

Final

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



Prepared For:

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

Under the

**LANTDIV CLEAN Program**

**Comprehensive Long-Term  
Environmental Action Navy**

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

**CTO-0021**

**Baker**

**FOSTER WHEELER**  
FOSTER WHEELER ENVIRESPONSE, INC.

**WESTON**  
MANAGERS DESIGNERS/CONSULTANTS

03.13-06/15/98-02279

**FINAL**

**REMEDIAL INVESTIGATION  
OPERABLE UNIT NO. 16 (SITES 89 AND 93)**

**MCB CAMP LEJEUNE, NORTH CAROLINA**

**CONTRACT TASK ORDER 0356  
VOLUME II OF II  
APPENDICES**

**JUNE 15, 1998**

*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***



## APPENDICES

- A Test Boring and Monitoring Well Construction Records
- B Geotechnical Engineering and Hydrogeologic Parameters
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- K Base Background Soil Report
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- P Ecological Risk Screening Calculations

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

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**SITE 89 PHASE I  
TEMPORARY MONITORING WELLS**

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**Baker**

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**TEST BORING AND WELL CONSTRUCTION RECORD**

PROJECT: Phase I Investigation at Sites 88, 89, and 93 - MCB Camp Lejeune

CTO NO.: 62470-356

BORING NO.: 89-TW04IW

COORDINATES: EAST: 2465170

NORTH: 360188.9900

ELEVATION: SURFACE: 11.84

TOP OF PVC CASING: 14.12

Rig: Diedrich D-50					Date	Progress (Ft.)	Weather	Depth to Water (Ft.)	Time
Split Spoon	Casing	Augers	Core Barrel						
Size (ID)	1-3/8"	--	2-3/4"	--	7/31/96	0.0 - 50.0	M.cloudy, 90s	--	--
Length	2'	--	5'	--					
Type	Stainless	--	HSA	--					
Hammer Wt.	140 #	--	--	--					
Fall	30"	--	--	--					
Stickup	--	--	--	--					

**Remarks:****SAMPLE TYPE**

S = Split Spoon A = Auger  
 T = Shelby Tube W = Wash  
 R = Air Rotary C = Core  
 D = Denison P = Piston  
 N = No Sample

**WELL INFORMATION**

Type	Diam.	Top Depth (Ft.)	Bottom Depth (Ft.)
Sch 40, PVC Riser	1"	0	42
Sch 40, 10-Slot, PVC Screen	1"	42	47

Depth (Ft.)	Sample Type & No.	Sample Rec. (Ft.,%)	SPT	Lab Class.	PID (ppm)	Visual Description	Well Installation Detail	Elevation (Ft. MSL)
1	S-1	1.0 50%	5	--	(1)	F SAND, some silt, trace clay; brown; m. dense; moist		
2			6					
2.0			9					
3	S-2	1.6 80%	4	--	(1)	CLAY, some silt, little f sand; gray w/ iron stains; stiff, moist		
4			6					
4.0			9					
5	S-3	1.7 85%	4	--	(1)			
6			7					
6.0			11					
7	S-4	0.0 0%	5	--	(1)	F SAND, some silt; gray; wet <b>Water @ 7.5'</b>		
8			10					
8.0			5					
9	S-5	1.7 85%	4	--	(1)	F SAND, some silt & clay; gray; stiff, wet		
10			3					
10.0			4					
			7					
			2			Match to Sheet 2		

DRILLING CO.: Parratt - Wolff

BAKER REP.: Mark DeJohn

DRILLER: Chip Lafever

BORING NO.: 89-TW04IW SHEET 1 OF 3



**TEST BORING AND WELL CONSTRUCTION RECORD**

PROJECT: Phase I Investigation at Sites 88, 89, and 93 - MCB Camp Lejeune

CTO NO.: 62470-356

BORING NO.:

89-TW04IW

SAMPLE TYPE						DEFINITIONS		
S = Split Spoon A = Auger T = Shelby Tube W = Wash R = Air Rotary C = Core D = Denison P = Piston N = No Sample						SPT = Standard Penetration Test (ASTM D1586) PID = Photo Ionization Detector measurement Lab Class = USCS (ASTM D2487)		
Depth (Ft.)	Sample Type & No.	Sample Rec. (Ft.,%)	SPT	Lab Class.	PID (ppm)	Visual Description	Well Installation Detail	Elevation (Ft. MSL)
11	S-6	1.4 70%	3	--	(1)	Continued from Sheet 1		
12			5					
13	S-7	1.4 70%	6	--	(1)	SILT, little to some clay, little f sand; dk gray; v. stiff; moist		
14			7					
15	S-8	2.0 100%	8	--	(1)			
16			9					
17	S-9	2.0 100%	10	--	(1)	M/C SAND, little silt w/ zones of clay; dk gray; m. dense; wet		
18			7					
19	S-10	2.0 100%	9	--	(1)			
20			10					
21	S-11	0.8 40%	13	--	(1)	F SAND & SHELL/FOSSIL FRAG, little silt, trace clay lt. gray; v. dense; moist		20
22			34					
23	S-12	1.5 75%	20	--	(1)	SILT, trace f sand & shell frag; lt gray; hard; damp		
24			22					
25	S-13	2.0 100%	34	--	(1)	F SAND, some shell/fossil frag & silt; lt gray; hard moist to wet		
26			38					
27	S-14	0.9 45%	38	--	(1)	SHELL FRAG, trace f sand; gray; v dense; wet		27.8
28			35					
29	S-15	1.3 65%	20	--	(1)	F SAND, some silt, trace clay; green; v dense; damp		28.0
30			16					
			28					
			37					
			20			Match to Sheet 3		

DRILLING CO.: Parratt - Wolff  
DRILLER: Chip Lafever

BAKER REP.: Mark DeJohn  
BORING NO.: 89-TW04IW SHEET 2 OF 3

## TEST BORING AND WELL CONSTRUCTION RECORD

PROJECT: Phase I Investigation at Sites 88, 89, and 93 - MCB Camp Lejeune

CTO NO.: 62470-356

BORING NO.:

89-TW04IW

SAMPLE TYPE							DEFINITIONS		
S = Split Spoon A = Auger T = Shelby Tube W = Wash R = Air Rotary C = Core D = Denison P = Piston N = No Sample							SPT = Standard Penetration Test (ASTM D1586) PID = Photo Ionization Detector measurement Lab Class = USCS (ASTM D2487)		
Depth (Ft.)	Sample Type & No.	Sample Rec. (Ft.,%)	SPT	Lab Class.	PID (ppm)	Visual Description	Well Installation Detail	Elevation (Ft. MSL)	
31	S-16	1.4	24	--	(1)	Continued from Sheet 2 SHELL/FOSSIL FRAG, little silt; gray; dense; wet			
32		70%	21						
			?						
33	S-17	1.0	24	--	(1)	F SAND, little shell/fossil frag & silt; gray; v dense; wet			
34		50%	37						
			34						
35	S-18	0.9	17	--	(1)	SHELL/FOSSIL FRAG, little silt; gray; dense; wet			
36		45%	21						
			22						
37	S-19	1.0	25	--	(1)				
38		50%	34						
			35						
			44						
39	S-20	1.1	38	--	(1)				
40		55%	21						
			20						
			25						
41	S-21	1.2	28	--	(1)				
42		60%	35						
			22						
			30						
43	S-22	1.2	29	--	(1)	F/M SAND, little silt; gray; v dense; wet			
44		60%	30						
			50						
45	S-23	0.9	14	--	(1)	little silt & clay			
46		45%	15						
			20						
			30						
47	S-24	1.0	17	--	(1)	F SAND, some silt, trace clay; greenish-gray; v dense; moist			
48	A-N	--	47						
			--						
49	S-25	--	--	--	(1)				
50									
BOH @ 50.0'									

DRILLING CO.: Parratt - Wolff  
DRILLER: Chip Lafever

BAKER REP.: Mark DeJohn  
BORING NO.: 89-TW04IW

SHEET 3 OF 3

**Baker**

Baker Environmental

**TEST BORING AND WELL CONSTRUCTION RECORD**

PROJECT: Phase I Investigation at Sites 88, 89, and 93 - MCB Camp Lejeune  
 CTO NO.: 62470-356 BORING NO.: 89-TW08  
 COORDINATES: EAST: 2465236.3900 NORTH: 360898.3600  
 ELEVATION: SURFACE: 13.26 TOP OF PVC CASING: 15.38

Rig: Diedrich D-50					Date	Progress (Ft.)	Weather	Depth to Water (Ft.)	Time
Split Spoon	Casing	Augers	Core Barrel						
Size (ID)	1-3/8"	--	2-3/4"	--	8/2/96	0.0 - 15.0	Rainy, 80s	--	--
Length	2'	--	5'	--					
Type	Stainless	--	HSA	--					
Hammer Wt.	140 #	--	--	--					
Fall	30"	--	--	--					
Stickup	--	--	--	--					

**Remarks:****SAMPLE TYPE**

S = Split Spoon A = Auger  
 T = Shelby Tube W = Wash  
 R = Air Rotary C = Core  
 D = Denison P = Piston  
 N = No Sample

**WELL INFORMATION**

Type	Diam.	Top Depth (Ft.)	Bottom Depth (Ft.)
Sch 40, PVC Riser	1"	0	5
Sch 40, 10-Slot, PVC Screen	1"	5	15

Depth (Ft.)	Sample Type & No.	Sample Rec. (Ft.,%)	SPT	Lab. Class	PID (ppm)	Visual Description	Well Installation Detail	Elevation (Ft. MSL)
1								
2								
3								
4								
5	A-N	--	--	--	--	Refer to the log for well 89-TW08IW for descriptions		5.0
6								
7								
8								
9								
10								

Match to Sheet 2

DRILLING CO.: Parratt - Wolff  
 DRILLER: Chip Lafever

BAKER REP.: Mark DeJohn  
 BORING NO.: 89-TW08 SHEET 1 OF 2

## TEST BORING AND WELL CONSTRUCTION RECORD

PROJECT: Phase I Investigation at Sites 88, 89, and 93 - MCB Camp Lejeune

CTO NO.: 62470-356

BORING NO.:

89-TW08

SAMPLE TYPE						DEFINITIONS		
S = Split Spoon A = Auger T = Shelby Tube W = Wash R = Air Rotary C = Core D = Denison P = Piston N = No Sample						SPT = Standard Penetration Test (ASTM D1586) PID = Photo Ionization Detector measurement Lab Class = USCS (ASTM D2487)		
Depth (Ft.)	Sample Type & No.	Sample Rec. (Ft.,%)	SPT	Lab Class	PID (ppm)	Visual Description	Well Installation Detail	Elevation (Ft. MSL)
11								
12								
13	A-N	--	--	--	--			
14								
15	15.0					15.0		15.0
16						BOH @ 15.0'		
17								
18								
19								
20								
21								
22								
23								
24								
25								
26								
27								
28								
29								
30								

DRILLING CO.: Parratt - Wolff

DRILLER: Chip Lafever

BAKER REP.:

BORING NO.:

Mark DeJohn

89-TW08

SHEET 2 OF 2



**Baker**

Baker Environmental

**TEST BORING AND WELL CONSTRUCTION RECORD**

PROJECT: Phase I Investigation at Sites 88, 89, and 93 - MCB Camp Lejeune

CTO NO.: 62470-356

BORING NO.: 89-TW08IW

COORDINATES: EAST: 2465236.9600

NORTH: 360893.7700

ELEVATION: SURFACE: 13.36

TOP OF PVC CASING: 15.19

Rig:	Diedrich D-50				Date	Progress (Ft.)	Weather	Depth to Water (Ft.)	Time
	Split Spoon	Casing	Augers	Core Barrel					
Size (ID)	1-3/8"	--	2-3/4"	--	8/2/96	0.0 - 42.0	Rainy, 80s	--	--
Length	2'	--	5'	--					
Type	Stainless	--	HSA	--					
Hammer Wt.	140 #	--	--	--					
Fall	30"	--	--	--					
Stickup	--	--	--	--					

**Remarks:**

SAMPLE TYPE						WELL INFORMATION							
S = Split Spoon A = Auger T = Shelby Tube W = Wash R = Air Rotary C = Core D = Denison P = Piston N = No Sample						Type	Diam.	Top Depth (Ft.)	Bottom Depth (Ft.)				
						Sch 40, PVC Riser	1"	0	37				
						Sch 40, 10-Slot, PVC Screen	1"	37	42				
Depth (Ft.)	Sample Type & No.	Sample Rec. (Ft.,%)	SPT	Lab Class.	PID (ppm)	Visual Description	Well Installation Detail		Elevation (Ft. MSL)				
1	S-1	1.2 60%	10	--	(1)	F SAND, little silt, trace gravel & clay; grayish-brown; m dense; damp							
2			15										
3	A-N	--	13	--	--								
4			13										
5			3										
6	S-2	1.5 75%	2	--	(1)					some silt & clay, trace wood; brown; soft; moist to wet			
7			2										
8	A-N	--	2	--	--					Water @ 6.0'			
9													
10													
			5			Match to Sheet 2							

DRILLING CO.: Parratt - Wolff

BAKER REP.: Mark DeJohn

DRILLER: Chip Lafever

BORING NO.: 89-TW08IW

SHEET 1 OF 3



## TEST BORING AND WELL CONSTRUCTION RECORD

PROJECT: Phase I Investigation at Sites 88, 89, and 93 - MCB Camp Lejeune  
 CTO NO.: 62470-356 BORING NO.: 89-TW081W

<u>SAMPLE TYPE</u>							<u>DEFINITIONS</u>							
S = Split Spoon A = Auger T = Shelby Tube W = Wash R = Air Rotary C = Core D = Denison P = Piston N = No Sample							SPT = Standard Penetration Test (ASTM D1586) PID = Photo Ionization Detector measurement Lab Class = USCS (ASTM D2487)							
Depth (Ft.)	Sample Type & No.	Sample Rec. (Ft.,%)	SPT	Lab Class.	PID (ppm)	Visual Description	Well Installation Detail	Elevation (Ft. MSL)						
11	S-3	1.1 55%	5	--	(1)	Continued from Sheet 1 Little silt & clay, trace m/c sand; dk gray; m dense; wet								
12			6											
13			8											
14	A-N	--	--	--	--									
15	S-4	1.0 50%	15	--	(1)									
16			16											
17			14											
18	A-N	--	--	--	--				F/C SAND, some gravel, trace silt & clay; dk gray; dense; wet					
19														
20														
21	S-5	2.0 100%	9	--	(1)				F SAND, some shell/fossil frag, silt & clay; gray; dense; wet					
22			13											
23			23											
24	A-N	--	--	--	--									
25														
26														
27	S-6	1.1 55%	14	--	(1)	SHELL/FOSSIL FRAG, some silt & clay; gray; dense; wet								
28			19											
29			25											
30	A-N	--	--	--	--									
31														
32														
33			15									Match to Sheet 3		

DRILLING CO.: Parratt - Wolff  
 DRILLER: Chip Lafever

BAKER REP.: Mark DeJohn  
 BORING NO.: 89-TW081W SHEET 2 OF 3



**TEST BORING AND WELL CONSTRUCTION RECORD**

PROJECT: Phase I Investigation at Sites 88, 89, and 93 - MCB Camp Lejeune  
 CTO NO.: 62470-356 BORING NO.: 89-TW08IW

SAMPLE TYPE						DEFINITIONS		
S = Split Spoon A = Auger T = Shelby Tube W = Wash R = Air Rotary C = Core D = Denison P = Piston N = No Sample						SPT = Standard Penetration Test (ASTM D1586) PID = Photo Ionization Detector measurement Lab Class = USCS (ASTM D2487)		
Depth (Ft.)	Sample Type & No.	Sample Rec. (Ft.,%)	SPT	Lab Class.	PID (ppm)	Visual Description	Well Installation Detail	Elevation (Ft. MSL)
31	S-7	1.5 75%	30	--	(1)	Continued from Sheet 2 trace silt & clay; v dense		
32			27					
32.0			25					
33	A-N	--	--	--	--			
34								
35								
35.0								
36	S-8	2.0 100%	20	--	(1)	smaller sized frag, trace silt		
37			24					
37.0			30					37.0
38	A-N	--	--	--	--			
39								
40								
40.0								40.0
41	S-9	1.7 85%	9	--	(1)	F SAND, some silt, trace shell frag & clay; olive drab; m dense; moist		
42			11					
42.0			18					
			21					42.0
43								
44								
45								
46								
47								
48								
49								
50								

DRILLING CO.: Parratt - Wolff  
 DRILLER: Chip Lafever

BAKER REP.: Mark DeJohn  
 BORING NO.: 89-TW08IW SHEET 3 OF 3



Baker Environmental

## TEST BORING AND WELL CONSTRUCTION RECORD

PROJECT:	Phase I Investigation at Sites 88, 89, and 93 - MCB Camp Lejeune	BORING NO.:	89-TW09
CTO NO.:	62470-356	NORTH:	360873.0100
COORDINATES: EAST:	2466256.6700	TOP OF PVC CASING:	16.94
ELEVATION: SURFACE:	14.45		

Rig: Diedrich D-50					Date	Progress (Ft.)	Weather	Depth to Water (Ft.)	Time
Split Spoon	Casing	Augers	Core Barrel						
Size (ID)	1-3/8"	--	2-3/4"	--	8/3/96	0.0 - 15.0	Cloudy, 70s	--	--
Length	2'	--	5'	--					
Type	Stainless	--	HSA	--					
Hammer Wt.	140 #	--	--	--					
Fall	30"	--	--	--					
Stickup	--	--	--	--					

Remarks:

SAMPLE TYPE	WELL INFORMATION		
S = Split Spoon    A = Auger T = Shelby Tube    W = Wash R = Air Rotary    C = Core D = Denison    P = Piston N = No Sample	Type	Diam.	Top Depth (Ft.)
	Sch 40, PVC Riser	1"	0
	Sch 40, 10-Slot, PVC Screen	1"	5

Depth (Ft.)	Sample Type & No.	Sample Rec. (Ft.,%)	SPT	Lab. Class	PID (ppm)	Visual Description	Well Installation Detail	Elevation (Ft. MSL)	
1									
2									
3									
4									
5	A-N	--	--	--	--	Refer to the log for well 89-TW09IW for descriptions		5.0	
6									
7									
8									
9									
10									
Match to Sheet 2									

DRILLING CO.:	Parratt - Wolff	BAKER REP.:	Mark DeJohn
DRILLER:	Chip Lafever	BORING NO.:	89-TW09



**TEST BORING AND WELL CONSTRUCTION RECORD**

PROJECT: Phase I Investigation at Sites 88, 89, and 93 - MCB Camp Lejeune

CTO NO.: 62470-356

BORING NO.:

89-TW09

SAMPLE TYPE						DEFINITIONS		
S = Split Spoon A = Auger T = Shelby Tube W = Wash R = Air Rotary C = Core D = Denison P = Piston N = No Sample						SPT = Standard Penetration Test (ASTM D1586) PID = Photo Ionization Detector measurement Lab Class = USCS (ASTM D2487)		
Depth (Ft.)	Sample Type & No.	Sample Rec. (Ft.,%)	SPT	Lab Class	PID (ppm)	Visual Description	Well Installation Detail	Elevation (Ft. MSL)
11								
12								
13	A-N	--	--	--	--			
14								
15	15.0					15.0	15.0	15.0
16						BOH @ 15.0'		
17								
18								
19								
20								
21								
22								
23								
24								
25								
26								
27								
28								
29								
30								

DRILLING CO.: Parratt - Wolff

DRILLER: Chip Lafever

BAKER REP.:

BORING NO.:

Mark DeJohn

89-TW09

SHEET 2 OF 2

**Baker**

Baker Environmental

**TEST BORING AND WELL CONSTRUCTION RECORD**

PROJECT: Phase I Investigation at Sites 88, 89, and 93 - MCB Camp Lejeune  
 CTO NO.: 62470-356 BORING NO.: 89-TW09IW  
 COORDINATES: EAST: 2466257.6700 NORTH: 360877.2200  
 ELEVATION: SURFACE: 14.45 TOP OF PVC CASING: 17.12

Rig: Diedrich D-50					Date	Progress (Ft.)	Weather	Depth to Water (Ft.)	Time
Split Spoon	Casing	Augers	Core Barrel						
Size (ID)	1-3/8"	--	2-3/4"	--	8/3/96	0.0 - 40.0	Cloudy, 70s	--	--
Length	2'	--	5'	--					
Type	Stainless	--	HSA	--					
Hammer Wt.	140 #	--	--	--					
Fall	30"	--	--	--					
Stickup	--	--	--	--					

Remarks: Note: (1) The H-Nu is not working properly.

SAMPLE TYPE							WELL INFORMATION			
S = Split Spoon A = Auger T = Shelby Tube W = Wash R = Air Rotary C = Core D = Denison P = Piston N = No Sample							Type	Diam.	Top Depth (Ft.)	Bottom Depth (Ft.)
							Sch 40, PVC Riser	1"	0	33
							Sch 40, 10-Slot, PVC Screen	1"	33	38
Depth (Ft.)	Sample Type & No.	Sample Rec. (Ft.,%)	SPT	Lab Class.	PID (ppm)	Visual Description	Well Installation Detail		Elevation (Ft. MSL)	
1	S-1	1.1 55%	5	--	(1)	F SAND, some silt, little clay; brown; m. dense; damp				
2			5							
2	2.0		12							
3	S-2	1.0 50%	9	--	(1)	dense				
3			12							
4	4.0		20							
4			20							
5	S-3	1.7 85%	6	--	(1)	SILT & CLAY, some f sand; gray w/ orange stains; stiff, damp				
5			6							
6	6.0		4				5.4			
6			8				6.0			
7	S-4	1.8 90%	8	--	(1)	F SAND, some silt, little clay; gray w/ orange stains; m dense; moist to wet				
7			9							
8	8.0		12							
8			13							
9	S-5	0.9 45%	15	--	(1)	F/M SAND, some silt, trace clay; orange; dense; wet				
9			18							
10	10.0		19							
10			22							
			6			Match to Sheet 2				

DRILLING CO.: Parratt - Wolff  
 DRILLER: Chip Lafever

BAKER REP.: Mark DeJohn  
 BORING NO.: 89-TW09IW SHEET 1 OF 3



## TEST BORING AND WELL CONSTRUCTION RECORD

PROJECT: Phase I Investigation at Sites 88, 89, and 93 - MCB Camp Lejeune  
 CTO NO.: 62470-356 BORING NO.: 89-TW091W

<u>SAMPLE TYPE</u>							<u>DEFINITIONS</u>			
S = Split Spoon A = Auger T = Shelby Tube W = Wash R = Air Rotary C = Core D = Denison P = Piston N = No Sample							SPT = Standard Penetration Test (ASTM D1586) PID = Photo Ionization Detector measurement Lab Class = USCS (ASTM D2487)			
Depth (Ft.)	Sample Type & No.	Sample Rec. (Ft.,%)	SPT	Lab Class.	PID (ppm)	Visual Description	Well Installation Detail	Elevation (Ft. MSL)		
11	S-6	1.3	6	--	(1)	Continued from Sheet 1				
12		65%	12							
13	S-7	2.0	12	--	(1)					
14		100%	13			13.6				
15	S-8	1.0	2	--	(1)	F SAND, some silt, little clay; gray w/ orange stains; m dense; wet - becoming brown; loose				
16		50%	2							
17	S-9	1.8	3	--	(1)	faint rust-colored laminae				
18		90%	3							
19	S-10	1.4	WOH/12"	--	(1)	v loose				
20		70%	1							
21	S-11	1.7	WOH/18"	--	(1)					
22		85%	2							
23	S-12	1.8	WOH	--	(1)	SILT, some shell/fossil frag & clay, trace f sand; tan & gray; v stiff, wet				
24		90%	14							
25	S-13	1.4	7	--	(1)	F SAND, some silt, little shell frag, trace clay; gray; dense; moist				
26		70%	17							
27	S-14	1.4	4	--	(1)	SHELL/FOSSIL FRAG, trace f sand & silt; gray; m dense; wet				
28		70%	10							
29	S-15	0.3	8	--	(1)	dense				
30		15%	12							
			20							
			26							
			10			Match to Sheet 3				

DRILLING CO.: Parratt - Wolff BAKER REP.: Mark DeJohn  
 DRILLER: Chip Lafever BORING NO.: 89-TW091W SHEET 2 OF 3



## TEST BORING AND WELL CONSTRUCTION RECORD

PROJECT: Phase I Investigation at Sites 88, 89, and 93 - MCB Camp Lejeune  
 CTO NO.: 62470-356 BORING NO.: 89-TW09IW

<b>SAMPLE TYPE</b>						<b>DEFINITIONS</b>		
S = Split Spoon A = Auger T = Shelby Tube W = Wash R = Air Rotary C = Core D = Denison P = Piston N = No Sample						SPT = Standard Penetration Test (ASTM D1586) PID = Photo Ionization Detector measurement Lab Class = USCS (ASTM D2487)		
Depth (Ft.)	Sample Type & No.	Sample Rec. (Ft., %)	SPT	Lab Class.	PID (ppm)	Visual Description	Well Installation Detail	Elevation (Ft. MSL)
31	S-16	1.2 60%	11	--	(1)	Continued from Sheet 2		
32			21					
33	S-17	1.4 70%	12	--	(1)			
34			17					
35	S-18	1.3 65%	12	--	(1)			
36			15					
37	S-19	1.6 80%	22	--	(1)	v dense		
38			29					
39	S-20	1.3 65%	6	--	(1)	F SAND, some silt, little clay, trace shell frag; dk green; stiff, moist		
40			11					
41						BOH @ 40.0		
42								
43								
44								
45								
46								
47								
48								
49								
50								

DRILLING CO.: Parratt - Wolff  
 DRILLER: Chip Lafever

BAKER REP.: Mark DeJohn  
 BORING NO.: 89-TW09IW SHEET 3 OF 3





Baker Environmental

### TEST BORING AND WELL CONSTRUCTION RECORD

PROJECT: Phase I Investigation at Sites 88, 89, and 93 - MCB Camp Lejeune  
 CTO NO.: 62470-356 BORING NO.: 89-TW10  
 COORDINATES: EAST: 2466152.5800 NORTH: 360533.9600  
 ELEVATION: SURFACE: 13.78 TOP OF PVC CASING: 16.14

Rig: Diedrich D-50					Date	Progress (Ft.)	Weather	Depth to Water (Ft.)	Time
Size (ID)	Split Spoon	Casing	Augers	Core Barrel					
Length	1-3/8"	--	2-3/4"	--	8/3/96	0.0 - 15.0	M Cloudy, 80s	--	--
Type	2'	--	5'	--					
Hammer Wt.	Stainless	--	HSA	--					
Fall	140 #	--	--	--					
Stickup	30"	--	--	--					
	--	--	--	--					

Remarks:

**SAMPLE TYPE**

S = Split Spoon A = Auger  
 T = Shelby Tube W = Wash  
 R = Air Rotary C = Core  
 D = Denison P = Piston  
 N = No Sample

**WELL INFORMATION**

Type	Diam.	Top Depth (Ft.)	Bottom Depth (Ft.)
Sch 40, PVC Riser	1"	0	5
Sch 40, 10-Slot, PVC Screen	1"	5	15

Depth (Ft.)	Sample Type & No.	Sample Rec. (Ft.,%)	SPT	Lab. Class	PID (ppm)	Visual Description	Well Installation Detail	Elevation (Ft. MSL)	
1									
2									
3									
4									
5	A-N	--	--	--	--	Refer to the log for well 89-TW10IW for descriptions		5.0	
6									
7									
8									
9									
10									
Match to Sheet 2									

DRILLING CO.: Parratt - Wolff  
 DRILLER: Chip Lafever

BAKER REP.: Mark DeJohn  
 BORING NO.: 89-TW10 SHEET 1 OF 2



## TEST BORING AND WELL CONSTRUCTION RECORD

PROJECT: Phase I Investigation at Sites 88, 89, and 93 - MCB Camp Lejeune  
 CTO NO.: 62470-356 BORING NO.: 89-TW10

<u>SAMPLE TYPE</u>						<u>DEFINITIONS</u>		
S = Split Spoon A = Auger T = Shelby Tube W = Wash R = Air Rotary C = Core D = Denison P = Piston N = No Sample						SPT = Standard Penetration Test (ASTM D1586) PID = Photo Ionization Detector measurement Lab Class = USCS (ASTM D2487)		
Depth (Ft.)	Sample Type & No.	Sample Rec. (Ft.,%)	SPT	Lab Class	PID (ppm)	Visual Description	Well Installation Detail	Elevation (Ft. MSL)
11								
12								
13	A-N	--	--	--	--			
14								
15	15.0					15.0	15.0	15.0
16						BOH @ 15.0'		
17								
18								
19								
20								
21								
22								
23								
24								
25								
26								
27								
28								
29								
30								

DRILLING CO.: Parratt - Wolff  
 DRILLER: Chip Lafever

BAKER REP.: Mark DeJohn  
 BORING NO.: 89-TW10 SHEET 2 OF 2



## TEST BORING AND WELL CONSTRUCTION RECORD

**PROJECT:** Phase I Investigation at Sites 88, 89, and 93 - MCB Camp Lejeune  
**CTO NO.:** 62470-356 **BORING NO.:** 89-TW10IW  
**COORDINATES:** EAST: 2466154.1900 **NORTH:** 360537.7300  
**ELEVATION:** SURFACE: 13.78 **TOP OF PVC CASING:** 14.81

Rig: Diedrich D-50					Date	Progress (Ft.)	Weather	Depth to Water (Ft.)	Time
Size (ID)	Split Spoon	Casing	Augers	Core Barrel					
Length	1-3/8"	--	2-3/4"	--	8/3/96	0.0 - 44.0	M Cloudy, 80s	--	--
Type	2'	--	5'	--					
Hammer Wt.	Stainless	--	HSA	--					
Fall	140 #	--	--	--					
Stickup	30"	--	--	--					
	--	--	--	--					

**Remarks:**

SAMPLE TYPE						WELL INFORMATION				
S = Split Spoon A = Auger T = Shelby Tube W = Wash R = Air Rotary C = Core D = Denison P = Piston N = No Sample						Type		Diam.	Top Depth (Ft.)	Bottom Depth (Ft.)
						Sch 40, PVC Riser		1"	0	39
						Sch 40, 10-Slot, PVC Screen		1"	39	44
Depth (Ft.)	Sample Type & No.	Sample Rec. (Ft., %)	SPT	Lab Class.	PID (ppm)	Visual Description	Well Installation Detail		Elevation (Ft. MSL)	
1	S-1	1.3	2	--	(1)	F SAND, some silt, little clay; brown; loose; damp				
2		65%	4							
3	A-N	--	--	--	--					
4										
5						5.0				
6	S-2	1.5	4	--	(1)	CLAY, some silt, little f sand; gray w/ orange & red stains - mottled; stiff; damp				
7		75%	6							
8			7							
9	A-N	--	--	--	--					
10						10.0				
			8			Match to Sheet 2				

**DRILLING CO.:** Parratt - Wolff  
**DRILLER:** Chip Lafever

**BAKER REP.:** Mark DeJohn  
**BORING NO.:** 89-TW10IW **SHEET 1 OF 3**

## TEST BORING AND WELL CONSTRUCTION RECORD

PROJECT: Phase I Investigation at Sites 88, 89, and 93 - MCB Camp Lejeune

CTO NO.: 62470-356

BORING NO.:

89-TW10IW

SAMPLE TYPE							DEFINITIONS		
S = Split Spoon A = Auger T = Shelby Tube W = Wash R = Air Rotary C = Core D = Denison P = Piston N = No Sample							SPT = Standard Penetration Test (ASTM D1586) PID = Photo Ionization Detector measurement Lab Class = USCS (ASTM D2487)		
Depth (Ft.)	Sample Type & No.	Sample Rec. (Ft.,%)	SPT	Lab Class.	PID (ppm)	Visual Description	Well Installation Detail	Elevation (Ft. MSL)	
11	S-3	1.7	9	--	(1)	Continued from Sheet 1 M/C SAND, little silt; orangish-brn; m dense; wet			
12		85%	8						11.3
13	A-N	--	--	--	--				
14						F SAND, some silt, trace clay; dk greenish-gray; m dense; wet			
15									15.0
16	S-4	1.5	5	--	(1)	SILT, trace coarse sand & clay; dk green; m dense; damp			
17		75%	6						
18			17						
19	A-N	--	--	--	--				
20									
21	S-5	1.5	27	--	(1)	SHELL/FOSSIL FRAG, trace silt & clay; gray; v dense; wet			
22		75%	28						20.4
23			27						
24	A-N	--	--	--	--				
25									
26	S-6	1.4	16	--	(1)	little silt & clay; dense			
27		70%	17						
28			20						
29	A-N	--	--	--	--				
30									
			16			Match to Sheet 3			

DRILLING CO.: Parratt - Wolff  
 DRILLER: Chip Lafever

BAKER REP.: Mark DeJohn  
 BORING NO.: 89-TW10IW SHEET 2 OF 3



## TEST BORING AND WELL CONSTRUCTION RECORD

PROJECT: Phase I Investigation at Sites 88, 89, and 93 - MCB Camp Lejeune  
 CTO NO.: 62470-356 BORING NO.: 89-TW10IW

<u>SAMPLE TYPE</u>						<u>DEFINITIONS</u>			
S = Split Spoon A = Auger T = Shelby Tube W = Wash R = Air Rotary C = Core D = Denison P = Piston N = No Sample						SPT = Standard Penetration Test (ASTM D1586) PID = Photo Ionization Detector measurement Lab Class = USCS (ASTM D2487)			
Depth (Ft.)	Sample Type & No.	Sample Rec. (Ft.,%)	SPT	Lab Class.	PID (ppm)	Visual Description	Well Installation Detail	Elevation (Ft. MSL)	
31	S-7	1.8 90%	18	--	(1)	Continued from Sheet 2 trace silt & clay; dense			
32			27 36						32.0
33	A-N	--	--	--	--				
34			--						35.0
35			--						
36	S-8	1.5 75%	19	--	(1)				
37			24 22						36.5
38			--						
39	A-N	--	--	--	--				
40			--						40.0
41	S-9	1.4 70%	25	--	(1)				
42			23 8						42.0
43	S-10	1.8 90%	12	--	(1)	F SAND, some silt, trace clay; dk green; dense; moist			
44			19 28 30						44.0
45									
46									
47									
48									
49									
50									

DRILLING CO.: Parratt - Wolff  
 DRILLER: Chip Lafever

BAKER REP.: Mark DeJohn  
 BORING NO.: 89-TW10IW SHEET 3 OF 3



## TEST BORING AND WELL CONSTRUCTION RECORD

**Baker Environmental**

PROJECT: Phase I Investigation at Sites 88, 89, and 93 - MCB Camp Lejeune  
 CTO NO.: 62470-356 BORING NO.: 89-TW11  
 COORDINATES: EAST: 2466374.8600 NORTH: 361184.2100  
 ELEVATION: SURFACE: 17.72 TOP OF PVC CASING: 17.63

Rig: Diedrich D-50					Date	Progress (Ft.)	Weather	Depth to Water (Ft.)	Time
Size (ID)	Split Spoon	Casing	Augers	Core Barrel					
Length	1-3/8"	--	2-3/4"	--	8/4/96	0.0 - 15.0	P Sunny, 70s	--	--
Type	2'	--	5'	--					
Hammer Wt.	Stainless	--	HSA	--					
Fall	140 #	--	--	--					
Stickup	30"	--	--	--					
	--	--	--	--					

**Remarks:**

**SAMPLE TYPE**

S = Split Spoon A = Auger  
 T = Shelby Tube W = Wash  
 R = Air Rotary C = Core  
 D = Denison P = Piston  
 N = No Sample

**WELL INFORMATION**

Type	Diam.	Top Depth (Ft.)	Bottom Depth (Ft.)
Sch 40, PVC Riser	1"	0	5
Sch 40, 10-Slot, PVC Screen	1"	5	15

Depth (Ft.)	Sample Type & No.	Sample Rec. (Ft.,%)	SPT	Lab. Class	PID (ppm)	Visual Description	Well Installation Detail	Elevation (Ft. MSL)
1								
2								
3								
4								
5	A-N	--	--	--	--	Refer to the log for well 89-TW11IW for descriptions	5.0	
6								
7								
8								
9								
10								

Match to Sheet 2

DRILLING CO.: Parratt - Wolff  
 DRILLER: Chip Lafever

BAKER REP.: Mark DeJohn  
 BORING NO.: 89-TW11 SHEET 1 OF 2



## TEST BORING AND WELL CONSTRUCTION RECORD

PROJECT: Phase I Investigation at Sites 88, 89, and 93 - MCB Camp Lejeune  
 CTO NO.: 62470-356 BORING NO.: 89-TW11

<u>SAMPLE TYPE</u>						<u>DEFINITIONS</u>		
S = Split Spoon A = Auger T = Shelby Tube W = Wash R = Air Rotary C = Core D = Denison P = Piston N = No Sample						SPT = Standard Penetration Test (ASTM D1586) PID = Photo Ionization Detector measurement Lab Class = USCS (ASTM D2487)		
Depth (Ft.)	Sample Type & No.	Sample Rec. (Ft.,%)	SPT	Lab Class	PID (ppm)	Visual Description	Well Installation Detail	Elevation (Ft. MSL)
11								
12								
13	A-N	--	--	--	--			
14								
15	15.0					15.0		15.0
16						BOH @ 15.0'		
17								
18								
19								
20								
21								
22								
23								
24								
25								
26								
27								
28								
29								
30								

DRILLING CO.: Parratt - Wolff BAKER REP.: Mark DeJohn  
 DRILLER: Chip Lafever BORING NO.: 89-TW11 SHEET 2 OF 2



## TEST BORING AND WELL CONSTRUCTION RECORD

**Baker Environmental**

PROJECT:	Phase I Investigation at Sites 88, 89, and 93 - MCB Camp Lejeune		
CTO NO.:	62470-356	BORING NO.:	89-TW11IW
COORDINATES: EAST:	2466378.8300	NORTH:	361182.2500
ELEVATION: SURFACE:	15.25	TOP OF PVC CASING:	17.63

Rig: Diedrich D-50					Date	Progress (Ft.)	Weather	Depth to Water (Ft.)	Time
Split Spoon	Casing	Augers	Core Barrel						
Size (ID)	1-3/8"	--	2-3/4"	--	8/4/96	0.0 - 42.0	P Sunny, 70s	--	--
Length	2'	--	5'	--					
Type	Stainless	--	HSA	--					
Hammer Wt.	140 #	--	--	--					
Fall	30"	--	--	--					
Stickup	--	--	--	--					

Remarks: Note: (1) The H-Nu is not working properly.

SAMPLE TYPE						WELL INFORMATION				
S = Split Spoon    A = Auger T = Shelby Tube    W = Wash R = Air Rotary    C = Core D = Denison    P = Piston N = No Sample						Type		Diam.	Top Depth (Ft.)	Bottom Depth (Ft.)
						Sch 40, PVC Riser		1"	0	33
						Sch 40, 10-Slot, PVC Screen		1"	33	38
Depth (Ft.)	Sample Type & No.	Sample Rec. (Ft., %)	SPT	Lab Class.	PID (ppm)	Visual Description	Well Installation Detail		Elevation (Ft. MSL)	
1	S-1	0.8 40%	15	--	(1)	F SAND, little silt & clay; gray; m dense; damp          little silt; gray w/ tan streaks; m dense; wet <b>Water @ 5.0'</b>				
2			11							
2.0	7									
3	7									
4	--	--	--	--						
5	A-N	--	--	--						
5.0										
6	S-2	2.0 100%	6	--	(1)					
6			9							
7	8									
7.0	7									
8	A-N	--	--	--	--					
9										
10										
10.0						10.0				
						Match to Sheet 2				

DRILLING CO.: Parratt - Wolff  
 DRILLER: Chip Lafever

BAKER REP.: Mark DeJohn  
 BORING NO.: 89-TW11IW SHEET 1 OF 3





## TEST BORING AND WELL CONSTRUCTION RECORD

PROJECT: Phase I Investigation at Sites 88, 89, and 93 - MCB Camp Lejeune

CTO NO.: 62470-356

BORING NO.: 89-TW11IW

89-TW11IW

SAMPLE TYPE						DEFINITIONS		
S = Split Spoon A = Auger T = Shelby Tube W = Wash R = Air Rotary C = Core D = Denison P = Piston N = No Sample						SPT = Standard Penetration Test (ASTM D1586) PID = Photo Ionization Detector measurement Lab Class = USCS (ASTM D2487)		
Depth (Ft.)	Sample Type & No.	Sample Rec. (Ft., %)	SPT	Lab Class.	PID (ppm)	Visual Description	Well Installation Detail	Elevation (Ft. MSL)
11	S-3	1.8 90%	12	--	(1)	Continued from Sheet 1 F/M SAND, little silt; gray w/ tan streaks; m dense; wet		
12			16					
13			20					
14	A-N	--	15	--	--			
15			16					
16			2					
17	S-4	1.4 70%	17	--	(1)	F SAND, little silt & clay; gray; v loose; wet		
18			2					
19			2					
20	A-N	--	20	--	--			
21			2					
22			2					
23	S-5	2.0 100%	23	--	(1)	some silt, little clay; dk green		
24			2					
25			2					
26	A-N	--	26	--	--			
27			9					
28			7					
29	S-6	2.0 100%	29	--	(1)	F SAND, little shell/fossil frag & silt, trace clay; gray; m dense; moist		
30			20					
31			31					
32	A-N	--	32	--	--			
33			9					
34			7					
35	S-6	2.0 100%	35	--	(1)	F SAND, little shell/fossil frag & silt, trace clay; gray; m dense; moist		
36			20					
37			31					
38	A-N	--	38	--	--			
39			9					
40			7					
41	S-6	2.0 100%	41	--	(1)	F SAND, little shell/fossil frag & silt, trace clay; gray; m dense; moist		
42			20					
43			31					
44	A-N	--	44	--	--			
45			9					
46			7					
47	S-6	2.0 100%	47	--	(1)	F SAND, little shell/fossil frag & silt, trace clay; gray; m dense; moist		
48			20					
49			31					
50	A-N	--	50	--	--			
51			9					
52			7					
53	S-6	2.0 100%	53	--	(1)	F SAND, little shell/fossil frag & silt, trace clay; gray; m dense; moist		
54			20					
55			31					
56	A-N	--	56	--	--			
57			9					
58			7					
59	S-6	2.0 100%	59	--	(1)	F SAND, little shell/fossil frag & silt, trace clay; gray; m dense; moist		
60			20					
61			31					
62	A-N	--	62	--	--			
63			9					
64			7					
65	S-6	2.0 100%	65	--	(1)	F SAND, little shell/fossil frag & silt, trace clay; gray; m dense; moist		
66			20					
67			31					
68	A-N	--	68	--	--			
69			9					
70			7					
71	S-6	2.0 100%	71	--	(1)	F SAND, little shell/fossil frag & silt, trace clay; gray; m dense; moist		
72			20					
73			31					
74	A-N	--	74	--	--			
75			9					
76			7					
77	S-6	2.0 100%	77	--	(1)	F SAND, little shell/fossil frag & silt, trace clay; gray; m dense; moist		
78			20					
79			31					
80	A-N	--	80	--	--			
81			9					
82			7					
83	S-6	2.0 100%	83	--	(1)	F SAND, little shell/fossil frag & silt, trace clay; gray; m dense; moist		
84			20					
85			31					
86	A-N	--	86	--	--			
87			9					
88			7					
89	S-6	2.0 100%	89	--	(1)	F SAND, little shell/fossil frag & silt, trace clay; gray; m dense; moist		
90			20					
91			31					
92	A-N	--	92	--	--			
93			9					
94			7					
95	S-6	2.0 100%	95	--	(1)	F SAND, little shell/fossil frag & silt, trace clay; gray; m dense; moist		
96			20					
97			31					
98	A-N	--	98	--	--			
99			9					
100			7					
101	S-6	2.0 100%	101	--	(1)	F SAND, little shell/fossil frag & silt, trace clay; gray; m dense; moist		
102			20					
103			31					
104	A-N	--	104	--	--			
105			9					
106			7					
107	S-6	2.0 100%	107	--	(1)	F SAND, little shell/fossil frag & silt, trace clay; gray; m dense; moist		
108			20					
109			31					
110	A-N	--	110	--	--			
111			9					
112			7					
113	S-6	2.0 100%	113	--	(1)	F SAND, little shell/fossil frag & silt, trace clay; gray; m dense; moist		
114			20					
115			31					
116	A-N	--	116	--	--			
117			9					
118			7					
119	S-6	2.0 100%	119	--	(1)	F SAND, little shell/fossil frag & silt, trace clay; gray; m dense; moist		
120			20					
121			31					
122	A-N	--	122	--	--			
123			9					
124			7					
125	S-6	2.0 100%	125	--	(1)	F SAND, little shell/fossil frag & silt, trace clay; gray; m dense; moist		
126			20					
127			31					
128	A-N	--	128	--	--			
129			9					
130			7					
131	S-6	2.0 100%	131	--	(1)	F SAND, little shell/fossil frag & silt, trace clay; gray; m dense; moist		
132			20					
133			31					
134	A-N	--	134	--	--			
135			9					
136			7					
137	S-6	2.0 100%	137	--	(1)	F SAND, little shell/fossil frag & silt, trace clay; gray; m dense; moist		
138			20					
139			31					
140	A-N	--	140	--	--			
141			9					
142			7					
143	S-6	2.0 100%	143	--	(1)	F SAND, little shell/fossil frag & silt, trace clay; gray; m dense; moist		
144			20					
145			31					
146	A-N	--	146	--	--			
147			9					
148			7					
149	S-6	2.0 100%	149	--	(1)	F SAND, little shell/fossil frag & silt, trace clay; gray; m dense; moist		
150			20					
151			31					
152	A-N	--	152	--	--			
153			9					
154			7					
155	S-6	2.0 100%	155	--	(1)	F SAND, little shell/fossil frag & silt, trace clay; gray; m dense; moist		
156			20					
157			31					
158	A-N	--	158	--	--			
159			9					
160			7					
161	S-6	2.0 100%	161	--	(1)	F SAND, little shell/fossil frag & silt, trace clay; gray; m dense; moist		
162			20					
163			31					
164	A-N	--	164	--	--			
165			9					
166			7					
167	S-6	2.0 100%	167	--	(1)	F SAND, little shell/fossil frag & silt, trace clay; gray; m dense; moist		
168			20					
169			31					
170	A-N	--	170	--	--			
171			9					
172			7					
173	S-6	2.0 100%	173	--	(1)	F SAND, little shell/fossil frag & silt, trace clay; gray; m dense; moist		
174			20					
175			31					
176	A-N	--	176	--	--			
177			9					
178			7					
179	S-6	2.0 100%	179	--	(1)	F SAND, little shell/fossil frag & silt, trace clay; gray; m dense; moist		
180			20					
181			31					
182	A-N	--	182	--	--			
183			9					
184			7					
185	S-6	2.0 100%	185	--	(1)	F SAND, little shell/fossil frag & silt, trace clay; gray; m dense; moist		
186			20					
187			31					
188	A-N	--	188	--	--			
189			9					
190			7					
191	S-6	2.0 100%	191	--	(1)	F SAND, little shell/fossil frag & silt, trace clay; gray; m dense; moist		
192			20					
193			31					
194	A-N	--	194	--	--			
195			9					
196			7					
197	S-6	2.0 100%	197	--	(1)	F SAND, little shell/fossil frag & silt, trace clay; gray; m dense; moist		
198			20					
199			31					
200	A-N	--	200	--	--			
201			9					
202			7					
203	S-6	2.0 100%	203	--	(1)	F SAND, little shell/fossil frag & silt, trace clay; gray; m dense; moist		
204			20					
205			31					
206	A-N	--	206	--	--			
207			9					
208			7					
209	S-6	2.0 100%	209	--	(1)	F SAND, little shell/fossil frag & silt, trace clay; gray; m dense; moist		
210			20					
211			31					
212	A-N	--	212	--	--			
213			9					
214			7					
215	S-6	2.0 100%	215	--	(1)	F SAND, little shell/fossil frag & silt, trace clay; gray; m dense; moist		
216			20					
217			31					
218	A-N	--	218	--	--			
219			9					
220			7					
221	S-6	2.0 100%	221	--	(1)	F SAND, little shell/fossil frag & silt, trace clay; gray; m dense; moist		
222			20					
223			31					
224	A-N	--	224	--	--			
225			9					
226			7					
227	S-6	2.0 100%	227	--	(1)	F SAND, little shell/fossil frag & silt, trace clay; gray; m dense; moist		
228			20					
229			31					
230	A-N	--	230	--	--			
231			9					
232			7					
233	S-6	2.0 100%	233	--	(1)	F SAND, little shell/fossil frag & silt, trace clay; gray; m dense; moist		
234			20					
235			31					
236	A-N	--	236	--	--			
237			9					
238			7					
239	S-6	2.0 100%	239					



## TEST BORING AND WELL CONSTRUCTION RECORD

PROJECT: Phase I Investigation at Sites 88, 89, and 93 - MCB Camp Lejeune  
 CTO NO.: 62470-356 BORING NO.: 89-TW11IW

<u>SAMPLE TYPE</u>						<u>DEFINITIONS</u>		
S = Split Spoon A = Auger T = Shelby Tube W = Wash R = Air Rotary C = Core D = Denison P = Piston N = No Sample						SPT = Standard Penetration Test (ASTM D1586) PID = Photo Ionization Detector measurement Lab Class = USCS (ASTM D2487)		
Depth (Ft.)	Sample Type & No.	Sample Rec. (Ft.,%)	SPT	Lab Class.	PID (ppm)	Visual Description	Well Installation Detail	Elevation (Ft. MSL)
31	S-7	2.0 100%	20	--	(1)	Continued from Sheet 2 SHELL/FOSSIL FRAG, little silt, trace clay; gray; dense; wet		
32			26					
33			33					
34	A-N	--	--	--	--			
35			--					
36	S-8	1.3 65%	20	--	(1)			
37			23					
38			26					
39	A-N	--	--	--	--			
40			--					
41	S-9	1.0 50%	6	--	(1)	F SAND, some silt, little clay; dk green; m dense; moist		
42			13					
43			14					
44			15					42.0
45						BOH @ 42.0'		
46								
47								
48								
49								
50								

DRILLING CO.: Parratt - Wolff  
 DRILLER: Chip Lafever

BAKER REP.: Mark DeJohn  
 BORING NO.: 89-TW11IW SHEET 3 OF 3



Baker Environmental

### TEST BORING AND WELL CONSTRUCTION RECORD

PROJECT: Phase I Investigation at Sites 88, 89, and 93 - MCB Camp Lejeune  
 CTO NO.: 62470-356 BORING NO.: 89-TW12  
 COORDINATES: EAST: 2465345.2200 NORTH: 360043.8200  
 ELEVATION: SURFACE: 11.98 TOP OF PVC CASING: 13.62

Rig: Diedrich D-50					Date	Progress (Ft.)	Weather	Depth to Water (Ft.)	Time
Size (ID)	Split Spoon	Casing	Augers	Core Barrel					
Size (ID)	1-3/8"	--	2-3/4"	--	8/4/96	0.0 - 10.0	P Sunny, 70s	--	--
Length	2'	--	5'	--					
Type	Stainless	--	HSA	--					
Hammer Wt.	140 #	--	--	--					
Fall	30"	--	--	--					
Stickup	--	--	--	--					

Remarks:

SAMPLE TYPE					WELL INFORMATION			
S = Split Spoon A = Auger T = Shelby Tube W = Wash R = Air Rotary C = Core D = Denison P = Piston N = No Sample					Type	Diam.	Top Depth (Ft.)	Bottom Depth (Ft.)
					Sch 40, PVC Riser	1"	0	5
					Sch 40, 10-Slot, PVC Screen	1"	5	10

Depth (Ft.)	Sample Type & No.	Sample Rec. (Ft.,%)	SPT	Lab. Class	PID (ppm)	Visual Description	Well Installation Detail	Elevation (Ft. MSL)
1								
2								
3								
4								
5	A-N	--	--	--	--	Refer to the log for well 89-TW12IW for descriptions		5.0
6								
7								
8								
9								
10								
						BOH @ 10.0'		

DRILLING CO.: Parratt - Wolff  
 DRILLER: Chip Lafever

BAKER REP.: Mark DeJohn  
 BORING NO.: 89-TW12 SHEET 1 OF 2

**Baker**

Baker Environmental

**TEST BORING AND WELL CONSTRUCTION RECORD**

PROJECT: Phase I Investigation at Sites 88, 89, and 93 - MCB Camp Lejeune  
 CTO NO.: 62470-356 BORING NO.: 89-TW12IW  
 COORDINATES: EAST: 2465346.33 NORTH: 360047.0300  
 ELEVATION: SURFACE: 11.38 TOP OF PVC CASING: 13.35

Rig:	Split Spoon	Casing	Augers	Core Barrel	Date	Progress (Ft.)	Weather	Depth to Water (Ft.)	Time
Diedrich D-50	1-3/8"	--	2-3/4"	--	8/4/96	0.0 - 47.0	P Sunny, 70s	--	--
Size (ID)	2'	--	5'	--					
Length	Stainless	--	HSA	--					
Type	140 #	--	--	--					
Hammer Wt.	30"	--	--	--					
Fall	--	--	--	--					
Stickup									

Remarks: Note: (1) The H-Nu is not working properly.

SAMPLE TYPE						WELL INFORMATION							
S = Split Spoon A = Auger T = Shelby Tube W = Wash R = Air Rotary C = Core D = Denison P = Piston N = No Sample						Type	Diam.	Top Depth (Ft.)	Bottom Depth (Ft.)				
						Sch 40, PVC Riser	1"	0	42				
						Sch 40, 10-Slot, PVC Screen	1"	42	47				
Depth (Ft.)	Sample Type & No.	Sample Rec. (Ft.,%)	SPT	Lab Class.	PID (ppm)	Visual Description	Well Installation Detail		Elevation (Ft. MSL)				
1	S-1	1.8 90%	4	--	(1)	F SAND, little silt, trace coal frag; brown & gray m dense; damp							
2			5							7			
3	A-N	--	--	--									
4			--										
5			10										
6	S-2	1.6 80%	3	--	(1)					F SAND, some silt, trace clay; gray to dk gray; loose; wet			
7			2										
8	A-N	--	--	--									
9			--										
10			5										
						Match to Sheet 2							

DRILLING CO.: Parratt - Wolff  
 DRILLER: Chip Lafever

BAKER REP.: Mark DeJohn  
 BORING NO.: 89-TW12IW SHEET 1 OF 3

**TEST BORING AND WELL CONSTRUCTION RECORD**

PROJECT: Phase I Investigation at Sites 88, 89, and 93 - MCB Camp Lejeune

CTO NO.: 62470-356

BORING NO.:

89-TW12IW

SAMPLE TYPE						DEFINITIONS			
S = Split Spoon A = Auger T = Shelby Tube W = Wash R = Air Rotary C = Core D = Denison P = Piston N = No Sample						SPT = Standard Penetration Test (ASTM D1586) PID = Photo Ionization Detector measurement Lab Class = USCS (ASTM D2487)			
Depth (Ft.)	Sample Type & No.	Sample Rec. (Ft.,%)	SPT	Lab Class.	PID (ppm)	Visual Description	Well Installation Detail	Elevation (Ft. MSL)	
11	S-3	1.4 70%	1	--	(1)	Continued from Sheet 1 CLAY, little silt, trace f sand; dk gray; v soft; moist			
12			2						
13	A-N	--	--	--	--				
14									
15									
16	S-4	1.8 90%	5	--	(1)	bluish-gray; v stiff; moist			
17			8						
18			8						
19	A-N	--	--	--	--				
20									
21	S-5	0.1 13%	23 50/3"	--	(1)	LIMESTONE FRAG			
22	A-N	--	--	--	--				
23									
24									
25	S-6	1.7 85%	25	--	(1)	SHELL/FOSSIL FRAG, little silt & clay; lt gray; dense; wet			
26			15						
27			19 31						
28	A-N	--	--	--	--				
29									
30						Match to Sheet 3			

DRILLING CO.: Parratt - Wolff  
DRILLER: Chip Lafever

BAKER REP.: Mark DeJohn  
BORING NO.: 89-TW12IW SHEET 2 OF 3



## TEST BORING AND WELL CONSTRUCTION RECORD

PROJECT: Phase I Investigation at Sites 88, 89, and 93 - MCB Camp Lejeune  
 CTO NO.: 62470-356 BORING NO.: 89-TW12IW

<u>SAMPLE TYPE</u>						<u>DEFINITIONS</u>				
S = Split Spoon A = Auger T = Shelby Tube W = Wash R = Air Rotary C = Core D = Denison P = Piston N = No Sample						SPT = Standard Penetration Test (ASTM D1586) PID = Photo Ionization Detector measurement Lab Class = USCS (ASTM D2487)				
Depth (Ft.)	Sample Type & No.	Sample Rec. (Ft.,%)	SPT	Lab Class.	PID (ppm)	Visual Description	Well Installation Detail	Elevation (Ft. MSL)		
31	S-7	1.3 65%	28	--	(1)	Continued from Sheet 2 little m/c sand, trace silt & clay; v dense				
32			30						39	
33	A-N	--	--	--	--					
34			--							
35			35.0							
36	S-8	1.3 65%	23	--	(1)	trace silt & clay				
37			30						31	30
38	A-N	--	--	--	--					
39			--							
40			40.0							
41	S-9	1.4 70%	19	--	(1)	little silt & clay				
42			25						31	34
43	A-N	--	--	--	--					
44			--							
45			45.0							
46	S-10	1.0 50%	2	--	(1)	F/M SAND, little silt, trace clay; dk green; loose; wet				
47			2						3	6
48			47.0						47.0	47.0
49						BOH @ 47.0'				
50										

DRILLING CO.: Parratt - Wolff  
 DRILLER: Chip Lafever

BAKER REP.: Mark DeJohn  
 BORING NO.: 89-TW12IW SHEET 3 OF 3



Baker Environmental

## TEST BORING AND WELL CONSTRUCTION RECORD

PROJECT: Phase I Investigation at Sites 88, 89, and 93 - MCB Camp Lejeune  
 CTO NO.: 62470-356 BORING NO.: 89-TW13  
 COORDINATES: EAST: 2466032.3200 NORTH: 360223.9100  
 ELEVATION: SURFACE: 13.28 TOP OF PVC CASING: 14.00

Rig: Diedrich D-50					Date	Progress (Ft.)	Weather	Depth to Water (Ft.)	Time
Split Spoon	Casing	Augers	Core Barrel						
Size (ID)	1-3/8"	--	2-3/4"	--	8/5/96	0.0 - 20.0	P Sunny, 80s	--	--
Length	2'	--	5'	--					
Type	Stainless	--	HSA	--					
Hammer Wt.	140 #	--	--	--					
Fall	30"	--	--	--					
Stickup	--	--	--	--					

**Remarks:**

SAMPLE TYPE	WELL INFORMATION		
S = Split Spoon A = Auger T = Shelby Tube W = Wash R = Air Rotary C = Core D = Denison P = Piston N = No Sample	Type	Diam.	Top Depth (Ft.)
	Sch 40, PVC Riser	1"	0
	Sch 40, 10-Slot, PVC Screen	1"	9
			Bottom Depth (Ft.)
			19

Depth (Ft.)	Sample Type & No.	Sample Rec. (Ft., %)	SPT	Lab. Class	PID (ppm)	Visual Description	Well Installation Detail	Elevation (Ft. MSL)
1								
2								
3								
4								
5	A-N	--	--	--	--	Refer to the log for well 89-TW13IW for descriptions		
6								
7								
8								
9								9.0
10								
Match to Sheet 2								

DRILLING CO.: Parratt - Wolff  
 DRILLER: Chip Lafever

BAKER REP.: Mark DeJohn  
 BORING NO.: 89-TW13 SHEET 1 OF 2

**TEST BORING AND WELL CONSTRUCTION RECORD**

PROJECT: Phase I Investigation at Sites 88, 89, and 93 - MCB Camp Lejeune

CTO NO.: 62470-356

BORING NO.:

89-TW13

SAMPLE TYPE						DEFINITIONS		
S = Split Spoon A = Auger T = Shelby Tube W = Wash R = Air Rotary C = Core D = Denison P = Piston N = No Sample						SPT = Standard Penetration Test (ASTM D1586) PID = Photo Ionization Detector measurement Lab Class = USCS (ASTM D2487)		
Depth (Ft.)	Sample Type & No.	Sample Rec. (Ft.,%)	SPT	Lab Class	PID (ppm)	Visual Description	Well Installation Detail	Elevation (Ft. MSL)
11								
12								
13	A-N	--	--	--	--			
14								
15								
16								
17								
18								
19								19.5
20	20.0						20.0	20.0
						BOH @ 20.0'		
21								
22								
23								
24								
25								
26								
27								
28								
29								
30								

DRILLING CO.: Parratt - Wolff  
 DRILLER: Chip Lafever

BAKER REP.: Mark DeJohn  
 BORING NO.: 89-TW13 SHEET 2 OF 2



**Baker**

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**TEST BORING AND WELL CONSTRUCTION RECORD**

PROJECT: Phase I Investigation at Sites 88, 89, and 93 - MCB Camp Lejeune  
 CTO NO.: 62470-356 BORING NO.: 89-TW13IW  
 COORDINATES: EAST: 2466029.9900 NORTH: 360219.0100  
 ELEVATION: SURFACE: 13.18 TOP OF PVC CASING: 14.29

Rig: Diedrich D-50					Date	Progress (Ft.)	Weather	Depth to Water (Ft.)	Time
Split Spoon	Casing	Augers	Core Barrel						
Size (ID)	1-3/8"	--	2-3/4"	--	8/4/96	0.0 - 47.0	P Sunny, 80s	--	--
Length	2'	--	5'	--					
Type	Stainless	--	HSA	--					
Hammer Wt.	140 #	--	--	--					
Fall	30"	--	--	--					
Stickup	--	--	--	--					

Remarks: Note: (1) The H-Nu is not working properly.

SAMPLE TYPE							WELL INFORMATION				
S = Split Spoon A = Auger T = Shelby Tube W = Wash R = Air Rotary C = Core D = Denison P = Piston N = No Sample							Type		Diam.	Top Depth (Ft.)	Bottom Depth (Ft.)
							Sch 40, PVC Riser		1"	0	39
							Sch 40, 10-Slot, PVC Screen		1"	39	44
Depth (Ft.)	Sample Type & No.	Sample Rec. (Ft.,%)	SPT	Lab Class.	PID (ppm)	Visual Description	Well Installation Detail		Elevation (Ft. MSL)		
1	S-1	1.3 65%	9	--	(1)	SILT, little f sand & clay; brown; m dense; damp					
2			11								
	11										
3	A-N	--	--	--							
4			--								
5			--								
6	S-2	1.1 55%	11	--	(1)						
7			12								
	10										
8	A-N	--	--	--							
9			--								
10			--								
10.0			2			10.0					
Match to Sheet 2											

DRILLING CO.: Parratt - Wolff  
 DRILLER: Chip Lafever

BAKER REP.: Mark DeJohn  
 BORING NO.: 89-TW13IW SHEET 1 OF 3



## TEST BORING AND WELL CONSTRUCTION RECORD

PROJECT: Phase I Investigation at Sites 88, 89, and 93 - MCB Camp Lejeune  
 CTO NO.: 62470-356 BORING NO.: 89-TW131W

<u>SAMPLE TYPE</u>						<u>DEFINITIONS</u>			
S = Split Spoon A = Auger T = Shelby Tube W = Wash R = Air Rotary C = Core D = Denison P = Piston N = No Sample						SPT = Standard Penetration Test (ASTM D1586) PID = Photo Ionization Detector measurement Lab Class = USCS (ASTM D2487)			
Depth (Ft.)	Sample Type & No.	Sample Rec. (Ft.,%)	SPT	Lab Class.	PID (ppm)	Visual Description	Well Installation Detail	Elevation (Ft. MSL)	
11	S-3	1.3 65%	3	--	(1)	Continued from Sheet 1 F SAND, little silt, trace clay & gravel; dk gray to gray; loose; wet Water @ 11.5'			
12			3						8
13	A-N	--	--	--	--				
14			--						
15			15.0						
16	S-4	1.5 75%	3	--	(1)	F/M SAND, little silt, layer of clay & organic matter; dk gray; loose; wet			
17			3						9
18	A-N	--	--	--	--				
19			--						
20			20.0						
21	S-5	1.0 71%	26	--	(1)	SHELL/FOSSIL FRAG, trace silt & clay; gray; v dense; moist to wet			
22			31						50/4"
23	A-N	--	--	--	--				
24			--						
25			25.0						
26	S-6	1.7 85%	20	--	(1)	wet			
27			22						28
28	A-N	--	--	--	--				
29			--						
30			30.0						
			22			Match to Sheet 3			

DRILLING CO.: Parratt - Wolff  
 DRILLER: Chip Lafever

BAKER REP.: Mark DeJohn  
 BORING NO.: 89-TW131W SHEET 2 OF 3

## TEST BORING AND WELL CONSTRUCTION RECORD

PROJECT: Phase I Investigation at Sites 88, 89, and 93 - MCB Camp Lejeune

CTO NO.: 62470-356

BORING NO.:

89-TW13IW

SAMPLE TYPE						DEFINITIONS			
S = Split Spoon A = Auger T = Shelby Tube W = Wash R = Air Rotary C = Core D = Denison P = Piston N = No Sample						SPT = Standard Penetration Test (ASTM D1586) PID = Photo Ionization Detector measurement Lab Class = USCS (ASTM D2487)			
Depth (Ft.)	Sample Type & No.	Sample Rec. (Ft.,%)	SPT	Lab Class.	PID (ppm)	Visual Description	Well Installation Detail	Elevation (Ft. MSL)	
31	S-7	1.5 75%	24	--	(1)	Continued from Sheet 2 smaller frag; dense			
32			25						
32			23						
33	A-N	--	--	--	--				
34			--						
35			--						
36	S-8	2.0 100%	31	--	(1)	F/M SAND, little silt, trace shell frag; gray; v dense; wet			
37			23						
37			33						
38	A-N	--	--	--	--				
39			--						
40			--						
41	S-9	1.1 55%	27	--	(1)	SHELL/FOSSIL FRAG, trace silt & clay; lt gray; v dense; wet			
42			30						
42			30						
43	A-N	--	--	--	--				
44			--						
45			--						
46	S-10	1.0 50%	17	--	(1)	F SAND, little silt, trace clay; dk green; dense; moist to wet			
47			20						
47			24						
48			25			BOH @ 47.0'			
49									
50									

DRILLING CO.: Parratt - Wolff  
 DRILLER: Chip Lafever

BAKER REP.:  
 BORING NO.:

Mark DeJohn  
 89-TW13IW SHEET 3 OF 3

**Baker**

Baker Environmental

**TEST BORING AND WELL CONSTRUCTION RECORD**

PROJECT: Phase I Investigation at Sites 88, 89, and 93 - MCB Camp Lejeune  
 CTO NO.: 62470-356 BORING NO.: 89-TW15  
 COORDINATES: EAST: 2465529.2600 NORTH: 360827.5500  
 ELEVATION: SURFACE: 16.21 TOP OF PVC CASING: 17.47

Rig: Diedrich D-50					Date	Progress (Ft.)	Weather	Depth to Water (Ft.)	Time
Split Spoon	Casing	Augers	Core Barrel						
Size (ID)	1-3/8"	--	2-3/4"	--	8/6/96	0.0 - 15.0	P Sunny, 80s	--	--
Length	2'	--	5'	--					
Type	Stainless	--	HSA	--					
Hammer Wt.	140 #	--	--	--					
Fall	30"	--	--	--					
Stickup	--	--	--	--					

**Remarks:****SAMPLE TYPE**

S = Split Spoon A = Auger  
 T = Shelby Tube W = Wash  
 R = Air Rotary C = Core  
 D = Denison P = Piston  
 N = No Sample

**WELL INFORMATION**

Type	Diam.	Top Depth (Ft.)	Bottom Depth (Ft.)
Sch 40, PVC Riser	1"	0	5
Sch 40, 10-Slot, PVC Screen	1"	5	15

Depth (Ft.)	Sample Type & No.	Sample Rec. (Ft.,%)	SPT	Lab. Class	PID (ppm)	Visual Description	Well Installation Detail	Elevation (Ft. MSL)
1								
2								
3								
4								
5	A-N	--	--	--	--	Refer to the log for well 89-TW15IW for descriptions		5.0
6								
7								
8								
9								
10								

Match to Sheet 2

DRILLING CO.: Parratt - Wolff  
 DRILLER: Chip Lafever

BAKER REP.: Mark DeJohn  
 BORING NO.: 89-TW15 SHEET 1 OF 2

## TEST BORING AND WELL CONSTRUCTION RECORD

PROJECT: Phase I Investigation at Sites 88, 89, and 93 - MCB Camp Lejeune  
 CTO NO.: 62470-356

BORING NO.: 89-TW15

SAMPLE TYPE						DEFINITIONS		
S = Split Spoon A = Auger T = Shelby Tube W = Wash R = Air Rotary C = Core D = Denison P = Piston N = No Sample						SPT = Standard Penetration Test (ASTM D1586) PID = Photo Ionization Detector measurement Lab Class = USCS (ASTM D2487)		
Depth (Ft.)	Sample Type & No.	Sample Rec. (Ft.,%)	SPT	Lab Class	PID (ppm)	Visual Description	Well Installation Detail	Elevation (Ft. MSL)
11								
12								
13	A-N	--	--	--	--			
14								
15	15.0					15.0		15.0
16						BOH @ 15.0'		
17								
18								
19								
20								
21								
22								
23								
24								
25								
26								
27								
28								
29								
30								

DRILLING CO.: Parratt - Wolff  
 DRILLER: Chip Lafever

BAKER REP.: Mark DeJohn  
 BORING NO.: 89-TW15 SHEET 2 OF 2



Baker Environmental

## TEST BORING AND WELL CONSTRUCTION RECORD

PROJECT: Phase I Investigation at Sites 88, 89, and 93 - MCB Camp Lejeune  
 CTO NO.: 62470-356 BORING NO.: 89-TW15IW  
 COORDINATES: EAST: 2465533.4600 NORTH: 360828.1700  
 ELEVATION: SURFACE: 16.25 TOP OF PVC CASING: 16.70

Rig: Diedrich D-50					Date	Progress (Ft.)	Weather	Depth to Water (Ft.)	Time
Split Spoon	Casing	Augers	Core Barrel						
Size (ID)	1-3/8"	--	2-3/4"	--	8/6/96	0.0 - 47.0	P Sunny, 80s	--	--
Length	2'	--	5'	--					
Type	Stainless	--	HSA	--					
Hammer Wt.	140 #	--	--	--					
Fall	30"	--	--	--					
Stickup	--	--	--	--					

Remarks:

SAMPLE TYPE	WELL INFORMATION			
S = Split Spoon A = Auger T = Shelby Tube W = Wash R = Air Rotary C = Core D = Denison P = Piston N = No Sample	Type	Diam.	Top Depth (Ft.)	Bottom Depth (Ft.)
	Sch 40, PVC Riser	1"	0	39.5
	Sch 40, 10-Slot, PVC Screen	1"	39.5	44.5

Depth (Ft.)	Sample Type & No.	Sample Rec. (Ft., %)	SPT	Lab Class.	PID (ppm)	Visual Description	Well Installation Detail	Elevation (Ft. MSL)
1	A-N	--	--	--	--	F SAND, little silt & clay; brown; m dense; damp	6.1	
2								
3								
4								
5								
5.0	S-1	2.0 100%	6	--	0.4 0.4	F SAND, trace silt; brown; m dense; damp to wet	Water @ 7.0'	
6			8					
7			7					
7.0	A-N	--	--	--	--	Water @ 7.0'	Match to Sheet 2	
8								
9								
10								
10.0			4					

DRILLING CO.: Parratt - Wolff BAKER REP.: Mark DeJohn  
 DRILLER: Chip Lafever BORING NO.: 89-TW15IW SHEET 1 OF 3

**TEST BORING AND WELL CONSTRUCTION RECORD**

PROJECT: Phase I Investigation at Sites 88, 89, and 93 - MCB Camp Lejeune

CTO NO.: 62470-356

BORING NO.:

89-TW15IW

SAMPLE TYPE							DEFINITIONS			
S = Split Spoon A = Auger T = Shelby Tube W = Wash R = Air Rotary C = Core D = Denison P = Piston N = No Sample							SPT = Standard Penetration Test (ASTM D1586) PID = Photo Ionization Detector measurement Lab Class = USCS (ASTM D2487)			
Depth (Ft.)	Sample Type & No.	Sample Rec. (Ft.,%)	SPT	Lab Class.	PID (ppm)	Visual Description	Well Installation Detail	Elevation (Ft. MSL)		
11	S-2	1.4 70%	8	--	0.4	Continued from Sheet 1 brown & gray layering				
12			8		0.4					
			9							
13	A-N	--	--	--	--					
14			--							
15			--							
16	S-3	1.4 70%	4	--	0.3	F/M SAND, trace silt & c sand; brown & gray layers; m dense; wet				
17			5		0.3					
			6							
18	A-N	--	--	--	--	SILT, some clay; dk gray; stiff; moist				
19			--							
20			--							
21	S-4	1.5 75%	3	--	0.2	M/C SAND & SHELL FRAG, little silt & clay; dk gray; loose; wet				
22			4		0.2					
			5							
23	A-N	--	--	--	--					
24			--							
25			--							
26	S-5	1.6 80%	21	--	0.2	F SAND, little shell/fossil frag & silt, trace clay; lt gray; v dense; moist				
27			40		0.2					
			32							
28	A-N	--	--	--	--					
29			--							
30			--							
			10			Match to Sheet 3				

DRILLING CO.: Parratt - Wolff  
DRILLER: Chip Lafever

BAKER REP.: Mark DeJohn  
BORING NO.: 89-TW15IW SHEET 2 OF 3



## TEST BORING AND WELL CONSTRUCTION RECORD

PROJECT: Phase I Investigation at Sites 88, 89, and 93 - MCB Camp Lejeune  
 CTO NO.: 62470-356 BORING NO.: 89-TW15IW

<u>SAMPLE TYPE</u>						<u>DEFINITIONS</u>		
S = Split Spoon A = Auger T = Shelby Tube W = Wash R = Air Rotary C = Core D = Denison P = Piston N = No Sample						SPT = Standard Penetration Test (ASTM D1586) PID = Photo Ionization Detector measurement Lab Class = USCS (ASTM D2487)		
Depth (Ft.)	Sample Type & No.	Sample Rec. (Ft.,%)	SPT	Lab Class.	PID (ppm)	Visual Description	Well Installation Detail	Elevation (Ft. MSL)
31	S-6	1.8	17	--	0.2	Continued from Sheet 2 SHELL/FOSSIL FRAG, little f sand & silt, trace clay, gray, dense; wet		
32		90%	32		0.2			
33	A-N	--	--	--	--	trace silt & clay		
34								
35			16			SHELL/FOSSIL FRAG, trace silt & clay; lt gray; v dense; wet		
36	S-7	1.3	20	--	0.2			
37		65%	21		0.2			
38	A-N	--	--	--	--			
39								
40			18			F SAND little silt, trace clay; dk green; m dense; moist		
41	S-8	1.3	23	--	0.2			
42		65%	25		0.2			
43	A-N	--	--	--	--			
44								
45			8			BOH @ 47.0'		
46	S-9	1.5	9	--	0.2			
47		75%	10		0.2			
48			12					
49								
50								

DRILLING CO.: Parratt - Wolff  
 DRILLER: Chip Lafever

BAKER REP.: Mark DeJohn  
 BORING NO.: 89-TW15IW SHEET 3 OF 3





Baker Environmental

**TEST BORING AND WELL CONSTRUCTION RECORD**

PROJECT: Phase I Investigation at Sites 88, 89, and 93 - MCB Camp Lejeune  
 CTO NO.: 62470-356 BORING NO.: 89-TW16  
 COORDINATES: EAST: 2465688.9900 NORTH: 360537.9100  
 ELEVATION: SURFACE: 15.02 TOP OF PVC CASING: 17.02

Rig: Diedrich D-50					Date	Progress (Ft.)	Weather	Depth to Water (Ft.)	Time
Split Spoon	Casing	Augers	Core Barrel						
Size (ID)	1-3/8"	--	2-3/4"	--	8/6/96	0.0 - 15.0	P Sunny, 80s	--	--
Length	2'	--	5'	--					
Type	Stainless	--	HSA	--					
Hammer Wt.	140 #	--	--	--					
Fall	30"	--	--	--					
Stickup	--	--	--	--					

Remarks:

SAMPLE TYPE					WELL INFORMATION			
S = Split Spoon A = Auger T = Shelby Tube W = Wash R = Air Rotary C = Core D = Denison P = Piston N = No Sample					Type	Diam.	Top Depth (Ft.)	Bottom Depth (Ft.)
					Sch 40, PVC Riser	1"	0	5
					Sch 40, 10-Slot, PVC Screen	1"	5	15

Depth (Ft.)	Sample Type & No.	Sample Rec. (Ft.,%)	SPT	Lab. Samp.	PID (ppm)	Visual Description	Well Installation Detail	Elevation (Ft. MSL)
1								
2								
3								
4								
5	A-N	--	--	--	--	Refer to the log for well 89-TW16IW for descriptions		5.0
6								
7								
8								
9								
10								

Match to Sheet 2

DRILLING CO.: Parratt - Wolff BAKER REP.: Mark DeJohn  
 DRILLER: Chip Lafever BORING NO.: 89-TW16 SHEET 1 OF 2



## TEST BORING AND WELL CONSTRUCTION RECORD

PROJECT: Phase I Investigation at Sites 88, 89, and 93 - MCB Camp Lejeune  
 CTO NO.: 62470-356 BORING NO.: 89-TW16

<u>SAMPLE TYPE</u>						<u>DEFINITIONS</u>			
S = Split Spoon A = Auger T = Shelby Tube W = Wash R = Air Rotary C = Core D = Denison P = Piston N = No Sample						SPT = Standard Penetration Test (ASTM D1586) PID = Photo Ionization Detector measurement Lab Class = USCS (ASTM D2487)			
Depth (Ft.)	Sample Type & No.	Sample Rec. (Ft.,%)	SPT	Lab Class	PID (ppm)	Visual Description	Well Installation Detail	Elevation (Ft. MSL)	
11									
12									
13	A-N	--	--	--	--				
14									
15	15.0					15.0		15.0	
16						BOH @ 15.0'			
17									
18									
19									
20									
21									
22									
23									
24									
25									
26									
27									
28									
29									
30									

DRILLING CO.: Parratt - Wolff BAKER REP.: Mark DeJohn  
 DRILLER: Chip Lafever BORING NO.: 89-TW16 SHEET 2 OF 2

**Baker**

Baker Environmental

**TEST BORING AND WELL CONSTRUCTION RECORD**

PROJECT: Phase I Investigation at Sites 88, 89, and 93 - MCB Camp Lejeune

CTO NO.: 62470-356

BORING NO.:

89-TW161W

COORDINATES: EAST: 2465689.5200

NORTH:

360542.2600

ELEVATION: SURFACE: 15.46

TOP OF PVC CASING:

15.46

Rig: Diedrich D-50					Date	Progress (Ft.)	Weather	Depth to Water (Ft.)	Time
Split Spoon	Casing	Augers	Core Barrel						
Size (ID)	1-3/8"	--	2-3/4"	--	8/6/96	0.0 - 47.0	P Sunny, 80s	--	--
Length	2'	--	5'	--					
Type	Stainless	--	HSA	--					
Hammer Wt.	140 #	--	--	--					
Fall	30"	--	--	--					
Stickup	--	--	--	--					

Remarks:

**SAMPLE TYPE**

S = Split Spoon A = Auger  
 T = Shelby Tube W = Wash  
 R = Air Rotary C = Core  
 D = Denison P = Piston  
 N = No Sample

**WELL INFORMATION**

Type	Diam.	Top Depth (Ft.)	Bottom Depth (Ft.)
Sch 40, PVC Riser	1"	0	40
Sch 40, 10-Slot, PVC Screen	1"	40	45

Depth (Ft.)	Sample Type & No.	Sample Rec. (Ft., %)	SPT	Lab Class.	PID (ppm)	Visual Description	Well Installation Detail	Elevation (Ft. MSL)
1								
2								
3	A-N	--	--	--	--			
4								
5						F SAND, little silt & clay; brown; m dense; damp		
6	S-1	2.0 100%	7 7 9	--	0.2 0.2	6.2		
7			12			F/M SAND, trace silt & clay; brown & gray layers; m dense; moist		
8								
9	A-N	--	--	--	--			
10								
			10			Match to Sheet 2		

DRILLING CO.: Parratt - Wolff

BAKER REP.:

Mark DeJohn

DRILLER: Chip Lafever

BORING NO.:

89-TW161W

SHEET 1 OF 3

## TEST BORING AND WELL CONSTRUCTION RECORD

PROJECT: Phase I Investigation at Sites 88, 89, and 93 - MCB Camp Lejeune

CTO NO.: 62470-356

BORING NO.:

89-TW16IW

<u>SAMPLE TYPE</u>						<u>DEFINITIONS</u>			
S = Split Spoon A = Auger T = Shelby Tube W = Wash R = Air Rotary C = Core D = Denison P = Piston N = No Sample						SPT = Standard Penetration Test (ASTM D1586) PID = Photo Ionization Detector measurement Lab Class = USCS (ASTM D2487)			
Depth (Ft.)	Sample Type & No.	Sample Rec. (Ft.,%)	SPT	Lab Class.	PID (ppm)	Visual Description	Well Installation Detail	Elevation (Ft. MSL)	
11	S-2	1.8	12	--	0.1	Continued from Sheet 1 11.4			
12		90%	14		0.1				
			17						
13	A-N	--	--	--	--	M/C SAND, trace gravel & silt; brown; m dense; wet			
14									
15									
16	S-3	2.0	6	--	0.1	16.5			
17		100%	9		0.1				
			18						
18	A-N	--	--	--	--	F SAND, some silt, trace clay; orange; m dense; wet			
19									
20									
21	S-4	1.8	5	--	0.1	F SAND, some silt, little clay; green; dense; moist			
22		90%	7		0.1				
			42						
23	A-N	--	--	--	--	SHELL/FOSSIL FRAG, trace silt & clay; gray; v dense; wet			
24									
25									
26	S-5	1.2	8	--	0.1	some f sand & silt, trace clay			
27		60%	9		0.1				
			12						
28	A-N	--	--	--	--				
29									
30									
			12			Match to Sheet 3			

DRILLING CO.: Parratt - Wolff  
 DRILLER: Chip Lafever

BAKER REP.: Mark DeJohn  
 BORING NO.: 89-TW16IW SHEET 2 OF 3

## TEST BORING AND WELL CONSTRUCTION RECORD

PROJECT: Phase I Investigation at Sites 88, 89, and 93 - MCB Camp Lejeune

CTO NO.: 62470-356

BORING NO.:

89-TW16IW

SAMPLE TYPE							DEFINITIONS			
S = Split Spoon A = Auger T = Shelby Tube W = Wash R = Air Rotary C = Core D = Denison P = Piston N = No Sample							SPT = Standard Penetration Test (ASTM D1586) PID = Photo Ionization Detector measurement Lab Class = USCS (ASTM D2487)			
Depth (Ft.)	Sample Type & No.	Sample Rec. (Ft., %)	SPT	Lab Class.	PID (ppm)	Visual Description	Well Installation Detail	Elevation (Ft. MSL)		
31	S-6	2.0 100%	24	--	0.1	Continued from Sheet 2 trace silt & clay; dense				
32			18						21	
33	A-N	--	--	--	--					
34			--							
35	S-7	1.2 60%	12	--	0.1					
36			18							
37	A-N	--	17	--	--					
38			22							
39	S-8	1.1 55%	15	--	0.1	little silt & clay				
40			16							
41	A-N	--	20	--	--					
42			18							
43	S-9	2.0 100%	4	--	0.1	F SAND, little silt, trace clay; dk green; m dense moist				
44			5							
45	A-N	--	12	--	0.1					
46			13							
47										
48										
49										
50										

DRILLING CO.: Parratt - Wolff  
 DRILLER: Chip Lafever

BAKER REP.: Mark DeJohn  
 BORING NO.: 89-TW16IW SHEET 3 OF 3

**Baker**

Baker Environmental

**TEST BORING AND WELL CONSTRUCTION RECORD**

PROJECT: Phase I Investigation at Sites 88, 89, and 93 - MCB Camp Lejeune  
 CTO NO.: 62470-356 BORING NO.: 89-TW171W  
 COORDINATES: EAST: Not Surveyed NORTH: Not Surveyed  
 ELEVATION: SURFACE: Not Surveyed TOP OF PVC CASING: Not Surveyed

Rig: Diedrich D-50					Date	Progress (Ft.)	Weather	Depth to Water (Ft.)	Time
Split Spoon	Casing	Augers	Core Barrel						
Size (ID)	1-3/8"	--	2-3/4"	--	8/7/96	0.0 - 42.0	Cloudy, 70s	--	--
Length	2'	--	5'	--					
Type	Stainless	--	HSA	--					
Hammer Wt.	140 #	--	--	--					
Fall	30"	--	--	--					
Stickup	--	--	--	--					

**Remarks:****SAMPLE TYPE**

S = Split Spoon A = Auger  
 T = Shelby Tube W = Wash  
 R = Air Rotary C = Core  
 D = Denison P = Piston  
 N = No Sample

**WELL INFORMATION**

Type	Diam.	Top Depth (Ft.)	Bottom Depth (Ft.)
Sch 40, PVC Riser	1"	0	40
Sch 40, 10-Slot, PVC Screen	1"	40	45

Depth (Ft.)	Sample Type & No.	Sample Rec. (Ft., %)	SPT	Lab Class.	PID (ppm)	Visual Description	Well Installation Detail	Elevation (Ft. MSL)
1	A-N	--	--	--	--	F SAND, little silt, trace clay; brown & dk gray layers; m dense; moist		
2								
3								
4								
5								
5.0	S-1	1.5 75%	5	--	--			
6			7					
7			11 13					
7.0	A-N	--	--	--	--			
8								
9								
10								
10.0			4			Match to Sheet 2		

DRILLING CO.: Parratt - Wolff  
 DRILLER: Chip Lafever

BAKER REP.: Mark DeJohn  
 BORING NO.: 89-TW171W SHEET 1 OF 3

## TEST BORING AND WELL CONSTRUCTION RECORD

PROJECT: Phase I Investigation at Sites 88, 89, and 93 - MCB Camp Lejeune

CTO NO.: 62470-356

BORING NO.:

89-TW171W

SAMPLE TYPE						DEFINITIONS			
S = Split Spoon A = Auger T = Shelby Tube W = Wash R = Air Rotary C = Core D = Denison P = Piston N = No Sample						SPT = Standard Penetration Test (ASTM D1586) PID = Photo Ionization Detector measurement Lab Class = USCS (ASTM D2487)			
Depth (Ft.)	Sample Type & No.	Sample Rec. (Ft.,%)	SPT	Lab Class.	PID (ppm)	Visual Description	Well Installation Detail	Elevation (Ft. MSL)	
11	S-2	0.9	7	--	--	Continued from Sheet 1			
12		45%	8						
13	A-N	--	--	--	--	F/M SAND, some silt, trace clay w/ gray clayey laminae; orange; m dense; wet			
14									
15								15.0	
16	S-3	1.7	WOT/	--	--	SILT, trace clay; dk green; v soft; wet			
17		85%	24"						
18	A-N	--	--	--	--				
19									
20								20.0	
21	S-4	2.0	WOH	--	--	F SAND, some silt, trace clay; dk green; v loose; wet; yellow stain @ 21' w/ a solvent odor			
22		100%	1						
23	A-N	--	--	--	--				
24									
25								25.0	
26	S-5	2.0	7	--	0.1	SHELL/FOSSIL FRAG,			
27		100%	14		0.1	little silt, trace clay;			
28	A-N	--	19	--		lt gray; dense; wet			
29			31						
30									
			32			Match to Sheet 3			

DRILLING CO.: Parratt - Wolff

DRILLER: Chip Lafever

BAKER REP.:

BORING NO.:

Mark DeJohn

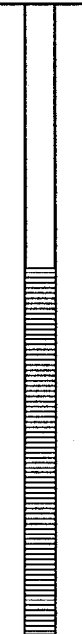
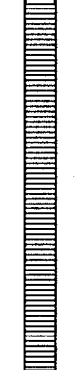
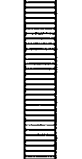

89-TW171W

SHEET 2 OF 3



## TEST BORING AND WELL CONSTRUCTION RECORD

PROJECT: Phase I Investigation at Sites 88, 89, and 93 - MCB Camp Lejeune  
 CTO NO.: 62470-356 BORING NO.: 89-TW17IW

<u>SAMPLE TYPE</u>						<u>DEFINITIONS</u>			
S = Split Spoon A = Auger T = Shelby Tube W = Wash R = Air Rotary C = Core D = Denison P = Piston N = No Sample						SPT = Standard Penetration Test (ASTM D1586) PID = Photo Ionization Detector measurement Lab Class = USCS (ASTM D2487)			
Depth (Ft.)	Sample Type & No.	Sample Rec. (Ft.,%)	SPT	Lab Class.	PID (ppm)	Visual Description	Well Installation Detail	Elevation (Ft. MSL)	
31	S-6	1.4 70%	34	--	--	Continued from Sheet 2 trace silt & clay; v dense			
32			41						47
33	A-N	--	--	--	--				
34			--	--	--	--			
35	S-7	1.0 50%	19	--	0.1 0.1	dense			
36			21						
37			18						29
38	A-N	--	--	--	--				
39			--	--	--				
40	S-8	1.2 60%	18	--	--	F SAND, little silt, trace clay; dk green; dense; moist		42.0	
41			22						
42			21						23
43						BOH @ 42.0'			
44									
45									
46									
47									
48									
49									
50									

DRILLING CO.: Parratt - Wolff BAKER REP.: Mark DeJohn  
 DRILLER: Chip Lafever BORING NO.: 89-TW17IW SHEET 3 OF 3





Baker Environmental

**TEST BORING AND WELL CONSTRUCTION RECORD**

PROJECT: Phase I Investigation at Sites 88, 89, and 93 - MCB Camp Lejeune  
 CTO NO.: 62470-356 BORING NO.: 89-TW18  
 COORDINATES: EAST: 2466351.5600 NORTH: 360162.9000  
 ELEVATION: SURFACE: 15.19 TOP OF PVC CASING: 17.11

Rig: Diedrich D-50					Date	Progress (Ft.)	Weather	Depth to Water (Ft.)	Time
Split Spoon	Casing	Augers	Core Barrel						
Size (ID)	1-3/8"	--	2-3/4"	--	8/12/96	0.0 - 15.0	M Cloudy, 80s	--	--
Length	2'	--	5'	--					
Type	Stainless	--	HSA	--					
Hammer Wt.	140 #	--	--	--					
Fall	30"	--	--	--					
Stickup	--	--	--	--					

Remarks:


SAMPLE TYPE						WELL INFORMATION			
S = Split Spoon A = Auger T = Shelby Tube W = Wash R = Air Rotary C = Core D = Denison P = Piston N = No Sample						Type	Diam.	Top Depth (Ft.)	Bottom Depth (Ft.)
						Sch 40, PVC Riser	1"	0	5
						Sch 40, 10-Slot, PVC Screen	1"	5	15
Depth (Ft.)	Sample Type & No.	Sample Rec. (Ft.,%)	SPT	Lab. Class	PID (ppm)	Visual Description	Well Installation Detail		Elevation (Ft. MSL)
1									
2									
3									
4									
5	A-N	--	--	--	--	Refer to the log for well 89-TW18IW for descriptions           Match to Sheet 2			5.0
6									
7									
8									
9									
10									

DRILLING CO.: Parratt - Wolff BAKER REP.: Mark DeJohn  
 DRILLER: Chip Lafever BORING NO.: 89-TW18 SHEET 1 OF 2



## TEST BORING AND WELL CONSTRUCTION RECORD

PROJECT: Phase I Investigation at Sites 88, 89, and 93 - MCB Camp Lejeune  
 CTO NO.: 62470-356 BORING NO.: 89-TW18

<u>SAMPLE TYPE</u>						<u>DEFINITIONS</u>			
S = Split Spoon A = Auger T = Shelby Tube W = Wash R = Air Rotary C = Core D = Denison P = Piston N = No Sample						SPT = Standard Penetration Test (ASTM D1586) PID = Photo Ionization Detector measurement Lab Class = USCS (ASTM D2487)			
Depth (Ft.)	Sample Type & No.	Sample Rec. (Ft.,%)	SPT	Lab Class	PID (ppm)	Visual Description	Well Installation Detail	Elevation (Ft. MSL)	
11									
12									
13	A-N	--	--	--	--				
14									
15	15.0					15.0		15.0	
16						BOH @ 15.0'			
17									
18									
19									
20									
21									
22									
23									
24									
25									
26									
27									
28									
29									
30									

**Baker**

Baker Environmental

**TEST BORING AND WELL CONSTRUCTION RECORD**

PROJECT: Phase I Investigation at Sites 88, 89, and 93 - MCB Camp Lejeune  
 CTO NO.: 62470-356 BORING NO.: 89-TW181W  
 COORDINATES: EAST: 2466350.7400 NORTH: 360166.1500  
 ELEVATION: SURFACE: 14.89 TOP OF PVC CASING: 15.04

Rig:	Diedrich D-50				Date	Progress (Ft.)	Weather	Depth to Water (Ft.)	Time
	Split Spoon	Casing	Augers	Core Barrel					
Size (ID)	1-3/8"	--	2-3/4"	--	8/12/96	0.0 - 47.0	M Cloudy, 80s	--	--
Length	2'	--	5'	--					
Type	Stainless	--	HSA	--					
Hammer Wt.	140 #	--	--	--					
Fall	30"	--	--	--					
Stickup	--	--	--	--					

Remarks: Note: (1) The H-Nu was not used due to rainy conditions.

SAMPLE TYPE						WELL INFORMATION			
S = Split Spoon A = Auger T = Shelby Tube W = Wash R = Air Rotary C = Core D = Denison P = Piston N = No Sample						Type	Diam.	Top Depth (Ft.)	Bottom Depth (Ft.)
						Sch 40, PVC Riser	1"	0	40
						Sch 40, 10-Slot, PVC Screen	1"	40	45
Depth (Ft.)	Sample Type & No.	Sample Rec. (Ft., %)	SPT	Lab Class.	PID (ppm)	Visual Description	Well Installation Detail		Elevation (Ft. MSL)
1									
2									
3	A-N	--	--	--	--				
4									
5	5.0								
6	S-1	2.0	6	--	(1)	F SAND, little silt & clay (less clay w/ depth); gray w/ orange laminae; m dense; damp			
7	7.0	100%	9						
			13						
8			15						
9	A-N	--	--	--	--				
10	10.0								
			10			Match to Sheet 2			

DRILLING CO.: Parratt - Wolff  
 DRILLER: Chip Lafever

BAKER REP.: Mark DeJohn  
 BORING NO.: 89-TW181W SHEET 1 OF 3



Baker Environmental

## TEST BORING AND WELL CONSTRUCTION RECORD

PROJECT: Phase I Investigation at Sites 88, 89, and 93 - MCB Camp Lejeune

CTO NO.: 62470-356

BORING NO.:

89-TW18IW

<u>SAMPLE TYPE</u>						<u>DEFINITIONS</u>			
S = Split Spoon A = Auger T = Shelby Tube W = Wash R = Air Rotary C = Core D = Denison P = Piston N = No Sample						SPT = Standard Penetration Test (ASTM D1586) PID = Photo Ionization Detector measurement Lab Class = USCS (ASTM D2487)			
Depth (Ft.)	Sample Type & No.	Sample Rec. (Ft.,%)	SPT	Lab Class.	PID (ppm)	Visual Description	Well Installation Detail	Elevation (Ft. MSL)	
11	S-2	1.4	14	--	(1)	Continued from Sheet 1 F SAND, trace silt; tan; wet			
12		70%	17						11.5
			22						
13	A-N	--	--	--	--	F/M SAND, trace c sand & silt; tan & gray w/ orange stains; dense; wet			
14									
15									15.0
16	S-3	2.0	5	--	(1)	F SAND, some silt, little clay; dk gray; m dense; moist			
17		100%	12						
			17						
18	A-N	--	--	--	--				
19									
20									
21	S-4	1.4	10	--	(1)	trace shell frag; v dense; green; damp			
22		100%	18						
			50.4						
23	A-N	--	--	--	--				
24									
25									25.0
26	S-5	2.0	10	--	(1)	F SAND, some silt, little shell frag & clay; lt gray; dense; moist			
27		100%	13						
			29						
28	A-N	--	--	--	--				
29									
30									30.0
						Match to Sheet 3			

DRILLING CO.: Parratt - Wolff  
 DRILLER: Chip Lafever

BAKER REP.: Mark DeJohn  
 BORING NO.: 89-TW18IW SHEET 2 OF 3



**TEST BORING AND WELL CONSTRUCTION RECORD**

PROJECT: Phase I Investigation at Sites 88, 89, and 93 - MCB Camp Lejeune  
 CTO NO.: 62470-356 BORING NO.: 89-TW18IW

SAMPLE TYPE						DEFINITIONS		
S = Split Spoon A = Auger T = Shelby Tube W = Wash R = Air Rotary C = Core D = Denison P = Piston N = No Sample						SPT = Standard Penetration Test (ASTM D1586) PID = Photo Ionization Detector measurement Lab Class = USCS (ASTM D2487)		
Depth (Ft.)	Sample Type & No.	Sample Rec. (Ft.,%)	SPT	Lab Class.	PID (ppm)	Visual Description	Well Installation Detail	Elevation (Ft. MSL)
31	S-6	2.0	18	--	(1)	Continued from Sheet 2 SHELL/FOSSIL FRAG, little silt & clay; lt gray; v dense; wet		
32		100%	46					
33	A-N	--	--	--	--			
34						trace silt & clay		
35								
36	S-7	1.4	18	--	(1)			
37		70%	22			dense		
38			29					
39	A-N	--	--	--	--			
40						dense		
41	S-8	1.4	12	--	(1)			
42		70%	18					
43			29			F SAND, little silt, trace clay; green; dense; moist		
44	A-N	--	--	--	--			
45			28					
46	S-9	1.0	12		(1)	BOH @ 47.0'		47.0
47		50%	13					
48			23					
49			27					
50								

DRILLING CO.: Parratt - Wolff  
 DRILLER: Chip Lafever

BAKER REP.: Mark DeJohn  
 BORING NO.: 89-TW18IW SHEET 3 OF 3



**TEST BORING AND WELL CONSTRUCTION RECORD**

PROJECT: Phase I Investigation at Sites 88, 89, and 93 - MCB Camp Lejeune  
 CTO NO.: 62470-356 BORING NO.: 89-TW19  
 COORDINATES: EAST: 2466593.8800 NORTH: 361111.0900  
 ELEVATION: SURFACE: 15.67 TOP OF PVC CASING: 17.59

Rig: CME - 850					Date	Progress (Ft.)	Weather	Depth to Water (Ft.)	Time
Split Spoon	Casing	Augers	Core Barrel						
Size (ID)	1-3/8"	--	2-3/4"	--	8/13/96	0.0 - 15.0	Rainy, 70s	--	--
Length	2'	--	5'	--					
Type	Stainless	--	HSA	--					
Hammer Wt.	140 #	--	--	--					
Fall	30"	--	--	--					
Stickup	--	--	--	--					

Remarks:

SAMPLE TYPE					WELL INFORMATION			
S = Split Spoon A = Auger T = Shelby Tube W = Wash R = Air Rotary C = Core D = Denison P = Piston N = No Sample					Type	Diam.	Top Depth (Ft.)	Bottom Depth (Ft.)
					Sch 40, PVC Riser	1"	0	5
					Sch 40, 10-Slot, PVC Screen	1"	5	15

Depth (Ft.)	Sample Type & No.	Sample Rec. (Ft.,%)	SPT	Lab. Class	PID (ppm)	Visual Description	Well Installation Detail	Elevation (Ft. MSL)	
1									
2									
3									
4									
5	A-N	--	--	--	--	Refer to the log for well 89-TW19IW for descriptions		5.0	
6									
7									
8									
9									
10									
							Match to Sheet 2		

DRILLING CO.: Parratt - Wolff BAKER REP.: Mark DeJohn  
 DRILLER: Chip Lafever BORING NO.: 89-TW19 SHEET 1 OF 2

## TEST BORING AND WELL CONSTRUCTION RECORD

PROJECT: Phase I Investigation at Sites 88, 89, and 93 - MCB Camp Lejeune

CTO NO.: 62470-356

BORING NO.:

89-TW19

SAMPLE TYPE						DEFINITIONS				
S = Split Spoon A = Auger T = Shelby Tube W = Wash R = Air Rotary C = Core D = Denison P = Piston N = No Sample						SPT = Standard Penetration Test (ASTM D1586) PID = Photo Ionization Detector measurement Lab Class = USCS (ASTM D2487)				
Depth (Ft.)	Sample Type & No.	Sample Rec. (Ft.,%)	SPT	Lab Class	PID (ppm)	Visual Description	Well Installation Detail	Elevation (Ft. MSL)		
11										
12										
13	A-N	--	--	--	--					
14										
15	15.0					15.0		15.0		
16						BOH @ 15.0'				
17										
18										
19										
20										
21										
22										
23										
24										
25										
26										
27										
28										
29										
30										

DRILLING CO.: Parratt - Wolff  
 DRILLER: Chip Lafever

BAKER REP.: Mark DeJohn  
 BORING NO.: 89-TW19 SHEET 2 OF 2

**Baker**

Baker Environmental

**TEST BORING AND WELL CONSTRUCTION RECORD**

PROJECT: Phase I Investigation at Sites 88, 89, and 93 - MCB Camp Lejeune  
 CTO NO.: 62470-356 BORING NO.: 89-TW19IW  
 COORDINATES: EAST: 2466592.3000 NORTH: 361109.1400  
 ELEVATION: SURFACE: 15.47 TOP OF PVC CASING: 17.71

Rig: CME - 850					Date	Progress (Ft.)	Weather	Depth to Water (Ft.)	Time
Split Spoon	Casing	Augers	Core Barrel						
Size (ID)	1-3/8"	--	2-3/4"	--	8/13/96	0.0 - 42.0	Rainy, 70s	--	--
Length	2'	--	5'	--					
Type	Stainless	--	HSA	--					
Hammer Wt.	140 #	--	--	--					
Fall	30"	--	--	--					
Stickup	--	--	--	--					

Remarks: Note: (1) Due to wet conditions, the H-Nu was not used.

SAMPLE TYPE						WELL INFORMATION			
S = Split Spoon A = Auger T = Shelby Tube W = Wash R = Air Rotary C = Core D = Denison P = Piston N = No Sample						Type	Diam.	Top Depth (Ft.)	Bottom Depth (Ft.)
						Sch 40, PVC Riser	1"	0	35
						Sch 40, 10-Slot, PVC Screen	1"	35	40
Depth (Ft.)	Sample Type & No.	Sample Rec. (Ft.,%)	SPT	Lab Class.	PID (ppm)	Visual Description	Well Installation Detail		Elevation (Ft. MSL)
1	A-N	--	--	--	--	F SAND, little silt & clay; gray; m dense; damp			
2									
3									
4									
5									
5.0	S-1	2.0 100%	3	--	(1)	F SAND, little silt & clay; tan; loose; moist			
6			5						
7			5						
7.0	A-N	--	--	--	--	F SAND, trace silt; tan; loose; wet Water @ 6.2'			
8									
9									
10									
10.0									
			WOH			Match to Sheet 2			

DRILLING CO.: Parratt - Wolff  
 DRILLER: Chip Lafever

BAKER REP.: Mark DeJohn  
 BORING NO.: 89-TW19IW SHEET 1 OF 3



## TEST BORING AND WELL CONSTRUCTION RECORD

PROJECT: Phase I Investigation at Sites 88, 89, and 93 - MCB Camp Lejeune

CTO NO.: 62470-356

BORING NO.:

89-TW191W

SAMPLE TYPE							DEFINITIONS		
S = Split Spoon A = Auger T = Shelby Tube W = Wash R = Air Rotary C = Core D = Denison P = Piston N = No Sample							SPT = Standard Penetration Test (ASTM D1586) PID = Photo Ionization Detector measurement Lab Class = USCS (ASTM D2487)		
Depth (Ft.)	Sample Type & No.	Sample Rec. (Ft.,%)	SPT	Lab Class.	PID (ppm)	Visual Description	Well Installation Detail	Elevation (Ft. MSL)	
11	S-2	1.2 60%	1	--	(1)	Continued from Sheet 1 CLAY, little f sand & silt; mottled, gray & orange; soft; moist			
12			2						
13	A-N	--	--	--	--				
14			--						
15			--						
16	S-3	2.0 100%	WOH/12"	--	(1)	F SAND, little silt & clay; gray w/ orange stains; v loose; wet			
17			1 1						
18	A-N	--	--	--	--				
19			--						
20			--						
21	S-4	2.0 100%	WOH/12"	--	(1)	some silt, trace clay; green; v loose; wet			
22			1 1						
23	A-N	--	--	--	--				
24			--						
25			--						
26	S-5	1.8 90%	6	--	(1)	F/M SAND, little silt, trace clay; brown; m dense; wet			
27			12 8 13						
28	A-N	--	--	--	--	F SAND, some shell/fossil frag, trace clay; lt gray; m dense; moist to wet			
29			--						
30			--						
			6			Match to Sheet 3			

DRILLING CO.: Parratt - Wolff  
 DRILLER: Chip Lafever

BAKER REP.: Mark DeJohn  
 BORING NO.: 89-TW191W



## TEST BORING AND WELL CONSTRUCTION RECORD

PROJECT: Phase I Investigation at Sites 88, 89, and 93 - MCB Camp Lejeune

CTO NO.: 62470-356

BORING NO.:

89-TW19IW

SAMPLE TYPE							DEFINITIONS			
S = Split Spoon A = Auger T = Shelby Tube W = Wash R = Air Rotary C = Core D = Denison P = Piston N = No Sample							SPT = Standard Penetration Test (ASTM D1586) PID = Photo Ionization Detector measurement Lab Class = USCS (ASTM D2487)			
Depth (Ft.)	Sample Type & No.	Sample Rec. (Ft.,%)	SPT	Lab Class.	PID (ppm)	Visual Description	Well Installation Detail	Elevation (Ft. MSL)		
31	S-6	1.2 60%	12	--	(1)	Continued from Sheet 2 dense				
32			27 33							
33	A-N	--	--	--	--					
34			--							
35			--							
36	S-7	0.8 40%	10	--	(1)	SHELL/FOSSIL FRAG, trace silt; lt gray; dense; wet				
37			11 12 14							
38			--							
39	A-N	--	--	--	--					
40			--							
41	S-8	1.2 60%	9	--	(1)	F SAND, little silt & clay; green; m dense; damp				
42			7 9 12							
43						BOH @ 42.0'				
44										
45										
46										
47										
48										
49										
50										

DRILLING CO.: Parratt - Wolff  
 DRILLER: Chip Lafever

BAKER REP.: Mark DeJohn  
 BORING NO.: 89-TW19IW SHEET 3 OF 3



Baker Environmental

## TEST BORING AND WELL CONSTRUCTION RECORD

PROJECT:	Phase I Investigation at Sites 88, 89, and 93 - MCB Camp Lejeune		
CTO NO.:	62470-356	BORING NO.:	89-TW20
COORDINATES: EAST:	2466377.5500	NORTH:	360685.1100
ELEVATION: SURFACE:	17.92	TOP OF PVC CASING:	20.34

Rig: CME - 850					Date	Progress (Ft.)	Weather	Depth to Water (Ft.)	Time
Split Spoon	Casing	Augers	Core Barrel						
Size (ID)	1-3/8"	--	2-3/4"	--	8/13/96	0.0 - 15.0	M Cloudy, 80s	--	--
Length	2'	--	5'	--					
Type	Stainless	--	HSA	--					
Hammer Wt.	140 #	--	--	--					
Fall	30"	--	--	--					
Stickup	--	--	--	--					

**Remarks:**

**SAMPLE TYPE**

S = Split Spoon    A = Auger  
 T = Shelby Tube    W = Wash  
 R = Air Rotary    C = Core  
 D = Denison    P = Piston  
 N = No Sample

**WELL INFORMATION**

Type	Diam.	Top Depth (Ft.)	Bottom Depth (Ft.)
Sch 40, PVC Riser	1"	0	5
Sch 40, 10-Slot, PVC Screen	1"	5	15

Depth (Ft.)	Sample Type & No.	Sample Rec. (Ft.,%)	SPT	Lab. Class	PID (ppm)	Visual Description	Well Installation Detail	Elevation (Ft. MSL)	
1									
2									
3									
4									
5	A-N	--	--	--	--	Refer to the log for well 89-TW20IW for descriptions		5.0	
6									
7									
8									
9									
10									
Match to Sheet 2									

DRILLING CO.: Parratt - Wolff  
 DRILLER: Chip Lafever

BAKER REP.: Mark DeJohn  
 BORING NO.: 89-TW20      SHEET 1 OF 2



## TEST BORING AND WELL CONSTRUCTION RECORD

PROJECT: Phase I Investigation at Sites 88, 89, and 93 - MCB Camp Lejeune  
 CTO NO.: 62470-356 BORING NO.: 89-TW20

<u>SAMPLE TYPE</u>						<u>DEFINITIONS</u>		
S = Split Spoon A = Auger T = Shelby Tube W = Wash R = Air Rotary C = Core D = Denison P = Piston N = No Sample						SPT = Standard Penetration Test (ASTM D1586) PID = Photo Ionization Detector measurement Lab Class = USCS (ASTM D2487)		
Depth (Ft.)	Sample Type & No.	Sample Rec. (Ft.,%)	SPT	Lab Class	PID (ppm)	Visual Description	Well Installation Detail	Elevation (Ft. MSL)
11								
12								
13	A-N	--	--	--	--			
14								
15	15.0					15.0	15.0	15.0
16						BOH @ 15.0'		
17								
18								
19								
20								
21								
22								
23								
24								
25								
26								
27								
28								
29								
30								

DRILLING CO.: Parratt - Wolff  
 DRILLER: Chip Lafever

BAKER REP.: Mark DeJohn  
 BORING NO.: 89-TW20 SHEET 2 OF 2

**Baker**

Baker Environmental

**TEST BORING AND WELL CONSTRUCTION RECORD**

PROJECT: Phase I Investigation at Sites 88, 89, and 93 - MCB Camp Lejeune

CTO NO.: 62470-356

BORING NO.: 89-TW20IW

COORDINATES: EAST: 2466380.6100

NORTH: 360683.9700

ELEVATION: SURFACE: 17.56

TOP OF PVC CASING: 20.84

Rig: CME - 850					Date	Progress (Ft.)	Weather	Depth to Water (Ft.)	Time
Split Spoon	Casing	Augers	Core Barrel						
Size (ID)	1-3/8"	--	2-3/4"	--	8/13/96	0.0 - 47.0	M Cloudy, 80s	--	--
Length	2'	--	5'	--					
Type	Stainless	--	HSA	--					
Hammer Wt.	140 #	--	--	--					
Fall	30"	--	--	--					
Stickup	--	--	--	--					
Remarks: Note: (1) Due to wet conditions, the H-Nu was not used.									
<b>SAMPLE TYPE</b>					<b>WELL INFORMATION</b>				
S = Split Spoon A = Auger T = Shelby Tube W = Wash R = Air Rotary C = Core D = Denison P = Piston N = No Sample					Type		Diam.	Top Depth (Ft.)	Bottom Depth (Ft.)
					Sch 40, PVC Riser		1"	0	40
					Sch 40, 10-Slot, PVC Screen		1"	40	45
Depth (Ft.)	Sample Type & No.	Sample Rec. (Ft.,%)	SPT	Lab Class.	PID (ppm)	Visual Description	Well Installation Detail		Elevation (Ft. MSL)
1									
2									
3	A-N	--	--	--	--				
4									
5	5.0								
6	S-1	2.0 100%	5 6 7	--	(1)	F SAND, trace silt; tan w/ brown laminae; m dense; damp			
7	7.0								
8									
9	A-N	--	--	--	--				
10	10.0								
			4			Match to Sheet 2			

DRILLING CO.: Parratt - Wolff

BAKER REP.: Mark DeJohn

DRILLER: Chip Lafever

BORING NO.: 89-TW20IW

SHEET 1 OF 3

## TEST BORING AND WELL CONSTRUCTION RECORD

PROJECT: Phase I Investigation at Sites 88, 89, and 93 - MCB Camp Lejeune

CTO NO.: 62470-356

BORING NO.:

89-TW20IW

<u>SAMPLE TYPE</u>							<u>DEFINITIONS</u>			
S = Split Spoon A = Auger T = Shelby Tube W = Wash R = Air Rotary C = Core D = Denison P = Piston N = No Sample							SPT = Standard Penetration Test (ASTM D1586) PID = Photo Ionization Detector measurement Lab Class = USCS (ASTM D2487)			
Depth (Ft.)	Sample Type & No.	Sample Rec. (Ft.,%)	SPT	Lab Class.	PID (ppm)	Visual Description	Well Installation Detail	Elevation (Ft. MSL)		
11	S-2	1.4 70%	4 2	--	(1)	Continued from Sheet 1 gray, wet <b>Water @ 10'</b>				
12			2						11.5	
13	A-N	--	--	--	--	CLAY, some f sand & silt; mottled, gray, orange & red; m stiff, damp				
14										
15									15.0	
16	S-3	1.3 65%	1 2	--	(1)	CLAY, little silt, trace organic debris; dk brown; soft; moist				
17			2							
18	A-N	--	--	--	--					
19										
20									20.0	
21	S-4	1.5 75%	WOH/12" 3	--	(1)	F SAND, little silt, trace clay & shell frag; green; v loose; moist				
22			6							
23	A-N	--	--	--	--					
24										
25									25.0	
26	S-5	1.5 75%	16 18 20 26	--	(1)	F SAND, little silt & shell/ fossil frag, trace clay; gray; dense; moist				
27										
28	A-N	--	--	--	--					
29										
30									30.0	
			18			Match to Sheet 3				

DRILLING CO.: Parratt - Wolff  
 DRILLER: Chip Lafever

BAKER REP.: Mark DeJohn  
 BORING NO.: 89-TW20IW

## TEST BORING AND WELL CONSTRUCTION RECORD

PROJECT: Phase I Investigation at Sites 88, 89, and 93 - MCB Camp Lejeune

CTO NO.: 62470-356

BORING NO.: 89-TW20IW

89-TW20IW

<u>SAMPLE TYPE</u>						<u>DEFINITIONS</u>		
S = Split Spoon A = Auger T = Shelby Tube W = Wash R = Air Rotary C = Core D = Denison P = Piston N = No Sample						SPT = Standard Penetration Test (ASTM D1586) PID = Photo Ionization Detector measurement Lab Class = USCS (ASTM D2487)		
Depth (Ft.)	Sample Type & No.	Sample Rec. (Ft.,%)	SPT	Lab Class.	PID (ppm)	Visual Description	Well Installation Detail	Elevation (Ft. MSL)
31	S-6	1.4 70%	22	--	(1)	Continued from Sheet 2 lt brown		
32			26					38
33								
34	A-N	--	--	--	--			
35								
36								
36.5	S-7	1.7 85%	12	--	(1)	SHELL/FOSSIL FRAG, trace silt; lt brown; m dense; wet		
37			14					11
38			12					
39								
40								
41								
41	S-8	1.4 70%	10	--	(1)			
42			12					14
43			14					16
44	A-N	--	--	--	--			
45								
46								
46	S-9	2.0 100%	3	--	(1)	F SAND, little silt, trace clay; green; m dense; moist		
47			4					8
47			8					12
48								
49								
50								

DRILLING CO.: Parratt - Wolff  
 DRILLER: Chip Lafever

BAKER REP.: Mark DeJohn  
 BORING NO.: 89-TW20IW SHEET 3 OF 3



## TEST BORING AND WELL CONSTRUCTION RECORD

**PROJECT:** Phase I Investigation at Sites 88, 89, and 93 - MCB Camp Lejeune  
**CTO NO.:** 62470-356 **BORING NO.:** 89-TW21  
**COORDINATES: EAST:** 2466756.7400 **NORTH:** 361031.9200  
**ELEVATION: SURFACE:** 16.17 **TOP OF PVC CASING:** 18.36

Rig: CME - 850					Date	Progress (Ft.)	Weather	Depth to Water (Ft.)	Time
Split Spoon	Casing	Augers	Core Barrel						
Size (ID)	1-3/8"	--	2-3/4"	--	8/14/96	0.0 - 15.0	M Cloudy, 70s	--	--
Length	2'	--	5'	--					
Type	Stainless	--	HSA	--					
Hammer Wt.	140 #	--	--	--					
Fall	30"	--	--	--					
Stickup	--	--	--	--					

**Remarks:**

SAMPLE TYPE	WELL INFORMATION			
S = Split Spoon    A = Auger T = Shelby Tube    W = Wash R = Air Rotary    C = Core D = Denison    P = Piston N = No Sample	Type	Diam.	Top Depth (Ft.)	Bottom Depth (Ft.)
	Sch 40, PVC Riser	1"	0	4
	Sch 40, 10-Slot, PVC Screen	1"	4	14

Depth (Ft.)	Sample Type & No.	Sample Rec. (Ft.,%)	SPT	Lab. Class	PID (ppm)	Visual Description	Well Installation Detail	Elevation (Ft. MSL)
1								
2								
3								
4								4.0
5	A-N	--	--	--	--	Refer to the log for well 89-TW21IW for descriptions.          Match to Sheet 2		
6								
7								
8								
9								
10								

**DRILLING CO.:** Parratt - Wolff  
**DRILLER:** Chip Lafever

**BAKER REP.:** Mark DeJohn  
**BORING NO.:** 89-TW21 **SHEET 1 OF 2**





# TEST BORING AND WELL CONSTRUCTION RECORD

PROJECT: Phase I Investigation at Sites 88, 89, and 93 - MCB Camp Lejeune  
 CTO NO.: 62470-356 BORING NO.: 89-TW21

<b>SAMPLE TYPE</b>						<b>DEFINITIONS</b>		
S = Split Spoon A = Auger T = Shelby Tube W = Wash R = Air Rotary C = Core D = Denison P = Piston N = No Sample						SPT = Standard Penetration Test (ASTM D1586) PID = Photo Ionization Detector measurement Lab Class = USCS (ASTM D2487)		
Depth (Ft.)	Sample Type & No.	Sample Rec. (Ft.,%)	SPT	Lab Class	PID (ppm)	Visual Description	Well Installation Detail	Elevation (Ft. MSL)
11								
12								
13	A-N	--	--	--	--			
14								14.0
15	15.0					15.0	█	15.0
16						BOH @ 15.0'		
17								
18								
19								
20								
21								
22								
23								
24								
25								
26								
27								
28								
29								
30								

DRILLING CO.: Parratt - Wolff BAKER REP.: Mark DeJohn  
 DRILLER: Chip Lafever BORING NO.: 89-TW21 SHEET 2 OF 2



## TEST BORING AND WELL CONSTRUCTION RECORD

**PROJECT:** Phase I Investigation at Sites 88, 89, and 93 - MCB Camp Lejeune  
**CTO NO.:** 62470-356 **BORING NO.:** 89-TW21IW  
**COORDINATES: EAST:** 2466758.7400 **NORTH:** 361028.4700  
**ELEVATION: SURFACE:** 16.27 **TOP OF PVC CASING:** 18.49

Rig: CME - 850					Date	Progress (Ft.)	Weather	Depth to Water (Ft.)	Time
Split Spoon	Casing	Augers	Core Barrel						
Size (ID)	1-3/8"	--	2-3/4"	--	8/14/96	0.0 - 42.0	M Cloudy, 70s	--	--
Length	2'	--	5'	--					
Type	Stainless	--	HSA	--					
Hammer Wt.	140 #	--	--	--					
Fall	30"	--	--	--					
Stickup	--	--	--	--					

**Remarks:**

SAMPLE TYPE	WELL INFORMATION		
S = Split Spoon A = Auger T = Shelby Tube W = Wash R = Air Rotary C = Core D = Denison P = Piston N = No Sample	Type	Diam.	Top Depth (Ft.)
	Sch 40, PVC Riser	1"	0
	Sch 40, 10-Slot, PVC Screen	1"	35
			Bottom Depth (Ft.)
			35
			40

Depth (Ft.)	Sample Type & No.	Sample Rec. (Ft.,%)	SPT	Lab Class.	PID (ppm)	Visual Description	Well Installation Detail	Elevation (Ft. MSL)
1								
2								
3	A-N	--	--	--	--			
4								
5	5.0							
6	S-1	1.0	2	--	(1)	F SAND, trace silt; gray; loose; wet		
7	7.0	50%	3					
			4					
8			6					
9	A-N	--	--	--	--			
10	10.0							
			1			Match to Sheet 2		

**DRILLING CO.:** Parratt - Wolff  
**DRILLER:** Chip Lafever

**BAKER REP.:** Mark DeJohn  
**BORING NO.:** 89-TW21IW **SHEET 1 OF 3**

## TEST BORING AND WELL CONSTRUCTION RECORD

PROJECT: Phase I Investigation at Sites 88, 89, and 93 - MCB Camp Lejeune

CTO NO.: 62470-356

BORING NO.:

89-TW21IW

SAMPLE TYPE						DEFINITIONS		
S = Split Spoon A = Auger T = Shelby Tube W = Wash R = Air Rotary C = Core D = Denison P = Piston N = No Sample						SPT = Standard Penetration Test (ASTM D1586) PID = Photo Ionization Detector measurement Lab Class = USCS (ASTM D2487)		
Depth (Ft.)	Sample Type & No.	Sample Rec. (Ft., %)	SPT	Lab Class.	PID (ppm)	Visual Description	Well Installation Detail	Elevation (Ft. MSL)
11	S-2	1.8	1	--	(1)	Continued from Sheet 1		
12		90%	1					
13			1					
14	A-N	--	--	--	--	CLAY, little f sand & silt; grayish-brown; v soft wet		
15								
16								
16	S-3	1.5	WOH/	--	(1)	gray		16.2
17		75%	24'					
18						PEAT; dk brown; v soft; moist		
19	A-N	--	--	--	--			
20								
21								
21	S-4	2.0	3	--	(1)	F SAND, some silt, little clay; gray; loose; wet		
22		100%	1					
23			4					
24	A-N	--	--	--	--			
25								
26								
26	S-5	0.9	17	--	(1)	F SAND, little silt, trace shell frag; lt gray; v dense; damp		
27		45%	22					
28			38					
29	A-N	--	--	--	--			
30								
30								
			4			Match to Sheet 3		

DRILLING CO.: Parratt - Wolff

DRILLER: Chip Lafever

BAKER REP.:

Mark DeJohn

BORING NO.:

89-TW21IW

SHEET 2 OF 3



## TEST BORING AND WELL CONSTRUCTION RECORD

PROJECT: Phase I Investigation at Sites 88, 89, and 93 - MCB Camp Lejeune

CTO NO.: 62470-356

BORING NO.:

89-TW21IW

SAMPLE TYPE						DEFINITIONS		
S = Split Spoon A = Auger T = Shelby Tube W = Wash R = Air Rotary C = Core D = Denison P = Piston N = No Sample						SPT = Standard Penetration Test (ASTM D1586) PID = Photo Ionization Detector measurement Lab Class = USCS (ASTM D2487)		
Depth (Ft.)	Sample Type & No.	Sample Rec. (Ft.,%)	SPT	Lab Class.	PID (ppm)	Visual Description	Well Installation Detail	Elevation (Ft. MSL)
31	S-6	1.9 95%	14	--	(1)	Continued from Sheet 2 SHELL/FOSSIL FRAG, some f sand & silt, trace clay; lt gray; dense; moist		
32			17 24					
33	A-N	--	--	--	--			
34			--					
35	S-7	1.1 55%	14	--	(1)	wet; petroleum odor noted		
36			16 22					
37	A-N	--	--	--	--			
38			--					
39	S-8	2.0 100%	4	--	(1)	F SAND, little silt & clay green; m dense; moist		
40			5 6					
41	A-N	--	--	--	--			
42			--					
42			7					42.0
43								
44								
45								
46								
47								
48								
49								
50								

DRILLING CO.: Parratt - Wolff

DRILLER: Chip Lafever

BAKER REP.:

Mark DeJohn

BORING NO.:

89-TW21IW

SHEET 3 OF 3

**Baker**

Baker Environmental

**TEST BORING AND WELL CONSTRUCTION RECORD**

PROJECT: Phase I Investigation at Sites 88, 89, and 93 - MCB Camp Lejeune

CTO NO.: 62470-356

BORING NO.:

89-TW22

COORDINATES: EAST:

NORTH:

ELEVATION: SURFACE: 18.12

TOP OF PVC CASING:

20.97

Rig: CME - 850					Date	Progress (Ft.)	Weather	Depth to Water (Ft.)	Time
Split Spoon	Casing	Augers	Core Barrel						
Size (ID)	1-3/8"	--	2-3/4"	--	8/15/96	0.0 - 15.0	P Sunny, 70s	--	--
Length	2'	--	5'	--					
Type	Stainless	--	HSA	--					
Hammer Wt.	140 #	--	--	--					
Fall	30"	--	--	--					
Stickup	--	--	--	--					


Remarks:

**SAMPLE TYPE**

S = Split Spoon A = Auger  
 T = Shelby Tube W = Wash  
 R = Air Rotary C = Core  
 D = Denison P = Piston  
 N = No Sample

**WELL INFORMATION**

Type	Diam.	Top Depth (Ft.)	Bottom Depth (Ft.)
Sch 40, PVC Riser	1"	0	5
Sch 40, 10-Slot, PVC Screen	1"	5	15

Depth (Ft.)	Sample Type & No.	Sample Rec. (Ft.,%)	SPT	Lab. Class	PID (ppm)	Visual Description	Well Installation Detail	Elevation (Ft. MSL)
1								
2								
3								
4								
5	A-N	--	--	--	--	Refer to the log for well 89-TW22IW for descriptions		5.0
6								
7								
8								
9								
10								
						Match to Sheet 2		

DRILLING CO.: Parratt - Wolff

BAKER REP.:

Mark DeJohn

DRILLER: Chip Lafever

BORING NO.:

89-TW22

SHEET 1 OF 2

## TEST BORING AND WELL CONSTRUCTION RECORD

PROJECT: Phase I Investigation at Sites 88, 89, and 93 - MCB Camp Lejeune

CTO NO.: 62470-356

BORING NO.:

89-TW22

SAMPLE TYPE						DEFINITIONS			
S = Split Spoon A = Auger T = Shelby Tube W = Wash R = Air Rotary C = Core D = Denison P = Piston N = No Sample						SPT = Standard Penetration Test (ASTM D1586) PID = Photo Ionization Detector measurement Lab Class = USCS (ASTM D2487)			
Depth (Ft.)	Sample Type & No.	Sample Rec. (Ft.,%)	SPT	Lab Class	PID (ppm)	Visual Description	Well Installation Detail		Elevation (Ft. MSL)
11									
12									
13	A-N	--	--	--	--				
14									
15	15.0					15.0		15.0	
16						BOH @ 15.0'			
17									
18									
19									
20									
21									
22									
23									
24									
25									
26									
27									
28									
29									
30									

DRILLING CO.: Parratt - Wolff  
 DRILLER: Chip Lafever

BAKER REP.: Mark DeJohn  
 BORING NO.: 89-TW22 SHEET 2 OF 2



## TEST BORING AND WELL CONSTRUCTION RECORD

**PROJECT:** Phase I Investigation at Sites 88, 89, and 93 - MCB Camp Lejeune  
**CTO NO.:** 62470-356 **BORING NO.:** 89-TW22IW  
**COORDINATES: EAST:** 2466585.6000 **NORTH:** 360629.2400  
**ELEVATION: SURFACE:** 18.12 **TOP OF PVC CASING:** 20.69

<b>Rig:</b> CME - 850					<b>Date</b>	<b>Progress (Ft.)</b>	<b>Weather</b>	<b>Depth to Water (Ft.)</b>	<b>Time</b>
<b>Split Spoon</b>	<b>Casing</b>	<b>Augers</b>	<b>Core Barrel</b>						
<b>Size (ID)</b>	1-3/8"	--	2-3/4"	--	8/15/96	0.0 - 47.0	P Sunny, 70s	--	--
<b>Length</b>	2'	--	5'	--					
<b>Type</b>	Stainless	--	HSA	--					
<b>Hammer Wt.</b>	140 #	--	--	--					
<b>Fall</b>	30"	--	--	--					
<b>Stickup</b>	--	--	--	--					

**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 = Denison    P = Piston            N = No Sample         </p>	<p style="text-align: center;"><b>WELL INFORMATION</b></p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 60%;">Type</th> <th style="width: 10%;">Diam.</th> <th style="width: 15%;">Top Depth (Ft.)</th> <th style="width: 15%;">Bottom Depth (Ft.)</th> </tr> </thead> <tbody> <tr> <td>Sch 40, PVC Riser</td> <td>1"</td> <td>0</td> <td>40</td> </tr> <tr> <td>Sch 40, 10-Slot, PVC Screen</td> <td>1"</td> <td>40</td> <td>45</td> </tr> </tbody> </table>	Type	Diam.	Top Depth (Ft.)	Bottom Depth (Ft.)	Sch 40, PVC Riser	1"	0	40	Sch 40, 10-Slot, PVC Screen	1"	40	45
Type	Diam.	Top Depth (Ft.)	Bottom Depth (Ft.)										
Sch 40, PVC Riser	1"	0	40										
Sch 40, 10-Slot, PVC Screen	1"	40	45										

Depth (Ft.)	Sample Type & No.	Sample Rec. (Ft.,%)	SPT	Lab Class.	PID (ppm)	Visual Description	Well Installation Detail	Elevation (Ft. MSL)
1	A-N	--	--	--	--	F SAND, trace silt; brown & gray layers; m dense; damp		
2								
3								
4								
5								
5.0	S-1	1.1 55%	5	--	(1)	F SAND, trace silt; brown & gray layers; m dense; damp		
6			6					
7			8					
7.0	A-N	--	--	--	--	F SAND, trace silt; brown & gray layers; m dense; damp		
8								
9								
10								
10.0			2			10.0		
						Match to Sheet 2		

**DRILLING CO.:** Parratt - Wolff  
**DRILLER:** Chip Lafever

**BAKER REP.:** Mark DeJohn  
**BORING NO.:** 89-TW22IW SHEET 1 OF 3

## TEST BORING AND WELL CONSTRUCTION RECORD

PROJECT: Phase I Investigation at Sites 88, 89, and 93 - MCB Camp Lejeune

CTO NO.: 62470-356

BORING NO.:

89-TW22IW

SAMPLE TYPE						DEFINITIONS		
S = Split Spoon A = Auger T = Shelby Tube W = Wash R = Air Rotary C = Core D = Denison P = Piston N = No Sample						SPT = Standard Penetration Test (ASTM D1586) PID = Photo Ionization Detector measurement Lab Class = USCS (ASTM D2487)		
Depth (Ft.)	Sample Type & No.	Sample Rec. (Ft., %)	SPT	Lab Class.	PID (ppm)	Visual Description	Well Installation Detail	Elevation (Ft. MSL)
11	S-2	1.0	6	--	(1)	Continued from Sheet 1 CLAY, trace silt; brown & gray; stiff; moist		11.7
12		50%	6					
13	A-N	--	--	--	--	F SAND, little silt, trace clay & c sand; brown & gray; m dense; wet		15.0
14								
15								
16	S-3	2.0	2	--	(1)	CLAY, little f sand & silt; gray; soft; wet		16.3
17		100%	2					
18	A-N	--	--	--	--	CLAY, some organic matter, trace silt; dk brown; soft; wet		20.0
19								
20								
21	S-4	0.5	4	--	(1)	F SAND, little silt; dk gray, loose; wet		25.0
22		25%	4					
23			2					
24	A-N	--	--	--	--			25.0
25								
26	S-5	1.8	12	--	(1)	F SAND, some silt, trace clay; lt greenish-gray; v dense; moist		26.1
27		90%	27					
28	A-N	--	43	--	--	SHELL/FOSSIL FRAG, trace silt; lt gray; v dense; wet		30.0
29			50					
30								
			11	Match to Sheet 3				

DRILLING CO.: Parratt - Wolff  
 DRILLER: Chip Lafever

BAKER REP.: Mark DeJohn  
 BORING NO.: 89-TW22IW SHEET 2 OF 3



### TEST BORING AND WELL CONSTRUCTION RECORD

PROJECT: Phase I Investigation at Sites 88, 89, and 93 - MCB Camp Lejeune

CTO NO.: 62470-356

BORING NO.:

89-TW22IW

SAMPLE TYPE						DEFINITIONS		
S = Split Spoon A = Auger T = Shelby Tube W = Wash R = Air Rotary C = Core D = Denison P = Piston N = No Sample						SPT = Standard Penetration Test (ASTM D1586) PID = Photo Ionization Detector measurement Lab Class = USCS (ASTM D2487)		
Depth (Ft.)	Sample Type & No.	Sample Rec. (Ft., %)	SPT	Lab Class.	PID (ppm)	Visual Description	Well Installation Detail	Elevation (Ft. MSL)
31	S-6	2.0 100%	11	--	(1)	Continued from Sheet 2 F SAND, some shell/fossil frag & silt, trace clay; lt gray; dense; moist		
32			23					
33	A-N	--	--	--	--			
34			--					
35			--					
36	S-7	2.0 100%	12	--	(1)	SHELL/FOSSIL FRAG, little silt, trace clay; lt gray; m dense; wet		
37			13 14					
38	A-N	--	--	--	--			
39			--					
40			--					
41	S-8	2.0 100%	13	--	(1)			
42			17 29 41					
43	A-N	--	--	--	--			
44			--					
45			--					
46	S-9	1.8 90%	1	--	(1)	F SAND, little silt & clay green; loose; moist		
47			3 5 8					
48						BOH @ 47.0'		
49								
50								

DRILLING CO.: Parratt - Wolff  
 DRILLER: Chip Lafever

BAKER REP.: Mark DeJohn  
 BORING NO.: 89-TW22IW SHEET 3 OF 3



Baker Environmental

### TEST BORING AND WELL CONSTRUCTION RECORD

PROJECT: Phase I Investigation at Sites 88, 89, and 93 - MCB Camp Lejeune  
 CTO NO.: 62470-356 BORING NO.: 89-TW23IW  
 COORDINATES: EAST: 2467096.3400 NORTH: 360800.1500  
 ELEVATION: SURFACE: 12.10 TOP OF PVC CASING: 15.39

Rig: CME - 850					Date	Progress (Ft.)	Weather	Depth to Water (Ft.)	Time
Split Spoon	Casing	Augers	Core Barrel						
Size (ID)	1-3/8"	--	2-3/4"	--	8/19/96	0.0 - 37.0	M Sunny, 70s	--	--
Length	2'	--	5'	--					
Type	Stainless	--	HSA	--					
Hammer Wt.	140 #	--	--	--					
Fall	30"	--	--	--					
Stickup	--	--	--	--					

Remarks:

SAMPLE TYPE						WELL INFORMATION			
S = Split Spoon A = Auger T = Shelby Tube W = Wash R = Air Rotary C = Core D = Denison P = Piston N = No Sample						Type	Diam.	Top Depth (Ft.)	Bottom Depth (Ft.)
						Sch 40, PVC Riser	1"	0	30
						Sch 40, 10-Slot, PVC Screen	1"	30	35
Depth (Ft.)	Sample Type & No.	Sample Rec. (Ft., %)	SPT	Lab Class.	PID (ppm)	Visual Description	Well Installation Detail		Elevation (Ft. MSL)
1									
2									
3	A-N	--	--	--	--				
4									
5	5.0								
6	S-1	1.1	3	--	--	F SAND, trace silt; brown & gray laminae; loose; damp			
7	7.0	55%	4						
8			5						
9	A-N	--	--	--	--				
10	10.0								
			3			Match to Sheet 2			

DRILLING CO.: Parratt - Wolff  
 DRILLER: Chip Lafever

BAKER REP.: Mark DeJohn  
 BORING NO.: 89-TW23IW SHEET 1 OF 3

**TEST BORING AND WELL CONSTRUCTION RECORD**

PROJECT: Phase I Investigation at Sites 88, 89, and 93 - MCB Camp Lejeune

CTO NO.: 62470-356

BORING NO.:

89-TW23IW

SAMPLE TYPE						DEFINITIONS		
S = Split Spoon A = Auger T = Shelby Tube W = Wash R = Air Rotary C = Core D = Denison P = Piston N = No Sample						SPT = Standard Penetration Test (ASTM D1586) PID = Photo Ionization Detector measurement Lab Class = USCS (ASTM D2487)		
Depth (Ft.)	Sample Type & No.	Sample Rec. (Ft.,%)	SPT	Lab Class.	PID (ppm)	Visual Description	Well Installation Detail	Elevation (Ft. MSL)
11	S-2	1.8	2	--	--	Continued from Sheet 1 gray w/ orange stains; v loose; wet		
12		90%	1					
12			2					
13	A-N	--	--	--	--	brown w/ orange stains		
14								
15								
15								
16	S-3	2.0	WOH/ 12"	--	--			
17		100%	1					
17			1					
18	A-N	--	--	--	--	trace clay; brown & orange laminae		
19								
20								
20								
21	S-4	1.7	1	--	--			
22		85%	1					
22			2					
23	A-N	--	--	--	--	F SAND, little silt; dk green; v soft; wet		
24								
25								
25								
26	S-5	2.0	8	--	--	F SAND, little shell/fossil frag, silt & clay; lt gray; m dense; moist		
27		100%	10					
27			12					
28			15					
28	A-N	--	--	--	--			
29								
30								
30			15			Match to Sheet 3		

DRILLING CO.: Parratt - Wolff  
 DRILLER: Chip Lafever

BAKER REP.: Mark DeJohn  
 BORING NO.: 89-TW23IW SHEET 2 OF 3

## TEST BORING AND WELL CONSTRUCTION RECORD

PROJECT: Phase I Investigation at Sites 88, 89, and 93 - MCB Camp Lejeune

CTO NO.: 62470-356

BORING NO.:

89-TW23IW

SAMPLE TYPE						DEFINITIONS		
S = Split Spoon A = Auger T = Shelby Tube W = Wash R = Air Rotary C = Core D = Denison P = Piston N = No Sample						SPT = Standard Penetration Test (ASTM D1586) PID = Photo Ionization Detector measurement Lab Class = USCS (ASTM D2487)		
Depth (Ft.)	Sample Type & No.	Sample Rec. (Ft., %)	SPT	Lab Class.	PID (ppm)	Visual Description	Well Installation Detail	Elevation (Ft. MSL)
31	S-6	1.1 55%	17	--	--	Continued from Sheet 2		
32			16					
33	A-N	--	15	--	--	SHELL/FOSSIL FRAG, trace silt & clay; lt gray; dense; wet		
34								
35								
36	S-7	--	12	--	--			
37			13					
37			14					36.8 37.0
38						F SAND, some silt, tr. clay; lt greenish- gray; dense; damp		
39						BOH @ 37.0'		
40								
41								
42								
43								
44								
45								
46								
47								
48								
49								
50								

DRILLING CO.: Parratt - Wolff

DRILLER: Chip Lafever

BAKER REP.:

BORING NO.:

Mark DeJohn

89-TW23IW

SHEET 3 OF 3

**SITE 93 PHASE I  
TEMPORARY MONITORING WELLS**

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**TEST BORING AND WELL CONSTRUCTION RECORD**

PROJECT: Phase I Investigation at Sites 88, 89, and 93 - MCB Camp Lejeune  
 CTO NO.: 62470-356 BORING NO.: 93-TW01  
 COORDINATES: EAST: 2464824.5100 NORTH: 360193.8700  
 ELEVATION: SURFACE: 14.44 TOP OF PVC CASING: 16.48

Rig: Diedrich D-50					Date	Progress (Ft.)	Weather	Depth to Water (Ft.)	Time
	Split Spoon	Casing	Augers	Core Barrel					
Size (ID)	1-3/8"	--	2-3/4"	--	7/29/96	0.0 - 15.0	P Sunny, 80s	--	--
Length	2'	--	5'	--					
Type	Stainless	--	HSA	--					
Hammer Wt.	140 #	--	--	--					
Fall	30"	--	--	--					
Stickup	--	--	--	--					

Remarks:

<b>SAMPLE TYPE</b> S = Split Spoon A = Auger T = Shelby Tube W = Wash R = Air Rotary C = Core D = Denison P = Piston N = No Sample	<b>WELL INFORMATION</b>			
	Type	Diam.	Top Depth (Ft.)	Bottom Depth (Ft.)
	Sch 40, PVC Riser	1"	0	5
	Sch 40, 10-Slot, PVC Screen	1"	5	15

Depth (Ft.)	Sample Type & No.	Sample Rec. (Ft.,%)	SPT	Lab. Class	PID (ppm)	Visual Description	Well Installation Detail	Elevation (Ft. MSL)	
1									
2									
3									
4									
5	A-N	--	--	--	--	Refer to the log for well 93-TW011W for descriptions		5.0	
6									
7									
8									
9									
10									
Match to Sheet 2									

DRILLING CO.: Parratt - Wolff BAKER REP.: Mark DeJohn  
 DRILLER: Chip Lafever BORING NO.: 93-TW01 SHEET 1 OF 2



Baker Environmental

# TEST BORING AND WELL CONSTRUCTION RECORD

PROJECT: Phase I Investigation at Sites 88, 89, and 93 - MCB Camp Lejeune

CTO NO.: 62470-356

BORING NO.:

93-TW01

SAMPLE TYPE						DEFINITIONS		
S = Split Spoon A = Auger T = Shelby Tube W = Wash R = Air Rotary C = Core D = Denison P = Piston N = No Sample						SPT = Standard Penetration Test (ASTM D1586) PID = Photo Ionization Detector measurement Lab Class = USCS (ASTM D2487)		
Depth (Ft.)	Sample Type & No.	Sample Rec. (Ft.,%)	SPT	Lab Class	PID (ppm)	Visual Description	Well Installation Detail	Elevation (Ft. MSL)
11								
12								
13	A-N	--	--	--	--			
14								
15	15.0					15.0		15.0
16						BOH @ 15.0'		
17								
18								
19								
20								
21								
22								
23								
24								
25								
26								
27								
28								
29								
30								

DRILLING CO.: Parratt - Wolff  
DRILLER: Chip Lafever

BAKER REP.: Mark DeJohn  
BORING NO.: 93-TW01 SHEET 2 OF 2

**Baker**

Baker Environmental

**TEST BORING AND WELL CONSTRUCTION RECORD**

PROJECT: Phase I Investigation at Sites 88, 89, and 93 - MCB Camp Lejeune

CTO NO.: 62470-356

BORING NO.:

93-TW01IW

COORDINATES: EAST: 2464824.5100

NORTH:

360193.8700

ELEVATION: SURFACE: 14.54

TOP OF PVC CASING:

16.70

Rig: Diedrich D-50					Date	Progress (Ft.)	Weather	Depth to Water (Ft.)	Time
	Split Spoon	Casing	Augers	Core Barrel					
Size (ID)	1-3/8"	--	2-3/4"	--	7/29/96	0.0 - 54.0.0	P Sunny, 80s	--	--
Length	2'	--	5'	--					
Type	Stainless	--	HSA	--					
Hammer Wt.	140 #	--	--	--					
Fall	30"	--	--	--					
Stickup	--	--	--	--					

Remarks:

**SAMPLE TYPE**

S = Split Spoon A = Auger  
 T = Shelby Tube W = Wash  
 R = Air Rotary C = Core  
 D = Denison P = Piston  
 N = No Sample

**WELL INFORMATION**

Type	Diam.	Top Depth (Ft.)	Bottom Depth (Ft.)
Sch 40, PVC Riser	1"	0	48.5
Sch 40, 10-Slot, PVC Screen	1"	48.5	53.5

Depth (Ft.)	Sample Type & No.	Sample Rec. (Ft.,%)	SPT	Lab Class.	PID (ppm)	Visual Description	Well Installation Detail	Elevation (Ft. MSL)
1	S-1	1.0 50%	9	--	--	F SAND, some silt, coal & concrete; brown; m dense; moist		
2			13					
2	S-2	0.5 25%	11	--	--	F SAND; lt gray; m dense; moist		
3			6					
4	S-3	1.8 90%	2	--	--	F SAND & SILT; lt gray & brown; m stiff; wet Water @ 4.5'		
5			6					
6	S-4	2.0 100%	3	--	--	little wood & clay laminac; lt gray; stiff		
7			5					
8	S-5	2.0 100%	5	--	--	little wood; m stiff		
9			2					
10			3					
			4					
			6					
			2			Match to Sheet 2		

DRILLING CO.: Parratt - Wolff

BAKER REP.:

Jeff Tepsic

DRILLER: Chip Lafever

BORING NO.:

93-TW01IW

SHEET 1 OF 4





## TEST BORING AND WELL CONSTRUCTION RECORD

PROJECT: Phase I Investigation at Sites 88, 89, and 93 - MCB Camp Lejeune  
 CTO NO.: 62470-356 BORING NO.: 93-TW01IW

<u>SAMPLE TYPE</u>							<u>DEFINITIONS</u>			
S = Split Spoon A = Auger T = Shelby Tube W = Wash R = Air Rotary C = Core D = Denison P = Piston N = No Sample							SPT = Standard Penetration Test (ASTM D1586) PID = Photo Ionization Detector measurement Lab Class = USCS (ASTM D2487)			
Depth (Ft.)	Sample Type & No.	Sample Rec. (Ft., %)	SPT	Lab Class.	PID (ppm)	Visual Description	Well Installation Detail	Elevation (Ft. MSL)		
11	S-6	2.0	4	--	--	Continued from Sheet 1 F SAND, trace silt; lt gray; loose; wet	<div style="display: flex; justify-content: space-between;"> <div style="width: 100%; border-left: 1px solid black; border-right: 1px solid black; border-bottom: 1px solid black; height: 100%;"></div> </div>	<div style="display: flex; justify-content: space-between;"> <div style="width: 100%; border-left: 1px solid black; border-right: 1px solid black; border-bottom: 1px solid black; height: 100%;"></div> </div>		
12		100%	4	--	5					
13	S-7	2.0	4	--	--					
14		100%	5	--	6					
15	S-8	1.8	1	--	--	trace m/c sand & silt				
16		90%	WOH/ 18"	--	2					
17	S-9	1.8	2	--	--	F/M SAND, trace c sand; lt gray; loose; wet				
18		90%	2	--	2					
19	S-10	1.0 50%	2	--	--	M SAND, little shell frag, trace c sand; lt gray; v loose; wet				
20			1	--	2					
21			2	--	20.0					
22	S-11	1.0 50%	4	--	--	F SAND & SILT; lt gray to lt green; m dense; wt				
23			6	--	21.7					
24	S-12	2.0 100%	12	--	--	F/C SAND, little shell/ fossil frag; lt gray; v dense; wet				
25			22	--	30					
26			30	--	39					
27	S-13	2.0 100%	18	--	--	SHELL/FOSSIL FRAG & F SAND, trace silt; dense				
28			20	--	29					
29			26	--	41					
30	S-14	2.0 100%	20	--	--	SHELL/FOSSIL FRAG, trace f sand; v dense				
31			26	--	38					
32			38	--	33					
33	S-15	2.0 100%	13	--	--	little f sand; dense				
34			10	--	21					
35			21	--	25					
36	30.0		4			Match to Sheet 3				

DRILLING CO.: Parratt - Wolff  
 DRILLER: Chip Lafever

BAKER REP.: Jeff Tepsic  
 BORING NO.: 93-TW01IW SHEET 2 OF 4

## TEST BORING AND WELL CONSTRUCTION RECORD

PROJECT: Phase I Investigation at Sites 88, 89, and 93 - MCB Camp Lejeune

CTO NO.: 62470-356

BORING NO.:

93-TW01IW

SAMPLE TYPE							DEFINITIONS			
S = Split Spoon A = Auger T = Shelby Tube W = Wash R = Air Rotary C = Core D = Denison P = Piston N = No Sample							SPT = Standard Penetration Test (ASTM D1586) PID = Photo Ionization Detector measurement Lab Class = USCS (ASTM D2487)			
Depth (Ft.)	Sample Type & No.	Sample Rec. (Ft.,%)	SPT	Lab Class.	PID (ppm)	Visual Description	Well Installation Detail	Elevation (Ft. MSL)		
31	S-16	2.0 100%	10	--	--	Continued from Sheet 2				
32			16							
33	S-17	2.0 100%	18	--	--	some f sand, little silt; m dense				
34			10							
35	S-18	2.0 100%	16	--	--	F SAND & LIMESTONE FRAG, little shell frag				
36			20							
37			23							
38	S-19	2.0 100%	26	--	--	F SAND, little shell frag; v dense				
39			28							
40	S-20	2.0 100%	47	--	--	M SAND & LIMESTONE FRAG; dense				
41			40							
42	S-21	.3/100%	43	--	--	F SAND				
43			50							
44	A-N	--	50/3"	--	--					
45			--							
46	S-22	1.5 75%	4	--	--	LIMESTONE FRAG, some m sand; m dense				
47			8							
48	S-23	1.5 75%	15	--	--	F/M SAND, some limestone frag; v dense				
49			19							
50	S-24	1.5 75%	13	--	--	F SAND, trace silt; lt gray & green; dense; wet				
51			56							
52	S-25	1.5 75%	38	--	--	moist to wet		48.5		
53			24							
54			9							
55			17							
56			17							
57			23							
58			8							
59			28							
60			16							
61			17							
62	Match to Sheet 4									

DRILLING CO.: Parratt - Wolff

DRILLER: Chip Lafever

BAKER REP.: Jeff Tepsic

BORING NO.: 93-TW01IW

SHEET 3 OF 4



## TEST BORING AND WELL CONSTRUCTION RECORD

PROJECT: Phase I Investigation at Sites 88, 89, and 93 - MCB Camp Lejeune  
 CTO NO.: 62470-356 BORING NO.: 93-TW01IW

<u>SAMPLE TYPE</u>						<u>DEFINITIONS</u>			
S = Split Spoon A = Auger T = Shelby Tube W = Wash R = Air Rotary C = Core D = Denison P = Piston N = No Sample						SPT = Standard Penetration Test (ASTM D1586) PID = Photo Ionization Detector measurement Lab Class = USCS (ASTM D2487)			
Depth (Ft.)	Sample Type & No.	Sample Rec. (Ft.,%)	SPT	Lab Class.	PID (ppm)	Visual Description	Well Installation Detail	Elevation (Ft. MSL)	
51	S-26	1.5 75%	10	--	--	Continued from Sheet 3 some silt; lt green			
52			22						
52	52.0		25						
53	S-27	0.6 30%	12	--	--	trace silt			
54			31						
54	54.0		49			54.0	54.0		
55						BOH @ 54.0'			
56									
57									
58									
59									
60									
61									
62									
63									
64									
65									
66									
67									
68									
69									
70									

DRILLING CO.: Parratt - Wolff BAKER REP.: Jeff Tepsic  
 DRILLER: Chip Lafever BORING NO.: 93-TW01IW SHEET 4 OF 4



Baker Environmental

### TEST BORING AND WELL CONSTRUCTION RECORD

PROJECT: Phase I Investigation at Sites 88, 89, and 93 - MCB Camp Lejeune  
 CTO NO.: 62470-356 BORING NO.: 93-TW02  
 COORDINATES: EAST: 2464754.7100 NORTH: 360592.1700  
 ELEVATION: SURFACE: 16.59 TOP OF PVC CASING: 18.74

Rig: Diedrich D-50					Date	Progress (Ft.)	Weather	Depth to Water (Ft.)	Time
Split Spoon	Casing	Augers	Core Barrel						
Size (ID)	1-3/8"	--	2-3/4"	--	7/30/96	0.0 - 15.0	P Sunny, 80s	--	--
Length	2'	--	5'	--					
Type	Stainless	--	HSA	--					
Hammer Wt.	140 #	--	--	--					
Fall	30"	--	--	--					
Stickup	--	--	--	--					

Remarks:

SAMPLE TYPE						WELL INFORMATION			
S = Split Spoon A = Auger T = Shelby Tube W = Wash R = Air Rotary C = Core D = Denison P = Piston N = No Sample						Type	Diam.	Top Depth (Ft.)	Bottom Depth (Ft.)
						Sch 40, PVC Riser	1"	0	5
						Sch 40, 10-Slot, PVC Screen	1"	5	15
Depth (Ft.)	Sample Type & No.	Sample Rec. (Ft.,%)	SPT	Lab. Class	PID (ppm)	Visual Description	Well Installation Detail	Elevation (Ft. MSL)	
1									
2									
3									
4									
5	A-N	--	--	--	--	Refer to the log for well 93-TW02IW for descriptions		5.0	
6									
7									
8									
9									
10									

Match to Sheet 2

DRILLING CO.: Parratt - Wolff  
 DRILLER: Chip Lafever

BAKER REP.: Mark DeJohn  
 BORING NO.: 93-TW02 SHEET 1 OF 2



## TEST BORING AND WELL CONSTRUCTION RECORD

PROJECT: Phase I Investigation at Sites 88, 89, and 93 - MCB Camp Lejeune  
 CTO NO.: 62470-356 BORING NO.: 93-TW02

<u>SAMPLE TYPE</u>						<u>DEFINITIONS</u>		
S = Split Spoon A = Auger T = Shelby Tube W = Wash R = Air Rotary C = Core D = Denison P = Piston N = No Sample						SPT = Standard Penetration Test (ASTM D1586) PID = Photo Ionization Detector measurement Lab Class = USCS (ASTM D2487)		
Depth (Ft.)	Sample Type & No.	Sample Rec. (Ft.,%)	SPT	Lab Class	PID (ppm)	Visual Description	Well Installation Detail	Elevation (Ft. MSL)
11								
12								
13	A-N	--	--	--	--			
14								
15	15.0					15.0	15.0	15.0
16						BOH @ 15.0'		
17								
18								
19								
20								
21								
22								
23								
24								
25								
26								
27								
28								
29								
30								

DRILLING CO.: Parratt - Wolff  
 DRILLER: Chip Lafever

BAKER REP.: Mark DeJohn  
 BORING NO.: 93-TW02 SHEET 2 OF 2



Baker Environmental

## TEST BORING AND WELL CONSTRUCTION RECORD

PROJECT:	Phase I Investigation at Sites 88, 89, and 93 - MCB Camp Lejeune		
CTO NO.:	62470-356	BORING NO.:	93-TW02IW
COORDINATES: EAST:	2464759.2000	NORTH:	360592.2700
ELEVATION: SURFACE:	16.69	TOP OF PVC CASING:	18.72

Rig:	Diedrich D-50				Date	Progress (Ft.)	Weather	Depth to Water (Ft.)	Time
	Split Spoon	Casing	Augers	Core Barrel					
Size (ID)	1-3/8"	--	2-3/4"	--	7/30/96	0.0 - 52.0	P Sunny, 80s	--	--
Length	2'	--	5'	--					
Type	Stainless	--	HSA	--					
Hammer Wt.	140 #	--	--	--					
Fall	30"	--	--	--					
Stickup	--	--	--	--					

Remarks:

SAMPLE TYPE						WELL INFORMATION				
S = Split Spoon    A = Auger T = Shelby Tube    W = Wash R = Air Rotary    C = Core D = Denison    P = Piston N = No Sample						Type		Diam.	Top Depth (Ft.)	Bottom Depth (Ft.)
						Sch 40, PVC Riser		1"	0	45
						Sch 40, 10-Slot, PVC Screen		1"	45	50
Depth (Ft.)	Sample Type & No.	Sample Rec. (Ft.,%)	SPT	Lab Class.	PID (ppm)	Visual Description	Well Installation Detail		Elevation (Ft. MSL)	
1	S-1	1.1 55%	3	--	0.2	F SAND, little silt; dk brown; m dense; damp  some clay, trace silt; brown & gray w/ iron stains; m stiff; moist  little to some clay, trace silt; mottled brown & gray; v soft; wet <b>Water @ 4.0'</b>	<div style="border-left: 1px solid black; border-right: 1px solid black; height: 100%;"></div>	<div style="border-left: 1px solid black; border-right: 1px solid black; height: 100%;"></div>	<div style="border-left: 1px solid black; border-right: 1px solid black; height: 100%;"></div>	
2			9							2.0
3	S-2	2.0 100%	1	--	0.2					
4			3							4.0
5	S-3	1.2 60%	1	--	0.2					
6			1							6.0
7	S-4	2.0 100%	2	--	0.2					
8			2							8.0
9	S-5	1.2 60%	2	--	0.2					
10			4							10.0
			5			Match to Sheet 2				

DRILLING CO.: Parratt - Wolff  
 DRILLER: Chip Lafever

BAKER REP.: Mark DeJohn  
 BORING NO.: 93-TW02IW SHEET 1 OF 4



## TEST BORING AND WELL CONSTRUCTION RECORD

PROJECT: Phase I Investigation at Sites 88, 89, and 93 - MCB Camp Lejeune  
 CTO NO.: 62470-356 BORING NO.: 93-TW02IW

<u>SAMPLE TYPE</u>							<u>DEFINITIONS</u>			
S = Split Spoon A = Auger T = Shelby Tube W = Wash R = Air Rotary C = Core D = Denison P = Piston N = No Sample							SPT = Standard Penetration Test (ASTM D1586) PID = Photo Ionization Detector measurement Lab Class = USCS (ASTM D2487)			
Depth (Ft.)	Sample Type & No.	Sample Rec. (Ft.,%)	SPT	Lab Class.	PID (ppm)	Visual Description	Well Installation Detail	Elevation (Ft. MSL)		
11	S-6	0.9 45%	2	--	0.2	Continued from Sheet 1 little to some silt, trace clay; gray; loose				
12			7							
13	S-7	--	--	--	--					
14										
15	S-8	2.0 100%	2	--	0.2	little to some silt & clay; stiff				
16			5							
17			7							
18	S-9	2.0 100%	4	--	0.2	little silt		17.6		
19			5							
20	S-10	2.0 100%	7	--	0.2	M/C SAND, trace silt; orange; loose; wet		19.5		
21			2							
22	S-11	0.5 25%	6	--	0.2	F SAND, some silt, trace clay; dk gray; soft; wet				
23			2							
24	S-12	0.9 45%	1	--	0.2	little silt; v soft		24.0		
25			1							
26	S-13	1.2 60%	1	--	0.2	SILT, some f sand, trace shell frag & clay; lt gray; stiff; damp		26.0		
27			7							
28	S-14	2.0 100%	11	--	0.2	F SAND, some shell/fossil frag, little silt, trace clay; lt gray; v dense; damp				
29			7							
30	S-15	2.0 100%	10	--	0.2	m dense; moist to wet				
31			2							
			11							
			16							
			11							
			32							
			13			Match to Sheet 3				

DRILLING CO.: Parratt - Wolff BAKER REP.: Mark DeJohn  
 DRILLER: Chip Lafever BORING NO.: 93-TW02IW SHEET 2 OF 4

## TEST BORING AND WELL CONSTRUCTION RECORD

PROJECT: Phase I Investigation at Sites 88, 89, and 93 - MCB Camp Lejeune

CTO NO.: 62470-356

BORING NO.:

93-TW02IW

SAMPLE TYPE						DEFINITIONS			
S = Split Spoon A = Auger T = Shelby Tube W = Wash R = Air Rotary C = Core D = Denison P = Piston N = No Sample						SPT = Standard Penetration Test (ASTM D1586) PID = Photo Ionization Detector measurement Lab Class = USCS (ASTM D2487)			
Depth (Ft.)	Sample Type & No.	Sample Rec. (Ft.,%)	SPT	Lab Class.	PID (ppm)	Visual Description	Well Installation Detail	Elevation (Ft. MSL)	
31	S-16	1.2 60%	20	--	0.2	Continued from Sheet 2 dense; moist			
			25		0.2				
32	32.0		25						
33	S-17	1.4 70%	4	--	0.2	SHELL/FOSSIL FRAG, little f sand & silt, trace clay; lt gray; m dense			
			13		0.2				
34	34.0		11						
			24						
35	S-18	2.0 100%	5	--	0.2	F SAND, some shell/fossil frag, little silt; gray; dense; moist to wet			
			18		0.2				
36	36.0		23						
			38						
37	S-19	2.0 100%	15	--	0.2	wet			
			17		0.2				
38	38.0		19						
			26						
39	S-20	0.8 40%	20	--	0.2	v dense			
			26		0.2				
40	40.0		29						
			25						
41	S-21	0.8	28		0.2	F SAND, little silt; gray; v dense; wet			
42	41.0	100%	50/3		0.2				
	A-N	--	--	--	--				
43	S-22	2.0 100%	26	--	0.2	F/M SAND, little silt; gray; v dense; wet			
			28		0.2				
44	44.0		24						
			30						
45	S-23	2.0 100%	14	--	0.2			45.0	
			24		0.2				
46	46.0		28						
			32						
47	S-24	2.0 100%	17	--	0.2	F SAND, little silt, trace shell frag, m sand & clay; gray; v dense; wet			
			25		0.2				
48	48.0		27						
			23						
49	S-25	2.0 100%	8		0.2	little silt, trace shell frag & clay; m dense			
			9		0.2				
50	50.0		16						
			27					50.0	
			7			Match to Sheet 4			

DRILLING CO.: Parratt - Wolff  
DRILLER: Chip Lafever

BAKER REP.: Mark DeJohn  
BORING NO.: 93-TW02IW





# TEST BORING AND WELL CONSTRUCTION RECORD

PROJECT: Phase I Investigation at Sites 88, 89, and 93 - MCB Camp Lejeune  
 CTO NO.: 62470-356 BORING NO.: 93-TW02IW

<u>SAMPLE TYPE</u>						<u>DEFINITIONS</u>			
S = Split Spoon A = Auger T = Shelby Tube W = Wash R = Air Rotary C = Core D = Denison P = Piston N = No Sample						SPT = Standard Penetration Test (ASTM D1586) PID = Photo Ionization Detector measurement Lab Class = USCS (ASTM D2487)			
Depth (Ft.)	Sample Type & No.	Sample Rec. (Ft.,%)	SPT	Lab Class.	PID (ppm)	Visual Description	Well Installation Detail	Elevation (Ft. MSL)	
51	S-26	2.0 100%	16	--	0.2	Continued from Sheet 3 F SAND, some silt, trace shell frag & clay; greenish-gray; dense; damp to moist BOH@ 52.0'	[REDACTED]		
52			33		0.2			51.3	52.0
52			37					52.0	
53									
54									
55									
56									
57									
58									
59									
60									
61									
62									
63									
64									
65									
66									
67									
68									
69									
70									

DRILLING CO.: Parratt - Wolff BAKER REP.: Mark DeJohn  
 DRILLER: Chip Lafever BORING NO.: 93-TW02IW SHEET 4 OF 4



## TEST BORING AND WELL CONSTRUCTION RECORD

**PROJECT:** Phase I Investigation at Sites 88, 89, and 93 - MCB Camp Lejeune  
**CTO NO.:** 62470-356 **BORING NO.:** 93-TW03  
**COORDINATES: EAST:** 2464683.8800 **NORTH:** 361203.1500  
**ELEVATION: SURFACE:** 13.08 **TOP OF PVC CASING:** 15.93

Rig: Diedrich D-50					Date	Progress (Ft.)	Weather	Depth to Water (Ft.)	Time
Split Spoon	Casing	Augers	Core Barrel						
Size (ID)	1-3/8"	--	2-3/4"	--	7/30/96	0.0 - 15.0	P Sunny, 80s	--	--
Length	2'	--	5'	--					
Type	Stainless	--	HSA	--					
Hammer Wt.	140 #	--	--	--					
Fall	30"	--	--	--					
Stickup	--	--	--	--					

**Remarks:**

SAMPLE TYPE	WELL INFORMATION			
S = Split Spoon A = Auger T = Shelby Tube W = Wash R = Air Rotary C = Core D = Denison P = Piston N = No Sample	Type	Diam.	Top Depth (Ft.)	Bottom Depth (Ft.)
	Sch 40, PVC Riser	1"	0	4.5
	Sch 40, 10-Slot, PVC Screen	1"	4.5	14.5

Depth (Ft.)	Sample Type & No.	Sample Rec. (Ft.,%)	SPT	Lab. Class	PID (ppm)	Visual Description	Well Installation Detail	Elevation (Ft. MSL)
1								
2								
3								
4								
5	A-N	--	--	--	--	Refer to the log for well 93-TW03IW for descriptions		
6							4.5	
7								
8								
9								
10								
Match to Sheet 2								

**DRILLING CO.:** Parratt - Wolff **BAKER REP.:** Mark DeJohn  
**DRILLER:** Chip Lafever **BORING NO.:** 93-TW03 **SHEET 1 OF 2**



## TEST BORING AND WELL CONSTRUCTION RECORD

PROJECT: Phase I Investigation at Sites 88, 89, and 93 - MCB Camp Lejeune  
 CTO NO.: 62470-356 BORING NO.: 93-TW03

<b>SAMPLE TYPE</b>						<b>DEFINITIONS</b>		
S = Split Spoon A = Auger T = Shelby Tube W = Wash R = Air Rotary C = Core D = Denison P = Piston N = No Sample						SPT = Standard Penetration Test (ASTM D1586) PID = Photo Ionization Detector measurement Lab Class = USCS (ASTM D2487)		
Depth (Ft.)	Sample Type & No.	Sample Rec. (Ft.,%)	SPT	Lab Class	PID (ppm)	Visual Description	Well Installation Detail	Elevation (Ft. MSL)
11								
12								
13	A-N	--	--	--	--			
14								
15	15.0					15.0	15.0	14.5 15.0
16						BOH @ 15.0'		
17								
18								
19								
20								
21								
22								
23								
24								
25								
26								
27								
28								
29								
30								

DRILLING CO.: Parratt - Wolff  
 DRILLER: Chip Lafever

BAKER REP.: Mark DeJohn  
 BORING NO.: 93-TW03 SHEET 2 OF 2

**Baker**

Baker Environmental

**TEST BORING AND WELL CONSTRUCTION RECORD**

PROJECT: Phase I Investigation at Sites 88, 89, and 93 - MCB Camp Lejeune

CTO NO.: 62470-356

BORING NO.: 93-TW03IW

COORDINATES: EAST: 2464683.8800

NORTH: 361203.1500

ELEVATION: SURFACE: 12.98

TOP OF PVC CASING: 14.74

Rig: Diedrich D-50					Date	Progress (Ft.)	Weather	Depth to Water (Ft.)	Time
Split Spoon	Casing	Augers	Core Barrel						
Size (ID)	1-3/8"	--	2-3/4"	--	7/30/96	0.0 - 54.0	P Sunny, 80s	--	--
Length	2'	--	5'	--					
Type	Stainless	--	HSA	--					
Hammer Wt.	140 #	--	--	--					
Fall	30"	--	--	--					
Stickup	--	--	--	--					
<b>Remarks:</b>									
<b>SAMPLE TYPE</b>					<b>WELL INFORMATION</b>				
S = Split Spoon A = Auger T = Shelby Tube W = Wash R = Air Rotary C = Core D = Denison P = Piston N = No Sample					Type		Diam.	Top Depth (Ft.)	Bottom Depth (Ft.)
					Sch 40, PVC Riser		1"	0	45
					Sch 40, 10-Slot, PVC Screen		1"	45	50
Depth (Ft.)	Sample Type & No.	Sample Rec. (Ft.,%)	SPT	Lab Class.	PID (ppm)	Visual Description	Well Installation Detail		Elevation (Ft. MSL)
1	S-1	2.0 100%	2	--	0.1 0.1	F SAND, some silt, trace clay; black, brown & gray layers; m dense; damp			
2			4						
3	S-2	1.1 55%	4	--	0.1 0.1	some silt, little clay; moist moist			
4			7						
5	S-3	1.3 65%	1	--	0.1 0.1	some organic matter; black; loose; wet Water @ 4.0'			
6			2						
7			3						
8	S-4	1.0 50%	5	--	0.1 0.1	little silt & clay; dk green			
7			5						
8	S-5	2.0 100%	4	--	0.1 0.1	little silt & clay, trace c sand; v loose			
9			4						
10			4			Match to Sheet 2			

DRILLING CO.: Parratt - Wolff

BAKER REP.: Jeff Tepsic

DRILLER: Chip Lafever

BORING NO.: 93-TW03IW

SHEET 1 OF 4

## TEST BORING AND WELL CONSTRUCTION RECORD

PROJECT: Phase I Investigation at Sites 88, 89, and 93 - MCB Camp Lejeune

CTO NO.: 62470-356

BORING NO.:

93-TW03IW

SAMPLE TYPE						DEFINITIONS		
S = Split Spoon A = Auger T = Shelby Tube W = Wash R = Air Rotary C = Core D = Denison P = Piston N = No Sample						SPT = Standard Penetration Test (ASTM D1586) PID = Photo Ionization Detector measurement Lab Class = USCS (ASTM D2487)		
Depth (Ft.)	Sample Type & No.	Sample Rec. (Ft.,%)	SPT	Lab Class.	PID (ppm)	Visual Description	Well Installation Detail	Elevation (Ft. MSL)
11	S-6	1.8 90%	8	--	0.1 0.1	Continued from Sheet 1 some silt, trace shell frag; m dense; moist		
12			12					
13	S-7	1.4 70%	7	--	0.1 0.1			
14			9					
15	S-8	2.0 100%	4	--	0.1 0.1	some silt, trace shell frag & clay; greenish-gray		
16			6					
17	S-9	1.3 65%	4	--	0.1 0.1	SHELL/LIMESTONE FRAG, trace f sand & silt; lt gray; dense; wet		
18			16					
19	S-10	1.0 50%	13	--	0.1 0.1			
20			20					
21	S-11	1.3 65%	12	--	0.1 0.1	some f sand		
22			33					
23	S-12	2.0 100%	21	--	0.1 0.1			
24			32					
25	S-13	1.3 65%	20	--	0.1 0.1	SILT, some f sand, little clay & shell frag; lt gray; hard; damp		
26			24					
27	S-14	2.0 100%	20	--	0.1 0.1	F SAND & SHELL FRAG, some silt, trace clay; gray; v dense; wet		
28			24					
29	S-15	1.1 55%	25	--	0.1 0.1	dense		
30			27					
			27			Match to Sheet 3		

DRILLING CO.: Parratt - Wolff

DRILLER: Chip Lafever

BAKER REP.:

BORING NO.:

Jeff Tepsic

93-TW03IW

SHEET 2 OF 4



## TEST BORING AND WELL CONSTRUCTION RECORD

PROJECT: Phase I Investigation at Sites 88, 89, and 93 - MCB Camp Lejeune  
 CTO NO.: 62470-356 BORING NO.: 93-TW03IW

<u>SAMPLE TYPE</u>						<u>DEFINITIONS</u>			
S = Split Spoon A = Auger T = Shelby Tube W = Wash R = Air Rotary C = Core D = Denison P = Piston N = No Sample						SPT = Standard Penetration Test (ASTM D1586) PID = Photo Ionization Detector measurement Lab Class = USCS (ASTM D2487)			
Depth (Ft.)	Sample Type & No.	Sample Rec. (Ft.,%)	SPT	Lab Class.	PID (ppm)	Visual Description	Well Installation Detail	Elevation (Ft. MSL)	
31	S-16	1.9 95%	28	--	0.1	Continued from Sheet 2			
32			21		0.1				
33	S-17	1.3 65%	22	--	--	SHELL/FOSSIL FRAG, little f sand & silt; v dense			
34			25						26
35	S-18	1.2 60%	27	--	--	F SAND, some shell/fossil frag, little silt			
36			29						22
37	S-19	1.2 60%	24	--	--				
38			30						42
39	S-20	2.0 100%	28	--	--	some silt, little shell/fossil frag; dense			
40			17						22
41	S-21	1.0 50%	28	--					
42			21						21
43	S-22	1.3 65%	15	--	--	some shell/fossil frag, little silt			
44			20						50
45	A-N	--	--	--	--			45.0	
46								45.0	
47								45.0	
48								45.0	
49								45.0	
50	50.0	50.0							
			15			Match to Sheet 4		50.0	

DRILLING CO.: Parratt - Wolff  
 DRILLER: Chip Lafever

BAKER REP.: Jeff Tepsic  
 BORING NO.: 93-TW03IW SHEET 3 OF 4


## TEST BORING AND WELL CONSTRUCTION RECORD

PROJECT: Phase I Investigation at Sites 88, 89, and 93 - MCB Camp Lejeune

CTO NO.: 62470-356

BORING NO.:

93-TW03IW

SAMPLE TYPE						DEFINITIONS		
S = Split Spoon A = Auger T = Shelby Tube W = Wash R = Air Rotary C = Core D = Denison P = Piston N = No Sample						SPT = Standard Penetration Test (ASTM D1586) PID = Photo Ionization Detector measurement Lab Class = USCS (ASTM D2487)		
Depth (Ft.)	Sample Type & No.	Sample Rec. (Ft.,%)	SPT	Lab Class.	PID (ppm)	Visual Description	Well Installation Detail	Elevation (Ft. MSL)
51	S-23	1.1 55%	16	--	--	Continued from Sheet 3		
52			30					
53	S-24	1.2 60%	--	--	--			
54			54.0			54.0		
55						BOH @ 54.0'		
56								
57								
58								
59								
60								
61								
62								
63								
64								
65								
66								
67								
68								
69								
70								

DRILLING CO.: Parratt - Wolff  
 DRILLER: Chip Lafever

BAKER REP.: Jeff Tepsic  
 BORING NO.: 93-TW03IW



**TEST BORING AND WELL CONSTRUCTION RECORD**

PROJECT: Phase I Investigation at Sites 88, 89, and 93 - MCB Camp Lejeune  
 CTO NO.: 62470-356 BORING NO.: 93-TW04  
 COORDINATES: EAST: 2465170.1000 NORTH: 360186.3000  
 ELEVATION: SURFACE: 11.82 TOP OF PVC CASING: 13.92

Rig: <u>Diedrich D-50</u>					Date	Progress (Ft.)	Weather	Depth to Water (Ft.)	Time
Split Spoon	Casing	Augers	Core Barrel						
Size (ID)	1-3/8"	--	2-3/4"	--	7/31/96	0.0 - 15.0	M.cloudy, 90s	--	--
Length	2'	--	5'	--					
Type	Stainless	--	HSA	--					
Hammer Wt.	140 #	--	--	--					
Fall	30"	--	--	--					
Stickup	--	--	--	--					

Remarks:

SAMPLE TYPE					WELL INFORMATION			
S = Split Spoon A = Auger T = Shelby Tube W = Wash R = Air Rotary C = Core D = Denison P = Piston N = No Sample					Type	Diam.	Top Depth (Ft.)	Bottom Depth (Ft.)
					Sch 40, PVC Riser	1"	0	5
					Sch 40, 10-Slot, PVC Screen	1"	5	15

Depth (Ft.)	Sample Type & No.	Sample Rec. (Ft.,%)	SPT	Lab. Class	PID (ppm)	Visual Description	Well Installation Detail	Elevation (Ft. MSL)
1								
2								
3								
4								
5	A-N	--	--	--	--	Refer to the log for well 93-TW04IW for descriptions  Match to Sheet 2		5.0
6								
7								
8								
9								
10								

DRILLING CO.: Parratt - Wolff BAKER REP.: Mark DeJohn  
 DRILLER: Chip Lafever BORING NO.: 93-TW04 SHEET 1 OF 2





## TEST BORING AND WELL CONSTRUCTION RECORD

PROJECT: Phase I Investigation at Sites 88, 89, and 93 - MCB Camp Lejeune  
 CTO NO.: 62470-356 BORING NO.: 93-TW04

<u>SAMPLE TYPE</u>						<u>DEFINITIONS</u>			
S = Split Spoon A = Auger T = Shelby Tube W = Wash R = Air Rotary C = Core D = Denison P = Piston N = No Sample						SPT = Standard Penetration Test (ASTM D1586) PID = Photo Ionization Detector measurement Lab Class = USCS (ASTM D2487)			
Depth (Ft.)	Sample Type & No.	Sample Rec. (Ft.,%)	SPT	Lab Class	PID (ppm)	Visual Description	Well Installation Detail		Elevation (Ft. MSL)
11									
12									
13	A-N	--	--	--	--				
14									
15	15.0					15.0		15.0	
16						BOH @ 15.0'			
17									
18									
19									
20									
21									
22									
23									
24									
25									
26									
27									
28									
29									
30									

DRILLING CO.: Parratt - Wolff  
 DRILLER: Chip Lafever

BAKER REP.: Mark DeJohn  
 BORING NO.: 93-TW04 SHEET 2 OF 2



**TEST BORING AND WELL CONSTRUCTION RECORD**

PROJECT: Phase I Investigation at Sites 88, 89, and 93 - MCB Camp Lejeune  
 CTO NO.: 62470-356 BORING NO.: 93-TW05  
 COORDINATES: EAST: 2464904.0000 NORTH: 359726.9400  
 ELEVATION: SURFACE: 16.58 TOP OF PVC CASING: 19.72

Rig: Diedrich D-50					Date	Progress (Ft.)	Weather	Depth to Water (Ft.)	Time
Split Spoon	Casing	Augers	Core Barrel						
Size (ID)	1-3/8"	--	2-3/4"	--	7/31/96	0.0 - 15.0	M.cloudy, 90s	--	--
Length	2'	--	5'	--					
Type	Stainless	--	HSA	--					
Hammer Wt.	140 #	--	--	--					
Fall	30"	--	--	--					
Stickup	--	--	--	--					

Remarks:

SAMPLE TYPE					WELL INFORMATION			
S = Split Spoon A = Auger T = Shelby Tube W = Wash R = Air Rotary C = Core D = Denison P = Piston N = No Sample					Type	Diam.	Top Depth (Ft.)	Bottom Depth (Ft.)
					Sch 40, PVC Riser	1"	0	5
					Sch 40, 10-Slot, PVC Screen	1"	5	15

Depth (Ft.)	Sample Type & No.	Sample Rec. (Ft.,%)	SPT	Lab. Class	PID (ppm)	Visual Description	Well Installation Detail	Elevation (Ft. MSL)	
1									
2									
3									
4									
5	A-N	--	--	--	--	Refer to the log for well 93-TW05IW for descriptions		5.0	
6									
7									
8									
9									
10									
								Match to Sheet 2	

DRILLING CO.: Parratt - Wolff BAKER REP.: Mark DeJohn  
 DRILLER: Chip Lafever BORING NO.: 93-TW05 SHEET 1 OF 2

**TEST BORING AND WELL CONSTRUCTION RECORD**

PROJECT: Phase I Investigation at Sites 88, 89, and 93 - MCB Camp Lejeune  
 CTO NO.: 62470-356 BORING NO.: 93-TW05

SAMPLE TYPE						DEFINITIONS		
S = Split Spoon A = Auger T = Shelby Tube W = Wash R = Air Rotary C = Core D = Denison P = Piston N = No Sample						SPT = Standard Penetration Test (ASTM D1586) PID = Photo Ionization Detector measurement Lab Class = USCS (ASTM D2487)		
Depth (Ft.)	Sample Type & No.	Sample Rec. (Ft.,%)	SPT	Lab Class	PID (ppm)	Visual Description	Well Installation Detail	Elevation (Ft. MSL)
11	A-N	--	--	--	--			
12								
13								
14								
15								
16						BOH @ 15.0'		
17								
18								
19								
20								
21								
22								
23								
24								
25								
26								
27								
28								
29								
30								

DRILLING CO.: Parratt - Wolff  
 DRILLER: Chip Lafever

BAKER REP.: Mark DeJohn  
 BORING NO.: 93-TW05 SHEET 2 OF 2

**Baker**

Baker Environmental

**TEST BORING AND WELL CONSTRUCTION RECORD**

PROJECT: Phase I Investigation at Sites 88, 89, and 93 - MCB Camp Lejeune

CTO NO.: 62470-356

BORING NO.: 93-TW05IW

COORDINATES: EAST: 2464893.2000

NORTH: 359725.9100

ELEVATION: SURFACE: 16.68

TOP OF PVC CASING: 18.88

Rig:	Diedrich D-50				Date	Progress (Ft.)	Weather	Depth to Water (Ft.)	Time
	Split Spoon	Casing	Augers	Core Barrel					
Size (ID)	1-3/8"	--	2-3/4"	--	7/31/96	0.0 - 52.0	M Cloudy, 90s	--	--
Length	2'	--	5'	--					
Type	Stainless	--	HSA	--					
Hammer Wt.	140 #	--	--	--					
Fall	30"	--	--	--					
Stickup	--	--	--	--					

**Remarks:****SAMPLE TYPE**

S = Split Spoon A = Auger  
 T = Shelby Tube W = Wash  
 R = Air Rotary C = Core  
 D = Denison P = Piston  
 N = No Sample

**WELL INFORMATION**

Type	Diam.	Top Depth (Ft.)	Bottom Depth (Ft.)
Sch 40, PVC Riser	1"	0	45
Sch 40, 10-Slot, PVC Screen	1"	45	50

Depth (Ft.)	Sample Type & No.	Sample Rec. (Ft.,%)	SPT	Lab Class.	PID (ppm)	Visual Description	Well Installation Detail	Elevation (Ft. MSL)
1	S-1	1.2 60%	3	--	0.1 0.1	F SAND, some silt, trace clay; brown & black; m dense; damp		
2			8 4 2					
3	A-N	--	--	--	--			
4								
5								
6	S-2	1.6 80%	2	--	0.1 0.1	CLAY, some f sand & silt; gray; m stiff; moist		
7			2 2					
8	A-N	--	--	--	--	M/C SAND, some silt & clay; gray; m stiff; wet <b>Water @ 6.5</b>		
9								
10								
			5			Match to Sheet 2		

DRILLING CO.: Parratt - Wolff

BAKER REP.: Mark DeJohn

DRILLER: Chip Lafever

BORING NO.: 93-TW05IW

SHEET 1 OF 4



## TEST BORING AND WELL CONSTRUCTION RECORD

PROJECT: Phase I Investigation at Sites 88, 89, and 93 - MCB Camp Lejeune  
 CTO NO.: 62470-356 BORING NO.: 93-TW05IW

<u>SAMPLE TYPE</u>							<u>DEFINITIONS</u>			
S = Split Spoon A = Auger T = Shelby Tube W = Wash R = Air Rotary C = Core D = Denison P = Piston N = No Sample							SPT = Standard Penetration Test (ASTM D1586) PID = Photo Ionization Detector measurement Lab Class = USCS (ASTM D2487)			
Depth (Ft.)	Sample Type & No.	Sample Rec. (Ft.,%)	SPT	Lab Class.	PID (ppm)	Visual Description	Well Installation Detail	Elevation (Ft. MSL)		
11	S-3	2.0 100%	7	--	0.1 0.1	Continued from Sheet 1				
12			9 12							
13	A-N	--	--	--	--	SILT, some clay; dk gray; v stiff; damp				
14			--							
15			--							
16	S-4	2.0 100%	10	--	0.1 0.1	some clay, trace f sand				
17			11 12 14							
18	A-N	--	--	--	--	some clay, trace f sand				
19			--							
20			--							
21			--							
22	S-5	2.0 100%	3	--	0.1 0.1	some clay, trace f sand				
23			7 9 11							
24	A-N	--	--	--	--	some clay, trace f sand				
25			--							
26			--							
27	S-6	1.3 65%	3	--	0.1 0.1	SHELL/FOSSIL FRAG, trace silt & clay; gray; v dense; wet				
28			29 25 36							
29	A-N	--	--	--	--	SHELL/FOSSIL FRAG, trace silt & clay; gray; v dense; wet				
30			--							
6							Match to Sheet 3			

DRILLING CO.: Parratt - Wolff  
 DRILLER: Chip Lafever

BAKER REP.: Mark DeJohn  
 BORING NO.: 93-TW05IW SHEET 2 OF 4

## TEST BORING AND WELL CONSTRUCTION RECORD

PROJECT: Phase I Investigation at Sites 88, 89, and 93 - MCB Camp Lejeune

CTO NO.: 62470-356

BORING NO.:

93-TW05IW

SAMPLE TYPE						DEFINITIONS		
S = Split Spoon A = Auger T = Shelby Tube W = Wash R = Air Rotary C = Core D = Denison P = Piston N = No Sample						SPT = Standard Penetration Test (ASTM D1586) PID = Photo Ionization Detector measurement Lab Class = USCS (ASTM D2487)		
Depth (Ft.)	Sample Type & No.	Sample Rec. (Ft.,%)	SPT	Lab Class.	PID (ppm)	Visual Description	Well Installation Detail	Elevation (Ft. MSL)
31	S-7	1.4	33	--	0.1	Continued from Sheet 2 little silt & clay		
32		70%	36		0.1			
			37					
33	A-N	--	--	--	--			
34								
35								
36	S-8	1.2	8	--	0.1	some silt, little clay		
37		60%	31		0.1			
			38					
38	A-N	--	--	--	--			
39								
40								
41	S-9	0.9	17	--	0.1	trace silt & clay; dense		
42		45%	18		0.1			
			22					
43	A-N	--	--	--	--			
44								
45								
46	S-10	1.2	24	--	0.1	v dense		
47		60%	28		0.1			
			31					
48	A-N	--	--	--	--			
49								
50								
			24			Match to Sheet 4		

DRILLING CO.: Parratt - Wolff

DRILLER: Chip Lafever

BAKER REP.:

BORING NO.:

Mark DeJohn

93-TW05IW

SHEET 3 OF 4



Baker Environmental

# TEST BORING AND WELL CONSTRUCTION RECORD

PROJECT: Phase I Investigation at Sites 88, 89, and 93 - MCB Camp Lejeune

CTO NO.: 62470-356

BORING NO.:

93-TW05IW

SAMPLE TYPE						DEFINITIONS			
S = Split Spoon A = Auger T = Shelby Tube W = Wash R = Air Rotary C = Core D = Denison P = Piston N = No Sample						SPT = Standard Penetration Test (ASTM D1586) PID = Photo Ionization Detector measurement Lab Class = USCS (ASTM D2487)			
Depth (Ft.)	Sample Type & No.	Sample Rec. (Ft.,%)	SPT	Lab Class.	PID (ppm)	Visual Description	Well Installation Detail	Elevation (Ft. MSL)	
51	S-11	1.2 60%	32	--	0.1	Continued from Sheet 3	[Shaded Box]	52.0	
52			27		0.1				52.0
52			33			BOH @ 52.0'		52.0	
53									
54									
55									
56									
57									
58									
59									
60									
61									
62									
63									
64									
65									
66									
67									
68									
69									
70									

DRILLING CO.: Parratt - Wolff  
DRILLER: Chip Lafever

BAKER REP.: Mark DeJohn  
BORING NO.: 93-TW05IW SHEET 4 OF 4

**Baker**

Baker Environmental

**TEST BORING AND WELL CONSTRUCTION RECORD**

PROJECT: Phase I Investigation at Sites 88, 89, and 93 - MCB Camp Lejeune  
 CTO NO.: 62470-356 BORING NO.: 93-TW06  
 COORDINATES: EAST: 2464470.2900 NORTH: 360233.3400  
 ELEVATION: SURFACE: 17.72 TOP OF PVC CASING: 19.45

Rig: Diedrich D-50					Date	Progress (Ft.)	Weather	Depth to Water (Ft.)	Time
Split Spoon	Casing	Augers	Core Barrel						
Size (ID)	1-3/8"	--	2-3/4"	--	8/1/96	0.0 - 15.0	M Cloudy, 80s	--	--
Length	2'	--	5'	--					
Type	Stainless	--	HSA	--					
Hammer Wt.	140 #	--	--	--					
Fall	30"	--	--	--					
Stickup	--	--	--	--					

**Remarks:**

SAMPLE TYPE						WELL INFORMATION			
S = Split Spoon A = Auger T = Shelby Tube W = Wash R = Air Rotary C = Core D = Denison P = Piston N = No Sample						Type	Diam.	Top Depth (Ft.)	Bottom Depth (Ft.)
						Sch 40, PVC Riser	1"	0	4.5
						Sch 40, 10-Slot, PVC Screen	1"	4.5	14.5
Depth (Ft.)	Sample Type & No.	Sample Rec. (Ft.,%)	SPT	Lab. Class	PID (ppm)	Visual Description	Well Installation Detail		Elevation (Ft. MSL)
1									
2									
3									
4									
5	A-N	--	--	--	--	Refer to the log for well 93-TW06IW for descriptions          Match to Sheet 2			
6									4.5
7									
8									
9									
10									

DRILLING CO.: Parratt - Wolff  
 DRILLER: Chip Lafever

BAKER REP.: Mark DeJohn  
 BORING NO.: 93-TW06 SHEET 1 OF 2





## TEST BORING AND WELL CONSTRUCTION RECORD

PROJECT: Phase I Investigation at Sites 88, 89, and 93 - MCB Camp Lejeune  
 CTO NO.: 62470-356 BORING NO.: 93-TW06

<b>SAMPLE TYPE</b>						<b>DEFINITIONS</b>		
S = Split Spoon A = Auger T = Shelby Tube W = Wash R = Air Rotary C = Core D = Denison P = Piston N = No Sample						SPT = Standard Penetration Test (ASTM D1586) PID = Photo Ionization Detector measurement Lab Class = USCS (ASTM D2487)		
Depth (Ft.)	Sample Type & No.	Sample Rec. (Ft.,%)	SPT	Lab Class	PID (ppm)	Visual Description	Well Installation Detail	Elevation (Ft. MSL)
11								
12								
13	A-N	--	--	--	--			
14								
15	15.0					15.0	15.0	14.5
						BOH @ 15.0'		
16								
17								
18								
19								
20								
21								
22								
23								
24								
25								
26								
27								
28								
29								
30								

**Baker**

Baker Environmental

**TEST BORING AND WELL CONSTRUCTION RECORD**

PROJECT: Phase I Investigation at Sites 88, 89, and 93 - MCB Camp Lejeune  
 CTO NO.: 62470-356 BORING NO.: 93-TW06IW  
 COORDINATES: EAST: 2464472.6100 NORTH: 360236.2200  
 ELEVATION: SURFACE: 17.72 TOP OF PVC CASING: 19.08

Rig:	Diedrich D-50				Date	Progress (Ft.)	Weather	Depth to Water (Ft.)	Time
	Split Spoon	Casing	Augers	Core Barrel					
Size (ID)	1-3/8"	--	2-3/4"	--	8/1/96	0.0 - 52.0	M Cloudy, 80s	--	--
Length	2'	--	5'	--					
Type	Stainless	--	HSA	--					
Hammer Wt.	140 #	--	--	--					
Fall	30"	--	--	--					
Stickup	--	--	--	--					

Remarks: Note: (1) H-Nu not working properly; perhaps due to rainy conditions

SAMPLE TYPE							WELL INFORMATION			
S = Split Spoon A = Auger T = Shelby Tube W = Wash R = Air Rotary C = Core D = Denison P = Piston N = No Sample							Type	Diam.	Top Depth (Ft.)	Bottom Depth (Ft.)
							Sch 40, PVC Riser	1"	0	45
							Sch 40, 10-Slot, PVC Screen	1"	45	50
Depth (Ft.)	Sample Type & No.	Sample Rec. (Ft.,%)	SPT	Lab Class.	PID (ppm)	Visual Description	Well Installation Detail		Elevation (Ft. MSL)	
1										
2	A-N	--	--	--	--	F SAND, little silt, trace clay; damp				
3										
4										
5	5.0									
6	S-1	1	2	--	0.1	CLAY, some f sand & silt; mottled brown & gray; m stiff, moist				
7	7.0	50%	4		0.1					
8										
9	A-N	--	--	--	--					
10	10.0									
			3			Match to Sheet 2				

DRILLING CO.: Parratt - Wolff  
 DRILLER: Chip Lafever

BAKER REP.: Mark DeJohn  
 BORING NO.: 93-TW06IW SHEET 1 OF 4

## TEST BORING AND WELL CONSTRUCTION RECORD

PROJECT: Phase I Investigation at Sites 88, 89, and 93 - MCB Camp Lejeune  
 CTO NO.: 62470-356

BORING NO.: 93-TW06IW

SAMPLE TYPE						DEFINITIONS			
S = Split Spoon A = Auger T = Shelby Tube W = Wash R = Air Rotary C = Core D = Denison P = Piston N = No Sample						SPT = Standard Penetration Test (ASTM D1586) PID = Photo Ionization Detector measurement Lab Class = USCS (ASTM D2487)			
Depth (Ft.)	Sample Type & No.	Sample Rec. (Ft.,%)	SPT	Lab Class.	PID (ppm)	Visual Description	Well Installation Detail	Elevation (Ft. MSL)	
11	S-2	1.3	4	--	0.2	Continued from Sheet 1			
		65%	4		0.2				11.4
12			6			M/C SAND, little silt; gray; loose; wet Water @ 11.5			
13	A-N	--	--	--	--				
14									
15									
16	S-3	2.0	16	--	0.4				
		100%	15		0.2	little silt, trace clay			
17			14						
18	A-N	--	--	--	--				
19									
20									
21	S-4	1.3	5	--	0.2	F SAND, some silt, trace clay; dk green; m dense; wet			
		65%	8		0.2				21.5
22			9						
23	A-N	--	--	--	--				
24									
25									25.0
26	S-5	1.5	22	--	0.2	SHELL/FOSSIL FRAG, some silt trace clay; lt gray; v dense; wet			
		75%	23		0.2				
27			28						
28	A-N	--	--	--	--				
29									
30									
			12			Match to Sheet 3			

DRILLING CO.: Parratt - Wolff  
 DRILLER: Chip Lafever

BAKER REP.: Mark DeJohn  
 BORING NO.: 93-TW06IW SHEET 2 OF 4

## TEST BORING AND WELL CONSTRUCTION RECORD

PROJECT: Phase I Investigation at Sites 88, 89, and 93 - MCB Camp Lejeune

CTO NO.: 62470-356

BORING NO.:

93-TW06IW

SAMPLE TYPE						DEFINITIONS					
S = Split Spoon A = Auger T = Shelby Tube W = Wash R = Air Rotary C = Core D = Denison P = Piston N = No Sample						SPT = Standard Penetration Test (ASTM D1586) PID = Photo Ionization Detector measurement Lab Class = USCS (ASTM D2487)					
Depth (Ft.)	Sample Type & No.	Sample Rec. (Ft.,%)	SPT	Lab Class.	PID (ppm)	Visual Description	Well Installation Detail	Elevation (Ft. MSL)			
31	S-6	1.4 70%	20	--	0.2	Continued from Sheet 2 little silt & clay; dense					
32			23		0.2						
33	A-N	--	--	--							
34			--								
35			--								
36	S-7	0.9 45%	32	--	0.2				some silt, little clay; v dense		
37			34		0.2						
38	A-N	--	--	--							
39			--								
40			--								
41	S-8	1.3 65%	27	--	(1)	trace silt & clay					
42			26								
43	A-N	--	--	--							
44			--								
45			--								
46	S-9	1.3 65%	24	--	(1)				dense		
47			23								
48	A-N	--	--	--							
49			--								
50			--								
			17			Match to Sheet 4					

DRILLING CO.: Parratt - Wolff

DRILLER: Chip Lafever

BAKER REP.: Mark DeJohn

BORING NO.: 93-TW06IW

SHEET 3 OF 4



## TEST BORING AND WELL CONSTRUCTION RECORD

PROJECT: Phase I Investigation at Sites 88, 89, and 93 - MCB Camp Lejeune  
 CTO NO.: 62470-356 BORING NO.: 93-TW06IW

<b>SAMPLE TYPE</b>						<b>DEFINITIONS</b>		
S = Split Spoon A = Auger T = Shelby Tube W = Wash R = Air Rotary C = Core D = Denison P = Piston N = No Sample						SPT = Standard Penetration Test (ASTM D1586) PID = Photo Ionization Detector measurement Lab Class = USCS (ASTM D2487)		
Depth (Ft.)	Sample Type & No.	Sample Rec. (Ft.,%)	SPT	Lab Class.	PID (ppm)	Visual Description	Well Installation Detail	Elevation (Ft. MSL)
51	S-10	1.4 70%	21	--	(1)	Continued from Sheet 3 v dense		
52			35					35
53						BOH @ 52.0'		
54								
55								
56								
57								
58								
59								
60								
61								
62								
63								
64								
65								
66								
67								
68								
69								
70								

DRILLING CO.: Parratt - Wolff BAKER REP.: Mark DeJohn  
 DRILLER: Chip Lafever BORING NO.: 93-TW06IW SHEET 4 OF 4



Baker Environmental

**TEST BORING AND WELL CONSTRUCTION RECORD**

PROJECT: Phase I Investigation at Sites 88, 89, and 93 - MCB Camp Lejeune  
 CTO NO.: 62470-356 BORING NO.: 93-TW07  
 COORDINATES: EAST: 2464169.7600 NORTH: 360177.9300  
 ELEVATION: SURFACE: 17.82 TOP OF PVC CASING: 20.08

Rig: Diedrich D-50					Date	Progress (Ft.)	Weather	Depth to Water (Ft.)	Time
Split Spoon	Casing	Augers	Core Barrel						
Size (ID)	1-3/8"	--	2-3/4"	--	8/2/96	0.0 - 15.0	P Sunny, 70s	--	--
Length	2'	--	5'	--					
Type	Stainless	--	HSA	--					
Hammer Wt.	140 #	--	--	--					
Fall	30"	--	--	--					
Stickup	--	--	--	--					

Remarks:

SAMPLE TYPE					WELL INFORMATION			
S = Split Spoon A = Auger T = Shelby Tube W = Wash R = Air Rotary C = Core D = Denison P = Piston N = No Sample					Type	Diam.	Top Depth (Ft.)	Bottom Depth (Ft.)
					Sch 40, PVC Riser	1"	0	5
					Sch 40, 10-Slot, PVC Screen	1"	5	15

Depth (Ft.)	Sample Type & No.	Sample Rec. (Ft.,%)	SPT	Lab. Class	PID (ppm)	Visual Description	Well Installation Detail	Elevation (Ft. MSL)
1								
2								
3								
4								
5	A-N	--	--	--	--	Refer to the log for well 93-TW07IW for descriptions		5.0
6								
7								
8								
9								
10								

Match to Sheet 2

DRILLING CO.: Parratt - Wolff  
 DRILLER: Chip Lafever

BAKER REP.: Mark DeJohn  
 BORING NO.: 93-TW07 SHEET 1 OF 2

## TEST BORING AND WELL CONSTRUCTION RECORD

PROJECT: Phase I Investigation at Sites 88, 89, and 93 - MCB Camp Lejeune

CTO NO.: 62470-356

BORING NO.:

93-TW07

SAMPLE TYPE						DEFINITIONS		
S = Split Spoon A = Auger T = Shelby Tube W = Wash R = Air Rotary C = Core D = Denison P = Piston N = No Sample						SPT = Standard Penetration Test (ASTM D1586) PID = Photo Ionization Detector measurement Lab Class = USCS (ASTM D2487)		
Depth (Ft.)	Sample Type & No.	Sample Rec. (Ft.,%)	SPT	Lab Class	PID (ppm)	Visual Description	Well Installation Detail	Elevation (Ft. MSL)
11								
12								
13	A-N	--	--	--	--			
14								
15	15.0					15.0	15.0	15.0
16						BOH @ 15.0'		
17								
18								
19								
20								
21								
22								
23								
24								
25								
26								
27								
28								
29								
30								

DRILLING CO.: Parratt - Wolff  
 DRILLER: Chip Lafever

BAKER REP.: Mark DeJohn  
 BORING NO.: 93-TW07 SHEET 2 OF 2

**Baker**

Baker Environmental

**TEST BORING AND WELL CONSTRUCTION RECORD**

PROJECT: Phase I Investigation at Sites 88, 89, and 93 - MCB Camp Lejeune  
 CTO NO.: 62470-356 BORING NO.: 93-TW07IW  
 COORDINATES: EAST: 2464169.6800 NORTH: 360185.7800  
 ELEVATION: SURFACE: 17.52 TOP OF PVC CASING: 19.87

Rig:	Diedrich D-50				Date	Progress (Ft.)	Weather	Depth to Water (Ft.)	Time
	Split Spoon	Casing	Augers	Core Barrel					
Size (ID)	1-3/8"	--	2-3/4"	--	8/2/96	0.0 - 52.0	P Sunny, 70s	--	--
Length	2'	--	5'	--					
Type	Stainless	--	HSA	--					
Hammer Wt.	140 #	--	--	--					
Fall	30"	--	--	--					
Stickup	--	--	--	--					

Remarks: Note: (1) H-Nu not working properly; perhaps due to rainy conditions

SAMPLE TYPE						WELL INFORMATION			
S = Split Spoon A = Auger T = Shelby Tube W = Wash R = Air Rotary C = Core D = Denison P = Piston N = No Sample						Type	Diam.	Top Depth (Ft.)	Bottom Depth (Ft.)
						Sch 40, PVC Riser	1"	0	45
						Sch 40, 10-Slot, PVC Screen	1"	45	50
Depth (Ft.)	Sample Type & No.	Sample Rec. (Ft.,%)	SPT	Lab Class.	PID (ppm)	Visual Description	Well Installation Detail		Elevation (Ft. MSL)
1	S-1	1.1 55%	6	--	0.1	F SAND, little silt, trace clay; brown; m dense; damp			
2			8						
			13						
3	A-N	--	--	--	--				
4			--						
5			5.0						
6	S-2	1.4 70%	5	--	0.1				
7			8						
			13						
			15						
8	A-N	--	--	--	--				
9			--						
10			10.0						
			4			Match to Sheet 2			

DRILLING CO.: Parratt - Wolff  
 DRILLER: Chip Lafever

BAKER REP.: Mark DeJohn  
 BORING NO.: 93-TW07IW SHEET 1 OF 4





## TEST BORING AND WELL CONSTRUCTION RECORD

PROJECT: Phase I Investigation at Sites 88, 89, and 93 - MCB Camp Lejeune  
 CTO NO.: 62470-356 BORING NO.: 93-TW07IW

<u>SAMPLE TYPE</u>						<u>DEFINITIONS</u>		
S = Split Spoon A = Auger T = Shelby Tube W = Wash R = Air Rotary C = Core D = Denison P = Piston N = No Sample						SPT = Standard Penetration Test (ASTM D1586) PID = Photo Ionization Detector measurement Lab Class = USCS (ASTM D2487)		
Depth (Ft.)	Sample Type & No.	Sample Rec. (Ft.,%)	SPT	Lab Class.	PID (ppm)	Visual Description	Well Installation Detail	Elevation (Ft. MSL)
11	S-3	0.9 45%	4	--	0.1 0.1	Continued from Sheet 1		
12			5 3					
13	A-N	--	--	--	--			
14								
15								
16	S-4	1.5 75%	17	--	0.2 0.2	dense		
17			15 18 21					
18								
19	A-N	--	--	--	--			
20								
21								
22	S-5	1.5 75%	25	--	0.2 0.2	v dense		
23			19 33 39					
24								
25	A-N	--	--	--	--			
26	S-6	2.0 100%	2	--	0.1 0.1	F SAND, some silt, trace clay; dk green; loose; wet		
27			2 3 2					
28								
29	A-N	--	--	--	--			
30								
			WOH			Match to Sheet 3		

DRILLING CO.: Parratt - Wolff  
 DRILLER: Chip Lafever

BAKER REP.: Mark DeJohn  
 BORING NO.: 93-TW07IW SHEET 2 OF 4

## TEST BORING AND WELL CONSTRUCTION RECORD

PROJECT: Phase I Investigation at Sites 88, 89, and 93 - MCB Camp Lejeune

CTO NO.: 62470-356

BORING NO.:

93-TW07IW

SAMPLE TYPE							DEFINITIONS			
S = Split Spoon A = Auger T = Shelby Tube W = Wash R = Air Rotary C = Core D = Denison P = Piston N = No Sample							SPT = Standard Penetration Test (ASTM D1586) PID = Photo Ionization Detector measurement Lab Class = USCS (ASTM D2487)			
Depth (Ft.)	Sample Type & No.	Sample Rec. (Ft.,%)	SPT	Lab Class.	PID (ppm)	Visual Description	Well Installation Detail	Elevation (Ft. MSL)		
31	S-7	1.2 60%	WOH	--	0.2	Continued from Sheet 2 some silt, little clay; v loose				
32			1		0.2					
33	A-N	--	--	--	--					
34			--							
35	S-8	1.5 100%	25	--	0.1	some silt w/ tan clay laminae; v dense				
36			27		0.1					
37	A-N	--	50/5"	--	0.1					
38			--							
39	A-N	--	--	--	--					
40			--							
41	S-9	0.5 50%	45	--	0.2	SHELL/FOSSIL FRAG, trace silt & clay; gray v dense; wet				
42			52		0.2					
43	A-N	--	--	--	--					
44			--							
45	S-10	1.0 100%	34	--	0.2	F SAND, some shell/fossil frag & silt, trace clay; lt greenish-gray; v dense wet				
46			56		0.2					
47	A-N	--	--	--	--					
48			--							
49	A-N	--	--	--	--					
50			--							
			15			Match to Sheet 4				

DRILLING CO.: Parratt - Wolff  
 DRILLER: Chip Lafever

BAKER REP.: Mark DeJohn  
 BORING NO.: 93-TW07IW

## TEST BORING AND WELL CONSTRUCTION RECORD

PROJECT: Phase I Investigation at Sites 88, 89, and 93 - MCB Camp Lejeune

CTO NO.: 62470-356

BORING NO.:

93-TW07IW

SAMPLE TYPE						DEFINITIONS		
S = Split Spoon A = Auger T = Shelby Tube W = Wash R = Air Rotary C = Core D = Denison P = Piston N = No Sample						SPT = Standard Penetration Test (ASTM D1586) PID = Photo Ionization Detector measurement Lab Class = USCS (ASTM D2487)		
Depth (Ft.)	Sample Type & No.	Sample Rec. (Ft.,%)	SPT	Lab Class.	PID (ppm)	Visual Description	Well Installation Detail	Elevation (Ft. MSL)
51	S-11	1.0	17	--	(1)	Continued from Sheet 3 dense	[REDACTED]	52.0
52		50%	18					
53						BOH @ 52.0'		
54								
55								
56								
57								
58								
59								
60								
61								
62								
63								
64								
65								
66								
67								
68								
69								
70								

DRILLING CO.: Parratt - Wolff  
 DRILLER: Chip Lafever

BAKER REP.: Mark DeJohn  
 BORING NO.: 93-TW07IW SHEET 4 OF 4



## TEST BORING AND WELL CONSTRUCTION RECORD

**PROJECT:** Phase I Investigation at Sites 88, 89, and 93 - MCB Camp Lejeune  
**CTO NO.:** 62470-356 **BORING NO.:** 93-TW14  
**COORDINATES: EAST:** 2464852.0700 **NORTH:** 359892.5200  
**ELEVATION: SURFACE:** 15.58 **TOP OF PVC CASING:** 17.69

Rig: Diedrich D-50					Date	Progress (Ft.)	Weather	Depth to Water (Ft.)	Time
Split Spoon	Casing	Augers	Core Barrel						
Size (ID)	1-3/8"	--	2-3/4"	--	8/5/96	0.0 - 25.0	P Sunny, 80s	--	--
Length	2'	--	5'	--					
Type	Stainless	--	HSA	--					
Hammer Wt.	140 #	--	--	--					
Fall	30"	--	--	--					
Stickup	--	--	--	--					

**Remarks:**

SAMPLE TYPE	WELL INFORMATION			
S = Split Spoon A = Auger T = Shelby Tube W = Wash R = Air Rotary C = Core D = Denison P = Piston N = No Sample	Type	Diam.	Top Depth (Ft.)	Bottom Depth (Ft.)
	Sch 40, PVC Riser	1"	0	14.5
	Sch 40, 10-Slot, PVC Screen	1"	14.5	24.5

Depth (Ft.)	Sample Type & No.	Sample Rec. (Ft.,%)	SPT	Lab. Class	PID (ppm)	Visual Description	Well Installation Detail	Elevation (Ft. MSL)	
1									
2									
3									
4									
5	A-N	--	--	--	--	Refer to the log for well 93-TW14IW for descriptions			
6									
7									
8									
9									
10									
Match to Sheet 2									

**DRILLING CO.:** Parratt - Wolff **BAKER REP.:** Mark DeJohn  
**DRILLER:** Chip Lafever **BORING NO.:** 93-TW14 **SHEET 1 OF 2**



# TEST BORING AND WELL CONSTRUCTION RECORD

PROJECT: Phase I Investigation at Sites 88, 89, and 93 - MCB Camp Lejeune  
 CTO NO.: 62470-356 BORING NO.: 93-TW14

<u>SAMPLE TYPE</u>						<u>DEFINITIONS</u>			
S = Split Spoon A = Auger T = Shelby Tube W = Wash R = Air Rotary C = Core D = Denison P = Piston N = No Sample						SPT = Standard Penetration Test (ASTM D1586) PID = Photo Ionization Detector measurement Lab Class = USCS (ASTM D2487)			
Depth (Ft.)	Sample Type & No.	Sample Rec. (Ft.,%)	SPT	Lab Class	PID (ppm)	Visual Description	Well Installation Detail	Elevation (Ft. MSL)	
11									
12									
13	A-N	--	--	--	--				
14									
15								14.5	
16									
17									
18									
19									
20									
21									
22									
23									
24									
25								24.5	
25	25.0						25.0	25.0	
						BOH @ 25.0'			
26									
27									
28									
29									
30									

DRILLING CO.: Parratt - Wolff  
 DRILLER: Chip Lafever

BAKER REP.: Mark DeJohn  
 BORING NO.: 93-TW14 SHEET 2 OF 2



Baker Environmental

## TEST BORING AND WELL CONSTRUCTION RECORD

PROJECT:	Phase I Investigation at Sites 88, 89, and 93 - MCB Camp Lejeune	BORING NO.:	93-TW14IW
CTO NO.:	62470-356	NORTH:	359892.7200
COORDINATES: EAST:	2464849.7400	TOP OF PVC CASING:	17.73
ELEVATION: SURFACE:	15.58		

Rig: Diedrich D-50					Date	Progress (Ft.)	Weather	Depth to Water (Ft.)	Time
Split Spoon	Casing	Augers	Core Barrel						
Size (ID)	1-3/8"	--	2-3/4"	--	8/5/96	0.0 - 47.0	P Sunny, 80s	--	--
Length	2'	--	5'	--					
Type	Stainless	--	HSA	--					
Hammer Wt.	140 #	--	--	--					
Fall	30"	--	--	--					
Stickup	--	--	--	--					

Remarks: Note: (1) The H-Nu is not working properly.

SAMPLE TYPE						WELL INFORMATION			
S = Split Spoon A = Auger T = Shelby Tube W = Wash R = Air Rotary C = Core D = Denison P = Piston N = No Sample						Type	Diam.	Top Depth (Ft.)	Bottom Depth (Ft.)
						Sch 40, PVC Riser	1"	0	45
						Sch 40, 10-Slot, PVC Screen	1"	45	50
Depth (Ft.)	Sample Type & No.	Sample Rec. (Ft.,%)	SPT	Lab Class.	PID (ppm)	Visual Description	Well Installation Detail		Elevation (Ft. MSL)
1	S-1	1.5 75%	2	--	(1)	F SAND, some silt, little clay; brown & gray - mottled; loose; damp			
2			3						
			6						
2			5						
3	A-N	--	--	--	--				
4									
5									
5									
6	S-2	1.3 65%	2	--	(1)	CLAY, little silt, trace f sand; gray & red - mottled; m stiff, damp - becoming some f sand & silt			
7			3						
			4						
7			5						
8	A-N	--	--	--	--				
9									
10									
10									
			4			Match to Sheet 2			

DRILLING CO.: Parratt - Wolff  
 DRILLER: Chip Lafever

BAKER REP.: Mark DeJohn  
 BORING NO.: 93-TW14IW SHEET 1 OF 3



Baker Environmental

## TEST BORING AND WELL CONSTRUCTION RECORD

PROJECT: Phase I Investigation at Sites 88, 89, and 93 - MCB Camp Lejeune

CTO NO.: 62470-356

BORING NO.:

93-TW14IW

<u>SAMPLE TYPE</u>							<u>DEFINITIONS</u>			
S = Split Spoon A = Auger T = Shelby Tube W = Wash R = Air Rotary C = Core D = Denison P = Piston N = No Sample							SPT = Standard Penetration Test (ASTM D1586) PID = Photo Ionization Detector measurement Lab Class = USCS (ASTM D2487)			
Depth (Ft.)	Sample Type & No.	Sample Rec. (Ft., %)	SPT	Lab Class.	PID (ppm)	Visual Description	Well Installation Detail	Elevation (Ft. MSL)		
11	S-3	2.0 100%	7	--	(1)	Continued from Sheet 1 some silt, trace shell frag; dk gray; v stiff, damp				
12			8							
12			15							
13	A-N	--	--	--	--					
14			--							
15			--							
15	15.0									
16	S-4	1.9 95%	5	--	(1)					
16			7							
17			9							
17	17.0		14							
18	A-N	--	--	--	--					
19			--							
20			--							
20	20.0									
21	S-5	2.0 100%	3	--	(1)	M/C SAND, little silt, trace clay & shell frag; dk gray; m dense; wet <b>Water @ 20.5'</b>				
21			6							
22			12							
22			18							
23	A-N	--	--	--	--					
24			--							
25			--							
25	25.0									
26	S-6	1.4 70%	12	--	(1)	F SAND some silt, little shell/fossil frag, trace clay; lt gray; dense; moist				
26			19							
27			27							
27	26.9		50/5"							
28	A-N	--	--	--	--					
29			--							
30			--							
30	30.0									
			18			Match to Sheet 3				

DRILLING CO.: Parratt - Wolff  
 DRILLER: Chip Lafever

BAKER REP.: Mark DeJohn  
 BORING NO.: 93-TW14IW SHEET 2 OF 3

## TEST BORING AND WELL CONSTRUCTION RECORD

PROJECT: Phase I Investigation at Sites 88, 89, and 93 - MCB Camp Lejeune

CTO NO.: 62470-356

BORING NO.:

93-TW14IW

SAMPLE TYPE							DEFINITIONS			
S = Split Spoon A = Auger T = Shelby Tube W = Wash R = Air Rotary C = Core D = Denison P = Piston N = No Sample							SPT = Standard Penetration Test (ASTM D1586) PID = Photo Ionization Detector measurement Lab Class = USCS (ASTM D2487)			
Depth (Ft.)	Sample Type & No.	Sample Rec. (Ft.,%)	SPT	Lab Class.	PID (ppm)	Visual Description	Well Installation Detail	Elevation (Ft. MSL)		
31	S-7	1.4 70%	26	--	(1)	Continued from Sheet 2 SHELL/FOSSIL FRAG, trace silt & clay; lt gray; dense; wet				
32			23							
33			39							
34	A-N	--	--	--	--					
35			--							
36			--							
36.5	S-8	1.3 65%	14	--	(1)	smaller frag, little silt & clay				
37			21							
38			21							
39	A-N	--	--	--	--					
40			--							
41			--							
42.0	S-9	1.5 75%	27	--	(1)	v dense				
43			39							
44			43							
45.0	A-N	--	--	--	--					
46			--							
47			--							
47.0	S-10	1.1 55%	28	--	(1)	larger frag				
48			39							
49			45							
50.0	A-N	--	--	--	--					
			--							
			--							
							50.0	50.0		
BOH @ 50.0'										

DRILLING CO.: Parratt - Wolff

DRILLER: Chip Lafever

BAKER REP.:

Mark DeJohn

BORING NO.:

93-TW14IW

SHEET 3 OF 3



**SITE 89 PHASE II  
TEMPORARY MONITORING WELLS AND  
PERMANENT MONITORING WELLS**

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**Baker**

Baker Environmental

**TEST BORING AND WELL CONSTRUCTION RECORD**

PROJECT: Phase II Investigation at Sites 88, 89, and 93 - MCB Camp Lejeune

CTO NO.: 62470-356

BORING NO.:

89-MW03IW

COORDINATES: EAST: 2466017.6650

NORTH:

360818.4340

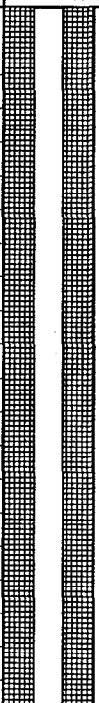
ELEVATION: SURFACE: 13.89

TOP OF PVC CASING:

13.48

Rig: CME-55					Date	Progress (Ft.)	Weather	Depth to Water (Ft.)	Time
Split Spoon	Casing	Augers	Core Barrel						
Size (ID)	1-3/8"	--	3-1/4"	--	5/15/97	0.0 - 42.0	P Cloudy, 70s	6.0	--
Length	2.0'	--	5.0'	--					
Type	Stainless	--	HSA	--					
Hammer Wt.	140 lbs.	--	--	--					
Fall	30"	--	--	--					
Stickup	--	--	--	--					

Remarks: Boring reamed with 6-1/4" HSAs. Flush-mount completion.

SAMPLE TYPE							WELL INFORMATION			
S = Split Spoon A = Auger T = Shelby Tube W = Wash R = Mud Rotary C = Core D = Denison P = Piston N = No Sample							Type	Diam.	Top Depth (Ft.)	Bottom Depth (Ft.)
							Sch 40 PVC Casing	2.0"	0	36.5
							Sch 40 PVC, 10-slot Screen	2.0"	36.5	41.5
Depth (Ft.)	Sample Type & No.	Sample Rec. (Ft.,%)	SPT	Lab Class.	PID (ppm)	Visual Description	Well Installation Detail		Elevation (Ft. MSL)	
1	S-1	1.3 65%	10	--	0.1 0.1	FINE SAND, some silt, little clay; brown; med dense; damp				
2			12							
3	S-2	1.2 60%	11	--	0.1 0.1	FINE to MEDIUM SAND, some silt, trace clay; brown- gray; dense; damp to moist				
4			12							
5	S-3	1.8 90%	15	--	0.1 0.1	FINE SAND, trace to little silt, trace clay; brown-gray; med dense; moist to wet				
6			11							
7	S-4	1.7 85%	7	--	0.1 0.1	wet Groundwater @ 6.0'				
8			8							
9	S-5	1.9 95%	9	--	0.1 0.1	some silt, trace to little clay; gray; med dense; wet				
10			5							
			4			Match to Sheet 2				

DRILLING CO.: Parratt - Wolff

BAKER REP.:

John Zimmerman

DRILLER: Kevin White

BORING NO.:

89-MW03IW

SHEET 1 OF 3

## TEST BORING AND WELL CONSTRUCTION RECORD

PROJECT: Phase II Investigation at Sites 88, 89, and 93 - MCB Camp Lejeune

CTO NO.: 62470-356

BORING NO.:

89-MW03IW

SAMPLE TYPE						DEFINITIONS				
S = Split Spoon A = Auger T = Shelby Tube W = Wash R = Mud Rotary C = Core D = Denison P = Piston N = No Sample						SPT = Standard Penetration Test (ASTM D1586) PID = Photo Ionization Detector measurement Lab Class = USCS (ASTM D2487)				
Depth (Ft.)	Sample Type & No.	Sample Rec. (Ft., %)	SPT	Lab Class.	PID (ppm)	Visual Description	Well Installation Detail	Elevation (Ft. MSL)		
11	S-6	1.9 95%	5 4	--	0.1 0.1	Continued from Sheet 1 <b>FINE to MEDIUM SAND</b> , trace to little silt; gray to brown; loose; wet		-10.11		
12			6							
13	S-7	1.3 65%	2 1	--	0.1 0.1	little silt, trace clay; brown; v loose; wet				
14			1							
15	S-8	1.1 55%	1 1	--	0.1 0.1	<b>FINE SAND</b> , little silt, trace clay; greenish-gray; v loose; wet				
16			2							
17	S-9	1.5 75%	2 2	--	0.1 0.1	trace to little silt; dark greenish-gray; loose; wet				
18			2							
19	S-10	1.1 55%	WOH 24"	--	0.1 0.1	v loose				
20										
21	S-11	0.9 45%	WOH 24"	--	0.1 0.1					
22										
23	S-12	1.0 50%	WOH 24"	--	0.1 0.1					
24						24.0				
25	S-13	2.0 100%	4 11 27	--	0.1 0.1	<b>FINE SAND &amp; SHELL FRAG</b> , part cemented some silt; lt greenish-gray; dense wet				
26			30							
27	S-14	2.0 100%	11 13 17	--	0.1 0.1					
28			17							
29	S-15	1.7 85%	13 17 19	--	0.1 0.1	little silt; lt greenish-gray; dense; wet				
30			21							
						Match to Sheet 3				

DRILLING CO.: Parratt - Wolff  
 DRILLER: Kevin White

BAKER REP.: John Zimmerman  
 BORING NO.: 89-MW03IW SHEET 2 OF 3



## TEST BORING AND WELL CONSTRUCTION RECORD

PROJECT: Phase II Investigation at Sites 88, 89, and 93 - MCB Camp Lejeune  
 CTO NO.: 62470-356 BORING NO.: 89-MW03IW

<u>SAMPLE TYPE</u>						<u>DEFINITIONS</u>			
S = Split Spoon A = Auger T = Shelby Tube W = Wash R = Mud Rotary C = Core D = Denison P = Piston N = No Sample						SPT = Standard Penetration Test (ASTM D1586) PID = Photo Ionization Detector measurement Lab Class = USCS (ASTM D2487)			
Depth (Ft.)	Sample Type & No.	Sample Rec. (Ft.,%)	SPT	Lab Class.	PID (ppm)	Visual Description	Well Installation Detail	Elevation (Ft. MSL)	
31	S-16	1.4 70%	16	--	0.1 0.1	Continued from Sheet 2			
32			21						31
33	S-17	1.5 75%	19	--	0.1 0.1	v dense			
34			24 26 21						34.0
35	S-18	1.1 55%	19	--	0.1 0.1	trace silt; lt greenish-gray; v dense; wet			
36			26 28						36.0
37	S-19	1.0 50%	30	--	0.1 0.1				
38			29 30 31						38.0
39	S-20	0.9 45%	29	--					
40			30 31						40.0
41	S-21	1.0 50%	28	--					
42			30 31 28						42.0
43						<b>FINE SAND, some to and silt; some clay; trace shells; dk green-gray; v dense; damp to moist</b>		41.5	-28.11
44								42.0	
45									
46									
47									
48									
49									
50									

DRILLING CO.: Parratt - Wolff  
 DRILLER: Kevin White

BAKER REP.: John Zimmerman  
 BORING NO.: 89-MW03IW SHEET 3 OF 3

**Baker**

Baker Environmental

**TEST BORING AND WELL CONSTRUCTION RECORD**

PROJECT: Phase II Investigation at Sites 88, 89, and 93 - MCB Camp Lejeune

CTO NO.: 62470-356

BORING NO.: 89-MW03DW

COORDINATES: EAST: 2466015.7270

NORTH: 360813.0460

ELEVATION: SURFACE: 13.90

TOP OF PVC CASING: 13.47

Rig: CME-55					Date	Progress (Ft.)	Weather	Depth to Water (Ft.)	Time
Split Spoon	Casing	Augers	Core Barrel						
Size (ID)	1-3/8"	--	3-1/4"	--	5/15/97	0.0 - 14.0	P Cloudy, 70s	--	--
Length	2.0'	--	5.0'	--	5/19/97	14.0 - 72.0	P Cloudy, 70s	--	--
Type	Stainless	--	HSA	--					
Hammer Wt.	140 lbs.	--	--	--					
Fall	30"	--	--	--					
Stickup	--	--	--	--					

Remarks: Boring reamed to 14 ft. w/ 6-1/4" HSA. 7-3/8" mud rotary from 14 ft to depth. Flush-mount completion.

SAMPLE TYPE						WELL INFORMATION			
S = Split Spoon A = Auger T = Shelby Tube W = Wash R = Mud Rotary C = Core D = Denison P = Piston N = No Sample						Type	Diam.	Top Depth (Ft.)	Bottom Depth (Ft.)
						Sch 40 PVC Casing	2.0"	0	65
						Sch 40 PVC, 10-slot Screen	2.0"	65	70
Depth (Ft.)	Sample Type & No.	Sample Rec. (Ft.,%)	SPT	Lab Class.	PID (ppm)	Visual Description	Well Installation Detail	Elevation (Ft. MSL)	
1	A-N	--	--	--	--				
2									
3	S-1	1.9 95%	10 14 25	--	0.4 0.4				
4									
5	A-N	--	--	--	--				
6									
7	S-2	1.8 90%	6 4 4 6	--	0.1 0.1				
8									
9	A-N	--	--	--	--				
10									

DRILLING CO.: Parratt - Wolff

BAKER REP.: John Zimmerman

DRILLER: Kevin White

BORING NO.: 89-MW03DW

SHEET 1 OF 5



## TEST BORING AND WELL CONSTRUCTION RECORD

PROJECT: Phase II Investigation at Sites 88, 89, and 93 - MCB Camp Lejeune  
 CTO NO.: 62470-356 BORING NO.: 89-MW03DW

<u>SAMPLE TYPE</u>						<u>DEFINITIONS</u>		
S = Split Spoon A = Auger T = Shelby Tube W = Wash R = Mud Rotary C = Core D = Denison P = Piston N = No Sample						SPT = Standard Penetration Test (ASTM D1586) PID = Photo Ionization Detector measurement Lab Class = USCS (ASTM D2487)		
Depth (Ft.)	Sample Type & No.	Sample Rec. (Ft.,%)	SPT	Lab Class.	PID (ppm)	Visual Description	Well Installation Detail	Elevation (Ft. MSL)
11						Continued from Sheet 2		
12	A-N	--	--	--	--			
13								
14	14.0							
15						See the log for 89-MW03IW for lithologic details		
16								
17								
18								
19	R-N	--	--	--	--			
20								
21								
22								
23								
24								
25								
26								
27								
28								
29								
30								Match to Sheet 3

DRILLING CO.: Parratt - Wolff  
 DRILLER: Kevin White

BAKER REP.: John Zimmerman  
 BORING NO.: 89-MW03DW SHEET 2 OF 5



## TEST BORING AND WELL CONSTRUCTION RECORD

PROJECT: Phase II Investigation at Sites 88, 89, and 93 - MCB Camp Lejeune  
 CTO NO.: 62470-356 BORING NO.: 89-MW03DW

<u>SAMPLE TYPE</u>						<u>DEFINITIONS</u>			
S = Split Spoon A = Auger T = Shelby Tube W = Wash R = Mud Rotary C = Core D = Denison P = Piston N = No Sample						SPT = Standard Penetration Test (ASTM D1586) PID = Photo Ionization Detector measurement Lab Class = USCS (ASTM D2487)			
Depth (Ft.)	Sample Type & No.	Sample Rec. (Ft.,%)	SPT	Lab Class.	PID (ppm)	Visual Description	Well Installation Detail	Elevation (Ft. MSL)	
31						Continued from Sheet 2			
32									
33									
34									
35	R-N	--	--	--	--				
36									
37									
38									
39									
40	40.0								
41	S-3	1.3 65%	18 24 15	--	0.1 0.1	FINE SAND, some silt; trace to little clay; dark greenish-gray; dense; damp			
42	42.0		23						
43	S-4	1.0 50%	11 10 13	--	0.1 0.1	some silt, trace shell frag & clay; dk greenish-gray; med dense; damp to moist			
44	44.0		20						
45	S-5	1.5 75%	9 10 14	--	0.1 0.1	little to some silt, trace clay & shell frag; dk green-gray; med dense; wet			
46	46.0		16				46.0	-32.10	
47	S-6	0.7 35%	10 22 32	--	0.1 0.1	FINE SAND, little silt, trace to little shell frag; greenish-gray; v dense; wet			
48	48.0		50/1"						
49	S-7	0.0 0%	28 32 30	--	0.1 0.1				
50	50.0		50/4"						
			39			Match to Sheet 4			

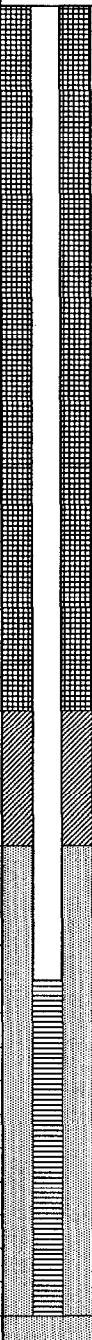
DRILLING CO.: Parratt - Wolff  
 DRILLER: Kevin White

BAKER REP.: John Zimmerman  
 BORING NO.: 89-MW03DW SHEET 3 OF 5

## TEST BORING AND WELL CONSTRUCTION RECORD

PROJECT: Phase II Investigation at Sites 88, 89, and 93 - MCB Camp Lejeune  
 CTO NO.: 62470-356

BORING NO.: 89-MW03DW

SAMPLE TYPE						DEFINITIONS																			
S = Split Spoon A = Auger T = Shelby Tube W = Wash R = Mud Rotary C = Core D = Denison P = Piston N = No Sample						SPT = Standard Penetration Test (ASTM D1586) PID = Photo Ionization Detector measurement Lab Class = USCS (ASTM D2487)																			
Depth (Ft.)	Sample Type & No.	Sample Rec. (Ft.,%)	SPT	Lab Class.	PID (ppm)	Visual Description	Well Installation Detail	Elevation (Ft. MSL)																	
51	S-8	1.0 50%	45	--	0.1	Continued from Sheet 3 <b>FINE SAND &amp; SHELL FRAG</b> , part cemented, trace silt; gray; v dense; wet																			
52			49																						
53	S-9	1.4 70%	32	--	0.1																				
54			38																						
55	S-10	1.1 55%	28	--	0.1																				
56			35																						
57	S-11	1.0 50%	50	--	0.1																				
58			60																						
59	S-12	1.0 50%	50	--	0.1																				
60			56																						
61	S-13	1.0 50%	17	--	0.1																				
62			31																						
63	S-14	1.2 60%	30	--	0.1																				
64			31																						
65	S-15	1.7 85%	8	--	0.1																				
66			9																						
67	S-16	1.9 95%	12	--	0.1																				
68			20																						
69	S-17	2.0 100%	23	--	0.1																				
70			30																						
			30				Match to Sheet 5																		

DRILLING CO.: Parratt - Wolff  
 DRILLER: Kevin White

BAKER REP.: John Zimmerman  
 BORING NO.: 89-MW03DW SHEET 4 OF 5



**TEST BORING AND WELL CONSTRUCTION RECORD**

PROJECT: Phase II Investigation at Sites 88, 89, and 93 - MCB Camp Lejeune  
 CTO NO.: 62470-356 BORING NO.: 89-MW03DW

SAMPLE TYPE						DEFINITIONS			
S = Split Spoon A = Auger T = Shelby Tube W = Wash R = Mud Rotary C = Core D = Denison P = Piston N = No Sample						SPT = Standard Penetration Test (ASTM D1586) PID = Photo Ionization Detector measurement Lab Class = USCS (ASTM D2487)			
Depth (Ft.)	Sample Type & No.	Sample Rec. (Ft.,%)	SPT	Lab Class.	PID (ppm)	Visual Description	Well Installation Detail	Elevation (Ft. MSL)	
.71	S-18	1.9	28	--	0.1	Continued from Sheet 4 and silt, little clay; olive; hard; damp		-58.10	
72	72.0	95%	35		0.1				
			23			BOH @ 72.0 ft.			
73									
74									
75									
76									
77									
78									
79									
80									
81									
82									
83									
84									
85									
86									
87									
88									
89									
90									

DRILLING CO.: Parratt - Wolff  
 DRILLER: Kevin White

BAKER REP.: John Zimmerman  
 BORING NO.: 89-MW03DW SHEET 5 OF 5



## TEST BORING AND WELL CONSTRUCTION RECORD

**PROJECT:** Phase II Investigation at Sites 88, 89, and 93 - MCB Camp Lejeune  
**CTO NO.:** 62470-356 **BORING NO.:** 89-MW04  
**COORDINATES: EAST:** 2466216.7650 **NORTH:** 360516.1690  
**ELEVATION: SURFACE:** 9.43 **TOP OF PVC CASING:** 11.91

Rig: CME-55					Date	Progress (Ft.)	Weather	Depth to Water (Ft.)	Time
Split Spoon	Casing	Augers	Core Barrel						
Size (ID)	1-3/8"	--	3-1/4"	--	4/16/97	0.0 - 14.0	Sunny, 60s	--	--
Length	2.0'	--	5.0'	--					
Type	Stainless	--	HSA	--					
Hammer Wt.	140 lbs.	--	--	--					
Fall	30"	--	--	--					
Stickup	--	--	--	--					

**Remarks:** Boring reamed with 6-1/4" HSAs.

SAMPLE TYPE	WELL INFORMATION			
S = Split Spoon A = Auger T = Shelby Tube W = Wash R = Mud Rotary C = Core D = Denison P = Piston N = No Sample	Type	Diam.	Top Depth (Ft.)	Bottom Depth (Ft.)
	Sch 40 PVC Casing	2.0"	0	4
	Sch 40 PVC, 10-slot Screen	2.0"	4	14

Depth (Ft.)	Sample Type & No.	Sample Rec. (Ft., %)	SPT	Lab Class.	PID (ppm)	Visual Description	Well Installation Detail	Elevation (Ft. MSL)
1	S-1	1.2 60%	WOH	--	0.5 0.5	FINE SAND & SILT; tan; v loose; damp		8.43
2			2					2.0
3	S-2	1.1 55%	3	--	0.5 0.5	CLAY & SILT, some fine sand; tan to gray; med stiff, damp to moist		5.43
4			4					4.0
5	S-3	1.9 95%	2	--	0.5 0.5	moist to wet		2.73
6			3					6.0
7	S-4	1.2 60%	2	--	0.5 0.5	FINE SAND & SILT; dark gray; loose; wet		
8			3					8.0
9	S-5	1.5 75%	1	--	0.5 0.5	Match to Sheet 2		
10			3					10.0

**DRILLING CO.:** Parratt - Wolff **BAKER REP.:** John Zimmerman  
**DRILLER:** Kevin White **BORING NO.:** 89-MW04 **SHEET 1 OF 2**

## TEST BORING AND WELL CONSTRUCTION RECORD

PROJECT: Phase II Investigation at Sites 88, 89, and 93 - MCB Camp Lejeune

CTO NO.: 62470-356

BORING NO.:

89-MW04

SAMPLE TYPE						DEFINITIONS		
S = Split Spoon A = Auger T = Shelby Tube W = Wash R = Mud Rotary C = Core D = Denison P = Piston N = No Sample						SPT = Standard Penetration Test (ASTM D1586) PID = Photo Ionization Detector measurement Lab Class = USCS (ASTM D2487)		
Depth (Ft.)	Sample Type & No.	Sample Rec. (Ft.,%)	SPT	Lab Class.	PID (ppm)	Visual Description	Well Installation Detail	Elevation (Ft. MSL)
11	S-6	1.2 60%	WOH/12"	--	0.5 0.5	trace to little clay, trace shell frag; greenish-gray; loose; damp to moist		
12			3					
13	S-7	1.6 80%	5	--	0.5 0.5			
14			5					
14			8			BOH @ 14.0		-4.57
15								
16								
17								
18								
19								
20								
21								
22								
23								
24								
25								
26								
27								
28								
29								
30								

DRILLING CO.: Parratt - Wolff  
 DRILLER: Kevin White

BAKER REP.: John Zimmerman  
 BORING NO.: 89-MW04 SHEET 2 OF 2

**Baker**

Baker Environmental

**TEST BORING AND WELL CONSTRUCTION RECORD**

PROJECT: Phase II Investigation at Sites 88, 89, and 93 - MCB Camp Lejeune

CTO NO.: 62470-356

BORING NO.:

89-MW04IW

COORDINATES: EAST: 2466212.2570

NORTH:

360527.4270

ELEVATION: SURFACE: 9.69

TOP OF PVC CASING:

11.16

Rig: CME-55					Date	Progress (Ft.)	Weather	Depth to Water (Ft.)	Time
Split Spoon	Casing	Augers	Core Barrel						
Size (ID)	1-3/8"	--	3-1/4"	--	4/16/97	0.0 - 50.0	Sunny, 60s	--	--
Length	2.0'	--	5.0'	--					
Type	Stainless	--	HSA	--					
Hammer Wt.	140 lbs.	--	--	--					
Fall	30"	--	--	--					
Stickup	--	--	--	--					
Remarks: Well set in a new boring located about 4' to the north. Boring drilled with 6-1/4" HSAs to 38.0'.									
<b>SAMPLE TYPE</b>					<b>WELL INFORMATION</b>				
S = Split Spoon A = Auger T = Shelby Tube W = Wash R = Mud Rotary C = Core D = Denison P = Piston N = No Sample					Type		Diam.	Top Depth (Ft.)	Bottom Depth (Ft.)
					Sch 40 PVC Casing		2.0"	0	32.5
					Sch 40 PVC, 10-slot Screen		2.0"	32.5	37.5
Depth (Ft.)	Sample Type & No.	Sample Rec. (Ft.,%)	SPT	Lab Class.	PID (ppm)	Visual Description	Well Installation Detail		Elevation (Ft. MSL)
1									
2									
3									
4									
5	A-N	--	--	--	--	See the log for 89-MW04 for lithologic details			
6									
7									
8									
9									
10	10.0								
			WOH			Match to Sheet 2			

DRILLING CO.: Parratt - Wolff

BAKER REP.:

John Zimmerman

DRILLER: Kevin White

BORING NO.:

89-MW04IW

SHEET 1 OF 3

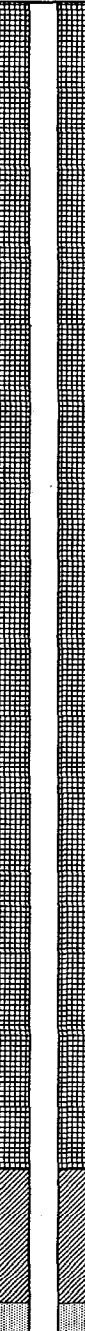
## TEST BORING AND WELL CONSTRUCTION RECORD

PROJECT: Phase II Investigation at Sites 88, 89, and 93 - MCB Camp Lejeune

CTO NO.: 62470-356

BORING NO.:

89-MW04IW

SAMPLE TYPE							DEFINITIONS		
S = Split Spoon A = Auger T = Shelby Tube W = Wash R = Mud Rotary C = Core D = Denison P = Piston N = No Sample							SPT = Standard Penetration Test (ASTM D1586) PID = Photo Ionization Detector measurement Lab Class = USCS (ASTM D2487)		
Depth (Ft.)	Sample Type & No.	Sample Rec. (Ft.,%)	SPT	Lab Class.	PID (ppm)	Visual Description	Well Installation Detail	Elevation (Ft. MSL)	
11	S-1	1.5 75%	3	--	0.2	Continued from Sheet 1 <b>FINE SAND &amp; SILT</b> , trace to little clay, trace shell frag; greenish-gray; loose; damp to moist			
12			4		0.2				
13	S-2	2.0 100%	7	--	0.2				
14			8		0.2				
15	S-3	1.5 75%	19	--	0.2	<b>SHELL &amp; FOSSIL FRAG</b> , w/ part. cemented sand, trace silt; light gray; dense; moist to wet		-4.81	
16			27		0.2				
17	S-4	2.0 100%	18	--	0.2				
18			15		0.2				
19	S-5	1.4 70%	5	--	0.2	<b>FINE SAND &amp; SILT</b> , trace to little shell frag; lt greenish-gray; med dense; damp to moist			
20			10		0.2				
21	S-6	2.0 100%	7	--	0.2	little shell frag, trace clay & part. cemented sand; light greenish-gray; med dense; damp to moist			
22			9		0.2				
23	S-7	1.8 90%	13	--	0.2				
24			16		0.2				
25	S-8	1.7 85%	7	--	0.2	<b>FINE to MEDIUM SAND</b> , part cemented, trace silt; lt greenish-gray; med dense; moist to wet			
26			8		0.2				
27	S-9	2.0 100%	9	--	0.2	part cemented, trace silt & shell frag; lt greenish-gray; med dense; wet		28.0	
28			11		0.2				
29	S-10	1.7 85%	4	--	0.2			-18.31	
30			9		0.2				
			9			Match to Sheet 3		30.0	-20.31

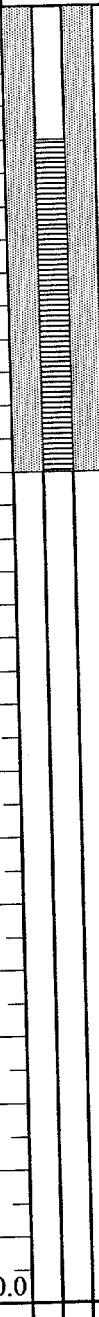
DRILLING CO.: Parratt - Wolff  
 DRILLER: Kevin White

BAKER REP.: John Zimmerman  
 BORING NO.: 89-MW04IW SHEET 2 OF 3

## TEST BORING AND WELL CONSTRUCTION RECORD

PROJECT: Phase II Investigation at Sites 88, 89, and 93 - MCB Camp Lejeune  
 CTO NO.: 62470-356

BORING NO.: 89-MW04IW

SAMPLE TYPE						DEFINITIONS		
S = Split Spoon A = Auger T = Shelby Tube W = Wash R = Mud Rotary C = Core D = Denison P = Piston N = No Sample						SPT = Standard Penetration Test (ASTM D1586) PID = Photo Ionization Detector measurement Lab Class = USCS (ASTM D2487)		
Depth (Ft.)	Sample Type & No.	Sample Rec. (Ft., %)	SPT	Lab Class.	PID (ppm)	Visual Description	Well Installation Detail	Elevation (Ft. MSL)
31	S-11	1.8 90%	8	--	0.2	Continued from Sheet 2		-
32			17		0.2			
33	S-12	2.0 100%	15	--	0.2	dense		-
34			22		0.2			
35	S-13	1.5 75%	13	--	0.2	FINE SAND, some shell frag, trace silt; lt greenish-gray; dense; wet		-
36			16		0.2			
37	S-14	1.0 50%	13	--	0.2	As above w/ silty sand at 37.5-38.0'		-
38			16		0.2			
39	S-15	1.5 75%	5	--	0.2	FINE to MEDIUM SAND, trace to little shell frag, trace silt; lt greenish-gray; med dense; wet		-
40			11		0.2			
41	S-16	2.0 100%	6	--	0.2	dense		-
42			12		0.2			
43	S-17	1.7 85%	5	--	0.2	med dense		-
44			7		0.2			
45	S-18	2.0 100%	10	--	0.2	as above w/ silty sand layer at 45.0-46.0'		-
46			12		0.2			
47	S-19	1.3 100%	13	--	0.2	very dense		-
48			23		0.2			
48	R-N	--	--	--	--			
49	S-20	1.4 70%	7	--	0.2			-
50			12		0.2			
50			50/2"			BOH @ 50.0 ft.		-40.31

DRILLING CO.: Parratt - Wolff  
 DRILLER: Kevin White

BAKER REP.: John Zimmerman  
 BORING NO.: 89-MW04IW SHEET 3 OF 3

**Baker**

**Baker Environmental**

**TEST BORING AND WELL CONSTRUCTION RECORD**

PROJECT: Phase II Investigation at Sites 88, 89, and 93 - MCB Camp Lejeune  
 CTO NO.: 62470-356 BORING NO.: 89-MW04DW  
 COORDINATES: EAST: 2466204.7370 NORTH: 360514.213  
 ELEVATION: SURFACE: 9.37 TOP OF PVC CASING: 10.91

Rig: CME-55					Date	Progress (Ft.)	Weather	Depth to Water (Ft.)	Time
Split Spoon	Casing	Augers	Core Barrel						
Size (ID)	1-3/8"	--	3-1/4"	--	4/17/97	0.0 - 74.0	P Cloudy, 70s	5.5	--
Length	2.0'	--	5.0'	--					
Type	Stainless	--	HSA	--					
Hammer Wt.	140 lbs.	--	--	--					
Fall	30"	--	--	--					
Stickup	--	--	--	--					

Remarks: Boring reamed to 14 ft. w/ 6-1/4" HSA. 7-3/8" mud rotary from 14 ft to depth.

