

03.13-08/22/96-01714

**FINAL**

**REMEDIAL INVESTIGATION REPORT  
OPERABLE UNIT NO. 6  
(SITE 43)  
VOLUME V  
MARINE CORPS BASE  
CAMP LEJEUNE, NORTH CAROLINA**

**CONTRACT TASK ORDER 0303  
APPENDICES A-W**

**AUGUST 22, 1996**

*Prepared For:*

**DEPARTMENT OF THE NAVY  
ATLANTIC DIVISION  
NAVAL FACILITIES  
ENGINEERING COMMAND  
*Norfolk, Virginia***

*Under:*

**LANTDIV CLEAN Program  
Contract N62470-89-D-4814**

*Prepared by:*

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## INTRODUCTION

A set of four 7-day, daily renewal chronic toxicity tests were conducted with larval fathead minnows (Pimephales promelas) and the freshwater cladoceran Ceriodaphnia dubia to determine the relative toxicity of surface water samples #43 and #44 from the Camp LeJeune Navy Clean, District III Project, Jacksonville, North Carolina. The larval fish survival and growth test and the C. dubia survival and reproduction test were conducted by Normandeau Associates, Spring City, Pennsylvania. The tests were conducted from 4 through 11 May 1995.

All tests were conducted according to procedures outlined in Methods for Measuring the Acute Toxicity of Effluents to Freshwater and Marine Organisms, Fourth Edition (EPA/600/4-90/027F), and Short-Term Methods for Estimating the Chronic Toxicity of Effluents and Receiving Water to Freshwater Organisms, Second Edition (EPA/600/4-89/001).

## MATERIALS

### TEST ORGANISMS

#### Fathead Minnow (Pimephales promelas)

Larval fathead minnows used in testing were obtained from Aqua Tox, Inc., a commercial laboratory located in Hot Springs, Arkansas. The minnow eggs were placed in a cubitainer containing culture water, and shipped overnight to Normandeu. Minnows that hatched during shipping were acclimated to laboratory environmental conditions for several hours before test initiation. The larvae were fed freshly hatched Artemia (brine shrimp) nauplii twice daily. No larval mortality was observed during the acclimation period. The larvae were less than 24 hours old at test initiation.

#### Freshwater Cladoceran Ceriodaphnia dubia

Cladoceran neonates, C. dubia, were obtained from Normandeu's in-house cultures. Individual cultures are maintained in 30 ml borosilicate glass culture tubes containing 10 ml of moderately hard reconstituted culture media. These animals are transferred daily to fresh reconstituted water and fed a combination of a unicellular green alga (Selenastrum capricornutum) concentrate and yeast/CEROPHYLL/trout chow (YCT) suspension.

The broods released during an 8-hr period were pooled, and used to initiate the chronic test. Since the neonates used in the test were released into moderately hard reconstituted water, they were fully acclimated to the dilution water used for this test.

### DILUTION WATER

Moderately hard reconstituted water was prepared according to procedures outlined in EPA/600/4-90/027F and was used as dilution/control water for the toxicity tests. Distilled water was decanted through a deionizing column (Specialty Filtration mixed bed) and reagent grade chemicals were dissolved into solution in the following concentrations: 96.0 mg/L of NaHCO<sub>3</sub>, 60.0 mg/L CaSO<sub>4</sub> · 2H<sub>2</sub>O, 60.0 mg/L MgSO<sub>4</sub>, and 4 mg/L KCl. The reconstituted water was then aerated for at least 24 hours prior to use as either acclimation water, dilution water, or control water.

### TEST MATERIAL

The material tested was surface water collected from sites 43 and 44 by Baker Environmental personnel. Three grab samples were collected for each of the four tests.

For the tests, the first samples collected 3 May were used to initiate the tests on 4 May (Day 1) and for renewals on Day 2. The samples collected 5 May were used for Days 3, 4, and 5, and the third samples collected 8 May were used for renewals on Days 6 and 7.

The samples were packed on ice and shipped overnight to Normandeu Associates on 4, 6, and 9 May. Chain-of-Custody forms accompanied all samples.

All samples were stored at 4°C and then used for test solution renewals. The maximum sample storage time at Normandeau was approximately 72 hours. Samples were warmed to test temperature prior to preparing test solutions for renewal.

## METHODS

### FATHEAD MINNOW STATIC RENEWAL CHRONIC TEST METHOD

Fathead minnow larvae were exposed to the surface water samples for 7 days under static renewal conditions. Minnows were exposed in groups of ten 400 mL plastic beakers containing 250-ml of test solution with four replicates per concentration (40 minnows per concentration). Test chambers were placed in randomized positions in a temperature controlled environment (Precision Scientific Incubator) maintained at  $25 \pm 1^\circ\text{C}$ . The highest concentration used was 100%. A 0.5 dilution factor was used to prepare sample concentrations of 50%, 25%, 12.5%, and 6.25%. A control sample consisting of 100% dilution water was also tested.

Test animals were fed 0.1 ml of freshly hatched brine shrimp twice daily. Test solutions were renewed daily by siphoning off the 24-hour-old solution and replacing it with freshly prepared test solution. Surviving minnows were counted and debris was removed from test chambers during the renewal process. Any dead organisms were also removed and recorded. Dissolved oxygen, and pH were measured at the beginning and end of each 24-hr exposure period in at least one replicate at each test concentration. Temperature was measured daily in at least one replicate of each test concentration. Conductivity, alkalinity, and hardness were measured in each sample and in the dilution water. The lighting regime was 16 hours light, 8 hours dark.

The test was terminated at the end of 7 days. All live minnows within each replicate were counted, rinsed with deionized water, and transferred as a group to pre-weighed pans. Minnows were dried in an oven at  $100^\circ\text{C}$  to  $105^\circ\text{C}$  for at least 8 hours and immediately transferred to a desiccator. Each pan containing minnows was weighed to the nearest 0.1 mg on a Mettler balance and the total dry minnow weight was divided by the number of minnows weighed to obtain the average minnow weight per replicate exposure.

### CERIODAPHNIA STATIC RENEWAL CHRONIC TEST METHOD

Young C. dubia (<24 hr old at test initiation) were continuously exposed for 7 days under static renewal conditions to the test solutions. Individual animals were exposed in 30-ml glass culture tubes containing 15 ml of test solution. Each treatment level, including the controls included 10 replicate test tubes (10 animals per concentration). Test tubes were placed in randomized positions within the test array, which was placed in a temperature controlled environment (Precision Scientific Incubator) maintained at  $25 \pm 1^\circ\text{C}$ . The highest concentration used was 100%. A 0.5 dilution factor was used to prepare lesser sample concentrations of 50%, 25%, 12.5%, and 6.25% sample. A control sample of 100% dilution water was also tested. After test initiation, surviving parent C. dubia were transferred daily to freshly prepared test solutions. The food ration per test tube, which was added after transfer, consisted of 0.2 ml of Selenastrum concentrate and 0.05 ml YCT concentrate.

Observations of the number of live or dead animals were made daily. Reproduction was monitored daily by counting the number of neonates viewed on a light table while the adults were being transferred to new test solutions. The young were discarded after counting.

Dissolved oxygen and pH were measured at the beginning and end of each 24-hr exposure period in one replicate of each test concentration. Temperature was measured daily in one replicate of each test treatment. Conductivity, salinity, alkalinity, and hardness were measured in each sample of test material and in the controls. The lighting regime was 16 hours light, 8 hours dark.

## STATISTICAL ANALYSIS

The statistical analysis of chronic toxicity tests with aquatic organisms follows a decision process illustrated in the flow chart in Figure 1 (EPA/600/4-89/001). All chronic test data are statistically analyzed to estimate the highest "safe" or "no-effect concentration" (NOEC) and "lowest-effect concentration" (LOEC) of the surface water sample for fathead minnow survival and growth, and *C. dubia* survival and reproduction. That is, the NOEC is the highest concentration of surface water sample that causes no observable adverse effects on the test organisms (i.e., the highest concentration of surface water in which the values for the observed responses are not statistically significantly different from the controls). The LOEC is the lowest concentration of surface water sample which causes adverse effects on the test organisms (i.e., where the values for the observed responses are statistically significantly different from the controls). Therefore, the results of the tests are expressed in terms of the two endpoints.

In data analysis, the test data first undergo hypothesis testing to determine if the distribution of the results is normal using the Shapiro-Wilk's Test or Chi-Square Test. The variance is then tested for homogeneity using Bartlett's Test. The endpoint estimates, NOEC and LOEC are determined using an Analysis of Variance Test (ANOVA) followed by a multiple comparison method comparing each of the treatment means with the control. Dunnett's Test (one-sided), Bonferroni's T-Test, Steel's Many-One Rank Test, and Wilcoxon Rank Sum Test are several types of multiple comparison tests used.

Acute endpoints are derived from data obtained 48 hours into the chronic test. The acute endpoints consist of the 48 hour  $LC_{50}$ , which is the concentration of surface water sample that will kill half of the organisms in a test population in 48 hours.  $LC_{50}$  and 95% confidence limits are calculated using one of the following methods: Probit, Spearman-Kärber, Trimmed Spearman-Kärber, or the Graphical Method (EPA/600/4-90/027F).



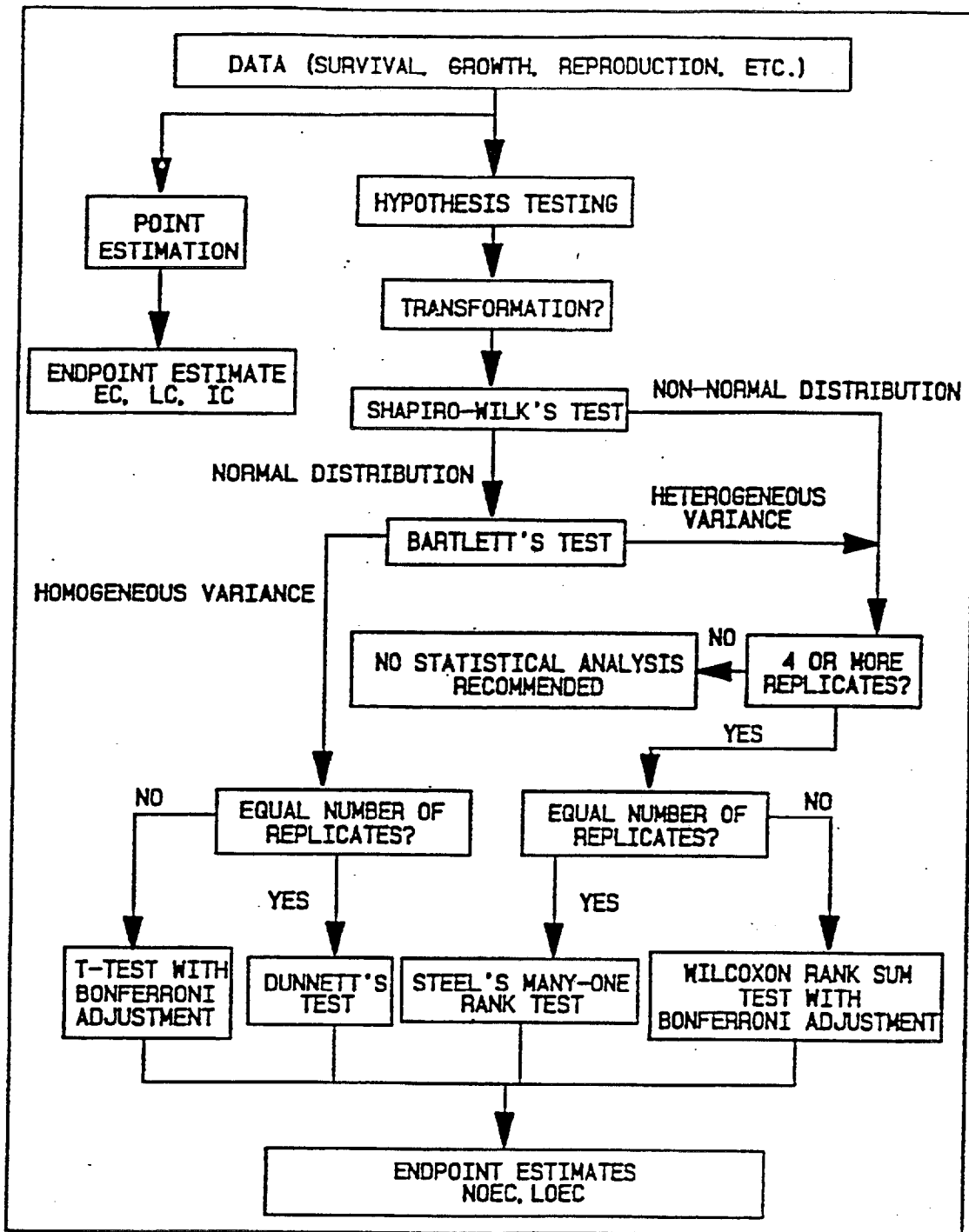


Figure 1. Flow chart for statistical analysis of test data.

## RESULTS

### FATHEAD MINNOW SURVIVAL AND GROWTH

Normality testing using Shapiro-Wilk's Test revealed that Arcsine transformed survival data were normally distributed for both sample #43 and #44. Bartlett's Test for Variance Equality revealed survival data were homogeneous for both sample #43 and #44. Survival data for both sample #43 and #44 were evaluated using Analysis of Variance (ANOVA)/Dunnett's Test for endpoint determination. This statistical comparison revealed no significant mortality occurred between the control and test concentrations during testing in either sample #43 or #44. Therefore, the no effect concentration (NOEC) for both sample #43 and #44 in the survival toxicity evaluation is 100 percent surface water and the low effect concentration (LOEC) was not detected in either sample #43 or #44. Acute endpoints were calculated from data obtained 48 hours into the test. The 48 hour LC<sub>50</sub> (lethal concentration) was greater than 100 percent surface water for both samples.

Normality testing using Shapiro-Wilk's Test revealed that growth raw sample data were normally distributed for both sample #43 and #44. Bartlett's Test for Variance Equality revealed growth data are homogeneous for both sample #43 and #44. Analysis of Variance (ANOVA)/Dunnett's Test was used for end point determination for both sample #43 and #44. No significant differences in growth were observed in any of the test concentrations. Therefore, the no effect concentration (NOEC) for both sample #43 and #44 in the growth toxicity evaluation is 100 percent surface water and the low effect concentration (LOEC) was not detected to 100 percent surface water in either sample #43 or #44.

### CERIODAPHNIA DUBIA SURVIVAL AND REPRODUCTION

Survival data were evaluated using Fisher's Exact Test for endpoint determination. Significant differences were observed in the 100 percent surface water for both sample #43 and #44 concentrations. Therefore, the no effect concentration (NOEC) for survival in both sample #43 and #44 for the cladoceran toxicity test is 50 percent surface water and the low effect concentration (LOEC) was 100 percent surface water for both sample #43 and #44. Acute endpoints were calculated from data obtained 48 hours into the test. The 48 hour LC<sub>50</sub> (lethal concentration) was greater than 100 percent surface water for sample #44 and 53.6 percent surface water for sample #43.

Due to a significant survival effect the 100 percent surface water concentrations were excluded from the reproduction evaluation for both sample #43 and #44. The reproduction data for both sample #43 and #44 passed when tested for homogeneity using Bartlett's Test for Variance Equality and passed normality using Chi-Square Test. Reproduction data were evaluated using Analysis of Variance (ANOVA)/Bonferroni T-Test for endpoint determination (i.e., sample #43 due to an unequal number of replicates). This statistical comparison revealed that the 50 percent test concentrations was significantly different ( $p = 0.05$ ) from the control in the reproduction evaluation. Therefore, the no effect concentration (NOEC) for reproduction is 25 percent surface water and the low effect concentration (LOEC) was 50 percent surface water for sample #43. Reproduction data for sample #44 were evaluated using Analysis of Variance (ANOVA)/Dunnett's Test for endpoint determination. This statistical comparison revealed none of the remaining test concentrations were significantly different ( $p = 0.05$ ) from the control.

Therefore, the no effect concentration (NOEC) for reproduction is 50 percent surface water and the low effect concentration (LOEC) was not detected to 50 percent surface water for sample #44.

## INTRODUCTION

Two 10-day static sediment toxicity tests were conducted with the amphipod Hyaella azteca (H. azteca) and the midge Chironomus tentans (C. tentans) to determine the short-term effects of Camp LeJeune sediment material. The objective of the tests was to determine the impact of Camp LeJeune sediment on H. azteca survival and C. tentans survival and growth. The sediment toxicity tests were conducted by Normandeau Associates, Spring City, Pennsylvania. The tests were conducted from 12 through 22 May 1995.

All tests were conducted according to the United States Environmental Protection Agency guidance document, Methods for Measuring the Toxicity and Bioaccumulation of Sediment-Associated Contaminants with Freshwater Invertebrates, (EPA/600/R-94/024).

## MATERIALS

### TEST ORGANISMS

#### Hyalella azteca

Immature H. azteca (10-day old) were laboratory reared by Aquatic Research Organisms (ARO), a commercial laboratory located in Hampton, New Hampshire. The organisms were placed in a plastic cubitainer containing moderately hard reconstituted water and detrital material and shipped overnight to Normandeau Associates. The amphipods were acclimated to laboratory test temperature for one day prior to test initiation. No mortality was observed during the acclimation period.

#### Chironomus tentans

Third instar C. tentans larvae were laboratory reared by Aquatic Research Organisms (ARO), a commercial laboratory located in Hampton, New Hampshire. Third instar larvae were confirmed by ARO personnel using head capsule measurements prior to shipping. The organisms were placed in a plastic cubitainer containing moderately hard reconstituted water and a monolayer of sand and shipped overnight to Normandeau Associates. The midges were acclimated to laboratory test temperature for one day prior to test initiation. No mortality was observed during the acclimation period.

### DILUTION WATER

Moderately hard reconstituted water was prepared according to procedures outlined in EPA/600/4-90/027F and was used as dilution/control water for the toxicity tests. Distilled water was decanted through a deionizing column (Specialty Filtration mixed bed) and reagent grade chemicals were dissolved into solution in the following concentrations: 96.0 mg/L of  $\text{NaHCO}_3$ , 60.0 mg/L  $\text{CaSO}_4 \cdot 2\text{H}_2\text{O}$ , 60.0 mg/L  $\text{MgSO}_4$ , and 4 mg/L KCl. The reconstituted water was then aerated for at least 24 hours prior to use as either acclimation water, dilution water, or control water.

### TEST MATERIAL

The material tested was sediment collected from the Camp LeJeune Navy Clean Site by Baker Environmental personnel. Two separate locations were sampled, Site 43 and 44. Within each site, several discrete samples were taken using a sediment corer sampler and composited. The samples were collected 4 and 5 May 1995, and transported to Normandeau's Aquatic Toxicology Laboratory via overnight shipping. Chain-of-Custody Forms accompanied all samples (Appendix C).

### CONTROL SEDIMENT

Control sediment was collected from the site on 4 May 1995 by Baker Environmental personnel, at a location considered free of contamination, and was a tan sand with some detrital material.

## METHODS

### SAMPLE PREPARATION

The samples for the sediment toxicity tests were stored in the Aquatic Toxicology Laboratory at 4°C prior to test initiation. The samples were warmed in a water bath to test temperature before preparation of the test sediment. Both samples were fairly uniform in their composition. The sample from Site 43 was thick with detrital material and a fine black mud, and the sample from Site 44 was a tan sand. The samples were then placed in the test chambers and allowed to settle.

### HAYALLELA AZTECA STATIC RENEWAL SEDIMENT TOXICITY TEST METHOD

Ten day old Hayallela azteca (H. azteca) were exposed to the sediment samples for ten days under static renewal conditions. H. azteca were exposed in groups of ten in 7.6 cm x 16 cm x 8.0 cm glass aquaria containing 200 to 250 mL of test sediment with eight replicates per sample (80 amphipods per sample). Overlying water (moderately hard reconstituted water) was used to fill the test aquaria to 900 mL. Test chambers were placed in randomized positions in a temperature controlled environment maintained at  $23 \pm 1^\circ\text{C}$ . A control sediment was also tested.

Test animals were fed 3.0 mL of YCT suspension daily. Test overlying water was renewed twice daily by siphoning off the old solution and replacing it with freshly prepared overlying water. Any dead organisms observed during the renewal process were removed and recorded. Dissolved oxygen, and temperature were measured daily during the exposure period in at least one replicate at each sediment sample. Conductivity, pH, ammonia, alkalinity, and hardness were measured in each sediment sample and in the control at the beginning and end of the test. The lighting regime was 16 hours light, 8 hours dark.

The test was terminated at the end of ten days. All live H. azteca within each replicate were collected with a sieve and counted.

### CHIRONOMUS TENTANS STATIC RENEWAL SEDIMENT TOXICITY TEST METHOD

Third instar Chironomus tentans (C. tentans) larvae were exposed to the sediment samples for ten days under static renewal conditions. C. tentans were exposed in groups of ten in 7.6 cm x 16 cm x 8.0 cm glass aquaria containing 200 to 250 mL of test sediment with eight replicates per sample (80 midges per sample). Overlying water (moderately hard reconstituted water) was used to fill the test aquaria to 900 mL. Test chambers were placed in randomized positions in a temperature controlled environment maintained at  $23 \pm 1^\circ\text{C}$ . A control sediment was also tested.

Test animals were fed 3.0 mL of Tetrafin suspension (4.0 mg dry solids) daily. Test overlying water was renewed twice daily by siphoning off the old solution and replacing it with freshly prepared overlying water. Any dead organisms observed during the renewal process were removed and recorded. Dissolved oxygen, and temperature were measured daily during the exposure period in at least one replicate at each sediment sample. Conductivity, pH, ammonia, alkalinity, and hardness were measured in each sediment sample and in the control at the beginning and end of the test. The lighting regime was 16 hours light, 8 hours dark.

The test was terminated at the end of ten days. All live C. tentans within each replicate collected with a sieve were counted, rinsed with deionized water, and transferred as a group to pre-weighed pans. Midges were dried in an oven at 100°C to 105°C for at least 8 hours and immediately transferred to a desiccator. Each pan containing midges was weighed to the nearest 0.1 mg on a Mettler balance and the total dry midge weight was divided by the number of midges weighed to obtain the average midge weight per replicate exposure.

## RESULTS

### HYALELLA AZTECA SURVIVAL

Individual data points and sediment sample means for the Hyalella azteca survival toxicity test are presented in Table 1.

Arc-sine Transformed survival data passed when tested for normality using Shapiro-Wilk's Test and for homogeneity using Bartlett's Test for Variance Equality. Therefore, the parametric procedure Analysis of Variance (ANOVA)/Dunnnett's Test was used to identify significant differences from the control sediment and test sediments. This statistical comparison revealed a significant difference between the control site and Site 43. No significant difference was observed at Site 44.

### CHIRONOMUS TENTANS SURVIVAL AND GROWTH

Individual data points and sediment sample means for the Chironomus tentans survival and growth toxicity tests are presented in Tables 2 and 3.

Arc-sine Transformed survival data passed when tested for normality using Shapiro-Wilk's Test and for homogeneity using Bartlett's Test for Variance Equality. Therefore, the parametric procedure Analysis of Variance (ANOVA)/Dunnnett's Test was used to identify significant differences from the control sediment and test sediments. This statistical comparison revealed no significant differences between the control sediment and sediment from Sites 43 and 44.

Growth raw sample data passed when tested for normality using Shapiro-Wilk's Test and for homogeneity using Bartlett's Test for Variance Equality. Therefore, the parametric procedure Analysis of Variance (ANOVA)/Dunnnett's Test was used to identify statistical differences between the control sediment and test sediments. This statistical comparison revealed no significant differences between the control sediment and sediments from Sites 43 and 44.



# TEST BORING RECORD

PROJECT: RI/FS at OU No. 6 - Site 43 - MCAS, New River

CTO NO.: 62470-303

BORING NO.: 43-BB-SB01

COORDINATES: EAST: 2468434.8732

NORTH: 359536.8922

ELEVATION: SURFACE: 8.70

RIG: Geoprobe 5400				DATE	PROGRESS (FT)	WEATHER	WATER DEPTH (FT)	TIME
	LARGE BORE SAMPLER	SMALL BORE SAMPLER	LINER					
SIZE (DIAM.)	1-3/8" ID	--	1-1/8" ID	3/1/95	0.0 - 7.0	Rainy & mild	5.0	0758
LENGTH	4.0'	--	4.0'					
TYPE	Piston	--	Plastic					

REMARKS: (1) - Sample collected from the 0-1 ft interval.

SAMPLE TYPE	DEFINITIONS
S = Split Spoon T = Shelby Tube R = Air Rotary D = Direct Push N = No Sample	A = Auger W = Wash C = Core P = Piston PID = Photoionization Detection Meter ppm = parts per million PS = Point Source BG = Background BOH = Bottom of Hole

Depth (ft)	Sample Type and No.	Sample Recovery (ft & %)	Lab ID Number	PID (ppm) PS/BG	Visual Description	Elev.			
1	S-1	2.5 83%	00(1)	0.3/0.1	SAND (fine), some silt, trace clay & roots; dark brown; moist	7.10			
2									
3					3.0		SAND (fine), some silt, trace clay; tan; moist	1.6	
4	S-2	1.9 95%	02	0.1/0.1		4.00			
5					5.0			SAND (fine), some silt, little clay; brown; moist	4.7 5.0
6	S-3	2.0 100%		0.1/0.1		1.7			
7					7.0			SAND (fine), little silt, trace clay; gray; wet GROUNDWATER @ 5.0 FT	7.0
8								BOH @ 7.0 FT	
9									
10									

CONTRACTOR: Microseeps  
 OPERATOR: Art Carion

BAKER REP.: Mark DeJohn  
 BORING NO.: 43-BB-SB01

SHEET 1 OF 1

# TEST BORING RECORD

PROJECT: RI/FS at OU No. 6 - Site 43 - MCAS, New River

CTO NO.: 62470-303

BORING NO.: 43-BB-SB02

COORDINATES: EAST: \_\_\_\_\_

NORTH: \_\_\_\_\_

ELEVATION: SURFACE: \_\_\_\_\_

RIG: Geoprobe 5400				DATE	PROGRESS (FT)	WEATHER	WATER DEPTH (FT)	TIME
	LARGE BORE SAMPLER	SMALL BORE SAMPLER	LINER					
SIZE (DIAM.)	1-3/8" ID	--	1-1/8" ID	3/1/95	0.0 - 5.0	Rainy & mild	3.0	0815
LENGTH	4.0'	--	4.0'					
TYPE	Piston	--	Plastic					

REMARKS: (1) - Sample collected from the 0-1 ft portion of this interval.  
 (2) - Sample collected from the 1-3 ft portion of this interval.

SAMPLE TYPE	DEFINITIONS
S = Split Spoon T = Shelby Tube R = Air Rotary D = Direct Push N = No Sample	A = Auger W = Wash C = Core P = Piston
	PID = Photoionization Detection Meter ppm = parts per million PS = Point Source BG = Background BOH = Bottom of Hole

Depth (ft)	Sample Type and No.	Sample Recovery (ft & %)	Lab ID Number	PID (ppm) PS/BG	Visual Description	Elev.
1	S-1	2.5 83%	00(1) 01(2)	0.1/0.1	SAND (fine), some silt, trace clay & roots; dk brown; moist	0.5
2					SAND (fine), little silt, trace clay; dark brown; moist	
3	S-2	2.0 100%	02	0.1/0.1	SAND (fine), trace silt & clay; gray	3.0
4					wet - GROUNDWATER @ 3.0 FT	
5					BOH @ 5.0 FT	5.0
6						
7						
8						
9						
10						

CONTRACTOR: Microseeps  
 OPERATOR: Art Carion

BAKER REP.: Mark DeJohn  
 BORING NO.: 43-BB-SB02 SHEET 1 OF 1

# TEST BORING RECORD

PROJECT: RI/FS at OU No. 6 - Site 43 - MCAS, New River

CTO NO.: 62470-303

BORING NO.: 43-BB-SB03

COORDINATES: EAST: 2468460.7626

NORTH: 359286.8627

ELEVATION: SURFACE: 5.00

RIG: Geoprobe 5400				DATE	PROGRESS (FT)	WEATHER	WATER DEPTH (FT)	TIME
SIZE (DIAM.)	LARGE BORE SAMPLER	SMALL BORE SAMPLER	LINER					
SIZE (DIAM.)	1-3/8" ID	--	1-1/8" ID	3/1/95	0.0 - 7.0	Rainy & mild	5.0	0847
LENGTH	4.0'	--	4.0'					
TYPE	Piston	--	Plastic					

REMARKS: (1) - Sample collected from the 0-1 ft interval.

SAMPLE TYPE	DEFINITIONS
S = Split Spoon T = Shelby Tube R = Air Rotary D = Direct Push N = No Sample	PID = Photoionization Detection Meter ppm = parts per million PS = Point Source BG = Background BOH = Bottom of Hole
A = Auger W = Wash C = Core P = Piston	

Depth (ft)	Sample Type and No.	Sample Recovery (ft & %)	Lab ID Number	PID (ppm) PS/BG	Visual Description	Elev.	
1	S-1	2.4 80%	00(1)	0.3/0.1	SAND (fine), some silt, trace clay; dark brown; moist	0.5	
2					SILT, little fine sand & clay; dark brown; petroleum odor		
3					3.0		
4	S-2	1.7 85%	02	2.6/0.2			
5					5.0	5.0	0.00
6	S-3	2.0 100%		3.9/0.2	SAND (fine), trace silt & clay; dark gray; wet - GROUNDWATER @ 5.0 FT		
7					7.0	7.0	-2.00
8							
9							
10							

CONTRACTOR: Microseeps

OPERATOR: Art Carion

BAKER REP.: Mark DeJohn

BORING NO.: 43-BB-SB03

SHEET 1 OF 1

# TEST BORING RECORD

PROJECT: RI/FS at OU No. 6 - Site 43 - MCAS, New River

CTO NO.: 62470-303

BORING NO.: 43-DA1-SB01

COORDINATES: EAST: 2469290.3929

NORTH: 359964.3992

ELEVATION: SURFACE: 3.70

RIG: None used - hand sampled				DATE	PROGRESS (FT)	WEATHER	WATER DEPTH (FT)	TIME
LARGE BORE SAMPLER	SMALL BORE SAMPLER	LINER						
SIZE (DIAM.)	--	1-3/8" OD	1-1/8" ID	3/10/95	0.0 - 5.0	Sunny & cool	1.6	1615
LENGTH	--	2.0'	2.0'					
TYPE	--	Hand	Plastic					

REMARKS:

SAMPLE TYPE	DEFINITIONS
S = Split Spoon      A = Auger T = Shelby Tube      W = Wash R = Air Rotary        C = Core D = Direct Push      P = Piston N = No Sample	PID = Photoionization Detection Meter ppm = parts per million PS = Point Source BG = Background BOH = Bottom of Hole

Depth (ft)	Sample Type and No.	Sample Recovery (ft & %)	Lab ID Number	PID (ppm) PS/BG	Visual Description	Elev.
1	S-0		00	0.2/0.1	SILT, some fine sand, little clay & organic matter; black; damp to moist	1.0 2.70
2	S-1	2.0 100%	01	0.1/0.1	SAND (fine), some silt, trace clay; gray; moist	1.6 2.10
3					SAND (fine to med), little silt, trace clay; gray; wet GROUNDWATER @ 1.6 FT	
4	S-2	2.0 100%		0.1/0.1	SILTY CLAY, trace fine sand; gray; damp to moist	4.2 -0.50 4.7 -1.00
5					SAND (fine), some silt, little clay; gray; wet	5.0 -1.30
6					BOH @ 5.0 FT.	
7						
8						
9						
10						

CONTRACTOR:

Microseeps

BAKER REP.:

Mark DeJohn

OPERATOR:

Art Carion

BORING NO.:

43-DA1-SB01

SHEET 1 OF 1

# TEST BORING RECORD

PROJECT: RI/FS at OU No. 6 - Site 43 - MCAS, New River

CTO NO.: 62470-303

BORING NO.: 43-DA1-SB02

COORDINATES: EAST: 2469305.1089

NORTH: 359958.2967

ELEVATION: SURFACE: 3.10

RIG: None used - hand sampled				DATE	PROGRESS (FT)	WEATHER	WATER DEPTH (FT)	TIME
	LARGE BORE SAMPLER	SMALL BORE SAMPLER	LINER					
SIZE (DIAM.)	--	1-3/8" OD	1-1/8" ID	3/10/95	0.0 - 3.0	Sunny & cool	0.5	1625
LENGTH	--	2.0'	2.0'					
TYPE	--	Hand	Plastic					

REMARKS:

SAMPLE TYPE	DEFINITIONS
S = Split Spoon T = Shelby Tube R = Air Rotary D = Direct Push N = No Sample	PID = Photoionization Detection Meter ppm = parts per million PS = Point Source BG = Background BOH = Bottom of Hole
A = Auger W = Wash C = Core P = Piston	

Depth (ft)	Sample Type and No.	Sample Recovery (ft & %)	Lab ID Number	PID (ppm) PS/BG	Visual Description	Elev.
1	S-0		00	2.7/0.1	SAND (fine), some silt, little clay; dark brown; wet	1.0 2.10
2	S-1	1.8 90%	01	0.4/0.1	SAND (fine), some silt, trace clay; gray; wet GROUNDWATER @ 0.5 FT	2.7 0.40
3					SILTY CLAY, trace fine sand; brown & gray; mottled; damp	3.0 0.10
					BOH @ 3.0 FT.	
6						
7						
8						
9						
10						

CONTRACTOR:

Microseeps

BAKER REP.:

Mark DeJohn

OPERATOR:

Art Carion

BORING NO.:

43-DA1-SB02

SHEET 1 OF 1

# TEST BORING RECORD

PROJECT: RI/FS at OU No. 6 - Site 43 - MCAS, New River  
 CTO NO.: 62470-303  
 COORDINATES: EAST: 24699300.0920  
 ELEVATION: SURFACE: 3.00

BORING NO.: 43-DA1-SB03  
 NORTH: 359955.4516

RIG: None used - hand sampled				DATE	PROGRESS (FT)	WEATHER	WATER DEPTH (FT)	TIME
	LARGE BORE SAMPLER	SMALL BORE SAMPLER	LINER					
SIZE (DIAM.)	--	1-3/8" OD	1-1/8" ID	3/10/95	0.0 - 5.0	Sunny & cool	0.5	1646
LENGTH	--	2.0'	2.0'					
TYPE	--	Hand	Plastic					

REMARKS:

SAMPLE TYPE	DEFINITIONS
S = Split Spoon      A = Auger T = Shelby Tube      W = Wash R = Air Rotary      C = Core D = Direct Push      P = Piston N = No Sample	PID = Photoionization Detection Meter ppm = parts per million PS = Point Source BG = Background BOH = Bottom of Hole

Depth (ft)	Sample Type and No.	Sample Recovery (ft & %)	Lab ID Number	PID (ppm) PS/BG	Visual Description	Elev.
1	S-0		00	0.6/0.1	SILT, some fine sand & clay; black wet GROUNDWATER @ 0.5 FT	1.3
2	S-1	2.0 100%	01	0.4/0.1	SAND (fine), some silt, trace clay; brown; moist to wet	0.30
3						
4	S-2	2.0 100%		0.1/0.1	SILTY CLAY, little fine sand; brown mottled; damp	-1.20
5					SAND (fine), some silt, trace clay; brown; wet	-2.00
6					BOH @ 5.0 FT.	
7						
8						
9						
10						

CONTRACTOR: Microseeps      BAKER REP.: Mark DeJohn  
 OPERATOR: Art Carion      BORING NO.: 43-DA1-SB03      SHEET 1 OF 1

# TEST BORING RECORD

PROJECT: RI/FS at OU No. 6 - Site 43 - MCAS, New River

CTO NO.: 62470-303

BORING NO.: 43-DA1-SB03

COORDINATES: EAST: 24699300.0920

NORTH: 359955.4516

ELEVATION: SURFACE: 3.00

RIG: None used - hand sampled				DATE	PROGRESS (FT)	WEATHER	WATER DEPTH (FT)	TIME
	LARGE BORE SAMPLER	SMALL BORE SAMPLER	LINER					
SIZE (DIAM.)	--	1-3/8" OD	1-1/8" ID	3/10/95	0.0 - 5.0	Sunny & cool	0.5	1646
LENGTH	--	2.0'	2.0'					
TYPE	--	Hand	Plastic					

REMARKS:

SAMPLE TYPE	DEFINITIONS
S = Split Spoon      A = Auger T = Shelby Tube      W = Wash R = Air Rotary        C = Core D = Direct Push      P = Piston N = No Sample	PID = Photoionization Detection Meter ppm = parts per million PS = Point Source BG = Background BOH = Bottom of Hole

Depth (ft)	Sample Type and No.	Sample Recovery (ft & %)	Lab ID Number	PID (ppm) PS/BG	Visual Description	Elev.
1	S-0		00	0.6/0.1	SILT, some fine sand & clay; black wet GROUNDWATER @ 0.5 FT	1.3
2	S-1	2.0 100%	01	0.4/0.1	SAND (fine), some silt, trace clay; brown; moist to wet	0.30
3						
4	S-2	2.0 100%		0.1/0.1	SILTY CLAY, little fine sand; brown mottled; damp	-1.20
5					SAND (fine), some silt, trace clay; brown; wet	-2.00
6					BOH @ 5.0 FT.	
7						
8						
9						
10						

CONTRACTOR: Microseeps

BAKER REP.: Mark DeJohn

OPERATOR: Art Carion

BORING NO.: 43-DA1-SB03

SHEET 1 OF 1

# TEST BORING RECORD

PROJECT: RI/FS at OU No. 6 - Site 43 - MCAS, New River  
 CTO NO.: 62470-303  
 COORDINATES: EAST: 2468994.3661  
 ELEVATION: SURFACE: 4.50

BORING NO.: 43-DA2-SB01  
 NORTH: 359918.4052

RIG: None used - hand sampled				DATE	PROGRESS (FT)	WEATHER	WATER DEPTH (FT)	TIME
	LARGE BORE SAMPLER	SMALL BORE SAMPLER	LINER					
SIZE (DIAM.)	--	1-3/8" OD	1-1/8" ID	3/10/95	0.0 - 3.0	Sunny & cool	1.0	1358
LENGTH	--	2.0'	2.0'					
TYPE	--	Hand	Plastic					

REMARKS:

SAMPLE TYPE	DEFINITIONS
S = Split Spoon T = Shelby Tube R = Air Rotary D = Direct Push N = No Sample	A = Auger W = Wash C = Core P = Piston
	PID = Photoionization Detection Meter ppm = parts per million PS = Point Source BG = Background BOH = Bottom of Hole

Depth (ft)	Sample Type and No.	Sample Recovery (ft & %)	Lab ID Number	PID (ppm) PS/BG	Visual Description	Elev.
1	S-0		00	0.2/0.2	SAND (fine), some silt, little gravel, clay & debris; black; moist to wet	1.3 3.20
2	S-1	1.9 95%	01	0.3/0.3	SAND (fine), little silt, trace clay; black wet GROUNDWATER @ 1.0 FT	
3						3.0 1.50
4					BOH @ 3.0 FT.	
5						
6						
7						
8						
9						
10						

CONTRACTOR: Microseeps BAKER REP.: Mark DeJohn  
 OPERATOR: Art Carion BORING NO.: 43-DA2-SB01 SHEET 1 OF 1



# TEST BORING RECORD

PROJECT: RI/FS at OU No. 6 - Site 43 - MCAS, New River

CTO NO.: 62470-303

BORING NO.: 43-DA2-SB02

COORDINATES: EAST: 2468997.7611

NORTH: 359925.9213

ELEVATION: SURFACE: 4.40

RIG: None used - hand sampled				DATE	PROGRESS (FT)	WEATHER	WATER DEPTH (FT)	TIME
LARGE BORE SAMPLER	SMALL BORE SAMPLER	LINER						
SIZE (DIAM.)	--	1-3/8" OD	1-1/8" ID	3/10/95	0.0 - 3.0	Sunny & cool	0.5	1403
LENGTH	--	2.0'	2.0'					
TYPE	--	Hand	Plastic					

REMARKS:

SAMPLE TYPE	DEFINITIONS
S = Split Spoon      A = Auger T = Shelby Tube      W = Wash R = Air Rotary        C = Core D = Direct Push      P = Piston N = No Sample	PID = Photoionization Detection Meter ppm = parts per million PS = Point Source BG = Background BOH = Bottom of Hole

Depth (ft)	Sample Type and No.	Sample Recovery (ft & %)	Lab ID Number	PID (ppm) PS/BG	Visual Description	Elev.
1	S-0		00	0.2/0.2	SAND (fine), some silt, little clay; black; wet	1.2
2	S-1	1.6 80%	01	0.3/0.3	SAND (fine), some silt, trace clay; gray; wet	
3					GROUNDWATER @ 0.5 FT	3.0
4					BOH @ 3.0 FT.	
5						
6						
7						
8						
9						
10						

CONTRACTOR:

Microseeps

BAKER REP.:

Mark DeJohn

OPERATOR:

Art Carion

BORING NO.:

43-DA2-SB02

SHEET 1 OF 1

# TEST BORING RECORD

PROJECT: RI/FS at OU No. 6 - Site 43 - MCAS, New River  
 CTO NO.: 62470-303 BORING NO.: 43-MA-SB01  
 COORDINATES: EAST: 2468973.5085 NORTH: 359366.9878  
 ELEVATION: SURFACE: 4.30

RIG: Geoprobe 5400				DATE	PROGRESS (FT)	WEATHER	WATER DEPTH (FT)	TIME
	LARGE BORE SAMPLER	SMALL BORE SAMPLER	LINER					
SIZE (DIAM.)	1-3/8" ID	--	1-1/8" ID	2/28/95	0.0 - 5.0	Cloudy & mild	3.0	1405
LENGTH	4.0'	--	4.0'					
TYPE	Piston	--	Plastic					

REMARKS:

<p style="text-align: center;"><b>SAMPLE TYPE</b></p> <p>S = Split Spoon      A = Auger                  T = Shelby Tube      W = Wash                  R = Air Rotary      C = Core                  D = Direct Push      P = Piston                  N = No Sample</p>	<p style="text-align: center;"><b>DEFINITIONS</b></p> <p>PID = Photoionization Detection Meter                  ppm = parts per million                  PS = Point Source                  BG = Background                  BOH = Bottom of Hole</p>
--	---

Depth (ft)	Sample Type and No.	Sample Recovery (ft & %)	Lab ID Number	PID (ppm) PS/BG	Visual Description	Elev.
1	D-N		00	0.2/0.2	SAND (fine), some silt, trace clay; brown; moist gray	
2	S-1	1.4 70%	01	0.2/0.2		
3						
4	S-2	2.0 100%		0.3/0.2	wet - GROUNDWATER @ 3.0 FT fresh wood (buried tree) encountered encountered in initial core BOH @ 5.0 FT	
5						5.0
6						
7						
8						
9						
10						

CONTRACTOR: Microseeps BAKER REP.: Mark DeJohn  
 OPERATOR: Art Carion BORING NO.: 43-MA-SB01 SHEET 1 OF 1

# TEST BORING RECORD

PROJECT: RI/FS at OU No. 6 - Site 43 - MCAS, New River

CTO NO.: 62470-303

BORING NO.: 43-MA-SB02

COORDINATES: EAST: 2469074.6607

NORTH: 359388.4406

ELEVATION: SURFACE: 3.90

RIG: Geoprobe 5400				DATE	PROGRESS (FT)	WEATHER	WATER DEPTH (FT)	TIME
	LARGE BORE SAMPLER	SMALL BORE SAMPLER	LINER					
SIZE (DIAM.)	1-3/8" ID	--	1-1/8" ID	2/28/95	0.0 - 7.0	Cloudy & mild	5.0	0952
LENGTH	4.0'	--	4.0'					
TYPE	Piston	--	Plastic					

REMARKS:

SAMPLE TYPE	DEFINITIONS
S = Split Spoon      A = Auger T = Shelby Tube      W = Wash R = Air Rotary        C = Core D = Direct Push      P = Piston N = No Sample	PID = Photoionization Detection Meter ppm = parts per million PS = Point Source BG = Background BOH = Bottom of Hole

Depth (ft)	Sample Type and No.	Sample Recovery (ft & %)	Lab ID Number	PID (ppm) PS/BG	Visual Description	Elev.
1	D-N		00	0.2/0.2	SILT, some fine sand, trace clay & roots; dark brown; damp	2.90
2	S-1	1.7 85%		0.2/0.2	SAND (fine), little silt, trace clay; gray w/ iron staining; damp	
3						
4	S-2	1.1 55%	02	0.3/0.2	little silt & clay	
5						
6	S-3	2.0 100%		0.2/0.2	trace silt & clay; brown & gray clayey layer @ 6.0-6.4 ft.	
7					GROUNDWATER @ 5.0 FT	-3.10
8					BOH @ 7.0 FT	
9						
10						

CONTRACTOR: Microseeps  
 OPERATOR: Art Carion

BAKER REP.: Mark DeJohn  
 BORING NO.: 43-MA-SB02

SHEET 1 OF 1

# TEST BORING RECORD

PROJECT: RI/FS at OU No. 6 - Site 43 - MCAS, New River

CTO NO.: 62470-303

BORING NO.: 43-MA-SB03

COORDINATES: EAST: 2469052.0103

NORTH: 359332.7838

ELEVATION: SURFACE: 4.60

RIG: Geoprobe 5400				DATE	PROGRESS (FT)	WEATHER	WATER DEPTH (FT)	TIME
	LARGE BORE SAMPLER	SMALL BORE SAMPLER	LINER					
SIZE (DIAM.)	1-3/8" ID	--	1-1/8" ID	2/28/95	0.0 - 5.0	Cloudy & mild	3.0	1321
LENGTH	4.0'	--	4.0'					
TYPE	Piston	--	Plastic					

REMARKS:

SAMPLE TYPE	DEFINITIONS
S = Split Spoon      A = Auger T = Shelby Tube      W = Wash R = Air Rotary        C = Core D = Direct Push       P = Piston N = No Sample	PID = Photoionization Detection Meter ppm = parts per million PS = Point Source BG = Background BOH = Bottom of Hole

Depth (ft)	Sample Type and No.	Sample Recovery (ft & %)	Lab ID Number	PID (ppm) PS/BG	Visual Description	Elev.
1	D-N		00	0.2/0.2	SAND (fine), some silt, little clay; trace roots; brown; moist	
2	S-1	1.9 95%	01	0.2/0.2		trace clay; tan
3						
4	S-2	1.7 85%		0.3/0.2	wet - GROUNDWATER @ 3.0 FT	
5						5.0
6					BOH @ 5.0 FT	-0.40
7						
8						
9						
10						

CONTRACTOR:

Microseeps

BAKER REP.: Mark DeJohn

OPERATOR:

Art Carion

BORING NO.: 43-MA-SB03

SHEET 1 OF 1

# TEST BORING RECORD

PROJECT: RI/FS at OU No. 6 - Site 43 - MCAS, New River

CTO NO.: 62470-303

BORING NO.: 43-MA-SB04

COORDINATES: EAST: 2468984.3716

NORTH: 359249.2372

ELEVATION: SURFACE: 4.60

RIG: Geoprobe 5400				DATE	PROGRESS (FT)	WEATHER	WATER DEPTH (FT)	TIME
	LARGE BORE SAMPLER	SMALL BORE SAMPLER	LINER					
SIZE (DIAM.)	1-3/8" ID	--	1-1/8" ID	2/28/95	0.0 - 5.0	Cloudy & mild	3.0	1117
LENGTH	4.0'	--	4.0'					
TYPE	Piston	--	Plastic					

REMARKS:

SAMPLE TYPE	DEFINITIONS
S = Split Spoon      A = Auger T = Shelby Tube      W = Wash R = Air Rotary        C = Core D = Direct Push      P = Piston N = No Sample	PID = Photoionization Detection Meter ppm = parts per million PS = Point Source BG = Background BOH = Bottom of Hole

Depth (ft)	Sample Type and No.	Sample Recovery (ft & %)	Lab ID Number	PID (ppm) PS/BG	Visual Description	Elev.
1	D-N		00	0.0/0.0	SILTY SAND, trace clay & roots; dark brown; damp	4.10
2	S-1	1.6 80%	01	0.1/0.0	SAND (fine), some silt, little clay; orange & gray (grays w/ depth); moist	
3					wet	0.80
4	S-2	1.5 75%		0.0/0.0	.....	
5					SAND (fine), little silt; gray; wet GROUNDWATER @ 3.0	-0.40
6					BOH @ 5.0 FT	
7						
8						
9						
10						

CONTRACTOR:

Microseeps

BAKER REP.:

Mark DeJohn

OPERATOR:

Art Carion

BORING NO.:

43-MA-SB04

SHEET 1 OF 1

# TEST BORING RECORD

PROJECT: RI/FS at OU No. 6 - Site 43 - MCAS, New River  
 CTO NO.: 62470-303 BORING NO.: 43-MA-SB05  
 COORDINATES: EAST: 2469086.4615 NORTH: 359271.4582  
 ELEVATION: SURFACE: 6.50

RIG: Geoprobe 5400				DATE	PROGRESS (FT)	WEATHER	WATER DEPTH (FT)	TIME
LARGE BORE SAMPLER	SMALL BORE SAMPLER	LINER						
SIZE (DIAM.)	1-3/8" ID	--	1-1/8" ID	2/28/95	0.0 - 7.0	Cloudy & mild	5.0	1044
LENGTH	4.0'	--	4.0'					
TYPE	Piston	--	Plastic					

REMARKS:

<b>SAMPLE TYPE</b> S = Split Spoon      A = Auger T = Shelby Tube      W = Wash R = Air Rotary        C = Core D = Direct Push      P = Piston N = No Sample	<b>DEFINITIONS</b> PID = Photoionization Detection Meter ppm = parts per million PS = Point Source BG = Background BOH = Bottom of Hole
---	--

Depth (ft)	Sample Type and No.	Sample Recovery (ft & %)	Lab ID Number	PID (ppm) PS/BG	Visual Description	Elev.
1	D-N		00	0.1/0.1	SAND (fine), some silt, trace roots; dark brown; damp	
2	S-1	1.6 80%		4.2/0.1	trace wood	4.10
3						2.4
4	S-2	1.3 65%	02	0.1/0.1	SAND (fine), some silt, trace clay; tan to brown; moist	
5						
6	S-3	2.0 100%			wet - GROUNDWATER @ 5.0 FT	
7						7.0
8					BOH @ 7.0 FT	-0.50
9						
10						

CONTRACTOR: Microseeps BAKER REP.: Mark DeJohn  
 OPERATOR: Art Carion BORING NO.: 43-MA-SB05 SHEET 1 OF 1

# TEST BORING RECORD

PROJECT: RI/FS at OU No. 6 - Site 43 - MCAS, New River

CTO NO.: 62470-303

BORING NO.: 43-OA-SB01

COORDINATES: EAST: 2468976.4406

NORTH: 359968.1445

ELEVATION: SURFACE: 4.00

RIG: None used - hand sampled				DATE	PROGRESS (FT)	WEATHER	WATER DEPTH (FT)	TIME
	LARGE BORE SAMPLER	SMALL BORE SAMPLER	LINER					
SIZE (DIAM.)	--	1-3/8" OD	1-1/8" ID	3/10/95	0.0 - 5.0	Sunny & cool	1.5	1157
LENGTH	--	2.0'	2.0'					
TYPE	--	Hand	Plastic					

REMARKS:

SAMPLE TYPE	DEFINITIONS
S = Split Spoon      A = Auger T = Shelby Tube      W = Wash R = Air Rotary        C = Core D = Direct Push      P = Piston N = No Sample	PID = Photoionization Detection Meter ppm = parts per million PS = Point Source BG = Background BOH = Bottom of Hole

Depth (ft)	Sample Type and No.	Sample Recovery (ft & %)	Lab ID Number	PID (ppm) PS/BG	Visual Description	Elev.
1	S-0		00	0.3/0.2	SAND (fine), some silt, little clay; dark brown; moist to wet	2.50
2	S-1	1.6 80%	01	0.3/0.1		1.5
3					SAND (fine), some silt, trace clay; gray; wet GROUNDWATER @ 1.5 FT	
4	S-2	2.0 100%		0.1/0.1		
5						5.0
6						
7						
8						
9						
10						

CONTRACTOR:

Microseeps

BAKER REP.:

Mark DeJohn

OPERATOR:

Art Carion

BORING NO.:

43-OA-SB01

SHEET 1 OF 1

# TEST BORING RECORD

PROJECT: RI/FS at OU No. 6 - Site 43 - MCAS, New River

CTO NO.: 62470-303

BORING NO.: 43-OA-SB02

COORDINATES: EAST: 2469185.3148

NORTH: 359978.4277

ELEVATION: SURFACE: 4.40

RIG: None used - hand sampled				DATE	PROGRESS (FT)	WEATHER	WATER DEPTH (FT)	TIME
LARGE BORE SAMPLER	SMALL BORE SAMPLER	LINER						
SIZE (DIAM.)	--	1-3/8" OD	1-1/8" ID	3/10/95	0.0 - 3.0	Sunny & cool	1.0	1455
LENGTH	--	2.0'	2.0'					
TYPE	--	Hand	Plastic					

REMARKS:

SAMPLE TYPE	DEFINITIONS
S = Split Spoon      A = Auger T = Shelby Tube      W = Wash R = Air Rotary        C = Core D = Direct Push      P = Piston N = No Sample	PID = Photoionization Detection Meter ppm = parts per million PS = Point Source BG = Background BOH = Bottom of Hole

Depth (ft)	Sample Type and No.	Sample Recovery (ft & %)	Lab ID Number	PID (ppm) PS/BG	Visual Description	Elev.
1	S-0		00	0.3/0.3	SAND (fine), some silt, little clay; dark brown; moist	0.5 3.90
2	S-1	1.8 90%	01	0.3/0.3	SAND (fine), little silt, trace clay; gray; wet	1.8 2.60
3					SAND (fine to med), trace silt & clay; brown; wet	3.0 1.40
4					GROUNDWATER @ 1.0 FT	
5					BOH @ 3.0 FT.	
6						
7						
8						
9						
10						

CONTRACTOR:

Microseeps

BAKER REP.:

Mark DeJohn

OPERATOR:

Art Carion

BORING NO.:

43-OA-SB02

SHEET 1 OF 1



# TEST BORING RECORD

PROJECT: RI/FS at OU No. 6 - Site 43 - MCAS, New River

CTO NO.: 62470-303

BORING NO.: 43-OA-SB03

COORDINATES: EAST: 2469019.9641

NORTH: 359836.6472

ELEVATION: SURFACE: 4.10

RIG: None used - hand sampled				DATE	PROGRESS (FT)	WEATHER	WATER DEPTH (FT)	TIME
LARGE BORE SAMPLER	SMALL BORE SAMPLER	LINER						
SIZE (DIAM.)	--	1-3/8" OD	1-1/8" ID	3/10/95	0.0 - 3.0	Sunny & cool	0.5	1123
LENGTH	--	2.0'	2.0'					
TYPE	--	Hand	Plastic					

REMARKS:

SAMPLE TYPE	DEFINITIONS
S = Split Spoon      A = Auger T = Shelby Tube      W = Wash R = Air Rotary        C = Core D = Direct Push      P = Piston N = No Sample	PID = Photoionization Detection Meter ppm = parts per million PS = Point Source BG = Background BOH = Bottom of Hole

Depth (ft)	Sample Type and No.	Sample Recovery (ft & %)	Lab ID Number	PID (ppm) PS/BG	Visual Description	Elev.
1	S-0		00	0.1/0.1	SILT, trace clay & fine sand; dark brown; wet	3.60
2	S-1	2.0 100%	01	0.1/0.1	SAND (fine), some silt, trace clay, brown to gray; wet	
3					GROUNDWATER @ 0.5 FT	1.10
4					BOH @ 3.0 FT.	
5						
6						
7						
8						
9						
10						

CONTRACTOR:

Microseeps

BAKER REP.:

Mark DeJohn

OPERATOR:

Art Carion

BORING NO.:

43-OA-SB03

SHEET 1 OF 1

# TEST BORING RECORD

**PROJECT:** RI/FS at OU No. 6 - Site 43 - MCAS, New River  
**CTO NO.:** 62470-303 **BORING NO.:** 43-OA-SB04  
**COORDINATES:** EAST: 2469234.9973 **NORTH:** 359932.7094  
**ELEVATION:** SURFACE: 3.70

RIG: None used - hand sampled				DATE	PROGRESS (FT)	WEATHER	WATER DEPTH (FT)	TIME
	LARGE BORE SAMPLER	SMALL BORE SAMPLER	LINER					
SIZE (DIAM.)	--	1-3/8" OD	1-1/8" ID	3/10/95	0.0 - 3.0	Sunny & cool	1.0	1522
LENGTH	--	2.0'	2.0'					
TYPE	--	Hand	Plastic					

REMARKS:

<b>SAMPLE TYPE</b> S = Split Spoon      A = Auger T = Shelby Tube      W = Wash R = Air Rotary        C = Core D = Direct Push       P = Piston N = No Sample	<b>DEFINITIONS</b> PID = Photoionization Detection Meter ppm = parts per million PS = Point Source BG = Background BOH = Bottom of Hole
--	--

Depth (ft)	Sample Type and No.	Sample Recovery (ft & %)	Lab ID Number	PID (ppm) PS/BG	Visual Description	Elev.	
1	S-0		00 00D	0.3/0.3	SAND (fine), some silt, trace clay; black; moist to wet GROUNDWATER @ 1.0 FT		
2	S-1	1.3 65%	01 01D	0.1/0.1		2.1	1.60
3						3.0	0.70
4					BOH @ 3.0 FT.		
5							
6							
7							
8							
9							
10							

**CONTRACTOR:** Microseeps **BAKER REP.:** Mark DeJohn  
**OPERATOR:** Art Carion **BORING NO.:** 43-OA-SB04 SHEET 1 OF 1

# TEST BORING RECORD

PROJECT: RI/FS at OU No. 6 - Site 43 - MCAS, New River

CTO NO.: 62470-303

BORING NO.: 43-OA-SB05

COORDINATES: EAST: 2469208.2530

NORTH: 359693.1615

ELEVATION: SURFACE: 5.90

RIG: None used - hand sampled				DATE	PROGRESS (FT)	WEATHER	WATER DEPTH (FT)	TIME
LARGE BORE SAMPLER	SMALL BORE SAMPLER	LINER						
SIZE (DIAM.)	--	1-3/8" OD	1-1/8" ID	3/6/95	0.0 - 5.0	Rainy & mild	4.7	1518
LENGTH	--	2.0'	2.0'					
TYPE	--	Hand	Plastic					

REMARKS: Note: (1) Due to rain and humidity, the HNu was not used.

SAMPLE TYPE	DEFINITIONS
S = Split Spoon T = Shelby Tube R = Air Rotary D = Direct Push N = No Sample	PID = Photoionization Detection Meter ppm = parts per million PS = Point Source BG = Background BOH = Bottom of Hole
A = Auger W = Wash C = Core P = Piston	

Depth (ft)	Sample Type and No.	Sample Recovery (ft & %)	Lab ID Number	PID (ppm) PS/BG	Visual Description	Elev.
1	S-0	--	00	(1)	SAND (fine), some silt, little clay, trace coarse sand @ 0-1 ft.; dark brown; damp	
2	S-1	1.9 95%		(1)		
3						
4	S-2	2.0 100%	02 02D	(1)	trace silt & clay; tan to gray moist to wet GROUNDWATER @ 4.7 FT.	
5						5.0
6						
7						
8						
9						
10						

CONTRACTOR: Microseeps

Art Carion

BAKER REP.: Mark DeJohn

OPERATOR: Art Carion

Art Carion

BORING NO.: 43-OA-SB05

43-OA-SB05

SHEET 1 OF 1

# TEST BORING RECORD

PROJECT: Ri/FS at OU No. 6 - Site 43 - MCAS, New River  
 CTO NO.: 62470-303  
 COORDINATES: EAST: 2469026.6403  
 ELEVATION: SURFACE: 6.30

BORING NO.: 43-OA-SB06  
 NORTH: 359555.5930

RIG: None used - hand sampled				DATE	PROGRESS (FT)	WEATHER	WATER DEPTH (FT)	TIME
LARGE BORE SAMPLER	SMALL BORE SAMPLER	LINER						
SIZE (DIAM.)	--	1-3/8" OD	1-1/8" ID	3/6/95	0.0 - 7.0	Rainy & mild	4.0	1424
LENGTH	--	2.0'	2.0'					
TYPE	--	Hand	Plastic					

REMARKS: Note: (1) Due to rain and humidity, the HNu was not used.

SAMPLE TYPE	DEFINITIONS
S = Split Spoon T = Shelby Tube R = Air Rotary D = Direct Push N = No Sample	A = Auger W = Wash C = Core P = Piston
	PID = Photoionization Detection Meter ppm = parts per million PS = Point Source BG = Background BOH = Bottom of Hole

Depth (ft)	Sample Type and No.	Sample Recovery (ft & %)	Lab ID Number	PID (ppm) PS/BG	Visual Description	Elev.
1	S-0	--	00	(1)	SAND (fine), some silt, little clay & roots; dark brown; moist	5.30
2	S-1	0.8 80%		(1)	CLAY, some silt, trace to little fine sand; brown; damp	4.30
3	S-2	1.8 90%	02	(1)	SAND (fine), little silt, trace clay gray; damp	
4					CLAY, trace silt & fine sand; gray; damp	2.80 2.30
5	S-3	2.0 100%		(1)	SAND (fine to coarse), little silt, trace to little clay; gray to brown; sand coarsens w/ depth	
6					wet GROUNDWATER @ 4.0 FT	0.30
7					BOH @ 6.0 FT.	
8						
9						
10						

CONTRACTOR: Microseeps      BAKER REP.: Mark DeJohn  
 OPERATOR: Art Carion      BORING NO.: 43-OA-SB06      SHEET 1 OF 1

# TEST BORING RECORD

PROJECT: RI/FS at OU No. 6 - Site 43 - MCAS, New River  
 CTO NO.: 62470-303  
 COORDINATES: EAST: 2469122.5858  
 ELEVATION: SURFACE: 3.80

BORING NO.: 43-OA-SB07  
 NORTH: 359454.3759

RIG: None used - hand sampled				DATE	PROGRESS (FT)	WEATHER	WATER DEPTH (FT)	TIME
LARGE BORE SAMPLER	SMALL BORE SAMPLER	LINER						
SIZE (DIAM.)	--	1-3/8" OD	1-1/8" ID	3/6/95	0.0 - 3.0	Rainy & mild	4.0	1455
LENGTH	--	2.0'	2.0'					
TYPE	--	Hand	Plastic					

REMARKS: Note: (1) Due to rain and humidity, the HNu was not used.

<p style="text-align: center;"><b>SAMPLE TYPE</b></p> <p>S = Split Spoon      A = Auger                  T = Shelby Tube      W = Wash                  R = Air Rotary      C = Core                  D = Direct Push      P = Piston                  N = No Sample</p>	<p style="text-align: center;"><b>DEFINITIONS</b></p> <p>PID = Photoionization Detection Meter                  ppm = parts per million                  PS = Point Source                  BG = Background                  BOH = Bottom of Hole</p>
--	---

Depth (ft)	Sample Type and No.	Sample Recovery (ft & %)	Lab ID Number	PID (ppm) PS/BG	Visual Description	Elev.
1	S-0	--	00	(1)	SAND (fine), little to some silt, trace to little clay; gray; moist to wet GROUNDWATER @ 1.0 FT.	
2	S-1	1.9 95%		(1)		
3						3.0
4					BOH @ 3.0 FT.	
5						
6						
7						
8						
9						
10						

CONTRACTOR: Microseeps      BAKER REP.: Mark DeJohn  
 OPERATOR: Art Carion      BORING NO.: 43-OA-SB07      SHEET 1 OF 1

# TEST BORING RECORD

PROJECT: RI/FS at OU No. 6 - Site 43 - MCAS, New River

CTO NO.: 62470-303

BORING NO.: 43-WA-SB01

COORDINATES: EAST: 2468958.5349

NORTH: 359759.8173

ELEVATION: SURFACE: 5.30

RIG: Geoprobe 5400				DATE	PROGRESS (FT)	WEATHER	WATER DEPTH (FT)	TIME
	LARGE BORE SAMPLER	SMALL BORE SAMPLER	LINER					
SIZE (DIAM.)	1-3/8" ID	--	1-1/8" ID	2/28/95	0.0 - 5.0	Cloudy & mild	3.0	1517
LENGTH	4.0'	--	4.0'					
TYPE	Piston	--	Plastic					
REMARKS:								
<b>SAMPLE TYPE</b> S = Split Spoon      A = Auger T = Shelby Tube      W = Wash R = Air Rotary      C = Core D = Direct Push      P = Piston N = No Sample				<b>DEFINITIONS</b> PID = Photoionization Detection Meter ppm = parts per million PS = Point Source BG = Background BOH = Bottom of Hole				
Depth (ft)	Sample Type and No.	Sample Recovery (ft & %)	Lab ID Number	PID (ppm) PS/BG	Visual Description		Elev.	
1	D-N		00	0.0/0.0	SAND (fine), some silt, trace clay & roots; dk brown; moist		4.80	
2	S-1	1.6 80%	01	0.0/0.0	SAND (fine), little silt, trace clay; gray; moist			
3								
4	S-2	2.0 100%		0.1/0.1	some silt; tan; wet GROUNDWATER @ 3.0 FT			
5							0.30	
6					BOH @ 5.0 FT			
7								
8								
9								
10								

CONTRACTOR:

Microseeps

BAKER REP.:

Mark DeJohn

OPERATOR:

Art Carion

BORING NO.:

43-WA-SB01

SHEET 1 OF 1

# TEST BORING RECORD

PROJECT: RI/FS at OU No. 6 - Site 43 - MCAS, New River  
 CTO NO.: 62470-303 BORING NO.: 43-WA-SB02  
 COORDINATES: EAST: 2468973.1929 NORTH: 359756.7595  
 ELEVATION: SURFACE: 5.20

RIG: Geoprobe 5400				DATE	PROGRESS (FT)	WEATHER	WATER DEPTH (FT)	TIME
	LARGE BORE SAMPLER	SMALL BORE SAMPLER	LINER					
SIZE (DIAM.)	1-3/8" ID	--	1-1/8" ID	2/28/95	0.0 - 5.0	Cloudy & mild	3.0	1447
LENGTH	4.0'	--	4.0'					
TYPE	Piston	--	Plastic					

REMARKS:

<p style="text-align: center;"><b>SAMPLE TYPE</b></p> <p>             S = Split Spoon      A = Auger              T = Shelby Tube      W = Wash              R = Air Rotary      C = Core              D = Direct Push      P = Piston              N = No Sample         </p>	<p style="text-align: center;"><b>DEFINITIONS</b></p> <p>             PID = Photoionization Detection Meter              ppm = parts per million              PS = Point Source              BG = Background              BOH = Bottom of Hole         </p>
--	---

Depth (ft)	Sample Type and No.	Sample Recovery (ft & %)	Lab ID Number	PID (ppm) PS/BG	Visual Description	Elev.
1	D-N		00	0.2/0.1	SAND (fine), some silt, trace roots; brown; damp	4.20
2	S-1	1.6 80%	01	0.0/0.0	SAND (fine), some silt, trace clay; tan; moist	
3					wet - GROUNDWATER @ 3.0 FT	
4	S-2	2.0 100%		0.0/0.0		
5					SAND (fine), some silt, little gravel, trace clay; tan & brown; wet	0.20
6						
7						
8						
9						
10						

CONTRACTOR: Microseeps BAKER REP.: Mark DeJohn  
 OPERATOR: Art Carion BORING NO.: 43-WA-SB02 SHEET 1 OF 1

# TEST BORING RECORD

PROJECT: RI/FS at OU No. 6 - Site 43 - MCAS, New River  
 CTO NO.: 62470-303 BORING NO.: 43-WA-SB03  
 COORDINATES: EAST: 2468968.6037 NORTH: 359741.6096  
 ELEVATION: SURFACE: 5.40

RIG: Geoprobe 5400				DATE	PROGRESS (FT)	WEATHER	WATER DEPTH (FT)	TIME
	LARGE BORE SAMPLER	SMALL BORE SAMPLER	LINER					
SIZE (DIAM.)	1-3/8" ID	--	1-1/8" ID	2/28/95	0.0 - 5.0	Cloudy & mild	3.0	1552
LENGTH	4.0'	--	4.0'					
TYPE	Piston	--	Plastic					

REMARKS:

<b>SAMPLE TYPE</b> S = Split Spoon      A = Auger T = Shelby Tube      W = Wash R = Air Rotary        C = Core D = Direct Push      P = Piston N = No Sample	<b>DEFINITIONS</b> PID = Photoionization Detection Meter ppm = parts per million PS = Point Source BG = Background BOH = Bottom of Hole
---	--

Depth (ft)	Sample Type and No.	Sample Recovery (ft & %)	Lab ID Number	PID (ppm) PS/BG	Visual Description	Elev.
1	D-N		00	0.1/0.1	SAND (fine), some silt, little clay brown; moist	
2	S-1	1.8 90%	01	0.1/0.1	gray	
3						
4	S-2	1.6 80%		0.0/0.0	trace gravel & clay; gray to brown; wet - GROUNDWATER @ 3.0 FT	
5						5.0
					BOH @ 5.0 FT	0.40
6						
7						
8						
9						
10						

CONTRACTOR: Microseeps BAKER REP.: Mark DeJohn  
 OPERATOR: Art Carion BORING NO.: 43-WA-SB03 SHEET 1 OF 1



# TEST BORING RECORD

**PROJECT:** RI/FS at OU No. 6 - Site 43 - MCAS, New River  
**CTO NO.:** 62470-303 **BORING NO.:** 43-GW01DW  
**COORDINATES:** EAST: 2468953.5616 **NORTH:** 359747.0027  
**ELEVATION:** SURFACE: 7.43

RIG: Geoprobe 5400				DATE	PROGRESS (FT)	WEATHER	WATER DEPTH (FT)	TIME
	LARGE BORE SAMPLER	SMALL BORE SAMPLER	LINER					
SIZE (DIAM.)	1-3/8" ID	--	1-1/8" ID	2/28/95	0.0 - 5.0	Cloudy & mild	3.0	1620
LENGTH	4.0'	--	4.0'					
TYPE	Piston	--	Plastic					

REMARKS:

<b>SAMPLE TYPE</b> S = Split Spoon      A = Auger T = Shelby Tube      W = Wash R = Air Rotary      C = Core D = Direct Push      P = Piston N = No Sample	<b>DEFINITIONS</b> PID = Photoionization Detection Meter ppm = parts per million PS = Point Source BG = Background BOH = Bottom of Hole
---	--

Depth (ft)	Sample Type and No.	Sample Recovery (ft & %)	Lab ID Number	PID (ppm) PS/BG	Visual Description	Elev.
1	D-N		00	0.1/0.1	SAND (fine), some silt, little clay brown; moist	
2	S-1	1.8 90%	01	0.1/0.1	gray	
3						
4	S-2	1.7 85%		0.1/0.1	tan; wet GROUNDWATER @ 3.0 FT	
5						5.0
					BOH @ 5.0 FT	2.43
6						
7						
8						
9						
10						

**CONTRACTOR:** Microseeps **BAKER REP.:** Mark DeJohn  
**OPERATOR:** Art Carion **BORING NO.:** 43-GW01DW SHEET 1 OF 1

**APPENDIX B**  
**TEST BORING AND WELL CONSTRUCTION RECORDS**

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# TEST BORING AND WELL CONSTRUCTION RECORD

PROJECT: RI/FS at OU No. 6 - Site 43 MCAS, New River  
 CTO NO.: 62470-303 BORING NO.: 43-PZ01  
 COORDINATES: EAST: 2458651.7147 NORTH: 359455.7106  
 ELEVATION: SURFACE: 7.05 TOP OF PVC CASING: 7.47

<b>RIG:</b> Geoprobe 5400					DATE	PROGRESS (FT.)	WEATHER	WATER DEPTH (FT.)	TIME
	LARGE BORE SAMPLER	LINER	AUGERS	CORE BARREL					
SIZE (DIAM.)	1-3/8" ID	1-1/8" ID			4/11/95	0.0-10.5	Cloudy, 70s	—	—
LENGTH	4.0'	4.0'							
TYPE	Piston	Plastic							
HAMMER WT.	NA								
FALL	NA								
STICK UP									

REMARKS: Piezometer construction consists of PVC screen and riser.

<u>SAMPLE TYPE</u>		Well Information	Diam.	Type	Top Depth (ft.)	Bottom Depth (ft.)
S = Split Spoon T = Shelby Tube R = Air Rotary D = Denison N = No Sample	A = Auger W = Wash C = Core P = Piston	Riser	1.0"	Schedule 40 PVC	+3.0	-0.6
		Screen	1.0"	Schedule 40 0.01 Slot	-0.6	-10.6

Depth (ft.)	Samp. Type and No.	Samp. Rec. (ft. & %)	SPT or RQD	Lab Class. or Pen. Rate	PID (ppm) PS/BG	Visual Description	Well Installation Detail	Elevation (ft. MSL)
1	S-0	1.7 85%			0.7/0.7	SILT, some fine sand, little organics; damp; brown 0.3'	#7 Top of Screen 20.6' #8	
2						FINE SAND, little to some silt; moist; lt. gray with ten laminants wet @ 2.0'		
3	S-1	1.7 85%			0.7/0.7			
4								
5	S-2	2.0 100%			0.6/0.6			
6						FINE and MEDIUM SAND, little to some silt; wet; tan 5.5'		
7	S-3	1.3 65%			0.6/0.6			
8								
9	S-4	1.6 80%			0.6/0.6	FINE and MEDIUM SAND, some silt, trace fine gravel; wet; orangish-tan 8.0'		
10						FINE SAND, some silt; wet; lt. gray 9.7'		
						SILT and FINE SAND, trace to little clay; damp to moist; orangish-tan Match to Sheet 2		

DRILLING CO.: Microseeps, Inc. BAKER REP.: Dave Gaviglia  
 DRILLER: Art Carion BORING NO.: 43-PZ01 SHEET 1 OF 2



# TEST BORING AND WELL CONSTRUCTION RECORD

PROJECT: RI/FS at OU No.6 - Site 43 MCAS, New River  
 CTO NO.: 62470-303 BORING NO.: 43-PZ01

<b>SAMPLE TYPE</b>						<b>DEFINITIONS</b>		
S = Split Spoon		A = Auger		<b>SPT</b> = Standard Penetration Test (ASTM D-1586)(Blows/0.5') <b>RQD</b> = Rock Quality Designation (%) <b>Lab. Class.</b> = USCS (ASTM D-2487) or AASHTO (ASTM D-3282) <b>Lab. Moist.</b> = Moisture Content (ASTM D-2216) Dry Weight Basis				
T = Shelby Tube		W = Wash						
R = Air Rotary		C = Core						
D = Denison		P = Piston						
N = No Sample								
Depth (ft.)	Samp. Type and No.	Samp. Rec. (ft. & %)	SPT or RQD	Lab Class. or Pen. Rate	PID (ppm)	Visual Description	Well Installation Detail	Elevation (ft. MSL)
11						Continued from Sheet 1 End of Boring @ 10.5'	*3	Bottom of Well @ 10.5'
12								
13								
14								
15								
16								
17								
18								
19								
20								
21								
22								
23								
24								
25								
26								
27								
28								
29								
30								

DRILLING CO.: Microseeps, Inc. BAKER REP.: Dave Gaviglia  
 DRILLER: Art Carion BORING NO.: 43-PZ01 SHEET 2 OF 2

## TEST BORING AND WELL CONSTRUCTION RECORD

PROJECT: RI/FS at 0U No. 6 - Site 43 MCAS, New River  
 S.O. NO.: 62470-303 BORING NO.: 43-GW01DW  
 COORDINATES: EAST: 2468953.5616 NORTH: 359747.0027  
 ELEVATION: SURFACE: \_\_\_\_\_ TOP OF STEEL CASING: 7.43  
 PVC

RIG: <u>B-80 Mobile Rig</u>									
	SPLIT SPOON	CASING	AUGERS	BIT CORE BARREL SIZE	DATE	PROGRESS (FT)	WEATHER	WATER DEPTH (FT)	TIME
SIZE (DIAM.)	2"	6"		10"/6"	3/12/95	0.0-38.0	Sunny, 70s	—	—
LENGTH	2'	36'			3/13/95	38.0-62.0	Sunny, 70s	—	—
TYPE	STD	Steel		Rotary					
HAMMER WT.	140#								
FALL	30"								
STICK UP									

REMARKS: \* Composite Geotech sample collected from 0' to 8'; Shelby tube sample @ 36' to 37.5'

SAMPLE TYPE		WELL INFORMATION	DIAM	TYPE	TOP DEPTH (FT)	BOTTOM DEPTH (FT)
S = Split Spoon	A = Auger	Well Casing	2" ID	PVC Threaded	+ 2.0	- 56.0
T = Shelby Tube	W = Wash	Well Screen	2" ID	PVC Slotted	- 56.0	- 61.0
R = Air Rotary	C = Core					
D = Denison	P = Piston					
N = No Sample						

Depth (Ft.)	Sample Type and No.	Samp. Rec. Ft. & %	SPT or RQD	Lab. Class. or Pen. Rate	PID (ppm)	Visual Description	Well Installation Detail	Elevation
1	S-1*	1.5 / 2.0	4		0.0	SILT and FINE SAND, trace clay and organics; damp; brown to lt. brown	Cement/Bentonite Grout	
2		75%	5					
3	S-2*	1.2 / 2.0	8		0.0	FINE SAND, little to some silt; wet; lt. gray	6" steel casing	
4		60%	5					
5	S-3*	1.2 / 2.0	5		0.0	FINE SAND and SILT, trace clay; wet; tan		
6		60%	6					
7	S-4*	1.2 / 2.0	12		0.0	FINE and MEDIUM SAND, some coarse sand and silt, little fine gravel, trace coarse gravel; wet; tan, lt. brown	PVC riser pipe, 2" ID, Sch. 40, flush joint threaded	
8		60%	11					
9	R-N							
10								

DRILLING CO.: Hardin Huber Incorporated  
 DRILLER: Jay Corron

BAKER REP.: Dave Gaviglia  
 BORING NO.: 43-GW01DW SHEET 1 OF 4

## TEST BORING AND WELL CONSTRUCTION RECORD

PROJECT: R1/FS at OU No.6 - Site 43 MCAS, New River

S.O. NO.: 62470-303

BORING NO.: 43-GW01DW

SAMPLE TYPE						DEFINITIONS		
S = Split Spoon	A = Auger				SPT = Standard Penetration Test (ASTM D-1586) (Blows/0.5')			
T = Shelby Tube	W = Wash				RQD = Rock Quality Designation (%)			
R = Air Rotary	C = Core				Lab. Class. = USCS (ASTM D-2487) or AASHTO (ASTM D-3282)			
D = Denison	P = Piston				Lab. Moist. = Moisture Content (ASTM D-2216) Dry Weight Basis			
N = No Sample								
Depth (Ft.)	Sample Type and No.	Samp. Rec. (Ft. & %)	SPT or RQD	Lab. Class. or Pen. Rate	PID Lab. Moist. % (ppm)	Visual Description	Well Installation Detail	Elevation
11	S-5	1.7 2.0 85%	2 2 2		0.0	FINE SAND and CLAYEY SILT; damp; lt. gray with tan silty laminants		
12								
13	R-N						6" steel casing	
14								
15						Dark tan @ approx. 15'		
16	S-6	1.8 2.0 90%	1 2 3		0.0			
17								
18	R-N							
19								
20							PVC riser pipe, 2" ID, Sch. 40, flush joint threaded	
21	S-7	1.8 2.0 90%	4 9 12 14		0.0	SILTY CLAY, some shell fragments, little to some fine sand; damp; lt. gray to white		
22						CLAYEY SILT, little to some fine sand; wet; brown		
23	R-N						Cement/Bentonite Grout	
24								
25								
26	S-8	1.8 2.0 90%	10 10 15 18		0.0	FINE to MEDIUM SAND, some silt and shell fragments; wet; lt. gray; partial cementation		
27								
28	R-N							
29								
30								

DRILLING CO.: Hardin Huber Incorporated  
 DRILLER: Jay Corron

BAKER REP.: Dave Gaviglia  
 BORING NO.: 43-GW01DW SHEET 2 OF 4

## TEST BORING AND WELL CONSTRUCTION RECORD

PROJECT: RI/FS at OUNo. 6-site 43 MCAS, New River

S.O. NO.: 62470-303

BORING NO.: 43-GW01DW

SAMPLE TYPE						DEFINITIONS		
S = Split Spoon	A = Auger				SPT = Standard Penetration Test (ASTM D-1586) (Blows/0.5')			
T = Shelby Tube	W = Wash				RQD = Rock Quality Designation (%)			
R = Air Rotary	C = Core				Lab. Class. = USCS (ASTM D-2487) or AASHTO (ASTM D-3282)			
D = Denison	P = Piston				Lab. Moist. = Moisture Content (ASTM D-2216) Dry Weight Basis			
N = No Sample								
Depth (Ft.)	Sample Type and No.	Samp. Rec. (Ft. & %)	SPT or RQD	Lab. Class. or Pen. Rate	PID (ppm)	Visual Description	Well Installation Detail	Elevation
31	S-9	1.3 2.0 65%	13 16 22 29		0.0	FINE to MEDIUM SAND, some silt and shell fragments; wet; lt. gray; partial cementation	Cement/Bentonite Grout	
2								Bentonite Slurry into steel casing
3	S-10	1.0 2.0 50%	9 12 13 14		0.0			
4						FINE SAND and SILT, trace to little clay, trace shell fragments; damp; greenish-gray		33.5'
35	S-11	1.9 2.0 95%	7 7 8 9		0.0	FINE SAND and SILT, little to some silty clay; damp; greenish-gray		34.0'
6							6" steel casing 236"	
7	T-12	1.5 1.5 100%	—		0.0			
8	R-N							
9	S-13	1.5 2.0 75%	9 7 9 9		0.0		PVC riser pipe, 2" ID, Sch. 40, flush joint threaded	
40							#7	
1	S-14	2.0 2.0 100%	6 9 15 16		0.0		#2	
2							#2	
3	S-15	1.2 2.0 60%	6 7 9 10		0.0		Bentonite slurry	
4								
45	S-16	2.0 2.0 100%	7 11 14 19		0.0	FINE SAND and SILT, little silty clay and medium sand; damp; greenish-gray		45.3'
6								46.6'
7	S-17	2.0 2.0 100%	15 13 32		0.0	FINE SAND and SILT, trace to little silty clay, trace to little shell fragments; damp; lt. greenish-gray		
8								
9	S-18	1.5 2.0 75%	14 18 24 38		0.0	CLAYEY SILT, some fine sand and shell fragments; moist; lt. gray; trace cementation		48.9'
50							#2	50.0'
							#2	Top of Bentonite Pellets 249"

DRILLING CO.: Hardin Huber Incorporated

BAKER REP.: Dave Gaviglia

DRILLER: Jay Corran

BORING NO.: 43-GW01DW

SHEET 3 OF 4

## TEST BORING AND WELL CONSTRUCTION RECORD

PROJECT: R1/FS at OU No. 6 - Site 43 MCAS, New River

S.O. NO.: 62470-303

BORING NO.: 43-GW01DW

SAMPLE TYPE						DEFINITIONS			
S = Split Spoon	A = Auger					SPT = Standard Penetration Test (ASTM D-1586) (Blows/0.5')			
T = Shelby Tube	W = Wash					RQD = Rock Quality Designation (%)			
R = Air Rotary	C = Core					Lab. Class. = USCS (ASTM D-2487) or AASHTO (ASTM D-3282)			
D = Denison	P = Piston					Lab. Moist. = Moisture Content (ASTM D-2216) Dry Weight Basis			
N = No Sample									
Depth (Ft.)	Sample Type and No.	Samp. Rec. (Ft. & %)	SPT or RQD	Lab. Class. or Pen. Rate	PID (ppm)	Visual Description	Well Installation Detail		Elevation
51	S-19	1.4 1.8 77%	14 17 38 50/3		0.0	FINE and MEDIUM SAND, some shell fragments, little silt; trace cementation; wet; lt. gray - gray partial cementation from 52' to 52.8'	#2	#2	Bentonite Pellets
51.8									
2	R-N							#7	
3	S-20	0.7 0.8 88%	28 50/3		0.0				PVC riser pipe, 2" ID, Sch. 40, flush joint threaded
4									
55							#5	#5	Top of screen @ 56'
6	R-N								PVC well screen, 2" ID, Sch. 40, flush joint threaded
7									
8								#8	
9									
60									Bottom of Well @ 61'
1									
2	62.0					62.0'	#5		62.0'
3						End of Boring @ 62.0'			
4									
65									
6									
7									
8									
9									
70									

DRILLING CO.: Hardin Huber Incorporated

DRILLER: Jay Corran

BAKER REP.: Dave Gaviglia

BORING NO.: 43-GW01DW



## TEST BORING AND WELL CONSTRUCTION RECORD

PROJECT: RI/FS at OU NO. 6 - Site 43 - MCAS, New River  
 CTO NO.: 62470-303 BORING NO.: 43-GW04  
 COORDINATES: EAST: 2468548.6426 NORTH: 359668.3892  
 ELEVATION: SURFACE: \_\_\_\_\_ TOP OF PVC CASING: 9.03

RIG: # <u>R40</u>					DATE	PROGRESS (FT.)	WEATHER	WATER DEPTH (FT.)	TIME
Post # 2 PP 10, 11, 13	SPLIT SPOON	CASING	AUGERS	CORE BARREL					
SIZE (DIAM.)	1-3/8"		4 1/4" ID		3-23-95	0-17.0	Clear, Cool (50's)	3.0	
LENGTH	2.0		5.0'						
TYPE	Std.		HSA						
HAMMER WT.	140 lbs.								
FALL	30"								
STICK UP									

REMARKS: Borehole continuously sampled to 16.0' (bgs). Borehole drilled out to 17.0' (bgs). Type II monitoring well set 3-23-95. H2O2 background = .2ppm.

SAMPLE TYPE		Well Information	Diam.	Type	Top Depth (ft.)	Bottom Depth (ft.)
S = Split Spoon	A = Auger	Riser	2.0"	Schedule 40 PVC	+2.5'	1.0' (bgs)
T = Shelby Tube	W = Wash					
R = Air Rotary	C = Core					
D = Denison	P = Piston	Screen	2.0"	Schedule 40 0.01 Slot	1.0' (bgs)	16.0' (bgs)
N = No Sample						

Depth (ft.)	Samp. Type and No.	Samp. Rec. (ft. & %)	SPT or RQD	Lab ID No.	PID (ppm)	Visual Description	Well Installation Detail	Elevation (ft. MSL)
1	S-1	1.6 2.0	2		.2	SILTY SAND, fine grained. Dark brown to brown, loose, damp to moist	<p>Bentonite Pellets PVC riser Sand pack Well screen</p>	
2		80%						
3	S-2	1.6 2.0	5		.2	SAND, fine to very fine grained w/ trace SILT. Light brown to buff w/ oxidation (orange medium dense, moist/wet		
4		80%						
5	S-3	1.2 2.0	5		.2	SAND, fine grained w/ trace SILT. Light brown to buff w/ oxidation (orange & yellow) staining, loose to medium dense, wet		
6		60%						
7	S-4	1.8 2.0	1	2	.2	SAND, fine to medium grained w/ trace SILT. Buff, loose, wet		
8		90%						
9	S-5	1.9 2.0	1	2	.2	SAND, fine to medium grained w/ trace SILT. Buff, loose, wet		
10		95%						

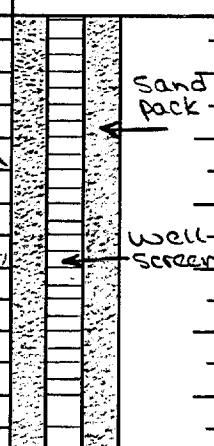
Match to Sheet 2

DRILLING CO.: Hardin-Huber, Inc. BAKER REP.: J. E. Zimmerman  
 DRILLER: R. Keenan BORING NO.: 43-GW04 SHEET 1 OF 2

## TEST BORING AND WELL CONSTRUCTION RECORD

PROJECT: RI/FS at OU No. 6 - Site 43 - MCAS, New River  
 CTO NO.: 62470-303

BORING NO.: 43-GW04

SAMPLE TYPE						DEFINITIONS		
S = Split Spoon		A = Auger		SPT = Standard Penetration Test (ASTM D-1586)(Blows/0.5')				
T = Shelby Tube		W = Wash		RQD = Rock Quality Designation (%)				
R = Air Rotary		C = Core		PID = Photoionization Detector				
D = Denison		P = Piston		ppm = parts per million				
N = No Sample								
Depth (ft.)	Samp. Type and No.	Samp. Rec. (ft. & %)	SPT or RQD	Lab ID No.	PID (ppm)	Visual Description	Well Installation Detail	Elevation (ft. MSL)
11	S-6	1.7	1		.2	Continued from Sheet 1 SAND, fine grained w/ trace SILT. Brown w/oxidation (orange) staining loose to very loose wet		
12		2.0	3		.2			
13	S-7	1.9	1		.2			
14		2.0	2		.2			
15	S-8	1.8	wash		.2			
16		2.0	6"		.2			
17	AN	-	-		-			
18						End of Boring		
19						TD: 17.0' (bgs).		
20								
21								
22								
23								
24								
25								
26								
27								
28								
29								
30								

DRILLING CO.: Hardin-Huber, Inc.

BAKER REP.: J.E. Zimmerman

DRILLER: R. Keenan

BORING NO.: 43-GW04

SHEET 2 OF 2

**Baker**

Baker Environmental, Inc.

**TEST BORING AND WELL CONSTRUCTION RECORD**PROJECT: R1/FS at OU No. 6 - Site 43 MCAS, New RiverS.O. NO.: 62470-303BORING NO.: 43-GW04DWCOORDINATES: EAST: 2468585.1235NORTH: 359677.8256

ELEVATION: SURFACE: \_\_\_\_\_

TOP OF STEEL CASING: 7.84

PVC

RIG: B-80 Mobile Rig					DATE	PROGRESS (FT)	WEATHER	WATER DEPTH (FT)	TIME
SPLIT SPOON	CASING	AUGERS	BIT CORE BARREL SIZE						
SIZE (DIAM.)	2"	6"		10"/6"	3/10/95	0.0-41.0	Sunny, 50s	—	—
LENGTH	2'	41'			3/11/95	41.0-65.0	Sunny, 60s	—	—
TYPE	STD	Steel		Rotary					
HAMMER WT.	140#								
FALL	30°								
STICK UP									

## REMARKS:

SAMPLE TYPE		WELL INFORMATION	DIAM	TYPE	TOP DEPTH (FT)	BOTTOM DEPTH (FT)
S = Split Spoon	A = Auger	Well Casing	2" ID	PVC Threaded	+2.0	-59.0
T = Shelby Tube	W = Wash					
R = Air Rotary	C = Core					
D = Denison	P = Piston	Well Screen	2" ID	PVC Slotted	-59.0	-64.0
N = No Sample						

Depth (Ft.)	Sample Type and No.	Samp. Rec. Ft. & %	SPT or RQD	Lab. Class. or Pen. Rate	PID (ppm)	Visual Description	Well Installation Detail	Elevation
1	S-1	1.0	2		0.0	SILT and FINE SAND, trace clay and organics; wet; dark brown to brown	Cement/Bentonite Grout	
2		2.0	3					
3	R-N	50%	1			FINE SAND and SILT, trace clay; wet; tan	6" steel casing	
4								
5								
6	S-2	1.2	14		0.0		PVC riser pipe, 2" ID, Sch. 40, flush joint threaded	
7		2.0	7					
8	R-N	60%	8					
9								
10								

DRILLING CO.: Hardin Huber IncorporatedBAKER REP.: Dave GravigliaDRILLER: Jay CarronBORING NO.: 43-GW04DWSHEET 1 OF 4

## TEST BORING AND WELL CONSTRUCTION RECORD

PROJECT: RI/FS at OU No.6 - Site 43 MCAS, New River

S.O. NO.: 62470-303

BORING NO.: 43-GW04DW

SAMPLE TYPE						DEFINITIONS		
S = Split Spoon	A = Auger				SPT = Standard Penetration Test (ASTM D-1586) (Blows/0.5')			
T = Shelby Tube	W = Wash				RQD = Rock Quality Designation (%)			
R = Air Rotary	C = Core				Lab. Class. = USCS (ASTM D-2487) or AASHTO (ASTM D-3282)			
D = Denison	P = Piston				Lab. Moist. = Moisture Content (ASTM D-2216) Dry Weight Basis			
N = No Sample								
Depth (Ft.)	Sample Type and No.	Samp. Rec. (Ft. & %)	SPT or RQD	Lab. Class. or Pen. Rate	PID Lab. Moist. % (ppm)	Visual Description	Well Installation Detail	Elevation
11	S-3	1.8	1		0.0	FINE to MEDIUM SAND, trace silt; wet; tan		
12		2.0	1			10.8'		
		90%	2			FINE SAND and CLAYEY SILT; damp; bluish-green		
13	R-N						6" steel casing	
14								
15								15.0'
16	S-4	2.0	2		0.0	FINE SAND and CLAYEY SILT; moist; tan to lt. brown		
17		2.0	1			15.2'		
		100%	1			FINE SAND and CLAYEY SILT; damp; Olive-dark gray		
18	R-N						PVC riser pipe, 2" ID, Sch. 40, flush joint threaded	
19								
20						lt. gray @ 20.0'		
21	S-5	1.8	1		0.0			
22		2.0	3			20.9'		
		90%	12			FINE SAND and SILTY CLAY, some shell fragments; partially cemented; damp; lt. gray		
23	R-N						Cement/Bentonite Grout	
24								
25								25.0'
26	S-6	1.6	22			FINE SAND and CLAYEY SILT, some shell fragments; partially cemented; wet; lt. gray		
27		2.0	25					
		80%	28					
28	R-N		14					
29								
30								30.0'

DRILLING CO.: Hardin Huber Incorporated  
 DRILLER: Jay Corron

BAKER REP.: Dave Gaviglia  
 BORING NO.: 43-GW04DW SHEET 2 OF 4

## TEST BORING AND WELL CONSTRUCTION RECORD

PROJECT: R1/FS at OU No. 6 - Site 43 MCAS, New River  
 S.O. NO.: 62470-303 BORING NO.: 43-GW04DW

SAMPLE TYPE						DEFINITIONS		
S = Split Spoon	A = Auger					SPT = Standard Penetration Test (ASTM D-1586) (Blows/0.5')		
T = Shelby Tube	W = Wash					RQD = Rock Quality Designation (%)		
R = Air Rotary	C = Core					Lab. Class. = USCS (ASTM D-2487) or AASHTO (ASTM D-3282)		
D = Denison	P = Piston					Lab. Moist. = Moisture Content (ASTM D-2216) Dry Weight Basis		
N = No Sample								
Depth (Ft.)	Sample Type and No.	Samp. Rec. (Ft. & %)	SPT or RQD	Lab. Class. or Pen. Rate	PID (ppm)	Visual Description	Well Installation Detail	Elevation
31	S-7	1.6 2.0 80%	16 18 19 20		0.0	FINE SAND and CLAYEY SILT, some shell fragments; partially cemented; wet; lt. gray	Cement/Bentonite Grout	
2							PVC riser pipe, 2" ID, Sch. 40; flush joint threaded	
3	S-8	1.7 2.0 85%	14 16 17		0.0			
4								
35	S-9	1.6 2.0 80%	15 19 22 24		0.0			
6								
7	S-10	1.6 2.0 80%	18 19 20 22		0.0	Increased silty clay content @ 37'	Bentonite Slurry into Steel Casing	
8								
9	S-11	1.6 2.0 80%	12 15 17 19		0.0	FINE SAND, some silt, trace to little silty clay; damp; greenish-gray		
40								
1	S-12	1.0 1.0 100%	6 7		0.0		6" steel Casing @ 41'	
2	S-13	1.8 2.0 90%	6 8 9 11		0.0			
3						Shell fragments @ 43.3' (.05')		
4	S-14	1.9 2.0 95%	8 8 32 35		0.0	FINE SAND, some silt, trace to little silty clay and shell fragments; damp; greenish-gray		
45								
6	S-15	2.0 2.0 100%	6 8 14 19		0.0	FINE SAND, little to some med. sand and silt, trace to little silty clay, trace shell fragments; damp to moist; Cemented sand and shell fragments @ 46.7'	Bentonite Slurry	
7								
8	S-16	1.8 2.0 90%	6 8 12 13		0.0			
9								
50	S-17	1.9 1.9 100%	4 12 50/4		0.0	FINE SAND and CLAYEY SILT, little shell fragments; partial cementation; damp; greenish-gray	Top of Bentonite Pellets @ 49'	

DRILLING CO.: Hardin Huber Incorporated  
 DRILLER: Jay Corron

BAKER REP.: Dave Gaviglia  
 BORING NO.: 43-GW04DW SHEET 3 OF 4

## TEST BORING AND WELL CONSTRUCTION RECORD

PROJECT: RI/FS at OU No. 6 - Site 43 MCAS, New River

S.O. NO.: 62470-303

BORING NO.: 43-GW04DW

SAMPLE TYPE						DEFINITIONS			
S = Split Spoon	A = Auger					SPT = Standard Penetration Test (ASTM D-1586) (Blows/0.5')			
T = Shelby Tube	W = Wash					RQD = Rock Quality Designation (%)			
R = Air Rotary	C = Core					Lab. Class. = USCS (ASTM D-2487) or AASHTO (ASTM D-3282)			
D = Denison	P = Piston					Lab. Moist. = Moisture Content (ASTM D-2216) Dry Weight Basis			
N = No Sample									
Depth (Ft.)	Sample Type and No.	Samp. Rec. (Ft. & %)	SPT or RQD	Lab. Class. or Pen. Rate	PID (ppm)	Visual Description	Well Installation Detail		Elevation
51	50.9 51.0 R-N					Continued from Page 3			
2	52.2 S-18	1.2 1.2 100%	17 22 50/2		0.0	CLAYEY SILT, some fine sand, little shell fragments; partial cementation; damp; lt. gray	#2	#2	Bentonite Pellets
3	53.0 R-N								PVC riser pipe, 2" ID, Sch. 40, flush joint threaded
3	53.15 S-19	0.1 0.15 66%	59/15		0.0				
4	R-N							#1	
55	55.0								Top of #1 Sand @ 55'
55	55.4 S-20	0.4 0.2 100%	100/4		0.0	FINE and MEDIUM SAND, some shell fragments, little to some silt; wet; lt. gray			
6									
7									
8									
9							#5	#5	Top of Screen @ 59'
60	R-N								PVC well screen, 2" ID, Sch. 40, flush joint threaded
1								#8	
2									
3									
4									Bottom of Well @ 64'
65	65.0							#5	65.0'
						End of Boring @ 65.0'			
6									
7									
8									
9									
70									

DRILLING CO.: Hardin Huber Incorporated

DRILLER: Jay Corron

BAKER REP.: Dave Gaviglia

BORING NO.: 43-GW04DW

SHEET 4 OF 4

**APPENDIX C**  
**EXPLORATORY TEST PIT RECORDS**

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# TEST PIT RECORD

Project: R1/FS at OU No. 6- Site 43 CTO No.: 303  
 Test Pit No.: 43-TP01 Date: April 20, 1995 Weather: Sunny & Warm  
 Endpoint Coordinates: North: 359741.7896 North: 359755.5573  
 East: 2468866.8044 East: 2468850.7773  
 Elevation: 8.00 Elevation: 7.30  
 Contractor: HHI Equipment: Backhoe Baker Rep.: DeJohn, Trebilcock  
Herbst

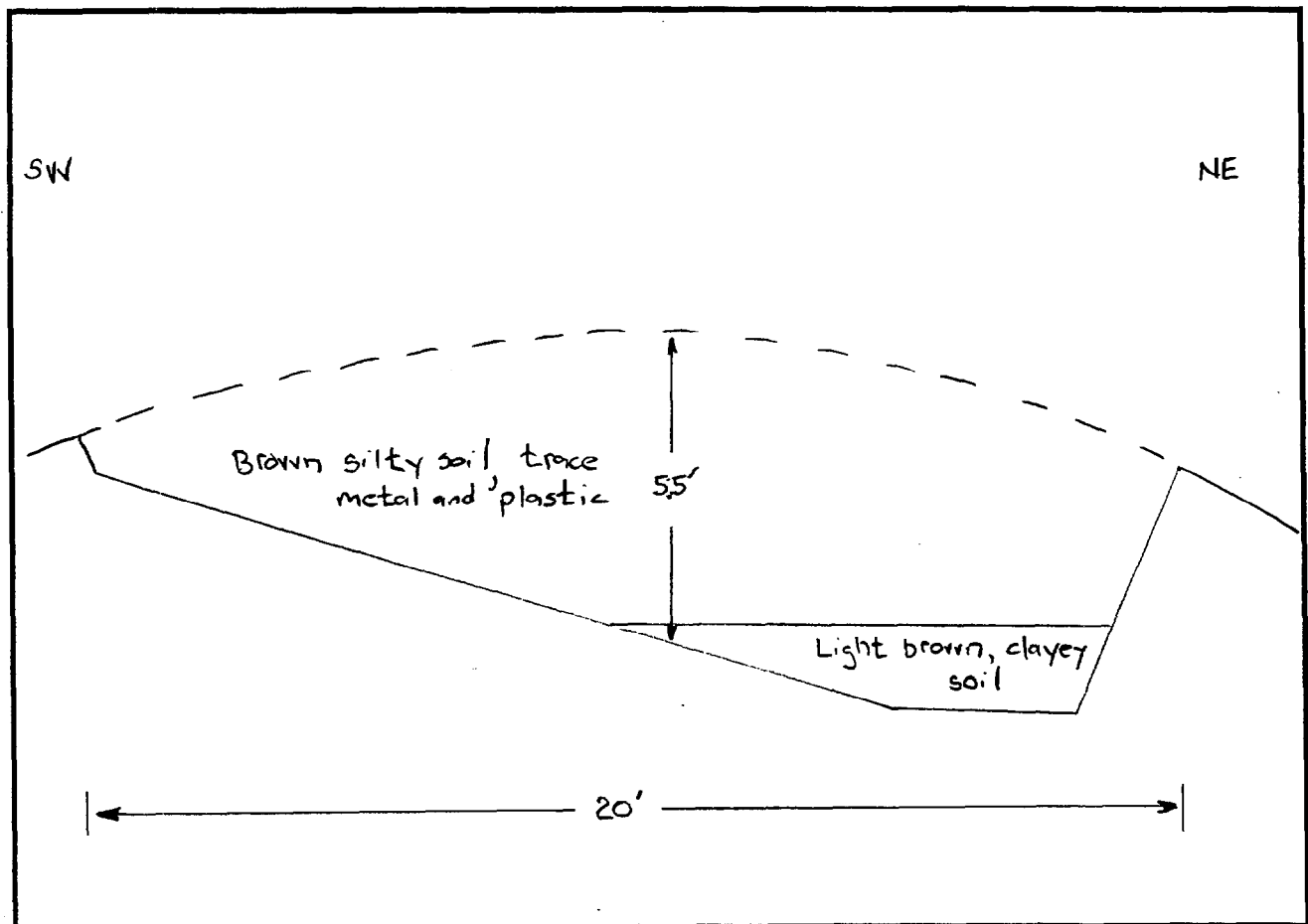
## AIR MONITORING

Time	PID (PS/BG)	FID (PS/BG)	Source
1042	0.4/0.4	1.0/1.0	Soil from pit
1052	0.3/0.3	1.0/1.0	Soil from pit

## Definitions

PID = Photo Ionization Detector  
 FID = Flame Ionization Detector  
 PS = Point Source (in ppm)  
 BG = Background (in ppm)

## TEST PIT CROSS SECTION





# TEST PIT RECORD

Project: RI/FS at OU No. 6 - Site 43 CTO No.: 303

Test Pit No.: 43-TP02 Date: April 20, 1995

Weather: Sunny & Warm

Endpoint Coordinates: North: 359767.7069

North: 359781.6559

East: 2468917.9614

East: 2468904.1420

Elevation: 7.60

Elevation: 8.10

Contractor: HHI Equipment: Backhoe

Baker Rep.: DeJohn, Trebilcock,  
Herbst

## AIR MONITORING

Time	PID (PS/BG)	FID (PS/BG)	Source
1130	0.3/0.3	1.4/1.3	Soil from pit
1140	0.2/0.2	1.4/1.4	Soil from pit
1150	0.3/0.3	1.4/1.3	Soil from pit

## Definitions

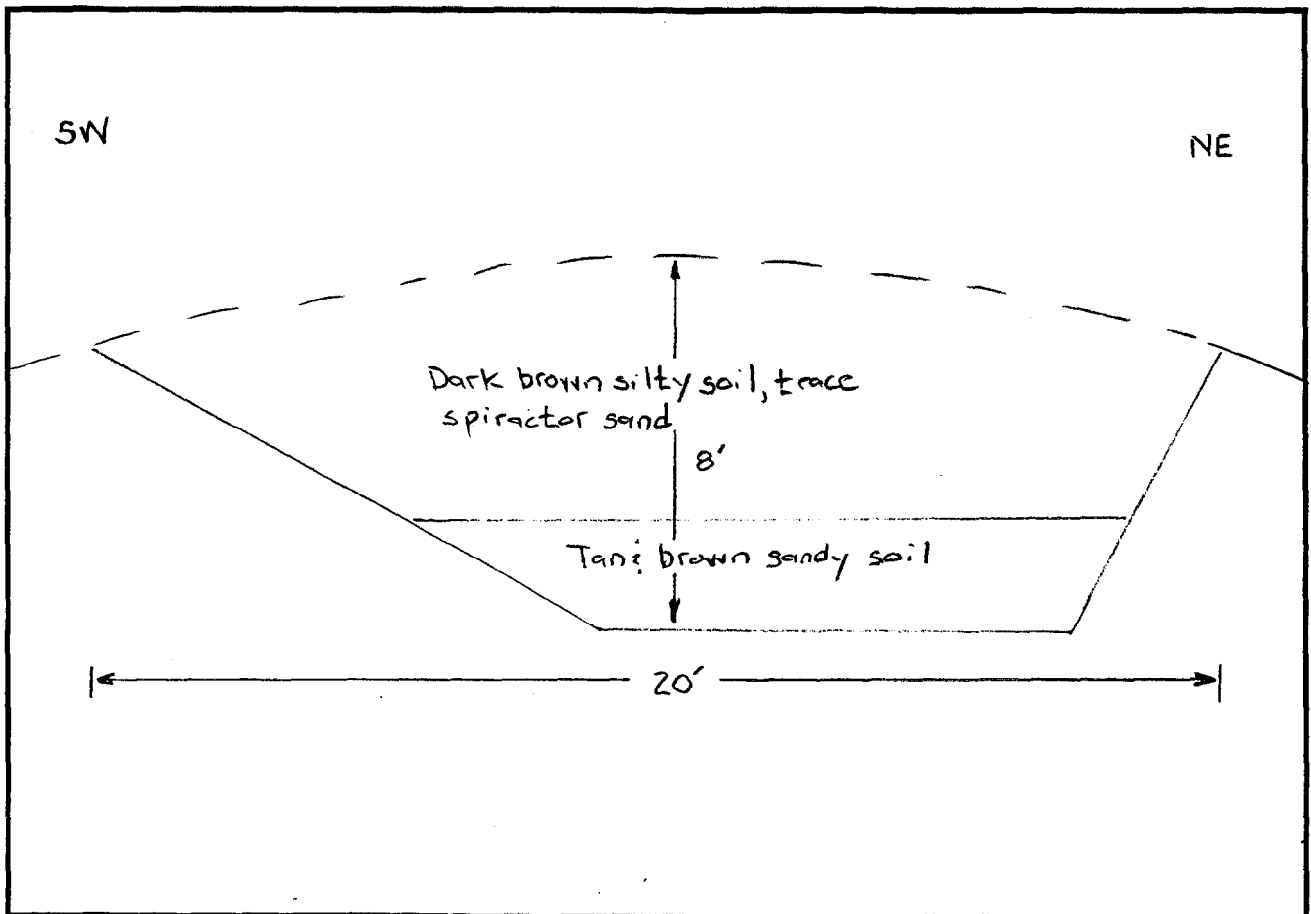
PID = Photo Ionization Detector

FID = Flame Ionization Detector

PS = Point Source (in ppm)

BG = Background (in ppm)

## TEST PIT CROSS SECTION



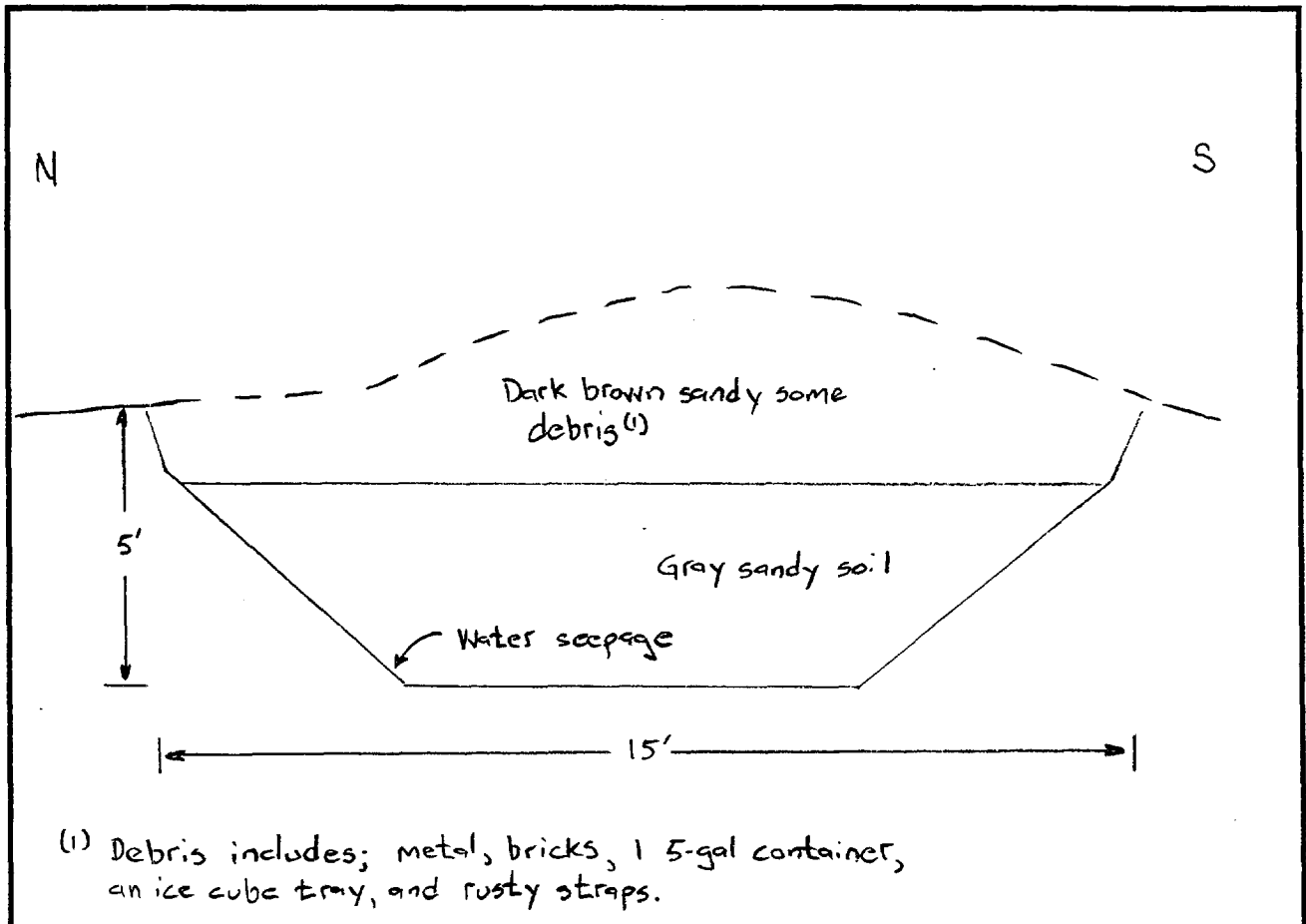
# TEST PIT RECORD

Project: RI/FS at OU No. 6 - site 43 CTO No.: 303  
 Test Pit No.: 43-TP03 Date: April 20, 1995 Weather: Sunny; Hot  
 Endpoint Coordinates: North: 359904.2376 North: 359918.9033  
 East: 2469008.4117 East: 2468998.8181  
 Elevation: 5.30 Elevation: 4.50  
 Contractor: HHI Equipment: Backhoe Baker Rep.: DeJohn, Treb. Kock,  
Herbst

## AIR MONITORING

Time	PID (PS/BG)	FID (PS/BG)	Source	Definitions
1458	0.7/0.7	0.5/0.5	Soil from pit	PID = Photo Ionization Detector
1508	0.4/0.4	0.4/0.4	Soil from pit	FID = Flame Ionization Detector
				PS = Point Source (in ppm)
				BG = Background (in ppm)

## TEST PIT CROSS SECTION



# TEST PIT RECORD

Project: RI/FS at OU No. 6 - Site 43 CTO No.: 303

Test Pit No.: 43-TP04 Date: April 20, 1995

Weather: Sunny & Hot

Endpoint Coordinates: North: 359846.7254

North: 359861.7578

East: 2469022.6988

East: 2469010.9169

Elevation: 4.80

Elevation: 6.10

Contractor: HHI Equipment: Backhoe

Baker Rep.: DeJahn, Trebilcock,  
Herbst

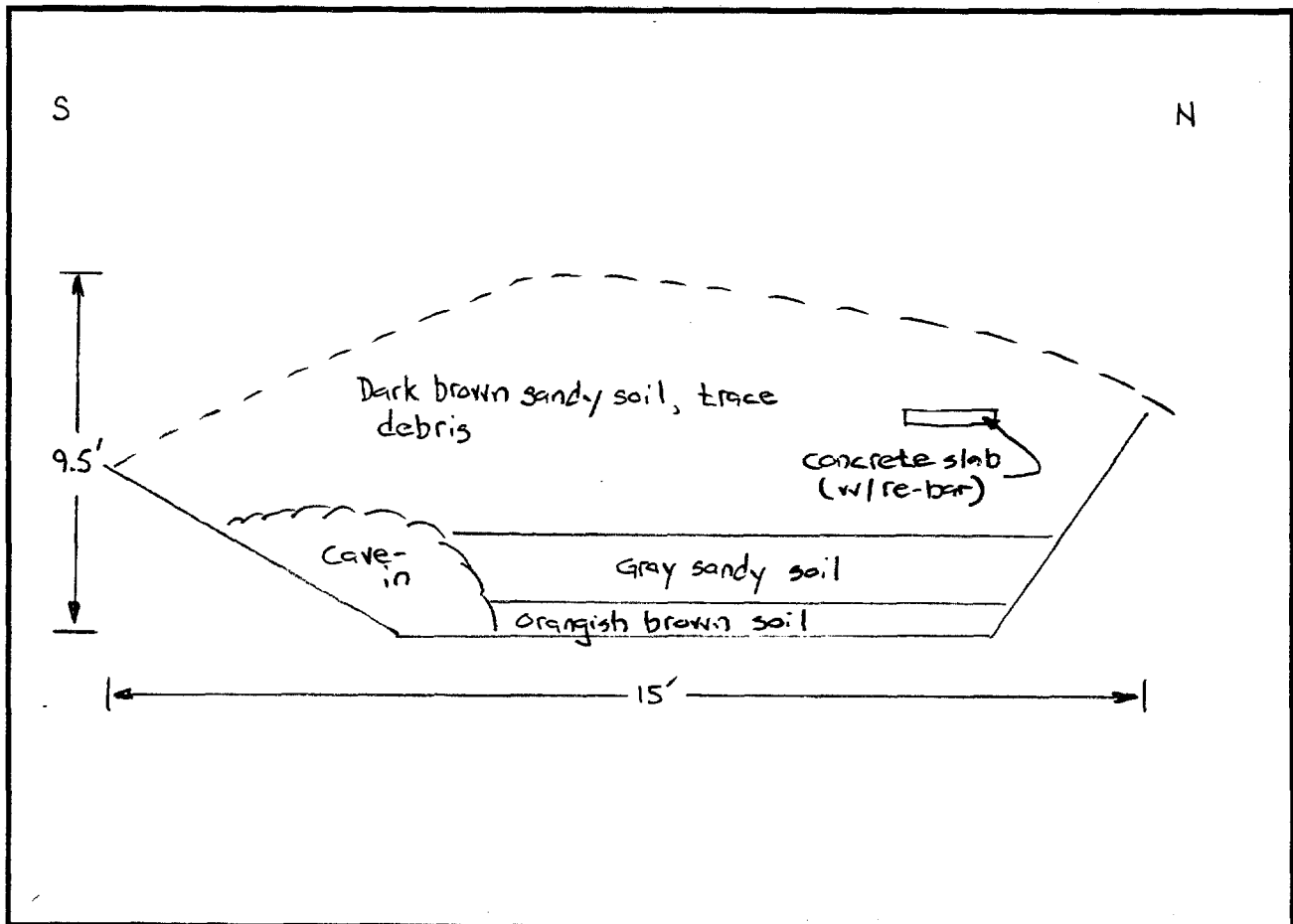
## AIR MONITORING

Time	PID (PS/BG)	FID (PS/BG)	Source
1548	0.4/0.4	0.8/0.8	Soil from pit
1552	0.4/0.4	0.8/0.8	Soil from pit

## Definitions

PID = Photo Ionization Detector  
 FID = Flame Ionization Detector  
 PS = Point Source (in ppm)  
 BG = Background (in ppm)

## TEST PIT CROSS SECTION



# TEST PIT RECORD

Project: RI/FS at OU No. 6 - site 43 CTO No.: 303

Test Pit No.: 43-TPO5 Date: April 21, 1995

Weather: P. Sunny & Warm

Endpoint Coordinates: North: 359514.8993

North: 359527.4715

East: 2469112.0569

East: 2469105.1818

Elevation: 4.90

Elevation: 5.70

Contractor: HHI Equipment: Backhoe

Baker Rep.: DeJohn, Trebilcock,  
Herbst

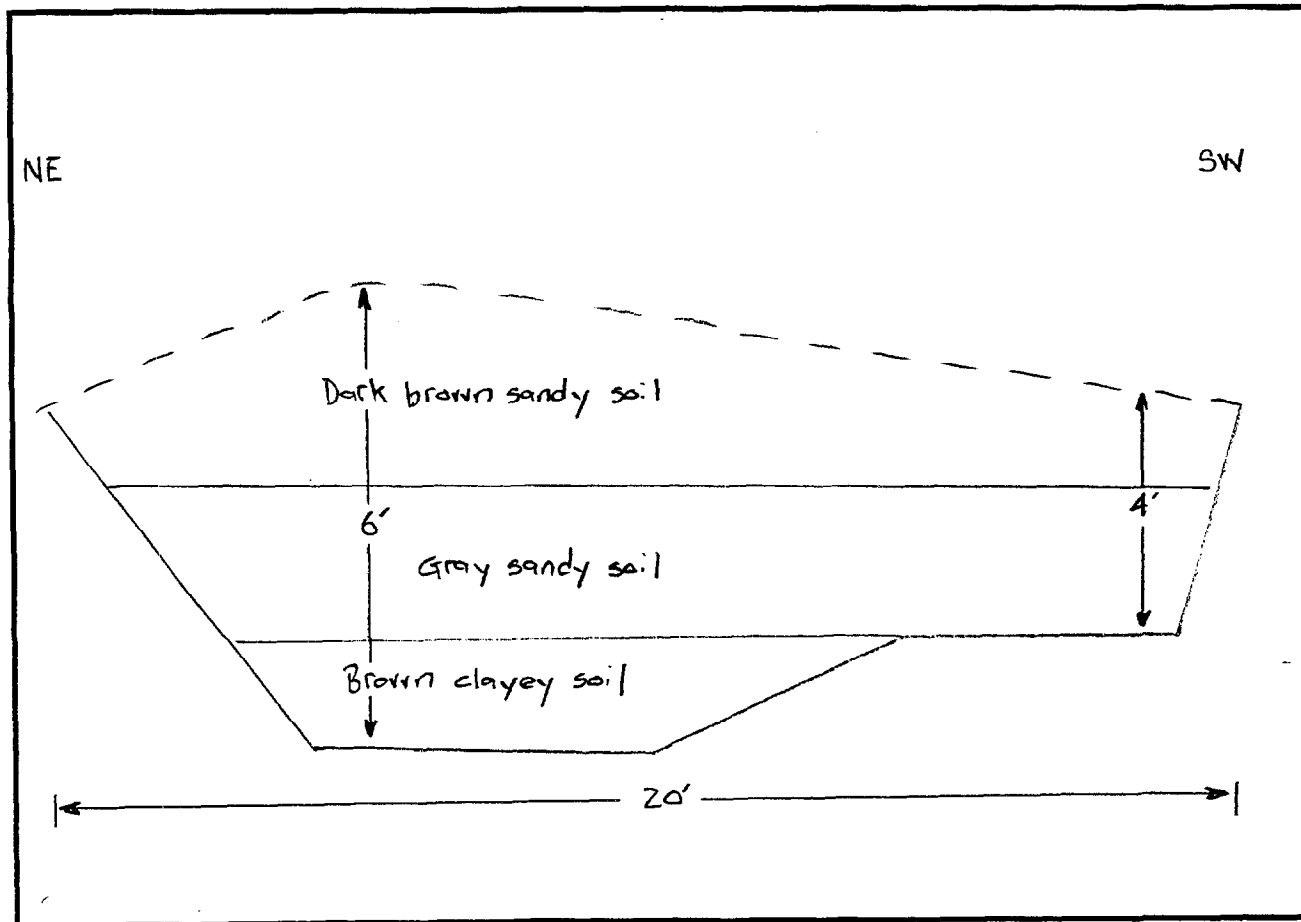
## AIR MONITORING

Time	PID (PS/BG)	FID (PS/BG)	Source
0758	0.7/0.6	0.8/0.8	Soil from pit
0804	0.3/0.3	0.8/0.8	Soil from pit and air in pit

## Definitions

PID = Photo Ionization Detector  
 FID = Flame Ionization Detector  
 PS = Point Source (in ppm)  
 BG = Background (in ppm)

## TEST PIT CROSS SECTION



**APPENDIX D**  
**CHAIN-OF-CUSTODY FORMS**

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WESTON Analytics Use Only

# Custody Transfer Record/Lab Work Request

Client: <u>Ralco Environmental</u>		Refrigerator #																		
Est. Final Proj. Sampling Date: <u>5/1/95</u>		#/Type Container	Liquid																	
Work Order #		Solid																		
Project Contact/Phone # <u>L Johnson 1112 091 6500</u>		Liquid																		
AD Project Manager <u>Denise Walkman</u>		Solid																		
QC	Del	TAT	Preservatives																	
Date Rec'd		Date Due		ANALYSES REQUESTED		ORGANIC				INORG										
Account #				→		VOA	BNA	Pest/PCB	Herb			Metal	CN	TSS	TDS					

MATRIX CODES S: Soil SE: Sediment SO: Solid SL: Sludge W: Water O: Oil A: Air DS: Drum Solids DL: Drum Liquids L: EP/CLP Leachate WI: Wipe X: Other F: Fish	Lab ID	Client ID/Description	Matrix QC Chosen (✓)		Matrix	Date Collected	Time Collected	WESTON Analytics Use Only												# Bottles	Notes		
			MS	MSD				1	2	3	4	5	6	7	8	9	10	11	12				
		303-TB-33			W	4/7	1705	X														2	Routine
		43-GW02-01			W	4/7	1725	X	X	X					X	X						8	Routine
		44-GWER-01			W	4/7	1920	X	X	X					X							6	Routine
		44-GW06DW-01			W	4/8	0930	X	X	X												6	Routine
		44-GW06-01			W	4/8	1035	X														3	Routine
		44-GW04-01			W	4/8	1235	X														3	Routine

FIELD PERSONNEL: COMPLETE ONLY SHADED AREAS				DATE/REVISIONS:				WESTON Analytics Use Only			
Special Instructions: - See last column for sample turn around times - Airbill # 2124805152 303-TB-33 = Weston Prepared Trip Blank				1. _____ 2. _____ 3. _____ 4. _____ 5. _____ 6. _____				Samples were: 1) Shipped ___ or Hand Delivered ___ Airbill # _____ 2) Ambient or Chilled 3) Received in Good Condition Y or N 4) Labels Indicate Properly Preserved Y or N 5) Received Within Holding Times Y or N COC Tape was: 1) Present on Outer Package Y or N 2) Unbroken on Outer Package Y or N 3) Present on Sample Y or N 4) Unbroken on Sample Y or N COC Record Present Upon Sample Rec't Y or N			
Relinquished by	Received by	Date	Time	Relinquished by	Received by	Date	Time	Discrepancies Between Samples Labels and COC Record? Y or N NOTES:			
7.7.7.	FedEx	4/8/95	1300								

















COC# 303073 TFT  
2 5-5-95

WESTON Analytics Use Only

# Custody Transfer Record/Lab Work Request

Client: Baker Environmental	Refrigerator #																			
Est. Final Proj. Sampling Date: 5-15-95	#/Type Container	Liquid																		
Work Order #		Solid																		
Project Contact/Phone: L. Johnson 417-269-6000	Volume	Liquid																		
AD Project Manager: Denise Wolfman		Solid																		
QC Del: TAT	Preservatives																			
Date Rec'd	Date Due	ANALYSES REQUESTED				ORGANIC				INORG		WESTON Analytics Use Only								
Account #		VOA	BNA	Pest/PCB	Herb	TOC	Grain Size	Atterberg Limits	Metal	CN										

MATRIX CODES: S: Soil SE: Sediment SO: Solid SL: Sludge W: Water O: Oil A: Air DS: Drum Solids DL: Drum Liquids L: EP/TCLP Leachate WI: Wipe X: Other F: Fish	Lab ID	Client ID/Description	Matrix QC Chosen (✓)		Matrix	Date Collected	Time Collected	WESTON Analytics Use Only												Bottle	Turn Around					
			MS	MSD																						
		44-EC-SD04-012			SE	5/4	1152	X	X	X														2	Routine	
		44-EC-SD04-06			SE	5/4	1153	X	X	X															2	Routine
		44-EC-SD03-012			SE	5/4	1215	X	X	X															2	Routine
		44-EC-SD03-06	X	X	SE	5/4	1220	X	X	X															4	Routine
		44-EC-SD03-060			SE	5/4	1220	X	X	X															2	Routine
		303-EC-SD01-06			SE	5/4	1550	X	X	X		X	X	X	X										3	Routine
		43-EC-SD01-06			SE	5/5	1042	X	X	X		X	X	X	X										3	Routine
		43-EC-SD01-060			SE	5/5	1042	X	X	X		X													2	Routine
		43-EC-SD01-012			SE	5/5	1040	X	X	X		X													2	Routine
		43-SHC-SD04-06	X	X	SE	5/5	0900	X	X	X		X	X	X	X										5	Routine

FIELD PERSONNEL: COMPLETE ONLY SHADED AREAS

Special Instructions:  
 - See last column for sample turn around  
 - Airbill # 212480441

DATE/REVISIONS:

- \_\_\_\_\_
- \_\_\_\_\_
- \_\_\_\_\_
- \_\_\_\_\_
- \_\_\_\_\_
- \_\_\_\_\_

WESTON Analytics Use Only

Samples were:  
 1) Shipped \_\_\_ or Hand Delivered \_\_\_  
 Airbill # \_\_\_\_\_

2) Ambient or Chilled

3) Received in Good Condition Y or N

4) Labels Indicate Properly Preserved Y or N

5) Received Within Holding Times Y or N

COC Tape was:  
 1) Present on Outer Package Y or N

2) Unbroken on Outer Package Y or N

3) Present on Sample Y or N

4) Unbroken on Sample Y or N

COC Record Present Upon Sample Rec't Y or N

Relinquished by	Received by	Date	Time	Relinquished by	Received by	Date	Time
7.7.7	FedEx	5/5/95	1530				

Discrepancies Between Samples Labels and COC Record? Y or N

NOTES:









**NORM IDEAU ASSOCIATES**

RMC ENVIRONMENTAL SERVICES DIVISION  
AQUATIC TOXICOLOGY LABORATORY

3450 Schuylkill Road  
Spring City, PA 19475-1124  
(610) 948-4700 • Fax: (610) 948-4752

Client: Baker Environmental  
Address: Airport office Park - Bldg. #3  
420 Rouser Road  
Phone: Coraopolis PA 15108  
Samplers: (412) 269-6000  
Job No.: 6240-303-0000

Client Contact: Aaron Bernhardt

Sample	Return To Client	[ ]
Disposal	Disposal by Lab	[X]

No. Container															
Container Size															

CHAIN OF CUSTODY

SAMPLE INFORMATION					Toxicity Test Requested								
RMC only Lab ID	Sample Identification	Matrix Code*	Sample Date	Sample Time	Acute	Chronic	Whole Sediment	Elutriate	Bioaccumulation	Product Efficacy	Other	Other	Other
	Site 43	SW	5-3-95	1500		X							
	Site 44	SW	5-3-95	1430		X							

**Potential Hazard Identification:**

Non-Hazard  Flammable  Unknown  Skin-Irritant  Poison

Relinquished By:	Received By:	Time:	Date:	Relinquished By:	Received By:	Time:	Date:
<u>T. T. L.</u>	<u>FedEx</u>	<u>5-3-95</u>	<u>1530</u>				

Special Instructions: \* Run 7-day Chronic w/ Fathead Minnows  
Shipment includes 2 containers per sample @ 1 gal. each  
Airbill # 1286065362

**\*Matrix Codes:**

S - soil	GW - ground water
SE - sediment	ST - stormwater
SL - sludge	PW - processed water
O - oil	DW - dilution water
WW - waste water	RW - receiving water
SW - surface water	X - other

RMC Use Only	Samples Were:									
	1. Shipped or hand delivered	2. Chilled or ambient	3. Received broken / leaking	4. Received within holding times	5. Discrepancies between sample labels and COC record?					
	Notes:	Notes:	Yes No	Yes No	Yes No					
	COC Tape Was:	1. Present on outer package	2. Unbroken on outer package	3. Present on sample	4. Unbroken on sample					
	Yes No	Yes No	Yes No	Yes No						



**NORMANDEAU ASSOCIATES**

RMC ENVIRONMENTAL SERVICES DIVISION  
AQUATIC TOXICOLOGY LABORATORY

3450 Schuylkill Road  
Spring City, PA 19475-1124  
(610) 948-4700 • Fax: (610) 948-4752

Client: Baker Environmental, Inc. Client Contact: Aaron Bernhardt  
Address: 420 Rouser Road - Bldg. #3  
Coropolis, PA 15108  
Phone: (412) 269-6000  
Samplers: Aaron Bernhardt / Peter Manclay  
Job No.: 62470-303-0000-00000

Sample	Return To Client	<input type="checkbox"/>
Disposal	Disposal by Lab	<input checked="" type="checkbox"/>

No. Container														
Container Size														

CHAIN OF CUSTODY

SAMPLE INFORMATION					Toxicity Test Requested								
RMC only Lab ID	Sample Identification	Matrix Code*	Sample Date	Sample Time	Acute	Chronic	Whole Sediment	Elutriate	Bioaccumulation	Product Efficacy	Other	Other	Other
	Site 44	SE	5-4-95	0910		10-day							
	Control	SE	5-4-95	1550		10-day							
	Site 43	SE	5-5-95	0900		10-day							
	Site 43	SW	5-5-95	0900		7-day							
	Site 44	SW	5-5-95	1350		7-day							

**Potential Hazard Identification:**  
 Non-Hazard  Flammable  Unknown  Skin-Irritant  Poison

Relinquished By:	Received By:	Time:	Date:	Relinquished By:	Received By:	Time:	Date:
<u>J. F. Tahlah</u>	<u>FedEx</u>	<u>5-5-95</u>	<u>1530</u>				

Special Instructions: \*Run 10-day Chronic w/ H. Azteca & C. Tentans for sediments only  
\*Run 7-day Chronic w/ Fathead Minnows for Surface Water  
Shipment includes 12 qt. jars + 4 containers (2 per) & 1 gal. each  
 Airbill # 1286065351

**\*Matrix Codes:**

S - soil	GW - ground water
SE - sediment	ST - stormwater
SL - sludge	PW - processed water
O - oil	DW - dilution water
WW - waste water	RW - receiving water
SW - surface water	X - other

RMC Use Only	Samples Were:	1. Shipped or hand delivered	2. Chilled or ambient	3. Received broken / leaking	4. Received within holding times	5. Discrepancies between sample labels and COC record?
	Notes:	Notes:	Yes No	Yes No	Yes No	
	COC Tag Was:	1. Present on outer package	2. Unbroken on outer package	3. Present on sample	4. Unbroken on sample	
	Yes No	Yes No	Yes No	Yes No		

**NORM IDEAU ASSOCIATES**

RMC ENVIRONMENTAL SERVICES DIVISION  
AQUATIC TOXICOLOGY LABORATORY

3450 Schuylkill Road  
Spring City, PA 19475-1124  
(610) 948-4700 • Fax: (610) 948-4752

Client: Baker Environmental  
Address: 420 Rouser Road - Bldg. A 3  
Coraopolis, PA 15108  
Phone: 412-269-6000  
Samplers: Aaron Bernhardt / Pete Monday  
Job No.: 62470-303

Client Contact: Aaron Bernhardt

Sample Disposal	Return To Client Disposal by Lab. <input checked="" type="checkbox"/>
-----------------	---

No. Container															
Container Size															

SAMPLE INFORMATION					Toxicity Test Requested								
RMC only Lab ID	Sample Identification	Matrix Code*	Sample Date	Sample Time	Acute	Chronic	Whole Sediment	Elutriate	Bioaccumulation	Product Efficacy	Other	Other	Other
	Site 43	SW	5-8-95	0725		7-day							
	Site 44	SW	5-8-95	0700		7-day							

**Potential Hazard Identification:**

Non-Hazard [ ] Flammable [ ] Unknown [ ] Skin-Irritant [ ] Poison [ ]

Relinquished By:	Received By:	Time:	Date:	Relinquished By:	Received By:	Time:	Date:
<u>John F. Tubill</u>	<u>FedEx</u>	<u>5-8-95</u>	<u>1530</u>				

Special Instructions: \* Run 7-day chronic w/ Fathead Minnows

Shipment contains 2 water samples per station

Airbill # 1286065152

**\*Matrix Codes:**

S - soil	GW - ground water
SE - sediment	ST - stormwater
SL - sludge	PW - processed water
O - oil	DW - dilution water
WW - waste water	RW - receiving water
SW - surface water	X - other

RMC Use Only	Samples Were:	1. Shipped or hand delivered	2. Chilled or ambient	3. Received broken / leaking	4. Received within holding times	5. Discrepancies between sample labels and COC record?
	Notes:	Notes:	Yes No	Yes No	Yes No	Yes No
	COC Tape Was:	1. Present on outer package	2. Unbroken on outer package	3. Present on sample	4. Unbroken on sample	
		Yes No	Yes No	Yes No	Yes No	

CHAIN OF CUSTODY

**APPENDIX E**  
**FIELD WELL DEVELOPMENT RECORDS**

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# FIELD WELL DEVELOPMENT RECORD

# Baker

Baker Environmental, Inc

PROJECT: SITE 43

CTO NO.: 303 WELL NO.: 43-GW01

DATE: 2-27-95

GEOLOGIST/ENGINEER: MD SMITH

TIME START	DEVELOPMENT DATA						
TIME FINISH	TIME	CUMULATIVE VOLUME (gallons)	pH	TEMP (°C)	SPEC COND. (µmhos/cm)	TEMP (°C)	COLOR AND TURBIDITY
0858							
1232							
INITIAL WATER LEVEL (FT) 4.36'	858	0	-		-	-	VERY TURBID
TOTAL WELL DEPTH (TD) 14.9'	913	10	-		-	-	VERY TURBID
	924	10 1/2	-		-	-	VERY TURBID
WELL DIAMETER (INCHES) 2"	928	11	-		-	-	TURBID
	944	17	6.53		320	18	CLEAR
CALCULATED WELL VOLUME 1.72 GAL	1031	20	-		-	-	VERY TURBID
BOREHOLE DIAMETER (INCHES) UNKNOWN	1058	28	6.53		310	19	TURBID
	1106	30	6.41		300	19	SLIGHTLY TURBID
BOREHOLE VOLUME -	1141	32	6.57		335	24	VERY SLIGHTLY TURBID
AMOUNT OF WATER ADDED DURING DRILLING -	1145	35	6.24		270	18	TURBID
	1157	38	-		-	-	TURBID
DEVELOPMENT METHOD PUMPING	1159	39	6.60		295	20	SLIGHTLY TURBID
	1206	40	6.28		270	20.5	SLIGHTLY TURBID
PUMP TYPE CENTRIFUGAL	1219	43	6.47		305	21	CLEAR
TOTAL TIME (A) 2 hr. 28 min.	1224	44	6.25		300	20	CLEAR
TOTAL PUMPING TIME	1232	45	6.50	↓	305	20	CLEAR
AVERAGE FLOW (GPM)(B) .3 GPM	<b>OBSERVATIONS/NOTES</b> This well was surged from 0950 to 1029. The system was shut down from 1113 to 1138 to allow recharge.						
TOTAL ESTIMATED WITHDRAWAL AxB = 456 GAL.							
MEASURED HNU/OVA READING Background							

**Baker**

Baker Environmental, Inc.

**FIELD WELL DEVELOPMENT RECORD**PROJECT: RI/FS at OU No. 6 - Site 43 - MCAS, New RiverCTO NO.: 62470-303WELL NO.: 43-GW01 DWDATE: 3-21-95GEOLOGIST/ENGINEER: M. S. HERBST

TIME START	DEVELOPMENT DATA						
0827							
TIME FINISH	TIME	CUMULATIVE VOLUME (gallons)	pH	TEMP (°C)	SPEC. COND. (µmhos/cm)	TEMP (°C)	COLOR AND TURBIDITY
0857							
INITIAL WATER LEVEL (FT)	0846	~ 88	7.66	17.5	500	17.5	VERY CLEAR
5.77'							
TOTAL WELL DEPTH (TD)	0850	~ 128	7.64	17.5	500	17.5	VERY CLEAR
61.0'							
WELL DIAMETER (INCHES)	0855	~ 190	7.64	18.0	500	18.0	VERY CLEAR
2.0"							
CALCULATED WELL VOLUME							
8.8 gallons							
BOREHOLE DIAMETER (INCHES)							
- N/A -							
BOREHOLE VOLUME							
- N/A -							
AMOUNT OF WATER ADDED DURING DRILLING							
- N/A -							
DEVELOPMENT METHOD							
AIR LIFT							
PUMP TYPE							
AIR COMPRESSOR							
TOTAL TIME (A)							
Øhr. 30 min.							
AVERAGE FLOW (GPM)(B)							
~ 8.0 gpm							
TOTAL ESTIMATED WITHDRAWAL AxB=	- PVC CONNECTOR CAME APART DUE TO THE STRONG FLOW... HAD TO SHUT DOWN COMPRESSOR FROM 0831 TO 0843.						
228 gallons	- FLOW WAS OUTSTANDING.						
HNU/OVA READING	- REF: pp. 70 - 71 CTS 302 VOL I.						
- N/A -							

# FIELD WELL DEVELOPMENT RECORD

# Baker

Baker Environmental, Inc

PROJECT: SITE 43

CTO NO.: 303 WELL NO.: 43-6W02

DATE: 2-28-95

GEOLOGIST/ENGINEER: MD SMITH

TIME START	DEVELOPMENT DATA						
TIME FINISH	TIME	CUMULATIVE VOLUME (gallons)	PH	TEMP (°C)	SPEC COND. (µmhos/cm)	TEMP (°C)	COLOR AND TURBIDITY
955							
1734							
INITIAL WATER LEVEL (FT) 4.44'	955	0	-	-	-	-	VERY TURBID
TOTAL WELL DEPTH (TD) 13.8'	1017	20	-		-	-	TURBID
WELL DIAMETER (INCHES) 2"	1022	22	-		-	-	TURBID
CALCULATED WELL VOLUME 1.52 GAL	1032	25	4.71		200	18	TURBID
BOREHOLE DIAMETER (INCHES) UNKNOWN	1143	60	4.79		200	20	SLIGHTLY TURBID
BOREHOLE VOLUME -	1622	95					TURBID
AMOUNT OF WATER ADDED DURING DRILLING -	1632	97					TURBID
DEVELOPMENT METHOD PUMPING	1708	123	4.96		240	19	TURBID
PUMP TYPE CENTRIFUGAL	1722	133	5.45		225	19	TURBID
TOTAL TIME (A) 2 hrs. 12 min	1726	136	5.45		210	19	TURBID
TOTAL PUMPING TIME	1731	138	5.02		205	19	TURBID
AVERAGE FLOW (GPM)(B) 1.0 GPM	1734	139	5.39		215	19	TURBID
TOTAL ESTIMATED WITHDRAWAL AXB = 139 GAL MEASURED							
HNU/OVA READING Background							
OBSERVATIONS/NOTES							
Between 1040 and 1622 the well was surged during this period the pump was clogged with sand several times.							

# FIELD WELL DEVELOPMENT RECORD

# Baker

Baker Environmental, Inc

PROJECT: SITE 43

CTO NO.: 303 WELL NO.: 43-GW03

DATE: 2-27-95 & 2-28-95

GEOLOGIST/ENGINEER: MDSMITH

TIME START 1545(2/27) 742(2/28)	DEVELOPMENT DATA						
	TIME	CUMULATIVE VOLUME (gallons)	pH	TEMP (°C)	SPEC. COND. (µmhos/cm)	TEMP (°C)	COLOR AND TURBIDITY
TIME FINISH 1710(2/27) 900(2/28)							
INITIAL WATER LEVEL (FT) 3.84'	2/27/95 1545	0	-	-	-	-	VERY TURBID
TOTAL WELL DEPTH (TD) - 15.07	1616	20					VERY TURBID
WELL DIAMETER (INCHES) 2"	1632	30	5.66		170	18	VERY TURBID
CALCULATED WELL VOLUME 1.8 GAL	1639	33	5.43		170	18	VERY TURBID
	1647	36	5.45		160	18	TURBID
BOREHOLE DIAMETER (INCHES) UNKNOWN	1651	50	5.35		165	17.5	TURBID
	1657	52	5.49		160	18	SLIGHTLY TURBID
BOREHOLE VOLUME -	1700	55	5.49		160	18	SLIGHTLY TURBID
	1706	60	5.49		160	18	SLIGHTLY TURBID
AMOUNT OF WATER ADDED DURING DRILLING -	1710	65	5.25		160	17.5	CLEAR
	2/28/95 742	73	-		-	-	VERY TURBID
DEVELOPMENT METHOD PUMPING	809	80	-		-	-	TURBID
	818	88	6.84		165	17	CLEAR
PUMP TYPE CENTRIFUGAL	825	93	5.79		165	17	CLEAR
	844	115	-		-	-	SLIGHTLY TURBID
TOTAL TIME (A) 2 hrs 43 min	847	117	5.72	↓	170	17	SLIGHTLY TURBID
TOTAL PUMPING TIME							
AVERAGE FLOW (GPM)(B) .77 GPM	<b>OBSERVATIONS/NOTES</b> <sup>2/27/95</sup> This well was surged from 1710 to 1740. The pump was bound up with sediment between 1752 and 1800. Development continued on 2/28/95.						
TOTAL ESTIMATED WITHDRAWAL AxB = 125 GAL							
MEASURED							
HNU/OVA READING Background							

# FIELD WELL DEVELOPMENT RECORD



PROJECT: SITE 43

CTO NO.: 303 WELL NO.: 43-6W03

DATE: 2-27-95 & 2-28-95

GEOLOGIST/ENGINEER: MD SMITH

	DEVELOPMENT DATA						
TIME START	TIME	CUMULATIVE VOLUME (gallons)	pH	TEMP (°C)	SPEC COND. (µmhos/cm)	TEMP (°C)	COLOR AND TURBIDITY
1545 (2/27) 742 (2/28)							
TIME FINISH							
1710 (2/27) 900 (2/28)							
INITIAL WATER LEVEL (FT) 3.84'	851	118	5.72	↑	165	17	SLIGHTLY TURBID
TOTAL WELL DEPTH (TD) 15.07'	857	120	5.72	↓	165	17	SLIGHTLY TURBID
	900	125	5.71	↓	165	17	SLIGHTLY TURBID
WELL DIAMETER (INCHES) 2"							
CALCULATED WELL VOLUME 1.86 GAL							
BOREHOLE DIAMETER (INCHES) UNKNOWN							
BOREHOLE VOLUME -							
AMOUNT OF WATER ADDED DURING DRILLING -							
DEVELOPMENT METHOD PUMPING							
PUMP TYPE CENTRIFUGAL							
TOTAL TIME (A) 2 hrs. 43 min TOTAL PUMPING TIME							
AVERAGE FLOW (GPM)(B) .77 GPM							
TOTAL ESTIMATED WITHDRAWAL AXB = 125 GAL  MEASURED	<p style="text-align: center; font-weight: bold;">OBSERVATIONS/NOTES</p> <p style="text-align: center;">Development started on 2-27-95.</p>						
HNU/OVA READING Background							



# Baker

Baker Environmental, Inc

## FIELD WELL DEVELOPMENT RECORD

PROJECT: RI/FS at OU No. 6 - Site 43 - MCAS, New River

CTO NO.: 62470-303

WELL NO.: 43-GW04

DATE: 3/25/95

GEOLOGIST/ENGINEER: Dave Gaviglia

TIME START	DEVELOPMENT DATA						
	TIME	CUMULATIVE VOLUME (gallons)	pH	TEMP (°C)	SPEC. COND. (µmhos/cm)	TEMP (°C)	COLOR AND TURBIDITY
1350							
TIME FINISH							
1550							
INITIAL WATER LEVEL (FT)	1350						Light Brown, Highly Turbid, High Suspended Particulates
4.46	1405	Purged 110 gallons					Medium Turbid, Light Gray with Fines
TOTAL WELL DEPTH (TD)	1411 to 1525	Surge Well					
16.5							
WELL DIAMETER (INCHES)	1539	65	6.45		355	16	Brown, cloudy
2.0" ID	1545	90	6.41		350	14.5	Brown, Cloudy
CALCULATED WELL VOLUME	1547	100	6.41		350	14.5	Opaque Brown, Cloudy, Fewer suspended particulates
2.30 gallons							
BOREHOLE DIAMETER (INCHES)	1550	113					
N/A							
BOREHOLE VOLUME							
N/A							
AMOUNT OF WATER ADDED DURING DRILLING							
N/A							
DEVELOPMENT METHOD							
Pump							
PUMP TYPE							
Centrifugal							
TOTAL TIME (A)							
2 hrs.							
AVERAGE FLOW (GPM)(B)							
4.5 gpm							
TOTAL ESTIMATED WITHDRAWAL AxB=	OBSERVATIONS/NOTES						
223 gallons							
HNU/OVA READING							
N/A							

**Baker**

Baker Environmental, inc.

**FIELD WELL DEVELOPMENT RECORD**PROJECT: RI/FS at OU No. 6 - Site 43 - MCAS, New RiverCTO NO.: 62470-303WELL NO.: 43-GW04 DWDATE: 3-21-95GEOLOGIST/ENGINEER: M. S. HERBST

TIME START	DEVELOPMENT DATA						
	TIME	CUMULATIVE VOLUME (gallons)	pH	TEMP (°C)	SPEC. COND. (µmhos/cm)	TEMP (°C)	COLOR AND TURBIDITY
1305							
TIME FINISH 1409							
INITIAL WATER LEVEL (FT) 4.37'	1315	17.0	9.71	25.0	450	25.0	TAN OPAQUE, VISIBLE OFF-WHITE SETTLING SOLIDS.
TOTAL WELL DEPTH (TD) 64.0'	1320	23.0	9.36	23.0	405	23.0	SAME WITH FEWER SETTLING SOLIDS.
WELL DIAMETER (INCHES) 2.0"	1333	39.5	8.93	22.5	420	22.5	CLEARING SLIGHTLY W/ NO SETTLING SOLIDS.
CALCULATED WELL VOLUME 9.50 gallons	1341	49.5	8.77	22.5	430	22.5	LIGHT TAN TRANSLUCENT.
BOREHOLE DIAMETER (INCHES) -N/A-	1357	69.5	8.49	22.5	445	22.5	SLIGHTLY MILKY TAN TRANSPARENT
BOREHOLE VOLUME -N/A-	1402	72.0	8.44	23.0	445	23.0	EXTREMELY CLEAR
AMOUNT OF WATER ADDED DURING DRILLING -N/A-	1406	76.0	8.35	23.0	445	23.0	SAME
DEVELOPMENT METHOD AIR LIFT							
PUMP TYPE AIR COMPRESSOR							
TOTAL TIME (A) 1 hr. 4 min.							
AVERAGE FLOW (GPM)(B) 1.25 gpm							
TOTAL ESTIMATED WITHDRAWAL AxB= 80 gallons	REF: pp. 72-73 CTO 303 vol I.						
HNU/OVA READING -N/A-							

**APPENDIX F**  
**INVESTIGATION DERIVED WASTE SUMMARY AND**  
**RECOMMENDATIONS**

---

**Baker Environmental, Inc.**  
Airport Office Park, Building 3  
420 Rouser Road  
Coraopolis, Pennsylvania 15108

May 17, 1995

(412) 269-6000  
FAX (412) 269-2002

Commander  
Atlantic Division  
Naval Facilities Engineering Command  
1510 Gilbert Street (Building N-26)  
Norfolk, Virginia 23511-2699

Attn: Ms. Linda Saksvig, P.E.  
Navy Technical Representative  
Code 18231

Re: Contract N62470-D-4814  
Navy CLEAN, District III  
Contract Task Order (CTO) 0303  
Disposal of Investigation Derived Waste  
Operable Unit No. 7 (Sites 36, 43, 44, 54, and 86)  
MCAS, New River, Jacksonville, North Carolina

Dear Ms. Saksvig:

This correspondence serves to inform you of the status of activities associated with the investigation derived wastes (IDW) generated during the field program conducted under Contract Task Order (CTO) 0303. Approximately 9,275 gallons of liquid (purge and development water, and decontamination fluids) and 70 cubic yards of soil/mud cuttings were generated during the field activities. Upon completion of the field program, liquid and soil/mud samples were collected to determine their waste characteristics (i.e., hazardous or non-hazardous) for disposal purposes. Samples of soil/mud were obtained by compositing three to five grab samples per roll-off box, and liquid samples from each tank/tanker were collected by using a bailer.

Liquid samples were analyzed for full Target Compound List (TCL) organics (i.e., volatiles, semivolatiles, and pesticides, and PCBs), Target Analyte List (TAL) metals, and RCRA hazardous waste characteristics (corrosivity, ignitability, and reactivity). Soil/mud samples were analyzed for full toxicity characteristic leachate procedure (TCLP), including PCBs, and RCRA parameters. A 7-day laboratory turnaround was requested for all samples to accelerate the disposal process, and reduce the cost of IDW storage.

Analytical results indicated that the liquid and soil/mud samples are non-hazardous based on the criteria outlined in 40 CFR 261, RCRA Identification and Listing of Hazardous Waste (based on TCLP and RCRA Waste Characteristic results). Accordingly, the following disposal options are proposed:

- Purge and development water will be emptied onto the ground surface at the site from which it was generated. The tanker at Site 86 will be driven to Site 36 for disposal due to the limited space and highly visible nature of the site.
- Decontamination fluids will be taken off site by a licensed waste hauler (Four Season Environmental Services) and disposed as non-hazardous.



**Baker**

Ms. Linda Saksvig  
May 17, 1995  
Page 2


- Roll-off boxes will be emptied on site and the soil/mud graded. The roll-off boxes at Site 86 will be transported to Site 36 for disposal due to the limited space and highly visible nature of the site.

The proposed disposal plan outlined above is consistent with the LANTDIV IDW Management Plan options and with other projects performed at MCB, Camp Lejeune. Moreover, Baker received verbal concurrence on May 13, 1995 for the proposed disposal plan from Ms. Katherine Landman, the acting Navy Technical Representative.

Baker appreciates the opportunity to serve LANTDIV on this important project. If you have any questions, please do not hesitate to contact me at (412) 269-2033 or Mr. Matthew Bartman (Activity Coordinator) at (412) 269-2053.

Sincerely,

BAKER ENVIRONMENTAL, INC.



Richard E. Bonelli  
Project Manager

REB/lq

cc: Ms. Lee Ann Rapp, Code 183  
Ms. Beth Collier, Code 02115  
Mr. Neal Paul, MCB, Camp Lejeune

**Baker**

bcc: APPajak/CF; JWMentz/RPWattras/PROG F; REBonelli/PF;  
TFTrebilcock; MDBartman(ck); Daily File  
S.O. #62470-303  
Subfile 8  
Initials *ADB*

**Baker Environmental, Inc.**  
Airport Office Park, Building 3  
420 Rouser Road  
Coraopolis, Pennsylvania 15108

May 17, 1995

(412) 269-6000  
FAX (412) 269-2002

Commander  
Atlantic Division  
Naval Facilities Engineering Command  
1510 Gilbert Street (Building N-26)  
Norfolk, Virginia 23511-2699

Attn: Ms. Linda Saksvig, P.E.  
Navy Technical Representative  
Code 18231

Re: Contract N62470-D-4814  
Navy CLEAN, District III  
Contract Task Order (CTO) 0303  
Disposal of Investigation Derived Waste  
Operable Unit No. 7 (Sites 36, 43, 44, 54, and 86)  
MCAS, New River, Jacksonville, North Carolina

Dear Ms. Saksvig:

This correspondence serves to inform you of the status of activities associated with the investigation derived wastes (IDW) generated during the field program conducted under Contract Task Order (CTO) 0303. Approximately 9,275 gallons of liquid (purge and development water, and decontamination fluids) and 70 cubic yards of soil/mud cuttings were generated during the field activities. Upon completion of the field program, liquid and soil/mud samples were collected to determine their waste characteristics (i.e., hazardous or non-hazardous) for disposal purposes. Samples of soil/mud were obtained by compositing three to five grab samples per roll-off box, and liquid samples from each tank/tanker were collected by using a bailer.

Liquid samples were analyzed for full Target Compound List (TCL) organics (i.e., volatiles, semivolatiles, and pesticides, and PCBs), Target Analyte List (TAL) metals, and RCRA hazardous waste characteristics (corrosivity, ignitability, and reactivity). Soil/mud samples were analyzed for full toxicity characteristic leachate procedure (TCLP), including PCBs, and RCRA parameters. A 7-day laboratory turnaround was requested for all samples to accelerate the disposal process, and reduce the cost of IDW storage.

Analytical results indicated that the liquid and soil/mud samples are non-hazardous based on the criteria outlined in 40 CFR 261, RCRA Identification and Listing of Hazardous Waste (based on TCLP and RCRA Waste Characteristic results). Accordingly, the following disposal options are proposed:

- Purge and development water will be emptied onto the ground surface at the site from which it was generated. The tanker at Site 86 will be driven to Site 36 for disposal due to the limited space and highly visible nature of the site.
- Decontamination fluids will be taken off site by a licensed waste hauler (Four Season Environmental Services) and disposed as non-hazardous.



A Total Quality Corporation

**Baker**

Ms. Linda Saksvig

May 17, 1995

Page 2

- Roll-off boxes will be emptied on site and the soil/mud graded. The roll-off boxes at Site 86 will be transported to Site 36 for disposal due to the limited space and highly visible nature of the site.

The proposed disposal plan outlined above is consistent with the LANTDIV IDW Management Plan options and with other projects performed at MCB, Camp Lejeune. Moreover, Baker received verbal concurrence on May 13, 1995 for the proposed disposal plan from Ms. Katherine Landman, the acting Navy Technical Representative.

Baker appreciates the opportunity to serve LANTDIV on this important project. If you have any questions, please do not hesitate to contact me at (412) 269-2033 or Mr. Matthew Bartman (Activity Coordinator) at (412) 269-2053.

Sincerely,

BAKER ENVIRONMENTAL, INC.



