBO (1 copy)



Source: Rand McNally

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Figure 1
Base Location Map
NAB Little Creek
Virginia Beach, Virginia

CH2MHILL

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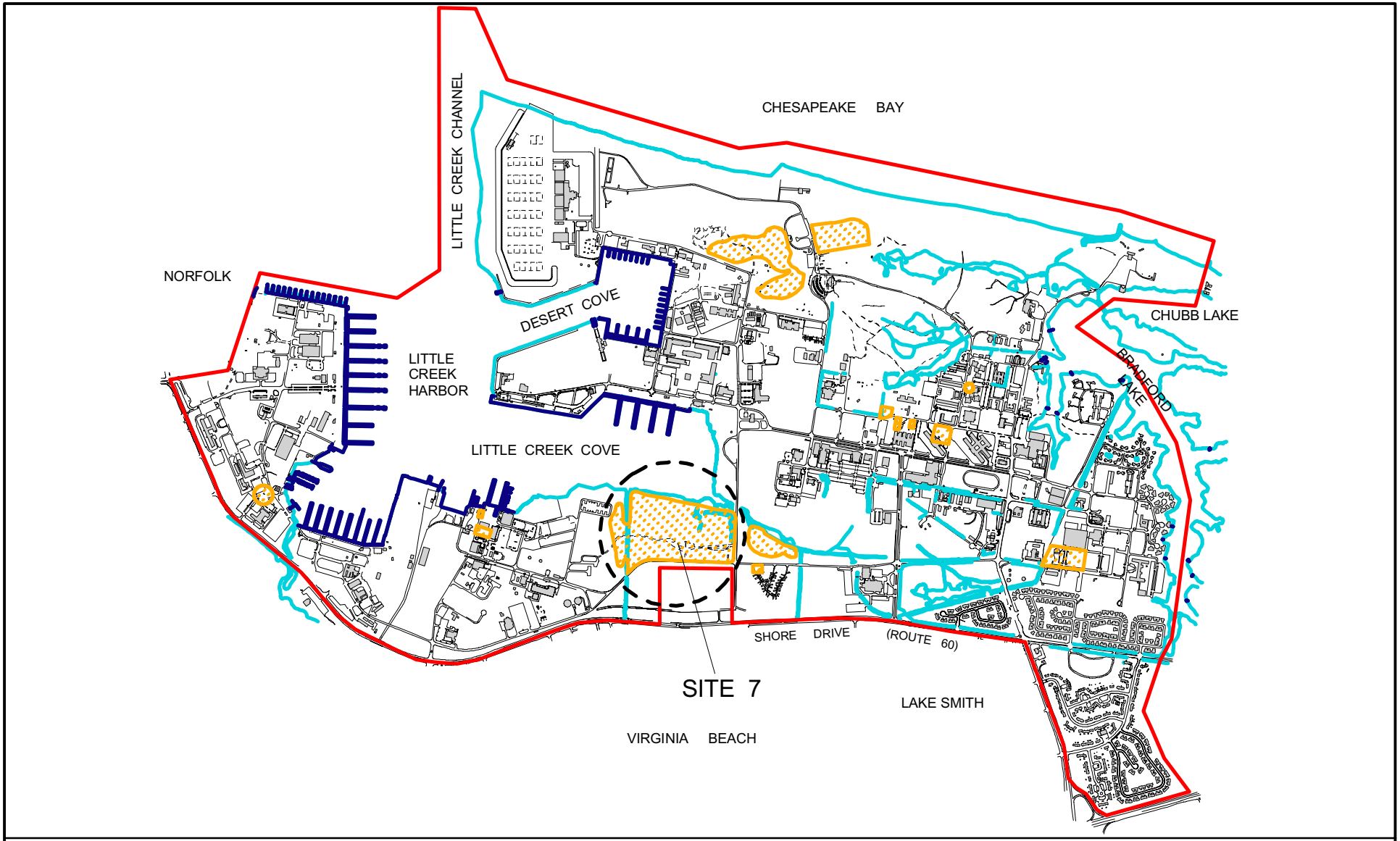

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0 800 1600 Feet

Figure 2
Site 7 Location Map
NAB Little Creek
Virginia Beach, Virginia

CH2MHILL

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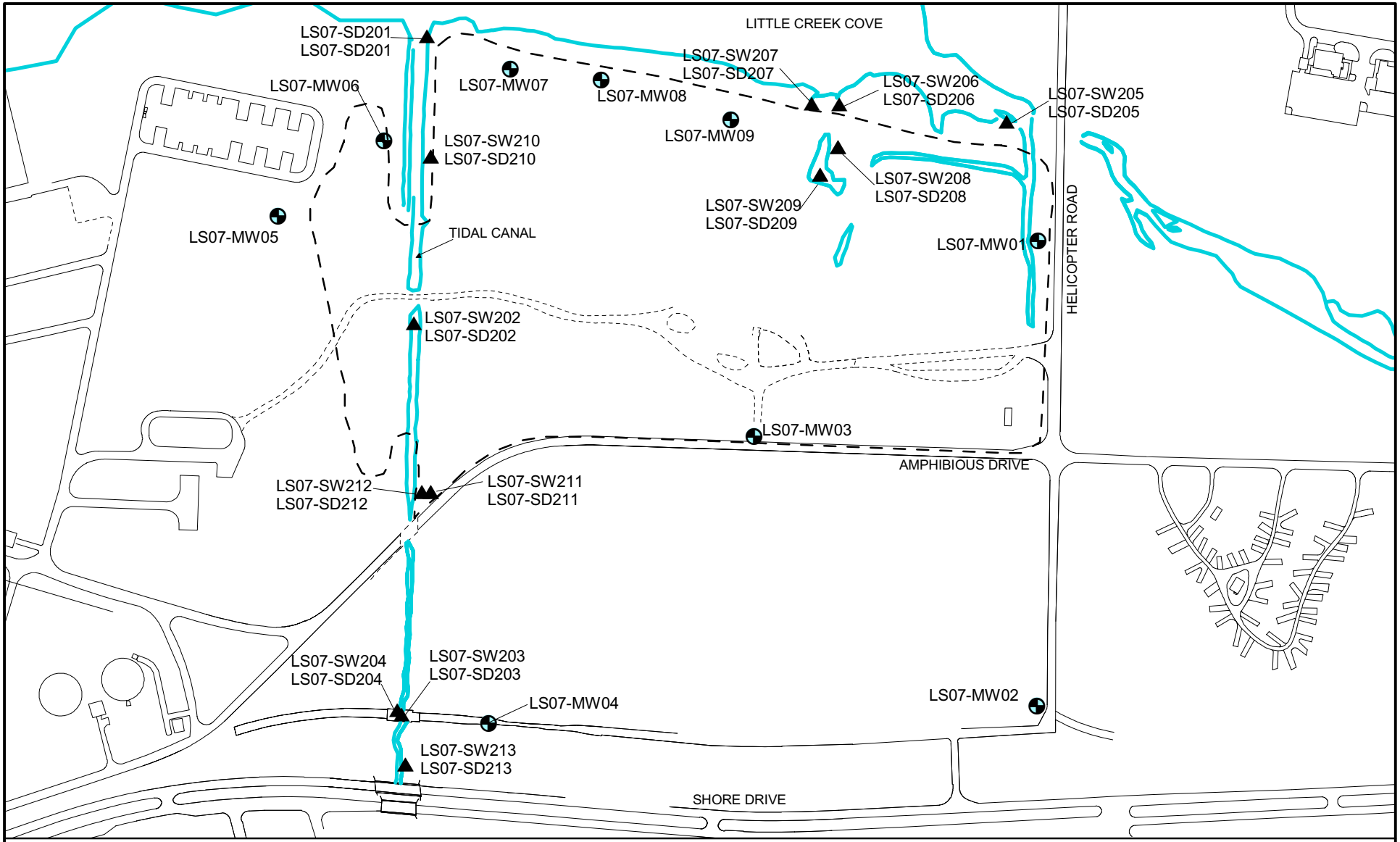

LEGEND

- ▲ Surface Water and Sediment Sampling Location
- ⊕ Groundwater Data Collection Point
- ----- Site Boundary

N

0 200 400 Feet

Figure 3
Site 7 - Media Sampling
Locations For LTM Round 6
Naval Amphibious Base Little Creek
Virginia Beach, Virginia

CH2MHILL

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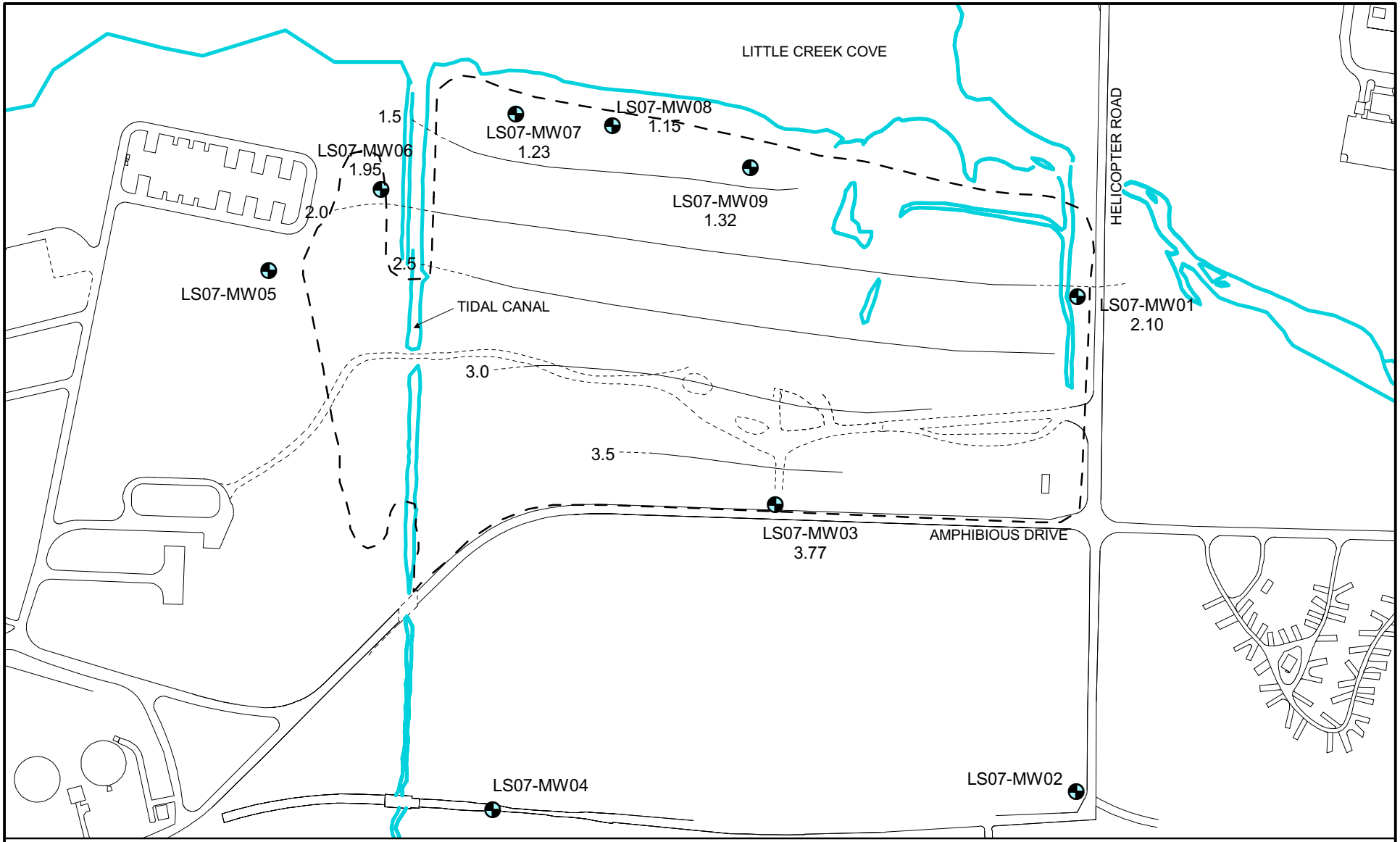

LEGEND

- Site Boundary
- LS07-MW01 (1.95) Groundwater Monitoring Point (Existing Monitoring Well)
- Groundwater Flow Direction
- 1.5 Groundwater Contour (Dashed Where Inferred)

N

0 200 400 Feet

Figure 4
Site 7 - Estimated Piezometric Surface
Round 6 of LTM Program
NAB Little Creek
Virginia Beach, Virginia

CH2MHILL

TABLE 1
WATER LEVEL MEASUREMENTS
SEPTEMBER 10-13, 20 2001
SEMIANNUAL MONITORING ROUND 6
SITE 7
NAB LITTLE CREEK

Monitoring Well	Measuring Point Elevation (ft above msl)	Depth to Water (ft below measuring point)	Water Level Elevation (ft above msl)
LS07-MW01	8.38	6.28	2.10
LS07-MW03	12.19	8.42	3.77
LS07-MW06	9.25	7.30	1.95
LS07-MW07	4.72	3.49	1.23
LS07-MW08	4.94	3.79	1.15
LS07-MW09	5.55	4.23	1.32

TABLE 2
STABILIZED GROUNDWATER FIELD PARAMETERS
SEMIANNUAL MONITORING ROUND 6
SITE 7
NAB LITTLE CREEK

Monitoring Well	PH (pH units)	Specific Conductance (umho/cm)	Dissolved Oxygen (mg/L)	Temperature (Degrees Celsius)
LS07-MW01	7.0	5.50	2.10	22.0
LS07-MW03	6.21	0.662	6.06	17.9
LS07-MW06	6.30	3.80	0.60	18.0
LS07-MW07	7.42	34.2	0.19	23.6
LS07-MW08	7.35	33.2	0.13	23.5
LS07-MW09	6.97	39.9	0.30	22.7

TABLE 3
REQUIRED CONTAINERS, PRESERVATIVES, AND HOLDING TIMES FOR WATER SAMPLES
SEMIANNUAL MONITORING ROUND 7
SITE 7
NAB LITTLE CREEK

Analysis	Sample Container	Preservative	Holding Time	Volume of Sample Collected
TCL Volatiles	Three 40-ml glass vial w/teflon lined cap	HCl to pH <2; Cool to 4ºC	14 days	Fill completely; no air bubbles
TCL Semivolatiles	Two 1-liter amber glass jars	Cool to 4ºC	7 days to extraction; 40 days to analysis	Fill to shoulder
TCL Pesticides/PCBs	Two 1-liter amber glass jars	Cool to 4ºC	7 days to extraction; 40 days to analysis	Fill to shoulder
TAL Metals (total or dissolved)	1-liter polyethylene bottle	HNO_3 to pH <2; Cool to 4ºC	6 months	Fill to shoulder
TAL Cyanide	1-liter bottle	NaOH to pH > 12; Cool to 4ºC	14 days	Fill to shoulder
Hardness (surface water only)	250 ml bottle, plastic or glass	HNO_3 to pH <2; Cool to 4ºC	6 months	Fill to shoulder

TABLE 4
REQUIRED CONTAINERS, PRESERVATIVES, AND HOLDING TIMES FOR SEDIMENT SAMPLES
SEMIANNUAL MONITORING ROUND 6
SITE 7
NAB LITTLE CREEK

Analysis	Sample Container	Preservative	Holding Time	Volume of Sample Collected
TCL Semivolatiles	8-oz glass bottle with teflon-lined cap	Cool to 4ºC	14 days to extraction; 40 days to analysis	Fill completely
TAL Pesticides/PCBs	Two 4-oz glass bottles with teflon-lined cap	Cool to 4ºC	14 days	Fill completely
TAL Inorganics	4-oz glass bottle with teflon-lined cap	None	6 months; 28 days for mercury	Fill to shoulder
Total Organic Carbon (TOC)	8-oz glass bottle with teflon-lined cap	Cool to 4ºC	24 hours	Fill to shoulder

Table 5
NAB Little Creek
Navy CLEAN II CTO-210, Long Term Monitoring Plan
Round 6, Detected Analytical Results for Site 7 Groundwater

Station ID	LS07-MW01		LS07-MW03	LS07-MW06	LS07-MW07	LS07-MW08	LS07-MW09
Sample ID	LS07-MW01-01C	LS07-MW01P-01C	LS07-MW03-01C	LS07-MW06-01C	LS07-MW07-01C	LS07-MW08-01C	LS07-MW09-01C
Sample Date	09/13/01	09/13/01	09/20/01	09/13/01	09/10/01	09/10/01	09/10/01
Chemical Name							
Volatile Organic Compounds (UG/L)							
2-Butanone	10 U	10 U	10 U	10 U	10 U	1 J	10 U
Toluene	2 J	2 J	10 U	10 U	10 U	10 U	10 U
Semi-volatile Organic Compounds (UG/L)							
Di-n-butylphthalate	12	11 U	7 B	12 U	1.9 J	5.6 J	4 J
bis(2-Ethylhexyl)phthalate	11 U	1 J	10 U	12 U	11 U	11 U	1 J
Total Metals (UG/L)							
Aluminum	124 J	137 J	135 J	11.7 U	25.5 B	30.3 B	15.8 B
Arsenic	3.9 U	3.9 U	3.9 U	27.5	3.9 U	3.9 U	3.9 U
Barium	6.3 J	6 J	29.8 J	17.6 J	58.8 J	41.6 J	87.5 J
Beryllium	0.2 U	0.2 U	0.3 J	0.2 U	0.2 U	0.2 U	0.2 U
Cadmium	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	0.54 J
Calcium	16,300	15,300	22,900	148,000	283,000	276,000	277,000
Chromium	1.6 J	0.73 J	1.1 J	0.93 J	2.2 B	89.8 L	0.7 UL
Cobalt	0.7 U	0.7 U	8.7 J	1.6 J	0.7 U	0.88 J	0.7 U
Copper	0.6 U	1.3 J	1.2 B	0.6 U	1.7 B	3.7 B	2.7 B
Iron	3,450	3,370	9,420	13,500	14.1 UL	2,010 L	29,800 L
Magnesium	36,900	34,400	9,430	125,000	594,000	576,000	768,000
Manganese	62.8	60.1	558	1,560	170	177	784
Nickel	1 U	1 U	5.1 J	1 U	1 U	12.5 J	1 U
Potassium	25,300	23,900	9,330	22,200	195,000	201,000	258,000
Sodium	400,000	374,000	41,100	389,000	4,750,000	4,750,000	6,520,000
Vanadium	1.9 J	2 J	1.1 U	1.1 U	3.4 J	8.9 J	1.5 J
Zinc	0.87 J	0.6 U	89.6	4.3 J	4.4 B	6.3 B	3.8 B
Dissolved Metals (UG/L)							
Aluminum	11.7 U	11.7 U	104 J	12.6 J	11.7 U	30.3 B	16.8 B
Arsenic	3.9 U	3.9 U	3.9 U	22.5	3.9 U	3.9 U	3.9 U
Barium	5.3 J	5.6 J	29.7 J	17.6 J	59.8 J	42.3 J	84.1 J
Beryllium	0.2 U	0.2 U	0.29 J	0.2 U	0.2 U	0.2 U	0.2 U
Cadmium	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	0.5 J
Calcium	14,100	15,100	23,900	147,000	292,000	273,000	272,000
Cobalt	0.7 U	0.7 U	8.2 J	1.8 J	0.7 U	0.7 U	0.7 U
Iron	3,130	3,260	9,400	12,900	14.1 U	14.1 U	27,700
Lead	1.4 U	1.4 U	1.4 U	1.4 U	1.5 J	1.4 U	1.4 U

B - Analyte not detected above associated blank
J - Reported value is estimated
L - Reported value may be biased low
U, UL - Analyte not detected

Table 5
NAB Little Creek
Navy CLEAN II CTO-210, Long Term Monitoring Plan
Round 6, Detected Analytical Results for Site 7 Groundwater

Station ID	LS07-MW01		LS07-MW03	LS07-MW06	LS07-MW07	LS07-MW08	LS07-MW09
Sample ID	LS07-MW01-01C	LS07-MW01P-01C	LS07-MW03-01C	LS07-MW06-01C	LS07-MW07-01C	LS07-MW08-01C	LS07-MW09-01C
Sample Date	09/13/01	09/13/01	09/20/01	09/13/01	09/10/01	09/10/01	09/10/01
Chemical Name							
Magnesium	31,400	33,800	9,990	124,000	617,000	571,000	751,000
Manganese	56.7	60	581	1,550	171	174	774
Nickel	1 U	1 U	4.6 J	1 U	1.4 J	1.3 J	1 U
Potassium	22,500	23,600	9,750	21,800	208,000	203,000	250,000
Sodium	344,000	365,000	45,100	380,000	5,020,000	4,780,000	6,380,000
Vanadium	1.1 U	1.5 J	1.1 U	1.1 U	2.7 J	3 J	2.1 J
Zinc	1.3 J	0.72 J	87.7	6 J	2.4 B	3.6 B	3.3 B

B - Analyte not detected above associated blank
J - Reported value is estimated
L - Reported value may be biased low
U, UL - Analyte not detected

Table 6
NAB Little Creek
Navy CLEAN II CTO-210, Long Term Monitoring Plan
Round 6, Detected Analytical Results for Site 7 Surface Water

Station ID	LS07-SW201		LS07-SW202				LS07-SW203		LS07-SW204				LS07-SW205		LS07-SW206		LS07-SW207		LS07-SW208	
Sample ID	LS07-SW201-01C		LS07-SW202-01C		LS07-SW202P-01C		LS07-SW203-01C		LS07-SW204-01C		LS07-SW204P-01C		LS07-SW205-01C		LS07-SW206-01C		LS07-SW207-01C		LS07-SW208-01C	
Sample Date	09/11/01		09/13/01		09/13/01		09/13/01		09/13/01		09/13/01		09/11/01		09/11/01		09/11/01		09/11/01	
Chemical Name																				
Volatile Organic Compounds (UG/L)																				
1,1,2,2-Tetrachloroethane	10	U	10	U	10	U	1	J	1	B	10	U	1	B	10	U	10	U	10	U
Acetone	10	U	10	U	10	U	1	J	4	J	2	J	1	J	10	U	10	U	10	U
Methyl-tert-butyl ether (MTBE)	10	U	1	J	1	J	10	U	10	U	10	U	10	U	10	U	10	U	10	U
Methylene chloride	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U
Toluene	10	U	1	J	1	J	10	U	10	U	10	U	10	U	10	U	10	U	10	U
Total Metals (UG/L)																				
Aluminum	131	J	379		1,590		11.7	U	257		177	J	450		374		294		245	
Antimony	3.6	U	3.6	U	3.6	U	3.6	U	3.6	U	3.6	U	3.6	U	3.6	U	5.2	J	3.6	U
Arsenic	3.9	U	3.9	U	3.9	U	6.9	J	4.2	J	3.9	U	3.9	U	3.9	U	3.9	U	3.9	U
Barium	22.1	J	21.8	J	21.5	J	19	J	28.9	J	27.3	J	19.2	J	20.1	J	20.5	J	30.2	J
Calcium	252,000		274,000		267,000		43,600		83,100		83,300		264,000		263,000		268,000		268,000	
Chromium	0.7	U	0.7	U	0.7	U	0.7	U	1.1	J	0.7	U	0.7	U	0.7	U	0.77	J	0.7	U
Cobalt	0.7	U	0.7	U	0.7	U	1.5	J	2.4	J	1.4	J	0.7	U	0.7	U	0.84	J	0.8	U
Copper	4.9	B	2.8	J	2.4	J	0.6	U	2	J	1.5	J	5.4	B	8.5	B	8.8	B	5.1	B
Iron	147	B	821		787		2,540		1,350		1,160		14.1	U	358		241		813	
Lead	1.4	U	1.6	J	1.4	U	1.4	U	1.4	U	2.8	B	1.5	J	1.4	U	1.4	U	1.9	J
Magnesium	809,000		830,000		818,000		93,500		203,000		203,000		829,000		842,000		862,000		852,000	
Manganese	44.8		25.7		25.7		288		186		184		16.9		27.7		27.8		42.1	
Nickel	1.1	J	1	U	1.7	J	1	U	1	J	1	U	2	J	1	U	1	U	1.4	J
Potassium	291,000		289,000		285,000		34,700		80,900		81,200		301,000		301,000		306,000		305,000	
Silver	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1.4	J	1	U
Sodium	6,750,000		7,180,000		7,100,000		806,000		1,830,000		1,830,000		7,190,000		7,180,000		7,170,000		7,100,000	
Vanadium	2.9	J	3.1	J	4.1	J	1.1	U	2.3	J	1.6	J	3	J	3.5	J	4.7	J	3	J
Zinc	14.1	B	7.4	J	8.5	J	5.9	J	20.1		14.8	J	11.5	B	12.2	J	17.3	B	16.3	J
Dissolved Metals (UG/L)																				
Aluminum	11.7	U	11.7	U	11.7	U	11.7	U	11.7	U	59.6	J	11.7	U	11.7	U	11.7	U	11.7	U
Arsenic	3.9	U	3.9	U	3.9	U	8.1	J	3.9	U	3.9	U	3.9	U	3.9	U	3.9	U	3.9	U
Barium	20.6	J	20	J	20.1	J	19.8	J	27.8	J	30.6	J	19.1	J	20.4	J	20.1	J	30.2	J
Calcium	261,000		265,000		265,000		44,700		104,000		118,000		269,000		267,000		265,000		274,000	
Chromium	0.7	U	0.7	U	0.7	U	22.9	J	0.7	U	0.7	U	0.7	U	2.1	J	0.7	U	0.7	U
Cobalt	0.7	U	0.7	U	0.7	U	1.8	J	1.8	J	1.9	J	0.7	U	0.7	U	0.7	U	0.7	U
Copper	3.3	B	4.2	J	0.99	J	2.1	B	0.681	J	1.2	J	3.2	B	3.1	J	3.5	B	2.1	J
Iron	14.1	U	107		125		3,200	L	14.1	U	14.1	U	282	U	14.1	U	282	U	14.1	U
Lead	1.4	U	1.4	U	1.4	U	1.4	U	1.8	J	1.4	U	1.4	U	1.4	U	1.4	U	1.4	U
Magnesium	852,000		797,000		819,000		94,200		265,000		303,000		845,000		855,000		848,000		871,000	
Manganese	21.4		16.9		18.4		303		168		156		6.3	J	18.6		17.9		40.4	
Nickel	1.2	J	1.1	J	1	U	1.8	J	1	U	1	U	1.2	J	1.5	J	1	U	2.8	J
Potassium	303,000		276,000		283,000		35,100		91,100		104,000		304,000		308,000		305,000		312,000	
Sodium	6,990,000		6,880,000		7,040,000		824,000		2,370,000		2,720,000		7,170,000		7,170,000		7,150,000		6,890,000	
Vanadium	2	J	2.2	J	2.3	J	2.2		1.1	U	1.1	U	1.8	J	3.4	J	2.6	J	1.6	J
Zinc	11	J	2.6	J	2.4	J	5.5	B	14	J	23.8		3.1	B	3.4	J	4.2	J	5.6	J

B - Analyte not detected above associated blank
J - Reported value is estimated
L - Reported value may be biased low
U - Analyte not detected

Table 6
NAB Little Creek
Navy CLEAN II CTO-210, Long Term Monitoring Plan
Round 6, Detected Analytical Results for Site 7 Surface Water

Station ID	LS07-SW209		LS07-SW210		LS07-SW211		LS07-SW212		LS07-SW213	
Sample ID	LS07-SW209-01C		LS07-SW210-01C		LS07-SW211-01C		LS07-SW212-01C		LS07-SW213-01C	
Sample Date	09/11/01		09/10/01		09/13/01		09/13/01		09/13/01	
Chemical Name										
Volatile Organic Compounds (UG/L)										
1,1,2,2-Tetrachloroethane	10	U	10	U	10	U	10	U	10	U
Acetone	10	U	10	U	10	U	2	J	10	U
Methyl-tert-butyl ether (MTBE)	10	U	2.1	J	10	U	10	U	10	U
Methylene chloride	10	U	10	U	10	U	2	J	10	U
Toluene	10	U	10	U	10	U	10	U	10	U
Total Metals (UG/L)										
Aluminum	326		156	J	431		258		416	
Antimony	3.6	U	3.6	U	3.6	U	3.6	U	3.6	U
Arsenic	3.9	U	4.3	J	3.9	U	3.9	U	6.2	J
Barium	32.5	J	21.6	J	27.8	J	35.9	J	34	J
Calcium	274,000		266,000		207,000		91,100		165,000	
Chromium	0.7	U	0.7	U	0.97	J	1.3	J	1.2	J
Cobalt	0.7	U	0.7	U	1.3	J	1.2	J	1.5	J
Copper	8.1	B	4.8	B	2.6	J	8.2	J	1.7	J
Iron	1,060		19.8	B	989		2,360		1,620	
Lead	4.2		1.4	U	1.4	U	3.3		1.9	J
Magnesium	865,000		844,000		597,000		230,000		464,000	
Manganese	43.1		23.8		89.8		281		154	
Nickel	1	J	1	U	1.9	J	1.7	J	1.1	J
Potassium	310,000		302,000		205,000		90,200		156,000	
Silver	1	U	1	U	1	U	1	U	1	U
Sodium	7,290,000		7,040,000		5,280,000		1,950,000		4,060,000	
Vanadium	3.1	J	2.6	J	3.6	J	1.7	J	2.1	J
Zinc	30		10.1	B	15.7	J	46.2		20.5	
Dissolved Metals (UG/L)										
Aluminum	11.7	U	13.5	B	24.4	J	20.8	J	11.7	U
Arsenic	3.9	U	3.9	U	3.9	U	3.9	U	3.9	U
Barium	33.1	J	19.6	J	26.4	J	33.2	J	34.4	J
Calcium	270,000		253,000		210,000		90,900		147,000	
Chromium	0.7	U	0.7	U	0.7	U	0.7	U	0.7	U
Cobalt	0.7	U	0.7	U	1.6	J	1.6	J	0.73	J
Copper	1.4	B	3.2	B	2.3	J	1.7	B	3.3	B
Iron	14.1	U	14.1	U	523		949		66.1	J
Lead	1.4	U	1.4	U	1.4	U	1.4	U	1.4	U
Magnesium	844,000		800,000		605,000		228,000		415,000	
Manganese	41.3		13.7	J	95.3		278		153	
Nickel	1	U	1.2	J	1	U	1.3	J	1	U
Potassium	303,000		289,000		207,000		90,200		150,000	
Sodium	7,120,000		6,770,000		5,310,000		1,920,000		3,760,000	
Vanadium	1.1	U	2.1	J	2.2	J	1.1	J	1.1	U
Zinc	4.2	J	6	B	18	J	34.4		15.6	J

B - Analyte not detected above associated blank
J - Reported value is estimated
L - Reported value may be biased low
U - Analyte not detected

Table 7
NAB Little Creek
Navy CLEAN II CTO-210, Long Term Monitoring Plan
Round 6, Detected Analytical Results for Site 7 Sediment

Station ID	LS07-SD201		LS07-SD202			LS07-SD203		LS07-SD204			LS07-SD205		LS07-SD206		LS07-SD207	
Sample ID	LS07-SD201-01C		LS07-SD202-01C		LS07-SD202P-01C	LS07-SD203-01C		LS07-SD204-01C		LS07-SD204P-01C	LS07-SD205-01C		LS07-SD206-01C		LS07-SD207-01C	
Sample Date	09/11/01		09/13/01		09/13/01	09/13/01		09/13/01		09/13/01	09/11/01		09/11/01		09/11/01	
Chemical Name																
Semi-volatile Organic Compounds (UG/KG)																
2-Methylnaphthalene	420	U	440	U	470 U	480	U	490	U	100 J	410	U	410	U	450	UJ
Acenaphthene	420	U	440	U	470 U	480	U	490	U	250 J	410	U	410	U	450	UJ
Acetophenone	420	U	440	U	470 U	480	U	490	U	480 U	410	U	410	U	450	UJ
Anthracene	420	U	440	U	470 U	480	U	490	U	590	410	U	410	U	450	UJ
Benzaldehyde	420	U	440	U	470 U	480	U	490	U	480 U	410	U	410	U	450	UJ
Benzo(a)anthracene	420	U	440	U	470 U	80	J	140	J	1,000	410	U	410	U	450	UJ
Benzo(a)pyrene	420	U	440	U	470 U	55	J	120	J	680	410	U	410	U	450	UJ
Benzo(b)fluoranthene	420	U	440	U	470 U	75	J	160	J	920	410	U	410	U	450	UJ
Benzo(g,h,i)perylene	420	U	440	U	470 U	480	U	85	J	450 J	410	U	410	U	450	UJ
Benzo(k)fluoranthene	420	U	440	U	470 U	480	U	54	J	360 J	410	U	410	U	450	UJ
Carbazole	420	U	440	U	470 U	480	U	490	U	290 J	410	U	410	U	450	UJ
Chrysene	420	U	440	U	470 U	100	J	140	J	890	410	U	410	U	450	UJ
Di-n-butylphthalate	420	U	440	U	50 J	480	U	490	U	480 U	410	U	410	U	450	UJ
Dibenzofuran	420	U	440	U	470 U	480	U	490	U	230 J	410	U	410	U	450	UJ
Fluoranthene	420	U	440	U	470 U	140	J	200	J	2,100	68.4	J	410	U	450	UJ
Fluorene	420	U	440	U	470 U	480	U	490	U	360 J	410	U	410	U	450	UJ
Indeno(1,2,3-cd)pyrene	420	U	440	U	470 U	480	U	71	J	380 J	410	U	410	U	450	UJ
Naphthalene	420	U	440	U	470 U	480	U	490	U	200 J	410	U	410	U	450	UJ
Phenanthrene	420	U	440	U	470 U	110	J	120	J	2,400	410	U	410	U	450	UJ
Phenol	420	U	440	U	470 U	480	U	490	U	480 U	410	U	410	U	450	UJ
Pyrene	420	U	440	U	470 U	150	J	180	J	1,400	55	J	410	U	450	UJ
bis(2-Ethylhexyl)phthalate	420	U	440	U	100 J	73	J	59	J	480 U	410	U	410	U	450	UJ
Pesticide/Polychlorinated Biphenyls (UG/KG)																
4,4'-DDD	4.2	U	4.4	U	4.7 U	13	J	2.1	J	2.1 J	4.1	U	4.1	U	4.5	UJ
4,4'-DDE	4.2	U	4.4	U	4.7 U	7.1	J	1.6	J	1.8 J	4.1	U	4.1	U	4.5	UJ
4,4'-DDT	4.2	U	4.4	U	4.7 U	2.8	J	1.2	J	1.2 J	4.1	U	4.1	U	4.5	UJ
Aroclor-1260	42	U	44	U	120 J	48	UJ	49	U	48 U	41	U	41	U	45	UJ
Total Metals (MG/KG)																
Aluminum	3,940		2,890		3,590	4,620		3,800		4,910	2,380		1,310		1,660	
Antimony	0.76	UL	0.84	UL	0.88 UL	0.91	L	1	L	0.88 UL	0.77	UL	0.77	UL	0.83	UL
Arsenic	2.7	L	1.9	L	2.8 L	8.2	L	4.9	L	5.2 L	1.8	L	1.6	L	1.4	L
Barium	9	J	9.1	J	7.5 J	47.6	J	28.6	J	17.2 J	9.5	J	3.8	B	4.1	
Beryllium	0.19	J	0.24	J	0.16 J	0.05	U	0.31	B	0.24 B	0.16	J	0.1	J	0.13	B
Cadmium	0.06	U	0.07	U	0.08 J	0.24	J	0.08	J	0.12 B	0.08	J	0.07	J	0.09	B
Calcium	559	J	371	J	436 J	2,070		890	J	640 J	9,260		344	J	346	
Chromium	8.9		6		7.2	14.9		10.1		10.3	4.8		3.4		4.6	
Cobalt	1.4	J	1.4	J	1.5 J	3.7	J	2.1	J	2.9 J	0.8	J	0.43	J	0.52	

NA - Not analyzed
B - Analyte not detected above associated blank
J - Reported value is estimated
K - Reported value may be biased high
L - Reported value may be biased low

U, UJ, UL - Analyte not detected

Table 7
NAB Little Creek
Navy CLEAN II CTO-210, Long Term Monitoring Plan
Round 6, Detected Analytical Results for Site 7 Sediment

Station ID	LS07-SD201	LS07-SD202		LS07-SD203	LS07-SD204		LS07-SD205	LS07-SD206	LS07-SD207
Sample ID	LS07-SD201-01C	LS07-SD202-01C	LS07-SD202P-01C	LS07-SD203-01C	LS07-SD204-01C	LS07-SD204P-01C	LS07-SD205-01C	LS07-SD206-01C	LS07-SD207-01C
Sample Date	09/11/01	09/13/01	09/13/01	09/13/01	09/13/01	09/13/01	09/11/01	09/11/01	09/11/01
Chemical Name									
Copper	3.9 B	24.4 L	16.3 L	49.4 L	30.1 L	12.2 L	4.4 B	4.4 B	5 L
Iron	5,980	3,360	3,990	8,150	7,090	7,500	3,570	1,910	2,590
Lead	4.9	45.5	14.2	29	19.2	9.4	4.4	3.8	5.3
Magnesium	1,440	781 J	1,130 J	1,030 J	1,090 J	1,410	830 J	524 J	759
Manganese	48.5	22	23.7	84.9	58.7	47.8	20.8	11.8	15.2
Mercury	0.013 J	0.023	0.02 J	0.06	0.03 J	0.04	0.02 J	0.011 J	0.02 U
Nickel	3.9 J	10.7	3.4 J	41.5	9.5 J	9.7 J	1.9 J	1.2 J	1.4 B
Potassium	868	555 J	780 J	547 J	567 J	871 J	526 J	359 J	472
Selenium	0.89 U	0.98 U	1 U	1.1 U	1.1 U	1 U	0.9 U	0.9 U	0.97 U
Silver	0.21 U	0.23 U	0.34 J	0.54 J	0.25 U	0.25 U	0.21 U	0.21 U	0.23 U
Sodium	2,100	2,330	3,610	743 J	1,460	1,440	2,020	1,830	2,830
Thallium	1.1 U	1.2 U	1.3 U	2.1 J	1.3 U	1.3 U	1.1 U	1.1 U	1.2 U
Vanadium	9.4 J	11.2 J	14.7	248	39.3	24.2	6.6 J	3.8 J	5
Zinc	27	108	32.8	87.8	83.9	50.1	26.9	20.4	19.7
Wet Chemistry (MG/KG)									
% Solids	79.7	75	NA	NA	NA	NA	81.4	81.5	NA
Total organic carbon (TOC)	2,290	5,540	9,540	43,100	21,900	22,700	2,300	2,680	2,580
pH	8.69	6.88	6.67	7.03	6.68	6.81	8.62	8.37	8.12

NA - Not analyzed
B - Analyte not detected above associated blank
J - Reported value is estimated
K - Reported value may be biased high
L - Reported value may be biased low

U, UJ, UL - Analyte not detected

Table 7
NAB Little Creek
Navy CLEAN II CTO-210, Long Term Monitoring Plan
Round 6, Detected Analytical Results for Site 7 Sediment

Station ID	LS07-SD208		LS07-SD209		LS07-SD210		LS07-SD211		LS07-SD212		LS07-SD213	
Sample ID	LS07-SD208-01C		LS07-SD209-01C		LS07-SD210-01C		LS07-SD211-01C		LS07-SD212-01C		LS07-SD213-01C	
Sample Date	09/11/01		09/11/01		09/10/01		09/13/01		09/13/01		09/13/01	
Chemical Name												
Semi-volatile Organic Compounds (UG/KG)												
2-Methylnaphthalene	640	U	600	U	410	U	490	U	460	U	450	U
Acenaphthene	640	U	600	U	410	U	490	U	460	U	450	U
Acetophenone	962		270	J	71	J	490	U	460	U	450	U
Anthracene	640	U	600	U	410	U	490	U	62	J	450	U
Benzaldehyde	340	J	100	J	43	J	490	U	460	U	450	U
Benzo(a)anthracene	640	U	600	U	410	U	120	J	190	J	450	U
Benzo(a)pyrene	64	J	600	U	410	U	71	J	150	J	450	U
Benzo(b)fluoranthene	130	J	140	J	41	J	100	J	230	J	450	U
Benzo(g,h,i)perylene	640	U	600	U	410	U	490	U	110	J	450	U
Benzo(k)fluoranthene	640	U	600	U	410	U	490	U	60	J	450	U
Carbazole	640	U	600	U	410	U	490	U	460	U	450	U
Chrysene	76	J	68	J	410	U	85	J	170	J	450	U
Di-n-butylphthalate	640	U	600	U	410	U	490	U	460	U	50	J
Dibenzofuran	640	U	600	U	410	U	490	U	460	U	450	U
Fluoranthene	230	J	140	J	50	J	87	J	350	J	450	U
Fluorene	640	U	600	U	410	U	490	U	460	U	450	U
Indeno(1,2,3-cd)pyrene	640	U	600	U	410	U	490	U	93	J	450	U
Naphthalene	640	U	600	U	410	U	490	U	460	U	450	U
Phenanthrene	640	U	600	U	410	U	490	U	240	J	450	U
Phenol	130	J	600	U	410	U	490	U	460	U	450	U
Pyrene	170	J	166	U	50	J	82	J	320	J	450	U
bis(2-Ethylhexyl)phthalate	66	J	69	J	43	J	490	U	120	J	450	U
Pesticide/Polychlorinated Biphenyls (UG/KG)												
4,4'-DDD	6.4	U	6	U	4.1	U	4.9	U	4.6	U	4.5	U
4,4'-DDE	6.4	U	6	U	4.1	U	4.9	U	4.6	U	4.5	U
4,4'-DDT	6.4	U	6	U	4.1	U	4.9	U	4.6	U	4.5	U
Aroclor-1260	74	J	100	J	41	U	49	U	46	U	45	U
Total Metals (MG/KG)												
Aluminum	12,300		14,000		1,490		2,610		3,260		2,860	
Antimony	3.2	UL	1.1	UL	0.73	UL	0.93	UL	0.91	U	0.84	UL
Arsenic	6.5	L	9.2	L	1.2	L	3.4	L	7.3		4.6	L
Barium	32.8	J	33.1	J	4.3	J	9.6	J	16	J	8.6	J
Beryllium	0.65	J	0.71	J	0.15	J	0.18	B	0.27	J	0.13	B
Cadmium	1.6	J	0.484	J	0.07	J	0.08	B	0.25	J	0.07	U
Calcium	5,090		4,600		333	J	622	J	911	J	380	J
Chromium	31.7		28		3.9		6.5		12.9		4.1	
Cobalt	5.6		6.2	J	0.71	J	1.4	J	2.7	J	1.9	J

NA - Not analyzed
B - Analyte not detected above associated blank
J - Reported value is estimated
K - Reported value may be biased high
L - Reported value may be biased low

U, UJ, UL - Analyte not detected

Table 7
NAB Little Creek
Navy CLEAN II CTO-210, Long Term Monitoring Plan
Round 6, Detected Analytical Results for Site 7 Sediment

Station ID	LS07-SD208		LS07-SD209		LS07-SD210		LS07-SD211		LS07-SD212		LS07-SD213	
Sample ID	LS07-SD208-01C		LS07-SD209-01C		LS07-SD210-01C		LS07-SD211-01C		LS07-SD212-01C		LS07-SD213-01C	
Sample Date	09/11/01		09/11/01		09/10/01		09/13/01		09/13/01		09/13/01	
Chemical Name												
Copper	43.7	L	25.8	L	5.7	B	12.1	L	95		6.9	L
Iron	23,200		22,800		3,290		5,410		12,100		3,420	
Lead	47.1		26.6		5.9		11.4		36.8	K	9.5	
Magnesium	4,240		4,540		624	J	937	J	1,060	J	442	J
Manganese	172		149		18.3		23.8		50.6		17.2	
Mercury	0.196		0.201		0.022		0.03		0.04		0.01	U
Nickel	15.1		15.6		1.7	J	2.9	J	10.5		1.9	B
Potassium	2,520		2,730		379	J	571	J	571	J	234	J
Selenium	1.4	U	1.3	U	0.86	U	1.1	U	1.6	K	0.98	U
Silver	0.88	J	0.31	U	0.2	U	0.26	U	0.25	U	0.23	U
Sodium	6,860		6,350		1,810		2,690		1,950		515	J
Thallium	1.8	U	1.6	U	1.1	U	1.4	U	1.3	U	1.2	U
Vanadium	34.8		33.8		5.3	J	10.3	J	31.1		7.1	J
Zinc	351		150		26.5		41.9		171		13.3	
Wet Chemistry (MG/KG)												
% Solids	52.4		55.2		82		NA		NA		NA	
Total organic carbon (TOC)	20,400		14,400		3,140		12,800		28,700		5,570	
pH	8.47		8.49		8.48		6.98		3.96		6.04	

NA - Not analyzed
B - Analyte not detected above associated blank
J - Reported value is estimated
K - Reported value may be biased high
L - Reported value may be biased low

U, UJ, UL - Analyte not detected

Table 8
NAB Little Creek
Navy CLEAN II CTO-210, Long Term Monitoring Plan
Round 6, Detected Analytical Results for Site 7 QC Samples

Sample Date				LS07-EB091101 09/11/2001	LS07-EB091301 09/13/2001	LS07-EB092001 09/20/2001	LS07-FB091101 09/11/2001	LS07-TB091001 09/10/2001	LS07-TB091301 09/13/2001
Chemical Name	**Frequency**	**Max Value**	**Max Location**						
Volatile Organic Compounds (UG/L)									
MTBE	3 / 3	1.20 J	LS07-TB091001	NA	NA	NA	1 J	1.2 J	1 J
Semi-volatile Organic Compounds (UG/L)									
di-n-Butyl Phthalate	1 / 4	2.00	LS07-EB092001	11 U	11 U	2	10 U	NA	NA
Pesticide/Polychlorinated Biphenyls (UG/L)									
Endrin Aldehyde	2 / 4	0.0970 J	LS07-EB091101	0.097 J	0.11 U	0.13 U	0.024 J	NA	NA
Total Metals (UG/L)									
Aluminum	3 / 4	40.2 J	LS07-FB091101	12.4 J	22.3 J	11.7 U	40.2 J	NA	NA
Barium	4 / 4	3.80 J	LS07-FB091101	1.2 J	0.68 J	1.9 J	3.8 J	NA	NA
Calcium	4 / 4	301.0 J	LS07-EB092001	137 J	235 J	301 J	111 J	NA	NA
Copper	3 / 4	17.9 J	LS07-FB091101	3.8 J	7.2 J	0.6 U	17.9 J	NA	NA
Iron	3 / 4	23.6 J	LS07-EB092001	23.5 J	14.1 U	23.6 J	19.1 J	NA	NA
Magnesium	4 / 4	128.0 J	LS07-EB091101	128 J	24.2 J	103 J	15.3 J	NA	NA
Manganese	4 / 4	1.000 J	LS07-EB091301	0.35 J	1 J	0.79 J	0.35 J	NA	NA
Potassium	4 / 4	67.7 J	LS07-EB091101	67.7 J	25.1 J	15 J	17.7 J	NA	NA
Sodium	4 / 4	1,510 J	LS07-EB091101	1,510 J	424 J	616 J	495 J	NA	NA
Zinc	4 / 4	6.00 J	LS07-FB091101	2.5 J	5.1 J	2 J	6 J	NA	NA
Dissolved Metals (UG/L)									
Aluminum	2 / 2	43.4 J	LS07-EB091101	43.4 J	NA	19.4 J	NA	NA	NA
Barium	2 / 2	2.60 J	LS07-EB092001	1.9 J	NA	2.6 J	NA	NA	NA
Calcium	2 / 2	359.0 J	LS07-EB092001	106 J	NA	359 J	NA	NA	NA
Chromium	1 / 2	4.10 J	LS07-EB092001	0.7 U	NA	4.1 J	NA	NA	NA
Copper	2 / 2	8.60 J	LS07-EB091101	8.6 J	NA	1.6 J	NA	NA	NA
Iron	2 / 2	108.0	LS07-EB092001	33.3 J	NA	108	NA	NA	NA
Lead	1 / 2	1.70 J	LS07-EB092001	1.4 U	NA	1.7 J	NA	NA	NA
Magnesium	2 / 2	107.0 J	LS07-EB092001	27.2 J	NA	107 J	NA	NA	NA
Manganese	2 / 2	1.40 J	LS07-EB092001	0.31 J	NA	1.4 J	NA	NA	NA
Potassium	2 / 2	35.1 J	LS07-EB092001	23.3 J	NA	35.1 J	NA	NA	NA
Sodium	2 / 2	675.0 J	LS07-EB092001	642 J	NA	675 J	NA	NA	NA
Zinc	2 / 2	11.1 J	LS07-EB092001	2 J	NA	11.1 J	NA	NA	NA
Wet Chemistry									
pH	2 / 2	5.52	LS07-EB092001	NA	5.38	5.52	NA	NA	NA

NA - Not analyzed

Appendix A
Analytical Parameters

TABLE A-1
Analytical Parameters

Volatile Organic Compounds on Target Compound List (TCL)		
Acetone	Chloromethane	4-Methyl-2-Pentenone
Benzene	Dibromochloromethane	Methylene Chloride
Bromoform	1,1-Dichloroethane	Styrene
Bromodichloromethane	1,2-Dichloroethane	1,1,2,2-Tetrachloroethane
Bromomethane	1,1-Dichloroethene	Tetrachloroethene
2-Butanone	1,2-Dichloroethene (total)1,2-	Toluene
Carbon Disulfide	Dichloropropane	1,1,1-Trichloroethane
Carbon Tetrachloride	cis-1,3-Dichloropropene	1,1,2-Trichloroethane
Chlorobenzene	trans-1,3 Dichloropropene	Trichloroethene
Chloroethane	Ethylbenzene	Vinyl Chloride
Chloroform	2-Hexanone	Xylenes (total)

Semivolatile Organic Compounds on Target Compound List (TCL)		
1,2-Dichlorobenzene	4-Chloro-3-methylphenol	4-Bromophenyl-phenylether
1,3-Dichlorobenzene	2-Methylnaphthalene	Hexachlorobenzene
1,4-Dichlorobenzene	Hexachlorocyclopentadiene	Pentachlorophenol
Phenol	2,4,6-Trichlorophenol	Phenanthrene
bis-(2-Chloroethyl)ether	2,4,5-Trichlorophenol	Anthracene
2-Chlorophenol	2-Chloronaphthalene	Di-n-butylphthalate
2-Methylphenol	2-Nitroaniline	Carbazole
2,2'-oxybis(1-Chloropropane)	Dimethylphthalate	Fluoranthene
4-Methylphenol	Acenaphthylene	Pyrene
N-Nitroso-di-n-propylamine	2,6-Dinitrotoluene	Butylbenzylphthalate
Hexachloroethane	3-Nitroaniline	3,3'-Dichlorobenzidine
Nitrobenzene	Acenaphthene 2,4-Dinitrophenol	Benzo(a)anthracene
Isophorone	4-Nitrophenol	Chrysene
2-Nitrophenol	Dibenzofuran	bis-(2-Ethylhexyl)phthalate
2,4-Dimethylphenol	2,4-Dinitrotoluene	Di-n-octylphthalate
bis-(2-Chloroethoxy)methane	Diethylphthalate	Benzo(b)fluoranthene
2,4-Dichlorophenol	4-Chlorophenyl-phenylether	Benzo(k)fluoranthene
1,2,4-Trichlorobenzene	Fluorene	Benzo(a)pyrene
Naphthalene	4-Nitroaniline	Indeno(1,2,3-cd)pyrene
4-Chloroaniline	4,6-Dinitro-2-methylphenol	Dibenz(a,h)anthracene
Hexachlorobutadiene	N-Nitrosodiphenylamine	Benzo(g,h,i)perylene

Inorganics on Target Analyte List (TAL)		
Aluminum	Cobalt	Nickel
Antimony	Copper	Potassium
Arsenic	Cyanide	Selenium
Barium	Iron	Silver
Beryllium	Lead	Sodium
Cadmium	Magnesium	Thallium
Calcium	Manganese	Vanadium
Chromium	Mercury	Zinc

Appendix B
Analytical Results

Table B-1
NAB Little Creek
Navy CLEAN II CTO-210, Long Term Monitoring Plan
Round 6, Analytical Results for Site 7 Groundwater

Station ID	LS07-MW01				LS07-MW03		LS07-MW06		LS07-MW07		LS07-MW08		LS07-MW09	
Sample ID	LS07-MW01-01C		LS07-MW01P-01C		LS07-MW03-01C		LS07-MW06-01C		LS07-MW07-01C		LS07-MW08-01C		LS07-MW09-01C	
Sample Date	09/13/01		09/13/01		09/20/01		09/13/01		09/10/01		09/10/01		09/10/01	
Chemical Name														
Volatile Organic Compounds (UG/L)														
1,1,1-Trichloroethane	10	U	10	U	10	U	10	U	10	U	10	U	10	U
1,1,2,2-Tetrachloroethane	10	U	10	U	1	B	10	U	10	U	1	B	1.2	B
1,1,2-Trichloro-1,2,2-trifluoroethane(Freon-113)	10	U	10	U	10	U	10	U	10	U	10	U	10	U
1,1,2-Trichloroethane	10	U	10	U	10	U	10	U	10	U	10	U	10	U
1,1-Dichloroethane	10	U	10	U	10	U	10	U	10	U	10	U	10	U
1,1-Dichloroethene	10	U	10	U	10	U	10	U	10	U	10	U	10	U
1,2,4-Trichlorobenzene	10	U	10	U	4	B	10	U	10	U	3.6	B	4.2	B
1,2-Dibromo-3-chloropropane	10	U	10	U	4	B	10	U	10	U	4.4	B	4.8	B
1,2-Dibromoethane	10	U	10	U	10	U	10	U	10	U	10	U	10	U
1,2-Dichlorobenzene	10	U	10	U	1	B	10	U	10	U	1.2	B	1.5	B
1,2-Dichloroethane	10	U	10	U	10	U	10	U	10	U	10	U	10	U
1,2-Dichloropropane	10	U	10	U	10	U	10	U	10	U	10	U	10	U
1,3-Dichlorobenzene	10	U	10	U	10	U	10	U	10	U	10	U	10	U
1,4-Dichlorobenzene	10	U	10	U	10	U	10	U	10	U	1.2	B	1.5	B
2-Butanone	10	U	10	U	10	U	10	U	10	U	1	J	10	U
2-Hexanone	10	U	10	U	10	U	10	U	10	U	10	U	10	U
4-Methyl-2-pentanone	10	U	10	U	10	U	10	U	10	U	10	U	10	U
Acetone	10	U	10	U	10	U	10	U	10	U	2	B	2.4	B
Benzene	10	U	10	U	10	U	10	U	10	U	10	U	10	U
Bromodichloromethane	10	U	10	U	10	U	10	U	10	U	10	U	10	U
Bromoform	10	U	10	U	10	U	10	U	10	U	10	U	10	U
Bromomethane	10	U	10	U	10	U	10	U	10	U	10	U	10	U
Carbon disulfide	10	U	10	U	10	U	10	U	10	U	10	U	10	U
Carbon tetrachloride	10	U	10	U	10	U	10	U	10	U	10	U	10	U
Chlorobenzene	10	U	10	U	10	U	10	U	10	U	10	U	10	U
Chloroethane	10	U	10	U	10	U	10	U	10	U	10	U	10	U
Chloroform	10	U	10	U	10	U	10	U	10	U	10	U	10	U
Chloromethane	10	U	10	U	10	U	10	U	10	U	10	U	10	U
Cumene	10	U	10	U	10	U	10	U	10	U	10	U	10	U
Cyclohexane	10	U	10	U	10	U	10	U	10	U	10	U	10	U
Dibromochloromethane	10	U	10	U	10	U	10	U	10	U	10	U	10	U
Dichlorodifluoromethane(Freon-12)	10	U	10	U	10	U	10	U	10	U	10	U	10	U
Ethylbenzene	10	U	10	U	10	U	10	U	10	U	10	U	10	U
Methyl acetate	10	U	10	U	10	U	10	U	10	U	10	U	10	U
Methyl-tert-butyl ether (MTBE)	10	U	10	U	10	U	10	U	10	U	10	U	10	U
Methylcyclohexane	10	U	10	U	1	B	10	U	10	U	1	B	1.4	B
Methylene chloride	10	U	10	U	10	U	10	U	10	U	10	U	10	U
Styrene	10	U	10	U	10	U	10	U	10	U	10	U	10	U
Tetrachloroethene	10	U	10	U	10	U	10	U	10	U	10	U	10	U

B - Analyte not detected above associated blank
J - Reported value is estimated
L - Reported value may be biased low
U, UL - Analyte not detected

Table B-1
NAB Little Creek
Navy CLEAN II CTO-210, Long Term Monitoring Plan
Round 6, Analytical Results for Site 7 Groundwater

Station ID	LS07-MW01		LS07-MW03	LS07-MW06	LS07-MW07	LS07-MW08	LS07-MW09
Sample ID	LS07-MW01-01C	LS07-MW01P-01C	LS07-MW03-01C	LS07-MW06-01C	LS07-MW07-01C	LS07-MW08-01C	LS07-MW09-01C
Sample Date	09/13/01	09/13/01	09/20/01	09/13/01	09/10/01	09/10/01	09/10/01
Chemical Name							
Toluene	2 J	2 J	10 U	10 U	10 U	10 U	10 U
Trichloroethene	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Trichlorofluoromethane(Freon-11)	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Vinyl chloride	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Xylene, total	10 U	10 U	10 U	10 U	10 U	10 U	10 U
cis-1,2-Dichloroethene	10 U	10 U	10 U	10 U	10 U	10 U	10 U
cis-1,3-Dichloropropene	10 U	10 U	10 U	10 U	10 U	10 U	10 U
trans-1,2-Dichloroethene	10 U	10 U	10 U	10 U	10 U	10 U	10 U
trans-1,3-Dichloropropene	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Semi-volatile Organic Compounds (UG/L)							
1,1-Biphenyl	11 U	11 U	10 U	12 U	11 U	11 U	11 U
2,2'-Oxybis(1-chloropropane)	11 U	11 U	10 U	12 U	11 U	11 U	11 U
2,4,5-Trichlorophenol	28 U	28 U	25 U	31 U	28 U	28 U	28 U
2,4,6-Trichlorophenol	11 U	11 U	10 U	12 U	11 U	11 U	11 U
2,4-Dichlorophenol	11 U	11 U	10 U	12 U	11 U	11 U	11 U
2,4-Dimethylphenol	11 U	11 U	10 U	12 U	11 U	11 U	11 U
2,4-Dinitrophenol	28 U	28 U	25 U	31 U	28 U	28 U	28 U
2,4-Dinitrotoluene	11 U	11 U	10 U	12 U	11 U	11 U	11 U
2,6-Dinitrotoluene	11 U	11 U	10 U	12 U	11 U	11 U	11 U
2-Chloronaphthalene	11 U	11 U	10 U	12 U	11 U	11 U	11 U
2-Chlorophenol	11 U	11 U	10 U	12 U	11 U	11 U	11 U
2-Methylnaphthalene	11 U	11 U	10 U	12 U	11 U	11 U	11 U
2-Methylphenol	11 U	11 U	10 U	12 U	11 U	11 U	11 U
2-Nitroaniline	28 U	28 U	25 U	31 U	28 U	28 U	28 U
2-Nitrophenol	11 U	11 U	10 U	12 U	11 U	11 U	11 U
3,3'-Dichlorobenzidine	11 U	11 U	10 U	12 U	11 U	11 U	11 U
3-Nitroaniline	28 U	28 U	25 U	31 U	28 U	28 U	28 U
4,6-Dinitro-2-methylphenol	28 U	28 U	25 U	31 U	28 U	28 U	28 U
4-Bromophenyl-phenylether	11 U	11 U	10 U	12 U	11 U	11 U	11 U
4-Chloro-3-methylphenol	11 U	11 U	10 U	12 U	11 U	11 U	11 U
4-Chloroaniline	11 U	11 U	10 U	12 U	11 U	11 U	11 U
4-Chlorophenyl-phenylether	11 U	11 U	10 U	12 U	11 U	11 U	11 U
4-Methylphenol	11 U	11 U	10 U	12 U	11 U	11 U	11 U
4-Nitroaniline	28 U	28 U	25 U	31 U	28 U	28 U	28 U
4-Nitrophenol	28 U	28 U	25 U	31 U	28 U	28 U	28 U
Acenaphthene	11 U	11 U	10 U	12 U	11 U	11 U	11 U
Acenaphthylene	11 U	11 U	10 U	12 U	11 U	11 U	11 U
Acetophenone	11 U	11 U	10 U	12 U	11 U	11 U	11 U
Anthracene	11 U	11 U	10 U	12 U	11 U	11 U	11 U
Atrazine	11 U	11 U	10 U	12 U	11 U	11 U	11 U

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Table B-1
NAB Little Creek
Navy CLEAN II CTO-210, Long Term Monitoring Plan
Round 6, Analytical Results for Site 7 Groundwater

Station ID	LS07-MW01		LS07-MW03	LS07-MW06	LS07-MW07	LS07-MW08	LS07-MW09
Sample ID	LS07-MW01-01C	LS07-MW01P-01C	LS07-MW03-01C	LS07-MW06-01C	LS07-MW07-01C	LS07-MW08-01C	LS07-MW09-01C
Sample Date	09/13/01	09/13/01	09/20/01	09/13/01	09/10/01	09/10/01	09/10/01
Chemical Name							
Benzaldehyde	11 U	11 U	10 U	12 U	11 U	11 U	11 U
Benzo(a)anthracene	11 U	11 U	10 U	12 U	11 U	11 U	11 U
Benzo(a)pyrene	11 U	11 U	10 U	12 U	11 U	11 U	11 U
Benzo(b)fluoranthene	11 U	11 U	10 U	12 U	11 U	11 U	11 U
Benzo(g,h,i)perylene	11 U	11 U	10 U	12 U	11 U	11 U	11 U
Benzo(k)fluoranthene	11 U	11 U	10 U	12 U	11 U	11 U	11 U
Butylbenzylphthalate	11 U	11 U	10 U	12 U	11 U	11 U	11 U
Caprolactam	11 U	11 U	10 U	12 U	11 U	11 U	11 U
Carbazole	11 U	11 U	10 U	12 U	11 U	11 U	11 U
Chrysene	11 U	11 U	10 U	12 U	11 U	11 U	11 U
Di-n-butylphthalate	12	11 U	7 B	12 U	1.9 J	5.6 J	4 J
Di-n-octylphthalate	11 U	11 U	10 U	12 U	11 U	11 U	11 U
Dibenz(a,h)anthracene	11 U	11 U	10 U	12 U	11 U	11 U	11 U
Dibenzofuran	11 U	11 U	10 U	12 U	11 U	11 U	11 U
Diethylphthalate	11 U	11 U	10 U	12 U	11 U	11 U	11 U
Dimethyl phthalate	11 U	11 U	10 U	12 U	11 U	11 U	11 U
Fluoranthene	11 U	11 U	10 U	12 U	11 U	11 U	11 U
Fluorene	11 U	11 U	10 U	12 U	11 U	11 U	11 U
Hexachlorobenzene	11 U	11 U	10 U	12 U	11 U	11 U	11 U
Hexachlorobutadiene	11 U	11 U	10 U	12 U	11 U	11 U	11 U
Hexachlorocyclopentadiene	11 U	11 U	10 U	12 U	11 U	11 U	11 U
Hexachloroethane	11 U	11 U	10 U	12 U	11 U	11 U	11 U
Indeno(1,2,3-cd)pyrene	11 U	11 U	10 U	12 U	11 U	11 U	11 U
Isophorone	11 U	11 U	10 U	12 U	11 U	11 U	11 U
Naphthalene	11 U	11 U	10 U	12 U	11 U	11 U	11 U
Nitrobenzene	11 U	11 U	10 U	12 U	11 U	11 U	11 U
Pentachlorophenol	28 U	28 U	25 U	31 U	28 U	28 U	28 U
Phenanthrene	11 U	11 U	10 U	12 U	11 U	11 U	11 U
Phenol	11 U	11 U	10 U	12 U	11 U	11 U	11 U
Pyrene	11 U	11 U	10 U	12 U	11 U	11 U	11 U
bis(2-Chloroethoxy)methane	11 U	11 U	10 U	12 U	11 U	11 U	11 U
bis(2-Chloroethyl)ether	11 U	11 U	10 U	12 U	11 U	11 U	11 U
bis(2-Ethylhexyl)phthalate	11 U	1 J	10 U	12 U	11 U	11 U	1 J
n-Nitroso-di-n-propylamine	11 U	11 U	10 U	12 U	11 U	11 U	11 U
n-Nitrosodiphenylamine	11 U	11 U	10 U	12 U	11 U	11 U	11 U
Pesticide/Polychlorinated Biphenyls (UG/L)							
Aroclor-1016	1 U	1.2 U	1 U	1.1 U	1.2 U	1.2 U	1.2 U
Aroclor-1221	2 U	2.4 U	2 U	2.2 U	2.4 U	2.4 U	2.4 U
Aroclor-1232	1 U	1.2 U	1 U	1.1 U	1.2 U	1.2 U	1.2 U
Aroclor-1242	1 U	1.2 U	1 U	1.1 U	1.2 U	1.2 U	1.2 U

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Table B-1
NAB Little Creek
Navy CLEAN II CTO-210, Long Term Monitoring Plan
Round 6, Analytical Results for Site 7 Groundwater

Station ID	LS07-MW01		LS07-MW03	LS07-MW06	LS07-MW07	LS07-MW08	LS07-MW09
Sample ID	LS07-MW01-01C	LS07-MW01P-01C	LS07-MW03-01C	LS07-MW06-01C	LS07-MW07-01C	LS07-MW08-01C	LS07-MW09-01C
Sample Date	09/13/01	09/13/01	09/20/01	09/13/01	09/10/01	09/10/01	09/10/01
Chemical Name							
Aroclor-1248	1 U	1.2 U	1 U	1.1 U	1.2 U	1.2 U	1.2 U
Aroclor-1254	1 U	1.2 U	1 U	1.1 U	1.2 U	1.2 U	1.2 U
Aroclor-1260	1 U	1.2 U	1 U	1.1 U	1.2 U	1.2 U	1.2 U
Total Metals (UG/L)							
Aluminum	124 J	137 J	135 J	11.7 U	25.5 B	30.3 B	15.8 B
Antimony	3.6 U	3.6 U	3.6 U	3.6 U	3.6 U	3.6 U	3.6 U
Arsenic	3.9 U	3.9 U	3.9 U	27.5	3.9 U	3.9 U	3.9 U
Barium	6.3 J	6 J	29.8 J	17.6 J	58.8 J	41.6 J	87.5 J
Beryllium	0.2 U	0.2 U	0.3 J	0.2 U	0.2 U	0.2 U	0.2 U
Cadmium	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	0.54 J
Calcium	16,300	15,300	22,900	148,000	283,000	276,000	277,000
Chromium	1.6 J	0.73 J	1.1 J	0.93 J	2.2 B	89.8 L	0.7 UL
Cobalt	0.7 U	0.7 U	8.7 J	1.6 J	0.7 U	0.88 J	0.7 U
Copper	0.6 U	1.3 J	1.2 B	0.6 U	1.7 B	3.7 B	2.7 B
Cyanide	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Iron	3,450	3,370	9,420	13,500	14.1 UL	2,010 L	29,800 L
Lead	1.4 U	1.4 U	1.4 U	1.4 U	1.4 U	1.4 U	1.4 U
Magnesium	36,900	34,400	9,430	125,000	594,000	576,000	768,000
Manganese	62.8	60.1	558	1,560	170	177	784
Mercury	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
Nickel	1 U	1 U	5.1 J	1 U	1 U	12.5 J	1 U
Potassium	25,300	23,900	9,330	22,200	195,000	201,000	258,000
Selenium	4.2 U	4.2 U	4.2 U	4.2 U	4.2 U	4.2 U	4.2 U
Silver	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Sodium	400,000	374,000	41,100	389,000	4,750,000	4,750,000	6,520,000
Thallium	5.3 U	5.3 U	5.3 U	5.3 U	5.3 U	5.3 U	5.3 U
Vanadium	1.9 J	2 J	1.1 U	1.1 U	3.4 J	8.9 J	1.5 J
Zinc	0.87 J	0.6 U	89.6	4.3 J	4.4 B	6.3 B	3.8 B
Dissolved Metals (UG/L)							
Aluminum	11.7 U	11.7 U	104 J	12.6 J	11.7 U	30.3 B	16.8 B
Antimony	3.6 U	3.6 U	3.6 U	3.6 U	3.6 U	3.6 U	3.6 U
Arsenic	3.9 U	3.9 U	3.9 U	22.5	3.9 U	3.9 U	3.9 U
Barium	5.3 J	5.6 J	29.7 J	17.6 J	59.8 J	42.3 J	84.1 J
Beryllium	0.2 U	0.2 U	0.29 J	0.2 U	0.2 U	0.2 U	0.2 U
Cadmium	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	0.5 J
Calcium	14,100	15,100	23,900	147,000	292,000	273,000	272,000
Chromium	0.7 U	0.7 U	0.7 U	0.7 U	2 B	3.7 B	0.7 U
Cobalt	0.7 U	0.7 U	8.2 J	1.8 J	0.7 U	0.7 U	0.7 U
Copper	0.6 U	0.6 U	0.6 U	0.6 U	1.9 B	2.9 B	1.5 B

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Table B-1
NAB Little Creek
Navy CLEAN II CTO-210, Long Term Monitoring Plan
Round 6, Analytical Results for Site 7 Groundwater

Station ID	LS07-MW01		LS07-MW03	LS07-MW06	LS07-MW07	LS07-MW08	LS07-MW09
Sample ID	LS07-MW01-01C	LS07-MW01P-01C	LS07-MW03-01C	LS07-MW06-01C	LS07-MW07-01C	LS07-MW08-01C	LS07-MW09-01C
Sample Date	09/13/01	09/13/01	09/20/01	09/13/01	09/10/01	09/10/01	09/10/01
Chemical Name							
Iron	3,130	3,260	9,400	12,900	14.1 U	14.1 U	27,700
Lead	1.4 U	1.4 U	1.4 U	1.4 U	1.5 J	1.4 U	1.4 U
Magnesium	31,400	33,800	9,990	124,000	617,000	571,000	751,000
Manganese	56.7	60	581	1,550	171	174	774
Mercury	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
Nickel	1 U	1 U	4.6 J	1 U	1.4 J	1.3 J	1 U
Potassium	22,500	23,600	9,750	21,800	208,000	203,000	250,000
Selenium	4.2 U	4.2 U	4.2 U	4.2 U	4.2 U	4.2 U	4.2 U
Silver	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Sodium	344,000	365,000	45,100	380,000	5,020,000	4,780,000	6,380,000
Thallium	5.3 U	5.3 U	5.3 U	5.3 U	5.3 U	5.3 U	5.3 U
Vanadium	1.1 U	1.5 J	1.1 U	1.1 U	2.7 J	3 J	2.1 J
Zinc	1.3 J	0.72 J	87.7	6 J	2.4 B	3.6 B	3.3 B

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Table B-2
NAB Little Creek
Navy CLEAN II CTO-210, Long Term Monitoring Plan
Round 6, Analytical Results for Site 7 Surface Water

Station ID	LS07-SW201		LS07-SW202				LS07-SW203		LS07-SW204				LS07-SW205		LS07-SW206		LS07-SW207	
Sample ID	LS07-SW201-01C		LS07-SW202-01C		LS07-SW202P-01C		LS07-SW203-01C		LS07-SW204-01C		LS07-SW204P-01C		LS07-SW205-01C		LS07-SW206-01C		LS07-SW207-01C	
Sample Date	09/11/01		09/13/01		09/13/01		09/13/01		09/13/01		09/13/01		09/11/01		09/11/01		09/11/01	
Chemical Name																		
Volatile Organic Compounds (UG/L)																		
1,1,1-Trichloroethane	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U
1,1,2,2-Tetrachloroethane	10	U	10	U	10	U	1	J	1	B	10	U	1	B	10	U	10	U
1,1,2-Trichloro-1,2,2-trifluoroethane(Freon-113)	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U
1,1,2-Trichloroethane	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U
1,1-Dichloroethane	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U
1,1-Dichloroethene	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U
1,2,4-Trichlorobenzene	10	U	10	U	10	U	4	B	4	B	10	U	4	B	10	U	10	U
1,2-Dibromo-3-chloropropane	10	U	10	U	10	U	4	B	5	B	10	U	5	B	10	U	10	U
1,2-Dibromoethane	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U
1,2-Dichlorobenzene	10	U	10	U	10	U	1	B	1	B	10	U	2	B	10	U	10	U
1,2-Dichloroethane	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U
1,2-Dichloropropane	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U
1,3-Dichlorobenzene	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U
1,4-Dichlorobenzene	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U
2-Butanone	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U
2-Hexanone	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U
4-Methyl-2-pentanone	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U
Acetone	10	U	10	U	10	U	1	J	4	J	2	J	1	J	10	U	10	U
Benzene	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U
Bromodichloromethane	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U
Bromoform	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U
Bromomethane	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U
Carbon disulfide	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U
Carbon tetrachloride	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U
Chlorobenzene	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U
Chloroethane	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U
Chloroform	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U
Chloromethane	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U
Cumene	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U
Cyclohexane	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U
Dibromochloromethane	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U
Dichlorodifluoromethane(Freon-12)	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U
Ethylbenzene	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U
Methyl acetate	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U
Methyl-tert-butyl ether (MTBE)	10	U	1	J	1	J	10	U	10	U	10	U	10	U	10	U	10	U
Methylcyclohexane	10	U	10	U	10	U	1	B	1	B	10	U	1	B	10	U	10	U
Methylene chloride	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U
Styrene	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U
Tetrachloroethene	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U

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Table B-2
NAB Little Creek
Navy CLEAN II CTO-210, Long Term Monitoring Plan
Round 6, Analytical Results for Site 7 Surface Water

Station ID	LS07-SW201	LS07-SW202		LS07-SW203	LS07-SW204		LS07-SW205	LS07-SW206	LS07-SW207
Sample ID	LS07-SW201-01C	LS07-SW202-01C	LS07-SW202P-01C	LS07-SW203-01C	LS07-SW204-01C	LS07-SW204P-01C	LS07-SW205-01C	LS07-SW206-01C	LS07-SW207-01C
Sample Date	09/11/01	09/13/01	09/13/01	09/13/01	09/13/01	09/13/01	09/11/01	09/11/01	09/11/01
Chemical Name									
Toluene	10 U	1 J	1 J	10 U	10 U	10 U	10 U	10 U	10 U
Trichloroethene	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Trichlorofluoromethane(Freon-11)	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Vinyl chloride	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Xylene, total	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
cis-1,2-Dichloroethene	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
cis-1,3-Dichloropropene	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
trans-1,2-Dichloroethene	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
trans-1,3-Dichloropropene	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Total Metals (UG/L)									
Aluminum	131 J	379	1,590	11.7 U	257	177 J	450	374	294
Antimony	3.6 U	3.6 U	3.6 U	3.6 U	3.6 U	3.6 U	3.6 U	3.6 U	5.2 J
Arsenic	3.9 U	3.9 U	3.9 U	6.9 J	4.2 J	3.9 U	3.9 U	3.9 U	3.9 U
Barium	22.1 J	21.8 J	21.5 J	19 J	28.9 J	27.3 J	19.2 J	20.1 J	20.5 J
Beryllium	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
Cadmium	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U
Calcium	252,000	274,000	267,000	43,600	83,100	83,300	264,000	263,000	268,000
Chromium	0.7 U	0.7 U	0.7 U	0.7 U	1.1 J	0.7 U	0.7 U	0.7 U	0.77 J
Cobalt	0.7 U	0.7 U	0.7 U	1.5 J	2.4 J	1.4 J	0.7 U	0.7 U	0.84 J
Copper	4.9 B	2.8 J	2.4 J	0.6 U	2 J	1.5 J	5.4 B	8.5 B	8.8 B
Cyanide	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Iron	147 B	821	787	2,540	1,350	1,160	14.1 U	358	241
Lead	1.4 U	1.6 J	1.4 U	1.4 U	1.4 U	2.8 B	1.5 J	1.4 U	1.4 U
Magnesium	809,000	830,000	818,000	93,500	203,000	203,000	829,000	842,000	862,000
Manganese	44.8	25.7	25.7	288	186	184	16.9	27.7	27.8
Mercury	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
Nickel	1.1 J	1 U	1.7 J	1 U	1 J	1 U	2 J	1 U	1 U
Potassium	291,000	289,000	285,000	34,700	80,900	81,200	301,000	301,000	306,000
Selenium	4.2 U	4.2 U	4.2 U	4.2 U	4.2 U	4.2 U	4.2 U	4.2 U	4.2 U
Silver	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1.4 J
Sodium	6,750,000	7,180,000	7,100,000	806,000	1,830,000	1,830,000	7,190,000	7,180,000	7,170,000
Thallium	5.3 U	5.3 U	5.3 U	5.3 U	5.3 U	5.3 U	5.3 U	5.3 U	5.3 U
Vanadium	2.9 J	3.1 J	4.1 J	1.1 U	2.3 J	1.6 J	3 J	3.5 J	4.7 J
Zinc	14.1 B	7.4 J	8.5 J	5.9 J	20.1	14.8 J	11.5 B	12.2 J	17.3 B
Dissolved Metals (UG/L)									
Aluminum	11.7 U	11.7 U	11.7 U	11.7 U	11.7 U	59.6 J	11.7 U	11.7 U	11.7 U
Antimony	3.6 U	3.6 U	3.6 U	3.6 U	3.6 U	3.6 U	3.6 U	3.6 U	3.6 U
Arsenic	3.9 U	3.9 U	3.9 U	8.1 J	3.9 U	3.9 U	3.9 U	3.9 U	3.9 U
Barium	20.6 J	20 J	20.1 J	19.8 J	27.8 J	30.6 J	19.1 J	20.4 J	20.1 J

B - Analyte not detected above associated blank
J - Reported value is estimated
L - Reported value may be biased low
U, UL, UN - Analyte not detected

Table B-2
NAB Little Creek
Navy CLEAN II CTO-210, Long Term Monitoring Plan
Round 6, Analytical Results for Site 7 Surface Water

Station ID	LS07-SW201	LS07-SW202		LS07-SW203	LS07-SW204		LS07-SW205	LS07-SW206	LS07-SW207
Sample ID	LS07-SW201-01C	LS07-SW202-01C	LS07-SW202P-01C	LS07-SW203-01C	LS07-SW204-01C	LS07-SW204P-01C	LS07-SW205-01C	LS07-SW206-01C	LS07-SW207-01C
Sample Date	09/11/01	09/13/01	09/13/01	09/13/01	09/13/01	09/13/01	09/11/01	09/11/01	09/11/01
Chemical Name									
Beryllium	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
Cadmium	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U
Calcium	261,000	265,000	265,000	44,700	104,000	118,000	269,000	267,000	265,000
Chromium	0.7 U	0.7 U	0.7 U	22.9 J	0.7 U	0.7 U	0.7 U	2.1 J	0.7 U
Cobalt	0.7 U	0.7 U	0.7 U	1.8 J	1.8 J	1.9 J	0.7 U	0.7 U	0.7 U
Copper	3.3 B	4.2 J	0.99 J	2.1 B	0.681 J	1.2 J	3.2 B	3.1 J	3.5 B
Iron	14.1 U	107	125	3,200 L	14.1 U	14.1 U	282 U	14.1 U	282 U
Lead	1.4 U	1.4 U	1.4 U	1.4 U	1.8 J	1.4 U	1.4 U	1.4 U	1.4 U
Magnesium	852,000	797,000	819,000	94,200	265,000	303,000	845,000	855,000	848,000
Manganese	21.4	16.9	18.4	303	168	156	6.3 J	18.6	17.9
Mercury	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
Nickel	1.2 J	1.1 J	1 U	1.8 J	1 U	1 U	1.2 J	1.5 J	1 U
Potassium	303,000	276,000	283,000	35,100	91,100	104,000	304,000	308,000	305,000
Selenium	4.2 U	4.2 U	4.2 U	4.2 UL	4.2 U	4.2 U	4.2 U	4.2 U	4.2 U
Silver	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Sodium	6,990,000	6,880,000	7,040,000	824,000	2,370,000	2,720,000	7,170,000	7,170,000	7,150,000
Thallium	5.3 U	5.3 U	5.3 U	5.3 U	5.3 U	5.3 U	5.3 U	5.3 U	5.3 U
Vanadium	2 J	2.2 J	2.3 J	2.2	1.1 U	1.1 U	1.8 J	3.4 J	2.6 J
Zinc	11 J	2.6 J	2.4 J	5.5 B	14 J	23.8	3.1 B	3.4 J	4.2 J

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L - Reported value may be biased low
U, UL, UN - Analyte not detected

Table B-2
NAB Little Creek
Navy CLEAN II CTO-210, Long Term Monitoring Plan
Round 6, Analytical Results for Site 7 Surface Water

Station ID	LS07-SW208		LS07-SW209		LS07-SW210		LS07-SW211		LS07-SW212		LS07-SW213	
Sample ID	LS07-SW208-01C		LS07-SW209-01C		LS07-SW210-01C		LS07-SW211-01C		LS07-SW212-01C		LS07-SW213-01C	
Sample Date	09/11/01		09/11/01		09/10/01		09/13/01		09/13/01		09/13/01	
Chemical Name												
Volatile Organic Compounds (UG/L)												
1,1,1-Trichloroethane	10	U	10	U	10	U	10	U	10	U	10	U
1,1,2,2-Tetrachloroethane	10	U	10	U	10	U	10	U	10	U	10	U
1,1,2-Trichloro-1,2,2-trifluoroethane(Freon-113)	10	U	10	U	10	U	10	U	10	U	10	U
1,1,2-Trichloroethane	10	U	10	U	10	U	10	U	10	U	10	U
1,1-Dichloroethane	10	U	10	U	10	U	10	U	10	U	10	U
1,1-Dichloroethene	10	U	10	U	10	U	10	U	10	U	10	U
1,2,4-Trichlorobenzene	10	U	10	U	10	U	10	U	10	U	10	U
1,2-Dibromo-3-chloropropane	10	U	10	U	10	U	10	U	10	U	10	U
1,2-Dibromoethane	10	U	10	U	10	U	10	U	10	U	10	U
1,2-Dichlorobenzene	10	U	10	U	10	U	10	U	10	U	10	U
1,2-Dichloroethane	10	U	10	U	10	U	10	U	10	U	10	U
1,2-Dichloropropane	10	U	10	U	10	U	10	U	10	U	10	U
1,3-Dichlorobenzene	10	U	10	U	10	U	10	U	10	U	10	U
1,4-Dichlorobenzene	10	U	10	U	10	U	10	U	10	U	10	U
2-Butanone	10	U	10	U	10	U	10	U	10	U	10	U
2-Hexanone	10	U	10	U	10	U	10	U	10	U	10	U
4-Methyl-2-pentanone	10	U	10	U	10	U	10	U	10	U	10	U
Acetone	10	U	10	U	10	U	10	U	2	J	10	U
Benzene	10	U	10	U	10	U	10	U	10	U	10	U
Bromodichloromethane	10	U	10	U	10	U	10	U	10	U	10	U
Bromoform	10	U	10	U	10	U	10	U	10	U	10	U
Bromomethane	10	U	10	U	10	U	10	U	10	U	10	U
Carbon disulfide	10	U	10	U	10	U	10	U	10	U	10	U
Carbon tetrachloride	10	U	10	U	10	U	10	U	10	U	10	U
Chlorobenzene	10	U	10	U	10	U	10	U	10	U	10	U
Chloroethane	10	U	10	U	10	U	10	U	10	U	10	U
Chloroform	10	U	10	U	10	U	10	U	10	U	10	U
Chloromethane	10	U	10	U	10	U	10	U	10	U	10	U
Cumene	10	U	10	U	10	U	10	U	10	U	10	U
Cyclohexane	10	U	10	U	10	U	10	U	10	U	10	U
Dibromochloromethane	10	U	10	U	10	U	10	U	10	U	10	U
Dichlorodifluoromethane(Freon-12)	10	U	10	U	10	U	10	U	10	U	10	U
Ethylbenzene	10	U	10	U	10	U	10	U	10	U	10	U
Methyl acetate	10	U	10	U	10	U	10	U	10	U	10	U
Methyl-tert-butyl ether (MTBE)	10	U	10	U	2.1	J	10	U	10	U	10	U
Methylcyclohexane	10	U	10	U	10	U	10	U	10	U	10	U
Methylene chloride	10	U	10	U	10	U	10	U	2	J	10	U
Styrene	10	U	10	U	10	U	10	U	10	U	10	U
Tetrachloroethene	10	U	10	U	10	U	10	U	10	U	10	U

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L - Reported value may be biased low
U, UL, UN - Analyte not detected

Table B-2
NAB Little Creek
Navy CLEAN II CTO-210, Long Term Monitoring Plan
Round 6, Analytical Results for Site 7 Surface Water

Station ID	LS07-SW208		LS07-SW209		LS07-SW210		LS07-SW211		LS07-SW212		LS07-SW213	
Sample ID	LS07-SW208-01C		LS07-SW209-01C		LS07-SW210-01C		LS07-SW211-01C		LS07-SW212-01C		LS07-SW213-01C	
Sample Date	09/11/01		09/11/01		09/10/01		09/13/01		09/13/01		09/13/01	
Chemical Name												
Toluene	10	U	10	U	10	U	10	U	10	U	10	U
Trichloroethene	10	U	10	U	10	U	10	U	10	U	10	U
Trichlorofluoromethane(Freon-11)	10	U	10	U	10	U	10	U	10	U	10	U
Vinyl chloride	10	U	10	U	10	U	10	U	10	U	10	U
Xylene, total	10	U	10	U	10	U	10	U	10	U	10	U
cis-1,2-Dichloroethene	10	U	10	U	10	U	10	U	10	U	10	U
cis-1,3-Dichloropropene	10	U	10	U	10	U	10	U	10	U	10	U
trans-1,2-Dichloroethene	10	U	10	U	10	U	10	U	10	U	10	U
trans-1,3-Dichloropropene	10	U	10	U	10	U	10	U	10	U	10	U
Total Metals (UG/L)												
Aluminum	245		326		156	J	431		258		416	
Antimony	3.6	U	3.6	U	3.6	U	3.6	U	3.6	U	3.6	U
Arsenic	3.9	U	3.9	U	4.3	J	3.9	U	3.9	U	6.2	J
Barium	30.2	J	32.5	J	21.6	J	27.8	J	35.9	J	34	J
Beryllium	0.2	U	0.2	U	0.2	U	0.2	U	0.2	U	0.2	U
Cadmium	0.3	U	0.3	U	0.3	U	0.3	U	0.3	U	0.3	U
Calcium	268,000		274,000		266,000		207,000		91,100		165,000	
Chromium	0.7	U	0.7	U	0.7	U	0.97	J	1.3	J	1.2	J
Cobalt	0.8	U	0.7	U	0.7	U	1.3	J	1.2	J	1.5	J
Copper	5.1	B	8.1	B	4.8	B	2.6	J	8.2	J	1.7	J
Cyanide	5	U	5	U	5	U	5	U	5	U	5	U
Iron	813		1,060		19.8	B	989		2,360		1,620	
Lead	1.9	J	4.2		1.4	U	1.4	U	3.3		1.9	J
Magnesium	852,000		865,000		844,000		597,000		230,000		464,000	
Manganese	42.1		43.1		23.8		89.8		281		154	
Mercury	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U
Nickel	1.4	J	1	J	1	U	1.9	J	1.7	J	1.1	J
Potassium	305,000		310,000		302,000		205,000		90,200		156,000	
Selenium	4.2	U	4.2	U	4.2	U	4.2	U	4.2	U	4.2	U
Silver	1	U	1	U	1	U	1	U	1	U	1	U
Sodium	7,100,000		7,290,000		7,040,000		5,280,000		1,950,000		4,060,000	
Thallium	5.3	U	5.3	U	5.3	U	5.3	U	5.3	U	5.3	U
Vanadium	3	J	3.1	J	2.6	J	3.6	J	1.7	J	2.1	J
Zinc	16.3	J	30		10.1	B	15.7	J	46.2		20.5	
Dissolved Metals (UG/L)												
Aluminum	11.7	U	11.7	U	13.5	B	24.4	J	20.8	J	11.7	U
Antimony	3.6	U	3.6	U	3.6	U	3.6	U	3.6	U	3.6	U
Arsenic	3.9	U	3.9	U	3.9	U	3.9	U	3.9	U	3.9	U
Barium	30.2	J	33.1	J	19.6	J	26.4	J	33.2	J	34.4	J

B - Analyte not detected above associated blank
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L - Reported value may be biased low
U, UL, UN - Analyte not detected

Table B-2
NAB Little Creek
Navy CLEAN II CTO-210, Long Term Monitoring Plan
Round 6, Analytical Results for Site 7 Surface Water

Station ID	LS07-SW208		LS07-SW209		LS07-SW210		LS07-SW211		LS07-SW212		LS07-SW213	
Sample ID	LS07-SW208-01C		LS07-SW209-01C		LS07-SW210-01C		LS07-SW211-01C		LS07-SW212-01C		LS07-SW213-01C	
Sample Date	09/11/01		09/11/01		09/10/01		09/13/01		09/13/01		09/13/01	
Chemical Name												
Beryllium	0.2	U	0.2	U	0.2	U	0.2	U	0.2	U	0.2	U
Cadmium	0.3	U	0.3	U	0.3	U	0.3	U	0.3	U	0.3	U
Calcium	274,000		270,000		253,000		210,000		90,900		147,000	
Chromium	0.7	U	0.7	U	0.7	U	0.7	U	0.7	U	0.7	U
Cobalt	0.7	U	0.7	U	0.7	U	1.6	J	1.6	J	0.73	J
Copper	2.1	J	1.4	B	3.2	B	2.3	J	1.7	B	3.3	B
Iron	14.1	U	14.1	U	14.1	U	523		949		66.1	J
Lead	1.4	U	1.4	U	1.4	U	1.4	U	1.4	U	1.4	U
Magnesium	871,000		844,000		800,000		605,000		228,000		415,000	
Manganese	40.4		41.3		13.7	J	95.3		278		153	
Mercury	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U
Nickel	2.8	J	1	U	1.2	J	1	U	1.3	J	1	U
Potassium	312,000		303,000		289,000		207,000		90,200		150,000	
Selenium	4.2	U	4.2	U	4.2	U	4.2	U	4.2	U	4.2	UN
Silver	1	U	1	U	1	U	1	U	1	U	1	U
Sodium	6,890,000		7,120,000		6,770,000		5,310,000		1,920,000		3,760,000	
Thallium	5.3	U	5.3	U	5.3	U	5.3	U	5.3	U	5.3	U
Vanadium	1.6	J	1.1	U	2.1	J	2.2	J	1.1	J	1.1	U
Zinc	5.6	J	4.2	J	6	B	18	J	34.4		15.6	J

B - Analyte not detected above associated blank
J - Reported value is estimated
L - Reported value may be biased low
U, UL, UN - Analyte not detected

Table B-3
NAB Little Creek
Navy CLEAN II CTO-210, Long Term Monitoring Plan
Round 6, Analytical Results for Site 7 Sediment

Station ID	LS07-SD201		LS07-SD202			LS07-SD203		LS07-SD204			LS07-SD205		LS07-SD206		LS07-SD207		LS07-SD208	
Sample ID	LS07-SD201-01C		LS07-SD202-01C		LS07-SD202P-01C	LS07-SD203-01C		LS07-SD204-01C		LS07-SD204P-01C	LS07-SD205-01C		LS07-SD206-01C		LS07-SD207-01C		LS07-SD208-01C	
Sample Date	09/11/01		09/13/01		09/13/01	09/13/01		09/13/01		09/13/01	09/11/01		09/11/01		09/11/01		09/11/01	
Chemical Name																		
Semi-volatile Organic Compounds (UG/KG)																		
1,1-Biphenyl	420	U	440	U	470	U	480	U	490	U	480	U	410	U	410	U	450	UJ	640	U
2,2'-Oxybis(1-chloropropane)	420	U	440	U	470	U	480	U	490	U	480	U	410	U	410	U	450	UJ	640	U
2,4,5-Trichlorophenol	1,000	U	1,100	U	1,200	U	1,200	U	1,200	U	1,200	U	1,000	U	1,000	U	1,100	UJ	1,600	U
2,4,6-Trichlorophenol	420	U	440	U	470	U	480	U	490	U	480	U	410	U	410	U	450	UJ	640	U
2,4-Dichlorophenol	420	U	440	U	470	U	480	U	490	U	480	U	410	U	410	U	450	UJ	640	U
2,4-Dimethylphenol	420	U	440	U	470	U	480	U	490	U	480	U	410	U	410	U	450	UJ	640	U
2,4-Dinitrophenol	1,000	U	1,100	U	1,200	U	1,200	U	1,200	U	1,200	U	1,000	U	1,000	U	1,100	UJ	1,600	U
2,4-Dinitrotoluene	420	U	440	U	470	U	480	U	490	U	480	U	410	U	410	U	450	UJ	640	U
2,6-Dinitrotoluene	420	U	440	U	470	U	480	U	490	U	480	U	410	U	410	U	450	UJ	640	U
2-Chloronaphthalene	420	U	440	U	470	U	480	U	490	U	480	U	410	U	410	U	450	UJ	640	U
2-Chlorophenol	420	U	440	U	470	U	480	U	490	U	480	U	410	U	410	U	450	UJ	640	U
2-Methylnaphthalene	420	U	440	U	470	U	480	U	490	U	100	J	410	U	410	U	450	UJ	640	U
2-Methylphenol	420	U	440	U	470	U	480	U	490	U	480	U	410	U	410	U	450	UJ	640	U
2-Nitroaniline	1,000	U	1,100	U	1,200	U	1,200	U	1,200	U	1,200	U	1,000	U	1,000	U	1,100	UJ	1,600	U
2-Nitrophenol	420	U	440	U	470	U	480	U	490	U	480	U	410	U	410	U	450	UJ	640	U
3,3'-Dichlorobenzidine	420	U	440	U	470	U	480	U	490	U	480	U	410	U	410	U	450	UJ	640	U
3-Nitroaniline	1,000	U	1,100	U	1,200	U	1,200	U	1,200	U	1,200	U	1,000	U	1,000	U	1,100	UJ	1,600	U
4,6-Dinitro-2-methylphenol	1,000	U	1,100	U	1,200	U	1,200	U	1,200	U	1,200	U	1,000	U	1,000	U	1,100	UJ	1,600	U
4-Bromophenyl-phenylether	420	U	440	U	470	U	480	U	490	U	480	U	410	U	410	U	450	UJ	640	U
4-Chloro-3-methylphenol	420	U	440	U	470	U	480	U	490	U	480	U	410	U	410	U	450	UJ	640	U
4-Chloroaniline	420	U	440	U	470	U	480	U	490	U	480	U	410	U	410	U	450	UJ	640	U
4-Chlorophenyl-phenylether	420	U	440	U	470	U	480	U	490	U	480	U	410	U	410	U	450	UJ	640	U
4-Methylphenol	420	U	440	U	470	U	480	U	490	U	480	U	410	U	410	U	450	UJ	640	U
4-Nitroaniline	1,000	U	1,100	U	1,200	U	1,200	U	1,200	U	1,200	U	1,000	U	1,000	U	1,100	UJ	1,600	U
4-Nitrophenol	1,000	U	1,100	U	1,200	U	1,200	U	1,200	U	1,200	U	1,000	U	1,000	U	1,100	UJ	1,600	U
Acenaphthene	420	U	440	U	470	U	480	U	490	U	250	J	410	U	410	U	450	UJ	640	U
Acenaphthylene	420	U	440	U	470	U	480	U	490	U	480	U	410	U	410	U	450	UJ	640	U
Acetophenone	420	U	440	U	470	U	480	U	490	U	480	U	410	U	410	U	450	UJ	962	
Anthracene	420	U	440	U	470	U	480	U	490	U	590		410	U	410	U	450	UJ	640	U
Atrazine	420	U	440	U	470	U	480	U	490	U	480	U	410	U	410	U	450	UJ	640	U
Benzaldehyde	420	U	440	U	470	U	480	U	490	U	480	U	410	U	410	U	450	UJ	340	J
Benzo(a)anthracene	420	U	440	U	470	U	80	J	140	J	1,000		410	U	410	U	450	UJ	640	U
Benzo(a)pyrene	420	U	440	U	470	U	55	J	120	J	680		410	U	410	U	450	UJ	64	J
Benzo(b)fluoranthene	420	U	440	U	470	U	75	J	160	J	920		410	U	410	U	450	UJ	130	J
Benzo(g,h,i)perylene	420	U	440	U	470	U	480	U	85	J	450	J	410	U	410	U	450	UJ	640	U
Benzo(k)fluoranthene	420	U	440	U	470	U	480	U	54	J	360	J	410	U	410	U	450	UJ	640	U
Butylbenzylphthalate	420	U	440	U	470	U	480	U	490	U	480	U	410	U	410	U	450	UJ	640	U
Caprolactam	420	U	440	U	470	U	480	U	490	U	480	U	410	U	410	U	450	UJ	640	U
Carbazole	420	U	440	U	470	U	480	U	490	U	290	J	410	U	410	U	450	UJ	640	U

NA - Not analyzed
B - Analyte not detected above associated blank
J - Reported value is estimated
K - Reported value may be biased high
L - Reported value may be biased low

U, UJ, UL - Analyte not detected

Table B-3
NAB Little Creek
Navy CLEAN II CTO-210, Long Term Monitoring Plan
Round 6, Analytical Results for Site 7 Sediment

Station ID	LS07-SD201		LS07-SD202				LS07-SD203		LS07-SD204				LS07-SD205		LS07-SD206		LS07-SD207		LS07-SD208	
Sample ID	LS07-SD201-01C		LS07-SD202-01C		LS07-SD202P-01C		LS07-SD203-01C		LS07-SD204-01C		LS07-SD204P-01C		LS07-SD205-01C		LS07-SD206-01C		LS07-SD207-01C		LS07-SD208-01C	
Sample Date	09/11/01		09/13/01		09/13/01		09/13/01		09/13/01		09/13/01		09/11/01		09/11/01		09/11/01		09/11/01	
Chemical Name																				
Chrysene	420	U	440	U	470	U	100	J	140	J	890		410	U	410	U	450	UJ	76	J
Di-n-butylphthalate	420	U	440	U	50	J	480	U	490	U	480	U	410	U	410	U	450	UJ	640	U
Di-n-octylphthalate	420	U	440	U	470	U	480	U	490	U	480	U	410	U	410	U	450	UJ	640	U
Dibenz(a,h)anthracene	420	U	440	U	470	U	480	U	490	U	480	U	410	U	410	U	450	UJ	640	U
Dibenzofuran	420	U	440	U	470	U	480	U	490	U	230	J	410	U	410	U	450	UJ	640	U
Diethylphthalate	420	U	440	U	470	U	480	U	490	U	480	U	410	U	410	U	450	UJ	640	U
Dimethyl phthalate	420	U	440	U	470	U	480	U	490	U	480	U	410	U	410	U	450	UJ	640	U
Fluoranthene	420	U	440	U	470	U	140	J	200	J	2,100		68.4	J	410	U	450	UJ	230	J
Fluorene	420	U	440	U	470	U	480	U	490	U	360	J	410	U	410	U	450	UJ	640	U
Hexachlorobenzene	420	U	440	U	470	U	480	U	490	U	480	U	410	U	410	U	450	UJ	640	U
Hexachlorobutadiene	420	U	440	U	470	U	480	U	490	U	480	U	410	U	410	U	450	UJ	640	U
Hexachlorocyclopentadiene	420	U	440	U	470	U	480	U	490	U	480	U	410	U	410	U	450	UJ	640	U
Hexachloroethane	420	U	440	U	470	U	480	U	490	U	480	U	410	U	410	U	450	UJ	640	U
Indeno(1,2,3-cd)pyrene	420	U	440	U	470	U	480	U	71	J	380	J	410	U	410	U	450	UJ	640	U
Isophorone	420	U	440	U	470	U	480	U	490	U	480	U	410	U	410	U	450	UJ	640	U
Naphthalene	420	U	440	U	470	U	480	U	490	U	200	J	410	U	410	U	450	UJ	640	U
Nitrobenzene	420	U	440	U	470	U	480	U	490	U	480	U	410	U	410	U	450	UJ	640	U
Pentachlorophenol	1,000	U	1,100	U	1,200	U	1,200	U	1,200	U	1,200	U	1,000	U	1,000	U	1,100	UJ	1,600	U
Phenanthrene	420	U	440	U	470	U	110	J	120	J	2,400		410	U	410	U	450	UJ	640	U
Phenol	420	U	440	U	470	U	480	U	490	U	480	U	410	U	410	U	450	UJ	130	J
Pyrene	420	U	440	U	470	U	150	J	180	J	1,400		55	J	410	U	450	UJ	170	J
bis(2-Chloroethoxy)methane	420	U	440	U	470	U	480	U	490	U	480	U	410	U	410	U	450	UJ	640	U
bis(2-Chloroethyl)ether	420	U	440	U	470	U	480	U	490	U	480	U	410	U	410	U	450	UJ	640	U
bis(2-Ethylhexyl)phthalate	420	U	440	U	100	J	73	J	59	J	480	U	410	U	410	U	450	UJ	66	J
n-Nitroso-di-n-propylamine	420	U	440	U	470	U	480	U	490	U	480	U	410	U	410	U	450	UJ	640	U
n-Nitrosodiphenylamine	420	U	440	U	470	U	480	U	490	U	480	U	410	U	410	U	450	UJ	640	U
Pesticide/Polychlorinated Biphenyls (UG/KG)																				
4,4'-DDD	4.2	U	4.4	U	4.7	U	13	J	2.1	J	2.1	J	4.1	U	4.1	U	4.5	UJ	6.4	U
4,4'-DDE	4.2	U	4.4	U	4.7	U	7.1	J	1.6	J	1.8	J	4.1	U	4.1	U	4.5	UJ	6.4	U
4,4'-DDT	4.2	U	4.4	U	4.7	U	2.8	J	1.2	J	1.2	J	4.1	U	4.1	U	4.5	UJ	6.4	U
Aldrin	2.1	U	2.2	U	2.3	U	2.4	UJ	2.4	U	2.4	U	2	U	2	U	2.2	UJ	3.2	U
Aroclor-1016	42	U	44	U	47	U	48	UJ	49	U	48	U	41	U	41	U	45	UJ	64	U
Aroclor-1221	84	U	89	U	94	U	95.3	UJ	97.3	U	95.9	U	82	U	82	U	90	UJ	127	U
Aroclor-1232	42	U	44	U	47	U	48	UJ	49	U	48	U	41	U	41	U	45	UJ	64	U
Aroclor-1242	42	U	44	U	47	U	48	UJ	49	U	48	U	41	U	41	U	45	UJ	64	U
Aroclor-1248	42	U	44	U	47	U	48	UJ	49	U	48	U	41	U	41	U	45	UJ	64	U
Aroclor-1254	42	U	44	U	47	U	48	UJ	49	U	48	U	41	U	41	U	45	UJ	64	U
Aroclor-1260	42	U	44	U	120	J	48	UJ	49	U	48	U	41	U	41	U	45	UJ	74	J
Dieldrin	4.2	U	4.4	U	4.7	U	4.8	UJ	4.9	U	4.8	U	4.1	U	4.1	U	4.5	UJ	6.4	U
Endosulfan I	2.1	U	2.2	U	2.3	U	2.4	UJ	2.4	U	2.4	U	2	U	2	U	2.2	UJ	3.2	U

NA - Not analyzed
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L - Reported value may be biased low

U, UJ, UL - Analyte not detected

Table B-3
NAB Little Creek
Navy CLEAN II CTO-210, Long Term Monitoring Plan
Round 6, Analytical Results for Site 7 Sediment

Station ID	LS07-SD201		LS07-SD202				LS07-SD203		LS07-SD204				LS07-SD205		LS07-SD206		LS07-SD207		LS07-SD208	
Sample ID	LS07-SD201-01C		LS07-SD202-01C		LS07-SD202P-01C		LS07-SD203-01C		LS07-SD204-01C		LS07-SD204P-01C		LS07-SD205-01C		LS07-SD206-01C		LS07-SD207-01C		LS07-SD208-01C	
Sample Date	09/11/01		09/13/01		09/13/01		09/13/01		09/13/01		09/13/01		09/11/01		09/11/01		09/11/01		09/11/01	
Chemical Name																				
Endosulfan II	4.2	U	4.4	U	4.7	U	4.8	UJ	4.9	U	4.8	U	4.1	U	4.1	U	4.5	UJ	6.4	U
Endosulfan sulfate	4.2	U	4.4	U	4.7	U	4.8	UJ	4.9	U	4.8	U	4.1	U	4.1	U	4.5	UJ	6.4	U
Endrin	4.2	U	4.4	U	4.7	U	4.8	UJ	4.9	U	4.8	U	4.1	U	4.1	U	4.5	UJ	6.4	U
Endrin aldehyde	4.2	U	4.4	U	4.7	U	4.8	UJ	4.9	U	4.8	U	4.1	U	4.1	U	4.5	UJ	6.4	U
Endrin ketone	4.2	U	4.4	U	4.7	U	4.8	UJ	4.9	U	4.8	U	4.1	U	4.1	U	4.5	UJ	6.4	U
Heptachlor	2.1	U	2.2	U	2.3	U	2.4	UJ	2.4	U	2.4	U	2	U	2	U	2.2	UJ	3.2	U
Heptachlor epoxide	2.1	U	2.2	U	2.3	U	2.4	UJ	2.4	U	2.4	U	2	U	2	U	2.2	UJ	3.2	U
Methoxychlor	21	U	22	U	22	U	24	UJ	24	U	24	U	20	U	20	U	22	UJ	32	U
Toxaphene	209	U	222	U	234	U	240	UJ	243	U	240	U	205	U	204	U	220	UJ	318	U
alpha-BHC	2.1	U	2.2	U	2.3	U	2.4	UJ	2.4	U	2.4	U	2	U	2	U	2.2	UJ	3.2	U
alpha-Chlordane	2.1	U	2.2	U	2.3	U	2.4	UJ	2.4	U	2.4	U	2	U	2	U	2.2	UJ	3.2	U
beta-BHC	2.1	U	2.2	U	2.3	U	2.4	UJ	2.4	U	2.4	U	2	U	2	U	2.2	UJ	3.2	U
delta-BHC	2.1	U	2.2	U	2.3	U	2.4	UJ	2.4	U	2.4	U	2	U	2	U	2.2	UJ	3.2	U
gamma-BHC (Lindane)	2.1	U	2.2	U	2.3	U	2.4	UJ	2.4	U	2.4	U	2	U	2	U	2.2	UJ	3.2	U
gamma-Chlordane	2.1	U	2.2	U	2.3	U	2.4	UJ	2.4	U	2.4	U	2	U	2	U	2.2	UJ	3.2	U
Total Metals (MG/KG)																				
Aluminum	3,940		2,890		3,590		4,620		3,800		4,910		2,380		1,310		1,660		12,300	
Antimony	0.76	UL	0.84	UL	0.88	UL	0.91	L	1	L	0.88	UL	0.77	UL	0.77	UL	0.83	UL	3.2	UL
Arsenic	2.7	L	1.9	L	2.8	L	8.2	L	4.9	L	5.2	L	1.8	L	1.6	L	1.4	L	6.5	L
Barium	9	J	9.1	J	7.5	J	47.6	J	28.6	J	17.2	J	9.5	J	3.8	B	4.1		32.8	J
Beryllium	0.19	J	0.24	J	0.16	J	0.05	U	0.31	B	0.24	B	0.16	J	0.1	J	0.13	B	0.65	J
Cadmium	0.06	U	0.07	U	0.08	J	0.24	J	0.08	J	0.12	B	0.08	J	0.07	J	0.09	B	1.6	J
Calcium	559	J	371	J	436	J	2,070		890	J	640	J	9,260		344	J	346		5,090	
Chromium	8.9		6		7.2		14.9		10.1		10.3		4.8		3.4		4.6		31.7	
Cobalt	1.4	J	1.4	J	1.5	J	3.7	J	2.1	J	2.9	J	0.8	J	0.43	J	0.52		5.6	
Copper	3.9	B	24.4	L	16.3	L	49.4	L	30.1	L	12.2	L	4.4	B	4.4	B	5	L	43.7	L
Cyanide	0.187	U	0.211	U	0.204	U	0.234	U	0.234	U	0.23	U	0.172	U	0.174	U	0.202	U	0.314	U
Iron	5,980		3,360		3,990		8,150		7,090		7,500		3,570		1,910		2,590		23,200	
Lead	4.9		45.5		14.2		29		19.2		9.4		4.4		3.8		5.3		47.1	
Magnesium	1,440		781	J	1,130	J	1,030	J	1,090	J	1,410		830	J	524	J	759		4,240	
Manganese	48.5		22		23.7		84.9		58.7		47.8		20.8		11.8		15.2		172	
Mercury	0.013	J	0.023		0.02	J	0.06		0.03	J	0.04		0.02	J	0.011	J	0.02	U	0.196	
Nickel	3.9	J	10.7		3.4	J	41.5		9.5	J	9.7	J	1.9	J	1.2	J	1.4	B	15.1	
Potassium	868		555	J	780	J	547	J	567	J	871	J	526	J	359	J	472		2,520	
Selenium	0.89	U	0.98	U	1	U	1.1	U	1.1	U	1	U	0.9	U	0.9	U	0.97	U	1.4	U
Silver	0.21	U	0.23	U	0.34	J	0.54	J	0.25	U	0.25	U	0.21	U	0.21	U	0.23	U	0.88	J
Sodium	2,100		2,330		3,610		743	J	1,460		1,440		2,020		1,830		2,830		6,860	
Thallium	1.1	U	1.2	U	1.3	U	2.1	J	1.3	U	1.3	U	1.1	U	1.1	U	1.2	U	1.8	U
Vanadium	9.4	J	11.2	J	14.7		248		39.3		24.2		6.6	J	3.8	J	5		34.8	
Zinc	27		108		32.8		87.8		83.9		50.1		26.9		20.4		19.7		351	

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Table B-3
NAB Little Creek
Navy CLEAN II CTO-210, Long Term Monitoring Plan
Round 6, Analytical Results for Site 7 Sediment

Station ID	LS07-SD201	LS07-SD202		LS07-SD203	LS07-SD204		LS07-SD205	LS07-SD206	LS07-SD207	LS07-SD208
Sample ID	LS07-SD201-01C	LS07-SD202-01C	LS07-SD202P-01C	LS07-SD203-01C	LS07-SD204-01C	LS07-SD204P-01C	LS07-SD205-01C	LS07-SD206-01C	LS07-SD207-01C	LS07-SD208-01C
Sample Date	09/11/01	09/13/01	09/13/01	09/13/01	09/13/01	09/13/01	09/11/01	09/11/01	09/11/01	09/11/01
Chemical Name										
Wet Chemistry (MG/KG)										
% Solids	79.7	75	NA	NA	NA	NA	81.4	81.5	NA	52.4
Total organic carbon (TOC)	2,290	5,540	9,540	43,100	21,900	22,700	2,300	2,680	2,580	20,400
pH	8.69	6.88	6.67	7.03	6.68	6.81	8.62	8.37	8.12	8.47

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Table B-3
NAB Little Creek
Navy CLEAN II CTO-210, Long Term Monitoring Plan
Round 6, Analytical Results for Site 7 Sediment

Station ID	LS07-SD209		LS07-SD210		LS07-SD211		LS07-SD212		LS07-SD213	
Sample ID	LS07-SD209-01C		LS07-SD210-01C		LS07-SD211-01C		LS07-SD212-01C		LS07-SD213-01C	
Sample Date	09/11/01		09/10/01		09/13/01		09/13/01		09/13/01	
Chemical Name										
Semi-volatile Organic Compounds (UG/KG)										
1,1-Biphenyl	600	U	410	U	490	U	460	U	450	U
2,2'-Oxybis(1-chloropropane)	600	U	410	U	490	U	460	U	450	U
2,4,5-Trichlorophenol	1,500	U	1,000	U	1,200	U	1,200	U	1,100	U
2,4,6-Trichlorophenol	600	U	410	U	490	U	460	U	450	U
2,4-Dichlorophenol	600	U	410	U	490	U	460	U	450	U
2,4-Dimethylphenol	600	U	410	U	490	U	460	U	450	U
2,4-Dinitrophenol	1,500	U	1,000	U	1,200	U	1,200	U	1,100	U
2,4-Dinitrotoluene	600	U	410	U	490	U	460	U	450	U
2,6-Dinitrotoluene	600	U	410	U	490	U	460	U	450	U
2-Chloronaphthalene	600	U	410	U	490	U	460	U	450	U
2-Chlorophenol	600	U	410	U	490	U	460	U	450	U
2-Methylnaphthalene	600	U	410	U	490	U	460	U	450	U
2-Methylphenol	600	U	410	U	490	U	460	U	450	U
2-Nitroaniline	1,500	U	1,000	U	1,200	U	1,200	U	1,100	U
2-Nitrophenol	600	U	410	U	490	U	460	U	450	U
3,3'-Dichlorobenzidine	600	U	410	U	490	U	460	U	450	U
3-Nitroaniline	1,500	U	1,000	U	1,200	U	1,200	U	1,100	U
4,6-Dinitro-2-methylphenol	1,500	U	1,000	U	1,200	U	1,200	U	1,100	U
4-Bromophenyl-phenylether	600	U	410	U	490	U	460	U	450	U
4-Chloro-3-methylphenol	600	U	410	U	490	U	460	U	450	U
4-Chloroaniline	600	U	410	U	490	U	460	U	450	U
4-Chlorophenyl-phenylether	600	U	410	U	490	U	460	U	450	U
4-Methylphenol	600	U	410	U	490	U	460	U	450	U
4-Nitroaniline	1,500	U	1,000	U	1,200	U	1,200	U	1,100	U
4-Nitrophenol	1,500	U	1,000	U	1,200	U	1,200	U	1,100	U
Acenaphthene	600	U	410	U	490	U	460	U	450	U
Acenaphthylene	600	U	410	U	490	U	460	U	450	U
Acetophenone	270	J	71	J	490	U	460	U	450	U
Anthracene	600	U	410	U	490	U	62	J	450	U
Atrazine	600	U	410	U	490	U	460	U	450	U
Benzaldehyde	100	J	43	J	490	U	460	U	450	U
Benzo(a)anthracene	600	U	410	U	120	J	190	J	450	U
Benzo(a)pyrene	600	U	410	U	71	J	150	J	450	U
Benzo(b)fluoranthene	140	J	41	J	100	J	230	J	450	U
Benzo(g,h,i)perylene	600	U	410	U	490	U	110	J	450	U
Benzo(k)fluoranthene	600	U	410	U	490	U	60	J	450	U
Butylbenzylphthalate	600	U	410	U	490	U	460	U	450	U
Caprolactam	600	U	410	U	490	U	460	U	450	U
Carbazole	600	U	410	U	490	U	460	U	450	U

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Table B-3
NAB Little Creek
Navy CLEAN II CTO-210, Long Term Monitoring Plan
Round 6, Analytical Results for Site 7 Sediment

Station ID	LS07-SD209		LS07-SD210		LS07-SD211		LS07-SD212		LS07-SD213	
Sample ID	LS07-SD209-01C		LS07-SD210-01C		LS07-SD211-01C		LS07-SD212-01C		LS07-SD213-01C	
Sample Date	09/11/01		09/10/01		09/13/01		09/13/01		09/13/01	
Chemical Name										
Chrysene	68	J	410	U	85	J	170	J	450	U
Di-n-butylphthalate	600	U	410	U	490	U	460	U	50	J
Di-n-octylphthalate	600	U	410	U	490	U	460	U	450	U
Dibenz(a,h)anthracene	600	U	410	U	490	U	460	U	450	U
Dibenzofuran	600	U	410	U	490	U	460	U	450	U
Diethylphthalate	600	U	410	U	490	U	460	U	450	U
Dimethyl phthalate	600	U	410	U	490	U	460	U	450	U
Fluoranthene	140	J	50	J	87	J	350	J	450	U
Fluorene	600	U	410	U	490	U	460	U	450	U
Hexachlorobenzene	600	U	410	U	490	U	460	U	450	U
Hexachlorobutadiene	600	U	410	U	490	U	460	U	450	U
Hexachlorocyclopentadiene	600	U	410	U	490	U	460	U	450	U
Hexachloroethane	600	U	410	U	490	U	460	U	450	U
Indeno(1,2,3-cd)pyrene	600	U	410	U	490	U	93	J	450	U
Isophorone	600	U	410	U	490	U	460	U	450	U
Naphthalene	600	U	410	U	490	U	460	U	450	U
Nitrobenzene	600	U	410	U	490	U	460	U	450	U
Pentachlorophenol	1,500	U	1,000	U	1,200	U	1,200	U	1,100	U
Phenanthrene	600	U	410	U	490	U	240	J	450	U
Phenol	600	U	410	U	490	U	460	U	450	U
Pyrene	166	U	50	J	82	J	320	J	450	U
bis(2-Chloroethoxy)methane	600	U	410	U	490	U	460	U	450	U
bis(2-Chloroethyl)ether	600	U	410	U	490	U	460	U	450	U
bis(2-Ethylhexyl)phthalate	69	J	43	J	490	U	120	J	450	U
n-Nitroso-di-n-propylamine	600	U	410	U	490	U	460	U	450	U
n-Nitrosodiphenylamine	600	U	410	U	490	U	460	U	450	U
Pesticide/Polychlorinated Biphenyls (UG/KG)										
4,4'-DDD	6	U	4.1	U	4.9	U	4.6	U	4.5	U
4,4'-DDE	6	U	4.1	U	4.9	U	4.6	U	4.5	U
4,4'-DDT	6	U	4.1	U	4.9	U	4.6	U	4.5	U
Aldrin	3	U	2	U	2.4	U	2.3	U	2.2	U
Aroclor-1016	60	U	41	U	49	U	46	U	45	U
Aroclor-1221	121	U	81	U	98.1	U	93	U	90	U
Aroclor-1232	60	U	41	U	49	U	46	U	45	U
Aroclor-1242	60	U	41	U	49	U	46	U	45	U
Aroclor-1248	60	U	41	U	49	U	46	U	45	U
Aroclor-1254	60	U	41	U	49	U	46	U	45	U
Aroclor-1260	100	J	41	U	49	U	46	U	45	U
Dieldrin	6	U	4.1	U	4.9	U	4.6	U	4.5	U
Endosulfan I	3	U	2	U	2.4	U	2.3	U	2.2	U

NA - Not analyzed
B - Analyte not detected above associated blank
J - Reported value is estimated
K - Reported value may be biased high
L - Reported value may be biased low

U, UJ, UL - Analyte not detected

Table B-3
NAB Little Creek
Navy CLEAN II CTO-210, Long Term Monitoring Plan
Round 6, Analytical Results for Site 7 Sediment

Station ID	LS07-SD209		LS07-SD210		LS07-SD211		LS07-SD212		LS07-SD213	
Sample ID	LS07-SD209-01C		LS07-SD210-01C		LS07-SD211-01C		LS07-SD212-01C		LS07-SD213-01C	
Sample Date	09/11/01		09/10/01		09/13/01		09/13/01		09/13/01	
Chemical Name										
Endosulfan II	6	U	4.1	U	4.9	U	4.6	U	4.5	U
Endosulfan sulfate	6	U	4.1	U	4.9	U	4.6	U	4.5	U
Endrin	6	U	4.1	U	4.9	U	4.6	U	4.5	U
Endrin aldehyde	6	U	4.1	U	4.9	U	4.6	U	4.5	U
Endrin ketone	6	U	4.1	U	4.9	U	4.6	U	4.5	U
Heptachlor	3	U	2	U	2.4	U	2.3	U	2.2	U
Heptachlor epoxide	3	U	2	U	2.4	U	2.3	U	2.2	U
Methoxychlor	30	U	20	U	24	U	23	U	22	U
Toxaphene	302	U	203	U	245	U	230	U	224	U
alpha-BHC	3	U	2	U	2.4	U	2.3	U	2.2	U
alpha-Chlordane	3	U	2	U	2.4	U	2.3	U	2.2	U
beta-BHC	3	U	2	U	2.4	U	2.3	U	2.2	U
delta-BHC	3	U	2	U	2.4	U	2.3	U	2.2	U
gamma-BHC (Lindane)	3	U	2	U	2.4	U	2.3	U	2.2	U
gamma-Chlordane	3	U	2	U	2.4	U	2.3	U	2.2	U
Total Metals (MG/KG)										
Aluminum	14,000		1,490		2,610		3,260		2,860	
Antimony	1.1	UL	0.73	UL	0.93	UL	0.91	U	0.84	UL
Arsenic	9.2	L	1.2	L	3.4	L	7.3		4.6	L
Barium	33.1	J	4.3	J	9.6	J	16	J	8.6	J
Beryllium	0.71	J	0.15	J	0.18	B	0.27	J	0.13	B
Cadmium	0.484	J	0.07	J	0.08	B	0.25	J	0.07	U
Calcium	4,600		333	J	622	J	911	J	380	J
Chromium	28		3.9		6.5		12.9		4.1	
Cobalt	6.2	J	0.71	J	1.4	J	2.7	J	1.9	J
Copper	25.8	L	5.7	B	12.1	L	95		6.9	L
Cyanide	0.292	U	0.206	U	0.226	U	0.217	U	0.214	U
Iron	22,800		3,290		5,410		12,100		3,420	
Lead	26.6		5.9		11.4		36.8	K	9.5	
Magnesium	4,540		624	J	937	J	1,060	J	442	J
Manganese	149		18.3		23.8		50.6		17.2	
Mercury	0.201		0.022		0.03		0.04		0.01	U
Nickel	15.6		1.7	J	2.9	J	10.5		1.9	B
Potassium	2,730		379	J	571	J	571	J	234	J
Selenium	1.3	U	0.86	U	1.1	U	1.6	K	0.98	U
Silver	0.31	U	0.2	U	0.26	U	0.25	U	0.23	U
Sodium	6,350		1,810		2,690		1,950		515	J
Thallium	1.6	U	1.1	U	1.4	U	1.3	U	1.2	U
Vanadium	33.8		5.3	J	10.3	J	31.1		7.1	J
Zinc	150		26.5		41.9		171		13.3	

NA - Not analyzed
B - Analyte not detected above associated blank
J - Reported value is estimated
K - Reported value may be biased high
L - Reported value may be biased low

U, UJ, UL - Analyte not detected

Table B-3
NAB Little Creek
Navy CLEAN II CTO-210, Long Term Monitoring Plan
Round 6, Analytical Results for Site 7 Sediment

Station ID	LS07-SD209		LS07-SD210		LS07-SD211		LS07-SD212		LS07-SD213	
Sample ID	LS07-SD209-01C		LS07-SD210-01C		LS07-SD211-01C		LS07-SD212-01C		LS07-SD213-01C	
Sample Date	09/11/01		09/10/01		09/13/01		09/13/01		09/13/01	
Chemical Name										
Wet Chemistry (MG/KG)										
% Solids	55.2		82		NA		NA		NA	
Total organic carbon (TOC)	14,400		3,140		12,800		28,700		5,570	
pH	8.49		8.48		6.98		3.96		6.04	

NA - Not analyzed
B - Analyte not detected above associated blank
J - Reported value is estimated
K - Reported value may be biased high
L - Reported value may be biased low

U, UJ, UL - Analyte not detected

Appendix C
Data Validation Summaries
(Included in the Original Letter Report)

Appendix D
Grain Size Distribution Results
For Sediment Samples
(Included in the Original Letter Report)

Appendix E
Statistical Analyses

LITTLE CREEK SITE7 LONG-TERM MONITORING GROUNDWATER EVALUATION

PREPARED FOR: Paul Landin/VBO

PREPARED BY: Alta Turner/BOS

DATE: February 25, 2002

ATT: *Site7_location.prt.pdf Site7 R1-R6 Exceedances.xls DUPES_RPD.xls ANLYZE.xls SUM.xls BOX20.doc RESULTS.xls TS20.doc*

Introduction

This TM evaluates available data from the 6 wells established for a long-term groundwater monitoring network at the Little Creek Site 7. Data from a single upgradient well [LS07-MW03], two cross gradient wells [LS07-MW01 and LS07-MW06] and three downgradient wells [LS07-MW07, LS07-MW08 and LS07-MW09] have been sampled six times, including: June and November 1998, June 1999, January 2000, and February and September 2001. Well locations are documented in *site7_location.prt.pdf*. While samples have been quantified for the full suite of 66 Appendix 5.5 constituents, the following discussion is limited to the subset of 20 parameters which have been detected in one or more wells over the ~38 month period. Those parameters include 6 volatile organics and 14 metals.

The primary objectives of the evaluation are twofold, to [1] examine the extent to which either cross gradient or downgradient constituent levels exceed levels in the upgradient well over the same period and [2] evaluate well-specific observations for changes over time. Secondarily, groundwater contaminant levels have been informally compared to water quality standards [including RBCs for groundwater and MCLs] in order to provide a context against which levels from Site 7 wells may be evaluated.

This TM consists of five sections. Section 1 describes the regulatory background for the analyses conducted. Section 2 describes available data and presents results from replicate measures to establish QA/QC checks on internal consistency of sampling and analysis results. Section 3 summarizes comparisons among upgradient, downgradient and cross gradient wells, including graphical displays and results from a nonparametric statistical test, the Kruskal-Wallis test which tests for differences among two or more subgroups [of wells] and, assuming differences among groups are found, identifies which groups differ. Section 4 summarizes results from explicit statistical tests for trend [Kendall's test for trend] and graphically displays time series for each of the 20 parameters across the three subgroups. Displays exhibit parameter concentrations for each well separately, on fixed scales, and include parameter-specific critical values. The final section, Section 5, summarizes results and suggests alternative monitoring options.

Data management procedures have been conducted in Access. Statistical tests and graphical displays have been developed using SYSTAT [developed and distributed by SPSS Corporation, Chicago IL] and S+ [developed and distributed by InsightfulCorp of Seattle WA].

1 Regulatory Background

Site 7 is a landfill on the Little Creek site. The final waste shipment was landfilled in 1979 In 1997, the landfill was closed, and capped with a remedial cover. The closure preceded regulatory requirements for long-term groundwater monitoring. However, monitoring has been conducted since 1998, giving a reasonable database against which gradient comparisons may be made. Regulatory guidance [7May, 2001] identifies performance standards against which monitoring data may be compared. Of the options indicated, gradient comparisons have been conducted using the ANOVA based on ranks. Multiple comparisons have been used to identify where differences between upgradient and downgradient wells are found, once statistically significant differences among gradient groups have been indicated with the ANOVA. To supplement those tests, trend tests have been conducted for each parameter and well combination in order to determine the extent to which constituent levels in site groundwater have changed or remained the same since the institution of the long term monitoring program.

2 Available Data/Internal Consistency Evaluation

Available Data. Data were provided in an Xcel spreadsheet, *Site7 R1-R6 Exceedances.xls* which was reformatted into a 820 record file consisting of 6 events for each of the 6 wells, quantified in 20 parameters [accounting for 720 records] plus results from 5 field duplicate samples [additional 100 records]. A single record [lead quantification from the June99 sample collected at LS07-MW06] has been eliminated due to rejection based upon data validation procedures. Data qualifications to concentrations reported from the laboratory has been specified as representing detectable and undetected concentrations. Detects [coded 'D'] include concentrations with a blank, 'J', 'K' or 'L' in the qualifier field. Nondetects [coded 'U'] include concentrations with an associated 'B', 'U' or 'UL' in the qualifier field.

Parameters quantified and detected in one or more groundwater samples collected from the network include 6 volatile organics: 2 butanone, acetone, carbon disulfide, chloroethane, methylene chloride and toluene, and 14 metals: antimony, arsenic, barium, beryllium, cadmium, chromium, cobalt, copper, lead, nickel, selenium, thallium, vanadium and zinc. *P.xls* lists the parameter class, full name, short name along with reporting units and the applicable RBC and MCL thresholds where such criteria exist.

Field Duplicate Evaluation. One sample at each sampling event was duplicated. Well selection per event differed, alternating between LS07-MW01 and either LS07-MW03 or LS07-MW06. The 100 paired results are listed in *DUPES_RPD.PRS.xls*. Records include parameter class, name reported result and qualifier for the first and second samples and relative percent difference [RPD]. RPD is calculated as the difference between the paired reported concentrations, divided by the average of the same two results, standardized to a percentage [multiplied by 100]. Of the 100 pairs, qualifiers were the same [either D-D or U-U] for 92 cases. Qualifiers in the remaining 8 pairs differed between detect and non-detect

[either U-D or D-U]. In these cases, the reported detection was generally less than the reported non-detect [indicating analytical laboratory "estimated" values], meaning that the discrepancies were in the "white noise" region of quantification approaching the instrumentation detection limit.

DUPES_RPD.SUM.xls lists the 20 parameters along with the minimum, maximum and mean RPD for the sets of 6 paired results. The table has been sorted by analytical class then average RPD [decreasing]. The largest RPDs are –87 [ZN] and +75 [CR] percent. Mean RPD values range between –25 and + 13 percent, averaging over all pairs, -4.1 percent. While there are no applicable criteria for field duplicates, there are for analytical duplicates. These values which approach the acceptable limits on analytical precision for aliquots from the same sample exhibit internally consistent results from field duplicates.

Statistical evaluations were limited to a single set of results for the 6 duplicate pairs. By convention, the "original" pair, designated in the sample identifier was the pair used in analyses and graphical displays. *ANLYZE.xls* lists data in the matrix format imported into the statistical software, documenting analytical concentrations as columns and well*event combinations as rows in a 36-record file.

3 Gradient/Well Comparisons

SUM.xls summarizes the 20 parameters with respect to frequency of detection [the ratio of counts of detected concentrations and total samples analyzed], the range [minimum and maximum] of reported nondetects and detects, the mean, median and standard deviation [where the reported concentration for nondetects has been divided by 2] and the exceedance of either an RBC or MCL threshold level in reported detected and undetected concentrations. The table lists parameter results for the three gradients: cross, down and up. The table has been sorted by analytical class, parameter short name and gradient.

The following bullets summarize overall tendencies documented in the table.

Volatile Organics

- With the exceptions of acetone and methylene chloride [which are known laboratory contaminants], FDs and summary statistics for the sets of observations from the three gradient conditions are comparable.
- The preponderance of reported volatile organic concentrations are nondetects throughout the site. Reporting limits for methylene chloride exceed both the RBC and MCL. The same exceedance of RBC levels is also true for chloroethane.

Inorganic Metals

- Visual comparison of mean and median values of inorganics across the gradients indicates that for the majority of parameters, down gradient values, overall, are either less than upgradient values; that is, 10 of the 14 parameters, including: AS, BE, CD, CO, CR, CU, NI, PB, V and ZN.
- In the remaining four parameters, downgradient levels are either substantively [BA] or marginally [SB, SE and TL] elevated as compared to upgradient levels.

- Constituent concentrations in cross gradient wells are typically lower than upgradient with the single exception of AS.

Results from explicit comparison using the nonparametric test for differences among 2 or more subgroups, the Kruskal-Wallis [KW] test, are found in *RESULTS.COMPARE.xls*. The KW basically compares the average ranks among groups after all observations have been ranked from the lowest to highest concentration. The nonparametric test is robust to both non-normal distributions of observations and differing variance structures in the observations. As such, it is useful in situations where the underlying distribution of data is unknown and/or where reported values cluster around a reporting limit. The table lists the probability of the test statistic when the null hypothesis assumed is that there are no statistically significant differences. By convention, when the probability of the test statistic is less than 0.05, it is concluded that the probability is 'rare' enough to suggest that the null hypothesis cannot be supported by the observations and that it should be rejected in favor of the alternative of statistically significant differences.

Parameters which exhibit statistically significant differences across gradients have been highlighted in the table. None of the 6 volatiles detected in one or more of the monitoring wells exhibits significant differences across groundwater gradient. Of the 14 inorganic metals, 5 parameters exhibit differences, including: AS, BA, CO, NI and ZN. In four cases, downgradient concentrations are less than upgradient. The exception is BA where the highest concentrations are found in the downgradient wells, the lowest in the cross gradient wells. The final column of the table indicates which individual upgradient/downgradient wells differ at the 0.01 level, which results in a parameter-wide cumulative alpha level of 0.05 across the 5 parameters exhibiting statistically-significant differences.

Graphical displays of the data are useful in comparing subgroups. A statistical graphic called a boxplot can be used to display the distribution of upgradient, down and cross gradient results. *BOXPLT.doc* displays a generic boxplot, including components and comparison. *BOX20.doc* gives paired boxplots for each of the parameters evaluated, boxplots of gradient in the left hand panel, boxplots comparing individual wells in the right hand panel. The panels also document corresponding critical values with broken lines where they exist.

Results from examination of the boxplots in which statistically significant differences are found are summarized, as follows:

Arsenic. Differences in AS levels are dominated by the extreme values observed in cross gradient well, LS07-MW06. Upgradient wells are comparatively higher than the other cross gradient well, LS07-MW01 and all 3 downgradient wells. All observations exceed the MCL [0.045 ug/L] while only results from MW06 and a portion of results from the upgradient well MW03 exceed the RBC of 10 ug/L.

Barium. Differences in barium levels are dominated by the downgradient well, LS07-MW09, the eastern-most downgradient well which is significantly greater than both the upgradient well as well as another downgradient well, LS07-MW08. Levels in the other two downgradient wells also exceed the upgradient well . None of the levels observed in any wells approach either the RBC [2600 ug/L] or the MCL [2000 ug/L].