SAMPLE TYPE							WELL INFORMATION			
S = Split Spoon A = Auger T = Shelby Tube W = Wash R = Mud Rotary C = Core D = Denison P = Piston N = No Sample							Type	Diam.	Top Depth (Ft.)	Bottom Depth (Ft.)
							Sch 40 PVC Casing	2.0"	0	65
							Sch 40 PVC, 10-slot Screen	2.0"	65	70
Depth (Ft.)	Sample Type & No.	Sample Rec. (Ft., %)	SPT	Lab Class.	PID (ppm)	Visual Description	Well Installation Detail	Elevation (Ft. MSL)		
1	S-1	1.4 70%	1	--	0.5 0.5	FINE SAND & SILT; tan; loose; damp          CLAY & SILT, some fine sand; gray to dk brown; med stiff; damp to moist LAB SAMPLE Groundwater @ 5.5'  F/M SAND, trace silt  FINE SAND & SILT, some wood frag; dk gray; loose; wet LAB SAMPLE Match to Sheet 2				
2			2							
3	T-1	--	--	--						
4			4							
5	S-2	2.0 100%	2	--	0.5 0.5					
6			3							
7	S-3	2.0 100%	2	--	0.5 0.5					
8			3							
9	S-4	1.2 60%	2	--	0.5 0.5					
10			3							
			4							

DRILLING CO.: Parratt - Wolff  
 DRILLER: Kevin White

BAKER REP.: John Zimmerman  
 BORING NO.: 89-MW04DW SHEET 1 OF 5



## TEST BORING AND WELL CONSTRUCTION RECORD

PROJECT: Phase II Investigation at Sites 88, 89, and 93 - MCB Camp Lejeune  
 CTO NO.: 62470-356 BORING NO.: 89-MW04DW

<u>SAMPLE TYPE</u>						<u>DEFINITIONS</u>		
S = Split Spoon A = Auger T = Shelby Tube W = Wash R = Mud Rotary C = Core D = Denison P = Piston N = No Sample						SPT = Standard Penetration Test (ASTM D1586) PID = Photo Ionization Detector measurement Lab Class = USCS (ASTM D2487)		
Depth (Ft.)	Sample Type & No.	Sample Rec. (Ft.,%)	SPT	Lab Class.	PID (ppm)	Visual Description	Well Installation Detail	Elevation (Ft. MSL)
11	T-2	--	--	--	--	Continued from Sheet 1		
12								
13	S-5	1.4 70%	4	--	0.5 0.5	trace to little clay, trace shell frag; greenish-gray; med dense; damp to moist		
14			14.0					
15	R-N	--	--	--	--	See the log for 89-MW04IW for lithologic details		
16								
17								
18								
19								
20								
21								
22								
23								
24								
25								
26								
27								
28								
29								
30	Match to Sheet 3							

DRILLING CO.: Parratt - Wolff  
 DRILLER: Kevin White

BAKER REP.: John Zimmerman  
 BORING NO.: 89-MW04DW SHEET 2 OF 5



## TEST BORING AND WELL CONSTRUCTION RECORD

PROJECT: Phase II Investigation at Sites 88, 89, and 93 - MCB Camp Lejeune  
 CTO NO.: 62470-356

BORING NO.: 89-MW04DW

SAMPLE TYPE						DEFINITIONS		
S = Split Spoon A = Auger T = Shelby Tube W = Wash R = Mud Rotary C = Core D = Denison P = Piston N = No Sample						SPT = Standard Penetration Test (ASTM D1586) PID = Photo Ionization Detector measurement Lab Class = USCS (ASTM D2487)		
Depth (Ft.)	Sample Type & No.	Sample Rec. (Ft.,%)	SPT	Lab Class.	PID (ppm)	Visual Description	Well Installation Detail	Elevation (Ft. MSL)
31						Continued from Sheet 2		
32								
33								
34								
35								
36								
37								
38								
39								
40	R-N	--	--	--	--			
41								
42								
43								
44								
45								
46								
47								
48								
49								
50	50.0		8					Match to Sheet 4

DRILLING CO.: Parratt - Wolff  
 DRILLER: Kevin White

BAKER REP.: John Zimmerman  
 BORING NO.: 89-MW04DW SHEET 3 OF 5



# TEST BORING AND WELL CONSTRUCTION RECORD

PROJECT: Phase II Investigation at Sites 88, 89, and 93 - MCB Camp Lejeune  
 CTO NO.: 62470-356 BORING NO.: 89-MW04DW

<b>SAMPLE TYPE</b>							<b>DEFINITIONS</b>		
S = Split Spoon A = Auger T = Shelby Tube W = Wash R = Mud Rotary C = Core D = Denison P = Piston N = No Sample							SPT = Standard Penetration Test (ASTM D1586) PID = Photo Ionization Detector measurement Lab Class = USCS (ASTM D2487)		
Depth (Ft.)	Sample Type & No.	Sample Rec. (Ft., %)	SPT	Lab Class.	PID (ppm)	Visual Description	Well Installation Detail	Elevation (Ft. MSL)	
51	S-6	1.2 60%	15	--	0.5	Continued from Sheet 3 <b>FINE to MEDIUM SAND</b> , trace shells & silt; green- gray; v dense; wet			
52			45		0.5				
53	S-7	1.4 70%	31	--	0.5				
54	R-N	--	100/4"	--	0.5				
55	S-8	1.0 50%	18	--	0.5	<b>FINE SAND</b> , trace shells & silt; greenish-gray; med dense; wet			
56			12		0.5				
57	S-9	1.3 65%	15	--	0.5	<b>FINE to MEDIUM SAND</b> , little shell frag, trace silt; greenish-gray; dense; wet			
58			25		0.5				
59	S-10	1.4 70%	23	--	0.5	some shell frag, trace silt; greenish-gray; v dense; wet			
60			28		0.5				
61	S-11	1.4 70%	65	--	0.5	<b>FINE SAND</b> , trace shell frag & silt; greenish-gray; dense; wet	60.0	-50.63	
62			15		0.5				
63	S-12	1.0 50%	17	--	0.5	v dense	63.0	-53.63	
64			18		0.5				
65	S-13	2.0 100%	31	--	0.5	little silt, trace shell frag; greenish-gray; med dense; wet	65.0	-55.63	
66			6		0.5				
67	S-14	0.5 25%	9	--	0.5	<b>FINE SAND</b> , trace to little silt; olive; v dense; wet			
68			10		0.5				
69	S-15	1.2 60%	15	--	0.5				
70			17		0.5				
			11			Match to Sheet 5	70.0	-60.63	

DRILLING CO.: Parratt - Wolff  
 DRILLER: Kevin White

BAKER REP.: John Zimmerman  
 BORING NO.: 89-MW04DW SHEET 4 OF 5

**TEST BORING AND WELL CONSTRUCTION RECORD**

PROJECT: Phase II Investigation at Sites 88, 89, and 93 - MCB Camp Lejeune

CTO NO.: 62470-356

BORING NO.:

89-MW04DW

SAMPLE TYPE							DEFINITIONS			
S = Split Spoon A = Auger T = Shelby Tube W = Wash R = Mud Rotary C = Core D = Denison P = Piston N = No Sample							SPT = Standard Penetration Test (ASTM D1586) PID = Photo Ionization Detector measurement Lab Class = USCS (ASTM D2487)			
Depth (Ft.)	Sample Type & No.	Sample Rec. (Ft.,%)	SPT	Lab Class.	PID (ppm)	Visual Description	Well Installation Detail	Elevation (Ft. MSL)		
71	S-16	0.5 25%	12	--	0.5	Continued from Sheet 4 <b>FINE SAND &amp; SILT,</b> little clay; olive; med dense to dense; damp				
72			12		0.5					
73	S-17	1.8 90%	21	--	0.5					
74			20		0.5					
74			35		0.5					
75						BOH @ 74.0 ft.				
76										
77										
78										
79										
80										
81										
82										
83										
84										
85										
86										
87										
88										
89										
90										

DRILLING CO.: Parratt - Wolff  
 DRILLER: Kevin White

BAKER REP.: John Zimmerman  
 BORING NO.: 89-MW04DW SHEET 5 OF 5

**Baker**

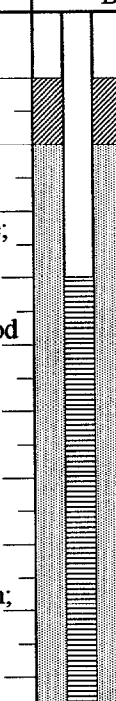
Baker Environmental

**TEST BORING AND WELL CONSTRUCTION RECORD**

PROJECT: Phase II Investigation at Sites 88, 89, and 93 - MCB Camp Lejeune  
 CTO NO.: 62470-356 BORING NO.: 89-MW05  
 COORDINATES: EAST: 2465203.7800 NORTH: 360897.6440  
 ELEVATION: SURFACE: 12.92 TOP OF PVC CASING: 12.37

Rig:	CME-55				Date	Progress (Ft.)	Weather	Depth to Water (Ft.)	Time
Size (ID)	Split Spoon	Casing	Augers	Core Barrel					
Length	1-3/8"	--	3-1/4"	--	4/20/97	0.0 - 14.0	P Cloudy, 50s	--	--
Type	2.0'	--	5.0'	--					
Hammer Wt.	Stainless	--	HSA	--					
Fall	140 lbs.	--	--	--					
Stickup	30"	--	--	--					
	--	--	--	--					

Remarks: Boring reamed with 6-1/4" HSAs.

SAMPLE TYPE							WELL INFORMATION			
S = Split Spoon A = Auger T = Shelby Tube W = Wash R = Mud Rotary C = Core D = Denison P = Piston N = No Sample							Type	Diam.	Top Depth (Ft.)	Bottom Depth (Ft.)
							Sch 40 PVC Casing	2.0"	0	4
							Sch 40 PVC, 10-slot Screen	2.0"	4	14
Depth (Ft.)	Sample Type & No.	Sample Rec. (Ft.,%)	SPT	Lab Class.	PID (ppm)	Visual Description	Well Installation Detail	Elevation (Ft. MSL)		
1	S-1	1.5 75%	6	--	0.3 0.3	FINE SAND & SILT; dk brown; v loose; damp		11.92		
2			7					6	2.0	10.92
3	S-2	1.8 90%	4	--	0.3 0.3	FINE SAND, little silt, trace clay; dk brown; loose; damp		8.92		
4			3						2	4.0
5	S-3	1.3 65%	2	--	0.3 0.3	some silt & clay, trace wood frag; dk brown to gray; stiff; moist to wet				
6			2						9	6.0
7	S-4	1.4 70%	1	--	0.3 0.3	dark brown; soft; wet Groundwater @ 5.5'				
8			1						1	8.0
9	S-5	1.6 80%	1	--	0.3 0.3	some silt & clay; dk brown; soft; wet				
10			1						2	10.0
			WOH			Match to Sheet 2				

DRILLING CO.: Parratt - Wolff  
 DRILLER: Kevin White

BAKER REP.: John Zimmerman  
 BORING NO.: 89-MW05 SHEET 1 OF 2

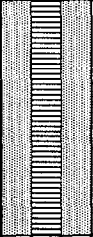
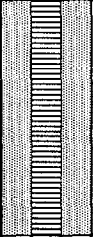
## TEST BORING AND WELL CONSTRUCTION RECORD

PROJECT: Phase II Investigation at Sites 88, 89, and 93 - MCB Camp Lejeune

CTO NO.: 62470-356

BORING NO.:

89-MW05

SAMPLE TYPE						DEFINITIONS		
S = Split Spoon A = Auger T = Shelby Tube W = Wash R = Mud Rotary C = Core D = Denison P = Piston N = No Sample						SPT = Standard Penetration Test (ASTM D1586) PID = Photo Ionization Detector measurement Lab Class = USCS (ASTM D2487)		
Depth (Ft.)	Sample Type & No.	Sample Rec. (Ft.,%)	SPT	Lab Class.	PID (ppm)	Visual Description	Well Installation Detail	Elevation (Ft. MSL)
11	S-6	1.2 60%	4	--	0.3 0.3	Continued from Sheet 1 little silt & clay; trace M/F sand; dk brown; m stiff; wet		
12			3					
13	S-7	1.6 80%	2	--	0.3 0.3	some M/F sand, little silt & clay; dk brown to gray; med stiff; wet		
14			4					
15						BOH @ 14.0		
16								
17								
18								
19								
20								
21								
22								
23								
24								
25								
26								
27								
28								
29								
30								

DRILLING CO.: Parratt - Wolff  
 DRILLER: Kevin White

BAKER REP.: John Zimmerman  
 BORING NO.: 89-MW05 SHEET 2 OF 2

**Baker**

Baker Environmental

**TEST BORING AND WELL CONSTRUCTION RECORD**

PROJECT: Phase II Investigation at Sites 88, 89, and 93 - MCB Camp Lejeune  
 CTO NO.: 62470-356 BORING NO.: 89-MW05IW  
 COORDINATES: EAST: 2465202.8100 NORTH: 360905.9240  
 ELEVATION: SURFACE: 13.07 TOP OF PVC CASING: 12.41

Rig: CME-55					Date	Progress (Ft.)	Weather	Depth to Water (Ft.)	Time
Split Spoon	Casing	Augers	Core Barrel						
Size (ID)	1-3/8"	--	3-1/4"	--	4/18/97	0.0 - 46.0	P Cloudy, 50s	5.5	--
Length	2.0'	--	5.0'	--					
Type	Stainless	--	HSA	--					
Hammer Wt.	140 lbs.	--	--	--					
Fall	30"	--	--	--					
Stickup	--	--	--	--					

Remarks: Boring reamed with 6-1/4" HSAs to 40.0 ft. bgs

SAMPLE TYPE							WELL INFORMATION			
S = Split Spoon A = Auger T = Shelby Tube W = Wash R = Mud Rotary C = Core D = Denison P = Piston N = No Sample							Type	Diam.	Top Depth (Ft.)	Bottom Depth (Ft.)
							Sch 40 PVC Casing	2.0"	0	35
							Sch 40 PVC, 10-slot Screen	2.0"	35	40
Depth (Ft.)	Sample Type & No.	Sample Rec. (Ft.,%)	SPT	Lab Class.	PID (ppm)	Visual Description	Well Installation Detail		Elevation (Ft. MSL)	
1	S-1	1.8 90%	3	--	0.3 0.3	FINE SAND & SILT; dk brown; loose; damp				
2			4							6
3	S-2	1.3 65%	3	--	0.3 0.3	FINE SAND, little silt, trace clay; dark brown; loose; damp				
4			3							3
5	S-3	1.3 65%	3	--	0.3 0.3	some silt & clay, trace wood frag; dark brown; loose; moist to wet				
6			2							2
7	S-4	0.5 25%	1	--	0.3 0.3	v loose; wet Groundwater @ 5.5'				
8			1							1
9	S-5	0.0 0%	1	--	--					
10			1							1
			2			Match to Sheet 2				

DRILLING CO.: Parratt - Wolff  
 DRILLER: Kevin White

BAKER REP.: John Zimmerman  
 BORING NO.: 89-MW05IW SHEET 1 OF 3

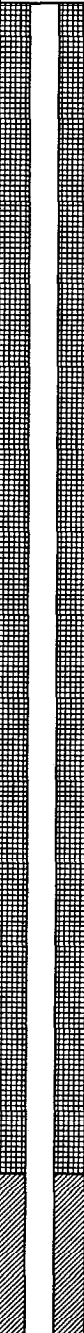
## TEST BORING AND WELL CONSTRUCTION RECORD

PROJECT: Phase II Investigation at Sites 88, 89, and 93 - MCB Camp Lejeune

CTO NO.: 62470-356

BORING NO.:

89-MW05IW

SAMPLE TYPE						DEFINITIONS		
S = Split Spoon A = Auger T = Shelby Tube W = Wash R = Mud Rotary C = Core D = Denison P = Piston N = No Sample						SPT = Standard Penetration Test (ASTM D1586) PID = Photo Ionization Detector measurement Lab Class = USCS (ASTM D2487)		
Depth (Ft.)	Sample Type & No.	Sample Rec. (Ft.,%)	SPT	Lab Class.	PID (ppm)	Visual Description	Well Installation Detail	Elevation (Ft. MSL)
11	S-6	1.3 65%	2	--	0.3	Continued from Sheet 1 little silt & clay, trace M/F sand; dark brown; loose; wet		
12			4		0.3			
13	S-7	1.6 80%	1	--	0.3	some M/F sand, little silt & clay; dk brown to gray; med dense; wet		
14			3		0.3			
15	S-8	1.6 80%	6	--	0.3	<b>FINE to COARSE SAND,</b> trace silt; gray; loose; wet		
16			4		0.3			
17	S-9	1.6 80%	1	--	0.3			
18			9		0.3			
19	S-10	1.2 60%	13	--	0.3	v dense		
20			21		0.3			
20	A-N	--	--	--	--	20.0		-6.93
21	S-11	0.7 35%	30	--	0.3	<b>SHELL &amp; FOSSIL FRAG,</b> some silt & clay; light gray; dense; wet		
22			15		0.3			
23	S-12	2.0 100%	18	--	0.3	v dense		
24			10		0.3			
25	S-13	1.2 60%	15	--	0.3	dense		
26			31		0.3			
27	S-14	1.3 65%	21	--	0.3			
28			13		0.3			
29	S-15	1.4 70%	15	--	0.3		28.0	-14.93
30			27		0.3			
			16			Match to Sheet 3		

DRILLING CO.: Parratt - Wolff  
DRILLER: Kevin White

BAKER REP.: John Zimmerman  
BORING NO.: 89-MW05IW SHEET 2 OF 3



**TEST BORING AND WELL CONSTRUCTION RECORD**

PROJECT: Phase II Investigation at Sites 88, 89, and 93 - MCB Camp Lejeune  
 CTO NO.: 62470-356 BORING NO.: 89-MW05IW

SAMPLE TYPE						DEFINITIONS		
S = Split Spoon A = Auger T = Shelby Tube W = Wash R = Mud Rotary C = Core D = Denison P = Piston N = No Sample						SPT = Standard Penetration Test (ASTM D1586) PID = Photo Ionization Detector measurement Lab Class = USCS (ASTM D2487)		
Depth (Ft.)	Sample Type & No.	Sample Rec. (Ft., %)	SPT	Lab Class.	PID (ppm)	Visual Description	Well Installation Detail	Elevation (Ft. MSL)
31	S-16	1.5 75%	19	--	0.3	Continued from Sheet 2		
32			22		0.3			
33	S-17	1.2 60%	40	--	0.3	v dense		33.0 -19.93
34			32		0.3			
35	S-18	1.0 50%	24	--	0.3	trace silt; light gray; dense; wet		35.0 -21.93
36			15		0.3			
37	S-19	1.3 65%	17	--	0.3			
38			16		0.3			
39	S-20	1.6 80%	13	--	0.3	med dense		
40			6		0.3			
41	S-21	0.8 40%	15	--	0.3	FINE SAND, some silt, trace clay & shell frag; olive; dense; damp		
42			19		0.3			
43	S-22	0.4 20%	9	--	0.3	some silt, trace clay & shell frag; olive; med dense; damp to moist		
44			10		0.3			
45	S-23	1.2 60%	13	--	0.3	trace silt & clay; olive; med dense; moist		
46			4		0.3			
47			7					
48			8					
49								
50								
						BOH @ 46.0 ft.		

DRILLING CO.: Parratt - Wolff  
 DRILLER: Kevin White

BAKER REP.: John Zimmerman  
 BORING NO.: 89-MW05IW SHEET 3 OF 3



**Baker**

Baker Environmental

**TEST BORING AND WELL CONSTRUCTION RECORD**

PROJECT: Phase II Investigation at Sites 88, 89, and 93 - MCB Camp Lejeune  
 CTO NO.: 62470-356 BORING NO.: 89-MW05DW  
 COORDINATES: EAST: 2466201.7200 NORTH: 360913.9020  
 ELEVATION: SURFACE: 13.33 TOP OF PVC CASING: 12.86

Rig: CME-55					Date	Progress (Ft.)	Weather	Depth to Water (Ft.)	Time
Split Spoon	Casing	Augers	Core Barrel						
Size (ID)	1-3/8"	--	3-1/4"	--	4/19/97	0.0 - 74.0	Cloudy, 50s	--	--
Length	2.0'	--	5.0'	--					
Type	Stainless	--	HSA	--					
Hammer Wt.	140 lbs.	--	--	--					
Fall	30"	--	--	--					
Stickup	--	--	--	--					

Remarks: Boring reamed to 14 ft. w/ 6-1/4" HSA. 7-3/8" mud rotary from 14 ft to depth.

SAMPLE TYPE							WELL INFORMATION			
S = Split Spoon A = Auger T = Shelby Tube W = Wash R = Mud Rotary C = Core D = Denison P = Piston N = No Sample							Type	Diam.	Top Depth (Ft.)	Bottom Depth (Ft.)
							Sch 40 PVC Casing	2.0"	0	65
							Sch 40 PVC, 10-slot Screen	2.0"	65	70
Depth (Ft.)	Sample Type & No.	Sample Rec. (Ft.,%)	SPT	Lab Class.	PID (ppm)	Visual Description	Well Installation Detail		Elevation (Ft. MSL)	
1	S-1	1.6 80%	5	--	0.2	FINE SAND & SILT; dk brown; med dense; damp				
2			8							
2	2.0	10								
3	S-2	1.2 60%	2	--	0.2					
3			1							
4	4.0	1								
5	S-3	1.6 80%	WOH	--	0.2					
5			3							
6	6.0	2								
7	S-4	1.4 70%	1	--	0.2					
7			1							
8	8.0	1								
9	S-5	0.5 25%	1	--	0.2					
9			1							
10	10.0	2								
		4				Match to Sheet 2				

DRILLING CO.: Parratt - Wolff  
 DRILLER: Kevin White

BAKER REP.: John Zimmerman  
 BORING NO.: 89-MW05DW SHEET 1 OF 5

**TEST BORING AND WELL CONSTRUCTION RECORD**

Baker Environmental

PROJECT: Phase II Investigation at Sites 88, 89, and 93 - MCB Camp Lejeune

CTO NO.: 62470-356

BORING NO.:

89-MW05DW

SAMPLE TYPE						DEFINITIONS		
S = Split Spoon A = Auger T = Shelby Tube W = Wash R = Mud Rotary C = Core D = Denison P = Piston N = No Sample						SPT = Standard Penetration Test (ASTM D1586) PID = Photo Ionization Detector measurement Lab Class = USCS (ASTM D2487)		
Depth (Ft.)	Sample Type & No.	Sample Rec. (Ft.,%)	SPT	Lab Class.	PID (ppm)	Visual Description	Well Installation Detail	Elevation (Ft. MSL)
11	S-6	1.3 65%	WOH	--	0.2	Continued from Sheet 1 little silt & clay, trace M/F sand; dk brown; v loose; wet		
12			18"					
13	A-N	--	--	--	--			
14			--					
15	R-N	--	--	--	--	See the log for 89-MW05IW for lithologic details		
16								
17								
18								
19								
20								
21								
22								
23								
24								
25								
26								
27								
28								
29								
30								

Match to Sheet 3

DRILLING CO.: Parratt - Wolff

DRILLER: Kevin White

BAKER REP.:

John Zimmerman

BORING NO.:

89-MW05DW

SHEET 2 OF 5

## TEST BORING AND WELL CONSTRUCTION RECORD

PROJECT: Phase II Investigation at Sites 88, 89, and 93 - MCB Camp Lejeune

CTO NO.: 62470-356

BORING NO.:

89-MW05DW

SAMPLE TYPE						DEFINITIONS		
S = Split Spoon A = Auger T = Shelby Tube W = Wash R = Mud Rotary C = Core D = Denison P = Piston N = No Sample						SPT = Standard Penetration Test (ASTM D1586) PID = Photo Ionization Detector measurement Lab Class = USCS (ASTM D2487)		
Depth (Ft.)	Sample Type & No.	Sample Rec. (Ft., %)	SPT	Lab Class.	PID (ppm)	Visual Description	Well Installation Detail	Elevation (Ft. MSL)
31						Continued from Sheet 2		
32								
33								
34								
35								
36								
37								
38								
39								
40	R-N	--	--	--	--			
41								
42								
43								
44								
45								
46	46.0							
47	S-7	1.8 90%	4 7	--	0.2 0.2	FINE SAND, some silt, trace clay & shell frag; olive; med dense; wet		
48	48.0		8					
49	S-8	1.0 50%	9 12	--	0.2 0.2		little shell frag & silt; olive; med dense; wet	
50	50.0		16					
			10			Match to Sheet 4		

DRILLING CO.: Parratt - Wolff  
DRILLER: Kevin White

BAKER REP.: John Zimmerman  
BORING NO.: 89-MW05DW SHEET 3 OF 5



## TEST BORING AND WELL CONSTRUCTION RECORD

PROJECT: Phase II Investigation at Sites 88, 89, and 93 - MCB Camp Lejeune  
 CTO NO.: 62470-356 BORING NO.: 89-MW05DW

<b>SAMPLE TYPE</b>						<b>DEFINITIONS</b>		
S = Split Spoon A = Auger T = Shelby Tube W = Wash R = Mud Rotary C = Core D = Denison P = Piston N = No Sample						SPT = Standard Penetration Test (ASTM D1586) PID = Photo Ionization Detector measurement Lab Class = USCS (ASTM D2487)		
Depth (Ft.)	Sample Type & No.	Sample Rec. (Ft.,%)	SPT	Lab Class.	PID (ppm)	Visual Description	Well Installation Detail	Elevation (Ft. MSL)
51	S-9	1.9 95%	9	--	0.2 0.2	Continued from Sheet 3 some shell frag & clay, little silt; olive; med dense; wet		
52			11 20					
53	S-10	1.4 70%	19	--	0.2 0.2	part cemented, some shell frag, little silt, trace m sand; light olive; dense; wet		
54			15 20 30					
55	S-11	1.0 50%	48	--	0.2 0.2	some shell frag, little silt; greenish-gray; v dense; wet		
56			31 38 32					
57	S-12	1.2 60%	81	--	0.2 0.2	<b>FINE to MEDIUM SAND,</b> little shell frag, trace silt; greenish-gray; v dense; wet		
58			53 43 34					
59	S-13	2.0 100%	18	--	0.2 0.2			
60			23 32 29					
61	S-14	1.1 55%	9	--	0.2 0.2	<b>FINE SAND,</b> trace shell frag & silt; greenish-gray; v dense; wet		
62			19 33 33					
63	S-15	1.3 65%	20	--	0.2 0.2	little silt, trace shell frag; greenish-gray; v dense; wet		
64			40 100 55					
65	S-16	1.6 80%	9	--	0.2 0.2	med dense		
66			14 14 15					
67	S-17	1.8 90%	12	--	0.2 0.2	dense		
68			16 25 32					
69	S-18	0.6 30%	19	--	0.2 0.2	some silt; olive; v dense; moist to damp		
70			38 32 25					
27						Match to Sheet 5		

DRILLING CO.: Parratt - Wolff  
 DRILLER: Kevin White

BAKER REP.: John Zimmerman  
 BORING NO.: 89-MW05DW SHEET 4 OF 5

**TEST BORING AND WELL CONSTRUCTION RECORD**

PROJECT: Phase II Investigation at Sites 88, 89, and 93 - MCB Camp Lejeune

CTO NO.: 62470-356

BORING NO.:

89-MW05DW

SAMPLE TYPE						DEFINITIONS			
S = Split Spoon A = Auger T = Shelby Tube W = Wash R = Mud Rotary C = Core D = Denison P = Piston N = No Sample						SPT = Standard Penetration Test (ASTM D1586) PID = Photo Ionization Detector measurement Lab Class = USCS (ASTM D2487)			
Depth (Ft.)	Sample Type & No.	Sample Rec. (Ft.,%)	SPT	Lab Class.	PID (ppm)	Visual Description	Well Installation Detail	Elevation (Ft. MSL)	
71	S-19	0.6 30%	18	--	0.2	Continued from Sheet 4 <b>FINE SAND &amp; SILT,</b> little clay; olive; dense; damp			
72			12		0.2				
73	S-17	1.0 50%	21	--	0.2	v dense			
74			22		0.2				
74			29			74.0	74.0	-60.67	
74			37			BOH @ 74.0 ft.			
75									
76									
77									
78									
79									
80									
81									
82									
83									
84									
85									
86									
87									
88									
89									
90									

DRILLING CO.: Parratt - Wolff  
 DRILLER: Kevin White

BAKER REP.: John Zimmerman  
 BORING NO.: 89-MW05DW SHEET 5 OF 5



## TEST BORING AND WELL CONSTRUCTION RECORD

**PROJECT:** Phase II Investigation at Sites 88, 89, and 93 - MCB Camp Lejeune  
**CTO NO.:** 62470-356 **BORING NO.:** 89-MW06IW  
**COORDINATES: EAST:** 2467489.1010 **NORTH:** 360457.7580  
**ELEVATION: SURFACE:** 9.88 **TOP OF PVC CASING:** 11.71

<b>Rig:</b> CME-55					<b>Date</b>	<b>Progress (Ft.)</b>	<b>Weather</b>	<b>Depth to Water (Ft.)</b>	<b>Time</b>
	<b>Split Spoon</b>	<b>Casing</b>	<b>Augers</b>	<b>Core Barrel</b>					
<b>Size (ID)</b>	1-3/8"	--	3-1/4"	--	5/2/97	0.0 - 40.0	Sunny, 60s	3.0	--
<b>Length</b>	2.0'	--	5.0'	--					
<b>Type</b>	Stainless	--	HSA	--					
<b>Hammer Wt.</b>	140 lbs.	--	--	--					
<b>Fall</b>	30"	--	--	--					
<b>Stickup</b>	--	--	--	--					

**Remarks:** Boring reamed with 6-1/4" HSAs to 37.0 ft. bgs

<b>SAMPLE TYPE</b> S = Split Spoon    A = Auger T = Shelby Tube    W = Wash R = Mud Rotary    C = Core D = Denison        P = Piston N = No Sample	<b>WELL INFORMATION</b>												
	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <th style="width: 60%;">Type</th> <th style="width: 10%;">Diam.</th> <th style="width: 15%;">Top Depth (Ft.)</th> <th style="width: 15%;">Bottom Depth (Ft.)</th> </tr> <tr> <td>Sch 40 PVC Casing</td> <td>2.0"</td> <td>0</td> <td>32</td> </tr> <tr> <td>Sch 40 PVC, 10-slot Screen</td> <td>2.0"</td> <td>32</td> <td>37</td> </tr> </table>	Type	Diam.	Top Depth (Ft.)	Bottom Depth (Ft.)	Sch 40 PVC Casing	2.0"	0	32	Sch 40 PVC, 10-slot Screen	2.0"	32	37
Type	Diam.	Top Depth (Ft.)	Bottom Depth (Ft.)										
Sch 40 PVC Casing	2.0"	0	32										
Sch 40 PVC, 10-slot Screen	2.0"	32	37										

Depth (Ft.)	Sample Type & No.	Sample Rec. (Ft.,%)	SPT	Lab Class.	PID (ppm)	Visual Description	Well Installation Detail	Elevation (Ft. MSL)
1	S-1	1.8 90%	WOH 1	--	0.2 0.2	FINE SAND, some silt, little clay; dark brown to brown; soft; damp to moist		
2			2					
3			3					
3	S-2	1.9 95%	3	--	0.2 0.2	some silt, little to some clay; brown; med stiff; wet Groundwater @ 3.0'		
4			4					
4	S-3	2.0 100%	6	--	0.2 0.2	FINE to MEDIUM SAND, trace silt; brown; med dense; wet		
5			8					
6			8					
7	S-4	1.8 90%	8	--	0.2 0.2			
8			12					
8	S-5	1.3 65%	11	--	0.2 0.2	trace to little silt & clay; brown to gray; v loose; wet		
9			8					
10			1					
			1			Match to Sheet 2		

**DRILLING CO.:** Parratt - Wolff **BAKER REP.:** John Zimmerman  
**DRILLER:** Kevin White **BORING NO.:** 89-MW06IW **SHEET 1 OF 3**

## TEST BORING AND WELL CONSTRUCTION RECORD

PROJECT: Phase II Investigation at Sites 88, 89, and 93 - MCB Camp Lejeune

CTO NO.: 62470-356

BORING NO.:

89-MW06IW

SAMPLE TYPE							DEFINITIONS			
S = Split Spoon A = Auger T = Shelby Tube W = Wash R = Mud Rotary C = Core D = Denison P = Piston N = No Sample							SPT = Standard Penetration Test (ASTM D1586) PID = Photo Ionization Detector measurement Lab Class = USCS (ASTM D2487)			
Depth (Ft.)	Sample Type & No.	Sample Rec. (Ft.,%)	SPT	Lab Class.	PID (ppm)	Visual Description	Well Installation Detail	Elevation (Ft. MSL)		
11	S-6	1.7 85%	2 2	--	0.2 0.2	Continued from Sheet 1 trace silt; brown; loose; wet				
12			2							
13	S-7	1.8 90%	3 4	--	0.2 0.2	As S-3 w/ coarse sand from 12.0-13.3'				
14			4							
15	S-8	2.0 100%	WOH 24"	--	0.2 0.2	FINE SAND & SILT, some clay; dk greenish-gray; v soft; wet				
16										
17	S-9	2.0 100%	WOH 24"	--	0.2 0.2					
18										
19	S-10	1.2 60%	WOH 12" 5	--	0.2 0.2					
20			17				19.4	-9.52		
21	S-11	1.4 70%	WOH 25 20	--	0.2 0.2	SHELLS & FINE SAND, part cemented, trace fossil frag, silt, & clay; lt gray; dense; wet				
22			18							
23	S-12	2.0 100%	12 24 20	--	0.2 0.2	little clay; trace fossil frag & silt; lt gray; dense; moist to wet				
24			24							
25	S-13	1.4 70%	6 16 50/4"	--	0.2 0.2	no cemented sands, little clay, trace to little silt; lt gray; moist to wet				
26	A-N	--	--	--	--					
27	S-14	1.6 80%	15 15 31	--	0.2 0.2					
28			34				28.0	-18.12		
29	S-15	1.7 85%	12 15 13	--	0.2 0.2	no cemented sands, trace silt; lt gray; med dense; wet				
30			12				30.0	-20.12		
			10			Match to Sheet 3				

DRILLING CO.: Parratt - Wolff  
 DRILLER: Kevin White

BAKER REP.: John Zimmerman  
 BORING NO.: 89-MW06IW SHEET 2 OF 3

## TEST BORING AND WELL CONSTRUCTION RECORD

PROJECT: Phase II Investigation at Sites 88, 89, and 93 - MCB Camp Lejeune

CTO NO.: 62470-356

BORING NO.:

89-MW06IW

SAMPLE TYPE							DEFINITIONS				
S = Split Spoon A = Auger T = Shelby Tube W = Wash R = Mud Rotary C = Core D = Denison P = Piston N = No Sample							SPT = Standard Penetration Test (ASTM D1586) PID = Photo Ionization Detector measurement Lab Class = USCS (ASTM D2487)				
Depth (Ft.)	Sample Type & No.	Sample Rec. (Ft.,%)	SPT	Lab Class.	PID (ppm)	Visual Description	Well Installation Detail	Elevation (Ft. MSL)			
31	S-16	1.4 70%	15	--	0.2	Continued from Sheet 2 dense		-22.12			
32			18		0.2				32.0		
33	S-17	1.6 80%	15	--	0.2						
34			16		0.2				34.0		
35	S-18	1.8 90%	20	--	0.2						
36			16		0.2				36.0		
37	S-19	1.5 75%	18	--	0.2				37.0	37.0	-27.12
38			12		0.2				38.0		
39	S-20	1.6 80%	3	--	0.2				FINE SAND & SILT, trace to little clay; trace shells greenish-gray; med dense; damp to wet	40.0	-30.12
40			5		0.2						
41											
42											
43											
44											
45											
46											
47											
48											
49											
50											

DRILLING CO.: Parratt - Wolff  
DRILLER: Kevin White

BAKER REP.: John Zimmerman  
BORING NO.: 89-MW06IW SHEET 3 OF 3





## TEST BORING AND WELL CONSTRUCTION RECORD

**Baker Environmental**

PROJECT:	Phase II Investigation at Sites 88, 89, and 93 - MCB Camp Lejeune		
CTO NO.:	62470-356	BORING NO.:	89-MW06DW
COORDINATES: EAST:	2467500.2340	NORTH:	360495.629
ELEVATION: SURFACE:	9.50	TOP OF PVC CASING:	11.44

Rig: CME-55					Date	Progress (Ft.)	Weather	Depth to Water (Ft.)	Time
Split Spoon	Casing	Augers	Core Barrel						
Size (ID)	1-3/8"	--	3-1/4"	--	5/2/97	0.0 - 30.0	Sunny, 70s	3.0	--
Length	2.0'	--	5.0'	--	5/3/97	30.0 - 74.0	P Sunny, 70s	--	--
Type	Stainless	--	HSA	--					
Hammer Wt.	140 lbs.	--	--	--					
Fall	30"	--	--	--					
Stickup	--	--	--	--					

**Remarks:** Boring reamed to 14 ft. w/ 6-1/4" HSA. 7-3/8" mud rotary from 14 ft to depth.

SAMPLE TYPE						WELL INFORMATION				
S = Split Spoon A = Auger T = Shelby Tube W = Wash R = Mud Rotary C = Core D = Denison P = Piston N = No Sample						Type		Diam.	Top Depth (Ft.)	Bottom Depth (Ft.)
						Sch 40 PVC Casing		2.0"	0	65
						Sch 40 PVC, 10-slot Screen		2.0"	65	70
Depth (Ft.)	Sample Type & No.	Sample Rec. (Ft.,%)	SPT	Lab Class.	PID (ppm)	Visual Description	Well Installation Detail	Elevation (Ft. MSL)		
1	S-1	1.8 90%	1	--	0.2	<b>FINE SAND</b> , some silt & clay; dk brown; soft, moist  some silt, little clay; brown; med stiff; wet Groundwater @ 3.0'  <b>FINE to MEDIUM SAND</b> , trace silt; brown; loose; wet				
2			1							
3	S-2	1.9 95%	3	--	0.2					
4			4							
5			5							
6	A-N	--	--	--	--					
7			--							
8	S-3	1.6 80%	2	--	0.2					
9			2							
10	A-N	--	--	--	--					
			WOH	Match to Sheet 2						

DRILLING CO.: Parratt - Wolff  
 DRILLER: Kevin White

BAKER REP.: John Zimmerman  
 BORING NO.: 89-MW06DW SHEET 1 OF 5

## TEST BORING AND WELL CONSTRUCTION RECORD

PROJECT: Phase II Investigation at Sites 88, 89, and 93 - MCB Camp Lejeune

CTO NO.: 62470-356

BORING NO.:

89-MW06DW

SAMPLE TYPE						DEFINITIONS		
S = Split Spoon A = Auger T = Shelby Tube W = Wash R = Mud Rotary C = Core D = Denison P = Piston N = No Sample						SPT = Standard Penetration Test (ASTM D1586) PID = Photo Ionization Detector measurement Lab Class = USCS (ASTM D2487)		
Depth (Ft.)	Sample Type & No.	Sample Rec. (Ft.,%)	SPT	Lab Class.	PID (ppm)	Visual Description	Well Installation Detail	Elevation (Ft. MSL)
11	S-4	1.4	2	--	0.2	Continued from Sheet 1		
12			2					
13	S-5	1.8	WOH	--	0.2	As above w/ coarse sand from 12.0-13.3'		
14			1					
15	R-N	--	--	--	--	See the log for 89-MW06IW for lithologic details		
16								
17								
18								
19								
20								
21								
22								
23								
24								
25								
26								
27						Match to Sheet 3		
28								
29								
30								

DRILLING CO.: Parratt - Wolff  
 DRILLER: Kevin White

BAKER REP.: John Zimmerman  
 BORING NO.: 89-MW06DW SHEET 2 OF 5



## TEST BORING AND WELL CONSTRUCTION RECORD

PROJECT: Phase II Investigation at Sites 88, 89, and 93 - MCB Camp Lejeune  
 CTO NO.: 62470-356 BORING NO.: 89-MW06DW

SAMPLE TYPE						DEFINITIONS			
S = Split Spoon A = Auger T = Shelby Tube W = Wash R = Mud Rotary C = Core D = Denison P = Piston N = No Sample						SPT = Standard Penetration Test (ASTM D1586) PID = Photo Ionization Detector measurement Lab Class = USCS (ASTM D2487)			
Depth (Ft.)	Sample Type & No.	Sample Rec. (Ft., %)	SPT	Lab Class.	PID (ppm)	Visual Description	Well Installation Detail	Elevation (Ft. MSL)	
31						Continued from Sheet 2			
32									
33									
34									
35	R-N	--	--	--	--				
36									
37									
38									
39									
40	40.0								
41	S-6	1.6 80%	3 4 6	--	0.9 0.9	FINE SAND & SILT, trace to little clay, trace shell frag; olive; m dense; moist to wet			
42	42.0		6						
43	S-7	1.5 75%	5 7 8	--	0.9 0.9	FINE SAND, some silt, trace clay & shells; olive; med dense; wet			
44	44.0		8						
45	S-8	1.5 75%	7 10 14	--	0.9 0.9	SHELL FRAG, little sand, trace silt; light gray; dense; wet			
46	46.0		14					45.4	-35.90
47	S-9	1.5 75%	12 15 21	--	0.9 0.9	some fine sand, trace silt; lt gray; v dense; wet			
48	48.0		22						
49	S-10	1.4 70%	16 22 38	--	0.9 0.9	Match to Sheet 4			
50	50.0		25 15						

DRILLING CO.: Parratt - Wolff  
 DRILLER: Kevin White

BAKER REP.: John Zimmerman  
 BORING NO.: 89-MW06DW SHEET 3 OF 5



# TEST BORING AND WELL CONSTRUCTION RECORD

PROJECT: Phase II Investigation at Sites 88, 89, and 93 - MCB Camp Lejeune  
 CTO NO.: 62470-356 BORING NO.: 89-MW06DW

<u>SAMPLE TYPE</u>							<u>DEFINITIONS</u>		
S = Split Spoon A = Auger T = Shelby Tube W = Wash R = Mud Rotary C = Core D = Denison P = Piston N = No Sample							SPT = Standard Penetration Test (ASTM D1586) PID = Photo Ionization Detector measurement Lab Class = USCS (ASTM D2487)		
Depth (Ft.)	Sample Type & No.	Sample Rec. (Ft.,%)	SPT	Lab Class.	PID (ppm)	Visual Description	Well Installation Detail	Elevation (Ft. MSL)	
51	S-11	1.3	25		0.9	Continued from Sheet 3 <b>FINE to MEDIUM SAND,</b> trace shell & silt, gray; v dense; wet			
51.3		100%	106/3"	--	0.9				
52	R-N	--	--	--	--				
53	S-12	1.3	36		0.9				
		100%	53	--	0.9				
54	R-N	--	--	--	--				
54.0	S-13	0.8	36		0.9	<b>FINE SAND,</b> trace shells & silt; gray; v dense; wet			
54.8		100%	70	--	0.9				
55	R-N	--	--	--	--				
56			40						
57	S-14	1.2	70		0.9				
		60%	70	--	0.9				
58			85						
59	S-15	1.0	34		0.9				
		50%	50	--	0.9				
60			67					60.0 -50.50	
61	S-16	1.3	18		0.9				
61.3		100%	20	--	0.9				
62	R-N	--	--	--	--				
63	S-17	1.5	27		0.9				
		75%	60	--	0.9			63.0 -53.50	
64			66						
64.0			70						
65	S-18	1.8	36		0.9				
		90%	51	--	0.9			65.0 -55.50	
66			96						
66.0			--						
67	S-19	1.7	13		0.9	greenish gray; dense			
		85%	16	--	0.9				
68			19						
68.0			20						
69	S-20	1.5	21		0.9	v dense			
		75%	31	--	0.9				
70			65						
70.0			70					70.0 -60.50	
			7			Match to Sheet 5			

DRILLING CO.: Parratt - Wolff BAKER REP.: John Zimmerman  
 DRILLER: Kevin White BORING NO.: 89-MW06DW SHEET 4 OF 5



**TEST BORING AND WELL CONSTRUCTION RECORD**

PROJECT: Phase II Investigation at Sites 88, 89, and 93 - MCB Camp Lejeune  
 CTO NO.: 62470-356 BORING NO.: 89-MW06DW

SAMPLE TYPE						DEFINITIONS			
S = Split Spoon A = Auger T = Shelby Tube W = Wash R = Mud Rotary C = Core D = Denison P = Piston N = No Sample						SPT = Standard Penetration Test (ASTM D1586) PID = Photo Ionization Detector measurement Lab Class = USCS (ASTM D2487)			
Depth (Ft.)	Sample Type & No.	Sample Rec. (Ft.,%)	SPT	Lab Class.	PID (ppm)	Visual Description	Well Installation Detail	Elevation (Ft. MSL)	
71	S-21	1.5 75%	8	--	0.9	Continued from Sheet 4 <b>FINE SAND</b> , little to some silt, trace to little clay, trace shells; greenish-gray; med dense to dense; damp to wet	[REDACTED]	[REDACTED]	
72			12		0.9				
73	S-22	1.2 60%	6	--	0.9				
74			24		0.9	74.0	74.0	-64.50	
74			28						
74			41			BOH @ 74.0 ft.			
75									
76									
77									
78									
79									
80									
81									
82									
83									
84									
85									
86									
87									
88									
89									
90									

DRILLING CO.: Parratt - Wolff  
 DRILLER: Kevin White

BAKER REP.: John Zimmerman  
 BORING NO.: 89-MW06DW SHEET 5 OF 5

**Baker**

Baker Environmental

**TEST BORING AND WELL CONSTRUCTION RECORD**

PROJECT: Phase II Investigation at Sites 88, 89, and 93 - MCB Camp Lejeune

CTO NO.: 62470-356

BORING NO.:

89-MW07IW

COORDINATES: EAST: 2467337.4970

NORTH:

361046.0500

ELEVATION: SURFACE: 17.44

TOP OF PVC CASING:

19.30

Rig: CME-55					Date	Progress (Ft.)	Weather	Depth to Water (Ft.)	Time
Split Spoon	Casing	Augers	Core Barrel						
Size (ID)	1-3/8"	--	3-1/4"	--	5/3/97	0.0 - 20.0	P Sunny, 70s	3.0	--
Length	2.0'	--	5.0'	--	5/4/97	20.0 - 42.0	Sunny, 70s	--	--
Type	Stainless	--	HSA	--					
Hammer Wt.	140 lbs.	--	--	--					
Fall	30"	--	--	--					
Stickup	--	--	--	--					

Remarks: Boring reamed with 6-1/4" HSAs to 40.0 ft. bgs

SAMPLE TYPE						WELL INFORMATION			
S = Split Spoon A = Auger T = Shelby Tube W = Wash R = Mud Rotary C = Core D = Denison P = Piston N = No Sample						Type	Diam.	Top Depth (Ft.)	Bottom Depth (Ft.)
						Sch 40 PVC Casing	2.0"	0	35
						Sch 40 PVC, 10-slot Screen	2.0"	35	40
Depth (Ft.)	Sample Type & No.	Sample Rec. (Ft.,%)	SPT	Lab Class.	PID (ppm)	Visual Description	Well Installation Detail		Elevation (Ft. MSL)
1	S-1	2.0 100%	1	--	0.4	FINE SAND & SILT; dark brown; loose; damp			
2			2						
3	S-2	1.8 90%	2	--	0.4	brown to lt brown; loose; damp			
4			3						
5	S-3	1.5 75%	4	--	0.4	as above w. clay & silt layer @ 4.0-4.7'			
6			5						
7	S-4	2.0 100%	4	--	0.4	FINE SAND, trace silt; tan; loose; damp to moist			
8			3						
9	S-5	1.2 60%	2	--	0.4	FINE SAND & SILT, trace clay; brownish-gray; loose; moist to wet Water -10.0'			
10			2						
			3			Match to Sheet 2			

DRILLING CO.: Parratt - Wolff

BAKER REP.:

John Zimmerman

DRILLER: Kevin White

BORING NO.:

89-MW07IW

SHEET 1 OF 3

**TEST BORING AND WELL CONSTRUCTION RECORD**

PROJECT: Phase II Investigation at Sites 88, 89, and 93 - MCB Camp Lejeune

CTO NO.: 62470-356

BORING NO.:

89-MW07IW

SAMPLE TYPE						DEFINITIONS			
S = Split Spoon A = Auger T = Shelby Tube W = Wash R = Mud Rotary C = Core D = Denison P = Piston N = No Sample						SPT = Standard Penetration Test (ASTM D1586) PID = Photo Ionization Detector measurement Lab Class = USCS (ASTM D2487)			
Depth (Ft.)	Sample Type & No.	Sample Rec. (Ft.,%)	SPT	Lab Class.	PID (ppm)	Visual Description	Well Installation Detail	Elevation (Ft. MSL)	
11	S-6	1.8	4	--	0.4	Continued from Sheet 1			
12		90%	4		0.4	FINE SAND, trace to little silt; gray; loose; wet			
13	S-7	1.5	5	--	0.4	FINE SAND & SILT, little clay; brownish-gray; med stiff; wet			
14		75%	9		0.4				
15	S-8	1.8	10	--	0.4				
16		90%	11		0.4				
17	S-9	1.8	2	--	0.2	gray; med stiff; wet			
18		90%	2		0.2				
19	S-10	1.7	1	--	0.2				
20		85%	1		0.2				
21	S-11	1.4	WOH	--	0.2	FINE SAND, some silt, little clay; brownish-gray; v soft; wet			
22		70%	18"		0.2				
23	S-12	1.9	1	--	0.2	FINE SAND & SILT, little clay; brownish-gray; soft; wet			
24		95%	1		0.2				
25	S-13	1.7	WOH	--	0.2	FINE to MEDIUM SAND, trace silt; dk greenish-gray; v loose; wet			
26		85%	1		0.2			-8.56	
27	S-14	1.9	10	--	0.2	CLAY & SILT; dk greenish-gray; hard; wet			
28		95%	13		0.2				
29	S-15	2.0	26	--	0.2	SHELLS & FINE SAND, part cemented, trace silt & clay; lt greenish-gray; med dense; moist to wet			
30		100%	9		0.2				
			22						
			13			Match to Sheet 3			

DRILLING CO.: Parratt - Wolff

DRILLER: Kevin White

BAKER REP.: John Zimmerman

BORING NO.: 89-MW07IW SHEET 2 OF 3



**TEST BORING AND WELL CONSTRUCTION RECORD**

PROJECT: Phase II Investigation at Sites 88, 89, and 93 - MCB Camp Lejeune  
 CTO NO.: 62470-356 BORING NO.: 89-MW07IW

SAMPLE TYPE							DEFINITIONS			
S = Split Spoon A = Auger T = Shelby Tube W = Wash R = Mud Rotary C = Core D = Denison P = Piston N = No Sample							SPT = Standard Penetration Test (ASTM D1586) PID = Photo Ionization Detector measurement Lab Class = USCS (ASTM D2487)			
Depth (Ft.)	Sample Type & No.	Sample Rec. (Ft.,%)	SPT	Lab Class.	PID (ppm)	Visual Description	Well Installation Detail	Elevation (Ft. MSL)		
31	S-16	1.1	15	--	0.2	Continued from Sheet 2		31.0	-13.56	
32		55%	10		0.2			32.0		
33	S-17	1.3	21	--	0.2	FINE SAND, little to some silt, little clay; lt greenish-gray; med dense to v dense; moist		33.0	-15.56	
34	A-N	--	50/4"	--	0.2			33.3		
35	S-18	1.7	12	--	0.2	SHELLS & FINE SAND, trace silt; lt gray; med dense; wet		35.0	-17.56	
36		85%	12		0.2			36.0		
37	S-19	1.3	21	--	0.2	dense				
38		65%	23		0.2			38.0		
39	S-20	2.0	10	--	0.2					
40		100%	14		0.2			40.0		
41	S-21	0.4	4	--	0.2	FINE SAND & SILT, little clay; trace shell frag; green-gray; med stiff, damp				
42		20%	6		0.2			42.0		
43			7			BOH @ 42.0 ft.				
44			8							
45										
46										
47										
48										
49										
50										

DRILLING CO.: Parratt - Wolff  
 DRILLER: Kevin White

BAKER REP.: John Zimmerman  
 BORING NO.: 89-MW07IW SHEET 3 OF 3





**TEST BORING AND WELL CONSTRUCTION RECORD**

PROJECT: Phase II Investigation at Sites 88, 89, and 93 - MCB Camp Lejeune  
 CTO NO.: 62470-356 BORING NO.: 89-MW07DW  
 COORDINATES: EAST: 2467335.4470 NORTH: 361037.5550  
 ELEVATION: SURFACE: 17.19 TOP OF PVC CASING: 18.99

Rig:	CME-55				Date	Progress (Ft.)	Weather	Depth to Water (Ft.)	Time
	Split Spoon	Casing	Augers	Core Barrel					
Size (ID)	1-3/8"	--	3-1/4"	--	5/4/97	0.0 - 40.0	P Sunny, 70s	3.0	--
Length	2.0'	--	5.0'	--	5/5/97	40.0 - 84.0	Sunny, 60s	--	--
Type	Stainless	--	HSA	--					
Hammer Wt.	140 lbs.	--	--	--					
Fall	30"	--	--	--					
Stickup	--	--	--	--					

Remarks: Boring reamed to 14 ft. w/ 6-1/4" HSA. 7-3/8" mud rotary from 14 ft to depth.

SAMPLE TYPE						WELL INFORMATION			
S = Split Spoon A = Auger T = Shelby Tube W = Wash R = Mud Rotary C = Core D = Denison P = Piston N = No Sample						Type	Diam.	Top Depth (Ft.)	Bottom Depth (Ft.)
						Sch 40 PVC Casing	2.0"	0	75
						Sch 40 PVC, 10-slot Screen	2.0"	75	80

Depth (Ft.)	Sample Type & No.	Sample Rec. (Ft.,%)	SPT	Lab Class.	PID (ppm)	Visual Description	Well Installation Detail	Elevation (Ft. MSL)
1	S-1	1.7 85%	2	--	0.1 0.1	FINE SAND & SILT; dark brown; v loose; damp		
2			1					
3	S-2	0.7 35%	2	--	0.1 0.1	loose		
4			2					
5	S-3	1.1 55%	4	--	0.1 0.1	As above w/ silt & clay layer @ 4.0-4.7'		
6			3					
7	S-4	2.0 100%	4	--	0.1 0.1	FINE SAND, trace silt; tan; loose; damp to moist		
8			4					
9	S-5	1.6 80%	4	--	0.1 0.1	FINE SAND & SILT; trace clay; brownish-gray; loose; moist to wet Water @ 10.0'		
10			2					
			2					
			3			Match to Sheet 2		

DRILLING CO.: Parratt - Wolff BAKER REP.: John Zimmerman  
 DRILLER: Kevin White BORING NO.: 89-MW07DW SHEET 1 OF 5

## TEST BORING AND WELL CONSTRUCTION RECORD

PROJECT: Phase II Investigation at Sites 88, 89, and 93 - MCB Camp Lejeune

CTO NO.: 62470-356

BORING NO.:

89-MW07DW

SAMPLE TYPE							DEFINITIONS				
S = Split Spoon A = Auger T = Shelby Tube W = Wash R = Mud Rotary C = Core D = Denison P = Piston N = No Sample							SPT = Standard Penetration Test (ASTM D1586) PID = Photo Ionization Detector measurement Lab Class = USCS (ASTM D2487)				
Depth (Ft.)	Sample Type & No.	Sample Rec. (Ft.,%)	SPT	Lab Class.	PID (ppm)	Visual Description	Well Installation Detail	Elevation (Ft. MSL)			
11	S-6	1.5 75%	3	--	0.1	Continued from Sheet 1 <b>FINE SAND</b> , trace to little silt; brown; loose wet					
12			4						5		
13	A-N	--	--	--	--						
14			--								
15	R-N	--	--	--	--				See the log for 89-MW07IW for lithologic details		
16											
17											
18											
19											
20											
21											
22											
23											
24											
25											
26											
27											
28											
29											
30											
Match to Sheet 3											

DRILLING CO.: Parratt - Wolff  
 DRILLER: Kevin White

BAKER REP.: John Zimmerman  
 BORING NO.: 89-MW07DW SHEET 2 OF 5

**TEST BORING AND WELL CONSTRUCTION RECORD**

PROJECT: Phase II Investigation at Sites 88, 89, and 93 - MCB Camp Lejeune

CTO NO.: 62470-356

BORING NO.:

89-MW07DW

SAMPLE TYPE						DEFINITIONS		
S = Split Spoon A = Auger T = Shelby Tube W = Wash R = Mud Rotary C = Core D = Denison P = Piston N = No Sample						SPT = Standard Penetration Test (ASTM D1586) PID = Photo Ionization Detector measurement Lab Class = USCS (ASTM D2487)		
Depth (Ft.)	Sample Type & No.	Sample Rec. (Ft.,%)	SPT	Lab Class.	PID (ppm)	Visual Description	Well Installation Detail	Elevation (Ft. MSL)
31						Continued from Sheet 2		
32								
33								
34								
35	R-N	--	--	--	--			
36								
37								
38								
39								
40	40.0							
41	S-7	2.0 100%	4 5 5	--	0.4 0.4	FINE SAND & SILT, trace to little clay, trace shell frag, olive; loose; moist to wet		
42	42.0		6					
43	S-8	2.0 100%	9 8 8	--	0.4 0.4	FINE SAND, some silt, trace to little clay, trace shells; olive; med dense; wet		
44	44.0		8					
45	S-9	1.8 90%	3 4 5	--	0.4 0.4	moist		
46	46.0		7					
47	S-10	2.0 100%	7 5 7	--	0.4 0.4	some silt, little clay; green-gray; med dense; moist to wet		
48	48.0		9					
49	S-11	1.8 90%	9 9 11	--	0.4 0.4	some silt, little clay, trace shells; greenish-gray; med dense; moist to wet		
50	50.0		13					
			WOH			Match to Sheet 4		

DRILLING CO.: Parratt - Wolff  
DRILLER: Kevin White

BAKER REP.: John Zimmerman  
BORING NO.: 89-MW07DW SHEET 3 OF 5

## TEST BORING AND WELL CONSTRUCTION RECORD

PROJECT: Phase II Investigation at Sites 88, 89, and 93 - MCB Camp Lejeune

CTO NO.: 62470-356

BORING NO.:

89-MW07DW

SAMPLE TYPE						DEFINITIONS		
S = Split Spoon A = Auger T = Shelby Tube W = Wash R = Mud Rotary C = Core D = Denison P = Piston N = No Sample						SPT = Standard Penetration Test (ASTM D1586) PID = Photo Ionization Detector measurement Lab Class = USCS (ASTM D2487)		
Depth (Ft.)	Sample Type & No.	Sample Rec. (Ft.,%)	SPT	Lab Class.	PID (ppm)	Visual Description	Well Installation Detail	Elevation (Ft. MSL)
51	S-12	1.7 85%	4	--	0.4	Continued from Sheet 3		
52			4		0.4			
52	52.0		6					
53	S-13	1.6 80%	4	--	0.4			
54			6		0.4			
54	54.0		8			54.0		-36.81
55	S-14	1.0 50%	8	--	0.4	<b>FINE to MEDIUM SAND,</b> little shell frag, trace silt; greenish-gray; dense; wet		
56			8		0.4			
56	56.0		22					
57	S-15	2.0 100%	30	--	0.4	trace shells & silt; green- gray; v dense wet		
58			32		0.4			
58	58.0		35					
59	S-16	2.0 100%	21	--	0.4			
60			28		0.4			
60	60.0		32					
61	S-17	1.9 146%	7	--	0.4	some shells, silt & clay at 61.7-62.0'; all damp to moist		
62			18		0.4			
62	62.0		13					
63	S-18	0.8 40%	24	--	0.4	<b>SHELL FRAG,</b> some fine sand & silt; lt greenish-gray; v dense; wet		
64			106		0.4			
64	64.0		55					
65	S-19	1.3 65%	16	--	0.4	<b>FINE to MEDIUM SAND,</b> trace shell frag & silt; green- gray; dense; wet		
66			20		0.4			
66	66.0		28					
67	S-20	1.5 75%	32	--	0.4			
68			57		0.4			
68	68.0		69					
69	S-21	1.8 90%	11	--	0.4	little shells, trace silt; green- gray; v dense; wet		
70			19		0.4			
70	70.0		30			70.0	70.0	-52.81
			36					
			7			Match to Sheet 5		

DRILLING CO.: Parratt - Wolff

DRILLER: Kevin White

BAKER REP.:

John Zimmerman

BORING NO.:

89-MW07DW

SHEET 4 OF 5

## TEST BORING AND WELL CONSTRUCTION RECORD

PROJECT: Phase II Investigation at Sites 88, 89, and 93 - MCB Camp Lejeune

CTO NO.: 62470-356

BORING NO.:

89-MW07DW

SAMPLE TYPE						DEFINITIONS		
S = Split Spoon A = Auger T = Shelby Tube W = Wash R = Mud Rotary C = Core D = Denison P = Piston N = No Sample						SPT = Standard Penetration Test (ASTM D1586) PID = Photo Ionization Detector measurement Lab Class = USCS (ASTM D2487)		
Depth (Ft.)	Sample Type & No.	Sample Rec. (Ft.,%)	SPT	Lab Class.	PID (ppm)	Visual Description	Well Installation Detail	Elevation (Ft. MSL)
71	S-22	1.6 80%	10	--	0.4	Continued from Sheet 4 <b>FINE SAND</b> , trace silt & shells; greenish-gray; med dense; wet		
72			19		0.4			
73	S-23	1.6 80%	7	--	0.4			73.0 -55.81
74			12		0.4			
75	S-24	1.8 90%	15	--	0.4	trace to some silt, little shells & clay; greenish-gray; dense; wet		75.0 -57.81
76			16		0.4			
77	S-25	1.7 85%	17	--	0.4	some silt, trace to little shells, trace clay; greenish-gray; dense; wet		
78			20		0.4			
79	S-26	1.8 90%	5	--	0.4	olive; dense; wet		
80			13		0.4			
81	S-27	1.7 85%	8	--	0.4	some silt, trace shells & clay; olive; med dense; wet		
82			12		0.4			
83	S-28	1.8 90%	11	--	0.4	some silt, trace shells; olive; dense; wet		
84			18		0.4			
84			21				84.0	84.0 -66.81
85						BOH @ 84.0 ft.		
86								
87								
88								
89								
90								

DRILLING CO.: Parratt - Wolff  
 DRILLER: Kevin White

BAKER REP.:  
 BORING NO.:

John Zimmerman  
 89-MW07DW SHEET 5 OF 5



## TEST BORING AND WELL CONSTRUCTION RECORD

PROJECT:	Phase II Investigation at Sites 88, 89, and 93 - MCB Camp Lejeune		
CTO NO.:	62470-356	BORING NO.:	89-MW08IW
COORDINATES: EAST:	2468344.4230	NORTH:	360665.3020
ELEVATION: SURFACE:	11.31	TOP OF PVC CASING:	13.26

Rig: CME-55					Date	Progress (Ft.)	Weather	Depth to Water (Ft.)	Time
Split Spoon	Casing	Augers	Core Barrel						
Size (ID)	1-3/8"	--	3-1/4"	--	5/12/97	0.0 - 12.0	P Sunny, 70s	8.5	--
Length	2.0'	--	5.0'	--	5/13/97	12.0 - 40.0	Cloudy, 60s	--	--
Type	Stainless	--	HSA	--					
Hammer Wt.	140 lbs.	--	--	--					
Fall	30"	--	--	--					
Stickup	--	--	--	--					

**Remarks:** Boring reamed with 6-1/4" HSAs to 37.0 ft. bgs

SAMPLE TYPE							WELL INFORMATION													
S = Split Spoon   A = Auger T = Shelby Tube   W = Wash R = Mud Rotary   C = Core D = Denison   P = Piston N = No Sample							Type		Diam.	Top Depth (Ft.)	Bottom Depth (Ft.)									
							Sch 40 PVC Casing		2.0"	0	32									
							Sch 40 PVC, 10-slot Screen		2.0"	32	37									
Depth (Ft.)	Sample Type & No.	Sample Rec. (Ft.,%)	SPT	Lab Class.	PID (ppm)	Visual Description	Well Installation Detail		Elevation (Ft. MSL)											
1	S-1	1.3 65%	1	--	0.1 0.1	<b>FINE SAND &amp; SILT;</b> brown; v loose; damp														
2			2																	
3	S-2	1.6 80%	5	--	0.1 0.1				<b>FINE SAND, some silt;</b> brown; med dense; damp											
4			8																	
5	S-3	1.8 90%	5	--	0.1 0.1							little to some silt; brown; med dense; damp								
6			6																	
7	S-4	1.8 90%	7	--	0.1 0.1										some clay from 6.0-6.9, otherwise as above; damp to moist					
8			10																	
9	S-5	1.8 90%	11	--	0.1 0.1													<b>FINE to MEDIUM SAND,</b> trace silt; tan to gray; med dense; moist to wet		
10			12																	
Match to Sheet 2																				

DRILLING CO.: Parratt - Wolff  
 DRILLER: Kevin White

BAKER REP.: John Zimmerman  
 BORING NO.: 89-MW08IW SHEET 1 OF 3

## TEST BORING AND WELL CONSTRUCTION RECORD

PROJECT: Phase II Investigation at Sites 88, 89, and 93 - MCB Camp Lejeune  
 CTO NO.: 62470-356

BORING NO.: 89-MW08IW

SAMPLE TYPE						DEFINITIONS			
S = Split Spoon A = Auger T = Shelby Tube W = Wash R = Mud Rotary C = Core D = Denison P = Piston N = No Sample						SPT = Standard Penetration Test (ASTM D1586) PID = Photo Ionization Detector measurement Lab Class = USCS (ASTM D2487)			
Depth (Ft.)	Sample Type & No.	Sample Rec. (Ft.,%)	SPT	Lab Class.	PID (ppm)	Visual Description	Well Installation Detail	Elevation (Ft. MSL)	
11	S-6	1.3 65%	12 12	--	0.1 0.1	Continued from Sheet 1 Groundwater @ 8.5'			
12			15			<b>FINE to COARSE SAND,</b>			
13	S-7	1.7 85%	8 11 9	--	0.9 0.9	trace silt; tan to gray; med dense; wet			
14			11						
15	S-8	0.0 0%	WOH 2 2	--	--				
16			2						
17	S-9	2.0 100%	3 2 3	--	0.9 0.9	<b>FINE to MEDIUM SAND,</b>			
18			3			trace to little silt, trace clay; gray to lt brown; loose; wet			
19	S-10	2.0 100%	WOH 24"	--	0.9 0.9	<b>FINE SAND,</b> some silt, little to some clay; lt brown; v soft; wet			
20			WOH						
21	S-11	1.8 90%	12" 1	--	0.9 0.9	some silt, trace clay; lt brown; v loose; wet			
22			2						
23	S-12	1.5 75%	2 2	--	0.9 0.9	<b>FINE SAND &amp; SILT,</b> some clay; brown; soft; moist			
24			2						
25	S-13	0.9 45%	WOH 18"	--	0.9 0.9	shell layer then:		24.8	-13.49
26			4			<b>FINE SAND,</b> some silt, trace to little clay, trace shells; tan; dense; moist			
27	S-14	1.7 85%	4 7 23	--	0.9 0.9				
28			30					28.0	-16.69
29	S-15	2.0 100%	26 30 36	--	0.9 0.9	as above with med sand			
30			20					30.0	-18.69
			7			Match to Sheet 3			

DRILLING CO.: Parratt - Wolff  
 DRILLER: Kevin White

BAKER REP.: John Zimmerman  
 BORING NO.: 89-MW08IW SHEET 2 OF 3

**TEST BORING AND WELL CONSTRUCTION RECORD**

PROJECT: Phase II Investigation at Sites 88, 89, and 93 - MCB Camp Lejeune

CTO NO.: 62470-356

BORING NO.:

89-MW08IW

SAMPLE TYPE						DEFINITIONS			
S = Split Spoon A = Auger T = Shelby Tube W = Wash R = Mud Rotary C = Core D = Denison P = Piston N = No Sample						SPT = Standard Penetration Test (ASTM D1586) PID = Photo Ionization Detector measurement Lab Class = USCS (ASTM D2487)			
Depth (Ft.)	Sample Type & No.	Sample Rec. (Ft.,%)	SPT	Lab Class.	PID (ppm)	Visual Description	Well Installation Detail	Elevation (Ft. MSL)	
31	S-16	1.4 70%	7	--	0.2	Continued from Sheet 2 <b>SHELLS &amp; FINE SAND</b> , part cemented, little silt, trace clay; lt greenish-gray; med dense to dense; wet		32.0	-20.69
32			16		0.2				
33	S-17	2.0 154%	12	--	0.2	part cemented, little silt; lt greenish-gray; dense; wet		37.0	-25.39
34			16		0.2				
35	S-18	2.0 100%	14	--	0.2	<b>FINE SAND</b> , some to and silt, some clay, little shells; olive; damp to moist		37.0	-25.69
36			23		0.2				
37	S-19	1.7 85%	6	--	0.9	BOH @ 40.0 ft.		40.0	-28.69
38			7		0.9				
39	S-20	2.0 100%	9	--	0.2			40.0	
40			18		0.2				
41									
42									
43									
44									
45									
46									
47									
48									
49									
50									

DRILLING CO.: Parratt - Wolff  
DRILLER: Kevin White

BAKER REP.: John Zimmerman  
BORING NO.: 89-MW08IW SHEET 3 OF 3





## TEST BORING AND WELL CONSTRUCTION RECORD

**PROJECT:** Phase II Investigation at Sites 88, 89, and 93 - MCB Camp Lejeune  
**CTO NO.:** 62470-356 **BORING NO.:** 89-MW08DW  
**COORDINATES: EAST:** 2468349.0550 **NORTH:** 360662.8720  
**ELEVATION: SURFACE:** 11.43 **TOP OF PVC CASING:** 13.38

Rig: CME-55					Date	Progress (Ft.)	Weather	Depth to Water (Ft.)	Time
Split Spoon	Casing	Augers	Core Barrel						
Size (ID)	1-3/8"	--	3-1/4"	--	5/13/97	0.0 - 40.0	P Sunny, 70s	--	--
Length	2.0'	--	5.0'	--	5/14/97	40.0 - 92.0	Sunny, 60s	--	--
Type	Stainless	--	HSA	--					
Hammer Wt.	140 lbs.	--	--	--					
Fall	30"	--	--	--					
Stickup	--	--	--	--					

**Remarks:** Boring reamed to 14 ft. w/ 6-1/4" HSA. 7-3/8" mud rotary from 14 ft to depth.

SAMPLE TYPE	WELL INFORMATION			
S = Split Spoon A = Auger T = Shelby Tube W = Wash R = Mud Rotary C = Core D = Denison P = Piston N = No Sample	Type	Diam.	Top Depth (Ft.)	Bottom Depth (Ft.)
	Sch 40 PVC Casing	2.0"	0	85
	Sch 40 PVC, 10-slot Screen	2.0"	85	90

Depth (Ft.)	Sample Type & No.	Sample Rec. (Ft.,%)	SPT	Lab Class.	PID (ppm)	Visual Description	Well Installation Detail	Elevation (Ft. MSL)
1								
2								
3	A-N	--	--	--	--	See the log for 89-MW08IW for lithologic details		
4								
5								
6	6.0							
7	S-1	1.6 80%	4 4 5	--	0.5 0.5	FINE SAND, some clay (6.0-6.9), little silt; grayish-brown; loose; damp to moist		
8	8.0							
9	A-N	--	--	--	--			
10	10.0					Match to Sheet 2		

**DRILLING CO.:** Parratt - Wolff  
**DRILLER:** Kevin White

**BAKER REP.:** John Zimmerman  
**BORING NO.:** 89-MW08DW SHEET 1 OF 6



## TEST BORING AND WELL CONSTRUCTION RECORD

PROJECT: Phase II Investigation at Sites 88, 89, and 93 - MCB Camp Lejeune  
 CTO NO.: 62470-356 BORING NO.: 89-MW08DW

<u>SAMPLE TYPE</u>							<u>DEFINITIONS</u>		
S = Split Spoon A = Auger T = Shelby Tube W = Wash R = Mud Rotary C = Core D = Denison P = Piston N = No Sample							SPT = Standard Penetration Test (ASTM D1586) PID = Photo Ionization Detector measurement Lab Class = USCS (ASTM D2487)		
Depth (Ft.)	Sample Type & No.	Sample Rec. (Ft.,%)	SPT	Lab Class.	PID (ppm)	Visual Description	Well Installation Detail	Elevation (Ft. MSL)	
11			11			Continued from Sheet 1 <b>FINE to COARSE SAND,</b> trace silt; gray; med dense; wet			
12	S-2	1.8 90%	12 8	--	0.5 0.5				
13	A-N	--	--	--	--				
14									
15									
16									
17									
18									
19									
20	R-N	--	--	--	--				
21									
22									
23									
24									
25									
26									
27									
28									
29									
30						Match to Sheet 3			

DRILLING CO.: Parratt - Wolff BAKER REP.: John Zimmerman  
 DRILLER: Kevin White BORING NO.: 89-MW08DW SHEET 2 OF 6

**TEST BORING AND WELL CONSTRUCTION RECORD**

PROJECT: Phase II Investigation at Sites 88, 89, and 93 - MCB Camp Lejeune  
 CTO NO.: 62470-356 BORING NO.: 89-MW08DW

SAMPLE TYPE						DEFINITIONS			
S = Split Spoon A = Auger T = Shelby Tube W = Wash R = Mud Rotary C = Core D = Denison P = Piston N = No Sample						SPT = Standard Penetration Test (ASTM D1586) PID = Photo Ionization Detector measurement Lab Class = USCS (ASTM D2487)			
Depth (Ft.)	Sample Type & No.	Sample Rec. (Ft.,%)	SPT	Lab Class.	PID (ppm)	Visual Description	Well Installation Detail	Elevation (Ft. MSL)	
31						Continued from Sheet 2			
32									
33									
34	R-N	--	--	--	--				
35									
36									
37									
38	38.0								
39	T-1	--	--	--	--				
40	40.0					40.0		-28.57	
41	S-3	2.0 100%	3 3 5	--	0.1 0.1	FINE SAND, some to and silt, some clay; olive; med stiff, damp			
42	42.0		5						
43	S-4	2.0 100%	3 5 6	--	0.1 0.1	some silt & clay, trace shells; olive; med stiff, damp			
44	44.0		8						
45	S-5	2.0 100%	3 4 7	--	0.1 0.1	some silt, little clay, trace shells; olive; med stiff, moist			
46	46.0		7						
47	S-6	2.0 100%	4 7 8	--	0.1 0.1	some silt, trace shells; olive; med dense; moist to wet			
48	48.0		10			48.0		-36.57	
49	S-7	2.0 100%	8 16 28	--	0.1 0.1	FINE to MEDIUM SAND, trace to little silt; lt greenish-gray; dense; wet			
50	50.0		43						
			3			Match to Sheet 4			

DRILLING CO.: Parratt - Wolff  
 DRILLER: Kevin White

BAKER REP.: John Zimmerman  
 BORING NO.: 89-MW08DW SHEET 3 OF 6

## TEST BORING AND WELL CONSTRUCTION RECORD

PROJECT: Phase II Investigation at Sites 88, 89, and 93 - MCB Camp Lejeune

CTO NO.: 62470-356

BORING NO.:

89-MW08DW

SAMPLE TYPE							DEFINITIONS																		
S = Split Spoon A = Auger T = Shelby Tube W = Wash R = Mud Rotary C = Core D = Denison P = Piston N = No Sample							SPT = Standard Penetration Test (ASTM D1586) PID = Photo Ionization Detector measurement Lab Class = USCS (ASTM D2487)																		
Depth (Ft.)	Sample Type & No.	Sample Rec. (Ft.,%)	SPT	Lab Class.	PID (ppm)	Visual Description	Well Installation Detail	Elevation (Ft. MSL)																	
51	S-8	1.6 80%	4	--	0.1	Continued from Sheet 3 trace to little silt, trace shells; greenish-gray, med dense; wet																			
52			52.0		7				0.1																
53	S-9	1.8 90%	8	--	0.1																				
54			54.0		9					0.1															
55	S-10	1.3 65%	11	--	0.1																				
56			56.0		21							0.1													
57	S-11	2.0 100%	13	--	0.1																				
58			58.0		18									0.1											
59	S-12	1.8 90%	21	--	0.1																				
60			60.0		21											0.1									
61	S-13	1.5 115%	17	--	0.1																				
62			62.0		23													0.1							
63	S-14	1.5 75%	30	--	0.1																				
64			64.0		35															0.1					
65	S-15	1.0 100%	18	--	0.4																				
66	65.0	55	--	0.4																					
67	R-N	--	--	--	--																				
68	66.0	--	--	--	--																				
69	S-16	1.7 85%	12	--	0.1																				
70			68.0		15																				
71	S-17	1.8 90%	30	--	0.1																				
72			69.0		31																				
73	S-17	1.8 90%	17	--	0.1																				
74			70.0		15																				
75	70.0	45	--	--	--																				
76	70.0	12	--	--	--																				

DRILLING CO.: Parratt - Wolff  
 DRILLER: Kevin White

BAKER REP.: John Zimmerman  
 BORING NO.: 89-MW08DW SHEET 4 OF 6

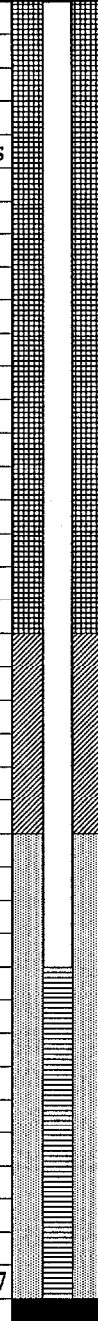
## TEST BORING AND WELL CONSTRUCTION RECORD

PROJECT: Phase II Investigation at Sites 88, 89, and 93 - MCB Camp Lejeune

CTO NO.: 62470-356

BORING NO.:

89-MW08DW

SAMPLE TYPE						DEFINITIONS		
S = Split Spoon A = Auger T = Shelby Tube W = Wash R = Mud Rotary C = Core D = Denison P = Piston N = No Sample						SPT = Standard Penetration Test (ASTM D1586) PID = Photo Ionization Detector measurement Lab Class = USCS (ASTM D2487)		
Depth (Ft.)	Sample Type & No.	Sample Rec. (Ft.,%)	SPT	Lab Class.	PID (ppm)	Visual Description	Well Installation Detail	Elevation (Ft. MSL)
71	S-18	2.0 100%	17	--	0.1	Continued from Sheet 4 some silt, little clay, trace shells; grn-gray; dense; wet		
72			13		0.1			
72			15					
73	S-19	1.8 90%	8	--	0.1	little to some silt, little shells & clay; greenish-gray; med dense; wet		
74			11		0.1			
74			19					
75	S-20	2.0 100%	7	--	0.1	little to some silt, little shells, trace clay; greenish-gray; med dense; wet		
75			8		0.1			
76			17					
76			20					
77	S-21	1.8 90%	11	--	0.1	dense		
77			18		0.1			
78			28					
78			35					
79	S-22	2.0 100%	11	--	0.1	some silt, trace shells & clay; greenish-gray; dense; wet		
79			12		0.1			
80			23				80.0	-68.57
80			31					
81	S-23	1.7 85%	10	--	0.1	little silt; becoming olive; dense; wet		
81			15		0.1			
82			18					
82			29					
83	S-24	1.9 95%	11	--	0.1	olive; v dense; wet		
83			20		0.1			
84			33				83.0	-71.57
84			57					
85	S-25	1.8 90%	9	--	0.1	med dense		
85			15		0.1			
86			14				85.0	-73.57
86			18					
87	S-26	2.0 100%	11	--	0.1	little silt, trace shells; olive; dense; wet		
87			17		0.1			
88			21					
88			27					
89	S-27	2.0 100%	18	--	0.1	v dense		
89			25		0.1			
89			31				89.7	-78.27
90			38				90.0	-78.57
90			15			Match to Sheet 6		

DRILLING CO.: Parratt - Wolff  
 DRILLER: Kevin White

BAKER REP.: John Zimmerman  
 BORING NO.: 89-MW08DW SHEET 5 OF 6

**TEST BORING AND WELL CONSTRUCTION RECORD**

PROJECT: Phase II Investigation at Sites 88, 89, and 93 - MCB Camp Lejeune  
 CTO NO.: 62470-356 BORING NO.: 89-MW08DW

SAMPLE TYPE						DEFINITIONS			
S = Split Spoon A = Auger T = Shelby Tube W = Wash R = Mud Rotary C = Core D = Denison P = Piston N = No Sample						SPT = Standard Penetration Test (ASTM D1586) PID = Photo Ionization Detector measurement Lab Class = USCS (ASTM D2487)			
Depth (Ft.)	Sample Type & No.	Sample Rec. (Ft.,%)	SPT	Lab Class.	PID (ppm)	Visual Description	Well Installation Detail	Elevation (Ft. MSL)	
91	S-28	2.0	17	--	0.1	Continued from Sheet 5 <b>FINE SAND &amp; SILT</b> , little to some clay; olive; dense; wet BOH @ 92.0 ft.	[REDACTED]	92.0	
92		100%	21		0.1				
			29						
93									
94									
95									
96									
97									
98									
99									
100									
101									
102									
103									
104									
105									
106									
107									
108									
109									
110									

DRILLING CO.: Parratt - Wolff  
 DRILLER: Kevin White

BAKER REP.: John Zimmerman  
 BORING NO.: 89-MW08DW SHEET 6 OF 6



## TEST BORING AND WELL CONSTRUCTION RECORD

PROJECT: Phase II Investigation at Sites 88, 89, and 93 - MCB Camp Lejeune  
 CTO NO.: 62470-356 BORING NO.: 89-TW24IW  
 COORDINATES: EAST: 2466716.7740 NORTH: 361194.8890  
 ELEVATION: SURFACE: 15.71 TOP OF PVC CASING: 17.78

Rig: CME-850					Date	Progress (Ft.)	Weather	Depth to Water (Ft.)	Time
Split Spoon	Casing	Augers	Core Barrel						
Size (ID)	1-3/8"	--	3-1/4"	--	4/14/97	0.0 - 22.0	P.Cloudy, 60s	5.0	--
Length	2'	--	5'	--					
Type	Stainless	--	HSA	--					
Hammer Wt.	140 #	--	--	--					
Fall	30"	--	--	--					
Stickup	--	--	--	--					

Remarks:						WELL INFORMATION			
<b>SAMPLE TYPE</b> S = Split Spoon A = Auger T = Shelby Tube W = Wash R = Air Rotary C = Core D = Denison P = Piston N = No Sample						Type	Diam.	Top Depth (Ft.)	Bottom Depth (Ft.)
						Sch 40, PVC Riser	1"	0	15
						Sch 40, 10-Slot, PVC Screen	1"	15	20
Depth (Ft.)	Sample Type & No.	Sample Rec. (Ft., %)	SPT	Lab Class.	PID (ppm)	Visual Description	Well Installation Detail	Elevation (Ft. MSL)	
1	S-1	1.4 70%	2	--	0.8 0.8	FINE SAND & SILT; brown; loose; damp			
2			2						
3	S-2	1.7 85%	3	--	0.8 0.8	some clay; brown to tan; loose; damp			
4			4						
5	S-3	1.9 95%	4	--	0.8 0.8	trace clay; tan; med dense; wet - Groundwater @ 5.0' LAB SAMPLE			
6			9						
7	S-4	0.2 9%	6	--	0.8 0.8	FINE SAND, trace silt & clay; tan; med dense; moist LAB SAMPLE			
8			8						
9	S-5	1.6 80%	4	--	0.8 0.8	CLAY & SILT, trace to little fine sand; tan & gray; m stiff; moist to wet Match to Sheet 2			
10			3						

DRILLING CO.: Parratt - Wolff  
 DRILLER: Kevin White

BAKER REP.: John Zimmerman  
 BORING NO.: 89-TW24IW SHEET 1 OF 2

## TEST BORING AND WELL CONSTRUCTION RECORD

PROJECT: Phase II Investigation at Sites 88, 89, and 93 - MCB Camp Lejeune  
 CTO NO.: 62470-356

BORING NO.: 89-TW24IW

SAMPLE TYPE						DEFINITIONS		
S = Split Spoon A = Auger T = Shelby Tube W = Wash R = Air Rotary C = Core D = Denison P = Piston N = No Sample						SPT = Standard Penetration Test (ASTM D1586) PID = Photo Ionization Detector measurement Lab Class = USCS (ASTM D2487)		
Depth (Ft.)	Sample Type & No.	Sample Rec. (Ft.,%)	SPT	Lab Class.	PID (ppm)	Visual Description	Well Installation Detail	Elevation (Ft. MSL)
11	S-6	1.1 55%	4	--	0.8 0.8	FINE to MEDIUM SAND, trace to little silt; tan to gray; loose; wet		
12			5					
13	S-7	2.0 100%	9	--	0.8 0.8			
14			4					
15	S-8	2.0 100%	3	--	0.8 0.8	FINE SAND, trace silt; greenish-gray; loose; wet		15.0
16			5					
17	S-9	2.0 100%	1	--	0.8 0.8	some silt; greenish-gray; v loose; wet		
18			1					
19	S-10	1.2 60%	1	--	0.8 0.8			
20			1					
21	S-11	0.8 40%	WOH 12"	--	0.8 0.8	some silt, trace to little clay; greenish-gray, m stiff; wet		20.0
22			5					
23						BOH @ 22.0 ft.		
24								
25								
26								
27								
28								
29								
30								

DRILLING CO.: Parratt - Wolff  
 DRILLER: Kevin White

BAKER REP.: John Zimmerman  
 BORING NO.: 89-TW24IW SHEET 2 OF 2



**Baker**

Baker Environmental

**TEST BORING AND WELL CONSTRUCTION RECORD**

PROJECT: Phase II Investigation at Sites 88, 89, and 93 - MCB Camp Lejeune  
 CTO NO.: 62470-356 BORING NO.: 89-TW25IW  
 COORDINATES: EAST: 2467547.1810 NORTH: 360717.3210  
 ELEVATION: SURFACE: 19.25 TOP OF PVC CASING: 18.35

Rig: CME-850					Date	Progress (Ft.)	Weather	Depth to Water (Ft.)	Time
Split Spoon	Casing	Augers	Core Barrel						
Size (ID)	1-3/8"	--	3-1/4"	--	4/14/97	0.0 - 28.0	P.Cloudy, 60s	10.5	--
Length	2'	--	5'	--					
Type	Stainless	--	HSA	--					
Hammer Wt.	140 #	--	--	--					
Fall	30"	--	--	--					
Stickup	--	--	--	--					

**Remarks:****SAMPLE TYPE**

S = Split Spoon A = Auger  
 T = Shelby Tube W = Wash  
 R = Air Rotary C = Core  
 D = Denison P = Piston  
 N = No Sample

**WELL INFORMATION**

Type	Diam.	Top Depth (Ft.)	Bottom Depth (Ft.)
Sch 40, PVC Riser	1"	0	23
Sch 40, 10-Slot, PVC Screen	1"	23	28

Depth (Ft.)	Sample Type & No.	Sample Rec. (Ft., %)	SPT	Lab Class.	PID (ppm)	Visual Description	Well Installation Detail	Elevation (Ft. MSL)
1	S-1	1.0 50%	3	--	0.8 0.8	FINE SAND & SILT, little clay; brown; loose; damp		
2			4					
3	S-2	1.3 65%	3	--	0.8 0.8			
4			4					
5	S-3	1.4 70%	4	--	0.8 0.8	FINE SAND, trace silt; brown; loose; damp		
6			6					
7	S-4	1.4 70%	4	--	0.8 0.8	CLAY & SILT, trace to little fine sand; light brown; med stiff; damp		
8			2					
9	S-5	1.4 70%	4	--	0.8 0.8			
10			4					
			3			Match to Sheet 2		

DRILLING CO.: Parratt - Wolff  
 DRILLER: Kevin White

BAKER REP.: John Zimmerman  
 BORING NO.: 89-TW25IW SHEET 1 OF 2

## TEST BORING AND WELL CONSTRUCTION RECORD

PROJECT: Phase II Investigation at Sites 88, 89, and 93 - MCB Camp Lejeune

CTO NO.: 62470-356

BORING NO.:

89-TW25IW

SAMPLE TYPE						DEFINITIONS			
S = Split Spoon A = Auger T = Shelby Tube W = Wash R = Air Rotary C = Core D = Denison P = Piston N = No Sample						SPT = Standard Penetration Test (ASTM D1586) PID = Photo Ionization Detector measurement Lab Class = USCS (ASTM D2487)			
Depth (Ft.)	Sample Type & No.	Sample Rec. (Ft.,%)	SPT	Lab Class.	PID (ppm)	Visual Description	Well Installation Detail	Elevation (Ft. MSL)	
11	S-6	1.6 80%	4	--	0.8 0.8	SAND & SILT, trace to little clay; brown to gray; stiff, moist - Water @ 10.5'			
12			4						
13	S-7	1.3 65%	7	--	0.8 0.8	FINE SAND, little to some silt, little clay; brown to gray; v stiff, moist to wet			
14			13						
15	S-8	2.0 100%	14	--	0.8 0.8	trace to little silt; brown; v loose; wet			
16			2						
17	S-9	2.0 100%	2	--	0.8 0.8	little to some silt; brown; v loose; wet			
18			1						
19	S-10	1.8 90%	2	--	0.8 0.8	FINE to MEDIUM SAND, some silt; brown to gray; loose; wet			
20			3						
21	S-11	1.4 70%	3	--	0.8 0.8	FINE SAND, trace silt; dark greenish-gray; v loose; wet			
22			2						
23	S-12	1.7 85%	WOH 12"	--	0.8 0.8	FINE to MEDIUM SAND, some silt; dk greenish-gray; loose; wet		23.0	
24			2						
25	S-13	1.5 75%	2	--	0.8 0.8	FINE SAND, some silt; dark greenish-gray; v loose; wet			
26			2						
27	S-13	1.5 75%	WOH 24"	--	0.8 0.8	trace to little clay; trace shell frag; greenish-gray; med dense; wet			
28			12						
29			18			BOH @ 28.0 ft.		28.0	
30									

DRILLING CO.: Parratt - Wolff  
DRILLER: Kevin White

BAKER REP.: John Zimmerman  
BORING NO.: 89-TW25IW SHEET 2 OF 2

**Baker**

Baker Environmental

**TEST BORING AND WELL CONSTRUCTION RECORD**

PROJECT: Phase II Investigation at Sites 88, 89, and 93 - MCB Camp Lejeune  
 CTO NO.: 62470-356 BORING NO.: 89-TW261W  
 COORDINATES: EAST: 2468102.9880 NORTH: 360761.3960  
 ELEVATION: SURFACE: 15.42 TOP OF PVC CASING: 18.41

Rig: CME-850					Date	Progress (Ft.)	Weather	Depth to Water (Ft.)	Time
Split Spoon	Casing	Augers	Core Barrel						
Size (ID)	1-3/8"	--	3-1/4"	--	4/15/97	0.0 - 42.0	P Cloudy, 60s	13.5	--
Length	2'	--	5'	--					
Type	Stainless	--	HSA	--					
Hammer Wt.	140 #	--	--	--					
Fall	30"	--	--	--					
Stickup	--	--	--	--					

**Remarks:****SAMPLE TYPE**

S = Split Spoon A = Auger  
 T = Shelby Tube W = Wash  
 R = Air Rotary C = Core  
 D = Denison P = Piston  
 N = No Sample

**WELL INFORMATION**

Type	Diam.	Top Depth (Ft.)	Bottom Depth (Ft.)
Sch 40, PVC Riser	1"	0	36
Sch 40, 10-Slot, PVC Screen	1"	36	41

Depth (Ft.)	Sample Type & No.	Sample Rec. (Ft.,%)	SPT	Lab Class.	PID (ppm)	Visual Description	Well Installation Detail	Elevation (Ft. MSL)
1	S-1	1.5 75%	1	--	0.4	FINE SAND, trace to little silt; brown; v loose; damp		
2			1		0.4			
3	S-2	1.4 70%	3	--	0.4	loose		
4			3		0.4			
5	S-3	1.3 65%	3	--	0.4	little silt; brown; loose; damp		
6			4		0.4			
7	S-4	1.4 70%	3	--	0.4			
8			4		0.4			
9	S-5	1.5 75%	4	--	0.4	trace silt; brown; med dense; damp		
10			5		0.4			
			5			Match to Sheet 2		

DRILLING CO.: Parratt - Wolff  
 DRILLER: Kevin White

BAKER REP.: John Zimmerman  
 BORING NO.: 89-TW261W SHEET 1 OF 3

## TEST BORING AND WELL CONSTRUCTION RECORD

PROJECT: Phase II Investigation at Sites 88, 89, and 93 - MCB Camp Lejeune  
 CTO NO.: 62470-356 BORING NO.: 89-TW26IW

SAMPLE TYPE							DEFINITIONS		
S = Split Spoon A = Auger T = Shelby Tube W = Wash R = Air Rotary C = Core D = Denison P = Piston N = No Sample							SPT = Standard Penetration Test (ASTM D1586) PID = Photo Ionization Detector measurement Lab Class = USCS (ASTM D2487)		
Depth (Ft.)	Sample Type & No.	Sample Rec. (Ft.,%)	SPT	Lab Class.	PID (ppm)	Visual Description	Well Installation Detail	Elevation (Ft. MSL)	
11	S-6	1.5 75%	2	--	0.4	Continued from Sheet 1 <b>FINE SAND &amp; SILT</b> , little clay; brown; soft; moist			
12			2		0.4				
12			5						
13	S-7	1.5 75%	5	--	0.4	<b>FINE SAND</b> , trace silt; brown; loose; moist to wet Groundwater @ 13.5'			
14			2		0.4				
14			5						
15	S-8	1.5 75%	8	--	0.4	<b>FINE to MEDIUM SAND</b> , trace to little silt; gray to brown; med dense; wet			
16			13		0.4				
16			15		0.4				
16			19						
17	S-9	1.8 90%	8	--	0.4	<b>FINE to COARSE SAND</b> , trace silt; brown; med dense; wet			
18			9		0.4				
18			4		0.4				
18			4						
19	S-10	1.8 90%	1	--	0.4	<b>FINE SAND &amp; SILT</b> ; brown to gray; v loose; wet			
20			1		0.4				
20			1		0.4				
20			1						
21	S-11	1.7 85%	WOH	--	0.4				
21			12"		0.4				
22			1		0.4				
22			2						
23	S-12	2.0 100%	WOH	--	0.4				
24			2		0.4				
24			1		0.4				
24			1						
25	S-13	1.8 90%	1	--	0.4	brown			
26			1		0.4				
26			1		0.4				
26			1						
27	S-14	2.0 100%	1	--	0.4	moist to wet			
28			1		0.4				
28			1		0.4				
28			1						
29	S-15	1.8 90%	1	--	0.4	light olive brown			
30			1		0.4				
30			1		0.4				
30			1						
Match to Sheet 3									

DRILLING CO.: Parratt - Wolff  
 DRILLER: Kevin White

BAKER REP.: John Zimmerman  
 BORING NO.: 89-TW26IW SHEET 2 OF 3



## TEST BORING AND WELL CONSTRUCTION RECORD

PROJECT: Phase II Investigation at Sites 88, 89, and 93 - MCB Camp Lejeune  
 CTO NO.: 62470-356 BORING NO.: 89-TW26IW

<b>SAMPLE TYPE</b>						<b>DEFINITIONS</b>		
S = Split Spoon A = Auger T = Shelby Tube W = Wash R = Air Rotary C = Core D = Denison P = Piston N = No Sample						SPT = Standard Penetration Test (ASTM D1586) PID = Photo Ionization Detector measurement Lab Class = USCS (ASTM D2487)		
Depth (Ft.)	Sample Type & No.	Sample Rec. (Ft.,%)	SPT	Lab Class.	PID (ppm)	Visual Description	Well Installation Detail	Elevation (Ft. MSL)
31	S-16	1.4 70%	WOH 24"	--	0.4 0.4	Continued from Sheet 2 olive brown		
32								
33	S-17	1.6 80%	WOH 24"	--	0.4 0.4			
34								
35	S-18	1.8 90%	19 14 9 12	--	0.4 0.4	FINE SAND, some shell frag. trace fossil frag & silt; light gray; med dense; wet		36.0
36								
37	S-19	1.5 75%	17 18 17	--	0.4 0.4	FOSSIL & SHELL FRAG, some fine sand, trace silt; light gray; dense; wet		
38								
39	S-20	1.4 70%	9 15 14 21	--	0.4 0.4			
40								
41	S-21	1.6 80%	8 7 8 9	--	0.4 0.4	FINE SAND & SILT, trace to little clay; greenish-gray; stiff; damp to moist		41.0
42								
43						BOH @ 42.0'		
44								
45								
46								
47								
48								
49								
50								

DRILLING CO.: Parratt - Wolff  
 DRILLER: Kevin White

BAKER REP.: John Zimmerman  
 BORING NO.: 89-TW26IW SHEET 3 OF 3

**Baker**

Baker Environmental

**TEST BORING AND WELL CONSTRUCTION RECORD**

PROJECT: Phase II Investigation at Sites 88, 89, and 93 - MCB Camp Lejeune  
 CTO NO.: 62470-356 BORING NO.: 89-TW271W  
 COORDINATES: EAST: 2468651.1840 NORTH: 360760.1650  
 ELEVATION: SURFACE: 6.54 TOP OF PVC CASING: 9.04

Rig: CME-850					Date	Progress (Ft.)	Weather	Depth to Water (Ft.)	Time
Split Spoon	Casing	Augers	Core Barrel						
Size (ID)	1-3/8"	--	3-1/4"	--	4/15/97	0.0 - 36.0	Sunny, 70s	7.5	--
Length	2'	--	5'	--					
Type	Stainless	--	HSA	--					
Hammer Wt.	140 #	--	--	--					
Fall	30"	--	--	--					
Stickup	--	--	--	--					

**Remarks:****SAMPLE TYPE**

S = Split Spoon A = Auger  
 T = Shelby Tube W = Wash  
 R = Air Rotary C = Core  
 D = Denison P = Piston  
 N = No Sample

**WELL INFORMATION**

Type	Diam.	Top Depth (Ft.)	Bottom Depth (Ft.)
Sch 40, PVC Riser	1"	0	29
Sch 40, 10-Slot, PVC Screen	1"	29	34

Depth (Ft.)	Sample Type & No.	Sample Rec. (Ft.,%)	SPT	Lab Class.	PID (ppm)	Visual Description	Well Installation Detail	Elevation (Ft. MSL)
1	S-1	2.0 100%	1	--	0.5	FINE SAND & SILT; dark brown to black; v loose; damp		
2			1		0.5			
3	S-2	1.4 70%	2	--	0.5	CLAY & SILT; brown to gray; med stiff; damp		
4			4		0.5			
5	S-3	0.7 35%	1	--	0.5	moist to wet		
6			4		0.5			
7	S-4	1.0 50%	4	--	0.5	FINE SAND, trace silt; brown to gray; med dense; wet Groundwater @ 7.5'		
8			4		0.5			
9	S-5	1.5 75%	6	--	0.5	FINE SAND & SILT, trace clay; gray; med dense; wet		
10			8		0.5			
			10			Match to Sheet 2		
			WOH					

DRILLING CO.: Parratt - Wolff  
 DRILLER: Kevin White

BAKER REP.: John Zimmerman  
 BORING NO.: 89-TW271W SHEET 1 OF 3

**TEST BORING AND WELL CONSTRUCTION RECORD**

PROJECT: Phase II Investigation at Sites 88, 89, and 93 - MCB Camp Lejeune  
 CTO NO.: 62470-356 BORING NO.: 89-TW27IW

SAMPLE TYPE						DEFINITIONS			
S = Split Spoon A = Auger T = Shelby Tube W = Wash R = Air Rotary C = Core D = Denison P = Piston N = No Sample						SPT = Standard Penetration Test (ASTM D1586) PID = Photo Ionization Detector measurement Lab Class = USCS (ASTM D2487)			
Depth (Ft.)	Sample Type & No.	Sample Rec. (Ft.,%)	SPT	Lab Class.	PID (ppm)	Visual Description	Well Installation Detail	Elevation (Ft. MSL)	
11	S-6	1.4 70%	/12"	--	0.5	Continued from Sheet 1 <b>FINE SAND</b> , trace silt; gray; loose; wet			
12			4		0.5				
13	S-7	1.4 70%	WOH	--	0.5	12.7 <b>CLAY &amp; SILT</b> ; dark gray; v soft; moist to wet			
14			24"		0.5				
15	S-8	1.8 90%	WOH	--	0.5	damp to moist - plastic			
16			24"		0.5				
17	S-9	2.0 100%	WOH	--	0.5	soft			
18			12"		0.5				
19	S-10	1.8 90%	WOH/6"	--	0.5	v soft - less plastic			
20			1		0.5				
21			1		0.5				
22	S-11	0.8 40%	1	--	0.5	<b>FINE to COARSE SAND</b> , trace silt; gray; v loose; wet			
23			2		0.5				
24	S-12	1.2 60%	2	--	0.5	<b>FINE to MEDIUM SAND</b> , trace silt; gray; loose; wet			
25			3		0.5				
26	S-13	1.2 60%	4	--	0.5				
27			1		0.5				
28			2		0.5				
29	S-14	1.0 50%	10	--	0.5	<b>FOSSIL &amp; SHELL FRAG</b> , little fine sand & silt; light gray; med dense; wet			
30			12		0.5				
31	S-15	1.5 75%	11	--	0.5	trace fine sand & silt; light gray; med dense; wet		29.0	
32			8		0.5				
33			13		0.5				
34			14						
35			13						
36			6			Match to Sheet 3			

DRILLING CO.: Parratt - Wolff  
 DRILLER: Kevin White

BAKER REP.: John Zimmerman  
 BORING NO.: 89-TW27IW SHEET 2 OF 3

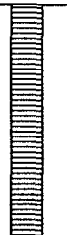
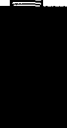
## TEST BORING AND WELL CONSTRUCTION RECORD

PROJECT: Phase II Investigation at Sites 88, 89, and 93 - MCB Camp Lejeune

CTO NO.: 62470-356

BORING NO.:

89-TW27IW

SAMPLE TYPE							DEFINITIONS			
S = Split Spoon A = Auger T = Shelby Tube W = Wash R = Air Rotary C = Core D = Denison P = Piston N = No Sample							SPT = Standard Penetration Test (ASTM D1586) PID = Photo Ionization Detector measurement Lab Class = USCS (ASTM D2487)			
Depth (Ft.)	Sample Type & No.	Sample Rec. (Ft.,%)	SPT	Lab Class.	PID (ppm)	Visual Description	Well Installation Detail	Elevation (Ft. MSL)		
31	S-16	1.2 60%	8	--	0.5	Continued from Sheet 2				
32			18		0.5					
33	S-17	1.3 65%	13	--	0.5					
34			14		0.5	some fine sand, trace silt; light gray; med dense; wet	34.0			
35	S-18	1.5 75%	6	--	0.5	FINE SAND & SILT, trace to little clay; greenish-gray; med stiff; damp to moist				
36			3		0.5				36.0	
37			3							
38										
39										
40										
41										
42										
43										
44										
45										
46										
47										
48										
49										
50										

DRILLING CO.: Parratt - Wolff  
 DRILLER: Kevin White

BAKER REP.: John Zimmerman  
 BORING NO.: 89-TW27IW SHEET 3 OF 3



**Baker**

Baker Environmental

**TEST BORING AND WELL CONSTRUCTION RECORD**

PROJECT: Phase II Investigation at Sites 88, 89, and 93 - MCB Camp Lejeune

CTO NO.: 62470-356

BORING NO.: 89-TW28IW

COORDINATES: EAST: 2467526.0610

NORTH: 361206.1820

ELEVATION: SURFACE: 15.42

TOP OF PVC CASING: 18.83

Rig: CME-850					Date	Progress (Ft.)	Weather	Depth to Water (Ft.)	Time
Split Spoon	Casing	Augers	Core Barrel						
Size (ID)	1-3/8"	--	3-1/4"	--	4/22/97	0.0 - 29.0	M Cloudy, 70s	7.5	--
Length	2'	--	5'	--					
Type	Stainless	--	HSA	--					
Hammer Wt.	140 #	--	--	--					
Fall	30"	--	--	--					
Stickup	--	--	--	--					

**Remarks:****SAMPLE TYPE**

S = Split Spoon A = Auger  
 T = Shelby Tube W = Wash  
 R = Air Rotary C = Core  
 D = Denison P = Piston  
 N = No Sample

**WELL INFORMATION**

Type	Diam.	Top Depth (Ft.)	Bottom Depth (Ft.)
Sch 40, PVC Riser	1"	0	23
Sch 40, 10-Slot, PVC Screen	1"	23	28

Depth (Ft.)	Sample Type & No.	Sample Rec. (Ft., %)	SPT	Lab Class.	PID (ppm)	Visual Description	Well Installation Detail	Elevation (Ft. MSL)
1	S-1	1.6 80%	3	--	0.3 0.3	FINE SAND & SILT; brown; loose; damp		
2			4					
2	S-2	1.3 65%	3	--	0.3 0.3	med dense		
3			5					
3	S-3	2.0 100%	6	--	0.3 0.3	As above w/ a clay & silt layer @ 4.0-4.7'		
4			6					
4	S-4	2.0 100%	7	--	0.3 0.3	FINE SAND, trace silt; light brown; med dense; moist to wet		
5			4					
5	S-5	2.0 100%	7	--	0.3 0.3	Groundwater @ 7.5'		
6			8					
6			8			FINE SAND & SILT; trace clay; brown; loose; wet		
7			4					
7			6			Match to Sheet 2		
8			8					
8			7					
9			2					
9			3					
10			4					
10			2					
			2					

DRILLING CO.: Parratt - Wolff

BAKER REP.: John Zimmerman

DRILLER: Kevin White

BORING NO.: 89-TW28IW SHEET 1 OF 2

**TEST BORING AND WELL CONSTRUCTION RECORD**

PROJECT: Phase II Investigation at Sites 88, 89, and 93 - MCB Camp Lejeune

CTO NO.: 62470-356

BORING NO.:

89-TW281W

SAMPLE TYPE							DEFINITIONS		
S = Split Spoon A = Auger T = Shelby Tube W = Wash R = Air Rotary C = Core D = Denison P = Piston N = No Sample							SPT = Standard Penetration Test (ASTM D1586) PID = Photo Ionization Detector measurement Lab Class = USCS (ASTM D2487)		
Depth (Ft.)	Sample Type & No.	Sample Rec. (Ft.,%)	SPT	Lab Class.	PID (ppm)	Visual Description	Well Installation Detail	Elevation (Ft. MSL)	
11	S-6	1.2 60%	2	--	0.3 0.3	Continued from Sheet 1 FINE SAND, trace to little silt; brown; loose; wet			
12			2						
13	A-N	--	--	--	--				
14			--						
15	S-7	1.0 50%	1	--	0.3 0.3	FINE SAND & SILT, little clay; gray; soft; wet			
16			1						
17	A-N	--	1	--	--				
18			--						
19	S-8	1.9 95%	1	--	0.3 0.3				
20			1						
21	A-N	--	1	--	--			23.0	
22			--						
23	S-9	1.5 75%	1	--	0.3 0.3	FINE to MEDIUM SAND, trace silt; gray to greenish-gray; v loose; wet			
24			1						
25	S-10	1.5 75%	WOH	--	0.3 0.3	CLAY & SILT, some fine sand; green/gray; moist			
26			12"						
27	SHELL FRAG & FINE SAND, part cement, ltl fossils		1					28.0	
28			1						
29	BOH @ 29.0 ft.		3					29.0	
30									

DRILLING CO.: Parratt - Wolff  
 DRILLER: Kevin White

BAKER REP.: John Zimmerman  
 BORING NO.: 89-TW281W SHEET 2 OF 2



## TEST BORING AND WELL CONSTRUCTION RECORD

PROJECT: Phase II Investigation at Sites 88, 89, and 93 - MCB Camp Lejeune  
 CTO NO.: 62470-356 BORING NO.: 89-TW29IW  
 COORDINATES: EAST: 2467553.4990 NORTH: 360426.6610  
 ELEVATION: SURFACE: 6.28 TOP OF PVC CASING: 7.97

Rig: CME-850					Date	Progress (Ft.)	Weather	Depth to Water (Ft.)	Time
Split Spoon	Casing	Augers	Core Barrel						
Size (ID)	1-3/8"	--	3-1/4"	--	4/23/97	0.0 - 19.0	Rainy, 60s	2.0	--
Length	2'	--	5'	--					
Type	Stainless	--	HSA	--					
Hammer Wt.	140 #	--	--	--					
Fall	30"	--	--	--					
Stickup	--	--	--	--					

**Remarks:**

SAMPLE TYPE	WELL INFORMATION			
S = Split Spoon A = Auger T = Shelby Tube W = Wash R = Air Rotary C = Core D = Denison P = Piston N = No Sample	Type	Diam.	Top Depth (Ft.)	Bottom Depth (Ft.)
	Sch 40, PVC Riser	1"	0	11.3
	Sch 40, 10-Slot, PVC Screen	1"	11.3	16.3

Depth (Ft.)	Sample Type & No.	Sample Rec. (Ft., %)	SPT	Lab Class.	PID (ppm)	Visual Description	Well Installation Detail	Elevation (Ft. MSL)
1	S-1	1.5 75%	1	--	0.2 0.2	FINE SAND, some silt & clay; brown; soft; damp to moist		
2			1					
3			3					
3	S-2	1.7 85%	3	--	0.2 0.2	some silt, little clay; gray to brown; stiff; wet		
4			5					
4			5			Groundwater @ 2.0'		
5	A-N	--	--	--	--			
6	S-3	0.7 35%	3	--	0.2 0.2	FINE to MEDIUM SAND, trace silt; gray; med dense; wet		
7			5					
7			8					
8	A-N	--	--	--	--			
9			--					
10			--					
			WOH			Match to Sheet 2		

DRILLING CO.: Parratt - Wolff BAKER REP.: John Zimmerman  
 DRILLER: Kevin White BORING NO.: 89-TW29IW SHEET 1 OF 2

**TEST BORING AND WELL CONSTRUCTION RECORD**

PROJECT: Phase II Investigation at Sites 88, 89, and 93 - MCB Camp Lejeune

CTO NO.: 62470-356

BORING NO.:

89-TW291W

SAMPLE TYPE						DEFINITIONS		
S = Split Spoon A = Auger T = Shelby Tube W = Wash R = Air Rotary C = Core D = Denison P = Piston N = No Sample						SPT = Standard Penetration Test (ASTM D1586) PID = Photo Ionization Detector measurement Lab Class = USCS (ASTM D2487)		
Depth (Ft.)	Sample Type & No.	Sample Rec. (Ft.,%)	SPT	Lab Class.	PID (ppm)	Visual Description	Well Installation Detail	Elevation (Ft. MSL)
11	S-4	1.3	1	--	0.2	Continued from Sheet 1 <b>FINE to COARSE SAND</b> , trace silt; brown to gray; v loose; wet		11.3
12		65%	1		0.2			
13	A-N	--	--	--	--			
14								
15								
16	S-5	0.7	WOH 12"	--	0.2	<b>FINE SAND &amp; SILT</b> , some clay; greenish-gray; v soft; wet		16.3
17		35%	1		0.2			
18	S-6	1.0	12	--	0.2	<b>FINE SAND &amp; SHELLS</b> , part cemented, trace fossils & silt; light gray; dense; wet		17.0
19		50%	18		0.2			
19			30					19.0
20						BOH @ 19.0 ft.		
21								
22								
23								
24								
25								
26								
27								
28								
29								
30								

DRILLING CO.: Parratt - Wolff  
 DRILLER: Kevin White

BAKER REP.: John Zimmerman  
 BORING NO.: 89-TW291W SHEET 2 OF 2



## TEST BORING AND WELL CONSTRUCTION RECORD

PROJECT:	Phase II Investigation at Sites 88, 89, and 93 - MCB Camp Lejeune	BORING NO.:	89-TW30IW
CTO NO.:	62470-356	NORTH:	360142.849
COORDINATES: EAST:	2467598.6160	TOP OF PVC CASING:	6.41
ELEVATION: SURFACE:	5.77		

<b>Rig:</b> CME-850					<b>Date</b>	<b>Progress (Ft.)</b>	<b>Weather</b>	<b>Depth to Water (Ft.)</b>	<b>Time</b>
	<b>Split Spoon</b>	<b>Casing</b>	<b>Augers</b>	<b>Core Barrel</b>					
<b>Size (ID)</b>	1-3/8"	--	3-1/4"	--	4/29/97	0.0 - 14.0	Drizzle, 60s	1.5	--
<b>Length</b>	2'	--	5'	--					
<b>Type</b>	Stainless	--	HSA	--					
<b>Hammer Wt.</b>	140 #	--	--	--					
<b>Fall</b>	30"	--	--	--					
<b>Stickup</b>	--	--	--	--					

**Remarks:**

<b>SAMPLE TYPE</b>						<b>WELL INFORMATION</b>				
S = Split Spoon A = Auger T = Shelby Tube W = Wash R = Air Rotary C = Core D = Denison P = Piston N = No Sample						Type		Diam.	Top Depth (Ft.)	Bottom Depth (Ft.)
						Sch 40, PVC Riser		1"	0	5.5
						Sch 40, 10-Slot, PVC Screen		1"	5.5	10.5
Depth (Ft.)	Sample Type & No.	Sample Rec. (Ft.,%)	SPT	Lab Class.	PID (ppm)	Visual Description	Well Installation Detail	Elevation (Ft. MSL)		
1	S-1	1.5 75%	2	--	0.9 0.9	<b>FINE SAND</b> , some silt; brown; loose; moist to wet Groundwater @ 1.5'				
2			2						4	
3			7						10	
4	S-2	1.3 65%	10	--	0.9 0.9				some silt, little clay; gray to brown; med dense; wet	
5			6							9
6	A-N	--	6	--	--				some silt, trace to little clay; gray; med dense; wet	
7			6							6
8	A-N	--	6	--	--				Match to Sheet 2	
9			6							6
10			2							6

DRILLING CO.: Parratt - Wolff  
 DRILLER: Kevin White

BAKER REP.: John Zimmerman  
 BORING NO.: 89-TW30IW SHEET 1 OF 2



## TEST BORING AND WELL CONSTRUCTION RECORD

PROJECT: Phase II Investigation at Sites 88, 89, and 93 - MCB Camp Lejeune  
 CTO NO.: 62470-356 BORING NO.: 89-TW30IW

<u>SAMPLE TYPE</u>						<u>DEFINITIONS</u>		
S = Split Spoon A = Auger T = Shelby Tube W = Wash R = Air Rotary C = Core D = Denison P = Piston N = No Sample						SPT = Standard Penetration Test (ASTM D1586) PID = Photo Ionization Detector measurement Lab Class = USCS (ASTM D2487)		
Depth (Ft.)	Sample Type & No.	Sample Rec. (Ft.,%)	SPT	Lab Class.	PID (ppm)	Visual Description	Well Installation Detail	Elevation (Ft. MSL)
11		1.6	1	--	4.4	Continued from Sheet 1 <b>FINE SAND &amp; SILT,</b> little clay; greenish-gray; v loose; wet		
12	S-4	80%	1		4.4			
13		1.4	<u>WOH</u>	--	4.4	trace shell frag.		
14	S-3	70%	24"		4.4			
						BOH @ 14.0 ft.		14.0
15								
16								
17								
18								
19								
20								
21								
22								
23								
24								
25								
26								
27								
28								
29								
30								

DRILLING CO.: Parratt - Wolff BAKER REP.: John Zimmerman  
 DRILLER: Kevin White BORING NO.: 89-TW30IW SHEET 2 OF 2

**SITE 93 PHASE II  
PERMANENT MONITORING WELLS**

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# Baker

Baker Environmental

## TEST BORING AND WELL CONSTRUCTION RECORD

PROJECT: Phase II Investigation at Sites 88, 89, and 93 - MCB Camp Lejeune  
 CTO NO.: 62470-356 BORING NO.: 93-MW01  
 COORDINATES: EAST: 2465203.7570 NORTH: 359893.8850  
 ELEVATION: SURFACE: 15.46 TOP OF PVC CASING: 14.98

Rig: CME-55					Date	Progress (Ft.)	Weather	Depth to Water (Ft.)	Time
Split Spoon	Casing	Augers	Core Barrel						
Size (ID)	1-3/8"	--	3-1/4"	--	4/30/97	0.0 - 14.0	Sunny, 70s	6.0	--
Length	2.0'	--	5.0'	--					
Type	Stainless	--	HSA	--					
Hammer Wt.	140 lbs.	--	--	--					
Fall	30"	--	--	--					
Stickup	--	--	--	--					

Remarks: Boring reamed with 6-1/4" HSAs. Flush-mount completion.

SAMPLE TYPE						WELL INFORMATION			
S = Split Spoon A = Auger T = Shelby Tube W = Wash R = Mud Rotary C = Core D = Denison P = Piston N = No Sample						Type	Diam.	Top Depth (Ft.)	Bottom Depth (Ft.)
						Sch 40 PVC Casing	2.0"	0	4
						Sch 40 PVC, 10-slot Screen	2.0"	4	12
Depth (Ft.)	Sample Type & No.	Sample Rec. (Ft., %)	SPT	Lab Class.	PID (ppm)	Visual Description	Well Installation Detail	Elevation (Ft. MSL)	
1	S-1	1.7 85%	3	--	0.6 0.6	FINE SAND & SILT; dark gray to brown; loose; damp		1.0	14.46
2			2.0					6	2.0
3	S-2	1.6 80%	13	--	0.6 0.6	FINE SAND, some silt; brown to gray; med dense; damp to moist LAB SAMPLE		4.0	11.46
4			4.0						
5	S-3	1.6 80%	8	--	0.6 0.6	trace silt; gray to brown; med dense; moist to wet		6.0	
6			6.0						
7	S-4	1.5 75%	9	--	0.6 0.6	FINE SAND & SILT, little clay; brown to gray; stiff; wet-Groundwater @ 6' LAB SAMPLE		8.0	
8			8.0						
9	S-5	1.7 85%	9	--	0.6 0.6	FINE SAND, trace silt; gray to brown; med dense; wet		10.0	
10			10.0						
			5			Match to Sheet 2			

DRILLING CO.: Parratt - Wolff  
 DRILLER: Kevin White

BAKER REP.: John Zimmerman  
 BORING NO.: 93-MW01 SHEET 1 OF 2



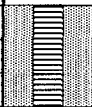

## TEST BORING AND WELL CONSTRUCTION RECORD

PROJECT: Phase II Investigation at Sites 88, 89, and 93 - MCB Camp Lejeune

CTO NO.: 62470-356

BORING NO.:

93-MW01

SAMPLE TYPE						DEFINITIONS			
S = Split Spoon A = Auger T = Shelby Tube W = Wash R = Mud Rotary C = Core D = Denison P = Piston N = No Sample						SPT = Standard Penetration Test (ASTM D1586) PID = Photo Ionization Detector measurement Lab Class = USCS (ASTM D2487)			
Depth (Ft.)	Sample Type & No.	Sample Rec. (Ft.,%)	SPT	Lab Class.	PID (ppm)	Visual Description	Well Installation Detail	Elevation (Ft. MSL)	
11	S-6	1.0 50%	3	--	0.6 0.6	FINE SAND & SILT, little clay; brown to gray; med stiff; wet		12.0	
12			4						5
13	S-7	1.5 75%	3	--	0.6 0.6	SILT & CLAY, trace fine sand; greenish-gray; med stiff; damp		14.0	
14			4						5
15						BOH @ 14.0			
16									
17									
18									
19									
20									
21									
22									
23									
24									
25									
26									
27									
28									
29									
30									

DRILLING CO.: Parratt - Wolff  
 DRILLER: Kevin White

BAKER REP.: John Zimmerman  
 BORING NO.: 93-MW01 SHEET 2 OF 2

**Baker**

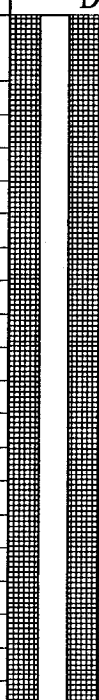
Baker Environmental

**TEST BORING AND WELL CONSTRUCTION RECORD**

PROJECT: Phase II Investigation at Sites 88, 89, and 93 - MCB Camp Lejeune  
 CTO NO.: 62470-356 BORING NO.: 93-MW01IW  
 COORDINATES: EAST: 2465204.2310 NORTH: 359900.8250  
 ELEVATION: SURFACE: 15.50 TOP OF PVC CASING: 15.18

Rig: CME-55					Date	Progress (Ft.)	Weather	Depth to Water (Ft.)	Time
Split Spoon	Casing	Augers	Core Barrel						
Size (ID)	1-3/8"	--	3-1/4"	--	4/30/97	0.0 - 50.0	Sunny, 70s	6.0	--
Length	2.0'	--	5.0'	--					
Type	Stainless	--	HSA	--					
Hammer Wt.	140 lbs.	--	--	--					
Fall	30"	--	--	--					
Stickup	--	--	--	--					

Remarks: Boring reamed with 6-1/4" HSAs. Flush-mount completion.

SAMPLE TYPE							WELL INFORMATION			
S = Split Spoon A = Auger T = Shelby Tube W = Wash R = Mud Rotary C = Core D = Denison P = Piston N = No Sample							Type	Diam.	Top Depth (Ft.)	Bottom Depth (Ft.)
							Sch 40 PVC Casing	2.0"	0	45
							Sch 40 PVC, 10-slot Screen	2.0"	45	50
Depth (Ft.)	Sample Type & No.	Sample Rec. (Ft., %)	SPT	Lab Class.	PID (ppm)	Visual Description	Well Installation Detail		Elevation (Ft. MSL)	
1	S-1	1.7 85%	10	--	0.3	FINE SAND & SILT; dark gray to brown; med dense; damp				
2			8							
3	S-2	1.1 55%	8	--	0.3	FINE SAND, some silt, trace to little clay; brown to gray; med dense; damp to moist				
4			8							
5	S-3	1.4 70%	10	--	0.3	trace silt; brown to gray; dense; moist to wet				
6			14							
7	S-4	1.4 70%	9	--	0.3	FINE SAND & SILT, little clay; gray to brown; med dense; wet				
8			11							
9	S-5	1.2 60%	3	--	0.3	Groundwater @ 6.0' FINE SAND, trace silt; gray to brown; loose; wet				
10			6							
			3			Match to Sheet 2				

DRILLING CO.: Parratt - Wolff  
 DRILLER: Kevin White

BAKER REP.: John Zimmerman  
 BORING NO.: 93-MW01IW SHEET 1 OF 3

## TEST BORING AND WELL CONSTRUCTION RECORD

PROJECT: Phase II Investigation at Sites 88, 89, and 93 - MCB Camp Lejeune

CTO NO.: 62470-356

BORING NO.:

93-MW01IW

SAMPLE TYPE						DEFINITIONS			
S = Split Spoon A = Auger T = Shelby Tube W = Wash R = Mud Rotary C = Core D = Denison P = Piston N = No Sample						SPT = Standard Penetration Test (ASTM D1586) PID = Photo Ionization Detector measurement Lab Class = USCS (ASTM D2487)			
Depth (Ft.)	Sample Type & No.	Sample Rec. (Ft.,%)	SPT	Lab Class.	PID (ppm)	Visual Description	Well Installation Detail	Elevation (Ft. MSL)	
11	S-6	1.2	3	--	0.3	Continued from Sheet 1 <b>FINE SAND &amp; SILT</b> , little clay; gray to brown; loose; wet			
12		60%	4		0.3				
13	T-1	--	--	--	--				
14						14.0			1.50
15	S-7	2.0	3	--	0.3	<b>SILT &amp; CLAY</b> , trace fine sand; greenish-gray; stiff; damp			
16		100%	4		0.3				
17	S-8	2.0	9	--	0.3	Very stiff			
18		100%	10		0.3				
19	S-9	2.0	10	--	0.3				
20		100%	11		0.3	trace fine sand & shell frag; greenish-gray; v stiff; damp			
21	S-10	1.5	5	--	0.3				
22		75%	5		0.3	stiff			
23	S-11	1.5	4	--	0.3				
24		75%	6		0.3	v stiff			
25	S-12	2.0	32	--	0.9				
26		100%	34		0.9	<b>FINE SAND</b> , trace to little silt, trace shell frag; gray; dense; wet			
27	S-13	2.0	23	--	0.9				
28		100%	25		0.9	<b>FINE SAND &amp; FOSSIL/ SHELL FRAG</b> , little silt & clay; light gray; v dense; wet			
29	S-14	1.8	23	--	0.9				
30		90%	30		0.9	<b>SHELL &amp; FOSSIL FRAG</b> , little fine sand silt & clay; light gray; v dense; wet			
			32						
			23			Match to Sheet 3			-7.50

DRILLING CO.: Parratt - Wolff  
 DRILLER: Kevin White

BAKER REP.: John Zimmerman  
 BORING NO.: 93-MW01IW SHEET 2 OF 3

## TEST BORING AND WELL CONSTRUCTION RECORD

PROJECT: Phase II Investigation at Sites 88, 89, and 93 - MCB Camp Lejeune

CTO NO.: 62470-356

BORING NO.:

93-MW01IW

SAMPLE TYPE						DEFINITIONS			
S = Split Spoon A = Auger T = Shelby Tube W = Wash R = Mud Rotary C = Core D = Denison P = Piston N = No Sample						SPT = Standard Penetration Test (ASTM D1586) PID = Photo Ionization Detector measurement Lab Class = USCS (ASTM D2487)			
Depth (Ft.)	Sample Type & No.	Sample Rec. (Ft.,%)	SPT	Lab Class.	PID (ppm)	Visual Description	Well Installation Detail	Elevation (Ft. MSL)	
31	S-15	1.3 65%	16	--	0.9	Continued from Sheet 2 with F/C sand, trace silt & clay; light gray; dense; wet			
32			33		0.9				
33			40						
33	S-16	2.0 100%	42	--	0.9	with F/M sand, trace silt & clay; light gray; v dense; wet			
34			45		0.9				
35			50						
35	S-17	1.5 75%	12	--	0.9				
36			27		0.9				
36			26						
37	S-18	1.7 85%	22	--	0.9	dense			
38			23		0.9				
38			18						
39	S-19	1.4 70%	23	--	0.9	v dense			
40			24		0.9				
40			20						
41	S-20	1.6 80%	20	--	0.9			41.0	-25.50
42			24		0.9				
42			20						
43	S-21	1.5 75%	23	--	0.9				
44			27		0.9				
44			25						
45	A-N	--	--	--	--			45.0	-29.50
46	S-22	1.7 85%	20	--	0.9	dense			
47			22		0.9				
47			21						
48	S-23	1.5 75%	24	--	0.9	v dense			
49			25		0.9				
49			26						
50	A-N	--	--	--	--			50.0	-34.50
						BOH @ 50.0 ft.			

DRILLING CO.: Parratt - Wolff  
 DRILLER: Kevin White

BAKER REP.: John Zimmerman  
 BORING NO.: 93-MW01IW SHEET 3 OF 3



## TEST BORING AND WELL CONSTRUCTION RECORD

PROJECT: Phase II Investigation at Sites 88, 89, and 93 - MCB Camp Lejeune  
 CTO NO.: 62470-356 BORING NO.: 93-MW02  
 COORDINATES: EAST: 2464828.2750 NORTH: 360132.2300  
 ELEVATION: SURFACE: 13.31 TOP OF PVC CASING: 12.76

Rig: CME-55					Date	Progress (Ft.)	Weather	Depth to Water (Ft.)	Time
Split Spoon	Casing	Augers	Core Barrel						
Size (ID)	1-3/8"	--	3-1/4"	--	4/22/97	0.0 - 14.0	Cloudy, 60s	6.0	--
Length	2.0'	--	5.0'	--					
Type	Stainless	--	HSA	--					
Hammer Wt.	140 lbs.	--	--	--					
Fall	30"	--	--	--					
Stickup	--	--	--	--					

Remarks: Boring reamed with 6-1/4" HSAs. Flush-mount completion.

SAMPLE TYPE	WELL INFORMATION			
S = Split Spoon A = Auger T = Shelby Tube W = Wash R = Mud Rotary C = Core D = Denison P = Piston N = No Sample	Type	Diam.	Top Depth (Ft.)	Bottom Depth (Ft.)
	Sch 40 PVC Casing	2.0"	0	4
	Sch 40 PVC, 10-slot Screen	2.0"	4	14

Depth (Ft.)	Sample Type & No.	Sample Rec. (Ft., %)	SPT	Lab Class.	PID (ppm)	Visual Description	Well Installation Detail	Elevation (Ft. MSL)
1	S-1	1.7 85%	10	--	0.2	FINE SAND & SILT; trace clay; gray to black; med dense; damp		12.31
2			8					2.0
3	S-2	1.9 95%	2	--	0.2	with wood frag; brown to black; v loose; moist to wet		
4			1					
5	S-3	1.7 85%	1	--	0.2	LAB SAMPLE		
6			2					
7	S-4	1.8 90%	2	--	0.2	trace roots; dark gray to black; loose; moist		
8			3					
9	S-5	1.0 50%	4	--	0.2	FINE SAND, trace to little silt & wood frag; gray; loose; wet LAB SAMPLE		
10			2					
			WOH			Groundwater @ 6.0'		
			1			FINE to MEDIUM SAND, trace silt; gray; v loose; wet		
			2					
			4			Match to Sheet 2		

DRILLING CO.: Parratt - Wolff  
 DRILLER: Kevin White

BAKER REP.: John Zimmerman  
 BORING NO.: 93-MW02 SHEET 1 OF 2

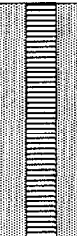
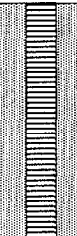
## TEST BORING AND WELL CONSTRUCTION RECORD

PROJECT: Phase II Investigation at Sites 88, 89, and 93 - MCB Camp Lejeune

CTO NO.: 62470-356

BORING NO.:

93-MW02

SAMPLE TYPE							DEFINITIONS			
S = Split Spoon A = Auger T = Shelby Tube W = Wash R = Mud Rotary C = Core D = Denison P = Piston N = No Sample							SPT = Standard Penetration Test (ASTM D1586) PID = Photo Ionization Detector measurement Lab Class = USCS (ASTM D2487)			
Depth (Ft.)	Sample Type & No.	Sample Rec. (Ft.,%)	SPT	Lab Class.	PID (ppm)	Visual Description	Well Installation Detail	Elevation (Ft. MSL)		
11	S-6	1.8 90%	8	--	0.2 0.2	Continued from Sheet 1 dark gray to gray, med dense; wet				
12			11						12	
13	S-7	1.1 55%	5	--	0.2 0.2	little to some silt, trace clay; gray; med dense; wet				
14			7						9	11
14.0						BOH @ 14.0		-0.69		
15										
16										
17										
18										
19										
20										
21										
22										
23										
24										
25										
26										
27										
28										
29										
30										

DRILLING CO.: Parratt - Wolff  
 DRILLER: Kevin White

BAKER REP.: John Zimmerman  
 BORING NO.: 93-MW02 SHEET 2 OF 2



Baker Environmental

## TEST BORING AND WELL CONSTRUCTION RECORD

PROJECT:	Phase II Investigation at Sites 88, 89, and 93 - MCB Camp Lejeune		
CTO NO.:	62470-356	BORING NO.:	93-MW02IW
COORDINATES: EAST:	2464837.8170	NORTH:	360133.1740
ELEVATION: SURFACE:	13.44	TOP OF PVC CASING:	12.71

Rig:	CME-55				Date	Progress (Ft.)	Weather	Depth to Water (Ft.)	Time
	Split Spoon	Casing	Augers	Core Barrel					
Size (ID)	1-3/8"	--	3-1/4"	--	4/21/97	0.0 - 50.0	Sunny, 60s	6.0	--
Length	2.0'	--	5.0'	--					
Type	Stainless	--	HSA	--					
Hammer Wt.	140 lbs.	--	--	--					
Fall	30"	--	--	--					
Stickup	--	--	--	--					

**Remarks:** Boring reamed with 6-1/4" HSAs. Flush-mount completion.

SAMPLE TYPE							WELL INFORMATION				
S = Split Spoon    A = Auger T = Shelby Tube    W = Wash R = Mud Rotary    C = Core D = Denison        P = Piston N = No Sample							Type		Diam.	Top Depth (Ft.)	Bottom Depth (Ft.)
							Sch 40 PVC Casing		2.0"	0	41
							Sch 40 PVC, 10-slot Screen		2.0"	41	46
Depth (Ft.)	Sample Type & No.	Sample Rec. (Ft.,%)	SPT	Lab Class.	PID (ppm)	Visual Description	Well Installation Detail	Elevation (Ft. MSL)			
1	S-1	1.5 75%	8	--	0.3 0.3	<b>FINE SAND &amp; SILT;</b> dark gray to black; med dense; damp					
2			10						12		
3	S-2	1.0 50%	2	--	0.3 0.3	trace clay; brown to black; loose; moist LAB SAMPLE					
4			3						5		
5	S-3	1.0 50%	1	--	0.3 0.3	gray, black & brown					
6			5						4		
7	S-4	1.2 60%	5	--	0.3 0.3	Groundwater @ 6.0' <b>FINE SAND,</b> trace silt & wood frag.; dark gray; loose; wet LAB SAMPLE					
8			2						3		
9	S-5	0.8 40%	2	--	0.3 0.3	<b>FINE to MEDIUM SAND,</b> trace silt; gray; loose; wet					
10			1						6		
			6			WOH					
Match to Sheet 2											

DRILLING CO.: Parratt - Wolff  
 DRILLER: Kevin White

BAKER REP.: John Zimmerman  
 BORING NO.: 93-MW02IW    SHEET 1 OF 3

## TEST BORING AND WELL CONSTRUCTION RECORD

PROJECT: Phase II Investigation at Sites 88, 89, and 93 - MCB Camp Lejeune  
 CTO NO.: 62470-356

BORING NO.: 93-MW02IW

SAMPLE TYPE							DEFINITIONS		
S = Split Spoon A = Auger T = Shelby Tube W = Wash R = Mud Rotary C = Core D = Denison P = Piston N = No Sample							SPT = Standard Penetration Test (ASTM D1586) PID = Photo Ionization Detector measurement Lab Class = USCS (ASTM D2487)		
Depth (Ft.)	Sample Type & No.	Sample Rec. (Ft.,%)	SPT	Lab Class.	PID (ppm)	Visual Description	Well Installation Detail	Elevation (Ft. MSL)	
11	S-6	0.8 40%	2 1	--	0.3 0.3	Continued from Sheet 1 little silt; gray; loose; wet		-6.56	
12			7						
13	S-7	1.2 60%	3 6	--	0.3 0.3	<b>FINE SAND</b> , little to some silt, trace clay; gray; loose; wet			
14			9						
15	S-8	2.0 100%	1 1	--	0.3 0.3	<b>FINE to MEDIUM SAND</b> , little silt, trace to little shell frag, trace gravel; dark gray; v loose; wet			
16			1						
17	S-9	1.5 75%	1 1	--	0.3 0.3	little silt & shell frag; trace gravel; dark gray; v loose; wet			
18			1						
19	S-10	1.1 55%	3 4	--	0.3 0.3	some shell frag, trace to little silt; dark gray; loose; wet			
20			4			20.0			
21	S-11	1.2 60%	15 19	--	0.3 0.3	<b>SHELL &amp; FOSSIL FRAG</b> , little silt, trace f sand & clay; greenish-gray; dense; wet			
22			43						
23	S-12	1.2 60%	8 18	--	0.3 0.3				
24			22						
25	S-13	1.8 90%	9 17	--	0.3 0.3	<b>SILT &amp; F/M SAND</b> , some shell frag, little clay; greenish-gray; dense; wet			
26			15						
27	S-14	1.4 70%	20 22	--	0.3 0.3	some shell frag; light gray; dense; wet			
28			18						
29	S-15	1.4 70%	17 8	--	0.3 0.3	some shell frag, trace fossil frag; light gray; dense; wet			
30			16						
			27						
			8			Match to Sheet 3			

DRILLING CO.: Parratt - Wolff  
 DRILLER: Kevin White

BAKER REP.: John Zimmerman  
 BORING NO.: 93-MW02IW SHEET 2 OF 3



## TEST BORING AND WELL CONSTRUCTION RECORD

PROJECT: Phase II Investigation at Sites 88, 89, and 93 - MCB Camp Lejeune  
 CTO NO.: 62470-356

BORING NO.: 93-MW02IW

SAMPLE TYPE							DEFINITIONS		
S = Split Spoon A = Auger T = Shelby Tube W = Wash R = Mud Rotary C = Core D = Denison P = Piston N = No Sample							SPT = Standard Penetration Test (ASTM D1586) PID = Photo Ionization Detector measurement Lab Class = USCS (ASTM D2487)		
Depth (Ft.)	Sample Type & No.	Sample Rec. (Ft.,%)	SPT	Lab Class.	PID (ppm)	Visual Description	Well Installation Detail	Elevation (Ft. MSL)	
31	S-16	1.7 85%	20	--	0.3 0.3	Continued from Sheet 2			
32			12						
33	S-17	1.0 50%	10	--	0.3 0.3	FINE to MEDIUM SAND, some shell frag & silt, trace fossil frag; light gray; dense wet			
34			21						
35	S-18	1.4 70%	15	--	0.3 0.3	CEMENTED SAND, little shell frag & silt; light greenish-gray; med dense; wet			
36			14						
37	S-19	1.3 65%	10	--	0.3 0.3	F/M SAND & SHELL FRAG, trace to little silt; light greenish-gray; med dense; wet		37.0 -23.56	
38			11						
39	S-20	0.9 45%	12	--	0.3 0.3	dense		39.0 -25.56	
40			15						
41	S-21	1.0 50%	15	--	0.3 0.3			41.0 -27.56	
42			16						
43	S-22	1.1 55%	10	--	0.3 0.3				
44			15						
45	S-23	1.3 65%	14	--	0.3 0.3	FINE SAND, trace shell frag & silt; greenish-gray; med dense; wet		46.0 -32.56	
46			12						
47	S-24	1.1 55%	10	--	0.3 0.3	FINE SAND, little to some clay, trace to little silt; little shell frag; greenish-gray; m dense; moist to wet			
48			11						
49	S-25	1.1 55%	17	--	0.3 0.3	with silt, little to some clay; greenish-gray to olive; med dense; moist			
50			11						
			35					50.0 -36.56	
BOH @ 50.0 ft.									

DRILLING CO.: Parratt - Wolff  
 DRILLER: Kevin White

BAKER REP.: John Zimmerman  
 BORING NO.: 93-MW02IW SHEET 3 OF 3

## TEST BORING AND WELL CONSTRUCTION RECORD

PROJECT: Phase II Investigation at Sites 88, 89, and 93 - MCB Camp Lejeune  
 CTO NO.: 62470-356 BORING NO.: 93-MW02DW  
 COORDINATES: EAST: 2464848.5400 NORTH: 360132.6090  
 ELEVATION: SURFACE: 13.07 TOP OF PVC CASING: 12.84

Rig: CME-55					Date	Progress (Ft.)	Weather	Depth to Water (Ft.)	Time
Split Spoon	Casing	Augers	Core Barrel						
Size (ID)	1-3/8"	--	3-1/4"	--	5/16/97	0.0 - 58.0	Sunny, 70s	--	--
Length	2.0'	--	5.0'	--	5/17/97	58.0 - 72.0	Sunny, 60s	--	--
Type	Stainless	--	HSA	--					
Hammer Wt.	140 lbs.	--	--	--					
Fall	30"	--	--	--					
Stickup	--	--	--	--					

Remarks: Boring reamed to 14 ft. w/ 6-1/4" HSA. 7-3/8" mud rotary from 14 ft to depth. Flush-mount completion.

SAMPLE TYPE							WELL INFORMATION			
S = Split Spoon A = Auger T = Shelby Tube W = Wash R = Mud Rotary C = Core D = Denison P = Piston N = No Sample							Type	Diam.	Top Depth (Ft.)	Bottom Depth (Ft.)
							Sch 40 PVC Casing	2.0"	0	66
							Sch 40 PVC, 10-slot Screen	2.0"	66	71
Depth (Ft.)	Sample Type & No.	Sample Rec. (Ft.,%)	SPT	Lab Class.	PID (ppm)	Visual Description	Well Installation Detail		Elevation (Ft. MSL)	
1	A-N	--	--	--	--					
2	2.0									
3	S-1	1.8 90%	4 3	--	0.1 0.1	FINE SAND & SILT, trace clay; brown to black; loose; damp to moist LAB SAMPLE				
4	4.0		2							
5	A-N	--	--	--	--					
6	6.0									
7	S-2	2.0 100%	2 2	--	0.1 0.1	FINE SAND, little silt, trace wood frag; gray; loose; wet LAB SAMPLE				
8	8.0		2							
9	A-N	--	--	--	--					
10										

Match to Sheet 2

DRILLING CO.: Parratt - Wolff  
 DRILLER: Kevin White

BAKER REP.: John Zimmerman  
 BORING NO.: 93-MW02DW SHEET 1 OF 5

**TEST BORING AND WELL CONSTRUCTION RECORD**

PROJECT: Phase II Investigation at Sites 88, 89, and 93 - MCB Camp Lejeune  
 CTO NO.: 62470-356

BORING NO.: 93-MW02DW

<b>SAMPLE TYPE</b> S = Split Spoon A = Auger T = Shelby Tube W = Wash R = Mud Rotary C = Core D = Denison P = Piston N = No Sample						<b>DEFINITIONS</b> SPT = Standard Penetration Test (ASTM D1586) PID = Photo Ionization Detector measurement Lab Class = USCS (ASTM D2487)		
Depth (Ft.)	Sample Type & No.	Sample Rec. (Ft.,%)	SPT	Lab Class.	PID (ppm)	Visual Description	Well Installation Detail	Elevation (Ft. MSL)
11								
12								
13								
14	R-N	--	--	--	--	See the log for 93-MW02IW for lithologic details		
15								
16								
17								
18								
19								
20								
21								
22								
23								
24								
25								
26								
27								
28								
29								
30								
						Match to Sheet 3		

DRILLING CO.: Parratt - Wolff  
 DRILLER: Kevin White

BAKER REP.: John Zimmerman  
 BORING NO.: 93-MW02DW SHEET 2 OF 5



# TEST BORING AND WELL CONSTRUCTION RECORD

PROJECT: Phase II Investigation at Sites 88, 89, and 93 - MCB Camp Lejeune  
 CTO NO.: 62470-356 BORING NO.: 93-MW02DW

<u>SAMPLE TYPE</u>						<u>DEFINITIONS</u>				
S = Split Spoon A = Auger T = Shelby Tube W = Wash R = Mud Rotary C = Core D = Denison P = Piston N = No Sample						SPT = Standard Penetration Test (ASTM D1586) PID = Photo Ionization Detector measurement Lab Class = USCS (ASTM D2487)				
Depth (Ft.)	Sample Type & No.	Sample Rec. (Ft.,%)	SPT	Lab Class.	PID (ppm)	Visual Description	Well Installation Detail	Elevation (Ft. MSL)		
31						Continued from Sheet 2				
32										
33										
34										
35										
36										
37										
38										
39										
40	R-N	--	--	--	--					
41										
42										
43										
44										
45										
46										
47										
48										
49										
50	50.0		7					Match to Sheet 4		

DRILLING CO.: Parratt - Wolff  
 DRILLER: Kevin White

BAKER REP.: John Zimmerman  
 BORING NO.: 93-MW02DW SHEET 3 OF 5

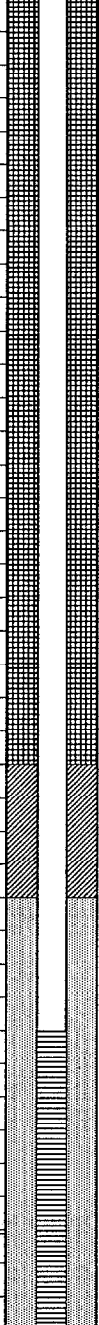
## TEST BORING AND WELL CONSTRUCTION RECORD

PROJECT: Phase II Investigation at Sites 88, 89, and 93 - MCB Camp Lejeune

CTO NO.: 62470-356

BORING NO.:

93-MW02DW

SAMPLE TYPE						DEFINITIONS							
S = Split Spoon A = Auger T = Shelby Tube W = Wash R = Mud Rotary C = Core D = Denison P = Piston N = No Sample						SPT = Standard Penetration Test (ASTM D1586) PID = Photo Ionization Detector measurement Lab Class = USCS (ASTM D2487)							
Depth (Ft.)	Sample Type & No.	Sample Rec. (Ft.,%)	SPT	Lab Class.	PID (ppm)	Visual Description	Well Installation Detail	Elevation (Ft. MSL)					
51	S-3	2.0 100%	9	--	0.1 0.1	Continued from Sheet 3 <b>FINE SAND</b> , some silt & shell frag; little clay; light greenish-gray; med dense; wet							
52			21										
53	S-4	2.0 100%	13	--	0.1 0.1	v dense			62.0				
54			31										
55	S-5	2.0 100%	10	--	0.1 0.1	some shell frag, little silt; greenish-gray; dense; wet				64.0			
56			13										
57	S-6	2.0 100%	11	--	0.1 0.1	very dense					66.0		
58			28										
59	S-7	1.6 80%	23	--	0.2 0.2	<b>FINE to MEDIUM SAND</b> , trace shell frag & silt; greenish-gray; dense; wet						69.1	
60			22										
61	S-8	1.7 85%	12	--	0.2 0.2								-48.93
62			20										
63	S-9	1.7 85%	14	--	0.2 0.2		-50.93						
64			14										
65	S-10	1.6 80%	12	--	0.2 0.2	little shell frag, trace to little silt; greenish-gray; dense; wet		-52.93					
66			22										
67	S-11	1.2 60%	24	--	0.2 0.2	little shell frag & silt; greenish-gray; v dense; wet			-56.03				
68			29										
69	S-12	1.3 65%	14	--	0.2 0.2					Match to Sheet 5			
70			29										
			8										

DRILLING CO.: Parratt - Wolff

DRILLER: Kevin White

BAKER REP.:

John Zimmerman

BORING NO.:

93-MW02DW SHEET 4 OF 5


## TEST BORING AND WELL CONSTRUCTION RECORD

PROJECT: Phase II Investigation at Sites 88, 89, and 93 - MCB Camp Lejeune

CTO NO.: 62470-356

BORING NO.:

93-MW02DW

SAMPLE TYPE						DEFINITIONS			
S = Split Spoon A = Auger T = Shelby Tube W = Wash R = Mud Rotary C = Core D = Denison P = Piston N = No Sample						SPT = Standard Penetration Test (ASTM D1586) PID = Photo Ionization Detector measurement Lab Class = USCS (ASTM D2487)			
Depth (Ft.)	Sample Type & No.	Sample Rec. (Ft.,%)	SPT	Lab Class.	PID (ppm)	Visual Description	Well Installation Detail	Elevation (Ft. MSL)	
71	S-13	1.2 60%	8	--	0.2	Continued from Sheet 4 shell frag; olive; v stiff; damp to moist		71.0	-57.93
72			16		0.2			72.0	-58.93
72			20			BOH @ 72.0 ft.			
73									
74									
75									
76									
77									
78									
79									
80									
81									
82									
83									
84									
85									
86									
87									
88									
89									
90									

DRILLING CO.: Parratt - Wolff

DRILLER: Kevin White

BAKER REP.:

BORING NO.:

John Zimmerman

93-MW02DW

SHEET 5 OF 5



## TEST BORING AND WELL CONSTRUCTION RECORD

**PROJECT:** Phase II Investigation at Sites 88, 89, and 93 - MCB Camp Lejeune  
**CTO NO.:** 62470-356 **BORING NO.:** 93-MW03  
**COORDINATES: EAST:** 2464117.0260 **NORTH:** 360199.3310  
**ELEVATION: SURFACE:** 17.49 **TOP OF PVC CASING:** 17.05

<b>Rig:</b> CME-55					<b>Date</b>	<b>Progress (Ft.)</b>	<b>Weather</b>	<b>Depth to Water (Ft.)</b>	<b>Time</b>
	<b>Split Spoon</b>	<b>Casing</b>	<b>Augers</b>	<b>Core Barrel</b>					
<b>Size (ID)</b>	1-3/8"	--	3-1/4"	--	4/30/97	0.0 - 22.0	Sunny, 60s	6.0	--
<b>Length</b>	2.0'	--	5.0'	--					
<b>Type</b>	Stainless	--	HSA	--					
<b>Hammer Wt.</b>	140 lbs.	--	--	--					
<b>Fall</b>	30"	--	--	--					
<b>Stickup</b>	--	--	--	--					

**Remarks:** Boring reamed with 6-1/4" HSAs. Flush-mount completion.

<p style="text-align: center;"><b>SAMPLE TYPE</b></p> <p>           S = Split Spoon    A = Auger            T = Shelby Tube    W = Wash            R = Mud Rotary    C = Core            D = Denison        P = Piston            N = No Sample         </p>	<p style="text-align: center;"><b>WELL INFORMATION</b></p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th>Type</th> <th>Diam.</th> <th>Top Depth (Ft.)</th> <th>Bottom Depth (Ft.)</th> </tr> </thead> <tbody> <tr> <td>Sch 40 PVC Casing</td> <td>2.0"</td> <td>0</td> <td>4</td> </tr> <tr> <td>Sch 40 PVC, 10-slot Screen</td> <td>2.0"</td> <td>4</td> <td>14</td> </tr> </tbody> </table>	Type	Diam.	Top Depth (Ft.)	Bottom Depth (Ft.)	Sch 40 PVC Casing	2.0"	0	4	Sch 40 PVC, 10-slot Screen	2.0"	4	14
Type	Diam.	Top Depth (Ft.)	Bottom Depth (Ft.)										
Sch 40 PVC Casing	2.0"	0	4										
Sch 40 PVC, 10-slot Screen	2.0"	4	14										

Depth (Ft.)	Sample Type & No.	Sample Rec. (Ft.,%)	SPT	Lab Class.	PID (ppm)	Visual Description	Well Installation Detail	Elevation (Ft. MSL)
1	S-1	1.3 65%	10	--	2.5 2.5	<b>FINE SAND &amp; SILT</b> ; trace clay; gray to black; med dense; damp		16.49
2			8					
3	S-2	1.5 75%	4	--	2.5 2.5	<b>FINE SAND</b> , trace silt; brown to black; med dense; damp to moist		15.49
4			5					
5	S-3	1.7 85%	7	--	2.5 2.5	LAB SAMPLE		13.49
6			4					
7	S-4	1.7 85%	4	--	2.5 2.5	little clay, trace to little silt; gray to brown; loose; moist to wet		
8			5					
9	S-5	2.0 100%	7	--	2.5 2.5	<b>FINE to MEDIUM SAND</b> , brown to gray; med dense; wet - Groudwater @ 6.0'		
10			2					
			2			LAB SAMPLE		
			2			loose		
			2			Match to Sheet 2		

**DRILLING CO.:** Parratt - Wolff **BAKER REP.:** John Zimmerman  
**DRILLER:** Kevin White **BORING NO.:** 93-MW03 **SHEET 1 OF 2**

**TEST BORING AND WELL CONSTRUCTION RECORD**

PROJECT: Phase II Investigation at Sites 88, 89, and 93 - MCB Camp Lejeune

CTO NO.: 62470-356

BORING NO.:

93-MW03

SAMPLE TYPE						DEFINITIONS		
S = Split Spoon A = Auger T = Shelby Tube W = Wash R = Mud Rotary C = Core D = Denison P = Piston N = No Sample						SPT = Standard Penetration Test (ASTM D1586) PID = Photo Ionization Detector measurement Lab Class = USCS (ASTM D2487)		
Depth (Ft.)	Sample Type & No.	Sample Rec. (Ft.,%)	SPT	Lab Class.	PID (ppm)	Visual Description	Well Installation Detail	Elevation (Ft. MSL)
11			2			Continued from Sheet 1		
12	S-6	2.0 100%	2	--	2.5 2.5			
13	S-7	1.4 70%	8	--	2.5 2.5	trace gravel, coarse sand & silt; gray; med dense; wet		
14			8					14.0
15	S-8	1.1 55%	5	--	2.5 2.5	<b>FINE to MEDIUM SAND,</b> trace to little gravel & coarse sand, trace silt; gray; med dense; wet		
16			10					15.0
17	S-9	1.7 85%	10	--	2.5 2.5	<b>FINE to COARSE SAND,</b> little silt, trace gravel; gray; med dense; wet		
18			12					
19	S-10	1.9 95%	15	--	2.5 2.5	<b>FINE to MEDIUM SAND,</b> trace silt; gray; med dense; wet		
20			6					
21	S-11	1.8 90%	2	--	2.5 2.5	<b>FINE SAND &amp; SILT,</b> little to some clay; dark greenish-gray; soft; moist to wet		
22			2					22.0
23						BOH @ 22.0 ft.		
24								
25								
26								
27								
28								
29								
30								

DRILLING CO.: Parratt - Wolff  
 DRILLER: Kevin White

BAKER REP.: John Zimmerman  
 BORING NO.: 93-MW03 SHEET 2 OF 2

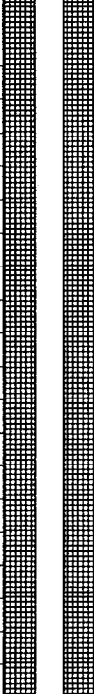


**Baker**

Baker Environmental

**TEST BORING AND WELL CONSTRUCTION RECORD**

PROJECT: Phase II Investigation at Sites 88, 89, and 93 - MCB Camp Lejeune  
 CTO NO.: 62470-356 BORING NO.: 93-MW031W  
 COORDINATES: EAST: 2464109.8820 NORTH: 360199.0260  
 ELEVATION: SURFACE: 17.63 TOP OF PVC CASING: 17.18

Rig: CME-55					Date	Progress (Ft.)	Weather	Depth to Water (Ft.)	Time	
Split Spoon	Casing	Augers	Core Barrel							
Size (ID)	1-3/8"	--	3-1/4"	--	4/29/97	0.0 - 50.0	Cloudy, 60s	6.0	--	
Length	2.0'	--	5.0'	--						
Type	Stainless	--	HSA	--						
Hammer Wt.	140 lbs.	--	--	--						
Fall	30"	--	--	--						
Stickup	--	--	--	--						
Remarks: Boring reamed with 6-1/4" HSAs. Flush-mount completion.										
<b>SAMPLE TYPE</b> S = Split Spoon A = Auger T = Shelby Tube W = Wash R = Mud Rotary C = Core D = Denison P = Piston N = No Sample					<b>WELL INFORMATION</b>					
					Type	Diam.	Top Depth (Ft.)	Bottom Depth (Ft.)		
					Sch 40 PVC Casing	2.0"	0	45		
					Sch 40 PVC, 10-slot Screen	2.0"	45	50		
Depth (Ft.)	Sample Type & No.	Sample Rec. (Ft.,%)	SPT	Lab Class.	PID (ppm)	Visual Description	Well Installation Detail	Elevation (Ft. MSL)		
1	S-1	1.1 55%	8	--	2.5 2.5	FINE SAND & SILT; trace clay; gray to black; med dense; damp				
2			8							
3	S-2	1.7 85%	7	--	2.5 2.5	FINE SAND, trace silt; brown to black; med dense; damp to moist				
4			6							
5	S-3	1.3 65%	4	--	2.5 2.5	little clay, trace to little silt; gray to brown; stiff; moist to wet				
6			7							
7	S-4	1.8 90%	4	--	2.5 2.5	FINE to MEDIUM SAND, trace silt; brown to gray; med dense; wet				
8			5							
9	S-5	1.4 70%	10	--	0.7 0.7	Groundwater @ 6.0' LAB SAMPLE				
10			4							
			2			Match to Sheet 2				

DRILLING CO.: Parratt - Wolff  
 DRILLER: Kevin White

BAKER REP.: John Zimmerman  
 BORING NO.: 93-MW031W SHEET 1 OF 3



**TEST BORING AND WELL CONSTRUCTION RECORD**

PROJECT: Phase II Investigation at Sites 88, 89, and 93 - MCB Camp Lejeune  
 CTO NO.: 62470-356 BORING NO.: 93-MW03IW

SAMPLE TYPE						DEFINITIONS			
S = Split Spoon A = Auger T = Shelby Tube W = Wash R = Mud Rotary C = Core D = Denison P = Piston N = No Sample						SPT = Standard Penetration Test (ASTM D1586) PID = Photo Ionization Detector measurement Lab Class = USCS (ASTM D2487)			
Depth (Ft.)	Sample Type & No.	Sample Rec. (Ft., %)	SPT	Lab Class.	PID (ppm)	Visual Description	Well Installation Detail	Elevation (Ft. MSL)	
11	S-6	1.1 55%	2 1	--	0.7 0.7	Continued from Sheet 1 gray; v loose; wet			
12			1						
13	S-7	1.3 65%	5 5	--	0.7 0.7	trace gravel & coarse sand; gray; loose; wet			
14			4						
15	S-8	1.2 60%	4 8 10	--	0.7 0.7	brownish-gray; med dense; wet			
16			10						
17	S-9	1.6 80%	12 14	--	0.7 0.7	<b>FINE to COARSE SAND,</b> little silt, trace gravel; gray; med dense; wet			
18			20						
19	S-10	1.5 75%	13 12	--	0.7 0.7	<b>FINE to MEDIUM SAND,</b> trace silt; gray; med dense; wet			
20			10 11						
21	S-11	0.9 45%	4 1 2	--	0.7 0.7	<b>FINE SAND &amp; SILT,</b> little to some clay; greenish-gray; soft; moist to wet			
22			1						
23	S-12	1.2 60%	2 2	--	0.7 0.7	trace to little clay; greenish- gray; soft; wet			
24			2						
25	S-13	1.4 70%	1 1	--	0.7 0.7	no clay; greenish-gray; v loose; wet			
26			1						
27	S-14	1.2 60%	WOH 18"	--	0.7 0.7				
28			1						
29	S-15	1.6 80%	1 1	--	0.7 0.7	little clay; greenish-gray; v loose; wet			
30			1						
						Match to Sheet 3			

DRILLING CO.: Parratt - Wolff  
 DRILLER: Kevin White

BAKER REP.: John Zimmerman  
 BORING NO.: 93-MW03IW SHEET 2 OF 3

**TEST BORING AND WELL CONSTRUCTION RECORD**

PROJECT: Phase II Investigation at Sites 88, 89, and 93 - MCB Camp Lejeune

CTO NO.: 62470-356

BORING NO.:

93-MW03IW

SAMPLE TYPE							DEFINITIONS		
S = Split Spoon A = Auger T = Shelby Tube W = Wash R = Mud Rotary C = Core D = Denison P = Piston N = No Sample							SPT = Standard Penetration Test (ASTM D1586) PID = Photo Ionization Detector measurement Lab Class = USCS (ASTM D2487)		
Depth (Ft.)	Sample Type & No.	Sample Rec. (Ft.,%)	SPT	Lab Class.	PID (ppm)	Visual Description	Well Installation Detail	Elevation (Ft. MSL)	
31	S-16	1.7 85%	WOH 18"	--	0.7 0.7	Continued from Sheet 2 little clay, trace m sand; greenish-gray; v loose; wet			
32			2						
33	S-17	1.7 85%	1 1	--	0.7 0.7	FINE SAND, trace silt; light brown; v loose; wet			
34			1				34.0	-16.37	
35	S-18	0.9 45%	WOH 15 22 28	--	0.7 0.7	SHELL & FOSSIL FRAG, little silt, trace fine sand, part cemented; light gray; dense; wet			
36			10						
37	S-19	1.4 70%	13 28	--	0.7 0.7				
38			32						
39	S-20	1.1 55%	30 35 32	--	0.7 0.7	v dense			
40			28						
41	S-21	2.0 100%	32 39 41	--	0.7 0.7	FINE to MEDIUM SAND, little silt, part. cemented; light gray; v dense; wet	41.0	-23.37	
42			26						
43	S-22	1.2 60%	23 28 30	--	0.7 0.7	light greenish-gray	43.0	-25.37	
44			26						
45	S-23	1.1 55%	20 22 32	--	0.7 0.7		45.0	-27.37	
46			25						
47	S-24	1.7 85%	9 10 9	--	0.7 0.7	med dense			
48			20						
49	S-25	1.5 75%	10 16 23	--	0.7 0.7	trace to little silt, trace shell frag; light greenish- gray; dense; wet	50.0	-32.37	
50			50				50.0	-32.37	
BOH @ 50.0 ft.									

DRILLING CO.: Parratt - Wolff  
 DRILLER: Kevin White

BAKER REP.: John Zimmerman  
 BORING NO.: 93-MW03IW

**Baker**

Baker Environmental

**TEST BORING AND WELL CONSTRUCTION RECORD**

PROJECT: Phase II Investigation at Sites 88, 89, and 93 - MCB Camp Lejeune  
 CTO NO.: 62470-356 BORING NO.: 93-MW04  
 COORDINATES: EAST: 2464830.9180 NORTH: 360592.4660  
 ELEVATION: SURFACE: 15.72 TOP OF PVC CASING: 15.42

Rig: CME-55					Date	Progress (Ft.)	Weather	Depth to Water (Ft.)	Time
Split Spoon	Casing	Augers	Core Barrel						
Size (ID)	1-3/8"	--	3-1/4"	--	5/6/97	0.0 - 15.0	Sunny, 70s	--	--
Length	2.0'	--	5.0'	--					
Type	Stainless	--	HSA	--					
Hammer Wt.	140 lbs.	--	--	--					
Fall	30"	--	--	--					
Stickup	--	--	--	--					
Remarks: Boring reamed with 6-1/4" HSAs. Flush-mount completion.									
<b>SAMPLE TYPE</b> S = Split Spoon A = Auger T = Shelby Tube W = Wash R = Mud Rotary C = Core D = Denison P = Piston N = No Sample					<b>WELL INFORMATION</b>				
					Type	Diam.	Top Depth (Ft.)	Bottom Depth (Ft.)	
					Sch 40 PVC Casing	2.0"	0	4	
					Sch 40 PVC, 10-slot Screen	2.0"	4	14	
Depth (Ft.)	Sample Type & No.	Sample Rec. (Ft.,%)	SPT	Lab Class.	PID (ppm)	Visual Description	Well Installation Detail	Elevation (Ft. MSL)	
1	A-N	--	--	--	--			1.0 14.72	
2	2.0							2.0 13.72	
3	S-1	1.8 90%	2 3	--	0.1 0.1	FINE SAND & SILT, trace clay; black to gray; loose; damp to moist			
4	4.0		4			LAB SAMPLE		4.0 11.72	
5	A-N	--	--	--	--				
6	6.0								
7	S-2	1.8 90%	3 5	--	0.1 0.1	FINE SAND, little to some clay, trace silt; gray; stiff; wet			
8	8.0		7			LAB SAMPLE			
9									
10	A-N	--	--	--	--				
Match to Sheet 2									

DRILLING CO.: Parratt - Wolff  
 DRILLER: Kevin White

BAKER REP.: John Zimmerman  
 BORING NO.: 93-MW04 SHEET 1 OF 2

**TEST BORING AND WELL CONSTRUCTION RECORD**

PROJECT: Phase II Investigation at Sites 88, 89, and 93 - MCB Camp Lejeune  
 CTO NO.: 62470-356 BORING NO.: 93-MW04

SAMPLE TYPE						DEFINITIONS			
S = Split Spoon A = Auger T = Shelby Tube W = Wash R = Mud Rotary C = Core D = Denison P = Piston N = No Sample						SPT = Standard Penetration Test (ASTM D1586) PID = Photo Ionization Detector measurement Lab Class = USCS (ASTM D2487)			
Depth (Ft.)	Sample Type & No.	Sample Rec. (Ft.,%)	SPT	Lab Class.	PID (ppm)	Visual Description	Well Installation Detail	Elevation (Ft. MSL)	
11						Continued from Sheet 1			
12									
13	A-N	--	--	--	--				
14								14.0	1.72
15	15.0							15.0	0.72
16						BOH @ 15.0 ft.			
17									
18									
19									
20									
21									
22									
23									
24									
25									
26									
27									
28									
29									
30									

DRILLING CO.: Parratt - Wolff  
 DRILLER: Kevin White

BAKER REP.: John Zimmerman  
 BORING NO.: 93-MW04 SHEET 2 OF 2

**Baker**

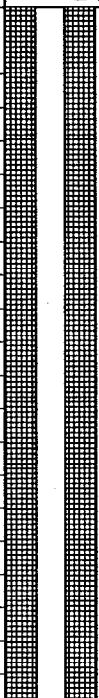
Baker Environmental

**TEST BORING AND WELL CONSTRUCTION RECORD**

PROJECT: Phase II Investigation at Sites 88, 89, and 93 - MCB Camp Lejeune  
 CTO NO.: 62470-356 BORING NO.: 93-MW04IW  
 COORDINATES: EAST: 2464834.7370 NORTH: 360592.5290  
 ELEVATION: SURFACE: 15.68 TOP OF PVC CASING: 15.41

Rig: CME-55					Date	Progress (Ft.)	Weather	Depth to Water (Ft.)	Time
Split Spoon	Casing	Augers	Core Barrel						
Size (ID)	1-3/8"	--	3-1/4"	--	5/6/97	0.0 - 52.0	Sunny, 70s	6.0	--
Length	2.0'	--	5.0'	--					
Type	Stainless	--	HSA	--					
Hammer Wt.	140 lbs.	--	--	--					
Fall	30"	--	--	--					
Stickup	--	--	--	--					

Remarks: Boring reamed with 6-1/4" HSAs. Flush-mount completion.

SAMPLE TYPE							WELL INFORMATION			
S = Split Spoon A = Auger T = Shelby Tube W = Wash R = Mud Rotary C = Core D = Denison P = Piston N = No Sample							Type	Diam.	Top Depth (Ft.)	Bottom Depth (Ft.)
							Sch 40 PVC Casing	2.0"	0	44
							Sch 40 PVC, 10-slot Screen	2.0"	44	49
Depth (Ft.)	Sample Type & No.	Sample Rec. (Ft.,%)	SPT	Lab Class.	PID (ppm)	Visual Description	Well Installation Detail	Elevation (Ft. MSL)		
1	S-1	1.8 90%	5	--	0.4 0.4	FINE SAND & SILT; trace clay & charcoal; gray to black; loose; damp				
2			4							
2	2.0	3								
3	S-2	1.8 90%	3	--	0.4 0.4					
3			3							
4	4.0	3								
5	S-3	1.3 65%	3	--	0.4 0.4					
5			3							
6	6.0	3								
7	S-4	1.8 90%	6	--	0.4 0.4					
7			5							
8	8.0	7								
8	5									
9	S-5	1.4 70%	2	--	0.4 0.4					
9			2							
10	10.0	7								
10	10									
		8				Match to Sheet 2				

DRILLING CO.: Parratt - Wolff  
 DRILLER: Kevin White

BAKER REP.: John Zimmerman  
 BORING NO.: 93-MW04IW SHEET 1 OF 4



**TEST BORING AND WELL CONSTRUCTION RECORD**

PROJECT: Phase II Investigation at Sites 88, 89, and 93 - MCB Camp Lejeune  
 CTO NO.: 62470-356 BORING NO.: 93-MW04IW

<b>SAMPLE TYPE</b> S = Split Spoon A = Auger T = Shelby Tube W = Wash R = Mud Rotary C = Core D = Denison P = Piston N = No Sample							<b>DEFINITIONS</b> SPT = Standard Penetration Test (ASTM D1586) PID = Photo Ionization Detector measurement Lab Class = USCS (ASTM D2487)		
Depth (Ft.)	Sample Type & No.	Sample Rec. (Ft.,%)	SPT	Lab Class.	PID (ppm)	Visual Description	Well Installation Detail	Elevation (Ft. MSL)	
11	S-6	1.6 80%	10	--	0.4	Continued from Sheet 1 v stiff			
12			8		0.4				
13	S-7	1.7 85%	3	--	0.4	little to some silt, trace clay; gray; med dense; wet		1.68	
14			4		0.4				
15	S-8	1.8 90%	5	--	0.4	<b>FINE to MEDIUM SAND</b> , little silt, trace to little shell frag, trace gravel; gray; med dense; wet			
16			6		0.4				
17	S-9	1.6 80%	9	--	0.4	trace gravel & silt; gray; med dense; wet			
18			10		0.4				
19	S-10	1.5 75%	2	--	0.4	trace to little silt, trace gravel; grayish-brown; loose; wet			
20			2		0.4				
21	S-11	1.2 60%	2	--	0.4	<b>FINE SAND</b> , partially cemented, little clay, trace silt; light gray; v loose; wet			
22			2		0.4				
23	S-12	1.4 70%	6	--	0.4	little shell frag, trace silt & clay; light greenish-gray; med dense; wet			
24			7		0.4				
25	S-13	1.5 75%	10	--	0.4	some silt, little to some shell frag, trace clay; green- gray; med dense; wet			
26			10		0.4				
27	S-14	1.2 60%	40	--	0.4	some shell frag, little to some silt, trace clay; green- gray; v dense; wet			
28			43		0.4				
29	S-15	1.8 90%	20	--	0.4	<b>FINE SAND &amp; SHELLS</b> , little silt, trace clay; green- gray; dense; wet			
30			18		0.4				
			25			Match to Sheet 3			

DRILLING CO.: Parratt - Wolff  
 DRILLER: Kevin White

BAKER REP.: John Zimmerman  
 BORING NO.: 93-MW04IW SHEET 2 OF 4

## TEST BORING AND WELL CONSTRUCTION RECORD

PROJECT: Phase II Investigation at Sites 88, 89, and 93 - MCB Camp Lejeune

CTO NO.: 62470-356

BORING NO.:

93-MW04IW

SAMPLE TYPE							DEFINITIONS		
S = Split Spoon A = Auger T = Shelby Tube W = Wash R = Mud Rotary C = Core D = Denison P = Piston N = No Sample							SPT = Standard Penetration Test (ASTM D1586) PID = Photo Ionization Detector measurement Lab Class = USCS (ASTM D2487)		
Depth (Ft.)	Sample Type & No.	Sample Rec. (Ft.,%)	SPT	Lab Class.	PID (ppm)	Visual Description	Well Installation Detail	Elevation (Ft. MSL)	
31	S-16	1.6 80%	28	--	0.4 0.4	Continued from Sheet 2 v dense			
32			28 29						
33	S-17	1.8 90%	27	--	0.4 0.4	dense			
34			25 18						
35	S-18	1.6 80%	28	--	0.4 0.4	FINE SAND, some shell frag, little silt; lt. greenish- gray; dense; wet			
36			21 21						
37	S-19	1.5 75%	20	--	0.4 0.4				
38			24 23 24						
39	S-20	1.2 60%	32	--	0.4 0.4				
40			16 15 21						
41	S-21	--	12	--	0.4 0.4	trace to little shell frag, trace silt; greenish-gray; dense; wet		40.0 -24.32	
42			21 19 15						
43	S-22	--	21	--	0.4 0.4	FINE to MEDIUM SAND, trace to little silt, trace shell frag; greenish-gray; v dense; wet		42.0 -26.32	
44			38 40 50						
45	S-23	1.6 80%	28	--	0.4 0.4				
46			31 40 40						
47	S-24	1.8 90%	21	--	0.4 0.4	FINE SAND, trace to little shell frag & silt; greenish- gray; v dense; wet			
48			50 52 55						
49	S-25	1.5 75%	20	--	0.4 0.4			49.0 -33.32	
50			20 20 30						
			10			Match to Sheet 4		50.0 -34.32	

DRILLING CO.: Parratt - Wolff

DRILLER: Kevin White

BAKER REP.:

John Zimmerman

BORING NO.:

93-MW04IW

SHEET 3 OF 4



**TEST BORING AND WELL CONSTRUCTION RECORD**

PROJECT: Phase II Investigation at Sites 88, 89, and 93 - MCB Camp Lejeune  
 CTO NO.: 62470-356 BORING NO.: 93-MW04IW

SAMPLE TYPE						DEFINITIONS			
S = Split Spoon A = Auger T = Shelby Tube W = Wash R = Mud Rotary C = Core D = Denison P = Piston N = No Sample						SPT = Standard Penetration Test (ASTM D1586) PID = Photo Ionization Detector measurement Lab Class = USCS (ASTM D2487)			
Depth (Ft.)	Sample Type & No.	Sample Rec. (Ft.,%)	SPT	Lab Class.	PID (ppm)	Visual Description	Well Installation Detail	Elevation (Ft. MSL)	
51	S-26	1.5	50	--	0.4	Continued from Sheet 3 little shell frag; olive; v dense; damp to moist	[REDACTED]	-36.32	
52		75%	50		0.4				
			100/4"			BOH @ 52.0 ft.			
53									
54									
55									
56									
57									
58									
59									
60									
61									
62									
63									
64									
65									
66									
67									
68									
69									
70									

DRILLING CO.: Parratt - Wolff  
 DRILLER: Kevin White

BAKER REP.: John Zimmerman  
 BORING NO.: 93-MW04IW SHEET 4 OF 4



## TEST BORING AND WELL CONSTRUCTION RECORD

**PROJECT:** Phase II Investigation at Sites 88, 89, and 93 - MCB Camp Lejeune  
**CTO NO.:** 62470-356 **BORING NO.:** 93-MW05  
**COORDINATES: EAST:** 2465187.4170 **NORTH:** 360551.7080  
**ELEVATION: SURFACE:** 11.02 **TOP OF PVC CASING:** 13.64

Rig: CME-55					Date	Progress (Ft.)	Weather	Depth to Water (Ft.)	Time
Split Spoon	Casing	Augers	Core Barrel						
Size (ID)	1-3/8"	--	3-1/4"	--	4/20/97	0.0 - 14.0	P Cloudy, 70s	6.0	--
Length	2.0'	--	5.0'	--					
Type	Stainless	--	HSA	--					
Hammer Wt.	140 lbs.	--	--	--					
Fall	30"	--	--	--					
Stickup	--	--	--	--					

**Remarks:** Boring reamed with 6-1/4" HSAs.

SAMPLE TYPE							WELL INFORMATION				
S = Split Spoon A = Auger T = Shelby Tube W = Wash R = Mud Rotary C = Core D = Denison P = Piston N = No Sample							Type		Top Depth (Ft.)	Bottom Depth (Ft.)	
							Sch 40 PVC Casing		2.0"	0	4
							Sch 40 PVC, 10-slot Screen		2.0"	4	14
Depth (Ft.)	Sample Type & No.	Sample Rec. (Ft.,%)	SPT	Lab Class.	PID (ppm)	Visual Description	Well Installation Detail	Elevation (Ft. MSL)			
1	S-1	1.5 75%	6	--	0.3 0.3	FINE SAND & SILT; trace roots; brown; med dense; damp	1.0	10.02			
2			7						6	2.0	9.02
3	S-2	1.8 90%	4	--	0.3 0.3	FINE SAND, little silt, trace clay; dark brown; loose; damp	4.0	7.02			
4			3						2		
5	S-3	1.3 65%	2	--	0.3 0.3	some silt & clay, trace wood; brown to gray; stiff; moist to wet LAB SAMPLE	6.0	10.02			
6			2						9		
7	S-4	1.4 70%	1	--	0.3 0.3	dark brown; soft; wet	8.0	10.02			
8			1						1		
9	S-5	1.6 80%	1	--	0.3 0.3		9.0	10.02			
10			1						2		
			WOH			Match to Sheet 2					

**DRILLING CO.:** Parratt - Wolff  
**DRILLER:** Kevin White

**BAKER REP.:** John Zimmerman  
**BORING NO.:** 93-MW05 **SHEET 1 OF 2**



## TEST BORING AND WELL CONSTRUCTION RECORD

PROJECT: Phase II Investigation at Sites 88, 89, and 93 - MCB Camp Lejeune  
 CTO NO.: 62470-356 BORING NO.: 93-MW05

<u>SAMPLE TYPE</u>							<u>DEFINITIONS</u>		
S = Split Spoon A = Auger T = Shelby Tube W = Wash R = Mud Rotary C = Core D = Denison P = Piston N = No Sample							SPT = Standard Penetration Test (ASTM D1586) PID = Photo Ionization Detector measurement Lab Class = USCS (ASTM D2487)		
Depth (Ft.)	Sample Type & No.	Sample Rec. (Ft.,%)	SPT	Lab Class.	PID (ppm)	Visual Description	Well Installation Detail	Elevation (Ft. MSL)	
11			4			little silt & clay, trace med to coarse sand; dk brown; med dense; wet SAMPLE			
12	S-6	1.5 75%	3 5	--	0.3 0.3				
13			2			some med to coarse sand, little silt & clay; dk brown; loose; wet			
14	S-7	1.6 80%	4 2 4	--	0.3 0.3			14.0	14.0
15						BOH @ 14.0			
16									
17									
18									
19									
20									
21									
22									
23									
24									
25									
26									
27									
28									
29									
30									

DRILLING CO.: Parratt - Wolff  
 DRILLER: Kevin White

BAKER REP.: John Zimmerman  
 BORING NO.: 93-MW05 SHEET 2 OF 2

**Baker**

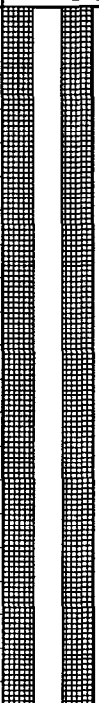
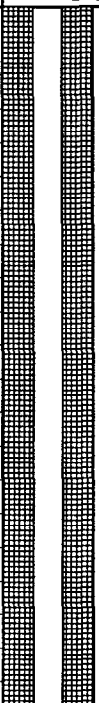
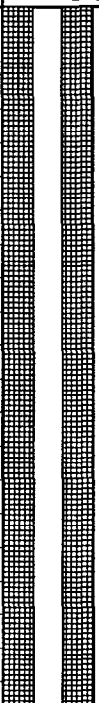
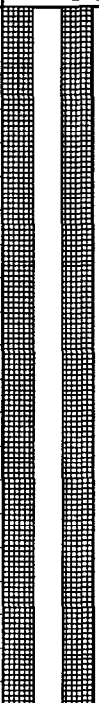
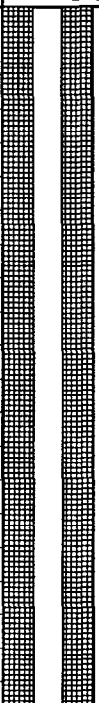
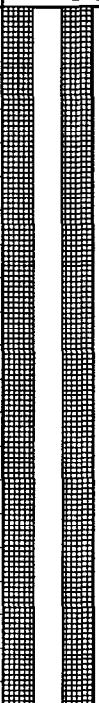
Baker Environmental

**TEST BORING AND WELL CONSTRUCTION RECORD**

PROJECT: Phase II Investigation at Sites 88, 89, and 93 - MCB Camp Lejeune  
 CTO NO.: 62470-356 BORING NO.: 93-MW05IW  
 COORDINATES: EAST: 2465188.1990 NORTH: 360561.4600  
 ELEVATION: SURFACE: 10.82 TOP OF PVC CASING: 13.29

Rig: CME-55					Date	Progress (Ft.)	Weather	Depth to Water (Ft.)	Time
Split Spoon	Casing	Augers	Core Barrel						
Size (ID)	1-3/8"	--	3-1/4"	--	4/20/97	0.0 - 46.0	P Cloudy, 70s	4.0	--
Length	2.0'	--	5.0'	--					
Type	Stainless	--	HSA	--					
Hammer Wt.	140 lbs.	--	--	--					
Fall	30"	--	--	--					
Stickup	--	--	--	--					

Remarks: Boring reamed with 6-1/4" HSAs.

SAMPLE TYPE							WELL INFORMATION			
S = Split Spoon A = Auger T = Shelby Tube W = Wash R = Mud Rotary C = Core D = Denison P = Piston N = No Sample							Type	Diam.	Top Depth (Ft.)	Bottom Depth (Ft.)
							Sch 40 PVC Casing	2.0"	0	35
							Sch 40 PVC, 10-slot Screen	2.0"	35	40
Depth (Ft.)	Sample Type & No.	Sample Rec. (Ft., %)	SPT	Lab Class.	PID (ppm)	Visual Description	Well Installation Detail	Elevation (Ft. MSL)		
1	S-1	0.6 30%	3	--	0.4 0.4	FINE SAND & SILT; trace roots; gray to black; loose; damp		8.12		
2			6							
3	S-2	1.7 85%	5	--	0.4 0.4	SILT & CLAY, some sand		7.12		
4			7							
5	S-3	1.3 65%	10	--	0.4 0.4	FINE SAND, trace silt; gray; dense; wet Groundwater @ 4.0' LAB SAMPLE				
6			18							
7	S-4	1.3 65%	6	--	0.4 0.4	med dense				
8			9							
9	S-5	1.1 55%	3	--	0.4 0.4	loose				
10			3							
			WOH			Match to Sheet 2				

DRILLING CO.: Parratt - Wolff  
 DRILLER: Kevin White

BAKER REP.: John Zimmerman  
 BORING NO.: 93-MW05IW SHEET 1 OF 3

## TEST BORING AND WELL CONSTRUCTION RECORD

PROJECT: Phase II Investigation at Sites 88, 89, and 93 - MCB Camp Lejeune  
 CTO NO.: 62470-356 BORING NO.: 93-MW05IW

SAMPLE TYPE						DEFINITIONS				
S = Split Spoon A = Auger T = Shelby Tube W = Wash R = Mud Rotary C = Core D = Denison P = Piston N = No Sample						SPT = Standard Penetration Test (ASTM D1586) PID = Photo Ionization Detector measurement Lab Class = USCS (ASTM D2487)				
Depth (Ft.)	Sample Type & No.	Sample Rec. (Ft., %)	SPT	Lab Class.	PID (ppm)	Visual Description	Well Installation Detail	Elevation (Ft. MSL)		
11	S-6	0.9 45%	1	--	0.4	Continued from Sheet 1 v loose				
12			2		0.4					
13	S-7	1.4 70%	6	--	0.4	FINE to COARSE SAND, trace gravel & silt; gray; med dense; wet				
14			8		0.4					
15	S-8	0.6 30%	4	--	0.4	FINE SAND & SILT, little clay; greenish-gray; stiff; wet				
16			6		0.4					
17	S-9	0.5 25%	7	--	0.4	hard				
18			10		0.4					
19	S-10	1.3 65%	8	--	0.4	FINE to MEDIUM SAND & SILT, trace to little clay, trace shells; greenish-gray; med dense; wet				
20			12		0.4					
21	S-11	1.7 85%	15	--	0.4	FINE SAND & SILT, little to some clay; trace shells greenish-gray; v stiff; wet				
22			14		0.4					
23	S-12	0.9 45%	9	--	0.4	SHELL & FOSSIL FRAG, little silt, trace f sand, part. cemented; greenish-gray; med dense; wet				
24			10		0.4					
25	S-13	1.0 50%	9	--	0.4					
26			12		0.4					
27	S-14	0.9 45%	10	--	0.4	FINE to MEDIUM SAND & SILT some shell frag, little to some clay; greenish- gray; med dense; wet				
28			11		0.4					
29	S-15	1.7 85%	12	--	0.4	As above, but no clay & dense				
30			15		0.4					
						Match to Sheet 3				

DRILLING CO.: Parratt - Wolf  
 DRILLER: Kevin White

BAKER REP.: John Zimmerman  
 BORING NO.: 93-MW05IW SHEET 2 OF 3



**TEST BORING AND WELL CONSTRUCTION RECORD**

PROJECT: Phase II Investigation at Sites 88, 89, and 93 - MCB Camp Lejeune  
 CTO NO.: 62470-356 BORING NO.: 93-MW05IW

SAMPLE TYPE						DEFINITIONS				
S = Split Spoon A = Auger T = Shelby Tube W = Wash R = Mud Rotary C = Core D = Denison P = Piston N = No Sample						SPT = Standard Penetration Test (ASTM D1586) PID = Photo Ionization Detector measurement Lab Class = USCS (ASTM D2487)				
Depth (Ft.)	Sample Type & No.	Sample Rec. (Ft., %)	SPT	Lab Class.	PID (ppm)	Visual Description	Well Installation Detail	Elevation (Ft. MSL)		
31	S-16	1.0 50%	8	--	0.4	Continued from Sheet 2 some shell frag, trace clay; greenish-gray; med dense		31.0	-20.18	
32			13		0.4					
33	S-17	1.1 55%	16	--	0.4	<b>FINE to MEDIUM SAND,</b> some shell frag, trace silt & clay; greenish-gray; dense; wet		33.0	-22.18	
34			17		0.4					
35	S-18	0.8 40%	16	--	0.4	little to some shell frag, trace silt; light gray; dense; wet		35.0	-24.18	
36			18		0.4					
37	S-19	1.2 60%	9	--	0.4	part. cemented, trace silt; greenish-gray; med dense; wet				
38			9		0.4					
39	S-20	1.0 50%	12	--	0.4	<b>FINE to MEDIUM SAND,</b> trace shell frag, & silt; greenish-gray; dense; wet		40.0	-29.18	
40			18		0.4					
41	S-21	1.1 55%	10	--	0.4	little to some clay; little shell frag, trace silt; green- gray; med dense; wet		42.0	-31.18	
42			13		0.4					
43	S-22	0.7 35%	15	--	0.4	<b>FINE SAND &amp; SILT,</b> little clay, trace shells; greenish- gray; hard; moist				
44			26		0.4					
45	S-23	0.3 15%	5	--	0.4	v stiff; moist to wet				
46			7		0.4					
46			11					46.0	-35.18	
47						BOH @ 46.0 ft.				
48										
49										
50										

DRILLING CO.: Parratt - Wolff  
 DRILLER: Kevin White

BAKER REP.: John Zimmerman  
 BORING NO.: 93-MW05IW SHEET 3 OF 3

**APPENDIX B**  
**GEOTECHNICAL ENGINEERING AND HYDROGEOLOGIC**  
**PARAMETERS**

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June 3, 1997

2592 HOPE MILLS ROAD  
FAYETTEVILLE, N. C. 28306  
910-426-2323

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Baker Environmental  
420 Rouser Road  
Coraopolis, Pennsylvania 15108

Attention: Mr. Jeffrey P. Tepsic

Reference: Permeability Testing  
Camp Lejeune Project  
Jacksonville, North Carolina  
Job No. 2053-97

Dear Mr. Tepsic:

Soil Tech Engineering, Inc. has recently completed laboratory tests on undisturbed soil samples recently obtained from various locations at Camp Lejeune in Jacksonville, North Carolina. Each sample was delivered to our laboratory for testing. Each sample was tested for bulk density, grain size and permeability as requested.

Each sample was tested for its physical properties in accordance with the following test procedures.

1. ASTM D-422, "Particle Size Analysis of Soils"
2. Coefficient of Permeability - Falling Head Method  
"Engineering Properties of Soils and Their  
Measurements" by Joseph E. Bowles.



Baker Environmental  
June 3, 1997  
Page Two

Please find the results of our laboratory tests attached. Please contact us if you have questions.

Very truly yours,

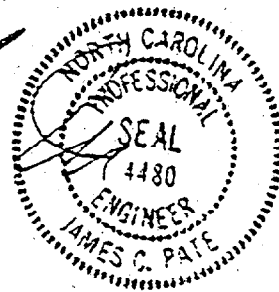
**SOIL TECH ENGINEERING**

*Pauls A. Downing Jr.*

Parks A. Downing, Jr.  
Manager

*[Handwritten signature of James Pate]*

James Pate, P.E.



PADjr:JP/tlc

2053a6-3

Attachments

**Permeability Testing  
Camp Lejeune Project  
Jacksonville, North Carolina  
Job No. 2053-97**

Sample Designation	89 MW04 DW	89 MW04 DW	88 MW 02-02
Depth	10-12' (Rec 2.0')	42-44' (Rec 2.0')	2-4' (Rec. 2.0')
Unit Weight Determination			
Sample Weight	697.37 gr.	735.6 gr.	523.1 gr.
Sample Height	3.375 inches	3.325 inches	3.25 inches
Wet Unit Weight, pcf	121.3 pcf	129.9 pcf	92.3 pcf
Existing Moisture, %	28.5%	23.2%	26.3%
Dry Unit Weight, pcf (Bulk Density)	94.4 pcf	105.4 pcf	73.1 pcf
Permeability Data			
<u>Prior to Saturation</u>			
Sample Unit Weight (wet), pcf	118.5 pcf	131.4 pcf	94.1 pcf
Moisture Content (prior), %	28.5%	23.2%	26.3%
<u>After Saturation</u>			
Sample Unit Weight (wet), pcf	118.7 pcf	132.2 pcf	101.1 pcf
Moisture Content (after), %	29.5%	21.4%	45.4%
Permeability, cm/sec.	1.06x10-5	1.07x10-5	6.2x10-4

**Grain Size Analysis  
Camp Lejeune Project  
Jacksonville, North Carolina  
Job No. 2053-97**

Location:	89 MW04 DW	89 MW04 DW	88 MW02-02
Depth:	10-12' (Rec. 2.0')	42-44' (Rec. 2.0')	2-4' (Rec. 2.0')

<u>Sieve Size</u>	<u>Percent Passing, By Weight</u>		
#10	99.7	97.4	99.3
#40	97.8	88.5	97.2
#80	82.5	17.2	33.9
#200	28.0	15.9	30.0
Percent Moisture:	28.5	23.2	26.3
Soil Description:	Dark Gray Silty SAND	Gray Fine to Medium Clayey SAND with Shells	Dark Brown Silty SAND



July 3, 1997

2592 HOPE MILLS ROAD  
FAYETTEVILLE, N. C. 28306  
910-426-2323

---

Baker Environmental  
420 Rouser Road  
Coraopolis, Pennsylvania 15108

Attention: Mr. Jeffrey P. Tepsic  
Reference: Permeability Testing  
Camp Lejeune Project  
Jacksonville, North Carolina  
Job No. 2053-97

Dear Mr. Tepsic:

Soil Tech Engineering, Inc. has recently completed laboratory tests on undisturbed soil samples recently obtained from various locations at Camp Lejeune in Jacksonville, North Carolina. Each sample was delivered to our laboratory for testing. Each sample was tested for bulk density, grain size and permeability as requested.

Each sample was tested for its physical properties in accordance with the following test procedures.

1. ASTM D-422, "Particle Size Analysis of Soils"
2. Coefficient of Permeability - Falling Head Method  
"Engineering Properties of Soils and Their Measurements" by Joseph E. Bowles.

Baker Environmental  
July 3, 1997  
Page Two

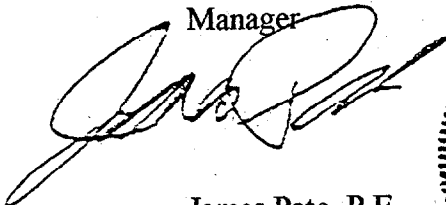
Please find the results of our laboratory tests attached. Please contact us if you have questions.

Very truly yours,

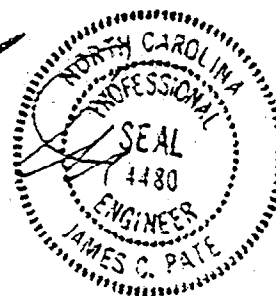
**SOIL TECH ENGINEERING**

*Parks A. Downing Jr.*

Parks A. Downing, Jr.  
Manager



James Pate, P.E.



PADjr:JP/tlc

2053a7-3

Attachments

**Permeability Testing  
Camp Lejeune Project  
Jacksonville, North Carolina  
Job No. 2053-97**

			Site 88	
Sample Designation	89 MW04 DW	93 MW01 IW	MW04IW 09	88 B04
Depth	2-4' (Rec 2.0')	12-14'	16-18' (Rec. 2.0')	20-22'
Unit Weight Determination				
Sample Weight, gr.	675.52	490.30	639.6	637.4
Sample Height, inches	3.225	3.325	3.28	3.25
Wet Unit Weight, pcf	122.9	89.2	113.8	114.7
Existing Moisture	25.6	69.9	29.3	33.6
Dry Unit Weight, pcf (Bulk Density)	97.9	52.5	88.0	85.85
Permeability Data				
<u>Prior to Saturation</u>				
Sample Unit Weight, pcf	118.1	87.8	111.8	115.9
Moisture Content (prior), %	25.6	69.9	29.3	33.6
<u>After Saturation</u>				
Sample Unit Weight (wet), pcf	118.6	87.2	111.3	112.8
Moisture Content (after), %	29.7	73.3	38.7	3.12
Permeability, cm/sec.	1.3x10-7	1.3x10-8	4.5x10-8	6.3x10-8

**Grain Size Analysis  
Camp Lejeune Project  
Jacksonville, North Carolina  
Job No. 2053-97**

Location:	89 MW04 DW	93 MW01-IW	MW04IW-09	88B04
Depth:	2-4' (Rec. 2.0')	12-14'	16-18' (Rec. 2.0')	20-22'
<u>Sieve Size</u>	<u>Percent Passing, By Weight</u>			
#10	100.0	99.9	100.0	99.7
#40	99.3	97.0	99.9	98.3
#80	90.4	71.0	80.7	78.8
#200	62.5	64.4	67.8	68.7
Percent Moisture:	25.6	69.9	38.7	33.6
Soil Description:	Gray/Orange Fine Sandy CLAY	Gray Clayey SILT	Gray/Orange CLAY	Gray CLAY



August 20, 1997

2592 HOPE MILLS ROAD  
FAYETTEVILLE, N. C. 28306  
910-426-2323

---

Baker Environmental  
420 Rouser Road  
Coraopolis, Pennsylvania 15108

Attention: Mr. Jeffrey P. Tepsic

Reference: Permeability Testing  
Camp Lejeune Project  
Jacksonville, North Carolina  
Job No. 2053-97

Dear Mr. Tepsic:

Soil Tech Engineering, Inc. has recently completed laboratory tests on undisturbed soil samples recently obtained from various locations at Camp Lejeune in Jacksonville, North Carolina. Each sample was delivered to our laboratory for testing. Each sample was tested for bulk density, grain size and permeability as requested.

Each sample was tested for its physical properties in accordance with the following test procedures.

1. ASTM D-422, "Particle Size Analysis of Soils"
2. Coefficient of Permeability - Falling Head Method  
"Engineering Properties of Soils and Their  
Measurements" by Joseph E. Bowles.

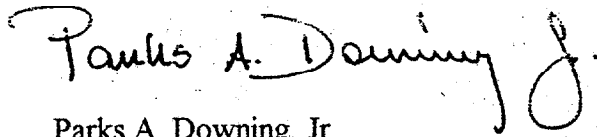


Baker Environmental  
August 20, 1997  
Page Two

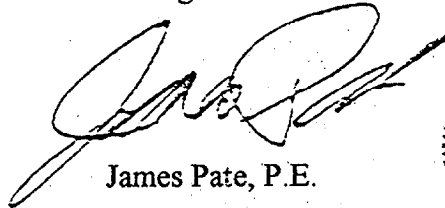
Please find the results of our laboratory tests attached. Please contact us if you have questions.

Very truly yours,

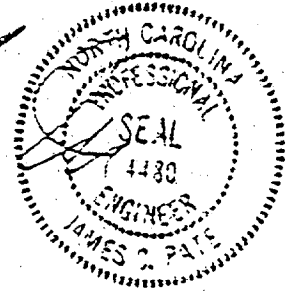
**SOIL TECH ENGINEERING**



Parks A. Downing, Jr.  
Manager



James Pate, P.E.



PADjr:JP/ad

Attachments

2053A820.WPS

**Permeability Testing  
Camp Lejeune Project  
Jacksonville, North Carolina  
Job No. 2053-97**

Sample Designation	89 MW08 DW
Depth	38.0 -40.0'
Unit Weight Determinatio	
Sample Weight	698.7 gr.
Sample Height	3.42 inches
Wet Unit Weight, pcf	119.1 pcf
Existing Moisture, %	29.6%
Dry Unit Weight, pcf (Bulk Density)	91.9pcf

**Permeability Data**

Prior to Saturation

Sample Unit Weight (wet), pcf	117.9 pcf
Moisture Content (prior), %	29.6%

After Saturation

Sample Unit Weight (wet), pcf	118.0 pcf
Moisture Content (after), %	30.3%
Permeability, cm/sec.	$5.4 \times 10^{-7}$

**Grain Size Analysis  
Camp Lejeune Project  
Onslow County, North Carolina  
Job No. 2053-97**

Location: 89 MW-08 DW

Depth: 38.0-40.0'

<u>Sieve Size</u>	<u>Percent Passing, By Weight</u>
#10	99.9
#40	99.0
#80	27.7
#200	18.5

Percent Moisture: 29.6

Soil Description: Gray Fine to Medium Clayey SAND

<b>Table 1</b> <b>Geotechnical Tests Performed, Reference Methods and Test Numbers</b>		
<b>Test Parameter</b>	<b>Method<sup>1</sup></b>	<b>Test Numbers</b>
Grain Size by Sieve and Hydrometer	D 421/422	1
Bulk Density (undisturbed)	D 2937	1

*Handwritten:*  
 RSW  
 9705-6006

<sup>1</sup> All analytical methods derived from the Annual Book of ASTM Standards, Section 4. Volume 4.08, Soil and Rock; building Stones; Geotextiles. American Society of Testing Materials, Philadelphia, PA, 1993 unless noted otherwise.

WESTON Analytics Use Only

# Custody Transfer Record/Lab Work Request



97056494

Client Baker - Lejeune #356  
 Work Order 19629-009-039 5/31/97  
 Date Rec'd. 5/3/97-001-00 Date Due 5/21/97  
 RFW Contact Beau Ramsey RS/5/97  
 Client Contact/Phone Matt Erdman

Refrigerator#	5	8	8	5		5	8	8	5
#/Type Container	11G	11G	11G	21G		21G	21G	11P	11G
Volume	2-oz	4-oz	8-oz	10oz		10oz	80-oz	1-P	2-oz
Preservative				DCI		DCI		WAS	
ANALYSES REQUESTED	VOA 624H	BVA 605H	HSL 4026 9061	624H	CHRT REDO	VOA 624H	625H 608H	HSL H026	624H 9001

WESTON Analytics Use Only

Samples Were:  
 1 Shipped or Hand-Delivered  **FX**  
 NOTES:

2 Ambient or Chilled   
 NOTES:

3 Received Broken/Leaking (Improperly Sealed)   
 Y  N   
 NOTES:

4 Properly Preserved   
 NOTES:

5 Received Within Holding Times   
 NOTES:

WA Use Only Lab ID	Client ID/Description	Matrix	Date Collected						
001	IR89-mw06dw-01	S	5/2/97	A	B	C			✓
002	↓ -02								
003	4w06iw-01								
004	↓ -01D								
005	↓ mw06iw-02								
006	TB05	W					A-B		
007	IR89-RBSB10	W	5/4/97				A-B	C-D	E
008	IR88-mw06iw-06	S					<del>A-B</del>	<del>C-D</del>	<del>E</del>
009	↓ 06D								A
010	↓ 07								A
011	IR88-RBSB11	W					A-B		
012	IR89-mw07iw-04 <i>MSAD*</i>	S	5/3/97	A	B	C			
013	↓ 06		5/3/97	A	B	C			
014	mw07dw-04		5/4/97	A	B	C			
015	mw07dw-06			A	B	C			

COC Tape Was:

1 Present on Outer Package  N  
 2 Unbroken on Outer Package  N  
 3 Present on Sample  N  
 4 Unbroken on Sample  N  
 NOTES: Y N

Matrix: W - Water DS - Drum Solids X - Other  
 S - Soil O - Oil DL - Drum Liquids  
 SE - Sediment A - Air F - Fish  
 SO - Solid WI - Wipe L - EP/TCLP Leachate

Special Instructions: *OC - NFESC Del - NFESC D Internal 100*

Item/Reason	Relinquished by	Received by	Date	Time	Item/Reason	Relinquished by	Received by	Date	Time
		<i>[Signature]</i>	5/3/97	1120					
1000 in 16		<i>[Signature]</i>	5/3/97	0150					
7-00	FE	<i>[Signature]</i>	5/4/97	1765					
18-25	FE	<i>[Signature]</i>	5/3/97	1415					

COC Record Was:

1 Present Upon Receipt of Samples  N  
 Discrepancies Between Sample Labels and COC Record?  N  
 NOTES: Y N

WESTON Analytics Use Only

97057, 494

# Custody Transfer Record/Lab Work Request



Client Baker Lejeune 356  
 Work Order 06629-889-039-0001-00  
 Date Rec'd. 5/3/97 Date Due 5/28/97  
 RFW Contact Juanita Ramirez  
 Client Contact/Phone Matth Kautman

Refrigerator#	5/6	5	8	8	5	8	8	8
#/Type Container	2/6	2/6	2/6	1/P	1/6	1/6	1/6	1/6
Volume	8.3	40ml	800	1.0	8.3	4.3	8.3	8.3
Preservative		OC1		HA03				
ANALYSES REQUESTED	ISUB	VA	GA5H	HA03			HSL Metals ICP 0.001	OCT 9.001

WESTON Analytics Use Only

Samples Were:  
 1 Shipped or Hand-Delivered FX  
 NOTES:

2 Ambient or Chilled Chilled  
 NOTES:

3 Received Broken/Leaking (Improperly Sealed)  
 Y N  
 NOTES:

4 Properly Preserved Y N  
 NOTES:

5 Received Within Holding Times  
Y N  
 NOTES:

COC Tape Was:  
 1 Present on Outer Package Y N  
 2 Unbroken on Outer Package Y N  
 3 Present on Sample Y N  
 4 Unbroken on Sample Y N  
 NOTES:

COC Record Was:  
 1 Present Upon Receipt of Samples Y N

Discrepancies Between Sample Labels and COC Record? Y N  
 NOTES:  
5/3/97 see 502

WA Use Only Lab ID	Client ID/Description	Matrix	Date Collected	*						
016	IR89-MW06DW-07	S	5/2/97	A-B						
017	TB06	W		A-B						
018	IR93-RBSB11	W	5/6/97	A-B	C-D	E				
019	IR88-RBSB12	↓		A-B						
020	IR93-MW04IW-02	S					A	B	C	
021	↓ ↓ 04	↓					A	B	C	
022	IR89-MW06DW-07	↓	5/2/97							A
023	TB07	W	5/2/97	A-B						
024	IR88-MW07IW-09	S	5/5/97							A-B
025	↓ ↓ 22	↓								A-B

Matrix: W - Water DS - Drum Solids X - Other  
 S - Soil O - Oil DL - Drum Liquids  
 SE - Sediment A - Air F - Fish  
 SO - Solid WI - Wipe L - EP/TCLP Leachate

Special Instructions: dx Grain Size / Bulk Density

QC = NFESC Del = NFESC

Item/Reason	Relinquished by	Received by	Date	Time	Item/Reason	Relinquished by	Received by	Date	Time
7.17	FX	<u>[Signature]</u>	5/6/97	1225					
18.25	FX	<u>[Signature]</u>	5/7/97	1615					
16 SUB	<u>A. Brubaker</u>	FX → ETL	5/8/97	1250					

WESTON®

OFF-LOAD / SUBCONTRACT FORM (side 1 of 2)

Client Name: Baker-Lejeune #356

Today's Date: 5/8/97

Lab Project Manager: Bosco Ramirez

Total No. Samples in Shipment: 3

Date Rec'd/Expected: 5/6/97/5/8/97  
(circle one)

W.O. #: 06629-009-039-0001-00

RFW #	DATE OF COLLECTION	QUANT.	MATRIX	PARAMETER	DUE DATE	UNIT COST	QC REQUIRED	DELIVERABLES	DETECT. LIMITS	ANALYTE LIST	HOLD TIME SAMPLE/ECT.	METHOD REF.
97056494	5/2/97	1	Soil	Grain Size	5/30/97	\$100	NFESC	NFESCD				
97056588	5/7/97	2	soil	Bulk Density		\$20						

Other special requirements/certifications: Send report to Sheryl Johnson

Hazard/Safety: Yes/No/Unknown - Radiation High Hazard High PCBs/Dioxins Other \_\_\_\_\_  
(please circle and indicate)

Laboratory Sign-Off: R. B...

ROY F. WESTON, INC. ENVIRONMENTAL TECHNOLOGY LABORATORY

5.

NATURAL MOISTURE CONTENT AND BULK DENSITY					
PROJECT	Baker - Lejuene#356	PROJECT ANALYST	JRA	OVEN MODEL	VWR
JOB NUMBER	9705G494	QA/QC ANALYST	WB	OVEN TEMPERATURE, C	105
W. O. NUMBER	06629-009-039-0001-00	DATE RECEIVED	05/09/97	DATE COMPLETED	05/14/97

SAMPLE DATA							
ETL Sample Number	016						
Project Sample I. D.	IR89-MW06DW-07						

MOISTURE CONTENT							
Total Solids, %	75.4						
Moisture Content, % wet	24.6						
Moisture Content, % dry	32.6						

BULK DENSITY							
Sample Type and/or Compactive Effort	as-received						
Bulk Density, g/cc	1.90						
Wet Unit Weight, pcf	118.3						
Dry Unit Weight, pcf	89.2						



ROY F. WESTON, INC. ENVIRONMENTAL TECHNOLOGY LABORATORY

GEOTECHNICAL TESTING DATA AND RESULTS

PROJECT	Baker - Lejuene#356	PROJECT SAMPLE I.D.	IR89-MW06DW-07	PROJECT ANALYST	JRA
JOB NUMBER	9705G494	ETL SAMPLE NUMBER	016	QA/QC ANALYST	WB
W. O. NUMBER	06629-009-039-0001-00	DATE RECEIVED	05/09/97	DATE COMPLETED	05/15/97

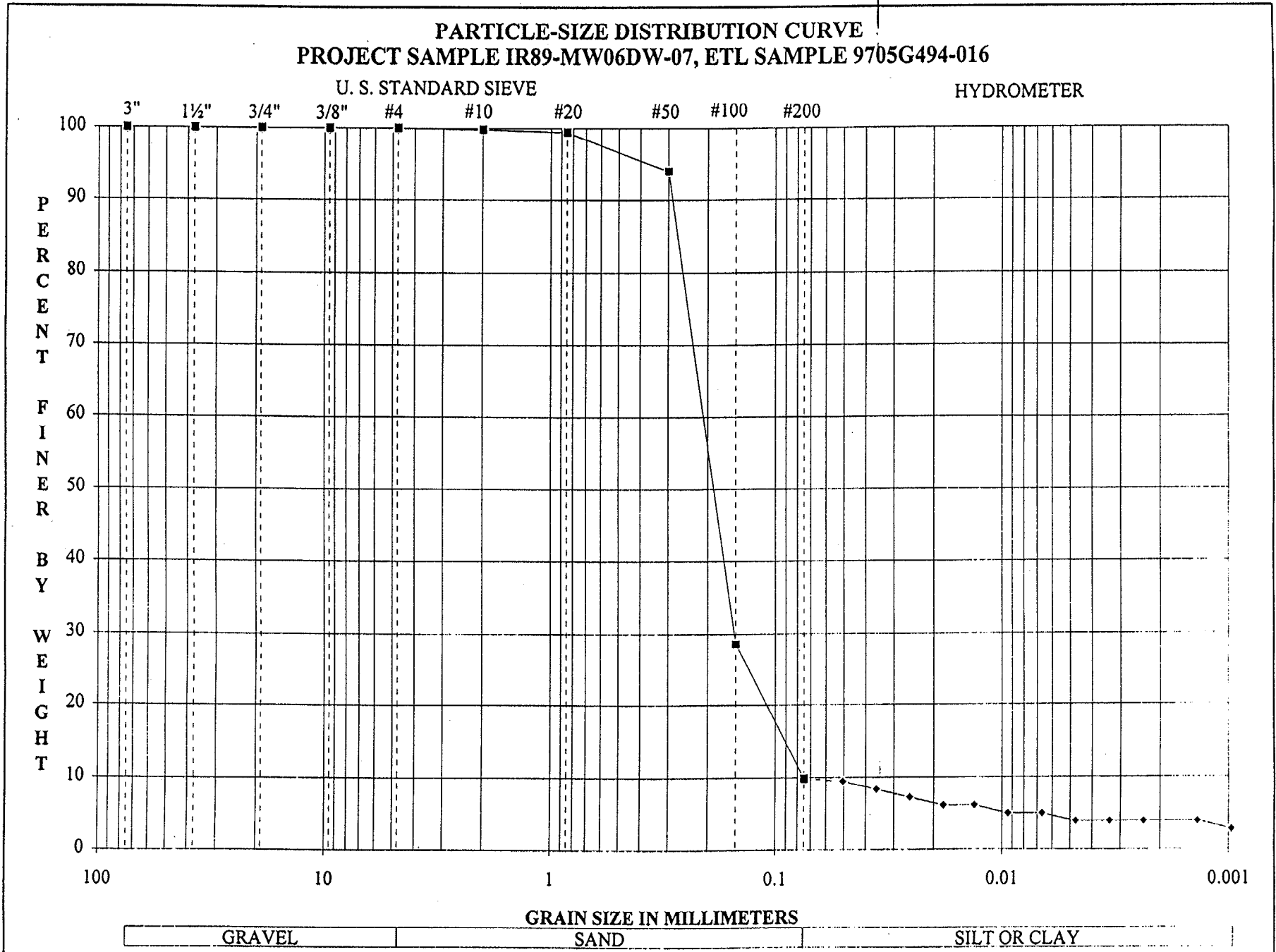
PARTICLE SIZE DISTRIBUTION		
U. S. Standard Sieve Size	Diameter mm	% Finer
3"	75.00	100.0
1½"	37.50	100.0
¾"	19.00	100.0
⅜"	9.500	100.0
#4	4.750	100.0
#10	2.000	99.8
#20	0.850	99.4
#50	0.300	93.9
#100	0.150	28.6
#200	0.075	9.9
HYDROMETER	0.0505	9.5
	0.0359	8.3
	0.0255	7.2
	0.0182	6.1
	0.0133	6.1
	0.0094	5.0
	0.0067	5.0
	0.0047	3.8
	0.0034	3.8
	0.0024	3.8
	0.0014	3.8
	0.0010	2.7

EFFECTIVE SIZES	
% Finer	Diameter mm
60	0.222
30	0.153
10	0.076
Uniformity Coefficient	Gradation Coefficient
2.9	1.4

SAMPLE DESCRIPTION
light brownish gray silty or clayey SAND with 10% silt or clay
Unified Soil Classification System (USCS) Group Symbol
SP/SM or SP/SC

NOTES

**PARTICLE-SIZE DISTRIBUTION CURVE**  
**PROJECT SAMPLE IR89-MW06DW-07, ETL SAMPLE 9705G494-016**



**APPENDIX C**  
**SAMPLE DOCUMENTATION**

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**SAMPLE TRACKING SHEETS**







Sample Tracking and Chain-of-Custody Documentation - Site 89  
 Groundwater and Surface Water Sampling, CTO-356  
 MCB, Camp Lejeune, North Carolina

MATRIX	SAMPLE ID	DATE SHIPPED	Analysis Requested						Analysis Received						DATE RECEIVED FROM LAB	TURNAROUND TIME	RFW #	DATE RECEIVED FROM VALIDATOR	TURNAROUND TIME	SDG #
			ICL Volatiles	ICL Semivolatiles	ICL Pesticides/PCBs	IAL Metals	Chloride	TSS/TDS	ICL Volatiles	ICL Semivolatiles	ICL Pesticides/PCBs	IAL Metals	Chloride	TSS/TDS						
	<b>COC# 356-006</b>																			
7-day turn	IR89-MW06IW-01	5/5/97	X						X						5/16/97	11	9705G534	5/27/97	11	9705G534
7-day turn	IR89-MW06DW-01	5/5/97	X						X						5/16/97	11	9705G534	5/27/97	11	9705G534
	<b>COC# 356-007</b>																			
7-day turn	IR89-MW07IW-01	5/6/97	X						X						5/16/97	10	9705G534	5/27/97	11	9705G534
7-day turn	IR89-MW07DW-01	5/6/97	X						X						5/16/97	10	9705G534	5/27/97	11	9705G534
	<b>COC# 356-009</b>																			
	IR89/93-FB01	5/13/97	X	X	X	X			X	X	X	X			6/6/97	23	9705G675	6/16/97	10	9705G675
	IR89/93-FB02	5/13/97	X	X	X	X			X	X	X	X			6/6/97	23	9705G675	6/16/97	10	9705G675
	IR89/93-FB03	5/13/97	X	X	X	X			X	X	X	X			6/6/97	23	9705G675	6/16/97	10	9705G675
	<b>COC# 356-013</b>																			
	IR36-GW05-01	5/19/97	X	X		X			X	X		X			6/19/97	30	9705G765	6/25/97	6	9705G765
	IR89-MW08IW-01	5/19/97	X	X		X			X	X		X			6/19/97	30	9705G765	6/25/97	6	9705G765
	IR89-MW08DW-01	5/19/97	X	X		X			X	X		X			6/19/97	30	9705G765	6/25/97	6	9705G765
	TB13	5/19/97	X						X						6/19/97	30	9705G765	6/25/97	6	9705G765
	<b>COC# 356-014</b>																			
	IR89-MW07IW-02	5/20/97	X	X		X			X	X		X			6/19/97	29	9705G765	6/25/97	6	9705G765
	IR89-MW07DW-02	5/20/97	X	X		X			X	X		X			6/19/97	29	9705G765	6/25/97	6	9705G765
	IR89-MW06IW-02	5/20/97	X	X		X			X	X		X			6/19/97	29	9705G765	6/25/97	6	9705G765
	IR89-MW06DW-02	5/20/97	X	X		X			X	X		X			6/19/97	29	9705G765	6/25/97	6	9705G765
	<b>COC# 356-015</b>																			
	TB15	5/28/97	X						X						6/26/97	28	9705G933	7/2/97	6	9705G933
	IR89-MW01-01	5/28/97	X						X						6/26/97	28	9705G933	7/2/97	6	9705G933
	IR89-MW03IW-01	5/28/97	X	X		X			X	X		X			6/26/97	28	9705G933	7/2/97	6	9705G933



Sample Tracking and Chain-of-Custody Documentation - Site 89  
 Groundwater and Surface Water Sampling, CTO-356  
 MCB, Camp Lejeune, North Carolina

MATRIX	SAMPLE ID	DATE SHIPPED	Analysis Requested					Analysis Received					DATE RECEIVED FROM LAB	TURNAROUND TIME	RFW #	DATE RECEIVED FROM VALIDATOR	TURNAROUND TIME	SDG #		
			ICL Volatiles	ICL Semivolatiles	ICL Pesticides/PCBs	IAL Metals	Chloride	TSS/TDS	ICL Volatiles	ICL Semivolatiles	ICL Pesticides/PCBs	IAL Metals							Chloride	TSS/TDS
HOLD	IR89-MW03DW-01	5/28/97	X	X		X		X	X	X		X		X	6/26/97	28	9705G933	7/2/97	6	9705G933
	IR89-MW05-01	5/28/97	X	X		X			X	X		X			6/26/97	28	9705G933	7/2/97	6	9705G933
	IR89-MW05IW-01	5/28/97	X	X	X	X			X	X	X	X			6/26/97	28	9705G933	7/2/97	6	9705G933
	IR89-MW05IW-01D	5/28/97	X	X	X	X			X	X	X	X			6/26/97	28	9705G933	7/2/97	6	9705G933
	IR89-MW05DW-01	5/28/97	X	X		X			X	X		X			6/26/97	28	9705G933	7/2/97	6	9705G933
	IR35-MW42B-01	5/28/97	X						X						6/26/97	28	9705G933	7/2/97	6	9705G933
	IR89/93-RBGW19	5/28/97																		
<b>COC# 356-016</b>																				
DUP	IR89/93-RBGW20	5/30/97	X	X	X	X			X	X	X	X			6/27/97	27	9705G977	7/7/97	10	9705G977
	IR89-MW04-01	5/30/97	X	X	X	X			X	X	X	X			6/27/97	27	9705G977	7/7/97	10	9705G977
	IR89-MW04-01D	5/30/97	X	X	X	X			X	X	X	X			6/27/97	27	9705G977	7/7/97	10	9705G977
	IR89-MW04IW-01	5/30/97	X	X		X			X	X		X			6/27/97	27	9705G977	7/7/97	10	9705G977
	IR89-MW04DW-01	5/30/97	X	X		X			X	X		X			6/27/97	27	9705G977	7/7/97	10	9705G977
Surface Water	<b>COC# 356-017</b>																			
	IR89-ECSW01-02	6/2/97						X						X	7/1/97	29	9706G009			
	IR89-ECSW02-02	6/2/97						X						X	7/1/97	29	9706G009			
	IR89-ECSW03-02	6/2/97						X						X	7/1/97	29	9706G009			
	IR89-ECSW04-02	6/2/97						X						X	7/1/97	29	9706G009			
	IR89-ECSW05-02	6/2/97						X						X	7/1/97	29	9706G009			
<b>TOTALS</b>			29	21	8	21	5	1	29	21	8	21	5	1						

Sample Tracking and Chain-of-Custody Documentation - Site 93  
 Soil Sampling, CTO-356  
 MCB, Camp Lejeune, North Carolina

MATRIX	SAMPLE ID	DATE SHIPPED	Analysis Requested							Analysis Received							DATE RECEIVED FROM LAB	TURNAROUND TIME	RFW #	DATE RECEIVED FROM VALIDATOR	TURNAROUND TIME	SDG #
			TCL Volatiles	TCL Semivolatiles	TCL Pest/PCBs	TAL Metals	Eng. Parameters (1)	Vertical Permeability	TCL Volatiles	TCL Semivolatiles	TCL Pest/PCBs	TAL Metals	Eng. Parameters (1)	Vertical Permeability								
DUP/MS/MSD	COC# 356-002																					
	93-MW05IW-04	4/21/97	X	X		X			X	X		X			5/22/97	31	9704G267	5/27/97	5	9704G267		
	93-MW05IW-02	4/21/97	X	X		X			X	X		X			5/22/97	31	9704G267	5/27/97	5	9704G267		
	93-MW05IW-07	4/21/97												X	5/22/97	31	9704G267	5/27/97	5	9704G267		
	COC# 356-003																					
	93-MW02-02	4/23/97	X	X		X			X	X		X			5/22/97	29	9704G330	5/27/97	5	9704G330		
	93-MW02-04	4/23/97	X	X		X			X	X		X			5/22/97	29	9704G330	5/27/97	5	9704G330		
	93-MW05-02	4/23/97	X	X	X	X			X	X	X	X			5/22/97	29	9704G330	5/27/97	5	9704G330		
	93-MW05-02D	4/23/97	X	X	X	X			X	X	X	X			5/22/97	29	9704G330	5/27/97	5	9704G330		
	93-MW05-04	4/23/97	X	X		X			X	X		X			5/22/97	29	9704G330	5/27/97	5	9704G330		
	93-MW02IW-02	4/23/97	X	X		X			X	X		X			5/22/97	29	9704G330	5/27/97	5	9704G330		
	93-MW02IW-04	4/23/97	X	X		X			X	X		X			5/22/97	29	9704G330	5/27/97	5	9704G330		
TB03	4/23/97	X							X					5/22/97	29	9704G330	5/27/97	5	9704G330			
COC# 356-004																						
DUP	IR93-MW01-02	4/30/97	X	X	X	X			X	X	X	X			6/2/97	32	9704G396	6/5/97	3	9704G396		
	IR93-MW01-04	4/30/97	X	X		X			X	X		X			6/2/97	32	9704G396	6/5/97	3	9704G396		
	IR93-MW03-02	4/30/97	X	X		X			X	X		X			6/2/97	32	9704G396	6/5/97	3	9704G396		
	IR93-MW03-02D	4/30/97	X	X		X			X	X		X			6/2/97	32	9704G396	6/5/97	3	9704G396		
	IR93-MW03-04	4/30/97	X	X		X			X	X		X			6/2/97	32	9704G396	6/5/97	3	9704G396		
	IR93-MW03IW-02	4/30/97	X	X		X			X	X		X			6/2/97	32	9704G396	6/5/97	3	9704G396		
	IR93-MW03IW-04	4/30/97	X	X		X			X	X		X			6/2/97	32	9704G396	6/5/97	3	9704G396		
	IR93-MW01IW-02	4/30/97	X	X		X			X	X		X			6/2/97	32	9704G396	6/5/97	3	9704G396		
	IR93-MW01IW-04	4/30/97	X	X		X			X	X		X			6/2/97	32	9704G396	6/5/97	3	9704G396		
	IR93-MW01IW-04D	4/30/97	X	X		X			X	X		X			6/2/97	32	9704G396	6/5/97	3	9704G396		
IR93-RBSB09	4/30/97	X	X	X	X			X	X	X	X			6/2/97	32	9704G396	6/5/97	3	9704G396			
COC# 356-007																						
DUP	IR93-RBSB11	5/6/97	X	X	X	X			X	X	X	X			6/4/97	28	9705G494	6/9/97	5	9705G494		
	IR93-MW04IW-02	5/6/97	X	X		X			X	X		X			6/4/97	28	9705G494	6/9/97	5	9705G494		
	IR93-MW04IW-04	5/6/97	X	X		X			X	X		X			6/4/97	28	9705G494	6/9/97	5	9705G494		

(1) Engineering Parameters = TOC, Grain Size, Bulk Density

Sample Tracking and Chain-of-Custody Documentation - Site 93  
 Soil Sampling, CTO-356  
 MCB, Camp Lejeune, North Carolina

MATRIX	SAMPLE ID	DATE SHIPPED	Analysis Requested						Analysis Received						DATE RECEIVED FROM LAB	TURNAROUND TIME	RFW #	DATE RECEIVED FROM VALIDATOR	TURNAROUND TIME	SDG #
			TCL Volatiles	TCL Semivolatiles	TCL Pest/PCBs	TAL Metals	Eng. Parameters (1)	Vertical Permeability	TCL Volatiles	TCL Semivolatiles	TCL Pest/PCBs	TAL Metals	Eng. Parameters (1)	Vertical Permeability						
	<b>COC# 356-008</b>																			
DUP	IR93-MW04-02	5/7/97	X	X		X			X	X		X			6/5/97	28	9705G588	6/16/97	11	9705G588
	IR93-MW04-02D	5/7/97	X	X		X			X	X		X			6/5/97	28	9705G588	6/16/97	11	9705G588
	IR93-MW04-04	5/7/97	X	X		X			X	X		X			6/5/97	28	9705G588	6/16/97	11	9705G588
	<b>COC# 356-012</b>																			
MS/MSD	IR93-MW02DW-02	5/16/97	X	X	X	X			X	X	X	X			6/13/97	27	9705G729	6/24/97	11	9705G729
	IR93-MW02DW-04	5/16/97	X	X		X			X	X		X			6/13/97	27	9705G729	6/24/97	11	9705G729
	IR93-RBSB16	5/16/97	X	X	X	X			X	X	X	X			6/13/97	27	9705G729	6/24/97	11	9705G729
<b>TOTALS</b>			30	29	7	29	1	0	30	29	7	29	1	0						

(1) Engineering Parameters = TOC, Grain Size, Bulk Density

Sample Tracking and Chain-of-Custody Documentation - Site 93  
 Groundwater Sampling, CTO-356  
 MCB, Camp Lejeune, North Carolina

MATRIX	SAMPLE ID	DATE SHIPPED	Analysis Requested							Analysis Received							DATE RECEIVED FROM LAB	TURNAROUND TIME	RFW #	DATE RECEIVED FROM VALIDATOR	TURNAROUND TIME	SDG #											
			ICL Volatiles	ICL Semivolatiles	ICL Pesticides/PCBs	IAL Metals	TSS/TDS	Natural Attenuation Param. (1)	BOD/COD	Methane	ICL Volatiles	ICL Semivolatiles	ICL Pesticides/PCBs	IAL Metals	TSS/TDS	Natural Attenuation Param. (1)							BOD/COD	Methane									
MS/MSD	<b>COC# 356-014</b>																																
	IR93-MW03-01	5/20/97	X	X		X			X		X	X		X		X			6/19/97	29	9705G765	6/25/97	6	9705G765									
	IR93-MW03IW-01	5/20/97	X	X	X	X					X	X	X	X		X			6/19/97	29	9705G765	6/25/97	6	9705G765									
	TB14	5/20/97	X								X								6/19/97	29	9705G765	6/25/97	6	9705G765									
	<b>COC# 356-015</b>																																
	IR93-MW05-01	5/28/97	X	X		X					X	X		X					6/26/97	28	9705G933	7/2/97	6	9705G933									
	IR93-MW05IW-01	5/28/97	X	X		X					X	X		X					6/26/97	28	9705G933	7/2/97	6	9705G933									
	<b>COC# 356-016</b>																																
	IR93-MW02DW-01	5/30/97	X	X		X					X	X		X					6/27/97	27	9705G977	7/7/97	10	9705G977									
	IR93-MW01-01	5/30/97	X			X			X	X	X			X		X	X	X	6/27/97	27	9705G977	7/7/97	10	9705G977									
	IR93-MW01IW-01	5/30/97	X	X		X			X	X	X			X		X	X	X	6/27/97	27	9705G977	7/7/97	10	9705G977									
	IR93-MW04-01	5/30/97	X	X		X			X	X	X			X		X	X	X	6/27/97	27	9705G977	7/7/97	10	9705G977									
	IR93-MW04-01D	5/30/97	X	X		X					X	X		X					6/27/97	27	9705G977	7/7/97	10	9705G977									
	IR93-MW04IW-01	5/30/97	X	X		X			X	X	X			X		X	X	X	6/27/97	27	9705G977	7/7/97	10	9705G977									
	TB16	5/30/97	X								X								6/27/97	27	9705G977	7/7/97	10	9705G977									
	<b>COC# 356-017</b>																																
	IR89/93-TNK01	6/2/97	X	X	X	X	X				X	X	X	X	X				6/19/97	17	9706G104												
	IR93-MW02-01	6/2/97	X	X	X	X			X	X	X	X	X	X		X	X	X	7/1/97	29	9706G009	7/7/97	6	9706G009									
IR93-MW02-01D	6/2/97	X	X	X	X					X	X	X	X					7/1/97	29	9706G009	7/7/97	6	9706G009										
IR93-MW02IW-01	6/2/97	X	X		X			X	X	X			X		X	X	X	7/1/97	29	9706G009	7/7/97	6	9706G009										
TB17	6/2/97	X								X								7/1/97	29	9706G009	7/7/97	6	9706G009										
IR93-MW01-01	6/2/97		X								X							7/1/97	29	9706G009	7/7/97	6	9706G009										
<b>TOTALS</b>			17	14	4	14	1	7	6	7	17	14	4	14	1	7	6	7															

(1) Natural Atten. Param. = nitrate, nitrite, sulfate, chloride, Fe+2, sulfide

**ON-SITE ANALYTICAL DATA**

# MICROSEEPS



University of Pittsburgh Applied Research Center  
220 William Pitt Way, Pittsburgh, PA 15238  
(412) 826-5245  
FAX (412) 826-3433

August 29, 1996

Mr. Jeff Tepsic  
Baker Environmental, Inc.  
Airport Office Park, Bldg. 3  
420 Rouser Road  
Coraopolis, PA 15108

Dear Mr. Tepsic:

Attached are final data listings and analysis logs for the recent mobile lab services provided at Camp LeJeune.

Please give me a call if you have questions or I can be of further assistance. Thank you for using MICROSEEPS.

