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SEMIANNUAL MONITORING REPORT

**OPERABLE UNIT NO. 5 - SITE 2
MARINE CORPS BASE
CAMP LEJEUNE, NORTH CAROLINA**

REPORTING PERIOD APRIL 1998 - SEPTEMBER 1998

CONTRACT TASK ORDER 0367

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SEMIANNUAL MONITORING REPORT

The semiannual monitoring report which follows presents a summary of groundwater sampling activities, field observations, analytical results, and significant findings which pertain to the monitoring program at Operable Unit (OU) No. 5 (Site 2), Marine Corps Base (MCB) Camp Lejeune, North Carolina. The report describes activities completed during the second quarter of calendar year 1998. Conclusions and recommendations regarding the monitoring program at Site 2 are also presented within this report.

Monitoring activities at OU No. 5 began in October 1995. The most recent sampling initiative was conducted on April 20, 1998. Groundwater samples from Site 2 were obtained from seven shallow monitoring wells and one intermediate monitoring well. Figure 1 depicts the locations of all existing monitoring wells and the former locations of four abandoned monitoring wells at Site 2. [Note that all tables and figures are provided after the text portion of this report.]

Sampling activities were conducted and subsequent laboratory analyses were performed according to procedures and methods specified in the Long-Term Monitoring Work Plans for OU No. 5 (Baker, 1996). The project work plans identify a select number of monitoring wells at Site 2 for which continued periodic sampling is required. Figure 1 depicts the locations of wells included in the monitoring program; Table 1 provides construction details of the monitoring wells. As stipulated in the project work plans, measurements of pH, specific conductance, dissolved oxygen, temperature, and turbidity were recorded prior to sampling. These measurements were taken to ensure that groundwater conditions had stabilized and that representative samples had been obtained from the surficial aquifer. Summaries of all groundwater field parameters are provided in Table 2.

The monitoring program at Site 2 was implemented to assess whether contamination, detected during previous investigations, remains present, has migrated, or has degraded through natural processes. Based upon previous analytical results and decision documents, Target Compound List (TCL) volatiles were identified as contaminants of concern at Site 2. Table 3 provides a summary of requested laboratory analyses and sample identifications.

Sample information, including well number, sample identification, time and date of sample collection, samplers, analytical parameters, and required laboratory turnaround time was recorded in a field logbook and on sample labels. Chain-of-custody documentation, provided in Attachment A, accompanied the samples to the laboratory.

Groundwater Elevation and Flow Direction

The following provides information concerning groundwater elevation and flow direction at Site 2. Water level measurements were obtained on April 20, 1998. Table 4 provides a summary of all water level measurements obtained during the monitoring program. Figure 2 depicts the static elevations and approximate flow direction of groundwater at Site 2, based upon the most recent water level measurements.

Static water level measurements were recorded from top-of-casing reference points. As Figure 2 suggests, shallow groundwater at Site 2 generally flows north-northeast toward Overs Creek, a tributary of Northeast Creek. Drainage ditches lie on both sides of the MCB, Camp Lejeune Railroad at Site 2. Surface water in the drainage ditches is stagnant with minimal flow. The ditches

appear to act as both a discharge and recharge, depending upon intensity and duration of precipitation events and the seasonal variations of the watertable.

Field Observations

The following field observations were noted in a previous monitoring report. The observations, however, remain relevant to the monitoring program and are therefore presented here.

Upon completion of shallow monitoring well 02-GW12, it was noted that the static water level was lower than anticipated. Groundwater was encountered at four feet below ground surface during installation of the pilot test boring. The water level had decreased within 24 hours after installation to a depth of 10 feet below ground surface. The water level was again recorded 48 hours after installation; it had decreased to a depth of approximately 21 feet below ground surface. Although shallow monitoring well 02-GW12 has produced a sufficient amount of groundwater during sampling activities, it continues to be purged dry almost immediately due to the low volume of water in the well.

The observed static water level in monitoring well 02-GW12 may indicate the presence of a shallow perched groundwater zone at Site 2. Perched groundwater often occurs when a layer or lens of lower permeability soil is positioned within more permeable materials. Water moving downward through the unsaturated zone is intercepted by the lower permeable material and accumulates on top of the lens, resulting in saturated soil above the main water table. Groundwater can move laterally, across the less permeable layer and then seep downward to the main watertable. At Site 2 a layer of silt is present beginning at approximately 13 feet below ground surface and extending to a depth of 16 feet below ground surface. This silt layer may retard or slow the vertical movement of groundwater, resulting in a perched groundwater zone.

ANALYTICAL RESULTS AND FINDINGS

The section which follows presents analytical results and findings from sampling performed at Site 2 during the second calendar quarter of 1998. A summary of all analytical results compiled during the sampling event are presented in Attachment B and corresponding laboratory data sheets are provided in Attachment C.

One trip blank was prepared prior to the sampling event. The trip blank accompanied groundwater samples from Site 2 during field collection, shipment, and laboratory analysis. As provided in Table 5, methylene chloride was detected in trip blank sample IR02-TB01-98B. Methylene chloride was detected at an estimated concentration of 1.3 micrograms per liter ($\mu\text{g/L}$) in the trip blank sample. Methylene chloride is a common laboratory contaminant and was therefore considered a laboratory artifact when detected among groundwater samples. There were no other detections of organic compounds in the trip blank sample.