Cobalt. With the exception of an anomalous value from cross gradient well LS07-MW06 [from the Jan2000 sample], differences in cobalt concentrations among wells and gradient subgroups lie in the comparatively elevated measurements in the upgradient well LS07-MW03. None of the reported levels approach the 730 ug/L RBC.

Nickel. Similar to cobalt results, an anomalous level in cross gradient well LS07-MW06 [also from the Jan 2000 sampling event] is an exception to the consistently elevated levels of nickel in upgradient well, LS07-MW03.

Zinc. Zinc concentrations in the upgradient well exceed all measures in all other wells, regardless of gradient, with the exception of the ZN quantitation from the Jan 2000 event in the cross gradient well, LS07-MW06.

4 Trend Test Results

A more explicit evaluation of conditions within individual wells has been performed using Kendall's trend test. Basically, the procedure determines if there is a positive or negative correlation between constituent concentration and time. The null hypothesis of the test is that there is no relationship. However, again, by convention, if the probability of the test statistic is less than 0.05, that is taken as an indication that the null hypothesis of no relationship is not viable and the null hypothesis is rejected in favor of the alternative hypothesis. In conducting this test, both increasing and decreasing trends have been considered of interest and the alternative hypothesis is two-sided in that positive correlation would suggest an increasing trend and negative correlation a decreasing trend. Results from the Kendall test are given in *RESULTS.TREND.xls*. The table lists probabilities for each of the 20 parameters [as rows] for each of the cross, down and upgradient wells [indicated in column headings]. Where the probability of the test statistic is less than 0.05, the probability has been highlighted. Additionally, the direction in the trend has been indicated in the adjacent column [**D** for decreasing trend and **I** for increasing trend].

Trend test results have been supplemented with time series plots for each of the wells and constituents examined. *TS20.doc* contains 20 pages [single parameter per page] of time series plots in three panels per page. The upper-most panel plots the upgradient well concentrations over the period, the center the cross gradient and the lower panel, the downgradient wells. The y-axis of concentration has been fixed to the range of all wells so that relative position of points within the plots reflects a true difference in concentration level. The broken horizontal lines indicate the relative position of the RBC and/or MCL for the constituent. The x-axis indicates the sequence of observations from Jan98 through Dec01 where ticks indicate the month of the sequence starting with January 1998. The three broken vertical lines indicate January of the years, 1999-2001. Plots include individual line plots for each well. The individual points on the plots have been coded with the data qualifier to indicate whether the constituent was reported as detected or undetected.

The following bullets summarize results from the trend tests and time series plots:

Volatile Organics

- None of the volatile organics exhibit significant change over time. This is not surprising as the frequencies of detection are low [0.00 in most cases with a maximum of 0.33 of acetone in cross gradient wells and methylene chloride in the upgradient well].

Inorganic Metals

- Trends exhibited in metals concentrations are limited to 6 of 84 possible tests or, 7 percent.

- Of the six cases, four indicate decreasing levels over the period of record and two cases increasing levels.

- No trends are apparent in either the cross gradient well, LS07-MW06, or the downgradient well LS07-MW08.

- *Cross Gradient LS07-MW01.* Cobalt levels in this cross gradient well apparently exhibit a decreasing trend. However, examination of the time series plot indicate that the trend corresponds to reductions in parameter reporting limits over the period of monitoring. Similarly, the apparent increasing trend in thallium in the well are attributable not to changes in levels of thallium but, rather, changes in increasing reporting limits for the sample quantifications [from 1.7 to 5.3 ug/L].

- *Downgradient LS07-MW07.* Changes in nickel concentrations in this downgradient wells reflect reductions in the reporting limit, from 6.4 to 1.0 ug/L, rather than significant reductions in detected concentrations.

- *Downgradient LS07-MW09* Similar to the situation in the cross gradient well, cobalt levels in MW09 are apparently decreasing. However, the values correspond to reported non-detects, indicating increased analytical resolution rather than reductions in observed cobalt concentrations in the groundwater. Vanadium levels have exhibited a decrease from the first quantification of 12.8 to 1.5 ug/L detected vanadium over the monitoring period.

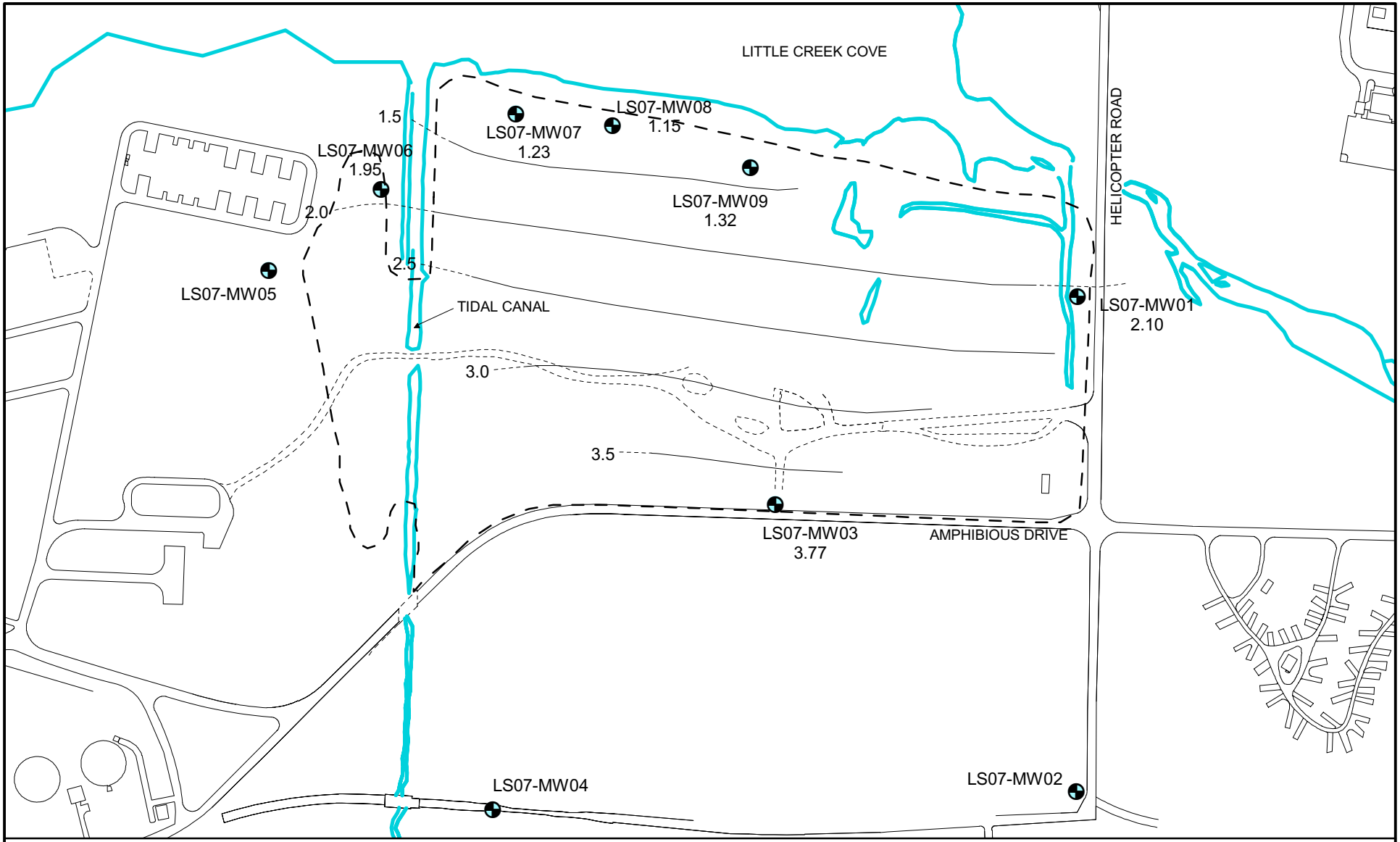
- *Upgradient LS07-MW03.* None of the quantifications of thallium in the well have been reported as detections. However, over the monitoring period, reporting limits have increased [marginally] from 1.7 to 5.3 ug/L.

5 Summary & Recommendations

Generalizing across the 20 parameters examined, among-well comparisons exhibit spatial variability in the long-term monitoring network at Site 7. However, contrary to what might be expected, upgradient concentrations in LS07-MW03 are more commonly elevated above either cross or downgradient levels. The single exception to that trend is found in levels of barium, which is elevated in the downgradient group, specifically LS07-MW09. Trends over time suggest that conditions throughout the site are stable. Changes observed are commonly attributable to fluctuations in reporting limits.

Site7_location.prt.pdf

File Path: v:\18gis\littlecreek\figures\site7.apr



LEGEND

- Site Boundary
- LS07-MW01 (1.95) Groundwater Monitoring Point (Existing Monitoring Well)
- Groundwater Flow Direction
- 1.5 Groundwater Contour (Dashed Where Inferred)

N

0 200 400 Feet

Figure 4
Site 7 - Estimated Piezometric Surface
Round 6 of LTM Program
NAB Little Creek
Virginia Beach, Virginia

CH2MHILL

Site7 R1-R6 Exceedances.xls

Little Creek Site 7
Rounds 1-6
GW Exceedances

Station ID	RBC-Tap	MCL-Groundwater	LS07-MW01							
Sample ID			LS07-MW01-98B	LS07-MW01P-98B	LS07-MW01-98D	LS07-MW01-99B	LS07-MW01P-99B	LS07-MW01-00A	LS07-MW01-01A	LS07-MW01-01C
Sample Date			06/03/98	06/03/98	11/16/98	06/11/99	06/11/99	01/12/00	02/26/01	09/13/01
Chemical Name										
Volatile Organic Compounds (UG/L)										
2-Butanone	1,900	--	10 U	10 U	10 U	10 U	10 U	5 U	10 U	10 U
Acetone	610	--	4 J	4 J	10 U	10 U	10 U	5 U	10 U	10 U
Carbon disulfide	1,000	--	10 U	10 U	10 U	10 U	10 U	1 U	10 U	10 U
Chloroethane	3.6	--	10 U	10 U	10 U	10 U	10 U	1 U	10 U	10 U
Methylene chloride	4.1	5	2 J	2 J	5 J	10 U	6 J	2 U	10 U	10 U
Toluene	750	1,000	10 U	10 U	10 U	10 U	10 U	1 U	10 U	2 J
Semi-volatile Organic Compounds (UG/L)										
4-Methylphenol	180	--	10 U	10 U	10 U	10 U	10 U	5 U	10 UJ	11 U
Di-n-butylphthalate	3,700	--	10 U	10 U	10 U	10 U	10 U	3 B	10 UJ	12
Hexachlorobenzene	0.042	1	10 U	10 U	10 U	10 U	10 U	5 U	10 UJ	11 U
Hexachlorobutadiene	0.86	--	10 U	10 U	10 U	10 U	10 U	5 U	10 UJ	11 U
Hexachloroethane	4.8	--	10 U	10 U	10 U	10 U	10 U	5 U	10 UJ	11 U
Naphthalene	6.5	--	10 U	10 U	10 U	10 U	10 U	5 U	10 UJ	11 U
bis(2-Ethylhexyl)phthalate	4.8	6	10 U	10 U	10 U	10 U	10 U	5 U	10 UJ	11 U
Pesticide/Polychlorinated Biphenyls (UG/L)										
No Detections										
Total Metals (UG/L)										
Aluminum	37,000	--	308 B	174 B	1,080 J	2,120	1,970	3,960	88.6 B	124 J
Antimony	15	6	2.3 U	2.3 U	2.6 U	4.9 U	5.4 B	4.9 UL	2.5 U	3.6 U
Arsenic	0.045	10	3.4 B	5.5 B	7.2 J	3.8 UL	3.8 UL	6.8 J	4.2 U	3.9 U
Barium	2,600	2,000	9 B	9.3 B	9.1 B	11.2 B	11.1 B	14.7 B	3.5 J	6.3 J
Beryllium	73	4	0.61 U	0.61 U	1 U	0.4 U	0.4 U	0.4 U	0.1 U	0.2 U
Cadmium	18	5	0.27 U	0.27 U	0.4 U	0.5 U	0.5 U	0.5 U	0.6 U	0.3 U
Calcium	--	--	12,500	12,600	7,720	8,730	8,470	9,120 B	8,180	16,300
Chromium	110	100	6.6 U	6.6 U	7.3 U	5.3 B	5 B	8.6 J	0.5 U	1.6 J
Cobalt	730	--	5.7 U	5.7 U	5.4 U	1.6 B	1.9 J	2.1 J	0.7 U	0.7 U
Copper	1,500	1,300	5.5 U	5.5 U	10.5 U	4.6 J	4.8 B	7.2 B	2.6 B	0.6 U
Iron	22,000	--	6,370	6,370	4,370	4,170	3,990	5,870	3,450 K	3,450
Lead	15	15	2.2 B	2.5 B	1.5 U	2.4 U	2.4 U	2.4 U	1.7 UL	1.4 U
Magnesium	--	--	18,100	18,400	12,500	14,000	13,100	20,800	14,500	36,900
Manganese	730	--	84.2	85.2	64.2	55.5	53.4	50.4	51.8	62.8
Mercury	11	2	0.12 U	0.13 U	0.13 U	0.2 U	0.2 U	0.2 U	0.08 J	0.1 U
Nickel	730	--	6.8 U	6.8 U	10 U	3 U	3.3 J	5.8 J	1.4 J	1 U
Potassium	--	--	14,400	14,600	10,300	11,600	10,900	14,000 B	11,600 J	25,300
Selenium	180	50	3.6 U	3.6 U	3.2 U	4.5 U	4.5 U	6 K	4.8 U	4.2 U
Sodium	--	--	189,000	191,000	121,000	164,000 B	152,000 B	213,000 L	138,000	400,000

Little Creek Site 7
Rounds 1-6
GW Exceedances

Station ID	RBC-Tap	MCL-Groundwater	LS07-MW01							
Sample ID			LS07-MW01-98B	LS07-MW01P-98B	LS07-MW01-98D	LS07-MW01-99B	LS07-MW01P-99B	LS07-MW01-00A	LS07-MW01-01A	LS07-MW01-01C
Sample Date			06/03/98	06/03/98	11/16/98	06/11/99	06/11/99	01/12/00	02/26/01	09/13/01
Chemical Name										
Thallium	2.6	2	1.7 U	2.2 B	2 U	2.5 U	2.5 U	2.5 U	6.2 U	5.3 U
Vanadium	260	--	5.8 U	5.8 U	10.1 J	5 J	4.7 J	8.9 J	2 B	1.9 J
Zinc	11,000	--	17.3 B	16.4 B	7.5 U	16.5 B	18.4 B	28 B	19 J	0.87 J
Dissolved Metals (UG/L)										
Aluminum	37,000	--	45.5 B	101 B	64.1 B	12.5 U	12.5 U	27.9 B	70.7 B	11.7 U
Antimony	15	6	2.3 U	2.3 U	2.6 U	4.9 U	4.9 U	4.9 U	2.5 U	3.6 U
Arsenic	0.045	10	5 J	5.4 J	5.7 J	4.2 L	3.8 UL	13.8	4.2 U	3.9 U
Barium	2,600	2,000	6.6 B	7 B	5.5 B	4.9 J	5.1 B	3.1 B	3.4 J	5.3 J
Beryllium	73	4	0.61 U	0.61 U	1 U	0.4 U	0.4 U	0.4 U	0.1 U	0.2 U
Cadmium	18	5	0.27 U	0.27 U	0.4 U	0.5 U	0.5 U	0.5 U	0.6 U	0.3 U
Calcium	--	--	11,500	10,800	6,200	7,140	7,430	3,830 B	8,000	14,100
Chromium	110	100	6.6 U	6.6 U	7.3 UL	5.8 J	2.8 B	1.2 J	0.9 J	0.7 U
Cobalt	730	--	5.7 U	5.7 U	5.4 U	2.7 J	7.1 B	0.9 U	0.7 U	0.7 U
Copper	1,500	1,300	5.5 U	5.5 U	10.5 U	2.4 B	2.4 B	4.5 B	11.3 J	0.6 U
Iron	22,000	--	6,410	5,570	3,370	2,600	2,690	1,800	3,660 L	3,130
Lead	15	15	1.7 U	2.7 J	1.7 J	2.4 U	2.4 U	2.4 UL	1.7 UL	1.4 U
Magnesium	--	--	15,100	15,500	6,220 J	10,500	11,000	3,700 B	13,300	31,400
Manganese	730	--	77.1	71.3	53.5	45	45.5	27	53	56.7
Mercury	11	2	0.12 U	0.13 U	0.13 U	0.2 U	0.2 U	0.2 U	0.06 U	0.1 U
Nickel	730	--	6.8 U	6.8 U	10 U	4.2 J	5.2 J	3 U	2.8 J	1 U
Potassium	--	--	12,500	12,100	7,160	10,000	10,900	4,390 B	11,100 J	22,500
Selenium	180	50	3.6 U	3.6 U	3.2 U	4.5 U	4.5 U	4.5 U	4.8 U	4.2 U
Sodium	--	--	157,000 J	159,000 J	57,800 J	120,000	127,000	26,400 J	128,000	344,000
Thallium	2.6	2	1.7 U	3.7 J	2 U	2.8 J	2.5 U	2.5 U	6.2 U	5.3 U
Vanadium	260	--	5.8 U	5.8 U	8.2 U	1.1 J	1 J	1.6 J	1.7 B	1.1 U
Zinc	11,000	--	18.1 B	15.7 B	7.5 U	15.1 B	19.5 B	12.3 B	182 J	1.3 J
Wet Chemistry (MG/L)										
Alkalinity	--	--	NA	NA	130	NA	NA	NA	NA	NA
Bicarbonate	--	--	NA	NA	130	NA	NA	NA	NA	NA
Chloride	--	--	NA	NA	389	NA	NA	NA	NA	NA
Sulfate	--	--	NA	NA	5 U	NA	NA	NA	NA	NA

Exceeds one or more criteria

Little Creek Site 7
Rounds 1-6
GW Exceedances

Station ID	RBC-Tap	MCL-Groundwater	LS07-MW01	LS07-MW03						
Sample ID			LS07-MW01P-01C	LS07-MW03-98B	LS07-MW03-98D	LS07-MW03P-98D	LS07-MW03-99B	LS07-MW03-00A	LS07-MW03-01A	LS07-MW03-01C
Sample Date			09/13/01	06/03/98	11/16/98	11/16/98	06/10/99	01/12/00	02/26/01	09/20/01
Chemical Name										
Volatile Organic Compounds (UG/L)										
2-Butanone	1,900	--	10 U	10 U	10 U	10 U	10 U	5 U	10 U	10 U
Acetone	610	--	10 U	5 J	10 U	10 U	10 U	5 U	10 U	10 U
Carbon disulfide	1,000	--	10 U	10 U	10 U	10 U	10 U	1 U	10 U	10 U
Chloroethane	3.6	--	10 U	10 U	10 U	10 U	10 U	1 U	10 U	10 U
Methylene chloride	4.1	5	10 U	2 J	4 J	6 J	10 U	2 U	1 B	10 U
Toluene	750	1,000	2 J	10 U	10 U	10 U	10 U	1 U	10 U	10 U
Semi-volatile Organic Compounds (UG/L)										
4-Methylphenol	180	--	11 U	10 U	10 U	10 U	10 U	5 U	10 UJ	10 U
Di-n-butylphthalate	3,700	--	11 U	10 U	10 U	10 U	10 U	3 B	10 UJ	7 B
Hexachlorobenzene	0.042	1	11 U	10 U	10 U	10 U	10 U	5 U	10 UJ	10 U
Hexachlorobutadiene	0.86	--	11 U	10 U	10 U	10 U	10 U	5 U	10 UJ	10 U
Hexachloroethane	4.8	--	11 U	10 U	10 U	10 U	10 U	5 U	10 UJ	10 U
Naphthalene	6.5	--	11 U	10 U	10 U	10 U	10 U	5 U	10 UJ	10 U
bis(2-Ethylhexyl)phthalate	4.8	6	1 J	10 U	10 U	10 U	10 U	5 U	10 UJ	10 U
Pesticide/Polychlorinated Biphenyls (UG/L)										
No Detections										
Total Metals (UG/L)										
Aluminum	37,000	--	137 J	14,500	8,170 J	12,800 J	11,700	13,500	156 B	135 J
Antimony	15	6	3.6 U	2.3 U	2.6 U	2.6 U	7.8 B	10.7 B	2.5 U	3.6 U
Arsenic	0.045	10	3.9 U	15.6	12.9	14.1	12.7 L	19.9	4.2 U	3.9 U
Barium	2,600	2,000	6 J	55.4 J	51 J	58.8 J	47.4 B	55.1 B	28.6 J	29.8 J
Beryllium	73	4	0.2 U	1.4 J	1.2 J	1.2 J	0.82 J	0.89 J	0.1 U	0.3 J
Cadmium	18	5	0.3 U	0.27 U	0.4 U	0.4 U	2 J	4.2 J	0.6 U	0.3 U
Calcium	--	--	15,300	39,100	36,000	37,500	27,800	32,200 B	25,000	22,900
Chromium	110	100	0.73 J	17.8	14.4	16.7	14.7	18.9	23.4	1.1 J
Cobalt	730	--	0.7 U	18.8 J	23.8 J	21.1 J	14.6 J	21.5 J	9.2 J	8.7 J
Copper	1,500	1,300	1.3 J	12.6 J	10.5 U	10.5 U	11.8 B	14.1 B	2 B	1.2 B
Iron	22,000	--	3,370	27,700	21,500	27,100	15,300	22,800	8,260 K	9,420
Lead	15	15	1.4 U	11.2 B	4.5	8.4 B	7.4	6.2	1.7 UL	1.4 U
Magnesium	--	--	34,400	18,400	17,300	18,200	13,000	15,600	10,600	9,430
Manganese	730	--	60.1	852	855	900	633	792	565	558
Mercury	11	2	0.1 U	0.12 U	0.13 U	0.13 U	0.2 U	0.2 U	0.08 J	0.1 U
Nickel	730	--	1 U	13.7 J	20.3 J	25.4 J	16.4 J	22.4 J	7.9 J	5.1 J
Potassium	--	--	23,900	12,300	12,000	12,900	10,900	12,700 B	9,040 J	9,330
Selenium	180	50	4.2 U	3.6 U	3.2 U	3.2 U	4.5 U	4.5 U	4.8 U	4.2 U
Sodium	--	--	374,000	66,100	65,100	66,400	48,600 B	58,200 L	47,700 B	41,100

Little Creek Site 7
Rounds 1-6
GW Exceedances

Station ID	RBC-Tap	MCL-Groundwater	LS07-MW01	LS07-MW03						
Sample ID			LS07-MW01P-01C	LS07-MW03-98B	LS07-MW03-98D	LS07-MW03P-98D	LS07-MW03-99B	LS07-MW03-00A	LS07-MW03-01A	LS07-MW03-01C
Sample Date			09/13/01	06/03/98	11/16/98	11/16/98	06/10/99	01/12/00	02/26/01	09/20/01
Chemical Name										
Thallium	2.6	2	5.3 U	1.7 U	2 U	2 U	2.5 U	2.5 U	6.2 U	5.3 U
Vanadium	260	--	2 J	32 J	17.8 J	29.8 J	23 J	26.3 J	1.1 B	1.1 U
Zinc	11,000	--	0.6 U	283	333	375	230	397	162	89.6
Dissolved Metals (UG/L)										
Aluminum	37,000	--	11.7 U	107 B	58.3 U	90.6 B	56.1 J	88.5 J	158 B	104 J
Antimony	15	6	3.6 U	2.3 U	8.5 J	2.8 J	4.9 U	13.3 B	2.5 U	3.6 U
Arsenic	0.045	10	3.9 U	2.3 U	5.4 J	5.6 J	4.1 L	3.8 U	4.2 U	3.9 U
Barium	2,600	2,000	5.6 J	24.9 B	35.1 J	33.2 J	20.7 J	27.9 B	29.3 J	29.7 J
Beryllium	73	4	0.2 U	0.61 U	1 U	1 U	0.4 U	0.4 U	0.1 U	0.29 J
Cadmium	18	5	0.3 U	0.27 U	0.4 U	0.4 U	0.5 U	0.5 U	0.6 U	0.3 U
Calcium	--	--	15,100	41,800	37,700	41,300	25,800	34,300 B	27,300	23,900
Chromium	110	100	0.7 U	6.6 U	7.3 U	7.3 U	2.3 J	1.3 J	0.5 U	0.7 U
Cobalt	730	--	0.7 U	9.8 J	10 J	12.3 J	10.4 J	12.2 J	9.2 J	8.2 J
Copper	1,500	1,300	0.6 U	12.2 B	10.5 U	10.5 U	2.3 B	3 B	5.1 B	0.6 U
Iron	22,000	--	3,260	6,710	7,280	7,120	5,240	6,980	7,940 L	9,400
Lead	15	15	1.4 U	1.7 U	1.5 U	1.5 U	2.4 R	2.4 UL	1.7 UL	1.4 U
Magnesium	--	--	33,800	19,100	16,800 J	18,200 J	11,500	15,900	11,700	9,990
Manganese	730	--	60	863	831	893	571	820	603	581
Mercury	11	2	0.1 U	0.13 U	0.13 U	0.13 U	0.2 U	0.2 U	0.09 J	0.1 U
Nickel	730	--	1 U	6.8 U	11.5 J	22.6 J	8 J	9 J	8 J	4.6 J
Potassium	--	--	23,600	11,600	11,600	12,500	9,490	10,500 B	9,750 J	9,750
Selenium	180	50	4.2 U	3.6 U	3.2 U	3.2 U	6	4.5 U	4.8 U	4.2 U
Sodium	--	--	365,000	72,700 J	66,200 J	72,000 J	45,600	64,400 J	57,700	45,100
Thallium	2.6	2	5.3 U	1.7 U	2.3 J	2 U	3 J	2.5 U	6.2 U	5.3 U
Vanadium	260	--	1.5 J	5.8 U	8.2 U	8.2 U	0.9 U	0.9 U	0.73 B	1.1 U
Zinc	11,000	--	0.72 J	159	190	197	133	157	220 J	87.7
Wet Chemistry (MG/L)										
Alkalinity	--	--	NA	NA	18.6	19.3	NA	NA	NA	NA
Bicarbonate	--	--	NA	NA	18.6	19.3	NA	NA	NA	NA
Chloride	--	--	NA	NA	91.6	94	NA	NA	NA	NA
Sulfate	--	--	NA	NA	164	174	NA	NA	NA	NA

Exceeds one or more

Little Creek Site 7
Rounds 1-6
GW Exceedances

Station ID	RBC-Tap	MCL-Groundwater	LS07-MW06						
Sample ID			LS07-MW06-98B	LS07-MW06-98D	LS07-MW06-99B	LS07-MW06-00A	LS07-MW06-01A	LS07-MW06P-01A	LS07-MW06-01C
Sample Date			06/04/98	11/21/98	06/10/99	01/12/00	02/26/01	02/26/01	09/13/01
Chemical Name									
Volatile Organic Compounds (UG/L)									
2-Butanone	1,900	--	10 U	10 U	10 U	5 U	10 U	10 U	10 U
Acetone	610	--	4 J	10 U	10 U	0.9 J	6 J	10 U	10 U
Carbon disulfide	1,000	--	10 U	10 U	10 U	1 U	10 U	10 U	10 U
Chloroethane	3.6	--	1 J	10 U	10 U	1 U	10 U	10 U	10 U
Methylene chloride	4.1	5	1 J	10 U	10 U	2 U	10 U	10 U	10 U
Toluene	750	1,000	10 U	10 U	10 U	1 U	10 U	10 U	10 U
Semi-volatile Organic Compounds (UG/L)									
4-Methylphenol	180	--	10 U	10 U	10 U	5 U	10 UJ	10 UJ	12 U
Di-n-butylphthalate	3,700	--	10 U	1 J	10 U	4 B	10 UJ	10 UJ	12 U
Hexachlorobenzene	0.042	1	10 U	10 U	10 U	5 U	10 UJ	10 UJ	12 U
Hexachlorobutadiene	0.86	--	10 U	10 U	10 U	5 U	10 UJ	10 UJ	12 U
Hexachloroethane	4.8	--	10 U	10 U	10 U	5 U	10 UJ	10 UJ	12 U
Naphthalene	6.5	--	10 U	10 U	10 U	5 U	10 UJ	10 UJ	12 U
bis(2-Ethylhexyl)phthalate	4.8	6	10 U	10 U	15	5	10 UJ	10 UJ	12 U
Pesticide/Polychlorinated Biphenyls (UG/L)									
No Detections									
Total Metals (UG/L)									
Aluminum	37,000	--	1,000	12,400	2,120	17,100	54.5 B	65.2 B	11.7 U
Antimony	15	6	2.3 U	2.6 U	11 B	53.9 B	2.5 U	2.5 U	3.6 U
Arsenic	0.045	10	25.2	57.7	39.4 L	66.5	18.8	17.6	27.5
Barium	2,600	2,000	35.8 J	32 J	29.5 B	51.5 B	16 J	16.2 J	17.6 J
Beryllium	73	4	1 J	1.2 J	0.4 U	0.96 J	0.1 U	0.1 U	0.2 U
Cadmium	18	5	0.27 U	0.4 U	0.5 U	0.98 J	0.6 U	0.6 U	0.3 U
Calcium	--	--	164,000	167,000	161,000	145,000	133,000	133,000	148,000
Chromium	110	100	6.6 U	16.8	5.8 J	26.6	0.5 U	0.5 U	0.93 J
Cobalt	730	--	5.7 U	8.2 J	9.9 J	46.5 J	2 J	1.9 J	1.6 J
Copper	1,500	1,300	5.5 U	10.5 U	19 J	6.7 B	0.95 B	1.5 B	0.6 U
Iron	22,000	--	18,900	35,000	19,900	31,800	11,500 K	11,400 K	13,500
Lead	15	15	1.7 U	6.4	2.4 R	2.4 U	1.7 UL	1.7 UL	1.4 U
Magnesium	--	--	138,000	141,000	137,000	122,000	113,000	113,000	125,000
Manganese	730	--	1,600	1,720	1,810	1,610	1,410	1,420	1,560
Mercury	11	2	0.13 U	0.13 U	0.2 U	0.2 U	0.06 U	0.08 J	0.1 U
Nickel	730	--	6.8 U	12.6 J	8.4 J	64.9	1.3 U	1.3 U	1 U
Potassium	--	--	24,500	21,600	21,700 J	23,600	25,600 J	25,600 J	22,200
Selenium	180	50	3.6 U	3.2 U	4.5 U	4.5 U	4.8 U	4.8 U	4.2 U
Sodium	--	--	460,000	429,000	393,000	269,000 L	306,000	309,000	389,000

Little Creek Site 7
Rounds 1-6
GW Exceedances

Station ID	RBC-Tap	MCL-Groundwater	LS07-MW06						
Sample ID			LS07-MW06-98B	LS07-MW06-98D	LS07-MW06-99B	LS07-MW06-00A	LS07-MW06-01A	LS07-MW06P-01A	LS07-MW06-01C
Sample Date			06/04/98	11/21/98	06/10/99	01/12/00	02/26/01	02/26/01	09/13/01
Chemical Name									
Thallium	2.6	2	1.7 U	2 U	5.9 J	2.5 U	6.2 U	6.2 U	5.3 U
Vanadium	260	--	5.8 U	23.3 J	4.7 J	35.7 J	0.81 B	0.72 B	1.1 U
Zinc	11,000	--	38 B	48.7	5.7 B	116	12.4 J	31.6 L	4.3 J
Dissolved Metals (UG/L)									
Aluminum	37,000	--	56.9 J	1,980	42.3 J	12.5 U	49.3 B	59.4 B	12.6 J
Antimony	15	6	3.7 J	2.6 U	5.6 B	47.7 B	2.5 U	2.5 U	3.6 U
Arsenic	0.045	10	19.3	36.6	22.7 L	25.2	17.3	16.1	22.5
Barium	2,600	2,000	36.8 B	12.9 J	24.3 J	26.3 B	16 J	14 J	17.6 J
Beryllium	73	4	0.81 B	1 U	0.4 U	0.4 U	0.1 U	0.1 U	0.2 U
Cadmium	18	5	0.27 U	0.4 U	0.5 U	0.84 J	0.6 U	0.6 U	0.3 U
Calcium	--	--	173,000	135,000	159,000	167,000	132,000	116,000	147,000
Chromium	110	100	6.6 U	7.3 U	2.9 J	1.9 J	0.56 J	0.5 U	0.7 U
Cobalt	730	--	5.7 U	5.4 U	3.3 J	2.7 J	1.5 J	1.3 J	1.8 J
Copper	1,500	1,300	5.5 U	10.5 U	3.4 B	15.5 B	1.7 B	5.4 B	0.6 U
Iron	22,000	--	17,500	18,800	15,700	14,100	11,500 L	10,100 L	12,900
Lead	15	15	1.7 U	6.2	2.4 R	2.4 UL	1.7 UL	1.7 UL	1.4 U
Magnesium	--	--	145,000	113,000	135,000	185,000	111,000	96,900	124,000
Manganese	730	--	1,700	1,360	1,800	1,500	1,400	1,230	1,550
Mercury	11	2	0.12 U	0.31	0.2 U	0.2 U	0.07 U	0.06 U	0.1 U
Nickel	730	--	6.8 U	10 U	3 U	3 U	2.2 J	2 J	1 U
Potassium	--	--	24,900	16,600	21,600 J	41,400	24,800 J	20,900 J	21,800
Selenium	180	50	3.6 U	3.2 U	4.5 U	6.4 L	4.8 U	4.8 U	4.2 U
Sodium	--	--	473,000 J	356,000	390,000	276,000 J	299,000	265,000	380,000
Thallium	2.6	2	2.5 B	2 U	7.2 J	4.2 J	6.2 U	6.2 U	5.3 U
Vanadium	260	--	5.8 U	8.2 U	0.9 U	0.9 U	0.7 U	0.7 U	1.1 U
Zinc	11,000	--	15.9 J	44.2	1.4 U	13.4 B	54.6 J	144 J	6 J
Wet Chemistry (MG/L)									
Alkalinity	--	--	NA	NA	NA	NA	NA	NA	NA
Bicarbonate	--	--	NA	748	NA	NA	NA	NA	NA
Chloride	--	--	NA	371	NA	NA	NA	NA	NA
Sulfate	--	--	NA	792	NA	NA	NA	NA	NA

Exceeds one or more

Little Creek Site 7
Rounds 1-6
GW Exceedances

Station ID	RBC-Tap	MCL-Groundwater	LS07-MW07					
Sample ID			LS07-MW07-98B	LS07-MW07-98D	LS07-MW07-99B	LS07-MW07-00A	LS07-MW07-01A	LS07-MW07-01C
Sample Date			06/04/98	11/18/98	06/11/99	01/13/00	02/27/01	09/10/01
Chemical Name								
Volatile Organic Compounds (UG/L)								
2-Butanone	1,900	--	10 U	10 U	10 U	5 U	10 U	10 U
Acetone	610	--	10 U	10 U	10 U	5 U	10 U	10 U
Carbon disulfide	1,000	--	1 J	10 U	10 U	1 U	10 U	10 U
Chloroethane	3.6	--	10 U	10 U	10 U	1 U	10 U	10 U
Methylene chloride	4.1	5	2 J	5 B	10 U	2 U	1 B	10 U
Toluene	750	1,000	10 U	10 U	10 U	1 U	10 U	10 U
Semi-volatile Organic Compounds (UG/L)								
4-Methylphenol	180	--	10 U	10 U	7 J	5 U	10 UL	11 U
Di-n-butylphthalate	3,700	--	10 U	10 U	10 U	5 U	10 UL	1.9 J
Hexachlorobenzene	0.042	1	10 U	10 U	10 U	5 U	48 L	11 U
Hexachlorobutadiene	0.86	--	10 U	10 U	10 U	5 U	6 L	11 U
Hexachloroethane	4.8	--	10 U	10 U	10 U	5 U	2 L	11 U
Naphthalene	6.5	--	10 U	10 U	18	5 U	10 UL	11 U
bis(2-Ethylhexyl)phthalate	4.8	6	10 U	10 U	10 U	5	10 UL	11 U
Pesticide/Polychlorinated Biphenyls (UG/L)								
No Detections								
Total Metals (UG/L)								
Aluminum	37,000	--	752	58.3 U	12.5 U	12.5 U	64.6 B	25.5 B
Antimony	15	6	2.3 U	2.6 U	25.3 J	19.4 B	2.5 U	3.6 U
Arsenic	0.045	10	3.7 B	3.1 U	3.8 UL	7.1 J	4.2 U	3.9 U
Barium	2,600	2,000	64.7 J	60.9 J	56.3 B	49.7 J	53.4 J	58.8 J
Beryllium	73	4	0.61 U	1 U	0.4 U	0.4 U	0.1 U	0.2 U
Cadmium	18	5	0.27 U	0.4 U	0.5 U	0.5 U	0.6 U	0.3 U
Calcium	--	--	345,000	265,000	295,000	245,000	296,000	283,000
Chromium	110	100	6.6 U	26.6	1 U	1 U	2.4 J	2.2 B
Cobalt	730	--	5.7 U	5.4 U	0.9 U	1.8 J	1.3 J	0.7 U
Copper	1,500	1,300	5.5 U	10.5 U	4.4 B	8.4 J	0.86 B	1.7 B
Iron	22,000	--	1,070	526	31.5 B	87.3 J	88.4 B	14.1 UL
Lead	15	15	1.7 U	1.5 U	2.4 U	2.4 UL	1.7 UL	1.4 U
Magnesium	--	--	685,000	563,000	687,000	625,000	625,000	594,000
Manganese	730	--	290	101	142	149	189	170
Mercury	11	2	0.13 U	0.13 U	0.2 U	0.2 U	0.06 U	0.1 U
Nickel	730	--	6.8 U	10 U	3 U	3 U	1.8 J	1 U
Potassium	--	--	188,000	161,000	351,000	187,000	282,000 J	195,000
Selenium	180	50	3.6 U	3.2 U	4.5 U	24.4 K	4.8 U	4.2 U
Sodium	--	--	5,930,000	4,790,000	5,660,000	4,760,000 L	4,380,000	4,750,000

Little Creek Site 7
Rounds 1-6
GW Exceedances

Station ID	RBC-Tap	MCL-Groundwater	LS07-MW07					
Sample ID			LS07-MW07-98B	LS07-MW07-98D	LS07-MW07-99B	LS07-MW07-00A	LS07-MW07-01A	LS07-MW07-01C
Sample Date			06/04/98	11/18/98	06/11/99	01/13/00	02/27/01	09/10/01
Chemical Name								
Thallium	2.6	2	3.3 B	2 U	26.4	18.3	6.2 U	5.3 U
Vanadium	260	--	11.6 J	8.2 U	1.2 J	0.9 U	2 B	3.4 J
Zinc	11,000	--	29.9 B	12.4 J	1.4 U	1.4 U	1.1 UL	4.4 B
Dissolved Metals (UG/L)								
Aluminum	37,000	--	57.6 B	58.3 U	12.5 U	12.5 U	15.1 U	11.7 U
Antimony	15	6	2.3 U	2.6 U	20.8 B	20.5 B	2.5 U	3.6 U
Arsenic	0.045	10	2.3 U	3.1 U	3.8 UL	7.5 J	4.2 U	3.9 U
Barium	2,600	2,000	63.4 J	51.1 J	56.4 J	49.3 J	54.2 J	59.8 J
Beryllium	73	4	0.61 U	1 U	0.4 U	0.4 U	0.1 U	0.2 U
Cadmium	18	5	0.27 U	0.4 U	0.5 U	0.5 U	0.6 U	0.3 U
Calcium	--	--	350,000	298,000	284,000	242,000	298,000	292,000
Chromium	110	100	6.6 U	7.3 U	1 U	1 U	1.3 J	2 B
Cobalt	730	--	5.7 U	5.4 U	1.3 J	2.3 J	0.7 U	0.7 U
Copper	1,500	1,300	5.5 U	10.5 U	7.7 B	7.8 B	1.1 B	1.9 B
Iron	22,000	--	91.4 B	149	7.4 U	7.4 U	21.7 B	14.1 U
Lead	15	15	1.7 U	1.5 U	2.4 U	2.4 UL	1.7 UL	1.5 J
Magnesium	--	--	687,000	626,000	662,000	633,000	633,000	617,000
Manganese	730	--	295	143	178	144	197	171
Mercury	11	2	0.13 U	0.13 U	0.27	0.2 U	0.06 U	0.1 U
Nickel	730	--	6.8 U	10 U	3 U	3 U	1.3 U	1.4 J
Potassium	--	--	189,000	179,000	323,000	184,000 L	282,000 J	208,000
Selenium	180	50	3.6 U	3.2 U	4.5 U	23.4 L	4.8 U	4.2 U
Sodium	--	--	5,950,000 J	5,510,000	5,390,000	4,870,000 J	4,460,000	5,020,000
Thallium	2.6	2	3.9 B	2 U	27.9	18.1	6.2 U	5.3 U
Vanadium	260	--	5.8 U	8.2 U	0.9 U	0.9 U	0.75 B	2.7 J
Zinc	11,000	--	18 J	14.1 J	1.4 U	1.4 U	2.4 B	2.4 B
Wet Chemistry (MG/L)								
Alkalinity	--	--	NA	NA	NA	NA	NA	NA
Bicarbonate	--	--	NA	1,500	NA	NA	NA	NA
Chloride	--	--	NA	11,900	NA	NA	NA	NA
Sulfate	--	--	NA	732	NA	NA	NA	NA

Exceeds one or more

Little Creek Site 7
Rounds 1-6
GW Exceedances

Station ID	RBC-Tap	MCL-Groundwater	LS07-MW08					
Sample ID			LS07-MW08-98B	LS07-MW08-98D	LS07-MW08-99B	LS07-MW08-00A	LS07-MW08-01A	LS07-MW08-01C
Sample Date			06/04/98	11/18/98	06/11/99	01/13/00	02/27/01	09/10/01
Chemical Name								
Volatile Organic Compounds (UG/L)								
2-Butanone	1,900	--	10 U	10 U	10 U	5 U	10 U	1 J
Acetone	610	--	10 U	10 U	10 U	5 U	7 J	2 B
Carbon disulfide	1,000	--	10 U	10 U	10 U	2	10 U	10 U
Chloroethane	3.6	--	10 U	10 U	10 U	1 U	10 U	10 U
Methylene chloride	4.1	5	1 J	3 B	10 U	2 U	6 B	10 U
Toluene	750	1,000	10 U	10 U	10 U	1 U	10 U	10 U
Semi-volatile Organic Compounds (UG/L)								
4-Methylphenol	180	--	10 U	10 U	NA	5 U	10 U	11 U
Di-n-butylphthalate	3,700	--	10 U	10 U	NA	3 B	10 U	5.6 J
Hexachlorobenzene	0.042	1	10 U	10 U	NA	5 U	10 U	11 U
Hexachlorobutadiene	0.86	--	10 U	10 U	NA	5 U	10 U	11 U
Hexachloroethane	4.8	--	10 U	10 U	NA	5 U	10 U	11 U
Naphthalene	6.5	--	10 U	10 U	NA	5 U	10 U	11 U
bis(2-Ethylhexyl)phthalate	4.8	6	10 U	10 U	NA	5 U	10 U	11 U
Pesticide/Polychlorinated Biphenyls (UG/L)								
No Detections								
Total Metals (UG/L)								
Aluminum	37,000	--	753	1,250	12.5 U	12.5 U	19.4 B	30.3 B
Antimony	15	6	2.3 U	2.6 U	26.1 B	16.6 b	2.5 U	3.6 U
Arsenic	0.045	10	8.3 B	3.1 U	5.3 L	6 J	4.2 U	3.9 U
Barium	2,600	2,000	61.4 J	65 J	50.3 B	42.1 J	34.1 J	41.6 J
Beryllium	73	4	0.81 B	1 U	0.4 U	0.4 U	0.1 U	0.2 U
Cadmium	18	5	0.27 U	0.4 U	0.74 J	0.5 U	0.66 J	0.3 U
Calcium	--	--	428,000	336,000	320,000	277,000	266,000	276,000
Chromium	110	100	6.6 U	18.4	1 U	1 U	0.78 J	89.8 L
Cobalt	730	--	5.7 U	5.4 U	1 J	1.5 J	0.7 U	0.88 J
Copper	1,500	1,300	5.5 U	10.5 U	4.4 B	10.8 J	1.5 B	3.7 B
Iron	22,000	--	1,330	2,040	15.7 J	7.4 U	30.9 B	2,010 L
Lead	15	15	1.7 U	1.5 U	2.4 U	2.4 UL	1.7 UL	1.4 U
Magnesium	--	--	787,000	644,000	668,000	637,000	583,000	576,000
Manganese	730	--	310	299	209	148	120	177
Mercury	11	2	0.13 U	0.13 U	0.2 U	0.2 U	0.07 U	0.1 U
Nickel	730	--	6.8 U	10.5 J	3 U	3 U	1.5 J	12.5 J
Potassium	--	--	211,000	173,000	331,000	222,000	272,000 J	201,000
Selenium	180	50	3.6 U	3.2 U	4.5 U	32.4 K	4.8 U	4.2 U
Sodium	--	--	6,980,000	5,660,000	5,510,000	5,020,000 L	4,110,000	4,750,000

Little Creek Site 7
Rounds 1-6
GW Exceedances

Station ID	RBC-Tap	MCL-Groundwater	LS07-MW08					
Sample ID			LS07-MW08-98B	LS07-MW08-98D	LS07-MW08-99B	LS07-MW08-00A	LS07-MW08-01A	LS07-MW08-01C
Sample Date			06/04/98	11/18/98	06/11/99	01/13/00	02/27/01	09/10/01
Chemical Name								
Thallium	2.6	2	3.4 B	2 U	30.8	19.3	6.2 U	5.3 U
Vanadium	260	--	8.1 J	9 J	1.2 J	0.93 J	0.87 B	8.9 J
Zinc	11,000	--	32.5 B	24.6	1.4 U	1.4 U	1.1 UL	6.3 B
Dissolved Metals (UG/L)								
Aluminum	37,000	--	56.2 B	58.3 U	12.5 U	12.5 U	19.1 B	22.3 B
Antimony	15	6	2.3 U	2.6 U	24.7 B	23.6 B	2.5 U	3.6 U
Arsenic	0.045	10	4.5 J	3.1 U	3.8 UL	3.8 U	4.2 U	3.9 U
Barium	2,600	2,000	52.4 J	71.2 J	51 J	42.4 J	37.9 J	42.3 J
Beryllium	73	4	0.81 B	1 U	0.4 U	0.4 U	0.1 U	0.2 U
Cadmium	18	5	0.27 U	0.4 U	0.5 U	0.56 J	0.6 U	0.3 U
Calcium	--	--	376,000	380,000	314,000	277,000	301,000	273,000
Chromium	110	100	6.6 U	7.3 U	1 U	1 U	1.7 J	3.7 B
Cobalt	730	--	5.7 U	5.4 U	0.9 U	2.3 J	0.7 U	0.7 U
Copper	1,500	1,300	5.5 U	10.5 U	6.6 B	8.9 B	2 B	2.9 B
Iron	22,000	--	128 B	175	7.4 U	7.4 U	36.2 B	14.1 U
Lead	15	15	1.7 U	1.5 U	2.4 U	2.4 UL	1.7 UL	1.4 U
Magnesium	--	--	680,000	715,000	636,000	595,000	624,000	571,000
Manganese	730	--	263	337	222	143	145	174
Mercury	11	2	0.12 U	0.14 U	0.2 U	0.2 U	0.07 J	0.1 U
Nickel	730	--	6.8 U	10 U	3 U	3 U	2.3 J	1.3 J
Potassium	--	--	179,000	191,000	310,000	196,000 L	298,000 J	203,000
Selenium	180	50	3.6 U	3.2 U	4.5 U	29.4 L	4.8 U	4.2 U
Sodium	--	--	5,780,000 J	5,980,000	5,190,000	4,630,000 J	4,470,000	4,780,000
Thallium	2.6	2	3.6 B	2 U	29.4	24.2	6.2 U	5.3 U
Vanadium	260	--	5.8 U	10.5 J	0.9 J	1 J	0.7 U	3 J
Zinc	11,000	--	31.8 B	14.9 J	1.4 U	1.4 U	57.9 B	3.6 B
Wet Chemistry (MG/L)								
Alkalinity	--	--	NA	NA	NA	NA	NA	NA
Bicarbonate	--	--	NA	1,040	NA	NA	NA	NA
Chloride	--	--	NA	12,000	NA	NA	NA	NA
Sulfate	--	--	NA	1,050	NA	NA	NA	NA

Exceeds one or more

Little Creek Site 7
Rounds 1-6
GW Exceedances

Station ID	RBC-Tap	MCL-Groundwater	LS07-MW09					
Sample ID			LS07-MW09-98B	LS07-MW09-98D	LS07-MW09-99B	LS07-MW09-00A	LS07-MW09-01A	LS07-MW09-01C
Sample Date			06/04/98	11/18/98	06/11/99	01/13/00	02/27/01	09/10/01
Chemical Name								
Volatile Organic Compounds (UG/L)								
2-Butanone	1,900	--	10 U	10 U	10 U	5 U	10 U	10 U
Acetone	610	--	7 J	10 U	10 U	5 U	10 J	2.4 B
Carbon disulfide	1,000	--	10 U	10 U	10 U	0.6 J	10 U	10 U
Chloroethane	3.6	--	10 U	10 U	10 U	1 U	10 U	10 U
Methylene chloride	4.1	5	4 J	4 B	10 U	2 U	2 B	10 U
Toluene	750	1,000	10 U	10 U	10 U	1 U	10 U	10 U
Semi-volatile Organic Compounds (UG/L)								
4-Methylphenol	180	--	10 U	10 U	10 U	5 U	10 U	11 U
Di-n-butylphthalate	3,700	--	10 U	10 U	10 U	3 B	10 U	4 J
Hexachlorobenzene	0.042	1	10 U	10 U	10 U	5 U	10 U	11 U
Hexachlorobutadiene	0.86	--	10 U	10 U	10 U	5 U	10 U	11 U
Hexachloroethane	4.8	--	10 U	10 U	10 U	5 U	10 U	11 U
Naphthalene	6.5	--	10 U	10 U	10 U	5 U	10 U	11 U
bis(2-Ethylhexyl)phthalate	4.8	6	1 B	10 U	10 U	5 U	10 U	1 J
Pesticide/Polychlorinated Biphenyls (UG/L)								
No Detections								
Total Metals (UG/L)								
Aluminum	37,000	--	778	119 B	12.5 U	12.5 U	15.1 U	15.8 B
Antimony	15	6	2.3 U	2.6 U	26 B	56.5 B	2.5 U	3.6 U
Arsenic	0.045	10	2.3 U	3.1 U	10.1 L	8.9 J	4.2 U	3.9 U
Barium	2,600	2,000	174 J	70.2 J	97.3 B	71 J	71.4 J	87.5 J
Beryllium	73	4	0.61 U	1 U	0.4 U	0.4 U	0.1 U	0.2 U
Cadmium	18	5	0.27 U	0.4 U	1 J	2.1 J	0.6 U	0.54 J
Calcium	--	--	346,000	292,000	296,000	235,000	271,000	277,000
Chromium	110	100	6.6 U	7.3 U	1 U	1 U	0.5 U	0.7 UL
Cobalt	730	--	5.7 U	5.4 U	2.2 J	2.2 J	0.7 U	0.7 U
Copper	1,500	1,300	14.5 J	10.5 U	6.5 J	1.7 U	0.7 U	2.7 B
Iron	22,000	--	102,000	28,300	57,200	51,800	39,800 K	29,800 L
Lead	15	15	1.7 U	1.5 U	2.4 U	2.4 UL	1.7 UL	1.4 U
Magnesium	--	--	919,000	766,000	853,000	816,000	777,000	768,000
Manganese	730	--	1,140	871	1,020	798	799	784
Mercury	11	2	0.13 U	0.13 U	0.2 U	0.2 U	0.08 J	0.1 U
Nickel	730	--	6.8 U	12.6 J	3 U	3.7 J	1.3 U	1 U
Potassium	--	--	229,000	210,000	422,000	256,000	346,000 J	258,000
Selenium	180	50	7.2 U	3.2 U	4.5 U	4.5 U	4.8 U	4.2 U
Sodium	--	--	7,220,000	10,400,000	6,990,000	6,500,000 L	5,790,000	6,520,000

Little Creek Site 7
Rounds 1-6
GW Exceedances

Station ID	RBC-Tap	MCL-Groundwater	LS07-MW09					
Sample ID			LS07-MW09-98B	LS07-MW09-98D	LS07-MW09-99B	LS07-MW09-00A	LS07-MW09-01A	LS07-MW09-01C
Sample Date			06/04/98	11/18/98	06/11/99	01/13/00	02/27/01	09/10/01
Chemical Name								
Thallium	2.6	2	1.7 U	2 U	12.6	8.1 J	6.2 U	5.3 U
Vanadium	260	--	12.8 J	8.2 U	2.8 J	1.9 J	0.7 U	1.5 J
Zinc	11,000	--	34.7 B	7.5 U	1.4 U	1.4 U	1.1 UL	3.8 B
Dissolved Metals (UG/L)								
Aluminum	37,000	--	36.7 U	58.3 U	12.5 U	12.5 U	65.8 B	16.8 B
Antimony	15	6	2.3 U	2.6 U	22.5 B	55.3 B	2.5 U	3.6 U
Arsenic	0.045	10	2.3 U	3.1 U	8.9 L	9.9 J	4.2 U	3.9 U
Barium	2,600	2,000	71.6 J	67.1 J	77.4 J	73.1 J	69.4 J	84.1 J
Beryllium	73	4	0.81 B	1 U	0.4 U	0.4 U	0.1 U	0.2 U
Cadmium	18	5	0.27 U	0.4 U	0.78 J	2.4 J	0.73 J	0.5 J
Calcium	--	--	330,000	300,000	285,000	276,000	262,000	272,000
Chromium	110	100	6.6 U	7.3 U	1 U	1 U	0.5 U	0.7 U
Cobalt	730	--	5.7 U	5.4 U	5.9 J	3.1 J	0.7 U	0.7 U
Copper	1,500	1,300	17.7 B	10.5 U	26.5	1.7 U	2.3 B	1.5 B
Iron	22,000	--	37,600	24,800	39,300	39,300	39,300 L	27,700
Lead	15	15	1.7 U	1.5 U	3.1	2.4 UL	1.7 UL	1.4 U
Magnesium	--	--	696,000	786,000	868,000	815,000	732,000	751,000
Manganese	730	--	1,040	899	979	924	767	774
Mercury	11	2	0.13 U	0.13 U	0.2 U	0.2 U	0.07 J	0.1 U
Nickel	730	--	6.8 U	10 U	3 U	3 U	1.7 J	1 U
Potassium	--	--	221,000	216,000	410,000	249,000 L	329,000 J	250,000
Selenium	180	50	3.6 U	3.2 U	14.2	10.1 L	4.8 U	4.2 U
Sodium	--	--	5,480,000 J	6,550,000	7,030,000	6,520,000 J	5,420,000	6,380,000
Thallium	2.6	2	1.7 U	2 U	11.3	13.4	6.2 U	5.3 U
Vanadium	260	--	5.8 U	8.2 U	0.98 J	0.9 U	0.71 B	2.1 J
Zinc	11,000	--	28.8 B	17.7 J	1.4 U	1.4 U	33.2 B	3.3 B
Wet Chemistry (MG/L)								
Alkalinity	--	--	NA	NA	NA	NA	NA	NA
Bicarbonate	--	--	NA	819	NA	NA	NA	NA
Chloride	--	--	NA	14,200	NA	NA	NA	NA
Sulfate	--	--	NA	1,240	NA	NA	NA	NA

Exceeds one or more

DUPES_RPD.xls

LITTLE CREEK SITE7 LONG-TERM GROUNDWATER MONITORING: JUN98 - SEP01

DUPLICATE SAMPLE RELATIVE PERCENT DIFFERENCE

DUPES_RPD.SUM.xls

		RELATIVE PERCENT DIFFERENCE		
CLASS	**PARAMETER**	**MIN**	**MAX**	**MEAN**
METAL	Chromium	-14.8	74.7	13.1
METAL	Cobalt	-17.1	12.0	0.0
METAL	Beryllium	0.0	0.0	0.0
METAL	Cadmium	0.0	0.0	0.0
METAL	Selenium	0.0	0.0	0.0
METAL	Antimony	-9.7	0.0	-1.9
METAL	Barium	-14.2	4.9	-2.6
METAL	Thallium	-25.6	0.0	-5.1
METAL	Nickel	-22.3	0.0	-6.4
METAL	Vanadium	-50.4	11.8	-7.5
METAL	Arsenic	-47.2	6.6	-9.9
METAL	Zinc	-87.3	36.7	-13.6
METAL	Lead	-60.5	0.0	-14.6
METAL	Copper	-73.7	0.0	-24.6
VOL	Methylene chloride	-40.0	50.0	2.0
VOL	2-Butanone	0.0	0.0	0.0
VOL	Carbon disulfide	0.0	0.0	0.0
VOL	Chloroethane	0.0	0.0	0.0
VOL	Toluene	0.0	0.0	0.0
VOL	Acetone	-50.0	0.0	-10.0
				-4.1

LITTLE CREEK SITE7 LONG-TERM GROUNDWATER MONITORING: JUN98 - SEP01							
	DUPLICATE SAMPLE RELATIVE PERCENT DIFFERENCE						
	DUPES_RPD.PRS.xls						
		DUPE	**QUAL**	**DUPE**	**QUAL**		**RPD**
WELLID	**PARAMETER**	**1**	**Q1**	**2**	**Q2**	**RPD**	**MEAN**
METALS							
MW01	Arsenic	3.4	U	5.5	U	-47.2	
MW01	Arsenic	3.8	U	3.8	U	0.0	
MW01	Arsenic	3.9	U	3.9	U	0.0	
MW06	Arsenic	18.8	D	17.6	D	6.6	
MW03	Arsenic	12.9	D	14.1	D	-8.9	-9.9
MW01	Barium	9	U	9.3	U	-3.3	
MW01	Barium	11.2	U	11.1	U	0.9	
MW01	Barium	6.3	D	6	D	4.9	
MW06	Barium	16	D	16.2	D	-1.2	
MW03	Barium	51	D	58.8	D	-14.2	-2.6
MW01	Beryllium	0.61	U	0.61	U	0.0	
MW01	Beryllium	0.4	U	0.4	U	0.0	
MW01	Beryllium	0.2	U	0.2	U	0.0	
MW06	Beryllium	0.1	U	0.1	U	0.0	
MW03	Beryllium	1.2	D	1.2	D	0.0	0.0
MW01	Cadmium	0.27	U	0.27	U	0.0	
MW01	Cadmium	0.5	U	0.5	U	0.0	
MW01	Cadmium	0.3	U	0.3	U	0.0	
MW06	Cadmium	0.6	U	0.6	U	0.0	
MW03	Cadmium	0.4	U	0.4	U	0.0	0.0
MW01	Cobalt	5.7	U	5.7	U	0.0	
MW01	Cobalt	1.6	U	1.9	D	-17.1	
MW01	Cobalt	0.7	U	0.7	U	0.0	
MW06	Cobalt	2	D	1.9	D	5.1	
MW03	Cobalt	23.8	D	21.1	D	12.0	0.0
MW01	Chromium	6.6	U	6.6	U	0.0	
MW01	Chromium	5.3	U	5	U	5.8	
MW01	Chromium	1.6	D	0.73	D	74.7	
MW06	Chromium	0.5	U	0.5	U	0.0	
MW03	Chromium	14.4	D	16.7	D	-14.8	13.1
MW01	Copper	5.5	U	5.5	U	0.0	
MW01	Copper	4.6	D	4.8	U	-4.3	
MW01	Copper	0.6	U	1.3	D	-73.7	
MW06	Copper	0.95	U	1.5	U	-44.9	
MW03	Copper	10.5	U	10.5	U	0.0	-24.6
MW01	Nickel	6.8	U	6.8	U	0.0	
MW01	Nickel	3	U	3.3	D	-9.5	
MW01	Nickel	1	U	1	U	0.0	
MW06	Nickel	1.3	U	1.3	U	0.0	
MW03	Nickel	20.3	D	25.4	D	-22.3	-6.4
MW01	Lead	2.2	U	2.5	U	-12.8	
MW01	Lead	2.4	U	2.4	U	0.0	
MW01	Lead	1.4	U	1.4	U	0.0	
MW06	Lead	1.7	U	1.7	U	0.0	

WELLID	PARAMETER	DUPE 1	QUAL Q1	DUPE 2	QUAL Q2	RPD	RPD MEAN
MW03	Lead	4.5	D	8.4	U	-60.5	-14.6
MW01	Antimony	2.3	U	2.3	U	0.0	
MW01	Antimony	4.9	U	5.4	U	-9.7	
MW01	Antimony	3.6	U	3.6	U	0.0	
MW06	Antimony	2.5	U	2.5	U	0.0	
MW03	Antimony	2.6	U	2.6	U	0.0	-1.9
MW01	Selenium	3.6	U	3.6	U	0.0	
MW01	Selenium	4.5	U	4.5	U	0.0	
MW01	Selenium	4.2	U	4.2	U	0.0	
MW06	Selenium	4.8	U	4.8	U	0.0	
MW03	Selenium	3.2	U	3.2	U	0.0	0.0
MW01	Thallium	1.7	U	2.2	U	-25.6	
MW01	Thallium	2.5	U	2.5	U	0.0	
MW01	Thallium	5.3	U	5.3	U	0.0	
MW06	Thallium	6.2	U	6.2	U	0.0	
MW03	Thallium	2	U	2	U	0.0	-5.1
MW01	Vanadium	5.8	U	5.8	U	0.0	
MW01	Vanadium	5	D	4.7	D	6.2	
MW01	Vanadium	1.9	D	2	D	-5.1	
MW06	Vanadium	0.81	U	0.72	U	11.8	
MW03	Vanadium	17.8	D	29.8	D	-50.4	-7.5
MW01	Zinc	17.3	U	16.4	U	5.3	
MW01	Zinc	16.5	U	18.4	U	-10.9	
MW01	Zinc	0.87	D	0.6	U	36.7	
MW06	Zinc	12.4	D	31.6	D	-87.3	
MW03	Zinc	333	D	375	D	-11.9	-13.6
VOLATILE ORGANICS							
MW01	Acetone	4	D	4	D	0.0	
MW01	Acetone	10	U	10	U	0.0	
MW01	Acetone	10	U	10	U	0.0	
MW06	Acetone	6	D	10	U	-50.0	
MW03	Acetone	10	U	10	U	0.0	-10.0
MW01	2-Butanone	10	U	10	U	0.0	
MW01	2-Butanone	10	U	10	U	0.0	
MW01	2-Butanone	10	U	10	U	0.0	
MW06	2-Butanone	10	U	10	U	0.0	
MW03	2-Butanone	10	U	10	U	0.0	0.0
MW01	Carbon disulfide	10	U	10	U	0.0	
MW01	Carbon disulfide	10	U	10	U	0.0	
MW01	Carbon disulfide	10	U	10	U	0.0	
MW06	Carbon disulfide	10	U	10	U	0.0	
MW03	Carbon disulfide	10	U	10	U	0.0	0.0
MW01	Chloroethane	10	U	10	U	0.0	
MW01	Chloroethane	10	U	10	U	0.0	
MW01	Chloroethane	10	U	10	U	0.0	
MW06	Chloroethane	10	U	10	U	0.0	
MW03	Chloroethane	10	U	10	U	0.0	0.0
MW01	Methylene chloride	2	D	2	D	0.0	

		DUPE	QUAL	DUPE	QUAL		RPD
WELLID	**PARAMETER**	**1**	**Q1**	**2**	**Q2**	**RPD**	**MEAN**
MW01	Methylene chloride	10	U	6	D	50.0	
MW01	Methylene chloride	10	U	10	U	0.0	
MW06	Methylene chloride	10	U	10	U	0.0	
MW03	Methylene chloride	4	D	6	D	-40.0	2.0
MW01	Toluene	10	U	10	U	0.0	
MW01	Toluene	10	U	10	U	0.0	
MW01	Toluene	2	D	2	D	0.0	
MW06	Toluene	10	U	10	U	0.0	
MW03	Toluene	10	U	10	U	0.0	0.0
						-4.1	

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GRDNT	BOXID	STN	DUP_N	SEQ	ACET	Q1	AS	Q2	BA	Q3	BE	Q4	BUT2	Q5	C2SLF	Q6	CD	Q7	CLANE	Q8	CO
CROSS	CROSS01	MW01	1	6	4	D	3.4	U	9	U	0.61	U	10	U	10	U	0.27	U	10	U	5.7
CROSS	CROSS01	MW01	1	11	10	U	7.2	D	9.1	U	1	U	10	U	10	U	0.4	U	10	U	5.4
CROSS	CROSS01	MW01	1	18	10	U	3.8	U	11.2	U	0.4	U	10	U	10	U	0.5	U	10	U	1.6
CROSS	CROSS01	MW01	1	25	5	U	6.8	D	14.7	U	0.4	U	5	U	1	U	0.5	U	1	U	2.1
CROSS	CROSS01	MW01	1	38	10	U	4.2	U	3.5	D	0.1	U	10	U	10	U	0.6	U	10	U	0.7
CROSS	CROSS01	MW01	1	45	10	U	3.9	U	6.3	D	0.2	U	10	U	10	U	0.3	U	10	U	0.7
CROSS	CROSS06	MW06	1	6	4	D	25.2	D	35.8	D	1	D	10	U	10	U	0.27	U	1	D	5.7
CROSS	CROSS06	MW06	1	11	10	U	57.7	D	32	D	1.2	D	10	U	10	U	0.4	U	10	U	8.2
CROSS	CROSS06	MW06	1	18	10	U	39.4	D	29.5	U	0.4	U	10	U	10	U	0.5	U	10	U	9.9
CROSS	CROSS06	MW06	1	25	0.9	D	66.5	D	51.5	U	0.96	D	5	U	1	U	0.98	D	1	U	46.5
CROSS	CROSS06	MW06	1	38	6	D	18.8	D	16	D	0.1	U	10	U	10	U	0.6	U	10	U	2
CROSS	CROSS06	MW06	1	45	10	U	27.5	D	17.6	D	0.2	U	10	U	10	U	0.3	U	10	U	1.6
DOWN	DOWN07	MW07	1	6	10	U	3.7	U	64.7	D	0.61	U	10	U	1	D	0.27	U	10	U	5.7
DOWN	DOWN07	MW07	1	11	10	U	3.1	U	60.9	D	1	U	10	U	10	U	0.4	U	10	U	5.4
DOWN	DOWN07	MW07	1	18	10	U	3.8	U	56.3	U	0.4	U	10	U	10	U	0.5	U	10	U	0.9
DOWN	DOWN07	MW07	1	25	5	U	7.1	D	49.7	D	0.4	U	5	U	1	U	0.5	U	1	U	1.8
DOWN	DOWN07	MW07	1	38	10	U	4.2	U	53.4	D	0.1	U	10	U	10	U	0.6	U	10	U	1.3
DOWN	DOWN07	MW07	1	45	10	U	3.9	U	58.8	D	0.2	U	10	U	10	U	0.3	U	10	U	0.7
DOWN	DOWN08	MW08	1	6	10	U	8.3	U	61.4	D	0.81	U	10	U	10	U	0.27	U	10	U	5.7
DOWN	DOWN08	MW08	1	11	10	U	3.1	U	65	D	1	U	10	U	10	U	0.4	U	10	U	5.4
DOWN	DOWN08	MW08	1	18	10	U	5.3	D	50.3	U	0.4	U	10	U	10	U	0.74	D	10	U	1
DOWN	DOWN08	MW08	1	25	5	U	6	D	42.1	D	0.4	U	5	U	2	D	0.5	U	1	U	1.5
DOWN	DOWN08	MW08	1	38	7	D	4.2	U	34.1	D	0.1	U	10	U	10	U	0.66	D	10	U	0.7
DOWN	DOWN08	MW08	1	45	2	U	3.9	U	41.6	D	0.2	U	1	D	10	U	0.3	U	10	U	0.88
DOWN	DOWN09	MW09	1	6	7	D	2.3	U	174	D	0.61	U	10	U	10	U	0.27	U	10	U	5.7
DOWN	DOWN09	MW09	1	11	10	U	3.1	U	70.2	D	1	U	10	U	10	U	0.4	U	10	U	5.4
DOWN	DOWN09	MW09	1	18	10	U	10.1	D	97.3	U	0.4	U	10	U	10	U	1	D	10	U	2.2
DOWN	DOWN09	MW09	1	25	5	U	8.9	D	71	D	0.4	U	5	U	0.6	D	2.1	D	1	U	2.2
DOWN	DOWN09	MW09	1	38	10	D	4.2	U	71.4	D	0.1	U	10	U	10	U	0.6	U	10	U	0.7
DOWN	DOWN09	MW09	1	45	2.4	U	3.9	U	87.5	D	0.2	U	10	U	10	U	0.54	D	10	U	0.7
UP	UP03	MW03	1	6	5	D	15.6	D	55.4	D	1.4	D	10	U	10	U	0.27	U	10	U	18.8
UP	UP03	MW03	1	11	10	U	12.9	D	51	D	1.2	D	10	U	10	U	0.4	U	10	U	23.8
UP	UP03	MW03	1	18	10	U	12.7	D	47.4	U	0.82	D	10	U	10	U	2	D	10	U	14.6
UP	UP03	MW03	1	25	5	U	19.9	D	55.1	U	0.89	D	5	U	1	U	4.2	D	1	U	21.5
UP	UP03	MW03	1	38	10	U	4.2	U	28.6	D	0.1	U	10	U	10	U	0.6	U	10	U	9.2
UP	UP03	MW03	1	45	10	U	3.9	U	29.8	D	0.3	D	10	U	10	U	0.3	U	10	U	8.7

Q9	CR	Q10	CU	Q11	MCL	Q12	NI	Q13	PB	Q14	SB	Q15	SE	Q16	TL	Q17	TOL	Q18	V	Q19	ZN
U	6.6	U	5.5	U	2	D	6.8	U	2.2	U	2.3	U	3.6	U	1.7	U	10	U	5.8	U	17.3
U	7.3	U	10.5	U	5	D	10	U	1.5	U	2.6	U	3.2	U	2	U	10	U	10.1	D	7.5
U	5.3	U	4.6	D	10	U	3	U	2.4	U	4.9	U	4.5	U	2.5	U	10	U	5	D	16.5
D	8.6	D	7.2	U	2	U	5.8	D	2.4	U	4.9	U	6	D	2.5	U	1	U	8.9	D	28
U	0.5	U	2.6	U	10	U	1.4	D	1.7	U	2.5	U	4.8	U	6.2	U	10	U	2	U	19
U	1.6	D	0.6	U	10	U	1	U	1.4	U	3.6	U	4.2	U	5.3	U	2	D	1.9	D	0.87
U	6.6	U	5.5	U	1	D	6.8	U	1.7	U	2.3	U	3.6	U	1.7	U	10	U	5.8	U	38
D	16.8	D	10.5	U	10	U	12.6	D	6.4	D	2.6	U	3.2	U	2	U	10	U	23.3	D	48.7
D	5.8	D	19	D	10	U	8.4	D			11	U	4.5	U	5.9	D	10	U	4.7	D	5.7
D	26.6	D	6.7	U	2	U	64.9	D	2.4	U	53.9	U	4.5	U	2.5	U	1	U	35.7	D	116
D	0.5	U	0.95	U	10	U	1.3	U	1.7	U	2.5	U	4.8	U	6.2	U	10	U	0.81	U	12.4
D	0.93	D	0.6	U	10	U	1	U	1.4	U	3.6	U	4.2	U	5.3	U	10	U	1.1	U	4.3
U	6.6	U	5.5	U	2	D	6.8	U	1.7	U	2.3	U	3.6	U	3.3	U	10	U	11.6	D	29.9
U	26.6	D	10.5	U	5	U	10	U	1.5	U	2.6	U	3.2	U	2	U	10	U	8.2	U	12.4
U	1	U	4.4	U	10	U	3	U	2.4	U	25.3	D	4.5	U	26.4	D	10	U	1.2	D	1.4
D	1	U	8.4	D	2	U	3	U	2.4	U	19.4	U	24.4	D	18.3	D	1	U	0.9	U	1.4
D	2.4	D	0.86	U	1	U	1.8	D	1.7	U	2.5	U	4.8	U	6.2	U	10	U	2	U	1.1
U	2.2	U	1.7	U	10	U	1	U	1.4	U	3.6	U	4.2	U	5.3	U	10	U	3.4	D	4.4
U	6.6	U	5.5	U	1	D	6.8	U	1.7	U	2.3	U	3.6	U	3.4	U	10	U	8.1	D	32.5
U	18.4	D	10.5	U	3	U	10.5	D	1.5	U	2.6	U	3.2	U	2	U	10	U	9	D	24.6
D	1	U	4.4	U	10	U	3	U	2.4	U	26.1	U	4.5	U	30.8	D	10	U	1.2	D	1.4
D	1	U	10.8	D	2	U	3	U	2.4	U	16.6	U	32.4	D	19.3	D	1	U	0.93	D	1.4
U	0.78	D	1.5	U	6	U	1.5	D	1.7	U	2.5	U	4.8	U	6.2	U	10	U	0.87	U	1.1
D	89.8	D	3.7	U	10	U	12.5	D	1.4	U	3.6	U	4.2	U	5.3	U	10	U	8.9	D	6.3
U	6.6	U	14.5	D	4	D	6.8	U	1.7	U	2.3	U	7.2	U	1.7	U	10	U	12.8	D	34.7
U	7.3	U	10.5	U	4	U	12.6	D	1.5	U	2.6	U	3.2	U	2	U	10	U	8.2	U	7.5
D	1	U	6.5	D	10	U	3	U	2.4	U	26	U	4.5	U	12.6	D	10	U	2.8	D	1.4
D	1	U	1.7	U	2	U	3.7	D	2.4	U	56.5	U	4.5	U	8.1	D	1	U	1.9	D	1.4
U	0.5	U	0.7	U	2	U	1.3	U	1.7	U	2.5	U	4.8	U	6.2	U	10	U	0.7	U	1.1
U	0.7	U	2.7	U	10	U	1	U	1.4	U	3.6	U	4.2	U	5.3	U	10	U	1.5	D	3.8
D	17.8	D	12.6	D	2	D	13.7	D	11.2	U	2.3	U	3.6	U	1.7	U	10	U	32	D	283
D	14.4	D	10.5	U	4	D	20.3	D	4.5	D	2.6	U	3.2	U	2	U	10	U	17.8	D	333
D	14.7	D	11.8	U	10	U	16.4	D	7.4	D	7.8	U	4.5	U	2.5	U	10	U	23	D	230
D	18.9	D	14.1	U	2	U	22.4	D	6.2	D	10.7	U	4.5	U	2.5	U	1	U	26.3	D	397
D	23.4	D	2	U	1	U	7.9	D	1.7	U	2.5	U	4.8	U	6.2	U	10	U	1.1	U	162
D	1.1	D	1.2	U	10	U	5.1	D	1.4	U	3.6	U	4.2	U	5.3	U	10	U	1.1	U	89.6

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SITE7 GROUNDWATER SUMMARY: JUN98 - SEP01

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GRDNT	P	UNITS	D	N	FD	NONDETECTS MIN	NONDETECTS MAX	DETECTS MIN	DETECTS MAX	MEAN	MEDIAN	SD	RBC	EXCEED D>	EXCEED U>	MCL	EXCEED D>	EXCEED U>
METALS																		
CROSS	AS	ug/L	8	12	0.67	3.4	4.2	6.8	66.5	21.4	13.0	22.7	0.045	8	4	10	6	
DOWN	AS	ug/L	5	18	0.28	2.3	8.3	5.3	10.1	3.5	4.1	2.8	0.045	5	13	10	1	
UP	AS	ug/L	4	6	0.67	3.9	4.2	12.7	19.9	10.9	12.8	7.3	0.045	4	2	10	4	
CROSS	BA	ug/L	6	12	0.50	9	51.5	3.5	35.8	14.5	15.4	11.3	2600			2000		
DOWN	BA	ug/L	15	18	0.83	50.3	97.3	34.1	174	61.5	61.2	32.5	2600			2000		
UP	BA	ug/L	4	6	0.67	47.4	55.1	28.6	55.4	36.0	49.2	13.5	2600			2000		
CROSS	BE	ug/L	3	12	0.25	0.1	1	0.96	1.2	0.4	0.4	0.4	73			4		
DOWN	BE	ug/L		18	0.00	0.1	1			0.2	0.4	0.2	73			4		
UP	BE	ug/L	5	6	0.83	0.1	0.1	0.3	1.4	0.8	0.9	0.5	73			4		
CROSS	CD	ug/L	1	12	0.08	0.27	0.6	0.98	0.98	0.3	0.5	0.2	18			5		
DOWN	CD	ug/L	5	18	0.28	0.27	0.6	0.54	2.1	0.4	0.5	0.5	18			5		
UP	CD	ug/L	2	6	0.33	0.27	0.6	2	4.2	1.2	0.5	1.7	18			5		
CROSS	CO	ug/L	6	12	0.50	0.7	5.7	1.6	46.5	6.7	3.8	12.9	730					
DOWN	CO	ug/L	7	18	0.39	0.7	5.7	0.88	2.2	1.6	1.7	1.0	730					
UP	CO	ug/L	6	6	1.00			8.7	23.8	16.1	16.7	6.3	730					
CROSS	CR	ug/L	6	12	0.50	0.5	7.3	0.93	26.6	6.1	6.2	7.9	110			100		
DOWN	CR	ug/L	5	18	0.28	0.5	7.3	0.78	89.8	8.7	1.6	21.4	110			100		
UP	CR	ug/L	6	6	1.00			1.1	23.4	15.1	16.3	7.6	110			100		
CROSS	CU	ug/L	2	12	0.17	0.6	10.5	4.6	19	4.1	5.5	5.0	1500			1300		
DOWN	CU	ug/L	4	18	0.22	0.7	10.5	6.5	14.5	4.0	5.0	3.9	1500			1300		
UP	CU	ug/L	1	6	0.17	1.2	14.1	12.6	12.6	5.4	11.2	4.4	1500			1300		
CROSS	NI	ug/L	5	12	0.42	1	10	1.4	64.9	9.0	6.3	18.0	730					
DOWN	NI	ug/L	6	18	0.33	1	10	1.5	12.6	3.7	3.0	4.0	730					
UP	NI	ug/L	6	6	1.00			5.1	22.4	14.3	15.1	6.8	730					
CROSS	PB	ug/L	1	11	0.09	1.4	2.4	6.4	6.4	1.4	1.7	1.7	15			15		
DOWN	PB	ug/L		18	0.00	1.4	2.4			0.9	1.7	0.2	15			15		
UP	PB	ug/L	3	6	0.50	1.4	11.2	4.5	7.4	4.2	5.4	2.8	15			15		
CROSS	SB	ug/L		12	0.00	2.3	53.9			4.0	3.1	7.3	15		1	6		2
DOWN	SB	ug/L	1	18	0.06	2.3	56.5	25.3	25.3	6.3	3.1	8.5	15	1	5	6	1	5
UP	SB	ug/L		6	0.00	2.3	10.7			2.5	3.1	1.8	15			6		2

GRDNT	P	UNITS	D	N	FD	NONDETECTS MIN	NONDETECTS MAX	DETECTS MIN	DETECTS MAX	MEAN	MEDIAN	SD	RBC	EXCEED D>	EXCEED U>	MCL	EXCEED D>	EXCEED U>
CROSS	SE	ug/L	1	12	0.08	3.2	4.8	6	6	2.4	4.4	1.2	180			50		
DOWN	SE	ug/L	2	18	0.11	3.2	7.2	24.4	32.4	5.1	4.5	8.6	180			50		
UP	SE	ug/L		6	0.00	3.2	4.8			2.1	4.4	0.3	180			50		
CROSS	TL	ug/L	1	12	0.08	1.7	6.2	5.9	5.9	2.1	2.5	1.5	2.6	1	4	2	1	7
DOWN	TL	ug/L	6	18	0.33	1.7	6.2	8.1	30.8	7.8	5.8	9.5	2.6	6	8	2	6	8
UP	TL	ug/L		6	0.00	1.7	6.2			1.7	2.5	0.9	2.6		2	2		4
CROSS	V	ug/L	7	12	0.58	0.81	5.8	1.9	35.7	8.1	5.4	10.8	260					
DOWN	V	ug/L	12	18	0.67	0.7	8.2	0.93	12.8	4.1	2.4	4.1	260					
UP	V	ug/L	4	6	0.67	1.1	1.1	17.8	32	16.7	20.4	13.3	260					
CROSS	ZN	ug/L	6	12	0.50	5.7	38	0.87	116	21.5	16.9	32.4	11000					
DOWN	ZN	ug/L	2	18	0.11	1.1	34.7	12.4	24.6	5.7	2.6	7.7	11000					
UP	ZN	ug/L	6	6	1.00			89.6	397	249.1	256.5	112.7	11000					
VOLATILES																		
CROSS	ACET	ug/L	4	12	0.33	5	10	0.9	6	4.4	10.0	1.4	610					
DOWN	ACET	ug/L	3	18	0.17	2	10	7	10	4.7	10.0	2.2	610					
UP	ACET	ug/L	1	6	0.17	5	10	5	5	4.6	10.0	1.0	610					
CROSS	BUT2	ug/L		12	0.00	5	10			4.6	10.0	1.0	1900					
DOWN	BUT2	ug/L	1	18	0.06	5	10	1	1	4.4	10.0	1.3	1900					
UP	BUT2	ug/L		6	0.00	5	10			4.6	10.0	1.0	1900					
CROSS	C2SLF	ug/L		12	0.00	1	10			4.3	10.0	1.8	1000					
DOWN	C2SLF	ug/L	3	18	0.17	1	10	0.6	2	4.1	10.0	1.7	1000					
UP	C2SLF	ug/L		6	0.00	1	10			4.3	10.0	1.8	1000					
CROSS	CLANE	ug/L	1	12	0.08	1	10	1	1	3.9	10.0	2.0	3.6		9			
DOWN	CLANE	ug/L		18	0.00	1	10			4.3	10.0	1.7	3.6		15			
UP	CLANE	ug/L		6	0.00	1	10			4.3	10.0	1.8	3.6		5			
CROSS	MCL	ug/L	3	12	0.25	2	10	1	5	3.8	10.0	1.9	4.1	1	7	5		7
DOWN	MCL	ug/L	3	18	0.17	1	10	1	4	2.8	4.0	1.8	4.1		8	5		7
UP	MCL	ug/L	2	6	0.33	1	10	2	4	2.9	3.0	2.0	4.1		2	5		2
CROSS	TOL	ug/L	1	12	0.08	1	10	2	2	4.0	10.0	1.8	750			1000		
DOWN	TOL	ug/L		18	0.00	1	10			4.3	10.0	1.7	750			1000		
UP	TOL	ug/L		6	0.00	1	10			4.3	10.0	1.8	750			1000		

BOX20.doc

RESULTS.xls

TS20.doc

Appendix D
Round 7 Long-Term Monitoring Letter Report

August 5, 2002

163738.LT.IR
02-KML-379

Commander
LANTNAVFACENGCOM
Attention: Code EV22-DMH, Ms. Dawn Hayes, P.E.
Lafayette Annex, Building A
6506 Hampton Boulevard
Norfolk, VA 23508

Subject: Navy CLEAN II Program
Contract No. N62470-95-D-6007
Contract Task Order 0210
Long Term Monitoring Round 7 Letter Report
NAB-Little Creek Site 7

Dear Ms. Hayes:

This long-term-monitoring (LTM) letter report documents activities and results of the seventh round of post-remedial-action groundwater, surface water, and sediment sampling at Site 7 (The Amphibious Base Landfill), Naval Amphibious Base (NAB) Little Creek, Virginia Beach, Virginia. The base location map is provided as Figure 1. The location of Site 7 within the base is shown in Figure 2.

This sampling event is the seventh round of a five-year semi-annual long term monitoring program for Site 7. The long-term monitoring program has been established to monitor groundwater, surface water, and sediment quality at Site 7 due to the former use of the site and its proximity to the Chesapeake Bay and other nearby surface water bodies. CH2M HILL conducted this seventh round of sampling on March 4 and 5, 2002. All sampling activities were conducted in accordance with the Revised Project Plans for the Long-Term Monitoring Program at Site 7 (Rounds 5 to 10) (CH2M HILL, February, 2001). All sample locations are shown in Figure 3.

Groundwater Monitoring Activities

Groundwater samples were collected from six existing monitoring wells at Site 7: LS07-MW01, LS07-MW03, LS07-MW06, LS07-MW07, LS07-MW08, and LS07-MW09 (See Figure 3). All samples were collected from wells that have been previously developed, thus the wells were not re-developed prior to sampling. Table 1 shows the water level elevations of the groundwater monitoring wells calculated from the recorded depth to water measurements. Figure 4 shows the estimated piezometric surface of Site 7.

All groundwater samples were collected with a peristaltic pump using a low-flow purge rate. Low flow purging involves removing groundwater from the well at a rate (generally 300 to 400 mL/min) such that the water level in the well does not decrease significantly, assuring that groundwater, rather than standing column water, is collected. To verify the water level is not decreasing, the water level is monitored with a water level indicator during purging and sampling. The purging continues until water quality parameters stabilize within 10 percent after three consecutive readings. The water quality parameters were measured with a Horiba U-22 Water Quality Meter, and included pH, specific conductance, dissolved oxygen (DO), and temperature. Daily calibrations of the Horiba U-22 were performed to ensure accurate measurements. Table 2 includes the final stabilized field parameters reached prior to sample collection for each monitoring well. All groundwater samples from Site 7 were analyzed for TCL organics (volatiles, semivolatiles, pesticides, and PCBs), TAL total metals, TAL dissolved metals, and cyanide.

Groundwater samples were placed in containers and preserved according to Navy protocol as noted in Table 3. The applicable Standard Operating Procedures (SOPs) for the collection of groundwater samples were followed as presented in Volume 2 of the Final Little Creek Master Project Plans (CH2M HILL, February 2001).

Purged groundwater from the monitoring wells was contained on site in 5-gallon buckets and transferred to appropriately labeled 55-gallon drums for temporary storage and disposal. CH2M HILL subcontracted out the disposal of investigation-derived waste (IDW) material in the designated IDW drums after completion of the sampling event.

Surface Water and Sediment Sampling Activities

Surface water and sediment samples were collected from seven locations previously sampled at Site 7: LS07-SW/SD201, LS07-SW/SD202, LS07-SW/SD203, LS07-SW/SD204, LS07-SW/SD205, LS07-SW/SD206, and LS07-SW/SD207. In addition, the following locations were added to the LTM sampling efforts during Round 5 and have since been included in all LTM sampling events (See Figure 3):

- Two locations in a small "pond" just south of the sampling locations LS07-SW/SD206 and LS07-SW/SD207, one in the southwest corner abutting the landfill (LS07-SW/SD209) and the second at the outlet of the pond (LS07-SW/SD208), to evaluate the impacts to this pond.
- One sample near the end of the drainage swale located along the southern edge of the landfill (LS07-SW/SD210).
- Three locations in the drainage canal present along the western site boundary, the first (LS07-SW/SD211) about midway between sampling locations 201 and 202, the second where the drainage swale enters the canal (LS07-SW/SD212), and the third (LS07-SW/SD213) just north of Shore Drive.

Surface water samples were analyzed for TCL VOCs and total and dissolved TAL metals, plus cyanide. Sediment samples were analyzed for TCL SVOCs, pesticides/PCBs, TAL metals and cyanide, total organic carbon (TOC), pH, and grain size distribution. The grain size distributions may be found in Appendix D.

All surface water and sediment samples were placed in containers and preserved according to Navy protocol as presented in Tables 3 and 4, respectively. The applicable SOPs for the collection of surface water and sediment samples were followed as presented in Volume 2 of the Final Little Creek Master Project Plans (CH2M HILL, February 2001).

Sampling Results

The laboratory that performed the analyses of the samples collected during Round 7 is approved by the Navy for the CLEAN II project. Appendix A lists the analytical parameters and reporting limits for the analyses completed in Round 7. The detected analytical results of the groundwater, surface water, sediment and QA/QC sampling are presented in Tables 5 through 8. Note that if a constituent was not detected in any of the samples, it does not appear in the tables. If a constituent is detected in at least one location for a given media, all the results for that compound are listed in the table. The sample results flagged with a "U" show that the compound was not detected in that sample, and the concentration beside the "U" is the detection limit achieved for the compound in that sample. Complete results with validation qualifiers for all constituents are found in Appendix B.

Analytical results were validated using EPA Region III Modifications to the National Functional Guidelines. The data validation report summary is in Appendix C.

Groundwater

Groundwater samples were obtained from six monitoring wells during the seventh round of sampling as part of the LTM Plan at the Site 7 Landfill. The detected concentrations of analytes in groundwater from Round 7 are summarized in Table 5 and are briefly discussed below.

Volatile Organic Compounds

All monitoring wells were sampled for TCL VOCs during Round 7. The EPA detection limits for VOCs in groundwater is 10 µg/L. Every groundwater sample had estimated results that were well below the detection limits.

Semivolatile Organic Compounds

All monitoring wells were sampled for TCL SVOCs during Round 7. No TCL SVOCs were detected in this sample set.

Pesticides/Polychlorinated Biphenyls

All monitoring wells were samples for Pesticides/PCBs during Round 7. No Pesticides/PCBs were detected in this sample set.

Total and Dissolved Metals

Seventeen total metals were detected at least once in the six monitoring wells sampled. Calcium, iron, magnesium, manganese, potassium and sodium were detected in all of the monitoring wells, at concentrations significantly exceeding the EPA detection limits in the majority of the samples. Other total metals that significantly exceeded their detection limits were aluminum at LS07-MW01, arsenic

at LS07-MW06, cyanide at LS07-MW07, and zinc at LS07-MW03. The sampling location with the greatest number of total metals detected was LS07-MW03. Eleven out the 17 total metals detected were present in this monitoring well.

Fourteen dissolved metals were detected at least once in the six monitoring wells sampled. Calcium, magnesium, manganese, potassium and sodium were detected in significant exceedance of their corresponding EPA detection limits in all of the monitoring wells. Two other dissolved metals were found in concentrations higher than their detection limits: Arsenic at LS07-MW06 and iron in all but two of the monitoring wells. As with total metals, monitoring well location LS07-MW03 had the highest frequency of dissolved metals detection. Nine of the 14 dissolved metals detected were present in this monitoring well.

Surface Water

Surface water samples were collected at 13 locations throughout Site 7. Table 6 presents analytes detected in the surface water during Round 7. The following paragraphs provide an of the analytes detected in the surface water samples.

Volatile Organic Compounds

Concentrations of volatile organic compounds were detected at LS07-SW202, LS07-SW203, LS07-SW211, and LS07-SW212. The EPA detection limits for VOCs in water is 10µg/L. The only sample with detections above this limit was LS07-SW202. In this sample, the concentration of acetone was 15J µg/L, and chloroform was found in concentration of 26 µg/L. The "J" denotes that the reported values were estimated.

Total and Dissolved Metals

Seventeen total metals were detected in at least one of the surface water samples collected at Site 7. The following analytes were detected in all surface water samples: calcium, iron, magnesium, potassium, sodium and zinc at concentrations significantly exceeding EPA reporting limits in the majority of the samples. Other total metals that exceeded EPA limits were: Aluminum at LS07-SW208, 209 and 210, and chromium, cyanide, and mercury at LS07-SW202. LS07-SW202 was the sample location with the most total metals detections. Every metal detected, with the exception of lead, was present at LS07-SW202.

Sixteen dissolved metals were detected in at least one of the surface water samples collected at Site 7. Barium, calcium, iron, magnesium, potassium and sodium were detected at all 13 sample locations at concentrations significantly exceeding EPA reporting limits in the majority of the samples. Two other dissolved metals were detected above the reporting limit: manganese at eight locations, and zinc at three locations. LS07-SW202 was once again the sample location that had the most dissolved metal detections. Every metal detected, with the exception of thallium, was present at LS07-SW202.

Sediment

Thirteen sediment samples were collected during Round 7 sampling at Site 7. Table 7 presents analytes detected in the sediment samples. In addition to analyzing for SVOCs, Pesticides/PCBs, and total metals, all sediment samples were analyzed for grain size; the particle size distribution graphs

are presented in Appendix D. The results of the wet chemistry analyses (TOC, and pH) are also included in Table 7. The following paragraphs provide general information about which analytes were detected in the sediment samples.

Semivolatile Organic Compounds

Concentrations of SVOCs in sediment were detected in all but the following samples: LS07-SD211 and LS07-SD213. A total of 24 SVOCs were detected in the sediment samples collected at Site 7. However, the only detections that were above EPA reporting limits were fluoroanthene at LS07-SD203 and -SD209, phenanthrene at LS07-SD203, and pyrene at LS07-SD209. The sediment sample locations with the highest SVOC detection frequency were LS07-SD203 and -SD204.

Pesticides and Polychlorinated Biphenyls (PCBs)

Five pesticides and one PCB were detected in the sediment samples collected at Site 7. 4,4'-DDD was estimated slightly above the EPA detection limit only in the duplicate sample at LS07-SD204. 4,4'-DDE and alpha-Chlordane were estimated slightly above EPA limits at LS07-SD202. Aroclor-1260 was found in exceedance of EPA limits at LS07-SD202, -SD209 and -SD212. Aroclor-1260 and beta-BHC were each detected above their detection limits at three sediment sample locations. The sediment sample locations where the most pesticides and PCBs were found were LS07-SD202 and -SD212.

Total Metals

Seventeen TAL total metals were detected in one or more of the sediment samples collected at Site 7. With the exception of barium, calcium, nickel, selenium and silver, nearly all the constituents were detected in each of the sediment samples. Table 7 provides a complete summary of the total metals detected in the Round 7 sediment sampling.

Quality Assurance/Quality Control (QA/QC)

The complete results of the QA/QC data can be found in Table 8. One pesticide, eight total metals, and eight dissolved metals were detected in these samples. The pesticide 4,4'-DDT was found in the equipment blank at 0.035 μg/L, estimated significantly below the laboratory detection limit. The majority of the total metals were found in one field blank and two equipment blanks, with copper being the only total metal exceeding the laboratory detection limit. The majority of the dissolved metals were found in two equipment blanks, with none exceeding the laboratory detection limits.

Summary

The seventh round of long-term-monitoring has been completed at NAB Little Creek, Site 7. This letter report documents the sampling activities and presents the results of the groundwater, surface water, and sediment sampling at Site 7, the Amphibious Base Landfill, in accordance with the long-term-monitoring plan.

This data will be utilized in the revised Site 7 RI/FS including the revised human health risk assessment and a separate ecological risk assessment. The next round of Site 7 long term monitoring (Round 8) is scheduled for September 2002. An annual monitoring report will be prepared to present an evaluation of Site 7 data generated during 2002.

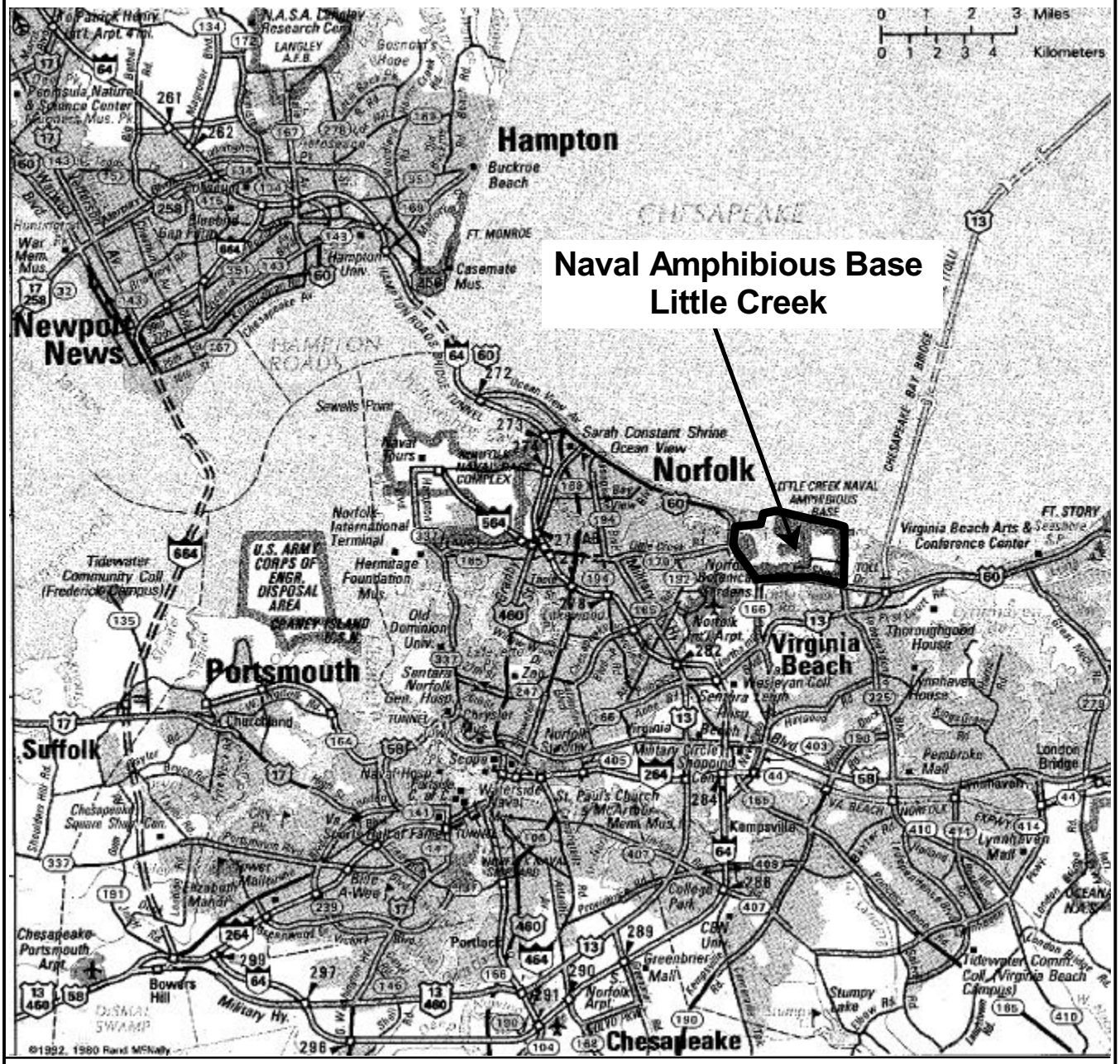
If you have any questions please do not hesitate to call Matt Louth at (757) 460-3734, extension 17.

Sincerely,

CH2M HILL

Matt Louth
Activity Manager

Cc: Ms. Mary Cooke/RPM EPA (2 copies)
Mr. Robert Weld/VADEQ (1 copy)
Mr. Randy Sawyer/WNSTN (1 copy)
Ms. Stephanie McManus/ NAB Little Creek (1 copy)
Mr. Paul Landin/CH2M HILL-VBO (1 copy)
Ms. Kim Henderson/CH2M HILL-VBO (1 copy)



Source: Rand McNally

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Figure 1
Base Location Map
NAB Little Creek
Virginia Beach, Virginia

CH2MHILL

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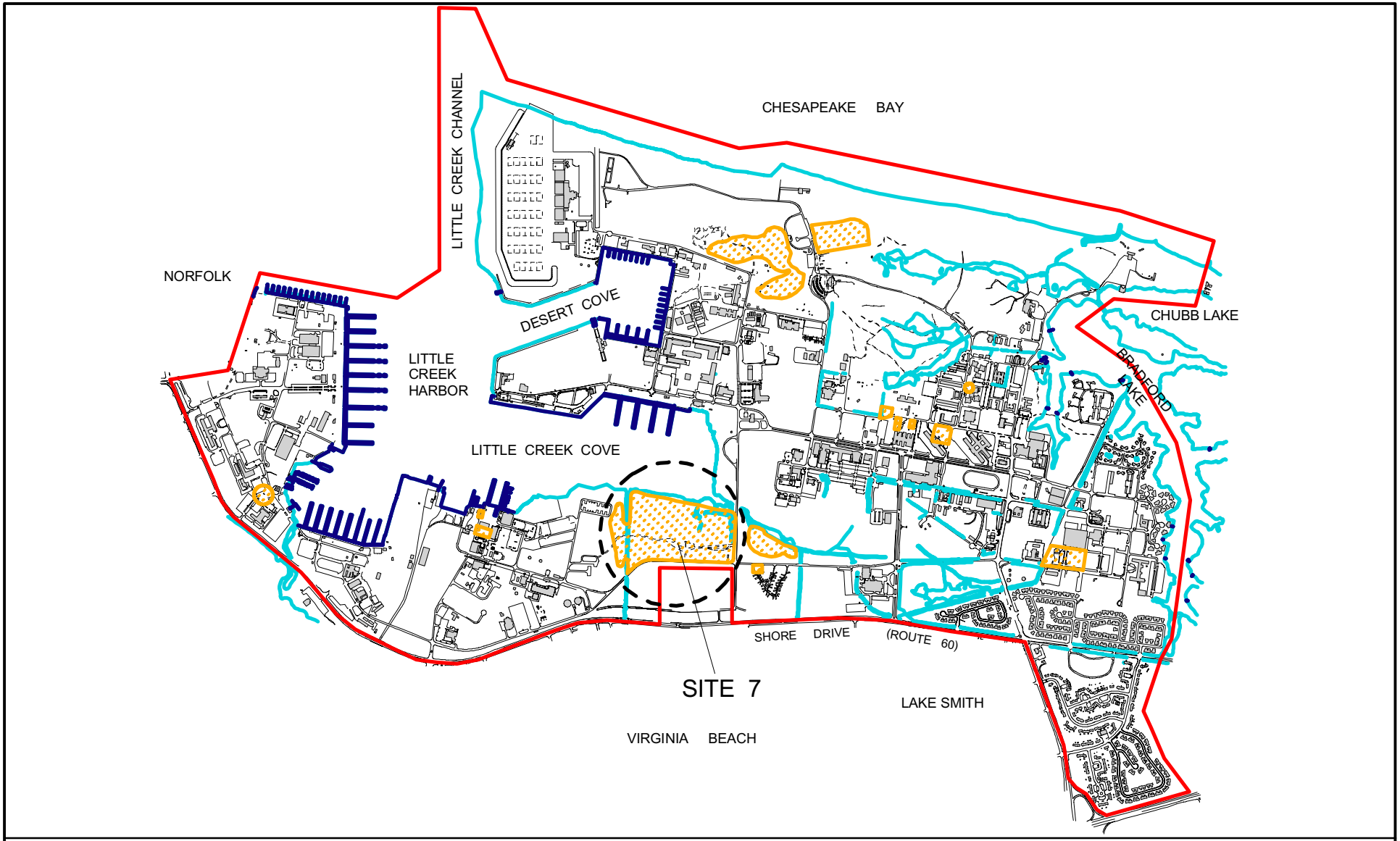

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0 800 1600 Feet

Figure 2
Site 7 Location Map
NAB Little Creek
Virginia Beach, Virginia

CH2MHILL

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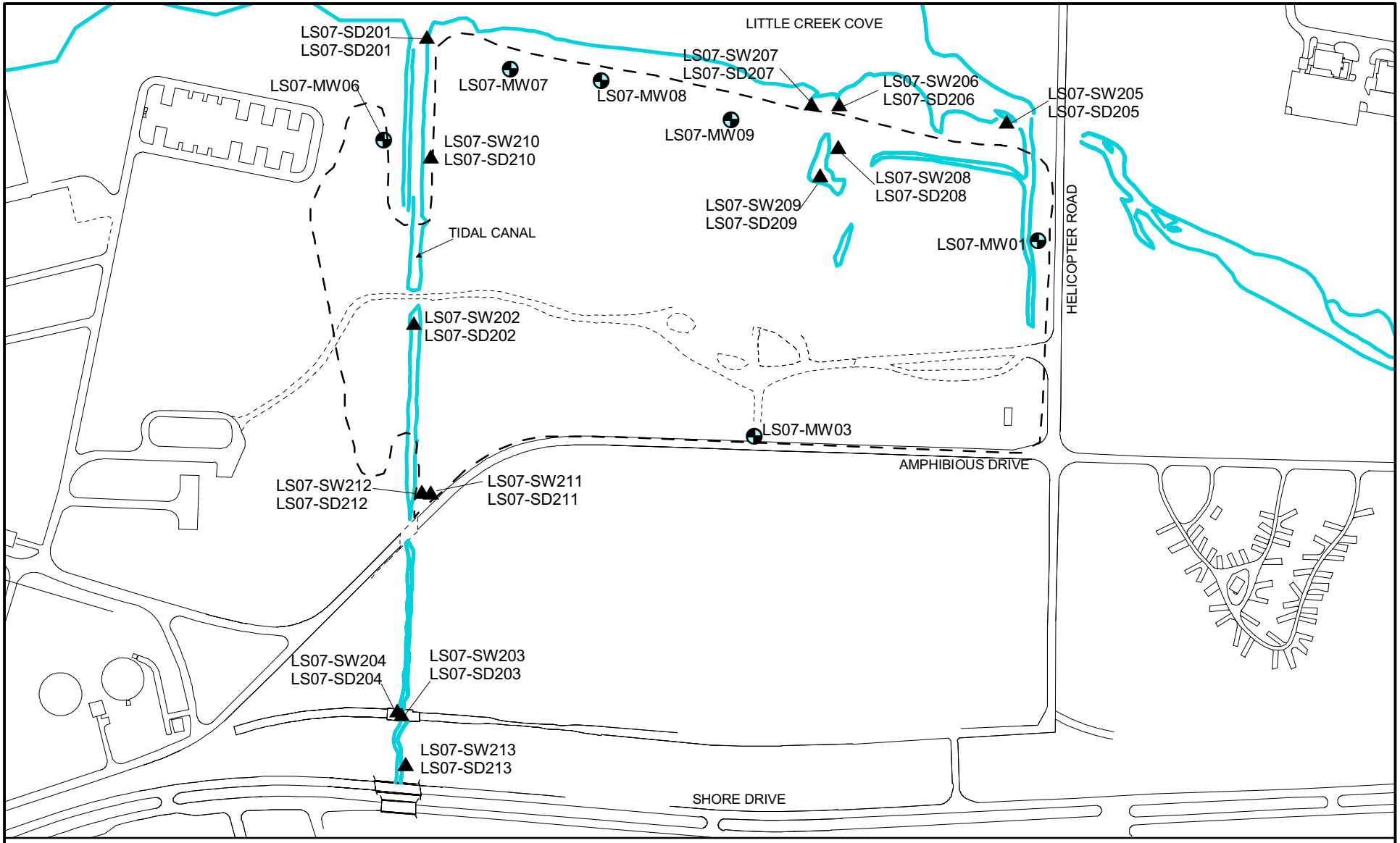

LEGEND

- ▲ Surface Water and Sediment Sampling Location
- ⊕ Groundwater Data Collection Point
- ----- Site Boundary

N

0 200 400 Feet

Figure 3
Site 7 - Media Sampling
Locations For LTM Round 7
Naval Amphibious Base Little Creek
Virginia Beach, Virginia

CH2MHILL

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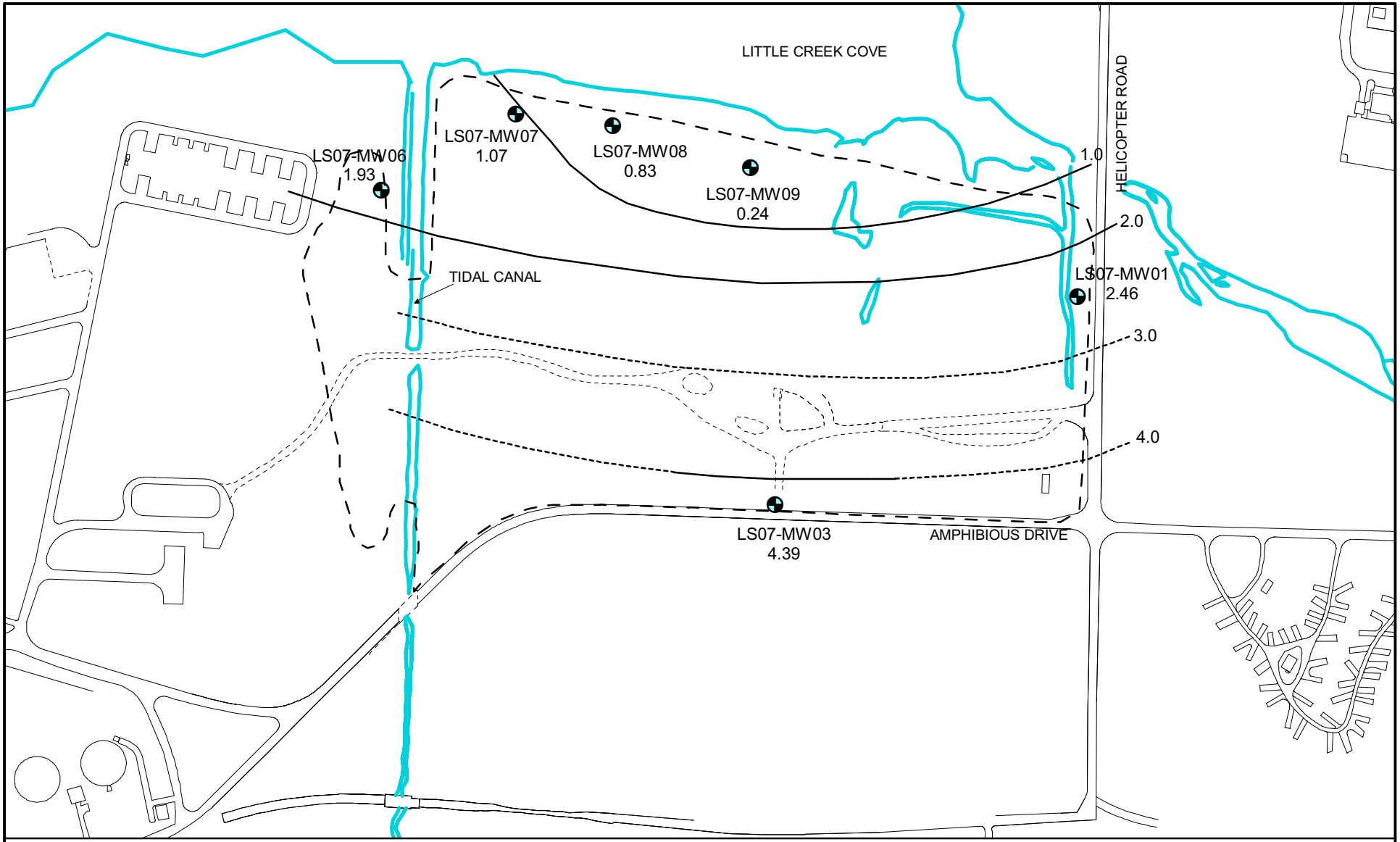

LEGEND

- Site Boundary
- LS07-MW01 (1.95) Groundwater Monitoring Point (Existing Monitoring Well)
- Groundwater Flow Direction
- 1.5 Groundwater Contour (Dashed Where Inferred)

N

0 200 400 Feet

Figure 4
Site 7 - Estimated Piezometric Surface
Round 7 of LTM Program
NAB Little Creek
Virginia Beach, Virginia

CH2MHILL

TABLE 1
WATER LEVEL MEASUREMENTS
SEMIANNUAL MONITORING ROUND 7
NAB LITTLE CREEK – SITE 7

Monitoring Well	Measuring Point Elevation (ft above msl)	Depth to Water (ft below measuring point)	Water Level Elevation (ft above msl)
LS07-MW01	8.38	5.92	2.46
LS07-MW03	12.19	7.8	4.39
LS07-MW06	9.25	7.32	1.93
LS07-MW07	4.72	3.65	1.07
LS07-MW08	4.94	4.11	0.83
LS07-MW09	5.55	5.31	0.24

TABLE 2
STABILIZED GROUNDWATER FIELD PARAMETERS
SEMIANNUAL MONITORING ROUND 7
NAB LITTLE CREEK – SITE 7

Monitoring Well	PH (pH units)	Specific Conductance (umho/cm)	Dissolved Oxygen (mg/L)	Temperature (Degrees Celsius)
LS07-MW01	7.09	3.64	0.46	12.48
LS07-MW03	5.68	1.19	0.36	16.03
LS07-MW06	6.55	3.23	0.7	13.45
LS07-MW07	7.31	48.3	0.26	10.26
LS07-MW08	7.38	46.7	0.35	10.82
LS07-MW09	7.08	5.44	0.69	10.13

TABLE 3 – SURFACE WATER, GROUNDWATER AND QA/QC SAMPLES
REQUIRED CONTAINERS, PRESERVATIVES, AND HOLDING TIMES
SEMIANNUAL MONITORING ROUND 7
NAB LITTLE CREEK – SITE 7

Analysis	Sample Container	Preservative	Holding Time	Volume of Sample Collected
TCL Volatiles (CLP OLM04)	Three 40-ml glass vials w/ teflon lined cap	HCl to pH <2; Cool to 4ºC	14 days	Fill completely; no air bubbles
TCL Semivolatiles (CLP OLM04)	Two 1-liter bottles	Cool to 4ºC	7 days	Fill to shoulder
TCL Pesticides/PCBs (CLP OLM04)	Two 1-liter bottles	Cool to 4ºC	7 days	Fill to shoulder
TAL Metals (total and filtered) (CLP ILM04)	One 1-liter filtered polyethylene bottle; One 1-liter unfiltered polyethylene bottle	HNO_3 to pH <2; Cool to 4ºC	6 months (Hg – 28 days)	Fill to shoulder
Cyanide (CLP ILM04)	1-liter polyethylene bottle	NaOH to pH > 12; Cool to 4ºC	28 days	Fill to shoulder

TABLE 4 – SEDIMENT AND QA/QC SAMPLES
REQUIRED CONTAINERS, PRESERVATIVES, AND HOLDING TIMES
SEMIANNUAL MONITORING ROUND 7
NAB LITTLE CREEK – SITE 7

Analysis	Sample Container	Preservative	Holding Time	Volume of Sample Collected
TCL Semivolatiles (CLP OLM04)	One 8-oz glass bottle with teflon-lined cap	Cool to 4ºC	14 days	Fill completely
TAL Pesticides/PCBs (CLP OLM04)	One 8-oz glass bottle with teflon-lined cap	Cool to 4ºC	14 days	Fill completely
TAL Metals (CLP ILM04)	One 4-oz plastic or glass	Cool to 4°C	6 months (Hg – 28 days)	Fill completely
Cyanide (CLP ILM04)	One 1-liter polyethylene bottle One 4-oz plastic or glass bottle for solids	Cool to 4°C	28 days	Fill completely
pH (SW846 9045)	One 4-oz plastic or glass bottle	Cool to 4°C	2 days	Fill completely
Total Organic Carbon (TOC) – (EPA 415.1)	One 8-oz plastic or glass bottle	Cool to 4ºC	28 days	Fill completely
Grain Size – sieve only (ASTM D422)	One 1-quart-sized baggie	None	N/A	Fill ¾ full and double bag

Table 5
NAB Little Creek
Navy CLEAN II CTO-210, Long Term Monitoring Plan
Round 7, Detected Analytical Results for Site 7 Groundwater

Station ID	LS07-MW01		LS07-MW03	LS07-MW06	LS07-MW07	LS07-MW08	LS07-MW09
Sample ID	LS07-MW01-02A	LS07-MW01P-02A	LS07-MW03-02A	LS07-MW06-02A	LS07-MW07-02A	LS07-MW08-02A	LS07-MW09-02A
Sample Date	03/05/02	03/05/02	03/05/02	03/05/02	03/04/02	03/04/02	03/04/02
Chemical Name							
Volatile Organic Compounds (UG/L)							
Carbon disulfide	10 U	10 U	10 U	10 U	4 J	10 U	10 U
Toluene	0.4 J	0.5 J	0.4 J	10 U	0.4 J	10 U	0.5 J
Total Metals (UG/L)							
Aluminum	1,340	932	94.9 J	233	44 U	44 U	44 U
Arsenic	1.7 U	1.7 U	2.2 J	30.6	1.7 U	1.7 U	2.2 J
Barium	6.6 B	5.7 B	39.9 B	21.1 B	65.9 J	58.4 B	83.3 J
Calcium	7,580	7,770	34,900	143,000	344,000	354,000	290,000
Cobalt	2 U	2 U	13 J	3 J	2 U	2 U	2 U
Cyanide	0.8 U	0.8 U	0.8 U	0.8 U	19	0.8 U	0.93 B
Iron	2,950	2,460	11,100	15,500	32.1 J	25.1 J	42,700
Magnesium	19,300	20,000	16,400	125,000	731,000	697,000	804,000
Manganese	33	31.9	785	1,590	242	295	843
Nickel	1 U	1 U	4.1 J	1 U	1.5 J	1 U	1 U
Potassium	17,400 J	17,800 J	12,600 J	29,400 J	316,000 J	320,000 J	364,000 J
Selenium	1.9 U	1.9 U	1.9 U	2.3 J	1.9 U	1.9 U	1.9 U
Silver	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.57 J
Sodium	189,000	196,000	78,600	326,000	4,980,000	4,910,000	6,310,000
Thallium	3 U	3 U	3 U	3 U	3 U	3 U	6 J
Vanadium	4.3 J	3.4 J	1.7 U	1.7 U	1.7 U	1.7 U	1.7 U
Zinc	4.6 UL	4.6 UL	107	4.6 UL	4.6 UL	4.6 UL	4.6 UL
Dissolved Metals (UG/L)							
Aluminum	65.6 U	65.6 U	82.2 J	65.6 U	65.6 U	65.6 U	65.6 U
Arsenic	2.4 U	2.4 U	2.4 U	18.7	2.4 U	2.4 U	2.4 U
Barium	2.9 B	2.4 B	35.8 B	19.6 B	60 J	52.5 J	73.7 J
Cadmium	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	0.48 J
Calcium	7,610	6,540	35,900	144,000	328,000	328,000	285,000
Chromium	0.6 U	0.6 U	0.6 U	0.6 U	0.76 J	1.6 J	0.6 U
Cobalt	0.7 U	0.7 U	12 J	2.5 J	0.7 U	0.7 U	0.7 U
Iron	1,320	1,390	10,800	13,900	56.4 B	44.8 B	38,600
Magnesium	17,400	14,500	16,000	123,000	745,000	711,000	887,000
Manganese	29.8	28.7	773	1,570	260	304	863
Nickel	1.3 U	1.3 U	7.8 B	1.7 B	1.3 U	2.2 J	2.6 J
Potassium	17,200 J	14,900 J	13,700 J	30,500 J	313,000 J	308,000 J	373,000 J
Sodium	188,000 J	150,000 J	75,300 J	387,000 J	5,980,000 J	5,750,000 J	6,640,000 J
Vanadium	0.94 J	1.4 J	0.88 J	0.8 U	2 J	1.8 J	0.8 U

B - Analyte not detected above associated blank
J - Report value is estimated
U - Analyte not detected
UL - Undetected, limit biased low

Table 6
NAB Little Creek
Navy CLEAN II CTO-210, Long Term Monitoring Plan
Round 7, Detected Analytical Results for Site 7 Surface Water

Station ID	LS07-SW201		LS07-SW202		LS07-SW203		LS07-SW203		LS07-SW204		LS07-SW205		LS07-SW206		LS07-SW207
Sample ID	LS07-SW201-02A		LS07-SW202-02A		LS07-SW203-02A		LS07-SW203P-02A		LS07-SW204-02A		LS07-SW205-02A		LS07-SW206-02A		LS07-SW207-0
Sample Date	03/04/02		03/05/02		03/05/02		03/05/02		03/05/02		03/04/02		03/04/02		03/04/02
Chemical Name															
Volatile Organic Compounds (UG/L)															
Acetone	10	U	15	J	10	U	6	J	10	U	10	U	10	U	10
Bromodichloromethane	10	U	2	J	10	U	10	U	10	U	10	U	10	U	10
Chlorobenzene	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10
Chloroform	10	U	26		1	J	1	J	10	U	10	U	10	U	10
Toluene	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10
Total Metals (UG/L)															
Aluminum	183	J	175	J	65.6	U	65.6	U	73.4	J	65.6	U	76.9	J	65.6
Arsenic	4.2	J	3.9	J	6.4	J	6.4	J	6.8	J	2.4	U	4	J	3
Barium	20.9	B	70.3	J	22.4	B	21.4	B	20.7	B	22.4	B	22.5	B	22.3
Calcium	279,000		71,700		27,900		27,200		25,600		286,000		288,000		285,000
Chromium	0.6	U	13.2		0.66	J	0.68	J	0.97	J	0.6	U	0.6	U	0.6
Cobalt	0.83	J	5.3	J	2.1	J	2.4	J	2.1	J	0.7	U	0.82	J	0.7
Cyanide	0.84	B	10.4		1.3	B	1.6	B	1.5	B	0.8	U	0.8	U	1.1
Iron	597		433		2,130		2,050		2,490		315		403		362
Lead	1.8	UL	1.8	UL	1.8	UL	1.8	UL	1.8	UL	1.8	UL	1.8	UL	1.8
Magnesium	920,000		35,000		19,500		18,900		18,000		967,000		949,000		952,000
Manganese	0.3	U	88.1		364		358		357		11.4	J	7.8	J	7.9
Mercury	0.1	U	0.73		0.11	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1
Nickel	1.9	J	12.9	J	1.4	J	1.3	U	1.3	U	1.8	J	1.4	J	2.2
Potassium	476,000	J	54,900	J	10,400	J	9,960	J	8,730	J	498,000	J	492,000	J	489,000
Sodium	7,350,000	J	1,560,000	J	177,000	J	169,000	J	131,000	J	7,820,000	J	7,480,000	J	7,570,000
Vanadium	1.5	J	4.3	J	1	J	1.1	J	0.88	J	0.8	U	1.5	J	0.8
Zinc	12	J	193	J	18	J	11.5	J	13.5	J	57.3	J	10.5	J	12.5
Dissolved Metals (UG/L)															
Aluminum	65.6	U	124	J	65.6	U	65.6	U	65.6	U	65.6	U	65.6	U	65.6
Arsenic	5.8	J	3.4	J	6.3	J	6.1	J	4.9	J	5.1	J	2.4	U	4.1
Barium	21.3	J	65.1	J	20.2	J	21.4	J	19.8	J	22.9	J	22.4	J	22.9
Calcium	295,000		68,900		26,400		27,600		25,800		292,000		288,000		291,000
Chromium	0.6	U	9.6	J	0.6	U	0.6	U	0.6	U	0.6	U	0.6	U	0.6
Cobalt	0.7	U	5.3	J	2.3	J	2.6	J	2.3	J	0.7	U	0.7	U	0.7
Iron	232		219		1,310		1,320		1,220		212		235		215

B - Analyte not detected above associated blank
J - Reported value is estimated
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UL - Undetected, limit biased low

Table 6
NAB Little Creek
Navy CLEAN II CTO-210, Long Term Monitoring Plan
Round 7, Detected Analytical Results for Site 7 Surface Water

Station ID	LS07-SW201		LS07-SW202		LS07-SW203		LS07-SW203		LS07-SW204		LS07-SW205		LS07-SW206		LS07-SW207
Sample ID	LS07-SW201-02A		LS07-SW202-02A		LS07-SW203-02A		LS07-SW203P-02A		LS07-SW204-02A		LS07-SW205-02A		LS07-SW206-02A		LS07-SW207-0
Sample Date	03/04/02		03/05/02		03/05/02		03/05/02		03/05/02		03/04/02		03/04/02		03/04/02
Chemical Name															
Magnesium	993,000		33,400		18,700		19,400		17,900		976,000		971,000		983,000
Manganese	0.3	U	82.8		338		357		346		9.8	J	5.3	J	6.2
Mercury	0.1	U	0.17	J	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1
Nickel	1.9	J	13.1	J	2.3	J	1.9	J	1.8	J	2	J	1.3	J	1.9
Potassium	519,000	J	53,500	J	10,500	J	10,900	J	9,460	J	516,000	J	522,000	J	517,000
Sodium	7,900,000	J	1,520,000	J	181,000	J	188,000	J	149,000	J	7,730,000	J	7,790,000	J	7,490,000
Thallium	6	U	6	U	6	U	6	U	6	U	6	U	6	U	6.4
Vanadium	0.8	U	4.1	J	0.8	U	0.8	U	1.4	J	0.8	U	0.8	U	0.8
Zinc	13	B	182	J	12.1	B	13.6	B	11.3	B	13.6	B	9.6	B	9.3

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Table 6
NAB Little Creek
Navy CLEAN II CTO-210, Long Term Monitoring Plan
Round 7, Detected Analytical Results for Site 7 Surface Water

Station ID		LS07-SW208		LS07-SW209		LS07-SW210		LS07-SW211		LS07-SW212		LS07-SW213	
Sample ID	2A	LS07-SW208-02A		LS07-SW209-02A		LS07-SW210-02A		LS07-SW211-02A		LS07-SW212-02A		LS07-SW213-02A	
Sample Date		03/04/02		03/04/02		03/04/02		03/05/02		03/05/02		03/05/02	
Chemical Name													
Volatile Organic Compounds (UG/L)													
Acetone	U	10	U	10	U	10	U	10	U	10	U	10	U
Bromodichloromethane	U	10	U	10	U	10	U	0.5	J	0.4	J	10	U
Chlorobenzene	U	10	U	10	U	10	U	0.6	J	10	U	10	U
Chloroform	U	10	U	10	U	10	U	4	J	4	J	10	U
Toluene	U	10	U	10	U	10	U	0.7	J	10	U	10	U
Total Metals (UG/L)													
Aluminum	U	244		490		288		148	J	65.6	U	65.6	U
Arsenic	J	2.5	J	2.7	J	2.4	U	6.1	J	3.4	J	7.9	J
Barium	B	30.2	B	43	B	22.4	B	29.6	B	28.1	B	13	B
Calcium		279,000		252,000		295,000		41,700		39,200		18,400	
Chromium	U	0.6	U	0.6	U	0.6	U	3.2	J	2.4	J	0.6	U
Cobalt	U	0.7	U	0.7	U	1.5	J	2.6	J	2.6	J	0.7	U
Cyanide	B	0.83	B	1.3	B	0.8	U	3.7	B	3.5	B	0.82	B
Iron		881		1,880		803		1,730		747		1,470	
Lead	UL	1.8	UL	2.5	J	1.8	UL	1.8	UL	1.8	UL	1.8	UL
Magnesium		930,000		786,000		984,000		33,100		29,500		5,930	
Manganese	J	27.7		68.7		5.3	J	250		235		176	
Mercury	U	0.1	U	0.1	U	0.1	U	0.2		0.19	J	0.1	U
Nickel	J	1.3	U	1.7	J	1.9	J	4.2	J	3.6	J	1.3	U
Potassium	J	483,000	J	422,000	J	512,000	J	25,500	J	23,300	J	3,590	J
Sodium	J	7,510,000	J	6,040,000	J	8,110,000	J	585,000	J	516,000	J	12,600	J
Vanadium	U	0.8	U	2	J	2.7	J	2.2	J	1.2	J	0.82	J
Zinc	J	29.6	J	39.5	J	11.3	J	71	J	60.9	J	3.9	J
Dissolved Metals (UG/L)													
Aluminum	U	65.6	U	65.6	U	65.6	U	65.6	U	65.6	U	65.6	U
Arsenic	J	2.4	U	4.1	J	3.1	J	4.4	J	2.7	J	7.9	J
Barium	J	30.7	J	44.2	J	22.3	J	27.9	J	27.1	J	12.7	J
Calcium		285,000		248,000		296,000		39,800		40,700		18,600	
Chromium	U	0.6	U	0.6	U	0.6	U	0.72	J	0.71	J	0.6	U
Cobalt	U	0.7	U	0.7	U	0.7	U	3.1	J	2.8		0.7	U
Iron		242		153		234		221		181		1,190	

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Table 6
NAB Little Creek
Navy CLEAN II CTO-210, Long Term Monitoring Plan
Round 7, Detected Analytical Results for Site 7 Surface Water

Station ID		LS07-SW208		LS07-SW209		LS07-SW210		LS07-SW211		LS07-SW212		LS07-SW213	
Sample ID	2A	LS07-SW208-02A		LS07-SW209-02A		LS07-SW210-02A		LS07-SW211-02A		LS07-SW212-02A		LS07-SW213-02A	
Sample Date		03/04/02		03/04/02		03/04/02		03/05/02		03/05/02		03/05/02	
Chemical Name													
Magnesium		945,000		783,000		988,000		29,600		32,000		5,970	
Manganese	J	26.3		64.3		0.3	U	238		246		182	
Mercury	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U
Nickel	J	1.3	U	2.3	J	1.8	J	5.4	J	4.7	J	1.3	U
Potassium	J	501,000	J	437,000	J	528,000	J	24,900	J	25,500	J	3,710	J
Sodium	J	7,450,000	J	5,930,000	J	7,940,000	J	551,000	J	550,000	J	13,000	J
Thallium	J	6	U	6	U	6	U	6	U	6	U	6	U
Vanadium	U	0.8	U	0.8	U	0.8	U	1.1	J	0.88	J	0.8	U
Zinc	B	18.7	B	8.3	B	9.1	B	61	J	56.9	J	5.7	B

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Table 7
NAB Little Creek
Navy CLEAN II CTO-210, Long Term Monitoring Plan
Round 7, Detected Analytical Results for Site 7 Sediment

Station ID	LS07-SD201		LS07-SD202		LS07-SD203		LS07-SD204				LS07-SD205		LS07-SD206		LS07-SD207	
Sample ID	LS07-SD201-02A		LS07-SD202-02A		LS07-SD203-02A		LS07-SD204P-02A		LS07-SD204-02A		LS07-SD205-02A		LS07-SD206-02A		LS07-SD207-02A	
Sample Date	03/04/02		03/05/02		03/05/02		03/05/02		03/05/02		03/04/02		03/04/02		03/04/02	
Chemical Name																
Semivolatile Organic Compounds (UG/KG)																
2-Methylnaphthalene	460	U	19	J	23	J	78	J	52	J	500	U	400	U	430	U
Acenaphthene	22	J	20	J	49	J	23	J	17	J	500	U	400	U	430	U
Acenaphthylene	460	U	570	U	400	U	510	U	470	U	500	U	400	U	430	U
Anthracene	71	J	49	J	130	J	67	J	41	J	500	U	400	U	430	U
Benzaldehyde	16	J	48	B	6	B	22	B	18	B	52	B	12	B	12	B
Benzo(a)anthracene	61	J	98	J	210	J	150	J	150	J	500	U	400	U	430	U
Benzo(a)pyrene	47	J	78	J	63	J	110	J	110	J	500	U	400	U	14	J
Benzo(b)fluoranthene	73	J	140	J	190	J	170	J	140	J	500	U	18	J	20	J
Benzo(k)fluoranthene	75	J	76	J	130	J	98	J	98	J	500	U	400	U	430	U
Butylbenzylphthalate	460	U	570	U	400	U	21	J	51	J	500	U	400	U	430	U
Carbazole	29	J	21	J	75	J	32	J	35	J	500	U	400	U	430	U
Chrysene	98	J	110	J	190	J	160	J	140	J	500	U	400	U	430	U
Di-n-butylphthalate	460	U	67	J	400	U	510	U	470	U	500	U	400	U	430	U
Di-n-octylphthalate	47	J	570	U	400	U	510	U	470	U	40	J	400	U	75	J
Dibenz(a,h)anthracene	460	U	19	J	45	J	29	J	29	J	500	U	400	U	430	U
Dibenzofuran	21	J	16	J	40	J	31	J	21	J	500	U	400	U	430	U
Diethylphthalate	460	U	570	U	400	U	510	U	470	U	500	U	400	U	12	J
Fluoranthene	260	J	310	J	510		330	J	280	J	20	J	45	J	10	J
Fluorene	37	J	570	U	67	J	29	J	470	U	500	U	400	U	430	U
Indeno(1,2,3-cd)pyrene	29	J	43	J	58	J	57	J	56	J	500	U	400	U	11	J
Naphthalene	460	U	570	U	50	J	44	J	28	J	500	U	400	U	430	U
Phenanthrene	130	J	130	J	480		250	J	180	J	500	U	400	U	430	U
Phenol	460	U	570	U	400	U	510	U	470	U	500	U	29	J	430	U
Pyrene	200	J	250	J	270	J	290	J	240	J	28	J	42	J	26	J
Pesticide/Polychlorinated Biphenyls (UG/KG)																
4,4'-DDD	4.7	U	5.7	U	4	U	5.1	U	3.5	J	5	U	4	U	4.3	U
4,4'-DDE	4.7	U	5	J	4	U	5.1	U	3.1	J	5	U	4	U	4.3	U
Aroclor-1260	47	U	150	J	40	U	51	U	47	U	50	U	40	U	43	U
Endosulfan I	1.2	J	2.9	U	2	U	2.6	U	2.4	U	2.6	U	2	U	2.2	U
alpha-Chlordane	2.4	U	2.8	J	2	U	2.6	U	2.4	U	2.6	U	2	U	2.2	U
beta-BHC	2.4	U	2.9	U	2	U	2.6	U	2.4	U	2.6	U	2	U	2.2	U
Total Metals (MG/KG)																
Aluminum	1,860		4,230		279		2,090		1,930		5,600		187		2,470	
Arsenic	1.4	J	6.3		0.401	U	7.3		6.4		5.1		0.396	U	1.3	J
Barium	8.7	J	20.7	B	2.8	B	20.5	J	19.4	J	12.4	B	0.81	B	5.8	B
Calcium	536	J	1,200	B	96.5	B	1,030	B	1,000	B	1,350	J	70.5	B	448	B
Chromium	5.1	L	10.5		0.5	B	7.1	B	6.4	B	11.5		0.21	UL	6.8	