Sincerely,



David J. Masdea

DJM/lsp

Attachment: 961048

## MICROSEEPS

961048

VER. 8

----- BAKER ENVIRONMENTAL -----  
 ----- PROJECT: CAMP LEJEUNE -----  
 ----- PROJECT LOCATION: SITE 88 -----  
 ----- SOIL CONCENTRATIONS IN (ng/g) -----

SAMPLE NAME	VINYL CHLORIDE (ng/g)	trans- 1,2-DCE (ng/g)	cis- 1,2-DCE (ng/g)	CHLORO FORM (ng/g)	CARBON				FILE NAME	DATE COLLECTED	TIME COLLECTED	DATE ANALYZED	TIME ANALYZED
					1,1,1- TCA (ng/g)	TETRA CHLORIDE (ng/g)	TCE (ng/g)	PCE (ng/g)					
88-TW04IW-03	<100	<1	<1	<.1	<.1	<.1	0.2	14.8	M11 8	08/16/96	713	08/16/96	1701
88-TW04IW (20-22')-10	<100	<1	<1	<.1	<.1	<.1	0.1	1.5	M11 9	08/16/96	----	08/16/96	1752
88-TW05-04	<100	<1	<1	<.1	<.1	<.1	0.1	1.2	M11 10	08/16/96	1243	08/16/96	1842
88-TW06-03	<100	<1	<1	<.1	<.1	<.1	<.1	0.4	M11 11	08/16/96	1349	08/16/96	1932
88-TW07-03	<100	<1	<1	<.1	<.1	<.1	<.1	0.1	M11 14	08/16/96	1516	08/16/96	2203
88-TW08-03	<100	<1	<1	<.1	<.1	<.1	0.8	237.6	M11 15	08/16/96	1620	08/16/96	2254
88-TW09-04	<100	<1	<1	<.1	<.1	<.1	3.3	22.6	M11 18	08/16/96	1718	08/17/96	124
88-TW09-06	<100	<1	<1	<.1	<.1	<.1	0.5	3.1	M11 19	08/16/96	1720	08/17/96	215
88-TW10-02	<100	<1	<1	<.1	<.1	<.1	<.1	<.1	M11 22	08/17/96	752	08/17/96	1026
88-TW11-02	<100	<1	<1	<.1	<.1	<.1	<.1	<.1	M11 25	08/17/96	907	08/17/96	1312
88-TW12-05	<100	<1	<1	<.1	<.1	<.1	<.1	<.1	M11 26	08/17/96	1025	08/17/96	1402
88-TW13-03	<100	<1	<1	<.1	<.1	<.1	<.1	1.5	M11 31	08/17/96	1214	08/17/96	1813
88-TW13-05	<100	<1	<1	<.1	<.1	<.1	<.1	0.9	M11 32	08/17/96	1227	08/17/96	1954
88-TW14-03	<100	<1	<1	0.1	<.1	<.1	<.1	0.3	M11 35	08/17/96	1355	08/17/96	2135
88-TW15-04	<100	<1	21	0.1	<.1	<.1	8.5	11.6	M11 36	08/17/96	1516	08/17/96	2225
88-TW16-04	<100	<1	<1	<.1	<.1	<.1	<.1	0.2	M11 59	08/18/96	1505	08/18/96	2026
8-TW17-04	<100	<1	<1	<.1	<.1	<.1	<.1	0.2	M11 58	08/18/96	1625	08/18/96	1936
88-TW18-03	<100	<1	<1	<.1	<.1	<.1	<.1	<.1	M11 79	08/19/96	1502	08/20/96	415
88-TW19-03	<100	<1	<1	<.1	<.1	<.1	<.1	<.1	M11 86	08/20/96	807	08/20/96	1330

## MICROSEEPS

961048  
VER. 24

----- BAKER ENVIRONMENTAL -----  
 ----- PROJECT: CAMP LEJEUNE -----  
 ----- PROJECT LOCATION: SITE 89/93 -----  
 ----- H2O CONCENTRATIONS IN (ug/l) -----

SAMPLE NAME	VINYL	trans-	cis-	CHLORO	CARBON				FILE NAME	DATE COLLECTED	TIME COLLECTED	DATE ANALYZED	TIME ANALYZED
	CHLORIDE (ug/l)	1,2-DCE (ug/l)	1,2-DCE (ug/l)	FORM (ug/l)	1,1,1- TCA (ug/l)	TETRA CHLORIDE (ug/l)	TCE (ug/l)	PCE (ug/l)					
89-EC-SW01-01	<50	<1	2	0.3	<.1	<.1	3.8	0.2	M10 481	08/15/96	800	08/15/96	1016
89-EC-SW02-01	<50	37	48	0.2	<.1	<.1	7.3	0.2	M10 482	08/15/96	745	08/15/96	1106
89-EC-SW03-01	<50	31	44	0.1	<.1	<.1	6.4	0.2	M10 485	08/15/96	740	08/15/96	1337
89-EC-SW04-01	<50	19	52	0.4	<.1	<.1	32.9	0.2	M10 486	08/15/96	720	08/15/96	1427
89-EC-SW05-01	<50	15	44	0.3	<.1	<.1	27.3	0.1	M10 487	08/15/96	715	08/15/96	1517
89-EC-SW06-01	<50	<1	<1	<.1	<.1	<.1	<.1	<.1	M10 377	08/01/96	1300	08/01/96	1452
89-EC-SW07-01	<50	21	27	<.1	<.1	<.1	14.8	1.2	M10 383	08/01/96	1500	08/01/96	2018
89-EC-SW08-01	<50	<1	<1	<.1	<.1	<.1	<.1	0.4	M10 384	08/01/96	1455	08/01/96	2108
89-EC-SW09-01	<50	16	44	0.4	<.1	<.1	28.5	0.2	M10 488	08/15/96	1350	08/15/96	1608
89-EC-SW10-01	<50	15	43	0.4	<.1	<.1	27.9	0.1	M10 487	08/15/96	1330	08/15/96	1658
89-EC-SW11-01	<50	14	43	0.4	<.1	<.1	27.6	0.2	M10 490	08/15/96	1315	08/15/96	1748
89-MW01-01	<50	177	261	<.1	<.1	<.1	323.1	42.4	M10 366	07/31/96	1135	07/31/96	1523
89-MW02-01A	130	451	818	<.1	<.1	<.1	744.3	9.4	M10 355	07/30/96	1145	07/30/96	1449
89-MW03-01	<50	82	150	<.1	<.1	<.1	131.0	13.1	M10 365	07/31/96	1100	07/31/96	1419
89-TW04-01	<50	<1	<1	2.3	<.1	<.1	<.1	<.1	M10 370	07/31/96	1710	07/31/96	1844
89-TW04IW-01	<50	<1	<1	2.1	<.1	<.1	<.1	<.1	M10 371	07/31/96	1705	07/31/96	1934
89-TW08-01	<50	61	253	<.1	<.1	<.1	638.4	27.0	M10 397	08/03/96	1040	08/03/96	1321
89-TW08IW-01	<50	<1	<1	0.8	<.1	<.1	0.3	<.1	M10 398	08/03/96	1055	08/03/96	1411
89-TW09-01	<50	<1	<1	4.8	<.1	<.1	<.1	<.1	M10 401	08/03/96	1500	08/03/96	1642
89-TW09-02	<50	<1	<1	3.4	<.1	<.1	<.1	<.1	M10 452	08/07/96	820	08/07/96	1013
89-TW09IW-01	<50	20	114	1.9	<.1	<.1	233.4	8.8	M10 402	08/03/96	1550	08/03/96	1732
89-TW09IW-02	<50	24	132	0.2	<.1	<.1	269.4	9.1	M10 453	08/07/96	845	08/07/96	1104
89-TW10-01	<50	<1	<1	5.2	<.1	<.1	0.2	<.1	M10 409	08/04/96	935	08/04/96	1104
89-TW10IW-01	<50	5	27	0.4	<.1	<.1	36.3	<.1	M10 410	08/04/96	955	08/04/96	1148
89-TW11-01	<50	<1	<1	3.9	<.1	<.1	<.1	<.1	M10 411	08/04/96	1215	08/04/96	1346
89-TW11IW-01	<50	<1	14	2.2	<.1	<.1	3.3	<.1	M10 413	08/04/96	1240	08/04/96	1527
89-TW12-01	<50	<1	<1	<.1	<.1	<.1	<.1	<.1	M10 420	08/04/96	1655	08/04/96	2241
89-TW12IW-01	<50	<1	<1	0.5	<.1	<.1	<.1	<.1	M10 421	08/04/96	1740	08/04/96	2331



## MICROSEEPS

961048  
VER. 24

----- BAKER ENVIRONMENTAL -----  
 ----- PROJECT: CAMP LEJEUNE -----  
 ----- PROJECT LOCATION: SITE 89/93 -----  
 ----- H2O CONCENTRATIONS IN (ug/l) -----

SAMPLE NAME	VINYL	trans-	cis-	CHLORO	1,1,1-	CARBON	TCE	PCE	FILE	DATE	TIME	DATE	TIME
	CHLORIDE	1,2-DCE	1,2-DCE	FORM	TCA	TETRA							
	(ug/l)	(ug/l)	(ug/l)	(ug/l)	(ug/l)	(ug/l)	(ug/l)	(ug/l)	NAME	COLLECTED	COLLECTED	ANALYZED	ANALYZED
89-TW13-01	<50	3	18	<.1	<.1	<.1	136.9	4.8	M10 431	08/05/96	1330	08/05/96	1508
89-TW13IW-01	<50	1	21	0.7	<.1	<.1	57.9	7.4	M10 432	08/05/96	1350	08/05/96	1558
89-TW15-01	<50	53	162	7.2	<.1	<.1	355.9	13.7	M10 444	08/06/96	1400	08/06/96	1535
89-TW15IW-01	<50	<1	3	1.7	<.1	<.1	6.0	0.1	M10 445	08/06/96	1440	08/06/96	1625
89-TW16-01	<50	44	102	8.6	<.1	<.1	562.9	42.7	M10 446	08/06/96	1530	08/06/96	1723
89-TW16IW-01	<50	<1	<1	1.7	<.1	<.1	0.6	<.1	M10 447	08/06/96	1550	08/06/96	1813
89-TW17IW-01	<50	90	287	2.6	<.1	<.1	425.7	1.5	M10 455	08/07/96	1045	08/07/96	1244
89-TW18-01	<50	<1	<1	6.6	0.2	<.1	<.1	0.2	M10 469	08/13/96	1440	08/13/96	1617
89-TW18IW-01	<50	<1	<1	2.4	<.1	<.1	<.1	<.1	M10 467	08/13/96	1300	08/13/96	1436
89-TW19-01	<50	<1	<1	1.3	<.1	<.1	<.1	<.1	M10 471	08/13/96	1800	08/13/96	1928
89-TW19IW-01	<50	<1	11	0.5	<.1	<.1	3.8	<.1	M10 470	08/13/96	1645	08/13/96	1813
89-TW20-01	<50	<1	<1	<.1	<.1	<.1	<.1	<.1	M10 475	08/14/96	1120	08/14/96	1251
89-TW20IW-01	<50	8	57	0.4	<.1	<.1	59.1	0.4	M10 474	08/14/96	930	08/14/96	1059
89-TW21-01	<50	<1	<1	<.1	<.1	<.1	<.1	<.1	M10 484	08/15/96	1045	08/15/96	1246
89-TW21IW-01	<50	1	9	1.7	<.1	<.1	10.4	<.1	M10 483	08/15/96	955	08/15/96	1156
89-TW22-01	<50	<1	<1	0.7	<.1	<.1	<.1	<.1	M11 6	08/16/96	1020	08/16/96	1521
89-TW22IW-01	<50	17	106	0.3	<.1	<.1	293.9	13.0	M11 7	08/16/96	945	08/16/96	1611
89-TW23IW-01	<50	9	84	0.5	<.1	<.1	123.9	0.1	M11 93	08/21/96	945	08/21/96	1145
89-WBLNK-01	<50	<1	<1	12.2	<.1	<.1	<.1	<.1	M10 412	08/04/96	1042	08/04/96	1436
93-MW05-01A	<50	5	15	<.1	<.1	<.1	24.3	65.1	M10 342	07/29/96	1700	07/30/96	319
93-TW01	<50	57	175	0.5	0.2	0.2	39.4	16.2	M10 352	07/30/96	910	07/30/96	1218
93-TW01-02	<50	55	155	<.1	<.1	<.1	33.9	15.9	M10 439	08/06/95	750	08/06/95	1105
93-TW01IW	<50	<1	<1	0.6	<.1	<.1	0.1	<.1	M10 353	07/30/96	1025	07/30/96	1308
93-TW02-01	<50	<1	<1	<.1	<.1	<.1	<.1	<.1	M10 358	07/30/96	1355	07/30/96	1720
93-TW02IW-01	<50	<1	4	<.1	<.1	<.1	0.1	<.1	M10 359	07/30/96	1435	07/30/96	1810
93-TW02IW-02	<50	<1	2	<.1	<.1	<.1	<.1	<.1	M10 440	08/06/95	825	08/06/95	1155
93-TW03-01	<50	<1	<1	<.1	<.1	<.1	<.1	<.1	M10 363	07/31/96	915	07/31/96	1238
93-TW03IW-01	<50	<1	<1	0.3	<.1	<.1	<.1	<.1	M10 364	07/31/96	940	07/31/96	1328

## MICROSEEPS

961048  
VER. 24

----- BAKER ENVIRONMENTAL -----  
 ----- PROJECT: CAMP LEJEUNE -----  
 ----- PROJECT LOCATION: SITE 89/93 -----  
 ----- H2O CONCENTRATIONS IN (ug/l) -----

SAMPLE NAME	VINYL CHLORIDE (ug/l)	trans- 1,2-DCE (ug/l)	cis- 1,2-DCE (ug/l)	CHLORO FORM (ug/l)	CARBON				FILE NAME	DATE COLLECTED	TIME COLLECTED	DATE ANALYZED	TIME ANALYZED
					1,1,1- TCA (ug/l)	TETRA CHLORIDE (ug/l)	TCE (ug/l)	PCE (ug/l)					
93-TW05-01	<50	<1	<1	<.1	<.1	<.1	<.1	<.1	M10 374	08/01/96	840	08/01/96	1114
93-TW05IW-01	<50	<1	<1	<.1	<.1	<.1	<.1	<.1	M10 375	08/01/96	845	08/01/96	1206
93-TW06-01	<50	<1	<1	<.1	<.1	<.1	1.3	8.9	M10 385	08/01/96	1720	08/01/96	2159
93-TW06IW-01	<50	<1	<1	1.7	<.1	<.1	0.1	0.5	M10 386	08/01/96	1745	08/01/96	2249
93-TW07-01	<50	<1	<1	<.1	<.1	<.1	0.6	0.8	M10 395	08/03/96	855	08/03/96	1140
93-TW07-02	<50	<1	<1	<.1	<.1	<.1	0.5	0.7	M10 441	08/06/95	910	08/06/95	1246
93-TW07IW-01	<50	<1	<1	0.8	<.1	<.1	<.1	0.1	M10 396	08/03/96	930	08/03/96	1230
93-TW07IW-02	<50	<1	<1	<.1	<.1	<.1	<.1	0.1	M10 449	08/06/96	1800	08/06/96	1949
93-TW08-02	<50	68	284	<.1	<.1	<.1	757.0	33.2	M10 442	08/06/95	940	08/06/95	1336
93-TW14-01	<50	<1	<1	0.8	<.1	<.1	<.1	<.1	M10 434	08/05/96	1600	08/05/96	1841
93-TW14IW-01	<50	<1	<1	2.3	<.1	<.1	<.1	<.1	M10 435	08/05/96	1635	08/05/96	1931
MW42B	<50	6	37	<.1	<.1	<.1	85.8	<.1	M10 368	07/31/96	1430	07/31/96	1704

## MICROSEEPS

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----- BAKER ENVIRONMENTAL -----  
 ----- PROJECT: CAMP LEJEUNE -----  
 ----- PROJECT LOCATION: SITE 88 -----  
 ----- SOIL CONCENTRATIONS IN (ng/g) -----

SAMPLE NAME	VINYL	trans-	cis-	CHLORO	1,1,1-	CARBON	TCE	PCE	FILE	DATE	TIME	DATE	TIME
	CHLORIDE	1,2-DCE	1,2-DCE	FORM	TCA	TETRA							
	(ng/g)	(ng/g)	(ng/g)	(ng/g)	(ng/g)	(ng/g)	(ng/g)	(ng/g)	NAME	COLLECTED	COLLECTED	ANALYZED	ANALYZED
88-TW04IW-03	<100	<1	<1	<.1	<.1	<.1	0.2	14.8	M11 8	08/16/96	713	08/16/96	1701
88-TW04IW (20-22')	<100	<1	<1	<.1	<.1	<.1	0.1	1.5	M11 9	08/16/96	----	08/16/96	1752
88-TW05-04	<100	<1	<1	<.1	<.1	<.1	0.1	1.2	M11 10	08/16/96	1243	08/16/96	1842
88-TW06-03	<100	<1	<1	<.1	<.1	<.1	<.1	0.4	M11 11	08/16/96	1349	08/16/96	1932
88-TW07-03	<100	<1	<1	<.1	<.1	<.1	<.1	0.1	M11 14	08/16/96	1516	08/16/96	2203
88-TW08-03	<100	<1	<1	<.1	<.1	<.1	0.8	237.6	M11 15	08/16/96	1620	08/16/96	2254
88-TW09-04	<100	<1	<1	<.1	<.1	<.1	3.3	22.6	M11 18	08/16/96	1718	08/17/96	124
88-TW09-06	<100	<1	<1	<.1	<.1	<.1	0.5	3.1	M11 19	08/16/96	1720	08/17/96	215
88-TW10-02	<100	<1	<1	<.1	<.1	<.1	<.1	<.1	M11 22	08/17/96	752	08/17/96	1026
88-TW11-02	<100	<1	<1	<.1	<.1	<.1	<.1	<.1	M11 25	08/17/96	907	08/17/96	1312
88-TW12-05	<100	<1	<1	<.1	<.1	<.1	<.1	<.1	M11 26	08/17/96	1025	08/17/96	1402
88-TW13-03	<100	<1	<1	<.1	<.1	<.1	<.1	1.5	M11 31	08/17/96	1214	08/17/96	1813
88-TW13-05	<100	<1	<1	<.1	<.1	<.1	<.1	0.9	M11 32	08/17/96	1227	08/17/96	1954
88-TW14-03	<100	<1	<1	0.1	<.1	<.1	<.1	0.3	M11 35	08/17/96	1355	08/17/96	2135
88-TW15-04	<100	<1	21	0.1	<.1	<.1	8.5	11.6	M11 36	08/17/96	1516	08/17/96	2225
88-TW16-04	<100	<1	<1	<.1	<.1	<.1	<.1	0.2	M11 59	08/18/96	1505	08/18/96	2026
98-TW17-04	<100	<1	<1	<.1	<.1	<.1	<.1	0.2	M11 58	08/18/96	1625	08/18/96	1936
88-TW18-03	<100	<1	<1	<.1	<.1	<.1	<.1	<.1	M11 79	08/19/96	1502	08/20/96	415
88-TW19-03	<100	<1	<1	<.1	<.1	<.1	<.1	<.1	M11 86	08/20/96	807	08/20/96	1330

## MICROSEEPS

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----- BAKER ENVIRONMENTAL -----  
 ----- PROJECT: CAMP LEJBUNE -----  
 ----- PROJECT LOCATION: SITE 88 -----  
 ----- H2O CONCENTRATIONS IN (ug/l) -----

SAMPLE NAME	VINYL CHLORIDE (ug/l)	trans- 1,2-DCE (ug/l)	cis- 1,2-DCE (ug/l)	CHLORO FORM (ug/l)	CARBON				FILE NAME	DATE COLLECTED	TIME COLLECTED	DATE ANALYZED	TIME ANALYZED
					1,1,1- TCA (ug/l)	TETRA CHLORIDE (ug/l)	TCE (ug/l)	PCE (ug/l)					
88-TW01-01	<50	<1	4	0.1	<.1	<.1	17.7	157.2	M10 378	08/01/96	1400	08/01/96	1607
88-TW02-01	<50	9	445	0.1	<.1	<.1	81.5	649.1	M10 379	08/01/96	1325	08/01/96	1657
88-TW03-01	<50	6	1184	1.4	0.2	<.1	838.1	14090.0	M10 380	08/01/96	1115	08/01/96	1747
88-TW04-01	<50	1	63	5.0	0.2	<.1	229.9	32839.4	M10 381	08/01/96	1035	08/01/96	1838
88-TW04IW-01	<50	<1	21	6.7	<.1	<.1	5.5	21.0	M11 13	08/16/96	1710	08/16/96	2113
88-TW05-01	<50	<1	3	11.9	<.1	<.1	20.8	1381.7	M11 12	08/16/96	1500	08/16/96	2023
88-TW05IW-01	<50	1	89	5.4	<.1	<.1	71.2	1142.7	M11 54	08/18/96	1332	08/18/96	1615
88-TW06-01	<50	<1	<1	1.8	<.1	<.1	<.1	<.1	M11 23	08/17/96	936	08/17/96	1131
88-TW07-01	<50	<1	<1	0.5	<.1	<.1	<.1	0.2	M11 24	08/17/96	1035	08/17/96	1221
88-TW08-01	<50	2	271	0.7	0.5	<.1	341.2	53703.8	M11 27	08/17/96	1250	08/17/96	1452
88-TW08IW-01	<50	11	883	8.3	<.1	<.1	822.7	1314.4	M11 55	08/18/96	1530	08/18/96	1705
88-TW09-01	<50	<1	14	0.5	<.1	<.1	70.8	969.2	M11 28	08/17/96	1325	08/17/96	1543
88-TW10-01	<50	<1	<1	<.1	<.1	<.1	0.2	0.1	M11 40	08/17/96	1415	08/18/96	146
88-TW11-01	<50	<1	<1	<.1	<.1	<.1	0.2	1.3	M11 30	08/17/96	1500	08/17/96	1723
88-TW12-01	<50	<1	<1	<.1	<.1	<.1	<.1	1.5	M11 37	08/17/96	1605	08/17/96	2315
88-TW13-01	<50	<1	<1	<.1	<.1	<.1	0.6	44.3	M11 38	08/17/96	1700	08/18/96	5
88-TW14-01	<50	<1	<1	<.1	<.1	<.1	<.1	0.1	M11 51	08/18/96	810	08/18/96	1101
88-TW15-01	<50	38	3725	<.1	<.1	<.1	3030.9	4931.8	M11 52	08/18/96	845	08/18/96	1151
88-TW16-01	<50	<1	<1	<.1	<.1	<.1	<.1	0.2	M11 57	08/18/96	1645	08/18/96	1845
88-TW17-01	<50	<1	<1	<.1	<.1	<.1	<.1	0.2	M11 85	08/20/96	850	08/20/96	1240
88-TW18-01	<50	<1	<1	<.1	<.1	<.1	<.1	<.1	M11 87	08/20/96	1010	08/20/96	1420
88-TW19-01	<50	<1	<1	<.1	<.1	<.1	<.1	<.1	M11 89	08/20/96	1640	08/20/96	1721
88-TW19IW-01	<50	<1	<1	3.1	<.1	<.1	<.1	<.1	M11 90	08/20/96	1515	08/20/96	1811

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----- BAKER ENVIRONMENTAL -----  
 ----- PROJECT: CAMP LEJEUNE -----  
 ----- PROJECT LOCATION: SITE 89/93 -----  
 ----- H2O CONCENTRATIONS IN (ug/l) -----

SAMPLE NAME	VINYL	trans-	cis-	CHLORO	1,1,1-	CARBON	TCE	PCB	FILE	DATE	TIME	DATE	TIME
	CHLORIDE	1,2-DCE	1,2-DCE	FORM	TCA	TETRA							
	(ug/l)	(ug/l)	(ug/l)	(ug/l)	(ug/l)	(ug/l)	(ug/l)	(ug/l)	NAME	COLLECTED	COLLECTED	ANALYZED	ANALYZED
89-EC-SW01-01	<50	<1	2	0.3	<.1	<.1	3.8	0.2	M10 481	08/15/96	800	08/15/96	1016
89-EC-SW02-01	<50	37	48	0.2	<.1	<.1	7.3	0.2	M10 482	08/15/96	745	08/15/96	1106
89-EC-SW03-01	<50	31	44	0.1	<.1	<.1	6.4	0.2	M10 485	08/15/96	740	08/15/96	1337
89-EC-SW04-01	<50	19	52	0.4	<.1	<.1	32.9	0.2	M10 486	08/15/96	720	08/15/96	1427
89-EC-SW05-01	<50	15	44	0.3	<.1	<.1	27.3	0.1	M10 487	08/15/96	715	08/15/96	1517
89-EC-SW06-01	<50	<1	<1	<.1	<.1	<.1	<.1	<.1	M10 377	08/01/96	1300	08/01/96	1452
89-EC-SW07-01	<50	21	27	<.1	<.1	<.1	14.8	1.2	M10 383	08/01/96	1500	08/01/96	2018
89-EC-SW08-01	<50	<1	<1	<.1	<.1	<.1	<.1	0.4	M10 384	08/01/96	1455	08/01/96	2108
89-EC-SW09-01	<50	16	44	0.4	<.1	<.1	28.5	0.2	M10 488	08/15/96	1350	08/15/96	1608
89-EC-SW10-01	<50	15	43	0.4	<.1	<.1	27.9	0.1	M10 487	08/15/96	1330	08/15/96	1658
89-EC-SW11-01	<50	14	43	0.4	<.1	<.1	27.6	0.2	M10 490	08/15/96	1315	08/15/96	1748
89-MW01-01	<50	177	261	<.1	<.1	<.1	323.1	42.4	M10 366	07/31/96	1135	07/31/96	1523
89-MW02-01A	130	451	818	<.1	<.1	<.1	744.3	9.4	M10 355	07/30/96	1145	07/30/96	1449
89-MW03-01	<50	82	150	<.1	<.1	<.1	131.0	13.1	M10 365	07/31/96	1100	07/31/96	1419
89-TW04-01	<50	<1	<1	2.3	<.1	<.1	<.1	<.1	M10 370	07/31/96	1710	07/31/96	1844
89-TW04IW-01	<50	<1	<1	2.1	<.1	<.1	<.1	<.1	M10 371	07/31/96	1705	07/31/96	1934
9-TW08-01	<50	61	253	<.1	<.1	<.1	638.4	27.0	M10 397	08/03/96	1040	08/03/96	1321
89-TW08IW-01	<50	<1	<1	0.8	<.1	<.1	0.3	<.1	M10 398	08/03/96	1055	08/03/96	1411
89-TW09-01	<50	<1	<1	4.8	<.1	<.1	<.1	<.1	M10 401	08/03/96	1500	08/03/96	1642
89-TW09-02	<50	<1	<1	3.4	<.1	<.1	<.1	<.1	M10 452	08/07/96	820	08/07/96	1013
89-TW09IW-01	<50	20	114	1.9	<.1	<.1	233.4	8.8	M10 402	08/03/96	1550	08/03/96	1732
89-TW09IW-02	<50	24	132	0.2	<.1	<.1	269.4	9.1	M10 453	08/07/96	845	08/07/96	1104
89-TW10-01	<50	<1	<1	5.2	<.1	<.1	0.2	<.1	M10 409	08/04/96	935	08/04/96	1104
89-TW10IW-01	<50	5	27	0.4	<.1	<.1	36.3	<.1	M10 410	08/04/96	955	08/04/96	1148
89-TW11-01	<50	<1	<1	3.9	<.1	<.1	<.1	<.1	M10 411	08/04/96	1215	08/04/96	1346
89-TW11IW-01	<50	<1	14	2.2	<.1	<.1	3.3	<.1	M10 413	08/04/96	1240	08/04/96	1527
89-TW12-01	<50	<1	<1	<.1	<.1	<.1	<.1	<.1	M10 420	08/04/96	1655	08/04/96	2241
89-TW12IW-01	<50	<1	<1	0.5	<.1	<.1	<.1	<.1	M10 421	08/04/96	1740	08/04/96	2331

## MICROSEEPS

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----- BAKER ENVIRONMENTAL -----

----- PROJECT: CAMP LEJEUNE -----

----- PROJECT LOCATION: SITE 89/93 -----

----- H2O CONCENTRATIONS IN (ug/l) -----

SAMPLE NAME	VINYL CHLORIDE (ug/l)	trans- 1,2-DCE (ug/l)	cis- 1,2-DCE (ug/l)	CHLORO FORM (ug/l)	CARBON				FILE NAME	DATE COLLECTED	TIME COLLECTED	DATE ANALYZED	TIME ANALYZED
					1,1,1- TCA (ug/l)	CHLORIDE (ug/l)	TCE (ug/l)	PCE (ug/l)					
9-TW13-01	<50	3	18	<.1	<.1	<.1	136.9	4.8	M10 431	08/05/96	1330	08/05/96	1508
89-TW13IW-01	<50	1	21	0.7	<.1	<.1	57.9	7.4	M10 432	08/05/96	1350	08/05/96	1558
89-TW15-01	<50	53	162	7.2	<.1	<.1	355.9	13.7	M10 444	08/06/96	1400	08/06/96	1535
89-TW15IW-01	<50	<1	3	1.7	<.1	<.1	6.0	0.1	M10 445	08/06/96	1440	08/06/96	1625
89-TW16-01	<50	44	102	8.6	<.1	<.1	562.9	42.7	M10 446	08/06/96	1530	08/06/96	1723
89-TW16IW-01	<50	<1	<1	1.7	<.1	<.1	0.6	<.1	M10 447	08/06/96	1550	08/06/96	1813
89-TW17IW-01	<50	90	287	2.6	<.1	<.1	425.7	1.5	M10 455	08/07/96	1045	08/07/96	1244
89-TW18-01	<50	<1	<1	6.6	0.2	<.1	<.1	0.2	M10 469	08/13/96	1440	08/13/96	1617
89-TW18IW-01	<50	<1	<1	2.4	<.1	<.1	<.1	<.1	M10 467	08/13/96	1300	08/13/96	1436
89-TW19-01	<50	<1	<1	1.3	<.1	<.1	<.1	<.1	M10 471	08/13/96	1800	08/13/96	1928
89-TW19IW-01	<50	<1	11	0.5	<.1	<.1	3.8	<.1	M10 470	08/13/96	1645	08/13/96	1813
89-TW20-01	<50	<1	<1	<.1	<.1	<.1	<.1	<.1	M10 475	08/14/96	1120	08/14/96	1251
89-TW20IW-01	<50	8	57	0.4	<.1	<.1	59.1	0.4	M10 474	08/14/96	930	08/14/96	1059
89-TW21-01	<50	<1	<1	<.1	<.1	<.1	<.1	<.1	M10 484	08/15/96	1045	08/15/96	1246
89-TW21IW-01	<50	1	9	1.7	<.1	<.1	10.4	<.1	M10 483	08/15/96	955	08/15/96	1156
89-TW22-01	<50	<1	<1	0.7	<.1	<.1	<.1	<.1	M11 6	08/16/96	1020	08/16/96	1521
9-TW22IW-01	<50	17	106	0.3	<.1	<.1	293.9	13.0	M11 7	08/16/96	945	08/16/96	1611
89-TW23IW-01	<50	9	84	0.5	<.1	<.1	123.9	0.1	M11 93	08/21/96	945	08/21/96	1145
89-WBLNK-01	<50	<1	<1	12.2	<.1	<.1	<.1	<.1	M10 412	08/04/96	1042	08/04/96	1436
93-MW05-01A	<50	5	15	<.1	<.1	<.1	24.3	65.1	M10 342	07/29/96	1700	07/30/96	319
93-TW01	<50	57	175	0.5	0.2	0.2	39.4	16.2	M10 352	07/30/96	910	07/30/96	1218
93-TW01-02	<50	55	155	<.1	<.1	<.1	33.9	15.9	M10 439	08/06/95	750	08/06/95	1105
93-TW01IW	<50	<1	<1	0.6	<.1	<.1	0.1	<.1	M10 353	07/30/96	1025	07/30/96	1308
93-TW02-01	<50	<1	<1	<.1	<.1	<.1	<.1	<.1	M10 358	07/30/96	1355	07/30/96	1720
93-TW02IW-01	<50	<1	4	<.1	<.1	<.1	0.1	<.1	M10 359	07/30/96	1435	07/30/96	1810
93-TW02IW-02	<50	<1	2	<.1	<.1	<.1	<.1	<.1	M10 440	08/06/95	825	08/06/95	1155
93-TW03-01	<50	<1	<1	<.1	<.1	<.1	<.1	<.1	M10 363	07/31/96	915	07/31/96	1238
93-TW03IW-01	<50	<1	<1	0.3	<.1	<.1	<.1	<.1	M10 364	07/31/96	940	07/31/96	1328

21-Aug-96

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----- BAKER ENVIRONMENTAL -----  
 ----- PROJECT: CAMP LEJEUNE -----  
 ----- PROJECT LOCATION: SITE 89/93 -----  
 ----- H2O CONCENTRATIONS IN (ug/l) -----

SAMPLE NAME	VINYL CHLORIDE (ug/l)	trans- 1,2-DCE (ug/l)	cis- 1,2-DCE (ug/l)	CHLORO FORM (ug/l)	1,1,1- TCA (ug/l)	CARBON			FILE NAME	DATE COLLECTED	TIME COLLECTED	DATE ANALYZED	TIME ANALYZED
						TETRA CHLORIDE (ug/l)	TCE (ug/l)	PCE (ug/l)					
3-TW05-01	<50	<1	<1	<.1	<.1	<.1	<.1	<.1	M10 374	08/01/96	840	08/01/96	1114
93-TW05IW-01	<50	<1	<1	<.1	<.1	<.1	<.1	<.1	M10 375	08/01/96	845	08/01/96	1206
93-TW06-01	<50	<1	<1	<.1	<.1	<.1	1.3	8.9	M10 385	08/01/96	1720	08/01/96	2159
93-TW06IW-01	<50	<1	<1	1.7	<.1	<.1	0.1	0.5	M10 386	08/01/96	1745	08/01/96	2249
93-TW07-01	<50	<1	<1	<.1	<.1	<.1	0.6	0.8	M10 395	08/03/96	855	08/03/96	1140
93-TW07-02	<50	<1	<1	<.1	<.1	<.1	0.5	0.7	M10 441	08/06/95	910	08/06/95	1246
93-TW07IW-01	<50	<1	<1	0.8	<.1	<.1	<.1	0.1	M10 396	08/03/96	930	08/03/96	1230
93-TW07IW-02	<50	<1	<1	<.1	<.1	<.1	<.1	0.1	M10 449	08/06/96	1800	08/06/96	1949
93-TW08-02	<50	68	284	<.1	<.1	<.1	757.0	33.2	M10 442	08/06/95	940	08/06/95	1336
93-TW14-01	<50	<1	<1	0.8	<.1	<.1	<.1	<.1	M10 434	08/05/96	1600	08/05/96	1841
93-TW14IW-01	<50	<1	<1	2.3	<.1	<.1	<.1	<.1	M10 435	08/05/96	1635	08/05/96	1931
MW42B	<50	6	37	<.1	<.1	<.1	85.8	<.1	M10 368	07/31/96	1430	07/31/96	1704

## MICROSEEPS

961048

VER. 8

----- BAKER ENVIRONMENTAL -----  
 ----- PROJECT: CAMP LEJEUNE -----  
 ----- PROJECT LOCATION: SITE 88 -----  
 ----- H2O CONCENTRATIONS IN (ug/l) -----

SAMPLE NAME	VINYL CHLORIDE (ug/l)	trans- 1,2-DCE (ug/l)	cis- 1,2-DCE (ug/l)	CHLORO FORM (ug/l)	CARBON				FILE NAME	DATE COLLECTED	TIME COLLECTED	DATE ANALYZED	TIME ANALYZED
					1,1,1- TCA (ug/l)	CHLORIDE (ug/l)	TCE (ug/l)	PCE (ug/l)					
8-TW01-01	<50	<1	4	0.1	<.1	<.1	17.7	157.2	M10 378	08/01/96	1400	08/01/96	1607
88-TW02-01	<50	9	445	0.1	<.1	<.1	81.5	649.1	M10 379	08/01/96	1325	08/01/96	1657
88-TW03-01	<50	6	1184	1.4	0.2	<.1	838.1	14090.0	M10 380	08/01/96	1115	08/01/96	1747
88-TW04-01	<50	1	63	5.0	0.2	<.1	229.9	32839.4	M10 381	08/01/96	1035	08/01/96	1838
88-TW04IW-01	<50	<1	21	6.7	<.1	<.1	5.5	21.0	M11 13	08/16/96	1710	08/16/96	2113
88-TW05-01	<50	<1	3	11.9	<.1	<.1	20.8	1381.7	M11 12	08/16/96	1500	08/16/96	2023
88-TW05IW-01	<50	1	89	5.4	<.1	<.1	71.2	1142.7	M11 54	08/18/96	1332	08/18/96	1615
88-TW06-01	<50	<1	<1	1.8	<.1	<.1	<.1	<.1	M11 23	08/17/96	936	08/17/96	1131
88-TW07-01	<50	<1	<1	0.5	<.1	<.1	<.1	0.2	M11 24	08/17/96	1035	08/17/96	1221
88-TW08-01	<50	2	271	0.7	0.5	<.1	341.2	53703.8	M11 27	08/17/96	1250	08/17/96	1452
88-TW08IW-01	<50	11	883	8.3	<.1	<.1	822.7	1314.4	M11 55	08/18/96	1530	08/18/96	1705
88-TW09-01	<50	<1	14	0.5	<.1	<.1	70.8	969.2	M11 28	08/17/96	1325	08/17/96	1543
88-TW10-01	<50	<1	<1	<.1	<.1	<.1	0.2	0.1	M11 40	08/17/96	1415	08/18/96	146
88-TW11-01	<50	<1	<1	<.1	<.1	<.1	0.2	1.3	M11 30	08/17/96	1500	08/17/96	1723
88-TW12-01	<50	<1	<1	<.1	<.1	<.1	<.1	1.5	M11 37	08/17/96	1605	08/17/96	2315
88-TW13-01	<50	<1	<1	<.1	<.1	<.1	0.6	44.3	M11 38	08/17/96	1700	08/18/96	5
8-TW14-01	<50	<1	<1	<.1	<.1	<.1	<.1	0.1	M11 51	08/18/96	810	08/18/96	1101
88-TW15-01	<50	38	3725	<.1	<.1	<.1	3030.9	4931.8	M11 52	08/18/96	845	08/18/96	1151
88-TW16-01	<50	<1	<1	<.1	<.1	<.1	<.1	0.2	M11 57	08/18/96	1645	08/18/96	1845
88-TW17-01	<50	<1	<1	<.1	<.1	<.1	<.1	0.2	M11 85	08/20/96	850	08/20/96	1240
88-TW18-01	<50	<1	<1	<.1	<.1	<.1	<.1	<.1	M11 87	08/20/96	1010	08/20/96	1420
88-TW19-01	<50	<1	<1	<.1	<.1	<.1	<.1	<.1	M11 89	08/20/96	1640	08/20/96	1721
88-TW19IW-01	<50	<1	<1	3.1	<.1	<.1	<.1	<.1	M11 90	08/20/96	1515	08/20/96	1811



# Site 88 Soil

MICROSEEPS

961048  
VER. 8

----- BAKER ENVIRONMENTAL -----  
----- PROJECT: CAMP LEJEUNE -----  
----- PROJECT LOCATION: SITE 88 -----  
----- SOIL CONCENTRATIONS IN (ng/g) -----

SAMPLE NAME	VINYL CHLORIDE (ng/g)	trans- 1,2-DCE (ng/g)	cis- 1,2-DCE (ng/g)	CHLORO FORM (ng/g)	1,1,1- TCA (ng/g)	CARBON			FILE NAME	DATE COLLECTED	TIME COLLECTED	DATE ANALYZED	TIME ANALYZED
						TETRA CHLORIDE (ng/g)	TCE (ng/g)	PCB (ng/g)					
3-TW04IW-03	<100	<1	<1	<.1	<.1	<.1	0.2	14.8	M11 8	08/16/96	713	08/16/96	1701
88-TW04IW (20-22')-10	<100	<1	<1	<.1	<.1	<.1	0.1	1.5	M11 9	08/16/96	----	08/16/96	1752
88-TW05-04	<100	<1	<1	<.1	<.1	<.1	0.1	1.2	M11 10	08/16/96	1243	08/16/96	1842
88-TW06-03	<100	<1	<1	<.1	<.1	<.1	<.1	0.4	M11 11	08/16/96	1349	08/16/96	1932
88-TW07-03	<100	<1	<1	<.1	<.1	<.1	<.1	0.1	M11 14	08/16/96	1516	08/16/96	2203
88-TW08-03	<100	<1	<1	<.1	<.1	<.1	0.8	237.6	M11 15	08/16/96	1620	08/16/96	2254
88-TW09-04	<100	<1	<1	<.1	<.1	<.1	3.3	22.6	M11 18	08/16/96	1718	08/17/96	124
88-TW09-06	<100	<1	<1	<.1	<.1	<.1	0.5	3.1	M11 19	08/16/96	1720	08/17/96	215
88-TW10-02	<100	<1	<1	<.1	<.1	<.1	<.1	<.1	M11 22	08/17/96	752	08/17/96	1026
88-TW11-02	<100	<1	<1	<.1	<.1	<.1	<.1	<.1	M11 25	08/17/96	907	08/17/96	1312
88-TW12-05	<100	<1	<1	<.1	<.1	<.1	<.1	<.1	M11 26	08/17/96	1025	08/17/96	1402
88-TW13-03	<100	<1	<1	<.1	<.1	<.1	<.1	1.5	M11 31	08/17/96	1214	08/17/96	1813
88-TW13-05	<100	<1	<1	<.1	<.1	<.1	<.1	0.9	M11 32	08/17/96	1227	08/17/96	1954
88-TW14-03	<100	<1	<1	0.1	<.1	<.1	<.1	0.3	M11 35	08/17/96	1355	08/17/96	2135
88-TW15-04	<100	<1	21	0.1	<.1	<.1	8.5	14.6	M11 36	08/17/96	1516	08/17/96	2225
88-TW16-04	<100	<1	<1	<.1	<.1	<.1	<.1	0.2	M11 59	08/18/96	1505	08/18/96	2026
8-TW17-04	<100	<1	<1	<.1	<.1	<.1	<.1	0.2	M11 58	08/18/96	1625	08/18/96	1936
88-TW18-03	<100	<1	<1	<.1	<.1	<.1	<.1	<.1	M11 79	08/19/96	1502	08/20/96	415
88-TW19-03	<100	<1	<1	<.1	<.1	<.1	<.1	<.1	M11 86	08/20/96	807	08/20/96	1330

# Site 88 GW

MICROSEREPS

S - Shallow  
IW - Intermediate Well

961048

VER. 8

----- BAKER ENVIRONMENTAL -----  
----- PROJECT: CAMP LEJEUNE -----  
----- PROJECT LOCATION: SITE 88 -----  
----- H2O CONCENTRATIONS IN (ug/l) -----

SAMPLE NAME	VINYL	trans-	cis-	CHLORO	1,1,1-	CARBON	TCE	PCE	FILE	DATE	TIME	DATE	TIME
	CHLORIDE	1,2-DCE	1,2-DCE	FORM	TCA	TETRA							
	(ug/l)	(ug/l)	(ug/l)	(ug/l)	(ug/l)	(ug/l)	(ug/l)	(ug/l)	NAME	COLLECTED	COLLECTED	ANALYZED	ANALYZED
W 88-TW01-01	<50	<1	4	0.1	<.1	<.1	17.7	157.2	M10 378	08/01/96	1400	08/01/96	1607
S 88-TW02-01	<50	9	445	0.1	<.1	<.1	81.5	649.1	M10 379	08/01/96	1325	08/01/96	1657
S 88-TW03-01	<50	6	1184	1.4	0.2	<.1	838.1	14090.0	M10 380	08/01/96	1115	08/01/96	1747
S 88-TW04-01	<50	1	63	5.0	0.2	<.1	229.9	32839.4	M10 381	08/01/96	1035	08/01/96	1838
IW 88-TW04IW-01	<50	<1	21	6.7	<.1	<.1	5.5	21.0	M11 13	08/16/96	1710	08/16/96	2113
S 88-TW05-01	<50	<1	3	11.9	<.1	<.1	20.8	1381.7	M11 12	08/16/96	1500	08/16/96	2023
IW 88-TW05IW-01	<50	1	89	5.4	<.1	<.1	71.2	1142.7	M11 54	08/18/96	1332	08/18/96	1615
S 88-TW06-01	<50	<1	<1	1.8	<.1	<.1	<.1	<.1	M11 23	08/17/96	936	08/17/96	1131
S 88-TW07-01	<50	<1	<1	0.5	<.1	<.1	<.1	0.2	M11 24	08/17/96	1035	08/17/96	1221
S 88-TW08-01	<50	2	271	0.7	0.5	<.1	341.2	53703.8	M11 27	08/17/96	1250	08/17/96	1452
IW 88-TW08IW-01	<50	11	883	8.3	<.1	<.1	822.7	1314.4	M11 55	08/18/96	1530	08/18/96	1705
S 88-TW09-01	<50	<1	14	0.5	<.1	<.1	70.8	969.2	M11 28	08/17/96	1325	08/17/96	1543
S 88-TW10-01	<50	<1	<1	<.1	<.1	<.1	0.2	0.1	M11 40	08/17/96	1415	08/18/96	146
S 88-TW11-01	<50	<1	<1	<.1	<.1	<.1	0.2	1.3	M11 30	08/17/96	1500	08/17/96	1723
S 88-TW12-01	<50	<1	<1	<.1	<.1	<.1	<.1	1.5	M11 37	08/17/96	1605	08/17/96	2315
S 88-TW13-01	<50	<1	<1	<.1	<.1	<.1	0.6	44.3	M11 38	08/17/96	1700	08/18/96	5
-TW14-01	<50	<1	<1	<.1	<.1	<.1	<.1	0.1	M11 51	08/18/96	810	08/18/96	1101
S 88-TW15-01	<50	38	3725	<.1	<.1	<.1	3030.9	4931.8	M11 52	08/18/96	845	08/18/96	1151
S 88-TW16-01	<50	<1	<1	<.1	<.1	<.1	<.1	0.2	M11 57	08/18/96	1645	08/18/96	1845
S 88-TW17-01	<50	<1	<1	<.1	<.1	<.1	<.1	0.2	M11 85	08/20/96	850	08/20/96	1240
S 88-TW18-01	<50	<1	<1	<.1	<.1	<.1	<.1	<.1	M11 87	08/20/96	1010	08/20/96	1420
S 88-TW19-01	<50	<1	<1	<.1	<.1	<.1	<.1	<.1	M11 89	08/20/96	1640	08/20/96	1721
IW 88-TW19IW-01	<50	<1	<1	3.1	<.1	<.1	<.1	<.1	M11 90	08/20/96	1515	08/20/96	1811

Site 89

89SW9  
896WSHO  
89GW IWO  
93GUSH  
93GWIW

MICROSEEPS

GW

S-shallow

IW - Intermediat Well

961048  
VER. 24

----- BAKER ENVIRONMENTAL -----  
----- PROJECT: CAMP LEJEUNE -----  
----- PROJECT LOCATION: SITE 89/93 -----  
----- H2O CONCENTRATIONS IN (ug/l) -----

SAMPLE NAME	VINYL CHLORIDE (ug/l)	trans- 1,2-DCE (ug/l)	cis- 1,2-DCE (ug/l)	CHLORO FORM (ug/l)	CARBON				FILE NAME	DATE COLLECTED	TIME COLLECTED	DATE ANALYZED	TIME ANALYZED
					1,1,1- TCA (ug/l)	TETRA CHLORIDE (ug/l)	TCE (ug/l)	PCE (ug/l)					
89-EC-SW01-01	<50	<1	2	0.3	<.1	<.1	3.8	0.2	M10 481	08/15/96	800	08/15/96	1016
89-EC-SW02-01	<50	37	48	0.2	<.1	<.1	7.3	0.2	M10 482	08/15/96	745	08/15/96	1106
89-EC-SW03-01	<50	31	44	0.1	<.1	<.1	6.4	0.2	M10 485	08/15/96	740	08/15/96	1337
89-EC-SW04-01	<50	19	52	0.4	<.1	<.1	32.9	0.2	M10 486	08/15/96	720	08/15/96	1427
89-EC-SW05-01	<50	15	44	0.3	<.1	<.1	27.3	0.1	M10 487	08/15/96	715	08/15/96	1517
89-EC-SW06-01	<50	<1	<1	<.1	<.1	<.1	<.1	<.1	M10 377	08/01/96	1300	08/01/96	1452
89-EC-SW07-01	<50	21	27	<.1	<.1	<.1	14.8	1.2	M10 383	08/01/96	1500	08/01/96	2018
89-EC-SW08-01	<50	<1	<1	<.1	<.1	<.1	<.1	0.4	M10 384	08/01/96	1455	08/01/96	2108
89-EC-SW09-01	<50	16	44	0.4	<.1	<.1	28.5	0.2	M10 488	08/15/96	1350	08/15/96	1608
89-EC-SW10-01	<50	15	43	0.4	<.1	<.1	27.9	0.1	M10 487	08/15/96	1330	08/15/96	1658
89-EC-SW11-01	<50	14	43	0.4	<.1	<.1	27.6	0.2	M10 490	08/15/96	1315	08/15/96	1748
89-MW01-01	<50	177	261	<.1	<.1	<.1	323.1	42.4	M10 366	07/31/96	1135	07/31/96	1523
89-MW02-01A	130	451	818	<.1	<.1	<.1	744.3	9.4	M10 355	07/30/96	1145	07/30/96	1449
89-MW03-01	<50	82	150	<.1	<.1	<.1	131.0	13.1	M10 365	07/31/96	1100	07/31/96	1419
89-TW04-01	<50	<1	<1	2.3	<.1	<.1	<.1	<.1	M10 370	07/31/96	1710	07/31/96	1844
89-TW04IW-01	<50	<1	<1	2.1	<.1	<.1	<.1	<.1	M10 371	07/31/96	1705	07/31/96	1934
89-TW08-01	<50	61	253	<.1	<.1	<.1	638.4	27.0	M10 397	08/03/96	1040	08/03/96	1321
89-TW08IW-01	<50	<1	<1	0.8	<.1	<.1	0.3	<.1	M10 398	08/03/96	1055	08/03/96	1411
89-TW09-Q1	<50	<1	<1	4.8	<.1	<.1	<.1	<.1	M10 401	08/03/96	1500	08/03/96	1642
89-TW09-02	<50	<1	<1	3.4	<.1	<.1	<.1	<.1	M10 452	08/07/96	820	08/07/96	1013
89-TW09IW-01	<50	20	114	1.9	<.1	<.1	233.4	8.8	M10 402	08/03/96	1550	08/03/96	1732
89-TW09IW-02	<50	24	132	0.2	<.1	<.1	269.4	9.1	M10 453	08/07/96	845	08/07/96	1104
89-TW10-01	<50	<1	<1	5.2	<.1	<.1	0.2	<.1	M10 409	08/04/96	935	08/04/96	1104
89-TW10IW-01	<50	5	27	0.4	<.1	<.1	36.3	<.1	M10 410	08/04/96	955	08/04/96	1148
89-TW11-01	<50	<1	<1	3.9	<.1	<.1	<.1	<.1	M10 411	08/04/96	1215	08/04/96	1346
89-TW11IW-01	<50	<1	14	2.2	<.1	<.1	3.3	<.1	M10 413	08/04/96	1240	08/04/96	1527
89-TW12-01	<50	<1	<1	<.1	<.1	<.1	<.1	<.1	M10 420	08/04/96	1655	08/04/96	2241
89-TW12IW-01	<50	<1	<1	0.5	<.1	<.1	<.1	<.1	M10 421	08/04/96	1740	08/04/96	2331

SW

Site 89  
SW

S  
S  
S

Site 89  
GW

IW

S

S

IW

S

IW

S

IW

S

IW

# Sites 89 & 93 GW

MICROSEEPS

961048  
VER. 24

----- BAKER ENVIRONMENTAL -----  
----- PROJECT: CAMP LEJEUNE -----  
----- PROJECT LOCATION: SITE 89/93 -----  
----- H2O CONCENTRATIONS IN (ug/l) -----

SAMPLE NAME	VINYL	trans-	cis-	CHLORO	1,1,1-	CARBON	TCE	PCB	FILE	DATE	TIME	DATE	TIME
	CHLORIDE	1,2-DCE	1,2-DCE	FORM	TCA	TETRA							
(ug/l)	(ug/l)	(ug/l)	(ug/l)	(ug/l)	(ug/l)	(ug/l)	(ug/l)	(ug/l)	NAME	COLLECTED	COLLECTED	ANALYZED	ANALYZED
89-TW13-01	<50	3	18	<.1	<.1	<.1	136.9	4.8	M10 431	08/05/96	1330	08/05/96	1508
IW 89-TW13IW-01	<50	1	21	0.7	<.1	<.1	57.9	7.4	M10 432	08/05/96	1350	08/05/96	1558
S 89-TW15-01	<50	53	162	7.2	<.1	<.1	355.9	13.7	M10 444	08/06/96	1400	08/06/96	1535
IW 89-TW15IW-01	<50	<1	3	1.7	<.1	<.1	6.0	0.1	M10 445	08/06/96	1440	08/06/96	1625
S 89-TW16-01	<50	44	102	8.6	<.1	<.1	562.9	42.7	M10 446	08/06/96	1530	08/06/96	1723
IW 89-TW16IW-01	<50	<1	<1	1.7	<.1	<.1	0.6	<.1	M10 447	08/06/96	1550	08/06/96	1813
IW 89-TW17IW-01	<50	90	287	2.6	<.1	<.1	425.7	1.5	M10 455	08/07/96	1045	08/07/96	1244
S 89-TW18-01	<50	<1	<1	6.6	0.2	<.1	<.1	0.2	M10 469	08/13/96	1440	08/13/96	1617
IW 89-TW18IW-01	<50	<1	<1	2.4	<.1	<.1	<.1	<.1	M10 467	08/13/96	1300	08/13/96	1436
S 89-TW19-01	<50	<1	<1	1.3	<.1	<.1	<.1	<.1	M10 471	08/13/96	1800	08/13/96	1928
IW 89-TW19IW-01	<50	<1	11	0.5	<.1	<.1	3.8	<.1	M10 470	08/13/96	1645	08/13/96	1813
S 89-TW20-01	<50	<1	<1	<.1	<.1	<.1	<.1	<.1	M10 475	08/14/96	1120	08/14/96	1251
IW 89-TW20IW-01	<50	8	57	0.4	<.1	<.1	59.1	0.4	M10 474	08/14/96	930	08/14/96	1059
S 89-TW21-01	<50	<1	<1	<.1	<.1	<.1	<.1	<.1	M10 484	08/15/96	1045	08/15/96	1246
IW 89-TW21IW-01	<50	1	9	1.7	<.1	<.1	10.4	<.1	M10 483	08/15/96	955	08/15/96	1156
S 89-TW22-01	<50	<1	<1	0.7	<.1	<.1	<.1	<.1	M11 6	08/16/96	1020	08/16/96	1521
IW 89-TW22IW-01	<50	17	106	0.3	<.1	<.1	293.9	13.0	M11 7	08/16/96	945	08/16/96	1611
IW 89-TW23IW-01	<50	9	84	0.5	<.1	<.1	123.9	0.1	M11 93	08/21/96	945	08/21/96	1145
89-WBLNK-01	<50	<1	<1	12.2	<.1	<.1	<.1	<.1	M10 412	08/04/96	1042	08/04/96	1436
S 93-MW05-01A	<50	5	15	<.1	<.1	<.1	24.3	65.1	M10 342	07/29/96	1700	07/30/96	319
S 93-TW01	<50	57	175	0.5	0.2	0.2	39.4	16.2	M10 352	07/30/96	910	07/30/96	1218
S 93-TW01-02	<50	55	155	<.1	<.1	<.1	33.9	15.9	M10 439	08/06/95	750	08/06/95	1105
IW 93-TW01IW	<50	<1	<1	0.6	<.1	<.1	0.1	<.1	M10 353	07/30/96	1025	07/30/96	1308
S 93-TW02-01	<50	<1	<1	<.1	<.1	<.1	<.1	<.1	M10 358	07/30/96	1355	07/30/96	1720
IW 93-TW02IW-01	<50	<1	4	<.1	<.1	<.1	0.1	<.1	M10 359	07/30/96	1435	07/30/96	1810
IW 93-TW02IW-02	<50	<1	2	<.1	<.1	<.1	<.1	<.1	M10 440	08/06/95	825	08/06/95	1155
S 93-TW03-01	<50	<1	<1	<.1	<.1	<.1	<.1	<.1	M10 363	07/31/96	915	07/31/96	1238
IW 93-TW03IW-01	<50	<1	<1	0.3	<.1	<.1	<.1	<.1	M10 364	07/31/96	940	07/31/96	1328

Site 93 GW

MICROBEPS

961048

VER. 24

----- BAKER ENVIRONMENTAL -----

----- PROJECT: CAMP LEJEUNE -----

----- PROJECT LOCATION: SITE 89/93 -----

----- H2O CONCENTRATIONS IN (ug/l) -----

SAMPLE NAME	VINYL	trans-	cis-	CHLORO	1,1,1-	CARBON			FILE	DATE COLLECTED	TIME COLLECTED	DATE ANALYZED	TIME ANALYZED
	CHLORIDE (ug/l)	1,2-DCE (ug/l)	1,2-DCE (ug/l)	FORM (ug/l)	TCA (ug/l)	TETRA CHLORIDE (ug/l)	TCE (ug/l)	PCR (ug/l)					
IW 93-TW05-01	<50	<1	<1	<.1	<.1	<.1	<.1	<.1	M10 374	08/01/96	840	08/01/96	1114
S 93-TW05IW-01	<50	<1	<1	<.1	<.1	<.1	<.1	<.1	M10 375	08/01/96	845	08/01/96	1206
S 93-TW06-01	<50	<1	<1	<.1	<.1	<.1	1.3	8.9	M10 385	08/01/96	1720	08/01/96	2159
IW 93-TW06IW-01	<50	<1	<1	1.7	<.1	<.1	0.1	0.5	M10 386	08/01/96	1745	08/01/96	2249
S 93-TW07-01	<50	<1	<1	<.1	<.1	<.1	0.6	0.8	M10 395	08/03/96	855	08/03/96	1140
S 93-TW07-02	<50	<1	<1	<.1	<.1	<.1	0.5	0.7	M10 441	08/06/95	910	08/06/95	1246
IW 93-TW07IW-01	<50	<1	<1	0.8	<.1	<.1	<.1	0.1	M10 396	08/03/96	930	08/03/96	1230
IW 93-TW07IW-02	<50	<1	<1	<.1	<.1	<.1	<.1	0.1	M10 449	08/06/96	1800	08/06/96	1949
S 93-TW08-02	<50	68	284	<.1	<.1	<.1	757.0	33.2	M10 442	08/06/95	940	08/06/95	1336
S 93-TW14-01	<50	<1	<1	0.8	<.1	<.1	<.1	<.1	M10 434	08/05/96	1600	08/05/96	1841
IW 93-TW14IW-01	<50	<1	<1	2.3	<.1	<.1	<.1	<.1	M10 435	08/05/96	1635	08/05/96	1931
S MW42B	<50	6	37	<.1	<.1	<.1	85.8	<.1	M10 368	07/31/96	1430	07/31/96	1704

MICROSEEPS, INC.

\*\*\*\*\* ONSITE ANALYSIS \*\*\*\*\*

PAGE 1 OF 11

LABORATORY LOCATION: CAMP LEJEUNE  
AIR STATION

PROJECT: 961048

ANALYSIS: Chloro's + BGA

PATH: C:\CP\M10\*.X

BASE FILE NAME: M10A/AB

ANALYSIS DATE	SAMPLE ID	CYCLE #	HSS #	PID MET/CAL	ECD MET/CAL	FID MET/CAL	COMMENTS
7-29-96	H2O BLANK	326	1	NA	<del>BE 2A</del> BE2	<del>BE 2A</del> BE2A	
	WSTD L5 R5	327	2				
	" " R5	328	3				
	" " R4	329	4				
	" " R4	330	5				
	" " R3	331	6				
	" " R3	332	7				
	" " R3	333	8				
	" " R3	334	9				
	" " R2	335	10				
	" " R2	336	11				
	CIS-1,2-DCE R4	337	12				
	" " R4	338	13				
	VC - <del>10000</del> 1000	339	14				
	VC + 9261000	340	15				
	H2O BLANK	341	16				
	G3-MW05-01A	342	17				
	WSTD L5 R5	343	18				
	" " R5	344	19				
	" " R4	345	20				
	" " R4	346	21				
	" " R3	347	22				
	" " R3	348	23				
7-30-96	H2O BLANK	349	1				
	WSTD L5 R3	350	2				

MICROSEEPS, INC.

CAMP LEJEUNE

\*\*\*\*\* ONSITE ANALYSIS \*\*\*\*\*

PAGE 2 OF 11

LABORATORY LOCATION: <sup>JA 7/30</sup> ~~CPARC~~

AIR STATION

PROJECT: 961048

ANALYSIS: Chloro - BTEX

PATH: @:\CP\M10A.X

BASE FILE NAME: M10A/AB

ANALYSIS DATE	SAMPLE ID	CYCLE #	HSS #	PID MET/CAL	ECD MET/CAL	FID MET/CAL	COMMENTS
7-30-96	WSTD L5 R2	351	3	NA	BEA 10 / BE2	BEA 7 / BE2	
	93-TW01	352	4				910
	- TW01 IW	353	5				1025
	- MW05-01A (R2)	354	6				Report
	89-MW02-01A	355	7				1145
	H2O BLANK	356	8				
	H2O BLANK	357	9				
	93-TW02-01	358	10				1355
	- TW02 IW-01	359	11				1425
7-31-96	H2O BLANK	360	12				
	WSTD L5 R4	361	2				
	GIS-1,2-DEE R6	362	3				
	<del>WSTD BLANK</del> 93-TW03-01	363	1 #				915
	93-TW03 IW-01	364	2				940
	89-MW03-01	365	3				1100
	- MW01-01	366	4				1125
	35-MW44B-04	367	5		BZASB	BEASB	4.8g - 1225 Site 35
	MW42B	368	6		BEA 10 / BE2	BEA 7 / BE2	1430
	WSTD L5 R3	369	7				
	<del>WSTD BLANK</del> 89-TW04-01	370	8				1710
	89-TW04 IW-01	371	9				1705
8-1-96	H2O BLANK	372	1				
	WSTD L5 R4	373	2				
	93-TW05-01	374	3				840
	- TW05 IW-01	375	4				845

MICROSEEPS, INC.

\*\*\*\*\* ONSITE ANALYSIS \*\*\*\*\*

PAGE 3 OF 11LABORATORY LOCATION: Camp LEJEUNE  
AIR STATIONPROJECT: 961048ANALYSIS: Chloro's + BTEXPATH: C:\CP\M10BASE FILE NAME: M10 A/AB

ANALYSIS DATE	SAMPLE ID	CYCLE #	HSS #	PID MET/CAL	ECD MET/CAL	FID MET/CAL	COMMENTS
8-1-96	H <sub>2</sub> O BLANK	376	5	NA	BE2AB BE2	BE2A BEA2	
	89-EC-SW06-01	377	1				1300
	88-TW01-01	378	1				1400
	-TW02-01	379	2				1325
	-TW03-01	380	3				1115
	-TW04-01	381	4				1035
	89-EC-SW07-01 H <sub>2</sub> O	382	5				1500
	89-EC-SW08-01	383	6				1455 1500
	-SW08-01	384	7				1455
	93-TW06-01	385	8				1720
	TW06IW-01	386	9				1745
8-2-96	H <sub>2</sub> O BLANK	387	1				
	WSTD L5 R4	388	2				
	35-TW31B-05	389	7				1030 4.97
	420 BLANK	390	2				
8-3-96	H <sub>2</sub> O BLANK	391	1				
	WSTD L5 R4	392	2				
	35-TW31A	393	3				
	35-TW31B	394	4				
	93-TW07-01	395	5				855
	-TW07IW-01	396	6				930
	WSTD L5 R4 J=8/3	397	7				
	89-TW08-01	397	7				1040
	-TW08IW-01	398	8				1055
	WSTD L5 R4	399	9				



MICROSEEPS, INC.

\*\*\*\*\* ONSITE ANALYSIS \*\*\*\*\*

PAGE 4 OF 11

LABORATORY LOCATION: CAMP LEJEUNE  
JACKSONVILLE, NC.  
AIR STATION

PROJECT: 961048

ANALYSIS: Chloro's & BTEX

PATH: C:\CP\M10

BASE FILE NAME: M10A\1A

ANALYSIS DATE	SAMPLE ID	CYCLE #	HSS #	PID MET/CAL	ECD MET/CAL	FID MET/CAL	COMMENTS
8-3-96	35-TW30B-04	400	10	NA	B2ASB/ B2ASB	B2AS/ B2AS	5.6 813
	89-TW09-01	401	11		BE2AS/ BE2	BE2AS/ BE2AS	1500
	-TW09IW-01	402	12				1550
	-TW31A R	403	13				-
	WSTD 624 R2	404	14				
	WSTD 624 R1	405	15				
8-4-96	H2O BLANK	406	1				
	WSTD 45 R4	407	2				
	WSTD C1512 R4	408	3				
	89-TW10-01	409	4				935
	-TW10IW-01	410	5				955
	89-TW11-01	411	1				1215
	-WBANK-01	412	2				1042
	-TW11IW-01	413	3				1240
	H2O BLANK	414	1				
	WSTD 624 R2	415	2				
	R2	416	3				
	R1	417	4				
	R1	418	5				
	H2O BLANK	419	6				
	89-TW12-01	420	7				1655
	-TW12IW-01	421	8				1740
	35-TW30B	422	9				-
	-TW31A	423	10				1310
	-TW31A	424	11				1527

MICROSEEPS, INC.

\*\*\*\*\* ONSITE ANALYSIS \*\*\*\*\*

PAGE 5 OF 11

LABORATORY LOCATION: CAMP Lejeune  
AIR STATION

PROJECT: 961048

ANALYSIS: Chloro's + BTEX

PATH: C:\CP\M10

BASE FILE NAME: M10A/AB

ANALYSIS DATE	SAMPLE ID	CYCLE #	HSS #	PID MET/CAL	ECD MET/CAL	FID MET/CAL	COMMENTS
8-4-96	35-TW31B	425	12	NA	REJAB/ BEZ	BEJA/ BEAL	1322
	-MW44A	426	13				1146
	-MW44B	427	14				
8-5-96	H2O BLANK	428	1				
	WSTD CS R4	429	2				
	WSTD CIS-1,2-DCE R4	430	3				
	89-TW13-01	431	4				1330
	-TW13IW-01	432	5				1350
	H2O BLANK	433	1				
	93-TW14-01	434	2				1600
	TW14IW-01	435	3				1625
8-6-96	H2O BLANK	436	1				
	WSTD CS R4	437	2				
	WSTD CIS-1,2-DCE R4	438	3				
	93-TW01-02	439	4				0750
	-TW02IW-02	440	5				0825
	-TW07-02	441	6				0910
	-TW08-02	442	7				0940
	H2O BLANK	443	8				
	89-TW15-01	444	9				1400
	-TW15IW-01	445	10				1440
	-TW16-01	446	11				1530
	-TW16IW-01	447	12				1552
	<del>89-TW07-02</del> H2O	448	13				1820 Jm 8/6/96
8-7-96	93-TW07IW-02	449	14				1800

MICROSEEPS, INC.

\*\*\*\*\* ONSITE ANALYSIS \*\*\*\*\*

PAGE 6 OF 11

LABORATORY LOCATION: CAMP Lejeune  
AIR STATION

PROJECT: 961048

ANALYSIS: Chlorides + BTEX

PATH: C:\CP\MIO

BASE FILE NAME: MIO A/AB

ANALYSIS DATE	SAMPLE ID	CYCLE #	HSS #	PID MET/CAL	ECD MET/CAL	FID MET/CAL	COMMENTS
8-17-96	H2O BLANK	450	1	NA	BE 2A2 BE 2	BGA1 BGA2	
	WSTD L5 R4	451	2				
	89-TW09-02	452	3				820
	-TW09IW-02	453	4				845
	H2O BLANK	454	5				
	89-TW17IW-01	455	6				1085
8-12-96	H2O BLANK	456	1				
	WSTD L5 R4	457	2				
	" " R4	458	3				
	" " R2	459	4				
	" " R2	460	5				
	CIS 1,2-DCE R4	461	6				
3-13-96	WSTD L5 R4	462	1				
	H2O BLANK	463	2				
	WSTD L5 R2	464	3				
	H2O BLANK	465	4				
	125MW01IW-01	466	5				1055
	89-TW18IW-01	467	6				1300
	H2O BLANK	468	1				
	89-TW18I-01	469	28				1440
	-TW19IW-01	470	3				1645
	-TW19-01	471	4				1800
8-14-96	H2O BLANK	472	1				
	WSTD L5 R4	473	2				
	89-TW20IW-01	474	3				0830

MICROSEEPS, INC.

\*\*\*\*\* ONSITE ANALYSIS \*\*\*\*\*

PAGE 7 OF 11

LABORATORY LOCATION: Camp Lejeune  
AIR STATION

PROJECT: 961048

ANALYSIS: Chloro's & BTEX

PATH: C:\CP\M10

BASE FILE NAME: M10 A/MB

ANALYSIS DATE	SAMPLE ID	CYCLE #	HSS #	PID MET/CAL	ECD MET/CAL	FID MET/CAL	COMMENTS
8-14-96	99-TW20-01	475	4	NA	BE2AB/ BE2	BE2A/ BEA2	1120
	1-20 BLANK	476	1				
	1251-MW01-01	477	2				1720
	TEST SOIL	478	3		D2ASB	B2AS	6.9g
8-15-96	H2O BLANK	479	1		BE2AB/ BE2	BE2A/BEA2	
	WSTD LS R4	480	2				
	89-EC-SW01-01	481	3				800
	-EC-SW02-01	482	4				745
	-TW21IW-01	483	5				765
	-TW21-01	484	6				1045
	-EC-SW03-01	485	7				740
	-EC-SW04-01	486	8				720
	-EC-SW05-01	487	9				715
	-EC-SW09-01	488	10				1350
	-EC-SW10-01	489	11				1330
	-EC-SW11-01	490	12				1315
	H2O BLANK	491	13		B2ASB	B2AS	1
	WSTD LS R4	492	14				1
	89-EC-SD09 (0-6')	493	15				0-6' 6.0g
	-EC-SD09 (6-12')	494	16				4.6g
	-EC-SD10 (0-6')	495	17				4.5g
	-EC-SD10 (6-12')	496	18				5.5g
	-EC-SD11 (0-6')	497	19				5.5
	-EC-SD11 (6-12')	498	20				5.4

MICROSEEPS, INC.

\*\*\*\*\* ONSITE ANALYSIS \*\*\*\*\*

PAGE 8 OF 11LABORATORY LOCATION: Camp Lejeune  
LOT #203PROJECT: 961048ANALYSIS: Choro'sPATH: C:\CP\M11BASE FILE NAME: M11 A/AB

ANALYSIS DATE	SAMPLE ID	CYCLE #	HSS #	PID MET/CAL	ECD MET/CAL	FID MET/CAL	COMMENTS
8-16-96	H2O BLANK	1	1	NA	M11 <sup>DE</sup> AWB	M11 <sup>EB</sup> AW	
	WSTD L5 R4	2	2				
	R2	3	3				
	WSTD C15 1,2-DCE R4	4	4				
	H2O BLANK	5	5				
	89-TW22-01	6	6				1020
	-TW22IW-01	7	7				0945
	88-TW04IW-03	8	8		M11 <sup>DE</sup> ASB	M11 <sup>EB</sup> AS	0713 5.1
	-TW04IW (20-22')	9	9				- 4.8
	-TW05-04	10	10				1243 5.0
	-TW06-03	11	11				1349 5.6
	-TW05-01	12	12		M11 <sup>DE</sup> AWB	M11 <sup>EB</sup> AW	1500 -
	-TW04IW-01	13	13				1710 -
	88-TW07-03	14	14		M11 <sup>DE</sup> ASB	M11 <sup>EB</sup> AS	1516 6.1
	-TW08-03	15	15				1620 5.0
	WSTD L5 R4	16	16				5.1 8/16
	H2O BLANK	17	17				5.1 8/16
	88-TW09-04	18	18				1718 5.1
	-TW09-06	19	19				1728 5.1
8-17-96	H2O BLANK	20	1		M11 <sup>DE</sup> BEAWB	M11 <sup>EB</sup> BEAW	
	WSTD L5 R4	21	2				
	88-TW10-02	22	3		M11 <sup>DE</sup> BEASB	M11 <sup>EB</sup> BEAS	752 5.1
	-TW06-01	23	1		M11 <sup>DE</sup> BEAWB	M11 <sup>EB</sup> BEAW	936
	-TW11-02-01	24	2		M11 <sup>DE</sup> BEAWB	M11 <sup>EB</sup> BEAW	907 1035 5.0
	-TW11-02	25	3				907 5.0

MICROSEEPS, INC.

\*\*\*\*\* ONSITE ANALYSIS \*\*\*\*\*

PAGE 9 OF 11LABORATORY LOCATION: CAMP LEJEUNEPROJECT: 961048ANALYSIS: Chloro / 601-602  
Compd.PATH: C:\CPI m11  
LOT 203BASE FILE NAME: M11 A/AB

ANALYSIS DATE	SAMPLE ID	CYCLE #	HSS #	PID MET/CAL	ECD MET/CAL	FID MET/CAL	COMMENTS
8-17-96	88-TW12-05	26	4	NA	BEASB	BEAS	1625 4.8
	-TW08-01	27	5		BEAWB	BEAW	1250
	-TW09-01	28	6				1325
	-TW10-01	29	7				1415
	-TW11-01	30	8				1500
	-TW13-03	31	9		BEASB	BEAS	1214 5.2
	-TW13-05	32	10				1227 6.2
	H2O BLANK	33	11		BEASB	BEAS	
	WSTD L5 R4	34	12				
	88-TW14-03	35	13				1355 5.3
	-TW15-04	36	14				1516 5.2
	-TW12-01	37	15		BEAWB	BEAW	1605
	-TW13-01	38	16				1700
	H2O BLANK	39	17				-
	88-TW10-01 R	40	18				1415
	WSTD 624K R4	41	19		AVWB	AVW	
	R4	42	20				
	R3	43	21				
	R3	44	22				
	R2	45	23				
	R2	46	24				
	R1	47	25				
	R1	48	26				
8-18-96	H2O BLANK	49	1		BEAWB	BEAW	
	WSTD L5 R4	50	2				

MICROSEEPS, INC.

\*\*\*\*\* ONSITE ANALYSIS \*\*\*\*\*

PAGE 10 OF 11

LABORATORY LOCATION: Camp LEJEUNE  
LOT 203

PROJECT: 961048

ANALYSIS: Chloro / 601-602 compd.

PATH: C:\CPI\m11

BASE FILE NAME: m11 A/AB

ANALYSIS DATE	SAMPLE ID	CYCLE #	HSS #	PID MET/CAL	ECD MET/CAL	FID MET/CAL	COMMENTS
8-18-96	88-TW14-01	51	3	NA	BEAWB	BEAW	810
	TW15-01	52	4				845
	H2O BLANK	53	1				
	88-TW08TW-01	54	2				1332
	-TW08TW-01	55	3				1730
	-TW16-04	56	4		BEASB	BEAS	1505 5.2g
	-TW16-01	57	5		BEAWB	BEAW	1645
	-TW17-04	58	6		BEASB	BEAS	1625 5.8g
	-TW16-04 R	59	7				1505 5.2g
8-19-96	H2O BLANK	60	1		AVWB	AVW	
	LOSTD L5 R4	61	2				
	" 624K R2	62	3				
	" " R1	63	4				
	" 65-12-DCP	64	5				
	" VC-1000	65	6				
	TT-MW01-01	66	7				940
	-MW02-01	67	8				1133
	-MW03-01	68	9				1255
	<del>8814</del> MW09-01 DUP01-01	69	10				1355
	-MW04-01	70	11				1450
	-MW05-01	71	12				1740
	-MW06-01	72	13				1640
	-FB01-01	73	14				1320
	-ER01-01	74	15				1700
	-MW07-01	75	16				





**CHAIN-OF-CUSTODY**

WESTON Analytics Use Only

*0. 6-002*  
**Custody Transfer Record/Lab Work Request**

Client <b>BAKER ENVIRONMENTAL, INC.</b>		Refrigerator #																		
Est. Final Proj. Sampling Date <b>8/21/96</b>		#/Type Container		Liquid																
Work Order #				Solid																
Project Contact/Phone # <b>M. Bartman / 412-269-2053</b>		Volume		Liquid																
AD Project Manager <b>D. Woltman</b>				Solid																
QC Del TAT		Preservatives																		
Date Rec'd		Date Due		ANALYSES REQUESTED →					ORGANIC			INORG								
Account #				VOA	BNA	Pest/PCB	Herb	Metal	CN	WESTON Analytics Use Only										

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 1996	Time Collected	WESTON Analytics Use Only										Number of bottles	Turnaround (days)			
			MS	MSD				1	2	3	4	5	6	7	8	9	10					
								VOA	BNA	Pest/PCB	Herb	Metal	CN	Total Organic Carbon	Grain Starch							
	89-TB02				W	7/27	1520	X													2	35
	89-EC-RS01				W	7/27	1130	X	X				X								5	35
	89-EC-SW01				W	7/27	0945	X	X				X								5	35
	89-EC-SW02				W	7/27	0845	X	X				X								5	35
	89-EC-SW03				W	7/27	0815	X	X				X								5	35
	89-EC-SD01-06				SE	7/27	0955	X	X				X		X	X					3	35
	89-EC-SD02-612				SE	7/27	0955	X	X				X		X	X					3	35
	89-EC-SD02-06				SE	7/27	0855	X	X				X		X	X					3	35
	89-EC-SD02-612				SE	7/27	0855	X	X				X		X	X					3	35
	89-EC-SD03-06				SE	7/27	0820	X	X				X		X	X					3	35

FIELD PERSONNEL: COMPLETE ONLY SHADED AREAS				DATE/REVISIONS:				WESTON Analytics Use Only			
Special Instructions: <b>89-EC-RS01 = Stainless Steel Sampling Spoon</b>  <b>FED-EX Airbill # 1369799001</b>				1. _____				Samples were: _____			
				2. _____				COC Tape was: _____			
				3. _____				1) Shipped ___ or Hand Delivered ___			
				4. _____				Airbill # _____			
				5. _____				2) Ambient or Chilled			
				6. _____				3) Received in Good Condition Y or N			
				4) Labels Indicate Properly Preserved Y or N				4) Unbroken on Sample Y or N			
				5) Received Within Holding Times Y or N				COC Record Present Upon Sample Rec't Y or N			

# 0356-002 Custody Transfer Record/Lab Work Request

Client <b>BAKER ENVIRONMENTAL, INC</b>		Refrigerator #																		
Est. Final Proj. Sampling Date <b>8/21/96</b>		#/Type Container	Liquid																	
Work Order #		Volume	Solid																	
Project Contact/Phone # <b>M. Bartman / 412-269-2053</b>			Liquid																	
AD Project Manager <b>D. Woltman</b>		Solid																		
QC Del TAT		Preservatives																		
Date Rec'd _____ Date Due _____		ANALYSES REQUESTED →		ORGANIC					INORG											
Account #		VOA	BNA	Pest/PCB	Herb					Metal	CN									

Total Organic Carbon GRAN SIZE  
 Number of bottles Turnaround (Days)

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														
			MS	MSD																		
		<b>89-EC-SD03-612</b>			<b>SE</b>	<b>7/27</b>	<b>0820</b>	<b>X</b>	<b>X</b>											<b>X</b>	<b>X</b>	<b>X</b>

FIELD PERSONNEL: COMPLETE ONLY SHADED AREAS				DATE/REVISIONS:				WESTON Analytics Use Only			
Special Instructions:  <b>FED-EX Airbill # 1369799001</b>				1. _____				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			
				2. _____							
				3. _____							
				4. _____							
				5. _____							
				6. _____							
Relinquished by	Received by	Date	Time	Relinquished by	Received by	Date	Time	Discrepancies Between Samples Labels and COC Record? Y or N NOTES:			
JPT	FED-EX	7/27/96	1500								

0356-6 12

# Custody Transfer Record/Lab Work Request

Client <b>BAKER ENVIRONMENTAL, INC.</b>		Refrigerator #	
Est. Final Proj. Sampling Date <b>8/2/96</b>		#/Type Container	Liquid
Work Order #			Solid
Project Contact/Phone # <b>D. WOLTMAN</b>		Volume	Liquid
AD Project Manager <b>M. Bartman/412.269.2053</b>			Solid
QC Del TAT		Preservatives	
Date Rec'd _____ Date Due _____		ANALYSES REQUESTED →	
Account #		ORGANIC	
		VOA	BNA
		Pest/PCB	Herb
		INORG	
		Metal	CN
		Total Organic Carbon	
		Grain Size	
		No. of bottles	
		Turnaround (Days)	

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										7/26 ROT	
			MS	MSD				1	2	3	4	5	6	7	8	9	10		
		89-EC-SD05-06	X	X	SE	7/26	1020	X	X	X					X	X	X	5	35
		89-EC-SD05-612	X	X	SE	7/26	1020	X	X	X					X	X	X	5	35
		89-EC-SD05-06D			SE	7/26	1020	X	X	X					X	X		2	35
		89-EC-SD05-612D			SE	7/26	1020	X	X	X					X	X		2	35
		89-EC-SD04-06			SE	7/26	1225	X	X						X	X	X	3	35
		89-EC-SD04-612			SE	7/26	1225	X	X						X	X	X	3	35
		89-EC-SW05	X	X	W	7/26	1000	X	X	X					X			2	35
		89-EC-SW05D			W	7/26	1000	X	X	X					X			2	35
		89-EC-SW04			W	7/26	1215	X	X						X			5	35
		89-TB01			W	7/22	1520	X											

FIELD PERSONNEL: COMPLETE ONLY SHADED AREAS

DATE/REVISIONS:

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

Special Instructions:  
**Fed-Ex Airbill # 1369798990**  
**SAMPLE # 89-EC-SW05 MS/MSD**  
**89-EC-SD05-06 " "**  
**89-EC-SD05-612 " "**  
**\* CONFIRM WITH MATT BARTMAN CONCERNING TOC BEING PERFORMED ON DUPLICATE SEDIMENT SAMPLE.**

**WESTON Analytics Use Only**

Samples were:	COC Tape was:
1) Shipped ___ or	1) Present on Outer
Hand Delivered ___	Package Y or N
Airbill # _____	2) Unbroken on Outer
2) Ambient or Chilled	Package Y or N
3) Received in Good	3) Present on Sample
Condition Y or N	Y or N
4) Labels Indicate	4) Unbroken on
Properly Preserved	Sample Y or N
Y or N	COC Record Present
5) Received Within	Upon Sample Rec't
Holding Times	Y or N
Y or N	

Discrepancies Between Samples Labels and COC Record? Y or N  
 NOTES:

Relinquished by	Received by	Date	Time	Relinquished by	Received by	Date	Time
JPT	FED-EX	7/26/96	1800				



0356-004  
**Custody Transfer Record/Lab Work Request**

Client <b>BARER</b>	Refrigerator #												
Est. Final Proj. Sampling Date	#/Type Container	Liquid											
Work Order # <b>356</b>		Solid											
Project Contact/Phone # <b>MAT BARTMAN</b>	Volume	Liquid											
AD Project Manager		Solid											
QC _____ Del _____ TAT _____	Preservatives												
Date Rec'd _____ Date Due _____	ANALYSES REQUESTED →	ORGANIC					INORG						
Account #		VOA	BNA	Pest/PCB	Herb	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														
			MS	MSD																		
		93-TW01-01			W	8/6/96	0750	X														
		93-TW02IW-01			W	8/6/96	0825	X														
		93-TW07-01			W	8/6/96	0910	X														
		89-TW08-01			W	8/6/96	0940	X														
		93-TW07IW-01			W	8/6/96	1800	X														
		89-TW09-01			W	8/7/96	0820	X														
		89-TW09IW-01			W	8/7/96	0845	X														
		TB-03			W	8/7/96	0945	X														
		89-TW17IW-01			W	8/7/96	1045	X														

<b>FIELD PERSONNEL: COMPLETE ONLY SHADED AREAS</b> Special Instructions: FedEx Airbill # 1369799071	<b>DATE/REVISIONS:</b> 1. _____ 2. _____ 3. _____ 4. _____ 5. _____ 6. _____	<b>WESTON Analytics Use Only</b> 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																
<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th>Relinquished by</th> <th>Received by</th> <th>Date</th> <th>Time</th> <th>Relinquished by</th> <th>Received by</th> <th>Date</th> <th>Time</th> </tr> </thead> <tbody> <tr> <td><i>[Signature]</i></td> <td><i>[Signature]</i></td> <td>8/7/96</td> <td>1600</td> <td></td> <td></td> <td></td> <td></td> </tr> </tbody> </table>	Relinquished by	Received by	Date	Time	Relinquished by	Received by	Date	Time	<i>[Signature]</i>	<i>[Signature]</i>	8/7/96	1600					Discrepancies Between Samples Labels and COC Record? Y or N NOTES:	
Relinquished by	Received by	Date	Time	Relinquished by	Received by	Date	Time											
<i>[Signature]</i>	<i>[Signature]</i>	8/7/96	1600															

356-4, 5

# Custody Transfer Record/Lab Work Request

Client: <b>BAKER ENVIRONMENTAL INC</b>	Refrigerator #																			
Est. Final Proj. Sampling Date: <b>8/30/96</b>	#/Type Container	Liquid																		
Work Order #		Solid																		
Project Contact/Phone # <b>M. Bartman / 412-269-2053</b>	Volume	Liquid																		
AD Project Manager <b>D. Waltman</b>		Solid																		
QC Del TAT	Preservatives																			
Date Rec'd	Date Due	ANALYSES REQUESTED →										ORGANIC		INORG		No. of bottles				
Account #		VOA	BNA	Pest/PCB	Herb							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 - EPA/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													
			MS	MSD																	
											1996										
		89-Box 01-01			S	8/16	1230					X	X								4
		89-TNK 01-01			W	8/16	1315	X	X	X				X							3
		89-TB 03			W	7/22	1520	X													2

FIELD PERSONNEL: COMPLETE ONLY SHADED AREAS				DATE/REVISIONS:				WESTON Analytics Use Only			
Special Instructions: 89-Box 01-01 2 4oz. soils for extra vol. 89-TNK 01-01 1 1 liter amber for extra vol. Fed-Ex Airbill # 1369799082				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:			
J.P.T.	FED-EX	8/16/96	1800								

WESTON Analytics Use Only

356-007

# Custody Transfer Record/Lab Work Request

Client: <u>BAKER ENVIRONMENTAL, INC.</u>	Refrigerator #																			
Est. Final Proj. Sampling Date: <u>8/30/96</u>	#/Type Container	Liquid																		
Work Order #		Solid																		
Project Contact/Phone # <u>M. Bartman / 412-269-2053</u>	Volume	Liquid																		
AD Project Manager <u>D. Woltman</u>		Solid																		
QC Del TAT	Preservatives																			
Date Rec'd	ANALYSES REQUESTED →	ORGANIC					INORG													No. of bottles
Account #		VOA	BNA	Pest/PCB	Herb		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											No. of bottles						
			MS	MSD																					
		88-TW19IW-01A			W	8/27	1335	X																	2
		88-TW19-01A			W	8/27	1410	X																	2
		88-TW09-01A			W	8/27	1455	X																	2
		88-TW05IW-01A			W	8/28	1230	X																	2
		88-TW05-01A			W	8/28	1720	X																	2
		88-TW08IW-01A			W	8/28	1030	X																	2
		88-TW08-01A			W	8/28	0915	X																	2
		88-TB04			W	8/29	0800	X																	2

FIELD PERSONNEL: COMPLETE ONLY SHADED AREAS

Special Instructions:  
FED-EX Airbill # 1369799115

DATE/REVISIONS:  
1. \_\_\_\_\_  
2. \_\_\_\_\_  
3. \_\_\_\_\_  
4. \_\_\_\_\_  
5. \_\_\_\_\_  
6. \_\_\_\_\_

**WESTON Analytics Use Only**

Samples were: 1) Shipped ___ or Hand Delivered ___ Airbill # _____	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 5) Received Within Holding Times Y or N
2) Ambient or Chilled	COC Record Present Upon Sample Rec't Y or N
3) Received in Good Condition Y or N	
4) Labels Indicate Properly Preserved Y or N	
5) Received Within Holding Times Y or N	

Discrepancies Between Samples Labels and COC Record? Y or N  
NOTES:

Relinquished by	Received by	Date	Time	Relinquished by	Received by	Date	Time
<u>A.P.T.</u>	<u>FED-EX</u>	<u>8/29/96</u>	<u>1600</u>				

# 356-006 Custody Transfer Record/Lab Work Request

Client <b>BAKER ENVIRONMENTAL, INC.</b>	Refrigerator #																			
Est. Final Proj. Sampling Date <b>8/30/96</b>	#/Type Container	Liquid																		
Work Order #		Solid																		
Project Contact/Phone # <b>M. Bartman / 412-269-2053</b>	Volume	Liquid																		
AD Project Manager <b>D. Woltman</b>		Solid																		
QC	Preservatives																			
Del	TAT	<b>ANALYSES REQUESTED</b> →																		
Date Rec'd	Date Due	<b>ORGANIC</b>					<b>INORG</b>					No. of bottles								
Account #		VOA	BNA	Pest/PCB	Herb	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															
			MS	MSD																			
						1996																	
		<b>88-BOX 01-01</b>			<b>S</b>	<b>8/20</b>	<b>1445</b>																<b>5</b>
		<b>88-TNK 01-01</b>			<b>W</b>	<b>8/20</b>	<b>1700</b>	<b>X</b>	<b>X</b>	<b>X</b>													<b>8</b>
		<b>88-TB 04</b>			<b>W</b>	<b>7/15</b>	<b>1545</b>	<b>X</b>															<b>2</b>
		<b>88-TW 08-03</b>			<b>S</b>	<b>8/16</b>	<b>1620</b>	<b>X</b>															<b>1</b>
		<b>88-TW 09-04</b>			<b>S</b>	<b>8/16</b>	<b>1718</b>	<b>X</b>															<b>1</b>
		<b>88-TW 07-03</b>			<b>S</b>	<b>8/16</b>	<b>1516</b>	<b>X</b>															<b>1</b>
		<b>88-TW 15-04</b>			<b>S</b>	<b>8/17</b>	<b>1510</b>	<b>X</b>															<b>1</b>

<b>FIELD PERSONNEL: COMPLETE ONLY SHADED AREAS</b>	<b>DATE/REVISIONS:</b>	<b>WESTON Analytics Use Only</b>
Special Instructions: <b>88-BOX 01-01 2 4oz. soils for extra volume.</b> <b>88-TNK 01-01 1 1 liter amber for extra volume.</b> <b>Fed-Ex Airbill # 1369799104</b>	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
<b>A.T.</b>	<b>FED-EX</b>	<b>8/21/96</b>	<b>1700</b>				

Discrepancies Between Samples Labels and COC Record? Y or N  
NOTES:



# 0356 - 003 Custody Transfer Record/Lab Work Request



Client <b>BAKER ENVIRONMENTAL INC.</b>			Refrigerator # _____												
Est. Final Proj. Sampling Date <b>8/31/96</b>			#/Type Container _____												
Work Order # _____			Liquid _____ Solid _____												
Project Contact/Phone # <b>M. Bartman / 412-269-2093</b>			Volume _____												
AD Project Manager <b>D. Woltman</b>			Liquid _____ Solid _____												
QC _____ Del _____ TAT _____			Preservatives _____												
Date Rec'd _____ Date Due _____			ANALYSES REQUESTED <span style="font-size: 2em;">→</span>												
Account # _____															
			<table border="1"> <tr> <th colspan="4">ORGANIC</th> <th colspan="2">INORG</th> </tr> <tr> <td>VOA</td> <td>BNA</td> <td>Pest/PCB</td> <td>Herb</td> <td>Metal</td> <td>CN</td> </tr> </table>	ORGANIC				INORG		VOA	BNA	Pest/PCB	Herb	Metal	CN
ORGANIC				INORG											
VOA	BNA	Pest/PCB	Herb	Metal	CN										

TPS/HSS

No. of bottles

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												
			MS	MSD																
						1996														
		7-TW01-02			W	8/2	1515						X	X						N
		7-TW03-02			W	8/2	1300						X	X						N
		7-MW03-02			W	8/2	1710						X	X						N
		<del>7-RS02 J.T.03</del>																		
		7-RS01-02			W	8/3	0900						X	X						N

**FIELD PERSONNEL: COMPLETE ONLY SHADED AREAS**

Special Instructions:  
 7-RS01-02 - Rinsate from Peristaltic pump, PETubing, & Silicon Tubing  
 Airbill # 1369799001

**DATE/REVISIONS:**

1. \_\_\_\_\_  
 2. \_\_\_\_\_  
 3. \_\_\_\_\_  
 4. \_\_\_\_\_  
 5. \_\_\_\_\_  
 6. \_\_\_\_\_

**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
VPT	FED-EX	8/3/96	1300				

Discrepancies Between Samples Labels and COC Record? Y or N \_\_\_\_\_

NOTES:

**PHASE II**

# Custody Transfer Record/Lab Work Request

Client: <u>Baker Environmental, Inc.</u>		Refrigerator #					
Est. Final Proj. Sampling Date: <u>6/7/97</u>		#/Type Container	Liquid				
Work Order #: <u>62470-356</u>			Solid				
Project Contact/Phone #		Volume	Liquid				
AD Project Manager			Solid				
QC Del: <u>TAT</u>		Preservatives					
Date Rec'd _____ Date Due _____		ANALYSES REQUESTED →					
Account #		ORGANIC				INORG	
		VOA	BNA	Pest/PCB	Herb	Metal	CN

MATRIX CODES: S - Soil SE - Sediment SO - Solid SL - Sludge W - Water O - Oil A - Air DS - Drum DL - Drum L - Liquids EP/TCP - Leachate WI - Wipe X - Other F - Fish	Lab ID	Client ID/Description	Matrix QC Chosen (✓)		Matrix	Date Collected	Time Collected	WESTON Analytics Use Only										
			MS	MSD														
		89-MW04-03			S	4/15/97	18:20	X	X	X							X	
		89-MW04-05			S	4/15/97	18:29	X	X	X							X	
		89-MW04DW-03			S	4/17/97	07:56	X	X								X	
		89-MW04DW-05			S	4/17/97	08:16	X	X								X	
		88-MW04DW-06			S	4/18/97	09:10	X										
		88-MW04DW-07			S	4/18/97	09:15	X										
		89-MW05IN-03			S	4/18/97	09:29	X	X	X							X	
		89-MW05IN-06			S	4/18/97	09:49	X	X								X	
		TB-01			W	4/18/97	11:55	X										
		89-RBD1			N	4/18/97	17:30	X	X	X							X	

**FIELD PERSONNEL: COMPLETE ONLY SHADED AREAS**

Special Instructions:

**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
<u>APT</u>	<u>FedEx</u>	<u>4/18/97</u>	<u>1800</u>				

Discrepancies Between Samples Labels and COC Record? Y or N  
NOTES:

WESTON Analytics Use Only

356-02  
Custody Transfer Record/Lab Work Request

<b>Client</b> <u>BAKER ENVIRONMENTAL</u>	<b>Refrigerator #</b>						
<b>Est. Final Proj. Sampling Date</b> <u>May 31 1997</u>	<b>#/Type Container</b>	Liquid					
<b>Work Order #</b> <u>62470-356</u>		Solid					
<b>Project Contact/Phone #</b> <u>910-347-8229</u>	<b>Volume</b>	Liquid					
<b>AD Project Manager</b>		Solid					
<b>QC</b> <u>Del</u> <u>TAT</u>	<b>Preservatives</b>						
<b>Date Rec'd</b> _____ <b>Date Due</b> _____	<b>ANALYSES REQUESTED</b> →	<b>ORGANIC</b>				<b>INORG</b>	
<b>Account #</b>		VOA	BNA	Pest/PCB	Herb	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									
			MS	MSD													
		89-RB02			W	4/20/97	1010	X	X	X							X
		89-RB03			W	4/20/97	1045	X	X	X							X
		89-RB04			W	4/20/97	1230	X	X	X							X
		88-SB01-02			S	4/19/97	0845	X									
		88-SB03-02			S	4/19/97	0803	X									
		88-MW02DW-06			S	4/20/97	0925	X									
		88-MW02DW-05			S	4/20/97	0900	X									
		93-MW05IW-04			S	4/20/97	1102	X	X								X
		93-MW05IW-02			S	4/20/97	1043	X	X								X
		89-MW05-03			S	4/20/97	0715	X	X								X

**FIELD PERSONNEL: COMPLETE ONLY SHADED AREAS**

Special Instructions:  
 89-RB02 Stainless Steel Sampling Spoon  
 89-RB03 Split Spoon  
 89-RB04 Split Spoon

**DATE/REVISIONS:**

1. \_\_\_\_\_
2. \_\_\_\_\_
3. \_\_\_\_\_
4. \_\_\_\_\_
5. \_\_\_\_\_
6. \_\_\_\_\_

**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
JPT	Fed-Ex	4/21/97	1800				

Discrepancies Between Samples Labels and COC Record? Y or N \_\_\_\_\_  
 NOTES: \_\_\_\_\_

356-02

# Custody Transfer Record/Lab Work Request

Client: <b>BAKER ENVIRONMENTAL</b>		Refrigerator #														
Est. Final Proj. Sampling Date		#/Type Container	Liquid													
Work Order # <u>62470-356</u>			Solid													
Project Contact/Phone #		Volume	Liquid													
AD Project Manager			Solid													
QC Del TAT		Preservatives														
Date Rec'd _____ Date Due _____		ANALYSES REQUESTED →	ORGANIC					INORG								
Account # _____			VOA	BNA	Pest/PCB	Herb	Metal	CN			TOO	Grain Size	Bulk Density			

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																			
			MS	MSD																							

FIELD PERSONNEL: COMPLETE ONLY SHADED AREAS				DATE/REVISIONS:				WESTON Analytics Use Only			
Special Instructions: <u>88-RB05 stainless steel sampling spoon</u>				1. _____				Samples were: 1) Shipped _____ or Hand Delivered _____ Airbill # _____			
				2. _____				2) Ambient or Chilled _____			
				3. _____				3) Received in Good Condition Y or N _____			
				4. _____				4) Labels Indicate Properly Preserved Y or N _____			
				5. _____				5) Received Within Holding Times Y or N _____			
				6. _____				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
<u>APT</u>	<u>Fed-EX</u>	<u>4/21/97</u>	<u>1800</u>				

Discrepancies Between Samples Labels and COC Record? Y or N \_\_\_\_\_  
NOTES: \_\_\_\_\_





# Custody Transfer Record/Lab Work Request

Client <b>BAKER ENVIRONMENTAL, INC.</b>	Refrigerator #																			
Est. Final Proj. Sampling Date <b>6/16/97</b>	#/Type Container	Liquid																		
Work Order # <b>CTD 350</b>	Volume	Solid																		
Project Contact/Phone # <b>M.D. BATTMAN</b> <b>412-209-2002</b>	Preservatives	Liquid																		
AD Project Manager <b>BOSCO RAMIREZ</b>		Solid																		
QC <b>BOA</b> Del <b>BOA TAT BOA</b>																				

ANALYSES REQUESTED →

VOA	BNA	Pest/PCB	Herb	TOC																

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														
			MS	MSD				VOA	BNA	Pest/PCB	Herb	TOC	Metal	CN								
		<b>IR88-MW03DW-02</b>			<b>S</b>	<b>4-30-97</b>	<b>0835</b>	✓														
		<b>IR88-MW03DW-04</b>			<b>S</b>	<b>4-30-97</b>	<b>0850</b>	✓														
		<b>IR93-MW01-02</b>			<b>S</b>	<b>4-30-97</b>	<b>1210</b>	✓	✓	✓												
		<b>IR93-MW01-04</b>			<b>S</b>	<b>4-30-97</b>	<b>1229</b>	✓	✓													
		<b>IR93-MW03-02</b>			<b>S</b>	<b>4-30-97</b>	<b>0741</b>	✓	✓													
		<b>IR93-MW03-02D</b>			<b>S</b>	<b>4-30-97</b>	<b>0741</b>	✓	✓													
		<b>IR93-MW03-04</b>			<b>S</b>	<b>4-30-97</b>	<b>0759</b>	✓	✓													
		<b>IR93-MW03LW-02</b>			<b>S</b>	<b>4-29-97</b>	<b>1100</b>	✓	✓													
		<b>IR93-MW03LW-04</b>			<b>S</b>	<b>4-29-97</b>	<b>1112</b>	✓	✓													
		<b>IR93-MW01LW-02</b>			<b>S</b>	<b>4-30-97</b>	<b>1502</b>	✓	✓													

FIELD PERSONNEL: COMPLETE ONLY SHADED AREAS	DATE/REVISIONS:	WESTON Analytics Use Only
Special Instructions: <b>Air bill # 3558272815</b>	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:
<b>APT</b>	<b>Fed-EX</b>	<b>4/30/97</b>	<b>1800</b>					





WESTON Analytics Use Only

356-004



# Custody Transfer Record/Lab Work Request

Page 1 of 1

Client <b>Baker Environmental, Inc.</b>		Refrigerator #															
Est. Final Proj. Sampling Date <b>6/16/97</b>		#/Type Container	Liquid														
Work Order # <b>CTO 356</b>			Solid														
Project Contact/Phone # <b>M.D. Bartman 412-269-2058</b>		Volume	Liquid														
AD Project Manager <b>Rosco Ramirez</b>			Solid														
QC <b>BoA Del BoA TAT BoA</b>		Preservatives															
Date Rec'd _____ Date Due _____		ANALYSES REQUESTED →			ORGANIC				INORG								
Account #				VOA	BNA	Pest/PCB	Herb			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																
			MS	MSD																				
		<b>IR89-RBSB08</b>			<b>W</b>	<b>4.30.97</b>	<b>1230</b>																	
		<b>IR93-RBSB09</b>			<b>W</b>	<b>4.30.97</b>	<b>1300</b>																	

FIELD PERSONNEL: COMPLETE ONLY SHADED AREAS			DATE/REVISIONS:			WESTON Analytics Use Only	
Special Instructions: <b>IR89-RBSB08 split spoon</b> <b>IR93-RBSB09 stainless steel spoon</b> <b>Airbill # 3558272815</b>			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'd Y or N	

Relinquished by	Received by	Date	Time	Relinquished by	Received by	Date	Time
<b>PT</b>	<b>Fed-EX</b>	<b>4.30.97</b>	<b>1800</b>				

# Custody Transfer Record/Lab Work Request

Client <u>Baker Environmental, Inc.</u>		Refrigerator #												
Est. Final Proj. Sampling Date <u>6/16/97</u>		#/Type Container	Liquid											
Work Order # <u>CTO 356</u>			Solid											
Project Contact/Phone # <u>MD Bartman 412-269-2053</u>		Volume	Liquid											
AD Project Manager <u>Bisco Ramirez</u>			Solid											
QC <u>BoA Del BoA TAT BoA</u>		Preservatives												
Date Rec'd _____ Date Due _____		ANALYSES REQUESTED	ORGANIC					INORG						
Account # _____			VOA	BNA	Pest/PCB	Herb	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												
			MS	MSD																
			1997																	
		IR89-MW06DW-01			S	5/2	1508	X	X							X				
		IR89-MW06DW-02			S	5/2	1515	X	X							X				
		IR89-MW06IW-01			S	5/2	0755	X	X							X				
		IR89-MW06IW-01D			S	5/2	0755	X	X							X				
		IR89-MW06IW-02			S	5/2	0805	X	X							X				
		TBO5			W	4/14	1455	X												

FIELD PERSONNEL: COMPLETE ONLY SHADED AREAS

DATE/REVISIONS:

1. \_\_\_\_\_

2. \_\_\_\_\_

3. \_\_\_\_\_

4. \_\_\_\_\_

5. \_\_\_\_\_

6. \_\_\_\_\_

Special Instructions:  
Airbill #: 3568272863

**WESTON Analytics Use Only**

Samples were:	COC Tape was:
1) Shipped _____ or Hand Delivered _____	1) Present on Outer Package Y or N
Airbill # _____	2) Unbroken on Outer Package Y or N
2) Ambient or Chilled	3) Present on Sample Y or N
3) Received in Good Condition Y or N	4) Unbroken on Sample Y or N
4) Labels Indicate Properly Preserved Y or N	COC Record Present Upon Sample Rec't Y or N
5) Received Within Holding Times Y or N	

Relinquished by	Received by	Date	Time	Relinquished by	Received by	Date	Time
<u>GT</u>	<u>Fed-EX</u>	<u>5/2/97</u>	<u>1800</u>				

Discrepancies Between Samples Labels and COC Record? Y or N

NOTES:

356-306

# Custody Transfer Record/Lab Work Request

Client <u>Baker Environmental Inc</u>		Refrigerator #																		
Est. Final Proj. Sampling Date <u>6-16-97</u>		#/Type Container		Liquid																
Work Order # <u>CTO 356</u>		Volume		Solid																
Project Contact/Phone # <u>MD. Bertman 412-269-2653</u>		Preservatives		Liquid																
AD Project Manager <u>Rosco Ramirez</u>		ANALYSES REQUESTED $\rightarrow$		Solid																
QC <u>BOA Del. BOA TAT See NOTE!!</u>																				
Date Rec'd _____ Date Due _____																				
Account # _____																				

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																		
			MS	MSD				VOA	BNA	Pes/PCB	Herb															
												INORG														
						1997																				
		<u>IR88-RBSB10</u>			<u>W</u>	<u>5/4</u>	<u>1130</u>	<u>X</u>	<u>X</u>	<u>X</u>													<u>X</u>			
		<u>IR88-MW06TW-06</u>			<u>S</u>	<u>5/4</u>	<u>1006</u>	<u>X</u>																		
		<u>IR88-MW06TW-06D</u>			<u>S</u>	<u>5/4</u>	<u>1006</u>	<u>X</u>																		
		<u>IR88-MW06TW-07</u>			<u>S</u>	<u>5/4</u>	<u>1010</u>	<u>X</u>																		
		<u>IR88-RRSR11</u>			<u>W</u>	<u>5/4</u>	<u>1400</u>	<u>X</u>																		
		<u>*IR89-MW06TW-01</u>			<u>W</u>	<u>5/5</u>	<u>1640</u>	<u>X</u>																		
		<u>*IR89-MW06DW-01</u>			<u>W</u>	<u>5/5</u>	<u>1635</u>	<u>X</u>																		
		<u>IR89-MW07TW-04</u>	<u>X</u>	<u>X</u>	<u>S</u>	<u>5/3</u>	<u>1616</u>	<u>X</u>	<u>X</u>													<u>X</u>				
		<u>IR89-MW07TW-06</u>			<u>S</u>	<u>5/3</u>	<u>1645</u>	<u>X</u>	<u>X</u>													<u>X</u>				
		<u>IR89-MW07DW-04</u>			<u>S</u>	<u>5/4</u>	<u>1624</u>	<u>X</u>	<u>X</u>													<u>X</u>				

FIELD PERSONNEL: COMPLETE ONLY SHADED AREAS

Special Instructions:  
IR88-RBSB10 SPIIT SPOON  
IR88-RBSB11 Stainless Steel spoon  
\* QUICK TAT Katten wood 412-269-6000

DATE/REVISIONS:

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

WESTON Analytics Use Only

Samples were: 1) Shipped ___ or Hand Delivered ___ Airbill # _____	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
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	

Relinquished by	Received by	Date	Time	Relinquished by	Received by	Date	Time
<u>JPT</u>	<u>Fed-Ex</u>	<u>5/5/97</u>	<u>1800</u>				

Discrepancies Between Samples Labels and COC Record? Y or N  
 NOTES:

WESTON Analytics Use Only

356-006

# Custody Transfer Record/Lab Work Request

Client <u>Baker Environmental</u>	Refrigerator #																	
Est. Final Proj. Sampling Date	#/Type Container	Liquid																
Work Order #		Solid																
Project Contact/Phone #	Volume	Liquid																
AD Project Manager		Solid																
QC _____ Del _____ TAT _____	Preservatives																	
Date Rec'd _____ Date Due _____	ANALYSES REQUESTED →	ORGANIC					INORG		GRAIN SIZE	Bulk Density								
Account # _____		VOA	BNA	Pest/PCB	Herb	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											
			MS	MSD															
						1997													
		TR89-MW07DW-06			S	5/4	1635	X	X						X				
		TR89-MW06DW-07			S	5/2	1527									X	X		
		TS06			W	4/14	1455	X											

FIELD PERSONNEL: COMPLETE ONLY SHADED AREAS	DATE/REVISIONS:	WESTON Analytics Use Only						
		Special Instructions:     	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:
40T	FED-EX	5/5/97	1800					

356 007

# Custody Transfer Record/Lab Work Request



Client <u>Baker Environmental, Inc.</u>		Refrigerator #							
Est. Final Proj. Sampling Date <u>6-16-97</u>		#/Type Container	Liquid						
Work Order # <u>CTO 356</u>			Solid						
Project Contact/Phone # <u>M.P. Bartman 412-269-2053</u>		Volume	Liquid						
AD Project Manager <u>Bosco Ramirez</u>			Solid						
QC <u>BoA</u> Del <u>BoA</u> TAT <u>BoA</u>		Preservatives							
Date Rec'd _____ Date Due _____		ANALYSES REQUESTED →	ORGANIC				INORG		Total Organic Carbon
Account # _____			VOA	BNA	Pest/PCB	Herb	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 1997	Time Collected	WESTON Analytics Use Only																		
			MS	MSD				1	2	3	4	5	6	7	8	9	10	11	12							
	X	IR89-MW07IW-01			W	5/6	1340	X																		
	X	IR89-MW07DW-01			W	5/6	1420	X																		
		IR93-RBSB11			W	5/6	1130	X	X	X					X											
		IR88-RBSB12			W	5/6	1630	X																		
		IR93-MW04IW-02			S	5/6	0746	X	X						X											
		IR93-MW04IW-04			S	5/6	0802	X	X						X											
		IR89-MW06DW-07			S	5/2	1527																	X		
		T807			W	4/14	1455	X																		
		IR88-MW07IW-09			S	5/5	1727																	X		
		IR88-MW07IW-22			S	5/5	1824																	X		

FIELD PERSONNEL: COMPLETE ONLY SHADED AREAS				DATE/REVISIONS:				WESTON Analytics Use Only			
Special Instructions: * Quick T.A.T. Karen Wood 412-269-6014 IR88-RBSB12 stainless steel spoon IR93-RBSB11 split spoon Airbill # 3558272874				1. _____ 2. _____ 3. _____ 4. _____ 5. _____ 6. _____							
Relinquished by	Received by	Date	Time	Relinquished by	Received by	Date	Time	Discrepancies Between Samples Labels and COC Record? Y or N NOTES:			
<u>JPT</u>	<u>Fed-Ex</u>	<u>5/14/97</u>	<u>1800</u>								

Samples were:		COC Tape was:	
1) Shipped <u>   </u> or Hand Delivered <u>   </u> Airbill # <u>   </u>		1) Present on Outer Package Y or N	
2) Ambient or Chilled		2) Unbroken on Outer Package Y or N	
3) Received in Good Condition Y or N		3) Present on Sample Y or N	
4) Labels Indicate Properly Preserved Y or N		4) Unbroken on Sample Y or N	
5) Received Within Holding Times Y or N		COC Record Present Upon Sample Rec't Y or N	





556-008  
**Custody Transfer Record/Lab Work Request**

Client: <u>Baker Environmental, Inc</u>	Refrigerator #																		
Est. Final Proj. Sampling Date: <u>6-16-97</u>	#/Type Container	Liquid																	
Work Order #: <u>CTO 356</u>		Solid																	
Project Contact/Phone #: <u>M.D. Bartman 412-269-2053</u>	Volume	Liquid																	
AD Project Manager: <u>Bosco Ramirez</u>		Solid																	
QC: <u>BoA Del BoA TAT BoA</u>	Preservatives																		
Date Rec'd _____ Date Due _____	ANALYSES REQUESTED →	ORGANIC					INORG												
Account # _____		VOA	BNA	Pest/PCB	Herb		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											
			MS	MSD															
			1997																
		IR93-MW04-04			S	5/6	1732	X	X										X
		IR88-SB04-04			S	5/6	1419	X											
		IR88-SB04-05			S	5/6	1425	X											
		IR88-SB05-05	X	X	S	5/6	1729	X											
		IR88-SB05-06			S	5/6	1731	X											
		IR88-SB06-04			S	5/6	1606	X											
		IR88-SB06-05			S	5/6	1611	X											
		TB08			W	4/21	1430	X											

<b>FIELD PERSONNEL: COMPLETE ONLY SHADED AREAS</b>				<b>DATE/REVISIONS:</b>				<b>WESTON Analytics Use Only</b>			
Special Instructions:				1. _____				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 _____			
				2. _____							
				3. _____							
				4. _____							
				5. _____							
				6. _____							
Relinquished by	Received by	Date	Time	Relinquished by	Received by	Date	Time	Discrepancies Between Samples Labels and COC Record? Y or N NOTES: _____ Y or N			
<u>A.P.T.</u>	<u>Fed-EX</u>	<u>5/7/96</u>	<u>1800</u>								

# 356-009 Custody Transfer Record/Lab Work Request

Client <u>Baker Environmental, Inc.</u>	Refrigerator #											
Est. Final Proj. Sampling Date <u>6-16-97</u>	#/Type Container	Liquid										
Work Order # <u>62470-356</u>		Solid										
Project Contact/Phone # <u>M.D. Bartman 412-269-2053</u>	Volume	Liquid										
AD Project Manager <u>Bosco Ramirez</u>		Solid										
QC <u>BoA Del BoA TAT BoA</u>	Preservatives											
Date Rec'd _____ Date Due _____	ANALYSES REQUESTED →	ORGANIC					INORG					
Account # _____		VOA	BNA	Pest/PCB	Herb	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 1997	Time Collected	WESTON Analytics Use Only														
			MS	MSD																		
		IR89/93-FB01			W	5/13	1230	X	X	X									X			DRILLERS H <sub>2</sub> O
		IR89/93-FB02			W	5/13	1510	X	X	X									X			Lab Grade DE H <sub>2</sub> O
		IR89/93-FB03			W	5/13	1530	X	X	X									X			DI H <sub>2</sub> O for DC ON
		IR89-MW08IW-04			S	5/12	1748	X	X										X			
		IR89-MW08IW-06			S	5/12	1813	X	X										X			
		IR89-RBSB14			W	5/13	1600	X	X	X									X			
		TB09			W	4/14	1455	X														

FIELD PERSONNEL: COMPLETE ONLY SHADED AREAS	DATE/REVISIONS:	WESTON Analytics Use Only																
Special Instructions: <u>IR89-RBSB14 Stainless Steel Spoon</u> <u>Airbill # 3558272793</u>	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																
<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <th>Relinquished by</th> <th>Received by</th> <th>Date</th> <th>Time</th> <th>Relinquished by</th> <th>Received by</th> <th>Date</th> <th>Time</th> </tr> <tr> <td><u>APT</u></td> <td><u>Fed-EX</u></td> <td><u>5/13/97</u></td> <td><u>1800</u></td> <td></td> <td></td> <td></td> <td></td> </tr> </table>		Relinquished by	Received by	Date	Time	Relinquished by	Received by	Date	Time	<u>APT</u>	<u>Fed-EX</u>	<u>5/13/97</u>	<u>1800</u>					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											
<u>APT</u>	<u>Fed-EX</u>	<u>5/13/97</u>	<u>1800</u>															
Discrepancies Between Samples Labels and COC Record? Y or N NOTES:																		



3-6-010  
Custody Transfer Record/Lab Work Request

Client <b>Baker Environmental, Inc.</b>		Refrigerator #																													
Est. Final Proj. Sampling Date <b>6-16-97</b>		#/Type Container	Liquid																												
Work Order # <b>62470-356</b>			Solid																												
Project Contact/Phone # <b>Mr. Bartman 412-269-2053</b>		Volume	Liquid																												
AD Project Manager <b>Bosco Ramirez</b>		Preservatives	Solid																												
QC <b>BOA</b> Del. <b>BOA TAT BOA</b>		ANALYSES REQUESTED →			ORGANIC					INORG						Total organic Carbon	Metals	CN	Nit. After Parameters	Sulfide	COD	Methane	No. of bottles								
Date Rec'd _____	Date Due _____	VOA	BNA	Pest/PCB	Herb																										
Account # _____																															

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 1997	Time Collected	WESTON Analytics Use Only																
			MS	MSD																				
	•	IR88-MW05-01			W	5/13	1600	X										X	X	X	X			8
	•	IR88-MW05IW-01			W	5/13	1700	X										X	X	X	X			8
	•	IR88-MW05DW-01			W	5/13	1850	X										X	X	X	X			8
	•	IR88-MW04-01			W	5/14	0940	X																2
	•	IR88-MW04IW-01			W	5/14	1045	X																2
	•	IR88-MW04DW-01			W	5/14	1110	X																2
	•	IR89-MW08DW-04			S	5/13	1412	X	X									X						3
	•	IR89-MW08DW-06			S	5/13	1420	X	X									X						3
	•	IR89-MW08IW-20			S	5/13	0907											X						1
	•	TB10			W	4/14	1455	X																2

<b>FIELD PERSONNEL: COMPLETE ONLY SHADED AREAS</b>	<b>DATE/REVISIONS:</b>
Special Instructions: <b>Nit. After Parameters include: Nitrate, Nitrite, Sulfate, <del>Sulfide</del> Chloride Fe<sup>+2</sup>, BOD, TSS/TDS</b>	1. _____ 2. _____ 3. _____ 4. _____ 5. _____ 6. _____

WESTON Analytics Use Only	
Samples were: 1) Shipped ___ or Hand Delivered ___ Airbill # _____	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
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	

Relinquished by	Received by	Date	Time	Relinquished by	Received by	Date	Time
A.P.T.	Fed-Ex	5/14/97	1700				

Discrepancies Between Samples Labels and COC Record? Y or N  
NOTES:

356-~~010~~ 011  
**Custody Transfer Record/Lab Work Request**

Client <u>Baker Environmental, Inc.</u>	Refrigerator # _____																	
Est. Final Proj. Sampling Date <u>6-16-97</u>	#/Type Container	Liquid _____ Solid _____																
Work Order # <u>62470-356</u>	Volume	Liquid _____ Solid _____																
Project Contact/Phone # <u>M.B. Bardman 412-269-2053</u>	Preservatives	_____																
AD Project Manager <u>Bosco Rameriz</u>	ANALYSES REQUESTED →	<table border="1" style="font-size: small;"> <tr> <th colspan="5">ORGANIC</th> <th colspan="3">INORG</th> </tr> <tr> <td>VOA</td> <td>BNA</td> <td>Pest/PCB</td> <td>Herb</td> <td>TCLP</td> <td>Metal</td> <td>CN</td> <td></td> </tr> </table>	ORGANIC					INORG			VOA	BNA	Pest/PCB	Herb	TCLP	Metal	CN	
ORGANIC					INORG													
VOA	BNA	Pest/PCB	Herb	TCLP	Metal	CN												
QC <u>BOA</u> Del <u>BOA</u> TAT <u>BOA</u>																		
Date Rec'd _____ Date Due _____																		
Account # _____																		

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																			
			MS	MSD				1	2	3	4	5	6	7	8	9	10	11	12								
						1997																					
		IR88-ROB1			SL	5/15	1100	X	X	X		X	X		X											DRILLING MUD #6076	
		IR88-ROB2			S	5/15	1130	X	X	X		X	X		X											#5044	
		IR88-ROB3			S	5/15	1200	X	X	X		X	X		X											#6021	
		IR89-MW03IW-02			S	5/15	0822	X	X	X					X												
		IR89-MW03IW-02D			S	5/15	0822	X	X	X					X												
		IR89-MW03IW-05	X	X	S	5/15	0846	X	X	X					X												
		IR88-MW03-01	X	X	W	5/14	1450	X																X	X	X	X
		IR88-MW03IW-01			W	5/14	1615	X																X	X	X	X
		IR88-MW03DW-01			W	5/14	1645	X																X	X	X	X
		IR88-MW02DW-01			W	5/15	1140	X																			

<b>FIELD PERSONNEL: COMPLETE ONLY SHADED AREAS</b> Special Instructions: TCLP includes BA, SVOA, Pest, Herb, metals  Nat. Atten. Parameters include: Nitrate, Nitrite, Sulfate, chloride, Fe <sup>+2</sup> , BOD, TSS/TDS  *VOAs only Airbill # 3558272745	<b>DATE/REVISIONS:</b> 1. _____ 2. _____ 3. _____ 4. _____ 5. _____ 6. _____	<b>WESTON Analytics Use Only</b> 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 _____																
<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <th>Relinquished by</th> <th>Received by</th> <th>Date</th> <th>Time</th> </tr> <tr> <td>APT</td> <td>Fed-EX</td> <td>5/15/97</td> <td>1730</td> </tr> </table>	Relinquished by	Received by	Date	Time	APT	Fed-EX	5/15/97	1730	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <th>Relinquished by</th> <th>Received by</th> <th>Date</th> <th>Time</th> </tr> <tr> <td> </td> <td> </td> <td> </td> <td> </td> </tr> </table>	Relinquished by	Received by	Date	Time					Discrepancies Between Samples Labels and COC Record? Y or N _____ NOTES: _____
Relinquished by	Received by	Date	Time															
APT	Fed-EX	5/15/97	1730															
Relinquished by	Received by	Date	Time															

# Custody Transfer Record/Lab Work Request

Client Baker Environmental, Inc. Refrigerator # \_\_\_\_\_  
 Est. Final Proj. Sampling Date 6-16-97 #/Type Container Liquid \_\_\_\_\_  
 Work Order # 62470-356 Solid \_\_\_\_\_  
 Project Contact/Phone # M.D. Portman 412-269-2053 Volume Liquid \_\_\_\_\_  
 AD Project Manager BOSCO Ramirez Solid \_\_\_\_\_  
 QC BOA Del BOA TAT BOA Preservatives \_\_\_\_\_  
 ANALYSES REQUESTED →

ORGANIC					INORG	
VOA	BNA	Pest/PCB	Herb	Metal	CN	

Date Rec'd \_\_\_\_\_ Date Due \_\_\_\_\_  
 Account # \_\_\_\_\_

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														
			MS	MSD																		
						1997																
		IR88-MW02-01			W	5/15	1025	X														
		IR89-RBSB15			W	5/15	1500	X	X	X												
		IR88-MW02IW-01			W	5/15	1240	X														
		IR88-MW02IW-01			W	5/15	1240	X														
		TB//			W	4/14	1455	X														

**FIELD PERSONNEL: COMPLETE ONLY SHADED AREAS**

Special Instructions:  
IR89-RBSB15 split spoon  
"HOLD"

**DATE/REVISIONS:**

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

**WESTON Analytics Use Only**

Samples were: \_\_\_\_\_ COC Tape was:  
 1) Shipped \_\_\_\_\_ or 1) Present on Outer  
 Hand Delivered \_\_\_\_\_ Package Y or N  
 Airbill # \_\_\_\_\_ 2) Unbroken on Outer  
 2) Ambient or Chilled Package Y or N  
 3) Received in Good Condition Y or N 3) Present on Sample Y or N  
 4) Labels Indicate Properly Preserved Y or N 4) Unbroken on Sample Y or N  
 5) Received Within Holding Times 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
<u>ADT</u>	<u>Fed-Ex</u>	<u>5/15/97</u>	<u>1730</u>				

Discrepancies Between Samples Labels and COC Record? Y or N  
 NOTES:





97059729

352012

# Custody Transfer Record/Lab Work Request

Client <u>Baker Environmental, Inc.</u>	Refrigerator #								
Est. Final Proj. Sampling Date <u>6-16-97</u>	#/Type Container	Liquid							
Work Order # <u>62470-356</u>		Solid							
Project Contact/Phone # <u>U.D. Bartman 412-269-2053</u>	Volume	Liquid							
AD Project Manager <u>Bosco Ramirez</u>		Solid							
QC <u>BoA Del BoA TAT BoA</u>	Preservatives								
Date Rec'd _____ Date Due _____	ANALYSES REQUESTED →	ORGANIC							
Account # _____		INORG							
	VOA	BNA	Pest/PCB	Herb	Metal	CN	Not Taken Parameters Sulfide	COD	Methane

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															
			MS	MSD																			
	011	IR88-MW06TW-01D			W	5/15	1645	X															
	012	IR88-MW09-01			W	5/16	0915	X															
	013	IR88-MW09-01D			W	5/16	0915	X															
	014	IR88-MW09IW-01			W	5/16	1110	X															
	015	TB12			W	4/14	1455	X															
	016	IR88-MW08-01			W	5/16	1355	X															
	017	IR88-MW08IW-01			W	5/16	1505	X										X	X	X	X		

FIELD PERSONNEL: COMPLETE ONLY SHADED AREAS				DATE/REVISIONS:				WESTON Analytics Use Only			
Special Instructions:				1. <u>TB Prep Date 041497</u>				Samples were: <u>Shipped</u> or <u>Hand Delivered</u> Airbill # <u>FedEx</u> 2) Ambient or <u>Chilled</u> 3) Received in Good Condition <u>Y</u> or N 4) Labels Indicate Properly Preserved <u>Y</u> or N 5) Received Within Holding Times <u>Y</u> or N COC Tape was: 1) Present on Outer Package <u>Y</u> or N 2) Unbroken on Outer Package <u>Y</u> or N 3) Present on Sample <u>Y</u> or N 4) Unbroken on Sample <u>Y</u> or N COC Record Present Upon Sample Rec't <u>Y</u> or N			
				2. _____							
				3. _____							
				4. <u>5.9c 5.2c Coolers</u>							
				5. _____							
				6. _____							
Relinquished by	Received by	Date	Time	Relinquished by	Received by	Date	Time	Discrepancies Between Samples Labels and COC Record? Y or <u>N</u> NOTES: <u>coc date &amp; initials</u>			
<u>FPT</u>	<u>Fed-EX</u>	<u>5/16/97</u>	<u>1730</u>								
	<u>R. Hew</u>	<u>5/17/97</u>	<u>13:30</u>								



# 3-3-013 Custody Transfer Record/Lab Work Request

Client <b>Baker Environmental, Inc.</b>		Refrigerator #																			
Est. Final Proj. Sampling Date <b>6-16-97</b>		#/Type Container	Liquid																		
Work Order # <b>62470-356</b>			Solid																		
Project Contact/Phone # <b>MD Bartman 412-269-2053</b>		Volume	Liquid																		
AD Project Manager <b>Bosco Ramirez</b>			Solid																		
QC <b>BoA</b> Del <b>BoA</b> TAT <b>BoA</b>		Preservatives																			
Date Rec'd _____ Date Due _____		ANALYSES REQUESTED →	ORGANIC					INORG													
Account # _____			VOA	BNA	Pest/PCB	Herb	Metal	CN	Methane	Nat. Atten Parameters	Sulfide										

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																
			MS	MSD				VOA	BNA	Pest/PCB	Herb	Metal	CN	Methane	Nat. Atten Parameters	Sulfide								
		IR89-MW07IW-02			W	5/20	1035	X	X					X										
		IR89-MW07DW-02			W	5/20	1105	X	X					X										
		IR89-MW06IW-02			W	5/19	1645	X	X					X										
		IR89-MW06DW-02			W	5/19	1750	X	X					X										
		IR93-MW03-01			W	5/20	1445	X	X					X		X	X	X						
		TB13			W	5/16	1445	X																
		IR93-MW03IW-01			W	5/20	1645	X	X	X				X										

FIELD PERSONNEL: COMPLETE ONLY SHADED AREAS				DATE/REVISIONS:				WESTON Analytics Use Only			
Special Instructions: <b>Airbill # 3558272723</b>				1. _____				Samples were: _____ COC Tape was: _____ 1) Shipped ___ or Hand Delivered ___ Package Y or N Airbill # _____ 2) Ambient or Chilled _____ Package Y or N 3) Received in Good Condition Y or N _____ 3) Present on Sample Y or N 4) Labels Indicate Properly Preserved Y or N _____ 4) Unbroken on Sample Y or N 5) Received Within Holding Times Y or N _____ COC Record Present Upon Sample Rec't Y or N			
Nat. Atten. Parameters include: Nitrate, Nitrite, Sulfate, Chloride, Fe <sup>+2</sup>				2. _____							
				3. _____							
				4. _____							
				5. _____							
				6. _____							
Relinquished by	Received by	Date	Time	Relinquished by	Received by	Date	Time	Discrepancies Between Samples Labels and COC Record? Y or N NOTES: _____			
<b>JPT</b>	<b>Fed-Ex</b>	<b>5/20/97</b>	<b>1800</b>								



# 356-015 Custody Transfer Record/Lab Work Request



Client <u>Baker Environmental, Inc.</u>	Refrigerator #																			
Est. Final Proj. Sampling Date <u>6-16-97</u>	#/Type Container	Liquid																		
Work Order # <u>62470-356</u>	Volume	Solid																		
Project Contact/Phone # <u>M.D. Bartman 412-269-2058</u>		Liquid																		
AD Project Manager <u>Bosco Rameriz</u>	Preservatives	Solid																		
QC <u>BOA Del BOA TAT BOA</u>	ANALYSES REQUESTED →	ORGANIC							INORG		PCB	TSS/TDS								
Date Rec'd _____ Date Due _____		VOA	BNA	pest/PCB	Herb	TEP	TEP SVA, Phos, Ac.b.	metals	Ignit. Acac.	Corros.			Metal	CN						
Account # _____	WESTON Analytics Use Only																			

MATRIX CODES: S - Soil SE - Sediment SO - Solid SL - Sludge W - Water O - Oil A - Air DS - Drum DL - Drum 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																		
			MS	MSD																						
		IR89/93-ROB1			S	5/27	1630								X	X	X				X				#257	
		TB15			W	5/16	1445	X																		
		IR35-MW42B-01			W	5/27	1515	X																		
		IR93-MW05-01			W	5/27	1650	X	X												X					
		IR93-MW05IW-01	X	X	W	5/27	1720	X	X												X					
		IR89-MW01-01			W	5/28	1055	X																		
		IR89-MW03IW-01			W	5/28	1010	X	X												X					
		IR89/93-RBGW19			W	5/28	1115	X	X	X											X					
		IR89-MW03DW-01			W	5/28	1120	X	X												X			X		
		<del>IR93-MW05-01</del>			<del>W</del>	<del>5/27</del>	<del>1630</del>	<del>X</del>	<del>X</del>												<del>X</del>					

<p><b>FIELD PERSONNEL: COMPLETE ONLY SHADED AREAS</b></p> <p>Special Instructions:                  ✗ Extra Volume Included                  IR89/93-RBGW19 silicon Tubing "HOLD"                  Airbill # 3558272734</p>	<p><b>DATE/REVISIONS:</b></p> <p>1. _____</p> <p>2. _____</p> <p>3. _____</p> <p>4. _____</p> <p>5. _____</p> <p>6. _____</p>	<p style="text-align: center;"><b>WESTON Analytics Use Only</b></p> <table style="width: 100%;"> <tr> <td style="width: 50%;">                     Samples were:                      1) Shipped ___ or Hand Delivered ___                      Airbill # _____                 </td> <td style="width: 50%;">                     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                 </td> </tr> <tr> <td>                     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                 </td> <td></td> </tr> </table>	Samples were: 1) Shipped ___ or Hand Delivered ___ Airbill # _____	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	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													
Samples were: 1) Shipped ___ or Hand Delivered ___ Airbill # _____	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																	
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																		
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Relinquished by	Received by	Date	Time	Relinquished by	Received by	Date	Time											
GPT	Fed-EX	5/28/97	1800															



35-015

# Custody Transfer Record/Lab Work Request

Client <u>Baker Environmental, Inc.</u>	Refrigerator #																		
Est. Final Proj. Sampling Date <u>6-16-97</u>	#/Type Container	Liquid																	
Work Order # <u>62470-356</u>	Volume	Liquid																	
Project Contact/Phone # <u>M.D. Bertman 412-269-2053</u>	Preservatives	Solid																	
AD Project Manager <u>Rosco Ramirez</u>	ANALYSES REQUESTED →	ORGANIC				INORG													
QC <u>BoA</u> Del <u>BoA</u> TAT <u>BoA</u>		VOA	BNA	Pest/PCB	Herb	Metal	C												
Date Rec'd _____ Date Due _____	WESTON Analytics Use Only																		
Account # _____	WESTON Analytics Use Only																		

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																		
			MS	MSD																						
		<u>IR89-MW05-01</u>			<u>W</u>	<u>5/28</u>	<u>1455</u>	X	X											X						
		<u>IR89-MW05IN-01</u>			<u>W</u>	<u>5/28</u>	<u>1525</u>	X	X	X										X						
		<u>IR89-MW05IW-01D</u>			<u>W</u>	<u>5/28</u>	<u>1525</u>	X	X	X										X						
		<u>IR89-MW05DW-01</u>			<u>W</u>	<u>5/28</u>	<u>1605</u>	X	X											X						

**FIELD PERSONNEL: COMPLETE ONLY SHADED AREAS**

Special Instructions: \_\_\_\_\_

**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
<u>AP</u>	<u>Fed-Ex</u>	<u>5/28/97</u>	<u>1800</u>				

Discrepancies Between Samples Labels and COC Record? Y or N  
 NOTES: \_\_\_\_\_

# 356-016 Custody Transfer Record/Lab Work Request

Client <u>Baker Environmental Inc</u>	Refrigerator #											
Est. Final Proj. Sampling Date <u>6-7-97</u>	#/Type Container	Liquid										
Work Order # <u>62470-356</u>		Solid										
Project Contact/Phone # <u>M.P. Bartman 412-269-2053</u>	Volume	Liquid										
AD Project Manager <u>Bosco Ramirez</u>		Solid										
QC <u>BoA Del BoA TAT BoA</u>	Preservatives											
Date Rec'd _____ Date Due _____	ANALYSES REQUESTED →	ORGANIC					INORG					
Account # _____		VOA	BNA	Pest/PCB	Herb		Metal	CN	Methand	Nat. Atten Parameters	Sulfide	

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													
			MS	MSD																	
	•	IR89/93-RBGW20			W	5/29	1015	X	X	X							X				
	•	IR93-MW02DW-01			W	5/29	1020	X	X								X				
	•	IR89-MW04-01			W	5/29	1350	X	X								X				
	•	IR89-MW04-01D			W	5/29	1350	X	X								X				
	•	IR89-MW04IW-01			W	5/29	1555	X	X								X				
	•	IR89-MW04DW-01			W	5/29	1600	X	X								X				
	•	IR93-MW01-01			W	5/30	0820	X	X								X	X	X	X	
	•	IR93-MW01IW-01			W	5/30	0955	X	X								X	X	X	X	
	•	IR93-MW04-01			W	5/30	1147	X	X								X	X	X	X	
	•	IR93-MW04-01D			W	5/30	1147	X	X								X	X	X	X	

<b>FIELD PERSONNEL: COMPLETE ONLY SHADED AREAS</b> Special Instructions: <u>Airbill # 3558272701</u> Nat. Atten. Parameters Include: Nitrate, Nitrite, Sulfate, Chloride, Fe <sup>+2</sup>	<b>DATE/REVISIONS:</b> 1. _____ 2. _____ 3. _____ 4. _____ 5. _____ 6. _____	<b>WESTON Analytics Use Only</b> Samples were: 1) Shipped <input type="checkbox"/> or Hand Delivered <input type="checkbox"/> 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																
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Relinquished by	Received by	Date	Time	Relinquished by	Received by	Date	Time											
<u>APT</u>	<u>Fcd-Ex</u>	<u>5/30/97</u>	<u>1800</u>															

# 350-016 Custody Transfer Record/Lab Work Request

Client <u>Baker Environmental, Inc.</u>	Refrigerator #																				
Est. Final Proj. Sampling Date <u>6-7-97</u>	#/Type Container	Liquid																			
Work Order # <u>62470-356</u>		Solid																			
Project Contact/Phone # <u>M.D. Bartman 412-269-2053</u>	Volume	Liquid																			
AD Project Manager <u>Bosco Ramirez</u>		Solid																			
QC <u>BOA</u> Del <u>BOA</u> TAT <u>BOA</u>	Preservatives																				
Date Rec'd _____ Date Due _____	ANALYSES REQUESTED →	ORGANIC					INORG														
Account # _____		VOA	BNA	Pest/PCB	Herb		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														
			MS	MSD				1	2	3	4	5	6	7	8	9	10					
								11	12	13	14	15	16	17	18	19	20					
		<u>IR93-MW04IW-01</u>			<u>W</u>	<u>5/30</u>	<u>1330</u>	X	X								X	X	X	X		
		<u>TR16</u>			<u>W</u>	<u>5/16</u>	<u>1455</u>	X														

<b>FIELD PERSONNEL: COMPLETE ONLY SHADED AREAS</b> Special Instructions: <u>Nat. Atten. Parameters Include:</u> <u>Nitrate, Nitrite, Sulfate, Chloride, Fe<sup>+2</sup></u>	<b>DATE/REVISIONS:</b> 1. _____ 2. _____ 3. _____ 4. _____ 5. _____ 6. _____	<b>WESTON Analytics Use Only</b> Samples were: 1) Shipped <input type="checkbox"/> or Hand Delivered <input type="checkbox"/> 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																
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Relinquished by	Received by	Date	Time	Relinquished by	Received by	Date	Time											
<u>APT</u>	<u>Fed-EX</u>	<u>5/30/97</u>	<u>1800</u>															







**APPENDIX D**  
**WELL DEVELOPMENT RECORDS**

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## FIELD WELL DEVELOPMENT RECORD

PROJECT: CAMP LEJEUNE SITES 88, 89 + 93

CTO NO.: 62470-356

WELL NO.: 89-MW04IW

DATE: 5-1-97

GEOLOGIST/ENGINEER: KENNETH A. TUA

TIME START <u>0838</u>
TIME FINISH <u>1115</u>
INITIAL WATER LEVEL (FT) <u>3.25</u>
TOTAL WELL DEPTH (TD) <u>40.3</u>
WELL DIAMETER (INCHES) <u>2.0</u>
CALCULATED WELL VOLUME <u>6.0 GAL.</u>
BOREHOLE DIAMETER (INCHES)
BOREHOLE VOLUME
AMOUNT OF WATER ADDED DURING DRILLING
DEVELOPMENT METHOD
PUMP TYPE <u>WATERRA</u>
TOTAL TIME (A) <u>157 MIN</u>
AVERAGE FLOW (GPM)(B)
TOTAL ESTIMATED WITHDRAWAL AxB=
HNU/OVA READING

DEVELOPMENT DATA							
TIME	CUMULATIVE VOLUME (gallons)	pH	Dissolved O <sub>2</sub> (mL/L)	SPEC. COND. (µmhos/cm)	TEMP (°C)	TURBIDITY (N.T.U)	COLOR
0838	0	6.90	2.1	361.28	19	200+	cloudy white
0850	10	7.22	1.0	437.66	19	200+	
0900	20	7.35	0.8	381.57	20	200+	
0913	30	7.33	1.5	410.25	20.5	200+	
0925	40	7.36	1.0	413.29	19.5	200+	
0935	50	7.55	1.25	409.22	20	200+	
0945	60	7.39	1.25	413.29	19.5	200+	
0955	70	7.42	1.55	409.22	20	200+	
1005	80	7.35	1.30	409.22	20	200+	
1015	90	7.31	1.0	409.22	20	200+	
1025	100	7.33	1.30	398.16	20	200+	
1035	110	7.34	1.40	398.16	20	200+	
1045	120	7.35	1.40	398.16	20	200+	
1055	130	7.34	1.30	398.16	20	200+	
1105	140	7.29	1.50	398.16	20	200+	cloudy
1115	150	7.31	1.50	398.16	20	200+	white









## FIELD WELL DEVELOPMENT RECORD

PROJECT: CAMP LEJEUNE SITES 88, 89 + 93

CTO NO.: 62470-356

WELL NO.: 89-MW06IW

DATE: 5-16-97

GEOLOGIST/ENGINEER: KENNETH A. TUA

TIME START	1615
TIME FINISH	0800 on 5-17-97
INITIAL WATER LEVEL (FT)	7.54
TOTAL WELL DEPTH (TD)	39.66
WELL DIAMETER (INCHES)	2.0
CALCULATED WELL VOLUME	5.23 GAL
BOREHOLE DIAMETER (INCHES)	
BOREHOLE VOLUME	
AMOUNT OF WATER ADDED DURING DRILLING	
DEVELOPMENT METHOD	
PUMP TYPE	WATERRA
TOTAL TIME (A)	160 MIN
AVERAGE FLOW (GPM)(B)	
TOTAL ESTIMATED WITHDRAWAL AxB=	
HNU/OVA READING	

DEVELOPMENT DATA							
TIME	CUMULATIVE VOLUME (gallons)	pH	Dissolved O <sub>2</sub> (mL/L)	SPEC. COND. (µmhos/cm)	TEMP (°C)	TURBIDITY (N.T.U)	COLOR
1615	0	7.64	1.90	324.90	21	200+	
1625	10	7.44	1.55	298.62	20	200+	
1635	20	7.45	2.15	290.42	19.5	200+	
1645	30	7.49	2.15	284.83	19.5	200+	
1655	40	7.48	2.15	265.44	20	200+	
1705	50	7.46	2.25	259.67	19	200+	
1715	60	7.47	2.25	282.25	19	200+	
1725	70	7.50	2.10	282.25	19	200+	
1735	80	7.44	2.10	282.25	19	200+	
1745	90	7.48	2.40	282.25	19	200+	
1755	100	7.43	2.20	282.25	19	192	
1805	110	7.43	2.20	282.25	19	171	
5-17-97							
0710	120	7.49	2.05	295.00	17	95	
0720	130	7.41	1.90	295.00	17	104	
0730	140	7.48	1.0	295.00	17	127	
0740	150	7.54	1.60	300.90	17	106	
0750	160	7.57	1.60	306.80	17	107	
0800	170	7.58	1.60	300.90	17	104	





# Baker

Baker Environmental, Inc.

## FIELD WELL DEVELOPMENT RECORD

PROJECT: CAMP LEJEUNE Sites 88, 89 + 93CTO NO.: 62470-356WELL NO.: 89-MW07IWDATE: 5-17-97GEOLOGIST/ENGINEER: KENNETH A. TUA

TIME START <u>1235</u>
TIME FINISH <u>1440</u>
INITIAL WATER LEVEL (FT) <u>13.25</u>
TOTAL WELL DEPTH (TD) <u>42.44</u>
WELL DIAMETER (INCHES) <u>2.0</u>
CALCULATED WELL VOLUME <u>4.75 GAL.</u>
BOREHOLE DIAMETER (INCHES)
BOREHOLE VOLUME
AMOUNT OF WATER ADDED DURING DRILLING
DEVELOPMENT METHOD
PUMP TYPE <u>WATERRA</u>
TOTAL TIME (A) <u>130 MIN.</u>
AVERAGE FLOW (GPM)(B)
TOTAL ESTIMATED WITHDRAWAL AxB=
HNU/OVA READING

DEVELOPMENT DATA							
TIME	CUMULATIVE VOLUME (gallons)	pH	Dissolved O <sub>2</sub> (mL/L)	SPEC. COND. ( $\mu$ mhos/cm)	TEMP (°C)	TURBIDITY (N.T.U)	COLOR
<u>1235</u>	<u>0</u>	<u>7.42</u>	<u>3.10</u>	<u>358.80</u>	<u>23</u>	<u>200+</u>	<u>CLOUDY WHITE</u>
<u>1250</u>	<u>25</u>	<u>7.49</u>	<u>1.65</u>	<u>312.00</u>	<u>23</u>	<u>200+</u>	
<u>1300</u>	<u>35</u>	<u>7.45</u>	<u>1.15</u>	<u>334.66</u>	<u>18</u>	<u>200+</u>	
<u>1310</u>	<u>45</u>	<u>7.40</u>	<u>0.95</u>	<u>327.41</u>	<u>19</u>	<u>200+</u>	
<u>1320</u>	<u>55</u>	<u>7.25</u>	<u>0.90</u>	<u>327.41</u>	<u>19</u>	<u>200+</u>	
<u>1330</u>	<u>65</u>	<u>7.28</u>	<u>1.30</u>	<u>331.18</u>	<u>18.5</u>	<u>200+</u>	
<u>1340</u>	<u>75</u>	<u>7.35</u>	<u>1.15</u>	<u>327.41</u>	<u>19</u>	<u>200+</u>	
<u>1400</u>	<u>95</u>	<u>7.26</u>	<u>0.75</u>	<u>327.41</u>	<u>19</u>	<u>200+</u>	
<u>1410</u>	<u>105</u>	<u>7.32</u>	<u>1.10</u>	<u>327.41</u>	<u>19</u>	<u>200+</u>	
<u>1420</u>	<u>115</u>	<u>7.23</u>	<u>0.70</u>	<u>327.41</u>	<u>19</u>	<u>200+</u>	
<u>1430</u>	<u>125</u>	<u>7.19</u>	<u>0.90</u>	<u>327.41</u>	<u>19</u>	<u>200+</u>	
<u>1440</u>	<u>135</u>	<u>7.21</u>	<u>1.05</u>	<u>327.41</u>	<u>19</u>	<u>200+</u>	<u>CLOUDY WHITE</u>
WATER REMAINED CLOUDY WHITE AT 16GPM							

## FIELD WELL DEVELOPMENT RECORD

PROJECT: CAMP LEJEUNE SITES 88, 89 + 93

CTO NO.: 62470-356

WELL NO.: 89-MW070W

DATE: 5-17-97

GEOLOGIST/ENGINEER: KENNETH A. TJA

TIME START	1000
TIME FINISH	1120
INITIAL WATER LEVEL (FT)	13.85
TOTAL WELL DEPTH (TD)	81.80
WELL DIAMETER (INCHES)	2.0
CALCULATED WELL VOLUME	11.07 GAL.
BOREHOLE DIAMETER (INCHES)	
BOREHOLE VOLUME	
AMOUNT OF WATER ADDED DURING DRILLING	
DEVELOPMENT METHOD	
PUMP TYPE	WATERRA
TOTAL TIME (A)	80 MIN.
AVERAGE FLOW (GPM)(B)	
TOTAL ESTIMATED WITHDRAWAL AxB=	
HNU/OVA READING	

DEVELOPMENT DATA							
TIME	CUMULATIVE VOLUME (gallons)	pH	Dissolved O <sub>2</sub> (mL/L)	SPEC. COND. (µmhos/cm)	TEMP (°C)	TURBIDITY (N.T.U)	COLOR
1000	0	8.52	0.80	513.90	18.5	200+	GRAY
1010	15	8.42	2.50	634.70	18.0	200+	
1020	30	7.90	2.50	692.40	18.0	105	
1030	40	7.78	1.80	733.85	19.0	67	
1040	50	7.71	1.80	733.85	19.0	66	
1050	60	7.56	2.20	726.05	19.5	49	
1100	70	7.56	2.20	726.05	19.5	34	
1110	80	7.53	2.25	670.20	19.5	15	
1120	90	7.62	2.20	670.20	19.5	10	CLEAR
WATER WAS CLEAR AT FINISH AT 10 GPM							



# FIELD WELL DEVELOPMENT RECORD

PROJECT: CAMP LEJEUNE SITES 88, 89 + 93  
 CTO NO.: 62470-356 WELL NO.: 89-MW081W  
 DATE: 5-16-97  
 GEOLOGIST/ENGINEER: KENNETH A. TUA

TIME START  <i>1310</i>
TIME FINISH  <i>1520</i>
INITIAL WATER LEVEL (FT)  <i>12.03</i>
TOTAL WELL DEPTH (TD)  <i>39.90</i>
WELL DIAMETER (INCHES)  <i>2.0</i>
CALCULATED WELL VOLUME  <i>4.54 GAL</i>
BOREHOLE DIAMETER (INCHES)
BOREHOLE VOLUME
AMOUNT OF WATER ADDED DURING DRILLING
DEVELOPMENT METHOD
PUMP TYPE  <i>WATERRA</i>
TOTAL TIME (A)  <i>130 MIN</i>
AVERAGE FLOW (GPM)(B)
TOTAL ESTIMATED WITHDRAWAL AxB=
HNU/OVA READING

DEVELOPMENT DATA							
TIME	CUMULATIVE VOLUME (gallons)	pH	Dissolved O <sub>2</sub> (mL/L)	SPEC. COND. (µmhos/cm)	TEMP (°C)	TURBIDITY (N.T.U)	COLOR
<i>1310</i>	<i>0</i>	<i>7.41</i>	<i>1.30</i>	<i>413.29</i>	<i>17.5</i>	<i>200+</i>	<i>GRAY</i>
<i>1320</i>	<i>10</i>	<i>7.46</i>	<i>1.75</i>	<i>342.86</i>	<i>20</i>	<i>200+</i>	
<i>1330</i>	<i>20</i>	<i>7.57</i>	<i>1.75</i>	<i>334.66</i>	<i>18</i>	<i>200+</i>	
<i>1340</i>	<i>30</i>	<i>7.44</i>	<i>1.25</i>	<i>323.12</i>	<i>18</i>	<i>200+</i>	
<i>1350</i>	<i>40</i>	<i>7.52</i>	<i>1.25</i>	<i>311.58</i>	<i>18</i>	<i>200+</i>	
<i>1400</i>	<i>50</i>	<i>7.50</i>	<i>1.60</i>	<i>305.81</i>	<i>18</i>	<i>200+</i>	
<i>1410</i>	<i>60</i>	<i>7.50</i>	<i>1.75</i>	<i>294.27</i>	<i>18</i>	<i>200+</i>	
<i>1420</i>	<i>70</i>	<i>7.47</i>	<i>1.50</i>	<i>300.04</i>	<i>18</i>	<i>200+</i>	
<i>1430</i>	<i>80</i>	<i>7.43</i>	<i>1.30</i>	<i>300.04</i>	<i>18</i>	<i>176</i>	
<i>1440</i>	<i>90</i>	<i>7.44</i>	<i>1.30</i>	<i>300.04</i>	<i>18</i>	<i>94</i>	
<i>1450</i>	<i>100</i>	<i>7.44</i>	<i>1.50</i>	<i>294.27</i>	<i>18</i>	<i>57</i>	
<i>1500</i>	<i>110</i>	<i>7.55</i>	<i>1.75</i>	<i>288.50</i>	<i>18</i>	<i>40</i>	
<i>1510</i>	<i>120</i>	<i>7.56</i>	<i>1.80</i>	<i>288.50</i>	<i>18</i>	<i>40</i>	
<i>1520</i>	<i>130</i>	<i>7.58</i>	<i>1.80</i>	<i>288.50</i>	<i>18</i>	<i>40</i>	<i>CLEAR</i>

## FIELD WELL DEVELOPMENT RECORD

PROJECT: CAMP LEJEUNE SITES 88, 89 + 93

CTO NO.: 62470-356 WELL NO.: 89-MW08DW

DATE: 5-16-97

GEOLOGIST/ENGINEER: KENNETH A. TUA

TIME START <b>0930</b>
TIME FINISH <b>1230</b>
INITIAL WATER LEVEL (FT) <b>11.45</b>
TOTAL WELL DEPTH (TD) <b>92.6</b>
WELL DIAMETER (INCHES) <b>2.0</b>
CALCULATED WELL VOLUME <b>13.22 GAL</b>
BOREHOLE DIAMETER (INCHES)
BOREHOLE VOLUME
AMOUNT OF WATER ADDED DURING DRILLING
DEVELOPMENT METHOD
PUMP TYPE <b>WATERRA</b>
TOTAL TIME (A) <b>180 MIN</b>
AVERAGE FLOW (GPM)(B)
TOTAL ESTIMATED WITHDRAWAL AxB=
HNU/OVA READING

DEVELOPMENT DATA							
TIME	CUMULATIVE VOLUME (gallons)	pH	Dissolved O <sub>2</sub> (mL/L)	SPEC. COND. (µmhos/cm)	TEMP (°C)	TURBIDITY (N.T.U)	COLOR
0930	0	7.56	4.25	180.64	19	200+	GRAY
0940	10	7.89	3.60	415.44	18	200+	
0950	20	7.91	3.50	484.68	18	200+	
1030	25	7.57	2.20	685.20	18.5	122+	
1050	29	7.43	2.50	742.30	18.5	65	
1100	33	7.40	2.80	685.20	18.5	18	
1110	37	7.32	1.80	685.20	18.5	13	
1120	41	7.39	2.15	677.40	19	200+	
1130	45	7.45	2.20	677.40	19	180+	
1140	49	7.26	2.00	677.40	19	105	
1150	53	7.43	2.10	677.40	19	80	
1200	57	7.32	2.50	677.40	19	72	
1210	61	7.35	2.25	677.40	19	65	
1220	65	7.30	2.30	677.40	19	44	
1230	69	7.33	2.60	677.40	19	46	CLEAR



# FIELD WELL DEVELOPMENT RECORD

PROJECT: CAMP LEJEUNE SITES 88, 89 + 93  
 CTO NO.: 62470-356 WELL NO.: 93-MW01  
 DATE: 5-15-97  
 GEOLOGIST/ENGINEER: KENNETH A. TUA

TIME START	<u>1630</u>
TIME FINISH	<u>1730</u>
INITIAL WATER LEVEL (FT)	<u>4.49</u>
TOTAL WELL DEPTH (TD)	<u>11.6</u>
WELL DIAMETER (INCHES)	<u>2.0</u>
CALCULATED WELL VOLUME	<u>1.15 GAL</u>
BOREHOLE DIAMETER (INCHES)	
BOREHOLE VOLUME	
AMOUNT OF WATER ADDED DURING DRILLING	
DEVELOPMENT METHOD	
PUMP TYPE	<u>WATERAA</u>
TOTAL TIME (A)	<u>60 MIN</u>
AVERAGE FLOW (GPM)(B)	
TOTAL ESTIMATED WITHDRAWAL AxB=	
HNU/OVA READING	

DEVELOPMENT DATA							
TIME	CUMULATIVE VOLUME (gallons)	pH	Dissolved O <sub>2</sub> (mL/L)	SPEC. COND. (µmhos/cm)	TEMP (°C)	TURBIDITY (N.T.U)	COLOR
<u>5-3-97</u> <u>0740</u>	<u>0</u>	<u>6.54</u>	<u>2.75</u>	<u>304.15</u>	<u>20</u>	<u>200+</u>	<u>BROWN</u>
<u>0755</u>	<u>10</u>	<u>6.18</u>	<u>4.50</u>	<u>231.44</u>	<u>19</u>	<u>200+</u>	
<u>0900</u>	<u>15</u>	<u>5.90</u>	<u>3.25</u>	<u>282.25</u>	<u>19</u>	<u>200+</u>	
<u>5-15-97</u> <u>1630</u>	<u>16</u>	<u>5.14</u>	<u>1.50</u>	<u>282.03</u>	<u>20</u>	<u>200+</u>	
<u>1635</u>	<u>17</u>	<u>5.19</u>	<u>1.90</u>	<u>273.32</u>	<u>20</u>	<u>200+</u>	
<u>1640</u>	<u>18</u>	<u>5.22</u>	<u>1.75</u>	<u>243.32</u>	<u>20</u>	<u>184</u>	
<u>1645</u>	<u>19</u>	<u>5.22</u>	<u>1.90</u>	<u>232.26</u>	<u>20</u>	<u>173</u>	
<u>1650</u>	<u>20</u>	<u>5.22</u>	<u>1.50</u>	<u>232.26</u>	<u>20</u>	<u>173</u>	
<u>1700</u>	<u>22</u>	<u>5.23</u>	<u>0.75</u>	<u>226.73</u>	<u>20</u>	<u>107</u>	
<u>1710</u>	<u>24</u>	<u>5.27</u>	<u>1.30</u>	<u>210.14</u>	<u>20</u>	<u>50</u>	
<u>1720</u>	<u>26</u>	<u>5.30</u>	<u>1.75</u>	<u>199.08</u>	<u>20</u>	<u>25</u>	
<u>1730</u>	<u>28</u>	<u>5.30</u>	<u>2.80</u>	<u>199.08</u>	<u>20</u>	<u>9</u>	<u>CLEAR</u>
<p><i>THE WELL WAS PUMPED DRY AFTER THE 10 AND 15 GALLONS WERE REMOVED ON 5-3-97. THE WELL WAS ALLOWED TO RECHARGE SEVERAL DAYS. DEVELOPMENT WAS FINISHED ON 5-15-97 BY PUMPING AT A SLOWER RATE.</i></p>							



## FIELD WELL DEVELOPMENT RECORD

PROJECT: CAMP LEJEUNE SITES 88, 89 + 93

CTO NO.: 62470-356 WELL NO.: 93-MW02

DATE: 5-30-97

GEOLOGIST/ENGINEER: MARK DEJOHN

TIME START	1330
TIME FINISH	1610
INITIAL WATER LEVEL (FT)	2.77
TOTAL WELL DEPTH (TD)	13.58
WELL DIAMETER (INCHES)	2.0
CALCULATED WELL VOLUME	1.7 GAL.
BOREHOLE DIAMETER (INCHES)	
BOREHOLE VOLUME	
AMOUNT OF WATER ADDED DURING DRILLING	
DEVELOPMENT METHOD	
PUMP TYPE	WATERRA
TOTAL TIME (A)	160 MIN.
AVERAGE FLOW (GPM)(B)	
TOTAL ESTIMATED WITHDRAWAL AxB=	
HNU/OVA READING	

DEVELOPMENT DATA							
TIME	CUMULATIVE VOLUME (gallons)	pH	Dissolved O <sub>2</sub> (mL/L)	SPEC. COND. (µmhos/cm)	TEMP (°C)	TURBIDITY (N.T.U)	COLOR
1330	0	6.14	NA	450	16.8	200+	Brown
1340	10	6.45		390	16.8	157	
1350	20	6.58		400	19.0	156	
1415	30	6.84		400	19.9	157	
1425	40	6.75		390	18.6	158	
1435	60	6.79		390	19.1	157	
1440	70	6.88		390	18.6	127	
1450	80	6.89		395	17.3	113	
1500	90	6.80		390	16.0	51	
1510	100	6.80		390	16.0	39	NEARLY CLEAR
1520	110	6.79		390	16.1	112	
1530	120	6.84		390	16.4	107	
1540	135	6.88		395	17.2	63	
1550	150	6.88		390	17.0	31	
1600	160	6.81		390	16.3	17	
1610	170	6.66		385	17.0	14	CLEAR
NA - DISSOLVED O <sub>2</sub> METER WAS NOT AVAILABLE.							

## FIELD WELL DEVELOPMENT RECORD

PROJECT: CAMP LEJEUNE SITE 88, 89 + 93  
 CTO NO.: 62470-356 WELL NO.: 93-MW 02IW  
 DATE: 5-18-97  
 GEOLOGIST/ENGINEER: JOHN E. ZIMMERMAN

TIME START	1510
TIME FINISH	1720
INITIAL WATER LEVEL (FT)	4.84
TOTAL WELL DEPTH (TD)	49.40
WELL DIAMETER (INCHES)	2.0
CALCULATED WELL VOLUME	7.26
BOREHOLE DIAMETER (INCHES)	
BOREHOLE VOLUME	
AMOUNT OF WATER ADDED DURING DRILLING	
DEVELOPMENT METHOD	
PUMP TYPE	WATERRA
TOTAL TIME (A)	130 MIN
AVERAGE FLOW (GPM)(B)	
TOTAL ESTIMATED WITHDRAWAL AxB=	
HNU/OVA READING	

DEVELOPMENT DATA							
TIME	CUMULATIVE VOLUME (gallons)	pH	Dissolved O <sub>2</sub> (mL/L)	SPEC. COND. (µmhos/cm)	TEMP (°C)	TURBIDITY (N.T.U)	COLOR
1510	0	8.87	1.9	330	21.3	200+	
1520	15	7.11	1.6	420	20.0	200+	
1530	30	7.00	1.6	420	20.0	200+	
1540	45	7.14	1.0	420	19.6	200+	
1550	60	7.19	0.7	430	19.8	200+	
1600	75	7.20	0.7	425	19.8	200+	
1610	90	7.21	0.7	425	19.3	200+	
1620	105	7.17	0.8	420	19.4	198	
1630	120	7.06	0.7	430	19.6	102	
1640	135	6.92	0.7	425	19.9	90	
1650	150	7.06	0.7	425	20.0	66	
1700	165	6.90	0.7	420	19.5	63	
1710	180	6.86	0.7	420	19.8	48	
1720	195	7.06	0.9	420	19.9	47	



## FIELD WELL DEVELOPMENT RECORD

PROJECT: CAMP LEJEUNE Sites 88, 89 + 93

CTO NO.: 62470-356 WELL NO.: 93-17W02DW

DATE: 5-18-97

GEOLOGIST/ENGINEER: JOHN E. ZIMMERMAN

TIME START	1125
TIME FINISH	1345
INITIAL WATER LEVEL (FT)	2.44
TOTAL WELL DEPTH (TD)	71.30
WELL DIAMETER (INCHES)	2.0"
CALCULATED WELL VOLUME	11.22
BOREHOLE DIAMETER (INCHES)	
BOREHOLE VOLUME	
AMOUNT OF WATER ADDED DURING DRILLING	
DEVELOPMENT METHOD	
PUMP TYPE	WATERRA
TOTAL TIME (A)	140 MIN
AVERAGE FLOW (GPM)(B)	
TOTAL ESTIMATED WITHDRAWAL AxB=	
HNU/OVA READING	

DEVELOPMENT DATA							
TIME	CUMULATIVE VOLUME (gallons)	pH	Dissolved O <sub>2</sub> (mL/L)	SPEC. COND. (µmhos/cm)	TEMP (°C)	TURBIDITY (N.T.U)	COLOR
1125	0	8.23	2.0	390	21.5	200+	
1135	15	7.64	0.7	450	17.9	200+	
1145	30	7.54	0.9	470	19.6	200+	
1155	45	7.55	0.8	400	20.7	123	
1205	60	7.42	0.8	400	17.8	87	
1215	75	7.38	0.8	400	14.9	84	
1225	90	7.28	0.6	400	18.4	68	
1235	105	7.34	0.9	400	17.5	61	
1245	120	7.29	0.9	400	17.8	68	
1255	135	7.30	0.9	400	17.8	50	
1305	150	7.28	0.9	400	17.4	39	
1315	165	7.25	0.8	400	17.9	40	
1325	180	7.21	0.9	400	17.8	29	
1335	195	7.20	0.9	400	17.8	27	
1345	210	7.23	0.9	400	17.4	28	

## FIELD WELL DEVELOPMENT RECORD

PROJECT: CAMP LEJEUNE SITES 88, 89 + 93

CTO NO.: 62470-356

WELL NO.: 93-19W03

DATE: 5-17-97

GEOLOGIST/ENGINEER: JOHN E. ZIMMERMAN

TIME START	1410
TIME FINISH	1625
INITIAL WATER LEVEL (FT)	3.04
TOTAL WELL DEPTH (TD)	14.06
WELL DIAMETER (INCHES)	2.0
CALCULATED WELL VOLUME	1.79 GAL.
BOREHOLE DIAMETER (INCHES)	
BOREHOLE VOLUME	
AMOUNT OF WATER ADDED DURING DRILLING	
DEVELOPMENT METHOD	
PUMP TYPE	HAND SURGING
TOTAL TIME (A)	135 MIN
AVERAGE FLOW (GPM)(B)	
TOTAL ESTIMATED WITHDRAWAL AxB=	
HNU/OVA READING	

DEVELOPMENT DATA							
TIME	CUMULATIVE VOLUME (gallons)	pH	Dissolved O <sub>2</sub> (mL/L)	SPEC. COND. (µmhos/cm)	TEMP (°C)	TURBIDITY (N.T.U)	COLOR
1410	0	5.54	2.9	143	22.2	200+	
1424	10	5.62	2.9	164	22.9	200+	
1435	20	5.61	3.1	151	23.7	200+	
1445	30	5.62	3.7	173	25.8	200+	
1455	40	5.59	2.9	171	23.5	200+	
1505	50	5.56	3.9	167	25.9	200+	
1515	60	5.53	3.0	179	25.8	200+	
1525	70	5.47	3.3	173	24.9	200+	
1535	80	5.42	2.9	162	23.8	200+	
1545	90	5.41	3.1	168	22.8	151	
1555	100	5.40	1.9	121	23.2	154	
1605	110	5.44	3.2	153	22.9	155	
1615	120	5.35	2.5	165	21.8	153	
1625	150	5.38	2.2	140	22.0	154	



## FIELD WELL DEVELOPMENT RECORD

PROJECT: CAMP LEJEUNE SITES 88, 89 + 93

CTO NO.: 62470 - 356 WELL NO.: 93-MW04

DATE: 5-20-97

GEOLOGIST/ENGINEER: MARK DeJOHN

TIME START	0745
TIME FINISH	1025
INITIAL WATER LEVEL (FT)	4.70
TOTAL WELL DEPTH (TD)	
WELL DIAMETER (INCHES)	2.0
CALCULATED WELL VOLUME	1.4 GAL.
BOREHOLE DIAMETER (INCHES)	
BOREHOLE VOLUME	
AMOUNT OF WATER ADDED DURING DRILLING	
DEVELOPMENT METHOD	
PUMP TYPE	WATERRA
TOTAL TIME (A)	160 MIN
AVERAGE FLOW (GPM)(B)	
TOTAL ESTIMATED WITHDRAWAL AxB=	
HNU/OVA READING	

DEVELOPMENT DATA							
TIME	CUMULATIVE VOLUME (gallons)	pH	Dissolved O <sub>2</sub> (mL/L)	SPEC. COND. (µmhos/cm)	TEMP (°C)	TURBIDITY (N.T.U)	COLOR
0745	0	5.49	2.9	292	23.0	200+	BROWN
0755	10	5.25	1.8	220	22.6	200+	
0805	20	5.16	1.6	213	22.3	200+	
0815	30	5.11	1.7	215	22.2	200+	
0825	40	5.05	1.5	215	21.4	200+	
0835	50	5.01	1.7	213	21.7	200+	
0845	60	4.99	1.8	207	22.2	200+	
0855	70	4.98	2.2	206	22.3	156	
0905	80	4.98	2.1	204	22.4	156	
0915	90	5.04	2.2	205	21.5	156	
0925	100	5.05	1.8	203	21.4	155	
0935	110	5.02	1.4	201	21.2	155	
0945	120	5.00	1.3	199	21.3	154	
0955	130	4.99	1.9	199	21.3	153	
1005	140	4.99	1.9	198	21.4	152	GRAY
1015	150	5.07	1.8	197	21.7	153	
1025	160	5.05	1.6	197	21.6	153	GRAY

## FIELD WELL DEVELOPMENT RECORD

PROJECT: CAMP LEJEUNE - SITES 88, 89 & 93  
 CTO NO.: 62470- WELL NO.: 93-MW04IW  
 DATE: 5-18-97  
 GEOLOGIST/ENGINEER: JOHN E. ZIMMERMAN

TIME START	1510
TIME FINISH	1720
INITIAL WATER LEVEL (FT)	4.84
TOTAL WELL DEPTH (TD)	49.70
WELL DIAMETER (INCHES)	2.0
CALCULATED WELL VOLUME	7.26
BOREHOLE DIAMETER (INCHES)	
BOREHOLE VOLUME	
AMOUNT OF WATER ADDED DURING DRILLING	
DEVELOPMENT METHOD	
PUMP TYPE	WATERRA
TOTAL TIME (A)	130 MIN
AVERAGE FLOW (GPM)(B)	
TOTAL ESTIMATED WITHDRAWAL AxB=	
HNU/OVA READING	

DEVELOPMENT DATA							
TIME	CUMULATIVE VOLUME (gallons)	pH	Dissolved O <sub>2</sub> (mLL)	SPEC. COND. (µmhos/cm)	TEMP (°C)	TURBIDITY (N.T.U)	COLOR
1510	0	8.87	1.9	330	21.3	200+	
1520	15	7.11	1.6	420	20.0	200+	
1530	30	7.00	1.6	420	20.2	200+	
1540	45	7.14	1.0	420	19.6	200+	
1550	60	7.19	0.7	430	19.8	200+	
1600	75	7.20	0.7	425	19.8	200+	
1610	90	7.21	0.7	425	19.3	200+	
1620	105	7.17	0.8	420	19.4	198	
1630	120	7.06	0.7	430	19.6	102	
1640	135	6.92	0.7	425	19.9	90	
1650	150	7.06	0.7	425	20.0	66	
1700	165	6.90	0.7	420	19.5	63	
1710	180	6.86	0.7	420	19.8	48	
1720	195	7.06	0.9	420	19.9	47	

## FIELD WELL DEVELOPMENT RECORD

PROJECT: CAMP LEJEUNE SITES 88, 89 + 93

CTO NO.: 62470-356

WELL NO.: 93-MW05

DATE: 5-1-97

GEOLOGIST/ENGINEER: KENNETH A. TUA

TIME START	1558
TIME FINISH	1849
INITIAL WATER LEVEL (FT)	4.34
TOTAL WELL DEPTH (TD)	14.90
WELL DIAMETER (INCHES)	2.0
CALCULATED WELL VOLUME	1.72 GAL.
BOREHOLE DIAMETER (INCHES)	
BOREHOLE VOLUME	
AMOUNT OF WATER ADDED DURING DRILLING	
DEVELOPMENT METHOD	
PUMP TYPE	WATERRA
TOTAL TIME (A)	171 Min
AVERAGE FLOW (GPM)(B)	
TOTAL ESTIMATED WITHDRAWAL AxB=	
HNU/OVA READING	

DEVELOPMENT DATA							
TIME	CUMULATIVE VOLUME (gallons)	pH	Dissolved O <sub>2</sub> (mL/L)	SPEC. COND. (µmhos/cm)	TEMP (°C)	TURBIDITY (N.T.U)	COLOR
1558	0	6.81	1.60	243.67	21	200+	DARK GRAY
1611	10	6.44	1.00	242.73	19	200+	
1624	20	6.31	1.50	242.73	19	200+	
1637	30	6.29	1.60	254.38	20	200+	
1649	40	6.27	1.40	248.38	19	200+	
1702	50	6.15	1.45	262.97	20	200+	
1715	60	6.17	1.50	248.38	19	200+	
1727	70	6.15	1.45	242.73	19	151	
1741	80	6.12	1.65	225.80	19	108	
1754	90	6.10	1.15	220.15	19	92	
1808	100	6.00	1.50	222.69	18.5	70	
1822	110	5.98	1.30	219.26	18	61	
1837	120	5.94	1.30	230.80	18	48	
1849	130	5.92	1.30	230.80	18	45	WHITE CLOUDY

## FIELD WELL DEVELOPMENT RECORD

PROJECT: CAMP LEJEUNE SITES 88, 89 + 93

CTO NO.: 62470-356 WELL NO.: 93-MW05IW

DATE: 5-2-97

GEOLOGIST/ENGINEER: KENNETH A. TUA

TIME START	0730
TIME FINISH	0920
INITIAL WATER LEVEL (FT)	3.12
TOTAL WELL DEPTH (TD)	42.5
WELL DIAMETER (INCHES)	2.0
CALCULATED WELL VOLUME	6.40 GAL
BOREHOLE DIAMETER (INCHES)	
BOREHOLE VOLUME	
AMOUNT OF WATER ADDED DURING DRILLING	
DEVELOPMENT METHOD	
PUMP TYPE	WATERRA
TOTAL TIME (A)	110
AVERAGE FLOW (GPM)(B)	
TOTAL ESTIMATED WITHDRAWAL AxB=	
HNU/OVA READING	

DEVELOPMENT DATA							
TIME	CUMULATIVE VOLUME (gallons)	pH	Dissolved O <sub>2</sub> (mL/L)	SPEC. COND. (µmhos/cm)	TEMP (°C)	TURBIDITY (N.T.U)	COLOR
0730	0	11.09	3.10	1016.10	19	200+	DARK GRAY
0741	10	8.30	1.60	372.57	19	200+	
0746	20	7.86	1.25	417.73	19	200+	
0751	30	7.68	1.35	440.31	19	200+	
0756	40	7.51	2.20	451.60	19	200+	
0804	50	7.45	1.25	451.09	18.5	200+	
0809	60	7.37	1.30	451.60	19	200+	
0817	70	7.34	1.60	440.31	19	200+	
0823	80	7.36	1.40	440.31	19	200+	
0830	90	7.32	1.50	451.60	19	200+	
0836	100	7.35	1.50	457.24	19	200+	
0842	110	7.28	1.25	434.66	19	200+	
0851	120	7.39	1.35	442.40	20	192	
0900	130	7.44	1.30	458.99	20	107	
0909	140	7.39	1.25	454.01	20.5	83	CLOUDY
0920	150	7.40	1.40	446.80	19.5	92	WHITE

## FIELD WELL DEVELOPMENT RECORD

PROJECT: CAMP LEJEUNE SITES 88, 89 + 93

CTO NO.: 62470-356

WELL NO.: 36-GW05

DATE: 5-17-97

GEOLOGIST/ENGINEER: KENNETH A. TUA

TIME START	1535
TIME FINISH	1725
INITIAL WATER LEVEL (FT)	8.29
TOTAL WELL DEPTH (TD)	26.78
WELL DIAMETER (INCHES)	2.0
CALCULATED WELL VOLUME	3.01 GAL
BOREHOLE DIAMETER (INCHES)	
BOREHOLE VOLUME	
AMOUNT OF WATER ADDED DURING DRILLING	
DEVELOPMENT METHOD	
PUMP TYPE	WATERRA
TOTAL TIME (A)	110 MIN.
AVERAGE FLOW (GPM)(B)	
TOTAL ESTIMATED WITHDRAWAL AxB=	
HNU/OVA READING	

DEVELOPMENT DATA							
TIME	CUMULATIVE VOLUME (gallons)	pH	Dis. O <sub>2</sub> (ml/L)	SPEC. COND. (µmhos/cm)	TEMP (°C)	TURB (N.T.U)	COLOR
1535	0	6.18	1.75	260	25.0	200+	RED/BROWN
1545	10	5.93	1.80	369.28	18.0	200+	
1555	20	5.92	1.80	323.12	18.0	200+	
1605	30	6.01	1.80	334.66	18.0	200+	
1615	40	6.01	1.70	361.77	17.5	200+	
1625	50	5.92	1.80	354.00	17.0	200+	
1635	60	5.92	1.70	342.20	17.0	200+	
1645	75	5.86	1.35	306.80	17.0	167	
1655	90	5.89	1.75	306.80	17.0	69	
1705	105	6.14	2.0	318.60	17.0	36	
1715	120	5.99	1.75	312.70	17.0	18	
1725	135	6.03	1.80	312.70	17.0	16	CLEAR
WATER WAS CLEAR UPON FINISHING AT A STEADY 1.5 GPM.							



**APPENDIX E**  
**NATURAL ATTENUATION AND ENGINEERING PARAMETERS**

# SOUTHWEST RESEARCH INSTITUTE

6220 CULEBRA ROAD • POST OFFICE DRAWER 28510 • SAN ANTONIO, TEXAS, USA 78228-0510 • (210) 684-5111 • TELEX 244846

Chemistry and Chemical Engineering Division  
Department of Environmental Engineering

June 9, 1997

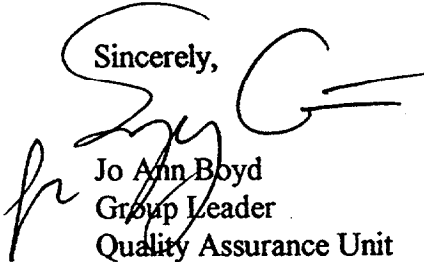
Ms. Sherri Scott  
Recra Environmental  
2417 Bond Street  
University Park, IL 60466-3182

Subject:	Blanket Order No.:	14-07219B96
	Weston RFW Batch No.:	9705G729
	Weston Release Number:	MR32601
	SwRI Project Number:	01-8680-063
	SDG:	89763 (9705G729-008)
	Work Order No.:	11437
	Samples Received:	May 20, 1997

Dear Ms. Scott,

Enclosed is the analytical data for the above referenced case. If you should have any questions, please do not hesitate to call me at 210/522-2169.

Sincerely,

  
Jo Ann Boyd  
Group Leader  
Quality Assurance Unit  
Division 01

TECHNICAL APPROVAL:

  
Chee-Kai Tan, Ph.D.  
Group Leader

Encl



SAN ANTONIO, TEXAS

HOUSTON, TEXAS • DETROIT, MICHIGAN • WASHINGTON, DC

**SOUTHWEST RESEARCH INSTITUTE**  
**CLIENT: RECRA ENVIRONMENTAL**  
**SDG: 89763 (9705G729-008)**  
**VTSR: MAY 20, 1997**

## **NARRATIVE**

**Client: Recra Environmental SDG: 89763**

**SwRI Work Order: 11437**

**SwRI Project No.: 01-8680-063**

**June 9, 1997**

**Page 1**

**SwRI Case Narrative  
Recra Environmental SDG: 89763**

1. Four (4) water samples for GC/MS Headspace analysis for Methane only:

SwRI ID	Customer ID	SwRI ID	Customer ID
89763	9705G729-008	89765	9705G729-010
89764	9705G729-009	89766	9705G729-017

2. Samples were received at SwRI on May 20, 1997 for a turnaround time of twenty-one (21) days from Validated Time of Sample Receipt (VTSR).

3. QC sample:

Performed on per 20 samples.

**GC/MS HEADSPACE ANALYSIS**

- Water samples were analyzed by Method 3810M headspace for methane at 90°C with packed column technique for achieving detection limit of 1.0 ppm.
- Samples were analyzed within fourteen days of the CED.
- Concentration of detected compounds were quantitated by external quantitation method as per protocol.
- The initial calibration standard was analyzed with a three point standard at 227 ppm, 45.4 ppm, and 2.27 ppm. A continuing calibration fortified with 45.4 ppm was analyzed at the end of a sequence to ensure that the sensitivity of the instrument was maintained. QC criteria of < 25 % RSD and < 20 % D were met by the initial and continuing calibrations.
- The method blank, VBLK01, was found clean of target compounds above the detection limit.
- QC sample (MS/MSD) analyzed per bid one per twenty samples, no QC on this shipment.

Client: Recra Environmental SDG: 89763

SwRI Work Order: 11437

SwRI Project No.: 01-8680-063

June 9, 1997

Page 2

7. Sample Calculation:

Standard F:052173 at 0.5 mL injection

Integration of methane = 259419 at 45.4 ppmv or RRF = area/conc. = 259419/45.4  
= 5714 ppmv

Sample 9705G729-008 at 0.5mL injection

Intergration of methane = 268834

Methane = (268834/5714)ppmv x (0.5mL/0.5mL) = 47.05ppmv (uL/L)

To convert to water concentration, ug/L, Ideal Gas Law was used:

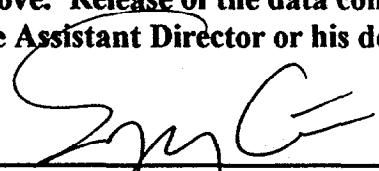
$PV=nRT$  where  $P=1\text{atm}$ ,  $R=0.08206(\text{L}\cdot\text{amt}/\text{mole}\cdot\text{K})$ ,  $T=25^\circ\text{K} = 298^\circ\text{K}$ ,  $MW=16 \text{ g/mole}$

$n=PV/RT$  or mass,  $g = (PV/RT) \times MW$

Thus  $\text{ug} = (1 \text{ atm} \times 47.05 \text{ uL}/0.08206 \times 298) \times 16 = 30.4 \text{ ug}$

The concentration reported = 30.4 ug/L

**"I certify that this data package is in compliance with the terms and conditions of the contract, both technically and for completeness, for other than the conditions detailed above. Release of the data contained in this hardcopy data package has been authorized by the Assistant Director or his designee, as verified by the following signature."**

  
\_\_\_\_\_  
Jo Ann Boyd,  
Group Leader  
Quality Assurance Unit,  
Division 01

6-9-97  
\_\_\_\_\_  
Date

**SOUTHWEST RESEARCH INSTITUTE**  
**CLIENT: RECRA ENVIRONMENTAL**  
**SDG: 89763 (9705G729-008)**  
**VTSR: MAY 20, 1997**

## **CHAIN-OF-CUSTODY**

**WESTON Analytics Use Only**  
 97056729

# Custody Transfer Record/Lab Work Request



Client: Weston / EMI  
 Work Order: \_\_\_\_\_  
 Date Rec'd: 5/17/97 Date Due: 6/10/97  
 RFW Contact: Bosco Ramirez  
 Client Contact/Phone: \_\_\_\_\_

Refrigerator#	<u>S/O</u>
#/Type Container	<u>3/6</u>
Volume	<u>40ml</u>
Preservative	
ANALYSES REQUESTED	<u>Methane *</u>

WA Use Only Lab ID	Client ID/Description	Matrix	Date Collected					
008	IR88 - MW01-01 ✓	W	5/15/97	X				INTACT
009	mw06-01 ✓	I	I	I				
010	MW06IW-01 ✓	I	I	I				
017	MW08IW-01 ✓	I	5/16/97	I				✓

*Samples rec preserved with ice - temp in 5.7°C with 6. Jm4.*

Matrix: W - Water DS - Drum Solids X - Other  
 S - Soil O - Oil DL - Drum Liquids  
 SE - Sediment A - Air F - Fish  
 SO - Solid WI - Wipe L - EP/TCLP Leachate

Special Instructions: \* SEE ATTACHED

Item/Reason	Relinquished by	Received by	Date	Time	Item/Reason	Relinquished by	Received by	Date	Time
SUB	<u>R. Bickhart</u>	<u>FX → Daisy SW</u>	<u>5/19/97</u>	<u>1300</u>			<u>Joe Mann</u>	<u>5/20/97</u>	<u>09:03</u>

**WESTON Analytics Use Only**

Samples Were:  
 Shipped or Hand-Delivered  
 Delivered  
 NOTES: FX

2 Ambient or Chilled  
 NOTES:

3 Received Broken/Leaking (Improperly Sealed)  
 Y N  
 NOTES:

4 Properly Preserved  
 Y N  
 NOTES:

5 Received Within Holding Times  
 Y N  
 NOTES:

COC Tape Was:

1 Present on Outer Package Y N  
 2 Unbroken on Outer Package Y N  
 3 Present on Sample Y N  
 4 Unbroken on Sample Y N  
 NOTES: Y N

COC Record Was:

1 Present Upon Receipt of Samples Y N

Discrepancies Between Sample Labels and COC Record? Y  
 NOTES:

1000003

**CLIENT: RECRA ENVIRONMENTAL**  
**SDG: 89763 (9705G729-008)**

**SAMPLE DATA**  
**METHOD 3810 (MODIFIED)**



1A  
VOLATILE ORGANICS ANALYSIS DATA SHEET  
HEADSPACE ANALYSIS BY METHOD 3810(MODIFIED)

010002

SAMPLE ID

9705G729-008DL

Lab Name: SwRI  
Lab Code: SwRI  
Matrix: Water  
Level: Medium  
Headspace vol: 22ml  
Injection vol: 0.50ml  
Client: WESTON  
Lab System ID: 89763  
Date Received: 05/20/97  
Conc/Dil Factor: 3.00  
GC Column: HAYE-SEP D  
Project: 01-8680-063  
SDG: 89763  
Lab File ID: F:0521714  
Date Analyzed: 05/21/97  
Detection Limit: 0.65  
Concentration: ug/L

Cas No.	Compound	ug/L
74-82-8	Methane	30.4

DATA QUALIFIERS

- U Indicates compound was analyzed for but not detected. Report the minimum detection limit for the sample with the U (e.g. 10U) based on necessary concentration/dilution action (this is not necessarily the instrument detection limit). The footnote should be read U compound was analyzed for but not detected. The number is the minimum attainable limit for the sample.
- E Concentration exceeds calibration range

1A  
VOLATILE ORGANICS ANALYSIS DATA SHEET  
HEADSPACE ANALYSIS BY METHOD 3810(MODIFIED)

010005

SAMPLE ID

9705G729-009

Lab Name: SwRI	Client: WESTON	Project: 01-8680-063
Lab Code: SwRI	Lab System ID: 89764	SDG: 89763
Matrix: Water	Date Received: 05/20/97	Lab File ID: F:0521715
Level: Medium	Conc/Dil Factor: 1.00	Date Analyzed: 05/21/97
Headspace vol: 22ml	GC Column: HAYE-SEP D	Detection Limit: 0.65
Injection vol: 1.50ml		Concentration: ug/L

Cas No.	Compound	ug/L
74-82-8	Methane	0.65U

DATA QUALIFIERS

- U Indicates compound was analyzed for but not detected. Report the minimum detection limit for the sample with the U (e.g. 10U) based on necessary concentration/dilution action (this is not necessarily the instrument detection limit). The footnote should be read U compound was analyzed for but not detected. The number is the minimum attainable limit for the sample.
- E Concentration exceeds calibration range

1A  
VOLATILE ORGANICS ANALYSIS DATA SHEET  
HEADSPACE ANALYSIS BY METHOD 3810(MODIFIED)

010008

SAMPLE ID

9705G729-010

Lab Name: SwRI	Client: WESTON	Project: 01-8680-063
Lab Code: SwRI	Lab System ID: 89765	SDG: 89763
Matrix: Water	Date Received: 05/20/97	Lab File ID: F:0521716
Level: Medium	Conc/Dil Factor: 1.00	Date Analyzed: 05/21/97
Headspace vol: 22ml	GC Column: HAYE-SEP D	Detection Limit: 0.65
Injection vol: 1.50ml		Concentration: ug/L

Cas No.	Compound	ug/L
74-82-8	Methane	0.65U

DATA QUALIFIERS

- U Indicates compound was analyzed for but not detected. Report the minimum detection limit for the sample with the U (e.g. 10U) based on necessary concentration/dilution action (this is not necessarily the instrument detection limit). The footnote should be read U compound was analyzed for but not detected. The number is the minimum attainable limit for the sample.
- E Concentration exceeds calibration range

1A  
VOLATILE ORGANICS ANALYSIS DATA SHEET  
HEADSPACE ANALYSIS BY METHOD 3810(MODIFIED)

010012

SAMPLE ID

9705G729-017

Lab Name: SwRI	Client: WESTON	Project: 01-8680-063
Lab Code: SwRI	Lab System ID: 89766	SDG: 89763
Matrix: Water	Date Received: 05/20/97	Lab File ID: F:0521718
Level: Medium	Conc/Dil Factor: 1.00	Date Analyzed: 05/21/97
Headspace vol: 22ml	GC Column: HAYE-SEP D	Detection Limit: 0.65
Injection vol: 1.50ml		Concentration: ug/L

Cas No.	Compound	ug/L
74-82-8	Methane	0.65 U

DATA QUALIFIERS

- U Indicates compound was analyzed for but not detected. Report the minimum detection limit for the sample with the U (e.g. 10U) based on necessary concentration/dilution action (this is not necessarily the instrument detection limit). The footnote should be read U compound was analyzed for but not detected. The number is the minimum attainable limit for the sample.
- E Concentration exceeds calibration range

Recra LabNet - Chicago  
 INORGANIC ANALYTICAL DATA PACKAGE FOR  
 Baker-Lejeune #356

LOT # :9705G494

CLIENT ID /ANALYSIS	SAMPLE #	MTX	PREP #	COLLECTN	DATE REC	EXT/PREP	ANALYSIS
IR89-MW06DW-07							
TOTAL ORGANIC CARBON	022	S	97GMC146	05/02/97	05/07/97	05/28/97	05/28/97
IR88-MW07IW-09							
TOTAL ORGANIC CARBON	024	S	97GMC146	05/05/97	05/07/97	05/28/97	05/28/97
IR88-MW07IW-22							
TOTAL ORGANIC CARBON	025	S	97GMC146	05/05/97	05/07/97	05/28/97	05/28/97

LAB QC:

TOTAL ORGANIC CARBON	LCS	BS	W	97GMC146	N/A	N/A	05/28/97	05/28/97
TOTAL ORGANIC CARBON	LCS	BSD	W	97GMC146	N/A	N/A	05/28/97	05/28/97
TOTAL ORGANIC CARBON	MBI		W	97GMC146	N/A	N/A	05/28/97	05/28/97

WESTON Analytics Use Only

# Custody Transfer Record/Lab Work Request



97056494

Client Baker - Lejeune #356  
 Work Order 5/30/97  
 Date Rec'd. 5/3/97 Date Due 5/27/97  
 RFW Contact Basav Ramuraj  
 Client Contact/Phone Matt Erdman

Refrigerator#	5	8	8	5		5	8	8	5
#Type Container	11G	11G	11G	21G		21G	21G	11P	11G
Volume	2-oz	4-oz	8-oz	10ml		10ml	80-oz	1-P	2-oz
Preservative				DCI		DCI		WMS	
ANALYSES REQUESTED	VOA 624H	BVA 625H	HSL Metals 9501	624H	CHRT REDD	VOA 624H	625H 628H	HSC Metals	624H 9501

WESTON Analytics Use Only

Samples Were:  
 1  Shipped or Hand-Delivered  **FX**  
 NOTES:

2 Ambient or  Skilled  
 NOTES:

3 Received Broken/Leaking (Improperly Sealed)  
 Y  N   
 NOTES:

4 Properly Preserved  
 Y  N  
 NOTES:  
 5/6/97 LLM

5 Received Within Holding Times  
 Y  N  
 NOTES:

WA Use Only Lab ID	Client ID/Description	Matrix	Date Collected						
001	IR89-mw06DW-01	S	5/2/97	A	B	C			✓
002	↓ -02								
003	4w06JW-01								
004	↓ -01D								
005	↓ MW06JW-02								
006	TB05	W					A-B		
007	IR89-RBSB10	W	5/4/97					A-B C-D E	
008	IR88-mw06JW-06	S						<del>A-B C-D E</del> A	
009	↓ 06D							A	
010	↓ 07							A	
011	IR88-RBSB11	W						A-B	
012	IR89-mw07JW-04 <i>MS/MSD*</i>	S	5/3/97	A	B	C			
013	↓ 06		5/3/97	A	B	C			
014	MW07DW-04		5/4/97	A	B	C			
015	↓ MW07DW-06			A	B	C			

COC Tape Was:

1 Present on Outer Package  Y  N  
 2 Unbroken on Outer Package  Y  N  
 3 Present on Sample  Y  N  
 4 Unbroken on Sample  Y  N  
 NOTES:

Matrix: W - Water DS - Drum Solids X - Other  
 S - Soil O - Oil DL - Drum Liquids  
 SE - Sediment A - Air F - Fish  
 SO - Solid WI - Wipe L - EP/TCPL Leachate

Special Instructions: *OC - NFESC DO - NFESC D Internal 100*

Item/Reason	Relinquished by	Received by	Date	Time	Item/Reason	Relinquished by	Received by	Date	Time
		<i>[Signature]</i>	5/3/97	1120					
logged in 16		<i>[Signature]</i>	5/3/97	0150					
7-97	FR	<i>[Signature]</i>	5/6/97	1725					
18-25	FR	<i>[Signature]</i>	5/7/97	1615					

COC Record Was:

1 Present Upon Receipt of Samples  Y  N

Discrepancies Between Sample Labels and COC Record?  Y  N  
 NOTES:

\* need 3x v01. for MS/MSD

\* Composite!! - w/ sample, then jars before analysis 5/7/97



# Custody Transfer Record/Lab Work Request

**WESTON Analytics Use Only**  
 97057, 494

Client Baker Lejeune 350  
 Work Order \_\_\_\_\_  
 Date Rec'd. 5/3/97 Date Due 5/28/97  
 RFW Contact James Kamins  
 Client Contact/Phone Mat (Kautman)

Refrigerator#	5/6	5	8	8	5	8	8	8
#/Type Container	2/G	2/G	2/G	1/P	1/G	1/G	1/G	1/G
Volume	8.3	40ml	800	1.0	2.3	4.3	8.3	8.3
Preservative		QCI		HAB				
ANALYSES REQUESTED	ISUB	VA	625H	H&L Metals	624H	625H	H&L Metals for %Sol	OCT %Sol

WA Use Only Lab ID	Client ID/Description	Matrix	Date Collected	*						
016	IR89-MW06DW-07	S	5/2/97	A-B						
017	TB06	W	↓	A-B						
018	IR93-RBSB11	W	5/6/97	A-B	C-D	E				
019	IR88-RBSB12	↓	↓	A-B						
020	IR93-MW04IW-02	S	↓				A	B	C	
021	↓ ↓ 04	↓	↓				A	B	C	
022	IR89-MW06DW-07	↓	5/2/97							A
023	TB07	W	5/2/97	A-B						
024	IR88-MW07IW-09	S	5/5/97							A-B
025	↓ ↓ 22	↓	↓							A-B

Matrix: W - Water DS - Drum Solids X - Other  
 S - Soil O - Oil DL - Drum Liquids  
 SE - Sediment A - Air F - Fish  
 SO - Solid WI - Wipe L - EP/TCLP Leachate

Special Instructions: dx Grain Size | Bulk Density

QC = NFESC Del = NFESC

Item/Reason	Relinquished by	Received by	Date	Time	Item/Reason	Relinquished by	Received by	Date	Time
7.17	FX	[Signature]	5/6/97	1325					
1.825	FR	[Signature]	5/7/97	1615					
16 SUB	P. Bahnd	FX → ETL	5/8/97	1250					

**WESTON Analytics Use Only**

Samples Were:  
 1 Shipped or Hand-Delivered   
 NOTES: FX

2 Ambient or Chilled   
 NOTES:

3 Received Broken/Leaking (Improperly Sealed)   
 Y  N  
 NOTES: N

4 Properly Preserved   
 N  
 NOTES: 5/3/97 see spec

5 Received Within Holding Times   
 Y  N  
 NOTES: Y

COC Tape Was:

1 Present on Outer Package  N  
 2 Unbroken on Outer Package  N  
 3 Present on Sample  N  
 4 Unbroken on Sample  N  
 NOTES: Y

COC Record Was:

1 Present Upon Receipt of Samples  N  
 Discrepancies Between Sample Labels and COC Record?  N  
 NOTES: 5/7/97 see spec

**Weston Environmental Metrics, Inc.**  
**Internal Sample Custody Transfer Record**

RFW Lot#: 97056494

Client: Saker Lejeune #356

Sample No.	Analysis	Relinquished by:	Received by:	Date	Time	Comments
1-6	GC/MS VOA	L. Heene	J. King	5-5-97	13:05	
1-5	% Sol	M. Schuy	E. Thompson	5-6-97	15:30	
1-5	% Sol	E. Thompson	M. Schuy	5-6-97	16:35	
7-15, 17	GC/MS VOA	L. Heene	L. Heene	5-6-97	19:05	
<del>8-10</del> <del>8-10</del> <del>10-15</del> <del>8-10</del> <del>11-15</del>	% Sol	L. Heene	E. Thompson	5-7-97	14:00	
18-21, 23	GC/MS VOA	M. Schuy	M. Schuy	5/7/97	16:20	
8-11-15	% Sol	E. Thompson	L. Heene	5/7/97	16:30	
7, 18	ORG	L. Heene	J. Berger	5/8/97	9:36	
7, 18	ORG	C. Will	L. Heene	5/8/97	14:00	
8-25 <del>8-25</del> <del>8-25</del> <del>8-25</del>	% Sol	L. Heene	E. Thompson	5/8/97	15:10	
80-22, 24-25	% Sol	L. Heene	E. Thompson	5/8/97	15:40	
12-15, <del>20-22, 24, 25</del>	% Sol	E. Thompson	L. Heene	5/8/97	15:50	
7, 18	Org. eoa8	M. Schuy	R. Pothole	5/9/97	9:30	
7, 18	Org	R. Pothole	L. Heene	5/9/97	12:50	
1-5, 15, 19, 20, 21	Org	L. Heene	Walter Newkirk	5/9/97	18:10	
1-5, 15, 12, 20, 21	Org	N. Walst	L. Heene	5/12/97	13:15	
7, 18	Met	L. Heene	Kevin M. ...	5-12-97	16:00	
1-5, 12-15, 20, 21	Met	L. Heene	Kevin M. ...	5-12-97	16:00	
1-5, 7, 12-15, 18, 20, 21	Met	Kevin M. ...	Gene Zimm	5-12-97	21:25	
8-25	% Sol	M. Schuy	E. Thompson	5-19-97	16:15	
8-25	% Sol	E. Thompson	M. Schuy	5-19-97	16:55	
8-9, 10, 21, 22, 24, 25	% Sol	L. Heene	Kevin M. ...	5-20-97	14:20	

bm  
5-20-97







97056494

356-006

# Custody Transfer Record/Lab Work Request

Client: <b>Saker Environmental Inc.</b>	Refrigerator #	
Est. Final Proj. Sampling Date: <b>6-16-97</b>	#/Type Container: <input type="checkbox"/> Liquid <input type="checkbox"/> Solid	
Work Order #: <b>CTO 356</b>	Volume: <input type="checkbox"/> Liquid <input type="checkbox"/> Solid	
Project Contact/Phone: <b>NO. Bolton 412-269-2653</b>	Preservatives	
AD Project Manager: <b>Rosco Ramirez</b>	ANALYSES REQUESTED →	ORGANIC
QC: <b>BOA DW BOA TAT See NOTE !!</b>		INORG
Date Rec'd _____ Date Due _____	VOA	BNA
Account # _____	Pest/PCB	Herb
	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															
			MS	MSD																			
	007	IR88-RBSB10			W	5/4	1130	X	X	X												X	
	008	IR88-MW06TW-06			S	5/4	1006	X															
	009	IR88-MW06TW-06D			S	5/4	1006	X															
	010	IR88-MW06TW-07			S	5/4	1010	X															
	011	IR88-RBSR11			W	5/4	1400	X															
		*IR88-MW06TW-01			W	5/5	1640	X															
		*IR89-MW06DW-01			W	5/5	1635	X															
	02	IR89-MW07IW-04	X	X	S	5/3	1616	X	X														X
	013	IR89-MW07IW-06			S	5/3	1645	X	X														X
	014	IR89-MW07DW-04			S	5/4	1624	X	X														X

FIELD PERSONNEL: COMPLETE ONLY SHADED AREAS	DATE/REVISIONS:	WESTON Analytics Use Only
Special Instructions: IR88-RBSB10 split spoon IR88-RBSB11 stainless steel spoon * Quick TAT Karen Wood 412-269-6000	1. _____ 2. _____ 3. _____ 4. _____ 5. _____ 6. _____	Samples were <input checked="" type="checkbox"/> Shipped <input type="checkbox"/> or Hand Delivered _____ Airbill # _____ 2) Ambient or Chilled _____ 3) Received in Good Condition - Y or N <input checked="" type="checkbox"/> Y or N 4) Labels Indicate Properly Preserved <input checked="" type="checkbox"/> Y or N 5) Received Within Holding Times <input checked="" type="checkbox"/> Y or N COC Tape was: 1) Present on Outer Package <input checked="" type="checkbox"/> Y or N 2) Unbroken on Outer Package <input checked="" type="checkbox"/> Y or N 3) Present on Sample <input checked="" type="checkbox"/> Y or N 4) Unbroken on Sample <input checked="" type="checkbox"/> Y or N COC Record Present Upon Sample Rec't <input checked="" type="checkbox"/> Y or N

Relinquished by	Received by	Date	Time	Relinquished by	Received by	Date	Time
APT	Fed-Ex	5/5/97	1800				
	[Signature]	5/6/97	1645				



WESTON Analytics Use Only  
97056494

356-007



# Custody Transfer Record/Lab Work Request

Page 1 of 1

Est. Final Proj. Sampling Date: 6-11-97 Work Order #: COC 356 Project Contact/Phone: M.P. Bachman 412-269-6052 AD Project Manager: Basco Ramirez DC: B2A DA: B2A TAT: B2A		Refrigerator # #/Type Container Volume Preservatives	Liquid Solid Liquid Solid	ANALYSES REQUESTED →										ORGANIC VOA BNA Pest/PCB Herb INORG Metal CN Total Organic Carbon			
Date Rec'd _____ Date Due _____ Account # _____		WESTON Analytics Use Only															
<b>MATRIX CODES:</b> S - Soil BE - 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											
			MS MSD		1997												
		IR89-NW07IW-01		W	5/6	1340	X										
		IR89-NW07DW-01		W	5/6	1420	X										
	018	IR93-RBSB11		W	5/6	1130	X X X	X									
	019	IR88-RBSB12		W	5/6	1630	X										
	020	IR93-NW04IW-02		S	5/6	0746	X X	X									
	021	IR93-NW04IW-04		S	5/6	0802	X X	X									
	022	IR89-NW06DW-07		S	5/2	1527		X									
	023	TB07		W	4/4	1455	X										
024	IR88-NW07IW-09		S	5/5	1727		X										
025	IR88-NW07I-22		S	5/5	1824		X										

**FIELD PERSONNEL: COMPLETE ONLY SHADED AREAS**

Special Instructions:  
 \* Quick T.A.T. Karen Wood 412-269-6014  
 IR88-RBSB12 Stainless steel Spoon  
 IR93-RBSB11 Split Spoon  
 Airbill # 3558272874

**DATE/REVISIONS:**

1. T.B. prep date 4/14/97  
 2. \_\_\_\_\_  
 3. \_\_\_\_\_  
 4. \_\_\_\_\_  
 5. \_\_\_\_\_  
 6. \_\_\_\_\_

**WESTON Analytics Use Only**

Samples were: FR  
 1) Shipped FR or Hand Delivered \_\_\_\_\_  
 Airbill # 47036  
 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
SPT	Fed-EX	5/6/97	1800				
	M. K. Huff	5/7/97	1505				

Discrepancies Between Samples Labels and COC Record? Y or N  
 NOTES:

Recra LabNet - Chicago  
 INORGANIC ANALYTICAL DATA PACKAGE FOR  
 Baker-Lejeune #356

LOT # :9706G009

CLIENT ID. /ANALYSIS	SAMPLE #	MTX	PREP #	COLLECTN DATE	REC	EXT/PREP	ANALYSIS
IR89-ECSW01-02							
CHLORIDE BY IC	001	W	97GIC161	06/01/97	06/03/97	06/28/97	06/28/97
IR89-ECSW02-02							
CHLORIDE BY IC	002	W	97GIC161	06/01/97	06/03/97	06/28/97	06/28/97
IR89-ECSW03-02							
CHLORIDE BY IC	003	W	97GIC161	06/01/97	06/03/97	06/28/97	06/28/97
IR89-ECSW04-02							
CHLORIDE BY IC	004	W	97GIC161	06/01/97	06/03/97	06/28/97	06/28/97
IR89-ECSW05-02							
CHLORIDE BY IC	005	W	97GIC161	06/01/97	06/03/97	06/28/97	06/28/97
IR93-MW02-01							
BOD 5 DAY	007	W	97GBD146	06/02/97	06/03/97	06/03/97	06/03/97
CHLORIDE BY IC	007	W	97GIC161	06/02/97	06/03/97	06/28/97	06/28/97
NITRITE BY IC	007	W	97GIC123	06/02/97	06/03/97	06/03/97	06/03/97
NITRATE BY IC	007	W	97GIC123	06/02/97	06/03/97	06/03/97	06/03/97
CHEMICAL OXYGEN DEMA	007	W	97GCD071	06/02/97	06/03/97	06/12/97	06/16/97
CHEMICAL OXYGEN DEMA	007 REP	W	97GCD071	06/02/97	06/03/97	06/12/97	06/16/97
CHEMICAL OXYGEN DEMA	007 MS	W	97GCD071	06/02/97	06/03/97	06/12/97	06/16/97
CHEMICAL OXYGEN DEMA	007 MSD	W	97GCD071	06/02/97	06/03/97	06/12/97	06/16/97
SULFATE BY IC	007	W	97GIC161	06/02/97	06/03/97	06/28/97	06/28/97
FERROUS IRON	007	W	97GMC152	06/02/97	06/03/97	06/03/97	06/03/97
FERROUS IRON	007 REP	W	97GMC152	06/02/97	06/03/97	06/03/97	06/03/97
FERROUS IRON	007 MS	W	97GMC152	06/02/97	06/03/97	06/03/97	06/03/97
SULFIDE	007	W	97GSF042	06/02/97	06/03/97	06/09/97	06/09/97
SULFIDE	007 REP	W	97GSF042	06/02/97	06/03/97	06/09/97	06/09/97
SULFIDE	007 MS	W	97GSF042	06/02/97	06/03/97	06/09/97	06/09/97
SUB-OUT TEST FOR SUB	007	W		06/02/97	06/03/97		
TOTAL DISSOLVED SOLI	007	W	97GSD134	06/02/97	06/03/97	06/06/97	06/06/97



NY CERTIFICATION # 11006

Recra LabNet - Chicago  
 INORGANIC ANALYTICAL DATA PACKAGE FOR  
 Baker-Lejeune #356

LOT # :9706G009

CLIENT ID /ANALYSIS	SAMPLE #	MTX	PREP #	COLLECTN	DATE REC	EXT/PREP	ANALYSIS
TOTAL SUSPENDED SOLI	007	W	97GSS103	06/02/97	06/03/97	06/06/97	06/06/97
TOTAL SUSPENDED SOLI	007 REP	W	97GSS103	06/02/97	06/03/97	06/06/97	06/06/97
TOTAL SUSPENDED SOLI	007 MS	W	97GSS103	06/02/97	06/03/97	06/06/97	06/06/97
IR93-MW02IW-01							
BOD 5 DAY	009	W	97GBD146	06/02/97	06/03/97	06/03/97	06/03/97
CHLORIDE BY IC	009	W	97GIC161	06/02/97	06/03/97	06/28/97	06/28/97
NITRITE BY IC	009	W	97GIC123	06/02/97	06/03/97	06/03/97	06/03/97
NITRITE BY IC	009 REP	W	97GIC123	06/02/97	06/03/97	06/03/97	06/03/97
NITRITE BY IC.	009 MS	W	97GIC123	06/02/97	06/03/97	06/03/97	06/03/97
NITRATE BY IC	009	W	97GIC123	06/02/97	06/03/97	06/03/97	06/03/97
NITRATE BY IC	009 REP	W	97GIC123	06/02/97	06/03/97	06/03/97	06/03/97
NITRATE BY IC	009 MS	W	97GIC123	06/02/97	06/03/97	06/03/97	06/03/97
CHEMICAL OXYGEN DEMA	009	W	97GCD071	06/02/97	06/03/97	06/12/97	06/16/97
SULFATE BY IC	009	W	97GIC123	06/02/97	06/03/97	06/03/97	06/03/97
SULFATE BY IC	009 REP	W	97GIC123	06/02/97	06/03/97	06/03/97	06/03/97
SULFATE BY IC	009 MS	W	97GIC123	06/02/97	06/03/97	06/03/97	06/03/97
FERROUS IRON	009	W	97GMC152	06/02/97	06/03/97	06/03/97	06/03/97
SULFIDE	009	W	97GSF042	06/02/97	06/03/97	06/09/97	06/09/97
SUB-OUT TEST FOR SUB	009	W		06/02/97	06/03/97		
TOTAL DISSOLVED SOLI	009	W	97GSD134	06/02/97	06/03/97	06/06/97	06/06/97
TOTAL SUSPENDED SOLI	009	W	97GSS103	06/02/97	06/03/97	06/06/97	06/06/97
IR88-MW05-01							
TOTAL DISSOLVED SOLI	012	W	97GSD133	05/31/97	06/03/97	06/06/97	06/06/97
TOTAL SUSPENDED SOLI	012	W	97GSS103	05/31/97	06/03/97	06/06/97	06/06/97
IR88-MW05DW-01							
TOTAL DISSOLVED SOLI	013	W	97GSD133	05/31/97	06/03/97	06/06/97	06/06/97
TOTAL SUSPENDED SOLI	013	W	97GSS103	05/31/97	06/03/97	06/06/97	06/06/97
IR88-MW05IW-01							
TOTAL DISSOLVED SOLI	014	W	97GSD133	05/31/97	06/03/97	06/06/97	06/06/97
TOTAL SUSPENDED SOLI	014	W	97GSS103	05/31/97	06/03/97	06/06/97	06/06/97



NY CERTIFICATION # 11006

Recra LabNet - Chicago  
 INORGANIC ANALYTICAL DATA PACKAGE FOR  
 Baker-Lejeune #356

LOT # :9706G009

CLIENT ID /ANALYSIS    SAMPLE #    MTX    PREP #    COLLECTN DATE REC    EXT/PREP    ANALYSIS

LAB QC:

CHLORIDE BY IC	LCS BS	W	97GIC161	N/A	N/A	06/28/97	06/28/97
CHLORIDE BY IC	LCS BSD	W	97GIC161	N/A	N/A	06/28/97	06/28/97
FLUORIDE BY IC	LCS BS	W	97GIC161	N/A	N/A	06/28/97	06/28/97
FLUORIDE BY IC	LCS BSD	W	97GIC161	N/A	N/A	06/28/97	06/28/97
NITRATE BY IC	LCS BS	W	97GIC161	N/A	N/A	06/28/97	06/28/97
NITRATE BY IC	LCS BSD	W	97GIC161	N/A	N/A	06/28/97	06/28/97
PHOSPHATE BY IC	LCS BS	W	97GIC161	N/A	N/A	06/28/97	06/28/97
PHOSPHATE BY IC	LCS BSD	W	97GIC161	N/A	N/A	06/28/97	06/28/97
SULFATE BY IC	LCS BS	W	97GIC161	N/A	N/A	06/28/97	06/28/97
SULFATE BY IC	LCS BSD	W	97GIC161	N/A	N/A	06/28/97	06/28/97
CHLORIDE BY IC	MB1	W	97GIC161	N/A	N/A	06/28/97	06/28/97
FLUORIDE BY IC	MB1	W	97GIC161	N/A	N/A	06/28/97	06/28/97
NITRATE BY IC	MB1	W	97GIC161	N/A	N/A	06/28/97	06/28/97
PHOSPHATE BY IC	MB1	W	97GIC161	N/A	N/A	06/28/97	06/28/97
SULFATE BY IC	MB1	W	97GIC161	N/A	N/A	06/28/97	06/28/97
BOD 5 DAY	LCS BS	W	97GBD146	N/A	N/A	06/03/97	06/03/97
BOD 5 DAY	LCS BSD	W	97GBD146	N/A	N/A	06/03/97	06/03/97
BOD 5 DAY	MB1	W	97GBD146	N/A	N/A	06/03/97	06/03/97
BROMIDE BY IC	LCS BS	W	97GIC123	N/A	N/A	06/03/97	06/03/97
BROMIDE BY IC	LCS BSD	W	97GIC123	N/A	N/A	06/03/97	06/03/97
CHLORIDE BY IC	LCS BS	W	97GIC123	N/A	N/A	06/03/97	06/03/97
CHLORIDE BY IC	LCS BSD	W	97GIC123	N/A	N/A	06/03/97	06/03/97
FLUORIDE BY IC	LCS BS	W	97GIC123	N/A	N/A	06/03/97	06/03/97
FLUORIDE BY IC	LCS BSD	W	97GIC123	N/A	N/A	06/03/97	06/03/97
NITRITE BY IC	LCS BS	W	97GIC123	N/A	N/A	06/03/97	06/03/97
NITRITE BY IC	LCS BSD	W	97GIC123	N/A	N/A	06/03/97	06/03/97
NITRATE BY IC	LCS BS	W	97GIC123	N/A	N/A	06/03/97	06/03/97
NITRATE BY IC	LCS BSD	W	97GIC123	N/A	N/A	06/03/97	06/03/97
PHOSPHATE BY IC	LCS BS	W	97GIC123	N/A	N/A	06/03/97	06/03/97
PHOSPHATE BY IC	LCS BSD	W	97GIC123	N/A	N/A	06/03/97	06/03/97
SULFATE BY IC	LCS BS	W	97GIC123	N/A	N/A	06/03/97	06/03/97
SULFATE BY IC	LCS BSD	W	97GIC123	N/A	N/A	06/03/97	06/03/97
BROMIDE BY IC	MB1	W	97GIC123	N/A	N/A	06/03/97	06/03/97
CHLORIDE BY IC	MB1	W	97GIC123	N/A	N/A	06/03/97	06/03/97



NY CERTIFICATION # 11006



Recra LabNet - Chicago  
 INORGANIC ANALYTICAL DATA PACKAGE FOR  
 Baker-Lejeune #356

LOT # :9706G009

CLIENT ID /ANALYSIS	SAMPLE #	MTX	PREP #	COLLECTN DATE	REC	EXT/PREP	ANALYSIS
FLUORIDE BY IC	MB1	W	97GIC123	N/A	N/A	06/03/97	06/03/97
NITRITE BY IC	MB1	W	97GIC123	N/A	N/A	06/03/97	06/03/97
NITRATE BY IC	MB1	W	97GIC123	N/A	N/A	06/03/97	06/03/97
PHOSPHATE BY IC	MB1	W	97GIC123	N/A	N/A	06/03/97	06/03/97
SULFATE BY IC	MB1	W	97GIC123	N/A	N/A	06/03/97	06/03/97
CHEMICAL OXYGEN DEMA	LCS BS	W	97GCD071	N/A	N/A	06/12/97	06/16/97
CHEMICAL OXYGEN DEMA	LCS BSD	W	97GCD071	N/A	N/A	06/12/97	06/16/97
CHEMICAL OXYGEN DEMA	MB1	W	97GCD071	N/A	N/A	06/12/97	06/16/97
FERROUS IRON	LCS BS	W	97GMC152	N/A	N/A	06/03/97	06/03/97
FERROUS IRON	LCS BSD	W	97GMC152	N/A	N/A	06/03/97	06/03/97
FERROUS IRON	MB1	W	97GMC152	N/A	N/A	06/03/97	06/03/97
SULFIDE	LCS BS	W	97GSF042	N/A	N/A	06/09/97	06/09/97
SULFIDE	LCS BSD	W	97GSF042	N/A	N/A	06/09/97	06/09/97
SULFIDE	MB1	W	97GSF042	N/A	N/A	06/09/97	06/09/97
TOTAL DISSOLVED SOLI	LCS BS	W	97GSD134	N/A	N/A	06/06/97	06/06/97
TOTAL DISSOLVED SOLI	LCS BSD	W	97GSD134	N/A	N/A	06/06/97	06/06/97
TOTAL DISSOLVED SOLI	MB1	W	97GSD134	N/A	N/A	06/06/97	06/06/97
TOTAL SUSPENDED SOLI	LCS BS	W	97GSS103	N/A	N/A	06/06/97	06/06/97
TOTAL SUSPENDED SOLI	LCS BSD	W	97GSS103	N/A	N/A	06/06/97	06/06/97
TOTAL SUSPENDED SOLI	MB1	W	97GSS103	N/A	N/A	06/06/97	06/06/97
TOTAL DISSOLVED SOLI	LCS BS	W	97GSD133	N/A	N/A	06/06/97	06/06/97
TOTAL DISSOLVED SOLI	LCS BSD	W	97GSD133	N/A	N/A	06/06/97	06/06/97
TOTAL DISSOLVED SOLI	MB1	W	97GSD133	N/A	N/A	06/06/97	06/06/97



NY CERTIFICATION # 11006



# Custody Transfer Record/Lab Work Request

1 of 2

RECRA LabNet Use Only  
97066-009

Client: Baker Lejeune 352  
W.O. #  
Project Name: 6/30/97  
Date Received: 6/3/97 Date Due: 6/30/97  
RECRA Project Manager: David Ramirez  
Client Contact: 6/3/97

Refrigerator #	3	5	3	3	3	3	P	3	3
#/Type Container	11P	21G	11G	11G	11P	11P	11P	11P	11P
Volume	1-2	40x1	80-3	80-2	1-2	1-2	1-2	1-2	1-2
Preservative		DCI			HMB3			ENTER NASH	HLS04
ANALYSES REQUESTED	IC CL	VEP	BNA	PIPUB	HSL Metals	TSS TDS	* see below	SFD	COB

RECRA Use Only LAB ID	CLIENT ID/Description	Matrix	Date Collected																	
CC1	IR89-ECSW01-02	W	6/1/97	A																
CC2	-ECSW02																			
CC3	ECSW03																			
CC4	ECSW04																			
CC5	ECSW05																			
CC6	IR89/93-TNK01				A	B	C	D	E	F										
CC7	IR93-mw02-01		6/2/97		A-B	C	D	E		F	G	H								
CC8	-01D				A-B	C	D	E												
CC9	-mw02JW-01				A-B	C		D		E	F	G								
010	TB17		6/1/97		A-B															
E11	IR93-mw01-01		6/2/97			A														
012	IR88-mw05-01		5/31/97							A										
013	MW05DW-01																			
014	MW05JW-01																			

Matrix: W - Water DS - Drum Solids X - Other Special Instructions: \* ICNO2, ICNO3, ICNO4, IFCL2, BOD5, ICCL  
 S - Soil O - Oil DL - Drum Liquids  
 SE - Sediment A - Air F - Fish  
 SO - Solid WI - Wipe L - EPITCLP Leachate

EC = NFESC DL = NFESC D Internal COC

Item/Reason	Relinquished by	Received by	Date	Time	Item/Reason	Relinquished by	Received by	Date	Time
74 96 McManis	<i>[Signature]</i>	<i>[Signature]</i>	6/3/97	1515					
6	<i>[Signature]</i>	<i>[Signature]</i>	6/3/97	1315					
	<i>[Signature]</i>	97066-104	6/7/97	2025					

RECRA LabNet Use Only

Samples Were:  
 1) Shipped or Hand Delivered  **FR**  
 NOTES

2) Ambient or Chilled   
 NOTES

3) Received Broken/Leaking (Improperly Sealed)  Y  N  
 NOTES

4) Properly Preserved  Y  N  
 NOTES

5) Received Within Holding Times  Y  N  
 NOTES

COC Tape Was:  
 1) Present on Outer Package  Y  N  
 2) Unbroken on Outer Package  Y  N  
 3) Present on Sample  Y  N  
 4) Unbroken on Sample  Y  N  
 NOTES

COC Record Was:  
 1) Present Upon Receipt of Samples  Y  N  
 Discrepancies Between Sample Labels and COC Record?  Y  N  
 Notes: *[Signature]*



# Custody Transfer Record/Lab Work Request

2 of 2

RECRA LabNet Use Only  
 97066009

Client Baker Hejune #356  
 W.O. # \_\_\_\_\_  
 Project Name \_\_\_\_\_  
 Date Received 6/3/97 Date Due 6/26/97  
 RECRA Project Manager Bosco Ramirez  
 Client Contact Karen Wood

Refrigerator #	3/0
#/Type Container	3/6
Volume	18ml
Preservative	HCl
ANALYSES REQUESTED	Mettrak TSUB

RECRA Use Only LAB ID	CLIENT ID/Description	Matrix	Date Collected
001	IR89-ECSW01-02	W	6/1/97
002	ECSW02-		
003	ECSW03		
004	ECSW04		
005	ECSW05		
006	IR89/93-TNK01		
007	IR93-MW02-01		6/2/97 I-JK
008	OID		
009	MW02TW-01		4-J
010	TR17		6/1/97
011	IR93-MW01-01		6/2/97
012	IR98-MW05-01		5/31/97
013	MW05DW-01		
014	MW05TW-01		

Matrix: W - Water DS - Drum Solids X - Other Special Instructions:  
 S - Soil O - Oil DL - Drum Liquids  
 SE - Sediment A - Air F - Fish  
 SO - Solid WI - Wipe L - EP/TCLP Leachate  
 GC = NFESC Del = NFESC A Internal coc

Item/Reason	Relinquished by	Received by	Date	Time	Item/Reason	Relinquished by	Received by	Date	Time
		X. Wachup	6/3/97	1515					

RECRA LabNet Use Only

Samples Were:

- 1) Shipped or Hand Delivered  
 NOTES: TS
- 2) Ambient or Chilled  
 NOTES:
- 3) Received Broken/Leaking (Improperly Sealed)  
 Y  N
- 4) Properly Preserved  
 NOTES: 6/3/97  
 Y  N
- 5) Received Within Holding Times  
 Y  N

COC Tape Was:

- 1) Present on Outer Package  
 Y  N
- 2) Unbroken on Outer Package  
 Y  N
- 3) Present on Sample  
 Y  N
- 4) Unbroken on Sample  
 Y  N

NOTES:

COC Record Was:

- 1) Present Upon Receipt of Samples  
 Y  N

Discrepancies Between Sample Labels and COC Record?  
 Y  N

Notes:

**Weston Environmental Metrics, Inc.**  
**Internal Sample Custody Transfer Record**

00

RFW Lot#: 97066009

Client: Bala Weymouth 356

Sample No.	Analysis	Relinquished by:	Received by:	Date	Time	Comments
7, 9	IC	K. Schuch	B. D. W.	6/3/97	1235	samples given to analyst before being logged
6-10	GC/MS Vol	K. Schuch	<del>Paul Klenoff</del>	6/3/97	1625	
7, 9	IC/BOD	L. H. Hemi	K. Schuch	6/4/97	10:55	
6-8	org	K. Schuch	C. Villi	6/4/97	1426	
6-8	org	C. Villi	L. H. Hemi	6/4/97	1608	
6-9, 11	org	K. Schuch	C. Villi	6/5/97	1510	
6-9	metals	L. H. Hemi	Paul Klenoff	6-5-97	15:50	
6-9, 11	org	C. Villi	L. H. Hemi	6/5/97	1555	
6-9	M. Metals	Cheryl Barb.	K. Schuch	6/5/97	2200	
6-9, 12, 13, 14	IC	K. Schuch	J. Fee	6-6-97	0901	#6 transferred to 97066104 6/7/97
7+9	Subtotal	L. H. Hemi	Paul Klenoff	6-9-97	9:48	
7+9	Subtotal	Paul Klenoff	L. H. Hemi	6-9-97	15:50	
<del>12, 13, 14</del>	<del>IC</del>	<del>6/10/97</del>				
7, 9	IC	J. Fee	K. Schuch	6-11-97	0750	
7, 9	COD	K. Schuch	C. Williamson	6/11/97	13:35	
12, 13, 14	IC	B. D. W.	P. Bullock	6/12/97	14:20	
7, 9	COD	C. Williamson	Paul Klenoff	6/12/97	17:55	
7	IC	K. Schuch	Paul Klenoff	6/20/97	0845	
7	IC	Amey Stoll	K. Schuch	6/21/97	13:55	
1-5, 7, 9, 10, 11	IC	L. H. Hemi	Amey Stoll	6/28/97	10:50	
1-5, 7	IC	Paul Klenoff	K. Schuch	6/30/97	1600	

EOC OK 6/18/97



WESTON Analytics Use Only

9706 GOC9

356-017

# Custody Transfer Record/Lab Work Request



10

Client <u>Baker Environmental, Inc.</u>		Refrigerator #																		
Est. Final Proj. Sampling Date <u>6-7-97</u>		#/Type Container	Liquid																	
Work Order # <u>62470-356</u>		Volume	Solid																	
Project Contact/Phone # <u>M.D. Bachman 412-269-2053</u>		Preservatives	Liquid																	
AD Project Manager <u>Rosco Ramirez</u>			Solid																	
QC <u>BoA Del BoA TAT BoA</u>																				
Date Rec'd _____ Date Due _____		ANALYSES REQUESTED →		ORGANIC					INORG											
Account # _____				VOA	BNA	Pest/PCB	Herb			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													
			MS	MSD																	
	<u>011</u>				<u>1997</u>																
	<u>010</u>	<u>IR93-MW01-01</u>			<u>W</u>	<u>6/2</u>	<u>1528</u>														

**FIELD PERSONNEL: COMPLETE ONLY SHADED AREAS**

Special Instructions:

**DATE/REVISIONS:**

1. \_\_\_\_\_

2. \_\_\_\_\_

3. \_\_\_\_\_

4. \_\_\_\_\_ 2.1, 2.5, 1.3, 4.3%

5. \_\_\_\_\_

6. \_\_\_\_\_

**WESTON Analytics Use Only**

Samples were: FR  
 1) Shipped Y 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
<u>APT</u>	<u>Fed. Ex</u>	<u>6/2/97</u>	<u>1800</u>				
	<u>[Signature]</u>	<u>6/3/97</u>	<u>125</u>				

Discrepancies Between Samples Labels and COC Record? Y or N

NOTES:  
[Signature]

To: Baker-Lejeune #356  
Airport Office Park, Bldg. 3  
420 Rouser Road  
Coraopolis, PA 15108

Attn: Ms. Karen Wood

Date: Monday June 30th, 1997

RE: IR89-ECSW01-02  
Project # 00000-000-000-0000  
Lab ID: 9706G009-001  
Sample Date: 06/01/97  
Date Received: 06/03/97

### Inorganic Data Report

Parameters	Result	Units	Reporting Limit
Chloride BY IC	7.0	mg/L	0.20



To: Baker-Lejeune #356  
Airport Office Park, Bldg. 3  
420 Rouser Road  
Coraopolis, PA 15108

Attn: Ms. Karen Wood

Date: Monday June 30th, 1997

RE: IR89-ECSW02-02  
Project # 00000-000-000-0000  
Lab ID: 9706G009-002  
Sample Date: 06/01/97  
Date Received: 06/03/97

### Inorganic Data Report

Parameters	Result	Units	Reporting Limit
Chloride BY IC	5.6	mg/L	0.20





To: Baker-Lejeune #356  
Airport Office Park, Bldg. 3  
420 Rouser Road  
Coraopolis, PA 15108

Date: Monday June 30th, 1997

RE: IR89-ECSW03-02  
Project # 00000-000-000-0000  
Lab ID: 9706G009-003  
Sample Date: 06/01/97  
Date Received: 06/03/97

Attn: Ms. Karen Wood

### Inorganic Data Report

Parameters	Result	Units	Reporting Limit
Chloride BY IC	5.4	mg/L	0.20



To: Baker-Lejeune #356  
Airport Office Park, Bldg. 3  
420 Rouser Road  
Coraopolis, PA 15108

Attn: Ms. Karen Wood

Date: Monday June 30th, 1997

RE: IR89-ECSW04-02  
Project # 00000-000-000-0000  
Lab ID: 9706G009-004  
Sample Date: 06/01/97  
Date Received: 06/03/97

### Inorganic Data Report

Parameters	Result	Units	Reporting Limit
Chloride BY IC	29.0	mg/L	2.0



To: Baker-Lejeune #356  
Airport Office Park, Bldg. 3  
420 Rouser Road  
Coraopolis, PA 15108

Attn: Ms. Karen Wood

Date: Monday June 30th, 1997

RE: IR89-ECSW05-02  
Project # 00000-000-000-0000  
Lab ID: 9706G009-005  
Sample Date: 06/01/97  
Date Received: 06/03/97

### Inorganic Data Report

Parameters	Result	Units	Reporting Limit
Chloride BY IC	31.3	mg/L	2.0



To: Baker-Lejeune #356  
Airport Office Park, Bldg. 3  
420 Rouser Road  
Coraopolis, PA 15108

Attn: Ms. Karen Wood

Date: Monday June 30th, 1997

RE: IR93-MW02-01  
Project # 00000-000-000-0000  
Lab ID: 9706G009-007  
Sample Date: 06/02/97  
Date Received: 06/03/97

### Inorganic Data Report

Parameters	Result	Units	Reporting Limit
BOD 5 Day	2	u mg/L	2
Chloride BY IC	8.0	mg/L	0.40
Nitrite-N by IC	0.10	u mg/L	0.10
Nitrate-N by IC	0.10	u mg/L	0.10
COD	7	mg/L	5
Sulfate by IC	16.2	mg/L	0.40
Ferrous Iron	0.30	mg/L	0.25
Sulfide	1.0	u mg/L	1.0
Total Dissolved Solid	260	mg/L	10
Total Suspended Solid	4	u mg/L	4



To: Baker-Lejeune #356  
Airport Office Park, Bldg. 3  
420 Rouser Road  
Coraopolis, PA 15108

Date: Monday June 30th, 1997

RE: IR93-MW02IW-01  
Project # 00000-000-000-0000  
Lab ID: 9706G009-009  
Sample Date: 06/02/97  
Date Received: 06/03/97

Attn: Ms. Karen Wood

### Inorganic Data Report

Parameters	Result	Units	Reporting Limit
BOD 5 Day	2	u mg/L	2
Chloride BY IC	8.0	mg/L	0.40
Nitrite-N by IC	0.10	u mg/L	0.10
Nitrate-N by IC	0.10	u mg/L	0.10
COD	12	mg/L	5
Sulfate by IC	1.7	mg/L	0.20
Ferrous Iron	0.40	mg/L	0.25
Sulfide	1.0	u mg/L	1.0
Total Dissolved Solid	260	mg/L	10
Total Suspended Solid	6	mg/L	4



To: Baker-Lejeune #356  
Airport Office Park, Bldg. 3  
420 Rouser Road  
Coraopolis, PA 15108

Date: Monday June 30th, 1997

Project # 00000-000-000-0000  
Lab Batch: 9706G009

Attn: Ms. Karen Wood

### Inorganic Method Blank Data Report

Sample	Lab ID	Parameter	Result	Units	Reporting Limit
Blank 1	97GIC161-MB1	Chloride BY IC	0.20	u mg/L	0.20
		Fluoride BY IC	0.10	u mg/L	0.10
		Nitrate-N by IC	0.10	u mg/L	0.10
		Phosphate by IC	0.10	u mg/L	0.10
		Sulfate by IC	0.20	u mg/L	0.20
Blank 1	97GBD146-MB1	BOD 5 Day	2	u mg/L	2
Blank 1	97GIC123-MB1	Bromide BY IC	0.10	u mg/L	0.10
		Chloride BY IC	0.20	u mg/L	0.20
		Fluoride BY IC	0.10	u mg/L	0.10
		Nitrite-N by IC	0.10	u mg/L	0.10
		Nitrate-N by IC	0.10	u mg/L	0.10
		Phosphate by IC	0.10	u mg/L	0.10
		Sulfate by IC	0.20	u mg/L	0.20
Blank 1	97GCD071-MB1	COD	5	u mg/L	5
Blank 1	97GMC152-MB1	Ferrous Iron	0.050	u mg/L	0.050
Blank 1	97GSF042-MB1	Sulfide	1.0	u mg/L	1.0
Blank 1	97GSD134-MB1	Total Dissolved Solid	10	u mg/L	10



To: Baker-Lejeune #356  
Airport Office Park, Bldg. 3  
420 Rouser Road  
Coraopolis, PA 15108

Date: Monday June 30th, 1997

Project # 00000-000-000-0000  
Lab Batch: 9706G009

Attn: Ms. Karen Wood

### Inorganic Method Blank Data Report

Sample	Lab ID	Parameter	Result	Units	Reporting Limit
Blank 1	97GSS103-MB1	Total Suspended Solid	4	u mg/L	4
Blank 1	97GSD133-MB1	Total Dissolved Solid	10	u mg/L	10



To: Baker-Lejeune #356  
Airport Office Park, Bldg. 3  
420 Rouser Road  
Coraopolis, PA 15108

Date: Monday June 30th, 1997

Project # 00000-000-000-0000  
Lab Batch: 9706G009

Attn: Ms. Karen Wood

### Inorganic Precision Data Report

Sample	Site ID	Parameter	Initial Result		Replicate	RPD
-007REP	IR93-MW02-01	COD	7		9	25.0
		Ferrous Iron, Rep	0.30		0.30	0.00
		Sulfide	1.0	u	1.0	u NC
		Tot Susp Solids	4	u	4	u NC
-009REP	IR93-MW02IW-01	Nitrite by IC	0.10	u	0.10	u NC
		Nitrate by IC	0.10	u	0.10	u NC
		Sulfate by IC	1.7		1.9	13.1





To: Baker-Lejeune #356  
Airport Office Park, Bldg. 3  
420 Rouser Road  
Coraopolis, PA 15108

Date: Monday June 30th, 1997

Project # 00000-000-000-0000  
Lab Batch: 9706G009

Attn: Ms. Karen Wood

### Inorganic Accuracy Data Report

Sample	Site ID	Parameter	Spiked Sample	Initial Result	Spiked Amount	% Recov
-007	IR93-MW02-01	COD	34	7	25	106
		COD MSD	57	7	25	200
		Ferrous Iron, MS	0.80	0.30	0.50	100
		Sulfide	3.9	1.0 u	4.0	97.8
		Tot Susp Solids	100	4 u	100	104
-009	IR93-MW02IW-01	Nitrite by IC	2.0	0.10 u	2.0	99.5
		Nitrate by IC	2.0	0.10 u	2.0	98.6
		Sulfate by IC	6.8	1.7	5.0	101



To: Baker-Lejeune #356  
Airport Office Park, Bldg. 3  
420 Rouser Road  
Coraopolis, PA 15108

Date: Monday June 30th, 1997

Project # 00000-000-000-0000  
Lab Batch: 9706G009

Attn: Ms. Karen Wood

### Inorganic Duplicate Spike Report

Sample	Site ID	Parameter	Spike #1 % Recov	Spike #2 % Recov	RPD
-007	IR93-MW02-01	COD	106	200	61.3



To: Baker-Lejeune #356  
Airport Office Park, Bldg. 3  
420 Rouser Road  
Coraopolis, PA 15108

Date: Monday June 30th, 1997

Project # 00000-000-000-0000  
Lab Batch: 9706G009

Attn: Ms. Karen Wood

### Inorganic Laboratory Control Standards Report

Lab ID	Parameter	Spiked Amount	Units	Spike #1 % Recov.	Spike #2 % Recov.	RPD
97GIC161-LCS	Chloride BY IC	5.0	mg/L	99.2	101	1.5
	Fluoride BY IC	1.0	mg/L	106	101	4.9
	Nitrate by IC	2.0	mg/L	94.4	95.0	0.70
	Phosphate by IC	2.0	mg/L	97.6	98.2	0.60
	Sulfate by IC	5.0	mg/L	95.0	96.3	1.4
97GBD146-LCS	BOD 5 Day	200	mg/L	91.9	88.9	3.3
97GIC123-LCS	Bromide BY IC	2.0	mg/L	96.2	94.1	2.2
	Chloride BY IC	5.0	mg/L	106	104	1.9
	Fluoride BY IC	1.0	mg/L	102	98.2	4.3
	Nitrite by IC	2.0	mg/L	101	98.0	3.2
	Nitrate by IC	2.0	mg/L	100	99.6	0.90
	Phosphate by IC	2.0	mg/L	98.0	99.2	1.2
	Sulfate by IC	5.0	mg/L	97.5	97.3	0.30
97GCD071-LCS	COD	25	mg/L	124	118	5.0
97GMC152-LCS	Ferrous Iron. MS	0.50	mg/L	100	100	0.00
97GSF042-LCS	Sulfide	4.0	mg/L	91.8	89.8	2.2
97GSD134-LCS	Tot Diss Sol	250	mg/L	95.2	92.0	3.4



To: Baker-Lejeune #356  
Airport Office Park, Bldg. 3  
420 Rouser Road  
Coraopolis, PA 15108

Date: Monday June 30th, 1997

Project # 00000-000-000-0000  
Lab Batch: 9706G009

Attn: Ms. Karen Wood

### Inorganic Laboratory Control Standards Report

Lab ID	Parameter	Spiked Amount	Units	Spike #1 % Recov.	Spike #2 % Recov.	RPD
97GSS103-LCS	Tot Susp Solids	200	mg/L	99.0	107	7.5
97GSD133-LCS	Tot Diss Sol	250	mg/L	96.8	112	14.6



Recra LabNet - Chicago  
Wet Chemistry Case Narrative

Client: Baker-Lejeune  
RFW lot #: 9706G009

Date Rec'd: 06/03/97

1. This narrative covers the analysis of samples in the above RFW lot number by the following methods.

BOD - EPA Method 405.1

Common Anions by IC Method 300.0:

Chloride

Nitrate-Nitrogen

Nitrite-Nitrogen

Sulfate

Ferrous Iron - Standard Methods 3500 FeD. Ferric Iron can be obtained by subtracting this result from the total Iron result.

Total Dissolved Solids (TDS)- EPA Method 160.1

Total Suspended Solids (TSS)- EPA Method 160.2


Sulfide - EPA Method 376.1

COD - Hach 8000

2. All established hold times were met.
3. Initial and continuing calibration criteria were met for analysis requiring calibration.
4. All method blanks were below the detection limits.
5. The LCSs analyzed with these samples were all within the Recra LabNet statistical acceptance limits, shown in the table below. Please see the LCS summary pages of this report for details.

Parameter	LCL %	UCL %	RPD %
BOD	60	145	21
Sulfate	85	107	10
Ferrous Iron	80	120	20
Nitrate, Nitrogen	85	107	10
Nitrite, Nitrogen	89	103	10
Chloride	87	118	10
Sulfide	69	113	13
TDS	73	119	13
TSS	81	115	10
COD	85	132	14

6. One of the COD matrix spikes was high at 200% recovery. The RPD for the sulfate duplicates were high at 13.1%. No matrix QC was done for BOD, TDS, or chloride. Please refer to the precision and accuracy pages for details.

  
Diane L. Harper  
Wet Chemistry Section Manager

97, June 30  
Date

To: Baker-Lejeune #356  
Airport Office Park, Bldg. 3  
420 Rouser Road  
Coraopolis, PA 15108

Attn: Ms. Karen Wood

Date: Friday May 30th, 1997

RE: IR89-MW06DW-07  
Project # 00000-000-000-0000  
Lab ID: 9705G494-022  
Sample Date: 05/02/97  
Date Received: 05/07/97

### Inorganic Data Report

Parameters	Result	Units	Reporting Limit
Total Organic Carbon	0.31	%	0.28

To: Baker-Lejeune #356  
Airport Office Park, Bldg. 3  
420 Rouser Road  
Coraopolis, PA 15108

Date: Friday May 30th, 1997

Project # 00000-000-000-0000  
Lab Batch: 9705G494

Attn: Ms. Karen Wood

### Inorganic Method Blank Data Report

Sample	Lab ID	Parameter	Result	Units	Reporting Limit
Blank 1	97GMC146-MB1	Total Organic Carbon	0.050	%	0.050

To: Baker-Lejeune #356  
Airport Office Park, Bldg. 3  
420 Rouser Road  
Coraopolis, PA 15108

Date: Friday May 30th, 1997

Project # 00000-000-000-0000  
Lab Batch: 9705G494

Attn: Ms. Karen Wood

### Inorganic Laboratory Control Standards Report

Lab ID	Parameter	Spiked Amount	Units	Spike #1 % Recov.	Spike #2 % Recov.	RPD
97GMC146-LCS	TOC	47.0	%	95.5	95.0	0.60

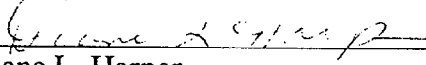


Recra Labnet - Chicago  
Wet Chemistry Case Narrative

Client: Baker-Lejeune #356  
RFW #: 9705G494

W.O. # NA  
Date Rec'd: 05/07/97

1. This narrative covers the analysis of the samples in sample delivery group 9705G494 in accordance with protocols based on the following methods:  
  
TOC - Walkley-Black Method
2. There is no established hold time for this parameter. Please see the laboratory chronicle section of this report for dates of preparation and analysis.
3. The method blank was below the reporting limit.
4. The LCSs, crystalline KHP which is 47% carbon, were within acceptance limits at 95.5% and 95.0% recovery.
5. Matrix QC was done on an alternate sample. Since the % solid analysis of the sample on which the matrix QC was done was not yet available, the data for that sample is not all calculated and appears in the raw data incomplete.

  
\_\_\_\_\_  
Diane L. Harper  
Wet Chemistry Section Manager

5/30/97  
\_\_\_\_\_  
Date



**RECRA  
LabNet**

*a division of Recra Environmental, Inc.*

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*Virtual Laboratories Everywhere*

June 27, 1997

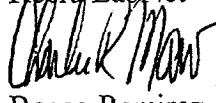
Ms. Karen Wood  
Baker Environmental, Inc.  
Airport Office Park, Bldg. 3  
420 Rouser Road  
Coraopolis, PA 15108

RE: Baker - Camp Lejeune #356  
ADDITIONAL DATA  
Lot # 9705G765

Dear Ms. Wood:

As requested, enclosed is the Wet Chemistry analytical report for the project and lot number listed above. If you have any questions, please contact me at 708-534-5200.


Sincerely,  
Recra LabNet - Chicago

*for*   
Bosco Ramirez  
Technical Director

jb

Enclosures

Approved By:

  
Michael J. Healy  
Vice President

The results presented in this report relate only to the analytical testing and conditions of sample at receipt. This report pertains to only those samples actually tested. All 1262 pages of this report are integral parts of the analytical data. Therefore, this report should be reproduced only in its entirety.