Richard E. Bonelli  
Project Manager

REB/lq

cc: Ms. Lee Ann Rapp, Code 183  
Ms. Beth Collier, Code 02115  
Mr. Neal Paul, MCB, Camp Lejeune

**WASTE CHARACTERISTIC SUMMARY**

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**SITE 43, AGAN STREET DUMP  
WASTE CHARACTERIZATION SUMMARY  
REMEDIAL INVESTIGATION, CTO - 303  
MCB CAMP LEJEUNE, NORTH CAROLINA  
ORGANIC COMPOUNDS**

LOCATION	43-TNK
DATE SAMPLED	04/25/95
UNITS	UG/L
<b>VOLATILES</b>	
CHLOROMETHANE	10 U
BROMOMETHANE	10 U
VINYL CHLORIDE	10 U
CHLOROETHANE	10 U
METHYLENE CHLORIDE	10 U
ACETONE	10 U
CARBON DISULFIDE	10 U
1,1-DICHLOROETHENE	10 U
1,1-DICHLOROETHANE	10 U
1,2-DICHLOROETHENE (TOTAL)	10 U
CHLOROFORM	10 U
1,2-DICHLOROETHANE	10 U
2-BUTANONE	10 U
1,1,1-TRICHLOROETHANE	10 U
CARBON TETRACHLORIDE	10 U
BROMODICHLOROMETHANE	10 U
1,2-DICHLOROPROPANE	10 U
CIS-1,3-DICHLOROPROPENE	10 U
TRICHLOROETHENE	10 U
DIBROMOCHLOROMETHANE	10 U
1,1,2-TRICHLOROETHANE	10 U
BENZENE	10 U
TRANS-1,3-DICHLOROPROPENE	10 U
BROMOFORM	10 U
4-METHYL-2-PENTANONE	10 U
2-HEXANONE	10 U
TETRACHLOROETHENE	10 U
1,1,2,2-TETRACHLOROETHANE	10 U
TOLUENE	10 U
CHLOROBENZENE	10 U
ETHYLBENZENE	10 U
STYRENE	10 U
XYLENE (TOTAL)	10 U

SITE 43, AGAN STREET DUMP  
WASTE CHARACTERIZATION SUMMARY  
REMEDIAL INVESTIGATION, CTO - 303  
MCB CAMP LEJEUNE, NORTH CAROLINA  
ORGANIC COMPOUNDS

LOCATION	43-TNK
DATE SAMPLED	04/25/95
UNITS	UG/L
<b>SEMIVOLATILES</b>	
PHENOL	10 U
BIS(2-CHLOROETHYL)ETHER	10 U
2-CHLOROPHENOL	10 U
1,3-DICHLOROBENZENE	10 U
1,4-DICHLOROBENZENE	10 U
1,2-DICHLOROBENZENE	10 U
2-METHYLPHENOL	10 U
2,2'-OXYBIS(1-CHLOROPROPANE)	10 U
4-METHYLPHENOL	10 U
N-NITROSO-DI-N-PROPYLAMINE	10 U
HEXACHLOROETHANE	10 U
NITROBENZENE	10 U
ISOPHORONE	10 U
2-NITROPHENOL	10 U
2,4-DIMETHYLPHENOL	10 U
BIS(2-CHLOROETHOXY)METHANE	10 U
2,4-DICHLOROPHENOL	10 U
1,2,4-TRICHLOROBENZENE	10 U
NAPHTHALENE	10 U
4-CHLOROANILINE	10 U
HEXACHLOROBUTADIENE	10 U
4-CHLORO-3-METHYLPHENOL	10 U
2-METHYLNAPHTHALENE	10 U
HEXACHLOROCYCLOPENTADIENE	10 U
2,4,6-TRICHLOROPHENOL	10 U
2,4,5-TRICHLOROPHENOL	25 U
2-CHLORONAPHTHALENE	10 U
2-NITROANILINE	25 U
DIMETHYLPHTHALATE	10 U
ACENAPHTHYLENE	10 U
2,6-DINITROTOLUENE	10 U
3-NITROANILINE	25 U
ACENAPHTHENE	10 U
2,4-DINITROPHENOL	25 U
4-NITROPHENOL	25 U

**SITE 43, AGAN STREET DUMP**  
**WASTE CHARACTERIZATION SUMMARY**  
**REMEDIAL INVESTIGATION, CTO - 303**  
**MCB CAMP LEJEUNE, NORTH CAROLINA**  
**ORGANIC COMPOUNDS**

LOCATION	43-TNK
DATE SAMPLED	04/25/95
UNITS	UG/L
<b>SEMIVOLATILES cont.</b>	
DIBENZOFURAN	10 U
2,4-DINITROTOLUENE	10 U
DIETHYLPHTHALATE	10 U
4-CHLOROPHENYL-PHENYLETHER	10 U
FLUORENE	10 U
4-NITROANILINE	25 U
4,6-DINITRO-2-METHYLPHENOL	25 U
N-NITROSODIPHENYLAMINE (1)	10 U
4-BROMOPHENYL-PHENYLETHER	10 U
HEXACHLOROBENZENE	10 U
PENTACHLOROPHENOL	25 U
PHENANTHRENE	10 U
ANTHRACENE	10 U
CARBAZOLE	10 U
DI-N-BUTYLPHTHALATE	10 U
FLUORANTHENE	10 U
PYRENE	10 U
BUTYLBENZYLPHTHALATE	10 U
3,3'-DICHLOROBENZIDINE	10 U
BENZO(A)ANTHRACENE	10 U
CHRYSENE	10 U
BIS(2-ETHYLHEXYL)PHTHALATE	10 U
DI-N-OCTYL PHTHALATE	10 U
BENZO(B)FLUORANTHENE	10 U
BENZO(K)FLUORANTHENE	10 U
BENZO(A)PYRENE	10 U
INDENO(1,2,3-CD)PYRENE	10 U
DIBENZO(A,H)ANTHRACENE	10 U
BENZO(G,H,I)PERYLENE	10 U

**SITE 43, AGAN STREET DUMP  
WASTE CHARACTERIZATION SUMMARY  
REMEDIAL INVESTIGATION, CTO - 303  
MCB CAMP LEJEUNE, NORTH CAROLINA  
ORGANIC COMPOUNDS**

LOCATION	43-TNK
DATE SAMPLED	04/25/95
UNITS	UG/L
<b>PESTICIDE/PCBS</b>	
ALPHA-BHC	0.049 R
BETA-BHC	0.049 R
DELTA-BHC	0.049 R
GAMMA-BHC (LINDANE)	0.049 R
HEPTACHLOR	0.049 R
ALDRIN	0.049 R
HEPTACHLOR EPOXIDE	0.049 R
ENDOSULFAN I	0.049 R
DIELDRIN	0.098 R
4,4'-DDE	0.098 R
ENDRIN	0.098 R
ENDOSULFAN II	0.098 R
4,4'-DDD	0.098 R
ENDOSULFAN SULFATE	0.098 R
4,4'-DDT	0.098 R
METHOXYCHLOR	0.49 R
ENDRIN KETONE	0.098 R
ENDRIN ALDEHYDE	0.098 R
ALPHA-CHLORDANE	0.049 R
GAMMA-CHLORDANE	0.049 R
TOXAPHENE	4.9 R
AROCLOR-1016	0.98 R
AROCLOR-1221	2 R
AROCLOR-1232	0.98 R
AROCLOR-1242	0.98 R
AROCLOR-1248	0.98 R
AROCLOR-1254	0.98 R
AROCLOR-1260	0.98 R

SITE 43, AGAN STREET DUMP  
WASTE CHARACTERIZATION SUMMARY  
REMEDIAL INVESTIGATION, CTO - 303  
MCB CAMP LEJEUNE, NORTH CAROLINA  
INORGANIC ANALYTES

LOCATION	43-TNK
DATE SAMPLED	04/25/95
UNITS	UG/L
ALUMINUM, TOTAL	5340 J
ANTIMONY, TOTAL	20.8 U
ARSENIC, TOTAL	1.7 U
BARIUM, TOTAL	39.5
BERYLLIUM, TOTAL	0.8 U
CADMIUM, TOTAL	1.9 U
CALCIUM, TOTAL	45300
CHROMIUM, TOTAL	11.5
COBALT, TOTAL	3.7 U
COPPER, TOTAL	59.3
IRON, TOTAL	3560 J
LEAD, TOTAL	3.8
MAGNESIUM, TOTAL	2900
MANGANESE, TOTAL	20.8
MERCURY, TOTAL	0.2 U
NICKEL, TOTAL	10.9 U
POTASSIUM, TOTAL	3200
SELENIUM, TOTAL	1.8
SILVER, TOTAL	2.8 U
SODIUM, TOTAL	16000
THALLIUM, TOTAL	1.2 U
VANADIUM, TOTAL	12.8 U
ZINC, TOTAL	19.6 U

**SITE 43, AGAN STREET DUMP  
RCRA - SUMMARY  
REMEDIAL INVESTIGATION, CTO - 303  
MCB CAMP LEJEUNE, NORTH CAROLINA**

LOCATION 43-TNK  
DATE SAMPLED 04/25/95

**WET CHEMISTRY**

CYANIDE, REACTIVE (ug/L) 25 U  
FLASH POINT, CLOSED CUP (deg F) 200 >  
SULFIDE REACTIVE (mg/L) 1 U

**APPENDIX G**  
**SAMPLING SUMMARIES**

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OUN )ITE 43  
SOIL  
CTO-0303

DATE SHIPPED	SAMPLE ID	Analysis Requested							Analysis Received							DATE EXPECTED	DATE REC'D	TURNAROUND TIME	SDG NO.	COMMENTS
		TCL VOA	TCL SVOA	TCL PEST/PCB	TAL METALS	TPH	GRAIN SIZE	ATTERBERG LIMITS	TCL VOA	TCL SVOA	TCL PEST/PCB	TAL METALS	TPH	GRAIN SIZE	ATTERBERG LIMITS					
3/7/95	43-OA-SB05-02	X	X	X	X				X	X	X	X				3/15/95	3/15/95	8	611	QT; VOC, SVOC, PEST & METALS 3/15
3/7/95	43-OA-SB05-02D	X	X	X	X				X	X	X	X				3/15/95	3/15/95	8	611	QT; VOC, SVOC, PEST & METALS 3/15
3/10/95	COC#303014																			
3/10/95	43-OA-SB03-00	X	X	X	X				X	X	X	X				4/15/95	4/13/95	33	686	R
3/10/95	43-OA-SB03-01	X	X	X	X				X	X	X	X				4/15/95	4/13/95	33	686	R
3/10/95	43-OA-SB01-00	X	X	X	X				X	X	X	X				4/15/95	4/18/95	38	687	R
3/10/95	43-OA-SB01-01	X	X	X	X				X	X	X	X				4/15/95	4/18/95	38	687	R
3/10/95	43-OA-SB01-01	X	X	X	X				X	X	X	X				4/15/95	4/12/95	32	613	R; RINSATE
3/10/95	43-OA-SB01-01	X							X							4/15/95	4/12/95	32	613	R; TRIP BLANK
3/11/95	COC#303015																			
3/11/95	43-DA2-SB01-00	X	X	X	X				X	X	X	X				4/17/95	4/18/95	37	687	R
3/11/95	43-DA2-SB01-01	X	X	X	X				X	X	X	X				4/17/95	4/18/95	37	687	R
3/11/95	43-DA2-SB02-00		X		X				X		X					4/17/95	4/18/95	37	687	R; MS/MSD
3/11/95	43-DA2-SB02-00D		X		X				X		X					4/17/95	4/18/95	37	687	R
3/11/95	43-DA2-SB02-01		X		X				X		X					4/17/95	4/18/95	37	687	R
3/11/95	43-OA-SB02-00	X	X	X	X				X	X	X	X				4/17/95	4/18/95	37	687	R
3/11/95	43-OA-SB02-01	X	X	X	X				X	X	X	X				4/17/95	4/18/95	37	687	R
3/11/95	43-OA-SB04-00		X		X				X		X					4/17/95	4/18/95	37	687	R; MS/MSD
3/11/95	43-OA-SB04-00D		X		X				X		X					4/17/95	4/18/95	37	687	R
3/11/95	43-OA-SB04-01		X		X				X		X					4/17/95	4/18/95	37	687	R
3/11/95	43-OA-SB04-01D		X		X				X		X					4/17/95	4/18/95	37	687	R
3/11/95	43-DA1-SB01-00		X		X				X		X					4/17/95	4/18/95	37	687	R
3/11/95	43-DA1-SB01-01		X		X				X		X					4/17/95	4/18/95	37	687	R
3/11/95	43-DA1-SB02-00		X		X				X		X					4/17/95	4/18/95	37	687	R
3/11/95	43-DA1-SB02-01		X		X				X		X					4/17/95	4/19/95	38	688	R
3/11/95	43-DA1-SB03-00	X	X	X	X				X	X	X	X				4/17/95	4/19/95	38	688	R
3/11/95	43-DA1-SB03-01	X	X	X	X				X	X	X	X				4/17/95	4/19/95	38	688	R
3/13/95	COC#303016																			
3/13/95	43-GW01DW						X	X					X	X		4/18/95	4/19/95	36	729	R
3/14/95	COC#303019																			
3/14/95	43-WA-SB01A-00		X						X							4/19/95	4/26/95	42	752	R
3/14/95	43-WA-SB01B-00		X						X							4/19/95	4/26/95	42	752	R
3/14/95	43-WA-SB01C-00		X						X							4/19/95	4/26/95	42	752	R
5/2/95	COC#303063																			
5/2/95	43-WA-SB01A1-00	X							X							6/7/95	6/16/95	44	638	R; TRIP BLANK
5/2/95	43-WA-SB01A1-00		X			X			X			X				6/7/95	6/9/95	37	636/7	QT SVOC ONLY; REC'D 5/23
5/2/95	43-WA-SB01A2-00		X			X			X			X				6/7/95	6/9/95	37	636/7	QT SVOC ONLY; REC'D 5/23
5/2/95	43-WA-SB01A3-00		X			X			X			X				6/7/95	6/9/95	37	636/7	QT SVOC ONLY; REC'D 5/23
5/2/95	43-WA-SB01A4-00		X			X			X			X				6/7/95	6/9/95	37	636/7	QT SVOC ONLY; REC'D 5/23
COUNT		36	64	34	57	4	2	2	33	66	29	59	4	1	1					



**OU No. 6, SITE 43  
GROUNDWATER  
CTO-0303**

DATE SHIPPED	SAMPLE ID	Analysis Requested						Analysis Received						DATE EXPECTED	DATE REC'D	TURNAROUND TIME	SDG NO.	COMMENTS	
		TCL VOA	TCL SVOA	TCL PEST/PCB	TAL METALS	DISSOLVED METALS	TSS	TDS	TCL VOA	TCL SVOA	TCL PEST/PCB	TAL METALS	DISSOLVED METALS						TSS
4/4/95	<b>COC#303043</b>																		
4/4/95	303-TB-39	X						X							5/10/95	5/3/95	29	133	R; TRIP BLANK
4/4/95	43-GW04DW-01	X	X	X	X		X	X	X	X	X		X	X	5/10/95	5/3/95	29	133	R
4/4/95	43-GW04DWD-01					X							X		5/10/95	5/3/95	29	133	R
4/4/95	43-GWERD-01	X	X	X	X			X	X	X	X				5/10/95	5/3/95	29	133	R; RINSATE
4/4/95	43-GWERD-01					X							X		5/10/95	5/3/95	29	133	R
4/5/95	<b>COC#303044</b>																		
4/5/95	43-GW01-01	X	X	X	X		X	X	X	X	X		X	X	5/11/95	5/3/95	28	133	R; MS/MSD
4/5/95	43-GW01-01D	X						X							5/11/95	5/3/95	28	133	R
4/5/95	43-TW01-01	X						X							5/11/95	5/3/95	28	133	R
4/5/95	43-GWER-02	X						X											HOLD; RINSATE
4/5/95	303-TB-39	X						X							5/11/95	5/3/95	28	133	R; TRIP BLANK
4/5/95	<b>COC#303045</b>																		
4/5/95	43-GW01-01D		X	X	X		X	X		X	X		X	X	5/11/95	5/3/95	28	133	R
4/5/95	43-TW01-01		X	X	X		X	X		X	X		X	X	5/11/95	5/3/95	28	133	R
4/5/95	43-GWER-02		X	X	X					X	X								HOLD; RINSATE
4/6/95	<b>COC#303046</b>																		
4/6/95	303-TB-31	X						X							5/12/95	5/3/95	27	133	R; TRIP BLANK
4/6/95	43-GW01DW-01	X	X	X	X		X	X	X	X	X		X	X	5/12/95	5/3/95	27	133	R
4/6/95	43-GWER-01	X	X	X	X			X	X	X	X				5/12/95	5/3/95	27	133	R; RINSATE
4/6/95	43-GW03-01	X						X							5/12/95	5/3/95	27	133	R
4/6/95	43-GW04-01	X						X							5/12/95	5/3/95	27	133	R
4/6/95	<b>COC#303047A</b>																		
4/6/95	43-GW03-01		X	X	X		X	X		X	X		X	X	5/12/95	5/3/95	27	133	R
4/6/95	43-GW04-01		X	X	X		X	X		X	X		X	X	5/12/95	5/3/95	27	133	R
4/7/95	<b>COC#303047B</b>																		
4/7/95	303-TB-32	X						X							5/13/95	5/3/95	26	133	R; TRIP BLANK
4/7/95	43-TW02-01	X	X	X	X		X	X	X	X	X		X	X	5/13/95	5/3/95	26	133	R
4/7/95	43-GWER-04	X	X	X	X		X	X											HOLD; RINSATE
4/7/95	43-TW03-01	X						X							5/13/95	5/3/95	26	133	R
4/7/95	43-TW04-01	X						X							5/13/95	5/3/95	26	133	R
4/7/95	<b>COC#303048</b>																		
4/7/95	43-TW03-01		X	X	X		X	X		X	X		X	X	5/13/95	5/3/95	26	133	R
4/7/95	43-TW04-01		X	X	X		X	X		X	X		X	X	5/13/95	5/3/95	26	133	R
4/8/95	<b>COC#303049</b>																		
4/8/95	303-TB-33	X						X							5/14/95	5/12/95	34	225	R; TRIP BLANK
4/8/95	43-GW02-01	X	X	X	X		X	X	X	X	X		X	X	5/14/95	5/12/95	34	225	R
COUNT		20	15	15	15	2	13	13	19	14	14	14	11	11					

OU No. 6, SITE 43  
SURFACE WATER  
CTO-0303

		Analysis Requested						Analysis Received										
DATE SHIPPED	SAMPLE ID	TCL VOA	TCL SVOA	TCL PEST/PCB	TAL METALS	DISSOLVED METALS	HARDNESS	TCL VOA	TCL SVOA	TCL PEST/PCB	TAL METALS	DISSOLVED METALS	HARDNESS	DATE EXPECTED	DATE REC'D	TURNAROUND TIME	SDG NO.	COMMENTS
5/4/95	COC#303065																	
5/4/95	43-SHC-SW04	X						X						6/9/95	6/9/95	35	702	R
5/4/95	43-SHC-SW03	X						X						6/9/95	6/9/95	35	702	R
5/4/95	43-EC-SW02	X						X						6/9/95	6/9/95	35	702	R
5/4/95	43-EC-SW01	X						X						6/9/95	6/9/95	35	702	R; MS/MSD
5/4/95	43-EC-SW01D	X						X						6/9/95	6/9/95	35	702	R
5/4/95	COC#303068																	
5/4/95	43-SHC-DSW04					X				X				6/9/95	6/9/95	35	702	R
5/4/95	43-SHC-DSW03					X				X				6/9/95	6/9/95	35	702	R
5/4/95	43-EC-DSW02					X				X				6/9/95	6/9/95	35	702	R
5/4/95	43-EC-DSW01D					X				X				6/9/95	6/9/95	35	702	R
5/4/95	COC#303069																	
5/4/95	43-SHC-SW04		X	X	X		X	X	X	X		X		6/9/95	6/9/95	35	702	R
5/4/95	43-EC-SW01D		X	X	X		X	X	X	X		X		6/9/95	6/9/95	35	702	R
5/4/95	COC#303070																	
5/4/95	43-SHC-SW03		X	X	X		X	X	X	X		X		6/9/95	6/9/95	35	702	R; LIMITED VOL
5/4/95	43-EC-SW02		X	X	X		X	X	X	X		X		6/9/95	6/9/95	35	702	R
5/4/95	43-EC-SW01					X						X		6/9/95	6/9/95	35	702	R; MS/MSD
5/4/95	43-EC-SW01				X					X				6/9/95	6/9/95	35	702	R; MS/MSD
5/4/95	COC#303071																	
5/4/95	43-EC-SW01		X	X			X	X				X		6/9/95	6/9/95	35	702	R; MS/MSD
5/4/95	43-EC-SW01	X						X						6/9/95	6/9/95	35	702	R; TRIP BLANK
5/5/95	COC#303073																	
5/5/95	43-SHC-SW01	X	X	X	X		X	X	X	X		X		6/10/95	6/9/95	34	702	R
5/5/95	43-SHC-SW02	X			X		X	X		X		X		6/10/95	6/9/95	34	702	R
5/5/95	43-SHC-DSW02					X						X		6/10/95	6/9/95	34	702	R
5/5/95	43-SHC-DSW01					X						X		6/10/95	6/9/95	34	702	R
5/5/95	43-SHC-SW01	X						X						6/10/95	6/9/95	34	702	R; RINSATE
5/6/95	COC#303074																	
5/6/95	43-SHC-SW02		X	X				X	X					6/11/95	6/15/95	39	735	R
5/6/95	43-SHC-SW01		X	X	X			X	X	X				6/11/95	6/15/95	39	735	R; RINSATE
COUNT		9	8	8	8	7	7	9	8	8	12	3	7					

**OU No. 6, SITE 43  
SEDIMENT  
CTO-0303**

DATE SHIPPED	SAMPLE ID	Analysis Requested							Analysis Received							DATE EXPECTED	DATE REC'D	TURNAROUND TIME	SDG NO.	COMMENTS	
		TCL VOA	TCL SVOA	TCL PEST/PCB	TAL METALS	TOC	GRAIN SIZE	ATTERBERG LIMITS	TCL VOA	TCL SVOA	TCL PEST/PCB	TAL METALS	TOC	GRAIN SIZE	ATTERBERG LIMITS						
5/5/95	COC#303072																				
5/5/95	303-FC-SD01-06	X	X	X	X	X	X	X	X	X	X	X	X	X	X	6/10/95	6/9/95	34	724	R; SDG 704 ATT&GS	
5/5/95	43-EC-SD01-06	X	X	X	X	X	X	X	X	X	X	X	X	X	6/10/95	6/9/95	34	724	R; SDG 704 ATT&GS		
5/5/95	43-EC-SD01-06D	X	X	X	X	X			X	X	X	X	X		6/10/95	6/9/95	34	724	R		
5/5/95	43-EC-SD01-612	X	X	X	X	X			X	X	X	X	X		6/10/95	6/9/95	34	724	R		
5/5/95	43-SHC-SD03-06	X	X	X	X	X	X	X	X	X	X	X	X	X	6/10/95	6/9/95	34	724	R; MS/MSD; 704 ATT&GS		
5/5/95	43-SHC-SD04-06D	X	X	X	X	X			X	X	X	X	X		6/10/95	6/9/95	34	724	R		
5/5/95	43-SHC-SD04-612	X	X	X	X	X			X	X	X	X	X		6/10/95	6/9/95	34	724	R		
5/5/95	COC#303073																				
5/5/95	303-TR-47	X							X						6/10/95	6/9/95	34	724	R; TRIP BLANK		
5/5/95	43-SHC-SD03-612	X	X	X	X				X	X	X	X			6/10/95	6/9/95	34	724	R		
5/5/95	43-SHC-SD03-06	X	X	X	X				X	X	X	X			6/10/95	6/9/95	34	724	R		
5/5/95	43-EC-SD02-612	X	X	X	X				X	X	X	X			6/10/95	6/9/95	34	724	R		
5/5/95	43-EC-SD02-06	X	X	X	X				X	X	X	X			6/10/95	6/9/95	34	724	R		
5/5/95	43-SHC-SD02-612	X	X	X	X				X	X	X	X			6/10/95	6/9/95	34	724	R		
5/5/95	43-SHC-SD02-06	X	X	X	X				X	X	X	X			6/10/95	6/9/95	34	724	R		
5/5/95	43-SHC-SD01-612	X	X	X	X	X			X	X	X	X	X		6/10/95	6/9/95	34	724	R		
5/5/95	43-SHC-SD01-06	X	X	X	X	X			X	X	X	X	X		6/10/95	6/9/95	34	724	R		
COUNT		16	15	15	15	9	3	3	16	15	15	15	9	3	3						

OU No. 3, SITE 43

IDW

CTO-0303

		Analysis Requested						Analysis Received												
DATE SHIPPED	SAMPLE ID	TCL VOA	TCL SVOA	TCL PEST/PCB	TAL METALS	FLASH POINT	REACTIVE CYANIDE	REACTIVE SULFIDE	TCL VOA	TCL SVOA	TCL PEST/PCB	TAL METALS	FLASH POINT	REACTIVE CYANIDE	REACTIVE SULFIDE	DATE EXPECTED	DATE REC'D	TURNAROUND TIME	SDG	
4/25/95	COCH303062																			
4/25/95	43-TNK	X	X	X	X	X	X	X	X	X	X	X	X	X	X	5/3/95	5/30/95	35	500	QT
COUNT		1	1	1	1	1	1	1	1	1	1	1	1	1						

## APPENDIX H DATA AND FREQUENCY SUMMARIES

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**SOIL**

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**SITE 43, AGAN STREET DUMP**  
**SURFACE SOIL - FREQUENCY OF DETECTION SUMMARY**  
**REMEDIAL INVESTIGATION, CTO-0303**  
**MCB, CAMP LEJEUNE, NORTH CAROLINA**  
**ORGANIC COMPOUNDS**

LOCATION	43-DA1-SB01-00	43-DA1-SB02-00	43-DA1-SB03-00	43-DA2-SB01-00	43-DA2-SB02-00	43-GW01DW-00
DATE SAMPLED	03/10/95	03/10/95	03/10/95	03/10/95	03/10/95	02/28/95
DEPTH	0-12"	0-12"	0-12"	0-12"	0-12"	0-12"
UNITS	UG/KG	UG/KG	UG/KG	UG/KG	UG/KG	UG/KG
<b>VOLATILES</b>						
CHLOROMETHANE	NA	NA	16 U	17 U	NA	12 U
BROMOMETHANE	NA	NA	16 U	17 U	NA	12 U
VINYL CHLORIDE	NA	NA	16 U	17 U	NA	12 U
CHLOROETHANE	NA	NA	16 U	17 U	NA	12 U
METHYLENE CHLORIDE	NA	NA	16 U	17 U	NA	12 U
ACETONE	NA	NA	18 U	17 U	NA	12 U
CARBON DISULFIDE	NA	NA	16 U	17 U	NA	12 U
1,1-DICHLOROETHENE	NA	NA	16 U	17 U	NA	12 U
1,1-DICHLOROETHANE	NA	NA	16 U	17 U	NA	12 U
1,2-DICHLOROETHENE (TOTAL)	NA	NA	16 U	17 U	NA	12 U
CHLOROFORM	NA	NA	16 U	17 U	NA	12 U
1,2-DICHLOROETHANE	NA	NA	16 U	17 U	NA	12 U
2-BUTANONE	NA	NA	16 U	17 U	NA	12 U
1,1,1-TRICHLOROETHANE	NA	NA	16 U	17 U	NA	12 U
CARBON TETRACHLORIDE	NA	NA	16 U	17 U	NA	12 U
BROMODICHLOROMETHANE	NA	NA	16 U	17 U	NA	12 U
1,2-DICHLOROPROPANE	NA	NA	16 U	17 U	NA	12 U
CIS-1,3-DICHLOROPROPENE	NA	NA	16 U	17 U	NA	12 U
TRICHLOROETHENE	NA	NA	16 U	17 U	NA	12 U
DIBROMOCHLOROMETHANE	NA	NA	16 U	17 U	NA	12 U
1,1,2-TRICHLOROETHANE	NA	NA	16 U	17 U	NA	12 U
BENZENE	NA	NA	16 U	17 U	NA	12 U
TRANS-1,3-DICHLOROPROPENE	NA	NA	16 U	17 U	NA	12 U
BROMOFORM	NA	NA	16 U	17 U	NA	12 U
4-METHYL-2-PENTANONE	NA	NA	16 U	17 UJ	NA	12 U
2-HEXANONE	NA	NA	16 U	17 UJ	NA	12 U
TETRACHLOROETHENE	NA	NA	16 U	17 UJ	NA	12 U
1,1,2,2-TETRACHLOROETHANE	NA	NA	16 U	17 UJ	NA	12 U
TOLUENE	NA	NA	16 U	17 UJ	NA	12 U
CHLOROBENZENE	NA	NA	16 U	17 UJ	NA	12 U
ETHYLBENZENE	NA	NA	16 U	17 UJ	NA	12 U
STYRENE	NA	NA	16 U	17 UJ	NA	12 U
XYLENE (TOTAL)	NA	NA	16 U	17 UJ	NA	12 U

SITE 43, AGAN STREET DUMP  
 SURFACE SOIL - FREQUENCY OF DETECTION SUMMARY  
 REMEDIAL INVESTIGATION, CTO-0303  
 MCB, CAMP LEJEUNE, NORTH CAROLINA  
 ORGANIC COMPOUNDS

LOCATION	43-DA1-SB01-00	43-DA1-SB02-00	43-DA1-SB03-00	43-DA2-SB01-00	43-DA2-SB02-00	43-GW01DW-00
DATE SAMPLED	03/10/95	03/10/95	03/10/95	03/10/95	03/10/95	02/28/95
DEPTH	0-12"	0-12"	0-12"	0-12"	0-12"	0-12"
UNITS	UG/KG	UG/KG	UG/KG	UG/KG	UG/KG	UG/KG
<b>SEMIVOLATILES</b>						
PHENOL	430 U	500 U	530 U	540 U	450 U	390 U
BIS(2-CHLOROETHYL)ETHER	430 U	500 U	530 U	540 U	450 U	390 U
2-CHLOROPHENOL	430 U	500 U	530 U	540 U	450 U	390 U
1,3-DICHLOROBENZENE	430 U	500 U	530 U	540 U	450 U	390 U
1,4-DICHLOROBENZENE	430 U	500 U	530 U	540 U	450 U	390 U
1,2-DICHLOROBENZENE	430 U	500 U	530 U	540 U	450 U	390 U
2-METHYLPHENOL	430 U	500 U	530 U	540 U	450 U	390 U
2,2'-OXYBIS(1-CHLOROPROPANE)	430 U	500 U	530 U	540 U	450 U	390 U
4-METHYLPHENOL	430 U	120 J	530 U	540 U	450 U	390 U
N-NITROSO-DI-N-PROPYLAMINE	430 U	500 U	530 U	540 U	450 U	390 U
HEXACHLOROETHANE	430 U	500 U	530 U	540 U	450 U	390 U
NITROBENZENE	430 U	500 U	530 U	540 U	450 U	390 U
ISOPHORONE	430 U	500 U	530 U	540 U	450 U	390 U
2-NITROPHENOL	430 U	500 U	530 U	540 U	450 U	390 U
2,4-DIMETHYLPHENOL	430 U	500 U	530 U	540 U	450 U	390 U
BIS(2-CHLOROETHOXY)METHANE	430 U	500 U	530 U	540 U	450 U	390 U
2,4-DICHLOROPHENOL	430 U	500 U	530 U	540 U	450 U	390 U
1,2,4-TRICHLOROBENZENE	430 U	500 U	530 U	540 U	450 U	390 U
NAPHTHALENE	430 U	500 U	530 U	540 U	450 U	390 U
4-CHLOROANILINE	430 U	500 U	530 U	540 U	450 U	390 U
HEXACHLOROBUTADIENE	430 U	500 U	530 U	540 U	450 U	390 U
4-CHLORO-3-METHYLPHENOL	430 U	500 U	530 U	540 U	450 U	390 U
2-METHYLNAPHTHALENE	430 U	500 U	530 U	540 U	450 U	390 U
HEXACHLOROCYCLOPENTADIENE	430 U	500 U	530 U	540 U	450 U	390 U
2,4,6-TRICHLOROPHENOL	430 U	500 U	530 U	540 U	450 U	390 U
2,4,5-TRICHLOROPHENOL	1100 U	1200 U	1300 U	1400 U	1100 U	980 U
2-CHLORONAPHTHALENE	430 U	500 U	530 U	540 U	450 U	390 U
2-NITROANILINE	1100 U	1200 U	1300 U	1400 U	1100 U	980 U
DIMETHYLPHTHALATE	430 U	500 U	530 U	540 U	450 U	390 U
ACENAPHTHYLENE	430 U	500 U	530 U	540 U	450 U	390 U
2,6-DINITROTOLUENE	430 U	500 U	530 U	540 U	450 U	390 U
3-NITROANILINE	1100 U	1200 U	1300 U	1400 U	1100 U	980 U
ACENAPHTHENE	430 U	500 U	530 U	540 U	450 U	390 U
2,4-DINITROPHENOL	1100 U	1200 U	1300 U	1400 U	1100 U	980 U



**SITE 43, AGAN STREET DUMP**  
**SURFACE SOIL - FREQUENCY OF DETECTION SUMMARY**  
**REMEDIAL INVESTIGATION, CTO-0303**  
**MCB, CAMP LEJEUNE, NORTH CAROLINA**  
**ORGANIC COMPOUNDS**

LOCATION	43-DA1-SB01-00	43-DA1-SB02-00	43-DA1-SB03-00	43-DA2-SB01-00	43-DA2-SB02-00	43-GW01DW-00
DATE SAMPLED	03/10/95	03/10/95	03/10/95	03/10/95	03/10/95	02/28/95
DEPTH	0-12"	0-12"	0-12"	0-12"	0-12"	0-12"
UNITS	UG/KG	UG/KG	UG/KG	UG/KG	UG/KG	UG/KG
<b>SEMIVOLATILE cont.</b>						
4-NITROPHENOL	1100 U	1200 U	1300 U	1400 U	1100 U	980 U
DIBENZOFURAN	430 U	500 U	530 U	540 U	450 U	390 U
2,4-DINITROTOLUENE	430 U	500 U	530 U	540 U	450 U	390 U
DIETHYLPHTHALATE	430 U	500 U	530 U	540 U	450 U	390 U
4-CHLOROPHENYL-PHENYLETHER	430 U	500 U	530 U	540 U	450 U	390 U
FLUORENE	430 U	500 U	530 U	540 U	450 U	390 U
4-NITROANILINE	1100 U	1200 U	1300 U	1400 U	1100 U	980 U
4,6-DINITRO-2-METHYLPHENOL	1100 U	1200 U	1300 U	1400 U	1100 U	980 U
N-NITROSODIPHENYLAMINE (1)	430 U	500 U	530 U	540 U	450 U	390 U
4-BROMOPHENYL-PHENYLETHER	430 U	500 U	530 U	540 U	450 U	390 U
HEXACHLOROBENZENE	430 U	500 U	530 U	540 U	450 U	390 U
PENTACHLOROPHENOL	1100 U	1200 U	1300 U	1400 U	1100 U	980 U
PHENANTHRENE	430 U	500 U	530 U	540 U	450 U	720
ANTHRACENE	430 U	500 U	530 U	540 U	450 U	44 J
CARBAZOLE	430 U	500 U	530 U	540 U	450 U	99 J
DI-N-BUTYLPHTHALATE	430 U	500 U	530 U	540 U	450 U	390 U
FLUORANTHENE	430 U	500 U	530 U	540 U	450 U	1400
PYRENE	430 U	500 U	530 U	540 U	450 U	1100
BUTYLBENZYLPHTHALATE	430 U	500 U	530 U	540 U	450 U	390 U
3,3'-DICHLOROBENZIDINE	430 U	500 U	530 U	540 U	450 U	390 U
BENZO(A)ANTHRACENE	430 U	500 U	530 U	540 U	450 U	570
CHRYSENE	430 U	500 U	530 U	540 U	450 U	1000
BIS(2-ETHYLHEXYL)PHTHALATE	430 U	500 U	530 U	260 J	450 U	94 J
DI-N-OCTYL PHTHALATE	430 U	500 U	530 U	540 U	450 U	390 U
BENZO(B)FLUORANTHENE	430 U	500 U	530 U	540 U	450 U	1500
BENZO(K)FLUORANTHENE	430 U	500 U	530 U	540 U	450 U	580
BENZO(A)PYRENE	430 U	500 U	530 U	540 U	450 U	760
INDENO(1,2,3-CD)PYRENE	430 U	500 U	530 U	540 U	450 U	500
DIBENZO(A,H)ANTHRACENE	430 U	500 U	530 U	540 U	450 U	110 J
BENZO(G,H,I)PERYLENE	430 U	500 U	530 U	540 U	450 U	420

**SITE 43, AGAN STREET DUMP**  
**SURFACE SOIL - FREQUENCY OF DETECTION SUMMARY**  
**REMEDIAL INVESTIGATION, CTO-0303**  
**MCB, CAMP LEJEUNE, NORTH CAROLINA**  
**ORGANIC COMPOUNDS**

LOCATION	43-DA1-SB01-00	43-DA1-SB02-00	43-DA1-SB03-00	43-DA2-SB01-00	43-DA2-SB02-00	43-GW01DW-00
DATE SAMPLED	03/10/95	03/10/95	03/10/95	03/10/95	03/10/95	02/28/95
DEPTH	0-12"	0-12"	0-12"	0-12"	0-12"	0-12"
UNITS	UG/KG	UG/KG	UG/KG	UG/KG	UG/KG	UG/KG
<b>PESTICIDE/PCBS</b>						
ALPHA-BHC	NA	NA	2.7 U	2.7 U	NA	2 UJ
BETA-BHC	NA	NA	2.7 UJ	2.7 U	NA	2 UJ
DELTA-BHC	NA	NA	2.7 U	2.7 U	NA	2 UJ
GAMMA-BHC (LINDANE)	NA	NA	2.7 U	2.7 U	NA	2 UJ
HEPTACHLOR	NA	NA	2.7 U	2.7 U	NA	2 UJ
ALDRIN	NA	NA	2.7 U	2.7 U	NA	2 UJ
HEPTACHLOR EPOXIDE	NA	NA	2.7 U	2.7 U	NA	2 UJ
ENDOSULFAN I	NA	NA	2.7 U	2.7 U	NA	2 UJ
DIELDRIN	NA	NA	5.4 U	5.4 U	NA	3.9 UJ
4,4'-DDE	NA	NA	1000 J	15	NA	3.9 UJ
ENDRIN	NA	NA	5.4 U	5.4 U	NA	3.9 UJ
ENDOSULFAN II	NA	NA	5.4 U	5.4 U	NA	3.9 UJ
4,4'-DDD	NA	NA	3000	5.4 U	NA	3.9 UJ
ENDOSULFAN SULFATE	NA	NA	5.4 U	5.4 U	NA	3.9 UJ
4,4'-DDT	NA	NA	1000 J	19 J	NA	3.9 UJ
METHOXYCHLOR	NA	NA	27 U	27 U	NA	20 UJ
ENDRIN KETONE	NA	NA	5.4 U	5.4 U	NA	3.9 UJ
ENDRIN ALDEHYDE	NA	NA	5.4 U	5.4 J	NA	3.9 UJ
ALPHA-CHLORDANE	NA	NA	2.7 U	2.7 U	NA	2 UJ
GAMMA-CHLORDANE	NA	NA	2.7 U	2.7 U	NA	2 UJ
TOXAPHENE	NA	NA	270 U	270 U	NA	200 UJ
AROCLOR-1016	NA	NA	54 U	54 U	NA	39 UJ
AROCLOR-1221	NA	NA	110 U	110 U	NA	79 UJ
AROCLOR-1232	NA	NA	54 U	54 U	NA	39 UJ
AROCLOR-1242	NA	NA	54 U	54 U	NA	39 UJ
AROCLOR-1248	NA	NA	54 U	54 U	NA	39 UJ
AROCLOR-1254	NA	NA	54 U	54 U	NA	39 UJ
AROCLOR-1260	NA	NA	54 U	54 U	NA	39 UJ

**SITE 43, AGAN STREET DUMP**  
**SURFACE SOIL - FREQUENCY OF DETECTION SUMMARY**  
**REMEDIAL INVESTIGATION, CTO-0303**  
**MCB, CAMP LEJEUNE, NORTH CAROLINA**  
**ORGANIC COMPOUNDS**

LOCATION	43-MA-SB01-00	43-MA-SB02-00	43-MA-SB03-00	43-MA-SB04-00	43-MA-SB05-00	43-OA-SB01-00
DATE SAMPLED	02/28/95	02/28/95	02/28/95	02/28/95	02/28/95	03/10/95
DEPTH	0-12"	0-12"	0-12"	0-12"	0-12"	0-12"
UNITS	UG/KG	UG/KG	UG/KG	UG/KG	UG/KG	UG/KG
<b>VOLATILES</b>						
CHLOROMETHANE	NA	NA	13 U	NA	NA	NA
BROMOMETHANE	NA	NA	13 U	NA	NA	NA
VINYL CHLORIDE	NA	NA	13 U	NA	NA	NA
CHLOROETHANE	NA	NA	13 U	NA	NA	NA
METHYLENE CHLORIDE	NA	NA	13 U	NA	NA	NA
ACETONE	NA	NA	13 U	NA	NA	NA
CARBON DISULFIDE	NA	NA	13 U	NA	NA	NA
1,1-DICHLOROETHENE	NA	NA	13 U	NA	NA	NA
1,1-DICHLOROETHANE	NA	NA	13 U	NA	NA	NA
1,2-DICHLOROETHENE (TOTAL)	NA	NA	13 U	NA	NA	NA
CHLOROFORM	NA	NA	13 U	NA	NA	NA
1,2-DICHLOROETHANE	NA	NA	13 U	NA	NA	NA
2-BUTANONE	NA	NA	13 U	NA	NA	NA
1,1,1-TRICHLOROETHANE	NA	NA	13 UJ	NA	NA	NA
CARBON TETRACHLORIDE	NA	NA	13 UJ	NA	NA	NA
BROMODICHLOROMETHANE	NA	NA	13 UJ	NA	NA	NA
1,2-DICHLOROPROPANE	NA	NA	13 UJ	NA	NA	NA
CIS-1,3-DICHLOROPROPENE	NA	NA	13 UJ	NA	NA	NA
TRICHLOROETHENE	NA	NA	13 UJ	NA	NA	NA
DIBROMOCHLOROMETHANE	NA	NA	13 UJ	NA	NA	NA
1,1,2-TRICHLOROETHANE	NA	NA	13 UJ	NA	NA	NA
BENZENE	NA	NA	13 UJ	NA	NA	NA
TRANS-1,3-DICHLOROPROPENE	NA	NA	13 UJ	NA	NA	NA
BROMOFORM	NA	NA	13 UJ	NA	NA	NA
4-METHYL-2-PENTANONE	NA	NA	13 UJ	NA	NA	NA
2-HEXANONE	NA	NA	13 UJ	NA	NA	NA
TETRACHLOROETHENE	NA	NA	13 UJ	NA	NA	NA
1,1,2,2-TETRACHLOROETHANE	NA	NA	13 UJ	NA	NA	NA
TOLUENE	NA	NA	13 UJ	NA	NA	NA
CHLOROBENZENE	NA	NA	13 UJ	NA	NA	NA
ETHYLBENZENE	NA	NA	13 UJ	NA	NA	NA
STYRENE	NA	NA	13 UJ	NA	NA	NA
XYLENE (TOTAL)	NA	NA	13 UJ	NA	NA	NA

SITE 43, AGAN STREET DUMP  
 SURFACE SOIL - FREQUENCY OF DETECTION SUMMARY  
 REMEDIAL INVESTIGATION, CTO-0303  
 MCB, CAMP LEJEUNE, NORTH CAROLINA  
 ORGANIC COMPOUNDS

LOCATION	43-MA-SB01-00	43-MA-SB02-00	43-MA-SB03-00	43-MA-SB04-00	43-MA-SB05-00	43-OA-SB01-00
DATE SAMPLED	02/28/95	02/28/95	02/28/95	02/28/95	02/28/95	03/10/95
DEPTH	0-12"	0-12"	0-12"	0-12"	0-12"	0-12"
UNITS	UG/KG	UG/KG	UG/KG	UG/KG	UG/KG	UG/KG
<b>SEMIVOLATILES</b>						
PHENOL	410 U	400 U	430 U	490 U	400 U	470 U
BIS(2-CHLOROETHYL)ETHER	410 U	400 U	430 U	490 U	400 U	470 U
2-CHLOROPHENOL	410 U	400 U	430 U	490 U	400 U	470 U
1,3-DICHLOROBENZENE	410 U	400 U	430 U	490 U	400 U	470 U
1,4-DICHLOROBENZENE	410 U	400 U	430 U	490 U	400 U	470 U
1,2-DICHLOROBENZENE	410 U	400 U	430 U	490 U	400 U	470 U
2-METHYLPHENOL	410 U	400 U	430 U	490 U	400 U	470 U
2,2'-OXYBIS(1-CHLOROPROPANE)	410 U	400 U	430 U	490 U	400 U	470 U
4-METHYLPHENOL	410 U	400 U	430 U	490 U	400 U	470 U
N-NITROSO-DI-N-PROPYLAMINE	410 U	400 U	430 U	490 U	400 U	470 U
HEXACHLOROETHANE	410 U	400 U	430 U	490 U	400 U	470 U
NITROBENZENE	410 U	400 U	430 U	490 U	400 U	470 U
ISOPHORONE	410 U	400 U	430 U	490 U	400 U	470 U
2-NITROPHENOL	410 U	400 U	430 U	490 U	400 U	470 U
2,4-DIMETHYLPHENOL	410 U	400 U	430 U	490 U	400 U	470 U
BIS(2-CHLOROETHOXY)METHANE	410 U	400 U	430 U	490 U	400 U	470 U
2,4-DICHLOROPHENOL	410 U	400 U	430 U	490 U	400 U	470 U
1,2,4-TRICHLOROBENZENE	410 U	400 U	430 U	490 U	400 U	470 U
NAPHTHALENE	410 U	400 U	430 U	490 U	400 U	470 U
4-CHLOROANILINE	410 U	400 U	430 U	490 U	400 U	470 U
HEXACHLOROBUTADIENE	410 U	400 U	430 U	490 U	400 U	470 U
4-CHLORO-3-METHYLPHENOL	410 U	400 U	430 U	490 U	400 U	470 U
2-METHYLNAPHTHALENE	410 U	400 U	430 U	490 U	400 U	470 U
HEXACHLOROCYCLOPENTADIENE	410 U	400 UJ	430 U	490 UJ	400 U	470 U
2,4,6-TRICHLOROPHENOL	410 U	400 U	430 U	490 U	400 U	470 U
2,4,5-TRICHLOROPHENOL	1000 U	990 U	1100 U	1200 U	1000 U	1200 U
2-CHLORONAPHTHALENE	410 U	400 U	430 U	490 U	400 U	470 U
2-NITROANILINE	1000 U	990 U	1100 U	1200 U	1000 U	1200 U
DIMETHYLPHTHALATE	410 U	400 U	430 U	490 U	400 U	470 U
ACENAPHTHYLENE	410 U	400 U	430 U	490 U	400 U	470 U
2,6-DINITROTOLUENE	410 U	400 U	430 U	490 U	400 U	470 U
3-NITROANILINE	1000 U	990 U	1100 U	1200 U	1000 U	1200 U
ACENAPHTHENE	410 U	400 U	430 U	490 U	400 U	470 U
2,4-DINITROPHENOL	1000 U	990 U	1100 U	1200 U	1000 U	1200 U

**SITE 43, AGAN STREET DUMP**  
**SURFACE SOIL - FREQUENCY OF DETECTION SUMMARY**  
**REMEDIAL INVESTIGATION, CTO-0303**  
**MCB, CAMP LEJEUNE, NORTH CAROLINA**  
**ORGANIC COMPOUNDS**

LOCATION	43-MA-SB01-00	43-MA-SB02-00	43-MA-SB03-00	43-MA-SB04-00	43-MA-SB05-00	43-OA-SB01-00
DATE SAMPLED	02/28/95	02/28/95	02/28/95	02/28/95	02/28/95	03/10/95
DEPTH	0-12"	0-12"	0-12"	0-12"	0-12"	0-12"
UNITS	UG/KG	UG/KG	UG/KG	UG/KG	UG/KG	UG/KG
<b>SEMIVOLATILE cont.</b>						
4-NITROPHENOL	1000 U	990 U	1100 U	1200 U	1000 U	1200 U
DIBENZOFURAN	410 U	400 U	430 U	490 U	400 U	470 U
2,4-DINITROTOLUENE	410 U	400 U	430 U	490 U	400 U	470 U
DIETHYLPHTHALATE	410 U	400 U	430 U	490 U	400 U	470 U
4-CHLOROPHENYL-PHENYLEETHER	410 U	400 U	430 U	490 U	400 U	470 U
FLUORENE	410 U	400 U	430 U	490 U	400 U	470 U
4-NITROANILINE	1000 U	990 U	1100 U	1200 U	1000 U	1200 U
4,6-DINITRO-2-METHYLPHENOL	1000 U	990 U	1100 U	1200 U	1000 U	1200 U
N-NITROSODIPHENYLAMINE (1)	410 U	400 U	430 U	490 U	400 U	470 U
4-BROMOPHENYL-PHENYLEETHER	410 U	400 U	430 U	490 U	400 U	470 U
HEXACHLOROBENZENE	410 U	400 U	430 U	490 U	400 U	470 U
PENTACHLOROPHENOL	1000 U	990 U	1100 U	1200 U	1000 U	1200 U
PHENANTHRENE	410 U	400 U	430 U	490 U	400 U	470 U
ANTHRACENE	410 U	400 U	430 U	490 U	400 U	470 U
CARBAZOLE	410 U	400 U	430 U	490 U	400 U	470 U
DI-N-BUTYLPHTHALATE	410 U	400 U	430 U	490 U	400 U	470 U
FLUORANTHENE	410 U	400 U	430 U	490 U	400 U	470 U
PYRENE	410 U	400 U	430 U	490 U	400 UJ	470 U
BUTYLBENZYLPHTHALATE	410 U	400 U	430 U	490 U	400 UJ	470 U
3,3'-DICHLOROBENZIDINE	410 U	400 U	430 U	490 U	400 UJ	470 U
BENZO(A)ANTHRACENE	410 U	400 U	430 U	490 U	400 UJ	470 U
CHRYSENE	410 U	400 U	430 U	490 U	400 UJ	470 U
BIS(2-ETHYLHEXYL)PHTHALATE	410 U	400 U	430 U	120 J	56 J	470 U
DI-N-OCTYL PHTHALATE	410 U	400 U	430 U	490 U	400 U	470 U
BENZO(B)FLUORANTHENE	410 U	400 U	430 U	490 U	400 U	470 U
BENZO(K)FLUORANTHENE	410 U	400 U	430 U	490 U	400 U	470 U
BENZO(A)PYRENE	410 U	400 U	430 U	490 U	400 U	470 U
INDENO(1,2,3-CD)PYRENE	410 U	400 U	430 U	490 U	400 U	470 U
DIBENZO(A,H)ANTHRACENE	410 U	400 U	430 U	490 U	400 U	470 U
BENZO(G,H,I)PERYLENE	410 U	400 U	430 U	490 U	400 U	470 U

**SITE 43, AGAN STREET DUMP**  
**SURFACE SOIL - FREQUENCY OF DETECTION SUMMARY**  
**REMEDIAL INVESTIGATION, CTO-0303**  
**MCB, CAMP LEJEUNE, NORTH CAROLINA**  
**ORGANIC COMPOUNDS**

LOCATION	43-MA-SB01-00	43-MA-SB02-00	43-MA-SB03-00	43-MA-SB04-00	43-MA-SB05-00	43-OA-SB01-00
DATE SAMPLED	02/28/95	02/28/95	02/28/95	02/28/95	02/28/95	03/10/95
DEPTH	0-12"	0-12"	0-12"	0-12"	0-12"	0-12"
UNITS	UG/KG	UG/KG	UG/KG	UG/KG	UG/KG	UG/KG
<b>PESTICIDE/PCBS</b>						
ALPHA-BHC	NA	NA	2.1 U	NA	NA	NA
BETA-BHC	NA	NA	2.1 U	NA	NA	NA
DELTA-BHC	NA	NA	2.1 U	NA	NA	NA
GAMMA-BHC (LINDANE)	NA	NA	2.1 U	NA	NA	NA
HEPTACHLOR	NA	NA	2.1 U	NA	NA	NA
ALDRIN	NA	NA	2.1 U	NA	NA	NA
HEPTACHLOR EPOXIDE	NA	NA	2.1 U	NA	NA	NA
ENDOSULFAN I	NA	NA	2.1 U	NA	NA	NA
DIELDRIN	NA	NA	4.3 U	NA	NA	NA
4,4'-DDE	NA	NA	26	NA	NA	NA
ENDRIN	NA	NA	4.3 U	NA	NA	NA
ENDOSULFAN II	NA	NA	4.3 U	NA	NA	NA
4,4'-DDD	NA	NA	4.3 U	NA	NA	NA
ENDOSULFAN SULFATE	NA	NA	4.3 U	NA	NA	NA
4,4'-DDT	NA	NA	30	NA	NA	NA
METHOXYCHLOR	NA	NA	21 U	NA	NA	NA
ENDRIN KETONE	NA	NA	4.3 U	NA	NA	NA
ENDRIN ALDEHYDE	NA	NA	4.3 UJ	NA	NA	NA
ALPHA-CHLORDANE	NA	NA	2.1 U	NA	NA	NA
GAMMA-CHLORDANE	NA	NA	2.1 U	NA	NA	NA
TOXAPHENE	NA	NA	210 U	NA	NA	NA
AROCLOR-1016	NA	NA	43 U	NA	NA	NA
AROCLOR-1221	NA	NA	85 U	NA	NA	NA
AROCLOR-1232	NA	NA	43 U	NA	NA	NA
AROCLOR-1242	NA	NA	43 U	NA	NA	NA
AROCLOR-1248	NA	NA	43 U	NA	NA	NA
AROCLOR-1254	NA	NA	43 U	NA	NA	NA
AROCLOR-1260	NA	NA	43 U	NA	NA	NA

SITE 43, AGAN STREET DUMP  
 SURFACE SOIL - FREQUENCY OF DETECTION SUMMARY  
 REMEDIAL INVESTIGATION, CTO-0303  
 MCB, CAMP LEJEUNE, NORTH CAROLINA  
 ORGANIC COMPOUNDS

LOCATION	43-OA-SB02-00	43-OA-SB03-00	43-OA-SB04-00	43-OA-SB05-00	43-OA-SB06-00	43-OA-SB07-00
DATE SAMPLED	03/10/95	03/10/95	03/10/95	03/06/95	03/06/95	03/06/95
DEPTH	0-12"	0-12"	0-12"	0-12"	0-12"	0-12"
UNITS	UG/KG	UG/KG	UG/KG	UG/KG	UG/KG	UG/KG
<b>VOLATILES</b>						
CHLOROMETHANE	15 U	NA	NA	12 U	NA	NA
BROMOMETHANE	15 U	NA	NA	12 U	NA	NA
VINYL CHLORIDE	15 U	NA	NA	12 U	NA	NA
CHLOROETHANE	15 U	NA	NA	12 U	NA	NA
METHYLENE CHLORIDE	15 U	NA	NA	12 U	NA	NA
ACETONE	15 U	NA	NA	12 U	NA	NA
CARBON DISULFIDE	15 U	NA	NA	12 U	NA	NA
1,1-DICHLOROETHENE	15 U	NA	NA	12 U	NA	NA
1,1-DICHLOROETHANE	15 U	NA	NA	12 U	NA	NA
1,2-DICHLOROETHENE (TOTAL)	15 U	NA	NA	12 U	NA	NA
CHLOROFORM	15 U	NA	NA	12 U	NA	NA
1,2-DICHLOROETHANE	15 U	NA	NA	12 U	NA	NA
2-BUTANONE	15 U	NA	NA	12 U	NA	NA
1,1,1-TRICHLOROETHANE	15 U	NA	NA	12 U	NA	NA
CARBON TETRACHLORIDE	15 U	NA	NA	12 U	NA	NA
BROMODICHLOROMETHANE	15 U	NA	NA	12 U	NA	NA
1,2-DICHLOROPROPANE	15 U	NA	NA	12 U	NA	NA
CIS-1,3-DICHLOROPROPENE	15 U	NA	NA	12 U	NA	NA
TRICHLOROETHENE	15 U	NA	NA	12 U	NA	NA
DIBROMOCHLOROMETHANE	15 U	NA	NA	12 U	NA	NA
1,1,2-TRICHLOROETHANE	15 U	NA	NA	12 U	NA	NA
BENZENE	15 U	NA	NA	12 U	NA	NA
TRANS-1,3-DICHLOROPROPENE	15 U	NA	NA	12 U	NA	NA
BROMOFORM	15 U	NA	NA	12 U	NA	NA
4-METHYL-2-PENTANONE	15 UJ	NA	NA	12 U	NA	NA
2-HEXANONE	15 UJ	NA	NA	12 U	NA	NA
TETRACHLOROETHENE	15 UJ	NA	NA	12 U	NA	NA
1,1,2,2-TETRACHLOROETHANE	15 UJ	NA	NA	12 U	NA	NA
TOLUENE	15 UJ	NA	NA	12 U	NA	NA
CHLOROBENZENE	15 UJ	NA	NA	12 U	NA	NA
ETHYLBENZENE	15 UJ	NA	NA	12 U	NA	NA
STYRENE	15 UJ	NA	NA	12 U	NA	NA
XYLENE (TOTAL)	15 UJ	NA	NA	12 U	NA	NA

SITE 43, AGAN STREET DUMP  
SURFACE SOIL - FREQUENCY OF DETECTION SUMMARY  
REMEDIAL INVESTIGATION, CTO-0303  
MCB, CAMP LEJEUNE, NORTH CAROLINA  
ORGANIC COMPOUNDS

LOCATION	43-OA-SB02-00	43-OA-SB03-00	43-OA-SB04-00	43-OA-SB05-00	43-OA-SB06-00	43-OA-SB07-00
DATE SAMPLED	03/10/95	03/10/95	03/10/95	03/06/95	03/06/95	03/06/95
DEPTH	0-12"	0-12"	0-12"	0-12"	0-12"	0-12"
UNITS	UG/KG	UG/KG	UG/KG	UG/KG	UG/KG	UG/KG
<b>SEMIVOLATILES</b>						
PHENOL	500 U	460 U	440 U	400 U	410 U	400 U
BIS(2-CHLOROETHYL)ETHER	500 U	460 U	440 U	400 U	410 U	400 U
2-CHLOROPHENOL	500 U	460 U	440 U	400 U	410 U	400 U
1,3-DICHLOROBENZENE	500 U	460 U	440 U	400 U	410 U	400 U
1,4-DICHLOROBENZENE	500 U	460 U	440 U	400 U	410 U	400 U
1,2-DICHLOROBENZENE	500 U	460 U	440 U	400 U	410 U	400 U
2-METHYLPHENOL	500 U	460 U	440 U	400 U	410 U	400 U
2,2'-OXYBIS(1-CHLOROPROPANE)	500 U	460 U	440 U	400 U	410 U	400 U
4-METHYLPHENOL	500 U	460 U	440 U	400 U	410 U	400 U
N-NITROSO-DI-N-PROPYLAMINE	500 U	460 U	440 U	400 U	410 U	400 U
HEXACHLOROETHANE	500 U	460 U	440 U	400 U	410 U	400 U
NITROBENZENE	500 U	460 U	440 U	400 U	410 U	400 U
ISOPHORONE	500 U	460 U	440 U	400 U	410 U	400 U
2-NITROPHENOL	500 U	460 U	440 U	400 U	410 U	400 U
2,4-DIMETHYLPHENOL	500 U	460 U	440 U	400 U	410 U	400 U
BIS(2-CHLOROETHOXY)METHANE	500 U	460 U	440 U	400 U	410 U	400 U
2,4-DICHLOROPHENOL	500 U	460 U	440 U	400 U	410 U	400 U
1,2,4-TRICHLOROBENZENE	500 U	460 U	440 U	400 U	410 U	400 U
NAPHTHALENE	500 U	460 U	440 U	400 U	410 U	400 U
4-CHLOROANILINE	500 U	460 U	440 U	400 U	410 U	400 U
HEXACHLOROBUTADIENE	500 U	460 U	440 U	400 U	410 U	400 U
4-CHLORO-3-METHYLPHENOL	500 U	460 U	440 U	400 U	410 U	400 U
2-METHYLNAPHTHALENE	500 U	460 U	440 U	400 U	410 U	400 U
HEXACHLOROCYCLOPENTADIENE	500 U	460 U	440 U	400 U	410 U	400 U
2,4,6-TRICHLOROPHENOL	500 U	460 U	440 U	400 U	410 U	400 U
2,4,5-TRICHLOROPHENOL	1300 U	1100 U	1100 U	990 U	1000 U	1000 U
2-CHLORONAPHTHALENE	500 U	460 U	440 U	400 U	410 U	400 U
2-NITROANILINE	1300 U	1100 U	1100 U	990 U	1000 U	1000 U
DIMETHYLPHTHALATE	500 U	460 U	440 U	400 U	410 U	400 U
ACENAPHTHYLENE	500 U	460 U	440 U	400 U	410 U	400 U
2,6-DINITROTOLUENE	500 U	460 U	440 U	400 U	410 U	400 U
3-NITROANILINE	1300 U	1100 U	1100 U	990 U	1000 U	1000 U
ACENAPHTHENE	500 U	460 U	440 U	400 U	410 U	400 U
2,4-DINITROPHENOL	1300 U	1100 U	1100 U	990 U	1000 U	1000 U



**SITE 43, AGAN STREET DUMP**  
**SURFACE SOIL - FREQUENCY OF DETECTION SUMMARY**  
**REMEDIAL INVESTIGATION, CTO-0303**  
**MCB, CAMP LEJEUNE, NORTH CAROLINA**  
**ORGANIC COMPOUNDS**

LOCATION	43-OA-SB02-00	43-OA-SB03-00	43-OA-SB04-00	43-OA-SB05-00	43-OA-SB06-00	43-OA-SB07-00
DATE SAMPLED	03/10/95	03/10/95	03/10/95	03/06/95	03/06/95	03/06/95
DEPTH	0-12"	0-12"	0-12"	0-12"	0-12"	0-12"
UNITS	UG/KG	UG/KG	UG/KG	UG/KG	UG/KG	UG/KG
<b>SEMIVOLATILE cont.</b>						
4-NITROPHENOL	1300 U	1100 U	1100 U	990 U	1000 U	1000 U
DIBENZOFURAN	500 U	460 U	440 U	400 U	410 U	400 U
2,4-DINITROTOLUENE	500 U	460 U	440 U	400 U	410 U	400 U
DIETHYLPHTHALATE	500 U	460 U	440 U	400 U	410 U	400 U
4-CHLOROPHENYL-PHENYLETHER	500 U	460 U	440 U	400 U	410 U	400 U
FLUORENE	500 U	460 U	440 U	400 U	410 U	400 U
4-NITROANILINE	1300 U	1100 U	1100 U	990 U	1000 U	1000 U
4,6-DINITRO-2-METHYLPHENOL	1300 U	1100 U	1100 U	990 U	1000 U	1000 U
N-NITROSODIPHENYLAMINE (1)	500 U	460 U	440 U	400 U	410 U	400 U
4-BROMOPHENYL-PHENYLETHER	500 U	460 U	440 U	400 U	410 U	400 U
HEXACHLOROBENZENE	500 U	460 U	440 U	400 U	410 U	400 U
PENTACHLOROPHENOL	1300 U	1100 U	1100 U	990 U	1000 U	1000 U
PHENANTHRENE	500 U	460 U	440 U	400 U	410 U	400 U
ANTHRACENE	500 U	460 U	440 U	400 U	410 U	400 U
CARBAZOLE	500 U	460 U	440 U	400 U	410 U	400 U
DI-N-BUTYLPHTHALATE	500 U	1600 U	440 U	1200 B	2000 U	400 U
FLUORANTHENE	500 U	460 U	440 U	400 U	410 U	400 U
PYRENE	500 U	460 U	440 U	400 U	410 U	400 U
BUTYLBENZYLPHTHALATE	500 U	420 J	440 U	400 U	410 U	400 U
3,3'-DICHLOROBENZIDINE	500 U	460 U	440 U	400 U	410 U	400 U
BENZO(A)ANTHRACENE	500 U	460 U	440 U	400 U	410 U	400 U
CHRYSENE	500 U	460 U	440 U	400 U	410 U	400 U
BIS(2-ETHYLHEXYL)PHTHALATE	500 U	430 J	440 U	400 U	410 U	400 U
DI-N-OCTYL PHTHALATE	500 U	460 U	440 U	400 U	410 U	400 U
BENZO(B)FLUORANTHENE	500 U	460 U	440 U	400 U	410 U	400 U
BENZO(K)FLUORANTHENE	500 U	460 U	440 U	400 U	410 U	400 U
BENZO(A)PYRENE	500 U	460 U	440 U	400 U	410 U	400 U
INDENO(1,2,3-CD)PYRENE	500 U	460 U	440 U	400 U	410 U	400 U
DIBENZO(A,H)ANTHRACENE	500 U	460 U	440 U	400 U	410 U	400 U
BENZO(G,H,I)PERYLENE	500 U	460 U	440 U	400 U	410 U	400 U

**SITE 43, AGAN STREET DUMP**  
**SURFACE SOIL - FREQUENCY OF DETECTION SUMMARY**  
**REMEDIAL INVESTIGATION, CTO-0303**  
**MCB, CAMP LEJEUNE, NORTH CAROLINA**  
**ORGANIC COMPOUNDS**

LOCATION	43-OA-SB02-00	43-OA-SB03-00	43-OA-SB04-00	43-OA-SB05-00	43-OA-SB06-00	43-OA-SB07-00
DATE SAMPLED	03/10/95	03/10/95	03/10/95	03/06/95	03/06/95	03/06/95
DEPTH	0-12"	0-12"	0-12"	0-12"	0-12"	0-12"
UNITS	UG/KG	UG/KG	UG/KG	UG/KG	UG/KG	UG/KG
<b>PESTICIDE/PCBS</b>						
ALPHA-BHC	2.5 U	NA	NA	2 UJ	NA	NA
BETA-BHC	2.5 U	NA	NA	2 U	NA	NA
DELTA-BHC	2.5 U	NA	NA	2 UJ	NA	NA
GAMMA-BHC (LINDANE)	2.5 U	NA	NA	2 UJ	NA	NA
HEPTACHLOR	2.5 U	NA	NA	2 U	NA	NA
ALDRIN	2.5 U	NA	NA	2 U	NA	NA
HEPTACHLOR EPOXIDE	2.5 U	NA	NA	2 U	NA	NA
ENDOSULFAN I	2.5 U	NA	NA	2 U	NA	NA
DIELDRIN	5 U	NA	NA	4 U	NA	NA
4,4'-DDE	7.1	NA	NA	4 UJ	NA	NA
ENDRIN	5 U	NA	NA	4 U	NA	NA
ENDOSULFAN II	5 U	NA	NA	4 U	NA	NA
4,4'-DDD	5 U	NA	NA	4 U	NA	NA
ENDOSULFAN SULFATE	5 U	NA	NA	4 U	NA	NA
4,4'-DDT	10	NA	NA	4 U	NA	NA
METHOXYCHLOR	25 U	NA	NA	20 U	NA	NA
ENDRIN KETONE	5 U	NA	NA	4 U	NA	NA
ENDRIN ALDEHYDE	5 U	NA	NA	4 U	NA	NA
ALPHA-CHLORDANE	2.5 U	NA	NA	2 U	NA	NA
GAMMA-CHLORDANE	2.5 U	NA	NA	2 U	NA	NA
TOXAPHENE	250 U	NA	NA	200 U	NA	NA
AROCLOR-1016	50 U	NA	NA	40 U	NA	NA
AROCLOR-1221	100 U	NA	NA	79 U	NA	NA
AROCLOR-1232	50 U	NA	NA	40 U	NA	NA
AROCLOR-1242	50 U	NA	NA	40 U	NA	NA
AROCLOR-1248	50 U	NA	NA	40 U	NA	NA
AROCLOR-1254	50 U	NA	NA	40 U	NA	NA
AROCLOR-1260	50 U	NA	NA	40 U	NA	NA

**SITE 43, AGAN STREET DUMP**  
**SURFACE SOIL - FREQUENCY OF DETECTION SUMMARY**  
**REMEDIAL INVESTIGATION, CTO-0303**  
**MCB, CAMP LEJEUNE, NORTH CAROLINA**  
**ORGANIC COMPOUNDS**

LOCATION	43-WA-SB01-00	43-WA-SB01A-00	43-WA-SB01A1-00	43-WA-SB01A2-00	43-WA-SB01A3-00	43-WA-SB01A4-00
DATE SAMPLED	02/28/95	03/14/95	05/01/95	05/01/95	05/01/95	05/01/95
DEPTH	0-12"	0-12"	0-12"	0-12"	0-12"	0-12"
UNITS	UG/KG	UG/KG	UG/KG	UG/KG	UG/KG	UG/KG
<b>VOLATILES</b>						
CHLOROMETHANE	12 U	NA	NA	NA	NA	NA
BROMOMETHANE	12 U	NA	NA	NA	NA	NA
VINYL CHLORIDE	12 U	NA	NA	NA	NA	NA
CHLOROETHANE	12 U	NA	NA	NA	NA	NA
METHYLENE CHLORIDE	12 U	NA	NA	NA	NA	NA
ACETONE	12 U	NA	NA	NA	NA	NA
CARBON DISULFIDE	12 U	NA	NA	NA	NA	NA
1,1-DICHLOROETHENE	12 U	NA	NA	NA	NA	NA
1,1-DICHLOROETHANE	12 U	NA	NA	NA	NA	NA
1,2-DICHLOROETHENE (TOTAL)	12 U	NA	NA	NA	NA	NA
CHLOROFORM	12 U	NA	NA	NA	NA	NA
1,2-DICHLOROETHANE	12 U	NA	NA	NA	NA	NA
2-BUTANONE	12 U	NA	NA	NA	NA	NA
1,1,1-TRICHLOROETHANE	12 U	NA	NA	NA	NA	NA
CARBON TETRACHLORIDE	12 U	NA	NA	NA	NA	NA
BROMODICHLOROMETHANE	12 U	NA	NA	NA	NA	NA
1,2-DICHLOROPROPANE	12 U	NA	NA	NA	NA	NA
CIS-1,3-DICHLOROPROPENE	12 U	NA	NA	NA	NA	NA
TRICHLOROETHENE	12 U	NA	NA	NA	NA	NA
DIBROMOCHLOROMETHANE	12 U	NA	NA	NA	NA	NA
1,1,2-TRICHLOROETHANE	12 U	NA	NA	NA	NA	NA
BENZENE	12 U	NA	NA	NA	NA	NA
TRANS-1,3-DICHLOROPROPENE	12 U	NA	NA	NA	NA	NA
BROMOFORM	12 U	NA	NA	NA	NA	NA
4-METHYL-2-PENTANONE	12 U	NA	NA	NA	NA	NA
2-HEXANONE	12 U	NA	NA	NA	NA	NA
TETRACHLOROETHENE	12 U	NA	NA	NA	NA	NA
1,1,2,2-TETRACHLOROETHANE	12 U	NA	NA	NA	NA	NA
TOLUENE	12 U	NA	NA	NA	NA	NA
CHLOROBENZENE	12 U	NA	NA	NA	NA	NA
ETHYLBENZENE	12 U	NA	NA	NA	NA	NA
STYRENE	12 U	NA	NA	NA	NA	NA
XYLENE (TOTAL)	12 U	NA	NA	NA	NA	NA

**SITE 43, AGAN STREET DUMP**  
**SURFACE SOIL - FREQUENCY OF DETECTION SUMMARY**  
**REMEDIAL INVESTIGATION, CTO-0303**  
**MCB, CAMP LEJEUNE, NORTH CAROLINA**  
**ORGANIC COMPOUNDS**

LOCATION	43-WA-SB01-00	43-WA-SB01A-00	43-WA-SB01A1-00	43-WA-SB01A2-00	43-WA-SB01A3-00	43-WA-SB01A4-00
DATE SAMPLED	02/28/95	03/14/95	05/01/95	05/01/95	05/01/95	05/01/95
DEPTH	0-12"	0-12"	0-12"	0-12"	0-12"	0-12"
UNITS	UG/KG	UG/KG	UG/KG	UG/KG	UG/KG	UG/KG
<b>SEMIVOLATILES</b>						
PHENOL	400 U	400 U	340 U	370 U	340 U	350 U
BIS(2-CHLOROETHYL)ETHER	400 U	400 U	340 U	370 U	340 U	350 U
2-CHLOROPHENOL	400 U	400 U	340 U	370 U	340 U	350 U
1,3-DICHLOROBENZENE	400 U	400 U	340 U	370 U	340 U	350 U
1,4-DICHLOROBENZENE	400 U	400 U	340 U	370 U	340 U	350 U
1,2-DICHLOROBENZENE	400 U	400 U	340 U	370 U	340 U	350 U
2-METHYLPHENOL	400 U	400 U	340 U	370 U	340 U	350 U
2,2'-OXYBIS(1-CHLOROPROPANE)	400 U	400 U	340 U	370 U	340 U	350 U
4-METHYLPHENOL	400 U	400 U	340 U	370 U	340 U	350 U
N-NITROSO-DI-N-PROPYLAMINE	400 U	400 U	340 U	370 U	340 U	350 U
HEXACHLOROETHANE	400 U	400 U	340 U	370 U	340 U	350 U
NITROBENZENE	400 U	400 U	340 U	370 U	340 U	350 U
ISOPHORONE	400 U	400 U	340 U	370 U	340 U	350 U
2-NITROPHENOL	400 U	400 U	340 U	370 U	340 U	350 U
2,4-DIMETHYLPHENOL	400 U	400 U	340 U	370 U	340 U	350 U
BIS(2-CHLOROETHOXY)METHANE	400 U	400 U	340 U	370 U	340 U	350 U
2,4-DICHLOROPHENOL	400 U	400 U	340 U	370 U	340 U	350 U
1,2,4-TRICHLOROBENZENE	400 U	400 U	340 U	370 U	340 U	350 U
NAPHTHALENE	400 U	400 U	340 U	370 U	340 U	350 U
4-CHLOROANILINE	400 U	400 U	340 U	370 U	340 U	350 U
HEXACHLOROBUTADIENE	400 U	400 U	340 U	370 U	340 U	350 U
4-CHLORO-3-METHYLPHENOL	400 U	400 U	340 U	370 U	340 U	350 U
2-METHYLNAPHTHALENE	400 U	74 J	340 U	370 U	340 U	350 U
HEXACHLOROCYCLOPENTADIENE	400 U	400 U	340 U	370 U	340 U	350 U
2,4,6-TRICHLOROPHENOL	400 U	400 U	340 U	370 U	340 U	350 U
2,4,5-TRICHLOROPHENOL	1000 U	1000 U	860 U	920 U	850 U	880 U
2-CHLORONAPHTHALENE	400 U	400 U	340 U	370 U	340 U	350 U
2-NITROANILINE	1000 U	1000 U	860 U	920 U	850 U	880 U
DIMETHYLPHTHALATE	400 U	400 U	340 U	370 U	340 U	350 U
ACENAPHTHYLENE	400 U	400 U	340 U	370 U	71 J	350 U
2,6-DINITROTOLUENE	400 U	400 U	340 U	370 U	340 U	350 U
3-NITROANILINE	1000 U	1000 U	860 U	920 U	850 U	880 U
ACENAPHTHENE	400 U	2900	340 U	45 J	63 J	350 U
2,4-DINITROPHENOL	1000 U	1000 U	860 U	920 U	850 U	880 U

**SITE 43, AGAN STREET DUMP**  
**SURFACE SOIL - FREQUENCY OF DETECTION SUMMARY**  
**REMEDIAL INVESTIGATION, CTO-0303**  
**MCB, CAMP LEJEUNE, NORTH CAROLINA**  
**ORGANIC COMPOUNDS**

LOCATION	43-WA-SB01-00	43-WA-SB01A-00	43-WA-SB01A1-00	43-WA-SB01A2-00	43-WA-SB01A3-00	43-WA-SB01A4-00
DATE SAMPLED	02/28/95	03/14/95	05/01/95	05/01/95	05/01/95	05/01/95
DEPTH	0-12"	0-12"	0-12"	0-12"	0-12"	0-12"
UNITS	UG/KG	UG/KG	UG/KG	UG/KG	UG/KG	UG/KG
<b>SEMIVOLATILE cont.</b>						
4-NITROPHENOL	1000 U	1000 U	860 U	920 U	850 U	880 U
DIBENZOFURAN	400 U	870	340 U	370 U	35 J	350 U
2,4-DINITROTOLUENE	400 U	400 U	340 U	370 U	340 U	350 U
DIETHYLPHTHALATE	400 U	400 U	340 U	370 U	340 U	350 U
4-CHLOROPHENYL-PHENYLETHER	400 U	400 U	340 U	370 U	340 U	350 U
FLUORENE	400 U	1700	340 U	53 J	59 J	350 U
4-NITROANILINE	1000 U	1000 U	860 U	920 U	850 U	880 U
4,6-DINITRO-2-METHYLPHENOL	1000 U	1000 U	860 U	920 U	850 U	880 U
N-NITROSODIPHENYLAMINE (1)	400 U	400 U	340 U	370 U	340 U	350 U
4-BROMOPHENYL-PHENYLETHER	400 U	400 U	340 U	370 U	340 U	350 U
HEXACHLOROBENZENE	400 U	400 U	340 U	370 U	340 U	350 U
PENTACHLOROPHENOL	1000 U	1000 U	860 U	920 U	850 U	880 U
PHENANTHRENE	260 J	5900 J	610	1000	1300	67 J
ANTHRACENE	400 U	820	340 U	370 U	210 J	350 U
CARBAZOLE	400 U	350 J	120 J	260 J	300 J	350 U
DI-N-BUTYLPHTHALATE	400 U	400 U	350 U	570 U	1700 U	450 U
FLUORANTHENE	530	60000	1500	2200	6400	230 J
PYRENE	470	64000	1200	2100	6500	170 J
BUTYLBENZYLPHTHALATE	400 U	400 U	340 U	50 J	100 J	350 U
3,3'-DICHLOROBENZIDINE	400 U	400 U	340 U	370 U	340 U	350 U
BENZO(A)ANTHRACENE	190 J	41000	560	980	3200	51 J
CHRYSENE	370 J	46000	890	1500	4500	110 J
BIS(2-ETHYLHEXYL)PHTHALATE	82 J	400 U	340 U	500 U	480 U	350 U
DI-N-OCTYL PHTHALATE	400 U	400 U	340 U	370 U	340 U	350 U
BENZO(B)FLUORANTHENE	410	52000	1100	2300	6800	170 J
BENZO(K)FLUORANTHENE	200 J	20000	420	700	1300	57 J
BENZO(A)PYRENE	260 J	39000	690	1300	4700	79 J
INDENO(1,2,3-CD)PYRENE	270 J	27000	590	1300	3600	90 J
DIBENZO(A,H)ANTHRACENE	73 J	1200	110 J	280 J	710	350 U
BENZO(G,H,I)PERYLENE	280 J	24000	560	1200	3400	87 J

**SITE 43, AGAN STREET DUMP**  
**SURFACE SOIL - FREQUENCY OF DETECTION SUMMARY**  
**REMEDIAL INVESTIGATION, CTO-0303**  
**MCB, CAMP LEJEUNE, NORTH CAROLINA**  
**ORGANIC COMPOUNDS**

LOCATION	43-WA-SB01-00	43-WA-SB01A-00	43-WA-SB01A1-00	43-WA-SB01A2-00	43-WA-SB01A3-00	43-WA-SB01A4-00
DATE SAMPLED	02/28/95	03/14/95	05/01/95	05/01/95	05/01/95	05/01/95
DEPTH	0-12"	0-12"	0-12"	0-12"	0-12"	0-12"
UNITS	UG/KG	UG/KG	UG/KG	UG/KG	UG/KG	UG/KG
<b>PESTICIDE/PCBS</b>						
ALPHA-BHC	2 UJ	NA	NA	NA	NA	NA
BETA-BHC	2 UJ	NA	NA	NA	NA	NA
DELTA-BHC	2 UJ	NA	NA	NA	NA	NA
GAMMA-BHC (LINDANE)	2 UJ	NA	NA	NA	NA	NA
HEPTACHLOR	2 UJ	NA	NA	NA	NA	NA
ALDRIN	2 UJ	NA	NA	NA	NA	NA
HEPTACHLOR EPOXIDE	2 J	NA	NA	NA	NA	NA
ENDOSULFAN I	2 UJ	NA	NA	NA	NA	NA
DIELDRIN	4.1 UJ	NA	NA	NA	NA	NA
4,4'-DDE	5.7 J	NA	NA	NA	NA	NA
ENDRIN	4.1 UJ	NA	NA	NA	NA	NA
ENDOSULFAN II	4.1 UJ	NA	NA	NA	NA	NA
4,4'-DDD	4.1 UJ	NA	NA	NA	NA	NA
ENDOSULFAN SULFATE	4.1 UJ	NA	NA	NA	NA	NA
4,4'-DDT	4.1 UJ	NA	NA	NA	NA	NA
METHOXYCHLOR	20 UJ	NA	NA	NA	NA	NA
ENDRIN KETONE	4.1 UJ	NA	NA	NA	NA	NA
ENDRIN ALDEHYDE	4.1 UJ	NA	NA	NA	NA	NA
ALPHA-CHLORDANE	2 UJ	NA	NA	NA	NA	NA
GAMMA-CHLORDANE	2 UJ	NA	NA	NA	NA	NA
TOXAPHENE	200 UJ	NA	NA	NA	NA	NA
AROCLOR-1016	41 UJ	NA	NA	NA	NA	NA
AROCLOR-1221	82 UJ	NA	NA	NA	NA	NA
AROCLOR-1232	41 UJ	NA	NA	NA	NA	NA
AROCLOR-1242	41 UJ	NA	NA	NA	NA	NA
AROCLOR-1248	41 UJ	NA	NA	NA	NA	NA
AROCLOR-1254	41 UJ	NA	NA	NA	NA	NA
AROCLOR-1260	41 UJ	NA	NA	NA	NA	NA

**SITE 43, AGAN STREET DUMP**  
**SURFACE SOIL - FREQUENCY OF DETECTION SUMMARY**  
**REMEDIAL INVESTIGATION, CTO-0303**  
**MCB, CAMP LEJEUNE, NORTH CAROLINA**  
**ORGANIC COMPOUNDS**

LOCATION	43-WA-SB01B-00	43-WA-SB01C-00	43-WA-SB02-00	43-WA-SB03-00
DATE SAMPLED	03/14/95	03/14/95	02/28/95	02/28/95
DEPTH	0-12"	0-12"	0-12"	0-12"
UNITS	UG/KG	UG/KG	UG/KG	UG/KG
<b>VOLATILES</b>				
CHLOROMETHANE	NA	NA	NA	NA
BROMOMETHANE	NA	NA	NA	NA
VINYL CHLORIDE	NA	NA	NA	NA
CHLOROETHANE	NA	NA	NA	NA
METHYLENE CHLORIDE	NA	NA	NA	NA
ACETONE	NA	NA	NA	NA
CARBON DISULFIDE	NA	NA	NA	NA
1,1-DICHLOROETHENE	NA	NA	NA	NA
1,1-DICHLOROETHANE	NA	NA	NA	NA
1,2-DICHLOROETHENE (TOTAL)	NA	NA	NA	NA
CHLOROFORM	NA	NA	NA	NA
1,2-DICHLOROETHANE	NA	NA	NA	NA
2-BUTANONE	NA	NA	NA	NA
1,1,1-TRICHLOROETHANE	NA	NA	NA	NA
CARBON TETRACHLORIDE	NA	NA	NA	NA
BROMODICHLOROMETHANE	NA	NA	NA	NA
1,2-DICHLOROPROPANE	NA	NA	NA	NA
CIS-1,3-DICHLOROPROPENE	NA	NA	NA	NA
TRICHLOROETHENE	NA	NA	NA	NA
DIBROMOCHLOROMETHANE	NA	NA	NA	NA
1,1,2-TRICHLOROETHANE	NA	NA	NA	NA
BENZENE	NA	NA	NA	NA
TRANS-1,3-DICHLOROPROPENE	NA	NA	NA	NA
BROMOFORM	NA	NA	NA	NA
4-METHYL-2-PENTANONE	NA	NA	NA	NA
2-HEXANONE	NA	NA	NA	NA
TETRACHLOROETHENE	NA	NA	NA	NA
1,1,2,2-TETRACHLOROETHANE	NA	NA	NA	NA
TOLUENE	NA	NA	NA	NA
CHLOROBENZENE	NA	NA	NA	NA
ETHYLBENZENE	NA	NA	NA	NA
STYRENE	NA	NA	NA	NA
XYLENE (TOTAL)	NA	NA	NA	NA

**SITE 43, AGAN STREET DUMP**  
**SURFACE SOIL - FREQUENCY OF DETECTION SUMMARY**  
**REMEDIAL INVESTIGATION, CTO-0303**  
**MCB, CAMP LEJEUNE, NORTH CAROLINA**  
**ORGANIC COMPOUNDS**

LOCATION	43-WA-SB01B-00	43-WA-SB01C-00	43-WA-SB02-00	43-WA-SB03-00
DATE SAMPLED	03/14/95	03/14/95	02/28/95	02/28/95
DEPTH	0-12"	0-12"	0-12"	0-12"
UNITS	UG/KG	UG/KG	UG/KG	UG/KG
<b>SEMIVOLATILES</b>				
PHENOL	410 U	350 U	420 U	400 U
BIS(2-CHLOROETHYL)ETHER	410 U	350 U	420 U	400 U
2-CHLOROPHENOL	410 U	350 U	420 U	400 U
1,3-DICHLOROBENZENE	410 U	350 U	420 U	400 U
1,4-DICHLOROBENZENE	410 U	350 U	420 U	400 U
1,2-DICHLOROBENZENE	410 U	350 U	420 U	400 U
2-METHYLPHENOL	410 U	350 U	420 U	400 U
2,2'-OXYBIS(1-CHLOROPROPANE)	410 U	350 U	420 U	400 U
4-METHYLPHENOL	410 U	350 U	420 U	400 U
N-NITROSO-DI-N-PROPYLAMINE	410 U	350 U	420 U	400 U
HEXACHLOROETHANE	410 U	350 U	420 U	400 U
NITROBENZENE	410 U	350 U	420 U	400 U
ISOPHORONE	410 U	350 U	420 U	400 U
2-NITROPHENOL	410 U	350 U	420 U	400 U
2,4-DIMETHYLPHENOL	410 U	350 U	420 U	400 U
BIS(2-CHLOROETHOXY)METHANE	410 U	350 U	420 U	400 U
2,4-DICHLOROPHENOL	410 U	350 U	420 U	400 U
1,2,4-TRICHLOROBENZENE	410 U	350 U	420 U	400 U
NAPHTHALENE	410 U	350 U	420 U	400 U
4-CHLOROANILINE	410 U	350 U	420 U	400 U
HEXACHLOROBUTADIENE	410 U	350 U	420 U	400 U
4-CHLORO-3-METHYLPHENOL	410 U	350 U	420 U	400 U
2-METHYLNAPHTHALENE	410 U	350 U	420 U	400 U
HEXACHLOROCYCLOPENTADIENE	410 U	350 U	420 U	400 U
2,4,6-TRICHLOROPHENOL	410 U	350 U	420 U	400 U
2,4,5-TRICHLOROPHENOL	1000 U	880 U	1000 U	1000 U
2-CHLORONAPHTHALENE	410 U	350 U	420 U	400 U
2-NITROANILINE	1000 U	880 U	1000 U	1000 U
DIMETHYLPHTHALATE	410 U	350 U	420 U	400 U
ACENAPHTHYLENE	410 U	350 U	420 U	400 U
2,6-DINITROTOLUENE	410 U	350 U	420 U	400 U
3-NITROANILINE	1000 U	880 U	1000 U	1000 U
ACENAPHTHENE	410 U	350 U	420 U	400 U
2,4-DINITROPHENOL	1000 U	880 U	1000 U	1000 U



**SITE 43, AGAN STREET DUMP**  
**SURFACE SOIL - FREQUENCY OF DETECTION SUMMARY**  
**REMEDIAL INVESTIGATION, CTO-0303**  
**MCB, CAMP LEJEUNE, NORTH CAROLINA**  
**ORGANIC COMPOUNDS**

LOCATION	43-WA-SB01B-00	43-WA-SB01C-00	43-WA-SB02-00	43-WA-SB03-00
DATE SAMPLED	03/14/95	03/14/95	02/28/95	02/28/95
DEPTH	0-12"	0-12"	0-12"	0-12"
UNITS	UG/KG	UG/KG	UG/KG	UG/KG
<b>SEMIVOLATILE cont.</b>				
4-NITROPHENOL	1000 U	880 U	1000 U	1000 U
DIBENZOFURAN	410 U	350 U	420 U	400 U
2,4-DINITROTOLUENE	410 U	350 U	420 U	400 U
DIETHYLPHTHALATE	410 U	350 U	420 U	400 U
4-CHLOROPHENYL-PHENYLETHER	410 U	350 U	420 U	400 U
FLUORENE	410 U	350 U	420 U	400 U
4-NITROANILINE	1000 U	880 U	1000 U	1000 U
4,6-DINITRO-2-METHYLPHENOL	1000 U	880 U	1000 U	1000 U
N-NITROSODIPHENYLAMINE (1)	410 U	350 U	420 U	400 U
4-BROMOPHENYL-PHENYLETHER	410 U	350 U	420 U	400 U
HEXACHLOROBENZENE	410 U	350 U	420 U	400 U
PENTACHLOROPHENOL	1000 U	880 U	1000 U	1000 U
PHENANTHRENE	410 U	54 J	420 U	400 U
ANTHRACENE	410 U	350 U	420 U	400 U
CARBAZOLE	410 U	350 U	420 U	400 U
DI-N-BUTYLPHTHALATE	410 U	350 U	420 U	400 U
FLUORANTHENE	130 J	350	420 U	49 J
PYRENE	150 J	430	420 U	49 J
BUTYLBENZYLPHTHALATE	410 U	350 U	420 U	400 U
3,3'-DICHLOROBENZIDINE	410 U	350 U	420 U	400 U
BENZO(A)ANTHRACENE	67 J	260 J	420 U	400 U
CHRYSENE	120 J	340 J	420 U	400 U
BIS(2-ETHYLHEXYL)PHTHALATE	43 J	45 J	66 J	220 J
DI-N-OCTYL PHTHALATE	410 U	350 U	420 U	400 U
BENZO(B)FLUORANTHENE	600	500	420 U	44 J
BENZO(K)FLUORANTHENE	280 J	200 J	420 U	400 U
BENZO(A)PYRENE	770	480	420 U	400 U
INDENO(1,2,3-CD)PYRENE	590	550	420 U	42 J
DIBENZO(A,H)ANTHRACENE	110 J	47 J	420 U	400 U
BENZO(G,H,I)PERYLENE	380 J	460	420 U	400 U

**SITE 43, AGAN STREET DUMP**  
**SURFACE SOIL - FREQUENCY OF DETECTION SUMMARY**  
**REMEDIAL INVESTIGATION, CTO-0303**  
**MCB, CAMP LEJEUNE, NORTH CAROLINA**  
**ORGANIC COMPOUNDS**

LOCATION	43-WA-SB01B-00	43-WA-SB01C-00	43-WA-SB02-00	43-WA-SB03-00
DATE SAMPLED	03/14/95	03/14/95	02/28/95	02/28/95
DEPTH	0-12"	0-12"	0-12"	0-12"
UNITS	UG/KG	UG/KG	UG/KG	UG/KG
<b>PESTICIDE/PCBS</b>				
ALPHA-BHC	NA	NA	NA	NA
BETA-BHC	NA	NA	NA	NA
DELTA-BHC	NA	NA	NA	NA
GAMMA-BHC (LINDANE)	NA	NA	NA	NA
HEPTACHLOR	NA	NA	NA	NA
ALDRIN	NA	NA	NA	NA
HEPTACHLOR EPOXIDE	NA	NA	NA	NA
ENDOSULFAN I	NA	NA	NA	NA
DIELDRIN	NA	NA	NA	NA
4,4'-DDE	NA	NA	NA	NA
ENDRIN	NA	NA	NA	NA
ENDOSULFAN II	NA	NA	NA	NA
4,4'-DDD	NA	NA	NA	NA
ENDOSULFAN SULFATE	NA	NA	NA	NA
4,4'-DDT	NA	NA	NA	NA
METHOXYCHLOR	NA	NA	NA	NA
ENDRIN KETONE	NA	NA	NA	NA
ENDRIN ALDEHYDE	NA	NA	NA	NA
ALPHA-CHLORDANE	NA	NA	NA	NA
GAMMA-CHLORDANE	NA	NA	NA	NA
TOXAPHENE	NA	NA	NA	NA
AROCLOR-1016	NA	NA	NA	NA
AROCLOR-1221	NA	NA	NA	NA
AROCLOR-1232	NA	NA	NA	NA
AROCLOR-1242	NA	NA	NA	NA
AROCLOR-1248	NA	NA	NA	NA
AROCLOR-1254	NA	NA	NA	NA
AROCLOR-1260	NA	NA	NA	NA

**SITE 43, AGAN STREET DUMP**  
**SURFACE SOIL - FREQUENCY OF DETECTION SUMMARY**  
**REMEDIAL INVESTIGATION, CTO-0303**  
**MCB, CAMP LEJEUNE, NORTH CAROLINA**  
**ORGANIC COMPOUNDS**

LOCATION DATE SAMPLED DEPTH UNITS	MINIMUM NONDETECTED	MAXIMUM NONDETECTED	MINIMUM DETECTED	MAXIMUM DETECTED	LOCATION OF MAXIMUM DETECTED	FREQUENCY OF DETECTION
<b>VOLATILES</b>						
CHLOROMETHANE	12 U	17 U	ND	ND		0/7
BROMOMETHANE	12 U	17 U	ND	ND		0/7
VINYL CHLORIDE	12 U	17 U	ND	ND		0/7
CHLOROETHANE	12 U	17 U	ND	ND		0/7
METHYLENE CHLORIDE	12 U	17 U	ND	ND		0/7
ACETONE	12 U	18 U	ND	ND		0/7
CARBON DISULFIDE	12 U	17 U	ND	ND		0/7
1,1-DICHLOROETHENE	12 U	17 U	ND	ND		0/7
1,1-DICHLOROETHANE	12 U	17 U	ND	ND		0/7
1,2-DICHLOROETHENE (TOTAL)	12 U	17 U	ND	ND		0/7
CHLOROFORM	12 U	17 U	ND	ND		0/7
1,2-DICHLOROETHANE	12 U	17 U	ND	ND		0/7
2-BUTANONE	12 U	17 U	ND	ND		0/7
1,1,1-TRICHLOROETHANE	12 U	17 U	ND	ND		0/7
CARBON TETRACHLORIDE	12 U	17 U	ND	ND		0/7
BROMODICHLOROMETHANE	12 U	17 U	ND	ND		0/7
1,2-DICHLOROPROPANE	12 U	17 U	ND	ND		0/7
CIS-1,3-DICHLOROPROPENE	12 U	17 U	ND	ND		0/7
TRICHLOROETHENE	12 U	17 U	ND	ND		0/7
DIBROMOCHLOROMETHANE	12 U	17 U	ND	ND		0/7
1,1,2-TRICHLOROETHANE	12 U	17 U	ND	ND		0/7
BENZENE	12 U	17 U	ND	ND		0/7
TRANS-1,3-DICHLOROPROPENE	12 U	17 U	ND	ND		0/7
BROMOFORM	12 U	17 U	ND	ND		0/7
4-METHYL-2-PENTANONE	12 U	17 UJ	ND	ND		0/7
2-HEXANONE	12 U	17 UJ	ND	ND		0/7
TETRACHLOROETHENE	12 U	17 UJ	ND	ND		0/7
1,1,2,2-TETRACHLOROETHANE	12 U	17 UJ	ND	ND		0/7
TOLUENE	12 U	17 UJ	ND	ND		0/7
CHLOROBENZENE	12 U	17 UJ	ND	ND		0/7
ETHYLBENZENE	12 U	17 UJ	ND	ND		0/7
STYRENE	12 U	17 UJ	ND	ND		0/7
XYLENE (TOTAL)	12 U	17 UJ	ND	ND		0/7

SITE 43, AGAN STREET DUMP  
 SURFACE SOIL - FREQUENCY OF DETECTION SUMMARY  
 REMEDIAL INVESTIGATION, CTO-0303  
 MCB, CAMP LEJEUNE, NORTH CAROLINA  
 ORGANIC COMPOUNDS

LOCATION DATE SAMPLED DEPTH UNITS	MINIMUM NONDETECTED	MAXIMUM NONDETECTED	MINIMUM DETECTED	MAXIMUM DETECTED	LOCATION OF MAXIMUM DETECTED	FREQUENCY OF DETECTION
<b>SEMIVOLATILES</b>						
PHENOL	340 U	540 U	ND	ND		0/28
BIS(2-CHLOROETHYL)ETHER	340 U	540 U	ND	ND		0/28
2-CHLOROPHENOL	340 U	540 U	ND	ND		0/28
1,3-DICHLOROBENZENE	340 U	540 U	ND	ND		0/28
1,4-DICHLOROBENZENE	340 U	540 U	ND	ND		0/28
1,2-DICHLOROBENZENE	340 U	540 U	ND	ND		0/28
2-METHYLPHENOL	340 U	540 U	ND	ND		0/28
2,2'-OXYBIS(1-CHLOROPROPANE)	340 U	540 U	ND	ND		0/28
4-METHYLPHENOL	340 U	540 U	120 J	120 J	43-DA1-SB02-00	1/28
N-NITROSO-DI-N-PROPYLAMINE	340 U	540 U	ND	ND		0/28
HEXACHLOROETHANE	340 U	540 U	ND	ND		0/28
NITROBENZENE	340 U	540 U	ND	ND		0/28
ISOPHORONE	340 U	540 U	ND	ND		0/28
2-NITROPHENOL	340 U	540 U	ND	ND		0/28
2,4-DIMETHYLPHENOL	340 U	540 U	ND	ND		0/28
BIS(2-CHLOROETHOXY)METHANE	340 U	540 U	ND	ND		0/28
2,4-DICHLOROPHENOL	340 U	540 U	ND	ND		0/28
1,2,4-TRICHLOROBENZENE	340 U	540 U	ND	ND		0/28
NAPHTHALENE	340 U	540 U	ND	ND		0/28
4-CHLOROANILINE	340 U	540 U	ND	ND		0/28
HEXACHLOROBUTADIENE	340 U	540 U	ND	ND		0/28
4-CHLORO-3-METHYLPHENOL	340 U	540 U	ND	ND		0/28
2-METHYLNAPHTHALENE	340 U	540 U	74 J	74 J	43-WA-SB01A-00	1/28
HEXACHLOROCYCLOPENTADIENE	340 U	540 U	ND	ND		0/28
2,4,6-TRICHLOROPHENOL	340 U	540 U	ND	ND		0/28
2,4,5-TRICHLOROPHENOL	850 U	1400 U	ND	ND		0/28
2-CHLORONAPHTHALENE	340 U	540 U	ND	ND		0/28
2-NITROANILINE	850 U	1400 U	ND	ND		0/28
DIMETHYLPHTHALATE	340 U	540 U	ND	ND		0/28
ACENAPHTHYLENE	340 U	540 U	71 J	71 J	43-WA-SB01A3-00	1/28
2,6-DINITROTOLUENE	340 U	540 U	ND	ND		0/28
3-NITROANILINE	850 U	1400 U	ND	ND		0/28
ACENAPHTHENE	340 U	540 U	45 J	2900	43-WA-SB01A-00	3/28
2,4-DINITROPHENOL	850 U	1400 U	ND	ND		0/28

SITE 43, AGAN STREET DUMP  
SURFACE SOIL - FREQUENCY OF DETECTION SUMMARY  
REMEDIAL INVESTIGATION, CTO-0303  
MCB, CAMP LEJEUNE, NORTH CAROLINA  
ORGANIC COMPOUNDS

LOCATION DATE SAMPLED DEPTH UNITS	MINIMUM NONDETECTED	MAXIMUM NONDETECTED	MINIMUM DETECTED	MAXIMUM DETECTED	LOCATION OF MAXIMUM DETECTED	FREQUENCY OF DETECTION
<b>SEMIVOLATILE cont.</b>						
4-NITROPHENOL	850 U	1400 U	ND	ND		0/28
DIBENZOFURAN	340 U	540 U	35 J	870	43-WA-SB01A-00	2/28
2,4-DINITROTOLUENE	340 U	540 U	ND	ND		0/28
DIETHYLPHTHALATE	340 U	540 U	ND	ND		0/28
4-CHLOROPHENYL-PHENYLEETHER	340 U	540 U	ND	ND		0/28
FLUORENE	340 U	540 U	53 J	1700	43-WA-SB01A-00	3/28
4-NITROANILINE	850 U	1400 U	ND	ND		0/28
4,6-DINITRO-2-METHYLPHENOL	850 U	1400 U	ND	ND		0/28
N-NITROSODIPHENYLAMINE (1)	340 U	540 U	ND	ND		0/28
4-BROMOPHENYL-PHENYLEETHER	340 U	540 U	ND	ND		0/28
HEXACHLOROBENZENE	340 U	540 U	ND	ND		0/28
PENTACHLOROPHENOL	850 U	1400 U	ND	ND		0/28
PHENANTHRENE	400 U	540 U	54 J	5900 J	43-WA-SB01A-00	8/28
ANTHRACENE	340 U	540 U	44 J	820	43-WA-SB01A-00	3/28
CARBAZOLE	350 U	540 U	99 J	350 J	43-WA-SB01A-00	5/28
DI-N-BUTYLPHTHALATE	350 U	2000 U	ND	ND		0/28
FLUORANTHENE	400 U	540 U	49 J	60000	43-WA-SB01A-00	10/28
PYRENE	400 U	540 U	49 J	64000	43-WA-SB01A-00	10/28
BUTYLBENZYLPHTHALATE	340 U	540 U	50 J	420 J	43-OA-SB03-00	3/28
3,3'-DICHLOROBENZIDINE	340 U	540 U	ND	ND		0/28
BENZO(A)ANTHRACENE	400 U	540 U	51 J	41000	43-WA-SB01A-00	9/28
CHRYSENE	400 U	540 U	110 J	46000	43-WA-SB01A-00	9/28
BIS(2-ETHYLHEXYL)PHTHALATE	340 U	530 U	43 J	430 J	43-OA-SB03-00	10/28
DI-N-OCTYL PHTHALATE	340 U	540 U	ND	ND		0/28
BENZO(B)FLUORANTHENE	400 U	540 U	44 J	52000	43-WA-SB01A-00	10/28
BENZO(K)FLUORANTHENE	400 U	540 U	57 J	20000	43-WA-SB01A-00	9/28
BENZO(A)PYRENE	400 U	540 U	79 J	39000	43-WA-SB01A-00	9/28
INDENO(1,2,3-CD)PYRENE	400 U	540 U	42 J	27000	43-WA-SB01A-00	10/28
DIBENZO(A,H)ANTHRACENE	350 U	540 U	47 J	1200	43-WA-SB01A-00	8/28
BENZO(G,H,I)PERYLENE	400 U	540 U	87 J	24000	43-WA-SB01A-00	9/28

**SITE 43, AGAN STREET DUMP**  
**SURFACE SOIL - FREQUENCY OF DETECTION SUMMARY**  
**REMEDIAL INVESTIGATION, CTO-0303**  
**MCB, CAMP LEJEUNE, NORTH CAROLINA**  
**ORGANIC COMPOUNDS**

LOCATION DATE SAMPLED DEPTH UNITS	MINIMUM NONDETECTED	MAXIMUM NONDETECTED	MINIMUM DETECTED	MAXIMUM DETECTED	LOCATION OF MAXIMUM DETECTED	FREQUENCY OF DETECTION
<b>PESTICIDE/PCBS</b>						
ALPHA-BHC	2 UJ	2.7 U	ND	ND		0/7
BETA-BHC	2 UJ	2.7 UJ	ND	ND		0/7
DELTA-BHC	2 UJ	2.7 U	ND	ND		0/7
GAMMA-BHC (LINDANE)	2 UJ	2.7 U	ND	ND		0/7
HEPTACHLOR	2 UJ	2.7 U	ND	ND		0/7
ALDRIN	2 UJ	2.7 U	ND	ND		0/7
HEPTACHLOR EPOXIDE	2 UJ	2.7 U	2 J	2 J	43-WA-SB01-00	1/7
ENDOSULFAN I	2 UJ	2.7 U	ND	ND		0/7
DIELDRIN	3.9 UJ	5.4 U	ND	ND		0/7
4,4'-DDE	3.9 UJ	4 UJ	5.7 J	1000 J	43-DA1-SB03-00	5/7
ENDRIN	3.9 UJ	5.4 U	ND	ND		0/7
ENDOSULFAN II	3.9 UJ	5.4 U	ND	ND		0/7
4,4'-DDD	3.9 UJ	5.4 U	3000	3000	43-DA1-SB03-00	1/7
ENDOSULFAN SULFATE	3.9 UJ	5.4 U	ND	ND		0/7
4,4'-DDT	3.9 UJ	4.1 UJ	10	1000 J	43-DA1-SB03-00	4/7
METHOXYCHLOR	20 UJ	27 U	ND	ND		0/7
ENDRIN KETONE	3.9 UJ	5.4 U	ND	ND		0/7
ENDRIN ALDEHYDE	3.9 UJ	5.4 U	5.4 J	5.4 J	43-DA2-SB01-00	1/7
ALPHA-CHLORDANE	2 UJ	2.7 U	ND	ND		0/7
GAMMA-CHLORDANE	2 UJ	2.7 U	ND	ND		0/7
TOXAPHENE	200 UJ	270 U	ND	ND		0/7
AROCLOR-1016	39 UJ	54 U	ND	ND		0/7
AROCLOR-1221	79 UJ	110 U	ND	ND		0/7
AROCLOR-1232	39 UJ	54 U	ND	ND		0/7
AROCLOR-1242	39 UJ	54 U	ND	ND		0/7
AROCLOR-1248	39 UJ	54 U	ND	ND		0/7
AROCLOR-1254	39 UJ	54 U	ND	ND		0/7
AROCLOR-1260	39 UJ	54 U	ND	ND		0/7

**SITE 43, AGAN STREET DUMP**  
**SURFACE SOIL - FREQUENCY OF DETECTION SUMMARY**  
**REMEDIAL INVESTIGATION, CTO-0303**  
**MCB, CAMP LEJEUNE, NORTH CAROLINA**  
**INORGANIC ANALYTES**

LOCATION	43-DA1-SB01-00	43-DA1-SB02-00	43-DA1-SB03-00	43-DA2-SB01-00	43-DA2-SB02-00	43-GW01DW-00
DATE SAMPLED	03/10/95	03/10/95	03/10/95	03/10/95	03/10/95	02/28/95
DEPTH	0-12"	0-12"	0-12"	0-12"	0-12"	0-12"
UNITS	MG/KG	MG/KG	MG/KG	MG/KG	MG/KG	MG/KG
<b>TOTAL METALS</b>						
ALUMINUM, TOTAL	4980 J	2680 J	2300	3380 J	2770 J	1920 J
ANTIMONY, TOTAL	4.2 UJ	5 UJ	3 UJ	5.7 UJ	3.8 UJ	4.2 UJ
ARSENIC, TOTAL	0.37 U	0.49 U	0.59 UJ	0.89	0.49 U	0.55 J
BARIUM, TOTAL	30.7	21	23.7	26.8	10.2	11.7
BERYLLIUM, TOTAL	0.18 U	0.22 U	0.082 U	0.25 U	0.17 U	0.18 U
CADMIUM, TOTAL	0.56 U	0.67 U	0.79 U	0.77 U	0.52 U	1.1 U
CALCIUM, TOTAL	2960	2770	2870	8200	3160	8280
CHROMIUM, TOTAL	5.3	106	11	52.3	2.6	8.9
COBALT, TOTAL	0.6 U	2.1	3.8	4.1	0.56 U	0.78
COPPER, TOTAL	3.5	4.8	5.5	55.7	8.9	3
IRON, TOTAL	2290	3560	2500	21100	1480	1830
LEAD, TOTAL	15.6	38.7	55.4	246	23.1	31.7
MAGNESIUM, TOTAL	202	181	169	287	91.5	153
MANGANESE, TOTAL	26.4	41.7	34	189	13.9	12.5
MERCURY, TOTAL	0.12	0.51	0.12 U	0.31	0.1 U	0.08 U
NICKEL, TOTAL	2.2 U	2.6 U	1.7	5	2 U	3.7
POTASSIUM, TOTAL	138 U	164 U	67.4	187 U	127 U	138 U
SELENIUM, TOTAL	0.36	0.39 U	0.47 UJ	0.61 J	0.39 U	0.36 UJ
SILVER, TOTAL	0.6 U	0.72 U	0.68 U	0.82 U	0.56 U	0.6 U
SODIUM, TOTAL	45.8	39.5	22.1	36.2	21.9	25.3 U
THALLIUM, TOTAL	0.21 U	0.28 U	0.34 U	0.33 U	0.29 U	0.22 U
VANADIUM, TOTAL	8.7	7.4	6.6	8.8	4.9	4.7
ZINC, TOTAL	16.2	595	478	348	23.9	34

**SITE 43, AGAN STREET DUMP**  
**SURFACE SOIL - FREQUENCY OF DETECTION SUMMARY**  
**REMEDIAL INVESTIGATION, CTO-0303**  
**MCB, CAMP LEJEUNE, NORTH CAROLINA**  
**INORGANIC ANALYTES**

LOCATION	43-MA-SB01-00	43-MA-SB02-00	43-MA-SB03-00	43-MA-SB04-00	43-MA-SB05-00	43-OA-SB01-00
DATE SAMPLED	02/28/95	02/28/95	02/28/95	02/28/95	02/28/95	03/10/95
DEPTH	0-12"	0-12"	0-12"	0-12"	0-12"	0-12"
UNITS	MG/KG	MG/KG	MG/KG	MG/KG	MG/KG	MG/KG
<b>TOTAL METALS</b>						
ALUMINUM, TOTAL	2030 J	8770	8890	2150	1060 J	2450 J
ANTIMONY, TOTAL	4.5 UJ	4.4 R	2.3 UJ	5.8 R	4.3 UJ	4.1 UJ
ARSENIC, TOTAL	0.36 J	0.87	0.83	0.75	0.72 J	0.45 U
BARIUM, TOTAL	5.4	14.6	12.5	15.1	5.3	7.8
BERYLLIUM, TOTAL	0.2 U	0.19 U	0.06 U	0.25 U	0.19 U	0.18 U
CADMIUM, TOTAL	0.61 U	0.6 U	0.61 U	0.78 U	0.64 U	0.55 U
CALCIUM, TOTAL	294	484 J	62.3 U	978 J	385	375
CHROMIUM, TOTAL	2	11 J	9.9	3.6 J	1.9	2.9
COBALT, TOTAL	0.65 U	0.64 U	0.49 U	0.84 U	0.63 U	0.59 U
COPPER, TOTAL	1.6 U	0.77	2.2	2.2	1.4 U	21.2
IRON, TOTAL	1510	4170	5400	1320	943	1370
LEAD, TOTAL	13.8	9	11.2 J	30.3	16.2	94.9
MAGNESIUM, TOTAL	62.7	338	287	90.4	64	87.3
MANGANESE, TOTAL	3	8.7 J	7.3	3.7 J	2.8	3.4
MERCURY, TOTAL	0.1 U	0.094 U	0.11 U	0.11 U	0.12 U	0.11 U
NICKEL, TOTAL	2.4 U	3.7	1.9	3.2	2.3 U	2.1 U
POTASSIUM, TOTAL	149 U	152	171	191 U	143 U	134 U
SELENIUM, TOTAL	0.35 UJ	0.43 U	0.37 U	0.53 U	0.41 UJ	0.36 U
SILVER, TOTAL	0.65 U	0.64 U	0.53 U	0.84 U	0.63 U	0.59 U
SODIUM, TOTAL	13.4 U	48.5	16.7 U	37.6 U	13 U	12.3
THALLIUM, TOTAL	0.21 U	0.26 U	0.17 U	0.32 U	0.25 U	0.26 U
VANADIUM, TOTAL	5.3	13.9	17.3	10.9	4.6	4
ZINC, TOTAL	3.4	13.1	4.6	16.4	12.1	5.7



**SITE 43, AGAN STREET DUMP**  
**SURFACE SOIL - FREQUENCY OF DETECTION SUMMARY**  
**REMEDIAL INVESTIGATION, CTO-0303**  
**MCB, CAMP LEJEUNE, NORTH CAROLINA**  
**INORGANIC ANALYTES**

LOCATION	43-OA-SB02-00	43-OA-SB03-00	43-OA-SB04-00	43-OA-SB05-00	43-OA-SB06-00	43-OA-SB07-00
DATE SAMPLED	03/10/95	03/10/95	03/10/95	03/06/95	03/06/95	03/06/95
DEPTH	0-12"	0-12"	0-12"	0-12"	0-12"	0-12"
UNITS	MG/KG	MG/KG	MG/KG	MG/KG	MG/KG	MG/KG
<b>TOTAL METALS</b>						
ALUMINUM, TOTAL	2890 J	1490	1280 J	6880	5660	3260
ANTIMONY, TOTAL	5.3 UJ	5.6 UJ	5 UJ	4.8 UJ	5 UJ	2.5 UJ
ARSENIC, TOTAL	0.46 U	0.27 UJ	0.47 U	0.68	1.1	0.59 J
BARIUM, TOTAL	8	5.3	3.2	9.7	10.8	7.7
BERYLLIUM, TOTAL	0.23 U	0.24 U	0.22 U	0.21 U	0.22 U	0.073 U
CADMIUM, TOTAL	0.72 U	0.76 U	0.67 U	0.65 U	0.67 U	0.74
CALCIUM, TOTAL	204	1730	94.6	174	39600	22200 J
CHROMIUM, TOTAL	2.3	2.2	1.1	7.1	6.7	6.1
COBALT, TOTAL	0.77 U	0.81 U	0.72 U	0.8	0.72 U	1.1 U
COPPER, TOTAL	2.9	0.68	0.46 U	0.92	0.47	2
IRON, TOTAL	1210	1220	844	3050	5320	2200 J
LEAD, TOTAL	28.4	10	4.3	7.9	7.6	3.7 U
MAGNESIUM, TOTAL	83.9	103	44.5	167	614	374
MANGANESE, TOTAL	4.3	3.4	3.2	6	10.6	11
MERCURY, TOTAL	0.12 U	0.13 U	0.1 U	0.09 U	0.09 U	0.095 U
NICKEL, TOTAL	2.8 U	2.9 U	2.6 U	2.5 U	2.6 U	1.1
POTASSIUM, TOTAL	177 U	185 U	164 U	159 U	165 U	169
SELENIUM, TOTAL	0.37 U	0.37 U	0.37 U	0.34 U	0.52	0.33 U
SILVER, TOTAL	0.77 U	0.81 U	0.72 U	0.7 U	0.72 U	0.57 U
SODIUM, TOTAL	28.8	8.2 U	19.6	19	89.8	38
THALLIUM, TOTAL	0.27 U	0.35 UJ	0.27 U	0.25 U	0.24 U	0.16 U
VANADIUM, TOTAL	4.3	4.5	3.1	10.5	12.3	7.7
ZINC, TOTAL	3.9	2.6	3.8	1.5	2.7	3.6

**SITE 43, AGAN STREET DUMP**  
**SURFACE SOIL - FREQUENCY OF DETECTION SUMMARY**  
**REMEDIAL INVESTIGATION, CTO-0303**  
**MCB, CAMP LEJEUNE, NORTH CAROLINA**  
**INORGANIC ANALYTES**

LOCATION	43-WA-SB01-00	43-WA-SB02-00	43-WA-SB03-00
DATE SAMPLED	02/28/95	02/28/95	02/28/95
DEPTH	0-12"	0-12"	0-12"
UNITS	MG/KG	MG/KG	MG/KG
<b>TOTAL METALS</b>			
ALUMINUM, TOTAL	2380	1750 J	2050 J
ANTIMONY, TOTAL	2.2 UJ	5 UJ	4.8 UJ
ARSENIC, TOTAL	0.33	0.53 J	0.52 J
BARIUM, TOTAL	11.8	551	7.2
BERYLLIUM, TOTAL	0.06 U	0.22 U	0.21 U
CADMIUM, TOTAL	0.57 U	1.7	0.65 U
CALCIUM, TOTAL	39100	23900	1190
CHROMIUM, TOTAL	4.6	17.9	2.5
COBALT, TOTAL	0.46 U	0.73 U	0.69 U
COPPER, TOTAL	2.9	6.1	1.2 U
IRON, TOTAL	2260	1690	1680
LEAD, TOTAL	14.7 J	30.8	10.5
MAGNESIUM, TOTAL	419	301	97.8
MANGANESE, TOTAL	19	14.4	7.9
MERCURY, TOTAL	0.12 U	0.11 U	0.1 U
NICKEL, TOTAL	1.5	2.6 U	2.5 U
POTASSIUM, TOTAL	111	166 U	159 U
SELENIUM, TOTAL	0.27 U	0.31 UJ	0.31 UJ
SILVER, TOTAL	0.5 U	0.73 U	0.69 U
SODIUM, TOTAL	73.4	47.8 U	23.2
THALLIUM, TOTAL	0.13 U	0.19 U	0.19 U
VANADIUM, TOTAL	5.1	5.7	4.1
ZINC, TOTAL	16.5	30.4	5.6

**SITE 43, AGAN STREET DUMP**  
**SURFACE SOIL - FREQUENCY OF DETECTION SUMMARY**  
**REMEDIAL INVESTIGATION, CTO-0303**  
**MCB, CAMP LEJEUNE, NORTH CAROLINA**  
**INORGANIC ANALYTES**

LOCATION DATE SAMPLED DEPTH UNITS	MINIMUM NONDETECTED	MAXIMUM NONDETECTED	MINIMUM DETECTED	MAXIMUM DETECTED	LOCATION OF MAXIMUM DETECTED	FREQUENCY OF DETECTION
<b>TOTAL METALS</b>						
ALUMINUM, TOTAL	NA	NA	1060 J	8890	43-MA-SB03-00	21/21
ANTIMONY, TOTAL	2.2 UJ	5.7 UJ	ND	ND		0/19
ARSENIC, TOTAL	0.27 UJ	0.59 UJ	0.33	1.1	43-OA-SB06-00	13/21
BARIUM, TOTAL	NA	NA	3.2	551	43-WA-SB02-00	21/21
BERYLLIUM, TOTAL	0.06 U	0.25 U	ND	ND		0/21
CADMIUM, TOTAL	0.52 U	1.1 U	0.74	1.7	43-WA-SB02-00	2/21
CALCIUM, TOTAL	62.3 U	62.3 U	94.6	39600	43-OA-SB06-00	20/21
CHROMIUM, TOTAL	NA	NA	1.1	106	43-DA1-SB02-00	21/21
COBALT, TOTAL	0.46 U	1.1 U	0.78	4.1	43-DA2-SB01-00	5/21
COPPER, TOTAL	0.46 U	1.6 U	0.47	55.7	43-DA2-SB01-00	17/21
IRON, TOTAL	NA	NA	844	21100	43-DA2-SB01-00	21/21
LEAD, TOTAL	3.7 U	3.7 U	4.3	246	43-DA2-SB01-00	20/21
MAGNESIUM, TOTAL	NA	NA	44.5	614	43-OA-SB06-00	21/21
MANGANESE, TOTAL	NA	NA	2.8	189	43-DA2-SB01-00	21/21
MERCURY, TOTAL	0.08 U	0.13 U	0.12	0.51	43-DA1-SB02-00	3/21
NICKEL, TOTAL	2 U	2.9 U	1.1	5	43-DA2-SB01-00	8/21
POTASSIUM, TOTAL	127 U	191 U	67.4	171	43-MA-SB03-00	5/21
SELENIUM, TOTAL	0.27 U	0.53 U	0.36	0.61 J	43-DA2-SB01-00	3/21
SILVER, TOTAL	0.5 U	0.84 U	ND	ND		0/21
SODIUM, TOTAL	8.2 U	47.8 U	12.3	89.8	43-OA-SB06-00	14/21
THALLIUM, TOTAL	0.13 U	0.35 UJ	ND	ND		0/21
VANADIUM, TOTAL	NA	NA	3.1	17.3	43-MA-SB03-00	21/21
ZINC, TOTAL	NA	NA	1.5	595	43-DA1-SB02-00	21/21

**SITE 43, AGAN STREET DUMP**  
**SUBSURFACE SOIL - FREQUENCY OF DETECTION SUMMARY**  
**REMEDIAL INVESTIGATION, CTO-0303**  
**MCB, CAMP LEJEUNE, NORTH CAROLINA**  
**ORGANIC COMPOUNDS**

LOCATION	43-DA1-SB01-01	43-DA1-SB02-01	43-DA1-SB03-01	43-DA2-SB01-01	43-DA2-SB02-01	43-GW01DW-01
DATE SAMPLED	03/10/95	03/10/95	03/10/95	03/10/95	03/10/95	02/28/95
DEPTH	1-3'	1-3'	1-3'	1-3'	1-3'	1-3'
UNITS	UG/KG	UG/KG	UG/KG	UG/KG	UG/KG	UG/KG
<b>VOLATILES</b>						
CHLOROMETHANE	NA	NA	11 U	12 U	NA	12 U
BROMOMETHANE	NA	NA	11 U	12 U	NA	12 U
VINYL CHLORIDE	NA	NA	11 U	12 U	NA	12 U
CHLOROETHANE	NA	NA	11 U	12 U	NA	12 U
METHYLENE CHLORIDE	NA	NA	11 U	12 U	NA	12 U
ACETONE	NA	NA	12 U	12 U	NA	12 U
CARBON DISULFIDE	NA	NA	11 U	12 U	NA	12 U
1,1-DICHLOROETHENE	NA	NA	11 U	12 U	NA	12 U
1,1-DICHLOROETHANE	NA	NA	11 U	12 U	NA	12 U
1,2-DICHLOROETHENE (TOTAL)	NA	NA	11 U	12 U	NA	12 U
CHLOROFORM	NA	NA	11 U	12 U	NA	12 U
1,2-DICHLOROETHANE	NA	NA	11 U	12 U	NA	12 U
2-BUTANONE	NA	NA	11 U	12 U	NA	12 U
1,1,1-TRICHLOROETHANE	NA	NA	11 U	12 U	NA	12 U
CARBON TETRACHLORIDE	NA	NA	11 U	12 U	NA	12 U
BROMODICHLOROMETHANE	NA	NA	11 U	12 U	NA	12 U
1,2-DICHLOROPROPANE	NA	NA	11 U	12 U	NA	12 U
CIS-1,3-DICHLOROPROPENE	NA	NA	11 U	12 U	NA	12 U
TRICHLOROETHENE	NA	NA	11 U	12 U	NA	12 U
DIBROMOCHLOROMETHANE	NA	NA	11 U	12 U	NA	12 U
1,1,2-TRICHLOROETHANE	NA	NA	11 U	12 U	NA	12 U
BENZENE	NA	NA	11 U	12 U	NA	12 U
TRANS-1,3-DICHLOROPROPENE	NA	NA	11 U	12 U	NA	12 U
BROMOFORM	NA	NA	11 U	12 U	NA	12 U
4-METHYL-2-PENTANONE	NA	NA	11 U	12 U	NA	12 U
2-HEXANONE	NA	NA	11 U	12 U	NA	12 U
TETRACHLOROETHENE	NA	NA	11 U	12 U	NA	12 U
1,1,2,2-TETRACHLOROETHANE	NA	NA	11 U	12 U	NA	12 U
TOLUENE	NA	NA	11 U	12 U	NA	12 U
CHLOROBENZENE	NA	NA	11 U	12 U	NA	12 U
ETHYLBENZENE	NA	NA	11 U	12 U	NA	12 U
STYRENE	NA	NA	11 U	12 U	NA	12 U
XYLENE (TOTAL)	NA	NA	11 U	12 U	NA	12 U

SITE 43, AGAN STREET DUMP  
SUBSURFACE SOIL - FREQUENCY OF DETECTION SUMMARY  
REMEDIAL INVESTIGATION, CTO-0303  
MCB, CAMP LEJEUNE, NORTH CAROLINA  
ORGANIC COMPOUNDS

LOCATION	43-DA1-SB01-01	43-DA1-SB02-01	43-DA1-SB03-01	43-DA2-SB01-01	43-DA2-SB02-01	43-GW01DW-01
DATE SAMPLED	03/10/95	03/10/95	03/10/95	03/10/95	03/10/95	02/28/95
DEPTH	1-3'	1-3'	1-3'	1-3'	1-3'	1-3'
UNITS	UG/KG	UG/KG	UG/KG	UG/KG	UG/KG	UG/KG
<b>SEMIVOLATILES</b>						
PHENOL	400 U	380 U	370 U	400 U	410 U	380 U
BIS(2-CHLOROETHYL)ETHER	400 U	380 U	370 U	400 U	410 U	380 U
2-CHLOROPHENOL	400 U	380 U	370 U	400 U	410 U	380 U
1,3-DICHLOROBENZENE	400 U	380 U	370 U	400 U	410 U	380 U
1,4-DICHLOROBENZENE	400 U	380 U	370 U	400 U	410 U	380 U
1,2-DICHLOROBENZENE	400 U	380 U	370 U	400 U	410 U	380 U
2-METHYLPHENOL	400 U	380 U	370 U	400 U	410 U	380 U
2,2'-OXYBIS(1-CHLOROPROPANE)	400 U	380 U	370 U	400 U	410 U	380 U
4-METHYLPHENOL	400 U	380 U	370 U	400 U	410 U	380 U
N-NITROSO-DI-N-PROPYLAMINE	400 U	380 U	370 U	400 U	410 U	380 U
HEXACHLOROETHANE	400 U	380 U	370 U	400 U	410 U	380 U
NITROBENZENE	400 U	380 U	370 U	400 U	410 U	380 U
ISOPHORONE	400 U	380 U	370 U	400 U	410 U	380 U
2-NITROPHENOL	400 U	380 U	370 U	400 U	410 U	380 U
2,4-DIMETHYLPHENOL	400 U	380 U	370 U	400 U	410 U	380 U
BIS(2-CHLOROETHOXY)METHANE	400 U	380 U	370 U	400 U	410 U	380 U
2,4-DICHLOROPHENOL	400 U	380 U	370 U	400 U	410 U	380 U
1,2,4-TRICHLOROBENZENE	400 U	380 U	370 U	400 U	410 U	380 U
NAPHTHALENE	400 U	380 U	370 U	400 U	410 U	380 U
4-CHLOROANILINE	400 U	380 U	370 U	400 U	410 U	380 U
HEXACHLOROBUTADIENE	400 U	380 U	370 U	400 U	410 U	380 U
4-CHLORO-3-METHYLPHENOL	400 U	380 U	370 U	400 U	410 U	380 U
2-METHYLNAPHTHALENE	400 U	380 U	370 U	400 U	410 U	380 U
HEXACHLOROCYCLOPENTADIENE	400 U	380 U	370 U	400 U	410 U	380 U
2,4,6-TRICHLOROPHENOL	400 U	380 U	370 U	400 U	410 U	380 U
2,4,5-TRICHLOROPHENOL	1000 U	950 U	940 U	1000 U	1000 U	960 U
2-CHLORONAPHTHALENE	400 U	380 U	370 U	400 U	410 U	380 U
2-NITROANILINE	1000 U	950 U	940 U	1000 U	1000 U	960 U
DIMETHYLPHTHALATE	400 U	380 U	370 U	400 U	410 U	380 U
ACENAPHTHYLENE	400 U	380 U	370 U	400 U	410 U	380 U
2,6-DINITROTOLUENE	400 U	380 U	370 U	400 U	410 U	380 U
3-NITROANILINE	1000 U	950 U	940 U	1000 U	1000 U	960 U
ACENAPHTHENE	400 U	380 U	370 U	400 U	410 U	380 U
2,4-DINITROPHENOL	1000 U	950 U	940 U	1000 U	1000 U	960 U

**SITE 43, AGAN STREET DUMP**  
**SUBSURFACE SOIL - FREQUENCY OF DETECTION SUMMARY**  
**REMEDIAL INVESTIGATION, CTO-0303**  
**MCB, CAMP LEJEUNE, NORTH CAROLINA**  
**ORGANIC COMPOUNDS**

LOCATION	43-DA1-SB01-01	43-DA1-SB02-01	43-DA1-SB03-01	43-DA2-SB01-01	43-DA2-SB02-01	43-GW01DW-01
DATE SAMPLED	03/10/95	03/10/95	03/10/95	03/10/95	03/10/95	02/28/95
DEPTH	1-3'	1-3'	1-3'	1-3'	1-3'	1-3'
UNITS	UG/KG	UG/KG	UG/KG	UG/KG	UG/KG	UG/KG
<b>SEMIVOLATILES cont.</b>						
4-NITROPHENOL	1000 U	950 U	940 U	1000 U	1000 U	960 U
DIBENZOFURAN	400 U	380 U	370 U	400 U	410 U	380 U
2,4-DINITROTOLUENE	400 U	380 U	370 U	400 U	410 U	380 U
DIETHYLPHTHALATE	400 U	380 U	370 U	400 U	410 U	380 U
4-CHLOROPHENYL-PHENYLETHER	400 U	380 U	370 U	400 U	410 U	380 U
FLUORENE	400 U	380 U	370 U	400 U	410 U	380 U
4-NITROANILINE	1000 U	950 U	940 U	1000 U	1000 U	960 U
4,6-DINITRO-2-METHYLPHENOL	1000 U	950 U	940 U	1000 U	1000 U	960 U
N-NITROSODIPHENYLAMINE (1)	400 U	380 U	370 U	400 U	410 U	380 U
4-BROMOPHENYL-PHENYLETHER	400 U	380 U	370 U	400 U	410 U	380 U
HEXACHLOROBENZENE	400 U	380 U	370 U	400 U	410 U	380 U
PENTACHLOROPHENOL	1000 U	950 U	940 U	1000 U	1000 U	960 U
PHENANTHRENE	400 U	380 U	370 U	400 U	410 U	380 U
ANTHRACENE	400 U	380 U	370 U	400 U	410 U	380 U
CARBAZOLE	400 U	380 U	370 U	400 U	410 U	380 U
DI-N-BUTYLPHTHALATE	400 U	380 U	370 U	400 U	410 U	380 U
FLUORANTHENE	400 U	380 U	370 U	400 U	410 U	380 U
PYRENE	400 U	380 U	370 U	400 U	410 U	380 U
BUTYLBENZYLPHTHALATE	400 U	380 U	370 U	400 U	410 U	380 U
3,3'-DICHLOROBENZIDINE	400 U	380 U	370 U	400 U	410 U	380 U
BENZO(A)ANTHRACENE	400 U	380 U	370 U	400 U	410 U	380 U
CHRYSENE	400 U	380 U	370 U	400 U	410 U	380 U
BIS(2-ETHYLHEXYL)PHTHALATE	400 U	380 U	370 U	400 U	410 U	380 U
DI-N-OCTYL PHTHALATE	400 U	380 U	370 U	400 U	410 U	380 U
BENZO(B)FLUORANTHENE	400 U	380 U	370 U	400 U	410 U	380 U
BENZO(K)FLUORANTHENE	400 U	380 U	370 U	400 U	410 U	380 U
BENZO(A)PYRENE	400 U	380 U	370 U	400 U	410 U	380 U
INDENO(1,2,3-CD)PYRENE	400 U	380 U	370 U	400 U	410 U	380 U
DIBENZO(A,H)ANTHRACENE	400 U	380 U	370 U	400 U	410 U	380 U
BENZO(G,H,I)PERYLENE	400 U	380 U	370 U	400 U	410 U	380 U

**SITE 43, AGAN STREET DUMP**  
**SUBSURFACE SOIL - FREQUENCY OF DETECTION SUMMARY**  
**REMEDIAL INVESTIGATION, CTO-0303**  
**MCB, CAMP LEJEUNE, NORTH CAROLINA**  
**ORGANIC COMPOUNDS**

LOCATION	43-DA1-SB01-01	43-DA1-SB02-01	43-DA1-SB03-01	43-DA2-SB01-01	43-DA2-SB02-01	43-GW01DW-01
DATE SAMPLED	03/10/95	03/10/95	03/10/95	03/10/95	03/10/95	02/28/95
DEPTH	1-3'	1-3'	1-3'	1-3'	1-3'	1-3'
UNITS	UG/KG	UG/KG	UG/KG	UG/KG	UG/KG	UG/KG
<b>PESTICIDE/PCBS</b>						
ALPHA-BHC	NA	NA	1.9 UJ	2 U	NA	1.9 UJ
BETA-BHC	NA	NA	1.9 UJ	2 U	NA	1.9 UJ
DELTA-BHC	NA	NA	1.9 UJ	2 U	NA	1.9 UJ
GAMMA-BHC (LINDANE)	NA	NA	1.9 UJ	2 U	NA	1.9 UJ
HEPTACHLOR	NA	NA	1.9 UJ	2 U	NA	1.9 UJ
ALDRIN	NA	NA	1.9 UJ	2 U	NA	1.9 UJ
HEPTACHLOR EPOXIDE	NA	NA	1.9 UJ	2 U	NA	1.9 UJ
ENDOSULFAN I	NA	NA	1.9 UJ	2 U	NA	1.9 UJ
DIELDRIN	NA	NA	3.8 UJ	4 U	NA	3.9 UJ
4,4'-DDE	NA	NA	9.1 J	4 U	NA	3.9 UJ
ENDRIN	NA	NA	3.8 UJ	4 U	NA	3.9 UJ
ENDOSULFAN II	NA	NA	3.8 UJ	4 U	NA	3.9 UJ
4,4'-DDD	NA	NA	1200	4 U	NA	3.9 UJ
ENDOSULFAN SULFATE	NA	NA	3.8 UJ	4 U	NA	3.9 UJ
4,4'-DDT	NA	NA	45 J	4 U	NA	3.9 UJ
METHOXYCHLOR	NA	NA	19 UJ	20 U	NA	19 UJ
ENDRIN KETONE	NA	NA	3.8 UJ	4 U	NA	3.9 UJ
ENDRIN ALDEHYDE	NA	NA	3.8 UJ	4 U	NA	3.9 UJ
ALPHA-CHLORDANE	NA	NA	1.9 UJ	2 U	NA	1.9 UJ
GAMMA-CHLORDANE	NA	NA	1.9 UJ	2 U	NA	1.9 UJ
TOXAPHENE	NA	NA	190 UJ	200 U	NA	190 UJ
AROCLOR-1016	NA	NA	38 UJ	40 U	NA	39 UJ
AROCLOR-1221	NA	NA	76 UJ	80 U	NA	77 UJ
AROCLOR-1232	NA	NA	38 UJ	40 U	NA	39 UJ
AROCLOR-1242	NA	NA	38 UJ	40 U	NA	39 UJ
AROCLOR-1248	NA	NA	38 UJ	40 U	NA	39 UJ
AROCLOR-1254	NA	NA	38 UJ	40 U	NA	39 UJ
AROCLOR-1260	NA	NA	38 UJ	40 U	NA	39 UJ

**SITE 43, AGAN STREET DUMP**  
**SUBSURFACE SOIL - FREQUENCY OF DETECTION SUMMARY**  
**REMEDIAL INVESTIGATION, CTO-0303**  
**MCB, CAMP LEJEUNE, NORTH CAROLINA**  
**ORGANIC COMPOUNDS**

LOCATION	43-MA-SB01-01	43-MA-SB02-02	43-MA-SB03-01	43-MA-SB04-01	43-MA-SB05-02	43-OA-SB01-01
DATE SAMPLED	02/28/95	02/28/95	02/28/95	02/28/95	02/28/95	03/10/95
DEPTH	1-3'	3-5'	1-3'	1-3'	3-5'	1-3'
UNITS	UG/KG	UG/KG	UG/KG	UG/KG	UG/KG	UG/KG
<b>VOLATILES</b>						
CHLOROMETHANE	NA	NA	12 U	NA	NA	NA
BROMOMETHANE	NA	NA	12 U	NA	NA	NA
VINYL CHLORIDE	NA	NA	12 U	NA	NA	NA
CHLOROETHANE	NA	NA	12 U	NA	NA	NA
METHYLENE CHLORIDE	NA	NA	12 U	NA	NA	NA
ACETONE	NA	NA	20 U	NA	NA	NA
CARBON DISULFIDE	NA	NA	12 U	NA	NA	NA
1,1-DICHLOROETHENE	NA	NA	12 U	NA	NA	NA
1,1-DICHLOROETHANE	NA	NA	12 U	NA	NA	NA
1,2-DICHLOROETHENE (TOTAL)	NA	NA	12 U	NA	NA	NA
CHLOROFORM	NA	NA	12 U	NA	NA	NA
1,2-DICHLOROETHANE	NA	NA	12 U	NA	NA	NA
2-BUTANONE	NA	NA	12 U	NA	NA	NA
1,1,1-TRICHLOROETHANE	NA	NA	12 U	NA	NA	NA
CARBON TETRACHLORIDE	NA	NA	12 U	NA	NA	NA
BROMODICHLOROMETHANE	NA	NA	12 U	NA	NA	NA
1,2-DICHLOROPROPANE	NA	NA	12 U	NA	NA	NA
CIS-1,3-DICHLOROPROPENE	NA	NA	12 U	NA	NA	NA
TRICHLOROETHENE	NA	NA	12 U	NA	NA	NA
DIBROMOCHLOROMETHANE	NA	NA	12 U	NA	NA	NA
1,1,2-TRICHLOROETHANE	NA	NA	12 U	NA	NA	NA
BENZENE	NA	NA	12 U	NA	NA	NA
TRANS-1,3-DICHLOROPROPENE	NA	NA	12 U	NA	NA	NA
BROMOFORM	NA	NA	12 U	NA	NA	NA
4-METHYL-2-PENTANONE	NA	NA	12 U	NA	NA	NA
2-HEXANONE	NA	NA	12 U	NA	NA	NA
TETRACHLOROETHENE	NA	NA	12 U	NA	NA	NA
1,1,2,2-TETRACHLOROETHANE	NA	NA	12 U	NA	NA	NA
TOLUENE	NA	NA	12 U	NA	NA	NA
CHLOROBENZENE	NA	NA	12 U	NA	NA	NA
ETHYLBENZENE	NA	NA	12 U	NA	NA	NA
STYRENE	NA	NA	12 U	NA	NA	NA
XYLENE (TOTAL)	NA	NA	12 U	NA	NA	NA



SITE 43, AGAN STREET DUMP  
 SUBSURFACE SOIL - FREQUENCY OF DETECTION SUMMARY  
 REMEDIAL INVESTIGATION, CTO-0303  
 MCB, CAMP LEJEUNE, NORTH CAROLINA  
 ORGANIC COMPOUNDS

LOCATION	43-MA-SB01-01	43-MA-SB02-02	43-MA-SB03-01	43-MA-SB04-01	43-MA-SB05-02	43-OA-SB01-01
DATE SAMPLED	02/28/95	02/28/95	02/28/95	02/28/95	02/28/95	03/10/95
DEPTH	1-3'	3-5'	1-3'	1-3'	3-5'	1-3'
UNITS	UG/KG	UG/KG	UG/KG	UG/KG	UG/KG	UG/KG
<b>SEMIVOLATILES</b>						
PHENOL	390 U	390 U	400 U	390 U	400 U	410 U
BIS(2-CHLOROETHYL)ETHER	390 U	390 U	400 U	390 U	400 U	410 U
2-CHLOROPHENOL	390 U	390 U	400 U	390 U	400 U	410 U
1,3-DICHLOROBENZENE	390 U	390 U	400 U	390 U	400 U	410 U
1,4-DICHLOROBENZENE	390 U	390 U	400 U	390 U	400 U	410 U
1,2-DICHLOROBENZENE	390 U	390 U	400 U	390 U	400 U	410 U
2-METHYLPHENOL	390 U	390 U	400 U	390 U	400 U	410 U
2,2'-OXYBIS(1-CHLOROPROPANE)	390 U	390 U	400 U	390 U	400 U	410 U
4-METHYLPHENOL	390 U	390 U	400 U	390 U	400 U	410 U
N-NITROSO-DI-N-PROPYLAMINE	390 U	390 U	400 U	390 U	400 U	410 U
HEXACHLOROETHANE	390 U	390 U	400 U	390 U	400 U	410 U
NITROBENZENE	390 U	390 U	400 U	390 U	400 U	410 U
ISOPHORONE	390 U	390 U	400 U	390 U	400 U	410 U
2-NITROPHENOL	390 U	390 U	400 U	390 U	400 U	410 U
2,4-DIMETHYLPHENOL	390 U	390 U	400 U	390 U	400 U	410 U
BIS(2-CHLOROETHOXY)METHANE	390 U	390 U	400 U	390 U	400 U	410 U
2,4-DICHLOROPHENOL	390 U	390 U	400 U	390 U	400 U	410 U
1,2,4-TRICHLOROBENZENE	390 U	390 U	400 U	390 U	400 U	410 U
NAPHTHALENE	390 U	390 U	400 U	390 U	400 U	410 U
4-CHLOROANILINE	390 U	390 U	400 U	390 U	400 U	410 U
HEXACHLOROBUTADIENE	390 U	390 U	400 U	390 U	400 U	410 U
4-CHLORO-3-METHYLPHENOL	390 U	390 U	400 U	390 U	400 U	410 U
2-METHYLNAPHTHALENE	390 U	390 U	400 U	390 U	400 U	410 U
HEXACHLOROCYCLOPENTADIENE	390 U	390 U	400 U	390 U	400 U	410 U
2,4,6-TRICHLOROPHENOL	390 U	390 U	400 U	390 U	400 U	410 U
2,4,5-TRICHLOROPHENOL	980 U	980 U	1000 U	960 U	990 U	1000 U
2-CHLORONAPHTHALENE	390 U	390 U	400 U	390 U	400 U	410 U
2-NITROANILINE	980 U	980 U	1000 U	960 U	990 U	1000 U
DIMETHYLPHTHALATE	390 U	390 U	400 U	390 U	400 U	410 U
ACENAPHTHYLENE	390 U	390 U	400 U	390 U	400 U	410 U
2,6-DINITROTOLUENE	390 U	390 U	400 U	390 U	400 U	410 U
3-NITROANILINE	980 U	980 U	1000 U	960 U	990 U	1000 U
ACENAPHTHENE	390 U	390 U	400 U	390 U	400 U	410 U
2,4-DINITROPHENOL	980 U	980 U	1000 U	960 U	990 U	1000 U

**SITE 43, AGAN STREET DUMP**  
**SUBSURFACE SOIL - FREQUENCY OF DETECTION SUMMARY**  
**REMEDIAL INVESTIGATION, CTO-0303**  
**MCB, CAMP LEJEUNE, NORTH CAROLINA**  
**ORGANIC COMPOUNDS**

LOCATION	43-MA-SB01-01	43-MA-SB02-02	43-MA-SB03-01	43-MA-SB04-01	43-MA-SB05-02	43-OA-SB01-01
DATE SAMPLED	02/28/95	02/28/95	02/28/95	02/28/95	02/28/95	03/10/95
DEPTH	1-3'	3-5'	1-3'	1-3'	3-5'	1-3'
UNITS	UG/KG	UG/KG	UG/KG	UG/KG	UG/KG	UG/KG
<b>SEMIVOLATILES cont.</b>						
4-NITROPHENOL	980 U	980 U	1000 U	960 U	990 U	1000 U
DIBENZOFURAN	390 U	390 U	400 U	390 U	400 U	410 U
2,4-DINITROTOLUENE	390 U	390 U	400 U	390 U	400 U	410 U
DIETHYLPHTHALATE	390 U	390 U	400 U	390 U	400 U	410 U
4-CHLOROPHENYL-PHENYLETHER	390 U	390 U	400 U	390 U	400 U	410 U
FLUORENE	390 U	390 U	400 U	390 U	400 U	410 U
4-NITROANILINE	980 U	980 U	1000 U	960 U	990 U	1000 U
4,6-DINITRO-2-METHYLPHENOL	980 U	980 U	1000 U	960 U	990 U	1000 U
N-NITROSODIPHENYLAMINE (1)	390 U	390 U	400 U	390 U	400 U	410 U
4-BROMOPHENYL-PHENYLETHER	390 U	390 U	400 U	390 U	400 U	410 U
HEXACHLOROBENZENE	390 U	390 U	400 U	390 U	400 U	410 U
PENTACHLOROPHENOL	980 U	980 U	1000 U	960 U	990 U	1000 U
PHENANTHRENE	390 U	390 U	400 U	390 U	400 U	410 U
ANTHRACENE	390 U	390 U	400 U	390 U	400 U	410 U
CARBAZOLE	390 U	390 U	400 U	390 U	400 U	410 U
DI-N-BUTYLPHTHALATE	390 U	490 U	400 U	390 U	400 U	410 U
FLUORANTHENE	390 U	390 U	400 U	390 U	400 U	410 U
PYRENE	390 U	390 U	400 U	390 U	400 U	410 U
BUTYLBENZYLPHTHALATE	390 U	390 U	400 U	390 U	400 U	410 U
3,3'-DICHLOROBENZIDINE	390 U	390 U	400 U	390 U	400 U	410 U
BENZO(A)ANTHRACENE	390 U	390 U	400 U	390 U	400 U	410 U
CHRYSENE	390 U	390 U	400 U	390 U	400 U	410 U
BIS(2-ETHYLHEXYL)PHTHALATE	390 U	390 U	400 U	390 U	400 U	410 U
DI-N-OCTYL PHTHALATE	390 U	390 U	400 U	390 U	400 U	410 U
BENZO(B)FLUORANTHENE	390 U	390 U	400 U	390 U	400 U	410 U
BENZO(K)FLUORANTHENE	390 U	390 U	400 U	390 U	400 U	410 U
BENZO(A)PYRENE	390 U	390 U	400 U	390 U	400 U	410 U
INDENO(1,2,3-CD)PYRENE	390 U	390 U	400 U	390 U	400 U	410 U
DIBENZO(A,H)ANTHRACENE	390 U	390 U	400 U	390 U	400 U	410 U
BENZO(G,H,I)PERYLENE	390 U	390 U	400 U	390 U	400 U	410 U

**SITE 43, AGAN STREET DUMP**  
**SUBSURFACE SOIL - FREQUENCY OF DETECTION SUMMARY**  
**REMEDIAL INVESTIGATION, CTO-0303**  
**MCB, CAMP LEJEUNE, NORTH CAROLINA**  
**ORGANIC COMPOUNDS**

LOCATION	43-MA-SB01-01	43-MA-SB02-02	43-MA-SB03-01	43-MA-SB04-01	43-MA-SB05-02	43-OA-SB01-01
DATE SAMPLED	02/28/95	02/28/95	02/28/95	02/28/95	02/28/95	03/10/95
DEPTH	1-3'	3-5'	1-3'	1-3'	3-5'	1-3'
UNITS	UG/KG	UG/KG	UG/KG	UG/KG	UG/KG	UG/KG
<b>PESTICIDE/PCBS</b>						
ALPHA-BHC	NA	NA	2 U	NA	NA	NA
BETA-BHC	NA	NA	2 U	NA	NA	NA
DELTA-BHC	NA	NA	2 U	NA	NA	NA
GAMMA-BHC (LINDANE)	NA	NA	2 U	NA	NA	NA
HEPTACHLOR	NA	NA	2 U	NA	NA	NA
ALDRIN	NA	NA	2 U	NA	NA	NA
HEPTACHLOR EPOXIDE	NA	NA	2 U	NA	NA	NA
ENDOSULFAN I	NA	NA	2 U	NA	NA	NA
DIELDRIN	NA	NA	3.9 U	NA	NA	NA
4,4'-DDE	NA	NA	3.9 U	NA	NA	NA
ENDRIN	NA	NA	3.9 U	NA	NA	NA
ENDOSULFAN II	NA	NA	3.9 U	NA	NA	NA
4,4'-DDD	NA	NA	3.9 U	NA	NA	NA
ENDOSULFAN SULFATE	NA	NA	3.9 U	NA	NA	NA
4,4'-DDT	NA	NA	3.9 U	NA	NA	NA
METHOXYCHLOR	NA	NA	20 U	NA	NA	NA
ENDRIN KETONE	NA	NA	3.9 U	NA	NA	NA
ENDRIN ALDEHYDE	NA	NA	3.9 U	NA	NA	NA
ALPHA-CHLORDANE	NA	NA	2 U	NA	NA	NA
GAMMA-CHLORDANE	NA	NA	2 U	NA	NA	NA
TOXAPHENE	NA	NA	200 U	NA	NA	NA
AROCLOR-1016	NA	NA	39 U	NA	NA	NA
AROCLOR-1221	NA	NA	78 U	NA	NA	NA
AROCLOR-1232	NA	NA	39 U	NA	NA	NA
AROCLOR-1242	NA	NA	39 U	NA	NA	NA
AROCLOR-1248	NA	NA	39 U	NA	NA	NA
AROCLOR-1254	NA	NA	39 U	NA	NA	NA
AROCLOR-1260	NA	NA	39 U	NA	NA	NA

**SITE 43, AGAN STREET DUMP**  
**SUBSURFACE SOIL - FREQUENCY OF DETECTION SUMMARY**  
**REMEDIAL INVESTIGATION, CTO-0303**  
**MCB, CAMP LEJEUNE, NORTH CAROLINA**  
**ORGANIC COMPOUNDS**

LOCATION	43-OA-SB02-01	43-OA-SB03-01	43-OA-SB04-01	43-OA-SB05-02	43-OA-SB06-02	43-WA-SB01-01
DATE SAMPLED	03/10/95	03/10/95	03/10/95	03/06/95	03/06/95	02/28/95
DEPTH	1-3'	1-3'	1-3'	3-5'	3-5'	1-3'
UNITS	UG/KG	UG/KG	UG/KG	UG/KG	UG/KG	UG/KG
<b>VOLATILES</b>						
CHLOROMETHANE	12 U	NA	NA	12 U	NA	12 U
BROMOMETHANE	12 U	NA	NA	12 U	NA	12 U
VINYL CHLORIDE	12 U	NA	NA	12 U	NA	12 U
CHLOROETHANE	12 U	NA	NA	12 U	NA	12 U
METHYLENE CHLORIDE	12 U	NA	NA	12 U	NA	12 U
ACETONE	12 U	NA	NA	12 U	NA	13 U
CARBON DISULFIDE	12 U	NA	NA	12 U	NA	12 U
1,1-DICHLOROETHENE	12 U	NA	NA	12 U	NA	12 U
1,1-DICHLOROETHANE	12 U	NA	NA	12 U	NA	12 U
1,2-DICHLOROETHENE (TOTAL)	12 U	NA	NA	12 U	NA	12 U
CHLOROFORM	12 U	NA	NA	12 U	NA	12 U
1,2-DICHLOROETHANE	12 U	NA	NA	12 U	NA	12 U
2-BUTANONE	12 U	NA	NA	12 U	NA	12 U
1,1,1-TRICHLOROETHANE	12 U	NA	NA	12 U	NA	12 U
CARBON TETRACHLORIDE	12 U	NA	NA	12 U	NA	12 U
BROMODICHLOROMETHANE	12 U	NA	NA	12 U	NA	12 U
1,2-DICHLOROPROPANE	12 U	NA	NA	12 U	NA	12 U
CIS-1,3-DICHLOROPROPENE	12 U	NA	NA	12 U	NA	12 U
TRICHLOROETHENE	12 U	NA	NA	12 U	NA	12 U
DIBROMOCHLOROMETHANE	12 U	NA	NA	12 U	NA	12 U
1,1,2-TRICHLOROETHANE	12 U	NA	NA	12 U	NA	12 U
BENZENE	12 U	NA	NA	12 U	NA	12 U
TRANS-1,3-DICHLOROPROPENE	12 U	NA	NA	12 U	NA	12 U
BROMOFORM	12 U	NA	NA	12 U	NA	12 U
4-METHYL-2-PENTANONE	12 U	NA	NA	12 U	NA	12 U
2-HEXANONE	12 U	NA	NA	12 U	NA	12 U
TETRACHLOROETHENE	12 U	NA	NA	12 U	NA	12 U
1,1,2,2-TETRACHLOROETHANE	12 U	NA	NA	12 U	NA	12 U
TOLUENE	12 U	NA	NA	12 U	NA	12 U
CHLOROBENZENE	12 U	NA	NA	12 U	NA	12 U
ETHYLBENZENE	12 U	NA	NA	12 U	NA	12 U
STYRENE	12 U	NA	NA	12 U	NA	12 U
XYLENE (TOTAL)	12 U	NA	NA	12 U	NA	12 U

**SITE 43, AGAN STREET DUMP**  
**SUBSURFACE SOIL - FREQUENCY OF DETECTION SUMMARY**  
**REMEDIAL INVESTIGATION, CTO-0303**  
**MCB, CAMP LEJEUNE, NORTH CAROLINA**  
**ORGANIC COMPOUNDS**

LOCATION	43-OA-SB02-01	43-OA-SB03-01	43-OA-SB04-01	43-OA-SB05-02	43-OA-SB06-02	43-WA-SB01-01
DATE SAMPLED	03/10/95	03/10/95	03/10/95	03/06/95	03/06/95	02/28/95
DEPTH	1-3'	1-3'	1-3'	3-5'	3-5'	1-3'
UNITS	UG/KG	UG/KG	UG/KG	UG/KG	UG/KG	UG/KG
<b>SEMIVOLATILES</b>						
PHENOL	400 U	400 U	390 U	400 U	390 U	390 U
BIS(2-CHLOROETHYL)ETHER	400 U	400 U	390 U	400 U	390 U	390 U
2-CHLOROPHENOL	400 U	400 U	390 U	400 U	390 U	390 U
1,3-DICHLOROBENZENE	400 U	400 U	390 U	400 U	390 U	390 U
1,4-DICHLOROBENZENE	400 U	400 U	390 U	400 U	390 U	390 U
1,2-DICHLOROBENZENE	400 U	400 U	390 U	400 U	390 U	390 U
2-METHYLPHENOL	400 U	400 U	390 U	400 U	390 U	390 U
2,2'-OXYBIS(1-CHLOROPROPANE)	400 U	400 U	390 U	400 U	390 U	390 U
4-METHYLPHENOL	400 U	400 U	390 U	400 U	390 U	390 U
N-NITROSO-DI-N-PROPYLAMINE	400 U	400 U	390 U	400 U	390 U	390 U
HEXACHLOROETHANE	400 U	400 U	390 U	400 U	390 U	390 U
NITROBENZENE	400 U	400 U	390 U	400 U	390 U	390 U
ISOPHORONE	400 U	400 U	390 U	400 U	390 U	390 U
2-NITROPHENOL	400 U	400 U	390 U	400 U	390 U	390 U
2,4-DIMETHYLPHENOL	400 U	400 U	390 U	400 U	390 U	390 U
BIS(2-CHLOROETHOXY)METHANE	400 U	400 U	390 U	400 U	390 U	390 U
2,4-DICHLOROPHENOL	400 U	400 U	390 U	400 U	390 U	390 U
1,2,4-TRICHLOROBENZENE	400 U	400 U	390 U	400 U	390 U	390 U
NAPHTHALENE	400 U	400 U	390 U	400 U	390 U	390 U
4-CHLOROANILINE	400 U	400 U	390 U	400 U	390 U	390 U
HEXACHLOROBUTADIENE	400 U	400 U	390 U	400 U	390 U	390 U
4-CHLORO-3-METHYLPHENOL	400 U	400 U	390 U	400 U	390 U	390 U
2-METHYLNAPHTHALENE	400 U	400 U	390 U	400 U	390 U	390 U
HEXACHLOROCYCLOPENTADIENE	400 U	400 U	390 U	400 U	390 U	390 U
2,4,6-TRICHLOROPHENOL	400 U	400 U	390 U	400 U	390 U	390 U
2,4,5-TRICHLOROPHENOL	990 U	1000 U	970 U	1000 U	960 U	960 U
2-CHLORONAPHTHALENE	400 U	400 U	390 U	400 U	390 U	390 U
2-NITROANILINE	990 U	1000 U	970 U	1000 U	960 U	960 U
DIMETHYLPHTHALATE	400 U	400 U	390 U	400 U	390 U	390 U
ACENAPHTHYLENE	400 U	400 U	390 U	400 U	390 U	390 U
2,6-DINITROTOLUENE	400 U	400 U	390 U	400 U	390 U	390 U
3-NITROANILINE	990 U	1000 U	970 U	1000 U	960 U	960 U
ACENAPHTHENE	400 U	400 U	390 U	400 U	390 U	390 U
2,4-DINITROPHENOL	990 U	1000 U	970 U	1000 U	960 U	960 U

**SITE 43, AGAN STREET DUMP**  
**SUBSURFACE SOIL - FREQUENCY OF DETECTION SUMMARY**  
**REMEDIAL INVESTIGATION, CTO-0303**  
**MCB, CAMP LEJEUNE, NORTH CAROLINA**  
**ORGANIC COMPOUNDS**

LOCATION	43-OA-SB02-01	43-OA-SB03-01	43-OA-SB04-01	43-OA-SB05-02	43-OA-SB06-02	43-WA-SB01-01
DATE SAMPLED	03/10/95	03/10/95	03/10/95	03/06/95	03/06/95	02/28/95
DEPTH	1-3'	1-3'	1-3'	3-5'	3-5'	1-3'
UNITS	UG/KG	UG/KG	UG/KG	UG/KG	UG/KG	UG/KG
<b>SEMIVOLATILES cont.</b>						
4-NITROPHENOL	990 U	1000 U	970 U	1000 U	960 U	960 U
DIBENZOFURAN	400 U	400 U	390 U	400 U	390 U	390 U
2,4-DINITROTOLUENE	400 U	400 U	390 U	400 U	390 U	390 U
DIETHYLPHTHALATE	400 U	400 U	390 U	400 U	390 U	390 U
4-CHLOROPHENYL-PHENYLETHER	400 U	400 U	390 U	400 U	390 U	390 U
FLUORENE	400 U	400 U	390 U	400 U	390 U	390 U
4-NITROANILINE	990 U	1000 U	970 U	1000 U	960 U	960 U
4,6-DINITRO-2-METHYLPHENOL	990 U	1000 U	970 U	1000 UJ	960 UJ	960 U
N-NITROSODIPHENYLAMINE (1)	400 U	400 U	390 U	400 U	390 U	390 U
4-BROMOPHENYL-PHENYLETHER	400 U	400 U	390 U	400 U	390 U	390 U
HEXACHLOROBENZENE	400 U	400 U	390 U	400 U	390 U	390 U
PENTACHLOROPHENOL	990 U	1000 U	970 U	1000 U	960 U	960 U
PHENANTHRENE	400 U	400 U	390 U	400 U	390 U	390 U
ANTHRACENE	400 U	400 U	390 U	400 U	390 U	390 U
CARBAZOLE	400 U	400 U	390 U	400 U	390 U	390 U
DI-N-BUTYLPHTHALATE	400 U	1200 U	390 U	1400 U	1600 U	390 U
FLUORANTHENE	400 U	400 U	390 U	400 U	390 U	390 U
PYRENE	400 U	400 U	390 U	400 U	390 U	390 U
BUTYLBENZYLPHTHALATE	400 U	440	390 U	400 U	390 U	390 U
3,3'-DICHLOROBENZIDINE	400 U	400 U	390 U	400 U	390 U	390 U
BENZO(A)ANTHRACENE	400 U	400 U	390 U	400 U	390 U	390 U
CHRYSENE	400 U	400 U	390 U	400 U	390 U	390 U
BIS(2-ETHYLHEXYL)PHTHALATE	400 U	530	390 U	400 U	390 U	390 U
DI-N-OCTYL PHTHALATE	400 U	400 U	390 U	400 U	390 U	390 U
BENZO(B)FLUORANTHENE	400 U	400 U	390 U	400 U	390 U	390 U
BENZO(K)FLUORANTHENE	400 U	400 U	390 U	400 U	390 U	390 U
BENZO(A)PYRENE	400 U	400 U	390 U	400 U	390 U	390 U
INDENO(1,2,3-CD)PYRENE	400 U	400 U	390 U	400 U	390 U	390 U
DIBENZO(A,H)ANTHRACENE	400 U	400 U	390 U	400 U	390 U	390 U
BENZO(G,H,I)PERYLENE	400 U	400 U	390 U	400 U	390 U	390 U

**SITE 43, AGAN STREET DUMP**  
**SUBSURFACE SOIL - FREQUENCY OF DETECTION SUMMARY**  
**REMEDIAL INVESTIGATION, CTO-0303**  
**MCB, CAMP LEJEUNE, NORTH CAROLINA**  
**ORGANIC COMPOUNDS**

LOCATION	43-OA-SB02-01	43-OA-SB03-01	43-OA-SB04-01	43-OA-SB05-02	43-OA-SB06-02	43-WA-SB01-01
DATE SAMPLED	03/10/95	03/10/95	03/10/95	03/06/95	03/06/95	02/28/95
DEPTH	1-3'	1-3'	1-3'	3-5'	3-5'	1-3'
UNITS	UG/KG	UG/KG	UG/KG	UG/KG	UG/KG	UG/KG
<b>PESTICIDE/PCBS</b>						
ALPHA-BHC	1.9 U	NA	NA	2 UJ	NA	2 UJ
BETA-BHC	1.9 U	NA	NA	2 U	NA	2 UJ
DELTA-BHC	1.9 U	NA	NA	2 UJ	NA	2 UJ
GAMMA-BHC (LINDANE)	1.9 U	NA	NA	2 UJ	NA	2 UJ
HEPTACHLOR	1.9 U	NA	NA	2 U	NA	2 UJ
ALDRIN	1.9 U	NA	NA	2 U	NA	2 UJ
HEPTACHLOR EPOXIDE	1.9 U	NA	NA	2 U	NA	2 UJ
ENDOSULFAN I	1.9 U	NA	NA	2 U	NA	2 UJ
DIELDRIN	3.9 U	NA	NA	4 U	NA	3.9 UJ
4,4'-DDE	3.9 U	NA	NA	4 UJ	NA	3.9 UJ
ENDRIN	3.9 U	NA	NA	4 U	NA	3.9 UJ
ENDOSULFAN II	3.9 U	NA	NA	4 U	NA	3.9 UJ
4,4'-DDD	3.9 U	NA	NA	4 U	NA	3.9 UJ
ENDOSULFAN SULFATE	3.9 U	NA	NA	4 U	NA	3.9 UJ
4,4'-DDT	3.9 U	NA	NA	4 U	NA	3.9 UJ
METHOXYCHLOR	19 U	NA	NA	20 U	NA	20 UJ
ENDRIN KETONE	3.9 U	NA	NA	4 U	NA	3.9 UJ
ENDRIN ALDEHYDE	3.9 U	NA	NA	4 U	NA	3.9 UJ
ALPHA-CHLORDANE	1.9 U	NA	NA	2 U	NA	2 UJ
GAMMA-CHLORDANE	1.9 U	NA	NA	2 U	NA	2 UJ
TOXAPHENE	190 U	NA	NA	200 U	NA	200 UJ
AROCLOR-1016	39 U	NA	NA	40 U	NA	39 UJ
AROCLOR-1221	77 U	NA	NA	80 U	NA	78 UJ
AROCLOR-1232	39 U	NA	NA	40 U	NA	39 UJ
AROCLOR-1242	39 U	NA	NA	40 U	NA	39 UJ
AROCLOR-1248	39 U	NA	NA	40 U	NA	39 UJ
AROCLOR-1254	39 U	NA	NA	40 U	NA	39 UJ
AROCLOR-1260	39 U	NA	NA	40 U	NA	39 UJ

**SITE 43, AGAN STREET DUMP**  
**SUBSURFACE SOIL - FREQUENCY OF DETECTION SUMMARY**  
**REMEDIAL INVESTIGATION, CTO-0303**  
**MCB, CAMP LEJEUNE, NORTH CAROLINA**  
**ORGANIC COMPOUNDS**

LOCATION	43-WA-SB02-01	43-WA-SB03-01
DATE SAMPLED	02/28/95	02/28/95
DEPTH	1-3'	1-3'
UNITS	UG/KG	UG/KG

**VOLATILES**

CHLOROMETHANE	NA	NA
BROMOMETHANE	NA	NA
VINYL CHLORIDE	NA	NA
CHLOROETHANE	NA	NA
METHYLENE CHLORIDE	NA	NA
ACETONE	NA	NA
CARBON DISULFIDE	NA	NA
1,1-DICHLOROETHENE	NA	NA
1,1-DICHLOROETHANE	NA	NA
1,2-DICHLOROETHENE (TOTAL)	NA	NA
CHLOROFORM	NA	NA
1,2-DICHLOROETHANE	NA	NA
2-BUTANONE	NA	NA
1,1,1-TRICHLOROETHANE	NA	NA
CARBON TETRACHLORIDE	NA	NA
BROMODICHLOROMETHANE	NA	NA
1,2-DICHLOROPROPANE	NA	NA
CIS-1,3-DICHLOROPROPENE	NA	NA
TRICHLOROETHENE	NA	NA
DIBROMOCHLOROMETHANE	NA	NA
1,1,2-TRICHLOROETHANE	NA	NA
BENZENE	NA	NA
TRANS-1,3-DICHLOROPROPENE	NA	NA
BROMOFORM	NA	NA
4-METHYL-2-PENTANONE	NA	NA
2-HEXANONE	NA	NA
TETRACHLOROETHENE	NA	NA
1,1,2,2-TETRACHLOROETHANE	NA	NA
TOLUENE	NA	NA
CHLOROBENZENE	NA	NA
ETHYLBENZENE	NA	NA
STYRENE	NA	NA
XYLENE (TOTAL)	NA	NA



**SITE 43, AGAN STREET DUMP**  
**SUBSURFACE SOIL - FREQUENCY OF DETECTION SUMMARY**  
**REMEDIAL INVESTIGATION, CTO-0303**  
**MCB, CAMP LEJEUNE, NORTH CAROLINA**  
**ORGANIC COMPOUNDS**

LOCATION	43-WA-SB02-01	43-WA-SB03-01
DATE SAMPLED	02/28/95	02/28/95
DEPTH	1-3'	1-3'
UNITS	UG/KG	UG/KG
<b>SEMIVOLATILES</b>		
PHENOL	390 U	390 U
BIS(2-CHLOROETHYL)ETHER	390 U	390 U
2-CHLOROPHENOL	390 U	390 U
1,3-DICHLOROBENZENE	390 U	390 U
1,4-DICHLOROBENZENE	390 U	390 U
1,2-DICHLOROBENZENE	390 U	390 U
2-METHYLPHENOL	390 U	390 U
2,2'-OXYBIS(1-CHLOROPROPANE)	390 U	390 U
4-METHYLPHENOL	390 U	390 U
N-NITROSO-DI-N-PROPYLAMINE	390 U	390 U
HEXACHLOROETHANE	390 U	390 U
NITROBENZENE	390 U	390 U
ISOPHORONE	390 U	390 U
2-NITROPHENOL	390 U	390 U
2,4-DIMETHYLPHENOL	390 U	390 U
BIS(2-CHLOROETHOXY)METHANE	390 U	390 U
2,4-DICHLOROPHENOL	390 U	390 U
1,2,4-TRICHLOROBENZENE	390 U	390 U
NAPHTHALENE	390 U	390 U
4-CHLOROANILINE	390 U	390 U
HEXACHLOROBUTADIENE	390 U	390 U
4-CHLORO-3-METHYLPHENOL	390 U	390 U
2-METHYLNAPHTHALENE	390 U	390 U
HEXACHLOROCYCLOPENTADIENE	390 U	390 U
2,4,6-TRICHLOROPHENOL	390 U	390 U
2,4,5-TRICHLOROPHENOL	970 U	960 U
2-CHLORONAPHTHALENE	390 U	390 U
2-NITROANILINE	970 U	960 U
DIMETHYLPHTHALATE	390 U	390 U
ACENAPHTHYLENE	390 U	390 U
2,6-DINITROTOLUENE	390 U	390 U
3-NITROANILINE	970 U	960 U
ACENAPHTHENE	390 U	390 U
2,4-DINITROPHENOL	970 U	960 U

**SITE 43, AGAN STREET DUMP**  
**SUBSURFACE SOIL - FREQUENCY OF DETECTION SUMMARY**  
**REMEDIAL INVESTIGATION, CTO-0303**  
**MCB, CAMP LEJEUNE, NORTH CAROLINA**  
**ORGANIC COMPOUNDS**

LOCATION	43-WA-SB02-01	43-WA-SB03-01
DATE SAMPLED	02/28/95	02/28/95
DEPTH	1-3'	1-3'
UNITS	UG/KG	UG/KG
<b>SEMIVOLATILES cont.</b>		
4-NITROPHENOL	970 U	960 U
DIBENZOFURAN	390 U	390 U
2,4-DINITROTOLUENE	390 U	390 U
DIETHYLPHTHALATE	390 U	390 U
4-CHLOROPHENYL-PHENYLETHER	390 U	390 U
FLUORENE	390 U	390 U
4-NITROANILINE	970 U	960 U
4,6-DINITRO-2-METHYLPHENOL	970 U	960 U
N-NITROSODIPHENYLAMINE (1)	390 U	390 U
4-BROMOPHENYL-PHENYLETHER	390 U	390 U
HEXACHLOROBENZENE	390 U	390 U
PENTACHLOROPHENOL	970 U	960 U
PHENANTHRENE	430	390 U
ANTHRACENE	390 U	390 U
CARBAZOLE	73 J	390 U
DI-N-BUTYLPHTHALATE	390 U	390 U
FLUORANTHENE	850	390 U
PYRENE	1800 J	390 U
BUTYLBENZYLPHTHALATE	39 J	390 U
3,3'-DICHLOROBENZIDINE	390 UJ	390 U
BENZO(A)ANTHRACENE	390 J	390 U
CHRYSENE	740 J	390 U
BIS(2-ETHYLHEXYL)PHTHALATE	180 J	390 U
DI-N-OCTYL PHTHALATE	390 U	390 U
BENZO(B)FLUORANTHENE	780	390 U
BENZO(K)FLUORANTHENE	340 J	390 U
BENZO(A)PYRENE	570	390 U
INDENO(1,2,3-CD)PYRENE	890	390 U
DIBENZO(A,H)ANTHRACENE	170 J	390 U
BENZO(G,H,I)PERYLENE	790	390 U

**SITE 43, AGAN STREET DUMP**  
**SUBSURFACE SOIL - FREQUENCY OF DETECTION SUMMARY**  
**REMEDIAL INVESTIGATION, CTO-0303**  
**MCB, CAMP LEJEUNE, NORTH CAROLINA**  
**ORGANIC COMPOUNDS**

LOCATION	43-WA-SB02-01	43-WA-SB03-01
DATE SAMPLED	02/28/95	02/28/95
DEPTH	1-3'	1-3'
UNITS	UG/KG	UG/KG

**PESTICIDE/PCBS**

ALPHA-BHC	NA	NA
BETA-BHC	NA	NA
DELTA-BHC	NA	NA
GAMMA-BHC (LINDANE)	NA	NA
HEPTACHLOR	NA	NA
ALDRIN	NA	NA
HEPTACHLOR EPOXIDE	NA	NA
ENDOSULFAN I	NA	NA
DIELDRIN	NA	NA
4,4'-DDE	NA	NA
ENDRIN	NA	NA
ENDOSULFAN II	NA	NA
4,4'-DDD	NA	NA
ENDOSULFAN SULFATE	NA	NA
4,4'-DDT	NA	NA
METHOXYCHLOR	NA	NA
ENDRIN KETONE	NA	NA
ENDRIN ALDEHYDE	NA	NA
ALPHA-CHLORDANE	NA	NA
GAMMA-CHLORDANE	NA	NA
TOXAPHENE	NA	NA
AROCLOR-1016	NA	NA
AROCLOR-1221	NA	NA
AROCLOR-1232	NA	NA
AROCLOR-1242	NA	NA
AROCLOR-1248	NA	NA
AROCLOR-1254	NA	NA
AROCLOR-1260	NA	NA

**SITE 43, AGAN STREET DUMP**  
**SUBSURFACE SOIL - FREQUENCY OF DETECTION SUMMARY**  
**REMEDIAL INVESTIGATION, CTO-0303**  
**MCB, CAMP LEJEUNE, NORTH CAROLINA**  
**ORGANIC COMPOUNDS**

LOCATION DATE SAMPLED DEPTH UNITS	MINIMUM NONDETECTED	MAXIMUM NONDETECTED	MINIMUM DETECTED	MAXIMUM DETECTED	LOCATION OF MAXIMUM DETECTED	FREQUENCY OF DETECTION
<b>VOLATILES</b>						
CHLOROMETHANE	11 U	12 U	ND	ND		0/7
BROMOMETHANE	11 U	12 U	ND	ND		0/7
VINYL CHLORIDE	11 U	12 U	ND	ND		0/7
CHLOROETHANE	11 U	12 U	ND	ND		0/7
METHYLENE CHLORIDE	11 U	12 U	ND	ND		0/7
ACETONE	12 U	20 U	ND	ND		0/7
CARBON DISULFIDE	11 U	12 U	ND	ND		0/7
1,1-DICHLOROETHENE	11 U	12 U	ND	ND		0/7
1,1-DICHLOROETHANE	11 U	12 U	ND	ND		0/7
1,2-DICHLOROETHENE (TOTAL)	11 U	12 U	ND	ND		0/7
CHLOROFORM	11 U	12 U	ND	ND		0/7
1,2-DICHLOROETHANE	11 U	12 U	ND	ND		0/7
2-BUTANONE	11 U	12 U	ND	ND		0/7
1,1,1-TRICHLOROETHANE	11 U	12 U	ND	ND		0/7
CARBON TETRACHLORIDE	11 U	12 U	ND	ND		0/7
BROMODICHLOROMETHANE	11 U	12 U	ND	ND		0/7
1,2-DICHLOROPROPANE	11 U	12 U	ND	ND		0/7
CIS-1,3-DICHLOROPROPENE	11 U	12 U	ND	ND		0/7
TRICHLOROETHENE	11 U	12 U	ND	ND		0/7
DIBROMOCHLOROMETHANE	11 U	12 U	ND	ND		0/7
1,1,2-TRICHLOROETHANE	11 U	12 U	ND	ND		0/7
BENZENE	11 U	12 U	ND	ND		0/7
TRANS-1,3-DICHLOROPROPENE	11 U	12 U	ND	ND		0/7
BROMOFORM	11 U	12 U	ND	ND		0/7
4-METHYL-2-PENTANONE	11 U	12 U	ND	ND		0/7
2-HEXANONE	11 U	12 U	ND	ND		0/7
TETRACHLOROETHENE	11 U	12 U	ND	ND		0/7
1,1,2,2-TETRACHLOROETHANE	11 U	12 U	ND	ND		0/7
TOLUENE	11 U	12 U	ND	ND		0/7
CHLOROBENZENE	11 U	12 U	ND	ND		0/7
ETHYLBENZENE	11 U	12 U	ND	ND		0/7
STYRENE	11 U	12 U	ND	ND		0/7
XYLENE (TOTAL)	11 U	12 U	ND	ND		0/7

SITE 43, AGAN STREET DUMP  
 SUBSURFACE SOIL - FREQUENCY OF DETECTION SUMMARY  
 REMEDIAL INVESTIGATION, CTO-0303  
 MCB, CAMP LEJEUNE, NORTH CAROLINA  
 ORGANIC COMPOUNDS

LOCATION DATE SAMPLED DEPTH UNITS	MINIMUM NONDETECTED	MAXIMUM NONDETECTED	MINIMUM DETECTED	MAXIMUM DETECTED	LOCATION OF MAXIMUM DETECTED	FREQUENCY OF DETECTION
<b>SEMIVOLATILES</b>						
PHENOL	370 U	410 U	ND	ND		0/20
BIS(2-CHLOROETHYL)ETHER	370 U	410 U	ND	ND		0/20
2-CHLOROPHENOL	370 U	410 U	ND	ND		0/20
1,3-DICHLOROBENZENE	370 U	410 U	ND	ND		0/20
1,4-DICHLOROBENZENE	370 U	410 U	ND	ND		0/20
1,2-DICHLOROBENZENE	370 U	410 U	ND	ND		0/20
2-METHYLPHENOL	370 U	410 U	ND	ND		0/20
2,2'-OXYBIS(1-CHLOROPROPANE)	370 U	410 U	ND	ND		0/20
4-METHYLPHENOL	370 U	410 U	ND	ND		0/20
N-NITROSO-DI-N-PROPYLAMINE	370 U	410 U	ND	ND		0/20
HEXACHLOROETHANE	370 U	410 U	ND	ND		0/20
NITROBENZENE	370 U	410 U	ND	ND		0/20
ISOPHORONE	370 U	410 U	ND	ND		0/20
2-NITROPHENOL	370 U	410 U	ND	ND		0/20
2,4-DIMETHYLPHENOL	370 U	410 U	ND	ND		0/20
BIS(2-CHLOROETHOXY)METHANE	370 U	410 U	ND	ND		0/20
2,4-DICHLOROPHENOL	370 U	410 U	ND	ND		0/20
1,2,4-TRICHLOROBENZENE	370 U	410 U	ND	ND		0/20
NAPHTHALENE	370 U	410 U	ND	ND		0/20
4-CHLOROANILINE	370 U	410 U	ND	ND		0/20
HEXACHLOROBUTADIENE	370 U	410 U	ND	ND		0/20
4-CHLORO-3-METHYLPHENOL	370 U	410 U	ND	ND		0/20
2-METHYLNAPHTHALENE	370 U	410 U	ND	ND		0/20
HEXACHLOROCYCLOPENTADIENE	370 U	410 U	ND	ND		0/20
2,4,6-TRICHLOROPHENOL	370 U	410 U	ND	ND		0/20
2,4,5-TRICHLOROPHENOL	940 U	1000 U	ND	ND		0/20
2-CHLORONAPHTHALENE	370 U	410 U	ND	ND		0/20
2-NITROANILINE	940 U	1000 U	ND	ND		0/20
DIMETHYLPHTHALATE	370 U	410 U	ND	ND		0/20
ACENAPHTHYLENE	370 U	410 U	ND	ND		0/20
2,6-DINITROTOLUENE	370 U	410 U	ND	ND		0/20
3-NITROANILINE	940 U	1000 U	ND	ND		0/20
ACENAPHTHENE	370 U	410 U	ND	ND		0/20
2,4-DINITROPHENOL	940 U	1000 U	ND	ND		0/20

SITE 43, AGAN STREET DUMP  
SUBSURFACE SOIL - FREQUENCY OF DETECTION SUMMARY  
REMEDIAL INVESTIGATION, CTO-0303  
MCB, CAMP LEJEUNE, NORTH CAROLINA  
ORGANIC COMPOUNDS

LOCATION DATE SAMPLED DEPTH UNITS	MINIMUM NONDETECTED	MAXIMUM NONDETECTED	MINIMUM DETECTED	MAXIMUM DETECTED	LOCATION OF MAXIMUM DETECTED	FREQUENCY OF DETECTION
<b>SEMIVOLATILES cont.</b>						
4-NITROPHENOL	940 U	1000 U	ND	ND		0/20
DIBENZOFURAN	370 U	410 U	ND	ND		0/20
2,4-DINITROTOLUENE	370 U	410 U	ND	ND		0/20
DIETHYLPHTHALATE	370 U	410 U	ND	ND		0/20
4-CHLOROPHENYL-PHENYLEETHER	370 U	410 U	ND	ND		0/20
FLUORENE	370 U	410 U	ND	ND		0/20
4-NITROANILINE	940 U	1000 U	ND	ND		0/20
4,6-DINITRO-2-METHYLPHENOL	940 U	1000 U	ND	ND		0/20
N-NITROSODIPIHENYLAMINE (1)	370 U	410 U	ND	ND		0/20
4-BROMOPHENYL-PHENYLEETHER	370 U	410 U	ND	ND		0/20
HEXACHLOROBENZENE	370 U	410 U	ND	ND		0/20
PENTACHLOROPHENOL	940 U	1000 U	ND	ND		0/20
PHENANTHRENE	370 U	410 U	430	430	43-WA-SB02-01	1/20
ANTHRACENE	370 U	410 U	ND	ND		0/20
CARBAZOLE	370 U	410 U	73 J	73 J	43-WA-SB02-01	1/20
DI-N-BUTYLPHTHALATE	370 U	1600 U	ND	ND		0/20
FLUORANTHENE	370 U	410 U	850	850	43-WA-SB02-01	1/20
PYRENE	370 U	410 U	1800 J	1800 J	43-WA-SB02-01	1/20
BUTYLBENZYLPHTHALATE	370 U	410 U	39 J	440	43-OA-SB03-01	2/20
3,3'-DICHLOROBENZIDINE	370 U	410 U	ND	ND		0/20
BENZO(A)ANTHRACENE	370 U	410 U	390 J	390 J	43-WA-SB02-01	1/20
CHRYSENE	370 U	410 U	740 J	740 J	43-WA-SB02-01	1/20
BIS(2-ETHYLHEXYL)PHTHALATE	370 U	410 U	180 J	530	43-OA-SB03-01	2/20
DI-N-OCTYL PHTHALATE	370 U	410 U	ND	ND		0/20
BENZO(B)FLUORANTHENE	370 U	410 U	780	780	43-WA-SB02-01	1/20
BENZO(K)FLUORANTHENE	370 U	410 U	340 J	340 J	43-WA-SB02-01	1/20
BENZO(A)PYRENE	370 U	410 U	570	570	43-WA-SB02-01	1/20
INDENO(1,2,3-CD)PYRENE	370 U	410 U	890	890	43-WA-SB02-01	1/20
DIBENZO(A,H)ANTHRACENE	370 U	410 U	170 J	170 J	43-WA-SB02-01	1/20
BENZO(G,H,I)PERYLENE	370 U	410 U	790	790	43-WA-SB02-01	1/20

**SITE 43, AGAN STREET DUMP**  
**SUBSURFACE SOIL - FREQUENCY OF DETECTION SUMMARY**  
**REMEDIAL INVESTIGATION, CTO-0303**  
**MCB, CAMP LEJEUNE, NORTH CAROLINA**  
**ORGANIC COMPOUNDS**

LOCATION DATE SAMPLED DEPTH UNITS	MINIMUM NONDETECTED	MAXIMUM NONDETECTED	MINIMUM DETECTED	MAXIMUM DETECTED	LOCATION OF MAXIMUM DETECTED	FREQUENCY OF DETECTION
<b>PESTICIDE/PCBS</b>						
ALPHA-BHC	1.9 UJ	2 U	ND	ND		0/7
BETA-BHC	1.9 UJ	2 U	ND	ND		0/7
DELTA-BHC	1.9 UJ	2 U	ND	ND		0/7
GAMMA-BHC (LINDANE)	1.9 UJ	2 U	ND	ND		0/7
HEPTACHLOR	1.9 UJ	2 U	ND	ND		0/7
ALDRIN	1.9 UJ	2 U	ND	ND		0/7
HEPTACHLOR EPOXIDE	1.9 UJ	2 U	ND	ND		0/7
ENDOSULFAN I	1.9 UJ	2 U	ND	ND		0/7
DIELDRIN	3.8 UJ	4 U	ND	ND		0/7
4,4'-DDE	3.9 UJ	4 U	9.1 J	9.1 J	43-DA1-SB03-01	1/7
ENDRIN	3.8 UJ	4 U	ND	ND		0/7
ENDOSULFAN II	3.8 UJ	4 U	ND	ND		0/7
4,4'-DDD	3.9 UJ	4 U	1200	1200	43-DA1-SB03-01	1/7
ENDOSULFAN SULFATE	3.8 UJ	4 U	ND	ND		0/7
4,4'-DDT	3.9 UJ	4 U	45 J	45 J	43-DA1-SB03-01	1/7
METHOXYCHLOR	19 UJ	20 U	ND	ND		0/7
ENDRIN KETONE	3.8 UJ	4 U	ND	ND		0/7
ENDRIN ALDEHYDE	3.8 UJ	4 U	ND	ND		0/7
ALPHA-CHLORDANE	1.9 UJ	2 U	ND	ND		0/7
GAMMA-CHLORDANE	1.9 UJ	2 U	ND	ND		0/7
TOXAPHENE	190 UJ	200 U	ND	ND		0/7
AROCLOR-1016	38 UJ	40 U	ND	ND		0/7
AROCLOR-1221	76 UJ	80 U	ND	ND		0/7
AROCLOR-1232	38 UJ	40 U	ND	ND		0/7
AROCLOR-1242	38 UJ	40 U	ND	ND		0/7
AROCLOR-1248	38 UJ	40 U	ND	ND		0/7
AROCLOR-1254	38 UJ	40 U	ND	ND		0/7
AROCLOR-1260	38 UJ	40 U	ND	ND		0/7

**SITE 43, AGAN STREET DUMP**  
**SUBSURFACE SOIL - FREQUENCY OF DETECTION SUMMARY**  
**REMEDIAL INVESTIGATION, CTO-0303**  
**MCB, CAMP LEJEUNE, NORTH CAROLINA**  
**INORGANIC ANALYTES**

LOCATION	43-DA1-SB01-01	43-DA1-SB02-01	43-DA1-SB03-01	43-DA2-SB01-01	43-DA2-SB02-01	43-GW01DW-01
DATE SAMPLED	03/10/95	03/10/95	03/10/95	03/10/95	03/10/95	02/28/95
DEPTH	1-3'	1-3'	1-3'	1-3'	1-3'	1-3'
UNITS	MG/KG	MG/KG	MG/KG	MG/KG	MG/KG	MG/KG
<b>TOTAL METALS</b>						
ALUMINUM, TOTAL	3730 J	2940	5530	1600 J	1740 J	948 J
ANTIMONY, TOTAL	3.6 UJ	2.3 UJ	2.1 UJ	4.7 UJ	3.7 UJ	4.8 UJ
ARSENIC, TOTAL	0.41 U	0.38 UJ	0.36 UJ	0.39 U	0.37 U	0.23 UJ
BARIUM, TOTAL	7.4	7.1	11.2	3	3.3	3.3
BERYLLIUM, TOTAL	0.16 U	0.063 U	0.057 U	0.2 U	0.16 U	0.21 U
CADMIUM, TOTAL	0.49 U	0.61 U	0.55 U	0.63 U	0.51 U	0.65 U
CALCIUM, TOTAL	139	153	261	194	280	194
CHROMIUM, TOTAL	4.4	4.3	6.8	1.9	1.4	2.3
COBALT, TOTAL	0.53 U	0.49 U	0.62	0.68 U	0.54 U	0.69 U
COPPER, TOTAL	0.63	0.84 U	1.6	0.43 U	0.34 U	0.44 U
IRON, TOTAL	2780	2420	6680	432	358	422
LEAD, TOTAL	3.7	3.9	3.5	2.6	1.8	2.3
MAGNESIUM, TOTAL	139	93.7	143	35.2	33.5	44.9
MANGANESE, TOTAL	3.4	2.4	3.9	2.1 U	2 U	3.7
MERCURY, TOTAL	0.12 U	0.1 U	0.099 U	0.11 U	0.12 U	0.11 U
NICKEL, TOTAL	1.9 U	0.92	1.7	2.4 U	2 U	2.5 U
POTASSIUM, TOTAL	185	53.7	124	155 U	124 U	158 U
SELENIUM, TOTAL	0.32 U	0.3 UJ	0.29 UJ	0.31 U	0.29 U	0.32 UJ
SILVER, TOTAL	0.53 U	0.53 U	0.48 U	0.68 U	0.54 U	0.69 U
SODIUM, TOTAL	44.4	30	35.1	10.7	15.4	18.4 U
THALLIUM, TOTAL	0.24 U	0.22 U	0.21 U	0.23 U	0.21 U	0.2 U
VANADIUM, TOTAL	6.8	8.8	10	0.85	0.74	2.5 U
ZINC, TOTAL	1.5	2	2.9	1.5	0.69 U	1.6



SITE 43, AGAN STREET DUMP  
 SUBSURFACE SOIL - FREQUENCY OF DETECTION SUMMARY  
 REMEDIAL INVESTIGATION, CTO-0303  
 MCB, CAMP LEJEUNE, NORTH CAROLINA  
 INORGANIC ANALYTES

LOCATION	43-MA-SB01-01	43-MA-SB02-02	43-MA-SB03-01	43-MA-SB04-01	43-MA-SB05-02	43-OA-SB01-01
DATE SAMPLED	02/28/95	02/28/95	02/28/95	02/28/95	02/28/95	03/10/95
DEPTH	1-3'	3-5'	1-3'	1-3'	3-5'	1-3'
UNITS	MG/KG	MG/KG	MG/KG	MG/KG	MG/KG	MG/KG
<b>TOTAL METALS</b>						
ALUMINUM, TOTAL	5040 J	3600 J	5660	4640	1100 J	1390 J
ANTIMONY, TOTAL	4.3 UJ	4.7 UJ	2.1 UJ	3.7 R	4.2 UJ	4.2 UJ
ARSENIC, TOTAL	0.55 J	0.3 J	0.24 U	0.31 U	0.37 J	0.36 U
BARIUM, TOTAL	9.3	11.7	10.9	10.9	3.4	4.8
BERYLLIUM, TOTAL	0.18 U	0.2 U	0.06 U	0.16 U	0.18 U	0.18 U
CADMIUM, TOTAL	0.58 U	0.63 U	0.57 U	0.49 U	0.57 U	0.56 U
CALCIUM, TOTAL	78.2	91.7	113	101 J	72.8	147
CHROMIUM, TOTAL	4.8	5	7.2	6.5 J	2.1	1.1
COBALT, TOTAL	0.62 U	0.68 U	0.45 U	0.53 U	0.61 U	0.6 U
COPPER, TOTAL	0.42 U	0.68 U	0.78 U	0.4	0.39 U	3.6
IRON, TOTAL	788	896	2270	1380	815	357
LEAD, TOTAL	7.3	4.7	5.5 J	4.9	5.4	7.5
MAGNESIUM, TOTAL	118	121	179	197	45.9	31.5
MANGANESE, TOTAL	2.6	3.9	4	5.4 J	2.9	2.1 U
MERCURY, TOTAL	0.12 U	0.11 U	0.09 U	0.1 U	0.093 U	0.11 U
NICKEL, TOTAL	2.2 U	2.4 U	0.82 U	1.9 U	2.2 U	2.2 U
POTASSIUM, TOTAL	141 U	155 U	158	177	140 U	138 U
SELENIUM, TOTAL	0.35 UJ	0.34 UJ	0.28 U	0.35 U	0.4 UJ	0.29
SILVER, TOTAL	0.62 U	0.68 U	0.49 U	0.53 U	0.61 U	0.6 U
SODIUM, TOTAL	15.1 U	21.8 U	37.9	17.5 U	9.9 U	24.1
THALLIUM, TOTAL	0.21 U	0.21 U	0.13 U	0.21 U	0.25 U	0.21 U
VANADIUM, TOTAL	4.3	5.9	7.8	5.9	2.4 U	1.5
ZINC, TOTAL	1.6	1.7	1.7 U	1.8	2.2	3.7

**SITE 43, AGAN STREET DUMP  
SUBSURFACE SOIL - FREQUENCY OF DETECTION SUMMARY  
REMEDIAL INVESTIGATION, CTO-0303  
MCB, CAMP LEJEUNE, NORTH CAROLINA  
INORGANIC ANALYTES**

LOCATION	43-OA-SB02-01	43-OA-SB03-01	43-OA-SB04-01	43-OA-SB05-02	43-OA-SB06-02	43-WA-SB01-01
DATE SAMPLED	03/10/95	03/10/95	03/10/95	03/06/95	03/06/95	02/28/95
DEPTH	1-3'	1-3'	1-3'	3-5'	3-5'	1-3'
UNITS	MG/KG	MG/KG	MG/KG	MG/KG	MG/KG	MG/KG
<b>TOTAL METALS</b>						
ALUMINUM, TOTAL	1130 J	513	3520 J	949	3290	884
ANTIMONY, TOTAL	4.2 UJ	4.5 UJ	4.2 UJ	4 UJ	4.2 UJ	2.1 UJ
ARSENIC, TOTAL	0.43 U	0.3 UJ	0.44	0.44 U	0.36 U	0.24 U
BARIUM, TOTAL	3.7	2 U	6	2.8 U	5.8	2.9
BERYLLIUM, TOTAL	0.18 U	0.2 U	0.18 U	0.17 U	0.18 U	0.06 U
CADMIUM, TOTAL	0.57 U	0.61 U	0.57 U	0.54 U	0.57 U	0.57 U
CALCIUM, TOTAL	17	139	21	144	403	181
CHROMIUM, TOTAL	1.3	1.7 U	5.6	1.8	4.8	2.2
COBALT, TOTAL	0.61 U	0.65 U	0.61 U	0.58 U	0.61 U	0.45 U
COPPER, TOTAL	0.5	0.41 U	0.44	0.37 U	0.39 U	0.78 U
IRON, TOTAL	596	317	3730	505	1350	414
LEAD, TOTAL	1.5	1.9	3.7	1.8	4.1	2.3 J
MAGNESIUM, TOTAL	37.1	22.1	103	29.7	83.9	37.4 U
MANGANESE, TOTAL	1.8 U	1.6	3.1	2.7	4	2.7
MERCURY, TOTAL	0.08 U	0.09 U	0.1 U	0.11 U	0.08 U	0.11 U
NICKEL, TOTAL	2.2 U	2.3 U	2.2 U	2.1 U	2.2	0.82 U
POTASSIUM, TOTAL	139 U	149 U	140 U	133 U	139 U	46.1 U
SELENIUM, TOTAL	0.34 U	0.42 U	0.34 U	0.35 U	0.28 U	0.28 U
SILVER, TOTAL	0.61 U	0.65 U	0.61 U	0.58 U	0.61 U	0.49 U
SODIUM, TOTAL	6.4	6.6 U	12.1	5.9 U	13.6	4.5 U
THALLIUM, TOTAL	0.25 U	0.39 U	0.25 U	0.25 U	0.21 U	0.13 U
VANADIUM, TOTAL	1.3	1.9 U	7.6	1.9	5.3	2.2 U
ZINC, TOTAL	1.8	0.82 U	1.3	0.74 U	1.4	1.1 U

**SITE 43, AGAN STREET DUMP**  
**SUBSURFACE SOIL - FREQUENCY OF DETECTION SUMMARY**  
**REMEDIAL INVESTIGATION, CTO-0303**  
**MCB, CAMP LEJEUNE, NORTH CAROLINA**  
**INORGANIC ANALYTES**