Groundwater conditions within the upper and lower portions of the surficial aquifer were evaluated through collection and analysis of samples obtained from seven shallow monitoring wells and one intermediate monitoring well at Site 2 (refer to Table 1 for well construction details). Analytical results from the monitoring program are provided in the paragraphs which follow and are summarized in Table 6. A summary of positive detections is provided in Table 7. The discussion which follows presents not only the most recent analytical results, but a comparison of those results versus previous investigative results.

A total of five volatile organic compounds (VOCs) were detected among samples obtained from three of the seven shallow monitoring wells and the one intermediate monitoring well at Site 2. As depicted in Figure 3, the majority of VOC detections were limited to the southern portion of the study area. Chlorobenzene, ethylbenzene, toluene, and xylene (total) were detected at maximum concentrations of 1.4, 140, 5.5, and 1,500 µg/L in the sample obtained from monitoring well 02-GW03. None of the five VOCs were detected at a concentrations which exceeded an applicable Federal Maximum Contaminant Level (MCL). Ethylbenzene and xylene (total) in the sample obtained from 02-GW03 exceeded applicable North Carolina Water Quality Standard (NCWQS) concentrations of 29 and 530 µg/L, respectively. None of the other VOC detections exceeded an applicable NCWQS. There are no water quality standards for 1,1,2,2-tetrachloroethane, however.

As depicted in Figure 3, xylene (total) and 1,1,2,2-tetrachloroethane were detected among four and three of the groundwater samples obtained at Site 2, respectively. Ethylbenzene was detected in samples obtained from 02-GW03 and 02-GW12; chlorobenzene and toluene were detected in the sample obtained from 02-GW03 only. Analytical results from the sampling event and a comparison of those results versus applicable groundwater standards are provided in Table 6.

The VOCs ethylbenzene and xylene (total) have consistently been detected in samples obtained from monitoring well 02-GW03 at concentrations exceeding the applicable state standards. Figures 4 and 5 depict ethylbenzene and xylene (total) concentrations in samples obtained from 02-GW03 since inception of monitoring program activities at Site 2. The same VOCs were identified in the Record of Decision (ROD) as contaminants of concern at Site 2 (Baker, 1994). As depicted in Figures 4 and 5, ethylbenzene and xylene (total) concentrations in samples obtained from 02-GW03 have generally increased since July 1996. The most probable explanation for the observed increase in contaminant concentrations is the change in sampling protocol instituted during 1996. Since July of 1996, groundwater samples have been acquired using a low-flow purge and sampling method. The low-flow method tends to result in samples that more accurately reflect true groundwater conditions.

Benzene, styrene, and 1,1,2,2-tetrachloroethane have been detected in samples obtained from 02-GW03 during previous sampling events. Analytical results from adjacent monitoring wells have exhibited lower concentrations of similar VOCs, suggesting that the observed contaminants are concentrated in the immediate vicinity of 02-GW03. Ethylbenzene and xylenes were detected most recently at concentrations of 5.2 and 71 µg/L in the sample obtained from monitoring well 02-GW12. Based upon the potentiometric surface map (refer to Figure 2), contaminants may have been transported by groundwater from nearby. Analytical data collected to date suggests that a localized area of groundwater contamination exists adjacent to monitoring well 02-GW03. Future samples collected from the southern portion of Site 2 will be required to confirm the migration of contaminants to 02-GW07 and 02-GW12 from the area surrounding 02-GW03.

Xylene (total) and 1,1,2,2-tetrachloroethane were detected at estimated concentrations of 3.0 and 1.1 µg/L in the sample obtained from intermediate monitoring well 02-GW03IW. Intermediate well 02-GW03IW was installed during February 1997 to determine if detected contaminants in samples obtained from 02-GW03, located within 15 feet of 02-GW03IW, had migrated vertically. The intermediate groundwater sample was obtained from a depth interval of 50 to 60 feet below ground surface. Shallow groundwater samples are typically obtained from less than 25 feet below ground surface. The presence of 1,1,2,2-tetrachloroethane and xylene (total) within the deeper portion of the surficial aquifer suggests that contamination may have begun to migrate vertically. Additional sampling will be needed to confirm the downward movement of contamination, however.

RECOMMENDATIONS

The Record of Decision for Site 2 stipulates that possible off-site migration of contaminants be monitored through groundwater sample collection and analysis (Baker, 1994). Groundwater monitoring was implemented to ensure that potential human and ecological receptors would not be exposed to known site contaminants. The sections which follow describe recommendations which have been implemented and recommendations which are proposed for future consideration.

Implemented Recommendations

Detailed information pertaining to the implemented recommendations which follow has been presented within previous monitoring reports. The final disposition of each recommendation is presented here to update information regarding the monitoring program. It remains the intent of this report to provide a thorough listing of recommendations and implemented actions.

Supply Well Sampling

Supply wells HP-616, HP- 646, and HP-647 were eliminated from the monitoring program at Site 2 during January 1997. The supply wells are located more than 1,200 feet from the study area and were sampled for six consecutive quarters with only one positive detection of an organic compound. In addition, all supply wells are currently sampled as part of an ongoing monitoring program administered by MCB Camp Lejeune.