Recra LabNet - Chicago  
 INORGANIC ANALYTICAL DATA PACKAGE FOR  
 Baker-Lejeune #356

LOT # :9705G765

CLIENT ID /ANALYSIS	SAMPLE #	MTX	PREP #	COLLECTN	DATE REC	EXT/PREP	ANALYSIS
IR88-TNK01							
TOTAL DISSOLVED SOLI	007	W	97GSD114	05/19/97	05/20/97	05/23/97	05/23/97
TOTAL SUSPENDED SOLI	007	W	97GSS095	05/19/97	05/20/97	05/23/97	05/23/97
IR93-MW03-01							
BOD 5 DAY	012	W	97GBD134	05/20/97	05/21/97	05/22/97	05/22/97
CHLORIDE BY IC	012	W	97GIC110	05/20/97	05/21/97	05/21/97	05/21/97
CHLORIDE BY IC	012 REP	W	97GIC110	05/20/97	05/21/97	05/21/97	05/21/97
CHLORIDE BY IC	012 MS	W	97GIC113	05/20/97	05/21/97	05/22/97	05/22/97
CHLORIDE BY IC	012 MSD	W	97GIC110	05/20/97	05/21/97	05/21/97	05/21/97
NITRITE BY IC	012	W	97GIC110	05/20/97	05/21/97	05/21/97	05/21/97
NITRITE BY IC	012 REP	W	97GIC110	05/20/97	05/21/97	05/21/97	05/21/97
NITRITE BY IC	012 MS	W	97GIC110	05/20/97	05/21/97	05/21/97	05/21/97
NITRATE BY IC	012	W	97GIC110	05/20/97	05/21/97	05/21/97	05/21/97
NITRATE BY IC	012 REP	W	97GIC110	05/20/97	05/21/97	05/21/97	05/21/97
SULFATE BY IC	012	W	97GIC110	05/20/97	05/21/97	05/21/97	05/21/97
SULFATE BY IC	012 REP	W	97GIC110	05/20/97	05/21/97	05/21/97	05/21/97
SULFATE BY IC	012 MS	W	97GIC113	05/20/97	05/21/97	05/22/97	05/22/97
SULFATE BY IC	012 MSD	W	97GIC110	05/20/97	05/21/97	05/21/97	05/21/97
FERROUS IRON	012	W	97GMC137	05/20/97	05/21/97	05/21/97	05/21/97
SULFIDE	012	W	97GSF037	05/20/97	05/21/97	05/27/97	05/27/97
SULFIDE	012 REP	W	97GSF037	05/20/97	05/21/97	05/27/97	05/27/97
SULFIDE	012 MS	W	97GSF037	05/20/97	05/21/97	05/27/97	05/27/97
SUB-OUT TEST FOR SUB	012	W		05/20/97	05/21/97		
TOTAL DISSOLVED SOLI	012	W	97GSD114	05/20/97	05/21/97	05/23/97	05/23/97
TOTAL SUSPENDED SOLI	012	W	97GSS095	05/20/97	05/21/97	05/23/97	05/23/97
TOTAL SUSPENDED SOLI	012 REP	W	97GSS095	05/20/97	05/21/97	05/23/97	05/23/97
TOTAL SUSPENDED SOLI	012 MS	W	97GSS095	05/20/97	05/21/97	05/23/97	05/23/97

LAB QC:

TOTAL DISSOLVED SOLI	LCS BS	W	97GSD114	N/A	N/A	05/23/97	05/23/97
TOTAL DISSOLVED SOLI	LCS BSD	W	97GSD114	N/A	N/A	05/23/97	05/23/97
TOTAL DISSOLVED SOLI	MB1	W	97GSD114	N/A	N/A	05/23/97	05/23/97

Recra LabNet - Chicago  
 INORGANIC ANALYTICAL DATA PACKAGE FOR  
 Baker-Lejeune #356

LOT # :9705G765

CLIENT ID /ANALYSIS	SAMPLE #	MTX	PREP #	COLLECTN	DATE REC	EXT/PREP	ANALYSIS
TOTAL SUSPENDED SOLI	LCS BS	W	97GSS095	N/A	N/A	05/23/97	05/23/97
TOTAL SUSPENDED SOLI	LCS BSD	W	97GSS095	N/A	N/A	05/23/97	05/23/97
TOTAL SUSPENDED SOLI	MB1	W	97GSS095	N/A	N/A	05/23/97	05/23/97
BOD 5 DAY	LCS BS	W	97GBD134	N/A	N/A	05/22/97	05/22/97
BOD 5 DAY	LCS BSD	W	97GBD134	N/A	N/A	05/22/97	05/22/97
BOD 5 DAY	MB1	W	97GBD134	N/A	N/A	05/22/97	05/22/97
BROMIDE BY IC	LCS BS	W	97GIC110	N/A	N/A	05/21/97	05/21/97
BROMIDE BY IC	LCS BSD	W	97GIC110	N/A	N/A	05/21/97	05/21/97
CHLORIDE BY IC	LCS BS	W	97GIC110	N/A	N/A	05/21/97	05/21/97
CHLORIDE BY IC	LCS BSD	W	97GIC110	N/A	N/A	05/21/97	05/21/97
NITRITE BY IC	LCS BS	W	97GIC110	N/A	N/A	05/21/97	05/21/97
NITRITE BY IC	LCS BSD	W	97GIC110	N/A	N/A	05/21/97	05/21/97
NITRATE BY IC	LCS BS	W	97GIC110	N/A	N/A	05/21/97	05/21/97
NITRATE BY IC	LCS BSD	W	97GIC110	N/A	N/A	05/21/97	05/21/97
PHOSPHATE BY IC	LCS BS	W	97GIC110	N/A	N/A	05/21/97	05/21/97
PHOSPHATE BY IC	LCS BSD	W	97GIC110	N/A	N/A	05/21/97	05/21/97
SULFATE BY IC	LCS BS	W	97GIC110	N/A	N/A	05/21/97	05/21/97
SULFATE BY IC	LCS BSD	W	97GIC110	N/A	N/A	05/21/97	05/21/97
BROMIDE BY IC	MB1	W	97GIC110	N/A	N/A	05/21/97	05/21/97
CHLORIDE BY IC	MB1	W	97GIC110	N/A	N/A	05/21/97	05/21/97
NITRITE BY IC	MB1	W	97GIC110	N/A	N/A	05/21/97	05/21/97
NITRATE BY IC	MB1	W	97GIC110	N/A	N/A	05/21/97	05/21/97
PHOSPHATE BY IC	MB1	W	97GIC110	N/A	N/A	05/21/97	05/21/97
SULFATE BY IC	MB1	W	97GIC110	N/A	N/A	05/21/97	05/21/97
BROMIDE BY IC	LCS BS	W	97GIC113	N/A	N/A	05/22/97	05/22/97
BROMIDE BY IC	LCS BSD	W	97GIC113	N/A	N/A	05/22/97	05/22/97
CHLORIDE BY IC	LCS BS	W	97GIC113	N/A	N/A	05/22/97	05/22/97
CHLORIDE BY IC	LCS BSD	W	97GIC113	N/A	N/A	05/22/97	05/22/97
NITRITE BY IC	LCS BS	W	97GIC113	N/A	N/A	05/22/97	05/22/97
NITRITE BY IC	LCS BSD	W	97GIC113	N/A	N/A	05/22/97	05/22/97
NITRATE BY IC	LCS BS	W	97GIC113	N/A	N/A	05/22/97	05/22/97
NITRATE BY IC	LCS BSD	W	97GIC113	N/A	N/A	05/22/97	05/22/97
PHOSPHATE BY IC	LCS BS	W	97GIC113	N/A	N/A	05/22/97	05/22/97
PHOSPHATE BY IC	LCS BSD	W	97GIC113	N/A	N/A	05/22/97	05/22/97
SULFATE BY IC	LCS BS	W	97GIC113	N/A	N/A	05/22/97	05/22/97
SULFATE BY IC	LCS BSD	W	97GIC113	N/A	N/A	05/22/97	05/22/97
BROMIDE BY IC	MB1	W	97GIC113	N/A	N/A	05/22/97	05/22/97
CHLORIDE BY IC	MB1	W	97GIC113	N/A	N/A	05/22/97	05/22/97
NITRITE BY IC	MB1	W	97GIC113	N/A	N/A	05/22/97	05/22/97
NITRATE BY IC	MB1	W	97GIC113	N/A	N/A	05/22/97	05/22/97

Recra LabNet - Chicago  
INORGANIC ANALYTICAL DATA PACKAGE FOR  
Baker-Lejeune #356

LOT # :9705G765

CLIENT ID /ANALYSIS	SAMPLE #	MTX	PREP #	COLLECTN	DATE REC	EXT/PREP	ANALYSIS
PHOSPHATE BY IC	MB1	W	97GIC113	N/A	N/A	05/22/97	05/22/97
SULFATE BY IC	MB1	W	97GIC113	N/A	N/A	05/22/97	05/22/97
SULFIDE	LCS BS	W	97GSF037	N/A	N/A	05/27/97	05/27/97
SULFIDE	LCS BSD	W	97GSF037	N/A	N/A	05/27/97	05/27/97
SULFIDE	MB1	W	97GSF037	N/A	N/A	05/27/97	05/27/97

# **CHAIN OF CUSTODY**

WESTON Analytics Use Only

97056765

# Custody Transfer Record/Lab Work Request



L7

Client Baker Lejeune #356  
 Work Order \_\_\_\_\_  
 Date Rec'd. 5/20/97 Date Due \_\_\_\_\_  
 RFW Contact Rosco Ramirez  
 Client Contact/Phone Matthew Bachman

Refrigerator#	5	8	8	8	8		510	P	8
#/Type Container	2/6-	1/6	1/6	1/P	1/P		3G	1P	1P
Volume	2ml	80-3	80-3	1-P	1-P		40ml	1L	1L
Preservative	AK1			HAC3					Zn Necll
ANALYSES REQUESTED	vol	BNA	PPCB	HSL	TDS		REDD	ISUB	JCM2
	COXA	675H	606H	Hekb	TSS		REHRT		JCS4
									JCEL
									SFD

WESTON Analytics Use Only

Samples Were:  
 1 Shipped or Hand-Delivered FR  
 NOTES:

2 Ambient of Chilled  
 NOTES:

3 Received Broken/Leaking (Improperly Sealed)  
 Y N  
 NOTES:

4 Properly Preserved  
 Y N  
 NOTES:

5 Received Within Holding Times  
 Y N  
 NOTES:

COC Tape Was:  
 1 Present on Outer Package Y N  
 2 Unbroken on Outer Package Y N  
 3 Present on Sample Y N  
 4 Unbroken on Sample Y N  
 NOTES:

COC Record Was:  
 1 Present Upon Receipt of Samples Y N

Discrepancies Between Sample Labels and COC Record?  
 Y N  
 NOTES:

WA Use Only Lab ID	Client ID/Description	Matrix	Date Collected									
001	IR36-6W95-01	W	5/18/97	A-B	C	D						✓
002	IR88-mw97-01 <u>MS/MSD*</u>			A-F								
003	IR88-mw97IW-01			A-B								
004	IR89-mw08IW-01		5/19/97	A-B	C	D						
005	IR89-mw08DW-01			A-B	C	D						
006	<del>IR88</del> TB13		5/18/97	A-B								
007	IR88-TNK01		5/19/97	A-B	C	D	E	F				
008	IR89-mw07IW-02	W	5-20-97	A-B	C	D						
009	L DW			A, B	C	D						
010	GFW		5-19-97	A, B	C	D						
011	L DW			A, B	C	D						
012	IR93-mw03-01		5-20-97	A-B	C	D	E		E-G	H	I	
013	IB-13 TB14		5-19-97	A, B								
014	IR93-mw03IW-01		5-20-97	A, B	C	D	E					

Matrix: W - Water DS - Drum Solids X - Other  
 S - Soil O - Oil DL - Drum Liquids  
 SE - Sediment A - Air F - Fish  
 SO - Solid WI - Wipe L - EP/CLP Leachate

Special Instructions: \* rec'd 3 x vol. for MS/MSD

QC = NFE SC Del = NFE SC D Internal coc

Item/Reason	Relinquished by	Received by	Date	Time	Item/Reason	Relinquished by	Received by	Date	Time
1-7		M. K. H. G.	5/20/97	15:45					
8-14		R. Hawk	5-21-97	12:15					
12 methane	P. Bahnd	FX → SW	5/21/97	14:28					

RFW 21-21-001/A-12/88 12 sub. methane 3 40ml vials to Southw #51

**Weston Environmental Metrics, Inc.**  
**Internal Sample Custody Transfer Record**

RFW Lot#: 97052705

Client: Baker Lejeune #3520

Sample No.	Analysis	Relinquished by:	Received by:	Date	Time	Comments
1-7	GC/MS-VOA	L. Heave	[Signature]	5/20/97	16:40	
12	IC/BCD/Fe2	[Signature]	[Signature]	5/21/97	12:20	
8,14	GC/MS	L. Heave	[Signature]	5/21/97	13:40	
12	IC/BCD/Fe2	Khonasey br.	[Signature]	5/22/97	11:30	
1,4,5,7-12,14	Org	[Signature]	R. P. [Signature]	5/22/97	12:40	
1,4,5,7-12,14	Org	R. P. [Signature]	[Signature]	5/22/97	14:05	
12	IC/BCD	[Signature]	B-D.W.	5-22-97	14:10	
7	Org	L. Heave	B-D.W.	5-23-97	8:34	
12	Soil [Signature]	R. Heave	[Signature]	5-23-97	9:11	
1,4,5,7-12,14	Metals	L. Heave	[Signature]	5-27-97	15:55	
12	Soil [Signature]	[Signature]	R. Heave	5/22/97	11:15	
1,4,5,7-12,14	Metals	[Signature]	Paul [Signature]	5-27-97	18:15	
1,12	GC/MS	[Signature]	L. Heave	5/27/97	11:00	
7,12	ORG	[Signature]	JABergen	5/30/97	14:50	
7,12	ORG	JABergen	[Signature]	5/30/97	16:00	
1,4,5,7,8,9,10,11,12,14	Metals	L. Heave	Cheryl Boyd	6/3/97	17:30	
1,4,5,7,8,9,10,11,12,14	Metals	Cheryl Boyd	L. Heave	6/4/97	15:00	

OK  
5/97



97056765

356-012

# Custody Transfer Record/Lab Work Request



Client <b>Baker Environmental, Inc</b>		Refrigerator #																		
Est. Final Proj. Sampling Date <b>6-16-97</b>		#/Type Container	Liquid																	
Work Order # <b>62476-356</b>		Volume	Solid																	
Project Contact/Phone # <b>MD. Bartman 412-269-2053</b>		Preservatives	Liquid																	
AD Project Manager <b>Bosco Ramirez</b>			Solid																	
OC <b>BOA</b> Del <b>BOA</b> TAT <b>BOA</b>		ANALYSES REQUESTED																		
Date Rec'd _____ Date Due _____																				
Account # _____																				

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													
			MS	MSD				VOA	BNA	Pest/PCB	Herb	INORG									
												Metal	CN								
	001	IR36-GW05-01			W	5/18	1600	X	X												
	002	IR88-MW07-01	X	X	W	5/18	0945	X													
	003	IR88-MW07EW-01			W	5/18	1115	X													
	004	IR89-MW08IW-01			W	5/19	1130	X	X												
	005	IR89-MW08DW-01			W	5/19	1415	X	X												
	006	TR12			W	4/21	1430	X													
	007	IR88-TAK01				5/19	1410	X	X	X											

FIELD PERSONNEL: COMPLETE ONLY SHADED AREAS				DATE/REVISIONS:				WESTON Analytics Use Only			
Special Instructions: Airbill # 3558272760				1. T.B. prep date 4/21/97				Samples were: <input checked="" type="checkbox"/> Shipped or <input checked="" type="checkbox"/> Hand Delivered			
				2. _____				COC Tape was: 1) Present on Outer Package <input checked="" type="checkbox"/> Y or N			
				3. _____				Airbill # _____			
				4. 3.9% 4.8% cooler				2) Ambient or Chilled <input checked="" type="checkbox"/> Y or N			
				5. _____				3) Received in Good Condition <input checked="" type="checkbox"/> Y or N			
				6. _____				3) Present on Sample Y or N			
								4) Labels Indicate Properly Preserved <input checked="" type="checkbox"/> Y or N			
								4) Unbroken on Sample Y or N			
								5) Received Within Holding Times <input checked="" type="checkbox"/> Y or N			
								COC Record Present Upon Sample Rec'l <input checked="" type="checkbox"/> Y or N			

Relinquished by	Received by	Date	Time	Relinquished by	Received by	Date	Time
APT	Fed-Ex	5/19/97	1800				
	APC	5/20/97	1540				

WESTON Analytics Use Only

97050765

# 356-013 Custody Transfer Record/Lab Work Request



Page \_\_\_ of \_\_\_

Client <b>Baker Environmental, Inc.</b>		Refrigerator #																		
Est. Final Proj. Sampling Date <b>6-16-97</b>		#/Type Container		Liquid																
Work Order # <b>62470-356</b>		Volume		Solid																
Project Contact/Phone # <b>M.D. Bertman 412-269-2053</b>		Preservatives		Liquid																
AD Project Manager <b>Bosco Rameriz</b>		ANALYSES REQUESTED		Solid																
QC <b>BOA</b> Del <b>BOA</b> TAT <b>BOA</b>		ORGANIC																		
Date Rec'd _____ Date Due _____		INORG																		
Account # _____		Metal																		
		CN																		
		Methand																		
		Nat. Atten Parameters																		
		Sulfide																		

MATRIX CODES: S - Soil SE - Sediment SO - Solid SL - Sludge W - Water O - Oil A - Air DS - Drum DL - Drum L - EP TCLP WI - Wipe X - Other F - Fish	Lab ID	Client ID/Description	Matrix QC Chosen (✓)		Matrix	Date Collected	Time Collected	WESTON Analytics Use Only													
			MS	MSD				VOA	BNA	Pest/PCB	Herb	Metal	CN	Methand	Nat. Atten Parameters	Sulfide					
	008	IR89-MW07IW-02			W	5/20	1035	X	X						X						
	009	IR89-MW07DW-02			W	5/20	1105	X	X						X						
	010	IR89-MW06IW-02			W	5/19	1645	X	X						X						
	011	IR89-MW06DW-02			W	5/19	1750	X	X						X						
	012	IR93-MW03-01			W	5/20	1445	X	X						X	X	X	X			
	013	TB13			W	5/16	1445	X													
	014	IR93-MW03IW-01			W	5/20	1645	X	X	X					X						

<b>FIELD PERSONNEL: COMPLETE ONLY SHADED AREAS</b> Special Instructions: <b>Airbill # 3558272723</b> Nat. Atten. Parameters include: Nitrate, Nitrite, Sulfate, Chloride, Fe <sup>+2</sup>	<b>DATE/REVISIONS:</b> 1. <b>TB Prep Date 051697</b> 2. _____ 3. _____ 4. <b>2.0: ccccl 2.7: ccccl</b> 5. _____ 6. _____	<b>WESTON Analytics Use Only</b> Samples were: 1) Shipped or Hand Delivered Airbill # <b>Fdx</b> 2) Ambient or Chilled 3) Received in Good Condition 4) Labels Indicate Properly Preserved 5) Received Within Holding Times 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'l (Y or N)
---	--	--

Relinquished by	Received by	Date	Time	Relinquished by	Received by	Date	Time
<b>APT</b>	<b>Fed-Ex</b>	<b>5/20/97</b>	<b>1800</b>				
	<b>Lu Hen</b>	<b>5-21-97</b>	<b>11:45</b>				

Discrepancies Between Samples Labels and COC Record: **X** or **N**  
 NOTES: **See 5/21/97**  
**cc ccccl signature**

RFW#: 9705X765

Sample Discrepancy Report (SDR)

Client: <u>Perkel</u>	Analyses: <u>air</u>
Contact: <u>Larren Wood</u>	Matrix: <u>Water</u> Soil Other
Project: <u>CTD 356</u>	Deliverable Type: (circle) <u>CLP</u> STD SPEC
Phone #: <u>412 269 6000</u>	
FAX #: <u>-2002</u>	

1.a. Type of Sample Discrepancy		COC received: Yes No		Quote from PM: Yes No			
COC / Sample		LOG-IN		Client		Unit	
<input type="checkbox"/> ID Discrepancy	<input type="checkbox"/> Rec'd past hold time	<input type="checkbox"/> Log-in past hold time	<input type="checkbox"/> Changed Analyses	<input type="checkbox"/> Analyzed past hold time			
<input type="checkbox"/> Date Discrepancy	<input type="checkbox"/> Improper Preserv.	<input type="checkbox"/> Log-in Error	<input type="checkbox"/> Improper bottle type	<input type="checkbox"/> Missing sample/extract			
<input type="checkbox"/> Incomplete	<input type="checkbox"/> Missing sample/extract		<input type="checkbox"/> Label unreadable	<input type="checkbox"/> Insufficient sample			
<input type="checkbox"/> Unreadable	<input type="checkbox"/> Container broken		<input type="checkbox"/> Insufficient sample				
<input type="checkbox"/> Cooler temp. _____ C	<input type="checkbox"/> - sample lost						
<input type="checkbox"/> Quote Discrepancy	<input type="checkbox"/> - suspect contamination						
	<input type="checkbox"/> Bubbles in VOA vials						
							EDD

1.b. Lab ID	(COC/Client ID)	Deficiency/Discrepancy	
<u>006</u>	<u>TB12</u>	<u>change to</u>	<u>TB13</u>
<u>013</u>	<u>TB13</u>	<u>change to</u>	<u>TB14</u>

Initiator sign: [Signature]

Date: 5/23/97

2.a. PM Establish Action Plan:			
<input type="checkbox"/> Cancel	<input type="checkbox"/> Bottle/jar replaced	<input type="checkbox"/> Change Test Code from _____ to _____	
<input type="checkbox"/> Add	<input type="checkbox"/> Lid replaced	<input type="checkbox"/> Change Due Date from _____ to _____	
<input type="checkbox"/> Place on hold	<input type="checkbox"/> Analyze samples	<input type="checkbox"/> Include in Case Narrative	
<input type="checkbox"/> Log-in	<input type="checkbox"/> Analyze Past Hold	<input type="checkbox"/> Amend EDD	
<input type="checkbox"/> Subcontract	<input type="checkbox"/> Preserve then Analyze		

2.b. Special Action:		Action Initiator	Action Completion	
Name:		Initial & Date:	Initial & Date:	
<u>login</u>	<u>Please change ID's, copy MK</u>	<u>PB</u>	<u>5/23</u>	<u>5/23/97</u>
<u>login</u>	<u>Please find blue COC copies for 9705X765 &amp; give to Byron</u>	<u>PB</u>	<u>5/23/97</u>	
<u>login</u>	<u>COC #'s for 9705X765 should be 013 &amp; 014 respectively. CO13. per Karen Wood.</u>	<u>PB</u>	<u>5/23/97</u>	

3. Receipt of Copies: (INITIAL AND DATE)

1. GC	4. W.C.
2. GCMS M: <u>5-23-97</u>	5. Digest
3. Metals	6. Extract
Distribution and Copy to QA: <u>5-27 OTAM</u>	

4. PM Final Approval of All Actions Taken:

Send copy to Client

Signature: [Signature] Date: 5/23/97

5. QA For Quality Measurement Only:

[Empty box for QA measurement]

Final Distribution - Attach original to worksheet and send a copy to QA

# **DATA SUMMARY**

To: Baker-Lejeune #356  
Airport Office Park, Bldg. 3  
420 Rouser Road  
Coraopolis, PA 15108

Attn: Ms. Karen Wood

Date: Friday June 20th, 1997

RE: IR93-MW03-01  
Project # 00000-000-000-0000  
Lab ID: 9705G765-012  
Sample Date: 05/20/97  
Date Received: 05/21/97

### Inorganic Data Report

Parameters	Result	Units	Reporting Limit
BOD 5 Day	2	u mg/L	2
Chloride BY IC	9.7	mg/L	0.40
Nitrite-N by IC	0.10	u mg/L	0.10
Nitrate-N by IC	0.10	u mg/L	0.10
Sulfate by IC	11.6	mg/L	0.40
Ferrous Iron	1.5	mg/L	0.050
Sulfide	1.0	u mg/L	1.0
Total Dissolved Solid	74	mg/L	10
Total Suspended Solid	4	u mg/L	4

To: Baker-Lejeune #356  
Airport Office Park, Bldg. 3  
420 Rouser Road  
Coraopolis, PA 15108

Date: Friday June 20th, 1997

Project # 00000-000-000-0000  
Lab Batch: 9705G765

Attn: Ms. Karen Wood

### Inorganic Method Blank Data Report

Sample	Lab ID	Parameter	Result	Units	Reporting Limit
Blank 1	97GSD114-MB1	Total Dissolved Solid	10	u mg/L	10
Blank 1	97GSS095-MB1	Total Suspended Solid	4	u mg/L	4
Blank 1	97GBD134-MB1	BOD 5 Day	2	u mg/L	2
Blank 1	97GIC110-MB1	Bromide BY IC	0.10	u mg/L	0.10
		Chloride BY IC	0.20	u mg/L	0.20
		Nitrite-N by IC	0.10	u mg/L	0.10
		Nitrate-N by IC	0.10	u mg/L	0.10
		Phosphate by IC	0.10	u mg/L	0.10
		Sulfate by IC	0.20	u mg/L	0.20
Blank 1	97GIC113-MB1	Bromide BY IC	0.10	u mg/L	0.10
		Chloride BY IC	0.20	u mg/L	0.20
		Nitrite-N by IC	0.10	u mg/L	0.10
		Nitrate-N by IC	0.10	u mg/L	0.10
		Phosphate by IC	0.10	u mg/L	0.10
		Sulfate by IC	0.20	u mg/L	0.20
Blank 1	97GSF037-MB1	Sulfide	1.0	u mg/L	1.0

To: Baker-Lejeune #356  
Airport Office Park, Bldg. 3  
420 Rouser Road  
Coraopolis, PA 15108

Date: Friday June 20th, 1997

Project # 00000-000-000-0000  
Lab Batch: 9705G765

Attn: Ms. Karen Wood

### Inorganic Precision Data Report

Sample	Site ID	Parameter	Initial Result		Replicate	RPD
-012REP	IR93-MW03-01	Chloride BY IC	9.7		9.0	7.6
		Nitrite by IC	0.10	u	0.10	u NC
		Nitrate by IC	0.10	u	0.10	u NC
		Sulfate by IC	11.6		11.2	4.3
		Sulfide	1.0	u	1.0	u NC
		Tot Susp Solids	4	u	4	u NC

To: Baker-Lejeune #356  
Airport Office Park, Bldg. 3  
420 Rouser Road  
Coraopolis, PA 15108

Date: Friday June 20th, 1997

Project # 00000-000-000-0000  
Lab Batch: 9705G765

Attn: Ms. Karen Wood

### Inorganic Accuracy Data Report

Sample	Site ID	Parameter	Spiked Sample	Initial Result	Spiked Amount	% Recov
-012	IR93-MW03-01	Chloride BY IC	60.1	9.7	50.0	101
		Chloride BY IC MSD	51.0	9.7	50.0	82.7
		Nitrite by IC	1.8	0.10	u 2.0	91.9
		Sulfate by IC	55.9	11.6	50.0	88.4
		Sulfate by IC MSD	51.8	11.6	50.0	ε
		Sulfide	4.1	1.0	u 4.0	102
		Tot Susp Solids	93	4	u 100	93.0



To: Baker-Lejeune #356  
Airport Office Park, Bldg. 3  
420 Rouser Road  
Coraopolis, PA 15108

Date: Friday June 20th, 1997

Project # 00000-000-000-0000  
Lab Batch: 9705G765

Attn: Ms. Karen Wood

### Inorganic Duplicate Spike Report

Sample	Site ID	Parameter	Spike #1 % Recov	Spike #2 % Recov	RPD
-012	IR93-MW03-01	Chloride BY IC	101	82.7	19.7
		Sulfate by IC	88.4	80.3	9.6

To: Baker-Lejeune #356  
Airport Office Park, Bldg. 3  
420 Rouser Road  
Coraopolis, PA 15108

Date: Friday June 20th, 1997

Project # 00000-000-000-0000  
Lab Batch: 9705G765

Attn: Ms. Karen Wood

### Inorganic Laboratory Control Standards Report

Lab ID	Parameter	Spiked Amount	Units	Spike #1 % Recov.	Spike #2 % Recov.	RPD
97GSD114-LCS	Tot Diss Sol	250	mg/L	103	102	0.80
97GSS095-LCS	Tot Susp Solids	200	mg/L	95.0	95.8	0.80
97GBD134-LCS	BOD 5 Day	200	mg/L	113	94.6	17.5
97GIC110-LCS	Bromide BY IC	2.0	mg/L	96.6	94.3	2.5
	Chloride BY IC	5.0	mg/L	97.1	95.7	1.5
	Nitrite by IC	2.0	mg/L	97.8	95.7	2.2
	Nitrate by IC	2.0	mg/L	94.8	94.8	0.10
	Phosphate by IC	2.0	mg/L	96.0	96.3	0.30
	Sulfate by IC	5.0	mg/L	99.3	99.5	0.10
97GIC113-LCS	Bromide BY IC	2.0	mg/L	92.4	92.8	0.40
	Chloride BY IC	5.0	mg/L	97.8	97.6	0.20
	Nitrite by IC	2.0	mg/L	96.1	95.8	0.30
	Nitrate by IC	2.0	mg/L	94.0	94.6	0.60
	Phosphate by IC	2.0	mg/L	94.5	94.8	0.40
	Sulfate by IC	5.0	mg/L	91.4	91.4	0.00
97GSF037-LCS	Sulfide	4.0	mg/L	91.8	95.8	4.2

To: Baker-Lejeune #356  
Airport Office Park, Bldg. 3  
420 Rouser Road  
Coraopolis, PA 15108

Attn: Ms. Karen Wood

Date: Friday June 20th, 1997

RE: IR93-MW03-01  
Project # 00000-000-000-0000  
Lab ID: 9705G765-012  
Sample Date: 05/20/97  
Date Received: 05/21/97

### Inorganic Data Report

Parameters	Result	Units	Reporting Limit
BOD 5 Day	2	u mg/L	2
Chloride BY IC	9.7	mg/L	0.40
Nitrite-N by IC	0.10	u mg/L	0.10
Nitrate-N by IC	0.10	u mg/L	0.10
Sulfate by IC	11.6	mg/L	0.40
Ferrous Iron	1.5	mg/L	0.050
Sulfide	1.0	u mg/L	1.0
Total Dissolved Solid	74	mg/L	10
Total Suspended Solid	4	u mg/L	4

To: Baker-Lejeune #356  
Airport Office Park, Bldg. 3  
420 Rouser Road  
Coraopolis, PA 15108

Date: Friday June 20th, 1997

Project # 00000-000-000-0000  
Lab Batch: 9705G765

Attn: Ms. Karen Wood

### Inorganic Method Blank Data Report

Sample	Lab ID	Parameter	Result	Units	Reporting Limit
Blank 1	97GSD114-MB1	Total Dissolved Solid	10	u mg/L	10
Blank 1	97GSS095-MB1	Total Suspended Solid	4	u mg/L	4
Blank 1	97GBD134-MB1	BOD 5 Day	2	u mg/L	2
Blank 1	97GIC110-MB1	Bromide BY IC	0.10	u mg/L	0.10
		Chloride BY IC	0.20	u mg/L	0.20
		Nitrite-N by IC	0.10	u mg/L	0.10
		Nitrate-N by IC	0.10	u mg/L	0.10
		Phosphate by IC	0.10	u mg/L	0.10
		Sulfate by IC	0.20	u mg/L	0.20
		Blank 1	97GIC113-MB1	Bromide BY IC	0.10
Chloride BY IC	0.20			u mg/L	0.20
Nitrite-N by IC	0.10			u mg/L	0.10
Nitrate-N by IC	0.10			u mg/L	0.10
Phosphate by IC	0.10			u mg/L	0.10
Sulfate by IC	0.20			u mg/L	0.20
Blank 1	97GSF037-MB1	Sulfide	1.0	u mg/L	1.0

To: Baker-Lejeune #356  
Airport Office Park, Bldg. 3  
420 Rouser Road  
Coraopolis, PA 15108

Date: Friday June 20th, 1997

Project # 00000-000-000-0000  
Lab Batch: 9705G765

Attn: Ms. Karen Wood

### Inorganic Precision Data Report

Sample	Site ID	Parameter	Initial Result		Replicate	RPD
-012REP	IR93-MW03-01	Chloride BY IC	9.7		9.0	7.6
		Nitrite by IC	0.10	u	0.10	u NC
		Nitrate by IC	0.10	u	0.10	u NC
		Sulfate by IC	11.6		11.2	4.3
		Sulfide	1.0	u	1.0	u NC
		Tot Susp Solids	4	u	4	u NC

To: Baker-Lejeune #356  
Airport Office Park, Bldg. 3  
420 Rouser Road  
Coraopolis, PA 15108

Date: Friday June 20th, 1997

Project # 00000-000-000-0000  
Lab Batch: 9705G765

Attn: Ms. Karen Wood

### Inorganic Accuracy Data Report

Sample	Site ID	Parameter	Spiked Sample	Initial Result	Spiked Amount	% Recov
-012	IR93-MW03-01	Chloride BY IC	60.1	9.7	50.0	101
		Chloride BY IC MSD	51.0	9.7	50.0	82.7
		Nitrite by IC	1.8	0.10	u 2.0	91.9
		Sulfate by IC	55.9	11.6	50.0	88.4
		Sulfate by IC MSD	51.8	11.6	50.0	88.4
		Sulfide	4.1	1.0	u 4.0	102
		Tot Susp Solids	93	4	u 100	93.0

To: Baker-Lejeune #356  
Airport Office Park, Bldg. 3  
420 Rouser Road  
Coraopolis, PA 15108

Date: Friday June 20th, 1997

Project # 00000-000-000-0000  
Lab Batch: 9705G765

Attn: Ms. Karen Wood

### Inorganic Duplicate Spike Report

Sample	Site ID	Parameter	Spike #1 % Recov	Spike #2 % Recov	RPD
-012	IR93-MW03-01	Chloride BY IC	101	82.7	19.7
		Sulfate by IC	88.4	80.3	9.6

To: Baker-Lejeune #356  
Airport Office Park, Bldg. 3  
420 Rouser Road  
Coraopolis, PA 15108

Date: Friday June 20th, 1997

Project # 00000-000-000-0000  
Lab Batch: 9705G765

Attn: Ms. Karen Wood

### Inorganic Laboratory Control Standards Report

Lab ID	Parameter	Spiked Amount	Units	Spike #1 % Recov.	Spike #2 % Recov.	RPD
97GSD114-LCS	Tot Diss Sol	250	mg/L	103	102	0.80
97GSS095-LCS	Tot Susp Solids	200	mg/L	95.0	95.8	0.80
97GBD134-LCS	BOD 5 Day	200	mg/L	113	94.6	17.5
97GIC110-LCS	Bromide BY IC	2.0	mg/L	96.6	94.3	2.5
	Chloride BY IC	5.0	mg/L	97.1	95.7	1.5
	Nitrite by IC	2.0	mg/L	97.8	95.7	2.2
	Nitrate by IC	2.0	mg/L	94.8	94.8	0.10
	Phosphate by IC	2.0	mg/L	96.0	96.3	0.30
	Sulfate by IC	5.0	mg/L	99.3	99.5	0.10
97GIC113-LCS	Bromide BY IC	2.0	mg/L	92.4	92.8	0.40
	Chloride BY IC	5.0	mg/L	97.8	97.6	0.20
	Nitrite by IC	2.0	mg/L	96.1	95.8	0.30
	Nitrate by IC	2.0	mg/L	94.0	94.6	0.60
	Phosphate by IC	2.0	mg/L	94.5	94.8	0.40
	Sulfate by IC	5.0	mg/L	91.4	91.4	0.00
97GSF037-LCS	Sulfide	4.0	mg/L	91.8	95.8	4.2



# CASE NARRATIVE

Recra LabNet - Chicago  
Wet Chemistry Case Narrative

Client: Baker-Lejeune  
RFW lot #: 9705G765

Date Rec'd: 05/20/97

1. This narrative covers the analysis of samples in the above RFW lot number by the following methods.

BOD - EPA Method 405.1

Common Anions by IC Method 300.0:

Chloride

Nitrate-Nitrogen

Nitrite-Nitrogen

Sulfate

Ferrous Iron- Standard Methods 3500 FeD Ferric Iron can be obtained by subtracting this result from the total Iron result.

Total Dissolved Solids (TDS)- EPA Method 160.1

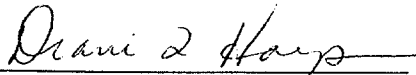
Total Suspended Solids (TSS)- EPA Method 160.2

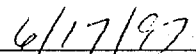
Sulfide - EPA Method 376.1

2. All established hold times were met.
3. Initial and continuing calibration criteria were met for analysis requiring calibration.
4. All method blanks were below the detection limits.
5. The LCSs analyzed with these samples were all within the Recra LabNet statistical acceptance limits, shown in the table below. Please see the LCS summary pages of this report for details.

Parameter	LCL %	UCL %	RPD %
BOD	60	145	21
Sulfate	85	107	10
Ferrous Iron	80	120	20
Nitrate, Nitrogen	85	107	10
Nitrite, Nitrogen	89	103	10
Chloride	87	118	10
Sulfide	69	113	13
TDS	73	119	13
TSS	81	115	10

6. One of the chloride matrix spikes was low at 82.7% recovery and one of the sulfate spike recoveries was also low at 80.3%. The ferrous iron matrix QC only appears in the raw data due to computer limitations. No matrix QC was done for BOD, and no NO<sub>3</sub> spike was done. Please refer to the precision and accuracy pages for details.

  
\_\_\_\_\_  
Diane L. Harper  
Wet Chemistry Section Manager

  
\_\_\_\_\_  
Date



RECRA  
LabNet

a division of Recra Environmental, Inc.

Virtual Laboratories Everywhere

June 18, 1997

Ms. Karen Wood  
Baker Environmental, Inc.  
Airport Office Park, Bldg. 3  
420 Rouser Road  
Coraopolis, PA 15108

RE: Baker - Camp Lejeune #356  
Analytical Report & EDD  
Lot # 9705G765

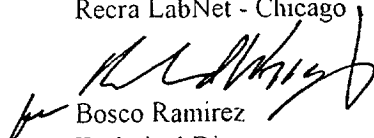
Dear Ms. Wood:

The enclosed analytical report and electronic deliverable are for the project and lot number listed above. The Methane analysis was performed by Southwest Research Institute.

On May 23rd, 1997 the Weston Environmental Metrics Division was purchased by Recra Environmental, Inc. Please note that analytical data reports may contain references to Weston, Weston Environmental Metrics and/or EMI. We are working diligently to change all references on forms and other sections of data packages to Recra as part of our continuing efforts to ensure a seamless transition for you, our valued client.

Recra is confident that you will continue to receive the same high quality service which you have received from Weston. If you have any questions concerning this report or our change in ownership, please contact me 708-534-5200.

Sincerely,  
Recra LabNet - Chicago

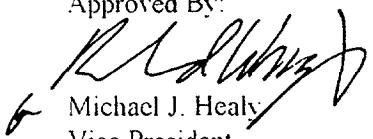
  
Bosco Ramirez  
Technical Director

jb

Enclosures

cc/enc: Heartland

Approved By:

  
Michael J. Healy  
Vice President

The results presented in this report relate only to the analytical testing and conditions of sample at receipt. This report pertains to only those samples actually tested. All pages of this report are integral parts of the analytical data. Therefore, this report should be reproduced only in its entirety.

27

## INORGANIC GLOSSARY OF DATA QUALIFIERS AND ABBREVIATIONS

### Data Qualifiers

- B Result is less than the CRDL, but greater than or equal to the instrument detection limit  
E Result is estimated due to interference  
M Analyte concentrations are greater than the CRDL, and the RSD of duplicate injections was greater than 20%  
N Matrix spike recovery was outside the control limits  
S Result was determined by the Method of Standard Additions (MSA)  
T Analyte was found in the TCLP extraction blank and sample  
u Analyte was not detected at or above the reporting limit  
W Post-digestion spike was outside 85-115% control limits, sample absorbance is less than 50% of spike absorbance  
+ MSA correlation coefficient is less than 0.995  
\* Duplicate analysis was outside the control limits

### Abbreviations

- A Analyzed by flame A.A. direct aspiration  
Batch Identifies a specific extraction, digestion or preparation set (equivalent to prep batch)  
BS Blank spike analysis was conducted on reagent grade water or a matrix free from the analyte of interest  
BSD Blank spike duplicate  
BRL Below reporting limit  
C Cyanide analyte flag on CLP form  
CCB Continuing calibration blank  
CCV Continuing calibration verification  
CD Calculation factor used by the Laboratory's Information Management System (LIMS)  
CV Analyzed by the cold vapor generation method for Mercury  
Contract Contract laboratory identification code  
DF Dilution factor  
F Analyzed by graphite furnace atomic absorption spectroscopy  
ICB Initial calibration blank  
ICV Initial calibration verification  
LCS/LC Denotes laboratory control standard  
LAB ID The full 12 character Recra laboratory identification number (equivalent to RFW#)  
MB Method blank or (PB) preparation blank  
MS Matrix spike  
MSD Matrix spike duplicate  
NA Not applicable  
NC Non-calculable precision due to insufficient concentration of analyte present in the sample  
NR Not required  
NS Not spiked  
P Analyzed by inductively coupled argon plasma  
REP Replicate analysis  
RFW# The full 12 character Recra laboratory identification number (equivalent to LAB ID)  
RFW Lot The first 8 characters of the RFW#  
RPD Relative percent difference of duplicate analyses (calculated on un-rounded results)  
WO# Work order no. Recra code used to define a specific client, job, phase and task  
X Result obtained indirectly through calculation based on results from other analyses

### NOTES:

- One or a combination of these data qualifiers and abbreviations may appear in the analytical report.
- Soil, sediment and sludge results are reported on a dry weight basis except when analyzed for landfill disposal or incineration parameters. All other results on a solid matrix are reported on an "as received" basis unless noted differently.
- Reporting limits are adjusted for preparation sample size, sample dilution and sample moisture content if analyzed on a dry weight basis.

CHI 22-05-005/D-6/5



**SOUTHWEST RESEARCH INSTITUTE**  
**CLIENT: RECRA ENVIRONMENTAL**  
**SDG: 90383 (9705G977-007)**  
**VTSR: JUNE 3, 1997**

## **CHAIN-OF-CUSTODY**



# Custody Transfer Record/Lab Work Request

RECRA LabNet Use Only  
97056977

Client RECRA LabNet-Chicago  
W.O. # \_\_\_\_\_  
Project Name \_\_\_\_\_  
Date Received 5/31/97 Date Due 6/24/97  
RECRA Project Manager Jeff James  
Client Contact \_\_\_\_\_

Refrigerator #	<u>S/O</u>																			
#/Type Container	<u>3/6</u>																			
Volume	<u>40ml</u>																			
Preservative																				
ANALYSES REQUESTED	<u>Methane</u>																			

RECRA Use Only LAB ID	CLIENT ID/Description	Matrix	Date Collected																	
<u>007</u>	<u>IR93-MW01-01</u>	<u>W</u>	<u>5/30/97</u>	<u>X</u>																<u>Intact</u>
<u>008</u>	<u>MW01IW-01</u>	<u>I</u>	<u>I</u>	<u>I</u>																
<u>009</u>	<u>MW04-01</u>	<u>I</u>	<u>I</u>	<u>I</u>																
<u>011</u>	<u>MW04IW-01</u>	<u>I</u>	<u>I</u>	<u>I</u>																<u>✓</u>

Matrix: W - Water DS - Drum Solids X - Other Special Instructions:  
 S - Soil O - Oil DL - Drum Liquids  
 SE - Sediment A - Air F - Fish  
 SO - Solid WI - Wipe L - EP/TCLP Leachate

Item/Reason	Relinquished by	Received by	Date	Time	Item/Reason	Relinquished by	Received by	Date	Time
<u>S/O</u>	<u>P. Bukhmetev</u>	<u>FX → SW</u>	<u>6/2/97</u>	<u>1650</u>					

RECRA LabNet Use Only

Sample Were:

- Shipped or Hand Delivered  
NOTES FX
- Ambient or Chilled  
NOTES
- Received Broken/Leaking (Improperly Sealed)  
Y N
- Properly Preserved  
Y N  
NOTES
- Received Within Holding Times  
Y N  
NOTES

COC Tape Was:

- Present on Outer Package  
Y N
- Unbroken on Outer Package  
Y N
- Present on Sample  
Y N
- Unbroken on Sample  
Y N  
NOTES

COC Record Was:

- Present Upon Receipt of Samples  
Y N

Discrepancies Between Sample Labels and COC Record?  
Y N

Notes:  
Joe Murray 6/3/97 10:07

**CLIENT: WESTON**  
**SDG: 90383: 9705G977-007**

**SAMPLE DATA**  
**METHOD 3810M**

IA  
**VOLATILE ORGANICS ANALYSIS DATA SHEET**  
**HEADSPACE ANALYSIS BY METHOD 3810(MODIFIED)**

010003

SAMPLE ID

9705G977-007
--------------

*AG*  
*063 6-24-97*

Lab Name: SwRI	Client: WESTON	Project: 01-8680-064
Lab Code: SwRI	Lab System ID: 90383	SDG: 90383
Matrix: Water	Date Received: 06/03/97	Lab File ID: F:061274
Level: Medium	Conc/Dil Factor: 1.00	Date Analyzed: 06/12/97
Headspace vol: 22ml	GC Column: HAYE-SEP D	Detection Limit: 0.65
Injection vol: 1.5ml		Concentration: ug/L

Cas No.	Compound	ug/L
74-82-8	Methane	4.6

DATA QUALIFIERS

- U Indicates compound was analyzed for but not detected. Report the minimum detection limit for the sample with the U (e.g. 10U) based on necessary concentration/dilution action (this is not necessarily the instrument detection limit). The footnote should be read U compound was analyzed for but not detected. The number is the minimum attainable limit for the sample.
- E Concentration exceeds calibration range



1A  
**VOLATILE ORGANICS ANALYSIS DATA SHEET**  
**HEADSPACE ANALYSIS BY METHOD 3810(MODIFIED)**

010006

SAMPLE ID

9705G977-008
--------------

Lab Name: SwRI  
 Lab Code: SwRI  
 Matrix: Water  
 Level: Medium  
 Headspace vol: 22ml  
 Injection vol: 1.5ml

Client: WESTON  
 Lab System ID: 90384  
 Date Received: 06/03/97  
 Conc/Dil Factor: 1.00  
 GC Column: HAYE-SEP D

Project: 01-8680-064 <sup>063 A6</sup> <sub>6.24 97</sub>  
 SDG: 90383  
 Lab File ID: F:061275  
 Date Analyzed: 06/12/97  
 Detection Limit: 0.65  
 Concentration: ug/L

Cas No.	Compound	ug/L
74-82-8	Methane	108.6 E

DATA QUALIFIERS

- U Indicates compound was analyzed for but not detected. Report the minimum detection limit for the sample with the U (e.g. 10U) based on necessary concentration/dilution action (this is not necessarily the instrument detection limit). The footnote should be read U compound was analyzed for but not detected. The number is the minimum attainable limit for the sample.
- E Concentration exceeds calibration range

1A  
**VOLATILE ORGANICS ANALYSIS DATA SHEET**  
**HEADSPACE ANALYSIS BY METHOD 3810(MODIFIED)**

**010009**

SAMPLE ID

9705G977-008DL
----------------

Lab Name: SwRI  
 Lab Code: SwRI  
 Matrix: Water  
 Level: Medium  
 Headspace vol: 22ml  
 Injection vol: 0.5ml

Client: WESTON  
 Lab System ID: 90384  
 Date Received: 06/03/97  
 Conc/Dil Factor: 3.00  
 GC Column: HAYE-SEP D

Project: 01-8680-~~064~~ <sup>063 AG</sup> 6-24-97  
 SDG: 90383 <sub>sc 6/12/97</sub>  
 Lab File ID: F:0612756  
 Date Analyzed: 06/12/97  
 Detection Limit: 0.65  
 Concentration: ug/L

Cas No.	Compound	ug/L
74-82-8	Methane	102.8

DATA QUALIFIERS

- U Indicates compound was analyzed for but not detected. Report the minimum detection limit for the sample with the U (e.g. 10U) based on necessary concentration/dilution action (this is not necessarily the instrument detection limit). The footnote should be read U compound was analyzed for but not detected. The number is the minimum attainable limit for the sample.
- E Concentration exceeds calibration range

1A  
**VOLATILE ORGANICS ANALYSIS DATA SHEET**  
**HEADSPACE ANALYSIS BY METHOD 3810(MODIFIED)**

010012

SAMPLE ID

9705G977-009

*AG*  
*0636-24-97*

Lab Name: SwRI	Client: WESTON	Project: 01-8680- <del>064</del>
Lab Code: SwRI	Lab System ID: 9038 <del>45</del> <i>26/12/97</i>	SDG: 90383
Matrix: Water	Date Received: 06/03/97	Lab File ID: F:061277
Level: Medium	Conc/Dil Factor: 1.00	Date Analyzed: 06/12/97
Headspace vol: 22ml	GC Column: HAYE-SEP D	Detection Limit: 0.65
Injection vol: 1.5ml		Concentration: ug/L

Cas No.	Compound	ug/L
74-82-8	Methane	3.8

DATA QUALIFIERS

- U Indicates compound was analyzed for but not detected. Report the minimum detection limit for the sample with the U (e.g. 10U) based on necessary concentration/dilution action (this is not necessarily the instrument detection limit). The footnote should be read U compound was analyzed for but not detected. The number is the minimum attainable limit for the sample.
- E Concentration exceeds calibration range

1A  
**VOLATILE ORGANICS ANALYSIS DATA SHEET**  
**HEADSPACE ANALYSIS BY METHOD 3810(MODIFIED)**

010015

SAMPLE ID

9705G977-011
--------------

Lab Name: SwRI	Client: WESTON	Project: 01-8680- <del>064</del> <sup>063 A6</sup> 6-24-97
Lab Code: SwRI	Lab System ID: 90386	SDG: 90383
Matrix: Water	Date Received: 06/03/97	Lab File ID: F:061278
Level: Medium	Conc/Dil Factor: 1.00	Date Analyzed: 06/12/97
Headspace vol: 22ml	GC Column: HAYE-SEP D	Detection Limit: 0.65
Injection vol: 1.5ml		Concentration: ug/L

Cas No.	Compound	ug/L
74-82-8	Methane	27.7

DATA QUALIFIERS

- U Indicates compound was analyzed for but not detected. Report the minimum detection limit for the sample with the U (e.g. 10U) based on necessary concentration/dilution action (this is not necessarily the instrument detection limit). The footnote should be read U compound was analyzed for but not detected. The number is the minimum attainable limit for the sample.
- E Concentration exceeds calibration range

**SOUTHWEST RESEARCH INSTITUTE**  
**CLIENT: RECRA ENVIRONMENTAL**  
**SDG: 90428 (9706G009-007)**  
**VTSR: JUNE 4, 1997**

## **CHAIN-OF-CUSTODY**



**CLIENT: WESTON**  
**SDG: 90428: 9706G009-007**

**VOLATILES ANALYSIS**  
**METHOD 3810M**

**CLIENT: WESTON**  
**SDG: 90428: 9706G009-007**

**QC SUMMARY**  
**METHOD 3810M**





**CLIENT: WESTON**  
**SDG: 90428: 9706G009-007**

**SAMPLE DATA**  
**METHOD 3810M**

1A  
VOLATILE ORGANICS ANALYSIS DATA SHEET  
HEADSPACE ANALYSIS BY METHOD 3810(MODIFIED)

010002

IR93.MWDZ.01

SAMPLE ID

9706G009-007

Lab Name: SwRI  
Lab Code: SwRI  
Matrix: Water  
Level: Medium  
Headspace vol: 22ml  
Injection vol: 1.5ml  
Client: WESTON  
Lab System ID: 90428  
Date Received: 06/04/97  
Conc/Dil Factor: 1.00  
GC Column: HAYE-SEP D  
Project: 01-8680-064 <sup>063 AG</sup> <sub>6-24-97</sub>  
SDG: 90428  
Lab File ID: F:061279  
Date Analyzed: 06/12/97  
Detection Limit: 0.65  
Concentration: ug/L

Cas No.	Compound	ug/L
74-82-8	Methane	28.4

DATA QUALIFIERS

- U Indicates compound was analyzed for but not detected. Report the minimum detection limit for the sample with the U (e.g. 10U) based on necessary concentration/dilution action (this is not necessarily the instrument detection limit). The footnote should be read U compound was analyzed for but not detected. The number is the minimum attainable limit for the sample.
- E Concentration exceeds calibration range

1A  
**VOLATILE ORGANICS ANALYSIS DATA SHEET**  
**HEADSPACE ANALYSIS BY METHOD 3810(MODIFIED)**

**010005**

SAMPLE ID

9706G009-009
--------------

Lab Name: SwRI	Client: WESTON	Project: 01-8680- <sup>063 AG</sup> <del>064</del> 6-24-97
Lab Code: SwRI	Lab System ID: <del>90428</del> 90429 <sup>AG</sup>	SDG: 90428
Matrix: Water	Date Received: 06/04/97 <sup>6-24-97</sup>	Lab File ID: F:0612710
Level: Medium	Conc/Dil Factor: 1.00	Date Analyzed: 06/12/97
Headspace vol: 22ml	GC Column: HAYE-SEP D	Detection Limit: 0.65
Injection vol: 1.5ml		Concentration: ug/L

Cas No.	Compound	ug/L
74-82-8	Methane	51.5

DATA QUALIFIERS

- U Indicates compound was analyzed for but not detected. Report the minimum detection limit for the sample with the U (e.g. 10U) based on necessary concentration/dilution action (this is not necessarily the instrument detection limit). The footnote should be read U compound was analyzed for but not detected. The number is the minimum attainable limit for the sample.
- E Concentration exceeds calibration range

**SOUTHWEST RESEARCH INSTITUTE**  
**CLIENT: RECRA ENVIRONMENTAL**  
**SDG: 89858 (9705G765-012)**  
**VTSR: MAY 22, 1997**

## **CHAIN-OF-CUSTODY**



**CLIENT: WESTON (EMI)**  
**SDG: 89858: 9705G765-012**

**VOLATILES ANALYSIS**  
**METHOD 3810M**

**CLIENT: WESTON (EMI)**  
**SDG: 89858: 9705G765-012**

**QC SUMMARY**  
**METHOD 3810M**



4A  
 SOUTHWEST RESEARCH INSTITUTE  
 VOLATILE METHOD BLANK SUMMARY



VBLK 01
---------

Lab Name: Southwest Research Institute  
 Lab Code: SwRI Case: WESTON  
 Lab File ID: F:052674  
 Date Analyzed: 05/26/97  
 Instrument ID: FID:F

Contract: 01-8680-063  
 SDG: 89858: 9705G765-012  
 Lab Sample ID: VBLK 01  
 Time Analyzed: 13:35

SAMPLE NO.	LAB SAMPLE ID	LAB FILE ID	TIME ANALYZED
1. 9705G765-012	89858	F:052679	14:20
6.			
7.			
8.			
9.			
10.			

Comments:

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**CLIENT: WESTON (EMI)**  
**SDG: 89858: 9705G765-012**

**SAMPLE DATA**  
**METHOD 3810M**

1A  
VOLATILE ORGANICS ANALYSIS DATA SHEET  
HEADSPACE ANALYSIS BY METHOD 3810(MODIFIED)

010002

IR93-MW03-01

SAMPLE ID

9705G765-012

Lab Name: SwRI  
Lab Code: SwRI  
Matrix: Water  
Level: Medium  
Headspace vol: 22ml  
Injection vol: 1.50ml

Client: WESTON  
Lab System ID: 89858  
Date Received: 05/22/97  
Conc/Dil Factor: 1.00  
GC Column: HAYE-SEP D

Project: 01-8680-063  
SDG: 89858  
Lab File ID: F:052679  
Date Analyzed: 05/26/97  
Detection Limit: 0.65  
Concentration: ug/L

Cas No.	Compound	ug/L
74-82-8	Methane	16.14

DATA QUALIFIERS

U

Indicates compound was analyzed for but not detected. Report the minimum detection limit for the sample with the (e.g. 10U) based on necessary concentration/dilution action (this is not necessarily the instrument detection limit). The footnote should be read U compound was analyzed for but not detected. The number is the minimum attainable limit for the sample.

E

Concentration exceeds calibration range

**APPENDIX F**  
**INVESTIGATIVE DERIVED WASTE SUMMARY**

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**Baker**

bcc: AERobb/CF; JWMentz/RPWattras/PRGM r; MDBartman/PJT F; JPTepsic; Daily File  
S.O.# 62470-356-0000-SRN  
Subfile# 8  
Initials *DES*

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

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

September 25, 1996

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

Attn: Ms. Katherine Landman  
Navy Technical Representative  
Code 18232

Re: Contract N62470-89-D-4814  
Navy CLEAN, District III  
Contract Task Order (CTO) 0356  
Operable Unit Nos. 15 and 16  
Sites 88, 89, and 93  
MCB, Camp Lejeune, North Carolina  
IDW Handling and Disposal

Dear Ms. Landman:

This letter describes the activities associated with the management of the investigative-derived waste (IDW) for the recent field activities at Operable Units 15 and 16 (Sites 88, 89, and 93).

Both solid and liquid IDW materials were generated during the investigative activities for the above referenced sites in July and August 1996. The materials were generated during temporary monitoring well installation and groundwater sampling activities. The IDW consisted of approximately 25 cubic yards of soil (total) in two roll-off boxes and approximately 1,350 gallons of purge water (total) in two polyethylene tanks. One roll-off box and a polyethylene tank were located at Camp Gieger next to Building TC-942. The other roll-off box and polyethylene tank were positioned on the north side of Building 25 (MWR Dry Cleaners) located on the main side of the base.

#### **SAMPLE COLLECTION AND ANALYSIS**

As part of the management of the waste material, both soil and purge water have been sampled. The paragraphs which follow describe the collection of the samples from the IDW material and the results of the analysis.

#### **Liquid IDW**

One grab sample was collected from each of the two polyethylene storage tanks. The samples were analyzed for full Target Compound List (TCL) organics and Target Analyte List (TAL) metals.

Ms. Katherine Landman  
September 25, 1996  
Page 2

### Solid IDW

The soil contained in the roll-off boxes was sampled by collecting approximately five to seven grab samples from random locations through out the length of the roll-off boxes. These samples were analyzed for full Toxicity Characteristic Leaching Procedure (TCLP) organics and metals, TCL Polychlorinated biphenyl (PCBs), and Resource Conservation Recovery Act (RCRA) characteristics for defining a hazardous waste.

### SAMPLE RESULTS

Results of the IDW sampling for each of the sites are summarized below. The discussion is separated by site and include both results of liquid and solid IDW material. The original analytical data and a copy of the original chain-of-custody are included in the attachment.

- Site 88 - Liquid IDW

The sample collected from the polyethylene tank at Site 88 was identified as 88-TNK01-01. The analytical results indicate that this IDW sample contained the organic compounds 1,2-dichloroethene at 11 ug/L and tetrachloroethene at 180 ug/L.

- Site 88 - Solid IDW

The composite soil sample collected from the roll-off box at Site 88 was identified as 88-BOX 01-01. The analytical results indicate that the sample is not hazardous based on the characteristics of toxicity, reactivity, ignitability, or corrosivity.

- Sites 89 and 93 - Liquid IDW

One grab sample was collected from the polyethylene tank used to containerize the purge water from Sites 89 and 93. This sample was identified as 89-TNK01-01. The analytical results indicated that this sample did not contain any organic or metal contaminants that were found to be characteristically hazardous.

- Sites 89 and 93 - Solid IDW

A composite soil sample identified as 89-BOX01-01 was collected from the roll-off box at Sites 89 and 93. The analytical results from the sample indicated that the soil is not hazardous based on the characteristics of toxicity, reactivity, ignitability, or corrosivity.

### CONCLUSIONS AND RECOMMENDATIONS

- Liquid IDW

The analytical results of the sample collected from the tank at Site 88 indicated that the IDW contained the organic compounds 1,2-dichloroethene and tetrachloroethene. Due to these detections, the liquid wastes from Site 88 were transported to a treatment plant on base. This was accomplished by coordinating disposal efforts with personnel from MCB, Camp Lejeune and OHM Remediation Services. The purge water was transported

**Baker**

Ms. Katherine Landman  
September 25, 1996  
Page 3

from Site 88 via a vacuum truck and discharged into a collection sump at the groundwater treatment facility located at Lot 203.

Analytical findings on the purge water from Sites 89 and 93 indicated that contaminants were not present above regulatory levels. Therefore, this purge water was returned to the site near Building TC-942.

- Solid IDW

The analytical results of the solid IDW indicate that the waste is nonhazardous. At other sites investigated at MCB, Camp Lejeune where solid IDW has been determined to be nonhazardous and inert, the contents of the roll-off boxes have been returned to the ground and graded off. This is a viable option for these sites, however, it will be necessary to move the roll-off boxes prior to dumping.

The roll-off box at Operable Unit 15 (Site 88) will be transported to Lot 203 and the contents deposited on the ground where it can be graded off. The roll-off box at Operable Unit 16 (Sites 89 and 93) will be transported to the northern portion of Camp Gieger (Site 35) where the roll-off box will be emptied and the soil graded off.

#### SUMMARY

The liquid IDW generated during the investigations of Sites 88, 89, and 93 has been disposed as described. Two roll-off boxes remain at MCB, Camp Lejeune with approximately 25 cubic yards of soil (total). A review of the analytical data, of the soil containerized in the roll-off boxes demonstrates the material is not considered a hazardous waste. A copy of the analytical data is provided in the attachment.

Upon receiving your concurrence in the space provided below, Baker will arrange for the disposal of the soil and the subsequent removal of the roll-off boxes.

\_\_\_\_\_  
Ms. Katherine Landman  
Navy Technical Representative

\_\_\_\_\_  
Date

Baker appreciates the opportunity to serve LANTDIV on this project. If you have any questions, please do not hesitate to contact me at (412) 269-2053.

Sincerely,

BAKER ENVIRONMENTAL, INC.

*Matthew D. Bartman*

Matthew D. Bartman  
Project Manager

MDB/lq

cc: Mr. Neal Paul, MCB, Camp Lejeune (w/attachments)

**ATTACHMENTS**

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1A  
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

88-TNK01-01

Lab Name: WESTON/ENV. METRICS INC.      Contract: 1104-09-001  
 Lab Code: WESTON      Case No.:      SAS No.:      SDG No.: 08G929  
 Matrix: (soil/water) WATER      Lab Sample ID: 9608G929-004  
 Sample wt/vol:      5.000 (g/mL) ML      Lab File ID: ZMC01  
 Level: (low/med) LOW      Date Received: 08/22/96  
 % Moisture: not dec. \_\_\_\_\_      Date Analyzed: 08/23/96  
 GC Column: CAP      ID: 0.53 (mm)      Dilution Factor: 1.0  
 Soil Extract Volume: \_\_\_\_\_ (uL)      Soil Aliquot Volume: \_\_\_\_\_ (uL)

CONCENTRATION UNITS:  
(ug/L or ug/Kg) UG/L

CAS NO.      COMPOUND      Q

74-87-3	-----Chloromethane	10	U
74-83-9	-----Bromomethane	10	U
75-01-4	-----Vinyl Chloride	10	U
75-00-3	-----Chloroethane	10	U
75-09-2	-----Methylene Chloride	10	U
67-64-1	-----Acetone	10	U
75-15-0	-----Carbon Disulfide	10	U
75-35-4	-----1,1-Dichloroethene	10	U
75-34-3	-----1,1-Dichloroethane	10	U
540-59-0	-----1,2-Dichloroethene (total)	11	U
67-66-3	-----Chloroform	10	U
107-06-2	-----1,2-Dichloroethane	10	U
78-93-3	-----2-Butanone	10	U
71-55-6	-----1,1,1-Trichloroethane	10	U
56-23-5	-----Carbon Tetrachloride	10	U
75-27-4	-----Bromodichloromethane	10	U
78-87-5	-----1,2-Dichloropropane	10	U
10061-01-5	-----cis-1,3-Dichloropropene	10	U
79-01-6	-----Trichloroethene	6	J
124-48-1	-----Dibromochloromethane	10	U
79-00-5	-----1,1,2-Trichloroethane	10	U
71-43-2	-----Benzene	10	U
10061-02-6	-----trans-1,3-Dichloropropene	10	U
75-25-2	-----Bromoform	10	U
108-10-1	-----4-Methyl-2-pentanone	10	U
591-78-6	-----2-Hexanone	10	U
127-18-4	-----Tetrachloroethene	180	U
79-34-5	-----1,1,2,2-Tetrachloroethane	10	U
108-88-3	-----Toluene	10	U
108-90-7	-----Chlorobenzene	10	U
100-41-4	-----Ethylbenzene	10	U
100-42-5	-----Styrene	10	U
1330-20-7	-----Xylene (total)	10	U

1B  
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

88-TNK01-01

Lab Name: WESTON/ENV. METRICS, INC. Contract: 1104-09-001

Lab Code: WESTON Case No.: SAS No.: SDG No.: 08G929

Matrix: (soil/water) WATER Lab Sample ID: 9608G929-004

Sample wt/vol: 970.0 (g/mL) ML Lab File ID: GCSA01

Level: (low/med) LOW Date Received: 08/22/96

% Moisture: \_\_\_\_\_ decanted: (Y/N)\_\_\_\_ Date Extracted: 08/23/96

Concentrated Extract Volume: 1000(uL) Date Analyzed: 09/09/96

Injection Volume: 2.0(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH: 6.0

CONCENTRATION UNITS:  
(ug/L or ug/Kg) UG/L

CAS NO. COMPOUND Q

108-95-2-----	Phenol	10	U
111-44-4-----	bis(2-Chloroethyl)ether	10	U
95-57-8-----	2-Chlorophenol	10	U
541-73-1-----	1,3-Dichlorobenzene	10	U
106-46-7-----	1,4-Dichlorobenzene	10	U
95-50-1-----	1,2-Dichlorobenzene	10	U
95-48-7-----	2-Methylphenol	10	U
108-60-1-----	2,2'-oxybis(1-Chloropropane)	10	U
106-44-5-----	4-Methylphenol	10	U
621-64-7-----	N-Nitroso-di-n-propylamine	10	U
67-72-1-----	Hexachloroethane	10	U
98-95-3-----	Nitrobenzene	10	U
78-59-1-----	Isophorone	10	U
88-75-5-----	2-Nitrophenol	10	U
105-67-9-----	2,4-Dimethylphenol	10	U
111-91-1-----	bis(2-Chloroethoxy)methane	10	U
120-83-2-----	2,4-Dichlorophenol	10	U
120-82-1-----	1,2,4-Trichlorobenzene	10	U
91-20-3-----	Naphthalene	10	U
106-47-8-----	4-Chloroaniline	10	U
87-68-3-----	Hexachlorobutadiene	10	U
59-50-7-----	4-Chloro-3-methylphenol	10	U
91-57-6-----	2-Methylnaphthalene	10	U
77-47-4-----	Hexachlorocyclopentadiene	10	U
88-06-2-----	2,4,6-Trichlorophenol	10	U
95-95-4-----	2,4,5-Trichlorophenol	26	U
91-58-7-----	2-Chloronaphthalene	10	U
88-74-4-----	2-Nitroaniline	26	U
131-11-3-----	Dimethylphthalate	10	U
208-96-8-----	Acenaphthylene	10	U
606-20-2-----	2,6-Dinitrotoluene	10	U
99-09-2-----	3-Nitroaniline	26	U
83-32-9-----	Acenaphthene	10	U

1C  
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

88-TNK01-01

Lab Name: WESTON/ENV. METRICS, INC. Contract: 1104-09-001

Lab Code: WESTON Case No.: SAS No.: SDG No.: 08G929

Matrix: (soil/water) WATER Lab Sample ID: 9608G929-004

Sample wt/vol: 970.0 (g/mL) ML Lab File ID: GCSA01

Level: (low/med) LOW Date Received: 08/22/96

% Moisture: \_\_\_\_\_ decanted: (Y/N) \_\_\_\_\_ Date Extracted: 08/23/96

Concentrated Extract Volume: 1000(uL) Date Analyzed: 09/09/96

Injection Volume: 2.0(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH: 6.0

CONCENTRATION UNITS:  
(ug/L or ug/Kg) UG/L

CAS NO.	COMPOUND	Q
---------	----------	---

51-28-5-----	2,4-Dinitrophenol _____	26 U
100-02-7-----	4-Nitrophenol _____	26 U
132-64-9-----	Dibenzofuran _____	10 U
121-14-2-----	2,4-Dinitrotoluene _____	10 U
84-66-2-----	Diethylphthalate _____	10 U
7005-72-3-----	4-Chlorophenyl-phenylether _____	10 U
86-73-7-----	Fluorene _____	10 U
100-01-6-----	4-Nitroaniline _____	26 U
534-52-1-----	4,6-Dinitro-2-methylphenol _____	26 U
86-30-6-----	n-Nitrosodiphenylamine (1) _____	10 U
101-55-3-----	4-Bromophenyl-phenylether _____	10 U
118-74-1-----	Hexachlorobenzene _____	10 U
87-86-5-----	Pentachlorophenol _____	26 U
85-01-8-----	Phenanthrene _____	10 U
120-12-7-----	Anthracene _____	10 U
86-74-8-----	Carbazole _____	10 U
84-74-2-----	Di-n-butylphthalate _____	10 U
206-44-0-----	Fluoranthene _____	10 U
129-00-0-----	Pyrene _____	10 U
85-68-7-----	Butylbenzylphthalate _____	10 U
91-94-1-----	3,3'-Dichlorobenzidine _____	10 U
56-55-3-----	Benzo(a)anthracene _____	10 U
218-01-9-----	Chrysene _____	10 U
117-81-7-----	bis(2-Ethylhexyl)phthalate _____	1 JB
117-84-0-----	Di-n-octylphthalate _____	10 U
205-99-2-----	Benzo(b)fluoranthene _____	10 U
207-08-9-----	Benzo(k)fluoranthene _____	10 U
50-32-8-----	Benzo(a)pyrene _____	10 U
193-39-5-----	Indeno(1,2,3-cd)pyrene _____	10 U
53-70-3-----	Dibenzo(a,h)anthracene _____	10 U
191-24-2-----	Benzo(g,h,i)perylene _____	10 U

(1) - Cannot be separated from Diphenylamine

1D  
PESTICIDE ANALYSIS DATA SHEET

EPA SAMPLE NO.

88-TNK01-01

Lab Name: Roy F. Weston, Inc. Contract: 00000-000-000-0000-00

Lab Code: WESTON Case No.: \_\_\_\_\_ SAS No.: \_\_\_\_\_ SDG No.: \_\_\_\_\_

Matrix: (soil/water) WATER Lab Sample ID: 9608G929-004

Sample wt/vol: 980 (g/mL) ML Lab File ID: 08289615.22

% Moisture: decanted: (Y/N) \_ Date Received: 08/22/96

Extraction: (SepF/Cont/Sonc) CONT Date Extracted: 08/23/96

Concentrated Extract Volume: 10000(uL) Date Analyzed: 08/29/96

Injection Volume: 1.0(uL) Dilution Factor: 1.00

GPC Cleanup: (Y/N) N pH: 6.0 Sulfur Cleanup: (Y/N) N

CONCENTRATION UNITS:  
(ug/L or ug/Kg) ug/L Q

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) <u>ug/L</u>	Q
319-84-6	alpha-BHC	0.051	U
319-85-7	beta-BHC	0.051	U
319-86-8	delta-BHC	0.051	U
58-89-9	gamma-BHC (Lindane)	0.051	U
76-44-8	Heptachlor	0.051	U
309-00-2	Aldrin	0.051	U
1024-57-3	Heptachlor epoxide	0.051	U
959-98-8	Endosulfan I	0.051	U
60-57-1	Dieldrin	0.10	U
72-55-9	4,4'-DDE	0.10	U
72-20-8	Endrin	0.10	U
33213-65-9	Endosulfan II	0.10	U
72-54-8	4,4'-DDD	0.10	U
1031-07-8	Endosulfan sulfate	0.10	U
50-29-3	4,4'-DDT	0.10	U
72-43-5	Methoxychlor	0.51	U
53494-70-5	Endrin ketone	0.10	U
7421-93-4	Endrin aldehyde	0.10	U
5103-71-9	alpha-Chlordane	0.051	U
5103-74-2	gamma-Chlordane	0.051	U
8001-35-2	Toxaphene	5.1	U
12674-11-2	Aroclor-1016	1.0	U
11104-28-2	Aroclor-1221	2.0	U
11141-16-5	Aroclor-1232	1.0	U
53469-21-9	Aroclor-1242	1.0	U
12672-29-6	Aroclor-1248	1.0	U
11097-69-1	Aroclor-1254	1.0	U
11096-82-5	Aroclor-1260	1.0	U

1  
INORGANIC ANALYSES DATA SHEET

G92904

Lab Name: WESTON\_EMI \_\_\_\_\_

Contract: \_\_\_\_\_

Lab Code: WESEMI

Case No.: \_\_\_\_\_

SAS No.: \_\_\_\_\_

SDG No.: G92904

Matrix (soil/water): WATER

Lab Sample ID: 9608G929-004

Level (low/med): LOW\_\_

Date Received: 08/22/96

% Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L\_

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	4860	-	N	P
7440-36-0	Antimony	14.4	U		P
7440-38-2	Arsenic	1.4	U		F
7440-39-3	Barium	27.9	B		P
7440-41-7	Beryllium	0.70	U		P
7440-43-9	Cadmium	2.6	U		P
7440-70-2	Calcium	35900			P
7440-47-3	Chromium	6.5 ± 0.76			P
7440-48-4	Cobalt	3.6	U		P
7440-50-8	Copper	2.9	B		P
7439-89-6	Iron	1560		N	P
7439-92-1	Lead	2.3	B		F
7439-95-4	Magnesium	2940	B		P
7439-96-5	Manganese	37.8			P
7439-97-6	Mercury	0.10	U		CV
7440-02-0	Nickel	8.7	U		P
7440-09-7	Potassium	2650	B		P
7782-49-2	Selenium	1.8	U		F
7440-22-4	Silver	3.1	U		P
7440-23-5	Sodium	9700			P
7440-28-0	Thallium	1.5	U		F
7440-62-2	Vanadium	7.2	B		P
7440-66-6	Zinc	2.3	U		P
	Cyanide				NR

Color Before: COLORLESS      Clarity Before: CLOUDY      Texture: \_\_\_\_\_

Color After: COLORLESS      Clarity After: CLOUDY      Artifacts: \_\_\_\_\_

Comments:  
88-TNK01-01 \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

1A  
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

88-BOX01-01

Lab Name: WESTON/ENV. METRICS INC. Contract: 1104-09-001

Lab Code: WESTON Case No.: SAS No.: SDG No.: 08G929

Matrix: (soil/water) WATER Lab Sample ID: 9608G929-003

Sample wt/vol: 5.000 (g/mL) ML Lab File ID: ZMC02

Level: (low/med) LOW Date Received: 08/22/96

% Moisture: not dec. \_\_\_\_\_ Date Analyzed: 08/29/96

Column: (pack/cap) CAP Dilution Factor: 20.0

CONCENTRATION UNITS:  
(ug/L or ug/Kg) ug/L

CAS NO.	COMPOUND	Q
---------	----------	---

75-01-4-----	Vinyl Chloride	200	U
75-35-4-----	1,1-Dichloroethene	100	U
78-93-3-----	2-Butanone	200	U
67-66-3-----	Chloroform	100	U
56-23-5-----	Carbon Tetrachloride	100	U
71-43-2-----	Benzene	100	U
107-06-2-----	1,2-Dichloroethane	100	U
79-01-6-----	Trichloroethene	100	U
127-18-4-----	Tetrachloroethene	100	U
108-90-7-----	Chlorobenzene	100	U

1B  
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

88-BOX01-01

Lab Name: WESTON/ENV. METRICS, INC.      Contract:  
 Lab Code: WESTON      Case No.:      SAS No.:      SDG No.: 08G929  
 Matrix: (soil/water) WATER      Lab Sample ID: 9608G929-002  
 Sample wt/vol:      100.0 (g/mL) ML      Lab File ID:      DBRG17  
 Level:      (low/med)      LOW      Date Received: 08/22/96  
 % Moisture: not dec. \_\_\_\_\_ dec. \_\_\_\_\_      Date Extracted: 08/30/96  
 Final Volume: 1000      Date Analyzed: 09/12/96  
 GPC Cleanup:      (Y/N) N      pH: 6.0      Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) ug/L	Q
110-86-1-----	Pyridine	500	U
106-46-7-----	1,4-Dichlorobenzene	50	U
95-48-7-----	o-Cresol	60	U
65794-96-9-----	meta & para-Cresol	30	U
67-72-1-----	Hexachloroethane	70	U
98-95-3-----	Nitrobenzene	40	U
87-68-3-----	Hexachlorobutadiene	80	U
88-06-2-----	2,4,6-Trichlorophenol	30	U
95-95-4-----	2,4,5-Trichlorophenol	40	U
121-14-2-----	2,4-Dinitrotoluene	20	U
118-74-1-----	Hexachlorobenzene	30	U
87-86-5-----	Pentachlorophenol	60	U

10  
ORGANICS ANALYSIS SHEET

CLIENT SAMPLE NO.

88-BOX01-01

Lab Name: Roy F. Weston, Inc. Work Order: 00000-000-000-0

Client: Baker-Lejeune #356

Matrix: WATER Lab Sample ID: 9608G929-002

Sample wt/vol: 100 (g/mL) ML Lab File ID: 09129606.43

Level: (low/med) LOW Date Received: 08/22/96

% Moisture: not dec.      dec. Date Extracted: 09/03/96

Extraction: (SepF/Cont/Sonc) CONT Date Analyzed: 09/14/96

GPC Cleanup: (Y/N) N pH: 6.0 Dilution Factor: 10

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) <u>ug/L</u>	
58-89-9-----	gamma-BHC (Lindane)	0.50	U
76-44-8-----	Heptachlor	0.60	U
1024-57-3-----	Heptachlor epoxide	0.80	U
12789-03-6-----	Chlordane	1.0	U
72-20-8-----	Endrin	3.0	U
72-43-5-----	Methoxychlor	7.0	U
8001-35-2-----	Toxaphene	50	U

FORM 1 GC-1

12/88 Rev.



ORGANICS ANALYSIS SHEET

CLIENT SAMPLE NO.

88-BOX01-01

Lab Name: Roy F. Weston, Inc. Work Order: 00000-000-000-0

Client: Baker-Lejeune #356

Matrix: SOIL

Lab Sample ID: 9608G929-001

Sample wt/vol: 30.9 (g/mL) G

Lab File ID: 08299607.48

Level: (low/med) LOW

Date Received: 08/22/96

% Moisture: not dec. 18 dec.

Date Extracted: 08/28/96

Extraction: (SepF/Cont/Sonc) SONC

Date Analyzed: 08/30/96

GPC Cleanup: (Y/N) N pH: 6.0

Dilution Factor: 0.50

CAS NO. COMPOUND CONCENTRATION UNITS:  
(ug/L or ug/Kg) ug/Kg

12674-11-2-----	Aroclor-1016	47	U
11104-28-2-----	Aroclor-1221	47	U
11141-16-5-----	Aroclor-1232	47	U
53469-21-9-----	Aroclor-1242	47	U
12672-29-6-----	Aroclor-1248	47	U
11097-69-1-----	Aroclor-1254	95	U
11096-82-5-----	Aroclor-1260	95	U

FORM 1 GC-1

12/88 Rev.

10  
ORGANICS ANALYSIS SHEET

CLIENT SAMPLE NO.

88-BOX01-01

Lab Name: Roy F. Weston, Inc. Work Order: 00000-000-000-0

Client: Baker-Lejeune #356

Matrix: WATER

Lab Sample ID: 9608G929-002

Sample wt/vol: 100 (g/mL) ML

Lab File ID: 09069631.38

Level: (low/med) LOW

Date Received: 08/22/96

% Moisture: not dec.      dec.

Date Extracted: 09/03/96

Extraction: (SepF/Cont/Sonc) SEPF

Date Analyzed: 09/07/96

GPC Cleanup: (Y/N) N pH: 6.0

Dilution Factor: 10

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) <u>ug/L</u>	
94-75-7-----	2,4-D	100	U
93-72-1-----	2,4,5-TP (Silvex)	10	U

FORM 1 GC-1

12/88 Rev.





1A  
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

89-TNK01-01

Lab Name: WESTON/ENV. METRICS INC.      Contract: 1104-09-001

Lab Code: WESTON      Case No.:      SAS No.:      SDG No.: 08G841

Matrix: (soil/water) WATER      Lab Sample ID: 9608G841-004

Sample wt/vol:      5.000 (g/mL) ML      Lab File ID: ZMA01

Level: (low/med) LOW      Date Received: 08/17/96

% Moisture: not dec. \_\_\_\_\_      Date Analyzed: 08/23/96

GC Column: CAP      ID: 0.53 (mm)      Dilution Factor: 1.0

Soil Extract Volume: \_\_\_\_\_ (uL)      Soil Aliquot Volume: \_\_\_\_\_ (uL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
74-87-3	-----Chloromethane	10	U
74-83-9	-----Bromomethane	10	U
75-01-4	-----Vinyl Chloride	10	U
75-00-3	-----Chloroethane	10	U
75-09-2	-----Methylene Chloride	10	U
67-64-1	-----Acetone	10	U
75-15-0	-----Carbon Disulfide	10	U
75-35-4	-----1,1-Dichloroethene	10	U
75-34-3	-----1,1-Dichloroethane	10	U
540-59-0	-----1,2-Dichloroethene (total)	10	U
67-66-3	-----Chloroform	10	U
107-06-2	-----1,2-Dichloroethane	10	U
78-93-3	-----2-Butanone	10	U
71-55-6	-----1,1,1-Trichloroethane	10	U
56-23-5	-----Carbon Tetrachloride	10	U
75-27-4	-----Bromodichloromethane	10	U
78-87-5	-----1,2-Dichloropropane	10	U
10061-01-5	-----cis-1,3-Dichloropropene	10	U
79-01-6	-----Trichloroethene	10	U
124-48-1	-----Dibromochloromethane	10	U
79-00-5	-----1,1,2-Trichloroethane	10	U
71-43-2	-----Benzene	10	U
10061-02-6	-----trans-1,3-Dichloropropene	10	U
75-25-2	-----Bromoform	10	U
108-10-1	-----4-Methyl-2-pentanone	10	U
591-78-6	-----2-Hexanone	10	U
127-18-4	-----Tetrachloroethene	10	U
79-34-5	-----1,1,2,2-Tetrachloroethane	10	U
108-88-3	-----Toluene	10	U
108-90-7	-----Chlorobenzene	10	U
100-41-4	-----Ethylbenzene	10	U
100-42-5	-----Styrene	10	U
1330-20-7	-----Xylene (total)	14	

1B  
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

89-TNK01-01

Lab Name: WESTON/ENV. METRICS, INC.      Contract:  
 Lab Code: WESTON      Case No.:      SAS No.:      SDG No.: 08G841  
 Matrix: (soil/water) WATER      Lab Sample ID: 9608G841-004  
 Sample wt/vol:      1010 (g/mL) ML      Lab File ID: DBPM05  
 Level: (low/med) LOW      Date Received: 08/17/96  
 % Moisture:      decanted: (Y/N)      Date Extracted: 08/20/96  
 Concentrated Extract Volume:      1000(uL)      Date Analyzed: 08/21/96  
 Injection Volume:      2.0(uL)      Dilution Factor: 1.0  
 GPC Cleanup: (Y/N) N      pH: 7.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
108-95-2	Phenol	10	U
111-44-4	bis(2-Chloroethyl)ether	10	U
95-57-8	2-Chlorophenol	10	U
541-73-1	1,3-Dichlorobenzene	10	U
106-46-7	1,4-Dichlorobenzene	10	U
95-50-1	1,2-Dichlorobenzene	10	U
95-48-7	2-Methylphenol	10	U
108-60-1	2,2'-oxybis(1-Chloropropane)	10	U
106-44-5	4-Methylphenol	10	U
621-64-7	N-Nitroso-di-n-propylamine	10	U
67-72-1	Hexachloroethane	10	U
98-95-3	Nitrobenzene	10	U
78-59-1	Isophorone	10	U
88-75-5	2-Nitrophenol	10	U
105-67-9	2,4-Dimethylphenol	10	U
111-91-1	bis(2-Chloroethoxy)methane	10	U
120-83-2	2,4-Dichlorophenol	10	U
120-82-1	1,2,4-Trichlorobenzene	10	U
91-20-3	Naphthalene	10	U
106-47-8	4-Chloroaniline	10	U
87-68-3	Hexachlorobutadiene	10	U
59-50-7	4-Chloro-3-methylphenol	10	U
91-57-6	2-Methylnaphthalene	10	U
77-47-4	Hexachlorocyclopentadiene	10	U
88-06-2	2,4,6-Trichlorophenol	10	U
95-95-4	2,4,5-Trichlorophenol	25	U
91-58-7	2-Chloronaphthalene	10	U
88-74-4	2-Nitroaniline	25	U
131-11-3	Dimethylphthalate	10	U
208-96-8	Acenaphthylene	10	U
606-20-2	2,6-Dinitrotoluene	10	U
99-09-2	3-Nitroaniline	25	U
83-32-9	Acenaphthene	10	U

1C  
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

89-TNK01-01

Lab Name: WESTON/ENV. METRICS, INC.      Contract:  
 Lab Code: WESTON      Case No.:      SAS No.:      SDG No.: 08G841  
 Matrix: (soil/water) WATER      Lab Sample ID: 9608G841-004  
 Sample wt/vol:      1010 (g/mL) ML      Lab File ID:      DBPM05  
 Level: (low/med)      LOW      Date Received: 08/17/96  
 % Moisture:      \_\_\_\_\_      decanted: (Y/N) \_\_\_\_\_      Date Extracted: 08/20/96  
 Concentrated Extract Volume:      1000(uL)      Date Analyzed: 08/21/96  
 Injection Volume:      2.0(uL)      Dilution Factor: 1.0  
 GPC Cleanup: (Y/N) N      pH: 7.0

CONCENTRATION UNITS:  
(ug/L or ug/Kg) UG/L      Q

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
51-28-5	2,4-Dinitrophenol	25	U
100-02-7	4-Nitrophenol	25	U
132-64-9	Dibenzofuran	10	U
121-14-2	2,4-Dinitrotoluene	10	U
84-66-2	Diethylphthalate	10	U
7005-72-3	4-Chlorophenyl-phenylether	10	U
86-73-7	Fluorene	10	U
100-01-6	4-Nitroaniline	25	U
534-52-1	4,6-Dinitro-2-methylphenol	25	U
86-30-6	n-Nitrosodiphenylamine (1)	10	U
101-55-3	4-Bromophenyl-phenylether	10	U
118-74-1	Hexachlorobenzene	10	U
87-86-5	Pentachlorophenol	25	U
85-01-8	Phenanthrene	10	U
120-12-7	Anthracene	10	U
86-74-8	Carbazole	10	U
84-74-2	Di-n-butylphthalate	10	U
206-44-0	Fluoranthene	10	U
129-00-0	Pyrene	10	U
85-68-7	Butylbenzylphthalate	10	U
91-94-1	3,3'-Dichlorobenzidine	10	U
56-55-3	Benzo(a)anthracene	10	U
218-01-9	Chrysene	10	U
117-81-7	bis(2-Ethylhexyl)phthalate	10	U
117-84-0	Di-n-octylphthalate	10	U
205-99-2	Benzo(b)fluoranthene	10	U
207-08-9	Benzo(k)fluoranthene	10	U
50-32-8	Benzo(a)pyrene	10	U
193-39-5	Indeno(1,2,3-cd)pyrene	10	U
53-70-3	Dibenzo(a,h)anthracene	10	U
191-24-2	Benzo(g,h,i)perylene	10	U

(1) - Cannot be separated from Diphenylamine

ID  
PESTICIDE ANALYSIS DATA SHEET

EPA SAMPLE NO.

89-TNK01-01

Lab Name: Roy F. Weston, Inc. Contract: 00000-000-000-0000-00

Lab Code: WESTON Case No.: \_\_\_\_\_ SAS No.: \_\_\_\_\_ SDG No.: \_\_\_\_\_

Matrix: (soil/water) WATER Lab Sample ID: 9608G841-004

Sample wt/vol: 1010 (g/mL) ML Lab File ID: 08239615.17

% Moisture: \_\_\_\_\_ decanted: (Y/N) \_ Date Received: 08/17/96

Extraction: (SepF/Cont/Sonc) CONT Date Extracted: 08/20/96

Concentrated Extract Volume: 10000(uL) Date Analyzed: 08/25/96

Injection Volume: 1.0(uL) Dilution Factor: 1.00

GPC Cleanup: (Y/N) N pH: 6.0 Sulfur Cleanup: (Y/N) N

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) <u>ug/L</u>	Q
319-84-6	alpha-BHC	0.050	U
319-85-7	beta-BHC	0.050	U
319-86-8	delta-BHC	0.050	U
58-89-9	gamma-BHC (Lindane)	0.050	U
76-44-8	Heptachlor	0.050	U
309-00-2	Aldrin	0.050	U
1024-57-3	Heptachlor epoxide	0.050	U
959-98-8	Endosulfan I	0.050	U
60-57-1	Dieldrin	0.099	U
72-55-9	4,4'-DDE	0.099	U
72-20-8	Endrin	0.099	U
33213-65-9	Endosulfan II	0.099	U
72-54-8	4,4'-DDD	0.099	U
1031-07-8	Endosulfan sulfate	0.099	U
50-29-3	4,4'-DDT	0.099	U
72-43-5	Methoxychlor	0.50	U
53494-70-5	Endrin ketone	0.099	U
7421-93-4	Endrin aldehyde	0.099	U
5103-71-9	alpha-Chlordane	0.050	U
5103-74-2	gamma-Chlordane	0.050	U
8001-35-2	Toxaphene	5.0	U
12674-11-2	Aroclor-1016	0.99	U
11104-28-2	Aroclor-1221	2.0	U
11141-16-5	Aroclor-1232	0.99	U
53469-21-9	Aroclor-1242	0.99	U
12672-29-6	Aroclor-1248	0.99	U
11097-69-1	Aroclor-1254	0.99	U
11096-82-5	Aroclor-1260	0.99	U



1  
INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

G84104

Lab Name: WESTON EMI Contract: \_\_\_\_\_

Lab Code: WESEMI Case No.: \_\_\_\_\_ SAS No.: \_\_\_\_\_ SDG No.: G84104

Matrix (soil/water): WATER Lab Sample ID: 9608G841-004

Level (low/med): LOW Date Received: 08/17/96

% Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	407	-		P
7440-36-0	Antimony	14.4	U		P
7440-38-2	Arsenic	1.4	U		F
7440-39-3	Barium	38.5	B		P
7440-41-7	Beryllium	0.70	U		P
7440-43-9	Cadmium	2.6	U		P
7440-70-2	Calcium	50600			P
7440-47-3	Chromium	3.3	U		P
7440-48-4	Cobalt	3.6	U		P
7440-50-8	Copper	2.0	U		P
7439-89-6	Iron	173			P
7439-92-1	Lead	1.9	B		F
7439-95-4	Magnesium	3690	B		P
7439-96-5	Manganese	29.9			P
7439-97-6	Mercury	0.10	U		CV
7440-02-0	Nickel	8.7	U		P
7440-09-7	Potassium	5290			P
7782-49-2	Selenium	1.8	U		F
7440-22-4	Silver	3.1	U		P
7440-23-5	Sodium	25900			P
7440-28-0	Thallium	1.5	U		F
7440-62-2	Vanadium	2.5	U		P
7440-66-6	Zinc	8.9	B		P
	Cyanide				NR

Color Before: COLORLESS Clarity Before: CLEAR Texture: \_\_\_\_\_

Color After: COLORLESS Clarity After: CLEAR Artifacts: \_\_\_\_\_

Comments:

89-TNK01-01  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

1A  
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

89-BOX01-01

Lab Name: WESTON/ENV. METRICS, INC. Contract: 1104-09-001

Lab Code: WESTON Case No.: SAS No.: SDG No.: 08G841

Matrix: (soil/water) WATER Lab Sample ID: 9608G841-003

Sample wt/vol: 5.000 (g/mL) ML Lab File ID: ZMA05

Level: (low/med) LOW Date Received: 08/17/96

% Moisture: not dec. \_\_\_\_\_ Date Analyzed: 08/27/96

Column: (pack/cap) CAP Dilution Factor: 20.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) ug/L	Q
75-01-4-----	Vinyl Chloride	200	U
75-35-4-----	1,1-Dichloroethene	100	U
78-93-3-----	2-Butanone	200	U
67-66-3-----	Chloroform	100	U
56-23-5-----	Carbon Tetrachloride	100	U
71-43-2-----	Benzene	100	U
107-06-2-----	1,2-Dichloroethane	100	U
79-01-6-----	Trichloroethene	100	U
127-18-4-----	Tetrachloroethene	100	U
108-90-7-----	Chlorobenzene	100	U

1B  
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

89-BOX01-01

Lab Name: WESTON/ENV. METRICS, INC.      Contract:  
 Lab Code: WESTON      Case No.:      SAS No.:      SDG No.: 08G841  
 Matrix: (soil/water) WATER      Lab Sample ID: 9608G841-002  
 Sample wt/vol:      100.0 (g/mL) ML      Lab File ID: DBPM12  
 Level: (low/med) LOW      Date Received: 08/17/96  
 % Moisture: not dec. \_\_\_\_\_ dec. \_\_\_\_\_      Date Extracted: 08/20/96  
 Final Volume: 1000      Date Analyzed: 08/21/96  
 GPC Cleanup: (Y/N) N      pH: 6.0      Dilution Factor: 1.0

CONCENTRATION UNITS:  
(ug/L or ug/Kg) ug/L      Q

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) ug/L	Q
110-86-1-----	Pyridine	500	U
106-46-7-----	1,4-Dichlorobenzene	50	U
95-48-7-----	o-Cresol	60	U
65794-96-9-----	meta & para-Cresol	30	U
67-72-1-----	Hexachloroethane	70	U
98-95-3-----	Nitrobenzene	40	U
87-68-3-----	Hexachlorobutadiene	80	U
88-06-2-----	2,4,6-Trichlorophenol	30	U
95-95-4-----	2,4,5-Trichlorophenol	40	U
121-14-2-----	2,4-Dinitrotoluene	20	U
118-74-1-----	Hexachlorobenzene	30	U
87-86-5-----	Pentachlorophenol	60	U

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ORGANICS ANALYSIS SHEET

CLIENT SAMPLE NO.

89-BOX01-01

Lab Name: Roy F. Weston, Inc. Work Order: 00000-000-000-0

Client: Baker-Lejeune #356

Matrix: WATER

Lab Sample ID: 9608G841-002

Sample wt/vol: 100 (g/mL) ML

Lab File ID: 09019629.89

Level: (low/med) LOW

Date Received: 08/17/96

% Moisture: not dec.      dec.

Date Extracted: 08/22/96

Extraction: (SepF/Cont/Sonc) CONT

Date Analyzed: 09/04/96

GPC Cleanup: (Y/N) N pH: 6.0

Dilution Factor: 10

CAS NO.                      COMPOUND                      CONCENTRATION UNITS:  
(ug/L or ug/Kg) ug/L

58-89-9-----	gamma-BHC (Lindane)	0.50	U
76-44-8-----	Heptachlor	0.60	U
1024-57-3-----	Heptachlor epoxide	0.80	U
12789-03-6-----	Chlordane	1.0	U
72-20-8-----	Endrin	3.0	U
72-43-5-----	Methoxychlor	7.0	U
8001-35-2-----	Toxaphene	50	U

FORM 1 GC-1

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ORGANICS ANALYSIS SHEET

CLIENT SAMPLE NO.

89-BOX01-01

Lab Name: Roy F. Weston, Inc. Work Order: 00000-000-000-0

Client: Baker-Lejeune #356

Matrix: SOIL

Lab Sample ID: 9608G841-001

Sample wt/vol: 30.2 (g/mL) G

Lab File ID: 08269607.81

Level: (low/med) LOW

Date Received: 08/17/96

% Moisture: not dec. 12 dec.

Date Extracted: 08/22/96

Extraction: (SepF/Cont/Sonc) SONC

Date Analyzed: 08/28/96

GPC Cleanup: (Y/N) N pH: 6.0

Dilution Factor: 0.50

CAS NO. COMPOUND CONCENTRATION UNITS:  
(ug/L or ug/Kg) ug/Kg

12674-11-2-----	Aroclor-1016	45	U
11104-28-2-----	Aroclor-1221	45	U
11141-16-5-----	Aroclor-1232	45	U
53469-21-9-----	Aroclor-1242	45	U
12672-29-6-----	Aroclor-1248	45	U
11097-69-1-----	Aroclor-1254	90	U
11096-82-5-----	Aroclor-1260	90	U

FORM 1 GC-1

12/88 Rev.

1  
ORGANICS ANALYSIS SHEET

CLIENT SAMPLE NO.

89-BOX01-01

Lab Name: Roy F. Weston, Inc. Work Order: 00000-000-000-0

Client: Baker-Lejeune #356

Matrix: WATER Lab Sample ID: 9608G841-002

Sample wt/vol: 100 (g/mL) ML Lab File ID: 09029631.67

Level: (low/med) LOW Date Received: 08/17/96

% Moisture: not dec.      dec. Date Extracted: 08/21/96

Extraction: (SepF/Cont/Sonc) SEPF Date Analyzed: 09/05/96

GPC Cleanup: (Y/N) N pH: 6.0 Dilution Factor: 10

CAS NO.                      COMPOUND                      CONCENTRATION UNITS:  
(ug/L or ug/Kg) ug/L

94-75-7-----	2,4-D	100	U
93-72-1-----	2,4,5-TP (Silvex)	10	U

FORM 1 GC-1

12/88 Rev.



Weston Environmental Metrics, Inc.  
 2417 Bond Street  
 University Park, Illinois 60466-3182  
 Phones: (708) 534-5200 (219) 885-7077 (815) 723-7533  
 Fax: (708) 534-5211

To: Baker-Lejeune #356  
 Airport Office Park, Bldg. 3  
 420 Rouser Road  
 Coraopolis, PA 15108

Attn: Mr. Matthew Bartman

Date: Thursday September 12th, 1996  
 RE: 89-BOX01-01  
 Project # 00000-000-000-0000  
 Lab ID: 9608G841-001  
 Sample Date: 08/16/96  
 Date Received: 08/17/96

Inorganic Data Report

Parameters	Result	Units	Reporting Limit
Cyanide, Reactive	0.26	u mg/kg	0.26
Corrosivity by pH	7.2	pH@24.7	0.20
Flash Point, Closed C	>200	DEG F	
Sulfide Reactive	24.0	u mg/kg	24.0

1  
INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

G84102

Lab Name: WESTON\_EMI Contract:

Lab Code: WESEMI Case No.: SAS No.: SDG No.: G84102

Matrix (soil/water): WATER Lab Sample ID: 9608G841-002

Level (low/med): LOW Date Received: 08/17/96

% Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M
7440-38-2	Arsenic	100	U		P
7440-39-3	Barium	500	U		P
7440-43-9	Cadmium	50.0	U		P
7440-47-3	Chromium	50.0	U		P
7439-92-1	Lead	50.0	U		P
7439-97-6	Mercury	10.0	U		CV
7782-49-2	Selenium	100	U		P
7440-22-4	Silver	50.0	U		P

Color Before: COLORLESS Clarity Before: CLEAR Texture:   
 Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments:   
 89-BOX01-01







**Baker**

bcc: PASHucet/CF; JWMentz/PRGM F; MDBartman/PJT F; JPTepsic; Daily File  
S.O.# 62470-356  
Subfile #8  
Initials *MDP*

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

June 19, 1997

(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. Katherine Landman  
Navy Technical Representative  
Code 18232

Re: Contract N62470-89-D-4814  
Navy CLEAN, District III  
Contract Task Order (CTO) 0356  
Operable Unit No. 16 (Sites 89 and 93)  
Phase II Site Investigations  
IDW Handling and Disposal  
MCB Camp Lejeune, North Carolina

Dear Ms. Landman:

This letter report describes sample collection activities, results, and recommendations for the disposal of solid and liquid investigative derived waste (IDW) for Sites 89 and 93, Marine Corps Base, Camp Lejeune, North Carolina. The IDW consists of approximately 20 cubic yards of soil in one roll off box and 5,000 gallons of groundwater stored in a tanker. The material was generated during the Phase II Site Investigation at Sites 89 and 93 in April and May of this year.

### Sample Collection and Analysis

One solid sample was collected from the roll-off-box and was identified as IR89/93-ROB1. The sample was analyzed for Resource Conservation Recovery Act (RCRA) hazardous waste characteristics and Toxicity Characteristic Leaching Procedure (TCLP) list contaminants. In addition, all of the samples were analyzed for polychlorinated byphenels (PCBs)

One liquid sample was collected from the tanker and given the sample identification IR89/93-TNK01. This sample was analyzed by appropriate methods to determine hazardous characteristics. The analyses included the following parameters:

- Target Compound List (TCL) Organics
  - Volatile Organic Contaminants (VOCs)
  - Semivolatile Organic Contaminants (SVOCs)
- Target Analyte List (TAL) Metals
- Total Suspended Solids (TSS)
- Total Dissolved Solids (TDS).

### Solid IDW Results

The sample collected from the roll off box was not found to be reactive to sulfide or cyanide. The flash point was greater than 200 degrees Farenhiet, demonstrating that the sample was not ignitable. The sample was not found



A Total Quality Corporation

**Baker**

Ms. Katherine Landman

June 19, 1997

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to be corrosive, as the pH was not less than 2 or greater than 12 standard units. There were no detections of VOCs, SVOCs, pesticides, or herbicides. PCBs were detected at 62 mg/kg in the sample. This concentration is below the PCB action level of 1 mg/kg as set by the Environmental Protection Agency's (EPA) guidance for PCB contamination. Detections of inorganics were below the established regulatory limits for the TCLP. Results of these analyses are contained in the attachment.

### Liquid IDW Results

Volatile organic compounds, including 1,2-dichloroethene (DCE) and trichloroethene (TCE), were both detected at 6J ug/L. The detection of DCE is below the North Carolina Water Quality Standards (NCWQS) and federal maximum contaminant levels (MCLs), however, TCE slightly exceeded regulatory standards. There were no detections of SVOCs, pesticides, or PCBs in the sample. Several inorganics were detected in the liquid sample, however, only iron, detected at 372 ug/L, exceeded the NCWQS of 300 ug/L. Total dissolved solids (TDS) were detected at 270 mg/L while total suspended solids (TSS) were measured at 20 mg/L in the sample. Results of the analyses are included in the attached.

### Recommendations

The analytical testing of the solid IDW at Sites 89 and 93, which included both RCRA hazardous waste characteristics and TCLP characteristics, demonstrated that the material was non-hazardous. It is recommended that the material be transported to Lot 203 at MCB Camp Lejeune for disposal.

Further, we recommend that the liquid IDW be disposed of at the Lot 203 Groundwater Treatment Facility. Upon LANTDIV's approval of the disposal recommendation, Baker will coordinate disposal activities with personnel at MCB Camp Lejeune and OHM.

Your concurrence with these recommendations can be indicated by signing the space provided below.

\_\_\_\_\_  
Ms. Katherine Landman, Navy Technical Representative

\_\_\_\_\_  
Date

Baker appreciates the opportunity to serve LANTDIV on this project. If you have any questions concerning the IDW disposal recommendations, please do not hesitate to contact me at (412) 269-2053.

Sincerely,

BAKER ENVIRONMENTAL, INC.

*Matthew D. Bartman*

Matthew D. Bartman  
Project Manager

MDB/lq  
Attachment

cc: Ms. Lee Anne Rapp, P.E., Code 18312  
Ms. Beth Collier, Code 02115  
Mr. Neal Paul, Camp Lejeune

1A  
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

IR89/93-ROB1

Lab Name: RECRA LABNET-CHICAGO

Contract:

Lab Code:

Case No.:

SAS No.:

SDG No.: 05G932

Matrix: (soil/water) WATER

Lab Sample ID: 9705G932-003

Sample wt/vol: 5.000 (g/mL) ML

Lab File ID: BQG01

Level: (low/med) LOW

Date Received: 05/29/97

% Moisture: not dec. \_\_\_\_\_

Date Analyzed: 06/06/97

Column: (pack/cap) CAP

Dilution Factor: 20.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) ug/L	Q
75-01-4-----	Vinyl Chloride	200	U
75-35-4-----	1,1-Dichloroethene	100	U
78-93-3-----	2-Butanone	200	U
67-66-3-----	Chloroform	100	U
56-23-5-----	Carbon Tetrachloride	100	U
71-43-2-----	Benzene	100	U
107-06-2-----	1,2-Dichloroethane	100	U
79-01-6-----	Trichloroethene	100	U
127-18-4-----	Tetrachloroethene	100	U
108-90-7-----	Chlorobenzene	100	U

1B  
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

IR89/93-ROB1

Lab Name: RECRA LABNET - CHICAGO      Contract:  
 Lab Code:                      Case No.:                      SAS No.:                      SDG No.: 05G932  
 Matrix: (soil/water) WATER                      Lab Sample ID: 9705G932-002  
 Sample wt/vol:                      100.0 (g/mL) ML                      Lab File ID: GEBH10  
 Level: (low/med)      LOW                      Date Received: 05/29/97  
 % Moisture: not dec. \_\_\_\_\_ dec. \_\_\_\_\_                      Date Extracted: 06/03/97  
 Final Volume: 1000                      Date Analyzed: 06/04/97  
 GPC Cleanup: (Y/N) N                      pH: 7.0                      Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) ug/L	Q
110-86-1-----	Pyridine	500	U
106-46-7-----	1,4-Dichlorobenzene	50	U
95-48-7-----	o-Cresol	60	U
65794-96-9-----	meta & para-Cresol	30	U
67-72-1-----	Hexachloroethane	70	U
98-95-3-----	Nitrobenzene	40	U
87-68-3-----	Hexachlorobutadiene	80	U
88-06-2-----	2,4,6-Trichlorophenol	30	U
95-95-4-----	2,4,5-Trichlorophenol	40	U
121-14-2-----	2,4-Dinitrotoluene	20	U
118-74-1-----	Hexachlorobenzene	30	U
87-86-5-----	Pentachlorophenol	60	U

1D  
ORGANICS ANALYSIS SHEET

CLIENT SAMPLE NO.

IR89/93-ROB1

Lab Name: Recra LabNet                      Work Order: 00000-000-000-0

Client: Baker-Lejeune #356

Matrix: SOIL    Lab Sample ID: 9705G932-001

Sample wt/vol: 30.0 (g/mL) G                      Lab File ID: 06069707.43

Level: (low/med) LOW                                      Date Received: 05/29/97

% Moisture: not dec. 22 dec.                              Date Extracted: 06/03/97

Extraction: (SepF/Cont/Sonc) SONC                      Date Analyzed: 06/08/97

GPC Cleanup: (Y/N) N                                      pH: 8.0                      Dilution Factor: 0.50

CAS NO.                      COMPOUND                      CONCENTRATION UNITS:  
(ug/L or ug/Kg) ug/Kg

12674-11-2-----	Aroclor-1016	51	U
11104-28-2-----	Aroclor-1221	51	U
11141-16-5-----	Aroclor-1232	51	U
53469-21-9-----	Aroclor-1242	62	
12672-29-6-----	Aroclor-1248	51	U
11097-69-1-----	Aroclor-1254	100	U
11096-82-5-----	Aroclor-1260	100	U

1D  
ORGANICS ANALYSIS SHEET

CLIENT SAMPLE NO.

IR89/93-ROB1

Lab Name: Recra LabNet - Chicagoork Order: 00000-000-000-0

Client: Baker-Lejeune #356

Matrix: WATER

Lab Sample ID: 9705G932-002

Sample wt/vol: 100 (g/mL) ML

Lab File ID: 06059732.32

Level: (low/med) LOW

Date Received: 05/29/97

% Moisture: not dec.        dec.

Date Extracted: 06/03/97

Extraction: (SepF/Cont/Sonc) SEPF

Date Analyzed: 06/06/97

GPC Cleanup: (Y/N) N pH: 7.0

Dilution Factor: 10

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) <u>ug/L</u>
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94-75-7-----	2,4-D	100	U
93-72-1-----	2,4,5-TP (Sillvex)	10	U

FORM 1 GC-1

12/88 Rev.



1D  
ORGANICS ANALYSIS SHEET

CLIENT SAMPLE NO.

IR89/93-ROB1

Lab Name: Recra LabNet                      Work Order: 00000-000-000-0

Client: Baker-Lejeune #356

Matrix:                                      WATER                                      Lab Sample ID: 9705G932-002

Sample wt/vol:                      100 (g/mL) ML                                      Lab File ID: 06059730.13

Level:      (low/med) LOW                                      Date Received: 05/29/97

% Moisture: not dec.        dec.                                      Date Extracted: 06/03/97

Extraction:      (SepF/Cont/Sonc)                      CONT                                      Date Analyzed: 06/05/97

GPC Cleanup:      (Y/N) N                                      pH: 7.0                                      Dilution Factor: 10

CAS NO.                      COMPOUND                                      CONCENTRATION UNITS:  
(ug/L or ug/Kg) ug/L

58-89-9-----	gamma-BHC (Lindane)	0.50	U
76-44-8-----	Heptachlor	0.60	U
1024-57-3-----	Heptachlor epoxide	0.80	U
12789-03-6-----	Chlordane	1.0	U
72-20-8-----	Endrin	3.0	U
72-43-5-----	Methoxychlor	7.0	U
8001-35-2-----	Toxaphene	50	U

FORM 1 GC-1

12/88 Rev.



To: Baker-Lejeune #356  
Airport Office Park, Bldg. 3  
420 Rouser Road  
Coraopolis, PA 15108

Date: Wednesday June 11th, 1997

Attn: Ms. Karen Wood

RE: IR89/93-ROB1  
Project # 00000-000-000-0000  
Lab ID: 9705G932-001  
Sample Date: 05/27/97  
Date Received: 05/29/97

### Inorganic Data Report

Parameters	Result	Units	Reporting Limit
Cyanide, Reactive	0.30	u mg/kg	0.30
Corrosivity by pH	9.8	pH@21.2	0.20
Flash Point, Closed C	>200	DEG F	
Sulfide Reactive	26.4	u mg/kg	26.4

1A  
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

IR89/93-TNK01

Lab Name: RECRA LABNET-CHICAGO

Contract:

Lab Code:

Case No.:

SAS No.:

SDG No.: 06G104

Matrix: (soil/water) WATER

Lab Sample ID: 9706G104-001

Sample wt/vol: 5.000 (g/mL) ML

Lab File ID: BRE01

Level: (low/med) LOW

Date Received: 06/03/97

% Moisture: not dec. \_\_\_\_\_

Date Analyzed: 06/10/97

GC Column: CAP ID: 0.53 (mm)

Dilution Factor: 1.0

Soil Extract Volume: \_\_\_\_\_ (uL)

Soil Aliquot Volume: \_\_\_\_\_ (ul)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/l	Q
74-87-3	Chloromethane	10	U
74-83-9	Bromomethane	10	U
75-01-4	Vinyl Chloride	10	U
75-00-3	Chloroethane	10	U
75-09-2	Methylene Chloride	10	U
67-64-1	Acetone	10	U
75-15-0	Carbon Disulfide	10	U
75-35-4	1,1-Dichloroethene	10	U
75-34-3	1,1-Dichloroethane	10	U
540-59-0	1,2-Dichloroethene (total)	6	J
67-66-3	Chloroform	10	U
107-06-7	1,2-Dichloroethane	10	U
78-93-3	2-Butanone	10	U
71-55-6	1,1,1-Trichloroethane	10	U
56-23-5	Carbon Tetrachloride	10	U
75-27-4	Bromodichloromethane	10	U
78-87-5	1,2-Dichloropropane	10	U
10061-01-5	cis-1,3-Dichloropropene	10	U
79-01-6	Trichloroethene	6	J
124-48-1	Dibromochloromethane	10	U
79-00-5	1,1,2-Trichloroethane	10	U
71-43-2	Benzene	10	U
10061-02-6	trans-1,3-Dichloropropene	10	U
75-25-2	Bromoform	10	U
108-10-1	4-Methyl-2-pentanone	10	U
591-78-6	2-Hexanone	10	U
127-18-4	Tetrachloroethene	10	U
79-34-5	1,1,2,2-Tetrachloroethane	10	U
108-88-3	Toluene	10	U
108-90-7	Chlorobenzene	10	U
100-41-4	Ethylbenzene	10	U
100-42-5	Styrene	10	U
1330-20-7	Xylene (total)	10	U

1E  
VOLATILE ORGANICS ANALYSIS DATA SHEET  
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.

1R89/93-TNK01

Lab Name: RECRA LABNET-CHICAGO

Contract:

Lab Code:

Case No.:

SAS No.:

SDG No.: 06G104

Matrix: (soil/water) WATER

Lab Sample ID: 9706G104-001

Sample wt/vol: 5.000 (g/mL) ML

Lab File ID: BRF01

Level: (low/med) LOW

Date Received: 06/03/97

% Moisture: not dec. \_\_\_\_\_

Date Analyzed: 06/10/97

GC Column: CAP ID: 0.53 (mm)

Dilution Factor: 1.0

Soil Extract Volume: \_\_\_\_\_ (uL)

Soil Aliquot Volume: \_\_\_\_\_ (uL)

Number TICs found: 0

CONCENTRATION UNITS:  
(ug/L or ug/Kg) ug/L

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
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1B  
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

Lab Name: RECRA LABNET - CHICAGO

Contract:

IR89/93-TNK01

Lab Code:

Case No.:

SAS No.:

SDG No.: 06G104

Matrix: (soil/water) WATER

Lab Sample ID: 9706G104-001

Sample wt/vol: 1000 (g/mL) ML

Lab File ID: AADH06

Level: (low/med) LOW

Date Received: 06/03/97

% Moisture: \_\_\_\_\_ decanted: (Y/N)\_\_\_

Date Extracted: 06/05/97

Concentrated Extract Volume: 1000(uL)

Date Analyzed: 06/09/97

Injection Volume: 2.0(uL)

Dilution Factor: 1.0

GPC Cleanup: (Y/N) N

pH: 6.0

CONCENTRATION UNITS:  
(ug/L or ug/Kg) UG/L Q

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
108-95-2	Phenol	10	U
111-44-4	bis(2-Chloroethyl)ether	10	U
95-57-8	2-Chlorophenol	10	U
541-73-1	1,3-Dichlorobenzene	10	U
106-46-7	1,4-Dichlorobenzene	10	U
95-50-1	1,2-Dichlorobenzene	10	U
95-48-7	2-Methylphenol	10	U
108-60-1	2,2'-oxybis(1-Chloropropane)	10	U
106-44-5	4-Methylphenol	10	U
621-64-7	N-Nitroso-di-n propylamine	10	U
67-72-1	Hexachloroethane	10	U
98-95-3	Nitrobenzene	10	U
78-59-1	Isophorone	10	U
88-75-5	2-Nitrophenol	10	U
105-67-9	2,4-Dimethylphenol	10	U
111-91-1	bis(2-Chloroethoxy)methane	10	U
120-83-2	2,4-Dichlorophenol	10	U
120-82-1	1,2,4-Trichlorobenzene	10	U
91-20-3	Naphthalene	10	U
106-47-8	4-Chloroaniline	10	U
87-68-3	Hexachlorobutadiene	10	U
59-50-7	4-Chloro-3-methylphenol	10	U
91-57-6	2-Methylnaphthalene	10	U
77-47-4	Hexachlorocyclopentadiene	10	U
88-06-2	2,4,6-Trichlorophenol	10	U
95-95-4	2,4,5-Trichlorophenol	25	U
91-58-7	2-Chloronaphthalene	10	U
88-74-4	2-Nitroaniline	25	U
131-11-3	Dimethylphthalate	10	U
208-96-8	Acenaphthylene	10	U
606-20-2	2,6-Dinitrotoluene	10	U
99-09-2	3-Nitroaniline	25	U
83-32-9	Acenaphthene	10	U

1C  
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

IR89/93-TNK01

Lab Name: RECRA LABNET - CHICAGO      Contract:  
 Lab Code:                      Case No.:                      SAS No.:                      SDG No.: 06G104  
 Matrix: (soil/water) WATER                      Lab Sample ID: 9706G104-001  
 Sample wt/vol:              1000 (g/mL) ML                      Lab File ID: AADH06  
 Level: (low/med) LOW                      Date Received: 06/03/97  
 % Moisture:              decanted: (Y/N)\_\_\_\_                      Date Extracted: 06/05/97  
 Concentrated Extract Volume:      1000(uL)                      Date Analyzed: 06/09/97  
 Injection Volume:              2.0(uL)                      Dilution Factor: 1.0  
 GPC Cleanup: (Y/N) N                      pH: 6.0

CONCENTRATION UNITS:  
(ug/L or ug/Kg) UG/L                      Q

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
51-28-5	2,4-Dinitrophenol	25	U
100-02-7	4-Nitrophenol	25	U
132-64-9	Dibenzofuran	10	U
121-14-2	2,4-Dinitrotoluene	10	U
84-66-2	Diethylphthalate	10	U
7005-72-3	4-Chlorophenyl-phenylether	10	U
86-73-7	Fluorene	10	U
100-01-6	4-Nitroaniline	25	U
534-52-1	4,6-Dinitro-2-methylphenol	25	U
86-30-6	n-Nitrosodiphenylamine (1)	10	U
101-55-3	4-Bromophenyl-phenylether	10	U
118-74-1	Hexachlorobenzene	10	U
87-86-5	Pentachlorophenol	25	U
85-01-8	Phenanthrene	10	U
120-12-7	Anthracene	10	U
86-74-8	Carbazole	10	U
84-74-2	Di-n-butylphthalate	10	U
206-44-0	Fluoranthene	10	U
129-00-0	Pyrene	10	U
85-68-7	Butylbenzylphthalate	10	U
91-94-1	3,3'-Dichlorobenzidine	10	U
56-55-3	Benzo(a)anthracene	10	U
218-01-9	Chrysene	10	U
117-81-7	bis(2-Ethylhexyl)phthalate	10	U
117-84-0	Di-n-octylphthalate	10	U
205-99-2	Benzo(b)fluoranthene	10	U
207-08-9	Benzo(k)fluoranthene	10	U
50-32-8	Benzo(a)pyrene	10	U
193-39-5	Indeno(1,2,3-cd)pyrene	10	U
53-70-3	Dibenzo(a,h)anthracene	10	U
191-24-2	Benzo(g,h,i)perylene	10	U

(1) - Cannot be separated from Diphenylamine

1F  
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET  
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.

IR89/93-TNK01

Lab Name: RECRA LABNET - CHICAGO      Contract:  
 Lab Code:                      Case No.:                      SAS No.:                      SDG No.: 06G104  
 Matrix: (soil/water) WATER                      Lab Sample ID: 9706G104-001  
 Sample wt/vol:                      1000 (g/mL) ML                      Lab File ID:      AADH06  
 Level:      (low/med)      LOW                      Date Received: 06/03/97  
 % Moisture:                      \_\_\_\_\_ decanted: (Y/N) \_\_\_\_\_                      Date Extracted: 06/05/97  
 Concentrated Extract Volume:                      1000(uL)                      Date Analyzed: 06/09/97  
 Injection Volume:                      2.0(uL)                      Dilution Factor: 1.0  
 GPC Cleanup:      (Y/N) N                      pH: 6.0

Number TICs found: 6                      CONCENTRATION UNITS:  
 (ug/L or ug/Kg) ug/L

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
1.	UNKNOWN PHTHALATE	26.55	2	J
2.	UNKNOWN PHTHALATE	26.62	5	J
3.	UNKNOWN PHTHALATE	26.71	5	J
4.	UNKNOWN PHTHALATE	26.78	3	J
5.	UNKNOWN PHTHALATE	27.02	3	J
6.	UNKNOWN PHTHALATE	27.33	3	J
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1D  
PESTICIDE ANALYSIS DATA SHEET

EPA SAMPLE NO.

IR89/93-TNK01

Lab Name: Recra LabNet Contract: 00000-000-000-0000-00  
 Lab Code: RECRA Case No.: \_\_\_\_\_ SAS No.: \_\_\_\_\_ SDG No.: \_\_\_\_\_  
 Matrix: (soil/water) WATER Lab Sample ID: 9706G104-001  
 Sample wt/vol: 1000 (g/mL) ML Lab File ID: 06059715.88  
 % Moisture: \_\_\_\_\_ decanted: (Y/N) \_\_\_\_\_ Date Received: 06/03/97  
 Extraction: (SepF/Cont/Sonc) CONT Date Extracted: 06/04/97  
 Concentrated Extract Volume: 10000(uL) Date Analyzed: 06/09/97  
 Injection Volume: 1.0(uL) Dilution Factor: 1.00  
 GPC Cleanup: (Y/N) N pH: 7.0 Sulfur Cleanup: (Y/N) N

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) <u>ug/L</u>	Q
319-84-6	alpha-BHC	0.050	U
319-85-7	beta-BHC	0.050	U
319-86-8	delta-BHC	0.050	U
58-89-9	gamma-BHC (Lindane)	0.050	U
76-44-8	Heptachlor	0.050	U
309-00-2	Aldrin	0.050	U
1024-57-3	Heptachlor epoxide	0.050	U
959-98-8	Endosulfan I	0.050	U
60-57-1	Dieldrin	0.10	U
72-55-9	4,4'-DDE	0.10	U
72-20-8	Endrin	0.10	U
33213-65-9	Endosulfan II	0.10	U
72-54-8	4,4'-DDD	0.10	U
1031-07-8	Endosulfan sulfate	0.10	U
50-29-3	4,4'-DDT	0.10	U
72-43-5	Methoxychlor	0.50	U
53494-70-5	Endrin ketone	0.10	U
7421-93-4	Endrin aldehyde	0.10	U
5103-71-9	alpha-Chlordane	0.050	U
5103-74-2	gamma-Chlordane	0.050	U
8001-35-2	Toxaphene	5.0	U
12674-11-2	Aroclor-1016	1.0	U
11104-28-2	Aroclor-1221	2.0	U
11141-16-5	Aroclor-1232	1.0	U
53469-21-9	Aroclor-1242	1.0	U
12672-29-6	Aroclor-1248	1.0	U
11097-69-1	Aroclor-1254	1.0	U
11096-82-5	Aroclor-1260	1.0	U

U.S. EPA - CLP

1  
INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

G10401

b Name: RECRA LABNET CHICAGO Contract: \_\_\_\_\_

b Code: RECRA Case No.: \_\_\_\_\_ SAS No.: \_\_\_\_\_ SDG No.: G10401

trix (soil/water): WATER Lab Sample ID: 9706G104-001

vel (low/med): LOW Date Received: 06/03/97

Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	305	-	-	P
7440-36-0	Antimony	1.9	U	-	P
7440-38-2	Arsenic	4.0	B	-	P
7440-39-3	Barium	25.0	B	-	P
7440-41-7	Beryllium	0.30	U	-	P
7440-43-9	Cadmium	0.40	U	-	P
7440-70-2	Calcium	57600	-	-	P
7440-47-3	Chromium	1.4	B	-	P
7440-48-4	Cobalt	0.50	U	-	P
7440-50-8	Copper	0.80	U	-	P
7439-89-6	Iron	372	-	-	P
7439-92-1	Lead	1.4	U	-	P
7439-95-4	Magnesium	2200	B	-	P
7439-96-5	Manganese	45.1	-	-	P
7439-97-6	Mercury	0.10	U	-	CV
7440-02-0	Nickel	1.1	B	-	P
7440-09-7	Potassium	6110	-	-	P
7782-49-2	Selenium	2.2	U	-	P
7440-22-4	Silver	0.50	U	-	P
7440-23-5	Sodium	38200	-	-	P
7440-28-0	Thallium	3.0	U	-	P
7440-62-2	Vanadium	3.9	B	-	P
7440-66-6	Zinc	0.40	U	-	P
	Cyanide		-	-	NR

lor Before: COLORLESS Clarity Before: CLEAR Texture: \_\_\_\_\_

lor After: COLORLESS Clarity After: CLEAR Artifacts: \_\_\_\_\_

omments:

IR89/93-TNK01

To: Baker-Lejeune #356  
Airport Office Park, Bldg. 3  
420 Rouser Road  
Coraopolis, PA 15108

Attn: Ms. Karen Wood

Date: Friday June 13th, 1997

RE: IR89/93-TNK01  
Project # 00000-000-000-0000  
Lab ID: 9706G104-001  
Sample Date: 06/01/97  
Date Received: 06/03/97

### Inorganic Data Report

Parameters	Result	Units	Reporting Limit
Total Dissolved Solid	270	mg/l	10
Total Suspended Solid	20	mg/L	4

**APPENDIX G**  
**AQUIFER CHARACTERIZATION DATA**

---



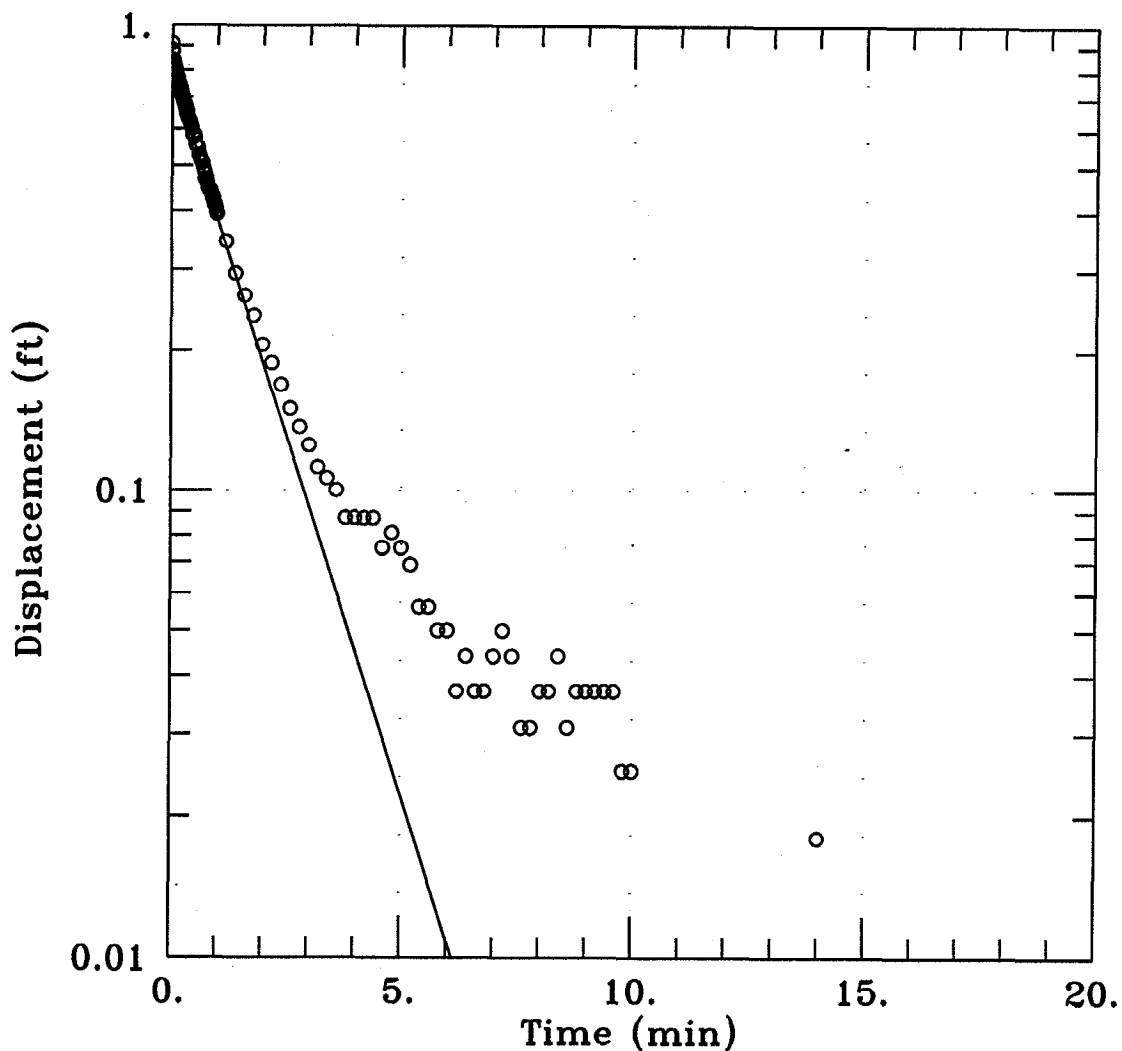
Client: LANTDIV

Company: Baker Environmental, Inc.

Location: Site 89 - MCB Camp Lejeune

Project: CTO-356

## 89-MW03 Rising Head Test



DATA SET:  
89MW3R.DAT  
07/15/97

AQUIFER MODEL:  
Unconfined  
SOLUTION METHOD:  
Bouwer-Rice

PROJECT DATA:  
test date: June 2, 1997

TEST DATA:  
H0 = 0.826 ft  
rc = 0.083 ft  
rw = 0.542 ft  
L = 10. ft  
b = 41. ft  
H = 10. ft

PARAMETER ESTIMATES:  
K = 8.467 ft/day  
y0 = 0.7855 ft

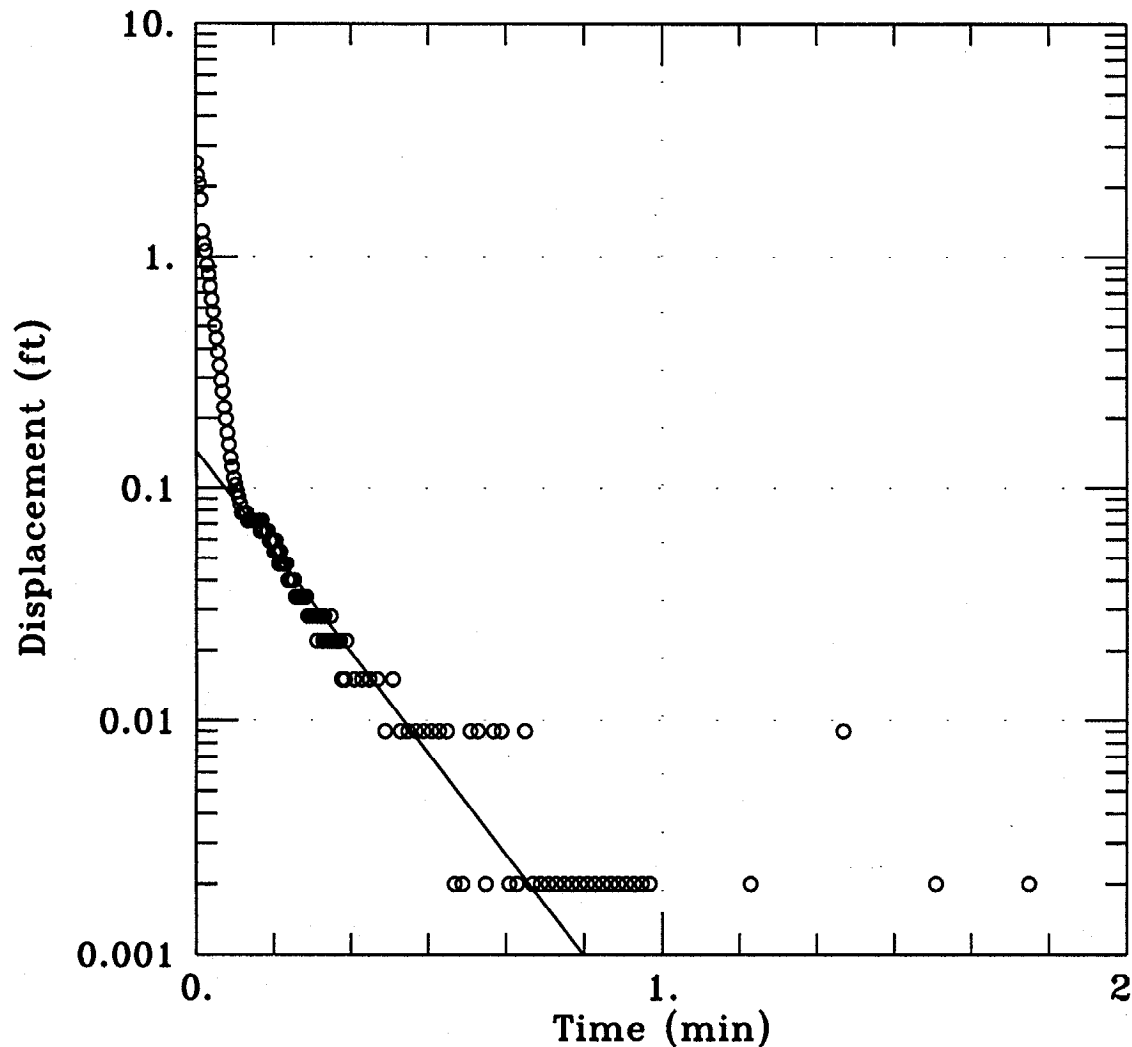
Client: LANTDIV

Company: Baker Environmental, Inc.

Location: Site 89 - MCB Camp Lejeune

Project: CTO-356

## 89-MW03IW Falling Head Test



DATA SET:  
89MW3IWF.DAT  
06/26/97

AQUIFER MODEL:  
Unconfined  
SOLUTION METHOD:  
Bower-Rice

PROJECT DATA:  
test date: June 2, 1997

TEST DATA:  
H0 = 2.529 ft  
rc = 0.083 ft  
rw = 0.542 ft  
L = 5. ft  
b = 41. ft  
H = 36.39 ft

PARAMETER ESTIMATES:  
K = 152.4 ft/day  
y0 = 0.1437 ft

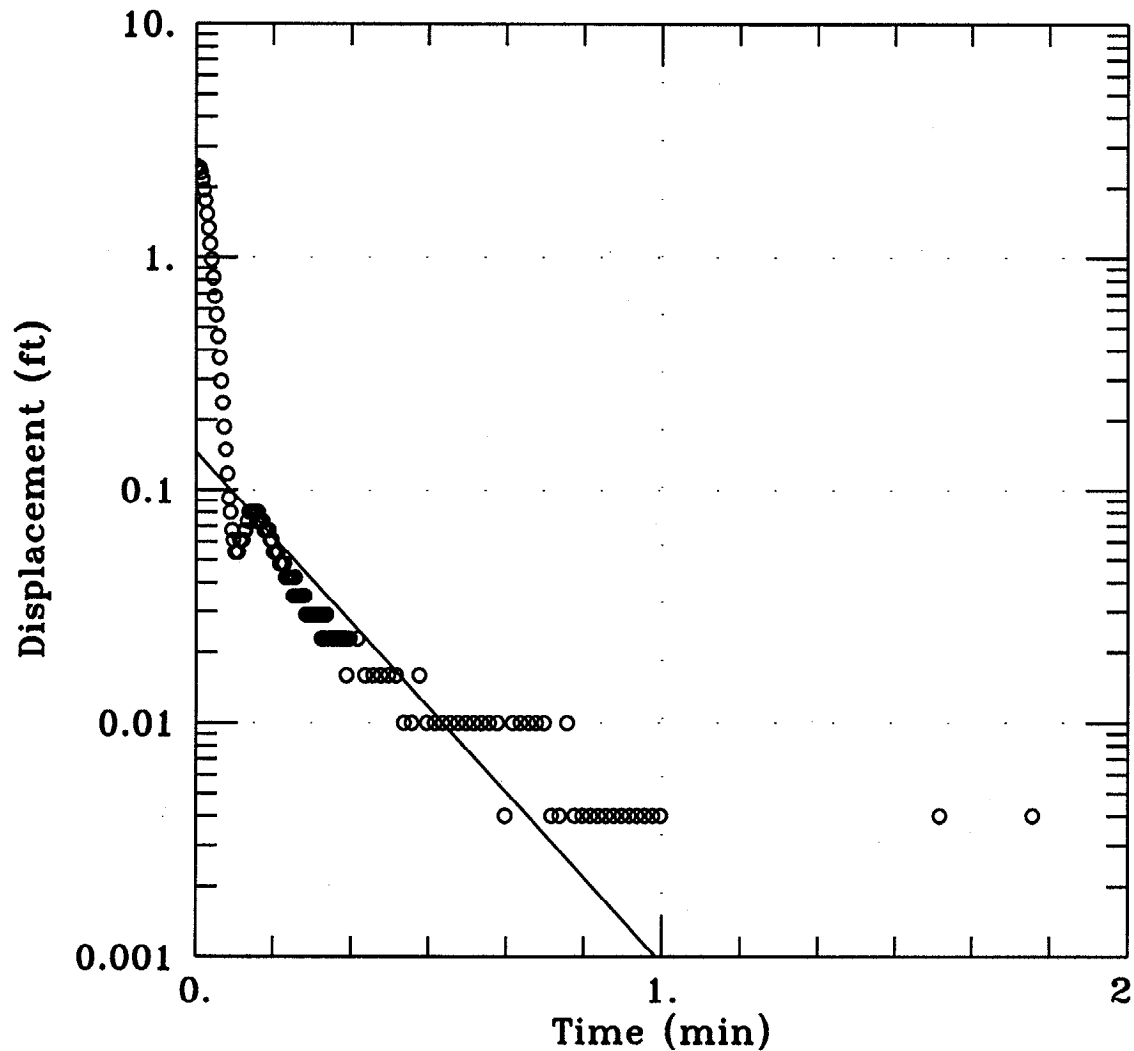
Client: LANTDIV

Company: Baker Environmental, Inc.

Location: Site 89 - MCB Camp Lejeune

Project: CTO-356

## 89-MW03IW Rising Head Test



DATA SET:  
89MW3IWR.DAT  
06/26/97

AQUIFER MODEL:  
Unconfined  
SOLUTION METHOD:  
Bouwer-Rice

PROJECT DATA:  
test date: June 2, 1997

TEST DATA:  
H0 = 2.44 ft  
rc = 0.083 ft  
rw = 0.542 ft  
L = 5. ft  
b = 41. ft  
H = 36.39 ft

PARAMETER ESTIMATES:  
K = 128.4 ft/day  
y0 = 0.1446 ft



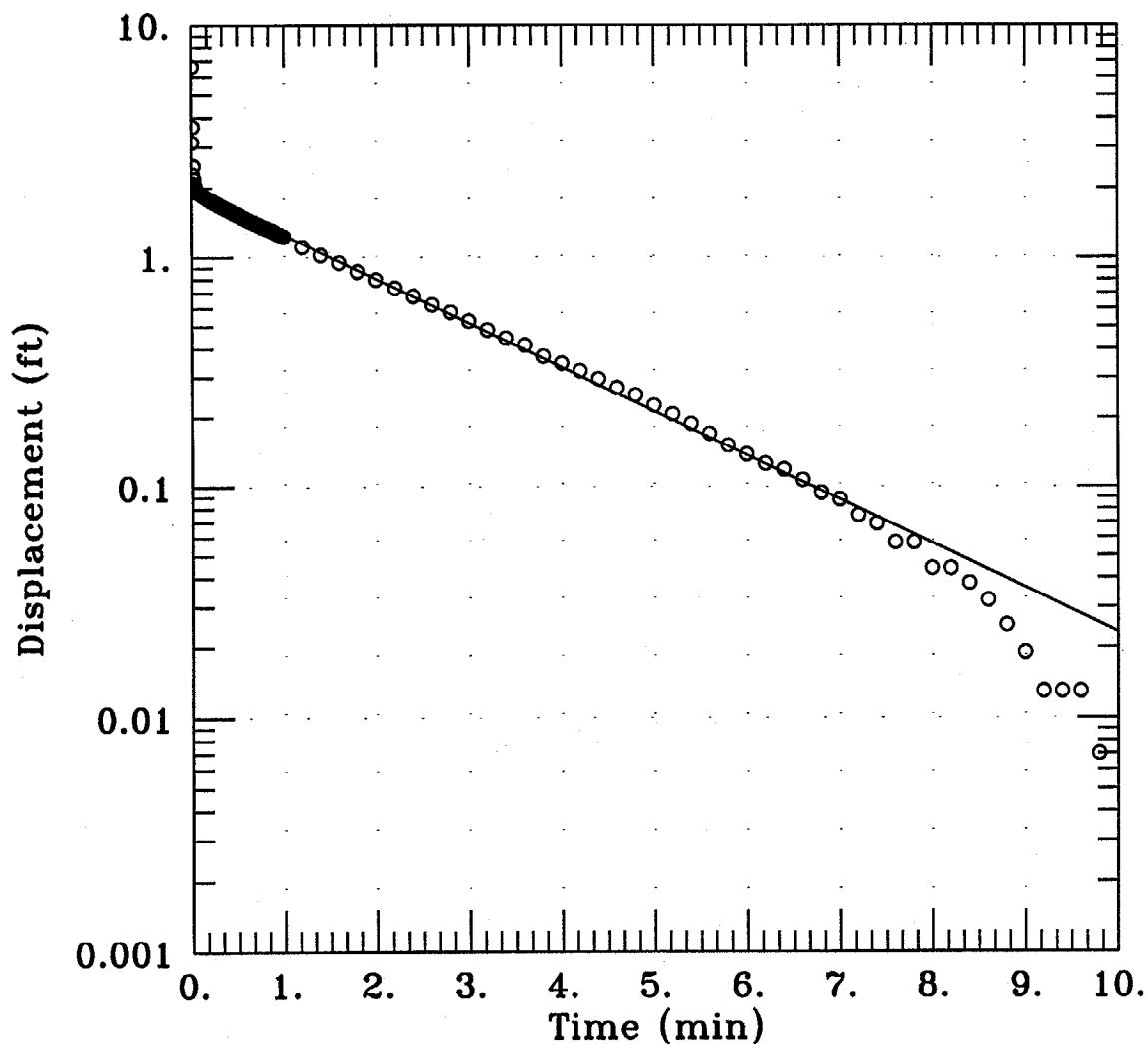
Client: LANTDIV

Company: Baker Environmental, Inc.

Location: Site 89 - MCB Camp Lejeune

Project: CT0-356

## 89-MW04 Rising Head Test



DATA SET:  
89MW4R.DAT  
07/15/97

AQUIFER MODEL:  
Unconfined  
SOLUTION METHOD:  
Bouwer-Rice

PROJECT DATA:  
test date: June 1, 1997

TEST DATA:  
H0 = 6.616 ft  
rc = 0.083 ft  
rw = 0.542 ft  
L = 8. ft  
b = 70. ft  
H = 8. ft

PARAMETER ESTIMATES:  
K = 5.772 ft/day  
y0 = 1.942 ft

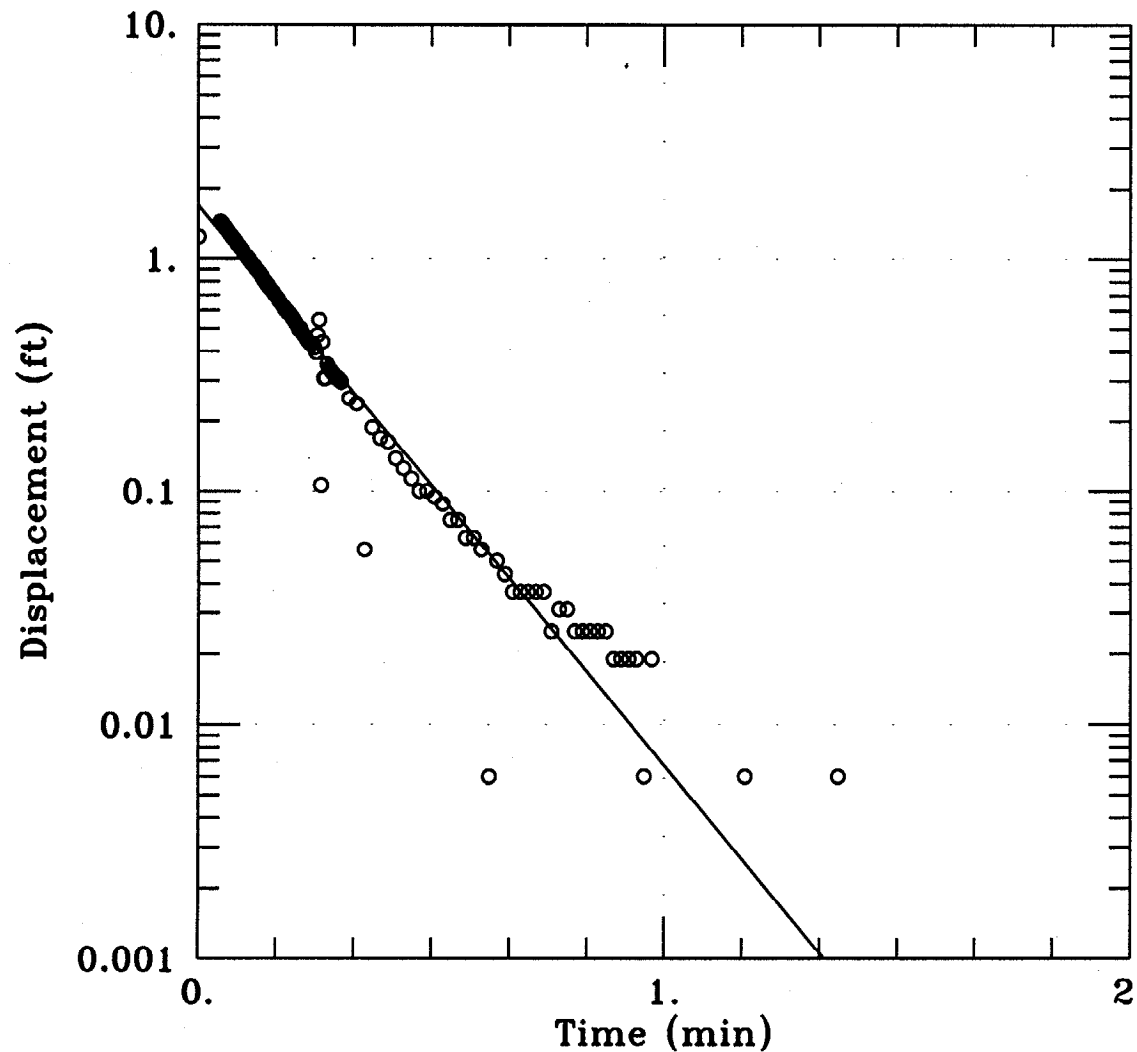
Client: LANTDIV

Company: Baker Environmental, Inc.

Location: Site 89 - MCB Camp Lejeune

Project: CT0-356

## 89-MW04IW Falling Head Test



DATA SET:  
89MW4IWF.DAT  
06/26/97

AQUIFER MODEL:  
Unconfined  
SOLUTION METHOD:  
Bouwer-Rice

PROJECT DATA:  
test date: June 1, 1997

TEST DATA:  
 $H_0 = 1.242$  ft  
 $r_c = 0.083$  ft  
 $r_w = 0.542$  ft  
 $L = 5$  ft  
 $b = 70$  ft  
 $H = 32.92$  ft

PARAMETER ESTIMATES:  
 $K = 125.5$  ft/day  
 $y_0 = 1.679$  ft

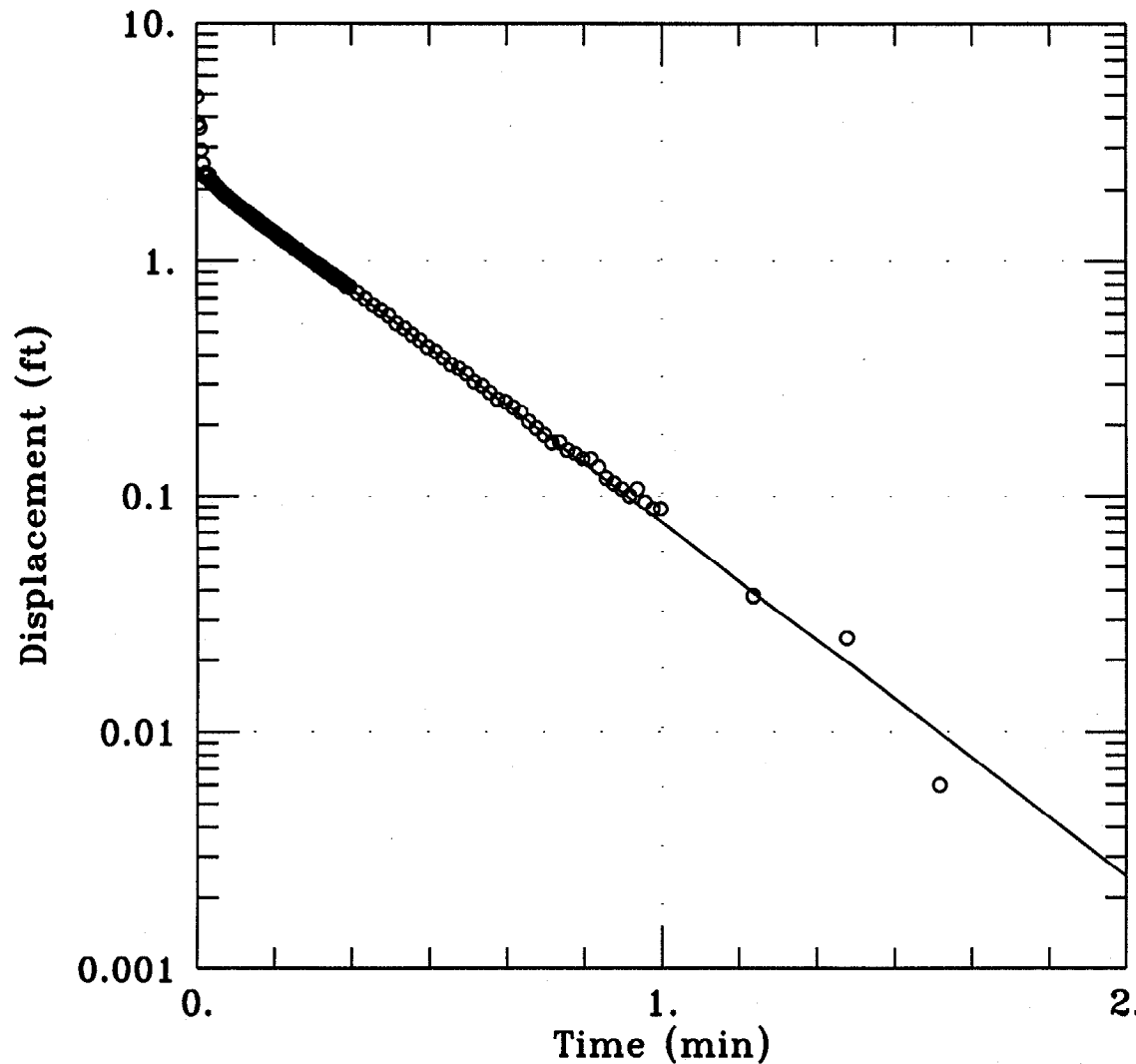
Client: LANTDIV

Company: Baker Environmental, Inc.

Location: Site 89 - MCB Camp Lejeune

Project: CTO-356

## 89-MW04IW Rising Head Test



DATA SET:  
89MW4IWR.DAT  
06/26/97

AQUIFER MODEL:  
Unconfined  
SOLUTION METHOD:  
Bouwer-Rice

PROJECT DATA:  
test date: June 1, 1997

TEST DATA:  
H0 = 4.882 ft  
rc = 0.083 ft  
rw = 0.542 ft  
L = 5. ft  
b = 70. ft  
H = 32.92 ft

PARAMETER ESTIMATES:  
K = 78.06 ft/day  
y0 = 2.4 ft

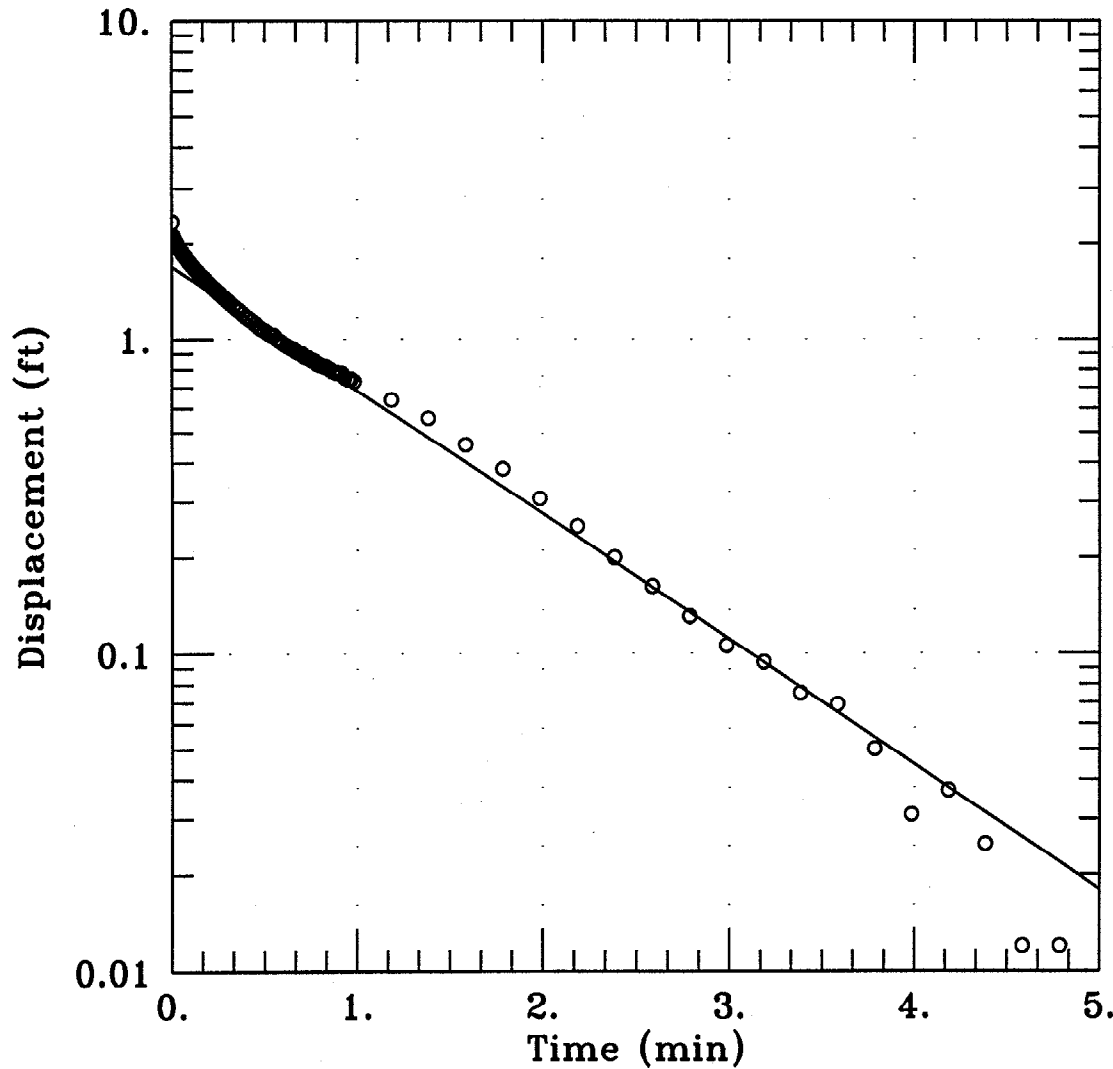
Client: LANTDIV

Company: Baker Environmental, Inc.

Location: Site 89 - MCB Camp Lejeune

Project: CT0-356

## 89-MW05 Rising Head Test



DATA SET:  
89MW5R.DAT  
07/15/97

AQUIFER MODEL:  
Unconfined  
SOLUTION METHOD:  
Bouwer-Rice

PROJECT DATA:  
test date: June 1, 1997

TEST DATA:  
H0 = 2.349 ft  
rc = 0.083 ft  
rw = 0.542 ft  
L = 10. ft  
b = 40. ft  
H = 10. ft

PARAMETER ESTIMATES:  
K = 10.82 ft/day  
y0 = 1.697 ft

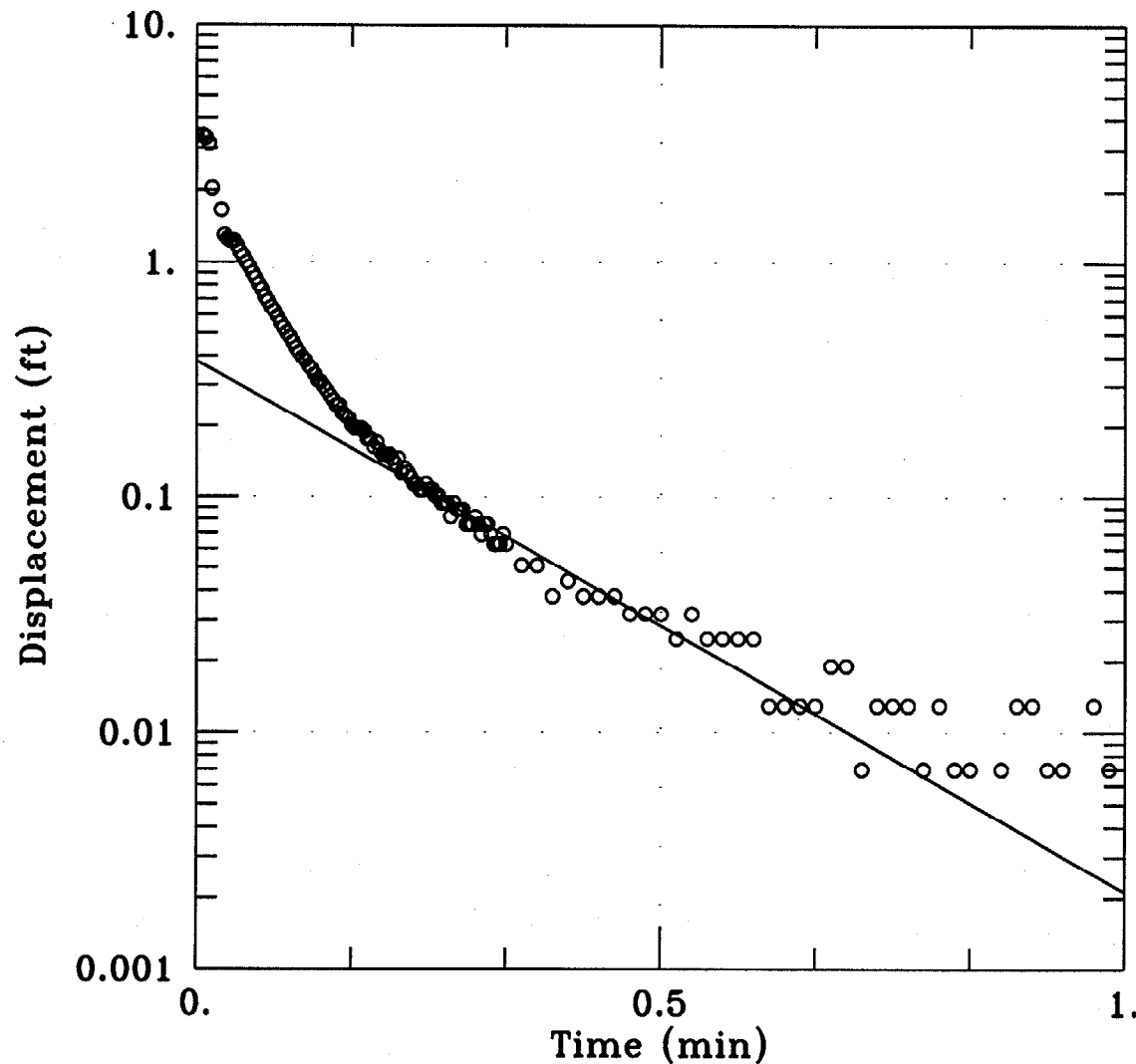
Client: LANTDIV

Company: Baker Environmental, Inc.

Location: Site 89 - MCB Camp Lejeune

Project: CT0-356

## 89-MW05IW Falling Head Test



DATA SET:  
89MW5IWF.DAT  
06/26/97

AQUIFER MODEL:  
Unconfined  
SOLUTION METHOD:  
Bower-Rice

PROJECT DATA:  
test date: June 1, 1997

TEST DATA:  
 $H_0 = 3.382$  ft  
 $r_c = 0.083$  ft  
 $r_w = 0.542$  ft  
 $L = 5$  ft  
 $b = 40$  ft  
 $H = 36.59$  ft

PARAMETER ESTIMATES:  
 $K = 134.5$  ft/day  
 $y_0 = 0.3803$  ft

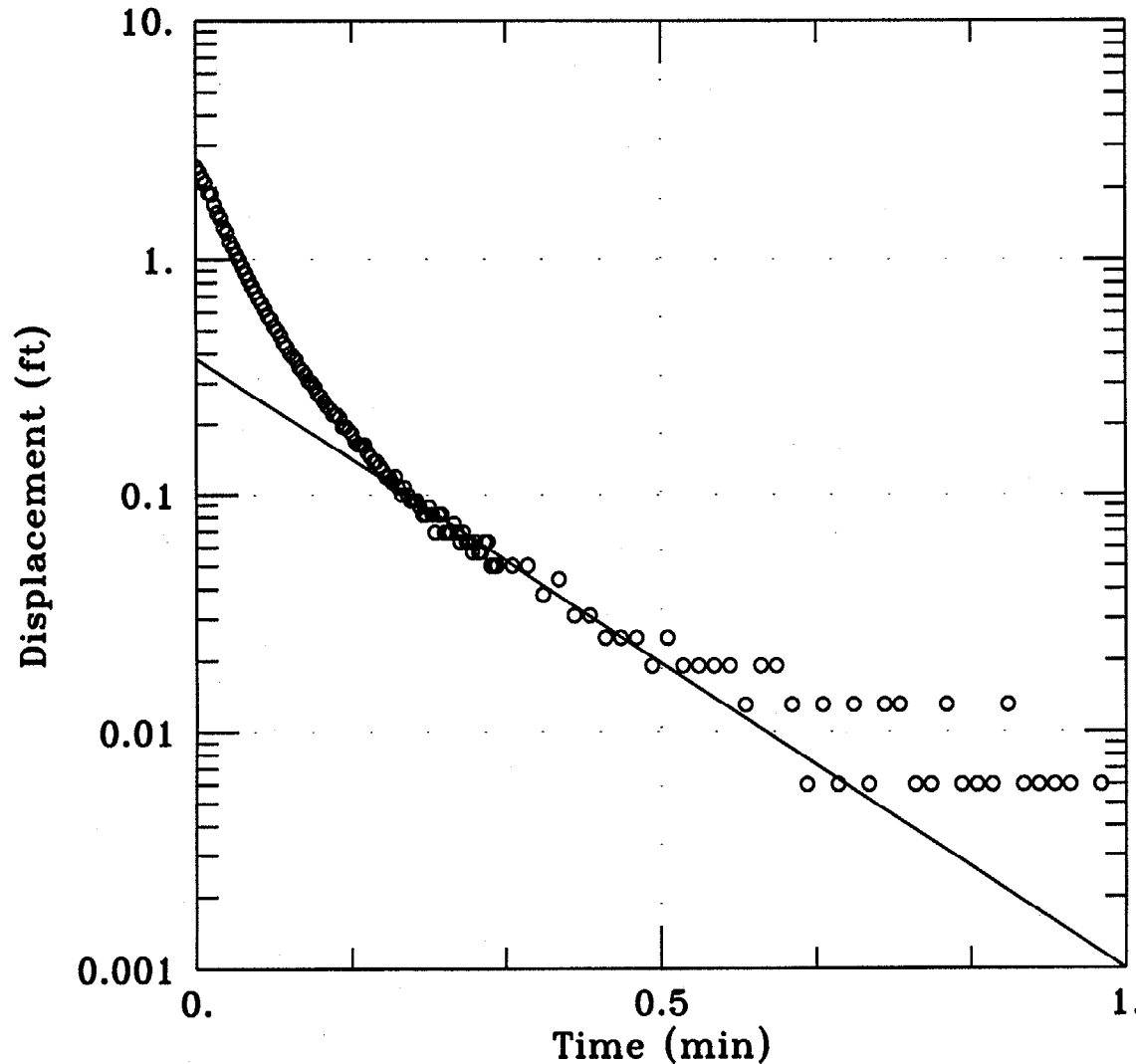
Client: LANTDIV

Company: Baker Environmental, Inc.

Location: Site 89 - MCB Camp Lejeune

Project: CTO-356

## 89-MW05IW Rising Head Test



DATA SET:  
89MW5IWR.DAT  
06/26/97

AQUIFER MODEL:  
Unconfined  
SOLUTION METHOD:  
Bower-Rice

PROJECT DATA:  
test date: June 1, 1997

TEST DATA:  
H0 = 2.426 ft  
rc = 0.083 ft  
rw = 0.542 ft  
L = 5. ft  
b = 40. ft  
H = 36.59 ft

PARAMETER ESTIMATES:  
K = 154. ft/day  
y0 = 0.3799 ft

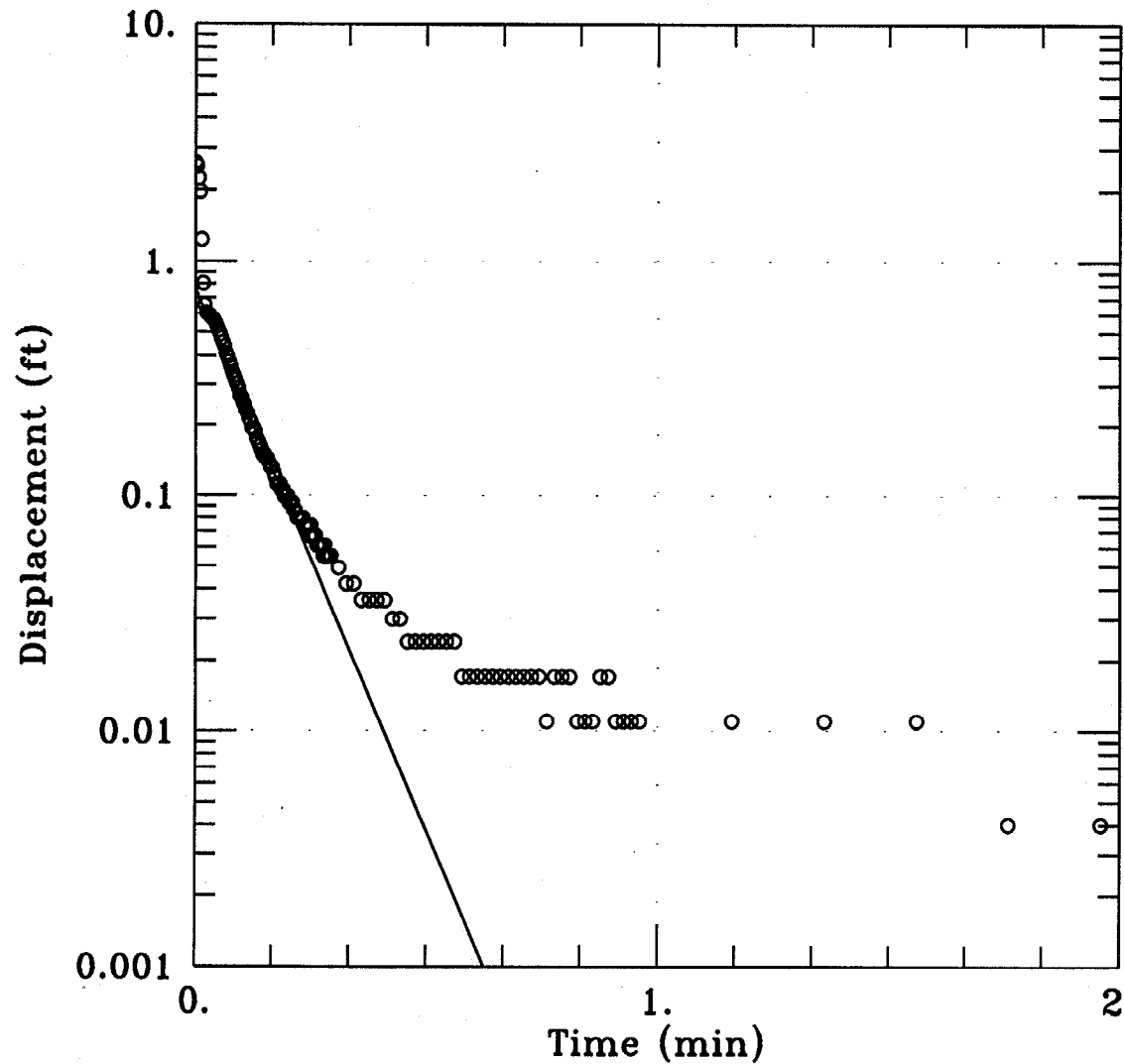
Client: LANTDIV

Company: Baker Environmental, Inc.

Location: Site 89 - MCB Camp Lejeune

Project: CTO-356

## 89-MW06IW Falling Head Test



DATA SET:  
89MW6IWF.DAT  
06/26/97

AQUIFER MODEL:  
Unconfined  
SOLUTION METHOD:  
Bouwer-Rice

PROJECT DATA:  
test date: June 1, 1997

TEST DATA:  
 $H_0 = 2.59$  ft  
 $r_c = 0.083$  ft  
 $r_w = 0.542$  ft  
 $L = 5.$  ft  
 $b = 37.$  ft  
 $H = 29.31$  ft

PARAMETER ESTIMATES:  
 $K = 256.6$  ft/day  
 $y_0 = 0.7576$  ft

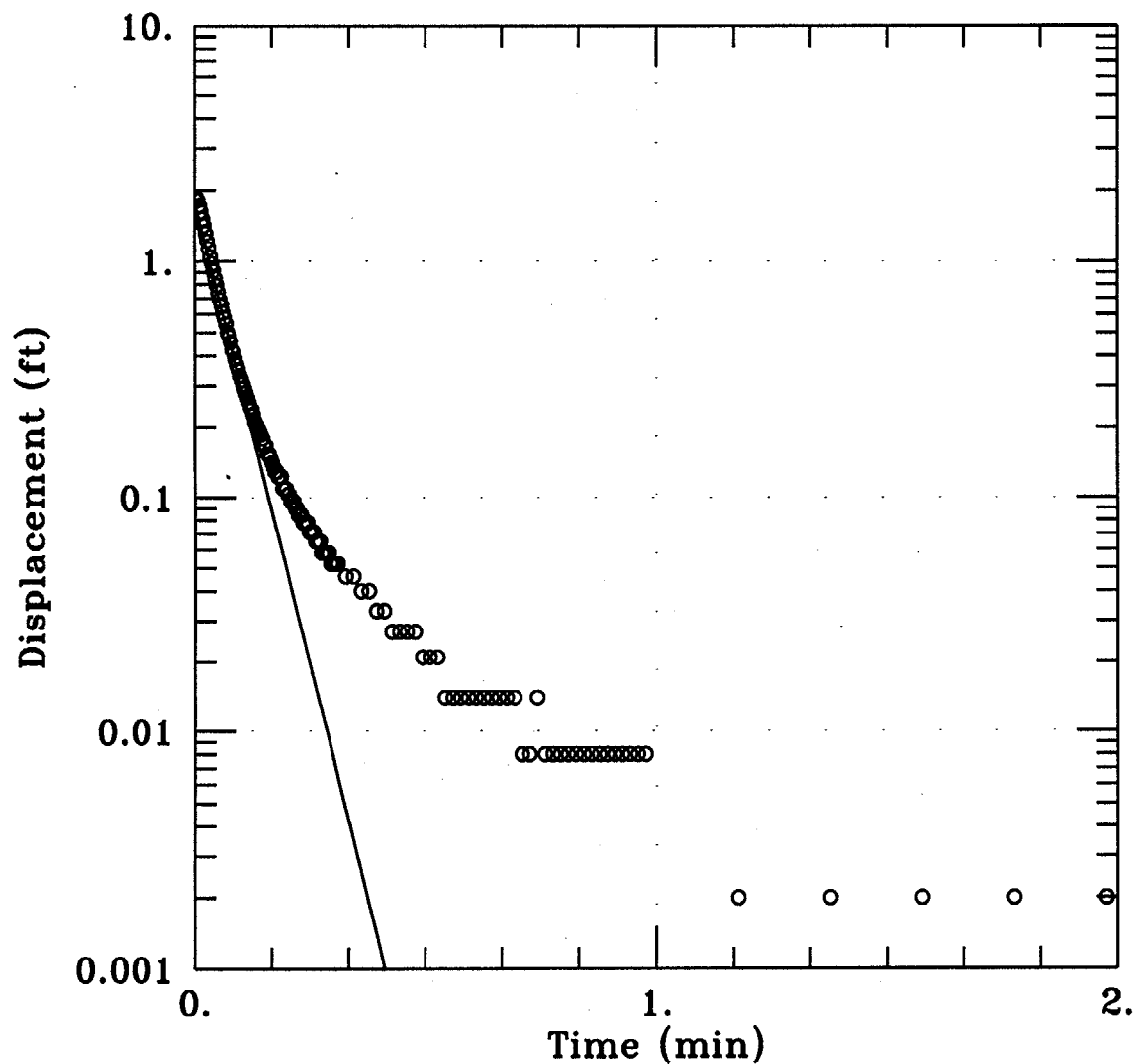
Client: LANTDIV

Company: Baker Environmental, Inc.

Location: Site 89 - MCB Camp Lejeune

Project: CT0-356

## 89-MW06IW Rising Head Test



DATA SET:  
89MW6IWR.DAT  
06/26/97

AQUIFER MODEL:  
Unconfined  
SOLUTION METHOD:  
Bouwer-Rice

PROJECT DATA:  
test date: June 1, 1997

TEST DATA:  
H<sub>0</sub> = 1.861 ft  
r<sub>c</sub> = 0.083 ft  
r<sub>w</sub> = 0.542 ft  
L = 5. ft  
b = 37. ft  
H = 29.31 ft

PARAMETER ESTIMATES:  
K = 438.6 ft/day  
y<sub>0</sub> = 1.772 ft



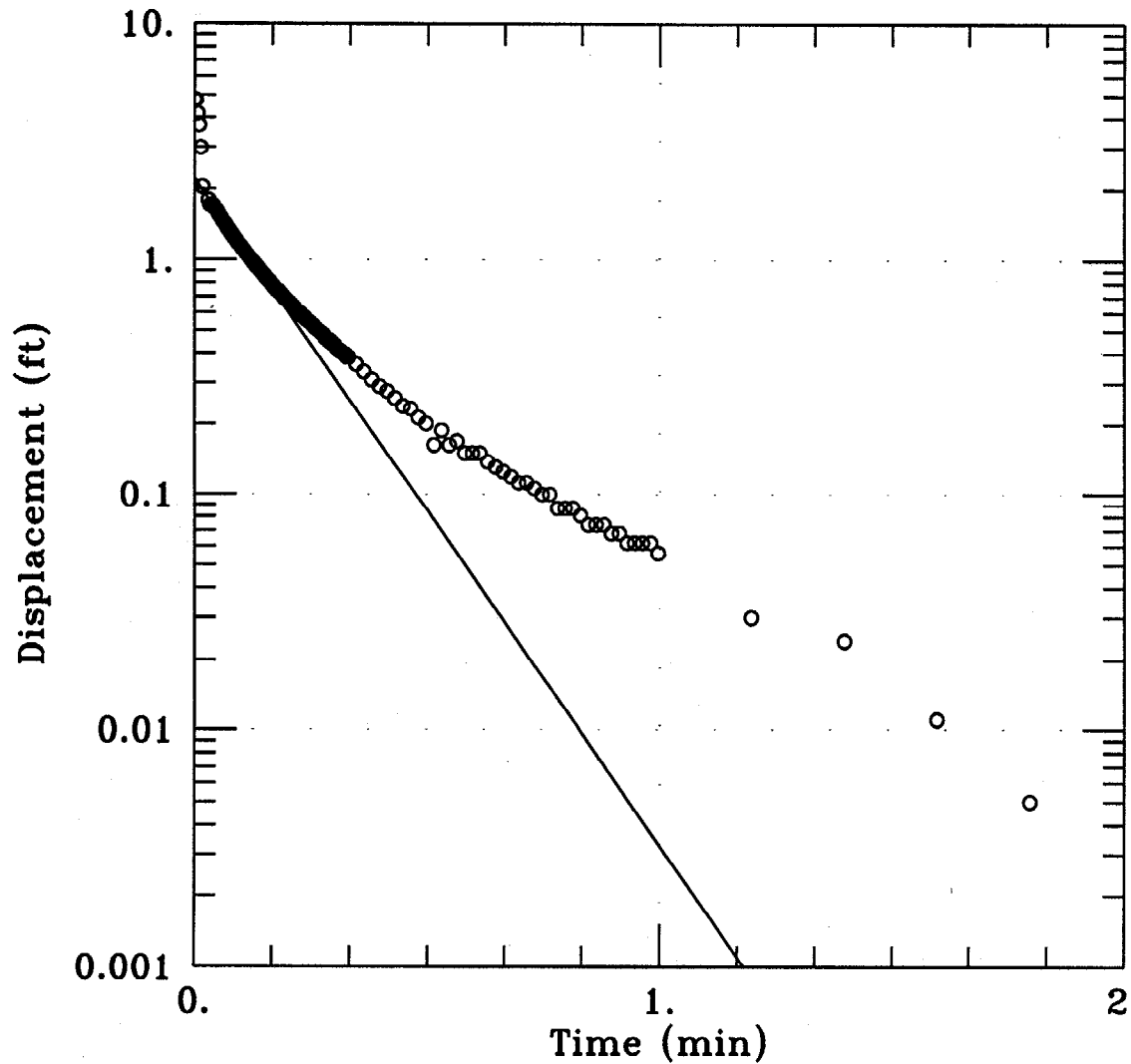
Client: LANTDIV

Company: Baker Environmental, Inc.

Location: Site 89 - MCB Camp Lejeune

Project: CTO-356

## 89-MW07IW Falling Head Test



DATA SET:  
89MW7IWF.DAT  
06/26/97

AQUIFER MODEL:  
Unconfined  
SOLUTION METHOD:  
Bouwer-Rice

PROJECT DATA:  
test date: June 1, 1997

TEST DATA:  
H0 = 4.79 ft  
rc = 0.083 ft  
rw = 0.542 ft  
L = 5. ft  
b = 40. ft  
H = 26.39 ft

PARAMETER ESTIMATES:  
K = 151.2 ft/day  
y0 = 2.201 ft

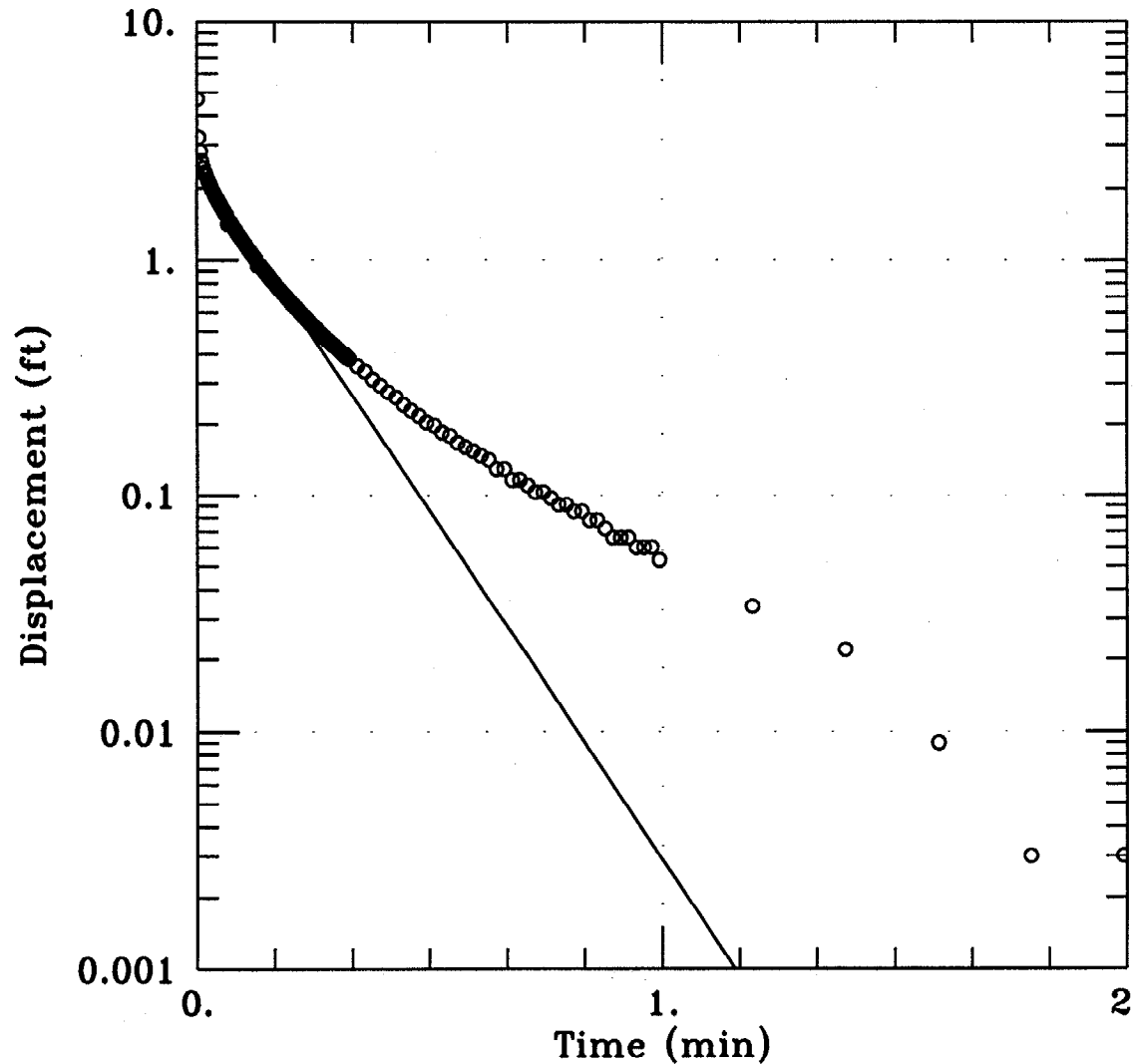
Client: LANTDIV

Company: Baker Environmental, Inc.

Location: Site 89 - MCB Camp Lejeune

Project: CT0-356

## 89-MW07IW Rising Head Test



DATA SET:  
89MW7IWR.DAT  
06/26/97

AQUIFER MODEL:  
Unconfined  
SOLUTION METHOD:  
Bouwer-Rice

PROJECT DATA:  
test date: June 1, 1997

TEST DATA:  
H0 = 4.693 ft  
rc = 0.083 ft  
rw = 0.542 ft  
L = 5. ft  
b = 40. ft  
H = 26.39 ft

PARAMETER ESTIMATES:  
K = 157.2 ft/day  
y0 = 2.531 ft

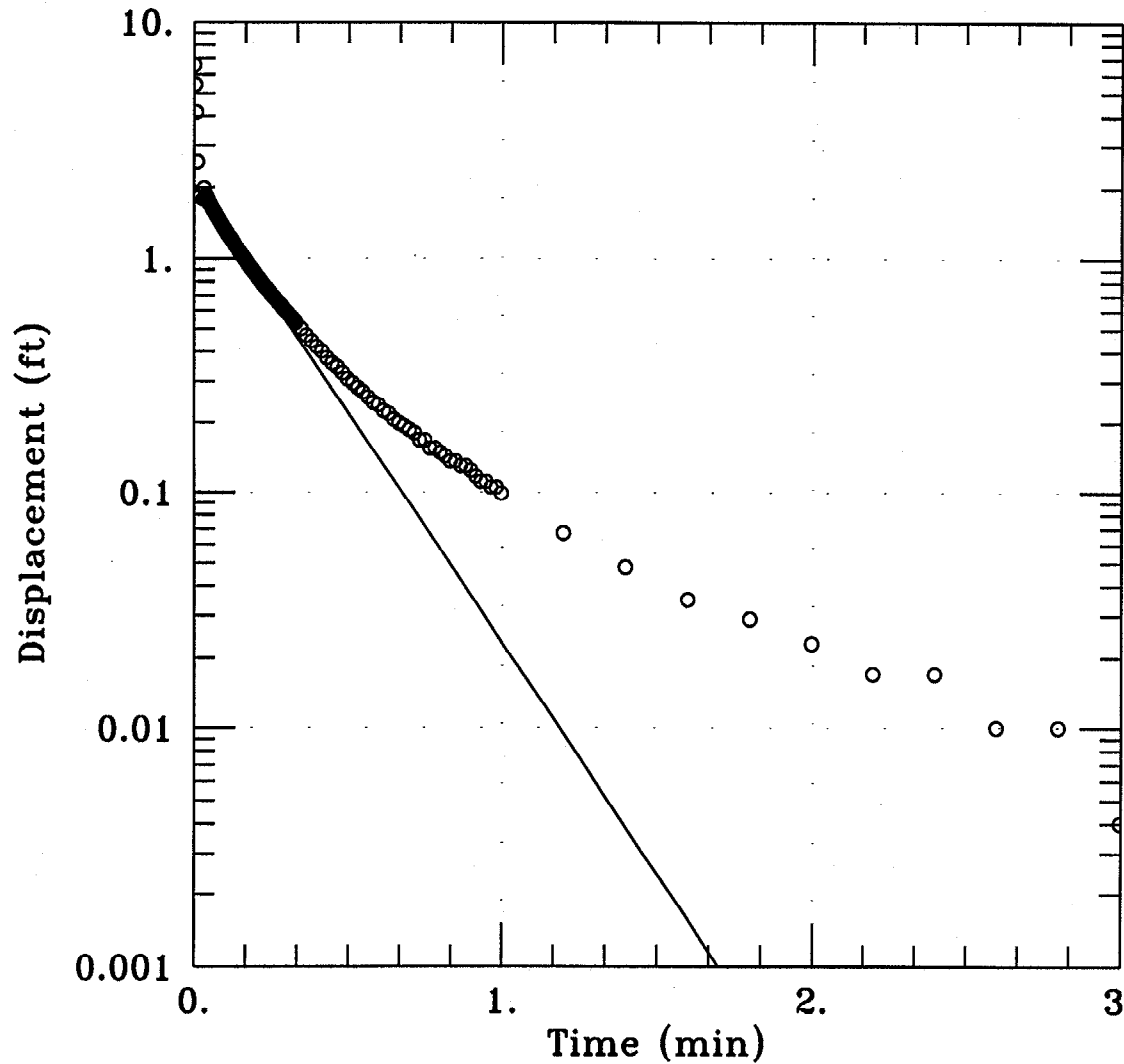
Client: LANTDIV

Company: Baker Environmental, Inc.

Location: Site 89 - MCB Camp Lejeune

Project: CT0-356

## 89-MW08IW Falling Head Test



DATA SET:  
89MW8IWF.DAT  
07/15/97

AQUIFER MODEL:  
Unconfined  
SOLUTION METHOD:  
Bouwer-Rice

PROJECT DATA:  
test date: June 1, 1997

TEST DATA:  
H0 = 6.58 ft  
rc = 0.083 ft  
rw = 0.542 ft  
L = 5. ft  
b = 37. ft  
H = 24.9 ft

PARAMETER ESTIMATES:  
K = 104.2 ft/day  
y0 = 2.062 ft

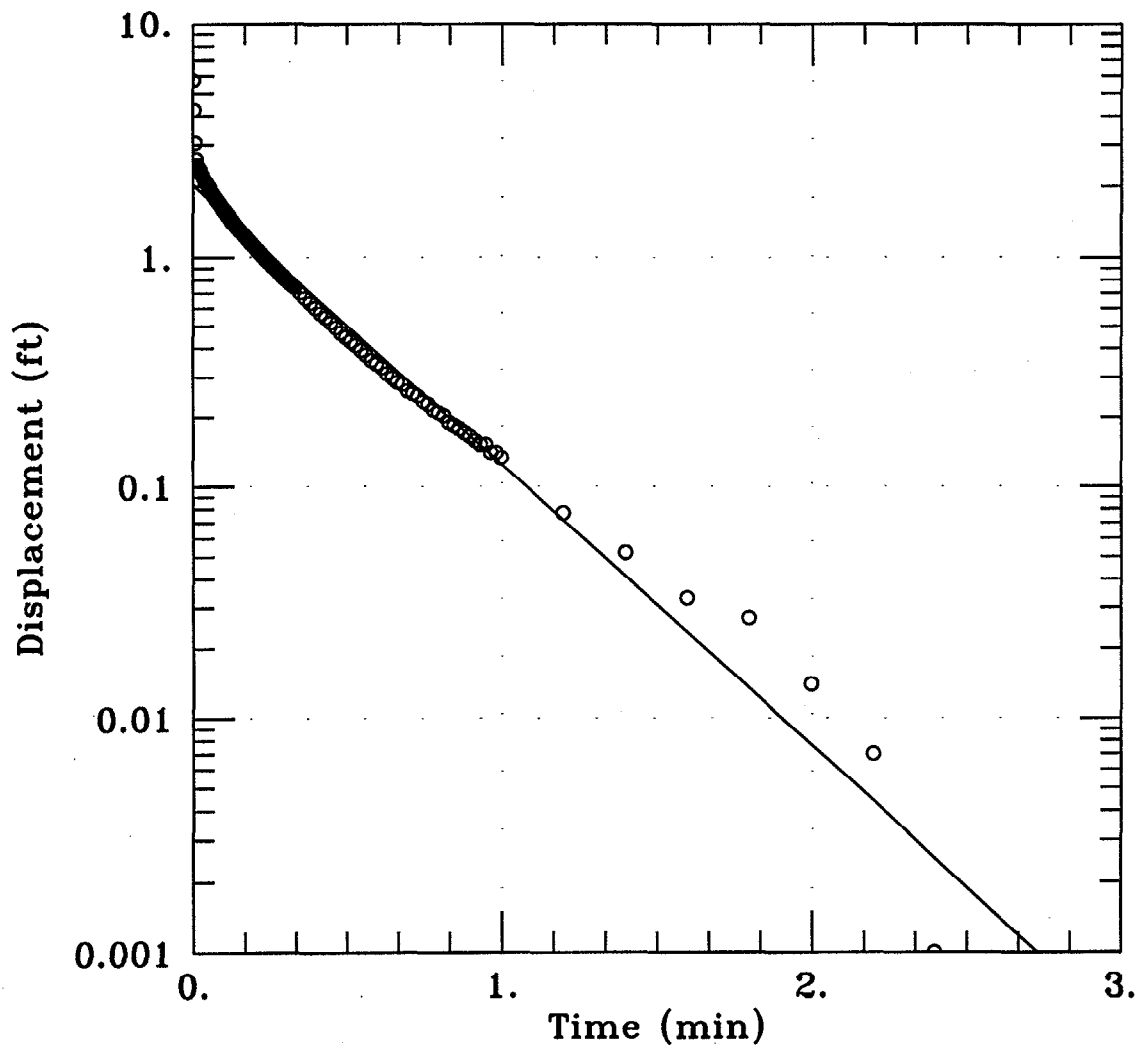
Client: LANTDIV

Company: Baker Environmental, Inc.

Location: Site 89 - MCB Camp Lejeune

Project: CT0-356

## 89-MW08IW Rising Head Test



DATA SET:  
89MW8IWR.DAT  
07/15/97

AQUIFER MODEL:  
Unconfined  
SOLUTION METHOD:  
Bouwer-Rice

PROJECT DATA:  
test date: June 1, 1997

TEST DATA:  
H0 = 5.734 ft  
rc = 0.083 ft  
rw = 0.542 ft  
L = 5. ft  
b = 37. ft  
H = 24.9 ft

PARAMETER ESTIMATES:  
K = 64.64 ft/day  
y0 = 2.021 ft



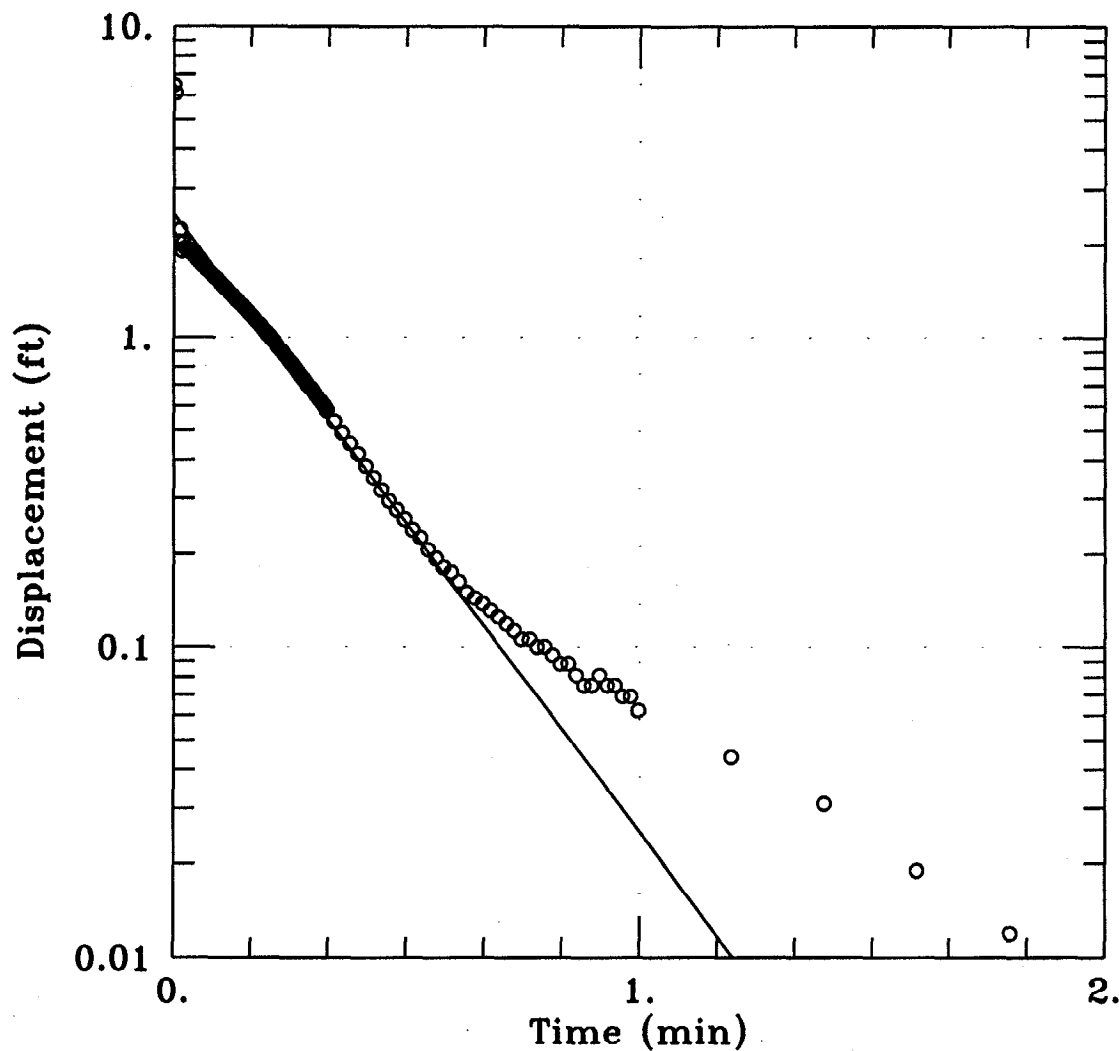
Client: LANTDIV

Company: Baker Environmental, Inc.

Location: Site 93 - MCB Camp Lejeune

Project: CT0-356

## 93-MW01 Rising Head Test



DATA SET:  
93MW1R.DAT  
06/26/97

AQUIFER MODEL:  
Unconfined  
SOLUTION METHOD:  
Bouwer-Rice

PROJECT DATA:  
test date: May 31, 1997

TEST DATA:  
H0 = 6.468 ft  
rc = 0.083 ft  
rw = 0.542 ft  
L = 8. ft  
b = 69. ft  
H = 8. ft

PARAMETER ESTIMATES:  
K = 59.92 ft/day  
y0 = 2.482 ft

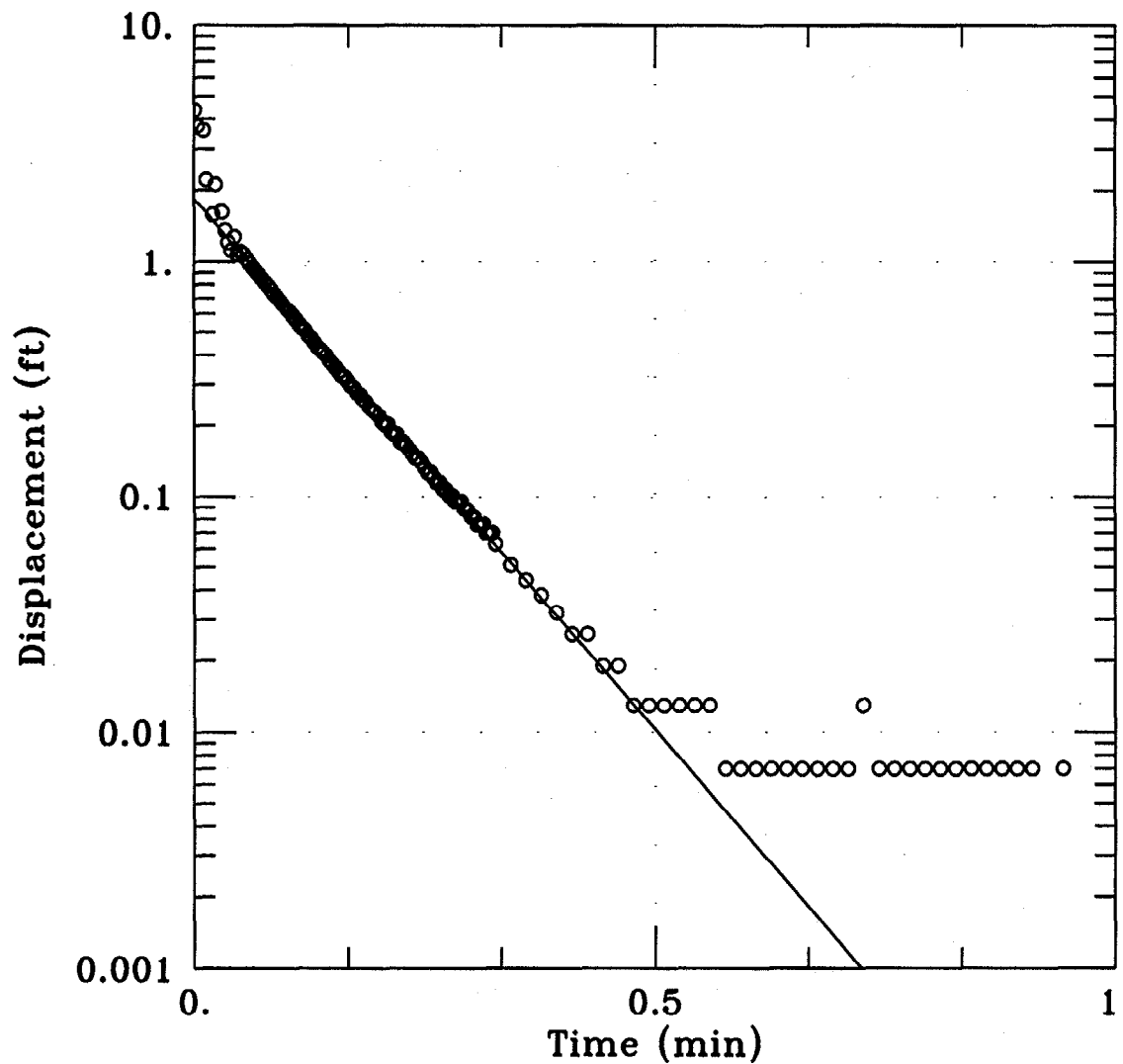
Client: LANTDIV

Company: Baker Environmental, Inc.

Location: Site 93 - MCB Camp Lejeune

Project: CT0-356

## 93-MW01IW Falling Head Test



DATA SET:  
93MW1IWF.DAT  
06/26/97

AQUIFER MODEL:  
Unconfined  
SOLUTION METHOD:  
Bouwer-Rice

PROJECT DATA:  
test date: May 31, 1997

TEST DATA:  
H0 = 4.348 ft  
rc = 0.083 ft  
rw = 0.542 ft  
L = 5. ft  
b = 69. ft  
H = 44.46 ft

PARAMETER ESTIMATES:  
K = 247.8 ft/day  
y0 = 1.83 ft

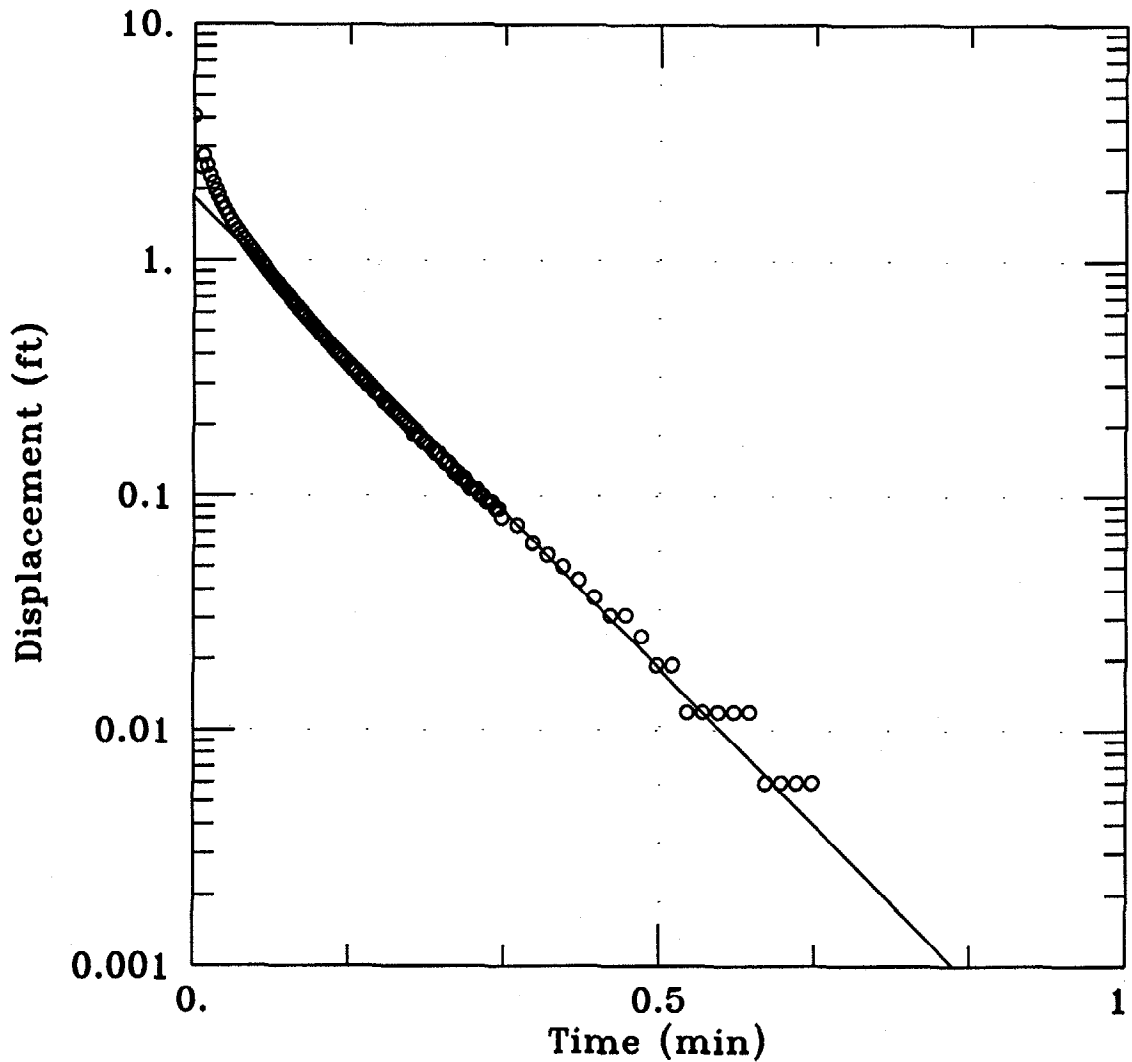
Client: LANTDIV

Company: Baker Environmental, Inc.

Location: Site 93 - MCB Camp Lejeune

Project: CT0-356

## 93-MW01IW Rising Head Test



DATA SET:  
93MW1IWR.DAT  
06/26/97

AQUIFER MODEL:  
Unconfined  
SOLUTION METHOD:  
Bouwer-Rice

PROJECT DATA:  
test date: May 31, 1997

TEST DATA:  
H0 = 4.084 ft  
rc = 0.083 ft  
rw = 0.542 ft  
L = 5. ft  
b = 69. ft  
H = 44.46 ft

PARAMETER ESTIMATES:  
K = 220.5 ft/day  
y0 = 1.845 ft



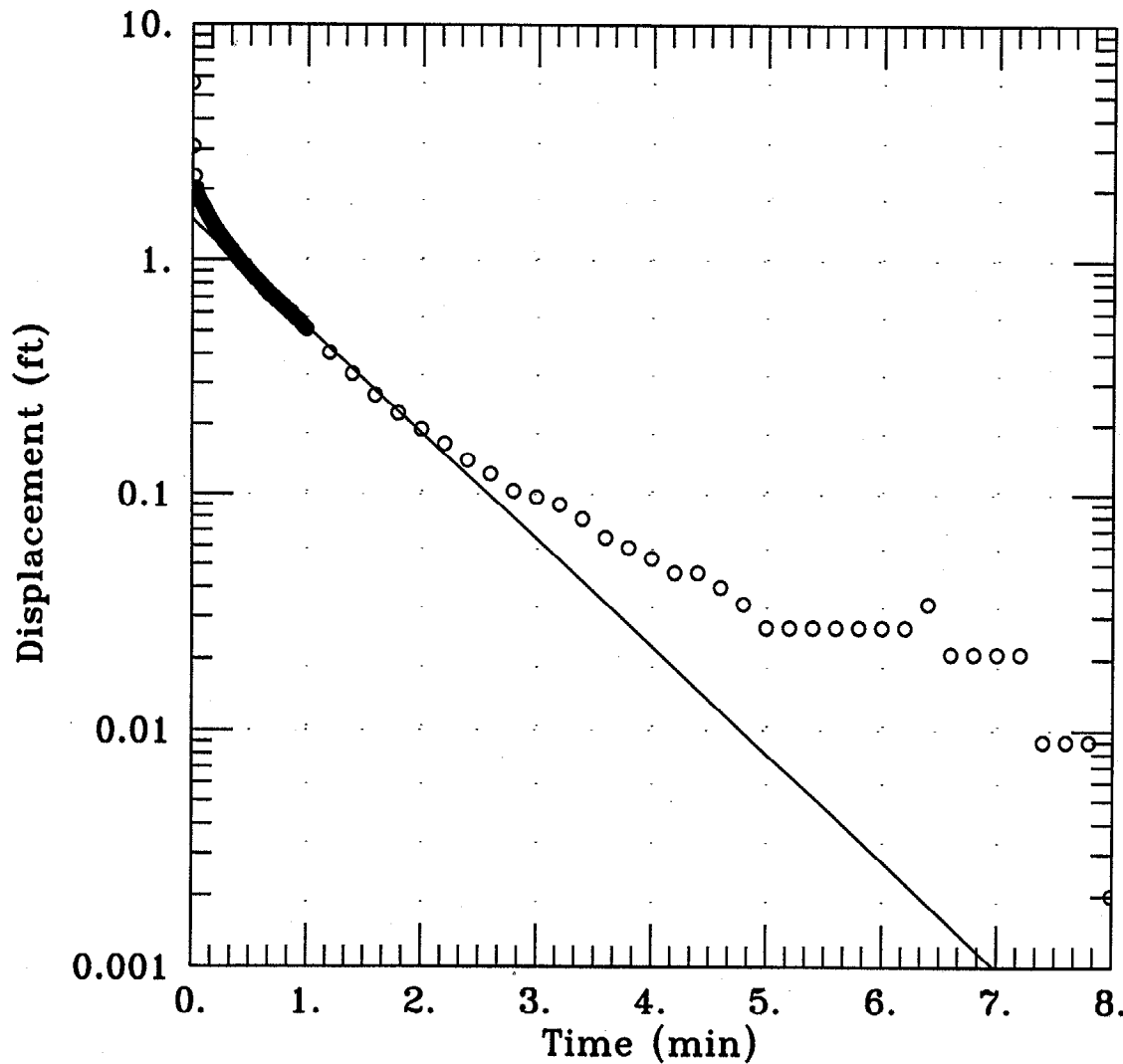
Client: LANTDIV

Company: Baker Environmental, Inc.

Location: Site 93 - MCB Camp Lejeune

Project: CTO-356

## 93-MW02 Rising Head Test



DATA SET:

93MW2R.DAT

07/15/97

AQUIFER MODEL:

Unconfined

SOLUTION METHOD:

Bouwer-Rice

PROJECT DATA:

test date: June 2, 1997

TEST DATA:

H0 = 5.648 ft

rc = 0.083 ft

rw = 0.542 ft

L = 10. ft

b = 69. ft

H = 11.34 ft

PARAMETER ESTIMATES:

K = 12.54 ft/day

y0 = 1.479 ft

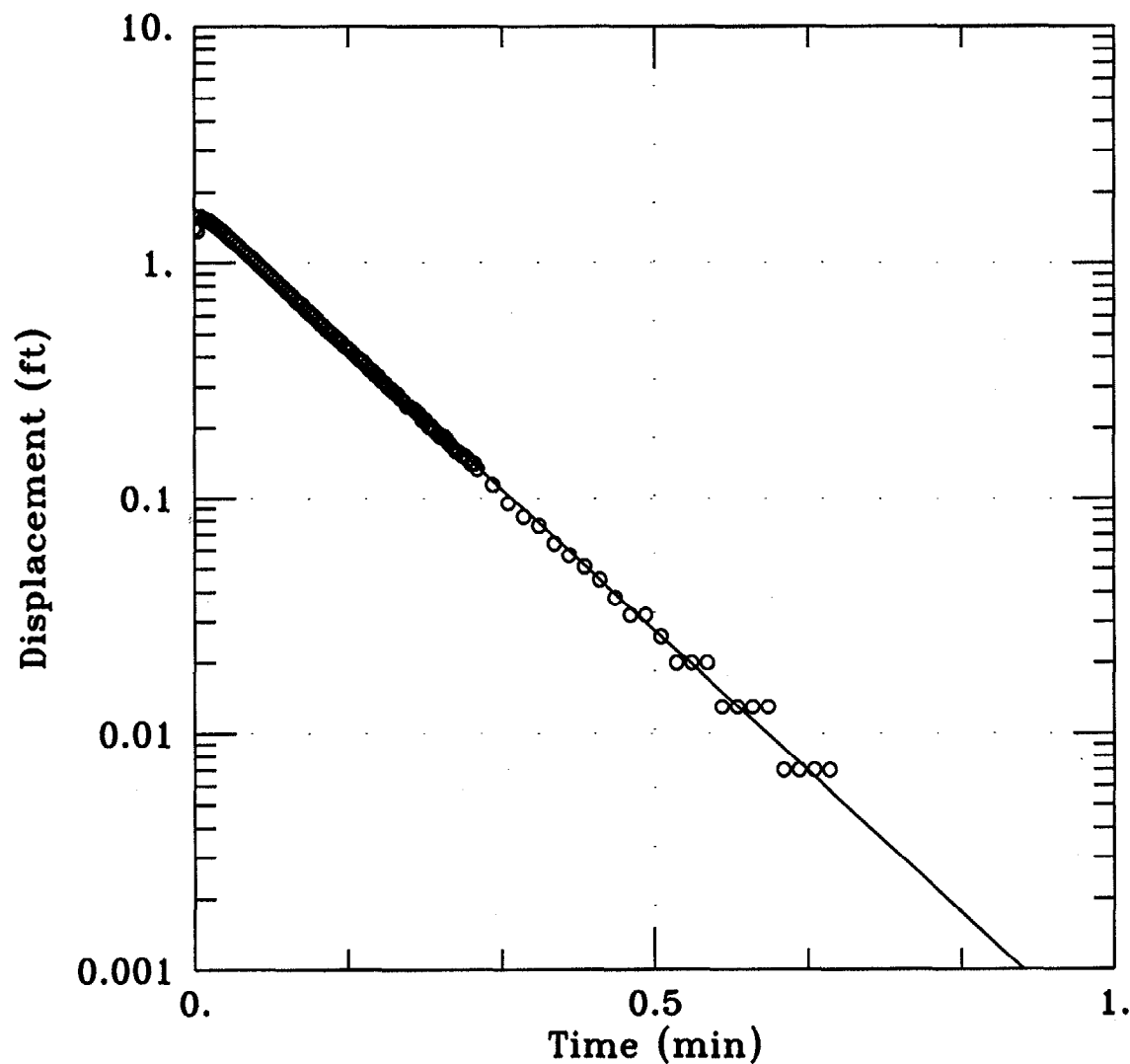
Client: LANTDIV

Company: Baker Environmental, Inc.

Location: Site 93 - MCB Camp Lejeune

Project: CTO-356

## 93-MW02IW Falling Head Test



DATA SET:  
93MW2IWF.DAT  
06/26/97

AQUIFER MODEL:  
Unconfined  
SOLUTION METHOD:  
Bouwer-Rice

PROJECT DATA:  
test date: June 2, 1997

TEST DATA:  
 $H_0 = 1.405$  ft  
 $r_c = 0.083$  ft  
 $r_w = 0.542$  ft  
 $L = 5$  ft  
 $b = 69$  ft  
 $H = 43.87$  ft

PARAMETER ESTIMATES:  
 $K = 197$  ft/day  
 $y_0 = 1.71$  ft

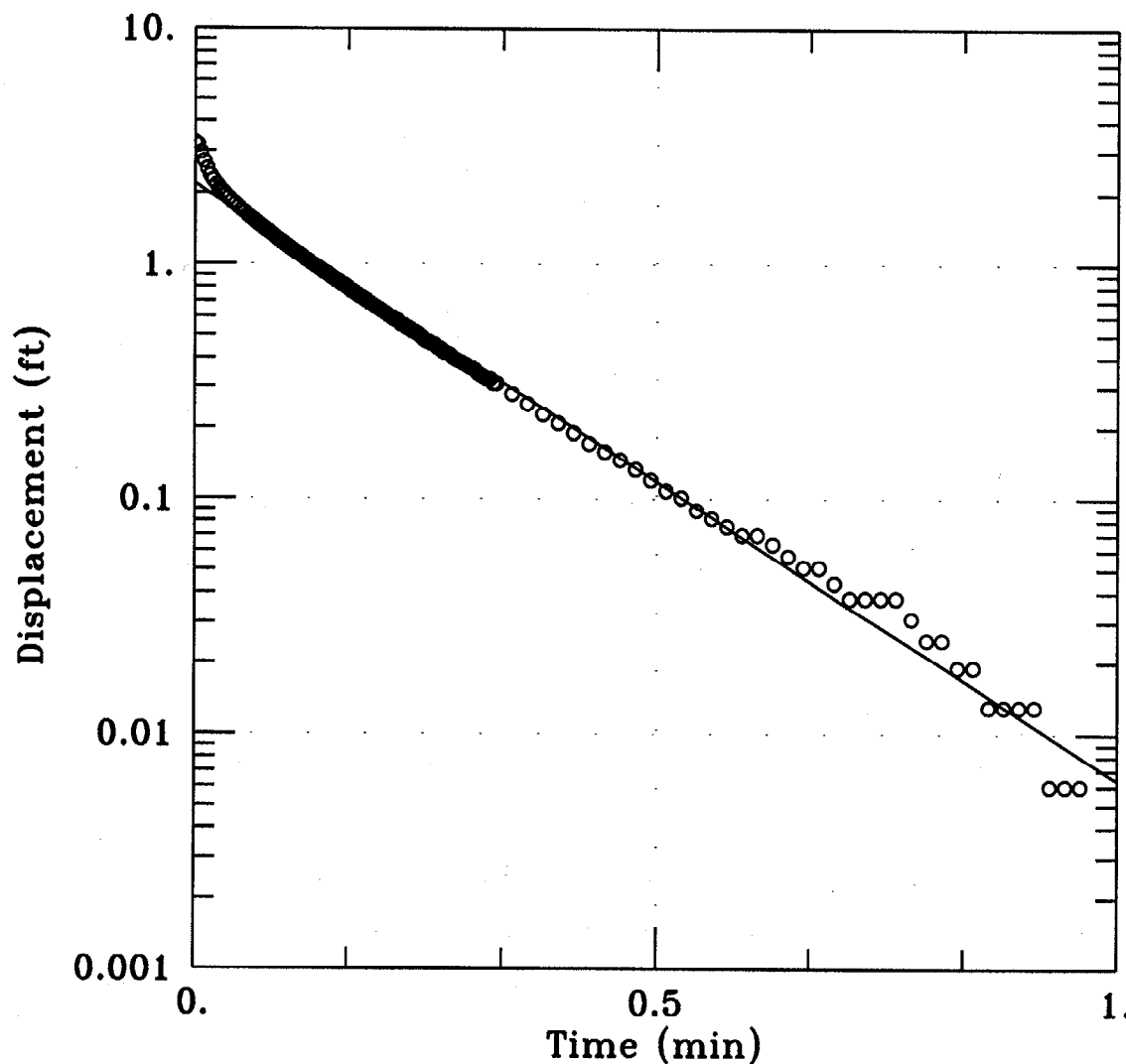
Client: LANTDIV

Company: Baker Environmental, Inc.

Location: Site 93 - MCB Camp Lejeune

Project: CTO-356

## 93-MW02IW Rising Head Test



DATA SET:  
93MW2IWR.DAT  
06/26/97

AQUIFER MODEL:  
Unconfined  
SOLUTION METHOD:  
Bower-Rice

PROJECT DATA:  
test date: June 2, 1997

TEST DATA:  
H0 = 3.232 ft  
rc = 0.083 ft  
rw = 0.542 ft  
L = 5. ft  
b = 69. ft  
H = 43.87 ft

PARAMETER ESTIMATES:  
K = 139.2 ft/day  
y0 = 2.184 ft

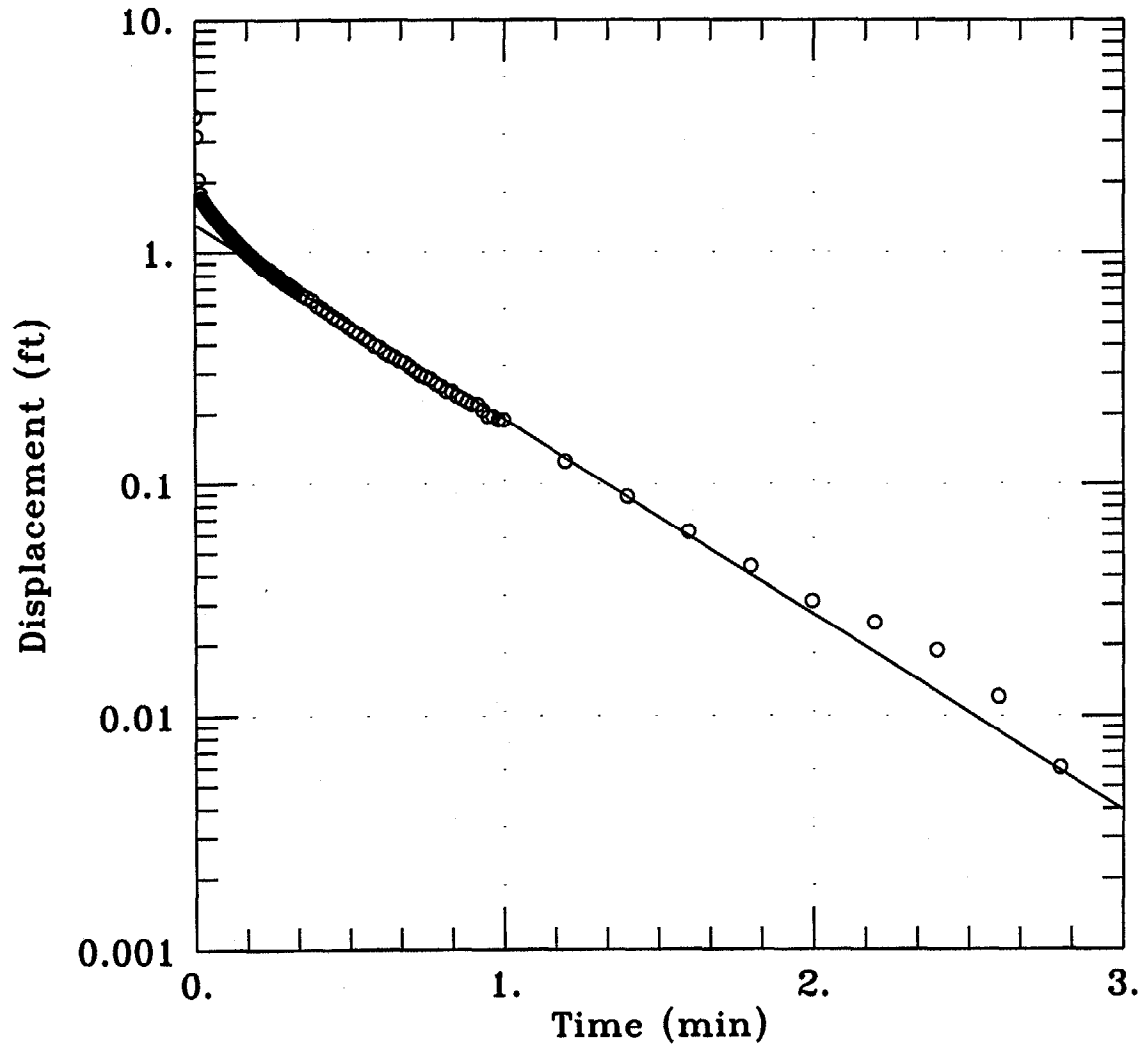
Client: LANTDIV

Company: Baker Environmental, Inc.

Location: Site 93 - MCB Camp Lejeune

Project: CTO-356

## 93-MW03 Rising Head Test



DATA SET:  
93MW3R.DAT  
07/15/97

AQUIFER MODEL:  
Unconfined  
SOLUTION METHOD:  
Bouwer-Rice

PROJECT DATA:  
test date: May 31, 1997

TEST DATA:  
H0 = 3.839 ft  
rc = 0.083 ft  
rw = 0.542 ft  
L = 10. ft  
b = 69. ft  
H = 10.38 ft

PARAMETER ESTIMATES:  
K = 22.75 ft/day  
y0 = 1.308 ft

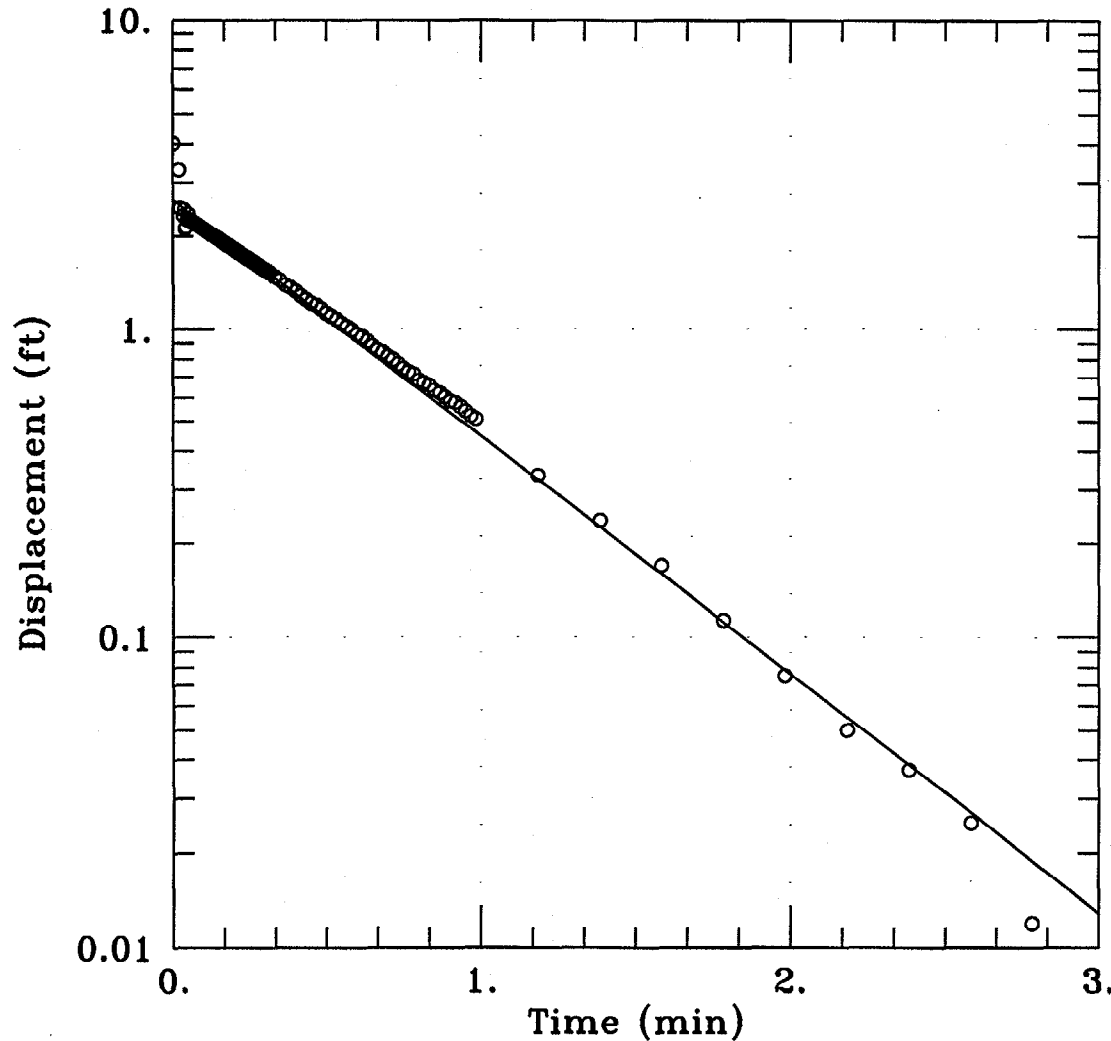
Client: LANTDIV

Company: Baker Environmental, Inc.

Location: Site 93 - MCB Camp Lejeune

Project: CT0-356

## 93-MW03IW Falling Head Test



DATA SET:  
93MW3IWF.DAT  
07/15/97

AQUIFER MODEL:  
Unconfined  
SOLUTION METHOD:  
Bouwer-Rice

PROJECT DATA:  
test date: May 31, 1997

TEST DATA:  
H0 = 4.016 ft  
rc = 0.083 ft  
rw = 0.542 ft  
L = 5. ft  
b = 69. ft  
H = 45.05 ft

PARAMETER ESTIMATES:  
K = 42.51 ft/day  
y0 = 2.633 ft

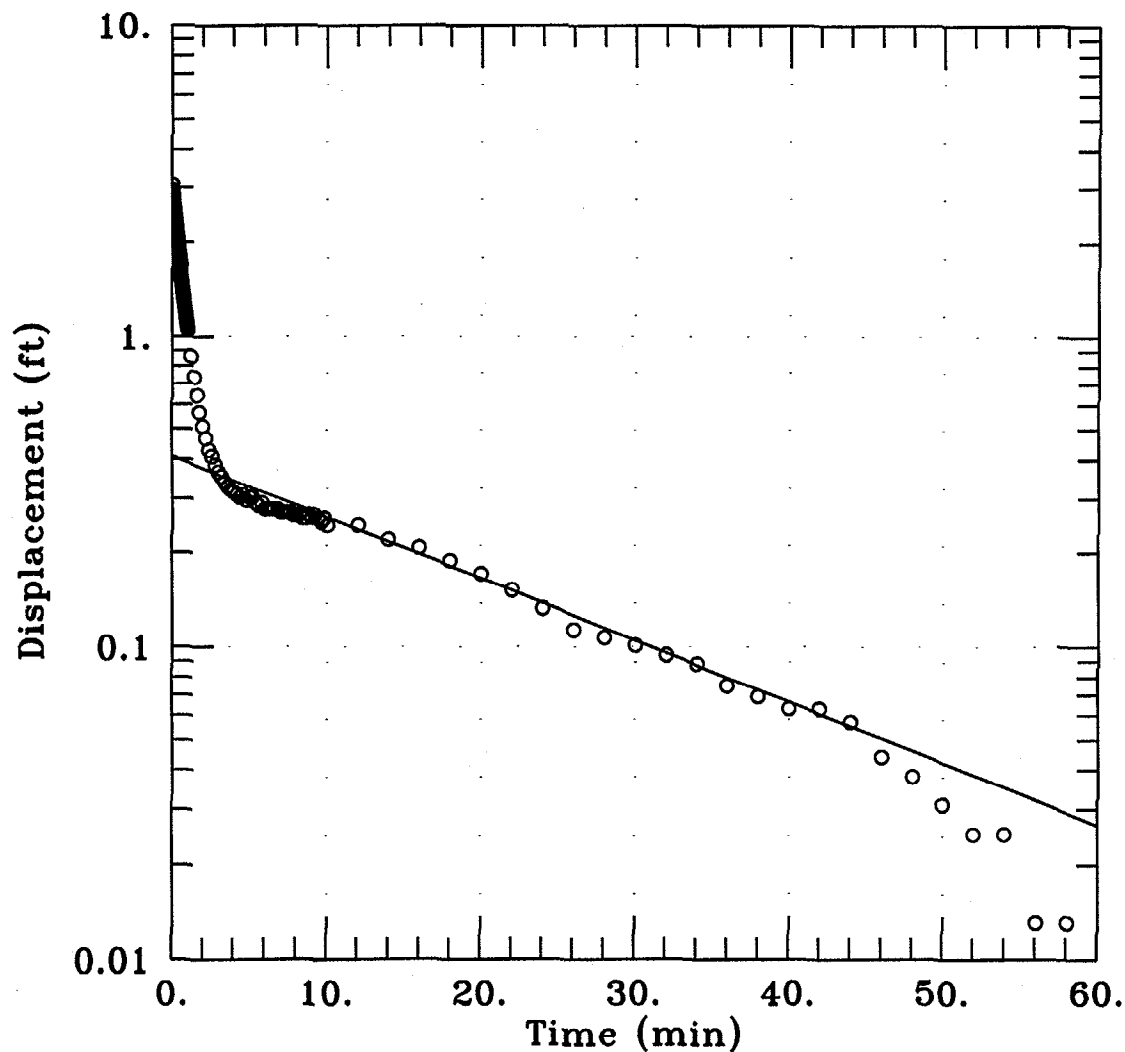
Client: LANTDIV

Company: Baker Environmental, Inc.

Location: Site 93 - MCB Camp Lejeune

Project: CTO-356

## 93-MW03IW Rising Head Test



DATA SET:  
93MW3IWR.DAT  
07/15/97

AQUIFER MODEL:  
Unconfined  
SOLUTION METHOD:  
Bouwer-Rice

PROJECT DATA:  
test date: May 31, 1997

TEST DATA:  
H<sub>0</sub> = 3.077 ft  
r<sub>c</sub> = 0.083 ft  
r<sub>w</sub> = 0.542 ft  
L = 5. ft  
b = 69. ft  
H = 45.05 ft

PARAMETER ESTIMATES:  
K = 1.091 ft/day  
y<sub>0</sub> = 0.4093 ft

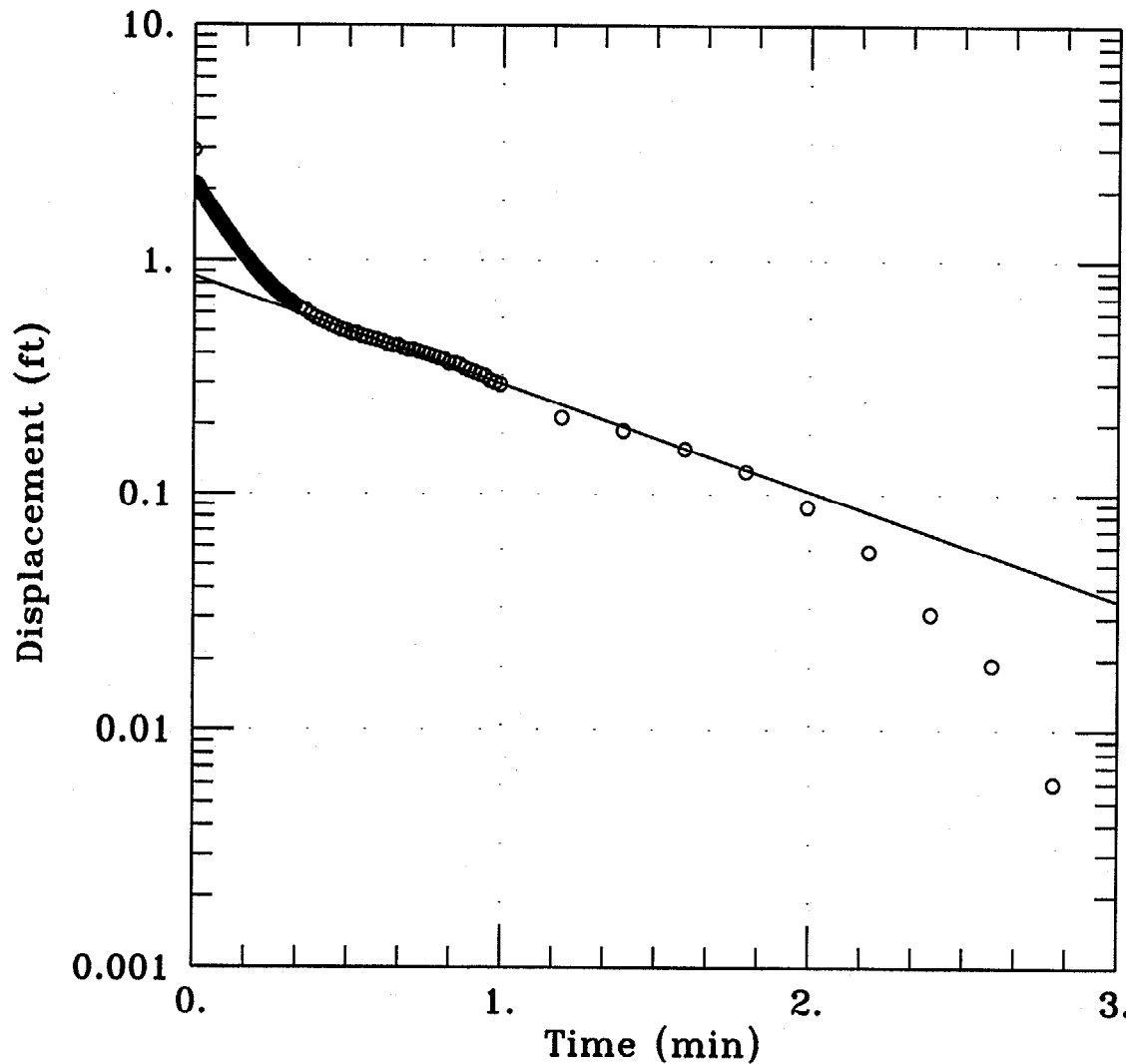
Client: LANTDIV

Company: Baker Environmental, Inc.

Location: Site 93 - MCB Camp Lejeune

Project: CTO-356

## 93-MW04 Rising Head Test



DATA SET:  
93MW4R.DAT  
07/15/97

AQUIFER MODEL:  
Unconfined  
SOLUTION METHOD:  
Bouwer-Rice

PROJECT DATA:  
test date: May 31, 1997

TEST DATA:  
H0 = 2.924 ft  
rc = 0.083 ft  
rw = 0.542 ft  
L = 10. ft  
b = 49. ft  
H = 10. ft

PARAMETER ESTIMATES:  
K = 12.53 ft/day  
y0 = 0.8566 ft

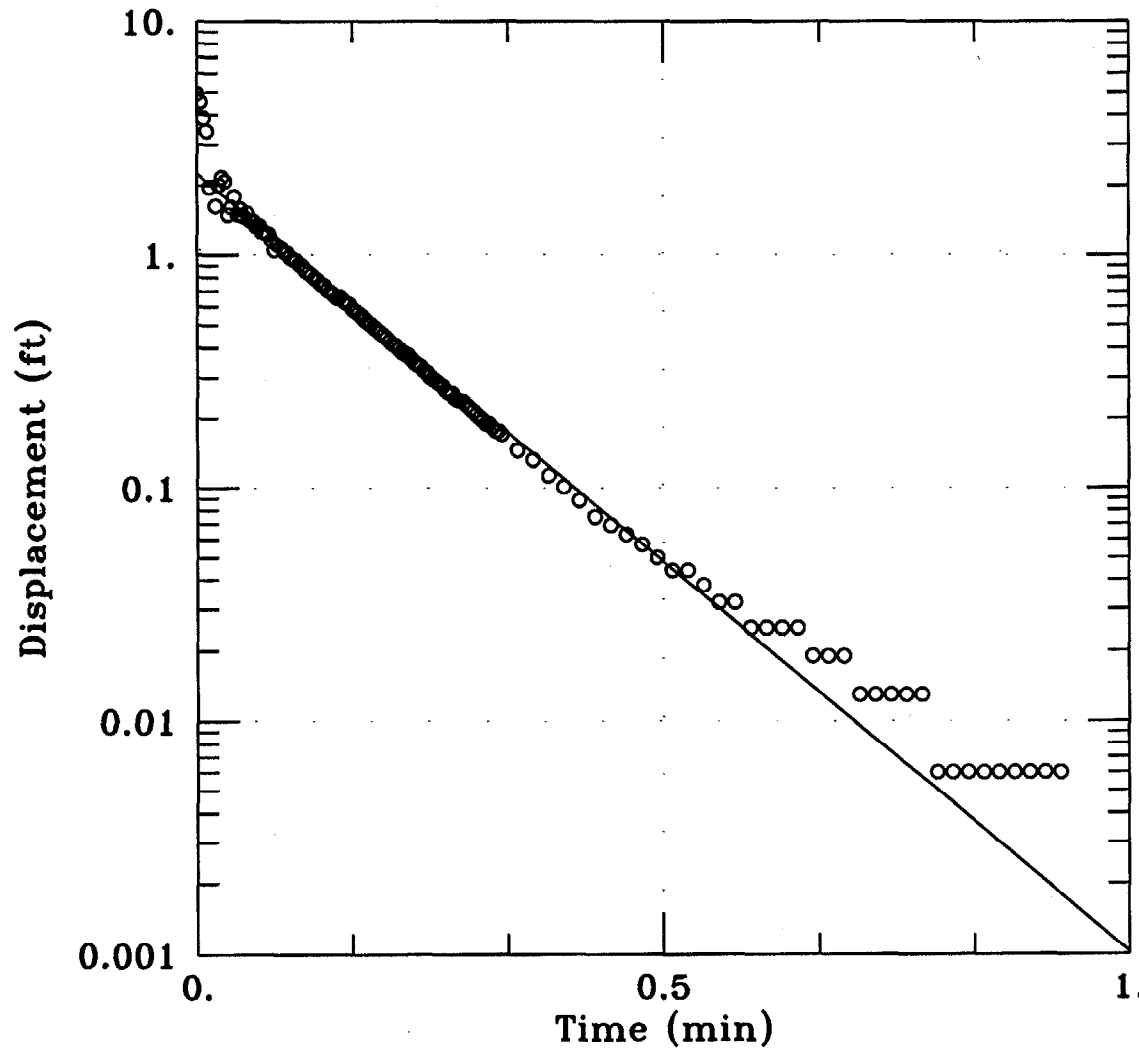
Client: LANTDIV

Company: Baker Environmental, Inc.

Location: Site 93 - MCB Camp Lejeune

Project: CTO-356

## 93-MW04IW Falling Head Test



DATA SET:  
93MW4IWF.DAT  
06/26/97

AQUIFER MODEL:  
Unconfined  
SOLUTION METHOD:  
Bouwer-Rice

PROJECT DATA:  
test date: May 31, 1997

TEST DATA:  
H0 = 4.924 ft  
rc = 0.083 ft  
rw = 0.542 ft  
L = 5. ft  
b = 49. ft  
H = 43.78 ft

PARAMETER ESTIMATES:  
K = 199. ft/day  
y0 = 2.246 ft



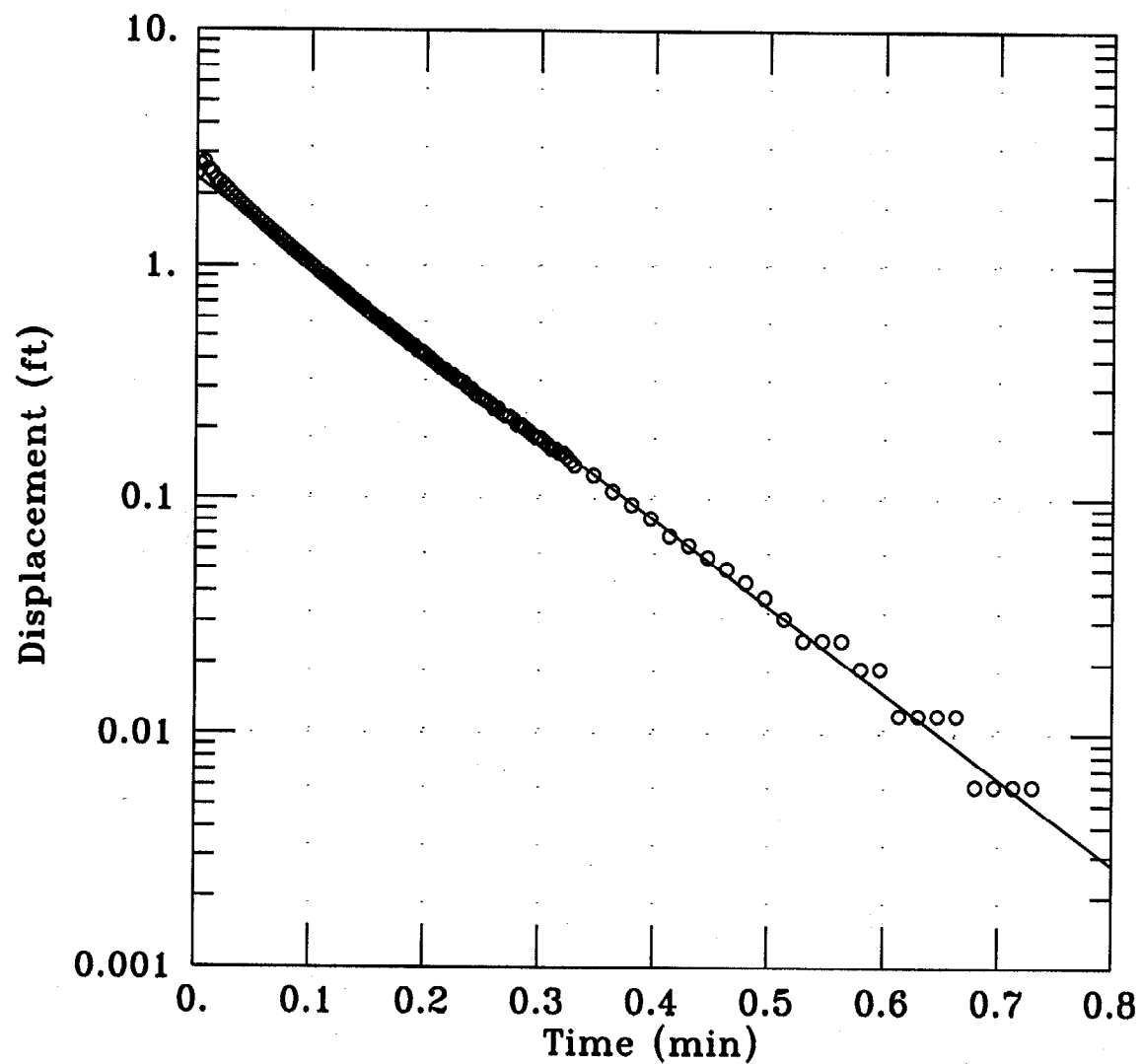
Client: LANTDIV

Company: Baker Environmental, Inc.