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Table 7
NAB Little Creek
Navy CLEAN II CTO-210, Long Term Monitoring Plan
Round 7, Detected Analytical Results for Site 7 Sediment

Station ID	LS07-SD201		LS07-SD202		LS07-SD203		LS07-SD204				LS07-SD205		LS07-SD206		LS07-SD207	
Sample ID	LS07-SD201-02A		LS07-SD202-02A		LS07-SD203-02A		LS07-SD204P-02A		LS07-SD204-02A		LS07-SD205-02A		LS07-SD206-02A		LS07-SD207-02A	
Sample Date	03/04/02		03/05/02		03/05/02		03/05/02		03/05/02		03/04/02		03/04/02		03/04/02	
Chemical Name																
Cobalt	0.86	J	2.8	J	0.472	U	2	J	1.8	J	3	J	0.466	U	1.2	J
Iron	4,970		12,800		1,260		8,400		8,020		10,900		459		4,840	
Lead	8.4		34.1		3		23.8		22.2		9.8		1.4	K	28.9	
Magnesium	1,070	J	1,720	J	103	B	696	J	644	J	2,300		134	B	1,180	J
Manganese	23.5		73.5		3.1	B	61.4		59.8		74.9		2	B	35.5	
Nickel	1.9	B	6.6	B	0.236	U	23.8		20.3		5.6	B	0.233	U	2.2	B
Potassium	544	J	963	J	56	B	247	J	224	J	1,410	J	95.7	J	644	J
Selenium	0.518	UL	1.1	J	0.448	UL	0.98	J	0.535	UL	0.566	UL	0.443	UL	0.479	UL
Silver	0.136	U	0.173	U	0.118	U	0.48	J	0.35	J	0.149	U	0.117	U	0.126	U
Sodium	3,330		2,790		348	B	674	B	655	B	4,150		606	B	2,510	
Vanadium	8.2	J	21.7		2.4	J	150		137		16		0.73	J	7	J
Zinc	52.8		209		9.8	B	112		110		30		3.1	J	33.1	
Wet Chemistry (MG/KG)																
Total organic carbon (TOC)	6,724		25,310		3,101		18,830		32,360		6,566		2,615		2,790	
pH	7.72		7.86		7.88		7.51		7.43		8.19		7.55		7.94	

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Table 7
NAB Little Creek
Navy CLEAN II CTO-210, Long Term Monitoring Plan
Round 7, Detected Analytical Results for Site 7 Sediment

Station ID	LS07-SD208		LS07-SD209		LS07-SD210		LS07-SD211		LS07-SD212		LS07-SD213	
Sample ID	LS07-SD208-02A		LS07-SD209-02A		LS07-SD210-02A		LS07-SD211-02A		LS07-SD212-02A		LS07-SD213-02A	
Sample Date	03/04/02		03/04/02		03/04/02		03/05/02		03/05/02		03/05/02	
Chemical Name												
Semivolatile Organic Compounds (UG/KG)												
2-Methylnaphthalene	570	U	20	J	540	U	410	R	38	J	420	U
Acenaphthene	570	U	210	J	540	U	410	R	540	U	420	U
Acenaphthylene	20	J	24	J	540	U	410	R	540	U	420	U
Anthracene	24	J	44	J	540	U	410	R	26	J	420	U
Benzaldehyde	28	B	14	B	19	B	11	B	25	B	13	B
Benzo(a)anthracene	70	J	120	J	20	J	410	R	77	J	420	U
Benzo(a)pyrene	60	J	75	J	13	J	410	R	68	J	420	U
Benzo(b)fluoranthene	120	J	160	J	27	J	410	R	85	J	420	U
Benzo(k)fluoranthene	89	J	94	J	540	U	410	R	63	J	420	U
Butylbenzylphthalate	570	U	630	U	540	U	410	R	540	U	420	U
Carbazole	570	U	630	U	540	U	410	R	540	U	420	U
Chrysene	100	J	160	J	32	J	410	R	91	J	420	U
Di-n-butylphthalate	570	U	630	U	540	U	410	R	540	U	420	U
Di-n-octylphthalate	56	J	630	U	540	U	410	R	160	J	420	U
Dibenz(a,h)anthracene	20	J	630	U	540	U	410	R	25	J	420	U
Dibenzofuran	570	U	25	J	540	U	410	R	23	J	420	U
Diethylphthalate	570	U	630	U	540	U	410	R	540	U	420	U
Fluoranthene	270	J	640		47	J	410	R	180	J	420	U
Fluorene	570	U	630	U	540	U	410	R	18	J	420	U
Indeno(1,2,3-cd)pyrene	60	J	61	J	540	U	410	R	46	J	420	U
Naphthalene	570	U	63	J	540	U	410	R	19	J	420	U
Phenanthrene	29	J	44	J	540	U	410	R	94	J	420	U
Phenol	63	J	630	U	540	U	410	U	540	U	420	U
Pyrene	240	J	480	J	53	J	410	R	160	J	420	U
Pesticide/Polychlorinated Biphenyls (UG/KG)												
4,4'-DDD	5.7	UJ	6.3	U	5.4	U	4.1	U	5.4	U	4.2	U
4,4'-DDE	5.7	UJ	6.3	U	5.4	U	4.1	U	3	J	4.2	U
Aroclor-1260	57	UJ	37	J	54	U	41	U	78		42	U
Endosulfan I	2.9	UJ	3.3	U	2.8	U	2.1	U	2.8	U	2.2	U
alpha-Chlordane	2.9	UJ	3.3	U	2.8	U	2.1	U	2.8	U	2.2	U
beta-BHC	2.9	UJ	3.3	U	2.8	U	2.7		4.1	J	8.7	J
Total Metals (MG/KG)												
Aluminum	5,320		9,150		10,600		933		3,650		658	
Arsenic	3.7		6.2		8.2		1.5	J	9.8		8.5	
Barium	14.9	B	24.6	J	21.5	J	5.9	B	16.2	B	2.9	B
Calcium	1,610	J	2,800		1,230	J	290	B	881	B	180	B
Chromium	12.1		22.8		22.5		2.4	B	11.2		0.56	B

B - Analyte not detected above associated blank
J - Value is estimated
K - Value may be biased high
L - Reported value may be biased low
U - Analyte not detected
UL - Undetected, limit biased low

Table 7
NAB Little Creek
Navy CLEAN II CTO-210, Long Term Monitoring Plan
Round 7, Detected Analytical Results for Site 7 Sediment

Station ID	LS07-SD208		LS07-SD209		LS07-SD210		LS07-SD211		LS07-SD212		LS07-SD213	
Sample ID	LS07-SD208-02A		LS07-SD209-02A		LS07-SD210-02A		LS07-SD211-02A		LS07-SD212-02A		LS07-SD213-02A	
Sample Date	03/04/02		03/04/02		03/04/02		03/05/02		03/05/02		03/05/02	
Chemical Name												
Cobalt	2.9	J	4.8	J	5	J	0.9	J	3.4	J	0.505	U
Iron	12,500		19,800		21,000		3,090		14,000		3,490	
Lead	21		25.3		14.1		7.7		30.3		4.1	
Magnesium	2,320		4,410		4,540		474	J	1,530	J	219	J
Manganese	68.8		156		164		22.5		66		7.9	
Nickel	7.1	B	11.9	J	12.1	J	2.2	B	9.5	J	0.252	U
Potassium	1,310	J	2,230		2,610		298	J	760	J	92.4	B
Selenium	0.656	UL	0.731	UL	0.625	UL	0.462	UL	0.75	J	0.479	UL
Silver	0.173	U	0.192	U	0.164	U	0.122	U	0.163	U	0.126	U
Sodium	4,630		5,980		6,440		1,250		2,980		285	B
Vanadium	17.3		25.6		29.2		7.4	J	29.1		3.3	J
Zinc	103		156		49.9		47.6	B	211		14.3	B
Wet Chemistry (MG/KG)												
Total organic carbon (TOC)	17,780		14,860		24,040		4,265		30,370		7,713	
pH	8.32		8.02		7.97		7.31		7.92		7.44	

B - Analyte not detected above associated blank
J - Value is estimated
K - Value may be biased high
L - Reported value may be biased low
U - Analyte not detected
UL - Undetected, limit biased low

Table 8
NAB Little Creek
Navy CLEAN II CTO-210, Long Term Monitoring Plan
Round 7, Detected Analytical Results for Site 7 QC Samples

Station ID	LC-QC									
Sample ID	LS07-FB030402		LS07-GW-EB030402		LS07-SD-EB030402		LS07-GW-EB030502		LS07-SD-EB030502	
Sample Date	03/04/02		03/04/02		03/04/02		03/05/02		03/05/02	
Chemical Name										
Pesticide/Polychlorinated Biphenyls (UG/L)										
4,4'-DDT	0.1	U	NA		0.035	J	NA		0.1	U
Total Metals (UG/L)										
Barium	11.8	J	NA		12.9	J	NA		13.2	J
Calcium	337	J	NA		349	J	NA		899	J
Copper	172		NA		167		NA		271	
Cyanide	1.1	J	NA		0.8	U	NA		0.8	U
Magnesium	106	J	NA		131	J	NA		158	J
Potassium	42	J	NA		43.6	J	NA		129	J
Sodium	511	J	NA		602	J	NA		701	J
Zinc	8.8	B	NA		11.3	B	NA		38.5	L
Dissolved Metals (UG/L)										
Barium	NA		10.5	J	NA		12.5	J	NA	
Calcium	NA		494	J	NA		1,090	J	NA	
Copper	NA		156	K	NA		251	K	NA	
Manganese	NA		2.2	J	NA		5.2	J	NA	
Nickel	NA		1.3	U	NA		3.2	J	NA	
Potassium	NA		184	U	NA		238	J	NA	
Sodium	NA		975	J	NA		542	J	NA	
Zinc	NA		16.9	J	NA		46	J	NA	
Wet Chemistry (MG/L)										
pH	NA		NA		5.88		NA		5.74	

J - Estimated
U - Undetected
NA - Not Analyzed
K - Biased High

Appendix A
Analytical Parameters and Reporting Limits

Pesticides/Aroclors Target Compound List (TCL) and EPA Reporting Limits (Method OLM04.2)		
Analyte	**Water (ug/L)**	**Soil (ug/Kg)**
alpha-BHC	0.05	1.7
beta-BHC	0.05	1.7
delta-BHC	0.05	1.7
gamma-BHC (Lindane)	0.05	1.7
Heptachlor	0.05	1.7
Aldrin	0.05	1.7
Heptachlor epoxide[3]	0.05	1.7
Endosulfan I	0.05	1.7
Dieldrin	0.05	3.3
4,4'-DDE	0.05	3.3
Endrin	0.05	3.3
Endosulfan II	0.05	3.3
4,4'-DDD	0.05	3.3
Endosulfan sulfate	0.05	3.3
4,4'-DDT	0.05	3.3
Methoxychlor	0.05	17
Endrin ketone	0.05	3.3
Endrin aldehyde	0.05	3.3
alpha-Chlordane	0.05	1.7
gamma-Chlordane	0.05	1.7
Toxaphene	0.05	170
Aroclor-1016	0.05	33
Aroclor-1221	0.05	67
Aroclor-1232	0.05	33
Aroclor 1242	0.05	33
aroclor-1248	0.05	33
Aroclor-1254	0.05	33
Aroclor-1260	0.05	33

Appendix B
Analytical Results

Table B-1
NAB Little Creek
Navy CLEAN II CTO-210
Round 7, Analytical Results for Site 7 Groundwater

Station ID	LS07-MW01				LS07-MW03		LS07-MW06		LS07-MW07		LS07-MW08		LS07-MW09	
Sample ID	LS07-MW01-02A		LS07-MW01P-02A		LS07-MW03-02A		LS07-MW06-02A		LS07-MW07-02A		LS07-MW08-02A		LS07-MW09-02A	
Sample Date	03/05/02		03/05/02		03/05/02		03/05/02		03/04/02		03/04/02		03/04/02	
Chemical Name														
Volatile Organic Compounds (UG/L)														
1,1,1-Trichloroethane	10	U	10	U	10	U	10	U	10	U	10	U	10	U
1,1,2,2-Tetrachloroethane	10	U	10	U	10	U	10	U	10	U	10	U	10	U
1,1,2-Trichloro-1,2,2-trifluoroethane(Freon-113)	10	U	10	U	10	U	10	U	10	U	10	U	10	U
1,1,2-Trichloroethane	10	U	10	U	10	U	10	U	10	U	10	U	10	U
1,1-Dichloroethane	10	U	10	U	10	U	10	U	10	U	10	U	10	U
1,1-Dichloroethene	10	U	10	U	10	U	10	U	10	U	10	U	10	U
1,2,4-Trichlorobenzene	10	U	10	U	10	U	10	U	10	U	10	U	10	U
1,2-Dibromo-3-chloropropane	10	U	10	U	10	U	10	U	10	U	10	U	10	U
1,2-Dibromoethane	10	U	10	U	10	U	10	U	10	U	10	U	10	U
1,2-Dichlorobenzene	10	U	10	U	10	U	10	U	10	U	10	U	10	U
1,2-Dichloroethane	10	U	10	U	10	U	10	U	10	U	10	U	10	U
1,2-Dichloropropane	10	U	10	U	10	U	10	U	10	U	10	U	10	U
1,3-Dichlorobenzene	10	U	10	U	10	U	10	U	10	U	10	U	10	U
1,4-Dichlorobenzene	10	U	10	U	10	U	10	U	10	U	10	U	10	U
2-Butanone	10	U	10	U	10	U	10	U	10	U	10	U	10	U
2-Hexanone	10	U	10	U	10	U	10	U	10	U	10	U	10	U
4-Methyl-2-pentanone	10	U	10	U	10	U	10	U	10	U	10	U	10	U
Acetone	10	U	10	U	10	U	10	U	10	U	10	U	10	U
Benzene	10	U	10	U	10	U	10	U	10	U	10	U	10	U
Bromodichloromethane	10	U	10	U	10	U	10	U	10	U	10	U	10	U
Bromoform	10	U	10	U	10	U	10	U	10	U	10	U	10	U
Bromomethane	1	B	1	B	1	B	2	B	4	B	2	B	0.9	B
Carbon disulfide	10	U	10	U	10	U	10	U	4	J	10	U	10	U
Carbon tetrachloride	10	U	10	U	10	U	10	U	10	U	10	U	10	U
Chlorobenzene	10	U	10	U	10	U	10	U	10	U	10	U	10	U
Chloroethane	10	U	10	U	10	U	10	U	10	U	10	U	10	U
Chloroform	10	U	10	U	10	U	10	U	10	U	10	U	10	U
Chloromethane	10	U	10	U	10	U	10	U	10	U	10	U	10	U
Cumene	10	U	10	U	10	U	10	U	10	U	10	U	10	U
Cyclohexane	10	U	10	U	10	U	10	U	10	U	10	U	10	U
Dibromochloromethane	10	U	10	U	10	U	10	U	10	U	10	U	10	U
Dichlorodifluoromethane(Freon-12)	10	U	10	U	10	U	10	U	10	U	10	U	10	U
Ethylbenzene	10	U	10	U	10	U	10	U	10	U	10	U	10	U

UL - Undetected, limit biased low

B - Analyte is not detected above associated blank
J - Reported value is estimated
U - Undetected

Table B-1
NAB Little Creek
Navy CLEAN II CTO-210
Round 7, Analytical Results for Site 7 Groundwater

Station ID	LS07-MW01		LS07-MW03	LS07-MW06	LS07-MW07	LS07-MW08	LS07-MW09
Sample ID	LS07-MW01-02A	LS07-MW01P-02A	LS07-MW03-02A	LS07-MW06-02A	LS07-MW07-02A	LS07-MW08-02A	LS07-MW09-02A
Sample Date	03/05/02	03/05/02	03/05/02	03/05/02	03/04/02	03/04/02	03/04/02
Chemical Name							
Methyl acetate	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Methyl-tert-butyl ether (MTBE)	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Methylcyclohexane	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Methylene chloride	10 U	0.5 B	0.5 B	0.7 B	0.4 B	0.4 B	0.5 B
Styrene	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Tetrachloroethene	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Toluene	0.4 J	0.5 J	0.4 J	10 U	0.4 J	10 U	0.5 J
Trichloroethene	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Trichlorofluoromethane(Freon-11)	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Vinyl chloride	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Xylene, total	10 U	10 U	10 U	10 U	10 U	10 U	10 U
cis-1,2-Dichloroethene	10 U	10 U	10 U	10 U	10 U	10 U	10 U
cis-1,3-Dichloropropene	10 U	10 U	10 U	10 U	10 U	10 U	10 U
trans-1,2-Dichloroethene	10 U	10 U	10 U	10 U	10 U	10 U	10 U
trans-1,3-Dichloropropene	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Semivolatile Organic Compounds (UG/L)							
1,1-Biphenyl	10 U	10 U	10 U	10 U	10 U	10 U	10 U
2,2'-Oxybis(1-chloropropane)	10 U	10 U	10 U	10 U	10 U	10 U	10 U
2,4,5-Trichlorophenol	25 U	25 U	25 U	25 U	25 U	25 U	25 U
2,4,6-Trichlorophenol	10 U	10 U	10 U	10 U	10 U	10 U	10 U
2,4-Dichlorophenol	10 U	10 U	10 U	10 U	10 U	10 U	10 U
2,4-Dimethylphenol	10 U	10 U	10 U	10 U	10 U	10 U	10 U
2,4-Dinitrophenol	25 U	25 U	25 U	25 U	25 U	25 U	25 U
2,4-Dinitrotoluene	10 U	10 U	10 U	10 U	10 U	10 U	10 U
2,6-Dinitrotoluene	10 U	10 U	10 U	10 U	10 U	10 U	10 U
2-Chloronaphthalene	10 U	10 U	10 U	10 U	10 U	10 U	10 U
2-Chlorophenol	10 U	10 U	10 U	10 U	10 U	10 U	10 U
2-Methylnaphthalene	10 U	10 U	10 U	10 U	10 U	10 U	10 U
2-Methylphenol	10 U	10 U	10 U	10 U	10 U	10 U	10 U
2-Nitroaniline	25 U	25 U	25 U	25 U	25 U	25 U	25 U
2-Nitrophenol	10 U	10 U	10 U	10 U	10 U	10 U	10 U
3,3'-Dichlorobenzidine	10 U	10 U	10 U	10 U	10 U	10 U	10 U
3-Nitroaniline	25 U	25 U	25 U	25 U	25 U	25 U	25 U
4,6-Dinitro-2-methylphenol	25 U	25 U	25 U	25 U	25 U	25 U	25 U

UL - Undetected, limit biased low

B - Analyte is not detected above associated blank
J - Reported value is estimated
U - Undetected

Table B-1
NAB Little Creek
Navy CLEAN II CTO-210
Round 7, Analytical Results for Site 7 Groundwater

Station ID	LS07-MW01		LS07-MW03	LS07-MW06	LS07-MW07	LS07-MW08	LS07-MW09
Sample ID	LS07-MW01-02A	LS07-MW01P-02A	LS07-MW03-02A	LS07-MW06-02A	LS07-MW07-02A	LS07-MW08-02A	LS07-MW09-02A
Sample Date	03/05/02	03/05/02	03/05/02	03/05/02	03/04/02	03/04/02	03/04/02
Chemical Name							
4-Bromophenyl-phenylether	10 U	10 U	10 U	10 U	10 U	10 U	10 U
4-Chloro-3-methylphenol	10 U	10 U	10 U	10 U	10 U	10 U	10 U
4-Chloroaniline	10 U	10 U	10 U	10 U	10 U	10 U	10 U
4-Chlorophenyl-phenylether	10 U	10 U	10 U	10 U	10 U	10 U	10 U
4-Methylphenol	10 U	10 U	10 U	10 U	10 U	10 U	10 U
4-Nitroaniline	25 U	25 U	25 U	25 U	25 U	25 U	25 U
4-Nitrophenol	25 U	25 U	25 U	25 U	25 U	25 U	25 U
Acenaphthene	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Acenaphthylene	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Acetophenone	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Anthracene	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Atrazine	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Benzaldehyde	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Benzo(a)anthracene	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Benzo(a)pyrene	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Benzo(b)fluoranthene	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Benzo(g,h,i)perylene	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Benzo(k)fluoranthene	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Butylbenzylphthalate	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Caprolactam	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Carbazole	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Chrysene	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Di-n-butylphthalate	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Di-n-octylphthalate	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Dibenz(a,h)anthracene	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Dibenzofuran	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Diethylphthalate	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Dimethyl phthalate	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Fluoranthene	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Fluorene	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Hexachlorobenzene	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Hexachlorobutadiene	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Hexachlorocyclopentadiene	10 U	10 U	10 U	10 U	10 U	10 U	10 UJ
Hexachloroethane	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Indeno(1,2,3-cd)pyrene	10 U	10 U	10 U	10 U	10 U	10 U	10 U

UL - Undetected, limit biased low

B - Analyte is not detected above associated blank
J - Reported value is estimated
U - Undetected

Table B-1
NAB Little Creek
Navy CLEAN II CTO-210
Round 7, Analytical Results for Site 7 Groundwater

Station ID	LS07-MW01		LS07-MW03	LS07-MW06	LS07-MW07	LS07-MW08	LS07-MW09
Sample ID	LS07-MW01-02A	LS07-MW01P-02A	LS07-MW03-02A	LS07-MW06-02A	LS07-MW07-02A	LS07-MW08-02A	LS07-MW09-02A
Sample Date	03/05/02	03/05/02	03/05/02	03/05/02	03/04/02	03/04/02	03/04/02
Chemical Name							
Isophorone	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Naphthalene	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Nitrobenzene	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Pentachlorophenol	25 U	25 U	25 U	25 U	25 U	25 U	25 U
Phenanthrene	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Phenol	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Pyrene	10 U	10 U	10 U	10 U	10 U	10 U	10 U
bis(2-Chloroethoxy)methane	10 U	10 U	10 U	10 U	10 U	10 U	10 U
bis(2-Chloroethyl)ether	10 U	10 U	10 U	10 U	10 U	10 U	10 U
bis(2-Ethylhexyl)phthalate	1 B	14 B	10 U	0.6 B	1 B	10 U	3 B
n-Nitroso-di-n-propylamine	10 U	10 U	10 U	10 U	10 U	10 U	10 U
n-Nitrosodiphenylamine	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Pesticide/Polychlorinated Biphenyls (UG/L)							
Aroclor-1016	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Aroclor-1221	2 U	2 U	2 U	2 U	2 U	2 U	2 U
Aroclor-1232	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Aroclor-1242	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Aroclor-1248	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Aroclor-1254	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Aroclor-1260	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Total Metals (UG/L)							
Aluminum	1,340	932	94.9 J	233	44 U	44 U	44 U
Antimony	1.5 U	1.5 U	1.5 U	1.5 U	1.5 U	1.5 U	1.5 U
Arsenic	1.7 U	1.7 U	2.2 J	30.6	1.7 U	1.7 U	2.2 J
Barium	6.6 B	5.7 B	39.9 B	21.1 B	65.9 J	58.4 B	83.3 J
Beryllium	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U
Cadmium	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	1.4 B
Calcium	7,580	7,770	34,900	143,000	344,000	354,000	290,000
Chromium	0.9 UL	0.9 UL	0.9 UL	0.9 UL	4.1 B	1.1 B	1 B
Cobalt	2 U	2 U	13 J	3 J	2 U	2 U	2 U
Copper	3.1 B	3 B	1.8 U	2.6 B	2.3 B	2.6 B	2.8 B
Cyanide	0.8 U	0.8 U	0.8 U	0.8 U	19	0.8 U	0.93 B
Iron	2,950	2,460	11,100	15,500	32.1 J	25.1 J	42,700

UL - Undetected, limit biased low

B - Analyte is not detected above associated blank
J - Reported value is estimated
U - Undetected

Table B-1
NAB Little Creek
Navy CLEAN II CTO-210
Round 7, Analytical Results for Site 7 Groundwater

Station ID	LS07-MW01		LS07-MW03	LS07-MW06	LS07-MW07	LS07-MW08	LS07-MW09
Sample ID	LS07-MW01-02A	LS07-MW01P-02A	LS07-MW03-02A	LS07-MW06-02A	LS07-MW07-02A	LS07-MW08-02A	LS07-MW09-02A
Sample Date	03/05/02	03/05/02	03/05/02	03/05/02	03/04/02	03/04/02	03/04/02
Chemical Name							
Lead	1.6 U	1.6 U	1.6 U	1.6 U	1.6 U	1.6 U	1.6 U
Magnesium	19,300	20,000	16,400	125,000	731,000	697,000	804,000
Manganese	33	31.9	785	1,590	242	295	843
Mercury	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
Nickel	1 U	1 U	4.1 J	1 U	1.5 J	1 U	1 U
Potassium	17,400 J	17,800 J	12,600 J	29,400 J	316,000 J	320,000 J	364,000 J
Selenium	1.9 U	1.9 U	1.9 U	2.3 J	1.9 U	1.9 U	1.9 U
Silver	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.57 J
Sodium	189,000	196,000	78,600	326,000	4,980,000	4,910,000	6,310,000
Thallium	3 U	3 U	3 U	3 U	3 U	3 U	6 J
Vanadium	4.3 J	3.4 J	1.7 U	1.7 U	1.7 U	1.7 U	1.7 U
Zinc	4.6 UL	4.6 UL	107	4.6 UL	4.6 UL	4.6 UL	4.6 UL
Dissolved Metals (UG/L)							
Aluminum	65.6 U	65.6 U	82.2 J	65.6 U	65.6 U	65.6 U	65.6 U
Antimony	4 U	4 U	4 U	4 U	4 U	4 U	4 U
Arsenic	2.4 U	2.4 U	2.4 U	18.7	2.4 U	2.4 U	2.4 U
Barium	2.9 B	2.4 B	35.8 B	19.6 B	60 J	52.5 J	73.7 J
Beryllium	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
Cadmium	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	0.48 J
Calcium	7,610	6,540	35,900	144,000	328,000	328,000	285,000
Chromium	0.6 U	0.6 U	0.6 U	0.6 U	0.76 J	1.6 J	0.6 U
Cobalt	0.7 U	0.7 U	12 J	2.5 J	0.7 U	0.7 U	0.7 U
Copper	4.3 U	4.3 U	4.3 U	4.3 U	4.3 U	4.3 U	4.3 U
Iron	1,320	1,390	10,800	13,900	56.4 B	44.8 B	38,600
Lead	1.8 U	1.8 U	1.8 U	1.8 U	1.8 UL	1.8 UL	1.8 UL
Magnesium	17,400	14,500	16,000	123,000	745,000	711,000	887,000
Manganese	29.8	28.7	773	1,570	260	304	863
Mercury	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
Nickel	1.3 U	1.3 U	7.8 B	1.7 B	1.3 U	2.2 J	2.6 J
Potassium	17,200 J	14,900 J	13,700 J	30,500 J	313,000 J	308,000 J	373,000 J
Selenium	4.6 U	4.6 U	4.6 U	4.6 U	4.6 UL	4.6 UL	4.6 UL
Silver	0.9 U	0.9 U	0.9 U	0.9 U	0.9 U	0.9 U	0.9 U
Sodium	188,000 J	150,000 J	75,300 J	387,000 J	5,980,000 J	5,750,000 J	6,640,000 J
Thallium	6 U	6 U	6 U	6 U	6 U	6 U	6 U

UL - Undetected, limit biased low

B - Analyte is not detected above associated blank
J - Reported value is estimated
U - Undetected

Table B-1
NAB Little Creek
Navy CLEAN II CTO-210
Round 7, Analytical Results for Site 7 Groundwater

Station ID	LS07-MW01				LS07-MW03		LS07-MW06		LS07-MW07		LS07-MW08		LS07-MW09	
Sample ID	LS07-MW01-02A		LS07-MW01P-02A		LS07-MW03-02A		LS07-MW06-02A		LS07-MW07-02A		LS07-MW08-02A		LS07-MW09-02A	
Sample Date	03/05/02		03/05/02		03/05/02		03/05/02		03/04/02		03/04/02		03/04/02	
Chemical Name														
Vanadium	0.94	J	1.4	J	0.88	J	0.8	U	2	J	1.8	J	0.8	U
Zinc	2.2	B	2	U	109	B	7.4	B	2.2	B	2	U	3.6	B

UL - Undetected, limit biased low

B - Analyte is not detected above associated blank
J - Reported value is estimated
U - Undetected

Table B-2
NAB Little Creek
Navy CLEAN II CTO-210, Long Term Monitoring Plan
Round 7, Analytical Results for Site 7 Surface Water

Station ID	LS07-SW201		LS07-SW202		LS07-SW203		LS07-SW203		LS07-SW204		LS07-SW205		LS07-SW206	
Sample ID	LS07-SW201-02A		LS07-SW202-02A		LS07-SW203-02A		LS07-SW203P-02A		LS07-SW204-02A		LS07-SW205-02A		LS07-SW206-02A	
Sample Date	03/04/02		03/05/02		03/05/02		03/05/02		03/05/02		03/04/02		03/04/02	
Chemical Name														
Volatile Organic Compounds (UG/L)														
1,1,1-Trichloroethane	10	U	10	U	10	U	10	U	10	U	10	U	10	U
1,1,2,2-Tetrachloroethane	10	U	10	U	10	U	10	U	10	U	10	U	10	U
1,1,2-Trichloro-1,2,2-trifluoroethane(Freon-113)	10	U	10	U	10	U	10	U	10	U	10	U	10	U
1,1,2-Trichloroethane	10	U	10	U	10	U	10	U	10	U	10	U	10	U
1,1-Dichloroethane	10	U	10	U	10	U	10	U	10	U	10	U	10	U
1,1-Dichloroethene	10	U	10	U	10	U	10	U	10	U	10	U	10	U
1,2,4-Trichlorobenzene	10	U	0.7	B	10	U	10	U	10	U	10	U	10	U
1,2-Dibromo-3-chloropropane	10	U	10	U	10	U	10	U	10	U	10	U	10	U
1,2-Dibromoethane	10	U	10	U	10	U	10	U	10	U	10	U	10	U
1,2-Dichlorobenzene	10	U	10	U	10	U	10	U	10	U	10	U	10	U
1,2-Dichloroethane	10	U	10	U	10	U	10	U	10	U	10	U	10	U
1,2-Dichloropropane	10	U	10	U	10	U	10	U	10	U	10	U	10	U
1,3-Dichlorobenzene	10	U	10	U	10	U	10	U	10	U	10	U	10	U
1,4-Dichlorobenzene	10	U	10	U	10	U	10	U	10	U	10	U	10	U
2-Butanone	10	U	10	U	10	U	10	U	10	U	10	U	10	U
2-Hexanone	10	U	10	U	10	U	10	U	10	U	10	U	10	U
4-Methyl-2-pentanone	10	U	10	U	10	U	10	U	10	U	10	U	10	U
Acetone	10	U	15	J	10	U	6	J	10	U	10	U	10	U
Benzene	10	U	10	U	10	U	10	U	10	U	10	U	10	U
Bromodichloromethane	10	U	2	J	10	U	10	U	10	U	10	U	10	U
Bromoform	10	U	10	U	10	U	10	U	10	U	10	U	10	U
Bromomethane	10	U	2	B	10	U	10	U	10	U	10	U	10	U
Carbon disulfide	10	U	10	U	10	U	10	U	10	U	10	U	10	U
Carbon tetrachloride	10	U	10	U	10	U	10	U	10	U	10	U	10	U
Chlorobenzene	10	U	10	U	10	U	10	U	10	U	10	U	10	U
Chloroethane	10	U	10	U	10	U	10	U	10	U	10	U	10	U
Chloroform	10	U	26		1	J	1	J	10	U	10	U	10	U
Chloromethane	10	U	10	U	10	U	10	U	10	U	10	U	10	U
Cumene	10	U	10	U	10	U	10	U	10	U	10	U	10	U
Cyclohexane	10	U	10	U	10	U	10	U	10	U	10	U	10	U
Dibromochloromethane	10	U	10	U	10	U	10	U	10	U	10	U	10	U
Dichlorodifluoromethane(Freon-12)	10	U	10	U	10	U	10	U	10	U	10	U	10	U
Ethylbenzene	10	U	10	U	10	U	10	U	10	U	10	U	10	U

B - Analyte not detected above associated blank
J - Reported value is estimated
U - Undetected
UL - Undetected, limit biased low

Table B-2
NAB Little Creek
Navy CLEAN II CTO-210, Long Term Monitoring Plan
Round 7, Analytical Results for Site 7 Surface Water

Station ID	LS07-SW201		LS07-SW202		LS07-SW203		LS07-SW203		LS07-SW204		LS07-SW205		LS07-SW206	
Sample ID	LS07-SW201-02A		LS07-SW202-02A		LS07-SW203-02A		LS07-SW203P-02A		LS07-SW204-02A		LS07-SW205-02A		LS07-SW206-02A	
Sample Date	03/04/02		03/05/02		03/05/02		03/05/02		03/05/02		03/04/02		03/04/02	
Chemical Name														
Methyl acetate	10	U	10	U	10	U	10	U	10	U	10	U	10	U
Methyl-tert-butyl ether (MTBE)	10	U	10	U	10	U	10	U	10	U	10	U	10	U
Methylcyclohexane	10	U	10	U	10	U	10	U	10	U	10	U	10	U
Methylene chloride	10	U	0.5	B	10	U	10	U	10	U	10	U	10	U
Styrene	10	U	10	U	10	U	10	U	10	U	10	U	10	U
Tetrachloroethene	10	U	10	U	10	U	10	U	10	U	10	U	10	U
Toluene	10	U	10	U	10	U	10	U	10	U	10	U	10	U
Trichloroethene	10	U	10	U	10	U	10	U	10	U	10	U	10	U
Trichlorofluoromethane(Freon-11)	10	U	10	U	10	U	10	U	10	U	10	U	10	U
Vinyl chloride	10	U	10	U	10	U	10	U	10	U	10	U	10	U
Xylene, total	10	U	10	U	10	U	10	U	10	U	10	U	10	U
cis-1,2-Dichloroethene	10	U	10	U	10	U	10	U	10	U	10	U	10	U
cis-1,3-Dichloropropene	10	U	10	U	10	U	10	U	10	U	10	U	10	U
trans-1,2-Dichloroethene	10	U	10	U	10	U	10	U	10	U	10	U	10	U
trans-1,3-Dichloropropene	10	U	10	U	10	U	10	U	10	U	10	U	10	U
Total Metals (UG/L)														
Aluminum	183	J	175	J	65.6	U	65.6	U	73.4	J	65.6	U	76.9	J
Antimony	4	U	4	U	4	U	4	U	4	U	4	U	4	U
Arsenic	4.2	J	3.9	J	6.4	J	6.4	J	6.8	J	2.4	U	4	J
Barium	20.9	B	70.3	J	22.4	B	21.4	B	20.7	B	22.4	B	22.5	B
Beryllium	0.2	U	0.2	U	0.2	U	0.2	U	0.2	U	0.2	U	0.2	U
Cadmium	0.3	U	0.3	U	0.3	U	0.3	U	0.3	U	0.3	U	0.3	U
Calcium	279,000		71,700		27,900		27,200		25,600		286,000		288,000	
Chromium	0.6	U	13.2		0.66	J	0.68	J	0.97	J	0.6	U	0.6	U
Cobalt	0.83	J	5.3	J	2.1	J	2.4	J	2.1	J	0.7	U	0.82	J
Copper	4.3	UL	4.9	B	4.3	UL	4.3	UL	4.3	UL	4.3	UL	4.3	UL
Cyanide	0.84	B	10.4		1.3	B	1.6	B	1.5	B	0.8	U	0.8	U
Iron	597		433		2,130		2,050		2,490		315		403	
Lead	1.8	UL	1.8	UL	1.8	UL	1.8	UL	1.8	UL	1.8	UL	1.8	UL
Magnesium	920,000		35,000		19,500		18,900		18,000		967,000		949,000	
Manganese	0.3	U	88.1		364		358		357		11.4	J	7.8	J
Mercury	0.1	U	0.73		0.11	U	0.1	U	0.1	U	0.1	U	0.1	U
Nickel	1.9	J	12.9	J	1.4	J	1.3	U	1.3	U	1.8	J	1.4	J
Potassium	476,000	J	54,900	J	10,400	J	9,960	J	8,730	J	498,000	J	492,000	J

B - Analyte not detected above associated blank
J - Reported value is estimated
U - Undetected
UL - Undetected, limit biased low

Table B-2
NAB Little Creek
Navy CLEAN II CTO-210, Long Term Monitoring Plan
Round 7, Analytical Results for Site 7 Surface Water

Station ID	LS07-SW201		LS07-SW202		LS07-SW203		LS07-SW203		LS07-SW204		LS07-SW205		LS07-SW206	
Sample ID	LS07-SW201-02A		LS07-SW202-02A		LS07-SW203-02A		LS07-SW203P-02A		LS07-SW204-02A		LS07-SW205-02A		LS07-SW206-02A	
Sample Date	03/04/02		03/05/02		03/05/02		03/05/02		03/05/02		03/04/02		03/04/02	
Chemical Name														
Selenium	4.6	UL	4.6	UL	4.6	UL	4.6	UL	4.6	UL	4.6	UL	4.6	UL
Silver	0.9	U	0.9	U	0.9	U	0.9	U	0.9	U	0.9	U	0.9	U
Sodium	7,350,000	J	1,560,000	J	177,000	J	169,000	J	131,000	J	7,820,000	J	7,480,000	J
Thallium	6	U	6	U	6	U	6	U	6	U	6	U	6	U
Vanadium	1.5	J	4.3	J	1	J	1.1	J	0.88	J	0.8	U	1.5	J
Zinc	12	J	193	J	18	J	11.5	J	13.5	J	57.3	J	10.5	J
Dissolved Metals (UG/L)														
Aluminum	65.6	U	124	J	65.6	U	65.6	U	65.6	U	65.6	U	65.6	U
Antimony	4	U	4	U	4	U	4	U	4	U	4	U	4	U
Arsenic	5.8	J	3.4	J	6.3	J	6.1	J	4.9	J	5.1	J	2.4	U
Barium	21.3	J	65.1	J	20.2	J	21.4	J	19.8	J	22.9	J	22.4	J
Beryllium	0.2	U	0.2	U	0.2	U	0.2	U	0.2	U	0.2	U	0.2	U
Cadmium	0.3	U	0.3	U	0.3	U	0.3	U	0.3	U	0.3	U	0.3	U
Calcium	295,000		68,900		26,400		27,600		25,800		292,000		288,000	
Chromium	0.6	U	9.6	J	0.6	U	0.6	U	0.6	U	0.6	U	0.6	U
Cobalt	0.7	U	5.3	J	2.3	J	2.6	J	2.3	J	0.7	U	0.7	U
Copper	4.3	U	4.3	U	4.3	U	4.3	U	4.3	U	4.3	U	4.3	U
Iron	232		219		1,310		1,320		1,220		212		235	
Lead	1.8	U	1.8	U	1.8	U	1.8	U	1.8	U	1.8	U	1.8	U
Magnesium	993,000		33,400		18,700		19,400		17,900		976,000		971,000	
Manganese	0.3	U	82.8		338		357		346		9.8	J	5.3	J
Mercury	0.1	U	0.17	J	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U
Nickel	1.9	J	13.1	J	2.3	J	1.9	J	1.8	J	2	J	1.3	J
Potassium	519,000	J	53,500	J	10,500	J	10,900	J	9,460	J	516,000	J	522,000	J
Selenium	4.6	U	4.6	U	4.6	U	4.6	U	4.6	U	4.6	U	4.6	U
Silver	0.9	U	0.9	U	0.9	U	0.9	U	0.9	U	0.9	U	0.9	U
Sodium	7,900,000	J	1,520,000	J	181,000	J	188,000	J	149,000	J	7,730,000	J	7,790,000	J
Thallium	6	U	6	U	6	U	6	U	6	U	6	U	6	U
Vanadium	0.8	U	4.1	J	0.8	U	0.8	U	1.4	J	0.8	U	0.8	U
Zinc	13	B	182	J	12.1	B	13.6	B	11.3	B	13.6	B	9.6	B

B - Analyte not detected above associated blank
J - Reported value is estimated
U - Undetected
UL - Undetected, limit biased low

Table B-2
NAB Little Creek
Navy CLEAN II CTO-210, Long Term Monitoring Plan
Round 7, Analytical Results for Site 7 Surface Water

Station ID	LS07-SW207		LS07-SW208		LS07-SW209		LS07-SW210		LS07-SW211		LS07-SW212		LS07-SW213	
Sample ID	LS07-SW207-02A		LS07-SW208-02A		LS07-SW209-02A		LS07-SW210-02A		LS07-SW211-02A		LS07-SW212-02A		LS07-SW213-02A	
Sample Date	03/04/02		03/04/02		03/04/02		03/04/02		03/05/02		03/05/02		03/05/02	
Chemical Name														
Volatile Organic Compounds (UG/L)														
1,1,1-Trichloroethane	10	U	10	U	10	U	10	U	10	U	10	U	10	U
1,1,2,2-Tetrachloroethane	10	U	10	U	10	U	10	U	10	U	10	U	10	U
1,1,2-Trichloro-1,2,2-trifluoroethane(Freon-113)	10	U	10	U	10	U	10	U	10	U	10	U	10	U
1,1,2-Trichloroethane	10	U	10	U	10	U	10	U	10	U	10	U	10	U
1,1-Dichloroethane	10	U	10	U	10	U	10	U	10	U	10	U	10	U
1,1-Dichloroethene	10	U	10	U	10	U	10	U	10	U	10	U	10	U
1,2,4-Trichlorobenzene	10	U	2	B	10	U	1	B	10	U	10	U	10	U
1,2-Dibromo-3-chloropropane	10	U	10	U	10	U	10	U	10	U	10	U	10	U
1,2-Dibromoethane	10	U	10	U	10	U	10	U	10	U	10	U	10	U
1,2-Dichlorobenzene	10	U	10	U	10	U	10	U	10	U	10	U	10	U
1,2-Dichloroethane	10	U	10	U	10	U	10	U	10	U	10	U	10	U
1,2-Dichloropropane	10	U	10	U	10	U	10	U	10	U	10	U	10	U
1,3-Dichlorobenzene	10	U	10	U	10	U	10	U	10	U	10	U	10	U
1,4-Dichlorobenzene	10	U	10	U	10	U	10	U	10	U	10	U	10	U
2-Butanone	10	U	10	U	10	U	10	U	10	U	10	U	10	U
2-Hexanone	10	U	10	U	10	U	10	U	10	U	10	U	10	U
4-Methyl-2-pentanone	10	U	10	U	10	U	10	U	10	U	10	U	10	U
Acetone	10	U	10	U	10	U	10	U	10	U	10	U	10	U
Benzene	10	U	10	U	10	U	10	U	10	U	10	U	10	U
Bromodichloromethane	10	U	10	U	10	U	10	U	0.5	J	0.4	J	10	U
Bromoform	10	U	10	U	10	U	10	U	10	U	10	U	10	U
Bromomethane	10	U	2	B	10	U	2	B	1	B	1	B	2	B
Carbon disulfide	10	U	10	U	10	U	10	U	10	U	10	U	10	U
Carbon tetrachloride	10	U	10	U	10	U	10	U	10	U	10	U	10	U
Chlorobenzene	10	U	10	U	10	U	10	U	0.6	J	10	U	10	U
Chloroethane	10	U	10	U	10	U	10	U	10	U	10	U	10	U
Chloroform	10	U	10	U	10	U	10	U	4	J	4	J	10	U
Chloromethane	10	U	10	U	10	U	10	U	10	U	10	U	10	U
Cumene	10	U	10	U	10	U	10	U	10	U	10	U	10	U
Cyclohexane	10	U	10	U	10	U	10	U	10	U	10	U	10	U
Dibromochloromethane	10	U	10	U	10	U	10	U	10	U	10	U	10	U
Dichlorodifluoromethane(Freon-12)	10	U	10	U	10	U	10	U	10	U	10	U	10	U
Ethylbenzene	10	U	10	U	10	U	10	U	10	U	10	U	10	U

B - Analyte not detected above associated blank
J - Reported value is estimated
U - Undetected
UL - Undetected, limit biased low

Table B-2
NAB Little Creek
Navy CLEAN II CTO-210, Long Term Monitoring Plan
Round 7, Analytical Results for Site 7 Surface Water

Station ID	LS07-SW207		LS07-SW208		LS07-SW209		LS07-SW210		LS07-SW211		LS07-SW212		LS07-SW213	
Sample ID	LS07-SW207-02A		LS07-SW208-02A		LS07-SW209-02A		LS07-SW210-02A		LS07-SW211-02A		LS07-SW212-02A		LS07-SW213-02A	
Sample Date	03/04/02		03/04/02		03/04/02		03/04/02		03/05/02		03/05/02		03/05/02	
Chemical Name														
Methyl acetate	10	U	10	U	10	U	10	U	10	U	10	U	10	U
Methyl-tert-butyl ether (MTBE)	10	U	10	U	10	U	10	U	10	U	10	U	10	U
Methylcyclohexane	10	U	10	U	10	U	10	U	10	U	10	U	10	U
Methylene chloride	10	U	0.6	B	10	U	0.3	B	0.5	B	0.4	B	0.4	B
Styrene	10	U	10	U	10	U	10	U	10	U	10	U	10	U
Tetrachloroethene	10	U	10	U	10	U	10	U	10	U	10	U	10	U
Toluene	10	U	10	U	10	U	10	U	0.7	J	10	U	10	U
Trichloroethene	10	U	10	U	10	U	10	U	10	U	10	U	10	U
Trichlorofluoromethane(Freon-11)	10	U	10	U	10	U	10	U	10	U	10	U	10	U
Vinyl chloride	10	U	10	U	10	U	10	U	10	U	10	U	10	U
Xylene, total	10	U	10	U	10	U	10	U	10	U	10	U	10	U
cis-1,2-Dichloroethene	10	U	10	U	10	U	10	U	10	U	10	U	10	U
cis-1,3-Dichloropropene	10	U	10	U	10	U	10	U	10	U	10	U	10	U
trans-1,2-Dichloroethene	10	U	10	U	10	U	10	U	10	U	10	U	10	U
trans-1,3-Dichloropropene	10	U	10	U	10	U	10	U	10	U	10	U	10	U
Total Metals (UG/L)														
Aluminum	65.6	U	244		490		288		148	J	65.6	U	65.6	U
Antimony	4	U	4	U	4	U	4	U	4	U	4	U	4	U
Arsenic	3	J	2.5	J	2.7	J	2.4	U	6.1	J	3.4	J	7.9	J
Barium	22.3	B	30.2	B	43	B	22.4	B	29.6	B	28.1	B	13	B
Beryllium	0.2	U	0.2	U	0.2	U	0.2	U	0.2	U	0.2	U	0.2	U
Cadmium	0.3	U	0.3	U	0.3	U	0.3	U	0.3	U	0.3	U	0.3	U
Calcium	285,000		279,000		252,000		295,000		41,700		39,200		18,400	
Chromium	0.6	U	0.6	U	0.6	U	0.6	U	3.2	J	2.4	J	0.6	U
Cobalt	0.7	U	0.7	U	0.7	U	1.5	J	2.6	J	2.6	J	0.7	U
Copper	4.3	UL	4.3	UL	7.1	B	5.7	B	4.3	UL	4.3	UL	4.3	UL
Cyanide	1.1	B	0.83	B	1.3	B	0.8	U	3.7	B	3.5	B	0.82	B
Iron	362		881		1,880		803		1,730		747		1,470	
Lead	1.8	UL	1.8	UL	2.5	J	1.8	UL	1.8	UL	1.8	UL	1.8	UL
Magnesium	952,000		930,000		786,000		984,000		33,100		29,500		5,930	
Manganese	7.9	J	27.7		68.7		5.3	J	250		235		176	
Mercury	0.1	U	0.1	U	0.1	U	0.1	U	0.2		0.19	J	0.1	U
Nickel	2.2	J	1.3	U	1.7	J	1.9	J	4.2	J	3.6	J	1.3	U
Potassium	489,000	J	483,000	J	422,000	J	512,000	J	25,500	J	23,300	J	3,590	J

B - Analyte not detected above associated blank
J - Reported value is estimated
U - Undetected
UL - Undetected, limit biased low

Table B-2
NAB Little Creek
Navy CLEAN II CTO-210, Long Term Monitoring Plan
Round 7, Analytical Results for Site 7 Surface Water

Station ID	LS07-SW207		LS07-SW208		LS07-SW209		LS07-SW210		LS07-SW211		LS07-SW212		LS07-SW213	
Sample ID	LS07-SW207-02A		LS07-SW208-02A		LS07-SW209-02A		LS07-SW210-02A		LS07-SW211-02A		LS07-SW212-02A		LS07-SW213-02A	
Sample Date	03/04/02		03/04/02		03/04/02		03/04/02		03/05/02		03/05/02		03/05/02	
Chemical Name														
Selenium	4.6	UL	4.6	UL	4.6	UL	4.6	UL	4.6	UL	4.6	UL	4.6	UL
Silver	0.9	U	0.9	U	0.9	U	0.9	U	0.9	U	0.9	U	0.9	U
Sodium	7,570,000	J	7,510,000	J	6,040,000	J	8,110,000	J	585,000	J	516,000	J	12,600	J
Thallium	6	U	6	U	6	U	6	U	6	U	6	U	6	U
Vanadium	0.8	U	0.8	U	2	J	2.7	J	2.2	J	1.2	J	0.82	J
Zinc	12.5	J	29.6	J	39.5	J	11.3	J	71	J	60.9	J	3.9	J
Dissolved Metals (UG/L)														
Aluminum	65.6	U	65.6	U	65.6	U	65.6	U	65.6	U	65.6	U	65.6	U
Antimony	4	U	4	U	4	U	4	U	4	U	4	U	4	U
Arsenic	4.1	J	2.4	U	4.1	J	3.1	J	4.4	J	2.7	J	7.9	J
Barium	22.9	J	30.7	J	44.2	J	22.3	J	27.9	J	27.1	J	12.7	J
Beryllium	0.2	U	0.2	U	0.2	U	0.2	U	0.2	U	0.2	U	0.2	U
Cadmium	0.3	U	0.3	U	0.3	U	0.3	U	0.3	U	0.3	U	0.3	U
Calcium	291,000		285,000		248,000		296,000		39,800		40,700		18,600	
Chromium	0.6	U	0.6	U	0.6	U	0.6	U	0.72	J	0.71	J	0.6	U
Cobalt	0.7	U	0.7	U	0.7	U	0.7	U	3.1	J	2.8		0.7	U
Copper	4.3	U	4.3	U	4.3	U	4.3	U	4.3	U	4.3	U	4.3	U
Iron	215		242		153		234		221		181		1,190	
Lead	1.8	U	1.8	U	1.8	U	1.8	U	1.8	U	1.8	U	1.8	U
Magnesium	983,000		945,000		783,000		988,000		29,600		32,000		5,970	
Manganese	6.2	J	26.3		64.3		0.3	U	238		246		182	
Mercury	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U
Nickel	1.9	J	1.3	U	2.3	J	1.8	J	5.4	J	4.7	J	1.3	U
Potassium	517,000	J	501,000	J	437,000	J	528,000	J	24,900	J	25,500	J	3,710	J
Selenium	4.6	U	4.6	U	4.6	U	4.6	U	4.6	U	4.6	U	4.6	U
Silver	0.9	U	0.9	U	0.9	U	0.9	U	0.9	U	0.9	U	0.9	U
Sodium	7,490,000	J	7,450,000	J	5,930,000	J	7,940,000	J	551,000	J	550,000	J	13,000	J
Thallium	6.4	J	6	U	6	U	6	U	6	U	6	U	6	U
Vanadium	0.8	U	0.8	U	0.8	U	0.8	U	1.1	J	0.88	J	0.8	U
Zinc	9.3	B	18.7	B	8.3	B	9.1	B	61	J	56.9	J	5.7	B

B - Analyte not detected above associated blank
J - Reported value is estimated
U - Undetected
UL - Undetected, limit biased low

Table B-3
NAB Little Creek
Navy CLEAN II CTO-210, Long Term Monitoring Plan
Round 7, Analytical Results for Site 7 Sediment

Station ID	LS07-SD201		LS07-SD202		LS07-SD203		LS07-SD204				LS07-SD205		LS07-SD206		LS07-SD207
Sample ID	LS07-SD201-02A		LS07-SD202-02A		LS07-SD203-02A		LS07-SD204P-02A		LS07-SD204-02A		LS07-SD205-02A		LS07-SD206-02A		LS07-SD207-0
Sample Date	03/04/02		03/05/02		03/05/02		03/05/02		03/05/02		03/04/02		03/04/02		03/04/02
Chemical Name															
Semivolatile Organic Compounds (UG/KG)															
1,1-Biphenyl	460	U	570	U	400	U	510	U	470	U	500	U	400	U	430
2,2'-Oxybis(1-chloropropane)	460	U	570	U	400	U	510	U	470	U	500	U	400	U	430
2,4,5-Trichlorophenol	1,200	U	1,400	U	1,000	U	1,300	U	1,200	U	1,300	U	1,000	U	1,100
2,4,6-Trichlorophenol	460	U	570	U	400	U	510	U	470	U	500	U	400	U	430
2,4-Dichlorophenol	460	U	570	U	400	U	510	U	470	U	500	U	400	U	430
2,4-Dimethylphenol	460	U	570	U	400	U	510	U	470	U	500	U	400	U	430
2,4-Dinitrophenol	1,200	U	1,400	U	1,000	U	1,300	U	1,200	U	1,300	U	1,000	U	1,100
2,4-Dinitrotoluene	460	U	570	U	400	U	510	U	470	U	500	U	400	U	430
2,6-Dinitrotoluene	460	U	570	U	400	U	510	U	470	U	500	U	400	U	430
2-Chloronaphthalene	460	U	570	U	400	U	510	U	470	U	500	U	400	U	430
2-Chlorophenol	460	U	570	U	400	U	510	U	470	U	500	U	400	U	430
2-Methylnaphthalene	460	U	19	J	23	J	78	J	52	J	500	U	400	U	430
2-Methylphenol	460	U	570	U	400	U	510	U	470	U	500	U	400	U	430
2-Nitroaniline	1,200	U	1,400	U	1,000	U	1,300	U	1,200	U	1,300	U	1,000	U	1,100
2-Nitrophenol	460	U	570	U	400	U	510	U	470	U	500	U	400	U	430
3,3'-Dichlorobenzidine	460	U	570	U	400	U	510	U	470	U	500	U	400	U	430
3-Nitroaniline	1,200	U	1,400	U	1,000	U	1,300	U	1,200	U	1,300	U	1,000	U	1,100
4,6-Dinitro-2-methylphenol	1,200	U	1,400	U	1,000	U	1,300	U	1,200	U	1,300	U	1,000	U	1,100
4-Bromophenyl-phenylether	460	U	570	U	400	U	510	U	470	U	500	U	400	U	430
4-Chloro-3-methylphenol	460	U	570	U	400	U	510	U	470	U	500	U	400	U	430
4-Chloroaniline	460	U	570	U	400	U	510	U	470	U	500	U	400	U	430
4-Chlorophenyl-phenylether	460	U	570	U	400	U	510	U	470	U	500	U	400	U	430
4-Methylphenol	460	U	570	U	400	U	510	U	470	U	500	U	400	U	430
4-Nitroaniline	1,200	U	1,400	U	1,000	U	1,300	U	1,200	U	1,300	U	1,000	U	1,100
4-Nitrophenol	1,200	U	1,400	U	1,000	U	1,300	U	1,200	U	1,300	U	1,000	U	1,100
Acenaphthene	22	J	20	J	49	J	23	J	17	J	500	U	400	U	430
Acenaphthylene	460	U	570	U	400	U	510	U	470	U	500	U	400	U	430
Acetophenone	52	B	61	B	23	B	29	B	31	B	100	B	88	B	58
Anthracene	71	J	49	J	130	J	67	J	41	J	500	U	400	U	430
Atrazine	460	U	570	U	400	U	510	U	470	U	500	U	400	U	430
Benzaldehyde	16	J	48	B	6	B	22	B	18	B	52	B	12	B	12
Benzo(a)anthracene	61	J	98	J	210	J	150	J	150	J	500	U	400	U	430
Benzo(a)pyrene	47	J	78	J	63	J	110	J	110	J	500	U	400	U	14

NA - Not analyzed
B - Blank contamination
J - Estimated
K - Biased high
L - Biased low

R - Unusable
U - Undetected
UJ - Undetected, estimated limit
UL - Undetected, limit biased low

Table B-3
NAB Little Creek
Navy CLEAN II CTO-210, Long Term Monitoring Plan
Round 7, Analytical Results for Site 7 Sediment

Station ID	LS07-SD201		LS07-SD202		LS07-SD203		LS07-SD204				LS07-SD205		LS07-SD206		LS07-SD207
Sample ID	LS07-SD201-02A		LS07-SD202-02A		LS07-SD203-02A		LS07-SD204P-02A		LS07-SD204-02A		LS07-SD205-02A		LS07-SD206-02A		LS07-SD207-0
Sample Date	03/04/02		03/05/02		03/05/02		03/05/02		03/05/02		03/04/02		03/04/02		03/04/02
Chemical Name															
Benzo(b)fluoranthene	73	J	140	J	190	J	170	J	140	J	500	U	18	J	20
Benzo(g,h,i)perylene	460	U	570	U	400	U	510	U	470	U	500	U	400	U	430
Benzo(k)fluoranthene	75	J	76	J	130	J	98	J	98	J	500	U	400	U	430
Butylbenzylphthalate	460	U	570	U	400	U	21	J	51	J	500	U	400	U	430
Caprolactam	460	U	570	U	400	U	510	U	470	U	500	U	400	U	430
Carbazole	29	J	21	J	75	J	32	J	35	J	500	U	400	U	430
Chrysene	98	J	110	J	190	J	160	J	140	J	500	U	400	U	430
Di-n-butylphthalate	460	U	67	J	400	U	510	U	470	U	500	U	400	U	430
Di-n-octylphthalate	47	J	570	U	400	U	510	U	470	U	40	J	400	U	75
Dibenz(a,h)anthracene	460	U	19	J	45	J	29	J	29	J	500	U	400	U	430
Dibenzofuran	21	J	16	J	40	J	31	J	21	J	500	U	400	U	430
Diethylphthalate	460	U	570	U	400	U	510	U	470	U	500	U	400	U	12
Dimethyl phthalate	460	U	570	U	400	U	510	U	470	U	500	U	400	U	430
Fluoranthene	260	J	310	J	510		330	J	280	J	20	J	45	J	10
Fluorene	37	J	570	U	67	J	29	J	470	U	500	U	400	U	430
Hexachlorobenzene	460	U	570	U	400	U	510	U	470	U	500	U	400	U	430
Hexachlorobutadiene	460	U	570	U	400	U	510	U	470	U	500	U	400	U	430
Hexachlorocyclopentadiene	460	U	570	U	400	U	510	U	470	U	500	UJ	400	UJ	430
Hexachloroethane	460	U	570	U	400	U	510	U	470	U	500	U	400	U	430
Indeno(1,2,3-cd)pyrene	29	J	43	J	58	J	57	J	56	J	500	U	400	U	11
Isophorone	460	U	570	U	400	U	510	U	470	U	500	U	400	U	430
Naphthalene	460	U	570	U	50	J	44	J	28	J	500	U	400	U	430
Nitrobenzene	460	U	570	U	400	U	510	U	470	U	500	U	400	U	430
Pentachlorophenol	1,200	U	1,400	U	1,000	U	1,300	U	1,200	U	1,300	U	1,000	U	1,100
Phenanthrene	130	J	130	J	480		250	J	180	J	500	U	400	U	430
Phenol	460	U	570	U	400	U	510	U	470	U	500	U	29	J	430
Pyrene	200	J	250	J	270	J	290	J	240	J	28	J	42	J	26
bis(2-Chloroethoxy)methane	460	U	570	U	400	U	510	U	470	U	500	U	400	U	430
bis(2-Chloroethyl)ether	460	U	570	U	400	U	510	U	470	U	500	U	400	U	430
bis(2-Ethylhexyl)phthalate	230	B	150	B	230	B	130	B	99	B	110	B	62	B	89
n-Nitroso-di-n-propylamine	460	U	570	U	400	U	510	U	470	U	500	U	400	U	430
n-Nitrosodiphenylamine	460	U	570	U	400	U	510	U	470	U	500	U	400	U	430
Pesticide/Polychlorinated Biphenyls (UG/KG)															
4,4'-DDD	4.7	U	5.7	U	4	U	5.1	U	3.5	J	5	U	4	U	4.3

NA - Not analyzed
B - Blank contamination
J - Estimated
K - Biased high
L - Biased low

R - Unusable
U - Undetected
UJ - Undetected, estimated limit
UL - Undetected, limit biased low

Table B-3
NAB Little Creek
Navy CLEAN II CTO-210, Long Term Monitoring Plan
Round 7, Analytical Results for Site 7 Sediment

Station ID	LS07-SD201		LS07-SD202		LS07-SD203		LS07-SD204				LS07-SD205		LS07-SD206		LS07-SD207
Sample ID	LS07-SD201-02A		LS07-SD202-02A		LS07-SD203-02A		LS07-SD204P-02A		LS07-SD204-02A		LS07-SD205-02A		LS07-SD206-02A		LS07-SD207-0
Sample Date	03/04/02		03/05/02		03/05/02		03/05/02		03/05/02		03/04/02		03/04/02		03/04/02
Chemical Name															
4,4'-DDE	4.7	U	5	J	4	U	5.1	U	3.1	J	5	U	4	U	4.3
4,4'-DDT	4.7	U	5.7	U	4	U	5.1	U	4.7	U	5	U	4	U	4.3
Aldrin	2.4	U	2.9	U	2	U	2.6	U	2.4	U	2.6	U	2	U	2.2
Aroclor-1016	47	U	57	U	40	U	51	U	47	U	50	U	40	U	43
Aroclor-1221	96	U	120	U	81	U	100	U	96	U	100	U	81	U	87
Aroclor-1232	47	U	57	U	40	U	51	U	47	U	50	U	40	U	43
Aroclor-1242	47	U	57	U	40	U	51	U	47	U	50	U	40	U	43
Aroclor-1248	47	U	57	U	40	U	51	U	47	U	50	U	40	U	43
Aroclor-1254	47	U	57	U	40	U	51	U	47	U	50	U	40	U	43
Aroclor-1260	47	U	150	J	40	U	51	U	47	U	50	U	40	U	43
Dieldrin	4.7	U	5.7	U	4	U	5.1	U	4.7	U	5	U	4	U	4.3
Endosulfan I	1.2	J	2.9	U	2	U	2.6	U	2.4	U	2.6	U	2	U	2.2
Endosulfan II	4.7	U	5.7	U	4	U	5.1	U	4.7	U	5	U	4	U	4.3
Endosulfan sulfate	4.7	U	5.7	U	4	U	5.1	U	4.7	U	5	U	4	U	4.3
Endrin	4.7	U	5.7	U	4	U	5.1	U	4.7	U	5	U	4	U	4.3
Endrin aldehyde	4.7	U	5.7	U	4	U	5.1	U	4.7	U	5	U	4	U	4.3
Endrin ketone	4.7	U	5.7	U	4	U	5.1	U	4.7	U	5	U	4	U	4.3
Heptachlor	2.4	U	2.9	U	2	U	2.6	U	2.4	U	2.6	U	2	U	2.2
Heptachlor epoxide	2.4	U	2.9	U	2	U	2.6	U	2.4	U	2.6	U	2	U	2.2
Methoxychlor	24	U	29	U	20	U	26	U	24	U	26	U	20	U	22
Toxaphene	240	U	290	U	200	U	260	U	240	U	260	U	200	U	220
alpha-BHC	2.4	U	2.9	U	2	U	2.6	U	2.4	U	2.6	U	2	U	2.2
alpha-Chlordane	2.4	U	2.8	J	2	U	2.6	U	2.4	U	2.6	U	2	U	2.2
beta-BHC	2.4	U	2.9	U	2	U	2.6	U	2.4	U	2.6	U	2	U	2.2
beta-Chlordane	2.4	U	2.9	U	2	U	2.6	U	2.4	U	2.6	U	2	U	2.2
delta-BHC	2.4	U	2.9	U	2	U	2.6	U	2.4	U	2.6	U	2	U	2.2
gamma-BHC (Lindane)	2.4	U	2.9	U	2	U	2.6	U	2.4	U	2.6	U	2	U	2.2
Total Metals (MG/KG)															
Aluminum	1,860		4,230		279		2,090		1,930		5,600		187		2,470
Antimony	0.409	UL	0.519	UL	0.354	UL	0.45	UL	0.422	UL	0.447	UL	0.35	UL	0.378
Arsenic	1.4	J	6.3		0.401	U	7.3		6.4		5.1		0.396	U	1.3
Barium	8.7	J	20.7	B	2.8	B	20.5	J	19.4	J	12.4	B	0.81	B	5.8
Beryllium	0.24	B	0.42	B	0.13	B	0.39	B	0.36	B	0.37	B	0.07	U	0.23
Cadmium	0.082	U	0.28	B	0.071	U	0.18	B	0.12	B	0.089	U	0.07	U	0.076

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L - Biased low

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U - Undetected
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UL - Undetected, limit biased low

Table B-3
NAB Little Creek
Navy CLEAN II CTO-210, Long Term Monitoring Plan
Round 7, Analytical Results for Site 7 Sediment

Station ID	LS07-SD201		LS07-SD202		LS07-SD203		LS07-SD204		LS07-SD204		LS07-SD205		LS07-SD206		LS07-SD207
Sample ID	LS07-SD201-02A		LS07-SD202-02A		LS07-SD203-02A		LS07-SD204P-02A		LS07-SD204-02A		LS07-SD205-02A		LS07-SD206-02A		LS07-SD207-0
Sample Date	03/04/02		03/05/02		03/05/02		03/05/02		03/05/02		03/04/02		03/04/02		03/04/02
Chemical Name															
Calcium	536	J	1,200	B	96.5	B	1,030	B	1,000	B	1,350	J	70.5	B	448
Chromium	5.1	L	10.5		0.5	B	7.1	B	6.4	B	11.5		0.21	UL	6.8
Cobalt	0.86	J	2.8	J	0.472	U	2	J	1.8	J	3	J	0.466	U	1.2
Copper	16.8	B	41.8	B	0.84	B	38.1	B	37.7	B	7.7	B	0.42	U	4
Cyanide	0.054	U	0.069	U	0.047	U	0.062	U	0.057	U	0.06	U	0.046	U	0.05
Iron	4,970		12,800		1,260		8,400		8,020		10,900		459		4,840
Lead	8.4		34.1		3		23.8		22.2		9.8		1.4	K	28.9
Magnesium	1,070	J	1,720	J	103	B	696	J	644	J	2,300		134	B	1,180
Manganese	23.5		73.5		3.1	B	61.4		59.8		74.9		2	B	35.5
Mercury	0.076	B	0.15	B	0.057	U	0.1	B	0.093	B	0.08	B	0.061	U	0.059
Nickel	1.9	B	6.6	B	0.236	U	23.8		20.3		5.6	B	0.233	U	2.2
Potassium	544	J	963	J	56	B	247	J	224	J	1,410	J	95.7	J	644
Selenium	0.518	UL	1.1	J	0.448	UL	0.98	J	0.535	UL	0.566	UL	0.443	UL	0.479
Silver	0.136	U	0.173	U	0.118	U	0.48	J	0.35	J	0.149	U	0.117	U	0.126
Sodium	3,330		2,790		348	B	674	B	655	B	4,150		606	B	2,510
Thallium	0.818	R	1.04	R	0.708	R	0.9	R	0.844	R	0.893	R	0.699	R	0.757
Vanadium	8.2	J	21.7		2.4	J	150		137		16		0.73	J	7
Zinc	52.8		209		9.8	B	112		110		30		3.1	J	33.1
Wet Chemistry (MG/KG)															
Total organic carbon (TOC)	6,724		25,310		3,101		18,830		32,360		6,566		2,615		2,790
pH	7.72		7.86		7.88		7.51		7.43		8.19		7.55		7.94

NA - Not analyzed
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K - Biased high
L - Biased low

R - Unusable
U - Undetected
UJ - Undetected, estimated limit
UL - Undetected, limit biased low

Table B-3
NAB Little Creek
Navy CLEAN II CTO-210, Long Term Monitoring Plan
Round 7, Analytical Results for Site 7 Sediment

Station ID	'	LS07-SD208		LS07-SD209		LS07-SD210		LS07-SD211		LS07-SD212		LS07-SD213	
Sample ID	2A	LS07-SD208-02A		LS07-SD209-02A		LS07-SD210-02A		LS07-SD211-02A		LS07-SD212-02A		LS07-SD213-02A	
Sample Date		03/04/02		03/04/02		03/04/02		03/05/02		03/05/02		03/05/02	
Chemical Name													
Semivolatile Organic Compounds (UG/KG)													
1,1-Biphenyl	U	570	U	630	U	540	U	410	R	540	U	420	U
2,2'-Oxybis(1-chloropropane)	U	570	U	630	U	540	U	410	R	540	U	420	U
2,4,5-Trichlorophenol	U	1,400	U	1,600	U	1,400	U	1,000	U	1,400	U	1,100	U
2,4,6-Trichlorophenol	U	570	U	630	U	540	U	410	U	540	U	420	U
2,4-Dichlorophenol	U	570	U	630	U	540	U	410	U	540	U	420	U
2,4-Dimethylphenol	U	570	U	630	U	540	U	410	U	540	U	420	U
2,4-Dinitrophenol	U	1,400	U	1,600	U	1,400	U	1,000	U	1,400	U	1,100	U
2,4-Dinitrotoluene	U	570	U	630	U	540	U	410	R	540	U	420	U
2,6-Dinitrotoluene	U	570	U	630	U	540	U	410	R	540	U	420	U
2-Chloronaphthalene	U	570	U	630	U	540	U	410	R	540	U	420	U
2-Chlorophenol	U	570	U	630	U	540	U	410	U	540	U	420	U
2-Methylnaphthalene	U	570	U	20	J	540	U	410	R	38	J	420	U
2-Methylphenol	U	570	U	630	U	540	U	410	U	540	U	420	U
2-Nitroaniline	U	1,400	U	1,600	U	1,400	U	1,000	R	1,400	U	1,100	U
2-Nitrophenol	U	570	U	630	U	540	U	410	U	540	U	420	U
3,3'-Dichlorobenzidine	U	570	U	630	U	540	U	410	R	540	U	420	U
3-Nitroaniline	U	1,400	U	1,600	U	1,400	U	1,000	R	1,400	U	1,100	U
4,6-Dinitro-2-methylphenol	U	1,400	U	1,600	U	1,400	U	1,000	U	1,400	U	1,100	U
4-Bromophenyl-phenylether	U	570	U	630	U	540	U	410	R	540	U	420	U
4-Chloro-3-methylphenol	U	570	U	630	U	540	U	410	U	540	U	420	U
4-Chloroaniline	U	570	U	630	U	540	U	410	R	540	U	420	U
4-Chlorophenyl-phenylether	U	570	U	630	U	540	U	410	R	540	U	420	U
4-Methylphenol	U	570	U	630	U	540	U	410	U	540	U	420	U
4-Nitroaniline	U	1,400	U	1,600	U	1,400	U	1,000	R	1,400	U	1,100	U
4-Nitrophenol	U	1,400	U	1,600	U	1,400	U	1,000	U	1,400	U	1,100	U
Acenaphthene	U	570	U	210	J	540	U	410	R	540	U	420	U
Acenaphthylene	U	20	J	24	J	540	U	410	R	540	U	420	U
Acetophenone	B	260	B	64	B	110	B	33	B	29	B	19	B
Anthracene	U	24	J	44	J	540	U	410	R	26	J	420	U
Atrazine	U	570	U	630	U	540	U	410	R	540	U	420	U
Benzaldehyde	B	28	B	14	B	19	B	11	B	25	B	13	B
Benzo(a)anthracene	U	70	J	120	J	20	J	410	R	77	J	420	U
Benzo(a)pyrene	J	60	J	75	J	13	J	410	R	68	J	420	U

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K - Biased high
L - Biased low

R - Unusable
U - Undetected
UJ - Undetected, estimated limit
UL - Undetected, limit biased low

Table B-3
NAB Little Creek
Navy CLEAN II CTO-210, Long Term Monitoring Plan
Round 7, Analytical Results for Site 7 Sediment

Station ID	'	LS07-SD208		LS07-SD209		LS07-SD210		LS07-SD211		LS07-SD212		LS07-SD213	
Sample ID	2A	LS07-SD208-02A		LS07-SD209-02A		LS07-SD210-02A		LS07-SD211-02A		LS07-SD212-02A		LS07-SD213-02A	
Sample Date		03/04/02		03/04/02		03/04/02		03/05/02		03/05/02		03/05/02	
Chemical Name													
Benzo(b)fluoranthene	J	120	J	160	J	27	J	410	R	85	J	420	U
Benzo(g,h,i)perylene	U	570	U	630	U	540	U	410	R	540	U	420	U
Benzo(k)fluoranthene	U	89	J	94	J	540	U	410	R	63	J	420	U
Butylbenzylphthalate	U	570	U	630	U	540	U	410	R	540	U	420	U
Caprolactam	U	570	U	630	U	540	U	410	R	540	U	420	U
Carbazole	U	570	U	630	U	540	U	410	R	540	U	420	U
Chrysene	U	100	J	160	J	32	J	410	R	91	J	420	U
Di-n-butylphthalate	U	570	U	630	U	540	U	410	R	540	U	420	U
Di-n-octylphthalate	J	56	J	630	U	540	U	410	R	160	J	420	U
Dibenz(a,h)anthracene	U	20	J	630	U	540	U	410	R	25	J	420	U
Dibenzofuran	U	570	U	25	J	540	U	410	R	23	J	420	U
Diethylphthalate	J	570	U	630	U	540	U	410	R	540	U	420	U
Dimethyl phthalate	U	570	U	630	U	540	U	410	R	540	U	420	U
Fluoranthene	J	270	J	640		47	J	410	R	180	J	420	U
Fluorene	U	570	U	630	U	540	U	410	R	18	J	420	U
Hexachlorobenzene	U	570	U	630	U	540	U	410	R	540	U	420	U
Hexachlorobutadiene	U	570	U	630	U	540	U	410	R	540	U	420	U
Hexachlorocyclopentadiene	UJ	570	UJ	630	UJ	540	UJ	410	R	540	UJ	420	UJ
Hexachloroethane	U	570	U	630	U	540	U	410	R	540	U	420	U
Indeno(1,2,3-cd)pyrene	J	60	J	61	J	540	U	410	R	46	J	420	U
Isophorone	U	570	U	630	U	540	U	410	R	540	U	420	U
Naphthalene	U	570	U	63	J	540	U	410	R	19	J	420	U
Nitrobenzene	U	570	U	630	U	540	U	410	R	540	U	420	U
Pentachlorophenol	U	1,400	U	1,600	U	1,400	U	1,000	U	1,400	U	1,100	U
Phenanthrene	U	29	J	44	J	540	U	410	R	94	J	420	U
Phenol	U	63	J	630	U	540	U	410	U	540	U	420	U
Pyrene	J	240	J	480	J	53	J	410	R	160	J	420	U
bis(2-Chloroethoxy)methane	U	570	U	630	U	540	U	410	R	540	U	420	U
bis(2-Chloroethyl)ether	U	570	U	630	U	540	U	410	R	540	U	420	U
bis(2-Ethylhexyl)phthalate	B	150	B	110	B	130	B	48	B	160	B	48	B
n-Nitroso-di-n-propylamine	U	570	U	630	U	540	U	410	R	540	U	420	U
n-Nitrosodiphenylamine	U	570	U	630	U	540	U	410	R	540	U	420	U
Pesticide/Polychlorinated Biphenyls (UG/KG)													
4,4'-DDD	U	5.7	UJ	6.3	U	5.4	U	4.1	U	5.4	U	4.2	U

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UL - Undetected, limit biased low

Table B-3
NAB Little Creek
Navy CLEAN II CTO-210, Long Term Monitoring Plan
Round 7, Analytical Results for Site 7 Sediment

Station ID	'	LS07-SD208		LS07-SD209		LS07-SD210		LS07-SD211		LS07-SD212		LS07-SD213	
Sample ID	2A	LS07-SD208-02A		LS07-SD209-02A		LS07-SD210-02A		LS07-SD211-02A		LS07-SD212-02A		LS07-SD213-02A	
Sample Date		03/04/02		03/04/02		03/04/02		03/05/02		03/05/02		03/05/02	
Chemical Name													
4,4'-DDE	U	5.7	UJ	6.3	U	5.4	U	4.1	U	3	J	4.2	U
4,4'-DDT	U	5.7	UJ	6.3	U	5.4	U	4.1	U	5.4	U	4.2	U
Aldrin	U	2.9	UJ	3.3	U	2.8	U	2.1	U	2.8	U	2.2	U
Aroclor-1016	U	57	UJ	63	U	54	U	41	U	54	U	42	U
Aroclor-1221	U	120	UJ	130	U	110	U	84	U	110	U	86	U
Aroclor-1232	U	57	UJ	63	U	54	U	41	U	54	U	42	U
Aroclor-1242	U	57	UJ	63	U	54	U	41	U	54	U	42	U
Aroclor-1248	U	57	UJ	63	U	54	U	41	U	54	U	42	U
Aroclor-1254	U	57	UJ	63	U	54	U	41	U	54	U	42	U
Aroclor-1260	U	57	UJ	37	J	54	U	41	U	78		42	U
Dieldrin	U	5.7	U	6.3	U	5.4	U	4.1	U	5.4	U	4.2	U
Endosulfan I	U	2.9	UJ	3.3	U	2.8	U	2.1	U	2.8	U	2.2	U
Endosulfan II	U	5.7	UJ	6.3	U	5.4	U	4.1	U	5.4	U	4.2	U
Endosulfan sulfate	U	5.7	UJ	6.3	U	5.4	U	4.1	U	5.4	U	4.2	U
Endrin	U	5.7	UJ	6.3	U	5.4	U	4.1	U	5.4	U	4.2	U
Endrin aldehyde	U	5.7	UJ	6.3	U	5.4	U	4.1	U	5.4	U	4.2	U
Endrin ketone	U	5.7	UJ	6.3	U	5.4	U	4.1	U	5.4	U	4.2	U
Heptachlor	U	2.9	UJ	3.3	U	2.8	U	2.1	U	2.8	U	2.2	U
Heptachlor epoxide	U	2.9	UJ	3.3	U	2.8	U	2.1	U	2.8	U	2.2	U
Methoxychlor	U	29	UJ	33	U	28	U	21	U	28	U	22	U
Toxaphene	U	290	UJ	330	U	280	U	210	U	280	U	220	U
alpha-BHC	U	2.9	UJ	3.3	U	2.8	U	2.1	U	2.8	U	2.2	U
alpha-Chlordane	U	2.9	UJ	3.3	U	2.8	U	2.1	U	2.8	U	2.2	U
beta-BHC	U	2.9	UJ	3.3	U	2.8	U	2.7		4.1	J	8.7	J
beta-Chlordane	U	2.9	UJ	3.3	U	2.8	U	2.1	U	2.8	U	2.2	U
delta-BHC	U	2.9	UJ	3.3	U	2.8	U	2.1	U	2.8	U	2.2	U
gamma-BHC (Lindane)	U	2.9	UJ	3.3	U	2.8	U	2.1	U	2.8	U	2.2	U
Total Metals (MG/KG)													
Aluminum		5,320		9,150		10,600		933		3,650		658	
Antimony	UL	0.518	UL	0.577	UL	0.493	UL	0.365	UL	0.489	UL	0.378	UL
Arsenic	J	3.7		6.2		8.2		1.5	J	9.8		8.5	
Barium	B	14.9	B	24.6	J	21.5	J	5.9	B	16.2	B	2.9	B
Beryllium	B	0.49	B	0.62	B	0.64	B	0.15	B	0.47	B	0.15	B
Cadmium	U	0.33	B	0.59	B	0.12	B	0.073	U	0.31	B	0.076	U

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UL - Undetected, limit biased low

Table B-3
NAB Little Creek
Navy CLEAN II CTO-210, Long Term Monitoring Plan
Round 7, Analytical Results for Site 7 Sediment

Station ID		LS07-SD208		LS07-SD209		LS07-SD210		LS07-SD211		LS07-SD212		LS07-SD213	
Sample ID	2A	LS07-SD208-02A		LS07-SD209-02A		LS07-SD210-02A		LS07-SD211-02A		LS07-SD212-02A		LS07-SD213-02A	
Sample Date		03/04/02		03/04/02		03/04/02		03/05/02		03/05/02		03/05/02	
Chemical Name													
Calcium	B	1,610	J	2,800		1,230	J	290	B	881	B	180	B
Chromium		12.1		22.8		22.5		2.4	B	11.2		0.56	B
Cobalt	J	2.9	J	4.8	J	5	J	0.9	J	3.4	J	0.505	U
Copper	B	16.8	B	23.9	B	11	B	11.1	B	49.2	B	2.4	B
Cyanide	U	0.069	U	0.075	U	0.066	U	0.05	U	0.064	U	0.049	U
Iron		12,500		19,800		21,000		3,090		14,000		3,490	
Lead		21		25.3		14.1		7.7		30.3		4.1	
Magnesium	J	2,320		4,410		4,540		474	J	1,530	J	219	J
Manganese		68.8		156		164		22.5		66		7.9	
Mercury	U	0.18	B	0.12	B	0.093	B	0.052	U	0.078	U	0.061	U
Nickel	B	7.1	B	11.9	J	12.1	J	2.2	B	9.5	J	0.252	U
Potassium	J	1,310	J	2,230		2,610		298	J	760	J	92.4	B
Selenium	UL	0.656	UL	0.731	UL	0.625	UL	0.462	UL	0.75	J	0.479	UL
Silver	U	0.173	U	0.192	U	0.164	U	0.122	U	0.163	U	0.126	U
Sodium		4,630		5,980		6,440		1,250		2,980		285	B
Thallium	R	1.04	R	1.15	R	0.987	R	0.73	R	0.977	R	0.757	R
Vanadium	J	17.3		25.6		29.2		7.4	J	29.1		3.3	J
Zinc		103		156		49.9		47.6	B	211		14.3	B
Wet Chemistry (MG/KG)													
Total organic carbon (TOC)		17,780		14,860		24,040		4,265		30,370		7,713	
pH		8.32		8.02		7.97		7.31		7.92		7.44	

NA - Not analyzed
B - Blank contamination
J - Estimated
K - Biased high
L - Biased low

R - Unusable
U - Undetected
UJ - Undetected, estimated limit
UL - Undetected, limit biased low

Table B-4
NAB Little Creek
Navy CLEAN II CTO-210, Long Term Monitoring Plan
Round 7, Analytical Results for Site 7 QA/QC

Station ID	LC-QC													
Sample ID	LS07-TB030402		LS07-FB030402		LS07-GW-EB030402		LS07-SD-EB030402		LS07-TB030502		LS07-GW-EB030502		LS07-SD-EB030502	
Sample Date	03/04/02		03/04/02		03/04/02		03/04/02		03/05/02		03/05/02		03/05/02	
Chemical Name														
Volatile Organic Compounds (UG/L)														
1,1,1-Trichloroethane	10	U	10	U	NA		NA		10	U	NA		NA	
1,1,2,2-Tetrachloroethane	10	U	10	U	NA		NA		10	U	NA		NA	
1,1,2-Trichloro-1,2,2-trifluoroethane(Freon-113)	10	U	10	U	NA		NA		10	U	NA		NA	
1,1,2-Trichloroethane	10	U	10	U	NA		NA		10	U	NA		NA	
1,1-Dichloroethane	10	U	10	U	NA		NA		10	U	NA		NA	
1,1-Dichloroethene	10	U	10	U	NA		NA		10	U	NA		NA	
1,2,4-Trichlorobenzene	10	U	10	U	NA		NA		10	U	NA		NA	
1,2-Dibromo-3-chloropropane	10	U	10	U	NA		NA		10	U	NA		NA	
1,2-Dibromoethane	10	U	10	U	NA		NA		10	U	NA		NA	
1,2-Dichlorobenzene	10	U	10	U	NA		NA		10	U	NA		NA	
1,2-Dichloroethane	10	U	10	U	NA		NA		10	U	NA		NA	
1,2-Dichloropropane	10	U	10	U	NA		NA		10	U	NA		NA	
1,3-Dichlorobenzene	10	U	10	U	NA		NA		10	U	NA		NA	
1,4-Dichlorobenzene	10	U	10	U	NA		NA		10	U	NA		NA	
2-Butanone	10	U	10	U	NA		NA		10	U	NA		NA	
2-Hexanone	10	U	10	U	NA		NA		10	U	NA		NA	
4-Methyl-2-pentanone	10	U	10	U	NA		NA		10	U	NA		NA	
Acetone	10	U	10	U	NA		NA		10	U	NA		NA	
Benzene	10	U	10	U	NA		NA		10	U	NA		NA	
Bromodichloromethane	10	U	10	U	NA		NA		10	U	NA		NA	
Bromoform	10	U	10	U	NA		NA		10	U	NA		NA	
Bromomethane	10	U	10	U	NA		NA		10	U	NA		NA	
Carbon disulfide	10	U	10	U	NA		NA		10	U	NA		NA	
Carbon tetrachloride	10	U	10	U	NA		NA		10	U	NA		NA	
Chlorobenzene	10	U	10	U	NA		NA		10	U	NA		NA	
Chloroethane	10	U	10	U	NA		NA		10	U	NA		NA	
Chloroform	10	U	10	U	NA		NA		10	U	NA		NA	
Chloromethane	10	U	10	U	NA		NA		10	U	NA		NA	
Cumene	10	U	10	U	NA		NA		10	U	NA		NA	
Cyclohexane	10	U	10	U	NA		NA		10	U	NA		NA	
Dibromochloromethane	10	U	10	U	NA		NA		10	U	NA		NA	
Dichlorodifluoromethane(Freon-12)	10	U	10	U	NA		NA		10	U	NA		NA	
Ethylbenzene	10	U	10	U	NA		NA		10	U	NA		NA	

U - Undetected
UL - Undetected, limit biased low

B - Analyte not detected above associated blank
J - Reported value is estimated
NA - Not analyzed

Table B-4
NAB Little Creek
Navy CLEAN II CTO-210, Long Term Monitoring Plan
Round 7, Analytical Results for Site 7 QA/QC

Station ID	LC-QC													
Sample ID	LS07-TB030402		LS07-FB030402		LS07-GW-EB030402		LS07-SD-EB030402		LS07-TB030502		LS07-GW-EB030502		LS07-SD-EB030502	
Sample Date	03/04/02		03/04/02		03/04/02		03/04/02		03/05/02		03/05/02		03/05/02	
Chemical Name														
Methyl acetate	10	U	10	U	NA		NA		10	U	NA		NA	
Methyl-tert-butyl ether (MTBE)	10	U	10	U	NA		NA		10	U	NA		NA	
Methylcyclohexane	10	U	10	U	NA		NA		10	U	NA		NA	
Methylene chloride	10	U	10	U	NA		NA		10	U	NA		NA	
Styrene	10	U	10	U	NA		NA		10	U	NA		NA	
Tetrachloroethene	10	U	10	U	NA		NA		10	U	NA		NA	
Toluene	10	U	10	U	NA		NA		10	U	NA		NA	
Trichloroethene	10	U	10	U	NA		NA		10	U	NA		NA	
Trichlorofluoromethane(Freon-11)	10	U	10	U	NA		NA		10	U	NA		NA	
Vinyl chloride	10	U	10	U	NA		NA		10	U	NA		NA	
Xylene, total	10	U	10	U	NA		NA		10	U	NA		NA	
cis-1,2-Dichloroethene	10	U	10	U	NA		NA		10	U	NA		NA	
cis-1,3-Dichloropropene	10	U	10	U	NA		NA		10	U	NA		NA	
trans-1,2-Dichloroethene	10	U	10	U	NA		NA		10	U	NA		NA	
trans-1,3-Dichloropropene	10	U	10	U	NA		NA		10	U	NA		NA	
Semivolatile Organic Compounds (UG/L)														
1,1-Biphenyl	NA		10	U	NA		10	U	NA		NA		10	U
2,2'-Oxybis(1-chloropropane)	NA		10	U	NA		10	U	NA		NA		10	U
2,4,5-Trichlorophenol	NA		25	U	NA		26	U	NA		NA		26	U
2,4,6-Trichlorophenol	NA		10	U	NA		10	U	NA		NA		10	U
2,4-Dichlorophenol	NA		10	U	NA		10	U	NA		NA		10	U
2,4-Dimethylphenol	NA		10	U	NA		10	U	NA		NA		10	U
2,4-Dinitrophenol	NA		25	U	NA		26	U	NA		NA		26	U
2,4-Dinitrotoluene	NA		10	U	NA		10	U	NA		NA		10	U
2,6-Dinitrotoluene	NA		10	U	NA		10	U	NA		NA		10	U
2-Chloronaphthalene	NA		10	U	NA		10	U	NA		NA		10	U
2-Chlorophenol	NA		10	U	NA		10	U	NA		NA		10	U
2-Methylnaphthalene	NA		10	U	NA		10	U	NA		NA		10	U
2-Methylphenol	NA		10	U	NA		10	U	NA		NA		10	U
2-Nitroaniline	NA		25	U	NA		26	U	NA		NA		26	U
2-Nitrophenol	NA		10	U	NA		10	U	NA		NA		10	U
3,3'-Dichlorobenzidine	NA		10	U	NA		10	U	NA		NA		10	U
3-Nitroaniline	NA		25	U	NA		26	U	NA		NA		26	U
4,6-Dinitro-2-methylphenol	NA		25	U	NA		26	U	NA		NA		26	U

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Table B-4
NAB Little Creek
Navy CLEAN II CTO-210, Long Term Monitoring Plan
Round 7, Analytical Results for Site 7 QA/QC

Station ID	LC-QC													
Sample ID	LS07-TB030402		LS07-FB030402		LS07-GW-EB030402		LS07-SD-EB030402		LS07-TB030502		LS07-GW-EB030502		LS07-SD-EB030502	
Sample Date	03/04/02		03/04/02		03/04/02		03/04/02		03/05/02		03/05/02		03/05/02	
Chemical Name														
4-Bromophenyl-phenylether	NA		10	U	NA		10	U	NA		NA		10	U
4-Chloro-3-methylphenol	NA		10	U	NA		10	U	NA		NA		10	U
4-Chloroaniline	NA		10	U	NA		10	U	NA		NA		10	U
4-Chlorophenyl-phenylether	NA		10	U	NA		10	U	NA		NA		10	U
4-Methylphenol	NA		10	U	NA		10	U	NA		NA		10	U
4-Nitroaniline	NA		25	U	NA		26	U	NA		NA		26	U
4-Nitrophenol	NA		25	U	NA		26	U	NA		NA		26	U
Acenaphthene	NA		10	U	NA		10	U	NA		NA		10	U
Acenaphthylene	NA		10	U	NA		10	U	NA		NA		10	U
Acetophenone	NA		10	U	NA		10	U	NA		NA		10	U
Anthracene	NA		10	U	NA		10	U	NA		NA		10	U
Atrazine	NA		10	U	NA		10	U	NA		NA		10	U
Benzaldehyde	NA		10	U	NA		10	U	NA		NA		10	U
Benzo(a)anthracene	NA		10	U	NA		10	U	NA		NA		10	U
Benzo(a)pyrene	NA		10	U	NA		10	U	NA		NA		10	U
Benzo(b)fluoranthene	NA		10	U	NA		10	U	NA		NA		10	U
Benzo(g,h,i)perylene	NA		10	U	NA		10	U	NA		NA		10	U
Benzo(k)fluoranthene	NA		10	U	NA		10	U	NA		NA		10	U
Butylbenzylphthalate	NA		10	U	NA		10	U	NA		NA		10	U
Caprolactam	NA		10	U	NA		10	U	NA		NA		10	U
Carbazole	NA		10	U	NA		10	U	NA		NA		10	U
Chrysene	NA		10	U	NA		10	U	NA		NA		10	U
Di-n-butylphthalate	NA		10	U	NA		10	U	NA		NA		10	U
Di-n-octylphthalate	NA		10	U	NA		10	U	NA		NA		10	U
Dibenz(a,h)anthracene	NA		10	U	NA		10	U	NA		NA		10	U
Dibenzofuran	NA		10	U	NA		10	U	NA		NA		10	U
Diethylphthalate	NA		10	U	NA		10	U	NA		NA		10	U
Dimethyl phthalate	NA		10	U	NA		10	U	NA		NA		10	U
Fluoranthene	NA		10	U	NA		10	U	NA		NA		10	U
Fluorene	NA		10	U	NA		10	U	NA		NA		10	U
Hexachlorobenzene	NA		10	U	NA		10	U	NA		NA		10	U
Hexachlorobutadiene	NA		10	U	NA		10	U	NA		NA		10	U
Hexachlorocyclopentadiene	NA		10	U	NA		10	U	NA		NA		10	U
Hexachloroethane	NA		10	U	NA		10	U	NA		NA		10	U
Indeno(1,2,3-cd)pyrene	NA		10	U	NA		10	U	NA		NA		10	U

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NAB Little Creek
Navy CLEAN II CTO-210, Long Term Monitoring Plan
Round 7, Analytical Results for Site 7 QA/QC

Station ID	LC-QC													
Sample ID	LS07-TB030402		LS07-FB030402		LS07-GW-EB030402		LS07-SD-EB030402		LS07-TB030502		LS07-GW-EB030502		LS07-SD-EB030502	
Sample Date	03/04/02		03/04/02		03/04/02		03/04/02		03/05/02		03/05/02		03/05/02	
Chemical Name														
Isophorone	NA		10	U	NA		10	U	NA		NA		10	U
Naphthalene	NA		10	U	NA		10	U	NA		NA		10	U
Nitrobenzene	NA		10	U	NA		10	U	NA		NA		10	U
Pentachlorophenol	NA		25	U	NA		26	U	NA		NA		26	U
Phenanthrene	NA		10	U	NA		10	U	NA		NA		10	U
Phenol	NA		10	U	NA		10	U	NA		NA		10	U
Pyrene	NA		10	U	NA		10	U	NA		NA		10	U
bis(2-Chloroethoxy)methane	NA		10	U	NA		10	U	NA		NA		10	U
bis(2-Chloroethyl)ether	NA		10	U	NA		10	U	NA		NA		10	U
bis(2-Ethylhexyl)phthalate	NA		1	B	NA		2	B	NA		NA		0.9	B
n-Nitroso-di-n-propylamine	NA		10	U	NA		10	U	NA		NA		10	U
n-Nitrosodiphenylamine	NA		10	U	NA		10	U	NA		NA		10	U
Pesticide/Polychlorinated Biphenyls (UG/L)														
4,4'-DDD	NA		0.1	U	NA		0.1	U	NA		NA		0.1	U
4,4'-DDE	NA		0.1	U	NA		0.1	U	NA		NA		0.1	U
4,4'-DDT	NA		0.1	U	NA		0.035	J	NA		NA		0.1	U
Aldrin	NA		0.05	U	NA		0.05	U	NA		NA		0.05	U
Aroclor-1016	NA		1	U	NA		1	U	NA		NA		1	U
Aroclor-1221	NA		2	U	NA		2	U	NA		NA		2	U
Aroclor-1232	NA		1	U	NA		1	U	NA		NA		1	U
Aroclor-1242	NA		1	U	NA		1	U	NA		NA		1	U
Aroclor-1248	NA		1	U	NA		1	U	NA		NA		1	U
Aroclor-1254	NA		1	U	NA		1	U	NA		NA		1	U
Aroclor-1260	NA		1	U	NA		1	U	NA		NA		1	U
Dieldrin	NA		0.1	U	NA		0.1	U	NA		NA		0.1	U
Endosulfan I	NA		0.05	U	NA		0.05	U	NA		NA		0.05	U
Endosulfan II	NA		0.1	U	NA		0.1	U	NA		NA		0.1	U
Endosulfan sulfate	NA		0.1	U	NA		0.1	U	NA		NA		0.1	U
Endrin	NA		0.1	U	NA		0.1	U	NA		NA		0.1	U
Endrin aldehyde	NA		0.1	U	NA		0.1	U	NA		NA		0.1	U
Endrin ketone	NA		0.1	U	NA		0.1	U	NA		NA		0.1	U
Heptachlor	NA		0.05	U	NA		0.05	U	NA		NA		0.05	U
Heptachlor epoxide	NA		0.05	U	NA		0.05	U	NA		NA		0.05	U
Methoxychlor	NA		0.5	U	NA		0.5	U	NA		NA		0.5	U

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Navy CLEAN II CTO-210, Long Term Monitoring Plan
Round 7, Analytical Results for Site 7 QA/QC

Station ID	LC-QC													
Sample ID	LS07-TB030402		LS07-FB030402		LS07-GW-EB030402		LS07-SD-EB030402		LS07-TB030502		LS07-GW-EB030502		LS07-SD-EB030502	
Sample Date	03/04/02		03/04/02		03/04/02		03/04/02		03/05/02		03/05/02		03/05/02	
Chemical Name														
Toxaphene	NA		5	U	NA		5	U	NA		NA		5	U
alpha-BHC	NA		0.05	U	NA		0.05	U	NA		NA		0.05	U
alpha-Chlordane	NA		0.05	U	NA		0.05	U	NA		NA		0.05	U
beta-BHC	NA		0.05	U	NA		0.05	U	NA		NA		0.05	U
beta-Chlordane	NA		0.05	U	NA		0.05	U	NA		NA		0.05	U
delta-BHC	NA		0.05	U	NA		0.05	U	NA		NA		0.05	U
gamma-BHC (Lindane)	NA		0.05	U	NA		0.05	U	NA		NA		0.05	U
Total Metals (UG/L)														
Aluminum	NA		44	U	NA		44	U	NA		NA		44	U
Antimony	NA		1.5	U	NA		2.4	B	NA		NA		1.5	U
Arsenic	NA		1.7	U	NA		1.7	U	NA		NA		1.7	U
Barium	NA		11.8	J	NA		12.9	J	NA		NA		13.2	J
Beryllium	NA		0.3	U	NA		0.3	U	NA		NA		0.3	U
Cadmium	NA		0.3	U	NA		0.3	U	NA		NA		0.3	U
Calcium	NA		337	J	NA		349	J	NA		NA		899	J
Chromium	NA		0.9	UL	NA		0.9	UL	NA		NA		0.9	UL
Cobalt	NA		2	U	NA		2	U	NA		NA		2	U
Copper	NA		172		NA		167		NA		NA		271	
Cyanide	NA		1.1	J	NA		0.8	U	NA		NA		0.8	U
Iron	NA		23.8	U	NA		23.8	U	NA		NA		23.8	U
Lead	NA		1.6	U	NA		1.6	U	NA		NA		1.6	U
Magnesium	NA		106	J	NA		131	J	NA		NA		158	J
Manganese	NA		0.3	UL	NA		0.3	UL	NA		NA		0.37	B
Mercury	NA		0.1	U	NA		0.1	U	NA		NA		0.1	U
Nickel	NA		1	U	NA		1	U	NA		NA		1	U
Potassium	NA		42	J	NA		43.6	J	NA		NA		129	J
Selenium	NA		1.9	U	NA		1.9	U	NA		NA		1.9	U
Silver	NA		0.5	U	NA		0.5	U	NA		NA		0.5	U
Sodium	NA		511	J	NA		602	J	NA		NA		701	J
Thallium	NA		3	U	NA		3	U	NA		NA		3	U
Vanadium	NA		1.7	U	NA		1.7	U	NA		NA		1.7	U
Zinc	NA		8.8	B	NA		11.3	B	NA		NA		38.5	L
Dissolved Metals (UG/L)														

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Navy CLEAN II CTO-210, Long Term Monitoring Plan
Round 7, Analytical Results for Site 7 QA/QC

Station ID	LC-QC													
Sample ID	LS07-TB030402		LS07-FB030402		LS07-GW-EB030402		LS07-SD-EB030402		LS07-TB030502		LS07-GW-EB030502		LS07-SD-EB030502	
Sample Date	03/04/02		03/04/02		03/04/02		03/04/02		03/05/02		03/05/02		03/05/02	
Chemical Name														
Aluminum	NA		NA		65.6	U	NA		NA		65.6	U	NA	
Antimony	NA		NA		4	U	NA		NA		4	U	NA	
Arsenic	NA		NA		2.4	U	NA		NA		2.4	U	NA	
Barium	NA		NA		10.5	J	NA		NA		12.5	J	NA	
Beryllium	NA		NA		0.2	U	NA		NA		0.2	U	NA	
Cadmium	NA		NA		0.3	U	NA		NA		0.3	U	NA	
Calcium	NA		NA		494	J	NA		NA		1,090	J	NA	
Chromium	NA		NA		0.6	U	NA		NA		0.6	U	NA	
Cobalt	NA		NA		0.7	U	NA		NA		0.7	U	NA	
Copper	NA		NA		156	K	NA		NA		251	K	NA	
Iron	NA		NA		18	U	NA		NA		18	U	NA	
Lead	NA		NA		1.8	U	NA		NA		1.8	U	NA	
Magnesium	NA		NA		169	B	NA		NA		200	B	NA	
Manganese	NA		NA		2.2	J	NA		NA		5.2	J	NA	
Mercury	NA		NA		0.1	U	NA		NA		0.1	U	NA	
Nickel	NA		NA		1.3	U	NA		NA		3.2	J	NA	
Potassium	NA		NA		184	U	NA		NA		238	J	NA	
Selenium	NA		NA		4.6	U	NA		NA		4.6	U	NA	
Silver	NA		NA		0.9	U	NA		NA		0.9	U	NA	
Sodium	NA		NA		975	J	NA		NA		542	J	NA	
Thallium	NA		NA		6	U	NA		NA		6	U	NA	
Vanadium	NA		NA		0.8	U	NA		NA		0.8	U	NA	
Zinc	NA		NA		16.9	J	NA		NA		46	J	NA	
Wet Chemistry (MG/L)														
Total organic carbon (TOC)	NA		5	U	NA		5	U	NA		NA		5	U
pH	NA		NA		NA		5.88		NA		NA		5.74	

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Appendix C
Data Validation Summaries
(Included in Original Letter Report)

Appendix D
Grain Size Distribution Results
For Sediment Samples
(Included in Original Letter Report)

Appendix E
Human Health Risk Assessment Data

TABLE 1

SELECTION OF EXPOSURE PATHWAYS

Site 7, NAB Little Creek

Scenario Timeframe	Medium	Exposure Medium	Exposure Point	Receptor Population	Receptor Age	Exposure Route	On-Site/ Off-Site	Type of Analysis	Rationale for Selection or Exclusion of Exposure Pathway
Current	Surface Soil	Surface Soil	Weigh Station Area	Maintenance Worker	Adult	Dermal Absorption	On-site	Quant	Site maintenance workers could contact surface soil while mowing grass or performing other activities at site.
						Ingestion	On-site	Quant	Site maintenance workers could contact surface soil while mowing grass or performing other activities at site.
				Trespasser/Visitor	Adolescents	Dermal Absorption	On-site	Quant	Although access to site limited by fencing and Little Creek Cove, and no trespassing signs, trespasser exposure will be evaluated
						Ingestion	On-site	Quant	Although access to site limited by fencing and Little Creek Cove, and no trespassing signs, trespasser exposure will be evaluated
		Air	Emissions from Soil at Weigh Station Area	Maintenance Worker	Adult	Inhalation	On-site	Quant	Site maintenance worker may inhale vapors and dust while working at site.
				Trespasser/Visitor	Adolescents	Inhalation	On-site	Quant	Although access to site limited by fencing and Little Creek Cove, and no trespassing signs, trespasser exposure will be evaluated
		Surface Soil	Area to West of Landfill, the "Ear"	Maintenance Worker	Adult	Dermal Absorption	On-site	Quant	Site maintenance workers could contact surface soil while mowing grass or performing other activities at site.
						Ingestion	On-site	Quant	Site maintenance workers could contact surface soil while mowing grass or performing other activities at site.
				Trespasser/Visitor	Adolescents	Dermal Absorption	On-site	Quant	Although access to site limited by fencing and Little Creek Cove, and no trespassing signs, trespasser exposure will be evaluated
						Ingestion	On-site	Quant	Although access to site limited by fencing and Little Creek Cove, and no trespassing signs, trespasser exposure will be evaluated
		Air	Emissions from Soil at Area to West of Landfill	Maintenance Worker	Adult	Inhalation	On-site	Quant	Site maintenance worker may inhale vapors and dust while working at site.
				Trespasser/Visitor	Adolescents	Inhalation	On-site	Quant	Although access to site limited by fencing and Little Creek Cove, and no trespassing signs, trespasser exposure will be evaluated
		Surface Soil	Site Perimeter	Maintenance Worker	Adult	Dermal Absorption	On-site	Quant	Site maintenance workers could contact surface soil while mowing grass or performing other activities at site.
						Ingestion	On-site	Quant	Site maintenance workers could contact surface soil while mowing grass or performing other activities at site.
				Trespasser/Visitor	Adolescents	Dermal Absorption	On-site	Quant	Although access to site limited by fencing and Little Creek Cove, and no trespassing signs, trespasser exposure will be evaluated.
						Ingestion	On-site	Quant	Although access to site limited by fencing and Little Creek Cove, and no trespassing signs, trespasser exposure will be evaluated.
		Air	Emissions from Soil at Site Perimeter	Maintenance Worker	Adult	Inhalation	On-site	Quant	Site maintenance worker may inhale vapors and dust while working at site.
				Trespasser/Visitor	Adolescents	Inhalation	On-site	Quant	Although access to site limited by fencing and Little Creek Cove, and no trespassing signs, trespasser exposure will be evaluated.
Current/Future	Surface Water	Surface Water	Little Creek Cove	Trespasser/Visitor	Adult	Dermal Absorption	On-site	Quant	Trespasser/Visistor could swim in Little Creek Cove.
						Ingestion	On-site	Quant	Trespasser/Visistor could swim in Little Creek Cove.
					Adolescents	Dermal Absorption	On-site	Quant	Trespasser/Visistor could swim in Little Creek Cove.
						Ingestion	On-site	Quant	Trespasser/Visistor could swim in Little Creek Cove.

TABLE 1

SELECTION OF EXPOSURE PATHWAYS

Site 7, NAB Little Creek

Scenario Timeframe	Medium	Exposure Medium	Exposure Point	Receptor Population	Receptor Age	Exposure Route	On-Site/ Off-Site	Type of Analysis	Rationale for Selection or Exclusion of Exposure Pathway
Current/Future	Surface Water	Surface Water	Little Creek Cove	Site Worker	Adult	Dermal Absorption	On-site	Quant	Cove may be used for scuba diving practice and training.
						Ingestion	On-site	Quant	Cove may be used for scuba diving practice and training.
			Pond	Trespasser/Visitor	Adult	Dermal Absorption	On-site	Quant	Although not likely due to limited access, pond could be used for wading.
						Ingestion	On-site	Quant	Although not likely due to limited access, pond could be used for wading.
					Adolescents	Dermal Absorption	On-site	Quant	Although not likely due to limited access, pond could be used for wading.
						Ingestion	On-site	Quant	Although not likely due to limited access, pond could be used for wading.
			Canal on West Side of Site	Trespasser/Visitor	Adult	Dermal Absorption	On-site	Quant	Although not likely due to limited access, pond could be used for wading.
						Ingestion	On-site	Quant	Although not likely due to limited access, pond could be used for wading.
					Adolescents	Dermal Absorption	On-site	Quant	Although not likely due to limited access, pond could be used for wading.
						Ingestion	On-site	Quant	Although not likely due to limited access, pond could be used for wading.
			Canal on East Side of Site	Trespasser/Visitor	Adult	Dermal Absorption	On-site	Quant	Although not likely due to limited access, pond could be used for wading.
						Ingestion	On-site	Quant	Although not likely due to limited access, pond could be used for wading.
					Adolescents	Dermal Absorption	On-site	Quant	Although not likely due to limited access, pond could be used for wading.
						Ingestion	On-site	Quant	Although not likely due to limited access, pond could be used for wading.
		Animal Tissue	Fish from Little Creek Cove	Fisher	Adult	Ingestion	On-site	Qual	Fishing may occur in Little Creek Cove.
					Child	Ingestion	On-site	Qual	Fishing may occur in Little Creek Cove.
	Sediment	Sediment	Little Creek Cove	Trespasser/Visitor	Adult	Dermal Absorption	On-site	Quant	Trespasser/Visistor could swim in Little Creek Cove.
						Ingestion	On-site	Quant	Trespasser/Visistor could swim in Little Creek Cove.
					Adolescents	Dermal Absorption	On-site	Quant	Trespasser/Visistor could swim in Little Creek Cove.
						Ingestion	On-site	Quant	Trespasser/Visistor could swim in Little Creek Cove.
				Site Worker	Adult	Dermal Absorption	On-site	Quant	Cove may be used for scuba diving practice and training.
						Ingestion	On-site	Quant	Cove may be used for scuba diving practice and training.

TABLE 1

SELECTION OF EXPOSURE PATHWAYS

Site 7, NAB Little Creek

Scenario Timeframe	Medium	Exposure Medium	Exposure Point	Receptor Population	Receptor Age	Exposure Route	On-Site/ Off-Site	Type of Analysis	Rationale for Selection or Exclusion of Exposure Pathway
Current/Future	Sediment	Sediment	Pond	Trespasser/Visitor	Adult	Dermal Absorption	On-site	Quant	Although not likely due to limited access, pond could be used for wading.
						Ingestion	On-site	Quant	Although not likely due to limited access, pond could be used for wading.
					Adolescents	Dermal Absorption	On-site	Quant	Although not likely due to limited access, pond could be used for wading.
						Ingestion	On-site	Quant	Although not likely due to limited access, pond could be used for wading.
			Canal on West Side of Site	Trespasser/Visitor	Adult	Dermal Absorption	On-site	Quant	Although not likely due to limited access, pond could be used for wading.
						Ingestion	On-site	Quant	Although not likely due to limited access, pond could be used for wading.
					Adolescents	Dermal Absorption	On-site	Quant	Although not likely due to limited access, pond could be used for wading.
						Ingestion	On-site	Quant	Although not likely due to limited access, pond could be used for wading.
			Canal on East Side of Site	Trespasser/Visitor	Adult	Dermal Absorption	On-site	Quant	Although not likely due to limited access, pond could be used for wading.
						Ingestion	On-site	Quant	Although not likely due to limited access, pond could be used for wading.
					Adolescents	Dermal Absorption	On-site	Quant	Although not likely due to limited access, pond could be used for wading.
						Ingestion	On-site	Quant	Although not likely due to limited access, pond could be used for wading.
Future	Groundwater	Groundwater	Upper Aquifer - Tap Water	Resident	Adult	Dermal Absorption	On-site	Quant	Although unlikely because groundwater is brackish and discharges directly to Little Creek Cove, groundwater could be used as a potable water supply in the future.
						Ingestion	On-site	Quant	Although unlikely because groundwater is brackish and discharges directly to Little Creek Cove, groundwater could be used as a potable water supply in the future.
					Child	Dermal Absorption	On-site	Quant	Although unlikely because groundwater is brackish and discharges directly to Little Creek Cove, groundwater could be used as a potable water supply in the future.
						Ingestion	On-site	Quant	Although unlikely because groundwater is brackish and discharges directly to Little Creek Cove, groundwater could be used as a potable water supply in the future.
					Child/Adult	Dermal Absorption	On-site	Quant	Although unlikely because groundwater is brackish and discharges directly to Little Creek Cove, groundwater could be used as a potable water supply in the future.
						Ingestion	On-site	Quant	Although unlikely because groundwater is brackish and discharges directly to Little Creek Cove, groundwater could be used as a potable water supply in the future.

TABLE 1

SELECTION OF EXPOSURE PATHWAYS

Site 7, NAB Little Creek

Scenario Timeframe	Medium	Exposure Medium	Exposure Point	Receptor Population	Receptor Age	Exposure Route	On-Site/ Off-Site	Type of Analysis	Rationale for Selection or Exclusion of Exposure Pathway
Future	Groundwater	Groundwater	Upper Aquifer - Tap Water	Industrial Worker	Adult	Dermal Absorption	On-site	None	Assumed site workers would not shower regularly at base even if groundwater used as a potable water supply for base.
						Ingestion	On-site	Quant	Although unlikely because groundwater is brackish and discharges directly to Little Creek Cove, groundwater could be used as a potable water supply in the future.
			Upper Aquifer - Excavation Pit	Construction Worker	Adult	Dermal Absorption	On-site	Quant	Construction workers may contact groundwater during excavation activities.
						Ingestion	On-site	None	Ingestion of groundwater during construction activities expected to be minimal.
		Air	Upper Aquifer -Water Vapors at Showerhead	Resident	Adult	Inhalation	On-site	Quant	Although unlikely because groundwater is brackish and discharges directly to Little Creek Cove, groundwater could be used as a potable water supply in the future.
					Child	Inhalation	On-site	None	Children are assumed to take baths, not showers, resulting in minimal inhalation exposure.
					Child/Adult	Inhalation	On-site	None	Children are assumed to take baths, not showers, resulting in minimal inhalation exposure.
				Industrial Worker	Adult	Inhalation	On-site	None	Assumed site workers would not shower regularly at base even if groundwater used as a potable water supply for base.
			Upper Aquifer - Water Vapors at Excavation Pit	Construction Worker	Adult	Inhalation	On-site	Quant	Construction workers may inhale vapors from groundwater during excavation activities.
	Soil*	Soil	Weigh Station Area	Construction Worker	Adult	Dermal Absorption	On-site	Quant	Exposure to soil during construction activities.
						Ingestion	On-site	Quant	Exposure to soil during construction activities.
				Industrial Worker	Adult	Dermal Absorption	On-site	Quant	If site used for industrial use in future, future industrial workers could contact surface and subsurface soil.
						Ingestion	On-site	Quant	If site used for industrial use in future, future industrial workers could contact surface and subsurface soil.
				Resident	Adult	Dermal Absorption	On-site	Quant	Although unlikely, if site used for future residential development, residents could contact soil.
						Ingestion	On-site	Quant	Although unlikely, if site used for future residential development, residents could contact soil.
					Child	Dermal Absorption	On-site	Quant	Although unlikely, if site used for future residential development, residents could contact soil.
						Ingestion	On-site	Quant	Although unlikely, if site used for future residential development, residents could contact soil.
					Child/Adult	Dermal Absorption	On-site	Quant	Although unlikely, if site used for future residential development, residents could contact soil.
						Ingestion	On-site	Quant	Although unlikely, if site used for future residential development, residents could contact soil.
		Air	Emissions from Soil at Weigh Station Area	Construction Worker	Adult	Inhalation	On-site	Quant	Exposure to emissions from soil during construction activities.
				Industrial Worker	Adult	Inhalation	On-site	Quant	If site used for industrial use in future, future industrial workers could inhale vapors and dust from soil.

TABLE 1

SELECTION OF EXPOSURE PATHWAYS

Site 7, NAB Little Creek

Scenario Timeframe	Medium	Exposure Medium	Exposure Point	Receptor Population	Receptor Age	Exposure Route	On-Site/ Off-Site	Type of Analysis	Rationale for Selection or Exclusion of Exposure Pathway
Future	Soil*	Air	Emissions from Soil at Weigh Station Area	Resident	Adult	Inhalation	On-site	Quant	If site used for future residential development, residents could inhale vapors and dust from soil.
					Child	Inhalation	On-site	Quant	If site used for future residential development, residents could inhale vapors and dust from soil.
					Child/Adult	Inhalation	On-site	Quant	If site used for future residential development, residents could inhale vapors and dust from soil.
		Soil	Area to West of Landfill, the "Ear"	Construction Worker	Adult	Dermal Absorption	On-site	Quant	Exposure to soil during construction activities.
						Ingestion	On-site	Quant	Exposure to soil during construction activities.
				Industrial Worker	Adult	Dermal Absorption	On-site	Quant	If site used for industrial use in future, future industrial workers could contact surface and subsurface soil.
						Ingestion	On-site	Quant	If site used for industrial use in future, future industrial workers could contact surface and subsurface soil.
				Resident	Adult	Dermal Absorption	On-site	Quant	Although unlikely, if site used for future residential development, residents could contact soil.
						Ingestion	On-site	Quant	Although unlikely, if site used for future residential development, residents could contact soil.
					Child	Dermal Absorption	On-site	Quant	Although unlikely, if site used for future residential development, residents could contact soil.
						Ingestion	On-site	Quant	Although unlikely, if site used for future residential development, residents could contact soil.
					Child/Adult	Dermal Absorption	On-site	Quant	Although unlikely, if site used for future residential development, residents could contact soil.
						Ingestion	On-site	Quant	Although unlikely, if site used for future residential development, residents could contact soil.
		Air	Emissions from Soil at Area to West of Landfill	Construction Worker	Adult	Inhalation	On-site	Quant	Exposure to emissions from soil during construction activities.
				Industrial Worker	Adult	Inhalation	On-site	Quant	If site used for industrial use in future, future industrial workers could inhale vapors and dust from soil.
				Resident	Adult	Inhalation	On-site	Quant	If site used for future residential development, residents could inhale vapors and dust from soil.
					Child	Inhalation	On-site	Quant	If site used for future residential development, residents could inhale vapors and dust from soil.
					Child/Adult	Inhalation	On-site	Quant	If site used for future residential development, residents could inhale vapors and dust from soil.
		Soil	Site Perimeter	Construction Worker	Adult	Dermal Absorption	On-site	Quant	Exposure to soil during construction activities.
						Ingestion	On-site	Quant	Exposure to soil during construction activities.
				Industrial Worker	Adult	Dermal Absorption	On-site	Quant	If site used for industrial use in future, future industrial workers could contact surface and subsurface soil.
						Ingestion	On-site	Quant	If site used for industrial use in future, future industrial workers could contact surface and subsurface soil.

TABLE 1

SELECTION OF EXPOSURE PATHWAYS

Site 7, NAB Little Creek

Scenario Timeframe	Medium	Exposure Medium	Exposure Point	Receptor Population	Receptor Age	Exposure Route	On-Site/ Off-Site	Type of Analysis	Rationale for Selection or Exclusion of Exposure Pathway
Future	Soil*	Soil	Site Perimeter	Resident	Adult	Dermal Absorption	On-site	Quant	Although unlikely, if site used for future residential development, residents could contact soil.
						Ingestion	On-site	Quant	Although unlikely, if site used for future residential development, residents could contact soil.
					Child	Dermal Absorption	On-site	Quant	Although unlikely, if site used for future residential development, residents could contact soil.
						Ingestion	On-site	Quant	Although unlikely, if site used for future residential development, residents could contact soil.
					Child/Adult	Dermal Absorption	On-site	Quant	Although unlikely, if site used for future residential development, residents could contact soil.
						Ingestion	On-site	Quant	Although unlikely, if site used for future residential development, residents could contact soil.
		Air	Emissions from Soil at Site Perimeter	Construction Worker	Adult	Inhalation	On-site	Quant	Exposure to emissions from soil during construction activities.
				Industrial Worker	Adult	Inhalation	On-site	Quant	If site used for industrial use in future, future industrial workers could inhale vapors and dust from soil.
				Resident	Adult	Inhalation	On-site	Quant	If site used for future residential development, residents could inhale vapors and dust from soil.
					Child	Inhalation	On-site	Quant	If site used for future residential development, residents could inhale vapors and dust from soil.
					Child/Adult	Inhalation	On-site	Quant	If site used for future residential development, residents could inhale vapors and dust from soil.
		Soil	Covered Area	Construction Worker	Adult	Dermal Absorption	On-site	Quant	Exposure to soil during construction activities.
						Ingestion	On-site	Quant	Exposure to soil during construction activities.
				Industrial Worker	Adult	Dermal Absorption	On-site	Quant	If site used for industrial use in future, future industrial workers could contact surface and subsurface soil.
						Ingestion	On-site	Quant	If site used for industrial use in future, future industrial workers could contact surface and subsurface soil.
				Resident	Adult	Dermal Absorption	On-site	Quant	Although unlikely, if site used for future residential development, residents could contact soil.
						Ingestion	On-site	Quant	Although unlikely, if site used for future residential development, residents could contact soil.
					Child	Dermal Absorption	On-site	Quant	Although unlikely, if site used for future residential development, residents could contact soil.
						Ingestion	On-site	Quant	Although unlikely, if site used for future residential development, residents could contact soil.
					Child/Adult	Dermal Absorption	On-site	Quant	Although unlikely, if site used for future residential development, residents could contact soil.
						Ingestion	On-site	Quant	Although unlikely, if site used for future residential development, residents could contact soil.

TABLE 1

SELECTION OF EXPOSURE PATHWAYS

Site 7, NAB Little Creek

Scenario Timeframe	Medium	Exposure Medium	Exposure Point	Receptor Population	Receptor Age	Exposure Route	On-Site/ Off-Site	Type of Analysis	Rationale for Selection or Exclusion of Exposure Pathway
Future	Soil*	Air	Emissions from Soil within Covered Area	Construction Worker	Adult	Inhalation	On-site	Quant	Exposure to emissions from soil during construction activities.
				Industrial Worker	Adult	Inhalation	On-site	Quant	If site used for industrial use in future, future industrial workers could inhale vapors and dust from soil.
				Resident	Adult	Inhalation	On-site	Quant	If site used for future residential development, residents could inhale vapors and dust from soil.
					Child	Inhalation	On-site	Quant	If site used for future residential development, residents could inhale vapors and dust from soil.
					Child/Adult	Inhalation	On-site	Quant	If site used for future residential development, residents could inhale vapors and dust from soil.

*Surface and subsurface soil.

Table 2.1

OCCURRENCE, DISTRIBUTION AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN

Site 7, NAB Little Creek

Scenario Timeframe: Current
Medium: Surface Soil
Exposure Medium: Surface Soil
Exposure Point: Weigh Station Area

CAS Number	Chemical	Minimum [1] Concentration	Minimum Qualifier	Maximum [1] Concentration	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration [2] Used for Screening	Background [3] Value	Screening [4] Toxicity Value	Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag	Rationale for [5] Contaminant Deletion or Selection
129-00-0	Pyrene	0.052	J	0.052	J	MG/KG	07-SS-104	1/2	0.42 - 0.42	0.052		235 N	68	SSL	NO	BSL
117-81-7	bis(2-Ethylhexyl)phthalate	0.14	J	0.14	J	MG/KG	07-SS-104	1/2	0.42 - 0.42	0.14		45.6 C	290	SSL	NO	BSL
11097-69-1	Aroclor-1254	0.06		0.06		MG/KG	LS07-SS203-00	1/2	0.042 - 0.34	0.06		0.32 C	1.1	SSL	NO	BSL
11096-82-5	Aroclor-1260	0.099	J	0.92		MG/KG	07-SS-104	2/2	0.042 - 0.042	0.92		0.319 C	NA		YES	ASL
5103-71-9	alpha-Chlordane	0.02		0.02		MG/KG	LS07-SS203-00	1/2	0.0022 - 0.017	0.02		1.82 C	0.92	SSL	NO	BSL
12789-03-6	gamma-Chlordane	0.015		0.015		MG/KG	LS07-SS203-00	1/2	0.0022 - 0.017	0.015		1.82 C	0.92	SSL	NO	BSL
7429-90-5	Aluminum	5,800		6,240		MG/KG	07-SS-104	2/2	42.765 - 42.765	6240	8500	7,821 N	NA		NO	BSL
7440-36-0	Antimony	1.9	J	1.9	J	MG/KG	LS07-SS203-00	1/2	3.9 - 12.83	1.9		3.13 N	1.3	SSL	NO	BSL
7440-38-2	Arsenic	2.3		2.3		MG/KG	07-SS-104	1/2	2.138 - 2.138	2.3	5.6	0.426 C	0.026	SSL	YES	ASL
7440-39-3	Barium	31.1	J	93.9		MG/KG	07-SS-104	2/2	42.765 - 42.765	93.9	69	548 N	210	SSL	NO	BSL
7440-41-7	Beryllium	0.43		0.43		MG/KG	07-SS-104	1/2	1.069 - 1.069	0.43	0.6	15.6 N	120	SSL	NO	BSL
7440-43-9	Cadmium	1.4		1.4		MG/KG	07-SS-104	1/2	1.069 - 1.069	1.4		7.8 N	5.5	SSL	NO	BSL
7440-70-2	Calcium	400	J	2,120		MG/KG	07-SS-104	2/2	1069.13 - 1069.13	2120	1817	NA	NA		NO	NUT
7440-47-3	Chromium	13.4	J	26.5		MG/KG	07-SS-104	2/2	2.138 - 2.138	26.5	20	23.5 N	4.2	SSL	YES	ASL
7440-48-4	Cobalt	1.7	J	5.9		MG/KG	07-SS-104	2/2	10.691 - 10.691	5.9	5.1	160 N	NA		NO	BSL
7440-50-8	Copper	55.4	J	78.2	J	MG/KG	07-SS-104	2/2	5.346 - 5.346	78.2		313 N	1100	SSL	NO	BSL
7439-89-6	Iron	7,540		14,800	J	MG/KG	07-SS-104	2/2	21.383 - 21.383	14800	15000	2,300 N	NA		YES	ASL
7439-92-1	Lead	143	J	638	J	MG/KG	07-SS-104	2/2	0.641 - 0.641	638	110	400	NA		YES	ASL
7439-95-4	Magnesium	369	J	3,210		MG/KG	07-SS-104	2/2	1069.13 - 1069.13	3210	1347	NA	NA		NO	NUT
7439-96-5	Manganese	28	K	470	J	MG/KG	07-SS-104	2/2	3.207 - 3.207	470	267	156 N	95	SSL	YES	ASL
7439-97-6	Mercury	0.2		0.2		MG/KG	LS07-SS203-00	1/2	0.1 - 0.44	0.2		2.35 N	NA		NO	BSL
7440-02-0	Nickel	12.1		18		MG/KG	07-SS-104	2/2	8.553 - 8.553	18	9.5	156 N	NA		NO	BSL
7440-09-7	Potassium	2,970		2,970		MG/KG	07-SS-104	1/2	1069.13 - 1069.13	2970	1435	NA	NA		NO	NUT
7440-62-2	Vanadium	21.6		36.7		MG/KG	07-SS-104	2/2	10.691 - 10.691	36.7	34.3	2.3 N	510	SSL	YES	ASL
7440-66-6	Zinc	146		320		MG/KG	07-SS-104	2/2	4.277 - 4.277	320	123	2,346 N	1400	SSL	NO	BSL

[1] Minimum/Maximum detected concentrations.
[2] Maximum concentration is used for screening.
[3] 95%UTL for urban surface soil from Little Creek Background Investigation.
[4] Risk-Based Concentration Table, October 15, 2003, U.S. EPA Region III, Jennifer Hubbard. Residential Soil.
RBC value for cadmium-food used as surrogate for cadmium.
RBC value for Chromium VI used for total chromium.
Lead screening toxicity value is 400 mg/kg, the EPA residential soil screening level for lead.
RBC value for manganese-nonfood used as surrogate for manganese.
RBC value for mercuric chloride used as surrogate for mercury.
[5] Rationale Codes

Selection Reason: Above Screening Levels (ASL)
Deletion Reason: No Toxicity Information (NTX)
Essential Nutrient (NUT)
Below Screening Level (BSL)

SQL = Sample Quantification Limit
COPC = Chemical of Potential Concern
ARAR/TBC = Applicable or Relevant and Appropriate Requirement/ To Be Considered
J = Estimated Value
K = Biased High
L = Biased Low
C = Carcinogenic
N = Noncarcinogenic
SSL = Region III Soil Screening Level, Soil to Groundwater Migration, DAF 20

Table 2.2

OCCURRENCE, DISTRIBUTION AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN

Site 7, NAB Little Creek

Scenario Timeframe: Current
Medium: Surface Soil
Exposure Medium: Air
Exposure Point: Emissions from Soil at Weigh Station Area

CAS Number	Chemical	Minimum [1] Concentration	Minimum Qualifier	Maximum [1] Concentration	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration [2] Used for Screening	Background [3] Value	Screening [4] Toxicity Value	Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag	Rationale for [5] Contaminant Deletion or Selection
v 129-00-0	Pyrene	1.1E-08		1.1E-08	J	MG/M^3	07-SS-104	1/2	(6)	1.1E-08		1.1E-02 N			NO	BSL
117-81-7	bis(2-Ethylhexyl)phthalate	1.06E-10	J	1.06E-10	J	MG/M^3	07-SS-104	1/2	(6)	1.1E-10		4.5E-04 C			NO	BSL
11097-69-1	Aroclor-1254	4.55E-11		4.55E-11		MG/M^3	LS07-SS203-00	1/2	(6)	4.5E-11		3.1E-06 C			NO	BSL
11096-82-5	Aroclor-1260	7.5E-11	J	6.97E-10		MG/M^3	07-SS-104	2/2	(6)	7.0E-10		3.1E-06 C			NO	BSL
5103-71-9	alpha-Chlordane	1.52E-11		1.52E-11		MG/M^3	LS07-SS203-00	1/2	(6)	1.5E-11		1.8E-05 C			NO	BSL
12789-03-6	gamma-Chlordane	1.14E-11		1.14E-11		MG/M^3	LS07-SS203-00	1/2	(6)	1.1E-11		1.8E-05 C			NO	BSL
7429-90-5	Aluminum	4.39E-06		4.73E-06		MG/M^3	07-SS-104	2/2	(6)	4.7E-06		3.7E-04 N			NO	BSL
7440-36-0	Antimony	1.44E-09	J	1.44E-09	J	MG/M^3	LS07-SS203-00	1/2	(6)	1.4E-09		1.5E-04 N			NO	BSL
7440-38-2	Arsenic	1.74E-09		1.74E-09		MG/M^3	07-SS-104	1/2	(6)	1.7E-09		4.1E-07 C			NO	BSL
7440-39-3	Barium	2.36E-08	J	7.11E-08		MG/M^3	07-SS-104	2/2	(6)	7.1E-08		5.1E-05 N			NO	BSL
7440-41-7	Beryllium	3.26E-10		3.26E-10		MG/M^3	07-SS-104	1/2	(6)	3.3E-10		7.5E-07 C			NO	BSL
7440-43-9	Cadmium	1.06E-09		1.06E-09		MG/M^3	07-SS-104	1/2	(6)	1.1E-09		9.9E-07 C			NO	BSL
7440-70-2	Calcium	3.03E-07	J	1.61E-06		MG/M^3	07-SS-104	2/2	(6)	1.6E-06		NA			NO	NUT
7440-47-3	Chromium	1.02E-08	J	2.01E-08		MG/M^3	07-SS-104	2/2	(6)	2.0E-08		1.5E-07 C			NO	BSL
7440-48-4	Cobalt	1.29E-09	J	4.47E-09		MG/M^3	07-SS-104	2/2	(6)	4.5E-09		6.4E-07 N			NO	BSL
7440-50-8	Copper	4.2E-08	J	5.92E-08	J	MG/M^3	07-SS-104	2/2	(6)	5.9E-08		1.5E-02 N			NO	BSL
7439-89-6	Iron	5.71E-06		1.12E-05	J	MG/M^3	07-SS-104	2/2	(6)	1.1E-05		1.1E-01 N			NO	BSL
7439-92-1	Lead	1.08E-07	J	4.83E-07	J	MG/M^3	07-SS-104	2/2	(6)	4.8E-07		NA			NO	NTX
7439-95-4	Magnesium	2.8E-07	J	2.43E-06		MG/M^3	07-SS-104	2/2	(6)	2.4E-06		NA			NO	NUT
7439-96-5	Manganese	2.12E-08	K	3.56E-07	J	MG/M^3	07-SS-104	2/2	(6)	3.6E-07		5.2E-06 N			NO	BSL
7439-97-6	Mercury	1.52E-10		1.52E-10		MG/M^3	LS07-SS203-00	1/2	(6)	1.5E-10		3.1E-05 N			NO	BSL
7440-02-0	Nickel	9.17E-09		1.36E-08		MG/M^3	07-SS-104	2/2	(6)	1.4E-08		7.3E-03 N			NO	BSL
7440-09-7	Potassium	2.25E-06		2.25E-06		MG/M^3	07-SS-104	1/2	(6)	2.3E-06		NA			NO	NUT
7440-62-2	Vanadium	1.64E-08		2.78E-08		MG/M^3	07-SS-104	2/2	(6)	2.8E-08		1.1E-04 N			NO	BSL
7440-66-6	Zinc	1.11E-07		2.42E-07		MG/M^3	07-SS-104	2/2	(6)	2.4E-07		1.1E-01 N			NO	BSL

[1] Minimum/maximum detected soil concentration multiplied by 1/PEF (1.32E+9 m3/kg) and 1/VF(chemical specific for VOCs only) to get air concentration. PEF and VF from EPA's Soil Screening Guidance. VFs calculated in Table 2.2A.

[2] Maximum concentration is used for screening.

[3] Background values not available.

[4] Risk-Based Concentration Table, October 15, 2003, U.S. EPA Region III, Jennifer Hubbard. Ambient Air.
RBC value for cadmium-food used as surrogate for cadmium.
RBC value for Chromium VI used for total chromium.
Lead screening toxicity value is 400 mg/kg, the EPA residential soil screening level for lead.
RBC value for manganese-nonfood used as surrogate for manganese.