Monitoring Well Sampling Scheme

Monitoring wells 02-GW06 and 02-GW09 were eliminated from the sampling program at Site 2 during February of 1997. The two monitoring wells are not positioned hydraulically downgradient of known contamination. Additional information gained from monitoring wells 02-GW06 and 02-GW09 was not expected to provide relevant data in support of the decision making process.

Sampling Frequency

The majority of groundwater samples obtained from Site 2 have exhibited little or no contamination during the initial six quarterly sampling events. Only two contaminants, ethylbenzene and xylenes, have consistently been detected above state water quality standards. In addition, there is little evidence to suggest that contaminants have migrated from the area immediately surrounding 02-GW03. Based upon this information, the number of yearly sampling events was reduced from four to two.

Sample Analyses

The sampling program for Site 2 was modified to eliminate total metal, total dissolved solid, and total suspended solid analyses from the monitoring program. Although iron, manganese, and total dissolved solids were detected at concentrations which exceeded applicable North Carolina standards, these analyses were not necessary data requirements. There was no history or evidence to suggest that metal disposal activities may have occurred at Site 2. Soils of the North Carolina coastal plain tend to be naturally rich in metals, especially iron and manganese. It is not uncommon to detect total metal concentrations in groundwater at MCB, Camp Lejeune that exceed applicable water quality standards.

Monitoring Well Abandonment and Installation

Deep monitoring well 02-GW03DW was situated adjacent to shallow monitoring well 02-GW03. The screened portion of 02-GW03DW was below a semi-confining unit that separates the surficial and Castle Hayne aquifers. Field observations suggested that bentonite clay, installed during well construction, had begun to enter the screen and sandpack of deep monitoring well 02-GW03DW. The sandpack was presumably clogged with bentonite, limiting the ability of groundwater to enter the well screen. Bentonite clay, as a result, may also have been introduced into groundwater samples obtained from the deep well. The bentonite may have falsely biased total metal and dissolved solid results. The results reflected naturally occurring metals from the surrounding formation that had adhered to the clay particles by a weak ionic bond.

Based on this information, well 02-GW03DW was abandoned. An intermediate well, set immediately above the semi-confining unit, was then installed to replace the deep monitoring well. The intermediate well was situated adjacent to shallow monitoring well 02-GW03 and installed to a depth of approximately 60 feet below ground surface. Groundwater samples collected above the semi-confining layer will be employed to determine if contaminants have migrated from the upper portion of the surficial aquifer to the lower portion of the surficial aquifer.

Shallow Monitoring Well Abandonment

Recorded field observations suggested that three of the five monitoring wells installed at Site 2 during 1984 had begun to deteriorate and were clogged with fine-grained material from the surrounding formation. Based upon this information, monitoring wells 02-GW01, 02-GW02, and 02-GW04 were abandoned.

Well Security and Aesthetics

Shallow monitoring wells that were installed during the 1984 Confirmation Study had begun to show signs of deterioration. The bollards and protective casings of wells 02-GW01 through 02-GW05 had developed peeling paint and rust. In addition, a number of the padlocks used to secure the protective steel covers were either missing or no longer functioned properly. As recommended, the bollards and well casings were repainted with a weather and rust resistant paint. New padlocks that operate with a universal key were also installed on each of the monitoring wells at Site 2.

Proposed Recommendations

Based upon the observations and findings presented in this monitoring report, no significant changes to the monitoring program are currently recommended.

REFERENCES

Baker Environmental, Incorporated (Baker). 1994. Record of Decision for Operable Unit No. 5 (Site 2), Marine Corps Base Camp Lejeune, North Carolina. Final. Prepared for the Department of the Navy Atlantic Division Naval Facilities Engineering Command, Norfolk, Virginia.

Baker Environmental, Inc. (Baker). December 1996. Long-Term Monitoring Work Plans for Remedial Investigation Sites. Prepared for the Navy Atlantic Division Naval Facilities Engineering Command, Norfolk, Virginia.

TABLES

TABLE 1

SUMMARY OF WELL CONSTRUCTION DETAILS
 OPERABLE UNIT NO. 5 - SITE 2
 MONITORING AND O&M SUPPORT, CTO - 0367
 MCB, CAMP LEJEUNE, NORTH CAROLINA

Monitoring Well Number	Date Installed	Top of Casing Elevation (feet, msl)	Ground Surface Elevation (feet, msl)	Boring Depth (feet, bgs)	Well Depth (feet, bgs)	Screen Interval Depth (feet, bgs)	Depth to Sand Pack (feet, bgs)	Depth to Bentonite (feet, bgs)	Stick-Up (feet, ags)
02-GW03	1984	35.40	33.00	NA	25.0	10.0 to 25.0	NA	NA	NA
02-GW03IW	1997	35.34	32.21	70.0	60.0	50.0 to 60.0	45.0	34.0	3.1
02-GW05	1984	33.72	31.80	NA	25.0	10.0 to 25.0	NA	NA	NA
02-GW07	1993	34.03	31.6	16.0	13.0	3.0 to 13.0	2.0	1.0	2.4
02-GW08	1993	34.92	31.90	12.5	12.5	2.5 to 12.5	1.5	0.5	3
02-GW10	1994	32.28	32.47	15.0	13.5	3.5 to 13.5	2.5	1.5	3.5
02-GW11	1994	35.20	33.94	15.0	14.0	1.0 to 14.0	3.0	2.0	3
02-GW12	1997	34.37	31.52	31.0	23.0	3.0 to 23.0	2.0	1.0	2.8