Location: Site 93 - MCB Camp Lejeune

Project: CTO-356

## 93-MW04IW Rising Head Test



DATA SET:  
93MW4IWR.DAT  
06/26/97

AQUIFER MODEL:  
Unconfined  
SOLUTION METHOD:  
Bouwer-Rice

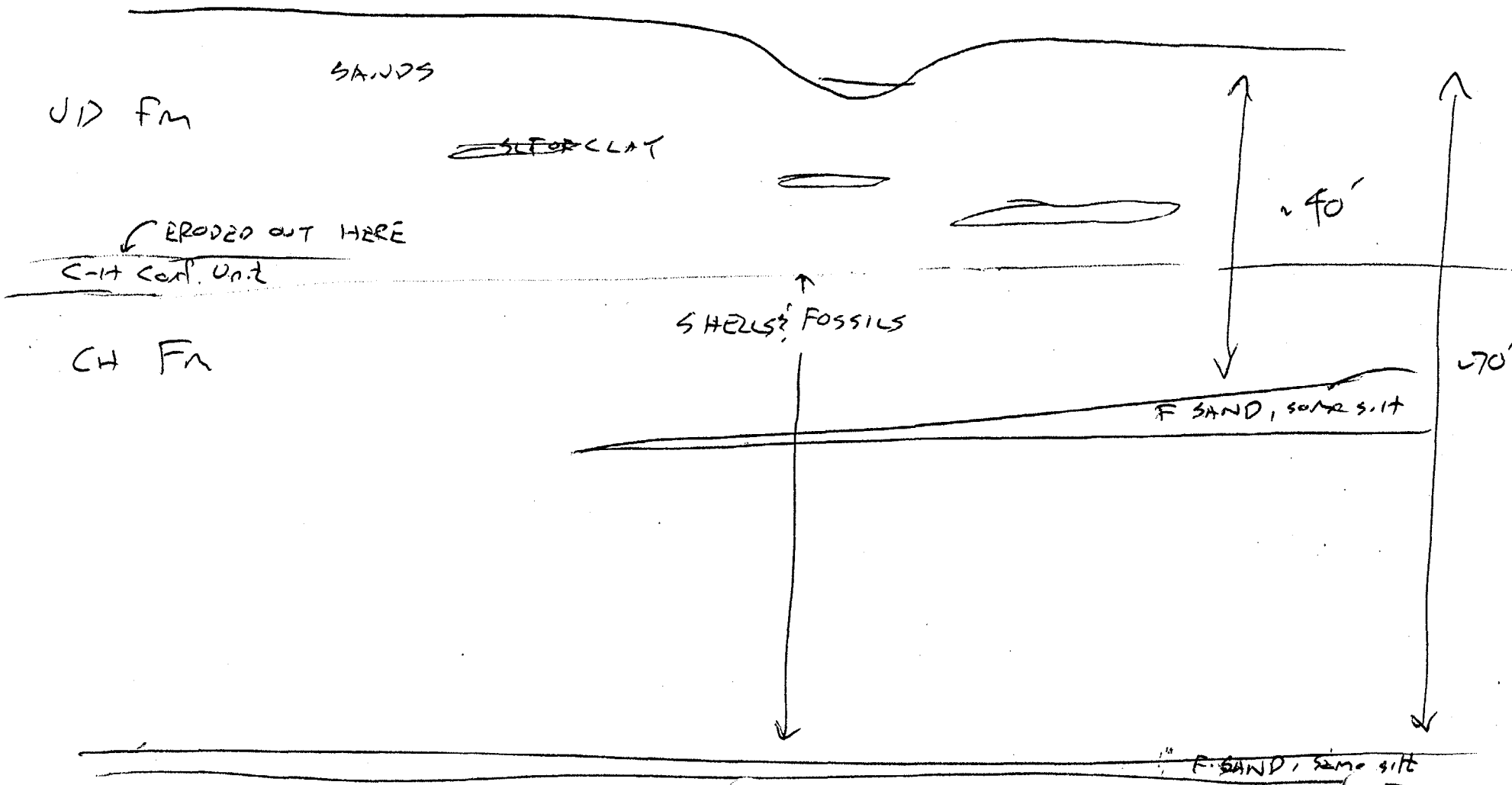
PROJECT DATA:  
test date: May 31, 1997

TEST DATA:  
 $H_0 = 2.431$  ft  
 $r_c = 0.083$  ft  
 $r_w = 0.542$  ft  
 $L = 5$  ft  
 $b = 49$  ft  
 $H = 43.78$  ft

PARAMETER ESTIMATES:  
 $K = 218.1$  ft/day  
 $y_0 = 2.345$  ft

93

89



18920000

# 89 - PERMS (14)

89-MW03 IW/DW

4/IW/DW

05/IW/DW

06 IW/DW

07 IW/DW

08 IW/DW

89-TW 24 IW

25 IW

26 IW

27 IW

28 IW

29 IW

30 IW

# 89 - TEMPS (7)

ALL

INT

93-MW01/IW

02/IW/DW

03/IW<sup>ps</sup>

04/04 IW<sup>ps</sup>

05/IW

93

PERMS

(11)

**APPENDIX H**  
**DATA FREQUENCY SUMMARIES**

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**SITE 89 SUBSURFACE SOIL - ORGANICS**

**FREQUENCY OF DETECTION SUMMARY**  
**SUBSURFACE SOIL - TCL ORGANICS**  
**PHASE II - FIXED BASE LABORATORY**  
**RI/FS CTO-0356**  
**OPERABLE UNIT NO. 16 (SITE 89)**  
**MCB CAMP LEJEUNE, NORTH CAROLINA**

SAMPLE ID	IR89-MW03IW-02	IR89-MW03DW-02	IR89-MW03IW-05	IR89-MW03DW-05	IR89-MW04-03	IR89-MW04DW-03
PHASE	PHASE II	PHASE II	PHASE II	PHASE II	PHASE II	PHASE II
DATE SAMPLED	05/15/97	05/15/97	05/15/97	05/15/97	04/15/97	04/17/97
DEPTH	3-5'	3-5'	9-11'	9-11'	5-7'	5-7'
<b>VOLATILES (ug/kg)</b>						
1,1,1-TRICHLOROETHANE	12 U	12 U	13 U	12 U	13 U	12 U
1,1,2,2-TETRACHLOROETHANE	61	98	29	20	13 U	12 U
1,1,2-TRICHLOROETHANE	12 U	12 U	13 U	12 U	13 U	12 U
1,1-DICHLOROETHANE	12 U	12 U	13 U	12 U	13 U	12 U
1,1-DICHLOROETHENE	12 U	12 U	13 U	12 U	13 U	12 U
1,2-DICHLOROETHANE	12 U	12 U	13 U	12 U	13 U	12 U
1,2-DICHLOROETHENE (TOTAL)	33 J	9 J	41	12 U	13 U	12 U
1,2-DICHLOROPROPANE	12 U	12 U	13 U	12 U	13 U	12 U
2-BUTANONE	12 U	12 U	13 U	12 U	13 U	12 U
2-HEXANONE	12 U	12 U	13 U	12 U	13 U	12 U
4-METHYL-2-PENTANONE	12 U	12 U	13 U	12 U	13 U	12 U
ACETONE	16 J	13 J	16	20 J	90	15
BENZENE	12 U	12 U	13 U	12 U	13 U	12 U
BROMODICHLOROMETHANE	12 U	12 U	13 U	12 U	13 U	12 U
BROMOFORM	12 U	12 U	13 U	12 U	13 U	12 U
BROMOMETHANE	12 U	12 U	13 U	12 U	13 U	12 U
CARBON DISULFIDE	12 U	12 U	13 U	12 U	13 U	12 U
CARBON TETRACHLORIDE	12 U	12 U	13 U	12 U	13 U	12 U
CHLOROBENZENE	12 U	12 U	13 U	12 U	13 U	12 U
CHLOROETHANE	12 U	12 U	13 U	12 U	13 U	12 U
CHLOROFORM	12 U	12 U	13 U	12 U	13 U	12 U
CHLOROMETHANE	12 U	12 U	13 U	12 U	13 U	12 U
CIS-1,3-DICHLOROPROPENE	12 U	12 U	13 U	12 U	13 U	12 U
DIBROMOCHLOROMETHANE	12 U	12 U	13 U	12 U	13 U	12 U
ETHYLBENZENE	12 U	12 U	13 U	12 U	13 U	12 U
METHYLENE CHLORIDE	12 U	12 U	13 U	12 U	13 U	12 U
STYRENE	12 U	12 U	13 U	12 U	13 U	12 U
TETRACHLOROETHENE	4 J	12 U	5 J	12 U	13 U	12 U
TOLUENE	12 U	12 U	13 U	12 U	13 U	12 U
TRANS-1,3-DICHLOROPROPENE	12 U	12 U	13 U	12 U	13 U	12 U
TRICHLOROETHENE	30 J	23	25	3 J	13 U	12 U
VINYL CHLORIDE	12 U	12 U	13 U	12 U	13 U	12 U
XYLENE (TOTAL)	12 U	12 U	13 U	12 U	13 U	12 U

**FREQUENCY OF DETECTION SUMMARY**  
**SUBSURFACE SOIL - TCL ORGANICS**  
**PHASE II - FIXED BASE LABORATORY**  
**RI/FS CTO-0356**  
**OPERABLE UNIT NO. 16 (SITE 89)**  
**MCB CAMP LEJEUNE, NORTH CAROLINA**

SAMPLE ID	IR89-MW03IW-02	IR89-MW03DW-02	IR89-MW03IW-05	IR89-MW03DW-05	IR89-MW04-03	IR89-MW04DW-03
PHASE	PHASE II	PHASE II	PHASE II	PHASE II	PHASE II	PHASE II
DATE SAMPLED	05/15/97	05/15/97	05/15/97	05/15/97	04/15/97	04/17/97
DEPTH	3-5'	3-5'	9-11'	9-11'	5-7'	5-7'
<b>SEMIVOLATILES (ug/kg)</b>						
1,2,4-TRICHLOROBENZENE	380 U	380 U	430 U	410 U	430 U	410 U
1,2-DICHLOROBENZENE	380 U	380 U	430 U	410 U	430 U	410 U
1,3-DICHLOROBENZENE	380 U	380 U	430 U	410 U	430 U	410 U
1,4-DICHLOROBENZENE	380 U	380 U	430 U	410 U	430 U	410 U
2,2'-OXYBIS(1-CHLOROPROPANE)	380 U	380 U	430 U	410 U	430 U	410 U
2,4,5-TRICHLOROPHENOL	950 U	960 U	1100 U	1000 U	1100 U	1000 U
2,4,6-TRICHLOROPHENOL	380 U	380 U	430 U	410 U	430 U	410 U
2,4-DICHLOROPHENOL	380 U	380 U	430 U	410 U	430 U	410 U
2,4-DIMETHYLPHENOL	380 U	380 U	430 U	410 U	430 U	410 U
2,4-DINITROPHENOL	950 U	960 U	1100 U	1000 U	1100 U	1000 U
2,4-DINITROTOLUENE	380 U	380 U	430 U	410 U	430 U	410 U
2,6-DINITROTOLUENE	380 U	380 U	430 U	410 U	430 U	410 U
2-CHLORONAPHTHALENE	380 U	380 U	430 U	410 U	430 U	410 U
2-CHLOROPHENOL	380 U	380 U	430 U	410 U	430 U	410 U
2-METHYLNAPHTHALENE	380 U	380 U	430 U	410 U	430 U	410 U
2-METHYLPHENOL	380 U	380 U	430 U	410 U	430 U	410 U
2-NITROANILINE	950 U	960 U	1100 U	1000 U	1100 U	1000 U
2-NITROPHENOL	380 U	380 U	430 U	410 U	430 U	410 U
3,3'-DICHLOROBENZIDINE	380 U	380 U	430 U	410 U	430 U	410 U
3-NITROANILINE	950 U	960 U	1100 U	1000 U	1100 U	1000 U
4,6-DINITRO-2-METHYLPHENOL	950 U	960 U	1100 U	1000 U	1100 U	1000 U
4-BROMOPHENYL-PHENYLETHER	380 U	380 U	430 U	410 U	430 U	410 U
4-CHLORO-3-METHYLPHENOL	380 U	380 U	430 U	410 U	430 U	410 U
4-CHLOROANILINE	380 U	380 U	430 U	410 U	430 U	410 U
4-CHLOROPHENYL-PHENYLETHER	380 U	380 U	430 U	410 U	430 U	410 U
4-METHYLPHENOL	380 U	380 U	430 U	410 U	430 U	410 U
4-NITROANILINE	950 U	960 U	1100 U	1000 U	1100 U	1000 U
4-NITROPHENOL	950 U	960 U	1100 U	1000 U	1100 U	1000 U
ACENAPHTHENE	380 U	380 U	430 U	410 U	430 U	410 U
ACENAPHTHYLENE	380 U	380 U	430 U	410 U	430 U	410 U
ANTHRACENE	380 U	380 U	430 U	410 U	430 U	410 U
BENZO(A)ANTHRACENE	380 U	380 U	430 U	410 U	430 U	410 U
BENZO(A)PYRENE	380 U	380 U	430 U	410 U	430 U	410 U

FREQUENCY OF DETECTION SUMMARY  
 SUBSURFACE SOIL - TCL ORGANICS  
 PHASE II - FIXED BASE LABORATORY  
 RI/FS CTO-0356  
 OPERABLE UNIT NO. 16 (SITE 89)  
 MCB CAMP LEJEUNE, NORTH CAROLINA

SAMPLE ID	IR89-MW03IW-02	IR89-MW03DW-02	IR89-MW03IW-05	IR89-MW03DW-05	IR89-MW04-03	IR89-MW04DW-03
PHASE	PHASE II	PHASE II	PHASE II	PHASE II	PHASE II	PHASE II
DATE SAMPLED	05/15/97	05/15/97	05/15/97	05/15/97	04/15/97	04/17/97
DEPTH	3-5'	3-5'	9-11'	9-11'	5-7'	5-7'
<b>SEMIVOLATILES (ug/kg) (cont)</b>						
BENZO(B)FLUORANTHENE	380 U	380 U	430 U	410 U	430 U	410 U
BENZO(G,H,I)PERYLENE	380 U	380 U	430 U	410 U	430 U	410 U
BENZO(K)FLUORANTHENE	380 U	380 U	430 U	410 U	430 U	410 U
BIS(2-CHLOROETHOXY)METHANE	380 U	380 U	430 U	410 U	430 U	410 U
BIS(2-CHLOROETHYL)ETHER	380 U	380 U	430 U	410 U	430 U	410 U
BIS(2-ETHYLHEXYL)PHTHALATE	380 U	380 U	480	410 U	430 U	410 U
BUTYLBENZYLPHTHALATE	380 U	380 U	430 U	410 U	430 U	410 U
CARBAZOLE	380 U	380 U	430 U	410 U	430 U	410 U
CHRYSENE	380 UJ	380 U	430 U	410 U	430 U	410 U
DIBENZO(A,H)ANTHRACENE	380 U	380 U	430 U	410 U	430 U	410 U
DIBENZOFURAN	380 U	380 U	430 U	410 U	430 U	410 U
DIETHYLPHTHALATE	380 U	380 U	430 U	410 U	430 U	410 U
DIMETHYLPHTHALATE	380 U	380 U	430 U	410 U	430 U	410 U
DI-N-BUTYLPHTHALATE	380 U	380 U	430 U	410 U	430 U	410 U
DI-N-OCTYLPHTHALATE	380 UJ	380 U	430 U	410 U	430 U	410 U
FLUORANTHENE	380 UJ	43 J	43 J	410 U	430 U	410 U
FLUORENE	380 U	380 U	430 U	410 U	430 U	410 U
HEXACHLOROBENZENE	380 U	380 U	430 U	410 U	430 U	410 U
HEXACHLOROBUTADIENE	380 U	380 U	430 U	410 U	430 U	410 U
HEXACHLOROCYCLOPENTADIENE	380 U	380 U	430 U	410 U	430 U	410 U
HEXACHLOROETHANE	380 U	380 U	430 U	410 U	430 U	410 U
INDENO(1,2,3-CD)PYRENE	380 U	380 U	430 U	410 U	430 U	410 U
ISOPHORONE	380 U	380 U	430 U	410 U	430 U	410 U
NAPHTHALENE	380 U	380 U	430 U	410 U	430 U	410 U
NITROBENZENE	380 U	380 U	430 U	410 U	430 U	410 U
N-NITROSO-DI-N-PROPYLAMINE	380 U	380 U	430 U	410 U	430 U	410 U
N-NITROSODIPHENYLAMINE (1)	380 U	380 U	430 U	410 U	430 U	410 U
PENTACHLOROPHENOL	950 U	960 U	1100 U	1000 U	1100 U	1000 U
PHENANTHRENE	380 U	380 U	430 U	410 U	430 U	410 U
PHENOL	380 U	380 U	430 U	410 U	430 U	410 U
PYRENE	380 UJ	49 J	66 J	410 U	430 U	410 U



**FREQUENCY OF DETECTION SUMMARY**  
**SUBSURFACE SOIL - TCL ORGANICS**  
**PHASE II - FIXED BASE LABORATORY**  
**RI/FS CTO-0356**  
**OPERABLE UNIT NO. 16 (SITE 89)**  
**MCB CAMP LEJEUNE, NORTH CAROLINA**

SAMPLE ID	IR89-MW03IW-02	IR89-MW03DW-02	IR89-MW03IW-05	IR89-MW03DW-05	IR89-MW04-03	IR89-MW04DW-03
PHASE	PHASE II	PHASE II	PHASE II	PHASE II	PHASE II	PHASE II
DATE SAMPLED	05/15/97	05/15/97	05/15/97	05/15/97	04/15/97	04/17/97
DEPTH	3-5'	3-5'	9-11'	9-11'	5-7'	5-7'
<b>PESTICIDES/PCBS (ug/kg)</b>						
4,4'-DDD	19 J	NA	4.3 U	NA	4.2 UJ	NA
4,4'-DDE	17 J	NA	4.3 U	NA	4.2 UJ	NA
4,4'-DDT	91	NA	4.3 U	NA	4.2 UJ	NA
ALDRIN	1.9 UJ	NA	2.2 U	NA	2.1 UJ	NA
ALPHA-BHC	1.9 UJ	NA	1 UJ	NA	2.1 UJ	NA
ALPHA-CHLORDANE	1.9 UJ	NA	2.2 U	NA	2.1 UJ	NA
BETA-BHC	1.9 UJ	NA	2.2 U	NA	2.1 UJ	NA
DELTA-BHC	1.9 UJ	NA	1 UJ	NA	2.1 UJ	NA
DIELDRIN	3.9 UJ	NA	4.3 U	NA	4.2 UJ	NA
ENDOSULFAN I	1.9 UJ	NA	2.2 U	NA	2.1 UJ	NA
ENDOSULFAN II	3.9 UJ	NA	4.3 U	NA	4.2 UJ	NA
ENDOSULFAN SULFATE	3.9 UJ	NA	4.3 U	NA	4.2 UJ	NA
ENDRIN	3.9 UJ	NA	4.3 U	NA	4.2 UJ	NA
ENDRIN ALDEHYDE	3.9 UJ	NA	4.3 U	NA	4.2 UJ	NA
ENDRIN KETONE	3.9 UJ	NA	4.3 U	NA	4.2 UJ	NA
GAMMA-BHC (LINDANE)	1.9 UJ	NA	2.2 U	NA	2.1 UJ	NA
GAMMA-CHLORDANE	1.9 UJ	NA	2.2 U	NA	2.1 UJ	NA
HEPTACHLOR	1.9 UJ	NA	2.2 U	NA	2.1 UJ	NA
HEPTACHLOR EPOXIDE	1.9 UJ	NA	2.2 U	NA	2.1 UJ	NA
METHOXYCHLOR	19 UJ	NA	22 U	NA	21 UJ	NA
TOXAPHENE	190 UJ	NA	220 U	NA	210 UJ	NA
AROCLOR-1016	39 UJ	NA	43 U	NA	42 UJ	NA
AROCLOR-1221	77 UJ	NA	86 U	NA	85 UJ	NA
AROCLOR-1232	39 UJ	NA	43 U	NA	42 UJ	NA
AROCLOR-1242	39 UJ	NA	43 U	NA	42 UJ	NA
AROCLOR-1248	39 UJ	NA	43 U	NA	42 UJ	NA
AROCLOR-1254	39 UJ	NA	43 U	NA	42 UJ	NA
AROCLOR-1260	39 UJ	NA	43 U	NA	42 UJ	NA

FREQUENCY OF DETECTION SUMMARY  
 SUBSURFACE SOIL - TCL ORGANICS  
 PHASE II - FIXED BASE LABORATORY  
 RI/FS CTO-0356  
 OPERABLE UNIT NO. 16 (SITE 89)  
 MCB CAMP LEJEUNE, NORTH CAROLINA

SAMPLE ID	IR89-MW04-05	IR89-MW04DW-05	IR89-MW05-03	IR89-MW05IW-03	IR89-MW05DW-03	IR89-MW05-06
PHASE	PHASE II	PHASE II	PHASE II	PHASE II	PHASE II	PHASE II
DATE SAMPLED	04/15/97	04/17/97	04/20/97	04/18/97	04/19/97	04/20/97
DEPTH	9-11'	9-11'	5-7'	5-7'	5-7'	11-13'
<b>VOLATILES (ug/kg)</b>						
1,1,1-TRICHLOROETHANE	12 U	15 U	13 U	12 U	13 U	17 U
1,1,2,2-TETRACHLOROETHANE	12 U	15 U	13 U	12 U	13 U	17 U
1,1,2-TRICHLOROETHANE	12 U	15 U	13 U	12 U	13 U	17 U
1,1-DICHLOROETHANE	12 U	15 U	13 U	12 U	13 U	17 U
1,1-DICHLOROETHENE	12 U	15 U	13 U	12 U	13 U	17 U
1,2-DICHLOROETHANE	12 U	15 U	13 U	12 U	13 U	17 U
1,2-DICHLOROETHENE (TOTAL)	27	15 U	13 U	12 U	13 U	57
1,2-DICHLOROPROPANE	12 U	15 U	13 U	12 U	13 U	17 U
2-BUTANONE	12 U	15 U	13 U	12 U	13 U	17 U
2-HEXANONE	12 U	15 U	13 U	12 U	13 U	17 U
4-METHYL-2-PENTANONE	12 U	15 U	13 U	12 U	13 U	17 U
ACETONE	46	15 U	96 U	17	22 U	39 U
BENZENE	12 U	15 U	13 U	12 U	13 U	17 U
BROMODICHLOROMETHANE	12 U	15 U	13 U	12 U	13 U	17 U
BROMOFORM	12 U	15 U	13 U	12 U	13 U	17 U
BROMOMETHANE	12 U	15 U	13 U	12 U	13 U	17 U
CARBON DISULFIDE	12 U	15 U	13 U	12 U	13 U	4 J
CARBON TETRACHLORIDE	12 U	15 U	13 U	12 U	13 U	17 U
CHLOROBENZENE	12 U	15 U	13 U	12 U	13 U	17 U
CHLOROETHANE	12 U	15 U	13 U	12 U	13 U	17 U
CHLOROFORM	12 U	15 U	13 U	12 U	13 U	17 U
CHLOROMETHANE	12 U	15 U	13 U	12 U	13 U	17 U
CIS-1,3-DICHLOROPROPENE	12 U	15 U	13 U	12 U	13 U	17 U
DIBROMOCHLOROMETHANE	12 U	15 U	13 U	12 U	13 U	17 U
ETHYLBENZENE	12 U	15 U	13 U	12 U	13 U	17 U
METHYLENE CHLORIDE	12 U	15 U	13 U	12 U	13 U	17 U
STYRENE	12 U	15 U	13 U	12 U	13 U	17 U
TETRACHLOROETHENE	12 U	15 U	13 U	12 U	13 U	17 U
TOLUENE	12 U	15 U	13 U	12 U	13 U	17 U
TRANS-1,3-DICHLOROPROPENE	12 U	15 U	13 U	12 U	13 U	17 U
TRICHLOROETHENE	12 U	15 U	13 U	12 U	13 U	95
VINYL CHLORIDE	12 U	15 U	13 U	12 U	13 U	17 U
XYLENE (TOTAL)	12 U	15 U	13 U	12 U	13 U	17 U

**FREQUENCY OF DETECTION SUMMARY**  
**SUBSURFACE SOIL - TCL ORGANICS**  
**PHASE II - FIXED BASE LABORATORY**  
**RI/FS CTO-0356**  
**OPERABLE UNIT NO. 16 (SITE 89)**  
**MCB CAMP LEJEUNE, NORTH CAROLINA**

SAMPLE ID	IR89-MW04-05	IR89-MW04DW-05	IR89-MW05-03	IR89-MW05IW-03	IR89-MW05DW-03	IR89-MW05-06
PHASE	PHASE II	PHASE II	PHASE II	PHASE II	PHASE II	PHASE II
DATE SAMPLED	04/15/97	04/17/97	04/20/97	04/18/97	04/19/97	04/20/97
DEPTH	9-11'	9-11'	5-7'	5-7'	5-7'	11-13'
<b>SEMIVOLATILES (ug/kg)</b>						
1,2,4-TRICHLOROBENZENE	400 U	490 U	430 U	400 U	430 U	570 U
1,2-DICHLOROBENZENE	400 U	490 U	430 U	400 U	430 U	570 U
1,3-DICHLOROBENZENE	400 U	490 U	430 U	400 U	430 U	570 U
1,4-DICHLOROBENZENE	400 U	490 U	430 U	400 U	430 U	570 U
2,2'-OXYBIS(1-CHLOROPROPANE)	400 U	490 U	430 U	400 U	430 U	570 U
2,4,5-TRICHLOROPHENOL	990 U	1200 U	1100 U	1000 U	1100 U	1400 U
2,4,6-TRICHLOROPHENOL	400 U	490 U	430 U	400 U	430 U	570 U
2,4-DICHLOROPHENOL	400 U	490 U	430 U	400 U	430 U	570 U
2,4-DIMETHYLPHENOL	400 U	490 U	430 U	400 U	430 U	570 U
2,4-DINITROPHENOL	990 U	1200 U	1100 U	1000 U	1100 U	1400 U
2,4-DINITROTOLUENE	400 U	490 U	430 U	400 U	430 U	570 U
2,6-DINITROTOLUENE	400 U	490 U	430 U	400 U	430 U	570 U
2-CHLORONAPHTHALENE	400 U	490 U	430 U	400 U	430 U	570 U
2-CHLOROPHENOL	400 U	490 U	430 U	400 U	430 U	570 U
2-METHYLNAPHTHALENE	400 U	490 U	430 U	400 U	430 U	570 U
2-METHYLPHENOL	400 U	490 U	430 U	400 U	430 U	570 U
2-NITROANILINE	990 U	1200 U	1100 U	1000 U	1100 U	1400 U
2-NITROPHENOL	400 U	490 U	430 U	400 U	430 U	570 U
3,3'-DICHLOROBENZIDINE	400 U	490 U	430 U	400 U	430 U	570 U
3-NITROANILINE	990 UJ	1200 UJ	1100 U	1000 UJ	1100 U	1400 U
4,6-DINITRO-2-METHYLPHENOL	990 U	1200 U	1100 U	1000 U	1100 U	1400 U
4-BROMOPHENYL-PHENYLETHER	400 U	490 U	430 U	400 U	430 U	570 U
4-CHLORO-3-METHYLPHENOL	400 U	490 U	430 U	400 U	430 U	570 U
4-CHLOROANILINE	400 U	490 U	430 U	400 U	430 U	570 U
4-CHLOROPHENYL-PHENYLETHER	400 U	490 U	430 U	400 U	430 U	570 U
4-METHYLPHENOL	400 U	490 U	430 U	400 U	430 U	570 U
4-NITROANILINE	990 U	1200 U	1100 U	1000 U	1100 U	1400 U
4-NITROPHENOL	990 U	1200 U	1100 U	1000 U	1100 U	1400 U
ACENAPHTHENE	400 U	490 U	430 U	400 U	430 U	570 U
ACENAPHTHYLENE	400 U	490 U	430 U	400 U	430 U	570 U
ANTHRACENE	400 U	490 U	430 U	400 U	430 U	570 U
BENZO(A)ANTHRACENE	400 U	490 U	430 U	400 U	430 U	570 U
BENZO(A)PYRENE	400 U	490 U	430 U	400 U	430 U	570 U

FREQUENCY OF DETECTION SUMMARY  
 SUBSURFACE SOIL - TCL ORGANICS  
 PHASE II - FIXED BASE LABORATORY  
 RI/FS CTO-0356  
 OPERABLE UNIT NO. 16 (SITE 89)  
 MCB CAMP LEJEUNE, NORTH CAROLINA

SAMPLE ID	IR89-MW04-05	IR89-MW04DW-05	IR89-MW05-03	IR89-MW05IW-03	IR89-MW05DW-03	IR89-MW05-06
PHASE	PHASE II	PHASE II	PHASE II	PHASE II	PHASE II	PHASE II
DATE SAMPLED	04/15/97	04/17/97	04/20/97	04/18/97	04/19/97	04/20/97
DEPTH	9-11'	9-11'	5-7'	5-7'	5-7'	11-13'
<b>SEMIVOLATILES (ug/kg) (cont)</b>						
BENZO(B)FLUORANTHENE	400 U	490 U	430 U	400 U	430 U	570 U
BENZO(G,H,I)PERYLENE	400 U	490 U	430 U	400 U	430 U	570 U
BENZO(K)FLUORANTHENE	400 U	490 U	430 U	400 U	430 U	570 U
BIS(2-CHLOROETHOXY)METHANE	400 U	490 U	430 U	400 U	430 U	570 U
BIS(2-CHLOROETHYL)ETHER	400 U	490 U	430 U	400 U	430 U	570 U
BIS(2-ETHYLHEXYL)PHTHALATE	98 J	490 U	87 J	42 J	430 U	290 J
BUTYLBENZYLPHTHALATE	400 U	490 U	430 U	400 U	430 U	570 U
CARBAZOLE	400 U	490 U	430 U	400 U	430 U	570 U
CHRYSENE	400 U	490 U	430 U	400 U	430 U	570 U
DIBENZO(A,H)ANTHRACENE	400 U	490 U	430 U	400 U	430 U	570 U
DIBENZOFURAN	400 U	490 U	430 U	400 U	430 U	570 U
DIETHYLPHTHALATE	400 U	490 U	430 U	400 U	430 U	570 U
DIMETHYLPHTHALATE	400 U	490 U	430 U	400 U	430 U	570 U
DI-N-BUTYLPHTHALATE	400 U	490 U	430 U	400 U	430 U	570 U
DI-N-OCTYLPHTHALATE	400 U	490 U	430 U	400 U	430 U	570 U
FLUORANTHENE	400 U	490 U	430 U	400 U	430 U	570 U
FLUORENE	400 U	490 U	430 U	400 U	430 U	570 U
HEXACHLOROBENZENE	400 U	490 U	430 U	400 U	430 U	570 U
HEXACHLOROBUTADIENE	400 U	490 U	430 U	400 U	430 U	570 U
HEXACHLOROCYCLOPENTADIENE	400 U	490 U	430 U	400 U	430 U	570 U
HEXACHLOROETHANE	400 U	490 U	430 U	400 U	430 U	570 U
INDENO(1,2,3-CD)PYRENE	400 U	490 U	430 U	400 U	430 U	570 U
ISOPHORONE	400 U	490 U	430 U	400 U	430 U	570 U
NAPHTHALENE	400 U	490 U	430 U	400 U	430 U	570 U
NITROBENZENE	400 U	490 U	430 U	400 U	430 U	570 U
N-NITROSO-DI-N-PROPYLAMINE	400 U	490 U	430 U	400 U	430 U	570 U
N-NITROSODIPHENYLAMINE (1)	400 U	490 U	430 U	400 U	430 U	570 U
PENTACHLOROPHENOL	990 U	1200 U	1100 U	1000 U	1100 U	1400 U
PHENANTHRENE	400 U	490 U	430 U	400 U	430 U	570 U
PHENOL	400 U	490 U	430 U	400 U	430 U	570 U
PYRENE	400 U	490 U	430 U	400 U	430 U	570 U

**FREQUENCY OF DETECTION SUMMARY**  
**SUBSURFACE SOIL - TCL ORGANICS**  
**PHASE II - FIXED BASE LABORATORY**  
**RI/FS CTO-0356**  
**OPERABLE UNIT NO. 16 (SITE 89)**  
**MCB CAMP LEJEUNE, NORTH CAROLINA**

SAMPLE ID	IR89-MW04-05	IR89-MW04DW-05	IR89-MW05-03	IR89-MW05IW-03	IR89-MW05DW-03	IR89-MW05-06
PHASE	PHASE II	PHASE II	PHASE II	PHASE II	PHASE II	PHASE II
DATE SAMPLED	04/15/97	04/17/97	04/20/97	04/18/97	04/19/97	04/20/97
DEPTH	9-11'	9-11'	5-7'	5-7'	5-7'	11-13'
<b>PESTICIDES/PCBS (ug/kg)</b>						
4,4'-DDD	4 UJ	NA	NA	12 UJ	NA	NA
4,4'-DDE	4 UJ	NA	NA	4 UJ	NA	NA
4,4'-DDT	4 UJ	NA	NA	4 UJ	NA	NA
ALDRIN	2 UJ	NA	NA	2 UJ	NA	NA
ALPHA-BHC	2 UJ	NA	NA	2 UJ	NA	NA
ALPHA-CHLORDANE	2 UJ	NA	NA	2 UJ	NA	NA
BETA-BHC	2 UJ	NA	NA	2 UJ	NA	NA
DELTA-BHC	2 UJ	NA	NA	2 UJ	NA	NA
DIELDRIN	4 UJ	NA	NA	4 UJ	NA	NA
ENDOSULFAN I	2 UJ	NA	NA	2 UJ	NA	NA
ENDOSULFAN II	4 UJ	NA	NA	4 UJ	NA	NA
ENDOSULFAN SULFATE	4 UJ	NA	NA	4 UJ	NA	NA
ENDRIN	4 UJ	NA	NA	4 UJ	NA	NA
ENDRIN ALDEHYDE	4 UJ	NA	NA	4 UJ	NA	NA
ENDRIN KETONE	4 UJ	NA	NA	4 UJ	NA	NA
GAMMA-BHC (LINDANE)	2 UJ	NA	NA	2 UJ	NA	NA
GAMMA-CHLORDANE	2 UJ	NA	NA	2 UJ	NA	NA
HEPTACHLOR	2 UJ	NA	NA	2 UJ	NA	NA
HEPTACHLOR EPOXIDE	2 UJ	NA	NA	2 UJ	NA	NA
METHOXYCHLOR	20 UJ	NA	NA	20 UJ	NA	NA
TOXAPHENE	200 UJ	NA	NA	200 UJ	NA	NA
AROCLOR-1016	40 UJ	NA	NA	40 UJ	NA	NA
AROCLOR-1221	81 UJ	NA	NA	80 UJ	NA	NA
AROCLOR-1232	40 UJ	NA	NA	40 UJ	NA	NA
AROCLOR-1242	40 UJ	NA	NA	40 UJ	NA	NA
AROCLOR-1248	40 UJ	NA	NA	40 UJ	NA	NA
AROCLOR-1254	40 UJ	NA	NA	40 UJ	NA	NA
AROCLOR-1260	40 UJ	NA	NA	40 UJ	NA	NA

FREQUENCY OF DETECTION SUMMARY  
 SUBSURFACE SOIL - TCL ORGANICS  
 PHASE II - FIXED BASE LABORATORY  
 RI/FS CTO-0356  
 OPERABLE UNIT NO. 16 (SITE 89)  
 MCB CAMP LEJEUNE, NORTH CAROLINA

SAMPLE ID	IR89-MW05IW-06	IR89-MW05DW-06	IR89-MW06IW-01	IR89-MW06DW-01	IR89-MW06IW-02	IR89-MW06DW-02
PHASE	PHASE II	PHASE II	PHASE II	PHASE II	PHASE II	PHASE II
DATE SAMPLED	04/18/97	04/19/97	05/02/97	05/02/97	05/02/97	05/02/97
DEPTH	11-13'	11-13'	1-3'	1-3'	3-5'	3-5'
<b>VOLATILES (ug/kg)</b>						
1,1,1-TRICHLOROETHANE	14 U	13 U	12 U	11 U	12 U	12 U
1,1,2,2-TETRACHLOROETHANE	14 U	13 U	12 U	11 U	12 U	12 U
1,1,2-TRICHLOROETHANE	14 U	13 U	12 U	11 U	12 U	12 U
1,1-DICHLOROETHANE	14 U	13 U	12 U	11 U	12 U	12 U
1,1-DICHLOROETHENE	14 U	13 U	12 U	11 U	12 U	12 U
1,2-DICHLOROETHANE	14 U	13 U	12 U	11 U	12 U	12 U
1,2-DICHLOROETHENE (TOTAL)	13 J	68	12 U	11 U	12 U	12 U
1,2-DICHLOROPROPANE	14 U	13 U	12 U	11 U	12 U	12 U
2-BUTANONE	17 J	13 U	12 U	11 U	12 U	12 U
2-HEXANONE	14 U	13 U	12 U	11 U	12 U	12 U
4-METHYL-2-PENTANONE	14 U	13 U	12 U	11 U	12 U	12 U
ACETONE	100	64 UJ	14 J	11 U	13	12 U
BENZENE	14 U	13 U	12 U	11 U	12 U	12 U
BROMODICHLOROMETHANE	14 U	13 U	12 U	11 U	12 U	12 U
BROMOFORM	14 U	13 U	12 U	11 U	12 U	12 U
BROMOMETHANE	14 U	13 U	12 U	11 U	12 U	12 U
CARBON DISULFIDE	14 U	13 U	12 U	11 U	12 U	12 U
CARBON TETRACHLORIDE	14 U	13 U	12 U	11 U	12 U	12 U
CHLOROBENZENE	14 U	13 U	12 U	11 U	12 U	12 U
CHLOROETHANE	14 U	13 U	12 U	11 U	12 U	12 U
CHLOROFORM	14 U	13 U	12 U	11 U	12 U	12 U
CHLOROMETHANE	14 U	13 U	12 U	11 U	12 U	12 U
CIS-1,3-DICHLOROPROPENE	14 U	13 U	12 U	11 U	12 U	12 U
DIBROMOCHLOROMETHANE	14 U	13 U	12 U	11 U	12 U	12 U
ETHYLBENZENE	14 U	13 U	12 U	11 U	12 U	12 U
METHYLENE CHLORIDE	14 U	13 U	12 U	11 U	12 U	12 U
STYRENE	14 U	13 U	12 U	11 U	12 U	12 U
TETRACHLOROETHENE	14 U	13 U	12 U	11 U	12 U	12 U
TOLUENE	110	13 U	12 U	11 U	12 U	12 U
TRANS-1,3-DICHLOROPROPENE	14 U	13 U	12 U	11 U	12 U	12 U
TRICHLOROETHENE	6 J	110	12 U	11 U	12 U	12 U
VINYL CHLORIDE	14 U	13 U	12 U	11 U	12 U	12 U
XYLENE (TOTAL)	14 U	13 U	12 U	11 U	12 U	12 U

**FREQUENCY OF DETECTION SUMMARY**  
**SUBSURFACE SOIL - TCL ORGANICS**  
**PHASE II - FIXED BASE LABORATORY**  
**RI/FS CTO-0356**  
**OPERABLE UNIT NO. 16 (SITE 89)**  
**MCB CAMP LEJEUNE, NORTH CAROLINA**

SAMPLE ID	IR89-MW05IW-06	IR89-MW05DW-06	IR89-MW06IW-01	IR89-MW06DW-01	IR89-MW06IW-02	IR89-MW06DW-02
PHASE	PHASE II	PHASE II	PHASE II	PHASE II	PHASE II	PHASE II
DATE SAMPLED	04/18/97	04/19/97	05/02/97	05/02/97	05/02/97	05/02/97
DEPTH	11-13'	11-13'	1-3'	1-3'	3-5'	3-5'
<b>SEMIVOLATILES (ug/kg)</b>						
1,2,4-TRICHLOROBENZENE	460 U	470 U	390 U	380 U	400 U	390 U
1,2-DICHLOROBENZENE	460 U	470 U	390 U	380 U	400 U	390 U
1,3-DICHLOROBENZENE	460 U	470 U	390 U	380 U	400 U	390 U
1,4-DICHLOROBENZENE	460 U	470 U	390 U	380 U	400 U	390 U
2,2'-OXYBIS(1-CHLOROPROPANE)	460 U	470 U	390 U	380 U	400 U	390 U
2,4,5-TRICHLOROPHENOL	1200 U	1200 U	980 U	940 U	1000 U	990 U
2,4,6-TRICHLOROPHENOL	460 U	470 U	390 U	380 U	400 U	390 U
2,4-DICHLOROPHENOL	460 U	470 U	390 U	380 U	400 U	390 U
2,4-DIMETHYLPHENOL	460 U	470 U	390 U	380 U	400 U	390 U
2,4-DINITROPHENOL	1200 U	1200 U	980 U	940 U	1000 U	990 U
2,4-DINITROTOLUENE	460 U	470 U	390 U	380 U	400 U	390 U
2,6-DINITROTOLUENE	460 U	470 U	390 U	380 U	400 U	390 U
2-CHLORONAPHTHALENE	460 U	470 U	390 U	380 U	400 U	390 U
2-CHLOROPHENOL	460 U	470 U	390 U	380 U	400 U	390 U
2-METHYLNAPHTHALENE	460 U	470 U	390 U	380 U	400 U	390 U
2-METHYLPHENOL	460 U	470 U	390 U	380 U	400 U	390 U
2-NITROANILINE	1200 U	1200 U	980 U	940 U	1000 U	990 U
2-NITROPHENOL	460 U	470 U	390 U	380 U	400 U	390 U
3,3'-DICHLOROBENZIDINE	460 U	470 U	390 U	380 U	400 U	390 U
3-NITROANILINE	1200 U	1200 U	980 U	940 U	1000 U	990 U
4,6-DINITRO-2-METHYLPHENOL	1200 U	1200 U	980 U	940 U	1000 U	990 U
4-BROMOPHENYL-PHENYLETHER	460 U	470 U	390 U	380 U	400 U	390 U
4-CHLORO-3-METHYLPHENOL	460 U	470 U	390 U	380 U	400 U	390 U
4-CHLOROANILINE	460 U	470 U	390 U	380 U	400 U	390 U
4-CHLOROPHENYL-PHENYLETHER	460 U	470 U	390 U	380 U	400 U	390 U
4-METHYLPHENOL	460 U	470 U	390 U	380 U	400 U	390 U
4-NITROANILINE	1200 U	1200 U	980 U	940 U	1000 U	990 U
4-NITROPHENOL	1200 U	1200 U	980 U	940 U	1000 U	990 U
ACENAPHTHENE	460 U	470 U	390 U	380 U	400 U	390 U
ACENAPHTHYLENE	460 U	470 U	390 U	380 U	400 U	390 U
ANTHRACENE	460 U	470 U	390 U	380 U	400 U	390 U
BENZO(A)ANTHRACENE	460 U	470 U	390 U	380 U	400 U	390 U
BENZO(A)PYRENE	460 U	470 U	390 U	380 U	400 U	390 U

**FREQUENCY OF DETECTION SUMMARY**  
**SUBSURFACE SOIL - TCL ORGANICS**  
**PHASE II - FIXED BASE LABORATORY**  
**RI/FS CTO-0356**  
**OPERABLE UNIT NO. 16 (SITE 89)**  
**MCB CAMP LEJEUNE, NORTH CAROLINA**

SAMPLE ID	IR89-MW05IW-06	IR89-MW05DW-06	IR89-MW06IW-01	IR89-MW06DW-01	IR89-MW06IW-02	IR89-MW06DW-02
PHASE	PHASE II	PHASE II	PHASE II	PHASE II	PHASE II	PHASE II
DATE SAMPLED	04/18/97	04/19/97	05/02/97	05/02/97	05/02/97	05/02/97
DEPTH	11-13'	11-13'	1-3'	1-3'	3-5'	3-5'
<b>SEMIVOLATILES (ug/kg) (cont)</b>						
BENZO(B)FLUORANTHENE	460 U	470 U	390 U	380 U	400 U	390 U
BENZO(G,H,I)PERYLENE	460 U	470 U	390 U	380 U	400 U	390 U
BENZO(K)FLUORANTHENE	460 U	470 U	390 U	380 U	400 U	390 U
BIS(2-CHLOROETHOXY)METHANE	460 U	470 U	390 U	380 U	400 U	390 U
BIS(2-CHLOROETHYL)ETHER	460 U	470 U	390 U	380 U	400 U	390 U
BIS(2-ETHYLHEXYL)PHTHALATE	130 J	470 U	58 J	630	400 U	81 J
BUTYLBENZYLPHTHALATE	460 U	470 U	390 U	380 U	400 U	390 U
CARBAZOLE	460 U	470 U	390 U	380 U	400 U	390 U
CHRYSENE	460 U	470 U	390 U	380 U	400 U	390 U
DIBENZO(A,H)ANTHRACENE	460 U	470 U	390 U	380 U	400 U	390 U
DIBENZOFURAN	460 U	470 U	390 U	380 U	400 U	390 U
DIETHYLPHTHALATE	460 U	470 U	390 U	380 U	400 U	390 U
DIMETHYLPHTHALATE	460 U	470 U	390 U	380 U	400 U	390 U
DI-N-BUTYLPHTHALATE	460 U	470 U	390 U	380 U	400 U	390 U
DI-N-OCTYLPHTHALATE	460 U	470 U	390 U	380 U	400 U	390 U
FLUORANTHENE	460 U	470 U	390 U	380 U	400 U	390 U
FLUORENE	460 U	470 U	390 U	380 U	400 U	390 U
HEXACHLOROBENZENE	460 U	470 U	390 U	380 U	400 U	390 U
HEXACHLOROBUTADIENE	460 U	470 U	390 U	380 U	400 U	390 U
HEXACHLOROCYCLOPENTADIENE	460 U	470 U	390 U	380 U	400 U	390 U
HEXACHLOROETHANE	460 U	470 U	390 U	380 U	400 U	390 U
INDENO(1,2,3-CD)PYRENE	460 U	470 U	390 U	380 U	400 U	390 U
ISOPHORONE	460 U	470 U	390 U	380 U	400 U	390 U
NAPHTHALENE	460 U	470 U	390 U	380 U	400 U	390 U
NITROBENZENE	460 U	470 U	390 U	380 U	400 U	390 U
N-NITROSO-DI-N-PROPYLAMINE	460 U	470 U	390 U	380 U	400 U	390 U
N-NITROSODIPHENYLAMINE (1)	460 U	470 U	390 U	380 U	400 U	390 U
PENTACHLOROPHENOL	1200 U	1200 U	980 U	940 U	1000 U	990 U
PHENANTHRENE	460 U	470 U	390 U	380 U	400 U	390 U
PHENOL	460 U	470 U	390 U	380 U	400 U	390 U
PYRENE	460 U	470 U	390 U	380 U	400 U	390 U



**FREQUENCY OF DETECTION SUMMARY**  
**SUBSURFACE SOIL - TCL ORGANICS**  
**PHASE II - FIXED BASE LABORATORY**  
**RI/FS CTO-0356**  
**OPERABLE UNIT NO. 16 (SITE 89)**  
**MCB CAMP LEJEUNE, NORTH CAROLINA**

SAMPLE ID	IR89-MW05IW-06	IR89-MW05DW-06	IR89-MW06IW-01	IR89-MW06DW-01	IR89-MW06IW-02	IR89-MW06DW-02
PHASE	PHASE II	PHASE II	PHASE II	PHASE II	PHASE II	PHASE II
DATE SAMPLED	04/18/97	04/19/97	05/02/97	05/02/97	05/02/97	05/02/97
DEPTH	11-13'	11-13'	1-3'	1-3'	3-5'	3-5'
<b>PESTICIDES/PCBS (ug/kg)</b>						
4,4'-DDD	NA	NA	NA	NA	NA	NA
4,4'-DDE	NA	NA	NA	NA	NA	NA
4,4'-DDT	NA	NA	NA	NA	NA	NA
ALDRIN	NA	NA	NA	NA	NA	NA
ALPHA-BHC	NA	NA	NA	NA	NA	NA
ALPHA-CHLORDANE	NA	NA	NA	NA	NA	NA
BETA-BHC	NA	NA	NA	NA	NA	NA
DELTA-BHC	NA	NA	NA	NA	NA	NA
DIELDRIN	NA	NA	NA	NA	NA	NA
ENDOSULFAN I	NA	NA	NA	NA	NA	NA
ENDOSULFAN II	NA	NA	NA	NA	NA	NA
ENDOSULFAN SULFATE	NA	NA	NA	NA	NA	NA
ENDRIN	NA	NA	NA	NA	NA	NA
ENDRIN ALDEHYDE	NA	NA	NA	NA	NA	NA
ENDRIN KETONE	NA	NA	NA	NA	NA	NA
GAMMA-BHC (LINDANE)	NA	NA	NA	NA	NA	NA
GAMMA-CHLORDANE	NA	NA	NA	NA	NA	NA
HEPTACHLOR	NA	NA	NA	NA	NA	NA
HEPTACHLOR EPOXIDE	NA	NA	NA	NA	NA	NA
METHOXYCHLOR	NA	NA	NA	NA	NA	NA
TOXAPHENE	NA	NA	NA	NA	NA	NA
AROCLOR-1016	NA	NA	NA	NA	NA	NA
AROCLOR-1221	NA	NA	NA	NA	NA	NA
AROCLOR-1232	NA	NA	NA	NA	NA	NA
AROCLOR-1242	NA	NA	NA	NA	NA	NA
AROCLOR-1248	NA	NA	NA	NA	NA	NA
AROCLOR-1254	NA	NA	NA	NA	NA	NA
AROCLOR-1260	NA	NA	NA	NA	NA	NA

**FREQUENCY OF DETECTION SUMMARY**  
**SUBSURFACE SOIL - TCL ORGANICS**  
**PHASE II - FIXED BASE LABORATORY**  
**RI/FS CTO-0356**  
**OPERABLE UNIT NO. 16 (SITE 89)**  
**MCB CAMP LEJEUNE, NORTH CAROLINA**

SAMPLE ID	IR89-MW07IW-04	IR89-MW07DW-04	IR89-MW07IW-06	IR89-MW07DW-06	IR89-MW08IW-04	IR89-MW08DW-04
PHASE	PHASE II	PHASE II	PHASE II	PHASE II	PHASE II	PHASE II
DATE SAMPLED	05/03/97	05/04/97	05/03/97	05/04/97	05/12/97	05/13/97
DEPTH	7-9'	7-9'	11-13'	11-13'	7-9'	7-9'
<b>VOLATILES (ug/kg)</b>						
1,1,1-TRICHLOROETHANE	11 U	11 U	12 U	12 U	13 U	12 U
1,1,2,2-TETRACHLOROETHANE	11 U	11 U	12 U	12 U	13 U	12 U
1,1,2-TRICHLOROETHANE	11 U	11 U	12 U	12 U	13 U	12 U
1,1-DICHLOROETHANE	11 U	11 U	12 U	12 U	13 U	12 U
1,1-DICHLOROETHENE	11 U	11 U	12 U	12 U	13 U	12 U
1,2-DICHLOROETHANE	11 U	11 U	12 U	12 U	13 U	12 U
1,2-DICHLOROETHENE (TOTAL)	11 U	11 U	12 U	12 U	13 U	12 U
1,2-DICHLOROPROPANE	11 U	11 U	12 U	12 U	13 U	12 U
2-BUTANONE	11 U	11 U	12 U	12 U	13 U	12 U
2-HEXANONE	11 U	11 U	12 U	12 U	13 U	12 U
4-METHYL-2-PENTANONE	11 U	11 U	12 U	12 U	13 U	12 U
ACETONE	11 U	11 U	12 U	12 U	21 J	34 J
BENZENE	11 U	11 U	12 U	12 U	13 U	12 U
BROMODICHLOROMETHANE	11 U	11 U	12 U	12 U	13 U	12 U
BROMOFORM	11 U	11 U	12 U	12 U	13 U	12 U
BROMOMETHANE	11 U	11 U	12 U	12 U	13 U	12 U
CARBON DISULFIDE	11 U	11 U	12 U	12 U	13 U	12 U
CARBON TETRACHLORIDE	11 U	11 U	12 U	12 U	13 U	12 U
CHLOROBENZENE	11 U	11 U	12 U	12 U	13 U	12 U
CHLOROETHANE	11 U	11 U	12 U	12 U	13 U	12 U
CHLOROFORM	11 U	11 U	12 U	12 U	13 U	12 U
CHLOROMETHANE	11 U	11 U	12 U	12 U	13 U	12 U
CIS-1,3-DICHLOROPROPENE	11 U	11 U	12 U	12 U	13 U	12 U
DIBROMOCHLOROMETHANE	11 U	11 U	12 U	12 U	13 U	12 U
ETHYLBENZENE	11 U	11 U	12 U	12 U	13 U	12 U
METHYLENE CHLORIDE	11 U	11 U	12 U	12 U	13 U	12 U
STYRENE	11 U	11 U	12 U	12 U	13 U	12 U
TETRACHLOROETHENE	11 U	11 U	12 U	12 U	13 U	12 U
TOLUENE	11 U	11 U	12 U	12 U	13 U	12 U
TRANS-1,3-DICHLOROPROPENE	11 U	11 U	12 U	12 U	13 U	12 U
TRICHLOROETHENE	11 U	11 U	12 U	12 U	13 U	12 U
VINYL CHLORIDE	11 U	11 U	12 U	12 U	13 U	12 U
XYLENE (TOTAL)	11 U	11 U	12 U	12 U	13 U	12 U

**FREQUENCY OF DETECTION SUMMARY**  
**SUBSURFACE SOIL - TCL ORGANICS**  
**PHASE II - FIXED BASE LABORATORY**  
**RI/FS CTO-0356**  
**OPERABLE UNIT NO. 16 (SITE 89)**  
**MCB CAMP LEJEUNE, NORTH CAROLINA**

SAMPLE ID	IR89-MW071W-04	IR89-MW07DW-04	IR89-MW071W-06	IR89-MW07DW-06	IR89-MW081W-04	IR89-MW08DW-04
PHASE	PHASE II	PHASE II	PHASE II	PHASE II	PHASE II	PHASE II
DATE SAMPLED	05/03/97	05/04/97	05/03/97	05/04/97	05/12/97	05/13/97
DEPTH	7-9'	7-9'	11-13'	11-13'	7-9'	7-9'
<b>SEMIVOLATILES (ug/kg)</b>						
1,2,4-TRICHLOROBENZENE	360 U	370 U	410 U	410 U	430 U	390 U
1,2-DICHLOROBENZENE	360 U	370 U	410 U	410 U	430 U	390 U
1,3-DICHLOROBENZENE	360 U	370 U	410 U	410 U	430 U	390 U
1,4-DICHLOROBENZENE	360 U	370 U	410 U	410 U	430 U	390 U
2,2'-OXYBIS(1-CHLOROPROPANE)	360 U	370 U	410 U	410 U	430 U	390 U
2,4,5-TRICHLOROPHENOL	900 U	920 U	1000 U	1000 U	1100 U	990 U
2,4,6-TRICHLOROPHENOL	360 U	370 U	410 U	410 U	430 U	390 U
2,4-DICHLOROPHENOL	360 U	370 U	410 U	410 U	430 U	390 U
2,4-DIMETHYLPHENOL	360 U	370 U	410 U	410 U	430 U	390 U
2,4-DINITROPHENOL	900 U	920 U	1000 U	1000 U	1100 U	990 U
2,4-DINITROTOLUENE	360 U	370 U	410 U	410 U	430 U	390 U
2,6-DINITROTOLUENE	360 U	370 U	410 U	410 U	430 U	390 U
2-CHLORONAPHTHALENE	360 U	370 U	410 U	410 U	430 U	390 U
2-CHLOROPHENOL	360 U	370 U	410 U	410 U	430 U	390 U
2-METHYLNAPHTHALENE	360 U	370 U	410 U	410 U	430 U	390 U
2-METHYLPHENOL	360 U	370 U	410 U	410 U	430 U	390 U
2-NITROANILINE	900 U	920 U	1000 U	1000 U	1100 U	990 U
2-NITROPHENOL	360 U	370 U	410 U	410 U	430 U	390 U
3,3'-DICHLOROBENZIDINE	360 U	370 U	410 U	410 U	430 U	390 U
3-NITROANILINE	900 U	920 U	1000 U	1000 U	1100 U	990 U
4,6-DINITRO-2-METHYLPHENOL	900 U	920 U	1000 U	1000 U	1100 U	990 U
4-BROMOPHENYL-PHENYLETHER	360 U	370 U	410 U	410 U	430 U	390 U
4-CHLORO-3-METHYLPHENOL	360 U	370 U	410 U	410 U	430 U	390 U
4-CHLOROANILINE	360 U	370 U	410 U	410 U	430 U	390 U
4-CHLOROPHENYL-PHENYLETHER	360 U	370 U	410 U	410 U	430 U	390 U
4-METHYLPHENOL	360 U	370 U	410 U	410 U	430 U	390 U
4-NITROANILINE	900 U	920 U	1000 U	1000 U	1100 U	990 U
4-NITROPHENOL	900 U	920 U	1000 U	1000 U	1100 U	990 U
ACENAPHTHENE	360 U	370 U	410 U	410 U	430 U	390 U
ACENAPHTHYLENE	360 U	370 U	410 U	410 U	430 U	390 U
ANTHRACENE	360 U	370 U	410 U	410 U	430 U	390 U
BENZO(A)ANTHRACENE	360 U	370 U	410 U	410 U	430 U	390 U
BENZO(A)PYRENE	360 U	370 U	410 U	410 U	430 U	390 U

**FREQUENCY OF DETECTION SUMMARY**  
**SUBSURFACE SOIL - TCL ORGANICS**  
**PHASE II - FIXED BASE LABORATORY**  
**RI/FS CTO-0356**  
**OPERABLE UNIT NO. 16 (SITE 89)**  
**MCB CAMP LEJEUNE, NORTH CAROLINA**

SAMPLE ID	IR89-MW07IW-04	IR89-MW07DW-04	IR89-MW07IW-06	IR89-MW07DW-06	IR89-MW08IW-04	IR89-MW08DW-04
PHASE	PHASE II	PHASE II	PHASE II	PHASE II	PHASE II	PHASE II
DATE SAMPLED	05/03/97	05/04/97	05/03/97	05/04/97	05/12/97	05/13/97
DEPTH	7-9'	7-9'	11-13'	11-13'	7-9'	7-9'
<b>SEMIVOLATILES (ug/kg) (cont)</b>						
BENZO(B)FLUORANTHENE	360 U	370 U	410 U	410 U	430 U	390 U
BENZO(G,H,I)PERYLENE	360 U	370 U	410 U	410 U	430 U	390 U
BENZO(K)FLUORANTHENE	360 U	370 U	410 U	410 U	430 U	390 U
BIS(2-CHLOROETHOXY)METHANE	360 U	370 U	410 U	410 U	430 U	390 U
BIS(2-CHLOROETHYL)ETHER	360 U	370 U	410 U	410 U	430 U	390 U
BIS(2-ETHYLHEXYL)PHTHALATE	360 U	95 J	410 U	410 U	430 U	390 U
BUTYLBENZYLPHthalate	360 U	370 U	410 U	410 U	430 U	390 U
CARBAZOLE	360 U	370 U	410 U	410 U	430 U	390 U
CHRYSENE	360 U	370 U	410 U	410 U	430 U	390 U
DIBENZO(A,H)ANTHRACENE	360 U	370 U	410 U	410 U	430 U	390 U
DIBENZOFURAN	360 U	370 U	410 U	410 U	430 U	390 U
DIETHYLPHthalate	360 U	370 U	410 U	410 U	430 U	390 U
DIMETHYLPHthalate	360 U	370 U	410 U	410 U	430 U	390 U
DI-N-BUTYLPHthalate	360 U	370 U	410 U	410 U	430 U	390 U
DI-N-OCTYLPHthalate	360 U	370 U	410 U	410 U	430 U	390 U
FLUORANTHENE	360 U	370 U	410 U	410 U	430 U	390 U
FLUORENE	360 U	370 U	410 U	410 U	430 U	390 U
HEXACHLOROBENZENE	360 U	370 U	410 U	410 U	430 U	390 U
HEXACHLOROBUTADIENE	360 U	370 U	410 U	410 U	430 U	390 U
HEXACHLOROCYCLOPENTADIENE	360 U	370 U	410 U	410 U	430 U	390 U
HEXACHLOROETHANE	360 U	370 U	410 U	410 U	430 U	390 U
INDENO(1,2,3-CD)PYRENE	360 U	370 U	410 U	410 U	430 U	390 U
ISOPHORONE	360 U	370 U	410 U	410 U	430 U	390 U
NAPHTHALENE	360 U	370 U	410 U	410 U	430 U	390 U
NITROBENZENE	360 U	370 U	410 U	410 U	430 U	390 U
N-NITROSO-DI-N-PROPYLAMINE	360 U	370 U	410 U	410 U	430 U	390 U
N-NITROSODIPHENYLAMINE (1)	360 U	370 U	410 U	410 U	430 U	390 U
PENTACHLOROPHENOL	900 U	920 U	1000 U	1000 U	1100 U	990 U
PHENANTHRENE	360 U	370 U	410 U	410 U	430 U	390 U
PHENOL	360 U	370 U	410 U	410 U	430 U	390 U
PYRENE	360 U	370 U	410 U	410 U	430 U	390 U

**FREQUENCY OF DETECTION SUMMARY**  
**SUBSURFACE SOIL - TCL ORGANICS**  
**PHASE II - FIXED BASE LABORATORY**  
**RI/FS CTO-0356**  
**OPERABLE UNIT NO. 16 (SITE 89)**  
**MCB CAMP LEJEUNE, NORTH CAROLINA**

SAMPLE ID	IR89-MW07IW-04	IR89-MW07DW-04	IR89-MW07IW-06	IR89-MW07DW-06	IR89-MW08IW-04	IR89-MW08DW-04
PHASE	PHASE II	PHASE II	PHASE II	PHASE II	PHASE II	PHASE II
DATE SAMPLED	05/03/97	05/04/97	05/03/97	05/04/97	05/12/97	05/13/97
DEPTH	7-9'	7-9'	11-13'	11-13'	7-9'	7-9'
<b>PESTICIDES/PCBS (ug/kg)</b>						
4,4'-DDD	NA	NA	NA	NA	NA	NA
4,4'-DDE	NA	NA	NA	NA	NA	NA
4,4'-DDT	NA	NA	NA	NA	NA	NA
ALDRIN	NA	NA	NA	NA	NA	NA
ALPHA-BHC	NA	NA	NA	NA	NA	NA
ALPHA-CHLORDANE	NA	NA	NA	NA	NA	NA
BETA-BHC	NA	NA	NA	NA	NA	NA
DELTA-BHC	NA	NA	NA	NA	NA	NA
DIELDRIN	NA	NA	NA	NA	NA	NA
ENDOSULFAN I	NA	NA	NA	NA	NA	NA
ENDOSULFAN II	NA	NA	NA	NA	NA	NA
ENDOSULFAN SULFATE	NA	NA	NA	NA	NA	NA
ENDRIN	NA	NA	NA	NA	NA	NA
ENDRIN ALDEHYDE	NA	NA	NA	NA	NA	NA
ENDRIN KETONE	NA	NA	NA	NA	NA	NA
GAMMA-BHC (LINDANE)	NA	NA	NA	NA	NA	NA
GAMMA-CHLORDANE	NA	NA	NA	NA	NA	NA
HEPTACHLOR	NA	NA	NA	NA	NA	NA
HEPTACHLOR EPOXIDE	NA	NA	NA	NA	NA	NA
METHOXYCHLOR	NA	NA	NA	NA	NA	NA
TOXAPHENE	NA	NA	NA	NA	NA	NA
AROCLOR-1016	NA	NA	NA	NA	NA	NA
AROCLOR-1221	NA	NA	NA	NA	NA	NA
AROCLOR-1232	NA	NA	NA	NA	NA	NA
AROCLOR-1242	NA	NA	NA	NA	NA	NA
AROCLOR-1248	NA	NA	NA	NA	NA	NA
AROCLOR-1254	NA	NA	NA	NA	NA	NA
AROCLOR-1260	NA	NA	NA	NA	NA	NA

FREQUENCY OF DETECTION SUMMARY  
 SUBSURFACE SOIL - TCL ORGANICS  
 PHASE II - FIXED BASE LABORATORY  
 RI/FS CTO-0356  
 OPERABLE UNIT NO. 16 (SITE 89)  
 MCB CAMP LEJEUNE, NORTH CAROLINA

SAMPLE ID	IR89-MW08IW-06	IR89-MW08DW-06
PHASE	PHASE II	PHASE II
DATE SAMPLED	05/12/97	05/13/97
DEPTH	11-13'	11-13'

**VOLATILES (ug/kg)**

1,1,1-TRICHLOROETHANE	12 U	12 U
1,1,2,2-TETRACHLOROETHANE	12 U	12 U
1,1,2-TRICHLOROETHANE	12 U	12 U
1,1-DICHLOROETHANE	12 U	12 U
1,1-DICHLOROETHENE	12 U	12 U
1,2-DICHLOROETHANE	12 U	12 U
1,2-DICHLOROETHENE (TOTAL)	12 U	12 U
1,2-DICHLOROPROPANE	12 U	12 U
2-BUTANONE	12 U	12 U
2-HEXANONE	12 U	12 U
4-METHYL-2-PENTANONE	12 U	12 U
ACETONE	36 J	12 UJ
BENZENE	3 J	12 U
BROMODICHLOROMETHANE	12 U	12 U
BROMOFORM	12 U	12 U
BROMOMETHANE	12 U	12 U
CARBON DISULFIDE	12 U	12 U
CARBON TETRACHLORIDE	12 U	12 U
CHLOROBENZENE	12 U	12 U
CHLOROETHANE	12 U	12 U
CHLOROFORM	12 U	12 U
CHLOROMETHANE	12 U	12 U
CIS-1,3-DICHLOROPROPENE	12 U	12 U
DIBROMOCHLOROMETHANE	12 U	12 U
ETHYLBENZENE	12 U	12 U
METHYLENE CHLORIDE	12 U	12 U
STYRENE	12 U	12 U
TETRACHLOROETHENE	12 U	12 U
TOLUENE	12 U	12 U
TRANS-1,3-DICHLOROPROPENE	12 U	12 U
TRICHLOROETHENE	12 U	12 U
VINYL CHLORIDE	12 U	12 U
XYLENE (TOTAL)	12 U	12 U

FREQUENCY OF DETECTION SUMMARY  
 SUBSURFACE SOIL - TCL ORGANICS  
 PHASE II - FIXED BASE LABORATORY  
 RI/FS CTO-0356  
 OPERABLE UNIT NO. 16 (SITE 89)  
 MCB CAMP LEJEUNE, NORTH CAROLINA

SAMPLE ID	IR89-MW08IW-06	IR89-MW08DW-06
PHASE	PHASE II	PHASE II
DATE SAMPLED	05/12/97	05/13/97
DEPTH	11-13'	11-13'

SEMIVOLATILES (ug/kg)

1,2,4-TRICHLOROBENZENE	390 U	380 U
1,2-DICHLOROBENZENE	390 U	380 U
1,3-DICHLOROBENZENE	390 U	380 U
1,4-DICHLOROBENZENE	390 U	380 U
2,2'-OXYBIS(1-CHLOROPROPANE)	390 U	380 U
2,4,5-TRICHLOROPHENOL	980 U	950 U
2,4,6-TRICHLOROPHENOL	390 U	380 U
2,4-DICHLOROPHENOL	390 U	380 U
2,4-DIMETHYLPHENOL	390 U	380 U
2,4-DINITROPHENOL	980 U	950 U
2,4-DINITROTOLUENE	390 U	380 U
2,6-DINITROTOLUENE	390 U	380 U
2-CHLORONAPHTHALENE	390 U	380 U
2-CHLOROPHENOL	390 U	380 U
2-METHYLNAPHTHALENE	390 U	380 U
2-METHYLPHENOL	390 U	380 U
2-NITROANILINE	980 U	950 U
2-NITROPHENOL	390 U	380 U
3,3'-DICHLOROBENZIDINE	390 U	380 U
3-NITROANILINE	980 U	950 U
4,6-DINITRO-2-METHYLPHENOL	980 U	950 U
4-BROMOPHENYL-PHENYLETHER	390 U	380 U
4-CHLORO-3-METHYLPHENOL	390 U	380 U
4-CHLOROANILINE	390 U	380 U
4-CHLOROPHENYL-PHENYLETHER	390 U	380 U
4-METHYLPHENOL	390 U	380 U
4-NITROANILINE	980 U	950 U
4-NITROPHENOL	980 U	950 U
ACENAPHTHENE	390 U	380 U
ACENAPHTHYLENE	390 U	380 U
ANTHRACENE	390 U	380 U
BENZO(A)ANTHRACENE	390 U	380 U
BENZO(A)PYRENE	390 U	380 U

**FREQUENCY OF DETECTION SUMMARY**  
**SUBSURFACE SOIL - TCL ORGANICS**  
**PHASE II - FIXED BASE LABORATORY**  
**RI/FS CTO-0356**  
**OPERABLE UNIT NO. 16 (SITE 89)**  
**MCB CAMP LEJEUNE, NORTH CAROLINA**

SAMPLE ID	IR89-MW08IW-06	IR89-MW08DW-06
PHASE	PHASE II	PHASE II
DATE SAMPLED	05/12/97	05/13/97
DEPTH	11-13'	11-13'
<b>SEMIVOLATILES (ug/kg) (cont)</b>		
BENZO(B)FLUORANTHENE	390 U	380 U
BENZO(G,H,I)PERYLENE	390 U	380 U
BENZO(K)FLUORANTHENE	390 U	380 U
BIS(2-CHLOROETHOXY)METHANE	390 U	380 U
BIS(2-CHLOROETHYL)ETHER	390 U	380 U
BIS(2-ETHYLHEXYL)PHTHALATE	390 U	76 J
BUTYLBENZYLPHTHALATE	390 U	380 U
CARBAZOLE	390 U	380 U
CHRYSENE	390 U	380 U
DIBENZO(A,H)ANTHRACENE	390 U	380 U
DIBENZOFURAN	390 U	380 U
DIETHYLPHTHALATE	390 U	380 U
DIMETHYLPHTHALATE	390 U	380 U
DI-N-BUTYLPHTHALATE	390 U	380 U
DI-N-OCTYLPHTHALATE	390 U	380 U
FLUORANTHENE	390 U	380 U
FLUORENE	390 U	380 U
HEXACHLOROBENZENE	390 U	380 U
HEXACHLOROBUTADIENE	390 U	380 U
HEXACHLOROCYCLOPENTADIENE	390 U	380 U
HEXACHLOROETHANE	390 U	380 U
INDENO(1,2,3-CD)PYRENE	390 U	380 U
ISOPHORONE	390 U	380 U
NAPHTHALENE	390 U	380 U
NITROBENZENE	390 U	380 U
N-NITROSO-DI-N-PROPYLAMINE	390 U	380 U
N-NITROSODIPHENYLAMINE (1)	390 U	380 U
PENTACHLOROPHENOL	980 U	950 U
PHENANTHRENE	390 U	380 U
PHENOL	390 U	380 U
PYRENE	390 U	380 U



**FREQUENCY OF DETECTION SUMMARY**  
**SUBSURFACE SOIL - TCL ORGANICS**  
**PHASE II - FIXED BASE LABORATORY**  
**RI/FS CTO-0356**  
**OPERABLE UNIT NO. 16 (SITE 89)**  
**MCB CAMP LEJEUNE, NORTH CAROLINA**

SAMPLE ID	IR89-MW08IW-06	IR89-MW08DW-06
PHASE	PHASE II	PHASE II
DATE SAMPLED	05/12/97	05/13/97
DEPTH	11-13'	11-13'
<b>PESTICIDES/PCBS (ug/kg)</b>		
4,4'-DDD	NA	NA
4,4'-DDE	NA	NA
4,4'-DDT	NA	NA
ALDRIN	NA	NA
ALPHA-BHC	NA	NA
ALPHA-CHLORDANE	NA	NA
BETA-BHC	NA	NA
DELTA-BHC	NA	NA
DIELDRIN	NA	NA
ENDOSULFAN I	NA	NA
ENDOSULFAN II	NA	NA
ENDOSULFAN SULFATE	NA	NA
ENDRIN	NA	NA
ENDRIN ALDEHYDE	NA	NA
ENDRIN KETONE	NA	NA
GAMMA-BHC (LINDANE)	NA	NA
GAMMA-CHLORDANE	NA	NA
HEPTACHLOR	NA	NA
HEPTACHLOR EPOXIDE	NA	NA
METHOXYCHLOR	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

**FREQUENCY OF DETECTION SUMMARY**  
**SUBSURFACE SOIL - TCL ORGANICS**  
**PHASE II - FIXED BASE LABORATORY**  
**RI/FS CTO-0356**  
**OPERABLE UNIT NO. 16 (SITE 89)**  
**MCB CAMP LEJEUNE, NORTH CAROLINA**

SAMPLE ID PHASE DATE SAMPLED DEPTH	Minimum Non-Detect	Maximum Non-Detect	Minimum Detected	Maximum Detected	Location of Maximum Detect	Frequency of Detection	Arithmetic Mean Positive Detects	Median Positive Detects
<b>VOLATILES (ug/kg)</b>								
1,1,1-TRICHLOROETHANE	11 U	17 U	ND	ND		0/26	--	--
1,1,2,2-TETRACHLOROETHANE	11 U	17 U	20	98	IR89-MW03DW-02	4/26	52	45
1,1,2-TRICHLOROETHANE	11 U	17 U	ND	ND		0/26	--	--
1,1-DICHLOROETHANE	11 U	17 U	ND	ND		0/26	--	--
1,1-DICHLOROETHENE	11 U	17 U	ND	ND		0/26	--	--
1,2-DICHLOROETHANE	11 U	17 U	ND	ND		0/26	--	--
1,2-DICHLOROETHENE (TOTAL)	11 U	15 U	9	J 68	IR89-MW05DW-06	7/26	35.43	33
1,2-DICHLOROPROPANE	11 U	17 U	ND	ND		0/26	--	--
2-BUTANONE	11 U	17 U	17	J 17	J IR89-MW05IW-06	1/26	17	17
2-HEXANONE	11 U	17 U	ND	ND		0/26	--	--
4-METHYL-2-PENTANONE	11 U	17 U	ND	ND		0/26	--	--
ACETONE	11 U	96 U	13	100	IR89-MW05IW-06	14/26	32.21	18.5
BENZENE	11 U	17 U	3	J 3	J IR89-MW08IW-06	1/26	3	3
BROMODICHLOROMETHANE	11 U	17 U	ND	ND		0/26	--	--
BROMOFORM	11 U	17 U	ND	ND		0/26	--	--
BROMOMETHANE	11 U	17 U	ND	ND		0/26	--	--
CARBON DISULFIDE	11 U	15 U	4	J 4	J IR89-MW05-06	1/26	4	4
CARBON TETRACHLORIDE	11 U	17 U	ND	ND		0/26	--	--
CHLOROBENZENE	11 U	17 U	ND	ND		0/26	--	--
CHLOROETHANE	11 U	17 U	ND	ND		0/26	--	--
CHLOROFORM	11 U	17 U	ND	ND		0/26	--	--
CHLOROMETHANE	11 U	17 U	ND	ND		0/26	--	--
CIS-1,3-DICHLOROPROPENE	11 U	17 U	ND	ND		0/26	--	--
DIBROMOCHLOROMETHANE	11 U	17 U	ND	ND		0/26	--	--
ETHYLBENZENE	11 U	17 U	ND	ND		0/26	--	--
METHYLENE CHLORIDE	11 U	17 U	ND	ND		0/26	--	--
STYRENE	11 U	17 U	ND	ND		0/26	--	--
TETRACHLOROETHENE	11 U	17 U	4	J 5	J IR89-MW03IW-05	2/26	4.5	4.5
TOLUENE	11 U	17 U	110	110	IR89-MW05IW-06	1/26	110	110
TRANS-1,3-DICHLOROPROPENE	11 U	17 U	ND	ND		0/26	--	--
TRICHLOROETHENE	11 U	15 U	3	J 110	IR89-MW05DW-06	7/26	41.71	25
VINYL CHLORIDE	11 U	17 U	ND	ND		0/26	--	--
XYLENE (TOTAL)	11 U	17 U	ND	ND		0/26	--	--

**FREQUENCY OF DETECTION SUMMARY**  
**SUBSURFACE SOIL - TCL ORGANICS**  
**PHASE II - FIXED BASE LABORATORY**  
**RI/FS CTO-0356**  
**OPERABLE UNIT NO. 16 (SITE 89)**  
**MCB CAMP LEJEUNE, NORTH CAROLINA**

SAMPLE ID PHASE DATE SAMPLED DEPTH	Minimum Non-Detect	Maximum Non-Detect	Minimum Detected	Maximum Detected	Location of Maximum Detect	Frequency of Detection	Arithmetic Mean Positive Detects	Median Positive Detects
<b>SEMIVOLATILES (ug/kg)</b>								
1,2,4-TRICHLOROBENZENE	360 U	570 U	ND	ND		0/26	--	--
1,2-DICHLOROBENZENE	360 U	570 U	ND	ND		0/26	--	--
1,3-DICHLOROBENZENE	360 U	570 U	ND	ND		0/26	--	--
1,4-DICHLOROBENZENE	360 U	570 U	ND	ND		0/26	--	--
2,2'-OXYBIS(1-CHLOROPROPANE)	360 U	570 U	ND	ND		0/26	--	--
2,4,5-TRICHLOROPHENOL	900 U	1400 U	ND	ND		0/26	--	--
2,4,6-TRICHLOROPHENOL	360 U	570 U	ND	ND		0/26	--	--
2,4-DICHLOROPHENOL	360 U	570 U	ND	ND		0/26	--	--
2,4-DIMETHYLPHENOL	360 U	570 U	ND	ND		0/26	--	--
2,4-DINITROPHENOL	900 U	1400 U	ND	ND		0/26	--	--
2,4-DINITROTOLUENE	360 U	570 U	ND	ND		0/26	--	--
2,6-DINITROTOLUENE	360 U	570 U	ND	ND		0/26	--	--
2-CHLORONAPHTHALENE	360 U	570 U	ND	ND		0/26	--	--
2-CHLOROPHENOL	360 U	570 U	ND	ND		0/26	--	--
2-METHYLNAPHTHALENE	360 U	570 U	ND	ND		0/26	--	--
2-METHYLPHENOL	360 U	570 U	ND	ND		0/26	--	--
2-NITROANILINE	900 U	1400 U	ND	ND		0/26	--	--
2-NITROPHENOL	360 U	570 U	ND	ND		0/26	--	--
3,3'-DICHLOROBENZIDINE	360 U	570 U	ND	ND		0/26	--	--
3-NITROANILINE	900 U	1400 U	ND	ND		0/26	--	--
4,6-DINITRO-2-METHYLPHENOL	900 U	1400 U	ND	ND		0/26	--	--
4-BROMOPHENYL-PHENYLETHER	360 U	570 U	ND	ND		0/26	--	--
4-CHLORO-3-METHYLPHENOL	360 U	570 U	ND	ND		0/26	--	--
4-CHLOROANILINE	360 U	570 U	ND	ND		0/26	--	--
4-CHLOROPHENYL-PHENYLETHER	360 U	570 U	ND	ND		0/26	--	--
4-METHYLPHENOL	360 U	570 U	ND	ND		0/26	--	--
4-NITROANILINE	900 U	1400 U	ND	ND		0/26	--	--
4-NITROPHENOL	900 U	1400 U	ND	ND		0/26	--	--
ACENAPHTHENE	360 U	570 U	ND	ND		0/26	--	--
ACENAPHTHYLENE	360 U	570 U	ND	ND		0/26	--	--
ANTHRACENE	360 U	570 U	ND	ND		0/26	--	--
BENZO(A)ANTHRACENE	360 U	570 U	ND	ND		0/26	--	--
BENZO(A)PYRENE	360 U	570 U	ND	ND		0/26	--	--

**FREQUENCY OF DETECTION SUMMARY**  
**SUBSURFACE SOIL - TCL ORGANICS**  
**PHASE II - FIXED BASE LABORATORY**  
**RI/FS CTO-0356**  
**OPERABLE UNIT NO. 16 (SITE 89)**  
**MCB CAMP LEJEUNE, NORTH CAROLINA**

SAMPLE ID PHASE DATE SAMPLED DEPTH	Minimum Non-Detect	Maximum Non-Detect	Minimum Detected	Maximum Detected	Location of Maximum Detect	Frequency of Detection	Arithmetic Mean Positive Detects	Median Positive Detects
<b>SEMIVOLATILES (ug/kg) (cont)</b>								
BENZO(B)FLUORANTHENE	360 U	570 U	ND	ND		0/26	--	--
BENZO(G,H,I)PERYLENE	360 U	570 U	ND	ND		0/26	--	--
BENZO(K)FLUORANTHENE	360 U	570 U	ND	ND		0/26	--	--
BIS(2-CHLOROETHOXY)METHANE	360 U	570 U	ND	ND		0/26	--	--
BIS(2-CHLOROETHYL)ETHER	360 U	570 U	ND	ND		0/26	--	--
BIS(2-ETHYLHEXYL)PHTHALATE	360 U	490 U	42	J 630	IR89-MW06DW-01	11/26	187.91	95
BUTYLBENZYLPHTHALATE	360 U	570 U	ND	ND		0/26	--	--
CARBAZOLE	360 U	570 U	ND	ND		0/26	--	--
CHRYSENE	360 U	570 U	ND	ND		0/26	--	--
DIBENZO(A,H)ANTHRACENE	360 U	570 U	ND	ND		0/26	--	--
DIBENZOFURAN	360 U	570 U	ND	ND		0/26	--	--
DIETHYLPHTHALATE	360 U	570 U	ND	ND		0/26	--	--
DIMETHYLPHTHALATE	360 U	570 U	ND	ND		0/26	--	--
DI-N-BUTYLPHTHALATE	360 U	570 U	ND	ND		0/26	--	--
DI-N-OCTYLPHTHALATE	360 U	570 U	ND	ND		0/26	--	--
FLUORANTHENE	360 U	570 U	43	J 43	J IR89-MW03DW-02,IR89-MW03IW-05	2/26	43	43
FLUORENE	360 U	570 U	ND	ND		0/26	--	--
HEXACHLOROBENZENE	360 U	570 U	ND	ND		0/26	--	--
HEXACHLOROBUTADIENE	360 U	570 U	ND	ND		0/26	--	--
HEXACHLOROCYCLOPENTADIENE	360 U	570 U	ND	ND		0/26	--	--
HEXACHLOROETHANE	360 U	570 U	ND	ND		0/26	--	--
INDENO(1,2,3-CD)PYRENE	360 U	570 U	ND	ND		0/26	--	--
ISOPHORONE	360 U	570 U	ND	ND		0/26	--	--
NAPHTHALENE	360 U	570 U	ND	ND		0/26	--	--
NITROBENZENE	360 U	570 U	ND	ND		0/26	--	--
N-NITROSO-DI-N-PROPYLAMINE	360 U	570 U	ND	ND		0/26	--	--
N-NITROSODIPHENYLAMINE (1)	360 U	570 U	ND	ND		0/26	--	--
PENTACHLOROPHENOL	900 U	1400 U	ND	ND		0/26	--	--
PHENANTHRENE	360 U	570 U	ND	ND		0/26	--	--
PHENOL	360 U	570 U	ND	ND		0/26	--	--
PYRENE	360 U	570 U	49	J 66	J IR89-MW03IW-05	2/26	57.5	57.5

**FREQUENCY OF DETECTION SUMMARY**  
**SUBSURFACE SOIL - TCL ORGANICS**  
**PHASE II - FIXED BASE LABORATORY**  
**RI/FS CTO-0356**  
**OPERABLE UNIT NO. 16 (SITE 89)**  
**MCB CAMP LEJEUNE, NORTH CAROLINA**

SAMPLE ID PHASE DATE SAMPLED DEPTH	Minimum	Maximum	Minimum	Maximum	Location of Maximum Detect	Frequency of Detection	Arithmetic Mean Positive Detects	Median Positive Detects
	Non-Detect	Non-Detect	Detected	Detected				
<b>PESTICIDES/PCBS (ug/kg)</b>								
4,4'-DDD	4 UJ	12 UJ	19 J	19 J	IR89-MW03IW-02	1/5	19	19
4,4'-DDE	4 UJ	4.3 U	17 J	17 J	IR89-MW03IW-02	1/5	17	17
4,4'-DDT	4 UJ	4.3 U	91	91	IR89-MW03IW-02	1/5	91	91
ALDRIN	1.9 UJ	2.2 U	ND	ND		0/5	--	--
ALPHA-BHC	1 UJ	2.1 UJ	ND	ND		0/5	--	--
ALPHA-CHLORDANE	1.9 UJ	2.2 U	ND	ND		0/5	--	--
BETA-BHC	1.9 UJ	2.2 U	ND	ND		0/5	--	--
DELTA-BHC	1 UJ	2.1 UJ	ND	ND		0/5	--	--
DIELDRIN	3.9 UJ	4.3 U	ND	ND		0/5	--	--
ENDOSULFAN I	1.9 UJ	2.2 U	ND	ND		0/5	--	--
ENDOSULFAN II	3.9 UJ	4.3 U	ND	ND		0/5	--	--
ENDOSULFAN SULFATE	3.9 UJ	4.3 U	ND	ND		0/5	--	--
ENDRIN	3.9 UJ	4.3 U	ND	ND		0/5	--	--
ENDRIN ALDEHYDE	3.9 UJ	4.3 U	ND	ND		0/5	--	--
ENDRIN KETONE	3.9 UJ	4.3 U	ND	ND		0/5	--	--
GAMMA-BHC (LINDANE)	1.9 UJ	2.2 U	ND	ND		0/5	--	--
GAMMA-CHLORDANE	1.9 UJ	2.2 U	ND	ND		0/5	--	--
HEPTACHLOR	1.9 UJ	2.2 U	ND	ND		0/5	--	--
HEPTACHLOR EPOXIDE	1.9 UJ	2.2 U	ND	ND		0/5	--	--
METHOXYCHLOR	19 UJ	22 U	ND	ND		0/5	--	--
TOXAPHENE	190 UJ	220 U	ND	ND		0/5	--	--
AROCLOR-1016	39 UJ	43 U	ND	ND		0/5	--	--
AROCLOR-1221	77 UJ	86 U	ND	ND		0/5	--	--
AROCLOR-1232	39 UJ	43 U	ND	ND		0/5	--	--
AROCLOR-1242	39 UJ	43 U	ND	ND		0/5	--	--
AROCLOR-1248	39 UJ	43 U	ND	ND		0/5	--	--
AROCLOR-1254	39 UJ	43 U	ND	ND		0/5	--	--
AROCLOR-1260	39 UJ	43 U	ND	ND		0/5	--	--

**SITE 89 SUBSURFACE SOIL - INORGANICS**

**FREQUENCY OF DETECTION SUMMARY**  
**SUBSURFACE SOIL - TAL METALS**  
**PHASE II - FIXED BASE LABORATORY**  
**RI/FS CTO-0356**  
**OPERABLE UNIT NO. 16 (SITE 89)**  
**MCB CAMP LEJEUNE, NORTH CAROLINA**

SAMPLE ID	IR89-MW03IW-02	IR89-MW03DW-02	IR89-MW03IW-05	IR89-MW03DW-05	IR89-MW04-03	IR89-MW04DW-03
PHASE	PHASE II	PHASE II	PHASE II	PHASE II	PHASE II	PHASE II
DATE SAMPLED	05/15/97	05/15/97	05/15/97	05/15/97	04/15/97	04/17/97
DEPTH	3-5'	3-5'	9-11'	9-11'	5-7'	5-7'
<b>TOTAL METALS (mg/kg)</b>						
ALUMINUM, TOTAL	1630	6080 J	2350	2590 J	8780 J	4640 J
ANTIMONY, TOTAL	0.35 UJ	0.38	0.35 UJ	0.36 U	0.31 U	0.29 U
ARSENIC, TOTAL	0.5 UJ	0.44 UJ	0.5 UJ	0.51 UJ	0.85 U	0.44 J
BARIUM, TOTAL	4.1	13.2	6.7	4.9	29.9	15.8
BERYLLIUM, TOTAL	0.06 U	0.05	0.06 U	0.06 U	0.78	0.37
CADMIUM, TOTAL	0.07 U	0.06 U	0.07 U	0.08 U	0.04 UJ	0.04 UJ
CALCIUM, TOTAL	1420	494	707	131	1620	1140
CHROMIUM, TOTAL	2.2	6.1	6.8	3.4	7.3	5.7
COBALT, TOTAL	0.09 UJ	0.13 J	0.33 J	0.09 UJ	0.61 J	0.23 J
COPPER, TOTAL	0.15 UJ	0.76 J	0.85 J	0.15 UJ	1.5	0.75 J
IRON, TOTAL	1120	3200	1520	507	3070	1890
LEAD, TOTAL	2.9	4.9	2.9	2.4	12.6 J	9.3 J
MAGNESIUM, TOTAL	66	161	81.3	69.3	460	284
MANGANESE, TOTAL	1.4	5.2	4.2	1.9	10.1	7.4
MERCURY, TOTAL	0.04 U	0.05 U	0.05 U	0.04 U	0.06 U	0.05 U
NICKEL, TOTAL	0.13 UJ	0.56 J	0.75 J	0.13 UJ	1.5 J	0.53 J
POTASSIUM, TOTAL	50.7 U	160	166 J	156	327 J	210 J
SELENIUM, TOTAL	0.46 J	0.56	0.66 J	0.41 U	0.37 UJ	0.34 UJ
SILVER, TOTAL	3 J	0.08 U	0.09 U	0.09 U	0.04 U	0.04 U
SODIUM, TOTAL	35.1 U	69.3	42.9	35.3 U	252 J	179 J
THALLIUM, TOTAL	0.56 U	0.49 U	0.55 U	0.56 U	0.37 UJ	0.34 UJ
VANADIUM, TOTAL	5.7	9.4	5.4	4.5	6.8	5.5
ZINC, TOTAL	0.5 J	2.5 J	1.9 J	0.75 J	4.5 J	3.6 J

**FREQUENCY OF DETECTION SUMMARY**  
**SUBSURFACE SOIL - TAL METALS**  
**PHASE II - FIXED BASE LABORATORY**  
**RI/FS CTO-0356**  
**OPERABLE UNIT NO. 16 (SITE 89)**  
**MCB CAMP LEJEUNE, NORTH CAROLINA**

SAMPLE ID	IR89-MW04-05	IR89-MW04DW-05	IR89-MW05-03	IR89-MW05IW-03	IR89-MW05DW-03	IR89-MW05-06
PHASE	PHASE II	PHASE II	PHASE II	PHASE II	PHASE II	PHASE II
DATE SAMPLED	04/15/97	04/17/97	04/20/97	04/18/97	04/19/97	04/20/97
DEPTH	9-11'	9-11'	5-7'	5-7'	5-7'	11-13'
<b>TOTAL METALS (mg/kg)</b>						
ALUMINUM, TOTAL	2280 J	8540 J	9410	7260 JJ	6450	8090
ANTIMONY, TOTAL	0.32 U	0.38 U	0.27 UJ	0.28 U	0.29 UJ	0.39 UJ
ARSENIC, TOTAL	0.35 UJ	0.72 J	0.77 J	0.56	0.6 J	0.44 UJ
BARIUM, TOTAL	11.6	27.3	17.7	15.4	13.9	15.5
BERYLLIUM, TOTAL	0.33	0.94	0.07	0.06	0.05	0.55
CADMIUM, TOTAL	0.04 UJ	0.24 J	0.04 J	0.04 UJ	0.04 UJ	0.05 UJ
CALCIUM, TOTAL	2450	2610	19100	737	1290	3870
CHROMIUM, TOTAL	3.9	8.7	10	7.5	6.8	6.8
COBALT, TOTAL	0.25 J	7.7	0.38 J	0.21 J	0.09 J	1.1 J
COPPER, TOTAL	0.96 J	2.7	1.4 J	0.71 J	0.83 J	0.69 J
IRON, TOTAL	12100	9980	3980	2790	2540	2990
LEAD, TOTAL	3.9 J	9.5 J	9.8	7.2 J	5.4	7.6
MAGNESIUM, TOTAL	195	496	569	253	223	238
MANGANESE, TOTAL	10.7	10.9	11	11.7	9.1	13.7
MERCURY, TOTAL	0.05 U	0.07 U	0.05 U	0.04 U	0.06 U	0.07 U
NICKEL, TOTAL	1 J	11.3	1.2 J	0.79 J	0.71 J	2.5 J
POTASSIUM, TOTAL	163 J	389 J	342 J	273 J	240 J	176 J
SELENIUM, TOTAL	0.37 UJ	0.45 UJ	0.32 UJ	0.34 UJ	0.47 J	0.6 J
SILVER, TOTAL	0.04 U	0.05 U	0.18	0.04 U	0.04 U	0.05 U
SODIUM, TOTAL	68 J	190 J	90.4 J	35.6 J	44.4 J	88.4 J
THALLIUM, TOTAL	0.37 UJ	0.45 UJ	0.32 UJ	0.34 UJ	0.34 UJ	0.47 UJ
VANADIUM, TOTAL	3.8	9.5	13.6	10.8	9.3	6.8
ZINC, TOTAL	2.2 J	111 J	8.8 J	2.5 J	4 J	3.9 J



**FREQUENCY OF DETECTION SUMMARY**  
**SUBSURFACE SOIL - TAL METALS**  
**PHASE II - FIXED BASE LABORATORY**  
**RI/FS CTO-0356**  
**OPERABLE UNIT NO. 16 (SITE 89)**  
**MCB CAMP LEJEUNE, NORTH CAROLINA**

SAMPLE ID	IR89-MW05IW-06	IR89-MW05DW-06	IR89-MW06IW-01	IR89-MW06DW-01	IR89-MW06IW-02	IR89-MW06DW-02
PHASE	PHASE II	PHASE II	PHASE II	PHASE II	PHASE II	PHASE II
DATE SAMPLED	04/18/97	04/19/97	05/02/97	05/02/97	05/02/97	05/02/97
DEPTH	11-13'	11-13'	1-3'	1-3'	3-5'	3-5'
<b>TOTAL METALS (mg/kg)</b>						
ALUMINUM, TOTAL	1910 J	4890	4910	5820	11200	9440
ANTIMONY, TOTAL	0.36 U	0.34 UJ	0.26 U	0.34 U	0.27 U	0.31 U
ARSENIC, TOTAL	0.41 UJ	0.39 UJ	0.89 J	0.38 UJ	1.6 J	1.6 J
BARIUM, TOTAL	7.2	10.6	9	11.7	12.3	13.1
BERYLLIUM, TOTAL	0.16	0.44	0.05	0.07	0.08	0.07
CADMIUM, TOTAL	0.05 UJ	0.04 UJ	0.03 UJ	0.04 UJ	0.03 UJ	0.04 UJ
CALCIUM, TOTAL	845	1740	21.1 UJ	51.6	12.8 U	16.2 U
CHROMIUM, TOTAL	2.4	4.8	5.4	3.7	13.2	12.3
COBALT, TOTAL	0.14 J	1.1 J	0.09 J	0.06 UJ	0.52 J	0.32 J
COPPER, TOTAL	0.76 J	0.66 J	0.27	0.17	0.76	0.74
IRON, TOTAL	1310	2290	3630	2620	8110	8350
LEAD, TOTAL	2.8 J	5.3	4	4	8.1	7.1
MAGNESIUM, TOTAL	82.6	183	139	120	372	298
MANGANESE, TOTAL	5.8	8.6	5.7	8.3	5	4.3
MERCURY, TOTAL	0.07 U	0.05 U	0.04 U	0.05 U	0.05 U	0.05 U
NICKEL, TOTAL	0.16 UJ	1.9 J	0.27 UJ	0.44 UJ	0.88 UJ	0.47 UJ
POTASSIUM, TOTAL	78 U	141 J	149 J	117	308 J	282 J
SELENIUM, TOTAL	0.43 UJ	0.41 UJ	0.36 UJ	0.46 UJ	0.37 UJ	0.42 J
SILVER, TOTAL	0.05 U	0.04 U	0.03 U	0.04 U	0.03 U	0.04 U
SODIUM, TOTAL	29.7 UJ	44.1 J	92.1	47.8	97.9	123
THALLIUM, TOTAL	0.43 UJ	0.41 UJ	0.31 UJ	0.4 UJ	0.32 UJ	0.36 UJ
VANADIUM, TOTAL	3.4	5.8	9.6	7.1	20.8	22.1
ZINC, TOTAL	1.1 J	5.7 J	0.81 J	0.94 J	2.4 J	1.7 J

**FREQUENCY OF DETECTION SUMMARY**  
**SUBSURFACE SOIL - TAL METALS**  
**PHASE II - FIXED BASE LABORATORY**  
**RI/FS CTO-0356**  
**OPERABLE UNIT NO. 16 (SITE 89)**  
**MCB CAMP LEJEUNE, NORTH CAROLINA**

SAMPLE ID	IR89-MW07IW-04	IR89-MW07DW-04	IR89-MW07IW-06	IR89-MW07DW-06	IR89-MW08IW-04	IR89-MW08DW-04
PHASE	PHASE II	PHASE II	PHASE II	PHASE II	PHASE II	PHASE II
DATE SAMPLED	05/03/97	05/04/97	05/03/97	05/04/97	05/12/97	05/13/97
DEPTH	7-9'	7-9'	11-13'	11-13'	7-9'	7-9'
<b>TOTAL METALS (mg/kg)</b>						
ALUMINUM, TOTAL	2780	1380	7170	4900	2250	7070
ANTIMONY, TOTAL	0.36 U	0.37 U	0.37 U	0.47 U	0.6 J	0.41 UJ
ARSENIC, TOTAL	1.8 J	0.56 J	0.42 J	0.4 UJ	1.1	2.3 J
BARIUM, TOTAL	5.5	3.3	12.9	7.7	3.8	10.9
BERYLLIUM, TOTAL	0.03	0.02 U	0.06	0.04	0.07 U	0.07
CADMIUM, TOTAL	0.03 UJ	0.04 UJ	0.04 UJ	0.04 UJ	0.09 U	0.09 U
CALCIUM, TOTAL	21.7 UJ	361	41 UJ	29 UJ	11.9	11.6
CHROMIUM, TOTAL	4	2.6	6.6	3.9	4.2	10.3
COBALT, TOTAL	0.05 J	0.05 UJ	0.27 J	0.14 J	0.11 UJ	0.18 J
COPPER, TOTAL	0.32	0.12 U	0.32	0.16 U	0.17 UJ	1.1 J
IRON, TOTAL	2260	1490	3300	1770	3600	4020
LEAD, TOTAL	3	2.4	7	6.2	3.9	6.2
MAGNESIUM, TOTAL	81.4	61.2	285	170	54.4	228
MANGANESE, TOTAL	2.3	1.7 UJ	2.5	2.6	1.2	11.1
MERCURY, TOTAL	0.04 U	0.05 U	0.06 U	0.05 U	0.07 U	0.06 U
NICKEL, TOTAL	0.11 UJ	0.12 UJ	0.15 UJ	0.16 UJ	0.15 UJ	0.24 J
POTASSIUM, TOTAL	149 J	98.7 U	158 J	121 J	108 U	330 J
SELENIUM, TOTAL	0.34 UJ	0.39 UJ	0.4 UJ	0.49 UJ	0.52	0.53 J
SILVER, TOTAL	0.03 U	0.04 U	0.04 U	0.04 U	0.11 U	0.11 U
SODIUM, TOTAL	42.5	23.1 U	50.9	47.9	41.3 U	80.7
THALLIUM, TOTAL	0.29 UJ	0.33 UJ	0.34 UJ	0.42 UJ	0.66 U	0.65 U
VANADIUM, TOTAL	10.5	4.2	9.9	5.1	11	15.3
ZINC, TOTAL	0.45 J	0.04 UJ	0.81 J	0.12 J	0.13 J	1.8 J

FREQUENCY OF DETECTION SUMMARY  
 SUBSURFACE SOIL - TAL METALS  
 PHASE II - FIXED BASE LABORATORY  
 RI/FS CTO-0356  
 OPERABLE UNIT NO. 16 (SITE 89)  
 MCB CAMP LEJEUNE, NORTH CAROLINA

SAMPLE ID	IR89-MW08IW-06	IR89-MW08DW-06
PHASE	PHASE II	PHASE II
DATE SAMPLED	05/12/97	05/13/97
DEPTH	11-13'	11-13'
<b>TOTAL METALS (mg/kg)</b>		
ALUMINUM, TOTAL	1900	1390
ANTIMONY, TOTAL	0.53	0.36 UJ
ARSENIC, TOTAL	0.56 UJ	0.51 UJ
BARIUM, TOTAL	4.8	4.7
BERYLLIUM, TOTAL	0.06 U	0.06 U
CADMIUM, TOTAL	0.08 U	0.08 U
CALCIUM, TOTAL	44.7	51.2
CHROMIUM, TOTAL	2.5	1.4
COBALT, TOTAL	0.1 UJ	0.1 UJ
COPPER, TOTAL	0.17 UJ	0.15 UJ
IRON, TOTAL	714	497
LEAD, TOTAL	1.8	1.8
MAGNESIUM, TOTAL	51.2	42.2
MANGANESE, TOTAL	1.3	0.43
MERCURY, TOTAL	0.04 U	0.05 U
NICKEL, TOTAL	0.2 J	0.13 UJ
POTASSIUM, TOTAL	89.3 U	63.2 U
SELENIUM, TOTAL	0.55	0.5 J
SILVER, TOTAL	0.1 U	0.1 U
SODIUM, TOTAL	39.1 U	35.9 U
THALLIUM, TOTAL	0.62 U	0.57 U
VANADIUM, TOTAL	2.3	1.2
ZINC, TOTAL	0.18 J	0.08 UJ

**FREQUENCY OF DETECTION SUMMARY**  
**SUBSURFACE SOIL - TAL METALS**  
**PHASE II - FIXED BASE LABORATORY**  
**RI/FS CTO-0356**  
**OPERABLE UNIT NO. 16 (SITE 89)**  
**MCB CAMP LEJEUNE, NORTH CAROLINA**

SAMPLE ID PHASE DATE SAMPLED DEPTH	Minimum Non-Detect	Maximum Non-Detect	Minimum Detected	Maximum Detected	Location of Maximum Detect	Frequency of Detection	Arithmetic Mean Positive Detects	Median Positive Detects
<b>TOTAL METALS (mg/kg)</b>								
ALUMINUM, TOTAL	NA	NA	1380	11200	IR89-MW06IW-02	26/26	5196.54	4905
ANTIMONY, TOTAL	0.26 U	0.47 U	0.38	0.6 J	IR89-MW08IW-04	3/26	0.5	0.53
ARSENIC, TOTAL	0.35 UJ	0.85 U	0.42 J	2.3 J	IR89-MW08DW-04	13/26	1.03	0.77
BARIUM, TOTAL	NA	NA	3.3	29.9	IR89-MW04-03	26/26	11.29	11.25
BERYLLIUM, TOTAL	0.02 U	0.07	0.03	0.94	IR89-MW04DW-05	19/26	0.22	0.07
CADMIUM, TOTAL	0.03 UJ	0.09 U	0.04 J	0.24 J	IR89-MW04DW-05	2/26	0.14	0.14
CALCIUM, TOTAL	12.8 U	41 UJ	11.6	19100	IR89-MW05-03	20/26	1934.3	791
CHROMIUM, TOTAL	NA	NA	1.4	13.2	IR89-MW06IW-02	26/26	5.87	5.55
COBALT, TOTAL	0.05 UJ	0.11 UJ	0.05 J	7.7	IR89-MW04DW-05	19/26	0.73	0.25
COPPER, TOTAL	0.12 U	0.17 UJ	0.17	2.7	IR89-MW04DW-05	19/26	0.86	0.76
IRON, TOTAL	NA	NA	497	12100	IR89-MW04-05	26/26	3448	2705
LEAD, TOTAL	NA	NA	1.8	12.6 J	IR89-MW04-03	26/26	5.46	5.1
MAGNESIUM, TOTAL	NA	NA	42.2	569	IR89-MW05-03	26/26	202.45	176.5
MANGANESE, TOTAL	1.7 UJ	1.7 UJ	0.43	13.7	IR89-MW05-06	25/26	6.26	5.7
MERCURY, TOTAL	0.04 U	0.07 U	ND	ND		0/26	--	--
NICKEL, TOTAL	0.11 UJ	0.88 UJ	0.2 J	11.3	IR89-MW04DW-05	13/26	1.78	0.79
POTASSIUM, TOTAL	50.7 U	108 U	117	389 J	IR89-MW04DW-05	20/26	217.85	171
SELENIUM, TOTAL	0.32 UJ	0.49 UJ	0.42 J	0.66 J	IR89-MW03IW-05	10/26	0.53	0.53
SILVER, TOTAL	0.03 U	0.11 U	0.18	3 J	IR89-MW03IW-02	2/26	1.59	1.59
SODIUM, TOTAL	23.1 U	41.3 U	35.6 J	252 J	IR89-MW04-03	19/26	88.78	69.3
THALLIUM, TOTAL	0.29 UJ	0.66 U	ND	ND		0/26	--	--
VANADIUM, TOTAL	NA	NA	1.2	22.1	IR89-MW06DW-02	26/26	8.44	6.95
ZINC, TOTAL	0.04 UJ	0.08 UJ	0.12 J	111 J	IR89-MW04DW-05	24/26	6.76	1.85

**SITE 89 GROUNDWATER - ORGANICS**

**FREQUENCY OF DETECTION SUMMARY**  
**GROUNDWATER - TCL ORGANICS**  
**PHASE I AND PHASE II - MOBILE LABORATORY AND**  
**PHASE II - FIXED BASE LABORATORY**  
**RI/FS CTO-0356**  
**OPERABLE UNIT NO. 16 (SITE 89)**  
**MCB CAMP LEJEUNE, NORTH CAROLINA**

SAMPLE ID	IR89-MW01-01	IR89-MW02-01	IR89-MW03-01	IR89-MW42B-02	IR89-TW04-01	IR89-TW04IW-01	IR89-TW08-01
PHASE	PHASE I	PHASE I	PHASE I	PHASE I	PHASE I	PHASE I	PHASE I
DATE SAMPLED	7/31/96	7/30/96	7/31/96	7/31/96	7/31/96	7/31/96	8/3/96
<b>VOLATILES (ug/L)</b>							
1,1,1-TRICHLOROETHANE	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
1,1,2,2-TETRACHLOROETHANE	NA	NA	NA	NA	NA	NA	NA
1,1,2-TRICHLOROETHANE	NA	NA	NA	NA	NA	NA	NA
1,1-DICHLOROETHANE	NA	NA	NA	NA	NA	NA	NA
1,1-DICHLOROETHENE	NA	NA	NA	NA	NA	NA	NA
1,2-DICHLOROBENZENE	NA	NA	NA	NA	NA	NA	NA
1,2-DICHLOROETHANE	NA	NA	NA	NA	NA	NA	NA
1,2-DICHLOROETHENE (TOTAL)	NA	NA	NA	NA	NA	NA	NA
1,2-DICHLOROPROPANE	NA	NA	NA	NA	NA	NA	NA
1,3-DICHLOROBENZENE	NA	NA	NA	NA	NA	NA	NA
1,4-DICHLOROBENZENE	NA	NA	NA	NA	NA	NA	NA
2-BUTANONE	NA	NA	NA	NA	NA	NA	NA
2-HEXANONE	NA	NA	NA	NA	NA	NA	NA
4-METHYL-2-PENTANONE	NA	NA	NA	NA	NA	NA	NA
ACETONE	NA	NA	NA	NA	NA	NA	NA
BENZENE	NA	NA	NA	NA	NA	NA	NA
BROMODICHLOROMETHANE	NA	NA	NA	NA	NA	NA	NA
BROMOFORM	NA	NA	NA	NA	NA	NA	NA
BROMOMETHANE	NA	NA	NA	NA	NA	NA	NA
CARBON DISULFIDE	NA	NA	NA	NA	NA	NA	NA
CARBON TETRACHLORIDE	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
CHLOROBENZENE	NA	NA	NA	NA	NA	NA	NA
CHLOROETHANE	NA	NA	NA	NA	NA	NA	NA
CHLOROFORM	1 U	1 U	1 U		2.3	2.1	1 U
CHLOROMETHANE	NA	NA	NA	NA	NA	NA	NA
CIS-1,2-DICHLOROETHENE	261	818	150	37	1 U	1 U	253
CIS-1,3-DICHLOROPROPENE	NA	NA	NA	NA	NA	NA	NA
DIBROMOCHLOROMETHANE	NA	NA	NA	NA	NA	NA	NA
ETHYLBENZENE	NA	NA	NA	NA	NA	NA	NA

**FREQUENCY OF DETECTION SUMMARY**  
**GROUNDWATER - TCL ORGANICS**  
**PHASE I AND PHASE II - MOBILE LABORATORY AND**  
**PHASE II - FIXED BASE LABORATORY**  
**RI/FS CTO-0356**  
**OPERABLE UNIT NO. 16 (SITE 89)**  
**MCB CAMP LEJEUNE, NORTH CAROLINA**

SAMPLE ID	IR89-MW01-01	IR89-MW02-01	IR89-MW03-01	IR89-MW42B-02	IR89-TW04-01	IR89-TW04IW-01	IR89-TW08-01
PHASE	PHASE I	PHASE I	PHASE I	PHASE I	PHASE I	PHASE I	PHASE I
DATE SAMPLED	7/31/96	7/30/96	7/31/96	7/31/96	7/31/96	7/31/96	8/3/96
<b>VOLATILES (ug/L) (cont)</b>							
FLUOROTRICHLOROMETHANE	NA	NA	NA	NA	NA	NA	NA
M&P-XYLENE	NA	NA	NA	NA	NA	NA	NA
METHYLENE CHLORIDE	NA	NA	NA	NA	NA	NA	NA
O-XYLENE	NA	NA	NA	NA	NA	NA	NA
STYRENE	NA	NA	NA	NA	NA	NA	NA
TETRACHLOROETHENE	42.4	9.4	13.1	0.1 U	0.1 U	0.1 U	27
TOLUENE	NA	NA	NA	NA	NA	NA	NA
TRANS-1,2-DICHLOROETHENE	177	451	82	6	1 U	1 U	61
TRANS-1,3-DICHLOROPROPENE	NA	NA	NA	NA	NA	NA	NA
TRICHLOROETHENE	323.1	744.3	131	85.8	0.1 U	0.1 U	638.4
VINYL CHLORIDE	50 U	130	50 U	50 U	50 U	50 U	50 U
XYLENE (TOTAL)	NA	NA	NA	NA	NA	NA	NA

**FREQUENCY OF DETECTION SUMMARY**  
**GROUNDWATER - TCL ORGANICS**  
**PHASE I AND PHASE II - MOBILE LABORATORY AND**  
**PHASE II - FIXED BASE LABORATORY**  
**RI/FS CTO-0356**  
**OPERABLE UNIT NO. 16 (SITE 89)**  
**MCB CAMP LEJEUNE, NORTH CAROLINA**

SAMPLE ID	IR89-MW01-01	IR89-MW02-01	IR89-MW03-01	IR89-MW42B-02	IR89-TW04-01	IR89-TW04IW-01	IR89-TW08-01
PHASE	PHASE I	PHASE I	PHASE I	PHASE I	PHASE I	PHASE I	PHASE I
DATE SAMPLED	7/31/96	7/30/96	7/31/96	7/31/96	7/31/96	7/31/96	8/3/96
<b>SEMIVOLATILES (ug/L)</b>							
1,2,4-TRICHLOROBENZENE	NA	NA	NA	NA	NA	NA	NA
1,2-DICHLOROBENZENE	NA	NA	NA	NA	NA	NA	NA
1,3-DICHLOROBENZENE	NA	NA	NA	NA	NA	NA	NA
1,4-DICHLOROBENZENE	NA	NA	NA	NA	NA	NA	NA
2,2'-OXYBIS(1-CHLOROPROPANE)	NA	NA	NA	NA	NA	NA	NA
2,4,5-TRICHLOROPHENOL	NA	NA	NA	NA	NA	NA	NA
2,4,6-TRICHLOROPHENOL	NA	NA	NA	NA	NA	NA	NA
2,4-DICHLOROPHENOL	NA	NA	NA	NA	NA	NA	NA
2,4-DIMETHYLPHENOL	NA	NA	NA	NA	NA	NA	NA
2,4-DINITROPHENOL	NA	NA	NA	NA	NA	NA	NA
2,4-DINITROTOLUENE	NA	NA	NA	NA	NA	NA	NA
2,6-DINITROTOLUENE	NA	NA	NA	NA	NA	NA	NA
2-CHLORONAPHTHALENE	NA	NA	NA	NA	NA	NA	NA
2-CHLOROPHENOL	NA	NA	NA	NA	NA	NA	NA
2-METHYLNAPHTHALENE	NA	NA	NA	NA	NA	NA	NA
2-METHYLPHENOL	NA	NA	NA	NA	NA	NA	NA
2-NITROANILINE	NA	NA	NA	NA	NA	NA	NA
2-NITROPHENOL	NA	NA	NA	NA	NA	NA	NA
3,3'-DICHLOROBENZIDINE	NA	NA	NA	NA	NA	NA	NA
3-NITROANILINE	NA	NA	NA	NA	NA	NA	NA
4,6-DINITRO-2-METHYLPHENOL	NA	NA	NA	NA	NA	NA	NA
4-BROMOPHENYL-PHENYLETHER	NA	NA	NA	NA	NA	NA	NA
4-CHLORO-3-METHYLPHENOL	NA	NA	NA	NA	NA	NA	NA
4-CHLOROANILINE	NA	NA	NA	NA	NA	NA	NA
4-CHLOROPHENYL-PHENYLETHER	NA	NA	NA	NA	NA	NA	NA
4-METHYLPHENOL	NA	NA	NA	NA	NA	NA	NA
4-NITROANILINE	NA	NA	NA	NA	NA	NA	NA
4-NITROPHENOL	NA	NA	NA	NA	NA	NA	NA
ACENAPHTHENE	NA	NA	NA	NA	NA	NA	NA



**FREQUENCY OF DETECTION SUMMARY**  
**GROUNDWATER - TCL ORGANICS**  
**PHASE I AND PHASE II - MOBILE LABORATORY AND**  
**PHASE II - FIXED BASE LABORATORY**  
**RI/FS CTO-0356**  
**OPERABLE UNIT NO. 16 (SITE 89)**  
**MCB CAMP LEJEUNE, NORTH CAROLINA**

SAMPLE ID	IR89-MW01-01	IR89-MW02-01	IR89-MW03-01	IR89-MW42B-02	IR89-TW04-01	IR89-TW04IW-01	IR89-TW08-01
PHASE	PHASE I	PHASE I	PHASE I	PHASE I	PHASE I	PHASE I	PHASE I
DATE SAMPLED	7/31/96	7/30/96	7/31/96	7/31/96	7/31/96	7/31/96	8/3/96
<b>SEMIVOLATILES (ug/L) (cont)</b>							
ACENAPHTHYLENE	NA	NA	NA	NA	NA	NA	NA
ANTHRACENE	NA	NA	NA	NA	NA	NA	NA
BENZO(A)ANTHRACENE	NA	NA	NA	NA	NA	NA	NA
BENZO(A)PYRENE	NA	NA	NA	NA	NA	NA	NA
BENZO(B)FLUORANTHENE	NA	NA	NA	NA	NA	NA	NA
BENZO(G,H,I)PERYLENE	NA	NA	NA	NA	NA	NA	NA
BENZO(K)FLUORANTHENE	NA	NA	NA	NA	NA	NA	NA
BIS(2-CHLOROETHOXY)METHANE	NA	NA	NA	NA	NA	NA	NA
BIS(2-CHLOROETHYL)ETHER	NA	NA	NA	NA	NA	NA	NA
BIS(2-ETHYLHEXYL)PHTHALATE	NA	NA	NA	NA	NA	NA	NA
BUTYLBENZYLPHTHALATE	NA	NA	NA	NA	NA	NA	NA
CARBAZOLE	NA	NA	NA	NA	NA	NA	NA
CHRYSENE	NA	NA	NA	NA	NA	NA	NA
DIBENZO(A,H)ANTHRACENE	NA	NA	NA	NA	NA	NA	NA
DIBENZOFURAN	NA	NA	NA	NA	NA	NA	NA
DIETHYLPHTHALATE	NA	NA	NA	NA	NA	NA	NA
DIMETHYLPHTHALATE	NA	NA	NA	NA	NA	NA	NA
DI-N-BUTYLPHTHALATE	NA	NA	NA	NA	NA	NA	NA
DI-N-OCTYLPHTHALATE	NA	NA	NA	NA	NA	NA	NA
FLUORANTHENE	NA	NA	NA	NA	NA	NA	NA
FLUORENE	NA	NA	NA	NA	NA	NA	NA
HEXACHLOROBENZENE	NA	NA	NA	NA	NA	NA	NA
HEXACHLOROBUTADIENE	NA	NA	NA	NA	NA	NA	NA
HEXACHLOROCYCLOPENTADIENE	NA	NA	NA	NA	NA	NA	NA
HEXACHLOROETHANE	NA	NA	NA	NA	NA	NA	NA
INDENO(1,2,3-CD)PYRENE	NA	NA	NA	NA	NA	NA	NA
ISOPHORONE	NA	NA	NA	NA	NA	NA	NA
NAPHTHALENE	NA	NA	NA	NA	NA	NA	NA
NITROBENZENE	NA	NA	NA	NA	NA	NA	NA

**FREQUENCY OF DETECTION SUMMARY**  
**GROUNDWATER - TCL ORGANICS**  
**PHASE I AND PHASE II - MOBILE LABORATORY AND**  
**PHASE II - FIXED BASE LABORATORY**  
**RI/FS CTO-0356**  
**OPERABLE UNIT NO. 16 (SITE 89)**  
**MCB CAMP LEJEUNE, NORTH CAROLINA**

SAMPLE ID	IR89-MW01-01	IR89-MW02-01	IR89-MW03-01	IR89-MW42B-02	IR89-TW04-01	IR89-TW04IW-01	IR89-TW08-01
PHASE	PHASE I	PHASE I	PHASE I	PHASE I	PHASE I	PHASE I	PHASE I
DATE SAMPLED	7/31/96	7/30/96	7/31/96	7/31/96	7/31/96	7/31/96	8/3/96
<b>SEMIVOLATILES (ug/L) (cont)</b>							
N-NITROSO-DI-N-PROPYLAMINE	NA	NA	NA	NA	NA	NA	NA
N-NITROSODIPHENYLAMINE (1)	NA	NA	NA	NA	NA	NA	NA
PENTACHLOROPHENOL	NA	NA	NA	NA	NA	NA	NA
PHENANTHRENE	NA	NA	NA	NA	NA	NA	NA
PHENOL	NA	NA	NA	NA	NA	NA	NA
PYRENE	NA	NA	NA	NA	NA	NA	NA

**FREQUENCY OF DETECTION SUMMARY**  
**GROUNDWATER - TCL ORGANICS**  
**PHASE I AND PHASE II - MOBILE LABORATORY AND**  
**PHASE II - FIXED BASE LABORATORY**  
**RI/FS CTO-0356**  
**OPERABLE UNIT NO. 16 (SITE 89)**  
**MCB CAMP LEJEUNE, NORTH CAROLINA**

SAMPLE ID	IR89-MW01-01	IR89-MW02-01	IR89-MW03-01	IR89-MW42B-02	IR89-TW04-01	IR89-TW04IW-01	IR89-TW08-01
PHASE	PHASE I	PHASE I	PHASE I	PHASE I	PHASE I	PHASE I	PHASE I
DATE SAMPLED	7/31/96	7/30/96	7/31/96	7/31/96	7/31/96	7/31/96	8/3/96
<b>PESTICIDES/PCBS (ug/L)</b>							
4,4'-DDD	NA	NA	NA	NA	NA	NA	NA
4,4'-DDE	NA	NA	NA	NA	NA	NA	NA
4,4'-DDT	NA	NA	NA	NA	NA	NA	NA
ALDRIN	NA	NA	NA	NA	NA	NA	NA
ALPHA-BHC	NA	NA	NA	NA	NA	NA	NA
ALPHA-CHLORDANE	NA	NA	NA	NA	NA	NA	NA
BETA-BHC	NA	NA	NA	NA	NA	NA	NA
DELTA-BHC	NA	NA	NA	NA	NA	NA	NA
DIELDRIN	NA	NA	NA	NA	NA	NA	NA
ENDOSULFAN I	NA	NA	NA	NA	NA	NA	NA
ENDOSULFAN II	NA	NA	NA	NA	NA	NA	NA
ENDOSULFAN SULFATE	NA	NA	NA	NA	NA	NA	NA
ENDRIN	NA	NA	NA	NA	NA	NA	NA
ENDRIN ALDEHYDE	NA	NA	NA	NA	NA	NA	NA
ENDRIN KETONE	NA	NA	NA	NA	NA	NA	NA
GAMMA-BHC (LINDANE)	NA	NA	NA	NA	NA	NA	NA
GAMMA-CHLORDANE	NA	NA	NA	NA	NA	NA	NA
HEPTACHLOR	NA	NA	NA	NA	NA	NA	NA
HEPTACHLOR EPOXIDE	NA	NA	NA	NA	NA	NA	NA
METHOXYCHLOR	NA	NA	NA	NA	NA	NA	NA
TOXAPHENE	NA	NA	NA	NA	NA	NA	NA
AROCLOR-1016	NA	NA	NA	NA	NA	NA	NA
AROCLOR-1221	NA	NA	NA	NA	NA	NA	NA
AROCLOR-1232	NA	NA	NA	NA	NA	NA	NA
AROCLOR-1242	NA	NA	NA	NA	NA	NA	NA
AROCLOR-1248	NA	NA	NA	NA	NA	NA	NA
AROCLOR-1254	NA	NA	NA	NA	NA	NA	NA
AROCLOR-1260	NA	NA	NA	NA	NA	NA	NA

**FREQUENCY OF DETECTION SUMMARY**  
**GROUNDWATER - TCL ORGANICS**  
**PHASE I AND PHASE II - MOBILE LABORATORY AND**  
**PHASE II - FIXED BASE LABORATORY**  
**RI/FS CTO-0356**  
**OPERABLE UNIT NO. 16 (SITE 89)**  
**MCB CAMP LEJEUNE, NORTH CAROLINA**

SAMPLE ID	IR89-TW08IW-01	IR89-TW09-01	IR89-TW09IW-01	IR89-TW10-01	IR89-TW10IW-01	IR89-TW11-01	IR89-TW11IW-01
PHASE	PHASE I	PHASE I	PHASE I	PHASE I	PHASE I	PHASE I	PHASE I
DATE SAMPLED	8/3/96	8/3/96	8/3/96	8/4/96	8/4/96	8/4/96	8/4/96
<b>VOLATILES (ug/L)</b>							
1,1,1-TRICHLOROETHANE	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
1,1,2,2-TETRACHLOROETHANE	NA	NA	NA	NA	NA	NA	NA
1,1,2-TRICHLOROETHANE	NA	NA	NA	NA	NA	NA	NA
1,1-DICHLOROETHANE	NA	NA	NA	NA	NA	NA	NA
1,1-DICHLOROETHENE	NA	NA	NA	NA	NA	NA	NA
1,2-DICHLOROBENZENE	NA	NA	NA	NA	NA	NA	NA
1,2-DICHLOROETHANE	NA	NA	NA	NA	NA	NA	NA
1,2-DICHLOROETHENE (TOTAL)	NA	NA	NA	NA	NA	NA	NA
1,2-DICHLOROPROPANE	NA	NA	NA	NA	NA	NA	NA
1,3-DICHLOROBENZENE	NA	NA	NA	NA	NA	NA	NA
1,4-DICHLOROBENZENE	NA	NA	NA	NA	NA	NA	NA
2-BUTANONE	NA	NA	NA	NA	NA	NA	NA
2-HEXANONE	NA	NA	NA	NA	NA	NA	NA
4-METHYL-2-PENTANONE	NA	NA	NA	NA	NA	NA	NA
ACETONE	NA	NA	NA	NA	NA	NA	NA
BENZENE	NA	NA	NA	NA	NA	NA	NA
BROMODICHLOROMETHANE	NA	NA	NA	NA	NA	NA	NA
BROMOFORM	NA	NA	NA	NA	NA	NA	NA
BROMOMETHANE	NA	NA	NA	NA	NA	NA	NA
CARBON DISULFIDE	NA	NA	NA	NA	NA	NA	NA
CARBON TETRACHLORIDE	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
CHLOROBENZENE	NA	NA	NA	NA	NA	NA	NA
CHLOROETHANE	NA	NA	NA	NA	NA	NA	NA
CHLOROFORM	0.8	4.8	1.9	5.2	0.4	3.9	2.2
CHLOROMETHANE	NA	NA	NA	NA	NA	NA	NA
CIS-1,2-DICHLOROETHENE	1 U	1 U	114	1 U	27	1 U	14
CIS-1,3-DICHLOROPROPENE	NA	NA	NA	NA	NA	NA	NA
DIBROMOCHLOROMETHANE	NA	NA	NA	NA	NA	NA	NA
ETHYLBENZENE	NA	NA	NA	NA	NA	NA	NA

**FREQUENCY OF DETECTION SUMMARY**  
**GROUNDWATER - TCL ORGANICS**  
**PHASE I AND PHASE II - MOBILE LABORATORY AND**  
**PHASE II - FIXED BASE LABORATORY**  
**RI/FS CTO-0356**  
**OPERABLE UNIT NO. 16 (SITE 89)**  
**MCB CAMP LEJEUNE, NORTH CAROLINA**

SAMPLE ID	IR89-TW08IW-01	IR89-TW09-01	IR89-TW09IW-01	IR89-TW10-01	IR89-TW10IW-01	IR89-TW11-01	IR89-TW11IW-01
PHASE	PHASE I	PHASE I	PHASE I	PHASE I	PHASE I	PHASE I	PHASE I
DATE SAMPLED	8/3/96	8/3/96	8/3/96	8/4/96	8/4/96	8/4/96	8/4/96
<b>VOLATILES (ug/L) (cont)</b>							
FLUOROTRICHLOROMETHANE	NA	NA	NA	NA	NA	NA	NA
M&P-XYLENE	NA	NA	NA	NA	NA	NA	NA
METHYLENE CHLORIDE	NA	NA	NA	NA	NA	NA	NA
O-XYLENE	NA	NA	NA	NA	NA	NA	NA
STYRENE	NA	NA	NA	NA	NA	NA	NA
TETRACHLOROETHENE	0.1 U	0.1 U	8.8	0.1 U	0.1 U	0.1 U	0.1 U
TOLUENE	NA	NA	NA	NA	NA	NA	NA
TRANS-1,2-DICHLOROETHENE	1 U	1 U	20	1 U	5	1 U	1 U
TRANS-1,3-DICHLOROPROPENE	NA	NA	NA	NA	NA	NA	NA
TRICHLOROETHENE	0.3	0.1 U	233.4	0.2	36.3	0.1 U	3.3
VINYL CHLORIDE	50 U	50 U	50 U	50 U	50 U	50 U	50 U
XYLENE (TOTAL)	NA	NA	NA	NA	NA	NA	NA

**FREQUENCY OF DETECTION SUMMARY**  
**GROUNDWATER - TCL ORGANICS**  
**PHASE I AND PHASE II - MOBILE LABORATORY AND**  
**PHASE II - FIXED BASE LABORATORY**  
**RI/FS CTO-0356**  
**OPERABLE UNIT NO. 16 (SITE 89)**  
**MCB CAMP LEJEUNE, NORTH CAROLINA**

SAMPLE ID	IR89-TW08IW-01	IR89-TW09-01	IR89-TW09IW-01	IR89-TW10-01	IR89-TW10IW-01	IR89-TW11-01	IR89-TW11IW-01
PHASE	PHASE I	PHASE I	PHASE I	PHASE I	PHASE I	PHASE I	PHASE I
DATE SAMPLED	8/3/96	8/3/96	8/3/96	8/4/96	8/4/96	8/4/96	8/4/96
<b>SEMIVOLATILES (ug/L)</b>							
1,2,4-TRICHLOROBENZENE	NA	NA	NA	NA	NA	NA	NA
1,2-DICHLOROBENZENE	NA	NA	NA	NA	NA	NA	NA
1,3-DICHLOROBENZENE	NA	NA	NA	NA	NA	NA	NA
1,4-DICHLOROBENZENE	NA	NA	NA	NA	NA	NA	NA
2,2'-OXYBIS(1-CHLOROPROPANE)	NA	NA	NA	NA	NA	NA	NA
2,4,5-TRICHLOROPHENOL	NA	NA	NA	NA	NA	NA	NA
2,4,6-TRICHLOROPHENOL	NA	NA	NA	NA	NA	NA	NA
2,4-DICHLOROPHENOL	NA	NA	NA	NA	NA	NA	NA
2,4-DIMETHYLPHENOL	NA	NA	NA	NA	NA	NA	NA
2,4-DINITROPHENOL	NA	NA	NA	NA	NA	NA	NA
2,4-DINITROTOLUENE	NA	NA	NA	NA	NA	NA	NA
2,6-DINITROTOLUENE	NA	NA	NA	NA	NA	NA	NA
2-CHLORONAPHTHALENE	NA	NA	NA	NA	NA	NA	NA
2-CHLOROPHENOL	NA	NA	NA	NA	NA	NA	NA
2-METHYLNAPHTHALENE	NA	NA	NA	NA	NA	NA	NA
2-METHYLPHENOL	NA	NA	NA	NA	NA	NA	NA
2-NITROANILINE	NA	NA	NA	NA	NA	NA	NA
2-NITROPHENOL	NA	NA	NA	NA	NA	NA	NA
3,3'-DICHLOROBENZIDINE	NA	NA	NA	NA	NA	NA	NA
3-NITROANILINE	NA	NA	NA	NA	NA	NA	NA
4,6-DINITRO-2-METHYLPHENOL	NA	NA	NA	NA	NA	NA	NA
4-BROMOPHENYL-PHENYLEETHER	NA	NA	NA	NA	NA	NA	NA
4-CHLORO-3-METHYLPHENOL	NA	NA	NA	NA	NA	NA	NA
4-CHLOROANILINE	NA	NA	NA	NA	NA	NA	NA
4-CHLOROPHENYL-PHENYLEETHER	NA	NA	NA	NA	NA	NA	NA
4-METHYLPHENOL	NA	NA	NA	NA	NA	NA	NA
4-NITROANILINE	NA	NA	NA	NA	NA	NA	NA
4-NITROPHENOL	NA	NA	NA	NA	NA	NA	NA
ACENAPHTHENE	NA	NA	NA	NA	NA	NA	NA

FREQUENCY OF DETECTION SUMMARY  
 GROUNDWATER - TCL ORGANICS  
 PHASE I AND PHASE II - MOBILE LABORATORY AND  
 PHASE II - FIXED BASE LABORATORY  
 RI/FS CTO-0356  
 OPERABLE UNIT NO. 16 (SITE 89)  
 MCB CAMP LEJEUNE, NORTH CAROLINA

SAMPLE ID	IR89-TW08IW-01	IR89-TW09-01	IR89-TW09IW-01	IR89-TW10-01	IR89-TW10IW-01	IR89-TW11-01	IR89-TW11IW-01
PHASE	PHASE I	PHASE I	PHASE I	PHASE I	PHASE I	PHASE I	PHASE I
DATE SAMPLED	8/3/96	8/3/96	8/3/96	8/4/96	8/4/96	8/4/96	8/4/96
<b>SEMIVOLATILES (ug/L) (cont)</b>							
ACENAPHTHYLENE	NA	NA	NA	NA	NA	NA	NA
ANTHRACENE	NA	NA	NA	NA	NA	NA	NA
BENZO(A)ANTHRACENE	NA	NA	NA	NA	NA	NA	NA
BENZO(A)PYRENE	NA	NA	NA	NA	NA	NA	NA
BENZO(B)FLUORANTHENE	NA	NA	NA	NA	NA	NA	NA
BENZO(G,H,I)PERYLENE	NA	NA	NA	NA	NA	NA	NA
BENZO(K)FLUORANTHENE	NA	NA	NA	NA	NA	NA	NA
BIS(2-CHLOROETHOXY)METHANE	NA	NA	NA	NA	NA	NA	NA
BIS(2-CHLOROETHYL)ETHER	NA	NA	NA	NA	NA	NA	NA
BIS(2-ETHYLHEXYL)PHTHALATE	NA	NA	NA	NA	NA	NA	NA
BUTYLBENZYLPHTHALATE	NA	NA	NA	NA	NA	NA	NA
CARBAZOLE	NA	NA	NA	NA	NA	NA	NA
CHRYSENE	NA	NA	NA	NA	NA	NA	NA
DIBENZO(A,H)ANTHRACENE	NA	NA	NA	NA	NA	NA	NA
DIBENZOFURAN	NA	NA	NA	NA	NA	NA	NA
DIETHYLPHTHALATE	NA	NA	NA	NA	NA	NA	NA
DIMETHYLPHTHALATE	NA	NA	NA	NA	NA	NA	NA
DI-N-BUTYLPHTHALATE	NA	NA	NA	NA	NA	NA	NA
DI-N-OCTYLPHTHALATE	NA	NA	NA	NA	NA	NA	NA
FLUORANTHENE	NA	NA	NA	NA	NA	NA	NA
FLUORENE	NA	NA	NA	NA	NA	NA	NA
HEXACHLOROBENZENE	NA	NA	NA	NA	NA	NA	NA
HEXACHLOROBUTADIENE	NA	NA	NA	NA	NA	NA	NA
HEXACHLOROCYCLOPENTADIENE	NA	NA	NA	NA	NA	NA	NA
HEXACHLOROETHANE	NA	NA	NA	NA	NA	NA	NA
INDENO(1,2,3-CD)PYRENE	NA	NA	NA	NA	NA	NA	NA
ISOPHORONE	NA	NA	NA	NA	NA	NA	NA
NAPHTHALENE	NA	NA	NA	NA	NA	NA	NA
NITROBENZENE	NA	NA	NA	NA	NA	NA	NA

**FREQUENCY OF DETECTION SUMMARY**  
**GROUNDWATER - TCL ORGANICS**  
**PHASE I AND PHASE II - MOBILE LABORATORY AND**  
**PHASE II - FIXED BASE LABORATORY**  
**RI/FS CTO-0356**  
**OPERABLE UNIT NO. 16 (SITE 89)**  
**MCB CAMP LEJEUNE, NORTH CAROLINA**

SAMPLE ID	IR89-TW08IW-01	IR89-TW09-01	IR89-TW09IW-01	IR89-TW10-01	IR89-TW10IW-01	IR89-TW11-01	IR89-TW11IW-01
PHASE	PHASE I	PHASE I	PHASE I	PHASE I	PHASE I	PHASE I	PHASE I
DATE SAMPLED	8/3/96	8/3/96	8/3/96	8/4/96	8/4/96	8/4/96	8/4/96
<b>SEMIVOLATILES (ug/L) (cont)</b>							
N-NITROSO-DI-N-PROPYLAMINE	NA	NA	NA	NA	NA	NA	NA
N-NITROSODIPHENYLAMINE (1)	NA	NA	NA	NA	NA	NA	NA
PENTACHLOROPHENOL	NA	NA	NA	NA	NA	NA	NA
PHENANTHRENE	NA	NA	NA	NA	NA	NA	NA
PHENOL	NA	NA	NA	NA	NA	NA	NA
PYRENE	NA	NA	NA	NA	NA	NA	NA



FREQUENCY OF DETECTION SUMMARY  
GROUNDWATER - TCL ORGANICS  
PHASE I AND PHASE II - MOBILE LABORATORY AND  
PHASE II - FIXED BASE LABORATORY  
RI/FS CTO-0356  
OPERABLE UNIT NO. 16 (SITE 89)  
MCB CAMP LEJEUNE, NORTH CAROLINA

SAMPLE ID	IR89-TW08IW-01	IR89-TW09-01	IR89-TW09IW-01	IR89-TW10-01	IR89-TW10IW-01	IR89-TW11-01	IR89-TW11IW-01
PHASE	PHASE I	PHASE I	PHASE I	PHASE I	PHASE I	PHASE I	PHASE I
DATE SAMPLED	8/3/96	8/3/96	8/3/96	8/4/96	8/4/96	8/4/96	8/4/96
<b>PESTICIDES/PCBS (ug/L)</b>							
4,4'-DDD	NA	NA	NA	NA	NA	NA	NA
4,4'-DDE	NA	NA	NA	NA	NA	NA	NA
4,4'-DDT	NA	NA	NA	NA	NA	NA	NA
ALDRIN	NA	NA	NA	NA	NA	NA	NA
ALPHA-BHC	NA	NA	NA	NA	NA	NA	NA
ALPHA-CHLORDANE	NA	NA	NA	NA	NA	NA	NA
BETA-BHC	NA	NA	NA	NA	NA	NA	NA
DELTA-BHC	NA	NA	NA	NA	NA	NA	NA
DIELDRIN	NA	NA	NA	NA	NA	NA	NA
ENDOSULFAN I	NA	NA	NA	NA	NA	NA	NA
ENDOSULFAN II	NA	NA	NA	NA	NA	NA	NA
ENDOSULFAN SULFATE	NA	NA	NA	NA	NA	NA	NA
ENDRIN	NA	NA	NA	NA	NA	NA	NA
ENDRIN ALDEHYDE	NA	NA	NA	NA	NA	NA	NA
ENDRIN KETONE	NA	NA	NA	NA	NA	NA	NA
GAMMA-BHC (LINDANE)	NA	NA	NA	NA	NA	NA	NA
GAMMA-CHLORDANE	NA	NA	NA	NA	NA	NA	NA
HEPTACHLOR	NA	NA	NA	NA	NA	NA	NA
HEPTACHLOR EPOXIDE	NA	NA	NA	NA	NA	NA	NA
METHOXYCHLOR	NA	NA	NA	NA	NA	NA	NA
TOXAPHENE	NA	NA	NA	NA	NA	NA	NA
AROCLOR-1016	NA	NA	NA	NA	NA	NA	NA
AROCLOR-1221	NA	NA	NA	NA	NA	NA	NA
AROCLOR-1232	NA	NA	NA	NA	NA	NA	NA
AROCLOR-1242	NA	NA	NA	NA	NA	NA	NA
AROCLOR-1248	NA	NA	NA	NA	NA	NA	NA
AROCLOR-1254	NA	NA	NA	NA	NA	NA	NA
AROCLOR-1260	NA	NA	NA	NA	NA	NA	NA

**FREQUENCY OF DETECTION SUMMARY**  
**GROUNDWATER - TCL ORGANICS**  
**PHASE I AND PHASE II - MOBILE LABORATORY AND**  
**PHASE II - FIXED BASE LABORATORY**  
**RI/FS CTO-0356**  
**OPERABLE UNIT NO. 16 (SITE 89)**  
**MCB CAMP LEJEUNE, NORTH CAROLINA**

SAMPLE ID	IR89-TW12-01	IR89-TW12IW-01	IR89-TW13-01	IR89-TW13IW-01	IR89-TW15-01	IR89-TW15IW-01	IR89-TW16-01
PHASE	PHASE I	PHASE I	PHASE I	PHASE I	PHASE I	PHASE I	PHASE I
DATE SAMPLED	8/4/96	8/4/96	8/5/96	8/5/96	8/6/96	8/6/96	8/6/96
<b>VOLATILES (ug/L)</b>							
1,1,1-TRICHLOROETHANE	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
1,1,2,2-TETRACHLOROETHANE	NA	NA	NA	NA	NA	NA	NA
1,1,2-TRICHLOROETHANE	NA	NA	NA	NA	NA	NA	NA
1,1-DICHLOROETHANE	NA	NA	NA	NA	NA	NA	NA
1,1-DICHLOROETHENE	NA	NA	NA	NA	NA	NA	NA
1,2-DICHLOROBENZENE	NA	NA	NA	NA	NA	NA	NA
1,2-DICHLOROETHANE	NA	NA	NA	NA	NA	NA	NA
1,2-DICHLOROETHENE (TOTAL)	NA	NA	NA	NA	NA	NA	NA
1,2-DICHLOROPROPANE	NA	NA	NA	NA	NA	NA	NA
1,3-DICHLOROBENZENE	NA	NA	NA	NA	NA	NA	NA
1,4-DICHLOROBENZENE	NA	NA	NA	NA	NA	NA	NA
2-BUTANONE	NA	NA	NA	NA	NA	NA	NA
2-HEXANONE	NA	NA	NA	NA	NA	NA	NA
4-METHYL-2-PENTANONE	NA	NA	NA	NA	NA	NA	NA
ACETONE	NA	NA	NA	NA	NA	NA	NA
BENZENE	NA	NA	NA	NA	NA	NA	NA
BROMODICHLOROMETHANE	NA	NA	NA	NA	NA	NA	NA
BROMOFORM	NA	NA	NA	NA	NA	NA	NA
BROMOMETHANE	NA	NA	NA	NA	NA	NA	NA
CARBON DISULFIDE	NA	NA	NA	NA	NA	NA	NA
CARBON TETRACHLORIDE	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
CHLOROBENZENE	NA	NA	NA	NA	NA	NA	NA
CHLOROETHANE	NA	NA	NA	NA	NA	NA	NA
CHLOROFORM	1 U	0.5	1 U	0.7	7.2	1.7	8.6
CHLOROMETHANE	NA	NA	NA	NA	NA	NA	NA
CIS-1,2-DICHLOROETHENE	1 U	1 U	18	21	162	3	102
CIS-1,3-DICHLOROPROPENE	NA	NA	NA	NA	NA	NA	NA
DIBROMOCHLOROMETHANE	NA	NA	NA	NA	NA	NA	NA
ETHYLBENZENE	NA	NA	NA	NA	NA	NA	NA

**FREQUENCY OF DETECTION SUMMARY**  
**GROUNDWATER - TCL ORGANICS**  
**PHASE I AND PHASE II - MOBILE LABORATORY AND**  
**PHASE II - FIXED BASE LABORATORY**  
**RI/FS CTO-0356**  
**OPERABLE UNIT NO. 16 (SITE 89)**  
**MCB CAMP LEJEUNE, NORTH CAROLINA**

SAMPLE ID	IR89-TW12-01	IR89-TW12IW-01	IR89-TW13-01	IR89-TW13IW-01	IR89-TW15-01	IR89-TW15IW-01	IR89-TW16-01
PHASE	PHASE I	PHASE I	PHASE I	PHASE I	PHASE I	PHASE I	PHASE I
DATE SAMPLED	8/4/96	8/4/96	8/5/96	8/5/96	8/6/96	8/6/96	8/6/96
<b>VOLATILES (ug/L) (cont)</b>							
FLUOROTRICHLOROMETHANE	NA	NA	NA	NA	NA	NA	NA
M&P-XYLENE	NA	NA	NA	NA	NA	NA	NA
METHYLENE CHLORIDE	NA	NA	NA	NA	NA	NA	NA
O-XYLENE	NA	NA	NA	NA	NA	NA	NA
STYRENE	NA	NA	NA	NA	NA	NA	NA
TETRACHLOROETHENE	0.1 U	0.1 U	4.8	7.4	13.7	0.1	42.7
TOLUENE	NA	NA	NA	NA	NA	NA	NA
TRANS-1,2-DICHLOROETHENE	1 U	1 U	3	1	53	1 U	44
TRANS-1,3-DICHLOROPROPENE	NA	NA	NA	NA	NA	NA	NA
TRICHLOROETHENE	0.1 U	0.1 U	136.9	57.9	355.9	6	562.9
VINYL CHLORIDE	50 U	50 U	50 U	50 U	50 U	50 U	50 U
XYLENE (TOTAL)	NA	NA	NA	NA	NA	NA	NA

**FREQUENCY OF DETECTION SUMMARY**  
**GROUNDWATER - TCL ORGANICS**  
**PHASE I AND PHASE II - MOBILE LABORATORY AND**  
**PHASE II - FIXED BASE LABORATORY**  
**RI/FS CTO-0356**  
**OPERABLE UNIT NO. 16 (SITE 89)**  
**MCB CAMP LEJEUNE, NORTH CAROLINA**

SAMPLE ID	IR89-TW12-01	IR89-TW12IW-01	IR89-TW13-01	IR89-TW13IW-01	IR89-TW15-01	IR89-TW15IW-01	IR89-TW16-01
PHASE	PHASE I	PHASE I	PHASE I	PHASE I	PHASE I	PHASE I	PHASE I
DATE SAMPLED	8/4/96	8/4/96	8/5/96	8/5/96	8/6/96	8/6/96	8/6/96
<b>SEMIVOLATILES (ug/L)</b>							
1,2,4-TRICHLOROBENZENE	NA	NA	NA	NA	NA	NA	NA
1,2-DICHLOROBENZENE	NA	NA	NA	NA	NA	NA	NA
1,3-DICHLOROBENZENE	NA	NA	NA	NA	NA	NA	NA
1,4-DICHLOROBENZENE	NA	NA	NA	NA	NA	NA	NA
2,2'-OXYBIS(1-CHLOROPROPANE)	NA	NA	NA	NA	NA	NA	NA
2,4,5-TRICHLOROPHENOL	NA	NA	NA	NA	NA	NA	NA
2,4,6-TRICHLOROPHENOL	NA	NA	NA	NA	NA	NA	NA
2,4-DICHLOROPHENOL	NA	NA	NA	NA	NA	NA	NA
2,4-DIMETHYLPHENOL	NA	NA	NA	NA	NA	NA	NA
2,4-DINITROPHENOL	NA	NA	NA	NA	NA	NA	NA
2,4-DINITROTOLUENE	NA	NA	NA	NA	NA	NA	NA
2,6-DINITROTOLUENE	NA	NA	NA	NA	NA	NA	NA
2-CHLORONAPHTHALENE	NA	NA	NA	NA	NA	NA	NA
2-CHLOROPHENOL	NA	NA	NA	NA	NA	NA	NA
2-METHYLNAPHTHALENE	NA	NA	NA	NA	NA	NA	NA
2-METHYLPHENOL	NA	NA	NA	NA	NA	NA	NA
2-NITROANILINE	NA	NA	NA	NA	NA	NA	NA
2-NITROPHENOL	NA	NA	NA	NA	NA	NA	NA
3,3'-DICHLOROBENZIDINE	NA	NA	NA	NA	NA	NA	NA
3-NITROANILINE	NA	NA	NA	NA	NA	NA	NA
4,6-DINITRO-2-METHYLPHENOL	NA	NA	NA	NA	NA	NA	NA
4-BROMOPHENYL-PHENYLETHER	NA	NA	NA	NA	NA	NA	NA
4-CHLORO-3-METHYLPHENOL	NA	NA	NA	NA	NA	NA	NA
4-CHLOROANILINE	NA	NA	NA	NA	NA	NA	NA
4-CHLOROPHENYL-PHENYLETHER	NA	NA	NA	NA	NA	NA	NA
4-METHYLPHENOL	NA	NA	NA	NA	NA	NA	NA
4-NITROANILINE	NA	NA	NA	NA	NA	NA	NA
4-NITROPHENOL	NA	NA	NA	NA	NA	NA	NA
ACENAPHTHENE	NA	NA	NA	NA	NA	NA	NA

**FREQUENCY OF DETECTION SUMMARY**  
**GROUNDWATER - TCL ORGANICS**  
**PHASE I AND PHASE II - MOBILE LABORATORY AND**  
**PHASE II - FIXED BASE LABORATORY**  
**RI/FS CTO-0356**  
**OPERABLE UNIT NO. 16 (SITE 89)**  
**MCB CAMP LEJEUNE, NORTH CAROLINA**

SAMPLE ID	IR89-TW12-01	IR89-TW12IW-01	IR89-TW13-01	IR89-TW13IW-01	IR89-TW15-01	IR89-TW15IW-01	IR89-TW16-01
PHASE	PHASE I	PHASE I	PHASE I	PHASE I	PHASE I	PHASE I	PHASE I
DATE SAMPLED	8/4/96	8/4/96	8/5/96	8/5/96	8/6/96	8/6/96	8/6/96
<b>SEMIVOLATILES (ug/L) (cont)</b>							
ACENAPHTHYLENE	NA	NA	NA	NA	NA	NA	NA
ANTHRACENE	NA	NA	NA	NA	NA	NA	NA
BENZO(A)ANTHRACENE	NA	NA	NA	NA	NA	NA	NA
BENZO(A)PYRENE	NA	NA	NA	NA	NA	NA	NA
BENZO(B)FLUORANTHENE	NA	NA	NA	NA	NA	NA	NA
BENZO(G,H,I)PERYLENE	NA	NA	NA	NA	NA	NA	NA
BENZO(K)FLUORANTHENE	NA	NA	NA	NA	NA	NA	NA
BIS(2-CHLOROETHOXY)METHANE	NA	NA	NA	NA	NA	NA	NA
BIS(2-CHLOROETHYL)ETHER	NA	NA	NA	NA	NA	NA	NA
BIS(2-ETHYLHEXYL)PHTHALATE	NA	NA	NA	NA	NA	NA	NA
BUTYLBENZYLPHTHALATE	NA	NA	NA	NA	NA	NA	NA
CARBAZOLE	NA	NA	NA	NA	NA	NA	NA
CHRYSENE	NA	NA	NA	NA	NA	NA	NA
DIBENZO(A,H)ANTHRACENE	NA	NA	NA	NA	NA	NA	NA
DIBENZOFURAN	NA	NA	NA	NA	NA	NA	NA
DIETHYLPHTHALATE	NA	NA	NA	NA	NA	NA	NA
DIMETHYLPHTHALATE	NA	NA	NA	NA	NA	NA	NA
DI-N-BUTYLPHTHALATE	NA	NA	NA	NA	NA	NA	NA
DI-N-OCTYLPHTHALATE	NA	NA	NA	NA	NA	NA	NA
FLUORANTHENE	NA	NA	NA	NA	NA	NA	NA
FLUORENE	NA	NA	NA	NA	NA	NA	NA
HEXACHLOROBENZENE	NA	NA	NA	NA	NA	NA	NA
HEXACHLOROBUTADIENE	NA	NA	NA	NA	NA	NA	NA
HEXACHLOROCYCLOPENTADIENE	NA	NA	NA	NA	NA	NA	NA
HEXACHLOROETHANE	NA	NA	NA	NA	NA	NA	NA
INDENO(1,2,3-CD)PYRENE	NA	NA	NA	NA	NA	NA	NA
ISOPHORONE	NA	NA	NA	NA	NA	NA	NA
NAPHTHALENE	NA	NA	NA	NA	NA	NA	NA
NITROBENZENE	NA	NA	NA	NA	NA	NA	NA

**FREQUENCY OF DETECTION SUMMARY**  
**GROUNDWATER - TCL ORGANICS**  
**PHASE I AND PHASE II - MOBILE LABORATORY AND**  
**PHASE II - FIXED BASE LABORATORY**  
**RI/FS CTO-0356**  
**OPERABLE UNIT NO. 16 (SITE 89)**  
**MCB CAMP LEJEUNE, NORTH CAROLINA**

SAMPLE ID	IR89-TW12-01	IR89-TW12IW-01	IR89-TW13-01	IR89-TW13IW-01	IR89-TW15-01	IR89-TW15IW-01	IR89-TW16-01
PHASE	PHASE I	PHASE I	PHASE I	PHASE I	PHASE I	PHASE I	PHASE I
DATE SAMPLED	8/4/96	8/4/96	8/5/96	8/5/96	8/6/96	8/6/96	8/6/96
<b>SEMIVOLATILES (ug/L) (cont)</b>							
N-NITROSO-DI-N-PROPYLAMINE	NA	NA	NA	NA	NA	NA	NA
N-NITROSODIPHENYLAMINE (1)	NA	NA	NA	NA	NA	NA	NA
PENTACHLOROPHENOL	NA	NA	NA	NA	NA	NA	NA
PHENANTHRENE	NA	NA	NA	NA	NA	NA	NA
PHENOL	NA	NA	NA	NA	NA	NA	NA
PYRENE	NA	NA	NA	NA	NA	NA	NA

**FREQUENCY OF DETECTION SUMMARY**  
**GROUNDWATER - TCL ORGANICS**  
**PHASE I AND PHASE II - MOBILE LABORATORY AND**  
**PHASE II - FIXED BASE LABORATORY**  
**RI/FS CTO-0356**  
**OPERABLE UNIT NO. 16 (SITE 89)**  
**MCB CAMP LEJEUNE, NORTH CAROLINA**

SAMPLE ID	IR89-TW12-01	IR89-TW12IW-01	IR89-TW13-01	IR89-TW13IW-01	IR89-TW15-01	IR89-TW15IW-01	IR89-TW16-01
PHASE	PHASE I	PHASE I	PHASE I	PHASE I	PHASE I	PHASE I	PHASE I
DATE SAMPLED	8/4/96	8/4/96	8/5/96	8/5/96	8/6/96	8/6/96	8/6/96
<b>PESTICIDES/PCBS (ug/L)</b>							
4,4'-DDD	NA	NA	NA	NA	NA	NA	NA
4,4'-DDE	NA	NA	NA	NA	NA	NA	NA
4,4'-DDT	NA	NA	NA	NA	NA	NA	NA
ALDRIN	NA	NA	NA	NA	NA	NA	NA
ALPHA-BHC	NA	NA	NA	NA	NA	NA	NA
ALPHA-CHLORDANE	NA	NA	NA	NA	NA	NA	NA
BETA-BHC	NA	NA	NA	NA	NA	NA	NA
DELTA-BHC	NA	NA	NA	NA	NA	NA	NA
DIELDRIN	NA	NA	NA	NA	NA	NA	NA
ENDOSULFAN I	NA	NA	NA	NA	NA	NA	NA
ENDOSULFAN II	NA	NA	NA	NA	NA	NA	NA
ENDOSULFAN SULFATE	NA	NA	NA	NA	NA	NA	NA
ENDRIN	NA	NA	NA	NA	NA	NA	NA
ENDRIN ALDEHYDE	NA	NA	NA	NA	NA	NA	NA
ENDRIN KETONE	NA	NA	NA	NA	NA	NA	NA
GAMMA-BHC (LINDANE)	NA	NA	NA	NA	NA	NA	NA
GAMMA-CHLORDANE	NA	NA	NA	NA	NA	NA	NA
HEPTACHLOR	NA	NA	NA	NA	NA	NA	NA
HEPTACHLOR EPOXIDE	NA	NA	NA	NA	NA	NA	NA
METHOXYCHLOR	NA	NA	NA	NA	NA	NA	NA
TOXAPHENE	NA	NA	NA	NA	NA	NA	NA
AROCLOR-1016	NA	NA	NA	NA	NA	NA	NA
AROCLOR-1221	NA	NA	NA	NA	NA	NA	NA
AROCLOR-1232	NA	NA	NA	NA	NA	NA	NA
AROCLOR-1242	NA	NA	NA	NA	NA	NA	NA
AROCLOR-1248	NA	NA	NA	NA	NA	NA	NA
AROCLOR-1254	NA	NA	NA	NA	NA	NA	NA
AROCLOR-1260	NA	NA	NA	NA	NA	NA	NA

**FREQUENCY OF DETECTION SUMMARY**  
**GROUNDWATER - TCL ORGANICS**  
**PHASE I AND PHASE II - MOBILE LABORATORY AND**  
**PHASE II - FIXED BASE LABORATORY**  
**RI/FS CTO-0356**  
**OPERABLE UNIT NO. 16 (SITE 89)**  
**MCB CAMP LEJEUNE, NORTH CAROLINA**

SAMPLE ID	IR89-TW16IW-01	IR89-TW17IW-01	IR89-TW18-01	IR89-TW18IW-01	IR89-TW19-01	IR89-TW19IW-01	IR89-TW20-01
PHASE	PHASE I	PHASE I	PHASE I	PHASE I	PHASE I	PHASE I	PHASE I
DATE SAMPLED	8/6/96	8/7/96	8/13/96	8/13/96	8/13/96	8/13/96	8/14/96
<b>VOLATILES (ug/L)</b>							
1,1,1-TRICHLOROETHANE	0.1 U	0.1 U	0.2	0.1 U	0.1 U	0.1 U	0.1 U
1,1,2,2-TETRACHLOROETHANE	NA	NA	NA	NA	NA	NA	NA
1,1,2-TRICHLOROETHANE	NA	NA	NA	NA	NA	NA	NA
1,1-DICHLOROETHANE	NA	NA	NA	NA	NA	NA	NA
1,1-DICHLOROETHENE	NA	NA	NA	NA	NA	NA	NA
1,2-DICHLOROBENZENE	NA	NA	NA	NA	NA	NA	NA
1,2-DICHLOROETHANE	NA	NA	NA	NA	NA	NA	NA
1,2-DICHLOROETHENE (TOTAL)	NA	NA	NA	NA	NA	NA	NA
1,2-DICHLOROPROPANE	NA	NA	NA	NA	NA	NA	NA
1,3-DICHLOROBENZENE	NA	NA	NA	NA	NA	NA	NA
1,4-DICHLOROBENZENE	NA	NA	NA	NA	NA	NA	NA
2-BUTANONE	NA	NA	NA	NA	NA	NA	NA
2-HEXANONE	NA	NA	NA	NA	NA	NA	NA
4-METHYL-2-PENTANONE	NA	NA	NA	NA	NA	NA	NA
ACETONE	NA	NA	NA	NA	NA	NA	NA
BENZENE	NA	NA	NA	NA	NA	NA	NA
BROMODICHLOROMETHANE	NA	NA	NA	NA	NA	NA	NA
BROMOFORM	NA	NA	NA	NA	NA	NA	NA
BROMOMETHANE	NA	NA	NA	NA	NA	NA	NA
CARBON DISULFIDE	NA	NA	NA	NA	NA	NA	NA
CARBON TETRACHLORIDE	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
CHLOROBENZENE	NA	NA	NA	NA	NA	NA	NA
CHLOROETHANE	NA	NA	NA	NA	NA	NA	NA
CHLOROFORM	1.7	2.6	6.6	2.4	1.3	0.5	0.1 U
CHLOROMETHANE	NA	NA	NA	NA	NA	NA	NA
CIS-1,2-DICHLOROETHENE	1 U	287	1 U	1 U	1 U	11	1 U
CIS-1,3-DICHLOROPROPENE	NA	NA	NA	NA	NA	NA	NA
DIBROMOCHLOROMETHANE	NA	NA	NA	NA	NA	NA	NA
ETHYLBENZENE	NA	NA	NA	NA	NA	NA	NA



**FREQUENCY OF DETECTION SUMMARY**  
**GROUNDWATER - TCL ORGANICS**  
**PHASE I AND PHASE II - MOBILE LABORATORY AND**  
**PHASE II - FIXED BASE LABORATORY**  
**RI/FS CTO-0356**  
**OPERABLE UNIT NO. 16 (SITE 89)**  
**MCB CAMP LEJEUNE, NORTH CAROLINA**

SAMPLE ID	IR89-TW16IW-01	IR89-TW17IW-01	IR89-TW18-01	IR89-TW18IW-01	IR89-TW19-01	IR89-TW19IW-01	IR89-TW20-01
PHASE	PHASE I	PHASE I	PHASE I	PHASE I	PHASE I	PHASE I	PHASE I
DATE SAMPLED	8/6/96	8/7/96	8/13/96	8/13/96	8/13/96	8/13/96	8/14/96
<b>VOLATILES (ug/L) (cont)</b>							
FLUOROTRICHLOROMETHANE	NA	NA	NA	NA	NA	NA	NA
M&P-XYLENE	NA	NA	NA	NA	NA	NA	NA
METHYLENE CHLORIDE	NA	NA	NA	NA	NA	NA	NA
O-XYLENE	NA	NA	NA	NA	NA	NA	NA
STYRENE	NA	NA	NA	NA	NA	NA	NA
TETRACHLOROETHENE	0.1 U	1.5	0.2	0.1 U	0.1 U	0.1 U	0.1 U
TOLUENE	NA	NA	NA	NA	NA	NA	NA
TRANS-1,2-DICHLOROETHENE	1 U	90	1 U	1 U	1 U	1 U	1 U
TRANS-1,3-DICHLOROPROPENE	NA	NA	NA	NA	NA	NA	NA
TRICHLOROETHENE	0.6	425.7	0.1 U	0.1 U	0.1 U	3.8	0.1 U
VINYL CHLORIDE	50 U	50 U	50 U	50 U	50 U	50 U	50 U
XYLENE (TOTAL)	NA	NA	NA	NA	NA	NA	NA

**FREQUENCY OF DETECTION SUMMARY**  
**GROUNDWATER - TCL ORGANICS**  
**PHASE I AND PHASE II - MOBILE LABORATORY AND**  
**PHASE II - FIXED BASE LABORATORY**  
**RI/FS CTO-0356**  
**OPERABLE UNIT NO. 16 (SITE 89)**  
**MCB CAMP LEJEUNE, NORTH CAROLINA**

SAMPLE ID	IR89-TW16IW-01	IR89-TW17IW-01	IR89-TW18-01	IR89-TW18IW-01	IR89-TW19-01	IR89-TW19IW-01	IR89-TW20-01
PHASE	PHASE I	PHASE I	PHASE I	PHASE I	PHASE I	PHASE I	PHASE I
DATE SAMPLED	8/6/96	8/7/96	8/13/96	8/13/96	8/13/96	8/13/96	8/14/96
<b>SEMIVOLATILES (ug/L)</b>							
1,2,4-TRICHLOROBENZENE	NA	NA	NA	NA	NA	NA	NA
1,2-DICHLOROBENZENE	NA	NA	NA	NA	NA	NA	NA
1,3-DICHLOROBENZENE	NA	NA	NA	NA	NA	NA	NA
1,4-DICHLOROBENZENE	NA	NA	NA	NA	NA	NA	NA
2,2'-OXYBIS(1-CHLOROPROPANE)	NA	NA	NA	NA	NA	NA	NA
2,4,5-TRICHLOROPHENOL	NA	NA	NA	NA	NA	NA	NA
2,4,6-TRICHLOROPHENOL	NA	NA	NA	NA	NA	NA	NA
2,4-DICHLOROPHENOL	NA	NA	NA	NA	NA	NA	NA
2,4-DIMETHYLPHENOL	NA	NA	NA	NA	NA	NA	NA
2,4-DINITROPHENOL	NA	NA	NA	NA	NA	NA	NA
2,4-DINITROTOLUENE	NA	NA	NA	NA	NA	NA	NA
2,6-DINITROTOLUENE	NA	NA	NA	NA	NA	NA	NA
2-CHLORONAPHTHALENE	NA	NA	NA	NA	NA	NA	NA
2-CHLOROPHENOL	NA	NA	NA	NA	NA	NA	NA
2-METHYLNAPHTHALENE	NA	NA	NA	NA	NA	NA	NA
2-METHYLPHENOL	NA	NA	NA	NA	NA	NA	NA
2-NITROANILINE	NA	NA	NA	NA	NA	NA	NA
2-NITROPHENOL	NA	NA	NA	NA	NA	NA	NA
3,3'-DICHLOROBENZIDINE	NA	NA	NA	NA	NA	NA	NA
3-NITROANILINE	NA	NA	NA	NA	NA	NA	NA
4,6-DINITRO-2-METHYLPHENOL	NA	NA	NA	NA	NA	NA	NA
4-BROMOPHENYL-PHENYLETHER	NA	NA	NA	NA	NA	NA	NA
4-CHLORO-3-METHYLPHENOL	NA	NA	NA	NA	NA	NA	NA
4-CHLOROANILINE	NA	NA	NA	NA	NA	NA	NA
4-CHLOROPHENYL-PHENYLETHER	NA	NA	NA	NA	NA	NA	NA
4-METHYLPHENOL	NA	NA	NA	NA	NA	NA	NA
4-NITROANILINE	NA	NA	NA	NA	NA	NA	NA
4-NITROPHENOL	NA	NA	NA	NA	NA	NA	NA
ACENAPHTHENE	NA	NA	NA	NA	NA	NA	NA

**FREQUENCY OF DETECTION SUMMARY**  
**GROUNDWATER - TCL ORGANICS**  
**PHASE I AND PHASE II - MOBILE LABORATORY AND**  
**PHASE II - FIXED BASE LABORATORY**  
**RI/FS CTO-0356**  
**OPERABLE UNIT NO. 16 (SITE 89)**  
**MCB CAMP LEJEUNE, NORTH CAROLINA**

SAMPLE ID	IR89-TW16IW-01	IR89-TW17IW-01	IR89-TW18-01	IR89-TW18IW-01	IR89-TW19-01	IR89-TW19IW-01	IR89-TW20-01
PHASE	PHASE I	PHASE I	PHASE I	PHASE I	PHASE I	PHASE I	PHASE I
DATE SAMPLED	8/6/96	8/7/96	8/13/96	8/13/96	8/13/96	8/13/96	8/14/96
<b>SEMIVOLATILES (ug/L) (cont)</b>							
ACENAPHTHYLENE	NA	NA	NA	NA	NA	NA	NA
ANTHRACENE	NA	NA	NA	NA	NA	NA	NA
BENZO(A)ANTHRACENE	NA	NA	NA	NA	NA	NA	NA
BENZO(A)PYRENE	NA	NA	NA	NA	NA	NA	NA
BENZO(B)FLUORANTHENE	NA	NA	NA	NA	NA	NA	NA
BENZO(G,H,I)PERYLENE	NA	NA	NA	NA	NA	NA	NA
BENZO(K)FLUORANTHENE	NA	NA	NA	NA	NA	NA	NA
BIS(2-CHLOROETHOXY)METHANE	NA	NA	NA	NA	NA	NA	NA
BIS(2-CHLOROETHYL)ETHER	NA	NA	NA	NA	NA	NA	NA
BIS(2-ETHYLHEXYL)PHTHALATE	NA	NA	NA	NA	NA	NA	NA
BUTYLBENZYLPHTHALATE	NA	NA	NA	NA	NA	NA	NA
CARBAZOLE	NA	NA	NA	NA	NA	NA	NA
CHRYSENE	NA	NA	NA	NA	NA	NA	NA
DIBENZO(A,H)ANTHRACENE	NA	NA	NA	NA	NA	NA	NA
DIBENZOFURAN	NA	NA	NA	NA	NA	NA	NA
DIETHYLPHTHALATE	NA	NA	NA	NA	NA	NA	NA
DIMETHYLPHTHALATE	NA	NA	NA	NA	NA	NA	NA
DI-N-BUTYLPHTHALATE	NA	NA	NA	NA	NA	NA	NA
DI-N-OCTYLPHTHALATE	NA	NA	NA	NA	NA	NA	NA
FLUORANTHENE	NA	NA	NA	NA	NA	NA	NA
FLUORENE	NA	NA	NA	NA	NA	NA	NA
HEXACHLOROBENZENE	NA	NA	NA	NA	NA	NA	NA
HEXACHLOROBUTADIENE	NA	NA	NA	NA	NA	NA	NA
HEXACHLOROCYCLOPENTADIENE	NA	NA	NA	NA	NA	NA	NA
HEXACHLOROETHANE	NA	NA	NA	NA	NA	NA	NA
INDENO(1,2,3-CD)PYRENE	NA	NA	NA	NA	NA	NA	NA
ISOPHORONE	NA	NA	NA	NA	NA	NA	NA
NAPHTHALENE	NA	NA	NA	NA	NA	NA	NA
NITROBENZENE	NA	NA	NA	NA	NA	NA	NA

**FREQUENCY OF DETECTION SUMMARY**  
**GROUNDWATER - TCL ORGANICS**  
**PHASE I AND PHASE II - MOBILE LABORATORY AND**  
**PHASE II - FIXED BASE LABORATORY**  
**RI/FS CTO-0356**  
**OPERABLE UNIT NO. 16 (SITE 89)**  
**MCB CAMP LEJEUNE, NORTH CAROLINA**

SAMPLE ID	IR89-TW16IW-01	IR89-TW17IW-01	IR89-TW18-01	IR89-TW18IW-01	IR89-TW19-01	IR89-TW19IW-01	IR89-TW20-01
PHASE	PHASE I	PHASE I	PHASE I	PHASE I	PHASE I	PHASE I	PHASE I
DATE SAMPLED	8/6/96	8/7/96	8/13/96	8/13/96	8/13/96	8/13/96	8/14/96
<b>SEMIVOLATILES (ug/L) (cont)</b>							
N-NITROSO-DI-N-PROPYLAMINE	NA	NA	NA	NA	NA	NA	NA
N-NITROSODIPHENYLAMINE (1)	NA	NA	NA	NA	NA	NA	NA
PENTACHLOROPHENOL	NA	NA	NA	NA	NA	NA	NA
PHENANTHRENE	NA	NA	NA	NA	NA	NA	NA
PHENOL	NA	NA	NA	NA	NA	NA	NA
PYRENE	NA	NA	NA	NA	NA	NA	NA

FREQUENCY OF DETECTION SUMMARY  
 GROUNDWATER - TCL ORGANICS  
 PHASE I AND PHASE II - MOBILE LABORATORY AND  
 PHASE II - FIXED BASE LABORATORY  
 RI/FS CTO-0356  
 OPERABLE UNIT NO. 16 (SITE 89)  
 MCB CAMP LEJEUNE, NORTH CAROLINA

SAMPLE ID	IR89-TW16IW-01	IR89-TW17IW-01	IR89-TW18-01	IR89-TW18IW-01	IR89-TW19-01	IR89-TW19IW-01	IR89-TW20-01
PHASE	PHASE I	PHASE I	PHASE I	PHASE I	PHASE I	PHASE I	PHASE I
DATE SAMPLED	8/6/96	8/7/96	8/13/96	8/13/96	8/13/96	8/13/96	8/14/96
<b>PESTICIDES/PCBS (ug/L)</b>							
4,4'-DDD	NA	NA	NA	NA	NA	NA	NA
4,4'-DDE	NA	NA	NA	NA	NA	NA	NA
4,4'-DDT	NA	NA	NA	NA	NA	NA	NA
ALDRIN	NA	NA	NA	NA	NA	NA	NA
ALPHA-BHC	NA	NA	NA	NA	NA	NA	NA
ALPHA-CHLORDANE	NA	NA	NA	NA	NA	NA	NA
BETA-BHC	NA	NA	NA	NA	NA	NA	NA
DELTA-BHC	NA	NA	NA	NA	NA	NA	NA
DIELDRIN	NA	NA	NA	NA	NA	NA	NA
ENDOSULFAN I	NA	NA	NA	NA	NA	NA	NA
ENDOSULFAN II	NA	NA	NA	NA	NA	NA	NA
ENDOSULFAN SULFATE	NA	NA	NA	NA	NA	NA	NA
ENDRIN	NA	NA	NA	NA	NA	NA	NA
ENDRIN ALDEHYDE	NA	NA	NA	NA	NA	NA	NA
ENDRIN KETONE	NA	NA	NA	NA	NA	NA	NA
GAMMA-BHC (LINDANE)	NA	NA	NA	NA	NA	NA	NA
GAMMA-CHLORDANE	NA	NA	NA	NA	NA	NA	NA
HEPTACHLOR	NA	NA	NA	NA	NA	NA	NA
HEPTACHLOR EPOXIDE	NA	NA	NA	NA	NA	NA	NA
METHOXYCHLOR	NA	NA	NA	NA	NA	NA	NA
TOXAPHENE	NA	NA	NA	NA	NA	NA	NA
AROCLOR-1016	NA	NA	NA	NA	NA	NA	NA
AROCLOR-1221	NA	NA	NA	NA	NA	NA	NA
AROCLOR-1232	NA	NA	NA	NA	NA	NA	NA
AROCLOR-1242	NA	NA	NA	NA	NA	NA	NA
AROCLOR-1248	NA	NA	NA	NA	NA	NA	NA
AROCLOR-1254	NA	NA	NA	NA	NA	NA	NA
AROCLOR-1260	NA	NA	NA	NA	NA	NA	NA

**FREQUENCY OF DETECTION SUMMARY**  
**GROUNDWATER - TCL ORGANICS**  
**PHASE I AND PHASE II - MOBILE LABORATORY AND**  
**PHASE II - FIXED BASE LABORATORY**  
**RI/FS CTO-0356**  
**OPERABLE UNIT NO. 16 (SITE 89)**  
**MCB CAMP LEJEUNE, NORTH CAROLINA**

SAMPLE ID	IR89-TW201W-01	IR89-TW21-01	IR89-TW21IW-01	IR89-TW22-01	IR89-TW22IW-01	IR89-TW23IW-01
PHASE	PHASE I	PHASE I	PHASE I	PHASE I	PHASE I	PHASE I
DATE SAMPLED	8/14/96	8/15/96	8/15/96	8/16/96	8/16/96	8/21/96
<b>VOLATILES (ug/L)</b>						
1,1,1-TRICHLOROETHANE	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
1,1,2,2-TETRACHLOROETHANE	NA	NA	NA	NA	NA	NA
1,1,2-TRICHLOROETHANE	NA	NA	NA	NA	NA	NA
1,1-DICHLOROETHANE	NA	NA	NA	NA	NA	NA
1,1-DICHLOROETHENE	NA	NA	NA	NA	NA	NA
1,2-DICHLOROBENZENE	NA	NA	NA	NA	NA	NA
1,2-DICHLOROETHANE	NA	NA	NA	NA	NA	NA
1,2-DICHLOROETHENE (TOTAL)	NA	NA	NA	NA	NA	NA
1,2-DICHLOROPROPANE	NA	NA	NA	NA	NA	NA
1,3-DICHLOROBENZENE	NA	NA	NA	NA	NA	NA
1,4-DICHLOROBENZENE	NA	NA	NA	NA	NA	NA
2-BUTANONE	NA	NA	NA	NA	NA	NA
2-HEXANONE	NA	NA	NA	NA	NA	NA
4-METHYL-2-PENTANONE	NA	NA	NA	NA	NA	NA
ACETONE	NA	NA	NA	NA	NA	NA
BENZENE	NA	NA	NA	NA	NA	NA
BROMODICHLOROMETHANE	NA	NA	NA	NA	NA	NA
BROMOFORM	NA	NA	NA	NA	NA	NA
BROMOMETHANE	NA	NA	NA	NA	NA	NA
CARBON DISULFIDE	NA	NA	NA	NA	NA	NA
CARBON TETRACHLORIDE	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
CHLOROBENZENE	NA	NA	NA	NA	NA	NA
CHLOROETHANE	NA	NA	NA	NA	NA	NA
CHLOROFORM	0.4	0.1 U	1.7	0.7	0.3	0.5
CHLOROMETHANE	NA	NA	NA	NA	NA	NA
CIS-1,2-DICHLOROETHENE	57	1 U	9	1 U	106	84
CIS-1,3-DICHLOROPROPENE	NA	NA	NA	NA	NA	NA
DIBROMOCHLOROMETHANE	NA	NA	NA	NA	NA	NA
ETHYLBENZENE	NA	NA	NA	NA	NA	NA

**FREQUENCY OF DETECTION SUMMARY**  
**GROUNDWATER - TCL ORGANICS**  
**PHASE I AND PHASE II - MOBILE LABORATORY AND**  
**PHASE II - FIXED BASE LABORATORY**  
**RI/FS CTO-0356**  
**OPERABLE UNIT NO. 16 (SITE 89)**  
**MCB CAMP LEJEUNE, NORTH CAROLINA**

SAMPLE ID	IR89-TW20IW-01	IR89-TW21-01	IR89-TW21IW-01	IR89-TW22-01	IR89-TW22IW-01	IR89-TW23IW-01
PHASE	PHASE I	PHASE I	PHASE I	PHASE I	PHASE I	PHASE I
DATE SAMPLED	8/14/96	8/15/96	8/15/96	8/16/96	8/16/96	8/21/96
<b>VOLATILES (ug/L) (cont)</b>						
FLUOROTRICHLOROMETHANE	NA	NA	NA	NA	NA	NA
M&P-XYLENE	NA	NA	NA	NA	NA	NA
METHYLENE CHLORIDE	NA	NA	NA	NA	NA	NA
O-XYLENE	NA	NA	NA	NA	NA	NA
STYRENE	NA	NA	NA	NA	NA	NA
TETRACHLOROETHENE	0.4	0.1 U	0.1 U	0.1 U	13	0.1
TOLUENE	NA	NA	NA	NA	NA	NA
TRANS-1,2-DICHLOROETHENE	8	1 U	1	1 U	17	9
TRANS-1,3-DICHLOROPROPENE	NA	NA	NA	NA	NA	NA
TRICHLOROETHENE	59.1	0.1 U	10.4	0.1 U	293.9	123.9
VINYL CHLORIDE	50 U	50 U	50 U	50 U	50 U	50 U
XYLENE (TOTAL)	NA	NA	NA	NA	NA	NA

**FREQUENCY OF DETECTION SUMMARY**  
**GROUNDWATER - TCL ORGANICS**  
**PHASE I AND PHASE II - MOBILE LABORATORY AND**  
**PHASE II - FIXED BASE LABORATORY**  
**RI/FS CTO-0356**  
**OPERABLE UNIT NO. 16 (SITE 89)**  
**MCB CAMP LEJEUNE, NORTH CAROLINA**

SAMPLE ID	IR89-TW20IW-01	IR89-TW21-01	IR89-TW21IW-01	IR89-TW22-01	IR89-TW22IW-01	IR89-TW23IW-01
PHASE	PHASE I	PHASE I	PHASE I	PHASE I	PHASE I	PHASE I
DATE SAMPLED	8/14/96	8/15/96	8/15/96	8/16/96	8/16/96	8/21/96
<b>SEMIVOLATILES (ug/L)</b>						
1,2,4-TRICHLOROBENZENE	NA	NA	NA	NA	NA	NA
1,2-DICHLOROBENZENE	NA	NA	NA	NA	NA	NA
1,3-DICHLOROBENZENE	NA	NA	NA	NA	NA	NA
1,4-DICHLOROBENZENE	NA	NA	NA	NA	NA	NA
2,2'-OXYBIS(1-CHLOROPROPANE)	NA	NA	NA	NA	NA	NA
2,4,5-TRICHLOROPHENOL	NA	NA	NA	NA	NA	NA
2,4,6-TRICHLOROPHENOL	NA	NA	NA	NA	NA	NA
2,4-DICHLOROPHENOL	NA	NA	NA	NA	NA	NA
2,4-DIMETHYLPHENOL	NA	NA	NA	NA	NA	NA
2,4-DINITROPHENOL	NA	NA	NA	NA	NA	NA
2,4-DINITROTOLUENE	NA	NA	NA	NA	NA	NA
2,6-DINITROTOLUENE	NA	NA	NA	NA	NA	NA
2-CHLORONAPHTHALENE	NA	NA	NA	NA	NA	NA
2-CHLOROPHENOL	NA	NA	NA	NA	NA	NA
2-METHYLNAPHTHALENE	NA	NA	NA	NA	NA	NA
2-METHYLPHENOL	NA	NA	NA	NA	NA	NA
2-NITROANILINE	NA	NA	NA	NA	NA	NA
2-NITROPHENOL	NA	NA	NA	NA	NA	NA
3,3'-DICHLOROBENZIDINE	NA	NA	NA	NA	NA	NA
3-NITROANILINE	NA	NA	NA	NA	NA	NA
4,6-DINITRO-2-METHYLPHENOL	NA	NA	NA	NA	NA	NA
4-BROMOPHENYL-PHENYLETHER	NA	NA	NA	NA	NA	NA
4-CHLORO-3-METHYLPHENOL	NA	NA	NA	NA	NA	NA
4-CHLOROANILINE	NA	NA	NA	NA	NA	NA
4-CHLOROPHENYL-PHENYLETHER	NA	NA	NA	NA	NA	NA
4-METHYLPHENOL	NA	NA	NA	NA	NA	NA
4-NITROANILINE	NA	NA	NA	NA	NA	NA
4-NITROPHENOL	NA	NA	NA	NA	NA	NA
ACENAPHTHENE	NA	NA	NA	NA	NA	NA



**FREQUENCY OF DETECTION SUMMARY**  
**GROUNDWATER - TCL ORGANICS**  
**PHASE I AND PHASE II - MOBILE LABORATORY AND**  
**PHASE II - FIXED BASE LABORATORY**  
**RI/FS CTO-0356**  
**OPERABLE UNIT NO. 16 (SITE 89)**  
**MCB CAMP LEJEUNE, NORTH CAROLINA**

SAMPLE ID	IR89-TW20IW-01	IR89-TW21-01	IR89-TW21IW-01	IR89-TW22-01	IR89-TW22IW-01	IR89-TW23IW-01
PHASE	PHASE I	PHASE I	PHASE I	PHASE I	PHASE I	PHASE I
DATE SAMPLED	8/14/96	8/15/96	8/15/96	8/16/96	8/16/96	8/21/96
<b>SEMIVOLATILES (ug/L) (cont)</b>						
ACENAPHTHYLENE	NA	NA	NA	NA	NA	NA
ANTHRACENE	NA	NA	NA	NA	NA	NA
BENZO(A)ANTHRACENE	NA	NA	NA	NA	NA	NA
BENZO(A)PYRENE	NA	NA	NA	NA	NA	NA
BENZO(B)FLUORANTHENE	NA	NA	NA	NA	NA	NA
BENZO(G,H,I)PERYLENE	NA	NA	NA	NA	NA	NA
BENZO(K)FLUORANTHENE	NA	NA	NA	NA	NA	NA
BIS(2-CHLOROETHOXY)METHANE	NA	NA	NA	NA	NA	NA
BIS(2-CHLOROETHYL)ETHER	NA	NA	NA	NA	NA	NA
BIS(2-ETHYLHEXYL)PHTHALATE	NA	NA	NA	NA	NA	NA
BUTYLBENZYLPHTHALATE	NA	NA	NA	NA	NA	NA
CARBAZOLE	NA	NA	NA	NA	NA	NA
CHRYSENE	NA	NA	NA	NA	NA	NA
DIBENZO(A,H)ANTHRACENE	NA	NA	NA	NA	NA	NA
DIBENZOFURAN	NA	NA	NA	NA	NA	NA
DIETHYLPHTHALATE	NA	NA	NA	NA	NA	NA
DIMETHYLPHTHALATE	NA	NA	NA	NA	NA	NA
DI-N-BUTYLPHTHALATE	NA	NA	NA	NA	NA	NA
DI-N-OCTYLPHTHALATE	NA	NA	NA	NA	NA	NA
FLUORANTHENE	NA	NA	NA	NA	NA	NA
FLUORENE	NA	NA	NA	NA	NA	NA
HEXACHLOROBENZENE	NA	NA	NA	NA	NA	NA
HEXACHLOROBUTADIENE	NA	NA	NA	NA	NA	NA
HEXACHLOROCYCLOPENTADIENE	NA	NA	NA	NA	NA	NA
HEXACHLOROETHANE	NA	NA	NA	NA	NA	NA
INDENO(1,2,3-CD)PYRENE	NA	NA	NA	NA	NA	NA
ISOPHORONE	NA	NA	NA	NA	NA	NA
NAPHTHALENE	NA	NA	NA	NA	NA	NA
NITROBENZENE	NA	NA	NA	NA	NA	NA

**FREQUENCY OF DETECTION SUMMARY**  
**GROUNDWATER - TCL ORGANICS**  
**PHASE I AND PHASE II - MOBILE LABORATORY AND**  
**PHASE II - FIXED BASE LABORATORY**  
**RI/FS CTO-0356**  
**OPERABLE UNIT NO. 16 (SITE 89)**  
**MCB CAMP LEJEUNE, NORTH CAROLINA**

SAMPLE ID	IR89-TW20IW-01	IR89-TW21-01	IR89-TW21IW-01	IR89-TW22-01	IR89-TW22IW-01	IR89-TW23IW-01
PHASE	PHASE I	PHASE I	PHASE I	PHASE I	PHASE I	PHASE I
DATE SAMPLED	8/14/96	8/15/96	8/15/96	8/16/96	8/16/96	8/21/96
<b>SEMIVOLATILES (ug/L) (cont)</b>						
N-NITROSO-DI-N-PROPYLAMINE	NA	NA	NA	NA	NA	NA
N-NITROSODIPHENYLAMINE (1)	NA	NA	NA	NA	NA	NA
PENTACHLOROPHENOL	NA	NA	NA	NA	NA	NA
PHENANTHRENE	NA	NA	NA	NA	NA	NA
PHENOL	NA	NA	NA	NA	NA	NA
PYRENE	NA	NA	NA	NA	NA	NA

**FREQUENCY OF DETECTION SUMMARY**  
**GROUNDWATER - TCL ORGANICS**  
**PHASE I AND PHASE II - MOBILE LABORATORY AND**  
**PHASE II - FIXED BASE LABORATORY**  
**RI/FS CTO-0356**  
**OPERABLE UNIT NO. 16 (SITE 89)**  
**MCB CAMP LEJEUNE, NORTH CAROLINA**

SAMPLE ID	IR89-TW20IW-01	IR89-TW21-01	IR89-TW21IW-01	IR89-TW22-01	IR89-TW22IW-01	IR89-TW23IW-01
PHASE	PHASE I	PHASE I	PHASE I	PHASE I	PHASE I	PHASE I
DATE SAMPLED	8/14/96	8/15/96	8/15/96	8/16/96	8/16/96	8/21/96
<b>PESTICIDES/PCBS (ug/L)</b>						
4,4'-DDD	NA	NA	NA	NA	NA	NA
4,4'-DDE	NA	NA	NA	NA	NA	NA
4,4'-DDT	NA	NA	NA	NA	NA	NA
ALDRIN	NA	NA	NA	NA	NA	NA
ALPHA-BHC	NA	NA	NA	NA	NA	NA
ALPHA-CHLORDANE	NA	NA	NA	NA	NA	NA
BETA-BHC	NA	NA	NA	NA	NA	NA
DELTA-BHC	NA	NA	NA	NA	NA	NA
DIELDRIN	NA	NA	NA	NA	NA	NA
ENDOSULFAN I	NA	NA	NA	NA	NA	NA
ENDOSULFAN II	NA	NA	NA	NA	NA	NA
ENDOSULFAN SULFATE	NA	NA	NA	NA	NA	NA
ENDRIN	NA	NA	NA	NA	NA	NA
ENDRIN ALDEHYDE	NA	NA	NA	NA	NA	NA
ENDRIN KETONE	NA	NA	NA	NA	NA	NA
GAMMA-BHC (LINDANE)	NA	NA	NA	NA	NA	NA
GAMMA-CHLORDANE	NA	NA	NA	NA	NA	NA
HEPTACHLOR	NA	NA	NA	NA	NA	NA
HEPTACHLOR EPOXIDE	NA	NA	NA	NA	NA	NA
METHOXYCHLOR	NA	NA	NA	NA	NA	NA
TOXAPHENE	NA	NA	NA	NA	NA	NA
AROCLOR-1016	NA	NA	NA	NA	NA	NA
AROCLOR-1221	NA	NA	NA	NA	NA	NA
AROCLOR-1232	NA	NA	NA	NA	NA	NA
AROCLOR-1242	NA	NA	NA	NA	NA	NA
AROCLOR-1248	NA	NA	NA	NA	NA	NA
AROCLOR-1254	NA	NA	NA	NA	NA	NA
AROCLOR-1260	NA	NA	NA	NA	NA	NA

**FREQUENCY OF DETECTION SUMMARY**  
**GROUNDWATER - TCL ORGANICS**  
**PHASE I AND PHASE II - MOBILE LABORATORY AND**  
**PHASE II - FIXED BASE LABORATORY**  
**RI/FS CTO-0356**  
**OPERABLE UNIT NO. 16 (SITE 89)**  
**MCB CAMP LEJEUNE, NORTH CAROLINA**

SAMPLE ID	IR89-MW03IW-01	IR89-MW03DW-01	IR89-MW04-01	IR89-MW04IW-01	IR89-MW04DW-01	IR89-MW05-01
PHASE	PHASE II	PHASE II	PHASE II	PHASE II	PHASE II	PHASE II
DATE SAMPLED	05/28/97	05/28/97	05/29/97	05/29/97	05/29/97	05/28/97
<b>VOLATILES (ug/L)</b>						
1,1,1-TRICHLOROETHANE	10 U	10 U	10 U	10 U	10 U	10 U
1,1,2,2-TETRACHLOROETHANE	10 U	10 U	4 J	10 U	10 U	10 U
1,1,2-TRICHLOROETHANE	10 U	10 U	3 J	10 U	10 U	10 U
1,1-DICHLOROETHANE	10 U	10 U	10 U	10 U	10 U	10 U
1,1-DICHLOROETHENE	10 U	10 U	10 U	2 J	10 U	10 U
1,2-DICHLOROBENZENE	NA	NA	NA	NA	NA	NA
1,2-DICHLOROETHANE	10 U	10 U	10 U	10 U	10 U	10 U
1,2-DICHLOROETHENE (TOTAL)	300	10 U	880	560	10 U	180 J
1,2-DICHLOROPROPANE	10 U	10 U	10 U	10 U	10 U	10 U
1,3-DICHLOROBENZENE	NA	NA	NA	NA	NA	NA
1,4-DICHLOROBENZENE	NA	NA	NA	NA	NA	NA
2-BUTANONE	10 U	10 U	10 U	10 U	10 U	10 U
2-HEXANONE	10 U	10 U	10 U	10 U	10 U	10 U
4-METHYL-2-PENTANONE	10 U	10 U	10 U	10 U	10 U	10 U
ACETONE	10 U	10 U	10 U	10 U	10 U	10 U
BENZENE	10 U	10 U	10 U	10 U	10 U	10 U
BROMODICHLOROMETHANE	10 U	10 U	10 U	10 U	10 U	10 U
BROMOFORM	10 U	10 U	10 U	10 U	10 U	10 U
BROMOMETHANE	10 U	10 U	10 U	10 U	10 U	10 U
CARBON DISULFIDE	10 U	10 U	10 U	10 U	10 U	10 U
CARBON TETRACHLORIDE	10 U	10 U	10 U	10 U	10 U	10 U
CHLOROBENZENE	10 U	10 U	10 U	10 U	10 U	10 U
CHLOROETHANE	10 U	10 U	10 U	10 U	10 U	10 U
CHLOROFORM	10 U	10 U	10 U	10 U	10 U	10 U
CHLOROMETHANE	10 U	10 U	10 U	10 U	10 U	10 U
CIS-1,2-DICHLOROETHENE	NA	NA	NA	NA	NA	NA
CIS-1,3-DICHLOROPROPENE	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
ETHYLBENZENE	10 U	10 U	10 U	10 U	10 U	10 U



**FREQUENCY OF DETECTION SUMMARY**  
**GROUNDWATER - TCL ORGANICS**  
**PHASE I AND PHASE II - MOBILE LABORATORY AND**  
**PHASE II - FIXED BASE LABORATORY**  
**RI/FS CTO-0356**  
**OPERABLE UNIT NO. 16 (SITE 89)**  
**MCB CAMP LEJEUNE, NORTH CAROLINA**

SAMPLE ID	IR89-MW03IW-01	IR89-MW03DW-01	IR89-MW04-01	IR89-MW04IW-01	IR89-MW04DW-01	IR89-MW05-01
PHASE	PHASE II	PHASE II	PHASE II	PHASE II	PHASE II	PHASE II
DATE SAMPLED	05/28/97	05/28/97	05/29/97	05/29/97	05/29/97	05/28/97
<b>SEMIVOLATILES (ug/L)</b>						
1,2,4-TRICHLOROBENZENE	10 U	10 U	10 U	10 U	10 U	10 U
1,2-DICHLOROBENZENE	10 U	10 U	10 U	10 U	10 U	10 U
1,3-DICHLOROBENZENE	10 U	10 U	10 U	10 U	10 U	10 U
1,4-DICHLOROBENZENE	10 U	10 U	10 U	10 U	10 U	10 U
2,2'-OXYBIS(1-CHLOROPROPANE)	10 U	10 U	10 U	10 U	10 U	10 U
2,4,5-TRICHLOROPHENOL	25 U	25 U	25 U	25 U	25 U	25 U
2,4,6-TRICHLOROPHENOL	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
2,4-DIMETHYLPHENOL	10 U	10 U	10 U	10 U	10 U	10 U
2,4-DINITROPHENOL	25 U	25 U	25 U	25 U	25 U	25 U
2,4-DINITROTOLUENE	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
2-CHLORONAPHTHALENE	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
2-METHYLNAPHTHALENE	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-NITROANILINE	25 U	25 U	25 U	25 U	25 U	25 U
2-NITROPHENOL	10 U	10 U	10 U	10 U	10 U	10 U
3,3'-DICHLOROBENZIDINE	10 U	10 U	10 U	10 U	10 U	10 U
3-NITROANILINE	25 U	25 U	25 UJ	25 UJ	25 UJ	25 U
4,6-DINITRO-2-METHYLPHENOL	25 U	25 U	25 U	25 U	25 U	25 U
4-BROMOPHENYL-PHENYLETHER	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
4-CHLOROANILINE	10 U	10 U	10 UJ	10 UJ	10 UJ	10 U
4-CHLOROPHENYL-PHENYLETHER	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
4-NITROANILINE	25 UJ	25 UJ	25 U	25 U	25 U	25 UJ
4-NITROPHENOL	25 UJ	25 UJ	25 U	25 U	25 U	25 UJ
ACENAPHTHENE	10 U	10 U	10 U	10 U	10 U	10 U

FREQUENCY OF DETECTION SUMMARY  
 GROUNDWATER - TCL ORGANICS  
 PHASE I AND PHASE II - MOBILE LABORATORY AND  
 PHASE II - FIXED BASE LABORATORY  
 RI/FS CTO-0356  
 OPERABLE UNIT NO. 16 (SITE 89)  
 MCB CAMP LEJEUNE, NORTH CAROLINA

SAMPLE ID	IR89-MW031W-01	IR89-MW03DW-01	IR89-MW04-01	IR89-MW041W-01	IR89-MW04DW-01	IR89-MW05-01
PHASE	PHASE II	PHASE II	PHASE II	PHASE II	PHASE II	PHASE II
DATE SAMPLED	05/28/97	05/28/97	05/29/97	05/29/97	05/29/97	05/28/97
<b>SEMIVOLATILES (ug/L) (cont)</b>						
ACENAPHTHYLENE	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
BENZO(A)ANTHRACENE	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
BENZO(B)FLUORANTHENE	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
BENZO(K)FLUORANTHENE	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
BIS(2-CHLOROETHYL)ETHER	10 U	10 U	10 U	10 U	10 U	10 U
BIS(2-ETHYLHEXYL)PHTHALATE	64	80	75	37 U	12 U	150
BUTYLBENZYLPHthalate	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
CHRYSENE	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
DIBENZOFURAN	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
DIMETHYLPHthalate	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
DI-N-OCTYLPHthalate	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
FLUORENE	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
HEXACHLOROBUTADIENE	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
HEXACHLOROETHANE	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
ISOPHORONE	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
NITROBENZENE	10 U	10 U	10 U	10 U	10 U	10 U

**FREQUENCY OF DETECTION SUMMARY**  
**GROUNDWATER - TCL ORGANICS**  
**PHASE I AND PHASE II - MOBILE LABORATORY AND**  
**PHASE II - FIXED BASE LABORATORY**  
**RI/FS CTO-0356**  
**OPERABLE UNIT NO. 16 (SITE 89)**  
**MCB CAMP LEJEUNE, NORTH CAROLINA**

SAMPLE ID	IR89-MW03IW-01	IR89-MW03DW-01	IR89-MW04-01	IR89-MW04IW-01	IR89-MW04DW-01	IR89-MW05-01
PHASE	PHASE II	PHASE II	PHASE II	PHASE II	PHASE II	PHASE II
DATE SAMPLED	05/28/97	05/28/97	05/29/97	05/29/97	05/29/97	05/28/97
<b>SEMIVOLATILES (ug/L) (cont)</b>						
N-NITROSO-DI-N-PROPYLAMINE	10 U	10 U	10 U	10 U	10 U	10 U
N-NITROSODIPHENYLAMINE (1)	10 U	10 U	10 U	10 U	10 U	10 U
PENTACHLOROPHENOL	25 U	25 U	25 U	25 U	25 U	25 U
PHENANTHRENE	10 U	10 U	10 U	10 U	10 U	10 U
PHENOL	10 U	10 U	10 U	10 U	10 U	10 U
PYRENE	10 U	10 U	10 U	10 U	10 U	10 U



**FREQUENCY OF DETECTION SUMMARY**  
**GROUNDWATER - TCL ORGANICS**  
**PHASE I AND PHASE II - MOBILE LABORATORY AND**  
**PHASE II - FIXED BASE LABORATORY**  
**RI/FS CTO-0356**  
**OPERABLE UNIT NO. 16 (SITE 89)**  
**MCB CAMP LEJEUNE, NORTH CAROLINA**

SAMPLE ID	IR89-MW03IW-01	IR89-MW03DW-01	IR89-MW04-01	IR89-MW04IW-01	IR89-MW04DW-01	IR89-MW05-01
PHASE	PHASE II	PHASE II	PHASE II	PHASE II	PHASE II	PHASE II
DATE SAMPLED	05/28/97	05/28/97	05/29/97	05/29/97	05/29/97	05/28/97
<b>PESTICIDES/PCBS (ug/L)</b>						
4,4'-DDD	NA	NA	0.1 U	NA	NA	NA
4,4'-DDE	NA	NA	0.1 U	NA	NA	NA
4,4'-DDT	NA	NA	0.1 U	NA	NA	NA
ALDRIN	NA	NA	0.05 U	NA	NA	NA
ALPHA-BHC	NA	NA	0.05 U	NA	NA	NA
ALPHA-CHLORDANE	NA	NA	0.05 U	NA	NA	NA
BETA-BHC	NA	NA	0.05 U	NA	NA	NA
DELTA-BHC	NA	NA	0.05 U	NA	NA	NA
DIELDRIN	NA	NA	0.1 U	NA	NA	NA
ENDOSULFAN I	NA	NA	0.05 U	NA	NA	NA
ENDOSULFAN II	NA	NA	0.1 U	NA	NA	NA
ENDOSULFAN SULFATE	NA	NA	0.1 U	NA	NA	NA
ENDRIN	NA	NA	0.1 U	NA	NA	NA
ENDRIN ALDEHYDE	NA	NA	0.1 U	NA	NA	NA
ENDRIN KETONE	NA	NA	0.1 U	NA	NA	NA
GAMMA-BHC (LINDANE)	NA	NA	0.05 U	NA	NA	NA
GAMMA-CHLORDANE	NA	NA	0.05 U	NA	NA	NA
HEPTACHLOR	NA	NA	0.05 U	NA	NA	NA
HEPTACHLOR EPOXIDE	NA	NA	0.05 U	NA	NA	NA
METHOXYCHLOR	NA	NA	0.5 U	NA	NA	NA
TOXAPHENE	NA	NA	5 U	NA	NA	NA
AROCLOR-1016	NA	NA	1 U	NA	NA	NA
AROCLOR-1221	NA	NA	2 U	NA	NA	NA
AROCLOR-1232	NA	NA	1 U	NA	NA	NA
AROCLOR-1242	NA	NA	1 U	NA	NA	NA
AROCLOR-1248	NA	NA	1 U	NA	NA	NA
AROCLOR-1254	NA	NA	1 U	NA	NA	NA
AROCLOR-1260	NA	NA	1 U	NA	NA	NA











**FREQUENCY OF DETECTION SUMMARY**  
**GROUNDWATER - TCL ORGANICS**  
**PHASE I AND PHASE II - MOBILE LABORATORY AND**  
**PHASE II - FIXED BASE LABORATORY**  
**RI/FS CTO-0356**  
**OPERABLE UNIT NO. 16 (SITE 89)**  
**MCB CAMP LEJEUNE, NORTH CAROLINA**

SAMPLE ID	IR89-MW05IW-01	IR89-MW05DW-01	IR89-MW06IW-01	IR89-MW06DW-01	IR89-MW07IW-01	IR89-MW07DW-01
PHASE	PHASE II	PHASE II	PHASE II	PHASE II	PHASE II	PHASE II
DATE SAMPLED	05/28/97	05/28/97	05/19/97	05/19/97	05/20/97	05/20/97
<b>PESTICIDES/PCBS (ug/L)</b>						
4,4'-DDD	0.1 UJ	NA	NA	NA	NA	NA
4,4'-DDE	0.1 UJ	NA	NA	NA	NA	NA
4,4'-DDT	0.1 UJ	NA	NA	NA	NA	NA
ALDRIN	0.05 UJ	NA	NA	NA	NA	NA
ALPHA-BHC	0.05 UJ	NA	NA	NA	NA	NA
ALPHA-CHLORDANE	0.05 UJ	NA	NA	NA	NA	NA
BETA-BHC	0.05 UJ	NA	NA	NA	NA	NA
DELTA-BHC	0.05 UJ	NA	NA	NA	NA	NA
DIELDRIN	0.1 UJ	NA	NA	NA	NA	NA
ENDOSULFAN I	0.05 UJ	NA	NA	NA	NA	NA
ENDOSULFAN II	0.1 UJ	NA	NA	NA	NA	NA
ENDOSULFAN SULFATE	0.1 UJ	NA	NA	NA	NA	NA
ENDRIN	0.1 UJ	NA	NA	NA	NA	NA
ENDRIN ALDEHYDE	0.1 UJ	NA	NA	NA	NA	NA
ENDRIN KETONE	0.1 UJ	NA	NA	NA	NA	NA
GAMMA-BHC (LINDANE)	0.05 UJ	NA	NA	NA	NA	NA
GAMMA-CHLORDANE	0.05 UJ	NA	NA	NA	NA	NA
HEPTACHLOR	0.05 UJ	NA	NA	NA	NA	NA
HEPTACHLOR EPOXIDE	0.05 UJ	NA	NA	NA	NA	NA
METHOXYCHLOR	0.5 UJ	NA	NA	NA	NA	NA
TOXAPHENE	5 UJ	NA	NA	NA	NA	NA
AROCLOR-1016	1 UJ	NA	NA	NA	NA	NA
AROCLOR-1221	2 UJ	NA	NA	NA	NA	NA
AROCLOR-1232	1 UJ	NA	NA	NA	NA	NA
AROCLOR-1242	1 UJ	NA	NA	NA	NA	NA
AROCLOR-1248	1 UJ	NA	NA	NA	NA	NA
AROCLOR-1254	1 UJ	NA	NA	NA	NA	NA
AROCLOR-1260	1 UJ	NA	NA	NA	NA	NA

**FREQUENCY OF DETECTION SUMMARY**  
**GROUNDWATER - TCL ORGANICS**  
**PHASE I AND PHASE II - MOBILE LABORATORY AND**  
**PHASE II - FIXED BASE LABORATORY**  
**RI/FS CTO-0356**  
**OPERABLE UNIT NO. 16 (SITE 89)**  
**MCB CAMP LEJEUNE, NORTH CAROLINA**

SAMPLE ID	IR89-MW08IW-01	IR89-MW08DW-01	IR89-TW24IW-01	IR89-TW25IW-01	IR89-TW26IW-01	IR89-TW27IW-01
PHASE	PHASE II	PHASE II	PHASE II	PHASE II	PHASE II	PHASE II
DATE SAMPLED	05/19/97	05/19/97	04/20/97	04/20/97	04/20/97	04/20/97
<b>VOLATILES (ug/L)</b>						
1,1,1-TRICHLOROETHANE	10 U	10 U	0.1 U	0.1 U	0.1 U	0.1 U
1,1,2,2-TETRACHLOROETHANE	10 U	10 U	10 U	10 U	10 U	10 U
1,1,2-TRICHLOROETHANE	10 U	10 U	1 U	1 U	1 U	1 U
1,1-DICHLOROETHANE	10 U	10 U	1 U	1 U	1 U	1 U
1,1-DICHLOROETHENE	10 U	10 U	0.1 U	0.1 U	0.1 U	0.1 U
1,2-DICHLOROBENZENE	NA	NA	2 U	2 U	2 U	2 U
1,2-DICHLOROETHANE	10 U	10 U	1 U	1 U	1 U	1 U
1,2-DICHLOROETHENE (TOTAL)	10 U	10 U	1 U	1 U	1 U	1 U
1,2-DICHLOROPROPANE	10 U	10 U	NA	NA	NA	NA
1,3-DICHLOROBENZENE	NA	NA	2 U	2 U	2 U	2 U
1,4-DICHLOROBENZENE	NA	NA	2 U	2 U	2 U	2 U
2-BUTANONE	10 U	10 U	NA	NA	NA	NA
2-HEXANONE	10 U	10 U	NA	NA	NA	NA
4-METHYL-2-PENTANONE	10 U	10 U	NA	NA	NA	NA
ACETONE	10 U	10 U	NA	NA	NA	NA
BENZENE	10 U	10 U	2 U	2 U	2 U	2 U
BROMODICHLOROMETHANE	10 U	10 U	NA	NA	NA	NA
BROMOFORM	10 U	10 U	NA	NA	NA	NA
BROMOMETHANE	10 U	10 U	NA	NA	NA	NA
CARBON DISULFIDE	10 U	10 U	NA	NA	NA	NA
CARBON TETRACHLORIDE	10 U	10 U	0.1 U	0.1 U	0.1 U	0.1 U
CHLOROBENZENE	10 U	10 U	2 U	2 U	2 U	2 U
CHLOROETHANE	10 U	10 U	NA	NA	NA	NA
CHLOROFORM	10 U	10 U	0.1 U	0.1 U	0.1 U	0.1 U
CHLOROMETHANE	10 U	10 U	NA	NA	NA	NA
CIS-1,2-DICHLOROETHENE	NA	NA	1 U	1 U	1 U	1 U
CIS-1,3-DICHLOROPROPENE	10 U	10 U	NA	NA	NA	NA
DIBROMOCHLOROMETHANE	10 U	10 U	NA	NA	NA	NA
ETHYLBENZENE	10 U	10 U	2 U	2 U	2 U	2 U



**FREQUENCY OF DETECTION SUMMARY**  
**GROUNDWATER - TCL ORGANICS**  
**PHASE I AND PHASE II - MOBILE LABORATORY AND**  
**PHASE II - FIXED BASE LABORATORY**  
**RI/FS CTO-0356**  
**OPERABLE UNIT NO. 16 (SITE 89)**  
**MCB CAMP LEJEUNE, NORTH CAROLINA**

SAMPLE ID	IR89-MW08IW-01	IR89-MW08DW-01	IR89-TW24IW-01	IR89-TW25IW-01	IR89-TW26IW-01	IR89-TW27IW-01
PHASE	PHASE II	PHASE II	PHASE II	PHASE II	PHASE II	PHASE II
DATE SAMPLED	05/19/97	05/19/97	04/20/97	04/20/97	04/20/97	04/20/97
<b>VOLATILES (ug/L) (cont)</b>						
FLUOROTRICHLOROMETHANE	NA	NA	0.1 U	0.1 U	0.1 U	0.1 U
M&P-XYLENE	NA	NA	2 U	2 U	2 U	2 U
METHYLENE CHLORIDE	10 U	10 U	1 U	1 U	1 U	1 U
O-XYLENE	NA	NA	2 U	2 U	2 U	2 U
STYRENE	10 U	10 U	NA	NA	NA	NA
TETRACHLOROETHENE	10 U	10 U	0.1 U	0.1	0.1 U	0.1 U
TOLUENE	10 U	10 U	2 U	2 U	2 U	2 U
TRANS-1,2-DICHLOROETHENE	NA	NA	NA	NA	NA	NA
TRANS-1,3-DICHLOROPROPENE	10 U	10 U	NA	NA	NA	NA
TRICHLOROETHENE	10 U	10 U	0.1 U	0.1 U	0.1 U	0.1 U
VINYL CHLORIDE	10 U	10 U	50 U	50 U	50 U	50 U
XYLENE (TOTAL)	10 U	10 U	NA	NA	NA	NA

**FREQUENCY OF DETECTION SUMMARY**  
**GROUNDWATER - TCL ORGANICS**  
**PHASE I AND PHASE II - MOBILE LABORATORY AND**  
**PHASE II - FIXED BASE LABORATORY**  
**RI/FS CTO-0356**  
**OPERABLE UNIT NO. 16 (SITE 89)**  
**MCB CAMP LEJEUNE, NORTH CAROLINA**

SAMPLE ID	IR89-MW08IW-01	IR89-MW08DW-01	IR89-TW24IW-01	IR89-TW25IW-01	IR89-TW26IW-01	IR89-TW27IW-01
PHASE	PHASE II	PHASE II	PHASE II	PHASE II	PHASE II	PHASE II
DATE SAMPLED	05/19/97	05/19/97	04/20/97	04/20/97	04/20/97	04/20/97
<b>SEMIVOLATILES (ug/L)</b>						
1,2,4-TRICHLOROBENZENE	10 U	10 U	NA	NA	NA	NA
1,2-DICHLOROBENZENE	10 U	10 U	NA	NA	NA	NA
1,3-DICHLOROBENZENE	10 U	10 U	NA	NA	NA	NA
1,4-DICHLOROBENZENE	10 U	10 U	NA	NA	NA	NA
2,2'-OXYBIS(1-CHLOROPROPANE)	10 U	10 U	NA	NA	NA	NA
2,4,5-TRICHLOROPHENOL	25 U	25 U	NA	NA	NA	NA
2,4,6-TRICHLOROPHENOL	10 U	10 U	NA	NA	NA	NA
2,4-DICHLOROPHENOL	10 U	10 U	NA	NA	NA	NA
2,4-DIMETHYLPHENOL	10 U	10 U	NA	NA	NA	NA
2,4-DINITROPHENOL	25 U	25 U	NA	NA	NA	NA
2,4-DINITROTOLUENE	10 U	10 U	NA	NA	NA	NA
2,6-DINITROTOLUENE	10 U	10 U	NA	NA	NA	NA
2-CHLORONAPHTHALENE	10 U	10 U	NA	NA	NA	NA
2-CHLOROPHENOL	10 U	10 U	NA	NA	NA	NA
2-METHYLNAPHTHALENE	10 U	10 U	NA	NA	NA	NA
2-METHYLPHENOL	10 U	10 U	NA	NA	NA	NA
2-NITROANILINE	25 U	25 U	NA	NA	NA	NA
2-NITROPHENOL	10 U	10 U	NA	NA	NA	NA
3,3'-DICHLOROBENZIDINE	10 U	10 U	NA	NA	NA	NA
3-NITROANILINE	25 U	25 U	NA	NA	NA	NA
4,6-DINITRO-2-METHYLPHENOL	25 U	25 U	NA	NA	NA	NA
4-BROMOPHENYL-PHENYLETHER	10 U	10 U	NA	NA	NA	NA
4-CHLORO-3-METHYLPHENOL	10 U	10 U	NA	NA	NA	NA
4-CHLOROANILINE	10 U	10 U	NA	NA	NA	NA
4-CHLOROPHENYL-PHENYLETHER	10 U	10 U	NA	NA	NA	NA
4-METHYLPHENOL	10 U	10 U	NA	NA	NA	NA
4-NITROANILINE	25 U	25 U	NA	NA	NA	NA
4-NITROPHENOL	25 U	25 U	NA	NA	NA	NA
ACENAPHTHENE	10 U	10 U	NA	NA	NA	NA

FREQUENCY OF DETECTION SUMMARY  
 GROUNDWATER - TCL ORGANICS  
 PHASE I AND PHASE II - MOBILE LABORATORY AND  
 PHASE II - FIXED BASE LABORATORY  
 RI/FS CTO-0356  
 OPERABLE UNIT NO. 16 (SITE 89)  
 MCB CAMP LEJEUNE, NORTH CAROLINA

SAMPLE ID	IR89-MW08IW-01	IR89-MW08DW-01	IR89-TW24IW-01	IR89-TW25IW-01	IR89-TW26IW-01	IR89-TW27IW-01
PHASE	PHASE II	PHASE II	PHASE II	PHASE II	PHASE II	PHASE II
DATE SAMPLED	05/19/97	05/19/97	04/20/97	04/20/97	04/20/97	04/20/97
<b>SEMIVOLATILES (ug/L) (cont)</b>						
ACENAPHTHYLENE	10 U	10 U	NA	NA	NA	NA
ANTHRACENE	10 U	10 U	NA	NA	NA	NA
BENZO(A)ANTHRACENE	10 U	10 U	NA	NA	NA	NA
BENZO(A)PYRENE	10 U	10 U	NA	NA	NA	NA
BENZO(B)FLUORANTHENE	10 U	10 U	NA	NA	NA	NA
BENZO(G,H,I)PERYLENE	10 U	10 U	NA	NA	NA	NA
BENZO(K)FLUORANTHENE	10 U	10 U	NA	NA	NA	NA
BIS(2-CHLOROETHOXY)METHANE	10 U	10 U	NA	NA	NA	NA
BIS(2-CHLOROETHYL)ETHER	10 U	10 U	NA	NA	NA	NA
BIS(2-ETHYLHEXYL)PHTHALATE	15 U	10 U	NA	NA	NA	NA
BUTYLBENZYLPHTHALATE	10 U	10 U	NA	NA	NA	NA
CARBAZOLE	10 U	10 U	NA	NA	NA	NA
CHRYSENE	10 U	10 U	NA	NA	NA	NA
DIBENZO(A,H)ANTHRACENE	10 U	10 U	NA	NA	NA	NA
DIBENZOFURAN	10 U	10 U	NA	NA	NA	NA
DIETHYLPHTHALATE	10 U	10 U	NA	NA	NA	NA
DIMETHYLPHTHALATE	10 U	10 U	NA	NA	NA	NA
DI-N-BUTYLPHTHALATE	10 U	10 U	NA	NA	NA	NA
DI-N-OCTYLPHTHALATE	10 U	10 U	NA	NA	NA	NA
FLUORANTHENE	10 U	10 U	NA	NA	NA	NA
FLUORENE	10 U	10 U	NA	NA	NA	NA
HEXACHLOROBENZENE	10 U	10 U	NA	NA	NA	NA
HEXACHLOROBUTADIENE	10 U	10 U	NA	NA	NA	NA
HEXACHLOROCYCLOPENTADIENE	10 U	10 U	NA	NA	NA	NA
HEXACHLOROETHANE	10 U	10 U	NA	NA	NA	NA
INDENO(1,2,3-CD)PYRENE	10 U	10 U	NA	NA	NA	NA
ISOPHORONE	10 U	10 U	NA	NA	NA	NA
NAPHTHALENE	10 U	10 U	NA	NA	NA	NA
NITROBENZENE	10 U	10 U	NA	NA	NA	NA

**FREQUENCY OF DETECTION SUMMARY**  
**GROUNDWATER - TCL ORGANICS**  
**PHASE I AND PHASE II - MOBILE LABORATORY AND**  
**PHASE II - FIXED BASE LABORATORY**  
**RI/FS CTO-0356**  
**OPERABLE UNIT NO. 16 (SITE 89)**  
**MCB CAMP LEJEUNE, NORTH CAROLINA**

SAMPLE ID	IR89-MW08IW-01	IR89-MW08DW-01	IR89-TW24IW-01	IR89-TW25IW-01	IR89-TW26IW-01	IR89-TW27IW-01
PHASE	PHASE II	PHASE II	PHASE II	PHASE II	PHASE II	PHASE II
DATE SAMPLED	05/19/97	05/19/97	04/20/97	04/20/97	04/20/97	04/20/97
<b>SEMIVOLATILES (ug/L) (cont)</b>						
N-NITROSO-DI-N-PROPYLAMINE	10 U	10 U	NA	NA	NA	NA
N-NITROSODIPHENYLAMINE (1)	10 U	10 U	NA	NA	NA	NA
PENTACHLOROPHENOL	25 U	25 U	NA	NA	NA	NA
PHENANTHRENE	10 U	10 U	NA	NA	NA	NA
PHENOL	10 U	10 U	NA	NA	NA	NA
PYRENE	10 U	10 U	NA	NA	NA	NA

**FREQUENCY OF DETECTION SUMMARY**  
**GROUNDWATER - TCL ORGANICS**  
**PHASE I AND PHASE II - MOBILE LABORATORY AND**  
**PHASE II - FIXED BASE LABORATORY**  
**RI/FS CTO-0356**  
**OPERABLE UNIT NO. 16 (SITE 89)**  
**MCB CAMP LEJEUNE, NORTH CAROLINA**

SAMPLE ID	IR89-MW08IW-01	IR89-MW08DW-01	IR89-TW24IW-01	IR89-TW25IW-01	IR89-TW26IW-01	IR89-TW27IW-01
PHASE	PHASE II	PHASE II	PHASE II	PHASE II	PHASE II	PHASE II
DATE SAMPLED	05/19/97	05/19/97	04/20/97	04/20/97	04/20/97	04/20/97
<b>PESTICIDES/PCBS (ug/L)</b>						
4,4'-DDD	NA	NA	NA	NA	NA	NA
4,4'-DDE	NA	NA	NA	NA	NA	NA
4,4'-DDT	NA	NA	NA	NA	NA	NA
ALDRIN	NA	NA	NA	NA	NA	NA
ALPHA-BHC	NA	NA	NA	NA	NA	NA
ALPHA-CHLORDANE	NA	NA	NA	NA	NA	NA
BETA-BHC	NA	NA	NA	NA	NA	NA
DELTA-BHC	NA	NA	NA	NA	NA	NA
DIELDRIN	NA	NA	NA	NA	NA	NA
ENDOSULFAN I	NA	NA	NA	NA	NA	NA
ENDOSULFAN II	NA	NA	NA	NA	NA	NA
ENDOSULFAN SULFATE	NA	NA	NA	NA	NA	NA
ENDRIN	NA	NA	NA	NA	NA	NA
ENDRIN ALDEHYDE	NA	NA	NA	NA	NA	NA
ENDRIN KETONE	NA	NA	NA	NA	NA	NA
GAMMA-BHC (LINDANE)	NA	NA	NA	NA	NA	NA
GAMMA-CHLORDANE	NA	NA	NA	NA	NA	NA
HEPTACHLOR	NA	NA	NA	NA	NA	NA
HEPTACHLOR EPOXIDE	NA	NA	NA	NA	NA	NA
METHOXYCHLOR	NA	NA	NA	NA	NA	NA
TOXAPHENE	NA	NA	NA	NA	NA	NA
AROCLOR-1016	NA	NA	NA	NA	NA	NA
AROCLOR-1221	NA	NA	NA	NA	NA	NA
AROCLOR-1232	NA	NA	NA	NA	NA	NA
AROCLOR-1242	NA	NA	NA	NA	NA	NA
AROCLOR-1248	NA	NA	NA	NA	NA	NA
AROCLOR-1254	NA	NA	NA	NA	NA	NA
AROCLOR-1260	NA	NA	NA	NA	NA	NA

**FREQUENCY OF DETECTION SUMMARY**  
**GROUNDWATER - TCL ORGANICS**  
**PHASE I AND PHASE II - MOBILE LABORATORY AND**  
**PHASE II - FIXED BASE LABORATORY**  
**RI/FS CTO-0356**  
**OPERABLE UNIT NO. 16 (SITE 89)**  
**MCB CAMP LEJEUNE, NORTH CAROLINA**

SAMPLE ID	IR89-TW28IW-01	IR89-TW29IW-01	IR89-TW30IW-01
PHASE	PHASE II	PHASE II	PHASE II
DATE SAMPLED	04/29/97	04/29/97	04/29/97
<b>VOLATILES (ug/L)</b>			
1,1,1-TRICHLOROETHANE	0.1 U	0.1 U	0.1 U
1,1,2,2-TETRACHLOROETHANE	10 U	10 U	10 U
1,1,2-TRICHLOROETHANE	1 U	1 U	1 U
1,1-DICHLOROETHANE	1 U	1 U	1 U
1,1-DICHLOROETHENE	0.1 U	0.1 U	0.1 U
1,2-DICHLOROBENZENE	2 U		2 U
1,2-DICHLOROETHANE	1 U	1 U	1 U
1,2-DICHLOROETHENE (TOTAL)	1 U	1 U	1 U
1,2-DICHLOROPROPANE	NA	NA	NA
1,3-DICHLOROBENZENE	2 U	2 U	2 U
1,4-DICHLOROBENZENE	2 U		2 U
2-BUTANONE	NA	NA	NA
2-HEXANONE	NA	NA	NA
4-METHYL-2-PENTANONE	NA	NA	NA
ACETONE	NA	NA	NA
BENZENE	2 U	2 U	2 U
BROMODICHLOROMETHANE	NA	NA	NA
BROMOFORM	NA	NA	NA
BROMOMETHANE	NA	NA	NA
CARBON DISULFIDE	NA	NA	NA
CARBON TETRACHLORIDE	0.1 U	0.1 U	0.1 U
CHLOROBENZENE	2 U	2 U	2 U
CHLOROETHANE	NA	NA	NA
CHLOROFORM	1.2	0.1 U	0.1 U
CHLOROMETHANE	NA	NA	NA
CIS-1,2-DICHLOROETHENE	1 U	1 U	1 U
CIS-1,3-DICHLOROPROPENE	NA	NA	NA
DIBROMOCHLOROMETHANE	NA	NA	NA
ETHYLBENZENE	2 U	2 U	2 U

**FREQUENCY OF DETECTION SUMMARY**  
**GROUNDWATER - TCL ORGANICS**  
**PHASE I AND PHASE II - MOBILE LABORATORY AND**  
**PHASE II - FIXED BASE LABORATORY**  
**RI/FS CTO-0356**  
**OPERABLE UNIT NO. 16 (SITE 89)**  
**MCB CAMP LEJEUNE, NORTH CAROLINA**

SAMPLE ID	IR89-TW28IW-01	IR89-TW29IW-01	IR89-TW30IW-01
PHASE	PHASE II	PHASE II	PHASE II
DATE SAMPLED	04/29/97	04/29/97	04/29/97
<b>VOLATILES (ug/L) (cont)</b>			
FLUOROTRICHLOROMETHANE	0.1 U	0.1 U	0.1 U
M&P-XYLENE	2 U	2 U	2 U
METHYLENE CHLORIDE	1 U	1 U	1 U
O-XYLENE	2 U	2 U	2 U
STYRENE	NA	NA	NA
TETRACHLOROETHENE	0.1 U	0.1 U	0.1 U
TOLUENE	2 U	6	2 U
TRANS-1,2-DICHLOROETHENE	NA	NA	NA
TRANS-1,3-DICHLOROPROPENE	NA	NA	NA
TRICHLOROETHENE	0.1 U	0.1 U	0.1 U
VINYL CHLORIDE	50 U	50 U	50 U
XYLENE (TOTAL)	NA	NA	NA

FREQUENCY OF DETECTION SUMMARY  
 GROUNDWATER - TCL ORGANICS  
 PHASE I AND PHASE II - MOBILE LABORATORY AND  
 PHASE II - FIXED BASE LABORATORY  
 RI/FS CTO-0356  
 OPERABLE UNIT NO. 16 (SITE 89)  
 MCB CAMP LEJEUNE, NORTH CAROLINA

SAMPLE ID	IR89-TW28IW-01	IR89-TW29IW-01	IR89-TW30IW-01
PHASE	PHASE II	PHASE II	PHASE II
DATE SAMPLED	04/29/97	04/29/97	04/29/97
<b>SEMIVOLATILES (ug/L)</b>			
1,2,4-TRICHLOROBENZENE	NA	NA	NA
1,2-DICHLOROBENZENE	NA	NA	NA
1,3-DICHLOROBENZENE	NA	NA	NA
1,4-DICHLOROBENZENE	NA	NA	NA
2,2'-OXYBIS(1-CHLOROPROPANE)	NA	NA	NA
2,4,5-TRICHLOROPHENOL	NA	NA	NA
2,4,6-TRICHLOROPHENOL	NA	NA	NA
2,4-DICHLOROPHENOL	NA	NA	NA
2,4-DIMETHYLPHENOL	NA	NA	NA
2,4-DINITROPHENOL	NA	NA	NA
2,4-DINITROTOLUENE	NA	NA	NA
2,6-DINITROTOLUENE	NA	NA	NA
2-CHLORONAPHTHALENE	NA	NA	NA
2-CHLOROPHENOL	NA	NA	NA
2-METHYLNAPHTHALENE	NA	NA	NA
2-METHYLPHENOL	NA	NA	NA
2-NITROANILINE	NA	NA	NA
2-NITROPHENOL	NA	NA	NA
3,3'-DICHLOROBENZIDINE	NA	NA	NA
3-NITROANILINE	NA	NA	NA
4,6-DINITRO-2-METHYLPHENOL	NA	NA	NA
4-BROMOPHENYL-PHENYLETHER	NA	NA	NA
4-CHLORO-3-METHYLPHENOL	NA	NA	NA
4-CHLOROANILINE	NA	NA	NA
4-CHLOROPHENYL-PHENYLETHER	NA	NA	NA
4-METHYLPHENOL	NA	NA	NA
4-NITROANILINE	NA	NA	NA
4-NITROPHENOL	NA	NA	NA
ACENAPHTHENE	NA	NA	NA



**FREQUENCY OF DETECTION SUMMARY**  
**GROUNDWATER - TCL ORGANICS**  
**PHASE I AND PHASE II - MOBILE LABORATORY AND**  
**PHASE II - FIXED BASE LABORATORY**  
**RI/FS CTO-0356**  
**OPERABLE UNIT NO. 16 (SITE 89)**  
**MCB CAMP LEJEUNE, NORTH CAROLINA**

SAMPLE ID	IR89-TW28IW-01	IR89-TW29IW-01	IR89-TW30IW-01
PHASE	PHASE II	PHASE II	PHASE II
DATE SAMPLED	04/29/97	04/29/97	04/29/97
<b>SEMIVOLATILES (ug/L) (cont)</b>			
ACENAPHTHYLENE	NA	NA	NA
ANTHRACENE	NA	NA	NA
BENZO(A)ANTHRACENE	NA	NA	NA
BENZO(A)PYRENE	NA	NA	NA
BENZO(B)FLUORANTHENE	NA	NA	NA
BENZO(G,H,I)PERYLENE	NA	NA	NA
BENZO(K)FLUORANTHENE	NA	NA	NA
BIS(2-CHLOROETHOXY)METHANE	NA	NA	NA
BIS(2-CHLOROETHYL)ETHER	NA	NA	NA
BIS(2-ETHYLHEXYL)PHTHALATE	NA	NA	NA
BUTYLBENZYLPHTHALATE	NA	NA	NA
CARBAZOLE	NA	NA	NA
CHRYSENE	NA	NA	NA
DIBENZO(A,H)ANTHRACENE	NA	NA	NA
DIBENZOFURAN	NA	NA	NA
DIETHYLPHTHALATE	NA	NA	NA
DIMETHYLPHTHALATE	NA	NA	NA
DI-N-BUTYLPHTHALATE	NA	NA	NA
DI-N-OCTYLPHTHALATE	NA	NA	NA
FLUORANTHENE	NA	NA	NA
FLUORENE	NA	NA	NA
HEXACHLOROBENZENE	NA	NA	NA
HEXACHLOROBUTADIENE	NA	NA	NA
HEXACHLOROCYCLOPENTADIENE	NA	NA	NA
HEXACHLOROETHANE	NA	NA	NA
INDENO(1,2,3-CD)PYRENE	NA	NA	NA
ISOPHORONE	NA	NA	NA
NAPHTHALENE	NA	NA	NA
NITROBENZENE	NA	NA	NA

FREQUENCY OF DETECTION SUMMARY  
 GROUNDWATER - TCL ORGANICS  
 PHASE I AND PHASE II - MOBILE LABORATORY AND  
 PHASE II - FIXED BASE LABORATORY  
 RI/FS CTO-0356  
 OPERABLE UNIT NO. 16 (SITE 89)  
 MCB CAMP LEJEUNE, NORTH CAROLINA

SAMPLE ID	IR89-TW28IW-01	IR89-TW29IW-01	IR89-TW30IW-01
PHASE	PHASE II	PHASE II	PHASE II
DATE SAMPLED	04/29/97	04/29/97	04/29/97
<b>SEMIVOLATILES (ug/L) (cont)</b>			
N-NITROSO-DI-N-PROPYLAMINE	NA	NA	NA
N-NITROSODIPHENYLAMINE (1)	NA	NA	NA
PENTACHLOROPHENOL	NA	NA	NA
PHENANTHRENE	NA	NA	NA
PHENOL	NA	NA	NA
PYRENE	NA	NA	NA

**FREQUENCY OF DETECTION SUMMARY**  
**GROUNDWATER - TCL ORGANICS**  
**PHASE I AND PHASE II - MOBILE LABORATORY AND**  
**PHASE II - FIXED BASE LABORATORY**  
**RI/FS CTO-0356**  
**OPERABLE UNIT NO. 16 (SITE 89)**  
**MCB CAMP LEJEUNE, NORTH CAROLINA**

SAMPLE ID	IR89-TW28IW-01	IR89-TW29IW-01	IR89-TW30IW-01
PHASE	PHASE II	PHASE II	PHASE II
DATE SAMPLED	04/29/97	04/29/97	04/29/97
<b>PESTICIDES/PCBS (ug/L)</b>			
4,4'-DDD	NA	NA	NA
4,4'-DDE	NA	NA	NA
4,4'-DDT	NA	NA	NA
ALDRIN	NA	NA	NA
ALPHA-BHC	NA	NA	NA
ALPHA-CHLORDANE	NA	NA	NA
BETA-BHC	NA	NA	NA
DELTA-BHC	NA	NA	NA
DIELDRIN	NA	NA	NA
ENDOSULFAN I	NA	NA	NA
ENDOSULFAN II	NA	NA	NA
ENDOSULFAN SULFATE	NA	NA	NA
ENDRIN	NA	NA	NA
ENDRIN ALDEHYDE	NA	NA	NA
ENDRIN KETONE	NA	NA	NA
GAMMA-BHC (LINDANE)	NA	NA	NA
GAMMA-CHLORDANE	NA	NA	NA
HEPTACHLOR	NA	NA	NA
HEPTACHLOR EPOXIDE	NA	NA	NA
METHOXYCHLOR	NA	NA	NA
TOXAPHENE	NA	NA	NA
AROCLOR-1016	NA	NA	NA
AROCLOR-1221	NA	NA	NA
AROCLOR-1232	NA	NA	NA
AROCLOR-1242	NA	NA	NA
AROCLOR-1248	NA	NA	NA
AROCLOR-1254	NA	NA	NA
AROCLOR-1260	NA	NA	NA

**FREQUENCY OF DETECTION SUMMARY**  
**GROUNDWATER - TCL ORGANICS**  
**PHASE I AND PHASE II - MOBILE LABORATORY AND**  
**PHASE II - FIXED BASE LABORATORY**  
**RI/FS CTO-0356**  
**OPERABLE UNIT NO. 16 (SITE 89)**  
**MCB CAMP LEJEUNE, NORTH CAROLINA**

SAMPLE ID PHASE DATE SAMPLED	Minimum Non-Detect	Maximum Non-Detect	Minimum Detected	Maximum Detected	Location of Maximum Detect	Frequency of Detection	Arithmetic Mean Positive Detects	Median Positive Detects
<b>VOLATILES (ug/L)</b>								
1,1,1-TRICHLOROETHANE	0.1 U	10 U	0.2	0.2	IR89-TW18-01	1/55	0.2	0.2
1,1,2,2-TETRACHLOROETHANE	10 U	10 U	4 J	4 J	IR89-MW04-01	1/21	4	4
1,1,2-TRICHLOROETHANE	1 U	10 U	3 J	3 J	IR89-MW04-01	1/21	3	3
1,1-DICHLOROETHANE	1 U	10 U	ND	ND		0/21	--	--
1,1-DICHLOROETHENE	0.1 U	10 U	2 J	2 J	IR89-MW04IW-01	1/21	2	2
1,2-DICHLOROBENZENE	2 U	2 U	ND	ND		0/6	--	--
1,2-DICHLOROETHANE	1 U	10 U	ND	ND		0/21	--	--
1,2-DICHLOROETHENE (TOTAL)	1 U	10 U	29	880	IR89-MW04-01	6/21	330.17	240
1,2-DICHLOROPROPANE	10 U	10 U	ND	ND		0/14	--	--
1,3-DICHLOROBENZENE	2 U	2 U	ND	ND		0/7	--	--
1,4-DICHLOROBENZENE	2 U	2 U	ND	ND		0/6	--	--
2-BUTANONE	10 U	10 U	ND	ND		0/14	--	--
2-HEXANONE	10 U	10 U	ND	ND		0/14	--	--
4-METHYL-2-PENTANONE	10 U	10 U	ND	ND		0/14	--	--
ACETONE	10 U	10 U	ND	ND		0/14	--	--
BENZENE	2 U	10 U	ND	ND		0/21	--	--
BROMODICHLOROMETHANE	10 U	10 U	ND	ND		0/14	--	--
BROMOFORM	10 U	10 U	ND	ND		0/14	--	--
BROMOMETHANE	10 U	10 U	ND	ND		0/14	--	--
CARBON DISULFIDE	10 U	10 U	ND	ND		0/14	--	--
CARBON TETRACHLORIDE	0.1 U	10 U	ND	ND		0/55	--	--
CHLOROBENZENE	2 U	10 U	ND	ND		0/21	--	--
CHLOROETHANE	10 U	10 U	ND	ND		0/14	--	--
CHLOROFORM	0.1 U	10 U	0.3	8.6	IR89-TW16-01	26/54	2.39	1.7
CHLOROMETHANE	10 U	10 U	ND	ND		0/14	--	--
CIS-1,2-DICHLOROETHENE	1 U	1 U	3	818	IR89-MW02-01	19/41	133.37	84
CIS-1,3-DICHLOROPROPENE	10 U	10 U	ND	ND		0/14	--	--
DIBROMOCHLOROMETHANE	10 U	10 U	ND	ND		0/14	--	--
ETHYLBENZENE	2 U	10 U	ND	ND		0/21	--	--

**FREQUENCY OF DETECTION SUMMARY**  
**GROUNDWATER - TCL ORGANICS**  
**PHASE I AND PHASE II - MOBILE LABORATORY AND**  
**PHASE II - FIXED BASE LABORATORY**  
**RI/FS CTO-0356**  
**OPERABLE UNIT NO. 16 (SITE 89)**  
**MCB CAMP LEJEUNE, NORTH CAROLINA**

SAMPLE ID PHASE DATE SAMPLED	Minimum Non-Detect	Maximum Non-Detect	Minimum Detected	Maximum Detected	Location of Maximum Detect	Frequency of Detection	Arithmetic Mean Positive Detects	Median Positive Detects
<b>VOLATILES (ug/L) (cont)</b>								
FLUOROTRICHLOROMETHANE	0.1 U	0.1 U	ND	ND		0/7	--	--
M&P-XYLENE	2 U	2 U	ND	ND		0/7	--	--
METHYLENE CHLORIDE	1 U	10 U	ND	ND		0/21	--	--
O-XYLENE	2 U	2 U	ND	ND		0/7	--	--
STYRENE	10 U	10 U	ND	ND		0/14	--	--
TETRACHLOROETHENE	0.1 U	10 U	0.1	42.7	IR89-TW16-01	17/55	11.28	7.4
TOLUENE	2 U	10 U	6	6	IR89-TW291W-01	1/21	6	6
TRANS-1,2-DICHLOROETHENE	1 U	1 U	1	451	IR89-MW02-01	16/34	64.25	18.5
TRANS-1,3-DICHLOROPROPENE	10 U	10 U	ND	ND		0/14	--	--
TRICHLOROETHENE	0.1 U	10 U	0.2	744.3	IR89-MW02-01	28/55	217.54	127.45
VINYL CHLORIDE	10 U	50 U	6 J	130	IR89-MW02-01	4/55	47	26
XYLENE (TOTAL)	10 U	10 U	ND	ND		0/14	--	--

**FREQUENCY OF DETECTION SUMMARY**  
**GROUNDWATER - TCL ORGANICS**  
**PHASE I AND PHASE II - MOBILE LABORATORY AND**  
**PHASE II - FIXED BASE LABORATORY**  
**RI/FS CTO-0356**  
**OPERABLE UNIT NO. 16 (SITE 89)**  
**MCB CAMP LEJEUNE, NORTH CAROLINA**