LOCATION	43-WA-SB02-01	43-WA-SB03-01
DATE SAMPLED	02/28/95	02/28/95
DEPTH	1-3'	1-3'
UNITS	MG/KG	MG/KG
<b>TOTAL METALS</b>		
ALUMINUM, TOTAL	3280 J	1820 J
ANTIMONY, TOTAL	4.2 UJ	4.4 UJ
ARSENIC, TOTAL	0.35 J	0.24 UJ
BARIIUM, TOTAL	7.1	4.4
BERYLLIUM, TOTAL	0.18 U	0.19 U
CADMIUM, TOTAL	0.57 U	0.67 U
CALCIUM, TOTAL	495	308
CHROMIUM, TOTAL	4.2	2.7
COBALT, TOTAL	0.84	0.64 U
COPPER, TOTAL	0.39 U	0.4 U
IRON, TOTAL	964	596
LEAD, TOTAL	6.9	3.1
MAGNESIUM, TOTAL	117	72.4
MANGANESE, TOTAL	3.7	3.7
MERCURY, TOTAL	0.09 U	0.09 U
NICKEL, TOTAL	2.2 U	2.3 U
POTASSIUM, TOTAL	140 U	146 U
SELENIUM, TOTAL	0.38 UJ	0.33 UJ
SILVER, TOTAL	0.61 U	0.64 U
SODIUM, TOTAL	8 U	11.1 U
THALLIUM, TOTAL	0.23 U	0.2 U
VANADIUM, TOTAL	3.9	2.6 U
ZINC, TOTAL	2.2	1.5

**SITE 43, AGAN STREET DUMP**  
**SUBSURFACE SOIL - FREQUENCY OF DETECTION SUMMARY**  
**REMEDIAL INVESTIGATION, CTO-0303**  
**MCB, CAMP LEJEUNE, NORTH CAROLINA**  
**INORGANIC ANALYTES**

LOCATION DATE SAMPLED DEPTH UNITS	MINIMUM NONDETECTED	MAXIMUM NONDETECTED	MINIMUM DETECTED	MAXIMUM DETECTED	LOCATION OF MAXIMUM DETECTED	FREQUENCY OF DETECTION
<b>TOTAL METALS</b>						
ALUMINUM, TOTAL	NA	NA	513	5660	43-MA-SB03-01	20/20
ANTIMONY, TOTAL	2.1 UJ	4.8 UJ	ND	ND		0/19
ARSENIC, TOTAL	0.23 UJ	0.44 U	0.3 J	0.55 J	43-MA-SB01-01	5/20
BARIUM, TOTAL	2 U	2.8 U	2.9	11.7	43-MA-SB02-02	18/20
BERYLLIUM, TOTAL	0.057 U	0.21 U	ND	ND		0/20
CADMIUM, TOTAL	0.49 U	0.67 U	ND	ND		0/20
CALCIUM, TOTAL	NA	NA	17	495	43-WA-SB02-01	20/20
CHROMIUM, TOTAL	1.7 U	1.7 U	1.1	7.2	43-MA-SB03-01	19/20
COBALT, TOTAL	0.45 U	0.69 U	0.62	0.84	43-WA-SB02-01	2/20
COPPER, TOTAL	0.34 U	0.84 U	0.4	3.6	43-OA-SB01-01	6/20
IRON, TOTAL	NA	NA	317	6680	43-DA1-SB03-01	20/20
LEAD, TOTAL	NA	NA	1.5	7.5	43-OA-SB01-01	20/20
MAGNESIUM, TOTAL	37.4 U	37.4 U	22.1	197	43-MA-SB04-01	19/20
MANGANESE, TOTAL	1.8 U	2.1 U	1.6	5.4 J	43-MA-SB04-01	16/20
MERCURY, TOTAL	0.08 U	0.12 U	ND	ND		0/20
NICKEL, TOTAL	0.82 U	2.5 U	0.92	2.2	43-OA-SB06-02	3/20
POTASSIUM, TOTAL	46.1 U	158 U	53.7	185	43-DA1-SB01-01	5/20
SELENIUM, TOTAL	0.28 U	0.42 U	0.29	0.29	43-OA-SB01-01	1/20
SILVER, TOTAL	0.48 U	0.69 U	ND	ND		0/20
SODIUM, TOTAL	4.5 U	21.8 U	6.4	44.4	43-DA1-SB01-01	10/20
THALLIUM, TOTAL	0.13 U	0.39 U	ND	ND		0/20
VANADIUM, TOTAL	1.9 U	2.6 U	0.74	10	43-DA1-SB03-01	15/20
ZINC, TOTAL	0.69 U	1.7 U	1.3	3.7	43-OA-SB01-01	15/20

**GROUNDWATER**

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**SITE 43, AGAN STREET DUMP**  
**GROUNDWATER - FREQUENCY OF DETECTION SUMMARY**  
**REMEDIAL INVESTIGATION, CTO-0303**  
**MCB, CAMP LEJEUNE, NORTH CAROLINA**  
**ORGANIC COMPOUNDS**

LOCATION	43-GW01-01	43-GW01DW-01	43-GW02-01	43-GW03-01	43-GW04-01	43-GW04DW-01
DATE SAMPLED	04/04/95	04/05/95	04/07/95	04/06/95	04/06/95	04/04/95
UNITS	UG/L	UG/L	UG/L	UG/L	UG/L	UG/L
<b>VOLATILES</b>						
CHLOROMETHANE	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
VINYL CHLORIDE	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
METHYLENE CHLORIDE	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
CARBON DISULFIDE	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
1,1-DICHLOROETHANE	10 U	10 U	10 U	10 U	10 U	10 U
1,2-DICHLOROETHENE (TOTAL)	10 U	10 U	10 UJ	10 U	10 U	10 U
CHLOROFORM	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
2-BUTANONE	10 U	10 U	10 U	10 U	10 U	10 U
1,1,1-TRICHLOROETHANE	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
BROMODICHLOROMETHANE	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
CIS-1,3-DICHLOROPROPENE	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
DIBROMOCHLOROMETHANE	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
BENZENE	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
BROMOFORM	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
2-HEXANONE	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
1,1,2,2-TETRACHLOROETHANE	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
CHLOROBENZENE	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
STYRENE	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

SITE 43, AGAN STREET DUMP  
GROUNDWATER - FREQUENCY OF DETECTION SUMMARY  
REMEDIAL INVESTIGATION, CTO-0303  
MCB, CAMP LEJEUNE, NORTH CAROLINA  
ORGANIC COMPOUNDS

LOCATION	43-GW01-01	43-GW01DW-01	43-GW02-01	43-GW03-01	43-GW04-01	43-GW04DW-01
DATE SAMPLED	04/04/95	04/05/95	04/07/95	04/06/95	04/06/95	04/04/95
UNITS	UG/L	UG/L	UG/L	UG/L	UG/L	UG/L
<b>SEMIVOLATILES</b>						
PHENOL	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
2-CHLOROPHENOL	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
1,2-DICHLOROBENZENE	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
2,2'-OXYBIS(1-CHLOROPROPANE)	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
N-NITROSO-DI-N-PROPYLAMINE	10 U	10 U	10 U	10 U	10 U	10 U
HEXACHLOROETHANE	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
ISOPHORONE	10 U	10 U	10 U	10 U	10 U	10 U
2-NITROPHENOL	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
BIS(2-CHLOROETHOXY)METHANE	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
1,2,4-TRICHLOROBENZENE	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
4-CHLOROANILINE	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
4-CHLORO-3-METHYLPHENOL	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
HEXACHLOROCYCLOPENTADIENE	10 U	10 U	10 U	10 U	10 U	10 U
2,4,6-TRICHLOROPHENOL	10 U	10 U	10 U	10 U	10 U	10 U
2,4,5-TRICHLOROPHENOL	25 U	24 U	25 U	25 U	24 U	24 U
2-CHLORONAPHTHALENE	10 U	10 U	10 U	10 U	10 U	10 U
2-NITROANILINE	25 U	24 U	25 U	25 U	24 U	24 U
DIMETHYLPHTHALATE	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
2,6-DINITROTOLUENE	10 U	10 U	10 U	10 U	10 U	10 U
3-NITROANILINE	25 U	24 U	25 U	25 U	24 U	24 U
ACENAPHTHENE	10 U	10 U	10 U	10 U	10 U	10 U
2,4-DINITROPHENOL	25 U	24 U	25 U	25 U	24 U	24 U

SITE 43, AGAN STREET DUMP  
GROUNDWATER - FREQUENCY OF DETECTION SUMMARY  
REMEDIAL INVESTIGATION, CTO-0303  
MCB, CAMP LEJEUNE, NORTH CAROLINA  
ORGANIC COMPOUNDS

LOCATION	43-GW01-01	43-GW01DW-01	43-GW02-01	43-GW03-01	43-GW04-01	43-GW04DW-01
DATE SAMPLED	04/04/95	04/05/95	04/07/95	04/06/95	04/06/95	04/04/95
UNITS	UG/L	UG/L	UG/L	UG/L	UG/L	UG/L
<b>SEMIVOLATILES cont.</b>						
4-NITROPHENOL	25 U	24 U	25 U	25 U	24 U	24 U
DIBENZOFURAN	10 U	10 U	10 U	10 U	10 U	10 U
2,4-DINITROTOLUENE	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
4-CHLOROPHENYL-PHENYLETHER	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
4-NITROANILINE	25 U	24 U	25 U	25 U	24 U	24 U
4,6-DINITRO-2-METHYLPHENOL	25 U	24 U	25 U	25 U	24 U	24 U
N-NITROSODIPHENYLAMINE (1)	10 U	10 U	10 U	10 U	10 U	10 U
4-BROMOPHENYL-PHENYLETHER	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
PENTACHLOROPHENOL	25 U	24 U	25 U	25 U	24 U	24 U
PHENANTHRENE	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
CARBAZOLE	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
FLUORANTHENE	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
BUTYLBENZYLPHTHALATE	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
BENZO(A)ANTHRACENE	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
BIS(2-ETHYLHEXYL)PHTHALATE	10 U	10 U	10 U	10 U	10 U	10 U
DI-N-OCTYL PHTHALATE	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
BENZO(K)FLUORANTHENE	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
INDENO(1,2,3-CD)PYRENE	10 U	10 U	10 U	10 U	10 U	10 U
DIBENZO(A,H)ANTHRACENE	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



**SITE 43, AGAN STREET DUMP  
GROUNDWATER - FREQUENCY OF DETECTION SUMMARY  
REMEDIAL INVESTIGATION, CTO-0303  
MCB, CAMP LEJEUNE, NORTH CAROLINA  
ORGANIC COMPOUNDS**

LOCATION DATE SAMPLED UNITS	43-GW01-01 04/04/95 UG/L	43-GW01DW-01 04/05/95 UG/L	43-GW02-01 04/07/95 UG/L	43-GW03-01 04/06/95 UG/L	43-GW04-01 04/06/95 UG/L	43-GW04DW-01 04/04/95 UG/L
<b>PESTICIDE/PCBS</b>						
ALPHA-BHC	0.049 U	0.047 U	0.052 U	0.048 U	0.05 U	0.046 U
BETA-BHC	0.049 U	0.047 U	0.052 U	0.048 U	0.05 U	0.046 U
DELTA-BHC	0.049 U	0.047 U	0.052 U	0.048 U	0.05 U	0.046 U
GAMMA-BHC (LINDANE)	0.049 U	0.047 U	0.052 U	0.048 U	0.05 U	0.046 U
HEPTACHLOR	0.049 U	0.047 U	0.052 U	0.048 U	0.05 U	0.046 U
ALDRIN	0.049 U	0.047 U	0.052 U	0.048 U	0.05 U	0.046 U
HEPTACHLOR EPOXIDE	0.049 U	0.047 U	0.052 U	0.048 U	0.05 U	0.046 U
ENDOSULFAN I	0.049 U	0.047 U	0.052 U	0.048 U	0.05 U	0.046 U
DIELDRIN	0.098 U	0.094 U	0.1 U	0.095 U	0.1 U	0.093 U
4,4'-DDE	0.098 U	0.094 U	0.1 U	0.095 U	0.1 U	0.093 U
ENDRIN	0.098 U	0.094 U	0.1 U	0.095 U	0.1 U	0.093 U
ENDOSULFAN II	0.098 U	0.094 U	0.1 U	0.095 U	0.1 U	0.093 U
4,4'-DDD	0.098 U	0.094 U	0.1 U	0.095 U	0.1 U	0.093 U
ENDOSULFAN SULFATE	0.098 U	0.094 U	0.1 U	0.095 U	0.1 U	0.093 U
4,4'-DDT	0.098 U	0.094 U	0.1 U	0.095 U	0.1 U	0.093 U
METHOXYCHLOR	0.49 UJ	0.47 UJ	0.52 UJ	0.48 UJ	0.5 UJ	0.46 UJ
ENDRIN KETONE	0.098 U	0.094 U	0.1 U	0.095 U	0.1 U	0.093 U
ENDRIN ALDEHYDE	0.098 U	0.094 U	0.1 U	0.095 U	0.1 U	0.093 U
ALPHA-CHLORDANE	0.049 U	0.047 U	0.052 U	0.048 U	0.05 U	0.046 U
GAMMA-CHLORDANE	0.049 U	0.047 U	0.052 U	0.048 U	0.05 U	0.046 U
TOXAPHENE	4.9 U	4.7 U	5.2 U	4.8 U	5 U	4.6 U
AROCLOR-1016	0.98 U	0.94 U	1 U	0.95 U	1 U	0.93 U
AROCLOR-1221	2 U	1.9 U	2.1 U	1.9 U	2 U	1.9 U
AROCLOR-1232	0.98 U	0.94 U	1 U	0.95 U	1 U	0.93 U
AROCLOR-1242	0.98 U	0.94 U	1 U	0.95 U	1 U	0.93 U
AROCLOR-1248	0.98 U	0.94 U	1 U	0.95 U	1 U	0.93 U
AROCLOR-1254	0.98 U	0.94 U	1 U	0.95 U	1 U	0.93 U
AROCLOR-1260	0.98 U	0.94 U	1 U	0.95 U	1 U	0.93 U

**SITE 43, AGAN STREET DUMP**  
**GROUNDWATER - FREQUENCY OF DETECTION SUMMARY**  
**REMEDIAL INVESTIGATION, CTO-0303**  
**MCB, CAMP LEJEUNE, NORTH CAROLINA**  
**ORGANIC COMPOUNDS**

LOCATION	43-TW01-01	43-TW02-01	43-TW03-01	43-TW04-01
DATE SAMPLED	04/05/95	04/06/95	04/07/95	04/07/95
UNITS	UG/L	UG/L	UG/L	UG/L
<b>VOLATILES</b>				
CHLOROMETHANE	10 U	10 U	10 U	10 U
BROMOMETHANE	10 U	10 U	10 U	10 U
VINYL CHLORIDE	10 U	10 U	10 U	10 U
CHLOROETHANE	10 U	10 U	10 U	10 U
METHYLENE CHLORIDE	10 U	10 U	10 U	10 U
ACETONE	10 U	10 U	10 U	10 U
CARBON DISULFIDE	10 U	10 U	10 U	10 U
1,1-DICHLOROETHENE	10 U	10 U	10 U	10 U
1,1-DICHLOROETHANE	10 U	10 U	10 U	10 U
1,2-DICHLOROETHENE (TOTAL)	10 U	10 U	10 U	10 U
CHLOROFORM	10 U	10 U	10 U	10 U
1,2-DICHLOROETHANE	10 U	10 U	10 U	10 U
2-BUTANONE	10 U	10 U	10 U	10 U
1,1,1-TRICHLOROETHANE	10 U	10 U	10 U	10 U
CARBON TETRACHLORIDE	10 U	10 U	10 U	10 U
BROMODICHLOROMETHANE	10 U	10 U	10 U	10 U
1,2-DICHLOROPROPANE	10 U	10 U	10 U	10 U
CIS-1,3-DICHLOROPROPENE	10 U	10 U	10 U	10 U
TRICHLOROETHENE	10 U	10 U	10 U	10 U
DIBROMOCHLOROMETHANE	10 U	10 U	10 U	10 U
1,1,2-TRICHLOROETHANE	10 U	10 U	10 U	10 U
BENZENE	10 U	10 U	10 U	10 U
TRANS-1,3-DICHLOROPROPENE	10 U	10 U	10 U	10 U
BROMOFORM	10 U	10 U	10 U	10 U
4-METHYL-2-PENTANONE	10 U	10 U	10 U	10 U
2-HEXANONE	10 U	10 U	10 U	10 U
TETRACHLOROETHENE	10 U	10 U	10 U	10 U
1,1,2,2-TETRACHLOROETHANE	10 U	10 U	10 U	10 U
TOLUENE	10 U	10 U	10 U	10 U
CHLOROBENZENE	10 U	10 U	10 U	10 U
ETHYLBENZENE	10 U	10 U	10 U	10 U
STYRENE	10 U	10 U	10 U	10 U
XYLENE (TOTAL)	10 U	10 U	10 U	10 U

**SITE 43, AGAN STREET DUMP**  
**GROUNDWATER - FREQUENCY OF DETECTION SUMMARY**  
**REMEDIAL INVESTIGATION, CTO-0303**  
**MCB, CAMP LEJEUNE, NORTH CAROLINA**  
**ORGANIC COMPOUNDS**

LOCATION	43-TW01-01	43-TW02-01	43-TW03-01	43-TW04-01
DATE SAMPLED	04/05/95	04/06/95	04/07/95	04/07/95
UNITS	UG/L	UG/L	UG/L	UG/L
<b>SEMIVOLATILES</b>				
PHENOL	10 U	11 U	11 U	10 U
BIS(2-CHLOROETHYL)ETHER	10 U	11 U	11 U	10 U
2-CHLOROPHENOL	10 U	11 U	11 U	10 U
1,3-DICHLOROBENZENE	10 U	11 U	11 U	10 U
1,4-DICHLOROBENZENE	10 U	11 U	11 U	10 U
1,2-DICHLOROBENZENE	10 U	11 U	11 U	10 U
2-METHYLPHENOL	10 U	11 U	11 U	10 U
2,2'-OXYBIS(1-CHLOROPROPANE)	10 U	11 U	11 U	10 U
4-METHYLPHENOL	10 U	11 U	11 U	2 J
N-NITROSO-DI-N-PROPYLAMINE	10 U	11 U	11 U	10 U
HEXACHLOROETHANE	10 U	11 U	11 U	10 U
NITROBENZENE	10 U	11 U	11 U	10 U
ISOPHORONE	10 U	11 U	11 U	10 U
2-NITROPHENOL	10 U	11 U	11 U	10 U
2,4-DIMETHYLPHENOL	10 U	11 U	11 U	10 U
BIS(2-CHLOROETHOXY)METHANE	10 U	11 U	11 U	10 U
2,4-DICHLOROPHENOL	10 U	11 U	11 U	10 U
1,2,4-TRICHLOROBENZENE	10 U	11 U	11 U	10 U
NAPHTHALENE	10 U	11 U	11 U	10 U
4-CHLOROANILINE	10 U	11 U	11 U	10 U
HEXACHLOROBUTADIENE	10 U	11 U	11 U	10 U
4-CHLORO-3-METHYLPHENOL	10 U	11 U	11 U	10 U
2-METHYLNAPHTHALENE	10 U	11 U	11 U	10 U
HEXACHLOROCYCLOPENTADIENE	10 U	11 U	11 U	10 U
2,4,6-TRICHLOROPHENOL	10 U	11 U	11 U	10 U
2,4,5-TRICHLOROPHENOL	24 U	27 U	27 U	24 U
2-CHLORONAPHTHALENE	10 U	11 U	11 U	10 U
2-NITROANILINE	24 U	27 U	27 U	24 U
DIMETHYLPHTHALATE	10 U	11 U	11 U	10 U
ACENAPHTHYLENE	10 U	11 U	11 U	10 U
2,6-DINITROTOLUENE	10 U	11 U	11 U	10 U
3-NITROANILINE	24 U	27 U	27 U	24 U
ACENAPHTHENE	10 U	11 U	11 U	10 U
2,4-DINITROPHENOL	24 U	27 U	27 U	24 U

**SITE 43, AGAN STREET DUMP**  
**GROUNDWATER - FREQUENCY OF DETECTION SUMMARY**  
**REMEDIAL INVESTIGATION, CTO-0303**  
**MCB, CAMP LEJEUNE, NORTH CAROLINA**  
**ORGANIC COMPOUNDS**

LOCATION	43-TW01-01	43-TW02-01	43-TW03-01	43-TW04-01
DATE SAMPLED	04/05/95	04/06/95	04/07/95	04/07/95
UNITS	UG/L	UG/L	UG/L	UG/L
<b>SEMIVOLATILES cont.</b>				
4-NITROPHENOL	24 U	27 U	27 U	24 U
DIBENZOFURAN	10 U	11 U	11 U	10 U
2,4-DINITROTOLUENE	10 U	11 U	11 U	10 U
DIETHYLPHthalate	10 U	11 U	11 U	10 U
4-CHLOROPHENYL-PHENYLETHER	10 U	11 U	11 U	10 U
FLUORENE	10 U	11 U	11 U	10 U
4-NITROANILINE	24 U	27 U	27 U	24 U
4,6-DINITRO-2-METHYLPHENOL	24 U	27 U	27 U	24 U
N-NITROSODIPHENYLAMINE (1)	10 U	11 U	11 U	10 U
4-BROMOPHENYL-PHENYLETHER	10 U	11 U	11 U	10 U
HEXACHLOROBENZENE	10 U	11 U	11 U	10 U
PENTACHLOROPHENOL	24 U	27 U	27 U	24 U
PHENANTHRENE	10 U	11 U	11 U	10 U
ANTHRACENE	10 U	11 U	11 U	10 U
CARBAZOLE	10 U	11 U	11 U	10 U
DI-N-BUTYLPHthalate	10 U	11 U	11 U	10 U
FLUORANTHENE	10 U	11 U	11 U	10 U
PYRENE	10 U	11 U	11 U	10 U
BUTYLBENZYLPHthalate	10 U	11 U	11 U	10 U
3,3'-DICHLOROBENZIDINE	10 U	11 U	11 U	10 U
BENZO(A)ANTHRACENE	10 U	11 U	11 U	10 U
CHRYSENE	10 U	11 U	11 U	10 U
BIS(2-ETHYLHEXYL)PHthalate	59 U	11 U	11 U	10 U
DI-N-OCTYL PHthalate	10 U	11 U	11 U	10 U
BENZO(B)FLUORANTHENE	10 U	11 U	11 U	10 U
BENZO(K)FLUORANTHENE	10 U	11 U	11 U	10 U
BENZO(A)PYRENE	10 U	11 U	11 U	10 U
INDENO(1,2,3-CD)PYRENE	10 U	11 U	11 U	10 U
DIBENZO(A,H)ANTHRACENE	10 U	11 U	11 U	10 U
BENZO(G,H,I)PERYLENE	10 U	11 U	11 U	10 U

**SITE 43, AGAN STREET DUMP**  
**GROUNDWATER - FREQUENCY OF DETECTION SUMMARY**  
**REMEDIAL INVESTIGATION, CTO-0303**  
**MCB, CAMP LEJEUNE, NORTH CAROLINA**  
**ORGANIC COMPOUNDS**

LOCATION	43-TW01-01	43-TW02-01	43-TW03-01	43-TW04-01
DATE SAMPLED	04/05/95	04/06/95	04/07/95	04/07/95
UNITS	UG/L	UG/L	UG/L	UG/L
<b>PESTICIDE/PCBS</b>				
ALPHA-BHC	0.048 U	0.052 U	0.052 U	0.051 U
BETA-BHC	0.048 U	0.052 U	0.052 U	0.051 U
DELTA-BHC	0.048 U	0.052 U	0.052 U	0.051 U
GAMMA-BHC (LINDANE)	0.048 U	0.052 U	0.052 U	0.051 U
HEPTACHLOR	0.048 U	0.052 U	0.052 U	0.051 U
ALDRIN	0.048 U	0.052 U	0.052 U	0.051 U
HEPTACHLOR EPOXIDE	0.048 U	0.052 U	0.052 U	0.051 U
ENDOSULFAN I	0.048 U	0.052 U	0.052 U	0.051 U
DIELDRIN	0.097 U	0.1 U	0.1 U	0.1 U
4,4'-DDE	0.097 U	0.1 U	0.1 U	0.1 U
ENDRIN	0.097 U	0.1 U	0.1 U	0.1 U
ENDOSULFAN II	0.097 U	0.1 U	0.1 U	0.1 U
4,4'-DDD	0.097 U	0.1 U	0.1 U	0.1 U
ENDOSULFAN SULFATE	0.097 U	0.1 U	0.1 U	0.1 U
4,4'-DDT	0.097 U	0.1 U	0.1 U	0.1 U
METHOXYCHLOR	0.48 UJ	0.52 UJ	0.52 UJ	0.51 UJ
ENDRIN KETONE	0.097 U	0.1 U	0.1 U	0.1 U
ENDRIN ALDEHYDE	0.097 U	0.1 U	0.1 U	0.1 U
ALPHA-CHLORDANE	0.048 U	0.052 U	0.052 U	0.051 U
GAMMA-CHLORDANE	0.048 U	0.052 U	0.052 U	0.051 U
TOXAPHENE	4.8 U	5.2 U	5.2 U	5.1 U
AROCLOR-1016	NA	NA	NA	NA
AROCLOR-1221	NA	NA	NA	NA
AROCLOR-1232	NA	NA	NA	NA
AROCLOR-1242	NA	NA	NA	NA
AROCLOR-1248	NA	NA	NA	NA
AROCLOR-1254	NA	NA	NA	NA
AROCLOR-1260	NA	NA	NA	NA

**SITE 43, AGAN STREET DUMP**  
**GROUNDWATER - FREQUENCY OF DETECTION SUMMARY**  
**REMEDIAL INVESTIGATION, CTO-0303**  
**MCB, CAMP LEJEUNE, NORTH CAROLINA**  
**ORGANIC COMPOUNDS**

LOCATION DATE SAMPLED UNITS	MINIMUM NONDETECTED	MAXIMUM NONDETECTED	MINIMUM DETECTED	MAXIMUM DETECTED	LOCATION OF MAXIMUM DETECTED	FREQUENCY OF DETECTION
<b>VOLATILES</b>						
CHLOROMETHANE	10 U	10 U	ND	ND		0/10
BROMOMETHANE	10 U	10 U	ND	ND		0/10
VINYL CHLORIDE	10 U	10 U	ND	ND		0/10
CHLOROETHANE	10 U	10 U	ND	ND		0/10
METHYLENE CHLORIDE	10 U	10 U	ND	ND		0/10
ACETONE	10 U	10 U	ND	ND		0/10
CARBON DISULFIDE	10 U	10 U	ND	ND		0/10
1,1-DICHLOROETHENE	10 U	10 U	ND	ND		0/10
1,1-DICHLOROETHANE	10 U	10 U	ND	ND		0/10
1,2-DICHLOROETHENE (TOTAL)	10 U	10 U	ND	ND		0/10
CHLOROFORM	10 U	10 U	ND	ND		0/10
1,2-DICHLOROETHANE	10 U	10 U	ND	ND		0/10
2-BUTANONE	10 U	10 U	ND	ND		0/10
1,1,1-TRICHLOROETHANE	10 U	10 U	ND	ND		0/10
CARBON TETRACHLORIDE	10 U	10 U	ND	ND		0/10
BROMODICHLOROMETHANE	10 U	10 U	ND	ND		0/10
1,2-DICHLOROPROPANE	10 U	10 U	ND	ND		0/10
CIS-1,3-DICHLOROPROPENE	10 U	10 U	ND	ND		0/10
TRICHLOROETHENE	10 U	10 U	ND	ND		0/10
DIBROMOCHLOROMETHANE	10 U	10 U	ND	ND		0/10
1,1,2-TRICHLOROETHANE	10 U	10 U	ND	ND		0/10
BENZENE	10 U	10 U	ND	ND		0/10
TRANS-1,3-DICHLOROPROPENE	10 U	10 U	ND	ND		0/10
BROMOFORM	10 U	10 U	ND	ND		0/10
4-METHYL-2-PENTANONE	10 U	10 U	ND	ND		0/10
2-HEXANONE	10 U	10 U	ND	ND		0/10
TETRACHLOROETHENE	10 U	10 U	ND	ND		0/10
1,1,2,2-TETRACHLOROETHANE	10 U	10 U	ND	ND		0/10
TOLUENE	10 U	10 U	ND	ND		0/10
CHLOROBENZENE	10 U	10 U	ND	ND		0/10
ETHYLBENZENE	10 U	10 U	ND	ND		0/10
STYRENE	10 U	10 U	ND	ND		0/10
XYLENE (TOTAL)	10 U	10 U	ND	ND		0/10

SITE 43, AGAN STREET DUMP  
GROUNDWATER - FREQUENCY OF DETECTION SUMMARY  
REMEDIAL INVESTIGATION, CTO-0303  
MCB, CAMP LEJEUNE, NORTH CAROLINA  
ORGANIC COMPOUNDS

LOCATION DATE SAMPLED UNITS	MINIMUM NONDETECTED	MAXIMUM NONDETECTED	MINIMUM DETECTED	MAXIMUM DETECTED	LOCATION OF MAXIMUM DETECTED	FREQUENCY OF DETECTION
<b>SEMIVOLATILES</b>						
PHENOL	10 U	11 U	ND	ND		0/10
BIS(2-CHLOROETHYL)ETHER	10 U	11 U	ND	ND		0/10
2-CHLOROPHENOL	10 U	11 U	ND	ND		0/10
1,3-DICHLOROBENZENE	10 U	11 U	ND	ND		0/10
1,4-DICHLOROBENZENE	10 U	11 U	ND	ND		0/10
1,2-DICHLOROBENZENE	10 U	11 U	ND	ND		0/10
2-METHYLPHENOL	10 U	11 U	ND	ND		0/10
2,2'-OXYBIS(1-CHLOROPROPANE)	10 U	11 U	ND	ND		0/10
4-METHYLPHENOL	10 U	11 U	2 J	2 J	43-TW04-01	1/10
N-NITROSO-DI-N-PROPYLAMINE	10 U	11 U	ND	ND		0/10
HEXACHLOROETHANE	10 U	11 U	ND	ND		0/10
NITROBENZENE	10 U	11 U	ND	ND		0/10
ISOPHORONE	10 U	11 U	ND	ND		0/10
2-NITROPHENOL	10 U	11 U	ND	ND		0/10
2,4-DIMETHYLPHENOL	10 U	11 U	ND	ND		0/10
BIS(2-CHLOROETHOXY)METHANE	10 U	11 U	ND	ND		0/10
2,4-DICHLOROPHENOL	10 U	11 U	ND	ND		0/10
1,2,4-TRICHLOROBENZENE	10 U	11 U	ND	ND		0/10
NAPHTHALENE	10 U	11 U	ND	ND		0/10
4-CHLOROANILINE	10 U	11 U	ND	ND		0/10
HEXACHLOROBUTADIENE	10 U	11 U	ND	ND		0/10
4-CHLORO-3-METHYLPHENOL	10 U	11 U	ND	ND		0/10
2-METHYLNAPHTHALENE	10 U	11 U	ND	ND		0/10
HEXACHLOROCYCLOPENTADIENE	10 U	11 U	ND	ND		0/10
2,4,6-TRICHLOROPHENOL	10 U	11 U	ND	ND		0/10
2,4,5-TRICHLOROPHENOL	24 U	27 U	ND	ND		0/10
2-CHLORONAPHTHALENE	10 U	11 U	ND	ND		0/10
2-NITROANILINE	24 U	27 U	ND	ND		0/10
DIMETHYLPHTHALATE	10 U	11 U	ND	ND		0/10
ACENAPHTHYLENE	10 U	11 U	ND	ND		0/10
2,6-DINITROTOLUENE	10 U	11 U	ND	ND		0/10
3-NITROANILINE	24 U	27 U	ND	ND		0/10
ACENAPHTHENE	10 U	11 U	ND	ND		0/10
2,4-DINITROPHENOL	24 U	27 U	ND	ND		0/10

**SITE 43, AGAN STREET DUMP**  
**GROUNDWATER - FREQUENCY OF DETECTION SUMMARY**  
**REMEDIAL INVESTIGATION, CTO-0303**  
**MCB, CAMP LEJEUNE, NORTH CAROLINA**  
**ORGANIC COMPOUNDS**

LOCATION DATE SAMPLED UNITS	MINIMUM NONDETECTED	MAXIMUM NONDETECTED	MINIMUM DETECTED	MAXIMUM DETECTED	LOCATION OF MAXIMUM DETECTED	FREQUENCY OF DETECTION
<b>SEMIVOLATILES cont.</b>						
4-NITROPHENOL	24 U	27 U	ND	ND		0/10
DIBENZOFURAN	10 U	11 U	ND	ND		0/10
2,4-DINITROTOLUENE	10 U	11 U	ND	ND		0/10
DIETHYLPHTHALATE	10 U	11 U	ND	ND		0/10
4-CHLOROPHENYL-PHENYLEETHER	10 U	11 U	ND	ND		0/10
FLUORENE	10 U	11 U	ND	ND		0/10
4-NITROANILINE	24 U	27 U	ND	ND		0/10
4,6-DINITRO-2-METHYLPHENOL	24 U	27 U	ND	ND		0/10
N-NITROSODIPHENYLAMINE (1)	10 U	11 U	ND	ND		0/10
4-BROMOPHENYL-PHENYLEETHER	10 U	11 U	ND	ND		0/10
HEXACHLOROBENZENE	10 U	11 U	ND	ND		0/10
PENTACHLOROPHENOL	24 U	27 U	ND	ND		0/10
PHENANTHRENE	10 U	11 U	ND	ND		0/10
ANTHRACENE	10 U	11 U	ND	ND		0/10
CARBAZOLE	10 U	11 U	ND	ND		0/10
DI-N-BUTYLPHTHALATE	10 U	11 U	ND	ND		0/10
FLUORANTHENE	10 U	11 U	ND	ND		0/10
PYRENE	10 U	11 U	ND	ND		0/10
BUTYLBENZYLPHTHALATE	10 U	11 U	ND	ND		0/10
3,3'-DICHLOROBENZIDINE	10 U	11 U	ND	ND		0/10
BENZO(A)ANTHRACENE	10 U	11 U	ND	ND		0/10
CHRYSENE	10 U	11 U	ND	ND		0/10
BIS(2-ETHYLHEXYL)PHTHALATE	10 U	59 U	ND	ND		0/10
DI-N-OCTYL PHTHALATE	10 U	11 U	ND	ND		0/10
BENZO(B)FLUORANTHENE	10 U	11 U	ND	ND		0/10
BENZO(K)FLUORANTHENE	10 U	11 U	ND	ND		0/10
BENZO(A)PYRENE	10 U	11 U	ND	ND		0/10
INDENO(1,2,3-CD)PYRENE	10 U	11 U	ND	ND		0/10
DIBENZO(A,H)ANTHRACENE	10 U	11 U	ND	ND		0/10
BENZO(G,H,I)PERYLENE	10 U	11 U	ND	ND		0/10



**SITE 43, AGAN STREET DUMP**  
**GROUNDWATER - FREQUENCY OF DETECTION SUMMARY**  
**REMEDIAL INVESTIGATION, CTO-0303**  
**MCB, CAMP LEJEUNE, NORTH CAROLINA**  
**ORGANIC COMPOUNDS**

LOCATION DATE SAMPLED UNITS	MINIMUM NONDETECTED	MAXIMUM NONDETECTED	MINIMUM DETECTED	MAXIMUM DETECTED	LOCATION OF MAXIMUM DETECTED	FREQUENCY OF DETECTION
<b>PESTICIDE/PCBS</b>						
ALPHA-BHC	0.046 U	0.052 U	ND	ND		0/10
BETA-BHC	0.046 U	0.052 U	ND	ND		0/10
DELTA-BHC	0.046 U	0.052 U	ND	ND		0/10
GAMMA-BHC (LINDANE)	0.046 U	0.052 U	ND	ND		0/10
HEPTACHLOR	0.046 U	0.052 U	ND	ND		0/10
ALDRIN	0.046 U	0.052 U	ND	ND		0/10
HEPTACHLOR EPOXIDE	0.046 U	0.052 U	ND	ND		0/10
ENDOSULFAN I	0.046 U	0.052 U	ND	ND		0/10
DIELDRIN	0.093 U	0.1 U	ND	ND		0/10
4,4'-DDE	0.093 U	0.1 U	ND	ND		0/10
ENDRIN	0.093 U	0.1 U	ND	ND		0/10
ENDOSULFAN II	0.093 U	0.1 U	ND	ND		0/10
4,4'-DDD	0.093 U	0.1 U	ND	ND		0/10
ENDOSULFAN SULFATE	0.093 U	0.1 U	ND	ND		0/10
4,4'-DDT	0.093 U	0.1 U	ND	ND		0/10
METHOXYCHLOR	0.46 UJ	0.52 UJ	ND	ND		0/10
ENDRIN KETONE	0.093 U	0.1 U	ND	ND		0/10
ENDRIN ALDEHYDE	0.093 U	0.1 U	ND	ND		0/10
ALPHA-CHLORDANE	0.046 U	0.052 U	ND	ND		0/10
GAMMA-CHLORDANE	0.046 U	0.052 U	ND	ND		0/10
TOXAPHENE	4.6 U	5.2 U	ND	ND		0/10
AROCLOR-1016	0.93 U	1 U	ND	ND		0/6
AROCLOR-1221	1.9 U	2.1 U	ND	ND		0/6
AROCLOR-1232	0.93 U	1 U	ND	ND		0/6
AROCLOR-1242	0.93 U	1 U	ND	ND		0/6
AROCLOR-1248	0.93 U	1 U	ND	ND		0/6
AROCLOR-1254	0.93 U	1 U	ND	ND		0/6
AROCLOR-1260	0.93 U	1 U	ND	ND		0/6

**SITE 43, AGAN STREET DUMP**  
**GROUNDWATER - FREQUENCY OF DETECTION SUMMARY**  
**REMEDIAL INVESTIGATION, CTO-0303**  
**MCB, CAMP LEJEUNE, NORTH CAROLINA**  
**INORGANIC ANALYTES**

LOCATION	43-GW01-01	43-GW01DW-01	43-GW02-01	43-GW03-01	43-GW04-01	43-GW04DW-01
DATE SAMPLED	04/04/95	04/05/95	04/07/95	04/06/95	04/06/95	04/04/95
UNITS	UG/L	UG/L	UG/L	UG/L	UG/L	UG/L
<b>TOTAL METALS</b>						
ALUMINUM, TOTAL	294	16.8 J	456	97.8	432	83.5 U
ANTIMONY, TOTAL	10.9 U	10.9 U	20.8 U	10.9 U	10.9 U	10.9 U
ARSENIC, TOTAL	1.3 U	1.3 U	1.7 U	1.3 U	1.3 U	1.3 U
BARIUM, TOTAL	12.5	5.9 U	54.5 J	30.3	16.1	5.7 U
BERYLLIUM, TOTAL	0.39 U	0.3 U	0.8 U	0.3 U	0.3 U	0.3 U
CADMIUM, TOTAL	2.9 U	2.9 U	1.9 U	2.9 U	2.9 U	2.9 U
CALCIUM, TOTAL	61500	74000	3410	28100	22400	68700
CHROMIUM, TOTAL	4.7 U	4.7 U	4.1 U	4.7 U	4.7 U	4.7 U
COBALT, TOTAL	2.3 U	2.3 U	3.4 U	2.3 U	2.3 U	2.3 U
COPPER, TOTAL	60.9	4 U	4.8 U	4 U	4 U	4 U
IRON, TOTAL	187 J	997 J	1050	4530 J	494 J	649 J
LEAD, TOTAL	1.4	1.2 U	0.6 U	1.2 U	1.2 U	1.2 U
MAGNESIUM, TOTAL	1990	5360	2560	2570	1630	2390
MANGANESE, TOTAL	7.4	86.7	22.9	34.7	8	28.5
MERCURY, TOTAL	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
NICKEL, TOTAL	4.2 U	4.2 U	10.9 U	4.2 U	4.2 U	4.2 U
POTASSIUM, TOTAL	2510	5330	1850	900	1620	3120
SELENIUM, TOTAL	1.5 U	1.5 U	1.8 U	1.5 U	1.5 U	1.5 U
SILVER, TOTAL	2.5 U	2.5 U	2.8 U	2.5 U	2.5 U	2.5 U
SODIUM, TOTAL	5180	57200	13200	7010	5580	28000
THALLIUM, TOTAL	1.1 U	1.1 U	1.4 U	1.1 U	1.1 U	1.1 U
VANADIUM, TOTAL	2.1 U	2.1 U	4 U	2.1 U	2.1 U	2.1 U
ZINC, TOTAL	16.1	1.9 U	15.4	2.7	2.2	2.1

**SITE 43, AGAN STREET DUMP**  
**GROUNDWATER - FREQUENCY OF DETECTION SUMMARY**  
**REMEDIAL INVESTIGATION, CTO-0303**  
**MCB, CAMP LEJEUNE, NORTH CAROLINA**  
**INORGANIC ANALYTES**

LOCATION	43-TW01-01	43-TW02-01	43-TW03-01	43-TW04-01
DATE SAMPLED	04/05/95	04/06/95	04/07/95	04/07/95
UNITS	UG/L	UG/L	UG/L	UG/L
<b>TOTAL METALS</b>				
ALUMINUM, TOTAL	4190	225	820	25100
ANTIMONY, TOTAL	10.9 U	10.9 U	10.9 U	10.9 U
ARSENIC, TOTAL	1.3 U	1.3 U	1.3 U	1.3 U
BARIIUM, TOTAL	81.5	10.3	42.4	104
BERYLLIUM, TOTAL	0.3 U	0.3 U	0.3 U	0.91 U
CADMIUM, TOTAL	2.9 U	2.9 U	2.9 U	2.9 U
CALCIUM, TOTAL	24100	74200	3710	81800
CHROMIUM, TOTAL	4.7 U	4.7 U	4.7 U	4.7 U
COBALT, TOTAL	2.3 U	2.3 U	2.3 U	3.9
COPPER, TOTAL	4 U	4 U	4 U	4 U
IRON, TOTAL	1950 J	109 J	331 J	33800 J
LEAD, TOTAL	1.9	1.2 U	1.2 U	1.4
MAGNESIUM, TOTAL	4540	1050	1970	154000
MANGANESE, TOTAL	27.6	5	4.4	107
MERCURY, TOTAL	0.2 U	0.2 U	0.2 U	0.2 U
NICKEL, TOTAL	4.4	4.2 U	4.2 U	13
POTASSIUM, TOTAL	769	404	731	20200
SELENIUM, TOTAL	1.5 U	1.5 U	1.5 U	15 U
SILVER, TOTAL	2.5 U	2.5 U	2.5 U	2.5 U
SODIUM, TOTAL	33100	7100	12100	1130000
THALLIUM, TOTAL	1.1 U	1.1 U	1.1 U	1.1 U
VANADIUM, TOTAL	5.1	2.1 U	2.1 U	5.4
ZINC, TOTAL	546	35.5	37.5	596

**SITE 43, AGAN STREET DUMP**  
**GROUNDWATER - FREQUENCY OF DETECTION SUMMARY**  
**REMEDIAL INVESTIGATION, CTO-0303**  
**MCB, CAMP LEJEUNE, NORTH CAROLINA**  
**INORGANIC ANALYTES**

LOCATION DATE SAMPLED UNITS	MINIMUM NONDETECTED	MAXIMUM NONDETECTED	MINIMUM DETECTED	MAXIMUM DETECTED	LOCATION OF MAXIMUM DETECTED	FREQUENCY OF DETECTION
<b>TOTAL METALS</b>						
ALUMINUM, TOTAL	83.5 U	83.5 U	16.8 J	25100	43-TW04-01	9/10
ANTIMONY, TOTAL	10.9 U	20.8 U	ND	ND		0/10
ARSENIC, TOTAL	1.3 U	1.7 U	ND	ND		0/10
BARIUM, TOTAL	5.7 U	5.9 U	10.3	104	43-TW04-01	8/10
BERYLLIUM, TOTAL	0.3 U	0.91 U	ND	ND		0/10
CADMIUM, TOTAL	1.9 U	2.9 U	ND	ND		0/10
CALCIUM, TOTAL	NA	NA	3410	81800	43-TW04-01	10/10
CHROMIUM, TOTAL	4.1 U	4.7 U	ND	ND		0/10
COBALT, TOTAL	2.3 U	3.4 U	3.9	3.9	43-TW04-01	1/10
COPPER, TOTAL	4 U	4.8 U	60.9	60.9	43-GW01-01	1/10
IRON, TOTAL	NA	NA	109 J	33800 J	43-TW04-01	10/10
LEAD, TOTAL	0.6 U	1.2 U	1.4	1.9	43-TW01-01	3/10
MAGNESIUM, TOTAL	NA	NA	1050	154000	43-TW04-01	10/10
MANGANESE, TOTAL	NA	NA	4.4	107	43-TW04-01	10/10
MERCURY, TOTAL	0.2 U	0.2 U	ND	ND		0/10
NICKEL, TOTAL	4.2 U	10.9 U	4.4	13	43-TW04-01	2/10
POTASSIUM, TOTAL	NA	NA	404	20200	43-TW04-01	10/10
SELENIUM, TOTAL	1.5 U	15 U	ND	ND		0/10
SILVER, TOTAL	2.5 U	2.8 U	ND	ND		0/10
SODIUM, TOTAL	NA	NA	5180	1130000	43-TW04-01	10/10
THALLIUM, TOTAL	1.1 U	1.4 U	ND	ND		0/10
VANADIUM, TOTAL	2.1 U	4 U	5.1	5.4	43-TW04-01	2/10
ZINC, TOTAL	1.9 U	1.9 U	2.1	596	43-TW04-01	9/10

**SITE 43, AGAN STREET DUMP**  
**GROUNDWATER**  
**REMEDIAL INVESTIGATION, CTO-0303**  
**MCB, CAMP LEJEUNE, NORTH CAROLINA**  
**DISSOLVED INORGANIC ANALYTES**

LOCATION	43-GW04DWD-01
DATE SAMPLED	04/04/95
UNITS	UG/L

**DISSOLVED METALS**

ALUMINUM, SOLUBLE	47.9 U
ANTIMONY, SOLUBLE	10.9 U
ARSENIC, SOLUBLE	1.3 U
BARIUM, SOLUBLE	5 U
BERYLLIUM, SOLUBLE	0.3 U
CADMIUM, SOLUBLE	2.9 U
CALCIUM, SOLUBLE	66800
CHROMIUM, SOLUBLE	4.7 U
COBALT, SOLUBLE	2.3 U
COPPER, SOLUBLE	4 U
IRON, SOLUBLE	591 J
LEAD, SOLUBLE	1.2 U
MAGNESIUM, SOLUBLE	2380
MANGANESE, SOLUBLE	29.1
MERCURY, SOLUBLE	0.2 U
NICKEL, SOLUBLE	4.2 U
POTASSIUM, SOLUBLE	2970
SELENIUM, SOLUBLE	1.5 U
SILVER, SOLUBLE	2.5 U
SODIUM, SOLUBLE	26600
THALLIUM, SOLUBLE	1.1 U
VANADIUM, SOLUBLE	3.5
ZINC, SOLUBLE	3.8

**SURFACE WATER**

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**SITE 43, AGAN STREET DUMP**  
**SURFACE WATER - FREQUENCY OF DETECTION SUMMARY**  
**REMEDIAL INVESTIGATION, CTO-0303**  
**MCB, CAMP LEJEUNE, NORTH CAROLINA**  
**ORGANIC COMPOUNDS**

LOCATION	43-EC-SW01	43-EC-SW02	43-SHC-SW01	43-SHC-SW02	43-SHC-SW03	43-SHC-SW04
DATE SAMPLED	05/03/95	05/03/95	05/05/95	05/05/95	05/03/95	05/03/95
UNITS	UG/L	UG/L	UG/L	UG/L	UG/L	UG/L
<b>VOLATILES</b>						
CHLOROMETHANE	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
VINYL CHLORIDE	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
METHYLENE CHLORIDE	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
CARBON DISULFIDE	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
1,1-DICHLOROETHANE	10 U	10 U	10 U	10 U	10 U	10 U
1,2-DICHLOROETHENE (TOTAL)	2 J	2 J	10 U	10 U	10 UJ	10 U
CHLOROFORM	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
2-BUTANONE	10 U	10 U	10 U	10 U	10 U	10 U
1,1,1-TRICHLOROETHANE	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
BROMODICHLOROMETHANE	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
CIS-1,3-DICHLOROPROPENE	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
DIBROMOCHLOROMETHANE	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
BENZENE	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
BROMOFORM	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
2-HEXANONE	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
1,1,2,2-TETRACHLOROETHANE	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
CHLOROBENZENE	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
STYRENE	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

SITE 43, AGAN STREET DUMP  
 SURFACE WATER - FREQUENCY OF DETECTION SUMMARY  
 REMEDIAL INVESTIGATION, CTO-0303  
 MCB, CAMP LEJEUNE, NORTH CAROLINA  
 ORGANIC COMPOUNDS

LOCATION	43-EC-SW01	43-EC-SW02	43-SHC-SW01	43-SHC-SW02	43-SHC-SW03	43-SHC-SW04
DATE SAMPLED	05/03/95	05/03/95	05/05/95	05/05/95	05/03/95	05/03/95
UNITS	UG/L	UG/L	UG/L	UG/L	UG/L	UG/L
<b>SEMIVOLATILES</b>						
PHENOL	10 U	10 U	11 U	10 U	10 U	10 U
BIS(2-CHLOROETHYL)ETHER	10 U	10 U	11 U	10 U	10 U	10 U
2-CHLOROPHENOL	10 U	10 U	11 U	10 U	10 U	10 U
1,3-DICHLOROBENZENE	10 U	10 U	11 U	10 U	10 U	10 U
1,4-DICHLOROBENZENE	10 U	10 U	11 U	10 U	10 U	10 U
1,2-DICHLOROBENZENE	10 U	10 U	11 U	10 U	10 U	10 U
2-METHYLPHENOL	10 U	10 U	11 U	10 U	10 U	10 U
2,2'-OXYBIS(1-CHLOROPROPANE)	10 U	10 U	11 U	10 U	10 U	10 U
4-METHYLPHENOL	10 U	10 U	11 U	10 U	10 U	10 U
N-NITROSO-DI-N-PROPYLAMINE	10 U	10 U	11 U	10 U	10 U	10 U
HEXACHLOROETHANE	10 U	10 U	11 U	10 U	10 U	10 U
NITROBENZENE	10 U	10 U	11 U	10 U	10 U	10 U
ISOPHORONE	10 U	10 U	11 U	10 U	10 U	10 U
2-NITROPHENOL	10 U	10 U	11 U	10 U	10 U	10 U
2,4-DIMETHYLPHENOL	10 U	10 U	11 U	10 U	10 U	10 U
BIS(2-CHLOROETHOXY)METHANE	10 U	10 U	11 U	10 U	10 U	10 U
2,4-DICHLOROPHENOL	10 U	10 U	11 U	10 U	10 U	10 U
1,2,4-TRICHLOROBENZENE	10 U	10 U	11 U	10 U	10 U	10 U
NAPHTHALENE	10 U	10 U	11 U	10 U	10 U	10 U
4-CHLOROANILINE	10 U	10 U	11 U	10 U	10 U	10 U
HEXACHLOROBUTADIENE	10 U	10 U	11 U	10 U	10 U	10 U
4-CHLORO-3-METHYLPHENOL	10 U	10 U	11 U	10 U	10 U	10 U
2-METHYLNAPHTHALENE	10 U	10 U	11 U	10 U	10 U	10 U
HEXACHLOROCYCLOPENTADIENE	10 U	10 U	11 U	10 U	10 U	10 U
2,4,6-TRICHLOROPHENOL	10 U	10 U	11 U	10 U	10 U	10 U
2,4,5-TRICHLOROPHENOL	24 U	25 U	28 U	24 U	26 U	26 U
2-CHLORONAPHTHALENE	10 U	10 U	11 U	10 U	10 U	10 U
2-NITROANILINE	24 U	25 U	28 U	24 U	26 U	26 U
DIMETHYLPHTHALATE	10 U	10 U	11 U	10 U	10 U	10 U
ACENAPHTHYLENE	10 U	10 U	11 U	10 U	10 U	10 U
2,6-DINITROTOLUENE	10 U	10 U	11 U	10 U	10 U	10 U
3-NITROANILINE	24 U	25 U	28 U	24 U	26 U	26 U
ACENAPHTHENE	10 U	10 U	11 U	10 U	10 U	10 U
2,4-DINITROPHENOL	24 U	25 U	28 U	24 U	26 U	26 U



**SITE 43, AGAN STREET DUMP**  
**SURFACE WATER - FREQUENCY OF DETECTION SUMMARY**  
**REMEDIAL INVESTIGATION, CTO-0303**  
**MCB, CAMP LEJEUNE, NORTH CAROLINA**  
**ORGANIC COMPOUNDS**

LOCATION	43-EC-SW01	43-EC-SW02	43-SHC-SW01	43-SHC-SW02	43-SHC-SW03	43-SHC-SW04
DATE SAMPLED	05/03/95	05/03/95	05/05/95	05/05/95	05/03/95	05/03/95
UNITS	UG/L	UG/L	UG/L	UG/L	UG/L	UG/L
<b>SEMIVOLATILES cont.</b>						
4-NITROPHENOL	24 U	25 U	28 U	24 U	26 U	26 U
DIBENZOFURAN	10 U	10 U	11 U	10 U	10 U	10 U
2,4-DINITROTOLUENE	10 U	10 U	11 U	10 U	10 U	10 U
DIETHYLPHTHALATE	10 U	10 U	11 U	10 U	10 U	10 U
4-CHLOROPHENYL-PHENYLETHER	10 U	10 U	11 U	10 U	10 U	10 U
FLUORENE	10 U	10 U	11 U	10 U	10 U	10 U
4-NITROANILINE	24 U	25 U	28 U	24 U	26 U	26 U
4,6-DINITRO-2-METHYLPHENOL	24 U	25 U	28 U	24 U	26 U	26 U
N-NITROSODIPHENYLAMINE (1)	10 U	10 U	11 U	10 U	10 U	10 U
4-BROMOPHENYL-PHENYLETHER	10 U	10 U	11 U	10 U	10 U	10 U
HEXACHLOROBENZENE	10 U	10 U	11 U	10 U	10 U	10 U
PENTACHLOROPHENOL	24 U	25 U	28 U	24 U	26 U	26 U
PHENANTHRENE	10 U	10 U	11 U	10 U	10 U	10 U
ANTHRACENE	10 U	10 U	11 U	10 U	10 U	10 U
CARBAZOLE	10 U	10 U	11 U	10 U	10 U	10 U
DI-N-BUTYLPHTHALATE	10 U	10 U	11 U	10 U	10 U	10 U
FLUORANTHENE	10 U	10 U	11 U	10 U	10 U	10 U
PYRENE	10 U	10 U	11 U	10 U	10 U	10 U
BUTYLBENZYLPHTHALATE	10 U	10 U	11 U	10 U	10 U	10 U
3,3'-DICHLOROBENZIDINE	10 U	10 U	11 U	10 U	10 U	10 U
BENZO(A)ANTHRACENE	10 U	10 U	11 U	10 U	10 U	10 U
CHRYSENE	10 U	10 U	11 U	10 U	10 U	10 U
BIS(2-ETHYLHEXYL)PHTHALATE	10 U	10 U	11 U	2 U	10 U	200
DI-N-OCTYL PHTHALATE	10 U	10 U	11 U	10 U	10 U	10 U
BENZO(B)FLUORANTHENE	10 U	10 U	11 U	10 U	10 U	10 U
BENZO(K)FLUORANTHENE	10 U	10 U	11 U	10 U	10 U	10 U
BENZO(A)PYRENE	10 U	10 U	11 U	10 U	10 U	10 U
INDENO(1,2,3-CD)PYRENE	10 U	10 U	11 U	10 U	10 U	10 U
DIBENZO(A,H)ANTHRACENE	10 U	10 U	11 U	10 U	10 U	10 U
BENZO(G,H,I)PERYLENE	10 U	10 U	11 U	10 U	10 U	10 U

**SITE 43, AGAN STREET DUMP**  
**SURFACE WATER - FREQUENCY OF DETECTION SUMMARY**  
**REMEDIAL INVESTIGATION, CTO-0303**  
**MCB, CAMP LEJEUNE, NORTH CAROLINA**  
**ORGANIC COMPOUNDS**

LOCATION	43-EC-SW01	43-EC-SW02	43-SHC-SW01	43-SHC-SW02	43-SHC-SW03	43-SHC-SW04
DATE SAMPLED	05/03/95	05/03/95	05/05/95	05/05/95	05/03/95	05/03/95
UNITS	UG/L	UG/L	UG/L	UG/L	UG/L	UG/L
<b>PESTICIDE/PCBS</b>						
ALPHA-BHC	0.054 U	0.05 UJ	0.05 U	0.05 UJ	0.052 U	0.05 UJ
BETA-BHC	0.054 U	0.05 UJ	0.05 U	0.05 UJ	0.052 U	0.05 UJ
DELTA-BHC	0.054 U	0.05 UJ	0.05 U	0.05 UJ	0.052 U	0.05 UJ
GAMMA-BHC (LINDANE)	0.054 U	0.05 UJ	0.05 U	0.05 UJ	0.052 U	0.05 UJ
HEPTACHLOR	0.054 U	0.05 UJ	0.05 U	0.05 UJ	0.052 U	0.05 UJ
ALDRIN	0.054 U	0.05 UJ	0.05 U	0.05 UJ	0.052 U	0.05 UJ
HEPTACHLOR EPOXIDE	0.054 U	0.05 UJ	0.05 U	0.05 UJ	0.052 U	0.05 UJ
ENDOSULFAN I	0.054 U	0.05 UJ	0.05 U	0.05 UJ	0.052 U	0.05 UJ
DIELDRIN	0.11 U	0.1 UJ	0.1 U	0.099 UJ	0.1 U	0.099 UJ
4,4'-DDE	0.097 J	0.1 UJ	0.1 U	0.099 UJ	0.095 J	0.099 UJ
ENDRIN	0.11 U	0.1 UJ	0.1 U	0.099 UJ	0.1 U	0.099 UJ
ENDOSULFAN II	0.11 U	0.1 UJ	0.1 U	0.099 UJ	0.1 U	0.099 UJ
4,4'-DDD	0.64 J	0.1 UJ	0.1 U	0.099 UJ	0.23	0.12 J
ENDOSULFAN SULFATE	0.11 U	0.1 UJ	0.1 U	0.099 UJ	0.1 U	0.099 UJ
4,4'-DDT	0.11 U	0.1 UJ	0.1 U	0.099 UJ	0.1 U	0.099 UJ
METHOXYCHLOR	0.54 UJ	0.5 UJ	0.5 UJ	0.5 UJ	0.52 UJ	0.5 UJ
ENDRIN KETONE	0.11 U	0.1 UJ	0.1 U	0.099 UJ	0.1 U	0.099 UJ
ENDRIN ALDEHYDE	0.11 U	0.1 UJ	0.1 U	0.099 UJ	0.1 U	0.099 UJ
ALPHA-CHLORDANE	0.054 U	0.05 UJ	0.05 U	0.05 UJ	0.052 U	0.05 UJ
GAMMA-CHLORDANE	0.054 U	0.05 UJ	0.05 U	0.05 UJ	0.052 U	0.05 UJ
TOXAPHENE	5.4 U	5 UJ	5 U	5 UJ	5.2 U	5 UJ
AROCLOR-1016	1.1 U	1 UJ	1 U	0.99 UJ	1 U	0.99 UJ
AROCLOR-1221	2.2 U	2 UJ	2 U	2 UJ	2.1 U	2 UJ
AROCLOR-1232	1.1 U	1 UJ	1 U	0.99 UJ	1 U	0.99 UJ
AROCLOR-1242	1.1 U	1 UJ	1 U	0.99 UJ	1 U	0.99 UJ
AROCLOR-1248	1.1 U	1 UJ	1 U	0.99 UJ	1 U	0.99 UJ
AROCLOR-1254	1.1 U	1 UJ	1 U	0.99 UJ	1 U	0.99 UJ
AROCLOR-1260	1.1 U	1 UJ	1 U	0.99 UJ	1 U	0.99 UJ

SITE 43, AGAN STREET DUMP  
 SURFACE WATER - FREQUENCY OF DETECTION SUMMARY  
 REMEDIAL INVESTIGATION, CTO-0303  
 MCB, CAMP LEJEUNE, NORTH CAROLINA  
 ORGANIC COMPOUNDS

LOCATION DATE SAMPLED UNITS	MINIMUM NONDETECTED	MAXIMUM NONDETECTED	MINIMUM DETECTED	MAXIMUM DETECTED	LOCATION OF MAXIMUM DETECTED	FREQUENCY OF DETECTION
<b>VOLATILES</b>						
CHLOROMETHANE	10 U	10 U	ND	ND		0/6
BROMOMETHANE	10 U	10 U	ND	ND		0/6
VINYL CHLORIDE	10 U	10 U	ND	ND		0/6
CHLOROETHANE	10 U	10 U	ND	ND		0/6
METHYLENE CHLORIDE	10 U	10 U	ND	ND		0/6
ACETONE	10 U	10 U	ND	ND		0/6
CARBON DISULFIDE	10 U	10 U	ND	ND		0/6
1,1-DICHLOROETHENE	10 U	10 U	ND	ND		0/6
1,1-DICHLOROETHANE	10 U	10 U	ND	ND		0/6
1,2-DICHLOROETHENE (TOTAL)	10 U	10 U	2 J	2 J	43-EC-SW02	2/6
CHLOROFORM	10 U	10 U	ND	ND		0/6
1,2-DICHLOROETHANE	10 U	10 U	ND	ND		0/6
2-BUTANONE	10 U	10 U	ND	ND		0/6
1,1,1-TRICHLOROETHANE	10 U	10 U	ND	ND		0/6
CARBON TETRACHLORIDE	10 U	10 U	ND	ND		0/6
BROMODICHLOROMETHANE	10 U	10 U	ND	ND		0/6
1,2-DICHLOROPROPANE	10 U	10 U	ND	ND		0/6
CIS-1,3-DICHLOROPROPENE	10 U	10 U	ND	ND		0/6
TRICHLOROETHENE	10 U	10 U	ND	ND		0/6
DIBROMOCHLOROMETHANE	10 U	10 U	ND	ND		0/6
1,1,2-TRICHLOROETHANE	10 U	10 U	ND	ND		0/6
BENZENE	10 U	10 U	ND	ND		0/6
TRANS-1,3-DICHLOROPROPENE	10 U	10 U	ND	ND		0/6
BROMOFORM	10 U	10 U	ND	ND		0/6
4-METHYL-2-PENTANONE	10 U	10 U	ND	ND		0/6
2-HEXANONE	10 U	10 U	ND	ND		0/6
TETRACHLOROETHENE	10 U	10 U	ND	ND		0/6
1,1,2,2-TETRACHLOROETHANE	10 U	10 U	ND	ND		0/6
TOLUENE	10 U	10 U	ND	ND		0/6
CHLOROBENZENE	10 U	10 U	ND	ND		0/6
ETHYLBENZENE	10 U	10 U	ND	ND		0/6
STYRENE	10 U	10 U	ND	ND		0/6
XYLENE (TOTAL)	10 U	10 U	ND	ND		0/6

**SITE 43, AGAN STREET DUMP**  
**SURFACE WATER - FREQUENCY OF DETECTION SUMMARY**  
**REMEDIAL INVESTIGATION, CTO-0303**  
**MCB, CAMP LEJEUNE, NORTH CAROLINA**  
**ORGANIC COMPOUNDS**

LOCATION DATE SAMPLED UNITS	MINIMUM NONDETECTED	MAXIMUM NONDETECTED	MINIMUM DETECTED	MAXIMUM DETECTED	LOCATION OF MAXIMUM DETECTED	FREQUENCY OF DETECTION
<b>SEMIVOLATILES</b>						
PHENOL	10 U	11 U	ND	ND		0/6
BIS(2-CHLOROETHYL)ETHER	10 U	11 U	ND	ND		0/6
2-CHLOROPHENOL	10 U	11 U	ND	ND		0/6
1,3-DICHLOROBENZENE	10 U	11 U	ND	ND		0/6
1,4-DICHLOROBENZENE	10 U	11 U	ND	ND		0/6
1,2-DICHLOROBENZENE	10 U	11 U	ND	ND		0/6
2-METHYLPHENOL	10 U	11 U	ND	ND		0/6
2,2'-OXYBIS(1-CHLOROPROPANE)	10 U	11 U	ND	ND		0/6
4-METHYLPHENOL	10 U	11 U	ND	ND		0/6
N-NITROSO-DI-N-PROPYLAMINE	10 U	11 U	ND	ND		0/6
HEXACHLOROETHANE	10 U	11 U	ND	ND		0/6
NITROBENZENE	10 U	11 U	ND	ND		0/6
ISOPHORONE	10 U	11 U	ND	ND		0/6
2-NITROPHENOL	10 U	11 U	ND	ND		0/6
2,4-DIMETHYLPHENOL	10 U	11 U	ND	ND		0/6
BIS(2-CHLOROETHOXY)METHANE	10 U	11 U	ND	ND		0/6
2,4-DICHLOROPHENOL	10 U	11 U	ND	ND		0/6
1,2,4-TRICHLOROBENZENE	10 U	11 U	ND	ND		0/6
NAPHTHALENE	10 U	11 U	ND	ND		0/6
4-CHLOROANILINE	10 U	11 U	ND	ND		0/6
HEXACHLOROBUTADIENE	10 U	11 U	ND	ND		0/6
4-CHLORO-3-METHYLPHENOL	10 U	11 U	ND	ND		0/6
2-METHYLNAPHTHALENE	10 U	11 U	ND	ND		0/6
HEXACHLOROCYCLOPENTADIENE	10 U	11 U	ND	ND		0/6
2,4,6-TRICHLOROPHENOL	10 U	11 U	ND	ND		0/6
2,4,5-TRICHLOROPHENOL	24 U	28 U	ND	ND		0/6
2-CHLORONAPHTHALENE	10 U	11 U	ND	ND		0/6
2-NITROANILINE	24 U	28 U	ND	ND		0/6
DIMETHYLPHTHALATE	10 U	11 U	ND	ND		0/6
ACENAPHTHYLENE	10 U	11 U	ND	ND		0/6
2,6-DINITROTOLUENE	10 U	11 U	ND	ND		0/6
3-NITROANILINE	24 U	28 U	ND	ND		0/6
ACENAPHTHENE	10 U	11 U	ND	ND		0/6
2,4-DINITROPHENOL	24 U	28 U	ND	ND		0/6

**SITE 43, AGAN STREET DUMP**  
**SURFACE WATER - FREQUENCY OF DETECTION SUMMARY**  
**REMEDIAL INVESTIGATION, CTO-0303**  
**MCB, CAMP LEJEUNE, NORTH CAROLINA**  
**ORGANIC COMPOUNDS**

LOCATION DATE SAMPLED UNITS	MINIMUM NONDETECTED	MAXIMUM NONDETECTED	MINIMUM DETECTED	MAXIMUM DETECTED	LOCATION OF MAXIMUM DETECTED	FREQUENCY OF DETECTION
<b>SEMIVOLATILES cont.</b>						
4-NITROPHENOL	24 U	28 U	ND	ND		0/6
DIBENZOFURAN	10 U	11 U	ND	ND		0/6
2,4-DINITROTOLUENE	10 U	11 U	ND	ND		0/6
DIETHYLPHTHALATE	10 U	11 U	ND	ND		0/6
4-CHLOROPHENYL-PHENYLETHER	10 U	11 U	ND	ND		0/6
FLUORENE	10 U	11 U	ND	ND		0/6
4-NITROANILINE	24 U	28 U	ND	ND		0/6
4,6-DINITRO-2-METHYLPHENOL	24 U	28 U	ND	ND		0/6
N-NITROSODIPHENYLAMINE (1)	10 U	11 U	ND	ND		0/6
4-BROMOPHENYL-PHENYLETHER	10 U	11 U	ND	ND		0/6
HEXACHLOROENZENE	10 U	11 U	ND	ND		0/6
PENTACHLOROPHENOL	24 U	28 U	ND	ND		0/6
PHENANTHRENE	10 U	11 U	ND	ND		0/6
ANTHRACENE	10 U	11 U	ND	ND		0/6
CARBAZOLE	10 U	11 U	ND	ND		0/6
DI-N-BUTYLPHTHALATE	10 U	11 U	ND	ND		0/6
FLUORANTHENE	10 U	11 U	ND	ND		0/6
PYRENE	10 U	11 U	ND	ND		0/6
BUTYLBENZYLPHTHALATE	10 U	11 U	ND	ND		0/6
3,3'-DICHLOROBENZIDINE	10 U	11 U	ND	ND		0/6
BENZO(A)ANTHRACENE	10 U	11 U	ND	ND		0/6
CHRYSENE	10 U	11 U	ND	ND		0/6
BIS(2-ETHYLHEXYL)PHTHALATE	2 U	11 U	200	200	43-SHC-SW04	1/6
DI-N-OCTYL PHTHALATE	10 U	11 U	ND	ND		0/6
BENZO(B)FLUORANTHENE	10 U	11 U	ND	ND		0/6
BENZO(K)FLUORANTHENE	10 U	11 U	ND	ND		0/6
BENZO(A)PYRENE	10 U	11 U	ND	ND		0/6
INDENO(1,2,3-CD)PYRENE	10 U	11 U	ND	ND		0/6
DIBENZO(A,H)ANTHRACENE	10 U	11 U	ND	ND		0/6
BENZO(G,H,I)PERYLENE	10 U	11 U	ND	ND		0/6

**SITE 43, AGAN STREET DUMP**  
**SURFACE WATER - FREQUENCY OF DETECTION SUMMARY**  
**REMEDIAL INVESTIGATION, CTO-0303**  
**MCB, CAMP LEJEUNE, NORTH CAROLINA**  
**ORGANIC COMPOUNDS**

LOCATION DATE SAMPLED UNITS	MINIMUM NONDETECTED	MAXIMUM NONDETECTED	MINIMUM DETECTED	MAXIMUM DETECTED	LOCATION OF MAXIMUM DETECTED	FREQUENCY OF DETECTION
<b>PESTICIDE/PCBS</b>						
ALPHA-BHC	0.05 UJ	0.054 U	ND	ND		0/6
BETA-BHC	0.05 UJ	0.054 U	ND	ND		0/6
DELTA-BHC	0.05 UJ	0.054 U	ND	ND		0/6
GAMMA-BHC (LINDANE)	0.05 UJ	0.054 U	ND	ND		0/6
HEPTACHLOR	0.05 UJ	0.054 U	ND	ND		0/6
ALDRIN	0.05 UJ	0.054 U	ND	ND		0/6
HEPTACHLOR EPOXIDE	0.05 UJ	0.054 U	ND	ND		0/6
ENDOSULFAN I	0.05 UJ	0.054 U	ND	ND		0/6
DIELDRIN	0.099 UJ	0.11 U	ND	ND		0/6
4,4'-DDE	0.099 UJ	0.1 UJ	0.095 J	0.097 J	43-EC-SW01	2/6
ENDRIN	0.099 UJ	0.11 U	ND	ND		0/6
ENDOSULFAN II	0.099 UJ	0.11 U	ND	ND		0/6
4,4'-DDD	0.099 UJ	0.1 UJ	0.12 J	0.64 J	43-EC-SW01	3/6
ENDOSULFAN SULFATE	0.099 UJ	0.11 U	ND	ND		0/6
4,4'-DDT	0.099 UJ	0.11 U	ND	ND		0/6
METHOXYCHLOR	0.5 UJ	0.54 UJ	ND	ND		0/6
ENDRIN KETONE	0.099 UJ	0.11 U	ND	ND		0/6
ENDRIN ALDEHYDE	0.099 UJ	0.11 U	ND	ND		0/6
ALPHA-CHLORDANE	0.05 UJ	0.054 U	ND	ND		0/6
GAMMA-CHLORDANE	0.05 UJ	0.054 U	ND	ND		0/6
TOXAPHENE	5 UJ	5.4 U	ND	ND		0/6
AROCLOR-1016	0.99 UJ	1.1 U	ND	ND		0/6
AROCLOR-1221	2 UJ	2.2 U	ND	ND		0/6
AROCLOR-1232	0.99 UJ	1.1 U	ND	ND		0/6
AROCLOR-1242	0.99 UJ	1.1 U	ND	ND		0/6
AROCLOR-1248	0.99 UJ	1.1 U	ND	ND		0/6
AROCLOR-1254	0.99 UJ	1.1 U	ND	ND		0/6
AROCLOR-1260	0.99 UJ	1.1 U	ND	ND		0/6

**SITE 43, AGAN STREET DUMP**  
**SURFACE WATER - FREQUENCY OF DETECTION SUMMARY**  
**REMEDIAL INVESTIGATION, CTO-0303**  
**MCB, CAMP LEJEUNE, NORTH CAROLINA**  
**INORGANIC ANALYTES**

LOCATION	43-EC-SW01	43-EC-SW02	43-SHC-SW01	43-SHC-SW02	43-SHC-SW03	43-SHC-SW04
DATE SAMPLED	05/03/95	05/03/95	05/05/95	05/05/95	05/03/95	05/03/95
UNITS	UG/L	UG/L	UG/L	UG/L	UG/L	UG/L
<b>TOTAL METALS</b>						
ALUMINUM, TOTAL	504	481	87.8 U	36.4 U	478	717
ANTIMONY, TOTAL	20.8 U	20.8 U	20.8 U	20.8 U	20.8 U	20.8 U
ARSENIC, TOTAL	1.7 UJ	1.8 J	1.7 U	1.7 U	2.5	1.7 U
BARIUM, TOTAL	33	34	28.8	35.9	36.5	35.2
BERYLLIUM, TOTAL	1.8 U	2 U	0.8 U	1.4 U	0.82 U	1.3 U
CADMIUM, TOTAL	5.7 U	3.8 U	2.5 U	3.7 U	2.1 U	3 U
CALCIUM, TOTAL	86900	91900	37200	48900	72200	85700
CHROMIUM, TOTAL	4.1 U	4.1 U	4.1 U	4.1 U	4.1 U	4.1 U
COBALT, TOTAL	3.4 U	3.4 U	3.4 U	3.4 U	3.4 U	3.4 U
COPPER, TOTAL	2.1	3.2	1.8 U	1.8 U	1.8 U	1.8
IRON, TOTAL	675 J	670 J	4280 J	2720 J	913 J	872 J
LEAD, TOTAL	2.5 J	2.7 J	0.87 J	0.8 UJ	2 J	2.8 J
MAGNESIUM, TOTAL	150000	165000	8360	33100	120000	158000
MANGANESE, TOTAL	48.9	51.5	38	51.9	57.1	38.7
MERCURY, TOTAL	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
NICKEL, TOTAL	10.9 U	10.9 U	10.9 U	10.9 U	10.9 U	10.9 U
POTASSIUM, TOTAL	49500 J	55200 J	3480 J	12100 J	40300 J	52300 J
SELENIUM, TOTAL	1.8 UJ	1.8 UJ	1.8 UJ	1.8 UJ	1.8 UJ	1.8 UJ
SILVER, TOTAL	2.8 U	2.8 U	2.8 U	2.8 U	2.8 U	2.8 U
SODIUM, TOTAL	1260000	1370000	67600	288000	1010000	1310000
THALLIUM, TOTAL	0.7 UJ	0.7 UJ	0.7 U	0.7 U	0.7 U	0.7 UJ
VANADIUM, TOTAL	2 U	2.7	2.8	2 U	3.4	2 U
ZINC, TOTAL	8.9 U	10 U	8.9 U	6.7 U	11.3 U	29.3 U

**SITE 43, AGAN STREET DUMP**  
**SURFACE WATER - FREQUENCY OF DETECTION SUMMARY**  
**REMEDIAL INVESTIGATION, CTO-0303**  
**MCB, CAMP LEJEUNE, NORTH CAROLINA**  
**INORGANIC ANALYTES**

LOCATION DATE SAMPLED UNITS	MINIMUM NONDETECTED	MAXIMUM NONDETECTED	MINIMUM DETECTED	MAXIMUM DETECTED	LOCATION OF MAXIMUM DETECTED	FREQUENCY OF DETECTION
<b>TOTAL METALS</b>						
ALUMINUM, TOTAL	36.4 U	87.8 U	478	717	43-SHC-SW04	4/6
ANTIMONY, TOTAL	20.8 U	20.8 U	ND	ND		0/6
ARSENIC, TOTAL	1.7 UJ	1.7 UJ	1.8 J	2.5	43-SHC-SW03	2/6
BARIUM, TOTAL	NA	NA	28.8	36.5	43-SHC-SW03	6/6
BERYLLIUM, TOTAL	0.8 U	2 U	ND	ND		0/6
CADMIUM, TOTAL	2.1 U	5.7 U	ND	ND		0/6
CALCIUM, TOTAL	NA	NA	37200	91900	43-EC-SW02	6/6
CHROMIUM, TOTAL	4.1 U	4.1 U	ND	ND		0/6
COBALT, TOTAL	3.4 U	3.4 U	ND	ND		0/6
COPPER, TOTAL	1.8 U	1.8 U	1.8	3.2	43-EC-SW02	3/6
IRON, TOTAL	NA	NA	670 J	4280 J	43-SHC-SW01	6/6
LEAD, TOTAL	0.8 UJ	0.8 UJ	0.87 J	2.8 J	43-SHC-SW04	5/6
MAGNESIUM, TOTAL	NA	NA	8360	165000	43-EC-SW02	6/6
MANGANESE, TOTAL	NA	NA	38	57.1	43-SHC-SW03	6/6
MERCURY, TOTAL	0.2 U	0.2 U	ND	ND		0/6
NICKEL, TOTAL	10.9 U	10.9 U	ND	ND		0/6
POTASSIUM, TOTAL	NA	NA	3480 J	55200 J	43-EC-SW02	6/6
SELENIUM, TOTAL	1.8 UJ	1.8 UJ	ND	ND		0/6
SILVER, TOTAL	2.8 U	2.8 U	ND	ND		0/6
SODIUM, TOTAL	NA	NA	67600	1370000	43-EC-SW02	6/6
THALLIUM, TOTAL	0.7 UJ	0.7 UJ	ND	ND		0/6
VANADIUM, TOTAL	2 U	2 U	2.7	3.4	43-SHC-SW03	3/6
ZINC, TOTAL	6.7 U	29.3 U	ND	ND		0/6



**SEDIMENT**

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**SITE 43, AGAN STREET DUMP**  
**SEDIMENT - FREQUENCY OF DETECTION SUMMARY**  
**REMEDIAL INVESTIGATION, CTO-0303**  
**MCB, CAMP LEJEUNE, NORTH CAROLINA**  
**ORGANIC COMPOUNDS**

LOCATION	43-EC-SD01-06	43-EC-SD01-612	43-EC-SD02-06	43-EC-SD02-612	43-SHC-SD01-06	43-SHC-SD01-612
DATE SAMPLED	05/05/95	05/05/95	05/05/95	05/05/95	05/05/95	05/05/95
DEPTH	0-6"	6-12"	0-6"	6-12"	0-6"	6-12"
UNITS	UG/KG	UG/KG	UG/KG	UG/KG	UG/KG	UG/KG
<b>VOLATILES</b>						
CHLOROMETHANE	62 U	110 U	46 U	63 U	12 U	13 U
BROMOMETHANE	62 U	110 U	46 U	63 U	12 U	13 U
VINYL CHLORIDE	62 U	110 U	46 U	63 U	12 U	13 U
CHLOROETHANE	62 U	110 U	46 U	63 U	12 U	13 U
METHYLENE CHLORIDE	62 U	110 U	46 U	63 U	12 U	13 U
ACETONE	140 J	110 U	46 U	63 U	12 U	10 J
CARBON DISULFIDE	20 J	110 U	46 U	26	12 U	3 J
1,1-DICHLOROETHENE	62 U	110 U	46 U	63 U	12 U	13 U
1,1-DICHLOROETHANE	62 U	110 U	46 U	63 U	12 U	13 U
1,2-DICHLOROETHENE (TOTAL)	62 U	110 U	46 U	63 U	12 U	13 U
CHLOROFORM	62 U	110 U	46 U	63 U	12 U	13 U
1,2-DICHLOROETHANE	62 U	110 U	46 U	63 U	12 U	13 U
2-BUTANONE	62 U	110 U	46 U	63 U	12 U	13 U
1,1,1-TRICHLOROETHANE	62 U	110 U	46 U	63 U	12 U	13 U
CARBON TETRACHLORIDE	62 U	110 U	46 U	63 U	12 U	13 U
BROMODICHLOROMETHANE	62 U	110 U	46 U	63 U	12 U	13 U
1,2-DICHLOROPROPANE	62 U	110 U	46 U	63 U	12 U	13 U
CIS-1,3-DICHLOROPROPENE	62 U	110 U	46 U	63 U	12 U	13 U
TRICHLOROETHENE	62 U	110 U	46 U	63 U	12 U	13 U
DIBROMOCHLOROMETHANE	62 U	110 U	46 U	63 U	12 U	13 U
1,1,2-TRICHLOROETHANE	62 U	110 U	46 U	63 U	12 U	13 U
BENZENE	62 U	110 U	46 U	63 U	12 U	13 U
TRANS-1,3-DICHLOROPROPENE	62 U	110 U	46 U	63 U	12 U	13 U
BROMOFORM	62 U	110 U	46 U	63 U	12 U	13 U
4-METHYL-2-PENTANONE	62 U	110 U	46 U	63 UJ	12 U	13 U
2-HEXANONE	62 UJ	110 UJ	46 U	63 UJ	12 U	13 U
TETRACHLOROETHENE	62 U	110 U	46 U	63 UJ	12 U	13 U
1,1,2,2-TETRACHLOROETHANE	62 U	110 U	46 U	63 UJ	12 U	13 U
TOLUENE	62 U	110 U	46 U	63 UJ	12 U	13 U
CHLOROBENZENE	62 U	110 U	46 U	63 UJ	12 U	13 U
ETHYLBENZENE	62 U	110 U	46 U	63 UJ	12 U	13 U
STYRENE	62 U	110 U	46 U	63 UJ	12 U	13 U
XYLENE (TOTAL)	62 U	110 U	46 U	63 UJ	12 U	13 U

SITE 43, AGAN STREET DUMP  
 SEDIMENT - FREQUENCY OF DETECTION SUMMARY  
 REMEDIAL INVESTIGATION, CTO-0303  
 MCB, CAMP LEJEUNE, NORTH CAROLINA  
 ORGANIC COMPOUNDS

LOCATION	43-EC-SD01-06	43-EC-SD01-612	43-EC-SD02-06	43-EC-SD02-612	43-SHC-SD01-06	43-SHC-SD01-612
DATE SAMPLED	05/05/95	05/05/95	05/05/95	05/05/95	05/05/95	05/05/95
DEPTH	0-6"	6-12"	0-6"	6-12"	0-6"	6-12"
UNITS	UG/KG	UG/KG	UG/KG	UG/KG	UG/KG	UG/KG
<b>SEMIVOLATILES</b>						
PHENOL	2100 U	3700 U	1500 U	2100 U	400 U	430 U
BIS(2-CHLOROETHYL)ETHER	2100 U	3700 U	1500 U	2100 U	400 U	430 U
2-CHLOROPHENOL	2100 U	3700 U	1500 U	2100 U	400 U	430 U
1,3-DICHLOROBENZENE	2100 U	3700 U	1500 U	2100 U	400 U	430 U
1,4-DICHLOROBENZENE	2100 U	3700 U	1500 U	2100 U	400 U	430 U
1,2-DICHLOROBENZENE	2100 U	3700 U	1500 U	2100 U	400 U	430 U
2-METHYLPHENOL	2100 U	3700 U	1500 U	2100 U	400 U	430 U
2,2-OXYBIS(1-CHLOROPROPANE)	2100 U	3700 U	1500 U	2100 U	400 U	430 U
4-METHYLPHENOL	2100 U	3700 U	1500 U	2100 U	400 U	430 U
N-NITROSO-DI-N-PROPYLAMINE	2100 U	3700 U	1500 U	2100 U	400 U	430 U
HEXACHLOROETHANE	2100 U	3700 U	1500 U	2100 U	400 U	430 U
NITROBENZENE	2100 U	3700 U	1500 U	2100 U	400 U	430 U
ISOPHORONE	2100 U	3700 U	1500 U	2100 U	400 U	430 U
2-NITROPHENOL	2100 U	3700 U	1500 U	2100 U	400 U	430 U
2,4-DIMETHYLPHENOL	2100 U	3700 U	1500 U	2100 U	400 U	430 U
BIS(2-CHLOROETHOXY)METHANE	2100 U	3700 U	1500 U	2100 U	400 U	430 U
2,4-DICHLOROPHENOL	2100 U	3700 U	1500 U	2100 U	400 U	430 U
1,2,4-TRICHLOROBENZENE	2100 U	3700 U	1500 U	2100 U	400 U	430 U
NAPHTHALENE	2100 U	3700 U	1500 U	2100 U	400 U	430 U
4-CHLOROANILINE	2100 U	3700 U	1500 U	2100 U	400 U	430 U
HEXACHLOROBUTADIENE	2100 U	3700 U	1500 U	2100 U	400 U	430 U
4-CHLORO-3-METHYLPHENOL	2100 U	3700 U	1500 U	2100 U	400 U	430 U
2-METHYLNAPHTHALENE	2100 U	3700 U	1500 U	2100 U	400 U	430 U
HEXACHLOROCYCLOPENTADIENE	2100 U	3700 U	1500 U	2100 U	400 U	430 U
2,4,6-TRICHLOROPHENOL	2100 U	3700 U	1500 U	2100 U	400 U	430 U
2,4,5-TRICHLOROPHENOL	5100 U	9200 U	3800 U	5200 U	1000 U	1100 U
2-CHLORONAPHTHALENE	2100 U	3700 U	1500 U	2100 U	400 U	430 U
2-NITROANILINE	5100 U	9200 U	3800 U	5200 U	1000 U	1100 U
DIMETHYLPHTHALATE	2100 U	3700 U	1500 U	2100 U	400 U	430 U
ACENAPHTHYLENE	2100 U	3700 U	1500 U	2100 U	400 U	430 U
2,6-DINITROTOLUENE	2100 U	3700 U	1500 U	2100 U	400 U	430 U
3-NITROANILINE	5100 U	9200 U	3800 U	5200 U	1000 U	1100 U
ACENAPHTHENE	2100 U	3700 U	1500 U	2100 U	400 U	430 U
2,4-DINITROPHENOL	5100 U	9200 U	3800 U	5200 U	1000 U	1100 U

SITE 43, AGAN STREET DUMP  
 SEDIMENT - FREQUENCY OF DETECTION SUMMARY  
 REMEDIAL INVESTIGATION, CTO-0303  
 MCB, CAMP LEJEUNE, NORTH CAROLINA  
 ORGANIC COMPOUNDS

LOCATION	43-EC-SD01-06	43-EC-SD01-612	43-EC-SD02-06	43-EC-SD02-612	43-SHC-SD01-06	43-SHC-SD01-612
DATE SAMPLED	05/05/95	05/05/95	05/05/95	05/05/95	05/05/95	05/05/95
DEPTH	0-6"	6-12"	0-6"	6-12"	0-6"	6-12"
UNITS	UG/KG	UG/KG	UG/KG	UG/KG	UG/KG	UG/KG
<b>SEMIVOLATILES cont.</b>						
4-NITROPHENOL	5100 U	9200 U	3800 U	5200 U	1000 U	1100 U
DIBENZOFURAN	2100 U	3700 U	1500 U	2100 U	400 U	430 U
2,4-DINITROTOLUENE	2100 U	3700 U	1500 U	2100 U	400 U	430 U
DIETHYLPHTHALATE	2100 U	3700 U	1500 U	2100 U	400 U	430 U
4-CHLOROPHENYL-PHENYLETHER	2100 U	3700 U	1500 U	2100 U	400 U	430 U
FLUORENE	2100 U	3700 U	1500 U	2100 U	400 U	430 U
4-NITROANILINE	5100 U	9200 U	3800 U	5200 U	1000 U	1100 U
4,6-DINITRO-2-METHYLPHENOL	5100 U	9200 U	3800 U	5200 U	1000 U	1100 U
N-NITROSODIPHENYLAMINE (1)	2100 U	3700 U	1500 U	2100 U	400 U	430 U
4-BROMOPHENYL-PHENYLETHER	2100 U	3700 U	1500 U	2100 U	400 U	430 U
HEXACHLOROBENZENE	2100 U	3700 U	1500 U	2100 U	400 U	430 U
PENTACHLOROPHENOL	5100 U	9200 U	3800 U	5200 U	1000 U	1100 U
PHENANTHRENE	2100 U	3700 U	1500 U	2100 U	400 U	430 U
ANTHRACENE	2100 U	3700 U	1500 U	2100 U	400 U	430 U
CARBAZOLE	2100 U	3700 U	1500 U	2100 U	400 U	430 U
DI-N-BUTYLPHTHALATE	2100 U	3700 U	1500 U	2100 U	400 U	430 U
FLUORANTHENE	2100 U	3700 U	1500 U	2100 U	400 U	430 U
PYRENE	2100 U	3700 U	200 J	2100 U	400 U	430 U
BUTYLBENZYLPHTHALATE	2100 U	3700 U	1500 U	2100 U	400 U	430 U
3,3'-DICHLOROBENZIDINE	2100 U	3700 U	1500 U	2100 U	400 U	430 U
BENZO(A)ANTHRACENE	2100 U	3700 U	1500 U	2100 U	400 U	430 U
CHRYSENE	2100 U	3700 U	1500 U	2100 U	400 U	430 U
BIS(2-ETHYLHEXYL)PHTHALATE	890 J	500 J	920 J	310 J	280 J	540
DI-N-OCTYL PHTHALATE	2100 U	3700 U	1500 U	2100 U	400 U	430 U
BENZO(B)FLUORANTHENE	2100 U	3700 U	1500 U	2100 U	400 U	430 U
BENZO(K)FLUORANTHENE	2100 U	3700 U	1500 U	2100 U	400 U	430 U
BENZO(A)PYRENE	2100 U	1400 J	1500 U	650 J	400 U	430 U
INDENO(1,2,3-CD)PYRENE	2100 U	3700 U	1500 U	2100 U	400 U	430 U
DIBENZO(A,H)ANTHRACENE	2100 U	3700 U	1500 U	2100 U	400 U	430 U
BENZO(G,H,I)PERYLENE	2100 U	3700 U	1500 U	2100 U	400 U	430 U

**SITE 43, AGAN STREET DUMP  
 SEDIMENT - FREQUENCY OF DETECTION SUMMARY  
 REMEDIAL INVESTIGATION, CTO-0303  
 MCB, CAMP LEJEUNE, NORTH CAROLINA  
 ORGANIC COMPOUNDS**

LOCATION	43-EC-SD01-06	43-EC-SD01-612	43-EC-SD02-06	43-EC-SD02-612	43-SHC-SD01-06	43-SHC-SD01-612
DATE SAMPLED	05/05/95	05/05/95	05/05/95	05/05/95	05/05/95	05/05/95
DEPTH	0-6"	6-12"	0-6"	6-12"	0-6"	6-12"
UNITS	UG/KG	UG/KG	UG/KG	UG/KG	UG/KG	UG/KG
<b>PESTICIDE/PCBS</b>						
ALPHA-BHC	10 R	18 UJ	7.7 R	10 UJ	2 UJ	2.1 UJ
BETA-BHC	10 R	18 UJ	7.7 R	10 UJ	2 UJ	2.1 UJ
DELTA-BHC	10 R	18 UJ	7.7 R	10 UJ	2 UJ	2.1 UJ
GAMMA-BHC (LINDANE)	10 R	18 UJ	7.7 R	10 UJ	2 UJ	2.1 UJ
HEPTACHLOR	10 R	18 UJ	7.7 R	10 UJ	2 UJ	2.1 UJ
ALDRIN	10 R	18 UJ	7.7 R	10 UJ	2 UJ	2.1 UJ
HEPTACHLOR EPOXIDE	10 R	18 UJ	7.7 R	10 UJ	2 UJ	2.1 UJ
ENDOSULFAN I	10 R	18 UJ	7.7 R	10 UJ	2 UJ	2.1 UJ
DIELDRIN	21 R	36 UJ	15 R	21 UJ	4 UJ	4.3 UJ
4,4'-DDE	1600 J	3600 UJ	890 J	110 J	12 J	24 J
ENDRIN	16 J	36 UJ	15 R	21 UJ	4 UJ	4.3 UJ
ENDOSULFAN II	21 R	36 UJ	15 R	21 UJ	4 UJ	4.3 UJ
4,4'-DDD	8500 J	1400	2200 J	160 J	5.6 J	9.8 J
ENDOSULFAN SULFATE	21 R	36 UJ	15 R	21 UJ	4 UJ	4.3 UJ
4,4'-DDT	180 J	36 UJ	11 J	21 UJ	4 UJ	4.3 UJ
METHOXYCHLOR	100 R	180 UJ	77 R	100 UJ	20 UJ	21 UJ
ENDRIN KETONE	21 R	36 UJ	15 R	21 UJ	4 UJ	4.3 UJ
ENDRIN ALDEHYDE	21 R	36 UJ	15 R	21 UJ	4 UJ	4.3 UJ
ALPHA-CHLORDANE	21 J	18 UJ	9.3 J	10 UJ	7.2 J	18 J
GAMMA-CHLORDANE	31 J	22 J	15 J	10 UJ	9.6 J	23 J
TOXAPHENE	1000 R	1800 UJ	770 R	1000 UJ	200 UJ	210 UJ
AROCLOR-1016	210 R	360 UJ	150 R	210 UJ	40 UJ	43 UJ
AROCLOR-1221	410 R	720 UJ	310 R	410 UJ	80 UJ	85 UJ
AROCLOR-1232	210 R	360 UJ	150 R	210 UJ	40 UJ	43 UJ
AROCLOR-1242	210 R	360 UJ	150 R	210 UJ	40 UJ	43 UJ
AROCLOR-1248	210 R	360 UJ	150 R	210 UJ	40 UJ	43 UJ
AROCLOR-1254	210 R	360 UJ	150 R	210 UJ	40 UJ	43 UJ
AROCLOR-1260	210 R	360 UJ	150 R	210 UJ	40 UJ	43 UJ

**SITE 43, AGAN STREET DUMP**  
**SEDIMENT - FREQUENCY OF DETECTION SUMMARY**  
**REMEDIAL INVESTIGATION, CTO-0303**  
**MCB, CAMP LEJEUNE, NORTH CAROLINA**  
**ORGANIC COMPOUNDS**

LOCATION	43-SHC-SD02-06	43-SHC-SD02-612	43-SHC-SD03-06	43-SHC-SD03-612	43-SHC-SD04-06	43-SHC-SD04-612
DATE SAMPLED	05/05/95	05/05/95	05/05/95	05/05/95	05/05/95	05/05/95
DEPTH	0-6"	6-12"	0-6"	6-12"	0-6"	6-12"
UNITS	UG/KG	UG/KG	UG/KG	UG/KG	UG/KG	UG/KG
<b>VOLATILES</b>						
CHLOROMETHANE	16 U	15 U	69 U	52 U	63 U	40 U
BROMOMETHANE	16 U	15 U	69 U	52 U	63 U	40 U
VINYL CHLORIDE	16 U	15 U	69 U	52 U	63 U	40 U
CHLOROETHANE	16 U	15 U	69 U	52 U	63 U	40 U
METHYLENE CHLORIDE	16 U	15 U	69 U	52 U	63 U	40 U
ACETONE	16 U	15 U	69 U	52 U	120 J	40 U
CARBON DISULFIDE	16 U	15 U	69 U	52 U	63 U	40 U
1,1-DICHLOROETHENE	16 U	15 U	69 U	52 U	63 U	40 U
1,1-DICHLOROETHANE	16 U	15 U	69 U	52 U	63 U	40 U
1,2-DICHLOROETHENE (TOTAL)	16 U	15 U	69 U	52 U	63 U	40 U
CHLOROFORM	16 U	15 U	69 U	52 U	63 U	40 U
1,2-DICHLOROETHANE	16 U	15 U	69 U	52 U	63 U	40 U
2-BUTANONE	16 U	15 U	69 U	52 U	63 U	40 U
1,1,1-TRICHLOROETHANE	16 U	15 U	69 U	52 U	63 U	40 U
CARBON TETRACHLORIDE	16 U	15 U	69 U	52 U	63 U	40 U
BROMODICHLOROMETHANE	16 U	15 U	69 U	52 U	63 U	40 U
1,2-DICHLOROPROPANE	16 U	15 U	69 U	52 U	63 U	40 U
CIS-1,3-DICHLOROPROPENE	16 U	15 U	69 U	52 U	63 U	40 U
TRICHLOROETHENE	16 U	15 U	69 U	52 U	63 U	40 U
DIBROMOCHLOROMETHANE	16 U	15 U	69 U	52 U	63 U	40 U
1,1,2-TRICHLOROETHANE	16 U	15 U	69 U	52 U	63 U	40 U
BENZENE	16 U	15 U	69 U	52 U	63 U	40 U
TRANS-1,3-DICHLOROPROPENE	16 U	15 U	69 U	52 U	63 U	40 U
BROMOFORM	16 U	15 U	69 U	52 U	63 U	40 U
4-METHYL-2-PENTANONE	16 U	15 U	69 UJ	52 U	63 U	40 U
2-HEXANONE	16 U	15 U	69 UJ	52 U	63 U	40 U
TETRACHLOROETHENE	16 U	15 U	69 UJ	52 U	63 U	40 U
1,1,2,2-TETRACHLOROETHANE	16 U	15 U	69 UJ	52 U	63 U	40 U
TOLUENE	16 U	15 U	69 UJ	52 U	63 U	40 U
CHLOROBENZENE	16 U	15 U	69 UJ	52 U	63 U	40 U
ETHYLBENZENE	16 U	15 U	69 UJ	52 U	63 U	40 U
STYRENE	16 U	15 U	69 UJ	52 U	63 U	40 U
XYLENE (TOTAL)	16 U	15 U	69 UJ	52 U	63 U	40 U

SITE 43, AGAN STREET DUMP  
 SEDIMENT - FREQUENCY OF DETECTION SUMMARY  
 REMEDIAL INVESTIGATION, CTO-0303  
 MCB, CAMP LEJEUNE, NORTH CAROLINA  
 ORGANIC COMPOUNDS

LOCATION	43-SHC-SD02-06	43-SHC-SD02-612	43-SHC-SD03-06	43-SHC-SD03-612	43-SHC-SD04-06	43-SHC-SD04-612
DATE SAMPLED	05/05/95	05/05/95	05/05/95	05/05/95	05/05/95	05/05/95
DEPTH	0-6"	6-12"	0-6"	6-12"	0-6"	6-12"
UNITS	UG/KG	UG/KG	UG/KG	UG/KG	UG/KG	UG/KG
<b>SEMIVOLATILES</b>						
PHENOL	540 U	480 U	2200 U	1700 U	2000 U	1300 U
BIS(2-CHLOROETHYL)ETHER	540 U	480 U	2200 U	1700 U	2000 U	1300 U
2-CHLOROPHENOL	540 U	480 U	2200 U	1700 U	2000 U	1300 U
1,3-DICHLOROBENZENE	540 U	480 U	2200 U	1700 U	2000 U	1300 U
1,4-DICHLOROBENZENE	540 U	480 U	2200 U	1700 U	2000 U	1300 U
1,2-DICHLOROBENZENE	540 U	480 U	2200 U	1700 U	2000 U	1300 U
2-METHYLPHENOL	540 U	480 U	2200 U	1700 U	2000 U	1300 U
2,2'-OXYBIS(1-CHLOROPROPANE)	540 U	480 U	2200 U	1700 U	2000 U	1300 U
4-METHYLPHENOL	540 U	480 U	2200 U	210 J	2000 U	1300 U
N-NITROSO-DI-N-PROPYLAMINE	540 U	480 U	2200 U	1700 U	2000 U	1300 U
HEXACHLOROETHANE	540 U	480 U	2200 U	1700 U	2000 U	1300 U
NITROBENZENE	540 U	480 U	2200 U	1700 U	2000 U	1300 U
ISOPHORONE	540 U	480 U	2200 U	1700 U	2000 U	1300 U
2-NITROPHENOL	540 U	480 U	2200 U	1700 U	2000 U	1300 U
2,4-DIMETHYLPHENOL	540 U	480 U	2200 U	1700 U	2000 U	1300 U
BIS(2-CHLOROETHOXY)METHANE	540 U	480 U	2200 U	1700 U	2000 U	1300 U
2,4-DICHLOROPHENOL	540 U	480 U	2200 U	1700 U	2000 U	1300 U
1,2,4-TRICHLOROBENZENE	540 U	480 U	2200 U	1700 U	2000 U	1300 U
NAPHTHALENE	540 U	480 U	2200 U	1700 U	2000 U	1300 U
4-CHLOROANILINE	540 U	480 U	2200 U	1700 U	2000 U	1300 U
HEXACHLOROBUTADIENE	540 U	480 U	2200 U	1700 U	2000 U	1300 U
4-CHLORO-3-METHYLPHENOL	540 U	480 U	2200 U	1700 U	2000 U	1300 U
2-METHYLNAPHTHALENE	540 U	480 U	2200 U	1700 U	2000 U	1300 U
HEXACHLOROCYCLOPENTADIENE	540 U	480 UJ	2200 U	1700 U	2000 U	1300 UJ
2,4,6-TRICHLOROPHENOL	540 U	480 U	2200 U	1700 U	2000 U	1300 U
2,4,5-TRICHLOROPHENOL	1400 U	1200 U	5600 U	4300 U	5100 U	3200 U
2-CHLORONAPHTHALENE	540 U	480 U	2200 U	1700 U	2000 U	1300 U
2-NITROANILINE	1400 U	1200 U	5600 U	4300 U	5100 U	3200 U
DIMETHYLPHTHALATE	540 U	480 U	2200 U	1700 U	2000 U	1300 U
ACENAPHTHYLENE	540 U	480 U	2200 U	1700 U	2000 U	1300 U
2,6-DINITROTOLUENE	540 U	480 U	2200 U	1700 U	2000 U	1300 U
3-NITROANILINE	1400 U	1200 U	5600 U	4300 U	5100 U	3200 U
ACENAPHTHENE	540 U	480 U	2200 U	1700 U	2000 U	1300 U
2,4-DINITROPHENOL	1400 U	1200 U	5600 U	4300 U	5100 U	3200 U

SITE 43, AGAN STREET DUMP  
 SEDIMENT - FREQUENCY OF DETECTION SUMMARY  
 REMEDIAL INVESTIGATION, CTO-0303  
 MCB, CAMP LEJEUNE, NORTH CAROLINA  
 ORGANIC COMPOUNDS

LOCATION	43-SHC-SD02-06	43-SHC-SD02-612	43-SHC-SD03-06	43-SHC-SD03-612	43-SHC-SD04-06	43-SHC-SD04-612
DATE SAMPLED	05/05/95	05/05/95	05/05/95	05/05/95	05/05/95	05/05/95
DEPTH	0-6"	6-12"	0-6"	6-12"	0-6"	6-12"
UNITS	UG/KG	UG/KG	UG/KG	UG/KG	UG/KG	UG/KG
<b>SEMIVOLATILES cont.</b>						
4-NITROPHENOL	1400 U	1200 U	5600 U	4300 U	5100 U	3200 U
DIBENZOFURAN	540 U	480 U	2200 U	1700 U	2000 U	1300 U
2,4-DINITROTOLUENE	540 U	480 U	2200 U	1700 U	2000 U	1300 U
DIETHYLPHTHALATE	540 U	480 U	2200 U	1700 U	2000 U	1300 U
4-CHLOROPHENYL-PHENYLETHER	540 U	480 U	2200 U	1700 U	2000 U	1300 U
FLUORENE	540 U	480 U	2200 U	1700 U	2000 U	1300 U
4-NITROANILINE	1400 U	1200 U	5600 U	4300 U	5100 U	3200 U
4,6-DINITRO-2-METHYLPHENOL	1400 U	1200 U	5600 U	4300 U	5100 U	3200 U
N-NITROSODIPHENYLAMINE (1)	540 U	480 U	2200 U	1700 U	2000 U	1300 U
4-BROMOPHENYL-PHENYLETHER	540 U	480 U	2200 U	1700 U	2000 U	1300 U
HEXACHLOROBENZENE	540 U	480 U	2200 U	1700 U	2000 U	1300 U
PENTACHLOROPHENOL	1400 U	1200 U	5600 U	4300 U	5100 U	3200 U
PHENANTHRENE	540 U	480 U	2200 U	1700 U	2000 U	1300 U
ANTHRACENE	540 U	480 U	2200 U	1700 U	2000 U	1300 U
CARBAZOLE	540 U	480 U	2200 U	1700 U	2000 U	1300 U
DI-N-BUTYLPHTHALATE	540 U	480 U	2200 U	1700 U	2000 U	1300 U
FLUORANTHENE	540 U	480 U	2200 U	1700 U	2000 U	1300 U
PYRENE	540 U	480 U	2200 U	1700 U	2000 U	1300 U
BUTYLBENZYLPHTHALATE	540 U	480 U	2200 U	1700 U	2000 U	1300 U
3,3'-DICHLOROBENZIDINE	540 U	480 U	2200 U	1700 U	2000 U	1300 U
BENZO(A)ANTHRACENE	540 U	480 U	2200 U	1700 U	2000 U	1300 U
CHRYSENE	540 U	480 U	2200 U	1700 U	2000 U	1300 U
BIS(2-ETHYLHEXYL)PHTHALATE	500 J	480 U	2500	1700	800 J	1300 U
DI-N-OCTYL PHTHALATE	540 U	480 U	2200 U	1700 U	2000 U	1300 U
BENZO(B)FLUORANTHENE	540 U	480 U	2200 U	1700 U	2000 U	1300 U
BENZO(K)FLUORANTHENE	540 U	480 U	2200 U	1700 U	2000 U	1300 U
BENZO(A)PYRENE	540 U	1900	2200 U	1700 U	290 J	1300 U
INDENO(1,2,3-CD)PYRENE	540 U	480 U	2200 U	1700 U	2000 U	1300 U
DIBENZO(A,H)ANTHRACENE	540 U	480 U	2200 U	1700 U	2000 U	1300 U
BENZO(G,H,I)PERYLENE	540 U	480 U	2200 U	1700 U	2000 U	1300 U



SITE 43, AGAN STREET DUMP  
 SEDIMENT - FREQUENCY OF DETECTION SUMMARY  
 REMEDIAL INVESTIGATION, CTO-0303  
 MCB, CAMP LEJEUNE, NORTH CAROLINA  
 ORGANIC COMPOUNDS

LOCATION	43-SHC-SD02-06	43-SHC-SD02-612	43-SHC-SD03-06	43-SHC-SD03-612	43-SHC-SD04-06	43-SHC-SD04-612
DATE SAMPLED	05/05/95	05/05/95	05/05/95	05/05/95	05/05/95	05/05/95
DEPTH	0-6"	6-12"	0-6"	6-12"	0-6"	6-12"
UNITS	UG/KG	UG/KG	UG/KG	UG/KG	UG/KG	UG/KG
<b>PESTICIDE/PCBS</b>						
ALPHA-BHC	2.7 UJ	2.4 UJ	11 UJ	8.4 R	10 UJ	6.5 UJ
BETA-BHC	2.7 UJ	2.4 UJ	11 UJ	8.4 R	10 UJ	6.5 UJ
DELTA-BHC	2.7 UJ	2.4 UJ	11 UJ	8.4 R	10 UJ	6.5 UJ
GAMMA-BHC (LINDANE)	2.7 UJ	2.4 UJ	11 UJ	8.4 R	10 UJ	6.5 UJ
HEPTACHLOR	2.7 UJ	2.4 UJ	11 UJ	8.4 R	10 UJ	6.5 UJ
ALDRIN	2.7 UJ	2.4 UJ	11 UJ	8.4 R	10 UJ	6.5 UJ
HEPTACHLOR EPOXIDE	2.7 UJ	2.4 UJ	11 UJ	8.4 R	10 UJ	6.5 UJ
ENDOSULFAN I	2.7 UJ	2.4 UJ	11 UJ	8.4 R	10 UJ	6.5 UJ
DIELDRIN	5.5 UJ	4.9 UJ	23 UJ	17 R	21 UJ	13 UJ
4,4'-DDE	36 J	4.9 UJ	450	1300 J	8900	55 J
ENDRIN	5.5 UJ	4.9 UJ	23 UJ	12 J	21 UJ	13 UJ
ENDOSULFAN II	5.5 UJ	4.9 UJ	23 UJ	17 R	21 UJ	13 UJ
4,4'-DDD	60 J	4.9 UJ	1300	6600 J	37000	280
ENDOSULFAN SULFATE	5.5 UJ	4.9 UJ	23 UJ	17 R	21 UJ	13 UJ
4,4'-DDT	9.3 J	4.9 UJ	23 UJ	13 J	65 J	16 J
METHOXYCHLOR	27 UJ	24 UJ	110 UJ	84 R	100 UJ	65 UJ
ENDRIN KETONE	5.5 UJ	4.9 UJ	23 UJ	17 R	21 UJ	13 UJ
ENDRIN ALDEHYDE	5.5 UJ	4.9 UJ	23 UJ	17 R	21 UJ	13 UJ
ALPHA-CHLORDANE	9.3 J	2.4 UJ	41 J	49 J	10 J	6.5 UJ
GAMMA-CHLORDANE	12 J	2.4 UJ	74 J	70 J	19 J	6.5 UJ
TOXAPHENE	270 UJ	240 UJ	1100 UJ	840 R	1000 UJ	650 UJ
AROCLOR-1016	55 UJ	49 UJ	230 UJ	170 R	210 UJ	130 UJ
AROCLOR-1221	110 UJ	98 UJ	460 UJ	340 R	420 UJ	260 UJ
AROCLOR-1232	55 UJ	49 UJ	230 UJ	170 R	210 UJ	130 UJ
AROCLOR-1242	55 UJ	49 UJ	230 UJ	170 R	210 UJ	130 UJ
AROCLOR-1248	55 UJ	49 UJ	230 UJ	170 R	210 UJ	130 UJ
AROCLOR-1254	55 UJ	49 UJ	230 UJ	170 R	210 UJ	130 UJ
AROCLOR-1260	55 UJ	49 UJ	230 UJ	170 R	210 UJ	130 UJ

**SITE 43, AGAN STREET DUMP**  
**SEDIMENT - FREQUENCY OF DETECTION SUMMARY**  
**REMEDIAL INVESTIGATION, CTO-0303**  
**MCB, CAMP LEJEUNE, NORTH CAROLINA**  
**ORGANIC COMPOUNDS**

LOCATION DATE SAMPLED DEPTH UNITS	MINIMUM NONDETECTED	MAXIMUM NONDETECTED	MINIMUM DETECTED	MAXIMUM DETECTED	LOCATION OF MAXIMUM DETECTED	FREQUENCY OF DETECTION
<b>VOLATILES</b>						
CHLOROMETHANE	12 U	110 U	ND	ND		0/12
BROMOMETHANE	12 U	110 U	ND	ND		0/12
VINYL CHLORIDE	12 U	110 U	ND	ND		0/12
CHLOROETHANE	12 U	110 U	ND	ND		0/12
METHYLENE CHLORIDE	12 U	110 U	ND	ND		0/12
ACETONE	12 U	110 U	10 J	140 J	43-EC-SD01-06	3/12
CARBON DISULFIDE	12 U	110 U	3 J	26	43-EC-SD02-612	3/12
1,1-DICHLOROETHENE	12 U	110 U	ND	ND		0/12
1,1-DICHLOROETHANE	12 U	110 U	ND	ND		0/12
1,2-DICHLOROETHENE (TOTAL)	12 U	110 U	ND	ND		0/12
CHLOROFORM	12 U	110 U	ND	ND		0/12
1,2-DICHLOROETHANE	12 U	110 U	ND	ND		0/12
2-BUTANONE	12 U	110 U	ND	ND		0/12
1,1,1-TRICHLOROETHANE	12 U	110 U	ND	ND		0/12
CARBON TETRACHLORIDE	12 U	110 U	ND	ND		0/12
BROMODICHLOROMETHANE	12 U	110 U	ND	ND		0/12
1,2-DICHLOROPROPANE	12 U	110 U	ND	ND		0/12
CIS-1,3-DICHLOROPROPENE	12 U	110 U	ND	ND		0/12
TRICHLOROETHENE	12 U	110 U	ND	ND		0/12
DIBROMOCHLOROMETHANE	12 U	110 U	ND	ND		0/12
1,1,2-TRICHLOROETHANE	12 U	110 U	ND	ND		0/12
BENZENE	12 U	110 U	ND	ND		0/12
TRANS-1,3-DICHLOROPROPENE	12 U	110 U	ND	ND		0/12
BROMOFORM	12 U	110 U	ND	ND		0/12
4-METHYL-2-PENTANONE	12 U	110 U	ND	ND		0/12
2-HEXANONE	12 U	110 UJ	ND	ND		0/12
TETRACHLOROETHENE	12 U	110 U	ND	ND		0/12
1,1,2,2-TETRACHLOROETHANE	12 U	110 U	ND	ND		0/12
TOLUENE	12 U	110 U	ND	ND		0/12
CHLOROBENZENE	12 U	110 U	ND	ND		0/12
ETHYLBENZENE	12 U	110 U	ND	ND		0/12
STYRENE	12 U	110 U	ND	ND		0/12
XYLENE (TOTAL)	12 U	110 U	ND	ND		0/12

SITE 43, AGAN STREET DUMP  
 SEDIMENT - FREQUENCY OF DETECTION SUMMARY  
 REMEDIAL INVESTIGATION, CTO-0303  
 MCB, CAMP LEJEUNE, NORTH CAROLINA  
 ORGANIC COMPOUNDS

LOCATION DATE SAMPLED DEPTH UNITS	MINIMUM NONDETECTED	MAXIMUM NONDETECTED	MINIMUM DETECTED	MAXIMUM DETECTED	LOCATION OF MAXIMUM DETECTED	FREQUENCY OF DETECTION
<b>SEMIVOLATILES</b>						
PHENOL	400 U	3700 U	ND	ND		0/12
BIS(2-CHLOROETHYL)ETHER	400 U	3700 U	ND	ND		0/12
2-CHLOROPHENOL	400 U	3700 U	ND	ND		0/12
1,3-DICHLOROBENZENE	400 U	3700 U	ND	ND		0/12
1,4-DICHLOROBENZENE	400 U	3700 U	ND	ND		0/12
1,2-DICHLOROBENZENE	400 U	3700 U	ND	ND		0/12
2-METHYLPHENOL	400 U	3700 U	ND	ND		0/12
2,2'-OXYBIS(1-CHLOROPROPANE)	400 U	3700 U	ND	ND		0/12
4-METHYLPHENOL	400 U	3700 U	210 J	210 J	43-SHC-SD03-612	1/12
N-NITROSO-DI-N-PROPYLAMINE	400 U	3700 U	ND	ND		0/12
HEXACHLOROETHANE	400 U	3700 U	ND	ND		0/12
NITROBENZENE	400 U	3700 U	ND	ND		0/12
ISOPHORONE	400 U	3700 U	ND	ND		0/12
2-NITROPHENOL	400 U	3700 U	ND	ND		0/12
2,4-DIMETHYLPHENOL	400 U	3700 U	ND	ND		0/12
BIS(2-CHLOROETHOXY)METHANE	400 U	3700 U	ND	ND		0/12
2,4-DICHLOROPHENOL	400 U	3700 U	ND	ND		0/12
1,2,4-TRICHLOROBENZENE	400 U	3700 U	ND	ND		0/12
NAPHTHALENE	400 U	3700 U	ND	ND		0/12
4-CHLOROANILINE	400 U	3700 U	ND	ND		0/12
HEXACHLOROBUTADIENE	400 U	3700 U	ND	ND		0/12
4-CHLORO-3-METHYLPHENOL	400 U	3700 U	ND	ND		0/12
2-METHYLNAPHTHALENE	400 U	3700 U	ND	ND		0/12
HEXACHLOROCYCLOPENTADIENE	400 U	3700 U	ND	ND		0/12
2,4,6-TRICHLOROPHENOL	400 U	3700 U	ND	ND		0/12
2,4,5-TRICHLOROPHENOL	1000 U	9200 U	ND	ND		0/12
2-CHLORONAPHTHALENE	400 U	3700 U	ND	ND		0/12
2-NITROANILINE	1000 U	9200 U	ND	ND		0/12
DIMETHYLPHTHALATE	400 U	3700 U	ND	ND		0/12
ACENAPHTHYLENE	400 U	3700 U	ND	ND		0/12
2,6-DINITROTOLUENE	400 U	3700 U	ND	ND		0/12
3-NITROANILINE	1000 U	9200 U	ND	ND		0/12
ACENAPHTHENE	400 U	3700 U	ND	ND		0/12
2,4-DINITROPHENOL	1000 U	9200 U	ND	ND		0/12

**SITE 43, AGAN STREET DUMP**  
**SEDIMENT - FREQUENCY OF DETECTION SUMMARY**  
**REMEDIAL INVESTIGATION, CTO-0303**  
**MCB, CAMP LEJEUNE, NORTH CAROLINA**  
**ORGANIC COMPOUNDS**

LOCATION DATE SAMPLED DEPTH UNITS	MINIMUM NONDETECTED	MAXIMUM NONDETECTED	MINIMUM DETECTED	MAXIMUM DETECTED	LOCATION OF MAXIMUM DETECTED	FREQUENCY OF DETECTION
<b>SEMIVOLATILES cont.</b>						
4-NITROPHENOL	1000 U	9200 U	ND	ND		0/12
DIBENZOFURAN	400 U	3700 U	ND	ND		0/12
2,4-DINITROTOLUENE	400 U	3700 U	ND	ND		0/12
DIETHYLPHTHALATE	400 U	3700 U	ND	ND		0/12
4-CHLOROPHENYL-PHENYLEETHER	400 U	3700 U	ND	ND		0/12
FLUORENE	400 U	3700 U	ND	ND		0/12
4-NITROANILINE	1000 U	9200 U	ND	ND		0/12
4,6-DINITRO-2-METHYLPHENOL	1000 U	9200 U	ND	ND		0/12
N-NITROSODIPHENYLAMINE (1)	400 U	3700 U	ND	ND		0/12
4-BROMOPHENYL-PHENYLEETHER	400 U	3700 U	ND	ND		0/12
HEXACHLOROBENZENE	400 U	3700 U	ND	ND		0/12
PENTACHLOROPHENOL	1000 U	9200 U	ND	ND		0/12
PHENANTHRENE	400 U	3700 U	ND	ND		0/12
ANTHRACENE	400 U	3700 U	ND	ND		0/12
CARBAZOLE	400 U	3700 U	ND	ND		0/12
DI-N-BUTYLPHTHALATE	400 U	3700 U	ND	ND		0/12
FLUORANTHENE	400 U	3700 U	ND	ND		0/12
PYRENE	400 U	3700 U	200 J	200 J	43-EC-SD02-06	1/12
BUTYLBENZYLPHTHALATE	400 U	3700 U	ND	ND		0/12
3,3'-DICHLOROBENZIDINE	400 U	3700 U	ND	ND		0/12
BENZO(A)ANTHRACENE	400 U	3700 U	ND	ND		0/12
CHRYSENE	400 U	3700 U	ND	ND		0/12
BIS(2-ETHYLHEXYL)PHTHALATE	480 U	1300 U	280 J	2500	43-SHC-SD03-06	10/12
DI-N-OCTYL PHTHALATE	400 U	3700 U	ND	ND		0/12
BENZO(B)FLUORANTHENE	400 U	3700 U	ND	ND		0/12
BENZO(K)FLUORANTHENE	400 U	3700 U	ND	ND		0/12
BENZO(A)PYRENE	400 U	2200 U	290 J	1900	43-SHC-SD02-612	4/12
INDENO(1,2,3-CD)PYRENE	400 U	3700 U	ND	ND		0/12
DIBENZO(A,H)ANTHRACENE	400 U	3700 U	ND	ND		0/12
BENZO(G,H,I)PERYLENE	400 U	3700 U	ND	ND		0/12

SITE 43, AGAN STREET DUMP  
 SEDIMENT - FREQUENCY OF DETECTION SUMMARY  
 REMEDIAL INVESTIGATION, CTO-0303  
 MCB, CAMP LEJEUNE, NORTH CAROLINA  
 ORGANIC COMPOUNDS

LOCATION DATE SAMPLED DEPTH UNITS	MINIMUM NONDETECTED	MAXIMUM NONDETECTED	MINIMUM DETECTED	MAXIMUM DETECTED	LOCATION OF MAXIMUM DETECTED	FREQUENCY OF DETECTION
<b>PESTICIDE/PCBS</b>						
ALPHA-BHC	2 UJ	18 UJ	ND	ND		0/9
BETA-BHC	2 UJ	18 UJ	ND	ND		0/9
DELTA-BHC	2 UJ	18 UJ	ND	ND		0/9
GAMMA-BHC (LINDANE)	2 UJ	18 UJ	ND	ND		0/9
HEPTACHLOR	2 UJ	18 UJ	ND	ND		0/9
ALDRIN	2 UJ	18 UJ	ND	ND		0/9
HEPTACHLOR EPOXIDE	2 UJ	18 UJ	ND	ND		0/9
ENDOSULFAN I	2 UJ	18 UJ	ND	ND		0/9
DIELDRIN	4 UJ	36 UJ	ND	ND		0/9
4,4'-DDE	4.9 UJ	3600 UJ	12 J	8900	43-SHC-SD04-06	10/12
ENDRIN	4 UJ	36 UJ	12 J	16 J	43-EC-SD01-06	2/11
ENDOSULFAN II	4 UJ	36 UJ	ND	ND		0/9
4,4'-DDD	4.9 UJ	4.9 UJ	5.6 J	37000	43-SHC-SD04-06	11/12
ENDOSULFAN SULFATE	4 UJ	36 UJ	ND	ND		0/9
4,4'-DDT	4 UJ	36 UJ	9.3 J	180 J	43-EC-SD01-06	6/12
METHOXYCHLOR	20 UJ	180 UJ	ND	ND		0/9
ENDRIN KETONE	4 UJ	36 UJ	ND	ND		0/9
ENDRIN ALDEHYDE	4 UJ	36 UJ	ND	ND		0/9
ALPHA-CHLORDANE	2.4 UJ	18 UJ	7.2 J	49 J	43-SHC-SD03-612	8/12
GAMMA-CHLORDANE	2.4 UJ	10 UJ	9.6 J	74 J	43-SHC-SD03-06	9/12
TOXAPHENE	200 UJ	1800 UJ	ND	ND		0/9
AROCLOR-1016	40 UJ	360 UJ	ND	ND		0/9
AROCLOR-1221	80 UJ	720 UJ	ND	ND		0/9
AROCLOR-1232	40 UJ	360 UJ	ND	ND		0/9
AROCLOR-1242	40 UJ	360 UJ	ND	ND		0/9
AROCLOR-1248	40 UJ	360 UJ	ND	ND		0/9
AROCLOR-1254	40 UJ	360 UJ	ND	ND		0/9
AROCLOR-1260	40 UJ	360 UJ	ND	ND		0/9

**SITE 43, AGAN STREET DUMP**  
**SEDIMENT - FREQUENCY OF DETECTION SUMMARY**  
**REMEDIAL INVESTIGATION, CTO-0303**  
**MCB, CAMP LEJEUNE, NORTH CAROLINA**  
**INORGANIC ANALYTES**

LOCATION	43-EC-SD01-06	43-EC-SD01-612	43-EC-SD02-06	43-EC-SD02-612	43-SHC-SD01-06	43-SHC-SD01-612
DATE SAMPLED	05/05/95	05/05/95	05/05/95	05/05/95	05/05/95	05/05/95
DEPTH	0-6"	6-12"	0-6"	6-12"	0-6"	6-12"
UNITS	MG/KG	MG/KG	MG/KG	MG/KG	MG/KG	MG/KG
<b>TOTAL METALS</b>						
ALUMINUM, TOTAL	15700	7670	13600	9950	878	1360
ANTIMONY, TOTAL	13.7 UJ	21 UJ	8.5 UJ	13.7 UJ	2.3 UJ	2.8 UJ
ARSENIC, TOTAL	2.7 J	3.7 U	4.5 J	5.7	0.37 U	0.31 U
BARIUM, TOTAL	31.5	21	32.1	34.3	4.4	7.9
BERYLLIUM, TOTAL	0.34 U	0.52 U	0.21 U	0.34 U	0.06 U	0.07 U
CADMIUM, TOTAL	4.8	6.8 U	2.8 U	4.5 U	0.76 U	0.91 U
CALCIUM, TOTAL	7280	12300	6930	13900	2210	1880
CHROMIUM, TOTAL	27.2	9.5	20.1	8.3	3.6	4.5
COBALT, TOTAL	2.1	2.4 U	3.1	1.8	0.27 U	0.66
COPPER, TOTAL	53	5.1	38.5	11.3	0.35 U	6.2
IRON, TOTAL	20500	11100	14600	23800	963	2040
LEAD, TOTAL	180	32.5 J	107	18.1 J	49.7	32.7
MAGNESIUM, TOTAL	4370	6440	2570	3090	82.5	110
MANGANESE, TOTAL	78.5	47.2	46.7	37.5	2.7	4.6
MERCURY, TOTAL	0.66	0.79 U	0.44	0.5 U	0.12 U	0.1 U
NICKEL, TOTAL	15.5	9.4 U	9.9	6.2 U	1.1 U	1.3 U
POTASSIUM, TOTAL	1070	800	868	1660	60.3	129
SELENIUM, TOTAL	1.7 U	3.9 U	2.6	2.4	0.4 U	0.32 U
SILVER, TOTAL	2.2 U	3.3 U	2.8	2.2 U	0.37 U	0.44 U
SODIUM, TOTAL	7270	14800	5700	6160	75.6	52.7
THALLIUM, TOTAL	0.66 U	1.5 U	0.54 U	0.82 U	0.15 U	0.13 U
VANADIUM, TOTAL	63.9	27.2	34.2	16.9	3.6	6.4
ZINC, TOTAL	338	117	219	53.3	45.7	48

**SITE 43, AGAN STREET DUMP**  
**SEDIMENT - FREQUENCY OF DETECTION SUMMARY**  
**REMEDIAL INVESTIGATION, CTO-0303**  
**MCB, CAMP LEJEUNE, NORTH CAROLINA**  
**INORGANIC ANALYTES**

LOCATION	43-SHC-SD02-06	43-SHC-SD02-612	43-SHC-SD03-06	43-SHC-SD03-612	43-SHC-SD04-06	43-SHC-SD04-612
DATE SAMPLED	05/05/95	05/05/95	05/05/95	05/05/95	05/05/95	05/05/95
DEPTH	0-6"	6-12"	0-6"	6-12"	0-6"	6-12"
UNITS	MG/KG	MG/KG	MG/KG	MG/KG	MG/KG	MG/KG
<b>TOTAL METALS</b>						
ALUMINUM, TOTAL	1720	2620	13900	10300	16400	4370
ANTIMONY, TOTAL	3.8 UJ	2.9 UJ	16.1 UJ	11.2 UJ	14.2 UJ	8 UJ
ARSENIC, TOTAL	0.4 U	0.41 U	3.2	2.1	4 J	1.3 U
BARIIUM, TOTAL	5.9	10.6	46.1	44.1	35.4	20.7
BERYLLIUM, TOTAL	0.1	0.07 U	0.4 U	0.28 U	0.36 U	0.2 U
CADMIUM, TOTAL	1.2 U	0.94 U	5.2 U	3.6 U	4.6 U	2.6 U
CALCIUM, TOTAL	1080	2100	6470	7890	9690	6520
CHROMIUM, TOTAL	1.8	2.9	19.9	14.2	18.7	4.5
COBALT, TOTAL	0.45 U	0.34 U	1.9 U	1.9	2.3	0.93 U
COPPER, TOTAL	1.7	0.43 U	29	13.1	31.6	1.2 U
IRON, TOTAL	2300	763	15100	6790	16700	5810
LEAD, TOTAL	42.5	6.1	206	99	111	7.6
MAGNESIUM, TOTAL	567	310	4100	4590	6000	3860
MANGANESE, TOTAL	5.5	3.4	52.2	25.9	52.6	11.7
MERCURY, TOTAL	0.11 U	0.13 U	0.6 U	0.38 U	0.57 U	0.26 U
NICKEL, TOTAL	1.7	1.3 U	9.5	5.9	8.3	3.6 U
POTASSIUM, TOTAL	137	101	1090	772	1340	409
SELENIUM, TOTAL	0.43 U	0.44 U	2.6	2	2 U	1.5 J
SILVER, TOTAL	0.6 U	0.46 U	2.5 U	1.9	2.3 U	1.3 U
SODIUM, TOTAL	482	197	9120	7730	9920	6500
THALLIUM, TOTAL	0.17 U	0.17 U	0.97 U	0.6 U	0.79 U	0.53 U
VANADIUM, TOTAL	5.4	2.1	57.3	26.6	43.7	7.5
ZINC, TOTAL	43.9	1.5	254	92.5	223	17.3

**SITE 43, AGAN STREET DUMP**  
**SEDIMENT - FREQUENCY OF DETECTION SUMMARY**  
**REMEDIAL INVESTIGATION, CTO-0303**  
**MCB, CAMP LEJEUNE, NORTH CAROLINA**  
**INORGANIC ANALYTES**

LOCATION DATE SAMPLED DEPTH UNITS	MINIMUM NONDETECTED	MAXIMUM NONDETECTED	MINIMUM DETECTED	MAXIMUM DETECTED	LOCATION OF MAXIMUM DETECTED	FREQUENCY OF DETECTION
<b>TOTAL METALS</b>						
ALUMINUM, TOTAL	NA	NA	878	16400	43-SHC-SD04-06	12/12
ANTIMONY, TOTAL	2.3 UJ	21 UJ	ND	ND		0/12
ARSENIC, TOTAL	0.31 U	3.7 U	2.1	5.7	43-EC-SD02-612	6/12
BARIIUM, TOTAL	NA	NA	4.4	46.1	43-SHC-SD03-06	12/12
BERYLLIUM, TOTAL	0.06 U	0.52 U	0.1	0.1	43-SHC-SD02-06	1/12
CADMIUM, TOTAL	0.76 U	6.8 U	4.8	4.8	43-EC-SD01-06	1/12
CALCIUM, TOTAL	NA	NA	1080	13900	43-EC-SD02-612	12/12
CHROMIUM, TOTAL	NA	NA	1.8	27.2	43-EC-SD01-06	12/12
COBALT, TOTAL	0.27 U	2.4 U	0.66	3.1	43-EC-SD02-06	6/12
COPPER, TOTAL	0.35 U	1.2 U	1.7	53	43-EC-SD01-06	9/12
IRON, TOTAL	NA	NA	763	23800	43-EC-SD02-612	12/12
LEAD, TOTAL	NA	NA	6.1	206	43-SHC-SD03-06	12/12
MAGNESIUM, TOTAL	NA	NA	82.5	6440	43-EC-SD01-612	12/12
MANGANESE, TOTAL	NA	NA	2.7	78.5	43-EC-SD01-06	12/12
MERCURY, TOTAL	0.1 U	0.79 U	0.44	0.66	43-EC-SD01-06	2/12
NICKEL, TOTAL	1.1 U	9.4 U	1.7	15.5	43-EC-SD01-06	6/12
POTASSIUM, TOTAL	NA	NA	60.3	1660	43-EC-SD02-612	12/12
SELENIUM, TOTAL	0.32 U	3.9 U	1.5 J	2.6	43-SHC-SD03-06	5/12
SILVER, TOTAL	0.37 U	3.3 U	1.9	2.8	43-EC-SD02-06	2/12
SODIUM, TOTAL	NA	NA	52.7	14800	43-EC-SD01-612	12/12
THALLIUM, TOTAL	0.13 U	1.5 U	ND	ND		0/12
VANADIUM, TOTAL	NA	NA	2.1	63.9	43-EC-SD01-06	12/12
ZINC, TOTAL	NA	NA	1.5	338	43-EC-SD01-06	12/12



**APPENDIX I**  
**STATISTICAL SUMMARIES**

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**SOIL**

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SITE 43, AGAN STREET DUMP  
 SURFACE SOIL - STATISTICAL SUMMARY  
 REMEDIAL INVESTIGATION, CTO-0303  
 MCB, CAMP LEJEUNE, NORTH CAROLINA  
 ORGANIC COMPOUNDS

	NORMAL ARITHMETIC MEAN	NORMAL STANDARD DEVIATION	NORMAL UPPER 95% CONFIDENCE INTERVAL	LOG ARITHMETIC MEAN	LOG STANDARD DEVIATION	LOG UPPER 95% CONFIDENCE INTERVAL
<b>SEMIVOLATILE</b>						
4-METHYLPHENOL	206.61	30.97	216.58	5.32	0.16	218.38
2-METHYLNAPHTHALENE	206.75	37.43	218.80	5.31	0.23	225.77
ACENAPHTHYLENE	207.71	37.17	219.68	5.31	0.24	227.32
ACENAPHTHENE	298.86	512.12	463.68	5.35	0.64	340.40
DIBENZOFURAN	230.36	132.31	272.94	5.34	0.46	275.82
FLUORENE	256.14	287.09	348.54	5.34	0.55	302.99
PHENANTHRENE	512.71	1090.41	863.65	5.62	0.88	614.75
ANTHRACENE	229.43	122.76	268.94	5.35	0.42	269.31
CARBAZOLE	218.71	48.71	234.39	5.36	0.24	239.26
FLUORANTHENE	2743.89	11288.46	6376.93	5.92	1.38	2308.52
PYRENE	2864.61	12044.54	6740.98	5.90	1.37	2234.99
BUTYLBENZYLPHTHALATE	210.71	60.52	230.19	5.30	0.35	243.19
BENZO(A)ANTHRACENE	1825.64	7699.40	4303.59	5.71	1.21	1237.87
CHRYSENE	2109.64	8642.94	4891.26	5.86	1.23	1497.89
BIS(2-ETHYLHEXYL)PHTHALATE	190.57	84.09	217.64	5.12	0.58	250.27
BENZO(B)FLUORANTHENE	2480.86	9791.12	5632.00	5.95	1.36	2284.88
BENZO(K)FLUORANTHENE	999.18	3731.03	2199.96	5.68	0.98	767.85
BENZO(A)PYRENE	1867.11	7328.47	4225.68	5.88	1.20	1450.26
INDENO(1,2,3-CD)PYRENE	1377.57	5065.36	3007.79	5.79	1.17	1249.54
DIBENZO(A,H)ANTHRACENE	251.96	217.33	321.91	5.33	0.59	313.44
BENZO(G,H,I)PERYLENE	1250.96	4501.32	2699.65	5.80	1.07	1073.10
<b>PESTICIDE/PCBS</b>						
HEPTACHLOR EPOXIDE	1.29	0.35	1.54	0.22	0.25	1.60
4,4'-DDE	151.11	374.42	426.08	2.56	2.14	188000.36
4,4'-DDD	430.48	1133.05	1262.58	1.82	2.73	16662146.43
4,4'-DDT	152.14	374.02	426.82	2.52	2.25	324094.73
ENDRIN ALDEHYDE	2.68	1.23	3.58	0.92	0.36	3.74

**SITE 43, AGAN STREET DUMP**  
**SURFACE SOIL - STATISTICAL SUMMARY**  
**REMEDIAL INVESTIGATION, CTO-0303**  
**MCB, CAMP LEJEUNE, NORTH CAROLINA**  
**INORGANIC ANALYTES**

	NORMAL ARITHMETIC MEAN	NORMAL STANDARD DEVIATION	NORMAL UPPER 95% CONFIDENCE INTERVAL	LOG ARITHMETIC MEAN	LOG STANDARD DEVIATION	LOG UPPER 95% CONFIDENCE INTERVAL
<b>TOTAL METALS</b>						
ALUMINUM, TOTAL	3381.90	2311.12	4251.87	7.95	0.59	4488.23
ARSENIC, TOTAL	0.50	0.28	0.61	-0.86	0.61	0.70
BARIUM, TOTAL	38.07	117.76	82.40	2.54	1.04	45.46
CADMIUM, TOTAL	0.42	0.31	0.54	-0.98	0.42	0.50
CALCIUM, TOTAL	7570.46	12517.95	12282.54	7.37	2.04	159904.26
CHROMIUM, TOTAL	12.76	24.01	21.79	1.76	1.12	23.85
COBALT, TOTAL	0.81	1.12	1.23	-0.69	0.84	1.17
COPPER, TOTAL	6.00	12.29	10.63	0.81	1.33	15.87
IRON, TOTAL	3187.95	4311.19	4810.79	7.71	0.73	4342.87
LEAD, TOTAL	33.43	53.06	53.40	2.89	1.07	67.84
MAGNESIUM, TOTAL	200.81	146.62	256.01	5.06	0.72	302.62
MANGANESE, TOTAL	20.30	40.08	35.38	2.28	1.06	36.45
MERCURY, TOTAL	0.09	0.11	0.13	-2.72	0.64	0.11
NICKEL, TOTAL	1.80	1.10	2.22	0.46	0.47	2.21
POTASSIUM, TOTAL	92.54	32.14	104.64	4.48	0.29	104.37
SELENIUM, TOTAL	0.23	0.12	0.28	-1.55	0.38	0.27
SODIUM, TOTAL	28.53	21.93	36.78	3.07	0.80	47.39
VANADIUM, TOTAL	7.35	3.76	8.77	1.89	0.47	9.13
ZINC, TOTAL	77.19	170.65	141.43	2.60	1.72	283.03

**SITE 43, AGAN STREET DUMP**  
**SUBSURFACE SOIL - STATISTICAL SUMMARY**  
**REMEDIAL INVESTIGATION, CTO-0303**  
**MCB, CAMP LEJEUNE, NORTH CAROLINA**  
**ORGANIC COMPOUNDS**

	NORMAL ARITHMETIC MEAN	NORMAL STANDARD DEVIATION	NORMAL UPPER 95% CONFIDENCE INTERVAL	LOG ARITHMETIC MEAN	LOG STANDARD DEVIATION	LOG UPPER 95% CONFIDENCE INTERVAL
<b>SEMIVOLATILE</b>						
PHENANTHRENE	208.50	52.37	228.75	5.32	0.18	223.64
CARBAZOLE	190.65	28.13	201.52	5.23	0.22	211.40
FLUORANTHENE	229.50	146.13	286.00	5.36	0.33	259.10
PYRENE	277.00	358.51	415.61	5.39	0.50	314.40
BUTYLBENZYLPHTHALATE	200.95	66.55	226.68	5.24	0.41	250.14
BENZO(A)ANTHRACENE	206.50	43.47	223.31	5.32	0.16	219.78
CHRYSENE	224.00	121.55	270.99	5.35	0.30	249.84
BIS(2-ETHYLHEXYL)PHTHALATE	212.50	74.98	241.49	5.33	0.23	232.49
BENZO(B)FLUORANTHENE	226.00	130.49	276.45	5.35	0.31	254.22
BENZO(K)FLUORANTHENE	204.00	32.39	216.52	5.31	0.12	214.66
BENZO(A)PYRENE	215.50	83.59	247.82	5.34	0.24	236.78
INDENO(1,2,3-CD)PYRENE	231.50	155.07	291.45	5.36	0.34	261.80
DIBENZO(A,H)ANTHRACENE	195.50	7.76	198.50	5.27	0.04	198.78
BENZO(G,H,I)PERYLENE	226.50	132.73	277.81	5.35	0.31	254.93
<b>PESTICIDE/PCBS</b>						
4,4'-DDE	2.99	2.70	4.97	0.90	0.58	5.45
4,4'-DDD	173.11	452.81	505.65	1.59	2.42	356441.82
4,4'-DDT	8.11	16.27	20.06	1.12	1.18	52.54

**SITE 43, AGAN STREET DUMP**  
**SUBSURFACE SOIL - STATISTICAL SUMMARY**  
**REMEDIAL INVESTIGATION, CTO-0303**  
**MCB, CAMP LEJEUNE, NORTH CAROLINA**  
**INORGANIC ANALYTES**

	NORMAL ARITHMETIC MEAN	NORMAL STANDARD DEVIATION	NORMAL UPPER 95% CONFIDENCE INTERVAL	LOG ARITHMETIC MEAN	LOG STANDARD DEVIATION	LOG UPPER 95% CONFIDENCE INTERVAL
<b>TOTAL METALS</b>						
ALUMINUM, TOTAL	2665.20	1672.29	3311.73	7.67	0.72	4137.23
ARSENIC, TOTAL	0.23	0.12	0.27	-1.59	0.45	0.28
BARIUM, TOTAL	5.93	3.39	7.24	1.59	0.68	8.87
CALCIUM, TOTAL	176.64	121.56	223.63	4.91	0.85	319.41
CHROMIUM, TOTAL	3.56	2.04	4.35	1.09	0.66	5.20
COBALT, TOTAL	0.34	0.14	0.39	-1.14	0.31	0.38
COPPER, TOTAL	0.54	0.79	0.84	-1.06	0.78	0.73
IRON, TOTAL	1403.50	1564.05	2008.19	6.83	0.88	2298.37
LEAD, TOTAL	3.92	1.87	4.64	1.25	0.49	5.01
MAGNESIUM, TOTAL	83.28	54.49	104.35	4.19	0.73	129.99
MANGANESE, TOTAL	2.89	1.24	3.37	0.94	0.55	3.90
NICKEL, TOTAL	1.11	0.37	1.25	0.04	0.38	1.33
POTASSIUM, TOTAL	85.96	41.68	102.08	4.36	0.45	107.21
SELENIUM, TOTAL	0.17	0.03	0.18	-1.78	0.17	0.18
SODIUM, TOTAL	14.46	12.77	19.39	2.31	0.88	25.16
VANADIUM, TOTAL	3.92	3.10	5.12	1.00	0.91	7.37
ZINC, TOTAL	1.56	0.84	1.89	0.27	0.67	2.33

**GROUNDWATER**

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**SITE 43, AGAN STREET DUMP**  
**GROUNDWATER - STATISTICAL SUMMARY**  
**REMEDIAL INVESTIGATION, CTO-0303**  
**MCB, CAMP LEJEUNE, NORTH CAROLINA**  
**ORGANIC COMPOUNDS**

	NORMAL ARITHMETIC MEAN	NORMAL STANDARD DEVIATION	NORMAL UPPER 95% CONFIDENCE INTERVAL	LOG ARITHMETIC MEAN	LOG STANDARD DEVIATION	LOG UPPER 95% CONFIDENCE INTERVAL
SEMIVOLATILE 4-METHYLPHENOL	4.80	1.01	5.38	1.54	0.30	5.92



**SITE 43, AGAN STREET DUMP**  
**GROUNDWATER - STATISTICAL SUMMARY**  
**REMEDIAL INVESTIGATION, CTO-0303**  
**MCB, CAMP LEJEUNE, NORTH CAROLINA**  
**INORGANIC ANALYTES**

	NORMAL ARITHMETIC MEAN	NORMAL STANDARD DEVIATION	NORMAL UPPER 95% CONFIDENCE INTERVAL	LOG ARITHMETIC MEAN	LOG STANDARD DEVIATION	LOG UPPER 95% CONFIDENCE INTERVAL
<b>TOTAL METALS</b>						
ALUMINUM, TOTAL	3167.34	7806.42	7692.29	5.96	2.13	408487.44
BARIUM, TOTAL	35.74	34.82	55.92	3.00	1.27	268.84
CALCIUM, TOTAL	44192.00	30809.56	62050.63	10.26	1.20	254429.63
COBALT, TOTAL	1.48	0.87	1.98	0.30	0.39	1.92
COPPER, TOTAL	7.93	18.61	18.72	1.05	1.08	18.83
IRON, TOTAL	4409.70	10409.54	10443.54	6.87	1.66	53797.19
LEAD, TOTAL	0.86	0.51	1.16	-0.30	0.56	1.35
MAGNESIUM, TOTAL	17806.00	47871.68	45554.60	8.20	1.40	68382.03
MANGANESE, TOTAL	33.22	35.58	53.85	2.97	1.13	145.60
NICKEL, TOTAL	3.76	3.46	5.76	1.09	0.63	6.17
POTASSIUM, TOTAL	3743.40	5967.49	7202.43	7.53	1.14	14238.11
SODIUM, TOTAL	129847.00	351809.16	333771.60	9.93	1.63	1038460.68
VANADIUM, TOTAL	1.99	1.75	3.00	0.44	0.68	3.43
ZINC, TOTAL	125.45	235.50	261.95	2.79	2.26	31079.29

**SURFACE WATER**

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**SITE 43, AGAN STREET DUMP**  
**SURFACE WATER - STATISTICAL SUMMARY**  
**REMEDIAL INVESTIGATION, CTO-0303**  
**MCB, CAMP LEJEUNE, NORTH CAROLINA**  
**ORGANIC COMPOUNDS**

	NORMAL ARITHMETIC MEAN	NORMAL STANDARD DEVIATION	NORMAL UPPER 95% CONFIDENCE INTERVAL	LOG ARITHMETIC MEAN	LOG STANDARD DEVIATION	LOG UPPER 95% CONFIDENCE INTERVAL
<b>VOLATILE</b>						
1,2-DICHLOROETHENE (TOTAL)	4.00	1.55	5.27	1.30	0.47	7.31
<b>SEMIVOLATILE</b>						
BIS(2-ETHYLHEXYL)PHTHALATE	36.92	79.91	102.65	1.97	1.76	18941.76
<b>PESTICIDE/PCBS</b>						
4,4'-DDE	0.07	0.02	0.08	-2.78	0.34	0.10
4,4'-DDD	0.19	0.23	0.38	-2.17	1.05	2.30

**SITE 43, AGAN STREET DUMP**  
**SURFACE WATER - STATISTICAL SUMMARY**  
**REMEDIAL INVESTIGATION, CTO-0303**  
**MCB, CAMP LEJEUNE, NORTH CAROLINA**  
**INORGANIC ANALYTES**

	NORMAL ARITHMETIC MEAN	NORMAL STANDARD DEVIATION	NORMAL UPPER 95% CONFIDENCE INTERVAL	LOG ARITHMETIC MEAN	LOG STANDARD DEVIATION	LOG UPPER 95% CONFIDENCE INTERVAL
<b>TOTAL METALS</b>						
ALUMINUM, TOTAL	373.68	280.13	604.13	5.30	1.55	93393.24
ARSENIC, TOTAL	1.28	0.71	1.86	0.14	0.48	2.33
BARIUM, TOTAL	33.90	2.80	36.21	3.52	0.09	36.60
CALCIUM, TOTAL	70466.67	22522.40	88994.05	11.11	0.37	107559.18
COPPER, TOTAL	1.63	0.93	2.40	0.36	0.55	3.46
IRON, TOTAL	1688.33	1490.80	2914.70	7.15	0.79	6196.97
LEAD, TOTAL	1.88	1.01	2.71	0.43	0.79	7.51
MAGNESIUM, TOTAL	105743.33	68065.53	161735.42	11.17	1.21	2502822.54
MANGANESE, TOTAL	47.68	7.71	54.02	3.85	0.17	55.94
POTASSIUM, TOTAL	35480.00	22191.03	53734.79	10.13	1.12	638575.87
SODIUM, TOTAL	884266.67	565092.65	1349123.36	13.30	1.22	21390491.64
VANADIUM, TOTAL	1.98	1.10	2.89	0.54	0.60	4.56

**SITE 43, AGAN STREET DUMP**  
**SURFACE WATER - STATISTICAL SUMMARY**  
**REMEDIAL INVESTIGATION, CTO-0303**  
**MCB, CAMP LEJEUNE, NORTH CAROLINA**  
**DISSOLVED ANALYTES**

	NORMAL ARITHMETIC MEAN	NORMAL STANDARD DEVIATION	NORMAL UPPER 95% CONFIDENCE INTERVAL	LOG ARITHMETIC MEAN	LOG STANDARD DEVIATION	LOG UPPER 95% CONFIDENCE INTERVAL
<b>DISSOLVED METALS</b>						
BARIUM, SOLUBLE	31.80	3.69	34.84	3.45	0.12	35.74
CALCIUM, SOLUBLE	69950.00	22064.88	88101.02	11.10	0.37	106590.52
COPPER, SOLUBLE	1.17	0.65	1.70	0.06	0.42	1.93
IRON, SOLUBLE	412.27	574.20	884.62	4.90	1.69	117447.52
MAGNESIUM, SOLUBLE	105568.33	67453.00	161056.54	11.18	1.20	2390959.79
MANGANESE, SOLUBLE	36.10	12.47	46.36	3.54	0.34	53.06
POTASSIUM, SOLUBLE	34936.67	21648.65	52745.29	10.12	1.10	584649.25
SODIUM, SOLUBLE	882533.33	559367.95	1342680.77	13.30	1.20	20203537.97
VANADIUM, SOLUBLE	1.52	0.83	2.20	0.31	0.49	2.76

**SEDIMENT**

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**SITE 43, AGAN STREET DUMP**  
**SEDIMENT - STATISTICAL SUMMARY**  
**REMEDIAL INVESTIGATION, CTO-0303**  
**MCB, CAMP LEJEUNE, NORTH CAROLINA**  
**ORGANIC COMPOUNDS**

	NORMAL ARITHMETIC MEAN	NORMAL STANDARD DEVIATION	NORMAL UPPER 95% CONFIDENCE INTERVAL	LOG ARITHMETIC MEAN	LOG STANDARD DEVIATION	LOG UPPER 95% CONFIDENCE INTERVAL
<b>VOLATILE</b>						
ACETONE	40.13	44.47	63.18	3.19	1.04	120.80
CARBON DISULFIDE	21.71	14.77	29.36	2.80	0.86	48.30
<b>SEMIVOLATILE</b>						
4-METHYLPHENOL	715.42	517.11	983.52	6.29	0.81	1478.31
PYRENE	722.92	519.43	992.22	6.30	0.82	1513.96
BIS(2-ETHYLHEXYL)PHTHALATE	819.17	661.42	1162.09	6.47	0.70	1419.76
BENZO(A)PYRENE	777.08	523.05	1048.27	6.42	0.76	1470.36
<b>PESTICIDE/PCBS</b>						
4,4'-DDE	1264.95	2495.64	2558.85	5.24	2.46	352926.78
ENDRIN	8.58	5.76	11.72	1.87	0.86	19.98
4,4'-DDD	4793.15	10521.48	10248.12	5.85	3.10	102410882.62
4,4'-DDT	28.41	50.59	54.64	2.45	1.32	130.71
ALPHA-CHLORDANE	15.27	15.05	23.07	2.29	1.03	48.41
GAMMA-CHLORDANE	23.75	24.19	36.30	2.63	1.20	98.13

**SITE 43, AGAN STREET DUMP**  
**SEDIMENT - STATISTICAL SUMMARY**  
**REMEDIAL INVESTIGATION, CTO-0303**  
**MCB, CAMP LEJEUNE, NORTH CAROLINA**  
**INORGANIC ANALYTES**

	NORMAL ARITHMETIC MEAN	NORMAL STANDARD DEVIATION	NORMAL UPPER 95% CONFIDENCE INTERVAL	LOG ARITHMETIC MEAN	LOG STANDARD DEVIATION	LOG UPPER 95% CONFIDENCE INTERVAL
<b>TOTAL METALS</b>						
ALUMINUM, TOTAL	8205.67	5885.93	11257.29	8.63	1.05	28213.38
ARSENIC, TOTAL	2.12	1.92	3.12	0.08	1.41	15.53
BARIUM, TOTAL	24.50	14.83	32.19	2.95	0.82	52.61
BERYLLIUM, TOTAL	0.13	0.07	0.16	-2.27	0.74	0.24
CADMIUM, TOTAL	1.81	1.35	2.51	0.30	0.86	3.94
CALCIUM, TOTAL	6520.83	4153.67	8674.35	8.52	0.83	14124.84
CHROMIUM, TOTAL	11.27	8.49	15.67	2.10	0.89	25.48
COBALT, TOTAL	1.25	0.98	1.76	-0.20	1.09	4.49
COPPER, TOTAL	15.87	17.77	25.09	1.64	2.01	1559.03
IRON, TOTAL	10038.83	8042.18	14208.39	8.72	1.21	43999.64
LEAD, TOTAL	74.35	66.67	108.92	3.82	1.15	288.43
MAGNESIUM, TOTAL	3007.46	2284.33	4191.80	7.33	1.59	44957.70
MANGANESE, TOTAL	30.71	25.28	43.82	2.90	1.24	137.38
MERCURY, TOTAL	0.24	0.19	0.34	-1.76	0.91	0.57
NICKEL, TOTAL	5.19	4.75	7.65	1.13	1.18	20.59
POTASSIUM, TOTAL	703.03	535.91	980.87	6.10	1.16	2841.04
SELENIUM, TOTAL	1.31	0.99	1.82	-0.18	1.13	5.00
SILVER, TOTAL	1.04	0.80	1.46	-0.30	0.94	2.63
SODIUM, TOTAL	5667.28	4678.54	8092.91	7.64	2.08	802290.49
VANADIUM, TOTAL	24.57	21.49	35.71	2.71	1.15	94.35
ZINC, TOTAL	121.10	109.62	177.93	4.18	1.49	1139.82



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

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**SOIL**

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**SITE 43, AGAN STREET DUMP**  
**SURFACE SOIL - DUPLICATE SUMMARY**  
**REMEDIAL INVESTIGATION, CTO-0303**  
**MCB, CAMP LEJEUNE, NORTH CAROLINA**  
**ORGANIC COMPOUNDS**

LOCATION	43-DA2-SB02-00D	43-GW01DW-00D	43-OA-SB04-00D
DATE SAMPLED	03/10/95	02/28/95	03/10/95
DEPTH	0-12"	0-12"	0-12"
UNITS	UG/KG	UG/KG	UG/KG

**VOLATILES**

CHLOROMETHANE	NA	12 U	NA
BROMOMETHANE	NA	12 U	NA
VINYL CHLORIDE	NA	12 U	NA
CHLOROETHANE	NA	12 U	NA
METHYLENE CHLORIDE	NA	12 U	NA
ACETONE	NA	12 U	NA
CARBON DISULFIDE	NA	12 U	NA
1,1-DICHLOROETHENE	NA	12 U	NA
1,1-DICHLOROETHANE	NA	12 U	NA
1,2-DICHLOROETHENE (TOTAL)	NA	12 U	NA
CHLOROFORM	NA	12 U	NA
1,2-DICHLOROETHANE	NA	12 U	NA
2-BUTANONE	NA	12 U	NA
1,1,1-TRICHLOROETHANE	NA	12 U	NA
CARBON TETRACHLORIDE	NA	12 U	NA
BROMODICHLOROMETHANE	NA	12 U	NA
1,2-DICHLOROPROPANE	NA	12 U	NA
CIS-1,3-DICHLOROPROPENE	NA	12 U	NA
TRICHLOROETHENE	NA	12 U	NA
DIBROMOCHLOROMETHANE	NA	12 U	NA
1,1,2-TRICHLOROETHANE	NA	12 U	NA
BENZENE	NA	12 U	NA
TRANS-1,3-DICHLOROPROPENE	NA	12 U	NA
BROMOFORM	NA	12 U	NA
4-METHYL-2-PENTANONE	NA	12 U	NA
2-HEXANONE	NA	12 U	NA
TETRACHLOROETHENE	NA	12 U	NA
1,1,2,2-TETRACHLOROETHANE	NA	12 U	NA
TOLUENE	NA	12 U	NA
CHLOROBENZENE	NA	12 U	NA
ETHYLBENZENE	NA	12 U	NA
STYRENE	NA	12 U	NA
XYLENE (TOTAL)	NA	12 U	NA

**SITE 43, AGAN STREET DUMP  
SURFACE SOIL - DUPLICATE SUMMARY  
REMEDIAL INVESTIGATION, CTO-0303  
MCB, CAMP LEJEUNE, NORTH CAROLINA  
ORGANIC COMPOUNDS**

LOCATION	43-DA2-SB02-00D	43-GW01DW-00D	43-OA-SB04-00D
DATE SAMPLED	03/10/95	02/28/95	03/10/95
DEPTH	0-12"	0-12"	0-12"
UNITS	UG/KG	UG/KG	UG/KG
<b>SEMIVOLATILES</b>			
PHENOL	460 U	380 U	450 U
BIS(2-CHLOROETHYL)ETHER	460 U	380 U	450 U
2-CHLOROPHENOL	460 U	380 U	450 U
1,3-DICHLOROBENZENE	460 U	380 U	450 U
1,4-DICHLOROBENZENE	460 U	380 U	450 U
1,2-DICHLOROBENZENE	460 U	380 U	450 U
2-METHYLPHENOL	460 U	380 U	450 U
2,2'-OXYBIS(1-CHLOROPROPANE)	460 U	380 U	450 U
4-METHYLPHENOL	460 U	380 U	450 U
N-NITROSO-DI-N-PROPYLAMINE	460 U	380 U	450 U
HEXACHLOROETHANE	460 U	380 U	450 U
NITROBENZENE	460 U	380 U	450 U
ISOPHORONE	460 U	380 U	450 U
2-NITROPHENOL	460 U	380 U	450 U
2,4-DIMETHYLPHENOL	460 U	380 U	450 U
BIS(2-CHLOROETHOXY)METHANE	460 U	380 U	450 U
2,4-DICHLOROPHENOL	460 U	380 U	450 U
1,2,4-TRICHLOROBENZENE	460 U	380 U	450 U
NAPHTHALENE	460 U	380 U	450 U
4-CHLOROANILINE	460 U	380 U	450 U
HEXACHLOROBUTADIENE	460 U	380 U	450 U
4-CHLORO-3-METHYLPHENOL	460 U	380 U	450 U
2-METHYLNAPHTHALENE	460 U	380 U	450 U
HEXACHLOROCYCLOPENTADIENE	460 U	380 U	450 U
2,4,6-TRICHLOROPHENOL	460 U	380 U	450 U
2,4,5-TRICHLOROPHENOL	1100 U	960 U	1100 U
2-CHLORONAPHTHALENE	460 U	380 U	450 U
2-NITROANILINE	1100 U	960 U	1100 U
DIMETHYLPHTHALATE	460 U	380 U	450 U
ACENAPHTHYLENE	460 U	380 U	450 U
2,6-DINITROTOLUENE	460 U	380 U	450 U
3-NITROANILINE	1100 U	960 U	1100 U
ACENAPHTHENE	460 U	380 U	450 U
2,4-DINITROPHENOL	1100 U	960 U	1100 U

**SITE 43, AGAN STREET DUMP  
SURFACE SOIL - DUPLICATE SUMMARY  
REMEDIAL INVESTIGATION, CTO-0303  
MCB, CAMP LEJEUNE, NORTH CAROLINA  
ORGANIC COMPOUNDS**

LOCATION	43-DA2-SB02-00D	43-GW01DW-00D	43-OA-SB04-00D
DATE SAMPLED	03/10/95	02/28/95	03/10/95
DEPTH	0-12"	0-12"	0-12"
UNITS	UG/KG	UG/KG	UG/KG
<b>SEMIVOLATILES cont.</b>			
4-NITROPHENOL	1100 U	960 U	1100 U
DIBENZOFURAN	460 U	380 U	450 U
2,4-DINITROTOLUENE	460 U	380 U	450 U
DIETHYLPHTHALATE	460 U	380 U	450 U
4-CHLOROPHENYL-PHENYLETHER	460 U	380 U	450 U
FLUORENE	460 U	380 U	450 U
4-NITROANILINE	1100 U	960 U	1100 U
4,6-DINITRO-2-METHYLPHENOL	1100 U	960 U	1100 U
N-NITROSODIPHENYLAMINE (1)	460 U	380 U	450 U
4-BROMOPHENYL-PHENYLETHER	460 U	380 U	450 U
HEXACHLOROBENZENE	460 U	380 U	450 U
PENTACHLOROPHENOL	1100 U	960 U	1100 U
PHENANTHRENE	460 U	420	450 U
ANTHRACENE	460 U	380 U	450 U
CARBAZOLE	460 U	87 J	450 U
DI-N-BUTYLPHTHALATE	460 U	380 U	450 U
FLUORANTHENE	460 U	1100	450 U
PYRENE	460 U	1100	450 U
BUTYLBENZYLPHTHALATE	460 U	380 U	450 U
3,3'-DICHLOROBENZIDINE	460 U	380 U	450 U
BENZO(A)ANTHRACENE	460 U	520	450 U
CHRYSENE	460 U	1100	450 U
BIS(2-ETHYLHEXYL)PHTHALATE	460 U	430	450 U
DI-N-OCTYL PHTHALATE	460 U	380 U	450 U
BENZO(B)FLUORANTHENE	460 U	1400	450 U
BENZO(K)FLUORANTHENE	460 U	550	450 U
BENZO(A)PYRENE	460 U	830	450 U
INDENO(1,2,3-CD)PYRENE	460 U	810	450 U
DIBENZO(A,H)ANTHRACENE	460 U	160 J	450 U
BENZO(G,H,I)PERYLENE	460 U	780	450 U

**SITE 43, AGAN STREET DUMP**  
**SURFACE SOIL - DUPLICATE SUMMARY**  
**REMEDIAL INVESTIGATION, CTO-0303**  
**MCB, CAMP LEJEUNE, NORTH CAROLINA**  
**ORGANIC COMPOUNDS**

LOCATION	43-DA2-SB02-00D	43-GW01DW-00D	43-OA-SB04-00D
DATE SAMPLED	03/10/95	02/28/95	03/10/95
DEPTH	0-12"	0-12"	0-12"
UNITS	UG/KG	UG/KG	UG/KG

**PESTICIDE/PCBS**

ALPHA-BHC	NA	1.9 UJ	NA
BETA-BHC	NA	1.9 UJ	NA
DELTA-BHC	NA	1.9 UJ	NA
GAMMA-BHC (LINDANE)	NA	1.9 UJ	NA
HEPTACHLOR	NA	1.9 UJ	NA
ALDRIN	NA	1.9 UJ	NA
HEPTACHLOR EPOXIDE	NA	1.9 UJ	NA
ENDOSULFAN I	NA	1.9 UJ	NA
DIELDRIN	NA	3.8 UJ	NA
4,4'-DDE	NA	3.8 UJ	NA
ENDRIN	NA	3.8 UJ	NA
ENDOSULFAN II	NA	3.8 UJ	NA
4,4'-DDD	NA	3.8 UJ	NA
ENDOSULFAN SULFATE	NA	3.8 UJ	NA
4,4'-DDT	NA	3.8 UJ	NA
METHOXYCHLOR	NA	19 UJ	NA
ENDRIN KETONE	NA	3.8 UJ	NA
ENDRIN ALDEHYDE	NA	3.8 UJ	NA
ALPHA-CHLORDANE	NA	1.9 UJ	NA
GAMMA-CHLORDANE	NA	1.9 UJ	NA
TOXAPHENE	NA	190 UJ	NA
AROCLOR-1016	NA	38 UJ	NA
AROCLOR-1221	NA	76 UJ	NA
AROCLOR-1232	NA	38 UJ	NA
AROCLOR-1242	NA	38 UJ	NA
AROCLOR-1248	NA	38 UJ	NA
AROCLOR-1254	NA	38 UJ	NA
AROCLOR-1260	NA	38 UJ	NA

**SITE 43, AGAN STREET DUMP**  
**SURFACE SOIL - DUPLICATE SUMMARY**  
**REMEDIAL INVESTIGATION, CTO-0303**  
**MCB, CAMP LEJEUNE, NORTH CAROLINA**  
**INORGANIC ANALYTES**

LOCATION	43-DA2-SB02-00D	43-GW01DW-00D	43-OA-SB04-00D
DATE SAMPLED	03/10/95	02/28/95	03/10/95
DEPTH	0-12"	0-12"	0-12"
UNITS	MG/KG	MG/KG	MG/KG
<b>TOTAL METALS</b>			
ALUMINUM, TOTAL	2510 J	1880 J	1280 J
ANTIMONY, TOTAL	4.8 UJ	4.2 UJ	4.2 UJ
ARSENIC, TOTAL	0.38 U	0.61 J	0.49 U
BARIUM, TOTAL	9.4	172	3.1
BERYLLIUM, TOTAL	0.21 U	0.18 U	0.18 U
CADMIUM, TOTAL	0.64 U	1.1	0.57 U
CALCIUM, TOTAL	2850	12200	52.9
CHROMIUM, TOTAL	2.7	6.7	1.8
COBALT, TOTAL	0.69 U	0.62 U	0.61 U
COPPER, TOTAL	8.2	3.7	0.39 U
IRON, TOTAL	1340	1900	874
LEAD, TOTAL	25.2	81.5	6.8
MAGNESIUM, TOTAL	75.8	200	42.3
MANGANESE, TOTAL	11.7	13.4	2.4
MERCURY, TOTAL	0.11 U	0.11 U	0.14 U
NICKEL, TOTAL	2.5 U	2.2 U	2.2 U
POTASSIUM, TOTAL	158 U	140 U	140 U
SELENIUM, TOTAL	0.38	0.37 UJ	0.38 U
SILVER, TOTAL	0.69 U	0.62 U	0.61 U
SODIUM, TOTAL	20.9	32.7 U	16.6
THALLIUM, TOTAL	0.22 U	0.23 U	0.28 U
VANADIUM, TOTAL	3.6	4.9	3.3
ZINC, TOTAL	20.7	39.3	1.7

**SITE 43, AGAN STREET DUMP  
SUBSURFACE SOIL - DUPLICATE SUMMARY  
REMEDIAL INVESTIGATION, CTO-0303  
MCB, CAMP LEJEUNE, NORTH CAROLINA  
ORGANIC COMPOUNDS**

LOCATION	43-MA-SB02-02D	43-OA-SB04-01D	43-OA-SB05-02D
DATE SAMPLED	02/28/95	03/10/95	03/06/95
DEPTH	3-5"	1-3"	3-5"
UNITS	UG/KG	UG/KG	UG/KG
<b>VOLATILES</b>			
CHLOROMETHANE	NA	NA	12 U
BROMOMETHANE	NA	NA	12 U
VINYL CHLORIDE	NA	NA	12 U
CHLOROETHANE	NA	NA	12 U
METHYLENE CHLORIDE	NA	NA	12 U
ACETONE	NA	NA	32
CARBON DISULFIDE	NA	NA	12 U
1,1-DICHLOROETHENE	NA	NA	12 U
1,1-DICHLOROETHANE	NA	NA	12 U
1,2-DICHLOROETHENE (TOTAL)	NA	NA	12 U
CHLOROFORM	NA	NA	12 U
1,2-DICHLOROETHANE	NA	NA	12 U
2-BUTANONE	NA	NA	12 U
1,1,1-TRICHLOROETHANE	NA	NA	12 U
CARBON TETRACHLORIDE	NA	NA	12 U
BROMODICHLOROMETHANE	NA	NA	12 U
1,2-DICHLOROPROPANE	NA	NA	12 U
CIS-1,3-DICHLOROPROPENE	NA	NA	12 U
TRICHLOROETHENE	NA	NA	12 U
DIBROMOCHLOROMETHANE	NA	NA	12 U
1,1,2-TRICHLOROETHANE	NA	NA	12 U
BENZENE	NA	NA	12 U
TRANS-1,3-DICHLOROPROPENE	NA	NA	12 U
BROMOFORM	NA	NA	12 U
4-METHYL-2-PENTANONE	NA	NA	12 U
2-HEXANONE	NA	NA	12 U
TETRACHLOROETHENE	NA	NA	12 U
1,1,2,2-TETRACHLOROETHANE	NA	NA	12 U
TOLUENE	NA	NA	12 U
CHLOROBENZENE	NA	NA	12 U
ETHYLBENZENE	NA	NA	12 U
STYRENE	NA	NA	12 U
XYLENE (TOTAL)	NA	NA	12 U



**SITE 43, AGAN STREET DUMP  
SUBSURFACE SOIL - DUPLICATE SUMMARY  
REMEDIAL INVESTIGATION, CTO-0303  
MCB, CAMP LEJEUNE, NORTH CAROLINA  
ORGANIC COMPOUNDS**

LOCATION	43-MA-SB02-02D	43-OA-SB04-01D	43-OA-SB05-02D
DATE SAMPLED	02/28/95	03/10/95	03/06/95
DEPTH	3-5"	1-3"	3-5"
UNITS	UG/KG	UG/KG	UG/KG

**SEMIVOLATILES**

PHENOL	390 U	400 U	400 U
BIS(2-CHLOROETHYL)ETHER	390 U	400 U	400 U
2-CHLOROPHENOL	390 U	400 U	400 U
1,3-DICHLOROBENZENE	390 U	400 U	400 U
1,4-DICHLOROBENZENE	390 U	400 U	400 U
1,2-DICHLOROBENZENE	390 U	400 U	400 U
2-METHYLPHENOL	390 U	400 U	400 U
2,2'-OXYBIS(1-CHLOROPROPANE)	390 U	400 U	400 U
4-METHYLPHENOL	390 U	400 U	400 U
N-NITROSO-DI-N-PROPYLAMINE	390 U	400 U	400 U
HEXACHLOROETHANE	390 U	400 U	400 U
NITROBENZENE	390 U	400 U	400 U
ISOPHORONE	390 U	400 U	400 U
2-NITROPHENOL	390 U	400 U	400 U
2,4-DIMETHYLPHENOL	390 U	400 U	400 U
BIS(2-CHLOROETHOXY)METHANE	390 U	400 U	400 U
2,4-DICHLOROPHENOL	390 U	400 U	400 U
1,2,4-TRICHLOROBENZENE	390 U	400 U	400 U
NAPHTHALENE	390 U	400 U	400 U
4-CHLOROANILINE	390 U	400 U	400 U
HEXACHLOROBUTADIENE	390 U	400 U	400 U
4-CHLORO-3-METHYLPHENOL	390 U	400 U	400 U
2-METHYLNAPHTHALENE	390 U	400 U	400 U
HEXACHLOROCYCLOPENTADIENE	390 U	400 U	400 U
2,4,6-TRICHLOROPHENOL	390 U	400 U	400 U
2,4,5-TRICHLOROPHENOL	980 U	1000 U	990 U
2-CHLORONAPHTHALENE	390 U	400 U	400 U
2-NITROANILINE	980 U	1000 U	990 U
DIMETHYLPHTHALATE	390 U	400 U	400 U
ACENAPHTHYLENE	390 U	400 U	400 U
2,6-DINITROTOLUENE	390 U	400 U	400 U
3-NITROANILINE	980 U	1000 U	990 U
ACENAPHTHENE	390 U	400 U	400 U
2,4-DINITROPHENOL	980 U	1000 U	990 U

SITE 43, AGAN STREET DUMP  
 SUBSURFACE SOIL - DUPLICATE SUMMARY  
 REMEDIAL INVESTIGATION, CTO-0303  
 MCB, CAMP LEJEUNE, NORTH CAROLINA  
 ORGANIC COMPOUNDS

LOCATION	43-MA-SB02-02D	43-OA-SB04-01D	43-OA-SB05-02D
DATE SAMPLED	02/28/95	03/10/95	03/06/95
DEPTH	3-5"	1-3"	3-5"
UNITS	UG/KG	UG/KG	UG/KG
<b>SEMIVOLATILES cont.</b>			
4-NITROPHENOL	980 U	1000 U	990 U
DIBENZOFURAN	390 U	400 U	400 U
2,4-DINITROTOLUENE	390 U	400 U	400 U
DIETHYLPHTHALATE	390 U	400 U	400 U
4-CHLOROPHENYL-PHENYLETHER	390 U	400 U	400 U
FLUORENE	390 U	400 U	400 U
4-NITROANILINE	980 U	1000 U	990 U
4,6-DINITRO-2-METHYLPHENOL	980 U	1000 U	990 UJ
N-NITROSODIPHENYLAMINE (1)	390 U	400 U	400 U
4-BROMOPHENYL-PHENYLETHER	390 U	400 U	400 U
HEXACHLOROBENZENE	390 U	400 U	400 U
PENTACHLOROPHENOL	980 U	1000 U	990 U
PHENANTHRENE	390 U	400 U	400 U
ANTHRACENE	390 U	400 U	400 U
CARBAZOLE	390 U	400 U	400 U
DI-N-BUTYLPHTHALATE	390 U	400 U	1700 U
FLUORANTHENE	390 U	400 U	400 U
PYRENE	390 U	400 U	400 U
BUTYLBENZYLPHTHALATE	390 U	400 U	400 U
3,3'-DICHLOROBENZIDINE	390 U	400 U	400 U
BENZO(A)ANTHRACENE	390 U	400 U	400 U
CHRYSENE	390 U	400 U	400 U
BIS(2-ETHYLHEXYL)PHTHALATE	390 U	400 U	400 U
DI-N-OCTYL PHTHALATE	390 U	400 U	400 U
BENZO(B)FLUORANTHENE	390 U	400 U	400 U
BENZO(K)FLUORANTHENE	390 U	400 U	400 U
BENZO(A)PYRENE	390 U	400 U	400 U
INDENO(1,2,3-CD)PYRENE	390 U	400 U	400 U
DIBENZO(A,H)ANTHRACENE	390 U	400 U	400 U
BENZO(G,H,I)PERYLENE	390 U	400 U	400 U

**SITE 43, AGAN STREET DUMP**  
**SUBSURFACE SOIL - DUPLICATE SUMMARY**  
**REMEDIAL INVESTIGATION, CTO-0303**  
**MCB, CAMP LEJEUNE, NORTH CAROLINA**  
**ORGANIC COMPOUNDS**

LOCATION	43-MA-SB02-02D	43-OA-SB04-01D	43-OA-SB05-02D
DATE SAMPLED	02/28/95	03/10/95	03/06/95
DEPTH	3-5"	1-3"	3-5"
UNITS	UG/KG	UG/KG	UG/KG
<b>PESTICIDE/PCBS</b>			
ALPHA-BHC	NA	NA	2 UJ
BETA-BHC	NA	NA	2 U
DELTA-BHC	NA	NA	2 UJ
GAMMA-BHC (LINDANE)	NA	NA	2 UJ
HEPTACHLOR	NA	NA	2 U
ALDRIN	NA	NA	2 U
HEPTACHLOR EPOXIDE	NA	NA	2 U
ENDOSULFAN I	NA	NA	2 U
DIELDRIN	NA	NA	4 U
4,4'-DDE	NA	NA	4 UJ
ENDRIN	NA	NA	4 U
ENDOSULFAN II	NA	NA	4 U
4,4'-DDD	NA	NA	4 U
ENDOSULFAN SULFATE	NA	NA	4 U
4,4'-DDT	NA	NA	4 U
METHOXYCHLOR	NA	NA	20 U
ENDRIN KETONE	NA	NA	4 U
ENDRIN ALDEHYDE	NA	NA	4 U
ALPHA-CHLORDANE	NA	NA	2 U
GAMMA-CHLORDANE	NA	NA	2 U
TOXAPHENE	NA	NA	200 U
AROCLOR-1016	NA	NA	40 U
AROCLOR-1221	NA	NA	80 U
AROCLOR-1232	NA	NA	40 U
AROCLOR-1242	NA	NA	40 U
AROCLOR-1248	NA	NA	40 U
AROCLOR-1254	NA	NA	40 U
AROCLOR-1260	NA	NA	40 U

**SITE 43, AGAN STREET DUMP**  
**SUBSURFACE SOIL - DUPLICATE SUMMARY**  
**REMEDIAL INVESTIGATION, CTO-0303**  
**MCB, CAMP LEJEUNE, NORTH CAROLINA**  
**INORGANIC ANALYTES**