Notes:

(1) Water Supply Well

msl = Mean sea level

bgs = Below ground surface

NA = Information not available

ags = Above ground surface

TABLE 2

**SUMMARY OF GROUNDWATER FIELD PARAMETERS
OPERABLE UNIT NO. 5 - SITE 2
MONITORING AND O&M SUPPORT, CTO-0367
MCB, CAMP LEJEUNE, NORTH CAROLINA**

Well Number	Measuring Time	Well Volumes	Field Parameters				
			Dissolved Oxygen (mg/L)	Specific Conductance μ mhos/cm	Temperature ($^{\circ}$ C)	pH (S.U.)	Turbidity (N.T.U)
02-GW03 (04/20/98)	0812	1.0	1.3	185	14.4	4.74	32
	0827	2.0	1.5	181	14.4	4.77	24
	0842	3.0	1.3	187	14.4	4.81	25
	0858	4.0	1.5	189	14.5	4.84	24
02-GW03IW (04/20/98)	0810	1.0	2.2	812	17.1	4.56	4.5
	0830	1.5	1.8	833	17.1	4.68	2.4
	0852	2.0	3.0	830	17.3	4.66	1.9
	0917	2.5	2.3	845	17.3	4.73	1.1
	0942	3.0	1.8	849	17.3	4.75	4.6
02-GW05 (04/20/98)	1239	1.0	1.8	280	17.2	4.77	9.5
	1249	1.5	0.4	201	17.1	5.70	24
	1300	2.0	1.0	276	17.3	4.63	25
	1309	2.5	1.2	278	17.0	4.63	28
	1321	3.0	2.0	283	16.9	4.66	26
02-GW07 (04/20/98)	0956	1.0	2.25	232	16.6	5.25	5.0
	1006	1.5	1.8	223	16.3	5.28	4.0
	1017	2.0	1.8	205	16.1	5.09	3.6
	1030	2.5	2.2	195	16.3	5.06	4.1
	1043	3.0	2.6	194	16.3	5.07	4.9
02-GW08 (04/20/98)	0807	1.0	2.5	143	15.5	3.66	11
	0819	1.5	2.4	144	15.3	3.92	24
	0835	2.0	1.5	147	15.4	4.00	17
	0848	2.5	1.8	142	15.4	4.03	14
	0904	3.0	1.5	142	15.5	4.10	12
02-GW10 (04/20/98)	1122	1.0	1.3	429	18.0	5.91	4.4
	1143	3.0	1.7	431	17.6	6.07	5.9
	1146	3.5	1.5	434	17.6	6.05	5.0
	1149	4.0	0.9	435	17.5	6.07	5.8
02-GW11 (04/20/98)	1233	1.0	1.5	208	17.2	5.18	3.8
	1243	2.0	0.8	202	17.4	5.19	4.0
	1254	3.0	1.0	196	17.5	5.17	5.1

TABLE 2 (Continued)

**SUMMARY OF GROUNDWATER FIELD PARAMETERS
OPERABLE UNIT NO. 5 - SITE 2
MONITORING AND O&M SUPPORT, CTO-0367
MCB, CAMP LEJEUNE, NORTH CAROLINA**

Well Number	Measuring Time	Well Volumes	Field Parameters				
			Dissolved Oxygen (mg/L)	Specific Conductance μ hos/cm	Temperature ($^{\circ}$ C)	pH (S.U.)	Turbidity (N.T.U)
68-GW03 (04/20/98)	1749	1.0	3.75	100.5	16.8	5.14	149
02-GW12 (04/20/98)	1010	1.0	2.0	155	15.7	4.95	2.1
	1019	2.0	1.5	155	15.7	4.90	1.9
	1032	3.0	2.0	153	15.8	4.92	1.1

Notes:

- mg/L = milligrams/liter
- N.T.U. = Nephelometric Turbidity Units
- S.U. = Standard Units
- μ hos/cm = micro ohms per centimeter
- $^{\circ}$ C = Degrees Centigrade

TABLE 3

**GROUNDWATER SAMPLING SUMMARY
OPERABLE UNIT NO. 5 - SITE 2
MONITORING AND O&M SUPPORT, CTO-0367
MCB, CAMP LEJEUNE, NORTH CAROLINA**

Sample Location	Media	TCL Volatiles ⁽¹⁾	Sample Identification
02-GW03	GW	X	IR02-GW03-98B
02-GW03IW	GW	X	IR02-GW03IW-98B
02-GW05	GW	X	IR02-GW05-98B
02-GW07	GW	X	IR02-GW07-98B
02-GW08	GW	X	IR02-GW08-98B
02-GW10	GW	X	IR02-GW10-98B
02-GW11	GW	X	IR02-GW11-98B
02-GW12	GW	X	IR02-GW12-98B

Notes:

⁽¹⁾ Target Compound List Volatiles by U.S. Environmental Protection Agency (EPA) Method 8260A.