SAMPLE ID PHASE DATE SAMPLED	Minimum Non-Detect	Maximum Non-Detect	Minimum Detected	Maximum Detected	Location of Maximum Detect	Frequency of Detection	Arithmetic Mean Positive Detects	Median Positive Detects
<b>SEMIVOLATILES (ug/L)</b>								
1,2,4-TRICHLOROBENZENE	10 U	10 U	ND	ND		0/14	--	--
1,2-DICHLOROBENZENE	10 U	10 U	ND	ND		0/14	--	--
1,3-DICHLOROBENZENE	10 U	10 U	ND	ND		0/14	--	--
1,4-DICHLOROBENZENE	10 U	10 U	ND	ND		0/14	--	--
2,2'-OXYBIS(1-CHLOROPROPANE)	10 U	10 U	ND	ND		0/14	--	--
2,4,5-TRICHLOROPHENOL	25 U	25 U	ND	ND		0/14	--	--
2,4,6-TRICHLOROPHENOL	10 U	10 U	ND	ND		0/14	--	--
2,4-DICHLOROPHENOL	10 U	10 U	ND	ND		0/14	--	--
2,4-DIMETHYLPHENOL	10 U	10 U	ND	ND		0/14	--	--
2,4-DINITROPHENOL	25 U	25 U	ND	ND		0/14	--	--
2,4-DINITROTOLUENE	10 U	10 U	ND	ND		0/14	--	--
2,6-DINITROTOLUENE	10 U	10 U	ND	ND		0/14	--	--
2-CHLORONAPHTHALENE	10 U	10 U	ND	ND		0/14	--	--
2-CHLOROPHENOL	10 U	10 U	ND	ND		0/14	--	--
2-METHYLNAPHTHALENE	10 U	10 U	ND	ND		0/14	--	--
2-METHYLPHENOL	10 U	10 U	ND	ND		0/14	--	--
2-NITROANILINE	25 U	25 U	ND	ND		0/14	--	--
2-NITROPHENOL	10 U	10 U	ND	ND		0/14	--	--
3,3'-DICHLOROBENZIDINE	10 U	10 U	ND	ND		0/14	--	--
3-NITROANILINE	25 UJ	25 UJ	ND	ND		0/14	--	--
4,6-DINITRO-2-METHYLPHENOL	25 U	25 U	ND	ND		0/14	--	--
4-BROMOPHENYL-PHENYLETHER	10 U	10 U	ND	ND		0/14	--	--
4-CHLORO-3-METHYLPHENOL	10 U	10 U	ND	ND		0/14	--	--
4-CHLOROANILINE	10 UJ	10 UJ	ND	ND		0/14	--	--
4-CHLOROPHENYL-PHENYLETHER	10 U	10 U	ND	ND		0/14	--	--
4-METHYLPHENOL	10 U	10 U	ND	ND		0/14	--	--
4-NITROANILINE	25 U	25 U	ND	ND		0/14	--	--
4-NITROPHENOL	25 U	25 U	ND	ND		0/14	--	--
ACENAPHTHENE	10 U	10 U	ND	ND		0/14	--	--

**FREQUENCY OF DETECTION SUMMARY**  
**GROUNDWATER - TCL ORGANICS**  
**PHASE I AND PHASE II - MOBILE LABORATORY AND**  
**PHASE II - FIXED BASE LABORATORY**  
**RI/FS CTO-0356**  
**OPERABLE UNIT NO. 16 (SITE 89)**  
**MCB CAMP LEJEUNE, NORTH CAROLINA**

SAMPLE ID PHASE DATE SAMPLED	Minimum Non-Detect	Maximum Non-Detect	Minimum Detected	Maximum Detected	Location of Maximum Detect	Frequency of Detection	Arithmetic Mean Positive Detects	Median Positive Detects
<b>SEMIVOLATILES (ug/L) (cont)</b>								
ACENAPHTHYLENE	10 U	10 U	ND	ND		0/14	--	--
ANTHRACENE	10 U	10 U	ND	ND		0/14	--	--
BENZO(A)ANTHRACENE	10 U	10 U	ND	ND		0/14	--	--
BENZO(A)PYRENE	10 U	10 U	ND	ND		0/14	--	--
BENZO(B)FLUORANTHENE	10 U	10 U	ND	ND		0/14	--	--
BENZO(G,H,I)PERYLENE	10 U	10 U	ND	ND		0/14	--	--
BENZO(K)FLUORANTHENE	10 U	10 U	ND	ND		0/14	--	--
BIS(2-CHLOROETHOXY)METHANE	10 U	10 U	ND	ND		0/14	--	--
BIS(2-CHLOROETHYL)ETHER	10 U	10 U	ND	ND		0/14	--	--
BIS(2-ETHYLHEXYL)PHTHALATE	10 U	37 U	64	150	IR89-MW05-01	4/14	92.25	77.5
BUTYLBENZYLPHTHALATE	10 U	10 U	ND	ND		0/14	--	--
CARBAZOLE	10 U	10 U	ND	ND		0/14	--	--
CHRYSENE	10 U	10 U	ND	ND		0/14	--	--
DIBENZO(A,H)ANTHRACENE	10 U	10 U	ND	ND		0/14	--	--
DIBENZOFURAN	10 U	10 U	ND	ND		0/14	--	--
DIETHYLPHTHALATE	10 U	10 U	ND	ND		0/14	--	--
DIMETHYLPHTHALATE	10 U	10 U	ND	ND		0/14	--	--
DI-N-BUTYLPHTHALATE	10 U	10 U	ND	ND		0/14	--	--
DI-N-OCTYLPHTHALATE	10 U	10 U	ND	ND		0/14	--	--
FLUORANTHENE	10 U	10 U	ND	ND		0/14	--	--
FLUORENE	10 U	10 U	ND	ND		0/14	--	--
HEXACHLOROBENZENE	10 U	10 U	ND	ND		0/14	--	--
HEXACHLOROBUTADIENE	10 U	10 U	ND	ND		0/14	--	--
HEXACHLOROCYCLOPENTADIENE	10 U	10 U	ND	ND		0/14	--	--
HEXACHLOROETHANE	10 U	10 U	ND	ND		0/14	--	--
INDENO(1,2,3-CD)PYRENE	10 U	10 U	ND	ND		0/14	--	--
ISOPHORONE	10 U	10 U	ND	ND		0/14	--	--
NAPHTHALENE	10 U	10 U	ND	ND		0/14	--	--
NITROBENZENE	10 U	10 U	ND	ND		0/14	--	--

**FREQUENCY OF DETECTION SUMMARY**  
**GROUNDWATER - TCL ORGANICS**  
**PHASE I AND PHASE II - MOBILE LABORATORY AND**  
**PHASE II - FIXED BASE LABORATORY**  
**RI/FS CTO-0356**  
**OPERABLE UNIT NO. 16 (SITE 89)**  
**MCB CAMP LEJEUNE, NORTH CAROLINA**

SAMPLE ID PHASE DATE SAMPLED	Minimum Non-Detect	Maximum Non-Detect	Minimum Detected	Maximum Detected	Location of Maximum Detect	Frequency of Detection	Arithmetic Mean Positive Detects	Median Positive Detects
<b>SEMIVOLATILES (ug/L) (cont)</b>								
N-NITROSO-DI-N-PROPYLAMINE	10 U	10 U	ND	ND		0/14	--	--
N-NITROSODIPHENYLAMINE (1)	10 U	10 U	ND	ND		0/14	--	--
PENTACHLOROPHENOL	25 U	25 U	ND	ND		0/14	--	--
PHENANTHRENE	10 U	10 U	ND	ND		0/14	--	--
PHENOL	10 U	10 U	ND	ND		0/14	--	--
PYRENE	10 U	10 U	ND	ND		0/14	--	--



**FREQUENCY OF DETECTION SUMMARY**  
**GROUNDWATER - TCL ORGANICS**  
**PHASE I AND PHASE II - MOBILE LABORATORY AND**  
**PHASE II - FIXED BASE LABORATORY**  
**RI/FS CTO-0356**  
**OPERABLE UNIT NO. 16 (SITE 89)**  
**MCB CAMP LEJEUNE, NORTH CAROLINA**

SAMPLE ID PHASE DATE SAMPLED	Minimum Non-Detect	Maximum Non-Detect	Minimum Detected	Maximum Detected	Location of Maximum Detect	Frequency of Detection	Arithmetic Mean Positive Detects	Median Positive Detects
<b>PESTICIDES/PCBS (ug/L)</b>								
4,4'-DDD	0.1 U	0.1 U	ND	ND		0/2	--	--
4,4'-DDE	0.1 U	0.1 U	ND	ND		0/2	--	--
4,4'-DDT	0.1 U	0.1 U	ND	ND		0/2	--	--
ALDRIN	0.05 U	0.05 U	ND	ND		0/2	--	--
ALPHA-BHC	0.05 U	0.05 U	ND	ND		0/2	--	--
ALPHA-CHLORDANE	0.05 U	0.05 U	ND	ND		0/2	--	--
BETA-BHC	0.05 U	0.05 U	ND	ND		0/2	--	--
DELTA-BHC	0.05 U	0.05 U	ND	ND		0/2	--	--
DIELDRIN	0.1 U	0.1 U	ND	ND		0/2	--	--
ENDOSULFAN I	0.05 U	0.05 U	ND	ND		0/2	--	--
ENDOSULFAN II	0.1 U	0.1 U	ND	ND		0/2	--	--
ENDOSULFAN SULFATE	0.1 U	0.1 U	ND	ND		0/2	--	--
ENDRIN	0.1 U	0.1 U	ND	ND		0/2	--	--
ENDRIN ALDEHYDE	0.1 U	0.1 U	ND	ND		0/2	--	--
ENDRIN KETONE	0.1 U	0.1 U	ND	ND		0/2	--	--
GAMMA-BHC (LINDANE)	0.05 U	0.05 U	ND	ND		0/2	--	--
GAMMA-CHLORDANE	0.05 U	0.05 U	ND	ND		0/2	--	--
HEPTACHLOR	0.05 U	0.05 U	ND	ND		0/2	--	--
HEPTACHLOR EPOXIDE	0.05 U	0.05 U	ND	ND		0/2	--	--
METHOXYCHLOR	0.5 U	0.5 U	ND	ND		0/2	--	--
TOXAPHENE	5 U	5 U	ND	ND		0/2	--	--
AROCLOR-1016	1 U	1 U	ND	ND		0/2	--	--
AROCLOR-1221	2 U	2 U	ND	ND		0/2	--	--
AROCLOR-1232	1 U	1 U	ND	ND		0/2	--	--
AROCLOR-1242	1 U	1 U	ND	ND		0/2	--	--
AROCLOR-1248	1 U	1 U	ND	ND		0/2	--	--
AROCLOR-1254	1 U	1 U	ND	ND		0/2	--	--
AROCLOR-1260	1 U	1 U	ND	ND		0/2	--	--

**SITE 89 GROUNDWATER - INORGANICS**

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**FREQUENCY OF DETECTION SUMMARY**  
**GROUNDWATER - TAL METALS**  
**PHASE II - FIXED BASE LABORATORY**  
**RI/FS CTO-0356**  
**OPERABLE UNIT NO. 16 (SITE 89)**  
**MCB CAMP LEJEUNE, NORTH CAROLINA**

SAMPLE ID	IR89-MW03IW-01	IR89-MW03DW-01	IR89-MW04-01	IR89-MW04IW-01	IR89-MW04DW-01	IR89-MW05-01
PHASE	PHASE II	PHASE II	PHASE II	PHASE II	PHASE II	PHASE II
DATE SAMPLED	05/28/97	05/28/97	05/29/97	05/29/97	05/29/97	05/28/97
<b>TOTAL METALS (ug/L)</b>						
ALUMINUM, TOTAL	36.4 U	33.5 U	39 U	31.7 U	75.1 U	37.3 U
ANTIMONY, TOTAL	1.9 U	2.2	1.9 U	1.9 U	1.9 U	1.9 U
ARSENIC, TOTAL	2.7 U	2.7 U	2.7 U	2.7 U	2.7 U	2.7 U
BARIUM, TOTAL	22.1	4.8	14.1	12.2	12.7	23.1
BERYLLIUM, TOTAL	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U
CADMIUM, TOTAL	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U
CALCIUM, TOTAL	92800	33200	89700	85300	33300	69400
CHROMIUM, TOTAL	0.5	0.5 U	0.5 U	0.5 U	0.5 U	0.88
COBALT, TOTAL	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
COPPER, TOTAL	0.8 U	0.8 U	0.8 UJ	0.8 UJ	0.8 UJ	0.8 U
IRON, TOTAL	394 J	477 J	12200	386	57.3	20000 J
LEAD, TOTAL	1.4 U	1.4 U	1.4 U	1.4 U	1.4 U	1.4 U
MAGNESIUM, TOTAL	2210	4390	2670	2190	9910	4350
MANGANESE, TOTAL	20.8	34.9	135	20.6	9.8	379
MERCURY, TOTAL	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
NICKEL, TOTAL	0.7 U	0.83	1.5 U	1.3 U	1.3 U	0.7 U
POTASSIUM, TOTAL	1170 J	9810 J	1740	1370	17400	3910 J
SELENIUM, TOTAL	2.2 U	2.2 U	2.2 U	2.2 U	2.2 U	2.2 U
SILVER, TOTAL	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
SODIUM, TOTAL	8160 NA		10900	9700 NA		10200
THALLIUM, TOTAL	3 U	3 U	3 U	3 U	3 U	3 U
VANADIUM, TOTAL	1.1	1.1	0.7 U	0.7 U	0.7 U	1
ZINC, TOTAL	0.4 UJ	0.4 UJ	0.4 UJ	0.4 UJ	0.4 UJ	0.4 UJ

**FREQUENCY OF DETECTION SUMMARY**  
**GROUNDWATER - TAL METALS**  
**PHASE II - FIXED BASE LABORATORY**  
**RI/FS CTO-0356**  
**OPERABLE UNIT NO. 16 (SITE 89)**  
**MCB CAMP LEJEUNE, NORTH CAROLINA**

SAMPLE ID	IR89-MW05IW-01	IR89-MW05DW-01	IR89-MW06IW-01	IR89-MW06DW-01	IR89-MW07IW-01	IR89-MW07DW-01
PHASE	PHASE II	PHASE II	PHASE II	PHASE II	PHASE II	PHASE II
DATE SAMPLED	05/28/97	05/28/97	05/19/97	05/19/97	05/20/97	05/20/97
<b>TOTAL METALS (ug/L)</b>						
ALUMINUM, TOTAL	38.6 U	40.4 U	56.3 U	66.7 U	66.8 U	65.8 U
ANTIMONY, TOTAL	2	1.9 U	1.9 U	1.9 U	1.9 U	1.9 U
ARSENIC, TOTAL	2.7 U	2.7 U	2.7 U	2.7 U	2.7 U	2.7 U
BARIUM, TOTAL	3.2	5.4	4.7	8.4	4.4	6.9
BERYLLIUM, TOTAL	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U
CADMIUM, TOTAL	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U
CALCIUM, TOTAL	77600	43500	51800	45300	62400	46900
CHROMIUM, TOTAL	0.5	0.67	0.5 U	0.5 U	0.5 U	0.5 U
COBALT, TOTAL	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
COPPER, TOTAL	0.8 U	0.8 U	0.8 UJ	0.8 UJ	0.8 UJ	0.8 UJ
IRON, TOTAL	4330 J	1120 J	115	30.7	163	13.4 U
LEAD, TOTAL	1.4 U	1.4 U	1.4 U	1.4 U	1.4 U	1.4 U
MAGNESIUM, TOTAL	1790	3530	1280	11300	1450	11300
MANGANESE, TOTAL	60.2	35.4	24.2	22.3	22.2	22.2
MERCURY, TOTAL	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
NICKEL, TOTAL	0.7 U	0.7 U	0.7 U	0.7 U	0.7 U	0.7 U
POTASSIUM, TOTAL	2450 J	9120 J	1460	13700	1480	13400
SELENIUM, TOTAL	2.2 U	2.7	2.2 U	2.2 U	2.2 U	2.2 U
SILVER, TOTAL	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
SODIUM, TOTAL	12600 NA		8600	96400	6300	78900
THALLIUM, TOTAL	3 U	3 U	3 U	3 U	3 U	3 U
VANADIUM, TOTAL	1	0.75	0.7 U	0.7 U	0.79	0.7 U
ZINC, TOTAL	0.4 UJ	0.4 UJ	0.4 UJ	0.4 UJ	0.4 UJ	0.4 UJ

**FREQUENCY OF DETECTION SUMMARY**  
**GROUNDWATER - TAL METALS**  
**PHASE II - FIXED BASE LABORATORY**  
**RI/FS CTO-0356**  
**OPERABLE UNIT NO. 16 (SITE 89)**  
**MCB CAMP LEJEUNE, NORTH CAROLINA**

SAMPLE ID	IR89-MW08IW-01	IR89-MW08DW-01
PHASE	PHASE II	PHASE II
DATE SAMPLED	05/19/97	05/19/97
<b>TOTAL METALS (ug/L)</b>		
ALUMINUM, TOTAL	68.4 U	60.7 U
ANTIMONY, TOTAL	1.9 U	1.9 U
ARSENIC, TOTAL	2.7 U	2.7 U
BARIUM, TOTAL	2.5	14.2
BERYLLIUM, TOTAL	0.3 U	0.3 U
CADMIUM, TOTAL	0.4 U	0.4 U
CALCIUM, TOTAL	46800	57200
CHROMIUM, TOTAL	0.5 U	0.5 U
COBALT, TOTAL	0.5 U	0.5 U
COPPER, TOTAL	0.8 UJ	0.8 UJ
IRON, TOTAL	59.3	54.3
LEAD, TOTAL	1.4 U	1.4 U
MAGNESIUM, TOTAL	1320	26400
MANGANESE, TOTAL	20.1	15.4
MERCURY, TOTAL	0.1 U	0.1 U
NICKEL, TOTAL	0.7 U	1
POTASSIUM, TOTAL	2350	25700
SELENIUM, TOTAL	2.2 U	2.4
SILVER, TOTAL	0.5 U	0.5 U
SODIUM, TOTAL	13500	80000
THALLIUM, TOTAL	3 U	3 U
VANADIUM, TOTAL	0.88	0.7 U
ZINC, TOTAL	0.4 UJ	0.4 UJ

**FREQUENCY OF DETECTION SUMMARY**  
**GROUNDWATER - TAL METALS**  
**PHASE II - FIXED BASE LABORATORY**  
**RI/FS CTO-0356**  
**OPERABLE UNIT NO. 16 (SITE 89)**  
**MCB CAMP LEJEUNE, NORTH CAROLINA**

SAMPLE ID PHASE DATE SAMPLED	Minimum Non-Detect	Maximum Non-Detect	Minimum Detected	Maximum Detected	Location of Maximum Detect	Frequency of Detection	Arithmetic Mean Positive Detects	Median Positive Detects
<b>TOTAL METALS (ug/L)</b>								
ALUMINUM, TOTAL	31.7 U	75.1 U	ND	ND		0/14	--	--
ANTIMONY, TOTAL	1.9 U	1.9 U	2	2.2	IR89-MW03DW-01	2/14	2.1	2.1
ARSENIC, TOTAL	2.7 U	2.7 U	ND	ND		0/14	--	--
BARIUM, TOTAL	NA	NA	2.5	23.1	IR89-MW05-01	14/14	9.91	7.65
BERYLLIUM, TOTAL	0.3 U	0.3 U	ND	ND		0/14	--	--
CADMIUM, TOTAL	0.4 U	0.4 U	ND	ND		0/14	--	--
CALCIUM, TOTAL	NA	NA	33200	92800	IR89-MW03IW-01	14/14	59657.14	54500
CHROMIUM, TOTAL	0.5 U	0.5 U	0.5	0.88	IR89-MW05-01	4/14	0.64	0.59
COBALT, TOTAL	0.5 U	0.5 U	ND	ND		0/14	--	--
COPPER, TOTAL	0.8 UJ	0.8 UJ	ND	ND		0/14	--	--
IRON, TOTAL	13.4 U	13.4 U	30.7	20000 J	IR89-MW05-01	13/14	3029.74	386
LEAD, TOTAL	1.4 U	1.4 U	ND	ND		0/14	--	--
MAGNESIUM, TOTAL	NA	NA	1280	26400	IR89-MW08DW-01	14/14	6006.43	3100
MANGANESE, TOTAL	NA	NA	9.8	379	IR89-MW05-01	14/14	58.72	22.25
MERCURY, TOTAL	0.1 U	0.1 U	ND	ND		0/14	--	--
NICKEL, TOTAL	0.7 U	1.5 U	0.83	1	IR89-MW08DW-01	2/14	0.92	0.92
POTASSIUM, TOTAL	NA	NA	1170 J	25700	IR89-MW08DW-01	14/14	7504.29	3180
SELENIUM, TOTAL	2.2 U	2.2 U	2.4	2.7	IR89-MW05DW-01	2/14	2.55	2.55
SILVER, TOTAL	0.5 U	0.5 U	ND	ND		0/14	--	--
SODIUM, TOTAL	NA	NA	6300	96400	IR89-MW06DW-01	11/11	30478.18	10900
THALLIUM, TOTAL	3 U	3 U	ND	ND		0/14	--	--
VANADIUM, TOTAL	0.7 U	0.7 U	0.75	1.1	IR89-MW03IW-01,IR89-MW03DW-01	7/14	0.95	1
ZINC, TOTAL	0.4 UJ	0.4 UJ	ND	ND		0/14	--	--

**SITE 89 SURFACE WATER - ORGANICS**

**FREQUENCY OF DETECTION SUMMARY**  
**SURFACE WATER - VOLATILE ORGANICS**  
**PHASE I - MOBILE LABORATORY AND FIXED BASE LABORATORY**  
**RI/FS CTO-0356**  
**OPERABLE UNIT NO. 16 (SITE 89)**  
**MCB CAMP LEJEUNE, NORTH CAROLINA**

SAMPLE ID	IR89-EC-SW01-01	IR89-EC-SW02-01	IR89-EC-SW03-01	IR89-EC-SW04-01	IR89-EC-SW05-01	IR89-EC-SW06-01
PHASE	PHASE I	PHASE I	PHASE I	PHASE I	PHASE I	PHASE I
DATE SAMPLED	07/27/96	07/27/96	07/27/96	07/26/96	07/26/96	8/1/96
<b>VOLATILES (ug/l)</b>						
1,1,1-TRICHLOROETHANE	10 U	10 U	10 U	10 U	10 U	0.1 U
1,1,2,2-TETRACHLOROETHANE	10 UJ	150 J	130 J	72	80	NA
1,1,2-TRICHLOROETHANE	10 U	10 U	10 U	10 U	10 U	NA
1,1-DICHLOROETHANE	10 U	10 U	10 U	10 U	10 U	NA
1,1-DICHLOROETHENE	10 U	10 U	10 U	10 U	10 U	NA
1,2-DICHLOROETHANE	10 U	10 U	10 U	10 U	10 U	NA
1,2-DICHLOROETHENE (TOTAL)	10 U	120	100	80	78	NA
1,2-DICHLOROPROPANE	10 U	10 U	10 U	10 U	10 U	NA
2-BUTANONE	10 UJ	10 UJ	10 UJ	10 UJ	10 UJ	NA
2-HEXANONE	10 UJ	10 UJ	10 UJ	10 UJ	10 UJ	NA
4-METHYL-2-PENTANONE	10 UJ	10 UJ	10 UJ	10 UJ	10 UJ	NA
ACETONE	10 UJ	10 UJ	10 UJ	10 UJ	10 UJ	NA
BENZENE	10 U	10 U	10 U	10 U	10 U	NA
BROMODICHLOROMETHANE	10 U	10 U	10 U	10 U	10 U	NA
BROMOFORM	10 U	10 U	10 U	10 U	10 U	NA
BROMOMETHANE	10 U	10 U	10 U	10 U	10 U	NA
CARBON DISULFIDE	10 U	10 U	10 U	10 U	10 U	NA
CARBON TETRACHLORIDE	10 U	10 U	10 U	10 U	10 U	0.1 U
CHLOROBENZENE	10 U	10 U	10 U	10 U	10 U	NA
CHLOROETHANE	10 U	10 U	10 U	10 U	10 U	NA
CHLOROFORM	10 U	10 U	10 U	10 U	10 U	1 U
CHLOROMETHANE	10 U	10 U	10 U	10 U	10 U	NA
CIS-1,2-DICHLOROETHENE	2	48	44	52	44	1 U
CIS-1,3-DICHLOROPROPENE	10 U	10 U	10 U	10 U	10 U	NA
DIBROMOCHLOROMETHANE	10 U	10 U	10 U	10 U	10 U	NA
ETHYLBENZENE	10 U	10 U	10 U	10 U	10 U	NA
METHYLENE CHLORIDE	10 U	10 U	10 U	10 U	10 U	NA



**FREQUENCY OF DETECTION SUMMARY**  
**SURFACE WATER - VOLATILE ORGANICS**  
**PHASE I - MOBILE LABORATORY AND FIXED BASE LABORATORY**  
**RI/FS CTO-0356**  
**OPERABLE UNIT NO. 16 (SITE 89)**  
**MCB CAMP LEJEUNE, NORTH CAROLINA**

SAMPLE ID	IR89-EC-SW01-01	IR89-EC-SW02-01	IR89-EC-SW03-01	IR89-EC-SW04-01	IR89-EC-SW05-01	IR89-EC-SW06-01
PHASE	PHASE I	PHASE I	PHASE I	PHASE I	PHASE I	PHASE I
DATE SAMPLED	07/27/96	07/27/96	07/27/96	07/26/96	07/26/96	8/1/96
<b>VOLATILES (ug/l) (cont)</b>						
STYRENE	10 U	10 U	10 U	10 U	10 U	NA
TETRACHLOROETHENE	10 U	10 U	10 U	10 U	10 U	0.1 U
TOLUENE	10 U	10 U	10 U	10 U	10 U	NA
TRANS-1,2-DICHLOROETHENE	1 U	37	31	19	15	1 U
TRANS-1,3-DICHLOROPROPENE	10 U	10 U	10 U	10 U	10 U	NA
TRICHLOROETHENE	3 J	18	16	26	24	0.1 U
VINYL CHLORIDE	10 U	25	21	10 U	10 U	50 U
XYLENE (TOTAL)	10 U	10 U	10 U	10 U	10 U	NA

**FREQUENCY OF DETECTION SUMMARY**  
**SURFACE WATER - VOLATILE ORGANICS**  
**PHASE I - MOBILE LABORATORY AND FIXED BASE LABORATORY**  
**R/FS CTO-0356**  
**OPERABLE UNIT NO. 16 (SITE 89)**  
**MCB CAMP LEJEUNE, NORTH CAROLINA**

SAMPLE ID	IR89-EC-SW07-01	IR89-EC-SW08-01	IR89-EC-SW09-01	IR89-EC-SW10-01	IR89-EC-SW11-01
PHASE	PHASE I	PHASE I	PHASE I	PHASE I	PHASE I
DATE SAMPLED	8/1/96	8/1/96	8/15/96	8/15/96	8/15/96
<b>VOLATILES (ug/l)</b>					
1,1,1-TRICHLOROETHANE	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
1,1,2,2-TETRACHLOROETHANE	NA	NA	NA	NA	NA
1,1,2-TRICHLOROETHANE	NA	NA	NA	NA	NA
1,1-DICHLOROETHANE	NA	NA	NA	NA	NA
1,1-DICHLOROETHENE	NA	NA	NA	NA	NA
1,2-DICHLOROETHANE	NA	NA	NA	NA	NA
1,2-DICHLOROETHENE (TOTAL)	NA	NA	NA	NA	NA
1,2-DICHLOROPROPANE	NA	NA	NA	NA	NA
2-BUTANONE	NA	NA	NA	NA	NA
2-HEXANONE	NA	NA	NA	NA	NA
4-METHYL-2-PENTANONE	NA	NA	NA	NA	NA
ACETONE	NA	NA	NA	NA	NA
BENZENE	NA	NA	NA	NA	NA
BROMODICHLOROMETHANE	NA	NA	NA	NA	NA
BROMOFORM	NA	NA	NA	NA	NA
BROMOMETHANE	NA	NA	NA	NA	NA
CARBON DISULFIDE	NA	NA	NA	NA	NA
CARBON TETRACHLORIDE	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
CHLOROBENZENE	NA	NA	NA	NA	NA
CHLOROETHANE	NA	NA	NA	NA	NA
CHLOROFORM	1 U	1 U	0.4	0.4	0.4
CHLOROMETHANE	NA	NA	NA	NA	NA
CIS-1,2-DICHLOROETHENE	27	1 U	44	43	43
CIS-1,3-DICHLOROPROPENE	NA	NA	NA	NA	NA
DIBROMOCHLOROMETHANE	NA	NA	NA	NA	NA
ETHYLBENZENE	NA	NA	NA	NA	NA
METHYLENE CHLORIDE	NA	NA	NA	NA	NA

**FREQUENCY OF DETECTION SUMMARY**  
**SURFACE WATER - VOLATILE ORGANICS**  
**PHASE I - MOBILE LABORATORY AND FIXED BASE LABORATORY**  
**RI/FS CTO-0356**  
**OPERABLE UNIT NO. 16 (SITE 89)**  
**MCB CAMP LEJEUNE, NORTH CAROLINA**

SAMPLE ID	IR89-EC-SW07-01	IR89-EC-SW08-01	IR89-EC-SW09-01	IR89-EC-SW10-01	IR89-EC-SW11-01
PHASE	PHASE I	PHASE I	PHASE I	PHASE I	PHASE I
DATE SAMPLED	8/1/96	8/1/96	8/15/96	8/15/96	8/15/96
<b>VOLATILES (ug/l) (cont)</b>					
STYRENE	NA	NA	NA	NA	NA
TETRACHLOROETHENE	1.2	0.4	0.2	0.1	0.2
TOLUENE	NA	NA	NA	NA	NA
TRANS-1,2-DICHLOROETHENE	21	1 U	16	15	14
TRANS-1,3-DICHLOROPROPENE	NA	NA	NA	NA	NA
TRICHLOROETHENE	14.8	0.1 U	28.5	27.9	27.6
VINYL CHLORIDE	50 U	50 U	50 U	50 U	50 U
XYLENE (TOTAL)	NA	NA	NA	NA	NA

**FREQUENCY OF DETECTION SUMMARY**  
**SURFACE WATER - VOLATILE ORGANICS**  
**PHASE I - MOBILE LABORATORY AND FIXED BASE LABORATORY**  
**R/FS CTO-0356**  
**OPERABLE UNIT NO. 16 (SITE 89)**  
**MCB CAMP LEJEUNE, NORTH CAROLINA**

SAMPLE ID PHASE DATE SAMPLED	Minimum Non-Detect	Maximum Non-Detect	Minimum Detected	Maximum Detected	Location of Maximum Detect	Frequency of Detection	Arithmetic Mean Positive Detects	Median Positive Detects
<b>VOLATILES (ug/l)</b>								
1,1,1-TRICHLOROETHANE	0.1 U	10 U	ND	ND		0/11	--	--
1,1,2,2-TETRACHLOROETHANE	10 UJ	10 UJ	72	150 J	IR89-EC-SW02-01	4/5	108	105
1,1,2-TRICHLOROETHANE	10 U	10 U	ND	ND		0/5	--	--
1,1-DICHLOROETHANE	10 U	10 U	ND	ND		0/5	--	--
1,1-DICHLOROETHENE	10 U	10 U	ND	ND		0/5	--	--
1,2-DICHLOROETHANE	10 U	10 U	ND	ND		0/5	--	--
1,2-DICHLOROETHENE (TOTAL)	10 U	10 U	78	120	IR89-EC-SW02-01	4/5	94.5	90
1,2-DICHLOROPROPANE	10 U	10 U	ND	ND		0/5	--	--
2-BUTANONE	10 UJ	10 UJ	ND	ND		0/5	--	--
2-HEXANONE	10 UJ	10 UJ	ND	ND		0/5	--	--
4-METHYL-2-PENTANONE	10 UJ	10 UJ	ND	ND		0/5	--	--
ACETONE	10 UJ	10 UJ	ND	ND		0/5	--	--
BENZENE	10 U	10 U	ND	ND		0/5	--	--
BROMODICHLOROMETHANE	10 U	10 U	ND	ND		0/5	--	--
BROMOFORM	10 U	10 U	ND	ND		0/5	--	--
BROMOMETHANE	10 U	10 U	ND	ND		0/5	--	--
CARBON DISULFIDE	10 U	10 U	ND	ND		0/5	--	--
CARBON TETRACHLORIDE	0.1 U	10 U	ND	ND		0/11	--	--
CHLOROBENZENE	10 U	10 U	ND	ND		0/5	--	--
CHLOROETHANE	10 U	10 U	ND	ND		0/5	--	--
CHLOROFORM	1 U	10 U	0.4	0.4	IR89-EC-SW09-01, IR89-EC-SW10-01, IR89-EC-SW11-01	3/11	0.4	0.4
CHLOROMETHANE	10 U	10 U	ND	ND		0/5	--	--
CIS-1,2-DICHLOROETHENE	1 U	1 U	2	52	IR89-EC-SW04-01	9/11	38.56	44
CIS-1,3-DICHLOROPROPENE	10 U	10 U	ND	ND		0/5	--	--
DIBROMOCHLOROMETHANE	10 U	10 U	ND	ND		0/5	--	--
ETHYLBENZENE	10 U	10 U	ND	ND		0/5	--	--
METHYLENE CHLORIDE	10 U	10 U	ND	ND		0/5	--	--

**FREQUENCY OF DETECTION SUMMARY**  
**SURFACE WATER - VOLATILE ORGANICS**  
**PHASE I - MOBILE LABORATORY AND FIXED BASE LABORATORY**  
**RI/FS CTO-0356**  
**OPERABLE UNIT NO. 16 (SITE 89)**  
**MCB CAMP LEJEUNE, NORTH CAROLINA**

SAMPLE ID PHASE DATE SAMPLED	Minimum Non-Detect	Maximum Non-Detect	Minimum Detected	Maximum Detected	Location of Maximum Detect	Frequency of Detection	Arithmetic Mean Positive Detects	Median Positive Detects
<b>VOLATILES (ug/l) (cont)</b>								
STYRENE	10 U	10 U	ND	ND		0/5	--	--
TETRACHLOROETHENE	0.1 U	10 U	0.1	1.2	IR89-EC-SW07-01	5/11	0.42	0.2
TOLUENE	10 U	10 U	ND	ND		0/5	--	--
TRANS-1,2-DICHLOROETHENE	1 U	1 U	14	37	IR89-EC-SW02-01	8/11	21	17.5
TRANS-1,3-DICHLOROPROPENE	10 U	10 U	ND	ND		0/5	--	--
TRICHLOROETHENE	0.1 U	0.1 U	3 J	28.5	IR89-EC-SW09-01	9/11	20.64	24
VINYL CHLORIDE	10 U	50 U	21	25	IR89-EC-SW02-01	2/11	23	23
XYLENE (TOTAL)	10 U	10 U	ND	ND		0/5	--	--

**FREQUENCY OF DETECTION SUMMARY**  
**SURFACE WATER - SEMIVOLATILE ORGANICS, PESTICIDES/PCBs**  
**PHASE I - FIXED BASE LABORATORY**  
**RI/FS CTO-0356**  
**OPERABLE UNIT NO. 16 (SITE 89)**  
**MCB CAMP LEJEUNE, NORTH CAROLINA**

SAMPLE ID	IR89-EC-SW01-01	IR89-EC-SW02-01	IR89-EC-SW03-01	IR89-EC-SW04-01	IR89-EC-SW05-01
PHASE	PHASE I	PHASE I	PHASE I	PHASE I	PHASE I
DATE SAMPLED	07/27/96	07/27/96	07/27/96	07/26/96	07/26/96
<b>SEMIVOLATILES (ug/l)</b>					
1,2,4-TRICHLOROBENZENE	10 U	10 U	10 U	10 U	11 U
1,2-DICHLOROBENZENE	10 U	10 U	10 U	10 U	11 U
1,3-DICHLOROBENZENE	10 U	10 U	10 U	10 U	11 U
1,4-DICHLOROBENZENE	10 U	10 U	10 U	10 U	11 U
2,2'-OXYBIS(1-CHLOROPROPANE)	10 U	10 U	10 U	10 U	11 U
2,4,5-TRICHLOROPHENOL	25 U	26 U	25 U	26 U	28 U
2,4,6-TRICHLOROPHENOL	10 U	10 U	10 U	10 U	11 U
2,4-DICHLOROPHENOL	10 U	10 U	10 U	10 U	11 U
2,4-DIMETHYLPHENOL	10 UJ	10 UJ	10 UJ	10 UJ	11 UJ
2,4-DINITROPHENOL	25 U	26 U	25 U	26 U	28 U
2,4-DINITROTOLUENE	10 U	10 U	10 U	10 U	11 U
2,6-DINITROTOLUENE	10 U	10 U	10 U	10 U	11 U
2-CHLORONAPHTHALENE	10 U	10 U	10 U	10 U	11 U
2-CHLOROPHENOL	10 U	10 U	10 U	10 U	11 U
2-METHYLNAPHTHALENE	10 U	10 U	10 U	10 U	11 U
2-METHYLPHENOL	10 U	10 U	10 U	10 U	11 U
2-NITROANILINE	25 U	26 U	25 U	26 U	28 U
2-NITROPHENOL	10 U	10 U	10 U	10 U	11 U
3,3'-DICHLOROBENZIDINE	10 UJ	10 UJ	10 UJ	10 UJ	11 UJ
3-NITROANILINE	25 U	26 U	25 U	26 U	28 U
4,6-DINITRO-2-METHYLPHENOL	25 UJ	26 UJ	25 UJ	26 UJ	28 UJ
4-BROMOPHENYL-PHENYLETHER	10 U	10 U	10 U	10 U	11 U
4-CHLORO-3-METHYLPHENOL	10 U	10 U	10 U	10 U	11 U
4-CHLOROANILINE	10 U	10 U	10 U	10 U	11 U
4-CHLOROPHENYL-PHENYLETHER	10 U	10 U	10 U	10 U	11 U
4-METHYLPHENOL	10 U	10 U	10 U	10 U	11 U
4-NITROANILINE	25 UJ	26 UJ	25 UJ	26 UJ	28 UJ
4-NITROPHENOL	25 U	26 U	25 U	26 U	28 U
ACENAPHTHENE	10 U	10 U	10 U	10 U	11 U
ACENAPHTHYLENE	10 U	10 U	10 U	10 U	11 U
ANTHRACENE	10 U	10 U	10 U	10 U	11 U
BENZO(A)ANTHRACENE	10 U	10 U	10 U	10 U	11 U

**FREQUENCY OF DETECTION SUMMARY**  
**SURFACE WATER - SEMIVOLATILE ORGANICS, PESTICIDES/PCBs**  
**PHASE I - FIXED BASE LABORATORY**  
**RI/FS CTO-0356**  
**OPERABLE UNIT NO. 16 (SITE 89)**  
**MCB CAMP LEJEUNE, NORTH CAROLINA**

SAMPLE ID	IR89-EC-SW01-01	IR89-EC-SW02-01	IR89-EC-SW03-01	IR89-EC-SW04-01	IR89-EC-SW05-01
PHASE	PHASE I	PHASE I	PHASE I	PHASE I	PHASE I
DATE SAMPLED	07/27/96	07/27/96	07/27/96	07/26/96	07/26/96
<b>SEMIVOLATILES (ug/l) (cont)</b>					
BENZO(A)PYRENE	10 U	10 U	10 U	10 U	11 U
BENZO(B)FLUORANTHENE	10 U	10 U	10 U	10 U	11 U
BENZO(G,H,I)PERYLENE	10 U	10 U	10 U	10 U	11 U
BENZO(K)FLUORANTHENE	10 U	10 U	10 U	10 U	11 U
BIS(2-CHLOROETHOXY)METHANE	10 U	10 U	10 U	10 U	11 U
BIS(2-CHLOROETHYL)ETHER	10 U	10 U	10 U	10 U	11 U
BIS(2-ETHYLHEXYL)PHTHALATE	10 U	13 U	10 U	10 U	11 U
BUTYLBENZYLPHTHALATE	10 U	10 U	10 U	10 U	11 U
CARBAZOLE	10 U	10 U	10 U	10 U	11 U
CHRYSENE	10 U	10 U	10 U	10 U	11 U
DIBENZO(A,H)ANTHRACENE	10 U	10 U	10 U	10 U	11 U
DIBENZOFURAN	10 U	10 U	10 U	10 U	11 U
DIETHYLPHTHALATE	10 U	10 U	10 U	10 U	11 U
DIMETHYLPHTHALATE	10 U	10 U	10 U	10 U	11 U
DI-N-BUTYLPHTHALATE	10 U	10 U	10 U	10 U	11 U
DI-N-OCTYLPHTHALATE	10 U	10 U	10 U	10 U	11 U
FLUORANTHENE	10 U	10 U	10 U	10 U	11 U
FLUORENE	10 U	10 U	10 U	10 U	11 U
HEXACHLOROBENZENE	10 U	10 U	10 U	10 U	11 U
HEXACHLOROBUTADIENE	10 U	10 U	10 U	10 U	11 U
HEXACHLOROCYCLOPENTADIENE	10 U	10 U	10 U	10 U	11 U
HEXACHLOROETHANE	10 U	10 U	10 U	10 U	11 U
INDENO(1,2,3-CD)PYRENE	10 U	10 U	10 U	10 U	11 U
ISOPHORONE	10 U	10 U	10 U	10 U	11 U
NAPHTHALENE	10 U	10 U	10 U	10 U	11 U
NITROBENZENE	10 U	10 U	10 U	10 U	11 U
N-NITROSO-DI-N-PROPYLAMINE	10 U	10 U	10 U	10 U	11 U
N-NITROSODIPHENYLAMINE (1)	10 U	10 U	10 U	10 U	11 U
PENTACHLOROPHENOL	25 UJ	26 UJ	25 UJ	26 UJ	28 UJ
PHENANTHRENE	10 U	10 U	10 U	10 U	11 U
PHENOL	10 U	10 U	10 U	10 U	11 U
PYRENE	10 U	10 U	10 U	10 U	11 U

**FREQUENCY OF DETECTION SUMMARY**  
**SURFACE WATER - SEMIVOLATILE ORGANICS, PESTICIDES/PCBs**  
**PHASE I - FIXED BASE LABORATORY**  
**RI/FS CTO-0356**  
**OPERABLE UNIT NO. 16 (SITE 89)**  
**MCB CAMP LEJEUNE, NORTH CAROLINA**

SAMPLE ID	IR89-EC-SW01-01	IR89-EC-SW02-01	IR89-EC-SW03-01	IR89-EC-SW04-01	IR89-EC-SW05-01
PHASE	PHASE I	PHASE I	PHASE I	PHASE I	PHASE I
DATE SAMPLED	07/27/96	07/27/96	07/27/96	07/26/96	07/26/96
<b>PESTICIDES/PCBS (ug/l)</b>					
4,4'-DDD	NA	NA	NA	NA	0.11 UJ
4,4'-DDE	NA	NA	NA	NA	0.11 UJ
4,4'-DDT	NA	NA	NA	NA	0.11 UJ
ALDRIN	NA	NA	NA	NA	0.054 UJ
ALPHA-BHC	NA	NA	NA	NA	0.054 UJ
ALPHA-CHLORDANE	NA	NA	NA	NA	0.054 UJ
AROCLOR-1016	NA	NA	NA	NA	1.1 UJ
AROCLOR-1221	NA	NA	NA	NA	2.2 UJ
AROCLOR-1232	NA	NA	NA	NA	1.1 UJ
AROCLOR-1242	NA	NA	NA	NA	1.1 UJ
AROCLOR-1248	NA	NA	NA	NA	1.1 UJ
AROCLOR-1254	NA	NA	NA	NA	1.1 UJ
AROCLOR-1260	NA	NA	NA	NA	1.1 UJ
BETA-BHC	NA	NA	NA	NA	0.054 UJ
DELTA-BHC	NA	NA	NA	NA	0.054 UJ
DIELDRIN	NA	NA	NA	NA	0.11 UJ
ENDOSULFAN I	NA	NA	NA	NA	0.054 UJ
ENDOSULFAN II	NA	NA	NA	NA	0.11 UJ
ENDOSULFAN SULFATE	NA	NA	NA	NA	0.11 UJ
ENDRIN	NA	NA	NA	NA	0.11 UJ
ENDRIN ALDEHYDE	NA	NA	NA	NA	0.11 UJ
ENDRIN KETONE	NA	NA	NA	NA	0.11 UJ
GAMMA-BHC (LINDANE)	NA	NA	NA	NA	0.054 UJ
GAMMA-CHLORDANE	NA	NA	NA	NA	0.054 UJ
HEPTACHLOR	NA	NA	NA	NA	0.054 UJ
HEPTACHLOR EPOXIDE	NA	NA	NA	NA	0.054 UJ
METHOXYCHLOR	NA	NA	NA	NA	0.54 UJ
TOXAPHENE	NA	NA	NA	NA	5.4 UJ



**FREQUENCY OF DETECTION SUMMARY**  
**SURFACE WATER - SEMIVOLATILE ORGANICS, PESTICIDES/PCBs**  
**PHASE I - FIXED BASE LABORATORY**  
**RI/FS CTO-0356**  
**OPERABLE UNIT NO. 16 (SITE 89)**  
**MCB CAMP LEJEUNE, NORTH CAROLINA**

SAMPLE ID PHASE DATE SAMPLED	Minimum Non-Detect	Maximum Non-Detect	Minimum Detected	Maximum Detected	Location of Maximum Detect	Frequency of Detection	Arithmetic Mean Positive Detects	Median Positive Detects
<b>SEMIVOLATILES (ug/l)</b>								
1,2,4-TRICHLOROBENZENE	10 U	11 U	ND	ND		0/5	--	--
1,2-DICHLOROBENZENE	10 U	11 U	ND	ND		0/5	--	--
1,3-DICHLOROBENZENE	10 U	11 U	ND	ND		0/5	--	--
1,4-DICHLOROBENZENE	10 U	11 U	ND	ND		0/5	--	--
2,2'-OXYBIS(1-CHLOROPROPANE)	10 U	11 U	ND	ND		0/5	--	--
2,4,5-TRICHLOROPHENOL	25 U	28 U	ND	ND		0/5	--	--
2,4,6-TRICHLOROPHENOL	10 U	11 U	ND	ND		0/5	--	--
2,4-DICHLOROPHENOL	10 U	11 U	ND	ND		0/5	--	--
2,4-DIMETHYLPHENOL	10 UJ	11 UJ	ND	ND		0/5	--	--
2,4-DINITROPHENOL	25 U	28 U	ND	ND		0/5	--	--
2,4-DINITROTOLUENE	10 U	11 U	ND	ND		0/5	--	--
2,6-DINITROTOLUENE	10 U	11 U	ND	ND		0/5	--	--
2-CHLORONAPHTHALENE	10 U	11 U	ND	ND		0/5	--	--
2-CHLOROPHENOL	10 U	11 U	ND	ND		0/5	--	--
2-METHYLNAPHTHALENE	10 U	11 U	ND	ND		0/5	--	--
2-METHYLPHENOL	10 U	11 U	ND	ND		0/5	--	--
2-NITROANILINE	25 U	28 U	ND	ND		0/5	--	--
2-NITROPHENOL	10 U	11 U	ND	ND		0/5	--	--
3,3'-DICHLOROBENZIDINE	10 UJ	11 UJ	ND	ND		0/5	--	--
3-NITROANILINE	25 U	28 U	ND	ND		0/5	--	--
4,6-DINITRO-2-METHYLPHENOL	25 UJ	28 UJ	ND	ND		0/5	--	--
4-BROMOPHENYL-PHENYLETHER	10 U	11 U	ND	ND		0/5	--	--
4-CHLORO-3-METHYLPHENOL	10 U	11 U	ND	ND		0/5	--	--
4-CHLOROANILINE	10 U	11 U	ND	ND		0/5	--	--
4-CHLOROPHENYL-PHENYLETHER	10 U	11 U	ND	ND		0/5	--	--
4-METHYLPHENOL	10 U	11 U	ND	ND		0/5	--	--
4-NITROANILINE	25 UJ	28 UJ	ND	ND		0/5	--	--
4-NITROPHENOL	25 U	28 U	ND	ND		0/5	--	--
ACENAPHTHENE	10 U	11 U	ND	ND		0/5	--	--
ACENAPHTHYLENE	10 U	11 U	ND	ND		0/5	--	--
ANTHRACENE	10 U	11 U	ND	ND		0/5	--	--
BENZO(A)ANTHRACENE	10 U	11 U	ND	ND		0/5	--	--

**FREQUENCY OF DETECTION SUMMARY**  
**SURFACE WATER - SEMIVOLATILE ORGANICS, PESTICIDES/PCBs**  
**PHASE I - FIXED BASE LABORATORY**  
**RI/FS CTO-0356**  
**OPERABLE UNIT NO. 16 (SITE 89)**  
**MCB CAMP LEJEUNE, NORTH CAROLINA**

SAMPLE ID PHASE DATE SAMPLED	Minimum Non-Detect	Maximum Non-Detect	Minimum Detected	Maximum Detected	Location of Maximum Detect	Frequency of Detection	Arithmetic Mean Positive Detects	Median Positive Detects
<b>SEMIVOLATILES (ug/l) (cont)</b>								
BENZO(A)PYRENE	10 U	11 U	ND	ND		0/5	--	--
BENZO(B)FLUORANTHENE	10 U	11 U	ND	ND		0/5	--	--
BENZO(G,H,I)PERYLENE	10 U	11 U	ND	ND		0/5	--	--
BENZO(K)FLUORANTHENE	10 U	11 U	ND	ND		0/5	--	--
BIS(2-CHLOROETHOXY)METHANE	10 U	11 U	ND	ND		0/5	--	--
BIS(2-CHLOROETHYL)ETHER	10 U	11 U	ND	ND		0/5	--	--
BIS(2-ETHYLHEXYL)PHTHALATE	10 U	13 U	ND	ND		0/5	--	--
BUTYLBENZYLPHTHALATE	10 U	11 U	ND	ND		0/5	--	--
CARBAZOLE	10 U	11 U	ND	ND		0/5	--	--
CHRYSENE	10 U	11 U	ND	ND		0/5	--	--
DIBENZO(A,H)ANTHRACENE	10 U	11 U	ND	ND		0/5	--	--
DIBENZOFURAN	10 U	11 U	ND	ND		0/5	--	--
DIETHYLPHTHALATE	10 U	11 U	ND	ND		0/5	--	--
DIMETHYLPHTHALATE	10 U	11 U	ND	ND		0/5	--	--
DI-N-BUTYLPHTHALATE	10 U	11 U	ND	ND		0/5	--	--
DI-N-OCTYLPHTHALATE	10 U	11 U	ND	ND		0/5	--	--
FLUORANTHENE	10 U	11 U	ND	ND		0/5	--	--
FLUORENE	10 U	11 U	ND	ND		0/5	--	--
HEXACHLOROBENZENE	10 U	11 U	ND	ND		0/5	--	--
HEXACHLOROBUTADIENE	10 U	11 U	ND	ND		0/5	--	--
HEXACHLOROCYCLOPENTADIENE	10 U	11 U	ND	ND		0/5	--	--
HEXACHLOROETHANE	10 U	11 U	ND	ND		0/5	--	--
INDENO(1,2,3-CD)PYRENE	10 U	11 U	ND	ND		0/5	--	--
ISOPHORONE	10 U	11 U	ND	ND		0/5	--	--
NAPHTHALENE	10 U	11 U	ND	ND		0/5	--	--
NITROBENZENE	10 U	11 U	ND	ND		0/5	--	--
N-NITROSO-DI-N-PROPYLAMINE	10 U	11 U	ND	ND		0/5	--	--
N-NITROSODIPHENYLAMINE (1)	10 U	11 U	ND	ND		0/5	--	--
PENTACHLOROPHENOL	25 UJ	28 UJ	ND	ND		0/5	--	--
PHENANTHRENE	10 U	11 U	ND	ND		0/5	--	--
PHENOL	10 U	11 U	ND	ND		0/5	--	--
PYRENE	10 U	11 U	ND	ND		0/5	--	--

**FREQUENCY OF DETECTION SUMMARY**  
**SURFACE WATER - SEMIVOLATILE ORGANICS, PESTICIDES/PCBS**  
**PHASE I - FIXED BASE LABORATORY**  
**RI/FS CTO-0356**  
**OPERABLE UNIT NO. 16 (SITE 89)**  
**MCB CAMP LEJEUNE, NORTH CAROLINA**

SAMPLE ID PHASE DATE SAMPLED	Minimum Non-Detect	Maximum Non-Detect	Minimum Detected	Maximum Detected	Location of Maximum Detect	Frequency of Detection	Arithmetic Mean Positive Detects	Median Positive Detects
<b>PESTICIDES/PCBS (ug/l)</b>								
4,4'-DDD	0.11 UJ	0.11 UJ	ND	ND		0/1	--	--
4,4'-DDE	0.11 UJ	0.11 UJ	ND	ND		0/1	--	--
4,4'-DDT	0.11 UJ	0.11 UJ	ND	ND		0/1	--	--
ALDRIN	0.054 UJ	0.054 UJ	ND	ND		0/1	--	--
ALPHA-BHC	0.054 UJ	0.054 UJ	ND	ND		0/1	--	--
ALPHA-CHLORDANE	0.054 UJ	0.054 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	--	--
BETA-BHC	0.054 UJ	0.054 UJ	ND	ND		0/1	--	--
DELTA-BHC	0.054 UJ	0.054 UJ	ND	ND		0/1	--	--
DIELDRIN	0.11 UJ	0.11 UJ	ND	ND		0/1	--	--
ENDOSULFAN I	0.054 UJ	0.054 UJ	ND	ND		0/1	--	--
ENDOSULFAN II	0.11 UJ	0.11 UJ	ND	ND		0/1	--	--
ENDOSULFAN SULFATE	0.11 UJ	0.11 UJ	ND	ND		0/1	--	--
ENDRIN	0.11 UJ	0.11 UJ	ND	ND		0/1	--	--
ENDRIN ALDEHYDE	0.11 UJ	0.11 UJ	ND	ND		0/1	--	--
ENDRIN KETONE	0.11 UJ	0.11 UJ	ND	ND		0/1	--	--
GAMMA-BHC (LINDANE)	0.054 UJ	0.054 UJ	ND	ND		0/1	--	--
GAMMA-CHLORDANE	0.054 UJ	0.054 UJ	ND	ND		0/1	--	--
HEPTACHLOR	0.054 UJ	0.054 UJ	ND	ND		0/1	--	--
HEPTACHLOR EPOXIDE	0.054 UJ	0.054 UJ	ND	ND		0/1	--	--
METHOXYCHLOR	0.54 UJ	0.54 UJ	ND	ND		0/1	--	--
TOXAPHENE	5.4 UJ	5.4 UJ	ND	ND		0/1	--	--

**SITE 89 SURFACE WATER - INORGANICS**

**FREQUENCY OF DETECTION SUMMARY**  
**SURFACE WATER - TAL METALS**  
**PHASE I - MOBILE LABORATORY AND FIXED BASE LABORATORY**  
**RI/FS CTO-0356**  
**OPERABLE UNIT NO. 16 (SITE 89)**  
**MCB CAMP LEJEUNE, NORTH CAROLINA**

SAMPLE ID	IR89-EC-SW01-01	IR89-EC-SW0201	IR89-EC-SW03-01	IR89-EC-SW04-01	IR89-EC-SW05-01
PHASE	PHASE I	PHASE I	PHASE I	PHASE I	PHASE I
DATE SAMPLED	07/27/96	07/27/96	07/27/96	07/26/96	07/26/96
<b>TOTAL METALS (ug/l)</b>					
ALUMINUM, TOTAL	41.8	189	201	554	275
ANTIMONY, TOTAL	14.4 U	14.4 U	14.4 U	18.5	14.4 U
ARSENIC, TOTAL	1.4 U	1.4 U	1.4 U	1.4 U	1.4 U
BARIUM, TOTAL	17.9	23.6	25	22.4	20.6
BERYLLIUM, TOTAL	0.7 U	0.7 U	0.7 U	0.7 U	0.7 U
CADMIUM, TOTAL	2.6 U	2.6 U	2.6 U	2.6 U	2.6 U
CALCIUM, TOTAL	42500	46300	46900	41800	37300
CHROMIUM, TOTAL	3.3 U	3.3 U	3.3 U	3.6	3.3 U
COBALT, TOTAL	3.6 U	3.6 U	3.6 U	3.6 U	3.6 U
COPPER, TOTAL	2.6	3.9	2 U	4.7	5.7 U
IRON, TOTAL	803	1500	1510	1570	1220
LEAD, TOTAL	1.2 U	1.2 U	5.4	3.8	1.3 J
MAGNESIUM, TOTAL	3560	2560	2480	2450	2200
MANGANESE, TOTAL	28.2	50.4	47.9	31.9	25.7
MERCURY, TOTAL	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
NICKEL, TOTAL	8.7 UJ	8.7 UJ	8.7 UJ	8.7 UJ	8.7 U
POTASSIUM, TOTAL	4270	2530	2300	2890	2240
SELENIUM, TOTAL	1.8 U	1.8 U	1.8 U	1.8 U	1.8 U
SILVER, TOTAL	3.1 U	3.1 U	3.1 U	3.1 U	3.1 U
SODIUM, TOTAL	38500	16600	15900	13400	11500
THALLIUM, TOTAL	1.5 U	1.5 U	1.5 U	1.5 U	1.5 U
VANADIUM, TOTAL	2.5 U	2.8	2.5 U	4.2	2.5 U
ZINC, TOTAL	17.2	13.3	9.2	17.7	9.3

**FREQUENCY OF DETECTION SUMMARY**  
**SURFACE WATER - TAL METALS**  
**PHASE I - MOBILE LABORATORY AND FIXED BASE LABORATORY**  
**RI/FS CTO-0356**  
**OPERABLE UNIT NO. 16 (SITE 89)**  
**MCB CAMP LEJEUNE, NORTH CAROLINA**

SAMPLE ID PHASE DATE SAMPLED	Minimum Non-Detect	Maximum Non-Detect	Minimum Detected	Maximum Detected	Location of Maximum Detect	Frequency of Detection	Arithmetic Mean Positive Detects	Median Positive Detects
<b>TOTAL METALS (ug/l)</b>								
ALUMINUM, TOTAL	NA	NA	41.8	554	IR89-EC-SW04-01	5/5	252.16	201
ANTIMONY, TOTAL	14.4 U	14.4 U	18.5	18.5	IR89-EC-SW04-01	1/5	18.5	18.5
ARSENIC, TOTAL	1.4 U	1.4 U	ND	ND		0/5	--	--
BARIUM, TOTAL	NA	NA	17.9	25	IR89-EC-SW03-01	5/5	21.9	22.4
BERYLLIUM, TOTAL	0.7 U	0.7 U	ND	ND		0/5	--	--
CADMIUM, TOTAL	2.6 U	2.6 U	ND	ND		0/5	--	--
CALCIUM, TOTAL	NA	NA	37300	46900	IR89-EC-SW03-01	5/5	42960	42500
CHROMIUM, TOTAL	3.3 U	3.3 U	3.6	3.6	IR89-EC-SW04-01	1/5	3.6	3.6
COBALT, TOTAL	3.6 U	3.6 U	ND	ND		0/5	--	--
COPPER, TOTAL	2 U	5.7 U	2.6	4.7	IR89-EC-SW04-01	3/5	3.73	3.9
IRON, TOTAL	NA	NA	803	1570	IR89-EC-SW04-01	5/5	1320.6	1500
LEAD, TOTAL	1.2 U	1.2 U	1.3	5.4	IR89-EC-SW03-01	3/5	3.5	3.8
MAGNESIUM, TOTAL	NA	NA	2200	3560	IR89-EC-SW01-01	5/5	2650	2480
MANGANESE, TOTAL	NA	NA	25.7	50.4	IR89-EC-SW0201	5/5	36.82	31.9
MERCURY, TOTAL	0.1 U	0.1 U	ND	ND		0/5	--	--
NICKEL, TOTAL	8.7 U	8.7 U	ND	ND		0/5	--	--
POTASSIUM, TOTAL	NA	NA	2240	4270	IR89-EC-SW01-01	5/5	2846	2530
SELENIUM, TOTAL	1.8 U	1.8 U	ND	ND		0/5	--	--
SILVER, TOTAL	3.1 U	3.1 U	ND	ND		0/5	--	--
SODIUM, TOTAL	NA	NA	11500	38500	IR89-EC-SW01-01	5/5	19180	15900
THALLIUM, TOTAL	1.5 U	1.5 U	ND	ND		0/5	--	--
VANADIUM, TOTAL	2.5 U	2.5 U	2.8	4.2	IR89-EC-SW04-01	2/5	3.5	3.5
ZINC, TOTAL	NA	NA	9.2	17.7	IR89-EC-SW04-01	5/5	13.34	13.3

**SITE 89 SEDIMENT - ORGANICS**

**FREQUENCY OF DETECTION SUMMARY**  
**SEDIMENT - VOLATILE ORGANICS**  
**PHASE I - MOBILE LABORATORY AND FIXED BASE LABORATORY**  
**RI/FS CTO-0356**  
**OPERABLE UNIT NO. 16 (SITE 89)**  
**MCB CAMP LEJEUNE, NORTH CAROLINA**

SAMPLE ID	IR89-EC-SD01-06	IR89-EC-SD01-612	IR89-EC-SD02-06	IR89-EC-SD02-612	IR89-EC-SD03-06	IR89-EC-SD03-612
PHASE	PHASE I	PHASE I	PHASE I	PHASE I	PHASE I	PHASE I
DATE SAMPLED	07/27/96	07/27/96	07/27/96	07/27/96	07/27/96	07/27/96
DEPTH	0-6"	6-12"	0-6"	6-12"	0-6"	6-12"
<b>VOLATILES (ug/kg)</b>						
1,1,1-TRICHLOROETHANE	13 U	14 U	13 U	12 U	12 U	12 U
1,1,2,2-TETRACHLOROETHANE	13 U	14 U	13 U	12 U	1700	550
1,1,2-TRICHLOROETHANE	13 U	14 U	13 U	12 U	19	13
1,1-DICHLOROETHANE	13 U	14 U	13 U	12 U	12 U	12 U
1,1-DICHLOROETHENE	13 UJ	14 UJ	13 UJ	12 UJ	12 UJ	37 J
1,2-DICHLOROETHANE	13 U	14 U	13 U	12 U	12 U	12 U
1,2-DICHLOROETHENE (TOTAL)	13 U	14 U	13 U	12 U	1600	1500
1,2-DICHLOROPROPANE	13 U	14 U	13 U	12 U	12 U	12 U
2-BUTANONE	13 UJ	14 UJ	13 UJ	12 UJ	12 UJ	12 UJ
2-HEXANONE	13 U	14 U	13 U	12 U	12 U	12 U
4-METHYL-2-PENTANONE	13 U	14 U	13 U	12 U	12 U	12 U
ACETONE	13 UJ	14 UJ	13 UJ	12 UJ	12 UJ	12 UJ
BENZENE	13 U	14 U	13 U	12 U	12 U	12 U
BROMODICHLOROMETHANE	13 U	14 U	13 U	12 U	12 U	12 U
BROMOFORM	13 UJ	14 UJ	13 UJ	12 UJ	12 UJ	12 UJ
BROMOMETHANE	13 U	14 U	13 U	12 U	12 U	12 U
CARBON DISULFIDE	13 UJ	14 UJ	13 UJ	12 UJ	12 UJ	12 UJ
CARBON TETRACHLORIDE	13 U	14 U	13 U	12 U	12 U	12 U
CHLOROBENZENE	13 U	14 U	13 U	12 U	12 U	12 U
CHLOROETHANE	13 U	14 U	13 U	12 U	12 U	12 U
CHLOROFORM	13 U	14 U	13 U	12 U	12 U	12 U
CHLOROMETHANE	13 U	14 U	13 U	12 U	12 U	12 U
CIS-1,2-DICHLOROETHENE	NA	NA	NA	NA	NA	NA
CIS-1,3-DICHLOROPROPENE	13 U	14 U	13 U	12 U	12 U	12 U
DIBROMOCHLOROMETHANE	13 U	14 U	13 U	12 U	12 U	12 U
ETHYLBENZENE	13 U	14 U	13 U	12 U	12 U	12 U
METHYLENE CHLORIDE	13 U	14 U	13 U	12 U	12 U	12 U
STYRENE	13 U	14 U	13 U	12 U	12 U	12 U
TETRACHLOROETHENE	13 U	14 U	13 U	12 U	12 U	12 U



**FREQUENCY OF DETECTION SUMMARY**  
**SEDIMENT - VOLATILE ORGANICS**  
**PHASE I - MOBILE LABORATORY AND FIXED BASE LABORATORY**  
**R/FS CTO-0356**  
**OPERABLE UNIT NO. 16 (SITE 89)**  
**MCB CAMP LEJEUNE, NORTH CAROLINA**

SAMPLE ID	IR89-EC-SD01-06	IR89-EC-SD01-612	IR89-EC-SD02-06	IR89-EC-SD02-612	IR89-EC-SD03-06	IR89-EC-SD03-612
PHASE	PHASE I	PHASE I	PHASE I	PHASE I	PHASE I	PHASE I
DATE SAMPLED	07/27/96	07/27/96	07/27/96	07/27/96	07/27/96	07/27/96
DEPTH	0-6"	6-12"	0-6"	6-12"	0-6"	6-12"
<b>VOLATILES (ug/kg) (cont)</b>						
TOLUENE	13 U	14 U	13 U	12 U	7 J	12 U
TRANS-1,2-DICHLOROETHENE	NA	NA	NA	NA	NA	NA
TRANS-1,3-DICHLOROPROPENE	13 U	14 U	13 U	12 U	12 U	12 U
TRICHLOROETHENE	13 U	14 U	13 U	12 U	2400	120
VINYL CHLORIDE	13 U	14 U	13 U	12 U	35	230
XYLENE (TOTAL)	13 U	14 U	13 U	12 U	12 U	12 U

**FREQUENCY OF DETECTION SUMMARY**  
**SEDIMENT - VOLATILE ORGANICS**  
**PHASE I - MOBILE LABORATORY AND FIXED BASE LABORATORY**  
**RI/FS CTO-0356**  
**OPERABLE UNIT NO. 16 (SITE 89)**  
**MCB CAMP LEJEUNE, NORTH CAROLINA**

SAMPLE ID	IR89-EC-SD04-06	IR89-EC-SD04-612	IR89-EC-SD05-06	IR89-EC-SD05-612	IR89-EC-SD09-06	IR89-EC-SD09-612
PHASE	PHASE I	PHASE I	PHASE I	PHASE I	PHASE I	PHASE I
DATE SAMPLED	07/26/96	07/26/96	07/26/96	07/26/96	8/15/96	8/15/96
DEPTH	0-6"	6-12"	0-6"	6-12"	0-6"	6-12"
<b>VOLATILES (ug/kg)</b>						
1,1,1-TRICHLOROETHANE	12 U	20 U	12 U	12 U	0.1 U	0.1 U
1,1,2,2-TETRACHLOROETHANE	12 U	20 U	12 U	12 U	NA	NA
1,1,2-TRICHLOROETHANE	12 U	20 U	12 U	12 U	NA	NA
1,1-DICHLOROETHANE	12 U	20 U	12 U	12 U	NA	NA
1,1-DICHLOROETHENE	12 UJ	20 UJ	12 UJ	12 U	NA	NA
1,2-DICHLOROETHANE	12 U	20 U	12 U	12 U	NA	NA
1,2-DICHLOROETHENE (TOTAL)	12 U	20 U	12 U	12 U	NA	NA
1,2-DICHLOROPROPANE	12 U	20 U	12 U	12 U	NA	NA
2-BUTANONE	12 UJ	20 UJ	12 UJ	12 U	NA	NA
2-HEXANONE	12 U	20 U	12 U	12 U	NA	NA
4-METHYL-2-PENTANONE	12 U	20 U	12 U	12 U	NA	NA
ACETONE	12 UJ	20 UJ	12 UJ	12 U	NA	NA
BENZENE	12 U	20 U	12 U	12 U	NA	NA
BROMODICHLOROMETHANE	12 U	20 U	12 U	12 U	NA	NA
BROMOFORM	12 UJ	20 UJ	12 UJ	12 U	NA	NA
BROMOMETHANE	12 U	20 U	12 U	12 U	NA	NA
CARBON DISULFIDE	12 UJ	20 UJ	12 UJ	12 UJ	NA	NA
CARBON TETRACHLORIDE	12 U	20 U	12 U	12 U	0.1 U	0.1 U
CHLOROBENZENE	12 U	20 U	12 U	12 U	NA	NA
CHLOROETHANE	12 U	20 U	12 U	12 U	NA	NA
CHLOROFORM	12 U	20 U	12 U	12 U	0.1 U	0.1 U
CHLOROMETHANE	12 U	20 U	12 U	12 U	NA	NA
CIS-1,2-DICHLOROETHENE	NA	NA	NA	NA	5	1 U
CIS-1,3-DICHLOROPROPENE	12 U	20 U	12 U	12 U	NA	NA
DIBROMOCHLOROMETHANE	12 U	20 U	12 U	12 U	NA	NA
ETHYLBENZENE	12 U	20 U	12 U	12 U	NA	NA
METHYLENE CHLORIDE	12 U	20 U	12 U	12 UJ	NA	NA
STYRENE	12 U	20 U	12 U	12 U	NA	NA
TETRACHLOROETHENE	12 U	20 U	12 U	12 U	0.1 U	0.1 U

**FREQUENCY OF DETECTION SUMMARY**  
**SEDIMENT - VOLATILE ORGANICS**  
**PHASE I - MOBILE LABORATORY AND FIXED BASE LABORATORY**  
**RI/FS CTO-0356**  
**OPERABLE UNIT NO. 16 (SITE 89)**  
**MCB CAMP LEJEUNE, NORTH CAROLINA**

SAMPLE ID	IR89-EC-SD04-06	IR89-EC-SD04-612	IR89-EC-SD05-06	IR89-EC-SD05-612	IR89-EC-SD09-06	IR89-EC-SD09-612
PHASE	PHASE I	PHASE I	PHASE I	PHASE I	PHASE I	PHASE I
DATE SAMPLED	07/26/96	07/26/96	07/26/96	07/26/96	8/15/96	8/15/96
DEPTH	0-6"	6-12"	0-6"	6-12"	0-6"	6-12"
<b>VOLATILES (ug/kg) (cont)</b>						
TOLUENE	12 U	20 U	12 U	12 U	NA	NA
TRANS-1,2-DICHLOROETHENE	NA	NA	NA	NA	1	1 U
TRANS-1,3-DICHLOROPROPENE	12 U	20 U	12 U	12 U	NA	NA
TRICHLOROETHENE	12 U	20 U	12 U	12 U	2.2	0.1 U
VINYL CHLORIDE	12 U	20 U	12 U	12 U	100 U	100 U
XYLENE (TOTAL)	12 U	20 U	12 U	12 U	NA	NA

**FREQUENCY OF DETECTION SUMMARY**  
**SEDIMENT - VOLATILE ORGANICS**  
**PHASE I - MOBILE LABORATORY AND FIXED BASE LABORATORY**  
**RI/FS CTO-0356**  
**OPERABLE UNIT NO. 16 (SITE 89)**  
**MCB CAMP LEJEUNE, NORTH CAROLINA**

SAMPLE ID	IR89-EC-SD10-06	IR89-EC-SD10-612	IR89-EC-SD11-06	IR89-EC-SD11-612
PHASE	PHASE I	PHASE I	PHASE I	PHASE I
DATE SAMPLED	8/15/96	8/15/96	8/15/96	8/15/96
DEPTH	0-6"	6-12"	0-6"	6-12"
<b>VOLATILES (ug/kg)</b>				
1,1,1-TRICHLOROETHANE	0.1 U	0.1 U	0.1 U	0.1 U
1,1,2,2-TETRACHLOROETHANE	NA	NA	NA	NA
1,1,2-TRICHLOROETHANE	NA	NA	NA	NA
1,1-DICHLOROETHANE	NA	NA	NA	NA
1,1-DICHLOROETHENE	NA	NA	NA	NA
1,2-DICHLOROETHANE	NA	NA	NA	NA
1,2-DICHLOROETHENE (TOTAL)	NA	NA	NA	NA
1,2-DICHLOROPROPANE	NA	NA	NA	NA
2-BUTANONE	NA	NA	NA	NA
2-HEXANONE	NA	NA	NA	NA
4-METHYL-2-PENTANONE	NA	NA	NA	NA
ACETONE	NA	NA	NA	NA
BENZENE	NA	NA	NA	NA
BROMODICHLOROMETHANE	NA	NA	NA	NA
BROMOFORM	NA	NA	NA	NA
BROMOMETHANE	NA	NA	NA	NA
CARBON DISULFIDE	NA	NA	NA	NA
CARBON TETRACHLORIDE	0.1 U	0.1 U	0.1 U	0.1 U
CHLOROBENZENE	NA	NA	NA	NA
CHLOROETHANE	NA	NA	NA	NA
CHLOROFORM	0.1 U	0.1 U	0.1 U	0.1 U
CHLOROMETHANE	NA	NA	NA	NA
CIS-1,2-DICHLOROETHENE	16	1 U	1 U	1 U
CIS-1,3-DICHLOROPROPENE	NA	NA	NA	NA
DIBROMOCHLOROMETHANE	NA	NA	NA	NA
ETHYLBENZENE	NA	NA	NA	NA
METHYLENE CHLORIDE	NA	NA	NA	NA
STYRENE	NA	NA	NA	NA
TETRACHLOROETHENE	0.1 U	0.1 U	0.1 U	0.1 U

**FREQUENCY OF DETECTION SUMMARY**  
**SEDIMENT - VOLATILE ORGANICS**  
**PHASE I - MOBILE LABORATORY AND FIXED BASE LABORATORY**  
**R/FS CTO-0356**  
**OPERABLE UNIT NO. 16 (SITE 89)**  
**MCB CAMP LEJEUNE, NORTH CAROLINA**

SAMPLE ID	IR89-EC-SD10-06	IR89-EC-SD10-612	IR89-EC-SD11-06	IR89-EC-SD11-612
PHASE	PHASE I	PHASE I	PHASE I	PHASE I
DATE SAMPLED	8/15/96	8/15/96	8/15/96	8/15/96
DEPTH	0-6"	6-12"	0-6"	6-12"
<b>VOLATILES (ug/kg) (cont)</b>				
TOLUENE	NA	NA	NA	NA
TRANS-1,2-DICHLOROETHENE	5	1 U	1 U	1 U
TRANS-1,3-DICHLOROPROPENE	NA	NA	NA	NA
TRICHLOROETHENE	11.3	0.6	0.9	0.3
VINYL CHLORIDE	100 U	100 U	100 U	100 U
XYLENE (TOTAL)	NA	NA	NA	NA

**FREQUENCY OF DETECTION SUMMARY**  
**SEDIMENT - VOLATILE ORGANICS**  
**PHASE I - MOBILE LABORATORY AND FIXED BASE LABORATORY**  
**RI/FS CTO-0356**  
**OPERABLE UNIT NO. 16 (SITE 89)**  
**MCB CAMP LEJEUNE, NORTH CAROLINA**

SAMPLE ID PHASE DATE SAMPLED DEPTH	Minimum Non-Detect	Maximum Non-Detect	Minimum Detected	Maximum Detected	Location of Maximum Detect	Frequency of Detection	Arithmetic Mean Positive Detects	Median Positive Detects
<b>VOLATILES (ug/kg)</b>								
1,1,1-TRICHLOROETHANE	0.1 U	20 U	ND	ND		0/16	--	--
1,1,2,2-TETRACHLOROETHANE	12 U	20 U	550	1700	IR89-EC-SD03-06	2/10	1125	1125
1,1,2-TRICHLOROETHANE	12 U	20 U	13	19	IR89-EC-SD03-06	2/10	16	16
1,1-DICHLOROETHANE	12 U	20 U	ND	ND		0/10	--	--
1,1-DICHLOROETHENE	12 U	20 UJ	37 J	37 J	IR89-EC-SD03-612	1/10	37	37
1,2-DICHLOROETHANE	12 U	20 U	ND	ND		0/10	--	--
1,2-DICHLOROETHENE (TOTAL)	12 U	20 U	1500	1600	IR89-EC-SD03-06	2/10	1550	1550
1,2-DICHLOROPROPANE	12 U	20 U	ND	ND		0/10	--	--
2-BUTANONE	12 U	20 UJ	ND	ND		0/10	--	--
2-HEXANONE	12 U	20 U	ND	ND		0/10	--	--
4-METHYL-2-PENTANONE	12 U	20 U	ND	ND		0/10	--	--
ACETONE	12 U	20 UJ	ND	ND		0/10	--	--
BENZENE	12 U	20 U	ND	ND		0/10	--	--
BROMODICHLOROMETHANE	12 U	20 U	ND	ND		0/10	--	--
BROMOFORM	12 U	20 UJ	ND	ND		0/10	--	--
BROMOMETHANE	12 U	20 U	ND	ND		0/10	--	--
CARBON DISULFIDE	12 UJ	20 UJ	ND	ND		0/10	--	--
CARBON TETRACHLORIDE	0.1 U	20 U	ND	ND		0/16	--	--
CHLOROBENZENE	12 U	20 U	ND	ND		0/10	--	--
CHLOROETHANE	12 U	20 U	ND	ND		0/10	--	--
CHLOROFORM	0.1 U	20 U	ND	ND		0/16	--	--
CHLOROMETHANE	12 U	20 U	ND	ND		0/10	--	--
CIS-1,2-DICHLOROETHENE	1 U	1 U	5	16	IR89-EC-SD10-06	2/6	10.5	10.5
CIS-1,3-DICHLOROPROPENE	12 U	20 U	ND	ND		0/10	--	--
DIBROMOCHLOROMETHANE	12 U	20 U	ND	ND		0/10	--	--
ETHYLBENZENE	12 U	20 U	ND	ND		0/10	--	--
METHYLENE CHLORIDE	12 UJ	20 U	ND	ND		0/10	--	--
STYRENE	12 U	20 U	ND	ND		0/10	--	--
TETRACHLOROETHENE	0.1 U	20 U	ND	ND		0/16	--	--

**FREQUENCY OF DETECTION SUMMARY**  
**SEDIMENT - VOLATILE ORGANICS**  
**PHASE I - MOBILE LABORATORY AND FIXED BASE LABORATORY**  
**R/FS CTO-0356**  
**OPERABLE UNIT NO. 16 (SITE 89)**  
**MCB CAMP LEJEUNE, NORTH CAROLINA**

SAMPLE ID	Minimum	Maximum	Minimum	Maximum	Location of	Frequency	Arithmetic Mean	Median
PHASE	Non-Detect	Non-Detect	Detected	Detected	Maximum Detect	of Detection	Positive Detects	Positive Detects
DATE SAMPLED								
DEPTH								
<b>VOLATILES (ug/kg) (cont)</b>								
TOLUENE	12 U	20 U	7 J	7 J	IR89-EC-SD03-06	1/10	7	7
TRANS-1,2-DICHLOROETHENE	1 U	1 U	1	5	IR89-EC-SD10-06	2/6	3	3
TRANS-1,3-DICHLOROPROPENE	12 U	20 U	ND	ND		0/10	--	--
TRICHLOROETHENE	0.1 U	20 U	0.3	2400	IR89-EC-SD03-06	7/16	362.19	2.2
VINYL CHLORIDE	12 U	100 U	35	230	IR89-EC-SD03-612	2/16	132.5	132.5
XYLENE (TOTAL)	12 U	20 U	ND	ND		0/10	--	--

**FREQUENCY OF DETECTION SUMMARY**  
**SEDIMENT - SEMIVOLATILE ORGANICS, PESTICIDES/PCBs**  
**PHASE I - FIXED BASE LABORATORY**  
**RI/FS CTO-0356**  
**OPERABLE UNIT NO. 16 (SITE 89)**  
**MCB CAMP LEJEUNE, NORTH CAROLINA**

SAMPLE ID	IR89-EC-SD01-06	IR89-EC-SD01-612	IR89-EC-SD02-06	IR89-EC-SD02-612	IR89-EC-SD03-06	IR89-EC-SD03-612
PHASE	PHASE I	PHASE I	PHASE I	PHASE I	PHASE I	PHASE I
DATE SAMPLED	07/27/96	07/27/96	07/27/96	07/27/96	07/27/96	07/27/96
DEPTH	0-6"	6-12"	0-6"	6-12"	0-6"	6-12"
<b>SEMIVOLATILES (ug/kg)</b>						
1,2,4-TRICHLOROBENZENE	410 U	440 U	430 U	410 U	410 U	380 U
1,2-DICHLOROBENZENE	410 U	440 U	430 U	410 U	410 U	380 U
1,3-DICHLOROBENZENE	410 U	440 U	430 U	410 U	410 U	380 U
1,4-DICHLOROBENZENE	410 U	440 U	430 U	410 U	410 U	380 U
2,2'-OXYBIS(1-CHLOROPROPANE)	410 U	440 U	430 U	410 U	410 U	380 U
2,4,5-TRICHLOROPHENOL	1000 U	1100 U	1100 U	1000 U	1000 U	960 U
2,4,6-TRICHLOROPHENOL	410 U	440 U	430 U	410 U	410 U	380 U
2,4-DICHLOROPHENOL	410 U	440 U	430 U	410 U	410 U	380 U
2,4-DIMETHYLPHENOL	410 U	440 U	430 U	410 U	410 U	380 U
2,4-DINITROPHENOL	1000 UJ	1100 UJ	1100 UJ	1000 UJ	1000 UJ	960 UJ
2,4-DINITROTOLUENE	410 U	440 U	430 U	410 U	470 UJ	380 U
2,6-DINITROTOLUENE	410 U	440 U	430 U	410 U	410 U	380 U
2-CHLORONAPHTHALENE	410 U	440 U	430 U	410 U	410 U	380 U
2-CHLOROPHENOL	410 U	440 U	430 U	410 U	410 U	380 U
2-METHYLNAPHTHALENE	410 U	440 U	430 U	410 U	410 U	380 U
2-METHYLPHENOL	410 U	440 U	430 U	410 U	410 U	380 U
2-NITROANILINE	1000 U	1100 U	1100 U	1000 U	1000 U	960 U
2-NITROPHENOL	410 U	440 U	430 U	410 U	410 U	380 U
3,3'-DICHLOROBENZIDINE	410 U	440 U	430 U	410 U	410 U	380 U
3-NITROANILINE	1000 UJ	1100 UJ	1100 U	1000 UJ	1000 UJ	960 UJ
4,6-DINITRO-2-METHYLPHENOL	1000 U	1100 U	1100 U	1000 U	1000 U	960 U
4-BROMOPHENYL-PHENYLETHER	410 U	440 U	430 U	410 U	410 U	380 U
4-CHLORO-3-METHYLPHENOL	410 U	440 U	430 U	410 U	410 U	380 U
4-CHLOROANILINE	410 U	440 U	430 U	410 U	410 U	380 U
4-CHLOROPHENYL-PHENYLETHER	410 U	440 U	430 U	410 U	410 U	380 U
4-METHYLPHENOL	410 U	440 U	430 U	410 U	410 U	380 U
4-NITROANILINE	1000 UJ	1100 U	1100 U	1000 U	1000 U	960 U
4-NITROPHENOL	1000 U	1100 U	1100 U	1000 U	1000 U	960 U
ACENAPHTHENE	410 U	440 U	430 U	410 U	410 U	380 U



**FREQUENCY OF DETECTION SUMMARY**  
**SEDIMENT - SEMIVOLATILE ORGANICS, PESTICIDES/PCBs**  
**PHASE I - FIXED BASE LABORATORY**  
**RI/FS CTO-0356**  
**OPERABLE UNIT NO. 16 (SITE 89)**  
**MCB CAMP LEJEUNE, NORTH CAROLINA**

SAMPLE ID	IR89-EC-SD01-06	IR89-EC-SD01-612	IR89-EC-SD02-06	IR89-EC-SD02-612	IR89-EC-SD03-06	IR89-EC-SD03-612
PHASE	PHASE I	PHASE I	PHASE I	PHASE I	PHASE I	PHASE I
DATE SAMPLED	07/27/96	07/27/96	07/27/96	07/27/96	07/27/96	07/27/96
DEPTH	0-6"	6-12"	0-6"	6-12"	0-6"	6-12"
<b>SEMIVOLATILES (ug/kg) (cont)</b>						
ACENAPHTHYLENE	410 U	440 U	430 U	410 U	410 U	380 U
ANTHRACENE	410 U	440 U	430 U	410 U	410 U	380 U
BENZO(A)ANTHRACENE	410 U	440 U	430 U	58 J	410 U	380 U
BENZO(A)PYRENE	410 U	440 U	430 U	75 J	410 U	380 U
BENZO(B)FLUORANTHENE	53 J	440 U	430 U	140 J	410 U	40 J
BENZO(G,H,I)PERYLENE	50 J	440 U	430 U	410 U	410 U	380 U
BENZO(K)FLUORANTHENE	410 U	440 U	430 U	50 J	410 U	380 U
BIS(2-CHLOROETHOXY)METHANE	410 U	440 U	430 U	410 U	410 U	380 U
BIS(2-CHLOROETHYL)ETHER	410 U	440 U	430 U	410 U	410 U	380 U
BIS(2-ETHYLHEXYL)PHTHALATE	360 J	97 J	150 J	130 J	140 J	90 J
BUTYLBENZYLPHthalate	410 U	440 U	430 U	410 U	410 U	380 U
CARBAZOLE	410 UJ	440 U	430 U	410 U	410 U	380 U
CHRYSENE	410 U	440 U	51 J	95 J	410 U	380 U
DIBENZO(A,H)ANTHRACENE	410 U	440 U	430 U	410 U	410 U	380 U
DIBENZOFURAN	410 U	440 U	430 U	410 U	410 U	380 U
DIETHYLPHthalate	410 U	440 U	430 U	410 U	410 U	380 U
DIMETHYLPHthalate	410 U	440 U	430 U	410 U	410 U	380 U
DI-N-BUTYLPHthalate	410 U	440 U	430 U	410 U	410 U	380 U
DI-N-OCTYLPHthalate	410 U	440 U	430 U	410 U	410 U	380 U
FLUORANTHENE	68 J	440 U	59 J	81 J	410 U	380 U
FLUORENE	410 U	440 U	430 U	410 U	410 U	380 U
HEXACHLOROBENZENE	410 U	440 U	430 U	410 U	410 U	380 U
HEXACHLOROBUTADIENE	410 U	440 U	430 U	410 U	410 U	380 U
HEXACHLOROCYCLOPENTADIENE	410 U	440 U	430 U	410 U	410 U	380 U
HEXACHLOROETHANE	410 U	440 U	430 U	410 U	410 U	380 U
INDENO(1,2,3-CD)PYRENE	410 U	440 U	430 U	410 U	410 U	380 U
ISOPHORONE	410 U	440 U	430 U	410 U	410 U	380 U

**FREQUENCY OF DETECTION SUMMARY**  
**SEDIMENT - SEMIVOLATILE ORGANICS, PESTICIDES/PCBs**  
**PHASE I - FIXED BASE LABORATORY**  
**RI/FS CTO-0356**  
**OPERABLE UNIT NO. 16 (SITE 89)**  
**MCB CAMP LEJEUNE, NORTH CAROLINA**

SAMPLE ID	IR89-EC-SD01-06	IR89-EC-SD01-612	IR89-EC-SD02-06	IR89-EC-SD02-612	IR89-EC-SD03-06	IR89-EC-SD03-612
PHASE	PHASE I	PHASE I	PHASE I	PHASE I	PHASE I	PHASE I
DATE SAMPLED	07/27/96	07/27/96	07/27/96	07/27/96	07/27/96	07/27/96
DEPTH	0-6"	6-12"	0-6"	6-12"	0-6"	6-12"
<b>SEMIVOLATILES (ug/kg) (cont)</b>						
NAPHTHALENE	410 U	440 U	430 U	410 U	410 U	380 U
NITROBENZENE	410 U	440 UJ	430 UJ	410 UJ	410 UJ	380 UJ
N-NITROSO-DI-N-PROPYLAMINE	410 U	440 U	430 U	410 U	410 U	380 U
N-NITROSODIPHENYLAMINE (1)	410 U	440 U	430 U	410 U	410 U	380 U
PENTACHLOROPHENOL	1000 U	1100 U	1100 U	1000 U	1000 U	960 U
PHENANTHRENE	50 J	440 U	430 U	44 J	42 J	380 U
PHENOL	410 U	440 U	430 U	410 U	410 U	380 U
PYRENE	50 J	440 U	85 J	140 J	410 U	52 J

**FREQUENCY OF DETECTION SUMMARY**  
**SEDIMENT - SEMIVOLATILE ORGANICS, PESTICIDES/PCBs**  
**PHASE I - FIXED BASE LABORATORY**  
**RI/FS CTO-0356**  
**OPERABLE UNIT NO. 16 (SITE 89)**  
**MCB CAMP LEJEUNE, NORTH CAROLINA**

SAMPLE ID	IR89-EC-SD01-06	IR89-EC-SD01-612	IR89-EC-SD02-06	IR89-EC-SD02-612	IR89-EC-SD03-06	IR89-EC-SD03-612
PHASE	PHASE I	PHASE I	PHASE I	PHASE I	PHASE I	PHASE I
DATE SAMPLED	07/27/96	07/27/96	07/27/96	07/27/96	07/27/96	07/27/96
DEPTH	0-6"	6-12"	0-6"	6-12"	0-6"	6-12"
<b>PESTICIDES/PCBS (ug/kg)</b>						
4,4'-DDD	NA	NA	NA	NA	NA	NA
4,4'-DDE	NA	NA	NA	NA	NA	NA
4,4'-DDT	NA	NA	NA	NA	NA	NA
ALDRIN	NA	NA	NA	NA	NA	NA
ALPHA-BHC	NA	NA	NA	NA	NA	NA
ALPHA-CHLORDANE	NA	NA	NA	NA	NA	NA
AROCLOR-1016	NA	NA	NA	NA	NA	NA
AROCLOR-1221	NA	NA	NA	NA	NA	NA
AROCLOR-1232	NA	NA	NA	NA	NA	NA
AROCLOR-1242	NA	NA	NA	NA	NA	NA
AROCLOR-1248	NA	NA	NA	NA	NA	NA
AROCLOR-1254	NA	NA	NA	NA	NA	NA
AROCLOR-1260	NA	NA	NA	NA	NA	NA
BETA-BHC	NA	NA	NA	NA	NA	NA
DELTA-BHC	NA	NA	NA	NA	NA	NA
DIELDRIN	NA	NA	NA	NA	NA	NA
ENDOSULFAN I	NA	NA	NA	NA	NA	NA
ENDOSULFAN II	NA	NA	NA	NA	NA	NA
ENDOSULFAN SULFATE	NA	NA	NA	NA	NA	NA
ENDRIN	NA	NA	NA	NA	NA	NA
ENDRIN ALDEHYDE	NA	NA	NA	NA	NA	NA
ENDRIN KETONE	NA	NA	NA	NA	NA	NA
GAMMA-BHC (LINDANE)	NA	NA	NA	NA	NA	NA
GAMMA-CHLORDANE	NA	NA	NA	NA	NA	NA
HEPTACHLOR	NA	NA	NA	NA	NA	NA
HEPTACHLOR EPOXIDE	NA	NA	NA	NA	NA	NA
METHOXYCHLOR	NA	NA	NA	NA	NA	NA
TOXAPHENE	NA	NA	NA	NA	NA	NA

**FREQUENCY OF DETECTION SUMMARY**  
**SEDIMENT - SEMIVOLATILE ORGANICS, PESTICIDES/PCBs**  
**PHASE I - FIXED BASE LABORATORY**  
**RI/FS CTO-0356**  
**OPERABLE UNIT NO. 16 (SITE 89)**  
**MCB CAMP LEJEUNE, NORTH CAROLINA**

SAMPLE ID	IR89-EC-SD04-06	IR89-EC-SD04-612	IR89-EC-SD05-06	IR89-EC-SD05-612
PHASE	PHASE I	PHASE I	PHASE I	PHASE I
DATE SAMPLED	07/26/96	07/26/96	07/26/96	07/26/96
DEPTH	0-6"	6-12"	0-6"	6-12"
<b>SEMIVOLATILES (ug/kg)</b>				
1,2,4-TRICHLOROBENZENE	410 U	650 U	390 U	420 U
1,2-DICHLOROBENZENE	410 U	650 U	390 U	420 U
1,3-DICHLOROBENZENE	410 U	650 U	390 U	420 U
1,4-DICHLOROBENZENE	410 U	650 U	390 U	420 U
2,2'-OXYBIS(1-CHLOROPROPANE)	410 U	650 U	390 U	420 U
2,4,5-TRICHLOROPHENOL	1000 U	1600 U	970 U	1000 U
2,4,6-TRICHLOROPHENOL	410 U	650 U	390 U	420 U
2,4-DICHLOROPHENOL	410 U	650 U	390 U	420 U
2,4-DIMETHYLPHENOL	410 U	650 U	390 U	420 U
2,4-DINITROPHENOL	1000 UJ	1600 UJ	970 UJ	1000 UJ
2,4-DINITROTOLUENE	410 U	650 U	390 U	420 U
2,6-DINITROTOLUENE	410 U	650 U	390 U	420 U
2-CHLORONAPHTHALENE	410 U	650 U	390 U	420 U
2-CHLOROPHENOL	410 U	650 U	390 U	420 U
2-METHYLNAPHTHALENE	410 U	650 U	390 U	420 U
2-METHYLPHENOL	410 U	650 U	390 U	420 U
2-NITROANILINE	1000 U	1600 U	970 U	1000 U
2-NITROPHENOL	410 U	650 U	390 U	420 U
3,3'-DICHLOROBENZIDINE	410 U	650 U	390 U	420 U
3-NITROANILINE	1000 UJ	1600 UJ	970 UJ	1000 UJ
4,6-DINITRO-2-METHYLPHENOL	1000 U	1600 U	970 U	1000 U
4-BROMOPHENYL-PHENYLETHER	410 U	650 U	390 U	420 U
4-CHLORO-3-METHYLPHENOL	410 U	650 U	390 U	420 U
4-CHLOROANILINE	410 U	650 U	390 U	420 U
4-CHLOROPHENYL-PHENYLETHER	410 U	650 U	390 U	420 U
4-METHYLPHENOL	410 U	650 U	390 U	420 U
4-NITROANILINE	1000 UJ	1600 UJ	970 U	1000 U
4-NITROPHENOL	1000 U	1600 U	970 U	1000 U
ACENAPHTHENE	410 U	650 U	390 U	420 U

**FREQUENCY OF DETECTION SUMMARY**  
**SEDIMENT - SEMIVOLATILE ORGANICS, PESTICIDES/PCBs**  
**PHASE I - FIXED BASE LABORATORY**  
**RI/FS CTO-0356**  
**OPERABLE UNIT NO. 16 (SITE 89)**  
**MCB CAMP LEJEUNE, NORTH CAROLINA**

SAMPLE ID	IR89-EC-SD04-06	IR89-EC-SD04-612	IR89-EC-SD05-06	IR89-EC-SD05-612
PHASE	PHASE I	PHASE I	PHASE I	PHASE I
DATE SAMPLED	07/26/96	07/26/96	07/26/96	07/26/96
DEPTH	0-6"	6-12"	0-6"	6-12"
<b>SEMIVOLATILES (ug/kg) (cont)</b>				
ACENAPHTHYLENE	410 U	650 U	390 U	420 U
ANTHRACENE	410 U	650 U	390 U	420 U
BENZO(A)ANTHRACENE	48 J	650 U	390 U	420 U
BENZO(A)PYRENE	65 J	3100	390 U	420 U
BENZO(B)FLUORANTHENE	140 J	650 U	44 J	420 U
BENZO(G,H,I)PERYLENE	55 J	650 U	390 U	420 U
BENZO(K)FLUORANTHENE	51 J	650 U	390 U	420 U
BIS(2-CHLOROETHOXY)METHANE	410 U	650 U	390 U	420 U
BIS(2-CHLOROETHYL)ETHER	410 U	650 U	390 U	420 U
BIS(2-ETHYLHEXYL)PHTHALATE	240 J	88 J	110 J	13000
BUTYLBENZYLPHthalATE	410 U	650 U	390 U	420 U
CARBAZOLE	410 UJ	650 UJ	390 U	420 U
CHRYSENE	120 J	650 U	390 U	420 U
DIBENZO(A,H)ANTHRACENE	410 U	650 U	390 U	420 U
DIBENZOFURAN	410 U	650 U	390 U	420 U
DIETHYLPHthalATE	410 U	650 U	390 U	420 U
DIMETHYLPHthalATE	410 U	650 U	390 U	420 U
DI-N-BUTYLPHthalATE	410 U	650 U	390 U	420 U
DI-N-OCTYLPHthalATE	410 U	650 U	390 U	420 U
FLUORANTHENE	180 J	650 U	51 J	420 U
FLUORENE	410 U	650 U	390 U	420 U
HEXACHLOROBENZENE	410 U	650 U	390 U	420 U
HEXACHLOROBUTADIENE	410 U	650 U	390 U	420 U
HEXACHLOROCYCLOPENTADIENE	410 U	650 U	390 U	420 U
HEXACHLOROETHANE	410 U	650 U	390 U	420 U
INDENO(1,2,3-CD)PYRENE	59 J	650 U	390 U	420 U
ISOPHORONE	410 U	650 U	390 U	420 U

**FREQUENCY OF DETECTION SUMMARY**  
**SEDIMENT - SEMIVOLATILE ORGANICS, PESTICIDES/PCBs**  
**PHASE I - FIXED BASE LABORATORY**  
**RI/FS CTO-0356**  
**OPERABLE UNIT NO. 16 (SITE 89)**  
**MCB CAMP LEJEUNE, NORTH CAROLINA**

SAMPLE ID	IR89-EC-SD04-06	IR89-EC-SD04-612	IR89-EC-SD05-06	IR89-EC-SD05-612
PHASE	PHASE I	PHASE I	PHASE I	PHASE I
DATE SAMPLED	07/26/96	07/26/96	07/26/96	07/26/96
DEPTH	0-6"	6-12"	0-6"	6-12"
<b>SEMIVOLATILES (ug/kg) (cont)</b>				
NAPHTHALENE	410 U	650 U	390 U	420 U
NITROBENZENE	410 U	650 U	390 UJ	420 UJ
N-NITROSO-DI-N-PROPYLAMINE	410 U	650 U	390 U	420 U
N-NITROSODIPHENYLAMINE (1)	410 U	650 U	390 U	420 U
PENTACHLOROPHENOL	1000 U	1600 U	970 U	1000 U
PHENANTHRENE	100 J	650 U	390 U	420 U
PHENOL	410 U	650 U	390 U	420 U
PYRENE	130 J	650 U	63 J	51 J

FREQUENCY OF DETECTION SUMMARY  
 SEDIMENT - SEMIVOLATILE ORGANICS, PESTICIDES/PCBs  
 PHASE I - FIXED BASE LABORATORY  
 RI/FS CTO-0356  
 OPERABLE UNIT NO. 16 (SITE 89)  
 MCB CAMP LEJEUNE, NORTH CAROLINA

SAMPLE ID	IR89-EC-SD04-06	IR89-EC-SD04-612	IR89-EC-SD05-06	IR89-EC-SD05-612
PHASE	PHASE I	PHASE I	PHASE I	PHASE I
DATE SAMPLED	07/26/96	07/26/96	07/26/96	07/26/96
DEPTH	0-6"	6-12"	0-6"	6-12"
<b>PESTICIDES/PCBS (ug/kg)</b>				
4,4'-DDD	NA	NA	42 J	79
4,4'-DDE	NA	NA	33 J	44 J
4,4'-DDT	NA	NA	23 J	34
ALDRIN	NA	NA	2 UJ	2.1 U
ALPHA-BHC	NA	NA	2 UJ	2.1 U
ALPHA-CHLORDANE	NA	NA	2 J	2.9
AROCLOR-1016	NA	NA	39 U	42 U
AROCLOR-1221	NA	NA	78 U	84 U
AROCLOR-1232	NA	NA	39 U	42 U
AROCLOR-1242	NA	NA	39 U	42 U
AROCLOR-1248	NA	NA	39 U	42 U
AROCLOR-1254	NA	NA	39 U	42 U
AROCLOR-1260	NA	NA	39 U	42 U
BETA-BHC	NA	NA	2 UJ	2.1 U
DELTA-BHC	NA	NA	2 UJ	2.1 UJ
DIELDRIN	NA	NA	3.9 UJ	4.2 U
ENDOSULFAN I	NA	NA	2 UJ	2.1 U
ENDOSULFAN II	NA	NA	3.9 UJ	4.2 U
ENDOSULFAN SULFATE	NA	NA	3.9 UJ	4.2 U
ENDRIN	NA	NA	3.9 UJ	4.2 U
ENDRIN ALDEHYDE	NA	NA	3.9 UJ	4.2 U
ENDRIN KETONE	NA	NA	3.9 UJ	4.2 U
GAMMA-BHC (LINDANE)	NA	NA	2 UJ	2.1 U
GAMMA-CHLORDANE	NA	NA	1.6 J	4.6 J
HEPTACHLOR	NA	NA	2 UJ	2.1 U
HEPTACHLOR EPOXIDE	NA	NA	2 UJ	2.1 U
METHOXYCHLOR	NA	NA	20 UJ	21 UJ
TOXAPHENE	NA	NA	200 UJ	210 U

**FREQUENCY OF DETECTION SUMMARY**  
**SEDIMENT - SEMIVOLATILE ORGANICS, PESTICIDES/PCBs**  
**PHASE I - FIXED BASE LABORATORY**  
**RI/FS CTO-0356**  
**OPERABLE UNIT NO. 16 (SITE 89)**  
**MCB CAMP LEJEUNE, NORTH CAROLINA**

SAMPLE ID PHASE DATE SAMPLED DEPTH	Minimum Non-Detect	Maximum Non-Detect	Minimum Detected	Maximum Detected	Location of Maximum Detect	Frequency of Detection	Arithmetic Mean Positive Detects	Median Positive Detects
<b>SEMIVOLATILES (ug/kg)</b>								
1,2,4-TRICHLOROBENZENE	380 U	650 U	ND	ND		0/10	--	--
1,2-DICHLOROBENZENE	380 U	650 U	ND	ND		0/10	--	--
1,3-DICHLOROBENZENE	380 U	650 U	ND	ND		0/10	--	--
1,4-DICHLOROBENZENE	380 U	650 U	ND	ND		0/10	--	--
2,2'-OXYBIS(1-CHLOROPROPANE)	380 U	650 U	ND	ND		0/10	--	--
2,4,5-TRICHLOROPHENOL	960 U	1600 U	ND	ND		0/10	--	--
2,4,6-TRICHLOROPHENOL	380 U	650 U	ND	ND		0/10	--	--
2,4-DICHLOROPHENOL	380 U	650 U	ND	ND		0/10	--	--
2,4-DIMETHYLPHENOL	380 U	650 U	ND	ND		0/10	--	--
2,4-DINITROPHENOL	960 UJ	1600 UJ	ND	ND		0/10	--	--
2,4-DINITROTOLUENE	380 U	650 U	ND	ND		0/10	--	--
2,6-DINITROTOLUENE	380 U	650 U	ND	ND		0/10	--	--
2-CHLORONAPHTHALENE	380 U	650 U	ND	ND		0/10	--	--
2-CHLOROPHENOL	380 U	650 U	ND	ND		0/10	--	--
2-METHYLNAPHTHALENE	380 U	650 U	ND	ND		0/10	--	--
2-METHYLPHENOL	380 U	650 U	ND	ND		0/10	--	--
2-NITROANILINE	960 U	1600 U	ND	ND		0/10	--	--
2-NITROPHENOL	380 U	650 U	ND	ND		0/10	--	--
3,3'-DICHLOROBENZIDINE	380 U	650 U	ND	ND		0/10	--	--
3-NITROANILINE	960 UJ	1600 UJ	ND	ND		0/10	--	--
4,6-DINITRO-2-METHYLPHENOL	960 U	1600 U	ND	ND		0/10	--	--
4-BROMOPHENYL-PHENYLETHER	380 U	650 U	ND	ND		0/10	--	--
4-CHLORO-3-METHYLPHENOL	380 U	650 U	ND	ND		0/10	--	--
4-CHLOROANILINE	380 U	650 U	ND	ND		0/10	--	--
4-CHLOROPHENYL-PHENYLETHER	380 U	650 U	ND	ND		0/10	--	--
4-METHYLPHENOL	380 U	650 U	ND	ND		0/10	--	--
4-NITROANILINE	960 U	1600 UJ	ND	ND		0/10	--	--
4-NITROPHENOL	960 U	1600 U	ND	ND		0/10	--	--
ACENAPHTHENE	380 U	650 U	ND	ND		0/10	--	--



**FREQUENCY OF DETECTION SUMMARY**  
**SEDIMENT - SEMIVOLATILE ORGANICS, PESTICIDES/PCBs**  
**PHASE I - FIXED BASE LABORATORY**  
**RI/FS CTO-0356**  
**OPERABLE UNIT NO. 16 (SITE 89)**  
**MCB CAMP LEJEUNE, NORTH CAROLINA**

SAMPLE ID PHASE DATE SAMPLED DEPTH	Minimum Non-Detect	Maximum Non-Detect	Minimum Detected	Maximum Detected	Location of Maximum Detect	Frequency of Detection	Arithmetic Mean Positive Detects	Median Positive Detects
<b>SEMIVOLATILES (ug/kg) (cont)</b>								
ACENAPHTHYLENE	380 U	650 U	ND	ND		0/10	--	--
ANTHRACENE	380 U	650 U	ND	ND		0/10	--	--
BENZO(A)ANTHRACENE	380 U	650 U	48 J	58 J	IR89-EC-SD02-612	2/10	53	53
BENZO(A)PYRENE	380 U	440 U	65 J	3100	IR89-EC-SD04-612	3/10	1080	75
BENZO(B)FLUORANTHENE	410 U	650 U	40 J	140 J	IR89-EC-SD02-612, IR89-EC-SD04-06	5/10	83.4	53
BENZO(G,H,I)PERYLENE	380 U	650 U	50 J	55 J	IR89-EC-SD04-06	2/10	52.5	52.5
BENZO(K)FLUORANTHENE	380 U	650 U	50 J	51 J	IR89-EC-SD04-06	2/10	50.5	50.5
BIS(2-CHLOROETHOXY)METHANE	380 U	650 U	ND	ND		0/10	--	--
BIS(2-CHLOROETHYL)ETHER	380 U	650 U	ND	ND		0/10	--	--
BIS(2-ETHYLHEXYL)PHTHALATE	NA	NA	88 J	13000	IR89-EC-SD05-612	10/10	1440.5	135
BUTYLBENZYLPHthalate	380 U	650 U	ND	ND		0/10	--	--
CARBAZOLE	380 U	650 U	ND	ND		0/10	--	--
CHRYSENE	380 U	650 U	51 J	120 J	IR89-EC-SD04-06	3/10	88.67	95
DIBENZO(A,H)ANTHRACENE	380 U	650 U	ND	ND		0/10	--	--
DIBENZOFURAN	380 U	650 U	ND	ND		0/10	--	--
DIETHYLPHthalate	380 U	650 U	ND	ND		0/10	--	--
DIMETHYLPHthalate	380 U	650 U	ND	ND		0/10	--	--
DI-N-BUTYLPHthalate	380 U	650 U	ND	ND		0/10	--	--
DI-N-OCTYLPHthalate	380 U	650 U	ND	ND		0/10	--	--
FLUORANTHENE	380 U	650 U	51 J	180 J	IR89-EC-SD04-06	5/10	87.8	68
FLUORENE	380 U	650 U	ND	ND		0/10	--	--
HEXACHLOROBENZENE	380 U	650 U	ND	ND		0/10	--	--
HEXACHLOROBUTADIENE	380 U	650 U	ND	ND		0/10	--	--
HEXACHLOROCYCLOPENTADIENE	380 U	650 U	ND	ND		0/10	--	--
HEXACHLOROETHANE	380 U	650 U	ND	ND		0/10	--	--
INDENO(1,2,3-CD)PYRENE	380 U	650 U	59 J	59 J	IR89-EC-SD04-06	1/10	59	59
ISOPHORONE	380 U	650 U	ND	ND		0/10	--	--

**FREQUENCY OF DETECTION SUMMARY**  
**SEDIMENT - SEMIVOLATILE ORGANICS, PESTICIDES/PCBs**  
**PHASE I - FIXED BASE LABORATORY**  
**RI/FS CTO-0356**  
**OPERABLE UNIT NO. 16 (SITE 89)**  
**MCB CAMP LEJEUNE, NORTH CAROLINA**

SAMPLE ID	Minimum	Maximum	Minimum	Maximum	Location of	Frequency	Arithmetic Mean	Median
PHASE	Non-Detect	Non-Detect	Detected	Detected	Maximum Detect	of Detection	Positive Detects	Positive Detects
DATE SAMPLED								
DEPTH								
<b>SEMIVOLATILES (ug/kg) (cont)</b>								
NAPHTHALENE	380 U	650 U	ND	ND		0/10	--	--
NITROBENZENE	380 UJ	650 U	ND	ND		0/10	--	--
N-NITROSO-DI-N-PROPYLAMINE	380 U	650 U	ND	ND		0/10	--	--
N-NITROSODIPHENYLAMINE (1)	380 U	650 U	ND	ND		0/10	--	--
PENTACHLOROPHENOL	960 U	1600 U	ND	ND		0/10	--	--
PHENANTHRENE	380 U	650 U	42 J	100 J	IR89-EC-SD04-06	4/10	59	47
PHENOL	380 U	650 U	ND	ND		0/10	--	--
PYRENE	410 U	650 U	50 J	140 J	IR89-EC-SD02-612	7/10	81.57	63

**FREQUENCY OF DETECTION SUMMARY**  
**SEDIMENT - SEMIVOLATILE ORGANICS, PESTICIDES/PCBs**  
**PHASE I - FIXED BASE LABORATORY**  
**RI/FS CTO-0356**  
**OPERABLE UNIT NO. 16 (SITE 89)**  
**MCB CAMP LEJEUNE, NORTH CAROLINA**

SAMPLE ID	Minimum	Maximum	Minimum	Maximum	Location of	Frequency	Arithmetic Mean	Median
PHASE	Non-Detect	Non-Detect	Detected	Detected	Maximum Detect	of Detection	Positive Detects	Positive Detects
DATE SAMPLED								
DEPTH								
<b>PESTICIDES/PCBS (ug/kg)</b>								
4,4'-DDD	0	0	42 J	79	IR89-EC-SD05-612	2/2	60.5	60.5
4,4'-DDE	0	0	33 J	44 J	IR89-EC-SD05-612	2/2	38.5	38.5
4,4'-DDT	0	0	23 J	34	IR89-EC-SD05-612	2/2	28.5	28.5
ALDRIN	2 UJ	2.1 U	ND	ND		0/2	--	--
ALPHA-BHC	2 UJ	2.1 U	ND	ND		0/2	--	--
ALPHA-CHLORDANE	0	0	2 J	2.9	IR89-EC-SD05-612	2/2	2.45	2.45
BETA-BHC	2 UJ	2.1 UJ	ND	ND		0/2	--	--
DELTA-BHC	3.9 UJ	4.2 U	ND	ND		0/2	--	--
DIELDRIN	2 UJ	2.1 U	ND	ND		0/2	--	--
ENDOSULFAN I	3.9 UJ	4.2 U	ND	ND		0/2	--	--
ENDOSULFAN II	3.9 UJ	4.2 U	ND	ND		0/2	--	--
ENDOSULFAN SULFATE	3.9 UJ	4.2 U	ND	ND		0/2	--	--
ENDRIN	3.9 UJ	4.2 U	ND	ND		0/2	--	--
ENDRIN ALDEHYDE	3.9 UJ	4.2 U	ND	ND		0/2	--	--
ENDRIN KETONE	2 UJ	2.1 U	ND	ND		0/2	--	--
GAMMA-BHC (LINDANE)	0	0	1.6 J	4.6 J	IR89-EC-SD05-612	2/2	3.1	3.1
GAMMA-CHLORDANE	2 UJ	2.1 U	ND	ND		0/2	--	--
HEPTACHLOR	2 UJ	2.1 U	ND	ND		0/2	--	--
HEPTACHLOR EPOXIDE	20 UJ	21 UJ	ND	ND		0/2	--	--
METHOXYCHLOR	200 UJ	210 U	ND	ND		0/2	--	--
TOXAPHENE	39 U	42 U	ND	ND		0/2	--	--
AROCLOR-1016	39 U	42 U	ND	ND		0/2	--	--
AROCLOR-1221	78 U	84 U	ND	ND		0/2	--	--
AROCLOR-1232	39 U	42 U	ND	ND		0/2	--	--
AROCLOR-1242	39 U	42 U	ND	ND		0/2	--	--
AROCLOR-1248	39 U	42 U	ND	ND		0/2	--	--
AROCLOR-1254	39 U	42 U	ND	ND		0/2	--	--
AROCLOR-1260	2 UJ	2.1 U	ND	ND		0/2	--	--

**SITE 89 SEDIMENT - INORGANICS**

**FREQUENCY OF DETECTION SUMMARY**  
**SEDIMENT - TAL METALS**  
**PHASE I - FIXED BASE LABORATORY**  
**R/FS CTO-0356**  
**OPERABLE UNIT NO. 16 (SITE 89)**  
**MCB CAMP LEJEUNE, NORTH CAROLINA**

SAMPLE ID	IR89-EC-SD01-06	IR89-EC-SD01-612	IR89-EC-SD02-06	IR89-EC-SD02-612	IR89-EC-SD03-06	IR89-EC-SD03-612
PHASE	PHASE I	PHASE I	PHASE I	PHASE I	PHASE I	PHASE I
DATE SAMPLED	07/27/96	07/27/96	07/27/96	07/27/96	07/27/96	07/27/96
DEPTH	0-6"	6-12"	0-6"	6-12"	0-6"	6-12"
<b>METALS (mg/kg)</b>						
ALUMINUM, TOTAL	1690 J	2800 J	1980 J	1990 J	2750 J	1820 J
ANTIMONY, TOTAL	2.9 U	3.3 U	3.2 U	2.9 U	3.1 U	2.7 U
ARSENIC, TOTAL	0.33 UJ	0.28 UJ	0.51	0.39	0.59	0.28 UJ
BARIUM, TOTAL	8.9	13.4	16.3	13.2	18.6	15.5
BERYLLIUM, TOTAL	0.14	0.36	0.16 U	0.15	0.15 U	0.13 U
CADMIUM, TOTAL	0.82	0.59 U	0.58 U	0.53 U	0.77	0.78
CALCIUM, TOTAL	21500 J	8020	18800 J	23000	47700 J	48000
CHROMIUM, TOTAL	4.1	3.6	5.2	3.4	4.5	2.7
COBALT, TOTAL	0.72 U	0.82 U	0.8 U	0.73 U	0.78 U	0.68 U
COPPER, TOTAL	5.5	2.9 U	38.7	7.9	5.9	3.1 U
IRON, TOTAL	1590 J	1630	3220 J	2930	2340 J	1750
LEAD, TOTAL	14.3 J	6.6	20.7 J	15.7	17.3 J	12.3
MAGNESIUM, TOTAL	413	219	369	409	768	888
MANGANESE, TOTAL	10.4	7.9	11.7	11.1	13.6	13.5
MERCURY, TOTAL	0.06 U	0.07 U	0.05 U	0.05 U	0.05 U	0.05 U
NICKEL, TOTAL	1.7 U	2 U	1.9 U	3.7	2.3	1.6 U
POTASSIUM, TOTAL	139 U	157 U	153 U	141 U	149 U	130 U
SELENIUM, TOTAL	0.42 UJ	0.36 U	0.44 U	0.31 UJ	0.34 U	0.36 U
SILVER, TOTAL	0.62 U	0.71 U	0.69 U	0.63 U	0.67 U	0.59 U
SODIUM, TOTAL	65.2	38.5	62.4	74.1	130	131
THALLIUM, TOTAL	0.35 UJ	0.3 UJ	0.36 U	0.26 U	0.29 U	0.3 U
VANADIUM, TOTAL	7.1	6.4	8.9	19.7	7.9	5.2
ZINC, TOTAL	53.1	24.9	34	33.5	27.6	40.7

**FREQUENCY OF DETECTION SUMMARY**  
**SEDIMENT - TAL METALS**  
**PHASE I - FIXED BASE LABORATORY**  
**RI/FS CTO-0356**  
**OPERABLE UNIT NO. 16 (SITE 89)**  
**MCB CAMP LEJEUNE, NORTH CAROLINA**

SAMPLE ID	IR89-EC-SD04-06	IR89-EC-SD04-612	IR89-EC-SD05-06	IR89-EC-SD05-612
PHASE	PHASE I	PHASE I	PHASE I	PHASE I
DATE SAMPLED	07/26/96	07/26/96	07/26/96	07/26/96
DEPTH	0-6"	6-12"	0-6"	6-12"
<b>METALS (mg/kg)</b>				
ALUMINUM, TOTAL	2040 J	14000 J	1010 J	1110 J
ANTIMONY, TOTAL	3.1 U	4.9 U	2.9 U	3.1 U
ARSENIC, TOTAL	0.42	0.55 UJ	0.38	0.85
BARIUM, TOTAL	9.9	30.1	6	10.7
BERYLLIUM, TOTAL	0.15 U	0.55	0.14 U	0.15 U
CADMIUM, TOTAL	0.56 U	0.89 U	0.53 U	0.55 U
CALCIUM, TOTAL	14000 J	8900	42700 J	26400
CHROMIUM, TOTAL	4.4	7.6	2.4	4.7
COBALT, TOTAL	0.77 U	1.2 U	0.73 U	0.77 U
COPPER, TOTAL	4.3 U	0.77 U	1.8 U	7.9
IRON, TOTAL	2150 J	3860	1190 J	1380
LEAD, TOTAL	20.2 J	13.5	35.4 J	14.6
MAGNESIUM, TOTAL	303	322	603	464
MANGANESE, TOTAL	10.3	16.3	8.6	7.3
MERCURY, TOTAL	0.05 U	0.1	0.05 U	0.06 U
NICKEL, TOTAL	1.9 U	3 U	1.8 U	1.9 U
POTASSIUM, TOTAL	148 U	236 U	141 U	147 U
SELENIUM, TOTAL	0.41 U	0.72 UJ	0.33 UJ	0.32 U
SILVER, TOTAL	0.66 U	1.1 U	0.63 U	0.66 U
SODIUM, TOTAL	56.4	88.6	125	92
THALLIUM, TOTAL	0.34 UJ	0.59 U	0.27 UJ	0.27 UJ
VANADIUM, TOTAL	5.2	11.2	4	5.5
ZINC, TOTAL	29.7	11.7	29.2	24.7

**FREQUENCY OF DETECTION SUMMARY**  
**SEDIMENT - TAL METALS**  
**PHASE I - FIXED BASE LABORATORY**  
**R/FS CTO-0356**  
**OPERABLE UNIT NO. 16 (SITE 89)**  
**MCB CAMP LEJEUNE, NORTH CAROLINA**

SAMPLE ID PHASE DATE SAMPLED DEPTH	Minimum Non-Detect	Maximum Non-Detect	Minimum Detected	Maximum Detected	Location of Maximum Detect	Frequency of Detection	Arithmetic Mean Positive Detects	Median Positive Detects
<b>METALS (mg/kg)</b>								
ALUMINUM, TOTAL	0	0	1010 J	14000 J	IR89-EC-SD04-612	10/10	3119	1985
ANTIMONY, TOTAL	2.7 U	4.9 U	ND	ND		0/10	--	--
ARSENIC, TOTAL	0.28 UJ	0.55 UJ	0.38	0.85	IR89-EC-SD05-612	6/10	0.52	0.47
BARIUM, TOTAL	0	0	6	30.1	IR89-EC-SD04-612	10/10	14.26	13.3
BERYLLIUM, TOTAL	0.13 U	0.16 U	0.14	0.55	IR89-EC-SD04-612	4/10	0.3	0.26
CADMIUM, TOTAL	0.53 U	0.89 U	0.77	0.82	IR89-EC-SD01-06	3/10	0.79	0.78
CALCIUM, TOTAL	0	0	8020	48000	IR89-EC-SD03-612	10/10	25902	22250
CHROMIUM, TOTAL	0	0	2.4	7.6	IR89-EC-SD04-612	10/10	4.26	4.25
COBALT, TOTAL	0.68 U	1.2 U	ND	ND		0/10	--	--
COPPER, TOTAL	0.77 U	4.3 U	5.5	38.7	IR89-EC-SD02-06	5/10	13.18	7.9
IRON, TOTAL	0	0	1190 J	3860	IR89-EC-SD04-612	10/10	2204	1950
LEAD, TOTAL	0	0	6.6	35.4 J	IR89-EC-SD05-06	10/10	17.06	15.15
MAGNESIUM, TOTAL	0	0	219	888	IR89-EC-SD03-612	10/10	475.8	411
MANGANESE, TOTAL	0	0	7.3	16.3	IR89-EC-SD04-612	10/10	11.07	10.75
MERCURY, TOTAL	0.05 U	0.07 U	0.1	0.1	IR89-EC-SD04-612	1/10	0.1	0.1
NICKEL, TOTAL	1.6 U	3 U	2.3	3.7	IR89-EC-SD02-612	2/10	3	3
POTASSIUM, TOTAL	130 U	236 U	ND	ND		0/10	--	--
SELENIUM, TOTAL	0.31 UJ	0.72 UJ	ND	ND		0/10	--	--
SILVER, TOTAL	0.59 U	1.1 U	ND	ND		0/10	--	--
SODIUM, TOTAL	0	0	38.5	131	IR89-EC-SD03-612	10/10	86.32	81.35
THALLIUM, TOTAL	0.26 U	0.59 U	ND	ND		0/10	--	--
VANADIUM, TOTAL	0	0	4	19.7	IR89-EC-SD02-612	10/10	8.11	6.75
ZINC, TOTAL	0	0	11.7	53.1	IR89-EC-SD01-06	10/10	30.91	29.45

**SITE 93 SUBSURFACE SOIL - ORGANICS**



**FREQUENCY OF DETECTION SUMMARY**  
**SUBSURFACE SOIL - TCL ORGANICS**  
**PHASE II - FIXED BASE LABORATORY**  
**RI/FS CTO-0356**  
**OPERABLE UNIT NO. 16 (SITE 93)**  
**MCB CAMP LEJEUNE, NORTH CAROLINA**

SAMPLE ID	IR93-MW01-02	IR93-MW01-04	IR93-MW01IW-02	IR93-MW01IW-04	IR93-MW02-02	IR93-MW02-04
PHASE	PHASE II	PHASE II	PHASE II	PHASE II	PHASE II	PHASE II
DATE SAMPLED	04/30/97	04/30/97	04/30/97	04/30/97	04/22/97	04/22/97
DEPTH	3-5'	7-9'	3-5'	7-9'	3-5'	7-9'
<b>VOLATILES (ug/kg)</b>						
1,1,1-TRICHLOROETHANE	11 U	12 U	12 U	12 U	13 U	12 U
1,1,2,2-TETRACHLOROETHANE	11 U	12 U	12 U	12 U	13 U	12 U
1,1,2-TRICHLOROETHANE	11 U	12 U	12 U	12 U	13 U	12 U
1,1-DICHLOROETHANE	11 U	12 U	12 U	12 U	13 U	12 U
1,1-DICHLOROETHENE	11 U	12 U	12 U	12 U	13 U	12 U
1,2-DICHLOROETHANE	11 U	12 U	12 U	12 U	13 U	12 U
1,2-DICHLOROETHENE (TOTAL)	11 U	12 U	12 U	12 U	13 U	12 U
1,2-DICHLOROPROPANE	11 U	12 U	12 U	12 U	13 U	12 U
2-BUTANONE	11 U	12 U	12 U	12 U	13 U	12 U
2-HEXANONE	11 U	12 U	12 U	12 U	13 U	12 U
4-METHYL-2-PENTANONE	11 U	12 U	12 U	12 U	13 U	12 U
ACETONE	19 J	12 U	39	12 U	22 J	44 J
BENZENE	11 U	12 U	12 U	12 U	13 U	12 U
BROMODICHLOROMETHANE	11 U	12 U	12 U	12 U	13 U	12 U
BROMOFORM	11 U	12 U	12 U	12 U	13 U	12 U
BROMOMETHANE	11 U	12 U	12 U	12 U	13 U	12 U
CARBON DISULFIDE	11 U	12 U	12 U	12 U	13 U	12 U
CARBON TETRACHLORIDE	11 U	12 U	12 U	12 U	13 U	12 U
CHLOROBENZENE	11 U	12 U	12 U	12 U	13 U	12 U
CHLOROETHANE	11 U	12 U	12 U	12 U	13 U	12 U
CHLOROFORM	11 U	12 U	12 U	12 U	13 U	12 U
CHLOROMETHANE	11 U	12 U	12 U	12 U	13 U	12 U
CIS-1,3-DICHLOROPROPENE	11 U	12 U	12 U	12 U	13 U	12 U
DIBROMOCHLOROMETHANE	11 U	12 U	12 U	12 U	13 U	12 U
ETHYLBENZENE	11 U	12 U	12 U	12 U	13 U	12 U
METHYLENE CHLORIDE	11 U	12 U	12 U	12 U	13 U	12 U
STYRENE	11 U	12 U	12 U	12 U	13 U	12 U
TETRACHLOROETHENE	11 U	12 U	12 U	12 U	13 U	12 U

**FREQUENCY OF DETECTION SUMMARY**  
**SUBSURFACE SOIL - TCL ORGANICS**  
**PHASE II - FIXED BASE LABORATORY**  
**RI/FS CTO-0356**  
**OPERABLE UNIT NO. 16 (SITE 93)**  
**MCB CAMP LEJEUNE, NORTH CAROLINA**

SAMPLE ID	IR93-MW01-02	IR93-MW01-04	IR93-MW01IW-02	IR93-MW01IW-04	IR93-MW02-02	IR93-MW02-04
PHASE	PHASE II	PHASE II	PHASE II	PHASE II	PHASE II	PHASE II
DATE SAMPLED	04/30/97	04/30/97	04/30/97	04/30/97	04/22/97	04/22/97
DEPTH	3-5'	7-9'	3-5'	7-9'	3-5'	7-9'
<b>VOLATILES (ug/kg) (cont)</b>						
TOLUENE	11 U	12 U	12 U	12 U	13 U	12 U
TRANS-1,3-DICHLOROPROPENE	11 U	12 U	12 U	12 U	13 U	12 U
TRICHLOROETHENE	11 U	12 U	12 U	12 U	13 U	12 U
VINYL CHLORIDE	11 U	12 U	12 U	12 U	13 U	12 U
XYLENE (TOTAL)	11 U	12 U	12 U	12 U	13 U	12 U

**FREQUENCY OF DETECTION SUMMARY**  
**SUBSURFACE SOIL - TCL ORGANICS**  
**PHASE II - FIXED BASE LABORATORY**  
**RI/FS CTO-0356**  
**OPERABLE UNIT NO. 16 (SITE 93)**  
**MCB CAMP LEJEUNE, NORTH CAROLINA**

SAMPLE ID	IR93-MW01-02	IR93-MW01-04	IR93-MW01IW-02	IR93-MW01IW-04	IR93-MW02-02	IR93-MW02-04
PHASE	PHASE II	PHASE II	PHASE II	PHASE II	PHASE II	PHASE II
DATE SAMPLED	04/30/97	04/30/97	04/30/97	04/30/97	04/22/97	04/22/97
DEPTH	3-5'	7-9'	3-5'	7-9'	3-5'	7-9'
<b>SEMIVOLATILES (ug/kg)</b>						
1,2,4-TRICHLOROBENZENE	370 U	400 U	420 U	400 U	420 U	410 U
1,2-DICHLOROBENZENE	370 U	400 U	420 U	400 U	420 U	410 U
1,3-DICHLOROBENZENE	370 U	400 U	420 U	400 U	420 U	410 U
1,4-DICHLOROBENZENE	370 U	400 U	420 U	400 U	420 U	410 U
2,2'-OXYBIS(1-CHLOROPROPANE)	370 U	400 U	420 U	400 U	420 U	410 U
2,4,5-TRICHLOROPHENOL	920 U	990 U	1000 U	990 U	1000 U	1000 U
2,4,6-TRICHLOROPHENOL	370 U	400 U	420 U	400 U	420 U	410 U
2,4-DICHLOROPHENOL	370 U	400 U	420 U	400 U	420 U	410 U
2,4-DIMETHYLPHENOL	370 U	400 U	420 U	400 U	420 U	410 U
2,4-DINITROPHENOL	920 U	990 U	1000 U	990 U	1000 U	1000 U
2,4-DINITROTOLUENE	370 U	400 U	420 U	400 U	420 U	410 U
2,6-DINITROTOLUENE	370 U	400 U	420 U	400 U	420 U	410 U
2-CHLORONAPHTHALENE	370 U	400 U	420 U	400 U	420 U	410 U
2-CHLOROPHENOL	370 U	400 U	420 U	400 U	420 U	410 U
2-METHYLNAPHTHALENE	370 U	400 U	420 U	400 U	420 U	410 U
2-METHYLPHENOL	370 U	400 U	420 U	400 U	420 U	410 U
2-NITROANILINE	920 U	990 U	1000 U	990 U	1000 U	1000 U
2-NITROPHENOL	370 U	400 U	420 U	400 U	420 U	410 U
3,3'-DICHLOROBENZIDINE	370 U	400 U	420 U	400 U	420 U	410 U
3-NITROANILINE	920 U	990 U	1000 U	990 U	1000 U	1000 U
4,6-DINITRO-2-METHYLPHENOL	920 U	990 U	1000 U	990 U	1000 U	1000 U
4-BROMOPHENYL-PHENYLETHER	370 U	400 U	420 U	400 U	420 U	410 U
4-CHLORO-3-METHYLPHENOL	370 U	400 U	420 U	400 U	420 U	410 U
4-CHLOROANILINE	370 U	400 U	420 U	400 U	420 U	410 U
4-CHLOROPHENYL-PHENYLETHER	370 U	400 U	420 U	400 U	420 U	410 U
4-METHYLPHENOL	370 U	400 U	420 U	400 U	420 U	410 U
4-NITROANILINE	920 U	990 U	1000 U	990 U	1000 U	1000 U
4-NITROPHENOL	920 U	990 U	1000 U	990 U	1000 U	1000 U

**FREQUENCY OF DETECTION SUMMARY**  
**SUBSURFACE SOIL - TCL ORGANICS**  
**PHASE II - FIXED BASE LABORATORY**  
**RI/FS CTO-0356**  
**OPERABLE UNIT NO. 16 (SITE 93)**  
**MCB CAMP LEJEUNE, NORTH CAROLINA**

SAMPLE ID	IR93-MW01-02	IR93-MW01-04	IR93-MW01IW-02	IR93-MW01IW-04	IR93-MW02-02	IR93-MW02-04
PHASE	PHASE II	PHASE II	PHASE II	PHASE II	PHASE II	PHASE II
DATE SAMPLED	04/30/97	04/30/97	04/30/97	04/30/97	04/22/97	04/22/97
DEPTH	3-5'	7-9'	3-5'	7-9'	3-5'	7-9'
<b>SEMIVOLATILES (ug/kg) (cont)</b>						
ACENAPHTHENE	370 U	400 U	420 U	400 U	420 U	410 U
ACENAPHTHYLENE	370 U	400 U	420 U	400 U	420 U	410 U
ANTHRACENE	370 U	400 U	420 U	400 U	420 U	410 U
BENZO(A)ANTHRACENE	370 U	400 U	420 U	400 U	420 U	410 U
BENZO(A)PYRENE	370 U	400 U	420 U	400 U	420 U	410 U
BENZO(B)FLUORANTHENE	370 U	400 U	420 U	400 U	420 U	410 U
BENZO(G,H,I)PERYLENE	370 U	400 U	420 U	400 U	420 U	410 U
BENZO(K)FLUORANTHENE	370 U	400 U	420 U	400 U	420 U	410 U
BIS(2-CHLOROETHOXY)METHANE	370 U	400 U	420 U	400 U	420 U	410 U
BIS(2-CHLOROETHYL)ETHER	370 U	400 U	420 U	400 U	420 U	410 U
BIS(2-ETHYLHEXYL)PHTHALATE	370 U	400 U	420 U	400 U	420 U	410 U
BUTYLBENZYLPHthalATE	370 U	400 U	420 U	400 U	420 U	410 U
CARBAZOLE	370 U	400 U	420 U	400 U	420 U	410 U
CHRYSENE	370 U	400 U	420 U	400 U	420 U	410 U
DIBENZO(A,H)ANTHRACENE	370 U	400 U	420 U	400 U	420 U	410 U
DIBENZOFURAN	370 U	400 U	420 U	400 U	420 U	410 U
DIETHYLPHthalATE	370 U	400 U	420 U	400 U	420 U	410 U
DIMETHYLPHthalATE	370 U	400 U	420 U	400 U	420 U	410 U
DI-N-BUTYLPHthalATE	370 U	400 U	420 U	400 U	420 U	410 U
DI-N-OCTYLPHthalATE	370 U	400 U	420 U	400 U	420 U	410 U
FLUORANTHENE	370 U	400 U	420 U	400 U	420 U	410 U
FLUORENE	370 U	400 U	420 U	400 U	420 U	410 U
HEXACHLOROBENZENE	370 U	400 U	420 U	400 U	420 U	410 U
HEXACHLOROBUTADIENE	370 U	400 U	420 U	400 U	420 U	410 U
HEXACHLOROCYCLOPENTADIENE	370 U	400 U	420 U	400 U	420 U	410 U
HEXACHLOROETHANE	370 U	400 U	420 U	400 U	420 U	410 U
INDENO(1,2,3-CD)PYRENE	370 U	400 U	420 U	400 U	420 U	410 U
ISOPHORONE	370 U	400 U	420 U	400 U	420 U	410 U

**FREQUENCY OF DETECTION SUMMARY**  
**SUBSURFACE SOIL - TCL ORGANICS**  
**PHASE II - FIXED BASE LABORATORY**  
**RI/FS CTO-0356**  
**OPERABLE UNIT NO. 16 (SITE 93)**  
**MCB CAMP LEJEUNE, NORTH CAROLINA**

SAMPLE ID	IR93-MW01-02	IR93-MW01-04	IR93-MW01IW-02	IR93-MW01IW-04	IR93-MW02-02	IR93-MW02-04
PHASE	PHASE II	PHASE II	PHASE II	PHASE II	PHASE II	PHASE II
DATE SAMPLED	04/30/97	04/30/97	04/30/97	04/30/97	04/22/97	04/22/97
DEPTH	3-5'	7-9'	3-5'	7-9'	3-5'	7-9'
<b>SEMIVOLATILES (ug/kg) (cont)</b>						
NAPHTHALENE	370 U	400 U	420 U	400 U	420 U	410 U
NITROBENZENE	370 U	400 U	420 U	400 U	420 U	410 U
N-NITROSO-DI-N-PROPYLAMINE	370 U	400 U	420 U	400 U	420 U	410 U
N-NITROSODIPHENYLAMINE (1)	370 U	400 U	420 U	400 U	420 U	410 U
PENTACHLOROPHENOL	920 U	990 U	1000 U	990 U	1000 U	1000 U
PHENANTHRENE	370 U	400 U	420 U	400 U	420 U	410 U
PHENOL	370 U	400 U	420 U	400 U	420 U	410 U
PYRENE	370 U	400 U	420 U	400 U	420 U	410 U

**FREQUENCY OF DETECTION SUMMARY**  
**SUBSURFACE SOIL - TCL ORGANICS**  
**PHASE II - FIXED BASE LABORATORY**  
**RI/FS CTO-0356**  
**OPERABLE UNIT NO. 16 (SITE 93)**  
**MCB CAMP LEJEUNE, NORTH CAROLINA**

SAMPLE ID	IR93-MW01-02	IR93-MW01-04	IR93-MW01IW-02	IR93-MW01IW-04	IR93-MW02-02	IR93-MW02-04
PHASE	PHASE II	PHASE II	PHASE II	PHASE II	PHASE II	PHASE II
DATE SAMPLED	04/30/97	04/30/97	04/30/97	04/30/97	04/22/97	04/22/97
DEPTH	3-5'	7-9'	3-5'	7-9'	3-5'	7-9'
<b>PESTICIDES/PCBS (ug/kg)</b>						
4,4'-DDD	3.7 UJ	NA	NA	NA	NA	NA
4,4'-DDE	3.7 UJ	NA	NA	NA	NA	NA
4,4'-DDT	3.7 UJ	NA	NA	NA	NA	NA
ALDRIN	1.8 UJ	NA	NA	NA	NA	NA
ALPHA-BHC	1.8 UJ	NA	NA	NA	NA	NA
ALPHA-CHLORDANE	1.8 UJ	NA	NA	NA	NA	NA
AROCLOR-1016	37 UJ	NA	NA	NA	NA	NA
AROCLOR-1221	74 UJ	NA	NA	NA	NA	NA
AROCLOR-1232	37 UJ	NA	NA	NA	NA	NA
AROCLOR-1242	37 UJ	NA	NA	NA	NA	NA
AROCLOR-1248	37 UJ	NA	NA	NA	NA	NA
AROCLOR-1254	37 UJ	NA	NA	NA	NA	NA
AROCLOR-1260	37 UJ	NA	NA	NA	NA	NA
BETA-BHC	1.8 UJ	NA	NA	NA	NA	NA
DELTA-BHC	1.8 UJ	NA	NA	NA	NA	NA
DIELDRIN	3.7 UJ	NA	NA	NA	NA	NA
ENDOSULFAN I	1.8 UJ	NA	NA	NA	NA	NA
ENDOSULFAN II	3.7 UJ	NA	NA	NA	NA	NA
ENDOSULFAN SULFATE	3.7 UJ	NA	NA	NA	NA	NA
ENDRIN	3.7 UJ	NA	NA	NA	NA	NA
ENDRIN ALDEHYDE	3.7 UJ	NA	NA	NA	NA	NA
ENDRIN KETONE	3.7 UJ	NA	NA	NA	NA	NA
GAMMA-BHC (LINDANE)	1.8 UJ	NA	NA	NA	NA	NA
GAMMA-CHLORDANE	1.8 UJ	NA	NA	NA	NA	NA
HEPTACHLOR	1.8 UJ	NA	NA	NA	NA	NA
HEPTACHLOR EPOXIDE	1.8 UJ	NA	NA	NA	NA	NA
METHOXYCHLOR	18 UJ	NA	NA	NA	NA	NA
TOXAPHENE	180 UJ	NA	NA	NA	NA	NA

**FREQUENCY OF DETECTION SUMMARY**  
**SUBSURFACE SOIL - TCL ORGANICS**  
**PHASE II - FIXED BASE LABORATORY**  
**RI/FS CTO-0356**  
**OPERABLE UNIT NO. 16 (SITE 93)**  
**MCB CAMP LEJEUNE, NORTH CAROLINA**

SAMPLE ID	IR93-MW02DW-02	IR93-MW02DW-04	IR93-MW02IW-02	IR93-MW02IW-04	IR93-MW03-02	IR93-MW03-04
PHASE	PHASE II	PHASE II	PHASE II	PHASE II	PHASE II	PHASE II
DATE SAMPLED	05/16/97	05/16/97	04/21/97	04/21/97	04/30/97	04/30/97
DEPTH	3-5'	7-9'	3-5'	7-9'	3-5'	7-9'
<b>VOLATILES (ug/kg)</b>						
1,1,1-TRICHLOROETHANE	11 U	13 U	12 U	12 U	12 U	12 U
1,1,2,2-TETRACHLOROETHANE	11 U	13 UJ	12 U	12 U	12 U	12 U
1,1,2-TRICHLOROETHANE	11 U	13 U	12 U	12 U	12 U	12 U
1,1-DICHLOROETHANE	11 U	13 U	12 U	12 U	12 U	12 U
1,1-DICHLOROETHENE	11 U	13 U	12 U	12 U	12 U	12 U
1,2-DICHLOROETHANE	11 U	13 U	12 U	12 U	12 U	12 U
1,2-DICHLOROETHENE (TOTAL)	11 U	13 U	12 U	12 U	12 U	12 U
1,2-DICHLOROPROPANE	11 U	13 U	12 U	12 U	12 U	12 U
2-BUTANONE	11 U	13 U	12 U	12 U	12 U	12 U
2-HEXANONE	11 U	13 UJ	12 U	12 U	12 U	12 U
4-METHYL-2-PENTANONE	11 U	13 UJ	12 U	12 U	12 U	12 U
ACETONE	11 U	58 J	120 J	30 J	130	22
BENZENE	11 U	13 U	12 U	12 U	12 U	12 U
BROMODICHLOROMETHANE	11 U	13 U	12 U	12 U	12 U	12 U
BROMOFORM	11 U	13 U	12 U	12 U	12 U	12 U
BROMOMETHANE	11 U	13 U	12 U	12 U	12 U	12 U
CARBON DISULFIDE	11 U	13 U	12 U	12 U	12 U	12 U
CARBON TETRACHLORIDE	11 U	13 U	12 U	12 U	12 U	12 U
CHLOROBENZENE	11 U	13 UJ	12 U	12 U	12 U	12 U
CHLOROETHANE	11 U	13 U	12 U	12 U	12 U	12 U
CHLOROFORM	11 U	13 U	12 U	12 U	12 U	12 U
CHLOROMETHANE	11 U	13 U	12 U	12 U	12 U	12 U
CIS-1,3-DICHLOROPROPENE	11 U	13 U	12 U	12 U	12 U	12 U
DIBROMOCHLOROMETHANE	11 U	13 U	12 U	12 U	12 U	12 U
ETHYLBENZENE	11 U	13 UJ	12 U	12 U	12 U	12 U
METHYLENE CHLORIDE	11 U	13 U	12 U	12 U	12 U	12 U
STYRENE	11 U	13 UJ	12 U	12 U	12 U	12 U
TETRACHLOROETHENE	11 U	13 UJ	12 U	12 U	12 U	12 U

**FREQUENCY OF DETECTION SUMMARY**  
**SUBSURFACE SOIL - TCL ORGANICS**  
**PHASE II - FIXED BASE LABORATORY**  
**RI/FS CTO-0356**  
**OPERABLE UNIT NO. 16 (SITE 93)**  
**MCB CAMP LEJEUNE, NORTH CAROLINA**

SAMPLE ID	IR93-MW02DW-02	IR93-MW02DW-04	IR93-MW02IW-02	IR93-MW02IW-04	IR93-MW03-02	IR93-MW03-04
PHASE	PHASE II	PHASE II	PHASE II	PHASE II	PHASE II	PHASE II
DATE SAMPLED	05/16/97	05/16/97	04/21/97	04/21/97	04/30/97	04/30/97
DEPTH	3-5'	7-9'	3-5'	7-9'	3-5'	7-9'
<b>VOLATILES (ug/kg) (cont)</b>						
TOLUENE	11 U	13 UJ	12 U	12 U	12 U	12 U
TRANS-1,3-DICHLOROPROPENE	11 U	13 U	12 U	12 U	12 U	12 U
TRICHLOROETHENE	11 U	13 U	12 U	12 U	12 U	12 U
VINYL CHLORIDE	11 U	13 U	12 U	12 U	12 U	12 U
XYLENE (TOTAL)	11 U	13 UJ	12 U	12 U	12 U	12 U



**FREQUENCY OF DETECTION SUMMARY**  
**SUBSURFACE SOIL - TCL ORGANICS**  
**PHASE II - FIXED BASE LABORATORY**  
**RI/FS CTO-0356**  
**OPERABLE UNIT NO. 16 (SITE 93)**  
**MCB CAMP LEJEUNE, NORTH CAROLINA**

SAMPLE ID	IR93-MW02DW-02	IR93-MW02DW-04	IR93-MW02IW-02	IR93-MW02IW-04	IR93-MW03-02	IR93-MW03-04
PHASE	PHASE II	PHASE II	PHASE II	PHASE II	PHASE II	PHASE II
DATE SAMPLED	05/16/97	05/16/97	04/21/97	04/21/97	04/30/97	04/30/97
DEPTH	3-5'	7-9'	3-5'	7-9'	3-5'	7-9'
<b>SEMIVOLATILES (ug/kg)</b>						
1,2,4-TRICHLOROBENZENE	360 U	420 U	380 U	410 U	380 U	380 U
1,2-DICHLOROBENZENE	360 U	420 U	380 U	410 U	380 U	380 U
1,3-DICHLOROBENZENE	360 U	420 U	380 U	410 U	380 U	380 U
1,4-DICHLOROBENZENE	360 U	420 U	380 U	410 U	380 U	380 U
2,2'-OXYBIS(1-CHLOROPROPANE)	360 U	420 U	380 U	410 U	380 U	380 U
2,4,5-TRICHLOROPHENOL	910 U	1000 U	950 U	1000 U	960 U	960 U
2,4,6-TRICHLOROPHENOL	360 U	420 U	380 U	410 U	380 U	380 U
2,4-DICHLOROPHENOL	360 U	420 U	380 U	410 U	380 U	380 U
2,4-DIMETHYLPHENOL	360 U	420 U	380 U	410 U	380 U	380 U
2,4-DINITROPHENOL	910 U	1000 U	950 U	1000 U	960 U	960 U
2,4-DINITROTOLUENE	360 U	420 U	380 U	410 U	380 U	380 U
2,6-DINITROTOLUENE	360 U	420 U	380 U	410 U	380 U	380 U
2-CHLORONAPHTHALENE	360 U	420 U	380 U	410 U	380 U	380 U
2-CHLOROPHENOL	360 U	420 U	380 U	410 U	380 U	380 U
2-METHYLNAPHTHALENE	360 U	420 U	380 U	410 U	380 U	380 U
2-METHYLPHENOL	360 U	420 U	380 U	410 U	380 U	380 U
2-NITROANILINE	910 U	1000 U	950 U	1000 U	960 U	960 U
2-NITROPHENOL	360 U	420 U	380 U	410 U	380 U	380 U
3,3'-DICHLOROBENZIDINE	360 U	420 U	380 U	410 U	380 U	380 U
3-NITROANILINE	910 U	1000 U	950 U	1000 U	960 U	960 U
4,6-DINITRO-2-METHYLPHENOL	910 U	1000 U	950 U	1000 U	960 U	960 U
4-BROMOPHENYL-PHENYLETHER	360 U	420 U	380 U	410 U	380 U	380 U
4-CHLORO-3-METHYLPHENOL	360 U	420 U	380 U	410 U	380 U	380 U
4-CHLOROANILINE	360 U	420 U	380 U	410 U	380 U	380 U
4-CHLOROPHENYL-PHENYLETHER	360 U	420 U	380 U	410 U	380 U	380 U
4-METHYLPHENOL	360 U	420 U	380 U	410 U	380 U	380 U
4-NITROANILINE	910 U	1000 U	950 U	1000 U	960 U	960 U
4-NITROPHENOL	910 U	1000 U	950 U	1000 U	960 U	960 U

**FREQUENCY OF DETECTION SUMMARY**  
**SUBSURFACE SOIL - TCL ORGANICS**  
**PHASE II - FIXED BASE LABORATORY**  
**RI/FS CTO-0356**  
**OPERABLE UNIT NO. 16 (SITE 93)**  
**MCB CAMP LEJEUNE, NORTH CAROLINA**

SAMPLE ID	IR93-MW02DW-02	IR93-MW02DW-04	IR93-MW02IW-02	IR93-MW02IW-04	IR93-MW03-02	IR93-MW03-04
PHASE	PHASE II	PHASE II	PHASE II	PHASE II	PHASE II	PHASE II
DATE SAMPLED	05/16/97	05/16/97	04/21/97	04/21/97	04/30/97	04/30/97
DEPTH	3-5'	7-9'	3-5'	7-9'	3-5'	7-9'
<b>SEMIVOLATILES (ug/kg) (cont)</b>						
ACENAPHTHENE	360 U	420 U	380 U	410 U	380 U	380 U
ACENAPHTHYLENE	360 U	420 U	380 U	410 U	380 U	380 U
ANTHRACENE	360 U	420 U	380 U	410 U	380 U	380 U
BENZO(A)ANTHRACENE	360 U	420 U	380 U	410 U	380 U	380 U
BENZO(A)PYRENE	360 U	420 U	380 U	400 J	380 U	380 U
BENZO(B)FLUORANTHENE	360 U	420 U	380 U	410 U	380 U	380 U
BENZO(G,H,I)PERYLENE	360 U	420 U	380 U	410 U	380 U	380 U
BENZO(K)FLUORANTHENE	360 U	420 U	380 U	410 U	380 U	380 U
BIS(2-CHLOROETHOXY)METHANE	360 U	420 U	380 U	410 U	380 U	380 U
BIS(2-CHLOROETHYL)ETHER	360 U	420 U	380 U	410 U	380 U	380 U
BIS(2-ETHYLHEXYL)PHTHALATE	360 U	420 J	380 U	920 U	380 U	380 U
BUTYLBENZYLPHthalate	360 U	420 U	380 U	410 U	380 U	380 U
CARBAZOLE	360 U	420 U	380 U	410 U	380 U	380 U
CHRYSENE	360 U	420 U	380 U	410 U	380 U	380 U
DIBENZO(A,H)ANTHRACENE	360 U	420 U	380 U	410 U	380 U	380 U
DIBENZOFURAN	360 U	420 U	380 U	410 U	380 U	380 U
DIETHYLPHthalate	360 U	420 U	380 U	410 U	380 U	380 U
DIMETHYLPHthalate	360 U	420 U	380 U	410 U	380 U	380 U
DI-N-BUTYLPHthalate	360 U	420 U	380 U	410 U	380 U	380 U
DI-N-OCTYLPHthalate	360 U	420 U	380 U	410 U	380 U	380 U
FLUORANTHENE	360 U	420 U	380 U	410 U	380 U	380 U
FLUORENE	360 U	420 U	380 U	410 U	380 U	380 U
HEXACHLOROBENZENE	360 U	420 U	380 U	410 U	380 U	380 U
HEXACHLOROBUTADIENE	360 U	420 U	380 U	410 U	380 U	380 U
HEXACHLOROCYCLOPENTADIENE	360 U	420 U	380 U	410 U	380 U	380 U
HEXACHLOROETHANE	360 U	420 U	380 U	410 U	380 U	380 U
INDENO(1,2,3-CD)PYRENE	360 U	420 U	380 U	410 U	380 U	380 U
ISOPHORONE	360 U	420 U	380 U	410 U	380 U	380 U

**FREQUENCY OF DETECTION SUMMARY**  
**SUBSURFACE SOIL - TCL ORGANICS**  
**PHASE II - FIXED BASE LABORATORY**  
**R/FS CTO-0356**  
**OPERABLE UNIT NO. 16 (SITE 93)**  
**MCB CAMP LEJEUNE, NORTH CAROLINA**

SAMPLE ID	IR93-MW02DW-02	IR93-MW02DW-04	IR93-MW02IW-02	IR93-MW02IW-04	IR93-MW03-02	IR93-MW03-04
PHASE	PHASE II	PHASE II	PHASE II	PHASE II	PHASE II	PHASE II
DATE SAMPLED	05/16/97	05/16/97	04/21/97	04/21/97	04/30/97	04/30/97
DEPTH	3-5'	7-9'	3-5'	7-9'	3-5'	7-9'
<b>SEMIVOLATILES (ug/kg) (cont)</b>						
NAPHTHALENE	360 U	420 U	380 U	410 U	380 U	380 U
NITROBENZENE	360 U	420 U	380 U	410 U	380 U	380 U
N-NITROSO-DI-N-PROPYLAMINE	360 U	420 U	380 U	410 U	380 U	380 U
N-NITROSODIPHENYLAMINE (1)	360 U	420 U	380 U	410 U	380 U	380 U
PENTACHLOROPHENOL	910 U	1000 U	950 U	1000 U	960 U	960 U
PHENANTHRENE	360 U	420 U	380 U	410 U	380 U	380 U
PHENOL	360 U	420 U	380 U	410 U	380 U	380 U
PYRENE	360 U	420 U	380 U	410 U	380 U	380 U

**FREQUENCY OF DETECTION SUMMARY**  
**SUBSURFACE SOIL - TCL ORGANICS**  
**PHASE II - FIXED BASE LABORATORY**  
**RI/FS CTO-0356**  
**OPERABLE UNIT NO. 16 (SITE 93)**  
**MCB CAMP LEJEUNE, NORTH CAROLINA**

SAMPLE ID	IR93-MW02DW-02	IR93-MW02DW-04	IR93-MW02IW-02	IR93-MW02IW-04	IR93-MW03-02	IR93-MW03-04
PHASE	PHASE II	PHASE II	PHASE II	PHASE II	PHASE II	PHASE II
DATE SAMPLED	05/16/97	05/16/97	04/21/97	04/21/97	04/30/97	04/30/97
DEPTH	3-5'	7-9'	3-5'	7-9'	3-5'	7-9'
PESTICIDES/PCBS (ug/kg)						
4,4'-DDD	55	NA	NA	NA	NA	NA
4,4'-DDE	22	NA	NA	NA	NA	NA
4,4'-DDT	33	NA	NA	NA	NA	NA
ALDRIN	1.9 U	NA	NA	NA	NA	NA
ALPHA-BHC	1.9 U	NA	NA	NA	NA	NA
ALPHA-CHLORDANE	1.9 U	NA	NA	NA	NA	NA
AROCLOR-1016	37 U	NA	NA	NA	NA	NA
AROCLOR-1221	74 U	NA	NA	NA	NA	NA
AROCLOR-1232	37 U	NA	NA	NA	NA	NA
AROCLOR-1242	37 U	NA	NA	NA	NA	NA
AROCLOR-1248	37 U	NA	NA	NA	NA	NA
AROCLOR-1254	37 U	NA	NA	NA	NA	NA
AROCLOR-1260	37 U	NA	NA	NA	NA	NA
BETA-BHC	1.9 U	NA	NA	NA	NA	NA
DELTA-BHC	1.9 U	NA	NA	NA	NA	NA
DIELDRIN	3.7 U	NA	NA	NA	NA	NA
ENDOSULFAN I	1.9 U	NA	NA	NA	NA	NA
ENDOSULFAN II	3.7 U	NA	NA	NA	NA	NA
ENDOSULFAN SULFATE	3.7 U	NA	NA	NA	NA	NA
ENDRIN	3.7 U	NA	NA	NA	NA	NA
ENDRIN ALDEHYDE	3.7 U	NA	NA	NA	NA	NA
ENDRIN KETONE	3.7 U	NA	NA	NA	NA	NA
GAMMA-BHC (LINDANE)	1.9 U	NA	NA	NA	NA	NA
GAMMA-CHLORDANE	1.9 U	NA	NA	NA	NA	NA
HEPTACHLOR	1.9 U	NA	NA	NA	NA	NA
HEPTACHLOR EPOXIDE	1.9 U	NA	NA	NA	NA	NA
METHOXYCHLOR	19 U	NA	NA	NA	NA	NA
TOXAPHENE	190 U	NA	NA	NA	NA	NA

**FREQUENCY OF DETECTION SUMMARY**  
**SUBSURFACE SOIL - TCL ORGANICS**  
**PHASE II - FIXED BASE LABORATORY**  
**RI/FS CTO-0356**  
**OPERABLE UNIT NO. 16 (SITE 93)**  
**MCB CAMP LEJEUNE, NORTH CAROLINA**

SAMPLE ID	IR93-MW03IW-02	IR93-MW03IW-04	IR93-MW04-02	IR93-MW04-04	IR93-MW04IW-02	IR93-MW04IW-04
PHASE	PHASE II	PHASE II	PHASE II	PHASE II	PHASE II	PHASE II
DATE SAMPLED	04/29/97	04/29/97	05/06/97	05/06/97	05/06/97	05/06/97
DEPTH	3-5'	7-9'	3-5'	7-9'	3-5'	7-9'
<b>VOLATILES (ug/kg)</b>						
1,1,1-TRICHLOROETHANE	12 U	12 U	12 U	12 U	12 U	12 U
1,1,2,2-TETRACHLOROETHANE	12 U	12 U	12 U	12 U	12 U	12 U
1,1,2-TRICHLOROETHANE	12 U	12 U	12 U	12 U	12 U	12 U
1,1-DICHLOROETHANE	12 U	12 U	12 U	12 U	12 U	12 U
1,1-DICHLOROETHENE	12 U	12 U	12 U	12 U	12 U	12 U
1,2-DICHLOROETHANE	12 U	12 U	12 U	12 U	12 U	12 U
1,2-DICHLOROETHENE (TOTAL)	12 U	12 U	12 U	12 U	12 U	12 U
1,2-DICHLOROPROPANE	12 U	12 U	12 U	12 U	12 U	12 U
2-BUTANONE	12 U	12 U	12 U	12 U	12 U	12 U
2-HEXANONE	12 U	12 U	12 U	12 U	12 U	12 U
4-METHYL-2-PENTANONE	12 U	12 U	12 U	12 U	12 U	12 U
ACETONE	12 U	12 U	12 U	12 U	24 J	12 U
BENZENE	12 U	12 U	12 U	12 U	12 U	12 U
BROMODICHLOROMETHANE	12 U	12 U	12 U	12 U	12 U	12 U
BROMOFORM	12 U	12 U	12 U	12 U	12 U	12 U
BROMOMETHANE	12 U	12 U	12 U	12 U	12 U	12 U
CARBON DISULFIDE	12 U	12 U	12 U	12 U	12 U	12 U
CARBON TETRACHLORIDE	12 U	12 U	12 U	12 U	12 U	12 U
CHLOROBENZENE	12 U	12 U	12 U	12 U	12 U	12 U
CHLOROETHANE	12 U	12 U	12 U	12 U	12 U	12 U
CHLOROFORM	12 U	12 U	12 U	12 U	12 U	12 U
CHLOROMETHANE	12 U	12 U	12 U	12 U	12 U	12 U
CIS-1,3-DICHLOROPROPENE	12 U	12 U	12 U	12 U	12 U	12 U
DIBROMOCHLOROMETHANE	12 U	12 U	12 U	12 U	12 U	12 U
ETHYLBENZENE	12 U	12 U	12 U	12 U	12 U	12 U
METHYLENE CHLORIDE	12 U	12 U	12 U	12 U	12 U	12 U
STYRENE	12 U	12 U	12 U	12 U	12 U	12 U
TETRACHLOROETHENE	12 U	12 U	12 U	12 U	12 U	12 U

**FREQUENCY OF DETECTION SUMMARY**  
**SUBSURFACE SOIL - TCL ORGANICS**  
**PHASE II - FIXED BASE LABORATORY**  
**R/FS CTO-0356**  
**OPERABLE UNIT NO. 16 (SITE 93)**  
**MCB CAMP LEJEUNE, NORTH CAROLINA**

SAMPLE ID	IR93-MW03IW-02	IR93-MW03IW-04	IR93-MW04-02	IR93-MW04-04	IR93-MW04IW-02	IR93-MW04IW-04
PHASE	PHASE II	PHASE II	PHASE II	PHASE II	PHASE II	PHASE II
DATE SAMPLED	04/29/97	04/29/97	05/06/97	05/06/97	05/06/97	05/06/97
DEPTH	3-5'	7-9'	3-5'	7-9'	3-5'	7-9'
<b>VOLATILES (ug/kg) (cont)</b>						
TOLUENE	12 U	12 U	12 U	12 U	12 U	12 U
TRANS-1,3-DICHLOROPROPENE	12 U	12 U	12 U	12 U	12 U	12 U
TRICHLOROETHENE	12 U	12 U	12 U	12 U	12 U	12 U
VINYL CHLORIDE	12 U	12 U	12 U	12 U	12 U	12 U
XYLENE (TOTAL)	12 U	12 U	12 U	12 U	12 U	12 U

**FREQUENCY OF DETECTION SUMMARY**  
**SUBSURFACE SOIL - TCL ORGANICS**  
**PHASE II - FIXED BASE LABORATORY**  
**RI/FS CTO-0356**  
**OPERABLE UNIT NO. 16 (SITE 93)**  
**MCB CAMP LEJEUNE, NORTH CAROLINA**

SAMPLE ID	IR93-MW03IW-02	IR93-MW03IW-04	IR93-MW04-02	IR93-MW04-04	IR93-MW04IW-02	IR93-MW04IW-04
PHASE	PHASE II	PHASE II	PHASE II	PHASE II	PHASE II	PHASE II
DATE SAMPLED	04/29/97	04/29/97	05/06/97	05/06/97	05/06/97	05/06/97
DEPTH	3-5'	7-9'	3-5'	7-9'	3-5'	7-9'
<b>SEMIVOLATILES (ug/kg)</b>						
1,2,4-TRICHLOROBENZENE	410 U	390 U	400 U	400 U	400 U	390 U
1,2-DICHLOROBENZENE	410 U	390 U	400 U	400 U	400 U	390 U
1,3-DICHLOROBENZENE	410 U	390 U	400 U	400 U	400 U	390 U
1,4-DICHLOROBENZENE	410 U	390 U	400 U	400 U	400 U	390 U
2,2'-OXYBIS(1-CHLOROPROPANE)	410 U	390 U	400 U	400 U	400 U	390 U
2,4,5-TRICHLOROPHENOL	1000 U	970 U	990 U	990 U	1000 U	970 U
2,4,6-TRICHLOROPHENOL	410 U	390 U	400 U	400 U	400 U	390 U
2,4-DICHLOROPHENOL	410 U	390 U	400 U	400 U	400 U	390 U
2,4-DIMETHYLPHENOL	410 U	390 U	400 U	400 U	400 U	390 U
2,4-DINITROPHENOL	1000 U	970 U	990 U	990 U	1000 U	970 U
2,4-DINITROTOLUENE	410 U	390 U	400 U	400 U	400 U	390 U
2,6-DINITROTOLUENE	410 U	390 U	400 U	400 U	400 U	390 U
2-CHLORONAPHTHALENE	410 U	390 U	400 U	400 U	400 U	390 U
2-CHLOROPHENOL	410 U	390 U	400 U	400 U	400 U	390 U
2-METHYLNAPHTHALENE	410 U	390 U	400 U	400 U	400 U	390 U
2-METHYLPHENOL	410 U	390 U	400 U	400 U	400 U	390 U
2-NITROANILINE	1000 U	970 U	990 U	990 U	1000 U	970 U
2-NITROPHENOL	410 U	390 U	400 U	400 U	400 U	390 U
3,3'-DICHLOROBENZIDINE	410 U	390 U	400 U	400 U	400 U	390 U
3-NITROANILINE	1000 U	970 U	990 U	990 U	1000 U	970 U
4,6-DINITRO-2-METHYLPHENOL	1000 U	970 U	990 U	990 U	1000 U	970 U
4-BROMOPHENYL-PHENYLEETHER	410 U	390 U	400 U	400 U	400 U	390 U
4-CHLORO-3-METHYLPHENOL	410 U	390 U	400 U	400 U	400 U	390 U
4-CHLOROANILINE	410 U	390 U	400 U	400 U	400 U	390 U
4-CHLOROPHENYL-PHENYLEETHER	410 U	390 U	400 U	400 U	400 U	390 U
4-METHYLPHENOL	410 U	390 U	400 U	400 U	400 U	390 U
4-NITROANILINE	1000 U	970 U	990 U	990 U	1000 U	970 U
4-NITROPHENOL	1000 U	970 U	990 U	990 U	1000 U	970 U

**FREQUENCY OF DETECTION SUMMARY**  
**SUBSURFACE SOIL - TCL ORGANICS**  
**PHASE II - FIXED BASE LABORATORY**  
**RI/FS CTO-0356**  
**OPERABLE UNIT NO. 16 (SITE 93)**  
**MCB CAMP LEJEUNE, NORTH CAROLINA**

SAMPLE ID	IR93-MW03IW-02	IR93-MW03IW-04	IR93-MW04-02	IR93-MW04-04	IR93-MW04IW-02	IR93-MW04IW-04
PHASE	PHASE II	PHASE II	PHASE II	PHASE II	PHASE II	PHASE II
DATE SAMPLED	04/29/97	04/29/97	05/06/97	05/06/97	05/06/97	05/06/97
DEPTH	3-5'	7-9'	3-5'	7-9'	3-5'	7-9'
<b>SEMIVOLATILES (ug/kg) (cont)</b>						
ACENAPHTHENE	410 U	390 U	400 U	400 U	400 U	390 U
ACENAPHTHYLENE	410 U	390 U	400 U	400 U	400 U	390 U
ANTHRACENE	410 U	390 U	400 U	400 U	400 U	390 U
BENZO(A)ANTHRACENE	410 U	390 U	400 U	400 U	400 U	390 U
BENZO(A)PYRENE	410 U	390 U	400 U	400 U	400 U	390 U
BENZO(B)FLUORANTHENE	410 U	390 U	400 U	400 U	400 U	390 U
BENZO(G,H,I)PERYLENE	410 U	390 U	400 U	400 U	400 U	390 U
BENZO(K)FLUORANTHENE	410 U	390 U	400 U	400 U	400 U	390 U
BIS(2-CHLOROETHOXY)METHANE	410 U	390 U	400 U	400 U	400 U	390 U
BIS(2-CHLOROETHYL)ETHER	410 U	390 U	400 U	400 U	400 U	390 U
BIS(2-ETHYLHEXYL)PHTHALATE	410 U	220 J	52 J	75 J	400 U	390 U
BUTYLBENZYLPHthalATE	410 U	390 U	400 U	400 U	400 U	390 U
CARBAZOLE	410 U	390 U	400 U	400 U	400 U	390 U
CHRYSENE	410 U	390 U	400 U	400 U	400 U	390 U
DIBENZO(A,H)ANTHRACENE	410 U	390 U	400 U	400 U	400 U	390 U
DIBENZOFURAN	410 U	390 U	400 U	400 U	400 U	390 U
DIETHYLPHthalATE	410 U	390 U	400 U	400 U	400 U	390 U
DIMETHYLPHthalATE	410 U	390 U	400 U	400 U	400 U	390 U
DI-N-BUTYLPHthalATE	410 U	390 U	400 U	400 U	400 U	390 U
DI-N-OCTYLPHthalATE	410 U	390 U	400 U	400 U	400 U	390 U
FLUORANTHENE	410 U	390 U	400 U	400 U	400 U	390 U
FLUORENE	410 U	390 U	400 U	400 U	400 U	390 U
HEXACHLOROBENZENE	410 U	390 U	400 U	400 U	400 U	390 U
HEXACHLOROBUTADIENE	410 U	390 U	400 U	400 U	400 U	390 U
HEXACHLOROCYCLOPENTADIENE	410 U	390 U	400 U	400 U	400 U	390 U
HEXACHLOROETHANE	410 U	390 U	400 U	400 U	400 U	390 U
INDENO(1,2,3-CD)PYRENE	410 U	390 U	400 U	400 U	400 U	390 U
ISOPHORONE	410 U	390 U	400 U	400 U	400 U	390 U



**FREQUENCY OF DETECTION SUMMARY**  
**SUBSURFACE SOIL - TCL ORGANICS**  
**PHASE II - FIXED BASE LABORATORY**  
**RI/FS CTO-0356**  
**OPERABLE UNIT NO. 16 (SITE 93)**  
**MCB CAMP LEJEUNE, NORTH CAROLINA**

SAMPLE ID	IR93-MW03IW-02	IR93-MW03IW-04	IR93-MW04-02	IR93-MW04-04	IR93-MW04IW-02	IR93-MW04IW-04
PHASE	PHASE II	PHASE II	PHASE II	PHASE II	PHASE II	PHASE II
DATE SAMPLED	04/29/97	04/29/97	05/06/97	05/06/97	05/06/97	05/06/97
DEPTH	3-5'	7-9'	3-5'	7-9'	3-5'	7-9'
<b>SEMIVOLATILES (ug/kg) (cont)</b>						
NAPHTHALENE	410 U	390 U	400 U	400 U	400 U	390 U
NITROBENZENE	410 U	390 U	400 U	400 U	400 U	390 U
N-NITROSO-DI-N-PROPYLAMINE	410 U	390 U	400 U	400 U	400 U	390 U
N-NITROSODIPHENYLAMINE (1)	410 U	390 U	400 U	400 U	400 U	390 U
PENTACHLOROPHENOL	1000 U	970 U	990 U	990 U	1000 U	970 U
PHENANTHRENE	410 U	390 U	400 U	400 U	400 U	390 U
PHENOL	410 U	390 U	400 U	400 U	400 U	390 U
PYRENE	410 U	390 U	400 U	400 U	400 U	390 U

**FREQUENCY OF DETECTION SUMMARY**  
**SUBSURFACE SOIL - TCL ORGANICS**  
**PHASE II - FIXED BASE LABORATORY**  
**RI/FS CTO-0356**  
**OPERABLE UNIT NO. 16 (SITE 93)**  
**MCB CAMP LEJEUNE, NORTH CAROLINA**

SAMPLE ID	IR93-MW03IW-02	IR93-MW03IW-04	IR93-MW04-02	IR93-MW04-04	IR93-MW04IW-02	IR93-MW04IW-04
PHASE	PHASE II	PHASE II	PHASE II	PHASE II	PHASE II	PHASE II
DATE SAMPLED	04/29/97	04/29/97	05/06/97	05/06/97	05/06/97	05/06/97
DEPTH	3-5'	7-9'	3-5'	7-9'	3-5'	7-9'
<b>PESTICIDES/PCBS (ug/kg)</b>						
4,4'-DDD	NA	NA	NA	NA	NA	NA
4,4'-DDE	NA	NA	NA	NA	NA	NA
4,4'-DDT	NA	NA	NA	NA	NA	NA
ALDRIN	NA	NA	NA	NA	NA	NA
ALPHA-BHC	NA	NA	NA	NA	NA	NA
ALPHA-CHLORDANE	NA	NA	NA	NA	NA	NA
AROCLOR-1016	NA	NA	NA	NA	NA	NA
AROCLOR-1221	NA	NA	NA	NA	NA	NA
AROCLOR-1232	NA	NA	NA	NA	NA	NA
AROCLOR-1242	NA	NA	NA	NA	NA	NA
AROCLOR-1248	NA	NA	NA	NA	NA	NA
AROCLOR-1254	NA	NA	NA	NA	NA	NA
AROCLOR-1260	NA	NA	NA	NA	NA	NA
BETA-BHC	NA	NA	NA	NA	NA	NA
DELTA-BHC	NA	NA	NA	NA	NA	NA
DIELDRIN	NA	NA	NA	NA	NA	NA
ENDOSULFAN I	NA	NA	NA	NA	NA	NA
ENDOSULFAN II	NA	NA	NA	NA	NA	NA
ENDOSULFAN SULFATE	NA	NA	NA	NA	NA	NA
ENDRIN	NA	NA	NA	NA	NA	NA
ENDRIN ALDEHYDE	NA	NA	NA	NA	NA	NA
ENDRIN KETONE	NA	NA	NA	NA	NA	NA
GAMMA-BHC (LINDANE)	NA	NA	NA	NA	NA	NA
GAMMA-CHLORDANE	NA	NA	NA	NA	NA	NA
HEPTACHLOR	NA	NA	NA	NA	NA	NA
HEPTACHLOR EPOXIDE	NA	NA	NA	NA	NA	NA
METHOXYCHLOR	NA	NA	NA	NA	NA	NA
TOXAPHENE	NA	NA	NA	NA	NA	NA

**FREQUENCY OF DETECTION SUMMARY**  
**SUBSURFACE SOIL - TCL ORGANICS**  
**PHASE II - FIXED BASE LABORATORY**  
**RI/FS CTO-0356**  
**OPERABLE UNIT NO. 16 (SITE 93)**  
**MCB CAMP LEJEUNE, NORTH CAROLINA**

SAMPLE ID	IR93-MW05-02	IR93-MW05-04	IR93-MW05IW-02	IR93-MW05IW-04
PHASE	PHASE II	PHASE II	PHASE II	PHASE II
DATE SAMPLED	04/21/97	04/21/97	04/20/97	04/20/97
DEPTH	3-5'	7-9'	3-5'	7-9'
<b>VOLATILES (ug/kg)</b>				
1,1,1-TRICHLOROETHANE	12 U	12 UJ	12 U	12 U
1,1,2,2-TETRACHLOROETHANE	12 U	12 U	12 U	12 U
1,1,2-TRICHLOROETHANE	12 U	12 UJ	12 U	12 U
1,1-DICHLOROETHANE	12 U	12 U	12 U	12 U
1,1-DICHLOROETHENE	12 U	12 U	12 U	12 U
1,2-DICHLOROETHANE	12 U	12 U	12 U	12 U
1,2-DICHLOROETHENE (TOTAL)	12 U	12 U	12 U	12 U
1,2-DICHLOROPROPANE	12 U	12 UJ	12 U	12 U
2-BUTANONE	12 U	12 U	13 J	12 U
2-HEXANONE	12 U	12 U	12 U	12 U
4-METHYL-2-PENTANONE	12 U	12 U	12 U	12 U
ACETONE	43 J	12 UJ	340	60
BENZENE	12 U	12 UJ	12 U	12 U
BROMODICHLOROMETHANE	12 U	12 UJ	12 U	12 U
BROMOFORM	12 U	12 UJ	12 U	12 U
BROMOMETHANE	12 U	12 U	12 U	12 U
CARBON DISULFIDE	12 U	12 U	12 U	12 U
CARBON TETRACHLORIDE	12 U	12 UJ	12 U	12 U
CHLOROBENZENE	12 U	12 U	12 U	12 U
CHLOROETHANE	12 U	12 U	12 U	12 U
CHLOROFORM	12 U	12 U	12 U	12 U
CHLOROMETHANE	12 U	12 U	12 U	12 U
CIS-1,3-DICHLOROPROPENE	12 U	12 UJ	12 U	12 U
DIBROMOCHLOROMETHANE	12 U	12 UJ	12 U	12 U
ETHYLBENZENE	12 U	12 U	12 U	12 U
METHYLENE CHLORIDE	12 U	12 U	12 U	12 U
STYRENE	12 U	12 U	12 U	12 U
TETRACHLOROETHENE	12 U	12 U	12 U	12 U

**FREQUENCY OF DETECTION SUMMARY**  
**SUBSURFACE SOIL - TCL ORGANICS**  
**PHASE II - FIXED BASE LABORATORY**  
**RI/FS CTO-0356**  
**OPERABLE UNIT NO. 16 (SITE 93)**  
**MCB CAMP LEJEUNE, NORTH CAROLINA**

SAMPLE ID	IR93-MW05-02	IR93-MW05-04	IR93-MW05IW-02	IR93-MW05IW-04
PHASE	PHASE II	PHASE II	PHASE II	PHASE II
DATE SAMPLED	04/21/97	04/21/97	04/20/97	04/20/97
DEPTH	3-5'	7-9'	3-5'	7-9'
<b>VOLATILES (ug/kg) (cont)</b>				
TOLUENE	12 U	12 U	12 U	12 U
TRANS-1,3-DICHLOROPROPENE	12 U	12 UJ	12 U	12 U
TRICHLOROETHENE	12 U	12 UJ	12 U	12 U
VINYL CHLORIDE	12 U	12 U	12 U	12 U
XYLENE (TOTAL)	12 U	12 U	12 U	12 U

**FREQUENCY OF DETECTION SUMMARY**  
**SUBSURFACE SOIL - TCL ORGANICS**  
**PHASE II - FIXED BASE LABORATORY**  
**RI/FS CTO-0356**  
**OPERABLE UNIT NO. 16 (SITE 93)**  
**MCB CAMP LEJEUNE, NORTH CAROLINA**

SAMPLE ID	IR93-MW05-02	IR93-MW05-04	IR93-MW05IW-02	IR93-MW05IW-04
PHASE	PHASE II	PHASE II	PHASE II	PHASE II
DATE SAMPLED	04/21/97	04/21/97	04/20/97	04/20/97
DEPTH	3-5'	7-9'	3-5'	7-9'
<b>SEMIVOLATILES (ug/kg)</b>				
1,2,4-TRICHLOROBENZENE	400 U	420 U	410 U	400 U
1,2-DICHLOROBENZENE	400 U	420 U	410 U	400 U
1,3-DICHLOROBENZENE	400 U	420 U	410 U	400 U
1,4-DICHLOROBENZENE	400 U	420 U	410 U	400 U
2,2'-OXYBIS(1-CHLOROPROPANE)	400 U	420 U	410 U	400 U
2,4,5-TRICHLOROPHENOL	1000 U	1000 U	1000 U	990 U
2,4,6-TRICHLOROPHENOL	400 U	420 U	410 U	400 U
2,4-DICHLOROPHENOL	400 U	420 U	410 U	400 U
2,4-DIMETHYLPHENOL	400 U	420 U	410 U	400 U
2,4-DINITROPHENOL	1000 U	1000 U	1000 U	990 U
2,4-DINITROTOLUENE	400 U	420 U	410 U	400 U
2,6-DINITROTOLUENE	400 U	420 U	410 U	400 U
2-CHLORONAPHTHALENE	400 U	420 U	410 U	400 U
2-CHLOROPHENOL	400 U	420 U	410 U	400 U
2-METHYLNAPHTHALENE	400 U	420 U	410 U	400 U
2-METHYLPHENOL	400 U	420 U	410 U	400 U
2-NITROANILINE	1000 U	1000 U	1000 U	990 U
2-NITROPHENOL	400 U	420 U	410 U	400 U
3,3'-DICHLOROBENZIDINE	400 U	420 U	410 U	400 U
3-NITROANILINE	1000 U	1000 U	1000 U	990 U
4,6-DINITRO-2-METHYLPHENOL	1000 U	1000 U	1000 U	990 U
4-BROMOPHENYL-PHENYLETHER	400 U	420 U	410 U	400 U
4-CHLORO-3-METHYLPHENOL	400 U	420 U	410 U	400 U
4-CHLOROANILINE	400 U	420 U	410 U	400 U
4-CHLOROPHENYL-PHENYLETHER	400 U	420 U	410 U	400 U
4-METHYLPHENOL	400 U	420 U	410 U	400 U
4-NITROANILINE	1000 U	1000 U	1000 U	990 U
4-NITROPHENOL	1000 U	1000 U	1000 U	990 U

**FREQUENCY OF DETECTION SUMMARY**  
**SUBSURFACE SOIL - TCL ORGANICS**  
**PHASE II - FIXED BASE LABORATORY**  
**RI/FS CTO-0356**  
**OPERABLE UNIT NO. 16 (SITE 93)**  
**MCB CAMP LEJEUNE, NORTH CAROLINA**

SAMPLE ID	IR93-MW05-02	IR93-MW05-04	IR93-MW05IW-02	IR93-MW05IW-04
PHASE	PHASE II	PHASE II	PHASE II	PHASE II
DATE SAMPLED	04/21/97	04/21/97	04/20/97	04/20/97
DEPTH	3-5'	7-9'	3-5'	7-9'
<b>SEMIVOLATILES (ug/kg) (cont)</b>				
ACENAPHTHENE	400 U	420 U	410 U	400 U
ACENAPHTHYLENE	400 U	420 U	410 U	400 U
ANTHRACENE	400 U	420 U	410 U	400 U
BENZO(A)ANTHRACENE	400 U	420 U	410 U	400 U
BENZO(A)PYRENE	400 U	420 U	410 U	400 U
BENZO(B)FLUORANTHENE	400 U	420 U	410 U	400 U
BENZO(G,H,I)PERYLENE	400 U	420 U	410 U	400 U
BENZO(K)FLUORANTHENE	400 U	420 U	410 U	400 U
BIS(2-CHLOROETHOXY)METHANE	400 U	420 U	410 U	400 U
BIS(2-CHLOROETHYL)ETHER	400 U	420 U	410 U	400 U
BIS(2-ETHYLHEXYL)PHTHALATE	400 U	420 U	43 J	400 U
BUTYLBENZYLPHTHALATE	400 U	420 U	410 U	400 U
CARBAZOLE	400 U	420 U	410 U	400 U
CHRYSENE	400 U	420 U	410 U	400 U
DIBENZO(A,H)ANTHRACENE	400 U	420 U	410 U	400 U
DIBENZOFURAN	400 U	420 U	410 U	400 U
DIETHYLPHTHALATE	400 U	420 U	410 U	400 U
DIMETHYLPHTHALATE	400 U	420 U	410 U	400 U
DI-N-BUTYLPHTHALATE	400 U	420 U	410 U	400 U
DI-N-OCTYLPHTHALATE	400 U	420 U	410 U	400 U
FLUORANTHENE	400 U	420 U	410 U	400 U
FLUORENE	400 U	420 U	410 U	400 U
HEXACHLORO BENZENE	400 U	420 U	410 U	400 U
HEXACHLORO BUTADIENE	400 U	420 U	410 U	400 U
HEXACHLORO CYCLOPENTADIENE	400 U	420 U	410 U	400 U
HEXACHLORO ETHANE	400 U	420 U	410 U	400 U
INDENO(1,2,3-CD)PYRENE	400 U	420 U	410 U	400 U
ISOPHORONE	400 U	420 U	410 U	400 U

**FREQUENCY OF DETECTION SUMMARY**  
**SUBSURFACE SOIL - TCL ORGANICS**  
**PHASE II - FIXED BASE LABORATORY**  
**RI/FS CTO-0356**  
**OPERABLE UNIT NO. 16 (SITE 93)**  
**MCB CAMP LEJEUNE, NORTH CAROLINA**

SAMPLE ID	IR93-MW05-02	IR93-MW05-04	IR93-MW05IW-02	IR93-MW05IW-04
PHASE	PHASE II	PHASE II	PHASE II	PHASE II
DATE SAMPLED	04/21/97	04/21/97	04/20/97	04/20/97
DEPTH	3-5'	7-9'	3-5'	7-9'
<b>SEMIVOLATILES (ug/kg) (cont)</b>				
NAPHTHALENE	400 U	420 U	410 U	400 U
NITROBENZENE	400 U	420 U	410 U	400 U
N-NITROSO-DI-N-PROPYLAMINE	400 U	420 U	410 U	400 U
N-NITROSODIPHENYLAMINE (1)	400 U	420 U	410 U	400 U
PENTACHLOROPHENOL	1000 U	1000 U	1000 U	990 U
PHENANTHRENE	400 U	420 U	410 U	400 U
PHENOL	400 U	420 U	410 U	400 U
PYRENE	400 U	420 U	410 U	400 U

**FREQUENCY OF DETECTION SUMMARY**  
**SUBSURFACE SOIL - TCL ORGANICS**  
**PHASE II - FIXED BASE LABORATORY**  
**RI/FS CTO-0356**  
**OPERABLE UNIT NO. 16 (SITE 93)**  
**MCB CAMP LEJEUNE, NORTH CAROLINA**

SAMPLE ID	IR93-MW05-02	IR93-MW05-04	IR93-MW05IW-02	IR93-MW05IW-04
PHASE	PHASE II	PHASE II	PHASE II	PHASE II
DATE SAMPLED	04/21/97	04/21/97	04/20/97	04/20/97
DEPTH	3-5'	7-9'	3-5'	7-9'
<b>PESTICIDES/PCBS (ug/kg)</b>				
4,4'-DDD	4.1 U	NA	NA	NA
4,4'-DDE	4.1 U	NA	NA	NA
4,4'-DDT	2.4 U	NA	NA	NA
ALDRIN	2 U	NA	NA	NA
ALPHA-BHC		NA	NA	NA
ALPHA-CHLORDANE	2 U	NA	NA	NA
AROCLOR-1016	41 U	NA	NA	NA
AROCLOR-1221	82 U	NA	NA	NA
AROCLOR-1232	41 U	NA	NA	NA
AROCLOR-1242	41 U	NA	NA	NA
AROCLOR-1248	41 U	NA	NA	NA
AROCLOR-1254	41 U	NA	NA	NA
AROCLOR-1260	41 U	NA	NA	NA
BETA-BHC	2 U	NA	NA	NA
DELTA-BHC	2 U	NA	NA	NA
DIELDRIN	4.1 U	NA	NA	NA
ENDOSULFAN I	2 U	NA	NA	NA
ENDOSULFAN II	4.1 U	NA	NA	NA
ENDOSULFAN SULFATE	4.1 U	NA	NA	NA
ENDRIN	4.1 U	NA	NA	NA
ENDRIN ALDEHYDE	4.1 U	NA	NA	NA
ENDRIN KETONE	4.1 U	NA	NA	NA
GAMMA-BHC (LINDANE)	2 U	NA	NA	NA
GAMMA-CHLORDANE	2 U	NA	NA	NA
HEPTACHLOR	2 U	NA	NA	NA
HEPTACHLOR EPOXIDE	2 U	NA	NA	NA
METHOXYCHLOR	20 U	NA	NA	NA
TOXAPHENE	200 U	NA	NA	NA



**FREQUENCY OF DETECTION SUMMARY**  
**SUBSURFACE SOIL - TCL ORGANICS**  
**PHASE II - FIXED BASE LABORATORY**  
**RI/FS CTO-0356**  
**OPERABLE UNIT NO. 16 (SITE 93)**  
**MCB CAMP LEJEUNE, NORTH CAROLINA**

SAMPLE ID PHASE DATE SAMPLED DEPTH	Minimum Non-Detect	Maximum Non-Detect	Minimum Detected	Maximum Detected	Location of Maximum Detect	Frequency of Detection	Arithmetic Mean Positive Detects	Median Positive Detects
<b>VOLATILES (ug/kg)</b>								
1,1,1-TRICHLOROETHANE	11 U	13 U	ND	ND		0/22	--	--
1,1,2,2-TETRACHLOROETHANE	11 U	13 UJ	ND	ND		0/22	--	--
1,1,2-TRICHLOROETHANE	11 U	13 U	ND	ND		0/22	--	--
1,1-DICHLOROETHANE	11 U	13 U	ND	ND		0/22	--	--
1,1-DICHLOROETHENE	11 U	13 U	ND	ND		0/22	--	--
1,2-DICHLOROETHANE	11 U	13 U	ND	ND		0/22	--	--
1,2-DICHLOROETHENE (TOTAL)	11 U	13 U	ND	ND		0/22	--	--
1,2-DICHLOROPROPANE	11 U	13 U	ND	ND		0/22	--	--
2-BUTANONE	11 U	13 J	13 J	13 J	IR93-MW05IW-02	1/22	13	13
2-HEXANONE	11 U	13 UJ	ND	ND		0/22	--	--
4-METHYL-2-PENTANONE	11 U	13 UJ	ND	ND		0/22	--	--
ACETONE	11 U	12 UJ	19 J	340	IR93-MW05IW-02	13/22	73.15	43
BENZENE	11 U	13 U	ND	ND		0/22	--	--
BROMODICHLOROMETHANE	11 U	13 U	ND	ND		0/22	--	--
BROMOFORM	11 U	13 U	ND	ND		0/22	--	--
BROMOMETHANE	11 U	13 U	ND	ND		0/22	--	--
CARBON DISULFIDE	11 U	13 U	ND	ND		0/22	--	--
CARBON TETRACHLORIDE	11 U	13 U	ND	ND		0/22	--	--
CHLOROBENZENE	11 U	13 UJ	ND	ND		0/22	--	--
CHLOROETHANE	11 U	13 U	ND	ND		0/22	--	--
CHLOROFORM	11 U	13 U	ND	ND		0/22	--	--
CHLOROMETHANE	11 U	13 U	ND	ND		0/22	--	--
CIS-1,3-DICHLOROPROPENE	11 U	13 U	ND	ND		0/22	--	--
DIBROMOCHLOROMETHANE	11 U	13 U	ND	ND		0/22	--	--
ETHYLBENZENE	11 U	13 UJ	ND	ND		0/22	--	--
METHYLENE CHLORIDE	11 U	13 U	ND	ND		0/22	--	--
STYRENE	11 U	13 UJ	ND	ND		0/22	--	--
TETRACHLOROETHENE	11 U	13 UJ	ND	ND		0/22	--	--

**FREQUENCY OF DETECTION SUMMARY**  
**SUBSURFACE SOIL - TCL ORGANICS**  
**PHASE II - FIXED BASE LABORATORY**  
**RI/FS CTO-0356**  
**OPERABLE UNIT NO. 16 (SITE 93)**  
**MCB CAMP LEJEUNE, NORTH CAROLINA**

SAMPLE ID PHASE DATE SAMPLED DEPTH	Minimum Non-Detect	Maximum Non-Detect	Minimum Detected	Maximum Detected	Location of Maximum Detect	Frequency of Detection	Arithmetic Mean Positive Detects	Median Positive Detects
<b>VOLATILES (ug/kg) (cont)</b>								
TOLUENE	11 U	13 UJ	ND	ND		0/22	--	--
TRANS-1,3-DICHLOROPROPENE	11 U	13 U	ND	ND		0/22	--	--
TRICHLOROETHENE	11 U	13 U	ND	ND		0/22	--	--
VINYL CHLORIDE	11 U	13 U	ND	ND		0/22	--	--
XYLENE (TOTAL)	11 U	13 UJ	ND	ND		0/22	--	--

**FREQUENCY OF DETECTION SUMMARY**  
**SUBSURFACE SOIL - TCL ORGANICS**  
**PHASE II - FIXED BASE LABORATORY**  
**RI/FS CTO-0356**  
**OPERABLE UNIT NO. 16 (SITE 93)**  
**MCB CAMP LEJEUNE, NORTH CAROLINA**

SAMPLE ID	Minimum	Maximum	Minimum	Maximum	Location of	Frequency	Arithmetic Mean	Median
PHASE	Non-Detect	Non-Detect	Detected	Detected	Maximum Detect	of Detection	Positive Detects	Positive Detects
DATE SAMPLED								
DEPTH								
<b>SEMIVOLATILES (ug/kg)</b>								
1,2,4-TRICHLOROBENZENE	360 U	420 U	ND	ND		0/22	--	--
1,2-DICHLOROBENZENE	360 U	420 U	ND	ND		0/22	--	--
1,3-DICHLOROBENZENE	360 U	420 U	ND	ND		0/22	--	--
1,4-DICHLOROBENZENE	360 U	420 U	ND	ND		0/22	--	--
2,2'-OXYBIS(1-CHLOROPROPANE)	360 U	420 U	ND	ND		0/22	--	--
2,4,5-TRICHLOROPHENOL	910 U	1000 U	ND	ND		0/22	--	--
2,4,6-TRICHLOROPHENOL	360 U	420 U	ND	ND		0/22	--	--
2,4-DICHLOROPHENOL	360 U	420 U	ND	ND		0/22	--	--
2,4-DIMETHYLPHENOL	360 U	420 U	ND	ND		0/22	--	--
2,4-DINITROPHENOL	910 U	1000 U	ND	ND		0/22	--	--
2,4-DINITROTOLUENE	360 U	420 U	ND	ND		0/22	--	--
2,6-DINITROTOLUENE	360 U	420 U	ND	ND		0/22	--	--
2-CHLORONAPHTHALENE	360 U	420 U	ND	ND		0/22	--	--
2-CHLOROPHENOL	360 U	420 U	ND	ND		0/22	--	--
2-METHYLNAPHTHALENE	360 U	420 U	ND	ND		0/22	--	--
2-METHYLPHENOL	360 U	420 U	ND	ND		0/22	--	--
2-NITROANILINE	910 U	1000 U	ND	ND		0/22	--	--
2-NITROPHENOL	360 U	420 U	ND	ND		0/22	--	--
3,3'-DICHLOROBENZIDINE	360 U	420 U	ND	ND		0/22	--	--
3-NITROANILINE	910 U	1000 U	ND	ND		0/22	--	--
4,6-DINITRO-2-METHYLPHENOL	910 U	1000 U	ND	ND		0/22	--	--
4-BROMOPHENYL-PHENYLETHER	360 U	420 U	ND	ND		0/22	--	--
4-CHLORO-3-METHYLPHENOL	360 U	420 U	ND	ND		0/22	--	--
4-CHLOROANILINE	360 U	420 U	ND	ND		0/22	--	--
4-CHLOROPHENYL-PHENYLETHER	360 U	420 U	ND	ND		0/22	--	--
4-METHYLPHENOL	360 U	420 U	ND	ND		0/22	--	--
4-NITROANILINE	910 U	1000 U	ND	ND		0/22	--	--
4-NITROPHENOL	910 U	1000 U	ND	ND		0/22	--	--

**FREQUENCY OF DETECTION SUMMARY**  
**SUBSURFACE SOIL - TCL ORGANICS**  
**PHASE II - FIXED BASE LABORATORY**  
**RI/FS CTO-0356**  
**OPERABLE UNIT NO. 16 (SITE 93)**  
**MCB CAMP LEJEUNE, NORTH CAROLINA**

SAMPLE ID PHASE DATE SAMPLED DEPTH	Minimum Non-Detect	Maximum Non-Detect	Minimum Detected	Maximum Detected	Location of Maximum Detect	Frequency of Detection	Arithmetic Mean Positive Detects	Median Positive Detects
<b>SEMIVOLATILES (ug/kg) (cont)</b>								
ACENAPHTHENE	360 U	420 U	ND	ND		0/22	--	--
ACENAPHTHYLENE	360 U	420 U	ND	ND		0/22	--	--
ANTHRACENE	360 U	420 U	ND	ND		0/22	--	--
BENZO(A)ANTHRACENE	360 U	420 U	ND	ND		0/22	--	--
BENZO(A)PYRENE	360 U	420 U	400 J	400 J	IR93-MW02IW-04	1/22	400	400
BENZO(B)FLUORANTHENE	360 U	420 U	ND	ND		0/22	--	--
BENZO(G,H,I)PERYLENE	360 U	420 U	ND	ND		0/22	--	--
BENZO(K)FLUORANTHENE	360 U	420 U	ND	ND		0/22	--	--
BIS(2-CHLOROETHOXY)METHANE	360 U	420 U	ND	ND		0/22	--	--
BIS(2-CHLOROETHYL)ETHER	360 U	420 U	ND	ND		0/22	--	--
BIS(2-ETHYLHEXYL)PHTHALATE	360 U	920 U	43 J	420 J	IR93-MW02DW-04	5/22	162	75
BUTYLBENZYLPHthalATE	360 U	420 U	ND	ND		0/22	--	--
CARBAZOLE	360 U	420 U	ND	ND		0/22	--	--
CHRYSENE	360 U	420 U	ND	ND		0/22	--	--
DIBENZO(A,H)ANTHRACENE	360 U	420 U	ND	ND		0/22	--	--
DIBENZOFURAN	360 U	420 U	ND	ND		0/22	--	--
DIETHYLPHthalATE	360 U	420 U	ND	ND		0/22	--	--
DIMETHYLPHthalATE	360 U	420 U	ND	ND		0/22	--	--
DI-N-BUTYLPHthalATE	360 U	420 U	ND	ND		0/22	--	--
DI-N-OCTYLPHthalATE	360 U	420 U	ND	ND		0/22	--	--
FLUORANTHENE	360 U	420 U	ND	ND		0/22	--	--
FLUORENE	360 U	420 U	ND	ND		0/22	--	--
HEXACHLOROBENZENE	360 U	420 U	ND	ND		0/22	--	--
HEXACHLOROBUTADIENE	360 U	420 U	ND	ND		0/22	--	--
HEXACHLOROCYCLOPENTADIENE	360 U	420 U	ND	ND		0/22	--	--
HEXACHLOROETHANE	360 U	420 U	ND	ND		0/22	--	--
INDENO(1,2,3-CD)PYRENE	360 U	420 U	ND	ND		0/22	--	--
ISOPHORONE	360 U	420 U	ND	ND		0/22	--	--

**FREQUENCY OF DETECTION SUMMARY**  
**SUBSURFACE SOIL - TCL ORGANICS**  
**PHASE II - FIXED BASE LABORATORY**  
**RI/FS CTO-0356**  
**OPERABLE UNIT NO. 16 (SITE 93)**  
**MCB CAMP LEJEUNE, NORTH CAROLINA**

SAMPLE ID	Minimum	Maximum	Minimum	Maximum	Location of	Frequency	Arithmetic Mean	Median
PHASE	Non-Detect	Non-Detect	Detected	Detected	Maximum Detect	of Detection	Positive Detects	Positive Detects
DATE SAMPLED								
DEPTH								
<b>SEMIVOLATILES (ug/kg) (cont)</b>								
NAPHTHALENE	360 U	420 U	ND	ND		0/22	--	--
NITROBENZENE	360 U	420 U	ND	ND		0/22	--	--
N-NITROSO-DI-N-PROPYLAMINE	360 U	420 U	ND	ND		0/22	--	--
N-NITROSODIPHENYLAMINE (1)	360 U	420 U	ND	ND		0/22	--	--
PENTACHLOROPHENOL	910 U	1000 U	ND	ND		0/22	--	--
PHENANTHRENE	360 U	420 U	ND	ND		0/22	--	--
PHENOL	360 U	420 U	ND	ND		0/22	--	--
PYRENE	360 U	420 U	ND	ND		0/22	--	--

**FREQUENCY OF DETECTION SUMMARY**  
**SUBSURFACE SOIL - TCL ORGANICS**  
**PHASE II - FIXED BASE LABORATORY**  
**RI/FS CTO-0356**  
**OPERABLE UNIT NO. 16 (SITE 93)**  
**MCB CAMP LEJEUNE, NORTH CAROLINA**

SAMPLE ID PHASE DATE SAMPLED DEPTH	Minimum Non-Detect	Maximum Non-Detect	Minimum Detected	Maximum Detected	Location of Maximum Detect	Frequency of Detection	Arithmetic Mean Positive Detects	Median Positive Detects
<b>PESTICIDES/PCBS (ug/kg)</b>								
4,4'-DDD	3.7 UJ	4.1 U	55	55	IR93-MW02DW-02	1/3	55	55
4,4'-DDE	3.7 UJ	4.1 U	22	22	IR93-MW02DW-02	1/3	22	22
4,4'-DDT	2.4 U	3.7 UJ	33	33	IR93-MW02DW-02	1/3	33	33
ALDRIN	1.8 UJ	2 U	ND	ND		0/3	--	--
ALPHA-BHC	1.8 UJ	1.9 U	ND	ND		0/2	--	--
ALPHA-CHLORDANE	1.8 UJ	2 U	ND	ND		0/3	--	--
AROCLOR-1016	37 U	41 U	ND	ND		0/3	--	--
AROCLOR-1221	74 U	82 U	ND	ND		0/3	--	--
AROCLOR-1232	37 U	41 U	ND	ND		0/3	--	--
AROCLOR-1242	37 U	41 U	ND	ND		0/3	--	--
AROCLOR-1248	37 U	41 U	ND	ND		0/3	--	--
AROCLOR-1254	37 U	41 U	ND	ND		0/3	--	--
AROCLOR-1260	37 U	41 U	ND	ND		0/3	--	--
BETA-BHC	1.8 UJ	2 U	ND	ND		0/3	--	--
DELTA-BHC	1.8 UJ	2 U	ND	ND		0/3	--	--
DIELDRIN	3.7 U	4.1 U	ND	ND		0/3	--	--
ENDOSULFAN I	1.8 UJ	2 U	ND	ND		0/3	--	--
ENDOSULFAN II	3.7 U	4.1 U	ND	ND		0/3	--	--
ENDOSULFAN SULFATE	3.7 U	4.1 U	ND	ND		0/3	--	--
ENDRIN	3.7 U	4.1 U	ND	ND		0/3	--	--
ENDRIN ALDEHYDE	3.7 U	4.1 U	ND	ND		0/3	--	--
ENDRIN KETONE	3.7 U	4.1 U	ND	ND		0/3	--	--
GAMMA-BHC (LINDANE)	1.8 UJ	2 U	ND	ND		0/3	--	--
GAMMA-CHLORDANE	1.8 UJ	2 U	ND	ND		0/3	--	--
HEPTACHLOR	1.8 UJ	2 U	ND	ND		0/3	--	--
HEPTACHLOR EPOXIDE	1.8 UJ	2 U	ND	ND		0/3	--	--
METHOXYCHLOR	18 UJ	20 U	ND	ND		0/3	--	--
TOXAPHENE	180 UJ	200 U	ND	ND		0/3	--	--

**SITE 93 SUBSURFACE SOIL - INORGANICS**

**FREQUENCY OF DETECTION SUMMARY**  
**SUBSURFACE SOIL - TAL METALS**  
**PHASE II - FIXED BASE LABORATORY**  
**RI/FS CTO-0356**  
**OPERABLE UNIT NO. 16 (SITE 93)**  
**MCB CAMP LEJEUNE, NORTH CAROLINA**

SAMPLE ID	IR93-MW01-02	IR93-MW01-04	IR93-MW01IW-02	IR93-MW01IW-04	IR93-MW02-02	IR93-MW02-04	IR93-MW02DW-02
PHASE	PHASE II	PHASE II	PHASE II	PHASE II	PHASE II	PHASE II	PHASE II
DATE SAMPLED	04/30/97	04/30/97	04/30/97	04/30/97	04/22/97	04/22/97	05/16/97
DEPTH	3-5'	7-9'	3-5'	7-9'	3-5'	7-9'	3-5'
<b>TOTAL METALS (mg/kg)</b>							
ALUMINUM, TOTAL	5970 J	4820 J	15700 J	2570 J	3100	4290 UJ	741 J
ANTIMONY, TOTAL	0.31 U	0.29 U	0.36 U	0.3 U	0.35 UJ	0.31 J	0.43
ARSENIC, TOTAL	0.96 J	0.33 UJ	1.4 J	0.34 UJ	0.39 UJ	0.64	3.1 J
BARIUM, TOTAL	7.8	7.1	19.3	5.2	28.5	40.6	32
BERYLLIUM, TOTAL	0.03	0.04	0.08	0.02	0.13 J	0.18 J	0.5
CADMIUM, TOTAL	0.04 U	0.04 U	0.05	0.04 U	0.04 UJ	0.04 J	0.07 U
CALCIUM, TOTAL	97.2	46	164	37.8	1200 J	2610 J	580
CHROMIUM, TOTAL	7.8 J	8 J	17.9 J	5.1 J	2.8 J	8.4 J	3.5
COBALT, TOTAL	0.17 J	0.12 J	0.42 J	0.06 J	1.1 J	1.2 J	1.6 J
COPPER, TOTAL	0.4 J	0.16 J	0.2 J	0.36 J	0.32 J	0.92 J	5.5
IRON, TOTAL	2960	1640	6880	785	5650	7200 J	2960
LEAD, TOTAL	4.7 J	4.6 J	9.4 J	3.4 J	4.9 J	5.4	3.1
MAGNESIUM, TOTAL	188	184	504	112	86.8	180	40.6
MANGANESE, TOTAL	7.5	9.8	6.7	8.1	10.4	24.6	1.3
MERCURY, TOTAL	0.04 U	0.04 U	0.05 U	0.04 U	0.04 U	0.06 U	0.05 U
NICKEL, TOTAL	0.55 J	0.27 J	1 J	0.15 J	2.1 J	3.1 J	2.9 J
POTASSIUM, TOTAL	188 J	228 J	510 J	161 J	69.8 U	112 J	74.9 U
SELENIUM, TOTAL	0.37 U	0.35 U	0.55	0.36 U	0.41 U	0.37 U	1.6
SILVER, TOTAL	0.04 UJ	0.04 J	0.04 UJ	0.04 UJ	0.04 U	0.04 U	0.09 U
SODIUM, TOTAL	99	56.4	151	42.5	28.3 UJ	41.7 J	57.4
THALLIUM, TOTAL	0.37 U	0.35 U	0.42 U	0.36 U	0.41 U	0.37 U	0.54 U
VANADIUM, TOTAL	10.6	8.5	25.3	4.4	4.3	6.8	8.7
ZINC, TOTAL	1.7	1.6	4.2	1.1	11.8	8.4	1.1 J



**FREQUENCY OF DETECTION SUMMARY**  
**SUBSURFACE SOIL - TAL METALS**  
**PHASE II - FIXED BASE LABORATORY**  
**RI/FS CTO-0356**  
**OPERABLE UNIT NO. 16 (SITE 93)**  
**MCB CAMP LEJEUNE, NORTH CAROLINA**

SAMPLE ID	IR93-MW02DW-04	IR93-MW02IW-02	IR93-MW02IW-04	IR93-MW03-02	IR93-MW03-04	IR93-MW03IW-02
PHASE	PHASE II	PHASE II	PHASE II	PHASE II	PHASE II	PHASE II
DATE SAMPLED	05/16/97	04/21/97	04/21/97	04/30/97	04/30/97	04/29/97
DEPTH	7-9'	3-5'	7-9'	3-5'	7-9'	3-5'
<b>TOTAL METALS (mg/kg)</b>						
ALUMINUM, TOTAL	748 J	3630	2410	14000 J	2070 J	20500 J
ANTIMONY, TOTAL	0.33 U	0.25 UJ	0.32 UJ	0.39 U	0.3 U	0.3 U
ARSENIC, TOTAL	0.46 UJ	0.28 UJ	0.36 UJ	3.4 J	0.34 UJ	0.74 J
BARIUM, TOTAL	4.4	8.1	13.6	13.8	2.5	17.1
BERYLLIUM, TOTAL	0.31	0.15 J	0.13 J	0.13	0.02 U	0.19
CADMIUM, TOTAL	0.07 U	0.03 UJ	0.04 UJ	0.09	0.04 U	0.07
CALCIUM, TOTAL	581	590 J	1300 J	1100	26	26.1
CHROMIUM, TOTAL	1.3	4.1 J	3 J	19.6 J	4.5 J	28.1 J
COBALT, TOTAL	0.09 UJ	0.05 UJ	0.13 J	0.52 J	0.06 UJ	0.66 J
COPPER, TOTAL	0.14 UJ	13.6	0.41 J	1.6	0.4 J	2.5
IRON, TOTAL	546	2170	2340	14900	501	7130
LEAD, TOTAL	1.9	3.5 J	4.2 J	10.6 J	2.1 J	8.7 J
MAGNESIUM, TOTAL	30.2	79.3	83.1	409	86.9	594
MANGANESE, TOTAL	1.7	5.1	4.1	7.5	4.3	6.7
MERCURY, TOTAL	0.05 U	0.05 U	0.04 U	0.04 U	0.06 U	0.06 U
NICKEL, TOTAL	0.12 UJ	0.55 J	0.14 UJ	1 J	0.13 UJ	1.1 J
POTASSIUM, TOTAL	55 U	65.8 U	83.5 U	651 J	131 J	887 J
SELENIUM, TOTAL	0.38 U	0.3 U	0.38 U	0.58	0.35 U	0.47
SILVER, TOTAL	0.09 U	0.03 U	0.04 U	0.04 UJ	0.04 UJ	0.04 UJ
SODIUM, TOTAL	32.3 U	20.5 UJ	48.5 J	91.4	24.4 U	130
THALLIUM, TOTAL	0.51 U	0.3 U	0.38 U	0.36 U	0.35 U	0.36 U
VANADIUM, TOTAL	1	5.6	2.1	27.6	4.4	64.9
ZINC, TOTAL	0.21 J	1.2 J	1.1 J	5.8	0.58	5.2

**FREQUENCY OF DETECTION SUMMARY**  
**SUBSURFACE SOIL - TAL METALS**  
**PHASE II - FIXED BASE LABORATORY**  
**RI/FS CTO-0356**  
**OPERABLE UNIT NO. 16 (SITE 93)**  
**MCB CAMP LEJEUNE, NORTH CAROLINA**

SAMPLE ID	IR93-MW03IW-04	IR93-MW04-02	IR93-MW04-04	IR93-MW04IW-02	IR93-MW04IW-04	IR93-MW05-02	IR93-MW05-04
PHASE	PHASE II	PHASE II	PHASE II	PHASE II	PHASE II	PHASE II	PHASE II
DATE SAMPLED	04/29/97	05/06/97	05/06/97	05/06/97	05/06/97	04/21/97	04/21/97
DEPTH	7-9'	3-5'	7-9'	3-5'	7-9'	3-5'	7-9'
<b>TOTAL METALS (mg/kg)</b>							
ALUMINUM, TOTAL	1990 J	1390	4590	8260	4060	6920	624
ANTIMONY, TOTAL	0.29 U	0.26 U	0.27	0.32 U	0.35 U	0.36 UJ	0.33 UJ
ARSENIC, TOTAL	0.68 J	0.29 UJ	0.29 UJ	0.86 J	0.39 UJ	0.41 UJ	0.37 UJ
BARIUM, TOTAL	2.7	4.6	8	13.3	6.7	14.8	5
BERYLLIUM, TOTAL	0.02 U	0.02	0.03	0.05	0.02 U	0.04 J	0.08 J
CADMIUM, TOTAL	0.04 U	0.03 UJ	0.03 UJ	0.04 UJ	0.04 UJ	0.05 UJ	0.04 UJ
CALCIUM, TOTAL	54.8	91.9	178	993	182	363 J	143 J
CHROMIUM, TOTAL	4.4 J	2.9	4.4	9.3	3.9	8.7 J	2.8 J
COBALT, TOTAL	0.05 UJ	0.05 UJ	0.07 J	0.17 J	0.07 J	0.19 J	0.06 UJ
COPPER, TOTAL	0.4 J	0.11 U	0.11 U	0.56	0.15 U	0.16 UJ	0.14 UJ
IRON, TOTAL	2620	390	1040	9610	968	4400	387
LEAD, TOTAL	2.9 J	3.9	5.1	6.4	4.5	7.8 J	2
MAGNESIUM, TOTAL	70.1	38.7	129	188	98.5	258	29.2 J
MANGANESE, TOTAL	3.5	2.4	3.6	2.4	2.2	2.8	2.5
MERCURY, TOTAL	0.06 U	0.04 U	0.04 U	0.05 U	0.06 U	0.06 U	0.04 U
NICKEL, TOTAL	0.12 UJ	0.11 UJ	0.11 UJ	0.17 UJ	0.15 UJ	0.16 UJ	0.14 UJ
POTASSIUM, TOTAL	121 J	60.2 U	105	152 J	101 U	220 J	68.4 U
SELENIUM, TOTAL	0.42	0.36 U	0.36 U	0.56 J	0.48 UJ	0.43 U	0.39 U
SILVER, TOTAL	0.04 UJ	0.03 U	0.03 U	0.04 U	0.04 U	0.05 U	0.04 U
SODIUM, TOTAL	23.4 U	81	156	88	56.8	77.7 J	27 UJ
THALLIUM, TOTAL	0.34 U	0.31 UJ	0.31 UJ	0.38 UJ	0.41 UJ	0.43 U	0.39 U
VANADIUM, TOTAL	4.6	2	5.5	14.7	4.6	12	1.7
ZINC, TOTAL	0.41	0.03 UJ	0.71 J	0.78 J	0.14 J	1.3 J	0.32 J

**FREQUENCY OF DETECTION SUMMARY**  
**SUBSURFACE SOIL - TAL METALS**  
**PHASE II - FIXED BASE LABORATORY**  
**RI/FS CTO-0356**  
**OPERABLE UNIT NO. 16 (SITE 93)**  
**MCB CAMP LEJEUNE, NORTH CAROLINA**

SAMPLE ID	IR93-MW05IW-02	IR93-MW05IW-04
PHASE	PHASE II	PHASE II
DATE SAMPLED	04/20/97	04/20/97
DEPTH	3-5'	7-9'
<b>TOTAL METALS (mg/kg)</b>		
ALUMINUM, TOTAL	9310	1010
ANTIMONY, TOTAL	0.28 UJ	0.28 UJ
ARSENIC, TOTAL	0.31 UJ	0.32 UJ
BARIUM, TOTAL	13	6.5
BERYLLIUM, TOTAL	0.06	0.1
CADMIUM, TOTAL	0.03 UJ	0.04 UJ
CALCIUM, TOTAL	274	81.4
CHROMIUM, TOTAL	9.8	5.9
COBALT, TOTAL	0.21 J	0.05 UJ
COPPER, TOTAL	0.12 UJ	0.2 J
IRON, TOTAL	3830	659
LEAD, TOTAL	8.1	2.6
MAGNESIUM, TOTAL	302	71.4
MANGANESE, TOTAL	4.8	10.6
MERCURY, TOTAL	0.05 U	0.04 U
NICKEL, TOTAL	0.4 J	0.12 UJ
POTASSIUM, TOTAL	253 J	115 J
SELENIUM, TOTAL	0.33 UJ	0.34 UJ
SILVER, TOTAL	0.03 U	0.04 U
SODIUM, TOTAL	69.6 J	23.2 UJ
THALLIUM, TOTAL	0.33 UJ	0.34 UJ
VANADIUM, TOTAL	9.4	3.9 J
ZINC, TOTAL	2.6 J	0.53 J

**FREQUENCY OF DETECTION SUMMARY**  
**SUBSURFACE SOIL - TAL METALS**  
**PHASE II - FIXED BASE LABORATORY**  
**R/FS CTO-0356**  
**OPERABLE UNIT NO. 16 (SITE 93)**  
**MCB CAMP LEJEUNE, NORTH CAROLINA**

SAMPLE ID PHASE DATE SAMPLED DEPTH	Minimum Non-Detect	Maximum Non-Detect	Minimum Detected	Maximum Detected	Location of Maximum Detect	Frequency of Detection	Arithmetic Mean Positive Detects	Median Positive Detects
<b>TOTAL METALS (mg/kg)</b>								
ALUMINUM, TOTAL	4290 UJ	4290 UJ	624	20500 J	IR93-MW03IW-02	21/22	5448.24	3630
ANTIMONY, TOTAL	0.25 UJ	0.39 U	0.27	0.43	IR93-MW02DW-02	3/22	0.34	0.31
ARSENIC, TOTAL	0.28 UJ	0.46 UJ	0.64	3.4 J	IR93-MW03-02	8/22	1.47	0.91
BARIUM, TOTAL	NA	NA	2.5	40.6	IR93-MW02-04	22/22	12.48	8.05
BERYLLIUM, TOTAL	0.02 U	0.02 U	0.02	0.5	IR93-MW02DW-02	19/22	0.12	0.08
CADMIUM, TOTAL	0.03 UJ	0.07	0.04 J	0.09	IR93-MW03-02	4/22	0.06	0.06
CALCIUM, TOTAL	NA	NA	26	2610 J	IR93-MW02-04	22/22	487.24	180
CHROMIUM, TOTAL	NA	NA	1.3	28.1 J	IR93-MW03IW-02	22/22	7.55	4.8
COBALT, TOTAL	0.05 UJ	0.09 UJ	0.06 J	1.6 J	IR93-MW02DW-02	15/22	0.45	0.19
COPPER, TOTAL	0.11 U	0.16 UJ	0.16 J	13.6	IR93-MW02IW-02	15/22	1.84	0.4
IRON, TOTAL	NA	NA	387	14900	IR93-MW03-02	22/22	3616.64	2480
LEAD, TOTAL	NA	NA	1.9	10.6 J	IR93-MW03-02	22/22	4.99	4.55
MAGNESIUM, TOTAL	NA	NA	29.2 J	594	IR93-MW03IW-02	22/22	171.04	105.25
MANGANESE, TOTAL	NA	NA	1.3	24.6	IR93-MW02-04	22/22	6.03	4.55
MERCURY, TOTAL	0.04 U	0.06 U	ND	ND		0/22	--	--
NICKEL, TOTAL	0.11 UJ	0.17 UJ	0.15 J	3.1 J	IR93-MW02-04	11/22	1.19	1
POTASSIUM, TOTAL	55 U	101 U	105	887 J	IR93-MW03IW-02	14/22	273.86	174.5
SELENIUM, TOTAL	0.3 U	0.48 UJ	0.42	1.6	IR93-MW02DW-02	6/22	0.7	0.56
SILVER, TOTAL	0.03 U	0.09 U	0.04 J	0.04 J	IR93-MW01-04	1/22	0.04	0.04
SODIUM, TOTAL	20.5 UJ	32.3 U	41.7 J	156	IR93-MW04-04	15/22	83.13	77.7
THALLIUM, TOTAL	0.3 U	0.54 U	ND	ND		0/22	--	--
VANADIUM, TOTAL	NA	NA	1	64.9	IR93-MW03IW-02	22/22	10.57	5.55
ZINC, TOTAL	0.03 UJ	0.03 UJ	0.14 J	11.8	IR93-MW02-02	21/22	2.42	1.1

**SITE 93 GROUNDWATER - ORGANICS**

**FREQUENCY OF DETECTION SUMMARY**  
**GROUNDWATER - VOLATILE ORGANICS**  
**PHASE I - MOBILE LABORATORY AND**  
**PHASE II - FIXED BASE LABORATORY**  
**RI/FS CTO-0356**  
**OPERABLE UNIT NO. 16 (SITE 93)**  
**MCB CAMP LEJEUNE, NORTH CAROLINA**

SAMPLE ID	IR93-MW05-01	IR93-TW01-01	IR93-TW01IW-01	IR93-TW02-01	IR93-TW02IW-01	IR93-TW03-01
PHASE	PHASE I	PHASE I	PHASE I	PHASE I	PHASE I	PHASE I
DATE SAMPLED	7/29/96	7/30/96	7/30/96	7/30/96	7/30/96	7/31/96
<b>VOLATILES (ug/L)</b>						
1,1,1-TRICHLOROETHANE	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
1,1,2,2-TETRACHLOROETHANE	NA	NA	NA	NA	NA	NA
1,1,2-TRICHLOROETHANE	NA	NA	NA	NA	NA	NA
1,1-DICHLOROETHANE	NA	NA	NA	NA	NA	NA
1,1-DICHLOROETHENE	NA	NA	NA	NA	NA	NA
1,2-DICHLOROETHANE	NA	NA	NA	NA	NA	NA
1,2-DICHLOROETHENE (TOTAL)	NA	NA	NA	NA	NA	NA
1,2-DICHLOROPROPANE	NA	NA	NA	NA	NA	NA
2-BUTANONE	NA	NA	NA	NA	NA	NA
2-HEXANONE	NA	NA	NA	NA	NA	NA
4-METHYL-2-PENTANONE	NA	NA	NA	NA	NA	NA
ACETONE	NA	NA	NA	NA	NA	NA
BENZENE	NA	NA	NA	NA	NA	NA
BROMODICHLOROMETHANE	NA	NA	NA	NA	NA	NA
BROMOFORM	NA	NA	NA	NA	NA	NA
BROMOMETHANE	NA	NA	NA	NA	NA	NA
CARBON DISULFIDE	NA	NA	NA	NA	NA	NA
CARBON TETRACHLORIDE	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
CHLOROBENZENE	NA	NA	NA	NA	NA	NA
CHLOROETHANE	NA	NA	NA	NA	NA	NA
CHLOROFORM	0.1 U	0.5	0.6	0.1 U	0.1 U	0.1 U
CHLOROMETHANE	NA	NA	NA	NA	NA	NA
CIS-1,2-DICHLOROETHENE	15	175	1 U	1 U	4	1 U
CIS-1,3-DICHLOROPROPENE	NA	NA	NA	NA	NA	NA
DIBROMOCHLOROMETHANE	NA	NA	NA	NA	NA	NA
ETHYLBENZENE	NA	NA	NA	NA	NA	NA
METHYLENE CHLORIDE	NA	NA	NA	NA	NA	NA
STYRENE	NA	NA	NA	NA	NA	NA

**FREQUENCY OF DETECTION SUMMARY**  
**GROUNDWATER - VOLATILE ORGANICS**  
**PHASE I - MOBILE LABORATORY AND**  
**PHASE II - FIXED BASE LABORATORY**  
**RI/FS CTO-0356**  
**OPERABLE UNIT NO. 16 (SITE 93)**  
**MCB CAMP LEJEUNE, NORTH CAROLINIA**

SAMPLE ID	IR93-MW05-01	IR93-TW01-01	IR93-TW01IW-01	IR93-TW02-01	IR93-TW02IW-01	IR93-TW03-01
PHASE	PHASE I	PHASE I	PHASE I	PHASE I	PHASE I	PHASE I
DATE SAMPLED	7/29/96	7/30/96	7/30/96	7/30/96	7/30/96	7/31/96
<b>VOLATILES (ug/L) (cont)</b>						
TETRACHLOROETHENE	65.1	16.2	0.1 U	0.1 U	0.1 U	0.1 U
TOLUENE	NA	NA	NA	NA	NA	NA
TRANS-1,2-DICHLOROETHENE	5	57	1 U	1 U	1 U	1 U
TRANS-1,3-DICHLOROPROPENE	NA	NA	NA	NA	NA	NA
TRICHLOROETHENE	24.3	39.4	0.1	0.1 U	0.1	0.1 U
VINYL CHLORIDE	50 U	50 U	50 U	50 U	50 U	50 U
XYLENE (TOTAL)	NA	NA	NA	NA	NA	NA

**FREQUENCY OF DETECTION SUMMARY**  
**GROUNDWATER - VOLATILE ORGANICS**  
**PHASE I - MOBILE LABORATORY AND**  
**PHASE II - FIXED BASE LABORATORY**  
**RI/FS CTO-0356**  
**OPERABLE UNIT NO. 16 (SITE 93)**  
**MCB CAMP LEJEUNE, NORTH CAROLINIA**

SAMPLE ID	IR93-TW03IW-01	IR93-TW05-01	IR93-TW05IW-01	IR93-TW06-01	IR93-TW06IW-01	IR93-TW07-01
PHASE	PHASE I	PHASE I	PHASE I	PHASE I	PHASE I	PHASE I
DATE SAMPLED	7/31/96	5/1/96	8/1/96	8/1/96	8/1/96	8/3/96
<b>VOLATILES (ug/L)</b>						
1,1,1-TRICHLOROETHANE	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
1,1,2,2-TETRACHLOROETHANE	NA	NA	NA	NA	NA	NA
1,1,2-TRICHLOROETHANE	NA	NA	NA	NA	NA	NA
1,1-DICHLOROETHANE	NA	NA	NA	NA	NA	NA
1,1-DICHLOROETHENE	NA	NA	NA	NA	NA	NA
1,2-DICHLOROETHANE	NA	NA	NA	NA	NA	NA
1,2-DICHLOROETHENE (TOTAL)	NA	NA	NA	NA	NA	NA
1,2-DICHLOROPROPANE	NA	NA	NA	NA	NA	NA
2-BUTANONE	NA	NA	NA	NA	NA	NA
2-HEXANONE	NA	NA	NA	NA	NA	NA
4-METHYL-2-PENTANONE	NA	NA	NA	NA	NA	NA
ACETONE	NA	NA	NA	NA	NA	NA
BENZENE	NA	NA	NA	NA	NA	NA
BROMODICHLOROMETHANE	NA	NA	NA	NA	NA	NA
BROMOFORM	NA	NA	NA	NA	NA	NA
BROMOMETHANE	NA	NA	NA	NA	NA	NA
CARBON DISULFIDE	NA	NA	NA	NA	NA	NA
CARBON TETRACHLORIDE	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
CHLOROBENZENE	NA	NA	NA	NA	NA	NA
CHLOROETHANE	NA	NA	NA	NA	NA	NA
CHLOROFORM	0.3	0.1 U	0.1 U	0.1 U	1.7	0.1 U
CHLOROMETHANE	NA	NA	NA	NA	NA	NA
CIS-1,2-DICHLOROETHENE	1 U	1 U	1 U	1 U	1 U	1 U
CIS-1,3-DICHLOROPROPENE	NA	NA	NA	NA	NA	NA
DIBROMOCHLOROMETHANE	NA	NA	NA	NA	NA	NA
ETHYLBENZENE	NA	NA	NA	NA	NA	NA
METHYLENE CHLORIDE	NA	NA	NA	NA	NA	NA
STYRENE	NA	NA	NA	NA	NA	NA



**FREQUENCY OF DETECTION SUMMARY**  
**GROUNDWATER - VOLATILE ORGANICS**  
**PHASE I - MOBILE LABORATORY AND**  
**PHASE II - FIXED BASE LABORATORY**  
**RI/FS CTO-0356**  
**OPERABLE UNIT NO. 16 (SITE 93)**  
**MCB CAMP LEJEUNE, NORTH CAROLINIA**

SAMPLE ID	IR93-TW03IW-01	IR93-TW05-01	IR93-TW05IW-01	IR93-TW06-01	IR93-TW06IW-01	IR93-TW07-01
PHASE	PHASE I	PHASE I	PHASE I	PHASE I	PHASE I	PHASE I
DATE SAMPLED	7/31/96	5/1/96	8/1/96	8/1/96	8/1/96	8/3/96
<b>VOLATILES (ug/L) (cont)</b>						
TETRACHLOROETHENE	0.1 U	0.1 U	0.1 U	8.9	0.5	0.8
TOLUENE	NA	NA	NA	NA	NA	NA
TRANS-1,2-DICHLOROETHENE	1 U	1 U	1 U	1 U	1 U	1 U
TRANS-1,3-DICHLOROPROPENE	NA	NA	NA	NA	NA	NA
TRICHLOROETHENE	0.1 U	0.1 U	0.1 U	1.3	0.1	0.6
VINYL CHLORIDE	50 U	50 U	50 U	50 U	50 U	50 U
XYLENE (TOTAL)	NA	NA	NA	NA	NA	NA

**FREQUENCY OF DETECTION SUMMARY**  
**GROUNDWATER - VOLATILE ORGANICS**  
**PHASE I - MOBILE LABORATORY AND**  
**PHASE II - FIXED BASE LABORATORY**  
**RI/FS CTO-0356**  
**OPERABLE UNIT NO. 16 (SITE 93)**  
**MCB CAMP LEJEUNE, NORTH CAROLINA**

SAMPLE ID	IR93-TW07IW-01	IR93-TW14-01	IR93-TW14IW-01	IR93-MW01-01	IR93-MW01IW-01	IR93-MW02-01
PHASE	PHASE I	PHASE I	PHASE I	PHASE II	PHASE II	PHASE II
DATE SAMPLED	8/3/96	8/5/96	8/5/96	05/30/97	05/30/97	06/02/97
<b>VOLATILES (ug/L)</b>						
1,1,1-TRICHLOROETHANE	0.1 U	0.1 U	0.1 U	10 U	10 U	10 U
1,1,2,2-TETRACHLOROETHANE	NA	NA	NA	10 U	10 U	10 U
1,1,2-TRICHLOROETHANE	NA	NA	NA	10 U	10 U	10 U
1,1-DICHLOROETHANE	NA	NA	NA	10 U	10 U	10 U
1,1-DICHLOROETHENE	NA	NA	NA	10 U	10 U	10 U
1,2-DICHLOROETHANE	NA	NA	NA	10 U	10 U	10 U
1,2-DICHLOROETHENE (TOTAL)	NA	NA	NA	10 U	10 U	10 U
1,2-DICHLOROPROPANE	NA	NA	NA	10 U	10 U	10 U
2-BUTANONE	NA	NA	NA	10 U	10 U	10 U
2-HEXANONE	NA	NA	NA	10 U	10 U	10 U
4-METHYL-2-PENTANONE	NA	NA	NA	10 U	10 U	10 U
ACETONE	NA	NA	NA	10 U	10 U	10 U
BENZENE	NA	NA	NA	10 U	10 U	10 U
BROMODICHLOROMETHANE	NA	NA	NA	10 U	10 U	10 U
BROMOFORM	NA	NA	NA	10 U	10 U	10 U
BROMOMETHANE	NA	NA	NA	10 U	10 U	10 U
CARBON DISULFIDE	NA	NA	NA	10 U	10 U	10 U
CARBON TETRACHLORIDE	0.1 U	0.1 U	0.1 U	10 U	10 U	10 U
CHLOROBENZENE	NA	NA	NA	10 U	10 U	10 U
CHLOROETHANE	NA	NA	NA	10 U	10 U	10 U
CHLOROFORM	0.8	0.8	2.3	10 U	10 U	10 U
CHLOROMETHANE	NA	NA	NA	10 U	10 U	10 U
CIS-1,2-DICHLOROETHENE	1 U	1 U	1 U	NA	NA	NA
CIS-1,3-DICHLOROPROPENE	NA	NA	NA	10 U	10 U	10 U
DIBROMOCHLOROMETHANE	NA	NA	NA	10 U	10 U	10 U
ETHYLBENZENE	NA	NA	NA	10 U	10 U	10 U
METHYLENE CHLORIDE	NA	NA	NA	10 U	10 U	10 U
STYRENE	NA	NA	NA	10 U	10 U	10 U

**FREQUENCY OF DETECTION SUMMARY**  
**GROUNDWATER - VOLATILE ORGANICS**  
**PHASE I - MOBILE LABORATORY AND**  
**PHASE II - FIXED BASE LABORATORY**  
**RI/FS CTO-0356**  
**OPERABLE UNIT NO. 16 (SITE 93)**  
**MCB CAMP LEJEUNE, NORTH CAROLINIA**

SAMPLE ID	IR93-TW071W-01	IR93-TW14-01	IR93-TW141W-01	IR93-MW01-01	IR93-MW011W-01	IR93-MW02-01
PHASE	PHASE I	PHASE I	PHASE I	PHASE II	PHASE II	PHASE II
DATE SAMPLED	8/3/96	8/5/96	8/5/96	05/30/97	05/30/97	06/02/97
<b>VOLATILES (ug/L) (cont)</b>						
TETRACHLOROETHENE	0.1	0.1 U	0.1 U	10 U	10 U	3 J
TOLUENE	NA	NA	NA	10 U	10 U	10 U
TRANS-1,2-DICHLOROETHENE	1 U	1 U	1 U	NA	NA	NA
TRANS-1,3-DICHLOROPROPENE	NA	NA	NA	10 U	10 U	10 U
TRICHLOROETHENE	0.1 U	0.1 U	0.1 U	10 U	10 U	10 U
VINYL CHLORIDE	50 U	50 U	50 U	10 U	10 U	10 U
XYLENE (TOTAL)	NA	NA	NA	10 U	10 U	10 U

**FREQUENCY OF DETECTION SUMMARY**  
**GROUNDWATER - VOLATILE ORGANICS**  
**PHASE I - MOBILE LABORATORY AND**  
**PHASE II - FIXED BASE LABORATORY**  
**RI/FS CTO-0356**  
**OPERABLE UNIT NO. 16 (SITE 93)**  
**MCB CAMP LEJEUNE, NORTH CAROLINA**

SAMPLE ID	IR93-MW02DW-01	IR93-MW02IW-01	IR93-MW03-01	IR93-MW03IW-01	IR93-MW04-01	IR93-MW04IW-01
PHASE	PHASE II	PHASE II	PHASE II	PHASE II	PHASE II	PHASE II
DATE SAMPLED	05/29/97	06/02/97	05/20/97	05/20/97	05/30/97	05/30/97
<b>VOLATILES (ug/L)</b>						
1,1,1-TRICHLOROETHANE	10 U	10 U	10 U	10 U	10 U	10 U
1,1,2,2-TETRACHLOROETHANE	10 U	10 U	10 U	10 U	10 U	10 U
1,1,2-TRICHLOROETHANE	10 U	10 U	10 U	10 U	10 U	10 U
1,1-DICHLOROETHANE	10 U	10 U	10 U	10 U	10 U	10 U
1,1-DICHLOROETHENE	10 U	10 U	10 U	10 U	10 U	10 U
1,2-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
1,2-DICHLOROPROPANE	10 U	10 U	10 U	10 U	10 U	10 U
2-BUTANONE	10 U	10 U	10 U	10 U	10 U	10 U
2-HEXANONE	10 U	10 U	10 U	10 U	10 U	10 U
4-METHYL-2-PENTANONE	10 U	10 U	10 U	10 U	10 U	10 U
ACETONE	10 U	10 U	10 U	10 U	10 U	10 U
BENZENE	10 U	10 U	10 U	10 U	10 U	10 U
BROMODICHLOROMETHANE	10 U	10 U	10 U	10 U	10 U	10 U
BROMOFORM	10 U	10 U	10 U	10 U	10 U	10 U
BROMOMETHANE	10 U	10 U	10 U	10 U	10 U	10 U
CARBON DISULFIDE	10 U	10 U	10 U	10 U	10 U	10 U
CARBON TETRACHLORIDE	10 U	10 U	10 U	10 U	10 U	10 U
CHLOROBENZENE	10 U	10 U	10 U	10 U	10 U	10 U
CHLOROETHANE	10 U	10 U	10 U	10 U	10 U	10 U
CHLOROFORM	10 U	10 U	10 U	10 U	10 U	10 U
CHLOROMETHANE	10 U	10 U	10 U	10 U	10 U	10 U
CIS-1,2-DICHLOROETHENE	NA	NA	NA	NA	NA	NA
CIS-1,3-DICHLOROPROPENE	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
ETHYLBENZENE	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
STYRENE	10 U	10 U	10 U	10 U	10 U	10 U

**FREQUENCY OF DETECTION SUMMARY**  
**GROUNDWATER - VOLATILE ORGANICS**  
**PHASE I - MOBILE LABORATORY AND**  
**PHASE II - FIXED BASE LABORATORY**  
**RI/FS CTO-0356**  
**OPERABLE UNIT NO. 16 (SITE 93)**  
**MCB CAMP LEJEUNE, NORTH CAROLINIA**

SAMPLE ID	IR93-MW02DW-01	IR93-MW02IW-01	IR93-MW03-01	IR93-MW03IW-01	IR93-MW04-01	IR93-MW04IW-01
PHASE	PHASE II	PHASE II	PHASE II	PHASE II	PHASE II	PHASE II
DATE SAMPLED	05/29/97	06/02/97	05/20/97	05/20/97	05/30/97	05/30/97
<b>VOLATILES (ug/L) (cont)</b>						
TETRACHLOROETHENE	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
TRANS-1,2-DICHLOROETHENE	NA	NA	NA	NA	NA	NA
TRANS-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
VINYL CHLORIDE	10 U	10 U	10 U	10 U	10 U	10 U
XYLENE (TOTAL)	10 U	10 U	10 U	10 U	10 U	10 U

**FREQUENCY OF DETECTION SUMMARY**  
**GROUNDWATER - VOLATILE ORGANICS**  
**PHASE I - MOBILE LABORATORY AND**  
**PHASE II - FIXED BASE LABORATORY**  
**RI/FS CTO-0356**  
**OPERABLE UNIT NO. 16 (SITE 93)**  
**MCB CAMP LEJEUNE, NORTH CAROLINA**

SAMPLE ID	IR93-MW05-01	IR93-MW05IW-01
PHASE	PHASE II	PHASE II
DATE SAMPLED	05/27/97	05/27/97
<b>VOLATILES (ug/L)</b>		
1,1,1-TRICHLOROETHANE	10 U	10 U
1,1,2,2-TETRACHLOROETHANE	10 U	10 U
1,1,2-TRICHLOROETHANE	10 U	10 U
1,1-DICHLOROETHANE	10 U	10 U
1,1-DICHLOROETHENE	10 U	10 U
1,2-DICHLOROETHANE	10 U	10 U
1,2-DICHLOROETHENE (TOTAL)	92	10 U
1,2-DICHLOROPROPANE	10 U	10 U
2-BUTANONE	10 U	10 U
2-HEXANONE	10 U	10 U
4-METHYL-2-PENTANONE	10 U	10 U
ACETONE	10 U	10 U
BENZENE	10 U	10 U
BROMODICHLOROMETHANE	10 U	10 U
BROMOFORM	10 U	10 U
BROMOMETHANE	10 U	10 U
CARBON DISULFIDE	10 U	10 U
CARBON TETRACHLORIDE	10 U	10 U
CHLOROBENZENE	10 U	10 U
CHLOROETHANE	10 U	10 U
CHLOROFORM	10 U	10 U
CHLOROMETHANE	10 U	10 U
CIS-1,2-DICHLOROETHENE	NA	NA
CIS-1,3-DICHLOROPROPENE	10 U	10 U
DIBROMOCHLOROMETHANE	10 U	10 U
ETHYLBENZENE	10 U	10 U
METHYLENE CHLORIDE	10 U	10 U
STYRENE	10 U	10 U

**FREQUENCY OF DETECTION SUMMARY**  
**GROUNDWATER - VOLATILE ORGANICS**  
**PHASE I - MOBILE LABORATORY AND**  
**PHASE II - FIXED BASE LABORATORY**  
**RI/FS CTO-0356**  
**OPERABLE UNIT NO. 16 (SITE 93)**  
**MCB CAMP LEJEUNE, NORTH CAROLINIA**

SAMPLE ID	IR93-MW05-01	IR93-MW05IW-01
PHASE	PHASE II	PHASE II
DATE SAMPLED	05/27/97	05/27/97
<b>VOLATILES (ug/L) (cont)</b>		
TETRACHLOROETHENE	10 U	10 U
TOLUENE	10 U	10 U
TRANS-1,2-DICHLOROETHENE	NA	NA
TRANS-1,3-DICHLOROPROPENE	10 U	10 U
TRICHLOROETHENE	28	10 U
VINYL CHLORIDE	10 U	10 U
XYLENE (TOTAL)	10 U	10 U

**FREQUENCY OF DETECTION SUMMARY**  
**GROUNDWATER - VOLATILE ORGANICS**  
**PHASE I - MOBILE LABORATORY AND**  
**PHASE II - FIXED BASE LABORATORY**  
**RI/FS CTO-0356**  
**OPERABLE UNIT NO. 16 (SITE 93)**  
**MCB CAMP LEJEUNE, NORTH CAROLINA**

SAMPLE ID PHASE DATE SAMPLED	Minimum Non-Detect	Maximum Non-Detect	Minimum Detected	Maximum Detected	Location of Maximum Detect	Frequency of Detection	Arithmetic Mean Positive Detects	Median Positive Detects
<b>VOLATILES (ug/L)</b>								
1,1,1-TRICHLOROETHANE	0.1 U	10 U	ND	ND		0/26	--	--
1,1,2,2-TETRACHLOROETHANE	10 U	10 U	ND	ND		0/11	--	--
1,1,2-TRICHLOROETHANE	10 U	10 U	ND	ND		0/11	--	--
1,1-DICHLOROETHANE	10 U	10 U	ND	ND		0/11	--	--
1,1-DICHLOROETHENE	10 U	10 U	ND	ND		0/11	--	--
1,2-DICHLOROETHANE	10 U	10 U	ND	ND		0/11	--	--
1,2-DICHLOROETHENE (TOTAL)	10 U	10 U	92	92	IR93-MW05-01	1/11	92	92
1,2-DICHLOROPROPANE	10 U	10 U	ND	ND		0/11	--	--
2-BUTANONE	10 U	10 U	ND	ND		0/11	--	--
2-HEXANONE	10 U	10 U	ND	ND		0/11	--	--
4-METHYL-2-PENTANONE	10 U	10 U	ND	ND		0/11	--	--
ACETONE	10 U	10 U	ND	ND		0/11	--	--
BENZENE	10 U	10 U	ND	ND		0/11	--	--
BROMODICHLOROMETHANE	10 U	10 U	ND	ND		0/11	--	--
BROMOFORM	10 U	10 U	ND	ND		0/11	--	--
BROMOMETHANE	10 U	10 U	ND	ND		0/11	--	--
CARBON DISULFIDE	10 U	10 U	ND	ND		0/11	--	--
CARBON TETRACHLORIDE	0.1 U	10 U	ND	ND		0/26	--	--
CHLOROBENZENE	10 U	10 U	ND	ND		0/11	--	--
CHLOROETHANE	10 U	10 U	ND	ND		0/11	--	--
CHLOROFORM	0.1 U	10 U	0.3	2.3	IR93-TW14IW-01	7/26	1	0.8
CHLOROMETHANE	10 U	10 U	ND	ND		0/11	--	--
CIS-1,2-DICHLOROETHENE	1 U	1 U	4	175	IR93-TW01-01	3/15	64.67	15
CIS-1,3-DICHLOROPROPENE	10 U	10 U	ND	ND		0/11	--	--
DIBROMOCHLOROMETHANE	10 U	10 U	ND	ND		0/11	--	--
ETHYLBENZENE	10 U	10 U	ND	ND		0/11	--	--
METHYLENE CHLORIDE	10 U	10 U	ND	ND		0/11	--	--
STYRENE	10 U	10 U	ND	ND		0/11	--	--



**FREQUENCY OF DETECTION SUMMARY**  
**GROUNDWATER - VOLATILE ORGANICS**  
**PHASE I - MOBILE LABORATORY AND**  
**PHASE II - FIXED BASE LABORATORY**  
**RI/FS CTO-0356**  
**OPERABLE UNIT NO. 16 (SITE 93)**  
**MCB CAMP LEJEUNE, NORTH CAROLINIA**