LOCATION	43-MA-SB02-02D	43-OA-SB04-01D	43-OA-SB05-02D
DATE SAMPLED	02/28/95	03/10/95	03/06/95
DEPTH	3-5"	1-3"	3-5"
UNITS	MG/KG	MG/KG	MG/KG
<b>TOTAL METALS</b>			
ALUMINUM, TOTAL	3160 J	4510 J	1070
ANTIMONY, TOTAL	3.4 UJ	4.5 UJ	4.4 UJ
ARSENIC, TOTAL	0.32 J	0.7	0.44 U
BARIUM, TOTAL	9.7	7.4	2.9 U
BERYLLIUM, TOTAL	0.15 U	0.2 U	0.19 U
CADMIUM, TOTAL	0.46 U	0.61 U	0.6 U
CALCIUM, TOTAL	84.7	26.8	137
CHROMIUM, TOTAL	4.6	5.7	1.8
COBALT, TOTAL	0.49 U	0.65 U	0.64 U
COPPER, TOTAL	0.44	0.48	0.41 U
IRON, TOTAL	822	3240	549
LEAD, TOTAL	4.6	3.5	1.7
MAGNESIUM, TOTAL	102	136	38.7 U
MANGANESE, TOTAL	3.1	3	2.5
MERCURY, TOTAL	0.11 U	0.37	0.09 U
NICKEL, TOTAL	2.8	2.4 U	2.3 U
POTASSIUM, TOTAL	112 U	175	147 U
SELENIUM, TOTAL	0.41 UJ	0.29 U	0.35 U
SILVER, TOTAL	0.49 U	0.65 U	0.64 U
SODIUM, TOTAL	21.3 U	18.3	9.5
THALLIUM, TOTAL	0.25 U	0.21 U	0.26 U
VANADIUM, TOTAL	5.1	7.6	2.6
ZINC, TOTAL	1.4	2	0.82 U

**GROUNDWATER**

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**SITE 43, AGAN STREET DUMP**  
**GROUNDWATER - DUPLICATE SUMMARY**  
**REMEDIAL INVESTIGATION, CTO-0303**  
**MCB, CAMP LEJEUNE, NORTH CAROLINA**  
**TCL ORGANICS**

LOCATION	43-GW01-01D	43-GW01DW-00D
DATE SAMPLED	04/04/95	02/28/95
UNITS	UG/L	UG/KG
<b>VOLATILES</b>		
CHLOROMETHANE	10 U	12 U
BROMOMETHANE	10 U	12 U
VINYL CHLORIDE	10 U	12 U
CHLOROETHANE	10 U	12 U
METHYLENE CHLORIDE	10 U	12 U
ACETONE	10 U	12 U
CARBON DISULFIDE	10 U	12 U
1,1-DICHLOROETHENE	10 U	12 U
1,1-DICHLOROETHANE	10 U	12 U
1,2-DICHLOROETHENE (TOTAL)	10 U	12 U
CHLOROFORM	10 U	12 U
1,2-DICHLOROETHANE	10 U	12 U
2-BUTANONE	10 U	12 U
1,1,1-TRICHLOROETHANE	10 U	12 U
CARBON TETRACHLORIDE	10 U	12 U
BROMODICHLOROMETHANE	10 U	12 U
1,2-DICHLOROPROPANE	10 U	12 U
CIS-1,3-DICHLOROPROPENE	10 U	12 U
TRICHLOROETHENE	10 U	12 U
DIBROMOCHLOROMETHANE	10 U	12 U
1,1,2-TRICHLOROETHANE	10 U	12 U
BENZENE	10 U	12 U
TRANS-1,3-DICHLOROPROPENE	10 U	12 U
BROMOFORM	10 U	12 U
4-METHYL-2-PENTANONE	10 U	12 U
2-HEXANONE	10 U	12 U
TETRACHLOROETHENE	10 U	12 U
1,1,2,2-TETRACHLOROETHANE	10 U	12 U
TOLUENE	10 U	12 U
CHLOROBENZENE	10 U	12 U
ETHYLBENZENE	10 U	12 U
STYRENE	10 U	12 U
XYLENE (TOTAL)	10 U	12 U

**SITE 43, AGAN STREET DUMP  
GROUNDWATER - DUPLICATE SUMMARY  
REMEDIAL INVESTIGATION, CTO-0303  
MCB, CAMP LEJEUNE, NORTH CAROLINA  
TCL ORGANICS**

LOCATION	43-GW01-01D	43-GW01DW-00D
DATE SAMPLED	04/04/95	02/28/95
UNITS	UG/L	UG/KG
<b>SEMIVOLATILES</b>		
PHENOL	10 U	380 U
BIS(2-CHLOROETHYL)ETHER	10 U	380 U
2-CHLOROPHENOL	10 U	380 U
1,3-DICHLOROBENZENE	10 U	380 U
1,4-DICHLOROBENZENE	10 U	380 U
1,2-DICHLOROBENZENE	10 U	380 U
2-METHYLPHENOL	10 U	380 U
2,2'-OXYBIS(1-CHLOROPROPANE)	10 U	380 U
4-METHYLPHENOL	10 U	380 U
N-NITROSO-DI-N-PROPYLAMINE	10 U	380 U
HEXACHLOROETHANE	10 U	380 U
NITROBENZENE	10 U	380 U
ISOPHORONE	10 U	380 U
2-NITROPHENOL	10 U	380 U
2,4-DIMETHYLPHENOL	10 U	380 U
BIS(2-CHLOROETHOXY)METHANE	10 U	380 U
2,4-DICHLOROPHENOL	10 U	380 U
1,2,4-TRICHLOROBENZENE	10 U	380 U
NAPHTHALENE	10 U	380 U
4-CHLOROANILINE	10 U	380 U
HEXACHLOROBUTADIENE	10 U	380 U
4-CHLORO-3-METHYLPHENOL	10 U	380 U
2-METHYLNAPHTHALENE	10 U	380 U
HEXACHLOROCYCLOPENTADIENE	10 U	380 U
2,4,6-TRICHLOROPHENOL	10 U	380 U
2,4,5-TRICHLOROPHENOL	25 U	960 U
2-CHLORONAPHTHALENE	10 U	380 U
2-NITROANILINE	25 U	960 U
DIMETHYLPHTHALATE	10 U	380 U
ACENAPHTHYLENE	10 U	380 U
2,6-DINITROTOLUENE	10 U	380 U
3-NITROANILINE	25 U	960 U
ACENAPHTHENE	10 U	380 U
2,4-DINITROPHENOL	25 U	960 U

**SITE 43, AGAN STREET DUMP**  
**GROUNDWATER - DUPLICATE SUMMARY**  
**REMEDIAL INVESTIGATION, CTO-0303**  
**MCB, CAMP LEJEUNE, NORTH CAROLINA**  
**TCL ORGANICS**

LOCATION	43-GW01-01D	43-GW01DW-00D
DATE SAMPLED	04/04/95	02/28/95
UNITS	UG/L	UG/KG
<b>SEMIVOLATILES cont.</b>		
4-NITROPHENOL	25 U	960 U
DIBENZOFURAN	10 U	380 U
2,4-DINITROTOLUENE	10 U	380 U
DIETHYLPHTHALATE	10 U	380 U
4-CHLOROPHENYL-PHENYLETHER	10 U	380 U
FLUORENE	10 U	380 U
4-NITROANILINE	25 U	960 U
4,6-DINITRO-2-METHYLPHENOL	25 U	960 U
N-NITROSODIPHENYLAMINE (1)	10 U	380 U
4-BROMOPHENYL-PHENYLETHER	10 U	380 U
HEXACHLOROBENZENE	10 U	380 U
PENTACHLOROPHENOL	25 U	960 U
PHENANTHRENE	10 U	420
ANTHRACENE	10 U	380 U
CARBAZOLE	10 U	87 J
DI-N-BUTYLPHTHALATE	10 U	380 U
FLUORANTHENE	10 U	1100
PYRENE	10 U	1100
BUTYLBENZYLPHTHALATE	10 U	380 U
3,3'-DICHLOROBENZIDINE	10 U	380 U
BENZO(A)ANTHRACENE	10 U	520
CHRYSENE	10 U	1100
BIS(2-ETHYLHEXYL)PHTHALATE	10 U	430
DI-N-OCTYL PHTHALATE	10 U	380 U
BENZO(B)FLUORANTHENE	10 U	1400
BENZO(K)FLUORANTHENE	10 U	550
BENZO(A)PYRENE	10 U	830
INDENO(1,2,3-CD)PYRENE	10 U	810
DIBENZO(A,H)ANTHRACENE	10 U	160 J
BENZO(G,H,I)PERYLENE	10 U	780



**SITE 43, AGAN STREET DUMP  
GROUNDWATER - DUPLICATE SUMMARY  
REMEDIAL INVESTIGATION, CTO-0303  
MCB, CAMP LEJEUNE, NORTH CAROLINA  
TCL ORGANICS**

LOCATION	43-GW01-01D	43-GW01DW-00D
DATE SAMPLED	04/04/95	02/28/95
UNITS	UG/L	UG/KG
<b>PESTICIDE/PCBS</b>		
ALPHA-BHC	0.049 U	1.9 UJ
BETA-BHC	0.049 U	1.9 UJ
DELTA-BHC	0.049 U	1.9 UJ
GAMMA-BHC (LINDANE)	0.049 U	1.9 UJ
HEPTACHLOR	0.049 U	1.9 UJ
ALDRIN	0.049 U	1.9 UJ
HEPTACHLOR EPOXIDE	0.049 U	1.9 UJ
ENDOSULFAN I	0.049 U	1.9 UJ
DIELDRIN	0.098 U	3.8 UJ
4,4'-DDE	0.098 U	3.8 UJ
ENDRIN	0.098 U	3.8 UJ
ENDOSULFAN II	0.098 U	3.8 UJ
4,4'-DDD	0.098 U	3.8 UJ
ENDOSULFAN SULFATE	0.098 U	3.8 UJ
4,4'-DDT	0.098 U	3.8 UJ
METHOXYCHLOR	0.49 UJ	19 UJ
ENDRIN KETONE	0.098 U	3.8 UJ
ENDRIN ALDEHYDE	0.098 U	3.8 UJ
ALPHA-CHLORDANE	0.049 U	1.9 UJ
GAMMA-CHLORDANE	0.049 U	1.9 UJ
TOXAPHENE	4.9 U	190 UJ
AROCLOR-1016	0.98 U	38 UJ
AROCLOR-1221	2 U	76 UJ
AROCLOR-1232	0.98 U	38 UJ
AROCLOR-1242	0.98 U	38 UJ
AROCLOR-1248	0.98 U	38 UJ
AROCLOR-1254	0.98 U	38 UJ
AROCLOR-1260	0.98 U	38 UJ

**SITE 43, AGAN STREET DUMP**  
**GROUNDWATER - DUPLICATE SUMMARY**  
**REMEDIAL INVESTIGATION, CTO-0303**  
**MCB, CAMP LEJEUNE, NORTH CAROLINA**  
**INORGANIC ANALYTES**

LOCATION	43-GW01-01D	43-GW01DW-00D
DATE SAMPLED	04/04/95	02/28/95
UNITS	UG/L	MG/KG
<b>TOTAL METALS</b>		
ALUMINUM, TOTAL	342	1880 J
ANTIMONY, TOTAL	10.9 U	4.2 UJ
ARSENIC, TOTAL	1.3 U	0.61 J
BARIIUM, TOTAL	12.6	172
BERYLLIUM, TOTAL	0.3 U	0.18 U
CADMIUM, TOTAL	2.9 U	1.1
CALCIUM, TOTAL	64100	12200
CHROMIUM, TOTAL	4.7 U	6.7
CÓBALT, TOTAL	2.3 U	0.62 U
COPPER, TOTAL	61.9	3.7
IRON, TOTAL	215 J	1900
LEAD, TOTAL	1.4	81.5
MAGNESIUM, TOTAL	2000	200
MANGANESE, TOTAL	7.1	13.4
MERCURY, TOTAL	0.2 U	0.11 U
NICKEL, TOTAL	4.2 U	2.2 U
POTASSIUM, TOTAL	2470	140 U
SELENIUM, TOTAL	1.5 U	0.37 UJ
SILVER, TOTAL	2.5 U	0.62 U
SODIUM, TOTAL	5310	32.7 U
THALLIUM, TOTAL	1.1 U	0.23 U
VANADIUM, TOTAL	2.1 U	4.9
ZINC, TOTAL	12.2	39.3

**SURFACE WATER**

**SITE 43, AGAN STREET DUMP**  
**SURFACE WATER - DUPLICATE SUMMARY**  
**REMEDIAL INVESTIGATION, CTO-0303**  
**MCB, CAMP LEJEUNE, NORTH CAROLINA**  
**ORGANIC COMPOUNDS**

LOCATION                    43-EC-SW01D  
 DATE SAMPLED              05/03/95  
 UNITS                        UG/L

**VOLATILES**

CHLOROMETHANE	10 U
BROMOMETHANE	10 U
VINYL CHLORIDE	10 U
CHLOROETHANE	10 U
METHYLENE CHLORIDE	10 U
ACETONE	10 U
CARBON DISULFIDE	10 U
1,1-DICHLOROETHENE	10 U
1,1-DICHLOROETHANE	10 U
1,2-DICHLOROETHENE (TOTAL)	2 J
CHLOROFORM	10 U
1,2-DICHLOROETHANE	10 U
2-BUTANONE	10 U
1,1,1-TRICHLOROETHANE	10 U
CARBON TETRACHLORIDE	10 U
BROMODICHLOROMETHANE	10 U
1,2-DICHLOROPROPANE	10 U
CIS-1,3-DICHLOROPROPENE	10 U
TRICHLOROETHENE	10 U
DIBROMOCHLOROMETHANE	10 U
1,1,2-TRICHLOROETHANE	10 U
BENZENE	10 U
TRANS-1,3-DICHLOROPROPENE	10 U
BROMOFORM	10 U
4-METHYL-2-PENTANONE	10 U
2-HEXANONE	10 U
TETRACHLOROETHENE	10 U
1,1,2,2-TETRACHLOROETHANE	10 U
TOLUENE	10 U
CHLOROBENZENE	10 U
ETHYLBENZENE	10 U
STYRENE	10 U
XYLENE (TOTAL)	10 U

SITE 43, AGAN STREET DUMP  
SURFACE WATER - DUPLICATE SUMMARY  
REMEDIAL INVESTIGATION, CTO-0303  
MCB, CAMP LEJEUNE, NORTH CAROLINA  
ORGANIC COMPOUNDS

LOCATION 43-EC-SW01D  
DATE SAMPLED 05/03/95  
UNITS UG/L

SEMIVOLATILES

PHENOL	10 U
BIS(2-CHLOROETHYL)ETHER	10 U
2-CHLOROPHENOL	10 U
1,3-DICHLOROBENZENE	10 U
1,4-DICHLOROBENZENE	10 U
1,2-DICHLOROBENZENE	10 U
2-METHYLPHENOL	10 U
2,2'-OXYBIS(1-CHLOROPROPANE)	10 U
4-METHYLPHENOL	10 U
N-NITROSO-DI-N-PROPYLAMINE	10 U
HEXACHLOROETHANE	10 U
NITROBENZENE	10 U
ISOPHORONE	10 U
2-NITROPHENOL	10 U
2,4-DIMETHYLPHENOL	10 U
BIS(2-CHLOROETHOXY)METHANE	10 U
2,4-DICHLOROPHENOL	10 U
1,2,4-TRICHLOROBENZENE	10 U
NAPHTHALENE	10 U
4-CHLOROANILINE	10 U
HEXACHLOROBUTADIENE	10 U
4-CHLORO-3-METHYLPHENOL	10 U
2-METHYLNAPHTHALENE	10 U
HEXACHLOROCYCLOPENTADIENE	10 U
2,4,6-TRICHLOROPHENOL	10 U
2,4,5-TRICHLOROPHENOL	24 U
2-CHLORONAPHTHALENE	10 U
2-NITROANILINE	24 U
DIMETHYLPHTHALATE	10 U
ACENAPHTHYLENE	10 U
2,6-DINITROTOLUENE	10 U
3-NITROANILINE	24 U
ACENAPHTHENE	10 U
2,4-DINITROPHENOL	24 U

**SITE 43, AGAN STREET DUMP**  
**SURFACE WATER - DUPLICATE SUMMARY**  
**REMEDIAL INVESTIGATION, CTO-0303**  
**MCB, CAMP LEJEUNE, NORTH CAROLINA**  
**ORGANIC COMPOUNDS**

LOCATION	43-EC-SW01D
DATE SAMPLED	05/03/95
UNITS	UG/L

**SEMIVOLATILES cont.**

4-NITROPHENOL	24 U
DIBENZOFURAN	10 U
2,4-DINITROTOLUENE	10 U
DIETHYLPHTHALATE	10 U
4-CHLOROPHENYL-PHENYLEETHER	10 U
FLUORENE	10 U
4-NITROANILINE	24 U
4,6-DINITRO-2-METHYLPHENOL	24 U
N-NITROSODIPHENYLAMINE (1)	10 U
4-BROMOPHENYL-PHENYLEETHER	10 U
HEXACHLOROBENZENE	10 U
PENTACHLOROPHENOL	24 U
PHENANTHRENE	10 U
ANTHRACENE	10 U
CARBAZOLE	10 U
DI-N-BUTYLPHTHALATE	10 U
FLUORANTHENE	10 U
PYRENE	10 U
BUTYLBENZYLPHTHALATE	10 U
3,3'-DICHLOROBENZIDINE	10 U
BENZO(A)ANTHRACENE	10 U
CHRYSENE	10 U
BIS(2-ETHYLHEXYL)PHTHALATE	10 U
DI-N-OCTYL PHTHALATE	10 U
BENZO(B)FLUORANTHENE	10 U
BENZO(K)FLUORANTHENE	10 U
BENZO(A)PYRENE	10 U
INDENO(1,2,3-CD)PYRENE	10 U
DIBENZO(A,H)ANTHRACENE	10 U
BENZO(G,H,I)PERYLENE	10 U

SITE 43, AGAN STREET DUMP  
SURFACE WATER - DUPLICATE SUMMARY  
REMEDIAL INVESTIGATION, CTO-0303  
MCB, CAMP LEJEUNE, NORTH CAROLINA  
ORGANIC COMPOUNDS

LOCATION	43-EC-SW01D
DATE SAMPLED	05/03/95
UNITS	UG/L

**PESTICIDE/PCBS**

ALPHA-BHC	0.046 UJ
BETA-BHC	0.046 UJ
DELTA-BHC	0.046 UJ
GAMMA-BHC (LINDANE)	0.046 UJ
HEPTACHLOR	0.046 UJ
ALDRIN	0.046 UJ
HEPTACHLOR EPOXIDE	0.046 UJ
ENDOSULFAN I	0.046 UJ
DIELDRIN	0.093 UJ
4,4'-DDE	0.093 UJ
ENDRIN	0.093 UJ
ENDOSULFAN II	0.093 UJ
4,4'-DDD	0.14 J
ENDOSULFAN SULFATE	0.093 UJ
4,4'-DDT	0.093 UJ
METHOXYCHLOR	0.46 UJ
ENDRIN KETONE	0.093 UJ
ENDRIN ALDEHYDE	0.093 UJ
ALPHA-CHLORDANE	0.046 UJ
GAMMA-CHLORDANE	0.046 UJ
TOXAPHENE	4.6 UJ
AROCLOR-1016	0.93 UJ
AROCLOR-1221	1.9 UJ
AROCLOR-1232	0.93 UJ
AROCLOR-1242	0.93 UJ
AROCLOR-1248	0.93 UJ
AROCLOR-1254	0.93 UJ
AROCLOR-1260	0.93 UJ

SITE 43, AGAN STREET DUMP  
SURFACE WATER - DUPLICATE SUMMARY  
REMEDIAL INVESTIGATION, CTO-0303  
MCB, CAMP LEJEUNE, NORTH CAROLINA  
INORGANIC ANALYTES

LOCATION 43-EC-SW01D  
DATE SAMPLED 05/03/95  
UNITS UG/L

**TOTAL METALS**

ALUMINUM, TOTAL	962
ANTIMONY, TOTAL	20.8 U
ARSENIC, TOTAL	1.7 UJ
BARIIUM, TOTAL	35.5
BERYLLIUM, TOTAL	0.8 U
CADMIUM, TOTAL	3 U
CALCIUM, TOTAL	89100
CHROMIUM, TOTAL	4.1 U
COBALT, TOTAL	3.4 U
COPPER, TOTAL	4.3
IRON, TOTAL	1210 J
LEAD, TOTAL	5.7 J
MAGNESIUM, TOTAL	156000
MANGANESE, TOTAL	54.2
MERCURY, TOTAL	0.2 U
NICKEL, TOTAL	10.9 U
POTASSIUM, TOTAL	52100 J
SELENIUM, TOTAL	1.8 UJ
SILVER, TOTAL	2.8 U
SODIUM, TOTAL	1320000
THALLIUM, TOTAL	0.7 UJ
VANADIUM, TOTAL	2 U
ZINC, TOTAL	18.1 U



SITE 43, AGAN STREET DUMP  
SURFACE WATER - DUPLICATE SUMMARY  
REMEDIAL INVESTIGATION, CTO-0303  
MCB, CAMP LEJEUNE, NORTH CAROLINA  
DISSOLVED INORGANIC ANALYTES

LOCATION 43-EC-DSW01D  
DATE SAMPLED 05/03/95  
UNITS UG/L

DISSOLVED METALS

ALUMINUM, SOLUBLE	46.8 U
ANTIMONY, SOLUBLE	20.8 U
ARSENIC, SOLUBLE	1.7 U
BARIUM, SOLUBLE	31.1
BERYLLIUM, SOLUBLE	1.9 U
CADMIUM, SOLUBLE	4.9 U
CALCIUM, SOLUBLE	87600
CHROMIUM, SOLUBLE	4.1 U
COBALT, SOLUBLE	3.4 U
COPPER, SOLUBLE	1.8 U
IRON, SOLUBLE	101 U
LEAD, SOLUBLE	0.8 UJ
MAGNESIUM, SOLUBLE	153000
MANGANESE, SOLUBLE	26.8
MERCURY, SOLUBLE	0.2 U
NICKEL, SOLUBLE	10.9 U
POTASSIUM, SOLUBLE	50300 J
SELENIUM, SOLUBLE	1.8 UJ
SILVER, SOLUBLE	2.8 U
SODIUM, SOLUBLE	1290000
THALLIUM, SOLUBLE	0.7 UJ
VANADIUM, SOLUBLE	2 U
ZINC, SOLUBLE	6 U

**SEDIMENT**

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**SITE 43, AGAN STREET DUMP**  
**SEDIMENT - DUPLICATE SUMMARY**  
**REMEDIAL INVESTIGATION, CTO-0303**  
**MCB, CAMP LEJEUNE, NORTH CAROLINA**  
**TCL ORGANICS**

LOCATION 43-SHC-SD04-06D  
 DATE SAMPLED 05/05/95  
 UNITS UG/KG

**VOLATILES**

CHLOROMETHANE	54 U
BROMOMETHANE	54 U
VINYL CHLORIDE	54 U
CHLOROETHANE	54 U
METHYLENE CHLORIDE	54 U
ACETONE	54 U
CARBON DISULFIDE	54 U
1,1-DICHLOROETHENE	54 U
1,1-DICHLOROETHANE	54 U
1,2-DICHLOROETHENE (TOTAL)	54 U
CHLOROFORM	54 U
1,2-DICHLOROETHANE	54 U
2-BUTANONE	54 U
1,1,1-TRICHLOROETHANE	54 U
CARBON TETRACHLORIDE	54 U
BROMODICHLOROMETHANE	54 U
1,2-DICHLOROPROPANE	54 U
CIS-1,3-DICHLOROPROPENE	54 U
TRICHLOROETHENE	54 U
DIBROMOCHLOROMETHANE	54 U
1,1,2-TRICHLOROETHANE	54 U
BENZENE	54 U
TRANS-1,3-DICHLOROPROPENE	54 U
BROMOFORM	54 U
4-METHYL-2-PENTANONE	54 U
2-HEXANONE	54 UJ
TETRACHLOROETHENE	54 U
1,1,2,2-TETRACHLOROETHANE	54 U
TOLUENE	54 U
CHLOROBENZENE	54 U
ETHYLBENZENE	54 U
STYRENE	54 U
XYLENE (TOTAL)	54 U

**SITE 43, AGAN STREET DUMP**  
**SEDIMENT - DUPLICATE SUMMARY**  
**REMEDIAL INVESTIGATION, CTO-0303**  
**MCB, CAMP LEJEUNE, NORTH CAROLINA**  
**TCL ORGANICS**

LOCATION 43-SHC-SD04-06D  
 DATE SAMPLED 05/05/95  
 UNITS UG/KG

**SEMIVOLATILES**

PHENOL	1800 U
BIS(2-CHLOROETHYL)ETHER	1800 U
2-CHLOROPHENOL	1800 U
1,3-DICHLOROBENZENE	1800 U
1,4-DICHLOROBENZENE	1800 U
1,2-DICHLOROBENZENE	1800 U
2-METHYLPHENOL	1800 U
2,2'-OXYBIS(1-CHLOROPROPANE)	1800 U
4-METHYLPHENOL	1800 U
N-NITROSO-DI-N-PROPYLAMINE	1800 U
HEXACHLOROETHANE	1800 U
NITROBENZENE	1800 U
ISOPHORONE	1800 U
2-NITROPHENOL	1800 U
2,4-DIMETHYLPHENOL	1800 U
BIS(2-CHLOROETHOXY)METHANE	1800 U
2,4-DICHLOROPHENOL	1800 U
1,2,4-TRICHLOROBENZENE	1800 U
NAPHTHALENE	1800 U
4-CHLOROANILINE	1800 U
HEXACHLOROBUTADIENE	1800 U
4-CHLORO-3-METHYLPHENOL	1800 U
2-METHYLNAPHTHALENE	1800 U
HEXACHLOROCYCLOPENTADIENE	1800 U
2,4,6-TRICHLOROPHENOL	1800 U
2,4,5-TRICHLOROPHENOL	4500 U
2-CHLORONAPHTHALENE	1800 U
2-NITROANILINE	4500 U
DIMETHYLPHTHALATE	1800 U
ACENAPHTHYLENE	1800 U
2,6-DINITROTOLUENE	1800 U
3-NITROANILINE	4500 U
ACENAPHTHENE	1800 U
2,4-DINITROPHENOL	4500 U

**SITE 43, AGAN STREET DUMP**  
**SEDIMENT - DUPLICATE SUMMARY**  
**REMEDIAL INVESTIGATION, CTO-0303**  
**MCB, CAMP LEJEUNE, NORTH CAROLINA**  
**TCL ORGANICS**

LOCATION 43-SHC-SD04-06D  
 DATE SAMPLED 05/05/95  
 UNITS UG/KG

**SEMIVOLATILES cont.**

4-NITROPHENOL	4500 U
DIBENZOFURAN	1800 U
2,4-DINITROTOLUENE	1800 U
DIETHYLPHTHALATE	1800 U
4-CHLOROPHENYL-PHENYLEETHER	1800 U
FLUORENE	1800 U
4-NITROANILINE	4500 U
4,6-DINITRO-2-METHYLPHENOL	4500 U
N-NITROSODIPHENYLAMINE (1)	1800 U
4-BROMOPHENYL-PHENYLEETHER	1800 U
HEXACHLOROBENZENE	1800 U
PENTACHLOROPHENOL	4500 U
PHENANTHRENE	1800 U
ANTHRACENE	1800 U
CARBAZOLE	1800 U
DI-N-BUTYLPHTHALATE	1800 U
FLUORANTHENE	1800 U
PYRENE	1800 U
BUTYLBENZYLPHTHALATE	1800 U
3,3'-DICHLOROBENZIDINE	1800 U
BENZO(A)ANTHRACENE	1800 U
CHRYSENE	1800 U
BIS(2-ETHYLHEXYL)PHTHALATE	400 J
DI-N-OCTYL PHTHALATE	1800 U
BENZO(B)FLUORANTHENE	1800 U
BENZO(K)FLUORANTHENE	1800 U
BENZO(A)PYRENE	1800 U
INDENO(1,2,3-CD)PYRENE	1800 U
DIBENZO(A,H)ANTHRACENE	1800 U
BENZO(G,H,I)PERYLENE	1800 U

**SITE 43, AGAN STREET DUMP  
SEDIMENT - DUPLICATE SUMMARY  
REMEDIAL INVESTIGATION, CTO-0303  
MCB, CAMP LEJEUNE, NORTH CAROLINA  
TCL ORGANICS**

LOCATION 43-SHC-SD04-06D  
DATE SAMPLED 05/05/95  
UNITS UG/KG

**PESTICIDE/PCBS**

ALPHA-BHC	8.9 R
BETA-BHC	8.9 R
DELTA-BHC	8.9 R
GAMMA-BHC (LINDANE)	8.9 R
HEPTACHLOR	8.9 R
ALDRIN	8.9 R
HEPTACHLOR EPOXIDE	8.9 R
ENDOSULFAN I	8.9 R
DIELDRIN	18 R
4,4'-DDE	7000 J
ENDRIN	69 J
ENDOSULFAN II	18 R
4,4'-DDD	38000 J
ENDOSULFAN SULFATE	18 R
4,4'-DDT	64 J
METHOXYCHLOR	89 R
ENDRIN KETONE	18 R
ENDRIN ALDEHYDE	18 R
ALPHA-CHLORDANE	11 J
GAMMA-CHLORDANE	18 J
TOXAPHENE	890 R
AROCLOR-1016	180 R
AROCLOR-1221	350 R
AROCLOR-1232	180 R
AROCLOR-1242	180 R
AROCLOR-1248	180 R
AROCLOR-1254	180 R
AROCLOR-1260	180 R

SITE 43, AGAN STREET DUMP  
SEDIMENT - DUPLICATE SUMMARY  
REMEDIAL INVESTIGATION, CTO-0303  
MCB, CAMP LEJEUNE, NORTH CAROLINA  
INORGANIC ANALYTES

LOCATION 43-SHC-SD04-06D  
DATE SAMPLED 05/05/95  
UNITS MG/KG

TOTAL METALS

ALUMINUM, TOTAL	14300
ANTIMONY, TOTAL	12.1 UJ
ARSENIC, TOTAL	2.8 J
BIARIUM, TOTAL	32.7
BERYLLIUM, TOTAL	0.3 U
CADMIUM, TOTAL	3.9 U
CALCIUM, TOTAL	7520
CHROMIUM, TOTAL	19.6
COBALT, TOTAL	2.5
COPPER, TOTAL	33.5
IRON, TOTAL	11400
LEAD, TOTAL	103
MAGNESIUM, TOTAL	5000
MANGANESE, TOTAL	32.4
MERCURY, TOTAL	0.54 U
NICKEL, TOTAL	10.4
POTASSIUM, TOTAL	1070
SELENIUM, TOTAL	2.3
SILVER, TOTAL	1.9 U
SODIUM, TOTAL	8340
THALLIUM, TOTAL	0.63 U
VANADIUM, TOTAL	41.4
ZINC, TOTAL	148

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

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**SOIL**

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**SITE 43, AGAN STREET DUMP**  
**SOIL QA/QC - FREQUENCY OF DETECTION SUMMARY**  
**REMEDIAL INVESTIGATION, CTO-0303**  
**MCB, CAMP LEJEUNE, NORTH CAROLINA**  
**ORGANIC COMPOUNDS**

SAMPLE	303-FB-01	303-TB-07	303-TB-08	303-TB-09	303-TB-13	303-TB-14
DATE SAMPLED	02/28/95	02/28/95	02/28/95	03/07/95	03/10/95	03/11/95
UNITS	UG/L	UG/L	UG/L	UG/L	UG/L	UG/L
<b>VOLATILES</b>						
CHLOROMETHANE	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
VINYL CHLORIDE	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
METHYLENE CHLORIDE	10 U	10 U	10 U	10 U	10 U	10 U
ACETONE	10 U	24 J	23 J	10 U	16 U	16 U
CARBON DISULFIDE	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
1,1-DICHLOROETHANE	10 U	10 U	10 U	10 U	10 U	10 U
1,2-DICHLOROETHENE (TOTAL)	10 U	10 U	10 U	10 U	10 U	10 U
CHLOROFORM	13	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
2-BUTANONE	10 U	18	18	23	32	29
1,1,1-TRICHLOROETHANE	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
BROMODICHLOROMETHANE	13	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
CIS-1,3-DICHLOROPROPENE	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
DIBROMOCHLOROMETHANE	10	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
BENZENE	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
BROMOFORM	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
2-HEXANONE	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
1,1,2,2-TETRACHLOROETHANE	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
CHLOROBENZENE	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
STYRENE	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

SITE 43, AGAN STREET DUMP  
 SOIL QA/QC - FREQUENCY OF DETECTION SUMMARY  
 REMEDIAL INVESTIGATION, CTO-0303  
 MCB, CAMP LEJEUNE, NORTH CAROLINA  
 ORGANIC COMPOUNDS

SAMPLE	303-FB-01	303-TB-07	303-TB-08	303-TB-09	303-TB-13	303-TB-14
DATE SAMPLED	02/28/95	02/28/95	02/28/95	03/07/95	03/10/95	03/11/95
UNITS	UG/L	UG/L	UG/L	UG/L	UG/L	UG/L
<b>SEMIVOLATILES</b>						
PHENOL	11 U	NA	NA	NA	NA	NA
BIS(2-CHLOROETHYL)ETHER	11 U	NA	NA	NA	NA	NA
2-CHLOROPHENOL	11 U	NA	NA	NA	NA	NA
1,3-DICHLOROBENZENE	11 U	NA	NA	NA	NA	NA
1,4-DICHLOROBENZENE	11 U	NA	NA	NA	NA	NA
1,2-DICHLOROBENZENE	11 U	NA	NA	NA	NA	NA
2-METHYLPHENOL	11 U	NA	NA	NA	NA	NA
2,2'-OXYBIS(1-CHLOROPROPANE)	11 U	NA	NA	NA	NA	NA
4-METHYLPHENOL	11 U	NA	NA	NA	NA	NA
N-NITROSO-DI-N-PROPYLAMINE	11 U	NA	NA	NA	NA	NA
HEXACHLOROETHANE	11 U	NA	NA	NA	NA	NA
NITROBENZENE	11 U	NA	NA	NA	NA	NA
ISOPHORONE	11 U	NA	NA	NA	NA	NA
2-NITROPHENOL	11 U	NA	NA	NA	NA	NA
2,4-DIMETHYLPHENOL	11 U	NA	NA	NA	NA	NA
BIS(2-CHLOROETHOXY)METHANE	11 U	NA	NA	NA	NA	NA
2,4-DICHLOROPHENOL	11 U	NA	NA	NA	NA	NA
1,2,4-TRICHLOROBENZENE	11 U	NA	NA	NA	NA	NA
NAPHTHALENE	11 U	NA	NA	NA	NA	NA
4-CHLOROANILINE	11 U	NA	NA	NA	NA	NA
HEXACHLOROBUTADIENE	11 U	NA	NA	NA	NA	NA
4-CHLORO-3-METHYLPHENOL	11 U	NA	NA	NA	NA	NA
2-METHYLNAPHTHALENE	11 U	NA	NA	NA	NA	NA
HEXACHLOROCYCLOPENTADIENE	11 U	NA	NA	NA	NA	NA
2,4,6-TRICHLOROPHENOL	11 U	NA	NA	NA	NA	NA
2,4,5-TRICHLOROPHENOL	27 U	NA	NA	NA	NA	NA
2-CHLORONAPHTHALENE	11 U	NA	NA	NA	NA	NA
2-NITROANILINE	27 U	NA	NA	NA	NA	NA
DIMETHYLPHTHALATE	11 U	NA	NA	NA	NA	NA
ACENAPHTHYLENE	11 U	NA	NA	NA	NA	NA
2,6-DINITROTOLUENE	11 U	NA	NA	NA	NA	NA
3-NITROANILINE	27 U	NA	NA	NA	NA	NA
ACENAPHTHENE	11 U	NA	NA	NA	NA	NA
2,4-DINITROPHENOL	27 U	NA	NA	NA	NA	NA

SITE 43, AGAN STREET DUMP  
 SOIL QA/QC - FREQUENCY OF DETECTION SUMMARY  
 REMEDIAL INVESTIGATION, CTO-0303  
 MCB, CAMP LEJEUNE, NORTH CAROLINA  
 ORGANIC COMPOUNDS

SAMPLE	303-FB-01	303-TB-07	303-TB-08	303-TB-09	303-TB-13	303-TB-14
DATE SAMPLED	02/28/95	02/28/95	02/28/95	03/07/95	03/10/95	03/11/95
UNITS	UG/L	UG/L	UG/L	UG/L	UG/L	UG/L
<b>SEMIVOLATILES cont.</b>						
4-NITROPHENOL	27 U	NA	NA	NA	NA	NA
DIBENZOFURAN	11 U	NA	NA	NA	NA	NA
2,4-DINITROTOLUENE	11 U	NA	NA	NA	NA	NA
DIETHYLPHTHALATE	11 U	NA	NA	NA	NA	NA
4-CHLOROPHENYL-PHENYLETHER	11 U	NA	NA	NA	NA	NA
FLUORENE	11 U	NA	NA	NA	NA	NA
4-NITROANILINE	27 U	NA	NA	NA	NA	NA
4,6-DINITRO-2-METHYLPHENOL	27 U	NA	NA	NA	NA	NA
N-NITROSODIPHENYLAMINE (1)	11 U	NA	NA	NA	NA	NA
4-BROMOPHENYL-PHENYLETHER	11 U	NA	NA	NA	NA	NA
HEXACHLOROBENZENE	11 U	NA	NA	NA	NA	NA
PENTACHLOROPHENOL	27 U	NA	NA	NA	NA	NA
PHENANTHRENE	11 U	NA	NA	NA	NA	NA
ANTHRACENE	11 U	NA	NA	NA	NA	NA
CARBAZOLE	11 U	NA	NA	NA	NA	NA
DI-N-BUTYLPHTHALATE	11 U	NA	NA	NA	NA	NA
FLUORANTHENE	11 U	NA	NA	NA	NA	NA
PYRENE	11 U	NA	NA	NA	NA	NA
BUTYLBENZYLPHTHALATE	11 U	NA	NA	NA	NA	NA
3,3'-DICHLOROBENZIDINE	11 U	NA	NA	NA	NA	NA
BENZO(A)ANTHRACENE	11 U	NA	NA	NA	NA	NA
CHRYSENE	11 U	NA	NA	NA	NA	NA
BIS(2-ETHYLHEXYL)PHTHALATE	11 U	NA	NA	NA	NA	NA
DI-N-OCTYL PHTHALATE	11 U	NA	NA	NA	NA	NA
BENZO(B)FLUORANTHENE	11 U	NA	NA	NA	NA	NA
BENZO(K)FLUORANTHENE	11 U	NA	NA	NA	NA	NA
BENZO(A)PYRENE	11 U	NA	NA	NA	NA	NA
INDENO(1,2,3-CD)PYRENE	11 U	NA	NA	NA	NA	NA
DIBENZO(A,H)ANTHRACENE	11 U	NA	NA	NA	NA	NA
BENZO(G,H,I)PERYLENE	11 U	NA	NA	NA	NA	NA

**SITE 43, AGAN STREET DUMP**  
**SOIL QA/QC - FREQUENCY OF DETECTION SUMMARY**  
**REMEDIAL INVESTIGATION, CTO-0303**  
**MCB, CAMP LEJEUNE, NORTH CAROLINA**  
**ORGANIC COMPOUNDS**

SAMPLE	303-FB-01	303-TB-07	303-TB-08	303-TB-09	303-TB-13	303-TB-14
DATE SAMPLED	02/28/95	02/28/95	02/28/95	03/07/95	03/10/95	03/11/95
UNITS	UG/L	UG/L	UG/L	UG/L	UG/L	UG/L
<b>PESTICIDE/PCBS</b>						
ALPHA-BHC	0.052 U	NA	NA	NA	NA	NA
BETA-BHC	0.052 U	NA	NA	NA	NA	NA
DELTA-BHC	0.052 U	NA	NA	NA	NA	NA
GAMMA-BHC (LINDANE)	0.052 U	NA	NA	NA	NA	NA
HEPTACHLOR	0.052 U	NA	NA	NA	NA	NA
ALDRIN	0.052 U	NA	NA	NA	NA	NA
HEPTACHLOR EPOXIDE	0.052 U	NA	NA	NA	NA	NA
ENDOSULFAN I	0.052 U	NA	NA	NA	NA	NA
DIELDRIN	0.1 U	NA	NA	NA	NA	NA
4,4'-DDE	0.1 U	NA	NA	NA	NA	NA
ENDRIN	0.1 U	NA	NA	NA	NA	NA
ENDOSULFAN II	0.1 U	NA	NA	NA	NA	NA
4,4'-DDD	0.1 U	NA	NA	NA	NA	NA
ENDOSULFAN SULFATE	0.1 U	NA	NA	NA	NA	NA
4,4'-DDT	0.1 U	NA	NA	NA	NA	NA
METHOXYCHLOR	0.52 U	NA	NA	NA	NA	NA
ENDRIN KETONE	0.1 U	NA	NA	NA	NA	NA
ENDRIN ALDEHYDE	0.1 U	NA	NA	NA	NA	NA
ALPHA-CHLORDANE	0.052 U	NA	NA	NA	NA	NA
GAMMA-CHLORDANE	0.052 U	NA	NA	NA	NA	NA
TOXAPHENE	5.2 U	NA	NA	NA	NA	NA
AROCLOR-1016	1 U	NA	NA	NA	NA	NA
AROCLOR-1221	2.1 U	NA	NA	NA	NA	NA
AROCLOR-1232	1 U	NA	NA	NA	NA	NA
AROCLOR-1242	1 U	NA	NA	NA	NA	NA
AROCLOR-1248	1 U	NA	NA	NA	NA	NA
AROCLOR-1254	1 U	NA	NA	NA	NA	NA
AROCLOR-1260	1 U	NA	NA	NA	NA	NA

**SITE 43, AGAN STREET DUMP**  
**SOIL QA/QC - FREQUENCY OF DETECTION SUMMARY**  
**REMEDIATION INVESTIGATION, CTO-0303**  
**MCB, CAMP LEJEUNE, NORTH CAROLINA**  
**ORGANIC COMPOUNDS**

SAMPLE	303-TB-15	303-TB-17	303-TB-42	43-SIER-01	43-SIER-03
DATE SAMPLED	03/13/95	03/14/95	05/01/95	02/28/95	03/10/95
UNITS	UG/L	UG/L	UG/L	UG/L	UG/L
<b>VOLATILES</b>					
CHLOROMETHANE	10 U	10 U	10 U	10 U	10 U
BROMOMETHANE	10 U	10 U	10 U	10 U	10 U
VINYL CHLORIDE	10 U	10 U	10 U	10 U	10 U
CHLOROETHANE	10 U	10 U	10 U	10 U	10 U
METHYLENE CHLORIDE	10 U	10 U	10 U	10 U	10 U
ACETONE	17 U	17 U	10 U	10 U	10 U
CARBON DISULFIDE	10 U	10 U	10 U	10 U	10 U
1,1-DICHLOROETHENE	10 U	10 U	10 U	10 U	10 U
1,1-DICHLOROETHANE	10 U	10 U	10 U	10 U	10 U
1,2-DICHLOROETHENE (TOTAL)	10 U	10 U	10 U	10 U	10 U
CHLOROFORM	10 U	10 U	10 U	10 U	4 J
1,2-DICHLOROETHANE	10 U	10 U	10 U	10 U	10 U
2-BUTANONE	28 J	29 J	10 U	10 U	10 U
1,1,1-TRICHLOROETHANE	10 U	10 U	10 U	10 U	10 U
CARBON TETRACHLORIDE	10 U	10 U	10 U	10 U	10 U
BROMODICHLOROMETHANE	10 U	10 U	10 U	10 U	10 U
1,2-DICHLOROPROPANE	10 U	10 U	10 U	10 U	10 U
CIS-1,3-DICHLOROPROPENE	10 U	10 U	10 U	10 U	10 U
TRICHLOROETHENE	10 U	10 U	10 U	10 U	10 U
DIBROMOCHLOROMETHANE	10 U	10 U	10 U	10 U	10 U
1,1,2-TRICHLOROETHANE	10 U	10 U	10 U	10 U	10 U
BENZENE	10 U	10 U	10 U	10 U	10 U
TRANS-1,3-DICHLOROPROPENE	10 U	10 U	10 U	10 U	10 U
BROMOFORM	10 U	10 U	10 U	10 U	10 U
4-METHYL-2-PENTANONE	10 U	10 U	10 U	10 U	10 U
2-HEXANONE	10 U	10 U	10 U	10 U	10 U
TETRACHLOROETHENE	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
TOLUENE	10 U	10 U	10 U	10 U	10 U
CHLOROBENZENE	10 U	10 U	10 U	10 U	10 U
ETHYL.BENZENE	10 U	10 U	10 U	10 U	10 U
STYRENE	10 U	10 U	10 U	10 U	10 U
XYLENE (TOTAL)	10 U	10 U	10 U	10 U	10 U

SITE 43, AGAN STREET DUMP  
 SOIL QA/QC - FREQUENCY OF DETECTION SUMMARY  
 REMEDIAL INVESTIGATION, CTO-0303  
 MCB, CAMP LEJEUNE, NORTH CAROLINA  
 ORGANIC COMPOUNDS

SAMPLE	303-TB-15	303-TB-17	303-TB-42	43-SIER-01	43-SIER-03
DATE SAMPLED	03/13/95	03/14/95	05/01/95	02/28/95	03/10/95
UNITS	UG/L	UG/L	UG/L	UG/L	UG/L
<b>SEMIVOLATILES</b>					
PHENOL	NA	NA	NA	10 U	9 UJ
BIS(2-CHLOROETHYL)ETHER	NA	NA	NA	10 U	9 UJ
2-CHLOROPHENOL	NA	NA	NA	10 U	9 UJ
1,3-DICHLOROBENZENE	NA	NA	NA	10 U	9 UJ
1,4-DICHLOROBENZENE	NA	NA	NA	10 U	9 UJ
1,2-DICHLOROBENZENE	NA	NA	NA	10 U	9 UJ
2-METHYLPHENOL	NA	NA	NA	10 U	9 UJ
2,2'-OXYBIS(1-CHLOROPROPANE)	NA	NA	NA	10 U	9 UJ
4-METHYLPHENOL	NA	NA	NA	10 U	9 UJ
N-NITROSO-DI-N-PROPYLAMINE	NA	NA	NA	10 U	9 UJ
HEXACHLOROETHANE	NA	NA	NA	10 U	9 UJ
NITROBENZENE	NA	NA	NA	10 U	9 U
ISOPHORONE	NA	NA	NA	10 U	9 U
2-NITROPHENOL	NA	NA	NA	10 U	9 U
2,4-DIMETHYLPHENOL	NA	NA	NA	10 U	9 U
BIS(2-CHLOROETHOXY)METHANE	NA	NA	NA	10 U	9 U
2,4-DICHLOROPHENOL	NA	NA	NA	10 U	9 U
1,2,4-TRICHLOROBENZENE	NA	NA	NA	10 U	9 U
NAPHTHALENE	NA	NA	NA	10 U	9 U
4-CHLOROANILINE	NA	NA	NA	10 U	9 U
HEXACHLOROBUTADIENE	NA	NA	NA	10 U	9 U
4-CHLORO-3-METHYLPHENOL	NA	NA	NA	10 U	9 U
2-METHYLNAPHTHALENE	NA	NA	NA	10 U	9 U
HEXACHLOROCYCLOPENTADIENE	NA	NA	NA	10 U	9 U
2,4,6-TRICHLOROPHENOL	NA	NA	NA	10 U	9 U
2,4,5-TRICHLOROPHENOL	NA	NA	NA	26 U	24 U
2-CHLORONAPHTHALENE	NA	NA	NA	10 U	9 U
2-NITROANILINE	NA	NA	NA	26 U	24 U
DIMETHYLPHTHALATE	NA	NA	NA	10 U	9 U
ACENAPHTHYLENE	NA	NA	NA	10 U	9 U
2,6-DINITROTOLUENE	NA	NA	NA	10 U	9 U
3-NITROANILINE	NA	NA	NA	26 U	24 U
ACENAPHTHENE	NA	NA	NA	10 U	9 U
2,4-DINITROPHENOL	NA	NA	NA	26 U	24 U

**SITE 43, AGAN STREET DUMP**  
**SOIL QA/QC - FREQUENCY OF DETECTION SUMMARY**  
**REMEDIAL INVESTIGATION, CTO-0303**  
**MCB, CAMP LEJEUNE, NORTH CAROLINA**  
**ORGANIC COMPOUNDS**

SAMPLE	303-TB-15	303-TB-17	303-TB-42	43-SIER-01	43-SIER-03
DATE SAMPLED	03/13/95	03/14/95	05/01/95	02/28/95	03/10/95
UNITS	UG/L	UG/L	UG/L	UG/L	UG/L
<b>SEMIVOLATILES cont.</b>					
4-NITROPHENOL	NA	NA	NA	26 U	24 U
DIBENZOFURAN	NA	NA	NA	10 U	9 U
2,4-DINITROTOLUENE	NA	NA	NA	10 U	9 U
DIETHYLPHTHALATE	NA	NA	NA	10 U	9 U
4-CHLOROPHENYL-PHENYLEETHER	NA	NA	NA	10 U	9 U
FLUORENE	NA	NA	NA	10 U	9 U
4-NITROANILINE	NA	NA	NA	26 U	24 U
4,6-DINITRO-2-METHYLPHENOL	NA	NA	NA	26 U	24 U
N-NITROSODIPHENYLAMINE (1)	NA	NA	NA	10 U	9 U
4-BROMOPHENYL-PHENYLEETHER	NA	NA	NA	10 U	9 U
HEXACHLOROBENZENE	NA	NA	NA	10 U	9 U
PENTACHLOROPHENOL	NA	NA	NA	26 U	24 U
PHENANTHRENE	NA	NA	NA	10 U	9 U
ANTHRACENE	NA	NA	NA	10 U	9 U
CARBAZOLE	NA	NA	NA	10 U	9 U
DI-N-BUTYLPHTHALATE	NA	NA	NA	10 U	9 U
FLUORANTHENE	NA	NA	NA	10 U	9 U
PYRENE	NA	NA	NA	10 U	9 U
BUTYLBENZYLPHTHALATE	NA	NA	NA	10 U	9 U
3,3'-DICHLOROBENZIDINE	NA	NA	NA	10 U	9 U
BENZO(A)ANTHRACENE	NA	NA	NA	10 U	9 U
CHRYSENE	NA	NA	NA	10 U	9 U
BIS(2-ETHYLHEXYL)PHTHALATE	NA	NA	NA	10 U	3 J
DI-N-OCTYL PHTHALATE	NA	NA	NA	10 U	9 U
BENZO(B)FLUORANTHENE	NA	NA	NA	10 U	9 U
BENZO(K)FLUORANTHENE	NA	NA	NA	10 U	9 U
BENZO(A)PYRENE	NA	NA	NA	10 U	9 U
INDENO(1,2,3-CD)PYRENE	NA	NA	NA	10 U	9 U
DIBENZO(A,H)ANTHRACENE	NA	NA	NA	10 U	9 U
BENZO(G,H,I)PERYLENE	NA	NA	NA	10 U	9 U



**SITE 43, AGAN STREET DUMP**  
**SOIL QA/QC - FREQUENCY OF DETECTION SUMMARY**  
**REMEDIAL INVESTIGATION, CTO-0303**  
**MCB, CAMP LEJEUNE, NORTH CAROLINA**  
**ORGANIC COMPOUNDS**

SAMPLE	303-TB-15	303-TB-17	303-TB-42	43-SIER-01	43-SIER-03
DATE SAMPLED	03/13/95	03/14/95	05/01/95	02/28/95	03/10/95
UNITS	UG/L	UG/L	UG/L	UG/L	UG/L
<b>PESTICIDE/PCBS</b>					
ALPHA-BHC	NA	NA	NA	0.051 U	0.046 UJ
BETA-BHC	NA	NA	NA	0.051 U	0.046 UJ
DELTA-BHC	NA	NA	NA	0.051 U	0.046 UJ
GAMMA-BHC (LINDANE)	NA	NA	NA	0.051 U	0.046 UJ
HEPTACHLOR	NA	NA	NA	0.051 U	0.046 UJ
ALDRIN	NA	NA	NA	0.051 U	0.046 UJ
HEPTACHLOR EPOXIDE	NA	NA	NA	0.051 U	0.046 UJ
ENDOSULFAN I	NA	NA	NA	0.051 U	0.046 UJ
DIELDRIN	NA	NA	NA	0.1 U	0.093 UJ
4,4'-DDE	NA	NA	NA	0.1 U	0.093 UJ
ENDRIN	NA	NA	NA	0.1 U	0.093 UJ
ENDOSULFAN II	NA	NA	NA	0.1 U	0.093 UJ
4,4'-DDD	NA	NA	NA	0.1 U	0.093 UJ
ENDOSULFAN SULFATE	NA	NA	NA	0.1 U	0.093 UJ
4,4'-DDT	NA	NA	NA	0.1 U	0.093 UJ
METHOXYCHLOR	NA	NA	NA	0.51 U	0.46 UJ
ENDRIN KETONE	NA	NA	NA	0.1 U	0.093 UJ
ENDRIN ALDEHYDE	NA	NA	NA	0.1 U	0.093 UJ
ALPHA-CHLORDANE	NA	NA	NA	0.051 U	0.046 UJ
GAMMA-CHLORDANE	NA	NA	NA	0.051 U	0.046 UJ
TOXAPHENE	NA	NA	NA	5.1 U	4.6 UJ
AROCLOR-1016	NA	NA	NA	1 U	0.93 UJ
AROCLOR-1221	NA	NA	NA	2 U	1.9 UJ
AROCLOR-1232	NA	NA	NA	1 U	0.93 UJ
AROCLOR-1242	NA	NA	NA	1 U	0.93 UJ
AROCLOR-1248	NA	NA	NA	1 U	0.93 UJ
AROCLOR-1254	NA	NA	NA	1 U	0.93 UJ
AROCLOR-1260	NA	NA	NA	1 U	0.93 UJ

**SITE 43, AGAN STREET DUMP**  
**SOIL QA/QC - FREQUENCY OF DETECTION SUMMARY**  
**REMEDIAL INVESTIGATION, CTO-0303**  
**MCB, CAMP LEJEUNE, NORTH CAROLINA**  
**ORGANIC COMPOUNDS**

SAMPLE DATE SAMPLED UNITS	MINIMUM NONDETECTED	MAXIMUM NONDETECTED	MINIMUM DETECTED	MAXIMUM DETECTED	LOCATION OF MAXIMUM DETECTED	FREQUENCY OF DETECTION
<b>VOLATILES</b>						
CHLOROMETHANE	10 U	10 U	ND	ND		0/11
BROMOMETHANE	10 U	10 U	ND	ND		0/11
VINYL CHLORIDE	10 U	10 U	ND	ND		0/11
CHLOROETHANE	10 U	10 U	ND	ND		0/11
METHYLENE CHLORIDE	10 U	10 U	ND	ND		0/11
ACETONE	10 U	17 U	23 J	24 J	303-TB-07	2/11
CARBON DISULFIDE	10 U	10 U	ND	ND		0/11
1,1-DICHLOROETHENE	10 U	10 U	ND	ND		0/11
1,1-DICHLOROETHANE	10 U	10 U	ND	ND		0/11
1,2-DICHLOROETHENE (TOTAL)	10 U	10 U	ND	ND		0/11
CHLOROFORM	10 U	10 U	4 J	13	303-FB-01	2/11
1,2-DICHLOROETHANE	10 U	10 U	ND	ND		0/11
2-BUTANONE	10 U	10 U	18	32	303-TB-13	7/11
1,1,1-TRICHLOROETHANE	10 U	10 U	ND	ND		0/11
CARBON TETRACHLORIDE	10 U	10 U	ND	ND		0/11
BROMODICHLOROMETHANE	10 U	10 U	13	13	303-FB-01	1/11
1,2-DICHLOROPROPANE	10 U	10 U	ND	ND		0/11
CIS-1,3-DICHLOROPROPENE	10 U	10 U	ND	ND		0/11
TRICHLOROETHENE	10 U	10 U	ND	ND		0/11
DIBROMOCHLOROMETHANE	10 U	10 U	10	10	303-FB-01	1/11
1,1,2-TRICHLOROETHANE	10 U	10 U	ND	ND		0/11
BENZENE	10 U	10 U	ND	ND		0/11
TRANS-1,3-DICHLOROPROPENE	10 U	10 U	ND	ND		0/11
BROMOFORM	10 U	10 U	ND	ND		0/11
4-METHYL-2-PENTANONE	10 U	10 U	ND	ND		0/11
2-HEXANONE	10 U	10 U	ND	ND		0/11
TETRACHLOROETHENE	10 U	10 U	ND	ND		0/11
1,1,2,2-TETRACHLOROETHANE	10 U	10 U	ND	ND		0/11
TOLUENE	10 U	10 U	ND	ND		0/11
CHLOROBENZENE	10 U	10 U	ND	ND		0/11
ETHYLBENZENE	10 U	10 U	ND	ND		0/11
STYRENE	10 U	10 U	ND	ND		0/11
XYLENE (TOTAL)	10 U	10 U	ND	ND		0/11

**SITE 43, AGAN STREET DUMP**  
**SOIL QA/QC - FREQUENCY OF DETECTION SUMMARY**  
**REMEDIAL INVESTIGATION, CTO-0303**  
**MCB, CAMP LEJEUNE, NORTH CAROLINA**  
**ORGANIC COMPOUNDS**

SAMPLE DATE SAMPLED UNITS	MINIMUM NONDETECTED	MAXIMUM NONDETECTED	MINIMUM DETECTED	MAXIMUM DETECTED	LOCATION OF MAXIMUM DETECTED	FREQUENCY OF DETECTION
<b>SEMIVOLATILES</b>						
PHENOL	9 UJ	11 U	ND	ND		0/3
BIS(2-CHLOROETHYL)ETHER	9 UJ	11 U	ND	ND		0/3
2-CHLOROPHENOL	9 UJ	11 U	ND	ND		0/3
1,3-DICHLOROBENZENE	9 UJ	11 U	ND	ND		0/3
1,4-DICHLOROBENZENE	9 UJ	11 U	ND	ND		0/3
1,2-DICHLOROBENZENE	9 UJ	11 U	ND	ND		0/3
2-METHYLPHENOL	9 UJ	11 U	ND	ND		0/3
2,2'-OXYBIS(1-CHLOROPROPANE)	9 UJ	11 U	ND	ND		0/3
4-METHYLPHENOL	9 UJ	11 U	ND	ND		0/3
N-NITROSO-DI-N-PROPYLAMINE	9 UJ	11 U	ND	ND		0/3
HEXACHLOROETHANE	9 UJ	11 U	ND	ND		0/3
NITROBENZENE	9 U	11 U	ND	ND		0/3
ISOPHORONE	9 U	11 U	ND	ND		0/3
2-NITROPHENOL	9 U	11 U	ND	ND		0/3
2,4-DIMETHYLPHENOL	9 U	11 U	ND	ND		0/3
BIS(2-CHLOROETHOXY)METHANE	9 U	11 U	ND	ND		0/3
2,4-DICHLOROPHENOL	9 U	11 U	ND	ND		0/3
1,2,4-TRICHLOROBENZENE	9 U	11 U	ND	ND		0/3
NAPHTHALENE	9 U	11 U	ND	ND		0/3
4-CHLOROANILINE	9 U	11 U	ND	ND		0/3
HEXACHLOROBUTADIENE	9 U	11 U	ND	ND		0/3
4-CHLORO-3-METHYLPHENOL	9 U	11 U	ND	ND		0/3
2-METHYLNAPHTHALENE	9 U	11 U	ND	ND		0/3
HEXACHLOROCYCLOPENTADIENE	9 U	11 U	ND	ND		0/3
2,4,6-TRICHLOROPHENOL	9 U	11 U	ND	ND		0/3
2,4,5-TRICHLOROPHENOL	24 U	27 U	ND	ND		0/3
2-CHLORONAPHTHALENE	9 U	11 U	ND	ND		0/3
2-NITROANILINE	24 U	27 U	ND	ND		0/3
DIMETHYLPHTHALATE	9 U	11 U	ND	ND		0/3
ACENAPHTHYLENE	9 U	11 U	ND	ND		0/3
2,6-DINITROTOLUENE	9 U	11 U	ND	ND		0/3
3-NITROANILINE	24 U	27 U	ND	ND		0/3
ACENAPHTHENE	9 U	11 U	ND	ND		0/3
2,4-DINITROPHENOL	24 U	27 U	ND	ND		0/3

**SITE 43, AGAN STREET DUMP**  
**SOIL QA/QC - FREQUENCY OF DETECTION SUMMARY**  
**REMEDIAL INVESTIGATION, CTO-0303**  
**MCB, CAMP LEJEUNE, NORTH CAROLINA**  
**ORGANIC COMPOUNDS**

SAMPLE DATE SAMPLED UNITS	MINIMUM NONDETECTED	MAXIMUM NONDETECTED	MINIMUM DETECTED	MAXIMUM DETECTED	LOCATION OF MAXIMUM DETECTED	FREQUENCY OF DETECTION
<b>SEMIVOLATILES cont.</b>						
4-NITROPHENOL	24 U	27 U	ND	ND		0/3
DIBENZOFURAN	9 U	11 U	ND	ND		0/3
2,4-DINITROTOLUENE	9 U	11 U	ND	ND		0/3
DIETHYLPHTHALATE	9 U	11 U	ND	ND		0/3
4-CHLOROPHENYL-PHENYLETHER	9 U	11 U	ND	ND		0/3
FLUORENE	9 U	11 U	ND	ND		0/3
4-NITROANILINE	24 U	27 U	ND	ND		0/3
4,6-DINITRO-2-METHYLPHENOL	24 U	27 U	ND	ND		0/3
N-NITROSODIPHENYLAMINE (1)	9 U	11 U	ND	ND		0/3
4-BROMOPHENYL-PHENYLETHER	9 U	11 U	ND	ND		0/3
HEXACHLOROBENZENE	9 U	11 U	ND	ND		0/3
PENTACHLOROPHENOL	24 U	27 U	ND	ND		0/3
PHENANTHRENE	9 U	11 U	ND	ND		0/3
ANTHRACENE	9 U	11 U	ND	ND		0/3
CARBAZOLE	9 U	11 U	ND	ND		0/3
DI-N-BUTYLPHTHALATE	9 U	11 U	ND	ND		0/3
FLUORANTHENE	9 U	11 U	ND	ND		0/3
PYRENE	9 U	11 U	ND	ND		0/3
BUTYLBENZYLPHTHALATE	9 U	11 U	ND	ND		0/3
3,3'-DICHLOROBENZIDINE	9 U	11 U	ND	ND		0/3
BENZO(A)ANTHRACENE	9 U	11 U	ND	ND		0/3
CHRYSENE	9 U	11 U	ND	ND		0/3
BIS(2-ETHYLHEXYL)PHTHALATE	10 U	11 U	3 J	3 J	43-SIER-03	1/3
DI-N-OCTYL PHTHALATE	9 U	11 U	ND	ND		0/3
BENZO(B)FLUORANTHENE	9 U	11 U	ND	ND		0/3
BENZO(K)FLUORANTHENE	9 U	11 U	ND	ND		0/3
BENZO(A)PYRENE	9 U	11 U	ND	ND		0/3
INDENO(1,2,3-CD)PYRENE	9 U	11 U	ND	ND		0/3
DIBENZO(A,H)ANTHRACENE	9 U	11 U	ND	ND		0/3
BENZO(G,H,I)PERYLENE	9 U	11 U	ND	ND		0/3

SITE 43, AGAN STREET DUMP  
 SOIL QA/QC - FREQUENCY OF DETECTION SUMMARY  
 REMEDIAL INVESTIGATION, CTO-0303  
 MCB, CAMP LEJEUNE, NORTH CAROLINA  
 ORGANIC COMPOUNDS

SAMPLE DATE SAMPLED UNITS	MINIMUM NONDETECTED	MAXIMUM NONDETECTED	MINIMUM DETECTED	MAXIMUM DETECTED	LOCATION OF MAXIMUM DETECTED	FREQUENCY OF DETECTION
<b>PESTICIDE/PCBS</b>						
ALPHA-BHC	0.046 UJ	0.052 U	ND	ND		0/3
BETA-BHC	0.046 UJ	0.052 U	ND	ND		0/3
DELTA-BHC	0.046 UJ	0.052 U	ND	ND		0/3
GAMMA-BHC (LINDANE)	0.046 UJ	0.052 U	ND	ND		0/3
HEPTACHLOR	0.046 UJ	0.052 U	ND	ND		0/3
ALDRIN	0.046 UJ	0.052 U	ND	ND		0/3
HEPTACHLOR EPOXIDE	0.046 UJ	0.052 U	ND	ND		0/3
ENDOSULFAN I	0.046 UJ	0.052 U	ND	ND		0/3
DIELDRIN	0.093 UJ	0.1 U	ND	ND		0/3
4,4'-DDE	0.093 UJ	0.1 U	ND	ND		0/3
ENDRIN	0.093 UJ	0.1 U	ND	ND		0/3
ENDOSULFAN II	0.093 UJ	0.1 U	ND	ND		0/3
4,4'-DDD	0.093 UJ	0.1 U	ND	ND		0/3
ENDOSULFAN SULFATE	0.093 UJ	0.1 U	ND	ND		0/3
4,4'-DDT	0.093 UJ	0.1 U	ND	ND		0/3
METHOXYCHLOR	0.46 UJ	0.52 U	ND	ND		0/3
ENDRIN KETONE	0.093 UJ	0.1 U	ND	ND		0/3
ENDRIN ALDEHYDE	0.093 UJ	0.1 U	ND	ND		0/3
ALPHA-CHLORDANE	0.046 UJ	0.052 U	ND	ND		0/3
GAMMA-CHLORDANE	0.046 UJ	0.052 U	ND	ND		0/3
TOXAPHENE	4.6 UJ	5.2 U	ND	ND		0/3
AROCLOR-1016	0.93 UJ	1 U	ND	ND		0/3
AROCLOR-1221	1.9 UJ	2.1 U	ND	ND		0/3
AROCLOR-1232	0.93 UJ	1 U	ND	ND		0/3
AROCLOR-1242	0.93 UJ	1 U	ND	ND		0/3
AROCLOR-1248	0.93 UJ	1 U	ND	ND		0/3
AROCLOR-1254	0.93 UJ	1 U	ND	ND		0/3
AROCLOR-1260	0.93 UJ	1 U	ND	ND		0/3

**SITE 43, AGAN STREET DUMP**  
**SOIL QA/QC - FREQUENCY OF DETECTION SUMMARY**  
**REMEDIAL INVESTIGATION, CTO-0303**  
**MCB, CAMP LEJEUNE, NORTH CAROLINA**  
**INORGANIC ANALYTES**

SAMPLE	303-FB-01	43-SIER-01	43-SIER-03
DATE SAMPLED	02/28/95	02/28/95	03/10/95
DEPTH	N/A	N/A	N/A
UNITS	UG/L	UG/L	UG/L
<b>TOTAL METALS</b>			
ALUMINUM, TOTAL	65.5 U	16.8 U	24 U
ANTIMONY, TOTAL	10.9 U	10.9 U	20.7 U
ARSENIC, TOTAL	1.6 U	1.6 U	1.7 U
BARIUM, TOTAL	3.7 U	0.8 U	1.7 U
BERYLLIUM, TOTAL	1.5 U	1.4 U	0.9 U
CADMIUM, TOTAL	2.9 U	2.9 U	2.8 U
CALCIUM, TOTAL	32400	58.2 U	118 U
CHROMIUM, TOTAL	4.7 U	4.7 U	2.9 U
COBALT, TOTAL	2.3 U	2.3 U	3 U
COPPER, TOTAL	4 U	4 U	1.9 U
IRON, TOTAL	314	7 U	6.4 U
LEAD, TOTAL	1.6 U	1.6 U	1.2 U
MAGNESIUM, TOTAL	4190	34.3 U	22.9 U
MANGANESE, TOTAL	10.5 U	0.9 U	2.1 U
MERCURY, TOTAL	0.2 U	0.2 U	0.2 U
NICKEL, TOTAL	4.2 U	4.2 U	10.8 U
POTASSIUM, TOTAL	4660	67.9 U	975
SELENIUM, TOTAL	1.8 UJ	1.8 U	1.5 U
SILVER, TOTAL	2.5 U	2.5 U	3 U
SODIUM, TOTAL	29100	92.2 U	177 U
THALLIUM, TOTAL	0.7 U	0.7 U	0.7 U
VANADIUM, TOTAL	2.1 U	2.1 U	2.3 U
ZINC, TOTAL	8.1 U	1.9 U	3.8 U

SITE 43, AGAN STREET DUMP  
 SOIL QA/QC - FREQUENCY OF DETECTION SUMMARY  
 REMEDIAL INVESTIGATION, CTO-0303  
 MCB, CAMP LEJEUNE, NORTH CAROLINA  
 INORGANIC ANALYTES

SAMPLE DATE SAMPLED DEPTH UNITS	MINIMUM NONDETECTED	MAXIMUM NONDETECTED	MINIMUM DETECTED	MAXIMUM DETECTED	LOCATION OF MAXIMUM DETECTED	FREQUENCY OF DETECTION
<b>TOTAL METALS</b>						
ALUMINUM, TOTAL	16.8 U	65.5 U	ND	ND		0/3
ANTIMONY, TOTAL	10.9 U	20.7 U	ND	ND		0/3
ARSENIC, TOTAL	1.6 U	1.7 U	ND	ND		0/3
BARIUM, TOTAL	0.8 U	3.7 U	ND	ND		0/3
BERYLLIUM, TOTAL	0.9 U	1.5 U	ND	ND		0/3
CADMIUM, TOTAL	2.8 U	2.9 U	ND	ND		0/3
CALCIUM, TOTAL	58.2 U	118 U	32400	32400	303-FB-01	1/3
CHROMIUM, TOTAL	2.9 U	4.7 U	ND	ND		0/3
COBALT, TOTAL	2.3 U	3 U	ND	ND		0/3
COPPER, TOTAL	1.9 U	4 U	ND	ND		0/3
IRON, TOTAL	6.4 U	7 U	314	314	303-FB-01	1/3
LEAD, TOTAL	1.2 U	1.6 U	ND	ND		0/3
MAGNESIUM, TOTAL	22.9 U	34.3 U	4190	4190	303-FB-01	1/3
MANGANESE, TOTAL	0.9 U	10.5 U	ND	ND		0/3
MERCURY, TOTAL	0.2 U	0.2 U	ND	ND		0/3
NICKEL, TOTAL	4.2 U	10.8 U	ND	ND		0/3
POTASSIUM, TOTAL	67.9 U	67.9 U	975	4660	303-FB-01	2/3
SELENIUM, TOTAL	1.5 U	1.8 UJ	ND	ND		0/3
SILVER, TOTAL	2.5 U	3 U	ND	ND		0/3
SODIUM, TOTAL	92.2 U	177 U	29100	29100	303-FB-01	1/3
THALLIUM, TOTAL	0.7 U	0.7 U	ND	ND		0/3
VANADIUM, TOTAL	2.1 U	2.3 U	ND	ND		0/3
ZINC, TOTAL	1.9 U	8.1 U	ND	ND		0/3

**GROUNDWATER**

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**SITE 43, AGAN STREET DUMP**  
**GROUNDWATER QA/QC - FREQUENCY OF DETECTION SUMMARY**  
**REMEDIAL INVESTIGATION, CTO-0303**  
**MCB, CAMP LEJEUNE, NORTH CAROLINA**  
**ORGANIC COMPOUNDS**

SAMPLE	303-TB-29	303-TB-30	303-TB-31	303-TB-32	303-TB-33	43-GWER-01
DATE SAMPLED	04/04/95	04/04/95	04/05/95	04/06/95	04/07/95	04/04/95
UNITS	UG/L	UG/L	UG/L	UG/L	UG/L	UG/L
<b>VOLATILES</b>						
CHLOROMETHANE	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
VINYL CHLORIDE	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
METHYLENE CHLORIDE	10 U	10 U	10 U	10 U	10 U	10 U
ACETONE	15	10 U	10 U	10 U	10 U	10 U
CARBON DISULFIDE	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
1,1-DICHLOROETHANE	10 U	10 U	10 U	10 U	10 U	10 U
1,2-DICHLOROETHENE (TOTAL)	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
1,2-DICHLOROETHANE	10 U	10 U	10 U	10 U	10 U	10 U
2-BUTANONE	22	10 U	10 U	10 U	10 U	10 U
1,1,1-TRICHLOROETHANE	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
BROMODICHLOROMETHANE	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
CIS-1,3-DICHLOROPROPENE	10 U	10 U	10 U	10 U	10 U	10 U
TRICHLOROETHENE	10 U	10 U	10 U	10 U	1 J	10 U
DIBROMOCHLOROMETHANE	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
BENZENE	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
BROMOFORM	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
2-HEXANONE	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
1,1,2,2-TETRACHLOROETHANE	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
CHLOROBENZENE	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
STYRENE	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

**SITE 43, AGAN STREET DUMP**  
**GROUNDWATER QA/QC - FREQUENCY OF DETECTION SUMMARY**  
**REMEDIAL INVESTIGATION, CTO-0303**  
**MCB, CAMP LEJEUNE, NORTH CAROLINA**  
**ORGANIC COMPOUNDS**

SAMPLE	303-TB-29	303-TB-30	303-TB-31	303-TB-32	303-TB-33	43-GWER-01
DATE SAMPLED	04/04/95	04/04/95	04/05/95	04/06/95	04/07/95	04/04/95
UNITS	UG/L	UG/L	UG/L	UG/L	UG/L	UG/L
<b>SEMIVOLATILES</b>						
PHENOL	NA	NA	NA	NA	NA	11 U
BIS(2-CHLOROETHYL)ETHER	NA	NA	NA	NA	NA	11 U
2-CHLOROPHENOL	NA	NA	NA	NA	NA	11 U
1,3-DICHLOROBENZENE	NA	NA	NA	NA	NA	11 U
1,4-DICHLOROBENZENE	NA	NA	NA	NA	NA	11 U
1,2-DICHLOROBENZENE	NA	NA	NA	NA	NA	11 U
2-METHYLPHENOL	NA	NA	NA	NA	NA	11 U
2,2'-OXYBIS(1-CHLOROPROPANE)	NA	NA	NA	NA	NA	11 U
4-METHYLPHENOL	NA	NA	NA	NA	NA	11 U
N-NITROSO-DI-N-PROPYLAMINE	NA	NA	NA	NA	NA	11 U
HEXACHLOROETHANE	NA	NA	NA	NA	NA	11 U
NITROBENZENE	NA	NA	NA	NA	NA	11 U
ISOPHORONE	NA	NA	NA	NA	NA	11 U
2-NITROPHENOL	NA	NA	NA	NA	NA	11 U
2,4-DIMETHYLPHENOL	NA	NA	NA	NA	NA	11 U
BIS(2-CHLOROETHOXY)METHANE	NA	NA	NA	NA	NA	11 U
2,4-DICHLOROPHENOL	NA	NA	NA	NA	NA	11 U
1,2,4-TRICHLOROBENZENE	NA	NA	NA	NA	NA	11 U
NAPHTHALENE	NA	NA	NA	NA	NA	11 U
4-CHLOROANILINE	NA	NA	NA	NA	NA	11 U
HEXACHLOROBUTADIENE	NA	NA	NA	NA	NA	11 U
4-CHLORO-3-METHYLPHENOL	NA	NA	NA	NA	NA	11 U
2-METHYLNAPHTHALENE	NA	NA	NA	NA	NA	11 U
HEXACHLOROCYCLOPENTADIENE	NA	NA	NA	NA	NA	11 U
2,4,6-TRICHLOROPHENOL	NA	NA	NA	NA	NA	11 U
2,4,5-TRICHLOROPHENOL	NA	NA	NA	NA	NA	28 U
2-CHLORONAPHTHALENE	NA	NA	NA	NA	NA	11 U
2-NITROANILINE	NA	NA	NA	NA	NA	28 U
DIMETHYLPHTHALATE	NA	NA	NA	NA	NA	11 U
ACENAPHTHYLENE	NA	NA	NA	NA	NA	11 U
2,6-DINITROTOLUENE	NA	NA	NA	NA	NA	11 U
3-NITROANILINE	NA	NA	NA	NA	NA	28 U
ACENAPHTHENE	NA	NA	NA	NA	NA	11 U
2,4-DINITROPHENOL	NA	NA	NA	NA	NA	28 U

**SITE 43, AGAN STREET DUMP**  
**GROUNDWATER QA/QC - FREQUENCY OF DETECTION SUMMARY**  
**REMEDIAL INVESTIGATION, CTO-0303**  
**MCB, CAMP LEJEUNE, NORTH CAROLINA**  
**ORGANIC COMPOUNDS**

SAMPLE	303-TB-29	303-TB-30	303-TB-31	303-TB-32	303-TB-33	43-GWER-01
DATE SAMPLED	04/04/95	04/04/95	04/05/95	04/06/95	04/07/95	04/04/95
UNITS	UG/L	UG/L	UG/L	UG/L	UG/L	UG/L
4-NITROPHENOL	NA	NA	NA	NA	NA	28 U
DIBENZOFURAN	NA	NA	NA	NA	NA	11 U
2,4-DINITROTOLUENE	NA	NA	NA	NA	NA	11 U
DIETHYLPHTHALATE	NA	NA	NA	NA	NA	11 U
<b>SEMIVOLATILES cont.</b>						
4-CHLOROPHENYL-PHENYLETHER	NA	NA	NA	NA	NA	11 U
FLUORENE	NA	NA	NA	NA	NA	11 U
4-NITROANILINE	NA	NA	NA	NA	NA	28 U
4,6-DINITRO-2-METHYLPHENOL	NA	NA	NA	NA	NA	28 U
N-NITROSODIPHENYLAMINE (1)	NA	NA	NA	NA	NA	11 U
4-BROMOPHENYL-PHENYLETHER	NA	NA	NA	NA	NA	11 U
HEXACHLOROBENZENE	NA	NA	NA	NA	NA	11 U
PENTACHLOROPHENOL	NA	NA	NA	NA	NA	28 U
PHENANTHRENE	NA	NA	NA	NA	NA	11 U
ANTHRACENE	NA	NA	NA	NA	NA	11 U
CARBAZOLE	NA	NA	NA	NA	NA	11 U
DI-N-BUTYLPHTHALATE	NA	NA	NA	NA	NA	11 U
FLUORANTHENE	NA	NA	NA	NA	NA	11 U
PYRENE	NA	NA	NA	NA	NA	11 U
BUTYLBENZYLPHTHALATE	NA	NA	NA	NA	NA	11 U
3,3'-DICHLOROBENZIDINE	NA	NA	NA	NA	NA	11 U
BENZO(A)ANTHRACENE	NA	NA	NA	NA	NA	11 U
CHRYSENE	NA	NA	NA	NA	NA	11 U
BIS(2-ETHYLHEXYL)PHTHALATE	NA	NA	NA	NA	NA	11 U
DI-N-OCTYL PHTHALATE	NA	NA	NA	NA	NA	11 U
BENZO(B)FLUORANTHENE	NA	NA	NA	NA	NA	11 U
BENZO(K)FLUORANTHENE	NA	NA	NA	NA	NA	11 U
BENZO(A)PYRENE	NA	NA	NA	NA	NA	11 U
INDENO(1,2,3-CD)PYRENE	NA	NA	NA	NA	NA	11 U
DIBENZO(A,H)ANTHRACENE	NA	NA	NA	NA	NA	11 U
BENZO(G,H,I)PERYLENE	NA	NA	NA	NA	NA	11 U

**SITE 43, AGAN STREET DUMP**  
**GROUNDWATER QA/QC - FREQUENCY OF DETECTION SUMMARY**  
**REMEDIAL INVESTIGATION, CTO-0303**  
**MCB, CAMP LEJEUNE, NORTH CAROLINA**  
**ORGANIC COMPOUNDS**

SAMPLE	303-TB-29	303-TB-30	303-TB-31	303-TB-32	303-TB-33	43-GWER-01
DATE SAMPLED	04/04/95	04/04/95	04/05/95	04/06/95	04/07/95	04/04/95
UNITS	UG/L	UG/L	UG/L	UG/L	UG/L	UG/L
<b>PESTICIDE/PCBS</b>						
ALPHA-BHC	NA	NA	NA	NA	NA	0.046 UJ
BETA-BHC	NA	NA	NA	NA	NA	0.046 UJ
DELTA-BHC	NA	NA	NA	NA	NA	0.046 UJ
GAMMA-BHC (LINDANE)	NA	NA	NA	NA	NA	0.046 UJ
HEPTACHLOR	NA	NA	NA	NA	NA	0.046 UJ
ALDRIN	NA	NA	NA	NA	NA	0.046 UJ
HEPTACHLOR EPOXIDE	NA	NA	NA	NA	NA	0.046 UJ
ENDOSULFAN I	NA	NA	NA	NA	NA	0.046 UJ
DIELDRIN	NA	NA	NA	NA	NA	0.093 UJ
4,4'-DDE	NA	NA	NA	NA	NA	0.093 UJ
ENDRIN	NA	NA	NA	NA	NA	0.093 UJ
ENDOSULFAN II	NA	NA	NA	NA	NA	0.093 UJ
4,4'-DDD	NA	NA	NA	NA	NA	0.093 UJ
ENDOSULFAN SULFATE	NA	NA	NA	NA	NA	0.093 UJ
4,4'-DDT	NA	NA	NA	NA	NA	0.093 UJ
METHOXYCHLOR	NA	NA	NA	NA	NA	0.46 UJ
ENDRIN KETONE	NA	NA	NA	NA	NA	0.093 UJ
ENDRIN ALDEHYDE	NA	NA	NA	NA	NA	0.093 UJ
ALPHA-CHLORDANE	NA	NA	NA	NA	NA	0.046 UJ
GAMMA-CHLORDANE	NA	NA	NA	NA	NA	0.046 UJ
TOXAPHENE	NA	NA	NA	NA	NA	4.6 UJ
AROCLOR-1016	NA	NA	NA	NA	NA	0.93 UJ
AROCLOR-1221	NA	NA	NA	NA	NA	1.9 UJ
AROCLOR-1232	NA	NA	NA	NA	NA	0.93 UJ
AROCLOR-1242	NA	NA	NA	NA	NA	0.93 UJ
AROCLOR-1248	NA	NA	NA	NA	NA	0.93 UJ
AROCLOR-1254	NA	NA	NA	NA	NA	0.93 UJ
AROCLOR-1260	NA	NA	NA	NA	NA	0.93 UJ

**SITE 43, AGAN STREET DUMP**  
**GROUNDWATER QA/QC - FREQUENCY OF DETECTION SUMMARY**  
**REMEDIAL INVESTIGATION, CTO-0303**  
**MCB, CAMP LEJEUNE, NORTH CAROLINA**  
**ORGANIC COMPOUNDS**

SAMPLE 43-GWER-03  
 DATE SAMPLED 04/06/95  
 UNITS UG/L

**VOLATILES**

CHLOROMETHANE	10 U
BROMOMETHANE	10 U
VINYL CHLORIDE	10 U
CHLOROETHANE	10 U
METHYLENE CHLORIDE	10 U
ACETONE	10 U
CARBON DISULFIDE	10 U
1,1-DICHLOROETHENE	10 U
1,1-DICHLOROETHANE	10 U
1,2-DICHLOROETHENE (TOTAL)	10 U
CHLOROFORM	5 J
1,2-DICHLOROETHANE	10 U
2-BUTANONE	10 U
1,1,1-TRICHLOROETHANE	10 U
CARBON TETRACHLORIDE	10 U
BROMODICHLOROMETHANE	10 U
1,2-DICHLOROPROPANE	10 U
CIS-1,3-DICHLOROPROPENE	10 U
TRICHLOROETHENE	10 U
DIBROMOCHLOROMETHANE	10 U
1,1,2-TRICHLOROETHANE	10 U
BENZENE	10 U
TRANS-1,3-DICHLOROPROPENE	10 U
BROMOFORM	10 U
4-METHYL-2-PENTANONE	10 U
2-HEXANONE	10 U
TETRACHLOROETHENE	10 U
1,1,2,2-TETRACHLOROETHANE	10 U
TOLUENE	10 U
CHLOROBENZENE	10 U
ETHYLBENZENE	10 U
STYRENE	10 U
XYLENE (TOTAL)	10 U

**SITE 43, AGAN STREET DUMP**  
**GROUNDWATER QA/QC - FREQUENCY OF DETECTION SUMMARY**  
**REMEDIAL INVESTIGATION, CTO-0303**  
**MCB, CAMP LEJEUNE, NORTH CAROLINA**  
**ORGANIC COMPOUNDS**

SAMPLE	43-GWER-03
DATE SAMPLED	04/06/95
UNITS	UG/L

**SEMIVOLATILES**

PHENOL	10 U
BIS(2-CHLOROETHYL)ETHER	10 U
2-CHLOROPHENOL	10 U
1,3-DICHLOROBENZENE	10 U
1,4-DICHLOROBENZENE	10 U
1,2-DICHLOROBENZENE	10 U
2-METHYLPHENOL	10 U
2,2'-OXYBIS(1-CHLOROPROPANE)	10 U
4-METHYLPHENOL	10 U
N-NITROSO-DI-N-PROPYLAMINE	10 U
HEXACHLOROETHANE	10 U
NITROBENZENE	10 U
ISOPHORONE	10 U
2-NITROPHENOL	10 U
2,4-DIMETHYLPHENOL	10 U
BIS(2-CHLOROETHOXY)METHANE	10 U
2,4-DICHLOROPHENOL	10 U
1,2,4-TRICHLOROBENZENE	10 U
NAPHTHALENE	10 U
4-CHLOROANILINE	10 U
HEXACHLOROBUTADIENE	10 U
4-CHLORO-3-METHYLPHENOL	10 U
2-METHYLNAPHTHALENE	10 U
HEXACHLOROCYCLOPENTADIENE	10 U
2,4,6-TRICHLOROPHENOL	10 U
2,4,5-TRICHLOROPHENOL	24 U
2-CHLORONAPHTHALENE	10 U
2-NITROANILINE	24 U
DIMETHYLPHTHALATE	10 U
ACENAPHTHYLENE	10 U
2,6-DINITROTOLUENE	10 U
3-NITROANILINE	24 U
ACENAPHTHENE	10 U
2,4-DINITROPHENOL	24 U

**SITE 43, AGAN STREET DUMP**  
**GROUNDWATER QA/QC - FREQUENCY OF DETECTION SUMMARY**  
**REMEDIAL INVESTIGATION, CTO-0303**  
**MCB, CAMP LEJEUNE, NORTH CAROLINA**  
**ORGANIC COMPOUNDS**

SAMPLE	43-GWER-03
DATE SAMPLED	04/06/95
UNITS	UG/L
4-NITROPHENOL	24 U
DIBENZOFURAN	10 U
2,4-DINITROTOLUENE	10 U
DIETHYLPHTHALATE	10 U
<b>SEMIVOLATILES cont.</b>	
4-CHLOROPHENYL-PHENYLETHER	10 U
FLUORENE	10 U
4-NITROANILINE	24 U
4,6-DINITRO-2-METHYLPHENOL	24 U
N-NITROSODIPHENYLAMINE (1)	10 U
4-BROMOPHENYL-PHENYLETHER	10 U
HEXACHLOROBENZENE	10 U
PENTACHLOROPHENOL	24 U
PHENANTHRENE	10 U
ANTHRACENE	10 U
CARBAZOLE	10 U
DI-N-BUTYLPHTHALATE	10 U
FLUORANTHENE	10 U
PYRENE	10 U
BUTYLBENZYLPHTHALATE	10 U
3,3'-DICHLOROBENZIDINE	10 U
BENZO(A)ANTHRACENE	10 U
CHRYSENE	10 U
BIS(2-ETHYLHEXYL)PHTHALATE	10 U
DI-N-OCTYL PHTHALATE	10 U
BENZO(B)FLUORANTHENE	10 U
BENZO(K)FLUORANTHENE	10 U
BENZO(A)PYRENE	10 U
INDENO(1,2,3-CD)PYRENE	10 U
DIBENZO(A,H)ANTHRACENE	10 U
BENZO(G,H,I)PERYLENE	10 U

**SITE 43, AGAN STREET DUMP**  
**GROUNDWATER QA/QC - FREQUENCY OF DETECTION SUMMARY**  
**REMEDIAL INVESTIGATION, CTO-0303**  
**MCB, CAMP LEJEUNE, NORTH CAROLINA**  
**ORGANIC COMPOUNDS**

SAMPLE	43-GWER-03
DATE SAMPLED	04/06/95
UNITS	UG/L

<b>PESTICIDE/PCBS</b>	
ALPHA-BHC	0.05 UJ
BETA-BHC	0.05 UJ
DELTA-BHC	0.05 UJ
GAMMA-BHC (LINDANE)	0.05 UJ
HEPTACHLOR	0.05 UJ
ALDRIN	0.05 UJ
HEPTACHLOR EPOXIDE	0.05 UJ
ENDOSULFAN I	0.05 UJ
DIELDRIN	0.1 UJ
4,4'-DDE	0.1 UJ
ENDRIN	0.1 UJ
ENDOSULFAN II	0.1 UJ
4,4'-DDD	0.1 UJ
ENDOSULFAN SULFATE	0.1 UJ
4,4'-DDT	0.1 UJ
METHOXYCHLOR	0.5 UJ
ENDRIN KETONE	0.1 UJ
ENDRIN ALDEHYDE	0.1 UJ
ALPHA-CHLORDANE	0.05 UJ
GAMMA-CHLORDANE	0.05 UJ
TOXAPHENE	5 UJ
AROCLOR-1016	1 UJ
AROCLOR-1221	2 UJ
AROCLOR-1232	1 UJ
AROCLOR-1242	1 UJ
AROCLOR-1248	1 UJ
AROCLOR-1254	1 UJ
AROCLOR-1260	1 UJ



**SITE 43, AGAN STREET DUMP**  
**GROUNDWATER QA/QC - FREQUENCY OF DETECTION SUMMARY**  
**REMEDIAL INVESTIGATION, CTO-0303**  
**MCB, CAMP LEJEUNE, NORTH CAROLINA**  
**ORGANIC COMPOUNDS**

SAMPLE DATE SAMPLED UNITS	MINIMUM NONDETECTED	MAXIMUM NONDETECTED	MINIMUM DETECTED	MAXIMUM DETECTED	LOCATION OF MAXIMUM DETECTED	FREQUENCY OF DETECTION
<b>VOLATILES</b>						
CHLOROMETHANE	10 U	10 U	ND	ND		0/7
BROMOMETHANE	10 U	10 U	ND	ND		0/7
VINYL CHLORIDE	10 U	10 U	ND	ND		0/7
CHLOROETHANE	10 U	10 U	ND	ND		0/7
METHYLENE CHLORIDE	10 U	10 U	ND	ND		0/7
ACETONE	10 U	10 U	15	15	303-TB-29	1/7
CARBON DISULFIDE	10 U	10 U	ND	ND		0/7
1,1-DICHLOROETHENE	10 U	10 U	ND	ND		0/7
1,1-DICHLOROETHANE	10 U	10 U	ND	ND		0/7
1,2-DICHLOROETHENE (TOTAL)	10 U	10 U	ND	ND		0/7
CHLOROFORM	10 U	10 U	5 J	5 J	43-GWER-03	1/7
1,2-DICHLOROETHANE	10 U	10 U	ND	ND		0/7
2-BUTANONE	10 U	10 U	22	22	303-TB-29	1/7
1,1,1-TRICHLOROETHANE	10 U	10 U	ND	ND		0/7
CARBON TETRACHLORIDE	10 U	10 U	ND	ND		0/7
BROMODICHLOROMETHANE	10 U	10 U	ND	ND		0/7
1,2-DICHLOROPROPANE	10 U	10 U	ND	ND		0/7
CIS-1,3-DICHLOROPROPENE	10 U	10 U	ND	ND		0/7
TRICHLOROETHENE	10 U	10 U	1 J	1 J	303-TB-33	1/7
DIBROMOCHLOROMETHANE	10 U	10 U	ND	ND		0/7
1,1,2-TRICHLOROETHANE	10 U	10 U	ND	ND		0/7
BENZENE	10 U	10 U	ND	ND		0/7
TRANS-1,3-DICHLOROPROPENE	10 U	10 U	ND	ND		0/7
BROMOFORM	10 U	10 U	ND	ND		0/7
4-METHYL-2-PENTANONE	10 U	10 U	ND	ND		0/7
2-HEXANONE	10 U	10 U	ND	ND		0/7
TETRACHLOROETHENE	10 U	10 U	ND	ND		0/7
1,1,2,2-TETRACHLOROETHANE	10 U	10 U	ND	ND		0/7
TOLUENE	10 U	10 U	ND	ND		0/7
CHLOROBENZENE	10 U	10 U	ND	ND		0/7
ETHYLBENZENE	10 U	10 U	ND	ND		0/7
STYRENE	10 U	10 U	ND	ND		0/7
XYLENE (TOTAL)	10 U	10 U	ND	ND		0/7

SITE 43, AGAN STREET DUMP  
GROUNDWATER QA/QC - FREQUENCY OF DETECTION SUMMARY  
REMEDIAL INVESTIGATION, CTO-0303  
MCB, CAMP LEJEUNE, NORTH CAROLINA  
ORGANIC COMPOUNDS

SAMPLE DATE SAMPLED UNITS	MINIMUM NONDETECTED	MAXIMUM NONDETECTED	MINIMUM DETECTED	MAXIMUM DETECTED	LOCATION OF MAXIMUM DETECTED	FREQUENCY OF DETECTION
<b>SEMIVOLATILES</b>						
PHENOL	10 U	11 U	ND	ND		0/2
BIS(2-CHLOROETHYL)ETHER	10 U	11 U	ND	ND		0/2
2-CHLOROPHENOL	10 U	11 U	ND	ND		0/2
1,3-DICHLOROBENZENE	10 U	11 U	ND	ND		0/2
1,4-DICHLOROBENZENE	10 U	11 U	ND	ND		0/2
1,2-DICHLOROBENZENE	10 U	11 U	ND	ND		0/2
2-METHYLPHENOL	10 U	11 U	ND	ND		0/2
2,2'-OXYBIS(1-CHLOROPROPANE)	10 U	11 U	ND	ND		0/2
4-METHYLPHENOL	10 U	11 U	ND	ND		0/2
N-NITROSO-DI-N-PROPYLAMINE	10 U	11 U	ND	ND		0/2
HEXACHLOROETHANE	10 U	11 U	ND	ND		0/2
NITROBENZENE	10 U	11 U	ND	ND		0/2
ISOPHORONE	10 U	11 U	ND	ND		0/2
2-NITROPHENOL	10 U	11 U	ND	ND		0/2
2,4-DIMETHYLPHENOL	10 U	11 U	ND	ND		0/2
BIS(2-CHLOROETHOXY)METHANE	10 U	11 U	ND	ND		0/2
2,4-DICHLOROPHENOL	10 U	11 U	ND	ND		0/2
1,2,4-TRICHLOROBENZENE	10 U	11 U	ND	ND		0/2
NAPHTHALENE	10 U	11 U	ND	ND		0/2
4-CHLOROANILINE	10 U	11 U	ND	ND		0/2
HEXACHLOROBUTADIENE	10 U	11 U	ND	ND		0/2
4-CHLORO-3-METHYLPHENOL	10 U	11 U	ND	ND		0/2
2-METHYLNAPHTHALENE	10 U	11 U	ND	ND		0/2
HEXACHLOROCYCLOPENTADIENE	10 U	11 U	ND	ND		0/2
2,4,6-TRICHLOROPHENOL	10 U	11 U	ND	ND		0/2
2,4,5-TRICHLOROPHENOL	24 U	28 U	ND	ND		0/2
2-CHLORONAPHTHALENE	10 U	11 U	ND	ND		0/2
2-NITROANILINE	24 U	28 U	ND	ND		0/2
DIMETHYLPHTHALATE	10 U	11 U	ND	ND		0/2
ACENAPHTHYLENE	10 U	11 U	ND	ND		0/2
2,6-DINITROTOLUENE	10 U	11 U	ND	ND		0/2
3-NITROANILINE	24 U	28 U	ND	ND		0/2
ACENAPHTHENE	10 U	11 U	ND	ND		0/2
2,4-DINITROPHENOL	24 U	28 U	ND	ND		0/2

SITE 43, AGAN STREET DUMP  
GROUNDWATER QA/QC - FREQUENCY OF DETECTION SUMMARY  
REMEDIAL INVESTIGATION, CTO-0303  
MCB, CAMP LEJEUNE, NORTH CAROLINA  
ORGANIC COMPOUNDS

SAMPLE DATE SAMPLED UNITS	MINIMUM NONDETECTED	MAXIMUM NONDETECTED	MINIMUM DETECTED	MAXIMUM DETECTED	LOCATION OF MAXIMUM DETECTED	FREQUENCY OF DETECTION
4-NITROPHENOL	24 U	28 U	ND	ND		0/2
DIBENZOFURAN	10 U	11 U	ND	ND		0/2
2,4-DINITROTOLUENE	10 U	11 U	ND	ND		0/2
DIETHYLPHTHALATE	10 U	11 U	ND	ND		0/2
<b>SEMIVOLATILES cont.</b>						
4-CHLOROPHENYL-PHENYLETHER	10 U	11 U	ND	ND		0/2
FLUORENE	10 U	11 U	ND	ND		0/2
4-NITROANILINE	24 U	28 U	ND	ND		0/2
4,6-DINITRO-2-METHYLPHENOL	24 U	28 U	ND	ND		0/2
N-NITROSODIPHENYLAMINE (1)	10 U	11 U	ND	ND		0/2
4-BROMOPHENYL-PHENYLETHER	10 U	11 U	ND	ND		0/2
HEXACHLOROBENZENE	10 U	11 U	ND	ND		0/2
PENTACHLOROPHENOL	24 U	28 U	ND	ND		0/2
PHENANTHRENE	10 U	11 U	ND	ND		0/2
ANTHRACENE	10 U	11 U	ND	ND		0/2
CARBAZOLE	10 U	11 U	ND	ND		0/2
DI-N-BUTYLPHTHALATE	10 U	11 U	ND	ND		0/2
FLUORANTHENE	10 U	11 U	ND	ND		0/2
PYRENE	10 U	11 U	ND	ND		0/2
BUTYLBENZYLPHTHALATE	10 U	11 U	ND	ND		0/2
3,3'-DICHLOROBENZIDINE	10 U	11 U	ND	ND		0/2
BENZO(A)ANTHRACENE	10 U	11 U	ND	ND		0/2
CHRYSENE	10 U	11 U	ND	ND		0/2
BIS(2-ETHYLHEXYL)PHTHALATE	10 U	11 U	ND	ND		0/2
DI-N-OCTYL PHTHALATE	10 U	11 U	ND	ND		0/2
BENZO(B)FLUORANTHENE	10 U	11 U	ND	ND		0/2
BENZO(K)FLUORANTHENE	10 U	11 U	ND	ND		0/2
BENZO(A)PYRENE	10 U	11 U	ND	ND		0/2
INDENO(1,2,3-CD)PYRENE	10 U	11 U	ND	ND		0/2
DIBENZO(A,H)ANTHRACENE	10 U	11 U	ND	ND		0/2
BENZO(G,H,I)PERYLENE	10 U	11 U	ND	ND		0/2

**SITE 43, AGAN STREET DUMP**  
**GROUNDWATER QA/QC - FREQUENCY OF DETECTION SUMMARY**  
**REMEDIAL INVESTIGATION, CTO-0303**  
**MCB, CAMP LEJEUNE, NORTH CAROLINA**  
**ORGANIC COMPOUNDS**

SAMPLE DATE SAMPLED UNITS	MINIMUM NONDETECTED	MAXIMUM NONDETECTED	MINIMUM DETECTED	MAXIMUM DETECTED	LOCATION OF MAXIMUM DETECTED	FREQUENCY OF DETECTION
<b>PESTICIDE/PCBS</b>						
ALPHA-BHC	0.046 UJ	0.05 UJ	ND	ND		0/2
BETA-BHC	0.046 UJ	0.05 UJ	ND	ND		0/2
DELTA-BHC	0.046 UJ	0.05 UJ	ND	ND		0/2
GAMMA-BHC (LINDANE)	0.046 UJ	0.05 UJ	ND	ND		0/2
HEPTACHLOR	0.046 UJ	0.05 UJ	ND	ND		0/2
ALDRIN	0.046 UJ	0.05 UJ	ND	ND		0/2
HEPTACHLOR EPOXIDE	0.046 UJ	0.05 UJ	ND	ND		0/2
ENDOSULFAN I	0.046 UJ	0.05 UJ	ND	ND		0/2
DIELDRIN	0.093 UJ	0.1 UJ	ND	ND		0/2
4,4'-DDE	0.093 UJ	0.1 UJ	ND	ND		0/2
ENDRIN	0.093 UJ	0.1 UJ	ND	ND		0/2
ENDOSULFAN II	0.093 UJ	0.1 UJ	ND	ND		0/2
4,4'-DDD	0.093 UJ	0.1 UJ	ND	ND		0/2
ENDOSULFAN SULFATE	0.093 UJ	0.1 UJ	ND	ND		0/2
4,4'-DDT	0.093 UJ	0.1 UJ	ND	ND		0/2
METHOXYCHLOR	0.46 UJ	0.5 UJ	ND	ND		0/2
ENDRIN KETONE	0.093 UJ	0.1 UJ	ND	ND		0/2
ENDRIN ALDEHYDE	0.093 UJ	0.1 UJ	ND	ND		0/2
ALPHA-CHLORDANE	0.046 UJ	0.05 UJ	ND	ND		0/2
GAMMA-CHLORDANE	0.046 UJ	0.05 UJ	ND	ND		0/2
TOXAPHENE	4.6 UJ	5 UJ	ND	ND		0/2
AROCLOR-1016	0.93 UJ	1 UJ	ND	ND		0/2
AROCLOR-1221	1.9 UJ	2 UJ	ND	ND		0/2
AROCLOR-1232	0.93 UJ	1 UJ	ND	ND		0/2
AROCLOR-1242	0.93 UJ	1 UJ	ND	ND		0/2
AROCLOR-1248	0.93 UJ	1 UJ	ND	ND		0/2
AROCLOR-1254	0.93 UJ	1 UJ	ND	ND		0/2
AROCLOR-1260	0.93 UJ	1 UJ	ND	ND		0/2

**SITE 43, AGAN STREET DUMP**  
**GROUNDWATER QA/QC - FREQUENCY OF DETECTION SUMMARY**  
**REMEDIAL INVESTIGATION, CTO-0303**  
**MCB, CAMP LEJEUNE, NORTH CAROLINA**  
**INORGANIC ANALYTES**

LOCATION	43-GWER-01	43-GWER-03
DATE SAMPLED	04/04/95	04/06/95
DEPTH	N/A	N/A
UNITS	UG/L	UG/L
<b>TOTAL METALS</b>		
ALUMINUM, TOTAL	16.8 U	16.8 U
ANTIMONY, TOTAL	10.9 U	10.9 U
ARSENIC, TOTAL	1.3 U	1.3 U
BARIUM, TOTAL	0.8 U	0.8 U
BERYLLIUM, TOTAL	0.3 U	0.3 U
CADMIUM, TOTAL	2.9 U	2.9 U
CALCIUM, TOTAL	107 U	80.1 U
CHROMIUM, TOTAL	4.7 U	4.7 U
COBALT, TOTAL	2.3 U	2.3 U
COPPER, TOTAL	4 U	4 U
IRON, TOTAL	4 U	8.4 U
LEAD, TOTAL	1.2 U	1.2 U
MAGNESIUM, TOTAL	34.3 U	34.3 U
MANGANESE, TOTAL	0.9 U	0.9 U
MERCURY, TOTAL	0.2 U	0.2 U
NICKEL, TOTAL	4.2 U	4.2 U
POTASSIUM, TOTAL	67.9 U	67.9 U
SELENIUM, TOTAL	1.5 U	1.5 U
SILVER, TOTAL	2.5 U	2.5 U
SODIUM, TOTAL	53.9 U	104 U
THALLIUM, TOTAL	1.1 U	1.1 U
VANADIUM, TOTAL	2.1 U	2.1 U
ZINC, TOTAL	2.1	1.9 U

SITE 43, AGAN STREET DUMP  
GROUNDWATER QA/QC - FREQUENCY OF DETECTION SUMMARY  
REMEDIAL INVESTIGATION, CTO-0303  
MCB, CAMP LEJEUNE, NORTH CAROLINA  
INORGANIC ANALYTES

LOCATION DATE SAMPLED DEPTH UNITS	MINIMUM NONDETECTED	MAXIMUM NONDETECTED	MINIMUM DETECTED	MAXIMUM DETECTED	LOCATION OF MAXIMUM DETECTED	FREQUENCY OF DETECTION
<b>TOTAL METALS</b>						
ALUMINUM, TOTAL	16.8 U	16.8 U	ND	ND		0/2
ANTIMONY, TOTAL	10.9 U	10.9 U	ND	ND		0/2
ARSENIC, TOTAL	1.3 U	1.3 U	ND	ND		0/2
BARIIUM, TOTAL	0.8 U	0.8 U	ND	ND		0/2
BERYLLIUM, TOTAL	0.3 U	0.3 U	ND	ND		0/2
CADMIUM, TOTAL	2.9 U	2.9 U	ND	ND		0/2
CALCIUM, TOTAL	80.1 U	107 U	ND	ND		0/2
CHROMIUM, TOTAL	4.7 U	4.7 U	ND	ND		0/2
COBALT, TOTAL	2.3 U	2.3 U	ND	ND		0/2
COPPER, TOTAL	4 U	4 U	ND	ND		0/2
IRON, TOTAL	4 U	8.4 U	ND	ND		0/2
LEAD, TOTAL	1.2 U	1.2 U	ND	ND		0/2
MAGNESIUM, TOTAL	34.3 U	34.3 U	ND	ND		0/2
MANGANESE, TOTAL	0.9 U	0.9 U	ND	ND		0/2
MERCURY, TOTAL	0.2 U	0.2 U	ND	ND		0/2
NICKEL, TOTAL	4.2 U	4.2 U	ND	ND		0/2
POTASSIUM, TOTAL	67.9 U	67.9 U	ND	ND		0/2
SELENIUM, TOTAL	1.5 U	1.5 U	ND	ND		0/2
SILVER, TOTAL	2.5 U	2.5 U	ND	ND		0/2
SODIUM, TOTAL	53.9 U	104 U	ND	ND		0/2
THALLIUM, TOTAL	1.1 U	1.1 U	ND	ND		0/2
VANADIUM, TOTAL	2.1 U	2.1 U	ND	ND		0/2
ZINC, TOTAL	1.9 U	1.9 U	2.1	2.1	43-GWER-01	1/2

**SURFACE WATER**

SITE 43, AGAN STREET DUMP  
 SURFACE WATER QA/QC - FREQUENCY OF DETECTION SUMMARY  
 REMEDIAL INVESTIGATION, CTO-0303  
 MCB, CAMP LEJEUNE, NORTH CAROLINA  
 ORGANIC COMPOUNDS

SAMPLE	303-TB-44	303-TB-45	43-SEER-01
DATE SAMPLED	05/03/95	05/03/95	05/05/95
UNITS	UG/L	UG/L	UG/L
<b>VOLATILES</b>			
CHLOROMETHANE	10 U	10 U	10 U
BROMOMETHANE	10 U	10 U	10 U
VINYL CHLORIDE	10 U	10 U	10 U
CHLOROETHANE	10 U	10 U	10 U
METHYLENE CHLORIDE	10 U	10 U	10 U
ACETONE	10 U	10 U	10 U
CARBON DISULFIDE	10 U	10 U	10 U
1,1-DICHLOROETHENE	10 U	10 U	10 U
1,1-DICHLOROETHANE	10 U	10 U	10 U
1,2-DICHLOROETHENE (TOTAL)	10 U	10 U	10 U
CHLOROFORM	10 U	10 U	3 J
1,2-DICHLOROETHANE	10 U	10 U	10 U
2-BUTANONE	10 U	10 U	10 U
1,1,1-TRICHLOROETHANE	10 U	10 U	10 U
CARBON TETRACHLORIDE	10 U	10 U	10 U
BROMODICHLOROMETHANE	10 U	10 U	10 U
1,2-DICHLOROPROPANE	10 U	10 U	10 U
CIS-1,3-DICHLOROPROPENE	10 U	10 U	10 U
TRICHLOROETHENE	10 U	10 U	10 U
DIBROMOCHLOROMETHANE	10 U	10 U	10 U
1,1,2-TRICHLOROETHANE	10 U	10 U	10 U
BENZENE	10 U	10 U	10 U
TRANS-1,3-DICHLOROPROPENE	10 U	10 U	10 U
BROMOFORM	10 U	10 U	10 U
4-METHYL-2-PENTANONE	10 U	10 U	10 U
2-HEXANONE	10 U	10 U	10 U
TETRACHLOROETHENE	10 U	10 U	10 U
1,1,2,2-TETRACHLOROETHANE	10 U	10 U	10 U
TOLUENE	10 U	10 U	10 U
CHLOROBENZENE	10 U	10 U	10 U
ETHYLBENZENE	10 U	10 U	10 U
STYRENE	10 U	10 U	10 U
XYLENE (TOTAL)	10 U	10 U	10 U



**SITE 43, AGAN STREET DUMP**  
**SURFACE WATER QA/QC - FREQUENCY OF DETECTION SUMMARY**  
**REMEDIATION INVESTIGATION, CTO-0303**  
**MCB, CAMP LEJEUNE, NORTH CAROLINA**  
**ORGANIC COMPOUNDS**

SAMPLE	303-TB-44	303-TB-45	43-SEER-01
DATE SAMPLED	05/03/95	05/03/95	05/05/95
UNITS	UG/L	UG/L	UG/L
<b>SEMIVOLATILES</b>			
PHENOL	NA	NA	10 U
BIS(2-CHLOROETHYL)ETHER	NA	NA	10 U
2-CHLOROPHENOL	NA	NA	10 U
1,3-DICHLOROBENZENE	NA	NA	10 U
1,4-DICHLOROBENZENE	NA	NA	10 U
1,2-DICHLOROBENZENE	NA	NA	10 U
2-METHYLPHENOL	NA	NA	10 U
2,2'-OXYBIS(1-CHLOROPROPANE)	NA	NA	10 U
4-METHYLPHENOL	NA	NA	10 U
N-NITROSO-DI-N-PROPYLAMINE	NA	NA	10 U
HEXACHLOROETHANE	NA	NA	10 U
NITROBENZENE	NA	NA	10 U
ISOPHORONE	NA	NA	10 U
2-NITROPHENOL	NA	NA	10 U
2,4-DIMETHYLPHENOL	NA	NA	10 U
BIS(2-CHLOROETHOXY)METHANE	NA	NA	10 U
2,4-DICHLOROPHENOL	NA	NA	10 U
1,2,4-TRICHLOROBENZENE	NA	NA	10 U
NAPHTHALENE	NA	NA	10 U
4-CHLOROANILINE	NA	NA	10 U
HEXACHLOROBUTADIENE	NA	NA	10 U
4-CHLORO-3-METHYLPHENOL	NA	NA	10 U
2-METHYLNAPHTHALENE	NA	NA	10 U
HEXACHLOROCYCLOPENTADIENE	NA	NA	10 U
2,4,6-TRICHLOROPHENOL	NA	NA	10 U
2,4,5-TRICHLOROPHENOL	NA	NA	26 U
2-CHLORONAPHTHALENE	NA	NA	10 U
2-NITROANILINE	NA	NA	26 U
DIMETHYLPHTHALATE	NA	NA	10 U
ACENAPHTHYLENE	NA	NA	10 U
2,6-DINITROTOLUENE	NA	NA	10 U
3-NITROANILINE	NA	NA	26 U
ACENAPHTHENE	NA	NA	10 U
2,4-DINITROPHENOL	NA	NA	26 U

**SITE 43, AGAN STREET DUMP**  
**SURFACE WATER QA/QC - FREQUENCY OF DETECTION SUMMARY**  
**REMEDIAL INVESTIGATION, CTO-0303**  
**MCB, CAMP LEJEUNE, NORTH CAROLINA**  
**ORGANIC COMPOUNDS**

SAMPLE	303-TB-44	303-TB-45	43-SEER-01
DATE SAMPLED	05/03/95	05/03/95	05/05/95
UNITS	UG/L	UG/L	UG/L
<b>SEMIVOLATILES cont.</b>			
4-NITROPHENOL	NA	NA	26 U
DIBENZOFURAN	NA	NA	10 U
2,4-DINITROTOLUENE	NA	NA	10 U
DIETHYLPHTHALATE	NA	NA	10 U
4-CHLOROPHENYL-PHENYLETHER	NA	NA	10 U
FLUORENE	NA	NA	10 U
4-NITROANILINE	NA	NA	26 U
4,6-DINITRO-2-METHYLPHENOL	NA	NA	26 U
N-NITROSODIPHENYLAMINE (1)	NA	NA	10 U
4-BROMOPHENYL-PHENYLETHER	NA	NA	10 U
HEXACHLOROBENZENE	NA	NA	10 U
PENTACHLOROPHENOL	NA	NA	26 U
PHENANTHRENE	NA	NA	10 U
ANTHRACENE	NA	NA	10 U
CARBAZOLE	NA	NA	10 U
DI-N-BUTYLPHTHALATE	NA	NA	10 U
FLUORANTHENE	NA	NA	10 U
PYRENE	NA	NA	10 U
BUTYLBENZYLPHTHALATE	NA	NA	10 U
3,3'-DICHLOROBENZIDINE	NA	NA	10 U
BENZO(A)ANTHRACENE	NA	NA	10 U
CHRYSENE	NA	NA	10 U
BIS(2-ETHYLHEXYL)PHTHALATE	NA	NA	36
DI-N-OCTYL PHTHALATE	NA	NA	10 U
BENZO(B)FLUORANTHENE	NA	NA	10 U
BENZO(K)FLUORANTHENE	NA	NA	10 U
BENZO(A)PYRENE	NA	NA	10 U
INDENO(1,2,3-CD)PYRENE	NA	NA	10 U
DIBENZO(A,H)ANTHRACENE	NA	NA	10 U
BENZO(G,H,I)PERYLENE	NA	NA	10 U

**SITE 43, AGAN STREET DUMP**  
**SURFACE WATER QA/QC - FREQUENCY OF DETECTION SUMMARY**  
**REMEDIAL INVESTIGATION, CTO-0303**  
**MCB, CAMP LEJEUNE, NORTH CAROLINA**  
**ORGANIC COMPOUNDS**

SAMPLE	303-TB-44	303-TB-45	43-SEER-01
DATE SAMPLED	05/03/95	05/03/95	05/05/95
UNITS	UG/L	UG/L	UG/L
<b>PESTICIDE/PCBS</b>			
ALPHA-BHC	NA	NA	0.056 UJ
BETA-BHC	NA	NA	0.056 UJ
DELTA-BHC	NA	NA	0.056 UJ
GAMMA-BHC (LINDANE)	NA	NA	0.056 UJ
HEPTACHLOR	NA	NA	0.056 UJ
ALDRIN	NA	NA	0.056 UJ
HEPTACHLOR EPOXIDE	NA	NA	0.056 UJ
ENDOSULFAN I	NA	NA	0.056 UJ
DIELDRIN	NA	NA	0.11 UJ
4,4'-DDE	NA	NA	0.11 UJ
ENDRIN	NA	NA	0.11 UJ
ENDOSULFAN II	NA	NA	0.11 UJ
4,4'-DDD	NA	NA	0.11 UJ
ENDOSULFAN SULFATE	NA	NA	0.11 UJ
4,4'-DDT	NA	NA	0.11 UJ
METHOXYCHLOR	NA	NA	0.56 UJ
ENDRIN KETONE	NA	NA	0.11 UJ
ENDRIN ALDEHYDE	NA	NA	0.11 UJ
ALPHA-CHLORDANE	NA	NA	0.056 UJ
GAMMA-CHLORDANE	NA	NA	0.056 UJ
TOXAPHENE	NA	NA	5.6 UJ
AROCLOR-1016	NA	NA	1.1 UJ
AROCLOR-1221	NA	NA	2.2 UJ
AROCLOR-1232	NA	NA	1.1 UJ
AROCLOR-1242	NA	NA	1.1 UJ
AROCLOR-1248	NA	NA	1.1 UJ
AROCLOR-1254	NA	NA	1.1 UJ
AROCLOR-1260	NA	NA	1.1 UJ

**SITE 43, AGAN STREET DUMP**  
**SURFACE WATER QA/QC - FREQUENCY OF DETECTION SUMMARY**  
**REMEDIAL INVESTIGATION, CTO-0303**  
**MCB, CAMP LEJEUNE, NORTH CAROLINA**  
**ORGANIC COMPOUNDS**

SAMPLE DATE SAMPLED UNITS	MINIMUM NONDETECTED	MAXIMUM NONDETECTED	MINIMUM DETECTED	MAXIMUM DETECTED	LOCATION OF MAXIMUM DETECTED	FREQUENCY OF DETECTION
<b>VOLATILES</b>						
CHLOROMETHANE	10 U	10 U	ND	ND		0/3
BROMOMETHANE	10 U	10 U	ND	ND		0/3
VINYL CHLORIDE	10 U	10 U	ND	ND		0/3
CHLOROETHANE	10 U	10 U	ND	ND		0/3
METHYLENE CHLORIDE	10 U	10 U	ND	ND		0/3
ACETONE	10 U	10 U	ND	ND		0/3
CARBON DISULFIDE	10 U	10 U	ND	ND		0/3
1,1-DICHLOROETHENE	10 U	10 U	ND	ND		0/3
1,1-DICHLOROETHANE	10 U	10 U	ND	ND		0/3
1,2-DICHLOROETHENE (TOTAL)	10 U	10 U	ND	ND		0/3
CHLOROFORM	10 U	10 U	3 J	3 J	43-SEER-01	1/3
1,2-DICHLOROETHANE	10 U	10 U	ND	ND		0/3
2-BUTANONE	10 U	10 U	ND	ND		0/3
1,1,1-TRICHLOROETHANE	10 U	10 U	ND	ND		0/3
CARBON TETRACHLORIDE	10 U	10 U	ND	ND		0/3
BROMODICHLOROMETHANE	10 U	10 U	ND	ND		0/3
1,2-DICHLOROPROPANE	10 U	10 U	ND	ND		0/3
CIS-1,3-DICHLOROPROPENE	10 U	10 U	ND	ND		0/3
TRICHLOROETHENE	10 U	10 U	ND	ND		0/3
DIBROMOCHLOROMETHANE	10 U	10 U	ND	ND		0/3
1,1,2-TRICHLOROETHANE	10 U	10 U	ND	ND		0/3
BENZENE	10 U	10 U	ND	ND		0/3
TRANS-1,3-DICHLOROPROPENE	10 U	10 U	ND	ND		0/3
BROMOFORM	10 U	10 U	ND	ND		0/3
4-METHYL-2-PENTANONE	10 U	10 U	ND	ND		0/3
2-HEXANONE	10 U	10 U	ND	ND		0/3
TETRACHLOROETHENE	10 U	10 U	ND	ND		0/3
1,1,2,2-TETRACHLOROETHANE	10 U	10 U	ND	ND		0/3
TOLUENE	10 U	10 U	ND	ND		0/3
CHLOROBENZENE	10 U	10 U	ND	ND		0/3
ETHYLBENZENE	10 U	10 U	ND	ND		0/3
STYRENE	10 U	10 U	ND	ND		0/3
XYLENE (TOTAL)	10 U	10 U	ND	ND		0/3

SITE 43, AGAN STREET DUMP  
 SURFACE WATER QA/QC - FREQUENCY OF DETECTION SUMMARY  
 REMEDIAL INVESTIGATION, CTO-0303  
 MCB, CAMP LEJEUNE, NORTH CAROLINA  
 ORGANIC COMPOUNDS

SAMPLE DATE SAMPLED UNITS	MINIMUM NONDETECTED	MAXIMUM NONDETECTED	MINIMUM DETECTED	MAXIMUM DETECTED	LOCATION OF MAXIMUM DETECTED	FREQUENCY OF DETECTION
<b>SEMIVOLATILES</b>						
PHENOL	10 U	10 U	ND	ND		0/1
BIS(2-CHLOROETHYL)ETHER	10 U	10 U	ND	ND		0/1
2-CHLOROPHENOL	10 U	10 U	ND	ND		0/1
1,3-DICHLOROBENZENE	10 U	10 U	ND	ND		0/1
1,4-DICHLOROBENZENE	10 U	10 U	ND	ND		0/1
1,2-DICHLOROBENZENE	10 U	10 U	ND	ND		0/1
2-METHYLPHENOL	10 U	10 U	ND	ND		0/1
2,2'-OXYBIS(1-CHLOROPROPANE)	10 U	10 U	ND	ND		0/1
4-METHYLPHENOL	10 U	10 U	ND	ND		0/1
N-NITROSO-DI-N-PROPYLAMINE	10 U	10 U	ND	ND		0/1
HEXACHLOROETHANE	10 U	10 U	ND	ND		0/1
NITROBENZENE	10 U	10 U	ND	ND		0/1
ISOPHORONE	10 U	10 U	ND	ND		0/1
2-NITROPHENOL	10 U	10 U	ND	ND		0/1
2,4-DIMETHYLPHENOL	10 U	10 U	ND	ND		0/1
BIS(2-CHLOROETHOXY)METHANE	10 U	10 U	ND	ND		0/1
2,4-DICHLOROPHENOL	10 U	10 U	ND	ND		0/1
1,2,4-TRICHLOROBENZENE	10 U	10 U	ND	ND		0/1
NAPHTHALENE	10 U	10 U	ND	ND		0/1
4-CHLOROANILINE	10 U	10 U	ND	ND		0/1
HEXACHLOROBUTADIENE	10 U	10 U	ND	ND		0/1
4-CHLORO-3-METHYLPHENOL	10 U	10 U	ND	ND		0/1
2-METHYLNAPHTHALENE	10 U	10 U	ND	ND		0/1
HEXACHLOROCYCLOPENTADIENE	10 U	10 U	ND	ND		0/1
2,4,6-TRICHLOROPHENOL	10 U	10 U	ND	ND		0/1
2,4,5-TRICHLOROPHENOL	26 U	26 U	ND	ND		0/1
2-CHLORONAPHTHALENE	10 U	10 U	ND	ND		0/1
2-NITROANILINE	26 U	26 U	ND	ND		0/1
DIMETHYLPHTHALATE	10 U	10 U	ND	ND		0/1
ACENAPHTHYLENE	10 U	10 U	ND	ND		0/1
2,6-DINITROTOLUENE	10 U	10 U	ND	ND		0/1
3-NITROANILINE	26 U	26 U	ND	ND		0/1
ACENAPHTHENE	10 U	10 U	ND	ND		0/1
2,4-DINITROPHENOL	26 U	26 U	ND	ND		0/1

**SITE 43, AGAN STREET DUMP**  
**SURFACE WATER QA/QC - FREQUENCY OF DETECTION SUMMARY**  
**REMEDIAL INVESTIGATION, CTO-0303**  
**MCB, CAMP LEJEUNE, NORTH CAROLINA**  
**ORGANIC COMPOUNDS**

SAMPLE DATE SAMPLED UNITS	MINIMUM NONDETECTED	MAXIMUM NONDETECTED	MINIMUM DETECTED	MAXIMUM DETECTED	LOCATION OF MAXIMUM DETECTED	FREQUENCY OF DETECTION
<b>SEMIVOLATILES cont.</b>						
4-NITROPHENOL	26 U	26 U	ND	ND		0/1
DIBENZOFURAN	10 U	10 U	ND	ND		0/1
2,4-DINITROTOLUENE	10 U	10 U	ND	ND		0/1
DIETHYLPHTHALATE	10 U	10 U	ND	ND		0/1
4-CHLOROPHENYL-PHENYLETHER	10 U	10 U	ND	ND		0/1
FLUORENE	10 U	10 U	ND	ND		0/1
4-NITROANILINE	26 U	26 U	ND	ND		0/1
4,6-DINITRO-2-METHYLPHENOL	26 U	26 U	ND	ND		0/1
N-NITROSODIPHENYLAMINE (1)	10 U	10 U	ND	ND		0/1
4-BROMOPHENYL-PHENYLETHER	10 U	10 U	ND	ND		0/1
HEXACHLOROBENZENE	10 U	10 U	ND	ND		0/1
PENTACHLOROPHENOL	26 U	26 U	ND	ND		0/1
PHENANTHRENE	10 U	10 U	ND	ND		0/1
ANTHRACENE	10 U	10 U	ND	ND		0/1
CARBAZOLE	10 U	10 U	ND	ND		0/1
DI-N-BUTYLPHTHALATE	10 U	10 U	ND	ND		0/1
FLUORANTHENE	10 U	10 U	ND	ND		0/1
PYRENE	10 U	10 U	ND	ND		0/1
BUTYLBENZYLPHTHALATE	10 U	10 U	ND	ND		0/1
3,3'-DICHLOROBENZIDINE	10 U	10 U	ND	ND		0/1
BENZO(A)ANTHRACENE	10 U	10 U	ND	ND		0/1
CHRYSENE	10 U	10 U	ND	ND		0/1
BIS(2-ETHYLHEXYL)PHTHALATE	NA	NA	36	36	43-SEER-01	1/1
DI-N-OCTYL PHTHALATE	10 U	10 U	ND	ND		0/1
BENZO(B)FLUORANTHENE	10 U	10 U	ND	ND		0/1
BENZO(K)FLUORANTHENE	10 U	10 U	ND	ND		0/1
BENZO(A)PYRENE	10 U	10 U	ND	ND		0/1
INDENO(1,2,3-CD)PYRENE	10 U	10 U	ND	ND		0/1
DIBENZO(A,H)ANTHRACENE	10 U	10 U	ND	ND		0/1
BENZO(G,H,I)PERYLENE	10 U	10 U	ND	ND		0/1

**SITE 43, AGAN STREET DUMP**  
**SURFACE WATER QA/QC - FREQUENCY OF DETECTION SUMMARY**  
**REMEDIAL INVESTIGATION, CTO-0303**  
**MCB, CAMP LEJEUNE, NORTH CAROLINA**  
**ORGANIC COMPOUNDS**

SAMPLE DATE SAMPLED UNITS	MINIMUM NONDETECTED	MAXIMUM NONDETECTED	MINIMUM DETECTED	MAXIMUM DETECTED	LOCATION OF MAXIMUM DETECTED	FREQUENCY OF DETECTION
<b>PESTICIDE/PCBS</b>						
ALPHA-BHC	0.056 UJ	0.056 UJ	ND	ND		0/1
BETA-BHC	0.056 UJ	0.056 UJ	ND	ND		0/1
DELTA-BHC	0.056 UJ	0.056 UJ	ND	ND		0/1
GAMMA-BHC (LINDANE)	0.056 UJ	0.056 UJ	ND	ND		0/1
HEPTACHLOR	0.056 UJ	0.056 UJ	ND	ND		0/1
ALDRIN	0.056 UJ	0.056 UJ	ND	ND		0/1
HEPTACHLOR EPOXIDE	0.056 UJ	0.056 UJ	ND	ND		0/1
ENDOSULFAN I	0.056 UJ	0.056 UJ	ND	ND		0/1
DIELDRIN	0.11 UJ	0.11 UJ	ND	ND		0/1
4,4'-DDE	0.11 UJ	0.11 UJ	ND	ND		0/1
ENDRIN	0.11 UJ	0.11 UJ	ND	ND		0/1
ENDOSULFAN II	0.11 UJ	0.11 UJ	ND	ND		0/1
4,4'-DDD	0.11 UJ	0.11 UJ	ND	ND		0/1
ENDOSULFAN SULFATE	0.11 UJ	0.11 UJ	ND	ND		0/1
4,4'-DDT	0.11 UJ	0.11 UJ	ND	ND		0/1
METHOXYCHLOR	0.56 UJ	0.56 UJ	ND	ND		0/1
ENDRIN KETONE	0.11 UJ	0.11 UJ	ND	ND		0/1
ENDRIN ALDEHYDE	0.11 UJ	0.11 UJ	ND	ND		0/1
ALPHA-CHLORDANE	0.056 UJ	0.056 UJ	ND	ND		0/1
GAMMA-CHLORDANE	0.056 UJ	0.056 UJ	ND	ND		0/1
TOXAPHENE	5.6 UJ	5.6 UJ	ND	ND		0/1
AROCLOR-1016	1.1 UJ	1.1 UJ	ND	ND		0/1
AROCLOR-1221	2.2 UJ	2.2 UJ	ND	ND		0/1
AROCLOR-1232	1.1 UJ	1.1 UJ	ND	ND		0/1
AROCLOR-1242	1.1 UJ	1.1 UJ	ND	ND		0/1
AROCLOR-1248	1.1 UJ	1.1 UJ	ND	ND		0/1
AROCLOR-1254	1.1 UJ	1.1 UJ	ND	ND		0/1
AROCLOR-1260	1.1 UJ	1.1 UJ	ND	ND		0/1

SITE 43, AGAN STREET DUMP  
SURFACE WATER QA/QC - FREQUENCY OF DETECTION SUMMARY  
REMEDIAL INVESTIGATION, CTO-0303  
MCB, CAMP LEJEUNE, NORTH CAROLINA  
INORGANIC ANALYTES

SAMPLE 43-SEER-1  
DATE SAMPLED 05/05/95  
UNITS UG/L

TOTAL METALS	
ALUMINUM, TOTAL	21.2 U
ANTIMONY, TOTAL	20.8 U
ARSENIC, TOTAL	1.7 U
BARIUM, TOTAL	1 U
BERYLLIUM, TOTAL	0.8 U
CADMIUM, TOTAL	1.9 U
CALCIUM, TOTAL	130 U
CHROMIUM, TOTAL	4.1 U
COBALT, TOTAL	3.4 U
COPPER, TOTAL	1.8 U
IRON, TOTAL	3.9 U
LEAD, TOTAL	0.8 UJ
MAGNESIUM, TOTAL	41.7 U
MANGANESE, TOTAL	1.7 U
MERCURY, TOTAL	0.2 U
NICKEL, TOTAL	10.9 U
POTASSIUM, TOTAL	768 U
SELENIUM, TOTAL	1.8 U
SILVER, TOTAL	2.8 U
SODIUM, TOTAL	103 U
THALLIUM, TOTAL	0.7 U
VANADIUM, TOTAL	2 U
ZINC, TOTAL	6 U



SITE 43, AGAN STREET DUMP  
 SURFACE WATER QA/QC - FREQUENCY OF DETECTION SUMMARY  
 REMEDIAL INVESTIGATION, CTO-0303  
 MCB, CAMP LEJEUNE, NORTH CAROLINA  
 INORGANIC ANALYTES

SAMPLE DATE SAMPLED UNITS	MINIMUM NONDETECTED	MAXIMUM NONDETECTED	MINIMUM DETECTED	MAXIMUM DETECTED	LOCATION OF MAXIMUM DETECTED	FREQUENCY OF DETECTION
<b>TOTAL METALS</b>						
ALUMINUM, TOTAL	21.2 U	21.2 U	ND	ND		0/1
ANTIMONY, TOTAL	20.8 U	20.8 U	ND	ND		0/1
ARSENIC, TOTAL	1.7 U	1.7 U	ND	ND		0/1
BARIUM, TOTAL	1 U	1 U	ND	ND		0/1
BERYLLIUM, TOTAL	0.8 U	0.8 U	ND	ND		0/1
CADMIUM, TOTAL	1.9 U	1.9 U	ND	ND		0/1
CALCIUM, TOTAL	130 U	130 U	ND	ND		0/1
CHROMIUM, TOTAL	4.1 U	4.1 U	ND	ND		0/1
COBALT, TOTAL	3.4 U	3.4 U	ND	ND		0/1
COPPER, TOTAL	1.8 U	1.8 U	ND	ND		0/1
IRON, TOTAL	3.9 U	3.9 U	ND	ND		0/1
LEAD, TOTAL	0.8 UJ	0.8 UJ	ND	ND		0/1
MAGNESIUM, TOTAL	41.7 U	41.7 U	ND	ND		0/1
MANGANESE, TOTAL	1.7 U	1.7 U	ND	ND		0/1
MERCURY, TOTAL	0.2 U	0.2 U	ND	ND		0/1
NICKEL, TOTAL	10.9 U	10.9 U	ND	ND		0/1
POTASSIUM, TOTAL	768 U	768 U	ND	ND		0/1
SELENIUM, TOTAL	1.8 U	1.8 U	ND	ND		0/1
SILVER, TOTAL	2.8 U	2.8 U	ND	ND		0/1
SODIUM, TOTAL	103 U	103 U	ND	ND		0/1
THALLIUM, TOTAL	0.7 U	0.7 U	ND	ND		0/1
VANADIUM, TOTAL	2 U	2 U	ND	ND		0/1
ZINC, TOTAL	6 U	6 U	ND	ND		0/1

**SEDIMENT**

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**SITE 43, AGAN STREET DUMP**  
**SEDIMENT QA/QC - FREQUENCY OF DETECTION SUMMARY**  
**REMEDIAL INVESTIGATION, CTO-0303**  
**MCB, CAMP LEJEUNE, NORTH CAROLINA**  
**ORGANIC COMPOUNDS**

SAMPLE	303-TB-47	43-SEER-01
DATE SAMPLED	05/05/95	05/05/95
UNITS	UG/L	UG/L
<b>VOLATILES</b>		
CHLOROMETHANE	10 U	10 U
BROMOMETHANE	10 U	10 U
VINYL CHLORIDE	10 U	10 U
CHLOROETHANE	10 U	10 U
METHYLENE CHLORIDE	10 U	10 U
ACETONE	10 U	10 U
CARBON DISULFIDE	10 U	10 U
1,1-DICHLOROETHENE	10 U	10 U
1,1-DICHLOROETHANE	10 U	10 U
1,2-DICHLOROETHENE (TOTAL)	10 U	10 U
CHLOROFORM	10 U	3 J
1,2-DICHLOROETHANE	10 U	10 U
2-BUTANONE	10 U	10 U
1,1,1-TRICHLOROETHANE	10 U	10 U
CARBON TETRACHLORIDE	10 U	10 U
BROMODICHLOROMETHANE	10 U	10 U
1,2-DICHLOROPROPANE	10 U	10 U
CIS-1,3-DICHLOROPROPENE	10 U	10 U
TRICHLOROETHENE	10 U	10 U
DIBROMOCHLOROMETHANE	10 U	10 U
1,1,2-TRICHLOROETHANE	10 U	10 U
BENZENE	10 U	10 U
TRANS-1,3-DICHLOROPROPENE	10 U	10 U
BROMOFORM	10 U	10 U
4-METHYL-2-PENTANONE	10 U	10 U
2-HEXANONE	10 U	10 U
TETRACHLOROETHENE	10 U	10 U
1,1,2,2-TETRACHLOROETHANE	10 U	10 U
TOLUENE	10 U	10 U
CHLOROBENZENE	10 U	10 U
ETHYLBENZENE	10 U	10 U
STYRENE	10 U	10 U
XYLENE (TOTAL)	10 U	10 U

**SITE 43, AGAN STREET DUMP**  
**SEDIMENT QA/QC - FREQUENCY OF DETECTION SUMMARY**  
**REMEDIAL INVESTIGATION, CTO-0303**  
**MCB, CAMP LEJEUNE, NORTH CAROLINA**  
**ORGANIC COMPOUNDS**

SAMPLE	303-TB-47	43-SEER-01
DATE SAMPLED	05/05/95	05/05/95
UNITS	UG/L	UG/L
<b>SEMIVOLATILES</b>		
PHENOL	NA	10 U
BIS(2-CHLOROETHYL)ETHER	NA	10 U
2-CHLOROPHENOL	NA	10 U
1,3-DICHLOROBENZENE	NA	10 U
1,4-DICHLOROBENZENE	NA	10 U
1,2-DICHLOROBENZENE	NA	10 U
2-METHYLPHENOL	NA	10 U
2,2'-OXYBIS(1-CHLOROPROPANE)	NA	10 U
4-METHYLPHENOL	NA	10 U
N-NITROSO-DI-N-PROPYLAMINE	NA	10 U
HEXACHLOROETHANE	NA	10 U
NITROBENZENE	NA	10 U
ISOPHORONE	NA	10 U
2-NITROPHENOL	NA	10 U
2,4-DIMETHYLPHENOL	NA	10 U
BIS(2-CHLOROETHOXY)METHANE	NA	10 U
2,4-DICHLOROPHENOL	NA	10 U
1,2,4-TRICHLOROBENZENE	NA	10 U
NAPHTHALENE	NA	10 U
4-CHLOROANILINE	NA	10 U
HEXACHLOROBUTADIENE	NA	10 U
4-CHLORO-3-METHYLPHENOL	NA	10 U
2-METHYLNAPHTHALENE	NA	10 U
HEXACHLOROCYCLOPENTADIENE	NA	10 U
2,4,6-TRICHLOROPHENOL	NA	10 U
2,4,5-TRICHLOROPHENOL	NA	26 U
2-CHLORONAPHTHALENE	NA	10 U
2-NITROANILINE	NA	26 U
DIMETHYLPHTHALATE	NA	10 U
ACENAPHTHYLENE	NA	10 U
2,6-DINITROTOLUENE	NA	10 U
3-NITROANILINE	NA	26 U
ACENAPHTHENE	NA	10 U
2,4-DINITROPHENOL	NA	26 U

**SITE 43, AGAN STREET DUMP**  
**SEDIMENT QA/QC - FREQUENCY OF DETECTION SUMMARY**  
**REMEDIAL INVESTIGATION, CTO-0303**  
**MCB, CAMP LEJEUNE, NORTH CAROLINA**  
**ORGANIC COMPOUNDS**

SAMPLE	303-TB-47	43-SEER-01
DATE SAMPLED	05/05/95	05/05/95
UNITS	UG/L	UG/L
<b>SEMIVOLATILES cont.</b>		
4-NITROPHENOL	NA	26 U
DIBENZOFURAN	NA	10 U
2,4-DINITROTOLUENE	NA	10 U
DIETHYLPHTHALATE	NA	10 U
4-CHLOROPHENYL-PHENYLETHER	NA	10 U
FLUORENE	NA	10 U
4-NITROANILINE	NA	26 U
4,6-DINITRO-2-METHYLPHENOL	NA	26 U
N-NITROSODIPHENYLAMINE (1)	NA	10 U
4-BROMOPHENYL-PHENYLETHER	NA	10 U
HEXACHLOROBENZENE	NA	10 U
PENTACHLOROPHENOL	NA	26 U
PHENANTHRENE	NA	10 U
ANTHRACENE	NA	10 U
CARBAZOLE	NA	10 U
DI-N-BUTYLPHTHALATE	NA	10 U
FLUORANTHENE	NA	10 U
PYRENE	NA	10 U
BUTYLBENZYLPHTHALATE	NA	10 U
3,3'-DICHLOROBENZIDINE	NA	10 U
BENZO(A)ANTHRACENE	NA	10 U
CHRYSENE	NA	10 U
BIS(2-ETHYLHEXYL)PHTHALATE	NA	36
DI-N-OCTYL PHTHALATE	NA	10 U
BENZO(B)FLUORANTHENE	NA	10 U
BENZO(K)FLUORANTHENE	NA	10 U
BENZO(A)PYRENE	NA	10 U
INDENO(1,2,3-CD)PYRENE	NA	10 U
DIBENZO(A,H)ANTHRACENE	NA	10 U
BENZO(G,H,I)PERYLENE	NA	10 U

**SITE 43, AGAN STREET DUMP**  
**SEDIMENT QA/QC - FREQUENCY OF DETECTION SUMMARY**  
**REMEDIAL INVESTIGATION, CTO-0303**  
**MCB, CAMP LEJEUNE, NORTH CAROLINA**  
**ORGANIC COMPOUNDS**

SAMPLE	303-TB-47	43-SEER-01
DATE SAMPLED	05/05/95	05/05/95
UNITS	UG/L	UG/L
<b>PESTICIDE/PCBS</b>		
ALPHA-BHC	NA	0.056 UJ
BETA-BHC	NA	0.056 UJ
DELTA-BHC	NA	0.056 UJ
GAMMA-BHC (LINDANE)	NA	0.056 UJ
HEPTACHLOR	NA	0.056 UJ
ALDRIN	NA	0.056 UJ
HEPTACHLOR EPOXIDE	NA	0.056 UJ
ENDOSULFAN I	NA	0.056 UJ
DIELDRIN	NA	0.11 UJ
4,4'-DDE	NA	0.11 UJ
ENDRIN	NA	0.11 UJ
ENDOSULFAN II	NA	0.11 UJ
4,4'-DDD	NA	0.11 UJ
ENDOSULFAN SULFATE	NA	0.11 UJ
4,4'-DDT	NA	0.11 UJ
METHOXYCHLOR	NA	0.56 UJ
ENDRIN KETONE	NA	0.11 UJ
ENDRIN ALDEHYDE	NA	0.11 UJ
ALPHA-CHLORDANE	NA	0.056 UJ
GAMMA-CHLORDANE	NA	0.056 UJ
TOXAPHENE	NA	5.6 UJ
AROCLOR-1016	NA	1.1 UJ
AROCLOR-1221	NA	2.2 UJ
AROCLOR-1232	NA	1.1 UJ
AROCLOR-1242	NA	1.1 UJ
AROCLOR-1248	NA	1.1 UJ
AROCLOR-1254	NA	1.1 UJ
AROCLOR-1260	NA	1.1 UJ

**SITE 43, AGAN STREET DUMP**  
**SEDIMENT QA/QC - FREQUENCY OF DETECTION SUMMARY**  
**REMEDIAL INVESTIGATION, CTO-0303**  
**MCB, CAMP LEJEUNE, NORTH CAROLINA**  
**ORGANIC COMPOUNDS**

SAMPLE DATE SAMPLED UNITS	MINIMUM NONDETECTED	MAXIMUM NONDETECTED	MINIMUM DETECTED	MAXIMUM DETECTED	LOCATION OF MAXIMUM DETECTED	FREQUENCY OF DETECTION
<b>VOLATILES</b>						
CHLOROMETHANE	10 U	10 U	ND	ND		0/2
BROMOMETHANE	10 U	10 U	ND	ND		0/2
VINYL CHLORIDE	10 U	10 U	ND	ND		0/2
CHLOROETHANE	10 U	10 U	ND	ND		0/2
METHYLENE CHLORIDE	10 U	10 U	ND	ND		0/2
ACETONE	10 U	10 U	ND	ND		0/2
CARBON DISULFIDE	10 U	10 U	ND	ND		0/2
1,1-DICHLOROETHENE	10 U	10 U	ND	ND		0/2
1,1-DICHLOROETHANE	10 U	10 U	ND	ND		0/2
1,2-DICHLOROETHENE (TOTAL)	10 U	10 U	ND	ND		0/2
CHLOROFORM	10 U	10 U	3 J	3 J	43-SEER-01	1/2
1,2-DICHLOROETHANE	10 U	10 U	ND	ND		0/2
2-BUTANONE	10 U	10 U	ND	ND		0/2
1,1,1-TRICHLOROETHANE	10 U	10 U	ND	ND		0/2
CARBON TETRACHLORIDE	10 U	10 U	ND	ND		0/2
BROMODICHLOROMETHANE	10 U	10 U	ND	ND		0/2
1,2-DICHLOROPROPANE	10 U	10 U	ND	ND		0/2
CIS-1,3-DICHLOROPROPENE	10 U	10 U	ND	ND		0/2
TRICHLOROETHENE	10 U	10 U	ND	ND		0/2
DIBROMOCHLOROMETHANE	10 U	10 U	ND	ND		0/2
1,1,2-TRICHLOROETHANE	10 U	10 U	ND	ND		0/2
BENZENE	10 U	10 U	ND	ND		0/2
TRANS-1,3-DICHLOROPROPENE	10 U	10 U	ND	ND		0/2
BROMOFORM	10 U	10 U	ND	ND		0/2
4-METHYL-2-PENTANONE	10 U	10 U	ND	ND		0/2
2-HEXANONE	10 U	10 U	ND	ND		0/2
TETRACHLOROETHENE	10 U	10 U	ND	ND		0/2
1,1,2,2-TETRACHLOROETHANE	10 U	10 U	ND	ND		0/2
TOLUENE	10 U	10 U	ND	ND		0/2
CHLOROBENZENE	10 U	10 U	ND	ND		0/2
ETHYLBENZENE	10 U	10 U	ND	ND		0/2
STYRENE	10 U	10 U	ND	ND		0/2
XYLENE (TOTAL)	10 U	10 U	ND	ND		0/2

**SITE 43, AGAN STREET DUMP**  
**SEDIMENT QA/QC - FREQUENCY OF DETECTION SUMMARY**  
**REMEDIAL INVESTIGATION, CTO-0303**  
**MCB, CAMP LEJEUNE, NORTH CAROLINA**  
**ORGANIC COMPOUNDS**

SAMPLE DATE SAMPLED UNITS	MINIMUM NONDETECTED	MAXIMUM NONDETECTED	MINIMUM DETECTED	MAXIMUM DETECTED	LOCATION OF MAXIMUM DETECTED	FREQUENCY OF DETECTION
<b>SEMIVOLATILES</b>						
PHENOL	10 U	10 U	ND	ND		0/1
BIS(2-CHLOROETHYL)ETHER	10 U	10 U	ND	ND		0/1
2-CHLOROPHENOL	10 U	10 U	ND	ND		0/1
1,3-DICHLOROBENZENE	10 U	10 U	ND	ND		0/1
1,4-DICHLOROBENZENE	10 U	10 U	ND	ND		0/1
1,2-DICHLOROBENZENE	10 U	10 U	ND	ND		0/1
2-METHYLPHENOL	10 U	10 U	ND	ND		0/1
2,2'-OXYBIS(1-CHLOROPROPANE)	10 U	10 U	ND	ND		0/1
4-METHYLPHENOL	10 U	10 U	ND	ND		0/1
N-NITROSO-DI-N-PROPYLAMINE	10 U	10 U	ND	ND		0/1
HEXACHLOROETHANE	10 U	10 U	ND	ND		0/1
NITROBENZENE	10 U	10 U	ND	ND		0/1
ISOPHORONE	10 U	10 U	ND	ND		0/1
2-NITROPHENOL	10 U	10 U	ND	ND		0/1
2,4-DIMETHYLPHENOL	10 U	10 U	ND	ND		0/1
BIS(2-CHLOROETHOXY)METHANE	10 U	10 U	ND	ND		0/1
2,4-DICHLOROPHENOL	10 U	10 U	ND	ND		0/1
1,2,4-TRICHLOROBENZENE	10 U	10 U	ND	ND		0/1
NAPHTHALENE	10 U	10 U	ND	ND		0/1
4-CHLOROANILINE	10 U	10 U	ND	ND		0/1
HEXACHLOROBUTADIENE	10 U	10 U	ND	ND		0/1
4-CHLORO-3-METHYLPHENOL	10 U	10 U	ND	ND		0/1
2-METHYLNAPHTHALENE	10 U	10 U	ND	ND		0/1
HEXACHLOROCYCLOPENTADIENE	10 U	10 U	ND	ND		0/1
2,4,6-TRICHLOROPHENOL	10 U	10 U	ND	ND		0/1
2,4,5-TRICHLOROPHENOL	26 U	26 U	ND	ND		0/1
2-CHLORONAPHTHALENE	10 U	10 U	ND	ND		0/1
2-NITROANILINE	26 U	26 U	ND	ND		0/1
DIMETHYLPHTHALATE	10 U	10 U	ND	ND		0/1
ACENAPHTHYLENE	10 U	10 U	ND	ND		0/1
2,6-DINITROTOLUENE	10 U	10 U	ND	ND		0/1
3-NITROANILINE	26 U	26 U	ND	ND		0/1
ACENAPHTHENE	10 U	10 U	ND	ND		0/1
2,4-DINITROPHENOL	26 U	26 U	ND	ND		0/1



**SITE 43, AGAN STREET DUMP**  
**SEDIMENT QA/QC - FREQUENCY OF DETECTION SUMMARY**  
**REMEDIAL INVESTIGATION, CTO-0303**  
**MCB, CAMP LEJEUNE, NORTH CAROLINA**  
**ORGANIC COMPOUNDS**

SAMPLE DATE SAMPLED UNITS	MINIMUM NONDETECTED	MAXIMUM NONDETECTED	MINIMUM DETECTED	MAXIMUM DETECTED	LOCATION OF MAXIMUM DETECTED	FREQUENCY OF DETECTION
<b>SEMIVOLATILES cont.</b>						
4-NITROPHENOL	26 U	26 U	ND	ND		0/1
DIBENZOFURAN	10 U	10 U	ND	ND		0/1
2,4-DINITROTOLUENE	10 U	10 U	ND	ND		0/1
DIETHYLPHTHALATE	10 U	10 U	ND	ND		0/1
4-CHLOROPHENYL-PHENYLETHER	10 U	10 U	ND	ND		0/1
FLUORENE	10 U	10 U	ND	ND		0/1
4-NITROANILINE	26 U	26 U	ND	ND		0/1
4,6-DINITRO-2-METHYLPHENOL	26 U	26 U	ND	ND		0/1
N-NITROSODIPHENYLAMINE (1)	10 U	10 U	ND	ND		0/1
4-BROMOPHENYL-PHENYLETHER	10 U	10 U	ND	ND		0/1
HEXACHLOROBENZENE	10 U	10 U	ND	ND		0/1
PENTACHLOROPHENOL	26 U	26 U	ND	ND		0/1
PHENANTHRENE	10 U	10 U	ND	ND		0/1
ANTHRACENE	10 U	10 U	ND	ND		0/1
CARBAZOLE	10 U	10 U	ND	ND		0/1
DI-N-BUTYLPHTHALATE	10 U	10 U	ND	ND		0/1
FLUORANTHENE	10 U	10 U	ND	ND		0/1
PYRENE	10 U	10 U	ND	ND		0/1
BUTYLBENZYLPHTHALATE	10 U	10 U	ND	ND		0/1
3,3'-DICHLOROBENZIDINE	10 U	10 U	ND	ND		0/1
BENZO(A)ANTHRACENE	10 U	10 U	ND	ND		0/1
CHRYSENE	10 U	10 U	ND	ND		0/1
BIS(2-ETHYLHEXYL)PHTHALATE	NA	NA	36	36	43-SEER-01	1/1
DI-N-OCTYL PHTHALATE	10 U	10 U	ND	ND		0/1
BENZO(B)FLUORANTHENE	10 U	10 U	ND	ND		0/1
BENZO(K)FLUORANTHENE	10 U	10 U	ND	ND		0/1
BENZO(A)PYRENE	10 U	10 U	ND	ND		0/1
INDENO(1,2,3-CD)PYRENE	10 U	10 U	ND	ND		0/1
DIBENZO(A,H)ANTHRACENE	10 U	10 U	ND	ND		0/1
BENZO(G,H,I)PERYLENE	10 U	10 U	ND	ND		0/1

**SITE 43, AGAN STREET DUMP**  
**SEDIMENT QA/QC - FREQUENCY OF DETECTION SUMMARY**  
**REMEDIAL INVESTIGATION, CTO-0303**  
**MCB, CAMP LEJEUNE, NORTH CAROLINA**  
**ORGANIC COMPOUNDS**

SAMPLE DATE SAMPLED UNITS	MINIMUM NONDETECTED	MAXIMUM NONDETECTED	MINIMUM DETECTED	MAXIMUM DETECTED	LOCATION OF MAXIMUM DETECTED	FREQUENCY OF DETECTION
<b>PESTICIDE/PCBS</b>						
ALPHA-BHC	0.056 UJ	0.056 UJ	ND	ND		0/1
BETA-BHC	0.056 UJ	0.056 UJ	ND	ND		0/1
DELTA-BHC	0.056 UJ	0.056 UJ	ND	ND		0/1
GAMMA-BHC (LINDANE)	0.056 UJ	0.056 UJ	ND	ND		0/1
HEPTACHLOR	0.056 UJ	0.056 UJ	ND	ND		0/1
ALDRIN	0.056 UJ	0.056 UJ	ND	ND		0/1
HEPTACHLOR EPOXIDE	0.056 UJ	0.056 UJ	ND	ND		0/1
ENDOSULFAN I	0.056 UJ	0.056 UJ	ND	ND		0/1
DIELDRIN	0.11 UJ	0.11 UJ	ND	ND		0/1
4,4'-DDE	0.11 UJ	0.11 UJ	ND	ND		0/1
ENDRIN	0.11 UJ	0.11 UJ	ND	ND		0/1
ENDOSULFAN II	0.11 UJ	0.11 UJ	ND	ND		0/1
4,4'-DDD	0.11 UJ	0.11 UJ	ND	ND		0/1
ENDOSULFAN SULFATE	0.11 UJ	0.11 UJ	ND	ND		0/1
4,4'-DDT	0.11 UJ	0.11 UJ	ND	ND		0/1
METHOXYCHLOR	0.56 UJ	0.56 UJ	ND	ND		0/1
ENDRIN KETONE	0.11 UJ	0.11 UJ	ND	ND		0/1
ENDRIN ALDEHYDE	0.11 UJ	0.11 UJ	ND	ND		0/1
ALPHA-CHLORDANE	0.056 UJ	0.056 UJ	ND	ND		0/1
GAMMA-CHLORDANE	0.056 UJ	0.056 UJ	ND	ND		0/1
TOXAPHENE	5.6 UJ	5.6 UJ	ND	ND		0/1
AROCLOR-1016	1.1 UJ	1.1 UJ	ND	ND		0/1
AROCLOR-1221	2.2 UJ	2.2 UJ	ND	ND		0/1
AROCLOR-1232	1.1 UJ	1.1 UJ	ND	ND		0/1
AROCLOR-1242	1.1 UJ	1.1 UJ	ND	ND		0/1
AROCLOR-1248	1.1 UJ	1.1 UJ	ND	ND		0/1
AROCLOR-1254	1.1 UJ	1.1 UJ	ND	ND		0/1
AROCLOR-1260	1.1 UJ	1.1 UJ	ND	ND		0/1

SITE 43, AGAN STREET DUMP  
SEDIMENT QA/QC - FREQUENCY OF DETECTION SUMMARY  
REMEDIAL INVESTIGATION, CTO-0303  
MCB, CAMP LEJEUNE, NORTH CAROLINA  
INORGANIC ANALYTES

SAMPLE 43-SEER-01  
DATE SAMPLED 05/05/95  
UNITS UG/L

**TOTAL METALS**

ALUMINUM, TOTAL	21.2 U
ANTIMONY, TOTAL	20.8 U
ARSENIC, TOTAL	1.7 U
BARIUM, TOTAL	1 U
BERYLLIUM, TOTAL	0.8 U
CADMIUM, TOTAL	1.9 U
CALCIUM, TOTAL	130 U
CHROMIUM, TOTAL	4.1 U
COBALT, TOTAL	3.4 U
COPPER, TOTAL	1.8 U
IRON, TOTAL	3.9 U
LEAD, TOTAL	0.8 UJ
MAGNESIUM, TOTAL	41.7 U
MANGANESE, TOTAL	1.7 U
MERCURY, TOTAL	0.2 U
NICKEL, TOTAL	10.9 U
POTASSIUM, TOTAL	768 U
SELENIUM, TOTAL	1.8 U
SILVER, TOTAL	2.8 U
SODIUM, TOTAL	103 U
THALLIUM, TOTAL	0.7 U
VANADIUM, TOTAL	2 U
ZINC, TOTAL	6 U

**SITE 43, AGAN STREET DUMP**  
**SEDIMENT QA/QC - FREQUENCY OF DETECTION SUMMARY**  
**REMEDIAL INVESTIGATION, CTO-0303**  
**MCB, CAMP LEJEUNE, NORTH CAROLINA**  
**INORGANIC ANALYTES**

SAMPLE DATE SAMPLED UNITS	MINIMUM NONDETECTED	MAXIMUM NONDETECTED	MINIMUM DETECTED	MAXIMUM DETECTED	LOCATION OF MAXIMUM DETECTED	FREQUENCY OF DETECTION
<b>TOTAL METALS</b>						
ALUMINUM, TOTAL	21.2 U	21.2 U	ND	ND		0/1
ANTIMONY, TOTAL	20.8 U	20.8 U	ND	ND		0/1
ARSENIC, TOTAL	1.7 U	1.7 U	ND	ND		0/1
BARIUM, TOTAL	1 U	1 U	ND	ND		0/1
BERYLLIUM, TOTAL	0.8 U	0.8 U	ND	ND		0/1
CADMIUM, TOTAL	1.9 U	1.9 U	ND	ND		0/1
CALCIUM, TOTAL	130 U	130 U	ND	ND		0/1
CHROMIUM, TOTAL	4.1 U	4.1 U	ND	ND		0/1
COBALT, TOTAL	3.4 U	3.4 U	ND	ND		0/1
COPPER, TOTAL	1.8 U	1.8 U	ND	ND		0/1
IRON, TOTAL	3.9 U	3.9 U	ND	ND		0/1
LEAD, TOTAL	0.8 UJ	0.8 UJ	ND	ND		0/1
MAGNESIUM, TOTAL	41.7 U	41.7 U	ND	ND		0/1
MANGANESE, TOTAL	1.7 U	1.7 U	ND	ND		0/1
MERCURY, TOTAL	0.2 U	0.2 U	ND	ND		0/1
NICKEL, TOTAL	10.9 U	10.9 U	ND	ND		0/1
POTASSIUM, TOTAL	768 U	768 U	ND	ND		0/1
SELENIUM, TOTAL	1.8 U	1.8 U	ND	ND		0/1
SILVER, TOTAL	2.8 U	2.8 U	ND	ND		0/1
SODIUM, TOTAL	103 U	103 U	ND	ND		0/1
THALLIUM, TOTAL	0.7 U	0.7 U	ND	ND		0/1
VANADIUM, TOTAL	2 U	2 U	ND	ND		0/1
ZINC, TOTAL	6 U	6 U	ND	ND		0/1

**APPENDIX L**  
**GRAIN SIZE, PERMEABILITY,**  
**AND TPH ANALYTICAL RESULTS**

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**GRAIN SIZE ANALYTICAL RESULTS**

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ROY F. WESTON, INC. ENVIRONMENTAL TECHNOLOGY LABORATORY

GEOTECHNICAL TESTING DATA AND RESULTS

PROJECT	Baker Environmental	PROJECT SAMPLE I.D.	43-GW01DW	PROJECT ANALYST	RJA
JOB NUMBER	9503G729	ETL SAMPLE NUMBER	002	QA/QC ANALYST	RWF
W. O. NUMBER	06629-009-004-0001-00	DATE RECEIVED	03/20/95	DATE COMPLETED	03/26/95

PARTICLE SIZE DISTRIBUTION		
U. S. Standard Sieve Size	Diameter ' mm	% Finer
3"	75.00	100.0
1 1/2"	37.50	100.0
3/4"	19.00	100.0
3/8"	9.500	99.2
#4	4.750	95.5
#10	2.000	93.4
#20	0.850	85.6
#50	0.300	62.6
#100	0.150	26.7
#200	0.075	9.0
HYDROMETER	0.0490	10.1
	0.0351	8.7
	0.0250	8.0
	0.0178	7.3
	0.0130	6.6
	0.0093	5.9
	0.0066	5.9
	0.0046	5.9
	0.0033	5.1
	0.0023	5.1
0.0014	4.4	
0.0010	4.4	

EFFECTIVE SIZES	
% Finer	Diameter mm
60	0.289
30	0.164
10	0.079
Uniformity Coefficient	Gradation Coefficient
3.6	1.2

SAMPLE DESCRIPTION
brown silty SAND with 4% gravel and 9% silt of low plasticity
Unified Soil Classification System (USCS) Group Symbol
SP/SM

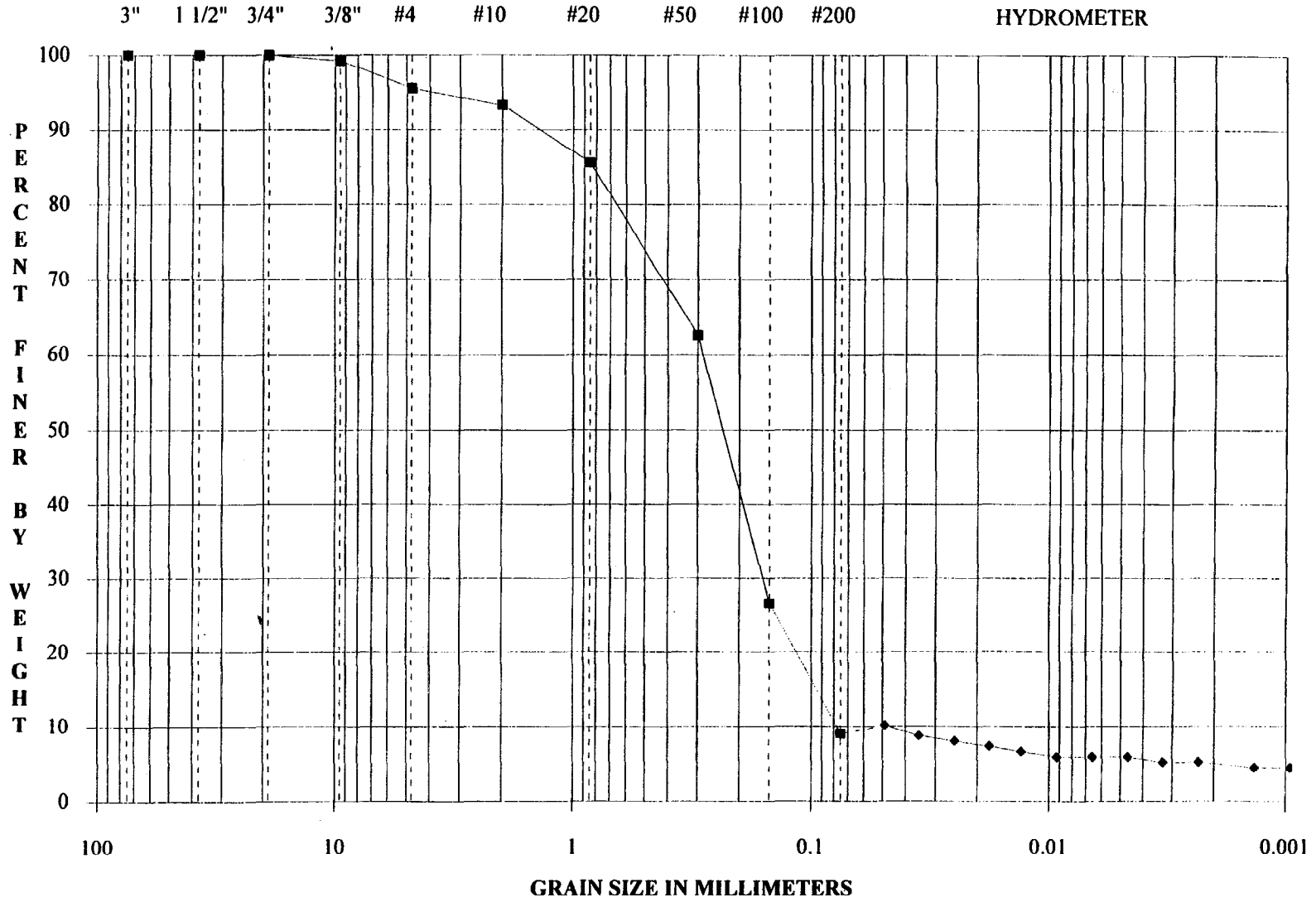
INDEX PROPERTIES		
% moisture dry basis		
Liquid Limit	Plastic Limit	Plasticity Index
non-plastic, non-cohesive		

NOTES

**PARTICLE-SIZE DISTRIBUTION CURVE FOR**

**PROJECT SAMPLE 43-GW01DW, ETL SAMPLE 9503G729-002**

U. S. STANDARD SIEVE SIZES



GRAVEL SAND SILT OR CLAY



ROY F. WESTON, INC. ENVIRONMENTAL TECHNOLOGY LABORATORY

GEOTECHNICAL TESTING DATA AND RESULTS

PROJECT	Baker Environmental	PROJECT SAMPLE I.D.	43-EC-SD01-06	PROJECT ANALYST	WB
JOB NUMBER	9505G704	ETL SAMPLE NUMBER	005	QA/QC ANALYST	RWF
W. O. NUMBER	06629-009-004-0001-00	DATE RECEIVED	05/08/95	DATE COMPLETED	05/14/95

PARTICLE SIZE DISTRIBUTION		
U. S. Standard Sieve Size	Diameter mm	% Finer
3"	75.00	100.0
1 1/2"	37.50	100.0
3/4"	19.00	100.0
3/8"	9.500	100.0
#4	4.750	92.6
#10	2.000	87.1
#20	0.850	66.6
#50	0.300	57.0
#100	0.150	53.3
#200	0.075	50.7
HYDROMETER	0.0418	65.7
	0.0301	62.1
	0.0214	60.3
	0.0154	56.6
	0.0117	47.6
	0.0084	43.9
	0.0060	38.5
	0.0044	33.0
	0.0032	25.8
	0.0023	22.1
0.0013	18.5	
0.0009	16.7	

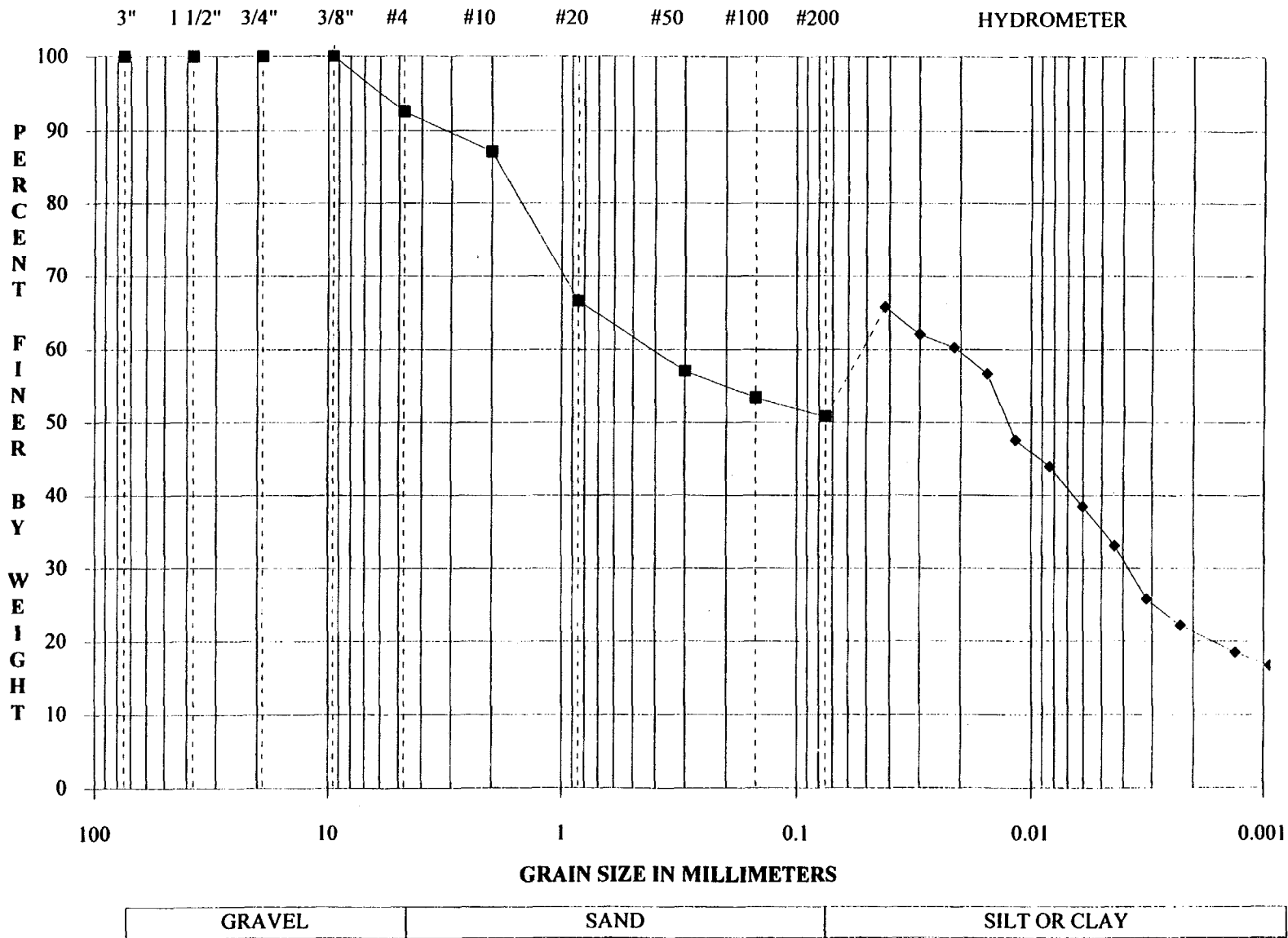
EFFECTIVE SIZES	
% Finer	Diameter mm
60	0.471
30	NA
10	NA
Uniformity Coefficient	Gradation Coefficient
NA	NA

SAMPLE DESCRIPTION
dark brown SILT of high plasticity with 7% gravel and 42% sand contains organics
Unified Soil Classification System (USCS) Group Symbol
MH

INDEX PROPERTIES		
% moisture dry basis		
Liquid Limit	Plastic Limit	Plasticity Index
180.4	148.4	32.0

NOTES
NA=NOT APPLICABLE

**PARTICLE-SIZE DISTRIBUTION CURVE FOR  
PROJECT SAMPLE 43-EC-SD01-06, ETL SAMPLE 9505G704-005  
U. S. STANDARD SIEVE SIZES**



ROY F. WESTON, INC. ENVIRONMENTAL TECHNOLOGY LABORATORY

GEOTECHNICAL TESTING DATA AND RESULTS

PROJECT	Baker Environmental	PROJECT SAMPLE I.D.	43-SHC-SD04-06	PROJECT ANALYST	WB
JOB NUMBER	9505G704	ETL SAMPLE NUMBER	006	QA/QC ANALYST	RWF
W. O. NUMBER	06629-009-004-0001-00	DATE RECEIVED	05/08/95	DATE COMPLETED	05/14/95

PARTICLE SIZE DISTRIBUTION		
U. S. Standard Sieve Size	Diameter mm	% Finer
3"	75.00	100.0
1 1/2"	37.50	100.0
3/4"	19.00	100.0
3/8"	9.500	100.0
#4	4.750	91.8
#10	2.000	88.4
#20	0.850	72.9
#50	0.300	64.3
#100	0.150	60.8
#200	0.075	57.6
HYDROMETER	0.0425	62.8
	0.0303	60.9
	0.0216	59.1
	0.0155	55.4
	0.0118	44.4
	0.0085	40.7
	0.0061	35.2
	0.0044	27.9
	0.0032	22.4
	0.0023	20.6
0.0013	18.7	
0.0009	15.0	

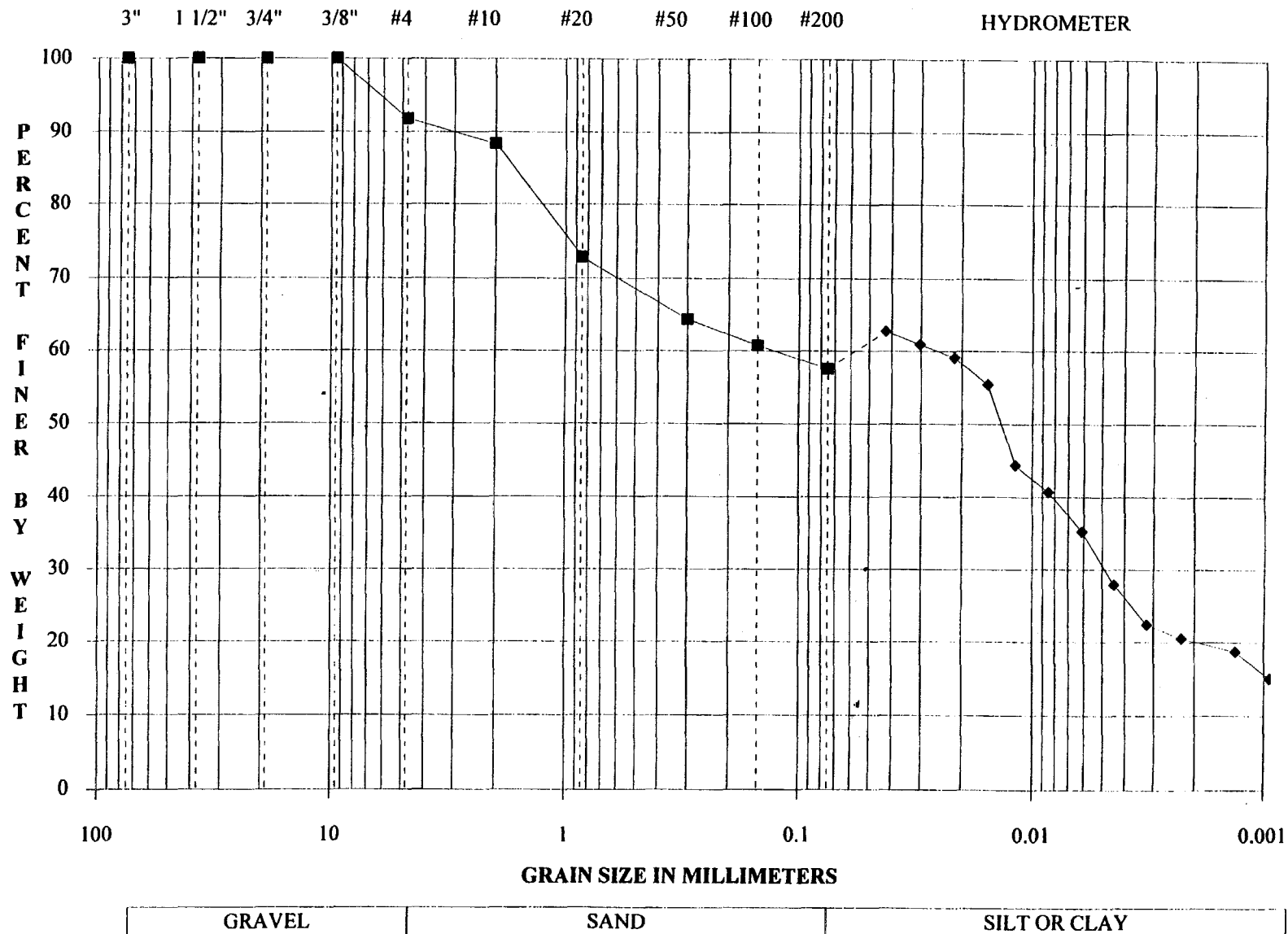
EFFECTIVE SIZES	
% Finer	Diameter mm
60	0.132
30	NA
10	NA
Uniformity Coefficient	Gradation Coefficient
NA	NA

SAMPLE DESCRIPTION
dark brown SILT of high plasticity with 8% gravel and 34% sand contains organics
Unified Soil Classification System (USCS) Group Symbol
MH

INDEX PROPERTIES		
% moisture dry basis		
Liquid Limit	Plastic Limit	Plasticity Index
180.2	147.3	32.9

NOTES
NA=NOT APPLICABLE

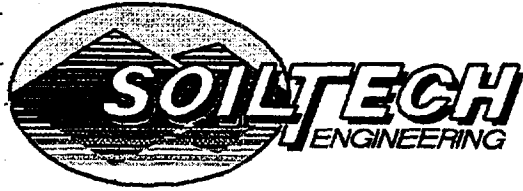
**PARTICLE-SIZE DISTRIBUTION CURVE FOR**  
**PROJECT SAMPLE 43-SHC-SD04-06, ETL SAMPLE 9505G704-006**  
U. S. STANDARD SIEVE SIZES



**PERMEABILITY ANALYTICAL RESULTS**

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7850 MARKET STREET  
WILMINGTON, NORTH CAROLINA 28405

OFFICE: 910-686-9114  
FAX: 910-686-9666

April 25, 1995

Baker Environmental, Incorporated  
Airport Office Park, Building 3  
420 Rouser Road  
Coraopolis, Pennsylvania 15108

Attention: Mr. Richard Bonelli

Reference: White Road Extension - Lot 1005  
Marine Corp. Air Station  
Jacksonville, North Carolina  
Job No. 684-95

Dear Mr. Bonelli:

Soil Tech Engineering, Inc. has recently conducted laboratory testing on two subsurface soil specimens recently delivered to our laboratory. We understand the samples were obtained from the Whites Road Extension Project on Lot 1005, at the Marine Corp. Air Station, located at Camp Lejeune, North Carolina.