X = Requested Analysis

TABLE 4

SUMMARY OF WATER LEVEL MEASUREMENTS
 OPERABLE UNIT NO. 5 - SITE 2
 MONITORING AND O&M SUPPORT, CTO-0367
 MCB, CAMP LEJEUNE, NORTH CAROLINA

Well Identification	Reference Elevation ⁽¹⁾	SWE (08/08/96)	SWE (11/06/96)	SWE (04/26/97)	SWE (10/26/97)	SWL (04/20/98)	SWE (04/20/98)
02-GW03	35.40	20.23	28.67	27.91	24.37	5.84	29.56
02-GW03IW	35.34	NA	NA	7.39	3.29	28.65	6.69
02-GW05	33.72	18.24	24.35	25.54	24.15	7.57	26.15
02-GW06	34.40	31.61	30.55	20.44	26.68	3.48	30.92
02-GW07	34.03	30.06	29.25	27.41	26.10	5.44	28.59
02-GW08	34.92	31.74	31.04	29.60	27.11	3.27	31.65
02-GW09	35.02	31.42	30.07	28.82	25.15	4.65	30.37
02-GW10	32.28	27.29	NR	26.32	25.95	5.26	27.02
02-GW11	35.20	28.97	28.36	27.58	27.26	6.47	28.73
02-GW12	34.37	NA	NA	9.73	15.90	17.51	16.86

Notes:

⁽¹⁾ Top of well casing in feet above mean sea level (msl)

NA = Not Applicable

NR = Not Recorded

SWL = Static water level taken from top of well casing

SWE = Static water elevation in feet above msl

TABLE 5

TRIP BLANK ANALYTICAL RESULTS
 OPERABLE UNIT NO. 5 - SITE 2
 MONITORING AND O&M SUPPORT, CTO-0367
 MCB, CAMP LEJEUNE, NORTH CAROLINA

SAMPLE ID	IR02-TB01-98B
DATE SAMPLED	04-20-1998
VOLATILES (ug/L)	
1,1,1-Trichloroethane	5 U
1,1,2,2-Tetrachloroethane	5 U
1,1,2-Trichloroethane	5 U
1,1-Dichloroethane	5 U
1,1-Dichloroethene	5 U
1,2-Dichloroethane	5 U
1,2-Dichloroethene (total)	5 U
1,2-Dichloropropane	5 U
2-Butanone	20 U
2-Hexanone	20 U
4-Methyl-2-pentanone	20 U
Acetone	20 U
Benzene	5 U
Bromodichloromethane	5 U
Bromoform	5 U
Bromomethane	10 U
Carbon disulfide	5 U
Carbon tetrachloride	5 U
Chlorobenzene	5 U
Chloroethane	10 U
Chloroform	5 U
Chloromethane	10 U
cis-1,3-Dichloropropene	5 U
Dibromochloromethane	5 U
Ethylbenzene	5 U
Methylene chloride	1.3 J B
Styrene	5 U
Tetrachloroethene	5 U
Toluene	5 U
trans-1,3-Dichloropropene	5 U
Trichloroethene	5 U
Vinyl chloride	10 U
Xylenes (total)	5 U

U = not detected
 J = estimated value
 B = Detected in blank
 ug/L = micrograms per liter

TABLE 6

**SUMMARY OF GROUNDWATER ANALYTICAL RESULTS
OPERABLE UNIT NO. 5 - SITE 2
MONITORING AND O&M SUPPORT, CTO-0367
MCB, CAMP LEJEUNE, NORTH CAROLINA**

Fraction	Detected Contaminants	Comparison Criteria		Concentration Range		Location of Maximum Detection	Detection Frequency	Detections Above	
		NCWQS	MCL	Min.	Max.			NCWQS	MCL
Volatile Organics	1,1,2,2-Tetrachloroethane	NE	NE	0.6 J	2.7 J	02-GW03	3/8	NA	NA
	Chlorobenzene	50	100	1.4 J	1.4 J	02-GW03	1/8	0	0
	Ethylbenzene	29	700	5.2	140	02-GW03	2/8	1	0
	Toluene	1,000	1,000	5.5	5.5	02-GW03	1/8	0	0
	Xylene (Total)	530	10,000	3.0 J	1,500	02-GW03	4/8	1	0

Notes:

Concentrations presented in micrograms per liter ($\mu\text{g/L}$) or parts per billion.