[5] Rationale Codes

Selection Reason: Above Screening Levels (ASL)

Deletion Reason: No Toxicity Information (NTX)
Essential Nutrient (NUT)
Below Screening Level (BSL)

(6) See Table 2.1 for surface soil data detection limits, concentrations converted from surface soil data to air concetrations.

SQL = Sample Quantification Limit
COPC = Chemical of Potential Concern
ARAR/TBC = Applicable or Relevant and Appropriate Requirement/ To Be Considered
J = Estimated Value
K = Biased High
L = Biased Low
C = Carcinogenic
N = Noncarcinogenic
SSL = Region III Soil Screening Level, Soil to Groundwater Migration, DAF 20

Table 2.2A
OCCURRENCE, DISTRIBUTION AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN
Calculation of Generic Chemical Specific VF Factors
Site 7, NAB Little Creek

Chemical	Diffusivity in Air (D_i) (cm^2/s)	Henry's Law Constant (H') (unitless)	Diffusivity in Water (D_w) (cm^2/s)	Soil Organic Carbon Partition Coeff. (K_{oc}) (cm^3/g)	Soil Water Partition Coeff. ($K_d = K_{oc} \times F_{oc}$) ($g/cm^3$)	Solubility in Water (S) (mg/L)	Apparent Diffusivity (D_A) (cm^2/s)	Volatilization Factor (VF) (m^3/kg)
Anthracene	3.24E-02	2.67E-03	7.74E-06	2.95E+04	1.77E+02	4.34E-02	2.63E-08	1.01E+06
Fluorene	3.63E-02	2.61E-03	7.88E-06	1.38E+04	8.28E+01	1.98E+00	6.15E-08	6.63E+05
Pyrene	2.72E-02	4.51E-04	7.24E-06	1.05E+05	6.30E+02	1.35E-01	1.11E-09	4.93E+06

Volatilization factor (VF) = (m^3/kg)

$$\frac{Q/C * (3.14 * D_A * T)^{1/2} * 10^{-4}\ m^2/cm^2}{2 * r_b * D_A}$$

Apparent Diffusivity (D_A) = (cm^2/s)

$$\frac{[(Q_a^{10/3} * D_i * H' + Q_w^{10/3} * D_w)/n^2]}{(r_b * K_d + Q_w + Q_a * H')}$$

Parameters	Values
Q/C - Inverse of the mean concentration at the center of a 0.5-acre-square source for Philadelphia (g/m^2-s per kg/m^3)	90.24
T - Exposure interval(s)	9.5E+08
r_b - Soil bulk density (g/cm^3)	1.5
Q_a - Air-filled soil porosity (L_{air}/L_{water}) = n - Q_w	0.28
n - Total soil porosity (Lpore/Lsoil) = 1 - (r_b/r_s)	0.43
Q_w - Water-filled soil porosity (Lwater/Lsoil)	0.15
r_s - Soil particle density (g/cm^3)	2.65
f_{oc} - fraction organic carbon in soil (g/g)	0.006

Chemical and physical properties from USEPA, 1996, *Soil Screening Guidance: User's Guide,* EPA/540/R-96/018.

Table 2.3

OCCURRENCE, DISTRIBUTION AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN

Site 7, NAB Little Creek

Scenario Timeframe: Current
Medium: Surface Soil
Exposure Medium: Surface Soil
Exposure Point: Area to West of Landfill, the "Ear"

CAS Number	Chemical	Minimum [1] Concentration	Minimum Qualifier	Maximum [1] Concentration	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration [2] Used for Screening	Background [3] Value	Screening [4] Toxicity Value	Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag	Rationale for [5] Contaminant Deletion or Selection
205-99-2	Benzo(b)fluoranthene	0.08	J	0.08	J	MG/KG	LS07-SS201P-00	1/2	0.36 - 0.44	0.08		0.875 C	4.5	SSL	NO	BSL
207-08-9	Benzo(k)fluoranthene	0.045	J	0.045	J	MG/KG	LS07-SS201P-00	1/2	0.36 - 0.44	0.045		8.75 C	45	SSL	NO	BSL
218-01-9	Chrysene	0.07	J	0.07	J	MG/KG	LS07-SS201P-00	1/2	0.36 - 0.44	0.07		87.5 C	87.5	SSL	NO	BSL
7429-90-5	Aluminum	2,070		6,180		MG/KG	LS07-SS201-00	2/2	36.964 - 48.038	6180	8500	7,821 N	NA	SSL	NO	BSL
7440-36-0	Antimony	1.1	J	1.1	J	MG/KG	LS07-SS201-00	1/2	11.089 - 14.411	1.1		3.13 N	1.3	SSL	NO	BSL
7440-38-2	Arsenic	4.6		4.6		MG/KG	LS07-SS201P-00	1/2	1.848 - 2.402	4.6	5.6	0.426 C	0.026	SSL	YES	ASL
7440-39-3	Barium	7.8	J	24.3	J	MG/KG	LS07-SS201-00	2/2	36.964 - 48.038	24.3	69	548 N	210	SSL	NO	BSL
7440-70-2	Calcium	441	J	515	J	MG/KG	LS07-SS202-00	2/2	924.095 - 1200.942	515	1817	NA	NA	SSL	NO	NUT
7440-47-3	Chromium	4.8	J	14	J	MG/KG	LS07-SS201-00	2/2	1.848 - 2.402	14	20	23.5 N	4.2	SSL	NO	BSL
7440-48-4	Cobalt	2	J	2	J	MG/KG	LS07-SS201-00	1/2	9.241 - 12.009	2	5.1	160 N	160	SSL	NO	BSL
7440-50-8	Copper	6.5	J	37.9	J	MG/KG	LS07-SS201-00	2/2	4.62 - 6.005	37.9		313 N	1100	SSL	NO	BSL
57-12-5	Cyanide	0.09	J	0.09	J	MG/KG	LS07-SS202-00	1/2	0.5 - 0.5	0.09		156 N	15	SSL	NO	BSL
7439-89-6	Iron	3,310		8,840		MG/KG	LS07-SS201-00	2/2	18.482 - 24.019	8840	15000	2,300 N	NA		YES	ASL
7439-92-1	Lead	11.8	J	41.9	J	MG/KG	LS07-SS201-00	2/2	0.554 - 0.721	41.9	110	400	NA		NO	BSL
7439-95-4	Magnesium	435	J	949	J	MG/KG	LS07-SS201-00	2/2	924.095 - 1200.942	949	1347	NA	NA		NO	NUT
7439-96-5	Manganese	19.6	K	34.9	K	MG/KG	LS07-SS201-00	2/2	2.772 - 3.603	34.9	267	156 N	95	SSL	NO	BSL
7439-97-6	Mercury	0.03	J	0.03	J	MG/KG	LS07-SS202-00	1/2	0.1 - 0.1	0.03		2.35 N	NA		NO	BSL
7440-02-0	Nickel	6.8	J	6.8	J	MG/KG	LS07-SS201-00	1/2	7.393 - 9.608	6.8	9.5	156 N	NA		NO	BSL
7440-09-7	Potassium	434	J	666	J	MG/KG	LS07-SS201-00	2/2	924.095 - 1200.942	666	1435	NA	NA		NO	NUT
7782-49-2	Selenium	0.93	J	0.93	J	MG/KG	LS07-SS201-00	1/2	0.924 - 1.201	0.93		39.1 N	1.9	SSL	NO	BSL
7440-23-5	Sodium	422	J	422	J	MG/KG	LS07-SS201-00	1/2	924.095 - 1200.942	422	623	NA	NA		NO	NUT
7440-28-0	Thallium	1	J	1	J	MG/KG	LS07-SS202-00	1/2	1.848 - 2.402	1		0.548 N	0.36	SSL	YES	ASL
7440-62-2	Vanadium	10		26		MG/KG	LS07-SS201-00	2/2	9.241 - 12.009	26	34.3	2.3 N	510	SSL	YES	ASL
7440-66-6	Zinc	55.2		55.2		MG/KG	LS07-SS201-00	1/2	3.696 - 4.804	55.2	123	2,346 N	1400	SSL	NO	BSL

[1] Minimum/Maximum detected concentrations.
[2] Maximum concentration is used for screening.
[3] 95%UTL for urban surface soil from Little Creek Background Investigation.
[4] Risk-Based Concentration Table, October 15, 2003, U.S. EPA Region III, Jennifer Hubbard. Residential Soil.
RBC value for Chromium VI used for total chromium.
Lead screening toxicity value is 400 mg/kg, the EPA residential soil screening level for lead.
RBC value for manganese-nonfood used as surrogate for manganese.
RBC value for mercuric chloride used as surrogate for mercury.
[5] Rationale Codes

Selection Reason: Above Screening Levels (ASL)
Deletion Reason: No Toxicity Information (NTX)
Essential Nutrient (NUT)
Below Screening Level (BSL)

SQL = Sample Quantification Limit
COPC = Chemical of Potential Concern
ARAR/TBC = Applicable or Relevant and Appropriate Requirement/ To Be Considered
J = Estimated Value
K = Biased High
L = Biased Low
C = Carcinogenic
N = Noncarcinogenic
SSL = Region III Soil Screening Level, Soil to Groundwater Migration, DAF 20

Table 2.4

OCCURRENCE, DISTRIBUTION AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN

Site 7, NAB Little Creek

Scenario Timeframe: Current
Medium: Surface Soil
Exposure Medium: Air
Exposure Point: Emissions from Soil at Area to West of Landfill

CAS Number	Chemical	Minimum [1] Concentration	Minimum Qualifier	Maximum [1] Concentration	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration [2] Used for Screening	Background [3] Value	Screening [4] Toxicity Value	Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag	Rationale for [5] Contaminant Deletion or Selection
205-99-2	Benzo(b)fluoranthene	6.06E-11	J	6.06E-11	J	MG/M^3	LS07-SS201P-00	1/2	(6)	6.1E-11		8.6E-06 C			NO	BSL
207-08-9	Benzo(k)fluoranthene	3.41E-11	J	3.41E-11	J	MG/M^3	LS07-SS201P-00	1/2	(6)	3.4E-11		8.6E-05 C			NO	BSL
218-01-9	Chrysene	5.3E-11	J	5.3E-11	J	MG/M^3	LS07-SS201P-00	1/2	(6)	5.3E-11		8.6E-04 C			NO	BSL
7429-90-5	Aluminum	1.57E-06		4.68E-06		MG/M^3	LS07-SS201-00	2/2	(6)	4.7E-06		3.7E-04 N			NO	BSL
7440-36-0	Antimony	8.33E-10	J	8.33E-10	J	MG/M^3	LS07-SS201-00	1/2	(6)	8.3E-10		1.5E-04 N			NO	BSL
7440-38-2	Arsenic	3.48E-09		3.48E-09		MG/M^3	LS07-SS201P-00	1/2	(6)	3.5E-09		4.1E-07 C			NO	BSL
7440-39-3	Barium	5.91E-09	J	1.84E-08	J	MG/M^3	LS07-SS201-00	2/2	(6)	1.8E-08		5.1E-05 N			NO	BSL
7440-70-2	Calcium	3.34E-07	J	3.9E-07	J	MG/M^3	LS07-SS202-00	2/2	(6)	3.9E-07		NA			NO	NUT
7440-47-3	Chromium	3.64E-09	J	1.06E-08	J	MG/M^3	LS07-SS201-00	2/2	(6)	1.1E-08		1.5E-07 C			NO	BSL
7440-48-4	Cobalt	1.52E-09	J	1.52E-09	J	MG/M^3	LS07-SS201-00	1/2	(6)	1.5E-09		6.4E-07 N			NO	BSL
7440-50-8	Copper	4.92E-09	J	2.87E-08	J	MG/M^3	LS07-SS201-00	2/2	(6)	2.9E-08		1.5E-02 N			NO	BSL
57-12-5	Cyanide	6.82E-11	J	6.82E-11	J	MG/M^3	LS07-SS202-00	1/2	(6)	6.8E-11		7.3E-03 N			NO	BSL
7439-89-6	Iron	2.51E-06		6.7E-06		MG/M^3	LS07-SS201-00	2/2	(6)	6.7E-06		1.1E-01 N			NO	BSL
7439-92-1	Lead	8.94E-09	J	3.17E-08	J	MG/M^3	LS07-SS201-00	2/2	(6)	3.2E-08		NA			NO	BSL
7439-95-4	Magnesium	3.3E-07	J	7.19E-07	J	MG/M^3	LS07-SS201-00	2/2	(6)	7.2E-07		NA			NO	NUT
7439-96-5	Manganese	1.48E-08	K	2.64E-08	K	MG/M^3	LS07-SS201-00	2/2	(6)	2.6E-08		5.2E-06 N			NO	BSL
7439-97-6	Mercury	2.27E-11	J	2.27E-11	J	MG/M^3	LS07-SS202-00	1/2	(6)	2.3E-11		3.1E-05 N			NO	BSL
7440-02-0	Nickel	5.15E-09	J	5.15E-09	J	MG/M^3	LS07-SS201-00	1/2	(6)	5.2E-09		7.3E-03 N			NO	BSL
7440-09-7	Potassium	3.29E-07	J	5.05E-07	J	MG/M^3	LS07-SS201-00	2/2	(6)	5.0E-07		NA			NO	NUT
7782-49-2	Selenium	7.05E-10	J	7.05E-10	J	MG/M^3	LS07-SS201-00	1/2	(6)	7.0E-10		1.8E-03 N			NO	BSL
7440-23-5	Sodium	3.2E-07	J	3.2E-07	J	MG/M^3	LS07-SS201-00	1/2	(6)	3.2E-07		NA			NO	NUT
7440-28-0	Thallium	7.58E-10	J	7.58E-10	J	MG/M^3	LS07-SS202-00	1/2	(6)	7.6E-10		2.6E-05 N			NO	BSL
7440-62-2	Vanadium	7.58E-09		1.97E-08		MG/M^3	LS07-SS201-00	2/2	(6)	2.0E-08		1.1E-04 N			NO	BSL
7440-66-6	Zinc	4.18E-08		4.18E-08		MG/M^3	LS07-SS201-00	1/2	(6)	4.2E-08		1.1E-01 N			NO	BSL

[1] Minimum/maximum detected soil concentration multiplied by 1/PEF (1.32E+9 m3/kg) and 1/VF(chemical specific for VOCs only) to get air concentration. PEF and VF from EPA's Soil Screening Guidance. VFs calculated in Table 2.2A.

[2] Maximum concentration is used for screening.

[3] Background values not available.

[4] Risk-Based Concentration Table, October 15, 2003, U.S. EPA Region III, Jennifer Hubbard. Ambient Air.
RBC value for Chromium VI used for total chromium.
Lead screening toxicity value is 400 mg/kg, the EPA residential soil screening level for lead.
RBC value for manganese-nonfood used as surrogate for manganese.

[5] Rationale Codes

Selection Reason: Above Screening Levels (ASL)

Deletion Reason: No Toxicity Information (NTX)
Essential Nutrient (NUT)
Below Screening Level (BSL)

(6) See Table 2.3 for surface soil data detection limits, concentrations converted from surface soil data to air concetrations.

SQL = Sample Quantification Limit
COPC = Chemical of Potential Concern
ARAR/TBC = Applicable or Relevant and Appropriate Requirement/ To Be Considered
J = Estimated Value
K = Biased High
L = Biased Low
C = Carcinogenic
N = Noncarcinogenic
SSL = Region III Soil Screening Level, Soil to Groundwater Migration, DAF 20

Table 2.5

OCCURRENCE, DISTRIBUTION AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN

Site 7, NAB Little Creek

Scenario Timeframe: Current
Medium: Surface Soil
Exposure Medium: Surface Soil
Exposure Point: Site Perimeter

CAS Number	Chemical	Minimum [1] Concentration	Minimum Qualifier	Maximum [1] Concentration	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration [2] Used for Screening	Background [3] Value	Screening [4] Toxicity Value	Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag	Rationale for [5] Contaminant Deletion or Selection
120-12-7	Anthracene	0.22	J	0.22	J	MG/KG	07-SS-101	1/2	0.36 - 0.36	0.22		2,346 N	47	SSL	NO	BSL
56-55-3	Benzo(a)anthracene	0.71		0.71		MG/KG	07-SS-101	1/2	0.36 - 0.36	0.71		0.875 C	1.5	SSL	NO	BSL
50-32-8	Benzo(a)pyrene	0.45		0.45		MG/KG	07-SS-101	1/2	0.36 - 0.36	0.45		0.0875 C	0.37	SSL	YES	ASL
205-99-2	Benzo(b)fluoranthene	0.51		0.51		MG/KG	07-SS-101	1/2	0.36 - 0.36	0.51		0.875 C	4.5	SSL	NO	BSL
191-24-2	Benzo(g,h,i)perylene	0.21	J	0.21	J	MG/KG	07-SS-101	1/2	0.36 - 0.36	0.21		235 N	NA		NO	BSL
207-08-9	Benzo(k)fluoranthene	0.38		0.38		MG/KG	07-SS-101	1/2	0.36 - 0.36	0.38		8.75 C	8.75	SSL	NO	BSL
85-68-7	Butylbenzylphthalate	0.058	J	0.058	J	MG/KG	07-SS-101	1/2	0.36 - 0.36	0.058		1,564 N	NA		NO	BSL
218-01-9	Chrysene	0.39		0.39		MG/KG	07-SS-101	1/2	0.36 - 0.36	0.39		87.5 C	150	SSL	NO	BSL
206-44-0	Fluoranthene	1.3		1.3		MG/KG	07-SS-101	1/2	0.36 - 0.36	1.3		313 N	630	SSL	NO	BSL
86-73-7	Fluorene	0.06	J	0.06	J	MG/KG	07-SS-101	1/2	0.36 - 0.36	0.06		313 N	14	SSL	NO	BSL
193-39-5	Indeno(1,2,3-cd)pyrene	0.23	J	0.23	J	MG/KG	07-SS-101	1/2	0.36 - 0.36	0.23		0.875 C	13	SSL	NO	BSL
85-01-8	Phenanthrene	0.83		0.83		MG/KG	07-SS-101	1/2	0.36 - 0.83	0.83		235 N	NA		NO	BSL
129-00-0	Pyrene	1.6		1.6		MG/KG	07-SS-101	1/2	0.36 - 0.36	1.6		235 N	68	SSL	NO	BSL
117-81-7	bis(2-Ethylhexyl)phthalate	0.047	J	0.15	J	MG/KG	07-SS-101	2/2	NA	0.15		45.6 C	290	SSL	NO	BSL
7429-90-5	Aluminum	2,880		3,410		MG/KG	07-SS-101	2/2	NA	3410	8500	7,821 N	NA		NO	BSL
7440-38-2	Arsenic	2.2		3.5		MG/KG	07-SS-108	2/2	NA	3.5	5.6	0.426 C	0.26	SSL	YES	ASL
7440-39-3	Barium	11.4		12.1		MG/KG	07-SS-101	2/2	NA	12.1	69	548 N	210	SSL	NO	BSL
7440-43-9	Cadmium	0.65		0.65		MG/KG	07-SS-108	1/2	0.53 - 0.53	0.65		7.8 N	5.5	SSL	NO	BSL
7440-70-2	Calcium	206		843	J	MG/KG	07-SS-101	2/2	NA	843	1817	NA	NA		NO	NUT
7440-47-3	Chromium	8.3		9.5		MG/KG	07-SS-108	2/2	NA	9.5	20	23.5 N	4.2	SSL	NO	BSL
7440-48-4	Cobalt	1.1		1.4		MG/KG	07-SS-101	2/2	NA	1.4	5.1	160 N	NA		NO	BSL
7440-50-8	Copper	7.7	J	32.8	J	MG/KG	07-SS-101	2/2	NA	32.8		313 N	1100	SSL	NO	BSL
7439-89-6	Iron	6,290	J	7,330	J	MG/KG	07-SS-108	2/2	NA	7330	15000	2,300 N	NA		YES	ASL
7439-92-1	Lead	18.8	J	24.1	J	MG/KG	07-SS-101	2/2	NA	24.1	110	400	NA		NO	BSL
7439-95-4	Magnesium	630	J	799	J	MG/KG	07-SS-101	2/2	NA	799	1347	NA	NA		NO	NUT
7439-96-5	Manganese	26.1	J	50.8	J	MG/KG	07-SS-101	2/2	NA	50.8	267	156 N	95	SSL	NO	BSL
7439-97-6	Mercury	0.07		0.07		MG/KG	07-SS-108	1/2	0.05 - 0.05	0.07		2.35 N	2.35	SSL	NO	BSL
7440-02-0	Nickel	3.4		6.8		MG/KG	07-SS-101	2/2	NA	6.8	9.5	156 N	156	SSL	NO	BSL
7440-09-7	Potassium	563	J	762	J	MG/KG	07-SS-108	2/2	NA	762	1435	NA	NA		NO	NUT
7440-23-5	Sodium	262		262		MG/KG	07-SS-108	1/2	104 - 104	262	623	NA	NA		NO	NUT
7440-62-2	Vanadium	13.4		202		MG/KG	07-SS-101	2/2	NA	202	34.3	2.3 N	510	SSL	YES	ASL
7440-66-6	Zinc	17.6		64.2		MG/KG	07-SS-101	2/2	NA	64.2	123	2,346 N	1400	SSL	NO	BSL

[1] Minimum/Maximum detected concentrations.
[2] Maximum concentration is used for screening.
[3] 95%UTL for urban surface soil from Little Creek Background Investigation.
[4] Risk-Based Concentration Table, October 15, 2003, U.S. EPA Region III, Jennifer Hubbard. Residential Soil.
RBC value for pyrene used as surrogate for phenanthrene and benzo(g,h,i)perylene.
RBC value for cadmium-food used as surrogate for cadmium.
RBC value for Chromium VI used for total chromium.
Lead screening toxicity value is 400 mg/kg, the EPA residential soil screening level for lead.
RBC value for manganese-nonfood used as surrogate for manganese.

SQL = Sample Quantification Limit
COPC = Chemical of Potential Concern
ARAR/TBC = Applicable or Relevant and Appropriate Requirement/ To Be Considered
J = Estimated Value
K = Biased High
L = Biased Low
C = Carcinogenic
N = Noncarcinogenic

Table 2.5

OCCURRENCE, DISTRIBUTION AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN

Site 7, NAB Little Creek

Scenario Timeframe: Current
Medium: Surface Soil
Exposure Medium: Surface Soil
Exposure Point: Site Perimeter

CAS Number	Chemical	Minimum [1] Concentration	Minimum Qualifier	Maximum [1] Concentration	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration [2] Used for Screening	Background [3] Value	Screening [4] Toxicity Value	Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag	Rationale for [5] Contaminant Deletion or Selection

RBC value for mercuric chloride used as surrogate for mercury.

SSL = Region III Soil Screening Level, Soil to Groundwater Migration, DAF 20

NA = Not available

[5] Rationale Codes

Selection Reason: Above Screening Levels (ASL)

Deletion Reason: No Toxicity Information (NTX)
Essential Nutrient (NUT)
Below Screening Level (BSL)

Table 2.6

OCCURRENCE, DISTRIBUTION AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN

Site 7, NAB Little Creek

Scenario Timeframe: Current
Medium: Surface Soil
Exposure Medium: Air
Exposure Point: Emissions from Soil at Site Perimeter

CAS Number	Chemical	Minimum [1] Concentration	Minimum Qualifier	Maximum [1] Concentration	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration [2] Used for Screening	Background [3] Value	Screening [4] Toxicity Value	Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag	Rationale for [5] Contaminant Deletion or Selection
120-12-7	Anthracene	2.2E-07	J	2.2E-07	J	MG/M^3	07-SS-101	1/2	(6)	2.2E-07		1.1E-01 N			NO	BSL
56-55-3	Benzo(a)anthracene	5.38E-10		5.38E-10		MG/M^3	07-SS-101	1/2	(6)	5.4E-10		8.6E-06 C			NO	BSL
50-32-8	Benzo(a)pyrene	3.41E-10		3.41E-10		MG/M^3	07-SS-101	1/2	(6)	3.4E-10		2.0E-06 C			NO	BSL
205-99-2	Benzo(b)fluoranthene	3.86E-10		3.86E-10		MG/M^3	07-SS-101	1/2	(6)	3.9E-10		8.6E-06 C			NO	BSL
191-24-2	Benzo(g,h,i)perylene	1.59E-10	J	1.59E-10	J	MG/M^3	07-SS-101	1/2	(6)	1.6E-10		1.1E-02 N			NO	BSL
207-08-9	Benzo(k)fluoranthene	2.88E-10		2.88E-10		MG/M^3	07-SS-101	1/2	(6)	2.9E-10		8.6E-05 C			NO	BSL
85-68-7	Butylbenzylphthalate	4.39E-11	J	4.39E-11	J	MG/M^3	07-SS-101	1/2	(6)	4.4E-11		7.3E-02 N			NO	BSL
218-01-9	Chrysene	2.95E-10		2.95E-10		MG/M^3	07-SS-101	1/2	(6)	3.0E-10		8.6E-04 C			NO	BSL
206-44-0	Fluoranthene	9.85E-10		9.85E-10		MG/M^3	07-SS-101	1/2	(6)	9.8E-10		1.5E-02 N			NO	BSL
86-73-7	Fluorene	9.1E-08	J	9.1E-08	J	MG/M^3	07-SS-101	1/2	(6)	9.1E-08		1.5E-02 N			NO	BSL
193-39-5	Indeno(1,2,3-cd)pyrene	1.74E-10	J	1.74E-10	J	MG/M^3	07-SS-101	1/2	(6)	1.7E-10		8.6E-06 C			NO	BSL
85-01-8	Phenanthrene	6.29E-10		6.29E-10		MG/M^3	07-SS-101	1/2	(6)	6.3E-10		1.1E-02 N			NO	BSL
129-00-0	Pyrene	3.3E-07		3.3E-07		MG/M^3	07-SS-101	1/2	(6)	3.3E-07		1.1E-02 N			NO	BSL
117-81-7	bis(2-Ethylhexyl)phthalate	3.56E-11	J	1.14E-10	J	MG/M^3	07-SS-101	2/2	(6)	1.1E-10		4.5E-04 C			NO	BSL
7429-90-5	Aluminum	2.18E-06		2.58E-06		MG/M^3	07-SS-101	2/2	(6)	2.6E-06		3.7E-04 N			NO	BSL
7440-38-2	Arsenic	1.67E-09		2.65E-09		MG/M^3	07-SS-108	2/2	(6)	2.7E-09		4.1E-07 C			NO	BSL
7440-39-3	Barium	8.64E-09		9.17E-09		MG/M^3	07-SS-101	2/2	(6)	9.2E-09		5.1E-05 N			NO	BSL
7440-43-9	Cadmium	4.92E-10		4.92E-10		MG/M^3	07-SS-108	1/2	(6)	4.9E-10		9.9E-07 C			NO	BSL
7440-70-2	Calcium	1.56E-07		6.39E-07	J	MG/M^3	07-SS-101	2/2	(6)	6.4E-07		NA			NO	NUT
7440-47-3	Chromium	6.29E-09		7.2E-09		MG/M^3	07-SS-108	2/2	(6)	7.2E-09		1.5E-07 C			NO	BSL
7440-48-4	Cobalt	8.33E-10		1.06E-09		MG/M^3	07-SS-101	2/2	(6)	1.1E-09		6.4E-07 N			NO	BSL
7440-50-8	Copper	5.83E-09	J	2.48E-08	J	MG/M^3	07-SS-101	2/2	(6)	2.5E-08		1.5E-02 N			NO	BSL
7439-89-6	Iron	4.77E-06	J	5.55E-06	J	MG/M^3	07-SS-108	2/2	(6)	5.6E-06		1.1E-01 N			NO	BSL
7439-92-1	Lead	1.42E-08	J	1.83E-08	J	MG/M^3	07-SS-101	2/2	(6)	1.8E-08		NA			NO	BSL
7439-95-4	Magnesium	4.77E-07	J	6.05E-07	J	MG/M^3	07-SS-101	2/2	(6)	6.1E-07		NA			NO	NUT
7439-96-5	Manganese	1.98E-08	J	3.85E-08	J	MG/M^3	07-SS-101	2/2	(6)	3.8E-08		5.2E-06 N			NO	BSL
7439-97-6	Mercury	5.3E-11		5.3E-11		MG/M^3	07-SS-108	1/2	(6)	5.3E-11		3.1E-05 N			NO	BSL
7440-02-0	Nickel	2.58E-09		5.15E-09		MG/M^3	07-SS-101	2/2	(6)	5.2E-09		7.3E-03 N			NO	BSL
7440-09-7	Potassium	4.27E-07	J	5.77E-07	J	MG/M^3	07-SS-108	2/2	(6)	5.8E-07		NA			NO	NUT
7440-23-5	Sodium	1.98E-07		1.98E-07		MG/M^3	07-SS-108	1/2	(6)	2.0E-07		NA			NO	NUT
7440-62-2	Vanadium	1.02E-08		1.53E-07		MG/M^3	07-SS-101	2/2	(6)	1.5E-07		1.1E-04 N			NO	BSL
7440-66-6	Zinc	1.33E-08		4.86E-08		MG/M^3	07-SS-101	2/2	(6)	4.9E-08		1.1E-01 N			NO	BSL

[1] Minimum/maximum detected soil concentration multiplied by 1/PEF (1.32E+9 m3/kg) and 1/VF(chemical specific for VOCs only) to get air concentration. PEF and VF from EPA's Soil Screening Guidance. VFs calculated in Table 2.2A.

[2] Maximum concentration is used for screening.

[3] Background values not available.

[4] Risk-Based Concentration Table, October 15, 2003, U.S. EPA Region III, Jennifer Hubbard. Ambient Air.
RBC value for pyrene used as surrogate for phenanthrene and benzo(g,h,i)perylene.
RBC value for cadmium-food used as surrogate for cadmium.
RBC value for Chromium VI used for total chromium.
Lead screening toxicity value is 400 mg/kg, the EPA residential soil screening level for lead.

SQL = Sample Quantification Limit
COPC = Chemical of Potential Concern
ARAR/TBC = Applicable or Relevant and Appropriate Requirement/ To Be Considered
J = Estimated Value
K = Biased High
L = Biased Low
C = Carcinogenic
N = Noncarcinogenic

Table 2.6

OCCURRENCE, DISTRIBUTION AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN

Site 7, NAB Little Creek

Scenario Timeframe: Current
Medium: Surface Soil
Exposure Medium: Air
Exposure Point: Emissions from Soil at Site Perimeter

CAS Number	Chemical	Minimum [1] Concentration	Minimum Qualifier	Maximum [1] Concentration	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration [2] Used for Screening	Background [3] Value	Screening [4] Toxicity Value	Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag	Rationale for [5] Contaminant Deletion or Selection

RBC value for manganese-nonfood used as surrogate for manganese.

SSL = Region III Soil Screening Level, Soil to Groundwater Migration, DAF 20

[5] Rationale Codes

Selection Reason: Above Screening Levels (ASL)

Deletion Reason: No Toxicity Information (NTX)
Essential Nutrient (NUT)
Below Screening Level (BSL)

(6) See Table 2.5 for surface soil data detection limits, concentrations converted from surface soil data to air concetrations.

Table 2.7

OCCURRENCE, DISTRIBUTION AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN

Site 7, NAB Little Creek

Scenario Timeframe: Current/Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Little Creek Cove

CAS Number	Chemical	Minimum [1] Concentration	Minimum Qualifier	Maximum [1] Concentration	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration [2] Used for Screening	Background [3] Value	Screening [4] Toxicity Value	Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag	Rationale for [5] Contaminant Deletion or Selection
7429-90-5	Aluminum	76.9	J	374		UG/L	LS07-SW206-01C	5/9	200 - 200	374		36,500 N			NO	BSL
7440-36-0	Antimony	5.2	J	5.2	J	UG/L	LS07-SW207-01C	1/9	60 - 60	5.2		14.6 N	14	AWQC	NO	BSL
7440-38-2	Arsenic	3	J	4.2	J	UG/L	LS07-SW201-02A	3/9	10 - 10	4.2		0.446 C	0.018	AWQC	YES	ASL
7440-39-3	Barium	10.2	J	22.1	J	UG/L	LS07-SW201-01C	6/9	200 - 200	22.1		2,555 N			NO	BSL
7440-43-9	Cadmium	0.67	J	0.67	J	UG/L	LS07-SW207-01A	1/9	5 - 5	0.67		18.3 N			NO	BSL
7440-70-2	Calcium	165,000	J	288,000		UG/L	LS07-SW206-02A	9/9	5000 - 5000	288,000		NA			NO	NUT
7440-47-3	Chromium	0.77	J	1.6		UG/L	LS07-SW201-01A	4/9	10 - 10	1.6		110 N			NO	BSL
7440-48-4	Cobalt	0.82	J	1.1		UG/L	LS07-SW201-01A	5/9	50 - 50	1.1		730 N			NO	BSL
7439-89-6	Iron	241	J	597		UG/L	LS07-SW201-02A	5/9	100 - 100	597		11,000 N			NO	BSL
7439-95-4	Magnesium	537,000	J	952,000		UG/L	LS07-SW207-02A	9/9	5000 - 100000	952,000		NA			NO	NUT
7439-96-5	Manganese	7.8	J	44.8		UG/L	LS07-SW201-01C	5/9	15 - 15	44.8		730 N			NO	BSL
7439-97-6	Mercury	6.9	L	6.9	L	UG/L	LS07-SW201-01A	1/7	0.2 - 0.3	6.9		11.0 N	0.05	AWQC	NO	BSL
7440-02-0	Nickel	1.1	L	2.2	L	UG/L	LS07-SW207-02A	6/9	40 - 40	2.2		730 N	610	AWQC	NO	BSL
7440-09-7	Potassium	284,000	L	492,000	L	UG/L	LS07-SW206-02A	9/9	5000 - 50000	492,000		NA			NO	NUT
7440-22-4	Silver	1.4	J	1.4	J	UG/L	LS07-SW207-01C	1/9	10 - 10	1.4		183 N			NO	BSL
7440-23-5	Sodium	3,970,000	J	7,570,000	J	UG/L	LS07-SW207-02A	9/9	50000 - 250000	7,570,000		NA			NO	NUT
7440-62-2	Vanadium	1.5	J	4.7	J	UG/L	LS07-SW207-01C	5/9	50 - 50	4.7		11 N			NO	BSL
7440-66-6	Zinc	10.5	J	12.5	J	UG/L	LS07-SW207-02A	4/9	20 - 20	12.5		10,950 N	9,100	AWQC	NO	BSL

Unfiltered metals used.

[1] Minimum/Maximum detected concentrations.

[2] Maximum concentration is used for screening.

[3] Background values not available.

[4] Risk-Based Concentration Table, October 15, 2003, U.S. EPA Region III, Jennifer Hubbard. Ten times tap water RBC.
RBC value for cadmium-water used as surrogate for cadmium.
RBC value for Chromium VI used for total chromium.
RBC value for manganese-nonfood used as surrogate for manganese.
RBC value for mercuric chloride used as surrogate for mercury.
RBC value for Chromium VI used for total chromium.
RBC value for manganese-nonfood used as surrogate for manganese.

[5] Rationale Codes

Selection Reason: Above Screening Levels (ASL)

Deletion Reason: No Toxicity Information (NTX)
Essential Nutrient (NUT)
Below Screening Level (BSL)

SQL = Sample Quantification Limit
COPC = Chemical of Potential Concern
ARAR/TBC = Applicable or Relevant and Appropriate Requirement/ To Be Considered
J = Estimated Value
K = Biased High
L = Biased Low
C = Carcinogenic
N = Noncarcinogenic
AWQC = Ambient Water Quality Criteria for Human Health, Consumption of Water and Organisms

Table 2.8

OCCURRENCE, DISTRIBUTION AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN

Site 7, NAB Little Creek

Scenario Timeframe: Current/Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Pond

CAS Number	Chemical	Minimum [1] Concentration	Minimum Qualifier	Maximum [1] Concentration	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration [2] Used for Screening	Background [3] Value	Screening [4] Toxicity Value	Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag	Rationale for [5] Contaminant Deletion or Selection
7429-90-5	Aluminum	244		516		UG/L	LS07-SW209-01A	5/6	200 - 200	516		36,500 N			NO	BSL
7440-38-2	Arsenic	2.5		2.7		UG/L	LS07-SW209-02A	2/6	10 - 10	2.7		0.446 C	0.018	AWQC	YES	ASL
7440-39-3	Barium	12		32.5		UG/L	LS07-SW209-01C	4/6	200 - 200	32.5		2,555 N			NO	BSL
7440-70-2	Calcium	72,100		279,000		UG/L	LS07-SW208-02A	6/6	5000 - 5000	279,000		NA			NO	NUT
7440-47-3	Chromium	1.9		2.1		UG/L	LS07-SW208-01A	2/6	10 - 10	2.1		110 N			NO	BSL
7440-48-4	Cobalt	0.76		0.76		UG/L	LS07-SW208-01A	1/6	50 - 50	0.76		730 N			NO	BSL
7439-89-6	Iron	813		1,880		UG/L	LS07-SW209-02A	5/6	100 - 100	1,880		11,000 N			NO	BSL
7439-92-1	Lead	1.9	J	4.2		UG/L	LS07-SW209-01C	3/6	3 - 3	4.2		15			NO	BSL
7439-95-4	Magnesium	218,000	J	930,000		UG/L	LS07-SW208-02A	6/6	5000 - 50000	930,000		NA			NO	NUT
7439-96-5	Manganese	10	J	68.7		UG/L	LS07-SW209-02A	5/6	15 - 15	68.7		730 N			NO	BSL
7439-97-6	Mercury	0.08	J	0.08	J	UG/L	LS07-SW208-01A	1/6	0.2 - 0.3	0.08		11.0 N	0.05	AWQC	NO	BSL
7440-02-0	Nickel	1	J	1.7	J	UG/L	LS07-SW209-02A	3/6	40 - 40	1.7		730 N	610	AWQC	NO	BSL
2023695	Potassium	124,000	J	483,000	J	UG/L	LS07-SW208-02A	6/6	5000 - 50000	483,000		NA			NO	NUT
7440-23-5	Sodium	1,690,000	J	7,510,000	J	UG/L	LS07-SW208-02A	6/6	25000 - 250000	7,510,000		NA			NO	NUT
7440-62-2	Vanadium	1	J	3.1	J	UG/L	LS07-SW209-01C	4/6	50 - 50	3.1		11 N			NO	BSL
7440-66-6	Zinc	16.3	J	39.5	J	UG/L	LS07-SW209-02A	4/6	20 - 20	39.5		10,950 N	9,100	AWQC	NO	BSL

Unfiltered metals used.

[1] Minimum/Maximum detected concentrations.

[2] Maximum concentration is used for screening.

[3] Background values not available.

[4] Risk-Based Concentration Table, October 15, 2003, U.S. EPA Region III, Jennifer Hubbard. Ten times tap water RBC.
RBC value for Chromium VI used for total chromium.
Lead screening toxicity value is 400 mg/kg, the EPA residential soil screening level for lead.
RBC value for manganese-nonfood used as surrogate for manganese.
RBC value for mercuric chloride used as surrogate for mercury.
RBC value for Chromium VI used for total chromium.
RBC value for manganese-nonfood used as surrogate for manganese.

[5] Rationale Codes

Selection Reason: Above Screening Levels (ASL)

Deletion Reason: No Toxicity Information (NTX)
Essential Nutrient (NUT)
Below Screening Level (BSL)

SQL = Sample Quantification Limit
COPC = Chemical of Potential Concern
ARAR/TBC = Applicable or Relevant and Appropriate Requirement/ To Be Considered
J = Estimated Value
K = Biased High
L = Biased Low
C = Carcinogenic
N = Noncarcinogenic
AWQC = Ambient Water Quality Criteria for Human Health, Consumption of Water and Organisms

Table 2.9

OCCURRENCE, DISTRIBUTION AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN

Site 7, NAB Little Creek

Scenario Timeframe: Current/Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Canal on West Side of Site

CAS Number	Chemical	Minimum [1] Concentration	Minimum Qualifier	Maximum [1] Concentration	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration [2] Used for Screening	Background [3] Value	Screening [4] Toxicity Value	Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag	Rationale for [5] Contaminant Deletion or Selection
79-34-5	1,1,2,2-Tetrachloroethane	1	J	1	J	UG/L	LS07-SW203-01C	1/21	10 - 10	1		0.527 C	0.8	AWQC	YES	ASL
67-64-1	Acetone	1	J	15	J	UG/L	LS07-SW202-02A	8/21	10 - 10	15		5,500 N			NO	BSL
75-27-4	Bromodichloromethane	0.4	J	2	J	UG/L	LS07-SW202-02A	3/21	10 - 10	2		1.70 C	0.56	AWQC	YES	ASL
108-90-7	Chlorobenzene	0.6	J	0.6	J	UG/L	LS07-SW211-02A	1/21	10 - 10	0.6		106 N	680	AWQC	NO	BSL
67-66-3	Chloroform	1	J	26		UG/L	LS07-SW202-02A	6/21	10 - 10	26		1.5 C	5.7	AWQC	YES	ASL
1634-04-4	Methyl-tert-butyl ether (MTBE)	1	J	2.1	J	UG/L	LS07-SW210-01C	2/21	10 - 10	2.1		26 C			NO	BSL
75-09-2	Methylene chloride	2	J	2	J	UG/L	LS07-SW212-01C	1/21	10 - 10	2		41.0 C	4.7	AWQC	NO	BSL
108-88-3	Toluene	0.7	J	1	J	UG/L	LS07-SW202-01C LS07-SW202P-01C	2/21	10 - 10	1		747 N	6,800	AWQC	NO	BSL
7429-90-5	Aluminum	73.4	J	1,590	J	UG/L	LS07-SW202-01C	12/21	200 - 200	1,590		36,500 N			NO	BSL
7440-38-2	Arsenic	3.4	J	9.4	J	UG/L	LS07-SW213-01A	16/21	10 - 10	9.4		0.446 C	0.018	AWQC	YES	ASL
7440-39-3	Barium	15.4	J	72.4	J	UG/L	LS07-SW204-01A	15/21	200 - 200	72.4		2,555 N			NO	BSL
7440-41-7	Beryllium	0.14	J	0.14	J	UG/L	LS07-SW212-01A	1/21	5 - 5	0.14		73 N			NO	BSL
7440-43-9	Cadmium	0.63	J	0.63	J	UG/L	LS07-SW202-01A	1/21	5 - 5	0.63		18.3 N			NO	BSL
7440-70-2	Calcium	18,400	J	295,000	J	UG/L	LS07-SW210-02A	21/21	5000 - 5000	295,000		NA			NO	NUT
7440-47-3	Chromium	0.68	J	13.2	J	UG/L	LS07-SW202-02A	16/21	10 - 10	13.2		110 N			NO	BSL
7440-48-4	Cobalt	0.7	J	5.3	J	UG/L	LS07-SW202-02A	18/21	50 - 50	5.3		730 N			NO	BSL
7440-50-8	Copper	1.7	J	8.2	J	UG/L	LS07-SW212-01C	5/21	25 - 25	8.2		1,460 N	1,300	AWQC	NO	BSL
57-12-5	Cyanide	6	L	10.4		UG/L	LS07-SW202-02A	2/21	5 - 10	10.4		730 N			NO	BSL
7439-89-6	Iron	433	L	5,350		UG/L	LS07-SW204-01A	20/21	100 - 100	5,350		11,000 N			NO	BSL
7439-92-1	Lead	1.6	L	3.5	L	UG/L	LS07-SW203-01A	5/21	3 - 3	3.5		15			NO	BSL
7439-95-4	Magnesium	5,930	L	984,000	L	UG/L	LS07-SW210-02A	21/21	5000 - 100000	984,000		NA			NO	NUT
7439-96-5	Manganese	5.3	L	387	L	UG/L	LS07-SW213-01A	21/21	15 - 15	387		730 N			NO	BSL
7439-97-6	Mercury	0.08	J	0.73	L	UG/L	LS07-SW202-02A	4/18	0.2 - 0.3	0.73		11.0 N	0.05	AWQC	NO	BSL
7440-02-0	Nickel	1	J	12.9	L	UG/L	LS07-SW202-02A	14/21	40 - 40	12.9		730 N	610	AWQC	NO	BSL
7440-09-7	Potassium	3,590	J	512,000	L	UG/L	LS07-SW210-02A	21/21	5000 - 100000	512,000		NA			NO	NUT
7440-23-5	Sodium	12,600	J	8,110,000	L	UG/L	LS07-SW210-02A	21/21	5000 - 250000	8,110,000		NA			NO	NUT
7440-62-2	Vanadium	0.82	J	4.3	L	UG/L	LS07-SW202-02A	18/21	50 - 50	4.3		11 N			NO	BSL
7440-66-6	Zinc	3.9	J	280	L	UG/L	LS07-SW204-01A	16/21	20 - 20	280		10,950 N	9,100	AWQC	NO	BSL

Unfiltered metals

[1] Minimum/Maximum detected concentrations.

[2] Maximum concentration is used for screening.

[3] Background values not available.

[4] Risk-Based Concentration Table, Ocober 15, 2003, U.S. EPA Region III, Jennifer Hubbard. Ten times tap water RBC.

RBC value for cadmium-water used as surrogate for cadmium.

RBC value for Chromium VI used for total chromium.

Lead screening toxicity value is 400 mg/kg, the EPA residential soil screening level for lead.

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SQL = Sample Quantification Limit

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L = Biased Low

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Table 2.9

OCCURRENCE, DISTRIBUTION AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN

Site 7, NAB Little Creek

Scenario Timeframe: Current/Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Canal on West Side of Site

CAS Number	Chemical	Minimum [1] Concentration	Minimum Qualifier	Maximum [1] Concentration	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration [2] Used for Screening	Background [3] Value	Screening [4] Toxicity Value	Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag	Rationale for [5] Contaminant Deletion or Selection

[5] Rationale Codes

Selection Reason: Above Screening Levels (ASL)

Deletion Reason: No Toxicity Information (NTX)
Essential Nutrient (NUT)
Below Screening Level (BSL)

Table 2.10

OCCURRENCE, DISTRIBUTION AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN

Site 7, NAB Little Creek

Scenario Timeframe: Current/Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Canal on East Side of Site

CAS Number	Chemical	Minimum [1] Concentration	Minimum Qualifier	Maximum [1] Concentration	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration [2] Used for Screening	Background [3] Value	Screening [4] Toxicity Value	Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag	Rationale for [5] Contaminant Deletion or Selection
67-64-1	Acetone	1	J	1	J	UG/L	LS07-SW205-01C	1/3	10 - 10	1		5,500 N			NO	BSL
7429-90-5	Aluminum	450		450		UG/L	LS07-SW205-01C	1/3	200 - 200	450		36,500 N			NO	BSL
7440-39-3	Barium	14.9		19.2		UG/L	LS07-SW205-01C	2/3	200 - 200	19.2		2,555 N			NO	BSL
7440-70-2	Calcium	186,000		286,000		UG/L	LS07-SW205-02A	3/3	5000 - 5000	286000		NA			NO	NUT
7440-47-3	Chromium	1.8		1.8		UG/L	LS07-SW205-01A	1/3	10 - 10	1.8		110 N			NO	BSL
7440-48-4	Cobalt	1.1	J	1.1	J	UG/L	LS07-SW205-01A	1/3	50 - 50	1.1		730 N			NO	BSL
7439-89-6	Iron	315	J	590	J	UG/L	LS07-SW205-01A	2/3	100 - 100	590		11,000 N			NO	BSL
7439-92-1	Lead	1.5	J	1.5	J	UG/L	LS07-SW205-01C	1/3	3 - 3	1.5		15			NO	BSL
7439-95-4	Magnesium	594,000	J	967,000	J	UG/L	LS07-SW205-02A	3/3	5000 - 50000	967000		NA			NO	NUT
7439-96-5	Manganese	11.4	J	21	J	UG/L	LS07-SW205-01A	3/3	15 - 15	21		730 N			NO	BSL
7440-02-0	Nickel	1.8	J	2.2	J	UG/L	LS07-SW205-01A	3/3	40 - 40	2.2		730 N	610	AWQC	NO	BSL
2023695	Potassium	301,000	J	498,000	J	UG/L	LS07-SW205-02A	3/3	5000 - 50000	498000		NA			NO	NUT
7440-23-5	Sodium	4,390,000	J	7,820,000	J	UG/L	LS07-SW205-02A	3/3	50000 - 250000	7820000		NA			NO	NUT
7440-62-2	Vanadium	3	J	3	J	UG/L	LS07-SW205-01C	1/3	50 - 50	3		11 N			NO	BSL
7440-66-6	Zinc	57.3	J	57.3	J	UG/L	LS07-SW205-02A	1/3	20 - 20	57.3		10,950 N	9,100	AWQC	NO	BSL

Unfiltered metals

[1] Minimum/Maximum detected concentrations.

[2] Maximum concentration is used for screening.

[3] Background values not available.

[4] Risk-Based Concentration Table, October 15, 2003, U.S. EPA Region III, Jennifer Hubbard. Ten times tap water RBC.
RBC value for Chromium VI used for total chromium.
Lead screening toxicity value is 400 mg/kg, the EPA residential soil screening level for lead.
RBC value for manganese-nonfood used as surrogate for manganese.
RBC value for Chromium VI used for total chromium.
RBC value for manganese-nonfood used as surrogate for manganese.

[5] Rationale Codes

Selection Reason: Above Screening Levels (ASL)

Deletion Reason: No Toxicity Information (NTX)
Essential Nutrient (NUT)
Below Screening Level (BSL)

SQL = Sample Quantification Limit
COPC = Chemical of Potential Concern
ARAR/TBC = Applicable or Relevant and Appropriate Requirement/ To Be Considered
J = Estimated Value
K = Biased High
L = Biased Low
C = Carcinogenic
N = Noncarcinogenic
AWQC = Ambient Water Quality Criteria for Human Health, Consumption of Water and Organisms

Table 2.11

OCCURRENCE, DISTRIBUTION AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN

Site 7, NAB Little Creek

Scenario Timeframe: Current/Future
Medium: Sediment
Exposure Medium: Sediment
Exposure Point: Little Creek Cove

CAS Number	Chemical	Minimum [1] Concentration	Minimum Qualifier	Maximum [1] Concentration	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration [2] Used for Screening	Background [3] Value	Screening [4] Toxicity Value	Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag	Rationale for [5] Contaminant Deletion or Selection
106-44-5	4-Methylphenol	0.13	J	0.13	J	MG/KG	LS07-SD206-01A	1/6	0.4 - 2.3	0.13		391 N			NO	BSL
120-12-7	Anthracene	0.17	J	0.17	J	MG/KG	LS07-SD206-01A	1/6	0.4 - 2.3	0.17		23,464 N			NO	BSL
100-52-7	Benzaldehyde	0.13	J	0.13	J	MG/KG	LS07-SD206-01A	1/6	0.4 - 2.3	0.13		7,821 N			NO	BSL
56-55-3	Benzo(a)anthracene	0.11	J	0.11	J	MG/KG	LS07-SD206-01A	1/6	0.4 - 2.3	0.11		8.75 C			NO	BSL
50-32-8	Benzo(a)pyrene	0.014	J	0.014	J	MG/KG	LS07-SD207-02A	1/6	0.4 - 2.3	0.014		0.875 C			NO	BSL
205-99-2	Benzo(b)fluoranthene	0.018	J	0.02	J	MG/KG	LS07-SD207-02A	2/6	0.4 - 2.3	0.02		8.75 C			NO	BSL
207-08-9	Benzo(k)fluoranthene	0.1	J	0.1	J	MG/KG	LS07-SD206-01A	1/6	0.4 - 2.3	0.1		87.5 C			NO	BSL
218-01-9	Chrysene	0.2	J	0.2	J	MG/KG	LS07-SD206-01A	1/6	0.4 - 2.3	0.2		875 C			NO	BSL
117-84-0	Di-n-octylphthalate	0.075	J	0.075	J	MG/KG	LS07-SD207-02A	1/6	0.4 - 2.3	0.075		3,100 N			NO	BSL
84-66-2	Diethylphthalate	0.012	J	0.012	J	MG/KG	LS07-SD207-02A	1/6	0.4 - 2.3	0.012		62,571 N			NO	BSL
206-44-0	Fluoranthene	0.01	J	0.26	J	MG/KG	LS07-SD206-01A	3/6	0.4 - 2.3	0.26		3,129 N			NO	BSL
193-39-5	Indeno(1,2,3-cd)pyrene	0.011	J	0.011	J	MG/KG	LS07-SD207-02A	1/6	0.4 - 2.3	0.011		8.75 C			NO	BSL
108-95-2	Phenol	0.029	J	0.029	J	MG/KG	LS07-SD206-02A	1/6	0.4 - 2.3	0.029		23,000 N			NO	BSL
129-00-0	Pyrene	0.026	J	0.21	J	MG/KG	LS07-SD206-01A	3/6	0.4 - 2.3	0.21		2,346 N			NO	BSL
7429-90-5	Aluminum	187		2,660		MG/KG	LS07-SD206-01A	6/6	38.265 - 50.435	2,660		78,214 N			NO	BSL
7440-38-2	Arsenic	1.3	J	2.8		MG/KG	LS07-SD206-01A	4/6	1.913 - 2.522	2.8		4.26 C			NO	BSL
7440-39-3	Barium	4.1		5.5	J	MG/KG	LS07-SD206-01A	2/6	38.265 - 50.435	5.5		5,475 N			NO	BSL
7440-41-7	Beryllium	0.1	J	0.1	J	MG/KG	LS07-SD206-01C	1/6	0.957 - 1.261	0.1		156 N			NO	BSL
7440-43-9	Cadmium	0.07	J	0.07	J	MG/KG	LS07-SD206-01C	1/6	0.957 - 1.261	0.07		78 N			NO	BSL
7440-70-2	Calcium	344	J	346		MG/KG	LS07-SD207-01C	2/6	956.636 - 1260.87	346		NA			NO	NUT
7440-47-3	Chromium	1.5	J	6.8		MG/KG	LS07-SD207-02A	5/6	1.913 - 2.522	6.8		235 N			NO	BSL
7440-48-4	Cobalt	0.43	J	1.2	J	MG/KG	LS07-SD206-01A LS07-SD207-02A	4/6	9.566 - 12.609	1.2		1,600 N			NO	BSL
7440-50-8	Copper	3.6	J	14.7	J	MG/KG	LS07-SD206-01A	3/6	4.783 - 6.304	14.7		3,129 N			NO	BSL
7439-89-6	Iron	459		4,840		MG/KG	LS07-SD207-02A	6/6	19.133 - 25.218	4,840		23,000 N			NO	BSL
7439-92-1	Lead	1.4	K	28.9		MG/KG	LS07-SD207-02A	6/6	0.574 - 0.757	28.9		400			NO	BSL
7439-95-4	Magnesium	524	J	1,180	J	MG/KG	LS07-SD207-02A	3/6	956.636 - 1260.87	1,180		NA			NO	NUT
7439-96-5	Manganese	11.8		35.5		MG/KG	LS07-SD207-02A	4/6	2.87 - 3.783	35.5		1,564 N			NO	BSL
7439-97-6	Mercury	0.011	J	0.011	J	MG/KG	LS07-SD206-01C	1/4	0.022 - 0.121	0.011		23.5 N			NO	BSL
7440-02-0	Nickel	1.2	J	1.2	J	MG/KG	LS07-SD206-01C	1/6	7.653 - 10.087	1.2		1,564 N			NO	BSL
7440-09-7	Potassium	95.7	J	644	J	MG/KG	LS07-SD207-02A	4/6	956.636 - 1260.87	644		NA			NO	NUT
7782-49-2	Selenium	0.77	J	0.77	J	MG/KG	LS07-SD206-01A	1/6	0.957 - 1.261	0.77		391 N			NO	BSL
7440-23-5	Sodium	1,830		2,830		MG/KG	LS07-SD207-01C	3/6	956.636 - 1260.87	2,830		NA			NO	NUT
7440-28-0	Thallium	1.8	J	1.8	J	MG/KG	LS07-SD207-01A	1/4	1.913 - 2.32	1.8		5.48 N			NO	BSL
7440-62-2	Vanadium	0.73	J	7	J	MG/KG	LS07-SD207-02A	6/6	9.566 - 12.609	7		23 N			NO	BSL
7440-66-6	Zinc	3.1	J	38.5	L	MG/KG	LS07-SD206-01A	5/6	3.827 - 5.044	38.5		23,464 N			NO	BSL

Table 2.11

OCCURRENCE, DISTRIBUTION AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN

Site 7, NAB Little Creek

Scenario Timeframe: Current/Future
Medium: Sediment
Exposure Medium: Sediment
Exposure Point: Little Creek Cove

CAS Number	Chemical	Minimum [1] Concentration	Minimum Qualifier	Maximum [1] Concentration	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration [2] Used for Screening	Background [3] Value	Screening [4] Toxicity Value	Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag	Rationale for [5] Contaminant Deletion or Selection

[1] Minimum/Maximum detected concentrations.
[2] Maximum concentration is used for screening.
[3] Background values not available.
[4] Risk-Based Concentration Table, October 15, 2003, U.S. EPA Region III, Jennifer Hubbard. Ten times residential soil RBC.
RBC value for cadmium-food used as surrogate for cadmium.
RBC value for Chromium VI used for total chromium.
Lead screening toxicity value is 400 mg/kg, the EPA residential soil screening level for lead.
RBC value for manganese-nonfood used as surrogate for manganese.
RBC value for mercuric chloride used as surrogate for mercury.
[5] Rationale Codes

Selection Reason: Above Screening Levels (ASL)
Deletion Reason: No Toxicity Information (NTX)
Essential Nutrient (NUT)
Below Screening Level (BSL)

SQL = Sample Quantification Limit
COPC = Chemical of Potential Concern
ARAR/TBC = Applicable or Relevant and Appropriate Requirement/ To Be Considered
J = Estimated Value
K = Biased High
L = Biased Low
C = Carcinogenic
N = Noncarcinogenic

Table 2.12

OCCURRENCE, DISTRIBUTION AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN

Site 7, NAB Little Creek

Scenario Timeframe: Current/Future
Medium: Sediment
Exposure Medium: Sediment
Exposure Point: Pond

CAS Number	Chemical	Minimum [1] Concentration	Minimum Qualifier	Maximum [1] Concentration	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration [2] Used for Screening	Background [3] Value	Screening [4] Toxicity Value	Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag	Rationale for [5] Contaminant Deletion or Selection
91-57-6	2-Methylnaphthalene	0.02	J	0.02	J	MG/KG	LS07-SD209-02A	1/6	0.57 - 2.3	0.02		1,564 N			NO	BSL
83-32-9	Acenaphthene	0.21	J	0.21	J	MG/KG	LS07-SD209-02A	1/6	0.57 - 2.3	0.21		4,693 N			NO	BSL
208-96-8	Acenaphthylene	0.02	J	0.024	J	MG/KG	LS07-SD209-02A	2/6	0.57 - 2.3	0.024		1,564 N			NO	BSL
98-86-2	Acetophenone	0.27	J	0.962		MG/KG	LS07-SD208-01C	2/6	0.57 - 2.3	0.962		7,821 N			NO	BSL
120-12-7	Anthracene	0.024	J	0.044	J	MG/KG	LS07-SD209-02A	2/6	0.57 - 2.3	0.044		23,464 N			NO	BSL
100-52-7	Benzaldehyde	0.1	J	0.34	J	MG/KG	LS07-SD208-01C	2/6	0.57 - 2.3	0.34		7,821 N			NO	BSL
56-55-3	Benzo(a)anthracene	0.07	J	0.12	J	MG/KG	LS07-SD209-02A	2/6	0.57 - 2.3	0.12		8.75 C			NO	BSL
50-32-8	Benzo(a)pyrene	0.06	J	0.075	J	MG/KG	LS07-SD209-02A	3/6	0.57 - 2.3	0.075		0.875 C			NO	BSL
205-99-2	Benzo(b)fluoranthene	0.12	J	0.19	J	MG/KG	LS07-SD208-01A	5/6	0.57 - 2.3	0.19		8.75 C			NO	BSL
207-08-9	Benzo(k)fluoranthene	0.089	J	0.15	J	MG/KG	LS07-SD208-01A	3/6	0.57 - 2.3	0.15		87.5 C			NO	BSL
218-01-9	Chrysene	0.068	J	0.21	J	MG/KG	LS07-SD208-01A	5/6	0.57 - 2.3	0.21		875 C			NO	BSL
117-84-0	Di-n-octylphthalate	0.056	J	0.056	J	MG/KG	LS07-SD208-02A	1/6	0.57 - 2.3	0.056		3,100 N			NO	BSL
53-70-3	Dibenz(a,h)anthracene	0.02	J	0.02	J	MG/KG	LS07-SD208-02A	1/6	0.57 - 2.3	0.02		0.875 C			NO	BSL
132-64-9	Dibenzofuran	0.025	J	0.025	J	MG/KG	LS07-SD209-02A	1/6	0.57 - 2.3	0.025		160 N			NO	BSL
206-44-0	Fluoranthene	0.14	J	0.64		MG/KG	LS07-SD209-02A	6/6	0.57 - 2.3	0.64		3,129 N			NO	BSL
193-39-5	Indeno(1,2,3-cd)pyrene	0.06	J	0.061	J	MG/KG	LS07-SD209-02A	2/6	0.57 - 2.3	0.061		8.75 C			NO	BSL
91-20-3	Naphthalene	0.063	J	0.063	J	MG/KG	LS07-SD209-02A	1/6	0.57 - 2.3	0.063		1,564 N			NO	BSL
85-01-8	Phenanthrene	0.029	J	0.044	J	MG/KG	LS07-SD209-02A	2/6	0.57 - 2.3	0.044		2,346 N			NO	BSL
108-95-2	Phenol	0.063	J	0.13	J	MG/KG	LS07-SD208-01C	2/6	0.57 - 2.3	0.13		23,000 N			NO	BSL
129-00-0	Pyrene	0.17	J	0.48	J	MG/KG	LS07-SD209-02A	5/6	0.57 - 2.3	0.48		2,346 N			NO	BSL
117-81-7	bis(2-Ethylhexyl)phthalate	0.066	J	0.069	J	MG/KG	LS07-SD209-01C	2/6	0.57 - 2.3	0.069		456 C			NO	BSL
11096-82-5	Aroclor-1260	0.037	J	0.1	J	MG/KG	LS07-SD209-01C	3/6	0.046 - 0.071	0.1		3.19 C			NO	BSL
7429-90-5	Aluminum	3,810		14,000		MG/KG	LS07-SD209-01C	6/6	46.882 - 76.923	14,000		78,214 N			NO	BSL
7440-38-2	Arsenic	3.2	K	9.2	L	MG/KG	LS07-SD209-01C	6/6	2.344 - 3.846	9.2		4.26 C			YES	ASL
7440-39-3	Barium	11.5	J	33.1	J	MG/KG	LS07-SD209-01C	5/6	46.882 - 76.923	33.1		5,475 N			NO	BSL
7440-41-7	Beryllium	0.65	J	0.71	J	MG/KG	LS07-SD209-01C	2/6	1.172 - 1.923	0.71		156 N			NO	BSL
7440-43-9	Cadmium	0.484	J	1.6	J	MG/KG	LS07-SD208-01C	2/6	1.172 - 1.923	1.6		78 N			NO	BSL
7440-70-2	Calcium	1,180	J	5,090		MG/KG	LS07-SD208-01C	6/6	1172.058 - 1923.07	5,090		NA			NO	NUT
7440-47-3	Chromium	8.6	L	31.7		MG/KG	LS07-SD208-01C	6/6	2.344 - 3.846	31.7		235 N			NO	BSL
7440-48-4	Cobalt	1.8	J	6.2	J	MG/KG	LS07-SD209-01C	6/6	11.721 - 19.231	6.2		1,600 N			NO	BSL
7440-50-8	Copper	17.5	L	43.7	L	MG/KG	LS07-SD208-01C	4/6	5.86 - 9.615	43.7		3,129 N			NO	BSL
7439-89-6	Iron	7,400		23,200		MG/KG	LS07-SD208-01C	6/6	23.441 - 38.462	23,200		23,000 N			YES	ASL
7439-92-1	Lead	11.5	J	47.1		MG/KG	LS07-SD208-01C	6/6	0.703 - 1.154	47.1		400			NO	BSL
7439-95-4	Magnesium	1,200	L	4,540		MG/KG	LS07-SD209-01C	6/6	1172.058 - 1923.07	4,540		NA			NO	NUT
7439-96-5	Manganese	50.5	L	172		MG/KG	LS07-SD208-01C	6/6	3.516 - 5.769	172		1,564 N			NO	BSL
7439-97-6	Mercury	0.08	J	0.201		MG/KG	LS07-SD209-01C	4/6	0.033 - 0.2	0.201		23.5 N			NO	BSL

Table 2.12

OCCURRENCE, DISTRIBUTION AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN

Site 7, NAB Little Creek

Scenario Timeframe: Current/Future
Medium: Sediment
Exposure Medium: Sediment
Exposure Point: Pond

CAS Number	Chemical	Minimum [1] Concentration	Minimum Qualifier	Maximum [1] Concentration	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration [2] Used for Screening	Background [3] Value	Screening [4] Toxicity Value	Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag	Rationale for [5] Contaminant Deletion or Selection
7440-02-0	Nickel	5.1	J	15.6		MG/KG	LS07-SD209-01C	5/6	9.376 - 15.385	15.6		1,564 N			NO	BSL
7440-09-7	Potassium	893	J	2,730		MG/KG	LS07-SD209-01C	6/6	1172.058 - 1923.07	2,730		NA			NO	NUT
7440-22-4	Silver	0.8	J	0.88	J	MG/KG	LS07-SD208-01C	2/5	3.08 - 3.846	0.88		391 N			NO	BSL
7440-23-5	Sodium	4,630		6,860		MG/KG	LS07-SD208-01C	4/6	1172.058 - 1923.07	6,860		NA			NO	NUT
7440-28-0	Thallium	1.2	J	1.2	J	MG/KG	LS07-SD209-01A	1/4	2.344 - 3.444	1.2		5.48 N			NO	BSL
7440-62-2	Vanadium	11.6	J	34.8		MG/KG	LS07-SD208-01C	6/6	11.721 - 19.231	34.8		23 N			YES	ASL
7440-66-6	Zinc	79.1	L	351		MG/KG	LS07-SD208-01C	6/6	4.688 - 7.692	351		23,464 N			NO	BSL

[1] Minimum/Maximum detected concentrations.

[2] Maximum concentration is used for screening.

[3] Background values not available.

[4] Risk-Based Concentration Table, October 15, 2003, U.S. EPA Region III, Jennifer Hubbard. Ten times residential soil RBC.
RBC value for pyrene used as surrogate for phenanthrene and benzo(g,h,i)perylene.
RBC value for cadmium-food used as surrogate for cadmium.
RBC value for Chromium VI used for total chromium.
Lead screening toxicity value is 400 mg/kg, the EPA residential soil screening level for lead.
RBC value for manganese-nonfood used as surrogate for manganese.
RBC value for mercuric chloride used as surrogate for mercury.

[5] Rationale Codes

Selection Reason: Above Screening Levels (ASL)

Deletion Reason: No Toxicity Information (NTX)
Essential Nutrient (NUT)
Below Screening Level (BSL)

SQL = Sample Quantification Limit
COPC = Chemical of Potential Concern
ARAR/TBC = Applicable or Relevant and Appropriate Requirement/ To Be Considered
J = Estimated Value
K = Biased High
L = Biased Low
C = Carcinogenic
N = Noncarcinogenic

Table 2.13

OCCURRENCE, DISTRIBUTION AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN

Site 7, NAB Little Creek

Scenario Timeframe: Current/Future
Medium: Sediment
Exposure Medium: Sediment
Exposure Point: Canal on West Side of Site

CAS Number	Chemical	Minimum [1] Concentration	Minimum Qualifier	Maximum [1] Concentration	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration [2] Used for Screening	Background [3] Value	Screening [4] Toxicity Value	Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag	Rationale for [5] Contaminant Deletion or Selection
91-57-6	2-Methylnaphthalene	0.019	J	0.1	J	MG/KG	LS07-SD204P-01C	5/23	0.4 - 11	0.1		1,564 N			NO	BSL
83-32-9	Acenaphthene	0.02	J	0.25	J	MG/KG	LS07-SD204P-01C	5/23	0.4 - 11	0.25		4,693 N			NO	BSL
98-86-2	Acetophenone	0.071	J	0.071	J	MG/KG	LS07-SD210-01C	1/24	0.4 - 11	0.071		7,821 N			NO	BSL
120-12-7	Anthracene	0.026	J	0.59		MG/KG	LS07-SD204P-01C	7/23	0.4 - 11	0.59		23,464 N			NO	BSL
100-52-7	Benzaldehyde	0.016	J	0.043	J	MG/KG	LS07-SD210-01C	2/24	0.4 - 11	0.043		7,821 N			NO	BSL
56-55-3	Benzo(a)anthracene	0.02	J	1		MG/KG	LS07-SD204P-01C	13/23	0.4 - 11	1		8.75 C			NO	BSL
50-32-8	Benzo(a)pyrene	0.013	J	0.68		MG/KG	LS07-SD204P-01C	13/23	0.4 - 11	0.68		0.875 C			NO	BSL
205-99-2	Benzo(b)fluoranthene	0.027	J	0.92		MG/KG	LS07-SD204P-01C	14/23	0.4 - 11	0.92		8.75 C			NO	BSL
191-24-2	Benzo(g,h,i)perylene	0.11	J	0.45	J	MG/KG	LS07-SD204P-01C	3/23	0.4 - 11	0.45		2,346 N			NO	BSL
207-08-9	Benzo(k)fluoranthene	0.06	J	0.54	J	MG/KG	LS07-SD212P-01A	10/23	0.4 - 11	0.54		87.5 C			NO	BSL
85-68-7	Butylbenzylphthalate	0.051	J	0.051	J	MG/KG	LS07-SD204-02A	1/23	0.4 - 11	0.051		15,643 N			NO	BSL
86-74-8	Carbazole	0.021	J	0.29	J	MG/KG	LS07-SD204P-01C	5/23	0.4 - 11	0.29		319 C			NO	BSL
218-01-9	Chrysene	0.032	J	0.89		MG/KG	LS07-SD204P-01C	13/23	0.4 - 11	0.89		875 C			NO	BSL
84-74-2	Di-n-butylphthalate	0.05	J	0.067	J	MG/KG	LS07-SD202-02A	3/23	0.4 - 11	0.067		7,821 N			NO	BSL
117-84-0	Di-n-octylphthalate	0.047	J	0.16	J	MG/KG	LS07-SD212-02A	2/23	0.4 - 11	0.16		3,100 N			NO	BSL
53-70-3	Dibenz(a,h)anthracene	0.019	J	0.045	J	MG/KG	LS07-SD203-02A	4/23	0.4 - 11	0.045		0.875 C			NO	BSL
132-64-9	Dibenzofuran	0.016	J	0.23	J	MG/KG	LS07-SD204P-01C	6/23	0.4 - 11	0.23		160 N			NO	BSL
206-44-0	Fluoranthene	0.047	J	2.1		MG/KG	LS07-SD204P-01C	14/23	0.4 - 11	2.1		3,129 N			NO	BSL
86-73-7	Fluorene	0.018	J	0.36	J	MG/KG	LS07-SD204P-01C	5/23	0.4 - 11	0.36		3,129 N			NO	BSL
193-39-5	Indeno(1,2,3-cd)pyrene	0.029	J	0.38	J	MG/KG	LS07-SD204P-01C	9/23	0.4 - 11	0.38		8.75 C			NO	BSL
91-20-3	Naphthalene	0.019	J	0.2	J	MG/KG	LS07-SD204P-01C	4/23	0.4 - 11	0.2		1,564 N			NO	BSL
85-01-8	Phenanthrene	0.094	J	2.4		MG/KG	LS07-SD204P-01C	11/23	0.4 - 11	2.4		2,346 N			NO	BSL
129-00-0	Pyrene	0.05	J	1.4		MG/KG	LS07-SD204P-01C	14/23	0.4 - 11	1.4		2,346 N			NO	BSL
117-81-7	bis(2-Ethylhexyl)phthalate	0.043	J	0.46	J	MG/KG	LS07-SD202-01A	6/24	0.4 - 11	0.46		456 C			NO	BSL
72-54-8	4,4'-DDD	0.0021	J	0.023		MG/KG	LS07-SD204-01A	5/24	0.004 - 0.0057	0.023		26.6 C			NO	BSL
72-55-9	4,4'-DDE	0.0018	J	0.013	J	MG/KG	LS07-SD204-01A	6/24	0.004 - 0.0057	0.013		18.8 C			NO	BSL
50-29-3	4,4'-DDT	0.0012	J	0.014	J	MG/KG	LS07-SD202-01A	3/24	0.004 - 0.0057	0.014		18.8 C			NO	BSL
11096-82-5	Aroclor-1260	0.051	J	0.26		MG/KG	LS07-SD202-01A	5/24	0.04 - 0.057	0.26		3.19 C			NO	BSL
959-98-8	Endosulfan I	0.0012	J	0.0029	J	MG/KG	LS07-SD202-01A	2/24	0.002 - 0.0029	0.0029		469 N			NO	BSL
72-20-8	Endrin	0.02	J	0.02	J	MG/KG	LS07-SD202-01A	1/24	0.004 - 0.0057	0.02		23.5 N			NO	BSL
53494-70-5	Endrin ketone	0.012		0.012		MG/KG	LS07-SD211-01A	1/24	0.004 - 0.0057	0.012		23.5 N			NO	BSL
5103-71-9	alpha-Chlordane	0.0028	J	0.0028	J	MG/KG	LS07-SD202-02A	1/24	0.002 - 0.0029	0.0028		18.2 C			NO	BSL
319-85-7	beta-BHC	0.0027	UJ	0.0087	J	MG/KG	LS07-SD213-02A	3/24	0.002 - 0.0029	0.0087		3.55 C			NO	BSL
12789-03-6	gamma-Chlordane	0.0031		0.0031		MG/KG	LS07-SD202-01A	1/16	0.00203 - 0.0027	0.0031		18.2 C			NO	BSL
7429-90-5	Aluminum	279		10,600		MG/KG	LS07-SD210-02A	24/24	36.327 - 69.204	10,600		78,214 N			NO	BSL
7440-36-0	Antimony	0.91	L	2.9	J	MG/KG	LS07-SD202-01A	3/17	12.2 - 20.761	2.9		31.3 N			NO	BSL
7440-38-2	Arsenic	1.2	L	9.8		MG/KG	LS07-SD212-02A	22/24	1.816 - 3.46	9.8		4.26 C			YES	ASL

Table 2.13

OCCURRENCE, DISTRIBUTION AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN

Site 7, NAB Little Creek

Scenario Timeframe: Current/Future
Medium: Sediment
Exposure Medium: Sediment
Exposure Point: Canal on West Side of Site

CAS Number	Chemical	Minimum [1] Concentration	Minimum Qualifier	Maximum [1] Concentration	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration [2] Used for Screening	Background [3] Value	Screening [4] Toxicity Value	Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag	Rationale for [5] Contaminant Deletion or Selection
7440-39-3	Barium	4.3	J	47.6	J	MG/KG	LS07-SD203-01C	19/24	36.327 - 69.204	47.6		5,475 N			NO	BSL
7440-41-7	Beryllium	0.15	J	0.27	J	MG/KG	LS07-SD212-01C	4/24	0.908 - 1.73	0.27		156 N			NO	BSL
7440-43-9	Cadmium	0.07	J	0.25	J	MG/KG	LS07-SD212-01C	5/24	0.908 - 1.73	0.25		78 N			NO	BSL
7440-70-2	Calcium	149	J	2,070		MG/KG	LS07-SD203-01C	15/24	908.183 - 1730.1	2,070		NA			NO	NUT
7440-47-3	Chromium	3.8		22.5		MG/KG	LS07-SD210-02A	20/24	1.816 - 3.46	22.5		235 N			NO	BSL
7440-48-4	Cobalt	0.71	J	5	J	MG/KG	LS07-SD210-02A	21/24	9.082 - 17.301	5		1,600 N			NO	BSL
7440-50-8	Copper	5.5	L	3,060	J	MG/KG	LS07-SD202-01A	14/24	4.541 - 8.651	3,060		3,129 N			NO	BSL
7439-89-6	Iron	1,260		21,000		MG/KG	LS07-SD210-02A	24/24	18.164 - 34.602	21,000		23,000 N			NO	BSL
7439-92-1	Lead	3		172	J	MG/KG	LS07-SD202-01A	24/24	0.545 - 1.038	172		400			NO	BSL
7439-95-4	Magnesium	219	J	4,540		MG/KG	LS07-SD210-02A	21/24	908.183 - 1730.1	4,540		NA			NO	NUT
7439-96-5	Manganese	7.9		164		MG/KG	LS07-SD210-02A	23/24	2.725 - 5.19	164		1,564 N			NO	BSL
7439-97-6	Mercury	0.013	J	0.06		MG/KG	LS07-SD203-01C	7/19	0.022 - 0.173	0.06		23.5 N			NO	BSL
7440-02-0	Nickel	1.7	J	50.7	L	MG/KG	LS07-SD202-01A	17/24	7.265 - 13.841	50.7		1,564 N			NO	BSL
7440-09-7	Potassium	234	J	2,610		MG/KG	LS07-SD210-02A	18/24	908.183 - 1730.1	2,610		NA			NO	NUT
7782-49-2	Selenium	0.75	J	1.6	K	MG/KG	LS07-SD212-01C	6/24	0.908 - 1.73	1.6		391 N			NO	BSL
7440-22-4	Silver	0.34	J	0.57	J	MG/KG	LS07-SD202-01A	5/21	2.04 - 3.46	0.57		391 N			NO	BSL
7440-23-5	Sodium	515	J	6,440		MG/KG	LS07-SD210-02A	14/24	908.183 - 1730.1	6,440		NA			NO	NUT
7440-28-0	Thallium	1.3	J	2.1	J	MG/KG	LS07-SD203-01C	2/16	1.816 - 2.712	2.1		5.48 N			NO	BSL
7440-62-2	Vanadium	2.4	J	248		MG/KG	LS07-SD203-01C	24/24	9.082 - 17.301	248		23 N			YES	ASL
7440-66-6	Zinc	11.4	L	211		MG/KG	LS07-SD212-02A	21/24	3.633 - 6.92	211		23,464 N			NO	BSL

[1] Minimum/Maximum detected concentrations.
[2] Maximum concentration is used for screening.
[3] Background values not available.
[4] Risk-Based Concentration Table, October 15, 2003, U.S. EPA Region III, Jennifer Hubbard. Ten times residential soil RBC.
RBC value for pyrene used as surrogate for phenanthrene and benzo(g,h,i)perylene.
RBC value for endosulfan used as surrogate for endosulfan I, endosulfan II, and endosulfan sulfate.
RBC value for endrin used as surrogate for endrin aldehyde and endrin ketone.
RBC value for cadmium-food used as surrogate for cadmium.
RBC value for Chromium VI used for total chromium.
Lead screening toxicity value is 400 mg/kg, the EPA residential soil screening level for lead.
RBC value for manganese-nonfood used as surrogate for manganese.
RBC value for mercuric chloride used as surrogate for mercury.
[5] Rationale Codes

Selection Reason: Above Screening Levels (ASL)
Deletion Reason: No Toxicity Information (NTX)
Essential Nutrient (NUT)
Below Screening Level (BSL)

SQL = Sample Quantification Limit
COPC = Chemical of Potential Concern
ARAR/TBC = Applicable or Relevant and Appropriate Requirement/ To Be Considered
J = Estimated Value
K = Biased High
L = Biased Low
C = Carcinogenic
N = Noncarcinogenic

Table 2.14

OCCURRENCE, DISTRIBUTION AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN

Site 7, NAB Little Creek

Scenario Timeframe: Current/Future
Medium: Sediment
Exposure Medium: Sediment
Exposure Point: Canal on East Side of Site

CAS Number	Chemical	Minimum [1] Concentration	Minimum Qualifier	Maximum [1] Concentration	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration [2] Used for Screening	Background [3] Value	Screening [4] Toxicity Value	Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag	Rationale for [5] Contaminant Deletion or Selection
205-99-2	Benzo(b)fluoranthene	0.045	J	0.045	J	MG/KG	LS07-SD205-01A	1/3	0.41 - 0.5	0.045		8.75 C			NO	BSL
117-84-0	Di-n-octylphthalate	0.04	J	0.04	J	MG/KG	LS07-SD205-02A	1/3	0.41 - 0.5	0.04		3,100 N			NO	BSL
206-44-0	Fluoranthene	0.02	J	0.0684	J	MG/KG	LS07-SD205-01C	3/3	0.41 - 0.5	0.0684		3,129 N			NO	BSL
129-00-0	Pyrene	0.028	J	0.072	J	MG/KG	LS07-SD205-01A	3/3	0.41 - 0.5	0.072		2,346 N			NO	BSL
7429-90-5	Aluminum	1,840		5,600		MG/KG	LS07-SD205-02A	3/3	42.7 - 59.555	5,600		78,214 N			NO	BSL
7440-38-2	Arsenic	1.8	L	5.1		MG/KG	LS07-SD205-02A	2/3	2.13 - 2.978	5.1		4.26 C			YES	ASL
7440-39-3	Barium	4.4	J	9.5	J	MG/KG	LS07-SD205-01C	2/3	42.7 - 59.555	9.5		5,475 N			NO	BSL
7440-41-7	Beryllium	0.16	J	0.16	J	MG/KG	LS07-SD205-01C	1/3	1.07 - 1.489	0.16		156 N			NO	BSL
7440-43-9	Cadmium	0.08	J	0.08	J	MG/KG	LS07-SD205-01C	1/3	1.07 - 1.489	0.08		78 N			NO	BSL
7440-70-2	Calcium	661	J	9,260		MG/KG	LS07-SD205-01C	3/3	1070 - 1488.87	9,260		NA			NO	NUT
7440-47-3	Chromium	4.3		11.5		MG/KG	LS07-SD205-02A	3/3	2.13 - 2.978	11.5		235 N			NO	BSL
7440-48-4	Cobalt	0.8	J	3	J	MG/KG	LS07-SD205-02A	2/3	10.7 - 14.889	3		1,600 N			NO	BSL
7440-50-8	Copper	11.2	J	11.2	J	MG/KG	LS07-SD205-01A	1/3	5.34 - 7.444	11.2		3,129 N			NO	BSL
7439-89-6	Iron	3,350		10,900		MG/KG	LS07-SD205-02A	3/3	21.3 - 29.777	10,900		23,000 N			NO	BSL
7439-92-1	Lead	4.4		9.8		MG/KG	LS07-SD205-02A	3/3	0.64 - 0.893	9.8		400			NO	BSL
7439-95-4	Magnesium	783	J	2,300		MG/KG	LS07-SD205-02A	3/3	1070 - 1488.87	2,300		NA			NO	NUT
7439-96-5	Manganese	18.3		74.9		MG/KG	LS07-SD205-02A	3/3	3.2 - 4.467	74.9		1,564 N			NO	BSL
7439-97-6	Mercury	0.02	J	0.02	J	MG/KG	LS07-SD205-01C	1/2	0.023 - 0.143	0.02		23.5 N			NO	BSL
7440-02-0	Nickel	1.9	J	1.9	J	MG/KG	LS07-SD205-01C	1/3	8.54 - 11.911	1.9		1,564 N			NO	BSL
7440-09-7	Potassium	422	J	1,410	J	MG/KG	LS07-SD205-02A	3/3	1070 - 1488.87	1,410		NA			NO	NUT
7440-22-4	Silver	1.2	J	1.2	J	MG/KG	LS07-SD205-01A	1/3	2.13 - 2.978	1.2		391 N			NO	BSL
7440-23-5	Sodium	2,020		4,150		MG/KG	LS07-SD205-02A	3/3	1070 - 1488.87	4,150		NA			NO	NUT
7440-62-2	Vanadium	5.4	J	16		MG/KG	LS07-SD205-02A	3/3	10.7 - 14.889	16		23 N			NO	BSL
7440-66-6	Zinc	26.9		38.2	L	MG/KG	LS07-SD205-01A	3/3	4.27 - 5.955	38.2		23,464 N			NO	BSL

[1] Minimum/Maximum detected concentrations.
[2] Maximum concentration is used for screening.
[3] Background values not available.
[4] Risk-Based Concentration Table, October 15, 2003, U.S. EPA Region III, Jennifer Hubbard. Ten times residential soil RBC.
RBC value for cadmium-food used as surrogate for cadmium.
RBC value for Chromium VI used for total chromium.
Lead screening toxicity value is 400 mg/kg, the EPA residential soil screening level for lead.
RBC value for manganese-nonfood used as surrogate for manganese.
RBC value for mercuric chloride used as surrogate for mercury.
[5] Rationale Codes

Selection Reason: Above Screening Levels (ASL)
Deletion Reason: No Toxicity Information (NTX)
Essential Nutrient (NUT)
Below Screening Level (BSL)

SQL = Sample Quantification Limit
COPC = Chemical of Potential Concern
ARAR/TBC = Applicable or Relevant and Appropriate Requirement/ To Be Considered
J = Estimated Value
K = Biased High
L = Biased Low
C = Carcinogenic
N = Noncarcinogenic

Table 2.15

OCCURRENCE, DISTRIBUTION AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN

Site 7, NAB Little Creek

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater
Exposure Point: Upper Aquifer - Tap Water

CAS Number	Chemical	Minimum [1] Concentration	Minimum Qualifier	Maximum [1] Concentration	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration [2] Used for Screening	Background [3] Value	Screening [4] Toxicity Value	Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag	Rationale for [5] Contaminant Deletion or Selection
108-88-3	Toluene	0.4	J	2	J	UG/L	LS07-MW01-01C LS07-MW01P-01C	3/6	1 - 10	2		74.7 N	100	MCL	NO	BSL
84-74-2	Di-n-butylphthalate	12		12		UG/L	LS07-MW01-01C	1/6	10 - 11	12		365 N	NA		NO	BSL
117-81-7	bis(2-Ethylhexyl)phthalate	1	J	1	J	UG/L	LS07-MW01P-01C	1/6	5 - 11	1		4.78 C	NA		NO	BSL
7429-90-5	Aluminum	94.9	J	3,960	J	UG/L	LS07-MW01-00A	5/6	200 - 200	3,960	713	3,650 N	50	SMCL	YES	ASL
7440-38-2	Arsenic	2.2	J	6.8	J	UG/L	LS07-MW01-00A	2/6	10 - 10	6.8	73	0.0446 C	10	MCL	YES	ASL
7440-39-3	Barium	6.3	J	29.8	J	UG/L	LS07-MW03-01C	3/6	200 - 200	29.8	130	256 N	200	MCL	NO	BSL
7440-41-7	Beryllium	0.3	J	0.3	J	UG/L	LS07-MW03-01C	1/6	5 - 5	0.3	0.5	7.3 N	4	MCL	NO	BSL
7440-70-2	Calcium	7,770	J	34,900	J	UG/L	LS07-MW03-02A	5/6	5000 - 5000	34,900	129,000	NA	NA		NO	NUT
7440-47-3	Chromium	1.1	J	23.4	J	UG/L	LS07-MW03-01A	4/6	10 - 10	23.4	4.1	11.0 N	100	MCL	YES	ASL
7440-48-4	Cobalt	2.1	J	13	J	UG/L	LS07-MW03-02A	4/6	50 - 50	13	2.6	73 N	NA		NO	BSL
7440-50-8	Copper	1.3	J	1.3	J	UG/L	LS07-MW01P-01C	1/6	25 - 25	1.3		146 N	1300	MCL	NO	BSL
7439-89-6	Iron	2,950	J	11,100	J	UG/L	LS07-MW03-02A	6/6	100 - 100	11,100	70,800	1,100 N	300	SMCL	YES	ASL
7439-95-4	Magnesium	9,430	J	36,900	J	UG/L	LS07-MW01-01C	6/6	5000 - 5000	36,900	45,600	NA	NA		NO	NUT
7439-96-5	Manganese	33	J	785	J	UG/L	LS07-MW03-02A	6/6	15 - 15	785	1,500	73 N	50	SMCL	YES	ASL
7439-97-6	Mercury	0.08	J	0.08	J	UG/L	LS07-MW03-01A	1/6	0.2 - 0.3	0.08	0.3	1.10 N	2	MCL	NO	BSL
7440-02-0	Nickel	4.1	J	7.9	J	UG/L	LS07-MW03-01A	4/6	40 - 40	7.9	14	73 N	NA		NO	BSL
7440-09-7	Potassium	9,040	J	25,300	J	UG/L	LS07-MW01-01C	5/6	5000 - 5000	25,300	36,800	NA	NA		NO	NUT
7782-49-2	Selenium	6	K	6	K	UG/L	LS07-MW01-00A	1/6	5 - 5	6	8	18.3 N	50	MCL	NO	BSL
7440-23-5	Sodium	41,100	K	400,000	K	UG/L	LS07-MW01-01C	5/6	5000 - 5000	400,000	337,000	NA	NA		NO	NUT
7440-62-2	Vanadium	2	K	8.9	K	UG/L	LS07-MW01-00A	3/6	50 - 50	8.9	5	1.1 N	NA		YES	ASL
7440-66-6	Zinc	0.87	K	162	K	UG/L	LS07-MW03-01A	4/6	20 - 20	162	59	1,095 N	5000	SMCL	NO	BSL

Unfiltered metals used.

[1] Minimum/Maximum detected concentrations.

[2] Maximum concentration is used for screening.

[3] 95%UTL for Groundwater from Little Creek Background Investigation.

[4] Risk-Based Concentration Table, October 15, 2003, U.S. EPA Region III, Jennifer Hubbard. Tap water RBC.

RBC value for Chromium VI used for total chromium.

RBC value for manganese-nonfood used as surrogate for manganese.

RBC value for mercuric chloride used as surrogate for mercury.

RBC value for Chromium VI used for total chromium.

RBC value for manganese-nonfood used as surrogate for manganese.

RBC value for mercuric chloride used as surrogate for mercury.

[5] Rationale Codes

Selection Reason: Above Screening Levels (ASL)

Deletion Reason: No Toxicity Information (NTX)
Essential Nutrient (NUT)
Below Screening Level (BSL)

SQL = Sample Quantification Limit

COPC = Chemical of Potential Concern

ARAR/TBC = Applicable or Relevant and Appropriate Requirement/ To Be Considered

J = Estimated Value

K = Biased High

L = Biased Low

C = Carcinogenic

N = Noncarcinogenic

MCL = Federal Maximum Contaminant Level

SMCL = Secondary Maximum Contaminant Level

Table 2.16

OCCURRENCE, DISTRIBUTION AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN

Site 7, NAB Little Creek

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater
Exposure Point: Upper Aquifer - Excavation Pit

CAS Number	Chemical	Minimum [1] Concentration	Minimum Qualifier	Maximum [1] Concentration	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration [2] Used for Screening	Background [3] Value	Screening [4] Toxicity Value	Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag	Rationale for [5] Contaminant Deletion or Selection
108-88-3	Toluene	0.4	J	2	J	UG/L	LS07-MW01-01C LS07-MW01P-01C	3/6	1 - 10	2		74.7 N	100	MCL	NO	BSL
84-74-2	Di-n-butylphthalate	12		12		UG/L	LS07-MW01-01C	1/6	10 - 11	12		365 N	NA		NO	BSL
117-81-7	bis(2-Ethylhexyl)phthalate	1	J	1	J	UG/L	LS07-MW01P-01C	1/6	5 - 11	1		4.78 C	NA		NO	BSL
7429-90-5	Aluminum	94.9	J	3,960	J	UG/L	LS07-MW01-00A	5/6	200 - 200	3,960	713	3,650 N	50	SMCL	YES	ASL
7440-38-2	Arsenic	2.2	J	6.8	J	UG/L	LS07-MW01-00A	2/6	10 - 10	6.8	73	0.0446 C	10	MCL	YES	ASL
7440-39-3	Barium	6.3	J	29.8	J	UG/L	LS07-MW03-01C	3/6	200 - 200	29.8	130	256 N	200	MCL	NO	BSL
7440-41-7	Beryllium	0.3	J	0.3	J	UG/L	LS07-MW03-01C	1/6	5 - 5	0.3	0.5	7.3 N	4	MCL	NO	BSL
7440-70-2	Calcium	7,770	J	34,900	J	UG/L	LS07-MW03-02A	5/6	5000 - 5000	34,900	129,000	NA	NA		NO	NUT
7440-47-3	Chromium	1.1	J	23.4	J	UG/L	LS07-MW03-01A	4/6	10 - 10	23.4	4.1	11.0 N	100	MCL	YES	ASL
7440-48-4	Cobalt	2.1	J	13	J	UG/L	LS07-MW03-02A	4/6	50 - 50	13	2.6	73 N	NA		NO	BSL
7440-50-8	Copper	1.3	J	1.3	J	UG/L	LS07-MW01P-01C	1/6	25 - 25	1.3		146 N	1300	MCL	NO	BSL
7439-89-6	Iron	2,950	J	11,100	J	UG/L	LS07-MW03-02A	6/6	100 - 100	11,100	70,800	1,100 N	300	SMCL	YES	ASL
7439-95-4	Magnesium	9,430	J	36,900	J	UG/L	LS07-MW01-01C	6/6	5000 - 5000	36,900	45,600	NA	NA		NO	NUT
7439-96-5	Manganese	33	J	785	J	UG/L	LS07-MW03-02A	6/6	15 - 15	785	1,500	73 N	50	SMCL	YES	ASL
7439-97-6	Mercury	0.08	J	0.08	J	UG/L	LS07-MW03-01A	1/6	0.2 - 0.3	0.08	0.3	1.10 N	2	MCL	NO	BSL
7440-02-0	Nickel	4.1	J	7.9	J	UG/L	LS07-MW03-01A	4/6	40 - 40	7.9	14	73 N	NA		NO	BSL
7440-09-7	Potassium	9,040	J	25,300	J	UG/L	LS07-MW01-01C	5/6	5000 - 5000	25,300	36,800	NA	NA		NO	NUT
7782-49-2	Selenium	6	K	6	K	UG/L	LS07-MW01-00A	1/6	5 - 5	6	8	18.3 N	50	MCL	NO	BSL
7440-23-5	Sodium	41,100	K	400,000	K	UG/L	LS07-MW01-01C	5/6	5000 - 5000	400,000	337,000	NA	NA		NO	NUT
7440-62-2	Vanadium	2	K	8.9	K	UG/L	LS07-MW01-00A	3/6	50 - 50	8.9	5	1.1 N	NA		YES	ASL
7440-66-6	Zinc	0.87	K	162	K	UG/L	LS07-MW03-01A	4/6	20 - 20	162	59	1,095 N	5000	SMCL	NO	BSL

Unfiltered metals used.

[1] Minimum/Maximum detected concentrations.

[2] Maximum concentration is used for screening.

[3] 95%UTL for Groundwater from Little Creek Background Investigation.

[4] Risk-Based Concentration Table, October 15, 2003, U.S. EPA Region III, Jennifer Hubbard. Tap water RBC.
RBC value for Chromium VI used for total chromium.
RBC value for manganese-nonfood used as surrogate for manganese.
RBC value for mercuric chloride used as surrogate for mercury.
RBC value for Chromium VI used for total chromium.
RBC value for manganese-nonfood used as surrogate for manganese.
RBC value for mercuric chloride used as surrogate for mercury.

[5] Rationale Codes

Selection Reason: Above Screening Levels (ASL)

Deletion Reason: No Toxicity Information (NTX)
Essential Nutrient (NUT)
Below Screening Level (BSL)

SQL = Sample Quantification Limit
COPC = Chemical of Potential Concern
ARAR/TBC = Applicable or Relevant and Appropriate Requirement/ To Be Considered
J = Estimated Value
K = Biased High
L = Biased Low
C = Carcinogenic
N = Noncarcinogenic
MCL = Federal Maximum Contaminant Level
SMCL = Secondary Maximum Contaminant Level

Table 2.17

OCCURRENCE, DISTRIBUTION AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN

Site 7, NAB Little Creek

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater
Exposure Point: Upper Aquifer -Water Vapors at Showerhead

CAS Number	Chemical	Minimum [1] Concentration	Minimum Qualifier	Maximum [1] Concentration	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration [2] Used for Screening	Background [3] Value	Screening [4] Toxicity Value	Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag	Rationale for [5] Contaminant Deletion or Selection
108-88-3	Toluene	0.4	J	2	J	UG/L	LS07-MW01-01C LS07-MW01P-01C	3/6	1 - 10	2		74.7 N	100	MCL	NO	BSL

Unfiltered metals used.

[1] Minimum/Maximum detected concentrations.

[2] Maximum concentration is used for screening.

[3] Background values not available.

[4] Risk-Based Concentration Table, October 15, 2003, U.S. EPA Region III, Jennifer Hubbard. Tap water RBC.
RBC value for Chromium VI used for total chromium.
RBC value for manganese-nonfood used as surrogate for manganese.
RBC value for mercuric chloride used as surrogate for mercury.
RBC value for Chromium VI used for total chromium.
RBC value for manganese-nonfood used as surrogate for manganese.
RBC value for mercuric chloride used as surrogate for mercury.

[5] Rationale Codes

Selection Reason: Above Screening Levels (ASL)

Deletion Reason: No Toxicity Information (NTX)
Essential Nutrient (NUT)
Below Screening Level (BSL)

SQL = Sample Quantification Limit
COPC = Chemical of Potential Concern
ARAR/TBC = Applicable or Relevant and Appropriate Requirement/ To Be Considered
J = Estimated Value
K = Biased High
L = Biased Low
C = Carcinogenic
N = Noncarcinogenic
MCL = Federal Maximum Contaminant Level
SMCL = Secondary Maximum Contaminant Level

Table 2.18

OCCURRENCE, DISTRIBUTION AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN

Site 7, NAB Little Creek

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater
Exposure Point: Upper Aquifer - Water Vapors at Excavation Pit

CAS Number	Chemical	Minimum [1] Concentration	Minimum Qualifier	Maximum [1] Concentration	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration [2] Used for Screening	Background [3] Value	Screening [4] Toxicity Value	Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag	Rationale for [5] Contaminant Deletion or Selection
108-88-3	Toluene	0.4	J	2	J	UG/L	LS07-MW01-01C LS07-MW01P-01C	3/6	1 - 10	2		74.7 N	100	MCL	NO	BSL

Unfiltered metals used.

[1] Minimum/Maximum detected concentrations.

[2] Maximum concentration is used for screening.

[3] Background values not available.

[4] Risk-Based Concentration Table, October 15, 2003, U.S. EPA Region III, Jennifer Hubbard. Tap water RBC.
RBC value for Chromium VI used for total chromium.
RBC value for manganese-nonfood used as surrogate for manganese.
RBC value for mercuric chloride used as surrogate for mercury.
RBC value for Chromium VI used for total chromium.
RBC value for manganese-nonfood used as surrogate for manganese.
RBC value for mercuric chloride used as surrogate for mercury.

[5] Rationale Codes

Selection Reason: Above Screening Levels (ASL)

Deletion Reason: No Toxicity Information (NTX)
Essential Nutrient (NUT)
Below Screening Level (BSL)

SQL = Sample Quantification Limit
COPC = Chemical of Potential Concern
ARAR/TBC = Applicable or Relevant and Appropriate Requirement/ To Be Considered
J = Estimated Value
K = Biased High
L = Biased Low
C = Carcinogenic
N = Noncarcinogenic
MCL = Federal Maximum Contaminant Level
SMCL = Secondary Maximum Contaminant Level

Table 2.19

OCCURRENCE, DISTRIBUTION AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN

Site 7, NAB Little Creek

Scenario Timeframe: Future
Medium: Soil*
Exposure Medium: Soil
Exposure Point: Weigh Station Area

CAS Number	Chemical	Minimum [1] Concentration	Minimum Qualifier	Maximum [1] Concentration	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration [2] Used for Screening	Background [3] Value	Screening [4] Toxicity Value	Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag	Rationale for [5] Contaminant Deletion or Selection
129-00-0	Pyrene	0.052	J	0.052	J	MG/KG	07-SS-104	1/3	0.42 - 2	0.052		235 N	68	SSL	NO	BSL
117-81-7	bis(2-Ethylhexyl)phthalate	0.14	J	0.14	J	MG/KG	07-SS-104	1/3	0.42 - 2	0.14		45.6 C	290	SSL	NO	BSL
72-54-8	4,4'-DDD	0.02		0.02		MG/KG	LS07-SB203-02	1/3	0.0041 - 0.034	0.02	0.24	2.66 C	11	SSL	NO	BSL
72-55-9	4,4'-DDE	0.0058	J	0.0058	J	MG/KG	LS07-SB203-02	1/3	0.0041 - 0.034	0.0058	0.0062	1.88 C	35	SSL	NO	BSL
11097-69-1	Aroclor-1254	0.06		0.11		MG/KG	LS07-SB203-02	2/3	0.041 - 0.34	0.11		0.32 C	1.1	SSL	NO	BSL
11096-82-5	Aroclor-1260	0.099	J	0.92		MG/KG	07-SS-104	3/3	0.041 - 0.042	0.92		0.319 C	NA		YES	ASL
5103-71-9	alpha-Chlordane	0.016		0.02		MG/KG	LS07-SS203-00	2/3	0.0021 - 0.017	0.02		1.82 C	0.92	SSL	NO	BSL
12789-03-6	gamma-Chlordane	0.015		0.015		MG/KG	LS07-SB203-02 LS07-SS203-00	2/3	0.0021 - 0.017	0.015		1.82 C	0.92	SSL	NO	BSL
7429-90-5	Aluminum	4,170		6,240		MG/KG	07-SS-104	3/3	38.606 - 42.765	6,240	8,500	7,821 N	NA		NO	BSL
7440-36-0	Antimony	1.3	J	1.9	J	MG/KG	LS07-SS203-00	2/3	3.9 - 12.83	1.9		3.13 N	1.3	SSL	NO	BSL
7440-38-2	Arsenic	2.3		2.3		MG/KG	07-SS-104	1/3	1.93 - 2.138	2.3	5.6	0.426 C	0.026	SSL	YES	ASL
7440-39-3	Barium	31.1	J	93.9		MG/KG	07-SS-104	3/3	38.606 - 42.765	93.9	69	548 N	210	SSL	NO	BSL
7440-41-7	Beryllium	0.43		2.8		MG/KG	LS07-SB203-02	2/3	0.965 - 1.069	2.8	0.6	15.6 N	120	SSL	NO	BSL
7440-43-9	Cadmium	1.4		1.4		MG/KG	07-SS-104	1/3	0.965 - 1.069	1.4		7.8 N	5.5	SSL	NO	BSL
7440-70-2	Calcium	400	J	2,120		MG/KG	07-SS-104	3/3	965.158 - 1069.13	2,120	1,817	NA	NA		NO	NUT
7440-47-3	Chromium	13.4	J	26.5		MG/KG	07-SS-104	3/3	1.93 - 2.138	26.5	20	23.5 N	4.2	SSL	YES	ASL
7440-48-4	Cobalt	1.7	J	14.8		MG/KG	LS07-SB203-02	3/3	9.652 - 10.691	14.8	5.1	160 N	NA		NO	BSL
7440-50-8	Copper	55.4	J	396	J	MG/KG	LS07-SB203-02	3/3	4.826 - 5.346	396		313 N	1,100	SSL	YES	ASL
7439-89-6	Iron	7,540		14,800	J	MG/KG	07-SS-104	3/3	19.303 - 21.383	14,800	15,000	2,300 N	NA		YES	ASL
7439-92-1	Lead	143	J	638	J	MG/KG	07-SS-104	3/3	0.579 - 0.641	638	16.4	400	NA		YES	ASL
7439-95-4	Magnesium	369	J	3,210		MG/KG	07-SS-104	3/3	965.158 - 1069.13	3,210	1,347	NA	NA		NO	NUT
7439-96-5	Manganese	28	K	470	J	MG/KG	07-SS-104	3/3	2.895 - 3.207	470	267	156 N	95	SSL	YES	ASL
7439-97-6	Mercury	0.12		0.2		MG/KG	LS07-SS203-00	2/3	0.1 - 0.44	0.2		2.35 N	NA		NO	BSL
7440-02-0	Nickel	12.1		116		MG/KG	LS07-SB203-02	3/3	7.721 - 8.553	116	9.5	156 N	NA		NO	BSL
7440-09-7	Potassium	2,970		2,970		MG/KG	07-SS-104	1/3	965.158 - 1069.13	2,970	1,435	NA	NA		NO	NUT
7782-49-2	Selenium	0.8	J	0.8	J	MG/KG	LS07-SB203-02	1/3	0.34 - 1.069	0.8		39.1 N	1.9	SSL	NO	BSL
7440-23-5	Sodium	784	J	784	J	MG/KG	LS07-SB203-02	1/3	110 - 1069.13	784	623	NA	NA		NO	NUT
7440-62-2	Vanadium	14.7		36.7		MG/KG	07-SS-104	3/3	9.652 - 10.691	36.7	34.3	2.3 N	510	SSL	YES	ASL
7440-66-6	Zinc	146		1,540		MG/KG	LS07-SB203-02	3/3	3.861 - 4.277	1,540	39	2,346 N	1,400	SSL	NO	BSL

* Surface soil & subsurface soil combined

[1] Minimum/Maximum detected concentrations.

[2] Maximum concentration is used for screening.

[3] 95%UTL for urban surface soil from Little Creek Background Investigation.

[4] Risk-Based Concentration Table, October 15, 2003, U.S. EPA Region III, Jennifer Hubbard. Residential Soil.
RBC value for cadmium-food used as surrogate for cadmium.
RBC value for Chromium VI used for total chromium.
Lead screening toxicity value is 400 mg/kg, the EPA residential soil screening level for lead.
RBC value for manganese-nonfood used as surrogate for manganese.
RBC value for mercuric chloride used as surrogate for mercury.

[5] Rationale Codes

Selection Reason: Above Screening Levels (ASL)
Deletion Reason: No Toxicity Information (NTX)
Essential Nutrient (NUT)

SQL = Sample Quantification Limit
COPC = Chemical of Potential Concern
ARAR/TBC = Applicable or Relevant and Appropriate Requirement/ To Be Considered
J = Estimated Value
K = Biased High
L = Biased Low
C = Carcinogenic
N = Noncarcinogenic
SSL = Region III Soil Screening Level, Soil to Groundwater Migration, DAF 20

Table 2.19

OCCURRENCE, DISTRIBUTION AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN

Site 7, NAB Little Creek

Scenario Timeframe: Future
Medium: Soil*
Exposure Medium: Soil
Exposure Point: Weigh Station Area

CAS Number	Chemical	Minimum [1] Concentration	Minimum Qualifier	Maximum [1] Concentration	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration [2] Used for Screening	Background [3] Value	Screening [4] Toxicity Value	Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag	Rationale for [5] Contaminant Deletion or Selection

Below Screening Level (BSL)

Table 2.20

OCCURRENCE, DISTRIBUTION AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN

Site 7, NAB Little Creek

Scenario Timeframe: Future
Medium: Soil*
Exposure Medium: Air
Exposure Point: Emissions from Soil at Weigh Station Area

CAS Number	Chemical	Minimum [1] Concentration	Minimum Qualifier	Maximum [1] Concentration	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration [2] Used for Screening	Background [3] Value	Screening [4] Toxicity Value	Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag	Rationale for [5] Contaminant Deletion or Selection
129-00-0	Pyrene	1.1E-08	J	1.1E-08	J	MG/M^3	07-SS-104	1/3	(6)	1.1E-08		1.1E-02 N			NO	BSL
117-81-7	bis(2-Ethylhexyl)phthalate	1.1E-10	J	1.1E-10	J	MG/M^3	07-SS-104	1/3	(6)	1.1E-10		4.5E-04 C			NO	BSL
72-54-8	4,4'-DDD	1.5E-11		1.5E-11		MG/M^3	LS07-SB203-02	1/3	(6)	1.5E-11		2.6E-05 C			NO	BSL
72-55-9	4,4'-DDE	4.4E-12	J	4.4E-12	J	MG/M^3	LS07-SB203-02	1/3	(6)	4.4E-12		1.8E-05 C			NO	BSL
11097-69-1	Aroclor-1254	4.5E-11		8.3E-11		MG/M^3	LS07-SB203-02	2/3	(6)	8.3E-11		3.1E-06 C			NO	BSL
11096-82-5	Aroclor-1260	7.5E-11	J	7.0E-10		MG/M^3	07-SS-104	3/3	(6)	7.0E-10		3.1E-06 C			NO	BSL
5103-71-9	alpha-Chlordane	1.2E-11		1.5E-11		MG/M^3	LS07-SS203-00	2/3	(6)	1.5E-11		1.8E-05 C			NO	BSL
12789-03-6	gamma-Chlordane	1.1E-11		1.1E-11		MG/M^3	LS07-SB203-02 LS07-SS203-00	2/3	(6)	1.1E-11		1.8E-05 C			NO	BSL
7429-90-5	Aluminum	3.2E-06		4.7E-06		MG/M^3	07-SS-104	3/3	(6)	4.7E-06		3.7E-04 N			NO	BSL
7440-36-0	Antimony	9.8E-10	J	1.4E-09	J	MG/M^3	LS07-SS203-00	2/3	(6)	1.4E-09		1.5E-04 N			NO	BSL
7440-38-2	Arsenic	1.7E-09		1.7E-09		MG/M^3	07-SS-104	1/3	(6)	1.7E-09		4.1E-07 C			NO	BSL
7440-39-3	Barium	2.4E-08	J	7.1E-08		MG/M^3	07-SS-104	3/3	(6)	7.1E-08		5.1E-05 N			NO	BSL
7440-41-7	Beryllium	3.3E-10		2.1E-09		MG/M^3	LS07-SB203-02	2/3	(6)	2.1E-09		7.5E-07 C			NO	BSL
7440-43-9	Cadmium	1.1E-09		1.1E-09		MG/M^3	07-SS-104	1/3	(6)	1.1E-09		9.9E-07 C			NO	BSL
7440-70-2	Calcium	3.0E-07	J	1.6E-06		MG/M^3	07-SS-104	3/3	(6)	1.6E-06		NA			NO	NUT
7440-47-3	Chromium	1.0E-08	J	2.0E-08		MG/M^3	07-SS-104	3/3	(6)	2.0E-08		1.5E-07 C			NO	BSL
7440-48-4	Cobalt	1.3E-09	J	1.1E-08		MG/M^3	LS07-SB203-02	3/3	(6)	1.1E-08		6.4E-07 N			NO	BSL
7440-50-8	Copper	4.2E-08	J	3.0E-07	J	MG/M^3	LS07-SB203-02	3/3	(6)	3.0E-07		1.5E-02 N			NO	BSL
7439-89-6	Iron	5.7E-06		1.1E-05	J	MG/M^3	07-SS-104	3/3	(6)	1.1E-05		1.1E-01 N			NO	BSL
7439-92-1	Lead	1.1E-07	J	4.8E-07	J	MG/M^3	07-SS-104	3/3	(6)	4.8E-07		NA			NO	BSL
7439-95-4	Magnesium	2.8E-07	J	2.4E-06		MG/M^3	07-SS-104	3/3	(6)	2.4E-06		NA			NO	NUT
7439-96-5	Manganese	2.1E-08	K	3.6E-07	J	MG/M^3	07-SS-104	3/3	(6)	3.6E-07		5.2E-06 N			NO	BSL
7439-97-6	Mercury	9.1E-11		1.5E-10		MG/M^3	LS07-SS203-00	2/3	(6)	1.5E-10		3.1E-05 N			NO	BSL
7440-02-0	Nickel	9.2E-09		8.8E-08		MG/M^3	LS07-SB203-02	3/3	(6)	8.8E-08		7.3E-03 N			NO	BSL
7440-09-7	Potassium	2.3E-06		2.3E-06		MG/M^3	07-SS-104	1/3	(6)	2.3E-06		NA			NO	NUT
7782-49-2	Selenium	6.1E-10	J	6.1E-10	J	MG/M^3	LS07-SB203-02	1/3	(6)	6.1E-10		1.8E-03 N			NO	BSL
7440-23-5	Sodium	5.9E-07	J	5.9E-07	J	MG/M^3	LS07-SB203-02	1/3	(6)	5.9E-07		NA			NO	NUT
7440-62-2	Vanadium	1.1E-08		2.8E-08		MG/M^3	07-SS-104	3/3	(6)	2.8E-08		1.1E-04 N			NO	BSL
7440-66-6	Zinc	1.1E-07		1.2E-06		MG/M^3	LS07-SB203-02	3/3	(6)	1.2E-06		1.1E-01 N			NO	BSL

* Surface soil & subsurface soil combined

[1] Minimum/maximum detected soil concentration multiplied by 1/PEF (1.32E+9 m3/kg) and 1/VF(chemical specific for VOCs only) to get air concentration. PEF and VF from EPA's Soil Screening Guidance. VFs calculated in Table 2.20A.

[2] Maximum concentration is used for screening.

[3] Background values not available.

[4] Risk-Based Concentration Table, October 15, 2003, U.S. EPA Region III, Jennifer Hubbard. Ambient Air.
RBC value for cadmium-food used as surrogate for cadmium.
RBC value for Chromium VI used for total chromium.
Lead screening toxicity value is 400 mg/kg, the EPA residential soil screening level for lead.
RBC value for manganese-nonfood used as surrogate for manganese.

[5] Rationale Codes

Selection Reason: Above Screening Levels (ASL)

Deletion Reason: No Toxicity Information (NTX)
Essential Nutrient (NUT)
Below Screening Level (BSL)

SQL = Sample Quantification Limit
COPC = Chemical of Potential Concern
ARAR/TBC = Applicable or Relevant and Appropriate Requirement/ To Be Considered
J = Estimated Value
K = Biased High
L = Biased Low
C = Carcinogenic
N = Noncarcinogenic
SSL = Region III Soil Screening Level, Soil to Groundwater Migration, DAF 20

Table 2.20

OCCURRENCE, DISTRIBUTION AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN

Site 7, NAB Little Creek

Scenario Timeframe: Future
Medium: Soil*
Exposure Medium: Air
Exposure Point: Emissions from Soil at Weigh Station Area

CAS Number	Chemical	Minimum [1] Concentration	Minimum Qualifier	Maximum [1] Concentration	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration [2] Used for Screening	Background [3] Value	Screening [4] Toxicity Value	Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag	Rationale for [5] Contaminant Deletion or Selection

(6) See Table 2.19 for soil data detection limits, concentrations converted from soil data to air concetrations.

Table 2.20A
OCCURRENCE, DISTRIBUTION AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN
Calculation of Generic Chemical Specific VF Factors
Site 7, NAB Little Creek

Chemical	Diffusivity in Air (D_I) (cm^2/s)	Henry's Law Constant (H') (unitless)	Diffusivity in Water (D_w) (cm^2/s)	Soil Organic Carbon Partition Coeff. (K_{oc}) (cm^3/g)	Soil Water Partition Coeff. ($K_d = K_{oc} \times F_{oc}$) ($g/cm^3$)	Solubility in Water (S) (mg/L)	Apparent Diffusivity (D_A) (cm^2/s)	Volatilization Factor (VF) (m^3/kg)
2-Butanone	4.05E-02	1.05E-05	3.80E-05	4.50E+00	2.70E-02	2.39E+05	2.08E-06	1.14E+05
Acetone	1.24E-01	1.59E-03	1.14E-05	5.75E-01	3.45E-03	1.00E+06	1.02E-04	1.63E+04
1,4-Dichlorobenzene	6.90E-02	9.96E-02	7.90E-06	6.17E02	3.70E+00	7.38E+01	9.58E-05	1.68E+04
Methylene chloride	1.01E-01	8.98E-02	1.17E-05	1.17E01	7.02E-02	1.30E+04	2.58E-03	3.23E+03
Tetrachloroethene	7.20E-02	7.54E-01	8.20E-06	1.55E02	9.30E-01	2.00E+02	2.47E-03	3.31E+03
2-Methylnaphthalene	5.60E-02	2.07E-02	7.84E-06	2.13E+03	1.28E+01	2.54E+01	4.80E-06	7.50E+04
Anthracene	3.24E-02	2.67E-03	7.74E-06	2.95E+04	1.77E+02	4.34E-02	2.63E-08	1.01E+06
Fluorene	3.63E-02	2.61E-03	7.88E-06	1.38E+04	8.28E+01	1.98E+00	6.15E-08	6.63E+05
Pyrene	2.72E-02	4.51E-04	7.24E-06	1.05E+05	6.30E+02	1.35E-01	1.11E-09	4.93E+06

Volatilization factor (VF) = (m^3/kg)

$$\frac{Q/C * (3.14 * D_A * T)^{1/2} * 10^{-4}\ m^2/cm^2}{2 * r_b * D_A}$$

Apparent Diffusivity (D_A) = (cm^2/s)

$$\frac{[(Q_a^{10/3} * D_I * H' + Q_w^{10/3} * D_w)/n^2]}{(r_b * K_d + Q_w + Q_a * H')}$$

Parameters	Values
Q/C - Inverse of the mean concentration at the center of a 0.5-acre-square source for Philadelphia (g/m^2-s per kg/m^3)	90.24
T - Exposure interval(s)	9.5E+08
r_b - Soil bulk density (g/cm^3)	1.5
Q_a - Air-filled soil porosity (L_{air}/L_{water}) = n - Q_w	0.28
n - Total soil porosity (Lpore/Lsoil) = 1 - (r_b/r_s)	0.43
Q_w - Water-filled soil porosity (Lwater/Lsoil)	0.15
r_s - Soil particle density (g/cm^3)	2.65
f_{oc} - fraction organic carbon in soil (g/g)	0.006

Chemical and physical properties from USEPA, 1996, *Soil Screening Guidance: User's Guide,* EPA/540/R-96/018.

Table 2.21

OCCURRENCE, DISTRIBUTION AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN

Site 7, NAB Little Creek

Scenario Timeframe: Future
Medium: Soil*
Exposure Medium: Soil
Exposure Point: Area to West of Landfill, the "Ear"

CAS Number	Chemical	Minimum [1] Concentration	Minimum Qualifier	Maximum [1] Concentration	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration [2] Used for Screening	Background [3] Value	Screening [4] Toxicity Value	Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag	Rationale for [5] Contaminant Deletion or Selection
205-99-2	Benzo(b)fluoranthene	0.08	J	0.08	J	MG/KG	LS07-SS201P-00	1/5	0.35 - 4.3	0.08		0.875 C	4.5	SSL	NO	BSL
207-08-9	Benzo(k)fluoranthene	0.045	J	0.045	J	MG/KG	LS07-SS201P-00	1/5	0.35 - 4.3	0.045		8.75 C	45	SSL	NO	BSL
218-01-9	Chrysene	0.07	J	0.07	J	MG/KG	LS07-SS201P-00	1/5	0.35 - 4.3	0.07		87.5 C	87.5	SSL	NO	BSL
117-81-7	bis(2-Ethylhexyl)phthalate	0.1	J	0.1	J	MG/KG	07-SB-6D	1/5	0.35 - 4.3	0.1		45.6 C	290	SSL	NO	BSL
72-54-8	4,4'-DDD	0.0046		0.0046		MG/KG	LS07-SB201-02	1/5	0.0035 - 0.0043	0.0046	0.24	2.66 C	11	SSL	NO	BSL
72-55-9	4,4'-DDE	0.01		0.01		MG/KG	LS07-SB201-02	1/5	0.0035 - 0.0043	0.01	0.0062	1.88 C	35	SSL	NO	BSL
53469-21-9	Aroclor-1242	0.05		0.05		MG/KG	LS07-SB201-02	1/5	0.035 - 0.043	0.05		0.319 C	NA		NO	BSL
7429-90-5	Aluminum	1,450		7,510		MG/KG	LS07-SB201-02	5/5	31.756 - 48.038	7510	8,500	7,821 N	NA	SSL	NO	BSL
7440-36-0	Antimony	1.1	J	1.1	J	MG/KG	LS07-SS201-00	1/4	9.527 - 14.411	1.1		3.13 N	1.3	SSL	NO	BSL
7440-38-2	Arsenic	2.4	J	4.6		MG/KG	LS07-SS201P-00	2/5	1.588 - 2.402	4.6	5.6	0.426 C	0.026	SSL	YES	ASL
7440-39-3	Barium	3.8	J	54.6		MG/KG	LS07-SB201-02	5/5	31.756 - 48.038	54.6	69	548 N	210	SSL	NO	BSL
7440-41-7	Beryllium	0.44		2.3		MG/KG	LS07-SB201-02	2/5	0.794 - 1.201	2.3	0.6	15.6 N	120	SSL	NO	BSL
7440-43-9	Cadmium	1.1	J	1.1	J	MG/KG	07-SB-6D	1/5	0.794 - 1.201	1.1		7.8 N	5.5	SSL	NO	BSL
7440-70-2	Calcium	425		2,470		MG/KG	LS07-SB201-02	5/5	793.903 - 1200.942	2470	1,817	NA	NA	SSL	NO	NUT
7440-47-3	Chromium	3.3	J	21.7	J	MG/KG	LS07-SB201-02	5/5	1.588 - 2.402	21.7	20	23.5 N	4.2	SSL	NO	BSL
7440-48-4	Cobalt	2	J	9.2	J	MG/KG	LS07-SB201-02	3/5	7.939 - 12.009	9.2	5.1	160 N	160	SSL	NO	BSL
7440-50-8	Copper	2.6		747	J	MG/KG	LS07-SB201-02	5/5	3.97 - 6.005	747		313 N	1100	SSL	YES	ASL
57-12-5	Cyanide	0.09	J	0.09	J	MG/KG	LS07-SS202-00	1/5	0.5 - 1.4	0.09		156 N	15	SSL	NO	BSL
7439-89-6	Iron	1,950		21,800		MG/KG	LS07-SB201-02	5/5	15.878 - 24.019	21800	15,000	2,300 N	NA		YES	ASL
7439-92-1	Lead	2.1	J	218	J	MG/KG	LS07-SB201-02	5/5	0.476 - 0.721	218	16.4	400	NA		NO	BSL
7439-95-4	Magnesium	295	J	1,170	L	MG/KG	LS07-SB201-02	5/5	793.903 - 1200.942	1170	1,347	NA	NA		NO	NUT
7439-96-5	Manganese	19.6	K	133	K	MG/KG	LS07-SB201-02	5/5	2.382 - 3.603	133	267	156 N	95	SSL	NO	BSL
7439-97-6	Mercury	0.03	J	0.03	J	MG/KG	LS07-SB201-02 LS07-SS202-00	2/5	0.06 - 0.1	0.03		2.35 N	NA		NO	BSL
7440-02-0	Nickel	5.4		43.6		MG/KG	LS07-SB201-02	3/5	6.351 - 9.608	43.6	9.5	156 N	NA		NO	BSL
2023695	Potassium	434	J	1,080	J	MG/KG	LS07-SB201-02	4/5	793.903 - 1200.942	1080	1,435	NA	NA		NO	NUT
7782-49-2	Selenium	0.93	J	0.93	J	MG/KG	LS07-SS201-00	1/5	0.38 - 1.201	0.93		39.1 N	1.9	SSL	NO	BSL
7440-23-5	Sodium	422	J	515	J	MG/KG	LS07-SB201-02	2/4	793.903 - 1200.942	515	623	NA	NA		NO	NUT
7440-28-0	Thallium	1	J	1	J	MG/KG	LS07-SS202-00	1/5	0.57 - 2.402	1		0.548 N	0.36	SSL	YES	ASL
7440-62-2	Vanadium	4	J	26		MG/KG	LS07-SS201-00	5/5	7.939 - 12.009	26	34.3	2.3 N	510	SSL	YES	ASL
7440-66-6	Zinc	27.8		806		MG/KG	LS07-SB201-02	3/5	3.176 - 4.804	806	39	2,346 N	1400	SSL	NO	BSL

* Surface soil & subsurface soil combined

[1] Minimum/Maximum detected concentrations.

[2] Maximum concentration is used for screening.

[3] 95%UTL for urban surface soil from Little Creek Background Investigation.

[4] Risk-Based Concentration Table, October 15, 2003, U.S. EPA Region III, Jennifer Hubbard. Residential Soil.

RBC value for cadmium-food used as surrogate for cadmium.

RBC value for Chromium VI used for total chromium.

Lead screening toxicity value is 400 mg/kg, the EPA residential soil screening level for lead.

RBC value for manganese-nonfood used as surrogate for manganese.

RBC value for mercuric chloride used as surrogate for mercury.

[5] Rationale Codes

Selection Reason: Above Screening Levels (ASL)

Deletion Reason: No Toxicity Information (NTX)
Essential Nutrient (NUT)
Below Screening Level (BSL)

SQL = Sample Quantification Limit

COPC = Chemical of Potential Concern

ARAR/TBC = Applicable or Relevant and Appropriate Requirement/ To Be Considered

J = Estimated Value

K = Biased High

L = Biased Low

C = Carcinogenic

N = Noncarcinogenic

SSL = Region III Soil Screening Level, Soil to Groundwater Migration, DAF 20

Table 2.22

OCCURRENCE, DISTRIBUTION AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN

Site 7, NAB Little Creek

Scenario Timeframe: Future
Medium: Soil*
Exposure Medium: Air
Exposure Point: Emissions from Soil at Area to West of Landfill

CAS Number	Chemical	Minimum [1] Concentration	Minimum Qualifier	Maximum [1] Concentration	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration [2] Used for Screening	Background [3] Value	Screening [4] Toxicity Value	Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag	Rationale for [5] Contaminant Deletion or Selection
205-99-2	Benzo(b)fluoranthene	6.06E-11	J	6.06E-11	J	MG/M^3	LS07-SS201P-00	1/5	(6)	6.1E-11		8.6E-06 C			NO	BSL
207-08-9	Benzo(k)fluoranthene	3.41E-11	J	3.41E-11	J	MG/M^3	LS07-SS201P-00	1/5	(6)	3.4E-11		8.6E-05 C			NO	BSL
218-01-9	Chrysene	5.3E-11	J	5.3E-11	J	MG/M^3	LS07-SS201P-00	1/5	(6)	5.3E-11		8.6E-04 C			NO	BSL
117-81-7	bis(2-Ethylhexyl)phthalate	7.58E-11	J	7.58E-11	J	MG/M^3	07-SB-6D	1/5	(6)	7.6E-11		4.5E-04 C			NO	BSL
72-54-8	4,4'-DDD	3.48E-12		3.48E-12		MG/M^3	LS07-SB201-02	1/5	(6)	3.5E-12		2.6E-05 C			NO	BSL
72-55-9	4,4'-DDE	7.58E-12		7.58E-12		MG/M^3	LS07-SB201-02	1/5	(6)	7.6E-12		1.8E-05 C			NO	BSL
53469-21-9	Aroclor-1242	3.79E-11		3.79E-11		MG/M^3	LS07-SB201-02	1/5	(6)	3.8E-11		3.1E-06 C			NO	BSL
7429-90-5	Aluminum	1.1E-06		5.69E-06		MG/M^3	LS07-SB201-02	5/5	(6)	5.7E-06		3.7E-04 N			NO	BSL
7440-36-0	Antimony	8.33E-10	J	8.33E-10	J	MG/M^3	LS07-SS201-00	1/4	(6)	8.3E-10		1.5E-04 N			NO	BSL
7440-38-2	Arsenic	1.82E-09	J	3.48E-09		MG/M^3	LS07-SS201P-00	2/5	(6)	3.5E-09		4.1E-07 C			NO	BSL
7440-39-3	Barium	2.88E-09	J	4.14E-08		MG/M^3	LS07-SB201-02	5/5	(6)	4.1E-08		5.1E-05 N			NO	BSL
7440-41-7	Beryllium	3.33E-10		1.74E-09		MG/M^3	LS07-SB201-02	2/5	(6)	1.7E-09		7.5E-07 C			NO	BSL
7440-43-9	Cadmium	8.33E-10	J	8.33E-10	J	MG/M^3	07-SB-6D	1/5	(6)	8.3E-10		9.9E-07 C			NO	BSL
7440-70-2	Calcium	3.22E-07		1.87E-06		MG/M^3	LS07-SB201-02	5/5	(6)	1.9E-06		NA			NO	NUT
7440-47-3	Chromium	2.5E-09	J	1.64E-08	J	MG/M^3	LS07-SB201-02	5/5	(6)	1.6E-08		1.5E-07 C			NO	BSL
7440-48-4	Cobalt	1.52E-09	J	6.97E-09	J	MG/M^3	LS07-SB201-02	3/5	(6)	7.0E-09		6.4E-07 N			NO	BSL
7440-50-8	Copper	1.97E-09		5.66E-07	J	MG/M^3	LS07-SB201-02	5/5	(6)	5.7E-07		1.5E-02 N			NO	BSL
57-12-5	Cyanide	6.82E-11	J	6.82E-11	J	MG/M^3	LS07-SS202-00	1/5	(6)	6.8E-11		7.3E-03 N			NO	BSL
7439-89-6	Iron	1.48E-06		1.65E-05		MG/M^3	LS07-SB201-02	5/5	(6)	1.7E-05		1.1E-01 N			NO	BSL
7439-92-1	Lead	1.59E-09	J	1.65E-07	J	MG/M^3	LS07-SB201-02	5/5	(6)	1.7E-07		NA			NO	BSL
7439-95-4	Magnesium	2.23E-07	J	8.86E-07	L	MG/M^3	LS07-SB201-02	5/5	(6)	8.9E-07		NA			NO	NUT
7439-96-5	Manganese	1.48E-08	K	1.01E-07	K	MG/M^3	LS07-SB201-02	5/5	(6)	1.0E-07		5.2E-06 N			NO	BSL
7439-97-6	Mercury	2.27E-11	J	2.27E-11	J	MG/M^3	LS07-SB201-02 LS07-SS202-00	2/5	(6)	2.3E-11		3.1E-05 N			NO	BSL
7440-02-0	Nickel	4.09E-09		3.3E-08		MG/M^3	LS07-SB201-02	3/5	(6)	3.3E-08		7.3E-03 N			NO	BSL
2023695	Potassium	3.29E-07	J	8.18E-07	J	MG/M^3	LS07-SB201-02	4/5	(6)	8.2E-07		NA			NO	NUT
7782-49-2	Selenium	7.05E-10	J	7.05E-10	J	MG/M^3	LS07-SS201-00	1/5	(6)	7.0E-10		1.8E-03 N			NO	BSL
7440-23-5	Sodium	3.2E-07	J	3.9E-07	J	MG/M^3	LS07-SB201-02	2/4	(6)	3.9E-07		NA			NO	NUT
7440-28-0	Thallium	7.58E-10	J	7.58E-10	J	MG/M^3	LS07-SS202-00	1/5	(6)	7.6E-10		2.6E-05 N			NO	BSL
7440-62-2	Vanadium	3.03E-09	J	1.97E-08		MG/M^3	LS07-SS201-00	5/5	(6)	2.0E-08		1.1E-04 N			NO	BSL
7440-66-6	Zinc	2.11E-08		6.11E-07		MG/M^3	LS07-SB201-02	3/5	(6)	6.1E-07		1.1E-01 N			NO	BSL

* Surface soil & subsurface soil combined

[1] Minimum/maximum detected soil concentration multiplied by 1/PEF (1.32E+9 m3/kg) and 1/VF(chemical specific for VOCs only) to get air concentration. PEF and VF from EPA's Soil Screening Guidance. VFs calculated in Table 2.20A.

[2] Maximum concentration is used for screening.

[3] Background values not available.

[4] Risk-Based Concentration Table, October 15, 2003, U.S. EPA Region III, Jennifer Hubbard. Ambient Air.
RBC value for cadmium-food used as surrogate for cadmium.
RBC value for Chromium VI used for total chromium.
Lead screening toxicity value is 400 mg/kg, the EPA residential soil screening level for lead.
RBC value for manganese-nonfood used as surrogate for manganese.

[5] Rationale Codes

Selection Reason: Above Screening Levels (ASL)

Deletion Reason: No Toxicity Information (NTX)
Essential Nutrient (NUT)
Below Screening Level (BSL)

(6) See Table 2.21 for soil data detection limits, concentrations converted from soil data to air concetrations.