Two undistributed soil samples were picked up from the project site and delivered to our laboratory. Once received, each sample was tested in accordance with the following procedures:

1. ASTM D-422, "Particle Size Analysis of Soils."
2. ASTM D-423 & D-424; "Liquid Limit, Plastic Limit and Plasticity Index of Soils"
3. Coefficient of Permeability - Falling Head Method, "Engineering Properties of Soils and Their Measurements" by Joseph E. Bowles.

Based on our laboratory testing, both samples were found to be a clayey sand which exhibited permeabilities ranging from  $4.4 \times 10^{-7}$  to  $1.4 \times 10^{-7}$  centimeters per second.

**Laboratory Analysis**  
**White Road Extension - Lot 1005**  
**Marine Corp. Air Station - Camp Lejune**

Location Depth	6-GW16DW	43GW01 DW
	10' - 12'	36.0' - 37.5'
<b>I) Permeability (cm/Sec)</b>	4.4 X 10 <sup>-7</sup> cm/sec	1.4 X 10 <sup>-7</sup> cm/sec
<b>Wet unit weight (pcf)</b>	129.8 pcf	127.1 pcf
<b>Existing Moisture, %</b>	15.6	28.4
<b>Saturation moisture, %</b>	16.1	27.5

**II) Particle Size Analysis**

Sieve Size	<u>% Passing</u>	
10	81.0	100.0
40	74.0	99.1
80	25.0	45.1
200	15.6	21.7
<b>Moisture Content</b>	22.7%	28.4%
<b>Soil Description</b>	Green Gray Clayey fine SAND with shell fragments	Gray clayey fine SAND (sc)

**III) Attenberg Limits**

<b>Plasticity Limit</b>	Non-Plastic	Non-Plastic
<b>Liquid Limit</b>	Non-Plastic	Non-Plastic
<b>Plasticity Index</b>	Non-Plastic	Non-Plastic

White Road Extension - Lot 1005  
April 25, 1995  
Page Two

Attached please find the results of our laboratory testing. If you have any questions after reviewing this letter, please do not hesitate to contact us.

Very truly yours,

SOIL TECH ENGINEERING

*Parks A. Downing Jr.*

Parks A. Downing, Jr.  
Manager

*John S. Tunstall*

John S. Tunstall, P.E.  
Staff Engineer

PADjr:JST/bs

684a4-25

Attachments



**TPH ANALYTICAL RESULTS**

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**SITE 43, AGAN STREET DUMP**  
**TOTAL PETROLEUM HYDROCARBONS**  
**REMEDIAL INVESTIGATION, CTO-0303**  
**MCB, CAMP LEJEUNE, NORTH CAROLINA**

LOCATION	43-WA-SB01A1-00	43-WA-SB01A2-00	43-WA-SB01A3-00	43-WA-SB01A4-00
DATE SAMP	05/01/95	05/01/95	05/01/95	05/01/95
DEPTH	0-6'	0-6'	0-6'	0-6'
DIESEL FUEL (MG/KG)	4.2 U	4.4 U	4.2 U	4.3 U
GASOLINE (UG/KG)	30 U	33 U	30 U	33 U

**APPENDIX M**  
**WET CHEMISTRY ANALYTICAL RESULTS**

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**SITE 43, AGAN STREET DUMP**  
**WET CHEMISTRY ANALYTICAL SUMMARY**  
**REMEDIAL INVESTIGATION, CTO-0303**  
**MCB, CAMP LEJEUNE, NORTH CAROLINA**

LOCATION	43-GW01-01	43-GW01-01D	43-GW01DW-01	43-GW02-01	43-GW03-01	43-GW04-01
DATE_SAMPLED	04/04/95	04/04/95	04/05/95	04/07/95	04/06/95	04/06/95
UNITS	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L
TOTAL DISSOLVED SOLIDS	210	200	400	64	130	98
TOTAL SUSPENDED SOLIDS	5 U	5 U	6	5 U	8	6

**SITE 43, AGAN STREET DUMP**  
**WET CHEMISTRY ANALYTICAL SUMMARY**  
**REMEDIAL INVESTIGATION, CTO-0303**  
**MCB, CAMP LEJEUNE, NORTH CAROLINA**

LOCATION	43-GW04DW-01	43-TW01-01	43-TW02-01	43-TW03-01	43-TW04-01
DATE_SAMPLED	04/04/95	04/05/95	04/06/95	04/07/95	04/07/95
UNITS	MG/L	MG/L	MG/L	MG/L	MG/L
TOTAL DISSOLVED SOLIDS	290	240	250	64	4000
TOTAL SUSPENDED SOLIDS	5 U	42	5	5 U	8

**SITE 43, AGAN STREET DUMP**  
**SEDIMENT TOTAL ORGANIC CARBON RESULTS**  
**REMEDIAL INVESTIGATION, CTO-0303**  
**MCB, CAMP LEJEUNE, NORTH CAROLINA**

LOCATION	43-EC-SD01-06	43-EC-SD01-06D	43-EC-SD01-612	43-SHC-SD01-06	43-SHC-SD01-612
DATE SAMPLED	05/05/95	05/05/95	05/05/95	05/05/95	05/05/95
DEPTH	0-6"	0-6"	6-12"	0-6"	6-12"
UNITS	%	%	%	%	%
TOTAL ORGANIC CARBON	24.5	23.6	71.2	0.48	1.7

**SITE 43, AGAN STREET DUMP  
SEDIMENT TOTAL ORGANIC CARBON RESULTS  
REMEDIAL INVESTIGATION, CTO-0303  
MCB, CAMP LEJEUNE, NORTH CAROLINA**

LOCATION	43-SHC-SD04-06	43-SHC-SD04-06D	43-SHC-SD04-612
DATE SAMPLED	05/05/95	05/05/95	05/05/95
DEPTH	0-6"	0-6"	6-12"
UNITS	%	%	%
TOTAL ORGANIC CARBON	36.5	28	28.3

**APPENDIX N**  
**AQUIFER TEST RESULTS**

---



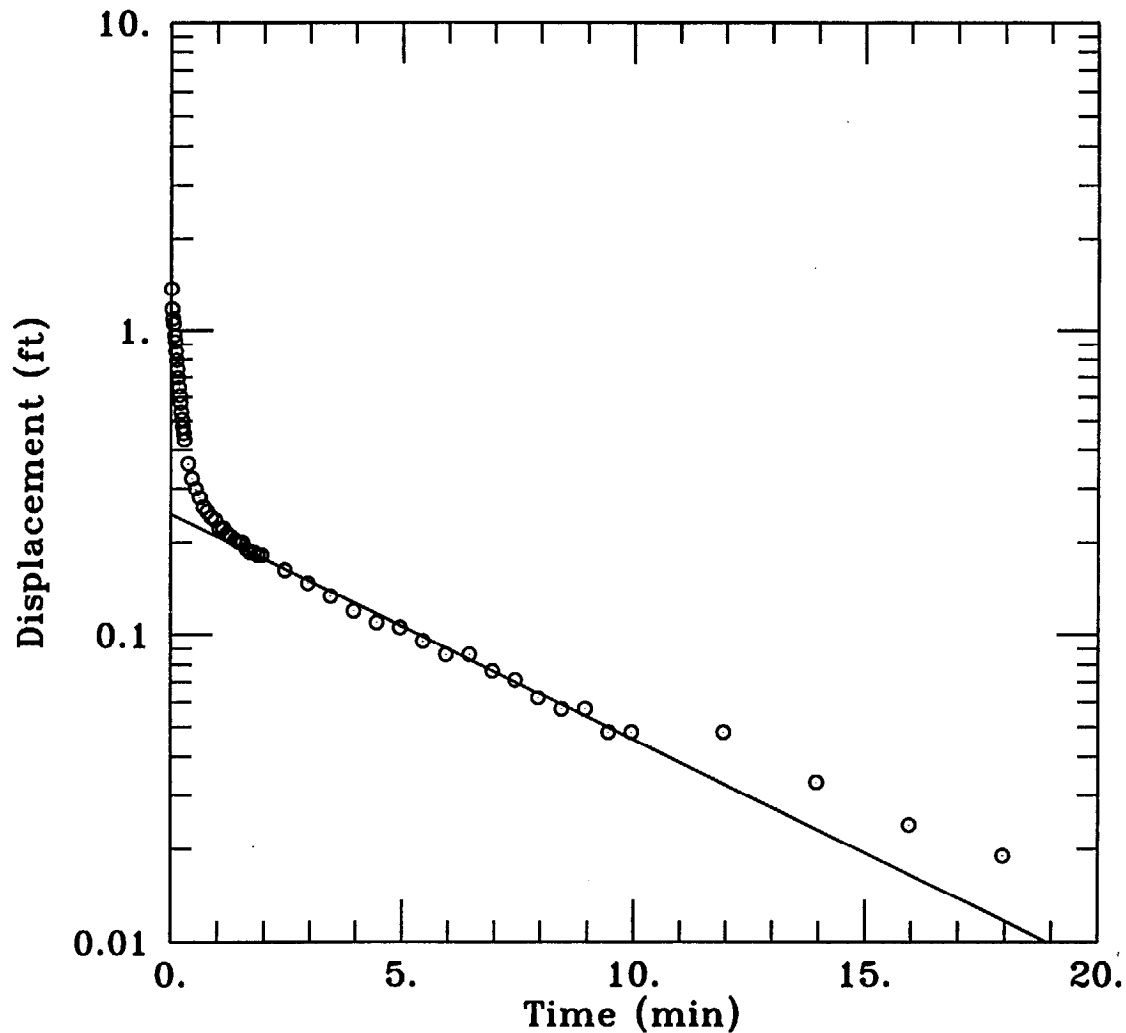
Client: LANTDIV

Company: BAKER ENVIRONMENTAL, INC.

Location: SITE 43, CAMP LEJEUNE

Project: CTO-303

## 43-GW01 RISING HEAD TEST



DATA SET:  
43GW01R.DAT  
05/30/95

AQUIFER MODEL:  
Unconfined  
SOLUTION METHOD:  
Bouwer-Rice

PROJECT DATA:  
test date: APRIL 7, 1995

TEST DATA:  
H0 = 1.371 ft  
rc = 0.0833 ft  
rw = 0.33 ft  
L = 10. ft  
b = 35. ft  
H = 8.5 ft

PARAMETER ESTIMATES:  
K = 0.9609 ft/day  
y0 = 0.2476 ft

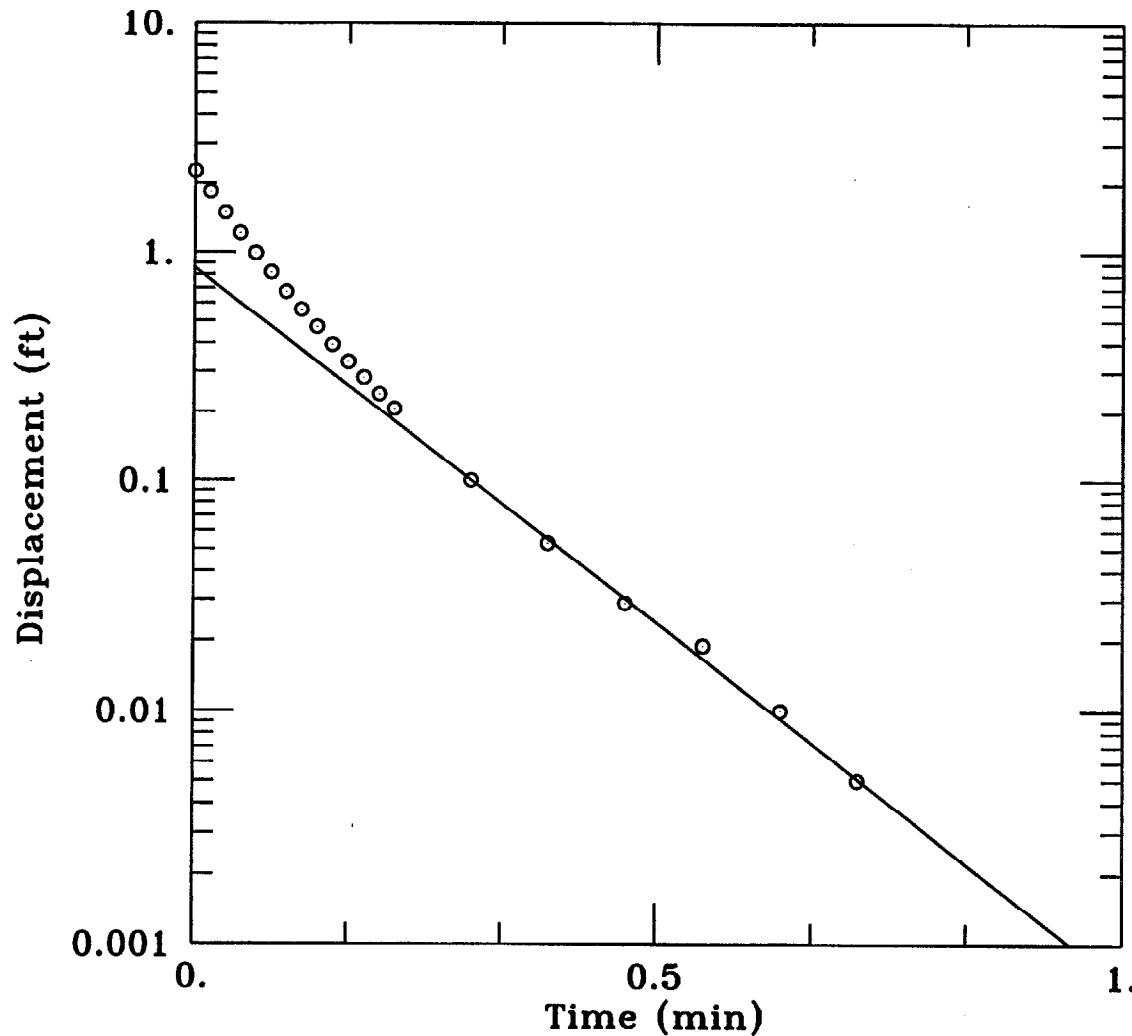
Client: LANTDIV

Company: BAKER ENVIRONMENTAL, INC.

Location: SITE 43, CAMP LEJEUNE

Project: CTO-303

## 43-GW01DW RISING HEAD TEST



DATA SET:  
43GW01DR.DAT  
05/30/95

AQUIFER MODEL:  
Unconfined  
SOLUTION METHOD:  
Bouwer-Rice

PROJECT DATA:  
test date: APRIL 7, 1995

TEST DATA:  
H0 = 2.256 ft  
rc = 0.0833 ft  
rw = 0.25 ft  
L = 5. ft  
b = 160. ft  
H = 58.42 ft

PARAMETER ESTIMATES:  
K = 59.25 ft/day  
y0 = 0.8573 ft

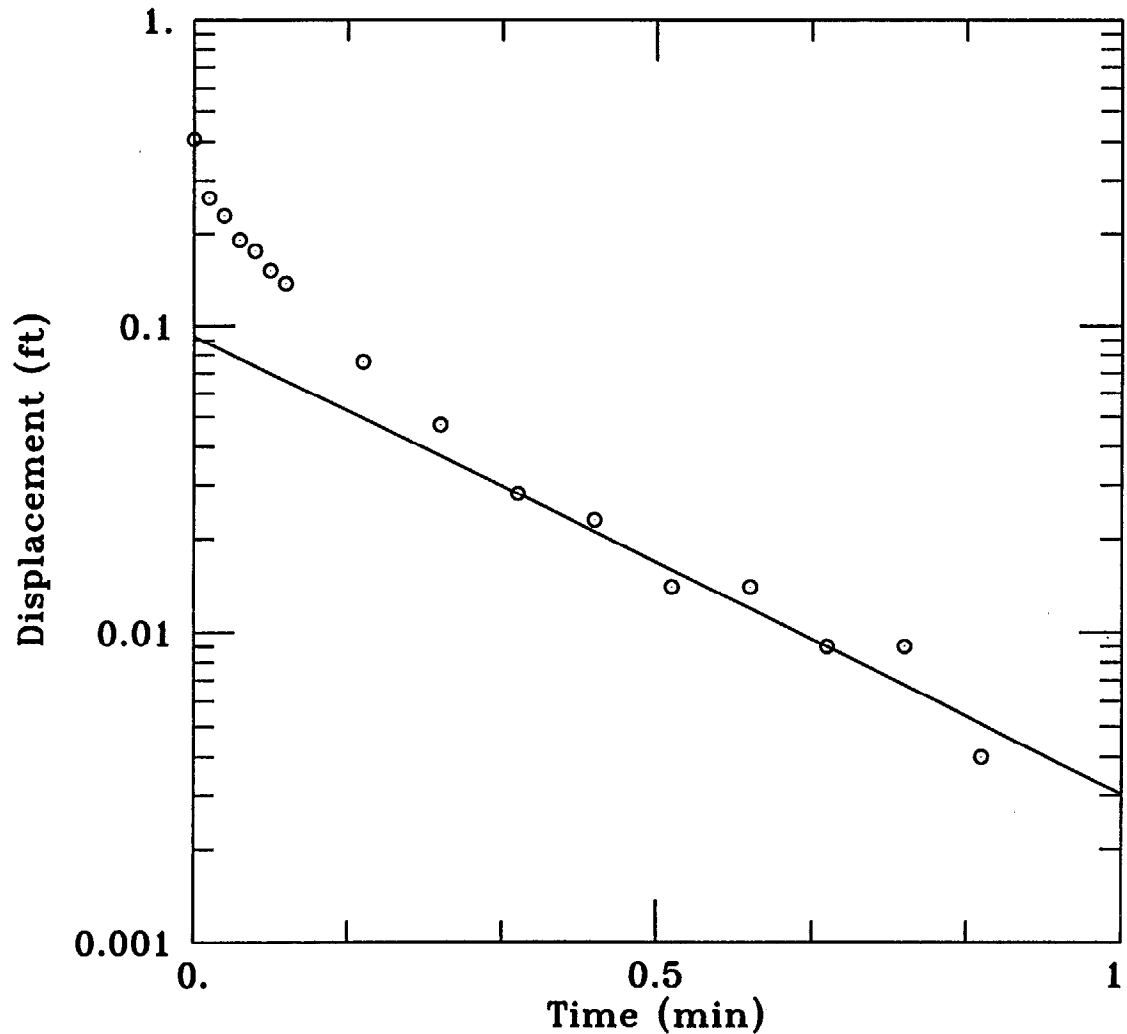
Client: LANTDIV

Company: BAKER ENVIRONMENTAL, INC.

Location: SITE 43, CAMP LEJEUNE

Project: CTO-303

## 43-GW01DW FALLING HEAD TEST



DATA SET:  
43GW01DF.DAT  
05/30/95

AQUIFER MODEL:  
Unconfined  
SOLUTION METHOD:  
Bouwer-Rice

PROJECT DATA:  
test date: APRIL 7, 1995

TEST DATA:  
H0 = 0.406 ft  
rc = 0.0833 ft  
rw = 0.25 ft  
L = 5. ft  
b = 160. ft  
H = 58.42 ft

PARAMETER ESTIMATES:  
K = 28.27 ft/day  
y0 = 0.09246 ft

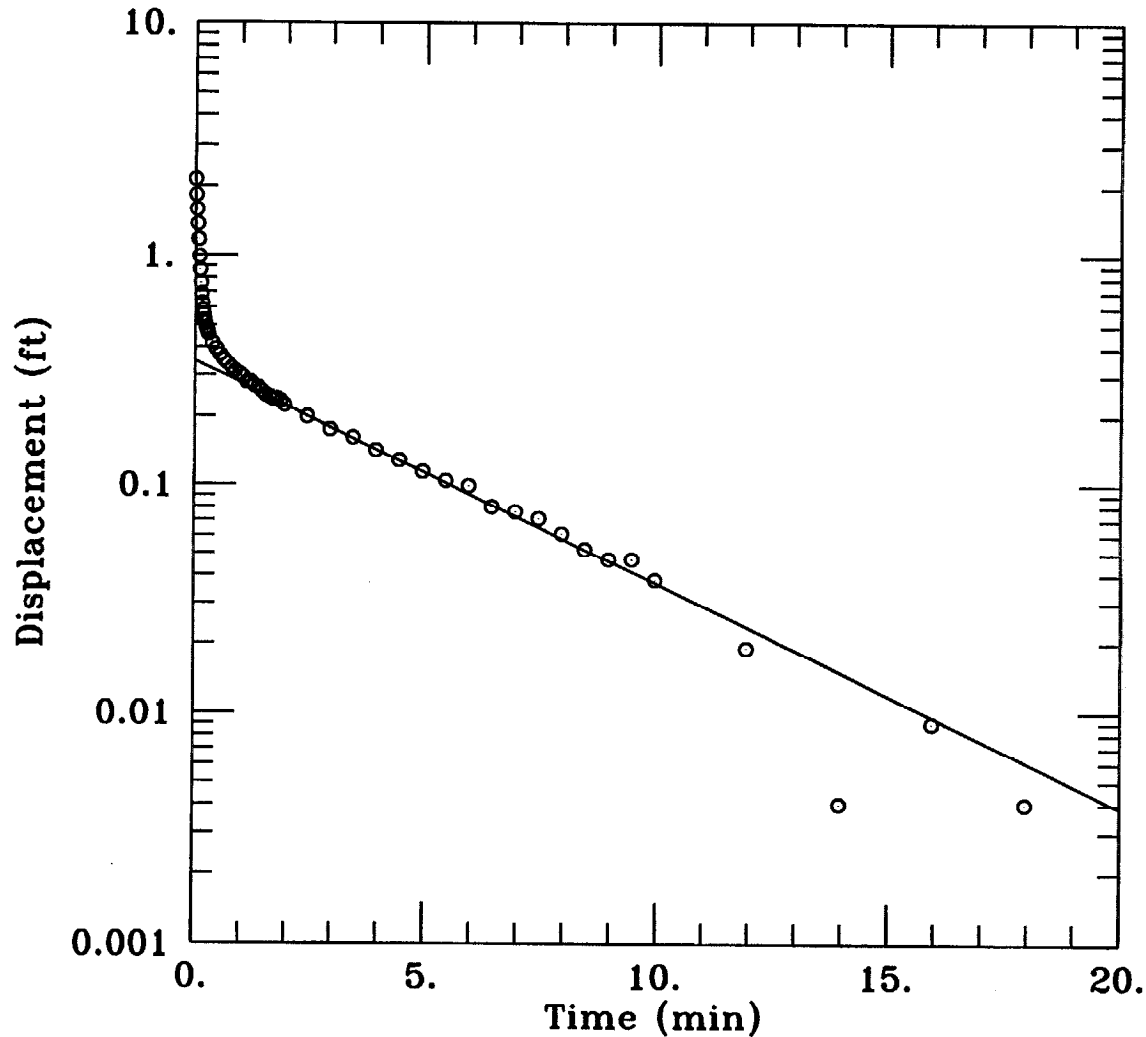
Client: LANTDIV

Company: BAKER ENVIRONMENTAL, INC.

Location: SITE 43, CAMP LEJEUNE

Project: CTO-303

## 43-GW02 RISING HEAD TEST



DATA SET:  
43GW02R.DAT  
05/30/95

AQUIFER MODEL:  
Unconfined  
SOLUTION METHOD:  
Bower-Rice

PROJECT DATA:  
test date: APRIL 8, 1995

TEST DATA:  
H0 = 2.136 ft  
rc = 0.0833 ft  
rw = 0.33 ft  
L = 10. ft  
b = 35. ft  
H = 9.07 ft

PARAMETER ESTIMATES:  
K = 1.293 ft/day  
y0 = 0.3466 ft

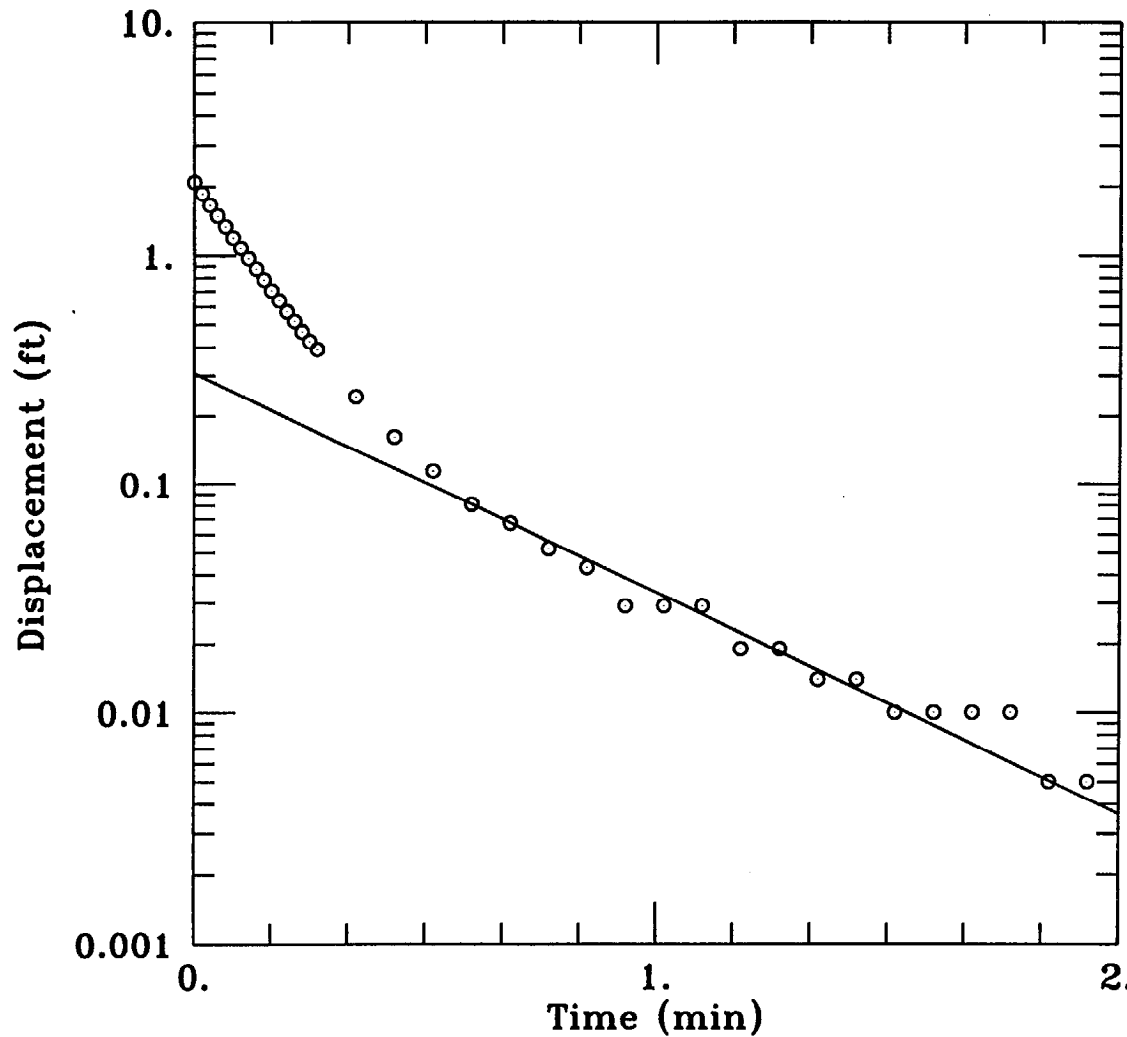
Client: LANTDIV

Company: BAKER ENVIRONMENTAL, INC.

Location: SITE 43, CAMP LEJEUNE

Project: CTO-303

### 43-GW04 RISING HEAD TEST



DATA SET:  
43GW04R.DAT  
05/30/95

AQUIFER MODEL:  
Unconfined  
SOLUTION METHOD:  
Bouwer-Rice

PROJECT DATA:  
test date: APRIL 8, 1995

TEST DATA:  
H0 = 2.081 ft  
rc = 0.0833 ft  
rw = 0.33 ft  
L = 15. ft  
b = 35. ft  
H = 13.35 ft

PARAMETER ESTIMATES:  
K = 9.863 ft/day  
y0 = 0.3064 ft

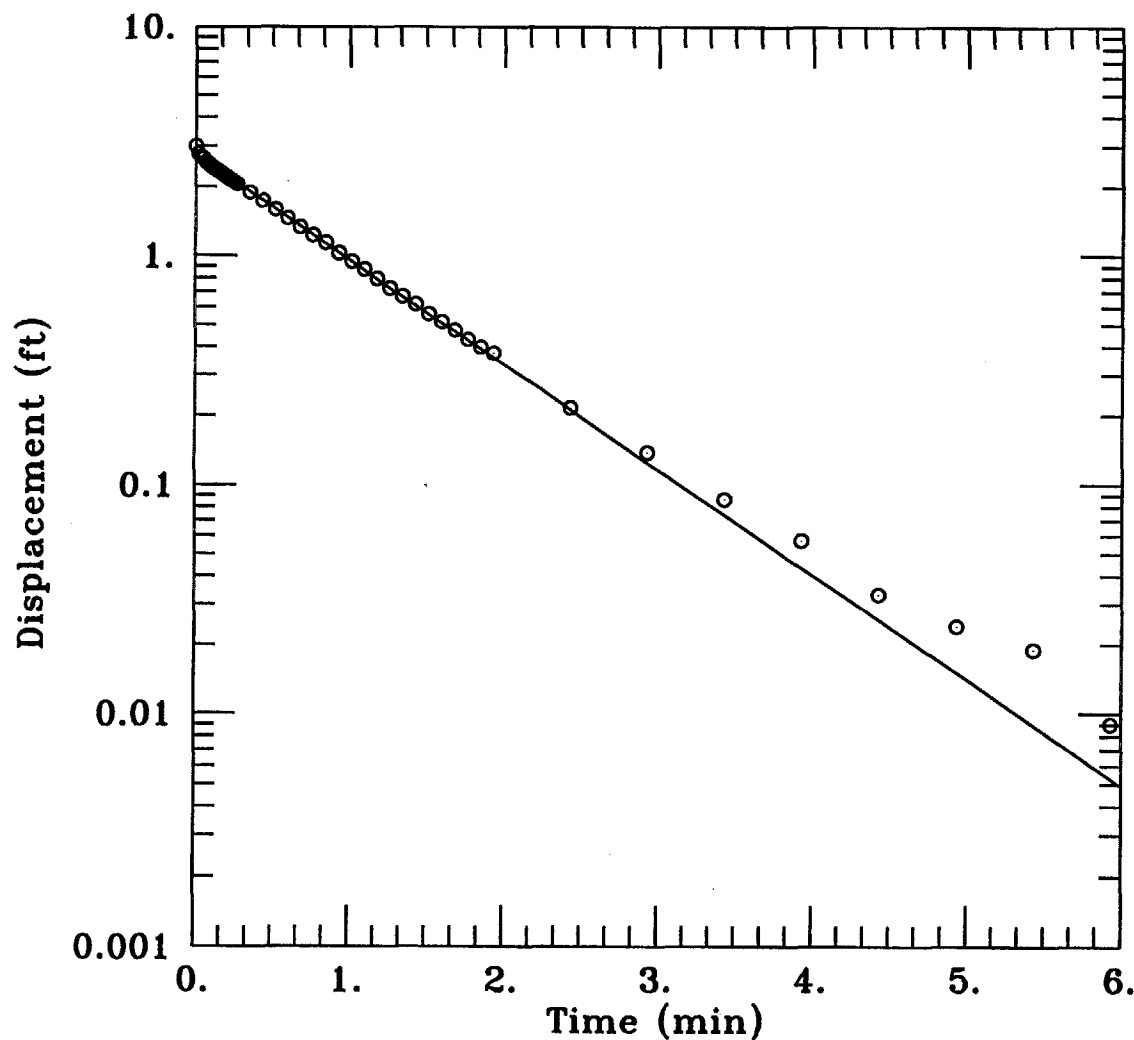
Client: LANTDIV

Company: BAKER ENVIRONMENTAL, INC.

Location: SITE 43, CAMP LEJEUNE

Project: CTO-303

## 43-GW04DW RISING HEAD TEST



DATA SET:  
43GW04DR.DAT  
05/30/95

AQUIFER MODEL:  
Unconfined  
SOLUTION METHOD:  
Bouwer-Rice

PROJECT DATA:  
test date: APRIL 8, 1995

TEST DATA:  
H<sub>0</sub> = 2.994 ft  
r<sub>c</sub> = 0.0833 ft  
r<sub>w</sub> = 0.25 ft  
L = 5. ft  
b = 160. ft  
H = 61.49 ft

PARAMETER ESTIMATES:  
K = 8.786 ft/day  
y<sub>0</sub> = 2.742 ft

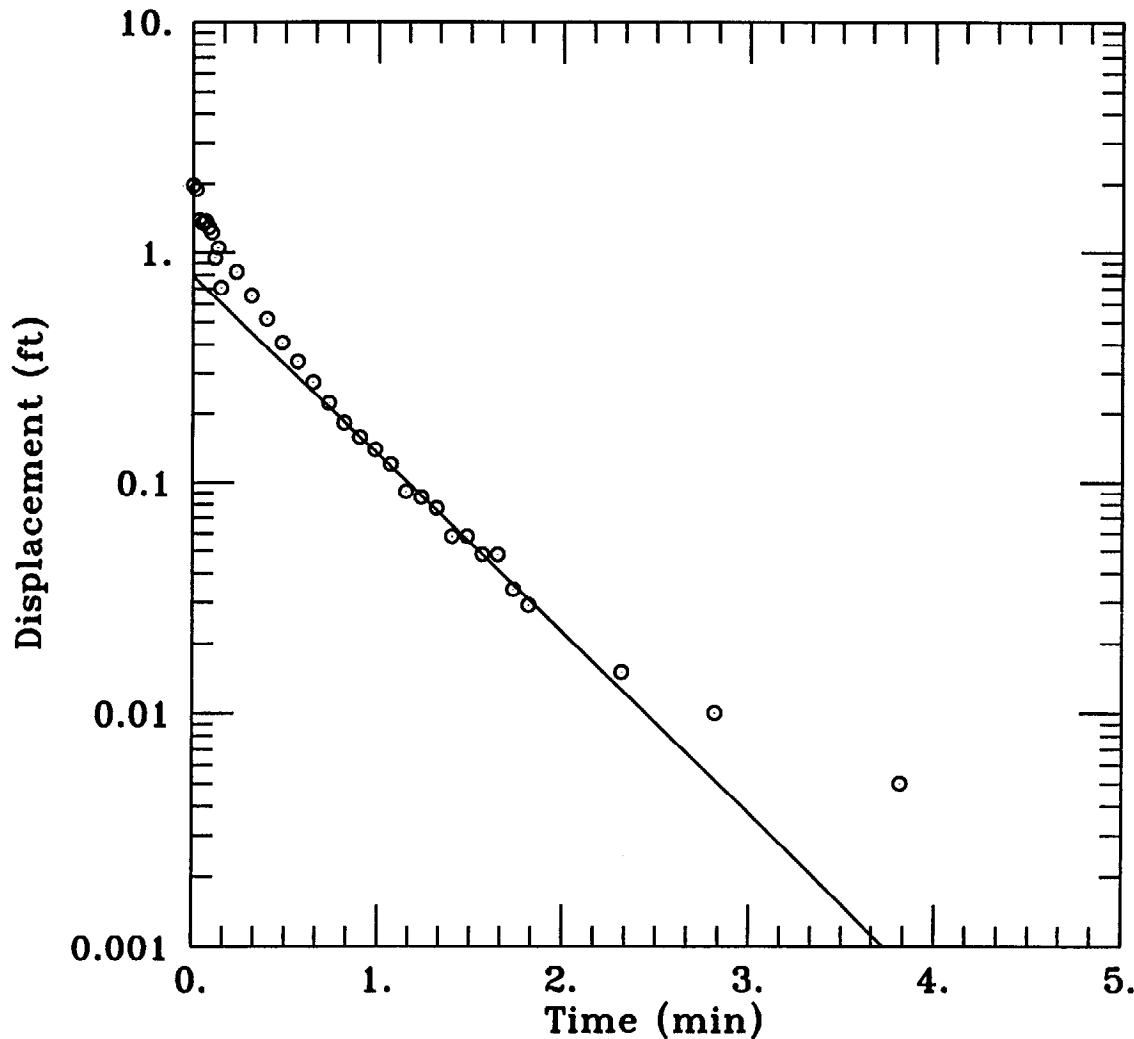
Client: LANTDIV

Company: BAKER ENVIRONMENTAL, INC.

Location: SITE 43, CAMP LEJEUNE

Project: CTO-303

## 43-GW04DW FALLING HEAD TEST



DATA SET:  
43GW04DF.DAT  
05/30/95

AQUIFER MODEL:  
Unconfined  
SOLUTION METHOD:  
Bouwer-Rice

PROJECT DATA:  
test date: APRIL 8, 1995

TEST DATA:  
H0 = 1.972 ft  
rc = 0.0833 ft  
rw = 0.25 ft  
L = 5. ft  
b = 160. ft  
H = 61.49 ft

PARAMETER ESTIMATES:  
K = 14.89 ft/day  
y0 = 0.7915 ft

**APPENDIX O**  
**AQUIFER PROPERTY CALCULATIONS**

---



S.O. No. 62470-303

Subject: GROUNDWATER FLOW GRADIENTS

SITE 43 Sheet No. 1 of 1

Drawing No. \_\_\_\_\_

Computed by MKD Checked By \_\_\_\_\_ Date JAN 10, 1996



EQUATION  $i = \Delta E / D$  WHERE:  $\Delta E =$  CHANGE IN GROUNDWATER ELEVATION  
 $D =$  DISTANCE OVER WHICH  $\Delta E$  OCCURS

SHALLOW WELLS

$$\begin{aligned} \Delta E &= 1.0 \text{ ft} & i &= 1.0 \text{ ft} / 280 \text{ ft} \\ D &= 280 \text{ ft} & &\approx 0.004 \text{ ft/ft} \end{aligned}$$

DEEP WELLS

$$\begin{aligned} \Delta E &= 0.5 \text{ ft} & i &= 0.5 \text{ ft} / 374 \text{ ft} \\ D &= 374 \text{ ft} & &\approx 0.001 \text{ ft/ft} \end{aligned}$$

S.O. No. 62470-303

Subject: GROUNDWATER FLOW VELOCITY CALCULATIONS



SITE 43

Sheet No. 1 of 1

Drawing No. \_\_\_\_\_

Computed by MKD Checked By JEZ 1/2/96 Date DEC. 8, 1995

$$V = Ki / n_e$$

WHERE

V = VELOCITY

K = HYDRAULIC CONDUCTIVITY

i = GRADIENT

$n_e$  = EFFECTIVE POROSITY

43-GW01

K = 1.0 ft/day

i = 0.01 ft/ft

$n_e$  = ASSUME 30%

$$V = (1.0 \text{ ft/day}) (0.01 \text{ ft/ft}) / 0.30 \text{ ok}$$

$$\approx 0.03 \text{ ft/day}$$

43-GW02

K = 1.3 ft/day

i = 0.01 ft/ft

$n_e$  = ASSUME 30%

$$V = (1.3 \text{ ft/day}) (0.01 \text{ ft/ft}) / 0.30 \text{ ok}$$

$$\approx 0.04 \text{ ft/day}$$

43-GW04

K = 9.9 ft/day

i = 0.01 ft/ft

$n_e$  = ASSUME 30%

$$V = (9.9 \text{ ft/day}) (0.01 \text{ ft/ft}) / 0.30 \text{ ok}$$

$$\approx 0.33 \text{ ft/day}$$

43-GW01DW

K = 59.3 ft/day

i = 0.001 ft/ft

$n_e$  = ASSUME 30%

$$V = (59.3 \text{ ft/day}) (0.001 \text{ ft/ft}) / 0.30 \text{ ok}$$

$$\approx 0.20 \text{ ft/day}$$

43-GW04 DW

K = 8.8 ft/day

i = 0.001 ft/ft

$n_e$  = ASSUME 30%

$$V = (8.8 \text{ ft/day}) (0.001 \text{ ft/ft}) / 0.30 \text{ ok}$$

$$\approx 0.03 \text{ ft/day}$$

**APPENDIX P**  
**BASE BACKGROUND ANALYTICAL RESULTS AND**  
**EVALUATION REPORT**

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This appendix provides background concentration values for inorganic elements in the following media: surface and subsurface soils, groundwater, surface water, and sediment. These background samples were collected in areas not known to have been impacted by site operations and have been collected during Baker Remedial Investigations since 1993. The following information regarding base background samples is provided in the back of each media section:

- minimum concentration per inorganic analyte
- maximum concentration per inorganic analyte
- average concentration per inorganic analyte
- twice the average concentration per inorganic analyte (soils only).

The minimum and maximum concentrations are used for comparison bases only. Whereas twice the average concentration is used to compare the inorganic analytical results from on-site soil samples to what is considered to be naturally occurring by USEPA Region IV.

**SOIL**

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**BASE BACKGROUND  
SURFACE SOILS  
TAL INORGANICS  
MCB CAMP LEJEUNE, NORTH CAROLINA**

	6-201N-SB11-00	6-201N-SB12-00	6-201C-SB38-00	6-201C-SB39-00	78-BB-SB-00	41-BB-SB01-00	41-BB-SB02-00
Aluminum	1120	45.25	748	245	1490	528	1430
Antimony	4.7	4.8	1.4	1.3	0.33	2.07	0.865
Arsenic	0.28	0.29	0.91	0.28	0.22	0.356	0.317
Barium	2	2.05	16.5	3.5	8.6	1.525	4.06
Beryllium	0.095	0.1	0.03	0.03	0.11	0.1	0.09
Cadmium	0.285	0.295	0.58	0.175	0.55	0.392	0.349
Calcium	178	108	10700	402	941	18.3	54.6
Chromium	0.475	0.49	1.6	0.33	2.2	1.02	0.91
Cobalt	0.85	0.9	0.195	0.185	1.8	1.965	1.75
Copper	0.55	0.6	3.1	0.75	2	2	87.2
Iron	525	160	684	238	1020	83	970
Lead	2	3	62.9	25.1	20.4	2.59	10.9
Magnesium	11.65	10.1	200	26	118	8.85	39.1
Manganese	3.1	1	16	4.5	11.1	0.87	10.2
Mercury	0.01	0.01	0.05	0.06	0.05	0.0305	0.078
Nickel	1.6	1.65	0.8	0.75	2.2	3.55	3.15
Potassium	36.55	37.5	54.5	30.6	102	91.5	81.5
Selenium	0.47	0.485	0.5	0.465	0.31	0.311	0.277
Silver	0.95	1	0.195	0.185	0.33	0.1965	0.175
Sodium	19.65	15.85	14	4.7	67.5	44.1	39.3
Thallium	0.19	0.195	0.205	0.185	0.11	0.565	0.505
Vanadium	1.05	0.8	2.8	1.6	5.3	2.505	2.23
Zinc	0.55	0.8	23.1	4.6	28.3	2.66	6.11
Cyanide					0.265	1.23	1.09

Concentrations are in milligrams per kilogram (mg/kg).

Qualifiers have been removed per Baker's standards.

Qualifiers R, U, and UJ have been given one-half the detection value.

Qualifiers J, NJ, and B have been removed with no detection value change.

**BASE BACKGROUND  
SURFACE SOILS  
TAL INORGANICS  
MCB CAMP LEJEUNE, NORTH CAROLINA**

	41-BB-SB03-00	41-BB-SB04-00	69-BB-SB01-00	69-BB-SB02-00	69-BB-SB03-00	69-BB-SB04-00	74-BB-SB01-00
Aluminum	2100	5370	1310	4150	9570	5360	3110
Antimony	0.87	0.94	0.85	0.95	0.95	0.95	0.905
Arsenic	0.3205	0.345	0.31	0.345	0.79	0.35	0.3325
Barium	4.53	13.4	5.6	15.4	19.6	20.8	11.1
Beryllium	0.09	0.095	0.14	0.155	0.155	0.155	0.148
Cadmium	0.3525	0.38	0.26	0.285	0.29	0.29	0.2695
Calcium	79.2	46.3	28.2	43.6	282	53	181
Chromium	2.64	3.24	0.75	4	12.5	5.8	0.84
Cobalt	1.77	1.905	2.1	2.3	2.35	2.35	2.225
Copper	1.8	1.94	1.75	1.9	1.95	1.95	4.56
Iron	1120	2160	425	1430	9640	3890	1740
Lead	9.98	6.61	2.8	6	5.3	5.6	5.19
Magnesium	74	144	37.3	91.8	610	247	70
Manganese	11.6	11.8	15.1	12.7	12.3	8.3	9.44
Mercury	0.057	0.08	0.015	0.06	0.045	0.025	0.04
Nickel	3.2	3.45	2.9	1.6	1.65	1.65	1.56
Potassium	190	177	32.25	35.5	361	106	87.5
Selenium	0.2795	0.301	0.27	0.295	0.3	0.3	0.29
Silver	0.177	0.1905	0.045	0.045	4.3	0.39	0.046
Sodium	39.65	42.75	20	22	22.4	22.3	70.4
Thallium	0.51	0.55	0.495	0.55	0.55	0.55	0.53
Vanadium	2.255	2.43	1.8	1.95	13.5	5.6	5.21
Zinc	5.97	7.15	3.1	5.2	10.8	7.9	1.27
Cyanide	1.1	1.19	2.2	2.4	2.4	2.4	1.15

Concentrations are in milligrams per kilogram (mg/kg).

Qualifiers have been removed per Baker's standards.

Qualifiers R, U, and UJ have been given one-half the detection value.

Qualifiers J, NJ, and B have been removed with no detection value change.

BASE BACKGROUND  
SURFACE SOILS  
TAL INORGANICS  
MCB CAMP LEJEUNE, NORTH CAROLINA

	74-BB-SB02-00	74-BB-SB03-00	74-BB-SB04-00	1-BB-SB38-00	1-BB-SB39-00	1-GW13-00	28-BB-SB37-00	28-BB-SB38-00
Aluminum	1730	1000	2100	3920	4930	1600	2840	379
Antimony	0.925	0.855	0.96	3.6	3.15	8.0	3.55	2.9
Arsenic	0.339	0.314	0.352	0.315	0.28	0.29	0.31	0.255
Barium	1.6	3.12	16	9.6	9.3	2.8	5.1	1.8
Beryllium	0.151	0.14	0.1565	0.105	0.10	0.095	0.105	0.085
Cadmium	0.275	0.2545	0.285	0.315	0.28	0.285	0.31	0.255
Calcium	46.9	43.9	377	538	353	248	114	13.10
Chromium	2.7	0.795	1.98	3.5	4.7	4.1	2.0	0.60
Cobalt	2.27	2.1	2.355	0.42	0.375	0.38	0.415	0.34
Copper	3.92	1.755	1.965	1.6	0.6	1.9	0.6	0.50
Iron	401	787	1640	2270	1470	1000	1210	444
Lead	3.79	1.14	142	5.9	4.5	4.2	2.8	1.7
Magnesium	37.5	16.1	52.5	152	183	47.2	68.8	12.9
Manganese	3.13	7.37	4.61	10.6	4.2	5.9	2.7	3.3
Mercury	0.048	0.0305	0.05	0.03	0.025	0.03	0.025	0.025
Nickel	1.59	1.475	1.65	0.8	0.65	0.65	0.750	0.6
Potassium	89	82.5	92.5	149	153	20.650	29.75	8.35
Selenium	0.296	0.274	0.307	0.42	0.375	0.38	0.415	0.34
Silver	0.047	0.0435	0.0485	0.5	0.465	0.475	0.5	0.425
Sodium	71.8	87.6	122	11.0	17.2	7.25	28.5	18.2
Thallium	0.54	0.4985	0.56	0.42	0.38	0.38	0.415	0.34
Vanadium	1.94	1.8	4.69	7.9	6.1	3.5	3.6	2.1
Zinc	1.15	1.97	2.87	7.2	4.0	1.4	0.9	0.71
Cyanide	1.17	1.08	1.21					

Concentrations are in milligrams per kilogram (mg/kg).

Qualifiers have been removed per Baker's standards.

Qualifiers R, U, and UJ have been given one-half the detection value.

Qualifiers J, NJ, and B have been removed with no detection value change.



**BASE BACKGROUND  
SURFACE SOILS  
TAL INORGANICS  
MCB CAMP LEJEUNE, NORTH CAROLINA**

	28-GW09DW-00	30-BB-SB12-00	30-BB-SB13-00	30-BB-SB14-00	30-BB-SB15-00	30-BB-SB16-00	30-GW03-00	35-SS01-00
Aluminum	5460	54.6	24.9	49.2	37.5	196	17.7	2220.0
Antimony	3.35	3.2	3.2	3.3	3.5	3.650	3.9	2.45
Arsenic	1.8	0.28	0.29	0.29	0.31	0.325	0.34	0.065
Barium	11.6	1.8	0.7	0.7	0.7	3.100	0.8	15.6
Beryllium	0.10	0.095	0.10	0.10	0.10	0.110	0.12	0.11
Cadmium	0.295	0.28	0.29	0.29	0.31	0.325	0.34	0.04
Calcium	368	11.45	4.3	9.9	9.0	172	5.2	605.0
Chromium	6.0	1.6	0.7	1.9	0.7	0.75	0.8	1.9
Cobalt	0.91	0.375	0.38	0.38	0.41	0.43	0.45	0.60
Copper	2.9	0.55	0.6	0.6	0.6	0.65	0.7	3.9
Iron	2250	276	102	218	69.7	167	80.4	1250.0
Lead	11.6	3.3	0.47	2.4	0.73	4.4	0.86	3.60
Magnesium	157	6.5	2.6	2.6	2.8	37.1	3.1	71.6
Manganese	4.1	11.9	4.4	9.5	1.3	2.5	2.3	5.5
Mercury	0.025	0.06	0.02	0.03	0.05	0.03	0.03	0.065
Nickel	1.9	0.65	0.7	0.7	1.7	0.9	0.8	1.3
Potassium	158	8.25	11.1	3.8	1.0	29.6	1.2	129.5
Selenium	0.94	0.375	0.38	0.38	0.41	0.43	0.45	0.075
Silver	0.49	0.47	0.47	0.48	0.5	0.6	0.6	0.16
Sodium	15.0	14.8	26.0	4.9	5.2	18.2	5.8	126.00
Thallium	0.395	0.375	0.38	0.38	0.41	0.43	0.45	0.06
Vanadium	8.3	1.7	0.75	1.7	0.31	0.76	0.34	3.60
Zinc	6.6	0.35	0.30	0.48	1.7	2.0	1.2	7.4
Cyanide								

Concentrations are in milligrams per kilogram (mg/kg).  
Qualifiers have been removed per Baker's standards.  
Qualifiers R, U, and UJ have been given one-half the detection value.  
Qualifiers J, NJ, and B have been removed with no detection value change.

**BASE BACKGROUND  
SURFACE SOILS  
TAL INORGANICS  
MCB CAMP LEJEUNE, NORTH CAROLINA**

	BB-SB02-00	BB-SB03-00	16-BB-SB01-00	16-BB-SB02-00	16-BB-SB03-00	80-BB-SB01-00	80-BB-SB02-00	80-BB-SB03-00
Aluminum	3630.0	1950.0	1710.0	3630	1950	2240.0	7770.0	2850.0
Antimony	5.00	5.55	5.05	5	5.55	1.35	1.40	1.40
Arsenic	1.000	1.100	1.000	1	1.1	0.250	3.200	0.265
Barium	7.4	7.0	4.1	7.4	7	9.9	13.0	11.6
Beryllium	0.10	0.11	0.23	0.1	0.11	0.020	0.10	0.06
Cadmium	0.50	0.55	1.00	0.5	0.55	0.165	0.175	0.175
Calcium	113.0	227.0	96.8	113	227	505	997.0	239.0
Chromium	3.3	2.5	1.0	3.3	2.5	1.200	10.0	2.0
Cobalt	1.00	1.10	1.00	1	1.1	0.205	1.30	0.45
Copper	1.0	1.1	1.0	1	1.1	1.3	2.2	0.92
Iron	2150.0	1610.0	1260.0	2150	1610	604.0	5550.0	1450.0
Lead	5.20	10.20	7.40	5.2	10.2	7.5	8.90	8.30
Magnesium	99.1	69.4	42.9	99.1	69.4	94.8	289.0	94.2
Manganese	7.4	5.5	6.9	7.4	5.5	66.0	30.7	12.8
Mercury	0.055	0.055	0.055	0.055	0.055	0.050	0.050	0.060
Nickel	2.0	2.25	2.00	2	2.25	1.4	2.70	1.40
Potassium	1.0	111.5	101.0	100	111.5	163.0	416.0	90.9
Selenium	0.500	0.550	0.500	0.5	0.55	0.285	0.300	0.300
Silver	0.50	0.55	0.50	0.5	0.55	0.220	0.23	0.23
Sodium	25.20	26.20	35.90	25.2	26.2	24.1	77.10	72.70
Thallium	1.00	1.10	1.00	1	1.1	0.435	0.46	0.465
Vanadium	5.40	3.10	4.50	5.4	3.1	2.3	14.70	4.30
Zinc	8.7	22.1	9.2	4.35	22.1	6.1	12.9	3.5
Cyanide								

Concentrations are in milligrams per kilogram (mg/kg).

Qualifiers have been removed per Baker's standards.

Qualifiers R, U, and UJ have been given one-half the detection value.

Qualifiers J, NJ, and B have been removed with no detection value change.

**BASE BACKGROUND  
SURFACE SOILS  
TAL INORGANICS  
MCB CAMP LEJEUNE, NORTH CAROLINA**

	7-BB-SB01-00	7-BB-SB02-00	7-BB-SB03-00	36-BB-SB01-00	36-BB-SB02-00	36-BB-SB03-00	43-BB-SB01-00	43-BB-SB02-00
Aluminum	7180.0	3770.0	5800.0	6950	2300	2380	3520	2510
Antimony	6.05	5.50	5.60	1.15	1.2	1.75	2.35	2.3
Arsenic	1.200	1.100	3.900	0.42	0.205	0.17	0.51	0.55
Barium	12.0	10.2	9.7	13.2	12.4	14	6.3	10.8
Beryllium	0.26	0.11	0.11	0.03	0.035	0.075	0.105	0.1
Cadmium	0.600	0.550	0.550	0.31	0.3	0.235	0.335	0.31
Calcium	397.0	69.5	615.0	462	897	1690	1180	908
Chromium	8.4	3.8	10.6	7.9	2.7	3.1	2.8	2.8
Cobalt	1.20	1.10	1.10	0.245	0.255	0.255	0.345	0.335
Copper	1.20	1.10	2.30	2.8	2.8	4.9	0.7	11.2
Iron	3050.0	2170.0	7510.0	6670	1750	1560	1050	2050
Lead	7.10	6.40	8.70	10.3	17.5	39.6	6.6	13.6
Magnesium	104.0	50.5	79.5	185	105	86	68.9	56.4
Manganese	3.25	3.1	1.8	6.9	14.3	21.4	3	5
Mercury	0.060	0.060	0.060	0.045	0.05	0.045	0.13	0.12
Nickel	2.40	2.20	2.25	0.45	1.6	0.9	1.25	1.2
Potassium	121.0	110.0	111.5	138	60.2	58	78.5	76
Selenium	0.600	0.550	1.300	0.12	0.16	0.135	0.195	0.17
Silver	0.60	0.55	0.55	0.265	0.275	0.255	0.345	0.335
Sodium	15.80	15.25	17.30	13.1	14.1	14.05	14.45	9.9
Thallium	1.200	1.100	1.100	0.055	0.075	0.1	0.12	0.105
Vanadium	9.70	5.40	18.20	15.4	8.3	6.4	1.6	3.7
Zinc	5.3	2.9	3.8	6	12.7	20.8	2.6	16.7
Cyanide								

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Qualifiers J, NJ, and B have been removed with no detection value change.

**BASE BACKGROUND  
SURFACE SOILS  
TAL INORGANICS  
MCB CAMP LEJEUNE, NORTH CAROLINA**

	43-BB-SB03-00	44-BB-SB01-00	54-BB-SB01-00	54-BB-SB02-00	86-BB-SB01-00	MIN	MAX	AVG	2Xaverage
Aluminum	2730	4950	8990	4950	6590	17.7	9570	2970.297	5940.594
Antimony	2.2	1.2	1.25	1.3	1.95	0.33	8	2.672	5.344
Arsenic	0.67	1.3	1.1	1.2	0.45	0.065	3.9	0.652	1.305
Barium	13	14.9	18.7	13.3	13.9	0.65	20.8	8.680	17.360
Beryllium	0.095	0.08	0.0345	0.0375	0.085	0.02	0.26	0.103	0.205
Cadmium	0.3	0.325	0.335	0.34	0.265	0.04	1	0.344	0.688
Calcium	1610	668	1020	3590	3960	4.25	10700	698.394	1396.788
Chromium	2.9	5.9	9.2	6.8	6.5	0.33	12.5	3.346	6.693
Cobalt	0.32	0.43	0.375	0.41	0.285	0.185	2.355	0.961	1.923
Copper	0.75	2.5	2.1	4.2	2.2	0.5	87.2	3.600	7.200
Iron	1110	3220	4700	2780	4030	69.7	9640	1877.531	3755.063
Lead	13.8	19.6	3.95	12.3	21.5	0.47	142	11.875	23.749
Magnesium	60.5	189	371	259	233	2.55	610	102.875	205.751
Manganese	6.5	6.7	14.8	19.9	11.5	0.87	66	9.248	18.497
Mercury	0.05	0.06	0.041	0.04	0.04	0.01	0.13	0.047	0.094
Nickel	1.15	1.7	1.3	1.6	7.2	0.45	7.2	1.717	3.434
Potassium	73.5	220	223	175	160	1	416	99.805	199.610
Selenium	0.185	0.34	0.145	0.13	0.43	0.075	1.3	0.373	0.746
Silver	0.32	0.28	0.285	0.295	0.285	0.0435	4.3	0.438	0.875
Sodium	12.7	12.75	8.3	9.55	18.3	4.7	126	29.649	59.298
Thallium	0.11	0.065	0.065	0.06	0.13	0.055	1.2	0.450	0.899
Vanadium	4	11.8	13.4	9.1	48.6	0.305	48.6	5.814	11.628
Zinc	4.5	7.4	7.2	9.1	18.4	0.3	28.3	6.940	13.880
Cyanide						0.265	2.4	1.453	2.905

Concentrations are in milligrams per kilogram (mg/kg).

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Qualifiers R, U, and UJ have been given one-half the detection value.

Qualifiers J, NJ, and B have been removed with no detection value change.

**BASE BACKGROUND  
SUBSURFACE SOIL  
TAL INORGANICS  
MCB CAMP LEJEUNE, NORTH CAROLINA**

	6-201N-SB11-07	6-201N-SB12-02	6-201C-SB38-01	6-201C-SB39-04	78-BB-SB-01	2-GW09-01	1-BB-SB38-05	1-BB-SB39-04	1-BB-SB39-06	1-GW13-04
Aluminum	672	857	3620	2970	10200	8520	4580	6180	5980	4160
Antimony	4.7	4.85	1.4	1.25	0.355	1.6	4.2	3.25	2.95	6.9
Arsenic	0.31	0.315	0.033	0.305	0.24	0.47	1.1	0.29	0.26	0.285
Barium	2	2.05	7.6	6.5	10.9	6.6	7.5	11.800	8.600	7.500
Beryllium	0.095	0.1	0.03	0.025	0.12	0.23	0.125	0.095	0.085	0.095
Cadmium	0.285	0.295	0.57	0.17	0.6	1.2	0.370	0.290	0.260	0.285
Calcium	5.35	5.4	4410	12.1	81.3	10.6	35.600	12.250	19.700	52.400
Chromium	1.6	1.85	6	2.2	5.7	8.7	10.5	5.5	5.3	7.1
Cobalt	0.65	0.9	0.235	0.175	0.95	1.9	0.495	0.385	0.350	0.380
Copper	0.475	0.6	1.7	0.65	0.95	0.47	6.6	0.6	0.5	2.1
Iron	257	126	456	833	822	2840	4940	1510	1210	567
Lead	1.2	1.6	11.5	2.7	6.1	4.3	5.1	3.8	3.1	3.3
Magnesium	13.1	12.7	133	86.8	188	260	222	189	217	131
Manganese	0.475	0.395	7.5	2.6	2.4	5.2	4.1	4.9	5.4	2.0
Mercury	0.01	0.01	0.04	0.015	0.045	0.11	0.025	0.025	0.020	0.050
Nickel	1.6	1.7	0.8	0.7	2.4	4.7	0.850	2.300	0.600	0.650
Potassium	48.9	40.8	84.7	187	123	184	409	191	268	98
Selenium	0.5	0.5	0.55	0.5	0.29	0.115	0.495	0.385	0.350	0.380
Silver	0.95	1	0.195	0.175	0.355	0.7	0.600	0.480	0.435	0.475
Sodium	12.7	12.15	13.25	7.25	44.9	31.5	12.850	21.6	9.2	9.6
Thallium	0.205	0.21	0.22	0.2	0.12	0.23	0.495	0.385	0.350	0.380
Vanadium	0.75	1	3	4.7	7.4	13.4	12.200	6.500	6.100	3.500
Zinc	0.475	0.395	11.6	0.9	2.1	1.4	4.700	2.900	2.400	1.000

**BASE BACKGROUND  
SUBSURFACE SOIL  
TAL INORGANICS  
MCB CAMP LEJEUNE, NORTH CAROLINA**

	1-GW13-08	28-BB-SB37-03	28-BB-SB38-04	28-GW09DW-01	30-BB-SB12-03	30-BB-SB13-01	30-BB-SB14-01	30-BB-SB15-01	30-BB-SB16-02	30-GW03-01
Aluminum	6600	5170	2830	5730	2970	17.1	25.7	42.6	777	16.9
Antimony	3.2	3.55	3.55	3.75	3.9	3.1	3.6	3.6	3.4	3.9
Arsenic	0.280	0.315	0.315	1.500	0.34	0.28	0.32	0.32	0.30	0.34
Barium	8.400	9.700	5.000	11.700	0.8	0.7	0.8	0.8	3.5	0.8
Beryllium	0.095	0.105	0.105	0.110	0.12	0.09	0.11	0.11	0.10	0.12
Cadmium	0.280	0.315	0.315	0.330	0.34	0.28	0.32	0.32	0.30	0.34
Calcium	92.600	23.450	6.850	441.000	7.0	6.9	4.8	6.3	116	6.6
Chromium	8.3	7.3	3.4	4.7	3.9	0.7	0.8	0.8	0.7	0.8
Cobalt	0.375	0.42	0.42	0.93	0.45	0.37	0.42	0.43	0.40	0.46
Copper	1.6	0.65	0.65	0.65	0.7	0.6	0.7	0.7	0.6	0.7
Iron	959	2090	749	2780	908	95.9	155	63.3	514	74.5
Lead	4.0	4.1	2.3	7.4	0.7	0.47	1.9	0.91	3.2	0.59
Magnesium	262	153	66	157	24.7	7.5	2.9	2.9	30.2	3.1
Manganese	4.5	3.2	1.5	5.3	1.7	4.3	6.7	1.1	3.7	1.7
Mercury	0.025	0.025	0.025	0.025	0.03	0.03	0.08	0.25	0.03	0.68
Nickel	0.650	0.750	0.750	1	0.8	0.7	0.8	2.2	1.7	0.8
Potassium	308	122	91.3	136	13.2	6.3	1.1	21.3	21.9	1.2
Selenium	0.375	0.420	0.420	0.440	0.45	0.37	0.42	0.43	0.40	0.46
Silver	0.470	0.500	0.550	0.550	0.6	0.46	0.6	0.6	0.50	0.6
Sodium	10.9	33.8	28.6	20.3	12.5	11.1	19.3	5.4	14.4	5.8
Thallium	0.375	0.420	0.420	0.440	0.45	0.37	0.42	0.43	0.40	0.46
Vanadium	10.100	6.4	2.8	8.5	6.2	0.73	1.0	0.84	1.6	0.34
Zinc	2.700	1.9	1.0	4.2	0.35	0.32	0.39	1.2	1.7	1.3

**BASE BACKGROUND  
SUBSURFACE SOIL  
TAL INORGANICS  
MCB CAMP LEJEUNE, NORTH CAROLINA**

	35-GWDS01-03	BB-SB02-07	BB-SB03-05	80-BB-SB01-06	80-SS-SB01-03	80-BB-SB2-03	80-BB-SB02-06	80-BB-SB03-03	80-BB-SB03-06	7-BB-SB01-05
Aluminum	2910	888	2330	11000	2520	5950	9600	9500	1060	1400
Antimony	2.750	5.000	5.600	6.200	1.300	1.350	1.650	3.500	1.300	5.150
Arsenic	0.12	1.00	1.10	15.40	0.245	1.60	4.70	1.80	0.24	1.05
Barium	5.5	1.6	3.8	22.3	4.5	9.9	13.5	10.9	4.3	16.1
Beryllium	0.06	0.10	0.11	0.31	0.01	0.04	0.20	0.09	0.01	0.105
Cadmium	0.30	0.50	0.55	0.205	0.16	0.165	0.205	0.16	0.155	0.50
Calcium	456.0	74.2	290.0	257.0	105.0	323.0	210.0	142.0	34.2	38.95
Chromium	2.2	2.4	4.2	66.4	2.1	10.0	22.0	12.0	2.9	5.0
Cobalt	0.65	1	1.1	7	0.42	0.71	1.40	0.75	0.20	1.05
Copper	0.550	1	1.1	9.5	0.670	1.6	4.4	2.2	0.630	1.05
Iron	442	1220	1870	90500	795	2920	12800	3350	557	571
Lead	8.1	2.4	3.8	21.4	2.9	5	11.7	7.8	5.4	3
Magnesium	63.5	35.7	115.0	852.0	76.0	282.0	455.0	357.0	50.7	30.6
Manganese	5.6	2.7	2.4	14.9	1.8	19.9	7.4	6.2	5.4	1.95
Mercury	0.03	0.055	0.06	0.07	0.045	0.055	0.07	0.045	0.045	0.055
Nickel	1.050	2	2.250	0.600	0.455	1.4	0.6	2.2	0.450	2.050
Potassium	145	100.5	228	1250	161	297	1020	458	130	103
Selenium	0.085	0.500	0.550	2.400	0.275	0.285	0.355	0.275	0.275	0.50
Silver	0.39	0.50	0.55	0.275	0.21	0.22	0.275	0.21	0.21	0.50
Sodium	141.0	20.6	28.2	124.0	63.4	25.5	47.1	73.2	18.3	16.85
Thallium	0.06	1.00	1.10	2.70	0.425	0.44	0.55	0.42	0.42	1.05
Vanadium	3.0	3.9	4.9	69.4	2.3	10.8	18.4	13.5	2.4	2.3
Zinc	2.6	8.7	4.9	26.6	2.0	3.5	8.1	4.8	1.7	3.1

**BASE BACKGROUND  
SUBSURFACE SOIL  
TAL INORGANICS  
MCB CAMP LEJEUNE, NORTH CAROLINA**

	7-BB-SB02-05	7-BB-SB03-09	16-BB-SB01-07	16-BB-SB02-07	16-BB-SB03-05	36-BB-SB01-02	36-BB-SB02-02	36-BB-SB03-03	43-BB-SB01-02	43-BB-SB02-01
Aluminum	1700	581	1940	888	2330	4480	8700	3810	4320	959
Antimony	5.150	5.750	5.8	5	5.6	1.15	1.2	1.9	2.3	1.75
Arsenic	1.05	1.15	1.15	1	1.1	0.155	0.69	0.185	0.44	0.115
Barium	22.6	10.8	3.7	0.8	3.8	13.9	13.7	5.5	8.9	2.2
Beryllium	0.105	0.115	0.115	0.1	0.11	0.032	0.035	0.08	0.1	0.075
Cadmium	0.50	0.550	0.6	0.5	0.55	0.31	0.315	0.255	0.31	0.235
Calcium	41.55	32.15	135	74.2	290	116	225	48.2	76.9	77.6
Chromium	6.2	3.9	4.7	2.4	4.2	4.2	13.5	3.7	5.5	1.2
Cobalt	1.05	1.15	1.15	1	1.1	0.245	0.25	0.275	0.335	0.255
Copper	1.05	1.15	1.15	1	1.1	0.43	0.98	0.175	0.21	0.16
Iron	709	1620	1150	1220	1870	2690	4080	976	2370	414
Lead	1.8	1.1	2.9	2.4	3.8	5.4	6.6	4	6.1	1.6
Magnesium	44.1	12.25	104	35.7	115	78.6	292	110	121	17.9
Manganese	2.65	2.1	5	2.7	2.4	2.5	6.7	3.6	3	1.3
Mercury	0.050	0.060	0.06	0.055	0.06	0.06	0.06	0.045	0.045	0.05
Nickel	2.050	2.300	2.3	2	2.25	1	9.1	1	1.2	0.9
Potassium	102.5	114.5	116	100.5	228	91.3	222	62.5	76	57.5
Selenium	0.50	0.55	0.6	0.5	0.55	0.12	0.175	0.145	0.185	0.155
Silver	0.50	0.55	0.6	0.5	0.55	0.27	0.27	0.275	0.335	0.255
Sodium	13.6	15.65	29.8	10.3	28.2	11.3	25.6	6.1	36.65	4.2
Thallium	1.05	1.15	1.15	1	1.1	0.055	0.085	0.105	0.11	0.095
Vanadium	3.1	2.5	4	3.9	4.9	8.2	17	2.05	5.9	0.9
Zinc	2.1	3.15	15	4.35	2.45	0.82	2.6	0.89	2.3	0.76



**BASE BACKGROUND  
SUBSURFACE SOIL  
TAL INORGANICS  
MCB CAMP LEJEUNE, NORTH CAROLINA**

	43-BB-SB03-02	44-BB-SB01-03	54-BB-SB01-04	54-BB-SB02-04	86-BB-SB01-02	MIN	MAX	AVG	2Xaverage
Aluminum	2260	10300	1100	1040	2460	16.900	11000.000	3687.651	7375.302
Antimony	2.25	1.15	1.25	1.25	2	0.355	6.900	3.205	6.409
Arsenic	0.31	1.2	0.16	0.195	0.22	0.033	15.400	0.984	1.968
Barium	9.1	12.5	1.15	1.05	4.4	0.650	22.600	7.102	14.204
Beryllium	0.1	0.065	0.06	0.0345	0.09	0.010	0.310	0.095	0.191
Cadmium	0.305	0.305	0.325	0.335	0.275	0.155	1.200	0.356	0.712
Calcium	295	20.9	24.6	14.7	50.8	4.750	4410.000	195.754	391.509
Chromium	2	11	1.15	1	3.1	0.650	66.400	6.281	12.562
Cobalt	0.33	0.495	0.26	0.305	0.29	0.175	7.000	0.752	1.504
Copper	0.265	0.86	0.45	0.46	0.185	0.160	9.500	1.208	2.416
Iron	507	4720	392	319	3160	63.300	90500.000	3626.038	7252.076
Lead	2.8	4.15	0.8	1.75	2.4	0.465	21.400	4.164	8.327
Magnesium	49.3	302	16.4	17.35	71.3	2.850	852.000	130.359	260.718
Manganese	2.5	3.9	0.5	0.6	1.8	0.395	19.900	3.959	7.919
Mercury	0.055	0.0425	0.11	0.05	0.055	0.010	0.680	0.065	0.130
Nickel	1.2	0.92	9.2	7.7	1.05	0.450	9.200	1.857	3.714
Potassium	75	207	29.9	14.45	66.5	1.050	1250.000	173.618	347.236
Selenium	0.17	0.155	0.145	0.17	0.175	0.085	2.400	0.401	0.801
Silver	0.33	0.26	0.28	0.29	0.29	0.175	1.000	0.433	0.866
Sodium	8.75	86.4	4.4	2.2	6.8	2.200	141.000	26.338	52.676
Thallium	0.105	0.07	0.065	0.08	0.13	0.055	2.700	0.477	0.955
Vanadium	1.7	17.1	0.85	0.8	1.85	0.340	69.400	6.727	13.454
Zinc	1.6	2.5	0.92	1.3	0.37	0.320	26.600	3.331	6.662

**GROUNDWATER**

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**DRAFT**

**EVALUATION OF METALS IN  
GROUNDWATER**

**MARINE CORPS BASE,  
CAMP LEJEUNE, NORTH CAROLINA**

**CONTRACT TASK ORDER 0177**

**JUNE 3, 1994**

*Prepared for:*

**DEPARTMENT OF THE NAVY  
ATLANTIC DIVISION  
NAVAL FACILITIES  
ENGINEERING COMMAND  
*Norfolk, Virginia***

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*Prepared by:*

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*Coraopolis, Pennsylvania***

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6	Total Metals in Deep Monitoring Wells
7	Summary of Field Parameters in Shallow, Deep, and Supply Wells

## 1.0 INTRODUCTION

Numerous groundwater investigations have been conducted at Marine Corps Base (MCB), Camp Lejeune under the Department of the Navy (DON) Installation Restoration Program (IRP). These studies have identified elevated levels of total metals in shallow groundwater at almost every site. The degree of contamination, based on dissolved metals analysis of groundwater samples, is limited. It is believed that the presence of elevated metals are not always related to past disposal activities for several reasons, which is the basis of this study.

Currently, Records of Decision (ROD) are being prepared for Operable Units No. 1 (Sites 21, 24, and 78) and No. 5 (Site 2). Both RODs are proposing to not remediate shallow groundwater which contains elevated levels of total metals above State groundwater standards (i.e., North Carolina Water Quality Standards) and/or Federal drinking water standards (i.e., Maximum Contaminant Levels). Specifically, remediation of shallow groundwater due to elevated total metals is not cost effective, or practical, due to the following: (1) the shallow aquifer is not used for potable supply; (2) the source of metals in groundwater cannot be correlated with soil data or previous disposal practices; (3) the extent of shallow groundwater contamination (based on total metals analysis) is widespread and in many cases undefinable, since there are no apparent contaminant plumes or patterns associated with the metals; and (4) deep groundwater, which is the source of potable water, is not significantly contaminated with metals above the standards.

## 2.0 STUDY OBJECTIVES

The DON/Marine Corps initiated a study on inorganics in groundwater throughout MCB Camp Lejeune to assess whether total metals in groundwater are related to disposal practices or to other factors. The overall goal of this study is to provide information that would be used in consideration of not remediating shallow groundwater at Operable Units No. 1 and No. 5, and possibly other operable units where total metals are elevated without cause. The following study objectives were identified:

- (1) Determine whether the elevated total metals detected in the shallow aquifer are related to past disposal practices, well construction factors, sampling techniques, or suspended particulates in the samples;
- (2) Determine whether total metals in shallow groundwater are elevated throughout the region or MCB Camp Lejeune;
- (3) Determine whether there is a correlation between elevated total metals in groundwater and metals in soil; and

- (4) Determine whether the concentrations of total metals (i.e., low versus high) is related to shallow and deep aquifer characteristics.

### **3.0 SCOPE OF WORK**

Groundwater and soil data from a total of 21 sites were compiled as part of the overall study. Three of the 21 sites are located outside the boundary of the base. These sites include the ABC Cleaners Superfund Site, located along Route 24 in Jacksonville, and two sites located along Highway 17 (Off-site Properties No. 1 and No. 2). The two sites along Route 17 were investigated by the DON/Marine Corps as part of a real estate survey. The other 18 sites are located throughout various portions of MCB Camp Lejeune (see Figure 1).

Information from studies conducted by Baker and other consultants were obtained to evaluate metal concentrations in groundwater. The study focused on 14 metals of potential concern to human health and the environment. Some of the information was collected under the IR Program whereas other information was obtained during other investigations (e.g., ABC Cleaners RI/FS). The following data tables were then prepared to determine why total metals are generally elevated in shallow groundwater.

- Table 1 - Total Metal Concentrations in Shallow Groundwater by Site
- Table 2 - Summary of Repeat Sampling of Shallow Wells (Sites 2 and 78)
- Table 3 - Dissolved Metal Concentrations in Shallow Groundwater by Site
- Table 4 - Summary of Total Metal Concentrations in Upgradient Wells
- Table 5 - Comparison of Subsurface Metal Concentrations in Uncontaminated and Contaminated Wells
- Table 6 - Total Metal Concentrations in Deep Groundwater by Site
- Table 7 - Summary of Field Parameters in Shallow Monitoring Wells, Deep Monitoring Wells, and Supply Wells

The tables are presented at the end of this report.

#### 4.0 DATA ANALYSIS

The following discussion represents an analysis of the information contained in each of the previously mentioned tables.

##### Table 1 (Total Metal Concentrations in Shallow Groundwater)

All of the sites had at least one (and in most cases several) metal which exceeded either State water quality standards or Federal drinking water standards. The most frequently detected metals included chromium, lead, and manganese, which were detected at almost every site above drinking water standards. Other frequently detected metals which exceeded drinking water standards included arsenic, beryllium, cadmium, and nickel.

An analysis of the data from Table 1 indicates that elevated total metals are present in shallow groundwater at every site, including the three sites which are located off base. The two sites which did not exhibit significant contamination include the ABC Cleaners site (only chromium exceeded the standards) and Site 48 (only manganese exceeded the standards).

Total metals detected in shallow groundwater at Site 2 exceeded State and/or Federal standards in seven of the 11 shallow monitoring wells. Manganese was the most frequently detected metal (7/11). Lead (3/11), chromium (2/11), and cadmium (1/11) were also detected above the standards, but less frequently (see Figure 2).

With the exception of Wells 78GW03 and 78GW19, total metals were detected at Site 78 (Hadnot Point Industrial Area) above Federal MCLs or NCWQS in every shallow well (see Figure 3). The extent of elevated total metals in groundwater is widespread, encompassing approximately one square mile (or approximately 660 acres) in total area. The distribution and concentration of total metals in shallow groundwater makes it virtually impossible to identify or illustrate contaminant plumes (see Figure 3).

An analysis of the total metals results indicates the following pattern. Samples exhibiting elevated levels of lead, chromium, or other contaminants of concern, also exhibited elevated levels of other metals such as aluminum, antimony, iron, and zinc. Samples which did not exhibit elevated levels of lead, chromium, or manganese also did not exhibit elevated levels of other metals. This pattern indicates that the elevated total metals are not limited to one or

two contaminants, which would be the case if a lead or chromium plume in the groundwater truly existed. In other words, if a site is impacted by a particular metal due to disposal activities (say chromium for example), then other metals such as aluminum, lead, or zinc should not be consistently elevated as in the case of samples collected from the shallow aquifer at MCB Camp Lejeune. This point is depicted in the data summary tables provided in Appendix A for Sites 2 and 78. These tables were taken from the Remedial Investigation Reports for Operable Units No. 1 and No. 5. As an example, note that sample numbers 78-MW08, 78-MW10, 78-MW11, and 78-MW12 all had elevated levels of total metals when compared to samples 78-MW09-2 and 78-MW09-3. It is clear that most of the metal concentrations in a particular sample follow a consistent pattern throughout.

Table 2 (Comparison of Repeat Sampling of Shallow Wells)

Five wells from Sites 2 and 78 were randomly chosen to evaluate total metals concentrations between sampling rounds. The comparison was limited to only chromium, lead, and manganese since these contaminants were frequently detected throughout MCB Camp Lejeune. In several cases, metal concentrations were significantly different between the sampling rounds. If the shallow aquifer was impacted due to former disposal activities, a contaminant plume would be present and concentrations would not significantly deviate. The deviation in metal concentrations may indicate that sampling results are biased due to suspended particulates in the samples.

Table 3 (Dissolved Metal Concentration in Shallow Groundwater by Site)

The data base for Table 3 was limited to 12 sites since many of the previous investigations (i.e., prior to Navy CLEAN) did not analyze for dissolved metals. Nevertheless, an analysis of the 12 sites revealed that elevated levels of dissolved metals in groundwater is limited. Manganese was the most frequently detected metal above drinking water standards (10 of 12 sites exhibited elevated levels). Lead was detected at only one site (Site 21) above drinking water standards. Chromium was also detected at only one site (Site 78) above drinking water standards. No other metal was detected above the standards.

Literature searches have indicated that manganese is a naturally occurring metal in North Carolina. Therefore, the presence of manganese may not be attributable to site-related activities (Greenhorne & O'Mara, 1992).



An analysis of the data from Table 3 clearly shows a significant reduction in metal concentrations when compared to Table 1 (total metals in shallow groundwater). One possible reason for this reduction is that suspended solids or particles are not being introduced into the analysis of the sample due to filtering. A second possibility is that the metals are not significantly present in a dissolved state in shallow groundwater due to the species of metals under site conditions. It should be noted that calcium and sodium did not exhibit such a pattern since the salts of these metals are more soluble in water. For example, the concentrations of total calcium and total sodium versus dissolved calcium and dissolved sodium are similar and are not affected by the removal of the particulates during filtering. The fact that these salts do not exhibit the pattern that the other metals show supports the possibility that total metal concentrations are influenced by particulates in the sample.

Table 4 (Total Metals in Upgradient Shallow Wells)

The data base for Table 4 consists of groundwater results from 14 upgradient shallow monitoring wells (i.e., one well per site). These wells were installed to determine baseline groundwater quality to which on-site groundwater conditions could be compared. In some cases, the upgradient wells were located in areas where other base activities may have influenced groundwater quality.

The analysis of this data shows that manganese was the most frequently detected metal above Federal or State standards in upgradient shallow wells. Manganese was detected in 7 of the 14 upgradient wells above drinking water standards. Chromium and lead were also frequently detected above drinking water standards in upgradient (background) wells. These contaminants were detected in 6 of the 14 upgradient wells. At Site 2, samples collected from an upgradient well (2GW9) exhibited elevated levels of chromium (83 $\mu$ /l), lead (27.2 $\mu$ /l) and manganese (747 $\mu$ /l). At Site 78, samples collected from upgradient wells 96W4 and 78GW26 did not exhibit elevated levels of total metals. The concentration range for metals detected above NC WQS and/of Federal MCLs in upgradient wells is provided below:

- beryllium (ND-46.5  $\mu$ /l)
- cadmium (ND-10  $\mu$ /l)
- chromium (ND-198  $\mu$ /l)
- lead (ND-78.8  $\mu$ /l)
- manganese (ND-747  $\mu$ /l)
- mercury (ND-1.6J  $\mu$ /l)

Based on the above range representing upgradient wells, none of the on-site wells at Site 2 exhibited total metals above the maximum background concentrations. However, at Site 78, lead and chromium were detected above the maximum background in several on-site wells.

An analysis of the data from Table 4 indicates that shallow groundwater upgradient of some sites contains total metals above drinking water standards. A comparison of Table 4 data against Table 1 data indicates that shallow groundwater samples from upgradient wells are less contaminated than samples collected from on-site monitoring wells. However, it should be noted that the data base for Table 4 consists of only 14 wells whereas the data base for Table 1 consists of over 130 wells. Therefore, to assume that upgradient groundwater quality is better than on-site groundwater quality may not be justified due to the different data bases.

Table 5 (Comparison of Subsurface Metal Concentrations in Uncontaminated and Contaminated Wells)

The purpose of this table is to determine whether metal concentrations in soils correlate with the elevated levels of metals in shallow groundwater.

To evaluate this, metals in subsurface soils, representing an area of groundwater contamination, were compared to metals in subsurface soil in areas which did not exhibit groundwater contamination. If the elevated total metals in shallow groundwater are present due to former disposal activities, subsurface metals in soil representing an area of groundwater contamination would be expected to be elevated or higher than metals in subsurface soil representing a non-contaminated area. This evaluation assumes that the well exhibiting elevated total metals is within a source area and that the soil sample is representative of soil impacted by metal contamination.

As shown on Table 5, there is no clear pattern or correlation which indicates that elevated total metals are due to soil contamination. Note that in many cases, the concentration of metals which represent "non-contaminated" areas are greater than the metals which represent "contaminated" areas. Also note that the metals in subsurface soil are within or close to background subsurface metal concentrations. Therefore, this supports the possibility that in many cases at MCB Camp Lejeune, the elevated total metals in shallow groundwater cannot be attributable to a source or to past disposal practices.

#### Table 6 (Total Metals in Deep Monitoring Wells)

Table 6 presents total metal concentrations in deep groundwater for each site. The data base is limited to only 8 sites. Metal concentrations in supply wells were also included for comparison purposes.

As shown on Table 6, total metals in deep groundwater are below drinking water standards with a few exceptions. Arsenic and cadmium were detected above the standards in one deep monitoring well at Site 78 (see Figure 4). Manganese was detected in deep groundwater at three sites and a few of the supply wells. Lead was detected in one supply well at 16  $\mu\text{l}$ , which is slightly above the drinking water standard of 15  $\mu\text{l}$ .

Elevated total metals are not widespread in deep groundwater for two possible reasons. First, most metals are not very mobile in the environment. Second, deep groundwater samples may not have significant amounts of suspended particulates due to different geologic conditions. Soils in the deeper aquifer are more compacted and consist primarily of calcareous sands, clays, and limestone fragments. Soils in the shallow aquifer are loosely compacted and consist primarily of fine-grained sands, silts, and clays. This classification may support the possibility that suspended solids are collected during sampling, thereby influencing the analysis for total metals.

#### Table 7 (Summary of Field Parameters in Shallow, Deep, and Supply Wells)

Table 7 provides a range of pH and specific conductivity values representative of shallow and deep groundwater. In general, lower pH values were noted more often in shallow wells than in deep wells (including the supply wells). This condition may influence the leachability and speciation of metals in groundwater.

Deep groundwater usually exhibited higher specific conductivity values. High specific conductivity values are representative of high dissolved conditions. The fact that deep groundwater generally exhibited higher specific conductivity values indicates that most of the metals, if present, are in a dissolved state. The high specific conductivity values could also indicate less suspended particulates due to the geologic conditions of the deep aquifer. The lower specific conductivity values observed in shallow wells indicates that the metals in the shallow aquifer are not in a dissolved state. This also supports the possibility that suspended particulates in the shallow aquifer are influencing the analysis of total metals.

## 5.0 ANALYSIS OF THE STUDY OBJECTIVES

Each of the objectives identified for this study are analyzed below based on the information collected.

### Objective No. 1 (Determine whether the elevated total metals in the shallow aquifer are related to past disposal practices, well construction factors, sampling techniques, or suspended particulates in the samples)

Based on the analysis of information provided in Tables 1 through 7 and Appendix A, it appears that suspended particulates in groundwater samples could influence the concentration of total metals in groundwater. Well construction factors and sampling techniques are probably not a significant factor since the data base is representative of data obtained by Baker, ESE (Site 28 and 30), Roy F. Weston (ABC Cleaners), and Halliburton NUS (Site 7). No particular pattern was noted between sites which Baker obtained the samples versus sites in which other consultants obtained the data. Sampling methods were also considered. For Sites 63 and 65 for example, samples were collected with a bailer. At Sites 2 and 78, samples were collected with a low flow pump. All four sites exhibited elevated levels of total metals in groundwater samples. In addition, due to the fact that deep groundwater quality is not significantly impacted with metals indicates that well construction or sampling techniques are probably not factors related to elevated total metals in groundwater.

With respect to past disposal practices, Table 5 clearly shows that soil concentrations do not correlate with elevated total metals in groundwater. Based on this analysis, and on many of the sites previously investigated, the source of total metals in groundwater cannot be attributable to soil contamination or disposal practices in many cases. This is based on both the history of the site as well as the analytical soil results. In some cases, total metals were detected at elevated levels even when the site history did not correlate with the contaminants found. For example, Sites 2 and 21 have a history of pesticide storage and handling, and there are no known disposal areas (i.e., buried debris) within the site boundary. Nevertheless, both of these sites exhibited several metals above drinking water standards that would not be expected to be present at high concentrations based on the historical use of the site. These metals included lead, chromium, beryllium, cadmium, and manganese.

Objective No. 2 (Determine whether total metals in shallow groundwater are elevated throughout the region or MCB Camp Lejeune)

Based on groundwater data obtained from both upgradient wells and off base wells, total metals were detected above drinking water standards in shallow groundwater in areas that would not be influenced by former disposal activities at the sites. Given that some of the upgradient wells are contaminated, it is apparent that total metals in shallow groundwater are elevated in certain areas of the base outside of the influence of site-related disposal activities. However, it is unknown whether the shallow aquifer upgradient of the sites is contaminated due to other base-related activities or whether the levels in groundwater samples are also elevated due to the influence of suspended fines in the samples.

Objective No. 3 (Determine whether there is a correlation between elevated total metals in groundwater and metals in soil)

An evaluation of the data presented in Table 5 shows that metals in soil samples collected in areas of groundwater contamination are not elevated when compared to metals in soil samples collected in areas that did not exhibit groundwater contamination. This supports the possibility that in many cases, elevated levels of total metals in shallow groundwater are not related to the disposal history at the site. As previously mentioned, sites which did not exhibit soil contamination (when compared to background soil levels) or did not have a history of disposal indicative of metals contamination still exhibited elevated levels of total metals in groundwater. Since there is no apparent correlation between metals in soil and total metals in groundwater, then the possibility exists that the elevated total metals in groundwater are biased high due to suspended particulates.

Objective No. 4 (Determine whether the concentrations of total metals in groundwater is related to shallow and deep aquifer characteristics)

There is some evidence that the geologic conditions of the shallow and deep aquifers influence the amount of total metals detected in groundwater samples. The fact that the deep aquifer generally exhibited higher specific conductivity values indicates that there is more dissolved constituents in the deep aquifer when compared to the shallow aquifer. This was evident when comparing Table 1 (total metals in shallow groundwater) to Table 6 (total metals in deep groundwater). Table 6 did not indicate significant levels of total metals in deep groundwater throughout MCB Camp Lejeune.

The geologic conditions of the shallow aquifer would tend to result in samples that may contain suspended particulates. The suspended particulates could influence the total metals concentrations in the samples.

## **6.0 CONCLUSIONS**

- 1. Elevated levels of total metals in the shallow aquifer are probably influenced to some degree by the geologic conditions of the site.**
- 2. There is no correlation between metal levels in soil and total metals in groundwater. Therefore, elevated total metals in groundwater cannot be attributable to soil contamination of past disposal practices.**
- 3. Elevated levels of total metals in the shallow aquifer may be biased high due to suspended particulates in the samples.**
- 4. Dissolved metals in groundwater were generally below Federal MCLs and NC WQS and therefore, do not present a significant problem at MCB Camp Lejeune.**
- 5. Total and dissolved metal concentrations in the Castle Hayne aquifer were generally below drinking water standards and therefore, do not present a significant problem at MCB Camp Lejeune.**
- 6. The presence of manganese in shallow and deep groundwater may be due to naturally occurring geologic conditions.**

## **7.0 RECOMMENDATIONS**

- 1. Remediation of total metals in the shallow aquifer at Operable Units 1 and 5 is not recommended based on the following:**
  - **Elevated metals in groundwater at both operable units does not appear to be related to soil contamination or past disposal practices;**
  - **The distribution of total metals in groundwater is not characteristic of a plume that would be present due to a source of contamination;**
  - **Remediation of total metals would not be practical from an engineering or cost standpoint; and**
  - **Currently, there is no human or environmental exposure to shallow groundwater.**
  
- 2. Additional background wells should be installed at all sites in order to provide a baseline for comparing on-site groundwater quality.**

**Tables**

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**TABLE 1  
TOTAL METALS BY SITE  
SHALLOW MONITORING WELLS  
MCB, CAMP LEJEUNE, NORTH CAROLINA**

Site Number	NCWQS	FEDERAL	Site 1	Site 2	Site 6	Site 7	Site 9	Site 21	Site 24	Site 28	Site 30	Site 41	Site 43	Site 44
Units	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
Arsenic	50	50	7.2 - 57.4	2.2 - 23.6	ND - 23.3	ND - 43.4J	ND	ND - 101	ND - 116J	5.4 - 13J	6.4 - 12J	2.4 - 36.3	ND - 23.4	ND - 570
Barium	2000	2000	335 - 833	46 - 1420	ND - 1020	427 - 641	ND - 1060	ND - 647	ND - 1120	78.8 - 376	60.1 - 396	55.2 - 999	220 - 745	315 - 3180
Beryllium	NE	4	2.7J - 43.4	1 - 3	ND - 7.5	ND - 10.3J	ND	ND - 8	ND - 19	ND - 1.2J	ND - 2.4	0.80 - 42.8	1.5 - 4.2	1.4 - 36.6
Cadmium	5	5	ND - 12.9	7	ND	ND	ND	ND	ND - 12	3.3J - 17.3J	ND - 10.7J	3.2 - 110	ND - 6.9	ND - 32
Calcium	NA	NA	8850 - 726000	5710 - 450000	5430 - 64900	5050 - 51300	16100 - 90700	6130J - 63000J	ND - 151000	20200 - 160000	1730 - 11900	8750 - 828000	10300 - 91900	2430 - 191000
Chromium	50	100	172 - 627	11 - 117	ND - 201	47.8 - 220	ND - 214	ND - 348J	19 - 316	9.0J - 140	42.8 - 106J	10.5 - 244	161 - 249	126 - 895
Copper	1000	1300	44.6 - 117	3 - 23	ND - 175	17.7 - 36.4	ND - 39.7	ND - 84	ND - 52	18.8J - 75.4	15.8 - 42.5	16.3 - 1030	64.2 - 104	28.6 - 313
Lead	15	15	40.8J - 176J	2.7 - 44.8	ND - 200	23 - 37.3	ND - 127	ND - 2000J	3.1 - 89	20.3J - 234J	7.7J - 115J	4.8 - 9340	16.5 - 28.8	15.8 - 508
Manganese	50	50 (1)	125 - 1720	21 - 190	ND - 362	56.9 - 220	ND - 91.3	59 - 276J	29 - 518	82.2 - 304	78.5 - 578	56.6 - 2110	72.6 - 297	88 - 1730
Mercury	1.1	2	ND - 1.2J	ND	ND - .46	0.2 - 0.36	ND - 1.4	ND - 2.4J	ND - 3.2	ND - 1.4J	0.88J - 0.9J	0.13 - 0.92	ND - 0.24	ND - 1.1
Nickel	100	100	28.5 - 426	ND	ND - 41.9	ND	ND	ND - 123	ND - 140	ND - 59.8	17.1J - 52.6J	28.8 - 137	20.5 - 143	21.9 - 486
Sodium	NA	NA	9090 - 19000	ND - 103000	1110 - 68700	7040 - 136000	1390 - 4170	7950 - 15700	5230 - 19200	9480 - 74700	5320 - 8100	2080 - 40200	9160 - 22100	4060 - 12600
Vanadium	NE	NE	214 - 640	9 - 184	ND - 330	37.8 - 423	ND - 175	ND - 419	ND - 408	6.1 - 164	57 - 101	20.4 - 244	122 - 233	184 - 759
Zinc	2100	3000 (1)	ND - 1110	6 - 146	ND - 1620	83.6 - 133	ND - 118	27J - 487J	20 - 650	ND	79.2 - 104	25.7 - 5180	19J - 661J	87.3 - 2800J

Site Number	Site 48	Site 63	Site 65	Site 69	Site 78	Site 82	ABC	Offsite	Offsite
Units	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	Cleaners	Property #1	Property #2
	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
Arsenic	ND	ND - 23.4	ND - 308	2.9 - 29.6	ND - 405J	ND - 67.8	ND - 12	10.3 - 160	ND
Barium	18 - 51.3	56.1 - 5410	105 - 638	46.5 - 850	ND - 1250	ND - 540	35 - 220	ND - 468	ND
Beryllium	ND	ND - 3.1	ND	1.3 - 10.6	ND - 19	ND	NA	ND - 8.5	ND
Cadmium	2.2 - 3.3	ND	ND	2.4 - 11.4	ND - 21	ND	NA	ND	ND
Calcium	30600 - 115000	2830 - 24300	33300 - 181000	2010 - 38700	ND - 642000	6380 - 60800	790 - 16000	ND - 22800	ND - 5200
Chromium	5.8 - 17.5	4.4 - 134	50.1 - 364	15.1 - 159	ND - 858J	ND - 174	ND - 57	52.8 - 636	ND - 94
Copper	3.1 - 13.5	10.7 - 126	28.2 - 127	16.2 - 70.8	ND - 699	ND - 29.3	ND - 89	ND - 140	ND
Lead	ND	4.3J - 369	19.1 - 132	7.8 - 188	ND - 360J	ND - 89	ND - 10	12.3 - 345	6.3 - 62.3
Manganese	38.1 - 585	50.3 - 1020	56.2 - 474	13.0 - 912	26 - 714	26.9 - 283	4 - 44	56 - 973	ND - 60.1
Mercury	0.04 - 0.09	ND - 0.20	ND - 0.29	0.10 - 0.94	ND - 1.5	ND - 0.66	NA	ND	ND
Nickel	ND	19.8 - 54.2	19.4 - 84.3	13.6 - 99.8	ND - 234	ND - 34.6	ND - 77	40.2 - 380	ND
Sodium	5750 - 8760	3150 - 7100	3850 - 11700	4790 - 41300	ND - 42500	5670 - 36300	5800 - 33000	ND - 9390	ND - 7630
Vanadium	3.4 - 12.8	7.9 - 163	59.8 - 433	17.3 - 210	ND - 1700	ND - 256	ND - 45	70 - 739	ND - 64.7
Zinc	ND - 30.3	58.5J - 1110J	148J - 406J	36.2 - 12100	6J - 967J	ND - 204	14 - 220	ND - 736	ND - 40.8

NOTES:  
 J - Value is estimated.  
 JB - Value is estimated below the CRDL, but greater than the IDL.  
 NE - Not established.  
 NA - Not analyzed.  
 ND - Not detected.  
 NCWQS - North Carolina Water Quality Standard  
 MCL - Maximum Contaminant Level  
 (1) - Secondary MCL

**TABLE 2**  
**COMPARISON OF REPEAT SAMPLING OF SHALLOW WELLS**  
**MCB, CAMP LEJEUNE, NORTH CAROLINA**

Well Date	2GW01		2GW03		2GW06		2GW08		2GW09	
	5/1993	3/1994	5/1993	3/1994	5/1993	3/1994	5/1993	3/1994	5/1993	3/1994
Chromium	18	ND	11	ND	15	ND	ND	ND	25	83
Lead	15.5 J	ND	3.5 J	ND	6.7 J	ND	ND	3.4	27.2 J	23.6
Manganese	55	47	21	ND	79	140	53	415	290	747

Well Date	78GW05		78GW08		78GW15		78GW16		78GW19	
	1/1991	4/1994	1/1991	4/1994	1/1991	4/1994	1/1991	4/1994	1/1991	4/1994
Chromium	ND	17 J	91.8	491 J	21.4	215 J	209	353 J	13.8	ND
Lead	13.6	13.1 J	54.1	131 J	16.6	33	100	224	31.7	8.3
Manganese	162	161 J	46.5	213 J	18.3	115	98.3	150	79	26

NOTES:  
 J - Value is estimated.  
 ND - Not detected.

**TABLE 3  
DISSOLVED METALS BY SITE  
SHALLOW MONITORING WELLS  
MCB, CAMP LEJEUNE, NORTH CAROLINA**

Site Number Units	NCWQS ug/L	FEDERAL MCL ug/L	Site 1 ug/L	Site 2 ug/L	Site 6 ug/L	Site 7 ug/L	Site 9 ug/L	Site 21 ug/L	Site 24 ug/L	Site 28 ug/L	Site 30 ug/L	Site 41 ug/L	Site 43 ug/L	Site 44 ug/L
Arsenic	50	50	NA	2.2 - 7.1	ND	NA	ND	ND - 10.6	ND - 16.3	NA	NA	2.2 - 4.7	NA	NA
Barium	2000	2000	NA	25 - 149	ND	NA	ND	ND	ND	NA	NA	12.4 - 451	NA	NA
Beryllium	NE	4	NA	1	ND	NA	ND	ND	ND	NA	NA	0.80 - 3.2	NA	NA
Cadmium	5	5	NA	ND	ND	NA	ND	ND - 5	ND	NA	NA	3.2 - 4.2	NA	NA
Calcium	NA	NA	NA	5800 - 441000	6230 - 57400	NA	15800 - 82400	35900	ND - 113000	NA	NA	4710 - 138000	NA	NA
Chromium	50	100	NA	10	ND	NA	ND	ND	ND	NA	NA	8.3 - 9.6	NA	NA
Copper	1000	1300	NA	2 - 9	ND	NA	ND	ND	ND	NA	NA	16.3 - 23.9	NA	NA
Lead	15	15	NA	2.1	ND	NA	ND	ND - 94	ND	NA	NA	1.0	NA	NA
Manganese	50	50 (1)	NA	17 - 129	ND - 92.7	NA	ND	40 - 134	ND - 320	NA	NA	7.1 - 521	NA	NA
Mercury	1.1	2	NA	ND	ND	NA	ND	ND	ND - 0.5	NA	NA	0.13 - 0.20	NA	NA
Nickel	100	100	NA	ND	ND	NA	ND	ND	ND - 57	NA	NA	28.8 - 31.2	NA	NA
Sodium	NA	NA	NA	ND - 103000	1420 - 70500	NA	1280 - 3860	16200	ND - 183000	NA	NA	2500 - 34200	NA	NA
Vanadium	NE	NE	NA	43	ND	NA	ND	ND	ND	NA	NA	20.4	NA	NA
Zinc	2100	5000 (1)	NA	8 - 35	ND - 350	NA	ND	6B - 30	ND - 437	NA	NA	10.6 - 125	NA	NA

Site Number Units	Site 48 ug/L	Site 63 ug/L	Site 65 ug/L	Site 69 ug/L	Site 78 ug/L	Site 82 ug/L	ABC Cleaners ug/L	Offsite Property #1 ug/L	Offsite Property #2 ug/L
Arsenic	ND	NA	NA	2.9	ND - 21.6	ND	NA	ND - 18.8	ND
Barium	16.8 - 27.6	NA	NA	13.7 - 35.8	ND	ND	NA	ND	ND
Beryllium	ND	NA	NA	1.3	ND	ND	NA	ND	ND
Cadmium	ND - 3.1	NA	NA	2.4	ND	ND	NA	ND	ND
Calcium	72600 - 80700	NA	NA	764 - 10600	ND - 296000	15200 - 58500	NA	ND - 7710	ND
Chromium	ND	NA	NA	7.2	ND - 39	ND	NA	ND - 30.0	ND
Copper	2.6 - 7.6	NA	NA	16.2	ND - 121	ND	NA	ND - 10.7	ND
Lead	ND	NA	NA	1	ND - 17.2	ND	NA	ND - 15.8	ND
Manganese	39.7 - 539	NA	NA	8.5 - 139	ND - 132	21 - 127	NA	ND - 63.8	ND - 21.3
Mercury	0.05 - 0.09	NA	NA	0.1	ND - 0.6	ND	NA	ND	ND
Nickel	ND	NA	NA	13.6	ND	ND	NA	ND	ND
Sodium	6430 - 8920	NA	NA	5170 - 41100	ND - 42200	5980 - 36000	NA	ND - 9540	ND - 6750
Vanadium	ND	NA	NA	16.6	ND	ND	NA	ND	ND
Zinc	ND	NA	NA	7.0 - 7670	ND - 58	ND - 119	NA	ND - 468	ND - 222

**NOTES:**

- J - Value is estimated.
- JB - Value is estimated below the CRDL, but greater than the IDL.
- NE - Not established.
- NA - Not analyzed.
- ND - Not detected.
- NCWQS - North Carolina Water Quality Standard
- MCL - Maximum Contaminant Level
- (1) - Secondary MCL

**TABLE 4  
SUMMARY OF TOTAL METALS IN UPGRADIENT WELLS  
SHALLOW MONITORING WELLS  
MCB, CAMP LEJEUNE, NORTH CAROLINA**

Well Number	NCWQS	FEDERAL MCL	Upgradient	Upgradient	Upgradient	Upgradient	Upgradient	Upgradient	Upgradient	Upgradient	Upgradient	Upgradient	Upgradient
			of Site 1	of Site 2	of Site 6	of Site 7	of Site 9	of Sites 21 and 78	of Site 24	of Site 28	of Site 30	of Site 41	of Site 43
Units	ug/L	ug/L	1GW06 ug/L	2GW09 ug/L	6BP6S ug/L	7GW03 ug/L	9GW4S ug/L	78GW26 ug/L	24GW07 ug/L	28GW04 ug/L		41GW05 ug/L	
Arsenic	50	50	17.8 J	12.9	ND	ND	ND	ND	3.7 J	7.4 J		13.1	
Barium	2000	2000	548	328	257	428	71.3	ND	ND	576		55.7	
Beryllium	NE	4	3.2 J	3	ND	ND	ND	ND	ND	9.3 J		1.6	
Cadmium	5	5	ND	ND	ND	ND	ND	not reported	ND	3.3 J		10	
Chromium	50	100	193	75	198	124	ND	13	37	122		54.4	
Copper	1000	1300	64.8	23	35.6	36.4	ND	ND	ND	20.7 J		27	
Lead	15	15	78.8 J	27.2	64.4	30.3 J	ND	9	11.4	22.4 J		23.7	
Manganese	50	50 (1)	202	747	84.5	56.9 J	ND	ND	39	206		203	
Mercury	1.1	2	1.6 J	ND	ND	0.36	ND	ND	ND	ND		0.16	
Nickel	100	100	51.6	ND	ND	ND	ND	ND	ND	59.8		38	
Vanadium	NE	NE	214	86	209	152	ND	149	64	85.3		38.1	
Zinc	2100	5000 (1)	ND	103	56.6	86.4 J	ND	68.1	41	ND		173	

No Upgradient Well Sites

No Upgradient Well Sites

No Upgradient Well Sites

Well Number	Upgradient	Upgradient	Upgradient	Upgradient	Upgradient	Upgradient	Upgradient	Upgradient	Upgradient
	of Site 48	of Site 63	of Site 65	of Site 69	of Site 78	of Site 82	of ABC Cleaners	of Offsite Property #1	of Offsite Property #2
Units	48GW1 ug/L			69GW07 ug/L	9GW04 ug/L	6MW3S ug/L	MW-S01 ug/L		
Arsenic	ND			2.9	ND	ND	ND		
Barium	29.4 J			46.3	ND	ND	35		
Beryllium	ND			1.3	ND	ND	NA		
Cadmium	2.5 J			2.4	ND	ND	NA		
Chromium	ND			15.8	ND	ND	ND		
Copper	ND			16.2	ND	ND	ND		
Lead	ND			7.8	ND	ND	3		
Manganese	70.6			13	ND	ND	10		
Mercury	ND			0.1	ND	ND	NA		
Nickel	ND			13.6	ND	ND	ND		
Vanadium	3.4 J			17.3	ND	ND	9		
Zinc	ND			36.2	ND	ND	23		

No Upgradient Well Sites

No Upgradient Well Sites

No Upgradient Well Sites

No Upgradient Well Sites

**NOTES:**  
 J - Value is estimated.  
 JB - Value is estimated below the CRDL, but greater than the IDL.  
 NE - Not established.  
 NA - Not analyzed.  
 ND - Not detected.  
 NCWQS - North Carolina Water Quality Standard  
 MCL - Maximum Contaminant Level  
 (1) - Secondary MCL

**TABLE 5**  
**COMPARISON OF INORGANIC SUBSURFACE SOIL CONCENTRATIONS IN "CLEAN" AND "CONTAMINATED" WELLS**  
**MCB, CAMP LEJEUNE, NORTH CAROLINA**

Units Well Number Soil Sample Number	Camp Lejeune Background Subsurface Soil Data mg/kg	Site 1		Site 2		Site 6		Site 7		Site 9		Site 21	
		"Clean" mg/kg	"Contaminated" mg/kg	"Clean" mg/kg	"Contaminated" mg/kg	"Clean" mg/kg	"Contaminated" mg/kg	"Clean" mg/kg	"Contaminated" mg/kg	"Clean" mg/kg	"Contaminated" mg/kg	"Clean" mg/kg	"Contaminated" mg/kg
		--	--	1GW07	2GW09	6GW18	6GW15	7GW03	7GW02	9GW5	9GW1	21GW03	21GW02
		--	--	2-GW07-01	2-GW09-02	6-GW18-0303	6-GW15-03	GW03-002	GW02-7595	9-GW5-03	9-SB35-03	21-GW03	21-GW02
Arsenic	0.03 - 0.47	NA	NA	1.7 J	ND	ND	ND	1.5	ND	ND	ND	ND	0.55 J
Barium	2 - 11	NA	NA	12.5 J	ND	ND	ND	6.6	71	ND	ND	ND	4.4 J
Beryllium	0.03 - 0.23	NA	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Cadmium	0.17 - 1.2	NA	NA	ND	ND	ND	ND	1.3	4.5	ND	ND	ND	ND
Chromium	2 - 9	NA	NA	10.9 J	4.6	ND	1.0	5.2	6	ND	2.6 J	15.2	5.2 J
Copper	0.47 - 2	NA	NA	0.97 J	ND	ND	ND	ND	ND	ND	ND	ND	ND
Lead	1 - 12	NA	NA	8 J	4.3	3.3 J	1.2	2.5	34.4	1.6	6.5	7.1	6.9 J
Manganese	0.40 - 8	NA	NA	4.3 J	4.1	ND	1.8 B	3	11.5	ND	3.7 J	9.5	3.4 J
Mercury	0.01 - 0.11	NA	NA	0.3 J	ND	ND	ND	10.13	0.48	ND	ND	ND	ND
Nickel	0.70 - 5.0	NA	NA	ND	ND	ND	ND	3.4	11.8	ND	ND	ND	ND
Vanadium	0.75 - 13	NA	NA	13.8 J	ND	ND	2.9 B	5.5	4.5	ND	ND	15.5	4.4 J
Zinc	0.40 - 12	NA	NA	ND	ND	ND	ND	1.3	ND	ND	6.1 J	5.7	3 J

**NOTES:**  
 Shaded area indicates inorganic which exceeded a MCL and/or NCWQS in groundwater sample.  
 J - Value is estimated.  
 JB - Value is estimated below the CRDL, but greater than the IDL.  
 NA - No available wells to compare OR compound was not analyzed.  
 ND - Not detected.  
 NCWQS - North Carolina Water Quality Standard  
 MCL - Maximum Contaminant Level  
 (1) - Secondary MCL

**TABLE 5  
COMPARISON OF INORGANIC SUBSURFACE SOIL CONCENTRATIONS IN "CLEAN" AND "CONTAMINATED" WELLS  
MCB, CAMP LEJEUNE, NORTH CAROLINA**

Units Well Number Soil Sample Number	Site 24		Site 28		Site 30		Site 41		Site 43		Site 44	
	"Clean" mg/kg	"Contaminated" mg/kg	"Clean" mg/kg	"Contaminated" mg/kg	"Clean" mg/kg	"Contaminated" mg/kg	"Clean" mg/kg	"Contaminated" mg/kg	"Clean" mg/kg	"Contaminated" mg/kg	"Clean" mg/kg	"Contaminated" mg/kg
	24GW10	24GW02	--	--	--	--	41GW04	41-GW11	43GW01	43GW02	44GW02	44GW01
	24-GW10	24-BDA-8D09	--	--	--	--	41-GW04-DW	41-GW11-01	43-GW01-00	43-GW02-00	44-GW02-035	--
Arsenic	ND	ND	NA	NA	NA	NA	0.51	1.6	ND	ND	ND	1.7
Barium	ND	ND	NA	NA	NA	NA	9.4	22.6	ND	ND	ND	17.5
Beryllium	ND	ND	NA	NA	NA	NA	0.18	0.18	ND	ND	ND	ND
Cadmium	ND	ND	NA	NA	NA	NA	0.73	0.73	8.3	ND	ND	ND
Chromium	11.2	9.1	NA	NA	NA	NA	3.6	11.2	1.3	6.0	3.6	10.1
Copper	ND	ND	NA	NA	NA	NA	3.7	27.3	3.4	ND	6.2	25.4
Lead	4.6	6.1	NA	NA	NA	NA	4.8	110	2.1	6.1	5.0	10.7
Manganese	4.7	8.4	NA	NA	NA	NA	1.7	75.5	31.3	1.2	6.5	20.4
Mercury	ND	ND	NA	NA	NA	NA	0.06	0.31	ND	ND	ND	ND
Nickel	ND	ND	NA	NA	NA	NA	6.6	6.6	7.6	3.1	3.1	1.4
Vanadium	18.4	10	NA	NA	NA	NA	6.8	9.3	7.2	5.8	5	14.7
Zinc	ND	7.8	NA	NA	NA	NA	7.7	190	20.1	3	3.2	16.9

NOTES:  
 Shaded area Indicates inorganic which exceeded a MCL and/or NCWQS in groundwater sample.  
 J - Value is estimated.  
 JB - Value is estimated below the CRDL, but greater than the IDL.  
 NA - No available wells to compare OR compound was not analyzed.  
 ND - Not detected.  
 NCWQS - North Carolina Water Quality Standard  
 MCL - Maximum Contaminant Level  
 (1) - Secondary MCL

**TABLE 5  
COMPARISON OF INORGANIC SUBSURFACE SOIL CONCENTRATIONS IN "CLEAN" AND "CONTAMINATED" WELLS  
MCB, CAMP LEJEUNE, NORTH CAROLINA**

Units Well Number Soil Sample Number	Site 48		Site 63		Site 65		Site 69		Site 78		Site 82	
	"Clean" mg/kg	"Contaminated" mg/kg	"Clean" mg/kg	"Contaminated" mg/kg	"Clean" mg/kg	"Contaminated" mg/kg	"Clean" mg/kg	"Contaminated" mg/kg	"Clean" mg/kg	"Contaminated" mg/kg	"Clean" mg/kg	"Contaminated" mg/kg
	48-GW01	48-GW03	63MW03	63MW02	65MW03	65MW02	69-GW11	69-GW03	78GW34	78GW24-1	6-GW28	82MW3
	48-GW1A-01	48-C3-03	63-MW03-04	63-MW02-06	65-MW03-11	65-MW02-06	69-GW11-04	69-CSA-SB23-00	78-GW34	78-B903-SB03	6-GW28-09	6-GW17D-06
Arsenic	1.3	0.77 J	ND	ND	ND	1.3	0.68	0.63	ND	ND	0.31	15.9
Barium	21.1	15	ND	ND	3.4	6.8	5.6	3	ND	ND	ND	ND
Beryllium	0.2	0.19	ND	ND	ND	ND	0.3	0.28	ND	ND	ND	ND
Cadmium	1.4	1.8 J	ND	ND	NA	NA	0.56	0.52	ND	ND	ND	ND
Chromium	18.2	18.6	7.7	ND	3.5	3.7	6.8	17.0	18.5	2.7	2.6	1
Copper	3.5	3.8	ND	ND	1.5	3.1	3.8	3.5	3.4 B	ND	ND	ND
Lead	32.3	14.3	4.2	2.8	17	17	4.3	11	4.5 J	2.6 J	2.7	4.3
Manganese	411	7	4.9	19.8	3.5	6.9	4	1.2	9.2	ND	ND	ND
Mercury	ND	ND	ND	ND	NA	NA	0.06	0.03	ND	ND	ND	ND
Nickel	2.2	1.9 J	ND	ND	ND	ND	3.2	3	ND	ND	ND	ND
Vanadium	28.3	20.8 J	ND	ND	4.4	3	4.4	3.6	18.7	19.2	ND	ND
Zinc	ND	ND	ND	ND	2.7	5	3.2	1.3	7.9	ND	ND	ND

**NOTES:**

Shaded area indicates inorganic which exceeded a MCL and/or NCWQS in groundwater sample.

J - Value is estimated.

JB - Value is estimated below the CRDL, but greater than the IDL.

NA - No available wells to compare OR compound was not analyzed.

ND - Not detected.

NCWQS - North Carolina Water Quality Standard

MCL - Maximum Contaminant Level

(1) - Secondary MCL

**TABLE 5  
COMPARISON OF INORGANIC SUBSURFACE SOIL CONCENTRATIONS IN "CLEAN" AND "CONTAMINATED" WELLS  
MCB, CAMP LEJEUNE, NORTH CAROLINA**

	ABC Cleaners		Offsite Property #1		Offsite Property #2	
	"Clean" mg/kg	"Contaminated" mg/kg	"Clean" mg/kg	"Contaminated" mg/kg	"Clean" mg/kg	"Contaminated" mg/kg
Units	--	--	--	--	--	--
Well Number	--	--	--	--	--	--
Soil Sample Number	--	--	--	--	--	--
Arsenic	NA	NA	NA	NA	NA	NA
Barium	NA	NA	NA	NA	NA	NA
Beryllium	NA	NA	NA	NA	NA	NA
Cadmium	NA	NA	NA	NA	NA	NA
Chromium	NA	NA	NA	NA	NA	NA
Copper	NA	NA	NA	NA	NA	NA
Lead	NA	NA	NA	NA	NA	NA
Manganese	NA	NA	NA	NA	NA	NA
Mercury	NA	NA	NA	NA	NA	NA
Nickel	NA	NA	NA	NA	NA	NA
Vanadium	NA	NA	NA	NA	NA	NA
Zinc	NA	NA	NA	NA	NA	NA

**NOTES:**

Shaded area indicates inorganic which exceeded a MCL and/or NCWQS in groundwater sample.

J - Value is estimated.

JB - Value is estimated below the CRDL, but greater than the IDL.

NA - No available wells to compare OR compound was not analyzed.

ND - Not detected.

NCWQS - North Carolina Water Quality Standard

MCL - Maximum Contaminant Level

(1) - Secondary MCL



**TABLE 6  
TOTAL METALS BY SITE  
DEEP MONITORING WELLS  
MCB, CAMP LEJEUNE, NORTH CAROLINA**

	Site 1	Site 2	Site 6	Site 7	Site 9	Site 21	Site 24	Site 28	Site 30	Site 41	Site 43	Site 44	Site 48	Site 63	Site 65	Site 69	Site 78	Site 82	ABC Cleaners	Base Supply Wells (1)
Arsenic		ND	ND		ND					2.2 - 9.6						2.2 - 3.5	2 - 118 J	ND	ND - 14	ND
Barium		1420	ND		ND					22.6 - 186						42.3 - 58.0	ND - 547	ND	4 - 36	ND
Beryllium		ND	ND		ND					3.2						0.80 - 0.89	ND	ND	NA	NA
Cadmium	No Deep Wells	ND	ND	No Deep Wells	ND	No Deep Wells	No Deep Wells	No Deep Wells	No Deep Wells	4.2 - 4.7	No Deep Wells	No Deep Wells	No Deep Wells	No Deep Wells	No Deep Wells	3.2	ND - 21	ND	NA	ND
Chromium		16	ND		ND					9.6 - 40.5						8.3 - 20.7	ND - 10	ND	ND - 32	ND
Copper		ND	ND		ND					23.9						16.3	ND	ND	ND - 41	ND - 130
Lead		ND	ND		ND					1.0 - 11.1						3.1 - 6.8	ND	ND	ND - 10	ND - 16
Manganese		ND	ND - 33.5		ND					16.9 - 101						53.7 - 114	ND - 591	ND - 21.6	ND - 45	10 - 120
Mercury		ND	ND		ND					0.15 - 0.17						0.16 - 0.17	ND - 0.3	ND	NA	ND
Nickel		ND	ND		ND					31.2						28.8	ND	ND	ND - 14	NA
Vanadium		ND	ND		ND					20.4 - 49.8						20.4	ND - 24 J	ND	ND - 13	NA
Zinc		ND	ND		ND					17.8 - 83.8						31.1 - 48.7	ND - 181 J	ND	58 - 390	ND - 120

**NOTES:**

J - Value is estimated.

NA - Not analyzed.

ND - Not detected.

(1) - Range is based on 67 supply wells located throughout MCB, Camp Lejeune, NC.

**TABLE 7**  
**SUMMARY OF FIELD PARAMETERS IN**  
**SHALLOW, DEEP, AND SUPPLY WELLS**  
**MCB, CAMP LEJEUNE, NORTH CAROLINA**

	Shallow Wells		Deep Wells		Supply Wells	
	Range (1)	Average Maximum	Range (2)	Average Maximum	Range (3)	Average Maximum
pH (standard units)	4.5 - 7.28	6.08	7.52 - 11.34	8.88	6.91 - 7.45	7.32
Specific Conductivity (micromhos/cm)	40 - 580	267	149 - 525	350	212 - 511	353

- (1) - Based on data from 11 sites.
- (2) - Based on data from 6 sites.
- (3) - Based on data from 9 supply wells.

**Appendix A**  
**Data Summary Tables**  
**for Sites 2 and 78**

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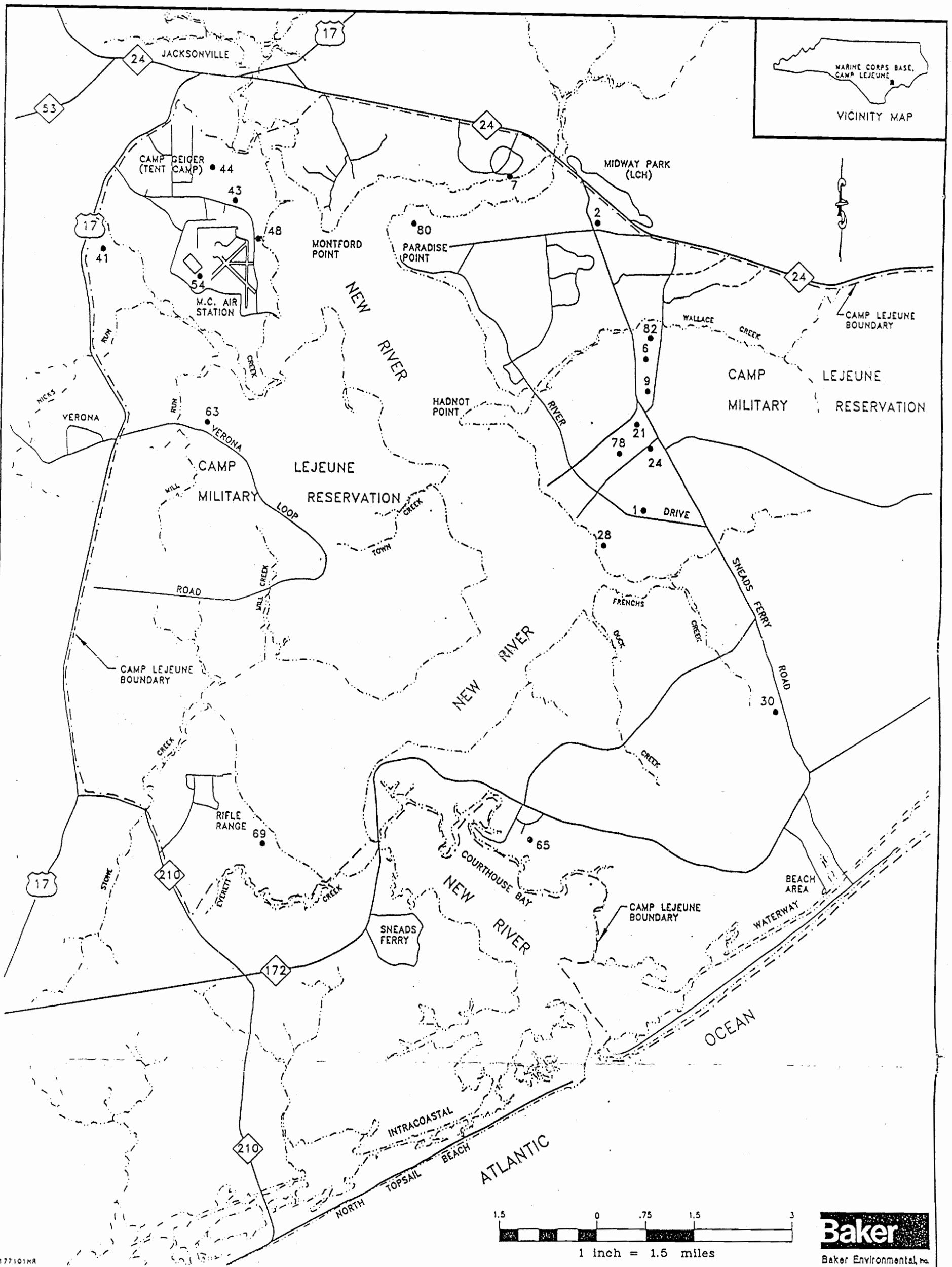
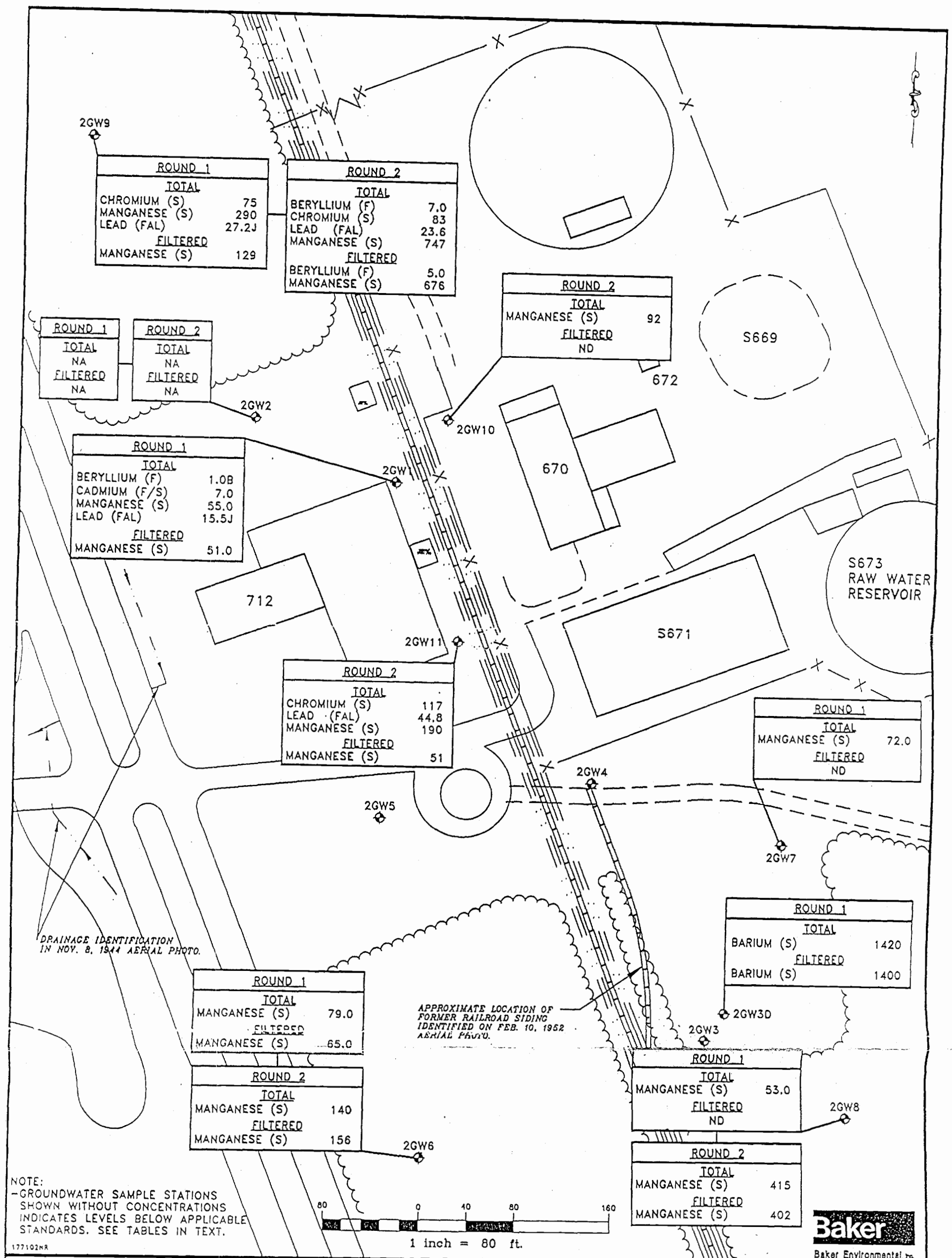


FIGURE 1  
 SITE LOCATION MAP  
 INORGANIC GROUNDWATER STUDY  
 MARINE CORPS BASE, CAMP LEJEUNE  
 NORTH CAROLINA

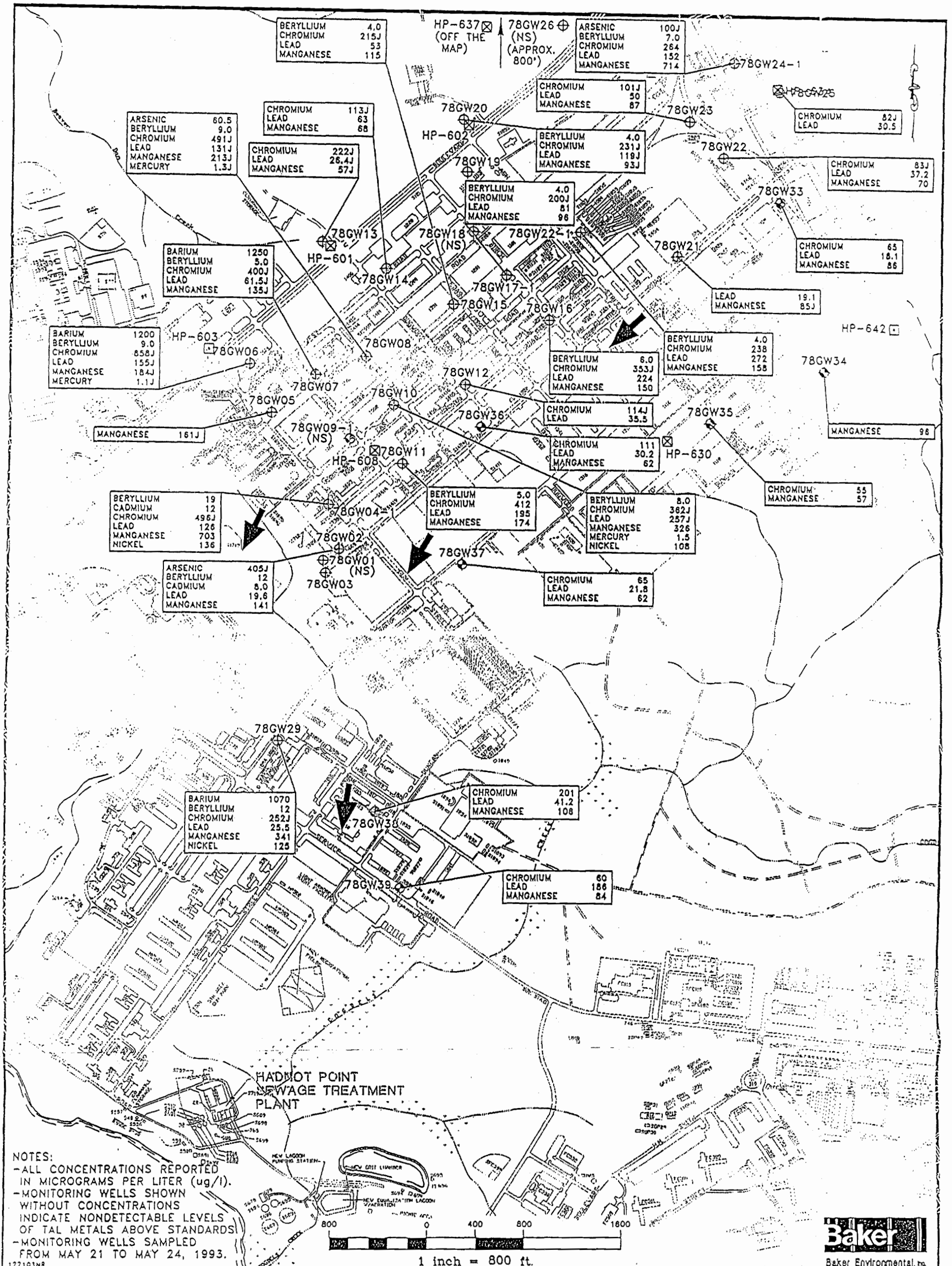
01714YBIZ



**LEGEND**

2GW1	GROUNDWATER WELL
(F)	EXCEEDS FEDERAL STANDARD
(S)	EXCEEDS STATE STANDARD
(FAL)	FEDERAL ACTION LEVEL
ND	NOT DETECTED ABOVE APPLICABLE STANDARDS
NA	NOT ANALYZED
J	ESTIMATED CONCENTRATIONS
CONCENTRATIONS EXPRESSED IN $\mu\text{g}/\text{l}(\text{ppb})$	
SOURCE: LANTDIV, FEB. 1992	

**FIGURE 2**  
 POSITIVE DETECTIONS ABOVE APPLICABLE FEDERAL AND STATE STANDARDS FOR TOTAL AND FILTERED INORGANIC ANALYTES IN GROUNDWATER  
 SITE 2  
 REMEDIAL INVESTIGATION CTO-0174  
 MARINE CORPS BASE, CAMP LEJEUNE  
 NORTH CAROLINA



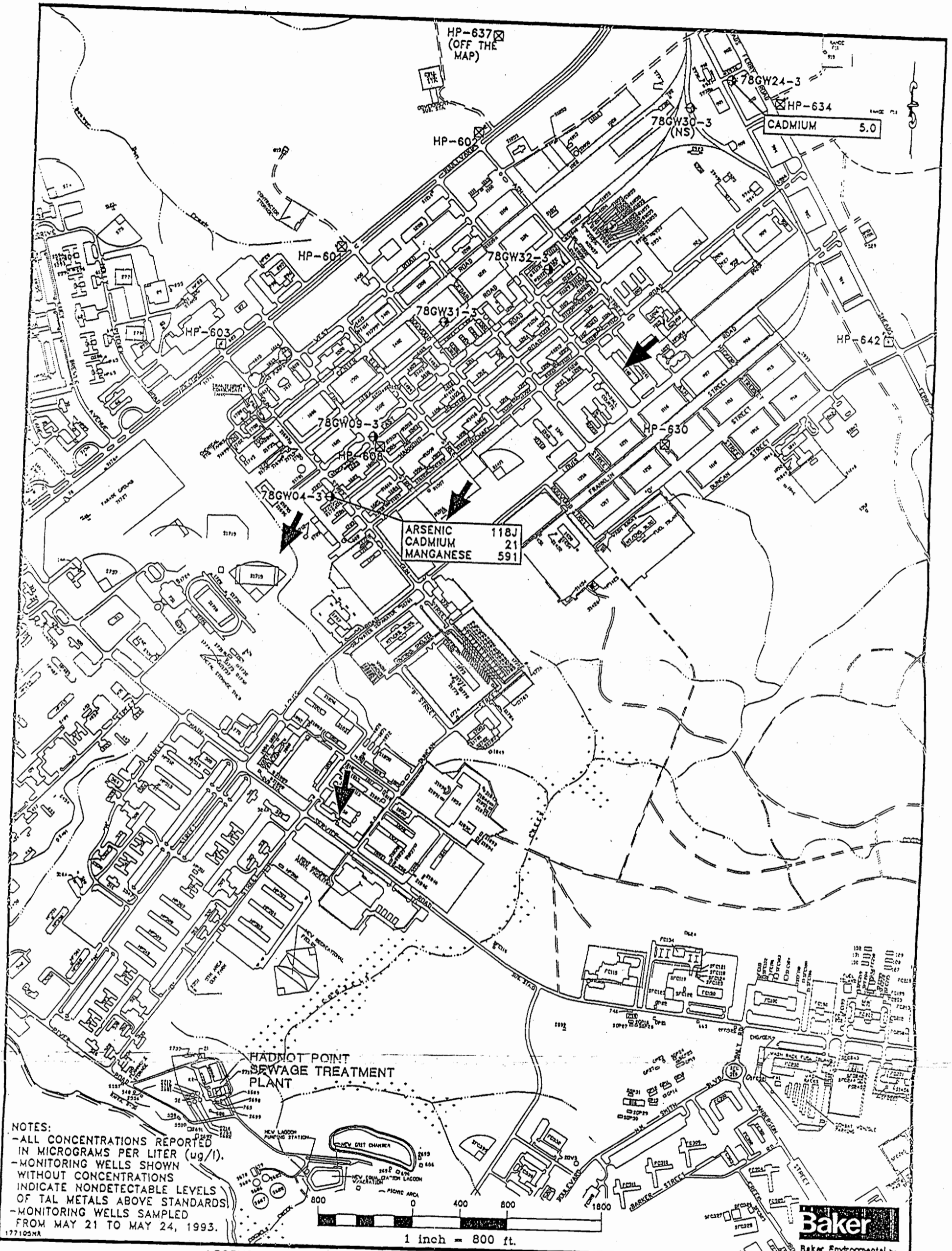
NOTES:  
 -ALL CONCENTRATIONS REPORTED IN MICROGRAMS PER LITER (ug/l).  
 -MONITORING WELLS SHOWN WITHOUT CONCENTRATIONS INDICATE NONDETECTABLE LEVELS OF TAL METALS ABOVE STANDARDS.  
 -MONITORING WELLS SAMPLED FROM MAY 21 TO MAY 24, 1993.

**LEGEND**

- 78GW02 EXISTING SHALLOW MONITORING WELL INSTALLED BY ESE, 1984-1991
  - 78GW33 SHALLOW MONITORING WELL INSTALLED BY BAKER ENVIRONMENTAL, INC., 1993
  - APPROXIMATE DIRECTION OF GROUNDWATER FLOW
  - (NS) NOT SAMPLED FOR TAL METALS
  - HP-603 WATER SUPPLY WELL (ACTIVE)-NOT SAMPLED
  - HP-601 WATER SUPPLY WELL (INACTIVE)-NOT SAMPLED
- SOURCE: LANTDIV, FEBRUARY 1992

**FIGURE 3**  
 POSITIVE DETECTIONS OF TAL METALS ABOVE FEDERAL MCLs AND/OR NCWQS IN SHALLOW WELLS  
 SITE 78  
 REMEDIAL INVESTIGATION CTO-0177  
 MARINE CORPS BASE, CAMP LEJEUNE  
 NORTH CAROLINA





**FIGURE 4**  
**POSITIVE DETECTIONS OF TAL METALS ABOVE FEDERAL MCLs AND/OR NCWQS IN DEEP WELLS**  
**SITE 78**  
**REMEDIAL INVESTIGATION CTO-0177**  
**MARINE CORPS BASE, CAMP LEJEUNE**  
**NORTH CAROLINA**

177105NA

**SOURCE: LANTDIV, FEBRUARY 1992**

OPERABLE UNIT NO. 1 - SITES 21, 24, 78  
 SHALLOW, INTERMEDIATE AND DEEP MONITORING WELLS  
 GROUNDWATER DATA AND FREQUENCY SUMMARY  
 REMEDIAL INVESTIGATION CTO - 19177  
 MCB CAMP LEJEUNE, NORTH CAROLINA  
 TAL METALS AND CYANIDE

	MINIMUM NONDETECTED UG/L	MAXIMUM NONDETECTED UG/L	MINIMUM DETECTED UG/L	MAXIMUM DETECTED UG/L	LOCATION OF MAXIMUM DETECTED	FREQUENCY OF DETECTION
ALUMINUM	NA	NA	68 J	542000 J	78-GW06-01	59 / 59
ANTIMONY	3 U	20 U	3.3 B	169 J	78-GW02-01	7 / 33
ARSENIC	2 U	10 U	2.3 J	405 J	78-GW02-01	44 / 48
BARIUM	NA	NA	17 B	1250	78-GW07-01	59 / 59
BERYLLIUM	1 U	4 U	1 B	19	24-GW02-01	52 / 59
CADMIUM	5 U	25 U	5	21	78-GW04-3-01	9 / 59
CALCIUM	NA	NA	2420 B	642000	78-GW04-1-01	59 / 59
CHROMIUM	10 U	50 U	10	858 J	78-GW06-01	46 / 59
COBALT	8 U	8 U	8 B	170	78-GW22-2-01	25 / 59
COPPER	2 U	2 U	3 B	699	78-GW39-01	58 / 59
IRON	NA	NA	32 B	523000	78-GW04-3-01	59 / 59
LEAD	1.8 U	4.9 U	2.9 B	2000 J	21-GW0B-01	50 / 59
MAGNESIUM	NA	NA	88 B	37100	24-GW03-01	59 / 59
MANGANESE	2 U	2 U	2 B	714	78-GW24-1-01	57 / 59
MERCURY	0.2 U	0.2 U	0.23 J	3.2	24-GW06-01	24 / 52
NICKEL	20 U	20 U	20 B	234	78-GW22-2-01	31 / 59
POTASSIUM	NA	NA	982 B	67300	78-GW32-3-01	59 / 59
SELENIUM	1 U	5 U	1.1 J	99.5 J	78-GW32-2-01	41 / 54
SILVER	3 U	15 U	5 J	5 J	78-GW09-3-01	1 / 59
SODIUM	NA	NA	2450 B	42500	78-GW32-3-01	59 / 59
THALLIUM	1 U	1 U	1 B	7.3 J	78-GW32-2-01	16 / 59
VANADIUM	4 U	4 U	4 J	1700	78-GW08-01	55 / 59
ZINC	6 U	6 U	6 J	967 J	78-GW22-2-01	57 / 59
CYANIDE	10 U	10 U	ND	ND	ND	0 / 54



OPERABLE UNIT NO. 1 - SITES 21, 24, 78  
SHALLOW, INTERMEDIATE AND DEEP MONITORING WELLS  
GROUNDWATER DATA AND FREQUENCY SUMMARY  
REMEDIAL INVESTIGATION CTO - 19177  
MCB CAMP LEJEUNE, NORTH CAROLINA  
TAL METALS AND CYANIDE

SAMPLE NO.	21-GW0C-01	24-GW01-01	24-GW02-01	24-GW03-01	24-GW04-01	24-GW06-01
UNITS	UG/L	UG/L	UG/L	UG/L	UG/L	UG/L
ALUMINUM	209000 J	262000	93700	50200	58900	19800
ANTIMONY	7 U	3 U	3 UJ	3 U	4.6 B	3.5 B
ARSENIC	101	10 UJ	2.3 J	4.7 J	116 J	10.1 J
BARIUM	467	380	1120	480	290	159 B
BERYLLIUM	8	3 B	19	5	2 B	9
CADMIUM	10 U	5 U	12	5 U	5 U	5
CALCIUM	35200 J	4120 B	2420 B	124000	65600	151000
CHROMIUM	291 J	296	316	110	153	78
COBALT	60	8 U	41 B	66	8 U	35 B
COPPER	84	49	52	22 B	31	15 B
IRON	106000 J	58600	395000	16300	70500	69500
LEAD	92.5 J	89	17.9	21.6	23.6	7.4
MAGNESIUM	16300	12200	7240	37100	7690	4320 B
MANGANESE	273 J	117	518	393	66	431
MERCURY	0.23 J	0.23	2.6	0.2 U	0.2 U	3.2
NICKEL	123	38 B	140	85	20 U	93
POTASSIUM	11800	12000	7550	15400	6130	3370 B
SELENIUM	4.3 B	1.3 J	1.1 J	16.2 J	4.3 J	1 UJ
SILVER	3 U	3 UJ	15 UJ	3 UJ	3 UJ	3 UJ
SODIUM	15200	6030	11600	19200	5230	7280
THALLIUM	1 U	1 U	1 U	2.4 B	1 U	1 B
VANADIUM	419	304	408	92	202	83
ZINC	487 J	118	461	650	80	489
CYANIDE	10 U					

OPERABLE UNIT NO. 1 - SITES 21, 24, 78  
 SHALLOW, INTERMEDIATE AND DEEP MONITORING WELLS  
 GROUNDWATER DATA AND FREQUENCY SUMMARY  
 REMEDIAL INVESTIGATION CTO - 19177  
 MCB CAMP LEJEUNE, NORTH CAROLINA  
 TAL METALS AND CYANIDE

SAMPLE NO.	78-GW04-1-01	78-GW04-2-01	78-GW04-3-01	78-GW05-01	78-GW06-01	78-GW07-01
UNITS	UG/L	UG/L	UG/L	UG/L	UG/L	UG/L
ALUMINUM	297000 J	286	115 B	23000 J	542000 J	207000 J
ANTIMONY	7 R	7 R	7 R	7 U	7 U	7 U
ARSENIC	18.6 J	2 R	118 J	5.2 J	26 B	16.2
BARIUM	728	519	547	54 B	1200	1250
BERYLLIUM	19	1 B	1 B	2 B	9	5
CADMIUM	12	5 U	21	5 U	5 U	5 U
CALCIUM	642000	170000	105000	90200 J	7180 J	18700 J
CHROMIUM	496 J	10 U	50 U	17 J	858 J	400 J
COBALT	28 B	8 U	8 U	8 U	11 B	20 B
COPPER	87	4 B	7 B	8 B	127	53
IRON	267000 J	32 B	523000	14900 J	142000 J	96700 J
LEAD	126	2 U	2 U	13.1 J	155 J	61.5 J
MAGNESIUM	23500	88 B	3210 B	12700	24000	20000
MANGANESE	703	51	591	161 J	184 J	135 J
MERCURY	0.75	0.2 U	0.3	0.2 R	1.1 J	0.44 J
NICKEL	136	20 B	20 U	20 U	86	54
POTASSIUM	18800	21800	11300	4770 B	25600	13200
SELENIUM	9 J	1 R	1 R	6.4	5.5 B	9.1
SILVER	6 UJ	3 U	15 U	3 U	3 U	3 U
SODIUM	8870	11500	9290	23900	5090	9260
THALLIUM	1.2 J	1 U	1 U	1 UJ	1.1 B	1 UJ
VANADIUM	591	4 UJ	24 J	28 B	811	406
ZINC	373 J	7 J	79 J	32 J	223 J	158 J
CYANIDE	10 U	10 U	10 U	10 U	10 U	10 U

OPERABLE UNIT NO. 1 - SITES 21, 24, 78  
 SHALLOW, INTERMEDIATE AND DEEP MONITORING WELLS  
 GROUNDWATER DATA AND FREQUENCY SUMMARY  
 REMEDIAL INVESTIGATION CTO - 19177  
 MCB CAMP LEJEUNE, NORTH CAROLINA  
 TAL METALS AND CYANIDE

SAMPLE NO.	78-GW13-01	78-GW14-01	78-GW15-01	78-GW16-01	78-GW17-1-01	78-GW17-2-01
UNITS	UG/L	UG/L	UG/L	UG/L	UG/L	UG/L
ALUMINUM	61800 J	103000 J	205000 J	341000 J	168000 J	541 J
ANTIMONY	7 U	7 R	7 R	7 R	7 R	7 R
ARSENIC	38.3	18.4 J	4 R	19 J	11.6 J	2 R
BARIUM	236	321	469	511	261	57 B
BERYLLIUM	3 B	1 B	4 B	6	4 B	1 B
CADMIUM	5 U	10 U	5 U	5 U	10 U	5 U
CALCIUM	4040 J	5300	29100	62700	86900	144000
CHROMIUM	222 J	113 J	215 J	353 J	200 J	10 UJ
COBALT	20 B	8 U	9 B	13 B	9 B	8 U
COPPER	18 B	33	49	80	40	5 B
IRON	61800 J	49600 J	43300 J	80900 J	48700 J	2120 J
LEAD	26.4 J	63	53	224	81	5.9
MAGNESIUM	11800	10600	13400	10800	9940	2570 B
MANGANESE	57 J	68	115	150	96	33
MERCURY	0.3 J	0.38	0.2 U	0.38	0.2 U	0.2 U
NICKEL	40	34 B	29 B	61	30 B	20 U
POTASSIUM	8210	6460	12000	14000	11600	1630 B
SELENIUM	4.7 B	12.4 J	2.1 J	14.5 J	5 UJ	1 UJ
SILVER	3 U	3 UJ	3 UJ	3 UJ	3 UJ	3 UJ
SODIUM	13000	15400	6410	4120 B	3180 B	9480
THALLIUM	1 U	1 UJ	1 J	1.4 J	1 J	1 UJ
VANADIUM	158	122	248	371	289	4 U
ZINC	96 J	51 J	116 J	157 J	98 J	6 UJ
CYANIDE	10 U	10 U	10 U	10 U	10 U	10 U

OPERABLE UNIT NO. 1 - SITES 21, 24, 78  
 SHALLOW, INTERMEDIATE AND DEEP MONITORING WELLS  
 GROUNDWATER DATA AND FREQUENCY SUMMARY  
 REMEDIAL INVESTIGATION CTO - 19177  
 MCB CAMP LEJEUNE, NORTH CAROLINA  
 TAL METALS AND CYANIDE

SAMPLE NO.	78-GW23-01	78-GW24-1-01	78-GW24-2-01	78-GW24-3-01	78-GW25-01	78-GW29-01
UNITS	UG/L	UG/L	UG/L	UG/L	UG/L	UG/L
ALUMINUM	111000 J	160000	1340	304	101000 J	78800 J
ANTIMONY	7 R	7 R	7 R	7 R	7 R	7 R
ARSENIC	7.6 J	100 J	2 R	2 R	11.4 J	19 J
BARIUM	230	396	34 B	17 B	119 B	1070
BERYLLIUM	2 B	7	1 B	1 U	2 B	12
CADMIUM	5 U	5 U	5	5	5 U	5 U
CALCIUM	10800	34400	107000	73400	37800	41600
CHROMIUM	101 J	264	10	10 U	82 J	252 J
COBALT	8 B	39 B	8 U	8 U	8 U	17 B
COPPER	25	71	6 B	5 B	26	34
IRON	30800 J	159000	2320	2370	26300 J	125000 J
LEAD	50	152	3.3	2.9 B	30.5	25.5
MAGNESIUM	7110	11600	1740 B	1500 B	4500 B	21900
MANGANESE	87	714	21	41	33	341
MERCURY	0.3	0.75	0.2 U	0.2 U	0.2 U	0.2 U
NICKEL	42	91	20 U	20 U	20 U	125
POTASSIUM	5450	9090	1050 B	982 B	4950 B	11600
SELENIUM	4.4 J	17.6 J	1 R	1 R	1.6 J	2.5 J
SILVER	3 UJ	3 U	3 U	3 U	3 UJ	3 UJ
SODIUM	7450	10800	8350	7050	16400	21200
THALLIUM	1.7 J	1.5 B	1 U	1 U	1.3 J	1 UJ
VANADIUM	108	436	4 J	4 UJ	144	183
ZINC	67 J	291 J	11 J	16 J	34 J	330 J
CYANIDE	10 U	10 U	10 U	10 U	10 U	10 U

OPERABLE UNIT NO. 1 - SITES 21, 24, 78  
 SHALLOW, INTERMEDIATE AND DEEP MONITORING WELLS  
 GROUNDWATER DATA AND FREQUENCY SUMMARY  
 REMEDIAL INVESTIGATION CTO - 19177  
 MCB CAMP LEJEUNE, NORTH CAROLINA  
 TAL METALS AND CYANIDE

SAMPLE NO.	78-GW35-01	78-GW36-01	78-GW37-01	78-GW38-01	78-GW39-01
UNITS	UG/L	UG/L	UG/L	UG/L	UG/L
ALUMINUM	47100	120000	73500	102000	60000
ANTIMONY	3 U	20 U	3 U	20 U	20 U
ARSENIC	2 UJ	3.1 J	4 J	33.6 J	4 UJ
BARIUM	261	152 B	123 B	420	256
BERYLLIUM	1 B	2 U	2 B	4 U	1 U
CADMIUM	5 U	5 U	5 U	25 U	5 U
CALCIUM	7480	35400	10100	62200	16800
CHROMIUM	55	111	65	201	60
COBALT	8 U	8 U	8 U	8 U	10 B
COPPER	15 B	29	22 B	110	699
IRON	11800	21200	18800	67500	28800
LEAD	13.2	30.2	21.8	41.2	186
MAGNESIUM	5680	5740	4600 B	17500	14300
MANGANESE	57	62	62	106	84
MERCURY	0.2 U	0.3	0.2 U	0.2 U	0.52
NICKEL	20 U	24 B	20 U	32 B	32 B
POTASSIUM	6150	5820	5990	8180	3840 B
SELENIUM	3.5 J	1.7 J	1.1 J	1.3 J	4.3 J
SILVER	3 UJ	3 UJ	3 UJ	3 UJ	3 UJ
SODIUM	10300	2450 B	7270	10300	19500
THALLIUM	1 U	1 U	1 U	1 U	1 U
VANADIUM	59	98	106	235	67
ZINC	30	57	58	134	138
CYANIDE	10 U	10 U	10 U	10 U	10 U

OPERABLE UNIT NO. 5 - SITE 2  
 SHALLOW AND DEEP MONITORING WELLS  
 GROUNDWATER STATISTICAL SUMMARY  
 REMEDIAL INVESTIGATION CTO - 19174  
 MCB CAMP LEJEUNE, NORTH CAROLINA  
 TAL METALS AND CYANIDE

SAMPLE NO.	2-GW01-01	2-GW02-01	2-GW03-01	2-GW03DW-01	2-GW04-01	2-GW05-01
UNITS	UG/L		UG/L	UG/L	UG/L	UG/L
ALUMINUM	36000		5200	269	16800	4050
ANTIMONY	10 U		10 U	3.5 U	10 U	10 U
ARSENIC	21.2		2.5 B	1 UJ	23.6	2.2 B
BARIUM	52 B		46 B	1420	95 B	100 B
BERYLLIUM	1 B		0.5 U	0.5 U	2 B	0.5 U
CADMIUM	7		2.5 U	2.5 U	2.5 U	2.5 U
CALCIUM	23700		8460	450000	11100	21000
CHROMIUM	18		11	16	5 U	5 U
COBALT	10 B		4 U	4 U	4 U	4 U
COPPER	10 B		4 B	8 B	5 B	3 B
IRON	10300		7190	127	28100	12700
LEAD	15.5 L		3.5 J	1.1 UJ	2.7 J	0.5 UJ
MAGNESIUM	5660		1600 B	75 B	1920 B	4800 B
MANGANESE	55		21	2 U	21	46
MERCURY	0.1 U		0.1 U	0.1 U	0.1 U	0.1 U
NICKEL	10 U		10 U	10 U	10 U	10 U
POTASSIUM	2560 B		1030 B	187000	1210 B	2130 B
SELENIUM	4.2 B		0.5 U	0.5 U	0.5 U	0.5 U
SILVER	1.5 U		1.5 U	1.5 U	1.5 U	1.5 U
SODIUM	4040 B		5490	103000	5560	10100
THALLIUM	0.5 U		0.5 U	0.5 UJ	0.5 U	0.5 U
VANADIUM	72		10 B	2 U	89	9 B
ZINC	146		13 B	9 B	16 B	6 B
CYANIDE	5 U		5 U	5 U	5 U	5 U

OPERABLE UNIT NO. 5 - SITE 2  
 SHALLOW AND DEEP MONITORING WELLS  
 GROUNDWATER STATISTICAL SUMMARY  
 REMEDIAL INVESTIGATION CTO - 19174  
 MCB CAMP LEJEUNE, NORTH CAROLINA  
 DISSOLVED METALS

SAMPLE NO.	2-GW01D-01	2-GW02D-01	2-GW03D-01	2-GW03DWD-01	2-GW04D-01	2-GW05D-01
	UNITS	UG/L	UG/L	UG/L	UG/L	UG/L
ALUMINUM	1930		66 B	89 B	60 B	1990
ANTIMONY	10 U		10 U	3.5 UJ	10 U	10 U
ARSENIC	2.2 B		1 U	1 UJ	6.1 B	1 U
BARIUM	42 B		25 B	1400	64 B	98 B
BERYLLIUM	1 B		0.5 U	0.5 U	0.5 U	1 B
CADMIUM	2.5 U		2.5 U	2.5 U	2.5 U	2.5 U
CALCIUM	24400		7100	441000	11300	21800
CHROMIUM	5 U		5 U	11	5 U	5 U
COBALT	4 U		4 U	4 U	4 U	4 U
COPPER	4 B		2 B	6 B	9 B	4 B
IRON	2560		2170	10 U	2720	7400
LEAD	2.1 J		0.5 UJ	0.5 UJ	0.5 UJ	0.5 UJ
MAGNESIUM	5220		1030 B	26 B	1840 B	4900 B
MANGANESE	51		4.5 U	1 U	17	46
MERCURY	0.1 U		0.1 U	0.1 U	0.1 U	0.1 U
NICKEL	10 U		10 U	10 U	10 U	10 U
POTASSIUM	2140 B		589 B	188000	1130 B	2170 B
SELENIUM	0.5 U		0.5 U	0.5 U	0.5 U	0.5 U
SILVER	1.5 U		1.5 U	1.5 U	1.5 U	1.5 U
SODIUM	3590 B		5400	103000	5710	9970
THALLIUM	0.5 U		0.5 U	0.5 U	0.5 U	0.5 U
VANADIUM	2 U		2 U	2 U	2 U	2 U
ZINC	28		3 U	3 U	8 B	9 B
CYANIDE						

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**SURFACE WATER**

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BASE BACKGROUND  
SURFACE WATER  
MCB, CAMP LEJEUNE, NORTH CAROLINA  
TAL INORGANICS

Sample ID:	6-BH01-SW-06B	6-BH01-SW-06M	6-BH02-SW-06M	6-WC01-SW-06B	6-WC01-SW-06M	6-WC02-SW-06B	6-WC03-SW-06B
ALUMINUM	1210	1230	868	1350	1220	633	747
ANTIMONY	17.2 UJ	14 U	14 U	14 U	14 U	16.2 UJ	49 U
ARSENIC	3 U	3 U	3 UJ	3 UJ	3 UJ	2 U	2 U
BARIUM	13.4 JB	14 JB	25.1 JB	16 JB	16.2 JB	19.3 B	21 U
BERYLLIUM	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	1 U
CADMIUM	1.9 UJ	2.6 UJ	1.9 U	1.9 U	1.9 U	1.9 U	3 U
CALCIUM	612 B	600 B	16100	3640 B	3670 B	9990	9360
CHROMIUM	3.6 U	3.6 U	7 U	3.6 UJ	3.6 UJ	3.6 U	5 U
COBALT	2 U	2 U	3 UJ	2 U	2 U	2 U	6 U
COPPER	3.2 UJ	3 UJ	7 UJ	1.9 U	1.9 U	1.9 U	4 U
CYANIDE	10 U	10 U	10 U	10 U	10 U	10 UJ	10 U
IRON	958	818	921	1050	941	844	849
LEAD	1 U	1 U	3 U	2.3 JB	1.9 JB	1.2 B	5
MAGNESIUM	588 B	612 B	1010 B	632 B	639 B	1110 B	916 B
MANGANESE	6.5 B	6.2 B	14 JB	9 UJ	8.9 UJ	8.8 B	9.8 JB
MERCURY	0.04 U	0.05 U	0.04 U	0.04 U	0.04 U	0.07 U	0.2 U
NICKEL	7.9 UJ	7.9 UJ	7.9 U	7.9 UJ	7.9 UJ	7.9 U	17 U
POTASSIUM	117 UJ	146 UJ	685 B	376 B	341 B	604 B	610 B
SELENIUM	5 U	5 U	5 U	5 UJ	5 UJ	5 U	5 U
SILVER	2 UJ	2 UJ	4 UJ	2 UJ	2 UJ	3.8 UJ	10 U
SODIUM	4680 B	4850 B	5250	3930 B	3980 B	7790	6240
THALLIUM	2 UJ	2 UJ	2 UJ	2 U	2 UJ	2 UJ	2 UJ
VANADIUM	1.8 UJ	1.8 UJ	2 JB	3.3 JB	1.9 JB	2.1 JB	5 U
ZINC	4.5 U	4.9 U	13.1 U	8.7 U	7.6 U	7.5 U	7.4 U

Concentrations presented in micrograms per liter (UG/L)

BASE BACKGROUND  
SURFACE WATER  
MCB, CAMP LEJEUNE, NORTH CAROLINA  
TAL INORGANICS

Sample ID:	6-WC03-SW-06M	6-WC03-SW-312M	41-TC-SW06	41-UN-SW01	41-NE-SW05	2-OC-SW01	69-UT1-SW-06
ALUMINUM	633	676	390.0	447.0 J	178.0	556	1110
ANTIMONY	49 U	49 U	7.60 U	7.60 U	7.60 U	7 U	49 U
ARSENIC	2 U	2 U	2.90 U	2.20 U	2.90 U	2 U	3 U
BARIUM	21 U	21 U	23.6	23.3	27.2	18 B	23 B
BERYLLIUM	1 U	1 U	0.760 U	0.760 U	0.760 U	1 U	1 U
CADMIUM	3 U	3 U	3.19 U	3.19 U	3.19 U	5 U	3 JB
CALCIUM	8890	9430	18900.0	41600.0	40300.0	22900	1380 B
CHROMIUM	5 U	5 U	8.31 U	8.31 U	8.31 U	10 U	5 U
COBALT	6 U	6 U	16.0 U	16.0 U	16.0 U	8 U	8 JB
COPPER	4 U	129	16.3 U	16.3 U	16.3 U	4 B	7 JB
CYANIDE	10 U	10 U	NZ	NZ	NZ	NZ	10 U
IRON	756	830	1460.0	1300.0 J	469.0	413	1000
LEAD	5	10.4	1.40	1.85	1.17	2 U	2 B
MAGNESIUM	883 B	936 B	1620.0	1770.0	2410.0	1960 B	846 B
MANGANESE	8.2 JB	9.2 JB	25.7	17.5	40.0	24	9 JB
MERCURY	0.2 U	0.52	0.171 U	0.182 UJ	0.160 U	0.2 U	0.2 U
NICKEL	17 U	1380	17.4 U	28.8 U	17.4 U	20 U	17 U
POTASSIUM	603 B	640 B	2210	1860	1620	809 B	385 B
SELENIUM	5 U	5 U	1.60 UJ	1.60 UJ	1.60 UJ	1 U	5 U
SILVER	10 U	10 U	1.60 U	1.60 U	1.60 U	3 UJ	10 U
SODIUM	6100	6500	15000	22100	12300	6190	4790 JB
THALLIUM	2 UJ	2 UJ	3.00 U	3.00 U	3.00 U	1 U	2 UJ
VANADIUM	5 U	5 U	20.4 U	20.4 U	20.4 U	4 U	10 JB
ZINC	10.4 U	111	21.4	24.9	33.2	23 UJ	18 B

Concentrations presented in micrograms per liter (UG/L)

**BASE BACKGROUND**  
**SURFACE WATER**  
**MCB, CAMP LEJEUNE, NORTH CAROLINA**  
**TAL INORGANICS**

	Mininum (ug/L)	Maximum (ug/L)	Average (ug/L)
ALUMINUM	178	1350	803.4
ANTIMONY	ND	ND	NA
ARSENIC	ND	ND	NA
BARIUM	13.4	27.2	17.9
BERYLLIUM	ND	ND	NA
CADMIUM	3	3	1.5
CALCIUM	600	41600	13383.7
CHROMIUM	ND	ND	NA
COBALT	8	8	3.7
COPPER	4	129	12.7
CYANIDE	ND	ND	NA
IRON	413	1460	900.6
LEAD	1.17	10.4	2.6
MAGNESIUM	588	2410	1138.0
MANGANESE	6.2	40	13.4
MERCURY	0.52	0.52	0.1
NICKEL	1380	1380	105.1
POTASSIUM	341	2210	776.8
SELENIUM	ND	ND	NA
SILVER	ND	ND	NA
SODIUM	3930	22100	7835.7
THALLIUM	ND	ND	NA
VANADIUM	1.9	10	4.4
ZINC	18	111	18.0

Qualifiers have been removed per Baker's standards.

Qualifiers U and UJ have been given one-half the detection value.

Qualifiers J, NJ, and B have been removed with no detection value change.

**SEDIMENT**

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BASE BACKGROUND  
SEDIMENT  
MCB, CAMP LEJEUNE, NORTH CAROLINA  
TAL INORGANICS

Sample ID:	2-OCSD01-06	2-OCSD01-612	6-BH01-SD-612B	6-BH01-SD-612M	6-BH01-SD-6B	6-BH01-SD-6M	6-BH02-SD-06M
ALUMINUM	8680	9090	6760	7790	5610	6360	3010
ANTIMONY	R	R	4.7 UJ	5.9 U	4.9 UJ	4.8 U	3.8 U
ARSENIC	0.56 UJ	0.57 UJ	1 U	1.1 U	1.1 U	0.93 U	0.77 U
BARIUM	30.5 B	30 B	9.7 JB	14.4 B	8.5 UJ	9.9 JB	12.5 B
BERYLLIUM	0.85 B	0.86 B	0.13 B	0.17 B	0.14 B	0.1 U	0.08 U
CADMIUM	1.4 U	1.4 U	0.51 UJ	0.8 UJ	0.86 UJ	0.65 UJ	0.54 JB
CALCIUM	6320	6180	59.3 U	82.8 U	61.9 U	70.2 U	1410
CHROMIUM	9.9	10	5.1	4.7	4.9	3.6	3.3 U
COBALT	2.3 U	2.3 U	0.53 U	0.84 U	0.55 U	0.69 U	1.1 UJ
COPPER	1.1 B	0.86 B	3.2 JB	10.1 JB	4.2 JB	6.2 JB	2.5 UJ
IRON	842	845	765	1590	638	956	1240
LEAD	8.8	8	8.9	12.3	11.3	10.2	6.9
MAGNESIUM	322 B	307 B	128 B	160 B	103 B	130 B	77.9 B
MANGANESE	4.8	5.7	4.9	6 B	4.7	4.9 B	4.4 J
MERCURY	0.14 U	0.14 U	0.05 U	0.05 U	0.05 U	0.04 UJ	0.03 U
NICKEL	5.6 U	5.7 U	2.1 UJ	3.3 UJ	2.2 UJ	2.7 UJ	2.7 UJ
POTASSIUM	229 B	237 B	125 B	163 B	122 B	140 B	76.8 UJ
SELENIUM	1.7 J	2.1 J	1.7 UJ	1.9 U	1.8 UJ	1.6 UJ	1.3 U
SILVER	0.85 UJ	0.86 UJ	0.53 UJ	0.84 UJ	0.55 UJ	0.69 UJ	0.82 UJ
SODIUM	86.2 B	78.9 B	35.5 UJ	42.8 UJ	41.5 UJ	39.4 UJ	25.4 UJ
THALLIUM	0.31 J	0.29 J	0.69 U	0.76 U	0.73 U	0.62 U	0.51 U
VANADIUM	6.8 B	6.6 B	5.7 B	6.5 B	4.8 B	4.9 B	3.3 JB
ZINC	18.9	18.9	2.1 U	1.4 U	1.6 U	1.8 U	12

Concentrations presented in milligrams per kilogram (mg/kg).

BASE BACKGROUND  
SEDIMENT  
MCB, CAMP LEJEUNE, NORTH CAROLINA  
TAL INORGANICS

Sample ID:	6-BH02-SD-612M	6-WC01-SD-06B	6-WC01-SD-612B	6-WC02-SD-06B	6-WC02-SD-612B	6-WC03-SD-06B	6-WC03-SD-06M
ALUMINUM	7780	2090 J	2510	6540 J	5390 J	6480 J	4780 J
ANTIMONY	4.6 U	3.3 U	3.1 U	3.1 U	4.1 U	6.8 UJ	3.4 U
ARSENIC	1.6 JB	1.2 JB	0.73 UJ	0.81 U	0.64 U	1.4 UJ	0.82 UJ
BARIUM	30 B	5.2 JB	15.3 B	19.6 JB	23.7 JB	15.8 JB	37.1 JB
BERYLLIUM	0.33 B	0.07 U	0.07 U	0.26 U	0.33 U	0.27 U	0.32 U
CADMIUM	1.3 JB	0.45 U	0.42 U	0.42 U	0.74 UJ	1.2 UJ	0.46 U
CALCIUM	3890	329 B	1060 B	1090 JB	1790 J	2850 J	22200 J
CHROMIUM	9.9	3 UJ	2.5 UJ	4.2	3.4	6.2	6.4
COBALT	2.6 UJ	0.48 U	0.44 U	0.6 JB	0.87 JB	0.94 U	1.3 JB
COPPER	2.3 UJ	0.86 UJ	0.64 UJ	0.43 JB	0.62 JB	5.8 JB	53200
IRON	3150	724 J	1430 J	1200 J	1570 J	6870 J	6940 J
LEAD	8.9	9.7 J	2.3 J	4.8 J	4.8 J	9 J	314 J
MAGNESIUM	187 B	50.5 B	57 B	372 JB	356 JB	440 JB	852 JB
MANGANESE	8.6 J	2.4 UJ	4.7 J	8.8	6.5	9.7	23
MERCURY	0.07 U	0.03 U	0.04 U	0.08 U	0.06 U	0.11 U	0.06 U
NICKEL	7.2 UJ	1.9 UJ	1.8 UJ	1.7 UJ	2.8 B	3.7 UJ	1.9 UJ
POTASSIUM	151 U	92.1 B	98.1 B	145 B	97 U	220 B	360 B
SELENIUM	2.9	1.4 UJ	1.2 UJ	1 U	1.3 U	2.7 U	1 UJ
SILVER	1.3 UJ	0.48 UJ	0.44 UJ	0.52 UJ	1.2 UJ	1.5 UJ	7.3
SODIUM	39.9 UJ	38.3 UJ	27 UJ	491 JB	469 JB	277 UJ	489 JB
THALLIUM	0.65 UJ	0.55 U	0.49 U	0.4 UJ	0.5 UJ	1.1 UJ	0.4 UJ
VANADIUM	14.1 B	5.7 B	4.4 B	5.8 B	7 B	11.6 B	9.1 B
ZINC	12.6	3.1 U	3.1 U	1.6 U	2.4 U	16.3 U	926

Concentrations presented in milligrams per kilogram (mg/kg).

BASE BACKGROUND  
 SEDIMENT  
 MCB, CAMP LEJEUNE, NORTH CAROLINA  
 TAL INORGANICS

Sample ID:	6-WC03-SD-612B	41-UN-SD01-06	41-UN-SD01-612	41-NE-SD05-06	41-NE-SD05-612	41-TC-SD06-06
ALUMINUM	7040 J	1720.0	2780.0	437 J	351 J	2580.0 J
ANTIMONY	6.8 U	2.15 U	2.09 U	1.91 U	1.88 U	2.28 U
ARSENIC	1.3 JB	0.789 U	0.768 U	0.542 U	0.532 U	0.702
BARIIUM	25.2 JB	5.24	7.66	3.2 U	3.14 U	13.5
BERYLLIUM	0.26 U	0.351 U	0.342 U	0.196 U	0.193 U	0.234 U
CADMIUM	0.92 U	0.639 U	0.622 U	0.823 U	0.809 U	0.982 U
CALCIUM	4500 J	1250.0	1660.0	314 J	216 J	1090.0 J
CHROMIUM	8.3	4.81 U	3.18 U	2.42 J	2.11 UJ	3.42 J
COBALT	0.97 U	2.65 U	2.58 U	4.13 U	4.06 U	4.92 U
COPPER	79.6	4.41 U	4.29 U	4.21 U	4.13 U	5.02 U
IRON	6050 J	924.0 J	1160.0 J	354 J	262 J	2840.0 J
LEAD	10.3 J	13.8 J	12.6 J	1.94	2.19	18.7
MAGNESIUM	333 JB	62.5	59.4	21.5	18.2 U	99.8
MANGANESE	8.3	2.94	2.67	1.96 J	1.79 UJ	8.72 J
MERCURY	0.11 U	0.068 U	0.066 U	0.064 U	0.063 U	0.077 U
NICKEL	3.8 UJ	5.97	3.79	7.4 U	7.3 U	8.90 U
POTASSIUM	457 B	136.0 U	132.0 U	197 U	193 U	235.0 U
SELENIUM	2.3 U	0.688 U	0.670 U	0.387 UJ	0.38 UJ	0.462 UJ
SILVER	1.3 UJ	0.435 U	0.424 U	0.413 UJ	0.406 UJ	0.492 UJ
SODIUM	382 UJ	73.6 J	49.3 UJ	95 U	117	347.0
THALLIUM	0.93 UJ	1.25 U	1.22 U	0.748 UJ	0.735 UJ	0.892 UJ
VANADIUM	15.7 B	4.52 U	4.40 U	5.26 U	5.17 U	6.28 U
ZINC	12.3 U	10.5 U	15.2 U	7.41 U	13.6	18.0

Concentrations presented in milligrams per kilogram (mg/kg).

BASE BACKGROUND  
SEDIMENT  
MCB, CAMP LEJEUNE, NORTH CAROLINA  
TAL INORGANICS

Sample ID: 410TC-SD06-612 69-UT1-SD-06

ALUMINUM	6600.0 J	1240
ANTIMONY	2.11 U	9.4 U
ARSENIC	0.864	0.62 U
BARIUM	25.3	4 U
BERYLLIUM	0.377	0.19 U
CADMIUM	0.909 U	0.58 U
CALCIUM	1230.0 J	264 B
CHROMIUM	8.72 J	3.3
COBALT	4.56 U	1.2 UJ
COPPER	4.64 U	1.5 UJ
IRON	6030.0 J	3530
LEAD	13.6	1
MAGNESIUM	235.0	48.9 B
MANGANESE	13.7 J	2.9 J
MERCURY	0.071 U	0.11 U
NICKEL	8.20 U	3.3 U
POTASSIUM	381.0	81.1 B
SELENIUM	0.862 J	1 U
SILVER	0.456 UJ	1.9 U
SODIUM	105.0 U	122 JB
THALLIUM	0.826 UJ	0.42 UJ
VANADIUM	12.7	4 UJ
ZINC	19.9	4.4 U

Concentrations presented in milligrams per kilogram (mg/kg).



BASE BACKGROUND  
 SEDIMENT  
 MCB CAMP LEJEUNE, NORTH CAROLINA  
 TAL INORGANICS

	Minimum (mg/kg)	Maximum (mg/kg)	Average (mg/kg)
ALUMINUM	351	9090	4800.8
ANTIMONY	ND	ND	NA
ARSENIC	0.702	1.6	0.6
BARIUM	5.2	37.1	15.5
BERYLLIUM	0.13	0.86	0.2
CADMIUM	0.54	1.3	0.4
CALCIUM	216	22200	2626.4
CHROMIUM	2.42	10	4.7
COBALT	0.6	1.3	1.0
COPPER	0.43	53200	2424.1
IRON	262	6940	2268.6
LEAD	1	314	22.5
MAGNESIUM	21.5	852	200.5
MANGANESE	1.96	23	6.4
MERCURY	ND	ND	NA
NICKEL	2.8	5.97	2.4
POTASSIUM	81.1	457	157.2
SELENIUM	0.862	2.9	0.9
SILVER	7.3	7.3	0.7
SODIUM	73.6	491	130.6
THALLIUM	0.29	0.31	0.4
VANADIUM	3.3	15.7	6.3
ZINC	12	926	49.2

Qualifiers have been removed per Baker's standards.

Qualifiers U and UJ have been given one-half the detection limit.

Qualifiers J, NJ, and B have been removed with no detection value change.