- J = Compound Detected at an Estimated Concentration
- MCL = Federal Maximum Contaminant Level. Maximum permissible level of a contaminant in water which is delivered to users of public water systems (U.S. Environmental Protection Agency - Drinking Water Regulations and Health Advisories).
- NA = Not Applicable
- NCWQS = North Carolina Water Quality Standards (North Carolina Administrative Code, Title 15A, Subchapter 2L).
- NE = Not Established

TABLE 7

POSITIVE DETECTIONS IN GROUNDWATER
 OPERABLE UNIT NO. 5 - SITE 2
 MONITORING AND O&M SUPPORT, CTO-0367
 MCB, CAMP LEJEUNE, NORTH CAROLINA

SAMPLE ID	IR02-GW03-98B	IR02-GW03IW-98B	IR02-GW05-98B	IR02-GW07-98B	IR02-GW08-98B	IR02-GW10-98B	IR02-GW11-98B	IR02-GW12-98B
DATE SAMPLED	04-20-1998	04-20-1998	04-20-1998	04-20-1998	04-20-1998	04-20-1998	04-20-1998	04-20-1998
VOLATILES (ug/l)								
1,1,2,2-Tetrachloroethane	2.7 J	1.1 J	5 U	0.59 J	5 U	5 U	5 U	5 U
Chlorobenzene	1.4 J	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Ethylbenzene	140	5 U	5 U	5 U	5 U	5 U	5 U	5.2
Methylene chloride	5 U	5 U	5 U	1.3 JB	2.8 JB	2.7 JB	3.4 JB	2.5 JB
Toluene	5.5	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Xylenes (total)	1500	3 J	5 U	6.5	5 U	5 U	5 U	71

Notes:

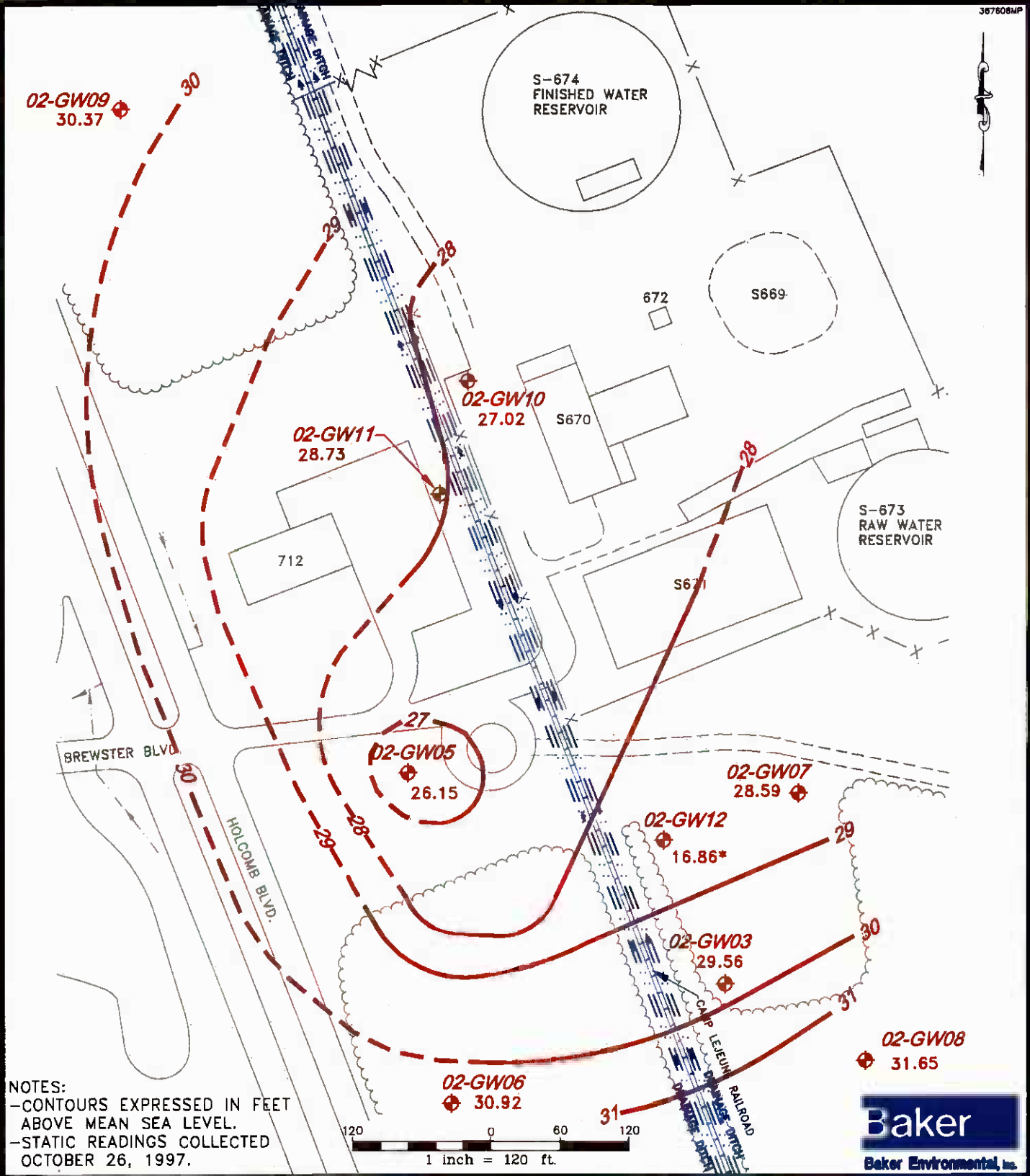
U = Not detected

J = Estimated

B = Detected in blank

ug/l = micrograms per liter

FIGURES



NOTES:
 -CONTOURS EXPRESSED IN FEET ABOVE MEAN SEA LEVEL.
 -STATIC READINGS COLLECTED OCTOBER 26, 1997.