SQL = Sample Quantification Limit
COPC = Chemical of Potential Concern
ARAR/TBC = Applicable or Relevant and Appropriate Requirement/ To Be Considered
J = Estimated Value
K = Biased High
L = Biased Low
C = Carcinogenic
N = Noncarcinogenic
SSL = Region III Soil Screening Level, Soil to Groundwater Migration, DAF 20

Table 2.23

OCCURRENCE, DISTRIBUTION AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN

Site 7, NAB Little Creek

Scenario Timeframe: Future
Medium: Soil*
Exposure Medium: Soil
Exposure Point: Site Perimeter

CAS Number	Chemical	Minimum [1] Concentration	Minimum Qualifier	Maximum [1] Concentration	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration [2] Used for Screening	Background [3] Value	Screening [4] Toxicity Value	Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag	Rationale for [5] Contaminant Deletion or Selection
78-93-3	2-Butanone	0.009	J	0.009	J	MG/KG	07-SB-101D	1/6	0.011 - 0.017	0.009		4,693 N	0.79	SSL	NO	BSL
67-64-1	Acetone	0.056	J	0.08		MG/KG	07-SB-110	2/6	0.011 - 0.017	0.08		7,000 N	0.25	SSL	NO	BSL
75-09-2	Methylene chloride	0.003	J	0.003	J	MG/KG	07-SB-101D	1/6	0.011 - 0.017	0.003		85.2 C	0.019	SSL	NO	BSL
127-18-4	Tetrachloroethene	0.007	J	0.007	J	MG/KG	07-SB-105D	1/6	0.011 - 0.017	0.007		1.2 C	0.029	SSL	NO	BSL
106-46-7	1,4-Dichlorobenzene	0.038	J	0.038	J	MG/KG	07-SB-103D	1/6	0.36 - 0.79	0.038		26.6 C	0.0071	SSL	NO	BSL
120-12-7	Anthracene	0.22	J	0.22	J	MG/KG	07-SS-101	1/6	0.36 - 0.79	0.22		2,346 N	47	SSL	NO	BSL
56-55-3	Benzo(a)anthracene	0.71		0.71		MG/KG	07-SS-101	1/6	0.36 - 0.79	0.71		0.875 C	1.5	SSL	NO	BSL
50-32-8	Benzo(a)pyrene	0.45		0.45		MG/KG	07-SS-101	1/6	0.36 - 0.79	0.45		0.0875 C	0.37	SSL	YES	ASL
205-99-2	Benzo(b)fluoranthene	0.51		0.51		MG/KG	07-SS-101	1/6	0.36 - 0.79	0.51		0.875 C	4.5	SSL	NO	BSL
191-24-2	Benzo(g,h,i)perylene	0.21	J	0.21	J	MG/KG	07-SS-101	1/6	0.36 - 0.79	0.21		235 N			NO	BSL
207-08-9	Benzo(k)fluoranthene	0.38		0.38		MG/KG	07-SS-101	1/6	0.36 - 0.79	0.38		8.75 C	45	SSL	NO	BSL
85-68-7	Butylbenzylphthalate	0.058	J	0.058	J	MG/KG	07-SS-101	1/6	0.36 - 0.79	0.058		1,564 N	1700	SSL	NO	BSL
218-01-9	Chrysene	0.39		0.39		MG/KG	07-SS-101	1/6	0.36 - 0.79	0.39		87.5 C	150	SSL	NO	BSL
206-44-0	Fluoranthene	1.3		1.3		MG/KG	07-SS-101	1/6	0.36 - 0.79	1.3		313 N	630	SSL	NO	BSL
86-73-7	Fluorene	0.06	J	0.06	J	MG/KG	07-SS-101	1/6	0.36 - 0.79	0.06		313 N	14	SSL	NO	BSL
193-39-5	Indeno(1,2,3-cd)pyrene	0.23	J	0.23	J	MG/KG	07-SS-101	1/6	0.36 - 0.79	0.23		0.875 C	13	SSL	NO	BSL
85-01-8	Phenanthrene	0.83		0.83		MG/KG	07-SS-101	1/6	0.36 - 0.83	0.83		235 N			NO	BSL
129-00-0	Pyrene	1.6		1.6		MG/KG	07-SS-101	1/6	0.36 - 0.79	1.6		235 N	68	SSL	NO	BSL
117-81-7	bis(2-Ethylhexyl)phthalate	0.047	J	0.15	J	MG/KG	07-SS-101	2/6	0.38 - 0.79	0.15		45.6 C	290	SSL	NO	BSL
7429-90-5	Aluminum	2,880		18,900		MG/KG	07-SB-103D	6/6	NA	18900	8,500	7,821 N	NA	SSL	YES	ASL
7440-38-2	Arsenic	1.3	J	5.1	J	MG/KG	07-SB-105D	6/6	NA	5.1	5.6	0.426 C	0.026	SSL	YES	ASL
7440-39-3	Barium	5.4		46.1		MG/KG	07-SB-103D	6/6	NA	46.1	69	548 N	210	SSL	NO	BSL
7440-41-7	Beryllium	0.27		0.42		MG/KG	07-SB-9D	4/6	0.18 - 0.19	0.42	0.6	15.6 N	120	SSL	NO	BSL
7440-43-9	Cadmium	0.65		2.2	J	MG/KG	07-SB-110	5/6	0.53 - 0.53	2.2		7.8 N	5.5	SSL	NO	BSL
7440-70-2	Calcium	206		843	J	MG/KG	07-SS-101	6/6	NA	843	1,817	NA	NA	SSL	NO	NUT
7440-47-3	Chromium	4.7		18.8		MG/KG	07-SB-105D	6/6	NA	18.8	20	23.5 N	4.2	SSL	NO	BSL
7440-48-4	Cobalt	1.1		5.1		MG/KG	07-SB-9D	6/6	NA	5.1	5.1	160 N	160	SSL	NO	BSL
7440-50-8	Copper	2.9		32.8	J	MG/KG	07-SS-101	6/6	NA	32.8		313 N	1100	SSL	NO	BSL
7439-89-6	Iron	3,730		13,000		MG/KG	07-SB-105D	6/6	NA	13000	15,000	2,300 N	NA		YES	ASL
7439-92-1	Lead	3.9	J	24.1	J	MG/KG	07-SS-101	6/6	NA	24.1	16.4	400	NA		NO	BSL
7439-95-4	Magnesium	630	J	1,440		MG/KG	07-SB-101D	6/6	NA	1440	1,347	NA	NA		NO	NUT
7439-96-5	Manganese	17.4		50.8	J	MG/KG	07-SS-101	6/6	NA	50.8	267	156 N	95	SSL	NO	BSL
7439-97-6	Mercury	0.07		0.07		MG/KG	07-SB-103D 07-SS-108	2/6	0.05 - 0.06	0.07		2.35 N	NA		NO	BSL
7440-02-0	Nickel	3.4		8.9		MG/KG	07-SB-9D	6/6	NA	8.9	9.5	156 N	NA		NO	BSL
7440-09-7	Potassium	477		922		MG/KG	07-SB-101D	6/6	NA	922	1,435	NA	NA		NO	NUT

Table 2.23

OCCURRENCE, DISTRIBUTION AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN

Site 7, NAB Little Creek

Scenario Timeframe: Future
Medium: Soil*
Exposure Medium: Soil
Exposure Point: Site Perimeter

CAS Number	Chemical	Minimum [1] Concentration	Minimum Qualifier	Maximum [1] Concentration	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration [2] Used for Screening	Background [3] Value	Screening [4] Toxicity Value	Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag	Rationale for [5] Contaminant Deletion or Selection
7440-23-5	Sodium	140		1,450		MG/KG	07-SB-9D	5/6	104 - 104	1450	623	NA	NA		NO	NUT
7440-62-2	Vanadium	6.1		202		MG/KG	07-SS-101	6/6	NA	202	34.3	2.3 N	510	SSL	YES	ASL
7440-66-6	Zinc	15.5		64.2		MG/KG	07-SS-101	6/6	NA	64.2	39	2,346 N	1400	SSL	NO	BSL

* Surface soil & subsurface soil combined

[1] Minimum/Maximum detected concentrations.

[2] Maximum concentration is used for screening.

[3] 95%UTL for urban surface soil from Little Creek Background Investigation.

[4] Risk-Based Concentration Table, October 15, 2003, U.S. EPA Region III, Jennifer Hubbard. Residential Soil.
RBC value for pyrene used as surrogate for phenanthrene and benzo(g,h,i)perylene.
RBC value for cadmium-food used as surrogate for cadmium.
RBC value for Chromium VI used for total chromium.
Lead screening toxicity value is 400 mg/kg, the EPA residential soil screening level for lead.
RBC value for manganese-nonfood used as surrogate for manganese.
RBC value for mercuric chloride used as surrogate for mercury.

[5] Rationale Codes

Selection Reason: Above Screening Levels (ASL)

Deletion Reason: No Toxicity Information (NTX)
Essential Nutrient (NUT)
Below Screening Level (BSL)

SQL = Sample Quantification Limit
COPC = Chemical of Potential Concern
ARAR/TBC = Applicable or Relevant and Appropriate Requirement/ To Be Considered
J = Estimated Value
K = Biased High
L = Biased Low
C = Carcinogenic
N = Noncarcinogenic
SSL = Region III Soil Screening Level, Soil to Groundwater Migration, DAF 20
NA = Not Available

Table 2.24

OCCURRENCE, DISTRIBUTION AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN

Site 7, NAB Little Creek

Scenario Timeframe: Future
Medium: Soil*
Exposure Medium: Air
Exposure Point: Emissions from Soil at Site Perimeter

CAS Number	Chemical	Minimum [1] Concentration	Minimum Qualifier	Maximum [1] Concentration	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration [2] Used for Screening	Background [3] Value	Screening [4] Toxicity Value	Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag	Rationale for [5] Contaminant Deletion or Selection
78-93-3	2-Butanone	7.9E-08	J	7.9E-08	J	MG/M^3	07-SB-101D	1/6	(6)	7.9E-08		1.0E-01 N			NO	BSL
67-64-1	Acetone	3.4E-06	J	4.9E-06		MG/M^3	07-SB-110	2/6	(6)	4.9E-06		3.3E-01 N			NO	BSL
75-09-2	Methylene chloride	9.3E-07	J	9.3E-07	J	MG/M^3	07-SB-101D	1/6	(6)	9.3E-07		3.8E-03 C			NO	BSL
127-18-4	Tetrachloroethene	2.1E-06	J	2.1E-06	J	MG/M^3	07-SB-105D	1/6	(6)	2.1E-06		3.1E-04 C			NO	BSL
106-46-7	1,4-Dichlorobenzene	2.3E-06	J	2.3E-06	J	MG/M^3	07-SB-103D	1/6	(6)	2.3E-06		2.8E-04 C			NO	BSL
120-12-7	Anthracene	2.2E-07	J	2.2E-07	J	MG/M^3	07-SS-101	1/6	(6)	2.2E-07		1.1E-01 N			NO	BSL
56-55-3	Benzo(a)anthracene	5.4E-10		5.4E-10		MG/M^3	07-SS-101	1/6	(6)	5.4E-10		8.6E-06 C			NO	BSL
50-32-8	Benzo(a)pyrene	3.4E-10		3.4E-10		MG/M^3	07-SS-101	1/6	(6)	3.4E-10		2.0E-06 C			NO	BSL
205-99-2	Benzo(b)fluoranthene	3.9E-10		3.9E-10		MG/M^3	07-SS-101	1/6	(6)	3.9E-10		8.6E-06 C			NO	BSL
191-24-2	Benzo(g,h,i)perylene	1.6E-10	J	1.6E-10	J	MG/M^3	07-SS-101	1/6	(6)	1.6E-10		1.1E-02 N			NO	BSL
207-08-9	Benzo(k)fluoranthene	2.9E-10		2.9E-10		MG/M^3	07-SS-101	1/6	(6)	2.9E-10		8.6E-05 C			NO	BSL
85-68-7	Butylbenzylphthalate	4.4E-11	J	4.4E-11	J	MG/M^3	07-SS-101	1/6	(6)	4.4E-11		7.3E-02 N			NO	BSL
218-01-9	Chrysene	3.0E-10		3.0E-10		MG/M^3	07-SS-101	1/6	(6)	3.0E-10		8.6E-04 C			NO	BSL
206-44-0	Fluoranthene	9.8E-10		9.8E-10		MG/M^3	07-SS-101	1/6	(6)	9.8E-10		1.5E-02 N			NO	BSL
86-73-7	Fluorene	9.1E-08	J	9.1E-08	J	MG/M^3	07-SS-101	1/6	(6)	9.1E-08		1.5E-02 N			NO	BSL
193-39-5	Indeno(1,2,3-cd)pyrene	1.7E-10	J	1.7E-10	J	MG/M^3	07-SS-101	1/6	(6)	1.7E-10		8.6E-06 C			NO	BSL
85-01-8	Phenanthrene	6.3E-10		6.3E-10		MG/M^3	07-SS-101	1/6	(6)	6.3E-10		1.1E-02 N			NO	BSL
129-00-0	Pyrene	3.3E-07		3.3E-07		MG/M^3	07-SS-101	1/6	(6)	3.3E-07		1.1E-02 N			NO	BSL
117-81-7	bis(2-Ethylhexyl)phthalate	3.6E-11	J	1.1E-10	J	MG/M^3	07-SS-101	2/6	(6)	1.1E-10		4.5E-04 N			NO	BSL
7429-90-5	Aluminum	2.2E-06		1.4E-05		MG/M^3	07-SB-103D	6/6	(6)	1.4E-05		3.7E-04 N			NO	BSL
7440-38-2	Arsenic	9.8E-10	J	3.9E-09	J	MG/M^3	07-SB-105D	6/6	(6)	3.9E-09		4.1E-07 C			NO	BSL
7440-39-3	Barium	4.1E-09		3.5E-08		MG/M^3	07-SB-103D	6/6	(6)	3.5E-08		5.1E-05 N			NO	BSL
7440-41-7	Beryllium	2.0E-10		3.2E-10		MG/M^3	07-SB-9D	4/6	(6)	3.2E-10		7.5E-07 C			NO	BSL
7440-43-9	Cadmium	4.9E-10		1.7E-09	J	MG/M^3	07-SB-110	5/6	(6)	1.7E-09		9.9E-07 C			NO	BSL
7440-70-2	Calcium	1.6E-07		6.4E-07	J	MG/M^3	07-SS-101	6/6	(6)	6.4E-07		NA			NO	NUT
7440-47-3	Chromium	3.6E-09		1.4E-08		MG/M^3	07-SB-105D	6/6	(6)	1.4E-08		1.5E-07 C			NO	BSL
7440-48-4	Cobalt	8.3E-10		3.9E-09		MG/M^3	07-SB-9D	6/6	(6)	3.9E-09		2.1E-06 N			NO	BSL
7440-50-8	Copper	2.2E-09		2.5E-08	J	MG/M^3	07-SS-101	6/6	(6)	2.5E-08		1.5E-02 N			NO	BSL
7439-89-6	Iron	2.8E-06		9.8E-06		MG/M^3	07-SB-105D	6/6	(6)	9.8E-06		1.1E-01 N			NO	BSL
7439-92-1	Lead	3.0E-09	J	1.8E-08	J	MG/M^3	07-SS-101	6/6	(6)	1.8E-08		NA			NO	BSL
7439-95-4	Magnesium	4.8E-07	J	1.1E-06		MG/M^3	07-SB-101D	6/6	(6)	1.1E-06		NA			NO	NUT
7439-96-5	Manganese	1.3E-08		3.8E-08	J	MG/M^3	07-SS-101	6/6	(6)	3.8E-08		5.2E-06 N			NO	BSL
7439-97-6	Mercury	5.3E-11		5.3E-11		MG/M^3	07-SB-103D 07-SS-108	2/6	(6)	5.3E-11		3.1E-05 N			NO	BSL
7440-02-0	Nickel	2.6E-09		6.7E-09		MG/M^3	07-SB-9D	6/6	(6)	6.7E-09		7.3E-03 N			NO	BSL
7440-09-7	Potassium	3.6E-07		7.0E-07		MG/M^3	07-SB-101D	6/6	(6)	7.0E-07		NA			NO	NUT

Table 2.24

OCCURRENCE, DISTRIBUTION AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN

Site 7, NAB Little Creek

Scenario Timeframe: Future
Medium: Soil*
Exposure Medium: Air
Exposure Point: Emissions from Soil at Site Perimeter

CAS Number	Chemical	Minimum [1] Concentration	Minimum Qualifier	Maximum [1] Concentration	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration [2] Used for Screening	Background [3] Value	Screening [4] Toxicity Value	Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag	Rationale for [5] Contaminant Deletion or Selection
7440-23-5	Sodium	1.1E-07		1.1E-06		MG/M^3	07-SB-9D	5/6	(6)	1.1E-06		NA			NO	NUT
7440-62-2	Vanadium	4.6E-09		1.5E-07		MG/M^3	07-SS-101	6/6	(6)	1.5E-07		1.1E-04 N			NO	BSL
7440-66-6	Zinc	1.2E-08		4.9E-08		MG/M^3	07-SS-101	6/6	(6)	4.9E-08		1.1E-01 N			NO	BSL

* Surface soil & subsurface soil combined

[1] Minimum/maximum detected soil concentration multiplied by 1/PEF (1.32E+9 m3/kg) and 1/VF(chemical specific for VOCs only) to get air concentration. PEF and VF from EPA's Soil Screening Guidance. VFs calculated in Table 2.20A.

[2] Maximum concentration is used for screening.

[3] Background values not available.

[4] Risk-Based Concentration Table, October 15, 2003, U.S. EPA Region III, Jennifer Hubbard. Ambient Air.
RBC value for pyrene used as surrogate for phenanthrene and benzo(g,h,i)perylene.
RBC value for cadmium-food used as surrogate for cadmium.
RBC value for Chromium VI used for total chromium.
Lead screening toxicity value is 400 mg/kg, the EPA residential soil screening level for lead.
RBC value for manganese-nonfood used as surrogate for manganese.

[5] Rationale Codes

Selection Reason: Above Screening Levels (ASL)

Deletion Reason: No Toxicity Information (NTX)
Essential Nutrient (NUT)
Below Screening Level (BSL)

(6) See Table 2.21 for soil data detection limits, concentrations converted from soil data to air concetrations.

SQL = Sample Quantification Limit
COPC = Chemical of Potential Concern
ARAR/TBC = Applicable or Relevant and Appropriate Requirement/ To Be Considered
J = Estimated Value
K = Biased High
L = Biased Low
C = Carcinogenic
N = Noncarcinogenic
SSL = Region III Soil Screening Level, Soil to Groundwater Migration, DAF 20
NA = Not Available

Table 2.25

OCCURRENCE, DISTRIBUTION AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN

Site 7, NAB Little Creek

Scenario Timeframe: Future
Medium: Soil*
Exposure Medium: Soil
Exposure Point: Covered Area

CAS Number	Chemical	Minimum [1] Concentration	Minimum Qualifier	Maximum [1] Concentration	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration [2] Used for Screening	Background [3] Value	Screening [4] Toxicity Value	Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag	Rationale for [5] Contaminant Deletion or Selection
67-64-1	Acetone	0.012		0.015	J	MG/KG	07-SS-102	2/5	0.01 - 0.011	0.015		7,000 N	0.25	SSL	NO	BSL
75-09-2	Methylene chloride	0.006	J	0.006	J	MG/KG	07-SS-102	1/5	0.01 - 0.011	0.006		85.2 C			NO	BSL
91-57-6	2-Methylnaphthalene	0.062	J	0.062	J	MG/KG	07-SS-107	1/5	0.34 - 0.36	0.062		156 N			NO	BSL
120-12-7	Anthracene	0.051	J	0.051	J	MG/KG	07-SS-105	1/5	0.34 - 0.37	0.051		2,346 N	47	SSL	NO	BSL
56-55-3	Benzo(a)anthracene	0.11	J	0.11	J	MG/KG	07-SS-105	1/5	0.34 - 0.37	0.11		0.875 C	1.5	SSL	NO	BSL
50-32-8	Benzo(a)pyrene	0.057	J	0.057	J	MG/KG	07-SS-105	1/5	0.34 - 0.37	0.057		0.0875 C	0.37	SSL	NO	BSL
205-99-2	Benzo(b)fluoranthene	0.1	J	0.1	J	MG/KG	07-SS-105	1/5	0.34 - 0.37	0.1		0.875 C	4.5	SSL	NO	BSL
218-01-9	Chrysene	0.082	J	0.082	J	MG/KG	07-SS-105	1/5	0.34 - 0.37	0.082		87.5 C	150	SSL	NO	BSL
206-44-0	Fluoranthene	0.046	J	0.24	J	MG/KG	07-SS-105	3/5	0.34 - 0.35	0.24		313 N	630	SSL	NO	BSL
85-01-8	Phenanthrene	0.039	J	0.19	J	MG/KG	07-SS-105	3/5	0.34 - 0.35	0.19		235 N			NO	BSL
129-00-0	Pyrene	0.062	J	0.25	J	MG/KG	07-SS-105	4/5	0.35 - 0.35	0.25		235 N	68	SSL	NO	BSL
117-81-7	bis(2-Ethylhexyl)phthalate	0.056	J	0.19	J	MG/KG	07-SS-106	4/5	0.34 - 0.37	0.19		45.6 C	290	SSL	NO	BSL
50-29-3	4,4'-DDT	0.0038	J	0.0038	J	MG/KG	07-SS-103	1/5	0.0035 - 0.037	0.0038		1.88 C	1.2	SSL	NO	BSL
11096-82-5	Aroclor-1260	0.13	J	3.5	J	MG/KG	07-SS-107	2/5	0.034 - 0.036	3.5		0.319 C			YES	ASL
5103-71-9	alpha-Chlordane	0.0051	J	0.0051	J	MG/KG	07-SS-103	1/5	0.0018 - 0.019	0.0051		1.82 C	0.92	SSL	NO	BSL
7429-90-5	Aluminum	2,200		4,970		MG/KG	07-SS-103	5/5	NA	4970	8,500	7,821 N	NA	SSL	NO	BSL
7440-38-2	Arsenic	1.2		2.1		MG/KG	07-SS-107	5/5	NA	2.1	5.6	0.426 C	0.026	SSL	YES	ASL
7440-39-3	Barium	8.8		44.4		MG/KG	07-SS-103	5/5	NA	44.4	69	548 N	210	SSL	NO	BSL
7440-41-7	Beryllium	0.23		0.65		MG/KG	07-SS-103	3/5	0.18 - 0.19	0.65	0.6	15.6 N	120	SSL	NO	BSL
7440-70-2	Calcium	162		2,450		MG/KG	07-SS-103	5/5	NA	2450	1,817	NA	NA	SSL	NO	NUT
7440-47-3	Chromium	4.6		11.3		MG/KG	07-SS-103	5/5	NA	11.3	20	23.5 N	4.2	SSL	NO	BSL
7440-48-4	Cobalt	0.8		6.1		MG/KG	07-SS-103	4/5	0.55 - 0.55	6.1	5.1	160 N	160	SSL	NO	BSL
7440-50-8	Copper	5	J	68	J	MG/KG	07-SS-103	5/5	NA	68		313 N	1100	SSL	NO	BSL
7439-89-6	Iron	3,040	J	10,200	J	MG/KG	07-SS-103	5/5	NA	10200	15,000	2,300 N	NA		YES	ASL
7439-92-1	Lead	5.5	J	98.9	J	MG/KG	07-SS-107	5/5	NA	98.9	16.4	400	NA		NO	BSL
7439-95-4	Magnesium	251		2,320		MG/KG	07-SS-103	5/5	NA	2320	1,347	NA	NA		NO	NUT
7439-96-5	Manganese	18.1	J	184	J	MG/KG	07-SS-103	5/5	NA	184	267	156 N	95	SSL	YES	ASL
7440-02-0	Nickel	4.3	J	16.1		MG/KG	07-SS-103	4/5	3.1 - 3.1	16.1	9.5	156 N	NA		NO	BSL
7440-09-7	Potassium	236		2,080		MG/KG	07-SS-103	5/5	NA	2080	1,435	NA	NA		NO	NUT
7440-23-5	Sodium	227		227		MG/KG	07-SS-103	1/2	38.5 - 38.5	227	623	NA	NA		NO	NUT
7440-62-2	Vanadium	7.4		39.5		MG/KG	07-SS-103	5/5	NA	39.5	34.3	2.3 N	510	SSL	YES	ASL
7440-66-6	Zinc	12.6		405		MG/KG	07-SS-103	5/5	NA	405	39	2,346 N	1400	SSL	NO	BSL

[1] Minimum/Maximum detected concentrations.

[2] Maximum concentration is used for screening.

[3] 95%UTL for urban surface soil from Little Creek Background Investigation.

[4] Risk-Based Concentration Table, October 15, 2003, U.S. EPA Region III, Jennifer Hubbard. Residential Soil.
RBC value for pyrene used as surrogate for phenanthrene and benzo(g,h,i)perylene.
RBC value for Chromium VI used for total chromium.
Lead screening toxicity value is 400 mg/kg, the EPA residential soil screening level for lead.
RBC value for manganese-nonfood used as surrogate for manganese.

[5] Rationale Codes

Selection Reason: Above Screening Levels (ASL)

Deletion Reason: No Toxicity Information (NTX)
Essential Nutrient (NUT)
Below Screening Level (BSL)

SQL = Sample Quantification Limit
COPC = Chemical of Potential Concern
ARAR/TBC = Applicable or Relevant and Appropriate Requirement/ To Be Considered
J = Estimated Value
K = Biased High
L = Biased Low
C = Carcinogenic
N = Noncarcinogenic
SSL = Region III Soil Screening Level, Soil to Groundwater Migration, DAF 20
NA = Not Available

Table 2.26

OCCURRENCE, DISTRIBUTION AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN

Site 7, NAB Little Creek

Scenario Timeframe: Future
Medium: Soil*
Exposure Medium: Air
Exposure Point: Emissions from Soil within Covered Area

CAS Number	Chemical	Minimum [1] Concentration	Minimum Qualifier	Maximum [1] Concentration	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration [2] Used for Screening	Background [3] Value	Screening [4] Toxicity Value	Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag	Rationale for [5] Contaminant Deletion or Selection
67-64-1	Acetone	7.4E-07		9.2E-07	J	MG/KG	07-SS-102	2/5	(6)	9.2E-07		3.3E-01 N			NO	BSL
75-09-2	Methylene chloride	1.9E-06	J	1.9E-06	J	MG/KG	07-SS-102	1/5	(6)	1.9E-06		3.8E-03 C			NO	BSL
91-57-6	2-Methylnaphthalene	8.3E-07	J	8.3E-07	J	MG/KG	07-SS-107	1/5	(6)	8.3E-07		7.3E-03 N			NO	BSL
120-12-7	Anthracene	5.0E-08	J	5.0E-08	J	MG/KG	07-SS-105	1/5	(6)	5.0E-08		1.1E-01 N			NO	BSL
56-55-3	Benzo(a)anthracene	8.3E-11	J	8.3E-11	J	MG/KG	07-SS-105	1/5	(6)	8.3E-11		8.6E-06 C			NO	BSL
50-32-8	Benzo(a)pyrene	4.3E-11	J	4.3E-11	J	MG/KG	07-SS-105	1/5	(6)	4.3E-11		2.0E-06 C			NO	BSL
205-99-2	Benzo(b)fluoranthene	7.6E-11	J	7.6E-11	J	MG/KG	07-SS-105	1/5	(6)	7.6E-11		8.6E-06 C			NO	BSL
218-01-9	Chrysene	6.2E-11	J	6.2E-11	J	MG/KG	07-SS-105	1/5	(6)	6.2E-11		8.6E-04 C			NO	BSL
206-44-0	Fluoranthene	3.5E-11	J	1.8E-10	J	MG/KG	07-SS-105	3/5	(6)	1.8E-10		1.5E-02 N			NO	BSL
85-01-8	Phenanthrene	3.0E-11	J	1.4E-10	J	MG/KG	07-SS-105	3/5	(6)	1.4E-10		1.1E-02 N			NO	BSL
129-00-0	Pyrene	1.3E-08	J	5.1E-08	J	MG/KG	07-SS-105	4/5	(6)	5.1E-08		1.1E-02 N			NO	BSL
117-81-7	bis(2-Ethylhexyl)phthalate	4.2E-11	J	1.4E-10	J	MG/KG	07-SS-106	4/5	(6)	1.4E-10		4.5E-04 N			NO	BSL
50-29-3	4,4'-DDT	2.9E-12	J	2.9E-12	J	MG/KG	07-SS-103	1/5	(6)	2.9E-12		1.8E-05 C			NO	BSL
11096-82-5	Aroclor-1260	9.8E-11	J	2.7E-09	J	MG/KG	07-SS-107	2/5	(6)	2.7E-09		3.1E-06 C			NO	BSL
5103-71-9	alpha-Chlordane	3.9E-12	J	3.9E-12	J	MG/KG	07-SS-103	1/5	(6)	3.9E-12		1.8E-05 C			NO	BSL
7429-90-5	Aluminum	1.7E-06		3.8E-06		MG/KG	07-SS-103	5/5	(6)	3.8E-06		3.7E-04 N			NO	BSL
7440-38-2	Arsenic	9.1E-10		1.6E-09		MG/KG	07-SS-107	5/5	(6)	1.6E-09		4.1E-07 C			NO	BSL
7440-39-3	Barium	6.7E-09		3.4E-08		MG/KG	07-SS-103	5/5	(6)	3.4E-08		5.1E-05 N			NO	BSL
7440-41-7	Beryllium	1.7E-10		4.9E-10		MG/KG	07-SS-103	3/5	(6)	4.9E-10		7.5E-07 C			NO	BSL
7440-70-2	Calcium	1.2E-07		1.9E-06		MG/KG	07-SS-103	5/5	(6)	1.9E-06		NA			NO	NUT
7440-47-3	Chromium	3.5E-09		8.6E-09		MG/KG	07-SS-103	5/5	(6)	8.6E-09		1.5E-07 C			NO	BSL
7440-48-4	Cobalt	6.1E-10		4.6E-09		MG/KG	07-SS-103	4/5	(6)	4.6E-09		2.1E-06 N			NO	BSL
7440-50-8	Copper	3.8E-09	J	5.2E-08	J	MG/KG	07-SS-103	5/5	(6)	5.2E-08		1.5E-02 N			NO	BSL
7439-89-6	Iron	2.3E-06	J	7.7E-06	J	MG/KG	07-SS-103	5/5	(6)	7.7E-06		1.1E-01 N			NO	BSL
7439-92-1	Lead	4.2E-09	J	7.5E-08	J	MG/KG	07-SS-107	5/5	(6)	7.5E-08		NA			NO	BSL
7439-95-4	Magnesium	1.9E-07		1.8E-06		MG/KG	07-SS-103	5/5	(6)	1.8E-06		NA			NO	NUT
7439-96-5	Manganese	1.4E-08	J	1.4E-07	J	MG/KG	07-SS-103	5/5	(6)	1.4E-07		5.2E-06 N			NO	BSL
7440-02-0	Nickel	3.3E-09	J	1.2E-08		MG/KG	07-SS-103	4/5	(6)	1.2E-08		7.3E-03 N			NO	BSL
7440-09-7	Potassium	1.8E-07		1.6E-06		MG/KG	07-SS-103	5/5	(6)	1.6E-06		NA			NO	NUT
7440-23-5	Sodium	1.7E-07		1.7E-07		MG/KG	07-SS-103	1/2	(6)	1.7E-07		NA			NO	NUT
7440-62-2	Vanadium	5.6E-09		3.0E-08		MG/KG	07-SS-103	5/5	(6)	3.0E-08		1.1E-04 N			NO	BSL
7440-66-6	Zinc	9.5E-09		3.1E-07		MG/KG	07-SS-103	5/5	(6)	3.1E-07		1.1E-01 N			NO	BSL

[1] Minimum/maximum detected soil concentration multiplied by 1/PEF (1.32E+9 m3/kg) and 1/VF(chemical specific for VOCs only) to get air concentration. PEF and VF from EPA's Soil Screening Guidance. VFs calculated in Table 2.20A.

[2] Maximum concentration is used for screening.

[3] Background values not available.

[4] Risk-Based Concentration Table, October 15, 2003, U.S. EPA Region III, Jennifer Hubbard. Ambient Air.
RBC value for pyrene used as surrogate for phenanthrene and benzo(g,h,i)perylene.
RBC value for Chromium VI used for total chromium.
Lead screening toxicity value is 400 mg/kg, the EPA residential soil screening level for lead.
RBC value for manganese-nonfood used as surrogate for manganese.

SQL = Sample Quantification Limit
COPC = Chemical of Potential Concern
ARAR/TBC = Applicable or Relevant and Appropriate Requirement/ To Be Considered
J = Estimated Value
K = Biased High
L = Biased Low
C = Carcinogenic
N = Noncarcinogenic

Table 2.26

OCCURRENCE, DISTRIBUTION AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN

Site 7, NAB Little Creek

Scenario Timeframe: Future
Medium: Soil*
Exposure Medium: Air
Exposure Point: Emissions from Soil within Covered Area

CAS Number	Chemical	Minimum [1] Concentration	Minimum Qualifier	Maximum [1] Concentration	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration [2] Used for Screening	Background [3] Value	Screening [4] Toxicity Value	Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag	Rationale for [5] Contaminant Deletion or Selection

[5] Rationale Codes

Selection Reason: Above Screening Levels (ASL)

Deletion Reason: No Toxicity Information (NTX)
Essential Nutrient (NUT)
Below Screening Level (BSL)

SSL = Region III Soil Screening Level, Soil to Groundwater Migration, DAF 20

NA = Not Available

(6) See Table 2.21 for soil data detection limits, concentrations converted from soil data to air concetrations.

Table 3.1

MEDIUM-SPECIFIC EXPOSURE POINT CONCENTRATION SUMMARY

Site 7, NAB Little Creek

Scenario Timeframe: Current
Medium: Surface Soil
Exposure Medium: Surface Soil
Exposure Point: Weigh Station Area

Chemical of Potential Concern	Units	Arithmetic Mean	95% UCL of Normal Data	Maximum Detected Concentration	Maximum Qualifier	EPC Units	Reasonable Maximum Exposure			Central Tendency		
							Medium EPC Value	Medium EPC Statistic	Medium EPC Rationale	Medium EPC Value	Medium EPC Statistic	Medium EPC Rationale
Aroclor-1260	MG/KG	0.51	3.10	0.92		MG/KG	0.92	Max	(5)	0.51	Mean-N	(6)
Arsenic	MG/KG	2.08	3.50	2.3		MG/KG	2.3	Max	(5)	2.08	Mean-N	(6)
Chromium	MG/KG	20.0	61.3	26.5		MG/KG	26.5	Max	(5)	20.0	Mean-N	(6)
Iron	MG/KG	11,170	34,090	14,800	J	MG/KG	14,800	Max	(5)	11,170	Mean-N	(6)
Lead	MG/KG	391	1,953	638	J	MG/KG	638	Max	(5)	391	Mean-N	(6)
Manganese	MG/KG	249	1,644	470	J	MG/KG	470	Max	(5)	249	Mean-N	(6)
Vanadium	MG/KG	29	76.8	37		MG/KG	37	Max	(5)	29	Mean-N	(6)

Full statistics for data included in Appendix.

For non-detects, 1/2 sample quantitation limit was used as a proxy concentration; for duplicate sample results, the maximum value was used in the calculation.

W - Test: Developed by Shapiro and Wilk, refer to Supplemental Guidance to RAGS: Calculating the Concentration Term, OSWER Directive 9285.7-081, May 1992.

Options: Maximum Detected Value (Max); 95% UCL of Normal Data (95% UCL-N); 95% UCL of Log-transformed Data (95% UCL-T);
Mean of Log-transformed Data (Mean-T); Mean of Normal Data (Mean-N).

(1) Shapiro-Wilk W Test indicates data are log-normally distributed.

(2) 95% UCL (or mean) exceeds maximum detected concentration. Therefore, maximum concentration used for EPC.

(3) Shapiro-Wilks W Test indicates data are normally distributed.

(4) Shapiro-Wilks W Test inconclusive. Use of 95% UCL (normal or transformed) that best fits the data according to the results of the Shapiro-Wilks W Test for EPC.

(5) Maximum detected concentration used because sample size is less than 5.

(6) Mean value used because sample size is less than 5.

Table 3.2

MEDIUM-SPECIFIC EXPOSURE POINT CONCENTRATION SUMMARY

Site 7, NAB Little Creek

Scenario Timeframe: Current
Medium: Surface Soil
Exposure Medium: Surface Soil
Exposure Point: Area to West of Landfill, the "Ear"

Chemical of Potential Concern	Units	Arithmetic Mean	95% UCL of Normal Data	Maximum Detected Concentration	Maximum Qualifier	EPC Units	Reasonable Maximum Exposure			Central Tendency		
							Medium EPC Value	Medium EPC Statistic	Medium EPC Rationale	Medium EPC Value	Medium EPC Statistic	Medium EPC Rationale
Arsenic	MG/KG	2.88	13.8	4.6		MG/KG	4.6	Max	(5)	2.88	Mean-N	(6)
Iron	MG/KG	6,075	23,533	8,840		MG/KG	8,840	Max	(5)	6,075	Mean-N	(6)
Thallium	MG/KG	0.806	2.03	1.0	J	MG/KG	1.0	Max	(5)	0.806	Mean-N	(6)
Vanadium	MG/KG	18.0	68.51	26.0		MG/KG	26.0	Max	(5)	18.0	Mean-N	(6)

Full statistics for data included in Appendix.

For non-detects, 1/2 sample quantitation limit was used as a proxy concentration; for duplicate sample results, the maximum value was used in the calculation.

W - Test: Developed by Shapiro and Wilk, refer to Supplemental Guidance to RAGS: Calculating the Concentration Term, OSWER Directive 9285.7-081, May 1992.

Options: Maximum Detected Value (Max); 95% UCL of Normal Data (95% UCL-N); 95% UCL of Log-transformed Data (95% UCL-T);
Mean of Log-transformed Data (Mean-T); Mean of Normal Data (Mean-N).

(1) Shapiro-Wilk W Test indicates data are log-normally distributed.

(2) 95% UCL (or mean) exceeds maximum detected concentration. Therefore, maximum concentration used for EPC.

(3) Shapiro-Wilks W Test indicates data are normally distributed.

(4) Shapiro-Wilks W Test inconclusive. Use of 95% UCL (normal or transformed) that best fits the data according to the results of the Shapiro-Wilks W Test for EPC.

(5) Maximum detected concentration used because sample size is less than 5.

(6) Mean value used because sample size is less than 5.

Table 3.3

MEDIUM-SPECIFIC EXPOSURE POINT CONCENTRATION SUMMARY

Site 7, NAB Little Creek

Scenario Timeframe: Current
Medium: Surface Soil
Exposure Medium: Surface Soil
Exposure Point: Site Perimeter

Chemical of Potential Concern	Units	Arithmetic Mean	95% UCL of Normal Data	Maximum Detected Concentration	Maximum Qualifier	EPC Units	Reasonable Maximum Exposure			Central Tendency		
							Medium EPC Value	Medium EPC Statistic	Medium EPC Rationale	Medium EPC Value	Medium EPC Statistic	Medium EPC Rationale
Benzo(a)pyrene	MG/KG	0.315	1.17	0.45		MG/KG	0.45	Max	(5)	0.315	Mean-N	(6)
Arsenic	MG/KG	2.85	6.95	3.50		MG/KG	3.50	Max	(5)	2.85	Mean-N	(6)
Iron	MG/KG	6,810	10,093	7,330	J	MG/KG	7,330	Max	(5)	6,810	Mean-N	(6)
Vanadium	MG/KG	108	703	202		MG/KG	202	Max	(5)	108	Mean-N	(6)

Full statistics for data included in Appendix.

For non-detects, 1/2 sample quantitation limit was used as a proxy concentration; for duplicate sample results, the maximum value was used in the calculation.

W - Test: Developed by Shapiro and Wilk, refer to Supplemental Guidance to RAGS: Calculating the Concentration Term, OSWER Directive 9285.7-081, May 1992.

Options: Maximum Detected Value (Max); 95% UCL of Normal Data (95% UCL-N); 95% UCL of Log-transformed Data (95% UCL-T);
Mean of Log-transformed Data (Mean-T); Mean of Normal Data (Mean-N).

(1) Shapiro-Wilk W Test indicates data are log-normally distributed.

(2) 95% UCL (or mean) exceeds maximum detected concentration. Therefore, maximum concentration used for EPC.

(3) Shapiro-Wilks W Test indicates data are normally distributed.

(4) Shapiro-Wilks W Test inconclusive. Use of 95% UCL (normal or transformed) that best fits the data according to the results of the Shapiro-Wilks W Test for EPC.

(5) Maximum detected concentration used because sample size is less than 5.

(6) Mean value used because sample size is less than 5.

Table 3.4

MEDIUM-SPECIFIC EXPOSURE POINT CONCENTRATION SUMMARY

Site 7, NAB Little Creek

Scenario Timeframe: Current/Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Little Creek Cove

Chemical of Potential Concern	Units	Arithmetic Mean	95% UCL of Normal Data	Maximum Detected Concentration	Maximum Qualifier	EPC Units	Reasonable Maximum Exposure			Central Tendency		
							Medium EPC Value	Medium EPC Statistic	Medium EPC Rationale	Medium EPC Value	Medium EPC Statistic	Medium EPC Rationale
Arsenic	UG/L	2.59	3.16	4.20	J	UG/L	3.27	95% UCL-T	(4)	2.48	Mean-T	(4)

Full statistics for data included in Appendix.

For non-detects, 1/2 sample quantitation limit was used as a proxy concentration; for duplicate sample results, the maximum value was used in the calculation.

W - Test: Developed by Shapiro and Wilk, refer to Supplemental Guidance to RAGS: Calculating the Concentration Term, OSWER Directive 9285.7-081, May 1992.

Options: Maximum Detected Value (Max); 95% UCL of Normal Data (95% UCL-N); 95% UCL of Log-transformed Data (95% UCL-T);
Mean of Log-transformed Data (Mean-T); Mean of Normal Data (Mean-N).

(1) Shapiro-Wilk W Test indicates data are log-normally distributed.

(2) 95% UCL (or mean) exceeds maximum detected concentration. Therefore, maximum concentration used for EPC.

(3) Shapiro-Wilks W Test indicates data are normally distributed.

(4) Shapiro-Wilks W Test inconclusive. Use of 95% UCL (normal or transformed) that best fits the data according to the results of the Shapiro-Wilks W Test for EPC.

Table 3.5

MEDIUM-SPECIFIC EXPOSURE POINT CONCENTRATION SUMMARY

Site 7, NAB Little Creek

Scenario Timeframe: Current/Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Pond

Chemical of Potential Concern	Units	Arithmetic Mean	95% UCL of Normal Data	Maximum Detected Concentration	Maximum Qualifier	EPC Units	Reasonable Maximum Exposure			Central Tendency		
							Medium EPC Value	Medium EPC Statistic	Medium EPC Rationale	Medium EPC Value	Medium EPC Statistic	Medium EPC Rationale
Arsenic	UG/L	2.22	2.47	2.70		UG/L	2.51	95% UCL-T	(4)	2.20	95% UCL-T	(4)

Full statistics for data included in Appendix.

For non-detects, 1/2 sample quantitation limit was used as a proxy concentration; for duplicate sample results, the maximum value was used in the calculation.

W - Test: Developed by Shapiro and Wilk, refer to Supplemental Guidance to RAGS: Calculating the Concentration Term, OSWER Directive 9285.7-081, May 1992.

Options: Maximum Detected Value (Max); 95% UCL of Normal Data (95% UCL-N); 95% UCL of Log-transformed Data (95% UCL-T);
Mean of Log-transformed Data (Mean-T); Mean of Normal Data (Mean-N).

(1) Shapiro-Wilk W Test indicates data are log-normally distributed.

(2) 95% UCL (or mean) exceeds maximum detected concentration. Therefore, maximum concentration used for EPC.

(3) Shapiro-Wilks W Test indicates data are normally distributed.

(4) Shapiro-Wilks W Test inconclusive. Use of 95% UCL (normal or transformed) that best fits the data according to the results of the Shapiro-Wilks W Test for EPC.

Table 3.6

MEDIUM-SPECIFIC EXPOSURE POINT CONCENTRATION SUMMARY

Site 7, NAB Little Creek

Scenario Timeframe: Current/Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Canal on West Side of Site

Chemical of Potential Concern	Units	Arithmetic Mean	95% UCL of Normal Data	Maximum Detected Concentration	Maximum Qualifier	EPC Units	Reasonable Maximum Exposure			Central Tendency		
							Medium EPC Value	Medium EPC Statistic	Medium EPC Rationale	Medium EPC Value	Medium EPC Statistic	Medium EPC Rationale
1,1,2,2-Tetrachloroethane	UG/L	4.81	5.14	1.0	J	UG/L	1.0	Max	(2)	1.0	Max	(2)
Bromodichloromethane	UG/L	4.42	4.98	2.0	J	UG/L	2.0	Max	(2)	2.0	Max	(2)
Chloroform	UG/L	5.67	7.45	26		UG/L	7.0	95% UCL-T	(4)	4.9	Mean-T	(4)
Arsenic	UG/L	5.25	6.2	9.4	J	UG/L	6.2	95% UCL-N	(3)	5.2	Mean-N	(3)

Full statistics for data included in Appendix.

For non-detects, 1/2 sample quantitation limit was used as a proxy concentration; for duplicate sample results, the maximum value was used in the calculation.

W - Test: Developed by Shapiro and Wilk, refer to Supplemental Guidance to RAGS: Calculating the Concentration Term, OSWER Directive 9285.7-081, May 1992.

Options: Maximum Detected Value (Max); 95% UCL of Normal Data (95% UCL-N); 95% UCL of Log-transformed Data (95% UCL-T);
Mean of Log-transformed Data (Mean-T); Mean of Normal Data (Mean-N).

(1) Shapiro-Wilk W Test indicates data are log-normally distributed.

(2) 95% UCL (or mean) exceeds maximum detected concentration. Therefore, maximum concentration used for EPC.

(3) Shapiro-Wilks W Test indicates data are normally distributed.

(4) Shapiro-Wilks W Test inconclusive. Use of 95% UCL (normal or transformed) that best fits the data according to the results of the Shapiro-Wilks W Test for EPC.

Table 3.7

MEDIUM-SPECIFIC EXPOSURE POINT CONCENTRATION SUMMARY

Site 7, NAB Little Creek

Scenario Timeframe: Current/Future
Medium: Sediment
Exposure Medium: Sediment
Exposure Point: Pond

Chemical of Potential Concern	Units	Arithmetic Mean	95% UCL of Normal Data	Maximum Detected Concentration	Maximum Qualifier	EPC Units	Reasonable Maximum Exposure			Central Tendency		
							Medium EPC Value	Medium EPC Statistic	Medium EPC Rationale	Medium EPC Value	Medium EPC Statistic	Medium EPC Rationale
Arsenic	MG/KG	5.88	7.68	9.20	L	MG/KG	7.68	95% UCL-N	(4)	5.88	Mean-N	(4)
Iron	MG/KG	16,500	21,761	23,200		MG/KG	21,761	95% UCL-N	(4)	16,500	Mean-N	(4)
Vanadium	MG/KG	24.2	31.7	34.8		MG/KG	31.7	95% UCL-N	(4)	24.2	Mean-N	(4)

Full statistics for data included in Appendix.

For non-detects, 1/2 sample quantitation limit was used as a proxy concentration; for duplicate sample results, the maximum value was used in the calculation.

W - Test: Developed by Shapiro and Wilk, refer to Supplemental Guidance to RAGS: Calculating the Concentration Term, OSWER Directive 9285.7-081, May 1992.

Options: Maximum Detected Value (Max); 95% UCL of Normal Data (95% UCL-N); 95% UCL of Log-transformed Data (95% UCL-T);
Mean of Log-transformed Data (Mean-T); Mean of Normal Data (Mean-N).

(1) Shapiro-Wilk W Test indicates data are log-normally distributed.

(2) 95% UCL (or mean) exceeds maximum detected concentration. Therefore, maximum concentration used for EPC.

(3) Shapiro-Wilks W Test indicates data are normally distributed.

(4) Shapiro-Wilks W Test inconclusive. Use of 95% UCL (normal or transformed) that best fits the data according to the results of the Shapiro-Wilks W Test for EPC.

Table 3.8

MEDIUM-SPECIFIC EXPOSURE POINT CONCENTRATION SUMMARY

Site 7, NAB Little Creek

Scenario Timeframe: Current/Future
Medium: Sediment
Exposure Medium: Sediment
Exposure Point: Canal on West Side of Site

Chemical of Potential Concern	Units	Arithmetic Mean	95% UCL of Normal Data	Maximum Detected Concentration	Maximum Qualifier	EPC Units	Reasonable Maximum Exposure			Central Tendency		
							Medium EPC Value	Medium EPC Statistic	Medium EPC Rationale	Medium EPC Value	Medium EPC Statistic	Medium EPC Rationale
Arsenic	MG/KG	5.17	6.15	9.80		MG/KG	6.15	95% UCL-N	(3)	5.17	Mean-N	(3)
Vanadium	MG/KG	24.17	31.69	34.80		MG/KG	31.69	95% UCL-N	(3)	24.17	Mean-N	(3)

Full statistics for data included in Appendix.

For non-detects, 1/2 sample quantitation limit was used as a proxy concentration; for duplicate sample results, the maximum value was used in the calculation.

W - Test: Developed by Shapiro and Wilk, refer to Supplemental Guidance to RAGS: Calculating the Concentration Term, OSWER Directive 9285.7-081, May 1992.

Options: Maximum Detected Value (Max); 95% UCL of Normal Data (95% UCL-N); 95% UCL of Log-transformed Data (95% UCL-T);
Mean of Log-transformed Data (Mean-T); Mean of Normal Data (Mean-N).

(1) Shapiro-Wilk W Test indicates data are log-normally distributed.

(2) 95% UCL (or mean) exceeds maximum detected concentration. Therefore, maximum concentration used for EPC.

(3) Shapiro-Wilks W Test indicates data are normally distributed.

(4) Shapiro-Wilks W Test inconclusive. Use of 95% UCL (normal or transformed) that best fits the data according to the results of the Shapiro-Wilks W Test for EPC.

Table 3.9

MEDIUM-SPECIFIC EXPOSURE POINT CONCENTRATION SUMMARY

Site 7, NAB Little Creek

Scenario Timeframe: Current/Future
Medium: Sediment
Exposure Medium: Sediment
Exposure Point: Canal on East Side of Site

Chemical of Potential Concern	Units	Arithmetic Mean	95% UCL of Normal Data	Maximum Detected Concentration	Maximum Qualifier	EPC Units	Reasonable Maximum Exposure			Central Tendency		
							Medium EPC Value	Medium EPC Statistic	Medium EPC Rationale	Medium EPC Value	Medium EPC Statistic	Medium EPC Rationale
Arsenic	MG/KG	2.67	6.27	5.10		MG/KG	5.10	Max	(5)	2.67	Mean	(6)

Full statistics for data included in Appendix.

For non-detects, 1/2 sample quantitation limit was used as a proxy concentration; for duplicate sample results, the maximum value was used in the calculation.

W - Test: Developed by Shapiro and Wilk, refer to Supplemental Guidance to RAGS: Calculating the Concentration Term, OSWER Directive 9285.7-081, May 1992.

Options: Maximum Detected Value (Max); 95% UCL of Normal Data (95% UCL-N); 95% UCL of Log-transformed Data (95% UCL-T);
Mean of Log-transformed Data (Mean-T); Mean of Normal Data (Mean-N).

(1) Shapiro-Wilk W Test indicates data are log-normally distributed.

(2) 95% UCL (or mean) exceeds maximum detected concentration. Therefore, maximum concentration used for EPC.

(3) Shapiro-Wilks W Test indicates data are normally distributed.

(4) Shapiro-Wilks W Test inconclusive. Use of 95% UCL (normal or transformed) that best fits the data according to the results of the Shapiro-Wilks W Test for EPC.

(5) Maximum detected concentration used because sample size is less than 5.

(6) Mean value used because sample size is less than 5.

Table 3.10

MEDIUM-SPECIFIC EXPOSURE POINT CONCENTRATION SUMMARY

Site 7, NAB Little Creek

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater
Exposure Point: Upper Aquifer - Tap Water

Chemical of Potential Concern	Units	Arithmetic Mean	95% UCL of Normal Data	Maximum Detected Concentration	Maximum Qualifier	EPC Units	Reasonable Maximum Exposure			Central Tendency		
							Medium EPC Value	Medium EPC Statistic	Medium EPC Rationale	Medium EPC Value	Medium EPC Statistic	Medium EPC Rationale
Aluminum	UG/L	957	2,233	3,960	J	UG/L	3,960	Max	(2)	299	Mean-T	(1)
Arsenic	UG/L	2.64	4.37	6.80	J	UG/L	6.80	Max	(2)	2.16	Mean-T	(1)
Chromium	UG/L	5.93	13.4	23.4	J	UG/L	23.4	Max	(2)	2.0	Mean-T	(1)
Iron	UG/L	6,842	9,555	11,100	J	UG/L	9,555	95% UCL-N	(4)	6,842	Mean-N	(4)
Manganese	UG/L	342	615	785	J	UG/L	615	95% UCL-N	(4)	342	Mean-N	(4)
Vanadium	UG/L	2.9	5.6	8.9	K	UG/L	8.9	Max	(2)	1.6	Mean-T	(1)

Full statistics for data included in Appendix.

For non-detects, 1/2 sample quantitation limit was used as a proxy concentration; for duplicate sample results, the maximum value was used in the calculation.

W - Test: Developed by Shapiro and Wilk, refer to Supplemental Guidance to RAGS: Calculating the Concentration Term, OSWER Directive 9285.7-081, May 1992.

Options: Maximum Detected Value (Max); 95% UCL of Normal Data (95% UCL-N); 95% UCL of Log-transformed Data (95% UCL-T);
Mean of Log-transformed Data (Mean-T); Mean of Normal Data (Mean-N).

(1) Shapiro-Wilk W Test indicates data are log-normally distributed.

(2) 95% UCL (or mean) exceeds maximum detected concentration. Therefore, maximum concentration used for EPC.

(3) Shapiro-Wilks W Test indicates data are normally distributed.

(4) Shapiro-Wilks W Test inconclusive. Use of 95% UCL (normal or transformed) that best fits the data according to the results of the Shapiro-Wilks W Test for EPC.

Table 3.11

MEDIUM-SPECIFIC EXPOSURE POINT CONCENTRATION SUMMARY

Site 7, NAB Little Creek

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater
Exposure Point: Upper Aquifer - Excavation Pit

Chemical of Potential Concern	Units	Arithmetic Mean	95% UCL of Normal Data	Maximum Detected Concentration	Maximum Qualifier	EPC Units	Reasonable Maximum Exposure			Central Tendency		
							Medium EPC Value	Medium EPC Statistic	Medium EPC Rationale	Medium EPC Value	Medium EPC Statistic	Medium EPC Rationale
Aluminum	UG/L	957	2,233	3,960	J	UG/L	3,960	Max	(2)	299	Mean-T	(1)
Arsenic	UG/L	2.64	4.37	6.80	J	UG/L	6.80	Max	(2)	2.16	Mean-T	(1)
Chromium	UG/L	5.93	13.4	23.4	J	UG/L	23.4	Max	(2)	2.0	Mean-T	(1)
Iron	UG/L	6,842	9,555	11,100	J	UG/L	9,555	95% UCL-N	(4)	6,842	Mean-N	(4)
Manganese	UG/L	342	615	785	J	UG/L	615	95% UCL-N	(4)	342	Mean-N	(4)
Vanadium	UG/L	2.9	5.6	8.9	K	UG/L	8.9	Max	(2)	1.6	Mean-T	(1)

Full statistics for data included in Appendix.

For non-detects, 1/2 sample quantitation limit was used as a proxy concentration; for duplicate sample results, the maximum value was used in the calculation.

W - Test: Developed by Shapiro and Wilk, refer to Supplemental Guidance to RAGS: Calculating the Concentration Term, OSWER Directive 9285.7-081, May 1992.

Options: Maximum Detected Value (Max); 95% UCL of Normal Data (95% UCL-N); 95% UCL of Log-transformed Data (95% UCL-T);
Mean of Log-transformed Data (Mean-T); Mean of Normal Data (Mean-N).

(1) Shapiro-Wilk W Test indicates data are log-normally distributed.

(2) 95% UCL (or mean) exceeds maximum detected concentration. Therefore, maximum concentration used for EPC.

(3) Shapiro-Wilks W Test indicates data are normally distributed.

(4) Shapiro-Wilks W Test inconclusive. Use of 95% UCL (normal or transformed) that best fits the data according to the results of the Shapiro-Wilks W Test for EPC.

Table 3.12

MEDIUM-SPECIFIC EXPOSURE POINT CONCENTRATION SUMMARY

Site 7, NAB Little Creek

Scenario Timeframe: Future
Medium: Soil*
Exposure Medium: Soil
Exposure Point: Weigh Station Area

Chemical of Potential Concern	Units	Arithmetic Mean	95% UCL of Normal Data	Maximum Detected Concentration	Maximum Qualifier	EPC Units	Reasonable Maximum Exposure			Central Tendency		
							Medium EPC Value	Medium EPC Statistic	Medium EPC Rationale	Medium EPC Value	Medium EPC Statistic	Medium EPC Rationale
Aroclor-1260	MG/KG	0.376	1.17	0.920		MG/KG	0.920	Max	(5)	0.376	Mean-N	(6)
Arsenic	MG/KG	1.97	2.46	2.30		MG/KG	2.30	Max	(5)	1.97	Mean-N	(6)
Chromium	MG/KG	20.8	32.1	26.5		MG/KG	26.5	Max	(5)	20.8	Mean-N	(6)
Copper	MG/KG	177	498	396	J	MG/KG	396	Max	(5)	177	Mean-N	(6)
Iron	MG/KG	11,547	17,764	14,800	J	MG/KG	14,800	Max	(5)	11,547	Mean-N	(6)
Lead	MG/KG	357	785	638	J	MG/KG	638	Max	(5)	357	Mean-N	(6)
Manganese	MG/KG	208	599	470	J	MG/KG	470	Max	(5)	208	Mean-N	(6)
Vanadium	MG/KG	24	43	37		MG/KG	37	Max	(5)	24	Mean-N	(6)

* Surface soil & subsurface soil combined.

Full statistics for data included in Appendix.

For non-detects, 1/2 sample quantitation limit was used as a proxy concentration; for duplicate sample results, the maximum value was used in the calculation.

W - Test: Developed by Shapiro and Wilk, refer to Supplemental Guidance to RAGS: Calculating the Concentration Term, OSWER Directive 9285.7-081, May 1992.

Options: Maximum Detected Value (Max); 95% UCL of Normal Data (95% UCL-N); 95% UCL of Log-transformed Data (95% UCL-T);
Mean of Log-transformed Data (Mean-T); Mean of Normal Data (Mean-N).

(1) Shapiro-Wilk W Test indicates data are log-normally distributed.

(2) 95% UCL (or mean) exceeds maximum detected concentration. Therefore, maximum concentration used for EPC.

(3) Shapiro-Wilks W Test indicates data are normally distributed.

(4) Shapiro-Wilks W Test inconclusive. Use of 95% UCL (normal or transformed) that best fits the data according to the results of the Shapiro-Wilks W Test for EPC.

(5) Maximum detected concentration used because sample size is less than 5.

(6) Mean value used because sample size is less than 5.

Table 3.13

MEDIUM-SPECIFIC EXPOSURE POINT CONCENTRATION SUMMARY

Site 7, NAB Little Creek

Scenario Timeframe: Future
Medium: Soil*
Exposure Medium: Soil
Exposure Point: Area to West of Landfill, the "Ear"

Chemical of Potential Concern	Units	Arithmetic Mean	95% UCL of Normal Data	Maximum Detected Concentration	Maximum Qualifier	EPC Units	Reasonable Maximum Exposure			Central Tendency		
							Medium EPC Value	Medium EPC Statistic	Medium EPC Rationale	Medium EPC Value	Medium EPC Statistic	Medium EPC Rationale
Arsenic	MG/KG	2.18	3.60	4.60		MG/KG	4.60	Max	(2)	1.83	Mean-T	(4)
Copper	MG/KG	160	473	747	J	MG/KG	747	Max	(2)	17.6	Mean-T	(1)
Iron	MG/KG	8,152	15,831	21,800		MG/KG	21,800	Max	(2)	5,705	Mean-T	(4)
Thallium	MG/KG	0.578	0.837	1.00	J	MG/KG	1.00	Max	(2)	0.53	Mean-T	(4)
Vanadium	MG/KG	13.8	23.6	26.0		MG/KG	26.0	Max	(2)	10.53	Mean-T	(4)

* Surface soil & subsurface soil combined.

Full statistics for data included in Appendix.

For non-detects, 1/2 sample quantitation limit was used as a proxy concentration; for duplicate sample results, the maximum value was used in the calculation.

W - Test: Developed by Shapiro and Wilk, refer to Supplemental Guidance to RAGS: Calculating the Concentration Term, OSWER Directive 9285.7-081, May 1992.

Options: Maximum Detected Value (Max); 95% UCL of Normal Data (95% UCL-N); 95% UCL of Log-transformed Data (95% UCL-T);
Mean of Log-transformed Data (Mean-T); Mean of Normal Data (Mean-N).

(1) Shapiro-Wilk W Test indicates data are log-normally distributed.

(2) 95% UCL (or mean) exceeds maximum detected concentration. Therefore, maximum concentration used for EPC.

(3) Shapiro-Wilks W Test indicates data are normally distributed.

(4) Shapiro-Wilks W Test inconclusive. Use of 95% UCL (normal or transformed) that best fits the data according to the results of the Shapiro-Wilks W Test for EPC.

Table 3.14

MEDIUM-SPECIFIC EXPOSURE POINT CONCENTRATION SUMMARY

Site 7, NAB Little Creek

Scenario Timeframe: Future
Medium: Soil*
Exposure Medium: Soil
Exposure Point: Site Perimeter

Chemical of Potential Concern	Units	Arithmetic Mean	95% UCL of Normal Data	Maximum Detected Concentration	Maximum Qualifier	EPC Units	Reasonable Maximum Exposure			Central Tendency		
							Medium EPC Value	Medium EPC Statistic	Medium EPC Rationale	Medium EPC Value	Medium EPC Statistic	Medium EPC Rationale
Benzo(a)pyrene	MG/KG	0.270	0.369	0.450		MG/KG	0.429	95% UCL-T	(4)	0.251	Mean-T	(4)
Aluminum	MG/KG	8,190	13,561	18,900		MG/KG	27,977	95% UCL-T	(4)	6,363	Mean-T	(4)
Arsenic	MG/KG	2.90	4.03	5.10	J	MG/KG	5.37	95% UCL-T	(4)	2.63	Mean-T	(4)
Iron	MG/KG	8,480	11,365	13,000		MG/KG	11,365	95% UCL-N	(4)	8,480	Mean-N	(4)
Vanadium	MG/KG	46.4	109	202		MG/KG	202	Max	(2)	21.3	Mean-T	(1)

* Surface soil & subsurface soil combined.

Full statistics for data included in Appendix.

For non-detects, 1/2 sample quantitation limit was used as a proxy concentration; for duplicate sample results, the maximum value was used in the calculation.

W - Test: Developed by Shapiro and Wilk, refer to Supplemental Guidance to RAGS: Calculating the Concentration Term, OSWER Directive 9285.7-081, May 1992.

Options: Maximum Detected Value (Max); 95% UCL of Normal Data (95% UCL-N); 95% UCL of Log-transformed Data (95% UCL-T);
Mean of Log-transformed Data (Mean-T); Mean of Normal Data (Mean-N).

(1) Shapiro-Wilk W Test indicates data are log-normally distributed.

(2) 95% UCL (or mean) exceeds maximum detected concentration. Therefore, maximum concentration used for EPC.

(3) Shapiro-Wilks W Test indicates data are normally distributed.

(4) Shapiro-Wilks W Test inconclusive. Use of 95% UCL (normal or transformed) that best fits the data according to the results of the Shapiro-Wilks W Test for EPC.

Table 3.15

MEDIUM-SPECIFIC EXPOSURE POINT CONCENTRATION SUMMARY

Site 7, NAB Little Creek

Scenario Timeframe: Future
Medium: Soil*
Exposure Medium: Soil
Exposure Point: Covered Area

Chemical of Potential Concern	Units	Arithmetic Mean	95% UCL of Normal Data	Maximum Detected Concentration	Maximum Qualifier	EPC Units	Reasonable Maximum Exposure			Central Tendency		
							Medium EPC Value	Medium EPC Statistic	Medium EPC Rationale	Medium EPC Value	Medium EPC Statistic	Medium EPC Rationale
Aroclor-1260	MG/KG	0.737	2.21	3.50	J	MG/KG	3.50	Max	(2)	0.075	Mean-T	(4)
Arsenic	MG/KG	1.76	2.11	2.10		MG/KG	2.11	95% UCL-N	(4)	1.76	Mean-N	(4)
Iron	MG/KG	5,134	7,972	10,200	J	MG/KG	10,200	Max	(2)	4,602	Mean-T	(4)
Manganese	MG/KG	62.6	129	184	J	MG/KG	184	Max	(2)	42.7	Mean-T	(1)
Vanadium	MG/KG	15.1	28.2	39.5		MG/KG	39.5	Max	(2)	11.9	Mean-T	(4)

Full statistics for data included in Appendix.

For non-detects, 1/2 sample quantitation limit was used as a proxy concentration; for duplicate sample results, the maximum value was used in the calculation.

W - Test: Developed by Shapiro and Wilk, refer to Supplemental Guidance to RAGS: Calculating the Concentration Term, OSWER Directive 9285.7-081, May 1992.

Options: Maximum Detected Value (Max); 95% UCL of Normal Data (95% UCL-N); 95% UCL of Log-transformed Data (95% UCL-T);
Mean of Log-transformed Data (Mean-T); Mean of Normal Data (Mean-N).

(1) Shapiro-Wilk W Test indicates data are log-normally distributed.

(2) 95% UCL (or mean) exceeds maximum detected concentration. Therefore, maximum concentration used for EPC.

(3) Shapiro-Wilks W Test indicates data are normally distributed.

(4) Shapiro-Wilks W Test inconclusive. Use of 95% UCL (normal or transformed) that best fits the data according to the results of the Shapiro-Wilks W Test for EPC.

TABLE 4.1

VALUES USED FOR DAILY INTAKE CALCULATIONS

Site 7, NAB Little Creek

Scenario Timeframe: Current
Medium: Surface Soil
Exposure Medium: Surface Soil
Exposure Point: Weigh Station Area
Receptor Population: Maintenance Worker
Receptor Age: Adult

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CT Value	CT Rationale/ Reference	Intake Equation/ Model Name
Ingestion	CS	Chemical Concentration in Soil	mg/kg	see Table …	see Table …	see Table …	see Table …	Chronic Daily Intake (CDI) (mg/kg-day) =
	IR-S	Ingestion Rate of Soil	mg/day	100	EPA, 1991	50	EPA, 1993	CS x IR-S x EF x ED x CF3 x 1/BW x 1/AT
	EF	Exposure Frequency	days/year	12	(1)	6	(1)	
	ED	Exposure Duration	years	25	EPA, 1991	5	EPA, 1993	
	CF3	Conversion Factor 3	kg/mg	0.000001	- -	0.000001	- -	
	BW	Body Weight	kg	70	EPA, 1991	70	EPA, 1991	
	AT-C	Averaging Time (Cancer)	days	25,550	EPA, 1989	25,550	EPA, 1989	
	AT-N	Averaging Time (Non-Cancer)	days	9,125	EPA, 1989	1,825	- -	
Dermal Absorption	CS	Chemical Concentration in Soil	mg/kg	see Table …	see Table …	see Table …	see Table …	CDI (mg/kg-day) =
	SA	Skin Surface Area Available for Contact	cm^2	5,300	EPA, 1992, (2)	2,000	EPA, 1992, (2)	CS x SA x SSAF x DABS x CF3 x EF x
	SSAF	Soil to Skin Adherence Factor	mg/cm^2-day	0.32	EPA, 1997, (3)	0.32	EPA, 1997, (3)	ED x 1/BW x 1/AT
	DABS	Dermal Absorption Factor Solids	--	chem specific	EPA, 2001	chem specific	EPA, 2001	
	CF3	Conversion Factor 3	kg/mg	0.000001	- -	0.000001	- -	
	EF	Exposure Frequency	days/year	12	(1)	6	(1)	
	ED	Exposure Duration	years	25	EPA, 1991	5	EPA, 1993	
	BW	Body Weight	kg	70	EPA, 1991	70	EPA, 1991	
	AT-C	Averaging Time (Cancer)	days	25,550	EPA, 1989	25,550	EPA, 1989	
	AT-N	Averaging Time (Non-Cancer)	days	9,125	EPA, 1989	1,825	- -	

(1) Conservative assumption based on information from Base. CT value is one-half RME value.

(2) RME SA includes head, hands, forearms, and lower legs. CT surface area includes head and hands.

(3) SSAF based on maximum adherence factor for utility workers.

Sources:

EPA, 1989: Risk Assessment Guidance for Superfund. Vol.1: Human Health Evaluation Manual, Part A. OERR. EPA/540/1-89/002.

EPA, 1991: Risk Assessment Guidance for Superfund. Vol.1: Human Health Evaluation Manual - Supplemental Guidance, Standard Default Exposure Factors. Interim Final. OSWER Directive 9285.6-03.

EPA, 1992: Dermal Exposure Assessment: Principals and Applications. ORD. EPA/600/8-91/011B.

EPA, 1993: Superfund's Standard Default Exposure Factors for the Central Tendency and Reasonable Maximum Exposure.

EPA, 1995: Assessing Dermal Exposure from Soil. EPA Region III. EPA/903-K-95-003.

EPA, 1997: Exposure Factors Handbook. EPA/600/P-95/002Fa.

EPA, 2001: Risk Assessment Guidance for Superfund. Vol.1: Human Health Evaluation Manual, Part E, Supplemental Guidance for Dermal Risk Assessment. OSWER 9285.7-02EP.

TABLE 4.2

VALUES USED FOR DAILY INTAKE CALCULATIONS

Site 7, NAB Little Creek

Scenario Timeframe: Current
Medium: Surface Soil
Exposure Medium: Surface Soil
Exposure Point: Weigh Station Area
Receptor Population: Trespasser/Visitor
Receptor Age: Adolescents

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CT Value	CT Rationale/ Reference	Intake Equation/ Model Name
Ingestion	CS	Chemical Concentration in Soil	mg/kg	see Table 3	see Table 3	see Table 3	see Table 3	Chronic Daily Intake (CDI) (mg/kg-day) =
	IR-S	Ingestion Rate of Soil	mg/day	100	EPA, 1991	50	EPA, 1993	CS x IR-S x EF x ED x CF3 x 1/BW x 1/AT
	EF	Exposure Frequency	days/year	104	(1)	52	(1)	
	ED	Exposure Duration	years	9	(2)	9	EPA, 1993	
	CF3	Conversion Factor 3	kg/mg	0.000001	- -	0.000001	- -	
	BW	Body Weight	kg	51	EPA, 1997,(3)	51	EPA, 1997,(3)	
	AT-C	Averaging Time (Cancer)	days	25,550	EPA, 1989	25,550	EPA, 1989	
	AT-N	Averaging Time (Non-Cancer)	days	3,285	EPA, 1989	3,285	EPA, 1989	
Dermal Absorption	CS	Chemical Concentration in Soil	mg/kg	see Table 3	see Table 3	see Table 3	see Table 3	CDI (mg/kg-day) =
	SA	Skin Surface Area Available for Contact	cm^2	4,600	EPA, 1997, (4)	3,700	EPA, 1997, (4)	CS x SA x SSAF x DABS x CF3 x EF x
	SSAF	Soil to Skin Adherence Factor	mg/cm^2-day	0.11	EPA, 1997, (5)	0.11	EPA, 1997, (5)	ED x 1/BW x 1/AT
	DABS	Dermal Absorption Factor Solids	--	chem specific	EPA, 2001	chem specific	EPA, 2001	
	CF3	Conversion Factor 3	kg/mg	0.000001	- -	0.000001	- -	
	EF	Exposure Frequency	days/year	104	(1)	52	(1)	
	ED	Exposure Duration	years	9	(2)	9	EPA, 1993	
	BW	Body Weight	kg	51	EPA, 1997,(3)	51	EPA, 1997,(3)	
	AT-C	Averaging Time (Cancer)	days	25,550	EPA, 1989	25,550	EPA, 1989	
	AT-N	Averaging Time (Non-Cancer)	days	3,285	EPA, 1989	3,285	EPA, 1989	

(1) Professional Judgement assuming 2 day per week for 52 weeks per year for the RME and 1/2 the RME value for the CT.

(2) Professional Judgement assuming adolescents from 9 to 18 years of age.

(3) Body weight is average value for the 9 year old and 18 year old male body weight.

(4) Surface area is 25% of total surface area for 12-15 year old male. 95th percentile for total surface area is 1.85 m^2, 50th percentile for total surface area is 1.49 m^2.

(5) Soil to skin adherence factor is based on maximum adherence factor for soccer players.

Sources:

EPA, 1989: Risk Assessment Guidance for Superfund. Vol.1: Human Health Evaluation Manual, Part A. OERR. EPA/540/1-89/002.

EPA, 1991: Risk Assessment Guidance for Superfund. Vol.1: Human Health Evaluation Manual - Supplemental Guidance, Standard Default Exposure Factors. Interim Final. OSWER Directive 9285.6-03.

EPA, 1992: Dermal Exposure Assessment: Principals and Applications. ORD. EPA/600/8-91/011B.

EPA, 1993: Superfund's Standard Default Exposure Factors for the Central Tendency and Reasonable Maximum Exposure.

EPA, 1995: Assessing Dermal Exposure from Soil. EPA Region III. EPA/903-K-95-003.

EPA, 1997: Exposure Factors Handbook. EPA/600/P-95/002Fa.

EPA, 2001: Risk Assessment Guidance for Superfund. Vol.1: Human Health Evaluation Manual, Part E, Supplemental Guidance for Dermal Risk Assessment. OSWER 9285.7-02EP.

TABLE 4.3

VALUES USED FOR DAILY INTAKE CALCULATIONS

Site 7, NAB Little Creek

Scenario Timeframe: Current
Medium: Surface Soil
Exposure Medium: Surface Soil
Exposure Point: Area to West of Landfill, the "Ear"
Receptor Population: Maintenance Worker
Receptor Age: Adult

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CT Value	CT Rationale/ Reference	Intake Equation/ Model Name
Ingestion	CS	Chemical Concentration in Soil	mg/kg	see Table …	see Table …	see Table …	see Table …	Chronic Daily Intake (CDI) (mg/kg-day) =
	IR-S	Ingestion Rate of Soil	mg/day	100	EPA, 1991	50	EPA, 1993	CS x IR-S x EF x ED x CF3 x 1/BW x 1/AT
	EF	Exposure Frequency	days/year	12	(1)	6	(1)	
	ED	Exposure Duration	years	25	EPA, 1991	5	EPA, 1993	
	CF3	Conversion Factor 3	kg/mg	0.000001	- -	0.000001	- -	
	BW	Body Weight	kg	70	EPA, 1991	70	EPA, 1991	
	AT-C	Averaging Time (Cancer)	days	25,550	EPA, 1989	25,550	EPA, 1989	
	AT-N	Averaging Time (Non-Cancer)	days	9,125	EPA, 1989	1,825	- -	
Dermal Absorption	CS	Chemical Concentration in Soil	mg/kg	see Table …	see Table …	see Table …	see Table …	CDI (mg/kg-day) =
	SA	Skin Surface Area Available for Contact	cm^2	5,300	EPA, 1992, (2)	2,000	EPA, 1992, (2)	CS x SA x SSAF x DABS x CF3 x EF x
	SSAF	Soil to Skin Adherence Factor	mg/cm^2-day	0.32	EPA, 1997, (3)	0.32	EPA, 1997, (3)	ED x 1/BW x 1/AT
	DABS	Dermal Absorption Factor Solids	--	chem specific	EPA, 2001	chem specific	EPA, 2001	
	CF3	Conversion Factor 3	kg/mg	0.000001	- -	0.000001	- -	
	EF	Exposure Frequency	days/year	12	(1)	6	(1)	
	ED	Exposure Duration	years	25	EPA, 1991	5	EPA, 1993	
	BW	Body Weight	kg	70	EPA, 1991	70	EPA, 1991	
	AT-C	Averaging Time (Cancer)	days	25,550	EPA, 1989	25,550	EPA, 1989	
	AT-N	Averaging Time (Non-Cancer)	days	9,125	EPA, 1989	1,825	- -	

(1) Conservative assumption based on information from Base. CT value is one-half RME value.

(2) RME SA includes head, hands, forearms, and lower legs. CT surface area includes head and hands.

(23) SSAF based on maximum adherence factor for utility workers.

Sources:

EPA, 1989: Risk Assessment Guidance for Superfund. Vol.1: Human Health Evaluation Manual, Part A. OERR. EPA/540/1-89/002.

EPA, 1991: Risk Assessment Guidance for Superfund. Vol.1: Human Health Evaluation Manual - Supplemental Guidance, Standard Default Exposure Factors. Interim Final. OSWER Directive 9285.6-03.

EPA, 1992: Dermal Exposure Assessment: Principals and Applications. ORD. EPA/600/8-91/011B.

EPA, 1993: Superfund's Standard Default Exposure Factors for the Central Tendency and Reasonable Maximum Exposure.

EPA, 1995: Assessing Dermal Exposure from Soil. EPA Region III. EPA/903-K-95-003.

EPA, 1997: Exposure Factors Handbook. EPA/600/P-95/002Fa.

EPA, 2001: Risk Assessment Guidance for Superfund. Vol.1: Human Health Evaluation Manual, Part E, Supplemental Guidance for Dermal Risk Assessment. OSWER 9285.7-02EP.

TABLE 4.4

VALUES USED FOR DAILY INTAKE CALCULATIONS

Site 7, NAB Little Creek

Scenario Timeframe: Current
Medium: Surface Soil
Exposure Medium: Surface Soil
Exposure Point: Area to West of Landfill, the "Ear"
Receptor Population: Trespasser/Visitor
Receptor Age: Adolescents

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CT Value	CT Rationale/ Reference	Intake Equation/ Model Name
Ingestion	CS	Chemical Concentration in Soil	mg/kg	see Table 3	see Table 3	see Table 3	see Table 3	Chronic Daily Intake (CDI) (mg/kg-day) =
	IR-S	Ingestion Rate of Soil	mg/day	100	EPA, 1991	50	EPA, 1993	CS x IR-S x EF x ED x CF3 x 1/BW x 1/AT
	EF	Exposure Frequency	days/year	104	(1)	52	(1)	
	ED	Exposure Duration	years	9	(2)	9	EPA, 1993	
	CF3	Conversion Factor 3	kg/mg	0.000001	- -	0.000001	- -	
	BW	Body Weight	kg	51	EPA, 1997,(3)	51	EPA, 1997,(3)	
	AT-C	Averaging Time (Cancer)	days	25,550	EPA, 1989	25,550	EPA, 1989	
	AT-N	Averaging Time (Non-Cancer)	days	3,285	EPA, 1989	3,285	EPA, 1989	
Dermal Absorption	CS	Chemical Concentration in Soil	mg/kg	see Table 3	see Table 3	see Table 3	see Table 3	CDI (mg/kg-day) =
	SA	Skin Surface Area Available for Contact	cm^2	4,600	EPA, 1997, (4)	3,700	EPA, 1997, (4)	CS x SA x SSAF x DABS x CF3 x EF x
	SSAF	Soil to Skin Adherence Factor	mg/cm^2-day	0.11	EPA, 1997, (5)	0.11	EPA, 1997, (5)	ED x 1/BW x 1/AT
	DABS	Dermal Absorption Factor Solids	--	chem specific	EPA, 2001	chem specific	EPA, 2001	
	CF3	Conversion Factor 3	kg/mg	0.000001	- -	0.000001	- -	
	EF	Exposure Frequency	days/year	104	(1)	52	(1)	
	ED	Exposure Duration	years	9	(2)	9	EPA, 1993	
	BW	Body Weight	kg	51	EPA, 1997,(3)	51	EPA, 1997,(3)	
	AT-C	Averaging Time (Cancer)	days	25,550	EPA, 1989	25,550	EPA, 1989	
	AT-N	Averaging Time (Non-Cancer)	days	3,285	EPA, 1989	3,285	EPA, 1989	

(1) Professional Judgement assuming 2 day per week for 52 weeks per year for the RME and 1/2 the RME value for the CT.

(2) Professional Judgement assuming adolescents from 9 to 18 years of age.

(3) Body weight is average value for the 9 year old and 18 year old male body weight.

(4) Surface area is 25% of total surface area for 12-15 year old male. 95th percentile for total surface area is 1.85 m^2, 50th percentile for total surface area is 1.49 m^2.

(5) Soil to skin adherence factor is based on maximum adherence factor for soccer players.

Sources:

EPA, 1989: Risk Assessment Guidance for Superfund. Vol.1: Human Health Evaluation Manual, Part A. OERR. EPA/540/1-89/002.

EPA, 1991: Risk Assessment Guidance for Superfund. Vol.1: Human Health Evaluation Manual - Supplemental Guidance, Standard Default Exposure Factors. Interim Final. OSWER Directive 9285.6-03.

EPA, 1992: Dermal Exposure Assessment: Principals and Applications. ORD. EPA/600/8-91/011B.

EPA, 1993: Superfund's Standard Default Exposure Factors for the Central Tendency and Reasonable Maximum Exposure.

EPA, 1995: Assessing Dermal Exposure from Soil. EPA Region III. EPA/903-K-95-003.

EPA, 1997: Exposure Factors Handbook. EPA/600/P-95/002Fa.

EPA, 2001: Risk Assessment Guidance for Superfund. Vol.1: Human Health Evaluation Manual, Part E, Supplemental Guidance for Dermal Risk Assessment. OSWER 9285.7-02EP.

TABLE 4.5

VALUES USED FOR DAILY INTAKE CALCULATIONS

Site 7, NAB Little Creek

Scenario Timeframe: Current
Medium: Surface Soil
Exposure Medium: Surface Soil
Exposure Point: Site Perimeter
Receptor Population: Maintenance Worker
Receptor Age: Adult

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CT Value	CT Rationale/ Reference	Intake Equation/ Model Name
Ingestion	CS	Chemical Concentration in Soil	mg/kg	see Table …	see Table …	see Table …	see Table …	Chronic Daily Intake (CDI) (mg/kg-day) =
	IR-S	Ingestion Rate of Soil	mg/day	100	EPA, 1991	50	EPA, 1993	CS x IR-S x EF x ED x CF3 x 1/BW x 1/AT
	EF	Exposure Frequency	days/year	12	(1)	6	(1)	
	ED	Exposure Duration	years	25	EPA, 1991	5	EPA, 1993	
	CF3	Conversion Factor 3	kg/mg	0.000001	- -	0.000001	- -	
	BW	Body Weight	kg	70	EPA, 1991	70	EPA, 1991	
	AT-C	Averaging Time (Cancer)	days	25,550	EPA, 1989	25,550	EPA, 1989	
	AT-N	Averaging Time (Non-Cancer)	days	9,125	EPA, 1989	1,825	- -	
Dermal Absorption	CS	Chemical Concentration in Soil	mg/kg	see Table …	see Table …	see Table …	see Table …	CDI (mg/kg-day) =
	SA	Skin Surface Area Available for Contact	cm^2	5,300	EPA, 1992, (2)	2,000	EPA, 1992, (2)	CS x SA x SSAF x DABS x CF3 x EF x
	SSAF	Soil to Skin Adherence Factor	mg/cm^2-day	0.32	EPA, 1997, (3)	0.32	EPA, 1997, (3)	ED x 1/BW x 1/AT
	DABS	Dermal Absorption Factor Solids	--	chem specific	EPA, 2001	chem specific	EPA, 2001	
	CF3	Conversion Factor 3	kg/mg	0.000001	- -	0.000001	- -	
	EF	Exposure Frequency	days/year	12	(1)	6	(1)	
	ED	Exposure Duration	years	25	EPA, 1991	5	EPA, 1993	
	BW	Body Weight	kg	70	EPA, 1991	70	EPA, 1991	
	AT-C	Averaging Time (Cancer)	days	25,550	EPA, 1989	25,550	EPA, 1989	
	AT-N	Averaging Time (Non-Cancer)	days	9,125	EPA, 1989	1,825	- -	

(1) Conservative assumption based on information from Base. CT value is one-half RME value.

(2) RME SA includes head, hands, forearms, and lower legs. CT surface area includes head and hands.

(23) SSAF based on maximum adherence factor for utility workers.

Sources:

EPA, 1989: Risk Assessment Guidance for Superfund. Vol.1: Human Health Evaluation Manual, Part A. OERR. EPA/540/1-89/002.

EPA, 1991: Risk Assessment Guidance for Superfund. Vol.1: Human Health Evaluation Manual - Supplemental Guidance, Standard Default Exposure Factors. Interim Final. OSWER Directive 9285.6-03.

EPA, 1992: Dermal Exposure Assessment: Principals and Applications. ORD. EPA/600/8-91/011B.

EPA, 1993: Superfund's Standard Default Exposure Factors for the Central Tendency and Reasonable Maximum Exposure.

EPA, 1995: Assessing Dermal Exposure from Soil. EPA Region III. EPA/903-K-95-003.

EPA, 1997: Exposure Factors Handbook. EPA/600/P-95/002Fa.

EPA, 2001: Risk Assessment Guidance for Superfund. Vol.1: Human Health Evaluation Manual, Part E, Supplemental Guidance for Dermal Risk Assessment. OSWER 9285.7-02EP.

TABLE 4.6

VALUES USED FOR DAILY INTAKE CALCULATIONS

Site 7, NAB Little Creek

Scenario Timeframe: Current
Medium: Surface Soil
Exposure Medium: Surface Soil
Exposure Point: Site Perimeter
Receptor Population: Trespasser/Visitor
Receptor Age: Adolescents

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CT Value	CT Rationale/ Reference	Intake Equation/ Model Name
Ingestion	CS	Chemical Concentration in Soil	mg/kg	see Table 3	see Table 3	see Table 3	see Table 3	Chronic Daily Intake (CDI) (mg/kg-day) =
	IR-S	Ingestion Rate of Soil	mg/day	100	EPA, 1991	50	EPA, 1993	CS x IR-S x EF x ED x CF3 x 1/BW x 1/AT
	EF	Exposure Frequency	days/year	104	(1)	52	(1)	
	ED	Exposure Duration	years	9	(2)	9	EPA, 1993	
	CF3	Conversion Factor 3	kg/mg	0.000001	- -	0.000001	- -	
	BW	Body Weight	kg	51	EPA, 1997,(3)	51	EPA, 1997,(3)	
	AT-C	Averaging Time (Cancer)	days	25,550	EPA, 1989	25,550	EPA, 1989	
	AT-N	Averaging Time (Non-Cancer)	days	3,285	EPA, 1989	3,285	EPA, 1989	
Dermal Absorption	CS	Chemical Concentration in Soil	mg/kg	see Table 3	see Table 3	see Table 3	see Table 3	CDI (mg/kg-day) =
	SA	Skin Surface Area Available for Contact	cm^2	4,600	EPA, 1997, (4)	3,700	EPA, 1997, (4)	CS x SA x SSAF x DABS x CF3 x EF x
	SSAF	Soil to Skin Adherence Factor	mg/cm^2-day	0.11	EPA, 1997, (5)	0.11	EPA, 1997, (5)	ED x 1/BW x 1/AT
	DABS	Dermal Absorption Factor Solids	--	chem specific	EPA, 2001	chem specific	EPA, 2001	
	CF3	Conversion Factor 3	kg/mg	0.000001	- -	0.000001	- -	
	EF	Exposure Frequency	days/year	104	(1)	52	(1)	
	ED	Exposure Duration	years	9	(2)	9	EPA, 1993	
	BW	Body Weight	kg	51	EPA, 1997,(3)	51	EPA, 1997,(3)	
	AT-C	Averaging Time (Cancer)	days	25,550	EPA, 1989	25,550	EPA, 1989	
	AT-N	Averaging Time (Non-Cancer)	days	3,285	EPA, 1989	3,285	EPA, 1989	

(1) Professional Judgement assuming 2 day per week for 52 weeks per year for the RME and 1/2 the RME value for the CT.

(2) Professional Judgement assuming adolescents from 9 to 18 years of age.

(3) Body weight is average value for the 9 year old and 18 year old male body weight.

(4) Surface area is 25% of total surface area for 12-15 year old male. 95th percentile for total surface area is 1.85 m^2, 50th percentile for total surface area is 1.49 m^2.

(5) Soil to skin adherence factor is based on maximum adherence factor for soccer players.

Sources:

EPA, 1989: Risk Assessment Guidance for Superfund. Vol.1: Human Health Evaluation Manual, Part A. OERR. EPA/540/1-89/002.

EPA, 1991: Risk Assessment Guidance for Superfund. Vol.1: Human Health Evaluation Manual - Supplemental Guidance, Standard Default Exposure Factors. Interim Final. OSWER Directive 9285.6-03.

EPA, 1992: Dermal Exposure Assessment: Principals and Applications. ORD. EPA/600/8-91/011B.

EPA, 1993: Superfund's Standard Default Exposure Factors for the Central Tendency and Reasonable Maximum Exposure.

EPA, 1995: Assessing Dermal Exposure from Soil. EPA Region III. EPA/903-K-95-003.

EPA, 1997: Exposure Factors Handbook. EPA/600/P-95/002Fa.

EPA, 2001: Risk Assessment Guidance for Superfund. Vol.1: Human Health Evaluation Manual, Part E, Supplemental Guidance for Dermal Risk Assessment. OSWER 9285.7-02EP.

TABLE 4.7

VALUES USED FOR DAILY INTAKE CALCULATIONS

Site 7, NAB Little Creek

Scenario Timeframe: Current/Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Little Creek Cove
Receptor Population: Trespasser/Visitor
Receptor Age: Adult

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CT Value	CT Rationale/ Reference	Intake Equation/ Model Name
Ingestion	CSW	Chemical Concentration in Surface Water	µg/l	see Table ----	- -	see Table ----	- -	Chronic Daily Intake (CDI) (mg/kg-day) =
	IR-SW	Ingestion Rate of Surface Water	l/hour	0.08	EPA, 1989	0.08	EPA, 1989	CSW x IR-SW x ET x EF x ED x CF1 x
	ET	Exposure Time	hr/day	2.6	EPA, 1989	2.6	EPA, 1989	1/BW x 1/AT
	EF	Exposure Frequency	days/year	52	(1)	26	(1)	
	ED	Exposure Duration	years	24	EPA, 1991	9	EPA, 1993	
	CF1	Conversion Factor 1	mg/µg	0.001	- -	0.001	- -	
	BW	Body Weight	kg	70	EPA, 1991	70	EPA, 1991	
	AT-C	Averaging Time (Cancer)	days	25,550	EPA, 1989	25,550	EPA, 1989	
	AT-N	Averaging Time (Non-Cancer)	days	8,760	EPA, 1989	3,285	EPA, 1989	
Dermal Absorption	CSW	Chemical Concentration in Surface Water	µg/l	see Table ----	- -	see Table ----	- -	CDI (mg/kg-day) =
	DAevent	Dermally Absorbed Dose per Event	mg/cm^2-event	calculated	EPA, 1992	calculated	EPA, 1992	DAevent x SA x EF x ED x 1/BW x 1/AT
	CF1	Conversion Factor 1	mg/µg	0.001	- -	0.001	- -	
	CF2	Conversion Factor 2	l/cm^3	0.001	- -	0.001	- -	Inorganics: DAevent (mg/cm^2-day) =
	PC	Permeability Constant	cm/hr	chem specific	EPA, 1992	chem specific	EPA, 1992	PC x CSW x ET x CF1 x CF2
	ET	Exposure Time	hr/day	2.6	EPA, 1989	2.6	EPA, 1989	
	t	Lag Time	hours	chem specific	EPA, 1992	chem specific	EPA, 1992	Organics :
	t*	Time to Reach Steady-state	hours	chem specific	EPA, 1992	chem specific	EPA, 1992	ET<t*: DAevent (mg/cm^2-day) =
	B	Ratio of Permeability of Stratum Corneum to Epidermis	dimensionless	chem specific	EPA, 1992	chem specific	EPA, 1992	2 x PC x CSW x (sqrt((6 x t x ET)/3.1415))
	SA	Skin Surface Area Available for Contact	cm^2	20,000	EPA, 1997, (2)	18,000	EPA, 1997, (2)	x CF1 x CF2
	EF	Exposure Frequency	days/year	52	(1)	26	(1)	
	ED	Exposure Duration	years	24	EPA, 1991	9	EPA, 1993	ET>t*: DAevent (mg/cm^2-day) =
	BW	Body Weight	kg	70	EPA, 1991	70	EPA, 1991	PC x CSW x (ET/(1+B) + 2 x t x ((1 + 3xB)/(1+B))
	AT-C	Averaging Time (Cancer)	days	25,550	EPA, 1989	25,550	EPA, 1989	x CF1 x CF2
	AT-N	Averaging Time (Non-Cancer)	days	8,760	EPA, 1989	3,285	EPA, 1989	

(1) Professional Judgement assuming 1 day per week for 52 weeks per year for the RME and 1/2 the RME value for the CT.

(2) Skin surface area in contact with surface water are based on ranges. For total adult male surface area ranges from 17,000 to 23,000 cm2, with a mean of 20,000 cm2.

Sources:

EPA, 1989: Risk Assessment Guidance for Superfund. Vol.1: Human Health Evaluation Manual, Part A. OERR. EPA/540/1-89/002.

EPA, 1991: Risk Assessment Guidance for Superfund. Vol.1: Human Health Evaluation Manual - Supplemental Guidance, Standard Default Exposure Factors. Interim Final. OSWER Directive 9285.6-03.

EPA, 1992: Dermal Exposure Assessment: Principals and Applications. ORD. EPA/600/8-91/011B.

EPA, 1993: Superfund's Standard Default Exposure Factors for the Central Tendency and Reasonable Maximum Exposure.

EPA, 1997: Exposure Factors Handbook. EPA/600/P-95/002Fa.

TABLE 4.8

VALUES USED FOR DAILY INTAKE CALCULATIONS

Site 7, NAB Little Creek

Scenario Timeframe: Current/Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Little Creek Cove
Receptor Population: Trespasser/Visitor
Receptor Age: Adolescents

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CT Value	CT Rationale/ Reference	Intake Equation/ Model Name
Ingestion	CSW	Chemical Concentration in Surface Water	µg/l	see Table ----	- -	see Table ----	- -	Chronic Daily Intake (CDI) (mg/kg-day) =
	IR-SW	Ingestion Rate of Surface Water	l/hour	0.08	EPA, 1989	0.08	EPA, 1989	CSW x IR-SW x ET x EF x ED x CF1 x
	ET	Exposure Time	hr/day	2.6	EPA, 1989	2.6	EPA, 1989	1/BW x 1/AT
	EF	Exposure Frequency	days/year	52	(1)	26	(1)	
	ED	Exposure Duration	years	9	(2)	9	(2)	
	CF1	Conversion Factor 1	mg/µg	0.001	- -	0.001	- -	
	BW	Body Weight	kg	51	EPA, 1997,(3)	51	EPA, 1997,(3)	
	AT-C	Averaging Time (Cancer)	days	25,550	EPA, 1989	25,550	EPA, 1989	
	AT-N	Averaging Time (Non-Cancer)	days	3,285	EPA, 1989	3,285	EPA, 1989	
Dermal Absorption	CSW	Chemical Concentration in Surface Water	µg/l	see Table ----	- -	see Table ----	- -	CDI (mg/kg-day) =
	DAevent	Dermally Absorbed Dose per Event	mg/cm^2-event	calculated	EPA, 1992	calculated	EPA, 1992	DAevent x SA x EF x ED x 1/BW x 1/AT
	CF1	Conversion Factor 1	mg/µg	0.001	- -	0.001	- -	
	CF2	Conversion Factor 2	l/cm^3	0.001	- -	0.001	- -	Inorganics: DAevent (mg/cm^2-day) =
	PC	Permeability Constant	cm/hr	chem specific	EPA, 1992	chem specific	EPA, 1992	PC x CSW x ET x CF1 x CF2
	ET	Exposure Time	hr/day	2.6	EPA, 1989	2.6	(2)	
	t	Lag Time	hours	chem specific	EPA, 1992	chem specific	EPA, 1992	Organics :
	t*	Time to Reach Steady-state	hours	chem specific	EPA, 1992	chem specific	EPA, 1992	ET<t*: DAevent (mg/cm^2-day) =
	B	Ratio of Permeability of Stratum Corneum to Epidermis	dimensionless	chem specific	EPA, 1992	chem specific	EPA, 1992	2 x PC x CSW x (sqrt((6 x t x ET)/3.1415))
	SA	Skin Surface Area Available for Contact	cm^2	15,000	EPA, 1997, (4)	12,000	EPA, 1997, (4)	x CF1 x CF2
	EF	Exposure Frequency	days/year	52	(1)	26	(1)	
	ED	Exposure Duration	years	9	(2)	9	(2)	ET>t*: DAevent (mg/cm^2-day) =
	BW	Body Weight	kg	51	EPA, 1997,(3)	51	EPA, 1997,(3)	PC x CSW x (ET/(1+B) + 2 x t x ((1 + 3xB)/(1+B))
	AT-C	Averaging Time (Cancer)	days	25,550	EPA, 1989	25,550	EPA, 1989	x CF1 x CF2
	AT-N	Averaging Time (Non-Cancer)	days	3,285	EPA, 1989	3,285	EPA, 1989	

(1) Professional Judgment assuming 1 day per week for 52 weeks per year for the RME and 1/2 the RME value for the CT.

(2) Professional Judgment assuming adolescents from 9 to 18 years of age.

(3) Body weight is average value for the 9 year old and 18 year old male body weight.

(4) Total surface area for a 12-15 year old male. The total body surface area ranges from 12,000 to 19,000 cm2 ; the mean value of 15,000 cm2 is used for the RME and 12,000 cm2 is used for the CT value.

Sources:

EPA, 1989: Risk Assessment Guidance for Superfund. Vol.1: Human Health Evaluation Manual, Part A. OERR. EPA/540/1-89/002.

EPA, 1992: Dermal Exposure Assessment: Principals and Applications. ORD. EPA/600/8-91/011B.

EPA, 1993: Superfund's Standard Default Exposure Factors for the Central Tendency and Reasonable Maximum Exposure.

EPA, 1997: Exposure Factors Handbook. EPA/600/P-95/002Fa.

TABLE 4.9

VALUES USED FOR DAILY INTAKE CALCULATIONS

Site 7, NAB Little Creek

Scenario Timeframe: Current/Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Little Creek Cove
Receptor Population: Site Worker
Receptor Age: Adult

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CT Value	CT Rationale/ Reference	Intake Equation/ Model Name
Ingestion	CSW	Chemical Concentration in Surface Water	µg/l	see Table ----	- -	see Table ----	- -	Chronic Daily Intake (CDI) (mg/kg-day) =
	IR-SW	Ingestion Rate of Surface Water	l/hour	0.08	EPA, 1989	0.08	EPA, 1989	CSW x IR-SW x ET x EF x ED x CF1 x
	ET	Exposure Time	hr/day	4	(1)	4	(1)	1/BW x 1/AT
	EF	Exposure Frequency	days/year	12	(1)	6	(1)	
	ED	Exposure Duration	years	25	EPA, 1991	5	EPA, 1993	
	CF1	Conversion Factor 1	mg/µg	0.001	- -	0.001	- -	
	BW	Body Weight	kg	70	EPA, 1991	70	EPA, 1991	
	AT-C	Averaging Time (Cancer)	days	25,550	EPA, 1989	25,550	EPA, 1989	
	AT-N	Averaging Time (Non-Cancer)	days	9,125	EPA, 1989	1,825	EPA, 1989	
Dermal Absorption	CSW	Chemical Concentration in Surface Water	µg/l	see Table ----	- -	see Table ----	- -	CDI (mg/kg-day) =
	DAevent	Dermally Absorbed Dose per Event	mg/cm^2-event	calculated	EPA, 1992	calculated	EPA, 1992	DAevent x SA x EF x ED x 1/BW x 1/AT
	CF1	Conversion Factor 1	mg/µg	0.001	- -	0.001	- -	
	CF2	Conversion Factor 2	l/cm^3	0.001	- -	0.001	- -	Inorganics: DAevent (mg/cm^2-day) =
	PC	Permeability Constant	cm/hr	chem specific	EPA, 1992	chem specific	EPA, 1992	PC x CSW x ET x CF1 x CF2
	ET	Exposure Time	hr/day	4	(1)	4	(1)	
	t	Lag Time	hours	chem specific	EPA, 1992	chem specific	EPA, 1992	Organics :
	t*	Time to Reach Steady-state	hours	chem specific	EPA, 1992	chem specific	EPA, 1992	ET<t*: DAevent (mg/cm^2-day) =
	B	Ratio of Permeability of Stratum Corneum to Epidermis	dimensionless	chem specific	EPA, 1992	chem specific	EPA, 1992	2 x PC x CSW x (sqrt((6 x t x ET)/3.1415))
	SA	Skin Surface Area Available for Contact	cm^2	5,300	EPA, 1992, (2)	5,300	EPA, 1992, (2)	x CF1 x CF2
	EF	Exposure Frequency	days/year	12	(1)	6	(1)	
	ED	Exposure Duration	years	25	EPA, 1991	5	EPA, 1993	ET>t*: DAevent (mg/cm^2-day) =
	BW	Body Weight	kg	70	EPA, 1991	70	EPA, 1991	PC x CSW x (ET/(1+B) + 2 x t x ((1 + 3xB)/(1+B))
	AT-C	Averaging Time (Cancer)	days	25,550	EPA, 1989	25,550	EPA, 1989	x CF1 x CF2
	AT-N	Averaging Time (Non-Cancer)	days	9,125	EPA, 1989	3,285	EPA, 1989	

(1) Professional Judgement assuming 4 hours per day, and 1 day per month per year for the RME and 1/2 the RME EF value for the CT.

(2) SA includes head, hands, forearms, and lower legs, assuming diver wears short sleeve and short pant wet suit and water shoes.

Sources:

EPA, 1989: Risk Assessment Guidance for Superfund. Vol.1: Human Health Evaluation Manual, Part A. OERR. EPA/540/1-89/002.

EPA, 1991: Risk Assessment Guidance for Superfund. Vol.1: Human Health Evaluation Manual - Supplemental Guidance, Standard Default Exposure Factors. Interim Final. OSWER Directive 9285.6-03.

EPA, 1992: Dermal Exposure Assessment: Principals and Applications. ORD. EPA/600/8-91/011B.

EPA, 1993: Superfund's Standard Default Exposure Factors for the Central Tendency and Reasonable Maximum Exposure.

EPA, 1997: Exposure Factors Handbook. EPA/600/P-95/002Fa.

TABLE 4.10

VALUES USED FOR DAILY INTAKE CALCULATIONS

Site 7, NAB Little Creek

Scenario Timeframe: Current/Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Pond
Receptor Population: Trespasser/Visitor
Receptor Age: Adult

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CT Value	CT Rationale/ Reference	Intake Equation/ Model Name
Ingestion	CSW	Chemical Concentration in Surface Water	µg/l	see Table ----	- -	see Table ----	- -	Chronic Daily Intake (CDI) (mg/kg-day) =
	IR-SW	Ingestion Rate of Surface Water	l/hour	0.08	EPA, 1989	0.08	EPA, 1989	CSW x IR-SW x ET x EF x ED x CF1 x
	ET	Exposure Time	hr/day	2.6	EPA, 1989	2.6	EPA, 1989	1/BW x 1/AT
	EF	Exposure Frequency	days/year	52	(1)	26	(1)	
	ED	Exposure Duration	years	24	EPA, 1991	9	EPA, 1993	
	CF1	Conversion Factor 1	mg/µg	0.001	- -	0.001	- -	
	BW	Body Weight	kg	70	EPA, 1991	70	EPA, 1991	
	AT-C	Averaging Time (Cancer)	days	25,550	EPA, 1989	25,550	EPA, 1989	
	AT-N	Averaging Time (Non-Cancer)	days	8,760	EPA, 1989	3,285	EPA, 1989	
Dermal Absorption	CSW	Chemical Concentration in Surface Water	µg/l	see Table ----	- -	see Table ----	- -	CDI (mg/kg-day) =
	DAevent	Dermally Absorbed Dose per Event	mg/cm^2-event	calculated	EPA, 1992	calculated	EPA, 1992	DAevent x SA x EF x ED x 1/BW x 1/AT
	CF1	Conversion Factor 1	mg/µg	0.001	- -	0.001	- -	
	CF2	Conversion Factor 2	l/cm^3	0.001	- -	0.001	- -	Inorganics: DAevent (mg/cm^2-day) =
	PC	Permeability Constant	cm/hr	chem specific	EPA, 1992	chem specific	EPA, 1992	PC x CSW x ET x CF1 x CF2
	ET	Exposure Time	hr/day	2.6	EPA, 1989	2.6	(2)	
	t	Lag Time	hours	chem specific	EPA, 1992	chem specific	EPA, 1992	Organics :
	t*	Time to Reach Steady-state	hours	chem specific	EPA, 1992	chem specific	EPA, 1992	ET<t*: DAevent (mg/cm^2-day) =
	B	Ratio of Permeability of Stratum Corneum to Epidermis	dimensionless	chem specific	EPA, 1992	chem specific	EPA, 1992	2 x PC x CSW x (sqrt((6 x t x ET)/3.1415))
	SA	Skin Surface Area Available for Contact	cm^2	6,000	EPA, 1997 (2)	5,400	EPA, 1997 (2)	x CF1 x CF2
	EF	Exposure Frequency	days/year	52	(1)	26	(1)	
	ED	Exposure Duration	years	24	EPA, 1991	9	EPA, 1993	ET>t*: DAevent (mg/cm^2-day) =
	BW	Body Weight	kg	70	EPA, 1991	70	EPA, 1991	PC x CSW x (ET/(1+B) + 2 x t x ((1 + 3xB)/(1+B))
	AT-C	Averaging Time (Cancer)	days	25,550	EPA, 1989	25,550	EPA, 1989	x CF1 x CF2
	AT-N	Averaging Time (Non-Cancer)	days	8,760	EPA, 1989	3,285	EPA, 1989	

(1) Professional Judgement assuming 1 day per week for 52 weeks per year for the RME and 1/2 the RME value for the CT.

(2) Skin surface area in contact with surface water based on contact while wading. Assumed 30 percent of total surface area (hands, forearms, lower legs, and feet).

Sources:

EPA, 1989: Risk Assessment Guidance for Superfund. Vol.1: Human Health Evaluation Manual, Part A. OERR. EPA/540/1-89/002.

EPA, 1991: Risk Assessment Guidance for Superfund. Vol.1: Human Health Evaluation Manual - Supplemental Guidance, Standard Default Exposure Factors. Interim Final. OSWER Directive 9285.6-03.

EPA, 1992: Dermal Exposure Assessment: Principals and Applications. ORD. EPA/600/8-91/011B.

EPA, 1993: Superfund's Standard Default Exposure Factors for the Central Tendency and Reasonable Maximum Exposure.

EPA, 1997: Exposure Factors Handbook. EPA/600/P-95/002Fa.

TABLE 4.11

VALUES USED FOR DAILY INTAKE CALCULATIONS

Site 7, NAB Little Creek

Scenario Timeframe: Current/Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Pond
Receptor Population: Trespasser/Visitor
Receptor Age: Adolescents

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CT Value	CT Rationale/ Reference	Intake Equation/ Model Name
Ingestion	CSW	Chemical Concentration in Surface Water	µg/l	see Table ----	- -	see Table ----	- -	Chronic Daily Intake (CDI) (mg/kg-day) =
	IR-SW	Ingestion Rate of Surface Water	l/hour	0.08	EPA, 1989	0.08	EPA, 1989	CSW x IR-SW x ET x EF x ED x CF1 x
	ET	Exposure Time	hr/day	2.6	EPA, 1989	2.6	EPA, 1989	1/BW x 1/AT
	EF	Exposure Frequency	days/year	52	(1)	26	(1)	
	ED	Exposure Duration	years	9	(2)	9	(2)	
	CF1	Conversion Factor 1	mg/µg	0.001	- -	0.001	- -	
	BW	Body Weight	kg	51	EPA, 1997,(3)	51	EPA, 1997,(3)	
	AT-C	Averaging Time (Cancer)	days	25,550	EPA, 1989	25,550	EPA, 1989	
	AT-N	Averaging Time (Non-Cancer)	days	3,285	EPA, 1989	3,285	EPA, 1989	
Dermal Absorption	CSW	Chemical Concentration in Surface Water	µg/l	see Table ----	- -	see Table ----	- -	CDI (mg/kg-day) =
	DAevent	Dermally Absorbed Dose per Event	mg/cm^2-event	calculated	EPA, 1992	calculated	EPA, 1992	DAevent x SA x EF x ED x 1/BW x 1/AT
	CF1	Conversion Factor 1	mg/µg	0.001	- -	0.001	- -	
	CF2	Conversion Factor 2	l/cm^3	0.001	- -	0.001	- -	Inorganics: DAevent (mg/cm^2-day) =
	PC	Permeability Constant	cm/hr	chem specific	EPA, 1992	chem specific	EPA, 1992	PC x CSW x ET x CF1 x CF2
	ET	Exposure Time	hr/day	2.6	EPA, 1989	2.6	(2)	
	t	Lag Time	hours	chem specific	EPA, 1992	chem specific	EPA, 1992	Organics :
	t*	Time to Reach Steady-state	hours	chem specific	EPA, 1992	chem specific	EPA, 1992	ET<t*: DAevent (mg/cm^2-day) =
	B	Ratio of Permeability of Stratum Corneum to Epidermis	dimensionless	chem specific	EPA, 1992	chem specific	EPA, 1992	2 x PC x CSW x (sqrt((6 x t x ET)/3.1415))
	SA	Skin Surface Area Available for Contact	cm^2	4,500	EPA, 1997, (4)	3,600	EPA, 1997, (4)	x CF1 x CF2
	EF	Exposure Frequency	days/year	52	(1)	26	(1)	
	ED	Exposure Duration	years	9	(2)	9	(2)	ET>t*: DAevent (mg/cm^2-day) =
	BW	Body Weight	kg	51	EPA, 1997,(3)	51	EPA, 1997,(3)	PC x CSW x (ET/(1+B) + 2 x t x ((1 + 3xB)/(1+B))
	AT-C	Averaging Time (Cancer)	days	25,550	EPA, 1989	25,550	EPA, 1989	x CF1 x CF2
	AT-N	Averaging Time (Non-Cancer)	days	3,285	EPA, 1989	3,285	EPA, 1989	

(1) Professional Judgment assuming 1 day per week for 52 weeks per year for the RME and 1/2 the RME value for the CT.

(2) Professional Judgment assuming adolescents from 9 to 18 years of age.

(3) Body weight is average value for the 9 year old and 18 year old male body weight.

(4) Skin surface area in contact with surface water based on contact while wading. Assumed 30 percent of total surface area (hands, forearms, lower legs, and feet).

Sources:

EPA, 1989: Risk Assessment Guidance for Superfund. Vol.1: Human Health Evaluation Manual, Part A. OERR. EPA/540/1-89/002.

EPA, 1991: Risk Assessment Guidance for Superfund. Vol.1: Human Health Evaluation Manual - Supplemental Guidance, Standard Default Exposure Factors. Interim Final. OSWER Directive 9285.6-03.

EPA, 1992: Dermal Exposure Assessment: Principals and Applications. ORD. EPA/600/8-91/011B.

EPA, 1993: Superfund's Standard Default Exposure Factors for the Central Tendency and Reasonable Maximum Exposure.

EPA, 1997: Exposure Factors Handbook. EPA/600/P-95/002Fa.

TABLE 4.12

VALUES USED FOR DAILY INTAKE CALCULATIONS

Site 7, NAB Little Creek

Scenario Timeframe: Current/Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Canal on West Side of Site
Receptor Population: Trespasser/Visitor
Receptor Age: Adult

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CT Value	CT Rationale/ Reference	Intake Equation/ Model Name
Ingestion	CSW	Chemical Concentration in Surface Water	µg/l	see Table ----	- -	see Table ----	- -	Chronic Daily Intake (CDI) (mg/kg-day) =
	IR-SW	Ingestion Rate of Surface Water	l/hour	0.08	EPA, 1989	0.08	EPA, 1989	CSW x IR-SW x ET x EF x ED x CF1 x
	ET	Exposure Time	hr/day	2.6	EPA, 1989	2.6	EPA, 1989	1/BW x 1/AT
	EF	Exposure Frequency	days/year	52	(1)	26	(1)	
	ED	Exposure Duration	years	24	EPA, 1991	9	EPA, 1993	
	CF1	Conversion Factor 1	mg/µg	0.001	- -	0.001	- -	
	BW	Body Weight	kg	70	EPA, 1991	70	EPA, 1991	
	AT-C	Averaging Time (Cancer)	days	25,550	EPA, 1989	25,550	EPA, 1989	
	AT-N	Averaging Time (Non-Cancer)	days	8,760	EPA, 1989	3,285	EPA, 1989	
Dermal Absorption	CSW	Chemical Concentration in Surface Water	µg/l	see Table ----	- -	see Table ----	- -	CDI (mg/kg-day) =
	DAevent	Dermally Absorbed Dose per Event	mg/cm^2-event	calculated	EPA, 1992	calculated	EPA, 1992	DAevent x SA x EF x ED x 1/BW x 1/AT
	CF1	Conversion Factor 1	mg/µg	0.001	- -	0.001	- -	
	CF2	Conversion Factor 2	l/cm^3	0.001	- -	0.001	- -	Inorganics: DAevent (mg/cm^2-day) =
	PC	Permeability Constant	cm/hr	chem specific	EPA, 1992	chem specific	EPA, 1992	PC x CSW x ET x CF1 x CF2
	ET	Exposure Time	hr/day	2.6	EPA, 1989	2.6	(2)	
	t	Lag Time	hours	chem specific	EPA, 1992	chem specific	EPA, 1992	Organics :
	t*	Time to Reach Steady-state	hours	chem specific	EPA, 1992	chem specific	EPA, 1992	ET<t*: DAevent (mg/cm^2-day) =
	B	Ratio of Permeability of Stratum Corneum to Epidermis	dimensionless	chem specific	EPA, 1992	chem specific	EPA, 1992	2 x PC x CSW x (sqrt((6 x t x ET)/3.1415))
	SA	Skin Surface Area Available for Contact	cm^2	6,000	EPA, 1997 (2)	5,400	EPA, 1997 (2)	x CF1 x CF2
	EF	Exposure Frequency	days/year	52	(1)	26	(1)	
	ED	Exposure Duration	years	24	EPA, 1991	9	EPA, 1993	ET>t*: DAevent (mg/cm^2-day) =
	BW	Body Weight	kg	70	EPA, 1991	70	EPA, 1991	PC x CSW x (ET/(1+B) + 2 x t x ((1 + 3xB)/(1+B))
	AT-C	Averaging Time (Cancer)	days	25,550	EPA, 1989	25,550	EPA, 1989	x CF1 x CF2
	AT-N	Averaging Time (Non-Cancer)	days	8,760	EPA, 1989	3,285	EPA, 1989	

(1) Professional Judgement assuming 1 day per week for 52 weeks per year for the RME and 1/2 the RME value for the CT.

(2) Skin surface area in contact with surface water based on contact while wading. Assumed 30 percent of total surface area (hands, forearms, lower legs, and feet).

Sources:

EPA, 1989: Risk Assessment Guidance for Superfund. Vol.1: Human Health Evaluation Manual, Part A. OERR. EPA/540/1-89/002.

EPA, 1991: Risk Assessment Guidance for Superfund. Vol.1: Human Health Evaluation Manual - Supplemental Guidance, Standard Default Exposure Factors. Interim Final. OSWER Directive 9285.6-03.

EPA, 1992: Dermal Exposure Assessment: Principals and Applications. ORD. EPA/600/8-91/011B.

EPA, 1993: Superfund's Standard Default Exposure Factors for the Central Tendency and Reasonable Maximum Exposure.

EPA, 1997: Exposure Factors Handbook. EPA/600/P-95/002Fa.

TABLE 4.13

VALUES USED FOR DAILY INTAKE CALCULATIONS

Site 7, NAB Little Creek

Scenario Timeframe: Current/Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Canal on West Side of Site
Receptor Population: Trespasser/Visitor
Receptor Age: Adolescents

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CT Value	CT Rationale/ Reference	Intake Equation/ Model Name
Ingestion	CSW	Chemical Concentration in Surface Water	µg/l	see Table ----	- -	see Table ----	- -	Chronic Daily Intake (CDI) (mg/kg-day) =
	IR-SW	Ingestion Rate of Surface Water	l/hour	0.08	EPA, 1989	0.08	EPA, 1989	CSW x IR-SW x ET x EF x ED x CF1 x
	ET	Exposure Time	hr/day	2.6	EPA, 1989	2.6	EPA, 1989	1/BW x 1/AT
	EF	Exposure Frequency	days/year	52	(1)	26	(1)	
	ED	Exposure Duration	years	9	(2)	9	(2)	
	CF1	Conversion Factor 1	mg/µg	0.001	- -	0.001	- -	
	BW	Body Weight	kg	51	EPA, 1997,(3)	51	EPA, 1997,(3)	
	AT-C	Averaging Time (Cancer)	days	25,550	EPA, 1989	25,550	EPA, 1989	
	AT-N	Averaging Time (Non-Cancer)	days	3,285	EPA, 1989	3,285	EPA, 1989	
Dermal Absorption	CSW	Chemical Concentration in Surface Water	µg/l	see Table ----	- -	see Table ----	- -	CDI (mg/kg-day) =
	DAevent	Dermally Absorbed Dose per Event	mg/cm^2-event	calculated	EPA, 1992	calculated	EPA, 1992	DAevent x SA x EF x ED x 1/BW x 1/AT
	CF1	Conversion Factor 1	mg/µg	0.001	- -	0.001	- -	
	CF2	Conversion Factor 2	l/cm^3	0.001	- -	0.001	- -	Inorganics: DAevent (mg/cm^2-day) =
	PC	Permeability Constant	cm/hr	chem specific	EPA, 1992	chem specific	EPA, 1992	PC x CSW x ET x CF1 x CF2
	ET	Exposure Time	hr/day	2.6	EPA, 1989	2.6	(2)	
	t	Lag Time	hours	chem specific	EPA, 1992	chem specific	EPA, 1992	Organics :
	t*	Time to Reach Steady-state	hours	chem specific	EPA, 1992	chem specific	EPA, 1992	ET<t*: DAevent (mg/cm^2-day) =
	B	Ratio of Permeability of Stratum Corneum to Epidermis	dimensionless	chem specific	EPA, 1992	chem specific	EPA, 1992	2 x PC x CSW x (sqrt((6 x t x ET)/3.1415))
	SA	Skin Surface Area Available for Contact	cm^2	4,500	EPA, 1997, (4)	3,600	EPA, 1997, (4)	x CF1 x CF2
	EF	Exposure Frequency	days/year	52	(1)	26	(1)	
	ED	Exposure Duration	years	9	(2)	9	(2)	ET>t*: DAevent (mg/cm^2-day) =
	BW	Body Weight	kg	51	EPA, 1997,(3)	51	EPA, 1997,(3)	PC x CSW x (ET/(1+B) + 2 x t x ((1 + 3xB)/(1+B))
	AT-C	Averaging Time (Cancer)	days	25,550	EPA, 1989	25,550	EPA, 1989	x CF1 x CF2
	AT-N	Averaging Time (Non-Cancer)	days	3,285	EPA, 1989	3,285	EPA, 1989	

(1) Professional Judgment assuming 1 day per week for 52 weeks per year for the RME and 1/2 the RME value for the CT.

(2) Professional Judgment assuming adolescents from 9 to 18 years of age.

(3) Body weight is average value for the 9 year old and 18 year old male body weight.

(4) Skin surface area in contact with surface water based on contact while wading. Assumed 30 percent of total surface area (hands, forearms, lower legs, and feet).

Sources:

EPA, 1989: Risk Assessment Guidance for Superfund. Vol.1: Human Health Evaluation Manual, Part A. OERR. EPA/540/1-89/002.

EPA, 1991: Risk Assessment Guidance for Superfund. Vol.1: Human Health Evaluation Manual - Supplemental Guidance, Standard Default Exposure Factors. Interim Final. OSWER Directive 9285.6-03.

EPA, 1992: Dermal Exposure Assessment: Principals and Applications. ORD. EPA/600/8-91/011B.

EPA, 1993: Superfund's Standard Default Exposure Factors for the Central Tendency and Reasonable Maximum Exposure.

EPA, 1997: Exposure Factors Handbook. EPA/600/P-95/002Fa.

TABLE 4.14

VALUES USED FOR DAILY INTAKE CALCULATIONS

Site 7, NAB Little Creek

Scenario Timeframe: Current/Future
Medium: Sediment
Exposure Medium: Sediment
Exposure Point: Pond
Receptor Population: Trespasser/Visitor
Receptor Age: Adult

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CT Value	CT Rationale/ Reference	Intake Equation/ Model Name
Ingestion	CSed	Chemical Concentration in Sediment	mg/kg	see Table ----	- -	see Table ----	- -	Chronic Daily Intake (CDI) (mg/kg-day) =
	IR-Sed	Ingestion Rate of Sediment	mg/day	50	(1)	25	(1)	CSed x IR-Sed x EF x ED x CF3 x 1/BW x 1/AT
	EF	Exposure Frequency	days/year	52	(2)	26	(2)	
	ED	Exposure Duration	years	24	EPA, 1991	9	EPA, 1993	
	CF3	Conversion Factor 3	kg/mg	0.000001	- -	0.000001	- -	
	BW	Body Weight	kg	70	EPA, 1991	70	EPA, 1991	
	AT-C	Averaging Time (Cancer)	days	25,550	EPA, 1989	25,550	EPA, 1989	
	AT-N	Averaging Time (Non-Cancer)	days	8,760	EPA, 1989	3,285	EPA, 1989	
Dermal Absorption	CSed	Chemical Concentration in Sediment	mg/kg	see Table ----	- -	see Table ----	- -	CDI (mg/kg-day) =
	SA	Skin Surface Area Available for Contact	cm^2	5,170	EPA, 1997, (3)	1,960	EPA, 1997, (3)	CSed x SA x SSAF x DABS x CF3 x EF x
	SSAF	Soil to Skin Adherence Factor	mg/cm^2-day	0.2	EPA,1997, (4)	0.19	EPA,1997, (4)	ED x 1/BW x 1/AT
	DABS	Dermal Absorption Factor Solids	--	chem specific	EPA, 2001	chem specific	EPA, 2001	
	CF3	Conversion Factor 3	kg/mg	0.000001	- -	0.000001	- -	
	EF	Exposure Frequency	days/year	52	(2)	26	(2)	
	ED	Exposure Duration	years	24	EPA, 1991	9	EPA, 1993	
	BW	Body Weight	kg	70	EPA, 1991	70	EPA, 1991	
	AT-C	Averaging Time (Cancer)	days	25,550	EPA, 1989	25,550	EPA, 1989	
	AT-N	Averaging Time (Non-Cancer)	days	8,760	EPA, 1989	3,285	EPA, 1989	

(1) Professional Judgement assuming 1/2 the default value for the residential soil scenario, and 1/2 the RME value for the CT.

(2) Professional Judgment assuming 1 day per week for 52 weeks per year for the RME and 1/2 the RME value for the CT.

(3) RME SA is the sum of the mean surface areas (for a male) of the hands, forearms, feet, and lower legs. CT SA is the sum of the mean surface areas (for a male) of the feet and hands.

(4) RME SSAF is soil adherence to hands for Gardeners No. 1 from EPA, 1997, Table 6-12. CT SSAF is average soil adherence to hands Gardeners No. 1 and No. 2 from EPA, 1997, Table 6-12.

Sources:

EPA, 1989: Risk Assessment Guidance for Superfund. Vol.1: Human Health Evaluation Manual, Part A. OERR. EPA/540/1-89/002.

EPA, 1991: Risk Assessment Guidance for Superfund. Vol.1: Human Health Evaluation Manual - Supplemental Guidance, Standard Default Exposure Factors. Interim Final. OSWER Directive 9285.6-03.

EPA, 1992: Dermal Exposure Assessment: Principals and Applications. ORD. EPA/600/8-91/011B.

EPA, 1993: Superfund's Standard Default Exposure Factors for the Central Tendency and Reasonable Maximum Exposure.

EPA, 1995: Assessing Dermal Exposure from Soil. EPA Region III. EPA/903-K-95-003.

EPA, 1997: Exposure Factors Handbook. EPA/600/P-95/002Fa.

EPA, 2001: Risk Assessment Guidance for Superfund. Vol.1: Human Health Evaluation Manual, Part E, Supplemental Guidance for Dermal Risk Assessment. OSWER 9285.7-02EP.

TABLE 4.15

VALUES USED FOR DAILY INTAKE CALCULATIONS

Site 7, NAB Little Creek

Scenario Timeframe: Current/Future
Medium: Sediment
Exposure Medium: Sediment
Exposure Point: Pond
Receptor Population: Trespasser/Visitor
Receptor Age: Adolescents

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CT Value	CT Rationale/ Reference	Intake Equation/ Model Name
Ingestion	CSed	Chemical Concentration in Sediment	mg/kg	see Table	- -	see Table	- -	Chronic Daily Intake (CDI) (mg/kg-day) =
	IR-Sed	Ingestion Rate of Sediment	mg/day	50	(1)	25	(1)	CSed x IR-Sed x EF x ED x CF3 x 1/BW x 1/AT
	EF	Exposure Frequency	days/year	52	(2)	26	(2)	
	ED	Exposure Duration	years	9	(3)	9	(3)	
	CF3	Conversion Factor 3	kg/mg	0.000001	- -	0.000001	- -	
	BW	Body Weight	kg	51	EPA, 1997	51	EPA, 1997	
	AT-C	Averaging Time (Cancer)	days	25,550	EPA, 1989	25,550	EPA, 1989	
	AT-N	Averaging Time (Non-Cancer)	days	3,285	EPA, 1989	3,285	EPA, 1989	
Dermal Absorption	CSed	Chemical Concentration in Sediment	mg/kg	see Table	- -	see Table	- -	CDI (mg/kg-day) =
	SA	Skin Surface Area Available for Contact	cm^2	4,500	EPA, 1997, (4)	3,600	EPA, 1997, (4)	CSed x SA x SSAF x DABS x CF3 x EF x
	SSAF	Soil to Skin Adherence Factor	mg/cm^2-day	0.2	EPA,1997, (5)	0.19	EPA,1997, (5)	ED x 1/BW x 1/AT
	DABS	Dermal Absorption Factor Solids	--	chem specific	EPA, 2001	chem specific	EPA, 2001	
	CF3	Conversion Factor 3	kg/mg	0.000001	- -	0.000001	- -	
	EF	Exposure Frequency	days/year	52	(2)	26	(2)	
	ED	Exposure Duration	years	9	(3)	9	(3)	
	BW	Body Weight	kg	51	EPA, 1997	51	EPA, 1997	
	AT-C	Averaging Time (Cancer)	days	25,550	EPA, 1989	25,550	EPA, 1989	
	AT-N	Averaging Time (Non-Cancer)	days	3,285	EPA, 1989	3,285	EPA, 1989	

(1) Professional Judgement assuming 1/2 the default value for the residential soil scenario per comment from EPA Region III, June 16, 1998, and 1/2 the RME value for the CT.

(2) Professional Judgment assuming 1 day per week for 52 weeks per year for the RME and 1/2 the RME value for the CT.

(3) Professional Judgment assuming adolescents from 9 to 18 years of age.

(4) Skin surface area in contact with sediment based on contact while wading. Assumes 30 percent of total surface area (hands, forearms, lower legs, and feet) of 12-15 year old male.

(5) RME SSAF is soil adherence to hands for Gardeners No. 1 from EPA, 1997, Table 6-12. CT SSAF is average soil adherence to hands Gardeners No. 1 and No. 2 from EPA, 1997, Table 6-12.

NA - Not available, used RME value.

Sources:

EPA, 1989: Risk Assessment Guidance for Superfund. Vol.1: Human Health Evaluation Manual, Part A. OERR. EPA/540/1-89/002.

EPA, 1991: Risk Assessment Guidance for Superfund. Vol.1: Human Health Evaluation Manual - Supplemental Guidance, Standard Default Exposure Factors. Interim Final. OSWER Directive 9285.6-03.

EPA, 1992: Dermal Exposure Assessment: Principals and Applications. ORD. EPA/600/8-91/011B.

EPA, 1995: Assessing Dermal Exposure from Soil. EPA Region III. EPA/903-K-95-003.

EPA, 1997: Exposure Factors Handbook. EPA/600/P-95/002Fa.

EPA, 2001: Risk Assessment Guidance for Superfund. Vol.1: Human Health Evaluation Manual, Part E, Supplemental Guidance for Dermal Risk Assessment. OSWER 9285.7-02EP.

TABLE 4.16

VALUES USED FOR DAILY INTAKE CALCULATIONS

Site 7, NAB Little Creek

Scenario Timeframe: Current/Future
Medium: Sediment
Exposure Medium: Sediment
Exposure Point: Canal on West Side of Site
Receptor Population: Trespasser/Visitor
Receptor Age: Adult

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CT Value	CT Rationale/ Reference	Intake Equation/ Model Name
Ingestion	CSed	Chemical Concentration in Sediment	mg/kg	see Table ----	- -	see Table ----	- -	Chronic Daily Intake (CDI) (mg/kg-day) =
	IR-Sed	Ingestion Rate of Sediment	mg/day	50	(1)	25	(1)	CSed x IR-Sed x EF x ED x CF3 x 1/BW x 1/AT
	EF	Exposure Frequency	days/year	52	(2)	26	(2)	
	ED	Exposure Duration	years	24	EPA, 1991	9	EPA, 1993	
	CF3	Conversion Factor 3	kg/mg	0.000001	- -	0.000001	- -	
	BW	Body Weight	kg	70	EPA, 1991	70	EPA, 1991	
	AT-C	Averaging Time (Cancer)	days	25,550	EPA, 1989	25,550	EPA, 1989	
	AT-N	Averaging Time (Non-Cancer)	days	8,760	EPA, 1989	3,285	EPA, 1989	
Dermal Absorption	CSed	Chemical Concentration in Sediment	mg/kg	see Table ----	- -	see Table ----	- -	CDI (mg/kg-day) =
	SA	Skin Surface Area Available for Contact	cm^2	5,170	EPA, 1997, (3)	1,960	EPA, 1997, (3)	CSed x SA x SSAF x DABS x CF3 x EF x
	SSAF	Soil to Skin Adherence Factor	mg/cm^2-day	0.2	EPA,1997, (4)	0.19	EPA,1997, (4)	ED x 1/BW x 1/AT
	DABS	Dermal Absorption Factor Solids	--	chem specific	EPA, 2001	chem specific	EPA, 2001	
	CF3	Conversion Factor 3	kg/mg	0.000001	- -	0.000001	- -	
	EF	Exposure Frequency	days/year	52	(2)	26	(2)	
	ED	Exposure Duration	years	24	EPA, 1991	9	EPA, 1993	
	BW	Body Weight	kg	70	EPA, 1991	70	EPA, 1991	
	AT-C	Averaging Time (Cancer)	days	25,550	EPA, 1989	25,550	EPA, 1989	
	AT-N	Averaging Time (Non-Cancer)	days	8,760	EPA, 1989	3,285	EPA, 1989	

(1) Professional Judgement assuming 1/2 the default value for the residential soil scenario, and 1/2 the RME value for the CT.

(2) Professional Judgment assuming 1 day per week for 52 weeks per year for the RME and 1/2 the RME value for the CT.

(3) RME SA is the sum of the mean surface areas (for a male) of the hands, forearms, feet, and lower legs. CT SA is the sum of the mean surface areas (for a male) of the feet and hands.

(4) RME SSAF is soil adherence to hands for Gardeners No. 1 from EPA, 1997, Table 6-12. CT SSAF is average soil adherence to hands Gardeners No. 1 and No. 2 from EPA, 1997, Table 6-12.

NA - Not available, used RME value.

Sources:

EPA, 1989: Risk Assessment Guidance for Superfund. Vol.1: Human Health Evaluation Manual, Part A. OERR. EPA/540/1-89/002.

EPA, 1991: Risk Assessment Guidance for Superfund. Vol.1: Human Health Evaluation Manual - Supplemental Guidance, Standard Default Exposure Factors. Interim Final. OSWER Directive 9285.6-03.

EPA, 1992: Dermal Exposure Assessment: Principals and Applications. ORD. EPA/600/8-91/011B.

EPA, 1993: Superfund's Standard Default Exposure Factors for the Central Tendency and Reasonable Maximum Exposure.

EPA, 1995: Assessing Dermal Exposure from Soil. EPA Region III. EPA/903-K-95-003.

EPA, 1997: Exposure Factors Handbook. EPA/600/P-95/002Fa.

EPA, 2001: Risk Assessment Guidance for Superfund. Vol.1: Human Health Evaluation Manual, Part E, Supplemental Guidance for Dermal Risk Assessment. OSWER 9285.7-02EP.

TABLE 4.17

VALUES USED FOR DAILY INTAKE CALCULATIONS

Site 7, NAB Little Creek

Scenario Timeframe: Current/Future
Medium: Sediment
Exposure Medium: Sediment
Exposure Point: Canal on West Side of Site
Receptor Population: Trespasser/Visitor
Receptor Age: Adolescents

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CT Value	CT Rationale/ Reference	Intake Equation/ Model Name
Ingestion	CSed	Chemical Concentration in Sediment	mg/kg	see Table	- -	see Table	- -	Chronic Daily Intake (CDI) (mg/kg-day) =
	IR-Sed	Ingestion Rate of Sediment	mg/day	50	(1)	25	(1)	CSed x IR-Sed x EF x ED x CF3 x 1/BW x 1/AT
	EF	Exposure Frequency	days/year	52	(2)	26	(2)	
	ED	Exposure Duration	years	9	(3)	9	(3)	
	CF3	Conversion Factor 3	kg/mg	0.000001	- -	0.000001	- -	
	BW	Body Weight	kg	51	EPA, 1997	51	EPA, 1997	
	AT-C	Averaging Time (Cancer)	days	25,550	EPA, 1989	25,550	EPA, 1989	
	AT-N	Averaging Time (Non-Cancer)	days	3,285	EPA, 1989	3,285	EPA, 1989	
Dermal Absorption	CSed	Chemical Concentration in Sediment	mg/kg	see Table	- -	see Table	- -	CDI (mg/kg-day) =
	SA	Skin Surface Area Available for Contact	cm^2	4,500	EPA, 1997, (4)	3,600	EPA, 1997, (4)	CSed x SA x SSAF x DABS x CF3 x EF x
	SSAF	Soil to Skin Adherence Factor	mg/cm^2-day	0.2	EPA,1997, (5)	0.19	EPA,1997, (5)	ED x 1/BW x 1/AT
	DABS	Dermal Absorption Factor Solids	--	chem specific	EPA, 2001	chem specific	EPA, 2001	
	CF3	Conversion Factor 3	kg/mg	0.000001	- -	0.000001	- -	
	EF	Exposure Frequency	days/year	52	(2)	26	(2)	
	ED	Exposure Duration	years	9	(3)	9	(3)	
	BW	Body Weight	kg	51	EPA, 1997	51	EPA, 1997	
	AT-C	Averaging Time (Cancer)	days	25,550	EPA, 1989	25,550	EPA, 1989	
	AT-N	Averaging Time (Non-Cancer)	days	3,285	EPA, 1989	3,285	EPA, 1989	

(1) Professional Judgement assuming 1/2 the default value for the residential soil scenario per comment from EPA Region III, June 16, 1998, and 1/2 the RME value for the CT.