**APPENDIX Q**  
**SITE CONCEPTUAL MODEL**

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**PRELIMINARY HUMAN HEALTH  
RISK ASSESSMENT  
CONCEPTUAL EVALUATION MODEL**

**OPERABLE UNIT NO. 6  
SITES 36, 43, 44, 86, AND 54**

**MARINE CORPS BASE  
CAMP LEJEUNE, NORTH CAROLINA**

**CONTRACT TASK ORDER 0303**

**AUGUST 3, 1995**

*Prepared for:*

**DEPARTMENT OF THE NAVY  
ATLANTIC DIVISION  
NAVAL FACILITIES  
ENGINEERING COMMAND  
*Norfolk, Virginia***

*Under:*

**LANTDIV CLEAN Program  
Contract N62470-89-D-4814**

*Prepared by:*

**BAKER ENVIRONMENTAL, INC.  
*Coraopolis, Pennsylvania***

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## INTRODUCTION

As part of the review of available site information for use in a risk assessment (RA) and feasibility study (FS), a conceptual evaluation model has been formulated for the sites. Originally developed to assist in planning site activities for the remedial investigation (RI), the conceptual site model also can be used to identify the key elements in a risk assessment, such as: potential exposure pathways, exposure points and data needs.

As part of the RA, a conceptual evaluation model has been developed for Operable Unit (OU) No. 6, which includes sites 36, 43, 44, 54 and 86. The conceptual models briefly describe each site and present potential sources of contamination, constituents present at the site, potentially contaminated media, constituent migration routes, potential receptors and exposure pathways. Ecological receptors are addressed in the conceptual evaluation model for ecological risk assessment. The model was developed in accordance with the guidance provided in USEPA Data Quality Objectives for Remedial Response Activities Development Process (USEPA, 1987).

## APPROACH

For the baseline human health risk assessment, both current and future land use exposure scenarios will be assumed for each site. A reasonable maximum exposure (RME) case scenario (i.e., worst case or upper bound risk estimate) will be utilized in the assessments. Consequently, the exposure scenarios presented will include RME assumptions for the input parameters in the exposure dose equations. Table 1 is a summary of these values.

The baseline risk assessment for each site will be conducted in concordance with the United States Environmental Protection Agency (USEPA) documents: Risk Assessment Guidance for Superfund: Human Health Evaluation Manual, Part A (USEPA, 1989) and Region IV Supplemental Risk Guidance (USEPA, 1992). The documents to be used in the assessment include, but are not limited to the following references: Risk Assessment Guidance for Superfund: Development of Risk-based Preliminary Remediation Goals, Part B (USEPA, 1991); "Human Health Evaluation Manual, Supplemental Guidance: Standard Default Exposure Factors" (USEPA, 1991); Exposure Factors Handbook (USEPA, 1989); Dermal Exposure Assessment: Principles and Applications, Interim Report (USEPA, 1992); and Superfund Exposure Assessment Manual (USEPA, 1988).

Toxicity values will be obtained from USEPA's Integrated Risk Information System (IRIS, 1995), the Health Effects Assessment Summary Tables (HEAST, 1994), and provisional or recommended USEPA toxicity values (i.e., values provided by the USEPA Environmental Criteria and Assessment Office [ECAO]), in accordance with Region IV and North Carolina Department of Environmental Health and Natural Resources (NCDEHNR) recommendations.

A mathematical model will be used to estimate exposure point concentrations. To estimate exposure from the inhalation of volatile contaminants in groundwater while showering, the "Integrated Household Exposure Model for Use of Tap Water Contaminated with Volatile Organic Chemicals" developed by S.A. Foster and P.C. Chrostowski will be applied. To evaluate the health effects of lead, the USEPA lead uptake/biokinetic model will be used.

The acceptable cancer risk range, as stipulated by the USEPA, is  $1 \times 10^{-4}$  to  $1 \times 10^{-6}$ . Cancer risks that fall above the upper end of this risk range will be considered unacceptable as protective of human health. The total noncarcinogenic acceptable risk level is a hazard index (HI) less than or equal to

1.0. This value depicts a level at or below which adverse systemic effects are not expected to occur in the exposed population.

### **SITE 36 - CAMP GEIGER AREA DUMP**

The Camp Geiger Area Dump (Site 36) is located approximately 1,000 feet east of Camp Geiger and 500 feet west of the New River, adjacent to the Camp Geiger Sewage Treatment Plant (STP). Camp Geiger is situated in the northwestern portion of MCB Camp Lejeune, approximately 3 miles southwest of Jacksonville, North Carolina.

During an initial assessment of potential sites at MCB Camp Lejeune, Site 36 was estimated to be approximately 1.5 acres in size. Based upon a review of aerial photographs and observations recorded during the RI scoping site visit, however, the size of the site was adjusted to include nearly 20 acres. The site is comprised primarily of open fields and wooded areas with dense understory. A gravel road bisects the site and provides access to Jack's Point Recreation Area, located approximately one-quarter mile east of the study area. The site is bordered to the north by Brinson Creek, to the east by woods, to the south by an unnamed tributary to the New River, and to the west by an improved (i.e., coarse gravel) road. Further to the west of the improved road lies an abandoned railroad right-of-way, once part of the Seaboard Coastline Railroad.

### **Background**

From the late 1940s to the late 1950s, Site 36 was used for the disposal of municipal wastes and mixed industrial wastes, including garbage, waste oils, solvents, and hydraulic fluids from the air station. Disposal records indicate that all waste solvents and oils were burned at this site. Previous investigations have indicated that most of this material was initially burned and then buried. However, unburned material was also reportedly buried.

According to interviews conducted by Water and Air Research, Inc. (WAR) during the Initial Assessment Study (IAS), less than five percent of all waste hydrocarbon material generated at the air station was disposed of at Site 36. The remaining waste oil was reportedly used for dust control on roads or went directly into storm drains (WAR, 1983).

During a site visit conducted in March, 1994, scattered debris (i.e., trees, glass, and metal), buried wire, and general litter was noted on-site. In addition, a few partially buried containers and 55-gallon drums and several mounds of construction debris were located in a swampy area southwest of the former dump. Fifty-five gallon drums containing unidentifiable material and 5-gallon pails labeled with "alkaline material" and "lubrication oil" were found south of the area where the unnamed tributary crosses the main access road.

A site investigation was performed by Water and Air Research, Inc. (WAR) in 1984. Additional investigations were conducted in 1986 and 1987 by Environmental Science and Engineering, Inc. (ESE). Levels of cadmium, chromium, lead, and phenols were detected in the groundwater (i.e., at both downgradient and upgradient wells) during the 1984 investigation. These levels exceeded federal and state groundwater criteria. Trans-1,2-dichloroethene (i.e., 2 µg/L), was detected at a low concentration, in the upgradient well only. The surface water and sediment from Brinson Creek and the unnamed tributary were also sampled. Trace levels of trans-1,2-dichloroethane, lead, and total phenols were detected in surface water and sediment. Chromium, lead, oil and grease, and phenols were detected in sediment.

The most recent sampling event included investigations of the following environmental media: background surface and subsurface soil, on-site surface and subsurface soil, shallow and deep groundwater, and surface water and sediment from Brinson Creek and the unnamed tributary. In addition, aquatic organisms were collected from Brinson Creek. A preliminary review of the unvalidated laboratory data indicates the presence of organic solvent constituents in the groundwater (i.e., trichloroethane [TCE], 1,2-dichloroethene [1,2-DCE], and 1,1,2,2-tetrachloroethene [1,1,2,2-PCE]) and soil, pesticides and PCBs in the surface soil, and metals, namely lead, in the soil and sediment.

### **Current and Future Exposure Scenarios**

At present, the site is used for military training exercises and recreation (i.e., fishing, swimming, jogging, etc.) for off-site visitors from nearby residences. Dirt roads are located throughout the site, which may contribute to fugitive dust generation from vehicular traffic. The majority of the site is heavily wooded and vegetated.

Current receptors include on-site military personnel, off-site trespassers from nearby residences (i.e., child and adult receptors), construction workers, and fishermen. For military receptors and trespassers, potential exposure pathways are surface soil incidental ingestion, dermal contact and inhalation of fugitive dust, and surface water and sediment incidental ingestion and dermal contact from the surrounding surface water. Fishermen will be similarly evaluated for surface water and sediment exposure via incidental ingestion and dermal contact. These receptors will also be assessed for exposure to contaminants in fish tissue via ingestion. Presently, a pipeline is being installed on the eastern portion of Site 36, so current subsurface soil exposure will be evaluated for construction workers. Workers are exposed to subsurface soil when it is excavated during groundbreaking for construction activities.

At present, groundwater at the site is not used for potable purposes. Consequently, current exposure to groundwater will not be evaluated.

In the future case, it is expected that the site will remain a military restricted area. As stated previously, groundwater is not currently used for potable purposes. It is assumed that this will continue into the future. As a result, groundwater exposure will not be assessed for future military personnel. Although it is unlikely that a future residence will be implemented at this site, in accordance with conservative guidance, it is assumed that a private well will be installed on-site in the future case. Consequently, groundwater exposure to a future residential child and adult receptor will be assessed. The potential groundwater exposure pathways are ingestion, dermal contact and inhalation while showering.

Figure 1 presents a flowchart of the potential exposure pathways and receptors at this site.

### **SITE 43 - AGAN STREET DUMP**

The Agan Street Dump (Site 43) is comprised of approximately 11 acres and is located within the operations area of Marine Corps Air Station (MCAS) New River, 2 miles west of the main entrance (see Figure 1-1). There is vehicle access to the site via Agan Street, from Curtis Road. Site 43 is located at the northern terminus of Agan Street, adjacent to an abandoned sewage disposal facility. The site is bordered to the north by Edwards Creek, to the east and south by Strawhorn Creek, and

to the west by Agan Street and the former sewage disposal facility. Strawhorn Creek discharges into Edwards Creek at Site 43. Edwards Creek then discharges into the New River approximately 2,000 feet north of the study area, near Site 36.

Much of the study area is heavily vegetated with dense understory and trees greater than three inches in diameter. Marsh areas prone to flooding line both Strawhorn and Edwards Creeks. An improved gravel-loop road provides access to the main portion of the study area, other unimproved paths extend outward from this road. Presently, Site 43 is unrestricted.

## **Background**

Reportedly, municipal waste, fiberglass and sewage treatment plant sludge were dumped on the ground surface at Site 43; however, it is not known exactly how long Site 43 was officially used as a dump (Halliburton/NUS, 1991). It has also been reported that other solid wastes may have been disposed at this site. The particular types and quantities of these wastes, however, are not known.

Baker Environmental, Inc. (Baker) conducted an SI at Site 43 in 1991. Soil samples contained polynuclear aromatic hydrocarbons (PAHs) and inorganic concentrations exceeding twice the base-specific background levels. Groundwater samples did not contain PAHs; however, they did contain carbon disulfide. Inorganics were also detected in groundwater and surface water at concentrations exceeding state and federal criteria. Sediment contained PAHs at locations downgradient from soil sample locations exhibiting PAH contamination at the confluence of Edwards Creek and at Strawhorn Creek. The presence of PAHs in sediment samples confirms the presence of PAHs in soil, as sediment contamination may be caused by surface runoff. Pesticides were also detected in sediment samples; however, there were no pesticides present in soil samples. Recent investigations indicate the presence of PAHs in soil (Baker, 1995).

## **Current and Future Exposure Scenarios**

Site 43 no longer serves as a waste dump. Presently, Site 43 has no official use.

Receptors exposed to surface soil include: future residents (i.e., children and adults), current military personnel, and current trespassers (i.e., children and adults) from adjacent, off-site residences. Surface soil exposure pathways for these receptors include incidental ingestion, dermal contact, and inhalation of fugitive dust.

Future construction workers are the only receptors exposed to subsurface soil. Exposure to subsurface soil exposure may occur during ground excavation for on-site construction activities. Exposure pathways include: incidental ingestion of subsurface soil, dermal contact with subsurface soil and inhalation of fugitive dust.

Presently, groundwater at Site 43 is not used for potable supplies. For this reason, current groundwater exposure is not evaluated. In a future scenario, it is possible that residential developments may be constructed at Site 43. Consequently, future groundwater exposure will be assessed for residential children and adults. Groundwater exposure pathways include: ingestion, dermal contact with groundwater and inhalation of volatilized organics while showering.

Groundwater exposure will not be evaluated for future military personnel, for the same reasons it is not evaluated for these receptors at Site 36.



Receptors exposed to surface water and sediment are current on-site trespassers and future residents. Exposure pathways for these receptors are incidental ingestion of surface water/sediment and dermal contact with surface water/sediment.

Figure 2 presents a flowchart of the potential exposure pathways and receptors at Site 43.

#### **SITE 44 - JONES STREET DUMP**

The Jones Street Dump (Site 44) encompasses approximately 5 acres and is situated within the operations area of MCAS New River. There is vehicle access to the site via Baxter Street, from Curtis Road. Site 44 is located at the northern terminus of Baxter Street, behind base housing units along Jones Street. The site is partially surrounded by a six-foot chain-link fence, and a portion of the site lies to the east of the fenced compound. The site is bordered to the north and west by Edwards Creek, to the south by base housing units along Jones Street, and to the east by woods and an unnamed tributary to Edwards Creek. Edwards Creek flows east from the study area toward Site 43, which is located about 2,000 feet to the east of Site 44.

A majority of the site is comprised of a gently dipping open field that slopes toward Edwards Creek. The field is covered with high grass, weeds, and small pine trees that are less than two inches in diameter. Surrounding the open field is a mature wooded area with dense understory.

#### **Background**

The Jones Street Dump reportedly operated in the 1950's. Site 44 served as a dump for municipal waste and various debris. It has also been reported that some potentially hazardous materials may have been disposed at this site. The particular types and quantities of these wastes, however, are not known.

WAR conducted an IAS at Site 44 in 1983. This study produced evidence that construction debris and small quantities of potentially hazardous waste were disposed at the dump.

Baker conducted an SI at Site 44 in 1991. Soil samples contained low levels of PAHs and specific pesticides (i.e., 4,4'-DDE and 4,4'-DDD). Inorganics were detected in soil samples at concentrations exceeding twice the base-specific background levels. Groundwater contained inorganics at concentrations exceeding state and federal criteria. Low concentrations of PAHs were detected in one well, and toluene and ethylbenzene were detected in another well at concentrations below state and federal standards. Surface water samples contained inorganics at low levels. Sediment samples contained trace levels of pesticides and semivolatiles, as well as slightly elevated concentrations of copper, lead and zinc.

#### **Current and Future Exposure Scenarios**

Site 44 no longer serves as a dump. Presently, Site 44 has no official use.

Receptors exposed to surface soil include: future residents, (i.e., children and adults) current military personnel and on-site trespassers (i.e., children and adults) from adjacent, off-site residences. Soil exposure pathways for these receptors include: incidental ingestion of surface soil, dermal contact with surface soil and inhalation of fugitive dust.

Future construction workers are the only receptors exposed to subsurface soil. Exposure to subsurface soil exposure may occur during ground excavation for on-site construction activities. Exposure pathways include: incidental ingestion of subsurface soil, dermal contact with subsurface soil and inhalation of fugitive dust.

Presently, Site 44 groundwater is not tapped for potable supplies. For this reason, current groundwater exposure is not evaluated. In a future scenario, it is possible that residential developments may be constructed at Site 44. Consequently, future groundwater exposure will be assessed for residential children and adults. Groundwater exposure pathways include: ingestion of groundwater, dermal contact with groundwater and inhalation of volatilized organics while showering.

Groundwater exposure will not be evaluated for future military personnel, for the same reasons it is not evaluated for these receptors at Site 36.

Receptors exposed to surface water and sediment are current on-site trespassers and future residents. Exposure pathways for these receptors are incidental ingestion of surface water/sediment and dermal contact with surface water/sediment.

Figure 3 presents a flowchart of the potential exposure pathways and receptors at this site.

#### **SITE 54 - CRASH CREW FIRE TRAINING BURN PIT**

The Crash Crew Fire Training Burn Pit (Site 54) is located near the southwest end of runway 5-23, within the operations area of MCAS New River. The burn pit is approximately 50 feet in diameter and is situated at the center of this 1.5 acre site. An 8,000-gallon underground storage tank (UST) lies to the northwest of the burn pit. Fire training exercises are conducted within the burn pit using JP-type fuel, which is stored in the nearby UST. An oil and water separator, located approximately 100 feet to the southeast of the burn pit, is used for temporary storage and collection of the spent fuel.

An improved gravel surface surrounds the burn pit, the remaining portion of the site is comprised of maintained lawn area. The ground surface slopes away from the central portion of the study area toward the south, southwest, and southeast. Two drainage ditches lead away from the burn pit area toward the south, on either side of an improved road. During periods of heavy precipitation, the ditches serve as channels for surface water runoff.

#### **Background**

Site 54 has served as a fire training burn pit since the mid-1950s. Waste fuels, oils, and solvents were used to simulate fire conditions that would result from aircraft crashes. Fire training at Site 54 was originally conducted on the ground surface, within a bermed area. In 1975 a lined burn pit was constructed (WAR, 1983). The same burn pit remains in operation today, however, only JP-type fuels are currently used during training exercises.

The site media (i.e., soil, groundwater, surface water, and sediment) were previously investigated by WAR in 1983, and by ESE in 1986 and 1987. POL contamination was noted in the soil at depth. The 1984 groundwater results indicated levels of chromium, oil and grease, and phenols. In later

studies, these same chemicals were detected in the groundwater; no VOCs were detected. Total phenols were found in surface water. Chromium, lead, oil and grease, and total phenols were detected in sediment.

During a recent site visit conducted in March, 1994, fuel odor and residue on standing water were observed in the pit. A stressed vegetated area, which may have been used as a burn area, was identified southwest of the burn pit. Broken glass and metal debris were scattered on the ground along Perimeter Road. A small spill area was also noted in this area.

The most recent sampling event investigated these same site media. A preliminary assessment of the unvalidated laboratory results indicates PAHs in the soil and VOCs, including benzene, toluene, ethylbenzene, xylenes (BTEX), and 1,2-DCE, in the groundwater.

### **Current and Future Scenarios**

Site 54 is currently used for emergency fire response training. Current receptors include on-site military personnel and trespassers (i.e., child and adult receptors). Exposure pathways for these receptors include surface soil incidental ingestion, dermal contact, and inhalation of fugitive dust.

At present, groundwater is not utilized for potable purposes. As a result, current groundwater exposure will not be assessed. Exposure to subsurface soil in the current scenario is unlikely for the receptor population. Consequently, subsurface soil is not considered to be a viable medium for exposure.

In the future case, it is unlikely that a residential scenario will be implemented at the site. It is assumed that the present activities will continue into the foreseeable future. However, to be conservative, groundwater exposure to a residential child and adult receptor will be assessed. Surface soil exposure, as calculated in the current scenario for the child and adult trespassers, is expected to remain the same in the future case.

Groundwater exposure for future on-site military personnel will not be assessed, for the same reasons it is not evaluated for the other sites. However, a construction worker will be evaluated in the future case. It is assumed that subsurface soil exposure may occur as a result of excavation for potential construction activities at the site. In addition, subsurface soil exposure will be assessed for future residents (i.e., child and adult receptor). The exposure pathways for these receptors are incidental ingestion, dermal contact, and inhalation.

Figure 4 presents a flowchart of the potential exposure pathways and receptors at this site.

### **SITE 86 - ABOVEGROUND STORAGE TANK AREA**

Site 86 is located on the southwest corner of the Foster and Campbell Street intersection, within the operations area of MCAS New River. The site is comprised of a lawn area surrounded by buildings, asphalt roads, and parking lots. Concrete pylons, upon which electric and steam overhead utilities are mounted, line the northern, western, and southern boundaries of the site. Campbell Street borders the site to the north and Foster Street lies adjacent to the east. Immediately to the south of the study area is Building AS-502, the MCAS fire station. The entrance road to the fire station borders the study area to the west.

The ground surface at Site 86 gently slopes to the south, toward a drainage ditch and culvert. Storm water drains that are located along Campbell Street receive runoff from only the northernmost portion of the study area. Stormwater from Site 86 eventually discharges into the New River, which lies approximately three quarters of a mile to the east.

### **Background**

Site 86 served as a storage area for petroleum products from 1954 to 1988. In 1954, three 25,000-gallon above ground storage tanks (ASTs) were installed within an earthen berm. Additionally, a small pump house was constructed to transfer fuel oil to and from the ASTs. The three tanks were reportedly used for No.6 fuel oil storage until 1979. From 1979 to 1988 the tanks were then used for temporary storage of waste oil (O'Brien & Gere, 1992). The three tanks were emptied in 1988 and are believed to have been removed in 1992. Today, the former location of the tanks is grass-covered and only a very slight depression remains.

A preliminary site investigation was conducted in 1990 by Dewberry and Davis. Several VOCs were found in the subsurface soil, including chloroform, methylene chloride, 1,1,1-trichloroethane (TCA), and 1,1,2-trichlorofluoroethane. These detections were attributed to localized surface spills. In 1992, O'Brien and Gere conducted a site assessment, investigating soil and groundwater at this site. Soil samples were analyzed for TPH and TCLP compounds. Most of the samples showed detections that did not exceed regulatory criteria for these parameters.

In the groundwater, several organic compounds were found: benzene, toluene, 1,1-dichloroethane (1,1-DCA), 1,2-dichloroethene (1,2-DCE), TCE, tetrachloroethene (PCE), chloroethane, and TCA. The detections of benzene, TCE, and PCE exceeded North Carolina groundwater criteria in a few samples. Toluene and TCA were detected below the state groundwater criteria. There are no criteria available for chloroethane, 1,1-DCA, and 1,2-DCE.

Baker conducted the latest investigation at this site in 1995, addressing soil and groundwater. A preliminary assessment of the unvalidated data indicated the presence of VOCs (i.e., TCE, 1,2-dichloroethane [1,2-DCA], 1,2-DCE, benzene, and PCE) in soil and groundwater.

### **Current and Future Scenarios**

Site 86 currently has no official uses. Current receptors include on-site military personnel and trespassers (i.e., child and adult receptors). Exposure pathways for these receptors include surface soil incidental ingestion, dermal contact, and inhalation of fugitive dust.

At present, groundwater is not utilized for potable purposes. As a result, current groundwater exposure will not be assessed. Exposure to subsurface soil in the current scenario is unlikely for the receptor population. Consequently, subsurface soil exposure is not considered to be viable.

In the future case, it is unlikely that a residential scenario will be implemented at the site. It is assumed that the present activities will continue into the foreseeable future. However, to be conservative, groundwater exposure to a residential child and adult receptor will be assessed. Surface soil exposure, as calculated in the current scenario for the child and adult trespassers, is expected to remain the same in the future case.

Like the previous sites, groundwater exposure for future on-site military personnel will not be assessed. However, a construction worker will be evaluated in the future case. It is assumed that subsurface soil exposure may occur as a result of excavation for potential construction activities at the site. In addition, subsurface soil exposure will be assessed for future residents (i.e., child and adult receptor). The exposure pathways for these receptors are incidental ingestion, dermal contact, and inhalation.

Figure 5 presents a flowchart of the potential exposure pathways and receptors at this site.

**TABLES**

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TABLE 1

**SUMMARY OF PRELIMINARY EXPOSURE DOSE INPUT PARAMETERS  
FOR SITES 36, 43, 44, 54, AND 86**

Input Parameter	Units	Receptor					
		Trespasser Child	Trespasser Adult	Military Personnel	Construction Worker	Residential Child	Residential Adult
<b>Soil (mg/kg)</b>							
Ingestion Rate, IR	mg/d	100	50	100	480	200	100
Fraction Ingested, FI	unitless	1	1	1	1	1	1
Exposure Frequency, EF	d/y	43	130	250	90	350	350
Exposure Duration, ED	y	6	30	4	1	6	30
Surface Area, SA	cm <sup>2</sup>	2,000	5,000	4,300	4,300	2,300	5,800
Absorption Factor, AF	mg/cm <sup>3</sup>	1	1	1	1	1	1
Averaging Time, Noncarc., ATnc	d	2,190	10,950	1,460	365	2,190	10,950
Averaging Time, Carc., ATcarc	d	25,550	25,550	25,550	25,550	25,550	25,550
Body Weight, BW	kg	15	70	70	70	15	70
Conversion Factor, CF	kg/mg	1x10 <sup>-6</sup>	1x10 <sup>-6</sup>	1x10 <sup>-6</sup>	1x10 <sup>-6</sup>	1x10 <sup>-6</sup>	1x10 <sup>-6</sup>
Absorbance Factor, ABS	unitless	Organics = 0.01; Inorganics = 0.001					
<b>Groundwater (mg/L)</b>							
Ingestion Rate, IR	L/d	NA	NA	NA	NA	1	2
Exposure Frequency, EF	d/y	NA	NA	NA	NA	350	350
Exposure Duration, ED	y	NA	NA	NA	NA	6	30
Exposure Time, ET	h/d	NA	NA	NA	NA	0.25	0.25
Surface Area, SA	cm <sup>2</sup>	NA	NA	NA	NA	10,000	23,000
Averaging Time, Noncarc., ATnc	d	NA	NA	NA	NA	2,190	10,950
Averaging Time, Carc., ATcarc	d	NA	NA	NA	NA	25,550	25,550
Conversion Factor, CF	L/cm <sup>3</sup>	NA	NA	NA	NA	0.001	0.001
Body Weight, BW	kg	NA	NA	NA	NA	15	70
<b>Sediment (mg/kg)</b>							
Ingestion Rate, IR	mg/d	200	100	NA	NA	200	100
Fraction Ingested, FI	unitless	1	1	NA	NA	1	1





TABLE 1 (Continued)

**SUMMARY OF PRELIMINARY EXPOSURE DOSE INPUT PARAMETERS  
FOR SITES 36, 43, 44, 54, AND 86**

Input Parameter	Units	Receptor					
		Trespasser Child	Trespasser Adult	Military Personnel	Construction Worker	Residential Child	Residential Adult
Body Weight, BW	kg	15	70	70	70	15	70
<b>Shower Air</b>							
Inhalation Rate, IR	m <sup>3</sup> /h	NA	NA	NA	NA	0.6	0.6
Exposure Time, ET	h/d	NA	NA	NA	NA	0.25	0.25
Exposure Frequency, EF	d/y	NA	NA	NA	NA	350	350
Exposure Duration, ED	y	NA	NA	NA	NA	6	30
Averaging Time, Noncarc., ATnc	d	NA	NA	NA	NA	2,190	10,950
Averaging Time, Carc., ATcarc	d	NA	NA	NA	NA	25,550	25,550
Body Weight, BW	kg	NA	NA	NA	NA	15	70
<b>Fish (mg/kg)</b>							
Ingestion rate, IR	kg/d	NA	NA	NA	NA	NA	0.284
Fraction Ingested, FI	unitless	NA	NA	NA	NA	NA	1
Exposure Frequency, EF	meals/yr	NA	NA	NA	NA	NA	48
Exposure Duration, ED	y	NA	NA	NA	NA	NA	30
Averaging Time, Noncarc., ATnc	d	NA	NA	NA	NA	NA	10,950
Averaging Time, Carc., ATcarc	d	NA	NA	NA	NA	NA	25,550
Body Weight, BW	kg	NA	NA	NA	NA	NA	70

## References:

USEPA Risk Assessment For Superfund Volume I. Human Health Manual (Part A) Interim Final, December, 1989.

USEPA Exposure Factors Handbook, July, 1989.

USEPA Risk Assessment For Superfund Volume I. Human Health Evaluation Manual Supplemental Guidance. "Standard Default Exposure Factors" Interim Final. March 25, 1991.

USEPA Dermal Exposure Assessment: Principles and Applications. Interim Report. January, 1992.

USEPA Region IV Guidance for Soil Absorbance. (USEPA, 1992)

**TABLE 1 (Continued)**

**SUMMARY OF PRELIMINARY EXPOSURE DOSE INPUT PARAMETERS  
FOR SITES 36, 43, 44, 54, AND 86**

Notes:

The exposure frequency for the trespasser receptors is based on the typical exposure pattern (i.e., more time spent outdoors in the warmer months vs. the cooler months) for people who actively garden or play outdoors. It is an upper-bound estimate (USEPA, 1992).

The skin surface area for the trespasser receptors is based on approximately 25 percent of the total surface body area for a child and adult receptor. These values are upper-bound estimates.

**FIGURES**

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FIGURE 1

FLOWCHART OF POTENTIAL EXPOSURE PATHWAYS AND RECEPTORS  
SITE 36: CAMP GEIGER AREA DUMP

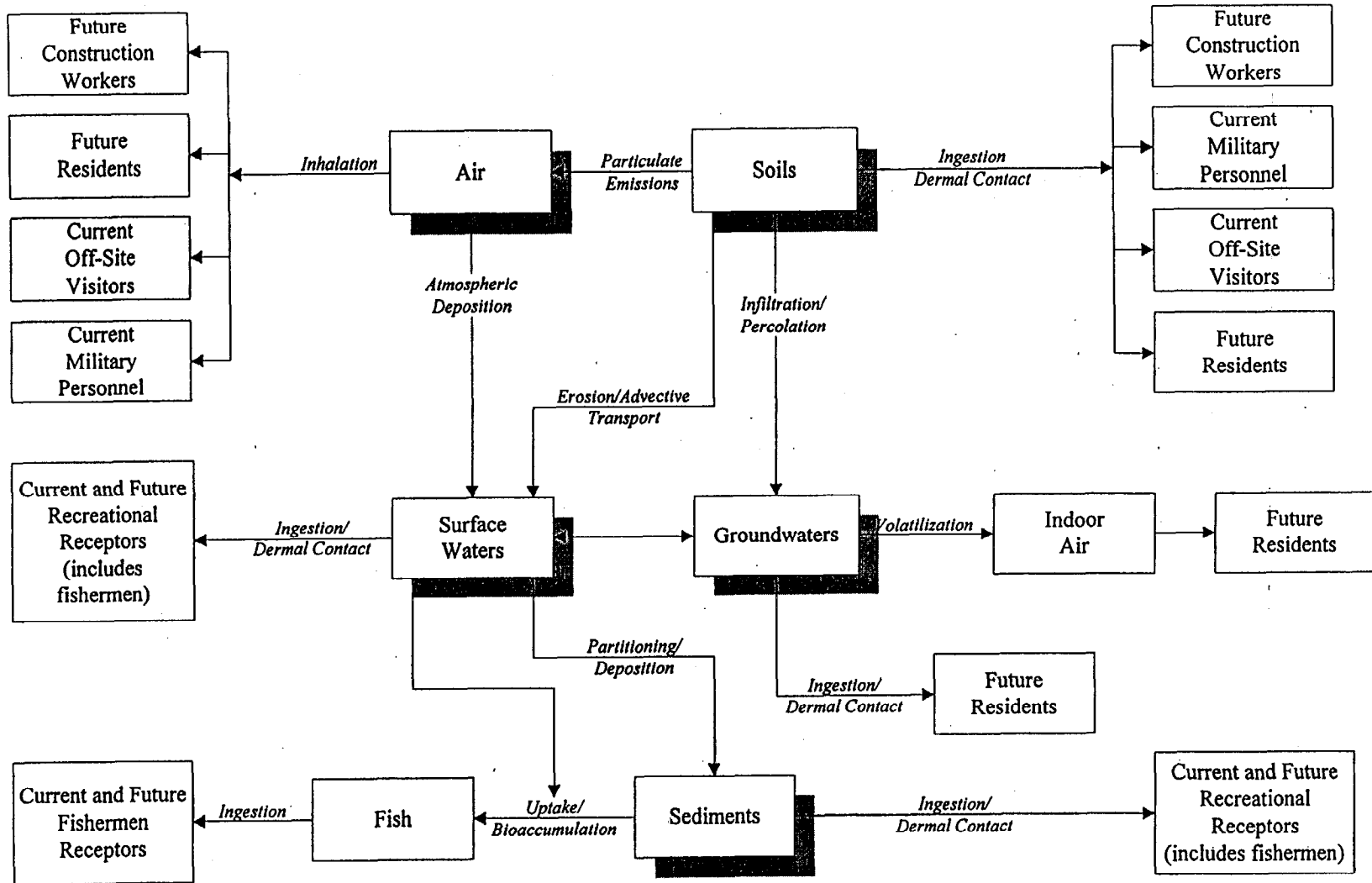


FIGURE 2

FLOWCHART OF POTENTIAL EXPOSURE PATHWAYS AND RECEPTORS  
SITE 43: AGAN STREET DUMP

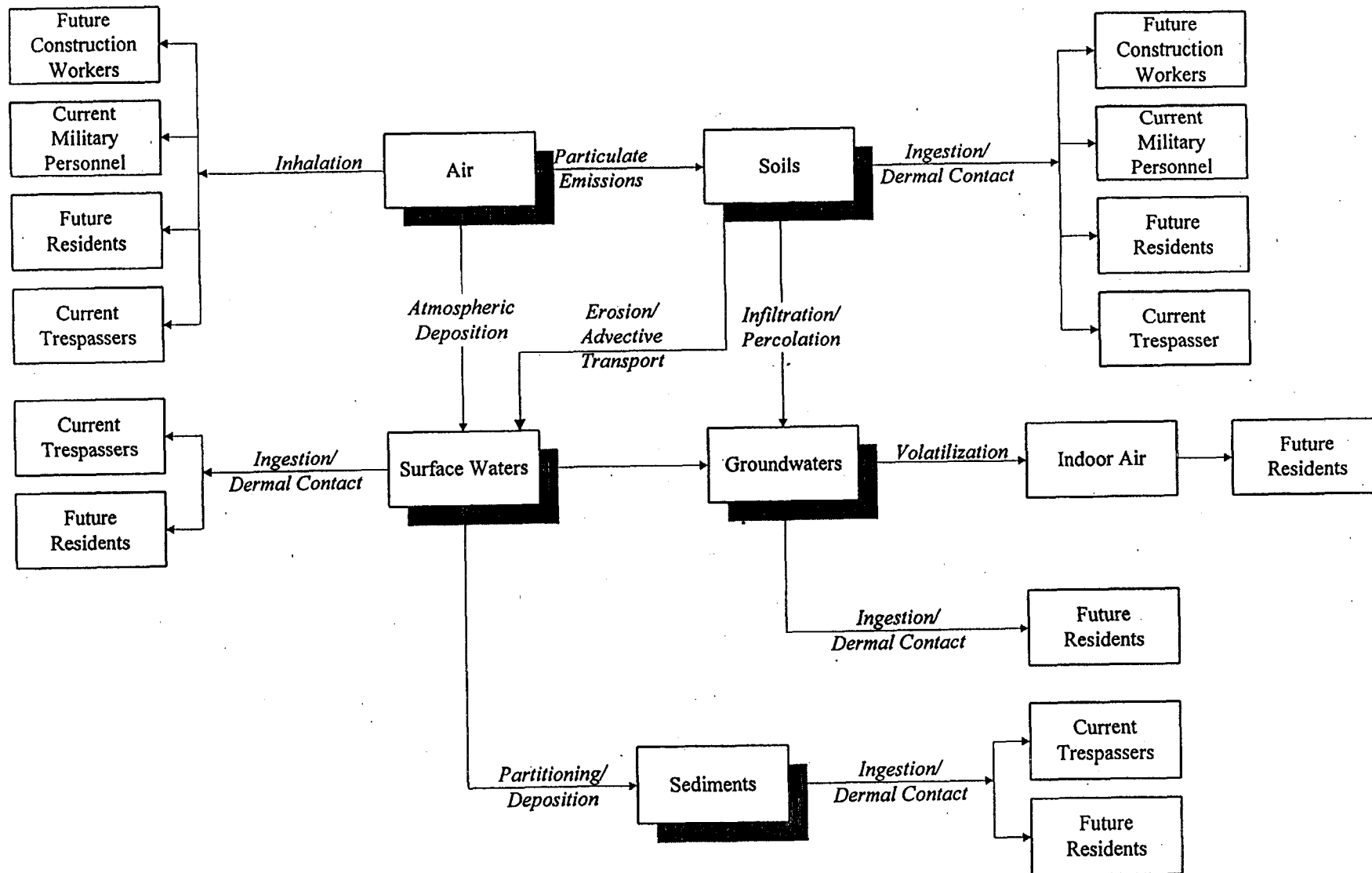


FIGURE 3

FLOWCHART OF POTENTIAL EXPOSURE PATHWAYS AND RECEPTORS  
SITE 44: JONES STREET DUMP

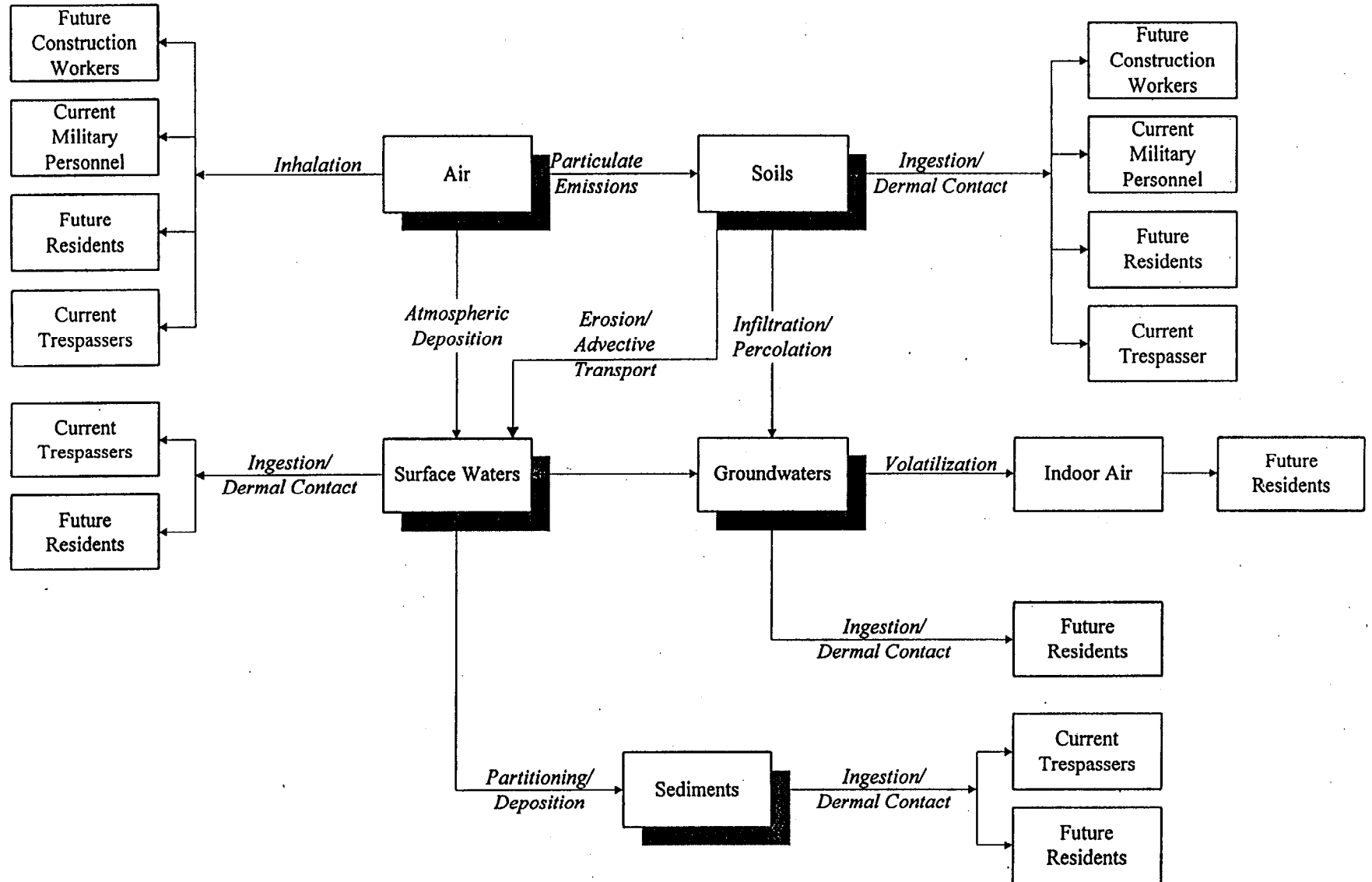


FIGURE 4

FLOWCHART OF POTENTIAL EXPOSURE PATHWAYS AND RECEPTORS  
SITE 54: CRASH CREW FIRE TRAINING BURN PIT

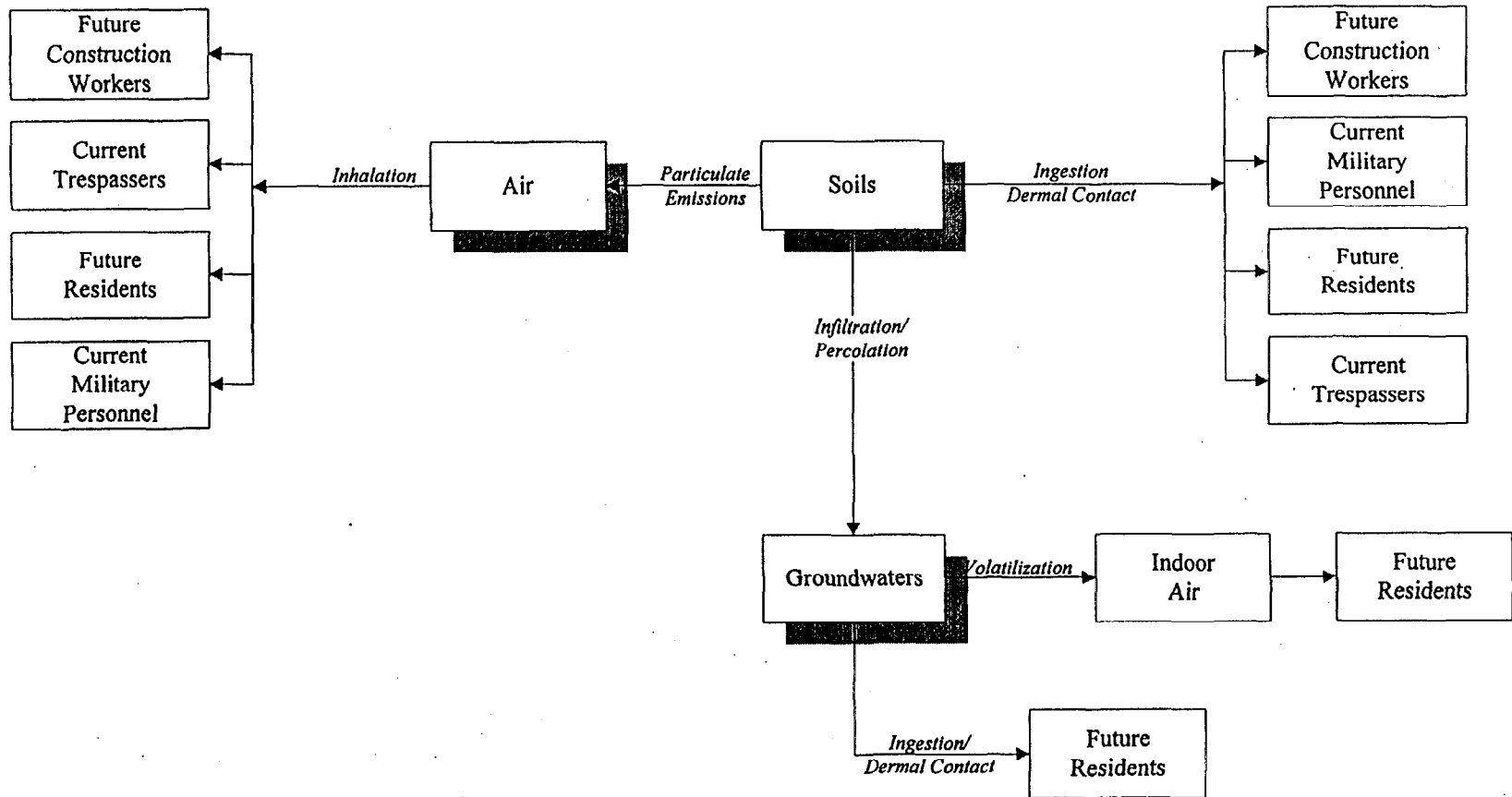
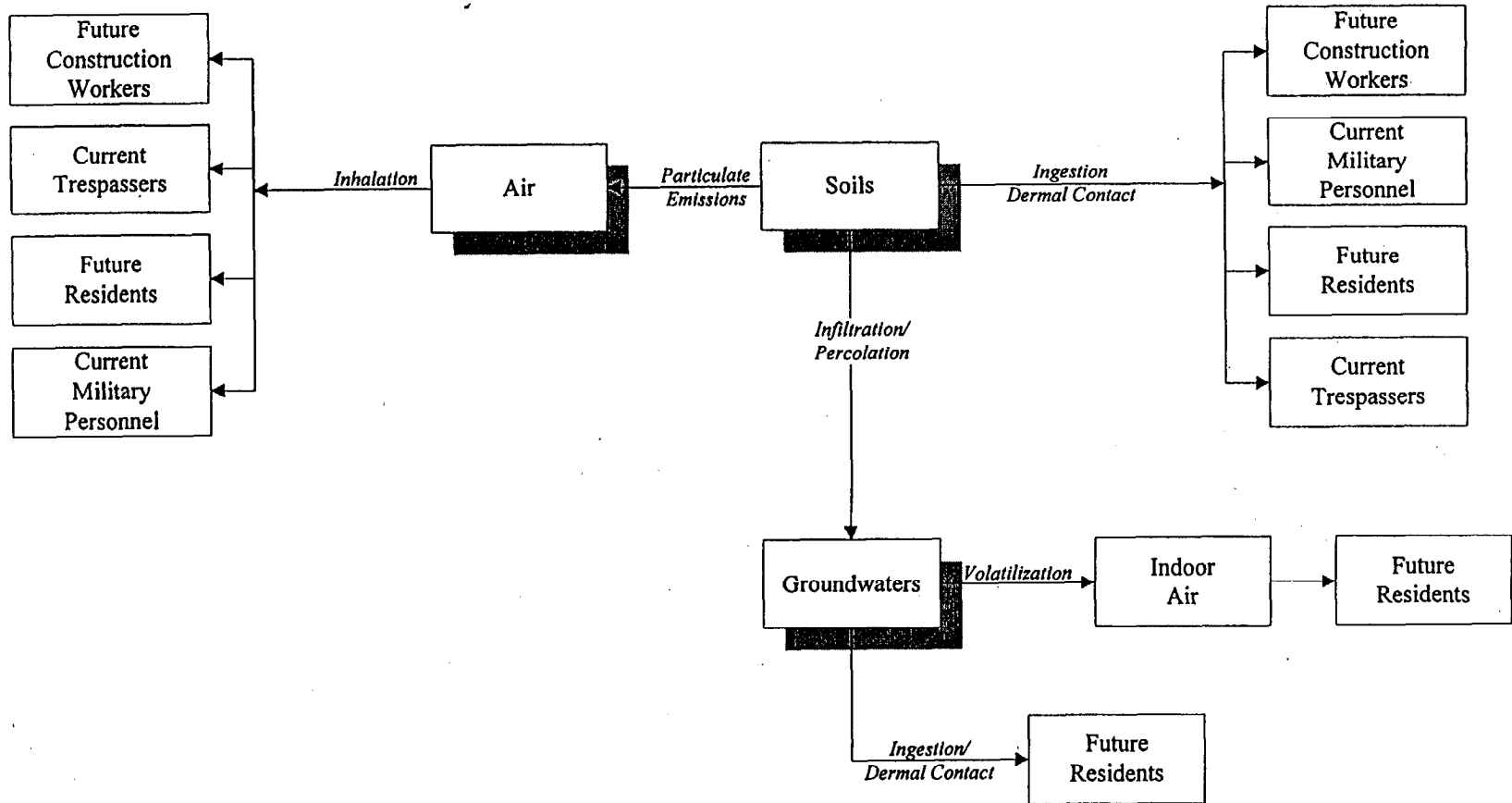


FIGURE 5

FLOWCHART OF POTENTIAL EXPOSURE PATHWAYS AND RECEPTORS  
SITE 86: ABOVEGROUND STORAGE TANK AREA





**APPENDIX R**  
**CDI CALCULATIONS**

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**EXAMPLE SOIL\* INGESTION CALCULATIONS  
OPERABLE UNIT NO. 6  
CONTRACT TASK ORDER 0303**

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

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

Where:

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

**Risks:**

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

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

$$\begin{aligned} \text{Intake (mg/kg}\cdot\text{day)} &= \frac{1.238 \text{ mg/kg} \times 100 \text{ mg/day} \times 350 \text{ days/yr} \times 30 \text{ yrs} \times 1.0\text{E-}6 \text{ kg/mg}}{70 \text{ kg} \times 25,550 \text{ days}} \\ &= 7.3\text{E-}07 \end{aligned}$$

$$\text{Risk} = 7.3\text{E-}07 \text{ mg/kg}\cdot\text{day} \times 0.73 \text{ mg/kg}\cdot\text{day}^{-1} = 5.3\text{E-}07$$

**Example Noncarcinogen: Barium**

$$\begin{aligned} \text{Intake (mg/kg}\cdot\text{day)} &= \frac{45.46 \text{ mg/kg} \times 100 \text{ mg/day} \times 350 \text{ days/yr} \times 30 \text{ yrs} \times 1.0\text{E-}6 \text{ kg/mg}}{70 \text{ kg} \times 10,950 \text{ days}} \\ &= 6.2\text{E-}05 \end{aligned}$$

$$\text{Risk} = \frac{6.2\text{E-}05 \text{ mg/kg}\cdot\text{day}}{7\text{E-}02 \text{ mg/kg}\cdot\text{day}} = 8.9\text{E-}04$$

\* This example calculation also is applicable for sediment ingestion.  
Re: Site 43 Future Residential Adult

SURFACE SOIL INGESTION EXPOSURE ASSESSMENT  
 OPERABLE UNIT NO. 6 (SITE 43)  
 REMEDIAL INVESTIGATION CTO-0303  
 MCB CAMP LEJEUNE, NORTH CAROLINA  
 CURRENT MILITARY PERSONNEL

Intake from ingestion of soil is calculated as follows:

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

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

Where: INPUTS  
 C = contaminant concentration in soil (mg/kg) specific  
 CF = conversion for kg to mg 1E-06  
 EF = adult exposure frequency (days/yr) 250  
 ED = adult exposure duration (yr) 4  
 IR = adult soil ingestion rate (mg/day) 100  
 BW = adult body weight (kg) 70  
 ATc = averaging time for carcinogen (yr) 70  
 ATnc = averaging time for noncarcinogen (yr) 4  
 DY = days per year (days/year) 365  
 CSF = cancer slope factor (mg/kg-day)<sup>-1</sup> specific  
 RID = reference dose (mg/kg-day) specific

COPC	Concentration Carcinogen (mg/kg)	Exposure Frequency (days/yr) Adult	Exposure Duration (yr) Adult	Conversion Factor (kg/mg)	Ingestion Rate (mg/day) Adult	Body Weight (kg) Adult	Average Carc Time (days)	Carc Dose (mg/kg/day) Adult	Slope Factor (mg/kg/day) <sup>-1</sup>	Carcinogenic Risk Adult	Percent Carcinogenic Risk Adult	Average Noncarc Time (days)	Noncarc Dose (mg/kg/day) Adult	Reference Dose (mg/kg/day)	Noncarcinogenic Risk Adult	Percent Noncarcinogenic Risk Adult
Benzo(a)anthracene	1.238	250	4	1E-06	100	70	25550	6.8E-08	7.3E-01	5.1E-08	5%	1460	1.2E-08	0.0E+00	0.0E+00	0%
Benzo(b)fluoranthene	2.285	250	4	1E-06	100	70	25550	1.3E-07	7.3E-01	9.3E-08	10%	1460	2.2E-08	0.0E+00	0.0E+00	0%
Benzo(k)fluoranthene	0.788	250	4	1E-06	100	70	25550	4.3E-08	7.3E-02	3.1E-09	0%	1460	7.5E-07	0.0E+00	0.0E+00	0%
Benzo(a)pyrene	1.450	250	4	1E-06	100	70	25550	8.1E-08	7.3E+00	5.9E-07	82%	1460	1.4E-06	0.0E+00	0.0E+00	0%
Indeno(1,2,3-cd)pyrene	1.250	250	4	1E-06	100	70	25550	7.0E-08	7.3E-01	5.1E-08	5%	1460	1.2E-08	0.0E+00	0.0E+00	0%
Dibenzo(a,h)anthracene	0.313	250	4	1E-06	100	70	25550	1.8E-08	7.3E+00	1.3E-07	13%	1460	3.1E-07	0.0E+00	0.0E+00	0%
4,4'-DDD	3.000	250	4	1E-06	100	70	25550	1.7E-07	2.4E-01	4.0E-08	4%	1460	2.9E-06	0.0E+00	0.0E+00	0%
Aluminum	4488.230	250	4	1E-06	100	70	25550	2.5E-04	0.0E+00	0.0E+00	0%	1460	4.4E-03	1.0E+00	4.4E-03	18%
Barium	45.460	250	4	1E-06	100	70	25550	2.5E-06	0.0E+00	0.0E+00	0%	1460	4.4E-05	7.0E-02	6.4E-04	3%
Chromium	23.850	250	4	1E-06	100	70	25550	1.3E-06	0.0E+00	0.0E+00	0%	1460	2.3E-05	5.0E-03	4.7E-03	20%
Iron	4342.870	250	4	1E-06	100	70	25550	2.4E-04	0.0E+00	0.0E+00	0%	1460	4.2E-03	3.0E-01	1.4E-02	59%
TOTAL										9.6E-07						2.4E-02

SURFACE SOIL INGESTION EXPOSURE ASSESSMENT  
 OPERABLE UNIT NO. 6 (SITE 43)  
 REMEDIAL INVESTIGATION CTO-0303  
 MCB CAMP LEJEUNE, NORTH CAROLINA  
 CURRENT CHILD TRESPASSER

Intake from ingestion of soil is calculated as follows:

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

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

Where: INPUTS  
 C = contaminant concentration in soil (mg/kg) specific  
 CF = conversion for kg to mg 1E-06  
 EF = child exposure frequency (days/yr) 130  
 ED = child exposure duration (yr) 6  
 IR = child soil ingestion rate (mg/day) 100  
 BW = child body weight (kg) 15  
 ATc = averaging time for carcinogen (yr) 70  
 ATnc = averaging time for noncarcinogen (yr) 6  
 DY = days per year (days/year) 365  
 CSF = cancer slope factor (mg/kg-day)<sup>-1</sup> specific  
 IRID = reference dose (mg/kg-day) specific

COPC	Concentration (mg/kg)	Exposure Frequency (days/yr) Child	Exposure Duration (yr) Child	Conversion Factor (kg/mg)	Ingestion Rate (mg/day) Child	Body Weight (kg) Child	Average Carc Time (days)	Carc Dose (mg/kg/day) Child	Slope Factor (mg/kg/day) <sup>-1</sup>	Carcinogenic Risk Child	Percent Carcinogenic Risk Child	Average Noncarc Time (days)	Noncarc Dose (mg/kg/day) Child	Reference Dose (mg/kg/day)	Noncarcinogenic Risk Child	Percent Noncarcinogenic Risk Child
Benzo(a)anthracene	1.238	130	6	1E-06	100	15	25550	2.5E-07	7.30E-01	1.8E-07	5%	2190	2.9E-06	0.00E+00	0.0E+00	0%
Benzo(b)fluoranthene	2.285	130	6	1E-06	100	15	25550	4.7E-07	7.30E-01	3.4E-07	10%	2190	5.4E-06	0.00E+00	0.0E+00	0%
Benzo(k)fluoranthene	0.788	130	6	1E-06	100	15	25550	1.8E-07	7.30E-02	1.1E-08	0%	2190	1.8E-06	0.00E+00	0.0E+00	0%
Benzo(a)pyrene	1.450	130	6	1E-06	100	15	25550	3.0E-07	7.30E+00	2.2E-06	62%	2190	3.4E-06	0.00E+00	0.0E+00	0%
Indeno(1,2,3-cd)pyrene	1.250	130	6	1E-06	100	15	25550	2.5E-07	7.30E-01	1.9E-07	5%	2190	3.0E-06	0.00E+00	0.0E+00	0%
Dibenzo(a,h)anthracene	0.313	130	6	1E-06	100	15	25550	6.4E-08	7.30E+00	4.7E-07	13%	2190	7.4E-07	0.00E+00	0.0E+00	0%
4,4'-DDD	3.000	130	6	1E-06	100	15	25550	6.1E-07	2.40E-01	1.5E-07	4%	2190	7.1E-06	0.00E+00	0.0E+00	0%
Aluminum	4489.230	130	6	1E-06	100	15	25550	9.1E-04	0.00E+00	0.0E+00	0%	2190	1.1E-02	1.00E+00	1.1E-02	18%
Barium	45.460	130	6	1E-06	100	15	25550	9.3E-06	0.00E+00	0.0E+00	0%	2190	1.1E-04	7.00E-02	1.5E-03	3%
Chromium	23.850	130	6	1E-06	100	15	25550	4.9E-06	0.00E+00	0.0E+00	0%	2190	5.7E-05	5.00E-03	1.1E-02	20%
Iron	4342.870	130	6	1E-06	100	15	25550	8.8E-04	0.00E+00	0.0E+00	0%	2190	1.0E-02	3.00E-01	3.4E-02	59%
<b>TOTAL</b>										<b>3.5E-06</b>					<b>5.8E-02</b>	

SEDIMENT INGESTION EXPOSURE ASSESSMENT  
 OPERABLE UNIT NO. 8 (SITE 43)  
 REMEDIAL INVESTIGATION CTO-0303  
 MCB CAMP LEJEUNE, NORTH CAROLINA  
 CURRENT CHILD TRESPASSER

Intake from ingestion of sediment is calculated as follows:

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

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

Where:	INPUTS
C = contaminant concentration in sediment (mg/kg)	Specific
CF = conversion for kg to mg	1E-06
EF = exposure frequency for child (days/yr)	45
ED = exposure duration for child (yr)	6
IR = soil ingestion rate for child (mg/day)	200
BW = body weight for child (kg)	15
ATc = averaging time for carcinogen (yr)	70
ATnc = averaging time for noncarcinogen (yr)	6
DY = days per year (days/year)	365
CSF = cancer slope factor (mg/kg-day) <sup>-1</sup>	Specific
RID = reference dose (mg/kg-day)	Specific

COPC	Concentration (mg/kg)	Exposure Frequency (days/yr) Child	Exposure Duration (yr) Child	Ingestion Rate (mg/day) Child	Conversion Factor (kg/mg)	Body Weight (kg) Child	Average Carc Time (days)	Carc Dose (mg/kg/day) Child	Slope Factor (mg/kg/day) <sup>-1</sup>	Carcinogenic Risk Child	Percent Carcinogenic Risk Child	Average Noncarc Time (days)	Noncarc Dose (mg/kg/day) Child	Reference Dose (mg/kg/day)	Noncarcinogenic Risk Child	Percent Noncarcinogenic Risk Child
Carbon Disulfide	0.028	45	6	200	1E-06	15	25550	3.7E-09	0.0E+00	0.0E+00	0%	2190	4.3E-08	1.0E-01	4.3E-07	0%
4-Methylphenol	0.210	45	6	200	1E-06	15	25550	3.0E-08	0.0E+00	0.0E+00	0%	2190	3.5E-07	5.0E-03	6.9E-05	0%
Pyrene	0.200	45	6	200	1E-06	15	25550	2.8E-08	0.0E+00	0.0E+00	0%	2190	3.3E-07	3.0E-02	1.1E-05	0%
Bis(2-ethylhexyl)phthalate	1.420	45	6	200	1E-06	15	25550	2.0E-07	1.4E-02	2.8E-09	0%	2190	2.3E-06	2.0E-02	1.2E-04	0%
Benzo(a)pyrene	1.470	45	6	200	1E-06	15	25550	2.1E-07	7.3E+00	1.5E-06	34%	2190	2.4E-06	0.0E+00	0.0E+00	0%
4,4'-DDE	8.900	45	6	200	1E-06	15	25550	1.3E-06	3.4E-01	4.3E-07	10%	2190	1.5E-05	0.0E+00	0.0E+00	0%
Endrin	0.018	45	6	200	1E-06	15	25550	2.3E-09	0.0E+00	0.0E+00	0%	2190	2.6E-08	3.0E-04	8.8E-05	0%
4,4'-DDD	37.000	45	6	200	1E-06	15	25550	5.2E-06	2.4E-01	1.3E-06	28%	2190	6.1E-05	0.0E+00	0.0E+00	0%
4,4'-DDT	0.131	45	6	200	1E-06	15	25550	1.8E-08	3.4E-01	6.3E-09	0%	2190	2.1E-07	5.0E-04	4.3E-04	0%
alpha-Chlordane	0.048	45	6	200	1E-06	15	25550	8.8E-09	1.3E+00	8.9E-09	0%	2190	8.0E-08	6.0E-05	1.3E-03	1%
gamma-Chlordane	0.074	45	6	200	1E-06	15	25550	1.0E-08	1.3E+00	1.4E-08	0%	2190	1.2E-07	6.0E-05	2.0E-03	1%
Aluminum	16400.000	45	6	200	1E-06	15	25550	2.3E-03	0.0E+00	0.0E+00	0%	2190	2.7E-02	1.0E+00	2.7E-02	11%
Arsenic	5.700	45	6	200	1E-06	15	25550	8.0E-07	1.5E+00	1.2E-06	27%	2190	9.4E-06	3.0E-04	3.1E-02	13%
Barium	46.100	45	6	200	1E-06	15	25550	6.5E-06	0.0E+00	0.0E+00	0%	2190	7.6E-05	7.0E-02	1.1E-03	0%
Beryllium	0.100	45	6	200	1E-06	15	25550	1.4E-08	4.3E+00	6.1E-08	1%	2190	1.6E-07	5.0E-03	3.3E-05	0%
Cadmium (soil)	3.940	45	6	200	1E-06	15	25550	5.6E-07	0.0E+00	0.0E+00	0%	2190	6.5E-06	1.0E-03	6.5E-03	3%
Chromium	25.480	45	6	200	1E-06	15	25550	3.6E-06	0.0E+00	0.0E+00	0%	2190	4.2E-05	5.0E-03	8.4E-03	4%
Cobalt	3.100	45	6	200	1E-06	15	25550	4.4E-07	0.0E+00	0.0E+00	0%	2190	5.1E-06	6.0E-02	8.5E-05	0%
Copper	53.000	45	6	200	1E-06	15	25550	7.5E-06	0.0E+00	0.0E+00	0%	2190	8.7E-05	4.0E-02	2.2E-03	1%
Iron	23800.000	45	6	200	1E-06	15	25550	3.4E-03	0.0E+00	0.0E+00	0%	2190	3.9E-02	3.0E-01	1.3E-01	56%
Lead	206.000	45	6	200	1E-06	15	25550	2.9E-05	0.0E+00	0.0E+00	0%	2190	3.4E-04	0.0E+00	0.0E+00	0%
Manganese (soil)	78.500	45	6	200	1E-06	15	25550	1.1E-05	0.0E+00	0.0E+00	0%	2190	1.3E-04	1.4E-01	9.2E-04	0%
Mercury	0.570	45	6	200	1E-06	15	25550	8.0E-08	0.0E+00	0.0E+00	0%	2190	9.4E-07	3.0E-04	3.1E-03	1%
Nickel	15.500	45	6	200	1E-06	15	25550	2.2E-06	0.0E+00	0.0E+00	0%	2190	2.5E-05	2.0E-02	1.3E-03	1%
Selenium	2.800	45	6	200	1E-06	15	25550	3.7E-07	0.0E+00	0.0E+00	0%	2190	4.3E-06	5.0E-03	8.5E-04	0%
Silver	2.630	45	6	200	1E-06	15	25550	3.7E-07	0.0E+00	0.0E+00	0%	2190	4.3E-06	5.0E-03	8.6E-04	0%
Vanadium	63.900	45	6	200	1E-06	15	25550	9.0E-06	0.0E+00	0.0E+00	0%	2190	1.1E-04	7.0E-03	1.5E-02	6%
Zinc	338.000	45	6	200	1E-06	15	25550	4.8E-05	0.0E+00	0.0E+00	0%	2190	5.6E-04	3.0E-01	1.9E-03	1%
<b>TOTAL</b>										<b>4.5E-08</b>					<b>2.3E-01</b>	

SURFACE SOIL INGESTION EXPOSURE ASSESSMENT  
 OPERABLE UNIT NO. 8 (SITE 43)  
 REMEDIAL INVESTIGATION CTO-0303  
 MCB CAMP LEJEUNE, NORTH CAROLINA  
 FUTURE RESIDENTIAL CHILD

Intake from ingestion of soil is calculated as follows:

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

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

Where:

C = contaminant concentration in soil (mg/kg)	INPUTS
CF = conversion for kg to mg	specific
EF = child exposure frequency (days/yr)	1E-06
ED = child exposure duration (yr)	350
IR = child soil ingestion rate (mg/day)	6
BW = child body weight (kg)	200
ATc = averaging time for carcinogen (yr)	15
ATnc = averaging time for noncarcinogen (yr)	70
DY = days per year (days/year)	6
CSF = cancer slope factor (mg/kg-day) <sup>-1</sup>	385
RD = reference dose (mg/kg-day)	specific
	specific

COPC	Concentration (mg/kg)	Exposure Frequency (days/yr) Child	Exposure Duration (yr) Child	Conversion Factor (kg/mg)	Ingestion Rate (mg/day) Child	Body Weight (kg) Child	Average Carc Time (days)	Carc Dose (mg/kg/day) Child	Slope Factor (mg/kg/day) <sup>-1</sup>	Carcinogenic Risk Child	Percent Carcinogenic Risk Child	Average Noncarc Time (days)	Noncarc Dose (mg/kg/day) Child	Reference Dose (mg/kg/day)	Noncarcinogenic Risk Child	Percent Noncarcinogenic Risk Child
Benzo(a)anthracene	1.238	350	6	1E-06	200	15	25550	1.4E-08	7.30E-01	9.9E-07	5%	2190	1.6E-05	0.00E+00	0.0E+00	0%
Benzo(b)fluoranthene	2.285	350	6	1E-06	200	15	25550	2.5E-08	7.30E-01	1.8E-06	10%	2190	2.9E-05	0.00E+00	0.0E+00	0%
Benzo(k)fluoranthene	0.768	350	6	1E-06	200	15	25550	8.4E-07	7.30E-02	6.1E-08	0%	2190	9.8E-06	0.00E+00	0.0E+00	0%
Benzo(a)pyrene	1.450	350	6	1E-06	200	15	25550	1.6E-06	7.30E+00	1.2E-05	62%	2190	1.9E-05	0.00E+00	0.0E+00	0%
Indeno(1,2,3-cd)pyrene	1.250	350	6	1E-06	200	15	25550	1.4E-06	7.30E-01	1.0E-06	5%	2190	1.6E-05	0.00E+00	0.0E+00	0%
Dibenzo(a,h)anthracene	0.313	350	6	1E-06	200	15	25550	3.4E-07	7.30E+00	2.5E-06	13%	2190	4.0E-06	0.00E+00	0.0E+00	0%
4,4'-DDD	3.000	350	6	1E-06	200	15	25550	3.3E-06	2.40E-01	7.9E-07	4%	2190	3.8E-05	0.00E+00	0.0E+00	0%
Aluminum	4488.230	350	6	1E-06	200	15	25550	4.9E-03	0.00E+00	0.0E+00	0%	2190	5.7E-02	1.00E+00	5.7E-02	18%
Barium	45.460	350	6	1E-06	200	15	25550	5.0E-05	0.00E+00	0.0E+00	0%	2190	5.8E-04	7.00E-02	8.3E-03	3%
Chromium	23.850	350	6	1E-06	200	15	25550	2.6E-05	0.00E+00	0.0E+00	0%	2190	3.0E-04	5.00E-03	6.1E-02	20%
Iron	4342.870	350	6	1E-06	200	15	25550	4.8E-03	0.00E+00	0.0E+00	0%	2190	5.6E-02	3.00E-01	1.9E-01	58%
TOTAL										1.9E-05					3.1E-01	

SEDIMENT INGESTION EXPOSURE ASSESSMENT  
 OPERABLE UNIT NO. 6 (SITE 43)  
 REMEDIAL INVESTIGATION CTO-0303  
 MCB CAMP LEJUNE, NORTH CAROLINA  
 FUTURE RESIDENTIAL CHILD

Inlake from ingestion of sediment is calculated as follows:

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

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

Where:	INPUTS
C = contaminant concentration in sediment (mg/kg)	Specific
CF = conversion for kg to mg	1E-06
EF = exposure frequency for child (days/yr)	45
ED = exposure duration for child (yr)	6
IR = soil ingestion rate for child (mg/day)	200
BW = body weight for child (kg)	15
ATC = averaging time for carcinogen (yr)	70
ATnc = averaging time for noncarcinogen (yr)	6
DY = days per year (days/year)	365
CSF = cancer slope factor (mg/kg-day) <sup>-1</sup>	Specific
RID = reference dose (mg/kg-day)	Specific

COPC	Concentration (mg/kg)	Exposure Frequency (days/yr) Child	Exposure Duration (yr) Child	Ingestion Rate (mg/day) Child	Conversion Factor (kg/mg)	Body Weight (kg) Child	Average Carc Time (days)	Carc Dose (mg/kg/day) Child	Slope Factor (mg/kg/day) <sup>-1</sup>	Carcinogenic Risk Child	Percent Carcinogenic Risk Child	Average Noncarc Time (days)	Noncarc Dose (mg/kg/day) Child	Reference Dose (mg/kg/day)	Noncarcinogenic Risk Child	Percent Noncarcinogenic Risk Child
Carbon Disulfide	0.026	45	6	200	1E-06	15	25550	3.7E-08	0.0E+00	0.0E+00	0%	2190	4.3E-08	1.0E-01	4.3E-07	0%
4-Methylphenol	0.210	45	6	200	1E-06	15	25550	3.0E-08	0.0E+00	0.0E+00	0%	2190	3.5E-07	5.0E-03	6.9E-05	0%
Pyrene	0.200	45	6	200	1E-06	15	25550	2.8E-08	0.0E+00	0.0E+00	0%	2190	3.3E-07	3.0E-02	1.1E-05	0%
Bis(2-ethylhexyl)phthalate	1.420	45	6	200	1E-06	15	25550	2.0E-07	1.4E-02	2.8E-09	0%	2190	2.3E-06	2.0E-02	1.2E-04	0%
Benzo(a)pyrene	1.470	45	6	200	1E-06	15	25550	2.1E-07	7.3E+00	1.5E-08	34%	2190	2.4E-06	0.0E+00	0.0E+00	0%
4,4'-DDE	8.900	45	6	200	1E-06	15	25550	1.3E-06	3.4E-01	4.3E-07	10%	2190	1.5E-05	0.0E+00	0.0E+00	0%
Endrin	0.016	45	6	200	1E-06	15	25550	2.3E-09	0.0E+00	0.0E+00	0%	2190	2.8E-08	3.0E-04	8.6E-05	0%
4,4'-DDD	37.000	45	6	200	1E-06	15	25550	5.2E-06	2.4E-01	1.3E-06	28%	2190	6.1E-05	0.0E+00	0.0E+00	0%
4,4'-DDT	0.131	45	6	200	1E-06	15	25550	1.8E-08	3.4E-01	6.3E-09	0%	2190	2.1E-07	5.0E-04	4.3E-04	0%
alpha-Chlordane	0.048	45	6	200	1E-06	15	25550	6.8E-09	1.3E+00	8.9E-09	0%	2190	8.0E-08	6.0E-05	1.3E-03	1%
gamma-Chlordane	0.074	45	6	200	1E-06	15	25550	1.0E-08	1.3E+00	1.4E-08	0%	2190	1.2E-07	6.0E-05	2.0E-03	1%
Aluminum	16400.000	45	6	200	1E-06	15	25550	2.3E-03	0.0E+00	0.0E+00	0%	2190	2.7E-02	1.0E+00	2.7E-02	0%
Arsenic	5.700	45	6	200	1E-06	15	25550	8.0E-07	1.5E+00	1.2E-08	27%	2190	9.4E-06	3.0E-04	3.1E-02	13%
Barium	46.100	45	6	200	1E-06	15	25550	8.5E-06	0.0E+00	0.0E+00	0%	2190	7.6E-05	7.0E-02	1.1E-03	0%
Beryllium	0.100	45	6	200	1E-06	15	25550	1.4E-08	4.3E+00	8.1E-08	1%	2190	1.6E-07	5.0E-03	3.3E-05	0%
Cadmium (soil)	3.940	45	6	200	1E-06	15	25550	5.6E-07	0.0E+00	0.0E+00	0%	2190	6.6E-06	1.0E-03	6.5E-03	3%
Chromium	25.480	45	6	200	1E-06	15	25550	3.6E-06	0.0E+00	0.0E+00	0%	2190	4.2E-05	5.0E-03	8.4E-03	4%
Cobalt	3.100	45	6	200	1E-06	15	25550	4.4E-07	0.0E+00	0.0E+00	0%	2190	5.1E-06	6.0E-02	8.5E-05	0%
Copper	53.000	45	6	200	1E-06	15	25550	7.5E-06	0.0E+00	0.0E+00	0%	2190	8.7E-05	4.0E-02	2.2E-03	1%
Iron	23800.000	45	6	200	1E-06	15	25550	3.4E-03	0.0E+00	0.0E+00	0%	2190	3.9E-02	3.0E-01	1.3E-01	56%
Lead	208.000	45	6	200	1E-06	15	25550	2.9E-05	0.0E+00	0.0E+00	0%	2190	3.4E-04	0.0E+00	0.0E+00	0%
Manganese (soil)	78.500	45	6	200	1E-06	15	25550	1.1E-05	0.0E+00	0.0E+00	0%	2190	1.3E-04	1.4E-01	9.2E-04	0%
Mercury	0.570	45	6	200	1E-06	15	25550	8.0E-08	0.0E+00	0.0E+00	0%	2190	9.4E-07	3.0E-04	3.1E-03	1%
Nickel	15.500	45	6	200	1E-06	15	25550	2.2E-06	0.0E+00	0.0E+00	0%	2190	2.5E-05	2.0E-02	1.3E-03	1%
Selenium	2.600	45	6	200	1E-06	15	25550	3.7E-07	0.0E+00	0.0E+00	0%	2190	4.3E-06	5.0E-03	8.5E-04	0%
Silver	2.630	45	6	200	1E-06	15	25550	3.7E-07	0.0E+00	0.0E+00	0%	2190	4.3E-06	5.0E-03	8.6E-04	0%
Vanadium	63.800	45	6	200	1E-06	15	25550	9.0E-06	0.0E+00	0.0E+00	0%	2190	1.1E-04	7.0E-03	1.5E-02	6%
Zinc	338.000	45	6	200	1E-06	15	25550	4.8E-05	0.0E+00	0.0E+00	0%	2190	5.6E-04	3.0E-01	1.9E-03	1%
TOTAL										4.5E-06					2.3E-01	

SURFACE SOIL INGESTION EXPOSURE ASSESSMENT  
 OPERABLE UNIT NO. 6 (SITE 43)  
 REMEDIAL INVESTIGATION CTO-0303  
 MCB CAMP LEJEUNE, NORTH CAROLINA  
 CURRENT ADULT TRESPASSER

Intake from ingestion of soil is calculated as follows:

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

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

Where:

INPUTS

C = contaminant concentration in soil (mg/kg)	
CF = conversion for kg to mg	1E-06
EF = adult exposure frequency (days/yr)	43
ED = adult exposure duration (yr)	30
IR = adult soil ingestion rate (mg/day)	50
BW = adult body weight (kg)	70
ATc = averaging time for carcinogen (yr)	70
ATnc = averaging time for noncarcinogen (yr)	30
DY = days per year (days/year)	365
CSF = cancer slope factor (mg/kg-day) <sup>-1</sup>	specific
RID = reference dose (mg/kg-day)	specific

COPC	Concentration (mg/kg)	Exposure Frequency (days/yr) Adult	Exposure Duration (yr) Adult	Conversion Factor (kg/mg)	Ingestion Rate (mg/day) Adult	Body Weight (kg) Adult	Average Carc Time (days)	Carc Dose (mg/kg/day) Adult	Slope Factor (mg/kg/day) <sup>-1</sup>	Carcinogenic Risk Adult	Percent Carcinogenic Risk Adult	Average Noncarc Time (days)	Noncarc Dose (mg/kg/day) Adult	Reference Dose (mg/kg/day)	Noncarcinogenic Risk Adult	Percent Noncarcinogenic Risk Adult
Benzo(a)anthracene	1.238	43	30	1E-06	50	70	25550	4.5E-08	7.3E-01	3.3E-08	5%	10950	1.0E-07	0.0E+00	0.0E+00	0%
Benzo(b)fluoranthene	2.285	43	30	1E-06	50	70	25550	8.2E-08	7.3E-01	6.0E-08	10%	10950	1.9E-07	0.0E+00	0.0E+00	0%
Benzo(k)fluoranthene	0.768	43	30	1E-06	50	70	25550	2.8E-08	7.3E-02	2.0E-09	0%	10950	6.5E-08	0.0E+00	0.0E+00	0%
Benzo(a)pyrene	1.450	43	30	1E-06	50	70	25550	5.2E-08	7.3E+00	3.8E-07	62%	10950	1.2E-07	0.0E+00	0.0E+00	0%
Indeno(1,2,3-cd)pyrene	1.250	43	30	1E-06	50	70	25550	4.5E-08	7.3E-01	3.3E-08	5%	10950	1.1E-07	0.0E+00	0.0E+00	0%
Dibenzo(a,h)anthracene	0.313	43	30	1E-06	50	70	25550	1.1E-08	7.3E+00	8.3E-08	13%	10950	2.6E-08	0.0E+00	0.0E+00	0%
4,4'-DDD	3.000	43	30	1E-06	50	70	25550	1.1E-07	2.4E-01	2.6E-08	4%	10950	2.5E-07	0.0E+00	0.0E+00	0%
Aluminum	4488.230	43	30	1E-06	50	70	25550	1.6E-04	0.0E+00	0.0E+00	0%	10950	3.8E-04	1.0E+00	3.8E-04	18%
Barium	45.460	43	30	1E-06	50	70	25550	1.6E-06	0.0E+00	0.0E+00	0%	10950	3.8E-06	7.0E-02	5.5E-05	3%
Chromium	23.850	43	30	1E-06	50	70	25550	8.8E-07	0.0E+00	0.0E+00	0%	10950	2.0E-08	5.0E-03	4.0E-04	20%
Iron	4342.870	43	30	1E-06	50	70	25550	1.6E-04	0.0E+00	0.0E+00	0%	10950	3.7E-04	3.0E-01	1.2E-03	59%
<b>TOTAL</b>										<b>6.2E-07</b>					<b>2.1E-03</b>	



SEDIMENT INGESTION EXPOSURE ASSESSMENT  
 OPERABLE UNIT NO. 6 (SITE 43)  
 REMEDIAL INVESTIGATION CTO-0303  
 MCB CAMP LEJEUNE, NORTH CAROLINA  
 CURRENT ADULT TRESPASSER

Inlake from ingestion of sediment is calculated as follows:

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

$$\text{Risk} = \text{Inlake} * CSF \text{ or } RID$$

Where: INPUTS  
 C = contaminant concentration in sediment (mg/kg)  
 CF = conversion for kg to mg 1E-06  
 EF = exposure frequency (days/yr) 45  
 ED = exposure duration (yr) 30  
 IR = soil ingestion rate (mg/day) 100  
 BW = body weight (kg) 70  
 ATc = averaging time for carcinogen (yr) 70  
 ATnc = averaging time for noncarcinogen (yr) 30  
 DY = days per year (days/year) 365  
 CSF = cancer slope factor (mg/kg-day)<sup>-1</sup> Specific  
 RID = reference dose (mg/kg-day) Specific

COPC	Concentration (mg/kg)	Exposure Frequency (days/yr)	Exposure Duration (yr)	Ingestion Rate (mg/day)	Conversion Factor (kg/mg)	Body Weight (kg)	Average Carc Time (days)	Carc Dose (mg/kg/day)	Slope Factor (mg/kg/day) <sup>-1</sup>	Carcinogenic Risk	Percent Carcinogenic Risk	Average Noncarc Time (days)	Noncarc Dose (mg/kg/day)	Reference Dose (mg/kg/day)	Noncarcinogenic Risk	Percent Noncarcinogenic Risk
Carbon Disulfide	0.026	45	30	100	1E-06	70	25550	2.0E-09	0.0E+00	0.0E+00	0%	10950	4.6E-09	1.0E-01	4.6E-08	0%
4-Methylphenol	0.210	45	30	100	1E-06	70	25550	1.6E-08	0.0E+00	0.0E+00	0%	10950	3.7E-08	5.0E-03	7.4E-06	0%
Pyrene	0.200	45	30	100	1E-06	70	25550	1.5E-08	0.0E+00	0.0E+00	0%	10950	3.5E-08	3.0E-02	1.2E-06	0%
Bis(2-ethylhexyl)phthalate	1.420	45	30	100	1E-06	70	25550	1.1E-07	1.4E-02	1.5E-09	0%	10950	2.5E-07	2.0E-02	1.3E-05	0%
Benzo(a)pyrene	1.470	45	30	100	1E-06	70	25550	1.1E-07	7.3E+00	8.1E-07	34%	10950	2.6E-07	0.0E+00	0.0E+00	0%
4,4'-DDE	8.900	45	30	100	1E-06	70	25550	6.7E-07	3.4E-01	2.3E-07	10%	10950	1.6E-06	0.0E+00	0.0E+00	0%
Endrin	0.016	45	30	100	1E-06	70	25550	1.2E-09	0.0E+00	0.0E+00	0%	10950	2.8E-09	3.0E-04	9.4E-06	0%
4,4'-DDD	37.000	45	30	100	1E-06	70	25550	2.8E-06	2.4E-01	6.7E-07	28%	10950	6.5E-06	0.0E+00	0.0E+00	0%
4,4'-DDT	0.131	45	30	100	1E-06	70	25550	9.9E-09	3.4E-01	3.4E-09	0%	10950	2.3E-08	5.0E-04	4.6E-05	0%
alpha-Chlordane	0.048	45	30	100	1E-06	70	25550	3.7E-09	1.3E+00	4.8E-09	0%	10950	8.5E-09	6.0E-05	1.4E-04	1%
gamma-Chlordane	0.074	45	30	100	1E-06	70	25550	5.6E-09	1.3E+00	7.3E-09	0%	10950	1.3E-08	6.0E-05	2.2E-04	1%
Aluminum	16400.000	45	30	100	1E-06	70	25550	1.2E-03	0.0E+00	0.0E+00	0%	10950	2.9E-03	1.0E+00	2.9E-03	11%
Arsenic	5.700	45	30	100	1E-06	70	25550	4.3E-07	1.5E+00	6.5E-07	27%	10950	1.0E-06	3.0E-04	3.3E-03	13%
Banion	46.100	45	30	100	1E-06	70	25550	3.5E-06	0.0E+00	0.0E+00	0%	10950	8.1E-06	7.0E-02	1.2E-04	0%
Beryllium	0.100	45	30	100	1E-06	70	25550	7.5E-09	4.3E+00	3.2E-08	1%	10950	1.8E-08	5.0E-03	3.5E-06	0%
Cadmium (soil)	3.940	45	30	100	1E-06	70	25550	3.0E-07	0.0E+00	0.0E+00	0%	10950	6.9E-07	1.0E-03	6.9E-04	3%
Chromium	25.480	45	30	100	1E-06	70	25550	1.9E-06	0.0E+00	0.0E+00	0%	10950	4.5E-06	5.0E-03	9.0E-04	4%
Cobalt	3.100	45	30	100	1E-06	70	25550	2.3E-07	0.0E+00	0.0E+00	0%	10950	5.5E-07	6.0E-02	9.1E-06	0%
Copper	53.000	45	30	100	1E-06	70	25550	4.0E-06	0.0E+00	0.0E+00	0%	10950	9.3E-06	4.0E-02	2.3E-04	1%
Iron	23800.000	45	30	100	1E-06	70	25550	1.8E-03	0.0E+00	0.0E+00	0%	10950	4.2E-03	3.0E-01	1.4E-02	56%
Lead	206.000	45	30	100	1E-06	70	25550	1.6E-05	0.0E+00	0.0E+00	0%	10950	3.6E-05	0.0E+00	0.0E+00	0%
Manganese (soil)	78.500	45	30	100	1E-06	70	25550	5.9E-06	0.0E+00	0.0E+00	0%	10950	1.4E-05	1.4E-01	9.9E-05	0%
Mercury	0.570	45	30	100	1E-06	70	25550	4.3E-08	0.0E+00	0.0E+00	0%	10950	1.0E-07	3.0E-04	3.3E-04	1%
Nickel	15.500	45	30	100	1E-06	70	25550	1.2E-06	0.0E+00	0.0E+00	0%	10950	2.7E-06	2.0E-02	1.4E-04	1%
Selenium	2.600	45	30	100	1E-06	70	25550	2.0E-07	0.0E+00	0.0E+00	0%	10950	4.6E-07	5.0E-03	9.2E-05	0%
Silver	2.830	45	30	100	1E-06	70	25550	2.0E-07	0.0E+00	0.0E+00	0%	10950	4.6E-07	5.0E-03	9.3E-05	0%
Vanadium	63.900	45	30	100	1E-06	70	25550	4.8E-06	0.0E+00	0.0E+00	0%	10950	1.1E-05	7.0E-03	1.6E-03	6%
Zinc	336.000	45	30	100	1E-06	70	25550	2.6E-05	0.0E+00	0.0E+00	0%	10950	6.0E-05	3.0E-01	2.0E-04	1%
TOTAL										2.4E-06					2.5E-02	



SEDIMENT INGESTION EXPOSURE ASSESSMENT  
 OPERABLE UNIT NO. 6 (SITE 43)  
 REMEDIAL INVESTIGATION CTO-0303  
 MCB CAMP LEJEUNE, NORTH CAROLINA  
 FUTURE RESIDENTIAL ADULT

Intake from ingestion of sediment is calculated as follows:

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

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

Where:	INPUTS
C = contaminant concentration in sediment (mg/kg)	Specific
CF = conversion for kg to mg	1E-06
EF = exposure frequency (days/yr)	45
ED = exposure duration (yr)	30
IR = soil ingestion rate (mg/day)	100
BW = body weight (kg)	70
ATc = averaging time for carcinogen (yr)	70
ATnc = averaging time for noncarcinogen (yr)	30
DY = days per year (days/year)	365
CSF = cancer slope factor (mg/kg-day) <sup>-1</sup>	Specific
RfD = reference dose (mg/kg-day)	Specific

COPC	Concentration (mg/kg)	Exposure Frequency (days/yr)	Exposure Duration (yr)	Ingestion Rate (mg/day)	Conversion Factor (kg/mg)	Body Weight (kg)	Average Carc Time (days)	Carc Dose (mg/kg/day)	Slope Factor (mg/kg/day) <sup>-1</sup>	Carcinogenic Risk	Percent Carcinogenic Risk	Average Noncarc Time (days)	Noncarc Dose (mg/kg/day)	Reference Dose (mg/kg/day)	Noncarcinogenic Risk	Percent Noncarcinogenic Risk
Carbon Disulfide	0.026	45	30	100	1E-06	70	25550	2.0E-09	0.0E+00	0.0E+00	0%	10950	4.6E-08	1.0E-01	4.6E-08	0%
4-Methylphenol	0.210	45	30	100	1E-06	70	25550	1.6E-08	0.0E+00	0.0E+00	0%	10950	3.7E-08	5.0E-03	7.4E-06	0%
Pyrene	0.200	45	30	100	1E-06	70	25550	1.5E-08	0.0E+00	0.0E+00	0%	10950	3.5E-08	3.0E-02	1.2E-06	0%
Bis(2-ethylhexyl)phthalate	1.420	45	30	100	1E-06	70	25550	1.1E-07	1.4E-02	1.5E-09	0%	10950	2.5E-07	2.0E-02	1.3E-05	0%
Benzo(a)pyrene	1.470	45	30	100	1E-06	70	25550	1.1E-07	7.3E+00	8.1E-07	34%	10950	2.6E-07	0.0E+00	0.0E+00	0%
4,4'-DDE	8.900	45	30	100	1E-06	70	25550	6.7E-07	3.4E-01	2.3E-07	10%	10950	1.6E-06	0.0E+00	0.0E+00	0%
Endrin	0.015	45	30	100	1E-06	70	25550	1.2E-09	0.0E+00	0.0E+00	0%	10950	2.8E-09	3.0E-04	9.4E-06	0%
4,4'-DDD	37.000	45	30	100	1E-06	70	25530	2.8E-06	2.4E-01	6.7E-07	26%	10950	6.5E-06	0.0E+00	0.0E+00	0%
4,4'-DDT	0.131	45	30	100	1E-06	70	25550	9.9E-09	3.4E-01	3.4E-09	0%	10950	2.3E-08	5.0E-04	4.6E-05	0%
alpha-Chlordane	0.048	45	30	100	1E-06	70	25550	3.7E-09	1.3E+00	4.8E-09	0%	10950	8.5E-09	8.0E-05	1.4E-04	1%
gamma-Chlordane	0.074	45	30	100	1E-06	70	25550	5.6E-09	1.3E+00	7.3E-09	0%	10950	1.3E-08	8.0E-05	2.2E-04	1%
Aluminum	16400.000	45	30	100	1E-06	70	25550	1.2E-03	0.0E+00	0.0E+00	0%	10950	2.9E-03	1.0E+00	2.9E-03	11%
Arsenic	5.700	45	30	100	1E-06	70	25550	4.3E-07	1.5E+00	6.5E-07	27%	10950	1.0E-06	3.0E-04	3.3E-03	13%
Barium	48.100	45	30	100	1E-06	70	25550	3.5E-06	0.0E+00	0.0E+00	0%	10950	8.1E-06	7.0E-02	1.2E-04	0%
Beryllium	0.100	45	30	100	1E-06	70	25550	7.5E-09	4.3E+00	3.2E-08	1%	10950	1.8E-08	5.0E-03	3.5E-06	0%
Cadmium (soil)	3.940	45	30	100	1E-06	70	25550	3.0E-07	0.0E+00	0.0E+00	0%	10950	6.9E-07	1.0E-03	6.9E-04	3%
Chromium	25.480	45	30	100	1E-06	70	25550	1.9E-06	0.0E+00	0.0E+00	0%	10950	4.5E-06	5.0E-03	9.0E-04	4%
Cobalt	3.100	45	30	100	1E-06	70	25550	2.3E-07	0.0E+00	0.0E+00	0%	10950	5.5E-07	6.0E-02	9.1E-06	0%
Copper	53.000	45	30	100	1E-06	70	25550	4.0E-06	0.0E+00	0.0E+00	0%	10950	9.3E-06	4.0E-02	2.3E-04	1%
Iron	23800.000	45	30	100	1E-06	70	25550	1.8E-03	0.0E+00	0.0E+00	0%	10950	4.2E-03	3.0E-01	1.4E-02	56%
Lead	208.000	45	30	100	1E-06	70	25550	1.6E-05	0.0E+00	0.0E+00	0%	10950	3.6E-05	0.0E+00	0.0E+00	0%
Manganese (soil)	78.500	45	30	100	1E-06	70	25550	5.9E-08	0.0E+00	0.0E+00	0%	10950	1.4E-05	1.4E-01	9.9E-05	0%
Mercury	0.570	45	30	100	1E-06	70	25550	4.3E-08	0.0E+00	0.0E+00	0%	10950	1.0E-07	3.0E-04	3.3E-04	1%
Nickel	15.500	45	30	100	1E-06	70	25550	1.2E-06	0.0E+00	0.0E+00	0%	10950	2.7E-06	2.0E-02	1.4E-04	1%
Selenium	2.600	45	30	100	1E-06	70	25550	2.0E-07	0.0E+00	0.0E+00	0%	10950	4.6E-07	5.0E-03	9.2E-05	0%
Silver	2.630	45	30	100	1E-06	70	25550	2.0E-07	0.0E+00	0.0E+00	0%	10950	4.6E-07	5.0E-03	9.3E-05	0%
Vanadium	63.900	45	30	100	1E-06	70	25550	4.8E-06	0.0E+00	0.0E+00	0%	10950	1.1E-05	7.0E-03	1.6E-03	6%
Zinc	338.000	45	30	100	1E-06	70	25550	2.6E-05	0.0E+00	0.0E+00	0%	10950	6.0E-05	3.0E-01	2.0E-04	1%
TOTAL										2.4E-06					2.5E-02	

SUBSURFACE SOIL INGESTION EXPOSURE ASSESSMENT  
 OPERABLE UNIT NO. 6 (SITE 43)  
 REMEDIAL INVESTIGATION CTO-0303  
 MCB CAMP LEJEUNE, NORTH CAROLINA  
 FUTURE CONSTRUCTION WORKER

Intake from ingestion of soil is calculated as follows:

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

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

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

COPC	Concentration Carcinogen (mg/kg)	Exposure Frequency (days/yr) Adult	Exposure Duration (yr) Adult	Conversion Factor (kg/mg)	Ingestion Rate (mg/day) Adult	Body Weight (kg) Adult	Average Carc Tim (days)	Carc Dose (mg/kg/day) Adult	Slope Factor (mg/kg/day) <sup>-1</sup>	Carcinogenic Risk Adult	Percent Carcinogenic Risk Adult	Average Noncarc Time (days)	Noncarc Dose (mg/kg/day) Adult	Reference Dose (mg/kg/day)	Noncarcinogenic Risk Adult	Percent Noncarcinogenic Risk Adult
Benzo(a)pyrene	0.237	90	1	1E-06	480	70	25550	5.7E-09	7.3E+00	4.2E-08	55%	365	4.0E-07	0.0E+00	0.0E+00	0%
Indeno(1,2,3-cd)pyrene	0.262	90	1	1E-06	480	70	25550	6.3E-09	7.3E-01	4.6E-09	6%	365	4.4E-07	0.0E+00	0.0E+00	0%
Dibenz(a,h)anthracene	0.170	90	1	1E-06	480	70	25550	4.1E-09	7.3E+00	3.0E-08	39%	365	2.9E-07	0.0E+00	0.0E+00	0%
Iron	2298.370	90	1	1E-06	480	70	25550	5.6E-05	0.0E+00	0.0E+00	0%	365	3.9E-03	3.0E-01	1.3E-02	100%
TOTAL										7.6E-08					1.3E-02	

**EXAMPLE DERMAL CONTACT WITH SOIL\* CALCULATIONS**  
**OPERABLE UNIT NO. 6**  
**CONTRACT TASK ORDER 0303**

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

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

Where:	C	=	Contaminant concentration in soil (mg/kg)
	CF	=	Conversion factor (kg/mg)
	SA	=	Surface available for contact (cm <sup>2</sup> /event)
	AF	=	Soil to skin adherence factor (mg/cm <sup>2</sup> )
	ABS	=	Fraction absorbed (percent) - 0.01 organics, 0.001 inorganics
	EF	=	Exposure frequency (days/year)
	ED	=	Exposure duration (years)
	IR	=	Ingestion rate (mg/day)
	BW	=	Body weight (kg)
	AT <sub>c</sub>	=	Averaging time carcinogen (days)
	AT <sub>nc</sub>	=	Averaging time noncarcinogen (days)

**Risks:**

Carcinogens = Intake (mg/kg-day) x dermally - adjusted CSF (mg/kg-day)<sup>-1</sup>

Noncarcinogens = Intake (mg/kg-day)/ dermally - adjusted RfD (mg/kg-day)

**Example Carcinogen: Arsenic**

$$\text{Intake (mg/kg-day)} = \frac{1.238 \text{ mg/kg} \times 1.0\text{E-}06 \text{ kg/mg} \times 5,800 \text{ cm}^2/\text{event} \times 0.01 \times 1 \text{ mg/cm}^2 \times 350 \text{ days/yr} \times 30 \text{ yr}}{70 \text{ kg} \times 25,550 \text{ days}}$$

$$= 4.2\text{E-}07$$

$$\text{Risk} = 4.2\text{E-}07 \text{ mg/kg-day} \times 1.5 \text{ mg/kg-day}^{-1} = 6.2\text{E-}07$$

**Example Noncarcinogen: Barium**

$$\text{Intake (mg/kg-day)} = \frac{45.46 \text{ mg/kg} \times 1.0\text{E-}06 \text{ kg/mg} \times 5,800 \text{ cm}^2/\text{event} \times 1 \text{ mg/cm}^2 \times 0.01 \times 350 \text{ days/yr} \times 30 \text{ yrs}}{70 \text{ kg} \times 10,950 \text{ days}}$$

$$= 3.6\text{E-}06$$

$$\text{Risk} = \frac{3.6\text{E-}06 \text{ mg/kg-day}}{1.4\text{E-}02 \text{ mg/kg-day}} = 2.6\text{E-}04$$

\* This example calculation also is applicable for sediment dermal contact.  
 Re: Site 43 Future Residential Adult

SURFACE SOIL DERMAL CONTACT EXPOSURE ASSESSMENT  
 OPERABLE UNIT NO. 6 (SITE 43)  
 REMEDIAL INVESTIGATION CTO-0303  
 MCB CAMP LEJEUNE, NORTH CAROLINA  
 CURRENT MILITARY PERSONNEL

Dermat contact with soil is calculated as follows:

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

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

Where:	INPUTS
C = contaminant concentration in soil (mg/kg)	specific
CF = conversion factor (kg/mg)	1E-06
SA = adult exposed skin surface area (cm <sup>2</sup> )	4300
AF = soil to skin adherence factor (mg/cm <sup>2</sup> )	1
Abs = fraction absorbed (unitless)	specific
EF = adult exposure frequency (events/yr)	250
ED = adult exposure duration (years)	4
BW = adult body weight (kg)	70
ATc = averaging time for carcinogen (yr)	70
ATnc = averaging time for noncarcinogen (yr)	4
DY = day per year (day/yr)	365
CSF = cancer slope factor (mg/kg-day) <sup>-1</sup>	specific
RfD = reference dose (mg/kg-day)	specific

Note: Inputs are scenario and site specific

COPC	Concentration Carcinogen (mg/kg)	Conversion Factor (kg/mg)	Surface Area (cm <sup>2</sup> ) Adult	Adherence Factor (mg/cm <sup>2</sup> )	Fraction Absorbed (%)	Exposure Frequency (events/yr) Adult	Exposure Duration (yrs) Adult	Body Weight (kg) Adult	Average Carc Time (days)	Carc Dose (mg/kg/day) Adult	Dermal Adjust. Slope Factor (mg/kg-day) <sup>-1</sup>	Carcinogenic Risk Adult	Percent Carcinogenic Risk Adult	Average Noncarc Time (days)	Noncarc Dose (mg/kg/day) Adult	Dermal Adjust. Reference Dose (mg/kg-day)	Noncarcinogenic Risk Adult	Percent Noncarcinogenic Risk Adult
Benzo(a)anthracene	1.238	1E-06	4300	1	0.01	250	4	70	25550	3.0E-08	1.46E+00	4.3E-08	5%	1460	5.2E-07	0.00E+00	0.0E+00	0%
Benzo(b)fluoranthene	2.285	1E-06	4300	1	0.01	250	4	70	25550	5.5E-08	1.46E+00	8.0E-08	10%	1460	9.6E-07	0.00E+00	0.0E+00	0%
Benzo(k)fluoranthene	0.768	1E-06	4300	1	0.01	250	4	70	25550	1.8E-08	1.46E+01	2.7E-09	0%	1460	3.2E-07	0.00E+00	0.0E+00	0%
Benzo(a)pyrene	1.450	1E-06	4300	1	0.01	250	4	70	25550	3.5E-08	1.46E+01	5.1E-07	62%	1460	6.1E-07	0.00E+00	0.0E+00	0%
Indeno(1,2,3-cd)pyrene	1.250	1E-06	4300	1	0.01	250	4	70	25550	3.0E-08	1.48E+00	4.4E-08	5%	1460	5.3E-07	0.00E+00	0.0E+00	0%
Dibenzo(a,h)anthracene	0.313	1E-06	4300	1	0.01	250	4	70	25550	7.5E-09	1.48E+01	1.1E-07	13%	1460	1.3E-07	0.00E+00	0.0E+00	0%
4,4'-DDD	3.000	1E-06	4300	1	0.01	250	4	70	25550	7.2E-08	4.80E-01	3.5E-08	4%	1460	1.3E-06	0.00E+00	0.0E+00	0%
Aluminum	4488.230	1E-06	4300	1	0.001	250	4	70	25550	1.1E-05	0.00E+00	0.0E+00	0%	1460	1.9E-04	2.00E-01	9.4E-04	18%
Barium	45.460	1E-06	4300	1	0.001	250	4	70	25550	1.1E-07	0.00E+00	0.0E+00	0%	1460	1.9E-06	1.40E-02	1.4E-04	3%
Chromium	23.850	1E-06	4300	1	0.001	250	4	70	25550	5.7E-08	0.00E+00	0.0E+00	0%	1460	1.0E-06	1.00E-03	1.0E-03	20%
Iron	4342.870	1E-06	4300	1	0.001	250	4	70	25550	1.0E-05	0.00E+00	0.0E+00	0%	1460	1.8E-04	6.00E-02	3.0E-03	59%
<b>TOTAL</b>												<b>8.2E-07</b>					<b>5.1E-03</b>	

SURFACE SOIL DERMAL CONTACT EXPOSURE ASSESSMENT  
 OPERABLE UNIT NO. 6 (SITE 43)  
 REMEDIAL INVESTIGATION CTO-0303  
 MCB CAMP LEJEUNE, NORTH CAROLINA  
 CURRENT CHILD TRESPASSER

Dermal contact with soil is calculated as follows:

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

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

Where:

	INPUTS
C = contaminant concentration in soil (mg/kg)	specific
CF = conversion factor (kg/mg)	1E-06
SA = child exposed skin surface area (cm <sup>2</sup> )	2000
AF = soil to skin adherence factor (mg/cm <sup>2</sup> )	1
Abs = fraction absorbed (unitless)	specific
EF = child exposure frequency (events/yr)	130
ED = child exposure duration (years)	6
BW = child body weight (kg)	15
ATc = averaging time for carcinogen (yr)	70
ATnc = averaging time for noncarcinogen (yr)	6
DY = day per year (day/yr)	365
CSF = cancer slope factor (mg/kg-day) <sup>-1</sup>	specific
RID = reference dose (mg/kg-day)	specific

COPC	Concentration (mg/kg)	Conversion Factor (kg/mg)	Surface Area (cm <sup>2</sup> ) Child	Adherence Factor (mg/cm <sup>2</sup> )	Fraction Absorbed (%)	Exposure Frequency (events/yr) Child	Exposure Duration (yrs) Child	Body Weight (kg) Child	Average Carc Time (days)	Carc Dose (mg/kg/day) Child	Dermal Adjust. Slope Factor (mg/kg-day) <sup>-1</sup>	Carcinogenic Risk Child	Percent Carcinogenic Risk Child	Average Noncarc Time (days)	Noncarc Dose (mg/kg/day) Child	Dermal Adjust. Reference Dose (mg/kg-day)	Noncarcinogenic Risk Child	Percent Noncarcinogenic Risk Child
Benzo(a)anthracene	1.238	1E-06	2000	1	0.01	130	6	15	25550	5.0E-08	1.5E+00	7.4E-08	5%	2190	5.9E-07	0.0E+00	0.0E+00	0%
Benzo(b)fluoranthene	2.285	1E-06	2000	1	0.01	130	6	15	25550	9.3E-08	1.5E+00	1.4E-07	10%	2190	1.1E-06	0.0E+00	0.0E+00	0%
Benzo(k)fluoranthene	0.768	1E-06	2000	1	0.01	130	6	15	25550	3.1E-08	1.5E-01	4.8E-09	0%	2190	3.8E-07	0.0E+00	0.0E+00	0%
Benzo(a)pyrene	1.450	1E-06	2000	1	0.01	130	6	15	25550	5.9E-08	1.5E+01	8.6E-07	62%	2190	6.9E-07	0.0E+00	0.0E+00	0%
Indeno(1,2,3-cd)pyrene	1.250	1E-06	2000	1	0.01	130	6	15	25550	5.1E-08	1.5E+00	7.4E-08	5%	2190	5.9E-07	0.0E+00	0.0E+00	0%
Dibenzo(a,h)anthracene	0.313	1E-06	2000	1	0.01	130	6	15	25550	1.3E-08	1.5E+01	1.9E-07	13%	2190	1.5E-07	0.0E+00	0.0E+00	0%
4,4'-DDD	3.000	1E-06	2000	1	0.01	130	6	15	25550	1.2E-07	4.8E-01	5.8E-08	4%	2190	1.4E-06	0.0E+00	0.0E+00	0%
Aluminum	4488.230	1E-06	2000	1	0.001	130	6	15	25550	1.8E-05	0.0E+00	0.0E+00	0%	2190	2.1E-04	2.0E-01	1.1E-03	18%
Barium	45.460	1E-06	2000	1	0.001	130	6	15	25550	1.9E-07	0.0E+00	0.0E+00	0%	2190	2.2E-08	1.4E-02	1.5E-04	3%
Chromium	23.850	1E-06	2000	1	0.001	130	6	15	25550	9.7E-08	0.0E+00	0.0E+00	0%	2190	1.1E-06	1.0E-03	1.1E-03	20%
Iron	4342.870	1E-06	2000	1	0.001	130	6	15	25550	1.8E-05	0.0E+00	0.0E+00	0%	2190	2.1E-04	8.0E-02	3.4E-03	59%
<b>TOTAL</b>												<b>1.4E-06</b>					<b>5.8E-03</b>	

SEDIMENT DERMAL CONTACT EXPOSURE ASSESSMENT  
 OPERABLE UNIT NO. 6 (SITE 43)  
 REMEDIAL INVESTIGATION CTO-0303  
 MCB CAMP LEJEUNE, NORTH CAROLINA  
 CURRENT CHILD TRESPASSER

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

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

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

Where:	INPUTS
C = contaminant concentration in soil (mg/kg)	
CF = conversion factor (kg/mg)	1.00E-06
SA = child exposed skin surface area (cm <sup>2</sup> )	2000
AF = sediment to skin adherence factor (mg/cm <sup>2</sup> )	1
Abs = fraction absorbed (unitless) (contaminant specific)	Specific
EF = child exposure frequency (events/yr)	45
ED = child exposure duration (years)	6
BW = child body weight (kg)	15
ATc = averaging time for carcinogen (yr)	70
ATnc = averaging time for noncarcinogen (yr)	6
DY = day per year (day/yr)	365
CSF = cancer slope factor (mg/kg-day) <sup>-1</sup>	Specific
IRD = reference dose (mg/kg-day)	Specific

COPC	Concentration Carcinogen (mg/kg)	Conversion Factor (kg/mg)	Surface Area (cm <sup>2</sup> ) Child	Adherence Factor (mg/cm <sup>2</sup> )	ABS Factor (%)	Exposure Frequency (events/yr) Child	Exposure Duration (yrs) Child	Body Weight (kg) Child	Average Carc Time (days)	Carc Dose (mg/kg/day) Child	Dermal Adjust. Slope Factor (mg/kg-day) <sup>-1</sup>	Carcinogenic Risk Child	Percent Carcinogenic Risk Child	Average Noncarc Time (days)	Noncarc Dose (mg/kg/day) Child	Dermal Adjust. Reference Dose (mg/kg-day)	Noncarcinogenic Risk Child	Percent Noncarcinogenic Risk Child
Carbon Disulfide	0.026	1E-06	2000	1	0.01	45	6	15	25550	3.7E-10	0.0E+00	0.0E+00	0%	2190	4.3E-09	8.0E-02	5.3E-08	0%
4-Methylphenol	0.210	1E-06	2000	1	0.01	45	6	15	25550	3.0E-09	0.0E+00	0.0E+00	0%	2190	3.5E-08	2.5E-03	1.4E-05	0%
Pyrene	0.200	1E-06	2000	1	0.01	45	6	15	25550	2.8E-09	0.0E+00	0.0E+00	0%	2190	3.3E-08	1.5E-02	2.2E-06	0%
Bis(2-ethylhexyl)phthalate	1.420	1E-06	2000	1	0.01	45	6	15	25550	2.0E-08	2.8E-02	5.6E-10	0%	2190	2.3E-07	1.0E-02	2.3E-05	0%
Benzo(a)pyrene	1.470	1E-06	2000	1	0.01	45	6	15	25550	2.1E-08	1.5E+01	3.0E-07	43%	2190	2.4E-07	0.0E+00	0.0E+00	0%
4,4'-DDE	8.900	1E-06	2000	1	0.01	45	6	15	25550	1.3E-07	6.8E-01	8.5E-08	12%	2190	1.5E-06	0.0E+00	0.0E+00	0%
Endrin	0.016	1E-06	2000	1	0.01	45	6	15	25550	2.3E-10	0.0E+00	0.0E+00	0%	2190	2.6E-09	1.5E-04	1.8E-05	0%
4,4'-DDD	37.000	1E-06	2000	1	0.01	45	6	15	25550	5.2E-07	4.8E-01	2.5E-07	35%	2190	6.1E-06	0.0E+00	0.0E+00	0%
4,4'-DDT	0.131	1E-06	2000	1	0.01	45	6	15	25550	1.8E-09	6.8E-01	1.3E-09	0%	2190	2.1E-08	2.5E-04	8.6E-05	1%
alpha-Chlordane	0.048	1E-06	2000	1	0.01	45	6	15	25550	6.8E-10	2.8E+00	1.8E-09	0%	2190	8.0E-09	3.0E-05	2.7E-04	2%
gamma-Chlordane	0.074	1E-06	2000	1	0.01	45	6	15	25550	1.0E-09	2.8E+00	2.7E-09	0%	2190	1.2E-08	3.0E-05	4.1E-04	3%
Aluminum	16400.000	1E-06	2000	1	0.001	45	6	15	25550	2.3E 05	0.0E+00	0.0E+00	0%	2190	2.7E-04	2.0E-01	1.3E-03	11%
Arsenic	5.700	1E-06	2000	1	0.001	45	6	15	25550	8.0E-09	7.5E+00	6.0E-08	9%	2190	9.4E-08	6.0E-05	1.6E-03	13%
Barium	48.100	1E-06	2000	1	0.001	45	6	15	25550	6.5E-08	0.0E+00	0.0E+00	0%	2190	7.6E-07	1.4E-02	5.4E-05	0%
Beryllium	0.100	1E-06	2000	1	0.001	45	6	15	25550	1.4E-10	2.1E+01	3.0E-09	0%	2190	1.6E-09	1.0E-03	1.8E-08	0%
Cadmium (soil)	3.940	1E-06	2000	1	0.001	45	6	15	25550	5.8E-09	0.0E+00	0.0E+00	0%	2190	6.5E-08	2.0E-04	3.2E-04	3%
Chromium	25.480	1E-06	2000	1	0.001	45	6	15	25550	3.8E-08	0.0E+00	0.0E+00	0%	2190	4.2E-07	1.0E-03	4.2E-04	3%
Cobalt	3.100	1E-06	2000	1	0.001	45	6	15	25550	4.4E-09	0.0E+00	0.0E+00	0%	2190	5.1E-08	1.2E-02	4.2E-06	0%
Copper	53.000	1E-06	2000	1	0.001	45	6	15	25550	7.5E-08	0.0E+00	0.0E+00	0%	2190	8.7E-07	8.0E-03	1.1E-04	1%
Iron	23800.000	1E-06	2000	1	0.001	45	6	15	25550	3.4E-05	0.0E+00	0.0E+00	0%	2190	3.9E-04	6.0E-02	6.5E-03	53%
Lead	208.000	1E-06	2000	1	0.001	45	6	15	25550	2.9E-07	0.0E+00	0.0E+00	0%	2190	3.4E-08	0.0E+00	0.0E+00	0%
Manganese (soil)	78.500	1E-06	2000	1	0.001	45	6	15	25550	1.1E-07	0.0E+00	0.0E+00	0%	2190	1.3E-06	2.8E-02	4.8E-05	0%
Mercury	0.570	1E-06	2000	1	0.001	45	6	15	25550	8.0E-10	0.0E+00	0.0E+00	0%	2190	9.4E-09	6.0E-05	1.6E-04	1%
Nickel	15.500	1E-06	2000	1	0.001	45	6	15	25550	2.2E-08	0.0E+00	0.0E+00	0%	2190	2.5E-07	4.0E-03	6.4E-05	1%
Selenium	2.600	1E-06	2000	1	0.001	45	6	15	25550	3.7E-09	0.0E+00	0.0E+00	0%	2190	4.3E-08	1.0E-03	4.3E-05	0%
Silver	2.630	1E-06	2000	1	0.001	45	6	15	25550	3.7E-09	0.0E+00	0.0E+00	0%	2190	4.3E-08	1.0E-03	4.3E-05	0%
Vanadium	63.900	1E-06	2000	1	0.001	45	6	15	25550	9.0E-08	0.0E+00	0.0E+00	0%	2190	1.1E-08	1.4E-03	7.5E-04	6%
Zinc	338.000	1E-06	2000	1	0.001	45	6	15	25550	4.8E-07	0.0E+00	0.0E+00	0%	2190	5.6E-06	6.0E-02	9.3E-05	1%
TOTAL												7.1E-07					1.2E-02	



SURFACE SOIL DERMAL CONTACT EXPOSURE ASSESSMENT  
 OPERABLE UNIT NO. 6 (SITE 43)  
 REMEDIAL INVESTIGATION CTO-0303  
 MCB CAMP LEJEUNE, NORTH CAROLINA  
 FUTURE RESIDENTIAL CHILD

Dermal contact with soil is calculated as follows:

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

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

Where:

C = contaminant concentration in soil (mg/kg)	INPUTS
CF = conversion factor (kg/mg)	specific
SA = child exposed skin surface area (cm2)	1E-06
AF = soil to skin adherence factor (mg/cm2)	2300
Abs = fraction absorbed (unitless)	1
EF = child exposure frequency (events/yr)	specific
ED = child exposure duration (years)	350
BW = child body weight (kg)	6
ATc = averaging time for carcinogen (yr)	15
ATnc = averaging time for noncarcinogen (yr)	70
DY = day per year (day/yr)	6
CSF = cancer slope factor (mg/kg-day) <sup>-1</sup>	365
RID = reference dose (mg/kg-day)	specific
	specific

COPC	Concentration (mg/kg)	Conversion Factor (kg/mg)	Surface Area (cm2) Child	Adherence Factor (mg/cm2)	Fraction Absorbed (%)	Exposure Frequency (events/yr) Child	Exposure Duration (yrs) Child	Body Weight (kg) Child	Average Carc Time (days)	Carc Dose (mg/kg/day) Child	Dermal Adjust. Slope Factor (mg/kg-day) <sup>-1</sup>	Carcinogenic Risk Child	Percent Carcinogenic Risk Child	Average Noncarc Time (days)	Noncarc Dose (mg/kg/day) Child	Dermal Adjust. Reference Dose (mg/kg-day)	Noncarcinogenic Risk Child	Percent Noncarcinogenic Risk Child
Benzo(a)anthracene	1.238	1E-06	2300	1	0.01	350	6	15	25550	1.6E-07	1.5E+00	2.3E-07	5%	2190	1.8E-06	0.0E+00	0.0E+00	0%
Benzo(b)fluoranthene	2.285	1E-06	2300	1	0.01	350	6	15	25550	2.9E-07	1.5E+00	4.2E-07	10%	2190	3.4E-06	0.0E+00	0.0E+00	0%
Benzo(k)fluoranthene	0.768	1E-06	2300	1	0.01	350	6	15	25550	9.7E-08	1.5E-01	1.4E-08	0%	2190	1.1E-08	0.0E+00	0.0E+00	0%
Benzo(a)pyrene	1.450	1E-06	2300	1	0.01	350	6	15	25550	1.8E-07	1.5E+01	2.7E-06	62%	2190	2.1E-08	0.0E+00	0.0E+00	0%
Indeno(1,2,3-cd)pyrene	1.250	1E-06	2300	1	0.01	350	6	15	25550	1.6E-07	1.5E+00	2.3E-07	5%	2190	1.8E-06	0.0E+00	0.0E+00	0%
Dibenzo(a,h)anthracene	0.313	1E-06	2300	1	0.01	350	6	15	25550	4.0E-08	1.5E+01	5.8E-07	13%	2190	4.8E-07	0.0E+00	0.0E+00	0%
4,4'-DDD	3.000	1E-06	2300	1	0.01	350	6	15	25550	3.8E-07	4.8E-01	1.8E-07	4%	2190	4.4E-06	0.0E+00	0.0E+00	0%
Aluminum	4488.230	1E-06	2300	1	0.001	350	6	15	25550	5.7E-05	0.0E+00	0.0E+00	0%	2190	6.6E-04	2.0E-01	3.3E-03	18%
Barium	45.460	1E-06	2300	1	0.001	350	6	15	25550	5.7E-07	0.0E+00	0.0E+00	0%	2190	6.7E-06	1.4E-02	4.8E-04	3%
Chromium	23.850	1E-06	2300	1	0.001	350	6	15	25550	3.0E-07	0.0E+00	0.0E+00	0%	2190	3.5E-06	1.0E-03	3.5E-03	20%
Iron	4342.870	1E-06	2300	1	0.001	350	6	15	25550	5.5E-05	0.0E+00	0.0E+00	0%	2190	6.4E-04	6.0E-02	1.1E-02	59%
<b>TOTAL</b>												4.3E-06					1.8E-02	

SEDIMENT DERMAL CONTACT EXPOSURE ASSESSMENT  
 OPERABLE UNIT NO. 6 (SITE 43)  
 REMEDIAL INVESTIGATION CTO-0303  
 MCB CAMP LEJEUNE, NORTH CAROLINA  
 FUTURE RESIDENTIAL CHILD

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

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

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

Where:	INPUTS
C = contaminant concentration in soil (mg/kg)	Specific
CF = conversion factor (kg/mg)	1.00E-06
SA = child exposed skin surface area (cm2)	2300
AF = sediment to skin adherence factor (mg/cm2)	1
Abs = fraction absorbed (unitless) (contaminant specific)	Specific
EF = child exposure frequency (events/yr)	45
ED = child exposure duration (years)	6
BW = child body weight (kg)	15
ATc = averaging time for carcinogen (yr)	70
ATnc = averaging time for noncarcinogen (yr)	6
DY = day per year (day/yr)	365
CSF = cancer slope factor (mg/kg-day)-1	Specific
RfD = reference dose (mg/kg-day)	Specific

COPC	Concentration Carcinogen (mg/kg)	Conversion Factor (kg/mg)	Surface Area (cm2) Child	Adherence Factor (mg/cm2)	ABS Factor (%)	Exposure Frequency (events/yr) Child	Exposure Duration (yrs) Child	Body Weight (kg) Child	Average Carc Time (days)	Carc Dose (mg/kg/day) Child	Dermal Adjust. Slope Factor (mg/kg-day)-1	Carcinogenic Risk Child	Percent Carcinogenic Risk Child	Average Noncarc Time (days)	Noncarc Dose (mg/kg/day) Child	Dermal Adjust. Reference Dose (mg/kg-day)	Noncarcinogenic Risk Child	Percent Noncarcinogenic Risk Child
Carbon Disulfide	0.028	1E-06	2300	1	0.01	45	6	15	25550	4.2E-10	0.0E+00	0.0E+00	0%	2190	4.9E-09	8.0E-02	8.1E-08	0%
4-Methylphenol	0.210	1E-06	2300	1	0.01	45	6	15	25550	3.4E-09	0.0E+00	0.0E+00	0%	2190	4.0E-08	2.5E-03	1.6E-05	0%
Pyrene	0.200	1E-06	2300	1	0.01	45	6	15	25550	3.3E-09	0.0E+00	0.0E+00	0%	2190	3.8E-08	1.5E-02	2.5E-06	0%
Bis(2-ethylhexyl)phthalate	1.420	1E-06	2300	1	0.01	45	6	15	25550	2.3E-08	2.8E-02	6.4E-10	0%	2190	2.7E-07	1.0E-02	2.7E-05	0%
Benzo(a)pyrene	1.470	1E-06	2300	1	0.01	45	6	15	25550	2.4E-08	1.5E+01	3.5E-07	43%	2190	2.8E-07	0.0E+00	0.0E+00	0%
4,4'-DDE	8.900	1E-06	2300	1	0.01	45	6	15	25550	1.4E-07	6.8E-01	8.8E-08	12%	2190	1.7E-06	0.0E+00	0.0E+00	0%
Endrin	0.016	1E-06	2300	1	0.01	45	6	15	25550	2.6E-10	0.0E+00	0.0E+00	0%	2190	3.0E-09	1.5E-04	2.0E-05	0%
4,4'-DDD	37.000	1E-06	2300	1	0.01	45	6	15	25550	6.0E-07	4.8E-01	2.9E-07	35%	2190	7.0E-06	0.0E+00	0.0E+00	0%
4,4'-DDT	0.131	1E-06	2300	1	0.01	45	6	15	25550	2.1E-09	6.8E-01	1.4E-09	0%	2190	2.5E-08	2.5E-04	9.9E-05	1%
alpha-Chlordane	0.048	1E-06	2300	1	0.01	45	6	15	25550	7.8E-10	2.8E+00	2.0E-09	0%	2190	9.2E-09	3.0E-05	3.1E-04	2%
gamma-Chlordane	0.074	1E-06	2300	1	0.01	45	6	15	25550	1.2E-09	2.6E+00	3.1E-09	0%	2190	1.4E-08	3.0E-05	4.7E-04	3%
Aluminum	16400.000	1E-06	2300	1	0.001	45	6	15	25550	2.7E-05	0.0E+00	0.0E+00	0%	2190	3.1E-04	2.0E-01	1.6E-03	11%
Arsenic	5.700	1E-06	2300	1	0.001	45	6	15	25550	9.2E-09	7.5E+00	6.9E-08	9%	2190	1.1E-07	6.0E-05	1.8E-03	13%
Barium	48.100	1E-06	2300	1	0.001	45	6	15	25550	7.5E-08	0.0E+00	0.0E+00	0%	2190	8.7E-07	1.4E-02	6.2E-05	0%
Beryllium	0.100	1E-06	2300	1	0.001	45	6	15	25550	1.6E-10	2.1E+01	3.5E-09	0%	2190	1.9E-09	1.0E-03	1.9E-06	0%
Cadmium (soil)	3.940	1E-06	2300	1	0.001	45	6	15	25550	6.4E-09	0.0E+00	0.0E+00	0%	2190	7.4E-08	2.0E-04	3.7E-04	3%
Chromium	25.480	1E-06	2300	1	0.001	45	6	15	25550	4.1E-08	0.0E+00	0.0E+00	0%	2190	4.8E-07	1.0E-03	4.8E-04	3%
Cobalt	3.100	1E-06	2300	1	0.001	45	6	15	25550	5.0E-09	0.0E+00	0.0E+00	0%	2190	5.8E-08	1.2E-02	4.9E-06	0%
Copper	53.000	1E-06	2300	1	0.001	45	6	15	25550	8.8E-08	0.0E+00	0.0E+00	0%	2190	1.0E-06	8.0E-03	1.3E-04	1%
Iron	23800.000	1E-06	2300	1	0.001	45	6	15	25550	3.9E-05	0.0E+00	0.0E+00	0%	2190	4.5E-04	6.0E-02	7.5E-03	53%
Lead	206.000	1E-06	2300	1	0.001	45	6	15	25550	3.3E-07	0.0E+00	0.0E+00	0%	2190	3.8E-06	0.0E+00	0.0E+00	0%
Manganese (soil)	78.500	1E-06	2300	1	0.001	45	6	15	25550	1.3E-07	0.0E+00	0.0E+00	0%	2190	1.5E-06	2.8E-02	5.3E-05	0%
Mercury	0.570	1E-06	2300	1	0.001	45	6	15	25550	8.2E-10	0.0E+00	0.0E+00	0%	2190	1.1E-08	6.0E-05	1.8E-04	1%
Nickel	15.500	1E-06	2300	1	0.001	45	6	15	25550	2.5E-08	0.0E+00	0.0E+00	0%	2190	2.8E-07	4.0E-03	7.3E-05	1%
Selenium	2.600	1E-06	2300	1	0.001	45	6	15	25550	4.2E-09	0.0E+00	0.0E+00	0%	2190	4.9E-08	1.0E-03	4.9E-05	0%
Silver	2.630	1E-06	2300	1	0.001	45	6	15	25550	4.3E-09	0.0E+00	0.0E+00	0%	2190	5.0E-08	1.0E-03	5.0E-05	0%
Vanadium	63.900	1E-06	2300	1	0.001	45	6	15	25550	1.0E-07	0.0E+00	0.0E+00	0%	2190	1.2E-06	1.4E-03	8.8E-04	6%
Zinc	338.000	1E-06	2300	1	0.001	45	6	15	25550	5.5E-07	0.0E+00	0.0E+00	0%	2190	6.4E-06	6.0E-02	1.1E-04	1%
TOTAL												8.1E-07					1.4E-02	

SEDIMENT DERMAL CONTACT EXPOSURE ASSESSMENT  
 OPERABLE UNIT NO. 6 (SITE 43)  
 REMEDIAL INVESTIGATION CTO-0303  
 MCB CAMP LEJEUNE, NORTH CAROLINA  
 CURRENT ADULT TRESPASSER

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

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

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

Where:	INPUTS
C = contaminant concentration in soil (mg/kg)	Specific
CF = conversion factor (kg/mg)	1.00E-06
SA = exposed skin surface area (cm <sup>2</sup> )	5000
AF = sediment to skin adherence factor (mg/cm <sup>2</sup> )	1
Abs = fraction absorbed (unitless) (contaminant specific)	Specific
EF = exposure frequency (events/yr)	45
ED = exposure duration (years)	30
BW = body weight (kg)	70
ATc = averaging time for carcinogen (yr)	70
ATnc = averaging time for noncarcinogen (yr)	30
DY = day per year (day/yr)	365
CSF = cancer slope factor (mg/kg-day) <sup>-1</sup>	Specific
RfD = reference dose (mg/kg-day)	Specific

COPC	Concentration (mg/kg)	Conversion Factor (kg/mg)	Surface Area (cm <sup>2</sup> )	Adherence Factor (mg/cm <sup>2</sup> )	ABS Factor (%)	Exposure Frequency (events/yr)	Exposure Duration (yrs)	Body Weight (kg)	Average Carc Time (days)	Carc Dose (mg/kg/day)	Dermal Adjust. Slope Factor (mg/kg-day) <sup>-1</sup>	Carcinogenic Risk	Percent Carcinogenic Risk	Average Noncarc Time (days)	Noncarc Dose (mg/kg/day)	Dermal Adjust. Reference Dose (mg/kg-day)	Noncarcinogenic Risk	Percent Noncarcinogenic Risk
Carbon Disulfide	0.026	1E-06	5000	1	0.01	45	30	70	25550	9.8E-10	0.0E+00	0.0E+00	0%	10950	2.3E-09	6.0E-02	2.9E-08	0%
4-Methylphenol	0.210	1E-06	5000	1	0.01	45	30	70	25550	7.9E-09	0.0E+00	0.0E+00	0%	10950	1.8E-08	2.5E-03	7.4E-06	0%
Pyrene	0.200	1E-06	5000	1	0.01	45	30	70	25550	7.5E-09	0.0E+00	0.0E+00	0%	10950	1.8E-08	1.5E-02	1.2E-06	0%
Bis(2-ethylhexyl)phthalate	1.420	1E-06	5000	1	0.01	45	30	70	25550	5.4E-08	2.8E-02	1.5E-09	0%	10950	1.3E-07	1.0E-02	1.3E-05	0%
Benzo(a)pyrene	1.470	1E-06	5000	1	0.01	45	30	70	25550	5.5E-08	1.5E+01	8.1E-07	43%	10950	1.3E-07	0.0E+00	0.0E+00	0%
4,4'-DDE	8.900	1E-06	5000	1	0.01	45	30	70	25550	3.4E-07	6.8E-01	2.3E-07	12%	10950	7.8E-07	0.0E+00	0.0E+00	0%
Endrin	0.016	1E-06	5000	1	0.01	45	30	70	25550	6.0E-10	0.0E+00	0.0E+00	0%	10950	1.4E-09	1.5E-04	9.4E-06	0%
4,4'-DDD	37.000	1E-06	5000	1	0.01	45	30	70	25550	1.4E-06	4.8E-01	6.7E-07	35%	10950	3.3E-06	0.0E+00	0.0E+00	0%
4,4'-DDT	0.131	1E-06	5000	1	0.01	45	30	70	25550	4.9E-09	6.8E-01	3.4E-09	0%	10950	1.2E-08	2.5E-04	4.6E-05	1%
alpha-Chlordane	0.048	1E-06	5000	1	0.01	45	30	70	25550	1.8E-09	2.6E+00	4.8E-09	0%	10950	4.3E-09	3.0E-05	1.4E-04	2%
gamma-Chlordane	0.074	1E-06	5000	1	0.01	45	30	70	25550	2.8E-09	2.6E+00	7.3E-09	0%	10950	6.5E-09	3.0E-05	2.2E-04	3%
Aluminum	16400.000	1E-06	5000	1	0.001	45	30	70	25550	6.2E-05	0.0E+00	0.0E+00	0%	10950	1.4E-04	2.0E-01	7.2E-04	11%
Arsenic	5.700	1E-06	5000	1	0.001	45	30	70	25550	2.2E-08	7.5E+00	1.6E-07	9%	10950	5.0E-08	6.0E-05	8.4E-04	13%
Barium	46.100	1E-06	5000	1	0.001	45	30	70	25550	1.7E-07	0.0E+00	0.0E+00	0%	10950	4.1E-07	1.4E-02	2.9E-05	0%
Beryllium	0.100	1E-06	5000	1	0.001	45	30	70	25550	3.8E-10	2.1E+01	8.1E-09	0%	10950	8.8E-10	1.0E-03	8.8E-07	0%
Cadmium (soil)	3.940	1E-06	5000	1	0.001	45	30	70	25550	1.5E-08	0.0E+00	0.0E+00	0%	10950	3.5E-08	2.0E-04	1.7E-04	3%
Chromium	25.480	1E-06	5000	1	0.001	45	30	70	25550	9.6E-08	0.0E+00	0.0E+00	0%	10950	2.2E-07	1.0E-03	2.2E-04	3%
Cobalt	3.100	1E-06	5000	1	0.001	45	30	70	25550	1.2E-08	0.0E+00	0.0E+00	0%	10950	2.7E-08	1.2E-02	2.3E-06	0%
Copper	53.000	1E-06	5000	1	0.001	45	30	70	25550	2.0E-07	0.0E+00	0.0E+00	0%	10950	4.7E-07	8.0E-03	5.8E-05	1%
Iron	23800.000	1E-06	5000	1	0.001	45	30	70	25550	9.0E-05	0.0E+00	0.0E+00	0%	10950	2.1E-04	6.0E-02	3.5E-03	53%
Lead	206.000	1E-06	5000	1	0.001	45	30	70	25550	7.8E-07	0.0E+00	0.0E+00	0%	10950	1.8E-06	0.0E+00	0.0E+00	0%
Manganese (soil)	78.500	1E-06	5000	1	0.001	45	30	70	25550	3.0E-07	0.0E+00	0.0E+00	0%	10950	6.9E-07	2.8E-02	2.5E-05	0%
Mercury	0.570	1E-06	5000	1	0.001	45	30	70	25550	2.2E-09	0.0E+00	0.0E+00	0%	10950	5.0E-09	6.0E-05	8.4E-05	1%
Nickel	15.500	1E-06	5000	1	0.001	45	30	70	25550	5.8E-08	0.0E+00	0.0E+00	0%	10950	1.4E-07	4.0E-03	3.4E-05	1%
Selenium	2.600	1E-06	5000	1	0.001	45	30	70	25550	9.8E-09	0.0E+00	0.0E+00	0%	10950	2.3E-08	1.0E-03	2.3E-05	0%
Silver	2.630	1E-06	5000	1	0.001	45	30	70	25550	9.9E-09	0.0E+00	0.0E+00	0%	10950	2.3E-08	1.0E-03	2.3E-05	0%
Vanadium	63.900	1E-06	5000	1	0.001	45	30	70	25550	2.4E-07	0.0E+00	0.0E+00	0%	10950	5.6E-07	1.4E-03	4.0E-04	6%
Zinc	338.000	1E-06	5000	1	0.001	45	30	70	25550	1.3E-06	0.0E+00	0.0E+00	0%	10950	3.0E-06	6.0E-02	5.0E-05	1%
TOTAL												1.9E-06					6.8E-03	

SURFACE SOIL DERMAL CONTACT EXPOSURE ASSESSMENT  
 OPERABLE UNIT NO. 6 (SITE 43)  
 REMEDIAL INVESTIGATION CTO-0303  
 MCB CAMP LEJEUNE, NORTH CAROLINA  
 CURRENT ADULT TRESPASSER

Dermal contact with soil is calculated as follows:

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

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

Where:

C = contaminant concentration in soil (mg/kg)	INPUTS
CF = conversion factor (kg/mg)	specific
SA = adult exposed skin surface area (cm <sup>2</sup> )	1E-06
AF = soil to skin adherence factor (mg/cm <sup>2</sup> )	5000
Abs = fraction absorbed (unitless)	1
EF = adult exposure frequency (events/yr)	specific
ED = adult exposure duration (years)	43
BW = adult body weight (kg)	30
ATc = averaging time for carcinogen (yr)	70
ATnc = averaging time for noncarcinogen (yr)	70
DY = day per year (day/yr)	30
CSF = cancer slope factor (mg/kg-day) <sup>-1</sup>	365
RfD = reference dose (mg/kg-day)	specific
	specific

COPC	Concentration (mg/kg)	Conversion Factor (kg/mg)	Surface Area (cm <sup>2</sup> ) Adult	Adherence Factor (mg/cm <sup>2</sup> )	Fraction Absorbed (%)	Exposure Frequency (events/yr) Adult	Exposure Duration (yrs) Adult	Body Weight (kg) Adult	Average Carc Time (days)	Carc Dose (mg/kg/day) Adult	Dermal Adjust. Slope Factor (mg/kg-day) <sup>-1</sup>	Carcinogenic Risk Adult	Percent Carcinogenic Risk Adult	Average Noncarc Time (days)	Noncarc Dose (mg/kg/day) Adult	Dermal Adjust. Reference Dose (mg/kg-day)	Noncarcinogenic Risk Adult	Percent Noncarcinogenic Risk Adult
Benzo(a)anthracene	1.238	1E-06	5000	1	0.01	43	30	70	25550	4.5E-08	1.5E+00	6.5E-08	5%	10950	1.0E-07	0.0E+00	0.0E+00	0%
Benzo(b)fluoranthene	2.285	1E-06	5000	1	0.01	43	30	70	25550	8.2E-08	1.5E+00	1.2E-07	10%	10950	1.9E-07	0.0E+00	0.0E+00	0%
Benzo(k)fluoranthene	0.768	1E-06	5000	1	0.01	43	30	70	25550	2.8E-08	1.5E-01	4.0E-09	0%	10950	6.5E-08	0.0E+00	0.0E+00	0%
Benzo(a)pyrene	1.450	1E-06	5000	1	0.01	43	30	70	25550	5.2E-08	1.5E+01	7.6E-07	62%	10950	1.2E-07	0.0E+00	0.0E+00	0%
Indeno(1,2,3-cd)pyrene	1.250	1E-06	5000	1	0.01	43	30	70	25550	4.5E-08	1.5E+00	6.6E-08	5%	10950	1.1E-07	0.0E+00	0.0E+00	0%
Dibenzo(a,h)anthracene	0.313	1E-06	5000	1	0.01	43	30	70	25550	1.1E-08	1.5E+01	1.7E-07	13%	10950	2.6E-08	0.0E+00	0.0E+00	0%
4,4'-DDD	3.000	1E-06	5000	1	0.01	43	30	70	25550	1.1E-07	4.8E-01	5.2E-08	4%	10950	2.5E-07	0.0E+00	0.0E+00	0%
Aluminum	4488.230	1E-06	5000	1	0.001	43	30	70	25550	1.6E-05	0.0E+00	0.0E+00	0%	10950	3.8E-05	2.0E-01	1.9E-04	18%
Barium	45.460	1E-06	5000	1	0.001	43	30	70	25550	1.6E-07	0.0E+00	0.0E+00	0%	10950	3.8E-07	1.4E-02	2.7E-05	3%
Chromium	23.850	1E-06	5000	1	0.001	43	30	70	25550	8.6E-08	0.0E+00	0.0E+00	0%	10950	2.0E-07	1.0E-03	2.0E-04	20%
Iron	4342.870	1E-06	5000	1	0.001	43	30	70	25550	1.6E-05	0.0E+00	0.0E+00	0%	10950	3.7E-05	6.0E-02	6.1E-04	59%
TOTAL												1.2E-06					1.0E-03	

SEDIMENT DERMAL CONTACT EXPOSURE ASSESSMENT  
 OPERABLE UNIT NO. 6 (SITE 43)  
 REMEDIAL INVESTIGATION CTO-0303  
 MCB CAMP LEJEUNE, NORTH CAROLINA  
 FUTURE RESIDENTIAL ADULT

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

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

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

Where:	INPUTS
C = contaminant concentration in soil (mg/kg)	Specific
CF = conversion factor (kg/mg)	1.00E-06
SA = exposed skin surface area (cm <sup>2</sup> )	5800
AF = sediment to skin adherence factor (mg/cm <sup>2</sup> )	1
Abs = fraction absorbed (unitless) (contaminant specific)	Specific
EF = exposure frequency (events/yr)	45
ED = exposure duration (years)	30
BW = body weight (kg)	70
ATc = averaging time for carcinogen (yr)	70
ATnc = averaging time for noncarcinogen (yr)	30
DY = day per year (day/yr)	365
CSF = cancer slope factor (mg/kg-day) <sup>-1</sup>	Specific
RID = reference dose (mg/kg-day)	Specific

COPC	Concentration (mg/kg)	Conversion Factor (kg/mg)	Surface Area (cm <sup>2</sup> )	Adherence Factor (mg/cm <sup>2</sup> )	ABS Factor (%)	Exposure Frequency (events/yr)	Exposure Duration (yrs)	Body Weight (kg)	Average Carc Time (days)	Carc Dose (mg/kg/day)	Dermal Adjust. Slope Factor (mg/kg-day) <sup>-1</sup>	Carcinogenic Risk	Percent Carcinogenic Risk	Average Noncarc Time (days)	Noncarc Dose (mg/kg/day)	Dermal Adjust. Reference Dose (mg/kg-day)	Noncarcinogenic Risk	Percent Noncarcinogenic Risk
Carbon Disulfide	0.028	1E-06	5800	1	0.01	45	30	70	25550	1.1E-09	0.0E+00	0.0E+00	0%	10950	2.7E-09	8.0E-02	3.3E-08	0%
4-Methylphenol	0.210	1E-06	5800	1	0.01	45	30	70	25550	9.2E-09	0.0E+00	0.0E+00	0%	10950	2.1E-08	2.5E-03	8.6E-06	0%
Pyrene	0.200	1E-06	5800	1	0.01	45	30	70	25550	8.8E-09	0.0E+00	0.0E+00	0%	10950	2.0E-08	1.5E-02	1.4E-06	0%
Bis(2-ethoxy)phthalate	1.420	1E-06	5800	1	0.01	45	30	70	25550	6.2E-08	2.8E-02	1.7E-09	0%	10950	1.5E-07	1.0E-02	1.5E-05	0%
Benzo(a)pyrene	1.470	1E-06	5800	1	0.01	45	30	70	25550	6.4E-08	1.5E+01	9.4E-07	43%	10950	1.5E-07	1.0E+00	0.0E+00	0%
4,4'-DDE	8.800	1E-06	5800	1	0.01	45	30	70	25550	3.9E-07	6.8E-01	2.6E-07	12%	10950	9.1E-07	0.0E+00	0.0E+00	0%
Endrin	0.016	1E-06	5800	1	0.01	45	30	70	25550	7.0E-10	0.0E+00	0.0E+00	0%	10950	1.8E-09	1.5E-04	1.1E-05	0%
4,4'-DDD	37.000	1E-06	5800	1	0.01	45	30	70	25550	1.8E-06	4.8E-01	7.8E-07	35%	10950	3.8E-06	0.0E+00	0.0E+00	0%
4,4'-DDT	0.131	1E-06	5800	1	0.01	45	30	70	25550	5.7E-09	8.8E-01	3.9E-09	0%	10950	1.3E-08	2.5E-04	5.3E-05	1%
alpha-Chlordane	0.048	1E-06	5800	1	0.01	45	30	70	25550	2.1E-09	2.6E+00	5.5E-09	0%	10950	4.9E-09	3.0E-05	1.6E-04	2%
gamma-Chlordane	0.074	1E-06	5800	1	0.01	45	30	70	25550	3.2E-09	2.6E+00	8.4E-09	0%	10950	7.6E-09	3.0E-05	2.5E-04	3%
Aluminum	16400.000	1E-06	5800	1	0.001	45	30	70	25550	7.2E-05	0.0E+00	0.0E+00	0%	10950	1.7E-04	2.0E-01	8.4E-04	11%
Arsenic	5.700	1E-06	5800	1	0.001	45	30	70	25550	2.5E-08	7.5E+00	1.9E-07	9%	10950	5.8E-08	6.0E-05	9.7E-04	13%
Barium	48.100	1E-06	5800	1	0.001	45	30	70	25550	2.0E-07	0.0E+00	0.0E+00	0%	10950	4.7E-07	1.4E-02	3.4E-05	0%
Beryllium	0.100	1E-06	5800	1	0.001	45	30	70	25550	4.4E-10	2.1E+01	9.4E-09	0%	10950	1.0E-09	1.0E-03	1.0E-06	0%
Cadmium (soil)	3.940	1E-06	5800	1	0.001	45	30	70	25550	1.7E-08	0.0E+00	0.0E+00	0%	10950	4.0E-08	2.0E-04	2.0E-04	3%
Chromium	25.480	1E-06	5800	1	0.001	45	30	70	25550	1.1E-07	0.0E+00	0.0E+00	0%	10950	2.6E-07	1.0E-03	2.8E-04	3%
Cobalt	3.100	1E-06	5800	1	0.001	45	30	70	25550	1.4E-08	0.0E+00	0.0E+00	0%	10950	3.2E-08	1.2E-02	2.8E-06	0%
Copper	53.000	1E-06	5800	1	0.001	45	30	70	25550	2.3E-07	0.0E+00	0.0E+00	0%	10950	5.4E-07	8.0E-03	6.8E-05	1%
Iron	23800.000	1E-06	5800	1	0.001	45	30	70	25550	1.0E-04	0.0E+00	0.0E+00	0%	10950	2.4E-04	6.0E-02	4.1E-03	53%
Lead	208.000	1E-06	5800	1	0.001	45	30	70	25550	9.0E-07	0.0E+00	0.0E+00	0%	10950	2.1E-06	0.0E+00	0.0E+00	0%
Manganese (soil)	78.500	1E-06	5800	1	0.001	45	30	70	25550	3.4E-07	0.0E+00	0.0E+00	0%	10950	8.0E-07	2.8E-02	2.9E-05	0%
Mercury	0.570	1E-06	5800	1	0.001	45	30	70	25550	2.5E-09	0.0E+00	0.0E+00	0%	10950	5.8E-09	6.0E-05	9.7E-05	1%
Nickel	15.500	1E-06	5800	1	0.001	45	30	70	25550	8.8E-08	0.0E+00	0.0E+00	0%	10950	1.6E-07	4.0E-03	4.0E-05	1%
Selenium	2.800	1E-06	5800	1	0.001	45	30	70	25550	1.1E-08	0.0E+00	0.0E+00	0%	10950	2.7E-08	1.0E-03	2.7E-05	0%
Silver	2.830	1E-06	5800	1	0.001	45	30	70	25550	1.2E-08	0.0E+00	0.0E+00	0%	10950	2.7E-08	1.0E-03	2.7E-05	0%
Vanadium	63.900	1E-06	5800	1	0.001	45	30	70	25550	2.8E-07	0.0E+00	0.0E+00	0%	10950	6.5E-07	1.4E-03	4.7E-04	6%
Zinc	338.000	1E-06	5800	1	0.001	45	30	70	25550	1.5E-06	0.0E+00	0.0E+00	0%	10950	3.5E-06	6.0E-02	5.8E-05	1%
TOTAL												2.2E-06					7.7E-03	



SUBSURFACE SOIL DERMAL CONTACT EXPOSURE ASSESSMENT  
 OPERABLE UNIT NO. 6 (SITE 43)  
 REMEDIAL INVESTIGATION CTO-0303  
 MCB CAMP LEJEUNE, NORTH CAROLINA  
 FUTURE CONSTRUCTION WORKER

Dermal contact with soil is calculated as follows:

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

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

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

COPC	Concentration Carcinogen (mg/kg)	Conversion Factor (kg/mg)	Surface Area (cm <sup>2</sup> ) Adult	Adherence Factor (mg/cm <sup>2</sup> )	Fraction Absorbed (%)	Exposure Frequency (events/yr) Adult	Exposure Duration (yrs) Adult	Body Weight (kg) Adult	Average Carc Time (days)	Carc Dose (mg/kg/day) Adult	Dermal Adjust. Slope Factor (mg/kg-day) <sup>-1</sup>	Carcinogenic Risk Adult	Percent Carcinogenic Risk Adult	Average Noncarc Time (days)	Noncarc Dose (mg/kg/day) Adult	Dermally-Adjusted Reference Dose (mg/kg-day)	Noncarcinogenic Risk Adult	Percent Noncarcinogenic Risk Adult
Benzo(a)pyrene	0.237	1E-06	4300	1	0.01	90	1	70	25550	5.1E-10	1.5E+01	7.5E-09	55%	365	3.6E-08	0.0E+00	0.0E+00	0%
Indeno(1,2,3-cd)pyrene	0.262	1E-06	4300	1	0.01	90	1	70	25550	5.7E-10	1.5E+00	8.3E-10	6%	365	4.0E-08	0.0E+00	0.0E+00	0%
Dibenz(a,h)anthracene	0.170	1E-06	4300	1	0.01	90	1	70	25550	3.7E-10	1.5E+01	5.4E-09	39%	365	2.6E-08	0.0E+00	0.0E+00	0%
Iron	2298.370	1E-06	4300	1	0.001	90	1	70	25550	5.0E-07	0.0E+00	0.0E+00	0%	365	3.5E-05	6.0E-02	5.8E-04	100%
<b>TOTAL</b>												<b>1.4E-08</b>					<b>5.8E-04</b>	

**EXAMPLE INHALATION OF PARTICULATES CALCULATIONS  
OPERABLE UNIT NO. 6  
CONTRACT TASK ORDER 0303**

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

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

Where:

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

**Risks:**

Carcinogens = Intake (mg/kg·day) x CSF (mg/kg·day)<sup>-1</sup>

Noncarcinogens = Intake (mg/kg·day)/RfD (mg/kg·day)

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

$$\text{Intake (mg/kg}\cdot\text{day)} = \frac{1.238 \text{ mg/kg} \times 20 \text{ m}^3/\text{day} \times 350 \text{ days/yr} \times 30 \text{ yrs} \times 1/1.3E+09 \text{ m}^3/\text{kg}}{70 \text{ kg} \times 25,550 \text{ days}}$$

$$= 1.1E-10$$

$$\text{Risk} = 1.1E-10 \text{ mg/kg}\cdot\text{day} \times 0.61 \text{ mg/kg}\cdot\text{day}^{-1} = 6.7E-11$$

**Example Noncarcinogen: Barium**

$$\text{Intake (mg/kg}\cdot\text{day)} = \frac{45.46 \text{ mg/kg} \times 20 \text{ m}^3/\text{day} \times 350 \text{ days/yr} \times 30 \text{ yrs} \times 1/1.3E+09 \text{ m}^3/\text{kg}}{70 \text{ kg} \times 10,950 \text{ days}}$$

$$= 9.4E-09$$

$$\text{Risk} = \frac{9.4E-09 \text{ mg/kg}\cdot\text{day}}{1.4E-04 \text{ mg/kg}\cdot\text{day}} = 6.6E-05$$

Re: Site 43 Future Residential Adult



SURFACE SOIL PARTICULATE INHALATION EXPOSURE ASSESSMENT  
 OPERABLE UNIT NO. 6 (SITE 43)  
 REMEDIAL INVESTIGATION CTO-0303  
 MCB CAMP LEJEUNE, NORTH CAROLINA  
 CURRENT MILITARY PERSONNEL

Intake from the inhalation of particulates is calculated as follows:

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

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

Where:	INPUTS
C = contaminant concentration in soil (mg/kg)	Calculated
CSF = carcinogenic slope factor	Specific
RfD = reference dose for noncarcinogen	Specific
IR = Inhalation rate (m3)	30
EF = adult exposure frequency (days)	250
ED = adult exposure duration (years)	4
BW = adult body weight (kg)	70
ATc = averaging time for carcinogen (yr)	70
ATnc = averaging time for noncarcinogen (yr)	4
DY = day per year (day/yr)	365
PEF = particulate emission factor (m3/kg)	1.32E+09

COPC	Concentration Carcinogen (mg/kg)	Particulate Emission Factor (m3/kg)	Exposure Frequency (events/yr)	Inhalation Rate (m3/day)	Exposure Duration (yrs)	Body Weight (kg)	Average Carc Time (days)	Carc Dose (mg/kg/day)	Slope Factor (mg/kg-day) <sup>-1</sup>	Carcinogenic Risk	Percent Contribution to Risk	Average Noncarc Time (days)	Noncarc Dose (mg/kg/day)	Reference Dose (mg/kg-day)	Noncarcinogenic Risk	Percent Noncarcinogenic Risk
Benzo(a)anthracene	1.238	1.3E+09	250	30	4	70	25550	1.8E-11	8.10E-01	9.8E-12	0%	1480	2.8E-10	0.00E+00	0.0E+00	NA
Benzo(b)fluoranthene	2.285	1.3E+09	250	30	4	70	25550	2.9E-11	8.10E-01	1.8E-11	0%	1480	5.1E-10	0.00E+00	0.0E+00	NA
Benzo(k)fluoranthene	0.788	1.3E+09	250	30	4	70	25550	9.8E-12	8.10E-02	8.0E-13	0%	1480	1.7E-10	0.00E+00	0.0E+00	NA
Benzo(a)pyrene	1.450	1.3E+09	250	30	4	70	25550	1.8E-11	8.10E+00	1.1E-10	1%	1480	3.2E-10	0.00E+00	0.0E+00	NA
Indeno(1,2,3-cd)pyrene	1.250	1.3E+09	250	30	4	70	25550	1.8E-11	8.10E-01	9.7E-12	0%	1480	2.8E-10	0.00E+00	0.0E+00	NA
Dibenzo(a,h)anthracene	0.313	1.3E+09	250	30	4	70	25550	4.0E-12	8.10E+00	2.4E-11	0%	1480	7.0E-11	0.00E+00	0.0E+00	NA
4,4'-DDD	3.000	1.3E+09	250	30	4	70	25550	3.8E-11	0.00E+00	0.0E+00	0%	1480	6.7E-10	0.00E+00	0.0E+00	NA
Aluminum	4488.230	1.3E+09	250	30	4	70	25550	5.7E-08	0.00E+00	0.0E+00	0%	1480	1.0E-06	0.00E+00	0.0E+00	NA
Barium	45.460	1.3E+09	250	30	4	70	25550	5.8E-10	0.00E+00	0.0E+00	0%	1480	1.0E-08	1.43E-04	7.1E-05	100%
Chromium	23.850	1.3E+09	250	30	4	70	25550	3.0E-10	4.20E+01	1.3E-08	99%	1480	5.3E-09	0.00E+00	0.0E+00	NA
Iron	4342.870	1.3E+09	250	30	4	70	25550	5.5E-08	0.00E+00	0.0E+00	0%	1480	9.7E-07	0.00E+00	0.0E+00	NA
<b>TOTAL</b>										<b>1.3E-08</b>					<b>7.1E-05</b>	

SURFACE SOIL PARTICULATE INHALATION EXPOSURE ASSESSMENT  
 OPERABLE UNIT NO. 8 (SITE 43)  
 REMEDIAL INVESTIGATION CTO-0303  
 MCB CAMP LEJEUNE, NORTH CAROLINA  
 CURRENT CHILD TRESPASSER

Intake from the inhalation of particulates is calculated as follows:

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

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

Where:	INPUTS
C = contaminant concentration in soil (mg/kg)	Calculated
CSF = carcinogenic slope factor	Specific
RID = reference dose for noncarcinogen	Specific
IR = Inhalation rate (m3)	15
EF = child exposure frequency (days)	130
ED = child exposure duration (years)	6
BW = child body weight (kg)	15
ATc = averaging time for carcinogen (yr)	70
ATnc = averaging time for noncarcinogen (yr)	6
DY = day per year (day/yr)	365
PEF = particulate emission factor (m3/kg)	1.32E+09

COPC	Concentration (mg/kg)	Particulate Emission Factor (m3/kg)	Exposure Frequency (events/yr)	Inhalation Rate (m3/day)	Exposure Duration (yrs)	Body Weight (kg)	Average Carc Time (days)	Carc Dose (mg/kg/day)	Slope Factor (mg/kg-day) <sup>-1</sup>	Carcinogenic Risk	Percent Contribution to Risk	Average Noncarc Time (days)	Noncarc Dose (mg/kg/day)	Reference Dose (mg/kg-day)	Noncarcinogenic Risk	Percent Noncarcinogenic Risk
Benzo(a)anthracene	1.238	1.3E+09	130	15	6	15	25550	2.9E-11	6.1E-01	1.7E-11	0%	2190	3.3E-10	0.0E+00	0.0E+00	0%
Benzo(b)fluoranthene	2.285	1.3E+09	130	15	6	15	25550	5.3E-11	6.1E-01	3.2E-11	0%	2190	6.2E-10	0.0E+00	0.0E+00	0%
Benzo(k)fluoranthene	0.788	1.3E+09	130	15	6	15	25550	1.8E-11	6.1E-02	1.1E-12	0%	2190	2.1E-10	0.0E+00	0.0E+00	0%
Benzo(a)pyrene	1.450	1.3E+09	130	15	6	15	25550	3.4E-11	6.1E+00	2.0E-10	1%	2190	3.9E-10	0.0E+00	0.0E+00	0%
Indeno(1,2,3-cd)pyrene	1.250	1.3E+09	130	15	6	15	25550	2.9E-11	6.1E-01	1.8E-11	0%	2190	3.4E-10	0.0E+00	0.0E+00	0%
Dibenzo(a,h)anthracene	0.313	1.3E+09	130	15	6	15	25550	7.2E-12	6.1E+00	4.4E-11	0%	2190	8.5E-11	0.0E+00	0.0E+00	0%
4,4'-DDD	3.000	1.3E+09	130	15	6	15	25550	6.9E-11	0.0E+00	0.0E+00	0%	2190	8.1E-10	0.0E+00	0.0E+00	0%
Aluminum	4488.230	1.3E+09	130	15	6	15	25550	1.0E-07	0.0E+00	0.0E+00	0%	2190	1.2E-08	0.0E+00	0.0E+00	0%
Barium	45.490	1.3E+09	130	15	6	15	25550	1.1E-09	0.0E+00	0.0E+00	0%	2190	1.2E-08	1.4E-04	8.6E-05	100%
Chromium	23.850	1.3E+09	130	15	6	15	25550	5.5E-10	4.2E+01	2.3E-08	89%	2190	6.4E-09	0.0E+00	0.0E+00	0%
Iron	4342.870	1.3E+09	130	15	6	15	25550	1.0E-07	0.0E+00	0.0E+00	0%	2190	1.2E-06	0.0E+00	0.0E+00	0%
<b>TOTAL</b>										<b>2.3E-08</b>					<b>8.6E-05</b>	

SURFACE SOIL PARTICULATE INHALATION EXPOSURE ASSESSMENT  
 OPERABLE UNIT NO. 6 (SITE 43)  
 REMEDIAL INVESTIGATION CTO-0303  
 MCB CAMP LEJEUNE, NORTH CAROLINA  
 FUTURE RESIDENTIAL CHILD

Intake from the inhalation of particulates is calculated as follows:

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

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

Where:	INPUTS
C = contaminant concentration in soil (mg/kg)	Calculated
CSF = carcinogenic slope factor	Specific
RfD = reference dose for noncarcinogen	Specific
IR = inhalation rate (m3)	15
EF = child exposure frequency (days)	350
ED = child exposure duration (years)	6
BW = child body weight (kg)	15
ATc = averaging time for carcinogen (yr)	70
ATnc = averaging time for noncarcinogen (yr)	6
DY = day per year (day/yr)	365
PEF = particulate emission factor (m3/kg)	1.32E+09

COPC	Concentration (mg/kg)	Particulate Emission Factor (m3/kg)	Exposure Frequency (events/yr)	Inhalation Rate (m3/day)	Exposure Duration (yrs)	Body Weight (kg)	Average Conc Time (days)	Carc Dose (mg/kg/day)	Slope Factor (mg/kg-day)-1	Carcinogenic Risk	Percent Contribution to Risk	Average Noncanc Time (days)	Noncanc Dose (mg/kg/day)	Reference Dose (mg/kg-day)	Noncarcinogenic Risk	Percent Noncarcinogenic Risk
Benzo(a)anthracene	1.238	1.3E+09	350	15	6	15	25550	7.7E-11	6.1E-01	4.7E-11	0%	2190	9.0E-10	0.0E+00	0.0E+00	NA
Benzo(b)fluoranthene	2.285	1.3E+09	350	15	6	15	25550	1.4E-10	6.1E-01	8.7E-11	0%	2190	1.7E-09	0.0E+00	0.0E+00	NA
Benzo(k)fluoranthene	0.788	1.3E+09	350	15	6	15	25550	4.8E-11	6.1E-02	2.9E-12	0%	2190	5.6E-10	0.0E+00	0.0E+00	NA
Benzo(a)pyrene	1.450	1.3E+09	350	15	6	15	25550	9.0E-11	6.1E+00	5.5E-10	1%	2190	1.1E-09	0.0E+00	0.0E+00	NA
Indeno(1,2,3-cd)pyrene	1.250	1.3E+09	350	15	6	15	25550	7.8E-11	6.1E-01	4.7E-11	0%	2190	9.1E-10	0.0E+00	0.0E+00	NA
Dibenzo(a,h)anthracene	0.313	1.3E+09	350	15	6	15	25550	2.0E-11	6.1E+00	1.2E-10	0%	2190	2.3E-10	0.0E+00	0.0E+00	NA
4,4'-DDD	3.000	1.3E+09	350	15	6	15	25550	1.0E-10	0.0E+00	0.0E+00	0%	2190	2.2E-09	0.0E+00	0.0E+00	NA
Aluminum	4488.230	1.3E+09	350	15	6	15	25550	2.8E-07	0.0E+00	0.0E+00	0%	2190	3.3E-06	0.0E+00	0.0E+00	NA
Barium	45.480	1.3E+09	350	15	6	15	25550	2.8E-09	0.0E+00	0.0E+00	0%	2190	3.3E-08	1.4E-04	2.3E-04	100%
Chromium	23.850	1.3E+09	350	15	6	15	25550	1.5E-09	4.2E+01	6.2E-08	99%	2190	1.7E-08	0.0E+00	0.0E+00	NA
Iron	4342.870	1.3E+09	350	15	6	15	25550	2.7E-07	0.0E+00	0.0E+00	0%	2190	3.2E-06	0.0E+00	0.0E+00	NA
TOTAL										6.3E-08					2.3E-04	

SURFACE SOIL PARTICULATE INHALATION EXPOSURE ASSESSMENT  
 OPERABLE UNIT NO. 6 (SITE 43)  
 REMEDIAL INVESTIGATION CTO-0303  
 MCB CAMP LEJEUNE, NORTH CAROLINA  
 CURRENT ADULT TRESPASSER

Intake from the inhalation of particulates is calculated as follows:

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

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

Where:	INPUTS
C = contaminant concentration in soil (mg/kg)	Specific
CSF = carcinogenic slope factor	Specific
RfD = reference dose for noncarcinogen	Specific
IR = inhalation rate (m3)	20
EF = adult exposure frequency (days)	43
ED = adult exposure duration (years)	30
BW = adult body weight (kg)	70
ATc = averaging time for carcinogen (yr)	70
ATnc = averaging time for noncarcinogen (yr)	30
DY = day per year (day/yr)	365
PEF = particulate emission factor (m3/kg)	1.32E+09

COPC	Concentration Carcinogen (mg/kg)	Particulate Emission Factor (m3/kg)	Exposure Frequency (events/yr)	Inhalation Rate (m3/day)	Exposure Duration (yrs)	Body Weight (kg)	Average Carc Time (days)	Carc Dose (mg/kg/day)	Slope Factor (mg/kg-day) <sup>-1</sup>	Carcinogenic Risk	Percent Contribution to Risk	Average Noncarc Time (days)	Noncarc Dose (mg/kg/day)	Reference Dose (mg/kg-day)	Noncarcinogenic Risk	Percent Noncarcinogenic Risk
Benzo(a)anthracene	1.238	1.3E+09	43	20	30	70	25550	1.4E-11	6.1E-01	8.3E-12	0%	10950	3.2E-11	0.0E+00	0.0E+00	NA
Benzo(b)fluoranthene	2.285	1.3E+09	43	20	30	70	25550	2.5E-11	6.1E-01	1.5E-11	0%	10950	5.8E-11	0.0E+00	0.0E+00	NA
Benzo(k)fluoranthene	0.768	1.3E+09	43	20	30	70	25550	8.4E-12	6.1E-02	5.1E-13	0%	10950	2.0E-11	0.0E+00	0.0E+00	NA
Benzo(a)pyrene	1.450	1.3E+09	43	20	30	70	25550	1.6E-11	6.1E+00	9.7E-11	1%	10950	3.7E-11	0.0E+00	0.0E+00	NA
Indeno(1,2,3-cd)pyrene	1.250	1.3E+09	43	20	30	70	25550	1.4E-11	6.1E-01	8.3E-12	0%	10950	3.2E-11	0.0E+00	0.0E+00	NA
Dibenzo(a,h)anthracene	0.313	1.3E+09	43	20	30	70	25550	3.4E-12	6.1E+00	2.1E-11	0%	10950	8.0E-12	0.0E+00	0.0E+00	NA
4,4'-DDD	3.000	1.3E+09	43	20	30	70	25550	3.3E-11	0.0E+00	0.0E+00	0%	10950	7.6E-11	0.0E+00	0.0E+00	NA
Aluminum	4488.230	1.3E+09	43	20	30	70	25550	4.9E-08	0.0E+00	0.0E+00	0%	10950	1.1E-07	0.0E+00	0.0E+00	NA
Barium	45.460	1.3E+09	43	20	30	70	25550	5.0E-10	0.0E+00	0.0E+00	0%	10950	1.2E-09	1.4E-04	8.1E-06	100%
Chromium	23.850	1.3E+09	43	20	30	70	25550	2.6E-10	4.2E+01	1.1E-08	99%	10950	6.1E-10	0.0E+00	0.0E+00	NA
Iron	4342.870	1.3E+09	43	20	30	70	25550	4.7E-08	0.0E+00	0.0E+00	0%	10950	1.1E-07	0.0E+00	0.0E+00	NA
<b>TOTAL</b>										<b>1.1E-08</b>					<b>8.1E-06</b>	

SURFACE SOIL PARTICULATE INHALATION EXPOSURE ASSESSMENT  
 OPERABLE UNIT NO. 6 (SITE 43)  
 REMEDIAL INVESTIGATION CTO-0303  
 MCB CAMP LEJEUNE, NORTH CAROLINA  
 FUTURE RESIDENTIAL ADULT

Intake from the inhalation of particulates is calculated as follows:

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

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

Where:	INPUTS
C = contaminant concentration in soil (mg/kg)	Calculated
CSF = carcinogenic slope factor	Specific
RfD = reference dose for noncarcinogen	Specific
IR = inhalation rate (m3)	70
EF = adult exposure frequency (days)	350
ED = adult exposure duration (years)	30
BW = adult body weight (kg)	70
ATc = averaging time for carcinogen (yr)	70
ATnc = averaging time for noncarcinogen (yr)	30
DY = day per year (day/yr)	365
PEF = particulate emission factor (m3/kg)	1.32E+09

COPC	Concentration (mg/kg)	Particulate Emission Factor (m3/kg)	Exposure Frequency (events/yr)	Inhalation Rate (m3/day)	Exposure Duration (yrs)	Body Weight (kg)	Average Conc Time (days)	Carc Dose (mg/kg/day)	Slope Factor (mg/kg-day) <sup>-1</sup>	Carcinogenic Risk	Percent Contribution to Risk	Average Noncarc Time (days)	Noncarc Dose (mg/kg/day)	Reference Dose (mg/kg-day)	Noncarcinogenic Risk	Percent Noncarcinogenic Risk
Benzo(a)anthracene	1.238	1.3E+09	350	20	30	70	25550	1.1E-10	6.1E-01	6.7E-11	0%	10950	2.6E-10	0.0E+00	0.0E+00	NA
Benzo(b)fluoranthene	2.285	1.3E+09	350	20	30	70	25550	2.0E-10	6.1E-01	1.2E-10	0%	10950	4.7E-10	0.0E+00	0.0E+00	NA
Benzo(k)fluoranthene	0.768	1.3E+09	350	20	30	70	25550	6.8E-11	6.1E-02	4.2E-12	0%	10950	1.6E-10	0.0E+00	0.0E+00	NA
Benzo(a)pyrene	1.450	1.3E+09	350	20	30	70	25550	1.3E-10	6.1E+00	7.9E-10	1%	10950	3.0E-10	0.0E+00	0.0E+00	NA
Indeno(1,2,3-cd)pyrene	1.250	1.3E+09	350	20	30	70	25550	1.1E-10	6.1E-01	6.8E-11	0%	10950	2.6E-10	0.0E+00	0.0E+00	NA
Dibenzo(a,h)anthracene	0.313	1.3E+09	350	20	30	70	25550	2.8E-11	6.1E+00	1.7E-10	0%	10950	6.5E-11	0.0E+00	0.0E+00	NA
1,4-DDD	3.000	1.3E+09	350	20	30	70	25550	2.7E-10	0.0E+00	0.0E+00	0%	10950	6.2E-10	0.0E+00	0.0E+00	NA
Aluminum	4488.230	1.3E+09	350	20	30	70	25550	4.0E-07	0.0E+00	0.0E+00	0%	10950	9.3E-07	0.0E+00	0.0E+00	NA
Barium	45.460	1.3E+09	350	20	30	70	25550	4.0E-09	0.0E+00	0.0E+00	0%	10950	9.4E-09	1.4E-04	6.6E-05	100%
Chromium	23.850	1.3E+09	350	20	30	70	25550	2.1E-09	4.2E+01	8.9E-08	99%	10950	5.0E-09	0.0E+00	0.0E+00	NA
Iron	4342.870	1.3E+09	350	20	30	70	25550	3.9E-07	0.0E+00	0.0E+00	0%	10950	9.0E-07	0.0E+00	0.0E+00	NA
<b>TOTAL</b>										<b>9.0E-08</b>					<b>6.6E-05</b>	

SUBSURFACE SOIL PARTICULATE INHALATION EXPOSURE ASSESSMENT  
 OPERABLE UNIT NO. 6 (SITE 43)  
 REMEDIAL INVESTIGATION CTO-0303  
 MCB CAMP LEJEUNE, NORTH CAROLINA  
 FUTURE CONSTRUCTION WORKER

Inhalation from the inhalation of particulates is calculated as follows:

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

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

Where:	INPUTS
C = contaminant concentration in soil (mg/kg)	Specific
CSF = carcinogenic slope factor	Specific
RfD = reference dose for noncarcinogen	Specific
IR = inhalation rate (m3)	20
EF = adult exposure frequency (days)	90
ED = adult exposure duration (years)	1
BW = adult body weight (kg)	70
ATc = averaging time for carcinogen (yr)	70
ATnc = averaging time for noncarcinogen (yr)	1
DY = day per year (day/yr)	365
PEF = particulate emission factor (m3/kg)	1.32E+09

COPC	Concentration Carcinogen (mg/kg)	Particulate Emission Factor (m3/kg)	Exposure Frequency (events/yr)	Inhalation Rate (m3/day)	Exposure Duration (yrs)	Body Weight (kg)	Average Carc Tim (days)	Carc Dose (mg/kg/day)	Slope Factor (mg/kg-day) <sup>-1</sup>	Carcinogenic Risk	Percent Contribution to Risk	Average Noncarc Time (days)	Noncarc Dose (mg/kg/day)	Reference Dose (mg/kg-day)	Noncarcinogenic Risk	Percent Noncarcinogenic Risk
Benzo(a)pyrene	0.237	1.3E+09	90	20	1	70	25550	1.8E-13	6.1E+00	1.1E-12	55%	365	1.3E-11	0.0E+00	0.0E+00	0%
Indeno(1,2,3-cd)pyrene	0.262	1.3E+09	90	20	1	70	25550	2.0E-13	6.1E-01	1.2E-13	6%	365	1.4E-11	0.0E+00	0.0E+00	0%
Dibenz(a,h)anthracene	0.170	1.3E+09	90	20	1	70	25550	1.3E-13	6.1E+00	7.9E-13	39%	365	9.1E-12	0.0E+00	0.0E+00	0%
Iron	2298.370	1.3E+09	90	20	1	70	25550	1.8E-09	0.0E+00	0.0E+00	0%	365	1.2E-07	0.0E+00	0.0E+00	0%
<b>TOTAL</b>										2.0E-12					0.0E+00	

**EXAMPLE GROUNDWATER INGESTION CALCULATIONS  
OPERABLE UNIT NO. 6  
CONTRACT TASK ORDER 0303**

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

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

Where:

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

**Risks:**

Carcinogens = Intake (mg/kg·day) x CSF (mg/kg·day)<sup>-1</sup>  
 Noncarcinogens = Intake (mg/kg·day)/RfD (mg/kg·day)

**Example Carcinogen: No Carcinogenic COPCs in Groundwater**

**Example Noncarcinogen: Aluminum**

$$Intake (mg/kg \cdot day) = \frac{25.1 \text{ mg/L} \times 2 \text{ L/day} \times 350 \text{ days/yr} \times 30 \text{ yrs}}{70 \text{ kg} \times 10,950 \text{ days}}$$

$$= 6.9E-01$$

$$Risk = \frac{6.9E-01 \text{ mg/kg} \cdot \text{day}}{1.0 \text{ mg/kg} \cdot \text{day}} = 6.9E-01$$

GROUNDWATER INGESTION EXPOSURE ASSESSMENT  
 OPERABLE UNIT NO. 6 (SITE 43)  
 REMEDIAL INVESTIGATION CTO-0303  
 MCB CAMP LEJEUNE, NORTH CAROLINA  
 FUTURE RESIDENTIAL CHILD

Intake from drinking water is calculated as follows:

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

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

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

SHALLOW AND DEEP GROUNDWATER

COPC	Concentration Carcinogen (mg/l)	Ingestion Rate (L/day) Child	Exposure Frequency (day/year) Child	Exposure Duration (year) Child	Body Weight (kg) Child	Average Carc Time (days)	Carc Dose (mg/kg-day) Child	Slope Factor (mg/kg-day) <sup>-1</sup>	Carcinogenic Risk Child	Percent Carcinogenic Risk Child	Average Noncarc Time (days)	Noncarc Dose (mg/kg-day) Child	Reference Dose (mg/kg-day)	Noncarcinogenic Risk Child	Percent Noncarcinogenic Risk Child
Aluminum	25.100	1	350	6	15	25550	1.4E-01	0.0E+00	0.0E+00	0%	2190	1.6E+00	1.0E+00	1.6E+00	16%
Iron	33.800	1	350	6	15	25550	1.9E-01	0.0E+00	0.0E+00	0%	2190	2.2E+00	3.0E-01	7.2E+00	82%
TOTAL									0.0E+00					8.8E+00	



GROUNDWATER INGESTION EXPOSURE ASSESSMENT  
 OPERABLE UNIT NO. 6 (SITE 43)  
 REMEDIAL INVESTIGATION CTO-0303  
 MCB CAMP LEJEUNE, NORTH CAROLINA  
 FUTURE RESIDENTIAL ADULT

Intake from drinking water is calculated as follows:

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

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

Where: INPUTS

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

Shallow and Deep Groundwater

COPC	Concentration (mg/l)	Ingestion Rate (L/day) Adult	Exposure Frequency (day/year) Adult	Exposure Duration (year) Adult	Body Weight (kg) Adult	Average Carc Time (days)	Carc Dose (mg/kg-day) Adult	Slope Factor (mg/kg-day) <sup>-1</sup>	Carcinogenic Risk Adult	Percent Carcinogenic Risk Adult	Average Noncarc Time (days)	Noncarc Dose (mg/kg-day) Adult	Reference Dose (mg/kg-day)	Noncarcinogenic Risk Adult	Percent Noncarcinogenic Risk Adult
Aluminum	25.10	2	350	30	70	25550	2.9E-01	0.0E+00	0.0E+00	0%	10950	6.9E-01	1.0E+00	6.9E-01	18%
Iron	33.80	2	350	30	70	25550	4.0E-01	0.0E+00	0.0E+00	0%	10950	9.3E-01	3.0E-01	3.1E+00	82%
TOTAL									0.0E+00					3.8E+00	

**EXAMPLE DERMAL CONTACT WITH GROUNDWATER CALCULATIONS  
OPERABLE UNIT NO. 6  
CONTRACT TASK ORDER 0303**

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

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

Where:

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

**Risks:**

Carcinogens = Intake (mg/kg·day) x CSF (mg/kg·day)<sup>-1</sup>  
 Noncarcinogens = Intake (mg/kg·day)/RfD (mg/kg·day)

**Example Carcinogen: No Carcinogenic COPCs in Groundwater**

**Example Noncarcinogen: Aluminum**

$$Intake (mg/kg\cdot day) = \frac{25.1 \text{ mg/L} \times 1.0E-03 \text{ L/cm}^3 \times 23,000 \text{ cm}^2/\text{event} \times 1.0E-03 \text{ cm/hr} \times 0.25 \text{ hr/day} \times 350 \text{ days/yr} \times 30 \text{ yrs}}{70 \text{ kg} \times 10,950 \text{ days}}$$

$$= 2.0E-03$$

$$Risk = \frac{2.0E-03 \text{ mg/kg}\cdot\text{day}}{2.0E-01 \text{ mg/kg}\cdot\text{day}} = 9.9E-03$$

GROUNDWATER DERMAL CONTACT EXPOSURE ASSESSMENT  
 OPERABLE UNIT NO. 6 (SITE 43)  
 REMEDIAL INVESTIGATION CTO-0303  
 MCB CAMP LEJEUNE, NORTH CAROLINA  
 FUTURE RESIDENTIAL CHILD

Dermal Contact from groundwater is calculated as follows:

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

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

Where:	INPUTS
CW = contaminant concentration in water (mg/l)	10000
SA = child skin surface available for contact (cm <sup>2</sup> )	Specific
PC = contaminant specific dermal permeability (cm/hr)	0.25
ET = child exposure time (hours/day)	350
EF = child exposure frequency (days/yr)	6
ED = child exposure duration (years)	0.001
CF = volumetric conversion factor for water (1liter/1000 cm <sup>3</sup> )	15
BW = child body weight (kg)	70
ATc = averaging time for carcinogen (yr)	8
ATnc = averaging time for noncarcinogen (yr)	365
DY = days per year (days)	