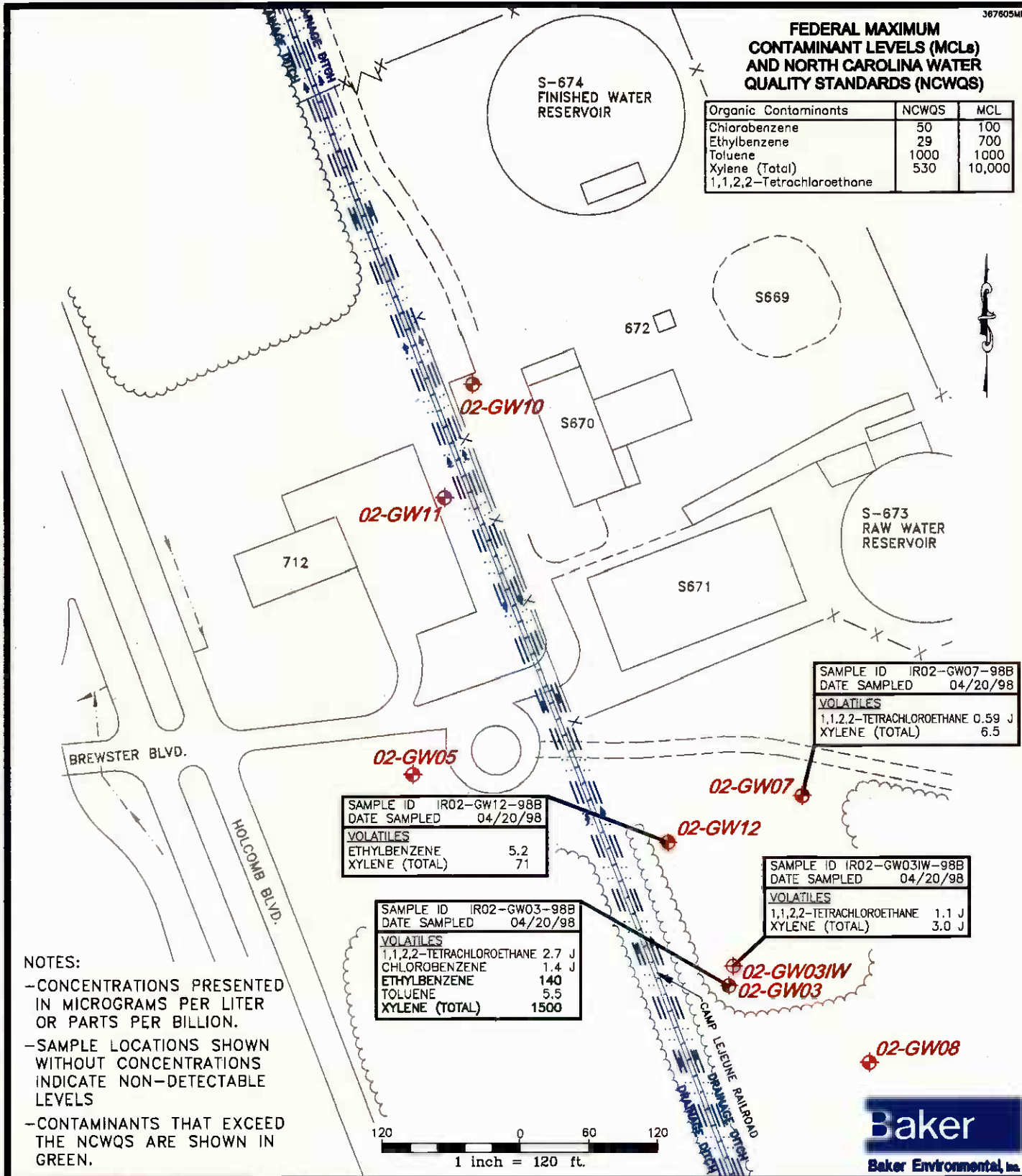
LEGEND	
02-GW02	SHALLOW MONITORING WELL
30.92	STATIC GROUNDWATER ELEVATION
-30-	GROUNDWATER CONTOUR INTERVAL
*	MEASUREMENT NOT USED IN CALCULATION ON APRIL 20, 1998.
→	DIRECTION OF SURFACE WATER FLOW
— — —	RAILROAD
~	TREE LINE

SOURCE: LANTDIV, FEB. 1992

FIGURE 2
 SHALLOW GROUNDWATER CONTOUR MAP
 OPERABLE UNIT NO. 5 - SITE 2
 MONITORING AND O&M SUPPORT
 CTO-0367
 MARINE CORPS BASE, CAMP LEJEUNE
 NORTH CAROLINA

FEDERAL MAXIMUM CONTAMINANT LEVELS (MCLs) AND NORTH CAROLINA WATER QUALITY STANDARDS (NCWQS)

Organic Contaminants	NCWQS	MCL
Chlorobenzene	50	100
Ethylbenzene	29	700
Toluene	1000	1000
Xylene (Total)	530	10,000
1,1,2,2-Tetrachloroethane		



NOTES:

- CONCENTRATIONS PRESENTED IN MICROGRAMS PER LITER OR PARTS PER BILLION.
- SAMPLE LOCATIONS SHOWN WITHOUT CONCENTRATIONS INDICATE NON-DETECTABLE LEVELS
- CONTAMINANTS THAT EXCEED THE NCWQS ARE SHOWN IN GREEN.