(2) Professional Judgment assuming 1 day per week for 52 weeks per year for the RME and 1/2 the RME value for the CT.

(3) Professional Judgment assuming adolescents from 9 to 18 years of age.

(4) Skin surface area in contact with sediment based on contact while wading. Assumes 30 percent of total surface area (hands, forearms, lower legs, and feet) of 12-15 year old male.

(5) RME SSAF is soil adherence to hands for Gardeners No. 1 from EPA, 1997, Table 6-12. CT SSAF is average soil adherence to hands Gardeners No. 1 and No. 2 from EPA, 1997, Table 6-12.

NA - Not available, used RME value.

Sources:

EPA, 1989: Risk Assessment Guidance for Superfund. Vol.1: Human Health Evaluation Manual, Part A. OERR. EPA/540/1-89/002.

EPA, 1991: Risk Assessment Guidance for Superfund. Vol.1: Human Health Evaluation Manual - Supplemental Guidance, Standard Default Exposure Factors. Interim Final. OSWER Directive 9285.6-03.

EPA, 1992: Dermal Exposure Assessment: Principals and Applications. ORD. EPA/600/8-91/011B.

EPA, 1995: Assessing Dermal Exposure from Soil. EPA Region III. EPA/903-K-95-003.

EPA, 1997: Exposure Factors Handbook. EPA/600/P-95/002Fa.

EPA, 2001: Risk Assessment Guidance for Superfund. Vol.1: Human Health Evaluation Manual, Part E, Supplemental Guidance for Dermal Risk Assessment. OSWER 9285.7-02EP.

TABLE 4.18

VALUES USED FOR DAILY INTAKE CALCULATIONS

Site 7, NAB Little Creek

Scenario Timeframe: Current/Future
Medium: Sediment
Exposure Medium: Sediment
Exposure Point: Canal on East Side of Site
Receptor Population: Trespasser/Visitor
Receptor Age: Adult

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CT Value	CT Rationale/ Reference	Intake Equation/ Model Name
Ingestion	CSed	Chemical Concentration in Sediment	mg/kg	see Table ----	- -	see Table ----	- -	Chronic Daily Intake (CDI) (mg/kg-day) =
	IR-Sed	Ingestion Rate of Sediment	mg/day	50	(1)	25	(1)	CSed x IR-Sed x EF x ED x CF3 x 1/BW x 1/AT
	EF	Exposure Frequency	days/year	52	(2)	26	(2)	
	ED	Exposure Duration	years	24	EPA, 1991	9	EPA, 1993	
	CF3	Conversion Factor 3	kg/mg	0.000001	- -	0.000001	- -	
	BW	Body Weight	kg	70	EPA, 1991	70	EPA, 1991	
	AT-C	Averaging Time (Cancer)	days	25,550	EPA, 1989	25,550	EPA, 1989	
	AT-N	Averaging Time (Non-Cancer)	days	8,760	EPA, 1989	3,285	EPA, 1989	
Dermal Absorption	CSed	Chemical Concentration in Sediment	mg/kg	see Table ----	- -	see Table ----	- -	CDI (mg/kg-day) =
	SA	Skin Surface Area Available for Contact	cm^2	5,170	EPA, 1997, (3)	1,960	EPA, 1997, (3)	CSed x SA x SSAF x DABS x CF3 x EF x
	SSAF	Soil to Skin Adherence Factor	mg/cm^2-day	0.2	EPA,1997, (4)	0.19	EPA,1997, (4)	ED x 1/BW x 1/AT
	DABS	Dermal Absorption Factor Solids	--	chem specific	EPA, 2001	chem specific	EPA, 2001	
	CF3	Conversion Factor 3	kg/mg	0.000001	- -	0.000001	- -	
	EF	Exposure Frequency	days/year	52	(2)	26	(2)	
	ED	Exposure Duration	years	24	EPA, 1991	9	EPA, 1993	
	BW	Body Weight	kg	70	EPA, 1991	70	EPA, 1991	
	AT-C	Averaging Time (Cancer)	days	25,550	EPA, 1989	25,550	EPA, 1989	
	AT-N	Averaging Time (Non-Cancer)	days	8,760	EPA, 1989	3,285	EPA, 1989	

(1) Professional Judgement assuming 1/2 the default value for the residential soil scenario, and 1/2 the RME value for the CT.

(2) Professional Judgment assuming 1 day per week for 52 weeks per year for the RME and 1/2 the RME value for the CT.

(3) RME SA is the sum of the mean surface areas (for a male) of the hands, forearms, feet, and lower legs. CT SA is the sum of the mean surface areas (for a male) of the feet and hands.

(4) RME SSAF is soil adherence to hands for Gardeners No. 1 from EPA, 1997, Table 6-12. CT SSAF is average soil adherence to hands Gardeners No. 1 and No. 2 from EPA, 1997, Table 6-12.

NA - Not available, used RME value.

Sources:

EPA, 1989: Risk Assessment Guidance for Superfund. Vol.1: Human Health Evaluation Manual, Part A. OERR. EPA/540/1-89/002.

EPA, 1991: Risk Assessment Guidance for Superfund. Vol.1: Human Health Evaluation Manual - Supplemental Guidance, Standard Default Exposure Factors. Interim Final. OSWER Directive 9285.6-03.

EPA, 1992: Dermal Exposure Assessment: Principals and Applications. ORD. EPA/600/8-91/011B.

EPA, 1993: Superfund's Standard Default Exposure Factors for the Central Tendency and Reasonable Maximum Exposure.

EPA, 1995: Assessing Dermal Exposure from Soil. EPA Region III. EPA/903-K-95-003.

EPA, 1997: Exposure Factors Handbook. EPA/600/P-95/002Fa.

EPA, 2001: Risk Assessment Guidance for Superfund. Vol.1: Human Health Evaluation Manual, Part E, Supplemental Guidance for Dermal Risk Assessment. OSWER 9285.7-02EP.

TABLE 4.19

VALUES USED FOR DAILY INTAKE CALCULATIONS

Site 7, NAB Little Creek

Scenario Timeframe: Current/Future
Medium: Sediment
Exposure Medium: Sediment
Exposure Point: Canal on East Side of Site
Receptor Population: Trespasser/Visitor
Receptor Age: Adolescents

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CT Value	CT Rationale/ Reference	Intake Equation/ Model Name
Ingestion	CSed	Chemical Concentration in Sediment	mg/kg	see Table	- -	see Table	- -	Chronic Daily Intake (CDI) (mg/kg-day) =
	IR-Sed	Ingestion Rate of Sediment	mg/day	50	(1)	25	(1)	CSed x IR-Sed x EF x ED x CF3 x 1/BW x 1/AT
	EF	Exposure Frequency	days/year	52	(2)	26	(2)	
	ED	Exposure Duration	years	9	(3)	9	(3)	
	CF3	Conversion Factor 3	kg/mg	0.000001	- -	0.000001	- -	
	BW	Body Weight	kg	51	EPA, 1997	51	EPA, 1997	
	AT-C	Averaging Time (Cancer)	days	25,550	EPA, 1989	25,550	EPA, 1989	
	AT-N	Averaging Time (Non-Cancer)	days	3,285	EPA, 1989	3,285	EPA, 1989	
Dermal Absorption	CSed	Chemical Concentration in Sediment	mg/kg	see Table	- -	see Table	- -	CDI (mg/kg-day) =
	SA	Skin Surface Area Available for Contact	cm^2	4,500	EPA, 1997, (4)	3,600	EPA, 1997, (4)	CSed x SA x SSAF x DABS x CF3 x EF x
	SSAF	Soil to Skin Adherence Factor	mg/cm^2-day	0.2	EPA,1997, (5)	0.19	EPA,1997, (5)	ED x 1/BW x 1/AT
	DABS	Dermal Absorption Factor Solids	--	chem specific	EPA, 2001	chem specific	EPA, 2001	
	CF3	Conversion Factor 3	kg/mg	0.000001	- -	0.000001	- -	
	EF	Exposure Frequency	days/year	52	(2)	26	(2)	
	ED	Exposure Duration	years	9	(3)	9	(3)	
	BW	Body Weight	kg	51	EPA, 1997	51	EPA, 1997	
	AT-C	Averaging Time (Cancer)	days	25,550	EPA, 1989	25,550	EPA, 1989	
	AT-N	Averaging Time (Non-Cancer)	days	3,285	EPA, 1989	3,285	EPA, 1989	

(1) Professional Judgement assuming 1/2 the default value for the residential soil scenario per comment from EPA Region III, June 16, 1998, and 1/2 the RME value for the CT.

(2) Professional Judgment assuming 1 day per week for 52 weeks per year for the RME and 1/2 the RME value for the CT.

(3) Professional Judgment assuming adolescents from 9 to 18 years of age.

(4) Skin surface area in contact with sediment based on contact while wading. Assumes 30 percent of total surface area (hands, forearms, lower legs, and feet) of 12-15 year old male.

(5) RME SSAF is soil adherence to hands for Gardeners No. 1 from EPA, 1997, Table 6-12. CT SSAF is average soil adherence to hands Gardeners No. 1 and No. 2 from EPA, 1997, Table 6-12.

NA - Not available, used RME value.

Sources:

EPA, 1989: Risk Assessment Guidance for Superfund. Vol.1: Human Health Evaluation Manual, Part A. OERR. EPA/540/1-89/002.

EPA, 1991: Risk Assessment Guidance for Superfund. Vol.1: Human Health Evaluation Manual - Supplemental Guidance, Standard Default Exposure Factors. Interim Final. OSWER Directive 9285.6-03.

EPA, 1992: Dermal Exposure Assessment: Principals and Applications. ORD. EPA/600/8-91/011B.

EPA, 1995: Assessing Dermal Exposure from Soil. EPA Region III. EPA/903-K-95-003.

EPA, 1997: Exposure Factors Handbook. EPA/600/P-95/002Fa.

EPA, 2001: Risk Assessment Guidance for Superfund. Vol.1: Human Health Evaluation Manual, Part E, Supplemental Guidance for Dermal Risk Assessment. OSWER 9285.7-02EP.

TABLE 4.20

VALUES USED FOR DAILY INTAKE CALCULATIONS

Site 7, NAB Little Creek

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater
Exposure Point: Upper Aquifer - Tap Water
Receptor Population: Resident
Receptor Age: Adult

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CT Value	CT Rationale/ Reference	Intake Equation/ Model Name
Ingestion	CW	Chemical Concentration in Water	µg/l	see Table …	see Table …	see Table …	see Table …	Chronic Daily Intake (CDI) (mg/kg-day) =
	IR-W	Ingestion Rate of Water	liters/day	2	EPA, 1997	1.4	EPA, 1993	CW x IR-W x EF x ED x CF1 x 1/BW x 1/AT
	EF	Exposure Frequency	days/year	350	EPA, 1991	234	EPA, 1993	
	ED	Exposure Duration	years	24	EPA, 1991	9	EPA, 1993	
	CF1	Conversion Factor 1	mg/µg	0.001	- -	0.001	- -	
	BW	Body Weight	kg	70	EPA, 1991	70	EPA, 1991	
	AT-C	Averaging Time (Cancer)	days	25,550	EPA, 1989	25,550	EPA, 1989	
	AT-N	Averaging Time (Non-Cancer)	days	8,760	EPA, 1989	3,285	EPA, 1989	
Dermal Absorption	CW	Chemical Concentration in Water	µg/l	see Table …	see Table …	see Table …	see Table …	CDI (mg/kg-day) =
	DAevent	Dermally Absorbed Dose per Event	mg/cm^2-event	calculated	EPA, 1992	calculated	EPA, 1992	DAevent x SA x EF x ED x 1/BW x 1/AT
	CF1	Conversion Factor 1	mg/µg	0.001	- -	0.001	- -	
	PC	Permeability Constant	cm/hr	chem specific	EPA, 1992	chem specific	EPA, 1992	Inorganics: DAevent (mg/cm^2-day) =
	t	Lag Time	hours	chem specific	EPA, 1992	chem specific	EPA, 1992	PC x CW x ET x CF1 x CF2
	t*	Time to Reach Steady-state	hours	chem specific	EPA, 1992	chem specific	EPA, 1992	
	B	Ratio of Permeability of Stratum Corneum to Epidermis	dimensionless	chem specific	EPA, 1992	chem specific	EPA, 1992	Organics :
	ET	Exposure Time	hr/day	0.2	EPA, 1992	0.2	EPA, 1992	ET<t*: DAevent (mg/cm^2-day) =
	CF2	Conversion Factor 2	l/cm^3	0.001	- -	0.001	- -	2 x PC x CW x (sqrt((6 x t x ET)/3.1415))
	SA	Skin Surface Area Available for Contact	cm^2	20,000	EPA, 1997, (1)	18,000	EPA, 1997, (1)	x CF1 x CF2
	EF	Exposure Frequency	days/year	350	EPA, 1991	234	EPA, 1993	
	ED	Exposure Duration	years	24	EPA, 1991	9	EPA, 1993	ET>t*: DAevent (mg/cm^2-day) =
	BW	Body Weight	kg	70	EPA, 1991	70	EPA, 1991	PC x CW x (ET/(1+B) + 2 x t x ((1 + 3xB)/(1+B))
	AT-C	Averaging Time (Cancer)	days	25,550	EPA, 1989	25,550	EPA, 1989	x CF1 x CF2
	AT-N	Averaging Time (Non-Cancer)	days	8,760	EPA, 1989	3,285	EPA, 1989	

(1) Skin surface area in contact with groundwater are based on ranges. For total adult male surface area ranges from 17,000 to 23,000 cm2, with a mean of 20,000 cm^2.

Sources:

EPA, 1989: Risk Assessment Guidance for Superfund. Vol.1: Human Health Evaluation Manual, Part A. OERR. EPA/540/1-89/002.

EPA, 1991: Risk Assessment Guidance for Superfund. Vol.1: Human Health Evaluation Manual - Supplemental Guidance, Standard Default Exposure Factors. Interim Final. OSWER Directive 9285.6-03.

EPA, 1992: Dermal Exposure Assessment: Principals and Applications. ORD. EPA/600/8-91/011B.

EPA, 1993: Superfund's Standard Default Exposure Factors for the Central Tendency and Reasonable Maximum Exposure.

EPA, 1997: Exposure Factors Handbook. EPA/600/P-95/002Fa.

TABLE 4.21

VALUES USED FOR DAILY INTAKE CALCULATIONS

Site 7, NAB Little Creek

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater
Exposure Point: Upper Aquifer - Tap Water
Receptor Population: Resident
Receptor Age: Child

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CT Value	CT Rationale/ Reference	Intake Equation/ Model Name
Ingestion	CW	Chemical Concentration in Water	µg/l	see Table …	see Table …	see Table …	see Table …	Chronic Daily Intake (CDI) (mg/kg-day) =
	IR-W	Ingestion Rate of Water	liters/day	1	EPA, 1997	1	EPA, 1997	CW x IR-W x EF x ED x CF1 x 1/BW x 1/AT
	EF	Exposure Frequency	days/year	350	EPA, 1991	234	EPA, 1993	
	ED	Exposure Duration	years	6	EPA, 1991	6	EPA, 1991	
	CF1	Conversion Factor 1	mg/µg	0.001	- -	0.001	- -	
	BW	Body Weight	kg	15	EPA, 1991	15	EPA, 1991	
	AT-C	Averaging Time (Cancer)	days	25,550	EPA, 1989	25,550	EPA, 1989	
	AT-N	Averaging Time (Non-Cancer)	days	2,190	EPA, 1989	2,190	EPA, 1989	
Dermal Absorption	CW	Chemical Concentration in Water	µg/l	see Table …	see Table …	see Table …	see Table …	CDI (mg/kg-day) =
	DAevent	Dermally Absorbed Dose per Event	mg/cm^2-event	calculated	EPA, 1992	calculated	EPA, 1992	DAevent x SA x EF x ED x 1/BW x 1/AT
	CF1	Conversion Factor 1	mg/µg	0.001	- -	0.001	- -	
	PC	Permeability Constant	cm/hr	chem specific	EPA, 1992	chem specific	EPA, 1992	Inorganics: DAevent (mg/cm^2-day) =
	t	Lag Time	hours	chem specific	EPA, 1992	chem specific	EPA, 1992	PC x CW x ET x CF1 x CF2
	t*	Time to Reach Steady-state	hours	chem specific	EPA, 1992	chem specific	EPA, 1992	
	B	Ratio of Permeability of Stratum Corneum to Epidermis	dimensionless	chem specific	EPA, 1992	chem specific	EPA, 1992	Organics :
	ET	Exposure Time	hr/day	0.33	EPA, 1992	0.33	EPA, 1992	ET<t*: DAevent (mg/cm^2-day) =
	CF2	Conversion Factor 2	l/cm^3	0.001	- -	0.001	- -	2 x PC x CW x (sqrt((6 x t x ET)/3.1415))
	SA	Skin Surface Area Available for Contact	cm^2	7,500	EPA, 1997, (1)	6,500	EPA, 1997, (1)	x CF1 x CF2
	EF	Exposure Frequency	days/year	350	EPA, 1991	234	EPA, 1993	
	ED	Exposure Duration	years	6	EPA, 1991	6	EPA, 1991	ET>t*: DAevent (mg/cm^2-day) =
	BW	Body Weight	kg	15	EPA, 1991	15	EPA, 1991	PC x CW x (ET/(1+B) + 2 x t x ((1 + 3xB)/(1+B))
	AT-C	Averaging Time (Cancer)	days	25,550	EPA, 1989	25,550	EPA, 1989	x CF1 x CF2
	AT-N	Averaging Time (Non-Cancer)	days	2,190	EPA, 1989	2,190	EPA, 1989	

(1) Skin surface area is total surface area of child.

Sources:

EPA, 1989: Risk Assessment Guidance for Superfund. Vol.1: Human Health Evaluation Manual, Part A. OERR. EPA/540/1-89/002.

EPA, 1991: Risk Assessment Guidance for Superfund. Vol.1: Human Health Evaluation Manual - Supplemental Guidance, Standard Default Exposure Factors. Interim Final. OSWER Directive 9285.6-03.

EPA, 1992: Dermal Exposure Assessment: Principals and Applications. ORD. EPA/600/8-91/011B.

EPA, 1993: Superfund's Standard Default Exposure Factors for the Central Tendency and Reasonable Maximum Exposure.

EPA, 1997: Exposure Factors Handbook. EPA/600/P-95/002Fa.

TABLE 4.22

VALUES USED FOR DAILY INTAKE CALCULATIONS

Site 7, NAB Little Creek

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater
Exposure Point: Upper Aquifer - Tap Water
Receptor Population: Resident
Receptor Age: Child/Adult

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CT Value	CT Rationale/ Reference	Intake Equation/ Model Name
Ingestion	CW	Chemical Concentration in Water	µg/l	see Table …	see Table …	see Table …	see Table …	Chronic Daily Intake (CDI) (mg/kg-day) =
	IR-W-A	Ingestion Rate of Water, Adult	liters/day	2	EPA, 1997	1.4	EPA, 1993	CW x IR-W-Adj x EF x CF1 x 1/AT
	IR-W-C	Ingestion Rate of Water, Child	liters/day	1	EPA, 1997	1	EPA, 1997	
	IR-W-Adj	Ingestion Rate of Water, Age-adjusted	liter-year/kg-day	1.09	calculated	0.58	calculated	IR-W-Adj (liter-year/kd-day) =
	EF	Exposure Frequency	days/year	350	EPA, 1991	234	EPA, 1993	(ED-C x IR-W-C / BW-C) + (ED-A x IR-W-A / BW-A)
	ED-A	Exposure Duration, Adult	years	24	EPA, 1991	9	EPA, 1993	
	ED-C	Exposure Duration, Child	years	6	EPA, 1991	6	EPA, 1991	
	CF1	Conversion Factor 1	mg/µg	0.001	- -	0.001	- -	
	BW-A	Body Weight , Adult	kg	70	EPA, 1991	70	EPA, 1991	
	BW-C	Body Weight, Child	kg	15	EPA, 1991	15	EPA, 1991	
	AT-C	Averaging Time (Cancer)	days	25,550	EPA, 1989	25,550	EPA, 1989	
Dermal Absorption	CW	Chemical Concentration in Water	µg/l	see Table …	see Table …	see Table …	see Table …	CDI (mg/kg-day) =
	DAevent-A	Dermally Absorbed Dose per Event, Adult	mg/cm^2-event	calculated	EPA, 1992	calculated	EPA, 1992	DA-Adj x EF x 1/AT
	DAevent-C	Dermally Absorbed Dose per Event, Child	mg/cm^2-event	calculated	EPA, 1992	calculated	EPA, 1992	DA-Adj = (DAevent-A x SA-A x ED-A x 1/BW-A)
	DA-Adj	Dermally Absorbed Dose, Age-adjusted	mg-year/event-kg	calculated		calculated		+ (DAevent-C x SA-C x ED-C x 1/BW-C)
	CF1	Conversion Factor 1	mg/µg	0.001	- -	0.001	- -	Inorganics:
	PC	Permeability Constant	cm/hr	chem specific	EPA, 1992	chem specific	EPA, 1992	DAevent-A (mg/cm^2-event) =
	t	Lag Time	hours	chem specific	EPA, 1992	chem specific	EPA, 1992	PC x CW x ET-A x CF1 x CF2
	t*	Time to Reach Steady-state	hours	chem specific	EPA, 1992	chem specific	EPA, 1992	DAevent-C (mg/cm^2-event) =
	B	Ratio of Permeability of Stratum Corneum to Epidermis	dimensionless	chem specific	EPA, 1992	chem specific	EPA, 1992	PC x CW x ET-C x CF1 x CF2
	ET-A	Exposure Time, Adult	hr/day	0.2	EPA, 1992	0.2	EPA, 1992	Organics:
	ET-C	Exposure Time, Child	hr/day	0.33	EPA, 1992	0.33	EPA, 1992	ET<t*: DAevent (mg/cm^2-day) =
	CF2	Conversion Factor 2	l/cm^3	0.001	- -	0.001	- -	DAevent-A (mg/cm^2-event) =
	SA-A	Skin Surface Area, Adult	cm^2	20,000	EPA, 1997	18,000	EPA, 1997	2 x PC x CW x (sqrt((6 x t x ET-A)/3.1415)) x CF1 x CF2
	SA-C	Skin Surface Area, Child	cm^2	7,500	EPA, 1997	6,500	EPA, 1997	DAevent-C (mg/cm^2-event) =
	EF	Exposure Frequency	days/year	350	EPA, 1991	234	EPA, 1993	2 x PC x CW x (sqrt((6 x t x ET-C)/3.1415)) x CF1 x CF2
	ED-A	Exposure Duration, Adult	years	24	EPA, 1991	9	EPA, 1993	ET>t*: DAevent (mg/cm^2-day) =
	ED-C	Exposure Duration, Child	years	6	EPA, 1991	6	EPA, 1991	DAevent-A (mg/cm^2-event) =
	BW-A	Body Weight , Adult	kg	70	EPA, 1991	70	EPA, 1991	PC x CW x (ET-A/(1+B) + 2 x t x ((1 + 3xB)/(1+B)) x CF1 x CF2
	BW-C	Body Weight, Child	kg	15	EPA, 1991	15	EPA, 1991	DAevent-C (mg/cm^2-event) =
	AT-C	Averaging Time (Cancer)	days	25,550	EPA, 1989	25,550	EPA, 1989	PC x CW x (ET-C/(1+B) + 2 x t x ((1 + 3xB)/(1+B)) x CF1 x CF2

TABLE 4.22

VALUES USED FOR DAILY INTAKE CALCULATIONS

Site 7, NAB Little Creek

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater
Exposure Point: Upper Aquifer - Tap Water
Receptor Population: Resident
Receptor Age: Child/Adult

	AT-N	Averaging Time (Non-Cancer)	days	2,190	EPA, 1989	2,190	EPA, 1989	

Sources:

EPA, 1989: Risk Assessment Guidance for Superfund. Vol.1: Human Health Evaluation Manual, Part A. OERR. EPA/540/1-89/002.

EPA, 1991: Risk Assessment Guidance for Superfund. Vol.1: Human Health Evaluation Manual - Supplemental Guidance, Standard Default Exposure Factors. Interim Final. OSWER Directive 9285.6-03.

EPA, 1992: Dermal Exposure Assessment: Principals and Applications. ORD. EPA/600/8-91/011B.

EPA, 1993: Superfund's Standard Default Exposure Factors for the Central Tendency and Reasonable Maximum Exposure.

EPA, 1997: Exposure Factors Handbook. EPA/600/P-95/002Fa.

TABLE 4.23

VALUES USED FOR DAILY INTAKE CALCULATIONS

Site 7, NAB Little Creek

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater
Exposure Point: Upper Aquifer - Tap Water
Receptor Population: Industrial Worker
Receptor Age: Adult

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CT Value	CT Rationale/ Reference	Intake Equation/ Model Name
Ingestion	CW	Chemical Concentration in Water	µg/l	see Table …	see Table …	see Table …	see Table …	Chronic Daily Intake (CDI) (mg/kg-day) =
	IR-W	Ingestion Rate of Water	liters/day	1	EPA, 1991	1	EPA, 1991	CW x IR-W x EF x ED x CF1 x 1/BW x 1/AT
	EF	Exposure Frequency	days/year	250	EPA, 1991	219	EPA, 1993	
	ED	Exposure Duration	years	25	EPA, 1991	5	EPA, 1993	
	CF1	Conversion Factor 1	mg/µg	0.001	- -	0.001	- -	
	BW	Body Weight	kg	70	EPA, 1991	70	EPA, 1991	
	AT-C	Averaging Time (Cancer)	days	25,550	EPA, 1989	25,550	EPA, 1989	
	AT-N	Averaging Time (Non-Cancer)	days	9,125	EPA, 1989	1,825	EPA, 1989	

Sources:

EPA, 1989: Risk Assessment Guidance for Superfund. Vol.1: Human Health Evaluation Manual, Part A. OERR. EPA/540/1-89/002.

EPA, 1991: Risk Assessment Guidance for Superfund. Vol.1: Human Health Evaluation Manual - Supplemental Guidance, Standard Default Exposure Factors. Interim Final. OSWER Directive 9285.6-03.

EPA, 1993: Superfund's Standard Default Exposure Factors for the Central Tendency and Reasonable Maximum Exposure.

TABLE 4.24

VALUES USED FOR DAILY INTAKE CALCULATIONS

Site 7, NAB Little Creek

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater
Exposure Point: Upper Aquifer - Excavation Pit
Receptor Population: Construction Worker
Receptor Age: Adult

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CT Value	CT Rationale/ Reference	Intake Equation/ Model Name
Dermal Absorption	CW	Chemical Concentration in Water	µg/l	see Table ----		see Table ----	chem specific	CDI (mg/kg-day) =
	DAevent	Dermally Absorbed Dose per Event	mg/cm^2-day	calculated	EPA, 1992	calculated	EPA, 1992	DAevent x SA x EF x ED x 1/BW x 1/AT
	CF1	Conversion Factor 1	mg/µg	0.001	- -	0.001	- -	
	PC	Permeability Constant	cm/hr	chem specific	EPA, 1992	chem specific	EPA, 1992	Inorganics: DAevent (mg/cm^2-day) =
	t	Lag Time	hours	chem specific	EPA, 1992	chem specific	EPA, 1992	PC x CW x ET x CF1 x CF2
	t*	Time to Reach Steady-state	hours	chem specific	EPA, 1992	chem specific	EPA, 1992	
	B	Ratio of Permeability of Stratum Corneum to Epidermis	dimensionless	chem specific	EPA, 1992	chem specific	EPA, 1992	Organics :
	ET	Exposure Time	hr/day	8	(1)	4	(1)	ET<t*: DAevent (mg/cm^2-day) =
	CF2	Conversion Factor 2	l/cm^3	0.001	- -	0.001	- -	2 x PC x CW x (sqrt((6 x t x ET)/3.1415))
	SA	Skin Surface Area Available for Contact	cm^2	5,300	EPA, 1992, (3)	2,000	EPA, 1992, (3)	x CF1 x CF2
	EF	Exposure Frequency	days/year	125	(2)	125	(2)	
	ED	Exposure Duration	years	1	EPA, 1991	1	EPA, 1991	ET>t*: DAevent (mg/cm^2-day) =
	BW	Body Weight	kg	70	EPA, 1991	70	EPA, 1991	PC x CW x (ET/(1+B) + 2 x t x ((1 + 3xB)/(1+B))
	AT-C	Averaging Time (Cancer)	days	25,550	EPA, 1989	25,550	EPA, 1989	x CF1 x CF2
	AT-N	Averaging Time (Non-Cancer)	days	365	EPA, 1989	365	EPA, 1989	

(1) Professional Judgement based on construction activities that would occur 8 hrs per day for the RME and 1/2 of a day for the CT.

(2) Assumed duration of construction project may be 1/2 a year.

(3) RME SA includes head, hands, forearms, and lower legs. CT surface area includes head and hands.

Sources:

EPA, 1989: Risk Assessment Guidance for Superfund. Vol.1: Human Health Evaluation Manual, Part A. OERR. EPA/540/1-89/002.

EPA, 1991: Risk Assessment Guidance for Superfund. Vol.1: Human Health Evaluation Manual - Supplemental Guidance, Standard Default Exposure Factors. Interim Final. OSWER Directive 9285.6-03.

EPA, 1992: Dermal Exposure Assessment: Principals and Applications. ORD. EPA/600/8-91/011B.

EPA, 1993: Superfund's Standard Default Exposure Factors for the Central Tendency and Reasonable Maximum Exposure.

TABLE 4.25

VALUES USED FOR DAILY INTAKE CALCULATIONS

Site 7, NAB Little Creek

Scenario Timeframe: Future
Medium: Soil*
Exposure Medium: Soil
Exposure Point: Weight Station Area
Receptor Population: Construction Worker
Receptor Age: Adult

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CT Value	CT Rationale/ Reference	Intake Equation/ Model Name
Ingestion	CS	Chemical Concentration in Soil	mg/kg	see Table …	see Table …	see Table …	see Table …	Chronic Daily Intake (CDI) (mg/kg-day) =
	IR-S	Ingestion Rate of Soil	mg/day	480	EPA, 1991	200	(4)	CS x IR-S x EF x ED x CF3 x 1/BW x 1/AT
	EF	Exposure Frequency	days/year	125	(1)	125	(1)	
	ED	Exposure Duration	years	1	EPA, 1991	1	EPA, 1991	
	CF3	Conversion Factor 3	kg/mg	0.000001	- -	0.000001	- -	
	BW	Body Weight	kg	70	EPA, 1991	70	EPA, 1991	
	AT-C	Averaging Time (Cancer)	days	25,550	EPA, 1989	25,550	EPA, 1989	
	AT-N	Averaging Time (Non-Cancer)	days	365	EPA, 1989	365	EPA, 1989	
Dermal Absorption	CS	Chemical Concentration in Soil	mg/kg	see Table …	see Table …	see Table …	see Table …	CDI (mg/kg-day) =
	SA	Skin Surface Area Available for Contact	cm^2	5,300	EPA, 1992, (2)	2,000	EPA, 1992, (2)	CS x SA x SSAF x DABS x CF3 x EF x
	SSAF	Soil to Skin Adherence Factor	mg/cm^2-day	0.24	EPA, 1997, (3)	0.24	EPA, 1997, (3)	ED x 1/BW x 1/AT
	DABS	Dermal Absorption Factor Solids	--	chem specific	EPA, 2001	chem specific	EPA, 2001	
	CF3	Conversion Factor 3	kg/mg	0.000001	- -	0.000001	- -	
	EF	Exposure Frequency	days/year	125	(1)	125	(1)	
	ED	Exposure Duration	years	1	EPA, 1991	1	EPA, 1991	
	BW	Body Weight	kg	70	EPA, 1991	70	EPA, 1991	
	AT-C	Averaging Time (Cancer)	days	25,550	EPA, 1989	25,550	EPA, 1989	
	AT-N	Averaging Time (Non-Cancer)	days	365	EPA, 1989	365	EPA, 1989	

* Surface and subsurface soil

(1) Assumed duration of construction project may be 1/2 a year.

(2) RME SA includes head, hands, forearms, and lower legs. CT surface area includes head and hands.

(3) Soil to skin adherence factor is based on maximum adherence factor for construction workers.

(4) Recommendation from EPA Region III Risk Assessor.

Sources:

EPA, 1989: Risk Assessment Guidance for Superfund. Vol.1: Human Health Evaluation Manual, Part A. OERR. EPA/540/1-89/002.

EPA, 1991: Risk Assessment Guidance for Superfund. Vol.1: Human Health Evaluation Manual - Supplemental Guidance, Standard Default Exposure Factors. Interim Final. OSWER Directive 9285.6-03.

EPA, 1992: Dermal Exposure Assessment: Principals and Applications. ORD. EPA/600/8-91/011B.

EPA, 1995: Assessing Dermal Exposure from Soil. EPA Region III. EPA/903-K-95-003.

EPA, 1997: Exposure Factors Handbook. EPA/600/P-95/002Fa.

EPA, 2001: Risk Assessment Guidance for Superfund. Vol.1: Human Health Evaluation Manual, Part E, Supplemental Guidance for Dermal Risk Assessment. OSWER 9285.7-02EP.

TABLE 4.26

VALUES USED FOR DAILY INTAKE CALCULATIONS

Site 7, NAB Little Creek

Scenario Timeframe: Future
Medium: Soil*
Exposure Medium: Soil
Exposure Point: Weigh Station Area
Receptor Population: Industrial Worker
Receptor Age: Adult

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CT Value	CT Rationale/ Reference	Intake Equation/ Model Name
Ingestion	CS	Chemical Concentration in Soil	mg/kg	see Table …	see Table …	see Table …	see Table …	Chronic Daily Intake (CDI) (mg/kg-day) =
	IR-S	Ingestion Rate of Soil	mg/day	100	EPA, 1991	50	EPA, 1993	CS x IR-S x EF x ED x CF3 x 1/BW x 1/AT
	EF	Exposure Frequency	days/year	250	EPA, 1991	219	EPA, 1993	
	ED	Exposure Duration	years	25	EPA, 1991	5	EPA, 1993	
	CF3	Conversion Factor 3	kg/mg	0.000001	- -	0.000001	- -	
	BW	Body Weight	kg	70	EPA, 1991	70	EPA, 1991	
	AT-C	Averaging Time (Cancer)	days	25,550	EPA, 1989	25,550	EPA, 1989	
	AT-N	Averaging Time (Non-Cancer)	days	9,125	EPA, 1989	1,825	- -	
Dermal Absorption	CS	Chemical Concentration in Soil	mg/kg	see Table …	see Table …	see Table …	see Table …	CDI (mg/kg-day) =
	SA	Skin Surface Area Available for Contact	cm^2	5,300	EPA, 1992, (1)	2,000	EPA, 1992, (1)	CS x SA x SSAF x DABS x CF3 x EF x
	SSAF	Soil to Skin Adherence Factor	mg/cm^2-day	0.32	EPA, 1997, (2)	0.32	EPA, 1997, (2)	ED x 1/BW x 1/AT
	DABS	Dermal Absorption Factor Solids	--	chem specific	EPA, 2001	chem specific	EPA, 2001	
	CF3	Conversion Factor 3	kg/mg	0.000001	- -	0.000001	- -	
	EF	Exposure Frequency	days/year	250	EPA, 1991	219	EPA, 1993	
	ED	Exposure Duration	years	25	EPA, 1991	5	EPA, 1993	
	BW	Body Weight	kg	70	EPA, 1991	70	EPA, 1991	
	AT-C	Averaging Time (Cancer)	days	25,550	EPA, 1989	25,550	EPA, 1989	
	AT-N	Averaging Time (Non-Cancer)	days	9,125	EPA, 1989	1,825	- -	

* Surface and subsurface soil

(1) RME SA includes head, hands, forearms, and lower legs. CT surface area includes head and hands.

(2) SSAF based on maximum adherence factor for utility workers.

Sources:

EPA, 1989: Risk Assessment Guidance for Superfund. Vol.1: Human Health Evaluation Manual, Part A. OERR. EPA/540/1-89/002.

EPA, 1991: Risk Assessment Guidance for Superfund. Vol.1: Human Health Evaluation Manual - Supplemental Guidance, Standard Default Exposure Factors. Interim Final. OSWER Directive 9285.6-03.

EPA, 1993: Superfund's Standard Default Exposure Factors for the Central Tendency and Reasonable Maximum Exposure.

EPA, 1995: Assessing Dermal Exposure from Soil. EPA Region III. EPA/903-K-95-003.

EPA, 1997: Exposure Factors Handbook. EPA/600/P-95/002Fa.

EPA, 2001: Risk Assessment Guidance for Superfund. Vol.1: Human Health Evaluation Manual, Part E, Supplemental Guidance for Dermal Risk Assessment. OSWER 9285.7-02EP.

TABLE 4.27

VALUES USED FOR DAILY INTAKE CALCULATIONS

Site 7, NAB Little Creek

Scenario Timeframe: Future
Medium: Soil*
Exposure Medium: Soil
Exposure Point: Weigh Station Area
Receptor Population: Resident
Receptor Age: Adult

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CT Value	CT Rationale/ Reference	Intake Equation/ Model Name
Ingestion	CS	Chemical Concentration in Soil	mg/kg	see Table 3	see Table 3	see Table 3	see Table 3	Chronic Daily Intake (CDI) (mg/kg-day) =
	IR-S	Ingestion Rate of Soil	mg/day	100	EPA, 1991	50	EPA, 1993	CS x IR-S x EF x ED x CF3 x 1/BW x 1/AT
	EF	Exposure Frequency	days/year	350	EPA, 1991	234	EPA, 1993	
	ED	Exposure Duration	years	24	EPA, 1991	9	EPA, 1993	
	CF3	Conversion Factor 3	kg/mg	0.000001	- -	0.000001	- -	
	BW	Body Weight	kg	70	EPA, 1991	70	EPA, 1991	
	AT-C	Averaging Time (Cancer)	days	25,550	EPA, 1989	25,550	EPA, 1989	
	AT-N	Averaging Time (Non-Cancer)	days	8,760	EPA, 1989	3,285	EPA, 1989	
Dermal Absorption	CS	Chemical Concentration in Soil	mg/kg	see Table 3	see Table 3	see Table 3	see Table 3	CDI (mg/kg-day) =
	SA	Skin Surface Area Available for Contact	cm^2	6,600	EPA, 1997, (1)	5,700	EPA, 1997, (1)	CS x SA x SSAF x DABS x CF3 x EF x
	SSAF	Soil to Skin Adherence Factor	mg/cm^2-day	0.2	EPA, 1997, (2)	0.2	EPA, 1997, (2)	ED x 1/BW x 1/AT
	DABS	Dermal Absorption Factor Solids	--	chem specific	EPA, 2001	chem specific	EPA, 2001	
	CF3	Conversion Factor 3	kg/mg	0.000001	- -	0.000001	- -	
	EF	Exposure Frequency	days/year	350	EPA, 1991	234	EPA, 1993	
	ED	Exposure Duration	years	24	EPA, 1991	9	EPA, 1993	
	BW	Body Weight	kg	70	EPA, 1991	70	EPA, 1991	
	AT-C	Averaging Time (Cancer)	days	25,550	EPA, 1989	25,550	EPA, 1989	
	AT-N	Averaging Time (Non-Cancer)	days	8,760	EPA, 1989	3,285	EPA, 1989	

* Surface and subsurface soil

(1) Surface area based on resident wearing shorts, short sleeve shirt, and shoes. RME value is 95th percentile and CT value is 50th percentile.

(2) Soil to skin adherence factor is based on maximum adherence factor for gardeners.

Sources:

EPA, 1989: Risk Assessment Guidance for Superfund. Vol.1: Human Health Evaluation Manual, Part A. OERR. EPA/540/1-89/002.

EPA, 1991: Risk Assessment Guidance for Superfund. Vol.1: Human Health Evaluation Manual - Supplemental Guidance, Standard Default Exposure Factors. Interim Final. OSWER Directive 9285.6-03.

EPA, 1993: Superfund's Standard Default Exposure Factors for the Central Tendency and Reasonable Maximum Exposure.

EPA, 1995: Assessing Dermal Exposure from Soil. EPA Region III. EPA/903-K-95-003.

EPA, 1997: Exposure Factors Handbook. EPA/600/P-95/002Fa.

EPA, 2001: Risk Assessment Guidance for Superfund. Vol.1: Human Health Evaluation Manual, Part E, Supplemental Guidance for Dermal Risk Assessment. OSWER 9285.7-02EP.

TABLE 4.28

VALUES USED FOR DAILY INTAKE CALCULATIONS

Site 7, NAB Little Creek

Scenario Timeframe: Future
Medium: Soil*
Exposure Medium: Soil
Exposure Point: Weigh Station Area
Receptor Population: Resident
Receptor Age: Child

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CT Value	CT Rationale/ Reference	Intake Equation/ Model Name
Ingestion	CS	Chemical Concentration in Soil	mg/kg	see Table 3	see Table 3	see Table 3	see Table 3	Chronic Daily Intake (CDI) (mg/kg-day) =
	IR-S	Ingestion Rate of Soil	mg/day	200	EPA, 1991	100	EPA, 1993	CS x IR-S x EF x ED x CF3 x 1/BW x 1/AT
	EF	Exposure Frequency	days/year	350	EPA, 1991	234	EPA, 1993	
	ED	Exposure Duration	years	6	EPA, 1991	6	EPA, 1991	
	CF3	Conversion Factor 3	kg/mg	0.000001	- -	0.000001	- -	
	BW	Body Weight	kg	15	EPA, 1991	15	EPA, 1991	
	AT-C	Averaging Time (Cancer)	days	25,550	EPA, 1989	25,550	EPA, 1989	
	AT-N	Averaging Time (Non-Cancer)	days	2,190	EPA, 1989	2,190	EPA, 1989	
Dermal Absorption	CS	Chemical Concentration in Soil	mg/kg	see Table 3	see Table 3	see Table 3	see Table 3	CDI (mg/kg-day) =
	SA	Skin Surface Area Available for Contact	cm^2	3,400	EPA, 1997, (1)	2,900	EPA, 1997, (1)	CS x SA x SSAF x DABS x CF3 x EF x
	SSAF	Soil to Skin Adherence Factor	mg/cm^2-day	0.11	EPA, 1997, (2)	0.11	EPA, 1997, (2)	ED x 1/BW x 1/AT
	DABS	Dermal Absorption Factor Solids	--	chem specific	EPA, 2001	chem specific	EPA, 2001	
	CF3	Conversion Factor 3	kg/mg	0.000001	- -	0.000001	- -	
	EF	Exposure Frequency	days/year	350	EPA, 1991	234	EPA, 1993	
	ED	Exposure Duration	years	6	EPA, 1991	6	EPA, 1991	
	BW	Body Weight	kg	15	EPA, 1991	15	EPA, 1991	
	AT-C	Averaging Time (Cancer)	days	25,550	EPA, 1989	25,550	EPA, 1989	
	AT-N	Averaging Time (Non-Cancer)	days	2,190	EPA, 1989	2,190	EPA, 1989	

* Surface and subsurface soil

(1) Surface area based on resident wearing shorts and short sleever shirt. RME value is 95th percentile and CT value is 50th percentile.

(2) Soil to skin adherence factor is based on maximum adherence factor for soccer players.

Sources:

EPA, 1989: Risk Assessment Guidance for Superfund. Vol.1: Human Health Evaluation Manual, Part A. OERR. EPA/540/1-89/002.

EPA, 1991: Risk Assessment Guidance for Superfund. Vol.1: Human Health Evaluation Manual - Supplemental Guidance, Standard Default Exposure Factors. Interim Final. OSWER Directive 9285.6-03.

EPA, 1993: Superfund's Standard Default Exposure Factors for the Central Tendency and Reasonable Maximum Exposure.

EPA, 1995: Assessing Dermal Exposure from Soil. EPA Region III. EPA/903-K-95-003.

EPA, 1997: Exposure Factors Handbook. EPA/600/P-95/002Fa.

EPA, 2001: Risk Assessment Guidance for Superfund. Vol.1: Human Health Evaluation Manual, Part E, Supplemental Guidance for Dermal Risk Assessment. OSWER 9285.7-02EP.

TABLE 4.29

VALUES USED FOR DAILY INTAKE CALCULATIONS

Site 7, NAB Little Creek

Scenario Timeframe: Future
Medium: Soil*
Exposure Medium: Soil
Exposure Point: Weigh Station Area
Receptor Population: Resident
Receptor Age: Child/Adult

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CT Value	CT Rationale/ Reference	Intake Equation/ Model Name
Ingestion	CS	Chemical Concentration in Soil	mg/kg	see Table 3	see Table 3	see Table 3	see Table 3	Chronic Daily Intake (CDI) (mg/kg-day) =
	IR-S-A	Ingestion Rate of Soil, Adult	mg/day	100	EPA, 1991	50	EPA, 1993	CS x IR-S-Adj x EF x CF3 x 1/AT
	IR-S-C	Ingestion Rate of Soil, Child	mg/day	200	EPA, 1991	100	EPA, 1993	
	IR-S-Adj	Ingestion Rate of Soil, Age-adjusted	mg-year/kg-day	114.29	calculated	46.43	calculated	IR-S-Adj (mg-year/kd-day) =
	EF	Exposure Frequency	days/year	350	EPA, 1991	234	EPA, 1993	(ED-C x IR-S-C / BW-C) + (ED-A x IR-S-A / BW-A)
	ED-A	Exposure Duration, Adult	years	24	EPA, 1991	9	EPA, 1993	
	ED-C	Exposure Duration, Child	years	6	EPA, 1991	6	EPA, 1991	
	CF3	Conversion Factor 3	kg/mg	0.000001	- -	0.000001	- -	
	BW-A	Body Weight , Adult	kg	70	EPA, 1991	70	EPA, 1991	
	BW-C	Body Weight, Child	kg	15	EPA, 1991	15	EPA, 1991	
	AT-C	Averaging Time (Cancer)	days	25,550	EPA, 1989	25,550	EPA, 1989	
Dermal Absorption	CS	Chemical Concentration in Soil	mg/kg	see Table 3	see Table 3	see Table 3	see Table 3	CDI (mg/kg-day) =
	SA-A	Skin Surface Area Available for Contact, Adult	cm^2	6,600	EPA, 1997	5,700	EPA, 1997	CS x DA-Adj x DABS x CF3 x EF x 1/AT
	SA-C	Skin Surface Area Available for Contact, Child	cm^2	3,400	EPA, 1997	2,900	EPA, 1997	
	SSAF-A	Soil to Skin Adherence Factor, Adult	mg/cm^2-day	0.2	EPA, 1997	0.2	EPA, 1997	DA-Adj (mg-year/kd-day) =
	SSAF-C	Soil to Skin Adherence Factor, Child	mg/cm^2-day	0.11	EPA, 1997	0.11	EPA, 1997	
	DA-Adj	Dermal Absorption, Age-adjusted	mg-year/kg-day	602	calculated	368.3	calculated	(ED-C x SA-C x SSAF-C / BW-C) + (ED-A x SA-A / BW-A)]
	DABS	Dermal Absorption Factor Solids	--	chem specific	EPA, 2001	chem specific	EPA, 2001	(ED-A x SA-A x SSAF-A / BW-A)
	CF3	Conversion Factor 3	kg/mg	0.000001	- -	0.000001	- -	
	EF	Exposure Frequency	days/year	350	EPA, 1991	234	EPA, 1993	
	ED-A	Exposure Duration, Adult	years	24	EPA, 1991	9	EPA, 1993	
	ED-C	Exposure Duration, Child	years	6	EPA, 1991	6	EPA, 1991	
	BW-A	Body Weight , Adult	kg	70	EPA, 1991	70	EPA, 1991	
	BW-C	Body Weight, Child	kg	15	EPA, 1991	15	EPA, 1991	
	AT-C	Averaging Time (Cancer)	days	25,550	EPA, 1989	25,550	EPA, 1989	

* Surface and subsurface soil

Sources:

EPA, 1989: Risk Assessment Guidance for Superfund. Vol.1: Human Health Evaluation Manual, Part A. OERR. EPA/540/1-89/002.

EPA, 1991: Risk Assessment Guidance for Superfund. Vol.1: Human Health Evaluation Manual - Supplemental Guidance, Standard Default Exposure Factors. Interim Final. OSWER Directive 9285.6-03.

TABLE 4.29

VALUES USED FOR DAILY INTAKE CALCULATIONS

Site 7, NAB Little Creek

Scenario Timeframe: Future
Medium: Soil*
Exposure Medium: Soil
Exposure Point: Weigh Station Area
Receptor Population: Resident
Receptor Age: Child/Adult

EPA, 1993: Superfund's Standard Default Exposure Factors for the Central Tendency and Reasonable Maximum Exposure.

EPA, 1995: Assessing Dermal Exposure from Soil. EPA Region III. EPA/903-K-95-003.

EPA, 1997: Exposure Factors Handbook. EPA/600/P-95/002Fa.

EPA, 2001: Risk Assessment Guidance for Superfund. Vol.1: Human Health Evaluation Manual, Part E, Supplemental Guidance for Dermal Risk Assessment. OSWER 9285.7-02EP.

TABLE 4.30

VALUES USED FOR DAILY INTAKE CALCULATIONS

Site 7, NAB Little Creek

Scenario Timeframe: Future
Medium: Soil*
Exposure Medium: Soil
Exposure Point: Area to West of Landfill, the "Ear"
Receptor Population: Construction Worker
Receptor Age: Adult

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CT Value	CT Rationale/ Reference	Intake Equation/ Model Name
Ingestion	CS	Chemical Concentration in Soil	mg/kg	see Table 3	see Table 3	see Table 3	see Table 3	Chronic Daily Intake (CDI) (mg/kg-day) =
	IR-S	Ingestion Rate of Soil	mg/day	480	EPA, 1991	200	(4)	CS x IR-S x EF x ED x CF3 x 1/BW x 1/AT
	EF	Exposure Frequency	days/year	125	(1)	125	(1)	
	ED	Exposure Duration	years	1	EPA, 1991	1	EPA, 1991	
	CF3	Conversion Factor 3	kg/mg	0.000001	- -	0.000001	- -	
	BW	Body Weight	kg	70	EPA, 1991	70	EPA, 1991	
	AT-C	Averaging Time (Cancer)	days	25,550	EPA, 1989	25,550	EPA, 1989	
	AT-N	Averaging Time (Non-Cancer)	days	365	EPA, 1989	365	EPA, 1989	
Dermal Absorption	CS	Chemical Concentration in Soil	mg/kg	see Table 3	see Table 3	see Table 3	see Table 3	CDI (mg/kg-day) =
	SA	Skin Surface Area Available for Contact	cm^2	5,300	EPA, 1992, (2)	2,000	EPA, 1992, (2)	CS x SA x SSAF x DABS x CF3 x EF x
	SSAF	Soil to Skin Adherence Factor	mg/cm^2-day	0.24	EPA, 1997, (3)	0.24	EPA, 1997, (3)	ED x 1/BW x 1/AT
	DABS	Dermal Absorption Factor Solids	--	chem specific	EPA, 2001	chem specific	EPA, 2001	
	CF3	Conversion Factor 3	kg/mg	0.000001	- -	0.000001	- -	
	EF	Exposure Frequency	days/year	125	(1)	125	(1)	
	ED	Exposure Duration	years	1	EPA, 1991	1	EPA, 1991	
	BW	Body Weight	kg	70	EPA, 1991	70	EPA, 1991	
	AT-C	Averaging Time (Cancer)	days	25,550	EPA, 1989	25,550	EPA, 1989	
	AT-N	Averaging Time (Non-Cancer)	days	365	EPA, 1989	365	EPA, 1989	

* Surface and subsurface soil

(1) Assumed duration of construction project may be 1/2 a year.

(2) RME SA includes head, hands, forearms, and lower legs. CT surface area includes head and hands.

(3) Soil to skin adherence factor is based on maximum adherence factor for construction workers.

(4) Recommendation from EPA Region III Risk Assessor.

Sources:

EPA, 1989: Risk Assessment Guidance for Superfund. Vol.1: Human Health Evaluation Manual, Part A. OERR. EPA/540/1-89/002.

EPA, 1991: Risk Assessment Guidance for Superfund. Vol.1: Human Health Evaluation Manual - Supplemental Guidance, Standard Default Exposure Factors. Interim Final. OSWER Directive 9285.6-03.

EPA, 1992: Dermal Exposure Assessment: Principals and Applications. ORD. EPA/600/8-91/011B.

EPA, 1993: Superfund's Standard Default Exposure Factors for the Central Tendency and Reasonable Maximum Exposure.

EPA, 1995: Assessing Dermal Exposure from Soil. EPA Region III. EPA/903-K-95-003.

EPA, 1997: Exposure Factors Handbook. EPA/600/P-95/002Fa.

EPA, 2001: Risk Assessment Guidance for Superfund. Vol.1: Human Health Evaluation Manual, Part E, Supplemental Guidance for Dermal Risk Assessment. OSWER 9285.7-02EP.

TABLE 4.31

VALUES USED FOR DAILY INTAKE CALCULATIONS

Site 7, NAB Little Creek

Scenario Timeframe: Future
Medium: Soil*
Exposure Medium: Soil
Exposure Point: Area to West of Landfill, the "Ear"
Receptor Population: Industrial Worker
Receptor Age: Adult

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CT Value	CT Rationale/ Reference	Intake Equation/ Model Name
Ingestion	CS	Chemical Concentration in Soil	mg/kg	see Table …	see Table …	see Table …	see Table …	Chronic Daily Intake (CDI) (mg/kg-day) =
	IR-S	Ingestion Rate of Soil	mg/day	100	EPA, 1991	50	EPA, 1993	CS x IR-S x EF x ED x CF3 x 1/BW x 1/AT
	EF	Exposure Frequency	days/year	250	EPA, 1991	219	EPA, 1993	
	ED	Exposure Duration	years	25	EPA, 1991	5	EPA, 1993	
	CF3	Conversion Factor 3	kg/mg	0.000001	- -	0.000001	- -	
	BW	Body Weight	kg	70	EPA, 1991	70	EPA, 1991	
	AT-C	Averaging Time (Cancer)	days	25,550	EPA, 1989	25,550	EPA, 1989	
	AT-N	Averaging Time (Non-Cancer)	days	9,125	EPA, 1989	1,825	- -	
Dermal Absorption	CS	Chemical Concentration in Soil	mg/kg	see Table …	see Table …	see Table …	see Table …	CDI (mg/kg-day) =
	SA	Skin Surface Area Available for Contact	cm^2	5,300	EPA, 1992, (1)	2,000	EPA, 1992, (1)	CS x SA x SSAF x DABS x CF3 x EF x
	SSAF	Soil to Skin Adherence Factor	mg/cm^2-day	0.32	EPA, 1997, (2)	0.32	EPA, 1997, (2)	ED x 1/BW x 1/AT
	DABS	Dermal Absorption Factor Solids	--	chem specific	EPA, 2001	chem specific	EPA, 2001	
	CF3	Conversion Factor 3	kg/mg	0.000001	- -	0.000001	- -	
	EF	Exposure Frequency	days/year	250	EPA, 1991	219	EPA, 1993	
	ED	Exposure Duration	years	25	EPA, 1991	5	EPA, 1993	
	BW	Body Weight	kg	70	EPA, 1991	70	EPA, 1991	
	AT-C	Averaging Time (Cancer)	days	25,550	EPA, 1989	25,550	EPA, 1989	
	AT-N	Averaging Time (Non-Cancer)	days	9,125	EPA, 1989	1,825	- -	

* Surface and subsurface soil

(1) RME SA includes head, hands, forearms, and lower legs. CT surface area includes head and hands.

(2) SSAF based on maximum adherence factor for utility workers.

Sources:

EPA, 1989: Risk Assessment Guidance for Superfund. Vol.1: Human Health Evaluation Manual, Part A. OERR. EPA/540/1-89/002.

EPA, 1991: Risk Assessment Guidance for Superfund. Vol.1: Human Health Evaluation Manual - Supplemental Guidance, Standard Default Exposure Factors. Interim Final. OSWER Directive 9285.6-03.

EPA, 1993: Superfund's Standard Default Exposure Factors for the Central Tendency and Reasonable Maximum Exposure.

EPA, 1995: Assessing Dermal Exposure from Soil. EPA Region III. EPA/903-K-95-003.

EPA, 1997: Exposure Factors Handbook. EPA/600/P-95/002Fa.

EPA, 2001: Risk Assessment Guidance for Superfund. Vol.1: Human Health Evaluation Manual, Part E, Supplemental Guidance for Dermal Risk Assessment. OSWER 9285.7-02EP.

TABLE 4.32

VALUES USED FOR DAILY INTAKE CALCULATIONS

Site 7, NAB Little Creek

Scenario Timeframe: Future
Medium: Soil*
Exposure Medium: Soil
Exposure Point: Area to West of Landfill, the "Ear"
Receptor Population: Resident
Receptor Age: Adult

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CT Value	CT Rationale/ Reference	Intake Equation/ Model Name
Ingestion	CS	Chemical Concentration in Soil	mg/kg	see Table 3	see Table 3	see Table 3	see Table 3	Chronic Daily Intake (CDI) (mg/kg-day) =
	IR-S	Ingestion Rate of Soil	mg/day	100	EPA, 1991	50	EPA, 1993	CS x IR-S x EF x ED x CF3 x 1/BW x 1/AT
	EF	Exposure Frequency	days/year	350	EPA, 1991	234	EPA, 1993	
	ED	Exposure Duration	years	24	EPA, 1991	9	EPA, 1993	
	CF3	Conversion Factor 3	kg/mg	0.000001	- -	0.000001	- -	
	BW	Body Weight	kg	70	EPA, 1991	70	EPA, 1991	
	AT-C	Averaging Time (Cancer)	days	25,550	EPA, 1989	25,550	EPA, 1989	
	AT-N	Averaging Time (Non-Cancer)	days	8,760	EPA, 1989	3,285	EPA, 1989	
Dermal Absorption	CS	Chemical Concentration in Soil	mg/kg	see Table 3	see Table 3	see Table 3	see Table 3	CDI (mg/kg-day) =
	SA	Skin Surface Area Available for Contact	cm^2	6,600	EPA, 1997, (1)	5,700	EPA, 1997, (1)	CS x SA x SSAF x DABS x CF3 x EF x
	SSAF	Soil to Skin Adherence Factor	mg/cm^2-day	0.2	EPA, 1997, (2)	0.2	EPA, 1997, (2)	ED x 1/BW x 1/AT
	DABS	Dermal Absorption Factor Solids	--	chem specific	EPA, 2001	chem specific	EPA, 2001	
	CF3	Conversion Factor 3	kg/mg	0.000001	- -	0.000001	- -	
	EF	Exposure Frequency	days/year	350	EPA, 1991	234	EPA, 1993	
	ED	Exposure Duration	years	24	EPA, 1991	9	EPA, 1993	
	BW	Body Weight	kg	70	EPA, 1991	70	EPA, 1991	
	AT-C	Averaging Time (Cancer)	days	25,550	EPA, 1989	25,550	EPA, 1989	
	AT-N	Averaging Time (Non-Cancer)	days	8,760	EPA, 1989	3,285	EPA, 1989	

* Surface and subsurface soil
(1) Surface area based on resident wearing shorts, short sleeve shirt, and shoes. RME value is 95th percentile and CT value is 50th percentile.
(2) Soil to skin adherence factor is based on maximum adherence factor for gardeners.

Sources:

EPA, 1989: Risk Assessment Guidance for Superfund. Vol.1: Human Health Evaluation Manual, Part A. OERR. EPA/540/1-89/002.

EPA, 1991: Risk Assessment Guidance for Superfund. Vol.1: Human Health Evaluation Manual - Supplemental Guidance, Standard Default Exposure Factors. Interim Final. OSWER Directive 9285.6-03.

EPA, 1993: Superfund's Standard Default Exposure Factors for the Central Tendency and Reasonable Maximum Exposure.

EPA, 1995: Assessing Dermal Exposure from Soil. EPA Region III. EPA/903-K-95-003.

EPA, 1997: Exposure Factors Handbook. EPA/600/P-95/002Fa.

EPA, 2001: Risk Assessment Guidance for Superfund. Vol.1: Human Health Evaluation Manual, Part E, Supplemental Guidance for Dermal Risk Assessment. OSWER 9285.7-02EP.

TABLE 4.33

VALUES USED FOR DAILY INTAKE CALCULATIONS

Site 7, NAB Little Creek

Scenario Timeframe: Future
Medium: Soil*
Exposure Medium: Soil
Exposure Point: Area to West of Landfill, the "Ear"
Receptor Population: Resident
Receptor Age: Child

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CT Value	CT Rationale/ Reference	Intake Equation/ Model Name
Ingestion	CS	Chemical Concentration in Soil	mg/kg	see Table 3	see Table 3	see Table 3	see Table 3	Chronic Daily Intake (CDI) (mg/kg-day) =
	IR-S	Ingestion Rate of Soil	mg/day	200	EPA, 1991	100	EPA, 1993	CS x IR-S x EF x ED x CF3 x 1/BW x 1/AT
	EF	Exposure Frequency	days/year	350	EPA, 1991	234	EPA, 1993	
	ED	Exposure Duration	years	6	EPA, 1991	6	EPA, 1991	
	CF3	Conversion Factor 3	kg/mg	0.000001	- -	0.000001	- -	
	BW	Body Weight	kg	15	EPA, 1991	15	EPA, 1991	
	AT-C	Averaging Time (Cancer)	days	25,550	EPA, 1989	25,550	EPA, 1989	
	AT-N	Averaging Time (Non-Cancer)	days	2,190	EPA, 1989	2,190	EPA, 1989	
Dermal Absorption	CS	Chemical Concentration in Soil	mg/kg	see Table 3	see Table 3	see Table 3	see Table 3	CDI (mg/kg-day) =
	SA	Skin Surface Area Available for Contact	cm^2	3,400	EPA, 1997, (1)	2,900	EPA, 1997, (1)	CS x SA x SSAF x DABS x CF3 x EF x
	SSAF	Soil to Skin Adherence Factor	mg/cm^2-day	0.11	EPA, 1997, (2)	0.11	EPA, 1997, (2)	ED x 1/BW x 1/AT
	DABS	Dermal Absorption Factor Solids	--	chem specific	EPA, 2001	chem specific	EPA, 2001	
	CF3	Conversion Factor 3	kg/mg	0.000001	- -	0.000001	- -	
	EF	Exposure Frequency	days/year	350	EPA, 1991	234	EPA, 1993	
	ED	Exposure Duration	years	6	EPA, 1991	6	EPA, 1991	
	BW	Body Weight	kg	15	EPA, 1991	15	EPA, 1991	
	AT-C	Averaging Time (Cancer)	days	25,550	EPA, 1989	25,550	EPA, 1989	
	AT-N	Averaging Time (Non-Cancer)	days	2,190	EPA, 1989	2,190	EPA, 1989	

* Surface and subsurface soil
(1) Surface area based on resident wearing shorts and short sleever shirt. RME value is 95th percentile and CT value is 50th percentile.
(2) Soil to skin adherence factor is based on maximum adherence factor for soccer players.

Sources:

EPA, 1989: Risk Assessment Guidance for Superfund. Vol.1: Human Health Evaluation Manual, Part A. OERR. EPA/540/1-89/002.

EPA, 1991: Risk Assessment Guidance for Superfund. Vol.1: Human Health Evaluation Manual - Supplemental Guidance, Standard Default Exposure Factors. Interim Final. OSWER Directive 9285.6-03.

EPA, 1993: Superfund's Standard Default Exposure Factors for the Central Tendency and Reasonable Maximum Exposure.

EPA, 1995: Assessing Dermal Exposure from Soil. EPA Region III. EPA/903-K-95-003.

EPA, 1997: Exposure Factors Handbook. EPA/600/P-95/002Fa.

EPA, 2001: Risk Assessment Guidance for Superfund. Vol.1: Human Health Evaluation Manual, Part E, Supplemental Guidance for Dermal Risk Assessment. OSWER 9285.7-02EP.

TABLE 4.34

VALUES USED FOR DAILY INTAKE CALCULATIONS

Site 7, NAB Little Creek

Scenario Timeframe: Future
Medium: Soil*
Exposure Medium: Soil
Exposure Point: Area to West of Landfill, the "Ear"
Receptor Population: Resident
Receptor Age: Child/Adult

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CT Value	CT Rationale/ Reference	Intake Equation/ Model Name
Ingestion	CS	Chemical Concentration in Soil	mg/kg	see Table 3	see Table 3	see Table 3	see Table 3	Chronic Daily Intake (CDI) (mg/kg-day) =
	IR-S-A	Ingestion Rate of Soil, Adult	mg/day	100	EPA, 1991	50	EPA, 1993	CS x IR-S-Adj x EF x CF3 x 1/AT
	IR-S-C	Ingestion Rate of Soil, Child	mg/day	200	EPA, 1991	100	EPA, 1993	
	IR-S-Adj	Ingestion Rate of Soil, Age-adjusted	mg-year/kg-day	114.29	calculated	46.43	calculated	IR-S-Adj (mg-year/kd-day) =
	EF	Exposure Frequency	days/year	350	EPA, 1991	234	EPA, 1993	(ED-C x IR-S-C / BW-C) + (ED-A x IR-S-A / BW-A)
	ED-A	Exposure Duration, Adult	years	24	EPA, 1991	9	EPA, 1993	
	ED-C	Exposure Duration, Child	years	6	EPA, 1991	6	EPA, 1991	
	CF3	Conversion Factor 3	kg/mg	0.000001	- -	0.000001	- -	
	BW-A	Body Weight , Adult	kg	70	EPA, 1991	70	EPA, 1991	
	BW-C	Body Weight, Child	kg	15	EPA, 1991	15	EPA, 1991	
	AT-C	Averaging Time (Cancer)	days	25,550	EPA, 1989	25,550	EPA, 1989	
Dermal Absorption	CS	Chemical Concentration in Soil	mg/kg	see Table 3	see Table 3	see Table 3	see Table 3	CDI (mg/kg-day) =
	SA-A	Skin Surface Area Available for Contact, Adult	cm^2	6,600	EPA, 1997	5,700	EPA, 1997	CS x DA-Adj x DABS x CF3 x EF x 1/AT
	SA-C	Skin Surface Area Available for Contact, Child	cm^2	3,400	EPA, 1997	2,900	EPA, 1997	
	SSAF-A	Soil to Skin Adherence Factor, Adult	mg/cm^2-day	0.2	EPA, 1997	0.2	EPA, 1997	DA-Adj (mg-year/kd-day) =
	SSAF-C	Soil to Skin Adherence Factor, Child	mg/cm^2-day	0.11	EPA, 1997	0.11	EPA, 1997	
	DA-Adj	Dermal Absorption, Age-adjusted	mg-year/kg-day	602	calculated	368.3	calculated	(ED-C x SA-C x SSAF-C / BW-C) + (ED-A x SA-A / BW-A)]
	DABS	Dermal Absorption Factor Solids	--	chem specific	EPA, 2001	chem specific	EPA, 2001	(ED-A x SA-A x SSAF-A / BW-A)
	CF3	Conversion Factor 3	kg/mg	0.000001	- -	0.000001	- -	
	EF	Exposure Frequency	days/year	350	EPA, 1991	234	EPA, 1993	
	ED-A	Exposure Duration, Adult	years	24	EPA, 1991	9	EPA, 1993	
	ED-C	Exposure Duration, Child	years	6	EPA, 1991	6	EPA, 1991	
	BW-A	Body Weight , Adult	kg	70	EPA, 1991	70	EPA, 1991	
	BW-C	Body Weight, Child	kg	15	EPA, 1991	15	EPA, 1991	
	AT-C	Averaging Time (Cancer)	days	25,550	EPA, 1989	25,550	EPA, 1989	

* Surface and subsurface soil

Sources:

EPA, 1989: Risk Assessment Guidance for Superfund. Vol.1: Human Health Evaluation Manual, Part A. OERR. EPA/540/1-89/002.

EPA, 1991: Risk Assessment Guidance for Superfund. Vol.1: Human Health Evaluation Manual - Supplemental Guidance, Standard Default Exposure Factors. Interim Final. OSWER Directive 9285.6-03.

TABLE 4.34

VALUES USED FOR DAILY INTAKE CALCULATIONS

Site 7, NAB Little Creek

Scenario Timeframe: Future
Medium: Soil*
Exposure Medium: Soil
Exposure Point: Area to West of Landfill, the "Ear"
Receptor Population: Resident
Receptor Age: Child/Adult

EPA, 1993: Superfund's Standard Default Exposure Factors for the Central Tendency and Reasonable Maximum Exposure.

EPA, 1995: Assessing Dermal Exposure from Soil. EPA Region III. EPA/903-K-95-003.

EPA, 1997: Exposure Factors Handbook. EPA/600/P-95/002Fa.

EPA, 2001: Risk Assessment Guidance for Superfund. Vol.1: Human Health Evaluation Manual, Part E, Supplemental Guidance for Dermal Risk Assessment. OSWER 9285.7-02EP.

TABLE 4.35

VALUES USED FOR DAILY INTAKE CALCULATIONS

Site 7, NAB Little Creek

Scenario Timeframe: Future
Medium: Soil*
Exposure Medium: Soil
Exposure Point: Site Perimeter
Receptor Population: Construction Worker
Receptor Age: Adult

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CT Value	CT Rationale/ Reference	Intake Equation/ Model Name
Ingestion	CS	Chemical Concentration in Soil	mg/kg	see Table 3	see Table 3	see Table 3	see Table 3	Chronic Daily Intake (CDI) (mg/kg-day) =
	IR-S	Ingestion Rate of Soil	mg/day	480	EPA, 1991	200	(4)	CS x IR-S x EF x ED x CF3 x 1/BW x 1/AT
	EF	Exposure Frequency	days/year	125	(1)	125	(1)	
	ED	Exposure Duration	years	1	EPA, 1991	1	EPA, 1991	
	CF3	Conversion Factor 3	kg/mg	0.000001	- -	0.000001	- -	
	BW	Body Weight	kg	70	EPA, 1991	70	EPA, 1991	
	AT-C	Averaging Time (Cancer)	days	25,550	EPA, 1989	25,550	EPA, 1989	
	AT-N	Averaging Time (Non-Cancer)	days	365	EPA, 1989	365	EPA, 1989	
Dermal Absorption	CS	Chemical Concentration in Soil	mg/kg	see Table 3	see Table 3	see Table 3	see Table 3	CDI (mg/kg-day) =
	SA	Skin Surface Area Available for Contact	cm^2	5,300	EPA, 1992, (2)	2,000	EPA, 1992, (2)	CS x SA x SSAF x DABS x CF3 x EF x
	SSAF	Soil to Skin Adherence Factor	mg/cm^2-day	0.24	EPA, 1997, (3)	0.24	EPA, 1997, (3)	ED x 1/BW x 1/AT
	DABS	Dermal Absorption Factor Solids	--	chem specific	EPA, 2001	chem specific	EPA, 2001	
	CF3	Conversion Factor 3	kg/mg	0.000001	- -	0.000001	- -	
	EF	Exposure Frequency	days/year	125	(1)	125	(1)	
	ED	Exposure Duration	years	1	EPA, 1991	1	EPA, 1991	
	BW	Body Weight	kg	70	EPA, 1991	70	EPA, 1991	
	AT-C	Averaging Time (Cancer)	days	25,550	EPA, 1989	25,550	EPA, 1989	
	AT-N	Averaging Time (Non-Cancer)	days	365	EPA, 1989	365	EPA, 1989	

* Surface and subsurface soil

(1) Assumed duration of construction project may be 1/2 a year.

(2) RME SA includes head, hands, forearms, and lower legs. CT surface area includes head and hands.

(3) Soil to skin adherence factor is based on maximum adherence factor for construction workers.

(4) Recommendation from EPA Region III Risk Assessor.

Sources:

EPA, 1989: Risk Assessment Guidance for Superfund. Vol.1: Human Health Evaluation Manual, Part A. OERR. EPA/540/1-89/002.

EPA, 1991: Risk Assessment Guidance for Superfund. Vol.1: Human Health Evaluation Manual - Supplemental Guidance, Standard Default Exposure Factors. Interim Final. OSWER Directive 9285.6-03.

EPA, 1992: Dermal Exposure Assessment: Principals and Applications. ORD. EPA/600/8-91/011B.

EPA, 1993: Superfund's Standard Default Exposure Factors for the Central Tendency and Reasonable Maximum Exposure.

EPA, 1995: Assessing Dermal Exposure from Soil. EPA Region III. EPA/903-K-95-003.

EPA, 1997: Exposure Factors Handbook. EPA/600/P-95/002Fa.

EPA, 2001: Risk Assessment Guidance for Superfund. Vol.1: Human Health Evaluation Manual, Part E, Supplemental Guidance for Dermal Risk Assessment. OSWER 9285.7-02EP.

TABLE 4.36

VALUES USED FOR DAILY INTAKE CALCULATIONS

Site 7, NAB Little Creek

Scenario Timeframe: Future
Medium: Soil*
Exposure Medium: Soil
Exposure Point: Site Perimeter
Receptor Population: Industrial Worker
Receptor Age: Adult

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CT Value	CT Rationale/ Reference	Intake Equation/ Model Name
Ingestion	CS	Chemical Concentration in Soil	mg/kg	see Table …	see Table …	see Table …	see Table …	Chronic Daily Intake (CDI) (mg/kg-day) =
	IR-S	Ingestion Rate of Soil	mg/day	100	EPA, 1991	50	EPA, 1993	CS x IR-S x EF x ED x CF3 x 1/BW x 1/AT
	EF	Exposure Frequency	days/year	250	EPA, 1991	219	EPA, 1993	
	ED	Exposure Duration	years	25	EPA, 1991	5	EPA, 1993	
	CF3	Conversion Factor 3	kg/mg	0.000001	- -	0.000001	- -	
	BW	Body Weight	kg	70	EPA, 1991	70	EPA, 1991	
	AT-C	Averaging Time (Cancer)	days	25,550	EPA, 1989	25,550	EPA, 1989	
	AT-N	Averaging Time (Non-Cancer)	days	9,125	EPA, 1989	1,825	- -	
Dermal Absorption	CS	Chemical Concentration in Soil	mg/kg	see Table …	see Table …	see Table …	see Table …	CDI (mg/kg-day) =
	SA	Skin Surface Area Available for Contact	cm^2	5,300	EPA, 1992, (1)	2,000	EPA, 1992, (1)	CS x SA x SSAF x DABS x CF3 x EF x
	SSAF	Soil to Skin Adherence Factor	mg/cm^2-day	0.32	EPA, 1997, (2)	0.32	EPA, 1997, (2)	ED x 1/BW x 1/AT
	DABS	Dermal Absorption Factor Solids	--	chem specific	EPA, 2001	chem specific	EPA, 2001	
	CF3	Conversion Factor 3	kg/mg	0.000001	- -	0.000001	- -	
	EF	Exposure Frequency	days/year	250	EPA, 1991	219	EPA, 1993	
	ED	Exposure Duration	years	25	EPA, 1991	5	EPA, 1993	
	BW	Body Weight	kg	70	EPA, 1991	70	EPA, 1991	
	AT-C	Averaging Time (Cancer)	days	25,550	EPA, 1989	25,550	EPA, 1989	
	AT-N	Averaging Time (Non-Cancer)	days	9,125	EPA, 1989	1,825	- -	

* Surface and subsurface soil

(1) RME SA includes head, hands, forearms, and lower legs. CT surface area includes head and hands.

(2) SSAF based on maximum adherence factor for utility workers.

Sources:

EPA, 1989: Risk Assessment Guidance for Superfund. Vol.1: Human Health Evaluation Manual, Part A. OERR. EPA/540/1-89/002.

EPA, 1991: Risk Assessment Guidance for Superfund. Vol.1: Human Health Evaluation Manual - Supplemental Guidance, Standard Default Exposure Factors. Interim Final. OSWER Directive 9285.6-03.

EPA, 1993: Superfund's Standard Default Exposure Factors for the Central Tendency and Reasonable Maximum Exposure.

EPA, 1995: Assessing Dermal Exposure from Soil. EPA Region III. EPA/903-K-95-003.

EPA, 1997: Exposure Factors Handbook. EPA/600/P-95/002Fa.

EPA, 2001: Risk Assessment Guidance for Superfund. Vol.1: Human Health Evaluation Manual, Part E, Supplemental Guidance for Dermal Risk Assessment. OSWER 9285.7-02EP.

TABLE 4.37

VALUES USED FOR DAILY INTAKE CALCULATIONS

Site 7, NAB Little Creek

Scenario Timeframe: Future
Medium: Soil*
Exposure Medium: Soil
Exposure Point: Site Perimeter
Receptor Population: Resident
Receptor Age: Adult

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CT Value	CT Rationale/ Reference	Intake Equation/ Model Name
Ingestion	CS	Chemical Concentration in Soil	mg/kg	see Table 3	see Table 3	see Table 3	see Table 3	Chronic Daily Intake (CDI) (mg/kg-day) =
	IR-S	Ingestion Rate of Soil	mg/day	100	EPA, 1991	50	EPA, 1993	CS x IR-S x EF x ED x CF3 x 1/BW x 1/AT
	EF	Exposure Frequency	days/year	350	EPA, 1991	234	EPA, 1993	
	ED	Exposure Duration	years	24	EPA, 1991	9	EPA, 1993	
	CF3	Conversion Factor 3	kg/mg	0.000001	- -	0.000001	- -	
	BW	Body Weight	kg	70	EPA, 1991	70	EPA, 1991	
	AT-C	Averaging Time (Cancer)	days	25,550	EPA, 1989	25,550	EPA, 1989	
	AT-N	Averaging Time (Non-Cancer)	days	8,760	EPA, 1989	3,285	EPA, 1989	
Dermal Absorption	CS	Chemical Concentration in Soil	mg/kg	see Table 3	see Table 3	see Table 3	see Table 3	CDI (mg/kg-day) =
	SA	Skin Surface Area Available for Contact	cm^2	6,600	EPA, 1997, (1)	5,700	EPA, 1997, (1)	CS x SA x SSAF x DABS x CF3 x EF x
	SSAF	Soil to Skin Adherence Factor	mg/cm^2-day	0.2	EPA, 1997, (2)	0.2	EPA, 1997, (2)	ED x 1/BW x 1/AT
	DABS	Dermal Absorption Factor Solids	--	chem specific	EPA, 2001	chem specific	EPA, 2001	
	CF3	Conversion Factor 3	kg/mg	0.000001	- -	0.000001	- -	
	EF	Exposure Frequency	days/year	350	EPA, 1991	234	EPA, 1993	
	ED	Exposure Duration	years	24	EPA, 1991	9	EPA, 1993	
	BW	Body Weight	kg	70	EPA, 1991	70	EPA, 1991	
	AT-C	Averaging Time (Cancer)	days	25,550	EPA, 1989	25,550	EPA, 1989	
	AT-N	Averaging Time (Non-Cancer)	days	8,760	EPA, 1989	3,285	EPA, 1989	

* Surface and subsurface soil

(1) Surface area based on resident wearing shorts, short sleeve shirt, and shoes. RME value is 95th percentile and CT value is 50th percentile.

(2) Soil to skin adherence factor is based on maximum adherence factor for gardeners.

Sources:

EPA, 1989: Risk Assessment Guidance for Superfund. Vol.1: Human Health Evaluation Manual, Part A. OERR. EPA/540/1-89/002.

EPA, 1991: Risk Assessment Guidance for Superfund. Vol.1: Human Health Evaluation Manual - Supplemental Guidance, Standard Default Exposure Factors. Interim Final. OSWER Directive 9285.6-03.

EPA, 1993: Superfund's Standard Default Exposure Factors for the Central Tendency and Reasonable Maximum Exposure.

EPA, 1995: Assessing Dermal Exposure from Soil. EPA Region III. EPA/903-K-95-003.

EPA, 1997: Exposure Factors Handbook. EPA/600/P-95/002Fa.

EPA, 2001: Risk Assessment Guidance for Superfund. Vol.1: Human Health Evaluation Manual, Part E, Supplemental Guidance for Dermal Risk Assessment. OSWER 9285.7-02EP.

TABLE 4.38

VALUES USED FOR DAILY INTAKE CALCULATIONS

Site 7, NAB Little Creek

Scenario Timeframe: Future
Medium: Soil*
Exposure Medium: Soil
Exposure Point: Site Perimeter
Receptor Population: Resident
Receptor Age: Child

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CT Value	CT Rationale/ Reference	Intake Equation/ Model Name
Ingestion	CS	Chemical Concentration in Soil	mg/kg	see Table 3	see Table 3	see Table 3	see Table 3	Chronic Daily Intake (CDI) (mg/kg-day) =
	IR-S	Ingestion Rate of Soil	mg/day	200	EPA, 1991	100	EPA, 1993	CS x IR-S x EF x ED x CF3 x 1/BW x 1/AT
	EF	Exposure Frequency	days/year	350	EPA, 1991	234	EPA, 1993	
	ED	Exposure Duration	years	6	EPA, 1991	6	EPA, 1991	
	CF3	Conversion Factor 3	kg/mg	0.000001	- -	0.000001	- -	
	BW	Body Weight	kg	15	EPA, 1991	15	EPA, 1991	
	AT-C	Averaging Time (Cancer)	days	25,550	EPA, 1989	25,550	EPA, 1989	
	AT-N	Averaging Time (Non-Cancer)	days	2,190	EPA, 1989	2,190	EPA, 1989	
Dermal Absorption	CS	Chemical Concentration in Soil	mg/kg	see Table 3	see Table 3	see Table 3	see Table 3	CDI (mg/kg-day) =
	SA	Skin Surface Area Available for Contact	cm^2	3,400	EPA, 1997, (1)	2,900	EPA, 1997, (1)	CS x SA x SSAF x DABS x CF3 x EF x
	SSAF	Soil to Skin Adherence Factor	mg/cm^2-day	0.11	EPA, 1997, (2)	0.11	EPA, 1997, (2)	ED x 1/BW x 1/AT
	DABS	Dermal Absorption Factor Solids	--	chem specific	EPA, 2001	chem specific	EPA, 2001	
	CF3	Conversion Factor 3	kg/mg	0.000001	- -	0.000001	- -	
	EF	Exposure Frequency	days/year	350	EPA, 1991	234	EPA, 1993	
	ED	Exposure Duration	years	6	EPA, 1991	6	EPA, 1991	
	BW	Body Weight	kg	15	EPA, 1991	15	EPA, 1991	
	AT-C	Averaging Time (Cancer)	days	25,550	EPA, 1989	25,550	EPA, 1989	
	AT-N	Averaging Time (Non-Cancer)	days	2,190	EPA, 1989	2,190	EPA, 1989	

* Surface and subsurface soil

(1) Surface area based on resident wearing shorts and short sleever shirt. RME value is 95th percentile and CT value is 50th percentile.

(2) Soil to skin adherence factor is based on maximum adherence factor for soccer players.

Sources:

EPA, 1989: Risk Assessment Guidance for Superfund. Vol.1: Human Health Evaluation Manual, Part A. OERR. EPA/540/1-89/002.

EPA, 1991: Risk Assessment Guidance for Superfund. Vol.1: Human Health Evaluation Manual - Supplemental Guidance, Standard Default Exposure Factors. Interim Final. OSWER Directive 9285.6-03.

EPA, 1993: Superfund's Standard Default Exposure Factors for the Central Tendency and Reasonable Maximum Exposure.

EPA, 1995: Assessing Dermal Exposure from Soil. EPA Region III. EPA/903-K-95-003.

EPA, 1997: Exposure Factors Handbook. EPA/600/P-95/002Fa.

EPA, 2001: Risk Assessment Guidance for Superfund. Vol.1: Human Health Evaluation Manual, Part E, Supplemental Guidance for Dermal Risk Assessment. OSWER 9285.7-02EP.

TABLE 4.39

VALUES USED FOR DAILY INTAKE CALCULATIONS

Site 7, NAB Little Creek

Scenario Timeframe: Future
Medium: Soil*
Exposure Medium: Soil
Exposure Point: Site Perimeter
Receptor Population: Resident
Receptor Age: Child/Adult

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CT Value	CT Rationale/ Reference	Intake Equation/ Model Name
Ingestion	CS	Chemical Concentration in Soil	mg/kg	see Table 3	see Table 3	see Table 3	see Table 3	Chronic Daily Intake (CDI) (mg/kg-day) =
	IR-S-A	Ingestion Rate of Soil, Adult	mg/day	100	EPA, 1991	50	EPA, 1993	CS x IR-S-Adj x EF x CF3 x 1/AT
	IR-S-C	Ingestion Rate of Soil, Child	mg/day	200	EPA, 1991	100	EPA, 1993	
	IR-S-Adj	Ingestion Rate of Soil, Age-adjusted	mg-year/kg-day	114.29	calculated	46.43	calculated	IR-S-Adj (mg-year/kd-day) =
	EF	Exposure Frequency	days/year	350	EPA, 1991	234	EPA, 1993	(ED-C x IR-S-C / BW-C) + (ED-A x IR-S-A / BW-A)
	ED-A	Exposure Duration, Adult	years	24	EPA, 1991	9	EPA, 1993	
	ED-C	Exposure Duration, Child	years	6	EPA, 1991	6	EPA, 1991	
	CF3	Conversion Factor 3	kg/mg	0.000001	- -	0.000001	- -	
	BW-A	Body Weight , Adult	kg	70	EPA, 1991	70	EPA, 1991	
	BW-C	Body Weight, Child	kg	15	EPA, 1991	15	EPA, 1991	
	AT-C	Averaging Time (Cancer)	days	25,550	EPA, 1989	25,550	EPA, 1989	
Dermal Absorption	CS	Chemical Concentration in Soil	mg/kg	see Table 3	see Table 3	see Table 3	see Table 3	CDI (mg/kg-day) =
	SA-A	Skin Surface Area Available for Contact, Adult	cm^2	6,600	EPA, 1997	5,700	EPA, 1997	CS x DA-Adj x DABS x CF3 x EF x 1/AT
	SA-C	Skin Surface Area Available for Contact, Child	cm^2	3,400	EPA, 1997	2,900	EPA, 1997	
	SSAF-A	Soil to Skin Adherence Factor, Adult	mg/cm^2-day	0.2	EPA, 1997	0.2	EPA, 1997	DA-Adj (mg-year/kd-day) =
	SSAF-C	Soil to Skin Adherence Factor, Child	mg/cm^2-day	0.11	EPA, 1997	0.11	EPA, 1997	
	DA-Adj	Dermal Absorption, Age-adjusted	mg-year/kg-day	602	calculated	368.3	calculated	(ED-C x SA-C x SSAF-C / BW-C) + (ED-A x SA-A / BW-A)]
	DABS	Dermal Absorption Factor Solids	--	chem specific	EPA, 2001	chem specific	EPA, 2001	(ED-A x SA-A x SSAF-A / BW-A)
	CF3	Conversion Factor 3	kg/mg	0.000001	- -	0.000001	- -	
	EF	Exposure Frequency	days/year	350	EPA, 1991	234	EPA, 1993	
	ED-A	Exposure Duration, Adult	years	24	EPA, 1991	9	EPA, 1993	
	ED-C	Exposure Duration, Child	years	6	EPA, 1991	6	EPA, 1991	
	BW-A	Body Weight , Adult	kg	70	EPA, 1991	70	EPA, 1991	
	BW-C	Body Weight, Child	kg	15	EPA, 1991	15	EPA, 1991	
	AT-C	Averaging Time (Cancer)	days	25,550	EPA, 1989	25,550	EPA, 1989	

* Surface and subsurface soil

Sources:

EPA, 1989: Risk Assessment Guidance for Superfund. Vol.1: Human Health Evaluation Manual, Part A. OERR. EPA/540/1-89/002.

EPA, 1991: Risk Assessment Guidance for Superfund. Vol.1: Human Health Evaluation Manual - Supplemental Guidance, Standard Default Exposure Factors. Interim Final. OSWER Directive 9285.6-03.

TABLE 4.39

VALUES USED FOR DAILY INTAKE CALCULATIONS

Site 7, NAB Little Creek

Scenario Timeframe: Future
Medium: Soil*
Exposure Medium: Soil
Exposure Point: Site Perimeter
Receptor Population: Resident
Receptor Age: Child/Adult

EPA, 1993: Superfund's Standard Default Exposure Factors for the Central Tendency and Reasonable Maximum Exposure.

EPA, 1995: Assessing Dermal Exposure from Soil. EPA Region III. EPA/903-K-95-003.

EPA, 1997: Exposure Factors Handbook. EPA/600/P-95/002Fa.

EPA, 2001: Risk Assessment Guidance for Superfund. Vol.1: Human Health Evaluation Manual, Part E, Supplemental Guidance for Dermal Risk Assessment. OSWER 9285.7-02EP.

TABLE 4.40

VALUES USED FOR DAILY INTAKE CALCULATIONS

Site 7, NAB Little Creek

Scenario Timeframe: Future
Medium: Soil*
Exposure Medium: Soil
Exposure Point: Covered Area
Receptor Population: Construction Worker
Receptor Age: Adult

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CT Value	CT Rationale/ Reference	Intake Equation/ Model Name
Ingestion	CS	Chemical Concentration in Soil	mg/kg	see Table 3	see Table 3	see Table 3	see Table 3	Chronic Daily Intake (CDI) (mg/kg-day) =
	IR-S	Ingestion Rate of Soil	mg/day	480	EPA, 1991	200	(4)	CS x IR-S x EF x ED x CF3 x 1/BW x 1/AT
	EF	Exposure Frequency	days/year	125	(1)	125	(1)	
	ED	Exposure Duration	years	1	EPA, 1991	1	EPA, 1991	
	CF3	Conversion Factor 3	kg/mg	0.000001	- -	0.000001	- -	
	BW	Body Weight	kg	70	EPA, 1991	70	EPA, 1991	
	AT-C	Averaging Time (Cancer)	days	25,550	EPA, 1989	25,550	EPA, 1989	
	AT-N	Averaging Time (Non-Cancer)	days	365	EPA, 1989	365	EPA, 1989	
Dermal Absorption	CS	Chemical Concentration in Soil	mg/kg	see Table 3	see Table 3	see Table 3	see Table 3	CDI (mg/kg-day) =
	SA	Skin Surface Area Available for Contact	cm^2	5,300	EPA, 1992, (2)	2,000	EPA, 1992, (2)	CS x SA x SSAF x DABS x CF3 x EF x
	SSAF	Soil to Skin Adherence Factor	mg/cm^2-day	0.24	EPA, 1997, (3)	0.24	EPA, 1997, (3)	ED x 1/BW x 1/AT
	DABS	Dermal Absorption Factor Solids	--	chem specific	EPA, 2001	chem specific	EPA, 2001	
	CF3	Conversion Factor 3	kg/mg	0.000001	- -	0.000001	- -	
	EF	Exposure Frequency	days/year	125	(1)	125	(1)	
	ED	Exposure Duration	years	1	EPA, 1991	1	EPA, 1991	
	BW	Body Weight	kg	70	EPA, 1991	70	EPA, 1991	
	AT-C	Averaging Time (Cancer)	days	25,550	EPA, 1989	25,550	EPA, 1989	
	AT-N	Averaging Time (Non-Cancer)	days	365	EPA, 1989	365	EPA, 1989	

* Surface and subsurface soil

(1) Assumed duration of construction project may be 1/2 a year.

(2) RME SA includes head, hands, forearms, and lower legs. CT surface area includes head and hands.

(3) Soil to skin adherence factor is based on maximum adherence factor for construction workers.

(4) Recommendation from EPA Region III Risk Assessor.

Sources:

EPA, 1989: Risk Assessment Guidance for Superfund. Vol.1: Human Health Evaluation Manual, Part A. OERR. EPA/540/1-89/002.

EPA, 1991: Risk Assessment Guidance for Superfund. Vol.1: Human Health Evaluation Manual - Supplemental Guidance, Standard Default Exposure Factors. Interim Final. OSWER Directive 9285.6-03.

EPA, 1992: Dermal Exposure Assessment: Principals and Applications. ORD. EPA/600/8-91/011B.

EPA, 1993: Superfund's Standard Default Exposure Factors for the Central Tendency and Reasonable Maximum Exposure.

EPA, 1995: Assessing Dermal Exposure from Soil. EPA Region III. EPA/903-K-95-003.

EPA, 1997: Exposure Factors Handbook. EPA/600/P-95/002Fa.

EPA, 2001: Risk Assessment Guidance for Superfund. Vol.1: Human Health Evaluation Manual, Part E, Supplemental Guidance for Dermal Risk Assessment. OSWER 9285.7-02EP.

TABLE 4.41

VALUES USED FOR DAILY INTAKE CALCULATIONS

Site 7, NAB Little Creek

Scenario Timeframe: Future
Medium: Soil*
Exposure Medium: Soil
Exposure Point: Covered Area
Receptor Population: Industrial Worker
Receptor Age: Adult

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CT Value	CT Rationale/ Reference	Intake Equation/ Model Name
Ingestion	CS	Chemical Concentration in Soil	mg/kg	see Table …	see Table …	see Table …	see Table …	Chronic Daily Intake (CDI) (mg/kg-day) =
	IR-S	Ingestion Rate of Soil	mg/day	100	EPA, 1991	50	EPA, 1993	CS x IR-S x EF x ED x CF3 x 1/BW x 1/AT
	EF	Exposure Frequency	days/year	250	EPA, 1991	219	EPA, 1993	
	ED	Exposure Duration	years	25	EPA, 1991	5	EPA, 1993	
	CF3	Conversion Factor 3	kg/mg	0.000001	- -	0.000001	- -	
	BW	Body Weight	kg	70	EPA, 1991	70	EPA, 1991	
	AT-C	Averaging Time (Cancer)	days	25,550	EPA, 1989	25,550	EPA, 1989	
	AT-N	Averaging Time (Non-Cancer)	days	9,125	EPA, 1989	1,825	- -	
Dermal Absorption	CS	Chemical Concentration in Soil	mg/kg	see Table …	see Table …	see Table …	see Table …	CDI (mg/kg-day) =
	SA	Skin Surface Area Available for Contact	cm^2	5,300	EPA, 1992, (1)	2,000	EPA, 1992, (1)	CS x SA x SSAF x DABS x CF3 x EF x
	SSAF	Soil to Skin Adherence Factor	mg/cm^2-day	0.32	EPA, 1997, (2)	0.32	EPA, 1997, (2)	ED x 1/BW x 1/AT
	DABS	Dermal Absorption Factor Solids	--	chem specific	EPA, 2001	chem specific	EPA, 2001	
	CF3	Conversion Factor 3	kg/mg	0.000001	- -	0.000001	- -	
	EF	Exposure Frequency	days/year	250	EPA, 1991	219	EPA, 1993	
	ED	Exposure Duration	years	25	EPA, 1991	5	EPA, 1993	
	BW	Body Weight	kg	70	EPA, 1991	70	EPA, 1991	
	AT-C	Averaging Time (Cancer)	days	25,550	EPA, 1989	25,550	EPA, 1989	
	AT-N	Averaging Time (Non-Cancer)	days	9,125	EPA, 1989	1,825	- -	

* Surface and subsurface soil

(1) RME SA includes head, hands, forearms, and lower legs. CT surface area includes head and hands.

(2) SSAF based on maximum adherence factor for utility workers.

Sources:

EPA, 1989: Risk Assessment Guidance for Superfund. Vol.1: Human Health Evaluation Manual, Part A. OERR. EPA/540/1-89/002.

EPA, 1991: Risk Assessment Guidance for Superfund. Vol.1: Human Health Evaluation Manual - Supplemental Guidance, Standard Default Exposure Factors. Interim Final. OSWER Directive 9285.6-03.

EPA, 1993: Superfund's Standard Default Exposure Factors for the Central Tendency and Reasonable Maximum Exposure.

EPA, 1995: Assessing Dermal Exposure from Soil. EPA Region III. EPA/903-K-95-003.

EPA, 1997: Exposure Factors Handbook. EPA/600/P-95/002Fa.

EPA, 2001: Risk Assessment Guidance for Superfund. Vol.1: Human Health Evaluation Manual, Part E, Supplemental Guidance for Dermal Risk Assessment. OSWER 9285.7-02EP.

TABLE 4.42

VALUES USED FOR DAILY INTAKE CALCULATIONS

Site 7, NAB Little Creek

Scenario Timeframe: Future
Medium: Soil*
Exposure Medium: Soil
Exposure Point: Covered Area
Receptor Population: Resident
Receptor Age: Adult

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CT Value	CT Rationale/ Reference	Intake Equation/ Model Name
Ingestion	CS	Chemical Concentration in Soil	mg/kg	see Table 3	see Table 3	see Table 3	see Table 3	Chronic Daily Intake (CDI) (mg/kg-day) =
	IR-S	Ingestion Rate of Soil	mg/day	100	EPA, 1991	50	EPA, 1993	CS x IR-S x EF x ED x CF3 x 1/BW x 1/AT
	EF	Exposure Frequency	days/year	350	EPA, 1991	234	EPA, 1993	
	ED	Exposure Duration	years	24	EPA, 1991	9	EPA, 1993	
	CF3	Conversion Factor 3	kg/mg	0.000001	- -	0.000001	- -	
	BW	Body Weight	kg	70	EPA, 1991	70	EPA, 1991	
	AT-C	Averaging Time (Cancer)	days	25,550	EPA, 1989	25,550	EPA, 1989	
	AT-N	Averaging Time (Non-Cancer)	days	8,760	EPA, 1989	3,285	EPA, 1989	
Dermal Absorption	CS	Chemical Concentration in Soil	mg/kg	see Table 3	see Table 3	see Table 3	see Table 3	CDI (mg/kg-day) =
	SA	Skin Surface Area Available for Contact	cm^2	6,600	EPA, 1997, (1)	5,700	EPA, 1997, (1)	CS x SA x SSAF x DABS x CF3 x EF x
	SSAF	Soil to Skin Adherence Factor	mg/cm^2-day	0.2	EPA, 1997, (2)	0.2	EPA, 1997, (2)	ED x 1/BW x 1/AT
	DABS	Dermal Absorption Factor Solids	--	chem specific	EPA, 2001	chem specific	EPA, 2001	
	CF3	Conversion Factor 3	kg/mg	0.000001	- -	0.000001	- -	
	EF	Exposure Frequency	days/year	350	EPA, 1991	234	EPA, 1993	
	ED	Exposure Duration	years	24	EPA, 1991	9	EPA, 1993	
	BW	Body Weight	kg	70	EPA, 1991	70	EPA, 1991	
	AT-C	Averaging Time (Cancer)	days	25,550	EPA, 1989	25,550	EPA, 1989	
	AT-N	Averaging Time (Non-Cancer)	days	8,760	EPA, 1989	3,285	EPA, 1989	

* Surface and subsurface soil

(1) Surface area based on resident wearing shorts, short sleeve shirt, and shoes. RME value is 95th percentile and CT value is 50th percentile.

(2) Soil to skin adherence factor is based on maximum adherence factor for gardeners.

Sources:

EPA, 1989: Risk Assessment Guidance for Superfund. Vol.1: Human Health Evaluation Manual, Part A. OERR. EPA/540/1-89/002.

EPA, 1991: Risk Assessment Guidance for Superfund. Vol.1: Human Health Evaluation Manual - Supplemental Guidance, Standard Default Exposure Factors. Interim Final. OSWER Directive 9285.6-03.

EPA, 1993: Superfund's Standard Default Exposure Factors for the Central Tendency and Reasonable Maximum Exposure.

EPA, 1995: Assessing Dermal Exposure from Soil. EPA Region III. EPA/903-K-95-003.

EPA, 1997: Exposure Factors Handbook. EPA/600/P-95/002Fa.

EPA, 2001: Risk Assessment Guidance for Superfund. Vol.1: Human Health Evaluation Manual, Part E, Supplemental Guidance for Dermal Risk Assessment. OSWER 9285.7-02EP.

TABLE 4.43

VALUES USED FOR DAILY INTAKE CALCULATIONS

Site 7, NAB Little Creek

Scenario Timeframe: Future
Medium: Soil*
Exposure Medium: Soil
Exposure Point: Covered Area
Receptor Population: Resident
Receptor Age: Child

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CT Value	CT Rationale/ Reference	Intake Equation/ Model Name
Ingestion	CS	Chemical Concentration in Soil	mg/kg	see Table 3	see Table 3	see Table 3	see Table 3	Chronic Daily Intake (CDI) (mg/kg-day) =
	IR-S	Ingestion Rate of Soil	mg/day	200	EPA, 1991	100	EPA, 1993	CS x IR-S x EF x ED x CF3 x 1/BW x 1/AT
	EF	Exposure Frequency	days/year	350	EPA, 1991	234	EPA, 1993	
	ED	Exposure Duration	years	6	EPA, 1991	6	EPA, 1991	
	CF3	Conversion Factor 3	kg/mg	0.000001	- -	0.000001	- -	
	BW	Body Weight	kg	15	EPA, 1991	15	EPA, 1991	
	AT-C	Averaging Time (Cancer)	days	25,550	EPA, 1989	25,550	EPA, 1989	
	AT-N	Averaging Time (Non-Cancer)	days	2,190	EPA, 1989	2,190	EPA, 1989	
Dermal Absorption	CS	Chemical Concentration in Soil	mg/kg	see Table 3	see Table 3	see Table 3	see Table 3	CDI (mg/kg-day) =
	SA	Skin Surface Area Available for Contact	cm^2	3,400	EPA, 1997, (1)	2,900	EPA, 1997, (1)	CS x SA x SSAF x DABS x CF3 x EF x
	SSAF	Soil to Skin Adherence Factor	mg/cm^2-day	0.11	EPA, 1997, (2)	0.11	EPA, 1997, (2)	ED x 1/BW x 1/AT
	DABS	Dermal Absorption Factor Solids	--	chem specific	EPA, 2001	chem specific	EPA, 2001	
	CF3	Conversion Factor 3	kg/mg	0.000001	- -	0.000001	- -	
	EF	Exposure Frequency	days/year	350	EPA, 1991	234	EPA, 1993	
	ED	Exposure Duration	years	6	EPA, 1991	6	EPA, 1991	
	BW	Body Weight	kg	15	EPA, 1991	15	EPA, 1991	
	AT-C	Averaging Time (Cancer)	days	25,550	EPA, 1989	25,550	EPA, 1989	
	AT-N	Averaging Time (Non-Cancer)	days	2,190	EPA, 1989	2,190	EPA, 1989	

* Surface and subsurface soil

(1) Surface area based on resident wearing shorts and short sleever shirt. RME value is 95th percentile and CT value is 50th percentile.

(2) Soil to skin adherence factor is based on maximum adherence factor for soccer players.

Sources:

EPA, 1989: Risk Assessment Guidance for Superfund. Vol.1: Human Health Evaluation Manual, Part A. OERR. EPA/540/1-89/002.

EPA, 1991: Risk Assessment Guidance for Superfund. Vol.1: Human Health Evaluation Manual - Supplemental Guidance, Standard Default Exposure Factors. Interim Final. OSWER Directive 9285.6-03.

EPA, 1993: Superfund's Standard Default Exposure Factors for the Central Tendency and Reasonable Maximum Exposure.

EPA, 1995: Assessing Dermal Exposure from Soil. EPA Region III. EPA/903-K-95-003.

EPA, 1997: Exposure Factors Handbook. EPA/600/P-95/002Fa.

EPA, 2001: Risk Assessment Guidance for Superfund. Vol.1: Human Health Evaluation Manual, Part E, Supplemental Guidance for Dermal Risk Assessment. OSWER 9285.7-02EP.

TABLE 4.44

VALUES USED FOR DAILY INTAKE CALCULATIONS

Site 7, NAB Little Creek

Scenario Timeframe: Future
Medium: Soil*
Exposure Medium: Soil
Exposure Point: Covered Area
Receptor Population: Resident
Receptor Age: Child/Adult

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CT Value	CT Rationale/ Reference	Intake Equation/ Model Name
Ingestion	CS	Chemical Concentration in Soil	mg/kg	see Table 3	see Table 3	see Table 3	see Table 3	Chronic Daily Intake (CDI) (mg/kg-day) =
	IR-S-A	Ingestion Rate of Soil, Adult	mg/day	100	EPA, 1991	50	EPA, 1993	CS x IR-S-Adj x EF x CF3 x 1/AT
	IR-S-C	Ingestion Rate of Soil, Child	mg/day	200	EPA, 1991	100	EPA, 1993	
	IR-S-Adj	Ingestion Rate of Soil, Age-adjusted	mg-year/kg-day	114.29	calculated	46.43	calculated	IR-S-Adj (mg-year/kd-day) =
	EF	Exposure Frequency	days/year	350	EPA, 1991	234	EPA, 1993	(ED-C x IR-S-C / BW-C) + (ED-A x IR-S-A / BW-A)
	ED-A	Exposure Duration, Adult	years	24	EPA, 1991	9	EPA, 1993	
	ED-C	Exposure Duration, Child	years	6	EPA, 1991	6	EPA, 1991	
	CF3	Conversion Factor 3	kg/mg	0.000001	- -	0.000001	- -	
	BW-A	Body Weight , Adult	kg	70	EPA, 1991	70	EPA, 1991	
	BW-C	Body Weight, Child	kg	15	EPA, 1991	15	EPA, 1991	
	AT-C	Averaging Time (Cancer)	days	25,550	EPA, 1989	25,550	EPA, 1989	
Dermal Absorption	CS	Chemical Concentration in Soil	mg/kg	see Table 3	see Table 3	see Table 3	see Table 3	CDI (mg/kg-day) =
	SA-A	Skin Surface Area Available for Contact, Adult	cm^2	6,600	EPA, 1997	5,700	EPA, 1997	CS x DA-Adj x DABS x CF3 x EF x 1/AT
	SA-C	Skin Surface Area Available for Contact, Child	cm^2	3,400	EPA, 1997	2,900	EPA, 1997	
	SSAF-A	Soil to Skin Adherence Factor, Adult	mg/cm^2-day	0.2	EPA, 1997	0.2	EPA, 1997	DA-Adj (mg-year/kd-day) =
	SSAF-C	Soil to Skin Adherence Factor, Child	mg/cm^2-day	0.11	EPA, 1997	0.11	EPA, 1997	
	DA-Adj	Dermal Absorption, Age-adjusted	mg-year/kg-day	602	calculated	368.3	calculated	(ED-C x SA-C x SSAF-C / BW-C) + (ED-A x SA-A / BW-A)]
	DABS	Dermal Absorption Factor Solids	--	chem specific	EPA, 2001	chem specific	EPA, 2001	(ED-A x SA-A x SSAF-A / BW-A)
	CF3	Conversion Factor 3	kg/mg	0.000001	- -	0.000001	- -	
	EF	Exposure Frequency	days/year	350	EPA, 1991	234	EPA, 1993	
	ED-A	Exposure Duration, Adult	years	24	EPA, 1991	9	EPA, 1993	
	ED-C	Exposure Duration, Child	years	6	EPA, 1991	6	EPA, 1991	
	BW-A	Body Weight , Adult	kg	70	EPA, 1991	70	EPA, 1991	
	BW-C	Body Weight, Child	kg	15	EPA, 1991	15	EPA, 1991	
	AT-C	Averaging Time (Cancer)	days	25,550	EPA, 1989	25,550	EPA, 1989	

* Surface and subsurface soil

Sources:

EPA, 1989: Risk Assessment Guidance for Superfund. Vol.1: Human Health Evaluation Manual, Part A. OERR. EPA/540/1-89/002.

EPA, 1991: Risk Assessment Guidance for Superfund. Vol.1: Human Health Evaluation Manual - Supplemental Guidance, Standard Default Exposure Factors. Interim Final. OSWER Directive 9285.6-03.

EPA, 1993: Superfund's Standard Default Exposure Factors for the Central Tendency and Reasonable Maximum Exposure.

TABLE 4.44

VALUES USED FOR DAILY INTAKE CALCULATIONS

Site 7, NAB Little Creek

Scenario Timeframe: Future
Medium: Soil*
Exposure Medium: Soil
Exposure Point: Covered Area
Receptor Population: Resident
Receptor Age: Child/Adult

EPA, 1995: Assessing Dermal Exposure from Soil. EPA Region III. EPA/903-K-95-003.

EPA, 1997: Exposure Factors Handbook. EPA/600/P-95/002Fa.

EPA, 2001: Risk Assessment Guidance for Superfund. Vol.1: Human Health Evaluation Manual, Part E, Supplemental Guidance for Dermal Risk Assessment. OSWER 9285.7-02EP.

TABLE 5.1

NON-CANCER TOXICITY DATA -- ORAL/DERMAL

Site 7, NAB Little Creek

Chemical of Potential Concern	Chronic/ Subchronic	Oral RfD Value	Oral RfD Units	Oral to Dermal Adjustment Factor (1)	Adjusted Dermal RfD (2)	Units	Primary Target Organ	Combined Uncertainty/Modifying Factors	Sources of RfD: Target Organ	Dates of RfD: Target Organ (3) (MM/DD/YY)
1,1,2,2-Tetrachloroethane	Chronic	6.0E-02	mg/kg-day	N/A	6.0E-02	mg/kg-day	Liver and Kidney		NCEA	3/30/2000
	Subchronic									
Bromodichloromethane	Chronic	2.0E-02	mg/kg-day	N/A	2.0E-02	mg/kg-day	Kidney	1000/1	IRIS	8/5/2002
	Subchronic									
Chloroform	Chronic	1.0E-02	mg/kg-day	N/A	1.0E-02	mg/kg-day	Liver	1000	IRIS	7/30/2002
	Subchronic	1.0E-02	mg/kg-day	N/A	1.0E-02	mg/kg-day	Liver	1000	HEAST	2/28/2000
Aroclor-1260	Chronic	N/A								
	Subchronic	N/A								
Benzo(a)pyrene	Chronic	N/A								
	Subchronic	N/A								
Aluminum	Chronic	1.0E+00	mg/kg-day	N/A	1.0E+00	mg/kg-day	CNS	100	NCEA	08/21/2002
	Subchronic	N/A								
Arsenic	Chronic	3.0E-04	mg/kg-day	95%	3.0E-04	mg/kg-day	Skin/Vascular	3/1	IRIS	08/21/2002
	Subchronic	3.0E-04	mg/kg-day	95%	3.0E-04	mg/kg-day	Skin/Vascular	3	HEAST	07/01/1997
Chromium (hexavalent)	Chronic	3.0E-03	mg/kg-day	2.5%	7.5E-05	mg/kg-day	NOAEL	300/3	IRIS	08/21/2002
	Subchronic	2.0E-02	mg/kg-day	2.5%	5.0E-04	mg/kg-day	NOAEL	100	HEAST	07/01/1997
Copper	Chronic	4.0E-02	mg/kg-day	N/A	4.0E-02	mg/kg-day	Gastrointestinal		HEAST	07/1997
	Subchronic	4.0E-02	mg/kg-day	N/A	4.0E-02	mg/kg-day	Gastrointestinal		HEAST	07/1997
Iron	Chronic	3.0E-01	mg/kg-day	N/A	3.0E-01	mg/kg-day	Gastrointestinal	1	NCEA	03/19/2002
	Subchronic	N/A								
Lead	Chronic	N/A								
	Subchronic	N/A								
Manganese (nonfood)	Chronic	2.0E-02	mg/kg-day	4%	8.0E-04	mg/kg-day	CNS	1	IRIS	08/21/2002
	Subchronic	N/A								
Manganese (food)	Chronic	1.4E-01	mg/kg-day	4%	5.6E-03	mg/kg-day	CNS	1	IRIS	7/30/2002
	Subchronic	N/A								
Thallium	Chronic	7.0E-05	mg/kg-day	100%	7.0E-05	mg/kg-day	Liver & Blood		USEPA RIII	10/15/2003
	Subchronic	N/A								
Vanadium	Chronic	1.0E-03	mg/kg-day	2.6%	2.6E-05	mg/kg-day	Kidney	100	NCEA	05/01/2000
	Subchronic	N/A								

N/A = Not Applicable or Not Available. IRIS indicates that calculations of dermal risks may not be appropriate for this chemical.

(1) Refer to RAGS, Part A. Source: Risk Assessment Guidance for Superfund. Volume 1: Human Health Evalution Manual (Part E, Supplemental Guidance for Dermal Risk Assessment(Interim). Section 4.2 and Exhibit 4-1. Only perform adjustment if adjustment factor > 50%.

(2) Provide equation for derivation in text.

(3) For IRIS values, provide the date IRIS was searched.
For HEAST values, provide the date of HEAST.
For NCEA values, provide the date of the article provided by NCEA.
For NCEA values, provide the date of the article provided by NCEA.

IRIS = Integrated Risk Information System
HEAST= Health Effects Assessment Summary Tables
NCEA = National Center for Environmental Assessment
USEPA RIII = USEPA Region III RBC Table.
CNS = Central Nervous System

TABLE 5.2

NON-CANCER TOXICITY DATA -- INHALATION

Site 7, NAB Little Creek

Chemical of Potential Concern	Chronic/ Subchronic	Value Inhalation RfC	Units	Adjusted Inhalation RfD (1)	Units	Primary Target Organ	Combined Uncertainty/Modifying Factors	Sources of RfC:RfD: Target Organ (2)	Dates (3) (MM/DD/YY)
1,1,2,2-Tetrachloroethane	Chronic	N/A							
	Subchronic	N/A							
Bromodichloromethane	Chronic	N/A							
	Subchronic	N/A							
Chloroform	Chronic	4.90E-02	mg/m^3	1.40E-02	mg/kg-day	Liver, Kidney	10	NCEA	12/1/1997
	Subchronic	3.00E-03	mg/m^3	8.60E-04	mg/kg-day	Liver, Kidney	100	NCEA	12/1/1997
Aroclor-1260	Chronic	N/A							
	Subchronic	N/A							
Benzo(a)pyrene	Chronic	N/A							
	Subchronic	N/A							
Aluminum	Chronic	3.50E-03	mg/m^3	1.00E-03	mg/kg-day	CNS	300	NCEA	08/21/2002
	Subchronic	N/A							
Arsenic	Chronic	N/A							
	Subchronic	N/A							
Chromium	Chronic	1.05E-04	mg/m^3	3.00E-05	mg/kg-day	Respiratory System	300	IRIS	08/21/2002
	Subchronic	3.99E-06	mg/m^3	1.14E-06	mg/kg-day	Respiratory System	100	NCEA	08/21/2002
Copper	Chronic	N/A							
	Subchronic	N/A							
Iron	Chronic	N/A							
	Subchronic	N/A							
Lead	Chronic	N/A							
Manganese	Chronic	5.01E-05	mg/m^3	1.43E-05	mg/kg-day	CNS	1000	IRIS	08/21/2002
	Subchronic	N/A							
Thallium	Chronic	N/A							
	Subchronic	N/A							
Vanadium	Chronic	N/A							
	Subchronic	N/A							

N/A = Not Applicable

(1) Provide equation used for derivation in text.

(2) For IRIS values, provide the date IRIS was searched.
For HEAST values, provide the date of HEAST.
For NCEA values, provide the date of the article provided by NCEA.

IRIS = Integrated Risk Information System
HEAST= Health Effects Assessment Summary Tables
NCEA = National Center for Environmental Assessment

TABLE 6.1

CANCER TOXICITY DATA -- ORAL/DERMAL

Site 7, NAB Little Creek

Chemical of Potential Concern	Oral Cancer Slope Factor	Oral to Dermal Adjustment Factor	Adjusted Dermal Cancer Slope Factor (1)	Units	EPA Carcinogen Group	Source	Date (2) (MM/DD/YY)
1,1,2,2-Tetrachloroethane	2.0E-01	NA	2.0E-01	$(mg/kg\text{-}day)^{-1}$	C	IRIS	8/5/2002
Bromodichloromethane	6.2E-02	NA	6.2E-02	$(mg/kg\text{-}day)^{-1}$	B2	IRIS	8/5/2002
Chloroform	N/A						
Aroclor-1260	2.0E+00	80% - 96%	2.0E+00	$(mg/kg\text{-}day)^{-1}$	B2	IRIS	08/21/2002
Benzo(a)pyrene	7.3E+00	58% - 8%	7.3E+00		B2	IRIS	7/30/2002
Aluminum	N/A					NCEA	08/26/1996
Arsenic	1.5E+00	95%	1.5E+00	$(mg/kg\text{-}day)^{-1}$	A	IRIS	08/21/2002
Chromium (hexavalent)	N/A				D	IRIS	7/30/2002
Copper	N/A						
Iron	N/A					NCEA	07/23/1996
Lead	N/A						
Manganese	N/A				D	IRIS	7/30/2002
Thallium	N/A					RBC	2/8/2002
Vanadium	N/A						

N/A-Not available

IRIS = Integrated Risk Information System

HEAST= Health Effects Assessment Summary Tables

NCEA = National Center for Environmental Assessment

EPA Carcinogen Group:

A - Human carcinogen

B1 - Probable human carcinogen - indicates that limited human data are available

B2 - Probable human carcinogen - indicates sufficient evidence in animals and inadequate or no evidence in humans

C - Possible human carcinogen

D - Not classifiable as a human carcinogen

E - Evidence of noncarcinogenicity

(1) Refer to RAGS, Part A. Source: Risk Assessment Guidance for Superfund. Volume 1: Human Health Evalution Manual (Part E, Supplemental Guidance for Dermal Risk Assessment(Interim). Section 4.2 and Exhibit 4-1. Only perform adjustment if adjustment factor > 50%.

(2) For IRIS values, provide the date IRIS was searched.
For HEAST values, provide the date of HEAST.
For NCEA values, provide article date provided by NCEA.

(2) For IRIS values, provide the date IRIS was searched.
For HEAST values, provide the date of HEAST.
For NCEA values, provide article date provided by NCEA.
For RBC values, provide the date of last change in the Tables.

TABLE 6.2

CANCER TOXICITY DATA -- INHALATION

Site 7, NAB Little Creek

Chemical of Potential Concern	Unit Risk	Units	Adjustment (1)	Inhalation Cancer Slope Factor	Units	Weight of Evidence/ Cancer Guidance Description	Source	Date (2) (MM/DD/YY)
1,1,2,2-Tetrachloroethane	5.8E-05	$(ug/m3)^{-1}$	3500	2.0E-01	$(mg/kg\text{-}day)^{-1}$	C	IRIS	08/05/2002
Bromodichloromethane	N/A							
Chloroform	2.3E-05	$(ug/m3)^{-1}$	3500	8.1E-02	$(mg/kg\text{-}day)^{-1}$	B2	IRIS	07/30/2002
Aroclor-1260	5.7E-04	$(ug/m3)^{-1}$	3500	2.0E+00	$(mg/kg\text{-}day)^{-1}$	B2	IRIS	07/30/2002
Benzo(a)pyrene	8.9E-04	$(ug/m3)^{-1}$	3500	3.1E+00	$(mg/kg\text{-}day)^{-1}$	B2	NCEA	1997
Aluminum	N/A			2.0E+00			NCEA	08/26/96
Arsenic	4.3E-03	$(ug/m3)^{-1}$	3500	1.5E+01	$(mg/kg\text{-}day)^{-1}$	A	IRIS	
Chromium (hexavalent)	1.2E-02	$(ug/m3)^{-1}$	3500	4.2E+01	$(mg/kg\text{-}day)^{-1}$	A	IRIS	07/30/2002
Copper	N/A							
Iron	N/A						NCEA	07/23/96
Lead	N/A							
Manganese	N/A					D	IRIS	07/30/2002
Thallium	N/A							
Vanadium	N/A							

IRIS = Integrated Risk Information System

HEAST= Health Effects Assessment Summary Tables

NCEA = National Center for Environmental Assessment

U = Under review.

N/A = Not Available

(1) Adjustment Factor applied to Unit Risk to calculate Inhalation Slope Factor = 70kg x 1/20m3/day x 1000ug/mg

(2) For IRIS values, provide the date IRIS was searched.
For HEAST values, provide the date of HEAST.
For NCEA values, provide the date of the article provided by NCEA.
For RBC values, provide the date of last change in the Tables.

EPA Group:

A - Human carcinogen

B1 - Probable human carcinogen - indicates that limited human data are available

B2 - Probable human carcinogen - indicates sufficient evidence in animals and inadequate or no evidence in humans

C - Possible human carcinogen

D - Not classifiable as a human carcinogen

E - Evidence of noncarcinogenicity

TABLE 7.1.RME
CALCULATION OF NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
Site 7, NAB Little Creek

Scenario Timeframe: Current
Medium: Surface Soil
Exposure Medium: Surface Soil
Exposure Point: Weigh Station Area
Receptor Population: Maintenance Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose (2)	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	Aroclor-1260	9.20E-01	mg/kg	9.20E-01	mg/kg	M	4.3E-08	mg/kg-day	N/A		N/A	N/A	
	Arsenic	2.30E+00	mg/kg	2.30E+00	mg/kg	M	1.1E-07	mg/kg-day	3.0E-04	mg/kg-day	N/A	N/A	3.6E-04
	Chromium	2.65E+01	mg/kg	2.65E+01	mg/kg	M	1.2E-06	mg/kg-day	3.0E-03	mg/kg-day	N/A	N/A	4.1E-04
	Iron	1.48E+04	mg/kg	1.48E+04	mg/kg	M	7.0E-04	mg/kg-day	3.0E-01	mg/kg-day	N/A	N/A	2.3E-03
	Lead	6.38E+02	mg/kg	6.38E+02	mg/kg	M	3.0E-05	mg/kg-day	N/A		N/A	N/A	
	Manganese	4.70E+02	mg/kg	4.70E+02	mg/kg	M	2.2E-05	mg/kg-day	2.0E-02	mg/kg-day	N/A	N/A	1.1E-03
	Vanadium	3.67E+01	mg/kg	3.67E+01	mg/kg	M	1.7E-06	mg/kg-day	1.0E-03	mg/kg-day	N/A	N/A	1.7E-03
	(Total)												5.9E-03
Dermal	Aroclor-1260	9.20E-01	mg/kg	9.20E-01	mg/kg	M	1.0E-07	mg/kg-day	N/A		N/A	N/A	
	Arsenic	2.30E+00	mg/kg	2.30E+00	mg/kg	M	5.5E-08	mg/kg-day	3.0E-04	mg/kg-day	N/A	N/A	1.8E-04
	Chromium	2.65E+01	mg/kg	2.65E+01	mg/kg	M	2.1E-07	mg/kg-day	7.5E-05	mg/kg-day	N/A	N/A	2.8E-03
	Iron	1.48E+04	mg/kg	1.48E+04	mg/kg	M	1.2E-04	mg/kg-day	3.0E-01	mg/kg-day	N/A	N/A	3.9E-04
	Lead	6.38E+02	mg/kg	6.38E+02	mg/kg	M	5.1E-06	mg/kg-day	N/A		N/A	N/A	
	Manganese	4.70E+02	mg/kg	4.70E+02	mg/kg	M	3.7E-06	mg/kg-day	8.0E-04	mg/kg-day	N/A	N/A	4.7E-03
	Vanadium	3.67E+01	mg/kg	3.67E+01	mg/kg	M	2.9E-07	mg/kg-day	2.6E-05	mg/kg-day	N/A	N/A	1.1E-02
	(Total)												1.9E-02
												Total Hazard Index Across All Exposure Routes/Pathways	2.5E-02

(1) Medium-Specific (M) EPC selected for hazard calculation.
(2) Chronic.

TABLE 7.2.RME
CALCULATION OF NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
Site 7, NAB Little Creek

Scenario Timeframe: Current
Medium: Surface Soil
Exposure Medium: Surface Soil
Exposure Point: Weigh Station Area
Receptor Population: Trespasser/Visitor
Receptor Age: Adolescents

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose (2)	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	Aroclor-1260	9.20E-01	mg/kg	9.20E-01	mg/kg	M	5.1E-07	mg/kg-day	N/A		N/A	N/A	
	Arsenic	2.30E+00	mg/kg	2.30E+00	mg/kg	M	1.3E-06	mg/kg-day	3.0E-04	mg/kg-day	N/A	N/A	4.3E-03
	Chromium	2.65E+01	mg/kg	2.65E+01	mg/kg	M	1.5E-05	mg/kg-day	3.0E-03	mg/kg-day	N/A	N/A	4.9E-03
	Iron	1.48E+04	mg/kg	1.48E+04	mg/kg	M	8.3E-03	mg/kg-day	3.0E-01	mg/kg-day	N/A	N/A	2.8E-02
	Lead	6.38E+02	mg/kg	6.38E+02	mg/kg	M	3.6E-04	mg/kg-day	N/A		N/A	N/A	
	Manganese	4.70E+02	mg/kg	4.70E+02	mg/kg	M	2.6E-04	mg/kg-day	2.0E-02	mg/kg-day	N/A	N/A	1.3E-02
	Vanadium	3.67E+01	mg/kg	3.67E+01	mg/kg	M	2.1E-05	mg/kg-day	1.0E-03	mg/kg-day	N/A	N/A	2.1E-02
	(Total)												7.0E-02
Dermal	Aroclor-1260	9.20E-01	mg/kg	9.20E-01	mg/kg	M	3.6E-07	mg/kg-day	N/A		N/A	N/A	
	Arsenic	2.30E+00	mg/kg	2.30E+00	mg/kg	M	2.0E-07	mg/kg-day	3.0E-04	mg/kg-day	N/A	N/A	6.5E-04
	Chromium	2.65E+01	mg/kg	2.65E+01	mg/kg	M	7.5E-07	mg/kg-day	7.5E-05	mg/kg-day	N/A	N/A	1.0E-02
	Iron	1.48E+04	mg/kg	1.48E+04	mg/kg	M	4.2E-04	mg/kg-day	3.0E-01	mg/kg-day	N/A	N/A	1.4E-03
	Lead	6.38E+02	mg/kg	6.38E+02	mg/kg	M	1.8E-05	mg/kg-day	N/A		N/A	N/A	
	Manganese	4.70E+02	mg/kg	4.70E+02	mg/kg	M	1.3E-05	mg/kg-day	8.0E-04	mg/kg-day	N/A	N/A	1.7E-02
	Vanadium	3.67E+01	mg/kg	3.67E+01	mg/kg	M	1.0E-06	mg/kg-day	2.6E-05	mg/kg-day	N/A	N/A	4.0E-02
	(Total)												6.9E-02
												Total Hazard Index Across All Exposure Routes/Pathways	1.4E-01

(1) Medium-Specific (M) EPC selected for hazard calculation.
(2) Chronic.

TABLE 7.3.RME
CALCULATION OF NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
Site 7, NAB Little Creek

Scenario Timeframe: Current
Medium: Surface Soil
Exposure Medium: Surface Soil
Exposure Point: Area to West of Landfill, the "Ear"
Receptor Population: Maintenance Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose (2)	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	Arsenic	4.60E+00	mg/kg	4.60E+00	mg/kg	M	2.2E-07	mg/kg-day	3.0E-04	mg/kg-day	N/A	N/A	7.2E-04
	Iron	8.84E+03	mg/kg	8.84E+03	mg/kg	M	4.2E-04	mg/kg-day	3.0E-01	mg/kg-day	N/A	N/A	1.4E-03
	Thallium	1.00E+00	mg/kg	1.00E+00	mg/kg	M	4.7E-08	mg/kg-day	7.0E-05	mg/kg-day	N/A	N/A	6.7E-04
	Vanadium	2.60E+01	mg/kg	2.60E+01	mg/kg	M	1.2E-06	mg/kg-day	1.0E-03	mg/kg-day	N/A	N/A	1.2E-03
	(Total)												4.0E-03
Dermal	Arsenic	4.60E+00	mg/kg	4.60E+00	mg/kg	M	1.1E-07	mg/kg-day	3.0E-04	mg/kg-day	N/A	N/A	3.7E-04
	Iron	8.84E+03	mg/kg	8.84E+03	mg/kg	M	7.0E-05	mg/kg-day	3.0E-01	mg/kg-day	N/A	N/A	2.3E-04
	Thallium	1.00E+00	mg/kg	1.00E+00	mg/kg	M	8.0E-09	mg/kg-day	7.0E-05	mg/kg-day	N/A	N/A	1.1E-04
	Vanadium	2.60E+01	mg/kg	2.60E+01	mg/kg	M	2.1E-07	mg/kg-day	2.6E-05	mg/kg-day	N/A	N/A	8.0E-03
	(Total)												8.7E-03
												Total Hazard Index Across All Exposure Routes/Pathways	1.3E-02

(1) Medium-Specific (M) EPC selected for hazard calculation.
(2) Chronic.

TABLE 7.4.RME
CALCULATION OF NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
Site 7, NAB Little Creek

Scenario Timeframe: Current
Medium: Surface Soil
Exposure Medium: Surface Soil
Exposure Point: Area to West of Landfill, the "Ear"
Receptor Population: Trespasser/Visitor
Receptor Age: Adolescents

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose (2)	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	Arsenic	4.60E+00	mg/kg	4.60E+00	mg/kg	M	2.6E-06	mg/kg-day	3.0E-04	mg/kg-day	N/A	N/A	8.6E-03
	Iron	8.84E+03	mg/kg	8.84E+03	mg/kg	M	4.9E-03	mg/kg-day	3.0E-01	mg/kg-day	N/A	N/A	1.6E-02
	Thallium	1.00E+00	mg/kg	1.00E+00	mg/kg	M	5.6E-07	mg/kg-day	7.0E-05	mg/kg-day	N/A	N/A	8.0E-03
	Vanadium	2.60E+01	mg/kg	2.60E+01	mg/kg	M	1.5E-05	mg/kg-day	1.0E-03	mg/kg-day	N/A	N/A	1.5E-02
	(Total)												4.8E-02
Dermal	Arsenic	4.60E+00	mg/kg	4.60E+00	mg/kg	M	3.9E-07	mg/kg-day	3.0E-04	mg/kg-day	N/A	N/A	1.3E-03
	Iron	8.84E+03	mg/kg	8.84E+03	mg/kg	M	2.5E-04	mg/kg-day	3.0E-01	mg/kg-day	N/A	N/A	8.3E-04
	Thallium	1.00E+00	mg/kg	1.00E+00	mg/kg	M	2.8E-08	mg/kg-day	7.0E-05	mg/kg-day	N/A	N/A	4.0E-04
	Vanadium	2.60E+01	mg/kg	2.60E+01	mg/kg	M	7.4E-07	mg/kg-day	2.6E-05	mg/kg-day	N/A	N/A	2.8E-02
	(Total)												3.1E-02
												Total Hazard Index Across All Exposure Routes/Pathways	7.8E-02

(1) Medium-Specific (M) EPC selected for hazard calculation.
(2) Chronic.

TABLE 7.5.RME
CALCULATION OF NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
Site 7, NAB Little Creek

Scenario Timeframe: Current
Medium: Surface Soil
Exposure Medium: Surface Soil
Exposure Point: Site Perimeter
Receptor Population: Maintenance Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose (2)	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	Benzo(a)pyrene	4.50E-01	mg/kg	4.50E-01	mg/kg	M	2.1E-08	mg/kg-day	N/A		N/A	N/A	
	Arsenic	3.50E+00	mg/kg	3.50E+00	mg/kg	M	1.6E-07	mg/kg-day	3.0E-04	mg/kg-day	N/A	N/A	5.5E-04
	Iron	7.33E+03	mg/kg	7.33E+03	mg/kg	M	3.4E-04	mg/kg-day	3.0E-01	mg/kg-day	N/A	N/A	1.1E-03
	Vanadium	2.02E+02	mg/kg	2.02E+02	mg/kg	M	9.5E-06	mg/kg-day	1.0E-03	mg/kg-day	N/A	N/A	9.5E-03
	(Total)												1.1E-02
Dermal	Benzo(a)pyrene	4.50E-01	mg/kg	4.50E-01	mg/kg	M	4.7E-08	mg/kg-day	N/A		N/A	N/A	
	Arsenic	3.50E+00	mg/kg	3.50E+00	mg/kg	M	8.4E-08	mg/kg-day	3.0E-04	mg/kg-day	N/A	N/A	2.8E-04
	Iron	7.33E+03	mg/kg	7.33E+03	mg/kg	M	5.8E-05	mg/kg-day	3.0E-01	mg/kg-day	N/A	N/A	1.9E-04
	Vanadium	2.02E+02	mg/kg	2.02E+02	mg/kg	M	1.6E-06	mg/kg-day	2.6E-05	mg/kg-day	N/A	N/A	6.2E-02
	(Total)												6.2E-02
												Total Hazard Index Across All Exposure Routes/Pathways	7.4E-02

(1) Medium-Specific (M) EPC selected for hazard calculation.
(2) Chronic.