SHALLOW AND DEEP GROUNDWATER

COPC	Concentration Carcinogen (mg/l)	Surface Area (cm <sup>2</sup> ) Child	Dermal Permeability (cm/hr)	Exposure Time (hours/day) Child	Exposure Frequency (days/yr) Child	Exposure Duration (years) Child	Volumetric Conversion (L/m <sup>3</sup> )	Body Weight (kg) Child	Averaging Carc Time (days)	Carc Dose (mg/kg-day) Child	Dermal Adjust. Slope Factor (mg/kg-day) <sup>-1</sup>	Carcinogenic Risk Child	Percent Carcinogenic Risk Child	Average Noncarc Time (days)	Noncarc Dose (mg/kg-day) Child	Dermal Adjust. Reference Dose (mg/kg-day)	Noncarc Risk Child	Percent Noncarcinogenic Risk Child
Aluminum	25.100	10000	1.00E-03	0.25	350	6	0.001	15	25550	3.4E-04	0.0E+00	0.0E+00	0%	2190	4.0E-03	2.0E-01	2.0E-02	18%
Iron	33.800	10000	1.00E-03	0.25	350	6	0.001	15	25550	4.6E-04	0.0E+00	0.0E+00	0%	2190	5.4E-03	8.0E-02	8.0E-02	82%
<b>TOTAL</b>												0.0E+00					1.1E-01	

GROUNDWATER DERMAL CONTACT EXPOSURE ASSESSMENT  
 OPERABLE UNIT NO. 6 (SITE 43)  
 REMEDIAL INVESTIGATION CTO-0303  
 MCB CAMP LEJEUNE, NORTH CAROLINA  
 FUTURE RESIDENTIAL ADULT

Dermal Contact from groundwater is calculated as follows:

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

Risk = Intake \* CSF or RfD

Where:	INPUTS
CW = contaminant concentration in water (mg/l)	
SA = adult skin surface available for contact (cm <sup>2</sup> )	23000
PC = contaminant specific dermal permeability (cm/hr)	Specific
ET = adult exposure time (hours/day)	0.25
EF = adult exposure frequency (days/yr)	350
ED = adult exposure duration (years)	30
CF = volumetric conversion factor for water (1liter/1000 cm <sup>3</sup> )	0.001
BW = adult body weight (kg)	70
ATc = averaging time for carcinogen (yr)	70
ATnc = averaging time for noncarcinogen (yr)	30
DY = days per year (days)	365

Note: Inputs are site and scenario specific

SHALLOW AND DEEP GROUNDWATER

COPC	Concentration Carcinogen (mg/l)	Surface Area (cm <sup>2</sup> ) Adult	Dermal Permeability (cm/hr)	Exposure Time (hours/day) Adult	Exposure Frequency (days/yr) Adult	Exposure Duration (years) Adult	Volumetric Conversion (L/m <sup>3</sup> )	Body Weight (kg) Adult	Averaging Carc Time (years)	Carc Dose (mg/kg-day) Adult	Derm. Adj. Slope Factor (mg/kg-day) <sup>-1</sup>	Carcinogenic Risk Adult	Percent Carcinogenic Risk Adult	Average Noncarc Time (years)	Noncarc Dose (mg/kg-day) Adult	Dermal Adjust. Reference Dose (mg/kg-day)	Noncarc Risk Adult	Percent Noncarcinogenic Risk Adult
Aluminum	25.10	23000	1.00E-03	0.25	350	30	0.001	70	25550	8.5E-04	0.0E+00	0.0E+00	0%	10950	2.0E-03	2.0E-01	9.9E-03	18%
Iron	33.80	23000	1.00E-03	0.25	350	30	0.001	70	25550	1.1E-03	0.0E+00	0.0E+00	0%	10950	2.7E-03	6.0E-02	4.4E-02	82%
TOTAL											0.0E+00	0.0E+00					5.4E-02	

**EXAMPLE SURFACE WATER INGESTION CALCULATIONS  
OPERABLE UNIT NO. 6  
CONTRACT TASK ORDER 0303**

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

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

Where:

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

**Risks:**

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

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

**Example Carcinogen: Arsenic**

$$\begin{aligned} \text{Intake (mg/kgday)} &= \frac{2.0E-03 \text{ mg/L} \times 0.005 \text{ L/day} \times 45 \text{ days/yr} \times 30 \text{ yrs} \times 2.6 \text{ hrs/day}}{70 \text{ kg} \times 25,550 \text{ days}} \\ &= 2.3E-08 \end{aligned}$$

$$\text{Risk} = 2.3E-08 \text{ mg/kg-day} \times 1.5 \text{ mg/kg-day}^{-1} = 3.4E-08$$

**Example Noncarcinogen: Manganese**

$$\begin{aligned} \text{Intake (mg/kgday)} &= \frac{0.056 \text{ mg/L} \times 0.005 \text{ L/day} \times 45 \text{ days/yr} \times 30 \text{ yrs} \times 2.6 \text{ hrs/day}}{70 \text{ kg} \times 10,950 \text{ days}} \\ &= 1.3E-06 \end{aligned}$$

$$\text{Risk} = \frac{1.3E-06 \text{ mg/kgday}}{1.4E-01 \text{ mg/kgday}} = 9.1E-06$$

SURFACE WATER INGESTION EXPOSURE ASSESSMENT  
 OPERABLE UNIT NO. 6 (SITE 43)  
 REMEDIAL INVESTIGATION CTO-0303  
 MCB CAMP LEJEUNE, NORTH CAROLINA  
 CURRENT CHILD TRESPASSER

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

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

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

Where:

Cw = contaminant concentration in surface water (mg/l)	specific	INPUT
CR = contact rate (Liter/hour)		0.005
ET = child exposure time (hours/event)		2.8
EF = child exposure frequency (events/yr)		45
ED = child exposure duration (yrs)		6
BW = child body weight (kg)		15
ATc = averaging time for carcinogen (yr)		70
ATnc = averaging time for noncarcinogen (yr)		6
DY = days per year (days)		365
CSF = cancer slope factor (mg/kg-day) <sup>-1</sup>	specific	
RID = reference dose (mg/kg-day)	specific	

COPC	Concentration (mg/l)	Contact Rate (l/hour)	Exposure Time (hrs/event) Child	Exposure Frequency (events/yr) Child	Exposure Duration (years) Child	Body Weight (kg) Child	Averaging Carc. Time (days)	Carc Dose (mg/kg-day) Child	Cancer Slope Factor (mg/kg-day) <sup>-1</sup>	Carcinogenic Risk Child	Percent Carcinogenic Risk Child	Averaging Time Noncarc (days)	Noncarc Dose (mg/kg-day) Child	Reference Dose (mg/kg-day)	Noncarcinogenic Risk Child	Percent Noncarcinogenic Risk Child
1,2-Dichloroethene (total)	0.0020	0.005	2.8	45	6	15	25550	1.8E-08	0.0E+00	0.0E+00	0%	2190	2.1E-07	9.0E-03	2.4E-05	1%
4,4'-DDE	0.0001	0.005	2.8	45	6	15	25550	8.9E-10	3.4E-01	3.0E-10	1%	2190	1.0E-08	0.0E+00	0.0E+00	0%
4,4'-DDD	0.0006	0.005	2.8	45	6	15	25550	5.9E-09	2.4E-01	1.4E-09	4%	2190	6.8E-08	0.0E+00	0.0E+00	0%
Aluminum	0.7170	0.005	2.8	45	6	15	25550	6.6E-06	0.0E+00	0.0E+00	0%	2190	7.7E-05	1.0E+00	7.7E-05	3%
Arsenic	0.0023	0.005	2.8	45	6	15	25550	2.1E-08	1.5E+00	3.2E-08	95%	2190	2.5E-07	3.0E-04	8.3E-04	32%
Barium	0.0365	0.005	2.8	45	6	15	25550	3.3E-07	0.0E+00	0.0E+00	0%	2190	3.9E-06	7.0E-02	5.6E-05	2%
Copper	0.0032	0.005	2.8	45	6	15	25550	2.9E-08	0.0E+00	0.0E+00	0%	2190	3.4E-07	4.0E-02	8.5E-06	0%
Iron	4.2800	0.005	2.8	45	6	15	25550	3.9E-05	0.0E+00	0.0E+00	0%	2190	4.6E-04	3.0E-01	1.5E-03	58%
Lead	0.0028	0.005	2.8	45	6	15	25550	2.6E-08	0.0E+00	0.0E+00	0%	2190	3.0E-07	0.0E+00	0.0E+00	0%
Manganese (water)	0.0559	0.005	2.8	45	6	15	25550	5.1E-07	0.0E+00	0.0E+00	0%	2190	6.0E-06	1.4E-01	4.3E-05	2%
Vanadium	0.0034	0.005	2.8	45	6	15	25550	3.1E-08	0.0E+00	0.0E+00	0%	2190	3.6E-07	7.0E-03	5.2E-05	2%
TOTAL										3.4E-08					2.6E-03	

SURFACE WATER INGESTION EXPOSURE ASSESSMENT  
 OPERABLE UNIT NO.8 (SITE 43)  
 REMEDIAL INVESTIGATION CTO-0303  
 MCB CAMP LEJEUNE, NORTH CAROLINA  
 FUTURE CHILD RESIDENT

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

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

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

Where: INPUT  
 C<sub>w</sub> = contaminant concentration in surface water (mg/l) 0.005  
 CR = contact rate (Liter/hour) 2.8  
 ET = child exposure time (hours/event) 45  
 EF = child exposure frequency (events/yr) 8  
 ED = child exposure duration (yrs) 15  
 BW = child body weight (kg) 70  
 ATc = averaging time for carcinogen (yr) 8  
 ATnc = averaging time for noncarcinogen (yr) 365  
 DY = days per year (days) specific  
 CSF = cancer slope factor (mg/kg-day)<sup>-1</sup> specific  
 RID = reference dose (mg/kg-day)

COPC	Concentration Carcinogen (mg/l)	Contact Rate (hour)	Exposure Time (hrs/event) Child	Exposure Frequency (events/yr) Child	Exposure Duration (years) Child	Body Weight (kg) Child	Averaging Carc. Time (days)	Carc Dose (mg/kg-day) Child	Cancer Slope Factor (mg/kg-day) <sup>-1</sup>	Carcinogenic Risk Child	Percent Carcinogenic Risk Child	Averaging Time Noncarc (days)	Noncarc Dose (mg/kg-day) Child	Reference Dose (mg/kg-day)	Noncarcinogenic Risk Child	Percent Noncarcinogenic Risk Child
1,2-Dichloroethene (total)	0.0020	0.005	2.8	45	8	15	25550	1.8E-08	0.0E+00	0.0E+00	0%	2180	2.1E-07	9.0E-03	2.4E-05	1%
4,4'-DDE	0.0001	0.005	2.8	45	8	15	25550	8.9E-10	3.4E-01	3.0E-10	1%	2180	1.0E-08	0.0E+00	0.0E+00	0%
4,4'-DDD	0.0008	0.005	2.8	45	8	15	25550	5.9E-09	2.4E-01	1.4E-09	4%	2180	6.8E-08	0.0E+00	0.0E+00	0%
Aluminum	0.7170	0.005	2.8	45	8	15	25550	6.6E-06	0.0E+00	0.0E+00	0%	2180	7.7E-05	1.0E+00	7.7E-05	3%
Arsenic	0.0023	0.005	2.8	45	8	15	25550	2.1E-08	1.5E+00	3.2E-08	95%	2180	2.5E-07	3.0E-04	8.3E-04	32%
Barium	0.0385	0.005	2.8	45	8	15	25550	3.3E-07	0.0E+00	0.0E+00	0%	2180	3.9E-06	7.0E-02	5.6E-05	2%
Copper	0.0032	0.005	2.8	45	8	15	25550	2.0E-08	0.0E+00	0.0E+00	0%	2180	3.4E-07	4.0E-02	8.5E-06	0%
Iron	4.2800	0.005	2.8	45	8	15	25550	3.9E-05	0.0E+00	0.0E+00	0%	2180	4.6E-04	3.0E-01	1.5E-03	58%
Lead	0.0028	0.005	2.8	45	8	15	25550	2.6E-08	0.0E+00	0.0E+00	0%	2180	3.0E-07	0.0E+00	0.0E+00	0%
Manganese (water)	0.0559	0.005	2.8	45	8	15	25550	5.1E-07	0.0E+00	0.0E+00	0%	2180	6.0E-06	1.4E-01	4.3E-05	2%
Vanadium	0.0034	0.005	2.8	45	8	15	25550	3.1E-08	0.0E+00	0.0E+00	0%	2180	3.6E-07	7.0E-03	5.2E-05	2%
TOTAL										3.4E-08					2.6E-03	

SURFACE WATER INGESTION EXPOSURE ASSESSMENT  
 OPERABLE UNIT NO.6 (SITE 43)  
 REMEDIAL INVESTIGATION CTO-0303  
 MCB CAMP LEJEUNE, NORTH CAROLINA  
 CURRENT ADULT TRESPASSER

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

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

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

Where: INPUT  
 Cw = contaminant concentration in surface water (mg/l)  
 CR = ingestion rate (Liter/hour) 0.005  
 ET = exposure time (hours/event) 2.6  
 EF = exposure frequency (events/yr) 45  
 ED = exposure duration (yrs) 30  
 BW = body weight (kg) 70  
 ATc = averaging time for carcinogen (yr) 70  
 ATnc = averaging time for noncarcinogen (yr) 30  
 DY = days per year (days) 365  
 CSF = cancer slope factor (mg/kg-day)<sup>-1</sup> specific  
 RfD = reference dose (mg/kg-day) specific

COPC	Concentration Carcinogen (mg/l)	Contact Rate (l/hour)	Exposure Time (hrs/event)	Exposure Frequency (events/yr)	Exposure Duration (years)	Body Weight (kg)	Average Carc Time (days)	Carc Dose (mg/kg-day)	Cancer Slope Factor (mg/kg-day) <sup>-1</sup>	Carcinogenic Risk	Percent Carcinogenic Risk	Averaging Time Noncarc. (days)	Noncarc Dose (mg/kg-day)	Reference Dose (mg/kg-day)	Noncarcinogenic Risk	Percent Noncarcinogenic Risk
1,2-Dichloroethene (total)	0.0020	0.005	2.6	45	30	70	25550	2.0E-08	0.0E+00	0.0E+00	0%	10950	4.6E-08	9.0E-03	5.1E-06	1%
4,4'-DDE	0.0001	0.005	2.6	45	30	70	25550	9.5E-10	3.4E-01	3.2E-10	1%	10950	2.2E-09	0.0E+00	0.0E+00	0%
4,4'-DDD	0.0006	0.005	2.6	45	30	70	25550	6.3E-09	2.4E-01	1.5E-09	4%	10950	1.5E-08	0.0E+00	0.0E+00	0%
Aluminum	0.7170	0.005	2.6	45	30	70	25550	7.0E-06	0.0E+00	0.0E+00	0%	10950	1.6E-05	1.0E+00	1.6E-05	3%
Arsenic	0.0023	0.005	2.6	45	30	70	25550	2.3E-08	1.5E+00	3.4E-08	95%	10950	5.3E-08	3.0E-04	1.8E-04	32%
Barium	0.0365	0.005	2.6	45	30	70	25550	3.6E-07	0.0E+00	0.0E+00	0%	10950	8.4E-07	7.0E-02	1.2E-05	2%
Copper	0.0032	0.005	2.6	45	30	70	25550	3.1E-08	0.0E+00	0.0E+00	0%	10950	7.3E-08	4.0E-02	1.8E-06	0%
Iron	4.2800	0.005	2.6	45	30	70	25550	4.2E-05	0.0E+00	0.0E+00	0%	10950	9.8E-05	3.0E-01	3.3E-04	58%
Lead	0.0028	0.005	2.6	45	30	70	25550	2.7E-08	0.0E+00	0.0E+00	0%	10950	6.4E-08	0.0E+00	0.0E+00	0%
Manganese (water)	0.0559	0.005	2.6	45	30	70	25550	5.5E-07	0.0E+00	0.0E+00	0%	10950	1.3E-06	1.4E-01	9.1E-06	2%
Vanadium	0.0034	0.005	2.6	45	30	70	25550	3.3E-08	0.0E+00	0.0E+00	0%	10950	7.8E-08	7.0E-03	1.1E-05	2%
TOTAL										3.6E-08					5.6E-04	



SURFACE WATER DERMAL CONTACT EXPOSURE ASSESSMENT  
 OPERABLE UNIT NO.6 (SITE 43)  
 REMEDIAL INVESTIGATION - CTO-0303  
 MCB CAMP LEJEUNE, NORTH CAROLINA  
 FUTURE ADULT RESIDENT

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

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

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

Where:	INPUTS
CW = contaminant concentration in water (mg/l)	
SA = skin surface available for contact (cm <sup>2</sup> )	5800
PC = contaminant specific dermal permeability (cm)	Specific
ET = exposure time (hours/day)	2.6
EF = exposure frequency (days/yr)	45
ED = exposure duration (years)	30
CF = volumetric conversion factor for water (1liter/	0.001
BW = body weight (kg)	70
ATc = averaging time for carcinogen (yr)	70
ATnc = averaging time for noncarcinogen (yr)	30
DY = days per year (days)	365
CSF = cancer slope factor (mg/kg-day) <sup>-1</sup>	Specific
RfD = reference dose (mg/kg-day)	Specific

COPC	Concentration (mg/l)	Surface Area (cm <sup>2</sup> )	Dermal Permeability (cm/hr)	Exposure Time (hours/day)	Exposure Frequency (days/yr)	Exposure Duration (years)	Volumetric Conversion (L/m <sup>3</sup> )	Body Weight (kg)	Averaging Carc Time (days)	Carc Dose (mg/kg-day)	Dermal Adjust. Slope Factor (mg/kg-day) <sup>-1</sup>	Carcinogenic Risk	Percent Carcinogenic Risk	Average Noncarc Time (days)	Noncarc Dose (mg/kg-day)	Dermal Adjust. Reference Dose (mg/kg-day)	Noncarc Risk	Percent Noncarcinogenic Risk
1,2-Dichloroethene (total)	0.0020	5800	1.0E-02	2.6	45	30	0.001	70	25550	2.3E-07	0.0E+00	0.0E+00	0%	10950	5.3E-07	7.2E-03	7.4E-05	2%
4,4'-DDE	0.0001	5800	2.4E-01	2.6	45	30	0.001	70	25550	2.6E-07	6.8E-01	1.8E-07	13%	10950	6.2E-07	0.0E+00	0.0E+00	0%
4,4'-DDD	0.0006	5800	2.8E-01	2.6	45	30	0.001	70	25550	2.0E-06	4.8E-01	9.8E-07	72%	10950	4.8E-06	0.0E+00	0.0E+00	0%
Aluminum	0.7170	5800	1.0E-03	2.6	45	30	0.001	70	25550	6.2E-06	0.0E+00	0.0E+00	0%	10950	1.9E-05	2.0E-01	9.5E-05	3%
Arsenic	0.0023	5800	1.0E-03	2.6	45	30	0.001	70	25550	2.7E-08	7.5E+00	2.0E-07	15%	10950	6.2E-08	6.0E-05	1.0E-03	31%
Barium	0.0365	5800	1.0E-03	2.6	45	30	0.001	70	25550	4.2E-07	0.0E+00	0.0E+00	0%	10950	9.7E-07	1.4E-02	6.9E-05	2%
Copper	0.0032	5800	1.0E-03	2.6	45	30	0.001	70	25550	3.6E-08	0.0E+00	0.0E+00	0%	10950	6.5E-08	8.0E-03	1.1E-05	0%
Iron	4.2800	5800	1.0E-03	2.6	45	30	0.001	70	25550	4.9E-05	0.0E+00	0.0E+00	0%	10950	1.1E-04	6.0E-02	1.9E-03	58%
Lead	0.0028	5800	4.0E-06	2.6	45	30	0.001	70	25550	1.3E-10	0.0E+00	0.0E+00	0%	10950	3.0E-10	0.0E+00	0.0E+00	0%
Manganese (water)	0.0559	5800	1.0E-03	2.6	45	30	0.001	70	25550	6.4E-07	0.0E+00	0.0E+00	0%	10950	1.5E-06	2.8E-02	5.3E-05	2%
Vanadium	0.0034	5800	1.0E-03	2.6	45	30	0.001	70	25550	3.9E-08	0.0E+00	0.0E+00	0%	10950	9.0E-08	1.4E-03	6.5E-05	2%
TOTAL												1.4E-06					3.3E-03	

**EXAMPLE SURFACE WATER DERMAL CONTACT CALCULATIONS  
OPERABLE UNIT NO. 6  
CONTRACT TASK ORDER 0303**

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

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

Where:

C	=	Contaminant concentration in surface water (mg/L)
SA	=	Skin surface area (cm <sup>2</sup> )
CF	=	Conversion factor (1 L/1,000 cm <sup>3</sup> )
EF	=	Exposure frequency (days/year)
ED	=	Exposure duration (years)
ET	=	Exposure time (hrs/day)
PC	=	Chemical-specific dermal permeability constant (cm/hr)
BW	=	Body weight (kg)
AT <sub>c</sub>	=	Averaging time carcinogen (days)
AT <sub>nc</sub>	=	Averaging time noncarcinogen (days)

**Risks:**

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

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

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

$$\text{Intake (mg/kgday)} = \frac{0.001 \text{ mg/L} \times 5,800 \text{ cm}^2 \times 45 \text{ days/yr} \times 30 \text{ yrs} \times 2.6 \text{ hrs/day} \times 1.0\text{E-}3 \text{ L/cm}^3 \times 0.28 \text{ cm/hr}}{70 \text{ kg} \times 25,550 \text{ days}}$$

$$= 2.0\text{E-}06$$

$$\text{Risk} = 2.0\text{E-}06 \text{ mg/kg·day} \times 0.48 \text{ mg/kg·day}^{-1} = 9.8\text{E-}07$$

**Example Noncarcinogen: Arsenic**

$$\text{Intake (mg/kgday)} = \frac{0.002 \text{ mg/L} \times 5,800 \text{ cm}^2 \times 45 \text{ days/yr} \times 30 \text{ yrs} \times 2.6 \text{ hrs/day} \times 1.0\text{E-}3 \text{ L/cm}^3 \times 1\text{E-}03 \text{ cm/hr}}{70 \text{ kg} \times 10,950 \text{ days}}$$

$$= 6.2\text{E-}08$$

$$\text{Risk} = \frac{6.2\text{E-}08 \text{ mg/kgday}}{6\text{E-}05 \text{ mg/kgday}} = 1.0\text{E-}03$$

SURFACE WATER DERMAL CONTACT EXPOSURE ASSESSMENT  
 OPERABLE UNIT NO. 6 (SITE 43)  
 REMEDIAL INVESTIGATION - CTO-0303  
 MCB CAMP LEJEUNE, NORTH CAROLINA  
 CURRENT CHILD TRESPASSER

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

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

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

Where:	INPUTS
CW = contaminant concentration in water (mg/l)	Specific
SA = child skin surface available for contact (cm <sup>2</sup> )	2000
PC = contaminant specific dermal permeability (cm/hr)	Specific
ET = child exposure time (hours/day)	2.6
EF = child exposure frequency (days/yr)	45
ED = child exposure duration (years)	6
CF = volumetric conversion factor for water (1liter/1000 cm <sup>3</sup> )	0.001
BW = child body weight (kg)	15
AT <sub>c</sub> = averaging time for carcinogen (yr)	70
AT <sub>nc</sub> = averaging time for noncarcinogen (yr)	6
DY = days per year (days)	365
CSF = cancer slope factor (mg/kg-day) <sup>-1</sup>	Specific
RID = reference dose (mg/kg-day)	Specific

COPC	Concentration Carcinogen (mg/l)	Surface Area (cm <sup>2</sup> ) Child	Dermal Permeability (cm/hr)	Exposure Time (hours/day) Child	Exposure Frequency (days/yr) Child	Exposure Duration (years) Child	Volumetric Conversion (L/m <sup>3</sup> )	Body Weight (kg) Child	Averaging Carc Time (days)	Carc Dose (mg/kg-day) Child	Dermal Adjust. Slope Factor (mg/kg-day) <sup>-1</sup>	Carcinogenic Risk Child	Percent Carcinogenic Risk Child	Average Noncarc Time (days)	Noncarc Dose (mg/kg-day) Child	Dermal Adjust. Reference Dose (mg/kg-day)	Noncarc. Risk Child	Percent Noncarcinogenic Risk Child
1,2-Dichloroethene (total)	0.0020	2000	1.0E-02	2.6	45	6	0.01	15	25550	7.3E-07	0.0E+00	0.0E+00	0%	2190	8.5E-08	7.2E-03	1.2E-03	19%
4,4'-DDE	0.0001	2000	2.4E-01	2.6	45	6	0.01	15	25550	8.5E-07	6.8E-01	5.8E-07	0%	2190	9.9E-08	0.0E+00	0.0E+00	0%
4,4'-DDD	0.0006	2000	2.8E-01	2.6	45	6	0.01	15	25550	8.6E-06	4.8E-01	3.2E-06	0%	2190	7.7E-05	0.0E+00	0.0E+00	0%
Aluminum	0.7170	2000	1.0E-03	2.6	45	6	0.001	15	25550	2.6E-06	0.0E+00	0.0E+00	0%	2190	3.1E-05	2.0E-01	1.5E-04	2%
Arsenic	0.0023	2000	1.0E-03	2.6	45	6	0.001	15	25550	8.5E-09	7.5E+00	6.4E-08	0%	2190	1.0E-07	6.0E-05	1.7E-03	26%
Barium	0.0365	2000	1.0E-03	2.6	45	6	0.001	15	25550	1.3E-07	0.0E+00	0.0E+00	0%	2190	1.8E-06	1.4E-02	1.1E-04	2%
Copper	0.0032	2000	1.0E-03	2.6	45	6	0.001	15	25550	1.2E-08	0.0E+00	0.0E+00	0%	2190	1.4E-07	6.0E-03	1.7E-05	0%
Iron	4.2800	2000	1.0E-03	2.6	45	6	0.001	15	25550	1.6E-05	0.0E+00	0.0E+00	0%	2190	1.8E-04	8.0E-02	3.0E-03	48%
Lead	0.0028	2000	4.0E-06	2.6	45	6	0.001	15	25550	4.1E-11	0.0E+00	0.0E+00	0%	2190	4.8E-10	0.0E+00	0.0E+00	0%
Manganese (water)	0.0559	2000	1.0E-03	2.6	45	6	0.001	15	25550	2.0E-07	0.0E+00	0.0E+00	0%	2190	2.4E-06	2.8E-02	8.5E-05	1%
Vanadium	0.0034	2000	1.0E-03	2.6	45	6	0.001	15	25550	1.2E-08	0.0E+00	0.0E+00	0%	2190	1.5E-07	1.4E-03	1.0E-04	2%
<b>TOTAL</b>												<b>3.8E-06</b>					<b>6.4E-03</b>	

SURFACE WATER DERMAL CONTACT EXPOSURE ASSESSMENT  
 OPERABLE UNIT NO. 6 (SITE 43)  
 REMEDIAL INVESTIGATION - CTO-0303  
 MCB CAMP LEJEUNE, NORTH CAROLINA  
 FUTURE CHILD RESIDENT

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

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

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

Where:	INPUTS
CW = contaminant concentration in water (mg/l)	Specific
SA = child skin surface available for contact (cm <sup>2</sup> )	2300
PC = contaminant specific dermal permeability (cm/hr)	Specific
ET = child exposure time (hours/day)	2.8
EF = child exposure frequency (days/yr)	45
ED = child exposure duration (years)	8
CF = volumetric conversion factor for water (1liter/1000 cm <sup>3</sup> )	0.001
BW = child body weight (kg)	15
ATc = averaging time for carcinogen (yr)	70
ATnc = averaging time for noncarcinogen (yr)	8
DY = days per year (days)	365
CSF = cancer slope factor (mg/kg-day) <sup>-1</sup>	Specific
RID = reference dose (mg/kg-day)	Specific

COPC	Concentration Carcinogen (mg/l)	Surface Area (cm <sup>2</sup> ) Child	Dermal Permeability (cm/hr)	Exposure Time (hours/day) Child	Exposure Frequency (days/yr) Child	Exposure Duration (years) Child	Volumetric Conversion (L/m <sup>3</sup> )	Body Weight (kg) Child	Averaging Carc Time (days)	Carc Dose (mg/kg-day) Child	Dermal Adjust. Slope Factor (mg/kg-day) <sup>-1</sup>	Carcinogenic Risk Child	Percent Carcinogenic Risk Child	Average Noncarc Time (days)	Noncarc Dose (mg/kg-day) Child	Dermal Adjust. Reference Dose (mg/kg-day)	Noncarc. Risk Child	Percent Noncarcinogenic Risk Child
1,2-Dichloroethene (total)	0.0020	2300	1.0E-02	2.8	45	8	0.001	15	25550	8.4E-08	0.0E+00	0.0E+00	0%	2190	9.8E-07	7.2E-03	1.4E-04	2%
4,4'-DDE	0.0001	2300	2.4E-01	2.8	45	8	0.001	15	25550	9.8E-08	6.8E-01	6.7E-08	13%	2190	1.1E-06	0.0E+00	0.0E+00	0%
4,4'-DDD	0.0008	2300	2.8E-01	2.8	45	8	0.001	15	25550	7.5E-07	4.8E-01	3.8E-07	72%	2190	8.8E-06	0.0E+00	0.0E+00	0%
Aluminum	0.7170	2300	1.0E-03	2.8	45	8	0.001	15	25550	3.0E-06	0.0E+00	0.0E+00	0%	2190	3.5E-05	2.0E-01	1.8E-04	3%
Arsenic	0.0023	2300	1.0E-03	2.8	45	8	0.001	15	25550	9.8E-09	7.5E+00	7.4E-08	15%	2190	1.1E-07	6.0E-05	1.9E-03	31%
Barium	0.0365	2300	1.0E-03	2.8	45	8	0.001	15	25550	1.5E-07	0.0E+00	0.0E+00	0%	2190	1.8E-06	1.4E-02	1.3E-04	2%
Copper	0.0032	2300	1.0E-03	2.8	45	8	0.001	15	25550	1.3E-08	0.0E+00	0.0E+00	0%	2190	1.6E-07	8.0E-03	2.0E-05	0%
Iron	4.2800	2300	1.0E-03	2.8	45	8	0.001	15	25550	1.8E-05	0.0E+00	0.0E+00	0%	2190	2.1E-04	6.0E-02	3.5E-03	58%
Lead	0.0028	2300	4.0E-06	2.8	45	8	0.001	15	25550	4.7E-11	0.0E+00	0.0E+00	0%	2190	5.5E-10	0.0E+00	0.0E+00	0%
Manganese (water)	0.0559	2300	1.0E-03	2.8	45	8	0.001	15	25550	2.4E-07	0.0E+00	0.0E+00	0%	2190	2.7E-06	2.8E-02	9.8E-05	2%
Vanadium	0.0034	2300	1.0E-03	2.8	45	8	0.001	15	25550	1.4E-08	0.0E+00	0.0E+00	0%	2190	1.7E-07	1.4E-03	1.2E-04	2%
TOTAL												8.0E-07					6.1E-03	

SURFACE WATER DERMAL CONTACT EXPOSURE ASSESSMENT  
 OPERABLE UNIT NO. 6 (SITE 43)  
 REMEDIAL INVESTIGATION - CTO-0303  
 MCB CAMP LEJEUNE, NORTH CAROLINA  
 CURRENT ADULT TRESPASSER

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

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

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

Where:	INPUTS
CW = contaminant concentration in water (mg/l)	
SA = skin surface available for contact (cm <sup>2</sup> )	5000
PC = contaminant specific dermal permeability (cm/hr)	Specific
ET = exposure time (hours/day)	2.8
EF = exposure frequency (days/yr)	45
ED = exposure duration (years)	30
CF = volumetric conversion factor for water (liter/10)	0.001
BW = body weight (kg)	70
ATc = averaging time for carcinogen (yr)	70
ATnc = averaging time for noncarcinogen (yr)	30
DY = days per year (days)	365
CSF = cancer slope factor (mg/kg-day) <sup>-1</sup>	Specific
RID = reference dose (mg/kg-day)	Specific

COPC	Concentration (mg/l)	Surface Area (cm <sup>2</sup> )	Dermal Permeability (cm/hr)	Exposure Time (hours/day)	Exposure Frequency (days/yr)	Exposure Duration (years)	Volumetric Conversion (L/m <sup>3</sup> )	Body Weight (kg)	Averaging Carc Time (days)	Carc Dose (mg/kg-day)	Dermal Adjust. Slope Factor (mg/kg-day) <sup>-1</sup>	Carcinogenic Risk	Percent Carcinogenic Risk	Average Noncarc Time (days)	Noncarc Dose (mg/kg-day)	Dermal Adjust. Reference Dose (mg/kg-day)	Noncarc Risk	Percent Noncarcinogenic Risk
1,2-Dichloroethene (total)	0.0020	5000	1.0E-02	2.8	45	30	0.01	70	25550	2.0E-06	0.0E+00	0.0E+00	0%	10950	4.6E-06	7.2E-03	6.4E-04	19%
4,4'-DDE	0.0001	5000	2.4E-01	2.8	45	30	0.01	70	25550	2.3E-06	6.8E-01	1.6E-06	15%	10950	5.3E-06	0.0E+00	0.0E+00	0%
4,4'-DDD	0.0006	5000	2.8E-01	2.8	45	30	0.01	70	25550	1.8E-05	4.8E-01	8.4E-06	83%	10950	4.1E-05	0.0E+00	0.0E+00	0%
Aluminum	0.7170	5000	1.0E-03	2.8	45	30	0.001	70	25550	7.0E-06	0.0E+00	0.0E+00	0%	10950	1.6E-05	2.0E-01	8.2E-05	2%
Arsenic	0.0023	5000	1.0E-03	2.8	45	30	0.001	70	25550	2.3E-08	7.5E+00	1.7E-07	2%	10950	5.3E-08	6.0E-05	8.9E-04	26%
Barium	0.0385	5000	1.0E-03	2.8	45	30	0.001	70	25550	3.8E-07	0.0E+00	0.0E+00	0%	10950	8.4E-07	1.4E-02	6.0E-05	2%
Copper	0.0032	5000	1.0E-03	2.8	45	30	0.001	70	25550	3.1E-08	0.0E+00	0.0E+00	0%	10950	7.3E-08	8.0E-03	9.2E-06	0%
Iron	4.2800	5000	1.0E-03	2.8	45	30	0.001	70	25550	4.2E-05	0.0E+00	0.0E+00	0%	10950	9.8E-05	6.0E-02	1.6E-03	48%
Lead	0.0028	5000	4.0E-06	2.8	45	30	0.001	70	25550	1.1E-10	0.0E+00	0.0E+00	0%	10950	2.6E-10	0.0E+00	0.0E+00	0%
Manganese (water)	0.0559	5000	1.0E-03	2.8	45	30	0.001	70	25550	5.5E-07	0.0E+00	0.0E+00	0%	10950	1.3E-06	2.8E-02	4.6E-05	1%
Vanadium	0.0034	5000	1.0E-03	2.8	45	30	0.001	70	25550	3.3E-08	0.0E+00	0.0E+00	0%	10950	7.8E-08	1.4E-03	5.6E-05	2%
TOTAL												1.0E-05					3.4E-03	

SURFACE WATER INGESTION EXPOSURE ASSESSMENT  
 OPERABLE UNIT NO.6 (SITE 43)  
 REMEDIAL INVESTIGATION CTO-0303  
 MCB CAMP LEJEUNE, NORTH CAROLINA  
 FUTURE ADULT RESIDENT

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

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

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

Where: INPUT  
 Cw = contaminant concentration in surface water ( specific  
 CR = ingestion rate (Liter/hour) 0.005  
 ET = exposure time (hours/event) 2.6  
 EF = exposure frequency (events/yr) 45  
 ED = exposure duration (yrs) 30  
 BW = body weight (kg) 70  
 ATc = averaging time for carcinogen (yr) 70  
 ATnc = averaging time for noncarcinogen (yr) 30  
 DY = days per year (days) 365  
 CSF = cancer slope factor (mg/kg-day)<sup>-1</sup> specific  
 RfD = reference dose (mg/kg-day) specific

COPC	Concentration Carcinogen (mg/l)	Contact Rate (l/hour)	Exposure Time (hrs/event)	Exposure Frequency (events/yr)	Exposure Duration (years)	Body Weight (kg)	Average Carc Time (days)	Carc Dose (mg/kg-day)	Cancer Slope Factor (mg/kg-day) <sup>-1</sup>	Carcinogenic Risk	Percent Carcinogenic Risk	Averaging Time Noncarc. (days)	Noncarc Dose (mg/kg-day)	Reference Dose (mg/kg-day)	Noncarcinogenic Risk	Percent Noncarcinogenic Risk
1,2-Dichloroethene (total)	0.0020	0.005	2.6	45	30	70	25550	2.0E-08	0.0E+00	0.0E+00	0%	10950	4.6E-08	9.0E-03	5.1E-06	1%
4,4'-DDE	0.0001	0.005	2.6	45	30	70	25550	9.5E-10	3.4E-01	3.2E-10	1%	10950	2.2E-09	0.0E+00	0.0E+00	0%
4,4'-DDD	0.0006	0.005	2.6	45	30	70	25550	6.3E-09	2.4E-01	1.5E-09	4%	10950	1.5E-08	0.0E+00	0.0E+00	0%
Aluminum	0.7170	0.005	2.6	45	30	70	25550	7.0E-08	0.0E+00	0.0E+00	0%	10950	1.6E-05	1.0E+00	1.6E-05	3%
Arsenic	0.0023	0.005	2.6	45	30	70	25550	2.3E-08	1.5E+00	3.4E-08	95%	10950	5.3E-08	3.0E-04	1.8E-04	32%
Barium	0.0365	0.005	2.6	45	30	70	25550	3.6E-07	0.0E+00	0.0E+00	0%	10950	8.4E-07	7.0E-02	1.2E-05	2%
Copper	0.0032	0.005	2.6	45	30	70	25550	3.1E-08	0.0E+00	0.0E+00	0%	10950	7.3E-08	4.0E-02	1.8E-06	0%
Iron	4.2800	0.005	2.6	45	30	70	25550	4.2E-05	0.0E+00	0.0E+00	0%	10950	9.8E-05	3.0E-04	3.3E-04	50%
Lead	0.0028	0.005	2.6	45	30	70	25550	2.7E-08	0.0E+00	0.0E+00	0%	10950	6.4E-08	0.0E+00	0.0E+00	0%
Manganese (water)	0.0559	0.005	2.6	45	30	70	25550	5.5E-07	0.0E+00	0.0E+00	0%	10950	1.3E-06	1.4E-01	9.1E-06	2%
Vanadium	0.0034	0.005	2.6	45	30	70	25550	3.3E-08	0.0E+00	0.0E+00	0%	10950	7.8E-08	7.0E-03	1.1E-05	2%
<b>TOTAL</b>										<b>3.6E-08</b>					<b>5.6E-04</b>	

## APPENDIX R

### CALCULATION OF PERMEABILITY CONSTANTS

Chemical-specific permeability constants (PCs or  $k_p$ ) were calculated using the following equation. (Reference: USEPA, 1992)

$$\text{Log } k_p = -2.72 + 0.71 \log k_{ow} - 0.0061 \text{ MW}$$

Where,

$k_p$  = permeability constant (cm/hr)

$k_{ow}$  = octanol/water coefficient (unitless)

MW = molecular weight (g/mole)

Parameter	Log $k_{ow}$	MW	$k_p$
acenaphthene	4	154	0.01
2-methylnaphthalene	3.86	142.2	$1.5 \times 10^{-3}$

PARAMETER	[CM/HR]	
	linked here	
	1.50E-03	
1,1-Dichloroethane	0.0126	
1,1-Dichloroethene	0.0015	
1,2,4-Trichlorobenzene	0.1000	
1,2-Dichloroethane	0.0053	
1,2-Dichloroethene (total)	0.0100	
1,2-Dichloropropane	0.0225	
1,3-Dichlorobenzene	0.0573	
1,4-Dichlorobenzene	0.0804	
2,4-Dimethylphenol	0.0150	
2,4-Dinitrotoluene	0.1000	
2-Butanone	0.0060	
2-Chlorophenol	0.0300	
2-Methylnaphthalene	0.1423	
2-Methylphenol	0.0160	
2-methylnaphthalene	0.1423	
4,4'-DDD	0.2800	
4,4'-DDE	0.2400	
4,4'-DDT	0.4300	
4-Methylphenol	0.0180	
Acenaphthene	0.1516	
Acenaphthene	1.50E-03	
Acenaphthylene	1.50E-03	
Acetone	0.0015	
Aldrin	0.0016	
Aluminum	0.0010	
Anthracene	0.0015	
Antimony	0.0010	
Arsenic	0.0010	
Barium	0.0010	
Benzene	0.0210	
Benzo(a)anthracene	0.0079	
Benzo(a)pyrene	0.9000	
Benzo(b)fluoranthene	0.6200	
Benzo(g,h,i)perylene	0.0015	
Benzo(k)fluoranthene	0.6200	
Benzoic acid	0.7120	
Beryllium	0.0010	
Bis(2-chloroethyl)ether	0.0021	
Bis(2-ethylhexyl)phthalate	3.30E-02	
Boron	0.0010	
Cadmium (soil)	0.0010	cadmium chloride
Cadmium (water)	0.0010	cadmium chloride
Carbon disulfide	0.5300	
Chlorobenzene	0.0404	
Chloroform	0.0089	
Chromium	0.0010	
Chrysene	0.6200	
Cis-1,2-Dichloroethene	0.0100	
Cobalt	0.0010	
Copper	0.0010	
Cyanide	0.0010	
Di-n-butylphthalate	2.3E-06	
Dibenz(a,h)anthracene	2.7	
Dibenzofuran	1.5E-03	
Diethyl phthalate	1.1E-05	
Dimethyl phthalate	3.3E-05	



Endosulfan sulfate	1.5E-03	
Endrin	0.0160	
Ethylbenzene	1.2000	
Fluoranthene	0.2970	
Fluorene	1.5E-03	
Heptachlor	0.0094	
Indeno(1,2,3-cd)pyrene	1.9000	
Iron	0.0010	
Isobutyl Alcohol	0.0015	
Kepone	0.0010	
Lead	4.0E-06	lead acetate
Magnesium	0.0010	
Manganese (soil)	0.0010	
Manganese (water)	0.0010	
Mercury	0.0010	
Molybdenum	0.0010	
Methylene Chloride	0.0051	
N-nitroso-di-n-propylamine	0.0028	
N-nitrosodiphenylamine	0.0005	
Naphthalene	0.0690	
Nickel	0.0001	nickel chloride
Pentachlorophenol	0.4900	
Phenanthrene	0.2700	
Phenol	0.0081	
Pyrene	0.0015	
Selenium	0.0010	
Silicon	0.0010	
Strontium	0.0010	
Styrene	0.6500	
Tetrachloroethene	0.0450	
Thallium	0.001	
Tin	0.0010	
Toluene	1.0000	
Total Xylenes	0.0800	
Trichloroethene	0.0160	
Trichlorotrifluoroethane	0.0015	
Vanadium	0.0010	
Vinyl Chloride	0.0073	
Zinc	0.0006	(zinc chloride)
Acenaphthene	0.1516	
beta-BHC	0.0015	
delta-BHC	0.0015	
gamma-BHC (Lindane)	0.0140	
p-Chloro-m-cresol	0.0500	
p-Cresol	0.0100	

#### Calculations

$$\log K_p = -2.72 + 0.71 \log K_w - 0.0061 \text{ MW}$$

	Kp	log Kw	MW (g/mole)
acenaphthene	0.15156537557	4	154
2-methylnaphthalene	0.14229184153	3.86	142.2

**APPENDIX S**  
**FIELD DATA SHEETS**

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SAMPLING STATION CHARACTERIZATION DATA SHEET

Station Number: 43-SHC-SW/SD01 Date: 5/5/95 Time: 12:30  
 Samplers: A.B. Lam Date: 5/5/95 Time: 12:30  
 Water Body: Stoughorn creek State: NC County: Orange

Sample Type: Fish Benthic Macroinvertebrate Sediment Surface Water

SAMPLING EQUIPMENT: Seine Gill Net Ponar Kemmerer Sediment Corer Spoon Other: \_\_\_\_\_

Riparian Zone/Instream Features

Predominant Surrounding Land Use: Forest Urban Industrial Other: \_\_\_\_\_

Shore Vegetation: \_\_\_\_\_

Aquatic Vegetation: None

Estimated Stream Width: 5 ft Est. Stream Depth: .5 ft Riffle: - ft Run: 1006 ft Pool: - ft

Stream Type: Cold Water Warm Water Velocity: TIDAL Channelized: Yes  No

Canopy Cover: Open Partly Open Partly Shaded Shaded

Sediment/Substrate:

Sediment Odors: Normal Sewage Petroleum Chemical Anaerobic Other: \_\_\_\_\_

Sediment Oils: Absent Slight Moderate Profuse HNU

Ponar Grab: Number of Jars Filled with Sediments Replicate: #1: NA Replicate #2: NA Replicate #3: NA

Sediment Description: GRAY BLACK MED TO FINE SAND.

Water:

5/5

Depth	Temp. °C	pH (s.u.)	Dissolved Oxygen (mg/L)	Conductivity (micromhos/cm)	Salinity (ppt)
1'	20.1	6.53	3.61M	788	.3

Water Odors: Normal Sewage Petroleum Chemical Other: \_\_\_\_\_

Water Surface Oils: Slick Sheen None Secchi: NA ft.

Turbidity: Clear Slightly Turbid Turbid Opaque Water Color: Clear

Weather Conditions: \_\_\_\_\_ Tide: In Out

Comments: \_\_\_\_\_

SAMPLING STATION CHARACTERIZATION DATA SHEET

Station Number: 43-SHC-SW/SD02 Date: May 5, 95 (SA) Time: 1140 (SA)  
 Samplers: AJB, PAM Date: May 5, 95 (SD) Time: 1150 (SA)  
 Water Body: Streamhorn Creek State: NC County: Onslow

Sample Type: Fish Benthic Macroinvertebrate Sediment Surface Water

SAMPLING EQUIPMENT: Seine Gill Net Ponar Kemmerer Sediment Core Spoon Other: \_\_\_\_\_

Riparian Zone/Instream Features

Predominant Surrounding Land Use: Forest Urban Industrial Other: \_\_\_\_\_

Shore Vegetation: \_\_\_\_\_

Aquatic Vegetation: None

Estimated Stream Width: 10 ft Est. Stream Depth: 1 ft Riffle: - ft Run: 100 ft Pool: - ft

Stream Type: Cold Water Warm Water Velocity: Tidal Channelized: Yes  No

Canopy Cover: Open Partly Open Partly Shaded Shaded

Sediment/Substrate:

Sediment Odors: Normal Sewage Petroleum Chemical Anaerobic Other: \_\_\_\_\_

Sediment Oils: Absent Slight Moderate Profuse HNu

Ponar Grab: Number of Jars Filled with Sediments Replicate: #1: NA Replicate #2: NA Replicate #3: NA

Sediment Description: Med to Fine sand (gray/black)

Water:

Depth	Temp. °C	pH (s.u.)	Dissolved Oxygen (mg/L)	Conductivity (micromhos/cm)	Salinity (ppt)
<u>-</u>	<u>18.3</u>	<u>6.71</u>	<u>3.7</u>	<u>3750</u>	<u>3</u>

Water Odors: Normal Sewage Petroleum Chemical Other: \_\_\_\_\_

Water Surface Oils: Slick Sheen None Secchi: NA ft.

Turbidity: Clear Slightly Turbid Turbid Opaque Water Color: Clear

Weather Conditions: Sunny ~ 75°F Tide: In Out

Comments: \_\_\_\_\_

**SAMPLING STATION CHARACTERIZATION DATA SHEET**

Station Number: 43-SAC-SA/1003 Date: MO, 83, 95 (SW) Time: 1811 (SW)  
 Samplers: AMD, DM Date: 5/5/95 Time: 0952  
 Water Body: Strawhorn Creek State: NC County: Danlow

Sample Type: Fish Benthic Macroinvertebrate Sediment Surface Water

SAMPLING EQUIPMENT: Seine Gill Net Ponar Kemmerer Sediment Corer Spoon Other: Dr

Riparian Zone/Instream Features

Predominant Surrounding Land Use: Forest Urban Industrial Other: \_\_\_\_\_

Shore Vegetation: \_\_\_\_\_

Aquatic Vegetation: None

Estimated Stream Width: 20 ft Est. Stream Depth: 0.5 ft Riffle: - ft Run: 100% ft Pool: - ft

Stream Type: Cold Water Warm Water Velocity: slow Channelized: Yes - No X

Canopy Cover: Open Partly Open Partly Shaded Shaded

Sediment/Substrate:

Sediment Odors: Normal Sewage Petroleum Chemical STRONG Anaerobic Other: \_\_\_\_\_

Sediment Oils: Absent Slight Moderate Profuse HNu

Ponar Grab: Number of Jars Filled with Sediments Replicate: #1: NA Replicate #2: NA Replicate #3: NA

Sediment Description: BROWN SILTY MUCK, ORGANIC MATERIAL

Water:

Depth	Temp. °C	pH (s.u.)	Dissolved Oxygen (mg/L)	Conductivity (micromhos/cm)	Salinity (ppt)
<u>5/3 surface</u>	<u>18.5</u>	<u>6.78</u>	<u>4.2</u>	<u>6220</u>	<u>4</u>
<u>5/3</u>	<u>19.5</u>	<u>6.96</u>	<u>4.9</u>	<u>6,610</u>	<u>4.8</u>

Water Odors: Normal Sewage Petroleum Chemical Other: \_\_\_\_\_

Water Surface Oils: Slick Sheen None Secchi: NA ft.

Turbidity: Clear Slightly Turbid Turbid Opaque Water Color: NONE

Weather Conditions: Partly cloudy 70°F (5/3) Tide: In Out

Comments: \_\_\_\_\_

**SAMPLING STATION CHARACTERIZATION DATA SHEET**

Station Number: 43-SHC-5045004 Date: May 3, 95 Time: 1000 (ca)  
 Samplers: ADA, MM Date: May 5, 95 Time: 0900 (SD)  
 Water Body: Streamhorn Creek State: NC County: Cash

Sample Type: Fish Benthic Macroinvertebrate Sediment Surface Water  
 SAMPLING EQUIPMENT: Seine Gill Net Ponar Kemmerer Sediment Core Spoon Other: DP

Riparian Zone/Instream Features

Predominant Surrounding Land Use: Forest Urban Industrial Other: \_\_\_\_\_

Shore Vegetation: \_\_\_\_\_

Aquatic Vegetation: None

Estimated Stream Width: 15 ft Est. Stream Depth: 0.5' ft Riffle: - ft Run: 1006 ft Pool: \_\_\_\_\_ ft

Stream Type: Cold Water Warm Water Velocity: None Channelized: Yes    No X

Canopy Cover: Open Partly Open Partly Shaded Shaded

Sediment/Substrate:

Sediment Odors: Normal Sewage Petroleum Chemical Anaerobic Other: \_\_\_\_\_

Sediment Oils: Absent Slight Moderate Profuse HNu

Ponar Grab: Number of Jars Filled with Sediments Replicate: #1: NA Replicate #2: NA Replicate #3: NA

Sediment Description: Brown silty muck; ORGANIC MATERIAL. LEAVES, STICKS.

Water:

Depth	Temp. °C	pH (s.u.)	Dissolved Oxygen (mg/L)	Conductivity (micromhos/cm)	Salinity (ppt)
<u>5/3 surface</u>	<u>20.3</u>	<u>7.82</u>	<u>7.7</u>	<u>10,100</u>	<u>5.8</u>
<u>5/5</u>	<u>20.0</u>	<u>6.83</u>	<u>4.6</u>	<u>10,600</u>	<u>7.0</u>

Water Odors: Normal Sewage Petroleum Chemical Other: \_\_\_\_\_

Water Surface Oils: Slick Sheen None Secchi: NA ft.

Turbidity: Clear Slightly Turbid Turbid Opaque Water Color: None

Weather Conditions: Partly Cloudy - 70°F (5/5) Tide: In Out

Comments: \_\_\_\_\_

SAMPLING STATION CHARACTERIZATION DATA SHEET

Station Number: 43-EC-SW/SD01 Date: May 3, 95 Time: 1845 (sw)  
 Samplers: HA, PA Date: May 5, 95 (SD) Time: 1040 (sw)  
 Water Body: Edwards Creek State: NC County: Onslow

Sample Type: Fish Benthic Macroinvertebrate Sediment Surface Water

SAMPLING EQUIPMENT: Seine Gill Net Ponar-- Kemmerer Sediment Corer Spoon ... Other: \_\_\_\_\_

Riparian Zone/Instream Features

Predominant Surrounding Land Use: Forest Urban Industrial Other: \_\_\_\_\_

Shore Vegetation: \_\_\_\_\_

Aquatic Vegetation: None

Estimated Stream Width: 50' ft Est. Stream Depth: 1.5 ft Riffle: — ft Run: 100% ft Pool: — ft

Stream Type: Cold Water Warm Water Velocity: None None Channelized: Yes — No X

Canopy Cover: Open Partly Open tidal Partly Shaded Shaded

Sediment/Substrate:

Sediment Odors: Normal Sewage Petroleum Chemical Anaerobic Other: \_\_\_\_\_

Sediment Oils: Absent Slight Moderate Profuse HX

Ponar Grab: Number of Jars Filled with Sediments Replicate: #1: NA Replicate #2: NA Replicate #3: NA

Sediment Description: Silty Brown Muck, much organic material / peat

Water:

Depth	Temp. °C	pH (s.u.)	Dissolved Oxygen (mg/L)	Conductivity (micromhos/cm)	Salinity (ppt)
<u>5/3</u> —	<u>19.9</u>	<u>8.19</u>	<u>2.9</u>	<u>9600</u>	<u>4.6</u>
<u>5/5</u> —	<u>22</u>	<u>NA</u>	<u>NA</u>	<u>8100</u>	<u>5.4</u>

Water Odors: Normal Sewage Petroleum- Chemical Other: \_\_\_\_\_

Water Surface Oils: Slick Sheen None Secchi: NA ft.

Turbidity: Clear Slightly Turbid Turbid Opaque Water Color: None

Weather Conditions: Partly Cloudy 70°F (5/3) Tide: In Out

Comments: Delayed & not measured due to large width of creeks & too rocky to walk

**SAMPLING STATION CHARACTERIZATION DATA SHEET**

Station Number: 47-FC-5413002 Date: May 8, 95 Time: 1830 (sa)  
 Samplers: AMB, MM Date: May 5, 95 Time: 1100 (sa)  
 Water Body: Edwards Creek State: NC County: Gaston

Sample Type: Fish Benthic Macroinvertebrate Sediment Surface Water

SAMPLING EQUIPMENT: Seine Gill Net Ponar Kemmerer Sediment Core Spoon Other: Dip

Riparian Zone/Instream Features

Predominant Surrounding Land Use: Forest Urban Industrial Other: \_\_\_\_\_

Shore Vegetation: \_\_\_\_\_

Aquatic Vegetation: NONE

Estimated Stream Width: 35 ft Est. Stream Depth: 4m ft Riffle: — ft Run: 100' ft Pool: — ft

Stream Type: Cold Water Warm Water Velocity: Tidal Channelized: Yes — No X

Canopy Cover: Open Partly Open Partly Shaded Shaded

Sediment/Substrate:

Sediment Odors: Normal Sewage Petroleum Chemical Anaerobic Other: \_\_\_\_\_

Sediment Oils: Absent Slight Moderate Profuse H2S

Ponar Grab: Number of Jars Filled with Sediments Replicate #1: NA Replicate #2: NA Replicate #3: NA

Sediment Description: Brown silty muck - much organic debris

Water:

Depth	Temp. °C	pH (s.u.)	Dissolved Oxygen (mg/L)	Conductivity (micromhos/cm)	Salinity (ppt)
<u>5/3</u> —	<u>21.3</u>	<u>8.67</u>	<u>13.7</u>	<u>9900</u>	<u>4.8</u>
<u>5/5</u> —	<u>22</u>	<u>8.4</u>	<u>14</u>	<u>7500</u>	<u>5.0</u>

Water Odors: Normal Sewage Petroleum Chemical Other: \_\_\_\_\_

Water Surface Oils: Slick Sheen None Secchi: NA ft.

Turbidity: Clear Slightly Turbid Turbid Opaque Water Color: \_\_\_\_\_

Weather Conditions: Partly Cloudy 70% (9/3) Tide: In Out

Comments: \*Not measured because too mucky - small fish - 0.5' at 5:20pm



ECOLOGICAL EVALUATION  
FIELD DATA SHEET - TERRESTRIAL

Project Name: OU no 6, MCB Camp Lejeune, Jacksonville, NC

Location: Site 43 / near St. Dump

Date: 3/21/95, 3/22/95

Sampling Location: open area

Data Collected By: ZS, CMC

Habitat Type: open area

Vegetation: \_\_\_\_\_

Trees:

Dominant Species:

- |                         |           |
|-------------------------|-----------|
| 1. _____                | 6. _____  |
| 2. _____                | 7. _____  |
| 3. <u>none dominant</u> | 8. _____  |
| 4. _____                | 9. _____  |
| 5. _____                | 10. _____ |

Secondary Species:

- |                         |           |
|-------------------------|-----------|
| 1. <u>mulberry -</u>    | 6. _____  |
| 2. <u>Honeylocust -</u> | 7. _____  |
| 3. <u>Loblolly -</u>    | 8. _____  |
| 4. _____                | 9. _____  |
| 5. _____                | 10. _____ |

**Saplings/Shrubs:**

**Dominant Species:**

- |          |           |
|----------|-----------|
| 1. _____ | 6. _____  |
| 2. _____ | 7. _____  |
| 3. _____ | 8. _____  |
| 4. _____ | 9. _____  |
| 5. _____ | 10. _____ |

**Secondary Species:**

- |                          |           |
|--------------------------|-----------|
| 1. <i>Dewberry</i> _____ | 6. _____  |
| 2. _____                 | 7. _____  |
| 3. _____                 | 8. _____  |
| 4. _____                 | 9. _____  |
| 5. _____                 | 10. _____ |

**Woody Vines:**

**Dominant Species:**

- |          |           |
|----------|-----------|
| 1. _____ | 6. _____  |
| 2. _____ | 7. _____  |
| 3. _____ | 8. _____  |
| 4. _____ | 9. _____  |
| 5. _____ | 10. _____ |

**Secondary Species:**

- |                                     |           |
|-------------------------------------|-----------|
| 1. <i>Japanese Honeyuckle</i> _____ | 6. _____  |
| 2. _____                            | 7. _____  |
| 3. _____                            | 8. _____  |
| 4. _____                            | 9. _____  |
| 5. _____                            | 10. _____ |

**Herbs:**

**Dominant Species:**

- 1. \_\_\_\_\_
- 2. \_\_\_\_\_
- 3. \_\_\_\_\_
- 4. \_\_\_\_\_
- 5. \_\_\_\_\_
- 6. \_\_\_\_\_
- 7. \_\_\_\_\_
- 8. \_\_\_\_\_
- 9. \_\_\_\_\_
- 10. \_\_\_\_\_

**Secondary Species:**

- 1. Grasses - drainage ditches
- 2. Eris yena - Eupatorium
- 3. Dog fennel - capillifolium
- 4. White Clover - trifolium repens
- 5. Curly Dock - Rumex crispus
- 6. St. Peterwort - Hypericum <sup>stans</sup>
- 7. \_\_\_\_\_
- 8. \_\_\_\_\_
- 9. \_\_\_\_\_
- 10. \_\_\_\_\_

**Birds:** \_\_\_\_\_

**Time:** \_\_\_\_\_

**Weather Conditions:**

<u>Species</u>	<u>Sex</u>	<u>Feeding</u>	<u>Nesting</u>	<u>Approx. No.</u>
1.	_____	_____	_____	_____
2.	_____	_____	_____	_____
3.	_____	listed in mixed forest	_____	_____
4.	_____	_____	_____	_____
5.	_____	_____	_____	_____
6.	_____	_____	_____	_____
7.	_____	_____	_____	_____
8.	_____	_____	_____	_____
9.	_____	_____	_____	_____

10. \_\_\_\_\_

Mammals: \_\_\_\_\_

Time: \_\_\_\_\_

Weather Conditions:

<u>Species</u>	<u>Observed</u>	<u>Sign</u>	<u>Adult/Juvenile</u>	<u>Sex</u>
1.	_____	_____	_____	_____
2.	_____	_____	_____	_____
3.	_____	_____	_____	_____
4.	_____	_____	_____	_____
5.	_____	_____	_____	_____
6.	_____	_____	_____	_____
7.	_____	_____	_____	_____
8.	_____	_____	_____	_____
9.	_____	_____	_____	_____
10.	_____	_____	_____	_____

*listed w. mixed forest*

Reptiles and Amphibians: \_\_\_\_\_

Time: \_\_\_\_\_

Weather Conditions:

<u>Species</u>	<u>Observed</u>	<u>Sign</u>	<u>Adult/Juvenile</u>	<u>Sex</u>
1.	_____	_____	_____	_____
2.	_____	_____	_____	_____
3.	_____	_____	_____	_____
4.	_____	_____	_____	_____
5.	_____	_____	_____	_____
6.	_____	_____	_____	_____

*listed w. mixed forest*

- 7. \_\_\_\_\_
- 8. \_\_\_\_\_
- 9. \_\_\_\_\_
- 10. \_\_\_\_\_

**Miscellaneous Notes:**

**ECOLOGICAL EVALUATION  
FIELD DATA SHEET - TERRESTRIAL**

Project Name: DD No. 6, MCB Camp Lejeune, Jacksonville, NC

Location: Site 43 Agon St. Dump

Date: 3/21/95, 3/22/95

Sampling Location: Swamp

Data Collected By: YSS, LMC

Habitat Type: Swamp

Vegetation: \_\_\_\_\_

**Trees:**

**Dominant Species:**

- |                         |           |
|-------------------------|-----------|
| 1. _____                | 6. _____  |
| 2. <u>none dominant</u> | 7. _____  |
| 3. _____                | 8. _____  |
| 4. _____                | 9. _____  |
| 5. _____                | 10. _____ |

**Secondary Species:**

- |  |           |
|--|-----------|
| 1. <u>Red Maple - <sup>Acer</sup> rubrum</u>                                     | 6. _____  |
| 2. <u>Sweetgum - <sup>Liquidambar</sup> styraciflua</u>                          | 7. _____  |
| 3. <u>Water Oak - <sup>Quercus</sup> nigra</u>                                   | 8. _____  |
| 4. <u>Swamp <sup>Chestnut</sup> <del>White</del> Oak <sup>Q. michauxii</sup></u> | 9. _____  |
| 5. <u>Sourwood - <sup>Oxydendrum</sup> carolinense</u>                           | 10. _____ |

*trees have buttressed trunks and surface roots*

**Saplings/Shrubs:**

**Dominant Species:**

- |                                      |           |
|--------------------------------------|-----------|
| 1. <u>Red bay - dominant in</u>      | 6. _____  |
| 2. <u>understory in some areas</u>   | 7. _____  |
| 3. <u><i>Persea borbonia</i></u>     | 8. _____  |
| 4. <u>Fetterbush - <i>Lyonia</i></u> | 9. _____  |
| 5. <u>dom. in some areas</u>         | 10. _____ |

**Secondary Species:**

- |  |           |
|--|-----------|
| 1. <u>Myrtle - <i>Myrica cerifera</i></u>        | 6. _____  |
| 2. <u>Juniper - <i>Juniperus virginiana</i></u>  | 7. _____  |
| 3. <u>Dawsonberry - <i>Celastrus lucidus</i></u> | 8. _____  |
| 4. <u><i>Frodosa frondosa</i></u>                | 9. _____  |
| 5. _____   | 10. _____ |

**Woody Vines:**

**Dominant Species:**

- |                        |           |
|------------------------|-----------|
| 1. _____               | 6. _____  |
| 2. _____               | 7. _____  |
| 3. <u>none present</u> | 8. _____  |
| 4. _____               | 9. _____  |
| 5. _____               | 10. _____ |

**Secondary Species:**

- |                        |           |
|------------------------|-----------|
| 1. _____               | 6. _____  |
| 2. _____               | 7. _____  |
| 3. <u>none present</u> | 8. _____  |
| 4. _____               | 9. _____  |
| 5. _____               | 10. _____ |

**Herbs:**

**Dominant Species:**

- |                         |           |
|-------------------------|-----------|
| 1. _____                | 6. _____  |
| 2. <u>none dominant</u> | 7. _____  |
| 3. _____                | 8. _____  |
| 4. _____                | 9. _____  |
| 5. _____                | 10. _____ |

**Secondary Species:**

- |   |   |
|---|---|
| 1. <u>Switch grass - <sup>Arundinaria</sup> meta</u>  | 6. <u>Jack in the Pulpit - <sup>Arisaema</sup> triphyllum</u> |
| 2. <u>Swamp dock - <sup>Rumex</sup> verticillatus</u> | 7. _____  |
| 3. <u>Arrow Arum - <sup>Peltandra</sup> virginica</u> | 8. _____  |
| 4. <u>Cattail - <sup>Typha</sup> latifolia</u>        | 9. _____  |
| 5. _____  | 10. _____   |

**Birds:**

\_\_\_\_\_

**Time:**

\_\_\_\_\_

**Weather Conditions:**

<u>Species</u>	<u>Sex</u>	<u>Feeding</u>	<u>Nesting</u>	<u>Approx. No.</u>
1.	_____	_____	_____	_____
2.	_____	_____	_____	_____
3.	_____	_____	_____	_____
4.	<u>listed w. mixed forest</u>			
5.	_____	_____	_____	_____
6.	_____	_____	_____	_____
7.	_____	_____	_____	_____
8.	_____	_____	_____	_____
9.	_____	_____	_____	_____



10. \_\_\_\_\_

Mammals: \_\_\_\_\_

Time: \_\_\_\_\_

Weather Conditions:

<u>Species</u>	<u>Observed</u>	<u>Sign</u>	<u>Adult/Juvenile</u>	<u>Sex</u>
----------------	-----------------	-------------	-----------------------	------------

1. \_\_\_\_\_

2. \_\_\_\_\_

3. \_\_\_\_\_

4. \_\_\_\_\_

5. \_\_\_\_\_

6. \_\_\_\_\_ *listed w. mixed forest*

7. \_\_\_\_\_

8. \_\_\_\_\_

9. \_\_\_\_\_

10. \_\_\_\_\_

Reptiles and Amphibians: \_\_\_\_\_

Time: \_\_\_\_\_

Weather Conditions:

<u>Species</u>	<u>Observed</u>	<u>Sign</u>	<u>Adult/Juvenile</u>	<u>Sex</u>
----------------	-----------------	-------------	-----------------------	------------

1. \_\_\_\_\_

2. \_\_\_\_\_

3. \_\_\_\_\_ *listed w. mixed forest*

4. \_\_\_\_\_

5. \_\_\_\_\_

6. \_\_\_\_\_

7. \_\_\_\_\_
8. \_\_\_\_\_
9. \_\_\_\_\_
10. \_\_\_\_\_

**Miscellaneous Notes:**

*This swamp grades directly into the marsh  
found along the creek.*

**ECOLOGICAL EVALUATION  
FIELD DATA SHEET - TERRESTRIAL**

Project Name: DD no. 6, MCB Camp Lejeune, Jacksonville, NC

Location: Site 43 Agan St. Dump

Date: 3/21/95, 3/22/95

Sampling Location: mixed forest

Data Collected By: ZSS, CMC

Habitat Type: mixed forest

Vegetation: \_\_\_\_\_

**Trees:**

**Dominant Species:**

- |  |           |
|--|-----------|
| 1. _____                               | 6. _____  |
| 2. <u>Loblolly Pine - Pinus taeda,</u> | 7. _____  |
| 3. <u>dom. in canopy</u>               | 8. _____  |
| 4. _____                               | 9. _____  |
| 5. _____                               | 10. _____ |

**Secondary Species: *Quercus***

- |  |           |
|--|-----------|
| 1. <u>water oak - <i>nigra</i></u>         | 6. _____  |
| 2. <u>sweetgum - <i>liquidambar</i></u>    | 7. _____  |
| 3. <u>tulip poplar - <i>tulipifera</i></u> | 8. _____  |
| 4. <u>sourwood - <i>oxydendrum</i></u>     | 9. _____  |
| 5. <u>honeylocust - <i>gladitsia</i></u>   | 10. _____ |

**Saplings/Shrubs:**

**Dominant Species:**

- |                         |           |
|-------------------------|-----------|
| 1. _____                | 6. _____  |
| 2. <u>none dominant</u> | 7. _____  |
| 3. _____                | 8. _____  |
| 4. _____                | 9. _____  |
| 5. _____                | 10. _____ |

**Secondary Species:**

- |  |  |
|--|--|
| 1. <u>myrtle - Myrica cerifera</u>                   | 6. <u>olive - <sup>Elaeagnus</sup> pungens</u> |
| 2. <u>juniper - <sup>Juniperus</sup> virginianus</u> | 7. _____                                       |
| 3. <u>rosebay - <sup>magnolia</sup> virginiana</u>   | 8. _____                                       |
| 4. <u>redbay - <sup>Persea</sup> borbonica</u>       | 9. _____                                       |
| 5. <u>blueberry - Vaccinium sp.</u>                  | 10. _____                                      |

**Woody Vines:**

**Dominant Species:**

- |          |           |
|----------|-----------|
| 1. _____ | 6. _____  |
| 2. _____ | 7. _____  |
| 3. _____ | 8. _____  |
| 4. _____ | 9. _____  |
| 5. _____ | 10. _____ |

**Secondary Species:**

- |   |           |
|---|-----------|
| 1. <u>green briar - Smilax rotundifolia</u>                   | 6. _____  |
| 2. <u>japanese honeysuckle - <sup>Lonicera japonica</sup></u> | 7. _____  |
| 3. _____  | 8. _____  |
| 4. _____  | 9. _____  |
| 5. _____  | 10. _____ |

**Herbs:**

**Dominant Species:**

- |          |           |
|----------|-----------|
| 1. _____ | 6. _____  |
| 2. _____ | 7. _____  |
| 3. _____ | 8. _____  |
| 4. _____ | 9. _____  |
| 5. _____ | 10. _____ |

**Secondary Species:**

- |   |           |
|---|-----------|
| 1. <u>partridge berry</u> - <sup>mitchella</sup> <u>repens</u>        | 6. _____  |
| 2. <u>spotted wintergreen</u> - <sup>Chimaphila</sup> <u>maculata</u> | 7. _____  |
| 3. <u>ebony spleenwort</u> - <sup>Asplenium</sup> <u>platyneuron</u>  | 8. _____  |
| 4. _____  | 9. _____  |
| 5. _____  | 10. _____ |

**Birds:** \_\_\_\_\_

**Time:** \_\_\_\_\_

**Weather Conditions:**

<u>Species</u>	<u>Sex</u>	<u>Feeding</u>	<u>Nesting</u>	<u>Approx. No.</u>
1. Downy woodpecker - Picoides pubescens				
2. Tufted Titmouse - Parus bicolor				
3. Myrtle Warbler - Dendroica coronata				
4. Carolina wren - Thyrothorus ludovicianus				
5. Carolina chickadee - Parus carolinensis				
6. Yellow Warbler - Dendroica petechia				
7. Grackle - Quiscalus quiscula				
8. _____				
9. _____				

10. \_\_\_\_\_

Mammals: \_\_\_\_\_

Time: \_\_\_\_\_

Weather Conditions:

<u>Species</u>	<u>Observed</u>	<u>Sign</u>	<u>Adult/Juvenile</u>	<u>Sex</u>
1.	white tail deer	- <i>Odocoileus virginianus</i>		tracks, browse
2.	skunk	- <i>Mephitis mephitis</i>		feeding area
3.	squirrel	- <i>Sciurus carolinensis</i>		feeding signs, nest
4.	rabbit	- <i>Sylvilagus floridanus</i>		droppings
5.				
6.				
7.				
8.				
9.				
10.				

Reptiles and Amphibians: \_\_\_\_\_

Time: \_\_\_\_\_

Weather Conditions:

<u>Species</u>	<u>Observed</u>	<u>Sign</u>	<u>Adult/Juvenile</u>	<u>Sex</u>
1.	anole	- <i>Anolis carolinensis</i>		
2.	carpenter frog	- <i>Rana virgatipes</i>		- in swampy areas
3.	green frog	- <i>Rana clamitans</i>		- along drainage ditches
4.				
5.				
6.				

7. \_\_\_\_\_
8. \_\_\_\_\_
9. \_\_\_\_\_
10. \_\_\_\_\_

**Miscellaneous Notes:**

## APPENDIX T WHITE OAK RIVER BASIN REFERENCE STATIONS

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## WHITE OAK RIVER BASIN REFERENCE STATIONS

### *Water Body Description*

Hadnot Creek, Holland Mill Creek (including Cartwheel Branch) and the section of the White Oak River that encompasses Hadnot Creek, Holland Mill Creek, and Webb Creek are classified as SA from their source to the White Oak River. The SA classifies the water body as a tidal saltwater with shellfishing for market purposes and the following uses: primary recreation, aquatic life propagation and survival, fishing, wildlife, and secondary recreation. Webb Creek is classified as C from its source to the White Oak River. The C classifies the water body as a fresh water with the following uses: aquatic life propagation and survival, fishing, wildlife, and secondary recreation. The section of the White Oak River that encompasses these three creeks is designated by the North Carolina Fisheries Rule as Class C - coastal fishing waters (NCMFC, 1993).

### *Biological Sampling*

Biological samples collected at the background stations consisted of fish and benthic macroinvertebrate. The biological samples were collected to obtain population statistics for fish and benthic macroinvertebrates and to obtain fish tissue samples for chemical analysis (Hadnot Creek only). Prior to initiating the sampling event at each station, the following information describing the site was recorded in the field log book:

Average width, depth and velocity of the water body

Description of substrate

Description of "abiotic" characteristics of the reach such as pools, riffles, runs, channel shape, degree of bank erosion, and shade/sun exposure

Description of "biotic" characteristics of the reach including aquatic and riparian vegetation and wetlands

Water quality measurements were collected during the benthic macroinvertebrate sampling, at a minimum, and during collection of some of the fish samples. On-site water quality measurements at these stations consisted of temperature, pH, specific conductance, salinity and dissolved oxygen. These measurements were conducted prior to sample collection. The station locations and sampling procedures for the collection of the fish and benthic macroinvertebrates is discussed later in this appendix.

### Fish and Shellfish

This section discusses collection of the fish and shellfish samples in the reference stations at Webb Creek, Hadnot Creek, and Holland Mill Creek.

A literature review was conducted to determine the fish species that may potentially be exposed to contaminants in the surface water/sediment exposure pathway. This review included compiling information from State and Federal natural resources agencies. In addition, Baker's experience in sampling similar areas formed a basis for a database of expected species for the area.

Sampling variability can prevent the same species of fish from being sampled at each station because either the preferred species was not captured, or adequate numbers of uniform-size individuals were not captured. Therefore, if the preferred species was not successfully collected to satisfy the above requirements, a substitute species was collected that, if possible, exhibiting a similar trophic position in the estuarine ecosystem.

The collected fish species were identified, measured, and counted. The small fish (less than 20 mm) were weighed in groups of 10 or 20 because of their low individual weight; the larger fish were weighed individually. The

proportion of individuals as hybrids and the proportion of individuals with disease, tumors, fin damage, and skeletal anomalies was recorded at each station.

Fish that exhibited signs of being dead for an extended period of time (i.e., brown gills, bloating) were not retained for tissue analysis because of the potential for decomposition and leaching of contaminants from the organs into the edible portions of the fish.

### Webb Creek

This section discusses collection of the fish samples in Webb Creek including the station locations and sampling procedures.

#### *Station Location*

The fish station WC02 was located on Webb Creek approximately 300 feet upstream from the Camp Lejeune railroad crossing. Station WC03 was located in the White Oak River approximately 25 feet downstream from its confluence with Webb Creek. See fish and benthic macroinvertebrate sampling station figure found later in this appendix for approximate sample locations.

#### *Sampling Procedures*

Fish were collected in Webb Creek using gill nets and hoop nets. All fish that were collected were processed for population statistics; no fish at these stations were collected for tissue analysis.

The gill nets were six feet deep by 50 to 100 feet long with a stretch mesh size ranging from two to four inches, and an approximate twine break strength of 29 pounds. The nets were deployed approximately at the locations shown on the figure found later in this appendix. Weights were attached to the nets to secure them on the bottom of the stream and yellow buoys marked with "Baker Environmental" were attached to the tops of the nets. The nets were deployed in the morning or evening, and they were checked for fish within twelve hours after deployment.

The hoop nets were three to four feet in diameter and fourteen to sixteen feet in length. Twenty-five foot wings were attached to the nets to help direct fish into the net. The nets were deployed in the middle of the channel with the wings stretched across the creek in a forty-five degree angle. The end of the net and the wings were secured using 6.5 foot wooden posts. The nets were checked at least once daily, as the fish usually survive when captured in these nets.

### Hadnot Creek

This section discusses collection of the fish samples in Hadnot Creek including the station locations and sampling procedures.

#### *Station Location*

Fish were collected from four stations in Hadnot Creek (HC01, HC02, HC03 and HC04). HC01 was located approximately 100 feet upstream of Rt. 1104. Station HC02 was located approximately 2,500 feet upstream of Rt. 58. Station HC03 was located in the White Oak River approximately 100 feet upstream from its confluence with Hadnot Creek. Finally, station HC04 was located in Hadnot Creek by the road off of the Rt. 1105 crossing. In October, 1993, fish were collected by Baker in Hadnot Creek as part of another investigation (Baker, 1993). Fillet samples of these fish were chemically analyzed and the results are included in this ERA.

#### *Sampling Procedures*

Fish were collected at these stations for population statistics; fish were not collected at these stations for tissue analysis. Fish were collected in Hadnot Creek using hoop nets, gill nets, a haul seine, pole fishing, and the

backpack electroshocker. The same sample collection and sample processing procedures used in Webb Creek were conducted at the Hadnot Creek stations for the gill nets and hoop nets. Pole fishing only was conducted during the October 1993 sampling.

Fish were collected in the furthest upstream stations using electrofishing, conducted with a Smith-Root, Inc., backpack electrofisher powered by a 300-watt portable generator. A DC current was applied utilizing a "rattail" as the cathode and a hand-held electrode as the anode. Blocking seines were placed downstream and upstream of the shocking areas to aid in the collection of the fish. The length of the shocking time per subsection was recorded as seconds of applied current. Stunned fish were collected with one-inch mesh or smaller dip nets handled by members of the field sampling team.

### Holland Mill Creek

This section discusses collection of the fish samples in Holland Mill Creek including the station locations and sampling procedures.

#### *Station Location*

Fish were collected from three stations in Holland Mill Creek (HM01, HM02, and HM03). HM01 was located on Cartwheel Branch just upstream of Rt. 1444. Station HM02 was located at the confluence of Holland Mill Creek and Cartwheel Branch. Station HM03 was located in the White Oak River approximately 50 feet downstream from Holland Mill Creek.

#### *Sampling Procedures*

Fish were collected at these stations for population statistics. Fish were not collected at these stations for tissue analysis. Fish were collected in Holland Mill Creek using hoop nets, gill nets, a haul seine, and the backpack electroshocker. The same sample collection and sample processing procedures used in the Webb Creek and Hadnot Creek stations were conducted at the Holland Mill Creek stations.

### Benthic Macroinvertebrates

This section discusses collection of benthic macroinvertebrate samples in the reference stations at Webb Creek, Hadnot Creek, and Holland Mill Creek.

#### Webb Creek

Benthic macroinvertebrates were collected in Webb Creek using the ponar grab deployed from the boat.

Benthic macroinvertebrates were collected from a boat using a standard ponar grab. The dimensions of the ponar are 23 x 23 cm (9 x 9 in.) for a sampling area of 529 cm<sup>2</sup> or 0.0523 m<sup>2</sup> (81 in<sup>2</sup>).

The ponar was deployed from the boat, which was positioned in slightly different locations for each replicate to prevent re-sampling the same area. After retrieving the ponar with a sediment sample, it was opened into a clean tub and the sediments were removed with a teflon spatula. The sediments were transferred to a 0.5 mm sieve that was agitated (by hand) in water to remove the small particles. The remaining contents in the sieve were transferred into 16-ounce plastic sample jars. The jars were filled up to one-half full with sediments, and buffered formalin solution (10 percent by weight) was added to the remainder of the jar to preserve the benthic macroinvertebrates contained in the sediments. A 100 percent cotton paper label, marked in pencil with the sample number, was placed inside the jar. The outside of the jar was labeled with the sample number using a black permanent marker to identify the sample containers.

After all the benthic macroinvertebrate sampling at the New River was completed, the sample jars were transported to RMC Environmental Services, Inc. for sample sorting and taxonomic identification of the benthic

macroinvertebrates.

#### Hadnot Creek

Benthic macroinvertebrates were collected in Hadnot Creek using the ponar grab deployed from the boat. The boat was not used at HC01 or HC04 because the water was too shallow. Benthic macroinvertebrates were collected using the same procedures used for collecting benthic macroinvertebrates in Webb Creek.

#### Holland Mill Creek

Benthic macroinvertebrates were collected in Holland Mill Creek using the ponar grab deployed from the boat. The boat was not used at HM01 because the water was too shallow. The same sample collection and sample processing procedures used in Webb Creek were conducted at the Holland Mill Creek stations.

#### Biological Tissue Sample Results

The analytical parameters included TCL VOCs, TCL SVOCs, TAL metals, and TCL pesticides/PCBs. Background fish fillet tissue were collected from Hadnot Creek and analyzed these results are discussed below.

#### *Hadnot Creek*

Several metals were detected in the Hadnot Creek fillet tissue samples. These metals included aluminum, arsenic, calcium, chromium, copper, magnesium, manganese, mercury, nickel, potassium, sodium and zinc in the fillet samples. The range of detected levels for these chemicals in the fish fillet tissue samples from Hadnot Creek are as follows:

	<u>Minimum (mg/kg)</u>	<u>Maximum (mg/kg)</u>
Aluminum	36.5	36.5
Arsenic	0.34	3.9
Calcium	154	1,170
Chromium	0.21	0.68
Copper	0.18	0.46
Magnesium	254	319
Manganese	0.008	0.38
Mercury	0.05	0.24
Nickel	0.45	0.45
Potassium	3,270	4,040
Sodium	505	1,060
Zinc	3.9	6.5

The maximum detect of manganese was in the southern flounder. The maximum detect of sodium was found in the red drum. Aluminum, calcium, chromium, magnesium, mercury, and potassium were detected at their highest concentrations in the largemouth bass. The maximum detects of arsenic, copper, nickel, and zinc were found in the longnose gar.

Two pesticides were detected in the fillet tissue samples, 4,4'-DDE and alpha-chlordane. 4,4'-DDE was detected twice, both in the longnose gar. Alpha-chlordane was detected once in the largemouth bass. The range of detected concentrations for these constituents were as follows:

	<u>Minimum (ug/kg)</u>	<u>Maximum (ug/kg)</u>
4,4'-DDE	9.7	12.0
alpha-Chlordane	0.17	0.17

Two VOCs and three SVOCs were detected in the fillet tissue samples. Common laboratory contaminants were the primary detections, which included methylene chloride, acetone, di-n-octyl phthalate and bis(2-ethylhexyl)phthalate. Phenol was also detected in the fillet tissue samples. The concentration ranges for these chemicals were the following:

	<u>Minimum (ug/kg)</u>	<u>Maximum (ug/kg)</u>
Methylene chloride	3.0	41.0
Acetone	16	130
di-n-octyl phthalate	61	500
bis(2-ethylhexyl) phthalate	820	17,000
Phenol	460	2,100

### Field Chemistry Results

- Samples from these surface water bodies were collected from the water surface and bottom.

#### *Webb Creek*

At Webb Creek, the salinity at station WC02 ranged from 0 to 7 ppt. Conductivity ranged from 850 to 10,500 micromhos/cm. Dissolved oxygen levels ranged from 4.4 to 9 mg/L. The pH at station WC02 in Webb Creek ranged from 6.85 to 7.48 S.U. in the surface water. The temperature of the water at WC02 ranged from 17.5 to 21 °C.

At WC03, the salinity ranged from 10 to 12.8 ppt. The conductivity ranged from 16,500 to 18,000 micromhos/cm. Dissolved oxygen levels ranged from 8.5 to 10 mg/L. The pH at WC03 in Webb Creek ranged from 7.33 to 7.56 S.U. in the surface water. The temperature of the water at WC03 ranged from 19 to 23 °C.

#### *Hadnot Creek*

In Hadnot Creek, the salinity at station HC01 was 0 ppt. The conductivity was 13.5 micromhos/cm. The dissolved oxygen level was 7.7 mg/L. The pH at HC01 was 6.89 S.U. in the surface water, and the temperature of the Hadnot Creek water was 17 °C.

At station HC02, the salinity ranged from 0 to 16.5 ppt. The conductivity ranged from 720 to 22,800 micromhos/cm. The dissolved oxygen levels ranged from 1 to 7.3 mg/L. The pH at HC02 ranged from 6.7 to 7.2 S.U. in the surface water. The temperature of the water at HC02 ranged from 15.5 to 22 °C.

At station HC03, the salinity ranged from 17 to 17.9 ppt. The conductivity ranged from 25,500 to 26,500 micromhos/cm. The dissolved oxygen level was 12 mg/L. The pH at HC03 ranged from 7.69 to 7.79 S.U. in the surface water. The temperature of the water at HC03 ranged from 17.5 to 17.8 °C.

At station HC04, the salinity was 0 ppt. The conductivity was 65 micromhos/cm, and the dissolved oxygen level was 5.3 mg/L. The pH at HC04 was 6.16 S.U. in the surface water, and the temperature of the water was 17.3 °C.

#### *Holland Mill Creek*

In Holland Mill Creek, the salinity was 0 ppt at station HM01. The conductivity was 140 micromhos/cm, and the dissolved oxygen level was 8.0 mg/L. The pH at station HM01 was 6.9 S.U. in the surface water, and the temperature of the water was 17.5 °C.

At station HM02, the salinity ranged from 1 to 25 ppt. The conductivity ranged from 2,490 to 38,000 micromhos/cm. The dissolved oxygen levels ranged from 5.0 to 11.8 mg/L. The pH at station HM02 ranged from 6.72 to 7.9 S.U. in the surface water. The temperature of the water at HM02 ranged from 15.2 to 20 °C.

At station HM03, the salinity ranged from 13.5 to 22 ppt. The conductivity ranged from 19,000 to 32,000 micromhos. The dissolved oxygen levels ranged from 3.4 to 10.8 mg/L. The pH at station HM03 ranged from 6.81 to 7.90 S.U. in the surface water. The temperature of the water at HM03 ranged from 17.5 to 17.8 °C.

**Statistical Summary of  
Analytical Results  
(Surface Water)**

## KEY TO STATISTICAL AND ANALYTICAL SUMMARY TABLES

U - Indicated analyte was analyzed for but not detected

J - Indicates an estimated value

UJ - Not detected, quantitation limit may be inaccurate or imprecise

R - Result is rejected and unusable

B - Not detected substantially above the level reported in laboratory or field blanks (organics)

P - There is greater than 25% difference for detected pesticide/PCB concentrations between the two GC columns, the lower of the two values is reported

L - Result is biased low

K - Result is biased high

ND - Analyte not detected

NZ - Analyte not analyzed

mg/L - Milligrams per liter

ug/L - Micrograms per liter

mg/kg - Milligrams per kilogram

ug/kg - Micrograms per kilogram



MARINE CORPS BASE CAMP LEJEUNE  
 STATISTICAL SUMMARY OF ANALYTICAL RESULTS  
 BACKGROUND - HADNOT CREEK  
 SURFACE WATER - METALS

PARAMETER	MINIMUM DETECTED VALUE (ug/L)	MAXIMUM DETECTED VALUE (ug/L)	SAMPLE No. OF MAXIMUM DETECTED VALUE	ARITHMETIC AVERAGE (ug/L)	RME (ug/L)	LOG NORMAL UPPER 95% CONFIDENCE LEVEL (ug/L)	No. OF TIMES DETECTED	No. OF TIMES ANALYZED	FREQUENCY OF DETECTION
Aluminum	692.00	692.00	+ HC-SW04	253.10	488.87	1019.72	1	5	20%
Arsenic	20.00	20.00	+ HC-SW03	5.30	13.35	3190.11	1	5	20%
Barium	9.00	26.00	+ HC-SW03	19.60	25.87	35.22	5	5	100%
Calcium	11600.00	107000.00	+ HC-SW03D	53760.00	92784.90	456379.04	5	5	100%
Chromium	125.00	130.00	+ HC-SW03	54.70	118.12	40374.07	2	5	40%
Iron	291.00	746.00	+ HC-SW01	492.00	666.33	793.41	5	5	100%
Magnesium	954.00	633000.00	+ HC-SW03	258640.80	576299.05	1.50E+16	5	5	100%
Potassium	14500.00	203000.00	+ HC-SW03	84234.00	187308.88	5.24E+12	3	5	60%
Selenium	6.00	6.00	+ HC-SW03	2.00	4.29	38.67	1	5	20%
Sodium	6090.00	2560000.00	+ HC-SW03D	1.01E+06	2.17E+06	4.80E+14	5	5	100%

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+ = THE LOG NORMAL 95% UCL IS GREATER THAN THE MAXIMUM DETECTED VALUE; THEREFORE, THE MAXIMUM VALUE IS USED TO CALCULATE CHRONIC DAILY INTAKE

\*+ = BOTH THE RME AND LOG NORMAL 95% UCL ARE GREATER THAN THE MAXIMUM DETECTED VALUE; THEREFORE, THE MAXIMUM VALUE IS USED TO CALCULATE CHRONIC DAILY INTAKE

RME = REASONABLE MAXIMUM EXPOSURE

NA = NOT APPLICABLE

MARINE CORPS BASE CAMP LEJEUNE  
 STATISTICAL SUMMARY OF ANALYTICAL RESULTS  
 BACKGROUND - HADNOT CREEK  
 SURFACE WATER - PESTICIDES/PCBs

PARAMETER	MINIMUM DETECTED VALUE (ug/L)	MAXIMUM DETECTED VALUE (ug/L)	SAMPLE No. OF MAXIMUM DETECTED VALUE	ARITHMETIC AVERAGE (ug/L)	RME (ug/L)	LOG NORMAL UPPER 95% CONFIDENCE LEVEL (ug/L)	No. OF TIMES DETECTED	No. OF TIMES ANALYZED	FREQUENCY OF DETECTION
NO PESTICIDES/PCBs WERE DETECTED									

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RME = REASONABLE MAXIMUM EXPOSURE

NA = NOT APPLICABLE

MARINE CORPS BASE CAMP LEJEUNE  
 STATISTICAL SUMMARY OF ANALYTICAL RESULTS  
 BACKGROUND - HADNOT CREEK  
 SURFACE WATER - SEMIVOLATILE ORGANIC COMPOUNDS

PARAMETER	MINIMUM DETECTED VALUE (ug/L)	MAXIMUM DETECTED VALUE (ug/L)	SAMPLE No. OF MAXIMUM DETECTED VALUE	ARITHMETIC AVERAGE (ug/L)	RME (ug/L)	LOG NORMAL UPPER 95% CONFIDENCE LEVEL (ug/L)	No. OF TIMES DETECTED	No. OF TIMES ANALYZED	FREQUENCY OF DETECTION
NO SEMIVOLATILE ORGANIC COMPOUNDS WERE DETECTED									

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RME = REASONABLE MAXIMUM EXPOSURE

NA = NOT APPLICABLE

MARINE CORPS BASE CAMP LEJEUNE  
 STATISTICAL SUMMARY OF ANALYTICAL RESULTS  
 BACKGROUND - HADNOT CREEK  
 SURFACE WATER - VOLATILE ORGANIC COMPOUNDS

PARAMETER	MINIMUM DETECTED VALUE (ug/L)	MAXIMUM DETECTED VALUE (ug/L)	SAMPLE No. OF MAXIMUM DETECTED VALUE	ARITHMETIC AVERAGE (ug/L)	RME (ug/L)	LOG NORMAL UPPER 95% CONFIDENCE LEVEL (ug/L)	No. OF TIMES DETECTED	No. OF TIMES ANALYZED	FREQUENCY OF DETECTION
NO VOLATILE ORGANIC COMPOUNDS WERE DETECTED									

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RME = REASONABLE MAXIMUM EXPOSURE

NA = NOT APPLICABLE

MARINE CORPS BASE CAMP LEJEUNE  
 STATISTICAL SUMMARY OF ANALYTICAL RESULTS  
 BACKGROUND - HOLLAND MILL CREEK  
 SURFACE WATER - METALS

PARAMETER	MINIMUM DETECTED VALUE (ug/L)	MAXIMUM DETECTED VALUE (ug/L)	SAMPLE No. OF MAXIMUM DETECTED VALUE	ARITHMETIC AVERAGE (ug/L)	RME (ug/L)	LOG NORMAL UPPER 95% CONFIDENCE LEVEL (ug/L)	No. OF TIMES DETECTED	No. OF TIMES ANALYZED	FREQUENCY OF DETECTION
Aluminum	535.00	535.00	*+ HM-SW02	269.50	657.32	48037.76	1	3	33%
Barium	20.00	49.00	*+ HM-SW01	35.67	60.35	204.30	3	3	100%
Calcium	14100.00	302000.00	*+ HM-SW03	118766.67	387190.45	4.42E+14	3	3	100%
Chromium	36.00	158.00	*+ HM-SW03	66.33	202.69	3.67E+12	2	3	67%
Iron	320.60	559.00	*+ HM-SW02	434.67	636.62	843.56	3	3	100%
Lead	58.10	58.10	*+ HM-SW03	19.95	75.65	1.70E+27	1	3	33%
Magnesium	2830.00	754000.00	*+ HM-SW03	288610.00	973947.76	1.02E+35	3	3	100%
Potassium	41100.00	288000.00	*+ HM-SW03	109978.33	372096.67	1.33E+36	2	3	67%
Selenium	1.50	41.00	*+ HM-SW03	15.00	52.97	8.42E+13	2	3	67%
Silver	37.00	37.00	*+ HM-SW03	16.83	46.42	284713.62	1	3	33%
Sodium	16500.00	6750000.00	*+ HM-SW03	2501833.33	8733985.25	1.96E+44	3	3	100%

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NA = NOT APPLICABLE

MARINE CORPS BASE CAMP LEJEUNE  
 STATISTICAL SUMMARY OF ANALYTICAL RESULTS  
 BACKGROUND - HOLLAND MILL CREEK  
 SURFACE WATER - PESTICIDES/PCBs

PARAMETER	MINIMUM DETECTED VALUE (ug/L)	MAXIMUM DETECTED VALUE (ug/L)	SAMPLE No. OF MAXIMUM DETECTED VALUE	ARITHMETIC AVERAGE (ug/L)	RME (ug/L)	LOG NORMAL UPPER 95% CONFIDENCE LEVEL (ug/L)	No. OF TIMES DETECTED	No. OF TIMES ANALYZED	FREQUENCY OF DETECTION
NO PESTICIDES/PCBs WERE DETECTED									

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RME = REASONABLE MAXIMUM EXPOSURE

NA = NOT APPLICABLE

MARINE CORPS BASE CAMP LEJEUNE  
 STATISTICAL SUMMARY OF ANALYTICAL RESULTS  
 BACKGROUND - HOLLAND MILL CREEK  
 SURFACE WATER - SEMIVOLATILE ORGANIC COMPOUNDS

PARAMETER	MINIMUM DETECTED VALUE (ug/L)	MAXIMUM DETECTED VALUE (ug/L)	SAMPLE No. OF MAXIMUM DETECTED VALUE	ARITHMETIC AVERAGE (ug/L)	RME (ug/L)	LOG NORMAL UPPER 95% CONFIDENCE LEVEL (ug/L)	No. OF TIMES DETECTED	No. OF TIMES ANALYZED	FREQUENCY OF DETECTION
NO SEMIVOLATILE ORGANIC COMPOUNDS WERE DETECTED									

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RME = REASONABLE MAXIMUM EXPOSURE

NA = NOT APPLICABLE

MARINE CORPS BASE CAMP LEJEUNE  
 STATISTICAL SUMMARY OF ANALYTICAL RESULTS  
 BACKGROUND - HOLLAND MILL CREEK  
 SURFACE WATER - VOLATILE ORGANIC COMPOUNDS

PARAMETER	MINIMUM DETECTED VALUE (ug/L)	MAXIMUM DETECTED VALUE (ug/L)	SAMPLE No. OF MAXIMUM DETECTED VALUE	ARITHMETIC AVERAGE (ug/L)	RME (ug/L)	LOG NORMAL UPPER 95% CONFIDENCE LEVEL (ug/L)	No. OF TIMES DETECTED	No. OF TIMES ANALYZED	FREQUENCY OF DETECTION
NO VOLATILE ORGANIC COMPOUNDS WERE DETECTED									

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 RME = REASONABLE MAXIMUM EXPOSURE  
 NA = NOT APPLICABLE



MARINE CORPS BASE CAMP LEJEUNE  
 STATISTICAL SUMMARY OF ANALYTICAL RESULTS  
 BACKGROUND - WEBB CREEK  
 SURFACE WATER - METALS

PARAMETER	MINIMUM DETECTED VALUE (ug/L)	MAXIMUM DETECTED VALUE (ug/L)	SAMPLE No. OF MAXIMUM DETECTED VALUE	ARITHMETIC AVERAGE (ug/L)	RME (ug/L)	LOG NORMAL UPPER 95% CONFIDENCE LEVEL (ug/L)	No. OF TIMES DETECTED	No. OF TIMES ANALYZED	FREQUENCY OF DETECTION
Barium	27.00	29.00	*+ WC-SW02	28.00	34.31	32.19	2	2	100%
Calcium	40500.00	46900.00	*+ WC-SW02	43700.00	63904.80	58284.51	2	2	100%
Chromium	97.00	97.00	*+ WC-SW03	52.25	334.80	1.32E+20	1	2	50%
Iron	321.00	660.00	*+ WC-SW02	490.50	1560.72	14358.69	2	2	100%
Magnesium	29000.00	44800.00	*+ WC-SW03	36900.00	86780.60	133710.58	2	2	100%
Potassium	10900.00	136000.00	*+ WC-SW03	73450.00	468390.70	1.01E+23	2	2	100%
Sodium	202000.00	895000.00	*+ WC-SW03	548500.00	2736301.00	6.83E+11	2	2	100%

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RME = REASONABLE MAXIMUM EXPOSURE

NA = NOT APPLICABLE

MARINE CORPS BASE CAMP LEJEUNE  
 STATISTICAL SUMMARY OF ANALYTICAL RESULTS  
 BACKGROUND - WEBB CREEK  
 SURFACE WATER - PESTICIDES/PCBs

PARAMETER	MINIMUM DETECTED VALUE (ug/L)	MAXIMUM DETECTED VALUE (ug/L)	SAMPLE No. OF MAXIMUM DETECTED VALUE	ARITHMETIC AVERAGE (ug/L)	RME (ug/L)	LOG NORMAL UPPER 95% CONFIDENCE LEVEL (ug/L)	No. OF TIMES DETECTED	No. OF TIMES ANALYZED	FREQUENCY OF DETECTION
Aldrin	0.04	0.04 *+	WC-SW02	0.03	0.06	0.07	1	2	50%

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RME = REASONABLE MAXIMUM EXPOSURE

NA = NOT APPLICABLE

MARINE CORPS BASE CAMP LEJEUNE  
 STATISTICAL SUMMARY OF ANALYTICAL RESULTS  
 BACKGROUND - WEBB CREEK  
 SURFACE WATER - SEMIVOLATILE ORGANIC COMPOUNDS

PARAMETER	MINIMUM DETECTED VALUE (ug/L)	MAXIMUM DETECTED VALUE (ug/L)	SAMPLE No. OF MAXIMUM DETECTED VALUE	ARITHMETIC AVERAGE (ug/L)	RME (ug/L)	LOG NORMAL UPPER 95% CONFIDENCE LEVEL (ug/L)	No. OF TIMES DETECTED	No. OF TIMES ANALYZED	FREQUENCY OF DETECTION
NO SEMIVOLATILE ORGANIC COMPOUNDS WERE DETECTED									

\* = THE RME IS GREATER THAN THE MAXIMUM DETECTED VALUE; THEREFORE, THE MAXIMUM VALUE IS USED TO CALCULATE CHRONIC DAILY INTAKE

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MARINE CORPS BASE CAMP LEJEUNE  
 STATISTICAL SUMMARY OF ANALYTICAL RESULTS  
 BACKGROUND - WEBB CREEK  
 SURFACE WATER - VOLATILE ORGANIC COMPOUNDS

PARAMETER	MINIMUM DETECTED VALUE (ug/L)	MAXIMUM DETECTED VALUE (ug/L)	SAMPLE No. OF MAXIMUM DETECTED VALUE	ARITHMETIC AVERAGE (ug/L)	RME (ug/L)	LOG NORMAL UPPER 95% CONFIDENCE LEVEL (ug/L)	No. OF TIMES DETECTED	No. OF TIMES ANALYZED	FREQUENCY OF DETECTION
NO VOLATILE ORGANIC COMPOUNDS WERE DETECTED									

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RME = REASONABLE MAXIMUM EXPOSURE

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**Statistical Summary of  
Analytical Results  
(Sediment)**

MARINE CORPS BASE CAMP LEJEUNE  
 STATISTICAL SUMMARY OF ANALYTICAL RESULTS  
 BACKGROUND - HADNOT CREEK  
 SEDIMENT - METALS

PARAMETER	MINIMUM DETECTED VALUE (mg/kg)	MAXIMUM DETECTED VALUE (mg/kg)	SAMPLE No. OF MAXIMUM DETECTED VALUE	ARITHMETIC AVERAGE (mg/kg)	RME (mg/kg)	LOG NORMAL UPPER 95% CONFIDENCE LEVEL (mg/kg)	No. OF TIMES DETECTED	No. OF TIMES ANALYZED	FREQUENCY OF DETECTION
Aluminum	780.00	14000.00	+ HC-SD03-612	5467.78	8305.91	20353.32	9	9	100%
Arsenic	0.26	1.90	*+ HC-SD02-612	1.71	2.67	8.56	6	9	67%
Barium	4.10	17.20	+ HC-SD03-612	9.75	13.11	21.84	8	9	89%
Beryllium	0.14	0.32	+ HC-SD02-612	0.16	0.24	4.60	3	6	50%
Cadmium	0.03	0.66	HC-SD03-06	0.11	0.24	0.42	7	9	78%
Calcium	1030.00	3620.00	+ HC-SD01-06	2645.56	3233.82	3840.09	9	9	100%
Chromium	1.30	41.60	+ HC-SD03-612	10.81	18.97	53.55	9	9	100%
Cobalt	4.50	5.00	HC-SD03-612	1.87	2.91	4.01	2	9	22%
Copper	0.66	1.50	*+ HC-SD02-06	1.35	1.75	2.01	6	9	67%
Iron	382.00	11100.00	+ HC-SD03-06D	3396.56	5709.65	28323.00	9	9	100%
Lead	3.70	5.30	*+ HC-SD03-06	4.50	9.55	305.02	2	2	100%
Magnesium	77.10	6540.00	+ HC-SD03-612	1977.79	3486.31	1292043.17	7	9	78%
Manganese	3.50	64.70	HC-SD03-612	16.54	29.38	62.63	9	9	100%
Mercury	0.25	0.42	*+ HC-SD03-612	0.34	0.48	11.17	3	3	100%
Nickel	1.80	12.10	+ HC-SD03-612	3.77	6.49	17.25	4	9	44%
Potassium	623.00	1840.00	+ HC-SD03-612	671.39	1079.26	2769.97	4	9	44%
Selenium	0.21	0.60	HC-SD02-06	0.30	0.39	0.48	5	9	56%
Sodium	1630.00	2750.00	+ HC-SD02-06	845.25	1750.35	183541390882.91	2	6	33%
Thallium	0.14	0.44	+ HC-SD03-612	0.23	0.31	0.46	6	9	67%
Vanadium	1.50	36.90	+ HC-SD03-612	11.11	18.54	56.26	9	9	100%
Zinc	20.80	40.00	+ HC-SD03-612	12.71	22.07	63.76	3	9	33%

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RME = REASONABLE MAXIMUM EXPOSURE

NA = NOT APPLICABLE

MARINE CORPS BASE CAMP LEJEUNE  
 STATISTICAL SUMMARY OF ANALYTICAL RESULTS  
 BACKGROUND - HADNOT CREEK  
 SEDIMENT - PESTICIDES/PCBs

PARAMETER	MINIMUM DETECTED VALUE (ug/kg)	MAXIMUM DETECTED VALUE (ug/kg)	SAMPLE No. OF MAXIMUM DETECTED VALUE	ARITHMETIC AVERAGE (ug/kg)	RME (ug/kg)	LOG NORMAL UPPER 95% CONFIDENCE LEVEL (ug/kg)	No. OF TIMES DETECTED	No. OF TIMES ANALYZED	FREQUENCY OF DETECTION
beta-BHC	1.70	1.70	*+ HC-SD04-612	1.93	2.39	2.58	1	9	11%
delta-BHC	0.64	0.64	*+ HC-SD01-06	1.82	2.35	2.91	1	9	11%
Heptachlor	0.48	2.00	*+ HC-SD04-612	1.89	2.42	3.26	2	9	22%
4,4'-DDD	1.50	4.00	HC-SD03-612	2.16	3.11	3.50	3	9	33%
4,4'-DDT	1.20	1.20	*+ HC-SD03-06D	3.23	4.23	5.08	1	9	11%
Methoxychlor	0.94	0.94	*+ HC-SD04-06	17.66	23.58	92.52	1	9	11%
Endrin aldehyde	0.59	7.10	+ HC-SD02-06	3.56	5.02	10.80	3	9	33%

\* = THE RME IS GREATER THAN THE MAXIMUM DETECTED VALUE; THEREFORE, THE MAXIMUM VALUE IS USED TO CALCULATE CHRONIC DAILY INTAKE

+ = THE LOG NORMAL 95% UCL IS GREATER THAN THE MAXIMUM DETECTED VALUE; THEREFORE, THE MAXIMUM VALUE IS USED TO CALCULATE CHRONIC DAILY INTAKE

\*+ = BOTH THE RME AND LOG NORMAL 95% UCL ARE GREATER THAN THE MAXIMUM DETECTED VALUE; THEREFORE, THE MAXIMUM VALUE IS USED TO CALCULATE CHRONIC DAILY INTAKE

RME = REASONABLE MAXIMUM EXPOSURE

NA = NOT APPLICABLE

MARINE CORPS BASE CAMP LEJEUNE  
 STATISTICAL SUMMARY OF ANALYTICAL RESULTS  
 BACKGROUND - HADNOT CREEK  
 SEDIMENT - SEMIVOLATILE ORGANIC COMPOUNDS

PARAMETER	MINIMUM DETECTED VALUE (ug/kg)	MAXIMUM DETECTED VALUE (ug/kg)	SAMPLE No. OF MAXIMUM DETECTED VALUE	ARITHMETIC AVERAGE (ug/kg)	RME (ug/kg)	LOG NORMAL UPPER 95% CONFIDENCE LEVEL (ug/kg)	No. OF TIMES DETECTED	No. OF TIMES ANALYZED	FREQUENCY OF DETECTION
NO SEMIVOLATILE ORGANIC COMPOUNDS WERE DETECTED									

\* = THE RME IS GREATER THAN THE MAXIMUM DETECTED VALUE; THEREFORE, THE MAXIMUM VALUE IS USED TO CALCULATE CHRONIC DAILY INTAKE

+ = THE LOG NORMAL 95% UCL IS GREATER THAN THE MAXIMUM DETECTED VALUE; THEREFORE, THE MAXIMUM VALUE IS USED TO CALCULATE CHRONIC DAILY INTAKE

\*+ = BOTH THE RME AND LOG NORMAL 95% UCL ARE GREATER THAN THE MAXIMUM DETECTED VALUE; THEREFORE, THE MAXIMUM VALUE IS USED TO CALCULATE CHRONIC DAILY INTAKE

RME = REASONABLE MAXIMUM EXPOSURE

NA = NOT APPLICABLE



MARINE CORPS BASE CAMP LEJEUNE  
 STATISTICAL SUMMARY OF ANALYTICAL RESULTS  
 BACKGROUND - HADNOT CREEK  
 SEDIMENT - VOLATILE ORGANIC COMPOUNDS

PARAMETER	MINIMUM DETECTED VALUE (ug/kg)	MAXIMUM DETECTED VALUE (ug/kg)	SAMPLE No. OF MAXIMUM DETECTED VALUE	ARITHMETIC AVERAGE (ug/kg)	RME (ug/kg)	LOG NORMAL UPPER 95% CONFIDENCE LEVEL (ug/kg)	No. OF TIMES DETECTED	No. OF TIMES ANALYZED	FREQUENCY OF DETECTION
Acetone	70.00	70.00	HC-SD01-06	18.06	30.44	36.73	1	9	11%
Carbon Disulfide	14.00	19.00	HC-SD02-612	12.44	15.67	18.14	2	9	22%
2-Butanone	7.00	7.00	*+ HC-SD01-06	11.06	13.94	15.49	1	9	11%

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\*+ = BOTH THE RME AND LOG NORMAL 95% UCL ARE GREATER THAN THE MAXIMUM DETECTED VALUE; THEREFORE, THE MAXIMUM VALUE IS USED TO CALCULATE CHRONIC DAILY INTAKE

RME = REASONABLE MAXIMUM EXPOSURE

NA = NOT APPLICABLE

MARINE CORPS BASE CAMP LEJEUNE  
 STATISTICAL SUMMARY OF ANALYTICAL RESULTS  
 BACKGROUND - HOLLAND MILL CREEK  
 SEDIMENT - METALS

PARAMETER	MINIMUM DETECTED VALUE (mg/kg)	MAXIMUM DETECTED VALUE (mg/kg)	SAMPLE No. OF MAXIMUM DETECTED VALUE	ARITHMETIC AVERAGE (mg/kg)	RME (mg/kg)	LOG NORMAL UPPER 95% CONFIDENCE LEVEL (mg/kg)	No. OF TIMES DETECTED	No. OF TIMES ANALYZED	FREQUENCY OF DETECTION
Aluminum	337.00	13600.00	+ HM-SD02-06	6181.29	10282.21	655067.62	7	7	100%
Barium	11.00	18.70	+ HM-SD02-06	8.71	13.92	68.49	4	7	57%
Cadmium	0.03	0.11	HM-SD01-06D	0.06	0.08	0.10	7	7	100%
Calcium	282.00	7860.00	+ HM-SD02-612	2952.86	4844.12	22431.34	7	7	100%
Chromium	1.10	38.40	+ HM-SD02-06	19.63	32.39	2021.73	7	7	100%
Cobalt	4.00	4.40	+ HM-SD02-06	2.02	3.18	6.18	2	7	29%
Iron	225.00	32400.00	+ HM-SD02-612	12262.43	21399.01	27918943.98	7	7	100%
Lead	0.62	9.20	+ HM-SD03-06	4.35	6.94	32.96	7	7	100%
Magnesium	26.70	5700.00	+ HM-SD03-06	2576.66	4422.69	136198282.35	7	7	100%
Manganese	1.30	67.20	+ HM-SD02-06	34.14	56.82	8851.72	7	7	100%
Mercury	0.09	0.35	+ HM-SD03-06	0.23	0.30	0.38	7	7	100%
Nickel	9.60	14.20	+ HM-SD03-06	6.76	11.07	359.48	4	7	57%
Potassium	1510.00	1760.00	+ HM-SD03-612	1007.00	1596.65	13233.89	4	7	57%
Selenium	0.25	0.40	HM-SD02-06	0.21	0.29	0.39	2	7	29%
Silver	0.49	0.49	*+ HM-SD01-06	0.39	0.49	0.60	1	7	14%
Thallium	0.13	0.37	+ HM-SD02-06	0.20	0.29	0.52	4	7	57%
Vanadium	0.66	30.00	+ HM-SD02-612	16.69	27.76	18094.26	6	7	86%
Zinc	6.70	43.10	+ HM-SD02-06	23.57	34.53	65.13	7	7	100%

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\*+ = BOTH THE RME AND LOG NORMAL 95% UCL ARE GREATER THAN THE MAXIMUM DETECTED VALUE; THEREFORE, THE MAXIMUM VALUE IS USED TO CALCULATE CHRONIC DAILY INTAKE

RME = REASONABLE MAXIMUM EXPOSURE

NA = NOT APPLICABLE

MARINE CORPS BASE CAMP LEJEUNE  
 STATISTICAL SUMMARY OF ANALYTICAL RESULTS  
 BACKGROUND - HOLLAND MILL CREEK  
 SEDIMENT - PESTICIDES/PCBs

PARAMETER	MINIMUM DETECTED VALUE (ug/kg)	MAXIMUM DETECTED VALUE (ug/kg)	SAMPLE No. OF MAXIMUM DETECTED VALUE	ARITHMETIC AVERAGE (ug/kg)	RME (ug/kg)	LOG NORMAL UPPER 95% CONFIDENCE LEVEL (ug/kg)	No. OF TIMES DETECTED	No. OF TIMES ANALYZED	FREQUENCY OF DETECTION
beta-BHC	3.80	7.30	HM-SD01-06D	3.24	4.69	5.98	2	7	29%
Aldrin	0.56	0.72	*+ HM-SD01-612	1.84	2.60	4.20	2	7	29%
Dieldrin	0.58	1.50	*+ HM-SD01-612	3.55	5.13	12.37	2	7	29%
4,4'-DDE	1.00	4.30	*+ HM-SD01-612	4.01	5.37	8.82	2	7	29%
4,4'-DDD	0.87	3.10	*+ HM-SD01-612	2.85	4.16	6.44	4	7	57%
4,4'-DDT	1.70	1.70	*+ HM-SD01-612	3.79	5.13	6.75	1	7	14%
alpha-Chlordane	1.30	1.30	*+ HM-SD01-612	1.99	2.61	3.14	1	7	14%
gamma-Chlordane	3.00	3.00	+ HM-SD01-612	2.24	2.86	3.56	1	7	14%

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RME = REASONABLE MAXIMUM EXPOSURE

NA = NOT APPLICABLE

MARINE CORPS BASE CAMP LEJEUNE  
 STATISTICAL SUMMARY OF ANALYTICAL RESULTS  
 BACKGROUND - HOLLAND MILL CREEK  
 SEDIMENT - SEMIVOLATILE ORGANIC COMPOUNDS

PARAMETER	MINIMUM DETECTED VALUE (ug/kg)	MAXIMUM DETECTED VALUE (ug/kg)	SAMPLE No. OF MAXIMUM DETECTED VALUE	ARITHMETIC AVERAGE (ug/kg)	RME (ug/kg)	LOG NORMAL UPPER 95% CONFIDENCE LEVEL (ug/kg)	No. OF TIMES DETECTED	No. OF TIMES ANALYZED	FREQUENCY OF DETECTION
Di-n-butylphthalate	534.00	619.00	+ HM-SD02-612	423.29	573.31	766.73	3	7	43%
bis(2-Ethylhexyl)phthalate	454.00	454.00	*+ HM-SD03-612	378.64	500.04	607.73	1	7	14%

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RME = REASONABLE MAXIMUM EXPOSURE

NA = NOT APPLICABLE

MARINE CORPS BASE CAMP LEJEUNE  
 STATISTICAL SUMMARY OF ANALYTICAL RESULTS  
 BACKGROUND - HOLLAND MILL CREEK  
 SEDIMENT - VOLATILE ORGANIC COMPOUNDS

PARAMETER	MINIMUM DETECTED VALUE (ug/kg)	MAXIMUM DETECTED VALUE (ug/kg)	SAMPLE No. OF MAXIMUM DETECTED VALUE	ARITHMETIC AVERAGE (ug/kg)	RME (ug/kg)	LOG NORMAL UPPER 95% CONFIDENCE LEVEL (ug/kg)	No. OF TIMES DETECTED	No. OF TIMES ANALYZED	FREQUENCY OF DETECTION
NO VOLATILE ORGANIC COMPOUNDS WERE DETECTED									

\* = THE RME IS GREATER THAN THE MAXIMUM DETECTED VALUE; THEREFORE, THE MAXIMUM VALUE IS USED TO CALCULATE CHRONIC DAILY INTAKE

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RME = REASONABLE MAXIMUM EXPOSURE

NA = NOT APPLICABLE

MARINE CORPS BASE CAMP LEJEUNE  
 STATISTICAL SUMMARY OF ANALYTICAL RESULTS  
 BACKGROUND - WEBB CREEK  
 SEDIMENT - METALS

PARAMETER	MINIMUM DETECTED VALUE (mg/kg)	MAXIMUM DETECTED VALUE (mg/kg)	SAMPLE No. OF MAXIMUM DETECTED VALUE	ARITHMETIC AVERAGE (mg/kg)	RME (mg/kg)	LOG NORMAL UPPER 95% CONFIDENCE LEVEL (mg/kg)	No. OF TIMES DETECTED	No. OF TIMES ANALYZED	FREQUENCY OF DETECTION
Aluminum	8200.00	14800.00	*+ WC-SD02-06	12275.00	15932.10	19239.95	4	4	100%
Barium	13.30	28.20	+ WC-SD02-06	18.83	26.76	35.92	4	4	100%
Cadmium	0.06	0.26	+ WC-SD02-06	0.13	0.24	1.11	4	4	100%
Calcium	2190.00	4060.00	*+ WC-SD02-06	3222.50	4132.21	4914.08	4	4	100%
Chromium	8.70	42.60	+ WC-SD03-612	24.93	42.26	246.57	4	4	100%
Cobalt	3.50	3.90	*+ WC-SD03-612	2.44	4.16	21.71	2	4	50%
Iron	8120.00	20700.00	+ WC-SD03-612	13980.00	20133.62	29586.84	4	4	100%
Lead	5.10	16.90	+ WC-SD02-06	9.85	16.48	51.03	4	4	100%
Magnesium	618.00	6060.00	*+ WC-SD03-612	3197.00	6127.63	817766.37	4	4	100%
Manganese	26.00	47.80	*+ WC-SD03-612	39.35	50.44	60.95	4	4	100%
Mercury	0.23	0.40	*+ WC-SD02-06	0.31	0.41	0.48	4	4	100%
Nickel	3.80	11.40	+ WC-SD03-612	7.25	11.11	21.80	4	4	100%
Potassium	1410.00	1590.00	*+ WC-SD03-612	905.88	1719.51	81148.45	2	4	50%
Thallium	0.24	0.24	+ WC-SD03-06	0.16	0.23	0.31	1	4	25%
Vanadium	11.90	31.00	+ WC-SD03-612	21.33	30.50	45.84	4	4	100%
Zinc	27.20	52.00	+ WC-SD02-06	33.83	48.09	61.59	4	4	100%

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+ = THE LOG NORMAL 95% UCL IS GREATER THAN THE MAXIMUM DETECTED VALUE; THEREFORE, THE MAXIMUM VALUE IS USED TO CALCULATE CHRONIC DAILY INTAKE

\*+ = BOTH THE RME AND LOG NORMAL 95% UCL ARE GREATER THAN THE MAXIMUM DETECTED VALUE; THEREFORE, THE MAXIMUM VALUE IS USED TO CALCULATE CHRONIC DAILY INTAKE

RME = REASONABLE MAXIMUM EXPOSURE

NA = NOT APPLICABLE

MARINE CORPS BASE CAMP LEJEUNE  
 STATISTICAL SUMMARY OF ANALYTICAL RESULTS  
 BACKGROUND - WEBB CREEK  
 SEDIMENT - PESTICIDES/PCBs

PARAMETER	MINIMUM DETECTED VALUE (ug/kg)	MAXIMUM DETECTED VALUE (ug/kg)	SAMPLE No. OF MAXIMUM DETECTED VALUE	ARITHMETIC AVERAGE (ug/kg)	RME (ug/kg)	LOG NORMAL UPPER 95% CONFIDENCE LEVEL (ug/kg)	No. OF TIMES DETECTED	No. OF TIMES ANALYZED	FREQUENCY OF DETECTION
delta-BHC	0.79	0.79	*+ WC-SD02-612	1.99	3.02	9.99	1	4	25%
Aldrin	1.20	1.20	*+ WC-SD02-06	1.93	2.65	3.66	1	4	25%
Dieldrin	3.70	3.70	*+ WC-SD02-06	4.00	4.79	4.98	1	4	25%
4,4'-DDE	16.00	16.00	+ WC-SD02-06	7.08	14.12	97.81	1	4	25%
4,4'-DDD	12.00	12.00	+ WC-SD02-06	6.08	10.78	28.91	1	4	25%
4,4'-DDT	0.76	2.60	*+ WC-SD02-06	2.37	4.64	91.00	3	4	75%

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\*+ = BOTH THE RME AND LOG NORMAL 95% UCL ARE GREATER THAN THE MAXIMUM DETECTED VALUE; THEREFORE, THE MAXIMUM VALUE IS USED TO CALCULATE CHRONIC DAILY INTAKE

RME = REASONABLE MAXIMUM EXPOSURE

NA = NOT APPLICABLE

MARINE CORPS BASE CAMP LEJEUNE  
 STATISTICAL SUMMARY OF ANALYTICAL RESULTS  
 BACKGROUND - WEBB CREEK  
 SEDIMENT - SEMIVOLATILE ORGANIC COMPOUNDS

PARAMETER	MINIMUM DETECTED VALUE (ug/kg)	MAXIMUM DETECTED VALUE (ug/kg)	SAMPLE No. OF MAXIMUM DETECTED VALUE	ARITHMETIC AVERAGE (ug/kg)	RME (ug/kg)	LOG NORMAL UPPER 95% CONFIDENCE LEVEL (ug/kg)	No. OF TIMES DETECTED	No. OF TIMES ANALYZED	FREQUENCY OF DETECTION
Benzo(a)pyrene	544.00	544.00	*+ WC-SD03-612	436.25	554.81	635.17	1	4	25%

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\*+ = BOTH THE RME AND LOG NORMAL 95% UCL ARE GREATER THAN THE MAXIMUM DETECTED VALUE; THEREFORE, THE MAXIMUM VALUE IS USED TO CALCULATE CHRONIC DAILY INTAKE

RME = REASONABLE MAXIMUM EXPOSURE

NA = NOT APPLICABLE



MARINE CORPS BASE CAMP LEJEUNE  
 STATISTICAL SUMMARY OF ANALYTICAL RESULTS  
 BACKGROUND - WEBB CREEK  
 SEDIMENT - VOLATILE ORGANIC COMPOUNDS

PARAMETER	MINIMUM DETECTED VALUE (ug/kg)	MAXIMUM DETECTED VALUE (ug/kg)	SAMPLE No. OF MAXIMUM DETECTED VALUE	ARITHMETIC AVERAGE (ug/kg)	RME (ug/kg)	LOG NORMAL UPPER 95% CONFIDENCE LEVEL (ug/kg)	No. OF TIMES DETECTED	No. OF TIMES ANALYZED	FREQUENCY OF DETECTION
NO VOLATILE ORGANIC COMPOUNDS WERE DETECTED									

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RME = REASONABLE MAXIMUM EXPOSURE

NA = NOT APPLICABLE

**Analytical Summary of Results**  
**(Surface Water)**

MARINE CORPS BASE CAMP LEJEUNE  
 ANALYTICAL SUMMARY OF RESULTS  
 BACKGROUND - HADNOT CREEK  
 SURFACE WATER - METALS

BAKER I.D.	HC-SW01	HC-SW02	HC-SW03	HC-SW03D	HC-SW04
LABORATORY I.D.	5167-16	5162	5166	5163	5152
DATE COLLECTED	08-MAY-1994	06-MAY-1994	06-MAY-1994	06-MAY-1994	08-MAY-1994
UNITS	UG/L	UG/L	UG/L	UG/L	UG/L
Aluminum	356 U	303 U	301 U	187 U	692
Arsenic	1 U	1 UJ	20	10 UJ	1 U
Barium	19 J	20 J	26 J	24 J	9 J
Calcium	27000	36600	86600	107000	11600
Chromium	9 U	19 U	130 J	125 J	9 U
Iron	746	528	339	291	556
Magnesium	1450	44800	633000	613000	954
Potassium	1670 U	14500	203000	202000	1670 U
Selenium	1 U	5 U	6 J	1 UJ	1 UJ
Sodium	6900	383000	2090000	2560000	6090

MARINE CORPS BASE CAMP LEJEUNE  
ANALYTICAL SUMMARY OF RESULTS  
BACKGROUND - HADNOT CREEK  
SURFACE WATER PESTICIDES AND PCBs

BAKER I.D.	HC-SW01	HC-SW02	HC-SW03	HC-SW03D	HC-SW04
LABORATORY I.D.	5167-16	5162	5166	5163	5152
DATE COLLECTED	08-MAY-1994	06-MAY-1994	06-MAY-1994	06-MAY-1994	08-MAY-1994
UNITS	ug/l	ug/l	ug/l	ug/l	ug/l

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NO PESTICIDES OR PCBs WERE DETECTED

MARINE CORPS BASE CAMP LEJEUNE  
ANALYTICAL SUMMARY OF RESULTS  
BACKGROUND - HADNOT CREEK  
SURFACE WATER - SEMIVOLATILE ORGANIC COMPOUNDS

BAKER I.D.	HC-SW01	HC-SW02	HC-SW03	HC-SW03D	HC-SW04
LABORATORY I.D.	5167-16	5162	5166	5163	5152
DATE COLLECTED	08-MAY-1994	06-MAY-1994	06-MAY-1994	06-MAY-1994	08-MAY-1994
UNITS	ug/l	ug/l	ug/l	ug/l	ug/l

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NO SEMIVOLATILE ORGANIC COMPOUNDS WERE DETECTED

MARINE CORPS BASE CAMP LEJEUNE  
ANALYTICAL SUMMARY OF RESULTS  
BACKGROUND - HADNOT CREEK  
SURFACE WATER - VOLATILE ORGANIC COMPOUNDS

BAKER I.D.	HC-SW01	HC-SW02	HC-SW03	HC-SW03D	HC-SW04
LABORATORY I.D.	5167-16	5162	5166	5163	5152
DATE COLLECTED	08-MAY-1994	06-MAY-1994	06-MAY-1994	06-MAY-1994	08-MAY-1994
UNITS	ug/l	ug/l	ug/l	ug/l	ug/l

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NO VOLATILE ORGANIC COMPOUNDS WERE DETECTED

MARINE CORPS BASE CAMP LEJEUNE  
 ANALYTICAL SUMMARY OF RESULTS  
 BACKGROUND - HOLLAND MILL CREEK  
 SURFACE WATER - METALS

BAKER I.D.	HM-SW01	HM-SW02	HM-SW03
LABORATORY I.D.	5167-18	5161	5160
DATE COLLECTED	08-MAY-1994	06-MAY-1994	06-MAY-1994
UNITS	UG/L	UG/L	UG/L
Aluminum	259 U	535 J	288 U
Barium	49 J	38 J	20 J
Calcium	14100	40200	302000
Chromium	10 U	36 J	158 J
Iron	425	559	320
Lead	1 U	2.5 U	58.1
Magnesium	2830	109000	754000
Potassium	1670 U	41100	288000
Selenium	1.5 J	5 U	41 J
Silver	10 U	17 U	37 J
Sodium	16500	739000	6750000

MARINE CORPS BASE CAMP LEJEUNE  
ANLAYTICAL SUMMARY OF RESULTS  
BACKGROUND - HOLLAND MILL CREEK  
SURFACE WATER - PESTICIDES AND PCBs

BAKER I.D.	HM-SW01	HM-SW02	HM-SW03
LABORATORY I.D.	5167-18	5161	5160
DATE COLLECTED	08-MAY-1994	06-MAY-1994	06-MAY-1994
UNITS	ug/l	ug/l	ug/l

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NO PESTICIDES OR PCBs WERE DETECTED



MARINE CORPS BASE CAMP LEJEUNE  
ANALYTICAL SUMMARY OF RESULTS  
BACKGROUND - HOLLAND MILL CREEK  
SURFACE WATER - SEMIVOLATILE ORGANIC COMPOUNDS

BAKER I.D.	HM-SW01	HM-SW02	HM-SW03
LABORATORY I.D.	5167-18	5161	5160
DATE COLLECTED	08-MAY-1994	06-MAY-1994	06-MAY-1994
UNITS	ug/l	ug/l	ug/l

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NO SEMIVOLATILE ORGANIC COMPOUNDS WERE DETECTED

MARINE CORPS BASE CAMP LEJEUNE  
ANALYTICAL SUMMARY OF RESULTS  
BACKGROUND - HOLLAND MILL CREEK  
SURFACE WATER - VOLATILE ORGANIC COMPOUNDS

BAKER I.D.	HM-SW01	HM-SW02	HM-SW03
LABORATORY I.D.	5167-18	5161	5160
DATE COLLECTED	08-MAY-1994	06-MAY-1994	06-MAY-1994
UNITS	ug/l	ug/l	ug/l

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NO VOLATILE ORGANIC COMPOUNDS WERE DETECTED

MARINE CORPS BASE CAMP LEJEUNE  
ANALYTICAL SUMMARY OF RESULTS  
BACKGROUND - WEBB CREEK  
SURFACE WATER - METALS

BAKER I.D.	WC-SW02	WC-SW03
LABORATORY I.D.	5167-8	5158
DATE COLLECTED	06-MAY-1994	06-MAY-1994
UNITS	UG/L	UG/L
Barium	29 J	27 J
Calcium	46900	40500
Chromium	15 U	97 J
Iron	660	321
Magnesium	29000	44800
Potassium	10900	136000
Sodium	202000	895000

MARINE CORPS BASE CAMP LEJEUNE  
ANALYTICAL SUMMARY OF RESULTS  
BACKGROUND - WEBB CREEK  
SURFACE WATER - PESTICIDES AND PCBs

BAKER I.D.	WC-SW02	WC-SW03
LABORATORY I.D.	5167-8	5158
DATE COLLECTED	06-MAY-1994	06-MAY-1994
UNITS	ug/l	ug/l
Aldrin	0.035 J	0.05 U

MARINE CORPS BASE CAMP LEJEUNE  
ANALYTICAL SUMMARY OF RESULTS  
BACKGROUND - WEBB CREEK  
SURFACE WATER - SEMIVOLATILE ORGANIC COMPOUNDS

BAKER I.D.	WC-SW02	WC-SW03
LABORATORY I.D.	5167-8	5158
DATE COLLECTED	06-MAY-1994	06-MAY-1994
UNITS	ug/l	ug/l

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NO SEMIVOLATILE ORGANIC COMPOUNDS WERE DETECTED

MARINE CORPS BASE CAMP LEJEUNE  
ANALYTICAL SUMMARY OF RESULTS  
BACKGROUND - WEBB CREEK  
SURFACE WATER - VOLATILE ORGANIC COMPOUNDS

BAKER I.D.	WC-SW02	WC-SW03
LABORATORY I.D.	5167-8	5158
DATE COLLECTED	06-MAY-1994	06-MAY-1994
UNITS	ug/l	ug/l

---

NO VOLATILE ORGANIC COMPOUNDS WERE DETECTED

**Analytical Summary of Results  
(Sediment)**

MARINE CORPS BASE CAMP LEJEUNE  
ANALYTICAL SUMMARY OF RESULTS  
BACKGROUND - HADNOT CREEK  
SEDIMENT - METALS

BAKER I.D.	HC-SD01-06	HC-SD01-612	HC-SD02-06	HC-SD02-612	HC-SD03-06	HC-SD03-06D	HC-SD03-612	HC-SD04-06	HC-SD04-612
LABORATORY I.D	5050	5044	5057-2	5054	5238	5237	5236	5052	5051
DATE COLLECTED	8-MAY-1994	8-MAY-1994	6-MAY-1994	6-MAY-1994	07-MAY-1994	07-MAY-1994	07-MAY-1994	8-MAY-1994	8-MAY-1994
UNITS	MG/KG	MG/KG	MG/KG	MG/KG	MG/KG	MG/KG	MG/KG	MG/KG	MG/KG
Aluminum	2940 J	1880 J	7820 J	10100 J	3120 J	7310 J	14000 J	780 J	1260 J
Arsenic	0.46 J	0.28 J	1.1 J	1.9 J	7.5 U	6.5 U	7.9 U	0.45 J	0.26 J
Barium	16.3 J	14.6 J	9.2 J	8.7 J	3.9 U	10.2	17.2	4.1 J	5.5 J
Beryllium	0.14 J	0.16 U	0.25 J	0.32 J	0.95 R	0.92 R	1.3 R	0.13 U	0.15 U
Cadmium	0.03 J	0.03 J	0.1 J	0.04 J	0.66	0.08	0.04 U	0.03 J	0.03 UJ
Calcium	3620 J	3330 J	2030 J	1610 J	3380 J	3350 J	3310 J	1030 J	2150 J
Chromium	2.3	3.2	6	6	16.1	18.8	41.6	2	1.3
Cobalt	1.6 U	1.8 U	2.7 U	1.8 U	3.7 U	4.5	5	1.5 U	1.6 U
Copper	1	1.1	1.5	0.81	4.9 U	4.3 U	3.5 U	0.66	0.73
Iron	648	586	3660	4630	7280 J	11100 J	1700 J	382	583
Lead	0.77 R	0.88 R	1.1 R	7.1 R	5.3	3.7	8.6 R	1 R	1.1 R
Magnesium	87.7	77.1	1450	1040	4420	4130	6540	48.2 U	62.5 U
Manganese	6.9	6.5	6.5	4.9	17.1	35.1	64.7	3.7	3.5
Mercury	0.19 R	0.13 R	0.42 R	0.24 R	0.34	0.25	0.42	0.11 R	0.08 R
Nickel	1.6 U	1.8 U	2.7 U	1.8	9.9	5.5	12.1	1.5 U	1.6 U
Potassium	349 U	396 U	623	395 U	1420	1250	1840	324 U	355 U
Selenium	0.27 J	0.34 J	0.6 J	0.47 J	0.48 UJ	0.41 UJ	0.51 UJ	0.21 J	0.2 UJ
Sodium	339 U	385 U	2750	1630	14100 R	9860 R	6620 R	315 U	344 U
Thallium	0.14	0.16	0.42	0.28	0.34 U	0.29	0.44	0.13 U	0.15 U
Vanadium	2.6	2.8	8.4	7	20.5	18.4	36.9	1.5	1.9
Zinc	4.9 U	4.5 U	9.7 U	6.6 U	20.8	34.3	40	4.5 U	8.3 U



MARINE COPRS BASE CAMP LEJEUNE  
 ANALYTICAL SUMMARY OF RESULTS  
 BACKGROUND - HADNOT CREEK  
 SEDIMENT - PESTICIDES AND PCBs

BAKER I.D.	HC-SD01-06	HC-SD01-612	HC-SD02-06	HC-SD02-612	HC-SD03-06	HC-SD03-06D	HC-SD03-612	HC-SD04-06	HC-SD04-612
LABORATORY I.D.	5057-7	5044	5055	5054	5238	5237	5236	5052	5051
DATE COLLECTED	8-MAY-1994	8-MAY-1994	6-MAY-1994	6-MAY-1994	07-MAY-1994	07-MAY-1994	07-MAY-1994	8-MAY-1994	8-MAY-1994
UNITS	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg
beta-BHC	2.4 U	2.8 U	4.2 U	2.8 U	5.8 U	4.9 U	6.2 U	2.3 U	1.7 J
delta-BHC	0.64 J	2.8 U	4.2 U	2.8 U	5.8 U	4.9 U	6.2 U	2.3 U	2.5 U
Heptachlor	0.48 J	2.8 U	4.2 U	2.8 U	5.8 U	4.9 U	6.2 U	2.3 U	2 J
4,4'-DDD	2.4 U	2.8 U	1.5 J	2.8 U	11 U	2 J	4 J	2.3 U	2.5 U
4,4'-DDT	4.7 U	5.4 U	8.2 U	5.3 U	11 U	1.2 J	12 U	4.4 U	4.8 U
Methoxychlor	24 U	28 U	42 U	28 U	58 U	49 U	62 U	0.94 J	25 U
Endrin aldehyde	0.59 J	5.4 U	7.1 J	0.77 J	11 U	9.6 U	12 U	4.4 U	4.8 U

MARINE CORPS BASE CAMP LEJEUNE  
ANALYTICAL SUMMARY OF RESULTS  
BACKGROUND - HADNOT CREEK  
SEDIMENT - SEMIVOLATILE ORGANIC COMPOUNDS

BAKER I.D.	HC-SD01-06	HC-SD01-612	HC-SD02-06	HC-SD02-612	HC-SD03-06	HC-SD03-06D	HC-SD03-612	HC-SD04-06	HC-SD04-612
LABORATORY I.D.	5057-7	5044	5055	5054	5238	5237	5236	5052	5051
DATE COLLECTED	8-MAY-1994	8-MAY-1994	6-MAY-1994	6-MAY-1994	07-MAY-1994	07-MAY-1994	07-MAY-1994	8-MAY-1994	8-MAY-1994
UNITS	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg

NO SEMIVOLATILE ORGANIC COMPOUNDS WERE DETECTED

MARINE CORPS BASE CAMP LEJEUNE  
 ANALYTICAL SUMMARY OF RESULTS  
 BACKGROUND - HADNOT CREEK  
 SEDIMENT - VOLATILE ORGANIC COMPOUNDS

BAKER I.D.	HC-SD01-06	HC-SD01-612	HC-SD02-06	HC-SD02-612	HC-SD03-06	HC-SD03-06D	HC-SD03-612	HC-SD04-06	HC-SD04-612
LABORATORY I.D.	5057-7	5044	5055	5054	5238	5237	5236	5052	5051
DATE COLLECTED	8-MAY-1994	8-MAY-1994	6-MAY-1994	6-MAY-1994	07-MAY-1994	07-MAY-1994	07-MAY-1994	8-MAY-1994	8-MAY-1994
UNITS	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg
Acetone	70 J	16 UJ	25 UJ	16 UJ	34 UJ	29 UJ	37 UJ	13 UJ	15 UJ
Carbon Disulfide	14 U	16 U	14	19 J	34 U	29 U	37 U	13 U	15 U
2-Butanone	7 J	16 UJ	25 UJ	16 UJ	34 UJ	29 UJ	37 UJ	13 UJ	15 UJ

MARINE CORPS BASE CAMP LEJEUNE  
 ANALYTICAL SUMMARY OF RESULTS  
 BACKGROUND - HOLLAND MILL CREEK  
 SEDIMENT - METALS

BAKER I.D.	HM-SD01-06	HM-SD01-06D	HM-SD01-612	HM-SD02-06	HM-SD02-612	HM-SD03-06	HM-SD03-612
LABORATORY I.D.	5243-18	5220	5219	5242	5241	5240	5239
DATE COLLECTED	08-MAY-1994	08-MAY-1994	08-MAY-1994	07-MAY-1994	07-MAY-1994	07-MAY-1994	07-MAY-1994
UNITS	MG/KG	MG/KG	MG/KG	MG/KG	MG/KG	MG/KG	MG/KG
Aluminum	457 J	337 J	505 J	13600 J	9850 J	8760 J	9760 J
Barium	3.4 U	2.1 U	3.9 U	18.7	13.7	11	12.9
Cadmium	0.03	0.11	0.03	0.08	0.06	0.05	0.03
Calcium	282 J	508 J	2850 J	4250 J	7860 J	2920 J	2000 J
Chromium	1.6	1.1	1.5	38.4	28.1	30.7	36
Cobalt	1.3 U	1.4 U	1.4 U	4.4	3.5 U	3.9 U	4
Iron	262 J	225 J	350 J	15800 J	32400 J	16900 J	19900 J
Lead	0.62 J	0.74 J	1	6	7.2	9.2	5.7
Magnesium	35.5	26.7	34.4	4940	3000	5700	4300
Manganese	1.9	1.3	1.6	67.2	55.5	50.2	61.3
Mercury	0.09	0.16	0.18	0.27	0.32	0.35	0.27
Nickel	1.3 U	1.4 U	1.4 U	11.2	9.6	14.2	10.3
Potassium	297 U	304 U	317 U	1510	1600	1720	1760
Selenium	0.17 U	0.17 U	0.25 J	0.4 J	0.45 UJ	0.5 UJ	0.37 UJ
Silver	0.49	0.37 U	0.39 U	0.85 U	0.95 U	1.1 U	0.79 U
Thallium	0.12 U	0.12 U	0.13	0.37	0.32	0.35 U	0.27
Vanadium	0.84	0.62 U	0.66	27.1	30	28.4	29.5
Zinc	9.7	6.7	8.3	43.1	33.2	34.1	29.9

MARINE CORPS BASE CAMP LEJEUNE  
 ANALYTICAL SUMMARY OF RESULTS  
 BACKGROUND - HOLLAND MILL CREEK  
 SEDIMENT - PESTICIDES AND PCBs

BAKER I.D.	HM-SD01-06	HM-SD01-06D	HM-SD01-612	HM-SD02-06	HM-SD02-612	HM-SD03-06	HM-SD03-612
LABORATORY I.D.	5243-18	5220	5219	5242	5241	5240	5239
DATE COLLECTED	08-MAY-1994	08-MAY-1994	08-MAY-1994	07-MAY-1994	07-MAY-1994	07-MAY-1994	07-MAY-1994
UNITS	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg
beta-BHC	2.1 UJ	7.3 J	3.8	5.1 U	5.5 U	6 U	4.5 U
Aldrin	2.1 U	0.56 J	0.72 J	5.1 U	5.5 U	6 U	4.5 U
Dieldrin	4 U	0.58 J	1.5 J	9.8 U	11 U	12 U	8.8 U
4,4'-DDE	4 U	1 J	4.3	9.8 U	11 U	12 U	8.8 U
4,4'-DDD	4 U	0.87 J	3.1	9.8 U	11 U	2.5 J	1.1 J
4,4'-DDT	4 U	4.1 U	1.7 J	9.8 U	11 U	12 U	8.8 U
alpha-Chlordane	2.1 U	2.1 U	1.3 J	5.1 U	5.5 U	6 U	4.5 U
gamma-Chlordane	2.1 U	2.1 U	3	5.1 U	5.5 U	6 U	4.5 U

MARINE CORPS BASE CAMP LEJEUNE  
 ANALYTICAL SUMMARY OF RESULTS  
 BACKGROUND - HOLLAND MILL CREEK  
 SEDIMENT - SEMIVOLATILE ORGANIC COMPOUNDS

BAKER I.D.	HM-SD01-06	HM-SD01-06D	HM-SD01-612	HM-SD02-06	HM-SD02-612	HM-SD03-06	HM-SD03-612
LABORATORY I.D.	5243-18	5220	5219	5242	5241	5240	5239
DATE COLLECTED	08-MAY-1994	08-MAY-1994	08-MAY-1994	07-MAY-1994	07-MAY-1994	07-MAY-1994	07-MAY-1994
UNITS	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg
Di-n-butylphthalate	401 U	412 U	429 U	614 J	619 J	1150 U	534 J
bis(2-Ethylhexyl)phthalate	401 UJ	412 UJ	429 UJ	943 U	1058 U	1150 U	454 J

MARINE CORPS BASE CAMP LEJEUNE  
ANALYTICAL SUMMARY OF RESULTS  
BACKGROUND - HOLLAND MILL CREEK  
SEDIMENT - VOLATILE ORGANIC COMPOUNDS

BAKER I.D.	HM-SD01-06	HM-SD01-06D	HM-SD01-612	HM-SD02-06	HM-SD02-612	HM-SD03-06	HM-SD03-612
LABORATORY I.D.	5243-18	5220	5219	5242	5241	5240	5239
DATE COLLECTED	08-MAY-1994	08-MAY-1994	08-MAY-1994	07-MAY-1994	07-MAY-1994	07-MAY-1994	07-MAY-1994
UNITS	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg

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NO VOLATILE ORGANIC COMPOUNDS WERE DETECTED

MARINE CORPS BASE CAMP LEJEUNE  
 ANALYTICAL SUMMARY OF RESULTS  
 BACKGROUND - WEBB CREEK  
 SEDIMENT - METALS

BAKER I.D. LABORATORY I.D. DATE COLLECTED UNITS	WC-SD02-06 5243-10 06-MAY-1994 MG/KG	WC-SD02-612 5232 06-MAY-1994 MG/KG	WC-SD03-06 5235 07-MAY-1994 MG/KG	WC-SD03-612 5234 07-MAY-1994 MG/KG
Aluminum	14800 J	8200	11500 J	14600 J
Barium	28.2	13.3	14.6	19.2
Cadmium	0.26	0.12	0.06	0.07
Calcium	4060 J	3260 J	2190 J	3380 J
Chromium	18.1	8.7	30.3	42.6
Cobalt	3.5	2.3 U	2.4 U	3.9
Iron	14600 J	8120	12500 J	20700 J
Lead	16.9	11.9	5.1	5.5
Magnesium	1690	618	4420	6060
Manganese	40.2	26	43.4	47.8
Mercury	0.4	0.36	0.23	0.26
Nickel	5.7	3.8	8.1	11.4
Potassium	739 U	508 U	1410	1590
Thallium	0.3 U	0.21 U	0.24	0.32 U
Vanadium	21	11.9	21.4	31
Zinc	52	27.8	28.3	27.2



MARINE CORPS BASE CAMP LEJEUNE  
 ANALYTICAL SUMMARY OF RESULTS  
 BACKGROUND - WEBB CREEK  
 SEDIMENT - PESTICIDES AND PCBs

BAKER I.D.	WC-SD02-06	WC-SD02-612	WC-SD03-06	WC-SD03-612
LABORATORY I.D.	5243-10	5232	5235	5234
DATE COLLECTED	06-MAY-1994	06-MAY-1994	07-MAY-1994	07-MAY-1994
UNITS	ug/kg	ug/kg	ug/kg	ug/kg
delta-BHC	5.2 U	0.79 J	3.7 U	5.4 U
Aldrin	1.2 J	3.9 U	3.7 U	5.4 U
Dieldrin	3.7 J	7.5 U	7.1 U	10 U
4,4'-DDE	16	7.5 U	7.1 U	10 U
4,4'-DDD	12	7.5 U	7.1 U	10 U
4,4'-DDT	2.6 J	1.1 J	0.76 J	10 U

MARINE CORPS BASE CAMP LEJEUNE  
ANALYTICAL SUMMARY OF RESULTS  
BACKGROUND - WEBB CREEK  
SEDIMENT - SEMIVOLATILE ORGANIC COMPOUNDS

BAKER I.D.	WC-SD02-06	WC-SD02-612	WC-SD03-06	WC-SD03-612
LABORATORY I.D.	5243-10	5232	5235	5234
DATE COLLECTED	06-MAY-1994	06-MAY-1994	07-MAY-1994	07-MAY-1994
UNITS	ug/kg	ug/kg	ug/kg	ug/kg
Benzo(a)pyrene	1000 U	688 U	714 U	544 J

MARINE CORPS BASE CAMP LEJEUNE  
ANALYTICAL SUMMARY OF RESULTS  
BACKGROUND - WEBB CREEK  
SEDIMENT - VOLATILE ORGANIC COMPOUNDS

BAKER I.D.	WC-SD02-06	WC-SD02-612	WC-SD03-06	WC-SD03-612
LABORATORY I.D.	5243-10	5232	5235	5234
DATE COLLECTED	06-MAY-1994	06-MAY-1994	07-MAY-1994	07-MAY-1994
UNITS	ug/kg	ug/kg	ug/kg	ug/kg

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NO VOLATILE ORGANIC COMPOUNDS WERE DETECTED

## Field Chemistry Results

**FIELD CHEMISTRY FROM BIOLOGICAL SAMPLES  
HADNOT CREEK, HOLLAND MILL CREEK, AND WEBB CREEK  
MCB CAMP LEJEUNE, NORTH CAROLINA**

Sample Identification	Sample Location	Salinity (ppt)	Conductivity (micromhos/cm)	DO (mg/L)	pH (S.U.)	Temperature (deg. C)
HC01-SW/SD-FS/BN	surface	0	13.5	7.7	6.89	17
	bottom	NA	NA	NA	NA	NA
HC02-SW/SD	surface	0.8	1,810	5.9	6.71	16.1
	bottom	15.5	21,900	1.0	6.73	18.2
HC02-FS/BN	surface	0.3	1,200	NA	NA	20.5
	bottom	13.1	20,900	NA	NA	22
	surface	0	720	7.3	7.2	15.5
	bottom	10.5	17,200	1	6.7	20
HC03-SW/SD	surface	0	1,050	NA	NA	20.5
	bottom	16.5	22,800	NA	NA	21
HC03-FS/BN	surface	17	25,500	12	7.79	17.5
	bottom	NA	NA	NA	NA	NA
HC04-SW/SD-FS/BN	surface	17.9	26,500	NA	7.69	17.8
	bottom	NA	NA	NA	NA	NA
HM01-SW/SD-FS/BN	surface	0	65	5.3	6.16	17.3
	bottom	NA	NA	NA	NA	NA
HM02-SW/SD	surface	0	140	8.0	6.9	17.5
	bottom	NA	NA	NA	NA	NA
HM02-FS/BN	surface	24	36,000	11.8	7.9	17.2
	bottom	25	38,000	11.6	7.6	17.6
	surface	21	29,000	7.75	NA	21
	bottom	19	27,000	7.75	NA	20
HM03-SW/SD	surface	2	3,810	NA	NA	19
	bottom	3.75	6,000	NA	NA	19.5
	surface	1	2,490	5.8	6.85	15.5
	bottom	1.1	2,700	5.0	6.72	15.2
HM03-FS/BN	surface	13.5	19,000	3.4	6.81	17.8
	bottom	NA	NA	NA	NA	NA
HM03-FS/BN	surface	22	32,000	10.8	7.90	17.5
	bottom	NA	NA	NA	NA	NA

Sample Identification	Sample Location	Salinity (ppt)	Conductivity (micromhos/cm)	DO (mg/L)	pH (S.U.)	Temperature (deg. C)
WC02-SW/SD	surface	4.5	9,000	9.0	7.48	21
	bottom	5.5	9,000	7.0	7.48	20.5
	surface	0	975	5.1	7.08	17.5
	bottom	0	1,250	4.4	7.15	17.5
WC02-FS/BN	surface	0	850	5.5	6.98	20.5
	bottom	7	10,500	6.1	6.85	21
WC03-SW/SD	surface	10	16,500	10	7.33	23
	bottom	10	16,500	8.5	7.36	22.4
WC03-FS/BN	surface	12	17,200	9.1	7.43	20
	bottom	12.8	18,000	9.6	7.56	19

ppt = parts per thousand

S.U. = Standard Units

NA = Not Analyzed

Sample Location = Water surface or water bottom

DO = Dissolved Oxygen level

FS = Fish sample

BN = Benthic Macroinvertebrate sample

SW/SD = Surface water/sediment sample

**Positive Detection Summary  
Fish Fillet Tissue Analysis**

MARINE CORPS BASE CAMP LEJEUNE  
BACKGROUND - HADNOT CREEK  
POSITIVE DETECTIONS SUMMARY  
FISH FILLET TISSUE SAMPLES

Parameter	HC1A-RD (Red Drum) (mg/kg)	HC1A-SF (Southern Flounder) (mg/kg)	HC1A-LBA (Largemouth Bass) (mg/kg)	HC1A-LBB (Largemouth Bass) (mg/kg)	HC1A-LBC (Largemouth Bass) (mg/kg)	HC1A-BCA (Blue Crab) (mg/kg)	HC1A-BCA (Blue Crab) (mg/kg)	HC1A-GA (Longnose Gar) (mg/kg)	HC1A-GB (Longnose Gar) (mg/kg)
Volatiles									
Acetone	0.13 J	0.056 J	0.077 J	0.07 J	0.037 J	0.11 J	0.099 J	0.028 J	0.016 J
Methylene Chloride	0.041	0.013 B	0.017 B	0.016 B	0.003 B	0.011 B	0.022 B	0.004 B	0.015 B
Semivolatiles									
Phenol	ND	0.46	ND	2.1	1.6	ND	ND	ND	ND
Di-n-octyl phthalate	ND	ND	0.061 J	ND	0.085	ND	ND	0.29 J	0.5 J
Bis(2-ethylhexyl)phthalate	1.1 B	0.82 B	3.6 B	3.2 B	4.8 B	ND	ND	11 J	17 J
Pesticides/PCBs									
4,4'-DDD	ND	ND	ND	ND	ND	0.0066	0.0056	ND	ND
4,4'-DDE	ND	ND	ND	ND	ND	0.0087	0.0046	0.012	0.0097
alpha-Chlordane	ND	ND	ND	ND	0.00017 P	0.0018	0.0012	ND	ND
Aroclor-1260	ND	ND	ND	ND	ND	ND	ND	ND	ND
Inorganics									
Aluminum	ND	ND	ND	36.5	ND	ND	ND	ND	ND
Arsenic	0.7 L	0.82	0.34 L	0.37 L	0.36 K	0.68	0.39	2.5	3.9 L
Barium	ND	ND	ND	ND	ND	ND	10.1	ND	ND
Cadmium	ND	ND	ND	ND	ND	0.14	0.11 J	ND	ND
Calcium	154	271	528	684	1170	4480	32200	493	520
Chromium	0.38 L	ND	0.23 L	0.68 L	0.63 L	ND	0.52 L	0.32 L	0.21 L
Copper	0.3 J	0.18 J	0.2 J	0.24 J	0.28 J	7.9	5.8	0.46 J	0.18 J
Iron	ND	ND	ND	ND	ND	ND	ND	ND	ND
Lead	ND	ND	ND	ND	ND	ND	ND	ND	ND
Magnesium	285	254	298	292	319	591	1800	286	300
Manganese	0.13	0.38	0.09 J	0.09 J	0.08 J	1.8	13.6	0.24 J	0.21 J
Mercury	0.07	0.05	0.22	0.24	0.17 K	0.08	0.02 J	0.22	0.14
Nickel	ND	ND	ND	ND	ND	ND	ND	0.45 L	ND
Potassium	3930	3700	3740	3610	4040	2170	1860	3410	3270
Sodium	1060	607	505	580	529	4060	4270	623	523
Zinc	5	5	3.9	4.4	4.6 L	25	17.9	6.5	4.6



## **Fish Distribution and Characterization**

**FISH DISTRIBUTION AND CHARACTERIZATION  
BACKGROUND STATIONS - WEBB, HADNOT, AND HOLLAND MILL CREEKS**

**MCB CAMP LEJEUNE, NORTH CAROLINA**

Common Name	Scientific Name	Length N.C. (cm)	Length Atlas (cm)	Water Type	Habitat	Spawning	Tolerance	Family	Sources
Atlantic Menhaden	<u>Brevoortia tyrannus</u>	20	46	Brackish or marine, enters freshwater	Rivers, streams	NA	Intermediate	Clupeidae	1,2,3,4
Spot	<u>Leiostomus xanthurus</u>	NA	NA	Brackish or marine, enters freshwater	NA	NA	NA	Sciaenidae	1
Stripped Mullet	<u>Mugil cephalus</u>	NA	23-35	Brackish or marine, enters freshwater	Rivers	NA	NA	Mugilidae	1,2
Pinfish	<u>Lagodon rhomboides</u>	NA	38	Marine, seldom enters freshwater	Shallow waters	NA	NA	Sparidae	1,2
Mud Catfish (Yellow Bullhead)	<u>Ictalopus natalis</u>	24	-38	Freshwater	Rivers Streams	April through May	Tolerant	Ictaluridae	1,2,3
Redbreast Sunfish	<u>Lepomis auritus</u>	18	6-15	Freshwater	Streams	April through June	NA	Centrarchidae	1,2,3
Atlantic Croaker	<u>Micropogonias undulatus</u>	NA	61	Estuaries, brackish- water or marine	NA	NA	NA	Sciaenidae	1,2
Pumpkinseed	<u>Lepomis gibbosus</u>	20	8-20	Freshwater	Streams Creeks	April through October	Moderately Tolerant	Centrarchidae	1,2,3,4
Longnose Gar	<u>Lepisosteus osseus</u>	80	-150	Freshwater; May enter brackish water	Rivers	April through May	Intermediate	Lepisosteidae	1,2,3
Summer Flounder	<u>Paralichthys dentatus</u>	NA	37	Brackish or marine, enters freshwater	Rivers	NA	NA	Bothidae	1
Flier	<u>Centrarchus macropterus</u>	12	7-19	Freshwater	Streams	April through May	NA	Centrarchidae	1,2,3
Chain Pickerel	<u>Esox niger</u>	44	38-45	Freshwater	Streams Creeks	February through March	Intermediate	Esocidae	1,2,3

**FISH DISTRIBUTION AND CHARACTERIZATION  
BACKGROUND STATIONS - WEBB, HADNOT, AND HOLLAND MILL CREEKS  
REMEDIAL INVESTIGATION, CTO-0232  
MCB CAMP LEJEUNE, NORTH CAROLINA**

Common Name	Scientific Name	Length N.C. (cm)	Length Atlas (cm)	Water Type	Habitat	Spawning	Tolerance	Family	Sources
Redear Fish	<u>Lepomis microlophus</u>	18	14-25	Freshwater	Streams	May through August	Intermediate	Centrarchidae	1,2,3
Warmouth	<u>Lepomis gulosus</u>	16	8-26	Freshwater	Rivers Streams	May through August	Intermediate	Centrarchidae	1,2,3
White Perch	<u>Morone americana</u>	NA	to 48	Brackish water; Freshwater	Bays and estuaries; Rivers and lakes	NA	Intermediate	Percichthyidae	3,5
Bluefish	<u>Pomatomus saltatrix</u>	NA	NA	Coastal waters	Surface waters; Near shore and off shore	NA	NA	Pomatomidae	2
Bluegill	<u>Lepomis macrochirus</u>	25	18-20	Freshwater	Rivers Streams Creeks	May through October	Intermediate	Centrarchidae	1,2,3
White Catfish	<u>Ictalurus catus</u>	31	-46	Freshwater	Rivers	May through June	Intermediate	Ictaluridae	1,2,3
Largemouth Bass	<u>Micropterus salmoides</u>	48	12-70	Freshwater	Rivers Streams Creeks	May through June	Intermediate	Centrarchidae	1,2,3
Mummichog	<u>Fundulus heteroclitus</u>	7	8-10	Shallow coastal waters	Rivers Streams	April through August	NA	Cyprinodontid ae	1,2,3
Redfin Pickerel	<u>Esox americanus</u>	23	25-30	Freshwater	Streams Creeks	February through March	NA	Esocidae	1,2,3
Hog Choker	<u>Trinectes maculatus</u>	5	7-12	Shallow coastal waters; Occasionally enters freshwater	Rivers Streams	March through April	NA	Soleidae	1,2,3

**FISH DISTRIBUTION AND CHARACTERIZATION  
 BACKGROUND STATIONS - WEBB, HADNOT, AND HOLLAND MILL CREEKS  
 REMEDIAL INVESTIGATION, CTO-0232  
 MCB CAMP LEJEUNE, NORTH CAROLINA**

Common Name	Scientific Name	Length N.C. (cm)	Length Atlas (cm)	Water Type	Habitat	Spawning	Tolerance	Family	Sources
Pirate Perch	<u>Aphredoderus sayanus</u>	9	7-14	Freshwater	Streams Creeks	January through March	Intermediate	Aphredoderida e	1,2,3
Eastern Mosquito (Mosquitofish)	<u>Gambusia affinis</u>	NA	NA	Fresh or brackish water	Ponds, lakes, ditches, backwaters, sluggish streams	NA	Intermediate	Poeciliidae	2,5

1 Menhinick, 1992.

2 Boschung, 1983.

3 USEPA, 1989d.

4 Raasch, 1991.

5 Kennish, 1986.

NA = Information not Available

**TOTAL NUMBER AND PERCENT OF AQUATIC SPECIES IDENTIFIED PER AREA  
WEBB CREEK AND HADNOT CREEK**

**MCB CAMP LEJEUNE, NORTH CAROLINA**

SPECIES	WEBB CREEK		Total Detected	HADNOT CREEK				Total Detected
	WC02	WC03		HC01	HCO2	HC03	HC04	
<b>FISH SPECIES</b>								
Spot	4		4			12		12
Stripped Mullet	4		4			3		3
Pumpkinseed			0		3			3
Mudcat	3		3	3				3
Redbreast sunfish	1		1	2				2
Long-Nosed Gar	9	5	14					0
American flier			0	3				3
Chain pickerel			0	1				1
Redear fish			0	1				1
Atlantic croaker			0			5		5
Warmouth			0		1			1
Bluefish			0			3		3
Yellow Bullhead	3		3	2				2
Blue gill	4		4					0
White catfish	1		1					0
Largemouth bass	2		2					0
Summer flounder		1	1					0
Mummichog		3	3					0
Pinfish	25	24	49			5		5
Atlantic menhaden			0			2		2
Redfin pickerel			0				2	2
White perch			0			1		1
Hog choker			0			1		1
Pirate perch			0				8	8

**TOTAL NUMBER AND PERCENT OF AQUATIC SPECIES IDENTIFIED PER AREA  
WEBB CREEK AND HADNOT CREEK**

**MCB CAMP LEJEUNE, NORTH CAROLINA**

SPECIES	WEBB CREEK		Total Detected	HADNOT CREEK				Total Detected
	WC02	WC03		HC01	HCO2	HC03	HC04	
<b>NO. OF SPECIES</b>	9	4	12	5	2	8	2	18
<b>NO. OF INDIVIDUALS</b>	53	33	86	10	4	32	10	56
<b>OTHER AQUATIC SPECIES</b>								
Grass shrimp		3	3					0
Crayfish			0				3	3
<b>NUMBER OF SPECIES</b>	0	1	1	0	0	0	1	1
<b>NO. OF INDIVIDUALS</b>	0	3	3	0	0	0	3	3

**TOTAL NUMBER AND PERCENT OF AQUATIC SPECIES IDENTIFIED PER AREA  
HOLLAND MILL CREEK**

**MCB CAMP LEJEUNE, NORTH CAROLINA**

SPECIES	HOLLAND MILL CREEK (CARTWHEEL BRANCH)			Total Detected
	HM01	HM02	HM03	
Spot			8	8
Stripped Mullet		11	3	14
Pumpkinseed	16	2		18
Chain pickerel	2			2
Swamp darter	6			6
Mud sunfish	1			1
Black drum		1		1
Ligar		3		3
Gizzard Shad		2		2
Spotted sunfish		2		2
Blue gill	2	1		3
Atlantic menhaden			199	199
Largemouth bass		1		1
Hog choker			2	2
Summer flounder		1	17	18
Mummichog		6		6
Pinfish		7	4	11
Goby, freshwater	1	1		2
<b>NUMBER OF SPECIES</b>	6	12	6	18
<b>NO. OF INDIVIDUALS</b>	28	38	233	299

**TOTAL NUMBER AND PERCENT OF AQUATIC SPECIES IDENTIFIED PER AREA  
HOLLAND MILL CREEK**

**MCB CAMP LEJEUNE, NORTH CAROLINA**

SPECIES	HOLLAND MILL CREEK (CARTWHEEL BRANCH)			Total Detected
	HM01	HM02	HM03	
<b>OTHER AQUATIC SPECIES</b>				
Unknown	1			1
Grass shrimp		13		13
Crayfish	3			3
<b>NUMBER OF SPECIES</b>	2	1	0	3
<b>NO. OF INDIVIDUALS</b>	4	13	0	17



## HADNOT CREEK - BACKGROUND STATIONS

SPECIES	COC SAMPLE NO.	HC01			HC02			HC03			HC04			
		Fish Length (cm)	Mass Weight	Average Weight (g)	Fish Length (cm)	Mass Weight	Average Weight (g)	Fish Length (cm)	Mass Weight	Average Weight (g)	Fish Length (cm)	Mass Weight	Average Weight (g)	
Strippet Mullet	HC03							15.25	45	45				
								12.5	20	20				
								12.5	20	20				
		COUNT						3		3				
		AVERAGE						13.416666667		28.333333333				
		MAXIMUM						15.25		45				
		MINIMUM						12.5		20				
Atlantic Menhaden	HC03							+1 collected, no length or weight						
								5	<5	2.5				
		COUNT						2		2				
		AVERAGE						5		2.5				
		MAXIMUM						5		2.5				
		MINIMUM						5		2.5				
Blue Fish	HC03						7	7	7					
							11	17	17					
							8	8	8					
		COUNT						3		3				
		AVERAGE						8.666666667		10.666666667				
		MAXIMUM						11		17				
		MINIMUM						7		7				
Spot	HC03						12.5	22	22					
							5.5	<5.0	2.5					
							5.75	<5.0	2.5					
							5	<5.0	2.5					
							3.5	<5.0	2.5					
							5.5	<5.0	2.5					
							14	40	40					
							13.5	35	35					
							12	35	35					
							14	35	35					
							5.5	<5.0	2.5					
							11.5	20	20					
		COUNT							12		12			
		AVERAGE							9.020833333		16.833333333			
		MAXIMUM							14		40			
MINIMUM							3.5		2.5					



HADNOT CREEK - BAC. JND STATIONS

SPECIES	COC SAMPLE NO.	HC01			HC02			HC03			HC04		
		Fish Length (cm)	Mass Weight	Average Weight (g)	Fish Length (cm)	Mass Weight	Average Weight (g)	Fish Length (cm)	Mass Weight	Average Weight (g)	Fish Length (cm)	Mass Weight	Average Weight (g)
Chain Pickerel	HC01	37	290	290									
	COUNT	1		1									
	AVERAGE	37		290									
	MAXIMUM	37		290									
	MINIMUM	37		290									
Yellow Bullhead	HC01	26.5	270	270									
		26.5	275	275									
	COUNT	2		2									
	AVERAGE	26.5		272.5									
	MINIMUM	26.5		270									
Pumpkinseed	HC02				13	60	50						
					17.5	125	125						
					16	100	100						
	COUNT				3		3						
	AVERAGE				15.5		91.66667						
Warmouth	HC02				22	250	250						
	COUNT				1		1						
	AVERAGE				22		250						
	MAXIMUM				22		250						
	MINIMUM				22		250						
Redfin Pickerel	HC04										+ 1 collected, no length or weight		
											17	30	30
	COUNT										2		2
	AVERAGE										17		30
	MINIMUM										17		30
Pirate Perch	HC04										5	>5	2.5
											4.5		2.5
											+ 6 collected, no length or weight		
	COUNT										8		8
	AVERAGE										4.75		2.5
Crayfish	HC04										6	10	3.3
											4.5		3.3
											4		3.3
	COUNT										3		3
	AVERAGE										4.8333333		3.3
Mudcat	3 collected at HC01, no length or weight												

HOLLAND MILL CREEK - BACKGROUND STATIONS

SPECIES	COC SAMPLE NO.	HM01 Fish Length (cm)	Mass Weight	Average Weight (g)	HM02 Fish Length (cm)	Mass Weight	Average Weight (g)	HM03 Fish Length (cm)	Mass Weight	Average Weight (g)		
Stripper Mullet	HM02				38.5	640	640					
					39.5	600	600					
					34.5	400	400					
					34.5	400	400					
					33.5	380	380					
					34	340	340					
					37	460	460					
					35	520	520					
					33.5	410	410					
					32	320	320					
					31	370	370					
			HM03							14.5	40	40
										6.5	<5	2.5
										+1 collected, no length or weight		
	COUNT				11		11	3		3		
	AVERAGE				34.818182		438.18182	10.5		21.25		
	MAXIMUM				39.5		640	14.5		40		
	MINIMUM				31		320	6.5		2.5		
Atlantic Menhaden	HM03							6	24	4		
								6		4		
								5.7		4		
								5.4		4		
								5.5		4		
								5.8		4		
								5.7	22	2.2		
								5.5		2.2		
								5		2.2		
								5.5		2.2		
								5.5		2.2		
								5.2		2.2		
								5.5		2.2		
								5.5		2.2		
								5.6		2.2		
								6.2		2.2		
								6	25	2.5		
								5.5		2.5		
								5		2.5		
								5.5		2.5		
								5.5		2.5		
								5.5		2.5		
								6		2.5		
								5		2.5		
								5.5		2.5		
								5.5	20	2		
								5.7		2		
								5		2		
								5		2		
								6		2		
								5.5		2		
								5.5		2		
								6	27	1.8		
								5.8		1.8		
						5.5		1.8				
						5.7		1.8				
						6		1.8				
						6		1.8				
						6.5		1.8				
						5.5		1.8				
						6.5		1.8				
						5.5		1.8				
						5.5		1.8				
						5.5		1.8				
						6		1.8				
						5.5		1.8				
						5.5		1.8				
						5.5	20	2				
						4.5		2				
						5		2				
						5.5		2				
						5.5		2				
						5.5		2				
						6		2				
						5.5		2				
						6		2				
						6		2				
						138 collected no length or weight						
	COUNT						199		61			
	AVERAGE						5.6		2.254984			
	MAXIMUM						6.5		4			
	MINIMUM						4.5		1.8			

HOLLAND MILL CREEK - BACKGROUND STATIONS

SPECIES	COC SAMPLE NO.	HM01			HM02			HM03			
		Fish Length (cm)	Mass Weight	Average Weight (g)	Fish Length (cm)	Mass Weight	Average Weight (g)	Fish Length (cm)	Mass Weight	Average Weight (g)	
Summer Flounder	HM02				29.5	250	250				
	HM03							33	400	400	
								43	850	850	
								20.5	90	90	
								24	120	120	
	+13 collected, no length or weight										
		COUNT				1		1	17		4
		AVERAGE				29.5		250	30.125		385
		MAXIMUM				29.5		250	43		850
		MINIMUM				29.5		250	20.5		90
Black Drum	HM02				28	350	350				
		COUNT			1		1				
		AVERAGE			28		350				
		MAXIMUM			28		350				
		MINIMUM			28		350				
Spotted Sunfish	HM02				15.5	65	65				
					17	110	110				
		COUNT			2		2				
		AVERAGE			16.25		87.5				
		MINIMUM			15.5		65				
Largemouth Bass	HM02				34	540	540				
		COUNT			1		1				
		AVERAGE			34		540				
		MAXIMUM			34		540				
		MINIMUM			34		540				
Hogchoker	HM03							+1 collected, no length or weight			
								6	10	10	
		COUNT						2		1	
		AVERAGE						6		10	
		MINIMUM						6		10	
Spot	HM03							5	<5	2.5	
								12	25	25	
								5.8	20	4	
								6		4	
								6.2		4	
								6.4		4	
								6.4		4	
	+1 collected, no length or weight										
		COUNT						6		7	
		AVERAGE						6.82857143		6.78571429	
	MAXIMUM						12		25		
	MINIMUM						5		2.5		
Blue Gill	HM02				17		105				
	HM01	10.5	10	10							
	+1 collected, no length or weight										
		COUNT	2		1	1		1			
		AVERAGE	10.5		10	17		105			

HOLLAND MILL CREEK - BACKGROUND STATIONS

SPECIES	COC SAMPLE NO.	HM01			HM02			HM03		
		Fish Length (cm)	Mass Weight	Average Weight (g)	Fish Length (cm)	Mass Weight	Average Weight (g)	Fish Length (cm)	Mass Weight	Average Weight (g)
Pumpkinseed	HM02				15	50		50		
					11.5	30		30		
	HM01	7.5	45	4.5						
		6.5		4.5						
		7.5		4.5						
		7.5		4.5						
		6		4.5						
		6		4.5						
		4.5		4.5						
		8.5		4.5						
		8		4.5						
		5.5		4.5						
		8		50	8.3					
		8.5			8.3					
		8.5			8.3					
		8.5			8.3					
	11		8.3							
	7.5		8.3							
	COUNT	16	16	2	2					
	AVERAGE	7.34375	5.925	13.25	40					
	MAXIMUM	11	8.3	15	50					
	MINIMUM	4.5	4.5	11.5	30					
Long-nose Gar	HM02				73	1250		1250		
					83	2000		2000		
					72.5	1640		1640		
		COUNT			3	3				
		AVERAGE			76.16666667	1630				
		MAXIMUM			83	2000				
	MINIMUM			72.5	1250					
Pinfish	HM02				17.5	80		80		
	HM03							5	<5	2.5
					+6 collected, no length or weight			+3 collected, no length or weight		
		COUNT			7	1	4			1
		AVERAGE			17.5	80	5			2.5
		MAXIMUM			17.5	80	5			2.5
	MINIMUM			17.5	80	5			2.5	
Gizzard Shad	HM02				33	480		480		
					34	460		460		
		COUNT			2	2				
		AVERAGE			33.5	470				
		MAXIMUM			34	480				
	MINIMUM			33	460					
Chain Pickerel	HM01	13	10	5						
		13.5		5						
		COUNT	2	2						
		AVERAGE	13.25	5						
		MAXIMUM	13.5	5						
		MINIMUM	13	5						
Unknown Fish	HM01	7.5	<5	2.5						
		COUNT	1	1						
		AVERAGE	7.5	2.5						
		MAXIMUM	7.5	2.5						
		MINIMUM	7.5	2.5						
Swamp Darter	HM01	6	18	3						
		6		3						
		6		3						
		6		3						
		6		3						
		6		3						
		COUNT	6	6						
		AVERAGE	6	3						
		MAXIMUM	6	3						
		MINIMUM	6	3						

HOLLAND MILL CREEK - BACKGROUND STATIONS

SPECIES	COC SAMPLE NO.	HM01			HM02			HM03		
		Fish Length (cm)	Mass Weight	Average Weight (g)	Fish Length (cm)	Mass Weight	Average Weight (g)	Fish Length (cm)	Mass Weight	Average Weight (g)
Crayfish	HM01	8.5	15	5						
		4.5		5						
		5.5		5						
		COUNT	3		3					
		AVERAGE	6.1666667		5					
		8.5		5						
		4.5		5						
Mud Sunfish	1 collected at HM01, no length or weight									
Mummichog	6 collected at HM02, no length or weight									
Goby, freshwater	1 collected at HM01 and 1 collected at HM02, no length or weight									
Grass shrimp	13 collected at HM02, no length or weight									

WEBB CREEK - BACKGROUND STATIONS

SPECIES	COC SAMPLE NO.	WC02			WC03		
		Fish Length (cm)	Mass Weight	Average Weight (g)	Fish Length (cm)	Mass Weight	Average Weight (g)
Stripper Mullet	WC02	39.5	500	500			
		35.5	380	380			
		41.5	700	700			
		37	600	600			
		COUNT	4		4		
AVERAGE	38.375		545				
MAXIMUM	41.5		700				
MINIMUM	35.5		380				
Summer Flounder	WC03				21	60	60
		COUNT			1		1
		AVERAGE			21		60
		MAXIMUM			21		60
		MINIMUM			21		60
Largemouth Bass	WC02	34	525	525			
		34	600	600			
		COUNT	2		2		
		AVERAGE	34		562.5		
		MAXIMUM	34		600		
MINIMUM	34		525				
Redbreast Sunfish	WC02	16	60	60			
		COUNT	1		1		
		AVERAGE	16		60		
		MAXIMUM	16		60		
		MINIMUM	16		60		
White Catfish	WC02	37	750	750			
		COUNT	1		1		
		AVERAGE	37		750		
		MAXIMUM	37		750		
		MINIMUM	37		750		
Spot	WC02	14.5	10	10			
		13	10	10			
		13	<10	5			
		+1 collected, no length or weight					
		COUNT	4		4		
		AVERAGE	13.5		8.33333333		
MAXIMUM	14.5		10				
MINIMUM	13		5				
Blue Gill	WC02	23	300	300			
		23.5	300	300			
		21.5	250	250			
		16.75	85	85			
		COUNT	4		4		
		AVERAGE	21.1875		233.75		
MAXIMUM	23.5		300				
MINIMUM	16.75		85				



WEBB CREEK - BACKGROUND STATIONS

SPECIES	COC SAMPLE NO.	WC02			WC03			
		Fish Length (cm)	Mass Weight	Average Weight (g)	Fish Length (cm)	Mass Weight	Average Weight (g)	
Long-nose Gar	WC02	68	1100	1100				
		71.5	1220	1220				
		73.5	1350	1350				
		72.5	1220	1220				
		66.5	1120	1120				
		72.5	1260	1260				
		71.5	1340	1340				
		69.5	1240	1240				
	WC03		75	1420	1420			
						87	1900	1900
						83	1850	1850
						97	2850	2850
						71.5	1000	1000
						73	1580	1580
		COUNT	9	9	5	5		
		AVERAGE	71.16667	1252.222	82.3	1836		
		MAXIMUM	75	1420	97	2850		
		MINIMUM	66.5	1100	71.5	1000		
Pinfish	WC02	10.5	NA					
			+24 collected, no length or weight		24 collected, no length or weight			
			COUNT	25		24		
			AVERAGE	10.5				
			MINIMUM	10.5				
Yellow Bullhead Catfish	WC02	38.5	900	900				
		32.5	620	620				
		36.5	640	640				
			COUNT	3	3			
			AVERAGE	35.83333	720			
		MINIMUM	32.5	620				
Mudcat	3 fish collected at WC02, no length or weight							
Mummichog	3 fish collected at WC03, no length or weight							
Grass shrimp	3 collected at WC03, no length or weight							

**Benthic Macroinvertebrate  
Characterization and Statistics**

MARINE CORPS BASE CAMP LEJEUNE  
 BACKGROUND - WEBB CREEK  
 BENTHIC MACROINVERTEBRATES

	WC02-BN			WC03-BN		
	01	02	03	01	02	03
NEMERTEA						
Anopla						
Heteronemertea						
Lineidae						
<i>Micrura leidy</i>				1	2	2
ANNELIDA						
Polychaeta						
Capitellida						
Capitellidae						
<i>Capitella capitata</i>	2					
Phyllodocida						
Nereidae						
<i>Nereis succinea</i>			1			
Spionida						
Spionidae						
<i>Scolecopides viridis</i>						1
Terebellida						
Ampharetidae						
<i>Hypaniola grayi</i>		4	10			
ARTHROPODA						
Crustacea						
Amphipoda						
Gammaridae						
<i>Gammarus tigrinus</i>	10			1	1	
Insecta						
Diptera						
Chironomidae						
<i>Chironomus decorus</i> gr.	8	24	13	38	17	6
<i>Procladius</i> sp.	1	3		2		1
<i>Tanytarsus</i> sp.		2	1			
MOLLUSCA						
Bivalvia						
Veneroida						
Corbiculidae						
<i>Polymesoda caroliniana</i>					1	
Tellinidae						
<i>Macoma tenta</i>					1	
Total Taxa	4	4	4	4	5	4
Total Specimens	21	33	25	42	22	10
Replicate Specimens Average		26.33			24.67	
Standard Deviation	4.425	10.532	6.185	18.339	7.057	2.380
Brillouin's Diversity		0.518			0.279	
SPECIES DENSITY (#/M <sup>2</sup> )	134	210	159	268	140	64
SPECIES DIVERSITY (Shannon-Wiener)	0.473	0.380	0.419	0.180	0.364	0.473



MARINE CORPS BASE CAMP LEJEUNE  
BACKGROUND - HOLLAND MILL CREEK  
BENTHIC MACROINVERTEBRATES

	HM01-BN			HM02-BN			HM03-BN		
	01	02	03	01	02	03	01	02	03
<b>NEMERTEA</b>									
Anopla									
Heteronemertea									
Lineidae									
<i>Micrura leidyi</i>									
							3	4	2
<b>ANNELIDA</b>									
Oligochaeta									
Tubificidae									
Tubificidae									
<i>Limnodrilus hoffmeisteri</i>									
	3	1	3						
Polychaeta									
Ariciida									
Orbiniidae									
<i>Scoloplos fragilis</i>									
							3	20	8
Capitellida									
Capitellidae									
<i>Heteromastus filiformis</i>									
							1	1	1
Phyllodocida									
Nereidae									
<i>Nereis succinea</i>									
				7	9	6			
Spionida									
Spionidae									
<i>Streblospio benedicti</i>									
							1		
Terebellida									
Ampharetidae									
<i>Hypaniola grayi</i> (ampharetid worm)									
				3		2			
<b>ARTHROPODA</b>									
Crustacea									
Decapoda									
Palaemonidae									
<i>Palaemonetes pugio</i>									
								1	
Insecta									
Coleoptera									
Dytiscidae									
<i>Hydroporus</i> sp.									
	1								
Elmidae									
<i>Dubiraphis</i> sp.									
			8						
Diptera									
Chaoboridae									
<i>Chaoborus</i> sp.									
			1						
Chironomidae									
<i>Ablabesmyia mallochi</i>									
	1								
<i>Chironomus decorus</i> gr.									
	2	2	2	120	180	76	1		
<i>Dicrotendipes nervosus</i>									
	5		3						
<i>Larsia</i> sp.									
			1						
<i>Polypedilum illinoense</i>									
	12		7						
<i>Polypedilum scalaeenum</i>									
	18		11						
<i>Tanytarsus</i> sp.									
	11		12						
<i>Tribelos lucundum</i>									
	50	159	31						
Megaloptera									
Sialidae									
<i>Sialis</i> sp.									
	1								
<b>MOLLUSCA</b>									
Bivalvia									
Veneroidea									
Mactridae									
<i>Mulinia lateralis</i>									
							3		
Tellinidae									
<i>Macoma tenta</i>									
							17	23	9
<b>Total Taxa</b>									
	10	3	10	3	2	4	7	4	4
<b>Total Specimens</b>									
	104	162	79	130	189	85	29	48	20
<b>Replicate Specimens Average</b>									
		115			134.667			32.3333	
<b>Standard Deviation</b>									
	15.0864	90.934	9.06091	66.4254	120.915	36.5639	5.75698	11.1056	4.08248
<b>Brillouin's Diversity</b>									
		0.5			0.122			0.497	
<b>SPECIES DENSITY (#/M<sup>2</sup>)</b>									
	663	1033	504	829	1205	542	185	306	127
<b>SPECIES DIVERSITY (Shannon-Wiener)</b>									
	0.695	0.045	0.793	0.138	0.083	0.186	0.593	0.436	0.480

**SYSTEMATIC LIST OF BENTHIC MACROINVERTEBRATE SPECIES  
AT BACKGROUND STATIONS  
(WEBB, HADNOT, AND HOLLAND MILL CREEKS)  
MCB CAMP LEJEUNE, NORTH CAROLINA**

Species	Systematic Listing
<b>NERMERTEA</b>	Phylum
Anopla	Class
Heteronemertea	Order
Lineidae	Family
<i>Micrura leidyl</i>	Genus Species
<b>ANNELIDA</b>	Phylum
Oligochaeta	Class
Lumbriculida	Order
Lumbriculiae	Family
<i>Eclipidrilus sp.</i>	Genus Species
Tubificida	Order
Tubificidae	Family
<i>Isochaetides freyi</i>	Genus Species
<i>Limnodrilus hoffmeisteri</i>	Genus Species
<i>Spirosperma carolinensis</i>	Genus Species
Polychaeta	Class
Ariciida	Order
Orbiniidae	Family
<i>Scoloplos fragilis</i>	Genus Species
Capitellida	Order
Capitellidae	Family
<i>Heteromastus filiformis</i>	Genus Species
<i>Capitella capitata</i>	Genus Species
Phyllodocida	Order
Nereidae	Family
<i>Nereis succinea</i>	Genus Species
Phyllodocidae	Family
<i>Eteone heteropoda</i>	Genus Species
Spionida	Order
Spionidae	Family
<i>Scolecopides viridis</i>	Genus Species
<i>Streblospio benedicti</i>	Genus Species
Terebellida	Order

**SYSTEMATIC LIST OF BENTHIC MACROINVERTEBRATE SPECIES  
AT BACKGROUND STATIONS  
(WEBB, HADNOT, AND HOLLAND MILL CREEKS)  
MCB CAMP LEJEUNE, NORTH CAROLINA**

Species	Systematic Listing
Ampharetidae	Family
<i>Hypaniola grayi</i>	Genus Species
<b>ARTHROPODA</b>	Phylum
Crustacea	Class
Amphipoda	Order
Corophiidae	Family
<i>Corophium lacustris</i>	Genus Species
Gammaridae	Family
<i>Crangonyx pseudogracillus</i>	Genus Species
<i>Gammarus tigrinus</i>	Genus Species
Tanaidacea	Order
Tanaidae	Family
<i>Leptochelia rapax</i>	Genus Species
Decapoda	Order
Palaemonidae	Family
<i>Palaemonetes pugio</i>	Genus Species
Insecta	Class
Coleoptera	Order
Dytiscidae	Family
<i>Hydroporus sp.</i>	Genus Species
Elmidae	Family
<i>Dubiraphia sp.</i>	Genus Species
Diptera	Order
Ceratopogonidae	Family
<i>Palpomyia/sphaeromyia sp.</i>	Genus Species
Chaoboridae	Family
<i>Chaoborus sp.</i>	Genus Species
Chironomidae	Family
<i>Ablabesmyia annulata</i>	Genus Species
<i>Ablabesmyia mallochii</i>	Genus Species
<i>Ablabesmyia ramphe gr.</i>	Genus Species
<i>Clinotanypus pinguis</i>	Genus Species
<i>Chironomus decorus gr.</i>	Genus Species
<i>Cryptochironomus fulvus gr</i>	Genus Species

**SYSTEMATIC LIST OF BENTHIC MACROINVERTEBRATE SPECIES  
AT BACKGROUND STATIONS  
(WEBB, HADNOT, AND HOLLAND MILL CREEKS)  
MCB CAMP LEJEUNE, NORTH CAROLINA**

Species	Systematic Listing
<i>Dicrotendipes nervosus</i>	Genus Species
<i>Epoicladus sp.</i>	Genus Species
<i>Glyptotendipes sp.</i>	Genus Species
<i>Larsia sp.</i>	Genus Species
<i>Nilothauma sp.</i>	Genus Species
<i>Paraiauterborniella nigrohaite</i>	Genus Species
<i>Polypedilum illinoense</i>	Genus Species
<i>Polypedilum scalaenum</i>	Genus Species
<i>Procladius sp.</i>	Genus Species
<i>Tanytarsus sp.</i>	Genus Species
<i>Tribelos jucundum</i>	Genus Species
<i>Tribelos lucundum</i>	Genus Species
Tipulidae	Family
<i>Psuedolimnophila sp.</i>	Genus Species
Ephemeroptera	Order
Ephemeridae	Family
<i>Hexagenia billineata</i>	Genus Species
Megaloptera	Order
Sialidae	Family
<i>Sialis sp.</i>	Genus Species
Odonata	Order
Coenagrionidae	Family
<i>Argia sp.</i>	Genus Species
Libellulidae	Family
<i>Pechydiplax longipennis</i>	Genus Species
Trichoptera	Order
Polycentropodidae	Family
<i>Phylacentropus sp.</i>	Genus Species
<b>MOLLUSCA</b>	Phylum
Bivalvia	Class
Mytiloidea	Order
Mytilidae	Family
<i>Geukensia demissa</i>	Genus Species
Veneroidea	Order



**SYSTEMATIC LIST OF BENTHIC MACROINVERTEBRATE SPECIES  
AT BACKGROUND STATIONS  
(WEBB, HADNOT, AND HOLLAND MILL CREEKS)  
MCB CAMP LEJEUNE, NORTH CAROLINA**

Species	Systematic Listing
Corbiculidae	Family
<i>Polymesoda caroliniana</i>	Genus Species
Mactridae	Family
<i>Mullinia lateralis</i>	Genus Species
Sphaeriidae	Family
<i>Pisidium casertanum</i>	Genus Species
Tellinidae	Family
<i>Macoma tenta</i>	Genus Species

**USEPA SENSITIVITY TO METALS AND TOLERANCE TO ORGANIC WASTE AND BIOTIC INDEX  
FOR BENTHIC MACROINVERTEBRATE SPECIES AT BACKGROUND STATIONS  
(WEBB, HADNOT, AND HOLLAND MILL CREEKS)  
MCB CAMP LEJEUNE, NORTH CAROLINA**

Species	USEPA <sup>(1)</sup> Metals	Organics	NCDEHNR <sup>(2)</sup> Biotic Index
NERMERTEA			
Anopla			
Heteronemertea			
Lineidae			
<i>Micrura leidyl</i>	NA	NA	NA
ANNELIDA			
Oligochaeta			
Lumbriculida			
Lumbriculidae			
<i>Eclipidrilus sp.</i>	NA	NA	NA
Tubificida			
Tubificidae			
<i>Isochaetides freyi</i>	NA	NA	8.6
<i>Limnodrilus hoffmeisteri</i>	NA	5	9.4
<i>Spirosperma carolinensis</i>	NA	3	NA
Polychaeta			
Ariciida			
Orbiniidae			
<i>Scoloplos fragilis</i>	NA	NA	NA
Capitellida			
Capitellidae			
<i>Heteromastus filiformis</i>	NA	NA	NA
<i>Capitella capitata</i>	NA	NA	NA
Phyllodocida			
Nereidae			
<i>Nereis succinea</i>	NA	NA	NA
Phyllodocidae			
<i>Eteone heteropoda</i>	NA	NA	NA
Spionida			
Spionidae			
<i>Scolecopleides virdis</i>	NA	NA	NA
<i>Streblospio benedicti</i>	NA	NA	NA

**USEPA SENSITIVITY TO METALS AND TOLERANCE TO ORGANIC WASTE AND BIOTIC INDES  
FOR BENTHIC MACROINVERTEBRATE SPECIES AT BACKGROUND STATIONS  
(WEBB, HADNOT, AND HOLLAND MILL CREEKS)  
MCB CAMP LEJEUNE, NORTH CAROLINA**

Species	USEPA <sup>(1)</sup> Metals	Organics	NCDEHNR <sup>(2)</sup> Biotic Index
Terebellida			
Ampharetidae			
<i>Hypaniola grayi</i>	NA	NA	NA
ARTHROPODA			
Crustacea			
Amphipoda			
Corophiidae			
<i>Corophium lacuatre</i>	NA	NA	NA
Gammaridae			
<i>Crangonyx pseudogracillus</i>	NA	NA	7.9
<i>Gammarus tigrinus</i>	NA	2	NA
Tanaidacea			
Tanaidae			
<i>Leptochelia rapox</i>	NA	NA	NA
Decapoda			
Palaemonidae			
<i>Palaemonetes pugio</i>	NA	NA	NA
Insecta			
Coleoptera			
Dytiscidae			
<i>Hydroporus sp.</i>	NA	NA	8.6
Elmidae			
<i>Dubiraphia sp.</i>	NA	NA	5.9
Diptera			
Ceratopogonidae			
<i>Palpomyia/sphaeromias sp.</i>	NA	NA	7.0
Chaoboridae			
<i>Chaoborus sp.</i>	NA	NA	8.5
Chironomidae			
<i>Ablabesmyia annulata</i>	NA	1	3.5
<i>Ablabesmyia mallochi</i>	S	2	7.2
<i>Ablabesmyia ramphe gr.</i>	NA	2	NA
<i>Clinotamypus pinguis</i>	S	3	8.7

**USEPA SENSITIVITY TO METALS AND TOLERANCE TO ORGANIC WASTE AND BIOTIC INDES  
FOR BENTHIC MACROINVERTEBRATE SPECIES AT BACKGROUND STATIONS  
(WEBB, HADNOT, AND HOLLAND MILL CREEKS)  
MCB CAMP LEJEUNE, NORTH CAROLINA**

Species	USEPA <sup>(1)</sup> Metals	Organics	NCDEHNR <sup>(2)</sup> Biotic Index
<i>Chironomus decorus gr.</i>	NA	NA	9.6
<i>Cryptochironomus fulvus gr</i>	NA	3	6.4
<i>Dicrotendipes nervosus</i>	S	2	9.7
<i>Epoicladius sp.</i>	NA	NA	0.0
<i>Glyptotendipes sp.</i>	NA	NA	9.4
<i>Larsia sp.</i>	NA	2	9.3
<i>Nilothauma sp.</i>	NA	NA	5.0
<i>Paraiauterborniella nigrohaite</i>	NA	NA	NA
<i>Polypedilum illinoense</i>	NA	3	9.0
<i>Polypedilum scalaenum</i>	NA	2	8.4
<i>Procladius sp.</i>	NA	NA	9.1
<i>Tanytarsus sp.</i>	NA	NA	6.7
<i>Tribelos jucundum</i>	S	1	6.3
<i>Tribelos lucundum</i>	NA	NA	6.3
Tipulidae			
<i>Psuedolimnophila sp.</i>	NA	NA	7.2
Ephemeroptera			
Ephemeridae			
<i>Hexagenia billineata</i>	NA	2	NA
Megaloptera			
Sialidae			
<i>Sialis sp.</i>	T	4	7.2
Odonata			
Coenagrionidae			
<i>Argia sp.</i>	NA	NA	8.2
Libellulidae			
<i>Pechydiplax longipennis</i>	NA	NA	NA
Trichoptera			
Polycentropodidae			
<i>Phylacentropus sp.</i>	NA	NA	6.2
MOLLUSCA			
Bivalvia			

**USEPA SENSITIVITY TO METALS AND TOLERANCE TO ORGANIC WASTE AND BIOTIC INDES  
FOR BENTHIC MACROINVERTEBRATE SPECIES AT BACKGROUND STATIONS  
(WEBB, HADNOT, AND HOLLAND MILL CREEKS)  
MCB CAMP LEJEUNE, NORTH CAROLINA**

Species	USEPA <sup>(1)</sup> Metals	Organics	NCDEHNR <sup>(2)</sup> Biotic Index
Mytiloidea			
Mytilidae			
<i>Geukensia demissa</i>	NA	NA	NA
Veneroidea			
Corbiculidae			
<i>Polymesoda caroliniana</i>	NA	NA	NA
Mactridae			
<i>Mullinia lateralis</i>	NA	NA	NA
Sphaeriidae			
<i>Pisidium casertanum</i>	NA	4	6.5
Tellinidae			
<i>Macoma tenta</i>	NA	NA	NA

(1) Macroinvertebrate Field and Laboratory Methods for Evaluating the Biological Integrity of Surface Waters

(2) Lenat, 1993

NA = Not Available

S = Sensitive to heavy metals

T = Tolerant to heavy metals

Organics Ranking = 0 to 5 with 0 being the least tolerant

**SUMMARY STATISTICS OF BENTHIC MACROINVERTEBRATE SPECIES AT  
HADNOT CREEK, HOLLAND MILL CREEK, AND WEBB CREEK  
MCB CAMP LEJEUNE, NORTH CAROLINA**

Station	Number of Species	Number of Organisms	Species Density (#/m <sup>2</sup> )	Species Diversity (Shannon-Weiner)	Species Diversity (Brillouin's)	Macroinvertebrate Biotic Index
WC02	7	79	504	0.570	0.518	9.4
WC03	7	74	472	0.323	0.279	9.6
HC01	20	286	1,823	0.802	0.755	7.8
HC02	4	79	504	0.196	0.072	7.6
HC03	8	244	1,555	0.683	0.675	NA
HC04	13	165	1,052	0.807	0.757	7.6
HM01	13	345	2,199	0.525	0.500	6.9
HM02	4	404	2,575	0.128	0.122	9.6
HM03	7	97	618	0.538	0.497	9.6

WC = Webb Creek Stations

HC = Hadnot Creek Stations

HM = Holland Mill Creek Stations

BN = Benthic Macroinvertebrate Sample

NA = Not Applicable

Species Density (#/m<sup>2</sup>) is based on a sample area of 0.0523 m<sup>2</sup>.