SAMPLE ID PHASE DATE SAMPLED	Minimum Non-Detect	Maximum Non-Detect	Minimum Detected	Maximum Detected	Location of Maximum Detect	Frequency of Detection	Arithmetic Mean Positive Detects	Median Positive Detects
<b>VOLATILES (ug/L) (cont)</b>								
TETRACHLOROETHENE	0.1 U	10 U	0.1	65.1	IR93-MW05-01	7/26	13.51	3
TOLUENE	10 U	10 U	ND	ND		0/11	--	--
TRANS-1,2-DICHLOROETHENE	1 U	1 U	5	57	IR93-TW01-01	2/15	31	31
TRANS-1,3-DICHLOROPROPENE	10 U	10 U	ND	ND		0/11	--	--
TRICHLOROETHENE	0.1 U	10 U	0.1	39.4	IR93-TW01-01	8/26	11.74	0.95
VINYL CHLORIDE	10 U	50 U	ND	ND		0/26	--	--
XYLENE (TOTAL)	10 U	10 U	ND	ND		0/11	--	--

**SITE 93 GROUNDWATER - INORGANICS**

**FREQUENCY OF DETECTION SUMMARY**  
**GROUNDWATER - TAL METALS**  
**PHASE II - FIXED BASE LABORATORY**  
**RI/FS CTO-0356**  
**OPERABLE UNIT NO. 16 (SITE 93)**  
**MCB CAMP LEJEUNE, NORTH CAROLINA**

SAMPLE ID	IR93-MW01-01	IR93-MW01IW-01	IR93-MW02-01	IR93-MW02DW-01	IR93-MW02IW-01	IR93-MW03-01	IR93-MW03IW-01
PHASE	PHASE II	PHASE II	PHASE II	PHASE II	PHASE II	PHASE II	PHASE II
DATE SAMPLED	05/30/97	05/30/97	06/02/97	05/29/97	06/02/97	05/20/97	05/20/97
<b>TOTAL METALS (ug/l)</b>							
ALUMINUM, TOTAL	140 U	71 U	26 U	32.6 U	2540	98.4 U	50.7 U
ANTIMONY, TOTAL	1.9 U	1.9 U	1.9 U	1.9 U	2.3	1.9 U	1.9 U
ARSENIC, TOTAL	2.7 U	2.7 U	2.7 U	2.7 U	4.3	2.7 U	2.7 U
BARIUM, TOTAL	56.8	18.7	24	4.2	73.9	35.3	29.4
BERYLLIUM, TOTAL	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U
CADMIUM, TOTAL	0.4 U	0.4 U	0.4 U	0.4 U	1.6	0.4 U	0.4 U
CALCIUM, TOTAL	14800	92600	84300	61700	15200	7870	106000
CHROMIUM, TOTAL	0.5 U	0.5 U	0.62	0.5 U	17	0.98	0.57
COBALT, TOTAL	10.3	0.5 U	0.5 U	0.5 U	1	0.5 U	0.5 U
COPPER, TOTAL	0.8 UJ	0.8 UJ	0.8 U	0.8 UJ	32.1	0.8 UJ	0.8 UJ
IRON, TOTAL	1190	4330	2810	577	3630	1600	3340
LEAD, TOTAL	1.4 U	1.4 U	1.4 U	1.4 U	164	1.4 U	1.4 U
MAGNESIUM, TOTAL	2460	1890	1800	3440	5220	457	2360
MANGANESE, TOTAL	432	45.8	27.6	41.9	206	9.2	38.7
MERCURY, TOTAL	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
NICKEL, TOTAL	14.8	1.5 U	0.7 U	1.5 U	3.7	0.7 U	0.7 U
POTASSIUM, TOTAL	1340	1870	1260	7620	24500	1080	1900
SELENIUM, TOTAL	2.2 U	2.2 U	2.2 U	2.2 U	2.9	2.2 U	2.2 U
SILVER, TOTAL	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
SODIUM, TOTAL	13000	7140	6510	39700	188 UJ	7900	7860
THALLIUM, TOTAL	3 U	3 U	3 U	3 U	3 U	3 U	3 U
VANADIUM, TOTAL	0.71	0.7 U	0.7 U	0.7 U	6.4	0.71	0.7 U
ZINC, TOTAL	10.8 J	0.4 UJ	4.4	0.4 UJ	316	0.4 UJ	0.4 UJ

**FREQUENCY OF DETECTION SUMMARY**  
**GROUNDWATER - TAL METALS**  
**PHASE II - FIXED BASE LABORATORY**  
**RI/FS CTO-0356**  
**OPERABLE UNIT NO. 16 (SITE 93)**  
**MCB CAMP LEJEUNE, NORTH CAROLINA**

SAMPLE ID	IR93-MW04-01	IR93-MW04IW-01	IR93-MW05-01	IR93-MW05IW-01
PHASE	PHASE II	PHASE II	PHASE II	PHASE II
DATE SAMPLED	05/30/97	05/30/97	05/27/97	05/27/97
<b>TOTAL METALS (ug/l)</b>				
ALUMINUM, TOTAL	270	35.4 U	39.3 U	26.6 U
ANTIMONY, TOTAL	1.9 U	1.9 U	1.9 U	1.9 U
ARSENIC, TOTAL	2.7 U	2.7 U	2.7 U	2.7 U
BARIUM, TOTAL	58.2	11.7	45.2	10.5
BERYLLIUM, TOTAL	0.3 U	0.3 U	0.3 U	0.3 U
CADMIUM, TOTAL	0.4 U	0.4 U	0.4 U	0.4 U
CALCIUM, TOTAL	4760	88000	16300	83000
CHROMIUM, TOTAL	0.5 U	0.5 U	0.64	0.57
COBALT, TOTAL	1.6	0.5 U	0.5 U	0.5 U
COPPER, TOTAL	0.8 UJ	0.8 UJ	0.8 U	0.8 U
IRON, TOTAL	934	3130	1840 J	3400 J
LEAD, TOTAL	1.4 U	1.4 U	1.4 U	1.4 U
MAGNESIUM, TOTAL	1200	1740	1410	1830
MANGANESE, TOTAL	17.1	37.7	25.8	47.2
MERCURY, TOTAL	0.1 U	0.1 U	0.1 U	0.1 U
NICKEL, TOTAL	4.4	1.5 U	0.7 U	0.7 U
POTASSIUM, TOTAL	892	1240	1330 J	1740 J
SELENIUM, TOTAL	2.2 U	2.2 U	2.2 U	2.2 U
SILVER, TOTAL	0.5 U	0.5 U	0.5 U	0.5 U
SODIUM, TOTAL	26500	6660	14700	7300
THALLIUM, TOTAL	3 U	3 U	3 U	3 U
VANADIUM, TOTAL	0.74	0.7 U	1.2 U	0.7 U
ZINC, TOTAL	2.7 J	0.4 UJ	0.4 UJ	0.4 UJ

**FREQUENCY OF DETECTION SUMMARY**  
**GROUNDWATER - TAL METALS**  
**PHASE II - FIXED BASE LABORATORY**  
**RI/FS CTO-0356**  
**OPERABLE UNIT NO. 16 (SITE 93)**  
**MCB CAMP LEJEUNE, NORTH CAROLINA**

SAMPLE ID PHASE DATE SAMPLED	Minimum Non-Detect	Maximum Non-Detect	Minimum Detected	Maximum Detected	Location of Maximum Detect	Frequency of Detection	Arithmetic Mean Positive Detects	Median Positive Detects
<b>TOTAL METALS (ug/l)</b>								
ALUMINUM, TOTAL	26 U	140 U	270	2540	IR93-MW02IW-01	2/11	1405	1405
ANTIMONY, TOTAL	1.9 U	1.9 U	2.3	2.3	IR93-MW02IW-01	1/11	2.3	2.3
ARSENIC, TOTAL	2.7 U	2.7 U	4.3	4.3	IR93-MW02IW-01	1/11	4.3	4.3
BARIUM, TOTAL	NA	NA	4.2	73.9	IR93-MW02IW-01	11/11	33.45	29.4
BERYLLIUM, TOTAL	0.3 U	0.3 U	ND	ND		0/11	--	--
CADMIUM, TOTAL	0.4 U	0.4 U	1.6	1.6	IR93-MW02IW-01	1/11	1.6	1.6
CALCIUM, TOTAL	NA	NA	4760	106000	IR93-MW03IW-01	11/11	52230	61700
CHROMIUM, TOTAL	0.5 U	0.5 U	0.57	17	IR93-MW02IW-01	6/11	3.4	0.63
COBALT, TOTAL	0.5 U	0.5 U	1	10.3	IR93-MW01-01	3/11	4.3	1.6
COPPER, TOTAL	0.8 U	0.8 U	32.1	32.1	IR93-MW02IW-01	1/11	32.1	32.1
IRON, TOTAL	NA	NA	577	4330	IR93-MW01IW-01	11/11	2434.64	2810
LEAD, TOTAL	1.4 U	1.4 U	164	164	IR93-MW02IW-01	1/11	164	164
MAGNESIUM, TOTAL	NA	NA	457	5220	IR93-MW02IW-01	11/11	2164.27	1830
MANGANESE, TOTAL	NA	NA	9.2	432	IR93-MW01-01	11/11	84.45	38.7
MERCURY, TOTAL	0.1 U	0.1 U	ND	ND		0/11	--	--
NICKEL, TOTAL	0.7 U	1.5 U	3.7	14.8	IR93-MW01-01	3/11	7.63	4.4
POTASSIUM, TOTAL	NA	NA	892	24500	IR93-MW02IW-01	11/11	4070.18	1340
SELENIUM, TOTAL	2.2 U	2.2 U	2.9	2.9	IR93-MW02IW-01	1/11	2.9	2.9
SILVER, TOTAL	0.5 U	0.5 U	ND	ND		0/11	--	--
SODIUM, TOTAL	188 UJ	188 UJ	6510	39700	IR93-MW02DW-01	10/11	13727	7880
THALLIUM, TOTAL	3 U	3 U	ND	ND		0/11	--	--
VANADIUM, TOTAL	0.7 U	1.2 U	0.71	6.4	IR93-MW02IW-01	4/11	2.14	0.73
ZINC, TOTAL	0.4 UJ	0.4 UJ	2.7 J	316	IR93-MW02IW-01	4/11	83.48	7.6

**APPENDIX I**  
**FIELD DUPLICATE SUMMARIES**

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**DUPLICATE FIELD SUMMARY**  
**SUBSURFACE SOIL - TCL ORGANICS**  
**PHASE II - FIXED BASE LABORATORY**  
**RI/FS CTO-0356**  
**OPERABLE UNIT NO. 16 (SITE 89)**  
**MCB CAMP LEJEUNE, NORTH CAROLINA**

SAMPLE ID	IR89-MW06IW-01D	IR89-MW03IW-02D	IR89-MW05-03D
PHASE	PHASE II	PHASE II	PHASE II
DATE SAMPLED	05/02/97	05/15/97	04/20/97
DEPTH	1-3'	3-5'	5-7'
<b>VOLATILES (ug/kg)</b>			
1,1,1-TRICHLOROETHANE	12 U	11 U	12 U
1,1,2-TRICHLOROETHANE	12 U	11 U	12 U
1,1-DICHLOROETHANE	12 U	11 U	12 U
1,1-DICHLOROETHENE	12 U	11 U	12 U
1,2-DICHLOROETHANE	12 U	11 U	12 U
1,2-DICHLOROETHENE (TOTAL)	12 U	9 J	12 U
1,2-DICHLOROPROPANE	12 U	11 U	12 U
2-BUTANONE	12 U	11 U	12 U
2-HEXANONE	12 U	11 U	12 U
4-METHYL-2-PENTANONE	12 U	11 U	12 U
ACETONE	13 J	19 J	34 U
BENZENE	12 U	11 U	12 U
BROMODICHLOROMETHANE	12 U	11 U	12 U
BROMOFORM	12 U	11 U	12 U
BROMOMETHANE	12 U	11 U	12 U
CARBON DISULFIDE	12 U	11 U	12 U
CARBON TETRACHLORIDE	12 U	11 U	12 U
CHLOROETHANE	12 U	11 U	12 U
CHLOROFORM	12 U	11 U	12 U
CHLOROMETHANE	12 U	11 U	12 U
CIS-1,3-DICHLOROPROPENE	12 U	11 U	12 U
DIBROMOCHLOROMETHANE	12 U	11 U	12 U
METHYLENE CHLORIDE	12 U	11 U	12 U
TETRACHLOROETHENE	12 U	11 U	12 U
TRANS-1,3-DICHLOROPROPENE	12 U	11 U	12 U
TRICHLOROETHENE	12 U	9 J	12 U
VINYL CHLORIDE	12 U	11 U	12 U
1,1,2,2-TETRACHLOROETHANE	12 U	47	12 U



**DUPLICATE FIELD SUMMARY**  
**SUBSURFACE SOIL - TCL ORGANICS**  
**PHASE II - FIXED BASE LABORATORY**  
**RI/FS CTO-0356**  
**OPERABLE UNIT NO. 16 (SITE 89)**  
**MCB CAMP LEJEUNE, NORTH CAROLINA**

SAMPLE ID	IR89-MW06IW-01D	IR89-MW03IW-02D	IR89-MW05-03D
PHASE	PHASE II	PHASE II	PHASE II
DATE SAMPLED	05/02/97	05/15/97	04/20/97
DEPTH	1-3'	3-5'	5-7'
<b>VOLATILES (ug/kg) (cont)</b>			
TOLUENE	12 U	11 U	12 U
CHLOROBENZENE	12 U	11 U	12 U
ETHYLBENZENE	12 U	11 U	12 U
STYRENE	12 U	11 U	12 U
XYLENE (TOTAL)	12 U	11 U	12 U

**DUPLICATE FIELD SUMMARY**  
**SUBSURFACE SOIL - TCL ORGANICS**  
**PHASE II - FIXED BASE LABORATORY**  
**RI/FS CTO-0356**  
**OPERABLE UNIT NO. 16 (SITE 89)**  
**MCB CAMP LEJEUNE, NORTH CAROLINA**

SAMPLE ID	IR89-MW061W-01D	IR89-MW031W-02D	IR89-MW05-03D
PHASE	PHASE II	PHASE II	PHASE II
DATE SAMPLED	05/02/97	05/15/97	04/20/97
DEPTH	1-3'	3-5'	5-7'
<b>SEMIVOLATILES (ug/kg)</b>			
1,2,4-TRICHLOROBENZENE	400 U	360 U	390 U
1,2-DICHLOROBENZENE	400 U	360 U	390 U
1,3-DICHLOROBENZENE	400 U	360 U	390 U
1,4-DICHLOROBENZENE	400 U	360 U	390 U
2,2'-OXYBIS(1-CHLOROPROPANE)	400 U	360 U	390 U
2,4,5-TRICHLOROPHENOL	1000 U	900 U	980 U
2,4,6-TRICHLOROPHENOL	400 U	360 U	390 U
2,4-DICHLOROPHENOL	400 U	360 U	390 U
2,4-DIMETHYLPHENOL	400 U	360 U	390 U
2,4-DINITROPHENOL	1000 U	900 U	980 U
2,4-DINITROTOLUENE	400 U	360 U	390 U
2,6-DINITROTOLUENE	400 U	360 U	390 U
2-CHLORONAPHTHALENE	400 U	360 U	390 U
2-CHLOROPHENOL	400 U	360 U	390 U
2-METHYLNAPHTHALENE	400 U	360 U	390 U
2-METHYLPHENOL	400 U	360 U	390 U
2-NITROANILINE	1000 U	900 U	980 U
2-NITROPHENOL	400 U	360 U	390 U
3,3'-DICHLOROBENZIDINE	400 U	360 U	390 U
3-NITROANILINE	1000 U	900 U	980 U
4,6-DINITRO-2-METHYLPHENOL	1000 U	900 U	980 U
4-BROMOPHENYL-PHENYLETHER	400 U	360 U	390 U
4-CHLORO-3-METHYLPHENOL	400 U	360 U	390 U
4-CHLOROANILINE	400 U	360 U	390 U
4-CHLOROPHENYL-PHENYLETHER	400 U	360 U	390 U
4-METHYLPHENOL	400 U	360 U	390 U
4-NITROANILINE	1000 U	900 U	980 U
4-NITROPHENOL	1000 U	900 U	980 U

**DUPLICATE FIELD SUMMARY**  
**SUBSURFACE SOIL - TCL ORGANICS**  
**PHASE II - FIXED BASE LABORATORY**  
**RI/FS CTO-0356**  
**OPERABLE UNIT NO. 16 (SITE 89)**  
**MCB CAMP LEJEUNE, NORTH CAROLINA**

SAMPLE ID	IR89-MW06IW-01D	IR89-MW03IW-02D	IR89-MW05-03D
PHASE	PHASE II	PHASE II	PHASE II
DATE SAMPLED	05/02/97	05/15/97	04/20/97
DEPTH	1-3'	3-5'	5-7'
<b>SEMIVOLATILES (ug/kg) (cont)</b>			
ACENAPHTHENE	400 U	360 U	390 U
ACENAPHTHYLENE	400 U	360 U	390 U
ANTHRACENE	400 U	46 J	390 U
BENZO(A)ANTHRACENE	400 U	320 J	390 U
BENZO(A)PYRENE	400 U	160 J	390 U
BENZO(B)FLUORANTHENE	400 U	500 J	390 U
BENZO(G,H,I)PERYLENE	400 U	120 J	390 U
BENZO(K)FLUORANTHENE	400 U	240 J	390 U
BIS(2-CHLOROETHOXY)METHANE	400 U	360 U	390 U
BIS(2-CHLOROETHYL)ETHER	400 U	360 U	390 U
BIS(2-ETHYLHEXYL)PHTHALATE	54 J	360 U	340 J
BUTYLBENZYLPHthalATE	400 U	360 U	390 U
CARBAZOLE	400 U	360 U	390 U
CHRYSENE	400 U	420 J	390 U
DIBENZO(A,H)ANTHRACENE	400 U	47 J	390 U
DIBENZOFURAN	400 U	360 U	390 U
DIETHYLPHthalATE	400 U	360 U	390 U
DIMETHYLPHthalATE	400 U	360 U	390 U
DI-N-BUTYLPHthalATE	400 U	360 U	390 U
DI-N-OCTYLPHthalATE	400 U	360 U	390 U
FLUORANTHENE	400 U	770 J	390 U
FLUORENE	400 U	40 J	390 U
HEXACHLOROBENZENE	400 U	360 U	390 U
HEXACHLOROBUTADIENE	400 U	360 U	390 U
HEXACHLOROCYCLOPENTADIENE	400 U	360 U	390 U
HEXACHLOROETHANE	400 U	360 U	390 U
INDENO(1,2,3-CD)PYRENE	400 U	160 J	390 U
ISOPHORONE	400 U	360 U	390 U

DUPLICATE FIELD SUMMARY  
 SUBSURFACE SOIL - TCL ORGANICS  
 PHASE II - FIXED BASE LABORATORY  
 RI/FS CTO-0356  
 OPERABLE UNIT NO. 16 (SITE 89)  
 MCB CAMP LEJEUNE, NORTH CAROLINA

SAMPLE ID	IR89-MW06IW-01D	IR89-MW03IW-02D	IR89-MW05-03D
PHASE	PHASE II	PHASE II	PHASE II
DATE SAMPLED	05/02/97	05/15/97	04/20/97
DEPTH	1-3'	3-5'	5-7'
<b>SEMIVOLATILES (ug/kg) (cont)</b>			
NAPHTHALENE	400 U	360 U	390 U
NITROBENZENE	400 U	360 U	390 U
N-NITROSO-DI-N-PROPYLAMINE	400 U	360 U	390 U
N-NITROSODIPHENYLAMINE (1)	400 U	360 U	390 U
PENTACHLOROPHENOL	1000 U	900 U	980 U
PHENANTHRENE	400 U	260 J	390 U
PHENOL	400 U	360 U	390 U
PYRENE	400 U	880 J	390 U

**DUPLICATE FIELD SUMMARY**  
**SUBSURFACE SOIL - TCL ORGANICS**  
**PHASE II - FIXED BASE LABORATORY**  
**RI/FS CTO-0356**  
**OPERABLE UNIT NO. 16 (SITE 89)**  
**MCB CAMP LEJEUNE, NORTH CAROLINA**

SAMPLE ID	IR89-MW061W-01D	IR89-MW031W-02D	IR89-MW05-03D
PHASE	PHASE II	PHASE II	PHASE II
DATE SAMPLED	05/02/97	05/15/97	04/20/97
DEPTH	1-3'	3-5'	5-7'
<b>PESTICIDES/PCBS (ug/kg)</b>			
4,4'-DDD	NA	24	NA
4,4'-DDE	NA	4 J	NA
4,4'-DDT	NA	3.6 U	NA
ALDRIN	NA	1.8 U	NA
ALPHA-BHC	NA	1 UJ	NA
ALPHA-CHLORDANE	NA	1.8 U	NA
AROCLOR-1016	NA	36 U	NA
AROCLOR-1221	NA	72 U	NA
AROCLOR-1232	NA	36 U	NA
AROCLOR-1242	NA	36 U	NA
AROCLOR-1248	NA	36 U	NA
AROCLOR-1254	NA	36 U	NA
AROCLOR-1260	NA	36 U	NA
BETA-BHC	NA	1.8 U	NA
DELTA-BHC	NA	1 UJ	NA
DIELDRIN	NA	3.6 U	NA
ENDOSULFAN I	NA	1.8 U	NA
ENDOSULFAN II	NA	3.6 U	NA
ENDOSULFAN SULFATE	NA	3.6 U	NA
ENDRIN	NA	3.6 U	NA
ENDRIN ALDEHYDE	NA	3.6 U	NA
ENDRIN KETONE	NA	3.6 U	NA
GAMMA-BHC (LINDANE)	NA	1.8 U	NA
GAMMA-CHLORDANE	NA	1.8 U	NA
HEPTACHLOR	NA	1.8 U	NA
HEPTACHLOR EPOXIDE	NA	1.8 U	NA
METHOXYCHLOR	NA	18 U	NA
TOXAPHENE	NA	180 U	NA

**FIELD DUPLICATE SUMMARY**  
**SUBSURFACE SOIL - TAL METALS**  
**PHASE II - FIXED BASE LABORATORY**  
**R/FS CTO-0356**  
**OPERABLE UNIT NO. 16 (SITE 89)**  
**MCB CAMP LEJEUNE, NORTH CAROLINA**

SAMPLE ID	IR89-MW031W-02D	IR89-MW05-03D	IR89-MW061W-01D
PHASE	PHASE II	PHASE II	PHASE II
DATE SAMPLED	05/15/97	04/20/97	05/02/97
DEPTH	3-5'	5-7'	1-3'
<b>TOTAL METALS (mg/kg)</b>			
ALUMINUM, TOTAL	6640	7430	2940
ANTIMONY, TOTAL	0.34 UJ	0.32 J	0.53 U
ARSENIC, TOTAL	0.85 J	0.5	0.64 J
BARIUM, TOTAL	20.2	14.9	13.8
BERYLLIUM, TOTAL	0.07	0.05	0.05
CADMIUM, TOTAL	0.22	0.04 UJ	0.04 UJ
CALCIUM, TOTAL	45200	5340	462
CHROMIUM, TOTAL	10.1	7.4	3
COBALT, TOTAL	0.31 J	0.18 J	0.07 UJ
COPPER, TOTAL	2 J	0.97 J	1.2
IRON, TOTAL	4460	3150	2260
LEAD, TOTAL	14.4	6.6	10
MAGNESIUM, TOTAL	853	284	179
MANGANESE, TOTAL	11.6	9.1	6.3
MERCURY, TOTAL	0.05 U	0.05 U	0.1
NICKEL, TOTAL	1.4 J	0.74 J	0.58 UJ
POTASSIUM, TOTAL	275 J	257 J	219 J
SELENIUM, TOTAL	0.41 J	0.4 J	0.48 UJ
SILVER, TOTAL	0.09 U	0.04 U	0.05 U
SODIUM, TOTAL	140	36.6 J	50.9
THALLIUM, TOTAL	0.53 U	0.37 UJ	0.42 UJ
VANADIUM, TOTAL	12.5	11	9.1
ZINC, TOTAL	13.3	14.7 J	4.9 J

FIELD DUPLICATE SUMMARY  
GROUNDWATER  
PHASE II - FIXED BASE LABORATORY  
RI/FS CTO-0356  
OPERABLE UNIT NO. 16 (SITE 89)  
MCB CAMPP LEJEUNE, NORTH CAROLINA

SAMPLE ID	IR89-MW05IW-01D	IR89-MW04-01D
PHASE	PHASE II	PHASE II
DATE SAMPLED	05/28/97	05/29/97
<b>VOLATILESS (ug/L)</b>		
1,1,1-TRICHLOROETHANE	10 U	10 U
1,1,2,2-TETRACHLOROETHANE	10 U	5 J
1,1,2-TRICHLOROETHANE	10 U	3 J
1,1-DICHLOROETHANE	10 U	10 U
1,1-DICHLOROETHENE	10 U	10 U
1,2-DICHLOROETHANE	10 U	10 U
1,2-DICHLOROPROPANE	10 U	10 U
2-BUTANONE	10 U	10 U
2-HEXANONE	10 U	10 U
4-METHYL-2-PENTANONE	10 U	10 U
ACETONE	10 U	10 U
BENZENE	10 U	10 U
BROMODICHLOROMETHANE	10 U	10 U
BROMOFORM	10 U	10 U
BROMOMETHANE	10 U	10 U
CARBON DISULFIDE	10 U	10 U
CARBON TETRACHLORIDE	10 U	10 U
CHLOROBENZENE	10 U	10 U
CHLOROETHANE	10 U	10 U
CHLOROFORM	10 U	10 U
CHLOROMETHANE	10 U	10 U
CIS-1,3-DICHLOROPROPENE	10 U	10 U
DIBROMOCHLOROMETHANE	10 U	10 U
ETHYLBENZENE	10 U	10 U
METHYLENE CHLORIDE	10 U	10 U
STYRENE	10 U	10 U
TETRACHLOROETHENE	10 U	7 J
TOLUENE	10 U	10 U

FIELD DUPLICATE SUMMARY  
GROUNDWATER  
PHASE II - FIXED BASE LABORATORY  
RI/FS CTO-0356  
OPERABLE UNIT NO. 16 (SITE 89)  
MCB CAMPP LEJEUNE, NORTH CAROLINA

SAMPLE ID	IR89-MW05IW-01D	IR89-MW04-01D
PHASE	PHASE II	PHASE II
DATE SAMPLED	05/28/97	05/29/97
<b>VOLATILES (ug/L) (cont)</b>		
TRANS-1,2-DICHLOROETHENE	10 U	860
TRANS-1,3-DICHLOROPROPENE	10 U	10 U
TRICHLOROETHENE	10 U	620
VINYL CHLORIDE	10 U	42
XYLENE (TOTAL)	10 U	10 U



**FIELD DUPLICATE SUMMARY**  
**GROUNDWATER - TAL METALS**  
**PHASE II - FIXED BASE LABORATORY**  
**RI/FS CTO-0356**  
**OPERABLE UNIT NO. 16 (SITE 89)**  
**MCB CAMP LEJEUNE, NORTH CAROLINIA**

SAMPLE ID	IR89-MW04-01D	IR89-MW05IW-01D
PHASE	PHASE II	PHASE II
DATE SAMPLED	05/29/97	05/28/97
<b>TOTAL METALS (ug/L)</b>		
ALUMINUM, TOTAL	34.5 U	35.6 U
ANTIMONY, TOTAL	1.9 U	1.9
ARSENIC, TOTAL	2.7 U	3.8
BARIUM, TOTAL	13.8	3.3
BERYLLIUM, TOTAL	0.3 U	0.3 U
CADMIUM, TOTAL	0.4 U	0.4 U
CALCIUM, TOTAL	88100	78700
CHROMIUM, TOTAL	0.5 U	0.62
COBALT, TOTAL	0.5 U	0.5 U
COPPER, TOTAL	0.8 UJ	0.8 U
IRON, TOTAL	12000	4390 J
LEAD, TOTAL	1.4 U	1.4 U
MAGNESIUM, TOTAL	2620	1810
MANGANESE, TOTAL	132	61.2
MERCURY, TOTAL	0.1 U	0.1 U
NICKEL, TOTAL	1.1 U	0.79
POTASSIUM, TOTAL	1700	2480 J
SELENIUM, TOTAL	2.2 U	2.2 U
SILVER, TOTAL	0.5 U	0.5 U
SODIUM, TOTAL	10800	12900
THALLIUM, TOTAL	3 U	3 U
VANADIUM, TOTAL	0.7 U	0.88
ZINC, TOTAL	0.4 UJ	0.4 UJ

FIELD DUPLICATE SUMMARY  
SURFACE WATER - VOLATILE ORGANICS  
PHASE I - FIXED BASE LABORATORY  
R/FS CTO-0356  
OPERABLE UNIT NO. 16 (SITE 89)  
MCB CAMP LEJEUNE, NORTH CAROLINA

SAMPLE ID IR89-EC-SW05-01D  
PHASE PHASE I  
DATE SAMPLED 07/26/96

VOLATILES (ug/l)

1,1,1-TRICHLOROETHANE	10 U
1,1,2,2-TETRACHLOROETHANE	79
1,1,2-TRICHLOROETHANE	10 U
1,1-DICHLOROETHANE	10 U
1,1-DICHLOROETHENE	10 U
1,2-DICHLOROETHANE	10 U
1,2-DICHLOROETHENE (TOTAL)	73
1,2-DICHLOROPROPANE	10 U
2-BUTANONE	10 U
2-HEXANONE	10 U
4-METHYL-2-PENTANONE	10 U
ACETONE	10 U
BENZENE	10 U
BROMODICHLOROMETHANE	10 U
BROMOFORM	10 U
BROMOMETHANE	10 U
CARBON DISULFIDE	10 U
CARBON TETRACHLORIDE	10 U
CHLOROBENZENE	10 U
CHLOROETHANE	10 U
CHLOROFORM	10 U
CHLOROMETHANE	10 U
CIS-1,2-DICHLOROETHENE	1 U
CIS-1,3-DICHLOROPROPENE	10 U
DIBROMOCHLOROMETHANE	10 U
ETHYLBENZENE	10 U
METHYLENE CHLORIDE	10 U
STYRENE	10 U
TETRACHLOROETHENE	10 U

FIELD DUPLICATE SUMMARY  
SURFACE WATER - VOLATILE ORGANICS  
PHASE I - FIXED BASE LABORATORY  
RI/FS CTO-0356  
OPERABLE UNIT NO. 16 (SITE 89)  
MCB CAMP LEJEUNE, NORTH CAROLINA

SAMPLE ID IR89-EC-SW05-01D  
PHASE PHASE I  
DATE SAMPLED 07/26/96

VOLATILES (ug/l) (cont)

TOLUENE	10 U
TRANS-1,2-DICHLOROETHENE	1 U
TRANS-1,3-DICHLOROPROPENE	10 U
TRICHLOROETHENE	24
VINYL CHLORIDE	10 U
XYLENE (TOTAL)	10 U

**FIELD DUPLICATE SUMMARY**  
**SURFACE WATER - SEMIVOLATILE ORGANICS, PESTICIDES/PCBs**  
**PHASE I - FIXED BASE LABORATORY**  
**RI/FS CTO-0356**  
**OPERABLE UNIT NO. 16 (SITE 89)**  
**MCB CAMP LEJEUNE, NORTH CAROLINA**

SAMPLE ID	IR89-EC-SW05-01D
PHASE	PHASE I
DATE SAMPLED	07/26/96

**SEMIVOLATILES (ug/l)**

1,2,4-TRICHLOROBENZENE	11 U
1,2-DICHLOROBENZENE	11 U
1,3-DICHLOROBENZENE	11 U
1,4-DICHLOROBENZENE	11 U
2,2'-OXYBIS(1-CHLOROPROPANE)	11 U
2,4,5-TRICHLOROPHENOL	27 U
2,4,6-TRICHLOROPHENOL	11 U
2,4-DICHLOROPHENOL	11 U
2,4-DIMETHYLPHENOL	11 U
2,4-DINITROPHENOL	27 U
2,4-DINITROTOLUENE	11 U
2,6-DINITROTOLUENE	11 U
2-CHLORONAPHTHALENE	11 U
2-CHLOROPHENOL	11 U
2-METHYLNAPHTHALENE	11 U
2-METHYLPHENOL	11 U
2-NITROANILINE	27 U
2-NITROPHENOL	11 UJ
3,3'-DICHLOROBENZIDINE	11 UJ
3-NITROANILINE	27 U
4,6-DINITRO-2-METHYLPHENOL	27 UJ
4-BROMOPHENYL-PHENYLEETHER	11 U
4-CHLORO-3-METHYLPHENOL	11 U
4-CHLOROANILINE	11 U
4-CHLOROPHENYL-PHENYLEETHER	11 U
4-METHYLPHENOL	11 U
4-NITROANILINE	27 UJ
4-NITROPHENOL	27 U
ACENAPHTHENE	11 U
ACENAPHTHYLENE	11 U

FIELD DUPLICATE SUMMARY  
 SURFACE WATER - SEMIVOLATILE ORGANICS, PESTICIDES/PCBs  
 PHASE I - FIXED BASE LABORATORY  
 RI/FS CTO-0356  
 OPERABLE UNIT NO. 16 (SITE 89)  
 MCB CAMP LEJEUNE, NORTH CAROLINA

SAMPLE ID                    IR89-EC-SW05-01D  
 PHASE                        PHASE I  
 DATE SAMPLED                07/26/96

SEMIVOLATILES (ug/l) (cont)

ANTHRACENE	11 U
BENZO(A)ANTHRACENE	11 U
BENZO(A)PYRENE	11 U
BENZO(B)FLUORANTHENE	11 U
BENZO(G,H,I)PERYLENE	11 U
BENZO(K)FLUORANTHENE	11 U
BIS(2-CHLOROETHOXY)METHANE	11 U
BIS(2-CHLOROETHYL)ETHER	11 U
BIS(2-ETHYLHEXYL)PHTHALATE	11 U
BUTYLBENZYLPHTHALATE	11 U
CARBAZOLE	11 U
CHRYSENE	11 U
DIBENZO(A,H)ANTHRACENE	11 U
DIBENZOFURAN	11 U
DIETHYLPHTHALATE	11 U
DIMETHYLPHTHALATE	11 U
DI-N-BUTYLPHTHALATE	11 U
DI-N-OCTYLPHTHALATE	11 U
FLUORANTHENE	11 U
FLUORENE	11 U
HEXACHLOROBENZENE	11 U
HEXACHLOROBUTADIENE	11 U
HEXACHLOROCYCLOPENTADIENE	11 U
HEXACHLOROETHANE	11 U
INDENO(1,2,3-CD)PYRENE	11 U
ISOPHORONE	11 U
NAPHTHALENE	11 U
NITROBENZENE	11 U
N-NITROSO-DI-N-PROPYLAMINE	11 U
N-NITROSODIPHENYLAMINE (1)	11 U

FIELD DUPLICATE SUMMARY  
SURFACE WATER - SEMIVOLATILE ORGANICS, PESTICIDES/PCBs  
PHASE I - FIXED BASE LABORATORY  
RI/FS CTO-0356  
OPERABLE UNIT NO. 16 (SITE 89)  
MCB CAMP LEJEUNE, NORTH CAROLINA

SAMPLE ID IR89-EC-SW05-01D  
PHASE PHASE I  
DATE SAMPLED 07/26/96

SEMIVOLATILES (ug/l) (cont)

PENTACHLOROPHENOL	27 UJ
PHENANTHRENE	11 U
PHENOL	11 U
PYRENE	11 U

**FIELD DUPLICATE SUMMARY**  
**SURFACE WATER - SEMIVOLATILE ORGANICS, PESTICIDES/PCBs**  
**PHASE I - FIXED BASE LABORATORY**  
**RI/FS CTO-0356**  
**OPERABLE UNIT NO. 16 (SITE 89)**  
**MCB CAMP LEJEUNE, NORTH CAROLINA**

SAMPLE ID                    IR89-EC-SW05-01D  
 PHASE                        PHASE I  
 DATE SAMPLED                07/26/96

**PESTICIDES/PCBS (ug/l)**

4,4'-DDD	0.11 UJ
4,4'-DDE	0.11 UJ
4,4'-DDT	0.11 UJ
ALDRIN	0.056 UJ
ALPHA-BHC	0.056 UJ
ALPHA-CHLORDANE	0.056 UJ
AROCLOR-1016	1.1 UJ
AROCLOR-1221	2.2 UJ
AROCLOR-1232	1.1 UJ
AROCLOR-1242	1.1 UJ
AROCLOR-1248	1.1 UJ
AROCLOR-1254	1.1 UJ
AROCLOR-1260	1.1 UJ
BETA-BHC	0.056 UJ
DELTA-BHC	0.056 UJ
DIELDRIN	0.11 UJ
ENDOSULFAN I	0.056 UJ
ENDOSULFAN II	0.11 UJ
ENDOSULFAN SULFATE	0.11 UJ
ENDRIN	0.11 UJ
ENDRIN ALDEHYDE	0.11 UJ
ENDRIN KETONE	0.11 UJ
GAMMA-BHC (LINDANE)	0.056 UJ
GAMMA-CHLORDANE	0.056 UJ
HEPTACHLOR	0.056 UJ
HEPTACHLOR EPOXIDE	0.056 UJ
METHOXYCHLOR	0.56 UJ
TOXAPHENE	5.6 UJ

FIELD DUPLICATE SUMMARY  
SURFACE WATER - TAL METALS  
PHASE I - FIXED BASE LABORATORY  
RI/FS CTO-0356  
OPERABLE UNIT NO. 16 (SITE 89)  
MCB CAMP LEJEUNE, NORTH CAROLINA

SAMPLE ID IR89-EC-SW05-01D  
PHASE PHASE I  
DATE SAMPLED 07/26/96

TOTAL METALS (ug/l)

ALUMINUM, TOTAL	294
ANTIMONY, TOTAL	14.4 U
ARSENIC, TOTAL	1.4 U
BARIUM, TOTAL	20.6
BERYLLIUM, TOTAL	0.7 U
CADMIUM, TOTAL	2.6 U
CALCIUM, TOTAL	39200
CHROMIUM, TOTAL	3.3 U
COBALT, TOTAL	3.6 U
COPPER, TOTAL	2.5
IRON, TOTAL	1250
LEAD, TOTAL	2
MAGNESIUM, TOTAL	2330
MANGANESE, TOTAL	27.8
MERCURY, TOTAL	0.1 U
NICKEL, TOTAL	8.7 UJ
POTASSIUM, TOTAL	2690
SELENIUM, TOTAL	1.8 U
SILVER, TOTAL	3.1 U
SODIUM, TOTAL	12000
THALLIUM, TOTAL	1.5 U
VANADIUM, TOTAL	2.6
ZINC, TOTAL	12.6





FIELD DUPLICATES  
 SUBSURFACE SOIL - TCL ORGANICS  
 PHASE II - FIXED BASE LABORATORY  
 RI/FS CTO-0356  
 OPERABLE UNIT NO. 16 (SITE 93)  
 MCB CAMP LEJEUNE, NORTH CAROLINA

SAMPLE ID	IR93-MW01IW-04D	IR93-MW03-02D	IR93-MW04-02D	IR93-MW05-02D
PHASE	9704G396-014	9704G396-008	9705G588-009	9704G330-005
DATE SAMPLED	PHASE II	PHASE II	PHASE II	PHASE II
DEPTH	04/30/97	04/30/97	05/06/97	04/21/97
DEPTH	7-9'	3-5'	3-5'	3-5'
<b>VOLATILES (ug/kg)</b>				
CHLOROMETHANE	12 U	13 U	12 U	12 U
BROMOMETHANE	12 U	13 U	12 U	12 U
VINYL CHLORIDE	12 U	13 U	12 U	12 U
CHLOROETHANE	12 U	13 U	12 U	12 U
METHYLENE CHLORIDE	12 U	13 U	12 U	12 U
ACETONE	12 U	63	12 U	43 J
CARBON DISULFIDE	12 U	13 U	12 U	12 U
1,1-DICHLOROETHENE	12 U	13 U	12 U	12 U
1,1-DICHLOROETHANE	12 U	13 U	12 U	12 U
1,2-DICHLOROETHENE (TOTAL)	12 U	13 U	12 U	12 U
CHLOROFORM	12 U	13 U	12 U	12 U
1,2-DICHLOROETHANE	12 U	13 U	12 U	12 U
2-BUTANONE	12 U	13 U	12 U	12 U
1,1,1-TRICHLOROETHANE	12 U	13 U	12 U	12 U
CARBON TETRACHLORIDE	12 U	13 U	12 U	12 U
BROMODICHLOROMETHANE	12 U	13 U	12 U	12 U
1,2-DICHLOROPROPANE	12 U	13 U	12 U	12 U
CIS-1,3-DICHLOROPROPENE	12 U	13 U	12 U	12 U
TRICHLOROETHENE	12 U	6 J	12 U	12 U
DIBROMOCHLOROMETHANE	12 U	13 U	12 U	12 U
1,1,2-TRICHLOROETHANE	12 U	13 U	12 U	12 U
BENZENE	12 U	13 U	12 U	12 U
TRANS-1,3-DICHLOROPROPENE	12 U	13 U	12 U	12 U
BROMOFORM	12 U	13 U	12 U	12 U
4-METHYL-2-PENTANONE	12 U	13 U	12 U	12 U
2-HEXANONE	12 U	13 U	12 U	12 U
TETRACHLOROETHENE	12 U	13 U	12 U	12 U
1,1,2,2-TETRACHLOROETHANE	12 U	13 U	12 U	12 U

**FIELD DUPLICATES**  
**SUBSURFACE SOIL - TCL ORGANICS**  
**PHASE II - FIXED BASE LABORATORY**  
**RI/FS CTO-0356**  
**OPERABLE UNIT NO. 16 (SITE 93)**  
**MCB CAMP LEJEUNE, NORTH CAROLINA**

SAMPLE ID	IR93-MW01IW-04D	IR93-MW03-02D	IR93-MW04-02D	IR93-MW05-02D
PHASE	9704G396-014	9704G396-008	9705G588-009	9704G330-005
DATE SAMPLED	PHASE II	PHASE II	PHASE II	PHASE II
DEPTH	04/30/97	04/30/97	05/06/97	04/21/97
DEPTH	7-9'	3-5'	3-5'	3-5'
<b>VOLATILES (ug/kg) (cont)</b>				
TOLUENE	12 U	13 U	12 U	12 U
CHLOROBENZENE	12 U	13 U	12 U	12 U
ETHYLBENZENE	12 U	13 U	12 U	12 U
STYRENE	12 U	13 U	12 U	12 U
XYLENE (TOTAL)	12 U	13 U	12 U	12 U

FIELD DUPLICATES  
 SUBSURFACE SOIL - TCL ORGANICS  
 PHASE II - FIXED BASE LABORATORY  
 RI/FS CTO-0356  
 OPERABLE UNIT NO. 16 (SITE 93)  
 MCB CAMP LEJEUNE, NORTH CAROLINA

SAMPLE ID	IR93-MW01IW-04D	IR93-MW03-02D	IR93-MW04-02D	IR93-MW05-02D
PHASE	9704G396-014	9704G396-008	9705G588-009	9704G330-005
DATE SAMPLED	PHASE II	PHASE II	PHASE II	PHASE II
DEPTH	04/30/97	04/30/97	05/06/97	04/21/97
DEPTH	7-9'	3-5'	3-5'	3-5'
<b>SEMIVOLATILES (ug/kg)</b>				
1,2,4-TRICHLOROBENZENE	410 U	420 U	410 U	400 U
1,2-DICHLOROBENZENE	410 U	420 U	410 U	400 U
1,3-DICHLOROBENZENE	410 U	420 U	410 U	400 U
1,4-DICHLOROBENZENE	410 U	420 U	410 U	400 U
2,2'-OXYBIS(1-CHLOROPROPANE)	410 U	420 U	410 U	400 U
2,4,5-TRICHLOROPHENOL	1000 U	1000 U	1000 U	990 U
2,4,6-TRICHLOROPHENOL	410 U	420 U	410 U	400 U
2,4-DICHLOROPHENOL	410 U	420 U	410 U	400 U
2,4-DIMETHYLPHENOL	410 U	420 U	410 U	400 U
2,4-DINITROPHENOL	1000 U	1000 U	1000 U	990 U
2,4-DINITROTOLUENE	410 U	420 U	410 U	400 U
2,6-DINITROTOLUENE	410 U	420 U	410 U	400 U
2-CHLORONAPHTHALENE	410 U	420 U	410 U	400 U
2-CHLOROPHENOL	410 U	420 U	410 U	400 U
2-METHYLNAPHTHALENE	410 U	420 U	410 U	400 U
2-METHYLPHENOL	410 U	420 U	410 U	400 U
2-NITROANILINE	1000 U	1000 U	1000 U	990 U
2-NITROPHENOL	410 U	420 U	410 U	400 U
3,3'-DICHLOROBENZIDINE	410 U	420 U	410 U	400 U
3-NITROANILINE	1000 U	1000 U	1000 U	990 U
4,6-DINITRO-2-METHYLPHENOL	1000 U	1000 U	1000 U	990 U
4-BROMOPHENYL-PHENYLETHER	410 U	420 U	410 U	400 U
4-CHLORO-3-METHYLPHENOL	410 U	420 U	410 U	400 U
4-CHLOROANILINE	410 U	420 U	410 U	400 U
4-CHLOROPHENYL-PHENYLETHER	410 U	420 U	410 U	400 U
4-METHYLPHENOL	410 U	420 U	410 U	400 U
4-NITROANILINE	1000 U	1000 U	1000 U	990 U
4-NITROPHENOL	1000 U	1000 U	1000 U	990 U

FIELD DUPLICATES  
 SUBSURFACE SOIL - TCL ORGANICS  
 PHASE II - FIXED BASE LABORATORY  
 RI/FS CTO-0356  
 OPERABLE UNIT NO. 16 (SITE 93)  
 MCB CAMP LEJEUNE, NORTH CAROLINA

SAMPLE ID	IR93-MW011W-04D	IR93-MW03-02D	IR93-MW04-02D	IR93-MW05-02D
PHASE	9704G396-014	9704G396-008	9705G588-009	9704G330-005
DATE SAMPLED	PHASE II	PHASE II	PHASE II	PHASE II
DEPTH	04/30/97	04/30/97	05/06/97	04/21/97
DEPTH	7-9'	3-5'	3-5'	3-5'
SEMIVOLATILES (ug/kg) (cont)	410 U	420 U	410 U	400 U
ACENAPHTHENE	410 U	420 U	410 U	400 U
ACENAPHTHYLENE	410 U	420 U	410 U	400 U
ANTHRACENE	410 U	420 U	410 U	400 U
BENZO(A)ANTHRACENE	410 U	420 U	410 U	400 U
BENZO(A)PYRENE				
BENZO(B)FLUORANTHENE	410 U	420 U	410 U	400 U
BENZO(G,H,I)PERYLENE	410 U	420 U	410 U	400 U
BENZO(K)FLUORANTHENE	410 U	420 U	410 U	400 U
BIS(2-CHLOROETHOXY)METHANE	410 U	420 U	410 U	400 U
BIS(2-CHLOROETHYL)ETHER	410 U	420 U	410 U	400 U
BIS(2-ETHYLHEXYL)PHTHALATE	410 U	420 U	410 U	400 U
BUTYLBENZYLPHTHALATE	410 U	420 U	410 U	400 U
CARBAZOLE	410 U	420 U	410 U	400 U
CHRYSENE	410 U	420 U	410 U	400 U
DIBENZO(A,H)ANTHRACENE	410 U	420 U	410 U	400 U
DIBENZOFURAN	410 U	420 U	410 U	400 U
DIETHYLPHTHALATE	410 U	420 U	410 U	400 U
DIMETHYLPHTHALATE	410 U	420 U	410 U	400 U
DI-N-BUTYLPHTHALATE	410 U	420 U	410 U	400 U
DI-N-OCTYLPHTHALATE	410 U	420 U	410 U	400 U
FLUORANTHENE	410 U	420 U	410 U	400 U
FLUORENE	410 U	420 U	410 U	400 U
HEXACHLOROBENZENE	410 U	420 U	410 U	400 U
HEXACHLOROBUTADIENE	410 U	420 U	410 U	400 U
HEXACHLOROCYCLOPENTADIENE	410 U	420 U	410 U	400 U
HEXACHLOROETHANE	410 U	420 U	410 U	400 U
INDENO(1,2,3-CD)PYRENE	410 U	420 U	410 U	400 U
ISOPHORONE	410 U	420 U	410 U	400 U

**FIELD DUPLICATES**  
**SUBSURFACE SOIL - TCL ORGANICS**  
**PHASE II - FIXED BASE LABORATORY**  
**RI/FS CTO-0356**  
**OPERABLE UNIT NO. 16 (SITE 93)**  
**MCB CAMP LEJEUNE, NORTH CAROLINA**

SAMPLE ID	IR93-MW01IW-04D	IR93-MW03-02D	IR93-MW04-02D	IR93-MW05-02D
PHASE	9704G396-014	9704G396-008	9705G588-009	9704G330-005
DATE SAMPLED	PHASE II	PHASE II	PHASE II	PHASE II
DEPTH	04/30/97	04/30/97	05/06/97	04/21/97
DEPTH	7-9'	3-5'	3-5'	3-5'
<b>SEMIVOLATILES (ug/kg) (cont)</b>				
NAPHTHALENE	410 U	420 U	410 U	400 U
NITROBENZENE	410 U	420 U	410 U	400 U
N-NITROSO-DI-N-PROPYLAMINE	410 U	420 U	410 U	400 U
N-NITROSODIPHENYLAMINE (1)	410 U	420 U	410 U	400 U
PENTACHLOROPHENOL	1000 U	1000 U	1000 U	990 U
PHENANTHRENE	410 U	420 U	410 U	400 U
PHENOL	410 U	420 U	410 U	400 U
PYRENE	410 U	420 U	410 U	400 U

**FIELD DUPLICATES**  
**SUBSURFACE SOIL - TCL ORGANICS**  
**PHASE II - FIXED BASE LABORATORY**  
**RI/FS CTO-0356**  
**OPERABLE UNIT NO. 16 (SITE 93)**  
**MCB CAMP LEJEUNE, NORTH CAROLINA**

SAMPLE ID	IR93-MW01IW-04D	IR93-MW03-02D	IR93-MW04-02D	IR93-MW05-02D
PHASE	9704G396-014	9704G396-008	9705G588-009	9704G330-005
DATE SAMPLED	PHASE II	PHASE II	PHASE II	PHASE II
DEPTH	04/30/97	04/30/97	05/06/97	04/21/97
DEPTH	7-9'	3-5'	3-5'	3-5'
<b>PESTICIDES/PCBS (ug/kg)</b>				
4,4'-DDD	NA	NA	NA	4 UJ
4,4'-DDE	NA	NA	NA	4 UJ
4,4'-DDT	NA	NA	NA	4 UJ
ALDRIN	NA	NA	NA	2 UJ
ALPHA-BHC	NA	NA	NA	2 UJ
ALPHA-CHLORDANE	NA	NA	NA	2 UJ
AROCLOR-1016	NA	NA	NA	40 UJ
AROCLOR-1221	NA	NA	NA	80 UJ
AROCLOR-1232	NA	NA	NA	40 UJ
AROCLOR-1242	NA	NA	NA	40 UJ
AROCLOR-1248	NA	NA	NA	40 UJ
AROCLOR-1254	NA	NA	NA	40 UJ
AROCLOR-1260	NA	NA	NA	40 UJ
BETA-BHC	NA	NA	NA	2 UJ
DELTA-BHC	NA	NA	NA	2 UJ
DIELDRIN	NA	NA	NA	4 UJ
ENDOSULFAN I	NA	NA	NA	2 UJ
ENDOSULFAN II	NA	NA	NA	4 UJ
ENDOSULFAN SULFATE	NA	NA	NA	4 UJ
ENDRIN	NA	NA	NA	4 UJ
ENDRIN ALDEHYDE	NA	NA	NA	4 UJ
ENDRIN KETONE	NA	NA	NA	4 UJ
GAMMA-BHC (LINDANE)	NA	NA	NA	2 UJ
GAMMA-CHLORDANE	NA	NA	NA	2 UJ
HEPTACHLOR	NA	NA	NA	2 UJ
HEPTACHLOR EPOXIDE	NA	NA	NA	2 UJ
METHOXYCHLOR	NA	NA	NA	20 UJ
TOXAPHENE	NA	NA	NA	200 UJ

**FIELD DUPLICATE SUMMARY**  
**SUBSURFACE SOIL - TAL METALS**  
**PHASE II - FIXED BASE LABORATORY**  
**RI/FS CTO-0356**  
**OPERABLE UNIT NO. 16 (SITE 93)**  
**MCB CAMP LEJEUNE, NORTH CAROLINA**

SAMPLE ID	IR93-MW01IW-04D	IR93-MW03-02D	IR93-MW04-02D	IR93-MW05-02D
PHASE	PHASE II	PHASE II	PHASE II	PHASE II
DATE SAMPLED	04/30/97	04/30/97	05/06/97	04/21/97
DEPTH	7-9'	3-5'	3-5'	3-5'
<b>TOTAL METALS (mg/kg)</b>				
ALUMINUM, TOTAL	6240 J	16100 J	4190	7360
ANTIMONY, TOTAL	0.39 U	0.44 U	0.31 U	0.34 UJ
ARSENIC, TOTAL	0.33 UJ	0.88 J	0.35 UJ	0.39 UJ
BARIUM, TOTAL	8.9	11.4	9.1	12.8
BERYLLIUM, TOTAL	0.05	0.14	0.03	0.04 J
CADMIUM, TOTAL	0.04 U	0.13	0.04 UJ	0.04 UJ
CALCIUM, TOTAL	70.8	48.6	507	174 J
CHROMIUM, TOTAL	9.1 J	22.6 J	4.5	10.1 J
COBALT, TOTAL	0.18 J	0.53 J	0.1 J	0.23 J
COPPER, TOTAL	0.29 J	1.4 J	0.17	0.15 UJ
IRON, TOTAL	1920	8800	1380	11800
LEAD, TOTAL	6 J	6.8 J	4.8	6 J
MAGNESIUM, TOTAL	234	499	108	206
MANGANESE, TOTAL	8	7.7	4.1	2.3
MERCURY, TOTAL	0.05 U	0.05 U	0.04 U	0.06 U
NICKEL, TOTAL	0.43 J	1.3 J	0.14 UJ	0.15 UJ
POTASSIUM, TOTAL	280 J	766 J	92.4 U	181 J
SELENIUM, TOTAL	0.34 U	0.39 U	0.43 U	0.41 U
SILVER, TOTAL	0.04 UJ	0.04 UJ	0.04 U	0.04 U
SODIUM, TOTAL	43	96.6	135	42.7 J
THALLIUM, TOTAL	0.34 U	0.39 U	0.37 UJ	0.41 U
VANADIUM, TOTAL	9	31.7	4.8	18
ZINC, TOTAL	2.1	4.4	0.38 J	1.4 J



FIELD DUPLICATE SUMMARY  
GROUNDWATER - TCL ORGANICS  
PHASE II - FIXED BASE LABORATORY  
R/FS CTO-0356  
OPERABLE UNIT NO. 16 (SITE 93)  
MCB CAMP LEJEUNE, NORTH CAROLINIA

SAMPLE ID	IR93-MW02-01D	IR93-MW04-01D
PHASE	PHASE II	PHASE II
DATE SAMPLED	06/02/97	05/30/97
<b>VOLATILES (ug/l)</b>		
1,1,1-TRICHLOROETHANE	10 U	10 U
1,1,2,2-TETRACHLOROETHANE	10 U	10 U
1,1,2-TRICHLOROETHANE	10 U	10 U
1,1-DICHLOROETHANE	10 U	10 U
1,1-DICHLOROETHENE	10 U	10 U
1,2-DICHLOROETHANE	10 U	10 U
1,2-DICHLOROETHENE (TOTAL)	10 U	10 U
1,2-DICHLOROPROPANE	10 U	10 U
2-BUTANONE	10 U	10 U
2-HEXANONE	10 U	10 U
4-METHYL-2-PENTANONE	10 U	10 U
ACETONE	10 U	10 U
BENZENE	10 U	10 U
BROMODICHLOROMETHANE	10 U	10 U
BROMOFORM	10 U	10 U
BROMOMETHANE	10 U	10 U
CARBON DISULFIDE	10 U	10 U
CARBON TETRACHLORIDE	10 U	10 U
CHLOROBENZENE	10 U	10 U
CHLOROETHANE	10 U	10 U
CHLOROFORM	10 U	10 U
CHLOROMETHANE	10 U	10 U
CIS-1,3-DICHLOROPROPENE	10 U	10 U
DIBROMOCHLOROMETHANE	10 U	10 U
ETHYLBENZENE	10 U	10 U
METHYLENE CHLORIDE	10 U	10 U
STYRENE	10 U	10 U
TETRACHLOROETHENE	3 J	10 U
TOLUENE	10 U	10 U
TRANS-1,3-DICHLOROPROPENE	10 U	10 U
TRICHLOROETHENE	10 U	10 U
VINYL CHLORIDE	10 U	10 U
XYLENE (TOTAL)	10 U	10 U

FIELD DUPLICATE SUMMARY  
GROUNDWATER - TCL ORGANICS  
PHASE II - FIXED BASE LABORATORY  
RI/FS CTO-0356  
OPERABLE UNIT NO. 16 (SITE 93)  
MCB CAMP LEJEUNE, NORTH CAROLINIA

SAMPLE ID	IR93-MW02-01D	IR93-MW04-01D
PHASE	PHASE II	PHASE II
DATE SAMPLED	06/02/97	05/30/97
SEMIVOLATILES (ug/l)		
1,2,4-TRICHLOROBENZENE	10 U	10 U
1,2-DICHLOROBENZENE	10 U	10 U
1,3-DICHLOROBENZENE	10 U	10 U
1,4-DICHLOROBENZENE	10 U	10 U
2,2'-OXYBIS(1-CHLOROPROPANE)	10 U	10 U
2,4,5-TRICHLOROPHENOL	25 U	25 U
2,4,6-TRICHLOROPHENOL	10 U	10 U
2,4-DICHLOROPHENOL	10 U	10 U
2,4-DIMETHYLPHENOL	10 U	10 U
2,4-DINITROPHENOL	25 U	25 U
2,4-DINITROTOLUENE	10 U	10 U
2,6-DINITROTOLUENE	10 U	10 U
2-CHLORONAPHTHALENE	10 U	10 U
2-CHLOROPHENOL	10 U	10 U
2-METHYLNAPHTHALENE	10 U	10 U
2-METHYLPHENOL	10 U	10 U
2-NITROANILINE	25 U	25 U
2-NITROPHENOL	10 U	10 U
3,3'-DICHLOROBENZIDINE	10 U	10 U
3-NITROANILINE	25 U	25 UJ
4,6-DINITRO-2-METHYLPHENOL	25 U	25 U
4-BROMOPHENYL-PHENYLETHER	10 U	10 U
4-CHLORO-3-METHYLPHENOL	10 U	10 U
4-CHLOROANILINE	10 U	10 UJ
4-CHLOROPHENYL-PHENYLETHER	10 U	10 U
4-METHYLPHENOL	10 U	10 U
4-NITROANILINE	25 U	25 U
4-NITROPHENOL	25 U	25 U
ACENAPHTHENE	10 U	10 U
ACENAPHTHYLENE	10 U	10 U
ANTHRACENE	10 U	10 U
BENZO(A)ANTHRACENE	10 U	10 U
BENZO(A)PYRENE	10 U	10 U

FIELD DUPLICATE SUMMARY  
GROUNDWATER - TCL ORGANICS  
PHASE II - FIXED BASE LABORATORY  
RI/FS CTO-0356  
OPERABLE UNIT NO. 16 (SITE 93)  
MCB CAMP LEJEUNE, NORTH CAROLINIA

SAMPLE ID	IR93-MW02-01D	IR93-MW04-01D
PHASE	PHASE II	PHASE II
DATE SAMPLED	06/02/97	05/30/97
<b>SEMIVOLATILES (ug/l) (cont)</b>		
BENZO(B)FLUORANTHENE	10 U	10 U
BENZO(G,H,I)PERYLENE	10 U	10 U
BENZO(K)FLUORANTHENE	10 U	10 U
BIS(2-CHLOROETHOXY)METHANE	10 U	10 U
BIS(2-CHLOROETHYL)ETHER	10 U	10 U
BIS(2-ETHYLHEXYL)PHTHALATE	2 J	2 U
BUTYLBENZYLPHTHALATE	10 U	10 U
CARBAZOLE	10 U	10 U
CHRYSENE	10 U	10 U
DIBENZO(A,H)ANTHRACENE	10 U	10 U
DIBENZOFURAN	10 U	10 U
DIETHYLPHTHALATE	10 U	10 U
DIMETHYLPHTHALATE	10 U	10 U
DI-N-BUTYLPHTHALATE	10 U	10 U
DI-N-OCTYLPHTHALATE	10 U	10 U
FLUORANTHENE	10 U	10 U
FLUORENE	10 U	10 U
HEXACHLOROBENZENE	10 U	10 U
HEXACHLOROBUTADIENE	10 U	10 U
HEXACHLOROCYCLOPENTADIENE	10 U	10 U
HEXACHLOROETHANE	10 U	10 U
INDENO(1,2,3-CD)PYRENE	10 U	10 U
ISOPHORONE	10 U	10 U
NAPHTHALENE	10 U	10 U
NITROBENZENE	10 U	10 U
N-NITROSO-DI-N-PROPYLAMINE	10 U	10 U
N-NITROSODIPHENYLAMINE (1)	10 U	10 U
PENTACHLOROPHENOL	25 U	25 U
PHENANTHRENE	10 U	10 U
PHENOL	10 U	10 U
PYRENE	10 U	10 U

FIELD DUPLICATE SUMMARY  
GROUNDWATER - TCL ORGANICS  
PHASE II - FIXED BASE LABORATORY  
RI/FS CTO-0356  
OPERABLE UNIT NO. 16 (SITE 93)  
MCB CAMP LEJEUNE, NORTH CAROLINA

SAMPLE ID	IR93-MW02-01D	IR93-MW04-01D
PHASE	PHASE II	PHASE II
DATE SAMPLED	06/02/97	05/30/97
<b>PESTICIDES/PCBS (ug/l)</b>		
4,4'-DDD	0.1 U	NA
4,4'-DDE	0.1 U	NA
4,4'-DDT	0.1 U	NA
ALDRIN	0.05 U	NA
ALPHA-BHC	0.05 U	NA
ALPHA-CHLORDANE	0.05 U	NA
AROCLOR-1016	1 U	NA
AROCLOR-1221	2 U	NA
AROCLOR-1232	1 U	NA
AROCLOR-1242	1 U	NA
AROCLOR-1248	1 U	NA
AROCLOR-1254	1 U	NA
AROCLOR-1260	1 U	NA
BETA-BHC	0.05 U	NA
DELTA-BHC	0.05 U	NA
DIELDRIN	0.1 U	NA
ENDOSULFAN I	0.05 U	NA
ENDOSULFAN II	0.1 U	NA
ENDOSULFAN SULFATE	0.1 U	NA
ENDRIN	0.1 U	NA
ENDRIN ALDEHYDE	0.1 U	NA
ENDRIN KETONE	0.1 U	NA
GAMMA-BHC (LINDANE)	0.05 U	NA
GAMMA-CHLORDANE	0.05 U	NA
HEPTACHLOR	0.05 U	NA
HEPTACHLOR EPOXIDE	0.05 U	NA
METHOXYCHLOR	0.5 U	NA
TOXAPHENE	5 U	NA

**FIELD DUPLICATE SUMMARY**  
**GROUNDWATER - TAL METALS**  
**PHASE II - FIXED BASE LABORATORY**  
**RI/FS CTO-0356**  
**OPERABLE UNIT NO. 16 (SITE 93)**  
**MCB CAMP LEJEUNE, NORTH CAROLINA**

SAMPLE ID	IR93-MW02-01D	IR93-MW04-01D
PHASE	PHASE II	PHASE II
DATE SAMPLED	06/02/97	05/30/97
<b>TOTAL METALS (ug/l)</b>		
ALUMINUM, TOTAL	21.6 U	277
ANTIMONY, TOTAL	1.9 U	1.9 U
ARSENIC, TOTAL	2.7 U	2.7 U
BARIUM, TOTAL	24.2	58.6
BERYLLIUM, TOTAL	0.3 U	0.3 U
CADMIUM, TOTAL	0.4 U	0.4 U
CALCIUM, TOTAL	84900	4860
CHROMIUM, TOTAL	0.55	0.5 U
COBALT, TOTAL	0.5 U	1.8
COPPER, TOTAL	0.8 U	0.8 UJ
IRON, TOTAL	2810	930
LEAD, TOTAL	1.4 U	2
MAGNESIUM, TOTAL	1820	1200
MANGANESE, TOTAL	27.8	17.3
MERCURY, TOTAL	0.1 U	0.1 U
NICKEL, TOTAL	0.7 U	3.5 U
POTASSIUM, TOTAL	1270	905
SELENIUM, TOTAL	2.2 U	2.2 U
SILVER, TOTAL	0.5 U	0.5 U
SODIUM, TOTAL	6610	26900
THALLIUM, TOTAL	3 U	3 U
VANADIUM, TOTAL	0.7 U	0.96
ZINC, TOTAL	3.7	2.6 J

**APPENDIX J**  
**QUALITY ASSURANCE/QUALITY CONTROL SUMMARIES**

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**SITE 89**

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QUALITY ASSURANCE/QUALITY CONTROL SUMMARY  
 SUBSURFACE SOIL - TCL ORGANICS  
 PHASE II - FIXED BASE LABORATORY  
 RI/FS CTO-0356  
 OPERABLE UNIT NO. 16 (SITE 89)  
 MCB CAMP LEJEUNE, NORTH CAROLINA

SAMPLE ID	IR89-RBSB01	IR89-RBSB02	IR89-RBSB03	IR89-RBSB04	IR89-RBSB08	IR89-RBSB10	IR89-RBSB14	IR89/93-FB01
PHASE	PHASE II	PHASE II	PHASE II	PHASE II	PHASE II	PHASE II	PHASE II	PHASE II
DATE SAMPLED	04/18/97	04/20/97	04/20/97	04/20/97	04/30/97	05/04/97	05/13/97	05/13/97
<b>VOLATILES (ug/l)</b>								
1,1,1-TRICHLOROETHANE	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
1,1,2,2-TETRACHLOROETHANE	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
1,1,2-TRICHLOROETHANE	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
1,1-DICHLOROETHANE	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
1,1-DICHLOROETHENE	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
1,2-DICHLOROETHANE	10 U	10 U	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	10 U	10 U
1,2-DICHLOROPROPANE	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
2-BUTANONE	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
2-HEXANONE	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
4-METHYL-2-PENTANONE	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
ACETONE	10 U	10 U	70	10 U	10 U	10 U	10 U	10 UJ
BENZENE	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
BROMODICHLOROMETHANE	10 U	10 U	10 U	10 U	10 U	10 U	10 U	18
BROMOFORM	10 U	10 U	10 U	10 U	10 U	10 U	10 U	9 J
BROMOMETHANE	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
CARBON DISULFIDE	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
CARBON TETRACHLORIDE	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
CHLOROBENZENE	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
CHLOROETHANE	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
CHLOROFORM	10 U	10 U	10 U	10 U	10 U	10 U	10 U	12
CHLOROMETHANE	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
CIS-1,3-DICHLOROPROPENE	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
DIBROMOCHLOROMETHANE	10 U	10 U	10 U	10 U	10 U	10 U	10 U	24
ETHYLBENZENE	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
METHYLENE CHLORIDE	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
STYRENE	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
TETRACHLOROETHENE	10 U	10 U	10 U	10 U	10 U	10 U	3 J	10 U
TOLUENE	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
TRANS-1,3-DICHLOROPROPENE	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
TRICHLOROETHENE	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
VINYL CHLORIDE	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
XYLENE (TOTAL)	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U



QUALITY ASSURANCE/QUALITY CONTROL SUMMARY  
 SUBSURFACE SOIL - TCL ORGANICS  
 PHASE II - FIXED BASE LABORATORY  
 RI/FS CTO-0356  
 OPERABLE UNIT NO. 16 (SITE 89)  
 MCB CAMP LEJEUNE, NORTH CAROLINA

SAMPLE ID	IR89-RBSB01	IR89-RBSB02	IR89-RBSB03	IR89-RBSB04	IR89-RBSB08	IR89-RBSB10	IR89-RBSB14	IR89/93-FB01
PHASE	PHASE II	PHASE II	PHASE II	PHASE II	PHASE II	PHASE II	PHASE II	PHASE II
DATE SAMPLED	04/18/97	04/20/97	04/20/97	04/20/97	04/30/97	05/04/97	05/13/97	05/13/97
SEMIVOLATILES (ug/l)	1							
1,2,4-TRICHLOROBENZENE	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
1,2-DICHLOROBENZENE	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
1,3-DICHLOROBENZENE	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
1,4-DICHLOROBENZENE	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
2,2'-OXYBIS(1-CHLOROPROPANE)	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
2,4,5-TRICHLOROPHENOL	26 U	25 U	25 U	25 U	25 U	25 U	25 U	25 U
2,4,6-TRICHLOROPHENOL	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
2,4-DICHLOROPHENOL	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
2,4-DIMETHYLPHENOL	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
2,4-DINITROPHENOL	26 U	25 U	25 U	25 U	25 UJ	25 U	25 U	25 U
2,4-DINITROTOLUENE	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
2,6-DINITROTOLUENE	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
2-CHLORONAPHTHALENE	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
2-CHLOROPHENOL	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
2-METHYLNAPHTHALENE	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
2-METHYLPHENOL	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
2-NITROANILINE	26 U	25 U	25 U	25 U	25 U	25 U	25 U	25 U
2-NITROPHENOL	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
3,3'-DICHLOROBENZIDINE	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
3-NITROANILINE	26 U	25 U	25 U	25 U	25 U	25 U	25 U	25 U
4,6-DINITRO-2-METHYLPHENOL	26 U	25 U	25 U	25 U	25 U	25 U	25 U	25 U
4-BROMOPHENYL-PHENYLETHER	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
4-CHLORO-3-METHYLPHENOL	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
4-CHLOROANILINE	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
4-CHLOROPHENYL-PHENYLETHER	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
4-METHYLPHENOL	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
4-NITROANILINE	26 U	25 U	25 U	25 U	25 U	25 U	25 U	25 U
4-NITROPHENOL	26 U	25 U	25 U	25 U	25 UJ	25 U	25 U	25 U
ACENAPHTHENE	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
ACENAPHTHYLENE	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
ANTHRACENE	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
BENZO(A)ANTHRACENE	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
BENZO(A)PYRENE	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U

QUALITY ASSURANCE/QUALITY CONTROL SUMMARY  
 SUBSURFACE SOIL - TCL ORGANICS  
 PHASE II - FIXED BASE LABORATORY  
 RI/FS CTO-0356  
 OPERABLE UNIT NO. 16 (SITE 89)  
 MCB CAMP LEJEUNE, NORTH CAROLINA

SAMPLE ID	IR89-RBSB01	IR89-RBSB02	IR89-RBSB03	IR89-RBSB04	IR89-RBSB08	IR89-RBSB10	IR89-RBSB14	IR89/93-FB01
PHASE	PHASE II	PHASE II	PHASE II	PHASE II	PHASE II	PHASE II	PHASE II	PHASE II
DATE SAMPLED	04/18/97	04/20/97	04/20/97	04/20/97	04/30/97	05/04/97	05/13/97	05/13/97
<b>SEMIVOLATILES (ug/l) (cont)</b>								
BENZO(B)FLUORANTHENE	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
BENZO(G,H,I)PERYLENE	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
BENZO(K)FLUORANTHENE	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
BIS(2-CHLOROETHOXY)METHANE	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
BIS(2-CHLOROETHYL)ETHER	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
BIS(2-ETHYLHEXYL)PHTHALATE	10 U	10 U	10 U	10 U	8 J	10 U	10 U	6 J
BUTYLBENZYLPHTHALATE	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
CARBAZOLE	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
CHRYSENE	10 U	10 U	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	10 U	10 U
DIBENZOFURAN	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
DIETHYLPHTHALATE	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
DIMETHYLPHTHALATE	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
DI-N-BUTYLPHTHALATE	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
DI-N-OCTYLPHTHALATE	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
FLUORANTHENE	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
FLUORENE	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
HEXACHLOROBENZENE	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
HEXACHLOROBUTADIENE	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
HEXACHLOROCYCLOPENTADIENE	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
HEXACHLOROETHANE	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
INDENO(1,2,3-CD)PYRENE	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
ISOPHORONE	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
NAPHTHALENE	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
NITROBENZENE	10 U	10 U	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	10 U	10 U
N-NITROSODIPHENYLAMINE (1)	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
PENTACHLOROPHENOL	26 U	25 U	25 U	25 U	25 U	25 U	25 U	25 U
PHENANTHRENE	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
PHENOL	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
PYRENE	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U

**QUALITY ASSURANCE/QUALITY CONTROL SUMMARY**  
**SUBSURFACE SOIL - TCL ORGANICS**  
**PHASE II - FIXED BASE LABORATORY**  
**RI/FS CTO-0356**  
**OPERABLE UNIT NO. 16 (SITE 89)**  
**MCB CAMP LEJEUNE, NORTH CAROLINA**

SAMPLE ID	IR89-RBSB01	IR89-RBSB02	IR89-RBSB03	IR89-RBSB04	IR89-RBSB08	IR89-RBSB10	IR89-RBSB14	IR89/93-FB01
PHASE	PHASE II	PHASE II	PHASE II	PHASE II	PHASE II	PHASE II	PHASE II	PHASE II
DATE SAMPLED	04/18/97	04/20/97	04/20/97	04/20/97	04/30/97	05/04/97	05/13/97	05/13/97
<b>PESTICIDES/PCBS (ug/l)</b>	<b>1</b>							
4,4'-DDD	0.11 U	0.1 U	0.1 UJ	0.1 U	0.1 U	0.1 UJ	0.1 UJ	0.1 U
4,4'-DDE	0.11 U	0.1 U	0.1 UJ	0.1 U	0.1 U	0.1 UJ	0.1 UJ	0.1 U
4,4'-DDT	0.11 U	0.1 U	0.1 UJ	0.1 U	0.1 U	0.1 UJ	0.1 UJ	0.1 U
ALDRIN	0.054 U	0.05 U	0.05 UJ	0.05 U	0.05 U	0.05 UJ	0.05 UJ	0.05 U
ALPHA-BHC	0.054 U	0.05 U	0.05 UJ	0.05 U	0.05 U	0.05 UJ	0.05 UJ	0.05 U
ALPHA-CHLORDANE	0.054 U	0.05 U	0.05 UJ	0.05 U	0.05 U	0.05 UJ	0.05 UJ	0.05 U
AROCLOR-1016	1.1 U	1 U	1 UJ	1 U	1 U	1 UJ	1 UJ	1 U
AROCLOR-1221	2.2 U	2 U	2 UJ	2 U	2 U	2 UJ	2 UJ	2 U
AROCLOR-1232	1.1 U	1 U	1 UJ	1 U	1 U	1 UJ	1 UJ	1 U
AROCLOR-1242	1.1 U	1 U	1 UJ	1 U	1 U	1 UJ	1 UJ	1 U
AROCLOR-1248	1.1 U	1 U	1 UJ	1 U	1 U	1 UJ	1 UJ	1 U
AROCLOR-1254	1.1 U	1 U	1 UJ	1 U	1 U	1 UJ	1 UJ	1 U
AROCLOR-1260	1.1 U	1 U	1 UJ	1 U	1 U	1 UJ	1 UJ	1 U
BETA-BHC	0.054 U	0.05 U	0.05 UJ	0.05 U	0.05 U	0.05 UJ	0.05 UJ	0.05 U
DELTA-BHC	0.054 U	0.05 U	0.05 UJ	0.05 U	0.05 U	0.05 UJ	0.05 UJ	0.05 U
DIELDRIN	0.11 U	0.1 U	0.1 UJ	0.1 U	0.1 U	0.1 UJ	0.1 UJ	0.1 U
ENDOSULFAN I	0.054 U	0.05 U	0.05 UJ	0.05 U	0.05 U	0.05 UJ	0.05 UJ	0.05 U
ENDOSULFAN II	0.11 U	0.1 U	0.1 UJ	0.1 U	0.1 U	0.1 UJ	0.1 UJ	0.1 U
ENDOSULFAN SULFATE	0.11 U	0.1 U	0.1 UJ	0.1 U	0.1 U	0.1 UJ	0.1 UJ	0.1 U
ENDRIN	0.11 U	0.1 U	0.1 UJ	0.1 U	0.1 U	0.1 UJ	0.1 UJ	0.1 U
ENDRIN ALDEHYDE	0.11 U	0.1 U	0.1 UJ	0.1 U	0.1 U	0.1 UJ	0.1 UJ	0.1 U
ENDRIN KETONE	0.11 U	0.1 U	0.1 UJ	0.1 U	0.1 U	0.1 UJ	0.1 UJ	0.1 U
GAMMA-BHC (LINDANE)	0.054 U	0.05 U	0.05 UJ	0.05 U	0.05 U	0.05 UJ	0.05 UJ	0.05 U
GAMMA-CHLORDANE	0.054 U	0.05 U	0.05 UJ	0.05 U	0.05 U	0.05 UJ	0.05 UJ	0.05 U
HEPTACHLOR	0.054 U	0.05 U	0.05 UJ	0.05 U	0.05 U	0.05 UJ	0.05 UJ	0.05 U
HEPTACHLOR EPOXIDE	0.054 U	0.05 U	0.05 UJ	0.05 U	0.05 U	0.05 UJ	0.05 UJ	0.05 U
METHOXYCHLOR	0.54 UJ	0.5 UJ	0.5 UJ	0.5 UJ	0.5 U	0.5 UJ	0.5 UJ	0.5 UJ
TOXAPHENE	5.4 U	5 U	5 UJ	5 U	5 U	5 UJ	5 UJ	5 U

**QUALITY ASSURANCE/QUALITY CONTROL SUMMARY**  
**SUBSURFACE SOIL - TCL ORGANICS**  
**PHASE II - FIXED BASE LABORATORY**  
**RI/FS CTO-0356**  
**OPERABLE UNIT NO. 16 (SITE 89)**  
**MCB CAMP LEJEUNE, NORTH CAROLINA**

SAMPLE ID	IR89/93-FB02	IR89/93-FB03	TB-01	TB-02	TB04	TB05	TB06	TB07	TB09
PHASE	PHASE II	PHASE II	PHASE II	PHASE II	PHASE II	PHASE II	PHASE II	PHASE II	PHASE II
DATE SAMPLED	05/13/97	05/13/97	04/15/97	04/19/97	04/29/97	05/02/97	05/02/97	05/02/97	05/12/97
<b>VOLATILES (ug/l)</b>									
1,1,1-TRICHLOROETHANE	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
1,1,2,2-TETRACHLOROETHANE	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
1,1,2-TRICHLOROETHANE	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
1,1-DICHLOROETHANE	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
1,1-DICHLOROETHENE	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
1,2-DICHLOROETHANE	10 U	10 U	10 U	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	10 U	10 U	10 U
1,2-DICHLOROPROPANE	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
2-BUTANONE	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
2-HEXANONE	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
4-METHYL-2-PENTANONE	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
ACETONE	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
BENZENE	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
BROMODICHLOROMETHANE	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
BROMOFORM	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
BROMOMETHANE	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
CARBON DISULFIDE	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
CARBON TETRACHLORIDE	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
CHLOROBENZENE	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
CHLOROETHANE	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
CHLOROFORM	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
CHLOROMETHANE	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
CIS-1,3-DICHLOROPROPENE	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
DIBROMOCHLOROMETHANE	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
ETHYLBENZENE	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
METHYLENE CHLORIDE	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
STYRENE	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
TETRACHLOROETHENE	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
TOLUENE	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
TRANS-1,3-DICHLOROPROPENE	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
TRICHLOROETHENE	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
VINYL CHLORIDE	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
XYLENE (TOTAL)	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U

QUALITY ASSURANCE/QUALITY CONTROL SUMMARY  
 SUBSURFACE SOIL - TCL ORGANICS  
 PHASE II - FIXED BASE LABORATORY  
 RI/FS CTO-0356  
 OPERABLE UNIT NO. 16 (SITE 89)  
 MCB CAMP LEJEUNE, NORTH CAROLINA

SAMPLE ID	IR89/93-FB02	IR89/93-FB03	TB-01	TB-02	TB04	TB05	TB06	TB07	TB09	
PHASE	PHASE II	PHASE II	PHASE II	PHASE II	PHASE II	PHASE II	PHASE II	PHASE II	PHASE II	
DATE SAMPLED	05/13/97	05/13/97	04/15/97	04/19/97	04/29/97	05/02/97	05/02/97	05/02/97	05/12/97	
<b>SEMIVOLATILES (ug/l)</b>										
1,2,4-TRICHLOROBENZENE	10 U	10 U	NA	NA	NA	NA	NA	NA	NA	
1,2-DICHLOROBENZENE	10 U	10 U	NA	NA	NA	NA	NA	NA	NA	
1,3-DICHLOROBENZENE	10 U	10 U	NA	NA	NA	NA	NA	NA	NA	
1,4-DICHLOROBENZENE	10 U	10 U	NA	NA	NA	NA	NA	NA	NA	
2,2'-OXYBIS(1-CHLOROPROPANE)	10 U	10 U	NA	NA	NA	NA	NA	NA	NA	
2,4,5-TRICHLOROPHENOL	25 U	25 U	NA	NA	NA	NA	NA	NA	NA	
2,4,6-TRICHLOROPHENOL	10 U	10 U	NA	NA	NA	NA	NA	NA	NA	
2,4-DICHLOROPHENOL	10 U	10 U	NA	NA	NA	NA	NA	NA	NA	
2,4-DIMETHYLPHENOL	10 U	10 U	NA	NA	NA	NA	NA	NA	NA	
2,4-DINITROPHENOL	25 U	25 U	NA	NA	NA	NA	NA	NA	NA	
2,4-DINITROTOLUENE	10 U	10 U	NA	NA	NA	NA	NA	NA	NA	
2,6-DINITROTOLUENE	10 U	10 U	NA	NA	NA	NA	NA	NA	NA	
2-CHLORONAPHTHALENE	10 U	10 U	NA	NA	NA	NA	NA	NA	NA	
2-CHLOROPHENOL	10 U	10 U	NA	NA	NA	NA	NA	NA	NA	
2-METHYLNAPHTHALENE	10 U	10 U	NA	NA	NA	NA	NA	NA	NA	
2-METHYLPHENOL	10 U	10 U	NA	NA	NA	NA	NA	NA	NA	
2-NITROANILINE	25 U	25 U	NA	NA	NA	NA	NA	NA	NA	
2-NITROPHENOL	10 U	10 U	NA	NA	NA	NA	NA	NA	NA	
3,3'-DICHLOROBENZIDINE	10 U	10 U	NA	NA	NA	NA	NA	NA	NA	
3-NITROANILINE	25 U	25 U	NA	NA	NA	NA	NA	NA	NA	
4,6-DINITRO-2-METHYLPHENOL	25 U	25 U	NA	NA	NA	NA	NA	NA	NA	
4-BROMOPHENYL-PHENYLETHER	10 U	10 U	NA	NA	NA	NA	NA	NA	NA	
4-CHLORO-3-METHYLPHENOL	10 U	10 U	NA	NA	NA	NA	NA	NA	NA	
4-CHLOROANILINE	10 U	10 U	NA	NA	NA	NA	NA	NA	NA	
4-CHLOROPHENYL-PHENYLETHER	10 U	10 U	NA	NA	NA	NA	NA	NA	NA	
4-METHYLPHENOL	10 U	10 U	NA	NA	NA	NA	NA	NA	NA	
4-NITROANILINE	25 U	25 UJ	NA	NA	NA	NA	NA	NA	NA	
4-NITROPHENOL	25 U	25 U	NA	NA	NA	NA	NA	NA	NA	
ACENAPHITHENE	10 U	10 U	NA	NA	NA	NA	NA	NA	NA	
ACENAPHTHYLENE	10 U	10 U	NA	NA	NA	NA	NA	NA	NA	
ANTHRACENE	10 U	10 U	NA	NA	NA	NA	NA	NA	NA	
BENZO(A)ANTHRACENE	10 U	10 U	NA	NA	NA	NA	NA	NA	NA	
BENZO(A)PYRENE	10 U	10 U	NA	NA	NA	NA	NA	NA	NA	

QUALITY ASSURANCE/QUALITY CONTROL SUMMARY  
 SUBSURFACE SOIL - TCL ORGANICS  
 PHASE II - FIXED BASE LABORATORY  
 RI/FS CTO-0356  
 OPERABLE UNIT NO. 16 (SITE 89)  
 MCB CAMP LEJEUNE, NORTH CAROLINA

SAMPLE ID	IR89/93-FB02	IR89/93-FB03	TB-01	TB-02	TB04	TB05	TB06	TB07	TB09
PHASE	PHASE II	PHASE II	PHASE II	PHASE II	PHASE II	PHASE II	PHASE II	PHASE II	PHASE II
DATE SAMPLED	05/13/97	05/13/97	04/15/97	04/19/97	04/29/97	05/02/97	05/02/97	05/02/97	05/12/97
<b>SEMIVOLATILES (ug/l) (cont)</b>									
BENZO(B)FLUORANTHENE	10 U	10 U	NA	NA	NA	NA	NA	NA	NA
BENZO(G,H,I)PERYLENE	10 U	10 U	NA	NA	NA	NA	NA	NA	NA
BENZO(K)FLUORANTHENE	10 U	10 U	NA	NA	NA	NA	NA	NA	NA
BIS(2-CHLOROETHOXY)METHANE	10 U	10 U	NA	NA	NA	NA	NA	NA	NA
BIS(2-CHLOROETHYL)ETHER	10 U	10 U	NA	NA	NA	NA	NA	NA	NA
BIS(2-ETHYLHEXYL)PHTHALATE	57	120	NA	NA	NA	NA	NA	NA	NA
BUTYLBENZYLPHTHALATE	10 U	10 U	NA	NA	NA	NA	NA	NA	NA
CARBAZOLE	10 U	10 U	NA	NA	NA	NA	NA	NA	NA
CHRYSENE	10 U	10 U	NA	NA	NA	NA	NA	NA	NA
DIBENZO(A,H)ANTHRACENE	10 U	10 U	NA	NA	NA	NA	NA	NA	NA
DIBENZOFURAN	10 U	10 U	NA	NA	NA	NA	NA	NA	NA
DIETHYLPHTHALATE	10 U	10 U	NA	NA	NA	NA	NA	NA	NA
DIMETHYLPHTHALATE	10 U	10 U	NA	NA	NA	NA	NA	NA	NA
DI-N-BUTYLPHTHALATE	10 U	10 U	NA	NA	NA	NA	NA	NA	NA
DI-N-OCTYLPHTHALATE	10 U	10 U	NA	NA	NA	NA	NA	NA	NA
FLUORANTHENE	10 U	10 U	NA	NA	NA	NA	NA	NA	NA
FLUORENE	10 U	10 U	NA	NA	NA	NA	NA	NA	NA
HEXACHLOROENZENE	10 U	10 U	NA	NA	NA	NA	NA	NA	NA
HEXACHLOROBUTADIENE	10 U	10 U	NA	NA	NA	NA	NA	NA	NA
HEXACHLOROCYCLOPENTADIENE	10 U	10 U	NA	NA	NA	NA	NA	NA	NA
HEXACHLOROETHANE	10 U	10 U	NA	NA	NA	NA	NA	NA	NA
INDENO(1,2,3-CD)PYRENE	10 U	10 U	NA	NA	NA	NA	NA	NA	NA
ISOPHORONE	10 U	10 U	NA	NA	NA	NA	NA	NA	NA
NAPHTHALENE	10 U	10 U	NA	NA	NA	NA	NA	NA	NA
NITROBENZENE	10 U	10 U	NA	NA	NA	NA	NA	NA	NA
N-NITROSO-DI-N-PROPYLAMINE	10 U	10 U	NA	NA	NA	NA	NA	NA	NA
N-NITROSODIPHENYLAMINE (1)	10 U	10 U	NA	NA	NA	NA	NA	NA	NA
PENTACHLOROPHENOL	25 U	25 U	NA	NA	NA	NA	NA	NA	NA
PHENANTHRENE	10 U	10 U	NA	NA	NA	NA	NA	NA	NA
PHENOL	10 U	10 U	NA	NA	NA	NA	NA	NA	NA
PYRENE	10 U	10 U	NA	NA	NA	NA	NA	NA	NA

**QUALITY ASSURANCE/QUALITY CONTROL SUMMARY**  
**SUBSURFACE SOIL - TCL ORGANICS**  
**PHASE II - FIXED BASE LABORATORY**  
**RI/FS CTO-0356**  
**OPERABLE UNIT NO. 16 (SITE 89)**  
**MCB CAMP LEJEUNE, NORTH CAROLINA**

SAMPLE ID	IR89/93-FB02	IR89/93-FB03	TB-01	TB-02	TB04	TB05	TB06	TB07	TB09
PHASE	PHASE II	PHASE II	PHASE II	PHASE II	PHASE II	PHASE II	PHASE II	PHASE II	PHASE II
DATE SAMPLED	05/13/97	05/13/97	04/15/97	04/19/97	04/29/97	05/02/97	05/02/97	05/02/97	05/12/97
<b>PESTICIDES/PCBS (ug/l)</b>									
4,4'-DDD	0.1 U	0.1 U	NA	NA	NA	NA	NA	NA	NA
4,4'-DDE	0.1 U	0.1 U	NA	NA	NA	NA	NA	NA	NA
4,4'-DDT	0.1 U	0.1 U	NA	NA	NA	NA	NA	NA	NA
ALDRIN	0.05 U	0.05 U	NA	NA	NA	NA	NA	NA	NA
ALPHA-BHC	0.05 U	0.05 U	NA	NA	NA	NA	NA	NA	NA
ALPHA-CHLORDANE	0.05 U	0.05 U	NA	NA	NA	NA	NA	NA	NA
AROCLOR-1016	1 U	1 U	NA	NA	NA	NA	NA	NA	NA
AROCLOR-1221	2 U	2 U	NA	NA	NA	NA	NA	NA	NA
AROCLOR-1232	1 U	1 U	NA	NA	NA	NA	NA	NA	NA
AROCLOR-1242	1 U	1 U	NA	NA	NA	NA	NA	NA	NA
AROCLOR-1248	1 U	1 U	NA	NA	NA	NA	NA	NA	NA
AROCLOR-1254	1 U	1 U	NA	NA	NA	NA	NA	NA	NA
AROCLOR-1260	1 U	1 U	NA	NA	NA	NA	NA	NA	NA
BETA-BHC	0.05 U	0.05 U	NA	NA	NA	NA	NA	NA	NA
DELTA-BHC	0.05 U	0.05 U	NA	NA	NA	NA	NA	NA	NA
DIELDRIN	0.1 U	0.1 U	NA	NA	NA	NA	NA	NA	NA
ENDOSULFAN I	0.05 U	0.05 U	NA	NA	NA	NA	NA	NA	NA
ENDOSULFAN II	0.1 U	0.1 U	NA	NA	NA	NA	NA	NA	NA
ENDOSULFAN SULFATE	0.1 U	0.1 U	NA	NA	NA	NA	NA	NA	NA
ENDRIN	0.1 U	0.1 U	NA	NA	NA	NA	NA	NA	NA
ENDRIN ALDEHYDE	0.1 U	0.1 U	NA	NA	NA	NA	NA	NA	NA
ENDRIN KETONE	0.1 U	0.1 U	NA	NA	NA	NA	NA	NA	NA
GAMMA-BHC (LINDANE)	0.05 U	0.05 U	NA	NA	NA	NA	NA	NA	NA
GAMMA-CHLORDANE	0.05 U	0.05 U	NA	NA	NA	NA	NA	NA	NA
HEPTACHLOR	0.05 U	0.05 U	NA	NA	NA	NA	NA	NA	NA
HEPTACHLOR EPOXIDE	0.05 U	0.05 U	NA	NA	NA	NA	NA	NA	NA
METHOXYCHLOR	0.5 UJ	0.5 UJ	NA	NA	NA	NA	NA	NA	NA
TOXAPHENE	5 U	5 U	NA	NA	NA	NA	NA	NA	NA

QUALITY ASSURANCE/QUALITY CONTROL SUMMARY  
 SUBSURFACE SOIL - TCL ORGANICS  
 PHASE II - FIXED BASE LABORATORY  
 RI/FS CTO-0356  
 OPERABLE UNIT NO. 16 (SITE 89)  
 MCB CAMP LEJEUNE, NORTH CAROLINA

SAMPLE ID	TB10	TB11	TB12
PHASE	PHASE II	PHASE II	PHASE II
DATE SAMPLED	05/13/97	05/14/97	05/15/97
<b>VOLATILES (ug/l)</b>			
1,1,1-TRICHLOROETHANE	10 U	10 U	10 U
1,1,2,2-TETRACHLOROETHANE	10 U	10 U	10 U
1,1,2-TRICHLOROETHANE	10 U	10 U	10 U
1,1-DICHLOROETHANE	10 U	10 U	10 U
1,1-DICHLOROETHENE	10 U	10 U	10 U
1,2-DICHLOROETHANE	10 U	10 U	10 U
1,2-DICHLOROETHENE (TOTAL)	10 U	10 U	10 U
1,2-DICHLOROPROPANE	10 U	10 U	10 U
2-BUTANONE	10 U	10 U	10 U
2-HEXANONE	10 U	10 U	10 U
4-METHYL-2-PENTANONE	10 U	10 U	10 U
ACETONE	10 UJ	10 U	10 U
BENZENE	10 U	10 U	10 U
BROMODICHLOROMETHANE	10 U	10 U	10 U
BROMOFORM	10 U	10 U	10 U
BROMOMETHANE	10 U	10 U	10 U
CARBON DISULFIDE	10 U	10 U	10 U
CARBON TETRACHLORIDE	10 U	10 U	10 U
CHLOROBENZENE	10 U	10 U	10 U
CHLOROETHANE	10 U	10 U	10 U
CHLOROFORM	10 U	10 U	10 U
CHLOROMETHANE	10 U	10 U	10 U
CIS-1,3-DICHLOROPROPENE	10 U	10 U	10 U
DIBROMOCHLOROMETHANE	10 U	10 U	10 U
ETHYLBENZENE	10 U	10 U	10 U
METHYLENE CHLORIDE	10 U	10 U	10 U
STYRENE	10 U	10 U	10 U
TETRACHLOROETHENE	10 U	10 U	10 U
TOLUENE	10 U	10 U	10 U
TRANS-1,3-DICHLOROPROPENE	10 U	10 U	10 U
TRICHLOROETHENE	10 U	10 U	10 U
VINYL CHLORIDE	10 U	10 U	10 U
XYLENE (TOTAL)	10 U	10 U	10 U



QUALITY ASSURANCE/QUALITY CONTROL SUMMARY  
 SUBSURFACE SOIL - TCL ORGANICS  
 PHASE II - FIXED BASE LABORATORY  
 RI/FS CTO-0356  
 OPERABLE UNIT NO. 16 (SITE 89)  
 MCB CAMP LEJEUNE, NORTH CAROLINA

SAMPLE ID	TB10	TB11	TB12
PHASE	PHASE II	PHASE II	PHASE II
DATE SAMPLED	05/13/97	05/14/97	05/15/97
<b>SEMIVOLATILES (ug/l)</b>			
1,2,4-TRICHLOROBENZENE	NA	NA	NA
1,2-DICHLOROBENZENE	NA	NA	NA
1,3-DICHLOROBENZENE	NA	NA	NA
1,4-DICHLOROBENZENE	NA	NA	NA
2,2'-OXYBIS(1-CHLOROPROPANE)	NA	NA	NA
2,4,5-TRICHLOROPHENOL	NA	NA	NA
2,4,6-TRICHLOROPHENOL	NA	NA	NA
2,4-DICHLOROPHENOL	NA	NA	NA
2,4-DIMETHYLPHENOL	NA	NA	NA
2,4-DINITROPHENOL	NA	NA	NA
2,4-DINITROTOLUENE	NA	NA	NA
2,6-DINITROTOLUENE	NA	NA	NA
2-CHLORONAPHTHALENE	NA	NA	NA
2-CHLOROPHENOL	NA	NA	NA
2-METHYLNAPHTHALENE	NA	NA	NA
2-METHYLPHENOL	NA	NA	NA
2-NITROANILINE	NA	NA	NA
2-NITROPHENOL	NA	NA	NA
3,3'-DICHLOROBENZIDINE	NA	NA	NA
3-NITROANILINE	NA	NA	NA
4,6-DINITRO-2-METHYLPHENOL	NA	NA	NA
4-BROMOPHENYL-PHENYLETHER	NA	NA	NA
4-CHLORO-3-METHYLPHENOL	NA	NA	NA
4-CHLOROANILINE	NA	NA	NA
4-CHLOROPHENYL-PHENYLETHER	NA	NA	NA
4-METHYLPHENOL	NA	NA	NA
4-NITROANILINE	NA	NA	NA
4-NITROPHENOL	NA	NA	NA
ACENAPHTHENE	NA	NA	NA
ACENAPHTHYLENE	NA	NA	NA
ANTHRACENE	NA	NA	NA
BENZO(A)ANTHRACENE	NA	NA	NA
BENZO(A)PYRENE	NA	NA	NA

QUALITY ASSURANCE/QUALITY CONTROL SUMMARY  
 SUBSURFACE SOIL - TCL ORGANICS  
 PHASE II - FIXED BASE LABORATORY  
 RI/FS CTO-0356  
 OPERABLE UNIT NO. 16 (SITE 89)  
 MCB CAMP LEJEUNE, NORTH CAROLINA

SAMPLE ID	TB10	TB11	TB12
PHASE	PHASE II	PHASE II	PHASE II
DATE SAMPLED	05/13/97	05/14/97	05/15/97
<b>SEMIVOLATILES (ug/l) (cont)</b>			
BENZO(B)FLUORANTHENE	NA	NA	NA
BENZO(G,H,I)PERYLENE	NA	NA	NA
BENZO(K)FLUORANTHENE	NA	NA	NA
BIS(2-CHLOROETHOXY)METHANE	NA	NA	NA
BIS(2-CHLOROETHYL)ETHER	NA	NA	NA
BIS(2-ETHYLHEXYL)PHTHALATE	NA	NA	NA
BUTYLBENZYLPHTHALATE	NA	NA	NA
CARBAZOLE	NA	NA	NA
CHRYSENE	NA	NA	NA
DIBENZO(A,H)ANTHRACENE	NA	NA	NA
DIBENZOFURAN	NA	NA	NA
DIETHYLPHTHALATE	NA	NA	NA
DIMETHYLPHTHALATE	NA	NA	NA
DI-N-BUTYLPHTHALATE	NA	NA	NA
DI-N-OCTYLPHTHALATE	NA	NA	NA
FLUORANTHENE	NA	NA	NA
FLUORENE	NA	NA	NA
HEXACHLOROENZENE	NA	NA	NA
HEXACHLOROBUTADIENE	NA	NA	NA
HEXACHLOROCYCLOPENTADIENE	NA	NA	NA
HEXACHLOROETHANE	NA	NA	NA
INDENO(1,2,3-CD)PYRENE	NA	NA	NA
ISOPHORONE	NA	NA	NA
NAPHTHALENE	NA	NA	NA
NITROBENZENE	NA	NA	NA
N-NITROSO-DI-N-PROPYLAMINE	NA	NA	NA
N-NITROSODIPHENYLAMINE (1)	NA	NA	NA
PENTACHLOROPHENOL	NA	NA	NA
PHENANTHRENE	NA	NA	NA
PHENOL	NA	NA	NA
PYRENE	NA	NA	NA

QUALITY ASSURANCE/QUALITY CONTROL SUMMARY  
 SUBSURFACE SOIL - TCL ORGANICS  
 PHASE II - FIXED BASE LABORATORY  
 RI/FS CTO-0356  
 OPERABLE UNIT NO. 16 (SITE 89)  
 MCB CAMP LEJEUNE, NORTH CAROLINA

SAMPLE ID	TB10	TB11	TB12
PHASE	PHASE II	PHASE II	PHASE II
DATE SAMPLED	05/13/97	05/14/97	05/15/97
<b>PESTICIDES/PCBS (ug/l)</b>			
4,4'-DDD	NA	NA	NA
4,4'-DDE	NA	NA	NA
4,4'-DDT	NA	NA	NA
ALDRIN	NA	NA	NA
ALPHA-BHC	NA	NA	NA
ALPHA-CHLORDANE	NA	NA	NA
AROCLOR-1016	NA	NA	NA
AROCLOR-1221	NA	NA	NA
AROCLOR-1232	NA	NA	NA
AROCLOR-1242	NA	NA	NA
AROCLOR-1248	NA	NA	NA
AROCLOR-1254	NA	NA	NA
AROCLOR-1260	NA	NA	NA
BETA-BHC	NA	NA	NA
DELTA-BHC	NA	NA	NA
DIELDRIN	NA	NA	NA
ENDOSULFAN I	NA	NA	NA
ENDOSULFAN II	NA	NA	NA
ENDOSULFAN SULFATE	NA	NA	NA
ENDRIN	NA	NA	NA
ENDRIN ALDEHYDE	NA	NA	NA
ENDRIN KETONE	NA	NA	NA
GAMMA-BHC (LINDANE)	NA	NA	NA
GAMMA-CHLORDANE	NA	NA	NA
HEPTACHLOR	NA	NA	NA
HEPTACHLOR EPOXIDE	NA	NA	NA
METHOXYCHLOR	NA	NA	NA
TOXAPHENE	NA	NA	NA

QUALITY ASSURANCE/QUALITY CONTROL SUMMARY  
 SUBSURFACE SOIL - TCL ORGANICS  
 PHASE II - FIXED BASE LABORATORY  
 RI/FS CTO-0356  
 OPERABLE UNIT NO. 16 (SITE 89)  
 MCB CAMP LEJEUNE, NORTH CAROLINA

SAMPLE ID PHASE DATE SAMPLED	Minimum Non-Detect	Maximum Non-Detect	Minimum Detected	Maximum Detected	Location of Maximum Detect	Frequency of Detection
<b>VOLATILES (ug/l)</b>						
1,1,1-TRICHLOROETHANE	10 U	10 U	ND	ND		0/20
1,1,2,2-TETRACHLOROETHANE	10 U	10 U	ND	ND		0/20
1,1,2-TRICHLOROETHANE	10 U	10 U	ND	ND		0/20
1,1-DICHLOROETHANE	10 U	10 U	ND	ND		0/20
1,1-DICHLOROETHENE	10 U	10 U	ND	ND		0/20
1,2-DICHLOROETHANE	10 U	10 U	ND	ND		0/20
1,2-DICHLOROETHENE (TOTAL)	10 U	10 U	ND	ND		0/20
1,2-DICHLOROPROPANE	10 U	10 U	ND	ND		0/20
2-BUTANONE	10 U	10 U	ND	ND		0/20
2-HEXANONE	10 U	10 U	ND	ND		0/20
4-METHYL-2-PENTANONE	10 U	10 U	ND	ND		0/20
ACETONE	10 U	10 U	70	70	IR89-RBSB03	1/20
BENZENE	10 U	10 U	ND	ND		0/20
BROMODICHLOROMETHANE	10 U	10 U	18	18	IR89/93-FB01	1/20
BROMOFORM	10 U	10 U	9 J	9 J	IR89/93-FB01	1/20
BROMOMETHANE	10 U	10 U	ND	ND		0/20
CARBON DISULFIDE	10 U	10 U	ND	ND		0/20
CARBON TETRACHLORIDE	10 U	10 U	ND	ND		0/20
CHLOROBENZENE	10 U	10 U	ND	ND		0/20
CHLOROETHANE	10 U	10 U	ND	ND		0/20
CHLOROFORM	10 U	10 U	12	12	IR89/93-FB01	1/20
CHLOROMETHANE	10 U	10 U	ND	ND		0/20
CIS-1,3-DICHLOROPROPENE	10 U	10 U	ND	ND		0/20
DIBROMOCHLOROMETHANE	10 U	10 U	24	24	IR89/93-FB01	1/20
ETHYLBENZENE	10 U	10 U	ND	ND		0/20
METHYLENE CHLORIDE	10 U	10 U	ND	ND		0/20
STYRENE	10 U	10 U	ND	ND		0/20
TETRACHLOROETHENE	10 U	10 U	3 J	3 J	IR89-RBSB14	1/20
TOLUENE	10 U	10 U	ND	ND		0/20
TRANS-1,3-DICHLOROPROPENE	10 U	10 U	ND	ND		0/20
TRICHLOROETHENE	10 U	10 U	ND	ND		0/20
VINYL CHLORIDE	10 U	10 U	ND	ND		0/20
XYLENE (TOTAL)	10 U	10 U	ND	ND		0/20

**QUALITY ASSURANCE/QUALITY CONTROL SUMMARY**  
**SUBSURFACE SOIL - TCL ORGANICS**  
**PHASE II - FIXED BASE LABORATORY**  
**RI/FS CTO-0356**  
**OPERABLE UNIT NO. 16 (SITE 89)**  
**MCB CAMP LEJEUNE, NORTH CAROLINA**

SAMPLE ID PHASE DATE SAMPLED	Minimum Non-Detect	Maximum Non-Detect	Minimum Detected	Maximum Detected	Location of Maximum Detect	Frequency of Detection
<b>SEMIVOLATILES (ug/l)</b>						
1,2,4-TRICHLOROBENZENE	10 U	10 U	ND	ND		0/10
1,2-DICHLOROBENZENE	10 U	10 U	ND	ND		0/10
1,3-DICHLOROBENZENE	10 U	10 U	ND	ND		0/10
1,4-DICHLOROBENZENE	10 U	10 U	ND	ND		0/10
2,2'-OXYBIS(1-CHLOROPROPANE)	10 U	10 U	ND	ND		0/10
2,4,5-TRICHLOROPHENOL	25 U	26 U	ND	ND		0/10
2,4,6-TRICHLOROPHENOL	10 U	10 U	ND	ND		0/10
2,4-DICHLOROPHENOL	10 U	10 U	ND	ND		0/10
2,4-DIMETHYLPHENOL	10 U	10 U	ND	ND		0/10
2,4-DINITROPHENOL	25 U	26 U	ND	ND		0/10
2,4-DINITROTOLUENE	10 U	10 U	ND	ND		0/10
2,6-DINITROTOLUENE	10 U	10 U	ND	ND		0/10
2-CHLORONAPHTHALENE	10 U	10 U	ND	ND		0/10
2-CHLOROPHENOL	10 U	10 U	ND	ND		0/10
2-METHYLNAPHTHALENE	10 U	10 U	ND	ND		0/10
2-METHYLPHENOL	10 U	10 U	ND	ND		0/10
2-NITROANILINE	25 U	26 U	ND	ND		0/10
2-NITROPHENOL	10 U	10 U	ND	ND		0/10
3,3'-DICHLOROENZIDINE	10 U	10 U	ND	ND		0/10
3-NITROANILINE	25 U	26 U	ND	ND		0/10
4,6-DINITRO-2-METHYLPHENOL	25 U	26 U	ND	ND		0/10
4-BROMOPHENYL-PHENYLETHER	10 U	10 U	ND	ND		0/10
4-CHLORO-3-METHYLPHENOL	10 U	10 U	ND	ND		0/10
4-CHLOROANILINE	10 U	10 U	ND	ND		0/10
4-CHLOROPHENYL-PHENYLETHER	10 U	10 U	ND	ND		0/10
4-METHYLPHENOL	10 U	10 U	ND	ND		0/10
4-NITROANILINE	25 U	26 U	ND	ND		0/10
4-NITROPHENOL	25 U	26 U	ND	ND		0/10
ACENAPHTHENE	10 U	10 U	ND	ND		0/10
ACENAPHTHYLENE	10 U	10 U	ND	ND		0/10
ANTHRACENE	10 U	10 U	ND	ND		0/10
BENZO(A)ANTHRACENE	10 U	10 U	ND	ND		0/10
BENZO(A)PYRENE	10 U	10 U	ND	ND		0/10

QUALITY ASSURANCE/QUALITY CONTROL SUMMARY  
 SUBSURFACE SOIL - TCL ORGANICS  
 PHASE II - FIXED BASE LABORATORY  
 RI/FS CTO-0356  
 OPERABLE UNIT NO. 16 (SITE 89)  
 MCB CAMP LEJEUNE, NORTH CAROLINA

SAMPLE ID PHASE DATE SAMPLED	Minimum Non-Detect	Maximum Non-Detect	Minimum Detected	Maximum Detected	Location of Maximum Detect	Frequency of Detection
SEMIVOLATILES (ug/l) (cont)			ND	ND		0/10
BENZO(B)FLUORANTHENE	10 U	10 U	ND	ND		0/10
BENZO(G,H,I)PERYLENE	10 U	10 U	ND	ND		0/10
BENZO(K)FLUORANTHENE	10 U	10 U	ND	ND		0/10
BIS(2-CHLOROETHOXY)METHANE	10 U	10 U	ND	ND		0/10
BIS(2-CHLOROETHYL)ETHER	10 U	10 U	ND	ND		0/10
BIS(2-ETHYLHEXYL)PHTHALATE	10 U	10 U	6 J	120	IR89/93-FB03	4/10
BUTYLBENZYLPHthalATE	10 U	10 U	ND	ND		0/10
CARBAZOLE	10 U	10 U	ND	ND		0/10
CHRYSENE	10 U	10 U	ND	ND		0/10
DIBENZO(A,H)ANTHRACENE	10 U	10 U	ND	ND		0/10
DIBENZOFURAN	10 U	10 U	ND	ND		0/10
DIETHYLPHthalATE	10 U	10 U	ND	ND		0/10
DIMETHYLPHthalATE	10 U	10 U	ND	ND		0/10
DI-N-BUTYLPHthalATE	10 U	10 U	ND	ND		0/10
DI-N-OCTYLPHthalATE	10 U	10 U	ND	ND		0/10
FLUORANTHENE	10 U	10 U	ND	ND		0/10
FLUORENE	10 U	10 U	ND	ND		0/10
HEXACHLORO BENZENE	10 U	10 U	ND	ND		0/10
HEXACHLOROBUTADIENE	10 U	10 U	ND	ND		0/10
HEXACHLOROCYCLOPENTADIENE	10 U	10 U	ND	ND		0/10
HEXACHLOROETHANE	10 U	10 U	ND	ND		0/10
INDENO(1,2,3-CD)PYRENE	10 U	10 U	ND	ND		0/10
ISOPHORONE	10 U	10 U	ND	ND		0/10
NAPHTHALENE	10 U	10 U	ND	ND		0/10
NITROBENZENE	10 U	10 U	ND	ND		0/10
N-NITROSO-DI-N-PROPYLAMINE	10 U	10 U	ND	ND		0/10
N-NITROSODIPHENYLAMINE (1)	10 U	10 U	ND	ND		0/10
PENTACHLOROPHENOL	25 U	26 U	ND	ND		0/10
PHENANTHRENE	10 U	10 U	ND	ND		0/10
PHENOL	10 U	10 U	ND	ND		0/10
PYRENE	10 U	10 U	ND	ND		0/10

**QUALITY ASSURANCE/QUALITY CONTROL SUMMARY**  
**SUBSURFACE SOIL - TCL ORGANICS**  
**PHASE II - FIXED BASE LABORATORY**  
**RI/FS CTO-0356**  
**OPERABLE UNIT NO. 16 (SITE 89)**  
**MCB CAMP LEJEUNE, NORTH CAROLINA**

SAMPLE ID PHASE DATE SAMPLED	Minimum Non-Detect	Maximum Non-Detect	Minimum Detected	Maximum Detected	Location of Maximum Detect	Frequency of Detection
<b>PESTICIDES/PCBS (ug/l)</b>						
4,4'-DDD	0.1 U	0.11 U	ND	ND		0/10
4,4'-DDE	0.1 U	0.11 U	ND	ND		0/10
4,4'-DDT	0.1 U	0.11 U	ND	ND		0/10
ALDRIN	0.05 U	0.054 U	ND	ND		0/10
ALPHA-BHC	0.05 U	0.054 U	ND	ND		0/10
ALPHA-CHLORDANE	0.05 U	0.054 U	ND	ND		0/10
AROCLOR-1016	1 U	1.1 U	ND	ND		0/10
AROCLOR-1221	2 U	2.2 U	ND	ND		0/10
AROCLOR-1232	1 U	1.1 U	ND	ND		0/10
AROCLOR-1242	1 U	1.1 U	ND	ND		0/10
AROCLOR-1248	1 U	1.1 U	ND	ND		0/10
AROCLOR-1254	1 U	1.1 U	ND	ND		0/10
AROCLOR-1260	1 U	1.1 U	ND	ND		0/10
BETA-BHC	0.05 U	0.054 U	ND	ND		0/10
DELTA-BHC	0.05 U	0.054 U	ND	ND		0/10
DIELDRIN	0.1 U	0.11 U	ND	ND		0/10
ENDOSULFAN I	0.05 U	0.054 U	ND	ND		0/10
ENDOSULFAN II	0.1 U	0.11 U	ND	ND		0/10
ENDOSULFAN SULFATE	0.1 U	0.11 U	ND	ND		0/10
ENDRIN	0.1 U	0.11 U	ND	ND		0/10
ENDRIN ALDEHYDE	0.1 U	0.11 U	ND	ND		0/10
ENDRIN KETONE	0.1 U	0.11 U	ND	ND		0/10
GAMMA-BHC (LINDANE)	0.05 U	0.054 U	ND	ND		0/10
GAMMA-CHLORDANE	0.05 U	0.054 U	ND	ND		0/10
HEPTACHLOR	0.05 U	0.054 U	ND	ND		0/10
HEPTACHLOR EPOXIDE	0.05 U	0.054 U	ND	ND		0/10
METHOXYCHLOR	0.5 UJ	0.54 UJ	ND	ND		0/10
TOXAPHENE	5 U	5.4 U	ND	ND		0/10

QUALITY ASSURANCE/QUALITY CONTROL SUMMARY  
 SUBSURFACE SOIL - TAL METALS  
 PHASE II - FIXED BASE LABORATORY  
 RI/FS CTO-0356  
 OPERABLE UNIT NO. 16 (SITE 89)  
 MCB CAMP LEJEUNE, NORTH CAROLINA

SAMPLE ID	IR89-RBSB01	IR89-RBSB02	IR89-RBSB03	IR89-RBSB04	IR89-RBSB08	IR89-RBSB10	IR89-RBSB14	IR89/93-FB01
PHASE	PHASE II	PHASE II	PHASE II	PHASE II	PHASE II	PHASE II	PHASE II	PHASE II
DATE SAMPLED	04/18/97	04/20/97	04/20/97	04/20/97	04/30/97	05/04/97	05/13/97	05/13/97
<b>TOTAL METALS (ug/l)</b>								
ALUMINUM, TOTAL	17.7 U	15.6 U	19 U	13 U	52 U	52.2 U	39.5 U	174
ANTIMONY, TOTAL	1.6 U	1.6 U	1.6 U	1.6 U	1.6 U	1.6 U	1.9 U	1.9 U
ARSENIC, TOTAL	2.1	2.2	1.8 U	1.8 U	1.8 UJ	1.8 UJ	2.7 U	2.7 U
BARIUM, TOTAL	0.12	0.1 U	0.12	0.1 U	0.18	0.1 U	0.3 U	3.6
BERYLLIUM, TOTAL	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.3 U	0.3 U
CADMIUM, TOTAL	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.4 U	0.4 U
CALCIUM, TOTAL	27.7 U	53.8 U	98.4 U	53.2 U	79.2	66.4	29.4 U	8720 U
CHROMIUM, TOTAL	0.3 U	0.3 U	0.3 U	0.34	0.3 UJ	0.3 UJ	0.5 U	0.5 U
COBALT, TOTAL	0.3 UJ	0.3 UJ	0.3 UJ	0.3 UJ	0.37	0.3 U	0.5 U	0.5 U
COPPER, TOTAL	0.7 UJ	0.7 UJ	0.7 UJ	0.7 UJ	0.7 UJ	0.7 UJ	0.8 UJ	0.8 UJ
IRON, TOTAL	6.4 UJ	6.4 UJ	68.4 J	6.4 UJ	126	113	13.4 U	112
LEAD, TOTAL	1.3 U	1.3 U	1.3 U	1.3 U	1.4 U	7.3 U	1.4 U	1.4 U
MAGNESIUM, TOTAL	6.9 UJ	6.9 UJ	6.9 UJ	6.9 UJ	6.9 U	6.9 U	13.9 U	4020
MANGANESE, TOTAL	0.4 UJ	0.4 UJ	3.2 J	0.63 J	2.4	2.1	0.4 U	1.2
MERCURY, TOTAL	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
NICKEL, TOTAL	0.7 U	1.6	0.7 U	0.7 U	1.5	0.78	4.6	0.7 U
POTASSIUM, TOTAL	89 U	91.7 U	99.3 UJ	89.1 U	113 U	108 U	111 U	7340
SELENIUM, TOTAL	1.9 U	1.9 UJ	1.9 UJ	1.9 UJ	1.9 U	2.2 U	2.2 U	2.2 U
SILVER, TOTAL	0.2 UJ	0.2 UJ	0.2 UJ	0.2 UJ	0.2 U	0.2 U	0.5 U	0.5 U
SODIUM, TOTAL	131 UJ	131 UJ	131 UJ	131 UJ	131 UJ	131 UJ	189 U	53100
THALLIUM, TOTAL	1.9 U	1.9 U	1.9 U	1.9 U	1.9 U	1.9 U	3 U	3 U
VANADIUM, TOTAL	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.7 U	0.7 U
ZINC, TOTAL	0.2 UJ	0.2 UJ	0.2 UJ	4.2 J	0.2 UJ	0.2 UJ	0.4 UJ	12.8



**QUALITY ASSURANCE/QUALITY CONTROL SUMMARY**  
**SUBSURFACE SOIL - TAL METALS**  
**PHASE II - FIXED BASE LABORATORY**  
**RI/FS CTO-0356**  
**OPERABLE UNIT NO. 16 (SITE 89)**  
**MCB CAMP LEJEUNE, NORTH CAROLINA**

SAMPLE ID	IR89/93-FB02	IR89/93-FB03
PHASE	PHASE II	PHASE II
DATE SAMPLED	05/13/97	05/13/97
<b>TOTAL METALS (ug/l)</b>		
ALUMINUM, TOTAL	37.1 U	34.5 U
ANTIMONY, TOTAL	1.9 U	1.9 U
ARSENIC, TOTAL	2.7 U	2.7 U
BARIUM, TOTAL	1.4	0.3 U
BERYLLIUM, TOTAL	0.3 U	0.3 U
CADMIUM, TOTAL	0.4 U	0.4 U
CALCIUM, TOTAL	21.8 U	23 U
CHROMIUM, TOTAL	0.5 U	0.74
COBALT, TOTAL	0.5 U	0.5 U
COPPER, TOTAL	0.8 UJ	0.8 UJ
IRON, TOTAL	29.2	13.4 U
LEAD, TOTAL	1.4 U	1.4 U
MAGNESIUM, TOTAL	13.9 U	13.9 U
MANGANESE, TOTAL	0.4 U	0.4 U
MERCURY, TOTAL	0.1 U	0.1 U
NICKEL, TOTAL	3.6	0.7 U
POTASSIUM, TOTAL	108 U	101 U
SELENIUM, TOTAL	2.2 U	2.2 U
SILVER, TOTAL	0.5 U	0.5 U
SODIUM, TOTAL	189 U	189 U
THALLIUM, TOTAL	3 U	3 U
VANADIUM, TOTAL	0.7 U	0.7 U
ZINC, TOTAL	0.4 UJ	0.4 UJ

**QUALITY ASSURANCE/QUALITY CONTROL SUMMARY**  
**SUBSURFACE SOIL - TAL METALS**  
**PHASE II - FIXED BASE LABORATORY**  
**R/FS CTO-0356**  
**OPERABLE UNIT NO. 16 (SITE 89)**  
**MCB CAMP LEJEUNE, NORTH CAROLINA**

SAMPLE ID PHASE DATE SAMPLED	Minimum Non-Detect	Maximum Non-Detect	Minimum Detected	Maximum Detected	Location of Maximum Detect	Frequency of Detection
<b>TOTAL METALS (ug/l)</b>						
ALUMINUM, TOTAL	13 U	52.2 U	174	174	IR89/93-FB01	1/10
ANTIMONY, TOTAL	1.6 U	1.9 U	ND	ND		0/10
ARSENIC, TOTAL	1.8 UJ	2.7 U	2.1	2.2	IR89-RBSB02	2/10
BARIUM, TOTAL	0.1 U	0.3 U	0.12	3.6	IR89/93-FB01	5/10
BERYLLIUM, TOTAL	0.1 U	0.3 U	ND	ND		0/10
CADMIUM, TOTAL	0.2 U	0.4 U	ND	ND		0/10
CALCIUM, TOTAL	21.8 U	8720 U	66.4	79.2	IR89-RBSB08	2/10
CHROMIUM, TOTAL	0.3 UJ	0.5 U	0.34	0.74	IR89/93-FB03	2/10
COBALT, TOTAL	0.3 U	0.5 U	0.37	0.37	IR89-RBSB08	1/10
COPPER, TOTAL	0.7 UJ	0.8 UJ	ND	ND		0/10
IRON, TOTAL	6.4 UJ	13.4 U	29.2	126	IR89-RBSB08	5/10
LEAD, TOTAL	1.3 U	7.3 U	ND	ND		0/10
MAGNESIUM, TOTAL	6.9 U	13.9 U	4020	4020	IR89/93-FB01	1/10
MANGANESE, TOTAL	0.4 U	0.4 U	0.63 J	3.2 J	IR89-RBSB03	5/10
MERCURY, TOTAL	0.1 U	0.1 U	ND	ND		0/10
NICKEL, TOTAL	0.7 U	0.7 U	0.78	4.6	IR89-RBSB14	5/10
POTASSIUM, TOTAL	89 U	113 U	7340	7340	IR89/93-FB01	1/10
SELENIUM, TOTAL	1.9 U	2.2 U	ND	ND		0/10
SILVER, TOTAL	0.2 UJ	0.5 U	ND	ND		0/10
SODIUM, TOTAL	131 UJ	189 U	53100	53100	IR89/93-FB01	1/10
THALLIUM, TOTAL	1.9 U	3 U	ND	ND		0/10
VANADIUM, TOTAL	0.5 U	0.7 U	ND	ND		0/10
ZINC, TOTAL	0.2 UJ	0.4 UJ	4.2 J	12.8	IR89/93-FB01	2/10

QUALITY ASSURANCE/QUALITY CONTROL SUMMARY  
GROUNDWATER - TCL ORGANICS  
PHASE II - FIXED BASE LABORATORY  
RI/FS CTO-0356  
OPERABLE UNIT NO. 16 (SITE 89)  
MCB CAMP LEJEUNE, NORTH CAROLINA

SAMPLE ID	IR89/93-FB01	IR89/93-FB02	IR89/93-FB03	IR89/93-RBGW20	TB09	TB13	TB14	TB15	TB16
PHASE	PHASE II	PHASE II	PHASE II	PHASE II	PHASE II	PHASE II	PHASE II	PHASE II	PHASE II
DATE SAMPLED	05/13/97	05/13/97	05/13/97	05/29/97	05/12/97	05/18/97	05/19/97	05/27/97	05/29/97
<b>VOLATILES (ug/l)</b>									
1,1,1-TRICHLOROETHANE	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
1,1,2,2-TETRACHLOROETHANE	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
1,1,2-TRICHLOROETHANE	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
1,1-DICHLOROETHANE	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
1,1-DICHLOROETHENE	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
1,2-DICHLOROETHANE	10 U	10 U	10 U	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	10 U	10 U	10 U
1,2-DICHLOROPROPANE	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
2-BUTANONE	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
2-HEXANONE	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
4-METHYL-2-PENTANONE	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
ACETONE	10 U	10 UJ	10 UJ	10 U	10 UJ	10 U	10 U	10 U	10 U
BENZENE	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
BROMODICHLOROMETHANE	18	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
BROMOFORM	9 J	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
BROMOMETHANE	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
CARBON DISULFIDE	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
CARBON TETRACHLORIDE	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
CHLOROBENZENE	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
CHLOROETHANE	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
CHLOROFORM	12	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
CHLOROMETHANE	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
CIS-1,3-DICHLOROPROPENE	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
DIBROMOCHLOROMETHANE	24	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
ETHYLBENZENE	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
METHYLENE CHLORIDE	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
STYRENE	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
TETRACHLOROETHENE	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
TOLUENE	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
TRANS-1,3-DICHLOROPROPENE	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
TRICHLOROETHENE	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
VINYL CHLORIDE	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
XYLENE (TOTAL)	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U

QUALITY ASSURANCE/QUALITY CONTROL SUMMARY  
GROUNDWATER - TCL ORGANICS  
PHASE II - FIXED BASE LABORATORY  
RI/FS CTO-0356  
OPERABLE UNIT NO. 16 (SITE 89)  
MCB CAMP LEJEUNE, NORTH CAROLINA

SAMPLE ID	IR89/93-FB01	IR89/93-FB02	IR89/93-FB03	IR89/93-RBGW20	TB09	TB13	TB14	TB15	TB16
PHASE	PHASE II	PHASE II	PHASE II	PHASE II	PHASE II	PHASE II	PHASE II	PHASE II	PHASE II
DATE SAMPLED	05/13/97	05/13/97	05/13/97	05/29/97	05/12/97	05/18/97	05/19/97	05/27/97	05/29/97
<b>SEMIVOLATILES (ug/l)</b>									
1,2,4-TRICHLOROBENZENE	10 U	10 U	10 U	10 U	NA	NA	NA	NA	NA
1,2-DICHLOROBENZENE	10 U	10 U	10 U	10 U	NA	NA	NA	NA	NA
1,3-DICHLOROBENZENE	10 U	10 U	10 U	10 U	NA	NA	NA	NA	NA
1,4-DICHLOROBENZENE	10 U	10 U	10 U	10 U	NA	NA	NA	NA	NA
2,2'-OXYBIS(1-CHLOROPROPANE)	10 U	10 U	10 U	10 U	NA	NA	NA	NA	NA
2,4,5-TRICHLOROPHENOL	25 U	25 U	25 U	25 U	NA	NA	NA	NA	NA
2,4,6-TRICHLOROPHENOL	10 U	10 U	10 U	10 U	NA	NA	NA	NA	NA
2,4-DICHLOROPHENOL	10 U	10 U	10 U	10 U	NA	NA	NA	NA	NA
2,4-DIMETHYLPHENOL	10 U	10 U	10 U	10 U	NA	NA	NA	NA	NA
2,4-DINITROPHENOL	25 U	25 U	25 U	25 U	NA	NA	NA	NA	NA
2,4-DINITROTOLUENE	10 U	10 U	10 U	10 U	NA	NA	NA	NA	NA
2,6-DINITROTOLUENE	10 U	10 U	10 U	10 U	NA	NA	NA	NA	NA
2-CHLORONAPHTHALENE	10 U	10 U	10 U	10 U	NA	NA	NA	NA	NA
2-CHLOROPHENOL	10 U	10 U	10 U	10 U	NA	NA	NA	NA	NA
2-METHYLNAPHTHALENE	10 U	10 U	10 U	10 U	NA	NA	NA	NA	NA
2-METHYLPHENOL	10 U	10 U	10 U	10 U	NA	NA	NA	NA	NA
2-NITROANILINE	25 U	25 U	25 U	25 U	NA	NA	NA	NA	NA
2-NITROPHENOL	10 U	10 U	10 U	10 U	NA	NA	NA	NA	NA
3,3'-DICHLOROBENZIDINE	10 U	10 U	10 U	10 U	NA	NA	NA	NA	NA
3-NITROANILINE	25 U	25 U	25 U	25 UJ	NA	NA	NA	NA	NA
4,6-DINITRO-2-METHYLPHENOL	25 U	25 U	25 U	25 U	NA	NA	NA	NA	NA
4-BROMOPHENYL-PHENYLETHER	10 U	10 U	10 U	10 U	NA	NA	NA	NA	NA
4-CHLORO-3-METHYLPHENOL	10 U	10 U	10 U	10 U	NA	NA	NA	NA	NA
4-CHLOROANILINE	10 U	10 U	10 U	10 UJ	NA	NA	NA	NA	NA
4-CHLOROPHENYL-PHENYLETHER	10 U	10 U	10 U	10 U	NA	NA	NA	NA	NA
4-METHYLPHENOL	10 U	10 U	10 U	10 U	NA	NA	NA	NA	NA
4-NITROANILINE	25 U	25 U	25 UJ	25 U	NA	NA	NA	NA	NA
4-NITROPHENOL	25 U	25 U	25 U	25 U	NA	NA	NA	NA	NA
ACENAPHTHENE	10 U	10 U	10 U	10 U	NA	NA	NA	NA	NA
ACENAPHTHYLENE	10 U	10 U	10 U	10 U	NA	NA	NA	NA	NA
ANTHRACENE	10 U	10 U	10 U	10 U	NA	NA	NA	NA	NA
BENZO(A)ANTHRACENE	10 U	10 U	10 U	10 U	NA	NA	NA	NA	NA
BENZO(A)PYRENE	10 U	10 U	10 U	10 U	NA	NA	NA	NA	NA

QUALITY ASSURANCE/QUALITY CONTROL SUMMARY  
GROUNDWATER - TCL ORGANICS  
PHASE II - FIXED BASE LABORATORY  
RI/FS CTO-0356  
OPERABLE UNIT NO. 16 (SITE 89)  
MCB CAMP LEJEUNE, NORTH CAROLINA

SAMPLE ID	IR89/93-FB01	IR89/93-FB02	IR89/93-FB03	IR89/93-RBGW20	TB09	TB13	TB14	TB15	TB16
PHASE	PHASE II	PHASE II	PHASE II	PHASE II	PHASE II	PHASE II	PHASE II	PHASE II	PHASE II
DATE SAMPLED	05/13/97	05/13/97	05/13/97	05/29/97	05/12/97	05/18/97	05/19/97	05/27/97	05/29/97
SEMIVOLATILES (ug/l) (cont)									
BENZO(B)FLUORANTHENE	10 U	10 U	10 U	10 U	NA	NA	NA	NA	NA
BENZO(G,H,I)PERYLENE	10 U	10 U	10 U	10 U	NA	NA	NA	NA	NA
BENZO(K)FLUORANTHENE	10 U	10 U	10 U	10 U	NA	NA	NA	NA	NA
BIS(2-CHLOROETHOXY)METHANE	10 U	10 U	10 U	10 U	NA	NA	NA	NA	NA
BIS(2-CHLOROETHYL)ETHER	10 U	10 U	10 U	10 U	NA	NA	NA	NA	NA
BIS(2-ETHYLHEXYL)PHTHALATE	6 J	57	120	10 U	NA	NA	NA	NA	NA
BUTYLBENZYLPHTHALATE	10 U	10 U	10 U	10 U	NA	NA	NA	NA	NA
CARBAZOLE	10 U	10 U	10 U	10 U	NA	NA	NA	NA	NA
CHRYSENE	10 U	10 U	10 U	10 U	NA	NA	NA	NA	NA
DIBENZO(A,H)ANTHRACENE	10 U	10 U	10 U	10 U	NA	NA	NA	NA	NA
DIBENZOFURAN	10 U	10 U	10 U	10 U	NA	NA	NA	NA	NA
DIETHYLPHTHALATE	10 U	10 U	10 U	10 U	NA	NA	NA	NA	NA
DIMETHYLPHTHALATE	10 U	10 U	10 U	10 U	NA	NA	NA	NA	NA
DI-N-BUTYLPHTHALATE	10 U	10 U	10 U	10 U	NA	NA	NA	NA	NA
DI-N-OCTYLPHTHALATE	10 U	10 U	10 U	10 U	NA	NA	NA	NA	NA
FLUORANTHENE	10 U	10 U	10 U	10 U	NA	NA	NA	NA	NA
FLUORENE	10 U	10 U	10 U	10 U	NA	NA	NA	NA	NA
HEXACHLOROBENZENE	10 U	10 U	10 U	10 U	NA	NA	NA	NA	NA
HEXACHLOROBUTADIENE	10 U	10 U	10 U	10 U	NA	NA	NA	NA	NA
HEXACHLOROCYCLOPENTADIENE	10 U	10 U	10 U	10 U	NA	NA	NA	NA	NA
HEXACHLOROETHANE	10 U	10 U	10 U	10 U	NA	NA	NA	NA	NA
INDENO(1,2,3-CD)PYRENE	10 U	10 U	10 U	10 U	NA	NA	NA	NA	NA
ISOPHORONE	10 U	10 U	10 U	10 U	NA	NA	NA	NA	NA
NAPHTHALENE	10 U	10 U	10 U	10 U	NA	NA	NA	NA	NA
NITROBENZENE	10 U	10 U	10 U	10 U	NA	NA	NA	NA	NA
N-NITROSO-DI-N-PROPYLAMINE	10 U	10 U	10 U	10 U	NA	NA	NA	NA	NA
N-NITROSODIPHENYLAMINE (1)	10 U	10 U	10 U	10 U	NA	NA	NA	NA	NA
PENTACHLOROPHENOL	25 U	25 U	25 U	25 U	NA	NA	NA	NA	NA

QUALITY ASSURANCE/QUALITY CONTROL SUMMARY  
GROUNDWATER - TCL ORGANICS  
PHASE II - FIXED BASE LABORATORY  
RI/FS CTO-0356  
OPERABLE UNIT NO. 16 (SITE 89)  
MCB CAMP LEJEUNE, NORTH CAROLINA

SAMPLE ID	IR89/93-FB01	IR89/93-FB02	IR89/93-FB03	IR89/93-RBGW20	TB09	TB13	TB14	TB15	TB16
PHASE	PHASE II	PHASE II	PHASE II	PHASE II	PHASE II	PHASE II	PHASE II	PHASE II	PHASE II
DATE SAMPLED	05/13/97	05/13/97	05/13/97	05/29/97	05/12/97	05/18/97	05/19/97	05/27/97	05/29/97
PHENANTHRENE	10 U	10 U	10 U	10 U	NA	NA	NA	NA	NA
PHENOL	10 U	10 U	10 U	10 U	NA	NA	NA	NA	NA
PYRENE	10 U	10 U	10 U	10 U	NA	NA	NA	NA	NA
PESTICIDES/PCBS (ug/l)	1								
4,4'-DDD	0.1 U	0.1 U	0.1 U	0.1 U	NA	NA	NA	NA	NA
4,4'-DDE	0.1 U	0.1 U	0.1 U	0.1 U	NA	NA	NA	NA	NA
4,4'-DDT	0.1 U	0.1 U	0.1 U	0.1 U	NA	NA	NA	NA	NA
ALDRIN	0.05 U	0.05 U	0.05 U	0.05 U	NA	NA	NA	NA	NA
ALPHA-BHC	0.05 U	0.05 U	0.05 U	0.05 U	NA	NA	NA	NA	NA
ALPHA-CHLORDANE	0.05 U	0.05 U	0.05 U	0.05 U	NA	NA	NA	NA	NA
AROCLOR-1016	1 U	1 U	1 U	1 U	NA	NA	NA	NA	NA
AROCLOR-1221	2 U	2 U	2 U	2 U	NA	NA	NA	NA	NA
AROCLOR-1232	1 U	1 U	1 U	1 U	NA	NA	NA	NA	NA
AROCLOR-1242	1 U	1 U	1 U	1 U	NA	NA	NA	NA	NA
AROCLOR-1248	1 U	1 U	1 U	1 U	NA	NA	NA	NA	NA
AROCLOR-1254	1 U	1 U	1 U	1 U	NA	NA	NA	NA	NA
AROCLOR-1260	1 U	1 U	1 U	1 U	NA	NA	NA	NA	NA
BETA-BHC	0.05 U	0.05 U	0.05 U	0.05 U	NA	NA	NA	NA	NA
DELTA-BHC	0.05 U	0.05 U	0.05 U	0.05 U	NA	NA	NA	NA	NA
DIELDRIN	0.1 U	0.1 U	0.1 U	0.1 U	NA	NA	NA	NA	NA
ENDOSULFAN I	0.05 U	0.05 U	0.05 U	0.05 U	NA	NA	NA	NA	NA
ENDOSULFAN II	0.1 U	0.1 U	0.1 U	0.1 U	NA	NA	NA	NA	NA
ENDOSULFAN SULFATE	0.1 U	0.1 U	0.1 U	0.1 U	NA	NA	NA	NA	NA
ENDRIN	0.1 U	0.1 U	0.1 U	0.1 U	NA	NA	NA	NA	NA
ENDRIN ALDEHYDE	0.1 U	0.1 U	0.1 U	0.1 U	NA	NA	NA	NA	NA
ENDRIN KETONE	0.1 U	0.1 U	0.1 U	0.1 U	NA	NA	NA	NA	NA
GAMMA-BHC (LINDANE)	0.05 U	0.05 U	0.05 U	0.05 U	NA	NA	NA	NA	NA
GAMMA-CHLORDANE	0.05 U	0.05 U	0.05 U	0.05 U	NA	NA	NA	NA	NA
HEPTACHLOR	0.05 U	0.05 U	0.05 U	0.05 U	NA	NA	NA	NA	NA
HEPTACHLOR EPOXIDE	0.05 U	0.05 U	0.05 U	0.05 U	NA	NA	NA	NA	NA
METHOXYCHLOR	0.5 U	0.5 UJ	0.5 UJ	0.5 U	NA	NA	NA	NA	NA
TOXAPHENE	5 U	5 U	5 U	5 U	NA	NA	NA	NA	NA

QUALITY ASSURANCE/QUALITY CONTROL SUMMARY  
GROUNDWATER - TCL ORGANICS  
PHASE II - FIXED BASE LABORATORY  
RI/FS CTO-0356  
OPERABLE UNIT NO. 16 (SITE 89)  
MCB CAMP LEJEUNE, NORTH CAROLINA

SAMPLE ID PHASE DATE SAMPLED	Minimum Non-Detect	Maximum Non-Detect	Minimum Detected	Maximum Detected	Location of Maximum Detect	Frequency of Detection
<b>VOLATILES (ug/l)</b>						
1,1,1-TRICHLOROETHANE	10 U	10 U	ND	ND		0/9
1,1,2,2-TETRACHLOROETHANE	10 U	10 U	ND	ND		0/9
1,1,2-TRICHLOROETHANE	10 U	10 U	ND	ND		0/9
1,1-DICHLOROETHANE	10 U	10 U	ND	ND		0/9
1,1-DICHLOROETHENE	10 U	10 U	ND	ND		0/9
1,2-DICHLOROETHANE	10 U	10 U	ND	ND		0/9
1,2-DICHLOROETHENE (TOTAL)	10 U	10 U	ND	ND		0/9
1,2-DICHLOROPROPANE	10 U	10 U	ND	ND		0/9
2-BUTANONE	10 U	10 U	ND	ND		0/9
2-HEXANONE	10 U	10 U	ND	ND		0/9
4-METHYL-2-PENTANONE	10 U	10 U	ND	ND		0/9
ACETONE	10 U	10 U	ND	ND		0/9
BENZENE	10 U	10 U		ND		0/9
BROMODICHLOROMETHANE	10 U	10 U	18	18	IR89/93-FB01	1/9
BROMOFORM	10 U	10 U	9 J	9 J	IR89/93-FB01	1/9
BROMOMETHANE	10 U	10 U	ND	ND		0/9
CARBON DISULFIDE	10 U	10 U	ND	ND		0/9
CARBON TETRACHLORIDE	10 U	10 U	ND	ND		0/9
CHLOROBENZENE	10 U	10 U	ND	ND		0/9
CHLOROETHANE	10 U	10 U	ND	ND		0/9
CHLOROFORM	10 U	10 U	12	12	IR89/93-FB01	1/9
CHLOROMETHANE	10 U	10 U	ND	ND		0/9
CIS-1,3-DICHLOROPROPENE	10 U	10 U	ND	ND		0/9
DIBROMOCHLOROMETHANE	10 U	10 U	24	24	IR89/93-FB01	1/9
ETHYLBENZENE	10 U	10 U	ND	ND		0/9
METHYLENE CHLORIDE	10 U	10 U	ND	ND		0/9
STYRENE	10 U	10 U	ND	ND		0/9
TETRACHLOROETHENE	10 U	10 U	ND	ND		0/9
TOLUENE	10 U	10 U	ND	ND		0/9
TRANS-1,3-DICHLOROPROPENE	10 U	10 U	ND	ND		0/9
TRICHLOROETHENE	10 U	10 U	ND	ND		0/9
VINYL CHLORIDE	10 U	10 U	ND U	ND		0/9
XYLENE (TOTAL)	10 U	10 U	ND U	ND		0/9

QUALITY ASSURANCE/QUALITY CONTROL SUMMARY  
GROUNDWATER - TCL ORGANICS  
PHASE II - FIXED BASE LABORATORY  
RI/FS CTO-0356  
OPERABLE UNIT NO. 16 (SITE 89)  
MCB CAMP LEJEUNE, NORTH CAROLINA

SAMPLE ID PHASE DATE SAMPLED	Minimum Non-Detect	Maximum Non-Detect	Minimum Detected	Maximum Detected	Location of Maximum Detect	Frequency of Detection
<b>SEMIVOLATILES (ug/l)</b>						
1,2,4-TRICHLOROBENZENE	10 U	10 U	ND	ND		0/4
1,2-DICHLOROBENZENE	10 U	10 U	ND	ND		0/4
1,3-DICHLOROBENZENE	10 U	10 U	ND	ND		0/4
1,4-DICHLOROBENZENE	10 U	10 U	ND	ND		0/4
2,2'-OXYBIS(1-CHLOROPROPANE)	10 U	10 U	ND	ND		0/4
2,4,5-TRICHLOROPHENOL	25 U	25 U	ND	ND		0/4
2,4,6-TRICHLOROPHENOL	10 U	10 U	ND	ND		0/4
2,4-DICHLOROPHENOL	10 U	10 U	ND	ND		0/4
2,4-DIMETHYLPHENOL	10 U	10 U	ND	ND		0/4
2,4-DINITROPHENOL	25 U	25 U	ND	ND		0/4
2,4-DINITROTOLUENE	10 U	10 U	ND	ND		0/4
2,6-DINITROTOLUENE	10 U	10 U	ND	ND		0/4
2-CHLORONAPHTHALENE	10 U	10 U	ND	ND		0/4
2-CHLOROPHENOL	10 U	10 U	ND	ND		0/4
2-METHYLNAPHTHALENE	10 U	10 U	ND	ND		0/4
2-METHYLPHENOL	10 U	10 U	ND	ND		0/4
2-NITROANILINE	25 U	25 U	ND	ND		0/4
2-NITROPHENOL	10 U	10 U	ND	ND		0/4
3,3'-DICHLOROBENZIDINE	10 U	10 U	ND	ND		0/4
3-NITROANILINE	25 U	25 U	ND	ND		0/4
4,6-DINITRO-2-METHYLPHENOL	25 U	25 U	ND	ND		0/4
4-BROMOPHENYL-PHENYLETHER	10 U	10 U	ND	ND		0/4
4-CHLORO-3-METHYLPHENOL	10 U	10 U	ND	ND		0/4
4-CHLOROANILINE	10 U	10 U	ND	ND		0/4
4-CHLOROPHENYL-PHENYLETHER	10 U	10 U	ND	ND		0/4
4-METHYLPHENOL	10 U	10 U	ND	ND		0/4
4-NITROANILINE	25 U	25 U	ND	ND		0/4
4-NITROPHENOL	25 U	25 U	ND	ND		0/4
ACENAPHTHENE	10 U	10 U	ND	ND		0/4
ACENAPHTHYLENE	10 U	10 U	ND	ND		0/4
ANTHRACENE	10 U	10 U	ND	ND		0/4
BENZO(A)ANTHRACENE	10 U	10 U	ND	ND		0/4
BENZO(A)PYRENE	10 U	10 U	ND	ND		0/4



QUALITY ASSURANCE/QUALITY CONTROL SUMMARY  
GROUNDWATER - TCL ORGANICS  
PHASE II - FIXED BASE LABORATORY  
RI/FS CTO-0356  
OPERABLE UNIT NO. 16 (SITE 89)  
MCB CAMP LEJEUNE, NORTH CAROLINA

SAMPLE ID PHASE DATE SAMPLED	Minimum Non-Detect	Maximum Non-Detect	Minimum Detected	Maximum Detected	Location of Maximum Detect	Frequency of Detection
SEMIVOLATILES (ug/l) (cont)						
BENZO(B)FLUORANTHENE	10 U	10 U	ND	ND		0/4
BENZO(G,H,I)PERYLENE	10 U	10 U	ND	ND		0/4
BENZO(K)FLUORANTHENE	10 U	10 U	ND	ND		0/4
BIS(2-CHLOROETHOXY)METHANE	10 U	10 U	ND	ND		0/4
BIS(2-CHLOROETHYL)ETHER	10 U	10 U	ND	ND		0/4
BIS(2-ETHYLHEXYL)PHTHALATE	10 U	10 U	6 J	120	IR89/93-FB03	3/4
BUTYLBENZYLPHTHALATE	10 U	10 U	ND	ND		0/4
CARBAZOLE	10 U	10 U	ND	ND		0/4
CHRYSENE	10 U	10 U	ND	ND		0/4
DIBENZO(A,H)ANTHRACENE	10 U	10 U	ND	ND		0/4
DIBENZOFURAN	10 U	10 U	ND	ND		0/4
DIETHYLPHTHALATE	10 U	10 U	ND	ND		0/4
DIMETHYLPHTHALATE	10 U	10 U	ND	ND		0/4
DI-N-BUTYLPHTHALATE	10 U	10 U	ND	ND		0/4
DI-N-OCTYLPHTHALATE	10 U	10 U	ND	ND		0/4
FLUORANTHENE	10 U	10 U	ND	ND		0/4
FLUORENE	10 U	10 U	ND	ND		0/4
HEXACHLOROBENZENE	10 U	10 U	ND	ND		0/4
HEXACHLOROBUTADIENE	10 U	10 U	ND	ND		0/4
HEXACHLOROCYCLOPENTADIENE	10 U	10 U	ND	ND		0/4
HEXACHLOROETHANE	10 U	10 U	ND	ND		0/4
INDENO(1,2,3-CD)PYRENE	10 U	10 U	ND	ND		0/4
ISOPHORONE	10 U	10 U	ND	ND		0/4
NAPHTHALENE	10 U	10 U	ND	ND		0/4
NITROBENZENE	10 U	10 U	ND	ND		0/4
N-NITROSO-DI-N-PROPYLAMINE	10 U	10 U	ND	ND		0/4
N-NITROSODIPHENYLAMINE (1)	10 U	10 U	ND	ND		0/4
PENTACHLOROPHENOL	25 U	25 U	ND	ND		0/4

QUALITY ASSURANCE/QUALITY CONTROL SUMMARY  
 GROUNDWATER - TCL ORGANICS  
 PHASE II - FIXED BASE LABORATORY  
 RI/FS CTO-0356  
 OPERABLE UNIT NO. 16 (SITE 89)  
 MCB CAMP LEJEUNE, NORTH CAROLINA

SAMPLE ID PHASE DATE SAMPLED	Minimum Non-Detect	Maximum Non-Detect	Minimum Detected	Maximum Detected	Location of Maximum Detect	Frequency of Detection
PHENANTHRENE	10 U	10 U	ND	ND		0/4
PHENOL	10 U	10 U	ND	ND		0/4
PYRENE	10 U	10 U	ND	ND		0/4
<b>PESTICIDES/PCBS (ug/l)</b>						
4,4'-DDD	0.1 U	0.1 U	ND	ND		0/4
4,4'-DDE	0.1 U	0.1 U	ND	ND		0/4
4,4'-DDT	0.1 U	0.1 U	ND	ND		0/4
ALDRIN	0.05 U	0.05 U	ND	ND		0/4
ALPHA-BHC	0.05 U	0.05 U	ND	ND		0/4
ALPHA-CHLORDANE	0.05 U	0.05 U	ND	ND		0/4
AROCLOR-1016	1 U	1 U	ND	ND		0/4
AROCLOR-1221	2 U	2 U	ND	ND		0/4
AROCLOR-1232	1 U	1 U	ND	ND		0/4
AROCLOR-1242	1 U	1 U	ND	ND		0/4
AROCLOR-1248	1 U	1 U	ND	ND		0/4
AROCLOR-1254	1 U	1 U	ND	ND		0/4
AROCLOR-1260	1 U	1 U	ND	ND		0/4
BETA-BHC	0.05 U	0.05 U	ND	ND		0/4
DELTA-BHC	0.05 U	0.05 U	ND	ND		0/4
DIELDRIN	0.1 U	0.1 U	ND	ND		0/4
ENDOSULFAN I	0.05 U	0.05 U	ND	ND		0/4
ENDOSULFAN II	0.1 U	0.1 U	ND	ND		0/4
ENDOSULFAN SULFATE	0.1 U	0.1 U	ND	ND		0/4
ENDRIN	0.1 U	0.1 U	ND	ND		0/4
ENDRIN ALDEHYDE	0.1 U	0.1 U	ND	ND		0/4
ENDRIN KETONE	0.1 U	0.1 U	ND	ND		0/4
GAMMA-BHC (LINDANE)	0.05 U	0.05 U	ND	ND		0/4
GAMMA-CHLORDANE	0.05 U	0.05 U	ND	ND		0/4
HEPTACHLOR	0.05 U	0.05 U	ND	ND		0/4
HEPTACHLOR EPOXIDE	0.05 U	0.05 U	ND	ND		0/4
METHOXYCHLOR	0.5 U	0.5 U	ND	ND		0/4
TOXAPHENE	5 U	5 U	ND	ND		0/4

QUALITY ASSURANCE/QUALITY CONTROL SUMMARY  
 GROUNDWATER - TAL METALS  
 PHASE II - FIXED BASE LABORATORY  
 RI/FS CTO-0356  
 OPERABLE UNIT NO. 16 (SITE 89)  
 MCB CAMP LEJEUNE, NORTH CAROLINA

SAMPLE ID	IR89/93-FB01	IR89/93-FB02	IR89/93-FB03	IR89/93-RBGW20
PHASE	PHASE II	PHASE II	PHASE II	PHASE II
DATE SAMPLED	05/13/97	05/13/97	05/13/97	05/29/97
TOTAL METALS (ug/l)				
ALUMINUM, TOTAL	174	37.1 U	34.5 U	30.2
ANTIMONY, TOTAL	1.9 U	1.9 U	1.9 U	1.9 U
ARSENIC, TOTAL	2.7 U	2.7 U	2.7 U	2.7 U
BARIUM, TOTAL	3.6	1.4	0.3 U	0.3 U
BERYLLIUM, TOTAL	0.3 U	0.3 U	0.3 U	0.3 U
CADMIUM, TOTAL	0.4 U	0.4 U	0.4 U	0.4 U
CALCIUM, TOTAL	8720 U	21.8 U	23 U	44.5 U
CHROMIUM, TOTAL	0.5 U	0.5 U	0.74	0.5 U
COBALT, TOTAL	0.5 U	0.5 U	0.5 U	0.5 U
COPPER, TOTAL	0.8 UJ	0.8 UJ	0.8 UJ	0.8 UJ
IRON, TOTAL	112	29.2	13.4 U	13.4 U
LEAD, TOTAL	1.4 U	1.4 U	1.4 U	1.4 U
MAGNESIUM, TOTAL	4020	13.9 U	13.9 U	13.9 U
MANGANESE, TOTAL	1.2	0.4 U	0.4 U	0.4 U
MERCURY, TOTAL	0.1 U	0.1 U	0.1 U	0.1 U
NICKEL, TOTAL	0.7 U	3.6	0.7 U	1.7 U
POTASSIUM, TOTAL	7340	108 U	101 U	106 U
SELENIUM, TOTAL	2.2 U	2.2 U	2.2 U	2.2 U
SILVER, TOTAL	0.5 U	0.5 U	0.5 U	0.5 U
SODIUM, TOTAL	53100	189 U	189 U	188 U
THALLIUM, TOTAL	3 U	3 U	3 U	3 U
VANADIUM, TOTAL	0.7 U	0.7 U	0.7 U	0.7 U
ZINC, TOTAL	12.8	0.4 UJ	0.4 UJ	0.4 UJ

**QUALITY ASSURANCE/QUALITY CONTROL SUMMARY**  
**GROUNDWATER - TAL METALS**  
**PHASE II - FIXED BASE LABORATORY**  
**RI/FS CTO-0356**  
**OPERABLE UNIT NO. 16 (SITE 89)**  
**MCB CAMP LEJEUNE, NORTH CAROLINA**

SAMPLE ID PHASE DATE SAMPLED	Minimum Non-Detect	Maximum Non-Detect	Minimum Detected	Maximum Detected	Location of Maximum Detect	Frequency of Detection
<b>TOTAL METALS (ug/l)</b>						
ALUMINUM, TOTAL	34.5 U	37.1 U	30.2	174	IR89/93-FB01	2/4
ANTIMONY, TOTAL	1.9 U	1.9 U	ND	ND		0/4
ARSENIC, TOTAL	2.7 U	2.7 U	ND	ND		0/4
BARIUM, TOTAL	0.3 U	0.3 U	1.4	3.6	IR89/93-FB01	2/4
BERYLLIUM, TOTAL	0.3 U	0.3 U	ND	ND		0/4
CADMIUM, TOTAL	0.4 U	0.4 U	ND	ND		0/4
CALCIUM, TOTAL	21.8 U	8720 U	ND	ND		0/4
CHROMIUM, TOTAL	0.5 U	0.5 U	0.74	0.74	IR89/93-FB03	1/4
COBALT, TOTAL	0.5 U	0.5 U	ND	ND		0/4
COPPER, TOTAL	0.8 UJ	0.8 UJ	ND	ND		0/4
IRON, TOTAL	13.4 U	13.4 U	29.2	112	IR89/93-FB01	2/4
LEAD, TOTAL	1.4 U	1.4 U	ND	ND		0/4
MAGNESIUM, TOTAL	13.9 U	13.9 U	4020	4020	IR89/93-FB01	1/4
MANGANESE, TOTAL	0.4 U	0.4 U	1.2	1.2	IR89/93-FB01	1/4
MERCURY, TOTAL	0.1 U	0.1 U	ND	ND		0/4
NICKEL, TOTAL	0.7 U	1.7 U	3.6	3.6	IR89/93-FB02	1/4
POTASSIUM, TOTAL	101 U	108 U	7340	7340	IR89/93-FB01	1/4
SELENIUM, TOTAL	2.2 U	2.2 U	ND	ND		0/4
SILVER, TOTAL	0.5 U	0.5 U	ND	ND		0/4
SODIUM, TOTAL	188 U	189 U	53100	53100	IR89/93-FB01	1/4
THALLIUM, TOTAL	3 U	3 U	ND	ND		0/4
VANADIUM, TOTAL	0.7 U	0.7 U	ND	ND		0/4
ZINC, TOTAL	0.4 UJ	0.4 UJ	12.8	12.8	IR89/93-FB01	1/4

**SITE 93**

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QUALITY ASSURANCE/QUALITY CONTROL SUMMARY  
 SUBSURFACE SOIL - TCL ORGANICS  
 PHASE II - FIXED BASE LABORATORY  
 RI/FS CTO9-0356  
 OPERABLE UNIT NO. 16 (SITE 93)  
 MCB CAMP LEJEUNE, NORTH CAROLINA

SAMPLE ID	IR89/93-FB01	IR89/93-FB02	IR89/93-FB03	IR93-RBSB09	IR93-RBSB11	IR93-RBSB16	TB-02
PHASE	PHASE II	PHASE II	PHASE II	PHASE II	PHASE II	PHASE II	PHASE II
DATE SAMPLED	05/13/97	05/13/97	05/13/97	04/30/97	05/06/97	05/16/97	04/19/97
<b>SEMIVOLATILES (ug/l)</b>							
1,2,4-TRICHLOROBENZENE	10 U	10 U	10 U	10 U	10 U	10 U	NA
1,2-DICHLOROBENZENE	10 U	10 U	10 U	10 U	10 U	10 U	NA
1,3-DICHLOROBENZENE	10 U	10 U	10 U	10 U	10 U	10 U	NA
1,4-DICHLOROBENZENE	10 U	10 U	10 U	10 U	10 U	10 U	NA
2,2'-OXYBIS(1-CHLOROPROPANE)	10 U	10 U	10 U	10 U	10 U	10 U	NA
2,4,5-TRICHLOROPHENOL	25 U	25 U	25 U	25 U	25 U	25 U	NA
2,4,6-TRICHLOROPHENOL	10 U	10 U	10 U	10 U	10 U	10 U	NA
2,4-DICHLOROPHENOL	10 U	10 U	10 U	10 U	10 U	10 U	NA
2,4-DIMETHYLPHENOL	10 U	10 U	10 U	10 U	10 U	10 U	NA
2,4-DINITROPHENOL	25 U	25 U	25 U	25 UJ	25 U	25 U	NA
2,4-DINITROTOLUENE	10 U	10 U	10 U	10 U	10 U	10 U	NA
2,6-DINITROTOLUENE	10 U	10 U	10 U	10 U	10 U	10 U	NA
2-CHLORONAPHTHALENE	10 U	10 U	10 U	10 U	10 U	10 U	NA
2-CHLOROPHENOL	10 U	10 U	10 U	10 U	10 U	10 U	NA
2-METHYLNAPHTHALENE	10 U	10 U	10 U	10 U	10 U	10 U	NA
2-METHYLPHENOL	10 U	10 U	10 U	10 U	10 U	10 U	NA
2-NITROANILINE	25 U	25 U	25 U	25 U	25 U	25 U	NA
2-NITROPHENOL	10 U	10 U	10 U	10 U	10 U	10 U	NA
3,3'-DICHLOROBENZIDINE	10 U	10 U	10 U	10 U	10 U	10 U	NA
3-NITROANILINE	25 U	25 U	25 U	25 U	25 U	25 U	NA
4,6-DINITRO-2-METHYLPHENOL	25 U	25 U	25 U	25 U	25 U	25 U	NA
4-BROMOPHENYL-PHENYLETHER	10 U	10 U	10 U	10 U	10 U	10 U	NA
4-CHLORO-3-METHYLPHENOL	10 U	10 U	10 U	10 U	10 U	10 U	NA
4-CHLOROANILINE	10 U	10 U	10 U	10 U	10 U	10 U	NA
4-CHLOROPHENYL-PHENYLETHER	10 U	10 U	10 U	10 U	10 U	10 U	NA
4-METHYLPHENOL	10 U	10 U	10 U	10 U	10 U	10 U	NA
4-NITROANILINE	25 U	25 U	25 UJ	25 U	25 U	25 U	NA
4-NITROPHENOL	25 U	25 U	25 U	25 UJ	25 U	25 U	NA
ACENAPHTHENE	10 U	10 U	10 U	10 U	10 U	10 U	NA
ACENAPHTHYLENE	10 U	10 U	10 U	10 U	10 U	10 U	NA
ANTHRACENE	10 U	10 U	10 U	10 U	10 U	10 U	NA
BENZO(A)ANTHRACENE	10 U	10 U	10 U	10 U	10 U	10 U	NA
BENZO(A)PYRENE	10 U	10 U	10 U	10 U	10 U	10 U	NA





**QUALITY ASSURANCE/QUALITY CONTROL SUMMARY**  
**SUBSURFACE SOIL - TCL ORGANICS**  
**PHASE II - FIXED BASE LABORATORY**  
**R/FS CTO9-0356**  
**OPERABLE UNIT NO. 16 (SITE 93)**  
**MCB CAMP LEJEUNE, NORTH CAROLINA**

SAMPLE ID	IR89/93-FB01	IR89/93-FB02	IR89/93-FB03	IR93-RBSB09	IR93-RBSB11	IR93-RBSB16	TB-02
PHASE	PHASE II	PHASE II	PHASE II	PHASE II	PHASE II	PHASE II	PHASE II
DATE SAMPLED	05/13/97	05/13/97	05/13/97	04/30/97	05/06/97	05/16/97	04/19/97
<b>PESTICIDES/PCBS (ug/l)</b>							
4,4'-DDD	0.1 U	0.1 U	0.1 U	0.1 U	0.1 UJ	0.1 U	NA
4,4'-DDE	0.1 U	0.1 U	0.1 U	0.1 U	0.1 UJ	0.1 U	NA
4,4'-DDT	0.1 U	0.1 U	0.1 U	0.1 U	0.1 UJ	0.1 U	NA
ALDRIN	0.05 U	0.05 U	0.05 U	0.05 U	0.05 UJ	0.05 U	NA
ALPHA-BHC	0.05 U	0.05 U	0.05 U	0.05 U	0.05 UJ	0.05 UJ	NA
ALPHA-CHLORDANE	0.05 U	0.05 U	0.05 U	0.05 U	0.05 UJ	0.05 U	NA
AROCLOR-1016	1 U	1 U	1 U	1 U	1 UJ	1 U	NA
AROCLOR-1221	2 U	2 U	2 U	2 U	2 UJ	2 U	NA
AROCLOR-1232	1 U	1 U	1 U	1 U	1 UJ	1 U	NA
AROCLOR-1242	1 U	1 U	1 U	1 U	1 UJ	1 U	NA
AROCLOR-1248	1 U	1 U	1 U	1 U	1 UJ	1 U	NA
AROCLOR-1254	1 U	1 U	1 U	1 U	1 UJ	1 U	NA
AROCLOR-1260	1 U	1 U	1 U	1 U	1 UJ	1 U	NA
BETA-BHC	0.05 U	0.05 U	0.05 U	0.05 U	0.05 UJ	0.05 U	NA
DELTA-BHC	0.05 U	0.05 U	0.05 U	0.05 U	0.05 UJ	0.05 UJ	NA
DIELDRIN	0.1 U	0.1 U	0.1 U	0.1 U	0.1 UJ	0.1 U	NA
ENDOSULFAN I	0.05 U	0.05 U	0.05 U	0.05 U	0.05 UJ	0.05 U	NA
ENDOSULFAN II	0.1 U	0.1 U	0.1 U	0.1 U	0.1 UJ	0.1 U	NA
ENDOSULFAN SULFATE	0.1 U	0.1 U	0.1 U	0.1 U	0.1 UJ	0.1 U	NA
ENDRIN	0.1 U	0.1 U	0.1 U	0.1 U	0.1 UJ	0.1 U	NA
ENDRIN ALDEHYDE	0.1 U	0.1 U	0.1 U	0.1 U	0.1 UJ	0.1 U	NA
ENDRIN KETONE	0.1 U	0.1 U	0.1 U	0.1 U	0.1 UJ	0.1 U	NA
GAMMA-BHC (LINDANE)	0.05 U	0.05 U	0.05 U	0.05 U	0.05 UJ	0.05 U	NA
GAMMA-CHLORDANE	0.05 U	0.05 U	0.05 U	0.05 U	0.05 UJ	0.05 U	NA
HEPTACHLOR	0.05 U	0.05 U	0.05 U	0.05 U	0.05 UJ	0.05 U	NA
HEPTACHLOR EPOXIDE	0.05 U	0.05 U	0.05 U	0.05 U	0.05 UJ	0.05 U	NA
METHOXYCHLOR	0.5 UJ	0.5 UJ	0.5 UJ	0.5 U	0.5 UJ	0.5 U	NA
TOXAPHENE	5 U	5 U	5 U	5 U	5 UJ	5 U	NA

QUALITY ASSURANCE/QUALITY CONTROL SUMMARY  
 SUBSURFACE SOIL - TCL ORGANICS  
 PHASE II - FIXED BASE LABORATORY  
 RI/FS CTO9-0356  
 OPERABLE UNIT NO. 16 (SITE 93)  
 MCB CAMP LEJEUNE, NORTH CAROLINA

SAMPLE ID	TB03	TB04	TB07	TB08	TB12
PHASE	PHASE II	PHASE II	PHASE II	PHASE II	PHASE II
DATE SAMPLED	04/21/97	04/29/97	05/02/97	05/06/97	05/15/97
<b>VOLATILES (ug/l)</b>					
1,1,1-TRICHLOROETHANE	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
1,1,2-TRICHLOROETHANE	10 U	10 U	10 U	10 U	10 U
1,1-DICHLOROETHANE	10 U	10 U	10 U	10 U	10 U
1,1-DICHLOROETHENE	10 U	10 U	10 U	10 U	10 U
1,2-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
1,2-DICHLOROPROPANE	10 U	10 U	10 U	10 U	10 U
2-BUTANONE	10 U	10 U	10 U	10 U	10 U
2-HEXANONE	10 U	10 U	10 U	10 U	10 U
4-METHYL-2-PENTANONE	10 U	10 U	10 U	10 U	10 U
ACETONE	10 U	10 U	10 U	10 U	10 U
BENZENE	10 U	10 U	10 U	10 U	10 U
BROMODICHLOROMETHANE	10 U	10 U	10 U	10 U	10 U
BROMOFORM	10 U	10 U	10 U	10 U	10 U
BROMOMETHANE	10 U	10 U	10 U	10 U	10 U
CARBON DISULFIDE	10 U	10 U	10 U	10 U	10 U
CARBON TETRACHLORIDE	10 U	10 U	10 U	10 U	10 U
CHLOROBENZENE	10 U	10 U	10 U	10 U	10 U
CHLOROETHANE	10 U	10 U	10 U	10 U	10 U
CHLOROFORM	10 U	10 U	10 U	10 U	10 U
CHLOROMETHANE	10 U	10 U	10 U	10 U	10 U
CIS-1,3-DICHLOROPROPENE	10 U	10 U	10 U	10 U	10 U
DIBROMOCHLOROMETHANE	10 U	10 U	10 U	10 U	10 U
ETHYLBENZENE	10 U	10 U	10 U	10 U	10 U
METHYLENE CHLORIDE	10 U	10 U	10 U	10 U	10 U
STYRENE	10 U	10 U	10 U	10 U	10 U
TETRACHLOROETHENE	10 U	10 U	10 U	10 U	10 U
TOLUENE	10 U	10 U	10 U	10 U	10 U
TRANS-1,3-DICHLOROPROPENE	10 U	10 U	10 U	10 U	10 U
TRICHLOROETHENE	10 U	10 U	10 U	10 U	10 U
VINYL CHLORIDE	10 U	10 U	10 U	10 U	10 U
XYLENE (TOTAL)	10 U	10 U	10 U	10 U	10 U

QUALITY ASSURANCE/QUALITY CONTROL SUMMARY  
 SUBSURFACE SOIL - TCL ORGANICS  
 PHASE II - FIXED BASE LABORATORY  
 RI/FS CTO9-0356  
 OPERABLE UNIT NO. 16 (SITE 93)  
 MCB CAMP LEJEUNE, NORTH CAROLINA

SAMPLE ID	TB03	TB04	TB07	TB08	TB12
PHASE	PHASE II	PHASE II	PHASE II	PHASE II	PHASE II
DATE SAMPLED	04/21/97	04/29/97	05/02/97	05/06/97	05/15/97
<b>SEMIVOLATILES (ug/l)</b>					
1,2,4-TRICHLOROBENZENE	NA	NA	NA	NA	NA
1,2-DICHLOROBENZENE	NA	NA	NA	NA	NA
1,3-DICHLOROBENZENE	NA	NA	NA	NA	NA
1,4-DICHLOROBENZENE	NA	NA	NA	NA	NA
2,2'-OXYBIS(1-CHLOROPROPANE)	NA	NA	NA	NA	NA
2,4,5-TRICHLOROPHENOL	NA	NA	NA	NA	NA
2,4,6-TRICHLOROPHENOL	NA	NA	NA	NA	NA
2,4-DICHLOROPHENOL	NA	NA	NA	NA	NA
2,4-DIMETHYLPHENOL	NA	NA	NA	NA	NA
2,4-DINITROPHENOL	NA	NA	NA	NA	NA
2,4-DINITROTOLUENE	NA	NA	NA	NA	NA
2,6-DINITROTOLUENE	NA	NA	NA	NA	NA
2-CHLORONAPHTHALENE	NA	NA	NA	NA	NA
2-CHLOROPHENOL	NA	NA	NA	NA	NA
2-METHYLNAPHTHALENE	NA	NA	NA	NA	NA
2-METHYLPHENOL	NA	NA	NA	NA	NA
2-NITROANILINE	NA	NA	NA	NA	NA
2-NITROPHENOL	NA	NA	NA	NA	NA
3,3'-DICHLOROBENZIDINE	NA	NA	NA	NA	NA
3-NITROANILINE	NA	NA	NA	NA	NA
4,6-DINITRO-2-METHYLPHENOL	NA	NA	NA	NA	NA
4-BROMOPHENYL-PHENYLETHER	NA	NA	NA	NA	NA
4-CHLORO-3-METHYLPHENOL	NA	NA	NA	NA	NA
4-CHLOROANILINE	NA	NA	NA	NA	NA
4-CHLOROPHENYL-PHENYLETHER	NA	NA	NA	NA	NA
4-METHYLPHENOL	NA	NA	NA	NA	NA
4-NITROANILINE	NA	NA	NA	NA	NA
4-NITROPHENOL	NA	NA	NA	NA	NA
ACENAPHTHENE	NA	NA	NA	NA	NA
ACENAPHTHYLENE	NA	NA	NA	NA	NA
ANTHRACENE	NA	NA	NA	NA	NA
BENZO(A)ANTHRACENE	NA	NA	NA	NA	NA
BENZO(A)PYRENE	NA	NA	NA	NA	NA

QUALITY ASSURANCE/QUALITY CONTROL SUMMARY  
 SUBSURFACE SOIL - TCL ORGANICS  
 PHASE II - FIXED BASE LABORATORY  
 RI/FS CTO9-0356  
 OPERABLE UNIT NO. 16 (SITE 93)  
 MCB CAMP LEJEUNE, NORTH CAROLINA

SAMPLE ID	TB03	TB04	TB07	TB08	TB12
PHASE	PHASE II	PHASE II	PHASE II	PHASE II	PHASE II
DATE SAMPLED	04/21/97	04/29/97	05/02/97	05/06/97	05/15/97
<b>SEMIVOLATILES (ug/l) (cont)</b>					
BENZO(B)FLUORANTHENE	NA	NA	NA	NA	NA
BENZO(G,H,I)PERYLENE	NA	NA	NA	NA	NA
BENZO(K)FLUORANTHENE	NA	NA	NA	NA	NA
BIS(2-CHLOROETHOXY)METHANE	NA	NA	NA	NA	NA
BIS(2-CHLOROETHYL)ETHER	NA	NA	NA	NA	NA
BIS(2-ETHYLHEXYL)PHTHALATE	NA	NA	NA	NA	NA
BUTYLBENZYLPHTHALATE	NA	NA	NA	NA	NA
CARBAZOLE	NA	NA	NA	NA	NA
CHRYSENE	NA	NA	NA	NA	NA
DIBENZO(A,H)ANTHRACENE	NA	NA	NA	NA	NA
DIBENZOFURAN	NA	NA	NA	NA	NA
DIETHYLPHTHALATE	NA	NA	NA	NA	NA
DIMETHYLPHTHALATE	NA	NA	NA	NA	NA
DI-N-BUTYLPHTHALATE	NA	NA	NA	NA	NA
DI-N-OCTYLPHTHALATE	NA	NA	NA	NA	NA
FLUORANTHENE	NA	NA	NA	NA	NA
FLUORENE	NA	NA	NA	NA	NA
HEXACHLOROBENZENE	NA	NA	NA	NA	NA
HEXACHLOROBUTADIENE	NA	NA	NA	NA	NA
HEXACHLOROCYCLOPENTADIENE	NA	NA	NA	NA	NA
HEXACHLOROETHANE	NA	NA	NA	NA	NA
INDENO(1,2,3-CD)PYRENE	NA	NA	NA	NA	NA
ISOPHORONE	NA	NA	NA	NA	NA
NAPHTHALENE	NA	NA	NA	NA	NA
NITROBENZENE	NA	NA	NA	NA	NA
N-NITROSO-DI-N-PROPYLAMINE	NA	NA	NA	NA	NA
N-NITROSODIPHENYLAMINE (1)	NA	NA	NA	NA	NA
PENTACHLOROPHENOL	NA	NA	NA	NA	NA
PHENANTHRENE	NA	NA	NA	NA	NA
PHENOL	NA	NA	NA	NA	NA
PYRENE	NA	NA	NA	NA	NA

QUALITY ASSURANCE/QUALITY CONTROL SUMMARY  
 SUBSURFACE SOIL - TCL ORGANICS  
 PHASE II - FIXED BASE LABORATORY  
 RI/FS CTO9-0356  
 OPERABLE UNIT NO. 16 (SITE 93)  
 MCB CAMP LEJEUNE, NORTH CAROLINA

SAMPLE ID	TB03	TB04	TB07	TB08	TB12
PHASE	PHASE II	PHASE II	PHASE II	PHASE II	PHASE II
DATE SAMPLED	04/21/97	04/29/97	05/02/97	05/06/97	05/15/97
<b>PESTICIDES/PCBS (ug/l)</b>					
4,4'-DDD	NA	NA	NA	NA	NA
4,4'-DDE	NA	NA	NA	NA	NA
4,4'-DDT	NA	NA	NA	NA	NA
ALDRIN	NA	NA	NA	NA	NA
ALPHA-BHC	NA	NA	NA	NA	NA
ALPHA-CHLORDANE	NA	NA	NA	NA	NA
AROCLOR-1016	NA	NA	NA	NA	NA
AROCLOR-1221	NA	NA	NA	NA	NA
AROCLOR-1232	NA	NA	NA	NA	NA
AROCLOR-1242	NA	NA	NA	NA	NA
AROCLOR-1248	NA	NA	NA	NA	NA
AROCLOR-1254	NA	NA	NA	NA	NA
AROCLOR-1260	NA	NA	NA	NA	NA
BETA-BHC	NA	NA	NA	NA	NA
DELTA-BHC	NA	NA	NA	NA	NA
DIELDRIN	NA	NA	NA	NA	NA
ENDOSULFAN I	NA	NA	NA	NA	NA
ENDOSULFAN II	NA	NA	NA	NA	NA
ENDOSULFAN SULFATE	NA	NA	NA	NA	NA
ENDRIN	NA	NA	NA	NA	NA
ENDRIN ALDEHYDE	NA	NA	NA	NA	NA
ENDRIN KETONE	NA	NA	NA	NA	NA
GAMMA-BHC (LINDANE)	NA	NA	NA	NA	NA
GAMMA-CHLORDANE	NA	NA	NA	NA	NA
HEPTACHLOR	NA	NA	NA	NA	NA
HEPTACHLOR EPOXIDE	NA	NA	NA	NA	NA
METHOXYCHLOR	NA	NA	NA	NA	NA
TOXAPHENE	NA	NA	NA	NA	NA

**QUALITY ASSURANCE/QUALITY CONTROL SUMMARY**  
**SUBSURFACE SOIL - TCL ORGANICS**  
**PHASE II - FIXED BASE LABORATORY**  
**RI/FS CTO9-0356**  
**OPERABLE UNIT NO. 16 (SITE 93)**  
**MCB CAMP LEJEUNE, NORTH CAROLINA**

SAMPLE ID PHASE DATE SAMPLED	Minimum Non-Detect	Maximum Non-Detect	Minimum Detected	Maximum Detected	Location of Maximum Detect	Frequency of Detection
<b>VOLATILES (ug/l)</b>						
1,1,1-TRICHLOROETHANE	10 U	10 U	ND	ND		0/12
1,1,2,2-TETRACHLOROETHANE	10 U	10 U	ND	ND		0/12
1,1,2-TRICHLOROETHANE	10 U	10 U	ND	ND		0/12
1,1-DICHLOROETHANE	10 U	10 U	ND	ND		0/12
1,1-DICHLOROETHENE	10 U	10 U	ND	ND		0/12
1,2-DICHLOROETHANE	10 U	10 U	ND	ND		0/12
1,2-DICHLOROETHENE (TOTAL)	10 U	10 U	ND	ND		0/12
1,2-DICHLOROPROPANE	10 U	10 U	ND	ND		0/12
2-BUTANONE	10 U	10 U	ND	ND		0/12
2-HEXANONE	10 U	10 U	ND	ND		0/12
4-METHYL-2-PENTANONE	10 U	10 U	ND	ND		0/12
ACETONE	10 U	10 U	ND	ND		0/12
BENZENE	10 U	10 U	ND	ND		0/12
BROMODICHLOROMETHANE	10 U	10 U	18	18	IR89/93-FB01	1/12
BROMOFORM	10 U	10 U	9 J	9 J	IR89/93-FB01	1/12
BROMOMETHANE	10 U	10 U	ND	ND		0/12
CARBON DISULFIDE	10 U	10 U	ND	ND		0/12
CARBON TETRACHLORIDE	10 U	10 U	ND	ND		0/12
CHLOROBENZENE	10 U	10 U	ND	ND		0/12
CHLOROETHANE	10 U	10 U	ND	ND		0/12
CHLOROFORM	10 U	10 U	12	12	IR89/93-FB01	1/12
CHLOROMETHANE	10 U	10 U	ND	ND		0/12
CIS-1,3-DICHLOROPROPENE	10 U	10 U	ND	ND		0/12
DIBROMOCHLOROMETHANE	10 U	10 U	24	24	IR89/93-FB01	1/12
ETHYLBENZENE	10 U	10 U	ND	ND		0/12
METHYLENE CHLORIDE	10 U	10 U	ND	ND		0/12
STYRENE	10 U	10 U	ND	ND		0/12
TETRACHLOROETHENE	10 U	10 U	ND	ND		0/12
TOLUENE	10 U	10 U	ND	ND		0/12
TRANS-1,3-DICHLOROPROPENE	10 U	10 U	ND	ND		0/12
TRICHLOROETHENE	10 U	10 U	ND	ND		0/12
VINYL CHLORIDE	10 U	10 U	ND	ND		0/12
XYLENE (TOTAL)	10 U	10 U	ND	ND		0/12

QUALITY ASSURANCE/QUALITY CONTROL SUMMARY  
 SUBSURFACE SOIL - TCL ORGANICS  
 PHASE II - FIXED BASE LABORATORY  
 RI/FS CTO9-0356  
 OPERABLE UNIT NO. 16 (SITE 93)  
 MCB CAMP LEJEUNE, NORTH CAROLINA

SAMPLE ID PHASE DATE SAMPLED	Minimum Non-Detect	Maximum Non-Detect	Minimum Detected	Maximum Detected	Location of Maximum Detect	Frequency of Detection
<b>SEMIVOLATILES (ug/l)</b>						
1,2,4-TRICHLOROBENZENE	10 U	10 U	ND	ND		0/6
1,2-DICHLOROBENZENE	10 U	10 U	ND	ND		0/6
1,3-DICHLOROBENZENE	10 U	10 U	ND	ND		0/6
1,4-DICHLOROBENZENE	10 U	10 U	ND	ND		0/6
2,2'-OXYBIS(1-CHLOROPROPANE)	10 U	10 U	ND	ND		0/6
2,4,5-TRICHLOROPHENOL	25 U	25 U	ND	ND		0/6
2,4,6-TRICHLOROPHENOL	10 U	10 U	ND	ND		0/6
2,4-DICHLOROPHENOL	10 U	10 U	ND	ND		0/6
2,4-DIMETHYLPHENOL	10 U	10 U	ND	ND		0/6
2,4-DINITROPHENOL	25 U	25 U	ND	ND		0/6
2,4-DINITROTOLUENE	10 U	10 U	ND	ND		0/6
2,6-DINITROTOLUENE	10 U	10 U	ND	ND		0/6
2-CHLORONAPHTHALENE	10 U	10 U	ND	ND		0/6
2-CHLOROPHENOL	10 U	10 U	ND	ND		0/6
2-METHYLNAPHTHALENE	10 U	10 U	ND	ND		0/6
2-METHYLPHENOL	10 U	10 U	ND	ND		0/6
2-NITROANILINE	25 U	25 U	ND	ND		0/6
2-NITROPHENOL	10 U	10 U	ND	ND		0/6
3,3'-DICHLOROBENZIDINE	10 U	10 U	ND	ND		0/6
3-NITROANILINE	25 U	25 U	ND	ND		0/6
4,6-DINITRO-2-METHYLPHENOL	25 U	25 U	ND	ND		0/6
4-BROMOPHENYL-PHENYLETHER	10 U	10 U	ND	ND		0/6
4-CHLORO-3-METHYLPHENOL	10 U	10 U	ND	ND		0/6
4-CHLOROANILINE	10 U	10 U	ND	ND		0/6
4-CHLOROPHENYL-PHENYLETHER	10 U	10 U	ND	ND		0/6
4-METHYLPHENOL	10 U	10 U	ND	ND		0/6
4-NITROANILINE	25 U	25 U	ND	ND		0/6
4-NITROPHENOL	25 U	25 U	ND	ND		0/6
ACENAPHTHENE	10 U	10 U	ND	ND		0/6
ACENAPHTHYLENE	10 U	10 U	ND	ND		0/6
ANTHRACENE	10 U	10 U	ND	ND		0/6
BENZO(A)ANTHRACENE	10 U	10 U	ND	ND		0/6
BENZO(A)PYRENE	10 U	10 U	ND	ND		0/6

**QUALITY ASSURANCE/QUALITY CONTROL SUMMARY**  
**SUBSURFACE SOIL - TCL ORGANICS**  
**PHASE II - FIXED BASE LABORATORY**  
**RI/FS CTO9-0356**  
**OPERABLE UNIT NO. 16 (SITE 93)**  
**MCB CAMP LEJEUNE, NORTH CAROLINA**

SAMPLE ID PHASE DATE SAMPLED	Minimum Non-Detect	Maximum Non-Detect	Minimum Detected	Maximum Detected	Location of Maximum Detect	Frequency of Detection
<b>SEMIVOLATILES (ug/l) (cont)</b>						
BENZO(B)FLUORANTHENE	10 U	10 U	ND	ND		0/6
BENZO(G,H,I)PERYLENE	10 U	10 U	ND	ND		0/6
BENZO(K)FLUORANTHENE	10 U	10 U	ND	ND		0/6
BIS(2-CHLOROETHOXY)METHANE	10 U	10 U	ND	ND		0/6
BIS(2-CHLOROETHYL)ETHER	10 U	10 U	ND	ND		0/6
BIS(2-ETHYLHEXYL)PHTHALATE	10 U	10 U	1 J	120	IR89/93-FB03	4/6
BUTYLBENZYLPHTHALATE	10 U	10 U	ND	ND		0/6
CARBAZOLE	10 U	10 U	ND	ND		0/6
CHRYSENE	10 U	10 U	ND	ND		0/6
DIBENZO(A,H)ANTHRACENE	10 U	10 U	ND	ND		0/6
DIBENZOFURAN	10 U	10 U	ND	ND		0/6
DIETHYLPHTHALATE	10 U	10 U	ND	ND		0/6
DIMETHYLPHTHALATE	10 U	10 U	ND	ND		0/6
DI-N-BUTYLPHTHALATE	10 U	10 U	ND	ND		0/6
DI-N-OCTYLPHTHALATE	10 U	10 U	ND	ND		0/6
FLUORANTHENE	10 U	10 U	ND	ND		0/6
FLUORENE	10 U	10 U	ND	ND		0/6
HEXACHLOROBENZENE	10 U	10 U	ND	ND		0/6
HEXACHLOROBUTADIENE	10 U	10 U	ND	ND		0/6
HEXACHLOROCYCLOPENTADIENE	10 U	10 U	ND	ND		0/6
HEXACHLOROETHANE	10 U	10 U	ND	ND		0/6
INDENO(1,2,3-CD)PYRENE	10 U	10 U	ND	ND		0/6
ISOPHORONE	10 U	10 U	ND	ND		0/6
NAPHTHALENE	10 U	10 U	ND	ND		0/6
NITROBENZENE	10 U	10 U	ND	ND		0/6
N-NITROSO-DI-N-PROPYLAMINE	10 U	10 U	ND	ND		0/6
N-NITROSODIPHENYLAMINE (1)	10 U	10 U	ND	ND		0/6
PENTACHLOROPHENOL	25 U	25 U	ND	ND		0/6
PHENANTHRENE	10 U	10 U	ND	ND		0/6
PHENOL	10 U	10 U	ND	ND		0/6
PYRENE	10 U	10 U	ND	ND		0/6



**QUALITY ASSURANCE/QUALITY CONTROL SUMMARY**  
**SUBSURFACE SOIL - TCL ORGANICS**  
**PHASE II - FIXED BASE LABORATORY**  
**RI/FS CTO9-0356**  
**OPERABLE UNIT NO. 16 (SITE 93)**  
**MCB CAMP LEJEUNE, NORTH CAROLINA**

SAMPLE ID PHASE DATE SAMPLED	Minimum Non-Detect	Maximum Non-Detect	Minimum Detected	Maximum Detected	Location of Maximum Detect	Frequency of Detection
<b>PESTICIDES/PCBS (ug/l)</b>						
4,4'-DDD	0.1 U	0.1 U	ND	ND		0/6
4,4'-DDE	0.1 U	0.1 U	ND	ND		0/6
4,4'-DDT	0.1 U	0.1 U	ND	ND		0/6
ALDRIN	0.05 U	0.05 U	ND	ND		0/6
ALPHA-BHC	0.05 U	0.05 U	ND	ND		0/6
ALPHA-CHLORDANE	0.05 U	0.05 U	ND	ND		0/6
AROCLOR-1016	1 U	1 U	ND	ND		0/6
AROCLOR-1221	2 U	2 U	ND	ND		0/6
AROCLOR-1232	1 U	1 U	ND	ND		0/6
AROCLOR-1242	1 U	1 U	ND	ND		0/6
AROCLOR-1248	1 U	1 U	ND	ND		0/6
AROCLOR-1254	1 U	1 U	ND	ND		0/6
AROCLOR-1260	1 U	1 U	ND	ND		0/6
BETA-BHC	0.05 U	0.05 U	ND	ND		0/6
DELTA-BHC	0.05 U	0.05 U	ND	ND		0/6
DIELDRIN	0.1 U	0.1 U	ND	ND		0/6
ENDOSULFAN I	0.05 U	0.05 U	ND	ND		0/6
ENDOSULFAN II	0.1 U	0.1 U	ND	ND		0/6
ENDOSULFAN SULFATE	0.1 U	0.1 U	ND	ND		0/6
ENDRIN	0.1 U	0.1 U	ND	ND		0/6
ENDRIN ALDEHYDE	0.1 U	0.1 U	ND	ND		0/6
ENDRIN KETONE	0.1 U	0.1 U	ND	ND		0/6
GAMMA-BHC (LINDANE)	0.05 U	0.05 U	ND	ND		0/6
GAMMA-CHLORDANE	0.05 U	0.05 U	ND	ND		0/6
HEPTACHLOR	0.05 U	0.05 U	ND	ND		0/6
HEPTACHLOR EPOXIDE	0.05 U	0.05 U	ND	ND		0/6
METHOXYCHLOR	0.5 UJ	0.5 UJ	ND	ND		0/6
TOXAPHENE	5 U	5 U	ND	ND		0/6

**QUALITY ASSURANCE/QUALITY CONTROL SUMMARY**  
**SUBSURFACE SOIL - TAL METALS**  
**PHASE II - FIXED BASE LABORATORY**  
**RI/FS CTO9-0356**  
**OPERABLE UNIT NO. 16 (SITE 93)**  
**MCB CAMP LEJEUNE, NORTH CAROLINA**

SAMPLE ID	IR89/93-FB01	IR89/93-FB02	IR89/93-FB03	IR93-RBSB09	IR93-RBSB11	IR93-RBSB16
PHASE	PHASE II	PHASE II	PHASE II	PHASE II	PHASE II	PHASE II
DATE SAMPLED	05/13/97	05/13/97	05/13/97	04/30/97	05/06/97	05/16/97
<b>TOTAL METALS (ug/l)</b>						
ALUMINUM, TOTAL	174	37.1 U	34.5 U	53.8 U	46.2 U	32.8 U
ANTIMONY, TOTAL	1.9 U	1.9 U	1.9 U	1.6	1.6 U	1.9 U
ARSENIC, TOTAL	2.7 U	2.7 U	2.7 U	1.8 UJ	1.8 UJ	2.7 U
BARIUM, TOTAL	3.6	1.4	0.3 U	0.1 U	0.1 U	0.3 U
BERYLLIUM, TOTAL	0.3 U	0.3 U	0.3 U	0.1 U	0.1 U	0.3 U
CADMIUM, TOTAL	0.4 U	0.4 U	0.4 U	0.2 U	0.2 U	0.4 U
CALCIUM, TOTAL	8720 U	21.8 U	23 U	20.3 U	54 U	62 U
CHROMIUM, TOTAL	0.5 U	0.5 U	0.74	0.3 UJ	0.3 UJ	0.5 U
COBALT, TOTAL	0.5 U	0.5 U	0.5 U	0.3 U	0.3 U	0.5 U
COPPER, TOTAL	0.8 UJ	0.8 UJ	0.8 UJ	0.7 UJ	0.7 UJ	0.8 UJ
IRON, TOTAL	112	29.2	13.4 U	6.4 U	6.4 U	33.2
LEAD, TOTAL	1.4 U	1.4 U	1.4 U	1.4 U	1.6 U	1.4 U
MAGNESIUM, TOTAL	4020	13.9 U	13.9 U	6.9 U	6.9 U	13.9 U
MANGANESE, TOTAL	1.2	0.4 U	0.4 U	0.4 U	0.4 U	0.63
MERCURY, TOTAL	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
NICKEL, TOTAL	0.7 U	3.6	0.7 U	0.7 U	4.1	2.4
POTASSIUM, TOTAL	7340	108 U	101 U	105 U	107 U	108 U
SELENIUM, TOTAL	2.2 U	2.2 U	2.2 U	1.9 U	2.2 U	2.2 U
SILVER, TOTAL	0.5 U	0.5 U	0.5 U	0.2 U	0.2 U	0.5 U
SODIUM, TOTAL	53100	189 U	189 U	131 UJ	131 UJ	188 U
THALLIUM, TOTAL	3 U	3 U	3 U	1.9 U	1.9 U	3 U
VANADIUM, TOTAL	0.7 U	0.7 U	0.7 U	0.5 U	0.5 U	0.7 U
ZINC, TOTAL	12.8	0.4 UJ	0.4 UJ	0.2 UJ	0.2 UJ	4.8

**QUALITY ASSURANCE/QUALITY CONTROL SUMMARY**  
**SUBSURFACE SOIL - TAL METALS**  
**PHASE II - FIXED BASE LABORATORY**  
**R1/FS CTO9-0356**  
**OPERABLE UNIT NO. 16 (SITE 93)**  
**MCB CAMP LEJEUNE, NORTH CAROLINA**

SAMPLE ID PHASE DATE SAMPLED	Minimum Non-Detect	Maximum Non-Detect	Minimum Detected	Maximum Detected	Location of Maximum Detect	Frequency of Detection
<b>TOTAL METALS (ug/l)</b>						
ALUMINUM, TOTAL	32.8 U	53.8 U	174	174	IR89/93-FB01	1/6
ANTIMONY, TOTAL	1.6 U	1.9 U	1.6	1.6	IR93-RBSB09	1/6
ARSENIC, TOTAL	1.8 U	2.7 U	ND	ND		0/6
BARIUM, TOTAL	0.1 U	0.3 U	1.4	3.6	IR89/93-FB01	2/6
BERYLLIUM, TOTAL	0.1 U	0.3 U	ND	ND		0/6
CADMIUM, TOTAL	0.2 U	0.4 U	ND	ND		0/6
CALCIUM, TOTAL	20.3 U	8720 U	ND	ND		0/6
CHROMIUM, TOTAL	0.3 UJ	0.5 U	0.74	0.74	IR89/93-FB03	1/6
COBALT, TOTAL	0.3 U	0.5 U	ND	ND		0/6
COPPER, TOTAL	0.7 UJ	0.8 UJ	ND	ND		0/6
IRON, TOTAL	6.4 U	13.4 U	29.2	112	IR89/93-FB01	3/6
LEAD, TOTAL	1.4 U	1.6 U	ND	ND		0/6
MAGNESIUM, TOTAL	6.9 U	13.9 U	4020	4020	IR89/93-FB01	1/6
MANGANESE, TOTAL	0.4 U	0.4 U	0.63	1.2	IR89/93-FB01	2/6
MERCURY, TOTAL	0.1 U	0.1 U	ND	ND		0/6
NICKEL, TOTAL	0.7 U	0.7 U	2.4	4.1	IR93-RBSB11	3/6
POTASSIUM, TOTAL	101 U	108 U	7340	7340	IR89/93-FB01	1/6
SELENIUM, TOTAL	1.9 U	2.2 U	ND	ND		0/6
SILVER, TOTAL	0.2 U	0.5 U	ND	ND		0/6
SODIUM, TOTAL	131 UJ	189 U	53100	53100	IR89/93-FB01	1/6
THALLIUM, TOTAL	1.9 U	3 U	ND	ND		0/6
VANADIUM, TOTAL	0.5 U	0.7 U	ND	ND		0/6
ZINC, TOTAL	0.2 UJ	0.4 UJ	4.8	12.8	IR89/93-FB01	2/6



QUALITY ASSURANCE/QUALITY CONTROL SUMMARY  
GROUNDWATER - TCL ORGANICS  
PHASE II - FIXED BASED LABORATORY  
RI/FS CTO-0356  
OPERABLE UNIT NO. 16 (SITE 93)  
MCB CAMP LEJEUNE, NORTH CAROLINA

SAMPLE ID	IR89/93-FB01	IR89/93-FB02	IR89/93-FB03	IR89/93-RBGW20	TB14	TB15	TB16	TB17
PHASE	PHASE II	PHASE II	PHASE II	PHASE II	PHASE II	PHASE II	PHASE II	PHASE II
DATE SAMPLED	05/13/97	05/13/97	05/13/97	05/29/97	05/19/97	05/27/97	05/29/97	06/01/97
<b>SEMIVOLATILES (ug/l)</b>								
PHENOL	10 U	10 U	10 U	10 U	NA	NA	NA	NA
BIS(2-CHLOROETHYL)ETHER	10 U	10 U	10 U	10 U	NA	NA	NA	NA
2-CHLOROPHENOL	10 U	10 U	10 U	10 U	NA	NA	NA	NA
1,3-DICHLOROBENZENE	10 U	10 U	10 U	10 U	NA	NA	NA	NA
1,4-DICHLOROBENZENE	10 U	10 U	10 U	10 U	NA	NA	NA	NA
1,2-DICHLOROBENZENE	10 U	10 U	10 U	10 U	NA	NA	NA	NA
2-METHYLPHENOL	10 U	10 U	10 U	10 U	NA	NA	NA	NA
2,2'-OXYBIS(1-CHLOROPROPANE)	10 U	10 U	10 U	10 U	NA	NA	NA	NA
4-METHYLPHENOL	10 U	10 U	10 U	10 U	NA	NA	NA	NA
N-NITROSO-DI-N-PROPYLAMINE	10 U	10 U	10 U	10 U	NA	NA	NA	NA
HEXACHLOROETHANE	10 U	10 U	10 U	10 U	NA	NA	NA	NA
NITROBENZENE	10 U	10 U	10 U	10 U	NA	NA	NA	NA
ISOPHORONE	10 U	10 U	10 U	10 U	NA	NA	NA	NA
2-NITROPHENOL	10 U	10 U	10 U	10 U	NA	NA	NA	NA
2,4-DIMETHYLPHENOL	10 U	10 U	10 U	10 U	NA	NA	NA	NA
BIS(2-CHLOROETHOXY)METHANE	10 U	10 U	10 U	10 U	NA	NA	NA	NA
2,4-DICHLOROPHENOL	10 U	10 U	10 U	10 U	NA	NA	NA	NA
1,2,4-TRICHLOROBENZENE	10 U	10 U	10 U	10 U	NA	NA	NA	NA
NAPHTHALENE	10 U	10 U	10 U	10 U	NA	NA	NA	NA
4-CHLOROANILINE	10 U	10 U	10 U	10 UJ	NA	NA	NA	NA
HEXACHLOROBUTADIENE	10 U	10 U	10 U	10 U	NA	NA	NA	NA
4-CHLORO-3-METHYLPHENOL	10 U	10 U	10 U	10 U	NA	NA	NA	NA
2-METHYLNAPHTHALENE	10 U	10 U	10 U	10 U	NA	NA	NA	NA
HEXACHLOROCYCLOPENTADIENE	10 U	10 U	10 U	10 U	NA	NA	NA	NA
2,4,6-TRICHLOROPHENOL	10 U	10 U	10 U	10 U	NA	NA	NA	NA
2,4,5-TRICHLOROPHENOL	25 U	25 U	25 U	25 U	NA	NA	NA	NA
2-CHLORONAPHTHALENE	10 U	10 U	10 U	10 U	NA	NA	NA	NA
2-NITROANILINE	25 U	25 U	25 U	25 U	NA	NA	NA	NA
DIMETHYLPHTHALATE	10 U	10 U	10 U	10 U	NA	NA	NA	NA
ACENAPHTHYLENE	10 U	10 U	10 U	10 U	NA	NA	NA	NA
2,6-DINITROTOLUENE	10 U	10 U	10 U	10 U	NA	NA	NA	NA
3-NITROANILINE	25 U	25 U	25 U	25 UJ	NA	NA	NA	NA
ACENAPHTHENE	10 U	10 U	10 U	10 U	NA	NA	NA	NA

QUALITY ASSURANCE/QUALITY CONTROL SUMMARY  
GROUNDWATER - TCL ORGANICS  
PHASE II - FIXED BASED LABORATORY  
RI/FS CTO-0356  
OPERABLE UNIT NO. 16 (SITE 93)  
MCB CAMP LEJEUNE, NORTH CAROLINA

SAMPLE ID	IR89/93-FB01	IR89/93-FB02	IR89/93-FB03	IR89/93-RBGW20	TB14	TB15	TB16	TB17
PHASE	PHASE II	PHASE II	PHASE II	PHASE II	PHASE II	PHASE II	PHASE II	PHASE II
DATE SAMPLED	05/13/97	05/13/97	05/13/97	05/29/97	05/19/97	05/27/97	05/29/97	06/01/97
<b>SEMIVOLATILES (ug/l) (cont)</b>								
2,4-DINITROPHENOL	25 U	25 U	25 U	25 U	NA	NA	NA	NA
4-NITROPHENOL	25 U	25 U	25 U	25 U	NA	NA	NA	NA
DIBENZOFURAN	10 U	10 U	10 U	10 U	NA	NA	NA	NA
2,4-DINITROTOLUENE	10 U	10 U	10 U	10 U	NA	NA	NA	NA
DIETHYLPHTHALATE	10 U	10 U	10 U	10 U	NA	NA	NA	NA
4-CHLOROPHENYL-PHENYLEETHER	10 U	10 U	10 U	10 U	NA	NA	NA	NA
FLUORENE	10 U	10 U	10 U	10 U	NA	NA	NA	NA
4-NITROANILINE	25 U	25 U	25 UJ	25 U	NA	NA	NA	NA
4,6-DINITRO-2-METHYLPHENOL	25 U	25 U	25 U	25 U	NA	NA	NA	NA
N-NITROSODIPHENYLAMINE (1)	10 U	10 U	10 U	10 U	NA	NA	NA	NA
4-BROMOPHENYL-PHENYLEETHER	10 U	10 U	10 U	10 U	NA	NA	NA	NA
HEXACHLOROBENZENE	10 U	10 U	10 U	10 U	NA	NA	NA	NA
PENTACHLOROPHENOL	25 U	25 U	25 U	25 U	NA	NA	NA	NA
PHENANTHRENE	10 U	10 U	10 U	10 U	NA	NA	NA	NA
ANTHRACENE	10 U	10 U	10 U	10 U	NA	NA	NA	NA
CARBAZOLE	10 U	10 U	10 U	10 U	NA	NA	NA	NA
DI-N-BUTYLPHTHALATE	10 U	10 U	10 U	10 U	NA	NA	NA	NA
FLUORANTHENE	10 U	10 U	10 U	10 U	NA	NA	NA	NA
PYRENE	10 U	10 U	10 U	10 U	NA	NA	NA	NA
BUTYLBENZYLPHTHALATE	10 U	10 U	10 U	10 U	NA	NA	NA	NA
3,3'-DICHLOROBENZIDINE	10 U	10 U	10 U	10 U	NA	NA	NA	NA
BENZO(A)ANTHRACENE	10 U	10 U	10 U	10 U	NA	NA	NA	NA
CHRYSENE	10 U	10 U	10 U	10 U	NA	NA	NA	NA
BIS(2-ETHYLHEXYL)PHTHALATE	6 J	57	120	10 U	NA	NA	NA	NA
DI-N-OCTYLPHTHALATE	10 U	10 U	10 U	10 U	NA	NA	NA	NA
BENZO(B)FLUORANTHENE	10 U	10 U	10 U	10 U	NA	NA	NA	NA
BENZO(K)FLUORANTHENE	10 U	10 U	10 U	10 U	NA	NA	NA	NA
BENZO(A)PYRENE	10 U	10 U	10 U	10 U	NA	NA	NA	NA
INDENO(1,2,3-CD)PYRENE	10 U	10 U	10 U	10 U	NA	NA	NA	NA
DIBENZO(A,H)ANTHRACENE	10 U	10 U	10 U	10 U	NA	NA	NA	NA
BENZO(G,H,I)PERYLENE	10 U	10 U	10 U	10 U	NA	NA	NA	NA

QUALITY ASSURANCE/QUALITY CONTROL SUMMARY  
GROUNDWATER - TCL ORGANICS  
PHASE II - FIXED BASED LABORATORY  
RI/FS CTO-0356  
OPERABLE UNIT NO. 16 (SITE 93)  
MCB CAMP LEJEUNE, NORTH CAROLINA

SAMPLE ID	IR89/93-FB01	IR89/93-FB02	IR89/93-FB03	IR89/93-RBGW20	TB14	TB15	TB16	TB17
PHASE	PHASE II	PHASE II	PHASE II	PHASE II	PHASE II	PHASE II	PHASE II	PHASE II
DATE SAMPLED	05/13/97	05/13/97	05/13/97	05/29/97	05/19/97	05/27/97	05/29/97	06/01/97
<b>PESTICIDES/PCBS (ug/l)</b>								
ALPHA-BHC	0.05 U	0.05 U	0.05 U	0.05 U	NA	NA	NA	NA
BETA-BHC	0.05 U	0.05 U	0.05 U	0.05 U	NA	NA	NA	NA
DELTA-BHC	0.05 U	0.05 U	0.05 U	0.05 U	NA	NA	NA	NA
GAMMA-BHC (LINDANE)	0.05 U	0.05 U	0.05 U	0.05 U	NA	NA	NA	NA
HEPTACHLOR	0.05 U	0.05 U	0.05 U	0.05 U	NA	NA	NA	NA
ALDRIN	0.05 U	0.05 U	0.05 U	0.05 U	NA	NA	NA	NA
HEPTACHLOR EPOXIDE	0.05 U	0.05 U	0.05 U	0.05 U	NA	NA	NA	NA
ENDOSULFAN I	0.05 U	0.05 U	0.05 U	0.05 U	NA	NA	NA	NA
DIELDRIN	0.1 U	0.1 U	0.1 U	0.1 U	NA	NA	NA	NA
4,4'-DDE	0.1 U	0.1 U	0.1 U	0.1 U	NA	NA	NA	NA
ENDRIN	0.1 U	0.1 U	0.1 U	0.1 U	NA	NA	NA	NA
ENDOSULFAN II	0.1 U	0.1 U	0.1 U	0.1 U	NA	NA	NA	NA
4,4'-DDD	0.1 U	0.1 U	0.1 U	0.1 U	NA	NA	NA	NA
ENDOSULFAN SULFATE	0.1 U	0.1 U	0.1 U	0.1 U	NA	NA	NA	NA
4,4'-DDT	0.1 U	0.1 U	0.1 U	0.1 U	NA	NA	NA	NA
METHOXYCHLOR	0.5 UJ	0.5 UJ	0.5 UJ	0.5 U	NA	NA	NA	NA
ENDRIN KETONE	0.1 U	0.1 U	0.1 U	0.1 U	NA	NA	NA	NA
ENDRIN ALDEHYDE	0.1 U	0.1 U	0.1 U	0.1 U	NA	NA	NA	NA
ALPHA-CHLORDANE	0.05 U	0.05 U	0.05 U	0.05 U	NA	NA	NA	NA
GAMMA-CHLORDANE	0.05 U	0.05 U	0.05 U	0.05 U	NA	NA	NA	NA
TOXAPHENE	5 U	5 U	5 U	5 U	NA	NA	NA	NA
AROCLOR-1016	1 U	1 U	1 U	1 U	NA	NA	NA	NA
AROCLOR-1221	2 U	2 U	2 U	2 U	NA	NA	NA	NA
AROCLOR-1232	1 U	1 U	1 U	1 U	NA	NA	NA	NA
AROCLOR-1242	1 U	1 U	1 U	1 U	NA	NA	NA	NA
AROCLOR-1248	1 U	1 U	1 U	1 U	NA	NA	NA	NA
AROCLOR-1254	1 U	1 U	1 U	1 U	NA	NA	NA	NA
AROCLOR-1260	1 U	1 U	1 U	1 U	NA	NA	NA	NA

QUALITY ASSURANCE/QUALITY CONTROL SUMMARY  
GROUNDWATER - TCL ORGANICS  
PHASE II - FIXED BASED LABORATORY  
RI/FS CTO-0356  
OPERABLE UNIT NO. 16 (SITE 93)  
MCB CAMP LEJEUNE, NORTH CAROLINA

SAMPLE ID PHASE DATE SAMPLED	Minimum Non-Detect	Maximum Non-Detect	Minimum Detected	Maximum Detected	Location of Maximum Detect	Frequency of Detection
<b>VOLATILES (ug/l)</b>						
CHLOROMETHANE	10 U	10 U	ND	ND		0/8
BROMOMETHANE	10 U	10 U	ND	ND		0/8
VINYL CHLORIDE	10 U	10 U	ND	ND		0/8
CHLOROETHANE	10 U	10 U	ND	ND		0/8
METHYLENE CHLORIDE	10 U	10 U	ND	ND		0/8
ACETONE	10 U	10 U	ND	ND		0/8
CARBON DISULFIDE	10 U	10 U	ND	ND		0/8
1,1-DICHLOROETHENE	10 U	10 U	ND	ND		0/8
1,1-DICHLOROETHANE	10 U	10 U	ND	ND		0/8
1,2-DICHLOROETHENE (TOTAL)	10 U	10 U	ND	ND		0/8
CHLOROFORM	10 U	10 U	12	12	IR89/93-FB01	1/8
1,2-DICHLOROETHANE	10 U	10 U	ND	ND		0/8
2-BUTANONE	10 U	10 U	ND	ND		0/8
1,1,1-TRICHLOROETHANE	10 U	10 U	ND	ND		0/8
CARBON TETRACHLORIDE	10 U	10 U	ND	ND		0/8
BROMODICHLOROMETHANE	10 U	10 U	18	18	IR89/93-FB01	1/8
1,2-DICHLOROPROPANE	10 U	10 U	ND	ND		0/8
CIS-1,3-DICHLOROPROPENE	10 U	10 U	ND	ND		0/8
TRICHLOROETHENE	10 U	10 U	ND	ND		0/8
DIBROMOCHLOROMETHANE	10 U	10 U	24	24	IR89/93-FB01	1/8
1,1,2-TRICHLOROETHANE	10 U	10 U	ND	ND		0/8
BENZENE	10 U	10 U	ND	ND		0/8
TRANS-1,3-DICHLOROPROPENE	10 U	10 U	ND	ND		0/8
BROMOFORM	10 U	10 U	9 J	9 J	IR89/93-FB01	1/8
4-METHYL-2-PENTANONE	10 U	10 U	ND	ND		0/8
2-HEXANONE	10 U	10 U	ND	ND		0/8
TETRACHLOROETHENE	10 U	10 U	ND	ND		0/8
1,1,2,2-TETRACHLOROETHANE	10 U	10 U	ND	ND		0/8
TOLUENE	10 U	10 U	ND	ND		0/8
CHLOROBENZENE	10 U	10 U	ND	ND		0/8
ETHYLBENZENE	10 U	10 U	ND	ND		0/8
STYRENE	10 U	10 U	ND	ND		0/8
XYLENE (TOTAL)	10 U	10 U	ND	ND		0/8



QUALITY ASSURANCE/QUALITY CONTROL SUMMARY  
GROUNDWATER - TCL ORGANICS  
PHASE II - FIXED BASED LABORATORY  
RI/FS CTO-0356  
OPERABLE UNIT NO. 16 (SITE 93)  
MCB CAMP LEJEUNE, NORTH CAROLINA

SAMPLE ID PHASE DATE SAMPLED	Minimum Non-Detect	Maximum Non-Detect	Minimum Detected	Maximum Detected	Location of Maximum Detect	Frequency of Detection
<b>SEMIVOLATILES (ug/l)</b>						
PHENOL	10 U	10 U	ND	ND		0/4
BIS(2-CHLOROETHYL)ETHER	10 U	10 U	ND	ND		0/4
2-CHLOROPHENOL	10 U	10 U	ND	ND		0/4
1,3-DICHLOROBENZENE	10 U	10 U	ND	ND		0/4
1,4-DICHLOROBENZENE	10 U	10 U	ND	ND		0/4
1,2-DICHLOROBENZENE	10 U	10 U	ND	ND		0/4
2-METHYLPHENOL	10 U	10 U	ND	ND		0/4
2,2'-OXYBIS(1-CHLOROPROPANE)	10 U	10 U	ND	ND		0/4
4-METHYLPHENOL	10 U	10 U	ND	ND		0/4
N-NITROSO-DI-N-PROPYLAMINE	10 U	10 U	ND	ND		0/4
HEXACHLOROETHANE	10 U	10 U	ND	ND		0/4
NITROBENZENE	10 U	10 U	ND	ND		0/4
ISOPHORONE	10 U	10 U	ND	ND		0/4
2-NITROPHENOL	10 U	10 U	ND	ND		0/4
2,4-DIMETHYLPHENOL	10 U	10 U	ND	ND		0/4
BIS(2-CHLOROETHOXY)METHANE	10 U	10 U	ND	ND		0/4
2,4-DICHLOROPHENOL	10 U	10 U	ND	ND		0/4
1,2,4-TRICHLOROBENZENE	10 U	10 U	ND	ND		0/4
NAPHTHALENE	10 U	10 U	ND	ND		0/4
4-CHLOROANILINE	10 U	10 U	ND	ND		0/4
HEXACHLOROBUTADIENE	10 U	10 U	ND	ND		0/4
4-CHLORO-3-METHYLPHENOL	10 U	10 U	ND	ND		0/4
2-METHYLNAPHTHALENE	10 U	10 U	ND	ND		0/4
HEXACHLOROCYCLOPENTADIENE	10 U	10 U	ND	ND		0/4
2,4,6-TRICHLOROPHENOL	10 U	10 U	ND	ND		0/4
2,4,5-TRICHLOROPHENOL	25 U	25 U	ND	ND		0/4
2-CHLORONAPHTHALENE	10 U	10 U	ND	ND		0/4
2-NITROANILINE	25 U	25 U	ND	ND		0/4
DIMETHYLPHTHALATE	10 U	10 U	ND	ND		0/4
ACENAPHTHYLENE	10 U	10 U	ND	ND		0/4
2,6-DINITROTOLUENE	10 U	10 U	ND	ND		0/4
3-NITROANILINE	25 U	25 U	ND	ND		0/4
ACENAPHTHENE	10 U	10 U	ND	ND		0/4

QUALITY ASSURANCE/QUALITY CONTROL SUMMARY  
GROUNDWATER - TCL ORGANICS  
PHASE II - FIXED BASED LABORATORY  
RI/FS CTO-0356  
OPERABLE UNIT NO. 16 (SITE 93)  
MCB CAMP LEJEUNE, NORTH CAROLINA

SAMPLE ID PHASE DATE SAMPLED	Minimum Non-Detect	Maximum Non-Detect	Minimum Detected	Maximum Detected	Location of Maximum Detect	Frequency of Detection
<b>SEMIVOLATILES (ug/l) (cont)</b>						
2,4-DINITROPHENOL	25 U	25 U	ND	ND		0/4
4-NITROPHENOL	25 U	25 U	ND	ND		0/4
DIBENZOFURAN	10 U	10 U	ND	ND		0/4
2,4-DINITROTOLUENE	10 U	10 U	ND	ND		0/4
DIETHYLPHTHALATE	10 U	10 U	ND	ND		0/4
4-CHLOROPHENYL-PHENYLETHER	10 U	10 U	ND	ND		0/4
FLUORENE	10 U	10 U	ND	ND		0/4
4-NITROANILINE	25 U	25 U	ND	ND		0/4
4,6-DINITRO-2-METHYLPHENOL	25 U	25 U	ND	ND		0/4
N-NITROSODIPHENYLAMINE (1)	10 U	10 U	ND	ND		0/4
4-BROMOPHENYL-PHENYLETHER	10 U	10 U	ND	ND		0/4
HEXACHLOROBENZENE	10 U	10 U	ND	ND		0/4
PENTACHLOROPHENOL	25 U	25 U	ND	ND		0/4
PHENANTHRENE	10 U	10 U	ND	ND		0/4
ANTHRACENE	10 U	10 U	ND	ND		0/4
CARBAZOLE	10 U	10 U	ND	ND		0/4
DI-N-BUTYLPHTHALATE	10 U	10 U	ND	ND		0/4
FLUORANTHENE	10 U	10 U	ND	ND		0/4
PYRENE	10 U	10 U	ND	ND		0/4
BUTYLBENZYLPHTHALATE	10 U	10 U	ND	ND		0/4
3,3'-DICHLOROBENZIDINE	10 U	10 U	ND	ND		0/4
BENZO(A)ANTHRACENE	10 U	10 U	ND	ND		0/4
CHRYSENE	10 U	10 U	ND	ND		0/4
BIS(2-ETHYLHEXYL)PHTHALATE	10 U	10 U	6 J	120	IR89/93-FB03	3/4
DI-N-OCTYLPHTHALATE	10 U	10 U	ND	ND		0/4
BENZO(B)FLUORANTHENE	10 U	10 U	ND	ND		0/4
BENZO(K)FLUORANTHENE	10 U	10 U	ND	ND		0/4
BENZO(A)PYRENE	10 U	10 U	ND	ND		0/4
INDENO(1,2,3-CD)PYRENE	10 U	10 U	ND	ND		0/4
DIBENZO(A,H)ANTHRACENE	10 U	10 U	ND	ND		0/4
BENZO(G,H,I)PERYLENE	10 U	10 U	ND	ND		0/4

**QUALITY ASSURANCE/QUALITY CONTROL SUMMARY**  
**GROUNDWATER - TCL ORGANICS**  
**PHASE II - FIXED BASED LABORATORY**  
**RI/FS CTO-0356**  
**OPERABLE UNIT NO. 16 (SITE 93)**  
**MCB CAMP LEJEUNE, NORTH CAROLINA**

SAMPLE ID PHASE DATE SAMPLED	Minimum Non-Detect	Maximum Non-Detect	Minimum Detected	Maximum Detected	Location of Maximum Detect	Frequency of Detection
<b>PESTICIDES/PCBS (ug/l)</b>						
ALPHA-BHC	0.05 U	0.05 U	ND	ND		0/4
BETA-BHC	0.05 U	0.05 U	ND	ND		0/4
DELTA-BHC	0.05 U	0.05 U	ND	ND		0/4
GAMMA-BHC (LINDANE)	0.05 U	0.05 U	ND	ND		0/4
HEPTACHLOR	0.05 U	0.05 U	ND	ND		0/4
ALDRIN	0.05 U	0.05 U	ND	ND		0/4
HEPTACHLOR EPOXIDE	0.05 U	0.05 U	ND	ND		0/4
ENDOSULFAN I	0.05 U	0.05 U	ND	ND		0/4
DIELDRIN	0.1 U	0.1 U	ND	ND		0/4
4,4'-DDE	0.1 U	0.1 U	ND	ND		0/4
ENDRIN	0.1 U	0.1 U	ND	ND		0/4
ENDOSULFAN II	0.1 U	0.1 U	ND	ND		0/4
4,4'-DDD	0.1 U	0.1 U	ND	ND		0/4
ENDOSULFAN SULFATE	0.1 U	0.1 U	ND	ND		0/4
4,4'-DDT	0.1 U	0.1 U	ND	ND		0/4
METHOXYCHLOR	0.5 UJ	0.5 UJ	ND	ND		0/4
ENDRIN KETONE	0.1 U	0.1 U	ND	ND		0/4
ENDRIN ALDEHYDE	0.1 U	0.1 U	ND	ND		0/4
ALPHA-CHLORDANE	0.05 U	0.05 U	ND	ND		0/4
GAMMA-CHLORDANE	0.05 U	0.05 U	ND	ND		0/4
TOXAPHENE	5 U	5 U	ND	ND		0/4
AROCLOR-1016	1 U	1 U	ND	ND		0/4
AROCLOR-1221	2 U	2 U	ND	ND		0/4
AROCLOR-1232	1 U	1 U	ND	ND		0/4
AROCLOR-1242	1 U	1 U	ND	ND		0/4
AROCLOR-1248	1 U	1 U	ND	ND		0/4
AROCLOR-1254	1 U	1 U	ND	ND		0/4
AROCLOR-1260	1 U	1 U	ND	ND		0/4

**QUALITY ASSURANCE/QUALITY CONTROL SUMMARY**  
**GROUNDWATER - TAL METALS**  
**PHASE II - FIXED BASED LABORATORY**  
**RI/FS CTO-0356**  
**OPERABLE UNIT NO. 16 (SITE 93)**  
**MCB CAMP LEJEUNE, NORTH CAROLINA**

SAMPLE ID	IR89/93-FB01	IR89/93-FB02	IR89/93-FB03	IR89/93-RBGW20
PHASE	PHASE II	PHASE II	PHASE II	PHASE II
DATE SAMPLED	05/13/97	05/13/97	05/13/97	05/29/97
<b>TOTAL METALS (ug/l)</b>				
ALUMINUM, TOTAL	174	37.1 U	34.5 U	30.2
ANTIMONY, TOTAL	1.9 U	1.9 U	1.9 U	1.9 U
ARSENIC, TOTAL	2.7 U	2.7 U	2.7 U	2.7 U
BARIUM, TOTAL	3.6	1.4	0.3 U	0.3 U
BERYLLIUM, TOTAL	0.3 U	0.3 U	0.3 U	0.3 U
CADMIUM, TOTAL	0.4 U	0.4 U	0.4 U	0.4 U
CALCIUM, TOTAL	8720 U	21.8 U	23 U	44.5 U
CHROMIUM, TOTAL	0.5 U	0.5 U	0.74	0.5 U
COBALT, TOTAL	0.5 U	0.5 U	0.5 U	0.5 U
COPPER, TOTAL	0.8 UJ	0.8 UJ	0.8 UJ	0.8 UJ
IRON, TOTAL	112	29.2	13.4 U	13.4 U
LEAD, TOTAL	1.4 U	1.4 U	1.4 U	1.4 U
MAGNESIUM, TOTAL	4020	13.9 U	13.9 U	13.9 U
MANGANESE, TOTAL	1.2	0.4 U	0.4 U	0.4 U
MERCURY, TOTAL	0.1 U	0.1 U	0.1 U	0.1 U
NICKEL, TOTAL	0.7 U	3.6	0.7 U	1.7 U
POTASSIUM, TOTAL	7340	108 U	101 U	106 U
SELENIUM, TOTAL	2.2 U	2.2 U	2.2 U	2.2 U
SILVER, TOTAL	0.5 U	0.5 U	0.5 U	0.5 U
SODIUM, TOTAL	53100	189 U	189 U	188 U
THALLIUM, TOTAL	3 U	3 U	3 U	3 U
VANADIUM, TOTAL	0.7 U	0.7 U	0.7 U	0.7 U
ZINC, TOTAL	12.8	0.4 UJ	0.4 UJ	0.4 UJ

**QUALITY ASSURANCE/QUALITY CONTROL SUMMARY**  
**GROUNDWATER - TAL METALS**  
**PHASE II - FIXED BASED LABORATORY**  
**RI/FS CTO-0356**  
**OPERABLE UNIT NO. 16 (SITE 93)**  
**MCB CAMP LEJEUNE, NORTH CAROLINA**

SAMPLE ID PHASE DATE SAMPLED	Minimum Non-Detect	Maximum Non-Detect	Minimum Detected	Maximum Detected	Location of Maximum Detect	Frequency of Detection
<b>TOTAL METALS (ug/l)</b>						
ALUMINUM, TOTAL	34.5 U	37.1 U	30.2	174	IR89/93-FB01	2/4
ANTIMONY, TOTAL	1.9 U	1.9 U	ND	ND		0/4
ARSENIC, TOTAL	2.7 U	2.7 U	ND	ND		0/4
BARIUM, TOTAL	0.3 U	0.3 U	1.4	3.6	IR89/93-FB01	2/4
BERYLLIUM, TOTAL	0.3 U	0.3 U	ND	ND		0/4
CADMIUM, TOTAL	0.4 U	0.4 U	ND	ND		0/4
CALCIUM, TOTAL	21.8 U	8720 U	ND	ND		0/4
CHROMIUM, TOTAL	0.5 U	0.5 U	0.74	0.74	IR89/93-FB03	1/4
COBALT, TOTAL	0.5 U	0.5 U	ND	ND		0/4
COPPER, TOTAL	0.8 UJ	0.8 UJ	ND	ND		0/4
IRON, TOTAL	13.4 U	13.4 U	29.2	112	IR89/93-FB01	2/4
LEAD, TOTAL	1.4 U	1.4 U	ND	ND		0/4
MAGNESIUM, TOTAL	13.9 U	13.9 U	4020	4020	IR89/93-FB01	1/4
MANGANESE, TOTAL	0.4 U	0.4 U	1.2	1.2	IR89/93-FB01	1/4
MERCURY, TOTAL	0.1 U	0.1 U	ND	ND		0/4
NICKEL, TOTAL	0.7 U	1.7 U	3.6	3.6	IR89/93-FB02	1/4
POTASSIUM, TOTAL	101 U	108 U	7340	7340	IR89/93-FB01	1/4
SELENIUM, TOTAL	2.2 U	2.2 U	ND	ND		0/4
SILVER, TOTAL	0.5 U	0.5 U	ND	ND		0/4
SODIUM, TOTAL	188 U	189 U	53100	53100	IR89/93-FB01	1/4
THALLIUM, TOTAL	3 U	3 U	ND	ND		0/4
VANADIUM, TOTAL	0.7 U	0.7 U	ND	ND		0/4
ZINC, TOTAL	0.4 UJ	0.4 UJ	12.8	12.8	IR89/93-FB01	1/4

**APPENDIX K**  
**BASE BACKGROUND SOIL REPORT**

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**SURFACE SOILS**

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



**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

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					

**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								

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								

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								

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	65-DW04-00	MIN	MAX	AVG	2Xaverage
Aluminum	2730	4950	8990	4950	6590	773	17.7	9570	2928.041	5856.083
Antimony	2.2	1.2	1.25	1.3	1.95	5.55	0.33	8	2.727	5.455
Arsenic	0.67	1.3	1.1	1.2	0.45	1.1	0.065	3.9	0.661	1.322
Barium	13	14.9	18.7	13.3	13.9	6.9	0.65	20.8	8.646	17.292
Beryllium	0.095	0.08	0.0345	0.0375	0.085	0.11	0.02	0.26	0.103	0.205
Cadmium	0.3	0.325	0.335	0.34	0.265	0.55	0.04	1	0.348	0.696
Calcium	1610	668	1020	3590	3960	79.3	4.25	10700	686.488	1372.977
Chromium	2.9	5.9	9.2	6.8	6.5	1.1	0.33	12.5	3.303	6.607
Cobalt	0.32	0.43	0.375	0.41	0.285	4.15	0.185	4.15	1.023	2.046
Copper	0.75	2.5	2.1	4.2	2.2	1.1	0.5	87.2	3.552	7.104
Iron	1110	3220	4700	2780	4030	509	69.7	9640	1851.213	3702.427
Lead	13.8	19.6	3.95	12.3	21.5	2	0.47	142	11.685	23.370
Magnesium	60.5	189	371	259	233	30.3	2.55	610	101.480	202.960
Manganese	6.5	6.7	14.8	19.9	11.5	9.6	0.87	66	9.255	18.510
Mercury	0.05	0.06	0.041	0.04	0.04	0.055	0.01	0.13	0.047	0.094
Nickel	1.15	1.7	1.3	1.6	7.2	2.25	0.45	7.2	1.727	3.455
Potassium	73.5	220	223	175	160	111.5	1	416	100.030	200.060
Selenium	0.185	0.34	0.145	0.13	0.43	0.55	0.075	1.3	0.377	0.753
Silver	0.32	0.28	0.285	0.295	0.285	0.55	0.0435	4.3	0.440	0.880
Sodium	12.7	12.75	8.3	9.55	18.3	22.25	4.7	126	29.507	59.013
Thallium	0.11	0.065	0.065	0.06	0.13	1.1	0.055	1.2	0.462	0.924
Vanadium	4	11.8	13.4	9.1	48.6	1.1	0.305	48.6	5.723	11.447
Zinc	4.5	7.4	7.2	9.1	18.4	3.9	0.3	28.3	6.882	13.763
Cyanide							0.265	2.4	1.453	2.905

**SUBSURFACE SOILS**

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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	65-DW04-05	MIN	MAX	AVG	2Xaverage
Aluminum	2260	10300	1100	1040	2460	4560	16.900	11000.000	3706.615	7413.230
Antimony	2.25	1.15	1.25	1.25	2	5.25	0.355	6.900	3.249	6.498
Arsenic	0.31	1.2	0.16	0.195	0.22	1.05	0.033	15.400	0.985	1.971
Barium	9.1	12.5	1.15	1.05	4.4	10.9	0.650	22.600	7.185	14.370
Beryllium	0.1	0.065	0.06	0.0345	0.09	0.105	0.010	0.310	0.096	0.191
Cadmium	0.305	0.305	0.325	0.335	0.275	0.5	0.155	1.200	0.359	0.718
Calcium	295	20.9	24.6	14.7	50.8	111	4.750	4410.000	193.912	387.824
Chromium	2	11	1.15	1	3.1	5.7	0.650	66.400	6.268	12.537
Cobalt	0.33	0.495	0.26	0.305	0.29	3.2	0.175	7.000	0.805	1.611
Copper	0.265	0.86	0.45	0.46	0.185	1.05	0.160	9.500	1.205	2.410
Iron	507	4720	392	319	3160	925	63.300	90500.000	3567.320	7134.639
Lead	2.8	4.15	0.8	1.75	2.4	2.7	0.465	21.400	4.132	8.264
Magnesium	49.3	302	16.4	17.35	71.3	192	2.850	852.000	131.699	263.398
Manganese	2.5	3.9	0.5	0.6	1.8	5.6	0.395	19.900	3.995	7.990
Mercury	0.055	0.0425	0.11	0.05	0.055	0.05	0.010	0.680	0.065	0.129
Nickel	1.2	0.92	9.2	7.7	1.05	2.1	0.450	9.200	1.863	3.725
Potassium	75	207	29.9	14.45	66.5	105	1.050	1250.000	172.126	344.252
Selenium	0.17	0.155	0.145	0.17	0.175	0.5	0.085	2.400	0.403	0.806
Silver	0.33	0.26	0.28	0.29	0.29	0.5	0.175	1.000	0.434	0.869
Sodium	8.75	86.4	4.4	2.2	6.8	69.9	2.200	141.000	27.285	54.570
Thallium	0.105	0.07	0.065	0.08	0.13	1.05	0.055	2.700	0.490	0.980
Vanadium	1.7	17.1	0.85	0.8	1.85	4.1	0.340	69.400	6.670	13.340
Zinc	1.6	2.5	0.92	1.3	0.37	3.45	0.320	26.600	3.334	6.668

**APPENDIX L**  
**BAKER'S EVALUATION OF METALS IN 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  
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*Norfolk, Virginia***

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## **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  $\mu$ /l, which is slightly above the drinking water standard of 15  $\mu$ /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 Units	NCVQS 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	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 - 576	60.1 - 396	55.2 - 999	220 - 745	315 - 3180
Beryllium	NE	4	2.7 J - 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	5.1 - 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 - 156000	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	5000 (1)	ND - 1110	6 - 146	ND - 1620	83.6 - 133	ND - 118	27J - 487J	20 - 650	ND	79.2 - 104	25.7 - 5180	19 J - 661J	87.3 - 2800J

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	Omite Property #1 ug/L	Omite Property #2 ug/L
Arsenic	ND	ND - 23.4	ND - 308	2.9 - 29.0	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	6580 - 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	4.3 J - 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 - 36500	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:  
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 JB - Value is estimated below the CRDL, but greater than the IDL.  
 NE - Not established.  
 NA - Not analyzed.  
 ND - Not detected.  
 NCVQS - 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	53	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	3800 - 441000	6230 - 37400	NA	13800 - 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	13200 - 38300	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 - 152	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	3170 - 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:**  
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 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	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	of Site 44
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	30	50	17.8 J	12.9	ND	ND	ND	ND	3.7 J	7.4 J		13.1		
Barium	2000	2000	348	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	25	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	30	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	36.6	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	6MW38 ug/L	MW-501 ug/L		
Arsenic	ND			2.9	ND	ND	ND		
Barium	29.4 J			46.5	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
		--	--	2GW07	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	1.6	5.2	6	ND	2.5	15.2	3.3 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 J	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	9.8	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	Site 24		Site 28		Site 30		Site 41		Site 43		Site 44	
	"Clean"	"Contaminated"	"Clean"	"Contaminated"	"Clean"	"Contaminated"	"Clean"	"Contaminated"	"Clean"	"Contaminated"	"Clean"	"Contaminated"
	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
Well Number	24GW10	24GW02	--	--	--	--	41GW04	41-GW11	43GW01	43GW02	44GW02	44GW01
Soil Sample Number	24-GW10	24-BDA-8B09	--	--	--	--	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	17.9
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	J	NA	NA	NA	NA	3.6	11.2	7.5	6.7	3.6 J	10.3
Copper	ND	ND	NA	NA	NA	NA	3.7	22.5	3.4	ND	6.2 J	25.4 J
Lead	4.6 J	<2.1	NA	NA	NA	NA	4.8	110	2.4	6.1	3.5	10.7
Manganese	4.7	1.1	NA	NA	NA	NA	3.7	75.9	31.2	8.2	3.4	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	7.1	3.1	3.4
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	130	20.1	3	3.2	34.9

**NOTES:**  
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 ND - Not detected.  
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 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-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-GW27D-06	
Arsenic	1.3	0.77 J	ND	ND	ND	1.9	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	0.32	ND	ND	ND	ND
Chromium	18.2	18.6	7.7	ND	3.9	3.7	6.8	1.7	18.5	9.1	2.6	3
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	2.5	1.7	3.7	4.3	1.1	4.5 J	2.5 J	2.7	4.3
Manganese	11.1	7	4.9	1.4	3.5	6.9	4	1.2	2.2	ND	ND	ND
Mercury	ND	ND	ND	ND	NA	NA	0.06	0.05	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.

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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"	"Contaminated"	"Clean"	"Contaminated"	"Clean"	"Contaminated"
	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	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 - 15	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

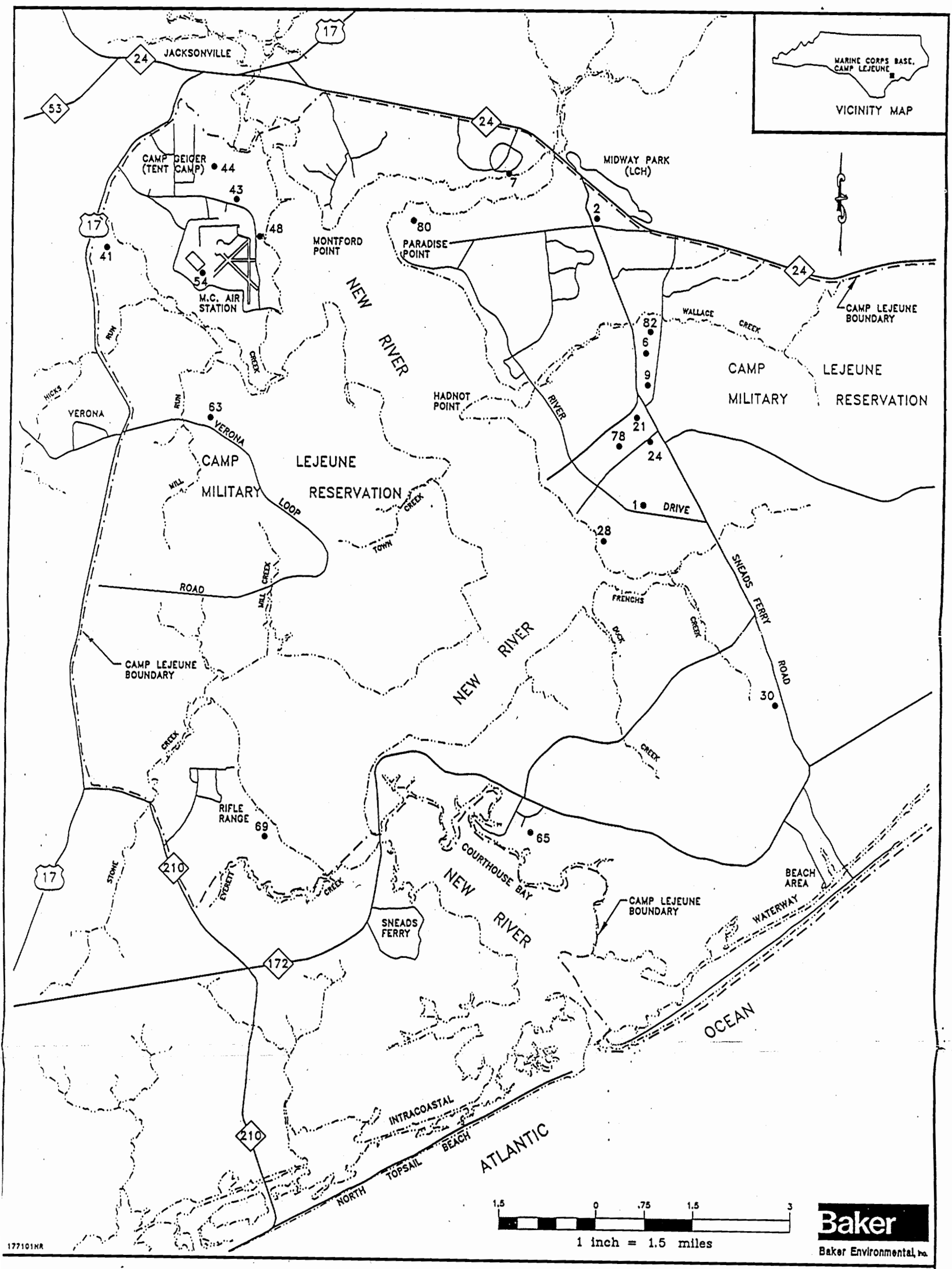
(1) - Based on data from 11 sites.

(2) - Based on data from 6 sites.

(3) - Based on data from 9 supply wells.

**Figures**

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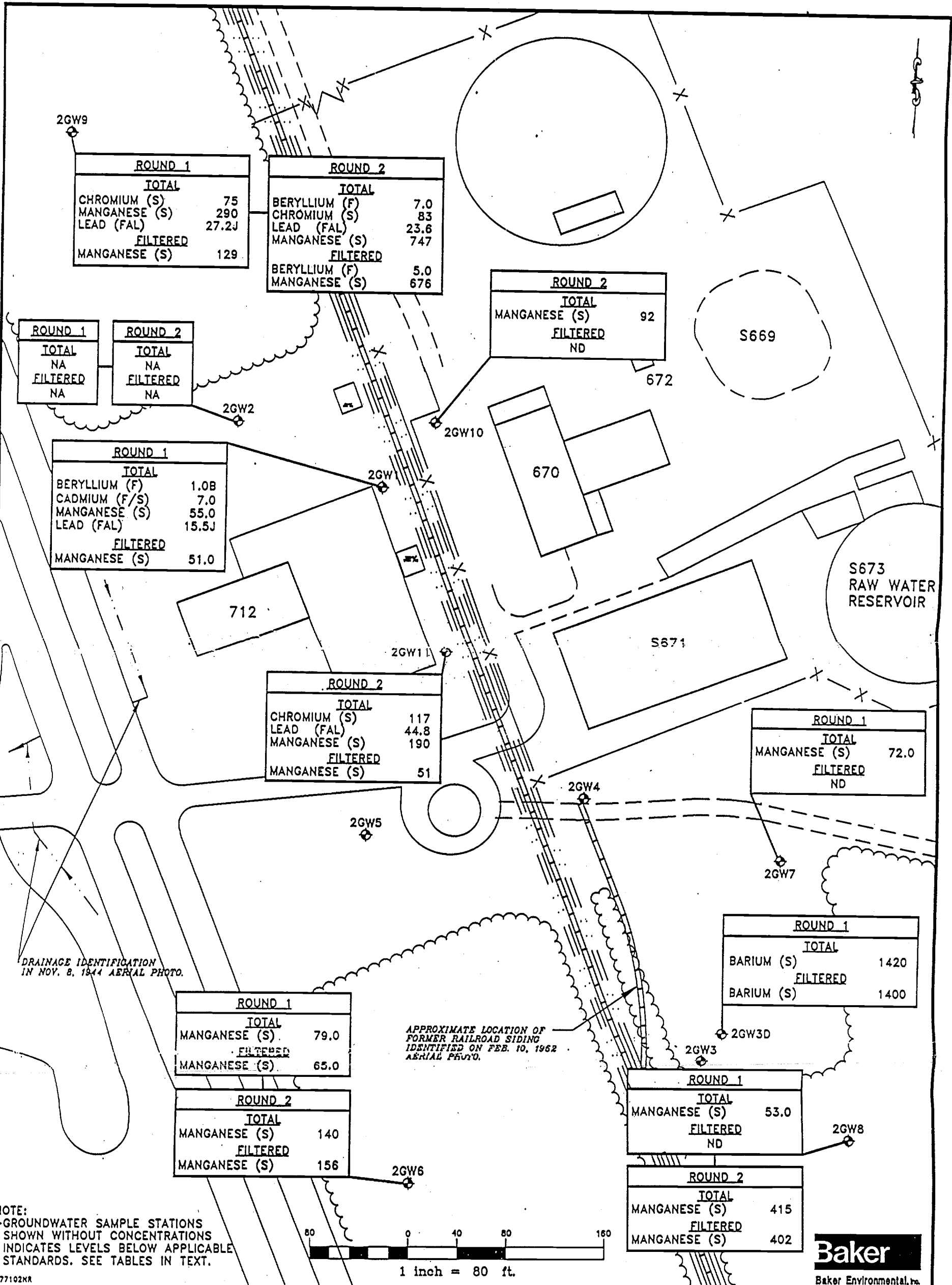


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**Baker**  
Baker Environmental, Inc.