TABLE 7.6.RME
CALCULATION OF NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
Site 7, NAB Little Creek

Scenario Timeframe: Current
Medium: Surface Soil
Exposure Medium: Surface Soil
Exposure Point: Site Perimeter
Receptor Population: Trespasser/Visitor
Receptor Age: Adolescents

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose (2)	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	Benzo(a)pyrene	4.50E-01	mg/kg	4.50E-01	mg/kg	M	2.5E-07	mg/kg-day	N/A		N/A	N/A	
	Arsenic	3.50E+00	mg/kg	3.50E+00	mg/kg	M	2.0E-06	mg/kg-day	3.0E-04	mg/kg-day	N/A	N/A	6.5E-03
	Iron	7.33E+03	mg/kg	7.33E+03	mg/kg	M	4.1E-03	mg/kg-day	3.0E-01	mg/kg-day	N/A	N/A	1.4E-02
	Vanadium	2.02E+02	mg/kg	2.02E+02	mg/kg	M	1.1E-04	mg/kg-day	1.0E-03	mg/kg-day	N/A	N/A	1.1E-01
	(Total)												1.3E-01
Dermal	Benzo(a)pyrene	4.50E-01	mg/kg	4.50E-01	mg/kg	M	1.7E-07	mg/kg-day	N/A		N/A	N/A	
	Arsenic	3.50E+00	mg/kg	3.50E+00	mg/kg	M	3.0E-07	mg/kg-day	3.0E-04	mg/kg-day	N/A	N/A	9.9E-04
	Iron	7.33E+03	mg/kg	7.33E+03	mg/kg	M	2.1E-04	mg/kg-day	3.0E-01	mg/kg-day	N/A	N/A	6.9E-04
	Vanadium	2.02E+02	mg/kg	2.02E+02	mg/kg	M	5.7E-06	mg/kg-day	2.6E-05	mg/kg-day	N/A	N/A	2.2E-01
	(Total)												2.2E-01
												Total Hazard Index Across All Exposure Routes/Pathways	3.5E-01

(1) Medium-Specific (M) EPC selected for hazard calculation.
(2) Chronic.

TABLE 7.7.RME
CALCULATION OF NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
Site 7, NAB Little Creek

Scenario Timeframe: Current/Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Little Creek Cove
Receptor Population: Trespasser/Visitor
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose (2)	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	Arsenic	3.27E+00	µg/L	3.27E+00	µg/L	M	1.4E-06	mg/kg-day	3.0E-04	mg/kg-day	N/A	N/A	4.6E-03
	(Total)												4.6E-03
Dermal	Arsenic	3.27E+00	µg/L	3.27E+00	µg/L	M	3.5E-07	mg/kg-day	3.0E-04	mg/kg-day	N/A	N/A	1.2E-03
	(Total)												1.2E-03
												Total Hazard Index Across All Exposure Routes/Pathways	5.8E-03

(1) Medium-Specific (M) EPC selected for hazard calculation.
(2) Chronic.

Table 7.7.RME and 7.8.RME Supplement
Calculation of DAevent
Little Creek Cove Surface Water, Trespasser/Visitor
Site 7, NAB Little Creek

Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Permeability Constant (PC) (cm/hr)	Lag Time (t) (hr)	Duration of Event (ET) (hr)	t* (hr)	B (dimensionless)	DAevent (mg/cm^2-event)	Eq
Arsenic	3.27E+00	µg/L	1.0E-03	N/A	2.6E+00	N/A	N/A	8.5E-09	1

Inorganics: DAevent (mg/cm2-event) =
PC x CW x ET x CF1 x CF2 (eq 1)

Organics: DAevent (mg/cm2-event) =

ET<t*: DAevent (mg/cm2-event) =
2 x PC x CW x (sqrt((6 x t x ET)/3.1415))
x CF1 x CF2 (eq 2)

ET>t*: DAevent (mg/cm2-event) =
PC x CW x (ET/(1+B) + 2 x t x ((1 + 3xB)/(1+B))
x CF1 x CF2 (eq 3)

Permeability constants from EPA 1992, Dermal Exposure Assessment: Principals and Applications.
ORD, EPA/600/8-91/001B. Default value of 0.001 cm/hour used for inorganics without published values.
N/A - not applicable.

TABLE 7.8.RME
CALCULATION OF NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
Site 7, NAB Little Creek

Scenario Timeframe: Current/Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Little Creek Cove
Receptor Population: Trespasser/Visitor
Receptor Age: Adolescents

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose (2)	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	Arsenic	3.27E+00	µg/L	3.27E+00	µg/L	M	1.9E-06	mg/kg-day	3.0E-04	mg/kg-day	N/A	N/A	6.3E-03
	(Total)												6.3E-03
Dermal	Arsenic	3.27E+00	µg/L	3.27E+00	µg/L	M	3.6E-07	mg/kg-day	3.0E-04	mg/kg-day	N/A	N/A	1.2E-03
	(Total)												1.2E-03
												Total Hazard Index Across All Exposure Routes/Pathways	7.5E-03

(1) Medium-Specific (M) EPC selected for hazard calculation.
(2) Chronic.

TABLE 7.9.RME
CALCULATION OF NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
Site 7, NAB Little Creek

Scenario Timeframe: Current/Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Little Creek Cove
Receptor Population: Site Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose (2)	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	Arsenic	3.27E+00	µg/L	3.27E+00	µg/L	M	4.9E-07	mg/kg-day	3.0E-04	mg/kg-day	N/A	N/A	1.6E-03
	(Total)												1.6E-03
Dermal	Arsenic	3.27E+00	µg/L	3.27E+00	µg/L	M	3.3E-08	mg/kg-day	3.0E-04	mg/kg-day	N/A	N/A	1.1E-04
	(Total)												1.1E-04
												Total Hazard Index Across All Exposure Routes/Pathways	1.7E-03

(1) Medium-Specific (M) EPC selected for hazard calculation.
(2) Chronic.

Table 7.9.RME Supplement
Calculation of DAevent
Little Creek Cove Surface Water, Adult Site Worker
Site 7, NAB Little Creek

Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Permeability Constant (PC) (cm/hr)	Lag Time (t) (hr)	Duration of Event (ET) (hr)	t* (hr)	B (dimensionless)	DAevent (mg/cm^2-event)	Eq
Arsenic	3.27E+00	µg/L	1.0E-03	N/A	4.0E+00	N/A	N/A	1.3E-08	1

Inorganics: DAevent (mg/cm2-event) =
PC x CW x ET x CF1 x CF2 (eq 1)

Organics: DAevent (mg/cm2-event) =

ET<t*: DAevent (mg/cm2-event) =
2 x PC x CW x (sqrt((6 x t x ET)/3.1415))
x CF1 x CF2 (eq 2)

ET>t*: DAevent (mg/cm2-event) =
PC x CW x (ET/(1+B) + 2 x t x ((1 + 3xB)/(1+B))
x CF1 x CF2 (eq 3)

Permeability constants from EPA 1992, Dermal Exposure Assessment: Principals and Applications.
ORD, EPA/600/8-91/001B. Default value of 0.001 cm/hour used for inorganics without published values.
N/A - not applicable.

TABLE 7.10.RME
CALCULATION OF NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
Site 7, NAB Little Creek

Scenario Timeframe: Current/Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Pond
Receptor Population: Trespasser/Visitor
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose (2)	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	Arsenic	2.51E+00	µg/L	2.51E+00	µg/L	M	1.1E-06	mg/kg-day	3.0E-04	mg/kg-day	N/A	N/A	3.5E-03
	(Total)												3.5E-03
Dermal	Arsenic	2.51E+00	µg/L	2.51E+00	µg/L	M	8.0E-08	mg/kg-day	3.0E-04	mg/kg-day	N/A	N/A	2.7E-04
	(Total)												2.7E-04
												Total Hazard Index Across All Exposure Routes/Pathways	3.8E-03

(1) Medium-Specific (M) EPC selected for hazard calculation.
(2) Chronic.

Table 7.10.RME and 7.11.RME Supplement
Calculation of DAevent
Pond Surface Water, Trespasser/Visitor
Site 7, NAB Little Creek

Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Permeability Constant (PC) (cm/hr)	Lag Time (t) (hr)	Duration of Event (ET) (hr)	t* (hr)	B (dimensionless)	DAevent (mg/cm^2-event)	Eq
Arsenic	2.51E+00	µg/L	1.0E-03	N/A	2.6E+00	N/A	N/A	6.5E-09	1

Inorganics: DAevent (mg/cm2-event) =
PC x CW x ET x CF1 x CF2 (eq 1)

Organics: DAevent (mg/cm2-event) =

ET<t*: DAevent (mg/cm2-event) =
2 x PC x CW x (sqrt((6 x t x ET)/3.1415))
x CF1 x CF2 (eq 2)

ET>t*: DAevent (mg/cm2-event) =
PC x CW x (ET/(1+B) + 2 x t x ((1 + 3xB)/(1+B))
x CF1 x CF2 (eq 3)

Permeability constants from EPA 1992, Dermal Exposure Assessment: Principals and Applications.
ORD, EPA/600/8-91/001B. Default value of 0.001 cm/hour used for inorganics without published values.
N/A - not applicable.

TABLE 7.11.RME
CALCULATION OF NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
Site 7, NAB Little Creek

Scenario Timeframe: Current/Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Pond
Receptor Population: Trespasser/Visitor
Receptor Age: Adolescents

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose (2)	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	Arsenic	2.51E+00	µg/L	2.51E+00	µg/L	M	1.5E-06	mg/kg-day	3.0E-04	mg/kg-day	N/A	N/A	4.9E-03
	(Total)												4.9E-03
Dermal	Arsenic	2.51E+00	µg/L	2.51E+00	µg/L	M	8.2E-08	mg/kg-day	3.0E-04	mg/kg-day	N/A	N/A	2.7E-04
	(Total)												2.7E-04
												Total Hazard Index Across All Exposure Routes/Pathways	5.1E-03

(1) Medium-Specific (M) EPC selected for hazard calculation.
(2) Chronic.

TABLE 7.12.RME
CALCULATION OF NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
Site 7, NAB Little Creek

Scenario Timeframe: Current/Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Canal on West Side of Site
Receptor Population: Trespasser/Visitor
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose (2)	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	1,1,2,2-Tetrachloroethane	1.00E+00	µg/L	1.00E+00	µg/L	M	4.2E-07	mg/kg-day	6.0E-02	mg/kg-day	N/A	N/A	7.1E-06
	Bromodichloromethane	2.00E+00	µg/L	2.00E+00	µg/L	M	8.5E-07	mg/kg-day	2.0E-02	mg/kg-day	N/A	N/A	4.2E-05
	Chloroform	7.03E+00	µg/L	7.03E+00	µg/L	M	3.0E-06	mg/kg-day	1.0E-02	mg/kg-day	N/A	N/A	3.0E-04
	Arsenic	6.20E+00	µg/L	6.20E+00	µg/L	M	2.6E-06	mg/kg-day	3.0E-04	mg/kg-day	N/A	N/A	8.7E-03
	(Total)												9.1E-03
Dermal	1,1,2,2-Tetrachloroethane	1.00E+00	µg/L	1.00E+00	µg/L	M	4.9E-07	mg/kg-day	6.0E-02	mg/kg-day	N/A	N/A	8.2E-06
	Bromodichloromethane	2.00E+00	µg/L	2.00E+00	µg/L	M	6.2E-07	mg/kg-day	2.0E-02	mg/kg-day	N/A	N/A	3.1E-05
	Chloroform	7.03E+00	µg/L	7.03E+00	µg/L	M	2.7E-06	mg/kg-day	1.0E-02	mg/kg-day	N/A	N/A	2.7E-04
	Arsenic	6.20E+00	µg/L	6.20E+00	µg/L	M	2.0E-07	mg/kg-day	3.0E-04	mg/kg-day	N/A	N/A	6.6E-04
	(Total)												9.6E-04
												Total Hazard Index Across All Exposure Routes/Pathways	1.0E-02

(1) Medium-Specific (M) EPC selected for hazard calculation.
(2) Chronic.

Table 7.12.RME and 7.13.RME Supplement
Calculation of DAevent
Canal on West Side of Site Surface Water, Trespasser/Visitor
Site 7, NAB Little Creek

Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Permeability Constant (PC) (cm/hr)	Lag Time (t) (hr)	Duration of Event (ET) (hr)	t* (hr)	B (dimensionless)	DAevent (mg/cm^2-event)	Eq
1,1,2,2-Tetrachloroethane	1.00E+00	µg/L	9.0E-03	9.2E-01	2.6E+00	2.2E+00	2.5E-02	4.0E-08	3
Bromodichloromethane	2.00E+00	µg/L	5.8E-03	8.7E-01	2.6E+00	2.1E+00	1.2E-02	5.0E-08	3
Chloroform	7.03E+00	µg/L	8.9E-03	4.7E-01	2.6E+00	1.1E+00	9.3E-03	2.2E-07	3
Arsenic	6.20E+00	µg/L	1.0E-03	N/A	2.6E+00	N/A	N/A	1.6E-08	1

Inorganics: DAevent (mg/cm2-event) =
PC x CW x ET x CF1 x CF2 (eq 1)

Organics: DAevent (mg/cm2-event) =

ET<t*: DAevent (mg/cm2-event) =
2 x PC x CW x (sqrt((6 x t x ET)/3.1415))
x CF1 x CF2 (eq 2)

ET>t*: DAevent (mg/cm2-event) =
PC x CW x (ET/(1+B) + 2 x t x ((1 + 3xB)/(1+B)))
x CF1 x CF2 (eq 3)

Permeability constants from EPA 1992, Dermal Exposure Assessment: Principals and Applications.
ORD, EPA/600/8-91/001B. Default value of 0.001 cm/hour used for inorganics without published values.
N/A - not applicable.

TABLE 7.13.RME
CALCULATION OF NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
Site 7, NAB Little Creek

Scenario Timeframe: Current/Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Canal on West Side of Site
Receptor Population: Trespasser/Visitor
Receptor Age: Adolescents

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose (2)	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	1,1,2,2-Tetrachloroethane	1.00E+00	µg/L	1.00E+00	µg/L	M	5.8E-07	mg/kg-day	6.0E-02	mg/kg-day	N/A	N/A	9.7E-06
	Bromodichloromethane	2.00E+00	µg/L	2.00E+00	µg/L	M	1.2E-06	mg/kg-day	2.0E-02	mg/kg-day	N/A	N/A	5.8E-05
	Chloroform	7.03E+00	µg/L	7.03E+00	µg/L	M	4.1E-06	mg/kg-day	1.0E-02	mg/kg-day	N/A	N/A	4.1E-04
	Arsenic	6.20E+00	µg/L	6.20E+00	µg/L	M	3.6E-06	mg/kg-day	3.0E-04	mg/kg-day	N/A	N/A	1.2E-02
	(Total)												1.2E-02
Dermal	1,1,2,2-Tetrachloroethane	1.00E+00	µg/L	1.00E+00	µg/L	M	5.1E-07	mg/kg-day	6.0E-02	mg/kg-day	N/A	N/A	8.4E-06
	Bromodichloromethane	2.00E+00	µg/L	2.00E+00	µg/L	M	6.3E-07	mg/kg-day	2.0E-02	mg/kg-day	N/A	N/A	3.2E-05
	Chloroform	7.03E+00	µg/L	7.03E+00	µg/L	M	2.8E-06	mg/kg-day	1.0E-02	mg/kg-day	N/A	N/A	2.8E-04
	Arsenic	6.20E+00	µg/L	6.20E+00	µg/L	M	2.0E-07	mg/kg-day	3.0E-04	mg/kg-day	N/A	N/A	6.8E-04
	(Total)												9.9E-04
												Total Hazard Index Across All Exposure Routes/Pathways	1.3E-02

(1) Medium-Specific (M) EPC selected for hazard calculation.
(2) Chronic.

TABLE 7.14.RME
CALCULATION OF NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
Site 7, NAB Little Creek

Scenario Timeframe: Future
Medium: Sediment
Exposure Medium: Sediment
Exposure Point: Pond
Receptor Population: Trespasser/Visitor
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose (2)	Reference Dose Units	Reference Concentration	Reference Concentratio Units	Hazard Quotient
Ingestion	Arsenic	7.68E+00	mg/kg	7.68E+00	mg/kg	M	7.8E-07	mg/kg-day	3.0E-04	mg/kg-day	N/A	N/A	2.6E-03
	Iron	2.18E+04	mg/kg	2.18E+04	mg/kg	M	2.2E-03	mg/kg-day	3.0E-01	mg/kg-day	N/A	N/A	7.4E-03
	Vanadium	3.17E+01	mg/kg	3.17E+01	mg/kg	M	3.2E-06	mg/kg-day	1.0E-03	mg/kg-day	N/A	N/A	3.2E-03
	(Total)												1.3E-02
Dermal	Arsenic	7.68E+00	mg/kg	7.68E+00	mg/kg	M	4.8E-07	mg/kg-day	3.0E-04	mg/kg-day	N/A	N/A	1.6E-03
	Iron	2.18E+04	mg/kg	2.18E+04	mg/kg	M	4.6E-04	mg/kg-day	3.0E-01	mg/kg-day	N/A	N/A	1.5E-03
	Vanadium	3.17E+01	mg/kg	3.17E+01	mg/kg	M	6.7E-07	mg/kg-day	2.6E-05	mg/kg-day	N/A	N/A	2.6E-02
	(Total)												2.9E-02
												Total Hazard Index Across All Exposure Routes/Pathways	4.2E-02

(1) Medium-Specific (M) EPC selected for hazard calculation.
(2) Chronic.

TABLE 7.15.RME
CALCULATION OF NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
Site 7, NAB Little Creek

Scenario Timeframe: Future
Medium: Sediment
Exposure Medium: Sediment
Exposure Point: Pond
Receptor Population: Trespasser/Visitor
Receptor Age: Adolescents

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose (2)	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	Arsenic	7.68E+00	mg/kg	7.68E+00	mg/kg	M	1.1E-06	mg/kg-day	3.0E-04	mg/kg-day	N/A	N/A	3.6E-03
	Iron	2.18E+04	mg/kg	2.18E+04	mg/kg	M	3.0E-03	mg/kg-day	3.0E-01	mg/kg-day	N/A	N/A	1.0E-02
	Vanadium	3.17E+01	mg/kg	3.17E+01	mg/kg	M	4.4E-06	mg/kg-day	1.0E-03	mg/kg-day	N/A	N/A	4.4E-03
	(Total)												1.8E-02
Dermal	Arsenic	7.68E+00	mg/kg	7.68E+00	mg/kg	M	5.8E-07	mg/kg-day	3.0E-04	mg/kg-day	N/A	N/A	1.9E-03
	Iron	2.18E+04	mg/kg	2.18E+04	mg/kg	M	5.5E-04	mg/kg-day	3.0E-01	mg/kg-day	N/A	N/A	1.8E-03
	Vanadium	3.17E+01	mg/kg	3.17E+01	mg/kg	M	8.0E-07	mg/kg-day	2.6E-05	mg/kg-day	N/A	N/A	3.1E-02
	(Total)												3.4E-02
												Total Hazard Index Across All Exposure Routes/Pathways	5.3E-02

(1) Medium-Specific (M) EPC selected for hazard calculation.
(2) Chronic.

TABLE 7.16.RME
CALCULATION OF NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
Site 7, NAB Little Creek

Scenario Timeframe: Future
Medium: Sediment
Exposure Medium: Sediment
Exposure Point: Canal on West Side of Site
Receptor Population: Trespasser/Visitor
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose (2)	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	Arsenic	6.15E+00	mg/kg	6.15E+00	mg/kg	M	6.3E-07	mg/kg-day	3.0E-04	mg/kg-day	N/A	N/A	2.1E-03
	Vanadium	3.17E+01	mg/kg	3.17E+01	mg/kg	M	3.2E-06	mg/kg-day	1.0E-03	mg/kg-day	N/A	N/A	3.2E-03
	(Total)												5.3E-03
Dermal	Arsenic	6.15E+00	mg/kg	6.15E+00	mg/kg	M	3.9E-07	mg/kg-day	3.0E-04	mg/kg-day	N/A	N/A	1.3E-03
	Vanadium	3.17E+01	mg/kg	3.17E+01	mg/kg	M	6.7E-07	mg/kg-day	2.6E-05	mg/kg-day	N/A	N/A	2.6E-02
	(Total)												2.7E-02
												Total Hazard Index Across All Exposure Routes/Pathways	3.2E-02

(1) Medium-Specific (M) EPC selected for hazard calculation.
(2) Chronic.

TABLE 7.17.RME
CALCULATION OF NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
Site 7, NAB Little Creek

Scenario Timeframe: Future
Medium: Sediment
Exposure Medium: Sediment
Exposure Point: Canal on West Side of Site
Receptor Population: Trespasser/Visitor
Receptor Age: Adolescents

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose (2)	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	Arsenic	6.15E+00	mg/kg	6.15E+00	mg/kg	M	8.6E-07	mg/kg-day	3.0E-04	mg/kg-day	N/A	N/A	2.9E-03
	Vanadium	3.17E+01	mg/kg	3.17E+01	mg/kg	M	4.4E-06	mg/kg-day	1.0E-03	mg/kg-day	N/A	N/A	4.4E-03
	(Total)												7.3E-03
Dermal	Arsenic	6.15E+00	mg/kg	6.15E+00	mg/kg	M	4.6E-07	mg/kg-day	3.0E-04	mg/kg-day	N/A	N/A	1.5E-03
	Vanadium	3.17E+01	mg/kg	3.17E+01	mg/kg	M	8.0E-07	mg/kg-day	2.6E-05	mg/kg-day	N/A	N/A	3.1E-02
	(Total)												3.2E-02
												Total Hazard Index Across All Exposure Routes/Pathways	3.9E-02

(1) Medium-Specific (M) EPC selected for hazard calculation.
(2) Chronic.

TABLE 7.18.RME
CALCULATION OF NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
Site 7, NAB Little Creek

Scenario Timeframe: Future
Medium: Sediment
Exposure Medium: Sediment
Exposure Point: Canal on East Side of Site
Receptor Population: Trespasser/Visitor
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose (2)	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	Arsenic (Total)	5.10E+00	mg/kg	5.10E+00	mg/kg	M	5.2E-07	mg/kg-day	3.0E-04	mg/kg-day	N/A	N/A	1.7E-03
													1.7E-03
Dermal	Arsenic (Total)	5.10E+00	mg/kg	5.10E+00	mg/kg	M	3.2E-07	mg/kg-day	3.0E-04	mg/kg-day	N/A	N/A	1.1E-03
													1.1E-03
Total Hazard Index Across All Exposure Routes/Pathways													2.8E-03

(1) Medium-Specific (M) EPC selected for hazard calculation.
(2) Chronic.

TABLE 7.19.RME
CALCULATION OF NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
Site 7, NAB Little Creek

Scenario Timeframe: Future
Medium: Sediment
Exposure Medium: Sediment
Exposure Point: Canal on East Side of Site
Receptor Population: Trespasser/Visitor
Receptor Age: Adolescents

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose (2)	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	Arsenic (Total)	5.10E+00	mg/kg	5.10E+00	mg/kg	M	7.1E-07	mg/kg-day	3.0E-04	mg/kg-day	N/A	N/A	2.4E-03
													2.4E-03
Dermal	Arsenic (Total)	5.10E+00	mg/kg	5.10E+00	mg/kg	M	3.8E-07	mg/kg-day	3.0E-04	mg/kg-day	N/A	N/A	1.3E-03
													1.3E-03
												Total Hazard Index Across All Exposure Routes/Pathways	3.7E-03

(1) Medium-Specific (M) EPC selected for hazard calculation.
(2) Chronic.

TABLE 7.20.RME
CALCULATION OF NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
Site 7, NAB Little Creek

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater
Exposure Point: Upper Aquifer - Tap Water
Receptor Population: Resident
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose (2)	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	Aluminum	3.96E+03	µg/L	3.96E+03	µg/L	M	1.1E-01	mg/kg-day	1.0E+00	mg/kg-day	N/A	N/A	1.1E-01
	Arsenic	6.80E+00	µg/L	6.80E+00	µg/L	M	1.9E-04	mg/kg-day	3.0E-04	mg/kg-day	N/A	N/A	6.2E-01
	Chromium	2.34E+01	µg/L	2.34E+01	µg/L	M	6.4E-04	mg/kg-day	3.0E-03	mg/kg-day	N/A	N/A	2.1E-01
	Iron	9.55E+03	µg/L	9.55E+03	µg/L	M	2.6E-01	mg/kg-day	3.0E-01	mg/kg-day	N/A	N/A	8.7E-01
	Manganese	6.15E+02	µg/L	6.15E+02	µg/L	M	1.7E-02	mg/kg-day	2.0E-02	mg/kg-day	N/A	N/A	8.4E-01
	Vanadium	8.90E+00	µg/L	8.90E+00	µg/L	M	2.4E-04	mg/kg-day	1.0E-03	mg/kg-day	N/A	N/A	2.4E-01
	(Total)												2.9E+00
Dermal	Aluminum	3.96E+03	µg/L	3.96E+03	µg/L	M	2.2E-04	mg/kg-day	1.0E+00	mg/kg-day	N/A	N/A	2.2E-04
	Arsenic	6.80E+00	µg/L	6.80E+00	µg/L	M	3.7E-07	mg/kg-day	3.0E-04	mg/kg-day	N/A	N/A	1.2E-03
	Chromium	2.34E+01	µg/L	2.34E+01	µg/L	M	1.3E-06	mg/kg-day	7.5E-05	mg/kg-day	N/A	N/A	1.7E-02
	Iron	9.55E+03	µg/L	9.55E+03	µg/L	M	5.2E-04	mg/kg-day	3.0E-01	mg/kg-day	N/A	N/A	1.7E-03
	Manganese	6.15E+02	µg/L	6.15E+02	µg/L	M	3.4E-05	mg/kg-day	8.0E-04	mg/kg-day	N/A	N/A	4.2E-02
	Vanadium	8.90E+00	µg/L	8.90E+00	µg/L	M	4.9E-07	mg/kg-day	2.6E-05	mg/kg-day	N/A	N/A	1.9E-02
	(Total)												8.1E-02
												Total Hazard Index Across All Exposure Routes/Pathways	3.0E+00

(1) Medium-Specific (M) EPC selected for hazard calculation.
(2) Chronic.

Table 7.20.RME Supplement
Calculation of DAevent
Groundwater, Adult
Site 7, NAB Little Creek

Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Permeability Constant (PC) (cm/hr)	Lag Time (t) (hr)	Duration of Event (ET) (hr)	t* (hr)	B (dimensionless)	DAevent (mg/cm^2-event)	Eq
Aluminum	3.96E+03	µg/L	1.0E-03	N/A	2.0E-01	N/A	N/A	7.9E-07	1
Arsenic	6.80E+00	µg/L	1.0E-03	N/A	2.0E-01	N/A	N/A	1.4E-09	1
Chromium	2.34E+01	µg/L	1.0E-03	N/A	2.0E-01	N/A	N/A	4.7E-09	1
Iron	9.55E+03	µg/L	1.0E-03	N/A	2.0E-01	N/A	N/A	1.9E-06	1
Manganese	6.15E+02	µg/L	1.0E-03	N/A	2.0E-01	N/A	N/A	1.2E-07	1
Vanadium	8.90E+00	µg/L	1.0E-03	N/A	2.0E-01	N/A	N/A	1.8E-09	1

Inorganics: DAevent (mg/cm2-event) =
PC x CW x ET x CF1 x CF2 (eq 1)

Organics: DAevent (mg/cm2-event) =

ET<t*: DAevent (mg/cm2-event) =
2 x PC x CW x (sqrt((6 x t x ET)/3.1415))
x CF1 x CF2 (eq 2)

ET>t*: DAevent (mg/cm2-event) =
PC x CW x (ET/(1+B) + 2 x t x ((1 + 3xB)/(1+B))
x CF1 x CF2 (eq 3)

Permeability constants from EPA 1992, Dermal Exposure Assessment: Principals and Applications.
ORD, EPA/600/8-91/001B. Default value of 0.001 cm/hour used for inorganics without published values.
N/A - not applicable.

TABLE 7.21.RME
CALCULATION OF NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
Site 7, NAB Little Creek

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater
Exposure Point: Upper Aquifer - Tap Water
Receptor Population: Resident
Receptor Age: Child

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose (2)	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	Aluminum	3.96E+03	µg/L	3.96E+03	µg/L	M	2.5E-01	mg/kg-day	1.0E+00	mg/kg-day	N/A	N/A	2.5E-01
	Arsenic	6.80E+00	µg/L	6.80E+00	µg/L	M	4.3E-04	mg/kg-day	3.0E-04	mg/kg-day	N/A	N/A	1.4E+00
	Chromium	2.34E+01	µg/L	2.34E+01	µg/L	M	1.5E-03	mg/kg-day	3.0E-03	mg/kg-day	N/A	N/A	5.0E-01
	Iron	9.55E+03	µg/L	9.55E+03	µg/L	M	6.1E-01	mg/kg-day	3.0E-01	mg/kg-day	N/A	N/A	2.0E+00
	Manganese	6.15E+02	µg/L	6.15E+02	µg/L	M	3.9E-02	mg/kg-day	2.0E-02	mg/kg-day	N/A	N/A	2.0E+00
	Vanadium	8.90E+00	µg/L	8.90E+00	µg/L	M	5.7E-04	mg/kg-day	1.0E-03	mg/kg-day	N/A	N/A	5.7E-01
	(Total)												6.8E+00
Dermal	Aluminum	3.96E+03	µg/L	3.96E+03	µg/L	M	6.3E-04	mg/kg-day	1.0E+00	mg/kg-day	N/A	N/A	6.3E-04
	Arsenic	6.80E+00	µg/L	6.80E+00	µg/L	M	1.1E-06	mg/kg-day	3.0E-04	mg/kg-day	N/A	N/A	3.6E-03
	Chromium	2.34E+01	µg/L	2.34E+01	µg/L	M	3.7E-06	mg/kg-day	7.5E-05	mg/kg-day	N/A	N/A	4.9E-02
	Iron	9.55E+03	µg/L	9.55E+03	µg/L	M	1.5E-03	mg/kg-day	3.0E-01	mg/kg-day	N/A	N/A	5.0E-03
	Manganese	6.15E+02	µg/L	6.15E+02	µg/L	M	9.7E-05	mg/kg-day	8.0E-04	mg/kg-day	N/A	N/A	1.2E-01
	Vanadium	8.90E+00	µg/L	8.90E+00	µg/L	M	1.4E-06	mg/kg-day	2.6E-05	mg/kg-day	N/A	N/A	5.4E-02
	(Total)												2.3E-01
												Total Hazard Index Across All Exposure Routes/Pathways	7.0E+00

(1) Medium-Specific (M) EPC selected for hazard calculation.
(2) Chronic.

Table 7.21.RME Supplement
Calculation of DAevent
Groundwater, Child
Site 7, NAB Little Creek

Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Permeability Constant (PC) (cm/hr)	Lag Time (t) (hr)	Duration of Event (ET) (hr)	t* (hr)	B (dimensionless)	DAevent (mg/cm^2-event)	Eq
Aluminum	3.96E+03	µg/L	1.0E-03	N/A	3.3E-01	N/A	N/A	1.3E-06	1
Arsenic	6.80E+00	µg/L	1.0E-03	N/A	3.3E-01	N/A	N/A	2.2E-09	1
Chromium	2.34E+01	µg/L	1.0E-03	N/A	3.3E-01	N/A	N/A	7.7E-09	1
Iron	9.55E+03	µg/L	1.0E-03	N/A	3.3E-01	N/A	N/A	3.2E-06	1
Manganese	6.15E+02	µg/L	1.0E-03	N/A	3.3E-01	N/A	N/A	2.0E-07	1
Vanadium	8.90E+00	µg/L	1.0E-03	N/A	3.3E-01	N/A	N/A	2.9E-09	1

Inorganics: DAevent (mg/cm2-event) =
PC x CW x ET x CF1 x CF2 (eq 1)

Organics: DAevent (mg/cm2-event) =

ET<t*: DAevent (mg/cm2-event) =
2 x PC x CW x (sqrt((6 x t x ET)/3.1415))
x CF1 x CF2 (eq 2)

ET>t*: DAevent (mg/cm2-event) =
PC x CW x (ET/(1+B) + 2 x t x ((1 + 3xB)/(1+B))
x CF1 x CF2 (eq 3)

Permeability constants from EPA 1992, Dermal Exposure Assessment: Principals and Applications.
ORD, EPA/600/8-91/001B. Default value of 0.001 cm/hour used for inorganics without published values.
N/A - not applicable.

TABLE 7.22.RME
CALCULATION OF NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
Site 7, NAB Little Creek

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater
Exposure Point: Upper Aquifer - Tap Water
Receptor Population: Industrial Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose (2)	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	Aluminum	3.96E+03	µg/L	3.96E+03	µg/L	M	3.9E-02	mg/kg-day	1.0E+00	mg/kg-day	N/A	N/A	3.9E-02
	Arsenic	6.80E+00	µg/L	6.80E+00	µg/L	M	6.7E-05	mg/kg-day	3.0E-04	mg/kg-day	N/A	N/A	2.2E-01
	Chromium	2.34E+01	µg/L	2.34E+01	µg/L	M	2.3E-04	mg/kg-day	3.0E-03	mg/kg-day	N/A	N/A	7.6E-02
	Iron	9.55E+03	µg/L	9.55E+03	µg/L	M	9.3E-02	mg/kg-day	3.0E-01	mg/kg-day	N/A	N/A	3.1E-01
	Manganese	6.15E+02	µg/L	6.15E+02	µg/L	M	6.0E-03	mg/kg-day	2.0E-02	mg/kg-day	N/A	N/A	3.0E-01
	Vanadium	8.90E+00	µg/L	8.90E+00	µg/L	M	8.7E-05	mg/kg-day	1.0E-03	mg/kg-day	N/A	N/A	8.7E-02
	(Total)												1.0E+00
												Total Hazard Index Across All Exposure Routes/Pathways	1.0E+00

(1) Medium-Specific (M) EPC selected for hazard calculation.
(2) Chronic.

TABLE 7.23.RME
CALCULATION OF NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
Site 7, NAB Little Creek

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater
Exposure Point: Upper Aquifer - Excavation Pit
Receptor Population: Construction Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose (2)	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Dermal	Aluminum	3.96E+03	µg/L	3.96E+03	µg/L	M	8.2E-04	mg/kg-day	1.0E+00	mg/kg-day	N/A	N/A	8.2E-04
	Arsenic	6.80E+00	µg/L	6.80E+00	µg/L	M	1.4E-06	mg/kg-day	3.0E-04	mg/kg-day	N/A	N/A	4.7E-03
	Chromium	2.34E+01	µg/L	2.34E+01	µg/L	M	4.9E-06	mg/kg-day	5.0E-04	mg/kg-day	N/A	N/A	9.7E-03
	Iron	9.55E+03	µg/L	9.55E+03	µg/L	M	2.0E-03	mg/kg-day	3.0E-01	mg/kg-day	N/A	N/A	6.6E-03
	Manganese	6.15E+02	µg/L	6.15E+02	µg/L	M	1.3E-04	mg/kg-day	8.0E-04	mg/kg-day	N/A	N/A	1.6E-01
	Vanadiuum	8.90E+00	µg/L	8.90E+00	µg/L	M	1.8E-06	mg/kg-day	2.6E-05	mg/kg-day	N/A	N/A	7.1E-02
	(Total)												2.5E-01
												Total Hazard Index Across All Exposure Routes/Pathways	2.5E-01

(1) Medium-Specific (M) EPC selected for hazard calculation.
(2) Subchronic. If subchronic value not available, chronic value used.

Table 7.23.RME Supplement
Calculation of DAevent
Groundwater, Adult Construction Worker
Site 7, NAB Little Creek

Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Permeability Constant (PC) (cm/hr)	Lag Time (t) (hr)	Duration of Event (ET) (hr)	t* (hr)	B (dimensionless)	DAevent (mg/cm^2-event)	Eq
Aluminum	3.96E+03	µg/L	1.0E-03	N/A	8.0E+00	N/A	N/A	3.2E-05	1
Arsenic	6.80E+00	µg/L	1.0E-03	N/A	8.0E+00	N/A	N/A	5.4E-08	1
Chromium	2.34E+01	µg/L	1.0E-03	N/A	8.0E+00	N/A	N/A	1.9E-07	1
Iron	9.55E+03	µg/L	1.0E-03	N/A	8.0E+00	N/A	N/A	7.6E-05	1
Manganese	6.15E+02	µg/L	1.0E-03	N/A	8.0E+00	N/A	N/A	4.9E-06	1
Vanadium	8.90E+00	µg/L	1.0E-03	N/A	8.0E+00	N/A	N/A	7.1E-08	1

Inorganics: DAevent (mg/cm2-event) =
PC x CW x ET x CF1 x CF2 (eq 1)

Organics: DAevent (mg/cm2-event) =

ET<t*: DAevent (mg/cm2-event) =
2 x PC x CW x (sqrt((6 x t x ET)/3.1415))
x CF1 x CF2 (eq 2)

ET>t*: DAevent (mg/cm2-event) =
PC x CW x (ET/(1+B) + 2 x t x ((1 + 3xB)/(1+B))
x CF1 x CF2 (eq 3)

Permeability constants from EPA 1992, Dermal Exposure Assessment: Principals and Applications.
ORD, EPA/600/8-91/001B. Default value of 0.001 cm/hour used for inorganics without published values.
N/A - not applicable.

TABLE 7.24.RME
CALCULATION OF NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
Site 7, NAB Little Creek

Scenario Timeframe: Future
Medium: Soil*
Exposure Medium: Soil
Exposure Point: Weigh Station Area
Receptor Population: Construction Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose (2)	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	Aroclor-1260	9.20E-01	mg/kg	9.20E-01	mg/kg	M	2.2E-06	mg/kg-day	N/A		N/A	N/A	
	Arsenic	2.30E+00	mg/kg	2.30E+00	mg/kg	M	5.4E-06	mg/kg-day	3.0E-04	mg/kg-day	N/A	N/A	1.8E-02
	Chromium	2.65E+01	mg/kg	2.65E+01	mg/kg	M	6.2E-05	mg/kg-day	2.0E-02	mg/kg-day	N/A	N/A	3.1E-03
	Copper	3.96E+02	mg/kg	3.96E+02	mg/kg	M	9.3E-04	mg/kg-day	4.0E-02	mg/kg-day	N/A	N/A	2.3E-02
	Iron	1.48E+04	mg/kg	1.48E+04	mg/kg	M	3.5E-02	mg/kg-day	3.0E-01	mg/kg-day	N/A	N/A	1.2E-01
	Lead	6.38E+02	mg/kg	6.38E+02	mg/kg	M	1.5E-03	mg/kg-day	N/A		N/A	N/A	
	Manganese	4.70E+02	mg/kg	4.70E+02	mg/kg	M	1.1E-03	mg/kg-day	2.0E-02	mg/kg-day	N/A	N/A	5.5E-02
	Vanadium	3.67E+01	mg/kg	3.67E+01	mg/kg	M	8.6E-05	mg/kg-day	1.0E-03	mg/kg-day	N/A	N/A	8.6E-02
	(Total)												3.0E-01
Dermal	Aroclor-1260	9.20E-01	mg/kg	9.20E-01	mg/kg	M	8.0E-07	mg/kg-day	N/A		N/A	N/A	
	Arsenic	2.30E+00	mg/kg	2.30E+00	mg/kg	M	4.3E-07	mg/kg-day	3.0E-04	mg/kg-day	N/A	N/A	1.4E-03
	Chromium	2.65E+01	mg/kg	2.65E+01	mg/kg	M	1.6E-06	mg/kg-day	5.0E-04	mg/kg-day	N/A	N/A	3.3E-03
	Copper	3.96E+02	mg/kg	3.96E+02	mg/kg	M	2.5E-05	mg/kg-day	4.0E-02	mg/kg-day	N/A	N/A	6.2E-04
	Iron	1.48E+04	mg/kg	1.48E+04	mg/kg	M	9.2E-04	mg/kg-day	3.0E-01	mg/kg-day	N/A	N/A	3.1E-03
	Lead	6.38E+02	mg/kg	6.38E+02	mg/kg	M	4.0E-05	mg/kg-day	N/A		N/A	N/A	
	Manganese	4.70E+02	mg/kg	4.70E+02	mg/kg	M	2.9E-05	mg/kg-day	8.0E-04	mg/kg-day	N/A	N/A	3.7E-02
	Vanadium	3.67E+01	mg/kg	3.67E+01	mg/kg	M	2.3E-06	mg/kg-day	2.6E-05	mg/kg-day	N/A	N/A	8.8E-02
	(Total)												1.3E-01
												Total Hazard Index Across All Exposure Routes/Pathways	4.3E-01

(1) Medium-Specific (M) EPC selected for hazard calculation.
(2) Subchronic, if available, else chronic.

TABLE 7.25.RME
CALCULATION OF NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
Site 7, NAB Little Creek

Scenario Timeframe: Future
Medium: Soil*
Exposure Medium: Soil
Exposure Point: Weigh Station Area
Receptor Population: Industrial Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose (2)	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	Aroclor-1260	9.20E-01	mg/kg	9.20E-01	mg/kg	M	9.0E-07	mg/kg-day	N/A		N/A	N/A	
	Arsenic	2.30E+00	mg/kg	2.30E+00	mg/kg	M	2.3E-06	mg/kg-day	3.0E-04	mg/kg-day	N/A	N/A	7.5E-03
	Chromium	2.65E+01	mg/kg	2.65E+01	mg/kg	M	2.6E-05	mg/kg-day	3.0E-03	mg/kg-day	N/A	N/A	8.6E-03
	Copper	3.96E+02	mg/kg	3.96E+02	mg/kg	M	3.9E-04	mg/kg-day	4.0E-02	mg/kg-day	N/A	N/A	9.7E-03
	Iron	1.48E+04	mg/kg	1.48E+04	mg/kg	M	1.4E-02	mg/kg-day	3.0E-01	mg/kg-day	N/A	N/A	4.8E-02
	Lead	6.38E+02	mg/kg	6.38E+02	mg/kg	M	6.2E-04	mg/kg-day	N/A		N/A	N/A	
	Manganese	4.70E+02	mg/kg	4.70E+02	mg/kg	M	4.6E-04	mg/kg-day	2.0E-02	mg/kg-day	N/A	N/A	2.3E-02
	Vanaduim	3.67E+01	mg/kg	3.67E+01	mg/kg	M	3.6E-05	mg/kg-day	1.0E-03	mg/kg-day	N/A	N/A	3.6E-02
	(Total)												1.3E-01
Dermal	Aroclor-1260	9.20E-01	mg/kg	9.20E-01	mg/kg	M	2.1E-06	mg/kg-day	N/A		N/A	N/A	
	Arsenic	2.30E+00	mg/kg	2.30E+00	mg/kg	M	1.1E-06	mg/kg-day	3.0E-04	mg/kg-day	N/A	N/A	3.8E-03
	Chromium	2.65E+01	mg/kg	2.65E+01	mg/kg	M	4.4E-06	mg/kg-day	7.5E-05	mg/kg-day	N/A	N/A	5.9E-02
	Copper	3.96E+02	mg/kg	3.96E+02	mg/kg	M	6.6E-05	mg/kg-day	4.0E-02	mg/kg-day	N/A	N/A	1.6E-03
	Iron	1.48E+04	mg/kg	1.48E+04	mg/kg	M	2.5E-03	mg/kg-day	3.0E-01	mg/kg-day	N/A	N/A	8.2E-03
	Lead	6.38E+02	mg/kg	6.38E+02	mg/kg	M	1.1E-04	mg/kg-day	N/A		N/A	N/A	
	Manganese	4.70E+02	mg/kg	4.70E+02	mg/kg	M	7.8E-05	mg/kg-day	8.0E-04	mg/kg-day	N/A	N/A	9.7E-02
	Vanadium	3.67E+01	mg/kg	3.67E+01	mg/kg	M	6.1E-06	mg/kg-day	2.6E-05	mg/kg-day	N/A	N/A	2.3E-01
	(Total)												4.0E-01
												Total Hazard Index Across All Exposure Routes/Pathways	5.4E-01

(1) Medium-Specific (M) EPC selected for hazard calculation.
(2) Chronic.

TABLE 7.26.RME
CALCULATION OF NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
Site 7, NAB Little Creek

Scenario Timeframe: Future
Medium: Soil*
Exposure Medium: Soil
Exposure Point: Weigh Station Area
Receptor Population: Resident
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose (2)	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	Aroclor-1260	9.20E-01	mg/kg	9.20E-01	mg/kg	M	1.3E-06	mg/kg-day	N/A		N/A	N/A	
	Arsenic	2.30E+00	mg/kg	2.30E+00	mg/kg	M	3.2E-06	mg/kg-day	3.0E-04	mg/kg-day	N/A	N/A	1.1E-02
	Chromium	2.65E+01	mg/kg	2.65E+01	mg/kg	M	3.6E-05	mg/kg-day	3.0E-03	mg/kg-day	N/A	N/A	1.2E-02
	Copper	3.96E+02	mg/kg	3.96E+02	mg/kg	M	5.4E-04	mg/kg-day	4.0E-02	mg/kg-day	N/A	N/A	1.4E-02
	Iron	1.48E+04	mg/kg	1.48E+04	mg/kg	M	2.0E-02	mg/kg-day	3.0E-01	mg/kg-day	N/A	N/A	6.8E-02
	Lead	6.38E+02	mg/kg	6.38E+02	mg/kg	M	8.7E-04	mg/kg-day	N/A		N/A	N/A	
	Manganese	4.70E+02	mg/kg	4.70E+02	mg/kg	M	6.4E-04	mg/kg-day	2.0E-02	mg/kg-day	N/A	N/A	3.2E-02
	Vanadium	3.67E+01	mg/kg	3.67E+01	mg/kg	M	5.0E-05	mg/kg-day	1.0E-03	mg/kg-day	N/A	N/A	5.0E-02
	(Total)												1.9E-01
Dermal	Aroclor-1260	9.20E-01	mg/kg	9.20E-01	mg/kg	M	2.3E-06	mg/kg-day	N/A		N/A	N/A	
	Arsenic	2.30E+00	mg/kg	2.30E+00	mg/kg	M	1.2E-06	mg/kg-day	3.0E-04	mg/kg-day	N/A	N/A	4.2E-03
	Chromium	2.65E+01	mg/kg	2.65E+01	mg/kg	M	4.8E-06	mg/kg-day	7.5E-05	mg/kg-day	N/A	N/A	6.4E-02
	Copper	3.96E+02	mg/kg	3.96E+02	mg/kg	M	7.2E-05	mg/kg-day	4.0E-02	mg/kg-day	N/A	N/A	1.8E-03
	Iron	1.48E+04	mg/kg	1.48E+04	mg/kg	M	2.7E-03	mg/kg-day	3.0E-01	mg/kg-day	N/A	N/A	8.9E-03
	Lead	6.38E+02	mg/kg	6.38E+02	mg/kg	M	1.2E-04	mg/kg-day	N/A		N/A	N/A	
	Manganese	4.70E+02	mg/kg	4.70E+02	mg/kg	M	8.5E-05	mg/kg-day	8.0E-04	mg/kg-day	N/A	N/A	1.1E-01
	Vanadium	3.67E+01	mg/kg	3.67E+01	mg/kg	M	6.6E-06	mg/kg-day	2.6E-05	mg/kg-day	N/A	N/A	2.6E-01
	(Total)												4.4E-01
												Total Hazard Index Across All Exposure Routes/Pathways	6.3E-01

(1) Medium-Specific (M) EPC selected for hazard calculation.
(2) Chronic.

TABLE 7.27.RME
CALCULATION OF NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
Site 7, NAB Little Creek

Scenario Timeframe: Future
Medium: Soil*
Exposure Medium: Soil
Exposure Point: Weigh Station Area
Receptor Population: Resident
Receptor Age: Child

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose (2)	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	Aroclor-1260	9.20E-01	mg/kg	9.20E-01	mg/kg	M	1.2E-05	mg/kg-day	N/A		N/A	N/A	
	Arsenic	2.30E+00	mg/kg	2.30E+00	mg/kg	M	2.9E-05	mg/kg-day	3.0E-04	mg/kg-day	N/A	N/A	9.8E-02
	Chromium	2.65E+01	mg/kg	2.65E+01	mg/kg	M	3.4E-04	mg/kg-day	3.0E-03	mg/kg-day	N/A	N/A	1.1E-01
	Copper	3.96E+02	mg/kg	3.96E+02	mg/kg	M	5.1E-03	mg/kg-day	4.0E-02	mg/kg-day	N/A	N/A	1.3E-01
	Iron	1.48E+04	mg/kg	1.48E+04	mg/kg	M	1.9E-01	mg/kg-day	3.0E-01	mg/kg-day	N/A	N/A	6.3E-01
	Lead	6.38E+02	mg/kg	6.38E+02	mg/kg	M	8.2E-03	mg/kg-day	N/A		N/A	N/A	
	Manganese	4.70E+02	mg/kg	4.70E+02	mg/kg	M	6.0E-03	mg/kg-day	2.0E-02	mg/kg-day	N/A	N/A	3.0E-01
	Vanadium	3.67E+01	mg/kg	3.67E+01	mg/kg	M	4.7E-04	mg/kg-day	1.0E-03	mg/kg-day	N/A	N/A	4.7E-01
	(Total)												1.7E+00
Dermal	Aroclor-1260	9.20E-01	mg/kg	9.20E-01	mg/kg	M	3.1E-06	mg/kg-day	N/A		N/A	N/A	
	Arsenic	2.30E+00	mg/kg	2.30E+00	mg/kg	M	1.6E-06	mg/kg-day	3.0E-04	mg/kg-day	N/A	N/A	5.5E-03
	Chromium	2.65E+01	mg/kg	2.65E+01	mg/kg	M	6.3E-06	mg/kg-day	7.5E-05	mg/kg-day	N/A	N/A	8.4E-02
	Copper	3.96E+02	mg/kg	3.96E+02	mg/kg	M	9.5E-05	mg/kg-day	4.0E-02	mg/kg-day	N/A	N/A	2.4E-03
	Iron	1.48E+04	mg/kg	1.48E+04	mg/kg	M	3.5E-03	mg/kg-day	3.0E-01	mg/kg-day	N/A	N/A	1.2E-02
	Lead	6.38E+02	mg/kg	6.38E+02	mg/kg	M	1.5E-04	mg/kg-day	N/A		N/A	N/A	
	Manganese	4.70E+02	mg/kg	4.70E+02	mg/kg	M	1.1E-04	mg/kg-day	8.0E-04	mg/kg-day	N/A	N/A	1.4E-01
	Vanadium	3.67E+01	mg/kg	3.67E+01	mg/kg	M	8.8E-06	mg/kg-day	2.6E-05	mg/kg-day	N/A	N/A	3.4E-01
	(Total)												5.8E-01
												Total Hazard Index Across All Exposure Routes/Pathways	2.3E+00

(1) Medium-Specific (M) EPC selected for hazard calculation.
(2) Chronic.

TABLE 7.28.RME
CALCULATION OF NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
Site 7, NAB Little Creek

Scenario Timeframe: Future
Medium: Soil*
Exposure Medium: Soil
Exposure Point: Area to West of Landfill, the "Ear"
Receptor Population: Construction Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose (2)	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	Arsenic	4.60E+00	mg/kg	4.60E+00	mg/kg	M	1.1E-05	mg/kg-day	3.0E-04	mg/kg-day	N/A	N/A	3.6E-02
	Copper	7.47E+02	mg/kg	7.47E+02	mg/kg	M	1.8E-03	mg/kg-day	4.0E-02	mg/kg-day	N/A	N/A	4.4E-02
	Iron	2.18E+04	mg/kg	2.18E+04	mg/kg	M	5.1E-02	mg/kg-day	3.0E-01	mg/kg-day	N/A	N/A	1.7E-01
	Thallium	1.00E+00	mg/kg	1.00E+00	mg/kg	M	2.3E-06	mg/kg-day	7.0E-05	mg/kg-day	N/A	N/A	3.4E-02
	Vanadium	2.60E+01	mg/kg	2.60E+01	mg/kg	M	6.1E-05	mg/kg-day	1.0E-03	mg/kg-day	N/A	N/A	6.1E-02
	(Total)												3.5E-01
Dermal	Arsenic	4.60E+00	mg/kg	4.60E+00	mg/kg	M	8.6E-07	mg/kg-day	3.0E-04	mg/kg-day	N/A	N/A	2.9E-03
	Copper	7.47E+02	mg/kg	7.47E+02	mg/kg	M	4.6E-05	mg/kg-day	4.0E-02	mg/kg-day	N/A	N/A	1.2E-03
	Iron	2.18E+04	mg/kg	2.18E+04	mg/kg	M	1.4E-03	mg/kg-day	3.0E-01	mg/kg-day	N/A	N/A	4.5E-03
	Thallium	1.00E+00	mg/kg	1.00E+00	mg/kg	M	6.2E-08	mg/kg-day	7.0E-05	mg/kg-day	N/A	N/A	8.9E-04
	Vanadium	2.60E+01	mg/kg	2.60E+01	mg/kg	M	1.6E-06	mg/kg-day	2.6E-05	mg/kg-day	N/A	N/A	6.2E-02
	(Total)												7.2E-02
												Total Hazard Index Across All Exposure Routes/Pathways	4.2E-01

(1) Medium-Specific (M) EPC selected for hazard calculation.
(2) Subchronic, if available, else chronic.

TABLE 7.29.RME
CALCULATION OF NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
Site 7, NAB Little Creek

Scenario Timeframe: Future
Medium: Soil*
Exposure Medium: Soil
Exposure Point: Area to West of Landfill, the "Ear"
Receptor Population: Industrial Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose (2)	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	Arsenic	4.60E+00	mg/kg	4.60E+00	mg/kg	M	4.5E-06	mg/kg-day	3.0E-04	mg/kg-day	N/A	N/A	1.5E-02
	Copper	7.47E+02	mg/kg	7.47E+02	mg/kg	M	7.3E-04	mg/kg-day	4.0E-02	mg/kg-day	N/A	N/A	1.8E-02
	Iron	2.18E+04	mg/kg	2.18E+04	mg/kg	M	2.1E-02	mg/kg-day	3.0E-01	mg/kg-day	N/A	N/A	7.1E-02
	Thallium	1.00E+00	mg/kg	1.00E+00	mg/kg	M	9.8E-07	mg/kg-day	7.0E-05	mg/kg-day	N/A	N/A	1.4E-02
	Vanadium	2.60E+01	mg/kg	2.60E+01	mg/kg	M	2.5E-05	mg/kg-day	1.0E-03	mg/kg-day	N/A	N/A	2.5E-02
	(Total)												1.4E-01
Dermal	Arsenic	4.60E+00	mg/kg	4.60E+00	mg/kg	M	2.3E-06	mg/kg-day	3.0E-04	mg/kg-day	N/A	N/A	7.6E-03
	Copper	7.47E+02	mg/kg	7.47E+02	mg/kg	M	1.2E-04	mg/kg-day	4.0E-02	mg/kg-day	N/A	N/A	3.1E-03
	Iron	2.18E+04	mg/kg	2.18E+04	mg/kg	M	3.6E-03	mg/kg-day	3.0E-01	mg/kg-day	N/A	N/A	1.2E-02
	Thallium	1.00E+00	mg/kg	1.00E+00	mg/kg	M	1.7E-07	mg/kg-day	7.0E-05	mg/kg-day	N/A	N/A	2.4E-03
	Vanadium	2.60E+01	mg/kg	2.60E+01	mg/kg	M	4.3E-06	mg/kg-day	2.6E-05	mg/kg-day	N/A	N/A	1.7E-01
	(Total)												1.9E-01
												Total Hazard Index Across All Exposure Routes/Pathways	3.3E-01

(1) Medium-Specific (M) EPC selected for hazard calculation.
(2) Chronic.

TABLE 7.30.RME
CALCULATION OF NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
Site 7, NAB Little Creek

Scenario Timeframe: Future
Medium: Soil*
Exposure Medium: Soil
Exposure Point: Area to West of Landfill, the "Ear"
Receptor Population: Resident
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose (2)	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	Arsenic	4.60E+00	mg/kg	4.60E+00	mg/kg	M	6.3E-06	mg/kg-day	3.0E-04	mg/kg-day	N/A	N/A	2.1E-02
	Copper	7.47E+02	mg/kg	7.47E+02	mg/kg	M	1.0E-03	mg/kg-day	4.0E-02	mg/kg-day	N/A	N/A	2.6E-02
	Iron	2.18E+04	mg/kg	2.18E+04	mg/kg	M	3.0E-02	mg/kg-day	3.0E-01	mg/kg-day	N/A	N/A	1.0E-01
	Thallium	1.00E+00	mg/kg	1.00E+00	mg/kg	M	1.4E-06	mg/kg-day	7.0E-05	mg/kg-day	N/A	N/A	2.0E-02
	Vanadium	2.60E+01	mg/kg	2.60E+01	mg/kg	M	3.6E-05	mg/kg-day	1.0E-03	mg/kg-day	N/A	N/A	3.6E-02
	(Total)												2.0E-01
Dermal	Arsenic	4.60E+00	mg/kg	4.60E+00	mg/kg	M	2.5E-06	mg/kg-day	3.0E-04	mg/kg-day	N/A	N/A	8.3E-03
	Copper	7.47E+02	mg/kg	7.47E+02	mg/kg	M	1.4E-04	mg/kg-day	4.0E-02	mg/kg-day	N/A	N/A	3.4E-03
	Iron	2.18E+04	mg/kg	2.18E+04	mg/kg	M	3.9E-03	mg/kg-day	3.0E-01	mg/kg-day	N/A	N/A	1.3E-02
	Thallium	1.00E+00	mg/kg	1.00E+00	mg/kg	M	1.8E-07	mg/kg-day	7.0E-05	mg/kg-day	N/A	N/A	2.6E-03
	Vanadium	2.60E+01	mg/kg	2.60E+01	mg/kg	M	4.7E-06	mg/kg-day	2.6E-05	mg/kg-day	N/A	N/A	1.8E-01
	(Total)												2.1E-01
												Total Hazard Index Across All Exposure Routes/Pathways	4.1E-01

(1) Medium-Specific (M) EPC selected for hazard calculation.
(2) Chronic.

TABLE 7.31.RME
CALCULATION OF NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
Site 7, NAB Little Creek

Scenario Timeframe: Future
Medium: Soil*
Exposure Medium: Soil
Exposure Point: Area to West of Landfill, the "Ear"
Receptor Population: Resident
Receptor Age: Child

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose (2)	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	Arsenic	4.60E+00	mg/kg	4.60E+00	mg/kg	M	5.9E-05	mg/kg-day	3.0E-04	mg/kg-day	N/A	N/A	2.0E-01
	Copper	7.47E+02	mg/kg	7.47E+02	mg/kg	M	9.6E-03	mg/kg-day	4.0E-02	mg/kg-day	N/A	N/A	2.4E-01
	Iron	2.18E+04	mg/kg	2.18E+04	mg/kg	M	2.8E-01	mg/kg-day	3.0E-01	mg/kg-day	N/A	N/A	9.3E-01
	Thallium	1.00E+00	mg/kg	1.00E+00	mg/kg	M	1.3E-05	mg/kg-day	7.0E-05	mg/kg-day	N/A	N/A	1.8E-01
	Vanadium	2.60E+01	mg/kg	2.60E+01	mg/kg	M	3.3E-04	mg/kg-day	1.0E-03	mg/kg-day	N/A	N/A	3.3E-01
	(Total)												1.9E+00
Dermal	Arsenic	4.60E+00	mg/kg	4.60E+00	mg/kg	M	3.3E-06	mg/kg-day	3.0E-04	mg/kg-day	N/A	N/A	1.1E-02
	Copper	7.47E+02	mg/kg	7.47E+02	mg/kg	M	1.8E-04	mg/kg-day	4.0E-02	mg/kg-day	N/A	N/A	4.5E-03
	Iron	2.18E+04	mg/kg	2.18E+04	mg/kg	M	5.2E-03	mg/kg-day	3.0E-01	mg/kg-day	N/A	N/A	1.7E-02
	Thallium	1.00E+00	mg/kg	1.00E+00	mg/kg	M	2.4E-07	mg/kg-day	7.0E-05	mg/kg-day	N/A	N/A	3.4E-03
	Vanadium	2.60E+01	mg/kg	2.60E+01	mg/kg	M	6.2E-06	mg/kg-day	2.6E-05	mg/kg-day	N/A	N/A	2.4E-01
	(Total)												2.8E-01
												Total Hazard Index Across All Exposure Routes/Pathways	2.2E+00

(1) Medium-Specific (M) EPC selected for hazard calculation.
(2) Chronic.

TABLE 7.32.RME
CALCULATION OF NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
Site 7, NAB Little Creek

Scenario Timeframe: Future
Medium: Soil*
Exposure Medium: Soil
Exposure Point: Site Perimeter
Receptor Population: Construction Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose (2)	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	Benzo(a)pyrene	4.29E-01	mg/kg	4.29E-01	mg/kg	M	1.0E-06	mg/kg-day	N/A		N/A	N/A	
	Aluminum	2.80E+04	mg/kg	2.80E+04	mg/kg	M	6.6E-02	mg/kg-day	1.0E+00	mg/kg-day	N/A	N/A	6.6E-02
	Arsenic	5.37E+00	mg/kg	5.37E+00	mg/kg	M	1.3E-05	mg/kg-day	3.0E-04	mg/kg-day	N/A	N/A	4.2E-02
	Iron	1.14E+04	mg/kg	1.14E+04	mg/kg	M	2.7E-02	mg/kg-day	3.0E-01	mg/kg-day	N/A	N/A	8.9E-02
	Vanadium	2.02E+02	mg/kg	2.02E+02	mg/kg	M	4.7E-04	mg/kg-day	1.0E-03	mg/kg-day	N/A	N/A	4.7E-01
	(Total)												6.7E-01
Dermal	Benzo(a)pyrene	4.29E-01	mg/kg	4.29E-01	mg/kg	M	3.5E-07	mg/kg-day	N/A		N/A	N/A	
	Aluminum	2.80E+04	mg/kg	2.80E+04	mg/kg	M	1.7E-03	mg/kg-day	1.0E+00	mg/kg-day	N/A	N/A	1.7E-03
	Arsenic	5.37E+00	mg/kg	5.37E+00	mg/kg	M	1.0E-06	mg/kg-day	3.0E-04	mg/kg-day	N/A	N/A	3.3E-03
	Iron	1.14E+04	mg/kg	1.14E+04	mg/kg	M	7.1E-04	mg/kg-day	3.0E-01	mg/kg-day	N/A	N/A	2.4E-03
	Vanadium	2.02E+02	mg/kg	2.02E+02	mg/kg	M	1.3E-05	mg/kg-day	2.6E-05	mg/kg-day	N/A	N/A	4.8E-01
	(Total)												4.9E-01
												Total Hazard Index Across All Exposure Routes/Pathways	1.2E+00

(1) Medium-Specific (M) EPC selected for hazard calculation.
(2) Chronic.

TABLE 7.33.RME
CALCULATION OF NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
Site 7, NAB Little Creek

Scenario Timeframe: Future
Medium: Soil*
Exposure Medium: Soil
Exposure Point: Site Perimeter
Receptor Population: Industrial Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose (2)	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	Benzo(a)pyrene	4.29E-01	mg/kg	4.29E-01	mg/kg	M	4.2E-07	mg/kg-day	N/A		N/A	N/A	
	Aluminum	2.80E+04	mg/kg	2.80E+04	mg/kg	M	2.7E-02	mg/kg-day	1.0E+00	mg/kg-day	N/A	N/A	2.7E-02
	Arsenic	5.37E+00	mg/kg	5.37E+00	mg/kg	M	5.3E-06	mg/kg-day	3.0E-04	mg/kg-day	N/A	N/A	1.8E-02
	Iron	1.14E+04	mg/kg	1.14E+04	mg/kg	M	1.1E-02	mg/kg-day	3.0E-01	mg/kg-day	N/A	N/A	3.7E-02
	Vanadium	2.02E+02	mg/kg	2.02E+02	mg/kg	M	2.0E-04	mg/kg-day	1.0E-03	mg/kg-day	N/A	N/A	2.0E-01
	(Total)												2.8E-01
Dermal	Benzo(a)pyrene	4.29E-01	mg/kg	4.29E-01	mg/kg	M	9.3E-07	mg/kg-day	N/A		N/A	N/A	
	Aluminum	2.80E+04	mg/kg	2.80E+04	mg/kg	M	4.6E-03	mg/kg-day	1.0E+00	mg/kg-day	N/A	N/A	4.6E-03
	Arsenic	5.37E+00	mg/kg	5.37E+00	mg/kg	M	2.7E-06	mg/kg-day	3.0E-04	mg/kg-day	N/A	N/A	8.9E-03
	Iron	1.14E+04	mg/kg	1.14E+04	mg/kg	M	1.9E-03	mg/kg-day	3.0E-01	mg/kg-day	N/A	N/A	6.3E-03
	Vanadium	2.02E+02	mg/kg	2.02E+02	mg/kg	M	3.4E-05	mg/kg-day	2.6E-05	mg/kg-day	N/A	N/A	1.3E+00
	(Total)												1.3E+00
												Total Hazard Index Across All Exposure Routes/Pathways	1.6E+00

(1) Medium-Specific (M) EPC selected for hazard calculation.
(2) Chronic.

TABLE 7.34.RME
CALCULATION OF NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
Site 7, NAB Little Creek

Scenario Timeframe: Future
Medium: Soil*
Exposure Medium: Soil
Exposure Point: Site Perimeter
Receptor Population: Resident
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose (2)	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	Benzo(a)pyrene	4.29E-01	mg/kg	4.29E-01	mg/kg	M	5.9E-07	mg/kg-day	N/A		N/A	N/A	
	Aluminum	2.80E+04	mg/kg	2.80E+04	mg/kg	M	3.8E-02	mg/kg-day	1.0E+00	mg/kg-day	N/A	N/A	3.8E-02
	Arsenic	5.37E+00	mg/kg	5.37E+00	mg/kg	M	7.4E-06	mg/kg-day	3.0E-04	mg/kg-day	N/A	N/A	2.5E-02
	Iron	1.14E+04	mg/kg	1.14E+04	mg/kg	M	1.6E-02	mg/kg-day	3.0E-01	mg/kg-day	N/A	N/A	5.2E-02
	Vanadium	2.02E+02	mg/kg	2.02E+02	mg/kg	M	2.8E-04	mg/kg-day	1.0E-03	mg/kg-day	N/A	N/A	2.8E-01
	(Total)												3.9E-01
Dermal	Benzo(a)pyrene	4.29E-01	mg/kg	4.29E-01	mg/kg	M	1.0E-06	mg/kg-day	N/A		N/A	N/A	
	Aluminum	2.80E+04	mg/kg	2.80E+04	mg/kg	M	5.1E-03	mg/kg-day	1.0E+00	mg/kg-day	N/A	N/A	5.1E-03
	Arsenic	5.37E+00	mg/kg	5.37E+00	mg/kg	M	2.9E-06	mg/kg-day	3.0E-04	mg/kg-day	N/A	N/A	9.7E-03
	Iron	1.14E+04	mg/kg	1.14E+04	mg/kg	M	2.1E-03	mg/kg-day	3.0E-01	mg/kg-day	N/A	N/A	6.9E-03
	Vanadium	2.02E+02	mg/kg	2.02E+02	mg/kg	M	3.7E-05	mg/kg-day	2.6E-05	mg/kg-day	N/A	N/A	1.4E+00
	(Total)												1.4E+00
												Total Hazard Index Across All Exposure Routes/Pathways	1.8E+00

(1) Medium-Specific (M) EPC selected for hazard calculation.
(2) Chronic.

TABLE 7.35.RME
CALCULATION OF NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
Site 7, NAB Little Creek

Scenario Timeframe: Future
Medium: Soil*
Exposure Medium: Soil
Exposure Point: Site Perimeter
Receptor Population: Resident
Receptor Age: Child

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose (2)	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	Benzo(a)pyrene	4.29E-01	mg/kg	4.29E-01	mg/kg	M	5.5E-06	mg/kg-day	N/A		N/A	N/A	
	Aluminum	2.80E+04	mg/kg	2.80E+04	mg/kg	M	3.6E-01	mg/kg-day	1.0E+00	mg/kg-day	N/A	N/A	3.6E-01
	Arsenic	5.37E+00	mg/kg	5.37E+00	mg/kg	M	6.9E-05	mg/kg-day	3.0E-04	mg/kg-day	N/A	N/A	2.3E-01
	Iron	1.14E+04	mg/kg	1.14E+04	mg/kg	M	1.5E-01	mg/kg-day	3.0E-01	mg/kg-day	N/A	N/A	4.8E-01
	Vanadium	2.02E+02	mg/kg	2.02E+02	mg/kg	M	2.6E-03	mg/kg-day	1.0E-03	mg/kg-day	N/A	N/A	2.6E+00
	(Total)												3.7E+00
Dermal	Benzo(a)pyrene	4.29E-01	mg/kg	4.29E-01	mg/kg	M	1.3E-06	mg/kg-day	N/A		N/A	N/A	
	Aluminum	2.80E+04	mg/kg	2.80E+04	mg/kg	M	6.7E-03	mg/kg-day	1.0E+00	mg/kg-day	N/A	N/A	6.7E-03
	Arsenic	5.37E+00	mg/kg	5.37E+00	mg/kg	M	3.9E-06	mg/kg-day	3.0E-04	mg/kg-day	N/A	N/A	1.3E-02
	Iron	1.14E+04	mg/kg	1.14E+04	mg/kg	M	2.7E-03	mg/kg-day	3.0E-01	mg/kg-day	N/A	N/A	9.1E-03
	Vanadium	2.02E+02	mg/kg	2.02E+02	mg/kg	M	4.8E-05	mg/kg-day	2.6E-05	mg/kg-day	N/A	N/A	1.9E+00
	(Total)												1.9E+00
												Total Hazard Index Across All Exposure Routes/Pathways	5.5E+00

(1) Medium-Specific (M) EPC selected for hazard calculation.
(2) Chronic.

TABLE 7.36.RME
CALCULATION OF NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
Site 7, NAB Little Creek

Scenario Timeframe: Future
Medium: Soil*
Exposure Medium: Soil
Exposure Point: Covered Area
Receptor Population: Construction Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose (2)	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	Aroclor-1260	3.50E+00	mg/kg	3.50E+00	mg/kg	M	8.2E-06	mg/kg-day	N/A		N/A	N/A	
	Arsenic	2.11E+00	mg/kg	2.11E+00	mg/kg	M	4.9E-06	mg/kg-day	3.0E-04	mg/kg-day	N/A	N/A	1.6E-02
	Iron	1.02E+04	mg/kg	1.02E+04	mg/kg	M	2.4E-02	mg/kg-day	3.0E-01	mg/kg-day	N/A	N/A	8.0E-02
	Manganese	1.84E+02	mg/kg	1.84E+02	mg/kg	M	4.3E-04	mg/kg-day	2.0E-02	mg/kg-day	N/A	N/A	2.2E-02
	Vanadium	3.95E+01	mg/kg	3.95E+01	mg/kg	M	9.3E-05	mg/kg-day	1.0E-03	mg/kg-day	N/A	N/A	9.3E-02
	(Total)												2.1E-01
Dermal	Aroclor-1260	3.50E+00	mg/kg	3.50E+00	mg/kg	M	3.0E-06	mg/kg-day	N/A		N/A	N/A	
	Arsenic	2.11E+00	mg/kg	2.11E+00	mg/kg	M	3.9E-07	mg/kg-day	3.0E-04	mg/kg-day	N/A	N/A	1.3E-03
	Iron	1.02E+04	mg/kg	1.02E+04	mg/kg	M	6.3E-04	mg/kg-day	3.0E-01	mg/kg-day	N/A	N/A	2.1E-03
	Manganese	1.84E+02	mg/kg	1.84E+02	mg/kg	M	1.1E-05	mg/kg-day	8.0E-04	mg/kg-day	N/A	N/A	1.4E-02
	Vanadium	3.95E+01	mg/kg	3.95E+01	mg/kg	M	2.5E-06	mg/kg-day	2.6E-05	mg/kg-day	N/A	N/A	9.5E-02
	(Total)												1.1E-01
												Total Hazard Index Across All Exposure Routes/Pathways	3.2E-01

(1) Medium-Specific (M) EPC selected for hazard calculation.
(2) Subchronic, if available, else chronic.

TABLE 7.37.RME
CALCULATION OF NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
Site 7, NAB Little Creek

Scenario Timeframe: Future
Medium: Soil*
Exposure Medium: Soil
Exposure Point: Covered Area
Receptor Population: Industrial Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose (2)	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	Aroclor-1260	3.50E+00	mg/kg	3.50E+00	mg/kg	M	3.4E-06	mg/kg-day	N/A		N/A	N/A	
	Arsenic	2.11E+00	mg/kg	2.11E+00	mg/kg	M	2.1E-06	mg/kg-day	3.0E-04	mg/kg-day	N/A	N/A	6.9E-03
	Iron	1.02E+04	mg/kg	1.02E+04	mg/kg	M	1.0E-02	mg/kg-day	3.0E-01	mg/kg-day	N/A	N/A	3.3E-02
	Manganese	1.84E+02	mg/kg	1.84E+02	mg/kg	M	1.8E-04	mg/kg-day	2.0E-02	mg/kg-day	N/A	N/A	9.0E-03
	Vanadium	3.95E+01	mg/kg	3.95E+01	mg/kg	M	3.9E-05	mg/kg-day	1.0E-03	mg/kg-day	N/A	N/A	3.9E-02
	(Total)												8.8E-02
Dermal	Aroclor-1260	3.50E+00	mg/kg	3.50E+00	mg/kg	M	8.1E-06	mg/kg-day	N/A		N/A	N/A	
	Arsenic	2.11E+00	mg/kg	2.11E+00	mg/kg	M	1.0E-06	mg/kg-day	3.0E-04	mg/kg-day	N/A	N/A	3.5E-03
	Iron	1.02E+04	mg/kg	1.02E+04	mg/kg	M	1.7E-03	mg/kg-day	3.0E-01	mg/kg-day	N/A	N/A	5.6E-03
	Manganese	1.84E+02	mg/kg	1.84E+02	mg/kg	M	3.1E-05	mg/kg-day	8.0E-04	mg/kg-day	N/A	N/A	3.8E-02
	Vanadium	3.95E+01	mg/kg	3.95E+01	mg/kg	M	6.6E-06	mg/kg-day	2.6E-05	mg/kg-day	N/A	N/A	2.5E-01
	(Total)												3.0E-01
												Total Hazard Index Across All Exposure Routes/Pathways	3.9E-01

(1) Medium-Specific (M) EPC selected for hazard calculation.
(2) Chronic.

TABLE 7.38.RME
CALCULATION OF NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
Site 7, NAB Little Creek

Scenario Timeframe: Future
Medium: Soil*
Exposure Medium: Soil
Exposure Point: Covered Area
Receptor Population: Resident
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose (2)	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	Aroclor-1260	3.50E+00	mg/kg	3.50E+00	mg/kg	M	4.8E-06	mg/kg-day	N/A		N/A	N/A	
	Arsenic	2.11E+00	mg/kg	2.11E+00	mg/kg	M	2.9E-06	mg/kg-day	3.0E-04	mg/kg-day	N/A	N/A	9.6E-03
	Iron	1.02E+04	mg/kg	1.02E+04	mg/kg	M	1.4E-02	mg/kg-day	3.0E-01	mg/kg-day	N/A	N/A	4.7E-02
	Manganese	1.84E+02	mg/kg	1.84E+02	mg/kg	M	2.5E-04	mg/kg-day	2.0E-02	mg/kg-day	N/A	N/A	1.3E-02
	Vanadium	3.95E+01	mg/kg	3.95E+01	mg/kg	M	5.4E-05	mg/kg-day	1.0E-03	mg/kg-day	N/A	N/A	5.4E-02
	(Total)												1.2E-01
Dermal	Aroclor-1260	3.50E+00	mg/kg	3.50E+00	mg/kg	M	8.9E-06	mg/kg-day	N/A		N/A	N/A	
	Arsenic	2.11E+00	mg/kg	2.11E+00	mg/kg	M	1.1E-06	mg/kg-day	3.0E-04	mg/kg-day	N/A	N/A	3.8E-03
	Iron	1.02E+04	mg/kg	1.02E+04	mg/kg	M	1.8E-03	mg/kg-day	3.0E-01	mg/kg-day	N/A	N/A	6.1E-03
	Manganese	1.84E+02	mg/kg	1.84E+02	mg/kg	M	3.3E-05	mg/kg-day	8.0E-04	mg/kg-day	N/A	N/A	4.2E-02
	Vanadium	3.95E+01	mg/kg	3.95E+01	mg/kg	M	7.1E-06	mg/kg-day	2.6E-05	mg/kg-day	N/A	N/A	2.7E-01
	(Total)												3.3E-01
												Total Hazard Index Across All Exposure Routes/Pathways	4.5E-01

(1) Medium-Specific (M) EPC selected for hazard calculation.
(2) Chronic.

TABLE 7.39.RME
CALCULATION OF NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
Site 7, NAB Little Creek

Scenario Timeframe: Future
Medium: Soil*
Exposure Medium: Soil
Exposure Point: Covered Area
Receptor Population: Resident
Receptor Age: Child

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose (2)	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	Aroclor-1260	3.50E+00	mg/kg	3.50E+00	mg/kg	M	4.5E-05	mg/kg-day	N/A		N/A	N/A	
	Arsenic	2.11E+00	mg/kg	2.11E+00	mg/kg	M	2.7E-05	mg/kg-day	3.0E-04	mg/kg-day	N/A	N/A	9.0E-02
	Iron	1.02E+04	mg/kg	1.02E+04	mg/kg	M	1.3E-01	mg/kg-day	3.0E-01	mg/kg-day	N/A	N/A	4.3E-01
	Manganese	1.84E+02	mg/kg	1.84E+02	mg/kg	M	2.4E-03	mg/kg-day	2.0E-02	mg/kg-day	N/A	N/A	1.2E-01
	Vanadium	3.95E+01	mg/kg	3.95E+01	mg/kg	M	5.1E-04	mg/kg-day	1.0E-03	mg/kg-day	N/A	N/A	5.1E-01
	(Total)												1.1E+00
Dermal	Aroclor-1260	3.50E+00	mg/kg	3.50E+00	mg/kg	M	1.2E-05	mg/kg-day	N/A		N/A	N/A	
	Arsenic	2.11E+00	mg/kg	2.11E+00	mg/kg	M	1.5E-06	mg/kg-day	3.0E-04	mg/kg-day	N/A	N/A	5.0E-03
	Iron	1.02E+04	mg/kg	1.02E+04	mg/kg	M	2.4E-03	mg/kg-day	3.0E-01	mg/kg-day	N/A	N/A	8.1E-03
	Manganese	1.84E+02	mg/kg	1.84E+02	mg/kg	M	4.4E-05	mg/kg-day	8.0E-04	mg/kg-day	N/A	N/A	5.5E-02
	Vanadium	3.95E+01	mg/kg	3.95E+01	mg/kg	M	9.4E-06	mg/kg-day	2.6E-05	mg/kg-day	N/A	N/A	3.6E-01
	(Total)												4.3E-01
												Total Hazard Index Across All Exposure Routes/Pathways	1.6E+00

(1) Medium-Specific (M) EPC selected for hazard calculation.
(2) Chronic.

TABLE 7.40.CT
CALCULATION OF NON-CANCER HAZARDS
CENTRAL TENDENCY EXPOSURE
Site 7, NAB Little Creek

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater
Exposure Point: Upper Aquifer - Tap Water
Receptor Population: Resident
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose (2)	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	Aluminum	2.99E+02	µg/L	2.99E+02	µg/L	M	3.8E-03	mg/kg-day	1.0E+00	mg/kg-day	N/A	N/A	3.8E-03
	Arsenic	2.16E+00	µg/L	2.16E+00	µg/L	M	2.8E-05	mg/kg-day	3.0E-04	mg/kg-day	N/A	N/A	9.2E-02
	Chromium	2.03E+00	µg/L	2.03E+00	µg/L	M	2.6E-05	mg/kg-day	3.0E-03	mg/kg-day	N/A	N/A	8.7E-03
	Iron	6.84E+03	µg/L	6.84E+03	µg/L	M	8.8E-02	mg/kg-day	3.0E-01	mg/kg-day	N/A	N/A	2.9E-01
	Manganese	3.42E+02	µg/L	3.42E+02	µg/L	M	4.4E-03	mg/kg-day	2.0E-02	mg/kg-day	N/A	N/A	2.2E-01
	Vanadium	1.64E+00	µg/L	1.64E+00	µg/L	M	2.1E-05	mg/kg-day	1.0E-03	mg/kg-day	N/A	N/A	2.1E-02
	(Total)												6.2E-01
Dermal	Aluminum	2.99E+02	µg/L	2.99E+02	µg/L	M	9.9E-06	mg/kg-day	1.0E+00	mg/kg-day	N/A	N/A	9.9E-06
	Arsenic	2.16E+00	µg/L	2.16E+00	µg/L	M	7.1E-08	mg/kg-day	3.0E-04	mg/kg-day	N/A	N/A	2.4E-04
	Chromium	2.03E+00	µg/L	2.03E+00	µg/L	M	6.7E-08	mg/kg-day	7.5E-05	mg/kg-day	N/A	N/A	8.9E-04
	Iron	6.84E+03	µg/L	6.84E+03	µg/L	M	2.3E-04	mg/kg-day	3.0E-01	mg/kg-day	N/A	N/A	7.5E-04
	Manganese	3.42E+02	µg/L	3.42E+02	µg/L	M	1.1E-05	mg/kg-day	8.0E-04	mg/kg-day	N/A	N/A	1.4E-02
	Vanadium	1.64E+00	µg/L	1.64E+00	µg/L	M	5.4E-08	mg/kg-day	2.6E-05	mg/kg-day	N/A	N/A	2.1E-03
	(Total)												1.6E-02
												Total Hazard Index Across All Exposure Routes/Pathways	6.3E-01

(1) Medium-Specific (M) EPC selected for hazard calculation.
(2) Chronic.

Table 7.40.CT Supplement
Calculation of DAevent
Groundwater, Adult
Site 7, NAB Little Creek

Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Permeability Constant (PC) (cm/hr)	Lag Time (t) (hr)	Duration of Event (ET) (hr)	t* (hr)	B (dimensionless)	DAevent (mg/cm^2-event)	Eq
Aluminum	2.99E+02	µg/L	1.0E-03	N/A	2.0E-01	N/A	N/A	6.0E-08	1
Arsenic	2.16E+00	µg/L	1.0E-03	N/A	2.0E-01	N/A	N/A	4.3E-10	1
Chromium	2.03E+00	µg/L	1.0E-03	N/A	2.0E-01	N/A	N/A	4.1E-10	1
Iron	6.84E+03	µg/L	1.0E-03	N/A	2.0E-01	N/A	N/A	1.4E-06	1
Manganese	3.42E+02	µg/L	1.0E-03	N/A	2.0E-01	N/A	N/A	6.8E-08	1
Vanadium	1.64E+00	µg/L	1.0E-03	N/A	2.0E-01	N/A	N/A	3.3E-10	1

Inorganics: DAevent (mg/cm2-event) =
PC x CW x ET x CF1 x CF2 (eq 1)

Organics: DAevent (mg/cm2-event) =

ET<t*: DAevent (mg/cm2-event) =
2 x PC x CW x (sqrt((6 x t x ET)/3.1415))
x CF1 x CF2 (eq 2)

ET>t*: DAevent (mg/cm2-event) =
PC x CW x (ET/(1+B) + 2 x t x ((1 + 3xB)/(1+B))
x CF1 x CF2 (eq 3)

Permeability constants from EPA 1992, Dermal Exposure Assessment: Principals and Applications.
ORD, EPA/600/8-91/001B. Default value of 0.001 cm/hour used for inorganics without published values.
N/A - not applicable.

TABLE 7.41.CT
CALCULATION OF NON-CANCER HAZARDS
CENTRAL TENDENCY EXPOSURE
Site 7, NAB Little Creek

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater
Exposure Point: Upper Aquifer - Tap Water
Receptor Population: Resident
Receptor Age: Child

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose (2)	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	Aluminum	2.99E+02	µg/L	2.99E+02	µg/L	M	1.3E-02	mg/kg-day	1.0E+00	mg/kg-day	N/A	N/A	1.3E-02
	Arsenic	2.16E+00	µg/L	2.16E+00	µg/L	M	9.2E-05	mg/kg-day	3.0E-04	mg/kg-day	N/A	N/A	3.1E-01
	Chromium	2.03E+00	µg/L	2.03E+00	µg/L	M	8.7E-05	mg/kg-day	3.0E-03	mg/kg-day	N/A	N/A	2.9E-02
	Iron	6.84E+03	µg/L	6.84E+03	µg/L	M	2.9E-01	mg/kg-day	3.0E-01	mg/kg-day	N/A	N/A	9.7E-01
	Manganese	3.42E+02	µg/L	3.42E+02	µg/L	M	1.5E-02	mg/kg-day	2.0E-02	mg/kg-day	N/A	N/A	7.3E-01
	Vanadium	1.64E+00	µg/L	1.64E+00	µg/L	M	7.0E-05	mg/kg-day	1.0E-03	mg/kg-day	N/A	N/A	7.0E-02
	(Total)												2.1E+00
Dermal	Aluminum	2.99E+02	µg/L	2.99E+02	µg/L	M	2.7E-05	mg/kg-day	1.0E+00	mg/kg-day	N/A	N/A	2.7E-05
	Arsenic	2.16E+00	µg/L	2.16E+00	µg/L	M	2.0E-07	mg/kg-day	3.0E-04	mg/kg-day	N/A	N/A	6.6E-04
	Chromium	2.03E+00	µg/L	2.03E+00	µg/L	M	1.9E-07	mg/kg-day	7.5E-05	mg/kg-day	N/A	N/A	2.5E-03
	Iron	6.84E+03	µg/L	6.84E+03	µg/L	M	6.3E-04	mg/kg-day	3.0E-01	mg/kg-day	N/A	N/A	2.1E-03
	Manganese	3.42E+02	µg/L	3.42E+02	µg/L	M	3.1E-05	mg/kg-day	8.0E-04	mg/kg-day	N/A	N/A	3.9E-02
	Vanadium	1.64E+00	µg/L	1.64E+00	µg/L	M	1.5E-07	mg/kg-day	2.6E-05	mg/kg-day	N/A	N/A	5.8E-03
	(Total)												5.0E-02
												Total Hazard Index Across All Exposure Routes/Pathways	2.2E+00

(1) Medium-Specific (M) EPC selected for hazard calculation.
(2) Chronic.

Table 7.41.CT Supplement
Calculation of DAevent
Groundwater, Child
Site 7, NAB Little Creek

Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Permeability Constant (PC) (cm/hr)	Lag Time (t) (hr)	Duration of Event (ET) (hr)	t* (hr)	B (dimensionless)	DAevent (mg/cm^2-event)	Eq
Aluminum	2.99E+02	µg/L	1.0E-03	N/A	3.3E-01	N/A	N/A	9.9E-08	1
Arsenic	2.16E+00	µg/L	1.0E-03	N/A	3.3E-01	N/A	N/A	7.1E-10	1
Chromium	2.03E+00	µg/L	1.0E-03	N/A	3.3E-01	N/A	N/A	6.7E-10	1
Iron	6.84E+03	µg/L	1.0E-03	N/A	3.3E-01	N/A	N/A	2.3E-06	1
Manganese	3.42E+02	µg/L	1.0E-03	N/A	3.3E-01	N/A	N/A	1.1E-07	1
Vanadium	1.64E+00	µg/L	1.0E-03	N/A	3.3E-01	N/A	N/A	5.4E-10	1

Inorganics: DAevent (mg/cm2-event) =
PC x CW x ET x CF1 x CF2 (eq 1)

Organics: DAevent (mg/cm2-event) =

ET<t*: DAevent (mg/cm2-event) =
2 x PC x CW x (sqrt((6 x t x ET)/3.1415))
x CF1 x CF2 (eq 2)

ET>t*: DAevent (mg/cm2-event) =
PC x CW x (ET/(1+B) + 2 x t x ((1 + 3xB)/(1+B))
x CF1 x CF2 (eq 3)

Permeability constants from EPA 1992, Dermal Exposure Assessment: Principals and Applications.
ORD, EPA/600/8-91/001B. Default value of 0.001 cm/hour used for inorganics without published values.
N/A - not applicable.

TABLE 7.42.CT
CALCULATION OF NON-CANCER HAZARDS
CENTRAL TENDENCY EXPOSURE
Site 7, NAB Little Creek

Scenario Timeframe: Future
Medium: Soil*
Exposure Medium: Soil
Exposure Point: Weigh Station Area
Receptor Population: Resident
Receptor Age: Child

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose (2)	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	Aroclor-1260	3.76E-01	mg/kg	3.76E-01	mg/kg	M	1.6E-06	mg/kg-day	N/A		N/A	N/A	
	Arsenic	1.97E+00	mg/kg	1.97E+00	mg/kg	M	8.4E-06	mg/kg-day	3.0E-04	mg/kg-day	N/A	N/A	2.8E-02
	Chromium	2.08E+01	mg/kg	2.08E+01	mg/kg	M	8.9E-05	mg/kg-day	3.0E-03	mg/kg-day	N/A	N/A	3.0E-02
	Copper	1.77E+02	mg/kg	1.77E+02	mg/kg	M	7.5E-04	mg/kg-day	4.0E-02	mg/kg-day	N/A	N/A	1.9E-02
	Iron	1.15E+04	mg/kg	1.15E+04	mg/kg	M	4.9E-02	mg/kg-day	3.0E-01	mg/kg-day	N/A	N/A	1.6E-01
	Lead	3.57E+02	mg/kg	3.57E+02	mg/kg	M	1.5E-03	mg/kg-day	N/A		N/A	N/A	
	Manganese	2.08E+02	mg/kg	2.08E+02	mg/kg	M	8.9E-04	mg/kg-day	2.0E-02	mg/kg-day	N/A	N/A	4.4E-02
	Vanadium	2.43E+01	mg/kg	2.43E+01	mg/kg	M	1.0E-04	mg/kg-day	1.0E-03	mg/kg-day	N/A	N/A	1.0E-01
	(Total)												3.9E-01
Dermal	Aroclor-1260	3.76E-01	mg/kg	3.76E-01	mg/kg	M	7.2E-07	mg/kg-day	N/A		N/A	N/A	
	Arsenic	1.97E+00	mg/kg	1.97E+00	mg/kg	M	8.0E-07	mg/kg-day	3.0E-04	mg/kg-day	N/A	N/A	2.7E-03
	Chromium	2.08E+01	mg/kg	2.08E+01	mg/kg	M	2.8E-06	mg/kg-day	7.5E-05	mg/kg-day	N/A	N/A	3.8E-02
	Copper	1.77E+02	mg/kg	1.77E+02	mg/kg	M	2.4E-05	mg/kg-day	4.0E-02	mg/kg-day	N/A	N/A	6.0E-04
	Iron	1.15E+04	mg/kg	1.15E+04	mg/kg	M	1.6E-03	mg/kg-day	3.0E-01	mg/kg-day	N/A	N/A	5.2E-03
	Lead	3.57E+02	mg/kg	3.57E+02	mg/kg	M	4.9E-05	mg/kg-day	N/A		N/A	N/A	
	Manganese	2.08E+02	mg/kg	2.08E+02	mg/kg	M	2.8E-05	mg/kg-day	8.0E-04	mg/kg-day	N/A	N/A	3.5E-02
	Vanadium	2.43E+01	mg/kg	2.43E+01	mg/kg	M	3.3E-06	mg/kg-day	2.6E-05	mg/kg-day	N/A	N/A	1.3E-01
	(Total)												2.1E-01
												Total Hazard Index Across All Exposure Routes/Pathways	6.0E-01

(1) Medium-Specific (M) EPC selected for hazard calculation.
(2) Chronic.

TABLE 7.43.CT
CALCULATION OF NON-CANCER HAZARDS
CENTRAL TENDENCY EXPOSURE
Site 7, NAB Little Creek

Scenario Timeframe: Future
Medium: Soil*
Exposure Medium: Soil
Exposure Point: Area to West of Landfill, the "Ear"
Receptor Population: Resident
Receptor Age: Child

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose (2)	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	Arsenic	1.83E+00	mg/kg	1.83E+00	mg/kg	M	7.8E-06	mg/kg-day	3.0E-04	mg/kg-day	N/A	N/A	2.6E-02
	Copper	1.76E+01	mg/kg	1.76E+01	mg/kg	M	7.5E-05	mg/kg-day	4.0E-02	mg/kg-day	N/A	N/A	1.9E-03
	Iron	5.71E+03	mg/kg	5.71E+03	mg/kg	M	2.4E-02	mg/kg-day	3.0E-01	mg/kg-day	N/A	N/A	8.1E-02
	Thallium	5.30E-01	mg/kg	5.30E-01	mg/kg	M	2.3E-06	mg/kg-day	7.0E-05	mg/kg-day	N/A	N/A	3.2E-02
	Vanadium	1.05E+01	mg/kg	1.05E+01	mg/kg	M	4.5E-05	mg/kg-day	1.0E-03	mg/kg-day	N/A	N/A	4.5E-02
	(Total)												1.9E-01
Dermal	Arsenic	1.83E+00	mg/kg	1.83E+00	mg/kg	M	7.5E-07	mg/kg-day	3.0E-04	mg/kg-day	N/A	N/A	2.5E-03
	Copper	1.76E+01	mg/kg	1.76E+01	mg/kg	M	2.4E-06	mg/kg-day	4.0E-02	mg/kg-day	N/A	N/A	6.0E-05
	Iron	5.71E+03	mg/kg	5.71E+03	mg/kg	M	7.8E-04	mg/kg-day	3.0E-01	mg/kg-day	N/A	N/A	2.6E-03
	Thallium	5.30E-01	mg/kg	5.30E-01	mg/kg	M	7.2E-08	mg/kg-day	7.0E-05	mg/kg-day	N/A	N/A	1.0E-03
	Vanadium	1.05E+01	mg/kg	1.05E+01	mg/kg	M	1.4E-06	mg/kg-day	2.6E-05	mg/kg-day	N/A	N/A	5.5E-02
	(Total)												6.1E-02
												Total Hazard Index Across All Exposure Routes/Pathways	2.5E-01

(1) Medium-Specific (M) EPC selected for hazard calculation.
(2) Chronic.

TABLE 7.44.CT
CALCULATION OF NON-CANCER HAZARDS
CENTRAL TENDANCY
Site 7, NAB Little Creek

Scenario Timeframe: Future
Medium: Soil*
Exposure Medium: Soil
Exposure Point: Site Perimeter
Receptor Population: Construction Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose (2)	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	Benzo(a)pyrene	2.51E-01	mg/kg	2.51E-01	mg/kg	M	2.5E-07	mg/kg-day	N/A		N/A	N/A	
	Aluminum	6.36E+03	mg/kg	6.36E+03	mg/kg	M	6.2E-03	mg/kg-day	1.0E+00	mg/kg-day	N/A	N/A	6.2E-03
	Arsenic	2.63E+00	mg/kg	2.63E+00	mg/kg	M	2.6E-06	mg/kg-day	3.0E-04	mg/kg-day	N/A	N/A	8.6E-03
	Iron	8.48E+03	mg/kg	8.48E+03	mg/kg	M	8.3E-03	mg/kg-day	3.0E-01	mg/kg-day	N/A	N/A	2.8E-02
	Vanadium	2.13E+01	mg/kg	2.13E+01	mg/kg	M	2.1E-05	mg/kg-day	1.0E-03	mg/kg-day	N/A	N/A	2.1E-02
	(Total)												6.3E-02
Dermal	Benzo(a)pyrene	2.51E-01	mg/kg	2.51E-01	mg/kg	M	7.7E-08	mg/kg-day	N/A		N/A	N/A	
	Aluminum	6.36E+03	mg/kg	6.36E+03	mg/kg	M	1.5E-04	mg/kg-day	1.0E+00	mg/kg-day	N/A	N/A	1.5E-04
	Arsenic	2.63E+00	mg/kg	2.63E+00	mg/kg	M	1.9E-07	mg/kg-day	3.0E-04	mg/kg-day	N/A	N/A	6.2E-04
	Iron	8.48E+03	mg/kg	8.48E+03	mg/kg	M	2.0E-04	mg/kg-day	3.0E-01	mg/kg-day	N/A	N/A	6.6E-04
	Vanadium	2.13E+01	mg/kg	2.13E+01	mg/kg	M	5.0E-07	mg/kg-day	2.6E-05	mg/kg-day	N/A	N/A	1.9E-02
	(Total)												2.1E-02
												Total Hazard Index Across All Exposure Routes/Pathways	8.4E-02

(1) Medium-Specific (M) EPC selected for hazard calculation.
(2) Chronic.

TABLE 7.45.CT
CALCULATION OF NON-CANCER HAZARDS
CENTRAL TENDANCY
Site 7, NAB Little Creek

Scenario Timeframe: Future
Medium: Soil*
Exposure Medium: Soil
Exposure Point: Site Perimeter
Receptor Population: Industrial Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose (2)	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	Benzo(a)pyrene	2.51E-01	mg/kg	2.51E-01	mg/kg	M	1.1E-07	mg/kg-day	N/A		N/A	N/A	
	Aluminum	6.36E+03	mg/kg	6.36E+03	mg/kg	M	2.7E-03	mg/kg-day	1.0E+00	mg/kg-day	N/A	N/A	2.7E-03
	Arsenic	2.63E+00	mg/kg	2.63E+00	mg/kg	M	1.1E-06	mg/kg-day	3.0E-04	mg/kg-day	N/A	N/A	3.8E-03
	Iron	8.48E+03	mg/kg	8.48E+03	mg/kg	M	3.6E-03	mg/kg-day	3.0E-01	mg/kg-day	N/A	N/A	1.2E-02
	Vanadium	2.13E+01	mg/kg	2.13E+01	mg/kg	M	9.1E-06	mg/kg-day	1.0E-03	mg/kg-day	N/A	N/A	9.1E-03
	(Total)												2.8E-02
Dermal	Benzo(a)pyrene	2.51E-01	mg/kg	2.51E-01	mg/kg	M	1.8E-07	mg/kg-day	N/A		N/A	N/A	
	Aluminum	6.36E+03	mg/kg	6.36E+03	mg/kg	M	3.5E-04	mg/kg-day	1.0E+00	mg/kg-day	N/A	N/A	3.5E-04
	Arsenic	2.63E+00	mg/kg	2.63E+00	mg/kg	M	4.1E-07	mg/kg-day	3.0E-04	mg/kg-day	N/A	N/A	1.4E-03
	Iron	8.48E+03	mg/kg	8.48E+03	mg/kg	M	4.7E-04	mg/kg-day	3.0E-01	mg/kg-day	N/A	N/A	1.6E-03
	Vanadium	2.13E+01	mg/kg	2.13E+01	mg/kg	M	1.2E-06	mg/kg-day	2.6E-05	mg/kg-day	N/A	N/A	4.5E-02
	(Total)												4.8E-02
												Total Hazard Index Across All Exposure Routes/Pathways	7.6E-02

(1) Medium-Specific (M) EPC selected for hazard calculation.
(2) Chronic.

TABLE 7.46.CT
CALCULATION OF NON-CANCER HAZARDS
CENTRAL TENDANCY
Site 7, NAB Little Creek

Scenario Timeframe: Future
Medium: Soil*
Exposure Medium: Soil
Exposure Point: Site Perimeter
Receptor Population: Resident
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose (2)	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	Benzo(a)pyrene	2.51E-01	mg/kg	2.51E-01	mg/kg	M	1.1E-07	mg/kg-day	N/A		N/A	N/A	
	Aluminum	6.36E+03	mg/kg	6.36E+03	mg/kg	M	2.9E-03	mg/kg-day	1.0E+00	mg/kg-day	N/A	N/A	2.9E-03
	Arsenic	2.63E+00	mg/kg	2.63E+00	mg/kg	M	1.2E-06	mg/kg-day	3.0E-04	mg/kg-day	N/A	N/A	4.0E-03
	Iron	8.48E+03	mg/kg	8.48E+03	mg/kg	M	3.9E-03	mg/kg-day	3.0E-01	mg/kg-day	N/A	N/A	1.3E-02
	Vanadium	2.13E+01	mg/kg	2.13E+01	mg/kg	M	9.8E-06	mg/kg-day	1.0E-03	mg/kg-day	N/A	N/A	9.8E-03
	(Total)												3.0E-02
Dermal	Benzo(a)pyrene	2.51E-01	mg/kg	2.51E-01	mg/kg	M	3.4E-07	mg/kg-day	N/A		N/A	N/A	
	Aluminum	6.36E+03	mg/kg	6.36E+03	mg/kg	M	6.6E-04	mg/kg-day	1.0E+00	mg/kg-day	N/A	N/A	6.6E-04
	Arsenic	2.63E+00	mg/kg	2.63E+00	mg/kg	M	8.2E-07	mg/kg-day	3.0E-04	mg/kg-day	N/A	N/A	2.7E-03
	Iron	8.48E+03	mg/kg	8.48E+03	mg/kg	M	8.9E-04	mg/kg-day	3.0E-01	mg/kg-day	N/A	N/A	3.0E-03
	Vanadium	2.13E+01	mg/kg	2.13E+01	mg/kg	M	2.2E-06	mg/kg-day	2.6E-05	mg/kg-day	N/A	N/A	8.6E-02
	(Total)												9.2E-02
												Total Hazard Index Across All Exposure Routes/Pathways	1.2E-01

(1) Medium-Specific (M) EPC selected for hazard calculation.
(2) Chronic.

TABLE 7.47.CT
CALCULATION OF NON-CANCER HAZARDS
CENTRAL TENDANCY
Site 7, NAB Little Creek

Scenario Timeframe: Future
Medium: Soil*
Exposure Medium: Soil
Exposure Point: Site Perimeter
Receptor Population: Resident
Receptor Age: Child

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose (2)	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	Benzo(a)pyrene	2.51E-01	mg/kg	2.51E-01	mg/kg	M	1.1E-06	mg/kg-day	N/A		N/A	N/A	
	Aluminum	6.36E+03	mg/kg	6.36E+03	mg/kg	M	8.1E-02	mg/kg-day	1.0E+00	mg/kg-day	N/A	N/A	8.1E-02
	Arsenic	2.63E+00	mg/kg	2.63E+00	mg/kg	M	3.4E-05	mg/kg-day	3.0E-04	mg/kg-day	N/A	N/A	1.1E-01
	Iron	8.48E+03	mg/kg	8.48E+03	mg/kg	M	1.1E-01	mg/kg-day	3.0E-01	mg/kg-day	N/A	N/A	3.6E-01
	Vanadium	2.13E+01	mg/kg	2.13E+01	mg/kg	M	2.7E-04	mg/kg-day	1.0E-03	mg/kg-day	N/A	N/A	2.7E-01
	(Total)												8.3E-01
Dermal	Benzo(a)pyrene	2.51E-01	mg/kg	2.51E-01	mg/kg	M	4.4E-07	mg/kg-day	N/A		N/A	N/A	
	Aluminum	6.36E+03	mg/kg	6.36E+03	mg/kg	M	8.7E-04	mg/kg-day	1.0E+00	mg/kg-day	N/A	N/A	8.7E-04
	Arsenic	2.63E+00	mg/kg	2.63E+00	mg/kg	M	1.1E-06	mg/kg-day	3.0E-04	mg/kg-day	N/A	N/A	3.6E-03
	Iron	8.48E+03	mg/kg	8.48E+03	mg/kg	M	1.2E-03	mg/kg-day	3.0E-01	mg/kg-day	N/A	N/A	3.9E-03
	Vanadium	2.13E+01	mg/kg	2.13E+01	mg/kg	M	2.9E-06	mg/kg-day	2.6E-05	mg/kg-day	N/A	N/A	1.1E-01
	(Total)												1.2E-01
												Total Hazard Index Across All Exposure Routes/Pathways	9.5E-01

(1) Medium-Specific (M) EPC selected for hazard calculation.
(2) Chronic.

TABLE 7.48.CT
CALCULATION OF NON-CANCER HAZARDS
CENTRAL TENDANCY
Site 7, NAB Little Creek

Scenario Timeframe: Future
Medium: Soil*
Exposure Medium: Soil
Exposure Point: Covered Area
Receptor Population: Resident
Receptor Age: Child

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose (2)	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	Aroclor-1260	7.54E-02	mg/kg	7.54E-02	mg/kg	M	3.2E-07	mg/kg-day	N/A		N/A	N/A	
	Arsenic	1.76E+00	mg/kg	1.76E+00	mg/kg	M	7.5E-06	mg/kg-day	3.0E-04	mg/kg-day	N/A	N/A	2.5E-02
	Iron	4.60E+03	mg/kg	4.60E+03	mg/kg	M	2.0E-02	mg/kg-day	3.0E-01	mg/kg-day	N/A	N/A	6.6E-02
	Manganese	4.27E+01	mg/kg	4.27E+01	mg/kg	M	1.8E-04	mg/kg-day	2.0E-02	mg/kg-day	N/A	N/A	9.1E-03
	Vanadium	1.19E+01	mg/kg	1.19E+01	mg/kg	M	5.1E-05	mg/kg-day	1.0E-03	mg/kg-day	N/A	N/A	5.1E-02
	(Total)												1.5E-01
Dermal	Aroclor-1260	7.54E-02	mg/kg	7.54E-02	mg/kg	M	1.4E-07	mg/kg-day	N/A		N/A	N/A	
	Arsenic	1.76E+00	mg/kg	1.76E+00	mg/kg	M	7.2E-07	mg/kg-day	3.0E-04	mg/kg-day	N/A	N/A	2.4E-03
	Iron	4.60E+03	mg/kg	4.60E+03	mg/kg	M	6.3E-04	mg/kg-day	3.0E-01	mg/kg-day	N/A	N/A	2.1E-03
	Manganese	4.27E+01	mg/kg	4.27E+01	mg/kg	M	5.8E-06	mg/kg-day	8.0E-04	mg/kg-day	N/A	N/A	7.3E-03
	Vanadium	1.19E+01	mg/kg	1.19E+01	mg/kg	M	1.6E-06	mg/kg-day	2.6E-05	mg/kg-day	N/A	N/A	6.3E-02
	(Total)												7.4E-02
												Total Hazard Index Across All Exposure Routes/Pathways	2.3E-01

(1) Medium-Specific (M) EPC selected for hazard calculation.
(2) Chronic.

TABLE 8.1.RME
CALCULATION OF CANCER RISKS
REASONABLE MAXIMUM EXPOSURE
Site 7, NAB Little Creek

Scenario Timeframe: Current
Medium: Surface Soil
Exposure Medium: Surface Soil
Exposure Point: Weigh Station Area
Receptor Population: Maintenance Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	Aroclor-1260	9.20E-01	mg/kg	9.20E-01	mg/kg	M	1.5E-08	mg/kg-day	2.00E+00	(mg/kg-day) $^{-1}$	3.1E-08
	Arsenic	2.30E+00	mg/kg	2.30E+00	mg/kg	M	3.9E-08	mg/kg-day	1.50E+00	(mg/kg-day) $^{-1}$	5.8E-08
	Chromium	2.65E+01	mg/kg	2.65E+01	mg/kg	M	4.4E-07				
	Iron	1.48E+04	mg/kg	1.48E+04	mg/kg	M	2.5E-04				
	Lead	6.38E+02	mg/kg	6.38E+02	mg/kg	M	1.1E-05				
	Manganese	4.70E+02	mg/kg	4.70E+02	mg/kg	M	7.9E-06				
	Vanadium	3.67E+01	mg/kg	3.67E+01	mg/kg	M	6.2E-07				
											8.9E-08
Dermal	Aroclor-1260	9.20E-01	mg/kg	9.20E-01	mg/kg	M	3.7E-08	mg/kg-day	2.0E+00	(mg/kg-day) $^{-1}$	7.3E-08
	Arsenic	2.30E+00	mg/kg	2.30E+00	mg/kg	M	2.0E-08	mg/kg-day	1.5E+00	(mg/kg-day) $^{-1}$	2.9E-08
	Chromium	2.65E+01	mg/kg	2.65E+01	mg/kg	M	7.5E-08				
	Iron	1.48E+04	mg/kg	1.48E+04	mg/kg	M	4.2E-05				
	Lead	6.38E+02	mg/kg	6.38E+02	mg/kg	M	1.8E-06				
	Manganese	4.70E+02	mg/kg	4.70E+02	mg/kg	M	1.3E-06				
	Vanadium	3.67E+01	mg/kg	3.67E+01	mg/kg	M	1.0E-07				
	(Total)										1.0E-07
										Total Risk Across All Exposure Routes/Pathways	1.9E-07

(1) Medium-Specific (M) EPC selected for risk calculation.

TABLE 8.2.RME
CALCULATION OF CANCER RISKS
REASONABLE MAXIMUM EXPOSURE
Site 7, NAB Little Creek

Scenario Timeframe: Current
Medium: Surface Soil
Exposure Medium: Surface Soil
Exposure Point: Weigh Station Area
Receptor Population: Trespasser/Visitor
Receptor Age: Adolescents

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	Aroclor-1260	9.20E-01	mg/kg	9.20E-01	mg/kg	M	6.6E-08	mg/kg-day	2.00E+00	(mg/kg-day) $^{-1}$	1.3E-07
	Arsenic	2.30E+00	mg/kg	2.30E+00	mg/kg	M	1.7E-07	mg/kg-day	1.50E+00	(mg/kg-day) $^{-1}$	2.5E-07
	Chromium	2.65E+01	mg/kg	2.65E+01	mg/kg	M	1.9E-06				
	Iron	1.48E+04	mg/kg	1.48E+04	mg/kg	M	1.1E-03				
	Lead	6.38E+02	mg/kg	6.38E+02	mg/kg	M	4.6E-05				
	Manganese	4.70E+02	mg/kg	4.70E+02	mg/kg	M	3.4E-05				
	Vanadium	3.67E+01	mg/kg	3.67E+01	mg/kg	M	2.6E-06				
	(Total)										3.8E-07
Dermal	Aroclor-1260	9.20E-01	mg/kg	9.20E-01	mg/kg	M	4.7E-08	mg/kg-day	2.0E+00	(mg/kg-day) $^{-1}$	9.4E-08
	Arsenic	2.30E+00	mg/kg	2.30E+00	mg/kg	M	2.5E-08	mg/kg-day	1.5E+00	(mg/kg-day) $^{-1}$	3.8E-08
	Chromium	2.65E+01	mg/kg	2.65E+01	mg/kg	M	9.6E-08				
	Iron	1.48E+04	mg/kg	1.48E+04	mg/kg	M	5.4E-05				
	Lead	6.38E+02	mg/kg	6.38E+02	mg/kg	M	2.3E-06				
	Manganese	4.70E+02	mg/kg	4.70E+02	mg/kg	M	1.7E-06				
	Vanadium	3.67E+01	mg/kg	3.67E+01	mg/kg	M	1.3E-07				
	(Total)										1.3E-07
										Total Risk Across All Exposure Routes/Pathways	5.1E-07

(1) Medium-Specific (M) EPC selected for risk calculation.

TABLE 8.3.RME
CALCULATION OF CANCER RISKS
REASONABLE MAXIMUM EXPOSURE
Site 7, NAB Little Creek

Scenario Timeframe: Current
Medium: Surface Soil
Exposure Medium: Surface Soil
Exposure Point: Area to West of Landfill, the "Ear"
Receptor Population: Maintenance Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	Arsenic	4.60E+00	mg/kg	4.60E+00	mg/kg	M	7.7E-08	mg/kg-day	1.50E+00	(mg/kg-day) $^{-1}$	1.2E-07
	Iron	8.84E+03	mg/kg	8.84E+03	mg/kg	M	1.5E-04				
	Thallium	1.00E+00	mg/kg	1.00E+00	mg/kg	M	1.7E-08				
	Vanadium	2.60E+01	mg/kg	2.60E+01	mg/kg	M	4.4E-07				
	(Total)										1.2E-07
Dermal	Arsenic	4.60E+00	mg/kg	4.60E+00	mg/kg	M	3.9E-08	mg/kg-day	1.5E+00	(mg/kg-day) $^{-1}$	5.9E-08
	Iron	8.84E+03	mg/kg	8.84E+03	mg/kg	M	2.5E-05				
	Thallium	1.00E+00	mg/kg	1.00E+00	mg/kg	M	2.8E-09				
	Vanadium	2.60E+01	mg/kg	2.60E+01	mg/kg	M	7.4E-08				
	(Total)										5.9E-08
										Total Risk Across All Exposure Routes/Pathways	1.7E-07

(1) Medium-Specific (M) EPC selected for risk calculation.

TABLE 8.4.RME
CALCULATION OF CANCER RISKS
REASONABLE MAXIMUM EXPOSURE
Site 7, NAB Little Creek

Scenario Timeframe: Current
Medium: Surface Soil
Exposure Medium: Surface Soil
Exposure Point: Area to West of Landfill, the "Ear"
Receptor Population: Trespasser/Visitor
Receptor Age: Adolescents

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	Arsenic	4.60E+00	mg/kg	4.60E+00	mg/kg	M	3.3E-07	mg/kg-day	1.50E+00	(mg/kg-day) $^{-1}$	5.0E-07
	Iron	8.84E+03	mg/kg	8.84E+03	mg/kg	M	6.3E-04				
	Thallium	1.00E+00	mg/kg	1.00E+00	mg/kg	M	7.2E-08				
	Vanadium	2.60E+01	mg/kg	2.60E+01	mg/kg	M	1.9E-06				
	(Total)										5.0E-07
Dermal	Arsenic	4.60E+00	mg/kg	4.60E+00	mg/kg	M	5.0E-08	mg/kg-day	1.5E+00	(mg/kg-day) $^{-1}$	7.5E-08
	Iron	8.84E+03	mg/kg	8.84E+03	mg/kg	M	3.2E-05				
	Thallium	1.00E+00	mg/kg	1.00E+00	mg/kg	M	3.6E-09				
	Vanadium	2.60E+01	mg/kg	2.60E+01	mg/kg	M	9.5E-08				
	(Total)										7.5E-08
										Total Risk Across All Exposure Routes/Pathways	5.7E-07

(1) Medium-Specific (M) EPC selected for risk calculation.

TABLE 8.5.RME
CALCULATION OF CANCER RISKS
REASONABLE MAXIMUM EXPOSURE
Site 7, NAB Little Creek

Scenario Timeframe: Current
Medium: Surface Soil
Exposure Medium: Surface Soil
Exposure Point: Site Perimeter
Receptor Population: Maintenance Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	Benzo(a)pyrene	4.50E-01	mg/kg	4.50E-01	mg/kg	M	7.5E-09	mg/kg-day	7.30E+00	(mg/kg-day) $^{-1}$	5.5E-08
	Arsenic	3.50E+00	mg/kg	3.50E+00	mg/kg	M	5.9E-08	mg/kg-day	1.50E+00	(mg/kg-day) $^{-1}$	8.8E-08
	Iron	7.33E+03	mg/kg	7.33E+03	mg/kg	M	1.2E-04				
	Vanadium	2.02E+02	mg/kg	2.02E+02	mg/kg	M	3.4E-06				
	(Total)										1.4E-07
Dermal	Benzo(a)pyrene	4.50E-01	mg/kg	4.50E-01	mg/kg	M	1.7E-08	mg/kg-day	7.3E+00	(mg/kg-day) $^{-1}$	1.2E-07
	Arsenic	3.50E+00	mg/kg	3.50E+00	mg/kg	M	3.0E-08	mg/kg-day	1.5E+00	(mg/kg-day) $^{-1}$	4.5E-08
	Iron	7.33E+03	mg/kg	7.33E+03	mg/kg	M	2.1E-05				
	Vanadium	2.02E+02	mg/kg	2.02E+02	mg/kg	M	5.7E-07				
	(Total)										1.7E-07
										Total Risk Across All Exposure Routes/Pathways	3.1E-07

(1) Medium-Specific (M) EPC selected for risk calculation.

TABLE 8.6.RME
CALCULATION OF CANCER RISKS
REASONABLE MAXIMUM EXPOSURE
Site 7, NAB Little Creek

Scenario Timeframe: Current
Medium: Surface Soil
Exposure Medium: Surface Soil
Exposure Point: Site Perimeter
Receptor Population: Trespasser/Visitor
Receptor Age: Adolescents

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	Benzo(a)pyrene	4.50E-01	mg/kg	4.50E-01	mg/kg	M	3.2E-08	mg/kg-day	7.30E+00	(mg/kg-day) $^{-1}$	2.4E-07
	Arsenic	3.50E+00	mg/kg	3.50E+00	mg/kg	M	2.5E-07	mg/kg-day	1.50E+00	(mg/kg-day) $^{-1}$	3.8E-07
	Iron	7.33E+03	mg/kg	7.33E+03	mg/kg	M	5.3E-04				
	Vanadium	2.02E+02	mg/kg	2.02E+02	mg/kg	M	1.5E-05				
	(Total)										6.1E-07
Dermal	Benzo(a)pyrene	4.50E-01	mg/kg	4.50E-01	mg/kg	M	2.1E-08	mg/kg-day	7.3E+00	(mg/kg-day) $^{-1}$	1.6E-07
	Arsenic	3.50E+00	mg/kg	3.50E+00	mg/kg	M	3.8E-08	mg/kg-day	1.5E+00	(mg/kg-day) $^{-1}$	5.7E-08
	Iron	7.33E+03	mg/kg	7.33E+03	mg/kg	M	2.7E-05				
	Vanadium	2.02E+02	mg/kg	2.02E+02	mg/kg	M	7.3E-07				
	(Total)										2.1E-07
										Total Risk Across All Exposure Routes/Pathways	8.3E-07

(1) Medium-Specific (M) EPC selected for risk calculation.

TABLE 8.7.RME
CALCULATION OF CANCER RISKS
REASONABLE MAXIMUM EXPOSURE
Site 7, NAB Little Creek

Scenario Timeframe: Current/Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Little Creek Cove
Receptor Population: Trespasser/Visitor
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	Arsenic	3.27E+00	µg/L	3.27E+00	µg/L	M	4.7E-07	mg/kg-day	1.5E+00	(mg/kg-day) $^{-1}$	7.1E-07
	(Total)										7.1E-07
Dermal	Arsenic	3.27E+00	µg/L	3.27E+00	µg/L	M	1.2E-07	mg/kg-day	1.5E+00	(mg/kg-day) $^{-1}$	1.8E-07
	(Total)										1.8E-07
										Total Risk Across All Exposure Routes/Pathways	8.9E-07

(1) Medium-Specific (M) EPC selected for risk calculation.

Table 8.7.RME and 8.8.RME Supplement
Calculation of DAevent
Little Creek Cove Surface Water, Trespasser/Visitor
Site 7, NAB Little Creek

Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Permeability Constant (PC) (cm/hr)	Lag Time (t) (hr)	Duration of Event (ET) (hr)	t* (hr)	B (dimensionless)	DAevent (mg/cm^2-event)	Eq
Arsenic	3.27E+00	µg/L	1.0E-03	N/A	2.6E+00	N/A	1.3E-02	8.5E-09	1

Inorganics: DAevent (mg/cm2-event) =
PC x CW x ET x CF1 x CF2 (eq 1)

Organics: DAevent (mg/cm2-event) =

ET<t*: DAevent (mg/cm2-event) =
2 x PC x CW x (sqrt((6 x t x ET)/3.1415))
x CF1 x CF2 (eq 2)

ET>t*: DAevent (mg/cm2-event) =
PC x CW x (ET/(1+B) + 2 x t x ((1 + 3xB)/(1+B))
x CF1 x CF2 (eq 3)

Permeability constants from EPA 1992, Dermal Exposure Assessment: Principals and Applications.
ORD, EPA/600/8-91/001B. Default value of 0.001 cm/hour used for inorganics without published values.
N/A - not applicable.

TABLE 8.8.RME
CALCULATION OF CANCER RISKS
REASONABLE MAXIMUM EXPOSURE
Site 7, NAB Little Creek

Scenario Timeframe: Current/Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Little Creek Cove
Receptor Population: Trespasser/Visitor
Receptor Age: Adolescents

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	Arsenic	3.27E+00	µg/L	3.27E+00	µg/L	M	2.4E-07	mg/kg-day	1.5E+00	(mg/kg-day) $^{-1}$	3.7E-07
	(Total)										3.7E-07
Dermal	Arsenic	3.27E+00	µg/L	3.27E+00	µg/L	M	4.6E-08	mg/kg-day	1.5E+00	(mg/kg-day) $^{-1}$	6.9E-08
	(Total)										6.9E-08
										Total Risk Across All Exposure Routes/Pathways	4.4E-07

(1) Medium-Specific (M) EPC selected for risk calculation.

TABLE 8.9.RME
CALCULATION OF CANCER RISKS
REASONABLE MAXIMUM EXPOSURE
Site 7, NAB Little Creek

Scenario Timeframe: Current/Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Little Creek Cove
Receptor Population: Site Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	Arsenic	3.27E+00	µg/L	3.27E+00	µg/L	M	1.8E-07	mg/kg-day	1.5E+00	(mg/kg-day) $^{-1}$	2.6E-07
	(Total)										2.6E-07
Dermal	Arsenic	3.27E+00	µg/L	3.27E+00	µg/L	M	1.2E-08	mg/kg-day	1.5E+00	(mg/kg-day) $^{-1}$	1.7E-08
	(Total)										1.7E-08
										Total Risk Across All Exposure Routes/Pathways	2.8E-07

(1) Medium-Specific (M) EPC selected for risk calculation.

Table 8.9.RME Supplement
Calculation of DAevent
Little Creek Cove Surface Water, Site Worker
Site 7, NAB Little Creek

Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Permeability Constant (PC) (cm/hr)	Lag Time (t) (hr)	Duration of Event (ET) (hr)	t* (hr)	B (dimensionless)	DAevent (mg/cm^2-event)	Eq
Arsenic	3.27E+00	µg/L	1.0E-03	N/A	4.0E+00	N/A	1.3E-02	1.3E-08	1

Inorganics: DAevent (mg/cm2-event) =
PC x CW x ET x CF1 x CF2 (eq 1)

Organics: DAevent (mg/cm2-event) =

ET<t*: DAevent (mg/cm2-event) =
2 x PC x CW x (sqrt((6 x t x ET)/3.1415))
x CF1 x CF2 (eq 2)

ET>t*: DAevent (mg/cm2-event) =
PC x CW x (ET/(1+B) + 2 x t x ((1 + 3xB)/(1+B))
x CF1 x CF2 (eq 3)

Permeability constants from EPA 1992, Dermal Exposure Assessment: Principals and Applications.
ORD, EPA/600/8-91/001B. Default value of 0.001 cm/hour used for inorganics without published values.
N/A - not applicable.

TABLE 8.10.RME
CALCULATION OF CANCER RISKS
REASONABLE MAXIMUM EXPOSURE
Site 7, NAB Little Creek

Scenario Timeframe: Current/Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Pond
Receptor Population: Trespasser/Visitor
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	Arsenic	2.51E+00	µg/L	2.51E+00	µg/L	M	3.6E-07	mg/kg-day	1.5E+00	(mg/kg-day) $^{-1}$	5.5E-07
	(Total)										5.5E-07
Dermal	Arsenic	2.51E+00	µg/L	2.51E+00	µg/L	M	2.7E-08	mg/kg-day	1.5E+00	(mg/kg-day) $^{-1}$	4.1E-08
	(Total)										4.1E-08
										Total Risk Across All Exposure Routes/Pathways	5.9E-07

(1) Medium-Specific (M) EPC selected for risk calculation.

Table 8.10.RME and 8.11.RME Supplement
Calculation of DAevent
Pond Surface Water, Trespasser/Visitor
Site 7, NAB Little Creek

Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Permeability Constant (PC) (cm/hr)	Lag Time (t) (hr)	Duration of Event (ET) (hr)	t* (hr)	B (dimensionless)	DAevent (mg/cm^2-event)	Eq
Arsenic	2.51E+00	µg/L	1.0E-03	N/A	2.6E+00	N/A	1.3E-02	6.5E-09	1

Inorganics: DAevent (mg/cm2-event) =
PC x CW x ET x CF1 x CF2 (eq 1)

Organics: DAevent (mg/cm2-event) =

ET<t*: DAevent (mg/cm2-event) =
2 x PC x CW x (sqrt((6 x t x ET)/3.1415))
x CF1 x CF2 (eq 2)

ET>t*: DAevent (mg/cm2-event) =
PC x CW x (ET/(1+B) + 2 x t x ((1 + 3xB)/(1+B))
x CF1 x CF2 (eq 3)

Permeability constants from EPA 1992, Dermal Exposure Assessment: Principals and Applications.
ORD, EPA/600/8-91/001B. Default value of 0.001 cm/hour used for inorganics without published values.
N/A - not applicable.

TABLE 8.11.RME
CALCULATION OF CANCER RISKS
REASONABLE MAXIMUM EXPOSURE
Site 7, NAB Little Creek

Scenario Timeframe: Current/Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Pond
Receptor Population: Trespasser/Visitor
Receptor Age: Adolescents

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	Arsenic	2.51E+00	µg/L	2.51E+00	µg/L	M	1.9E-07	mg/kg-day	1.5E+00	(mg/kg-day) $^{-1}$	2.8E-07
	(Total)										2.8E-07
Dermal	Arsenic	2.51E+00	µg/L	2.51E+00	µg/L	M	1.1E-08	mg/kg-day	1.5E+00	(mg/kg-day) $^{-1}$	1.6E-08
	(Total)										1.6E-08
										Total Risk Across All Exposure Routes/Pathways	3.0E-07

(1) Medium-Specific (M) EPC selected for risk calculation.

TABLE 8.12.RME
CALCULATION OF CANCER RISKS
REASONABLE MAXIMUM EXPOSURE
Site 7, NAB Little Creek

Scenario Timeframe: Current/Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Canal on West Side of Site
Receptor Population: Trespasser/Visitor
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	1,1,2,2-Tetrachloroethane	1.00E+00	µg/L	1.00E+00	µg/L	M	1.5E-07	mg/kg-day	2.0E-01	(mg/kg-day) $^{-1}$	2.9E-08
	Bromodichloromethane	2.00E+00	µg/L	2.00E+00	µg/L	M	2.9E-07	mg/kg-day	6.2E-02	(mg/kg-day) $^{-1}$	1.8E-08
	Chloroform	7.03E+00	µg/L	7.03E+00	µg/L	M	1.0E-06	mg/kg-day	N/A		
	Arsenic	6.20E+00	µg/L	6.20E+00	µg/L	M	9.0E-07	mg/kg-day	1.5E+00	(mg/kg-day) $^{-1}$	1.3E-06
	(Total)										1.4E-06
Dermal	1,1,2,2-Tetrachloroethane	1.00E+00	µg/L	1.00E+00	µg/L	M	1.7E-07	mg/kg-day	2.0E-01	(mg/kg-day) $^{-1}$	3.4E-08
	Bromodichloromethane	2.00E+00	µg/L	2.00E+00	µg/L	M	2.1E-07	mg/kg-day	6.2E-02	(mg/kg-day) $^{-1}$	1.3E-08
	Chloroform	7.03E+00	µg/L	7.03E+00	µg/L	M	9.2E-07	mg/kg-day	N/A		
	Arsenic	6.20E+00	µg/L	6.20E+00	µg/L	M	6.7E-08	mg/kg-day	1.5E+00	(mg/kg-day) $^{-1}$	1.0E-07
	(Total)										1.5E-07
										Total Risk Across All Exposure Routes/Pathways	1.5E-06

(1) Medium-Specific (M) EPC selected for risk calculation.

Table 8.12.RME and 8.13.RME Supplement
Calculation of DAevent
Canal on West Side of Site Surface Water, Trespasser/Visitor
Site 7, NAB Little Creek

Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Permeability Constant (PC) (cm/hr)	Lag Time (t) (hr)	Duration of Event (ET) (hr)	t* (hr)	B (dimensionless)	DAevent (mg/cm^2-event)	Eq
1,1,2,2-Tetrachloroethane	1.00E+00	µg/L	9.0E-03	9.2E-01	2.6E+00	2.2E+00	2.5E-02	4.0E-08	3
Bromodichloromethane	2.00E+00	µg/L	5.8E-03	8.7E-01	2.6E+00	2.1E+00	1.2E-02	5.0E-08	3
Chloroform	7.03E+00	µg/L	8.9E-03	4.7E-01	2.6E+00	1.1E+00	9.3E-03	2.2E-07	3
Arsenic	6.20E+00	µg/L	1.0E-03	N/A	2.6E+00	N/A	1.3E-02	1.6E-08	1

Inorganics: DAevent (mg/cm2-event) =
PC x CW x ET x CF1 x CF2 (eq 1)

Organics: DAevent (mg/cm2-event) =

ET<t*: DAevent (mg/cm2-event) =
2 x PC x CW x (sqrt((6 x t x ET)/3.1415))
x CF1 x CF2 (eq 2)

ET>t*: DAevent (mg/cm2-event) =
PC x CW x (ET/(1+B) + 2 x t x ((1 + 3xB)/(1+B))
x CF1 x CF2 (eq 3)

Permeability constants from EPA 1992, Dermal Exposure Assessment: Principals and Applications.
ORD, EPA/600/8-91/001B. Default value of 0.001 cm/hour used for inorganics without published values.
N/A - not applicable.

TABLE 8.13.RME
CALCULATION OF CANCER RISKS
REASONABLE MAXIMUM EXPOSURE
Site 7, NAB Little Creek

Scenario Timeframe: Current/Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Canal on West Side of Site
Receptor Population: Trespasser/Visitor
Receptor Age: Adolescents

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	1,1,2,2-Tetrachloroethane	1.00E+00	µg/L	1.00E+00	µg/L	M	7.5E-08	mg/kg-day	2.0E-01	(mg/kg-day) $^{-1}$	1.5E-08
	Bromodichloromethane	2.00E+00	µg/L	2.00E+00	µg/L	M	1.5E-07	mg/kg-day	6.2E-02	(mg/kg-day) $^{-1}$	9.3E-09
	Chloroform	7.03E+00	µg/L	7.03E+00	µg/L	M	5.2E-07	mg/kg-day	N/A		
	Arsenic	6.20E+00	µg/L	6.20E+00	µg/L	M	4.6E-07	mg/kg-day	1.5E+00	(mg/kg-day) $^{-1}$	6.9E-07
	(Total)										7.2E-07
Dermal	1,1,2,2-Tetrachloroethane	1.00E+00	µg/L	1.00E+00	µg/L	M	6.5E-08	mg/kg-day	2.0E-01	(mg/kg-day) $^{-1}$	1.3E-08
	Bromodichloromethane	2.00E+00	µg/L	2.00E+00	µg/L	M	8.2E-08	mg/kg-day	6.2E-02	(mg/kg-day) $^{-1}$	5.1E-09
	Chloroform	7.03E+00	µg/L	7.03E+00	µg/L	M	3.6E-07	mg/kg-day	N/A		
	Arsenic	6.20E+00	µg/L	6.20E+00	µg/L	M	2.6E-08	mg/kg-day	1.5E+00	(mg/kg-day) $^{-1}$	3.9E-08
	(Total)										5.7E-08
										Total Risk Across All Exposure Routes/Pathways	7.8E-07

(1) Medium-Specific (M) EPC selected for risk calculation.

TABLE 8.14.RME
CALCULATION OF CANCER RISKS
REASONABLE MAXIMUM EXPOSURE
Site 7, NAB Little Creek

Scenario Timeframe: Current/Future
Medium: Sediment
Exposure Medium: Sediment
Exposure Point: Pond
Receptor Population: Trespasser/Visitor
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	Arsenic	7.68E+00	mg/kg	7.68E+00	mg/kg	M	2.7E-07	mg/kg-day	1.50E+00	(mg/kg-day) $^{-1}$	4.0E-07
	Iron	2.18E+04	mg/kg	2.18E+04	mg/kg	M	7.6E-04	mg/kg-day	N/A		
	Vanadium	3.17E+01	mg/kg	3.17E+01	mg/kg	M	1.1E-06	mg/kg-day	N/A		
	(Total)										4.0E-07
Dermal	Arsenic	7.68E+00	mg/kg	7.68E+00	mg/kg	M	1.7E-07	mg/kg-day	1.5E+00	(mg/kg-day) $^{-1}$	2.5E-07
	Iron	2.18E+04	mg/kg	2.18E+04	mg/kg	M	1.6E-04	mg/kg-day	N/A		
	Vanadium	3.17E+01	mg/kg	3.17E+01	mg/kg	M	2.3E-07	mg/kg-day	N/A		
	(Total)										2.5E-07
										Total Risk Across All Exposure Routes/Pathways	6.5E-07

(1) Medium-Specific (M) EPC selected for risk calculation.

TABLE 8.15.RME
CALCULATION OF CANCER RISKS
REASONABLE MAXIMUM EXPOSURE
Site 7, NAB Little Creek

Scenario Timeframe: Current/Future
Medium: Sediment
Exposure Medium: Sediment
Exposure Point: Pond
Receptor Population: Trespasser/Visitor
Receptor Age: Adolescents

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	Arsenic	7.68E+00	mg/kg	7.68E+00	mg/kg	M	1.4E-07	mg/kg-day	1.50E+00	(mg/kg-day) $^{-1}$	2.1E-07
	Iron	2.18E+04	mg/kg	2.18E+04	mg/kg	M	3.9E-04				
	Vanadium	3.17E+01	mg/kg	3.17E+01	mg/kg	M	5.7E-07				
	(Total)										2.1E-07
Dermal	Arsenic	7.68E+00	mg/kg	7.68E+00	mg/kg	M	7.4E-08	mg/kg-day	1.5E+00	(mg/kg-day) $^{-1}$	1.1E-07
	Iron	2.18E+04	mg/kg	2.18E+04	mg/kg	M	7.0E-05				
	Vanadium	3.17E+01	mg/kg	3.17E+01	mg/kg	M	1.0E-07				
	(Total)										1.1E-07
										Total Risk Across All Exposure Routes/Pathways	3.2E-07

(1) Medium-Specific (M) EPC selected for risk calculation.