**USEPA SENSITIVITY TO METALS AND TOLERANCE TO ORGANIC WASTE AND BIOTIC INDEX  
FOR BENTHIC MACROINVERTEBRATE SPECIES AT BACKGROUND STATIONS  
(WEBB, HADNOT, AND HOLLAND MILL CREEKS)  
MCB CAMP LEJEUNE, NORTH CAROLINA**

Species	USEPA <sup>(1)</sup> Metals	Organics	NCDEHNR <sup>(2)</sup> Biotic Index
<b>NERMERTEA</b>			
Anopla			
Heteronemertea			
Lineidae			
<i>Micrura leidyl</i>	NA	NA	NA
<b>ANNELIDA</b>			
Oligochaeta			
Lumbriculida			
Lumbriculiae			
<i>Eclipidrilus sp.</i>	NA	NA	NA
Tubificida			
Tubificidae			
<i>Isochaetides freyi</i>	NA	NA	8.6
<i>Limnodrilus hoffmeisteri</i>	NA	5	9.4
<i>Spirosperma carolinensis</i>	NA	3	NA
Polychaeta			
Ariciida			
Orbiniidae			
<i>Scoloplos fragilis</i>	NA	NA	NA
Capitellida			
Capitellidae			
<i>Capitella capitata</i>	NA	NA	NA
Phyllodocida			
Nereidae			
<i>Nereis succinea</i>	NA	NA	NA
Phyllodocidae			
<i>Eteone heteropoda</i>	NA	NA	NA
Spionida			
Spionidae			
<i>Scolecopides viridis</i>	NA	NA	NA
<i>Streblospio benedicti</i>	NA	NA	NA
Terebellida			

**USEPA SENSITIVITY TO METALS AND TOLERANCE TO ORGANIC WASTE AND BIOTIC INDES  
FOR BENTHIC MACROINVERTEBRATE SPECIES AT BACKGROUND STATIONS  
(WEBB, HADNOT, AND HOLLAND MILL CREEKS)  
MCB CAMP LEJEUNE, NORTH CAROLINA**

Species	USEPA <sup>(1)</sup> Metals	Organics	NCDEHNR <sup>(2)</sup> Biotic Index
Ampharetidae			
<i>Hypaniola grayi</i>	NA	NA	NA
ARTHROPODA			
Crustacea			
Amphipoda			
Corophiidae			
<i>Corophium lacuatre</i>	NA	NA	NA
Gammaridae			
<i>Crangonyx pseudogracillus</i>	NA	NA	7.9
<i>Gammarus tigrinus</i>	NA	2	NA
Tanaidacea			
Tanaidae			
<i>Leptochelia rapox</i>	NA	NA	NA
Decapoda			
Palaemonidae			
<i>Palaemonetes pugio</i>	NA	NA	NA
Insecta			
Coleoptera			
Dytiscidae			
<i>Hydroporus sp.</i>	NA	NA	8.6
Elmidae			
<i>Dubiraphia sp.</i>	NA	NA	5.9
Diptera			
Ceratopogonidae			
<i>Palpomyia/sphaeromias sp.</i>	NA	NA	7.0
Chaoboridae			
<i>Chaoborus sp.</i>	NA	NA	8.5
Chironomidae			
<i>Ablabesmyia annulata</i>	NA	1	3.5
<i>Ablabesmyia mallochi</i>	S	2	7.2
<i>Ablabesmyia ramphe gr.</i>	NA	2	NA
<i>Clinotanypus pinguis</i>	S	3	8.7
<i>Chironomus decorus gr.</i>	NA	NA	9.6



**USEPA SENSITIVITY TO METALS AND TOLERANCE TO ORGANIC WASTE AND BIOTIC INDEKS  
FOR BENTHIC MACROINVERTEBRATE SPECIES AT BACKGROUND STATIONS  
(WEBB, HADNOT, AND HOLLAND MILL CREEKS)  
MCB CAMP LEJEUNE, NORTH CAROLINA**

Species	USEPA <sup>(1)</sup> Metals	Organics	NCDEHNR <sup>(2)</sup> Biotic Index
<i>Cryptochironomus fulvus gr</i>	NA	3	6.4
<i>Dicrotendipes nervosus</i>	S	2	9.7
<i>Epoicladius sp.</i>	NA	NA	0.0
<i>Glyptotendipes sp.</i>	NA	NA	9.4
<i>Larsia sp.</i>	NA	2	9.3
<i>Nilothauma sp.</i>	NA	NA	5.0
<i>Paraiauteroborniella nigrohaite</i>	NA	NA	NA
<i>Pobypedilum illinoense</i>	NA	3	9.0
<i>Pobypedilum scalaenum</i>	NA	2	8.4
<i>Procladius sp.</i>	NA	NA	9.1
<i>Tanytarsus sp.</i>	NA	NA	6.7
<i>Tribelos jucundum</i>	S	1	6.3
<i>Tribelos lucundum</i>	NA	NA	6.3
Tipulidae			
<i>Psuedolimnophila sp.</i>	NA	NA	7.2
Ephemeroptera			
Ephemeridae			
<i>Hexagenia billineata</i>	NA	2	NA
Megaloptera			
Sialidae			
<i>Sialis sp.</i>	T	4	7.2
Odonata			
Coenagrionidae			
<i>Argia sp.</i>	NA	NA	8.2
Libellulidae			
<i>Pechydiplax longipennis</i>	NA	NA	NA
Trichoptera			
Polycentropodidae			
<i>Phylacentropus sp.</i>	NA	NA	6.2
MOLLUSCA			
Bivalvia			
Mytiloidea			

**USEPA SENSITIVITY TO METALS AND TOLERANCE TO ORGANIC WASTE AND BIOTIC INDEX  
FOR BENTHIC MACROINVERTEBRATE SPECIES AT BACKGROUND STATIONS  
(WEBB, HADNOT, AND HOLLAND MILL CREEKS)  
MCB CAMP LEJEUNE, NORTH CAROLINA**

Species	USEPA <sup>(1)</sup> Metals	Organics	NCDEHNR <sup>(2)</sup> Biotic Index
Mytilidae			
<i>Geukensia demissa</i>	NA	NA	NA
Veneroida			
Corbiculidae			
<i>Polymesoda caroliniana</i>	NA	NA	NA
Mactridae			
<i>Mullinia lateralis</i>	NA	NA	NA
Sphaeriidae			
<i>Pisidium casertanum</i>	NA	4	6.5
Tellinidae			
<i>Macoma tenta</i>	NA	NA	NA

(1) Macroinvertebrate Field and Laboratory Methods for Evaluating the Biological Integrity of Surface Waters

(2) Lenat, 1993

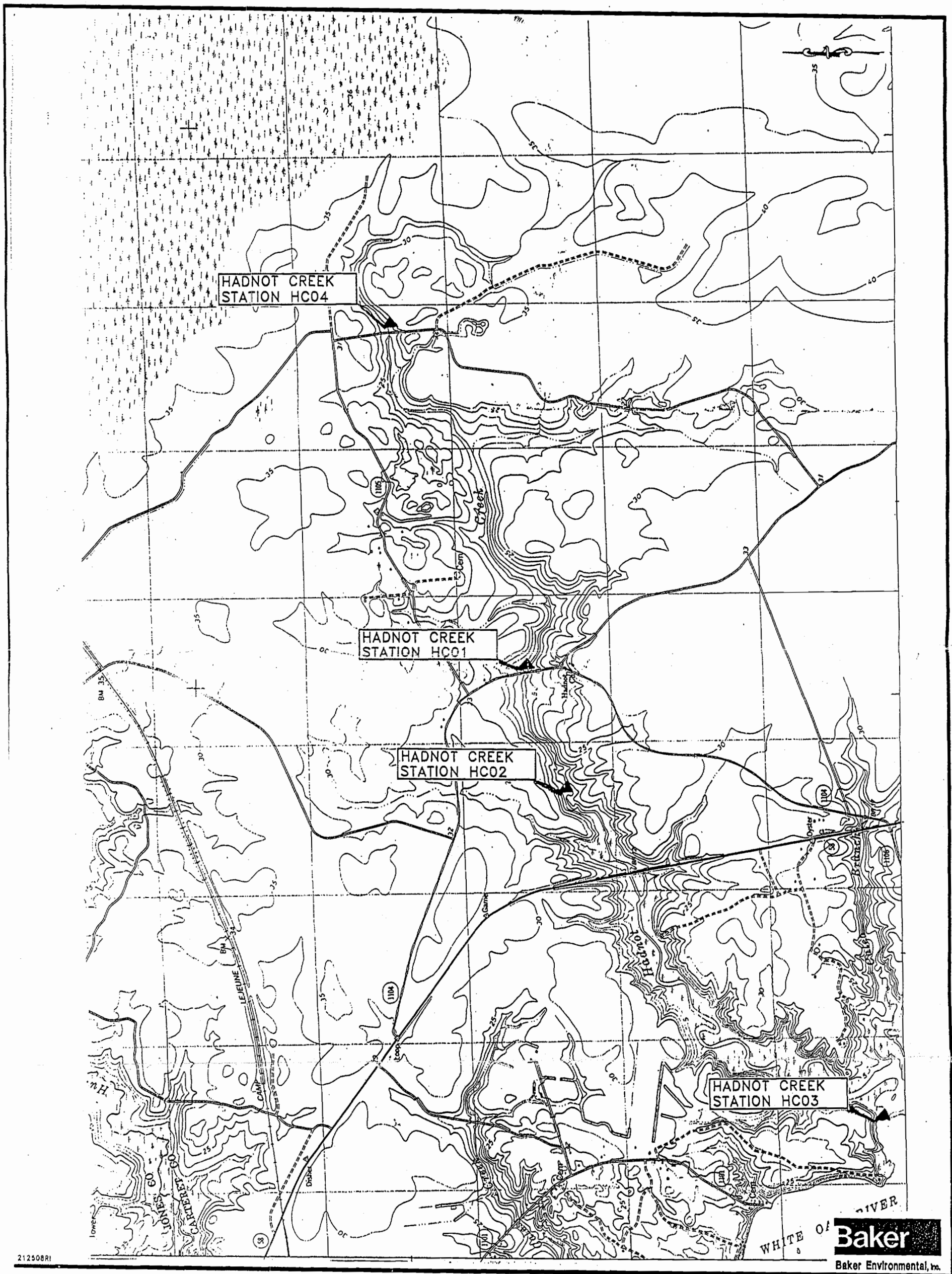
NA = Not Available

S = Sensitive to heavy metals

T = Tolerant to heavy metals

Organics Ranking = 0 to 5 with 0 being the least tolerant

**Sampling Station  
Location Maps**

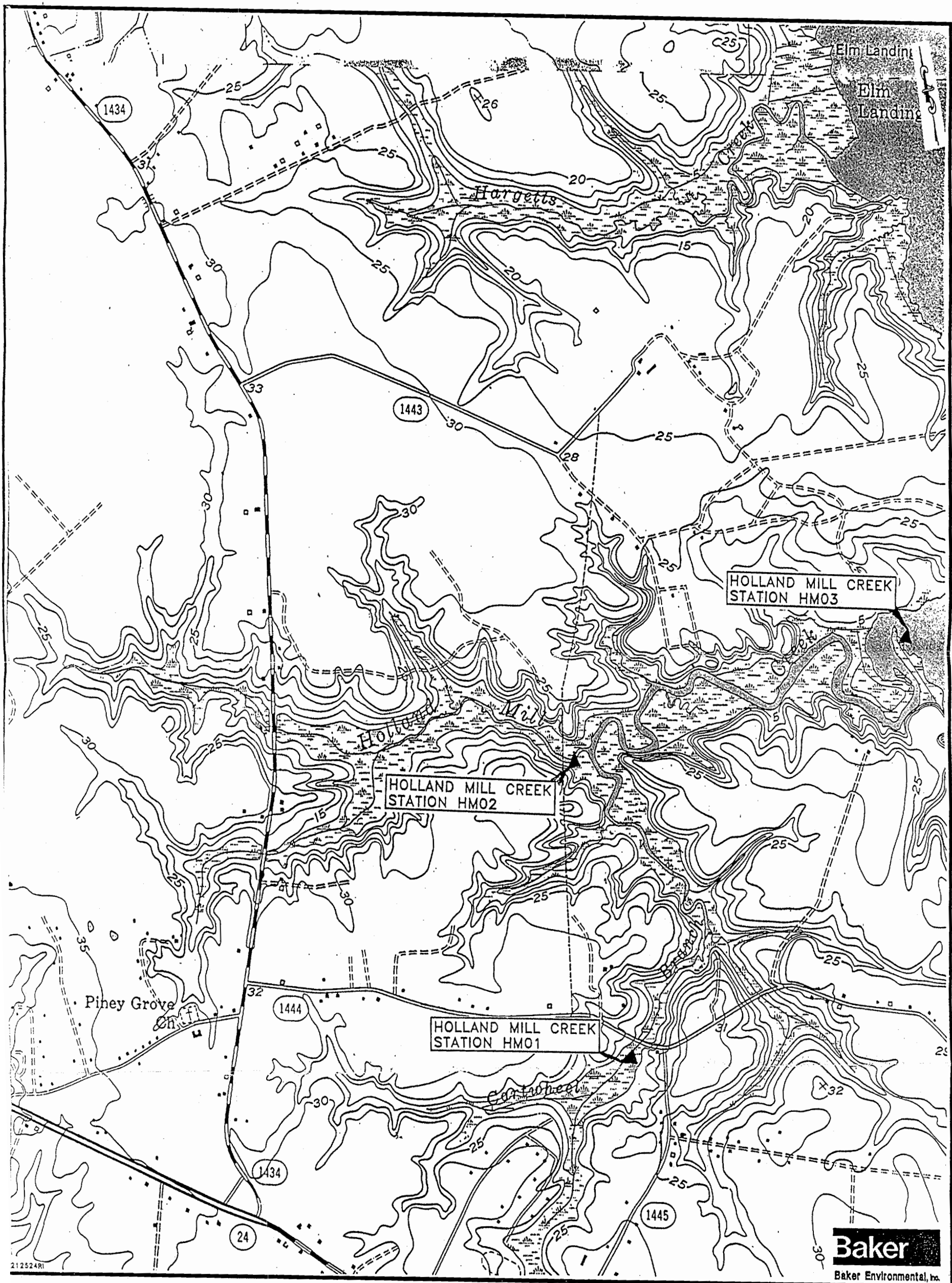


FISH AND BENTHIC MACROINVERTEBRATE SAMPLING LOCATION IN HADNOT CREEK

MARINE CORPS BASE, CAMP LEJEUNE  
NORTH CAROLINA

SOURCE: N.C. DIVISION OF MARINE FISHERIES, REPORT AFC-9, NOV. 1975.

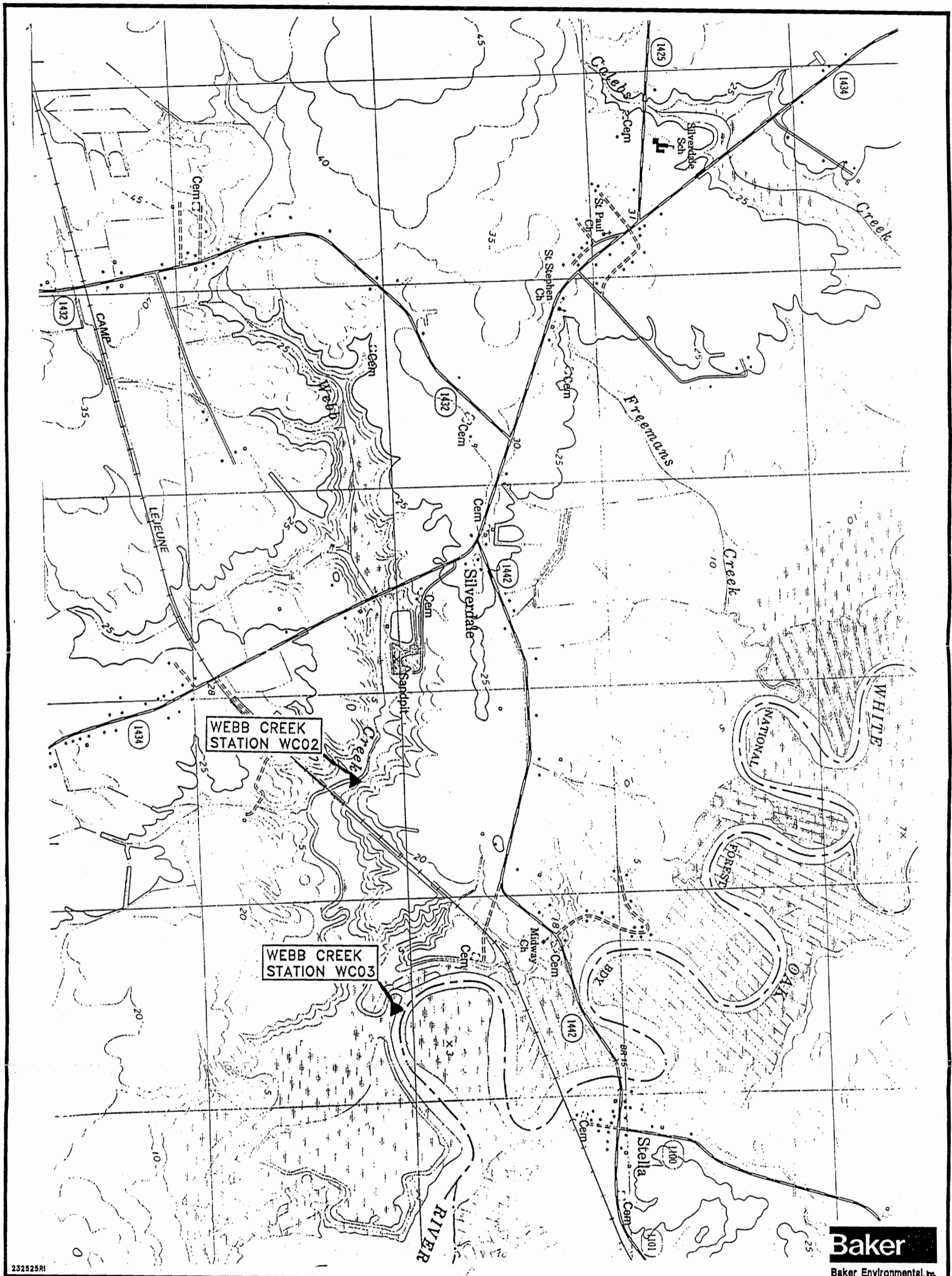
01714YB2Z



FISH AND BENTHIC MACROINVERTEBRATE SAMPLING LOCATION IN HOLLAND MILL CREEK

MARINE CORPS BASE, CAMP LEJEUNE  
NORTH CAROLINA

SOURCE: N.C. DIVISION OF MARINE FISHERIES, REPORT AFC-9, NOV. 1975.



**Baker**  
Baker Environmental, Inc.

FISH AND BENTHIC MACROINVERTEBRATE  
SAMPLING LOCATION IN WEBB CREEK

MARINE CORPS BASE, CAMP LEJEUNE  
NORTH CAROLINA

SOURCE: N.C. DIVISION OF MARINE  
FISHERIES, REPORT AFC-9, NOV. 1975.

232525R1

## **REFERENCE**

Baker, 1994. Baker Environmental Inc., 1994. "Supplemental Aquatic Survey for Wallace Creek and Bearhead Creek". Prepared for the Department of the Navy, Naval Facilities Engineering Command, Atlantic Division, Norfolk, Virginia.

## APPENDIX U SCREENING VALUE AND QUOTIENT INDEX CALCULATIONS

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**CALCULATION OF SEDIMENT QUALITY CRITERIA  
SALTWATER SEDIMENT SAMPLES  
SITE 43, AGAN STREET DUMP  
REMEDIAL INVESTIGATION CTO-0303  
MCAS, NEW RIVER, NORTH CAROLINA**

Contaminant	Koc (mL/g)	SWSV (ug/L)		Sample No SHC-SD01-06	SHC-SD01-612	EC-SD01-06	EC-SD01-612	
				SQC (ug/kg)	SQC (ug/kg)	SQC (ug/kg)	SQC (ug/kg)	
Aldrin	9.60E+04	0.003	(1)	1.38	4.90	70.56	205.06	
4,4'-DDD	7.70E+05	0.001	(4)	3.70	13.09	188.65	548.24	
4,4'-DDE	4.40E+06	0.001	(4)	21.12	74.80	1078.00	3132.80	
4,4'-DDT	2.43E+05	0.001	(1)	1.17	4.13	59.54	173.02	
Endrin	6.92E+04	0.002	(1)	0.66	2.35	33.90	98.52	
Alpha-chlordane	1.40E+05	0.004	(1)	2.69	9.52	137.20	398.72	
Gamma-chlordane	1.40E+05	0.004	(1)	2.69	9.52	137.20	398.72	
Benzo(a)pyrene	5.50E+06	0.21	(3)	5,544	19,635	282,975	822,360	
Bis(2-ethylhexyl)phthalate	1.00E+05	3.4	(2)	1,632	5,780	83,300	242,080	
Pyrene	3.80E+04	300	(3)	54,720	193,800	2,793,000	8,116,800	
Acetone	2.20E+00	NA		0.00	0.00	0.00	0.00	
Carbon disulfide	5.40E+01	NA	(3)	0.00	0.00	0.00	0.00	
4-Methylphenol	NA	NA		0.00	0.00	0.00	0.00	
SQC = (Koc*WQS*Foc)/1000000				<b>Foc (mg/k</b>	<b>4800</b>	<b>17000</b>	<b>245000</b>	<b>712000</b>

NA - Not Available

SWSV - Surface Water Screening Value

SQC - Sediment Quality Criteria

Foc - Fraction of organic carbon in mg/kg

Koc - Organic-carbon partition coefficient

(1) North Carolina Water Quality Standards

(2) USEPA, 1991 (Lowest Observed effects Level)

(3) USEPA, 1995b (Region III Water Quality Screening Values)

(4) Used 4,4'-DDT Value

**SURFACE WATER QUOTIENT INDEX CALCULATIONS  
 SITE 43, AGAN STREET DUMP  
 REMEDIAL INVESTIGATION CTO-0303  
 MCAS, NEW RIVER, NORTH CAROLINA**

Contaminant	Station	Concentration (ug/L)	North Carolina WQS	USEPA QSV		QI	QI	
				Acute	Chronic	North Carolina WQS	USEPA SWSV	Chronic
<b>Pesticides</b>								
4,4'-DDD	43-EC-SW01	0.64 J	0.001	0.68	0.001	640	0.9	640
4,4'-DDD	43-SHC-SW03	0.23	0.001	0.68	0.001	230	0.3	230
4,4'-DDD	43-SHC-SW04	0.12 J	0.001	0.68	0.001	120	0.2	120
4,4'-DDE	43-EC-SW01	0.097 J	0.001	14	0.001	97	0.0	97
4,4'-DDE	43-SHC-SW03	0.095 J	0.001	14	0.001	95	0.0	95
<b>Total Inorganics</b>								
Copper	43-EC-SW02	3.2	3	2.9	2.9	1.1	1.1	1.1
Manganese	43-EC-SW01	48.9	NE	NE	10	NA	NA	4.9
Manganese	43-EC-SW02	51.5	NE	NE	10	NA	NA	5.2
Manganese	43-SHC-SW01	38	NE	NE	10	NA	NA	3.8
Manganese	43-SHC-SW02	51.9	NE	NE	10	NA	NA	5.2
Manganese	43-SHC-SW03	57.1	NE	NE	10	NA	NA	5.7
Manganese	43-SHC-SW04	38.7	NE	NE	10	NA	NA	3.9
<b>Dissolved Inorganics</b>								
Manganese	43-EC-DSW01	27.3	NE	NE	10	NA	NA	2.7
Manganese	43-EC-DSW02	23.1	NE	NE	10	NA	NA	2.3
Manganese	43-SHC-DSW0	36.9	NE	NE	10	NA	NA	3.7
Manganese	43-SHC-DSW0	53.6	NE	NE	10	NA	NA	5.4
Manganese	43-SHC-DSW0	48.3	NE	NE	10	NA	NA	4.8
Manganese	43-SHC-DSW0	27.4	NE	NE	10	NA	NA	2.7

NE - No Value Established  
 NA - Not Applicable

SEDIMENT QUOTIENT INDEX CALCULATIONS  
 SITE 43, AGAN STREET DUMP  
 REMEDIAL INVESTIGATION CTO-0303  
 MCAS, NEW RIVER, NORTH CAROLINA

Contaminant	Station	Sample Concentratio	ERL	ERM	SQC	QI ER-L	QI ER-M	QI SQC
<b>Semivolatile (ug/kg)</b>								
Benzo(a)pyrene	43-EC-SD01-612	1400 J	430	1600	822360	3.3	0.9	0.00
Benzo(a)pyrene	43-EC-SD02-612	650 J	430	1600	282975	1.5	0.4	0.00
Benzo(a)pyrene	43-SHC-SD02-612	1900	430	1600	5544	4.4	1.2	0.34
Bis(2-ethylhexyl)phthalate	43-SHC-SD03-06	2500	1900	NE	1632	1.3	NA	1.53
Bis(2-ethylhexyl)phthalate	43-SHC-SD03-612	1700	1900	NE	1632	0.9	NA	1.04
<b>Pesticides (ug/kg)</b>								
Alpha-chlordane	43-EC-SD01-06	21 J	0.5	6	137.2	42.0	3.5	0.15
Alpha-chlordane	43-EC-SD02-06	9.3 J	0.5	6	137.2	18.6	1.6	0.07
Alpha-chlordane	43-SHC-SD01-06	7.2 J	0.5	6	2.69	14.4	1.2	2.68
Alpha-chlordane	43-SHC-SD01-612	18 J	0.5	6	9.52	36.0	3.0	1.89
Alpha-chlordane	43-SHC-SD02-06	9.3 J	0.5	6	2.69	18.6	1.6	3.46
Alpha-chlordane	43-SHC-SD03-06	41 J	0.5	6	2.69	82.0	6.8	15.24
Alpha-chlordane	43-SHC-SD03-612	49 J	0.5	6	2.69	98.0	8.2	18.22
Alpha-chlordane	43-SHC-SD04-06	10 J	0.5	6	2.69	20.0	1.7	3.72
Gamma-chlordane	43-EC-SD01-06	31 J	0.5	6	137.2	62.0	5.2	0.23
Gamma-chlordane	43-EC-SD01-612	22 J	0.5	6	398.7	44.0	3.7	0.06
Gamma-chlordane	43-EC-SD02-06	15 J	0.5	6	137.2	30.0	2.5	0.11
Gamma-chlordane	43-SHC-SD01-06	9.6 J	0.5	6	2.69	19.2	1.6	3.57
Gamma-chlordane	43-SHC-SD01-612	23 J	0.5	6	9.52	46.0	3.8	2.42
Gamma-chlordane	43-SHC-SD02-06	12 J	0.5	6	2.69	24.0	2.0	4.46
Gamma-chlordane	43-SHC-SD03-06	74 J	0.5	6	2.69	148	12.3	27.51
Gamma-chlordane	43-SHC-SD03-612	70 J	0.5	6	2.69	140	11.7	26.02
Gamma-chlordane	43-SHC-SD04-06	19 J	0.5	6	2.69	38.0	3.2	7.06
4,4'-DDD	43-EC-SD01-06	8500 J	2	20	188.65	4,250	425	45.06
4,4'-DDD	43-EC-SD01-612	1400	2	20	548.24	700	70.0	2.55
4,4'-DDD	43-EC-SD02-06	2200 J	2	20	188.65	1,100	110	11.66
4,4'-DDD	43-EC-SD02-612	160 J	2	20	188.65	80.0	8.0	0.85
4,4'-DDD	43-SHC-SD01-06	5.6 J	2	20	3.7	2.8	0.3	1.51
4,4'-DDD	43-SHC-SD01-612	9.8 J	2	20	13.09	4.9	0.5	0.75
4,4'-DDD	43-SHC-SD02-06	60 J	2	20	3.7	30.0	3.0	16.22
4,4'-DDD	43-SHC-SD03-06	1300	2	20	3.7	650	65	351.35
4,4'-DDD	43-SHC-SD03-612	6600 J	2	20	3.7	3,300	330	1783.78
4,4'-DDD	43-SHC-SD04-06	37000	2	20	3.7	18,500	1,850	10000.00
4,4'-DDD	43-SHC-SD04-612	280	2	20	3.7	140	14.0	75.68
4,4'-DDE	43-EC-SD01-06	1600 J	2.2	27	1078	727	59.3	1.48
4,4'-DDE	43-EC-SD02-06	890 J	2.2	27	1078	405	33.0	0.83
4,4'-DDE	43-EC-SD02-612	110 J	2.2	27	1078	50.0	4.1	0.10
4,4'-DDE	43-SHC-SD01-06	12 J	2.2	27	21.12	5.5	0.4	0.57
4,4'-DDE	43-SHC-SD01-612	24 J	2.2	27	74.8	10.9	0.9	0.32
4,4'-DDE	43-SHC-SD02-06	36 J	2.2	27	21.12	16.4	1.3	1.70
4,4'-DDE	43-SHC-SD03-06	450	2.2	27	21.12	205	16.7	21.31
4,4'-DDE	43-SHC-SD03-612	1300 J	2.2	27	21.12	591	48.1	61.55
4,4'-DDE	43-SHC-SD04-06	8900	2.2	27	21.12	4,045	330	421.40
4,4'-DDE	43-SHC-SD04-612	55 J	2.2	27	21.12	25.0	2.0	2.60
4,4'-DDT	43-EC-SD01-06	180 J	1	7	59.54	180	25.7	3.02
4,4'-DDT	43-EC-SD02-06	11 J	1	7	59.54	11.0	1.6	0.18
4,4'-DDT	43-SHC-SD02-06	9.3 J	1	7	1.17	9.3	1.3	7.95
4,4'-DDT	43-SHC-SD03-612	13 J	1	7	1.17	13.0	1.9	11.11
4,4'-DDT	43-SHC-SD04-06	65 J	1	7	1.17	65.0	9.3	55.56
4,4'-DDT	43-SHC-SD04-612	16 J	1	7	1.17	16.0	2.3	13.68
Endrin	43-EC-SD01-06	16 J	0.02	45	33.9	800.0	0.4	0.47
Endrin	43-SHC-SD03-612	12 J	0.02	45	0.66	600.0	0.3	18.18
<b>Inorganics (mg/kg)</b>								
Cadmium	43-EC-SD01-06	4.8	1.2	9.6	NE	4.0	0.5	NA
Copper	43-EC-SD01-06	53	34	270	NE	1.6	0.2	NA
Copper	43-EC-SD02-06	38.5	34	270	NE	1.1	0.1	NA
Lead	43-EC-SD01-06	180	46.7	218	NE	3.9	0.8	NA
Lead	43-EC-SD02-06	107	46.7	218	NE	2.3	0.5	NA
Lead	43-SHC-SD01-06	49.7	46.7	218	NE	1.1	0.2	NA
Lead	43-SHC-SD03-06	206	46.7	218	NE	4.4	0.9	NA
Lead	43-SHC-SD03-612	99	46.7	218	NE	2.1	0.5	NA
Lead	43-SHC-SD04-06	111	46.7	218	NE	2.4	0.5	NA
Mercury	43-EC-SD01-06	0.66	0.15	0.71	NE	4.4	0.9	NA
Mercury	43-EC-SD02-06	0.44	0.15	0.71	NE	2.9	0.6	NA
Selenium	43-EC-SD02-06	2.6	1	NE	NE	2.6	NA	NA
Selenium	43-EC-SD02-612	2.4	1	NE	NE	2.4	NA	NA
Selenium	43-SHC-SD03-06	2.6	1	NE	NE	2.6	NA	NA
Selenium	43-SHC-SD03-612	2	1	NE	NE	2.0	NA	NA
Selenium	43-SHC-SD04-612	1.5 J	1	NE	NE	1.5	NA	NA
Silver	43-EC-SD02-06	2.8	1	3.7	NE	2.8	0.8	NA
Silver	43-SHC-SD03-612	1.9	1	3.7	NE	1.9	0.5	NA
Zinc	43-EC-SD01-06	338	150	410	NE	2.3	0.8	NA
Zinc	43-EC-SD02-06	219	150	410	NE	1.5	0.5	NA
Zinc	43-SHC-SD03-06	254	150	410	NE	1.7	0.6	NA
Zinc	43-SHC-SD04-06	223	150	410	NE	1.5	0.5	NA

NE - No Value Established  
 NA - Not Applicable

## **APPENDIX V**

# **TERRESTRIAL REFERENCE VALUES AND CDI CALCULATIONS**

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EQUATIONS USED TO CALCULATE EXPOSURE FOR THE WHITETAILED DEER  
 SITE 43, AGAN STREET DUMP  
 REMEDIAL INVESTIGATION, CTO-0303  
 MCAS, NEW RIVER, NORTH CAROLINA

Food Source Ingestion of: lv=vegetation lf=fish lm=mammals lw=worms lfr=fruit	Feeding Rate (l in kg/d)	Incidental Soil Ingestion (ls in kg/d)	Rate of Drinking Water Ingestion (lw in l/d)	Rate of Worm Ingestion (lwo in kg/d)	Rate of Fruit Ingestion (lfr in kg/d)	Rate of Mammal Ingestion (lm in kg/d)	Rate of Vegetation Ingestion (lv in kg/d)	Body Weight (BW) (kg)	Home Range Size (acres)	Contaminate Area (acres)	H Ratio	Equation Used to Calculate Total Exposure E=total exposure Cw=constituent conc. in water Cs=constituent conc. in soil Cwo=constituent conc. in worms Cfr=constituent conc. in fruit H=ratio of home range area to site area
Vegetation(lv) 100 percent	1.600	1.85E-02	1.10E+00	NA	NA	NA	1.600	45.400	454.000	13.8	0.030	$\frac{E=(Cw)(lw) + [(Cs)(Bv)(lv) + (Cs)(ls)] H}{BW}$

Contaminant of Concern	Soil to Plant Transfer Coefficient (Bv)	Constituent Concentration in Water (mg/l) (Cw)	Constituent Concentration in Soil (mg/kg) (Cs)	Constituent Concentration in Worms (mg/kg) (Cwo)	Constituent Concentration in Fruit (mg/kg) (Cfr)	Constituent Concentration in Mammals (mg/kg) (Cm)	Total Exposure (mg/kg/d)	TRV	RATIO
1,2-Dichloroethene (total)	2.704	2.00E-03	ND	NA	NA	NA	4.85E-05	9.88E-01	4.91E-05
Acenaphthene	0.246	ND	3.40E-01	NA	NA	NA	9.37E-05	3.46E+00	2.71E-05
Anthracene	0.097	ND	2.69E-01	NA	NA	NA	3.12E-05	8.71E+00	3.58E-06
Benzo(a)anthracene	0.020	ND	1.24E+00	NA	NA	NA	4.12E-05	8.71E-02	4.73E-04
Benzo(b)fluoranthene	0.006	ND	2.28E+00	NA	NA	NA	4.27E-05	8.71E-02	4.90E-04
Benzo(k)fluoranthene	0.012	ND	7.68E-01	NA	NA	NA	1.89E-05	8.71E-02	2.17E-04
Benzo(g,h,i)perylene	0.007	ND	1.07E+00	NA	NA	NA	2.10E-05	8.71E-02	2.41E-04
Benzo(a)pyrene	0.013	ND	1.45E+00	NA	NA	NA	3.83E-05	8.71E-02	4.40E-04
Bis(2-ethylhexyl)phthalate	0.044	2.00E-01	2.50E-01	NA	NA	NA	4.86E-03	4.89E-02	9.95E-02
Butylbenzylphthalate	0.057	ND	2.43E-01	NA	NA	NA	1.78E-05	3.14E+00	5.67E-06
Carbazole	0.550	ND	2.39E-01	NA	NA	NA	1.43E-04	8.71E-02	1.65E-03
Chrysene	0.020	ND	1.50E+00	NA	NA	NA	4.99E-05	8.71E-02	5.73E-04
Dibenz(a,h)anthracene	0.007	ND	3.13E-01	NA	NA	NA	6.14E-06	8.71E-02	7.04E-05
Dibenzofuran	0.550	ND	2.76E-01	NA	NA	NA	1.65E-04	8.71E-02	1.90E-03
Fluoranthene	0.044	ND	2.31E+00	NA	NA	NA	1.38E-04	1.09E+00	1.26E-04
Fluorene	0.145	ND	3.03E-01	NA	NA	NA	5.05E-05	2.47E+00	2.05E-05
Indeno(1,2,3-cd)pyrene	0.007	ND	1.25E+00	NA	NA	NA	2.43E-05	8.71E-02	2.79E-04
Phenanthrene	0.097	ND	6.15E-01	NA	NA	NA	7.13E-05	8.10E+00	8.80E-06
Pyrene	0.033	ND	2.23E+00	NA	NA	NA	1.07E-04	6.53E-01	1.64E-04
4,4'-DDD	0.013	6.40E-04	3.00E+00	NA	NA	NA	9.47E-05	1.58E-01	5.99E-04
4,4'-DDE	0.020	9.70E-05	1.00E+00	NA	NA	NA	3.57E-05	1.58E-01	2.26E-04
4,4'-DDT	0.008	ND	1.00E+00	NA	NA	NA	2.06E-05	1.58E-01	1.30E-04
Endrin aldehyde	0.055	ND	3.74E-03	NA	NA	NA	2.68E-07	4.94E-02	5.42E-06
Heptachlor epoxide	0.127	ND	1.60E-03	NA	NA	NA	2.36E-07	7.55E-05	3.13E-03
Aluminum	0.004	7.17E-01	4.49E+03	NA	NA	NA	9.19E-02	6.51E+00	1.41E-02
Arsenic	0.040	2.33E-03	7.00E-01	NA	NA	NA	9.50E-05	3.25E-01	2.92E-04
Barium	0.150	3.65E-02	4.55E+01	NA	NA	NA	8.72E-03	1.30E-01	6.70E-02
Cadmium	0.550	ND	5.00E-01	NA	NA	NA	3.00E-04	3.25E-03	9.21E-02
Chromium	0.008	ND	2.39E+01	NA	NA	NA	4.85E-04	6.51E+00	7.46E-05
Cobalt	0.020	ND	1.17E+00	NA	NA	NA	3.94E-05	6.51E-02	6.06E-04
Copper	0.400	3.20E-03	1.59E+01	NA	NA	NA	7.05E-03	6.51E-01	1.08E-02
Iron	0.004	4.28E+00	4.34E+03	NA	NA	NA	1.76E-01	6.51E+00	2.70E-02
Lead	0.045	2.80E-03	6.78E+01	NA	NA	NA	4.16E-03	1.95E-01	2.13E-02
Manganese	0.250	5.59E-02	3.65E+01	NA	NA	NA	1.15E-02	1.30E+00	8.86E-03
Mercury	0.900	ND	1.10E-01	NA	NA	NA	1.07E-04	1.30E-02	8.23E-03
Nickel	0.060	ND	2.21E+00	NA	NA	NA	1.69E-04	3.25E-01	5.19E-04
Vanadium	0.006	3.40E-03	9.13E+00	NA	NA	NA	2.49E-04	3.25E-01	7.64E-04
Zinc	1.500	ND	2.83E+02	NA	NA	NA	4.57E-01	3.25E+00	1.40E-01
								SU	5.03E-01

ND - Not Detected  
 NA - Not Applicable

EQUATIONS USED TO CALCULATE EXPOSURE FOR THE EASTERN COTTONTAIL RABBIT  
 SITE 43, AGAN STREET DUMP  
 REMEDIAL INVESTIGATION, CTO-0303  
 MCAS, NEW RIVER, NORTH CAROLINA

Food Source Ingestion of: lv=vegetation lf=fish lm=mammals lw=worms lf=fruit	Feeding Rate (l in kg/d)	Incidental Soil Ingestion (ls in kg/d)	Rate of Drinking Water Ingestion (lw in l/d)	Rate of Worm Ingestion (lwo in kg/d)	Rate of Fruit Ingestion (lfr in kg/d)	Rate of Mammal Ingestion (lm in kg/d)	Rate of Vegetation Ingestion (lv in kg/d)	Body Weight (BW) (kg)	Home Range Size (acres)	Contaminated Area (acres)	H Ratio	Equation Used to Calculate Total Exposure E=total exposure Cw=constituent conc. in water Cs=constituent conc. in soil Cwo=constituent conc. in worms Cfr=constituent conc. in fruit H=ratio of home range area to site area
Vegetation (lv) 100 percent	0.237	5.69E-03	1.19E-01	NA	NA	NA	0.237	1.229	9.297	13.8	1.000	$E = \frac{Cw \times lv + [(Cs)(Bv)(lv) + (Cs)(ls)] [H]}{BW}$

Contaminant of Concern	Soil to Plant Transfer Coefficient (Bv)	Constituent Concentration in Water (mg/l) (Cw)	Constituent Concentration in Soil (mg/kg) (Cs)	Constituent Concentration in Worms (mg/kg) (Cwo)	Constituent Concentration in Fruit (mg/kg) (Cfr)	Constituent Concentration in Mammals (mg/kg) (Cm)	Total Exposure (mg/kg/d)	TRV	RATIO
1,2-Dichloroethene (total)	2.704	2.00E-03	ND	NA	NA	NA	1.94E-04	3.29E+00	5.90E-05
Acenaphthene	0.246	ND	3.40E-01	NA	NA	NA	1.78E-02	1.15E+01	1.54E-03
Anthracene	0.097	ND	2.69E-01	NA	NA	NA	6.29E-03	2.90E+01	2.17E-04
Benzo(a)anthracene	0.020	ND	1.24E+00	NA	NA	NA	1.04E-02	2.90E-01	3.59E-02
Benzo(b)fluoranthene	0.006	ND	2.28E+00	NA	NA	NA	1.32E-02	2.90E-01	4.55E-02
Benzo(k)fluoranthene	0.012	ND	7.68E-01	NA	NA	NA	5.26E-03	2.90E-01	1.81E-02
Benzo(g,h,i)perylene	0.007	ND	1.07E+00	NA	NA	NA	6.37E-03	2.90E-01	2.20E-02
Benzo(a)pyrene	0.013	ND	1.45E+00	NA	NA	NA	1.04E-02	2.90E-01	3.59E-02
Bis(2-ethylhexyl)phthalate	0.044	2.00E-01	2.50E-01	NA	NA	NA	2.27E-02	1.63E-01	1.39E-01
Butylbenzylphthalate	0.057	ND	2.43E-01	NA	NA	NA	3.80E-03	1.05E+01	3.63E-04
Carbazole	0.550	ND	2.39E-01	NA	NA	NA	2.65E-02	2.90E-01	9.13E-02
Chrysene	0.020	ND	1.50E+00	NA	NA	NA	1.26E-02	2.90E-01	4.35E-02
Dibenz(a,h)anthracene	0.007	ND	3.13E-01	NA	NA	NA	1.86E-03	2.90E-01	6.41E-03
Dibenzofuran	0.550	ND	2.76E-01	NA	NA	NA	3.05E-02	2.90E-01	1.05E-01
Fluoranthene	0.044	ND	2.31E+00	NA	NA	NA	3.04E-02	3.63E+00	8.38E-03
Fluorene	0.145	ND	3.03E-01	NA	NA	NA	9.86E-03	6.23E+00	1.20E-03
Indeno(1,2,3-cd)pyrene	0.007	ND	1.25E+00	NA	NA	NA	7.40E-03	2.90E-01	2.55E-02
Phenanthrene	0.097	ND	6.15E-01	NA	NA	NA	1.44E-02	2.70E+01	5.32E-04
Pyrene	0.033	ND	2.23E+00	NA	NA	NA	2.48E-02	2.18E+00	1.14E-02
4,4'-DDD	0.013	6.40E-04	3.00E+00	NA	NA	NA	2.16E-02	5.26E-01	4.10E-02
4,4'-DDE	0.020	9.70E-05	1.00E+00	NA	NA	NA	8.43E-03	5.26E-01	1.60E-02
4,4'-DDT	0.008	ND	1.00E+00	NA	NA	NA	6.12E-03	5.26E-01	1.16E-02
Erdin aldehyde	0.055	ND	3.74E-03	NA	NA	NA	5.74E-05	1.65E-01	3.49E-04
Heptachlor epoxide	0.127	ND	1.60E-03	NA	NA	NA	4.65E-05	2.51E-04	1.85E-01
Aluminum	0.004	7.17E-01	4.49E+03	NA	NA	NA	2.43E+01	1.16E+01	2.09E+00
Arsenic	0.040	2.33E-03	7.00E-01	NA	NA	NA	8.87E-03	2.90E+00	3.06E-03
Barium	0.150	3.65E-02	4.55E+01	NA	NA	NA	1.53E+00	1.16E+00	1.32E+00
Cadmium	0.550	ND	5.00E-01	NA	NA	NA	5.54E-02	2.90E-02	1.91E+00
Chromium	0.008	ND	2.39E+01	NA	NA	NA	1.45E-01	5.80E+01	2.50E-03
Cobalt	0.020	ND	1.17E+00	NA	NA	NA	9.93E-03	5.80E-01	1.71E-02
Copper	0.400	3.20E-03	1.59E+01	NA	NA	NA	1.59E+00	1.18E+01	1.12E-01
Iron	0.004	4.28E+00	4.34E+03	NA	NA	NA	2.39E+01	2.90E+01	8.23E-01
Lead	0.045	2.80E-03	6.78E+01	NA	NA	NA	9.03E-01	1.74E+00	5.19E-01
Manganese	0.250	5.59E-02	3.65E+01	NA	NA	NA	1.93E+00	2.32E+01	8.32E-02
Mercury	0.900	ND	1.10E-01	NA	NA	NA	1.96E-02	1.20E-01	1.63E-01
Nickel	0.060	ND	2.21E+00	NA	NA	NA	3.58E-02	2.90E+00	1.23E-02
Vanadium	0.006	3.40E-03	9.13E+00	NA	NA	NA	5.23E-02	5.80E-02	9.02E-01
Zinc	1.500	ND	2.83E+02	NA	NA	NA	8.32E+01	2.90E+01	2.87E+00
SUM									1.17E+01

ND - Not Detected  
 NA - Not Applicable

EQUATIONS USED TO CALCULATE EXPOSURE FOR THE BOBWHITE QUAIL  
 SITE 43, AGAN STREET DUMP  
 REMEDIAL INVESTIGATION, CTO-0303  
 MCAS, NEW RIVER, NORTH CAROLINA

Food Source ingestion of: lv=vegetation lf=fish lm=mammals lw=worms lfr=fruit	Feeding Rate (f in kg/d)	Incidental Soil Ingestion (is in kg/d)	Rate of Drinking Water Ingestion (lw in l/d)	Rate of Worm Ingestion (lwo in kg/d)	Rate of Fruit Ingestion (lfr in kg/d)	Rate of Mammal Ingestion (lm in kg/d)	Rate of Vegetation Ingestion (lv in kg/d)	Body Weight (BW) (kg)	Home Range Size (acres)	Contaminated Area (acres)	H Ratio	Equation Used to Calculate Total Exposure E=total exposure Cw=constituent conc. in water Cs=constituent conc. in soil Cwo=constituent conc. in worms Cfr=constituent conc. in fruit H=ratio of home range area to site area
Vegetation (lv) 100%	0.013	1.11E-03	1.91E-02	NA	NA	NA	0.013	0.174	26.242	13.8	0.524	$\frac{E=(Cw)(lw) + [(Cs)(Bv)(lv) + (Cs)(s)]H}{BW}$

Contaminant of Concern	Soil to Plant Transfer Coefficient (Bv)	Constituent Concentration in Water (mg/l) (Cw)	Constituent Concentration in Soil (mg/kg) (Cs)	Constituent Concentration in Worms (mg/kg) (Cwo)	Constituent Concentration in Fruit (mg/kg) (Cfr)	Constituent Concentration in Mammals (mg/kg) (Cm)	Total Exposure (mg/kg/d)	TRV	RATIO
1,2-Dichloroethene (total)	2.704	2.00E-03	ND	NA	NA	NA	0.000	1.38E+01	1.62E-05
Acenaphthene	0.246	ND	3.40E-01	NA	NA	NA	0.005	4.76E+01	9.57E-05
Anthracene	0.097	ND	2.69E-01	NA	NA	NA	0.002	1.20E+02	1.64E-05
Benzo(a)anthracene	0.020	ND	1.24E+00	NA	NA	NA	0.005	1.20E+00	4.28E-03
Benzo(b)fluoranthene	0.006	ND	2.28E+00	NA	NA	NA	0.008	1.20E+00	6.83E-03
Benzo(k)fluoranthene	0.012	ND	7.68E-01	NA	NA	NA	0.003	1.20E+00	2.44E-03
Benzo(g,h,i)perylene	0.007	ND	1.07E+00	NA	NA	NA	0.004	1.20E+00	3.24E-03
Benzo(a)pyrene	0.013	ND	1.45E+00	NA	NA	NA	0.006	1.20E+00	4.69E-03
Bis(2-ethylhexyl)phthalate	0.044	2.00E-01	2.50E-01	NA	NA	NA	0.023	2.30E+00	1.01E-02
Butylbenzylphthalate	0.057	ND	2.43E-01	NA	NA	NA	0.001	4.32E+01	3.18E-05
Carbazole	0.550	ND	2.39E-01	NA	NA	NA	0.006	1.20E+00	5.14E-03
Chrysene	0.020	ND	1.50E+00	NA	NA	NA	0.006	1.20E+00	5.17E-03
Dibenz(a,h)anthracene	0.007	ND	3.13E-01	NA	NA	NA	0.001	1.20E+00	9.45E-04
Dibenzofuran	0.550	ND	2.76E-01	NA	NA	NA	0.007	1.20E+00	5.92E-03
Fluoranthene	0.044	ND	2.31E+00	NA	NA	NA	0.012	1.50E+01	7.92E-04
Fluorene	0.145	ND	3.03E-01	NA	NA	NA	0.003	3.40E+01	8.23E-05
Indeno(1,2,3-cd)pyrene	0.007	ND	1.25E+00	NA	NA	NA	0.005	1.20E+00	3.76E-03
Phenanthrene	0.097	ND	6.15E-01	NA	NA	NA	0.004	1.12E+02	4.02E-05
Pyrene	0.033	ND	2.23E+00	NA	NA	NA	0.011	8.99E+00	1.17E-03
4,4'-DDD	0.013	6.40E-04	3.00E+00	NA	NA	NA	0.012	8.80E-02	1.33E-01
4,4'-DDE	0.020	9.70E-05	1.00E+00	NA	NA	NA	0.004	8.80E-02	4.72E-02
4,4'-DDT	0.008	ND	1.00E+00	NA	NA	NA	0.004	8.80E-02	4.15E-02
Endrin aldehyde	0.055	ND	3.74E-03	NA	NA	NA	0.000	1.16E+00	1.81E-05
Heptachlor epoxide	0.127	ND	1.60E-03	NA	NA	NA	0.000	1.04E-03	1.31E-02
Aluminum	0.004	7.17E-01	4.49E+03	NA	NA	NA	15.803	3.06E+01	5.17E-01
Arsenic	0.040	2.33E-03	7.00E-01	NA	NA	NA	0.004	1.98E+01	1.89E-04
Barium	0.150	3.65E-02	4.55E+01	NA	NA	NA	0.434	3.06E+00	1.42E-01
Cadmium	0.550	ND	5.00E-01	NA	NA	NA	0.013	5.59E+00	2.30E-03
Chromium	0.008	ND	2.39E+01	NA	NA	NA	0.087	1.53E+02	5.68E-04
Cobalt	0.020	ND	1.17E+00	NA	NA	NA	0.005	1.53E+00	3.18E-03
Copper	0.400	3.20E-03	1.59E+01	NA	NA	NA	0.312	4.59E+01	6.80E-03
Iron	0.004	4.28E+00	4.34E+03	NA	NA	NA	15.686	1.53E+02	1.03E-01
Lead	0.045	2.80E-03	6.78E+01	NA	NA	NA	0.351	7.52E+00	4.67E-02
Manganese	0.250	5.59E-02	3.65E+01	NA	NA	NA	0.499	3.06E+02	1.63E-03
Mercury	0.900	ND	1.10E-01	NA	NA	NA	0.004	3.06E-01	1.44E-02
Nickel	0.060	ND	2.21E+00	NA	NA	NA	0.013	4.59E+01	2.79E-04
Vanadium	0.006	3.40E-03	9.13E+00	NA	NA	NA	0.033	4.39E+01	7.51E-04
Zinc	1.500	ND	2.83E+02	NA	NA	NA	18.241	1.53E+02	1.19E-01
								SUM	1.25E+00

ND - Not Detected  
 NA - Not Applicable

EQUATIONS USED TO CALCULATE EXPOSURE FOR THE RED FOX  
 SITE 43, AGAN STREET DUMP  
 REMEDIAL INVESTIGATION, CTO-0303  
 MCAS, NEW RIVER, NORTH CAROLINA

Food Source Ingestion of: lv=vegetation lf=fish lm=mammals lw=worms lf=fruit	Feeding Rate (I in kg/d)	Incidental Soil Ingestion (Is in kg/d)	Rate of Drinking Water Ingestion (Iw in l/d)	Rate of Worm Ingestion (Iwo in kg/d)	Rate of Fruit Ingestion (If in kg/d)	Rate of Mammal Ingestion (Im in kg/d)	Rate of Vegetation Ingestion (Iv in kg/d)	Body Weight (BW) (kg)	Home Range Size (acres)	Contaminated Area (acres)	H Ratio	Equation Used to Calculate Total Exposure E=total exposure Cw=constituent conc. in water Cs=constituent conc. in soil Cwo=constituent conc. in worms Cf=constituent conc. in fruit H=ratio of home range area to site area
Small Mammals lm=80%	0.601	0.017	3.85E-01	NA	NA	0.481	0.1202	4.535	1245.4	13.8	0.011	$E = \frac{Cw \times Iw + (Cm \times I) + (Cs \times Bv) + (Cf \times I) + (Cwo \times Iwo) + (Cf \times I)}{BW}$
Vegetation lv=20%	0.112 Small Mammal	0.00289 Small Mammal	6.52E-02 Small Mammal	NA	NA	NA	0.112 Small Mammal	0.3725 Small Mammal				$Cm = \frac{Cw \times Iw + ((Cs \times Bv) + (Cs \times I) \times H) \times Bb}{BW}$
								Small Mammal	0.032	1	All AOCs	

Contaminant of Concern	Soil to Plant Transfer Coefficient (Bv)	Constituent Concentration in Water (mg/l) (Cw)	Constituent Concentration in Soil (mg/kg) (Cs)	Constituent Concentration in Worms (mg/kg) (Cwo)	Ingestion-to-tissue Biotransfer Factor (Bb)	Constituent Concentration in Mammals (mg/kg) (Cm)	Total Exposure (mg/kg/d)	TRV	RATIO
1,2-Dichloroethene (total)	2.704	2.00E-03	ND	NA	2.51E-08	8.79E-10	1.70E-04	2.13E+00	7.99E-05
Acenaphthene	0.248	ND	3.40E-01	NA	1.58E-04	4.39E-08	3.85E-05	7.45E+00	5.17E-08
Anthracene	0.097	ND	2.89E-01	NA	7.94E-04	7.79E-08	1.87E-05	1.88E+01	9.95E-07
Benzo(a)anthracene	0.020	ND	1.24E+00	NA	1.28E-02	2.05E-04	5.81E-05	1.88E-01	3.09E-04
Benzo(b)fluoranthene	0.008	ND	2.28E+00	NA	1.00E-01	2.06E-03	1.00E-04	1.88E-01	5.33E-04
Benzo(k)fluoranthene	0.012	ND	7.68E-01	NA	3.16E-02	2.60E-04	3.43E-05	1.88E-01	1.83E-04
Benzo(g,h,i)perylene	0.007	ND	1.07E+00	NA	7.94E-02	7.89E-04	4.70E-05	1.88E-01	2.50E-04
Benzo(a)pyrene	0.013	ND	1.45E+00	NA	2.51E-02	4.07E-04	6.55E-05	1.88E-01	3.49E-04
Bis(2-ethylhexyl)phthalate	0.044	2.00E-01	2.50E-01	NA	3.16E-03	1.27E-04	1.70E-02	1.05E-01	1.82E-01
Butylbenzylphthalate	0.057	ND	2.43E-01	NA	2.00E-03	1.18E-05	1.40E-05	6.77E+00	2.07E-08
Carbazole	0.550	ND	2.39E-01	NA	2.51E-02	1.04E-03	4.85E-05	1.88E-01	2.64E-04
Chrysene	0.020	ND	1.50E+00	NA	1.28E-02	2.48E-04	7.03E-05	1.88E-01	3.74E-04
Dibenz(a,h)anthracene	0.007	ND	3.13E-01	NA	7.94E-02	2.31E-04	1.37E-05	1.88E-01	7.31E-05
Dibenzofuran	0.550	ND	2.78E-01	NA	2.51E-02	1.20E-03	5.71E-05	1.88E-01	3.04E-04
Fluoranthene	0.044	ND	2.31E+00	NA	3.09E-03	1.48E-04	1.25E-04	2.35E+00	5.31E-05
Fluorene	0.145	ND	3.03E-01	NA	3.98E-04	6.12E-08	2.52E-08	5.32E+00	4.74E-08
Indeno(1,2,3-cd)pyrene	0.007	ND	1.25E+00	NA	8.13E-02	9.38E-04	5.47E-05	1.88E-01	2.92E-04
Phenanthrene	0.097	ND	8.15E-01	NA	7.94E-04	1.78E-05	4.27E-05	1.75E+01	2.44E-08
Pyrene	0.033	ND	2.23E+00	NA	5.01E-03	1.94E-04	1.14E-04	1.41E+00	8.07E-05
4,4'-DDD	0.013	6.40E-04	3.00E+00	NA	2.51E-02	8.48E-04	1.90E-04	3.41E-01	5.57E-04
4,4'-DDE	0.020	9.70E-05	1.00E+00	NA	1.28E-02	1.68E-04	5.51E-05	3.41E-01	1.82E-04
4,4'-DDT	0.008	ND	1.00E+00	NA	6.31E-02	6.03E-04	4.39E-05	3.41E-01	1.29E-04
Endrin aldehyde	0.055	ND	3.74E-03	NA	2.09E-03	1.87E-07	2.14E-07	3.25E-02	6.58E-06
Heptachlor epoxide	0.127	ND	1.60E-03	NA	5.01E-04	3.83E-08	1.25E-07	1.83E-04	7.68E-04
Aluminum	0.004	7.17E-01	4.49E+03	NA	1.50E-03	5.69E-02	2.50E-01	1.95E+01	1.28E-02
Arsenic	0.040	2.33E-03	7.00E-01	NA	2.00E-03	2.78E-05	2.35E-04	2.37E-02	9.93E-03
Barium	0.150	3.85E-02	4.55E+01	NA	1.50E-04	3.58E-04	6.80E-03	1.07E-01	6.53E-02
Cadmium	0.550	ND	5.00E-01	NA	5.40E-04	4.68E-05	1.01E-04	8.76E-02	1.03E-03
Chromium	0.008	ND	2.39E+01	NA	5.50E-03	1.24E-03	1.03E-03	1.03E+00	1.00E-03
Cobalt	0.020	ND	1.17E+00	NA	2.00E-02	3.10E-04	5.51E-05	3.75E-01	1.47E-04
Copper	0.400	3.20E-03	1.59E+01	NA	1.00E-02	2.02E-02	2.80E-03	7.80E+00	3.58E-04
Iron	0.004	4.28E+00	4.34E+03	NA	2.00E-02	7.47E-01	5.48E-01	1.88E+01	2.92E-02
Lead	0.045	2.80E-03	6.78E+01	NA	3.00E-04	4.22E-04	3.91E-03	3.41E+00	1.15E-03
Manganese	0.250	5.59E-02	3.65E+01	NA	4.00E-04	1.21E-03	8.92E-03	3.75E+00	2.38E-03
Mercury	0.900	ND	1.10E-01	NA	2.50E-01	7.64E-03	4.24E-03	1.36E-01	3.11E-04
Nickel	0.060	ND	2.21E+00	NA	6.00E-03	3.35E-04	1.30E-04	3.25E+01	3.99E-08
Vanadium	0.008	3.40E-03	8.13E+00	NA	2.50E-03	2.94E-04	8.78E-04	2.77E-01	2.45E-03
Zinc	1.500	ND	2.83E+02	NA	1.00E-01	1.30E+01	1.51E-01	1.30E+00	1.18E-01
								SUM	4.08E-01

ND - Not Detected  
 NA - Not Applicable



EQUATION USED TO CALCULATE EXPOSURE FOR THE RACCOON  
 SITE 43, AGAN STREET DUMP  
 REMEDIAL INVESTIGATION, CTO-0303  
 MCAS, NEW RIVER, NORTH CAROLINA

Food Source Ingestion of: Iv=vegetation If=fish Im=mammals Iw=worms If=fruit	Feeding Rate (I in kg/d)	Incidental Soil Ingestion (Is in kg/d)	Rate of Drinking Water Ingestion (Iw in kg/d)	Rate of Worm Ingestion (Iwo in kg/d)	Rate of Fruit Ingestion (If in kg/d)	Rate of Fish Ingestion (If in kg/d)	Rate of Vegetation Ingestion (IV in kg/d)	Body Weight (BW) (kg)	Home Range Size (acres)	Contaminant Area (acres)	H Ratio	Equation Used to Calculate Total Exposure E=total exposure Cw=constituent conc. in water Cs=constituent conc. in soil Cwo=constituent conc. in worms Cf=constituent conc. in fruit H=ratio of home range area to site area
Vegetation Iv=40%	0.214	2.01E-02	4.22E-01	NA	0.1	1.29E-01	NA	5.120	256.984	13.8	0.054	$E = (Cw)(Iw) + (Cf)(If) + [(Cs)(Bv)(Iv) + (Cs)(Is)] [H]$ BW
Fish If=60%												

Contaminant of Concern	Soil to Plant Transfer Coefficient (Br)	Constituent Concentration in Water (mg/l) (Cw)	Constituent Concentration in Soil (mg/kg) (Cs)	Constituent Concentration in Worms (mg/kg) (Cwo)	Fish Bioconcentration Factor (BCF)	Constituent Concentration in Fishes (mg/kg) (Cf) (=SW*BCF)	Total Exposure (mg/kg/d)	TRV	RATIO
1,2-Dichloroethene (total)	2.704	2.00E-03	ND	NA	5.6	1.12E-02	4.48E-04	2.04E+00	2.18E-04
Acenaphthene	0.248	ND	3.40E-01	NA	242.0	0.00E+00	1.47E-04	7.16E+00	2.05E-05
Anthracene	0.097	ND	2.69E-01	NA	30.0	0.00E+00	8.01E-05	1.80E+01	4.44E-06
Benzo(a)anthracene	0.020	ND	1.24E+00	NA	30.0	0.00E+00	2.82E-04	1.80E-01	1.57E-03
Benzo(b)fluoranthene	0.008	ND	2.28E+00	NA	30.0	0.00E+00	4.93E-04	1.80E-01	2.73E-03
Benzo(k)fluoranthene	0.012	ND	7.68E-01	NA	30.0	0.00E+00	1.70E-04	1.80E-01	9.40E-04
Benzo(g,h,i)perylene	0.007	ND	1.07E+00	NA	30.0	0.00E+00	2.32E-04	1.80E-01	1.29E-03
Benzo(a)pyrene	0.013	ND	1.45E+00	NA	30.0	0.00E+00	3.22E-04	1.80E-01	1.79E-03
Bis(2-ethylhexyl)phthalate	0.044	2.00E-01	2.50E-01	NA	130.0	2.60E+01	6.69E-01	1.01E-01	6.62E+00
Butylbenzylphthalate	0.057	ND	2.43E-01	NA	414.0	0.00E+00	6.36E-05	6.50E+00	9.78E-06
Carbazole	0.550	ND	2.39E-01	NA	ND	0.00E+00	1.88E-04	1.80E-01	9.33E-04
Chrysene	0.020	ND	1.50E+00	NA	30.0	0.00E+00	3.42E-04	1.80E-01	1.90E-03
Dibenz(a,h)anthracene	0.007	ND	3.13E-01	NA	30.0	0.00E+00	6.79E-05	1.80E-01	3.76E-04
Dibenzofuran	0.550	ND	2.76E-01	NA	ND	0.00E+00	1.94E-04	1.80E-01	1.08E-03
Fluoranthene	0.044	ND	2.31E+00	NA	1150.0	0.00E+00	5.77E-04	2.25E+00	2.56E-04
Fluorene	0.145	ND	3.03E-01	NA	30.0	0.00E+00	1.03E-04	5.11E+00	2.02E-05
Indeno(1,2,3-cd)pyrene	0.007	ND	1.25E+00	NA	30.0	0.00E+00	2.70E-04	1.80E-01	1.50E-03
Phenanthrene	0.087	ND	6.16E-01	NA	30.0	0.00E+00	1.93E-04	1.68E+01	1.09E-05
Pyrene	0.033	ND	2.23E+00	NA	30.0	0.00E+00	5.37E-04	1.35E+00	3.97E-04
4,4'-DDD	0.013	6.40E-04	3.00E+00	NA	53600.0	3.43E+01	8.62E-01	3.27E-01	2.64E+00
4,4'-DDE	0.020	9.70E-05	1.00E+00	NA	53600.0	5.20E+00	1.31E-01	3.27E-01	4.00E-01
4,4'-DDT	0.008	ND	1.00E+00	NA	53600.0	0.00E+00	2.17E-04	3.27E-01	6.65E-04
Endrin aldehyde	0.055	ND	3.74E-03	NA	3970.0	0.00E+00	9.73E-07	1.02E-01	9.52E-08
Heptachlor epoxide	0.127	ND	1.60E-03	NA	11200.0	0.00E+00	5.18E-07	1.58E-04	3.32E-03
Aluminum	0.001	7.17E-01	4.49E+03	NA	231.0	1.66E+02	5.17E+00	3.48E-01	1.48E+01
Arsenic	0.008	2.33E-03	7.00E-01	NA	44.0	1.03E-01	2.92E-03	2.27E-02	1.28E-01
Barium	0.015	3.65E-02	4.55E+01	NA	8.0	2.92E-01	2.05E-02	1.02E-01	2.01E-01
Cadmium	0.150	ND	5.00E-01	NA	64.0	0.00E+00	1.72E-04	1.64E-03	1.05E-01
Chromium	0.005	ND	2.39E+01	NA	16.0	0.00E+00	5.12E-03	9.86E-01	5.19E-03
Cobalt	0.007	ND	1.17E+00	NA	40.0	0.00E+00	2.54E-04	3.61E-01	7.03E-04
Copper	0.250	3.20E-03	1.59E+01	NA	36.0	1.15E-01	1.01E-02	7.49E+00	1.34E-03
Iron	0.001	4.28E+00	4.34E+03	NA	ND	0.00E+00	1.27E+00	1.80E+01	7.05E-02
Lead	0.009	2.80E-03	6.78E+01	NA	49.0	1.37E-01	1.85E-02	3.27E+00	5.65E-03
Manganese	0.050	5.59E-02	3.65E+01	NA	35.0	1.98E+00	6.31E-02	3.60E+00	1.75E-02
Mercury	0.200	ND	1.10E-01	NA	5500.0	0.00E+00	4.29E-05	1.31E-01	3.28E-04
Nickel	0.060	ND	2.21E+00	NA	47.0	0.00E+00	5.84E-04	2.05E+00	2.85E-04
Vanadium	0.003	3.40E-03	6.13E+00	NA	ND	0.00E+00	2.23E-03	2.66E-01	8.38E-03
Zinc	0.900	ND	2.83E+02	NA	47.0	0.00E+00	2.68E-01	6.54E+01	4.40E-03
SUM								2.51E+01	

ND - Not Detected  
 NA - Not Applicable

**DERIVATION OF TERRESTRIAL REFERENCE VALUES  
SITE 43, AGAN STREET DUMP  
REMEDIAL INVESTIGATION, CTO-0303  
MCAS, NEW RIVER, NORTH CAROLINA**

The following section discusses the procedures used to develop the terrestrial reference values (TRVs) used in the terrestrial portion of the ERA.

Most of the whitetailed deer, bobwhite quail, and cottontail rabbit TRVs for inorganic chemicals were derived from mineral tolerance values (MTLs) contained in the Mineral Tolerance of Domestic Animals (NAS, 1980). This book defines an MTL as "that dietary level that, when fed for a limited period, will not impair animal performance and should not produce unsafe residues in human food derived from the animal." (NAS, 1980) The values in this book were reported as mg mineral/kg feed. Therefore, these values were first converted to mg mineral/kg body weight-day using the following equation (Opresko et.al., 1993):

$$\text{TRV} = \text{MTL} * \text{CR}$$

where:

TRV = Terrestrial Reference Value (mg mineral/kg body weight-day)

MTL = Mineral Tolerance Value (mg mineral/kg food)

CR = consumption rate (kg food/kg body weight-day)

For the whitetailed deer TRVs derived from the cattle MTLs, a consumption rate of 0.05 kg food/kg body weight-day was used for the cow (O'Dell, 1971). Because the cattle MTL was developed primarily with cow studies that were conducted for less than 6 months, the new TRV was multiplied by 0.1 to account for subchronic to chronic uncertainty. The TRV for a cow then was adjusted to a TRV for a deer to account for differences in the body size using the following equation (Opresko et.al., 1993):

$$\text{TRV (deer)} = [\text{TRV (cow)}] * [\text{bw (cow)/bw (deer)}]^{1/3}$$

Where:

TRV (deer) = Deer Terrestrial Reference Value  
(mg mineral/kg body weight-day)

TRV (cow) = Cow Terrestrial Reference Value  
(mg mineral/kg body weight-day)

bw (cow) = body weight of a cow (100 kg)

bw (deer) = body weight of a deer (45.4 kg)

**DERIVATION OF TERRESTRIAL REFERENCE VALUES  
SITE 43, AGAN STREET DUMP  
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For the bobwhite quail TRVs derived from the poultry MTLs, a consumption rate of 0.41 kg food/kg body weight was calculated based on an average poultry weighing 0.5 kg, and the following allometric model (Nagy, 1987):

$$\text{CR (birds)} = 0.648 (\text{bw})^{0.651}$$

Where:

CR (birds) = consumption rate for birds  
(kg food/kg body weight-day)  
bw = body weight for an average bird (0.5 kg)

The TRV for poultry then was adjusted to a TRV for a bobwhite quail to account for differences in the body size using the same equation that was used to adjust the cow to the deer. The body weight used for the bobwhite quail was 0.174 kg.

For the cottontail rabbit TRVs derived from the rabbit MTLs, a consumption rate of 0.081 was calculated using the following equation:

$$\text{CR (rabbit)} = \text{FR}/\text{bw}$$

Where:

CR (rabbit) = consumption rate for rabbits  
(kg food/kg body weight-day)  
FR = feeding rate of a cottontail rabbit (0.237 kg/day)  
bw = body weight of a cottontail rabbit (1.229 kg)

The TRV (rabbit) was not adjusted for body size since a rabbit was used in the TRV calculation.

The following procedures were used for deriving TRV for the whitetailed deer, bobwhite quail, and cottontail rabbit when MTLs were not available, and for species that did not have MTLs. Their TRVs were determined using No Observed Adverse Effects Levels (NOAELs) or Lowest Observed Effects Levels (LOAELs). When available, the NOAEL or LOAEL from the Integrated Risk Information System (IRIS) was used in the TRV development. However, if a toxicity value was not available from IRIS, then one was obtained from various literature sources including Agency for Toxic Substances Registry Toxicological Profiles, Toxicological Benchmarks for Wildlife (Opresko *et.al.*, 1994) and published articles. Chemicals that only had diet concentration (as opposed to NOAELs) were converted to TRVs using the above equation and the appropriate consumption rates and body weights. The attached table contains the respective body weights used in the TRV adjustments.

As is presented in the attached table, toxicity data from many species were used to develop the TRVs. The attached table presents which animal was used to develop a particular TRV in parentheses. When possible, the chronic reproductive or developmental NOAEL value was used in the development of the TRV. However, in some instances, only a subchronic NOAEL or a chronic or sub-chronic LOAEL for some

**DERIVATION OF TERRESTRIAL REFERENCE VALUES  
SITE 43, AGAN STREET DUMP  
REMEDIAL INVESTIGATION, CTO-0303  
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chemicals were found in the literature. If a LOAEL was used, the number was divided by 10 as an uncertainty factor. If a subchronic value was used it also was divided by 10 as an uncertainty factor. Finally, toxicity values were not found for all the chemicals. Where possible, the toxicity of a similar chemical was used for these chemicals (i.e., using endrin for endrin aldehyde). The attached table identifies, in parentheses, which chemicals were used as surrogates.

TOXICITY DATA USED TO CALCULATE TERRESTRIAL REFERENCE VALUES  
 SITE 43, AGAN STREET DUMP  
 REMEDIAL INVESTIGATION, CTO-0303  
 MCAS, NEW RIVER, NORTH CAROLINA

Chemical	Substitute Chemical Used	Cattle (mg/kg/day)	Poultry (mg/kg/day)	Rabbit (mg/kg/day)	Dog (mg/kg/day)	Rat (mg/kg/day)	Mouse (mg/kg/day)	Guinea Pig (mg/kg/day)	Mink (mg/kg/day)
Aluminum		5 (1)	10 (1)	11.61 (1)	15 (1)	NA	1.93 (60)	NA	NA
Antimony		NA	NA	4.06 (1)	NA	0.035 (12)	NA	NA	NA
Arsenic		0.25 (1)	5.135 (61) Mallard	2.90 (1)	NA	NA	0.1261 (13)	NA	NA
Barium		0.1 (1)	1 (1)	1.16 (1)	NA	0.25 (4)	NA	NA	NA
Beryllium		NA	NA	NA	NA	0.54 (4)	NA	NA	NA
Cadmium		0.0025 (1)	1.45 (63) Mallard	0.03 (1)	0.075 (14)	0.004 (15)	NA	NA	NA
Chromium		5 (1)	50 (1)	58.03 (1)	NA	2.41 (5)	NA	NA	NA
Cobalt		0.05 (1)	0.5 (1)	0.58 (1)	NA	NA	NA	NA	NA
Copper		0.5 (1)	15 (1)	11.61 (1)	NA	NA	NA	NA	12.9 (17)
Iron		5 (1)	50 (1)	29.02 (1)	NA	NA	NA	NA	NA
Lead		0.15 (1)	3.85 (65) A. kestral	1.74 (1)	NA	8 (6)	NA	NA	NA
Manganese		1 (24)	100 (1)	23.21 (1)	NA	8.8 (66)	NA	NA	NA
Mercury		0.01 (1)	0.1 (1)	0.12 (1)	NA	0.32 (18)	NA	NA	NA
Molybdenum		NA	NA	NA	NA	0.02 (82)	NA	NA	NA
Nickel		0.25 (1)	15 (1)	2.90 (1)	25 (2)	5 (2)	NA	NA	NA
Selenium		0.01 (1)	0.5 (67) Mallard	0.12 (1)	NA	0.04 (19)	NA	NA	NA
Silver		NA	5 (1)	NA	NA	NA	0.181 (20)	NA	NA
Thallium		NA	NA	NA	NA	0.023 (54)	NA	NA	NA
Vanadium		0.25 (1)	11.38 (68) Mallard	0.06 (1)	NA	0.65 (58)	NA	NA	NA
Zinc		2.5 (1)	50 (1)	29.02 (1)	1 (3)	160 (69)	NA	NA	NA
Cyanide		NA	4.5 (21)	NA	0.375 (22)	10.8 (23)	NA	NA	NA
Acenaphthene		NA	NA	NA	NA	17.5 (56)	NA	NA	NA
Acenaphthylene		NA	NA	NA	NA	17.5 Acen.	NA	NA	NA
Anthracene		NA	NA	NA	NA	NA	100 (33)	NA	NA
Benzo(a)anthracene	(Benzo(a)pyrene	NA	NA	NA	NA	NA	1	NA	NA
Benzo(b)fluoranthene	(Benzo(a)pyrene	NA	NA	NA	NA	NA	1	NA	NA
Benzo(k)fluoranthene	(Benzo(a)pyrene	NA	NA	NA	NA	NA	1	NA	NA
Benzo(ghi)perylene	(Benzo(a)pyrene	NA	NA	NA	NA	NA	1	NA	NA
Benzo(g,h,i)perylene	(Benzo(a)pyrene	NA	NA	NA	NA	NA	1	NA	NA
Benzo(a)pyrene		NA	NA	NA	NA	NA	1 (7)	NA	NA
beta-BHC		NA	NA	NA	NA	5 (51)	NA	NA	NA
gamma-BHC	(beta-BHC)	NA	NA	NA	NA	5 (51)	NA	NA	NA
Bis(2-ethylhexyl)phthalate		NA	1.11 (16) Ringed Dove	NA	NA	NA	NA	0.1833 (11)	NA
Butylbenzylphthalate		NA	NA	NA	NA	15.9 (52)	NA	NA	NA
Carbazole	(Benzo(a)pyrene	NA	NA	NA	NA	NA	1	NA	NA
Chrysene	(Benzo(a)pyrene	NA	NA	NA	NA	NA	1	NA	NA
Dibenzofuran	(Benzo(a)pyrene	NA	NA	NA	NA	NA	1	NA	NA
Dibenzo(a,h)anthracene	(Benzo(a)pyrene	NA	NA	NA	NA	NA	1	NA	NA
Dibenz(a,h)anthracene	(Benzo(a)pyrene	NA	NA	NA	NA	NA	1	NA	NA
Diethylphthalate		NA	NA	NA	NA	NA	4583 (53)	NA	NA
2,4-Dimethylphenol		NA	NA	NA	NA	NA	5 (85)	NA	NA
Di-n-butylphthalate		NA	0.11 (16) Ringed Dove	NA	NA	125 (63)	NA	NA	NA
Di-n-octylphthalate		NA	NA	NA	NA	17.5 (79)	NA	NA	NA
2,6-Dinitrotoluene		NA	NA	NA	0.4 (84)	NA	NA	NA	NA
Fluoranthene		NA	NA	NA	NA	NA	12.5 (8)	NA	NA
Fluorene		NA	NA	NA	NA	12.5 (56)	NA	NA	NA
Indeno(1,2,3-cd)pyrene	(Benzo(a)pyrene	NA	NA	NA	NA	NA	1	NA	NA
2-Methylnaphthalene	(Naphthalene)	NA	NA	NA	NA	41	NA	NA	NA
Naphthalene		NA	NA	NA	NA	41 (9)	NA	NA	NA
Nitrobenzene		NA	NA	NA	NA	0.25 (80)	NA	NA	NA
n-Nitrosodiphenylamine		NA	NA	NA	NA	50 (81)	NA	NA	NA
Phenanthrene	(Naphthalene)	NA	NA	NA	NA	41	NA	NA	NA
Phenol		NA	NA	NA	NA	6 (57)	NA	NA	NA
Pyrene		NA	NA	NA	NA	NA	7.5 (10)	NA	NA

TOXICITY DATA USED TO CALCULATE TERRESTRIAL REFERENCE VALUES  
 SITE 43, AGAN STREET DUMP  
 REMEDIAL INVESTIGATION, CTO-0303  
 MCAS, NEW RIVER, NORTH CAROLINA

Chemical	Substitute Chemical Used	Cattle (mg/kg/day)	Poultry (mg/kg/day)	Rabbit (mg/kg/day)	Dog (mg/kg/day)	Rat (mg/kg/day)	Mouse (mg/kg/day)	Guinea Pig (mg/kg/day)	Mink (mg/kg/day)
Aldrin		0.5 (24)	NA	NA	0.025 (77)	0.025 (77)	NA	NA	NA
Alpha-chlordane	(Chlordane)	1 (24)	2.14 (70) Blackbird	NA	0.075 (48)	0.055 (49)	NA	NA	NA
Gamma-chlordane	(Chlordane)	1 (24)	2.14 (70) Blackbird	NA	0.075 (48)	0.055 (49)	NA	NA	NA
Dieldrin		0.5 (24)	0.03 (71) Mallard	NA	0.005 (25)	0.005 (25)	NA	NA	NA
4,4'-DDD	(DDT)	NA	0.088 (DDT)	NA	NA	0.8 (DDT)	NA	NA	NA
4,4'-DDE		NA	0.088 (24) Quail	NA	NA	0.8 (47)	NA	NA	NA
4,4'-DDT		NA	0.088 (24) Quail	NA	NA	0.8 (47)	NA	NA	NA
Endosulfan		NA	10 (72) Partridge	NA	0.57 (26)	0.6 (26)	NA	NA	NA
Endosulfan I		NA	10 (72) Partridge	NA	0.57 (26)	0.6 (26)	NA	NA	NA
Endosulfan II	(Endosulfan)	NA	10 (72) Partridge	NA	0.57 (26)	0.6 (26)	NA	NA	NA
Endosulfan sulfate	(Endosulfan)	NA	10 (72) Partridge	NA	0.57 (26)	0.6 (26)	NA	NA	NA
Endrin		NA	0.3 (73) Mallard	NA	0.025 (27)	0.25 (28)	NA	NA	NA
Endrin aldehyde	(Endrin)	NA	0.3 (73) Mallard	NA	0.025 (27)	0.25 (28)	NA	NA	NA
Endrin ketone	(Endrin)	NA	0.3 (73) Mallard	NA	0.025 (27)	0.25 (28)	NA	NA	NA
Heptachlor		NA	NA	NA	NA	0.15 (45)	NA	NA	0.057 (29)
Heptachlor Epoxide		NA	NA	NA	0.000125 (24)	NA	NA	NA	NA
Aroclor-1221		NA	NA	NA	NA	3.5 (30)	NA	NA	NA
Aroclor-1232	(Aroclor-1242)	NA	0.41 (78) Owl	NA	NA	0.15 (31)	NA	NA	NA
Aroclor-1260		NA	NA	NA	NA	0.005 (32)	NA	NA	NA
Aroclor-1254		NA	0.18 (76) Pheasant	1 (75)	NA	NA	NA	NA	0.1 (50)
Aroclor-1248		NA	NA	0.28 (77)	NA	NA	0.13 (62)	NA	NA
Methylene chloride		NA	NA	NA	NA	5.85 (34)	NA	NA	NA
Carbon disulfide		NA	NA	1.1 (35)	NA	NA	NA	NA	NA
1,1-Dichloroethene		NA	NA	NA	NA	28 (59)	NA	NA	NA
1,2-Dichloroethene (total)		NA	NA	NA	NA	5 (44)	NA	NA	NA
Chloroform		NA	NA	NA	30 (36)	38 (37)	NA	NA	NA
2-Butanone		NA	NA	NA	NA	NA	NA	NA	NA
1,1,1-Trichloroethane		NA	NA	NA	NA	NA	1000 (38)	NA	NA
Trichloroethene		NA	NA	NA	NA	100 (39)	NA	NA	NA
1,1,2-Trichloroethane		NA	NA	NA	NA	NA	0.39 (40)	NA	NA
Benzene		NA	NA	NA	NA	0.1 (41)	NA	NA	NA
1,1,2,2-Tetrachloroethane		NA	NA	NA	NA	76 (85)	NA	NA	NA
Tetrachloroethene		NA	NA	NA	NA	1.4 (42)	NA	NA	NA
Toluene		NA	NA	NA	NA	22.3 (38)	NA	NA	NA
Ethylbenzene		NA	NA	NA	NA	9.71 (41)	NA	NA	NA
Xylenes		NA	NA	NA	NA	179 (43)	NA	NA	NA
Xylenes (total)		NA	NA	NA	NA	179 (43)	NA	NA	NA
Vinyl chloride		NA	NA	NA	NA	0.17 (83)	NA	NA	NA
Acetone		NA	NA	NA	NA	10 (46)	NA	NA	NA

- (1) NAS, 1980
- (2) Ambrose et al., 1976
- (3) Drinker et al., 1927
- (4) Schroder and Mitchner, 1975a,b
- (5) Mackenzie et al., 1958
- (6) Azar et al., 1973
- (7) Mackenzie and Angevine, 1981
- (8) USEPA, 1988a
- (9) Schmall, 1955
- (10) USEPA, 1989a
- (11) Lamb, et al., 1987
- (12) Schroeder et al., 1976
- (13) Schroeder and Mitchner, 1971
- (14) Loser and Lorke, 1977
- (15) Kopp et al., 1982
- (16) Peakall et al., 1974
- (17) Aulerich et al., 1982
- (18) Fitzhugh et al., 1950

- (19) Halverson et al., 1966
- (20) Rungby and Dansher, 19
- (21) Gomez et al., 1983, 1988
- (22) USEPA, 1980
- (23) Howard and Hanzal, 1955
- (24) Ford et al., 1991
- (25) Walker et al., 1969
- (26) Hoechst, 1989
- (27) Vesicol, 1969
- (28) Treon et al., 1955
- (29) Aulerich et al., 1990
- (30) Wasserman and Culos, 1
- (31) Bruckner et al., 1974
- (32) Byrne et al., 1988
- (33) USEPA, 1989b
- (34) NCA, 1982
- (35) Hardin et al., 1981
- (36) Heywood et al., 1979
- (37) Jorgenson et al., 1985
- (38) Lane, et al., 1982
- (39) NTP, 1985a
- (40) White et al., 1985
- (41) Wolf et al., 1956
- (42) Buban, 1985
- (43) NTP, 1986a
- (44) Quast et al., 1983
- (45) Vesicol, 1955
- (46) USEPA, 1986a
- (47) Fitzhugh, 1948
- (48) WHO, 1984 and NRCC, 1975
- (49) Vesicol, 1983
- (50) Ringer, 1983
- (51) Ito et al., 1975
- (52) NTP, 1985b
- (53) McClane and Hughs, 1980
- (54) USEPA, 1986b

- (55) NCI, 1978
- (56) USEPA, 1989b
- (57) NTP, 1983a
- (58) Schroeder et al., 1970
- (59) Nitchke, et al., 1983
- (60) Ondreicka, et al., 1966
- (61) USFWS, 1964
- (62) Thomas and Hinsdill, 1980
- (63) White and Finely, 1978
- (64) Smith, et al., 1953
- (65) Pattee, 1984
- (66) Laskey, et al., 1982
- (67) Heinz, et al., 1987
- (68) White and Dieter, 1978
- (69) Schlicker and Cox, 1968
- (70) Stickler, e.al., 1983
- (71) Nebeker et al., 1992
- (72) Abiola, 1992

- (73) Spann, et al., 1986
- (74) Dow, 1958
- (75) Villeneuve, et al., 1972
- (76) Dahlgren, et al., 1972
- (77) FAO/WHO, 1978
- (78) McLane and Hughes, 1980
- (79) Piekacz, 1971
- (80) CIIT, 1984
- (81) NCI, 1979
- (82) Jeter et al., 1954
- (83) Til et al., 1983
- (84) Lee et al., 1976
- (85) USEPA, 1989c

**BODY WEIGHTS FOR TERRESTRIAL REFERENCE VALUE CALCULATION  
SITE 43, AGAN STREET DUMP  
REMEDIAL INVESTIGATION, CTO-0303  
MCAS, NEW RIVER, NORTH CAROLINA**

Body Weight (kg)

Cattle	100	(IT Corp, 1992)
Whitetailed Deer	45.4	(Dee, 1991)
Bobwhite Quail	0.0174	(USEPA, 1993b)
Eastern Cottontail	1.2285	(USEPA, 1993b)
Lab Rat	0.35	(USEPA, 1988)
Lab Dog	10	(USEPA, 1988)
Poultry	0.5	(IT Corp, 1992)
Red Fox	4.535	(Storm et.al., 1976)
Raccoon	5.12	(USEPA, 1993b)
Lab Mouse	0.03	(USEPA, 1988)
Guinea pig	0.86	(USEPA, 1988)
Mink	1	(USEPA, 1993b)
Mallard Duck	1	(Heinze et.al., 1989)
Short-tailed Shrew	0.017	(Schlesinger and Potter, 1974)
Americal Kestral	0.13	(Pattee, 1984)
Blackbird	0.064	(Stickel, 1983)
Pheasant	1	(USEPA, 1993b)
Ringed Dove	0.155	(Terres, 1980)
Screech Owl	0.181	(Dunning, 1984)
Partridge	0.4	(Abiola, 1992)

REGION IV TERRESTRIAL REFERENCE VALUE CALCULATION  
 SITE 43, AGAN STREET DUMP  
 REMEDIAL INVESTIGATION, CTO-0303  
 MCAS, NEW RIVER, NORTH CAROLINA

Chemical	Whitetailed Deer (mg/kg/day)	Bobwhite Quail (mg/kg/day)	Eastern Cottontail (mg/kg/day)	Red Fox (mg/kg/day)	Raccoon (mg/kg/day)
Aluminum	6.51E+00 (ct)	3.06E+01 (bi)	1.16E+01 (rb)	1.95E+01 (dg)	3.48E-01 (mo)
Antimony	6.91E-03 (rt)	9.52E-02 (rt)	4.06E+00 (rb)	1.49E-02 (rt)	1.43E-02 (rt)
Arsenic	3.25E-01 (ct)	1.98E+01 (bi)	2.90E+00 (rb)	2.37E-02 (mo)	2.27E-02 (mo)
Barium	1.30E-01 (ct)	3.06E+00 (bi)	1.16E+00 (rb)	1.07E-01 (rt)	1.02E-01 (rt)
Beryllium	1.07E-01 (rt)	1.47E+00 (rt)	3.55E-01 (rt)	2.30E-01 (rt)	2.21E-01 (rt)
Cadmium	3.25E-03 (ct)	5.59E+00 (bi)	2.90E-02 (rb)	9.76E-02 (dg)	1.64E-03 (rt)
Chromium	6.51E+00 (ct)	1.53E+02 (bi)	5.80E+01 (rb)	1.03E+00 (rt)	9.86E-01 (rt)
Cobalt	6.51E-02 (ct)	1.53E+00 (bi)	5.80E-01 (rb)	3.75E-01 (rb)	3.61E-01 (rb)
Copper	6.51E-01 (ct)	4.59E+01 (bi)	1.16E+01 (rb)	7.80E+00 (mk)	7.49E+00 (mk)
Iron	6.51E+00 (ct)	1.53E+02 (bi)	2.90E+01 (rb)	1.88E+01 (rb)	1.80E+01 (rb)
Lead	1.95E-01 (ct)	7.52E+00 (bi)	1.74E+00 (rb)	3.41E+00 (rt)	3.27E+00 (rt)
Manganese	1.30E+00 (ct)	3.06E+02 (bi)	2.32E+01 (rb)	3.75E+00 (rt)	3.60E+00 (rt)
Mercury	1.30E-02 (ct)	3.06E-01 (bi)	1.20E-01 (rb)	1.36E-01 (rt)	1.31E-01 (rt)
Molybdenum	3.95E-03 (rt)	5.44E-02 (rt)	1.32E-02 (rt)	8.52E-03 (rt)	8.18E-03 (rt)
Nickel	3.25E-01 (ct)	4.59E+01 (bi)	2.90E+00 (rb)	3.25E+01 (dg)	2.05E+00 (rt)
Selenium	1.30E-02 (ct)	1.93E+00 (bi)	1.20E-01 (rb)	1.70E-02 (rt)	1.64E-02 (rt)
Silver	1.58E-02 (mo)	1.53E-01 (bi)	5.25E-02 (mo)	3.40E-02 (mo)	3.26E-02 (mo)
Thallium	4.54E-03 (rt)	6.26E-02 (rt)	1.51E-02 (rt)	9.79E-03 (rt)	9.40E-03 (rt)
Vanadium	3.25E-01 (ct)	4.39E+01 (bi)	5.80E-02 (rb)	2.77E-01 (rt)	2.66E-01 (rt)
Zinc	3.25E+00 (ct)	1.53E+02 (bi)	2.90E+01 (rb)	1.30E+00 (dg)	6.54E+01 (rt)
Cyanide	2.13E+00 (rt)	1.38E+01 (bi)	7.11E+00 (rt)	4.88E-01 (dg)	4.42E+00 (rt)
Acenaphthene	3.46E+00 (rt)	4.76E+01 (rt)	1.15E+01 (rt)	7.45E+00 (rt)	7.16E+00 (rt)
Acenaphthylene	3.46E+00 (rt)	4.76E+01 (rt)	1.15E+01 (rt)	7.45E+00 (rt)	7.16E+00 (rt)
Anthracene	8.71E+00 (mo)	1.20E+02 (mo)	2.90E+01 (mo)	1.88E+01 (mo)	1.80E+01 (mo)
Benzo(a)anthracene	8.71E-02 (mo)	1.20E+00 (mo)	2.90E-01 (mo)	1.88E-01 (mo)	1.80E-01 (mo)
Benzo(b)fluoranthene	8.71E-02 (mo)	1.20E+00 (mo)	2.90E-01 (mo)	1.88E-01 (mo)	1.80E-01 (mo)
Benzo(k)fluoranthene	8.71E-02 (mo)	1.20E+00 (mo)	2.90E-01 (mo)	1.88E-01 (mo)	1.80E-01 (mo)
Benzo(ghi)perylene	8.71E-02 (mo)	1.20E+00 (mo)	2.90E-01 (mo)	1.88E-01 (mo)	1.80E-01 (mo)
Benzo(g,h,i)perylene	8.71E-02 (mo)	1.20E+00 (mo)	2.90E-01 (mo)	1.88E-01 (mo)	1.80E-01 (mo)
Benzo(a)pyrene	8.71E-02 (mo)	1.20E+00 (mo)	2.90E-01 (mo)	1.88E-01 (mo)	1.80E-01 (mo)
beta-BHC	9.88E-01 (rt)	1.36E+01 (rt)	3.29E+00 (rt)	2.13E+00 (rt)	2.04E+00 (rt)
gamma-BHC	9.88E-01 (rt)	1.36E+01 (rt)	3.29E+00 (rt)	2.13E+00 (rt)	2.04E+00 (rt)
Bis(2-ethylhexyl)phthalate	4.89E-02 (gp)	2.30E+00 (bi)	1.63E-01 (gp)	1.05E-01 (gp)	1.01E-01 (gp)
Bis(2-chloroethyl)ether	NA	NA	NA	NA	NA
Butylbenzylphthalate	3.14E+00 (rt)	4.32E+01 (rt)	1.05E+01 (rt)	6.77E+00 (rt)	6.50E+00 (rt)
Carbazole	8.71E-02 (mo)	1.20E+00 (mo)	2.90E-01 (mo)	1.88E-01 (mo)	1.80E-01 (mo)
Chrysene	8.71E-02 (mo)	1.20E+00 (mo)	2.90E-01 (mo)	1.88E-01 (mo)	1.80E-01 (mo)
Dibenzofuran	8.71E-02 (mo)	1.20E+00 (mo)	2.90E-01 (mo)	1.88E-01 (mo)	1.80E-01 (mo)
Dibenzo(a,h)anthracene	8.71E-02 (mo)	1.20E+00 (mo)	2.90E-01 (mo)	1.88E-01 (mo)	1.80E-01 (mo)
Dibenz(a,h)anthracene	8.71E-02 (mo)	1.20E+00 (mo)	2.90E-01 (mo)	1.88E-01 (mo)	1.80E-01 (mo)
Diethylphthalate	3.99E+02 (mo)	5.50E+03 (mo)	1.33E+03 (mo)	8.60E+02 (mo)	8.26E+02 (mo)
2,4-Dimethylphenol	4.36E-01 (mo)	6.00E+00 (mo)	1.45E+00 (mo)	9.39E-01 (mo)	9.01E-01 (mo)
Di-n-butylphthalate	2.47E+01 (rt)	2.28E+01 (bi)	8.23E+01 (rt)	5.32E+01 (rt)	5.11E+01 (rt)
Di-n-octylphthalate	3.46E+00 (rt)	4.76E+01 (bi)	1.15E+01 (rt)	7.45E+00 (rt)	7.16E+00 (rt)
2,6-Dinitrotoluene	2.42E-01 (dg)	3.33E+00 (dg)	8.05E-01 (dg)	5.20E-01 (dg)	5.00E-01 (dg)
Fluoranthene	1.09E+00 (mo)	1.50E+01 (mo)	3.63E+00 (mo)	2.35E+00 (mo)	2.25E+00 (mo)
Fluorene	2.47E+00 (rt)	3.40E+01 (bi)	8.23E+00 (rt)	5.32E+00 (rt)	5.11E+00 (rt)
Indeno(1,2,3-cd)pyrene	8.71E-02 (mo)	1.20E+00 (mo)	2.90E-01 (mo)	1.88E-01 (mo)	1.80E-01 (mo)
2-Methylnaphthalene	8.10E+00 (rt)	1.12E+02 (rt)	2.70E+01 (rt)	1.75E+01 (rt)	1.68E+01 (rt)
Naphthalene	8.10E+00 (rt)	1.12E+02 (rt)	2.70E+01 (rt)	1.75E+01 (rt)	1.68E+01 (rt)
Nitrobenzene	4.94E-02 (rt)	6.80E-01 (rt)	1.65E-01 (rt)	1.06E-01 (rt)	1.02E-01 (rt)
N-Nitrosodiphenylamine	9.88E+00 (rt)	1.36E+02 (rt)	3.29E+01 (rt)	2.13E+01 (rt)	2.04E+01 (rt)
Phenanthrene	8.10E+00 (rt)	1.12E+02 (rt)	2.70E+01 (rt)	1.75E+01 (rt)	1.68E+01 (rt)
Phenol	1.19E+00 (rt)	1.63E+01 (rt)	3.95E+00 (rt)	2.55E+00 (rt)	2.45E+00 (rt)
Pyrene	6.53E-01 (mo)	8.99E+00 (mo)	2.18E+00 (mo)	1.41E+00 (mo)	1.35E+00 (mo)



REGION IV TERRESTRIAL REFERENCE VALUE CALCULATION  
 SITE 43, AGAN STREET DUMP  
 REMEDIAL INVESTIGATION, CTO-0303  
 MCAS, NEW RIVER, NORTH CAROLINA

Chemical	Whitetailed Deer (mg/kg/day)	Bobwhite Quail (mg/kg/day)	Eastern Cottontail (mg/kg/day)	Red Fox (mg/kg/day)	Raccoon (mg/kg/day)
Aldrin	6.51E-01 (ct)	6.80E-02 (rt)	1.65E-02 (rt)	3.25E-02 (dg)	1.02E-02 (rt)
Alpha-chlordane	1.30E+00 (ct)	3.30E+00 (bi)	3.62E-02 (rt)	9.76E-02 (dg)	2.25E-02 (rt)
Gamma-chlordane	1.30E+00 (ct)	3.30E+00 (bi)	3.62E-02 (rt)	9.76E-02 (dg)	2.25E-02 (rt)
Dieldrin	6.51E-01 (ct)	1.16E-01 (bi)	3.29E-03 (rt)	6.51E-03 (dg)	2.04E-03 (rt)
4,4'-DDD	1.58E-01 (rt)	8.80E-02 (bi)	5.26E-01 (rt)	3.41E-01 (rt)	3.27E-01 (rt)
4,4'-DDE	1.58E-01 (rt)	8.80E-02 (bi)	5.26E-01 (rt)	3.41E-01 (rt)	3.27E-01 (rt)
4,4'-DDT	1.58E-01 (rt)	8.80E-02 (bi)	5.26E-01 (rt)	3.41E-01 (rt)	3.27E-01 (rt)
Endosulfan	1.19E-01 (rt)	2.84E+01 (bi)	3.95E-01 (rt)	7.42E-01 (dg)	2.45E-01 (rt)
Endosulfan I	1.19E-01 (rt)	2.84E+01 (bi)	3.95E-01 (rt)	7.42E-01 (dg)	2.45E-01 (rt)
Endosulfan II	1.19E-01 (rt)	2.84E+01 (bi)	3.95E-01 (rt)	7.42E-01 (dg)	2.45E-01 (rt)
Endosulfan sulfate	1.19E-01 (rt)	2.84E+01 (bi)	3.95E-01 (rt)	7.42E-01 (dg)	2.45E-01 (rt)
Endrin	4.94E-02 (rt)	1.16E+00 (bi)	1.65E-01 (rt)	3.25E-02 (dg)	1.02E-01 (rt)
Endrin aldehyde	4.94E-02 (rt)	1.16E+00 (bi)	1.65E-01 (rt)	3.25E-02 (dg)	1.02E-01 (rt)
Endrin ketone	4.94E-02 (rt)	1.16E+00 (bi)	1.65E-01 (rt)	3.25E-02 (dg)	1.02E-01 (rt)
Heptachlor	2.96E-02 (rt)	4.08E-01 (rt)	9.87E-02 (rt)	6.39E-02 (rt)	6.13E-02 (rt)
Heptachlor epoxide	7.55E-05 (dg)	1.04E-03 (dg)	2.51E-04 (dg)	1.63E-04 (dg)	1.56E-04 (dg)
Aroclor-1221	6.91E-01 (rt)	9.52E+00 (rt)	2.30E+00 (rt)	1.49E+00 (rt)	1.43E+00 (rt)
Aroclor-1232	2.96E-02 (rt)	8.95E-01 (bi)	9.87E-02 (rt)	6.39E-02 (rt)	6.13E-02 (rt)
Aroclor-1260	9.88E-04 (rt)	1.36E-02 (rt)	3.29E-03 (rt)	2.13E-03 (rt)	2.04E-03 (rt)
Aroclor-1254	2.80E-02 (mk)	6.95E-01 (bi)	1.00E+00 (rb)	6.47E-01 (rb)	6.21E-01 (rb)
Aroclor-1248	1.13E-02 (mo)	1.56E-01 (mo)	2.80E-01 (rb)	1.81E-01 (rb)	2.34E-02 (mo)
Methylene chloride	1.16E+00 (rt)	1.59E+01 (rt)	3.85E+00 (rt)	2.49E+00 (rt)	2.39E+00 (rt)
Carbon disulfide	3.30E-01 (rb)	4.55E+00 (rb)	1.10E+00 (rb)	7.12E-01 (rb)	6.84E-01 (rb)
1,1-Dichloroethene	5.53E+00 (rt)	7.61E+01 (rt)	1.84E+01 (rt)	1.19E+01 (rt)	1.14E+01 (rt)
1,2-Dichloroethene (total)	9.88E-01 (rt)	1.36E+01 (rt)	3.29E+00 (rt)	2.13E+00 (rt)	2.04E+00 (rt)
Chloroform	7.51E+00 (rt)	1.03E+02 (rt)	2.50E+01 (rt)	3.90E+01 (dg)	1.55E+01 (rt)
2-Butanone	NA	NA	NA	NA	NA
1,1,1-Trichloroethane	8.71E+01 (rt)	1.20E+03 (rt)	2.90E+02 (rt)	1.88E+02 (rt)	1.80E+02 (rt)
Trichloroethene	1.98E+01 (rt)	2.72E+02 (rt)	6.58E+01 (rt)	4.26E+01 (rt)	4.09E+01 (rt)
1,1,2-Trichloroethane	3.40E-02 (mo)	4.68E-01 (mo)	1.13E-01 (mo)	7.32E-02 (mo)	7.03E-02 (mo)
Benzene	1.98E-02 (rt)	2.72E-01 (rt)	6.58E-02 (rt)	4.26E-02 (rt)	4.09E-02 (rt)
1,1,2,2-Tetrachloroethane	1.50E+01 (rt)	2.07E+02 (rt)	5.00E+01 (rt)	3.24E+01 (rt)	3.11E+01 (rt)
Tetrachloroethene	2.77E-01 (rt)	3.81E+00 (rt)	9.21E-01 (rt)	5.96E-01 (rt)	5.72E-01 (rt)
Toluene	4.41E+00 (rt)	6.06E+01 (rt)	1.47E+01 (rt)	9.49E+00 (rt)	9.12E+00 (rt)
Ethylbenzene	1.92E+00 (rt)	2.64E+01 (rt)	6.39E+00 (rt)	4.13E+00 (rt)	3.97E+00 (rt)
Xylenes	3.54E+01 (rt)	4.87E+02 (rt)	4.87E+02 (rt)	1.18E+02 (rt)	7.32E+01 (rt)
Xylenes (total)	3.54E+01 (rt)	4.87E+02 (rt)	1.18E+02 (rt)	7.62E+01 (rt)	7.32E+01 (rt)
Vinyl chloride	3.36E-02 (rt)	4.62E-01 (rt)	1.12E-01 (rt)	7.24E-02 (rt)	6.95E-02 (rt)
Acetone	1.98E+00 (rt)	2.72E+01 (rt)	6.58E+00 (rt)	4.26E+00 (rt)	4.09E+00 (rt)
2-Hexanone	NA	NA	NA	NA	NA

Note: The following abbreviations indicate which species was used to develop the TRV

(ct) = cattle (rb) = rabbit  
 (rt) = rat (dg) = dog  
 (bi) = bird (mo) = mouse  
 (gp) = guinea pig (mk) = mink

NA - No Data Available

## REFERENCES FOR TERRESTRIAL REFERENCE VALUES

Abiola, F.A. 1992. "Ecotoxicity of Organochloride Insecticides: Effects of Endosulfan on Birds Reproduction and Evaluation of its Induction Effects in Partridge, *Perdix perdix*". L. Rev. Vet. Med. 143:443-450.

Agency for Toxic Substances and Disease Registry (ASTDR). 1994. Toxicological Profile for Selenium. Prepared by Clement Associates for the US Department of Health and Human Services.

Agency for Toxic Substances and Disease Registry (ASTDR). 1993. Toxicological Profile for Endosulfan. Prepared by Clement Associates for the US Department of Health and Human Services.

Agency for Toxic Substances and Disease Registry (ASTDR). 1993. Toxicological Profile for Total Xylenes - Draft. Prepared by Clement Associates for the US Department of Health and Human Services.

Agency for Toxic Substances and Disease Registry (ASTDR). 1991. Toxicological Profile for Arsenic - Draft. Prepared by Life Systems, Inc, for the US Department of Health and Human Services.

Agency for Toxic Substances and Disease Registry (ASTDR). 1991. Toxicological Profile for Polychlorinated Biphenyls - Draft. Prepared by Syracuse Research Corporation for the US Department of Health and Human Services.

Agency for Toxic Substances and Disease Registry (ASTDR). 1991. Toxicological Profile for Tetrachloroethylene- Draft. Prepared by Syracuse Research Corporation for the US Department of Health and Human Services.

Agency for Toxic Substances and Disease Registry (ASTDR). 1991. Toxicological Profile for Benzene - Draft. Prepared by Clement Associates for the US Department of Health and Human Services.

Agency for Toxic Substances and Disease Registry (ASTDR). 1991. Toxicological Profile for Beryllium - Draft. Prepared by Syracuse Research Corporation for the US Department of Health and Human Services.

Agency for Toxic Substances and Disease Registry (ASTDR). 1991. Toxicological Profile for Cadmium - Draft. Prepared by Life Systems, Inc, for the US Department of Health and Human Services.

Agency for Toxic Substances and Disease Registry (ASTDR). 1991. Toxicological Profile for Chromium - Draft. Prepared by Syracuse Research Corporation for the US Department of Health and Human Services.

Agency for Toxic Substances and Disease Registry (ASTDR). 1991. Toxicological Profile for N-Nitrosodiphenylamine, Draft. Prepared by Clement Associates for the US Department of Health and Human Services.

## REFERENCES FOR TERRESTRIAL REFERENCE VALUES

Agency for Toxic Substances and Disease Registry (ASTDR). 1991. Toxicological Profile for Cyanide - Draft. Prepared by Syracuse Research Corporation for the US Department of Health and Human Services.

Agency for Toxic Substances and Disease Registry (ASTDR). 1991. Toxicological Profile for Chloroform - Draft. Prepared by Clement Associates for the US Department of Health and Human Services.

Agency for Toxic Substances and Disease Registry (ASTDR). 1991. Toxicological Profile for Diethylphthalate - Draft. Prepared by Clement Associates for the US Department of Health and Human Services.

Agency for Toxic Substances and Disease Registry (ASTDR). 1991. Toxicological Profile for Heptachlor/Heptachlor Epoxide - Draft. Prepared by Clement Associates for the US Department of Health and Human Services.

Agency for Toxic Substances and Disease Registry (ASTDR). 1991. Toxicological Profile for Methylene Chloride - Draft. Prepared by Life Systems, Inc, for the US Department of Health and Human Services.

Agency for Toxic Substances and Disease Registry (ASTDR). 1991. Toxicological Profile for Vinyl Chloride - Draft. Prepared by Clement Associates for the US Department of Health and Human Services.

Agency for Toxic Substances and Disease Registry (ASTDR). 1989. Toxicological Profile for Copper - Draft. Prepared by Syracuse Research Corporation for the US Department of Health and Human Services.

Agency for Toxic Substances and Disease Registry (ASTDR). 1989. Toxicological Profile for 1,1-Dichloroethene - Draft. Prepared by Clement Associates for the US Department of Health and Human Services.

Agency for Toxic Substances and Disease Registry (ASTDR). 1989. Toxicological Profile for Endrin/Endrin Aldehyde - Draft. Prepared by Life Systems, Inc, for the US Department of Health and Human Services.

Agency for Toxic Substances and Disease Registry (ASTDR). 1989. Toxicological Profile for Ethylbenzene - Draft. Prepared by Clement Associates for the US Department of Health and Human Services.

Agency for Toxic Substances and Disease Registry (ASTDR). 1989. Toxicological Profile for Naphthalene/2-methynaphthalene - Draft. Prepared by Life Systems, Inc, for the US Department of Health and Human Services.

## REFERENCES FOR TERRESTRIAL REFERENCE VALUES

Agency for Toxic Substances and Disease Registry (ASTDR). 1989. Toxicological Profile for Polycyclic Aromatic Hydrocarbons - Draft. Prepared by Clement Associates for the US Department of Health and Human Services.

Agency for Toxic Substances and Disease Registry (ASTDR). 1989. Toxicological Profile for Silver - Draft. Prepared by Clement Associates for the US Department of Health and Human Services.

Agency for Toxic Substances and Disease Registry (ASTDR). 1989. Toxicological Profile for 1,1-Dichloroethane - Draft. Prepared by Clement Associates for the US Department of Health and Human Services.

Agency for Toxic Substances and Disease Registry (ASTDR). 1989. Toxicological Profile for 1,2-Dichloroethane. Prepared by Clement Associates for the US Department of Health and Human Services.

Agency for Toxic Substances and Disease Registry (ASTDR). 1989. Toxicological Profile for 1,1-Dichloroethene. Prepared by Clement Associates for the US Department of Health and Human Services.

Agency for Toxic Substances and Disease Registry (ASTDR). 1989. Toxicological Profile for Trichloroethylene. Prepared by Syracuse Research Corporation for the US Department of Health and Human Services.

Agency for Toxic Substances and Disease Registry (ASTDR). 1988. Toxicological Profile for Mercury - Draft. Prepared by Clement Associates for the US Department of Health and Human Services.

Agency for Toxic Substances and Disease Registry (ASTDR). 1988. Toxicological Profile for 1,1,2-Trichloroethane - Draft. Prepared by Clement Associates for the US Department of Health and Human Services.

Agency for Toxic Substances and Disease Registry (ASTDR). 1988. Toxicological Profile for 1,1,1-Trichloroethane - Draft. Prepared by Syracuse Research Corporation for the US Department of Health and Human Services.

Agency for Toxic Substances and Disease Registry (ASTDR). 1988. Toxicological Profile for Alpha, Beta, and gamma Isomers of Hexachlorocyclohexane - Draft. Prepared by Clement Associates for the US Department of Health and Human Services.

Alumot, E., E. Nachtomi, E. Mandel, et al., 1976. "Tolerance and Acceptable Daily Intake of Chlorinated Fumigants in the Rat Diet". Food Cosmet. Toxicol. 14:105-110. Cited in ASTDR, 1989 (1,2-Dichloroethane).

Ambrose, A.M., D.S. Larson, J.R. Borzelleca and G.R. Hennigar, Jr. 1976. "Long-Term Toxicologic Assessment of Nickel in Rats and Dogs". J. Food Science Technology. 13:181-187. Cited in IRIS, Accessed January 1995 (Nickel).

## REFERENCES FOR TERRESTRIAL REFERENCE VALUES

Agency for Toxic Substances and Disease Registry (ASTDR). 1989. Toxicological Profile for Polycyclic Aromatic Hydrocarbons - Draft. Prepared by Clement Associates for the US Department of Health and Human Services.

Agency for Toxic Substances and Disease Registry (ASTDR). 1989. Toxicological Profile for Silver - Draft. Prepared by Clement Associates for the US Department of Health and Human Services.

Agency for Toxic Substances and Disease Registry (ASTDR). 1989. Toxicological Profile for 1,1-Dichloroethane - Draft. Prepared by Clement Associates for the US Department of Health and Human Services.

Agency for Toxic Substances and Disease Registry (ASTDR). 1989. Toxicological Profile for 1,2-Dichloroethane. Prepared by Clement Associates for the US Department of Health and Human Services.

Agency for Toxic Substances and Disease Registry (ASTDR). 1989. Toxicological Profile for 1,1-Dichloroethene. Prepared by Clement Associates for the US Department of Health and Human Services.

Agency for Toxic Substances and Disease Registry (ASTDR). 1989. Toxicological Profile for Trichloroethylene. Prepared by Syracuse Research Corporation for the US Department of Health and Human Services.

Agency for Toxic Substances and Disease Registry (ASTDR). 1988. Toxicological Profile for Mercury - Draft. Prepared by Clement Associates for the US Department of Health and Human Services.

Agency for Toxic Substances and Disease Registry (ASTDR). 1988. Toxicological Profile for 1,1,2-Trichloroethane - Draft. Prepared by Clement Associates for the US Department of Health and Human Services.

Agency for Toxic Substances and Disease Registry (ASTDR). 1988. Toxicological Profile for 1,1,1-Trichloroethane - Draft. Prepared by Syracuse Research Corporation for the US Department of Health and Human Services.

Agency for Toxic Substances and Disease Registry (ASTDR). 1988. Toxicological Profile for Alpha, Beta, and gamma Isomers of Hexachlorocyclohexane - Draft. Prepared by Clement Associates for the US Department of Health and Human Services.

Alumot, E., E. Nachtomi, E. Mandel, *et al.*, 1976. "Tolerance and Acceptable Daily Intake of Chlorinated Fumigants in the Rat Diet". *Food Cosmet. Toxicol.* 14:105-110. Cited in ASTDR, 1989 (1,2-Dichloroethane).

Ambrose, A.M., D.S. Larson, J.R. Borzelleca and G.R. Hennigar, Jr. 1976. "Long-Term Toxicologic Assessment of Nickel in Rats and Dogs". *J. Food Science Technology.* 13:181-187. Cited in IRIS, Accessed January 1995 (Nickel).

## REFERENCES FOR TERRESTRIAL REFERENCE VALUES

Aulerich, R.J., G.J. Bursian, and A.C. Napolitano. 1990. "Subacute Toxicity of Dietary Heptachlor to Mink (Mustela vison)". Arch. Environ. Contam. Toxicol 19(6):913-916. Cited in ASTDR, 1991 (Heptachlor).

Aulerich, R.J., R.K., Ringer, M.R., Bleavins, et. al. 1982. "Effects of Supplemental Dietary Copper on Growth, Reproductive Performance and Kit Survival of Standard Dark Mink and the Acute Toxicity of Copper to Mink". J. Animal Sci. 55:337-343. Cited in ASDTR, 1989 (Copper).

Aulerich, R.J., and R.K., Ringer. 1980. "Toxicity of the Polychlorinated Biphenyl Aroclor-1016 to Mink". Environmental Research Laboratory, Office of Research and Development. Cited in Opresko, et.al., 1994.

Azar, A., H.J. Trochimowicz and M.E. Maxfield. 1973. "Review of Lead Studies in Animals Carried out at Haskell Laboratory - Two Year Feeding Study and Response to Hemorrhage Study". In Barth D., A. Berlin, R. Engel, P. Recht and J. Smeets, Ed. Environmental Health Aspects of Lead: Proceedings International Symposium; October 1972; Amsterdam, The Netherlands. Commission of the European Communities, Luxemburg. p. 199-208. Cited in IRIS, Accessed January 1995 (Lead).

Barnes, D.W., V.M. Sanders, K.L. White Jr., et.al. 1985. "Toxicology of Trans-1,2-Dichloroethylene in the Mouse". Drug. Chem. Toxicol. 8:373-392. Cited in IRIS Accessed After Jan. 1992 (Trans-1,2-Dichloroethylene).

Bleavins, M.R., C.S. Sisodia, and T.K. Mukkur. 1980. "The Effects of Methyl Mercury, Tetraethyl Lead, and Sodium Arsenite on the Humoral Immune Response in Mice". Toxicol. Appl. Pharmacol. 52:245-254. Cited in Opresko et.al., 1994.

Bornhauses, M. M.R. Nusch, and H. Greim. 1980. "Operant Behavior Performance Changes in Rats After Prenatal Methylmercury Exposure". Toxicol. Appl. Pharmacol. Cited in ASTDR, 1988 (Mercury).

Brown, D., K.R. Butterworth, I.F. Gaunt, P. Grasso, S.D. Gangolli. 1978. "Short-Term Oral Toxicity Study of Diethyl Phthalate in the Rat". Food Cosmet. Toxicol. 16:415-422. Cited in IRIS, Oct, 1992.

Bruckner, J.V., K.L. Khanna, and H.H. Cornish. 1974. Effect of Prolonged Ingestion of Polychlorinated Biphenyls on the Rat. Food Cosmet. Toxicol. 12:323. Cited in ASTDR, 1991 (PCBs).

Bruckner, J.V., W.F. MacKenzie, S. Muralidhara, R. Luthra, G.M. Kyle, and D. Acosta. 1986. "Oral Toxicity of Carbon Tetrachloride: Acute, Subacute, and Subchronic Studies in Rats". Fund. Appl. Toxicol. 6(1):16-34.

Buben, J.A., and E.J. O'Flaherty. 1985. "Delineation of the Role of Metabolism in the Hepatototoxicity of Trichloroethylene and Perchloroethylene: A Dose-Effect Study". Toxicol. Appl. Pharmacol. 78:105-122. Cited in ASTDR, 1991 (Tetrachloroethylene).

## REFERENCES FOR TERRESTRIAL REFERENCE VALUES

Byrne, J.J., J.P. Carbone, and M.G. Pepe. 1988. "Suppression of Serum Adrenal Cortex Hormones by Chronic Low-Dose Polychlorobiphenyl or Polybromobiphenyl Treatments". *Arch. Environ. Contam. Toxicol.* 17:47-53. Cited in ASTDR, 1991 (PCBs).

Cardy, R.H., W. Lijinski, and P.K. Hildebrandt. 1979. "Neoplastic and Nonneoplastic Urinary Bladder Lesions Induced in Fischer 344 rats and B6C3F Hybrid Mice by N-Nitrosodiphenylamine." *Ecotoxicol. Environ. Safety* 3:29-37.

Carpenter, C.P., C.S. Weil, and H.F. Smyth, 1953. "Chronic Oral Toxicity of Di(2-ethylhexyl)phthalate for Rats and Guinea Pigs". *Arch. Indust. Hyg. Occup. Med.* 8:219-226. Cited in IRIS, Accessed Oct. 1994 (DEHP).

Chang, L.W., S. Yamaguchi, and J.A.W. Dudley. 1974. "Neurological Changes in Cats Following Long-Term Diet of Mercury Contaminated Tuna". *Acta. Neuropathol. (Berlin)* 27:171-176. Cited in ASTDR, 1988 (Mercury).

Chang, L.W., and H.A. Hartman. 1972. "Ultrastructural Studies of the Nervous System After Mercury Intoxication". *Acta. Neuropathol. (Berlin)* 20:122-138. Cited in ASTDR, 1988 (Mercury).

CIIT (Chemical Industry Institute of Toxicology). 1984. Ninety-day Inhalation Toxicity Study of Nitrobenzene in F344 Rats and B6C3F1 Mice. Research Triangle Park, NC. FYI-OTS-0874-0333.

Cody, T.E., S. Witherup, L. Hastings, K. Stemmes, and R.T. Christian. 1981. "1,3-Dinitrobenzene: Toxic Effects in Vivo and in Vitro". *J. Toxicol. Environ. Health.* 7(5): 829-847. Cited in IRIS, March 1995

Cox, G.E., D.E. Bailey, and K. Morgareidge. 1975. "Toxicity Studies in Rats with 2-Butanol Including Growth, Reproduction and Teratologic Observations". Food and Drug Research Laboratories, Inc., Waverly, NY, Report No. 91MR R 1673.

Dahlgren, R.B., R.L. Linder, and C.W. Carlson. 1972. "Polychlorinated Biphenyls: Their Effects on Pinned Pheasants". *Environ. Health Perspect.* 1:89-101. Cited in Opresko *et al.*, 1994.

Dee, J.C. November, 1991. "Methodology For Assessing Potential Risks To Deer Populations: A Case Study at a Superfund Site". Paper presented at the 1991 Annual Meeting of the Society of Environmental Toxicology and Chemistry. Abstract No. 426.

Dikshith, T.S.S., R.B. Raizada, M.K. Srivastava, and B.S. Kaphalia. 1984. "Response of Rats to Repeated Oral Administration of Endosulfan". *Ind. Health.* 22:295-304. Cited in ASTDR 1993 (Endosulfan).

Domingo, J.L., J.L. Paternaia, J.M. Llobet, and J. Corbella. 1986. "Effects of Vanadium on Reproduction, Gestation, Parturition and Lactation in Rats upon Oral Administration". *Life Sci.* 39:819-824. Cited on Opresko *et al.*, 1994.

## REFERENCES FOR TERRESTRIAL REFERENCE VALUES

Dow Chemical Company. 1958. MRID No. 00061912. Available from USEPA, Write to FOI, USEPA, Washington, DC 20460 (Heptachlor Epoxide)

Drinker, K.P., P.K. Thompson, and M. Marsh. 1927. "An Investigation of the Effects of the Long-Continued Ingestion of Zinc, in the Form of Zinc Oxide, by Cats and Dogs, Together with Observations Upon the Excretion and the Storage of Zinc". *Am. J. Physiol.* 80:31. Cited in NAS, 1980.

Dunning, J.B., 1984. Body Weights of 686 Species of North American Birds. West. Bird Banding Assoc. Monogr. No. 1. Eldon Publ. Co. Cave Crk, AZ. Cited in Opresko, et.al., 1984.

Duer, R.S., M.S. Bercegeay, and L.M. Mayo. 1988. "Acute Exposures to p-Xylene and Toluene Alter Visual Information Processing". *Neurotoxicol Teratol* 10:147-153. Cited in ASTDR, 1990 (Total Xylenes).

Eisler, R. 1990. Chlordane Hazards to Fish, Wildlife, and Invertebrates: A Synoptic Review. U.S. Department of the Interior, Fish and Wildlife Service. Biological Report 85(1.21), July 1990.

Eisler, R. 1990. Cyanide Hazards to Fish, Wildlife, and Invertebrates: A Synoptic Review. U.S. Department of the Interior, Fish and Wildlife Service. Biological Report 85(1.23), July 1991.

FAO/WHO (Food Agriculture Organization/World Health Organization). 1978. "Evaluation of Some Pesticides in Food." Food and Agric, Organ. Plant Production and Protection Paper. Suppl. 10, Rome. Cited in Newell et al., 1987.

Fitzhugh, O.G., A.A. Nelson, and E.P. Laug et al. 1950 "Chronic Oral Toxicities of Mercuri-Phenyl and Mercuric Salts". *Arch. Ind. Hyg. Med.* 2:433-442. Cited in ASTDR, 1989 (Mercury).

Fitzhugh, O.G., 1948. "Use of DDT Insecticides on Food Products". *Ind. Eng. Chem.* 40:704-705.

Formigli, L., R. Scelsi, P. Poggi, C. Gregotti, A. DiNucci, E. Sabbioni, L. Gottardi, and L. Manzo. 1986. "Thallium-Induced Testicular Toxicity in the Rat". *Environ. Res.* 40:531-539.

Ford, K.L., F.M. Applehans, and R. Ober. 1991. "Development of Toxicity Reference Values for Terrestrial Wildlife". In HMC-Northeast '91 Conference Proceedings, Sponserec by the Hazardous Materials Control Research Institute. July 10-12, 1991.

Fucik, K.W., H.W. Armstrong, and J.M. Neff. 1977. "The Uptake of Napthalenes by the Clam Rangia cuneata, in the Vicinity of an Oil-Separator Platform in Trinity Bay, Texas". Proc. 1977 Oil Spill Conference. Washington DC: American Petroleum Institute. Cited in USEPA, 1981.

Gasaway, W.C., and I.O. Buss. 1972. "Zinc Toxicity in the Mallard". *J. Wildl. Manage.* 36: 1107-1117.

Gerhart, J.M. 1986. "Ninety-day Oral Toxicity Study of Copoper Cyanide (CuCN) in Sprague-Dawley Rats". Prepared for the Dynamac Coporation, Rockville, MD by IIT Research Institute, Chicago, IL. IITRI Project No. LO6183, Study No. 3. Cited in ASTDR, 1991 (Cyanide).



## REFERENCES FOR TERRESTRIAL REFERENCE VALUES

- Gomez, G., M.A. Aparicio, and C.C. Willhite. 1988. "Relationship Between Dietary Cassave Cyanide Levels and Broiler Performance". *Nutr. Rep. Int.* 37:63-75. Cited in Eisler, 1991 (Cyanide).
- Gomez, G., M. Valdivieso, J. Santos, and C. Hoyos. 1983. "Evaluation of Cassava Root Meal Prepared from Low- or High-Cyanide Containing Cultivars in Pig and Broiler Diets." *Nutr. Rep. Int.* 28:693-704. Cited in Eisler, 1991 (Cyanide).
- Good, E.E., and G.W. Ware. 1969. "Effects of Insecticides on Reproduction in the Laboratory Mouse, IV. Endrin and Dieldrin". *Toxicol. Appl. Pharmacol.* 14:201-203.
- Gross, W.G., and V.G. Heller. 1946. "Chromates in Animal Nutrition". *J. Ind. Hyg. Toxicol.* 28:52-56. Cited in IRIS, Accessed January 1995 (Chromium).
- Halverson, A.W., I.S. Palmer and P.L. Guss. 1966. "Toxicity of Selenium to Post-Weanling Rats." *Toxicol. Appl. Pharmacol.* 9:477-484. Cited in IRIS, Accessed January 1995 (Selenium).
- Hardin B.D., G.P. Bond, M.R. Sikor, F.D. Andrew, R.P. Beliles, and R.W. Niemeir. 1981. "Testing of Selected Workplace Chemicals for Teratogenic Potential". *Scand J. Work Environ. Health.* 7(Suppl 4):66-75. Cited in HEAST, March 1994.
- Harr, J.R., J.F. Bone, Tinsley, I.J., et. al. 1967. "Selenium Toxicity in Rats. II. Histopathology". In; Muth OH, Oldfield J.E., P.H., Weswig, ed. *Selenium Biomed Proc 1st Int. Symp. Oregon State Univ.* 1966. Vol. II, Westport, Conn: AVI Publishing Co. 153-178. Cited in ASTDR, 1989 (Selenium).
- Hazelton Labs. 1988. Subchronic Toxicity Study in Rats with m-Xylene. Report by Hazelton Laboratories America, Inc., Rockville MD for Dyanamic Corporation, Rockville, MD. Unpublished. Cited in ASTDR, 1993 (Total Xylenes).
- Health Effects Assessment Summary Tables (HEAST). 1994. USEPA, Office of Solid Waste and Emergency Response. EPA 540/R-94/020.
- Heath, R., J. Spann, and J. Kreitzer. 1969. "Marked DDE Impairment of Mallard Reproduction in Controlled Studies". *Nature* 224:47-48. Cited in Newell, 1987.
- Heinz, G.H., D.J. Hoffman, and L.G. Gold. 1989. "Impaired Reproduction of Mallards Fed and Organic Form of Selenium". *J. Wildl. Mgmt.* 53: 418-428. Cited in Opresko, et.al., 1994.
- Heinz, G.H., D.J. Hoffman, A.J. Krynitsky, and D.M.G. Weller. 1987. "Reproduction in Mallards Fed Selenium". *Environ. Toxicol. Chem.* 6:423-433.
- Heywood, R., R.J. Sortwell, PRB Noel, et al. 1979. "Safety Evaluation of Toothpaste Containing Chloroform, III. Long-term Study on Beagle Dogs". *J. Environ Pathol Toxicol* 2:835-851. Cited in ASTDR, 1991 (Chloroform).
- Hoechst. 1989. "Endosulfan-Beta - Substance Technical (code HOE 02671 00 ZD96 0002): Testing for Toxicity by Repeated Oral Administration (1-year feeding study) to Beagle Dogs". Conducted by Hoechst Aktiengesellschaft, Frankfurt, Germany. Project No. 87.0643. Cited in ASTDR, 1993 (Endosulfan).

## REFERENCES FOR TERRESTRIAL REFERENCE VALUES

- Howard, J.W., and R.F. Hanzal. 1955. "Chronic Toxicity for Rats of Food Treated with Hydrogen Cyanide". *J. Agric. Food. Chem.* 3:325-329.
- Huff, J.E., J.K. Haseman, and D.M. DeMarini, et.al. 1989. "Multiple-Site Carcinogenicity of Benzene in Fischer 344 Rats and B6C3F1 Mice". *Environ. Health. Perspect.* 82:125-163. Cited in ASTDR, 1991 (Benzene).
- Hulzebos, E.M., D.M.M. Adema, E.M. Dirven-van Breemen, L. Henzen, W.A. van Dis, H.A. Herbold, J.A. Hoekstra, R. Baerselman, and C.A.M van Genstel. 1993. "Phytotoxicity Studies with Lactuca sativa in Soil and Nutrient Solution". *Environmental Toxicology and Chemistry*, 12:1079-1094.
- IT Corporation. November, 1992. Baseline Risk Assessment, Weldon Springs Ordnance Works, Weldon Spring, Missouri. Prepared for the Department of Army Corps of Engineers, Kansas City District.
- Ito N., H. Nagasaki, H. Aoe, et.al. 1975. "Development of Hepatocellular Carcinomas in Rats Treated with Benzene Hexachloride". *JNCI* 54:801-805. Cited in ASTDR, 1988 (BHC).
- Izushi F., and M. Ogata. 1990. "Hepatic and Muscle Injuries in Mice Treated with Heptachlor". *Toxicol. Lett.* 54:47-54.
- Jeter, M.A., and G.K. Davis. 1954. "The Effects of Dietary Molybdenum Upon Growth, Hemoglobin, Reproduction, and Lactation in Rats." *J. Nutr.* 54:215-220. Cited in IRIS, August 1995
- Jorgenson, T.A., E.F. Meierhenry, and C.J. Rushbrook, et.al. 1985. "Carcinogenicity of Chloroform in Drinking Water to Male Osborne-Mendel Rats and Female B6C3F<sub>1</sub> Mice". *Fundam. Appl. Toxicol* 5:760-769. Cited in ASTDR 1991 (Chloroform).
- Kopp S.J., T. Glonek, H.M. Perry Jr. et.al., 1982. "Cardiovascular Actions of Cadmium at Environmental Exposure Levels." *Science* 217:837-839. Cited in ASTDR, 1991 (Cadmium).
- Lamb, J.C., IV, R.E. Chapin, J. Teague, A.D. Lawton, and J.R. Reel. 1987. "Reproductive Effects of Four Phthalic Acid Esters in the Mouse". *Toxicol. Appl. Pharmacol.* 88:255-269.
- Lane, R.W., B.L. Riddle, and J.F. Borzelleca. 1982. "Effects of 1,2-Dichloroethane and 1,1,1-Trichloroethane in Drinking Water on Reproduction and Development in Mice". *Toxicol. Appl. Pharmacol.* 63:409-421.
- Lang, E.P., A.A. Nelson, O.G. Fitzhugh, and F.M. Kunze. 1950. "Liver Cell Alteration and DDT Storage in the Fat of the Rat Induced by Dietary Levels of 1-50 ppm DDT". *J. Pharmacol. Exp. Thearp.* 98:268-273. Cited in IRIS, Oct. 1994.
- Laskey, J.W., G.L. Rehnberg, J.F. Hein, and S.D. Carter. 1982. "Effects of Chronic Manganese (MN<sub>3</sub>O<sub>4</sub>) Exposure on Selected Reproductive Parameters in Rats.: *J. Toxicol. Environ. Health.* 9:677-687. Cited in Opresko et.al., 1994.

## REFERENCES FOR TERRESTRIAL REFERENCE VALUES

- Lee, C.C. *et al.*, 1976. Mammalian Toxicity of Munition Compounds, Phase II. Effects of Multiple Doses. Part III: 2,6-Dinitrotoluene." U.S. Army Medical Research and Development Command, Fort Detrick, MD. Cited in HEAST, March 1994
- Linder, R.E., T.B. Gaines, and R.D. Kimbrough. 1974. "The Effect of Polychlorinated Biphenyls on Rat Reproduction". Food Cosmet. Toxicol. 12:63-77. Cited in ASTDR, 1991 (PCBs).
- Loser E and D. Lorke. 1977. "Semichronic Oral Toxicity of Cadmium. I. Studies on Rats". Toxicology 7:215-224. Cited in ASTDR, 1992 (Cadmium).
- MacKenzie, R.D., R.U. Byerrum, C.F. Decker, C.A. Hoppert and R.F. Langham. 1958. "Chronic Toxicity Studies. II. Hexavalent and Trivalent Chromium Administered in Drinking Water to Rats". Am. Med. Assoc. Arch. Ind. Health. 18:232-234. Cited in Chromium IRIS, Accessed January 1995.
- MacKenzie, K.M., and D.M. Angevine. 1981. "Infertility in Mice Exposed in Utero to Benzo(a)pyrene. Biol". Reprod. 24:183-191. Cited in ASTDR, 1989 (PAHs).
- McCauley, P.T., M. Robinson, L.W. Condie, *et al.* Undated. "The Effects of Subacute and Subchronic Oral Exposure To Cis-1,2-Dichloroethylene in Rats. Health Effects Research Laboratory, USEPA, Cincinnati, Ohio. Cited in HEAST, March 1994.
- McLane, M.A.R., and D.L. Hughes. 1980. "Reproductive Success of Screech Owls Fed Aroclor-1248". Arch Environ. Contam. Toxicol. 9:661-665. Cited in Opresko *et al.*, 1994.
- Massie H.R., and V.R. Aiello. 1984. "Excessive Intake of Copper: Influence on Longevity and Cadmium Accumulation in Mice". Mech. Ageing. Dev. 26:195-203. Cited in ASTDR, 1989 (Copper).
- National Academy of Sciences (NAS). 1980. Mineral Tolerance of Domestic Animals. National Research Council, Commission on Natural Resources, Committee on Animal Nutrition.
- National Coffee Association (NCA). 1982. "24-Month Chronic Toxicity and Oncogenicity Study of Methylene Chloride in Rats". Final report. Prepared by Hazelton Labs. America, Inc., Vienna, VA (Unpublished), Cited in IRIS, Oct. 1994.
- National Research Council of Canada (NRCC). 1975. Chlordane: its Effects on Canadian Ecosystems and its Chemistry. Nat. Res. Council. Can. Publ. NRCC 14094. Cited in Eisler, 1990 (Chlordane).
- Nawrot, P.S. and R.E. Staples. 1979. "Embryofetal Toxicity and Teratogenicity of Benzene and Toluene in the Mouse". Teratology, 19:41A
- NCI. 1979. Bioassay of N-Nitrosodiphenylamine for Possible Carcinogenicity. Bethesda, MD: US Dept. of Health, Education, and Welfare, Public Health Service, National Institute of Health, National Cancer Institute. Division of Cancer Cause and Prevention. DHEW Publ (NIH) 79-1720. Cited in ASTDR, 1991 (N-Nitrosodiphenylamine).
- NCI. 1978a. Bioassay of Technical-Grade Endrin for Possible Carcinogenicity. Bethesda, MD: National Cancer Institute. Division of Cancer Cause and Prevention. NCI-CG-TR 12. Cited in ASTDR, 1990 (Endrin).

## REFERENCES FOR TERRESTRIAL REFERENCE VALUES

NCI. 1978b. Bioassay of 1,1,2,2-Tetrachloroethane for Possible Carcinogenicity. Bethesda, MD: National Cancer Institute. Division of Cancer Cause and Prevention. NTIS PB277, 4537GA, DHEW/PUB/NIH-78-827. Cited in ASTDR, 1994 (Endrin).

NCI. 1977. Bioassay of Heptachlor of Possible Carcinogenicity. CAS No. 76-44-8. Technical Report Series 9. Bethesda, MD: U.S. Department of Health, Education, and Welfare, National Institute of Health, National Cancer Institute. DHEW Publication (NIH) 77-809. Cited in ASTDR, 1991 (Heptachlor).

Nebeker, A.V., W.L. Griffis, T.W. Stutzman, G.S. Schuytema, L.A. Carey, and S.M. Scherer. 1992. "Effects of Aqueous and Dietary Exposure of Dieldrin on Survival, Growth and Bioconcentration in Mallard Ducklings". USEPA, Corvallis Environmental Research Laboratory. Environ. Chem. and Toxicol. 11:987-699.

Newell, A.J., D.W. Johnson, and L.A. Allen. 1987. Niagara River Biota Contamination Project: Fish Flesh Criteria for Piscivorous Wildlife. Division of Fish and Wildlife, Bureau of Environmental Protection, NY Department of Environmental Conservation. Technical Report 87-3.

NTP. 1989. Toxicology and Carcinogenesis Studies of Toluene in F344/N Rats and B6C3F1 Mice. Technical Report Series No. 371. Research Triangle Park, NC. Cited in IRIS Accessed Oct. 1994. (Toluene).

NTP. 1988. Developmental Toxicity Evaluation of 1,1,1-Trichloroethane (CAS No. 71-55-6) Administered to CD Rats. Final report Part 1. National Toxicology Program, Research Triangle Park, NC. Cited in ASTDR, 1988 (1,1,1-Trichloroethane).

NTP. 1986a. NTP Technical Report on the Toxicological and Carcinogenesis of Xylenes (mixed) (60.2% m-Xylene, 13.6% p-Xylene, 17.0% Ethylbenzene, and 9.1% o-Xylene) in F344/N Rats and B6C3F1 Mice (Gavage Studies). US Department of Health and Human Services, National Institutes of Health, National Toxicology Program, Research Triangle Park, NC., NTP TR 327, NIH Publ. No 86-2583. Cited in IRIS Accessed Oct. 1994.

NTP. 1986b. NTP Technical Report Series No. 289. Toxicology and Carcinogenesis Studies of Benzene in F344/N Rats and B6C3F1 Mice (Gavage Studies). US Department of Health and Human Services, National Institutes of Health, National Toxicology Program, Research Triangle Park, NC., NIH Publ. No 86-2545. Cited in ASTDR, 1991 (Benzene).

NTP. 1985a. Trichloroethylene Reproduction and Fertility Assessment in CD-1 Mice when Administered in the Feed. National Toxicology Program, Department of Health and Human Services, National Institutes of Health, Bethesda, MD. Cited in ASTDR, 1989 (Trichloroethylene).

NTP. 1985b. Twenty-Six Week Subchronic Study and Modified Mating Trial in F344 Rats. Butyl Benzyl Phthalate. Final Report. Project No. 12307-02, -03. Hazelton Laboratories America, Inc. Unpublished Study. Cited in IRIS, Oct. 1992.

## REFERENCES FOR TERRESTRIAL REFERENCE VALUES

NTP. 1983a. Teratologic Evaluation of Phenol in CD Rats. Report Prepared by Research Triangle Institute, Research Triangle Park, NC. NTIS PB83-247726. Govt. Rep. Announce Index. 83(25):6247. Cited in HEAST, March 1994.

NTP. 1983b. Carcinogenic Studies of 1,1,1,2-Tetrachloroethane in F344/N Rats and B6C3F1 Mice. National Toxicology Program, Cited in HEAST, March 1994.

O'Dell, G.O., W.J. Miller, S.L. Moore, W.A. King, J.C. Ellers, and H. Jurecek. 1971. "Effect of Dietary Nickel Level on Excretion and Nickel Content of Tissues in Male Calves." *Journal of Animal Science*, 32:769-733. Cited in IT, 1992.

Ondreicka, R.E., E. Ginter, and J. Kortus. 1966. Chronic Toxicity of Aluminum in rats and Mice and its Effects on Phosphorus Metabolism." *Brit. J. Indust. Med.* 23:305-313. Cited in Opresko et.al., 1994.

Opresko, D.M., B.E. Sample, and G.W. Suter II. 1994. Toxicological Benchmarks for Wildlife, 1994 Revisions. Prepared for the US Department of Energy, Office of Environmental Restoration and Waste Management. September, 1994. ES/ER/TM-86/R1.

Pattee, O.H., 1984. "Eggshell Thickness and Reproduction in American Kestrels Exposed to Chronic Dietary Lead". *Arch. Environ. Contam. Toxicol.* 13:29-34.

Peakall, D.B., 1974. "Effects of di-N-butylphthalate and di-2-ethylhexylphthalate on the Eggs of Ring Doves". *Bull. Environ. Contam. Toxicol.* 12:698-702.

Piekacz, H. 1971. Effect of Dioctyl and Dibutyl Phthalates on the Organism of Rats after Oral Administration in Prolonged Experiment. II. Subacute and Chronic Toxicity. *Rocz Panstw Zakl Hig* 22(3):295-307. Cited in HEAST, November 1994.

Quast J.F., C.G. Humiston, C.E. Wade, et.al. 1983. "A Chronic Toxicity and Oncogenecity Study in Rats and Subchronic Toxicity Study in Dogs on Ingested Vinylidene Chloride". *Fundam Appl. Toxicol* 3(1):55-62. Cited in ASTDR, 1989 (1,1-Dichloroethene).

Ringer, R. 1983. "Toxicology of PCBs in Mink and Ferrets". In. F. D'Itri and M Kamrin (eds.), *PCBs: Human and Environmental Hazards*. Butterworth Pul., Woburn, MA. pp. 227-240. Cited in Newell et. al. 1987.

Roesijadi, G., J.W. Anderson, and J.W. Blaylock. "Uptake of Hydrocarbons from Marine Sediments Contaminated with Prudhoe Bay Crude Oil: Influence of Feeding Type of Test Species and Availability of Polycyclic Aromatic Hydrocarbons." *J. Fish. Res. Board. Can.* 35:608-614. Cited in USEPA, 1981.

Rogers, A.E. 1979. Nutrition. In: The Laboratory Rat, Volume I: Biology and Diseases, H.J. Baker, J.R. Lindsey and S.H. Weisbroth, Ed. Academic Press, New York. Cited in Manganese IRIS, Accessed January 1995.

Rosenfeld, I., and O.A. Beath. 1964. Selenium: Geobotany, Biochemistry, Toxicity and Nutrition. Academic Press, New York. p. 198-208.

## REFERENCES FOR TERRESTRIAL REFERENCE VALUES

- Rungby, J., and G. Danscher. 1984. "Hypoactivity in Silver Exposed Mice." *Acta. Pharmacol. et Toxicol.* 55:398-401. Cited in ASTDR, 1989 (Silver).
- Sanders, V.M., K.L. White Jr, G.M. Shopp Jr., and A.E. Munson. 1985. "Humoral and Cell-Mediated Immune Status of Mice Exposed to 1,1,2-Trichloroethane". *Drug Chem Toxicol* 8:357-372. Cited in IRIS Accessed Oct, 1988 (1,1,2-Trichloroethane).
- Schlicker, S.A. and D.H. Cox. 1968. "Maternal Dietary Zinc, and Development and Zinc, Iron, and Copper Content of the Rat Fetus". *J. Nutr.* 95:287-294. Cited in Opresko *et.al.*, 1994.
- Schlesinger, W.H., and G.L. Potter. 1974. "Lead, Copper, and cadmium Concentrations in Small Mammals in the Hubbard Brook Experimental Forest". *OKIOS.* 25:148-152. Cited in Opresko *et.al.*, 1994.
- Schmal, D. 1955. "The Testing of Naphthalene and Anthracene for Carcinogenic Effects on Rats". *Z. Krebsforsch* 60:697-710. Cited in ASTDR, 1989 (Naphthalene)
- Schroder, H.A. M. Mitchener, and A.P. Nasur. 1976. "Zirconium, Niobium, Antimony, Vanadium, and Lead in Rats". *J. Nutr.* 100:59-66. Cited in IRIS, Accessed Oct. 1994 (Antimony).
- Schroder, H.A. and M. Mitchener. 1975a. "Life-term Effects of Mercury, Methyl Mercury and Nine Other Trace Metals on Mice." *J. Nutr.* 105:452-458. Cited in IRIS, Accessed January 1995 (Barium).
- Schroder, H.A. and M. Mitchener. 1975b. "Life-term Studies in Rats: Effects of Aluminum, Barium, Beryllium and Tungsten." *J. Nutr.* 105:421-427. Cited in IRIS, Accessed January 1995 (Barium).
- Schroder, H.A. and M. Mitchener. 1971. "Toxic Effects of Trace Elements on the Reproduction of Mice and Rats". *Arch. Environ. Health* 23:102-106. Cited in ASTDR, 1991 (Arsenic).
- Schroder, H.A., M. Mitchener, and A.P. Nason. 1970. "Zirconium, Niobium, Antimony, and Lead in Rats: Life-Term Studies." *J. Nutr.* 100:59-69. Cited in HEAST, March 1994.
- Smith, C.C. 1953. "Toxicity of Butyl Sterate, Bibutyl Sebacate, Dibutyl Phthalate, and Methoxyethyl Oleate". *Arch. Hyg. Occup. Med.* 7:310-318.
- Smyth, H. Jr, C.P. Carpenter, C.S. Weil, *et.al.* 1962. "Range Finding Toxicity Data: List VI". *Am. Indust. Hyg. Assoc. J.* 23:95-107. Cited in ASTDR, 1989 (Ethylbenzene).
- Spann, J.W., G.H. Heinz, and C.S. Hulse. 1986. "Reproduction and Health in Mallards Fed Endrin". *Environ. Toxicol. Chem.* 5:755-759.
- Stickel, L.F., W.H. Stickel, R.A. Dryland, and D.L. Hughes. 1983. "Oxychlorane, HCS-3260, and Nonachlor in Birds: Lethal Residues and Loss Rates". *J. Toxicol. Environ. Health.* 12:611-622.
- Storm, G.L., R.D. Andrews, R.L. Phillips, R.A. Bishop, D.B. Siniff, and J.R. Tester. 1976. "Morphology, Reproduction, Dispersal, and Mortality of Midwestern Red Fox Populations". *Wildl. Monogr.* Cited in Opresko *et.al.*, 1994.

## REFERENCES FOR TERRESTRIAL REFERENCE VALUES

- Street J.C., and R.P. Sharma. 1975. "Alteration of Induced Cellular and Humoral Immune responses by Pesticides and Chemicals of Environmental Concern: Quantitative Studies of Immunosuppression by DDT, Aroclor 1254, Carbaryl, Carbofuran, and Methylparathion". *Toxicol. Appl. Pharmacol.* 32:587-602. Cited in ASTDR, 1991 (PCBs).
- Tewe, O.O., and E. Pessu. 1982. "Performance and Nutrient Utilization in Growing Pigs Fed Cassava Peel Rations." Cited in Eisler,
- Tewe, O.O., and J.H. Maner. 1981. "Long-Term and Carry-Over Effect of Dietary Inorganic Cyanide (KCN) in the Life Cycle Performance and Metabolism of Rats". *Toxicol. Appl. Pharmacol.* 58:1-7.
- Thomas, P.T., and R.D. Hinsdill. 1980. Perinatal PCB Exposure and its Effects on the Immune System of Young Rabbits". *Drug Chem. Toxicol.* 3:173-184. Cited in ASTDR, 1991 (PCBs).
- Til, H.P., H.R. Immel, and V.J. Feron. 1983. Lifespan Oral Carcinogenicity Study of Vinyl Chloride in Rats. Final Report. Civo Institutes, TNO, Report No. V-93.285/291099. Cited in ASTDR, 1991 (Vinyl Chloride)
- Tinsley, I.J, J.R. Harr, J.F. Bone *et.al.* 1967. "Selenium Toxicity in Rats. I. Growth and Longevity". In: Muth OH, Oldfield J.E., P.H., Weswig, ed. *Selenium Biomed Proc 1st Int. Symp.* Oregon State Univ. 1966. Vol, II, Westport, Conn: AVI Publishing Co. 141-152. Cited in ASTDR, 1994 (Selenium).
- Treon, J.F., F.P. Cleveland, and L. Cappel. 1955. "Toxicity of Endrin for Laboratory Animals." *Agricultural and Food Chemistry* 3:842-848. Cited in ASTDR, 1989 (Endrin)
- USDOD. 1985. AD-A171-601. Department of Defense. Available form Defense Technical Center. Write to Documents, Cameron Station, Alexandria, VA, 22314. Cited in IRIS, March, 1995. (HMX)
- USDOD. 1983a. AD-A168-637. Department of Defense. Available form Defense Technical Center. Write to Documents, Cameron Station, Alexandria, VA, 22314. Cited in IRIS, March, 1995. (TNT)
- USDOD. 1983a. AD-A160-774. Department of Defense. Available form Defense Technical Center. Write to Documents, Cameron Station, Alexandria, VA, 22314. Cited in IRIS, March, 1995. (RDX)
- USDOD. 1983b. AD-A157-002. Department of Defense. Available form Defense Technical Center. Write to Documents, Cameron Station, Alexandria, VA, 22314. Cited in IRIS, March, 1995. (TNT)
- USEPA, 1993a. Great Lakes Water Quality Initiatives Criteria Documents for the Protection of Wildlife (Proposed). DDT, Mercury, 2,3,7,8-TCDD, PCBs. EPA/822/R-93-007. Office of Science and Technology, Washington, D.C. Cited in Opresko, *et.al.*, 1994.
- USEPA, U.S. Environmental Protection Agency. December 1993b. Wildlife Exposure Factors Handbook. Office of Research and Development. Washington, D.C. EPA/600/R-93/187a.
- USEPA, 1989a. Mouse Oral Subchronic Study. Conducted by Toxicity Research Labs, LTD. Muskegon, MI. for the Office of Solid Waste. Cited in IRIS, After Jan. 1992.

## REFERENCES FOR TERRESTRIAL REFERENCE VALUES

- USEPA, 1989b. Mouse Oral Subchronic Study with Acenaphthene. Conducted by Hazelton Laboratory Inc., for the Office of Solid Waste. Cited in IRIS, Sept. 1993.
- USEPA, 1989c. Ninty-Day Gavage Study in Albino Mice Using 2,4-Dimethylphenol. Study No. 410-2831. Prepared by Dynamac Corporation, Rockville, MD, for the Office of Solid Waste and Emergency responce, Washington, DC.
- USEPA, 1988a. 13-Week Mouse Oral Subchronic Study. Prepared by Toxicity Research Labs, LTD. Muskegon, MI. for the Office of Solid Waste. Cited in IRIS, Jan. 1995.
- USEPA, 1988b. Recommendations for and Documentation of Biological Values for Use in Risk Assessment. Environmental Criteria and Assessment Office, Cincinnati, OH. EPA/600/6-87/008. Cited in Opresko, et.al., 1994.
- USEPA, 1987. Health and Environmental Effects Document for Chlorinated Cyclopentadienes. Prepared for the Office of Health and Environmental Assessment, Environmental Criteria and Assessment Office, Cincinnati, OH, for the Office of Solid Waste. Cited in HEAST, March 1994.
- USEPA, 1986a. Ninty-day Gavage Study with Albino Rats using Acetone. Office of Solid Waste. Cited in HEAST, March 1994.
- USEPA, 1986b. Subchronic (90 day) Toxicity of Thallium(I) Sulfate in Spragu-Dawley Rats. Final Report. Environmental Criteria and Assessment Office, Cincinnati, OH, for the Office of Solid Waste. Cited in HEAST, March 1994.
- USEPA, 1981. An Exposure and Risk Assessment for Benzo(a)pyrene and Other Polycyclic Aromatic Hydrocarbons, Volume IV.
- USEPA, 1980. Ambient Water Quality Criteria for Cyanides. USEPA. 440/5-80-037. Cited in Eisler, 1991.
- U.S. Fish and Wildlife Service. 1964. Pesticide-Wildlife Studies, 1963: A Review of Fish and Wildlife Service Investigations During the Calander Year. FWS Circular 199.
- Velsicol Chemical Company. 1969. MRID No. 00030198. Available from USEPA. Write to FOI, USEPA, Washington, DC, 20460. Cited in IRIS, Oct. 1992 (Endrin).
- Velsicol Chemical Company. 1955. MRID No. 00062599. Available from USEPA. Write to FOI, USEPA, Washington, DC, 20460. Cited in IRIS, Oct. 1992 (Heptachlor).
- Velsicol Chemical Company. 1983. MRID No. 00138591, 00144313. Available from USEPA. Write to FOI, USEPA, Washington, DC, 20460. Cited in IRIS, Oct. 1994 (Chlordane).
- Villeneuve D.C., D.L. grant, and W.E.J. Phillips. 1972. "Modification of Pentobarbital Sleeping Times in Rats Following Chronic PCB Ingestion". Bull. Environ. Contam. Toxicol. 7:264-269. Cited in ASTDR, 1991 (PCBs).



## REFERENCES FOR TERRESTRIAL REFERENCE VALUES

Vreman, K., N.G. van der Veen, E.J. van der Molen, and W.G. de Ruig. 1986. "Transfer of Cadmium, Lead, Mercury and Arsenic from Feed into Milk and Various Tissues of Dairy Cows: Chemical and Pathological Data". *Neth. J. Agric. Sci.* 34:129-144. Cited in Eisler, 1991 (Arsenic).

Walker, A.I.T., D.E. Stevenson, J. Robinson, R. Thorpe, and M. Roberts. 1969. "The Toxicology and Pharmacodynamics of Dieldrin (HEOD): Two-Year Oral Exposure to Rabbits and Dogs". *Toxicol. Appl. Pharmacol.* 15:345-373.

Wasserman, D. M., M. Cucos, et.al. 1973. "Function of Adrenal Gland-Zona Fasciculata in rats Receiving Polychlorinated Biphenyls". *Environ Res.* 6:334-338. Cited in ASTDR, 1991 (PCBs).

Wentink, G.H., T.J. Spierenburg, G.J. de Graaf, and A.C.A. van Exsel. 1985. A Case of Chronic Zinc Poisoning in Calves Fed with Zinc-Contaminated Roushage. *Veterinary Quarterly* 7:153-157. Cited in Eisler, Ronald. 1990. Zinc Hazards to Fish, Wildlife, and Invertebrates: A Synoptic Review. U.S. Department of the Interior, Fish and Wildlife Service. Biological Report 85(1.23), July 1991.

Will, M.E., and G.W. Suter. 1994. Toxicological Benchmarks for Screening Potential Contaminants of Concern for Effects on Soil and Litter Invertebrates and Heterotrophic Process. Environmental Sciences Division, Oak Ridge National Laboratory. ES/ER/TM-126.

Will, M.E., and G.W. Suter. 1994. Toxicological Benchmarks for Screening Potential Contaminants of Concern for Effects on Terrestrial Plants. Environmental Sciences Division, Oak Ridge National Laboratory. ES/ER/TM-85/RI.

White, D.H., and M.P. Dieter. 1978. "Effects of Dietary Vanadium in Mallard Ducks". *J. Toxicol. Environ. Health* 4:43-50. Cited in Opresko et.al., 1994.

White K.L. Jr, and V.M. Sanders, D.W. Barnes, et.al. 1985. "Toxicology of 1,1,2-Trichloroethane in the Mouse". *Drug Chem Toxicol* 8:333-356. Cited in ASTDR, 1988 (1,1,2-Trichloroethane).

White, D.H., and M.T. Finley. 1978. "Uptake and Retention of Dietary Cadmium in Mallard Ducks". *Environ. Res.* 17:53-59

Wolf, M.A., V.K. Rowe, D.D. McCollister, et.al., 1956. "Toxicological Studies of Certain Alkylated Benzenes and Benzene." *AMA Arch. Ind. Health*. Cited in IRIS, Accessed Oct. 1992.

World Health Organization (WHO). 1984. Chlordane. Environmental Health Criteria 34. World Health Organization, Geneva, Switzerland. Cited in Eisler, Ronald. 1990.

**NOTE: Some of the references in this list are not specifically referenced in the proceeding table. This reference list also includes other toxicity values not used in the development of the terrestrial reference values.**

**APPENDIX W**  
**BIOASSAY TESTING RESULTS**

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