FIGURE 1  
SITE LOCATION MAP  
INORGANIC GROUNDWATER STUDY  
MARINE CORPS BASE, CAMP LEJEUNE  
NORTH CAROLINA

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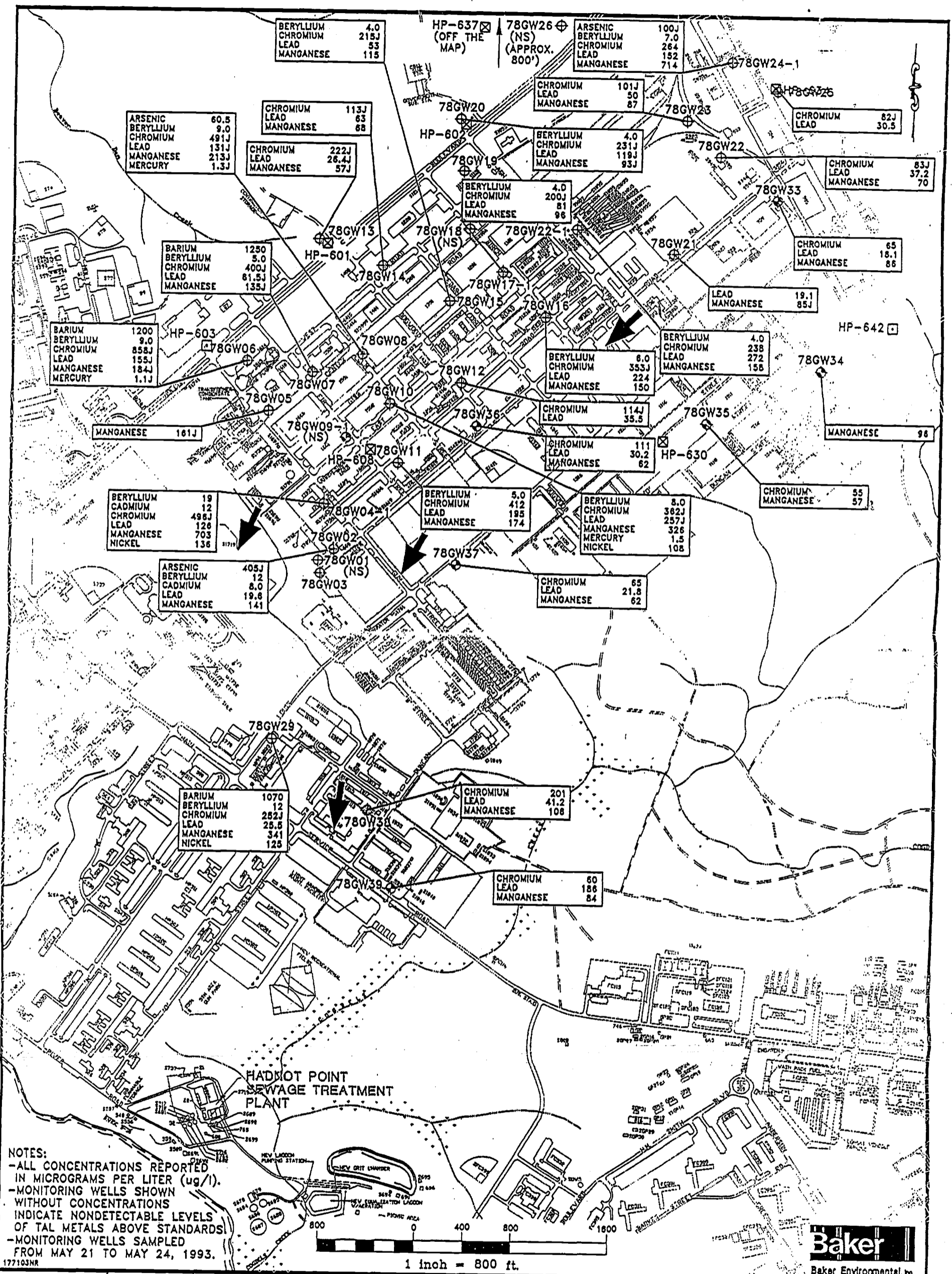


**FIGURE 2**  
 POSITIVE DETECTIONS ABOVE APPLICABLE FEDERAL AND STATE STANDARDS FOR TOTAL AND FILTERED INORGANIC ANALYTES IN GROUNDWATER  
 SITE 2  
 REMEDIAL INVESTIGATION CTO-0174  
 MARINE CORPS BASE, CAMP LEJEUNE  
 NORTH CAROLINA

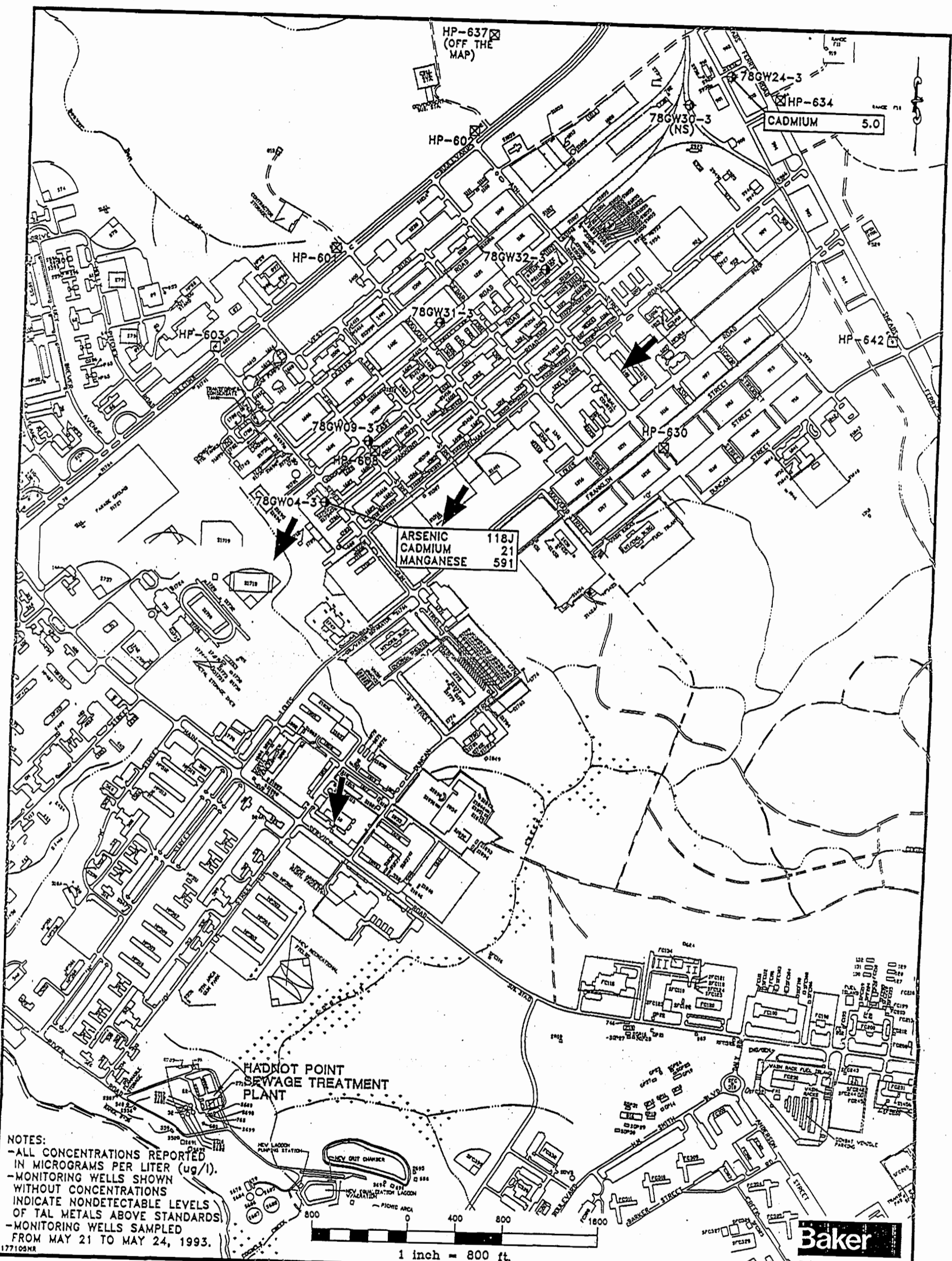


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NOTES:  
 -ALL CONCENTRATIONS REPORTED IN MICROGRAMS PER LITER (ug/l).  
 -MONITORING WELLS SHOWN WITHOUT CONCENTRATIONS INDICATE NONDETECTABLE LEVELS OF TAL METALS ABOVE STANDARDS.  
 -MONITORING WELLS SAMPLED FROM MAY 21 TO MAY 24, 1993.

177105NA

**LEGEND**

78GW04-3	EXISTING DEEP MONITORING WELL INSTALLED BY ESE, 1991
→	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: LANTDIY, FEBRUARY 1992

**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



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**APPENDIX M**  
**STATISTICAL SUMMARY**

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**STATISTICAL SUMMARY**  
**SUBSURFACE SOIL - TCL ORGANICS**  
**PHASE II - FIXED BASE LABORATORY**  
**RI/FS CTO-0356**  
**OPERABLE UNIT NO. 16 (SITE 89)**  
**MCB CAMP LEJEUNE, NORTH CAROLINA**

	Normal Arithmetic Mean	Normal Standard Deviation	Normal Upper 95% Confidence Level	Log Arithmetic Mean	Log Standard Deviation	Log Upper 95% Confidence Level
<b>VOLATILES (ug/kg)</b>						
1,1,2,2-TETRACHLOROETHANE	13.31	20.82	20.28	2.13	0.76	15.82
1,2-DICHLOROETHENE (TOTAL)	14	17.02	19.7	2.23	0.79	18.14
2-BUTANONE	6.63	2.2	7.37	1.86	0.22	7.13
ACETONE	23.44	24.41	31.62	2.77	0.86	34.73
BENZENE	6.13	0.9	6.43	1.8	0.17	6.52
CARBON DISULFIDE	6.08	0.61	6.28	1.8	0.11	6.33
TETRACHLOROETHENE	6.12	0.8	6.39	1.8	0.13	6.39
TOLUENE	10.21	20.36	17.03	1.93	0.57	10.24
TRICHLOROETHENE	15.69	26.48	24.56	2.16	0.88	19.38
<b>SEMIVOLATILES (ug/kg)</b>						
BIS(2-ETHYLHEXYL)PHTHALATE	198.54	124.87	240.37	5.12	0.61	261.91
FLUORANTHENE	195.23	49.84	211.93	5.21	0.44	239.65
PYRENE	196.35	46.39	211.89	5.23	0.37	229.9
<b>PESTICIDES/PCBS (ug/kg)</b>						
4,4'-DDD	6.25	7.33	13.24	1.39	0.98	71.78
4,4'-DDE	5.05	6.68	11.42	1.15	0.94	49.26
4,4'-DDT	19.85	39.77	57.77	1.48	1.69	19522.05

**STATISTICAL SUMMARY**  
**SUBSURFACE SOIL - TAL METALS**  
**PHASE II - FIXED BASE LABORATORY**  
**R/FS CTO-0356**  
**OPERABLE UNIT NO. 16 (SITE 89)**  
**MCB CAMP LEJEUNE, NORTH CAROLINA**

	Normal Arithmetic Mean	Normal Standard Deviation	Normal Upper 95% Confidence Level	Log Arithmetic Mean	Log Standard Deviation	Log Upper 95% Confidence Level
<b>TOTAL METALS (mg/kg)</b>						
ALUMINUM, TOTAL	5196.54	2970.11	6191.51	8.36	0.67	7130.58
ANTIMONY, TOTAL	0.21	0.12	0.25	-1.66	0.38	0.24
ARSENIC, TOTAL	0.63	0.58	0.82	-0.79	0.8	0.9
BARIUM, TOTAL	11.29	6.65	13.52	2.26	0.59	14.52
BERYLLIUM, TOTAL	0.17	0.25	0.25	-2.53	1.18	0.31
CADMIUM, TOTAL	0.03	0.04	0.04	-3.6	0.57	0.04
CALCIUM, TOTAL	1490.65	3728.9	2739.81	5.31	2.38	33791.08
CHROMIUM, TOTAL	5.87	3.11	6.91	1.63	0.56	7.51
COBALT, TOTAL	0.54	1.49	1.04	-1.76	1.32	0.96
COPPER, TOTAL	0.65	0.59	0.85	-0.94	1.15	1.45
IRON, TOTAL	3448	2944.17	4434.28	7.84	0.82	5245.07
LEAD, TOTAL	5.46	2.85	6.41	1.56	0.55	6.93
MAGNESIUM, TOTAL	202.45	145.27	251.11	5.05	0.76	293.41
MANGANESE, TOTAL	6.05	4.08	7.42	1.47	0.95	10.97
NICKEL, TOTAL	0.96	2.2	1.7	-1.17	1.43	2.15
POTASSIUM, TOTAL	176.96	106.52	212.64	4.94	0.79	272.69
SELENIUM, TOTAL	0.32	0.17	0.38	-1.26	0.51	0.4
SILVER, TOTAL	0.15	0.58	0.34	-3.4	1.08	0.11
SODIUM, TOTAL	69.49	59.78	89.52	3.92	0.84	106.82
VANADIUM, TOTAL	8.44	5.13	10.16	1.95	0.65	11.48
ZINC, TOTAL	6.24	21.47	13.43	0.16	1.78	23.57

**STATISTICAL SUMMARY**  
**GROUNDWATER - TCL ORGANICS**  
**PHASE I AND PHASE II - MOBILE LABORATORY AND**  
**PHASE II - FIXED BASE LABORATORY**  
**RI/FS CTO-0356**  
**OPERABLE UNIT NO. 16 (SITE 89)**  
**MCB CAMP LEJEUNE, NORTH CAROLINA**

SAMPLE ID PHASE DATE SAMPLED	Normal Arithmetic Mean	Normal Standard Deviation	Normal Upper 95% Confidence Level	Log Arithmetic Mean	Log Standard Deviation	Log Upper 95% Confidence Level
<b>VOLATILES (ug/L)</b>						
1,1,1-TRICHLOROETHANE	1.31	2.17	1.8	-1.8	2.02	4.07
1,1,2,2-TETRACHLOROETHANE	4.95	0.22	5.03	1.6	0.05	5.06
1,1,2-TRICHLOROETHANE	3.4	2.15	4.21	0.82	1.1	8.53
1,1-DICHLOROETHENE	3.21	2.38	4.11	0.03	2.2	136.47
1,2-DICHLOROETHENE (TOTAL)	96.4	225.53	181.28	1.85	2.46	2065.89
CHLOROFORM	2.51	2.34	3.04	0.11	1.62	8.45
CIS-1,2-DICHLOROETHENE	62.07	143.41	99.78	1.51	2.59	1053.15
TETRACHLOROETHENE	4.69	8.91	6.7	-0.63	2.49	49.54
TOLUENE	3.9	1.89	4.61	1.16	0.75	6.22
TRANS-1,2-DICHLOROETHENE	30.5	82.99	54.59	1.01	2.19	173.67
TRICHLOROETHENE	111.49	198.3	156.24	1.23	3.64	62123.04
VINYL CHLORIDE	22.6	17.24	26.49	2.89	0.73	28.97
<b>SEMIVOLATILES (ug/L)</b>						
BIS(2-ETHYLHEXYL)PHTHALATE	31.18	44.4	52.19	2.57	1.3	115.1

**STATISTICAL SUMMARY**  
**GROUNDWATER - TAL METALS**  
**PHASE II - FIXED BASE LABORATORY**  
**RI/FS CTO-0356**  
**OPERABLE UNIT NO. 16 (SITE 89)**  
**MCB CAMP LEJEUNE, NORTH CAROLINA**

	Normal Arithmetic Mean	Normal Standard Deviation	Normal Upper 95% Confidence Level	Log Arithmetic Mean	Log Standard Deviation	Log Upper 95% Confidence Level
<b>TOTAL METALS (ug/L)</b>						
ANTIMONY, TOTAL	1.11	0.42	1.31	0.06	0.29	1.29
BARIUM, TOTAL	9.91	6.72	13.09	2.07	0.71	16.61
CALCIUM, TOTAL	59657.14	20268.68	69250.33	10.94	0.34	72033.7
CHROMIUM, TOTAL	0.36	0.2	0.45	-1.13	0.45	0.46
IRON, TOTAL	2813.81	5939.31	5624.89	5.72	2.32	175885.9
MAGNESIUM, TOTAL	6006.43	6914.98	9279.3	8.24	0.95	12417.89
MANGANESE, TOTAL	58.72	97.41	104.82	3.47	0.94	103.51
NICKEL, TOTAL	0.5	0.23	0.61	-0.77	0.4	0.63
POTASSIUM, TOTAL	7504.29	7640.57	11120.58	8.39	1.1	21573.15
SELENIUM, TOTAL	1.31	0.53	1.56	0.22	0.31	1.55
SODIUM, TOTAL	30478.18	35409.38	49828.62	9.77	1.03	93008.96
VANADIUM, TOTAL	0.65	0.32	0.8	-0.56	0.52	0.9



**STATISTICAL SUMMARY**  
**SURFACE WATER - VOLATILE ORGANICS**  
**PHASE I - MOBILE LABORATORY AND FIXED BASE LABORATORY**  
**RI/FS CTO-0356**  
**OPERABLE UNIT NO. 16 (SITE 89)**  
**MCB CAMP LEJEUNE, NORTH CAROLINA**

	Normal Arithmetic Mean	Normal Standard Deviation	Normal Upper 95% Confidence Level	Log Arithmetic Mean	Log Standard Deviation	Log Upper 95% Confidence Level
<b>VOLATILES (ug/l)</b>						
1,1,2,2-TETRACHLOROETHANE	87.4	56.6	141.36	4.03	1.39	20836.26
1,2-DICHLOROETHENE (TOTAL)	76.6	43.51	118.08	3.95	1.32	13635.06
CHLOROFORM	2.52	2.38	3.82	0.29	1.26	14.74
CIS-1,2-DICHLOROETHENE	31.64	20.59	42.89	2.66	1.9	1923.1
TETRACHLOROETHENE	2.47	2.44	3.8	-0.11	1.82	91.15
TRANS-1,2-DICHLOROETHENE	15.41	11.93	21.93	1.98	1.74	410.65
TRICHLOROETHENE	16.9	11.27	23.06	1.81	2.46	17086.31
VINYL CHLORIDE	19.18	9.18	24.2	2.76	0.74	38.46

**STATISTICAL SUMMARY**  
**SURFACE WATER - SEMIVOLATILE ORGANICS, PESTICIDES/PCBs**  
**PHASE I - FIXED BASE LABORATORY**  
**RI/FS CTO-0356**  
**OPERABLE UNIT NO. 16 (SITE 89)**  
**MCB CAMP LEJEUNE, NORTH CAROLINA**

SAMPLE ID	IR89-EC-SW01-01	IR89-EC-SW02-01	IR89-EC-SW03-01	IR89-EC-SW04-01	IR89-EC-SW05-01
PHASE	PHASE I	PHASE I	PHASE I	PHASE I	PHASE I
DATE SAMPLED	07/27/96	07/27/96	07/27/96	07/26/96	07/26/96

SEMIVOLATILES (ug/l)	No Detects
PESTICIDES/PCBS (ug/l)	No Detects

**STATISTICAL SUMMARY**  
**SURFACE WATER - TAL METALS**  
**PHASE I - MOBILE LABORATORY AND FIXED BASE LABORATORY**  
**RI/FS CTO-0356**  
**OPERABLE UNIT NO. 16 (SITE 89)**  
**MCB CAMP LEJEUNE, NORTH CAROLINA**

	Normal Arithmetic Mean	Normal Standard Deviation	Normal Upper 95% Confidence Level	Log Arithmetic Mean	Log Standard Deviation	Log Upper 95% Confidence Level
<b>TOTAL METALS (ug/l)</b>						
ALUMINUM, TOTAL	252.16	188.74	432.1	5.24	0.95	3044.6
ANTIMONY, TOTAL	9.46	5.05	14.27	2.16	0.42	17.59
BARIUM, TOTAL	21.9	2.76	24.53	3.08	0.13	25.31
CALCIUM, TOTAL	42960	3881.75	46660.82	10.66	0.09	46893.06
CHROMIUM, TOTAL	2.04	0.87	2.87	0.66	0.35	3.27
COPPER, TOTAL	3.01	1.4	4.34	0.98	0.6	8.55
IRON, TOTAL	1320.6	319.49	1625.2	7.16	0.28	1873.34
LEAD, TOTAL	2.34	2.16	4.4	0.45	1.02	56.3
MAGNESIUM, TOTAL	2650	526.21	3151.68	7.87	0.18	3242.24
MANGANESE, TOTAL	36.82	11.5	47.78	3.57	0.31	56.2
POTASSIUM, TOTAL	2846	835.9	3642.94	7.92	0.26	3889.59
SODIUM, TOTAL	19180	10989.4	29657.19	9.76	0.47	38676.79
VANADIUM, TOTAL	2.15	1.33	3.42	0.63	0.57	5.64
ZINC, TOTAL	13.34	4.1	17.25	2.55	0.32	20.6

**STATISTICAL SUMMARY**  
**SEDIMENT - VOLATILE ORGANICS**  
**PHASE I - MOBILE LABORATORY AND FIXED BASE LABORATORY**  
**RI/FS CTO-0356**  
**OPERABLE UNIT NO. 16 (SITE 89)**  
**MCB CAMP LEJEUNE, NORTH CAROLINA**

	Normal Arithmetic Mean	Normal Standard Deviation	Normal Upper 95% Confidence Level	Log Arithmetic Mean	Log Standard Deviation	Log Upper 95% Confidence Level
<b>VOLATILES (ug/kg)</b>						
1,1,2,2-TETRACHLOROETHANE	230.4	543.86	545.67	2.89	2.12	18325.34
1,1,2-TRICHLOROETHANE	8.6	4.32	11.1	2.07	0.4	11.34
1,1-DICHLOROETHENE	9.7	9.67	15.31	2.06	0.57	14.47
1,2-DICHLOROETHENE (TOTAL)	315.4	651.12	692.84	2.99	2.3	44850.95
CIS-1,2-DICHLOROETHENE	3.83	6.23	8.96	0.27	1.53	438.64
TOLUENE	6.7	1.23	7.41	1.89	0.16	7.41
TRANS-1,2-DICHLOROETHENE	1.33	1.81	2.82	-0.19	0.93	7.09
TRICHLOROETHENE	161.83	597.54	423.71	1.63	2.41	2740.87
VINYL CHLORIDE	38.69	55.11	62.84	2.98	1.19	103.89

**STATISTICAL SUMMARY**  
**SEDIMENT - SEMIVOLATILE ORGANICS, PESTICIDES/PCBS**  
**PHASE I - FIXED BASE LABORATORY**  
**RI/FS CTO-0356**  
**OPERABLE UNIT NO. 16 (SITE 89)**  
**MCB CAMP LEJEUNE, NORTH CAROLINA**

	Normal Arithmetic Mean	Normal Standard Deviation	Normal Upper 95% Confidence Level	Log Arithmetic Mean	Log Standard Deviation	Log Upper 95% Confidence Level
<b>SEMIVOLATILES (ug/kg)</b>						
BENZO(A)ANTHRACENE	187.1	80.37	233.69	5.1	0.62	335.45
BENZO(A)PYRENE	468	926.55	1005.1	5.38	1.04	1315.96
BENZO(B)FLUORANTHENE	159.2	93.38	213.33	4.85	0.76	338.77
BENZO(G,H,I)PERYLENE	187	80.53	233.68	5.1	0.62	335.45
BENZO(K)FLUORANTHENE	186.6	81.26	233.7	5.09	0.63	337.03
BIS(2-ETHYLHEXYL)PHTHALATE	1440.5	4062.47	3795.44	5.39	1.5	5533.08
CHRYSENE	181.6	76.41	225.89	5.1	0.53	286.8
FLUORANTHENE	158.9	90.32	211.26	4.89	0.66	288.54
INDENO(1,2,3-CD)PYRENE	202.9	63.55	239.74	5.25	0.44	290.73
PHENANTHRENE	159.1	95.19	214.28	4.85	0.77	344.47
PYRENE	132.1	92.52	185.73	4.67	0.69	242.36
<b>PESTICIDES/PCBS (ug/kg)</b>						
4,4'-DDD	60.5	26.16	177.29	4.05	0.45	--
4,4'-DDE	38.5	7.78	73.23	3.64	0.2	--
4,4'-DDT	28.5	7.78	63.23	3.33	0.28	--
ALPHA-CHLORDANE	2.45	0.64	5.31	0.88	0.26	--
GAMMA-CHLORDANE	3.1	2.12	12.56	1	0.75	--

**STATISTICAL SUMMARY**  
**SEDIMENT - TAL METALS**  
**PHASE I - FIXED BASE LABORATORY**  
**RI/FS CTO-0356**  
**OPERABLE UNIT NO. 16 (SITE 89)**  
**MCB CAMP LEJEUNE, NORTH CAROLINA**

	Normal Arithmetic Mean	Normal Standard Deviation	Normal Upper 95% Confidence Level	Log Arithmetic Mean	Log Standard Deviation	Log Upper 95% Confidence Level
<b>METALS (mg/kg)</b>						
ALUMINUM, TOTAL	3119	3867.01	5360.63	7.71	0.73	5630.1
ARSENIC, TOTAL	0.39	0.23	0.52	-1.12	0.62	0.67
BARIUM, TOTAL	14.26	6.72	18.16	2.57	0.44	19.93
BERYLLIUM, TOTAL	0.16	0.16	0.25	-2.12	0.75	0.31
CADMIUM, TOTAL	0.45	0.24	0.59	-0.92	0.49	0.65
CALCIUM, TOTAL	25902	15182.68	34703.12	9.99	0.65	46623.03
CHROMIUM, TOTAL	4.26	1.47	5.11	1.4	0.33	5.39
COPPER, TOTAL	7.23	11.42	13.85	1.18	1.33	50.88
IRON, TOTAL	2204	878.31	2713.14	7.63	0.39	2914.99
LEAD, TOTAL	17.06	7.6	21.47	2.75	0.43	23.59
MAGNESIUM, TOTAL	475.8	213.67	599.66	6.08	0.43	658.95
MANGANESE, TOTAL	11.07	2.82	12.7	2.38	0.26	13.27
MERCURY, TOTAL	0.03	0.02	0.04	-3.48	0.43	0.05
NICKEL, TOTAL	1.39	0.93	1.93	0.19	0.51	2.06
SODIUM, TOTAL	86.32	32.98	105.44	4.39	0.4	115.41
VANADIUM, TOTAL	8.11	4.58	10.76	1.99	0.46	11.43
ZINC, TOTAL	30.91	10.87	37.21	3.37	0.39	41.17



**STATISTICAL SUMMARY**  
**SUBSURFACE SOIL - TCL ORGANICS**  
**PHASE II - FIXED BASE LABORATORY**  
**RI/FS CTO-0356**  
**OPERABLE UNIT NO. 16 (SITE 93)**  
**MCB CAMP LEJEUNE, NORTH CAROLINA**

SAMPLE ID PHASE DATE SAMPLED DEPTH	Normal Arithmetic Mean	Normal Standard Deviation	Normal Upper 95% Confidence Level	Log Arithmetic Mean	Log Standard Deviation	Log Upper 95% Confidence Level
<b>VOLATILES (ug/kg)</b>						
2-BUTANONE	6.32	1.51	6.87	1.83	0.17	6.75
ACETONE	45.66	74.46	72.98	3.03	1.24	98.47
<b>SEMIVOLATILES (ug/kg)</b>						
BENZO(A)PYRENE	208.18	43.63	224.19	5.32	0.15	219.03
BIS(2-ETHYLHEXYL)PHTHALATE	201.82	92.53	235.77	5.19	0.54	265.47
<b>PESTICIDES/PCBS (ug/kg)</b>						
4,4'-DDD	19.63	30.63	71.27	1.78	1.93	1.18789E+17
4,4'-DDE	8.63	11.58	28.15	1.47	1.4	3094864853
4,4'-DDT	12.02	18.18	42.67	1.43	1.8	5.9418E+15



**STATISTICAL SUMMARY**  
**SUBSURFACE SOIL - TAL METALS**  
**PHASE II - FIXED BASE LABORATORY**  
**RI/FS CTO-0356**  
**OPERABLE UNIT NO. 16 (SITE 93)**  
**MCB CAMP LEJEUNE, NORTH CAROLINA**

	Normal Arithmetic Mean	Normal Standard Deviation	Normal Upper 95% Confidence Level	Log Arithmetic Mean	Log Standard Deviation	Log Upper 95% Confidence Level
<b>TOTAL METALS (mg/kg)</b>						
ALUMINUM, TOTAL	5298.09	5331.47	7254.01	8.12	1	9696.41
ANTIMONY, TOTAL	0.18	0.07	0.21	-1.76	0.29	0.2
ARSENIC, TOTAL	0.65	0.91	0.98	-1.06	1.03	1.14
BARIUM, TOTAL	12.48	9.99	16.14	2.25	0.76	18.57
BERYLLIUM, TOTAL	0.1	0.12	0.14	-2.8	1.12	0.23
CADMIUM, TOTAL	0.03	0.02	0.04	-3.7	0.5	0.03
CALCIUM, TOTAL	487.24	628.26	717.73	5.39	1.37	1507.64
CHROMIUM, TOTAL	7.55	6.51	9.94	1.75	0.73	10.85
COBALT, TOTAL	0.31	0.44	0.47	-2.05	1.38	0.9
COPPER, TOTAL	1.27	3.01	2.37	-1.13	1.53	3.6
IRON, TOTAL	3616.64	3675.82	4965.17	7.67	1.11	8055.13
LEAD, TOTAL	4.99	2.51	5.91	1.49	0.5	6.25
MAGNESIUM, TOTAL	171.04	155.43	228.06	4.79	0.87	278.71
MANGANESE, TOTAL	6.03	5.05	7.88	1.55	0.71	8.67
NICKEL, TOTAL	0.63	0.92	0.97	-1.46	1.45	1.89
POTASSIUM, TOTAL	187.42	221.04	268.51	4.71	1.04	370.24
SELENIUM, TOTAL	0.33	0.32	0.45	-1.36	0.61	0.41
SILVER, TOTAL	0.02	0.01	0.02	-3.85	0.32	0.03
SODIUM, TOTAL	60.75	45.22	77.34	3.76	0.93	111.36
VANADIUM, TOTAL	10.57	13.97	15.7	1.86	0.97	17.69
ZINC, TOTAL	2.31	3.02	3.42	0.03	1.49	9.18

**STATISTICAL SUMMARY**  
**GROUNDWATER - VOLATILE ORGANICS**  
**PHASE I - MOBILE LABORATORY AND**  
**PHASE II - FIXED BASE LABORATORY**  
**R1/FS CTO-0356**  
**OPERABLE UNIT NO. 16 (SITE 93)**  
**MCB CAMP LEJEUNE, NORTH CAROLINIA**

SAMPLE ID PHASE DATE SAMPLED	Normal Arithmetic Mean	Normal Standard Deviation	Normal Upper 95% Confidence Level	Log Arithmetic Mean	Log Standard Deviation	Log Upper 95% Confidence Level
<b>VOLATILES (ug/L)</b>						
1,2-DICHLOROETHENE (TOTAL)	12.91	26.23	27.24	1.87	0.88	20.89
CHLOROFORM	2.4	2.33	3.18	-0.3	2.01	38.49
CIS-1,2-DICHLOROETHENE	13.33	44.88	33.74	0.06	1.72	30.42
TETRACHLOROETHENE	5.58	12.7	9.83	-0.15	2.39	148.62
TRANS-1,2-DICHLOROETHENE	4.57	14.55	11.19	-0.22	1.32	6.86
TRICHLOROETHENE	5.55	9.75	8.82	-0.19	2.43	163.4

**STATISTICAL SUMMARY**  
**GROUNDWATER - TCL ORGANICS**  
**PHASE II - FIXED BASE LABORATORY**  
**RI/FS CTO-0356**  
**OPERABLE UNIT NO. 16 (SITE 93)**  
**MCB CAMP LEJEUNE, NORTH CAROLINA**

	Normal Arithmetic Mean	Normal Standard Deviation	Normal Upper 95% Confidence Level	Log Arithmetic Mean	Log Standard Deviation	Log Upper 95% Confidence Level
<b>VOLATILES (ug/l)</b>						
1,2-DICHLOROETHENE (TOTAL)	12.91	26.23	27.24	1.87	0.88	20.89
TETRACHLOROETHENE	4.82	0.6	5.15	1.56	0.15	5.26
TRICHLOROETHENE	7.09	6.93	10.88	1.77	0.52	9.83
<b>SEMIVOLATILES (ug/l)</b>						
BIS(2-ETHYLNHEXYL)PHTHALATE	15.86	37.91	36.58	1.66	1.23	43.72
NAPHTHALENE	5.09	0.3	5.25	1.63	0.05	5.26

**STATISTICAL SUMMARY**  
**GROUNDWATER - TAL METALS**  
**PHASE II - FIXED BASE LABORATORY**  
**RI/FS CTO-0356**  
**OPERABLE UNIT NO. 16 (SITE 93)**  
**MCB CAMP LEJEUNE, NORTH CAROLINA**

SAMPLE ID PHASE DATE SAMPLED	Normal Arithmetic Mean	Normal Standard Deviation	Normal Upper 95%	Log-Arithmetic Mean	Log Standard Deviation	Log Upper 95% Confidence Level
<b>TOTAL METALS (ug/l)</b>						
ALUMINUM, TOTAL	279.09	753.54	690.88	3.83	1.6	1687.26
ANTIMONY, TOTAL	1.07	0.41	1.29	0.03	0.27	1.26
ARSENIC, TOTAL	1.62	0.89	2.11	0.41	0.35	2.01
BARIUM, TOTAL	33.45	22.61	45.81	3.23	0.87	79.96
CADMIUM, TOTAL	0.33	0.42	0.56	-1.42	0.63	0.48
CALCIUM, TOTAL	52230	40186.82	74191.2	10.41	1.14	224481.55
CHROMIUM, TOTAL	1.97	4.99	4.7	-0.56	1.23	4.75
COBALT, TOTAL	1.35	3	2.99	-0.75	1.22	3.84
COPPER, TOTAL	3.28	9.56	8.5	-0.52	1.32	7.65
IRON, TOTAL	2434.64	1252.97	3119.36	7.63	0.65	4222.28
LEAD, TOTAL	15.55	49.24	42.46	0.14	1.65	49.14
MAGNESIUM, TOTAL	2164.27	1265.07	2855.6	7.52	0.62	3625.28
MANGANESE, TOTAL	84.45	127.05	153.88	3.79	1.07	256.4
NICKEL, TOTAL	2.45	4.34	4.82	-0.06	1.3	11.51
POTASSIUM, TOTAL	4070.18	7034.7	7914.49	7.64	0.99	8678.64
SELENIUM, TOTAL	1.26	0.54	1.56	0.18	0.29	1.49
SODIUM, TOTAL	12487.64	11239.58	18629.82	8.88	1.56	233196.65
VANADIUM, TOTAL	1.02	1.79	2	-0.54	0.86	1.81
ZINC, TOTAL	30.48	94.75	82.26	-0.06	2.45	2518.76

**APPENDIX N**  
**HUMAN HEALTH RISK CALCULATIONS**

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**EXAMPLE SOIL\* INGESTION CALCULATIONS  
OPERABLE UNIT NO. 16  
CONTRACT TASK ORDER 0356**

**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)pyrene**

$$\begin{aligned} \text{Intake (mg/kg}\cdot\text{day)} &= \frac{0.22 \text{ mg/kg} \times 480 \text{ mg/day} \times 250 \text{ days/yr} \times 1 \text{ yr} \times 1.0\text{E-}6 \text{ kg/mg}}{70 \text{ kg} \times 25,550 \text{ days}} \\ &= 1.5\text{E-}08 \end{aligned}$$

$$\text{Risk} = 1.5\text{E-}08 \text{ mg/kg}\cdot\text{day} \times 7.3 \text{ mg/kg}\cdot\text{day}^{-1} = 1.1\text{E-}07$$

**Example Noncarcinogen: Aluminum**

$$\begin{aligned} \text{Intake (mg/kg}\cdot\text{day)} &= \frac{9700 \text{ mg/kg} \times 480 \text{ mg/day} \times 250 \text{ days/yr} \times 1 \text{ yr} \times 1.0\text{E-}6 \text{ kg/mg}}{70 \text{ kg} \times 365 \text{ days}} \\ &= 4.6\text{E-}02 \end{aligned}$$

$$\text{Risk} = \frac{4.6\text{E-}02 \text{ mg/kg}\cdot\text{day}}{1.0 \text{ mg/kg}\cdot\text{day}} = 4.6\text{E-}02$$

\* This example calculation also is applicable for sediment ingestion.

SUBSURFACE SOIL INGESTION EXPOSURE ASSESSMENT  
 SITE 89  
 REMEDIAL INVESTIGATION CTO-356  
 MCB CAMP LEJEUNE, NORTH CAROLINA  
 FUTURE CONSTRUCTION WORKER

$$\text{CDI (mg/kg/d)} = (\text{Cs} \cdot \text{IR} \cdot \text{CF} \cdot \text{FI} \cdot \text{EF} \cdot \text{ED}) / (\text{BW} \cdot \text{AT})$$

$$\text{ILCR} = \text{CDI} \cdot \text{CSF}_0$$

$$\text{HQ} = \text{CDI} / \text{RfDo}$$

Parameter	Description	Adult
CDI	Chronic daily intake (mg/kg/d)	CS
ILCR	Incremental lifetime cancer risk	CS
CSF <sub>0</sub>	Oral cancer slope factor (1/(mg/kg/d))	CS
HQ	Hazard quotient	CS
RfDo	Oral reference dose (mg/kg/d)	CS
Cs	Concentration of chemical in soil (mg/kg)	CS
IR	Ingestion Rate (mg/d)	480
CF	Conversion factor (kg/mg)	1E-06
FI	Fraction of soil Ingested from site	1
EF	Exposure Frequency (d/yr)	250
ED	Exposure Duration (yrs)	1
BW	Body weight (kg)	70
AT <sub>c</sub>	Averaging time, carcinogens (d)	25550
AT <sub>n</sub>	Averaging time, noncarcinogens (d)	365

Parameter	Cs (mg/kg)	CSF <sub>0</sub> 1/(mg/kg/d)	RfDo (mg/kg/d)	Adult Construction Worker					
				Carcinogens			Noncarcinogens		
				CDI (mg/kg/d)	ILCR	% Contrib. Total ILCR	CDI (mg/kg/d)	HQ	% Contrib. HI
Aluminum	7.1E+03	NA	1.00E+00	4.8E-04	--	0.0%	3.3E-02	3.3E-02	25.8%
Arsenic	9.0E-01	1.50E+00	3.00E-04	6.0E-08	9.1E-08	50.3%	4.2E-06	1.4E-02	10.8%
Beryllium	3.1E-01	4.30E+00	5.00E-03	2.1E-08	8.9E-08	49.7%	1.5E-06	2.9E-04	0.2%
Iron	5.2E+03	NA	3.00E-01	3.5E-04	--	0.0%	2.5E-02	8.2E-02	63.2%
Total ILCR:				1.8E-07		100.0%	HI: 1.3E-01		100.0%

NOTES:

NA - Toxicity criterion not available.

-- Not applicable.

SUBSURFACE SOIL INGESTION EXPOSURE ASSESSMENT  
 SITE 93  
 REMEDIAL INVESTIGATION CTO-356  
 MCB CAMP LEJEUNE, NORTH CAROLINA  
 FUTURE CONSTRUCTION WORKER

$$CDI \text{ (mg/kg/d)} = (Cs \cdot IR \cdot CF \cdot FI \cdot EF \cdot ED) / (BW \cdot AT)$$

$$ILCR = CDI \cdot CSF_o$$

$$HQ = CDI / RfDo$$

Parameter	Description	Adult Construction Worker
CDI	Chronic daily intake (mg/kg/d)	CS
ILCR	Incremental lifetime cancer risk	CS
CSFo	Oral cancer slope factor (1/(mg/kg/d))	CS
HQ	Hazard quotient	CS
RfDo	Oral reference dose (mg/kg/d)	CS
Cs	Concentration of chemical in soil (mg/kg)	CS
IR	Ingestion Rate (mg/d)	480
CF	Conversion factor (kg/mg)	1E-06
FI	Fraction of soil ingested from site	1
EF	Exposure Frequency (d/yr)	250
ED	Exposure Duration (yrs)	1
BW	Body weight (kg)	70
ATc	Averaging time, carcinogens (d)	25550
ATn	Averaging time, noncarcinogens (d)	365

Parameter	Cs (mg/kg)	CSFo 1/(mg/kg/d)	RfDo (mg/kg/d)	Adult Construction Worker					
				Carcinogens			Noncarcinogens		
				CDI (mg/kg/d)	ILCR	% Contrib. Total ILCR	CDI (mg/kg/d)	HQ	% Contrib. HI
Benzo(a)pyrene	2.2E-01	7.30E+00	NA	1.5E-08	1.1E-07	37.2%	1.0E-06	--	0.0%
Aluminum	9.7E+03	NA	1.00E+00	6.5E-04	--	0.0%	4.6E-02	4.6E-02	22.6%
Arsenic	1.1E+00	1.50E+00	3.00E-04	7.6E-08	1.1E-07	39.8%	5.4E-06	1.8E-02	8.9%
Beryllium	2.3E-01	4.30E+00	5.00E-03	1.5E-08	6.6E-08	23.0%	1.1E-06	2.2E-04	0.1%
Iron	8.1E+03	NA	3.00E-01	5.4E-04	--	0.0%	3.8E-02	1.3E-01	62.6%
Vanadium	1.8E+01	NA	7.00E-03	1.2E-06	--	0.0%	8.3E-05	1.2E-02	5.9%
Total ILCR:				2.9E-07	100.0%		HI:	2.0E-01	100.0%

NOTES:

NA - Toxicity criterion not available.

-- Not applicable.



SEDIMENT INGESTION EXPOSURE ASSESSMENT  
 SITE 89  
 REMEDIAL INVESTIGATION CTO-356  
 MCB CAMP LEJEUNE, NORTH CAROLINA  
 CURRENT ON-SITE RESIDENTS

$CDI (mg/kg/d) = (Cs \cdot IR \cdot CF \cdot FI \cdot EF \cdot ED) / (BW \cdot AT)$   
 $I LCR = CDI \cdot CSFo$   
 $HQ = CDI / RfDo$

Parameter	Description	Younger Child (1-6 Yrs Old)	
		Adult	Child
CDI	Chronic daily intake (mg/kg/d)	CS	CS
ILCR	Incremental lifetime cancer risk	CS	CS
CSFo	Oral cancer slope factor (1/(mg/kg/d))	CS	CS
HQ	Hazard quotient	CS	CS
RfDo	Oral reference dose (mg/kg/d)	CS	CS
Cs	Concentration of chemical in soil (mg/kg)	CS	CS
IR	Ingestion Rate (mg/d)	100	200
CF	Conversion factor (kg/mg)	1E-06	1E-06
FI	Fraction of soil ingested from site	1	1
EF	Exposure Frequency (d/yr)	100	100
ED	Exposure Duration (yrs)	4	4
BW	Body weight (kg)	70	15
ATc	Averaging time, carcinogens (d)	25550	25550
ATn	Averaging time, noncarcinogens (d)	1460	1460

Parameter	Cs (mg/kg)	CSFo 1/(mg/kg/d)	RfDo (mg/kg/d)	Adult Residents						Child Residents					
				Carcinogens			Noncarcinogens			Carcinogens			Noncarcinogens		
				CDI (mg/kg/d)	ILCR	% Contrib. Total ILCR	CDI (mg/kg/d)	HQ	% Contrib. HI	CDI (mg/kg/d)	ILCR	% Contrib. Total ILCR	CDI (mg/kg/d)	HQ	% Contrib. HI
Benzo(a)pyrene	1.3E+00	7.30E+00	NA	2.9E-08	2.1E-07	80.4%	5.2E-07	--	0.0%	2.7E-07	2.0E-06	80.4%	4.8E-06	--	0.0%
Aluminum	5.6E+03	NA	1.00E+00	1.3E-04	--	0.0%	2.2E-03	2.2E-03	31.9%	1.2E-03	0.0E+00	0.0%	2.1E-02	2.1E-02	31.9%
Arsenic	6.7E-01	1.50E+00	3.00E-04	1.5E-08	2.2E-08	8.4%	2.6E-07	8.7E-04	12.7%	1.4E-07	2.1E-07	8.4%	2.4E-06	8.2E-03	12.7%
Beryllium	3.1E-01	4.30E+00	5.00E-03	6.9E-09	3.0E-08	11.2%	1.2E-07	2.4E-05	0.4%	6.5E-08	2.8E-07	11.2%	1.1E-06	2.3E-04	0.4%
Iron	2.9E+03	NA	3.00E-01	6.5E-05	--	0.0%	1.1E-03	3.8E-03	55.1%	6.1E-04	0.0E+00	0.0%	1.1E-02	3.5E-02	55.1%
Total ILCR:				2.7E-07	100.0%		HI: 6.9E-03	100.0%		Total ILCR:	2.5E-06	100.0%	HI: 6.4E-02	100.0%	

NOTES:  
 NA - Toxicity criterion not available.  
 -- Not applicable.

SEDIMENT INGESTION EXPOSURE ASSESSMENT - RME  
 SITE 89  
 REMEDIAL INVESTIGATION CTO-356  
 MCB CAMP LEJEUNE, NORTH CAROLINA  
 FUTURE ON-SITE RESIDENTS

$$CDI (mg/kg/d) = (Cs \cdot IR \cdot CF \cdot FI \cdot EF \cdot ED) / (BW \cdot AT)$$

$$ILCR = CDI \cdot CSFo$$

$$HQ = CDI / RfDo$$

Parameter	Description	Adult	Younger Child (1-6 Yrs Old)
CDI	Chronic daily intake (mg/kg/d)	CS	CS
ILCR	Incremental lifetime cancer risk	CS	CS
CSFo	Oral cancer slope factor (1/(mg/kg/d))	CS	CS
HQ	Hazard quotient	CS	CS
RfDo	Oral reference dose (mg/kg/d)	CS	CS
Cs	Concentration of chemical in soil (mg/kg)	CS	CS
IR	Ingestion Rate (mg/d)	100	200
CF	Conversion factor (kg/mg)	1E-06	1E-06
FI	Fraction of soil ingested from site	1	1
EF	Exposure Frequency (d/yr)	100	100
ED	Exposure Duration (yrs)	30	6
BW	Body weight (kg)	70	15
ATc	Averaging time, carcinogens (d)	25550	25550
ATn	Averaging time, noncarcinogens (d)	10950	2190

Parameter	Cs (mg/kg)	CSFo (1/(mg/kg/d))	RfDo (mg/kg/d)	Adult Residents						Child Residents					
				Carcinogens			Noncarcinogens			Carcinogens			Noncarcinogens		
				CDI (mg/kg/d)	ILCR	% Contrib. Total ILCR	CDI (mg/kg/d)	HQ	% Contrib. HI	CDI (mg/kg/d)	ILCR	% Contrib. Total ILCR	CDI (mg/kg/d)	HQ	% Contrib. HI
Benzo(a)pyrene	1.3E+00	7.30E+00	NA	2.2E-07	1.6E-06	80.4%	5.2E-07	--	0.0%	4.1E-07	3.0E-06	80.4%	4.8E-06	--	0.0%
Aluminum	5.6E+03	NA	1.00E+00	9.4E-04	--	0.0%	2.2E-03	2.2E-03	31.9%	1.8E-03	0.0E+00	0.0%	2.1E-02	2.1E-02	31.9%
Arsenic	6.7E-01	1.50E+00	3.00E-04	1.1E-07	1.7E-07	8.4%	2.6E-07	8.7E-04	12.7%	2.1E-07	3.1E-07	8.4%	2.4E-06	8.2E-03	12.7%
Beryllium	3.1E-01	4.30E+00	5.00E-03	5.2E-08	2.2E-07	11.2%	1.2E-07	2.4E-05	0.4%	9.7E-08	4.2E-07	11.2%	1.1E-06	2.3E-04	0.4%
Iron	2.9E+03	NA	3.00E-01	4.9E-04	--	0.0%	1.1E-03	3.8E-03	55.1%	9.1E-04	0.0E+00	0.0%	1.1E-02	3.5E-02	55.1%
Total ILCR:				2.0E-06	100.0%		HI: 6.9E-03	100.0%		Total ILCR:	3.7E-06	100.0%	HI: 6.4E-02	100.0%	

NOTES:

- NA - Toxicity criterion not available.
- Not applicable.

SEDIMENT INGESTION EXPOSURE ASSESSMENT - CT  
 SITE 89  
 REMEDIAL INVESTIGATION CTO-356  
 MCB CAMP LEJEUNE, NORTH CAROLINA  
 FUTURE ON-SITE RESIDENTS

CDI (mg/kg/d) = (Cs\*IR\*CF\*FI\*EF\*ED)/(BW\*AT)  
 ILCR = CDI\*CSFo  
 HQ = CDI/RfDo

Parameter	Description	Younger Child (1-6 Yrs Old)	
		Adult	Child
CDI	Chronic daily intake (mg/kg/d)	CS	CS
ILCR	Incremental lifetime cancer risk	CS	CS
CSFo	Oral cancer slope factor (1/(mg/kg/d))	CS	CS
HQ	Hazard quotient	CS	CS
RfDo	Oral reference dose (mg/kg/d)	CS	CS
Cs	Concentration of chemical in soil (mg/kg)	CS	CS
IR	Ingestion Rate (mg/d)	50	100
CF	Conversion factor (kg/mg)	1E-06	1E-06
FI	Fraction of soil ingested from site	1	1
EF	Exposure Frequency (d/yr)	100	100
ED	Exposure Duration (yrs)	9	6
BW	Body weight (kg)	70	15
ATc	Averaging time, carcinogens (d)	25550	25550
ATn	Averaging time, noncarcinogens (d)	3285	2190

Parameter	Cs (mg/kg)	CSFo 1/(mg/kg/d)	RfDo (mg/kg/d)	Adult Residents						Child Residents					
				Carcinogens			Noncarcinogens			Carcinogens			Noncarcinogens		
				CDI (mg/kg/d)	ILCR	% Contrib. Total ILCR	CDI (mg/kg/d)	HQ	% Contrib. HI	CDI (mg/kg/d)	ILCR	% Contrib. Total ILCR	CDI (mg/kg/d)	HQ	% Contrib. HI
Benzo(a)pyrene	1.3E+00	7.30E+00	NA	3.3E-08	2.4E-07	80.4%	2.6E-07	-	0.0%	2.1E-07	1.5E-06	80.4%	2.4E-06	-	0.0%
Aluminum	5.6E+03	NA	1.00E+00	1.4E-04	-	0.0%	1.1E-03	1.1E-03	31.9%	8.8E-04	0.0E+00	0.0%	1.0E-02	1.0E-02	31.9%
Arsenic	6.7E-01	1.50E+00	3.00E-04	1.7E-08	2.5E-08	8.4%	1.3E-07	4.4E-04	12.7%	1.0E-07	1.6E-07	8.4%	1.2E-06	4.1E-03	12.7%
Beryllium	3.1E-01	4.30E+00	5.00E-03	7.8E-09	3.4E-08	11.2%	6.1E-08	1.2E-05	0.4%	4.9E-08	2.1E-07	11.2%	5.7E-07	1.1E-04	0.4%
Iron	2.9E+03	NA	3.00E-01	7.3E-05	-	0.0%	5.7E-04	1.9E-03	55.1%	4.6E-04	0.0E+00	0.0%	5.3E-03	1.8E-02	55.1%
Total ILCR:				3.0E-07	100.0%		HI:	3.5E-03	100.0%	Total ILCR:	1.9E-06	100.0%	HI:	3.2E-02	100.0%

NOTES:  
 NA - Toxicity criterion not available.  
 - Not applicable.

**EXAMPLE DERMAL CONTACT WITH SOIL\* CALCULATIONS  
OPERABLE UNIT NO. 9  
CONTRACT TASK ORDER 0356**

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

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

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: Benzo(a)pyrene**

$$Intake (mg/kg\cdot day) = \frac{0.22 \text{ mg/kg} \times 1.0E-06 \text{ kg/mg} \times 4,300 \text{ cm}^2/\text{event} \times 0.01 \times 1 \text{ mg/cm}^2 \times 250 \text{ days/yr} \times 1 \text{ yr}}{70 \text{ kg} \times 25,550 \text{ days}}$$

$$= 1.3E-09$$

$$Risk = 1.3E-09 \text{ mg/kg}\cdot\text{day} \times 14.6 \text{ mg/kg}\cdot\text{day}^{-1} = 1.9E-08$$

$$Intake (mg/kg\cdot day) = \frac{9700 \text{ mg/kg} \times 1.0E-06 \text{ kg/mg} \times 4,300 \text{ cm}^2/\text{event} \times 1 \text{ mg/cm}^2 \times 0.001 \times 250 \text{ days/yr} \times 1 \text{ yr}}{70 \text{ kg} \times 365 \text{ days}}$$

**Example Noncarcinogen: Aluminum**

$$= 4.1E-04$$

$$Risk = \frac{4.1E-04 \text{ mg/kg}\cdot\text{day}}{2.0E-01 \text{ mg/kg}\cdot\text{day}} = 2.0E-03$$

\* This example calculation also is applicable for sediment dermal contact.

Re: Site 93 Future Construction Worker

SUBSURFACE SOIL DERMAL CONTACT EXPOSURE ASSESSMENT  
 SITE 89  
 REMEDIAL INVESTIGATION CTO-356  
 MCB CAMP LEJEUNE, NORTH CAROLINA  
 FUTURE CONSTRUCTIONS WORKERS

$$\text{DAD (mg/kg/d)} = (\text{Cs} \cdot \text{CF} \cdot \text{AF} \cdot \text{ABS} \cdot \text{SA} \cdot \text{EF} \cdot \text{ED}) / (\text{BW} \cdot \text{AT})$$

$$\text{ILCR} = \text{CDI} \cdot \text{CSF}_o \cdot \text{Adj} \quad \text{CSF Adj} = \text{CSF} / \text{AE}$$

$$\text{HQ} = \text{CDI} / \text{RfDo Adj} \quad \text{RfD Adj} = \text{RfD} \cdot \text{AE}$$

Parameter	Description	Adult
DAD	Dermally absorbed dose (mg/kg/d)	CS
ILCR	Incremental lifetime cancer risk	CS
CSF <sub>o</sub>	Oral cancer slope factor (1/(mg/kg/d))	CS
HQ	Hazard quotient	CS
RfDo	Oral reference dose (mg/kg/d)	CS
Cs	Concentration of chemical in soil (mg/kg)	CS
CF	Conversion factor (kg/mg)	1E-06
AF	Soil to skin adherence factor (mg/cm <sup>2</sup> -event)	1
ABS	Absorption fraction	CS
SA	Skin surface area available for contact (cm <sup>2</sup> )	4300
EF	Exposure Frequency (d/yr)	250
ED	Exposure Duration (yrs)	1
BW	Body weight (kg)	70
AT <sub>c</sub>	Averaging time, carcinogens (d)	25550
AT <sub>n</sub>	Averaging time, noncarcinogens (d)	365
AE	Adjustment for Absorptin Efficiency	CS

Parameter	Cs (mg/kg)	ABS	CSF <sub>o</sub> 1/(mg/kg/d)	RfDo (mg/kg/d)	AE	Adj. CSF <sub>o</sub> 1/(mg/kg/d)	Adj. RfDo (mg/kg/d)	Adult Construction Worker					
								Carcinogens			Noncarcinogens		
								DAD (mg/kg/d)	ILCR	% Contrib. Total ILCR	DAD (mg/kg/d)	HQ	% Contrib. HI
Aluminum	7.1E+03	0.001	NA	1.00E+00	0.2	NA	2.00E-01	4.3E-06	--	0.0%	3.0E-04	1.5E-03	25.8%
Arsenic	9.0E-01	0.001	1.50E+00	3.00E-04	0.2	7.50E+00	6.00E-05	5.4E-10	4.1E-09	50.3%	3.8E-08	6.3E-04	10.8%
Beryllium	3.1E-01	0.001	4.30E+00	5.00E-03	0.2	2.15E+01	1.00E-03	1.9E-10	4.0E-09	49.7%	1.3E-08	1.3E-05	0.2%
Iron	5.2E+03	0.001	NA	3.00E-01	0.2	NA	6.00E-02	3.2E-06	--	0.0%	2.2E-04	3.7E-03	63.2%
Total ILCR:								8.1E-09	100.0%		HI: 5.8E-03	100.0%	

NOTES:

NA - Toxicity criterion not available.

-- Not applicable.

SUBSURFACE SOIL DERMAL CONTACT EXPOSURE ASSESSMENT  
 SITE 93  
 REMEDIAL INVESTIGATION CTO-356  
 MCB CAMP LEJEUNE, NORTH CAROLINA  
 FUTURE CONSTRUCTIONS WORKERS

$$\text{DAD (mg/kg/d)} = (\text{Cs} \cdot \text{CF} \cdot \text{AF} \cdot \text{ABS} \cdot \text{SA} \cdot \text{EF} \cdot \text{ED}) / (\text{BW} \cdot \text{AT})$$

$$\text{ILCR} = \text{CDI} \cdot \text{CSF}_0 \text{ Adj} \quad \text{CSF Adj} = \text{CSF} / \text{AE}$$

$$\text{HQ} = \text{CDI} / \text{RfDo Adj} \quad \text{RfD Adj} = \text{RfD} \cdot \text{AE}$$

Parameter	Description	Adult Construction Worker
DAD	Dermally absorbed dose (mg/kg/d)	CS
ILCR	incremental lifetime cancer risk	CS
CSF <sub>0</sub>	Oral cancer slope factor (1/(mg/kg/d))	CS
HQ	Hazard quotient	CS
RfDo	Oral reference dose (mg/kg/d)	CS
Cs	Concentration of chemical in soil (mg/kg)	CS
CF	Conversion factor (kg/mg)	1E-06
AF	Soil to skin adherence factor (mg/cm <sup>2</sup> -event)	1
ABS	Absorption fraction	CS
SA	Skin surface area available for contact (cm <sup>2</sup> )	4300
EF	Exposure Frequency (d/yr)	250
ED	Exposure Duration (yrs)	1
BW	Body weight (kg)	70
AT <sub>c</sub>	Averaging time, carcinogens (d)	25550
AT <sub>n</sub>	Averaging time, noncarcinogens (d)	365
AE	Adjustment for Absorptin Efficiency	CS

Parameter	Cs (mg/kg)	ABS	CSF <sub>0</sub> 1/(mg/kg/d)	RfDo (mg/kg/d)	AE	Adj. CSF <sub>0</sub> 1/(mg/kg/d)	Adj. RfDo (mg/kg/d)	Adult Construction Worker					
								Carcinogens			Noncarcinogens		
								DAD (mg/kg/d)	ILCR	% Contrib. Total ILCR	DAD (mg/kg/d)	HQ	% Contrib. HI
Benzo(a)pyrene	2.2E-01	0.01	7.30E+00	NA	0.5	1.46E+01	NA	1.3E-09	1.9E-08	70.3%	9.2E-08	--	0.0%
Aluminum	9.7E+03	0.001	NA	1.00E+00	0.2	NA	2.00E-01	5.8E-06	--	0.0%	4.1E-04	2.0E-03	22.6%
Arsenic	1.1E+00	0.001	1.50E+00	3.00E-04	0.2	7.50E+00	6.00E-05	6.9E-10	5.1E-09	18.8%	4.8E-08	8.0E-04	8.9%
Beryllium	2.3E-01	0.001	4.30E+00	5.00E-03	0.2	2.15E+01	1.00E-03	1.4E-10	3.0E-09	10.9%	9.7E-09	9.7E-06	0.1%
Iron	8.1E+03	0.001	NA	3.00E-01	0.2	NA	6.00E-02	4.8E-06	--	0.0%	3.4E-04	5.6E-03	62.6%
Vanadium	1.8E+01	0.001	NA	7.00E-03	0.2	NA	1.40E-03	1.1E-08	--	0.0%	7.4E-07	5.3E-04	5.9%
								Total ILCR:	2.7E-08	100.0%		HI: 9.0E-03	100.0%

NOTES:  
 NA - Toxicity criterion not available.  
 -- Not applicable.

SEDIMENT DERMAL CONTACT EXPOSURE ASSESSMENT  
 SITE 89  
 REMEDIAL INVESTIGATION CTO-356  
 MCB CAMP LEJEUNE, NORTH CAROLINA  
 CURRENT ON-SITE RESIDENTS

DAD (mg/kg/d) = (Cs\*CF\*AF\*ABS\*SA\*EF\*ED)/(BW\*AT)  
 ILCR = CDI\*CSF<sub>o</sub> Adj      CSF Adj = CSF/AE  
 HQ = CDI/RfDo Adj      RfD Adj = RfD\*AE

Parameter	Description	Younger Child (1-6 Yrs Old)	
		Adult	Child
DAD	Dermally absorbed dose (mg/kg/d)	CS	CS
ILCR	Incremental lifetime cancer risk	CS	CS
CSF <sub>o</sub>	Oral cancer slope factor (1/(mg/kg/d))	CS	CS
HQ	Hazard quotient	CS	CS
RfDo	Oral reference dose (mg/kg/d)	CS	CS
Cs	Concentration of chemical in soil (mg/kg)	CS	CS
CF	Conversion factor (kg/mg)	1E-06	1E-06
AF	Soil to skin adherence factor (mg/cm <sup>2</sup> -event)	1	1
ABS	Absorption fraction	CS	CS
SA	Skin surface area available for contact (cm <sup>2</sup> )	5800	2300
EF	Exposure Frequency (d/yr)	100	100
ED	Exposure Duration (yrs)	4	4
BW	Body weight (kg)	70	15
AT <sub>c</sub>	Averaging time, carcinogens (d)	25550	25550
AT <sub>n</sub>	Averaging time, noncarcinogens (d)	1460	1460
AE	Adjustment for Absorption Efficiency	CS	CS

Parameter	Cs (mg/kg)	ABS	CSF <sub>o</sub> 1/(mg/kg/d)	RfDo (mg/kg/d)	AE	Adj. CSF <sub>o</sub> 1/(mg/kg/d)	Adj. RfDo (mg/kg/d)	Adult Residents						Child Residents					
								Carcinogens			Noncarcinogens			Carcinogens			Noncarcinogens		
								DAD (mg/kg/d)	ILCR	% Contrib. Total ILCR	DAD (mg/kg/d)	HQ	% Contrib. HI	DAD (mg/kg/d)	ILCR	% Contrib. Total ILCR	DAD (mg/kg/d)	HQ	% Contrib. HI
Benzo(a)pyrene	1.3E+00	0.01	7.30E+00	NA	0.5	1.46E+01	NA	1.7E-08	2.5E-07	94.3%	3.0E-07	--	0.0%	3.2E-08	4.6E-07	94.3%	5.5E-07	--	0.0%
Aluminum	5.6E+03	0.001	NA	1.00E+00	0.2	NA	2.00E-01	7.3E-06	--	0.0%	1.3E-04	6.4E-04	31.9%	1.4E-05	--	0.0%	2.4E-04	1.2E-03	31.9%
Arsenic	6.7E-01	0.001	1.50E+00	3.00E-04	0.2	7.50E+00	6.00E-05	8.7E-10	6.5E-09	2.5%	1.5E-08	2.5E-04	12.7%	1.6E-09	1.2E-08	2.5%	2.8E-08	4.7E-04	12.7%
Beryllium	3.1E-01	0.001	4.30E+00	5.00E-03	0.2	2.15E+01	1.00E-03	4.0E-10	8.6E-09	3.3%	7.0E-09	7.0E-06	0.4%	7.4E-10	1.6E-08	3.3%	1.3E-08	1.3E-05	0.4%
Iron	2.9E+03	0.001	NA	3.00E-01	0.2	NA	6.00E-02	3.8E-06	--	0.0%	6.6E-05	1.1E-03	55.1%	7.0E-06	--	0.0%	1.2E-04	2.0E-03	55.1%
								Total ILCR: 2.6E-07 100.0%			HI: 2.0E-03 100.0%			Total ILCR: 4.9E-07 100.0%			HI: 3.7E-03 100.0%		

NOTES:  
 NA - Toxicity criterion not available.  
 -- Not applicable.

SEDIMENT DERMAL CONTACT EXPOSURE ASSESSMENT - RME  
 SITE 89  
 REMEDIAL INVESTIGATION CTO-356  
 MCB CAMP LEJEUNE, NORTH CAROLINA  
 FUTURE ON-SITE RESIDENTS

DAD (mg/kg/d) = (Cs\*CF\*AF\*ABS\*SA\*EF\*ED)/(BW\*AT)  
 ILCR = CDI\*CSFo Adj CSF Adj = CSF/AE  
 HQ = CDI/RfDo Adj RID Adj = RID\*AE

Parameter	Description	Adult	Younger Child (1-6 Yrs Old)
DAD	Dermally absorbed dose (mg/kg/d)	CS	CS
ILCR	Incremental lifetime cancer risk	CS	CS
CSFo	Oral cancer slope factor (1/(mg/kg/d))	CS	CS
HQ	Hazard quotient	CS	CS
RfDo	Oral reference dose (mg/kg/d)	CS	CS
Cs	Concentration of chemical in soil (mg/kg)	CS	CS
CF	Conversion factor (kg/mg)	1E-06	1E-06
AF	Soil to skin adherence factor (mg/cm2-event)	1	1
ABS	Absorption fraction	CS	CS
SA	Skin surface area available for contact (cm2)	5800	2300
EF	Exposure Frequency (d/yr)	100	100
ED	Exposure Duration (yrs)	30	6
BW	Body weight (kg)	70	15
ATc	Averaging time, carcinogens (d)	25550	25550
ATn	Averaging time, noncarcinogens (d)	10950	2190
AE	Adjustment for Absorptin Efficiency	CS	CS

Parameter	Cs (mg/kg)	ABS	CSFo 1/(mg/kg/d)	RfDo (mg/kg/d)	AE	Adj. CSFo 1/(mg/kg/d)	Adj. RfDo (mg/kg/d)	Adult Residents						Child Residents					
								Carcinogens			Noncarcinogens			Carcinogens			Noncarcinogens		
								DAD (mg/kg/d)	ILCR	% Contrib. Total ILCR	DAD (mg/kg/d)	HQ	% Contrib. HI	DAD (mg/kg/d)	ILCR	% Contrib. Total ILCR	DAD (mg/kg/d)	HQ	% Contrib. HI
Benzo(a)pyrene	1.3E+00	0.01	7.30E+00	NA	0.5	1.46E+01	NA	1.3E-07	1.9E-06	94.3%	3.0E-07	-	0.0%	4.7E-08	6.9E-07	94.3%	5.5E-07	-	0.0%
Aluminum	5.6E+03	0.001	NA	1.00E+00	0.2	NA	2.00E-01	5.5E-05	-	0.0%	1.3E-04	6.4E-04	31.9%	2.0E-05	-	0.0%	2.4E-04	1.2E-03	31.9%
Arsenic	6.7E-01	0.001	1.50E+00	3.00E-04	0.2	7.50E+00	6.00E-05	6.5E-09	4.9E-08	2.5%	1.5E-08	2.5E-04	12.7%	2.4E-09	1.8E-08	2.5%	2.8E-08	4.7E-04	12.7%
Beryllium	3.1E-01	0.001	4.30E+00	5.00E-03	0.2	2.15E+01	1.00E-03	3.0E-09	6.5E-08	3.3%	7.0E-09	7.0E-06	0.4%	1.1E-09	2.4E-08	3.3%	1.3E-08	1.3E-05	0.4%
Iron	2.9E+03	0.001	NA	3.00E-01	0.2	NA	6.00E-02	2.8E-05	-	0.0%	6.6E-05	1.1E-03	55.1%	1.0E-05	-	0.0%	1.2E-04	2.0E-03	55.1%
								Total ILCR: 2.0E-06 100.0%			HI: 2.0E-03 100.0%			Total ILCR: 7.3E-07 100.0%			HI: 3.7E-03 100.0%		

NOTES:  
 NA - Toxicity criterion not available.  
 -- Not applicable.



SEDIMENT DERMAL CONTACT EXPOSURE ASSESSMENT - CT  
 SITE 89  
 REMEDIAL INVESTIGATION CTO-356  
 MCB CAMP LEJEUNE, NORTH CAROLINA  
 FUTURE ON-SITE RESIDENTS

DAD (mg/kg/d) = (Cs\*CF\*AF\*ABS\*SA\*EF\*ED)/(BW\*AT)  
 ILCR = CDI\*CSFo Adj CSF Adj = CSF/AE  
 HQ = CDI/RfDo Adj RfD Adj = RfD\*AE

Parameter	Description	Adult	Younger Child (1-6 Yrs Old)
DAD	Dermally absorbed dose (mg/kg/d)	CS	CS
ILCR	Incremental lifetime cancer risk	CS	CS
CSFo	Oral cancer slope factor (1/(mg/kg/d))	CS	CS
HQ	Hazard quotient	CS	CS
RfDo	Oral reference dose (mg/kg/d)	CS	CS
Cs	Concentration of chemical in soil (mg/kg)	CS	CS
CF	Conversion factor (kg/mg)	1E-06	1E-06
AF	Soil to skin adherence factor (mg/cm <sup>2</sup> -event)	0.2	0.2
ABS	Absorption fraction	CS	CS
SA	Skin surface area available for contact (cm <sup>2</sup> )	5000	2000
EF	Exposure Frequency (d/yr)	100	100
ED	Exposure Duration (yrs)	9	6
BW	Body weight (kg)	70	15
ATc	Averaging time, carcinogens (d)	25550	25550
ATn	Averaging time, noncarcinogens (d)	3285	2190
AE	Adjustment for Absorption Efficiency	CS	CS

Parameter	Cs (mg/kg)	ABS	CSFo 1/(mg/kg/d)	RfDo (mg/kg/d)	AE	Adj. CSFo 1/(mg/kg/d)	Adj. RfDo (mg/kg/d)	Adult Residents						Child Residents					
								Carcinogens			Noncarcinogens			Carcinogens			Noncarcinogens		
								DAD (mg/kg/d)	ILCR	% Contrib. Total ILCR	DAD (mg/kg/d)	HQ	% Contrib. HI	DAD (mg/kg/d)	ILCR	% Contrib. Total ILCR	DAD (mg/kg/d)	HQ	% Contrib. HI
Benzo(a)pyrene	1.3E+00	0.01	7.30E+00	NA	0.5	1.46E+01	NA	6.6E-09	9.7E-08	94.3%	5.2E-08	-	0.0%	8.2E-09	1.2E-07	94.3%	9.6E-08	-	0.0%
Aluminum	5.6E+03	0.001	NA	1.00E+00	0.2	NA	2.00E-01	2.8E-06	-	0.0%	2.2E-05	1.1E-04	31.9%	3.5E-06	-	0.0%	4.1E-05	2.1E-04	31.9%
Arsenic	6.7E-01	0.001	1.50E+00	3.00E-04	0.2	7.50E+00	6.00E-05	3.4E-10	2.5E-09	2.5%	2.6E-09	4.4E-05	12.7%	4.2E-10	3.1E-09	2.5%	4.9E-09	8.2E-05	12.7%
Beryllium	3.1E-01	0.001	4.30E+00	5.00E-03	0.2	2.15E+01	1.00E-03	1.6E-10	3.4E-09	3.3%	1.2E-09	1.2E-06	0.4%	1.9E-10	4.2E-09	3.3%	2.3E-09	2.3E-06	0.4%
Iron	2.9E+03	0.001	NA	3.00E-01	0.2	NA	6.00E-02	1.5E-06	-	0.0%	1.1E-05	1.9E-04	55.1%	1.8E-06	-	0.0%	2.1E-05	3.5E-04	55.1%
								Total ILCR: 1.0E-07 100.0%			HI: 3.5E-04 100.0%			Total ILCR: 1.3E-07 100.0%			HI: 6.4E-04 100.0%		

NOTES:  
 NA - Toxicity criterion not available.  
 - Not applicable.

**EXAMPLE GROUNDWATER INGESTION CALCULATIONS  
OPERABLE UNIT NO. 16  
CONTRACT TASK ORDER 0356**

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

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

Where:

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

**Risks:**

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

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

**Example Carcinogen: Tetrachloroethene**

$$\text{Intake (mg/kg}\cdot\text{day)} = \frac{0.0651 \text{ mg/L} \times 2 \text{ L/day} \times 350 \text{ days/yr} \times 30 \text{ yrs}}{70 \text{ kg} \times 25,550 \text{ days}}$$

$$= 7.6\text{E-}07$$

$$\text{Risk} = 7.6\text{E-}04 \text{ mg/kg}\cdot\text{day} \times 5.2\text{E-}02 \text{ mg/kg}\cdot\text{day}^{-1} = 4.0\text{E-}05$$

**Example Noncarcinogen: Iron**

$$\text{Intake (mg/kg}\cdot\text{day)} = \frac{4.33 \text{ mg/L} \times 2 \text{ L/day} \times 350 \text{ days/yr} \times 30 \text{ yrs}}{70 \text{ kg} \times 10,950 \text{ days}}$$

$$= 1.2\text{E-}01$$

$$\text{Risk} = \frac{1.2\text{E-}01 \text{ mg/kg}\cdot\text{day}}{3.0\text{E-}01 \text{ mg/kg}\cdot\text{day}} = 4.0\text{E-}01$$

Re: Site 93 Future Residential Adult

GROUNDWATER INGESTION EXPOSURE ASSESSMENT-RME  
 SITE 89  
 REMEDIAL INVESTIGATION CTO-356  
 MCB CAMP LEJEUNE, NORTH CAROLINA  
 FUTURE ON-SITE RESIDENTS

$$\text{CDI (mg/kg/d)} = (\text{Cw} \cdot \text{IR} \cdot \text{EF} \cdot \text{ED}) / (\text{BW} \cdot \text{AT})$$

$$\text{ILCR} = \text{CDI} \cdot \text{CSFo}$$

$$\text{HQ} = \text{CDI} / \text{RfDo}$$

Parameter	Description	Younger Child (0-6 Yrs Old)	
		Adult	Child
CDI	Chronic daily intake (mg/kg/d)	CS	CS (Chemical Specific)
ILCR	Incremental lifetime cancer risk	CS	CS
CSFo	Oral cancer slope factor (1/(mg/kg/d))	CS	CS
HQ	Hazard quotient	CS	CS
RfDo	Oral reference dose (mg/kg/d)	CS	CS
Cw	Concentration of chemical in water (mg/L)	CS	CS
IR	Ingestion Rate (L/d)	2	1
EF	Exposure Frequency (d/yr)	350	350
ED	Exposure Duration (yrs)	30	6
BW	Body weight (kg)	70	15
ATc	Averaging time, carcinogens (d)	25550	25550
ATn	Averaging time, noncarcinogens (d)	10950	2190

Parameter	Cw (mg/L)	CSFo 1/(mg/kg/d)	RfDo (mg/kg/d)	Adult Residents						Child Residents					
				Carcinogens			Noncarcinogens			Carcinogens			Noncarcinogens		
				CDI (mg/kg/d)	ILCR	% Contrib. Total ILCR	CDI (mg/kg/d)	HQ	% Contrib. HI	CDI (mg/kg/d)	ILCR	% Contrib. Total ILCR	CDI (mg/kg/d)	HQ	% Contrib. HI
1,1,2,2-Tetrachloroethane	0.004	2.00E-01	NA	4.7E-05	9.4E-06	0.3%	1.1E-04	--	0.0%	2.2E-05	4.4E-06	0.3%	2.6E-04	--	0.0%
1,1,2-Trichloroethane	0.003	5.70E-02	4.00E-03	3.5E-05	2.0E-06	0.1%	8.2E-05	2.1E-02	0.2%	1.6E-05	9.4E-07	0.1%	1.9E-04	4.8E-02	0.2%
1,1-Dichloroethene	0.002	6.00E-01	9.00E-03	2.3E-05	1.4E-05	0.5%	5.5E-05	6.1E-03	0.1%	1.1E-05	6.6E-06	0.5%	1.3E-04	1.4E-02	0.1%
1,2-Dichloroethene (total)	0.88	NA	9.00E-03	1.0E-02	--	0.0%	2.4E-02	2.7E+00	23.3%	4.8E-03	--	0.0%	5.6E-02	6.3E+00	23.3%
Cis-1,2-Dichloroethene	0.818	NA	1.00E-02	9.6E-03	--	0.0%	2.2E-02	2.2E+00	19.5%	4.5E-03	--	0.0%	5.2E-02	5.2E+00	19.5%
Tetrachloroethene	0.0427	5.20E-02	1.00E-02	5.0E-04	2.6E-05	0.9%	1.2E-03	1.2E-01	1.0%	2.3E-04	1.2E-05	0.9%	2.7E-03	2.7E-01	1.0%
Trans-1,2-Dichloroethene	0.451	NA	2.00E-02	5.3E-03	--	0.0%	1.2E-02	6.2E-01	5.4%	2.5E-03	--	0.0%	2.9E-02	1.4E+00	5.4%
Trichloroethene	0.7443	1.10E-02	6.00E-03	8.7E-03	9.6E-05	3.2%	2.0E-02	3.4E+00	29.5%	4.1E-03	4.5E-05	3.2%	4.8E-02	7.9E+00	29.5%
Vinyl Chloride	0.13	1.90E+00	NA	1.5E-03	2.9E-03	95.2%	3.6E-03	--	0.0%	7.1E-04	1.4E-03	95.2%	8.3E-03	--	0.0%
Antimony	0.0022	NA	4.00E-04	2.6E-05	--	0.0%	6.0E-05	1.5E-01	1.3%	1.2E-05	--	0.0%	1.4E-04	3.5E-01	1.3%
Iron	20	NA	3.00E-01	2.3E-01	--	0.0%	5.5E-01	1.8E+00	15.9%	1.1E-01	--	0.0%	1.3E+00	4.3E+00	15.9%
Manganese	0.379	NA	2.30E-02	4.5E-03	--	0.0%	1.0E-02	4.5E-01	3.9%	2.1E-03	--	0.0%	2.4E-02	1.1E+00	3.9%
				Total ILCR:	3.0E-03	100.0%	HI: 1.2E+01 100.0%			Total ILCR:	1.4E-03	100.0%	HI: 2.7E+01 100.0%		

NOTES:

NA - Toxicity criterion not available.

-- Not applicable.

GROUNDWATER INGESTION EXPOSURE ASSESSMENT-CT  
 SITE 89  
 REMEDIAL INVESTIGATION CTO-356  
 MCB CAMP LEJEUNE, NORTH CAROLINA  
 FUTURE ON-SITE RESIDENTS

$$CDI \text{ (mg/kg/d)} = (C_w \cdot IR \cdot EF \cdot ED) / (BW \cdot AT)$$

$$ILCR = CDI \cdot CSFo$$

$$HQ = CDI / RfDo$$

Parameter	Description	Younger Child (0-6 Yrs Old)	
		Adult	Child
CDI	Chronic daily intake (mg/kg/d)	CS	CS
ILCR	Incremental lifetime cancer risk	CS	CS
CSFo	Oral cancer slope factor (1/(mg/kg/d))	CS	CS
HQ	Hazard quotient	CS	CS
RfDo	Oral reference dose (mg/kg/d)	CS	CS
Cw	Concentration of chemical in water (mg/L)	CS	CS
IR	Ingestion Rate (L/d)	1.4	1
EF	Exposure Frequency (d/yr)	234	234
ED	Exposure Duration (yrs)	9	6
BW	Body weight (kg)	70	15
ATc	Averaging time, carcinogens (d)	25550	25550
ATn	Averaging time, noncarcinogens (d)	3285	2190

Parameter	Cw (mg/L)	CSFo 1/(mg/kg/d)	RfDo (mg/kg/d)	Adult Residents						Child Residents					
				Carcinogens			Noncarcinogens			Carcinogens			Noncarcinogens		
				CDI (mg/kg/d)	ILCR	% Contrib. Total ILCR	CDI (mg/kg/d)	HQ	% Contrib. HI	CDI (mg/kg/d)	ILCR	% Contrib. Total ILCR	CDI (mg/kg/d)	HQ	% Contrib. HI
1,1,2,2-Tetrachloroethane	0.004	2.00E-01	NA	6.6E-06	1.3E-06	1.4%	5.1E-05	-	0.0%	1.5E-05	2.9E-06	1.4%	1.7E-04	-	0.0%
1,1,2-Trichloroethane	0.003	5.70E-02	4.00E-03	4.9E-06	2.8E-07	0.3%	3.8E-05	9.6E-03	1.2%	1.1E-05	6.3E-07	0.3%	1.3E-04	3.2E-02	1.2%
1,1-Dichloroethene	0.002	6.00E-01	9.00E-03	3.3E-06	2.0E-06	2.0%	2.6E-05	2.8E-03	0.4%	7.3E-06	4.4E-06	2.0%	8.5E-05	9.5E-03	0.4%
1,2-Dichloroethene (total)	0.0964	NA	9.00E-03	1.6E-04	-	0.0%	1.2E-03	1.4E-01	17.1%	3.5E-04	-	0.0%	4.1E-03	4.6E-01	17.1%
Cis-1,2-Dichloroethene	0.06207	NA	1.00E-02	1.0E-04	-	0.0%	8.0E-04	8.0E-02	9.9%	2.3E-04	-	0.0%	2.7E-03	2.7E-01	9.9%
Tetrachloroethene	0.00469	5.20E-02	1.00E-02	7.7E-06	4.0E-07	0.4%	6.0E-05	6.0E-03	0.7%	1.7E-05	8.9E-07	0.4%	2.0E-04	2.0E-02	0.7%
Trans-1,2-Dichloroethene	0.17367	NA	2.00E-02	2.9E-04	-	0.0%	2.2E-03	1.1E-01	13.8%	6.4E-04	-	0.0%	7.4E-03	3.7E-01	13.8%
Trichloroethene	0.11149	1.10E-02	6.00E-03	1.8E-04	2.0E-06	2.1%	1.4E-03	2.4E-01	29.6%	4.1E-04	4.5E-06	2.1%	4.8E-03	7.9E-01	29.6%
Vinyl Chloride	0.02897	1.90E+00	NA	4.8E-05	9.1E-05	93.8%	3.7E-04	-	0.0%	1.1E-04	2.0E-04	93.8%	1.2E-03	-	0.0%
Antimony	0.00129	NA	4.00E-04	2.1E-06	-	0.0%	1.7E-05	4.1E-02	5.1%	4.7E-06	-	0.0%	5.5E-05	1.4E-01	5.1%
Iron	2.81381	NA	3.00E-01	4.6E-03	-	0.0%	3.6E-02	1.2E-01	15.0%	1.0E-02	-	0.0%	1.2E-01	4.0E-01	15.0%
Manganese	0.10351	NA	2.30E-02	1.7E-04	-	0.0%	1.3E-03	5.8E-02	7.2%	3.8E-04	-	0.0%	4.4E-03	1.9E-01	7.2%
				Total ILCR: 9.7E-05 100.0%			HI: 8.0E-01 100.0%			Total ILCR: 2.1E-04 100.0%			HI: 2.7E+00 100.0%		

NOTES:  
 NA - Toxicity criterion not available.  
 - Not applicable.

GROUNDWATER INGESTION EXPOSURE ASSESSMENT - RME  
 SITE 93  
 REMEDIAL INVESTIGATION CTO-356  
 MCB CAMP LEJEUNE, NORTH CAROLINA  
 FUTURE ON-SITE RESIDENTS

$$CDI (mg/kg/d) = (C_w * IR * EF * ED) / (BW * AT)$$

$$ILCR = CDI * CSFo$$

$$HQ = CDI / RfDo$$

Parameter	Description	Younger Child (0-6 Yrs Old)		(Chemical Specific)
		Adult	Child	
CDI	Chronic daily intake (mg/kg/d)	CS	CS	
ILCR	Incremental lifetime cancer risk	CS	CS	
CSFo	Oral cancer slope factor (1/(mg/kg/d))	CS	CS	
HQ	Hazard quotient	CS	CS	
RfDo	Oral reference dose (mg/kg/d)	CS	CS	
Cw	Concentration of chemical in water (mg/L)	CS	CS	
IR	Ingestion Rate (L/d)	2	1	
EF	Exposure Frequency (d/yr)	350	350	
ED	Exposure Duration (yrs)	30	6	
BW	Body weight (kg)	70	15	
ATc	Averaging time, carcinogens (d)	25550	25550	
ATn	Averaging time, noncarcinogens (d)	10950	2190	

Parameter	Cw (mg/L)	CSFo 1/(mg/kg/d)	RfDo (mg/kg/d)	Adult Residents						Child Residents										
				Carcinogens			Noncarcinogens			Carcinogens			Noncarcinogens							
				CDI (mg/kg/d)	ILCR	% Contrib. Total ILCR	CDI (mg/kg/d)	HQ	% Contrib. HI	CDI (mg/kg/d)	ILCR	% Contrib. Total ILCR	CDI (mg/kg/d)	HQ	% Contrib. HI					
1,2-Dichloroethene (total)	0.092	NA	9.00E-03	1.1E-03	--	0.0%	2.5E-03	2.8E-01	10.5%	5.0E-04	--	0.0%	5.9E-03	6.5E-01	10.5%					
Cis-1,2-Dichloroethene	0.175	NA	1.00E-02	2.1E-03	--	0.0%	4.8E-03	4.8E-01	18.1%	9.6E-04	--	0.0%	1.1E-02	1.1E+00	18.1%					
Tetrachloroethene	0.0651	5.20E-02	1.00E-02	7.6E-04	4.0E-05	33.0%	1.8E-03	1.8E-01	6.7%	3.6E-04	1.9E-05	33.0%	4.2E-03	4.2E-01	6.7%					
Trans-1,2-Dichloroethene	0.057	NA	2.00E-02	6.7E-04	--	0.0%	1.6E-03	7.8E-02	2.9%	3.1E-04	--	0.0%	3.6E-03	1.8E-01	2.9%					
Trichloroethene	0.0394	1.10E-02	6.00E-03	4.6E-04	5.1E-06	4.2%	1.1E-03	1.8E-01	6.8%	2.2E-04	2.4E-06	4.2%	2.5E-03	4.2E-01	6.8%					
Antimony	0.0023	NA	4.00E-04	2.7E-05	--	0.0%	6.3E-05	1.6E-01	5.9%	1.3E-05	--	0.0%	1.5E-04	3.7E-01	5.9%					
Arsenic	0.0043	1.50E+00	3.00E-04	5.0E-05	7.6E-05	62.8%	1.2E-04	3.9E-01	14.8%	2.4E-05	3.5E-05	62.8%	2.7E-04	9.2E-01	14.8%					
Iron	4.33	NA	3.00E-01	5.1E-02	--	0.0%	1.2E-01	4.0E-01	14.9%	2.4E-02	--	0.0%	2.8E-01	9.2E-01	14.9%					
Lead	0.164	NA	NA	1.9E-03	--	0.0%	4.5E-03	--	0.0%	9.0E-04	--	0.0%	1.0E-02	--	0.0%					
Manganese	0.432	NA	2.30E-02	5.1E-03	--	0.0%	1.2E-02	5.1E-01	19.4%	2.4E-03	--	0.0%	2.8E-02	1.2E+00	19.4%					
				Total ILCR:		1.2E-04	100.0%		HI: 2.7E+00		100.0%		Total ILCR: 5.6E-05		100.0%		HI: 6.2E+00		100.0%	

NOTES:  
 NA - Toxicity criterion not available.  
 -- Not applicable.

GROUNDWATER INGESTION EXPOSURE ASSESSMENT - CT  
 SITE 93  
 REMEDIAL INVESTIGATION CTO-356  
 MCB CAMP LEJEUNE, NORTH CAROLINA  
 FUTURE ON-SITE RESIDENTS

$CDI (mg/kg/d) = (Cw \cdot IR \cdot EF \cdot ED) / (BW \cdot AT)$   
 $ILCR = CDI \cdot CSFo$   
 $HQ = CDI / RfDo$

Parameter	Description	Adult	Younger Child (0-6 Yrs Old)	
			Adult	Younger Child (0-6 Yrs Old)
CDI	Chronic daily intake (mg/kg/d)	CS	CS	(Chemical Specific)
ILCR	Incremental lifetime cancer risk	CS	CS	
CSFo	Oral cancer slope factor (1/(mg/kg/d))	CS	CS	
HQ	Hazard quotient	CS	CS	
RfDo	Oral reference dose (mg/kg/d)	CS	CS	
Cw	Concentration of chemical in water (mg/L)	CS	CS	
IR	Ingestion Rate (L/d)	1.4	1	
EF	Exposure Frequency (d/yr)	234	234	
ED	Exposure Duration (yrs)	9	6	
BW	Body weight (kg)	70	15	
ATc	Averaging time, carcinogens (d)	25550	25550	
ATn	Averaging time, noncarcinogens (d)	3285	2190	

Parameter	Cw (mg/L)	CSFo 1/(mg/kg/d)	RfDo (mg/kg/d)	Adult Residents						Child Residents					
				Carcinogens			Noncarcinogens			Carcinogens			Noncarcinogens		
				CDI (mg/kg/d)	ILCR	% Contrib. Total ILCR	CDI (mg/kg/d)	HQ	% Contrib. HI	CDI (mg/kg/d)	ILCR	% Contrib. Total ILCR	CDI (mg/kg/d)	HQ	% Contrib. HI
1,2-Dichloroethene (total)	0.02089	NA	9.00E-03	3.4E-05	--	0.0%	2.7E-04	3.0E-02	4.8%	7.7E-05	--	0.0%	8.9E-04	9.9E-02	4.8%
Cis-1,2-Dichloroethene	0.03042	NA	1.00E-02	5.0E-05	--	0.0%	3.8E-04	3.9E-02	6.4%	1.1E-04	--	0.0%	1.3E-03	1.3E-01	6.4%
Tetrachloroethene	0.00558	5.20E-02	1.00E-02	9.2E-06	4.8E-07	7.8%	7.2E-05	7.2E-03	1.2%	2.0E-05	1.1E-06	7.8%	2.4E-04	2.4E-02	1.2%
Trans-1,2-Dichloroethene	0.00686	NA	2.00E-02	1.1E-05	--	0.0%	8.8E-05	4.4E-03	0.7%	2.5E-05	--	0.0%	2.9E-04	1.5E-02	0.7%
Trichloroethene	0.0394	1.10E-02	6.00E-03	6.5E-05	7.1E-07	11.6%	5.1E-04	8.4E-02	13.7%	1.4E-04	1.6E-06	11.6%	1.7E-03	2.8E-01	13.7%
Antimony	0.00126	NA	4.00E-04	2.1E-06	--	0.0%	1.6E-05	4.0E-02	6.6%	4.6E-06	--	0.0%	5.4E-05	1.3E-01	6.6%
Arsenic	0.00201	1.50E+00	3.00E-04	3.3E-06	5.0E-06	80.6%	2.6E-05	8.6E-02	14.0%	7.4E-06	1.1E-05	80.6%	8.6E-05	2.9E-01	14.0%
Iron	4.22228	NA	3.00E-01	7.0E-03	--	0.0%	5.4E-02	1.8E-01	29.4%	1.5E-02	--	0.0%	1.8E-01	6.0E-01	29.4%
Lead	0.04914	NA	NA	8.1E-05	--	0.0%	6.3E-04	--	0.0%	1.8E-04	--	0.0%	2.1E-03	--	0.0%
Manganese	0.2564	NA	2.30E-02	4.2E-04	--	0.0%	3.3E-03	1.4E-01	23.3%	9.4E-04	--	0.0%	1.1E-02	4.8E-01	23.3%
				Total ILCR:	6.2E-06	100.0%	HI:	6.1E-01	100.0%	Total ILCR:	1.4E-05	100.0%	HI:	2.0E+00	100.0%

NOTES:

- NA - Toxicity criterion not available.
- Not applicable.

**EXAMPLE DERMAL CONTACT WITH GROUNDWATER CALCULATIONS  
OPERABLE UNIT NO. 16  
CONTRACT TASK ORDER 0356**

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

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

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)
IR	=	Ingestion rate (L/day)
BW	=	Body weight (kg)
AT <sub>c</sub>	=	Averaging time carcinogen (days)
AT <sub>nc</sub>	=	Averaging time noncarcinogen (days)

**Risks:**

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

**Example Carcinogen: Benzene**

$$\begin{aligned} \text{Intake (mg/kg·day)} &= \frac{0.0651 \text{ mg/L} \times 1.0\text{E-}03 \text{ L/cm}^3 \times 23,000 \text{ cm}^2/\text{event} \times 4.8\text{E-}02 \text{ cm/hr} \times 0.25 \text{ hr/day} \times 350 \text{ days/yr} \times 30 \text{ yrs}}{70 \text{ kg} \times 25,550 \text{ days}} \\ &= 1.1\text{E-}04 \end{aligned}$$

$$\text{Risk} = 1.1\text{E-}04 \text{ mg/kg·day} \times 6.5\text{E-}02 \text{ mg/kg·day}^{-1} = 6.9\text{E-}06$$

**Example Noncarcinogen: Iron**

$$\begin{aligned} \text{Intake (mg/kg·day)} &= \frac{4.33 \text{ mg/L} \times 1.0\text{E-}03 \text{ L/cm}^3 \times 23,000 \text{ cm}^2/\text{event} \times 1.0\text{E-}03 \text{ cm/hr} \times 0.25 \text{ hr/day} \times 350 \text{ days/yr} \times 30 \text{ yrs}}{70 \text{ kg} \times 10,950 \text{ days}} \\ &= 3.4\text{E-}04 \end{aligned}$$

$$\text{Risk} = \frac{3.4\text{E-}04 \text{ mg/kg·day}}{6.0\text{E-}02 \text{ mg/kg·day}} = 5.7\text{E-}03$$

Re: Site 93 Future Residential Adult

GROUNDWATER DERMAL CONTACT EXPOSURE ASSESSMENT - RME  
 SITE 89  
 REMEDIAL INVESTIGATION CTO-356  
 MCB CAMP LEJEUNE, NORTH CAROLINA  
 FUTURE ON-SITE RESIDENTS

$$DAD (mg/kg/d) = (C_w * C_f * K_p * S_A * E_f * E_d * E_t) / (B_w * A_t)$$

$$ILCR = CDI * CSF_o Adj \quad CSF Adj = CSF / AE$$

$$HQ = CDI / RfDo Adj \quad RfD Adj = RfD * AE$$

Parameter	Description	Adult	Younger Child (0-6 Yrs Old)
DAD	Dermally absorbed dose (mg/kg/d)	CS	CS (Chemical Specific)
ILCR	Incremental lifetime cancer risk	CS	CS
CSFo	Oral cancer slope factor (1/(mg/kg/d))	CS	CS
HQ	Hazard quotient	CS	CS
RfDo	Oral reference dose (mg/kg/d)	CS	CS
SA	Skin surface area available for contact (cm <sup>2</sup> )	23000	10000
ET	Exposure frequency (d/yr)	350	350
ED	Exposure duration (yrs)	30	6
ET	Exposure time (hrs/day)	0.25	0.25
BW	Body weight (kg)	70	15
Atc	Averaging time, carcinogens (d)	25550	25550
ATn	Averaging time, noncarcinogens (d)	10950	2190
Cw	Concentration of chemical in water (mg/L)	CS	CS
CF	Conversion factor (L/cm <sup>3</sup> )	0.001	0.001
Kp	Dermal permeability coefficient (cm/hour)	CS	CS
AE	Adjustment for Absorption Efficiency	CS	CS

Parameter	Cw (mg/L)	Kp (cm/hour)	CSFo (1/(mg/kg/d))	RfDo (mg/kg/d)	AE (unitless)	Adj CSFo (1/(mg/kg/d))	Adj RfDo (mg/kg/d)	Adult Residents						Child Residents							
								Carcinogens			Noncarcinogens			Carcinogens			Noncarcinogens				
								DAD (mg/kg/d)	ILCR	% Contrib. Total ILCR	DAD (mg/kg/d)	HQ	% Contrib. HI	DAD (mg/kg/d)	ILCR	% Contrib. Total ILCR	DAD (mg/kg/d)	HQ	% Contrib. HI		
1,1,2,2-Tetrachloroethane	0.004	9.00E-03	2.00E-01	NA	0.80	2.50E-01	NA	1.2E-06	3.0E-07	0.3%	2.8E-06	-	0.0%	4.9E-07	1.2E-07	0.3%	5.8E-06	-	0.0%		
1,1,2-Trichloroethane	0.003	8.40E-03	5.70E-02	4.00E-03	0.80	7.13E-02	3.20E-03	8.5E-07	6.1E-08	0.1%	2.0E-06	6.2E-04	0.1%	3.5E-07	2.5E-08	0.1%	4.0E-06	1.3E-03	0.1%		
1,1-Dichloroethene	0.002	1.60E-02	6.00E-01	9.00E-03	0.80	7.50E-01	7.20E-03	1.1E-06	8.1E-07	0.9%	2.5E-06	3.5E-04	0.1%	4.4E-07	3.3E-07	0.9%	5.1E-06	7.1E-04	0.1%		
1,2-Dichloroethene (total)	0.88	1.00E-02	NA	9.00E-03	0.80	NA	7.20E-03	3.0E-04	-	0.0%	6.9E-04	9.6E-02	21.4%	1.2E-04	-	0.0%	1.4E-03	2.0E-01	21.4%		
Cis-1,2-Dichloroethene	0.818	1.00E-02	NA	1.00E-02	0.80	NA	8.00E-03	2.8E-04	-	0.0%	6.4E-04	8.1E-02	17.9%	1.1E-04	-	0.0%	1.3E-03	1.6E-01	17.9%		
Tetrachloroethene	0.0427	4.80E-02	5.20E-02	1.00E-02	0.80	6.50E-02	8.00E-03	6.9E-05	4.5E-06	5.2%	1.6E-04	2.0E-02	4.5%	2.8E-05	1.8E-06	5.2%	3.3E-04	4.1E-02	4.5%		
Trans-1,2-Dichloroethene	0.451	1.00E-02	NA	2.00E-02	0.80	NA	1.60E-02	1.5E-04	-	0.0%	3.6E-04	2.2E-02	4.9%	6.2E-05	-	0.0%	7.2E-04	4.5E-02	4.9%		
Trichloroethene	0.7443	1.60E-02	1.10E-02	6.00E-03	0.80	1.38E-02	4.80E-03	4.0E-04	5.5E-06	6.3%	9.4E-04	2.0E-01	43.4%	1.6E-04	2.2E-06	6.3%	1.9E-03	4.0E-01	43.4%		
Vinyl Chloride	0.13	7.30E-03	1.90E+00	NA	0.80	2.37E+00	NA	3.2E-05	7.6E-05	87.2%	7.5E-05	-	0.0%	1.3E-05	3.1E-05	87.2%	1.5E-04	-	0.0%		
Antimony	0.0022	1.00E-03	NA	4.00E-04	0.20	NA	8.00E-05	7.4E-08	-	0.0%	1.7E-07	2.2E-03	0.5%	3.0E-08	-	0.0%	3.5E-07	4.4E-03	0.5%		
Iron	20	1.00E-03	NA	3.00E-01	0.20	NA	6.00E-02	6.8E-04	-	0.0%	1.6E-03	2.6E-02	5.8%	2.7E-04	-	0.0%	3.2E-03	5.3E-02	5.8%		
Manganese	0.379	1.00E-03	NA	2.30E-02	0.20	NA	4.60E-03	1.3E-05	-	0.0%	3.0E-05	6.5E-03	1.4%	5.2E-06	-	0.0%	6.1E-05	1.3E-02	1.4%		
								Total ILCR:	8.7E-05	100.0%	HI: 4.5E-01			100.0%	Total ILCR:	3.5E-05	100.0%	HI: 9.1E-01			100.0%

NOTES:  
 NA - Toxicity criterion not available.  
 - Not applicable.



GROUNDWATER DERMAL CONTACT EXPOSURE ASSESSMENT - CT  
 SITE 89  
 REMEDIAL INVESTIGATION CTO-356  
 MCB CAMP LEJEUNE, NORTH CAROLINA  
 FUTURE ON-SITE RESIDENTS

$$DAD \text{ (mg/kg/d)} = (C_w * C_f * K_p * S_A * E_f * E_d * E_t) / (B_w * A_T)$$

ILCR = CDI \* CSF<sub>o</sub> Adj      CSF Adj = CSF/AE  
 HQ = CDI/RfDo Adj      RID Adj = RID \* AE

Parameter	Description	Adult	Younger Child (0-6 Yrs Old)	(Chemical Specific)
DAD	Dermally absorbed dose (mg/kg/d)	CS	CS	
ILCR	Incremental lifetime cancer risk	CS	CS	
CSFo	Oral cancer slope factor (1/(mg/kg/d))	CS	CS	
HQ	Hazard quotient	CS	CS	
RfDo	Oral reference dose (mg/kg/d)	CS	CS	
SA	Skin surface area available for contact (cm <sup>2</sup> )	20000	7930	
ET	Exposure frequency (d/yr)	234	234	
ED	Exposure duration (yrs)	9	6	
ET	Exposure time (hrs/day)	0.25	0.25	
BW	Body weight (kg)	70	15	
ATc	Averaging time, carcinogens (d)	25550	25550	
ATn	Averaging time, noncarcinogens (d)	3285	2190	
Cw	Concentration of chemical in water (mg/L)	CS	CS	
CF	Conversion factor (L/cm <sup>3</sup> )	0.001	0.001	
Kp	Dermal permeability coefficient (cm/hour)	CS	CS	
AE	Adjustment for Absorption Efficiency	CS	CS	

Parameter	Cw (mg/L)	Kp (cm/hour)	CSFo 1/(mg/kg/d)	RfDo (mg/kg/d)	AE (unitless)	Adj CSFo 1/(mg/kg/d)	Adj RfDo (mg/kg/d)	Adult Residents						Child Residents																	
								Carcinogens			Noncarcinogens			Carcinogens			Noncarcinogens														
								DAD (mg/kg/d)	ILCR	% Contrib. Total ILCR	DAD (mg/kg/d)	HQ	% Contrib. HI	DAD (mg/kg/d)	ILCR	% Contrib. Total ILCR	DAD (mg/kg/d)	HQ	% Contrib. HI												
1,1,2,2-Tetrachloroethane	0.004	9.00E-03	2.00E-01	NA	0.80	2.50E-01	NA	2.1E-07	5.3E-08	1.6%	1.6E-06	—	0.0%	2.6E-07	6.5E-08	1.6%	3.1E-06	—	0.0%												
1,1,2-Trichloroethane	0.003	8.40E-03	5.70E-02	4.00E-03	0.80	7.13E-02	3.20E-03	1.6E-07	1.1E-08	0.3%	1.2E-06	3.6E-04	1.0%	1.8E-07	1.3E-08	0.3%	2.1E-06	6.7E-04	1.0%												
1,1-Dichloroethene	0.002	1.60E-02	6.00E-01	9.00E-03	0.80	7.50E-01	7.20E-03	1.9E-07	1.4E-07	4.2%	1.5E-06	2.0E-04	0.5%	2.3E-07	1.7E-07	4.2%	2.7E-06	3.8E-04	0.5%												
1,2-Dichloroethene (total)	0.0964	1.00E-02	NA	9.00E-03	0.80	NA	7.20E-03	5.7E-06	—	0.0%	4.4E-05	6.1E-03	16.4%	7.0E-06	—	0.0%	8.2E-05	1.1E-02	16.4%												
Cis-1,2-Dichloroethene	0.06207	1.00E-02	NA	1.00E-02	0.80	NA	8.00E-03	3.7E-06	—	0.0%	2.8E-05	3.6E-03	9.5%	4.5E-06	—	0.0%	5.3E-05	6.6E-03	9.5%												
Tetrachloroethene	0.00469	4.80E-02	5.20E-02	1.00E-02	0.80	6.50E-02	8.00E-03	1.3E-06	8.6E-08	2.5%	1.0E-05	1.3E-03	3.4%	1.6E-06	1.1E-07	2.5%	1.9E-05	2.4E-03	3.4%												
Trans-1,2-Dichloroethene	0.17367	1.00E-02	NA	2.00E-02	0.80	NA	1.60E-02	1.0E-05	—	0.0%	8.0E-05	5.0E-03	13.3%	1.3E-05	—	0.0%	1.5E-04	9.2E-03	13.3%												
Trichloroethene	0.11149	1.60E-02	1.10E-02	6.00E-03	0.80	1.38E-02	4.80E-03	1.1E-05	1.4E-07	4.3%	8.2E-05	1.7E-02	45.5%	1.3E-05	1.8E-07	4.3%	1.5E-04	3.1E-02	45.5%												
Vinyl Chloride	0.02897	7.30E-03	1.90E+00	NA	0.80	2.37E+00	NA	1.2E-06	3.0E-06	87.2%	9.7E-06	—	0.0%	1.5E-06	3.6E-06	87.2%	1.8E-05	—	0.0%												
Antimony	0.00129	1.00E-03	NA	4.00E-04	0.20	NA	8.00E-05	7.6E-09	—	0.0%	5.9E-08	7.4E-04	2.0%	9.4E-09	—	0.0%	1.1E-07	1.4E-03	2.0%												
Iron	2.81381	1.00E-03	NA	3.00E-01	0.20	NA	6.00E-02	1.7E-05	—	0.0%	1.3E-04	2.1E-03	5.7%	2.0E-05	—	0.0%	2.4E-04	4.0E-03	5.7%												
Manganese	0.10351	1.00E-03	NA	2.30E-02	0.20	NA	4.60E-03	6.1E-07	—	0.0%	4.7E-06	1.0E-03	2.8%	7.5E-07	—	0.0%	8.8E-06	1.9E-03	2.8%												
								Total ILCR: 3.4E-06			100.0%			HI: 3.7E-02			100.0%			Total ILCR: 4.2E-06			100.0%			HI: 6.9E-02			100.0%		

NOTES:  
 NA - Toxicity criterion not available.  
 — Not applicable.

GROUNDWATER DERMAL CONTACT EXPOSURE ASSESSMENT - RME  
 SITE 93  
 REMEDIAL INVESTIGATION CTO-356  
 MCB CAMP LEJEUNE, NORTH CAROLINA  
 FUTURE ON-SITE RESIDENTS

$$DAD (mg/kg/d) = (C_w * CF * K_p * SA * EF * ED * ET) / (BW * AT)$$

$$ILCR = CDI * CSF_o Adj \quad CSF Adj = CSF / AE$$

$$HQ = CDI / RfD_o Adj \quad RfD Adj = RfD * AE$$

Parameter	Description	Younger Child (0-6 Yrs Old)	
		Adult	Child
DAD	Dermally absorbed dose (mg/kg/d)	CS	CS (Chemical Specific)
ILCR	Incremental lifetime cancer risk	CS	CS
CSFo	Oral cancer slope factor (1/(mg/kg/d))	CS	CS
HQ	Hazard quotient	CS	CS
RfDo	Oral reference dose (mg/kg/d)	CS	CS
SA	Skin surface area available for contact (cm <sup>2</sup> )	23000	10000
ET	Exposure frequency (d/yr)	350	350
ED	Exposure duration (yrs)	30	6
ET	Exposure time (hrs/day)	0.25	0.25
BW	Body weight (kg)	70	15
ATc	Averaging time, carcinogens (d)	25550	25550
ATn	Averaging time, noncarcinogens (d)	10950	2190
Cw	Concentration of chemical in water (mg/L)	CS	CS
CF	Conversion factor (L/cm <sup>3</sup> )	0.001	0.001
Kp	Dermal permeability coefficient (cm/hour)	CS	CS
AE	Adjustment for Absorption Efficiency	CS	CS

Parameter	Cw (mg/L)	Kp (cm/hour)	CSFo (1/(mg/kg/d))	RfDo (mg/kg/d)	AE (unitless)	Adj CSFo (1/(mg/kg/d))	Adj RfDo (mg/kg/d)	Adult Residents						Child Residents							
								Carcinogens			Noncarcinogens			Carcinogens			Noncarcinogens				
								DAD (mg/kg/d)	ILCR	% Contrib.	DAD (mg/kg/d)	HQ	% Contrib.	DAD (mg/kg/d)	ILCR	% Contrib.	DAD (mg/kg/d)	HQ	% Contrib.		
1,2-Dichloroethene (total)	0.092	1.00E-02	NA	9.00E-03	0.80	NA	7.20E-03	3.1E-05	-	0.0%	7.2E-05	1.0E-02	10.9%	1.3E-05	-	0.0%	1.5E-04	2.0E-02	10.9%		
Cis-1,2-Dichloroethene	0.175	1.00E-02	NA	1.00E-02	0.80	NA	8.00E-03	5.9E-05	-	0.0%	1.4E-04	1.7E-02	18.7%	2.4E-05	-	0.0%	2.8E-04	3.5E-02	18.7%		
Tetrachloroethene	0.0651	4.80E-02	5.20E-02	1.00E-02	0.80	6.50E-02	8.00E-03	1.1E-04	6.9E-06	83.2%	2.5E-04	3.1E-02	33.4%	4.3E-05	2.8E-06	83.2%	5.0E-04	6.2E-02	33.4%		
Trans-1,2-Dichloroethene	0.057	1.00E-02	NA	2.00E-02	0.80	NA	1.60E-02	1.9E-05	-	0.0%	4.5E-05	2.8E-03	3.0%	7.8E-06	-	0.0%	9.1E-05	5.7E-03	3.0%		
Trichloroethene	0.0394	1.60E-02	1.10E-02	6.00E-03	0.80	1.38E-02	4.80E-03	2.1E-05	2.9E-07	3.6%	5.0E-05	1.0E-02	11.2%	8.6E-06	1.2E-07	3.6%	1.0E-04	2.1E-02	11.2%		
Antimony	0.0023	1.00E-03	NA	4.00E-04	0.20	NA	8.00E-05	7.8E-08	-	0.0%	1.8E-07	2.3E-03	2.5%	3.2E-08	-	0.0%	3.7E-07	4.6E-03	2.5%		
Arsenic	0.0043	1.00E-03	1.50E+00	3.00E-04	0.20	7.50E+00	6.00E-05	1.5E-07	1.1E-06	13.2%	3.4E-07	5.6E-03	6.1%	5.9E-08	4.4E-07	13.2%	6.9E-07	1.1E-02	6.1%		
Iron	4.33	1.00E-03	NA	3.00E-01	0.20	NA	6.00E-02	1.5E-04	-	0.0%	3.4E-04	5.7E-03	6.2%	5.9E-05	-	0.0%	6.9E-04	1.2E-02	6.2%		
Lead	0.164	1.00E-03	NA	NA	0.20	NA	NA	5.5E-06	-	0.0%	1.3E-05	-	0.0%	2.2E-06	-	0.0%	2.6E-05	-	0.0%		
Manganese	0.432	1.00E-03	NA	2.30E-02	0.20	NA	4.60E-03	1.5E-05	-	0.0%	3.4E-05	7.4E-03	8.0%	5.9E-06	-	0.0%	6.9E-05	1.5E-02	8.0%		
								Total ILCR:	8.2E-06	100.0%	HI: 9.2E-02			100.0%	Total ILCR:	3.3E-06	100.0%	HI: 1.9E-01			100.0%

NOTES:  
 NA - Toxicity criterion not available.  
 - Not applicable.

GROUNDWATER DERMAL CONTACT EXPOSURE ASSESSMENT - CT  
 SITE 93  
 REMEDIAL INVESTIGATION CTO-356  
 MCB CAMP LEJEUNE, NORTH CAROLINA  
 FUTURE ON-SITE RESIDENTS

$$DAD (mg/kg/d) = (Cw \cdot CF \cdot Kp \cdot SA \cdot EF \cdot ED \cdot ET) / (BW \cdot AT)$$

$$ILCR = CDI \cdot CSF_o \cdot Adj \quad CSF \text{ Adj} = CSF / AE$$

$$HQ = CDI / RfD_o \cdot Adj \quad RfD \text{ Adj} = RfD \cdot AE$$

Parameter	Description	Adult	Younger Child (0-6 Yrs Old)
DAD	Dermally absorbed dose (mg/kg/d)	CS	CS (Chemical Specific)
ILCR	Incremental lifetime cancer risk	CS	CS
CSF <sub>o</sub>	Oral cancer slope factor (1/(mg/kg/d))	CS	CS
HQ	Hazard quotient	CS	CS
RfD <sub>o</sub>	Oral reference dose (mg/kg/d)	CS	CS
SA	Skin surface area available for contact (cm <sup>2</sup> )	20000	7930
ET	Exposure frequency (d/yr)	234	234
ED	Exposure duration (yrs)	9	6
ET	Exposure time (hrs/day)	0.25	0.25
BW	Body weight (kg)	70	15
AT <sub>c</sub>	Averaging time, carcinogens (d)	25550	25550
AT <sub>n</sub>	Averaging time, noncarcinogens (d)	3285	2190
C <sub>w</sub>	Concentration of chemical in water (mg/L)	CS	CS
CF	Conversion factor (L/cm <sup>3</sup> )	0.001	0.001
K <sub>p</sub>	Dermal permeability coefficient (cm/hour)	CS	CS
AE	Adjustment for Absorption Efficiency	CS	CS

Parameter	C <sub>w</sub> (mg/L)	K <sub>p</sub> (cm/hour)	CSF <sub>o</sub> 1/(mg/kg/d)	RfD <sub>o</sub> (mg/kg/d)	AE (unitless)	Adj CSF <sub>o</sub> 1/(mg/kg/d)	Adj RfD <sub>o</sub> (mg/kg/d)	Adult Residents						Child Residents					
								Carcinogens			Noncarcinogens			Carcinogens			Noncarcinogens		
								DAD (mg/kg/d)	ILCR	% Contrib. Total ILCR	DAD (mg/kg/d)	HQ	% Contrib. HI	DAD (mg/kg/d)	ILCR	% Contrib. Total ILCR	DAD (mg/kg/d)	HQ	% Contrib. HI
1,2-Dichloroethene (total)	0.02089	1.00E-02	NA	9.00E-03	0.80	NA	7.20E-03	1.2E-06	--	0.0%	9.6E-06	1.3E-03	7.1%	1.5E-06	--	0.0%	1.8E-05	2.5E-03	7.1%
Cis-1,2-Dichloroethene	0.03042	1.00E-02	NA	1.00E-02	0.80	NA	8.00E-03	1.8E-06	--	0.0%	1.4E-05	1.7E-03	9.2%	2.2E-06	--	0.0%	2.6E-05	3.2E-03	9.2%
Tetrachloroethene	0.00558	4.80E-02	5.20E-02	1.00E-02	0.80	6.50E-02	8.00E-03	1.6E-06	1.0E-07	42.3%	1.2E-05	1.5E-03	8.1%	1.9E-06	1.3E-07	42.3%	2.3E-05	2.8E-03	8.1%
Trans-1,2-Dichloroethene	0.00686	1.00E-02	NA	2.00E-02	0.80	NA	1.60E-02	4.0E-07	--	0.0%	3.1E-06	2.0E-04	1.0%	5.0E-07	--	0.0%	5.8E-06	3.6E-04	1.0%
Trichloroethene	0.0394	1.60E-02	1.10E-02	6.00E-03	0.80	1.38E-02	4.80E-03	3.7E-06	5.1E-08	21.1%	2.9E-05	6.0E-03	31.9%	4.6E-06	6.3E-08	21.1%	5.3E-05	1.1E-02	31.9%
Antimony	0.00126	1.00E-03	NA	4.00E-04	0.20	NA	8.00E-05	7.4E-09	--	0.0%	5.8E-08	7.2E-04	3.8%	9.2E-09	--	0.0%	1.1E-07	1.3E-03	3.8%
Arsenic	0.00201	1.00E-03	1.50E+00	3.00E-04	0.20	7.50E+00	6.00E-05	1.2E-08	8.9E-08	36.6%	9.2E-08	1.5E-03	8.1%	1.5E-08	1.1E-07	36.6%	1.7E-07	2.8E-03	8.1%
Iron	4.22228	1.00E-03	NA	3.00E-01	0.20	NA	6.00E-02	2.5E-05	--	0.0%	1.9E-04	3.2E-03	17.1%	3.1E-05	--	0.0%	3.6E-04	6.0E-03	17.1%
Lead	0.04914	1.00E-03	NA	NA	0.20	NA	NA	2.9E-07	--	0.0%	2.3E-06	--	0.0%	3.6E-07	--	0.0%	4.2E-06	--	0.0%
Manganese	0.2564	1.00E-03	NA	2.30E-02	0.20	NA	4.60E-03	1.5E-06	--	0.0%	1.2E-05	2.6E-03	13.5%	1.9E-06	--	0.0%	2.2E-05	4.7E-03	13.5%
								Total ILCR: 2.4E-07 100.0%			HI: 1.9E-02 100.0%			Total ILCR: 3.0E-07 100.0%			HI: 3.5E-02 100.0%		

NOTES:  
 NA - Toxicity criterion not available.  
 -- Not applicable.

**EXAMPLE INHALATION OF GROUNDWATER VOLATILES CALCULATIONS  
OPERABLE UNIT NO. 16  
CONTRACT TASK ORDER 0356**

**Purpose:** Estimate intake/risk from the inhalation of groundwater volatiles

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

Where:

C	=	Contaminant concentration in shower air (mg/m <sup>3</sup> )
EF	=	Exposure frequency (days/year)
ED	=	Exposure duration (years)
ET	=	Exposure time (hr/day)
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: Tetrachloroethene**

$$\begin{aligned} \text{Intake (mg/kg}\cdot\text{day)} &= \frac{0.06594 \text{ mg/m}^3 \times 0.6 \text{ m}^3/\text{hr} \times 0.25\text{hr/day} \times 350 \text{ days/yr} \times 30 \text{ yrs}}{25,550 \text{ days} \times 70 \text{ kg}} \\ &= 5.8\text{E-}05 \end{aligned}$$

$$\text{Risk} = 5.8\text{E-}05 \text{ mg/kg}\cdot\text{day} \times 2.03\text{E-}03 \text{ mg/kg}\cdot\text{day}^{-1} = 1.2\text{E-}07$$

**Example Noncarcinogen: No carcinogenic COPC with inhalation RfD**

GROUNDWATER INHALATION EXPOSURE ASSESSMENT - RME  
 SITE 89  
 REMEDIAL INVESTIGATION CTO-356  
 MCB CAMP LEJEUNE, NORTH CAROLINA  
 FUTURE ON-SITE RESIDENTS

$$CDI \text{ (mg/kg/d)} = (CA \cdot RR \cdot ET \cdot EF \cdot ED) / (BW \cdot AT)$$

$$ILCR = CDI \cdot CSFI$$

$$HQ = CDI / RfDI$$

Parameter	Description	Adult	(Chemical Specific)
CDI	Chronic daily intake (mg/kg/d)	CS	
ILCR	Incremental lifetime cancer risk	CS	
CSFI	Oral cancer slope factor (1/(mg/kg/d))	CS	
HQ	Hazard quotient	CS	
RfDI	Oral reference dose (mg/kg/d)	CS	
CA	Concentration of volatilized chemical in shower air, Foster and Chrystowski Model (mg/m3)	CS	
RR	Respiration rate (m3/hr)	0.6	
ET	Exposure time (hrs/d)	0.25	
EF	Exposure Frequency (d/yr)	350	
ED	Exposure Duration (yrs)	30	
BW	Body weight (kg)	70	
ATc	Averaging time, carcinogens (d)	25550	
ATn	Averaging time, noncarcinogens (d)	10950	

Parameter	CA (mg/m3)	CSFI 1/(mg/kg/d)	RfDI (mg/kg/d)	Adult Residents					
				Carcinogens			Noncarcinogens		
				CDI (mg/kg/d)	ILCR	% Contrib. Total ILCR	CDI (mg/kg/d)	HQ	% Contrib. HI
1,1,2,2-Tetrachloroethane	0.00248	2.03E-01	NA	2.2E-06	4.4E-07	0.7%	5.1E-06	--	0.0%
1,1,2-Trichloroethane	0.00283	5.60E-02	NA	2.5E-06	1.4E-07	0.2%	5.8E-06	--	0.0%
1,1-Dichloroethene	0.00264	1.75E-01	NA	2.3E-06	4.1E-07	0.7%	5.4E-06	--	0.0%
1,2-Dichloroethene (total)	1.127	NA	NA	9.9E-04	0.0E+00	0.0%	2.3E-03	--	0.0%
Cis-1,2-Dichloroethene	1.0524	NA	NA	9.3E-04	0.0E+00	0.0%	2.2E-03	--	0.0%
Tetrachloroethene	0.04325	2.03E-03	NA	3.8E-05	7.7E-08	0.1%	8.9E-05	--	0.0%
Trans-1,2-Dichloroethene	0.57762	NA	NA	5.1E-04	0.0E+00	0.0%	1.2E-03	--	0.0%
Trichloroethene	0.83067	6.00E-03	NA	7.3E-04	4.4E-06	7.1%	1.7E-03	--	0.0%
Vinyl Chloride	0.212080	3.00E-01	NA	1.9E-04	5.6E-05	91.1%	4.4E-04	--	0.0%
Total ILCR:				6.1E-05	100.0%		HI: 0.0E+00		0.0%

NOTES:

-- Not applicable

GROUNDWATER INHALATION EXPOSURE ASSESSMENT - CT  
 SITE 89  
 REMEDIAL INVESTIGATION CTO-356  
 MCB CAMP LEJEUNE, NORTH CAROLINA  
 FUTURE ON-SITE RESIDENTS

$$CDI \text{ (mg/kg/d)} = (CA \cdot RR \cdot ET \cdot EF \cdot ED) / (BW \cdot AT)$$

$$ILCR = CDI \cdot CSFi$$

$$HQ = CDI / RfDi$$

Parameter	Description	Adult	
CDI	Chronic daily intake (mg/kg/d)	CS	(Chemical Specific)
ILCR	Incremental lifetime cancer risk	CS	
CSFi	Oral cancer slope factor (1/(mg/kg/d))	CS	
HQ	Hazard quotient	CS	
RfDi	Oral reference dose (mg/kg/d)	CS	
CA	Concentration of volatilized chemical in shower air, Foster and Chrystowski Model (mg/m3)	CS	
RR	Respiration rate (m3/hr)	0.6	
ET	Exposure time (hrs/d)	0.25	
EF	Exposure Frequency (d/yr)	234	
ED	Exposure Duration (yrs)	9	
BW	Body weight (kg)	70	
ATc	Averaging time, carcinogens (d)	25550	
ATn	Averaging time, noncarcinogens (d)	3285	

Parameter	CA (mg/m3)	CSFi 1/(mg/kg/d)	RfDi (mg/kg/d)	Adult Residents					
				Carcinogens			Noncarcinogens		
				CDI (mg/kg/d)	ILCR	% Contrib. Total ILCR	CDI (mg/kg/d)	HQ	% Contrib. HI
1,1,2,2-Tetrachloroethane	0.00248	2.03E-01	NA	4.4E-07	8.9E-08	3.1%	3.4E-06	--	0.0%
1,1,2-Trichloroethane	0.00283	5.60E-02	NA	5.0E-07	2.8E-08	1.0%	3.9E-06	--	0.0%
1,1-Dichloroethene	0.00264	1.75E-01	NA	4.7E-07	8.2E-08	2.9%	3.6E-06	--	0.0%
1,2-Dichloroethene (total)	0.12346	NA	NA	2.2E-05	0.0E+00	0.0%	1.7E-04	--	0.0%
Cis-1,2-Dichloroethene	0.07988	NA	NA	1.4E-05	0.0E+00	0.0%	1.1E-04	--	0.0%
Tetrachloroethene	0.00475	2.03E-03	NA	8.4E-07	1.7E-09	0.1%	6.5E-06	--	0.0%
Trans-1,2-Dichloroethene	0.22243	NA	NA	3.9E-05	0.0E+00	0.0%	3.1E-04	--	0.0%
Trichloroethene	0.12443	6.00E-03	NA	2.2E-05	1.3E-07	4.6%	1.7E-04	--	0.0%
Vinyl Chloride	0.047260	3.00E-01	NA	8.3E-06	2.5E-06	88.3%	6.5E-05	--	0.0%
Total ILCR:				2.8E-06		100.0%	HI: 0.0E+00		0.0%

NOTES:

-- Not applicable.

GROUNDWATER INHALATION EXPOSURE ASSESSMENT - RME  
 SITE 93  
 REMEDIAL INVESTIGATION CTO-356  
 MCB CAMP LEJEUNE, NORTH CAROLINA  
 FUTURE ON-SITE RESIDENTS

$$CDI \text{ (mg/kg/d)} = (CA \cdot RR \cdot ET \cdot EF \cdot ED) / (BW \cdot AT)$$

$$ILCR = CDI \cdot CSFi$$

$$HQ = CDI / RfDi$$

Parameter	Description	Adult
CDI	Chronic daily intake (mg/kg/d)	CS (Chemical Specific)
ILCR	Incremental lifetime cancer risk	CS
CSFi	Oral cancer slope factor (1/(mg/kg/d))	CS
HQ	Hazard quotient	CS
RfDi	Oral reference dose (mg/kg/d)	CS
CA	Concentration of volatilized chemical in shower air, Foster and Chrystowski Model (mg/m3)	CS
RR	Respiration rate (m3/hr)	0.6
ET	Exposure time (hrs/d)	0.25
EF	Exposure Frequency (d/yr)	350
ED	Exposure Duration (yrs)	30
BW	Body weight (kg)	70
ATc	Averaging time, carcinogens (d)	25550
ATn	Averaging time, noncarcinogens (d)	10950

Parameter	CA (mg/m3)	CSFi 1/(mg/kg/d)	RfDi (mg/kg/d)	Adult Residents					
				Carcinogens			Noncarcinogens		
				CDI (mg/kg/d)	ILCR	% Contrib. Total ILCR	CDI (mg/kg/d)	HQ	% Contrib. HI
1,2-Dichloroethene (total)	0.11783	NA	NA	1.0E-04	0.0E+00	0%	2.4E-04	--	--
Cis-1,2-Dichloroethene	0.22521	NA	NA	2.0E-04	0.0E+00	0%	4.6E-04	--	--
Tetrachloroethene	0.06594	2.03E-03	NA	5.8E-05	1.2E-07	34%	1.4E-04	--	--
Trans-1,2-Dichloroethene	0.073	NA	NA	6.4E-05	0.0E+00	0%	1.5E-04	--	--
Trichloroethene	0.04397	6.00E-03	NA	3.9E-05	2.3E-07	66%	9.0E-05	--	--
Total ILCR:				3.5E-07	100%		HI:	--	--

NOTES:

NA - Toxicity criterion not available.  
 -- Not applicable.

GROUNDWATER INHALATION EXPOSURE ASSESSMENT - CT  
 SITE 93  
 REMEDIAL INVESTIGATION CTO-356  
 MCB CAMP LEJEUNE, NORTH CAROLINA  
 FUTURE ON-SITE RESIDENTS

$$CDI \text{ (mg/kg/d)} = (CA \cdot RR \cdot ET \cdot EF \cdot ED) / (BW \cdot AT)$$

$$ILCR = CDI \cdot CSFI$$

$$HQ = CDI / RfDi$$

Parameter	Description	Adult	
CDI	Chronic daily intake (mg/kg/d)	CS	(Chemical Specific)
ILCR	Incremental lifetime cancer risk	CS	
CSFi	Oral cancer slope factor (1/(mg/kg/d))	CS	
HQ	Hazard quotient	CS	
RfDi	Oral reference dose (mg/kg/d)	CS	
CA	Concentration of volatilized chemical in shower air, Foster and Chrystowski Model (mg/m3)	CS	
RR	Respiration rate (m3/hr)	0.6	
ET	Exposure time (hrs/d)	0.25	
EF	Exposure Frequency (d/yr)	234	
ED	Exposure Duration (yrs)	9	
BW	Body weight (kg)	70	
ATc	Averaging time, carcinogens (d)	25550	
ATn	Averaging time, noncarcinogens (d)	3285	

Parameter	CA (mg/m3)	CSFi 1/(mg/kg/d)	RfDi (mg/kg/d)	Adult Residents					
				Carcinogens			Noncarcinogens		
				CDI (mg/kg/d)	ILCR	% Contrib. Total ILCR	CDI (mg/kg/d)	HQ	% Contrib. HI
1,2-Dichloroethene (total)	0.02675	NA	NA	4.7E-06	0.0E+00	0%	3.7E-05	--	--
Cis-1,2-Dichloroethene	0.03915	NA	NA	6.9E-06	0.0E+00	0%	5.4E-05	--	--
Tetrachloroethene	0.00565	2.03E-03	NA	1.0E-06	2E-09	4%	7.8E-06	--	--
Trans-1,2-Dichloroethene	0.00879	NA	NA	1.6E-06	0.0E+00	0%	1.2E-05	--	--
Trichloroethene	0.04397	6.00E-03	NA	7.8E-06	4.7E-08	96%	6.0E-05	--	--
				Total ILCR:	4.9E-08	100%	HI:	--	--

NOTES:

NA - Toxicity criterion not available.  
 -- Not applicable.



**EXAMPLE SURFACE WATER INGESTION CALCULATIONS  
OPERABLE UNIT NO. 16  
CONTRACT TASK ORDER 0356**

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

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

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:**

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

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

**Example Carcinogen: Tetrachloroethene**

$$\text{Intake (mg/kg}\cdot\text{day)} = \frac{0.0012 \text{ mg/L} \times 0.05 \text{ L/day} \times 100 \text{ days/yr} \times 30 \text{ yrs} \times 2.6 \text{ hrs/day}}{70 \text{ kg} \times 25,550 \text{ days}}$$

$$= 2.6\text{E-}07$$

$$\text{Risk} = 2.6\text{E-}07 \text{ mg/kg}\cdot\text{day} \times 5.2\text{E-}02 \text{ mg/kg}\cdot\text{day}^{-1} = 1.4\text{E-}08$$

**Example Noncarcinogen: Aluminum**

$$\text{Intake (mg/kg}\cdot\text{day)} = \frac{0.554 \text{ mg/L} \times 0.05 \text{ L/day} \times 100 \text{ days/yr} \times 30 \text{ yrs} \times 2.6 \text{ hrs/day}}{70 \text{ kg} \times 10,950 \text{ days}}$$

$$= 2.8\text{E-}04$$

$$\text{Risk} = \frac{2.8\text{E-}04 \text{ mg/kg}\cdot\text{day}}{1.0 \text{ mg/kg}\cdot\text{day}} = 2.8\text{E-}04$$

Re: Site 89 Future Residential Adult

SURFACE WATER INGESTION EXPOSURE ASSESSMENT  
 SITE 89  
 REMEDIAL INVESTIGATION CTO-356  
 MCB CAMP LEJEUNE, NORTH CAROLINA  
 CURRENT ON-SITE RESIDENTS

$$CDI \text{ (mg/kg/d)} = (C_w \cdot IR \cdot EF \cdot ET \cdot ED) / (BW \cdot AT)$$

$$ILCR = CDI \cdot CSFo$$

$$HQ = CDI / RfDo$$

Parameter	Description	Young Child	
		Adult	(0-6 Yrs Old)
CDI	Chronic daily intake (mg/kg/d)	CS	CS
ILCR	Incremental lifetime cancer risk	CS	CS
CSFo	Oral cancer slope factor (1/(mg/kg/d))	CS	CS
HQ	Hazard quotient	CS	CS
RfDo	Oral reference dose (mg/kg/d)	CS	CS
Cw	Concentration of chemical in water (mg/L)	CS	CS
IR	Ingestion Rate (L/d)	0.05	0.05
EF	Exposure Frequency (d/yr)	100	100
ET	Exposure Time (hrs/event)	2.6	2.6
ED	Exposure Duration (yrs)	4	4
BW	Body weight (kg)	70	15
ATc	Averaging time, carcinogens (d)	25550	25550
ATn	Averaging time, noncarcinogens (d)	1460	1460

Parameter	Cw (mg/L)	CSFo 1/(mg/kg/d)	RfDo (mg/kg/d)	Adult Residents						Child Residents					
				Carcinogens			Noncarcinogens			Carcinogens			Noncarcinogens		
				CDI (mg/kg/d)	ILCR	% Contrib. Total ILCR	CDI (mg/kg/d)	HQ	% Contrib. HI	CDI (mg/kg/d)	ILCR	% Contrib. Total ILCR	CDI (mg/kg/d)	HQ	% Contrib. HI
1,1,2,2-Tetrachloroethane	0.15	2.00E-01	NA	4.4E-06	8.7E-07	38.5%	7.6E-05	--	0.0%	2.0E-05	4.1E-06	38.5%	3.6E-04	--	0.0%
1,2-Dichloroethene (total)	0.12	NA	9.00E-03	3.6E-06	--	0.0%	6.1E-05	6.8E-03	42.0%	1.6E-05	--	0.0%	2.8E-04	3.2E-02	42.0%
Cis-1,2-Dichloroethene	0.052	NA	1.00E-02	1.6E-06	--	0.0%	2.6E-05	2.6E-03	16.4%	7.1E-06	--	0.0%	1.2E-04	1.2E-02	16.4%
Tetrachloroethene	0.0012	5.20E-02	1.00E-02	3.5E-08	1.8E-09	0.1%	6.1E-07	6.1E-05	0.4%	1.6E-07	8.5E-09	0.1%	2.8E-06	2.8E-04	0.4%
Trans-1,2-Dichloroethene	0.037	NA	2.00E-02	1.1E-06	--	0.0%	1.9E-05	9.4E-04	5.8%	5.0E-06	--	0.0%	8.8E-05	4.4E-03	5.8%
Trichloroethene	0.0285	1.10E-02	6.00E-03	8.3E-07	9.1E-09	0.4%	1.5E-05	2.4E-03	15.0%	3.9E-06	4.3E-08	0.4%	6.8E-05	1.1E-02	15.0%
Vinyl Chloride	0.025	1.90E+00	NA	7.3E-07	1.4E-06	61.0%	1.3E-05	--	0.0%	3.4E-06	6.4E-06	61.0%	5.9E-05	--	0.0%
Aluminum	0.554	NA	1.00E+00	1.6E-05	--	0.0%	2.8E-04	2.8E-04	1.7%	7.5E-05	--	0.0%	1.3E-03	1.3E-03	1.7%
Copper	0.0047	NA	4.00E-02	1.4E-07	--	0.0%	2.4E-06	6.0E-05	0.4%	6.4E-07	--	0.0%	1.1E-05	2.8E-04	0.4%
Iron	1.57	NA	3.00E-01	4.6E-05	--	0.0%	8.0E-04	2.7E-03	16.5%	2.1E-04	--	0.0%	3.7E-03	1.2E-02	16.5%
Vanadium	0.0042	NA	7.00E-03	1.2E-07	--	0.0%	2.1E-06	3.1E-04	1.9%	5.7E-07	--	0.0%	1.0E-05	1.4E-03	1.9%
				Total ILCR: 2.3E-06 100.0%			HI: 1.6E-02 100.0%			Total ILCR: 1.1E-05 100.0%			HI: 7.5E-02 100.0%		

NOTES:  
 NA - Toxicity criterion not available.  
 -- Not applicable.

SURFACE WATER INGESTION EXPOSURE ASSESSMENT - RME  
 SITE 89  
 REMEDIAL INVESTIGATION CTO-356  
 MCB CAMP LEJEUNE, NORTH CAROLINA  
 FUTURE ON-SITE RESIDENTS

CDI (mg/kg/d) = (Cw\*IR\*EF\*ET\*ED)/(BW\*AT)  
 ILCR = CDI\*CSFo  
 HQ = CDI/RfDo

Parameter	Description	Young Child (0-6 Yrs Old)	
		Adult	Child
CDI	Chronic daily Intake (mg/kg/d)	CS	CS (Chemical Specific)
ILCR	Incremental lifetime cancer risk	CS	CS
CSFo	Oral cancer slope factor (1/(mg/kg/d))	CS	CS
HQ	Hazard quotient	CS	CS
RfDo	Oral reference dose (mg/kg/d)	CS	CS
Cw	Concentration of chemical in water (mg/L)	CS	CS
IR	Ingestion Rate (L/d)	0.05	0.05
EF	Exposure Frequency (d/yr)	100	100
ET	Exposure Time (hrs/event)	2.6	2.6
ED	Exposure Duration (yrs)	30	6
BW	Body weight (kg)	70	15
ATc	Averaging time, carcinogens (d)	25550	25550
ATn	Averaging time, noncarcinogens (d)	10950	2190

Parameter	Cw (mg/L)	CSFo 1/(mg/kg/d)	RfDo (mg/kg/d)	Adult Residents						Child Residents					
				Carcinogens			Noncarcinogens			Carcinogens			Noncarcinogens		
				CDI (mg/kg/d)	ILCR	% Contrib. Total ILCR	CDI (mg/kg/d)	HQ	% Contrib. HI	CDI (mg/kg/d)	ILCR	% Contrib. Total ILCR	CDI (mg/kg/d)	HQ	% Contrib. HI
1,1,2,2-Tetrachloroethane	0.15	2.00E-01	NA	3.3E-05	6.5E-06	38.5%	7.6E-05	--	0.0%	3.1E-05	6.1E-06	38.5%	3.6E-04	--	0.0%
1,2-Dichloroethene (total)	0.12	NA	9.00E-03	2.6E-05	--	0.0%	6.1E-05	6.8E-03	42.0%	2.4E-05	--	0.0%	2.8E-04	3.2E-02	42.0%
Cis-1,2-Dichloroethene	0.052	NA	1.00E-02	1.1E-05	--	0.0%	2.6E-05	2.6E-03	16.4%	1.1E-05	--	0.0%	1.2E-04	1.2E-02	16.4%
Tetrachloroethene	0.0012	5.20E-02	1.00E-02	2.6E-07	1.4E-08	0.1%	6.1E-07	6.1E-05	0.4%	2.4E-07	1.3E-08	0.1%	2.8E-06	2.8E-04	0.4%
Trans-1,2-Dichloroethene	0.037	NA	2.00E-02	8.1E-06	--	0.0%	1.9E-05	9.4E-04	5.8%	7.5E-06	--	0.0%	8.8E-05	4.4E-03	5.8%
Trichloroethene	0.0285	1.10E-02	6.00E-03	6.2E-06	6.8E-08	0.4%	1.5E-05	2.4E-03	15.0%	6.8E-06	6.4E-08	0.4%	6.8E-05	1.1E-02	15.0%
Vinyl Chloride	0.025	1.90E+00	NA	5.5E-06	1.0E-05	61.0%	1.3E-05	--	0.0%	5.1E-06	9.7E-06	61.0%	5.9E-05	--	0.0%
Aluminum	0.554	NA	1.00E+00	1.2E-04	--	0.0%	2.8E-04	2.8E-04	1.7%	1.1E-04	--	0.0%	1.3E-03	1.3E-03	1.7%
Copper	0.0047	NA	4.00E-02	1.0E-06	--	0.0%	2.4E-06	6.0E-05	0.4%	9.6E-07	--	0.0%	1.1E-05	2.8E-04	0.4%
Iron	1.67	NA	3.00E-01	3.4E-04	--	0.0%	8.0E-04	2.7E-03	16.5%	3.2E-04	--	0.0%	3.7E-03	1.2E-02	16.5%
Vanadium	0.0042	NA	7.00E-03	9.2E-07	--	0.0%	2.1E-06	3.1E-04	1.9%	8.5E-07	--	0.0%	1.0E-05	1.4E-03	1.9%
Total ILCR:				1.7E-05	100.0%		HI: 1.6E-02	100.0%		Total ILCR:	1.6E-05	100.0%	HI: 7.5E-02	100.0%	

NOTES:  
 NA - Toxicity criterion not available.  
 -- Not applicable.

SURFACE WATER INGESTION EXPOSURE ASSESSMENT - CT  
 SITE 89  
 REMEDIAL INVESTIGATION CTO-356  
 MCB CAMP LEJEUNE, NORTH CAROLINA  
 FUTURE ON-SITE RESIDENTS

$CDI (mg/kg/d) = (C_w * IR * EF * ET * ED) / (BW * AT)$   
 $ILCR = CDI * CSFo$   
 $HQ = CDI / RfDo$

Parameter	Description	Young Child (0-6 Yrs Old)	
		Adult	Child
CDI	Chronic daily intake (mg/kg/d)	CS	CS (Chemical Specific)
ILCR	Incremental lifetime cancer risk	CS	CS
CSFo	Oral cancer slope factor (1/(mg/kg/d))	CS	CS
HQ	Hazard quotient	CS	CS
RfDo	Oral reference dose (mg/kg/d)	CS	CS
Cw	Concentration of chemical in water (mg/L)	CS	CS
IR	Ingestion Rate (L/d)	0.05	0.05
EF	Exposure Frequency (d/yr)	100	100
ET	Exposure Time (hrs/event)	2.6	2.6
ED	Exposure Duration (yrs)	9	6
BW	Body weight (kg)	70	15
ATc	Averaging time, carcinogens (d)	25550	25550
ATn	Averaging time, noncarcinogens (d)	3285	2190

Parameter	Cw (mg/L)	CSFo 1/(mg/kg/d)	RfDo (mg/kg/d)	Adult Residents						Child Residents					
				Carcinogens			Noncarcinogens			Carcinogens			Noncarcinogens		
				CDI (mg/kg/d)	ILCR	% Contrib. Total ILCR	CDI (mg/kg/d)	HQ	% Contrib. HI	CDI (mg/kg/d)	ILCR	% Contrib. Total ILCR	CDI (mg/kg/d)	HQ	% Contrib. HI
1,1,2,2-Tetrachloroethane	0.0874	2.00E-01	NA	5.7E-06	1.1E-06	32.2%	4.4E-05	-	0.0%	1.8E-05	3.6E-06	32.2%	2.1E-04	-	0.0%
1,2-Dichloroethene (total)	0.0766	NA	9.00E-03	5.0E-06	-	0.0%	3.9E-05	4.3E-03	41.4%	1.8E-05	-	0.0%	1.8E-04	2.0E-02	41.4%
Cis-1,2-Dichloroethene	0.03164	NA	1.00E-02	2.1E-06	-	0.0%	1.6E-05	1.6E-03	15.4%	6.4E-06	-	0.0%	7.5E-05	7.5E-03	15.4%
Tetrachloroethene	0.00247	5.20E-02	1.00E-02	1.6E-07	8.4E-09	0.2%	1.3E-06	1.3E-04	1.2%	5.0E-07	2.6E-08	0.2%	5.9E-06	5.9E-04	1.2%
Trans-1,2-Dichloroethene	0.01541	NA	2.00E-02	1.0E-06	-	0.0%	7.8E-06	3.9E-04	3.8%	3.1E-06	-	0.0%	3.7E-05	1.8E-03	3.8%
Trichloroethene	0.0169	1.10E-02	6.00E-03	1.1E-06	1.2E-08	0.3%	8.6E-06	1.4E-03	13.7%	3.4E-06	3.8E-08	0.3%	4.0E-05	6.7E-03	13.7%
Vinyl Chloride	0.01918	1.90E+00	NA	1.3E-06	2.4E-06	67.2%	9.8E-06	-	0.0%	3.9E-06	7.4E-06	67.2%	4.6E-05	-	0.0%
Aluminum	0.25216	NA	1.00E+00	1.6E-05	-	0.0%	1.3E-04	1.3E-04	1.2%	5.1E-05	-	0.0%	6.0E-04	6.0E-04	1.2%
Copper	0.00301	NA	4.00E-02	2.0E-07	-	0.0%	1.5E-06	3.8E-05	0.4%	6.1E-07	-	0.0%	7.1E-06	1.8E-04	0.4%
Iron	1.3206	NA	3.00E-01	8.6E-05	-	0.0%	6.7E-04	2.2E-03	21.4%	2.7E-04	-	0.0%	3.1E-03	1.0E-02	21.4%
Vanadium	0.00215	NA	7.00E-03	1.4E-07	-	0.0%	1.1E-06	1.6E-04	1.5%	4.4E-07	-	0.0%	5.1E-06	7.3E-04	1.5%
				Total ILCR: 3.5E-06 100.0%			HI: 1.0E-02 100.0%			Total ILCR: 1.1E-05 100.0%			HI: 4.9E-02 100.0%		

NOTES:  
 NA - Toxicity criterion not available.  
 - Not applicable.

**EXAMPLE SURFACE WATER DERMAL CONTACT CALCULATIONS  
OPERABLE UNIT NO. 16  
CONTRACT TASK ORDER 0356**

**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: Tetrachloroethene**

$$\begin{aligned} \text{Intake (mg/kg·day)} &= \frac{0.0012 \text{ mg/L} \times 5,800 \text{ cm}^2 \times 100 \text{ days/yr} \times 30 \text{ yrs} \times 2.6 \text{ hrs/day} \times 4.8E-02 \text{ L/cm}^3 \times 1E-03 \text{ cm/hr}}{70 \text{ kg} \times 25,550 \text{ days}} \\ &= 1.5E-06 \end{aligned}$$

$$\text{Risk} = 1.5E-06 \text{ mg/kg·day} \times 6.5E-02 \text{ mg/kg·day}^{-1} = 9.5E-08$$

**Example Noncarcinogen: Aluminum**

$$\begin{aligned} \text{Intake (mg/kg·day)} &= \frac{0.554 \text{ mg/L} \times 5,800 \text{ cm}^2 \times 100 \text{ days/yr} \times 30 \text{ yrs} \times 2.6 \text{ hrs/day} \times 1.0E-3 \text{ L/cm}^3 \times 1E-03 \text{ cm/hr}}{70 \text{ kg} \times 10,950 \text{ days}} \\ &= 3.3E-05 \end{aligned}$$

$$\text{Risk} = \frac{3.3E-05 \text{ mg/kgday}}{2.0E-01 \text{ mg/kgday}} = 1.6E-04$$

Re: Site 89 Future Residential Adult

SURFACE WATER DERMAL CONTACT EXPOSURE ASSESSMENT  
 SITE 89  
 REMEDIAL INVESTIGATION CTO-356  
 MCB CAMP LEJEUNE, NORTH CAROLINA  
 CURRENT ON-SITE RESIDENTS

$$DAD \text{ (mg/kg/d)} = (C_w * C_F * K_p * S_A * E_F * E_D * E_T) / (B_W * A_T)$$

$$ILCR = CDI * CSF_o \text{ Adj} \quad CSF \text{ Adj} = CSF / AE$$

$$HQ = CDI / RfD_o \text{ Adj} \quad RfD \text{ Adj} = RfD * AE$$

Parameter	Description	Younger Child (0-6 Yrs Old)	
		Adult	Child
DAD	Dermally absorbed dose (mg/kg/d)	CS	CS (Chemical Specific)
ILCR	Incremental lifetime cancer risk	CS	CS
CSFo	Oral cancer slope factor (1/(mg/kg/d))	CS	CS
HQ	Hazard quotient	CS	CS
RfDo	Oral reference dose (mg/kg/d)	CS	CS
SA	Skin surface area available for contact (cm <sup>2</sup> )	5300	2300
EF	Exposure frequency (d/yr)	100	100
ED	Exposure duration (yrs)	4	4
ET	Exposure time (hrs/day)	2.6	2.6
BW	Body weight (kg)	70	15
ATc	Averaging time, carcinogens (d)	25550	25550
ATn	Averaging time, noncarcinogens (d)	1460	1460
Cw	Concentration of chemical in water (mg/L)	CS	CS
CF	Conversion factor (L/cm <sup>3</sup> )	0.001	0.001
Kp	Dermal permeability coefficient (cm/hour)	CS	CS
AE	Adjustment for Absorption Efficiency	CS	CS

Parameter	Cw (mg/L)	Kp (cm/hour)	CSFo 1/(mg/kg/d)	RfDo (mg/kg/d)	AE (unitless)	Adj CSFo 1/(mg/kg/d)	Adj RfDo (mg/kg/d)	Adult Residents						Child Residents					
								Carcinogens			Noncarcinogens			Carcinogens			Noncarcinogens		
								DAD (mg/kg/d)	ILCR	% Contrib. Total ILCR	DAD (mg/kg/d)	HQ	% Contrib. HI	DAD (mg/kg/d)	ILCR	% Contrib. Total ILCR	DAD (mg/kg/d)	HQ	% Contrib. HI
1,1,2,2-Tetrachloroethane	0.15	9.00E-03	2.00E-01	NA	0.80	2.50E-01	NA	4.2E-06	1.0E-06	43.2%	7.3E-05	--	0.0%	8.4E-06	2.1E-06	43.2%	1.5E-04	--	0.0%
1,2-Dichloroethene (total)	0.12	1.00E-02	NA	9.00E-03	0.80	NA	7.20E-03	3.7E-06	--	0.0%	6.5E-05	9.0E-03	42.8%	7.5E-06	--	0.0%	1.3E-04	1.8E-02	42.8%
Cis-1,2-Dichloroethene	0.052	1.00E-02	NA	1.00E-02	0.80	NA	8.00E-03	1.6E-06	--	0.0%	2.8E-05	3.5E-03	16.7%	3.2E-06	--	0.0%	5.7E-05	7.1E-03	16.7%
Tetrachloroethene	0.0012	4.80E-02	5.20E-02	1.00E-02	0.80	6.50E-02	8.00E-03	1.8E-07	1.2E-08	0.5%	3.1E-06	3.9E-04	1.8%	3.6E-07	2.3E-08	0.5%	6.3E-06	7.9E-04	1.8%
Trans-1,2-Dichloroethene	0.037	1.00E-02	NA	2.00E-02	0.80	NA	1.60E-02	1.1E-06	--	0.0%	2.0E-05	1.2E-03	5.9%	2.3E-06	--	0.0%	4.0E-05	2.5E-03	5.9%
Trichloroethene	0.0285	1.60E-02	1.10E-02	6.00E-03	0.80	1.38E-02	4.80E-03	1.4E-06	1.9E-08	0.8%	2.5E-05	5.1E-03	24.4%	2.8E-06	3.9E-08	0.8%	5.0E-05	1.0E-02	24.4%
Vinyl Chloride	0.026	7.30E-03	1.90E+00	NA	0.80	2.37E+00	NA	5.6E-07	1.3E-06	55.5%	9.8E-06	--	0.0%	1.1E-06	2.7E-06	55.5%	2.0E-05	--	0.0%
Aluminum	0.554	1.00E-03	NA	1.00E+00	0.20	NA	2.00E-01	1.7E-06	--	0.0%	3.0E-05	1.5E-04	0.7%	3.5E-06	--	0.0%	6.1E-05	3.0E-04	0.7%
Copper	0.0047	1.00E-03	NA	4.00E-02	0.20	NA	8.00E-03	1.4E-08	--	0.0%	2.5E-07	3.2E-05	0.2%	2.9E-08	--	0.0%	5.1E-07	6.4E-05	0.2%
Iron	1.57	1.00E-03	NA	3.00E-01	0.20	NA	6.00E-02	4.8E-06	--	0.0%	8.5E-05	1.4E-03	6.7%	9.8E-06	--	0.0%	1.7E-04	2.9E-03	6.7%
Vanadium	0.0042	1.00E-03	NA	7.00E-03	0.20	NA	1.40E-02	1.3E-08	--	0.0%	2.3E-07	1.6E-04	0.8%	2.6E-08	--	0.0%	4.6E-07	3.3E-04	0.8%
								Total ILCR: 2.4E-06 100.0%			HI: 2.1E-02 100.0%			Total ILCR: 4.9E-06 100.0%			HI: 4.3E-02 100.0%		

NOTES:  
 NA - Toxicity criterion not available.  
 -- Not applicable.

SURFACE WATER DERMAL CONTACT EXPOSURE ASSESSMENT - RME  
 SITE 89  
 REMEDIAL INVESTIGATION CTO-356  
 MCB CAMP LEJEUNE, NORTH CAROLINA  
 FUTURE ON-SITE RESIDENTS

$$DAD \text{ (mg/kg/d)} = (C_w * CF * K_p * SA * EF * ED * ET) / (BW * AT)$$

$$ILCR = CDI * CSF_o \text{ Adj} \quad CSF \text{ Adj} = CSF / AE$$

$$HQ = CDI / RfDo \text{ Adj} \quad RfD \text{ Adj} = RfD * AE$$

Parameter	Description	Younger Child (0-6 Yrs Old)	
		Adult	Child
DAD	Dermally absorbed dose (mg/kg/d)	CS	CS (Chemical Specific)
ILCR	Incremental lifetime cancer risk	CS	CS
CSFo	Oral cancer slope factor (1/(mg/kg/d))	CS	CS
HQ	Hazard quotient	CS	CS
RfDo	Oral reference dose (mg/kg/d)	CS	CS
SA	Skin surface area available for contact (cm <sup>2</sup> )	5800	2300
ET	Exposure frequency (d/yr)	100	100
ED	Exposure duration (yrs)	30	6
ET	Exposure time (hrs/day)	2.6	2.6
BW	Body weight (kg)	70	15
ATc	Averaging time, carcinogens (d)	25550	25550
ATn	Averaging time, noncarcinogens (d)	10950	2190
Cw	Concentration of chemical in water (mg/L)	CS	CS
CF	Conversion factor (L/cm <sup>3</sup> )	0.001	0.001
Kp	Dermal permeability coefficient (cm/hour)	CS	CS
AE	Adjustment for Absorption Efficiency	CS	CS

Parameter	Cw (mg/L)	Kp (cm/hour)	CSFo 1/(mg/kg/d)	RfDo (mg/kg/d)	AE (unitless)	Adj CSFo 1/(mg/kg/d)	Adj RfDo (mg/kg/d)	Adult Residents						Child Residents							
								Carcinogens			Noncarcinogens			Carcinogens			Noncarcinogens				
								DAD (mg/kg/d)	ILCR	% Contrib. Total ILCR	DAD (mg/kg/d)	HQ	% Contrib. HI	DAD (mg/kg/d)	ILCR	% Contrib. Total ILCR	DAD (mg/kg/d)	HQ	% Contrib. HI		
1,1,2,2-Tetrachloroethane	0.15	9.00E-03	2.00E-01	NA	0.80	2.50E-01	NA	3.4E-05	8.5E-06	43.2%	8.0E-05	--	0.0%	1.3E-05	3.2E-06	43.2%	1.5E-04	--	0.0%		
1,2-Dichloroethene (total)	0.12	1.00E-02	NA	9.00E-03	0.80	NA	7.20E-03	3.0E-05	--	0.0%	7.1E-05	9.8E-03	42.8%	1.1E-05	--	0.0%	1.3E-04	1.8E-02	42.8%		
Cis-1,2-Dichloroethene	0.052	1.00E-02	NA	1.00E-02	0.80	NA	8.00E-03	1.3E-05	--	0.0%	3.1E-05	3.8E-03	16.7%	4.9E-06	--	0.0%	5.7E-05	7.1E-03	16.7%		
Tetrachloroethene	0.0012	4.80E-02	5.20E-02	1.00E-02	0.80	6.50E-02	8.00E-03	1.5E-06	9.5E-08	0.5%	3.4E-06	4.2E-04	1.8%	5.4E-07	3.5E-08	0.5%	6.3E-06	7.9E-04	1.8%		
Trans-1,2-Dichloroethene	0.037	1.00E-02	NA	2.00E-02	0.80	NA	1.60E-02	9.4E-06	--	0.0%	2.2E-05	1.4E-03	5.9%	3.5E-06	--	0.0%	4.0E-05	2.5E-03	5.9%		
Trichloroethene	0.0285	1.60E-02	1.10E-02	6.00E-03	0.80	1.38E-02	4.80E-03	1.2E-05	1.6E-07	0.8%	2.7E-05	5.6E-03	24.4%	4.3E-06	5.9E-08	0.8%	5.0E-05	1.0E-02	24.4%		
Vinyl Chloride	0.025	7.30E-03	1.90E+00	NA	0.80	2.37E+00	NA	4.8E-06	1.1E-05	55.5%	1.1E-05	--	0.0%	1.7E-06	4.1E-06	55.5%	2.0E-05	--	0.0%		
Aluminum	0.554	1.00E-03	NA	1.00E+00	0.20	NA	2.00E-01	1.4E-05	--	0.0%	3.3E-05	1.6E-04	0.7%	5.2E-06	--	0.0%	6.1E-05	3.0E-04	0.7%		
Copper	0.0047	1.00E-03	NA	4.00E-02	0.20	NA	8.00E-03	1.2E-07	--	0.0%	2.8E-07	3.5E-05	0.2%	4.4E-08	--	0.0%	5.1E-07	6.4E-05	0.2%		
Iron	1.57	1.00E-03	NA	3.00E-01	0.20	NA	6.00E-02	4.0E-05	--	0.0%	9.3E-05	1.5E-03	6.7%	1.5E-05	--	0.0%	1.7E-04	2.9E-03	6.7%		
Vanadium	0.0042	1.00E-03	NA	7.00E-03	0.20	NA	1.40E-03	1.1E-07	--	0.0%	2.5E-07	1.8E-04	0.8%	3.9E-08	--	0.0%	4.6E-07	3.3E-04	0.8%		
Total ILCR:								2.0E-05	100.0%	HI: 2.3E-02			100.0%	Total ILCR: 7.3E-06			100.0%	HI: 4.3E-02			100.0%

NOTES:  
 NA - Toxicity criterion not available.  
 -- Not applicable.

SURFACE WATER DERMAL CONTACT EXPOSURE ASSESSMENT - CT  
 SITE 89  
 REMEDIAL INVESTIGATION CTO-356  
 MCB CAMP LEJEUNE, NORTH CAROLINA  
 FUTURE ON-SITE RESIDENTS

$$DAD (mg/kg/d) = (Cw * CF * Kp * SA * EF * ED * ET) / (BW * AT)$$

$$ILCR = CDI * CSFo * Adj \quad CSF Adj = CSF / AE$$

$$HQ = CDI / RfDo * Adj \quad RfD Adj = RfD * AE$$

Parameter	Description	Younger Child (0-6 Yrs Old)	
		Adult	Child
DAD	Dermally absorbed dose (mg/kg/d)	CS	CS (Chemical Specific)
ILCR	Incremental lifetime cancer risk	CS	CS
CSFo	Oral cancer slope factor (1/(mg/kg/d))	CS	CS
HQ	Hazard quotient	CS	CS
RfDo	Oral reference dose (mg/kg/d)	CS	CS
SA	Skin surface area available for contact (cm <sup>2</sup> )	5000	2000
ET	Exposure frequency (d/yr)	100	100
ED	Exposure duration (yrs)	9	6
ET	Exposure time (hrs/day)	2.6	2.6
BW	Body weight (kg)	70	15
ATc	Averaging time, carcinogens (d)	25550	25550
ATn	Averaging time, noncarcinogens (d)	3285	2190
Cw	Concentration of chemical in water (mg/L)	CS	CS
CF	Conversion factor (L/cm <sup>3</sup> )	0.001	0.001
Kp	Dermal permeability coefficient (cm/hour)	CS	CS
AE	Adjustment for Absorption Efficiency	CS	CS

Parameter	Cw (mg/L)	Kp (cm/hour)	CSFo (1/(mg/kg/d))	RfDo (mg/kg/d)	AE (unitless)	Adj CSFo (1/(mg/kg/d))	Adj RfDo (mg/kg/d)	Adult Residents						Child Residents									
								Carcinogens			Noncarcinogens			Carcinogens			Noncarcinogens						
								DAD (mg/kg/d)	ILCR	% Contrib. Total ILCR	DAD (mg/kg/d)	HQ	% Contrib. HI	DAD (mg/kg/d)	ILCR	% Contrib. Total ILCR	DAD (mg/kg/d)	HQ	% Contrib. HI				
1,1,2,2-Tetrachloroethane	0.0874	9.00E-03	2.00E-01	NA	0.80	2.50E-01	NA	5.1E-06	1.3E-06	36.4%	4.0E-05	-	0.0%	6.4E-06	1.6E-06	36.4%	7.5E-05	-	0.0%				
1,2-Dichloroethene (total)	0.0766	1.00E-02	NA	9.00E-03	0.80	NA	7.20E-03	5.0E-06	-	0.0%	3.9E-05	5.4E-03	42.4%	6.2E-06	-	0.0%	7.3E-05	1.0E-02	42.4%				
Cis-1,2-Dichloroethene	0.03164	1.00E-02	NA	1.00E-02	0.80	NA	8.00E-03	2.1E-06	-	0.0%	1.6E-05	2.0E-03	15.8%	2.6E-06	-	0.0%	3.0E-05	3.8E-03	15.8%				
Tetrachloroethene	0.00247	4.80E-02	5.20E-02	1.00E-02	0.80	6.50E-02	8.00E-03	7.8E-07	5.0E-08	1.4%	6.0E-06	7.5E-04	5.9%	9.7E-07	6.3E-08	1.4%	1.1E-05	1.4E-03	5.9%				
Trans-1,2-Dichloroethene	0.01541	1.00E-02	NA	2.00E-02	0.80	NA	1.60E-02	1.0E-06	-	0.0%	7.8E-06	4.9E-04	3.8%	1.3E-06	-	0.0%	1.5E-05	9.1E-04	3.8%				
Trichloroethene	0.0169	1.60E-02	1.10E-02	6.00E-03	0.80	1.38E-02	4.80E-03	1.8E-06	2.4E-08	0.7%	1.4E-05	2.9E-03	22.5%	2.2E-06	3.0E-08	0.7%	2.6E-05	5.4E-03	22.5%				
Vinyl Chloride	0.01918	7.30E-03	1.90E+00	NA	0.80	2.37E+00	NA	9.2E-07	2.2E-06	61.5%	7.1E-06	-	0.0%	1.1E-06	2.7E-06	61.5%	1.3E-05	-	0.0%				
Aluminum	0.25216	1.00E-03	NA	1.00E+00	0.20	NA	2.00E-01	1.6E-06	-	0.0%	1.3E-05	6.4E-05	0.5%	2.1E-06	-	0.0%	2.4E-05	1.2E-04	0.5%				
Copper	0.00301	1.00E-03	NA	4.00E-02	0.20	NA	8.00E-03	2.0E-08	-	0.0%	1.5E-07	1.9E-06	0.2%	2.5E-08	-	0.0%	2.9E-07	3.6E-05	0.2%				
Copper	0.00301	1.00E-03	NA	4.00E-02	0.20	NA	8.00E-03	2.0E-08	-	0.0%	1.5E-07	1.9E-05	0.2%	2.5E-08	-	0.0%	2.9E-07	3.6E-05	0.2%				
Iron	1.3206	1.00E-03	NA	3.00E-01	0.20	NA	6.00E-02	8.6E-06	-	0.0%	6.7E-05	1.1E-03	8.8%	1.1E-05	-	0.0%	1.3E-04	2.1E-03	8.8%				
								Total ILCR:	3.5E-06	100.0%	HI:			1.3E-02	100.0%	Total ILCR:	4.4E-06	100.0%	HI:			2.4E-02	100.0%

NOTES:  
 NA - Toxicity criterion not available.  
 - Not applicable.



SUBSURFACE SOIL DERMAL CONTACT EXPOSURE ASSESSMENT  
 SITE 89  
 REMEDIAL INVESTIGATION CTO-356  
 MCB CAMP LEJEUNE, NORTH CAROLINA  
 FUTURE CONSTRUCTIONS WORKERS

$$\text{DAD (mg/kg/d)} = (\text{Cs} \cdot \text{CF} \cdot \text{AF} \cdot \text{ABS} \cdot \text{SA} \cdot \text{EF} \cdot \text{ED}) / (\text{BW} \cdot \text{AT})$$

$$\text{ILCR} = \text{CDI} \cdot \text{CSF}_o \text{ Adj} \quad \text{CSF Adj} = \text{CSF} / \text{AE}$$

$$\text{HQ} = \text{CDI} / \text{RfDo Adj} \quad \text{RfD Adj} = \text{RfD} \cdot \text{AE}$$

Parameter	Description	Adult
DAD	Dermally absorbed dose (mg/kg/d)	CS
ILCR	Incremental lifetime cancer risk	CS
CSFo	Oral cancer slope factor (1/(mg/kg/d))	CS
HQ	Hazard quotient	CS
RfDo	Oral reference dose (mg/kg/d)	CS
Cs	Concentration of chemical in soil (mg/kg)	CS
CF	Conversion factor (kg/mg)	1E-06
AF	Soil to skin adherence factor (mg/cm <sup>2</sup> -event)	1
ABS	Absorption fraction	CS
SA	Skin surface area available for contact (cm <sup>2</sup> )	5800
EF	Exposure Frequency (d/yr)	250
ED	Exposure Duration (yrs)	1
BW	Body weight (kg)	70
ATc	Averaging time, carcinogens (d)	25550
ATn	Averaging time, noncarcinogens (d)	365
AE	Adjustment for Absorptin Efficiency	CS

Parameter	Cs (mg/kg)	ABS	CSFo 1/(mg/kg/d)	RfDo (mg/kg/d)	AE	Adj. CSFo 1/(mg/kg/d)	Adj RfDo (mg/kg/d)	Adult Construction Worker						
								Carcinogens			Noncarcinogens			
								DAD (mg/kg/d)	ILCR	% Contrib. Total ILCR	DAD (mg/kg/d)	HQ	% Contrib. HI	
Aluminum	7.1E+03	0.001	NA	1.00E+00	0.2	NA	2.00E-01	5.8E-06	--	0.0%	4.0E-04	2.0E-03	25.8%	
Arsenic	9.0E-01	0.001	1.50E+00	3.00E-04	0.2	7.50E+00	6.00E-05	7.3E-10	5.5E-09	50.3%	5.1E-08	8.5E-04	10.8%	
Beryllium	3.1E-01	0.001	4.30E+00	5.00E-03	0.2	2.15E+01	1.00E-03	2.5E-10	5.4E-09	49.7%	1.8E-08	1.8E-05	0.2%	
Iron	5.2E+03	0.001	NA	3.00E-01	0.2	NA	6.00E-02	4.3E-06	--	0.0%	3.0E-04	5.0E-03	63.2%	
Total ILCR:								1.1E-08	100.0%		HI:		7.9E-03	100.0%

NOTES:

NA - Toxicity criterion not available.  
 -- Not applicable.

SUBSURFACE SOIL DERMAL CONTACT EXPOSURE ASSESSMENT  
 SITE 93  
 REMEDIAL INVESTIGATION CTO-356  
 MCB CAMP LEJEUNE, NORTH CAROLINA  
 FUTURE CONSTRUCTIONS WORKERS

$$\text{DAD (mg/kg/d)} = (\text{Cs} \cdot \text{CF} \cdot \text{AF} \cdot \text{ABS} \cdot \text{SA} \cdot \text{EF} \cdot \text{ED}) / (\text{BW} \cdot \text{AT})$$

$$\text{ILCR} = \text{CDI} \cdot \text{CSF}_o \cdot \text{Adj} \quad \text{CSF Adj} = \text{CSF} / \text{AE}$$

$$\text{HQ} = \text{CDI} / \text{RfDo Adj} \quad \text{RfD Adj} = \text{RfD} \cdot \text{AE}$$

Parameter	Description	Adult Construction Worker
DAD	Dermally absorbed dose (mg/kg/d)	CS
ILCR	Incremental lifetime cancer risk	CS
CSF <sub>o</sub>	Oral cancer slope factor (1/(mg/kg/d))	CS
HQ	Hazard quotient	CS
RfDo	Oral reference dose (mg/kg/d)	CS
Cs	Concentration of chemical in soil (mg/kg)	CS
CF	Conversion factor (kg/mg)	1E-06
AF	Soil to skin adherence factor (mg/cm <sup>2</sup> -event)	1
ABS	Absorption fraction	CS
SA	Skin surface area available for contact (cm <sup>2</sup> )	5800
EF	Exposure Frequency (d/yr)	250
ED	Exposure Duration (yrs)	1
BW	Body weight (kg)	70
AT <sub>c</sub>	Averaging time, carcinogens (d)	25550
AT <sub>n</sub>	Averaging time, noncarcinogens (d)	365
AE	Adjustment for Absorptin Efficiency	CS

Parameter	Cs (mg/kg)	ABS	CSF <sub>o</sub> 1/(mg/kg/d)	RfDo (mg/kg/d)	AE	Adj. CSF <sub>o</sub> 1/(mg/kg/d)	Adj. RfDo (mg/kg/d)	Adult Construction Worker					
								Carcinogens			Noncarcinogens		
								DAD (mg/kg/d)	ILCR	% Contrib. Total ILCR	DAD (mg/kg/d)	HQ	% Contrib. HI
Benzo(a)pyrene	2.2E-01	0.01	7.30E+00	NA	0.5	1.46E+01	NA	1.8E-09	2.6E-08	70.3%	1.2E-07	--	0.0%
Aluminum	9.7E+03	0.001	NA	1.00E+00	0.2	NA	2.00E-01	7.9E-06	--	0.0%	5.5E-04	2.8E-03	22.6%
Arsenic	1.1E+00	0.001	1.50E+00	3.00E-04	0.2	7.50E+00	6.00E-05	9.2E-10	6.9E-09	18.8%	6.5E-08	1.1E-03	8.9%
Beryllium	2.3E-01	0.001	4.30E+00	5.00E-03	0.2	2.15E+01	1.00E-03	1.9E-10	4.0E-09	10.9%	1.3E-08	1.3E-05	0.1%
Iron	8.1E+03	0.001	NA	3.00E-01	0.2	NA	6.00E-02	6.5E-06	--	0.0%	4.6E-04	7.6E-03	62.6%
Vanadium	1.8E+01	0.001	NA	7.00E-03	0.2	NA	1.40E-03	1.4E-08	--	0.0%	1.0E-06	7.2E-04	5.9%
								Total ILCR:	3.7E-08	100.0%	HI:	1.2E-02	100.0%

NOTES:

NA - Toxicity criterion not available.  
 -- Not applicable.

SEDIMENT INGESTION EXPOSURE ASSESSMENT  
 SITE 89  
 REMEDIAL INVESTIGATION CTO-356  
 MCB CAMP LEJEUNE, NORTH CAROLINA  
 CURRENT ON-SITE RESIDENTS

$$CDI \text{ (mg/kg/d)} = (Cs \cdot IR \cdot CF \cdot FI \cdot EF \cdot ED) / (BW \cdot AT)$$

$$ILCR = CDI \cdot CSFo$$

$$HQ = CDI / RfDo$$

Parameter	Description	Younger Child (1-6 Yrs Old)	
		Adult	Child
CDI	Chronic daily intake (mg/kg/d)	CS	CS
ILCR	Incremental lifetime cancer risk	CS	CS
CSFo	Oral cancer slope factor (1/(mg/kg/d))	CS	CS
HQ	Hazard quotient	CS	CS
RfDo	Oral reference dose (mg/kg/d)	CS	CS
Cs	Concentration of chemical in soil (mg/kg)	CS	CS
IR	Ingestion Rate (mg/d)	100	200
CF	Conversion factor (kg/mg)	1E-06	1E-06
FI	Fraction of soil ingested from site	1	1
EF	Exposure Frequency (d/yr)	100	100
ED	Exposure Duration (yrs)	4	4
BW	Body weight (kg)	70	15
ATc	Averaging time, carcinogens (d)	25550	25550
ATn	Averaging time, noncarcinogens (d)	1460	1460

Parameter	Cs (mg/kg)	CSFo 1/(mg/kg/d)	RfDo (mg/kg/d)	Adult Residents						Child Residents					
				Carcinogens			Noncarcinogens			Carcinogens			Noncarcinogens		
				CDI (mg/kg/d)	ILCR	% Contrib. Total ILCR	CDI (mg/kg/d)	HQ	% Contrib. HI	CDI (mg/kg/d)	ILCR	% Contrib. Total ILCR	CDI (mg/kg/d)	HQ	% Contrib. HI
Benzo(a)pyrene	1.32	7.30E+00	NA	2.9E-08	2.1E-07	84.7%	5.2E-07	--	0.0%	2.7E-07	2.0E-06	84.7%	4.8E-06	--	0.0%
Benzo(a)anthracene	0.34	7.30E-01	NA	7.5E-09	5.5E-09	2.2%	1.3E-07	--	0.0%	7.0E-08	5.1E-08	2.2%	1.2E-06	--	0.0%
Benzo(b)fluoranthene	0.34	7.30E-01	NA	7.6E-09	5.5E-09	2.2%	1.3E-07	--	0.0%	7.1E-08	5.2E-08	2.2%	1.2E-06	--	0.0%
Benzo(k)fluoranthene	0.34	7.30E-02	NA	7.5E-09	5.5E-10	0.2%	1.3E-07	--	0.0%	7.0E-08	5.1E-09	0.2%	1.2E-06	--	0.0%
Chrysene	0.29	7.30E-03	NA	6.4E-09	4.7E-11	0.0%	1.1E-07	--	0.0%	6.0E-08	4.4E-10	0.0%	1.0E-06	--	0.0%
Indeno(1,2,3-cd)pyrene	0.29	7.30E-01	NA	6.5E-09	4.7E-09	1.9%	1.1E-07	--	0.0%	6.1E-08	4.4E-08	1.9%	1.1E-06	--	0.0%
Aluminum	5630.10	NA	1.00E+00	1.3E-04	--	0.0%	2.2E-03	2.2E-03	32.0%	1.2E-03	0.0E+00	0.0%	2.1E-02	2.1E-02	32.0%
Arsenic	0.67	1.50E+00	3.00E-04	1.5E-08	2.2E-08	8.9%	2.6E-07	8.7E-04	12.7%	1.4E-07	2.1E-07	8.9%	2.4E-06	8.2E-03	12.7%
Iron	2914.99	NA	3.00E-01	6.5E-05	--	0.0%	1.1E-03	3.8E-03	55.3%	6.1E-04	0.0E+00	0.0%	1.1E-02	3.5E-02	55.3%
Total ILCR:				2.5E-07	100.0%		HI: 6.9E-03	100.0%		Total ILCR:	2.4E-06	100.0%	HI: 6.4E-02	100.0%	

NOTES:

- NA - Toxicity criterion not available.
- Not applicable.

SEDIMENT DERMAL CONTACT EXPOSURE ASSESSMENT  
 SITE 89  
 REMEDIAL INVESTIGATION CTO-356  
 MCB CAMP LEJEUNE, NORTH CAROLINA  
 CURRENT ON-SITE RESIDENTS

$$DAD \text{ (mg/kg/d)} = (Cs \cdot CF \cdot AF \cdot ABS \cdot SA \cdot EF \cdot ED) / (BW \cdot AT)$$

$$ILCR = CDI \cdot CSFo \text{ Adj} \quad CSF \text{ Adj} = CSF/AE$$

$$HQ = CDI/RfDo \text{ Adj} \quad RfD \text{ Adj} = RfD \cdot AE$$

Parameter	Description	Younger Child (1-8 Yrs Old)	
		Adult	Child
DAD	Dermally absorbed dose (mg/kg/d)	CS	CS
ILCR	Incremental lifetime cancer risk	CS	CS
CSFo	Oral cancer slope factor (1/(mg/kg/d))	CS	CS
HQ	Hazard quotient	CS	CS
RfDo	Oral reference dose (mg/kg/d)	CS	CS
Cs	Concentration of chemical in soil (mg/kg)	CS	CS
CF	Conversion factor (kg/mg)	1E-06	1E-06
AF	Soil to skin adherence factor (mg/cm <sup>2</sup> -event)	1	1
ABS	Absorption fraction	CS	CS
SA	Skin surface area available for contact (cm <sup>2</sup> )	5800	2300
EF	Exposure Frequency (d/yr)	100	100
ED	Exposure Duration (yrs)	4	4
BW	Body weight (kg)	70	15
ATc	Averaging time, carcinogens (d)	25550	25550
ATn	Averaging time, noncarcinogens (d)	1460	1460
AE	Adjustment for Absorptin Efficiency	CS	CS

Parameter	Cs (mg/kg)	ABS	CSFo 1/(mg/kg/d)	RfDo (mg/kg/d)	AE	Adj. CSFo 1/(mg/kg/d)	Adj. RfDo (mg/kg/d)	Adult Residents						Child Residents																	
								Carcinogens			Noncarcinogens			Carcinogens			Noncarcinogens														
								DAD (mg/kg/d)	% Contrib.	Total ILCR	DAD (mg/kg/d)	HQ	% Contrib.	DAD (mg/kg/d)	% Contrib.	Total ILCR	DAD (mg/kg/d)	HQ	% Contrib.												
Benzo(a)pyrene	1.32	0.01	7.30E+00	NA	0.5	1.46E+01	NA	1.7E-08	2.5E-07	90.7%	3.0E-07	--	0.0%	3.2E-08	4.6E-07	90.7%	5.5E-07	--	0.0%												
Benzo(a)anthracene	0.34	0.01	7.30E-01	NA	0.5	1.46E+00	NA	4.4E-09	6.4E-09	2.3%	7.6E-08	--	0.0%	8.1E-09	1.2E-08	2.3%	1.4E-07	--	0.0%												
Benzo(b)fluoranthene	0.34	0.01	7.30E-01	NA	0.5	1.46E+00	NA	4.4E-09	6.4E-09	2.3%	7.7E-08	--	0.0%	8.1E-09	1.2E-08	2.3%	1.4E-07	--	0.0%												
Benzo(k)fluoranthene	0.34	0.01	7.30E-02	NA	0.5	1.46E-01	NA	4.4E-09	6.4E-10	0.2%	7.7E-08	--	0.0%	8.1E-09	1.2E-09	0.2%	1.4E-07	--	0.0%												
Chrysene	0.29	0.01	7.30E-03	NA	0.5	1.46E-02	NA	3.7E-09	5.4E-11	0.0%	6.5E-08	--	0.0%	6.9E-09	1.0E-10	0.0%	1.2E-07	--	0.0%												
Indeno(1,2,3-cd)pyrene	0.29	0.01	7.30E-01	NA	0.5	1.46E+00	NA	3.8E-09	5.5E-09	2.0%	6.6E-08	--	0.0%	7.0E-09	1.0E-08	2.0%	1.2E-07	--	0.0%												
Aluminum	5630.10	0.001	NA	1.00E+00	0.2	NA	2.00E-01	7.3E-06	--	0.0%	1.3E-04	6.4E-04	32.0%	1.4E-05	--	0.0%	2.4E-04	1.2E-03	32.0%												
Arsenic	0.67	0.001	1.50E+00	3.00E-04	0.2	7.50E+00	6.00E-05	8.7E-10	6.5E-09	2.4%	1.5E-08	2.5E-04	12.7%	1.6E-09	1.2E-08	2.4%	2.8E-08	4.7E-04	12.7%												
Iron	2914.99	0.001	NA	3.00E-01	0.2	NA	6.00E-02	3.8E-06	--	0.0%	6.6E-05	1.1E-03	55.3%	7.0E-06	--	0.0%	1.2E-04	2.0E-03	55.3%												
								Total ILCR: 2.7E-07			100.0%			HI: 2.0E-03			100.0%			Total ILCR: 5.1E-07			100.0%			HI: 3.7E-03			100.0%		

NOTES:  
 NA - Toxicity criterion not available.  
 -- Not applicable.

SEDIMENT INGESTION EXPOSURE ASSESSMENT - RME  
 SITE 89  
 REMEDIAL INVESTIGATION CTO-356  
 MCB CAMP LEJEUNE, NORTH CAROLINA  
 FUTURE ON-SITE RESIDENTS

$$CDI \text{ (mg/kg/d)} = (Cs \cdot IR \cdot CF \cdot FI \cdot EF \cdot ED) / (BW \cdot AT)$$

$$ILCR = CDI \cdot CSFo$$

$$HQ = CDI / RfDo$$

Parameter	Description	Younger Child (1-6 Yrs Old)	
		Adult	Child
CDI	Chronic daily intake (mg/kg/d)	CS	CS
ILCR	Incremental lifetime cancer risk	CS	CS
CSFo	Oral cancer slope factor (1/(mg/kg/d))	CS	CS
HQ	Hazard quotient	CS	CS
RfDo	Oral reference dose (mg/kg/d)	CS	CS
Cs	Concentration of chemical in soil (mg/kg)	CS	CS
IR	Ingestion Rate (mg/d)	100	200
CF	Conversion factor (kg/mg)	1E-06	1E-06
FI	Fraction of soil ingested from site	1	1
EF	Exposure Frequency (d/yr)	100	100
ED	Exposure Duration (yrs)	30	6
BW	Body weight (kg)	70	15
ATc	Averaging time, carcinogens (d)	25550	25550
ATn	Averaging time, noncarcinogens (d)	10950	2190

Parameter	Cs (mg/kg)	CSFo (1/(mg/kg/d))	RfDo (mg/kg/d)	Adult Residents						Child Residents					
				Carcinogens			Noncarcinogens			Carcinogens			Noncarcinogens		
				CDI (mg/kg/d)	ILCR	% Contrib. Total ILCR	CDI (mg/kg/d)	HQ	% Contrib. HI	CDI (mg/kg/d)	ILCR	% Contrib. Total ILCR	CDI (mg/kg/d)	HQ	% Contrib. HI
Benzo(a)pyrene	1.32	7.30E+00	NA	2.2E-07	1.6E-06	84.7%	5.2E-07	--	0.0%	4.1E-07	3.0E-06	84.7%	4.8E-06	--	0.0%
Benzo(a)anthracene	0.34	7.30E-01	NA	5.6E-08	4.1E-08	2.2%	1.3E-07	--	0.0%	1.1E-07	7.7E-08	2.2%	1.2E-06	--	0.0%
Benzo(b)fluoranthene	0.34	7.30E-01	NA	5.7E-08	4.1E-08	2.2%	1.3E-07	--	0.0%	1.1E-07	7.7E-08	2.2%	1.2E-06	--	0.0%
Benzo(k)fluoranthene	0.34	7.30E-02	NA	5.7E-08	4.1E-09	0.2%	1.3E-07	--	0.0%	1.1E-07	7.7E-09	0.2%	1.2E-06	--	0.0%
Chrysene	0.29	7.30E-03	NA	4.8E-08	3.5E-10	0.0%	1.1E-07	--	0.0%	9.0E-08	6.6E-10	0.0%	1.0E-06	--	0.0%
Indeno(1,2,3-cd)pyrene	0.29	7.30E-01	NA	4.9E-08	3.6E-08	1.9%	1.1E-07	--	0.0%	9.1E-08	6.6E-08	1.9%	1.1E-06	--	0.0%
Aluminum	5630.10	NA	1.00E+00	9.4E-04	--	0.0%	2.2E-03	2.2E-03	32.0%	1.8E-03	0.0E+00	0.0%	2.1E-02	2.1E-02	32.0%
Arsenic	0.67	1.50E+00	3.00E-04	1.1E-07	1.7E-07	8.9%	2.6E-07	8.7E-04	12.7%	2.1E-07	3.1E-07	8.9%	2.4E-06	8.2E-03	12.7%
Iron	2914.99	NA	3.00E-01	4.9E-04	--	0.0%	1.1E-03	3.8E-03	55.3%	9.1E-04	0.0E+00	0.0%	1.1E-02	3.5E-02	55.3%
				Total ILCR: 1.9E-06 100.0%			HI: 6.9E-03 100.0%			Total ILCR: 3.6E-06 100.0%			HI: 6.4E-02 100.0%		

NOTES:  
 NA - Toxicity criterion not available.  
 -- Not applicable.

SEDIMENT INGESTION EXPOSURE ASSESSMENT - CT  
 SITE 89  
 REMEDIAL INVESTIGATION CTO-356  
 MCB CAMP LEJEUNE, NORTH CAROLINA  
 FUTURE ON-SITE RESIDENTS

$$CDI \text{ (mg/kg/d)} = (Cs \cdot IR \cdot CF \cdot FI \cdot EF \cdot ED) / (BW \cdot AT)$$

$$ILCR = CDI \cdot CSFo$$

$$HQ = CDI / RfDo$$

Parameter	Description	Younger Child (1-6 Yrs Old)	
		Adult	Child
CDI	Chronic daily intake (mg/kg/d)	CS	CS
ILCR	Incremental lifetime cancer risk	CS	CS
CSFo	Oral cancer slope factor (1/(mg/kg/d))	CS	CS
HQ	Hazard quotient	CS	CS
RfDo	Oral reference dose (mg/kg/d)	CS	CS
Cs	Concentration of chemical in soil (mg/kg)	CS	CS
IR	Ingestion Rate (mg/d)	50	100
CF	Conversion factor (kg/mg)	1E-06	1E-06
FI	Fraction of soil ingested from site	1	1
EF	Exposure Frequency (d/yr)	100	100
ED	Exposure Duration (yrs)	9	6
BW	Body weight (kg)	70	15
ATc	Averaging time, carcinogens (d)	25550	25550
ATn	Averaging time, noncarcinogens (d)	3285	2190

Parameter	Cs (mg/kg)	CSFo 1/(mg/kg/d)	RfDo (mg/kg/d)	Adult Residents						Child Residents					
				Carcinogens			Noncarcinogens			Carcinogens			Noncarcinogens		
				CDI (mg/kg/d)	ILCR	% Contrib. Total ILCR	CDI (mg/kg/d)	HQ	% Contrib. HI	CDI (mg/kg/d)	ILCR	Total ILCR	CDI (mg/kg/d)	HQ	% Contrib. HI
Benzo(a)pyrene	1.32	7.30E+00	NA	3.3E-08	2.4E-07	84.7%	2.6E-07	--	0.0%	2.1E-07	1.5E-06	84.7%	2.4E-06	--	0.0%
Benzo(a)anthracene	0.34	7.30E-01	NA	8.4E-09	6.2E-09	2.2%	6.6E-08	--	0.0%	5.3E-08	3.8E-08	2.2%	6.1E-07	--	0.0%
Benzo(b)fluoranthene	0.34	7.30E-01	NA	8.5E-09	6.2E-09	2.2%	6.6E-08	--	0.0%	5.3E-08	3.9E-08	2.2%	6.2E-07	--	0.0%
Benzo(k)fluoranthene	0.34	7.30E-02	NA	8.5E-09	6.2E-10	0.2%	6.6E-08	--	0.0%	5.3E-08	3.9E-09	0.2%	6.2E-07	--	0.0%
Chrysene	0.29	7.30E-03	NA	7.2E-09	5.3E-11	0.0%	5.6E-08	--	0.0%	4.5E-08	3.3E-10	0.0%	5.2E-07	--	0.0%
Indeno(1,2,3-cd)pyrene	0.29	7.30E-01	NA	7.3E-09	5.3E-09	1.9%	5.7E-08	--	0.0%	4.6E-08	3.3E-08	1.9%	5.3E-07	--	0.0%
Aluminum	5630.10	NA	1.00E+00	1.4E-04	--	0.0%	1.1E-03	1.1E-03	32.0%	8.8E-04	0.0E+00	0.0%	1.0E-02	1.0E-02	32.0%
Arsenic	0.67	1.50E+00	3.00E-04	1.7E-08	2.5E-08	8.9%	1.3E-07	4.4E-04	12.7%	1.0E-07	1.6E-07	8.9%	1.2E-06	4.1E-03	12.7%
Iron	2914.99	NA	3.00E-01	7.3E-06	--	0.0%	5.7E-04	1.9E-03	55.3%	4.6E-04	0.0E+00	0.0%	5.3E-03	1.8E-02	55.3%
				Total ILCR: 2.9E-07 100.0%			HI: 3.4E-03 100.0%			Total ILCR: 1.8E-06 100.0%			HI: 3.2E-02 100.0%		

NOTES:  
 NA - Toxicity criterion not available.  
 -- Not applicable.

SEDIMENT DERMAL CONTACT EXPOSURE ASSESSMENT - RME  
 SITE 89  
 REMEDIAL INVESTIGATION CTO-356  
 MCB CAMP LEJEUNE, NORTH CAROLINA  
 FUTURE ON-SITE RESIDENTS

DAD (mg/kg/d) = (Cs\*CF\*AF\*ABS\*SA\*EF\*ED)/(BW\*AT)  
 ILCR = CDI\*CSFo Adj      CSF Adj = CSF/AE  
 HQ = CDI/RfDo Adj      RfD Adj = RfD\*AE

Parameter	Description	Younger Child (1-6 Yrs Old)	
		Adult	Child
DAD	Dermally absorbed dose (mg/kg/d)	CS	CS
ILCR	Incremental lifetime cancer risk	CS	CS
CSFo	Oral cancer slope factor (1/(mg/kg/d))	CS	CS
HQ	Hazard quotient	CS	CS
RfDo	Oral reference dose (mg/kg/d)	CS	CS
Cs	Concentration of chemical in soil (mg/kg)	CS	CS
CF	Conversion factor (kg/mg)	1E-06	1E-06
AF	Soil to skin adherence factor (mg/cm2-event)	1	1
ABS	Absorption fraction	CS	CS
SA	Skin surface area available for contact (cm2)	5800	2300
EF	Exposure Frequency (d/yr)	100	100
ED	Exposure Duration (yrs)	30	6
BW	Body weight (kg)	70	15
ATc	Averaging time, carcinogens (d)	25550	25550
ATn	Averaging time, noncarcinogens (d)	10950	2190
AE	Adjustment for Absorptin Efficiency	CS	CS

Parameter	Cs (mg/kg)	ABS	CSFo 1/(mg/kg/d)	RfDo (mg/kg/d)	AE	Adj. CSFo 1/(mg/kg/d)	Adj. RfDo (mg/kg/d)	Adult Residents						Child Residents					
								Carcinogens			Noncarcinogens			Carcinogens			Noncarcinogens		
								DAD (mg/kg/d)	ILCR	% Contrib. Total ILCR	DAD (mg/kg/d)	HQ	% Contrib. HI	DAD (mg/kg/d)	ILCR	% Contrib. Total ILCR	DAD (mg/kg/d)	HQ	% Contrib. HI
Benzo(a)pyrene	1.32	0.01	7.30E+00	NA	0.5	1.46E+01	NA	1.3E-07	1.9E-06	90.7%	3.0E-07	--	0.0%	4.7E-08	6.9E-07	90.7%	5.5E-07	--	0.0%
Benzo(a)anthracene	0.34	0.01	7.30E-01	NA	0.5	1.46E+00	NA	3.3E-08	4.8E-08	2.3%	7.6E-08	--	0.0%	1.2E-08	1.8E-08	2.3%	1.4E-07	--	0.0%
Benzo(b)fluoranthene	0.34	0.01	7.30E-01	NA	0.5	1.46E+00	NA	3.3E-08	4.8E-08	2.3%	7.7E-08	--	0.0%	1.2E-08	1.8E-08	2.3%	1.4E-07	--	0.0%
Benzo(k)fluoranthene	0.34	0.01	7.30E-02	NA	0.5	1.46E-01	NA	3.3E-08	4.8E-09	0.2%	7.7E-08	--	0.0%	1.2E-08	1.8E-09	0.2%	1.4E-07	--	0.0%
Chrysene	0.29	0.01	7.30E-03	NA	0.5	1.46E-02	NA	2.8E-08	4.1E-10	0.0%	6.5E-08	--	0.0%	1.0E-08	1.5E-10	0.0%	1.2E-07	--	0.0%
Indeno(1,2,3-cd)pyrene	0.29	0.01	7.30E-01	NA	0.5	1.46E+00	NA	2.8E-08	4.1E-08	2.0%	6.6E-08	--	0.0%	1.0E-08	1.5E-08	2.0%	1.2E-07	--	0.0%
Aluminum	5630.10	0.001	NA	1.00E+00	0.2	NA	2.00E-01	5.5E-05	--	0.0%	1.3E-04	6.4E-04	32.0%	2.0E-05	--	0.0%	2.4E-04	1.2E-03	32.0%
Arsenic	0.67	0.001	1.50E+00	3.00E-04	0.2	7.50E+00	6.00E-05	6.5E-09	4.9E-08	2.4%	1.5E-08	2.5E-04	12.7%	2.4E-09	1.8E-08	2.4%	2.8E-08	4.7E-04	12.7%
Iron	2914.99	0.001	NA	3.00E-01	0.2	NA	6.00E-02	2.8E-05	--	0.0%	6.6E-05	1.1E-03	55.3%	1.0E-05	--	0.0%	1.2E-04	2.0E-03	55.3%
								Total ILCR: 2.1E-06 100.0%			HI: 2.0E-03 100.0%			Total ILCR: 7.6E-07 100.0%			HI: 3.7E-03 100.0%		

NOTES:  
 NA - Toxicity criterion not available.  
 -- Not applicable.

SEDIMENT DERMAL CONTACT EXPOSURE ASSESSMENT - CT  
 SITE 89  
 REMEDIAL INVESTIGATION CTO-356  
 MCB CAMP LEJEUNE, NORTH CAROLINA  
 FUTURE ON-SITE RESIDENTS

DAD (mg/kg/d) = (Cs\*CF\*AF\*ABS\*SA\*EF\*ED)/(BW\*AT)  
 ILCR = CDI\*CSFo Adj      CSF Adj = CSF/AE  
 HQ = CDI/RfDo Adj      RfD Adj = RfD\*AE

Parameter	Description	Younger Child	
		Adult (1-6 Yrs Old)	Child
DAD	Dermally absorbed dose (mg/kg/d)	CS	CS
ILCR	Incremental lifetime cancer risk	CS	CS
CSFo	Oral cancer slope factor (1/(mg/kg/d))	CS	CS
HQ	Hazard quotient	CS	CS
RfDo	Oral reference dose (mg/kg/d)	CS	CS
Cs	Concentration of chemical in soil (mg/kg)	CS	CS
CF	Conversion factor (kg/mg)	1E-06	1E-06
AF	Soil to skin adherence factor (mg/cm <sup>2</sup> -event)	0.2	0.2
ABS	Absorption fraction	CS	CS
SA	Skin surface area available for contact (cm <sup>2</sup> )	5000	2000
EF	Exposure Frequency (d/yr)	100	100
ED	Exposure Duration (yrs)	9	6
BW	Body weight (kg)	70	15
ATc	Averaging time, carcinogens (d)	25550	25550
ATn	Averaging time, noncarcinogens (d)	3285	2190
AE	Adjustment for Absorption Efficiency	CS	CS

Parameter	Cs (mg/kg)	ABS	CSFo (1/(mg/kg/d))	RfDo (mg/kg/d)	AE	Adj. CSFo (1/(mg/kg/d))	Adj. RfDo (mg/kg/d)	Adult Residents						Child Residents					
								Carcinogens			Noncarcinogens			Carcinogens			Noncarcinogens		
								DAD (mg/kg/d)	ILCR	% Contrib.	DAD (mg/kg/d)	HQ	% Contrib.	DAD (mg/kg/d)	ILCR	% Contrib.	DAD (mg/kg/d)	HQ	% Contrib.
								Total ILCR			Total ILCR			Total ILCR			Total ILCR		
Benzo(a)pyrene	1.3E+00	0.01	7.30E+00	NA	0.5	1.46E+01	NA	6.6E-09	9.7E-08	90.7%	5.2E-08	--	0.0%	8.2E-09	1.2E-07	90.7%	9.6E-08	--	0.0%
Benzo(a)anthracene	0.34	0.01	7.30E-01	NA	0.5	1.46E+00	NA	1.7E-09	2.5E-09	2.3%	1.3E-08	--	0.0%	2.1E-09	3.1E-09	2.3%	2.5E-08	--	0.0%
Benzo(b)fluoranthene	0.34	0.01	7.30E-01	NA	0.5	1.46E+00	NA	1.7E-09	2.5E-09	2.3%	1.3E-08	--	0.0%	2.1E-09	3.1E-09	2.3%	2.5E-08	--	0.0%
Benzo(k)fluoranthene	0.34	0.01	7.30E-02	NA	0.5	1.46E-01	NA	1.7E-09	2.5E-10	0.2%	1.3E-08	--	0.0%	2.1E-09	3.1E-10	0.2%	2.5E-08	--	0.0%
Chrysene	0.29	0.01	7.30E-03	NA	0.5	1.46E-02	NA	1.4E-09	2.1E-11	0.0%	1.1E-08	--	0.0%	1.8E-09	2.6E-11	0.0%	2.1E-08	--	0.0%
Indeno(1,2,3-cd)pyrene	0.29	0.01	7.30E-01	NA	0.5	1.46E+00	NA	1.5E-09	2.1E-09	2.0%	1.1E-08	--	0.0%	1.8E-09	2.7E-09	2.0%	2.1E-08	--	0.0%
Aluminum	5.6E+03	0.001	NA	1.00E+00	0.2	NA	2.00E-01	2.8E-06	--	0.0%	2.2E-05	1.1E-04	32.0%	3.5E-06	--	0.0%	4.1E-05	2.1E-04	32.0%
Arsenic	6.7E-01	0.001	1.50E+00	3.00E-04	0.2	7.50E+00	6.00E-05	3.4E-10	2.5E-09	2.4%	2.6E-09	4.4E-05	12.7%	4.2E-10	3.1E-09	2.4%	4.9E-09	8.2E-05	12.7%
Iron	2.9E+03	0.001	NA	3.00E-01	0.2	NA	6.00E-02	1.5E-06	--	0.0%	1.1E-05	1.9E-04	55.3%	1.8E-06	--	0.0%	2.1E-05	3.5E-04	55.3%
								Total ILCR:	1.1E-07	100.0%	HI: 3.4E-04 100.0%			Total ILCR:	1.3E-07	100.0%	HI: 6.4E-04 100.0%		

NOTES:  
 NA - Toxicity criterion not available.  
 -- Not applicable.



**APPENDIX O**  
**SHOWER MODEL CALCULATIONS**

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CALCULATION SPREADSHEET FOR INDOOR AIR CONCENTRATION OF VOLATILIZED ORGANIC COMPOUNDS  
 RESULTING FROM SHOWERING WITH WATER CONTAINING VOLATILE CONSTITUENTS OF INTEREST\*  
 SITE 89

REMEDIAL INVESTIGATION CTO-0356  
 MCB CAMP LEJEUNE, NORTH CAROLINA  
 GROUNDWATER - RME

(1) Estimation of overall mass transfer coefficient, KL (cm/hr):

$$KL = 1/(1/kl + RT/Hkg),$$

where

H = Henry's Law Constant (atm-m<sup>3</sup>/mol-K);  
 RT = product of ideal gas constant (8.2E-5atm-m<sup>3</sup>/mol-K)  
 and absolute temperature (293K)  
 = 0.024 atm-m<sup>3</sup>/mole;  
 kl = VOC-specific liquid-film mass transfer coefficient (cm/hr); and  
 = kl(CO<sub>2</sub>)\*(44/MWvoc)<sup>0.5</sup>; and  
 kg = VOC-specific gas-film mass transfer coefficient (cm/hr)  
 kl(H<sub>2</sub>O)\*(18/MWvoc)<sup>0.5</sup>

where

kl(CO<sub>2</sub>) = 20 cm/hr  
 kl(H<sub>2</sub>O) = 3000 cm/hr  
 MWvoc = Molecular weight of VOC.

(3) Estimation of VOC concentration leaving shower droplet, Cwd (ug/L):

$$Cwd = Cw[1 - \exp(-KaL*ts)/60d]$$

where

Cw = shower water concentrations (ug/L);  
 d = shower droplet diameter (mm); and  
 ts = shower droplet drop time (sec).

(5) Calculation of time-dependent indoor air concentration, Ca(t) (ug/m<sup>3</sup>):

$$Ca(t) = (S/R)[w \exp(RDs) - 1] \exp(-Rt) \text{ for } t > Ds$$

where

Ds = shower duration (min); and  
 t = time (min).

(2) Adjustment of overall mass transfer coefficient, KL,  
 to shower water temperature:

$$KaL = KL[(Tc*us)/(Ts*uc)]^{0.5}$$

where

KaL = adjusted overall mass transfer coefficient (cm/hr);  
 Tc = calibration water temperature of KL (K);  
 uc = water viscosity at Tc (cp); and  
 us = water viscosity at Ts (cp).

(4) Estimation of VOC generation rate in the shower room,  
 S (ug/m<sup>3</sup>-min):

$$S = (Cwd*FR)/SV$$

where

FR = shower water flow rate (L/min); and  
 SV = shower room air volume (m<sup>3</sup>).

\* Chrostowski, Foster, 1987.

(1) Estimation of overall mass transfer coefficient, KL (cm/hr):

$$KL = 1/(1/kl + RT/Hkg),$$

COI	kl(CO2) (cm/hr)	kg(H2O) (cm/hr)	MW (g/mol)	kl (cm/hr)	kg (cm/hr)	RT (atm-m3/mol)	H (atm-m3/mol-K)	KL (cm/hr)
1,1,2,2-Tetrachloroethane	20	3000	168	10.24	981.98	0.024	3.81E-04	6.18
1,1,2-Trichloroethane	20	3000	133	11.50	1103.65	0.024	1.17E-03	9.48
1,1-Dichloroethene	20	3000	97	13.47	1292.32	0.024	3.40E-02	13.37
1,2-Dichloroethene (tot.)	20	3000	97	13.47	1292.32	0.024	6.56E-03	12.98
cis-1,2-Dichloroethene	20	3000	97	13.47	1292.32	0.024	7.58E-03	13.04
Tetrachloroethene	20	3000	166	10.30	987.88	0.024	2.59E-02	10.20
trans-1,2-Dichloroethene	20	3000	97	13.47	1292.32	0.024	6.56E-03	12.98
Trichloroethene	20	3000	131.4	11.57	1110.35	0.024	9.10E-03	11.26
Vinyl Chloride	20	3000	63	16.71	1603.57	0.024	8.19E-02	16.66

(2) Adjustment of overall mass transfer coefficient, KL, to shower water temperature:

$$KaL = KL[(Tc*us)/(Ts*uc)]^{0.5}$$

COI	KL (cm/hr)	Tc (K)	Ts (K)	uc (cp)	us (cp)	KaL (cm/hr)
1,1,2,2-Tetrachloroethane	6.18	293	318	0.01002	0.5996	0.83
1,1,2-Trichloroethane	9.48	293	318	0.01002	0.5996	1.28
1,1-Dichloroethene	13.37	293	318	0.01002	0.5996	1.80
1,2-Dichloroethene (tot.)	12.98	293	318	0.01002	0.5996	1.75
cis-1,2-Dichloroethene	13.04	293	318	0.01002	0.5996	1.76
Tetrachloroethene	10.20	293	318	0.01002	0.5996	1.37
trans-1,2-Dichloroethene	12.98	293	318	0.01002	0.5996	1.75
Trichloroethene	11.26	293	318	0.01002	0.5996	1.52
Vinyl Chloride	16.66	293	318	0.01002	0.5996	2.24

(3) Estimation of VOC concentration leaving shower droplet, Cwd (ug/L):

$$\begin{aligned} \text{Cwd} &= \text{Cw} * [1 - \exp((-KaL * ts) / 60 * d)] \\ &= \text{Cw} (1 - \exp(A)) \end{aligned}$$

COI	Cw (ug/L)	KaL (cm/hr)	ts (sec)	d (mm)	A	exp(A)	Cwd (ug/L)
1,1,2,2-Tetrachloroethane	4	0.83	2	1	-0.028	0.973	0.11
1,1,2-Trichloroethane	3	1.28	2	1	-0.043	0.958	0.12
1,1-Dichloroethene	2	1.80	2	1	-0.060	0.942	0.12
1,2-Dichloroethene (tot.)	880	1.75	2	1	-0.058	0.943	49.79
cis-1,2-Dichloroethene	818	1.76	2	1	-0.059	0.943	46.51
Tetrachloroethene	42.7	1.37	2	1	-0.046	0.955	1.91
trans-1,2-Dichloroethene	451	1.75	2	1	-0.058	0.943	25.52
Trichloroethene	744.3	1.52	2	1	-0.051	0.951	36.70
Vinyl Chloride	130	2.24	2	1	-0.075	0.928	9.37

(4) Estimation of VOC generation rate in the shower room, S (ug/m3-min):

$$S = (\text{Cwd} * \text{FR}) / \text{SV}$$

COI	Cwd (ug/L)	FR (L/min)	SV (M3)	S (ug/m3-min)
1,1,2,2-Tetrachloroethane	0.11	10	6	0.18
1,1,2-Trichloroethane	0.12	10	6	0.21
1,1-Dichloroethene	0.12	10	6	0.19
1,2-Dichloroethene (tot.)	49.79	10	6	82.99
cis-1,2-Dichloroethene	46.51	10	6	77.51
Tetrachloroethene	1.91	10	6	3.18
trans-1,2-Dichloroethene	25.52	10	6	42.53
Trichloroethene	36.70	10	6	61.17
Vinyl Chloride	9.37	10	6	15.62

(5) Calculation of time-dependent indoor air concentration, Ca(t) (ug/m3):

$$Ca(t) = (S/R)[\exp(RDs)-1]*\exp(-Rt) \text{ for } t > Ds$$

COI	S (ug/m3-min)	R (1/min)	Ds (min)	t (min)	RDs	Rt	exp(RDs)	exp(-Rt)	Ca(t) (ug/m3)
1,1,2,2-Tetrachloroethane	0.18	0.008	15	20	0.12	0.16	1.13	0.85	2.48
1,1,2-Trichloroethane	0.21	0.008	15	20	0.12	0.16	1.13	0.85	2.83
1,1-Dichloroethene	0.19	0.008	15	20	0.12	0.16	1.13	0.85	2.64
1,2-Dichloroethene (tot.)	82.99	0.008	15	20	0.12	0.16	1.13	0.85	1127.06
cis-1,2-Dichloroethene	77.51	0.008	15	20	0.12	0.16	1.13	0.85	1052.70
Tetrachloroethene	3.18	0.008	15	20	0.12	0.16	1.13	0.85	43.25
trans-1,2-Dichloroethene	42.53	0.008	15	20	0.12	0.16	1.13	0.85	577.62
Trichloroethene	61.17	0.008	15	20	0.12	0.16	1.13	0.85	830.67
Vinyl Chloride	15.62	0.008	15	20	0.12	0.16	1.13	0.85	212.08

CALCULATION SPREADSHEET FOR INDOOR AIR CONCENTRATION OF VOLATILIZED ORGANIC COMPOUNDS  
 RESULTING FROM SHOWERING WITH WATER CONTAINING VOLATILE CONSTITUENTS OF INTEREST\*

SITE 89

REMEDIAL INVESTIGATION CTO-0356

MCB CAMP LEJEUNE, NORTH CAROLINA

GROUNDWATER - CT

(1) Estimation of overall mass transfer coefficient, KL (cm/hr):

$$KL = 1/(1/kl + RT/Hkg),$$

where

H = Henry's Law Constant (atm-m<sup>3</sup>/mol-K);  
 RT = product of ideal gas constant (8.2E-5atm-m<sup>3</sup>/mol-K)  
 and absolute temperature (293K)  
 = 0.024 atm-m<sup>3</sup>/mole;  
 kl = VOC-specific liquid-film mass transfer coefficient (cm/hr); and  
 = kl(CO<sub>2</sub>)\*(44/MWvoc)<sup>0.5</sup>; and  
 kg = VOC-specific gas-film mass transfer coefficient (cm/hr)  
 kl(H<sub>2</sub>O)\*(18/MWvoc)<sup>0.5</sup>

where

kl(CO<sub>2</sub>) = 20 cm/hr  
 kl(H<sub>2</sub>O) = 3000 cm/hr  
 MWvoc = Molecular weight of VOC.

(3) Estimation of VOC concentration leaving shower droplet, Cwd (ug/L):

$$Cwd = Cw[1 - \exp((-KaL*ts)/60d)]$$

where

Cw = shower water concentrations (ug/L);  
 d = shower droplet diameter (mm); and  
 ts = shower droplet drop time (sec).

(5) Calculation of time-dependent indoor air concentration, Ca(t) (ug/m<sup>3</sup>):

$$Ca(t) = (S/R)[\exp(RDs) - 1] \exp(-Rt) \text{ for } t > Ds$$

where

Ds = shower duration (min); and  
 t = time (min).

(2) Adjustment of overall mass transfer coefficient, KL,  
 to shower water temperature:

$$KaL = KL[(Tc*us)/(Ts*uc)]^{-0.5}$$

where

KaL = adjusted overall mass transfer coefficient (cm/hr);  
 Tc = calibration water temperature of KL (K);  
 uc = water viscosity at Tc (cp); and  
 us = water viscosity at Ts (cp).

(4) Estimation of VOC generation rate in the shower room,  
 S (ug/m<sup>3</sup>-min):

$$S = (Cwd*FR)/SV$$

where

FR = shower water flow rate (L/min); and  
 SV = shower room air volume (m<sup>3</sup>).

\* Chrostowski, Foster, 1987.

(1) Estimation of overall mass transfer coefficient, KL (cm/hr):

$$KL = 1/(1/kl + RT/Hkg),$$

COI	kl(CO2) (cm/hr)	kg(H2O) (cm/hr)	MW (g/mol)	kl (cm/hr)	kg (cm/hr)	RT (atm-m3/mol)	H (atm-m3/mol-K)	KL (cm/hr)
1,1,2,2-Tetrachloroethane	20	3000	168	10.24	981.98	0.024	3.81E-04	6.18
1,1,2-Trichloroethane	20	3000	133	11.50	1103.65	0.024	1.17E-03	9.48
1,1-Dichloroethene	20	3000	97	13.47	1292.32	0.024	3.40E-02	13.37
1,2-Dichloroethene (tot.)	20	3000	97	13.47	1292.32	0.024	6.56E-03	12.98
cis-1,2-Dichloroethene	20	3000	97	13.47	1292.32	0.024	7.58E-03	13.04
Tetrachloroethene	20	3000	166	10.30	987.88	0.024	2.59E-02	10.20
trans-1,2-Dichloroethene	20	3000	97	13.47	1292.32	0.024	6.56E-03	12.98
Trichloroethene	20	3000	131.4	11.57	1110.35	0.024	9.10E-03	11.26
Vinyl Chloride	20	3000	63	16.71	1603.57	0.024	8.19E-02	16.66

(2) Adjustment of overall mass transfer coefficient, KL, to shower water temperature:

$$KaL = KL[(Tc*us)/(Ts*uc)]^{0.5}$$

COI	KL (cm/hr)	Tc (K)	Ts (K)	uc (cp)	us (cp)	KaL (cm/hr)
1,1,2,2-Tetrachloroethane	6.18	293	318	0.01002	0.5996	0.83
1,1,2-Trichloroethane	9.48	293	318	0.01002	0.5996	1.28
1,1-Dichloroethene	13.37	293	318	0.01002	0.5996	1.80
1,2-Dichloroethene (tot.)	12.98	293	318	0.01002	0.5996	1.75
cis-1,2-Dichloroethene	13.04	293	318	0.01002	0.5996	1.76
Tetrachloroethene	10.20	293	318	0.01002	0.5996	1.37
trans-1,2-Dichloroethene	12.98	293	318	0.01002	0.5996	1.75
Trichloroethene	11.26	293	318	0.01002	0.5996	1.52
Vinyl Chloride	16.66	293	318	0.01002	0.5996	2.24

(3) Estimation of VOC concentration leaving shower droplet, Cwd (ug/L):

$$Cwd = Cw * [1 - \exp((-KaL * ts) / 60 * d)]$$

$$= Cw(1 - \exp(A))$$

COI	Cw (ug/L)	KaL (cm/hr)	ts (sec)	d (mm)	A	exp(A)	Cwd (ug/L)
1,1,2,2-Tetrachloroethane	4	0.83	2	1	-0.028	0.973	0.11
1,1,2-Trichloroethane	3	1.28	2	1	-0.043	0.958	0.12
1,1-Dichloroethene	2	1.80	2	1	-0.060	0.942	0.12
1,2-Dichloroethene (tot.)	96.4	1.75	2	1	-0.058	0.943	5.45
cis-1,2-Dichloroethene	62.07	1.76	2	1	-0.059	0.943	3.53
Tetrachloroethene	4.69	1.37	2	1	-0.046	0.955	0.21
trans-1,2-Dichloroethene	173.67	1.75	2	1	-0.058	0.943	9.83
Trichloroethene	111.49	1.52	2	1	-0.051	0.951	5.50
Vinyl Chloride	28.97	2.24	2	1	-0.075	0.928	2.09

(4) Estimation of VOC generation rate in the shower room, S (ug/m3-min):

$$S = (Cwd * FR) / SV$$

COI	Cwd (ug/L)	FR (L/min)	SV (M3)	S (ug/m3-min)
1,1,2,2-Tetrachloroethane	0.11	10	6	0.18
1,1,2-Trichloroethane	0.12	10	6	0.21
1,1-Dichloroethene	0.12	10	6	0.19
1,2-Dichloroethene (tot.)	5.45	10	6	9.09
cis-1,2-Dichloroethene	3.53	10	6	5.88
Tetrachloroethene	0.21	10	6	0.35
trans-1,2-Dichloroethene	9.83	10	6	16.38
Trichloroethene	5.50	10	6	9.16
Vinyl Chloride	2.09	10	6	3.48



(5) Calculation of time-dependent indoor air concentration, Ca(t) (ug/m3):

$$Ca(t) = (S/R)[\exp(RDs)-1]*\exp(-Rt) \text{ for } t > Ds$$

COI	S (ug/m3-min)	R (1/min)	Ds (min)	t (min)	RDs	Rt	exp(RDs)	exp(-Rt)	Ca(t) (ug/m3)
1,1,2,2-Tetrachloroethane	0.18	0.008	15	20	0.12	0.16	1.13	0.85	2.48
1,1,2-Trichloroethane	0.21	0.008	15	20	0.12	0.16	1.13	0.85	2.83
1,1-Dichloroethene	0.19	0.008	15	20	0.12	0.16	1.13	0.85	2.64
1,2-Dichloroethene (tot.)	9.09	0.008	15	20	0.12	0.16	1.13	0.85	123.46
cis-1,2-Dichloroethene	5.88	0.008	15	20	0.12	0.16	1.13	0.85	79.88
Tetrachloroethene	0.35	0.008	15	20	0.12	0.16	1.13	0.85	4.75
trans-1,2-Dichloroethene	16.38	0.008	15	20	0.12	0.16	1.13	0.85	222.43
Trichloroethene	9.16	0.008	15	20	0.12	0.16	1.13	0.85	124.43
Vinyl Chloride	3.48	0.008	15	20	0.12	0.16	1.13	0.85	47.26

CALCULATION SPREADSHEET FOR INDOOR AIR CONCENTRATION OF VOLATILIZED ORGANIC COMPOUNDS  
 RESULTING FROM SHOWERING WITH WATER CONTAINING VOLATILE CONSTITUENTS OF INTEREST\*

SITE 93

REMEDIAL INVESTIGATION CTO-0356

MCB CAMP LEJEUNE, NORTH CAROLINA

GROUNDWATER - RME

(1) Estimation of overall mass transfer coefficient, KL (cm/hr):

$$KL = 1/(1/kl + RT/Hkg),$$

where

- H = Henry's Law Constant (atm-m<sup>3</sup>/mol-K);  
 RT = product of ideal gas constant (8.2E-5atm-m<sup>3</sup>/mol-K)  
 and absolute temperature (293K)  
 = 0.024 atm-m<sup>3</sup>/mole;  
 kl = VOC-specific liquid-film mass transfer coefficient (cm/hr); and  
 = kl(CO<sub>2</sub>)\*(44/MWvoc)<sup>0.5</sup>; and  
 kg = VOC-specific gas-film mass transfer coefficient (cm/hr)  
 kl(H<sub>2</sub>O)\*(18/MWvoc)<sup>0.5</sup>

where

- kl(CO<sub>2</sub>) = 20 cm/hr  
 kl(H<sub>2</sub>O) = 3000 cm/hr  
 MWvoc = Molecular weight of VOC.

(3) Estimation of VOC concentration leaving shower droplet, Cwd (ug/L):

$$Cwd = Cw[1 - \exp((-KaL * ts)/60d)]$$

where

- Cw = shower water concentrations (ug/L);  
 d = shower droplet diameter (mm); and  
 ts = shower droplet drop time (sec).

(5) Calculation of time-dependent indoor air concentration, Ca(t) (ug/m<sup>3</sup>):

$$Ca(t) = (S/R)[w \exp(RDs) - 1] \exp(-Rt) \text{ for } t > Ds$$

where

- Ds = shower duration (min); and  
 t = time (min).

(2) Adjustment of overall mass transfer coefficient, KL,  
 to shower water temperature:

$$KaL = KL[(Tc * us)/(Ts * uc)]^{0.5}$$

where

- KaL = adjusted overall mass transfer coefficient (cm/hr);  
 Tc = calibration water temperature of KL (K);  
 uc = water viscosity at Tc (cp); and  
 us = water viscosity at Ts (cp).

(4) Estimation of VOC generation rate in the shower room,  
 S (ug/m<sup>3</sup>-min):

$$S = (Cwd * FR) / SV$$

where

- FR = shower water flow rate (L/min); and  
 SV = shower room air volume (m<sup>3</sup>).

\* Chrostowski, Foster, 1987.

(1) Estimation of overall mass transfer coefficient, KL (cm/hr):

$$KL = 1/(1/kl + RT/Hkg),$$

COI	kl(CO2) (cm/hr)	kg(H2O) (cm/hr)	MW (g/mol)	kl (cm/hr)	kg (cm/hr)	RT (atm-m3/mol)	H (atm-m3/mol-K)	KL (cm/hr)
1,2-Dichloroethene (tot.)	20	3000	97	13.47	1292.32	0.024	6.56E-03	12.98
cis-1,2-Dichloroethene	20	3000	97	13.47	1292.32	0.024	7.58E-03	13.04
Tetrachloroethene	20	3000	166	10.30	987.88	0.024	2.59E-02	10.20
trans-1,2-Dichloroethene	20	3000	97	13.47	1292.32	0.024	6.56E-03	12.98
Trichloroethene	20	3000	131.4	11.57	1110.35	0.024	9.10E-03	11.26

(2) Adjustment of overall mass transfer coefficient, KL, to shower water temperature:

$$KaL = KL[(Tc*us)/(Ts*uc)]^{n-0.5}$$

COI	KL (cm/hr)	Tc (K)	Ts (K)	uc (cp)	us (cp)	KaL (cm/hr)
1,2-Dichloroethene (tot.)	12.98	293	318	0.01002	0.5996	1.75
cis-1,2-Dichloroethene	13.04	293	318	0.01002	0.5996	1.76
Tetrachloroethene	10.20	293	318	0.01002	0.5996	1.37
trans-1,2-Dichloroethene	12.98	293	318	0.01002	0.5996	1.75
Trichloroethene	11.26	293	318	0.01002	0.5996	1.52

(3) Estimation of VOC concentration leaving shower droplet, Cwd (ug/L):

$$Cwd = Cw * [1 - \exp((-KaL * ts) / 60 * d)]$$

$$= Cw(1 - \exp(A))$$

COI	Cw (ug/L)	KaL (cm/hr)	ts (sec)	d (mm)	A	exp(A)	Cwd (ug/L)
1,2-Dichloroethene (tot.)	92	1.75	2	1	-0.058	0.943	5.21
cis-1,2-Dichloroethene	175	1.76	2	1	-0.059	0.943	9.95
Tetrachloroethene	65.1	1.37	2	1	-0.046	0.955	2.91
trans-1,2-Dichloroethene	57	1.75	2	1	-0.058	0.943	3.23
Trichloroethene	39.4	1.52	2	1	-0.051	0.951	1.94

(4) Estimation of VOC generation rate in the shower room, S (ug/m3-min):

$$S = (Cwd*FR)/SV$$

COI	Cwd (ug/L)	FR (L/min)	SV (M3)	S (ug/m3-min)
1,2-Dichloroethene (tot.)	5.21	10	6	8.68
cis-1,2-Dichloroethene	9.95	10	6	16.58
Tetrachloroethene	2.91	10	6	4.86
trans-1,2-Dichloroethene	3.23	10	6	5.38
Trichloroethene	1.94	10	6	3.24

(5) Calculation of time-dependent indoor air concentration, Ca(t) (ug/m3):

$$Ca(t) = (S/R)[\exp(RDs)-1]*\exp(-Rt) \text{ for } t > Ds$$

COI	S (ug/m3-min)	R (1/min)	Ds (min)	t (min)	RDs	Rt	exp(RDs)	exp(-Rt)	Ca(t) (ug/m3)
1,2-Dichloroethene (tot.)	8.68	0.008	15	20	0.12	0.16	1.13	0.85	117.83
cis-1,2-Dichloroethene	16.58	0.008	15	20	0.12	0.16	1.13	0.85	225.21
Tetrachloroethene	4.86	0.008	15	20	0.12	0.16	1.13	0.85	65.94
trans-1,2-Dichloroethene	5.38	0.008	15	20	0.12	0.16	1.13	0.85	73.00
Trichloroethene	3.24	0.008	15	20	0.12	0.16	1.13	0.85	43.97

CALCULATION SPREADSHEET FOR INDOOR AIR CONCENTRATION OF VOLATILIZED ORGANIC COMPOUNDS  
 RESULTING FROM SHOWERING WITH WATER CONTAINING VOLATILE CONSTITUENTS OF INTEREST\*  
 SITE 93  
 REMEDIAL INVESTIGATION CTO-0356  
 MCB CAMP LEJEUNE, NORTH CAROLINA  
 GROUNDWATER - CT

(1) Estimation of overall mass transfer coefficient,  $K_L$  (cm/hr):

$$K_L = 1/(1/k_l + RT/Hkg),$$

where

- H = Henry's Law Constant (atm-m<sup>3</sup>/mol-K);  
 RT = product of ideal gas constant (8.2E-5atm-m<sup>3</sup>/mol-K)  
 and absolute temperature (293K)  
 = 0.024 atm-m<sup>3</sup>/mole;  
 $k_l$  = VOC-specific liquid-film mass transfer coefficient (cm/hr); and  
 =  $k_l(\text{CO}_2) \cdot (44/\text{MW}_{\text{voc}})^{0.5}$ ; and  
 $k_g$  = VOC-specific gas-film mass transfer coefficient (cm/hr)  
 $k_l(\text{H}_2\text{O}) \cdot (18/\text{MW}_{\text{voc}})^{0.5}$

where

- $k_l(\text{CO}_2)$  = 20 cm/hr  
 $k_l(\text{H}_2\text{O})$  = 3000 cm/hr  
 $\text{MW}_{\text{voc}}$  = Molecular weight of VOC.

(3) Estimation of VOC concentration leaving shower droplet,  $C_{wd}$  (ug/L):

$$C_{wd} = C_w[1 - \exp((-K_a L \cdot t_s)/60d)]$$

where

- $C_w$  = shower water concentrations (ug/L);  
 d = shower droplet diameter (mm); and  
 $t_s$  = shower droplet drop time (sec).

(5) Calculation of time-dependent indoor air concentration,  $C_a(t)$  (ug/m<sup>3</sup>):

$$C_a(t) = (S/R)[w_x p(RD_s) - 1] \cdot \exp(-Rt) \text{ for } t > D_s$$

where

- $D_s$  = shower duration (min); and  
 t = time (min).

(2) Adjustment of overall mass transfer coefficient,  $K_L$ ,  
 to shower water temperature:

$$K_{aL} = K_L[(T_c \cdot u_s)/(T_s \cdot u_c)]^{0.5}$$

where

- $K_{aL}$  = adjusted overall mass transfer coefficient (cm/hr);  
 $T_c$  = calibration water temperature of  $K_L$  (K);  
 $u_c$  = water viscosity at  $T_c$  (cp); and  
 $u_s$  = water viscosity at  $T_s$  (cp).

(4) Estimation of VOC generation rate in the shower room,  
 $S$  (ug/m<sup>3</sup>-min):

$$S = (C_{wd} \cdot FR)/SV$$

where

- FR = shower water flow rate (L/min); and  
 SV = shower room air volume (m<sup>3</sup>).

\* Chrostowski, Foster, 1987.

(1) Estimation of overall mass transfer coefficient, KL (cm/hr):

$$KL = 1/(1/kl + RT/Hkg),$$

COI	kl(CO2) (cm/hr)	kg(H2O) (cm/hr)	MW (g/mol)	kl (cm/hr)	kg (cm/hr)	RT (atm-m3/mol)	H (atm-m3/mol-K)	KL (cm/hr)
1,2-Dichloroethene (tot.)	20	3000	97	13.47	1292.32	0.024	6.56E-03	12.98
cis-1,2-Dichloroethene	20	3000	97	13.47	1292.32	0.024	7.58E-03	13.04
Tetrachloroethene	20	3000	166	10.30	987.88	0.024	2.59E-02	10.20
trans-1,2-Dichloroethene	20	3000	97	13.47	1292.32	0.024	6.56E-03	12.98
Trichloroethene	20	3000	131.4	11.57	1110.35	0.024	9.10E-03	11.26

(2) Adjustment of overall mass transfer coefficient, KL, to shower water temperature:

$$KaL = KL[(Tc*us)/(Ts*uc)]^{0.5}$$

COI	KL (cm/hr)	Tc (K)	Ts (K)	uc (cp)	us (cp)	KaL (cm/hr)
1,2-Dichloroethene (tot.)	12.98	293	318	0.01002	0.5996	1.75
cis-1,2-Dichloroethene	13.04	293	318	0.01002	0.5996	1.76
Tetrachloroethene	10.20	293	318	0.01002	0.5996	1.37
trans-1,2-Dichloroethene	12.98	293	318	0.01002	0.5996	1.75
Trichloroethene	11.26	293	318	0.01002	0.5996	1.52

(3) Estimation of VOC concentration leaving shower droplet, Cwd (ug/L):

$$Cwd = Cw*[1 - \exp((-KaL*ts)/60*d)]$$

$$= Cw(1 - \exp(A))$$

COI	Cw (ug/L)	KaL (cm/hr)	ts (sec)	d (mm)	A	exp(A)	Cwd (ug/L)
1,2-Dichloroethene (tot.)	20.89	1.75	2	1	-0.058	0.943	1.18
cis-1,2-Dichloroethene	30.42	1.76	2	1	-0.059	0.943	1.73
Tetrachloroethene	5.58	1.37	2	1	-0.046	0.955	0.25
trans-1,2-Dichloroethene	6.86	1.75	2	1	-0.058	0.943	0.39
Trichloroethene	39.4	1.52	2	1	-0.051	0.951	1.94

(4) Estimation of VOC generation rate in the shower room, S (ug/m<sup>3</sup>-min):

$$S = (Cwd*FR)/SV$$

COI	Cwd (ug/L)	FR (L/min)	SV (M3)	S (ug/m <sup>3</sup> -min)
1,2-Dichloroethene (tot.)	1.18	10	6	1.97
cis-1,2-Dichloroethene	1.73	10	6	2.88
Tetrachloroethene	0.25	10	6	0.42
trans-1,2-Dichloroethene	0.39	10	6	0.65
Trichloroethene	1.94	10	6	3.24

(5) Calculation of time-dependent indoor air concentration, Ca(t) (ug/m<sup>3</sup>):

$$Ca(t) = (S/R)[\exp(RDs)-1]*\exp(-Rt) \text{ for } t > Ds$$

COI	S (ug/m <sup>3</sup> -min)	R (1/min)	Ds (min)	t (min)	RDs	Rt	exp(RDs)	exp(-Rt)	Ca(t) (ug/m <sup>3</sup> )
1,2-Dichloroethene (tot.)	1.97	0.008	15	20	0.12	0.16	1.13	0.85	26.75
cis-1,2-Dichloroethene	2.88	0.008	15	20	0.12	0.16	1.13	0.85	39.15
Tetrachloroethene	0.42	0.008	15	20	0.12	0.16	1.13	0.85	5.65
trans-1,2-Dichloroethene	0.65	0.008	15	20	0.12	0.16	1.13	0.85	8.79
Trichloroethene	3.24	0.008	15	20	0.12	0.16	1.13	0.85	43.97

**APPENDIX P**  
**ECOLOGICAL RISK SCREENING CALCULATIONS**

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TABLE 1

**BACK-UP CALCULATIONS FOR SURFACE WATER QUOTIENT INDICES PER STATION**  
**RI/FS CTO-356**  
**OPERABLE UNIT NO. 16 (SITE 89)**  
**MCB, CAMP LEJEUNE, NORTH CAROLINA**

Ecological Contaminant of Concern	Sample Identification	Maximum Concentration	Surface Water Screening Levels			Quotient Index Ratios		
			North Carolina Water Quality Standards	Region IV Acute Screening Values	Region IV Chronic Screening Values	North Carolina	Region IV Acute	Region IV Chronic
<b>Organics (µg/L)</b>								
1,2-Dichloroethene (total)	IR89-EC-SW02-0	120	NE	NE	NE	NA	NA	NA
cis-1,2-Dichloroethene	IR89-EC-SW02-0	52	NE	NE	NE	NA	NA	NA
Trichloroethene	IR89-EC-SW09-0	28.5	NE	NE	NE	NA	NA	NA
Vinyl Chloride	IR89-EC-SW02-0	25	NE	NE	NE	NA	NA	NA
<b>Metals (µg/L)</b>								
Aluminum	IR89-EC-SW02-0	189	NE	750	87	NA	0.25	2.17
	IR89-EC-SW03-0	201	NE	750	87	NA	0.27	2.31
	IR89-EC-SW04-0	554	NE	750	87	NA	0.74	6.37
	IR89-EC-SW05-0	275	NE	750	87	NA	0.37	3.16
Barium	IR89-EC-SW03-0	25	NE	NE	NE	NA	NA	NA
Iron	IR89-EC-SW02-0	1500	1000	NE	1000	1.50	NA	1.50
	IR89-EC-SW03-0	1510	1000	NE	1000	1.51	NA	1.51
	IR89-EC-SW04-0	1570	1000	NE	1000	1.57	NA	1.57
	IR89-EC-SW05-0	1220	1000	NE	1000	1.22	NA	1.22
Lead	IR89-EC-SW03-0	5.4	25	101	4	0.22	0.05	1.35
Manganese	IR89-EC-SW02-0	50.4	NE	NE	NE	NA	NA	NA

## Notes:

Quotient Index = Maximum Detected Concentration/Screening Value

µg/L - micrograms per liter

NA - Not Applicable (no screening value available)

TABLE 2

**BACK-UP SURFACE WATER QUOTIENT INDICES PER ECOLOGICAL CONTAMINANT OF CONCERN  
RI/FS CTO-356  
OPERABLE UNIT NO. 16 (SITE 89)  
MCB, CAMP LEJEUNE, NORTH CAROLINA**

Ecological Contaminant of Concern	Maximum Concentration	Surface Water Screening Values			Quotient Index Ratios		
		North Carolina Water Quality Standards	Region IV Acute	Region IV Chronic	North Carolina	Region IV Acute	Region IV Chronic
<b>Organics (µg/L)</b>							
1,2-Dichloroethene (total)	120	NE	NE	NE	NA	NA	NA
cis-1,2-Dichloroethene	52	NE	NE	NE	NA	NA	NA
Trichloroethene	28.5	NE	NE	NE	NA	NA	NA
Vinyl Chloride	25	NE	NE	NE	NA	NA	NA
<b>Metals (µg/L)</b>							
Aluminum	554	NE	750	87	NA	0.74	16.37
Barium	25	NE	NE	NE	NA	NA	NA
Iron	1570	1000	NE	1000	1.57	NA	1.57
Lead	5.4	25	101	4	0.22	0.05	11.35
Manganese	50.4	NE	NE	NE	NA	NA	NA
Total					1.79	0.79	9.29

## Notes:

Quotient Index = Maximum Detected Concentration/Screening Value

µg/L - micrograms per liter

NA - Not Applicable

NE - Not Established

TABLE 3

**BACK-UP CALCULATIONS FOR THE SEDIMENT QUOTIENT INDICES PER STATION  
R/FS CTO-356  
OPERABLE UNIT NO. 16 (SITE 89)  
MCB, CAMP LEJEUNE, NORTH CAROLINA**

Ecological Contaminant of Concern	Sample Identification	Maximum Concentration	Sediment Screening Values		Quotient Index Ratios	
			Region IV Screening Values	USEPA Ecotox Values	Region IV	Ecotox
<b>Organics (µg/kg)</b>						
1,1-Dichloroethene	IR89-EC-SD03-312	37	NE	NE	NA	NA
1,2-Dichloroethene (total)	IR89-EC-SD03-06	1600	NE	NE	NA	NA
cis-1,2-Dichloroethene	IR89-EC-SD10-06	16	NE	NE	NA	NA
trans-1,2-Dichloroethene	IR89-EC-SD10-06	5	NE	NE	NA	NA
1,1,2,2-Tetrachloroethane	IR89-EC-SD03-06	1700	NE	940	NA	1.81
1,1,2-Trichloroethane	IR89-EC-SD03-06	19	NE	NE	NA	NA
Trichloroethene	IR89-EC-SD03-06	2400	NE	1600	NA	1.50
Vinyl Chloride	IR89-EC-SD03-312	230	NE	NE	NA	NA
Benzo(a)pyrene	IR89-EC-SD04-612	3100	88.8	430	34.91	7.21
Benzo(b)fluoranthene	IR89-EC-SD02-612/04-06	140	NE	NE	NA	NA
Benzo(g,h,i)perylene	IR89-EC-SD04-06	55	NE	NE	NA	NA
Benzo(k)fluoranthene	IR89-EC-SD04-06	51	NE	NE	NA	NA
Bis(2-ethylhexyl)phthalate	IR89-EC-SD05-612	13000	NE	NE	NA	NA
Chrysene	IR89-EC-SD04-06	120	108.0	NE	1.11	NA
Fluoranthene	IR89-EC-SD04-06	180	113.0	2900	1.59	0.06
Indeno(1,2,3-cd)pyrene	IR89-EC-SD04-06	59	NE	NE	NA	NA
Phenanthrene	IR89-EC-SD04-06	100	86.7	NE	1.15	NA
alpha-Chlordane	IR-EC-SD05-06	2.0	0.5	NE	4.00	NA
	IR-EC-SD05-612	2.9	0.5	NE	5.80	NA
gamma-Chlordane	IR-EC-SD05-06	1.6	0.5	NE	3.20	NA
	IR-EC-SD05-612	4.6	0.5	NE	9.20	NA
4,4'-DDD	IR-EC-SD05-06	42	1.22	NE	34.43	NA
	IR-EC-SD05-612	79	1.22	NE	64.75	NA
4,4'-DDE	IR-EC-SD05-06	33	2.07	NE	15.94	NA
	IR-EC-SD05-612	43	2.07	NE	20.77	NA
4,4'-DDT	IR-EC-SD05-06	23	1.19	1.6	19.33	14.38
	IR-EC-SD05-612	34	1.19	1.6	28.57	21.25
<b>Metals (mg/kg)</b>						
Aluminum	IR-EC-SD04-612	14000	NE	NE	NA	NA
Barium	IR-EC-SD04-612	30	NE	NE	NA	NA
Beryllium	IR-EC-SD04-612	0.55	NE	NE	NA	NA
Cadmium	IR89-EC-SD01-06	0.82	0.676	1.2	1.21	0.68
	IR89-EC-SD03-06	0.77	0.676	1.2	1.14	0.64
	IR89-EC-SD03-612	0.78	0.676	1.2	1.15	0.65
Copper	IR89-EC-SD02-06	38.7	18.7	34	2.07	1.14
Iron	IR-EC-SD04-612	3860	NE	NE	NA	NA
Lead	IR89-EC-SD05-06	35.4	30	47	1.17	0.75
Manganese	IR-EC-SD04-612	16.3	NE	NE	NA	NA
Vanadium	IR-EC-SD02-612	19.7	NE	NE	NA	NA

## Notes:

Quotient Index = Maximum Detected Concentration/Screening Value  
µg/kg - micrograms per kilogram  
mg/kg - milligrams per kilogram  
NA - Not Applicable  
NE - Not Established

TABLE 4

**BACK-UP CALCULATIONS FOR THE SEDIMENT QUOTIENT INDICES  
PER ECOLOGICAL CONTAMINANT OF CONCERN**

RI/FS CTO-356

**OPERABLE UNIT NO. 16 (SITE 89)  
MCB, CAMP LEJEUNE, NORTH CAROLINA**

Ecological Contaminant of Concern	Maximum Concentration	Sediment Screening Values		Quotient Index	
		Region IV Screening Values	USEPA Ecotox Values	Region IV	Ecotox
<b>Organics (µg/kg)</b>					
1,1-Dichloroethene	37.0	NE	NE	NA	NA
1,2-Dichloroethene (total)	1600.0	NE	NE	NA	NA
cis-1,2-Dichloroethene	16.0	NE	NE	NA	NA
trans-1,2-Dichloroethene	5.0	NE	NE	NA	NA
1,1,2,2-Tetrachloroethane	1700.0	NE	940.0	NA	1.81
1,1,2-Trichloroethane	19.0	NE	NE	NA	NA
Trichloroethene	2400.0	NE	1600.0	NA	1.50
Vinyl Chloride	230.0	NE	NE	NA	NA
Benzo(a)pyrene	3100.0	88.8	430.0	34.91	7.21
Benzo(b)fluoranthene	140.0	NE	NE	NA	NA
Benzo(g,h,i)perylene	55.0	NE	NE	NA	NA
Benzo(k)fluoranthene	51.0	NE	NE	NA	NA
Bis(2-ethylhexyl)phthalate	13000.0	NE	NE	NA	NA
Chrysene	120.0	108.0	NE	1.11	NA
Fluoranthene	180.0	113.0	2900.00	1.59	0.06
Indeno(1,2,3-cd)pyrene	59.0	NE	NE	NA	NA
Phenanthrene	100.0	NE	NE	NA	NA
alpha-Chlordane	2.9	0.5	NE	5.80	NA
gamma-Chlordane	4.6	0.5	NE	9.20	NA
4,4'-DDD	79.0	1.22	NE	64.75	NA
4,4'-DDE	44.0	2.07	NE	21.26	NA
4,4'-DDT	34.0	1.19	1.60	28.57	21.25
<b>Metals (mg/kg)</b>					
Aluminum	14000.0	NE	NE	NA	NA
Barium	30.1	NE	NE	NA	NA
Beryllium	0.6	NE	NE	NA	NA
Cadmium	0.8	0.68	1.20	1.21	0.68
Copper	38.7	18.70	34.00	2.07	1.14
Iron	3860.0	NE	NE	NA	NA
Lead	35.4	30.20	47.00	1.17	0.75
Manganese	16.3	NE	NE	NA	NA
Vanadium	19.7	NE	NE	NA	NA
<b>Total</b>				<b>171.65</b>	<b>34.40</b>

Notes:

Quotient Index = Maximum Detected Concentration/Screening Value

µg/kg - micrograms per kilogram

mg/kg - milligrams per kilogram

NA - Not Applicable

NE - Not Established