TABLE 8.16.RME
CALCULATION OF CANCER RISKS
REASONABLE MAXIMUM EXPOSURE
Site 7, NAB Little Creek

Scenario Timeframe: Current/Future
Medium: Sediment
Exposure Medium: Sediment
Exposure Point: Canal on West Side of Site
Receptor Population: Trespasser/Visitor
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	Arsenic	6.15E+00	mg/kg	6.15E+00	mg/kg	M	2.1E-07	mg/kg-day	1.50E+00	(mg/kg-day) $^{-1}$	3.2E-07
	Vanadium	3.17E+01	mg/kg	3.17E+01	mg/kg	M	1.1E-06	mg/kg-day			
	(Total)										3.2E-07
Dermal	Arsenic	6.15E+00	mg/kg	6.15E+00	mg/kg	M	1.3E-07	mg/kg-day	1.5E+00	(mg/kg-day) $^{-1}$	2.0E-07
	Vanadium	3.17E+01	mg/kg	3.17E+01	mg/kg	M	2.3E-07	mg/kg-day			
	(Total)										2.0E-07
										Total Risk Across All Exposure Routes/Pathways	5.2E-07

(1) Medium-Specific (M) EPC selected for risk calculation.

TABLE 8.17.RME
CALCULATION OF CANCER RISKS
REASONABLE MAXIMUM EXPOSURE
Site 7, NAB Little Creek

Scenario Timeframe: Current/Future
Medium: Sediment
Exposure Medium: Sediment
Exposure Point: Canal on West Side of Site
Receptor Population: Trespasser/Visitor
Receptor Age: Adolescents

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	Arsenic	6.15E+00	mg/kg	6.15E+00	mg/kg	M	1.1E-07	mg/kg-day	1.50E+00	(mg/kg-day) $^{-1}$	1.7E-07
	Vanadium	3.17E+01	mg/kg	3.17E+01	mg/kg	M	5.7E-07	mg/kg-day			
	(Total)										1.7E-07
Dermal	Arsenic	6.15E+00	mg/kg	6.15E+00	mg/kg	M	6.0E-08	mg/kg-day	1.5E+00	(mg/kg-day) $^{-1}$	9.0E-08
	Vanadium	3.17E+01	mg/kg	3.17E+01	mg/kg	M	1.0E-07	mg/kg-day			
	(Total)										9.0E-08
										Total Risk Across All Exposure Routes/Pathways	2.6E-07

(1) Medium-Specific (M) EPC selected for risk calculation.

TABLE 8.18.RME
CALCULATION OF CANCER RISKS
REASONABLE MAXIMUM EXPOSURE
Site 7, NAB Little Creek

Scenario Timeframe: Current/Future
Medium: Sediment
Exposure Medium: Sediment
Exposure Point: Canal on East Side of Site
Receptor Population: Trespasser/Visitor
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	Arsenic	5.10E+00	mg/kg	5.10E+00	mg/kg	M	1.8E-07	mg/kg-day	1.50E+00	(mg/kg-day) $^{-1}$	2.7E-07
	(Total)										2.7E-07
Dermal	Arsenic	5.10E+00	mg/kg	5.10E+00	mg/kg	M	1.1E-07	mg/kg-day	1.5E+00	(mg/kg-day) $^{-1}$	1.7E-07
	(Total)										1.7E-07
										Total Risk Across All Exposure Routes/Pathways	4.3E-07

(1) Medium-Specific (M) EPC selected for risk calculation.

TABLE 8.19.RME
CALCULATION OF CANCER RISKS
REASONABLE MAXIMUM EXPOSURE
Site 7, NAB Little Creek

Scenario Timeframe: Current/Future
Medium: Sediment
Exposure Medium: Sediment
Exposure Point: Canal on East Side of Site
Receptor Population: Trespasser/Visitor
Receptor Age: Adolescents

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	Arsenic	5.10E+00	mg/kg	5.10E+00	mg/kg	M	9.2E-08	mg/kg-day	1.50E+00	(mg/kg-day) $^{-1}$	1.4E-07
	(Total)										1.4E-07
Dermal	Arsenic	5.10E+00	mg/kg	5.10E+00	mg/kg	M	4.9E-08	mg/kg-day	1.5E+00	(mg/kg-day) $^{-1}$	7.4E-08
	(Total)										7.4E-08
										Total Risk Across All Exposure Routes/Pathways	2.1E-07

(1) Medium-Specific (M) EPC selected for risk calculation.

TABLE 8.20.RME
CALCULATION OF CANCER RISKS
REASONABLE MAXIMUM EXPOSURE
Site 7, NAB Little Creek

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater
Exposure Point: Upper Aquifer - Tap Water
Receptor Population: Resident
Receptor Age: Child/Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	Aluminum	3.96E+03	µg/L	3.96E+03	µg/L	M	5.9E-02	mg/kg-day	N/A		
	Arsenic	6.80E+00	µg/L	6.80E+00	µg/L	M	1.0E-04	mg/kg-day	1.5E+00	(mg/kg-day) $^{-1}$	1.5E-04
	Chromium	2.34E+01	µg/L	2.34E+01	µg/L	M	3.5E-04	mg/kg-day	N/A		
	Iron	9.55E+03	µg/L	9.55E+03	µg/L	M	1.4E-01	mg/kg-day	N/A		
	Manganese	6.15E+02	µg/L	6.15E+02	µg/L	M	9.2E-03	mg/kg-day	N/A		
	Vanadium	8.90E+00	µg/L	8.90E+00	µg/L	M	1.3E-04	mg/kg-day	N/A		
	(Total)										1.5E-04
Dermal	Aluminum	3.96E+03	µg/L	3.96E+03	µg/L	M	1.3E-04	mg/kg-day	N/A		
	Arsenic	6.80E+00	µg/L	6.80E+00	µg/L	M	2.2E-07	mg/kg-day	1.5E+00	(mg/kg-day) $^{-1}$	3.3E-07
	Chromium	2.34E+01	µg/L	2.34E+01	µg/L	M	7.6E-07	mg/kg-day	N/A		
	Iron	9.55E+03	µg/L	9.55E+03	µg/L	M	3.1E-04	mg/kg-day	N/A		
	Manganese	6.15E+02	µg/L	6.15E+02	µg/L	M	2.0E-05	mg/kg-day	N/A		
	Vanadium	8.90E+00	µg/L	8.90E+00	µg/L	M	2.9E-07	mg/kg-day			
	(Total)										3.3E-07
										Total Risk Across All Exposure Routes/Pathways	1.5E-04

(1) Medium-Specific (M) EPC selected for risk calculation.

Table 8.20.RME Supplement
Calculation of DAevent
Groundwater, Child/Adult
Site 7, NAB Little Creek

Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Permeability Constant (PC) (cm/hr)	Lag Time (t) (hr)	Duration of Event (ETa) (hr)	Duration of Event (ETc) (hr)	t* (hr)	B (dimensionless)	Daevent Adult (mg/cm^2-event)	Daevent Child (mg/cm^2-event)	Eq
Aluminum	3.96E+03	µg/L	1.0E-03	N/A	2.0E-01	3.3E-01	N/A	N/A	7.9E-07	1.3E-06	1
Arsenic	6.80E+00	µg/L	1.0E-03	N/A	2.0E-01	3.3E-01	N/A	N/A	1.4E-09	2.2E-09	1
Chromium	2.34E+01	µg/L	1.0E-03	N/A	2.0E-01	3.3E-01	N/A	N/A	4.7E-09	7.7E-09	1
Iron	9.55E+03	µg/L	1.0E-03	N/A	2.0E-01	3.3E-01	N/A	N/A	1.9E-06	3.2E-06	1
Manganese	6.15E+02	µg/L	1.0E-03	N/A	2.0E-01	3.3E-01	N/A	N/A	1.2E-07	2.0E-07	1
Vanadium	8.90E+00	µg/L	1.0E-03	N/A	2.0E-01	3.3E-01	N/A	N/A	1.8E-09	2.9E-09	1

Inorganics: DAevent (mg/cm2-event) =
PC x CW x ET x CF1 x CF2 (eq 1)

Organics: DAevent (mg/cm2-event) =

ET<t*: DAevent (mg/cm2-event) =
2 x PC x CW x (sqrt((6 x t x ET)/3.1415))
x CF1 x CF2 (eq 2)

ET>t*: DAevent (mg/cm2-event) =
PC x CW x (ET/(1+B) + 2 x t x ((1 + 3xB)/(1+B))
x CF1 x CF2 (eq 3)

Permeability constants from EPA 1992, Dermal Exposure Assessment: Principals and Applications.
ORD, EPA/600/8-91/001B. Default value of 0.001 cm/hour used for inorganics without published values.
N/A - not applicable.
* Parameter values calculated on Table 8.2.RME Supplement 2.

TABLE 8.21.RME
CALCULATION OF CANCER RISKS
REASONABLE MAXIMUM EXPOSURE
Site 7, NAB Little Creek

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater
Exposure Point: Upper Aquifer - Tap Water
Receptor Population: Industrial Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	Aluminum	3.96E+03	µg/L	3.96E+03	µg/L	M	1.4E-02	mg/kg-day	N/A		
	Arsenic	6.80E+00	µg/L	6.80E+00	µg/L	M	2.4E-05	mg/kg-day	1.5E+00	(mg/kg-day) $^{-1}$	3.6E-05
	Chromium	2.34E+01	µg/L	2.34E+01	µg/L	M	8.2E-05	mg/kg-day	N/A		
	Iron	9.55E+03	µg/L	9.55E+03	µg/L	M	3.3E-02	mg/kg-day	N/A		
	Manganese	6.15E+02	µg/L	6.15E+02	µg/L	M	2.2E-03	mg/kg-day	N/A		
	Vanadium	8.90E+00	µg/L	8.90E+00	µg/L	M	3.1E-05	mg/kg-day	N/A		
	(Total)										3.6E-05
										Total Risk Across All Exposure Routes/Pathways	3.6E-05

(1) Medium-Specific (M) EPC selected for risk calculation.

TABLE 8.22.RME
CALCULATION OF CANCER RISKS
REASONABLE MAXIMUM EXPOSURE
Site 7, NAB Little Creek

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater
Exposure Point: Upper Aquifer - Excavation Pit
Receptor Population: Construction Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Dermal	Aluminum	3.96E+03	µg/L	3.96E+03	µg/L	M	1.2E-05	mg/kg-day	N/A		
	Arsenic	6.80E+00	µg/L	6.80E+00	µg/L	M	2.0E-08	mg/kg-day	1.5E+00	(mg/kg-day) $^{-1}$	3.0E-08
	Chromium	2.34E+01	µg/L	2.34E+01	µg/L	M	6.9E-08	mg/kg-day	N/A		
	Iron	9.55E+03	µg/L	9.55E+03	µg/L	M	2.8E-05	mg/kg-day	N/A		
	Manganese	6.15E+02	µg/L	6.15E+02	µg/L	M	1.8E-06	mg/kg-day	N/A		
	Vanadium	8.90E+00	µg/L	8.90E+00	µg/L	M	2.6E-08	mg/kg-day	N/A		
	(Total)										3.0E-08
										Total Risk Across All Exposure Routes/Pathways	3.0E-08

(1) Medium-Specific (M) EPC selected for risk calculation.

Table 8.22.RME Supplement
Calculation of DAevent
Groundwater, Adult Construction Worker
Site 7, NAB Little Creek

Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Permeability Constant (PC) (cm/hr)	Lag Time (t) (hr)	Duration of Event (ET) (hr)	t* (hr)	B (dimensionless)	DAevent (mg/cm^2-event)	Eq
Aluminum	3.96E+03	µg/L	1.0E-03	N/A	8.0E+00	N/A	N/A	3.2E-05	1
Arsenic	6.80E+00	µg/L	1.0E-03	N/A	8.0E+00	N/A	N/A	5.4E-08	1
Chromium	2.34E+01	µg/L	1.0E-03	N/A	8.0E+00	N/A	N/A	1.9E-07	1
Iron	9.55E+03	µg/L	1.0E-03	N/A	8.0E+00	N/A	N/A	7.6E-05	1
Manganese	6.15E+02	µg/L	1.0E-03	N/A	8.0E+00	N/A	N/A	4.9E-06	1
Vanadium	8.90E+00	µg/L	1.0E-03	N/A	8.0E+00	N/A	N/A	7.1E-08	1

Inorganics: DAevent (mg/cm2-event) =
PC x CW x ET x CF1 x CF2 (eq 1)

Organics: DAevent (mg/cm2-event) =

ET<t*: DAevent (mg/cm2-event) =
2 x PC x CW x (sqrt((6 x t x ET)/3.1415))
x CF1 x CF2 (eq 2)

ET>t*: DAevent (mg/cm2-event) =
PC x CW x (ET/(1+B) + 2 x t x ((1 + 3xB)/(1+B))
x CF1 x CF2 (eq 3)

Permeability constants from EPA 1992, Dermal Exposure Assessment: Principals and Applications.
ORD, EPA/600/8-91/001B. Default value of 0.001 cm/hour used for inorganics without published values.
N/A - not applicable.
* Parameter values calculated on Table 8.2.RME Supplement 2.

TABLE 8.23.RME
CALCULATION OF CANCER RISKS
REASONABLE MAXIMUM EXPOSURE
Site 7, NAB Little Creek

Scenario Timeframe: Future
Medium: Soil*
Exposure Medium: Soil
Exposure Point: Weigh Station Area
Receptor Population: Construction Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	Aroclor-1260	9.20E-01	mg/kg	9.20E-01	mg/kg	M	3.1E-08	mg/kg-day	2.00E+00	(mg/kg-day) $^{-1}$	6.2E-08
	Arsenic	2.30E+00	mg/kg	2.30E+00	mg/kg	M	7.7E-08	mg/kg-day	1.5E+00	(mg/kg-day) $^{-1}$	1.2E-07
	Chromium	2.65E+01	mg/kg	2.65E+01	mg/kg	M	8.9E-07	mg/kg-day	N/A		
	Copper	3.96E+02	mg/kg	3.96E+02	mg/kg	M	1.3E-05	mg/kg-day	N/A		
	Iron	1.48E+04	mg/kg	1.48E+04	mg/kg	M	5.0E-04	mg/kg-day	N/A		
	Lead	6.38E+02	mg/kg	6.38E+02	mg/kg	M	2.1E-05	mg/kg-day	N/A		
	Manganese	4.70E+02	mg/kg	4.70E+02	mg/kg	M	1.6E-05	mg/kg-day	N/A		
	Vanadium	3.67E+01	mg/kg	3.67E+01	mg/kg	M	1.2E-06	mg/kg-day	N/A		
	(Total)										1.8E-07
Dermal	Aroclor-1260	9.20E-01	mg/kg	9.20E-01	mg/kg	M	1.1E-08	mg/kg-day	2.0E+00	(mg/kg-day) $^{-1}$	2.3E-08
	Arsenic	2.30E+00	mg/kg	2.30E+00	mg/kg	M	6.1E-09	mg/kg-day	1.5E+00	(mg/kg-day) $^{-1}$	9.2E-09
	Chromium	2.65E+01	mg/kg	2.65E+01	mg/kg	M	2.4E-08	mg/kg-day	N/A		
	Copper	3.96E+02	mg/kg	3.96E+02	mg/kg	M	3.5E-07	mg/kg-day	N/A		
	Iron	1.48E+04	mg/kg	1.48E+04	mg/kg	M	1.3E-05	mg/kg-day	N/A		
	Lead	6.38E+02	mg/kg	6.38E+02	mg/kg	M	5.7E-07	mg/kg-day	N/A		
	Manganese	4.70E+02	mg/kg	4.70E+02	mg/kg	M	4.2E-07	mg/kg-day	N/A		
	Vanadium	3.67E+01	mg/kg	3.67E+01	mg/kg	M	3.3E-08	mg/kg-day	N/A		
											3.2E-08
										Total Risk Across All Exposure Routes/Pathways	2.1E-07

(1) Medium-Specific (M) EPC selected for risk calculation.

TABLE 8.24.RME
CALCULATION OF CANCER RISKS
REASONABLE MAXIMUM EXPOSURE
Site 7, NAB Little Creek

Scenario Timeframe: Future
Medium: Soil*
Exposure Medium: Soil
Exposure Point: Weigh Station Area
Receptor Population: Industrial Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	Aroclor-1260	9.20E-01	mg/kg	9.20E-01	mg/kg	M	3.2E-07	mg/kg-day	2.00E+00	(mg/kg-day) $^{-1}$	6.4E-07
	Arsenic	2.30E+00	mg/kg	2.30E+00	mg/kg	M	8.0E-07	mg/kg-day	1.5E+00	(mg/kg-day) $^{-1}$	1.2E-06
	Chromium	2.65E+01	mg/kg	2.65E+01	mg/kg	M	9.3E-06	mg/kg-day	N/A		
	Copper	3.96E+02	mg/kg	3.96E+02	mg/kg	M	1.4E-04	mg/kg-day	N/A		
	Iron	1.48E+04	mg/kg	1.48E+04	mg/kg	M	5.2E-03	mg/kg-day	N/A		
	Lead	6.38E+02	mg/kg	6.38E+02	mg/kg	M	2.2E-04	mg/kg-day	N/A		
	Manganese	4.70E+02	mg/kg	4.70E+02	mg/kg	M	1.6E-04	mg/kg-day	N/A		
	Vanadium	3.67E+01	mg/kg	3.67E+01	mg/kg	M	1.3E-05	mg/kg-day	N/A		
	(Total)										1.8E-06
Dermal	Aroclor-1260	9.20E-01	mg/kg	9.20E-01	mg/kg	M	7.6E-07	mg/kg-day	2.0E+00	(mg/kg-day) $^{-1}$	1.5E-06
	Arsenic	2.30E+00	mg/kg	2.30E+00	mg/kg	M	8.2E-09	mg/kg-day	1.5E+00	(mg/kg-day) $^{-1}$	1.2E-08
	Chromium	2.65E+01	mg/kg	2.65E+01	mg/kg	M	3.1E-08	mg/kg-day	N/A		
	Copper	3.96E+02	mg/kg	3.96E+02	mg/kg	M	4.7E-07	mg/kg-day	N/A		
	Iron	1.48E+04	mg/kg	1.48E+04	mg/kg	M	1.8E-05	mg/kg-day	N/A		
	Lead	6.38E+02	mg/kg	6.38E+02	mg/kg	M	7.6E-07	mg/kg-day	N/A		
	Manganese	4.70E+02	mg/kg	4.70E+02	mg/kg	M	5.6E-07	mg/kg-day	N/A		
	Vanadium	3.67E+01	mg/kg	3.67E+01	mg/kg	M	4.4E-08	mg/kg-day	N/A		
											1.5E-06
										Total Risk Across All Exposure Routes/Pathways	3.4E-06

(1) Medium-Specific (M) EPC selected for risk calculation.

TABLE 8.25.RME
CALCULATION OF CANCER RISKS
REASONABLE MAXIMUM EXPOSURE
Site 7, NAB Little Creek

Scenario Timeframe: Future
Medium: Soil*
Exposure Medium: Soil
Exposure Point: Weigh Station Area
Receptor Population: Resident
Receptor Age: Child/Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	Aroclor-1260	9.20E-01	mg/kg	9.20E-01	mg/kg	M	1.4E-06	mg/kg-day	2.0E+00	$(mg/kg\text{-}day)^{-1}$	2.9E-06
	Arsenic	2.30E+00	mg/kg	2.30E+00	mg/kg	M	3.6E-06	mg/kg-day	1.5E+00	$(mg/kg\text{-}day)^{-1}$	5.4E-06
	Chromium	2.65E+01	mg/kg	2.65E+01	mg/kg	M	4.1E-05	mg/kg-day	N/A		
	Copper	3.96E+02	mg/kg	3.96E+02	mg/kg	M	6.2E-04	mg/kg-day	N/A		
	Iron	1.48E+04	mg/kg	1.48E+04	mg/kg	M	2.3E-02	mg/kg-day	N/A		
	Lead	6.38E+02	mg/kg	6.38E+02	mg/kg	M	1.0E-03	mg/kg-day	N/A		
	Manganese	4.70E+02	mg/kg	4.70E+02	mg/kg	M	7.4E-04	mg/kg-day	N/A		
	Vanadium	3.67E+01	mg/kg	3.67E+01	mg/kg	M	5.7E-05	mg/kg-day	N/A		
	(Total)										8.3E-06
Dermal	Aroclor-1260	9.20E-01	mg/kg	9.20E-01	mg/kg	M	1.1E-06	mg/kg-day	2.0E+00	$(mg/kg\text{-}day)^{-1}$	2.1E-06
	Arsenic	2.30E+00	mg/kg	2.30E+00	mg/kg	M	5.7E-07	mg/kg-day	1.5E+00	$(mg/kg\text{-}day)^{-1}$	8.5E-07
	Chromium	2.65E+01	mg/kg	2.65E+01	mg/kg	M	2.2E-06	mg/kg-day	N/A		
	Copper	3.96E+02	mg/kg	3.96E+02	mg/kg	M	3.3E-05	mg/kg-day	N/A		
	Iron	1.48E+04	mg/kg	1.48E+04	mg/kg	M	1.2E-03	mg/kg-day	N/A		
	Lead	6.38E+02	mg/kg	6.38E+02	mg/kg	M	5.3E-05	mg/kg-day	N/A		
	Manganese	4.70E+02	mg/kg	4.70E+02	mg/kg	M	3.9E-05	mg/kg-day	N/A		
	Vanadium	3.67E+01	mg/kg	3.67E+01	mg/kg	M	3.0E-06	mg/kg-day	N/A		
											3.0E-06
										Total Risk Across All Exposure Routes/Pathways	1.1E-05

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for risk calculation.

TABLE 8.26.RME
CALCULATION OF CANCER RISKS
REASONABLE MAXIMUM EXPOSURE
Site 7, NAB Little Creek

Scenario Timeframe: Future
Medium: Soil*
Exposure Medium: Soil
Exposure Point: Area to West of Landfill, the "Ear"
Receptor Population: Construction Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	Arsenic	4.60E+00	mg/kg	4.60E+00	mg/kg	M	1.5E-07	mg/kg-day	1.5E+00	(mg/kg-day) $^{-1}$	2.3E-07
	Copper	7.47E+02	mg/kg	7.47E+02	mg/kg	M	2.5E-05	mg/kg-day	N/A		
	Iron	2.18E+04	mg/kg	2.18E+04	mg/kg	M	7.3E-04	mg/kg-day	N/A		
	Thallium	1.00E+00	mg/kg	1.00E+00	mg/kg	M	3.4E-08	mg/kg-day	N/A		
	Vanadium	2.60E+01	mg/kg	2.60E+01	mg/kg	M	8.7E-07	mg/kg-day	N/A		
	(Total)										2.3E-07
Dermal	Arsenic	4.60E+00	mg/kg	4.60E+00	mg/kg	M	1.2E-08	mg/kg-day	1.5E+00	(mg/kg-day) $^{-1}$	1.8E-08
	Copper	7.47E+02	mg/kg	7.47E+02	mg/kg	M	6.6E-07	mg/kg-day	N/A		
	Iron	2.18E+04	mg/kg	2.18E+04	mg/kg	M	1.9E-05	mg/kg-day	N/A		
	Thallium	1.00E+00	mg/kg	1.00E+00	mg/kg	M	8.9E-10	mg/kg-day	N/A		
	Vanadium	2.60E+01	mg/kg	2.60E+01	mg/kg	M	2.3E-08	mg/kg-day	N/A		
											1.8E-08
										Total Risk Across All Exposure Routes/Pathways	2.5E-07

(1) Medium-Specific (M) EPC selected for risk calculation.

TABLE 8.27.RME
CALCULATION OF CANCER RISKS
REASONABLE MAXIMUM EXPOSURE
Site 7, NAB Little Creek

Scenario Timeframe: Future
Medium: Soil*
Exposure Medium: Soil
Exposure Point: Area to West of Landfill, the "Ear"
Receptor Population: Industrial Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	Arsenic	4.60E+00	mg/kg	4.60E+00	mg/kg	M	1.6E-06	mg/kg-day	1.5E+00	(mg/kg-day) $^{-1}$	2.4E-06
	Copper	7.47E+02	mg/kg	7.47E+02	mg/kg	M	2.6E-04	mg/kg-day	N/A		
	Iron	2.18E+04	mg/kg	2.18E+04	mg/kg	M	7.6E-03	mg/kg-day	N/A		
	Thallium	1.00E+00	mg/kg	1.00E+00	mg/kg	M	3.5E-07	mg/kg-day	N/A		
	Vanadium	2.60E+01	mg/kg	2.60E+01	mg/kg	M	9.1E-06	mg/kg-day	N/A		
	(Total)										2.4E-06
Dermal	Arsenic	4.60E+00	mg/kg	4.60E+00	mg/kg	M	8.2E-07	mg/kg-day	1.5E+00	(mg/kg-day) $^{-1}$	1.2E-06
	Copper	7.47E+02	mg/kg	7.47E+02	mg/kg	M	4.4E-05	mg/kg-day	N/A		
	Iron	2.18E+04	mg/kg	2.18E+04	mg/kg	M	1.3E-03	mg/kg-day	N/A		
	Thallium	1.00E+00	mg/kg	1.00E+00	mg/kg	M	5.9E-08	mg/kg-day	N/A		
	Vanadium	2.60E+01	mg/kg	2.60E+01	mg/kg	M	1.5E-06	mg/kg-day	N/A		
											1.2E-06
										Total Risk Across All Exposure Routes/Pathways	3.6E-06

(1) Medium-Specific (M) EPC selected for risk calculation.

TABLE 8.28.RME
CALCULATION OF CANCER RISKS
REASONABLE MAXIMUM EXPOSURE
Site 7, NAB Little Creek

Scenario Timeframe: Future
Medium: Soil*
Exposure Medium: Soil
Exposure Point: Area to West of Landfill, the "Ear"
Receptor Population: Resident
Receptor Age: Child/Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	Arsenic	4.60E+00	mg/kg	4.60E+00	mg/kg	M	7.2E-06	mg/kg-day	1.5E+00	(mg/kg-day) $^{-1}$	1.1E-05
	Copper	7.47E+02	mg/kg	7.47E+02	mg/kg	M	1.2E-03	mg/kg-day	N/A		
	Iron	2.18E+04	mg/kg	2.18E+04	mg/kg	M	3.4E-02	mg/kg-day	N/A		
	Thallium	1.00E+00	mg/kg	1.00E+00	mg/kg	M	1.6E-06	mg/kg-day	N/A		
	Vanadium	2.60E+01	mg/kg	2.60E+01	mg/kg	M	4.1E-05	mg/kg-day	N/A		
	(Total)										1.1E-05
Dermal	Arsenic	4.60E+00	mg/kg	4.60E+00	mg/kg	M	1.1E-06	mg/kg-day	1.5E+00	(mg/kg-day) $^{-1}$	1.7E-06
	Copper	7.47E+02	mg/kg	7.47E+02	mg/kg	M	6.2E-05	mg/kg-day	N/A		
	Iron	2.18E+04	mg/kg	2.18E+04	mg/kg	M	1.8E-03	mg/kg-day	N/A		
	Thallium	1.00E+00	mg/kg	1.00E+00	mg/kg	M	8.2E-08	mg/kg-day	N/A		
	Vanadium	2.60E+01	mg/kg	2.60E+01	mg/kg	M	2.1E-06	mg/kg-day	N/A		
											1.7E-06
										Total Risk Across All Exposure Routes/Pathways	1.3E-05

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for risk calculation.

TABLE 8.29.RME
CALCULATION OF CANCER RISKS
REASONABLE MAXIMUM EXPOSURE
Site 7, NAB Little Creek

Scenario Timeframe: Future
Medium: Soil*
Exposure Medium: Soil
Exposure Point: Site Perimeter
Receptor Population: Construction Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	Benzo(a)pyrene	4.29E-01	mg/kg	4.29E-01	mg/kg	M	1.4E-08	mg/kg-day	7.30E+00	(mg/kg-day) $^{-1}$	1.1E-07
	Aluminum	2.80E+04	mg/kg	2.80E+04	mg/kg	M	9.4E-04	mg/kg-day	N/A		
	Arsenic	5.37E+00	mg/kg	5.37E+00	mg/kg	M	1.8E-07	mg/kg-day	1.5E+00	(mg/kg-day) $^{-1}$	2.7E-07
	Iron	1.14E+04	mg/kg	1.14E+04	mg/kg	M	3.8E-04	mg/kg-day	N/A		
	Vanadium	2.02E+02	mg/kg	2.02E+02	mg/kg	M	6.8E-06	mg/kg-day	N/A		
	(Total)										3.8E-07
Dermal	Benzo(a)pyrene	4.29E-01	mg/kg	4.29E-01	mg/kg	M	5.0E-09	mg/kg-day	7.3E+00	(mg/kg-day) $^{-1}$	3.6E-08
	Aluminum	2.80E+04	mg/kg	2.80E+04	mg/kg	M	2.5E-05	mg/kg-day	N/A		
	Arsenic	5.37E+00	mg/kg	5.37E+00	mg/kg	M	1.4E-08	mg/kg-day	1.5E+00	(mg/kg-day) $^{-1}$	2.1E-08
	Iron	1.14E+04	mg/kg	1.14E+04	mg/kg	M	1.0E-05	mg/kg-day	N/A		
	Vanadium	2.02E+02	mg/kg	2.02E+02	mg/kg	M	1.8E-07	mg/kg-day	N/A		
											5.8E-08
										Total Risk Across All Exposure Routes/Pathways	4.3E-07

(1) Medium-Specific (M) EPC selected for risk calculation.

TABLE 8.30.RME
CALCULATION OF CANCER RISKS
REASONABLE MAXIMUM EXPOSURE
Site 7, NAB Little Creek

Scenario Timeframe: Future
Medium: Soil*
Exposure Medium: Soil
Exposure Point: Site Perimeter
Receptor Population: Industrial Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	Benzo(a)pyrene	4.29E-01	mg/kg	4.29E-01	mg/kg	M	1.5E-07	mg/kg-day	7.30E+00	(mg/kg-day) $^{-1}$	1.1E-06
	Aluminum	2.80E+04	mg/kg	2.80E+04	mg/kg	M	9.8E-03	mg/kg-day	N/A		
	Arsenic	5.37E+00	mg/kg	5.37E+00	mg/kg	M	1.9E-06	mg/kg-day	1.50E+00	(mg/kg-day) $^{-1}$	2.8E-06
	Iron	1.14E+04	mg/kg	1.14E+04	mg/kg	M	4.0E-03	mg/kg-day	N/A		
	Vanadium	2.02E+02	mg/kg	2.02E+02	mg/kg	M	7.1E-05	mg/kg-day	N/A		
	(Total)										3.9E-06
Dermal	Benzo(a)pyrene	4.29E-01	mg/kg	4.29E-01	mg/kg	M	3.3E-07	mg/kg-day	7.3E+00	(mg/kg-day) $^{-1}$	2.4E-06
	Aluminum	2.80E+04	mg/kg	2.80E+04	mg/kg	M	3.3E-05		N/A		
	Arsenic	5.37E+00	mg/kg	5.37E+00	mg/kg	M	1.9E-08	mg/kg-day	1.5E+00	(mg/kg-day) $^{-1}$	2.9E-08
	Iron	1.14E+04	mg/kg	1.14E+04	mg/kg	M	1.3E-05	mg/kg-day	N/A		
	Vanadium	2.02E+02	mg/kg	2.02E+02	mg/kg	M	2.4E-07	mg/kg-day	N/A		
											2.4E-06
										Total Risk Across All Exposure Routes/Pathways	6.4E-06

(1) Medium-Specific (M) EPC selected for risk calculation.

TABLE 8.31.RME
CALCULATION OF CANCER RISKS
REASONABLE MAXIMUM EXPOSURE
Site 7, NAB Little Creek

Scenario Timeframe: Future
Medium: Soil*
Exposure Medium: Soil
Exposure Point: Site Perimeter
Receptor Population: Resident
Receptor Age: Child/Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	Benzo(a)pyrene	4.29E-01	mg/kg	4.29E-01	mg/kg	M	6.7E-07	mg/kg-day	7.3E+00	(mg/kg-day) $^{-1}$	4.9E-06
	Aluminum	2.80E+04	mg/kg	2.80E+04	mg/kg	M	4.4E-02	mg/kg-day	N/A		
	Arsenic	5.37E+00	mg/kg	5.37E+00	mg/kg	M	8.4E-06	mg/kg-day	1.5E+00	(mg/kg-day) $^{-1}$	1.3E-05
	Iron	1.14E+04	mg/kg	1.14E+04	mg/kg	M	1.8E-02	mg/kg-day	N/A		
	Vanadium	2.02E+02	mg/kg	2.02E+02	mg/kg	M	3.2E-04	mg/kg-day	N/A		
	(Total)										1.8E-05
Dermal	Benzo(a)pyrene	4.29E-01	mg/kg	4.29E-01	mg/kg	M	4.6E-07	mg/kg-day	7.3E+00	(mg/kg-day) $^{-1}$	3.4E-06
	Aluminum	2.80E+04	mg/kg	2.80E+04	mg/kg	M	2.3E-03	mg/kg-day	N/A		
	Arsenic	5.37E+00	mg/kg	5.37E+00	mg/kg	M	1.3E-06	mg/kg-day	1.5E+00	(mg/kg-day) $^{-1}$	2.0E-06
	Iron	1.14E+04	mg/kg	1.14E+04	mg/kg	M	9.4E-04	mg/kg-day	N/A		
	Vanadium	2.02E+02	mg/kg	2.02E+02	mg/kg	M	1.7E-05	mg/kg-day	N/A		
											5.4E-06
										Total Risk Across All Exposure Routes/Pathways	2.3E-05

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for risk calculation.

TABLE 8.32.RME
CALCULATION OF CANCER RISKS
REASONABLE MAXIMUM EXPOSURE
Site 7, NAB Little Creek

Scenario Timeframe: Future
Medium: Soil*
Exposure Medium: Soil
Exposure Point: Covered Area
Receptor Population: Construction Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	Aroclor-1260	3.50E+00	mg/kg	3.50E+00	mg/kg	M	1.2E-07	mg/kg-day	2.00E+00	(mg/kg-day) $^{-1}$	2.3E-07
	Arsenic	2.11E+00	mg/kg	2.11E+00	mg/kg	M	7.1E-08	mg/kg-day	1.5E+00	(mg/kg-day) $^{-1}$	1.1E-07
	Iron	1.02E+04	mg/kg	1.02E+04	mg/kg	M	3.4E-04	mg/kg-day	N/A		
	Manganese	1.84E+02	mg/kg	1.84E+02	mg/kg	M	6.2E-06	mg/kg-day	N/A		
	Vanadium	3.95E+01	mg/kg	3.95E+01	mg/kg	M	1.3E-06	mg/kg-day	N/A		
	(Total)										3.4E-07
Dermal	Aroclor-1260	3.50E+00	mg/kg	3.50E+00	mg/kg	M	4.4E-08	mg/kg-day	2.0E+00	(mg/kg-day) $^{-1}$	8.7E-08
	Arsenic	2.11E+00	mg/kg	2.11E+00	mg/kg	M	5.6E-09	mg/kg-day	1.5E+00	(mg/kg-day) $^{-1}$	8.4E-09
	Iron	1.02E+04	mg/kg	1.02E+04	mg/kg	M	9.1E-06	mg/kg-day	N/A		
	Manganese	1.84E+02	mg/kg	1.84E+02	mg/kg	M	1.6E-07	mg/kg-day	N/A		
	Vanadium	3.95E+01	mg/kg	3.95E+01	mg/kg	M	3.5E-08	mg/kg-day	N/A		
											9.6E-08
										Total Risk Across All Exposure Routes/Pathways	4.4E-07

(1) Medium-Specific (M) EPC selected for risk calculation.

TABLE 8.33.RME
CALCULATION OF CANCER RISKS
REASONABLE MAXIMUM EXPOSURE
Site 7, NAB Little Creek

Scenario Timeframe: Future
Medium: Soil*
Exposure Medium: Soil
Exposure Point: Covered Area
Receptor Population: Industrial Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	Aroclor-1260	3.50E+00	mg/kg	3.50E+00	mg/kg	M	1.2E-06	mg/kg-day	2.00E+00	(mg/kg-day) $^{-1}$	2.4E-06
	Arsenic	2.11E+00	mg/kg	2.11E+00	mg/kg	M	7.4E-07	mg/kg-day	1.50E+00	(mg/kg-day) $^{-1}$	1.1E-06
	Iron	1.02E+04	mg/kg	1.02E+04	mg/kg	M	3.6E-03	mg/kg-day	N/A		
	Manganese	1.84E+02	mg/kg	1.84E+02	mg/kg	M	6.4E-05	mg/kg-day	N/A		
	Vanadium	3.95E+01	mg/kg	3.95E+01	mg/kg	M	1.4E-05	mg/kg-day	N/A		
	(Total)										3.6E-06
Dermal	Aroclor-1260	3.50E+00	mg/kg	3.50E+00	mg/kg	M	2.9E-06	mg/kg-day	2.0E+00	(mg/kg-day) $^{-1}$	5.8E-06
	Arsenic	2.11E+00	mg/kg	2.11E+00	mg/kg	M	7.5E-09	mg/kg-day	1.5E+00	(mg/kg-day) $^{-1}$	1.1E-08
	Iron	1.02E+04	mg/kg	1.02E+04	mg/kg	M	1.2E-05	mg/kg-day	N/A		
	Manganese	1.84E+02	mg/kg	1.84E+02	mg/kg	M	2.2E-07	mg/kg-day	N/A		
	Vanadium	3.95E+01	mg/kg	3.95E+01	mg/kg	M	4.7E-08	mg/kg-day	N/A		
											5.8E-06
										Total Risk Across All Exposure Routes/Pathways	9.4E-06

(1) Medium-Specific (M) EPC selected for risk calculation.

TABLE 8.34.RME
CALCULATION OF CANCER RISKS
REASONABLE MAXIMUM EXPOSURE
Site 7, NAB Little Creek

Scenario Timeframe: Future
Medium: Soil*
Exposure Medium: Soil
Exposure Point: Covered Area
Receptor Population: Resident
Receptor Age: Child/Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	Aroclor-1260	3.50E+00	mg/kg	3.50E+00	mg/kg	M	5.5E-06	mg/kg-day	2.0E+00	(mg/kg-day) $^{-1}$	1.1E-05
	Arsenic	2.11E+00	mg/kg	2.11E+00	mg/kg	M	3.3E-06	mg/kg-day	1.5E+00	(mg/kg-day) $^{-1}$	4.9E-06
	Iron	1.02E+04	mg/kg	1.02E+04	mg/kg	M	1.6E-02	mg/kg-day	N/A		
	Manganese	1.84E+02	mg/kg	1.84E+02	mg/kg	M	2.9E-04	mg/kg-day	N/A		
	Vanadium	3.95E+01	mg/kg	3.95E+01	mg/kg	M	6.2E-05	mg/kg-day	N/A		
	(Total)										1.6E-05
Dermal	Aroclor-1260	3.50E+00	mg/kg	3.50E+00	mg/kg	M	4.0E-06	mg/kg-day	2.0E+00	(mg/kg-day) $^{-1}$	8.1E-06
	Arsenic	2.11E+00	mg/kg	2.11E+00	mg/kg	M	5.2E-07	mg/kg-day	1.5E+00	(mg/kg-day) $^{-1}$	7.8E-07
	Iron	1.02E+04	mg/kg	1.02E+04	mg/kg	M	8.4E-04	mg/kg-day	N/A		
	Manganese	1.84E+02	mg/kg	1.84E+02	mg/kg	M	1.5E-05	mg/kg-day	N/A		
	Vanadium	3.95E+01	mg/kg	3.95E+01	mg/kg	M	3.3E-06	mg/kg-day	N/A		
											8.9E-06
										Total Risk Across All Exposure Routes/Pathways	2.5E-05

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for risk calculation.

TABLE 8.35.CT
CALCULATION OF CANCER RISKS
CENTRAL TENDENCY EXPOSURE
Site 7, NAB Little Creek

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater
Exposure Point: Upper Aquifer - Tap Water
Receptor Population: Resident
Receptor Age: Child/Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	Aluminum	2.99E+02	µg/L	2.99E+02	µg/L	M	1.6E-03	mg/kg-day	N/A		
	Arsenic	2.16E+00	µg/L	2.16E+00	µg/L	M	1.1E-05	mg/kg-day	1.5E+00	(mg/kg-day) $^{-1}$	1.7E-05
	Chromium	2.03E+00	µg/L	2.03E+00	µg/L	M	1.1E-05	mg/kg-day	N/A		
	Iron	6.84E+03	µg/L	6.84E+03	µg/L	M	3.6E-02	mg/kg-day	N/A		
	Manganese	3.42E+02	µg/L	3.42E+02	µg/L	M	1.8E-03	mg/kg-day	N/A		
	Vanadium	1.64E+00	µg/L	1.64E+00	µg/L	M	8.7E-06	mg/kg-day	N/A		
	(Total)										1.7E-05
Dermal	Aluminum	2.99E+02	µg/L	2.99E+02	µg/L	M	3.6E-06	mg/kg-day	N/A		
	Arsenic	2.16E+00	µg/L	2.16E+00	µg/L	M	2.6E-08	mg/kg-day	1.5E+00	(mg/kg-day) $^{-1}$	3.9E-08
	Chromium	2.03E+00	µg/L	2.03E+00	µg/L	M	2.5E-08	mg/kg-day	N/A		
	Iron	6.84E+03	µg/L	6.84E+03	µg/L	M	8.3E-05	mg/kg-day	N/A		
	Manganese	3.42E+02	µg/L	3.42E+02	µg/L	M	4.1E-06	mg/kg-day	N/A		
	Vanadium	1.64E+00	µg/L	1.64E+00	µg/L	M	2.0E-08	mg/kg-day	N/A		
	(Total)										3.9E-08
										Total Risk Across All Exposure Routes/Pathways	1.7E-05

(1) Medium-Specific (M) EPC selected for risk calculation.

Table 8.35.CT Supplement
Calculation of DAevent
Groundwater, Child/Adult
Site 7, NAB Little Creek

Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Permeability Constant (PC) (cm/hr)	Lag Time (t) (hr)	Duration of Event (ETa) (hr)	Duration of Event (ETc) (hr)	t* (hr)	B (dimensionless)	Daevent Adult (mg/cm^2-event)	Daevent Child (mg/cm^2-event)	Eq
Aluminum	2.99E+02	µg/L	1.0E-03	N/A	2.0E-01	3.3E-01	N/A	N/A	6.0E-08	9.9E-08	1
Arsenic	2.16E+00	µg/L	1.0E-03	N/A	2.0E-01	3.3E-01	N/A	N/A	4.3E-10	7.1E-10	1
Chromium	2.03E+00	µg/L	1.0E-03	N/A	2.0E-01	3.3E-01	N/A	N/A	4.1E-10	6.7E-10	1
Iron	6.84E+03	µg/L	1.0E-03	N/A	2.0E-01	3.3E-01	N/A	N/A	1.4E-06	2.3E-06	1
Manganese	3.42E+02	µg/L	1.0E-03	N/A	2.0E-01	3.3E-01	N/A	N/A	6.8E-08	1.1E-07	1
Vanadium	1.64E+00	µg/L	1.0E-03	N/A	2.0E-01	3.3E-01	N/A	N/A	3.3E-10	5.4E-10	1

Inorganics: DAevent (mg/cm2-event) =
PC x CW x ET x CF1 x CF2 (eq 1)

Organics: DAevent (mg/cm2-event) =

ET<t*: DAevent (mg/cm2-event) =
2 x PC x CW x (sqrt((6 x t x ET)/3.1415))
x CF1 x CF2 (eq 2)

ET>t*: DAevent (mg/cm2-event) =
PC x CW x (ET/(1+B) + 2 x t x ((1 + 3xB)/(1+B))
x CF1 x CF2 (eq 3)

Permeability constants from EPA 1992, Dermal Exposure Assessment: Principals and Applications.
ORD, EPA/600/8-91/001B. Default value of 0.001 cm/hour used for inorganics without published values.
N/A - not applicable.
* Parameter values calculated on Table 8.2.RME Supplement 2.

TABLE 9.1.RME

SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs

REASONABLE MAXIMUM EXPOSURE

Site 7, NAB Little Creek

Scenario Timeframe: Current
Receptor Population: Maintenance Worker
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Surface Soil	Surface Soil	Weigh Station Area	Aroclor-1260	3.1E-08		7.3E-08	1.0E-07	Aroclor-1260	N/A	0.0E+00		0.0E+00	0.0E+00
			Arsenic	5.8E-08		2.9E-08	8.7E-08	Arsenic	Skin/vascular	3.6E-04		1.8E-04	5.4E-04
			Chromium	0.0E+00		0.0E+00	0.0E+00	Chromium	NOAEL	4.1E-04		2.8E-03	3.2E-03
			Iron	0.0E+00		0.0E+00	0.0E+00	Iron	Gastrointestinal	2.3E-03		3.9E-04	2.7E-03
			Lead	0.0E+00		0.0E+00	0.0E+00	Lead	N/A	0.0E+00		0.0E+00	0.0E+00
			Manganese	0.0E+00		0.0E+00	0.0E+00	Manganese	CNS	1.1E-03		4.7E-03	5.8E-03
			Vanadium	0.0E+00		0.0E+00	0.0E+00	Vanadium	Kidney	1.7E-03		1.1E-02	1.3E-02
			(Total)	8.9E-08		1.0E-07	1.9E-07	(Total)		5.9E-03		1.9E-02	2.5E-02
Surface Soil	Surface Soil	Area to West of Landfill, the "Ear"	Arsenic	1.2E-07		5.9E-08	1.7E-07	Arsenic	Skin/vascular	7.2E-04		3.7E-04	1.1E-03
			Iron	0.0E+00		0.0E+00	0.0E+00	Iron	Gastrointestinal	1.4E-03		2.3E-04	1.6E-03
			Thallium	0.0E+00		0.0E+00	0.0E+00	Thallium	Skin/vascular	6.7E-04		1.1E-04	7.8E-04
			Vanadium	0.0E+00		0.0E+00	0.0E+00	Vanadium	Kidney	1.2E-03		8.0E-03	9.2E-03
			(Total)	1.2E-07		5.9E-08	1.7E-07	(Total)		4.0E-03		8.7E-03	1.3E-02
Surface Soil	Surface Soil	Site Perimeter	Benzo(a)pyrene	5.5E-08		1.2E-07	1.8E-07	Benzo(a)pyrene	N/A	0.0E+00		0.0E+00	0.0E+00
			Arsenic	8.8E-08		4.5E-08	1.3E-07	Arsenic	Skin/vascular	5.5E-04		2.8E-04	8.3E-04
			Iron	0.0E+00		0.0E+00	0.0E+00	Iron	NOAEL	1.1E-03		1.9E-04	1.3E-03
			Vanadium	0.0E+00		0.0E+00	0.0E+00	Vanadium	Kidney	9.5E-03		6.2E-02	7.1E-02
			(Total)	1.4E-07		1.7E-07	3.1E-07	(Total)		1.1E-02		6.2E-02	7.4E-02

Total Risk Across Weigh Station Area Surface Soil	1.9E-07
Total Risk Across Area to West of Landfill, the "Ear", Surface Soil	1.7E-07
Total Risk Across Site Perimeter Surface Soil	3.1E-07
Total Risk Across All Surface Soil	6.8E-07

Total Hazard Index Across All Media and All Exposure Routes	1.1E-01
Total CNS HI =	5.8E-03
Total Gastrointestinal HI =	4.3E-03
Total NOAEL HI =	4.6E-03
Total Skin HI =	3.2E-03
Total Vascular HI =	3.2E-03
Total Kidney HI =	9.4E-02

TABLE 9.2.RME

SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs

REASONABLE MAXIMUM EXPOSURE

Site 7, NAB Little Creek

Scenario Timeframe: Current/Future
Receptor Population: Trespasser/Visitor
Receptor Age: Adolescents

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Surface Soil	Surface Soil	Weigh Station Area	Aroclor-1260	1.3E-07		9.4E-08	2.3E-07	Aroclor-1260	N/A	0.0E+00		0.0E+00	0.0E+00
			Arsenic	2.5E-07		3.8E-08	2.9E-07	Arsenic	Skin/vascular	4.3E-03		6.5E-04	4.9E-03
			Chromium	0.0E+00		0.0E+00	0.0E+00	Chromium	NOAEL	4.9E-03		1.0E-02	1.5E-02
			Iron	0.0E+00		0.0E+00	0.0E+00	Iron	Gastrointestinal	2.8E-02		1.4E-03	2.9E-02
			Lead	0.0E+00		0.0E+00	0.0E+00	Lead	N/A	0.0E+00		0.0E+00	0.0E+00
			Manganese	0.0E+00		0.0E+00	0.0E+00	Manganese	CNS	1.3E-02		1.7E-02	3.0E-02
			Vanadium	0.0E+00		0.0E+00	0.0E+00	Vanadium	Kidney	2.1E-02		4.0E-02	6.0E-02
			(Total)	3.8E-07		1.3E-07	5.1E-07	(Total)		7.0E-02		6.9E-02	1.4E-01
Surface Soil	Surface Soil	Area to West of Landfill, the "Ear"	Arsenic	5.0E-07		7.5E-08	5.7E-07	Arsenic	Skin/vascular	8.6E-03		1.3E-03	9.9E-03
			Iron	0.0E+00		0.0E+00	0.0E+00	Iron	Gastrointestinal	1.6E-02		8.3E-04	1.7E-02
			Thallium	0.0E+00		0.0E+00	0.0E+00	Thallium	Skin/vascular	8.0E-03		4.0E-04	8.4E-03
			Vanadium	0.0E+00		0.0E+00	0.0E+00	Vanadium	Kidney	1.5E-02		2.8E-02	4.3E-02
			(Total)	5.0E-07		7.5E-08	5.7E-07	(Total)		4.8E-02		3.1E-02	7.8E-02
Surface Soil	Surface Soil	Site Perimeter	Benzo(a)pyrene	2.4E-07		0.0E+00	2.4E-07	Benzo(a)pyrene	N/A	0.0E+00		0.0E+00	0.0E+00
			Arsenic	3.8E-07		1.6E-07	5.3E-07	Arsenic	Skin/vascular	6.5E-03		9.9E-04	7.5E-03
			Iron	0.0E+00		5.7E-08	5.7E-08	Iron	NOAEL	1.4E-02		6.9E-04	1.4E-02
			Vanadium	0.0E+00		0.0E+00	0.0E+00	Vanadium	Kidney	1.1E-01		2.2E-01	3.3E-01
			(Total)	6.1E-07		2.1E-07	8.3E-07	(Total)		1.3E-01		2.2E-01	3.5E-01
Surface Water	Surface Water	Little Creek Cove	Arsenic	3.7E-07		6.9E-08	4.4E-07	Arsenic	Skin/vascular	6.3E-03		1.2E-03	7.5E-03
			(Total)	3.7E-07		6.9E-08	4.4E-07	(Total)		6.3E-03		1.2E-03	7.5E-03
Surface Water	Surface Water	Pond	Arsenic	2.8E-07		1.6E-08	3.0E-07	Arsenic	Skin/vascular	4.9E-03		2.7E-04	5.1E-03
			(Total)	2.8E-07		1.6E-08	3.0E-07	(Total)		4.9E-03		2.7E-04	5.1E-03

TABLE 9.2.RME

SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs

REASONABLE MAXIMUM EXPOSURE

Site 7, NAB Little Creek

Scenario Timeframe: Current/Future
Receptor Population: Trespasser/Visitor
Receptor Age: Adolescents

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Surface Water	Surface Water	Canal on West Side of Site	1,1,2,2-Tetrachloroethane	1.5E-08		1.3E-08	2.8E-08	1,1,2,2-Tetrachloroethane	Liver and Kidney	9.7E-06		8.4E-06	1.8E-05
			Bromodichloromethane	9.3E-09		5.1E-09	1.4E-08	Bromodichloromethane	Kidney	5.8E-05		3.2E-05	9.0E-05
			Chloroform	0.0E+00		0.0E+00	0.0E+00	Chloroform	Liver	4.1E-04		2.8E-04	6.9E-04
			Arsenic	6.9E-07		3.9E-08	7.3E-07	Arsenic	Skin/vascular	1.2E-02		6.8E-04	1.3E-02
			(Total)	7.2E-07		5.7E-08	7.8E-07	(Total)		1.2E-02		9.9E-04	1.3E-02
Sediment	Sediment	Pond	Arsenic	2.1E-07		1.1E-07	3.2E-07	Arsenic	Skin/vascular	3.6E-03		1.9E-03	5.5E-03
			Iron	0.0E+00		0.0E+00	0.0E+00	Iron	NOAEL	1.0E-02		1.8E-03	1.2E-02
			Vanadium	0.0E+00		0.0E+00	0.0E+00	Vanadium	Kidney	4.4E-03		3.1E-02	3.5E-02
			(Total)	2.1E-07		1.1E-07	3.2E-07	(Total)		1.8E-02		3.4E-02	5.3E-02
Sediment	Sediment	Canal on West Side of Site	Arsenic	1.7E-07		9.0E-08	2.6E-07	Arsenic	Skin/vascular	2.9E-03		1.5E-03	4.4E-03
			Vanadium	0.0E+00		0.0E+00	0.0E+00	Vanadium	Kidney	4.4E-03		3.1E-02	3.5E-02
			(Total)	1.7E-07		9.0E-08	2.6E-07	(Total)		7.3E-03		3.2E-02	3.9E-02
Sediment	Sediment	Canal on East Side of Site	Arsenic	1.4E-07		7.4E-08	2.1E-07	Arsenic	Skin/vascular	2.4E-03		1.3E-03	3.7E-03
			(Total)	1.4E-07		7.4E-08	2.1E-07	(Total)		2.4E-03		1.3E-03	3.7E-03

Total Risk Across All Surface Soil	1.9E-06
Total Risk Across All Surface Water	1.5E-06
Total Risk Across All Sediment	7.9E-07
Total Risk Across All Media	4.2E-06

Total Hazard Index Across All Media and All Exposure Routes	6.9E-01
Total CNS HI =	3.0E-02
Total Gastrointestinal HI =	4.6E-02
Total Kidney HI =	2.2E-01
Total Liver HI =	7.0E-04
Total NOAEL HI =	4.1E-02
Total Skin HI =	7.0E-02
Total Vascular HI =	7.0E-02

TABLE 9.3.RME

SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs

REASONABLE MAXIMUM EXPOSURE

Site 7, NAB Little Creek

Scenario Timeframe: Current/Future
Receptor Population: Trespasser/Visitor
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Surface Water	Surface Water	Little Creek Cove	Arsenic	7.1E-07		1.8E-07	8.9E-07	Arsenic	Skin/vascular	4.6E-03		1.2E-03	5.8E-03
			(Total)	7.1E-07		1.8E-07	8.9E-07	(Total)		4.6E-03		1.2E-03	5.8E-03
Surface Water	Surface Water	Pond	Arsenic	5.5E-07		4.1E-08	5.9E-07	Arsenic	Skin/vascular	3.5E-03		2.7E-04	3.8E-03
			(Total)	5.5E-07		4.1E-08	5.9E-07	(Total)		3.5E-03		2.7E-04	3.8E-03
Surface Water	Surface Water	Canal on West Side of Site	1,1,2,2-Tetrachloroethan	2.9E-08		3.4E-08	6.3E-08	1,1,2,2-Tetrachloroethane	Liver and Kidney	7.1E-06		8.2E-06	1.5E-05
			Bromodichloromethane	1.8E-08		1.3E-08	3.1E-08	Bromodichloromethane	Kidney	4.2E-05		3.1E-05	7.3E-05
			Chloroform	0.0E+00		0.0E+00	0.0E+00	Chloroform	Liver	3.0E-04		2.7E-04	5.7E-04
			Arsenic	1.3E-06		1.0E-07	1.5E-06	Arsenic	Skin/vascular	8.7E-03		6.6E-04	9.4E-03
			(Total)	1.4E-06		1.5E-07	1.5E-06	(Total)		9.1E-03		9.6E-04	1.0E-02
Sediment	Sediment	Pond	Arsenic	4.0E-07		2.5E-07	6.5E-07	Arsenic	Skin/vascular	2.6E-03		1.6E-03	4.2E-03
			Iron	0.0E+00		0.0E+00	0.0E+00	Iron	NOAEL	7.4E-03		1.5E-03	8.9E-03
			Vanadium	0.0E+00		0.0E+00		Vanadium	Kidney	3.2E-03		2.6E-02	2.9E-02
			(Total)	4.0E-07		2.5E-07	6.5E-07	(Total)		1.3E-02		2.9E-02	4.2E-02
Sediment	Sediment	Canal on West Side of Site	Arsenic	3.2E-07		2.0E-07	5.2E-07	Arsenic	Skin/vascular	2.1E-03		1.3E-03	3.4E-03
			Vanadium	0.0E+00		0.0E+00	0.0E+00	Vanadium	Kidney	3.2E-03		2.6E-02	2.9E-02
			(Total)	3.2E-07		2.0E-07	5.2E-07	(Total)		5.3E-03		2.7E-02	3.2E-02
Sediment	Sediment	Canal on East Side of Site	Arsenic	2.7E-07		1.7E-07	4.3E-07	Arsenic	Skin/vascular	1.7E-03		1.1E-03	2.8E-03
			(Total)	2.7E-07		1.7E-07	4.3E-07	(Total)		1.7E-03		1.1E-03	2.8E-03

Total Risk Across All Surface Water	3.0E-06
Total Risk Across All Sediment	1.6E-06
Total Risk Across All Media	4.6E-06

Total Hazard Index Across All Media and All Exposure Routes	9.7E-02
Total Kidney HI =	5.8E-02
Total Liver HI =	5.8E-04
Total NOAEL HI =	8.9E-03
Total Skin HI =	2.9E-02
Total Vascular HI =	2.9E-02

TABLE 9.4.RME

SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs

REASONABLE MAXIMUM EXPOSURE

Site 7, NAB Little Creek

Scenario Timeframe: Current/Future
Receptor Population: Site Worker
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Surface Water	Surface Water	Little Creek Cove	Arsenic	2.6E-07		1.7E-08	2.8E-07	Arsenic	Skin/vascular	1.6E-03		1.1E-04	1.7E-03
			(Total)	2.6E-07		1.7E-08	2.8E-07	(Total)		1.6E-03		1.1E-04	1.7E-03
							Total Risk Across Surface Water 2.8E-07						Total Hazard Index Across All Media and All Exposure Routes 1.7E-03

Total Skin HI = 1.7E-03

Total Vascular HI = 1.7E-03

TABLE 9.5.RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURE
Site 7, NAB Little Creek

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Groundwater	Groundwater	Upper Aquifer - Tap Water						Aluminum	CNS	1.1E-01		2.2E-04	1.1E-01
								Arsenic	Skin/vascular	6.2E-01		1.2E-03	6.2E-01
								Chromium	NOAEL	2.1E-01		1.7E-02	2.3E-01
								Iron	Gastrointestinal	8.7E-01		1.7E-03	8.7E-01
								Manganese	CNS	8.4E-01		4.2E-02	8.9E-01
								Vanadium	Kidney	2.4E-01		1.9E-02	2.6E-01
								(Total)		2.9E+00		8.1E-02	3.0E+00
Soil*	Soil	Weigh Station Area						Aroclor-1260	N/A	0.0E+00		0.0E+00	0.0E+00
								Arsenic	Skin/vascular	1.1E-02		4.2E-03	1.5E-02
								Chromium	NOAEL	1.2E-02		6.4E-02	7.6E-02
								Copper	Gastrointestinal	1.4E-02		1.8E-03	1.5E-02
								Iron	Gastrointestinal	6.8E-02		8.9E-03	7.7E-02
								Lead	N/A	0.0E+00		0.0E+00	0.0E+00
								Manganese	CNS	3.2E-02		1.1E-01	1.4E-01
								Vanadium	Kidney	5.0E-02		2.6E-01	3.1E-01
								(Total)		1.9E-01		4.4E-01	6.3E-01
Soil*	Soil	Area to West of Landfill, the "Ear"						Arsenic	Skin/vascular	2.1E-02		8.3E-03	2.9E-02
								Copper	Gastrointestinal	2.6E-02		3.4E-03	2.9E-02
								Iron	Gastrointestinal	1.0E-01		1.3E-02	1.1E-01
								Thallium	Skin/vascular	2.0E-02		2.6E-03	2.2E-02
								Vanadium	Kidney	3.6E-02		1.8E-01	2.2E-01
								(Total)		2.0E-01		2.1E-01	4.1E-01
Soil*	Soil	Site Perimeter						Benzo(a)pyrene	N/A	0.0E+00		0.0E+00	0.0E+00
								Aluminum	CNS	3.8E-02		5.1E-03	4.3E-02
								Arsenic	Skin/vascular	2.5E-02		9.7E-03	3.4E-02
								Iron	Gastrointestinal	5.2E-02		6.9E-03	5.9E-02
								Vanadium	Kidney	2.8E-01		1.4E+00	1.7E+00
								(Total)		3.9E-01		1.4E+00	1.8E+00

TABLE 9.5.RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURE
Site 7, NAB Little Creek

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Soil*	Soil	Covered Area						Aroclor-1260	N/A	0.0E+00		0.0E+00	0.0E+00
								Arsenic	Skin/vascular	9.6E-03		3.8E-03	1.3E-02
								Iron	Gastrointestinal	4.7E-02		6.1E-03	5.3E-02
								Manganese	CNS	1.3E-02		4.2E-02	5.4E-02
								Vanadium	Kidney	5.4E-02		2.7E-01	3.3E-01
								(Total)		1.2E-01		3.3E-01	4.5E-01
							N/A	Total Hazard Index Across All Media and All Exposure Routes					6.3E+00

Total CNS (Nervous System) HI =	1.2E+00
Total Gastrointestinal HI =	1.2E+00
Total Kidney HI =	2.8E+00
Total NOAEL HI =	3.1E-01
Total Skin HI =	7.4E-01
Total Vascular HI =	7.4E-01

TABLE 9.6.RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURE
Site 7, NAB Little Creek

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Child

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Groundwater	Groundwater	Upper Aquifer - Tap Water						Aluminum	CNS	2.5E-01		6.3E-04	2.5E-01
								Arsenic	Skin/vascular	1.4E+00		3.6E-03	1.5E+00
								Chromium	NOAEL	5.0E-01		4.9E-02	5.5E-01
								Iron	Gastrointestinal	2.0E+00		5.0E-03	2.0E+00
								Manganese	CNS	2.0E+00		1.2E-01	2.1E+00
								Vanadium	Kidney	5.7E-01		5.4E-02	6.2E-01
								(Total)		6.8E+00		2.3E-01	7.0E+00
Soil*	Soil	Weigh Station Area						Aroclor-1260	N/A	0.0E+00		0.0E+00	0.0E+00
								Arsenic	Skin/vascular	9.8E-02		5.5E-03	1.0E-01
								Chromium	NOAEL	1.1E-01		8.4E-02	2.0E-01
								Copper	Gastrointestinal	1.3E-01		2.4E-03	1.3E-01
								Iron	Gastrointestinal	6.3E-01		1.2E-02	6.4E-01
								Lead	N/A	0.0E+00		0.0E+00	0.0E+00
								Manganese	CNS	3.0E-01		1.4E-01	4.4E-01
								Vanadium	Kidney	4.7E-01		3.4E-01	8.1E-01
								(Total)		1.7E+00		5.8E-01	2.3E+00
Soil*	Soil	Area to West of Landfill, the "Ear"						Arsenic	Skin/vascular	2.0E-01		1.1E-02	2.1E-01
								Copper	Gastrointestinal	2.4E-01		4.5E-03	2.4E-01
								Iron	Gastrointestinal	9.3E-01		1.7E-02	9.5E-01
								Thallium	Skin/vascular	1.8E-01		3.4E-03	1.9E-01
								Vanadium	Kidney	3.3E-01		2.4E-01	5.7E-01
								(Total)		1.9E+00		2.8E-01	2.2E+00
Soil*	Soil	Site Perimeter						Benzo(a)pyrene	N/A	0.0E+00		0.0E+00	0.0E+00
								Aluminum	CNS	3.6E-01		6.7E-03	3.6E-01
								Arsenic	Skin/vascular	2.3E-01		1.3E-02	2.4E-01
								Iron	Gastrointestinal	4.8E-01		9.1E-03	4.9E-01
								Vanadium	Kidney	2.6E+00		1.9E+00	4.4E+00
								(Total)		3.7E+00		1.9E+00	5.5E+00

TABLE 9.6.RME

SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs

REASONABLE MAXIMUM EXPOSURE

Site 7, NAB Little Creek

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Child

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Soil*	Soil	Covered Area						Aroclor-1260	N/A	0.0E+00		0.0E+00	0.0E+00
								Arsenic	Skin/vascular	9.0E-02		5.0E-03	9.5E-02
								Iron	Gastrointestinal	4.3E-01		8.1E-03	4.4E-01
								Manganese	CNS	1.2E-01		5.5E-02	1.7E-01
								Vanadium	Kidney	5.1E-01		3.6E-01	8.7E-01
								(Total)		1.1E+00		4.3E-01	1.6E+00
							N/A		Total Hazard Index Across All Media and All Exposure Routes				1.9E+01

Total CNS (Nervous System) HI =	3.3E+00
Total Gastrointestinal HI =	4.9E+00
Total Kidney HI =	7.3E+00
Total NOAEL HI =	7.5E-01
Total Skin HI =	2.3E+00
Total Vascular HI =	2.3E+00

TABLE 9.7.RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURE
Site 7, NAB Little Creek

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Child/Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Groundwater	Groundwater	Upper Aquifer - Tap Water	Aluminum	0.0E+00		0.0E+00	0.0E+00						
			Arsenic	1.5E-04		3.3E-07	1.5E-04						
			Chromium	0.0E+00		0.0E+00	0.0E+00						
			Iron	0.0E+00		0.0E+00	0.0E+00						
			Manganese	0.0E+00		0.0E+00	0.0E+00						
			Vanadium	0.0E+00		0.0E+00	0.0E+00						
			(Total)	1.5E-04		3.3E-07	1.5E-04						
Soil*	Soil	Weigh Station Area	Aroclor-1260	2.9E-06		2.1E-06	5.0E-06						
			Arsenic	5.4E-06		8.5E-07	6.3E-06						
			Chromium	0.0E+00		0.0E+00	0.0E+00						
			Copper	0.0E+00		0.0E+00	0.0E+00						
			Iron	0.0E+00		0.0E+00	0.0E+00						
			Lead	0.0E+00		0.0E+00	0.0E+00						
			Manganese	0.0E+00		0.0E+00	0.0E+00						
			Vanadium	0.0E+00		0.0E+00	0.0E+00						
			(Total)	8.3E-06		3.0E-06	1.1E-05						
Soil*	Soil	Area to West of Landfill, the "Ear	Arsenic	1.1E-05		1.7E-06	1.3E-05						
			Copper	0.0E+00		0.0E+00	0.0E+00						
			Iron	0.0E+00		0.0E+00	0.0E+00						
			Thallium	0.0E+00		0.0E+00	0.0E+00						
			Vanadium	0.0E+00		0.0E+00	0.0E+00						
			(Total)	1.1E-05		1.7E-06	1.3E-05						
Soil*	Soil	Site Perimeter	Benzo(a)pyrene	4.9E-06		3.4E-06	8.3E-06						
			Aluminum	0.0E+00		0.0E+00	0.0E+00						
			Arsenic	1.3E-05		2.0E-06	1.5E-05						
			Iron	0.0E+00		0.0E+00	0.0E+00						
			Vanadium	0.0E+00		0.0E+00	0.0E+00						
			(Total)	1.8E-05		5.4E-06	2.3E-05						

TABLE 9.7.RME

SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs

REASONABLE MAXIMUM EXPOSURE

Site 7, NAB Little Creek

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Child/Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Soil*	Soil	Covered Area	Aroclor-1260	1.1E-05		8.1E-06	1.9E-05						
			Arsenic	4.9E-06		7.8E-07	5.7E-06						
			Iron	0.0E+00		0.0E+00	0.0E+00						
			Manganese	0.0E+00		0.0E+00	0.0E+00						
			Vanadium	0.0E+00		0.0E+00	0.0E+00						
			(Total)	1.6E-05		8.9E-06	2.5E-05						

Total Risk Across Groundwater	1.5E-04
Total Risk Across Weigh Station Area Soil	1.1E-05
Total Risk Across Area to West of Landfill, the "Ear", Soil	1.3E-05
Total Risk Across Site Perimeter Soil	2.3E-05
Total Risk Across Covered Area Soil	2.5E-05
Total Risk Across All Media and Pathways	2.2E-04

Total Hazard Index Across All Media and All Exposure Routes	

TABLE 9.8.RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURE
Site 7, NAB Little Creek

Scenario Timeframe: Future
Receptor Population: Industrial Worker
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Groundwater	Groundwater	Upper Aquifer - Tap Water	Aluminum	0.0E+00			0.0E+00	Aluminum	CNS	3.9E-02			3.9E-02
			Arsenic	3.6E-05			3.6E-05	Arsenic	Skin/vascular	2.2E-01			2.2E-01
			Chromium	0.0E+00			0.0E+00	Chromium	NOAEL	7.6E-02			7.6E-02
			Iron	0.0E+00			0.0E+00	Iron	Gastrointestinal	3.1E-01			3.1E-01
			Manganese	0.0E+00			0.0E+00	Manganese	CNS	3.0E-01			3.0E-01
			Vanadium	0.0E+00				Vanadium	Kidney	8.7E-02			8.7E-02
			(Total)	3.6E-05			3.6E-05	(Total)		1.0E+00			1.0E+00
Soil*	Soil	Weigh Station Area	Aroclor-1260	6.4E-07		1.5E-06	2.2E-06	Aroclor-1260	N/A	0.0E+00		0.0E+00	0.0E+00
			Arsenic	1.2E-06		1.2E-08	1.2E-06	Arsenic	Skin/vascular	7.5E-03		3.8E-03	1.1E-02
			Chromium	0.0E+00		0.0E+00	0.0E+00	Chromium	NOAEL	8.6E-03		5.9E-02	6.7E-02
			Copper	0.0E+00		0.0E+00	0.0E+00	Copper	Gastrointestinal	9.7E-03		1.6E-03	1.1E-02
			Iron	0.0E+00		0.0E+00	0.0E+00	Iron	Gastrointestinal	4.8E-02		8.2E-03	5.6E-02
			Lead	0.0E+00		0.0E+00	0.0E+00	Lead	N/A	0.0E+00		0.0E+00	0.0E+00
			Manganese	0.0E+00		0.0E+00	0.0E+00	Manganese	CNS	2.3E-02		9.7E-02	1.2E-01
			Vanadium					Vanadium	Kidney	3.6E-02		2.3E-01	2.7E-01
			(Total)	1.8E-06		1.5E-06	3.4E-06	(Total)		1.3E-01		4.0E-01	5.4E-01
Soil*	Soil	Area to West of Landfill, the "Ear	Arsenic	2.4E-06		1.2E-06	3.6E-06	Arsenic	Skin/vascular	1.5E-02		7.6E-03	2.3E-02
			Copper	0.0E+00		0.0E+00	0.0E+00	Copper	Gastrointestinal	1.8E-02		3.1E-03	2.1E-02
			Iron	0.0E+00		0.0E+00	0.0E+00	Iron	Gastrointestinal	7.1E-02		1.2E-02	8.3E-02
			Thallium	0.0E+00		0.0E+00	0.0E+00	Thallium	Skin/vascular	1.4E-02		2.4E-03	1.6E-02
			Vanadium	0.0E+00		0.0E+00	0.0E+00	Vanadium	Kidney	2.5E-02		1.7E-01	1.9E-01
			(Total)	2.4E-06		1.2E-06	3.6E-06	(Total)		1.4E-01		1.9E-01	3.3E-01
Soil*	Soil	Site Perimeter	Benzo(a)pyrene	1.1E-06		2.4E-06	3.5E-06	Benzo(a)pyrene	N/A	0.0E+00		0.0E+00	0.0E+00
			Aluminum	0.0E+00		0.0E+00	0.0E+00	Aluminum	CNS	2.7E-02		4.6E-03	3.2E-02
			Arsenic	2.8E-06		2.9E-08	2.8E-06	Arsenic	Skin/vascular	1.8E-02		8.9E-03	2.6E-02
			Iron	0.0E+00		0.0E+00	0.0E+00	Iron	Gastrointestinal	3.7E-02		6.3E-03	4.3E-02
			Vanadium	0.0E+00		0.0E+00	0.0E+00	Vanadium	Kidney	2.0E-01		1.3E+00	1.5E+00
			(Total)	3.9E-06		2.4E-06	6.4E-06	(Total)		2.8E-01		1.3E+00	1.6E+00

TABLE 9.8.RME

SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs

REASONABLE MAXIMUM EXPOSURE

Site 7, NAB Little Creek

Scenario Timeframe: Future
Receptor Population: Industrial Worker
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Soil*	Soil	Covered Area	Aroclor-1260	2.4E-06		5.8E-06	8.3E-06	Aroclor-1260	N/A	0.0E+00		0.0E+00	0.0E+00
			Arsenic	1.1E-06		1.1E-08	1.1E-06	Arsenic	Skin/vascular	6.9E-03		3.5E-03	1.0E-02
			Iron	0.0E+00		0.0E+00	0.0E+00	Iron	Gastrointestinal	3.3E-02		5.6E-03	3.9E-02
			Manganese	0.0E+00		0.0E+00	0.0E+00	Manganese	CNS	9.0E-03		3.8E-02	4.7E-02
			Vanadium	0.0E+00		0.0E+00	0.0E+00	Vanadium	Kidney	3.9E-02		2.5E-01	2.9E-01
			(Total)	3.6E-06		5.8E-06	9.4E-06	(Total)		8.8E-02		3.0E-01	3.9E-01

Total Risk Across Groundwater	3.6E-05
Total Risk Across Weigh Station Area Soil	3.4E-06
Total Risk Across Area to West of Landfill, the "Ear", Soil	3.6E-06
Total Risk Across Site Perimeter Soil	6.4E-06
Total Risk Across Covered Area Soil	9.4E-06
Total Risk Across All Media and Pathways	5.8E-05

Total Hazard Index Across All Media and All Exposure Routes	3.9E+00
Total CNS (Nervous System) HI =	5.4E-01
Total Gastrointestinal HI =	5.7E-01
Total Kidney HI =	2.3E+00
Total NOAEL HI =	1.4E-01
Total Skin HI =	3.1E-01
Total Vascular HI =	3.1E-01

TABLE 9.9.RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURE
Site 7, NAB Little Creek

Scenario Timeframe: Future
Receptor Population: Construction Worker
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Groundwater	Groundwater	Upper Aquifer - Excavation Pit	Aluminum			0.0E+00	0.0E+00	Aluminum	CNS			8.2E-04	8.2E-04
			Arsenic			3.0E-08	3.0E-08	Arsenic	Skin/vascular			4.7E-03	4.7E-03
			Chromium			0.0E+00	0.0E+00	Chromium	NOAEL			9.7E-03	9.7E-03
			Iron			0.0E+00	0.0E+00	Iron	Gastrointestinal			6.6E-03	6.6E-03
			Manganese			0.0E+00	0.0E+00	Manganese	CNS			1.6E-01	1.6E-01
			Vanadium			0.0E+00	0.0E+00	Vanadium	Kidney			7.1E-02	7.1E-02
			(Total)			3.0E-08	3.0E-08	(Total)				2.5E-01	2.5E-01
Soil*	Soil	Weigh Station Area	Aroclor-1260	6.2E-08		2.3E-08	8.5E-08	Aroclor-1260	N/A	0.0E+00		0.0E+00	0.0E+00
			Arsenic	1.2E-07		9.2E-09	1.2E-07	Arsenic	Skin/vascular	1.8E-02		1.4E-03	1.9E-02
			Chromium	0.0E+00		0.0E+00	0.0E+00	Chromium	NOAEL	3.1E-03		3.3E-03	6.4E-03
			Copper	0.0E+00		0.0E+00	0.0E+00	Copper	Gastrointestinal	2.3E-02		6.2E-04	2.4E-02
			Iron	0.0E+00		0.0E+00	0.0E+00	Iron	Gastrointestinal	1.2E-01		3.1E-03	1.2E-01
			Lead	0.0E+00		0.0E+00	0.0E+00	Lead	N/A	0.0E+00		0.0E+00	0.0E+00
			Manganese	0.0E+00		0.0E+00	0.0E+00	Manganese	CNS	5.5E-02		3.7E-02	9.2E-02
			Vanadium	0.0E+00		0.0E+00	0.0E+00	Vanadium	Kidney	8.6E-02		8.8E-02	1.7E-01
			(Total)	1.8E-07		3.2E-08	2.1E-07	(Total)		3.0E-01		1.3E-01	4.3E-01
Soil*	Soil	Area to West of Landfill, the "Ear	Arsenic	2.3E-07		1.8E-08	2.5E-07	Arsenic	Skin/vascular	3.6E-02		2.9E-03	3.9E-02
			Copper	0.0E+00		0.0E+00	0.0E+00	Copper	Gastrointestinal	4.4E-02		1.2E-03	4.5E-02
			Iron	0.0E+00		0.0E+00	0.0E+00	Iron	Gastrointestinal	1.7E-01		4.5E-03	1.8E-01
			Thallium	0.0E+00		0.0E+00	0.0E+00	Thallium	Skin/vascular	3.4E-02		8.9E-04	3.4E-02
			Vanadium	0.0E+00		0.0E+00	0.0E+00	Vanadium	Kidney	6.1E-02		6.2E-02	1.2E-01
			(Total)	2.3E-07		1.8E-08	2.5E-07	(Total)		3.5E-01		7.2E-02	4.2E-01
Soil*	Soil	Site Perimeter	Benzo(a)pyrene	1.1E-07		3.6E-08	1.4E-07	Benzo(a)pyrene	N/A	0.0E+00		0.0E+00	0.0E+00
			Aluminum	0.0E+00		0.0E+00	0.0E+00	Aluminum	CNS	6.6E-02		1.7E-03	6.7E-02
			Arsenic	2.7E-07		2.1E-08	2.9E-07	Arsenic	Skin/vascular	4.2E-02		3.3E-03	4.5E-02
			Iron	0.0E+00		0.0E+00	0.0E+00	Iron	Gastrointestinal	8.9E-02		2.4E-03	9.1E-02
			Vanadium	0.0E+00		0.0E+00	0.0E+00	Vanadium	Kidney	4.7E-01		4.8E-01	9.6E-01
			(Total)	3.8E-07		5.8E-08	4.3E-07	(Total)		6.7E-01		4.9E-01	1.2E+00

TABLE 9.9.RME

SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs

REASONABLE MAXIMUM EXPOSURE

Site 7, NAB Little Creek

Scenario Timeframe: Future
Receptor Population: Construction Worker
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Soil*	Soil	Covered Area	Aroclor-1260	2.3E-07		8.7E-08	3.2E-07	Aroclor-1260	N/A	0.0E+00		0.0E+00	0.0E+00
			Arsenic	1.1E-07		8.4E-09	1.1E-07	Arsenic	Skin/vascular	1.6E-02		1.3E-03	1.8E-02
			Iron	0.0E+00		0.0E+00	0.0E+00	Iron	Gastrointestinal	8.0E-02		2.1E-03	8.2E-02
			Manganese	0.0E+00		0.0E+00	0.0E+00	Manganese	CNS	2.2E-02		1.4E-02	3.6E-02
			Vanadium	0.0E+00		0.0E+00	0.0E+00	Vanadium	Kidney	9.3E-02		9.5E-02	1.9E-01
			(Total)	3.4E-07		9.6E-08	4.4E-07	(Total)		2.1E-01		1.1E-01	3.2E-01

Total Risk Across Groundwater	3.0E-08
Total Risk Across Weigh Station Area Soil	2.1E-07
Total Risk Across Area to West of Landfill, the "Ear", Soil	2.5E-07
Total Risk Across Site Perimeter Soil	4.3E-07
Total Risk Across Covered Area Soil	4.4E-07
Total Risk Across All Media and Pathways	1.4E-06

Total Hazard Index Across All Media and All Exposure Routes	2.6E+00
Total CNS (Nervous System) HI =	3.6E-01
Total Gastrointestinal HI =	5.4E-01
Total Kidney HI =	1.5E+00
Total NOAEL HI =	1.6E-02
Total Skin HI =	1.6E-01
Total Vascular HI =	1.6E-01

TABLE 9.10.CT

SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs

CENTRAL Tendency EXPOSURE

Site 7, NAB Little Creek

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Groundwater	Groundwater	Upper Aquifer - Tap Water						Aluminum	CNS	3.8E-03		9.9E-06	3.8E-03
								Arsenic	Skin/vascular	9.2E-02		2.4E-04	9.3E-02
								Chromium	NOAEL	8.7E-03		8.9E-04	9.6E-03
								Iron	Gastrointestinal	2.9E-01		7.5E-04	2.9E-01
								Manganese	CNS	2.2E-01		1.4E-02	2.3E-01
								Vanadium	Kidney	2.1E-02		2.1E-03	2.3E-02
								(Total)		6.4E-01		1.8E-02	6.6E-01
Soil*	Soil	Site Perimeter						Benzo(a)pyrene	N/A	0.0E+00		0.0E+00	0.0E+00
								Aluminum	CNS	2.9E-03		6.6E-04	3.6E-03
								Arsenic	Skin/vascular	4.0E-03		2.7E-03	6.8E-03
								Iron	Gastrointestinal	1.3E-02		3.0E-03	1.6E-02
								Vanadium	Kidney	9.8E-03		8.6E-02	9.5E-02
								(Total)		3.0E-02		9.2E-02	1.2E-01
							N/A	Total Hazard Index Across All Media and All Exposure Routes					6.6E-01

Total CNS (Nervous System) HI =	2.4E-01
Total Gastrointestinal HI =	3.1E-01
Total NOAEL HI =	9.6E-03
Total Skin HI =	9.9E-02
Total Vascular HI =	9.9E-02
Total Kidney HI =	1.2E-01

TABLE 9.11.CT
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
CENTRAL Tendency EXPOSURE
Site 7, NAB Little Creek

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Child

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Groundwater	Groundwater	Upper Aquifer - Tap Water						Aluminum	CNS	1.3E-02		2.7E-05	1.3E-02
								Arsenic	Skin/vascular	3.1E-01		6.6E-04	3.1E-01
								Chromium	NOAEL	2.9E-02		2.5E-03	3.1E-02
								Iron	Gastrointestinal	9.7E-01		2.1E-03	9.8E-01
								Manganese	CNS	7.3E-01		3.9E-02	7.7E-01
								Vanadium	Kidney	7.0E-02		5.8E-03	7.6E-02
								(Total)		2.1E+00		5.0E-02	2.2E+00
Soil*	Soil	Weigh Station Area						Aroclor-1260	N/A	0.0E+00		0.0E+00	0.0E+00
								Arsenic	Skin/vascular	2.8E-02		2.7E-03	3.1E-02
								Chromium	NOAEL	3.0E-02		3.8E-02	6.7E-02
								Copper	Gastrointestinal	1.9E-02		6.0E-04	1.9E-02
								Iron	Gastrointestinal	1.6E-01		5.2E-03	1.7E-01
								Lead	N/A	0.0E+00		0.0E+00	0.0E+00
								Manganese	CNS	4.4E-02		3.5E-02	8.0E-02
								Vanadium	Kidney	1.0E-01		1.3E-01	2.3E-01
								(Total)		3.9E-01		2.1E-01	6.0E-01
Soil*	Soil	Area to West of Landfill, the "Ear"						Arsenic	Skin/vascular	2.6E-02		2.5E-03	2.9E-02
								Copper	Gastrointestinal	1.9E-03		6.0E-05	1.9E-03
								Iron	Gastrointestinal	8.1E-02		2.6E-03	8.4E-02
								Thallium	Liver/Blood	3.2E-02		1.0E-03	3.3E-02
								Vanadium	Kidney	4.5E-02		5.5E-02	1.0E-01
								(Total)		1.9E-01		6.1E-02	2.5E-01
Soil*	Soil	Site Perimeter						Benzo(a)pyrene	N/A	0.0E+00		0.0E+00	0.0E+00
								Aluminum	CNS	8.1E-02		8.7E-04	8.2E-02
								Arsenic	Skin/vascular	1.1E-01		3.6E-03	1.2E-01
								Iron	Gastrointestinal	3.6E-01		3.9E-03	3.7E-01
								Vanadium	Kidney	2.7E-01		1.1E-01	3.8E-01
								(Total)		8.3E-01		1.2E-01	9.5E-01
Soil*	Soil	Covered Area						Aroclor-1260	N/A	0.0E+00		0.0E+00	0.0E+00
								Arsenic	Skin/vascular	2.5E-02		2.4E-03	2.7E-02
								Iron	Gastrointestinal	6.6E-02		2.1E-03	6.8E-02
								Manganese	CNS	9.1E-03		7.3E-03	1.6E-02
								Vanadium	Kidney	5.1E-02		6.3E-02	1.1E-01
								(Total)		1.5E-01		7.4E-02	2.3E-01
							N/A	Total Hazard Index Across All Media and All Exposure Routes					4.2E+00

TABLE 9.11.CT

SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs

CENTRAL Tendency EXPOSURE

Site 7, NAB Little Creek

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Child

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total

Total CNS (Nervous System) HI =	9.6E-01
Total Gastrointestinal HI =	1.7E+00
Total Kidney HI =	9.1E-01
Total NOAEL HI =	9.9E-02
Total Skin HI =	4.7E-01
Total Vascular HI =	5.1E-01

TABLE 9.12.CT

SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs

REASONABLE MAXIMUM EXPOSURE

Site 7, NAB Little Creek

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Child/Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Groundwater	Groundwater	Upper Aquifer - Tap Water	Aluminum	0.0E+00		0.0E+00	0.0E+00						
			Arsenic	1.7E-05		3.9E-08	1.7E-05						
			Chromium	0.0E+00		0.0E+00	0.0E+00						
			Iron	0.0E+00		0.0E+00	0.0E+00						
			Manganese	0.0E+00		0.0E+00	0.0E+00						
			Vanadium	0.0E+00		0.0E+00	0.0E+00						
			(Total)	1.7E-05		3.9E-08	1.7E-05						
				Total Risk Across Groundwater			1.7E-05		Total Hazard Index Across All Media and All Exposure Routes				

TABLE 9.13.CT

SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs

REASONABLE MAXIMUM EXPOSURE

Site 7, NAB Little Creek

Scenario Timeframe: Future
Receptor Population: Construction Worker
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Soil*	Soil	Site Perimeter	Benzo(a)pyrene	N/A		N/A		Benzo(a)pyrene	N/A	0.0E+00		0.0E+00	0.0E+00
			Aluminum	N/A		N/A		Aluminum	CNS	6.2E-03		1.5E-04	6.4E-03
			Arsenic	N/A		N/A		Arsenic	Skin/vascular	8.6E-03		6.2E-04	9.2E-03
			Iron	N/A		N/A		Iron	Gastrointestinal	2.8E-02		6.6E-04	2.8E-02
			Vanadium	N/A		N/A		Vanadium	Kidney	2.1E-02		1.9E-02	4.0E-02
			(Total)	N/A		N/A		(Total)		6.3E-02		2.1E-02	8.4E-02
						Total Risk Across Site Perimeter Soil	N/A					Total Hazard Index Across All Media and All Exposure Routes	8.4E-02

Total CNS (Nervous System) HI =	6.4E-03
Total Gastrointestinal HI =	2.8E-02
Total Kidney HI =	4.0E-02
Total Skin HI =	9.2E-03
Total Vascular HI =	9.2E-03

TABLE 9.14.CT

SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs

REASONABLE MAXIMUM EXPOSURE

Site 7, NAB Little Creek

Scenario Timeframe: Future
Receptor Population: Industrial Worker
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Soil*	Soil	Site Perimeter	Benzo(a)pyrene	N/A		N/A		Benzo(a)pyrene	N/A	0.0E+00		0.0E+00	0.0E+00
			Aluminum	N/A		N/A		Aluminum	CNS	2.7E-03		3.5E-04	3.1E-03
			Arsenic	N/A		N/A		Arsenic	Skin/vascular	3.8E-03		1.4E-03	5.1E-03
			Iron	N/A		N/A		Iron	Gastrointestinal	1.2E-02		1.6E-03	1.4E-02
			Vanadium	N/A		N/A		Vanadium	Kidney	9.1E-03		4.5E-02	5.4E-02
			(Total)	N/A		N/A		(Total)		2.8E-02		4.8E-02	7.6E-02
						Total Risk Across Site Perimeter Soil	N/A					Total Hazard Index Across All Media and All Exposure Routes	7.6E-02

Total CNS (Nervous System) HI =	3.1E-03
Total Gastrointestinal HI =	1.4E-02
Total Kidney HI =	5.4E-02
Total Skin HI =	5.1E-03
Total Vascular HI =	5.1E-03

TABLE 10.1.RME

RISK ASSESSMENT SUMMARY

REASONABLE MAXIMUM EXPOSURE

Site 7, NAB Little Creek

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Groundwater	Groundwater	Upper Aquifer - Tap Water						Aluminum	CNS	1.1E-01		2.2E-04	1.1E-01
								Chromium	NOAEL	2.1E-01		1.7E-02	2.3E-01
								Vandium	Kidney	2.4E-01		1.9E-02	2.6E-01
								(Total)		5.7E-01		3.6E-02	6.0E-01
Soil*	Soil	Site Perimeter						Vanadium	Kidney	2.8E-01		1.4E+00	1.7E+00
								(Total)		2.8E-01		1.4E+00	1.7E+00
							N/A	Total Hazard Index Across All Media and All Exposure Routes					6.0E-01

Total CNS (Nervous System) HI =	1.1E-01
Total NOAEL HI =	2.3E-01
Total Kidney HI =	1.9E+00

TABLE 10.2.RME
RISK ASSESSMENT SUMMARY
REASONABLE MAXIMUM EXPOSURE
Site 7, NAB Little Creek

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Child

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Groundwater	Groundwater	Upper Aquifer - Tap Water						Aluminum	CNS	2.5E-01		6.3E-04	2.5E-01
								Chromium	NOAEL	5.0E-01		4.9E-02	5.5E-01
								Vanadium	Kidney	5.7E-01		5.4E-02	6.2E-01
								(Total)		1.3E+00		1.0E-01	1.4E+00
Soil*	Soil	Weigh Station Area						Chromium	NOAEL	1.1E-01		8.4E-02	2.0E-01
								Copper	Gastrointestinal	1.3E-01		2.4E-03	1.3E-01
								Iron	Gastrointestinal	6.3E-01		1.2E-02	6.4E-01
								Manganese	CNS	3.0E-01		1.4E-01	4.4E-01
								Vanadium	Kidney	4.7E-01		3.4E-01	8.1E-01
								(Total)		1.6E+00		5.8E-01	2.2E+00
Soil*	Soil	Area to West of Landfill, the "Ear"						Copper	Gastrointestinal	2.4E-01		4.5E-03	2.4E-01
								Iron	Gastrointestinal	9.3E-01		1.7E-02	9.5E-01
								Thallium	Skin/vascular	1.8E-01		3.4E-03	1.9E-01
								Vanadium	Kidney	3.3E-01		2.4E-01	5.7E-01
								(Total)		1.7E+00		2.6E-01	1.9E+00
Soil*	Soil	Site Perimeter						Aluminum	CNS	3.6E-01		6.7E-03	3.6E-01
								Arsenic	Skin/vascular	2.3E-01		1.3E-02	2.4E-01
								Iron	Gastrointestinal	4.8E-01		9.1E-03	4.9E-01
								Vanadium	Kidney	2.6E+00		1.9E+00	4.4E+00
								(Total)		3.7E+00		1.9E+00	5.5E+00
Soil*	Soil	Covered Area						Iron	Gastrointestinal	4.3E-01		8.1E-03	4.4E-01
								Manganese	CNS	1.2E-01		5.5E-02	1.7E-01
								Vanadium	Kidney	5.1E-01		3.6E-01	8.7E-01
								(Total)		1.1E+00		4.3E-01	1.5E+00
							N/A	Total Hazard Index Across All Media and All Exposure Routes					5.6E+00

Total CNS (Nervous System) HI =	1.2E+00
Total Gastrointestinal HI =	2.9E+00
Total NOAEL HI =	7.5E-01
Total Skin HI =	4.3E-01
Total Vascular HI =	4.3E-01
Total Kidney HI =	7.3E+00

TABLE 10.3.RME

RISK ASSESSMENT SUMMARY

REASONABLE MAXIMUM EXPOSURE

Site 7, NAB Little Creek

Scenario Timeframe: Future
Receptor Population: Industrial Worker
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Groundwater	Groundwater	Upper Aquifer - Tap Water	Aluminum	0.0E+00			0.0E+00	Aluminum	CNS	3.9E-02			3.9E-02
			Chromium	0.0E+00			0.0E+00	Chromium	NOAEL	7.6E-02			7.6E-02
			Vanadium	0.0E+00				Vanadium	Kidney	8.7E-02			8.7E-02
			(Total)	0.0E+00			0.0E+00	(Total)		2.0E-01			2.0E-01
Soil*	Soil	Site Perimeter	Benzo(a)pyrene	1.1E-06		2.4E-06	3.5E-06	Benzo(a)pyrene	N/A	0.0E+00		0.0E+00	0.0E+00
			Aluminum	0.0E+00		0.0E+00	0.0E+00	Aluminum	CNS	2.7E-02		4.6E-03	3.2E-02
			Arsenic	2.8E-06		2.9E-08	2.8E-06	Arsenic	Skin/vascular	1.8E-02		8.9E-03	2.6E-02
			Iron	0.0E+00		0.0E+00	0.0E+00	Iron	Gastrointestinal	3.7E-02		6.3E-03	4.3E-02
			Vanadium	0.0E+00		0.0E+00	0.0E+00	Vanadium	Kidney	2.0E-01		1.3E+00	1.5E+00
			(Total)	3.9E-06		2.4E-06	6.4E-06	(Total)		2.8E-01		1.3E+00	1.6E+00

Total Risk Across Groundwater	0.0E+00
Total Risk Across Site Perimeter Soil	6.4E-06
Total Risk Across All Media and Pathways	6.4E-06

Total Hazard Index Across All Media and All Exposure Routes	1.8E+00
Total CNS (Nervous System) HI =	7.1E-02
Total Gastrointestinal HI =	4.3E-02
Total Kidney HI =	1.6E+00
Total NOAEL HI =	7.6E-02
Total Skin HI =	2.6E-02
Total Vascular HI =	2.6E-02

TABLE 10.4.RME

RISK ASSESSMENT SUMMARY

REASONABLE MAXIMUM EXPOSURE

Site 7, NAB Little Creek

Scenario Timeframe: Future
Receptor Population: Construction Worker
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Soil*	Soil	Site Perimeter	Benzo(a)pyrene	1.1E-07		3.6E-08	1.4E-07	Benzo(a)pyrene	N/A	0.0E+00		0.0E+00	0.0E+00
			Aluminum	0.0E+00		0.0E+00	0.0E+00	Aluminum	CNS	6.6E-02		1.7E-03	6.7E-02
			Arsenic	2.7E-07		2.1E-08	2.9E-07	Arsenic	Skin/vascular	4.2E-02		3.3E-03	4.5E-02
			Iron	0.0E+00		0.0E+00	0.0E+00	Iron	Gastrointestinal	8.9E-02		2.4E-03	9.1E-02
			Vanadium	0.0E+00		0.0E+00	0.0E+00	Vanadium	Kidney	4.7E-01		4.8E-01	9.6E-01
			(Total)	3.8E-07		5.8E-08	4.3E-07	(Total)		6.7E-01		4.9E-01	1.2E+00

Total Risk Across Site Perimeter Soil	4.3E-07
Total Risk Across All Media and Pathways	4.3E-07
Total Hazard Index Across All Media and All Exposure Routes	1.2E+00
Total CNS (Nervous System) HI =	6.7E-02
Total Gastrointestinal HI =	9.1E-02
Total Kidney HI =	9.6E-01
Total Skin HI =	4.5E-02
Total Vascular HI =	4.5E-02

TABLE 10.5.CT

RISK ASSESSMENT SUMMARY

CENTRAL Tendency EXPOSURE

Site 7, NAB Little Creek

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Child

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
		Upper Aquifer - Tap Water						Arsenic	Skin/vascular	3.1E-01		6.6E-04	3.1E-01
								Iron	Gastrointestinal	9.7E-01		2.1E-03	9.8E-01
								Manganese	CNS	7.3E-01		3.9E-02	7.7E-01
								(Total)		2.0E+00		4.2E-02	2.1E+00
							N/A	Total Hazard Index Across All Media and All Exposure Routes					2.1E+00

Total CNS (Nervous System) HI =	7.7E-01
Total Gastrointestinal HI =	9.8E-01
Total Skin HI =	3.1E-01
Total Vascular HI =	3.1E-01

Table 11.1

COCs Comparison to Background - Combined Surface and Subsurface Soil

Site 7, NAB Little Creek

CAS Number	Chemical	Maximum [1] Concentration (mg/kg)	Maximum Qualifier	Distribution of Site 7 Data	Background [2] Value	Distribution of Background Data	Max. Site Conc. greater than Background UTL?	Max. Site Conc. greater than Background (t-test)	Max. Site Conc. greater than Background (MWU)
Weigh Station Area									
7440-38-2	Arsenic	2.30E+00		Not Analyzed, less than 5 samples	5.60E+00	Lognormal	NO		NO
7440-47-3	Chromium	2.65E+01		Not Analyzed, less than 5 samples	2.00E+01	Lognormal	YES		YES
7440-50-8	Copper	3.96E+02	J	Not Analyzed, less than 5 samples	N/A		YES		
7439-89-6	Iron	1.48E+04	J	Not Analyzed, less than 5 samples	1.50E+04	Lognormal	NO		YES
7439-96-5	Manganese	4.70E+02	J	Not Analyzed, less than 5 samples	2.67E+02	Lognormal	YES		YES
7440-62-2	Vanadium	3.67E+01		Not Analyzed, less than 5 samples	3.43E+01	Lognormal	YES		YES
Area to West of Landfill, "the Ear"									
7440-38-2	Arsenic	4.60E+00	J	Closer to Lognormal	5.60E+00	Lognormal	NO	NO	NO
7440-50-8	Copper	7.47E+02		Lognormal	N/A		YES		
7439-89-6	Iron	2.18E+04		Closer to Lognormal	1.50E+04	Lognormal	YES	YES	YES
7440-28-0	Thallium	1.00E+00	J	Closer to Lognormal	N/A		YES		
7440-62-2	Vanadium	2.60E+01		Closer to Lognormal	3.43E+01	Lognormal	NO	NO	NO
Site Perimeter									
7429-90-5	Aluminum	1.89E+04		Closer to Lognormal	8.50E+03	NP	YES		YES
7440-38-2	Arsenic	5.10E+00	J	Closer to Lognormal	5.60E+00	Lognormal	NO	YES	YES
7439-89-6	Iron	1.30E+04		Closer to Lognormal	1.50E+04	Lognormal	NO	YES	YES
7440-62-2	Vanadium	2.02E+02		Lognormal	3.43E+01	Lognormal	YES	YES	YES
Covered Area									
7439-89-6	Iron	1.02E+04	J	Closer to Lognormal	1.50E+04	Lognormal	NO	NO	NO
7440-28-0	Manganese	1.84E+02	J	Lognormal	2.67E+02	Lognormal	NO	NO	NO
7440-62-2	Vanadium	3.95E+01		Closer to Lognormal	3.43E+01	Lognormal	YES	NO	YES

Notes

[1] Maximum detected concentration.

[2] Background values are UTL for Fill and Urban Soil from Final Background Investigation for Naval Amphibiuous Base Little Creek, Virginia Beach, Virginia (CH2M Hill, December 2000)

Definitions

COPC = Chemical of Potential Concern

J = Estimated Value

N/A = Not Available

NP = Nonparametric

t-test = Student t-test (Table 11.1a)

MWU = Mann-Whitney U test (Table 11.1b)

Table 11.1b
Comparison of Surface Soil Sample Concentrations to Background Concentration
Using Mann-Whitney U Test
Weigh Station Area Soil
Site 7, NAB Little Creek

	Number of Samples	Concentration (mg/kg)	Rank	Sum Ranks (R and R')	U and U'	z	p	Decision	
Arsenic									
Site	3	1.75	37	116	31	-1.6136	0.0537	accept	no significant difference
		2.3	41						
		1.85	38						
Background	47	1.6	34	1159	110				
		3.3	47						
		2.7	43						
		1.3	27.5						
		0.75	13						
		0.95	18.5						
		0.7	10						
		0.86	15						
		0.55	8						
		0.9	17						
		2.7	43						
		0.89	16						
		5.4	49						
		1.4	31						
		2	39						
		1.2	24.5						
		1.1	22						
		1.2	24.5						
		0.83	14						
		2.7	43						
		0.72	12						
		0.295	4.5						
		1.1	22						
		0.29	3						
		0.265	1						
		1.4	31						
		1.3	27.5						
		0.285	2						
		1.3	27.5						
		1.6	34						
		1.6	34						
		0.62	9						
		1.1	22						
		4.4	48						
		1.3	27.5						
		3.2	46						
		11.4	50						
		2.1	40						
		0.71	11						
		0.97	20						
		1.4	31						
		0.365	7						
		0.35	6						
		3.1	45						
		1.7	36						
		0.295	4.5						
		0.95	18.5						

Table 11.1b
Comparison of Surface Soil Sample Concentrations to Background Concentration
Using Mann-Whitney U Test
Weigh Station Area Soil
Site 7, NAB Little Creek

	Number of Samples	Concentration (mg/kg)	Rank	Sum Ranks (R and R')	U and U'	z	p	Decision	
Chromium									
Site	3	22.4	50	146	4	-2.7222	0.0033	reject	site > background
		26.5	51						
		13.4	45						
Background	48	1.3	2.5	1180.3	139.7				
		4.3	21						
		5	26.5						
		1.9	8						
		7.3	38.5						
		2.7	15.5						
		3.1	19						
		1.5	4.5						
		0.7	1						
		2.4	13.5						
		6.1	34						
		2.1	11.5						
		8.3	42						
		20.5	49						
		4.5	22.5						
		1.3	2.5						
		1.7	6						
		6	33						
		1.8	7						
		1.5	4.5						
		16.8	47						
		10.4	44						
		5.7	32						
		14.1	46						
		5.5	30.5						
		7.3	38.8						
		8.8	43						
		7.7	41						
		4.5	22.5						
		5	26.5						
		2.1	11.5						
		2	9.5						
		2.4	13.5						
		5.2	29						
		4.6	24						
		18.2	48						
		7.6	40						
		2.8	17						
		5.5	30.5						
		2.7	15.5						
		3.6	20						
		6.3	35						
		2	9.5						
		4.9	25						
		6.6	37						
		6.4	36						
		5.1	28						
		3	18						

Table 11.1b
Comparison of Surface Soil Sample Concentrations to Background Concentration
Using Mann-Whitney U Test
Weigh Station Area Soil
Site 7, NAB Little Creek

	Number of Samples	Concentration (mg/kg)	Rank	Sum Ranks (R and R')	U and U'	z	p	Decision	
Iron									
Site	3	12300	49	143	7	-2.6021	0.0047	reject	site > background
		14800	50						
		7540	44						
Background	48	2470	22	1183	137				
		4940	40						
		5030	41						
		3850	31						
		3340	29						
		1190	12						
		921	4						
		1640	18						
		1410	14						
		2490	23						
		1450	15						
		1310	13						
		4810	38						
		2140	20						
		4700	37						
		2160	21						
		1010	6						
		4880	39						
		1060	8						
		4170	34						
		3100	27						
		2790	25						
		2550	24						
		1120	10						
		613	2						
		4420	35						
		4660	36						
		1500	16						
		7220	43						
		2910	26						
		3180	28						
		966	5						
		261	1						
		1900	19						
		4070	33						
		1130	11						
		9180	46						
		17600	51						
		4000	32						
		906	3						
		1050	7						
		5340	42						
		1110	9						
		1590	17						
		11700	48						
		9940	47						
		3510	30						
		8490	45						

Table 11.1b
Comparison of Surface Soil Sample Concentrations to Background Concentration
Using Mann-Whitney U Test
Weigh Station Area Soil
Site 7, NAB Little Creek

	Number of Samples	Concentration (mg/kg)	Rank	Sum Ranks (R and R')	U and U'	z	p	Decision	
Manganese									
Site	3	126	48	126	24	-1.9215	0.0274	reject	site > background
		470	51						
		28	27						
Background	48	18.6	20	1200	120	1.92154			
		34.4	31						
		119	46						
		99.6	45						
		41.3	33						
		9.5	12						
		6.3	5						
		14.4	16						
		41.6	34						
		27.4	26						
		8.1	10						
		7.9	9						
		382	50						
		12.1	13						
		36.2	32						
		25.9	25						
		5.4	3						
		71	40						
		6.2	4						
		79.1	43						
		55.3	37						
		24.5	24						
		57.1	38						
		31.5	30						
		7.4	8						
		47.2	36						
		19.7	21						
		21	23						
		68.5	39						
		15.9	18						
		15.7	17						
		7.2	6						
		2.3	2						
		19.8	22						
		122	47						
		17	19						
		323	49						
		44.3	35						
		30.3	28						
		8.6	11						
		1.7	1						
		74.2	42						
		7.3	7						
		31.3	29						
		72.2	41						
		91.4	44						
		12.7	14						
		14	15						

Table 11.1b
Comparison of Surface Soil Sample Concentrations to Background Concentration
Using Mann-Whitney U Test
Weigh Station Area Soil
Site 7, NAB Little Creek

	Number of Samples	Concentration (mg/kg)	Rank	Sum Ranks (R and R')	U and U'	z	p	Decision	
Vanadium									
Site	3	14.7	42	140	10	-2.482	0.0064	reject	site > background
		36.7	50						
		21.6	48						
Background	48	8.1	30	1186	134				
		9.2	34						
		17.1	44						
		69.1	51						
		4.9	19						
		4.6	16						
		4.7	17.5						
		4	13						
		3.9	11						
		5.9	24						
		5.4	23						
		4.7	17.5						
		18.2	45						
		10.3	36.5						
		8.9	33						
		11.3	39						
		20.8	47						
		10.7	38						
		4	13						
		9.7	35						
		6.3	26						
		8.2	31.5						
		8.2	31.5						
		3.1	9						
		1.4	2						
		5	20.5						
		5	20.5						
		5.1	22						
		10.3	36.5						
		4	13						
		3.5	10						
		2.2	5						
		0.81	1						
		4.4	15						
		6.1	25						
		2.5	8						
		12.8	40.5						
		27.9	49						
		6.8	28						
		2	4						
		2.3	6						
		7.9	29						
		1.9	3						
		2.4	7						
		19.1	46						
		15.1	43						
		6.6	27						
		12.8	40.5						

Table 11.1b
Comparison of Surface Soil Sample Concentrations to Background Concentration
Using Mann-Whitney U Test
Weigh Station Area Soil
Site 7, NAB Little Creek

	Number of Samples	Concentration (mg/kg)	Rank	Sum Ranks (R and R')	U and U'	z	p	Decision

Mann-Whitney U Test

$U = n1*n2 + n1 (n1 +1)/2 - R1$
$U' = n1*n2 + n2 (n2 +1)/2 - R2$
$z = (U - n1*n2/2)/((n1*n2*(n1+n2+1)/12)^{1/2})$

n1 = number of samples in data group 1 R1 = sum of ranks for data group 1
n2 = number of samples in data group 2 R2 = sum of ranks for data group 2

p = from area under the standard normal curve look-up table

Decision:
H_o: site data and background statistically similar
if $p < 0.05$ reject H_o, therefore, site data greater than background
Based on one-tailed test

Table 11.1c
Comparison of Surface Soil Sample Concentrations to Background Concentration
Using Mann-Whitney U Test
Area to the West of Landfill, "the Ear"
Site 7, NAB Little Creek

	Number of Samples	Concentration (mg/kg)	Rank	Sum Ranks (R and R')	U and U'	z	p	Decision	
Arsenic									
Site	5	2.4	42	171	79	-1.195	0.117	accept	no significant difference
		1.9	39						
		0.85	15						
		4.6	50						
		1.15	25						
Background	47	1.6	36	1207	156				
		3.3	48						
		2.7	44						
		1.3	29.5						
		0.75	13						
		0.95	19.5						
		0.7	10						
		0.86	16						
		0.55	8						
		0.9	18						
		2.7	44						
		0.89	17						
		5.4	51						
		1.4	33						
		2	40						
		1.2	26.5						
		1.1	23						
		1.2	26.5						
		0.83	14						
		2.7	44						
		0.72	12						
		0.295	4.5						
		1.1	23						
		0.29	3						
		0.265	1						
		1.4	33						
		1.3	29.5						
		0.285	2						
		1.3	29.5						
		1.6	36						
		1.6	36						
		0.62	9						
		1.1	23						
		4.4	49						
		1.3	29.5						
		3.2	47						
		11.4	52						
		2.1	41						
		0.71	11						
		0.97	21						
		1.4	33						
		0.365	7						
		0.35	6						
		3.1	46						
		1.7	38						
		0.295	4.5						
		0.95	19.5						

Table 11.1c
Comparison of Surface Soil Sample Concentrations to Background Concentration
Using Mann-Whitney U Test
Area to the West of Landfill, "the Ear"
Site 7, NAB Little Creek

	Number of Samples	Concentration (mg/kg)	Rank	Sum Ranks (R and R')	U and U'	z	p	Decision	
Iron									
Site	5	4860	41	192	63	-1.7345	0.0418	reject	site > background
		21800	53						
		1950	20						
		8840	48						
		3310	30						
Background	48	2470	23	1239	177				
		4940	43						
		5030	44						
		3850	33						
		3340	31						
		1190	12						
		921	4						
		1640	18						
		1410	14						
		2490	24						
		1450	15						
		1310	13						
		4810	40						
		2140	21						
		4700	39						
		2160	22						
		1010	6						
		4880	42						
		1060	8						
		4170	36						
		3100	28						
		2790	26						
		2550	25						
		1120	10						
		613	2						
		4420	37						
		4660	38						
		1500	16						
		7220	46						
		2910	27						
		3180	29						
		966	5						
		261	1						
		1900	19						
		4070	35						
		1130	11						
		9180	49						
		17600	52						
		4000	34						
		906	3						
		1050	7						
		5340	45						
		1110	9						
		1590	17						
		11700	51						
		9940	50						
		3510	32						
		8490	47						

Table 11.1c
Comparison of Surface Soil Sample Concentrations to Background Concentration
Using Mann-Whitney U Test
Area to the West of Landfill, "the Ear"
Site 7, NAB Little Creek

	Number of Samples	Concentration (mg/kg)	Rank	Sum Ranks (R and R')	U and U'	z	p	Decision	
Vanadium									
Site	5	5.3	24	176.5	78.5	-1.2628	0.1038	accept	no significant difference
		23.5	50						
		4	13.5						
		26	51						
		10	38						
Background	48	8.1	32	1254.5	161.5				
		9.2	36						
		17.1	46						
		69.1	53						
		4.9	20						
		4.6	17						
		4.7	18.5						
		4	13.5						
		3.9	11						
		5.9	26						
		5.4	25						
		4.7	18.5						
		18.2	47						
		10.3	39.5						
		8.9	35						
		11.3	42						
		20.8	49						
		10.7	41						
		4	13.5						
		9.7	37						
		6.3	28						
		8.2	33.5						
		8.2	33.5						
		3.1	9						
		1.4	2						
		5	21.5						
		5	21.5						
		5.1	23						
		10.3	39.5						
		4	13.5						
		3.5	10						
		2.2	5						
		0.81	1						
		4.4	16						
		6.1	27						
		2.5	8						
		12.8	43.5						
		27.9	52						
		6.8	30						
		2	4						
		2.3	6						
		7.9	31						
		1.9	3						
		2.4	7						
		19.1	48						
		15.1	45						
		6.6	29						
		12.8	43.5						

Table 11.1c
Comparison of Surface Soil Sample Concentrations to Background Concentration
Using Mann-Whitney U Test
Area to the West of Landfill, "the Ear"
Site 7, NAB Little Creek

	Number of Samples	Concentration (mg/kg)	Rank	Sum Ranks (R and R')	U and U'	z	p	Decision

Mann-Whitney U Test

$U = n1*n2 + n1 (n1 +1)/2 - R1$
$U' = n1*n2 + n2 (n2 +1)/2 - R2$
$z = (U - n1*n2/2)/((n1*n2*(n1+n2+1)/12)^{1/2})$

n1 = number of samples in data group 1 R1 = sum of ranks for data group 1
n2 = number of samples in data group 2 R2 = sum of ranks for data group 2

p = from area under the standard normal curve look-up table

Decision:
H_o: site data and background statistically similar
if $p < 0.05$ reject H_o, therefore, site data greater than background
Based on one-tailed test

Table 11.1d
Comparison of Soil Sample Concentrations to Background Concentration
Using Student t-test
Area to the West of Landfill, "the Ear"
Site 7, NAB Little Creek

	Sample Population				Background Data							
	Maximum Detected Concentration (max_{smp})	Count (n_1)	Mean (x1)	Standard Deviation (s1)	Maximum Detected Concentration (max_{bkg})	Count (n_2)	Mean (x_2)	Standard Deviation (s_2)	Pooled Sample Estimator (sp^2)	Calculated t-value (t)	$t_{0.05}$	Statistically Above Background?
Inorganics (mg/kg)												
Arsenic	4.6	5	0.6	0.7	5.6	47	0.2	0.7	0.5	1.13	1.68	No
Iron	21,800	5	9	0.9	15,000	48	8	0.9	0.7	1.93	1.68	Yes
Vanadium	26	5	2.4	0.8	34.3	48	2	0.9	0.8	0.84	1.68	No

Calculations:

$$sp^2 = \frac{[(n_1 - 1) * s_1^2] + [(n_2 - 1) * s_2^2]}{n_1 + n_2 - 2}$$

$$t = \frac{(x_1 - x_2) - D_0}{(sp^2 * (1/n_1 + 1/n_2))^{0.5}}$$

The Student t-test was used when both the sample population and the background population have a normal distribution.
If both the site and background populations are lognormally distributed, the data were transformed and the t-test was run.
The one-tailed test was used to determine the $t_{(0.05)}$ value.
D_0 is the hypothesized difference between the means, assuming that there is no difference, D_o=0.

Table 11.1e
Comparison of Surface Soil Sample Concentrations to Background Concentration
Using Mann-Whitney U Test
Site Perimeter
Site 7, NAB Little Creek

	Number of Samples	Concentration (mg/kg)	Rank	Sum Ranks (R and R')	U and U'	z	p	Decision	
Aluminum									
Site	6	6130	47	257	52	-2.5322	0.0057	reject	site > background
		18900	54						
		13500	53						
		4320	40						
		3410	34						
		2880	29						
Background	48	2320	27	1228	236				
		3340	33						
		3790	35						
		2670	28						
		1700	23						
		4770	43						
		458	6						
		798	13						
		1110	20						
		4110	39						
		3060	30						
		485	7						
		4470	41						
		609	10						
		2190	25						
		1010	19						
		378	5						
		3800	36						
		591	9						
		3810	37						
		3250	31						
		4490	42						
		3310	32						
		2240	26						
		329	2						
		1580	22						
		1430	21						
		733	11						
		6140	48						
		882	17						
		986	18						
		519	8						
		158	1						
		810	14						
		3870	38						
		776	12						
		8270	51						
		6720	49						
		2150	24						
		351	4						
		333	3						
		5920	46						
		834	15						
		847	16						
		5340	44						
		7050	50						
		5430	45						
		8500	52						

Table 11.1e
Comparison of Surface Soil Sample Concentrations to Background Concentration
Using Mann-Whitney U Test
Site Perimeter
Site 7, NAB Little Creek

	Number of Samples	Concentration (mg/kg)	Rank	Sum Ranks (R and R')	U and U'	z	p	Decision	
Arsenic									
Site	6	3.4	48	255	48	-2.6107	0.0045	reject	site > background
		1.3	28						
		5.1	51						
		1.9	38						
		2.2	41						
		3.5	49						
Background	47	1.6	35	1176	234				
		3.3	47						
		2.7	43						
		1.3	28						
		0.75	13						
		0.95	18.5						
		0.7	10						
		0.86	15						
		0.55	8						
		0.9	17						
		2.7	43						
		0.89	16						
		5.4	52						
		1.4	32						
		2	39						
		1.2	24.5						
		1.1	22						
		1.2	24.5						
		0.83	14						
		2.7	43						
		0.72	12						
		0.295	4.5						
		1.1	22						
		0.29	3						
		0.265	1						
		1.4	32						
		1.3	28						
		0.285	2						
		1.3	28						
		1.6	35						
		1.6	35						
		0.62	9						
		1.1	22						
		4.4	50						
		1.3	28						
		3.2	46						
		11.4	53						
		2.1	40						
		0.71	11						
		0.97	20						
		1.4	32						
		0.365	7						
		0.35	6						
		3.1	45						
		1.7	37						
		0.295	4.5						
		0.95	18.5						

Table 11.1e
Comparison of Surface Soil Sample Concentrations to Background Concentration
Using Mann-Whitney U Test
Site Perimeter
Site 7, NAB Little Creek

	Number of Samples	Concentration (mg/kg)	Rank	Sum Ranks (R and R')	U and U'	z	p	Decision	
Iron									
Site	6	8530	48	274	35	-3.0001	0.0013	reject	site > background
		12000	52						
		13000	53						
		3730	31						
		6290	44						
		7330	46						
Background	48	2470	22	1211	253				
		4940	41						
		5030	42						
		3850	32						
		3340	29						
		1190	12						
		921	4						
		1640	18						
		1410	14						
		2490	23						
		1450	15						
		1310	13						
		4810	39						
		2140	20						
		4700	38						
		2160	21						
		1010	6						
		4880	40						
		1060	8						
		4170	35						
		3100	27						
		2790	25						
		2550	24						
		1120	10						
		613	2						
		4420	36						
		4660	37						
		1500	16						
		7220	45						
		2910	26						
		3180	28						
		966	5						
		261	1						
		1900	19						
		4070	34						
		1130	11						
		9180	49						
		17600	54						
		4000	33						
		906	3						
		1050	7						
		5340	43						
		1110	9						
		1590	17						
		11700	51						
		9940	50						
		3510	30						
		8490	47						

Table 11.1e
Comparison of Surface Soil Sample Concentrations to Background Concentration
Using Mann-Whitney U Test
Site Perimeter
Site 7, NAB Little Creek

	Number of Samples	Concentration (mg/kg)	Rank	Sum Ranks (R and R')	U and U'	z	p	Decision	
Vanadium									
Site	6	10.8	40	264.5	44.5	-2.7386	0.0031	reject	site > background
		24	51						
		21.8	50						
		6.1	25.5						
		202	54						
		13.4	44						
Background	48	8.1	31	1220.5	243.5				
		9.2	35						
		17.1	46						
		69.1	53						
		4.9	19						
		4.6	16						
		4.7	17.5						
		4	13						
		3.9	11						
		5.9	24						
		5.4	23						
		4.7	17.5						
		18.2	47						
		10.3	37.5						
		8.9	34						
		11.3	41						
		20.8	49						
		10.7	39						
		4	13						
		9.7	36						
		6.3	27						
		8.2	32.5						
		8.2	32.5						
		3.1	9						
		1.4	2						
		5	20.5						
		5	20.5						
		5.1	22						
		10.3	37.5						
		4	13						
		3.5	10						
		2.2	5						
		0.81	1						
		4.4	15						
		6.1	25.5						
		2.5	8						
		12.8	42.5						
		27.9	52						
		6.8	29						
		2	4						
		2.3	6						
		7.9	30						
		1.9	3						
		2.4	7						
		19.1	48						
		15.1	45						
		6.6	28						
		12.8	42.5						

Table 11.1e
Comparison of Surface Soil Sample Concentrations to Background Concentration
Using Mann-Whitney U Test
Site Perimeter
Site 7, NAB Little Creek

	Number of Samples	Concentration (mg/kg)	Rank	Sum Ranks (R and R')	U and U'	z	p	Decision

Mann-Whitney U Test

$U = n1*n2 + n1 (n1 +1)/2 - R1$
$U' = n1*n2 + n2 (n2 +1)/2 - R2$
$z = (U - n1*n2/2)/((n1*n2*(n1+n2+1)/12)^{1/2})$

n1 = number of samples in data group 1 R1 = sum of ranks for data group 1
n2 = number of samples in data group 2 R2 = sum of ranks for data group 2

p = from area under the standard normal curve look-up table

Decision:
H_o: site data and background statistically similar
if $p < 0.05$ reject H_o, therefore, site data greater than background
Based on one-tailed test

Table 11.1f
Comparison of Soil Sample Concentrations to Background Concentration
Using Student t-test
Site Perimeter
Site 7, NAB Little Creek

	Sample Population				Background Data							
	Maximum Detected Concentration (max_{smp})	Count (n_1)	Mean (x1)	Standard Deviation (s1)	Maximum Detected Concentration (max_{bkg})	Count (n_2)	Mean (x_2)	Standard Deviation (s_2)	Pooled Sample Estimator (sp^2)	Calculated t-value (t)	$t_{0.05}$	Statistically Above Background?
Inorganics (mg/kg)												
Arsenic	5.1	6	1.0	0.5	5.6	47	0.2	0.7	0.5	2.42	1.67	Yes
Iron	13,000	6	9.0	0.5	15,000	48	7.9	0.9	0.7	3.08	1.67	Yes
Vanadium	202	6	3.1	1.2	34.3	48	2.0	0.9	0.9	2.59	1.67	Yes

Calculations:

$$sp^2 = \frac{[(n_1 - 1) * s_1^2] + [(n_2 - 1) * s_2^2]}{n_1 + n_2 - 2}$$

$$t = \frac{(x_1 - x_2) - D_0}{(sp^2 * (1/n_1 + 1/n_2))^{0.5}}$$

The Student t-test was used when both the sample population and the background population have a normal distribution.
If both the site and background populations are lognormally distributed, the data were transformed and the t-test was run.
The one-tailed test was used to determine the $t_{(0.05)}$ value.
D_0 is the hypothesized difference between the means, assuming that there is no difference, D_o=0.

Table 11.1g
Comparison of Surface Soil Sample Concentrations to Background Concentration
Using Mann-Whitney U Test
Covered Area
Site 7, NAB Little Creek

	Number of Samples	Concentration (mg/kg)	Rank	Sum Ranks (R and R')	U and U'	z	p	Decision	
Iron									
Site	5	5420	46	188	67	-1.6127	0.0537	accept	no significant difference
		10200	51						
		3040	27						
		3550	33						
		3460	31						
Background	48	2470	22	1243	173				
		4940	43						
		5030	44						
		3850	34						
		3340	30						
		1190	12						
		921	4						
		1640	18						
		1410	14						
		2490	23						
		1450	15						
		1310	13						
		4810	41						
		2140	20						
		4700	40						
		2160	21						
		1010	6						
		4880	42						
		1060	8						
		4170	37						
		3100	28						
		2790	25						
		2550	24						
		1120	10						
		613	2						
		4420	38						
		4660	39						
		1500	16						
		7220	47						
		2910	26						
		3180	29						
		966	5						
		261	1						
		1900	19						
		4070	36						
		1130	11						
		9180	49						
		17600	53						
		4000	35						
		906	3						
		1050	7						
		5340	45						
		1110	9						
		1590	17						
		11700	52						
		9940	50						
		3510	32						
		8490	48						

Table 11.1g
Comparison of Surface Soil Sample Concentrations to Background Concentration
Using Mann-Whitney U Test
Covered Area
Site 7, NAB Little Creek

	Number of Samples	Concentration (mg/kg)	Rank	Sum Ranks (R and R')	U and U'	z	p	Decision	
Manganese									
Site	5	55	39	166	89	-0.9433	0.1736	accept	no significant difference
		184	51						
		18.1	20						
		29.4	29						
		26.4	27						
Background	48	18.6	21	1265	151	0.9433			
		34.4	33						
		119	49						
		99.6	48						
		41.3	35						
		9.5	12						
		6.3	5						
		14.4	16						
		41.6	36						
		27.4	28						
		8.1	10						
		7.9	9						
		382	53						
		12.1	13						
		36.2	34						
		25.9	26						
		5.4	3						
		71	43						
		6.2	4						
		79.1	46						
		55.3	40						
		24.5	25						
		57.1	41						
		31.5	32						
		7.4	8						
		47.2	38						
		19.7	22						
		21	24						
		68.5	42						
		15.9	18						
		15.7	17						
		7.2	6						
		2.3	2						
		19.8	23						
		122	50						
		17	19						
		323	52						
		44.3	37						
		30.3	30						
		8.6	11						
		1.7	1						
		74.2	45						
		7.3	7						
		31.3	31						
		72.2	44						
		91.4	47						
		12.7	14						
		14	15						

Table 11.1g
Comparison of Surface Soil Sample Concentrations to Background Concentration
Using Mann-Whitney U Test
Covered Area
Site 7, NAB Little Creek

	Number of Samples	Concentration (mg/kg)	Rank	Sum Ranks (R and R')	U and U'	z	p	Decision	
Vanadium									
Site	5	10.1	38	190	65	-1.6736	0.0475	reject	site > background
		39.5	52						
		7.8	30						
		7.4	29						
		10.5	41						
Background	48	8.1	32	1241	175				
		9.2	36						
		17.1	47						
		69.1	53						
		4.9	19						
		4.6	16						
		4.7	17.5						
		4	13						
		3.9	11						
		5.9	24						
		5.4	23						
		4.7	17.5						
		18.2	48						
		10.3	39.5						
		8.9	35						
		11.3	43						
		20.8	50						
		10.7	42						
		4	13						
		9.7	37						
		6.3	26						
		8.2	33.5						
		8.2	33.5						
		3.1	9						
		1.4	2						
		5	20.5						
		5	20.5						
		5.1	22						
		10.3	39.5						
		4	13						
		3.5	10						
		2.2	5						
		0.81	1						
		4.4	15						
		6.1	25						
		2.5	8						
		12.8	44.5						
		27.9	51						
		6.8	28						
		2	4						
		2.3	6						
		7.9	31						
		1.9	3						
		2.4	7						
		19.1	49						
		15.1	46						
		6.6	27						
		12.8	44.5						

Table 11.1g
Comparison of Surface Soil Sample Concentrations to Background Concentration
Using Mann-Whitney U Test
Covered Area
Site 7, NAB Little Creek

	Number of Samples	Concentration (mg/kg)	Rank	Sum Ranks (R and R')	U and U'	z	p	Decision

Mann-Whitney U Test

$U = n1*n2 + n1\ (n1 + 1)/2 - R1$
$U' = n1*n2 + n2\ (n2 + 1)/2 - R2$
$z = (U - n1*n2/2)/((n1*n2*(n1+n2+1)/12)^{1/2})$

n1 = number of samples in data group 1 R1 = sum of ranks for data group 1
n2 = number of samples in data group 2 R2 = sum of ranks for data group 2

p = from area under the standard normal curve look-up table

Decision:
H_o: site data and background statistically similar
if $p < 0.05$ reject H_o, therefore, site data greater than background
Based on one-tailed test

Table 11.1h
Comparison of Soil Sample Concentrations to Background Concentration
Using Student t-test
Covered Area
Site 7, NAB Little Creek

	Sample Population				Background Data							
	Maximum Detected Concentration (max_{smp})	Count (n_1)	Mean (x1)	Standard Deviation (s1)	Maximum Detected Concentration (max_{bkg})	Count (n_2)	Mean (x_2)	Standard Deviation (s_2)	Pooled Sample Estimator (sp^2)	Calculated t-value (t)	$t_{0.05}$	Statistically Above Background?
Inorganics (mg/kg)												
Iron	10200	5	8.4	0.5	15,000	48	7.9	0.7	0.5	1.67	1.67	No
Manganese	184	5	3.8	0.9	267	48	3.2	1.1	1.2	1.09	1.67	No
Vanadium	39.5	5	2.5	0.7	34.3	48	2.0	0.9	0.9	1.18	1.67	No

Calculations:

$$sp^2 = \frac{[(n_1 - 1) * s_1^2] + [(n_2 - 1) * s_2^2]}{n_1 + n_2 - 2}$$

$$t = \frac{(x_1 - x_2) - D_0}{(sp^2 * (1/n_1 + 1/n_2))^{0.5}}$$

The Student t-test was used when both the sample population and the background population have a normal distribution.
If both the site and background populations are lognormally distributed, the data were transformed and the t-test was run.
The one-tailed test was used to determine the $t_{(0.05)}$ value.
D_0 is the hypothesized difference between the means, assuming that there is no difference, D_o=0.

Table 11.2

COCs Comparison to Background - Unfiltered Groundwater, Upper Aquifer

Site 7, NAB Little Creek

CAS Number	Chemical	Maximum [1] Concentration (ug/L)	Maximum Qualifier	Distribution of Site 10 Data	Background [2] Value (ug/L)	Distribution of Background Data	Max. Site Conc. greater than Background UTL?	Max. Site Conc. greater than Background (MWU)
7429-90-5	Aluminum	3.96E+03		Lognormal	7.13E+02	NP	YES	NO
7440-38-2	Arsenic	6.80E+00		Lognormal	7.30E+01	NP	NO	NO
7440-47-3	Chromium	2.34E+01		Lognormal	4.10E+00	NP	YES	NO
7439-89-6	Iron	1.11E+04		Closer to Normal	7.08E+04	NP	NO	NO
7439-96-5	Manganese	7.85E+02		Closer to Normal	1.50E+03	NP	NO	NO

Notes

[1] Maximum detected concentration. For inorganics, unfiltered results used following U.S. EPA Region III guidance (08/10/92).

[2] Background values are UTL from Final Background Investigation for Naval Amphibiuous Base Little Creek, Virginia Beach, Virginia (CH2M Hill, December 2000)

Definitions

COPC = Chemical of Potential Concern

NP = Nonparametric

MWU = Mann-Whitney U test (Table 11.2a)

Table 11.2a
Comparison of Unfiltered Groundwater Sample Concentrations to Background Concentration Using Mann-Whitney U Test
Site 7, NAB Little Creek

	Number of Samples	Concentration (ug/l)	Rank	Sum Ranks (R and R')	U and U'	z	p	Decision	
Aluminum									
Site	6	3960	14	57	12	-1.54919	0.0606	accept	no significant difference
		137	9						
		1340	13						
		78	6						
		135	8						
		94.9	7						
Background	8	42.7	3	48	36				
		67.2	5						
		48	4						
		32	2						
		404	11						
		6.25	1						
		713	12						
		170	10						
Arsenic									
Site	6	6.8	12	43	26	0.258199	0.3974	accept	no significant difference
		1.95	6.5						
		0.85	1						
		2.1	8						
		1.95	6.5						
		2.2	9						
Background	8	1.9	3.5	62	22				
		1.9	3.5						
		1.9	3.5						
		3.9	10						
		1.9	3.5						
		73	14						
		4	11						
		31.9	13						
Chromium									
Site	6	8.6	13	43.5	25.5	0.193649	0.4247	accept	no significant difference
		1.6	9						
		0.45	1.5						
		23.4	14						
		1.1	4.5						
		0.45	1.5						
Background	8	1.4	7.5	61.5	22.5				
		0.5	3						
		1.1	4.5						
		1.2	6						
		2.5	11						
		1.4	7.5						
		4.1	12						
		2.4	10						

Table 11.2a
Comparison of Unfiltered Groundwater Sample Concentrations to Background Concentration Using Mann-Whitney U Test
Site 7, NAB Little Creek

	Number of Samples	Concentration (ug/l)	Rank	Sum Ranks (R and R')	U and U'	z	p	Decision	
Iron									
Site	6	5870	7	43	26	0.258199	0.3974	accept	no significant difference
		3450	5						
		2950	4						
		8260	8						
		9420	9						
		11100	10						
Background	8	4580	6	62	22				
		22.8	2						
		13.75	1						
		13800	11						
		328	3						
		30400	13						
		70800	14						
		17100	12						
Manganese									
Site	6	50.4	4	45	24	0	0.5	accept	no significant difference
		62.8	5						
		33	3						
		565	11						
		558	10						
		785	12						
Background	8	159	7	60	24				
		143	6						
		16.3	1						
		386	9						
		25	2						
		1300	13						
		224	8						
		1500	14						

Mann-Whitney U Test

$U = n1*n2 + n1\,(n1 + 1)/2 - R1$
$U' = n1*n2 + n2\,(n2 + 1)/2 - R2$
$z = (U - n1*n2/2)/((n1*n2*(n1+n2+1)/12)^{1/2})$

n1 = number of samples in data group 1
n2 = number of samples in data group 2
R1 = sum of ranks for data group 1
R2 = sum of ranks for data group 2

p = from area under the standard normal curve look-up table

Decision:
H_o: site data and background statistically similar
if $p < 0.05$ reject H_o, therefore, site data greater than background
Based on one-tailed test