LEGEND

- 02-GW02 SHALLOW MONITORING WELL
- 02-GW03IW INTERMEDIATE MONITORING WELL
- DIRECTION OF SURFACE WATER FLOW
- RAILROAD
- ~ TREE LINE

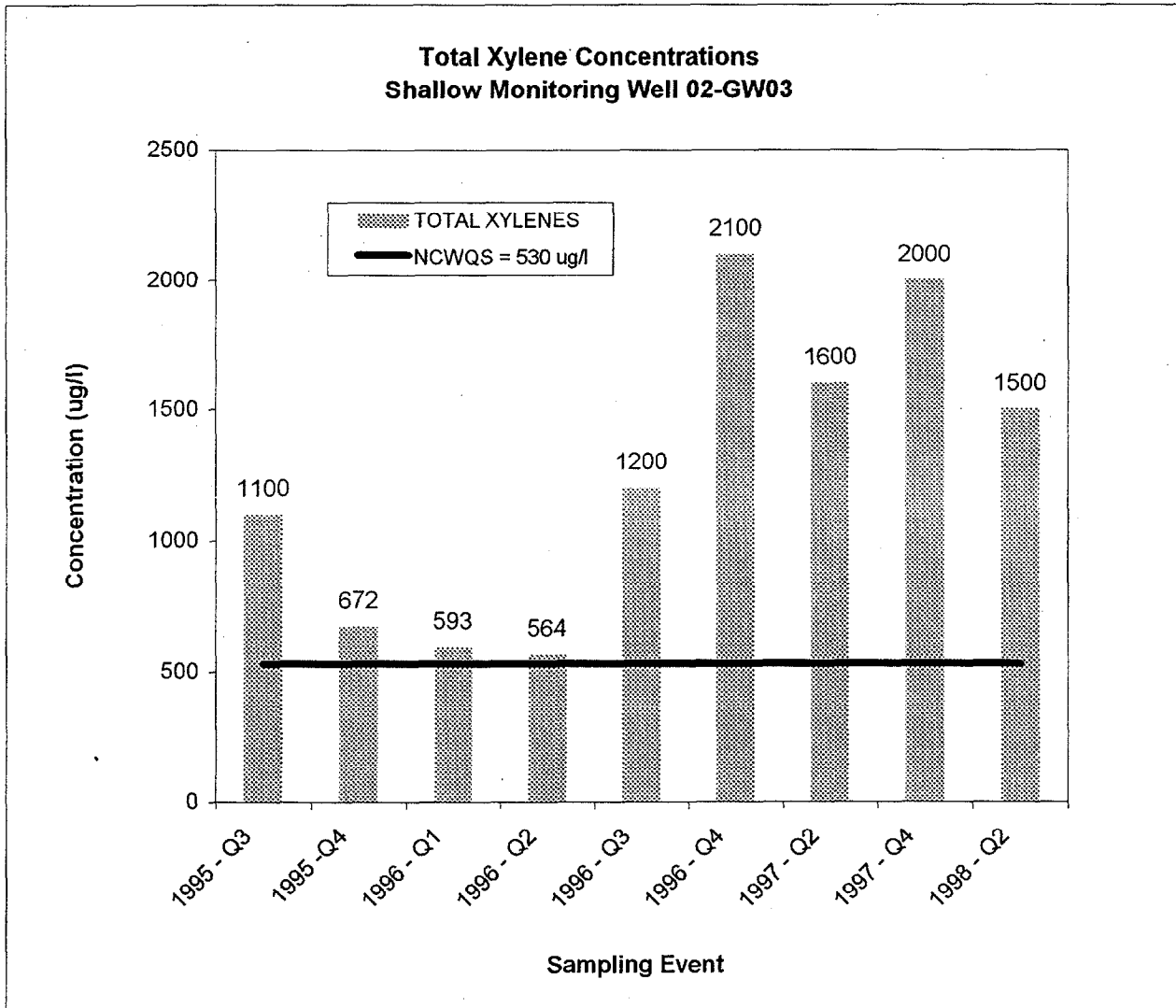
SOURCE: LANTDIV, FEB. 1992

FIGURE 3
VOLATILE ORGANIC COMPOUNDS
IN GROUNDWATER
OPERABLE UNIT NO. 5 - SITE 2
MONITORING AND O&M, CTO-0367
MARINE CORPS BASE, CAMP LEJEUNE
NORTH CAROLINA



FIGURE 4

**TOTAL XYLENE RESULTS FROM 02-GW03
OPERABLE UNIT NO. 5 - SITE 2
MONITORING AND O&M SUPPORT, CTO-0367
MCB, CAMP LEJEUNE, NORTH CAROLINA**



Q1 - Quarter 1 (January - March)
Q2 - Quarter 2 (April - June)

Q3 - Quarter 3 (July - September)
Q4 - Quarter 4 (October - December)

Notes:

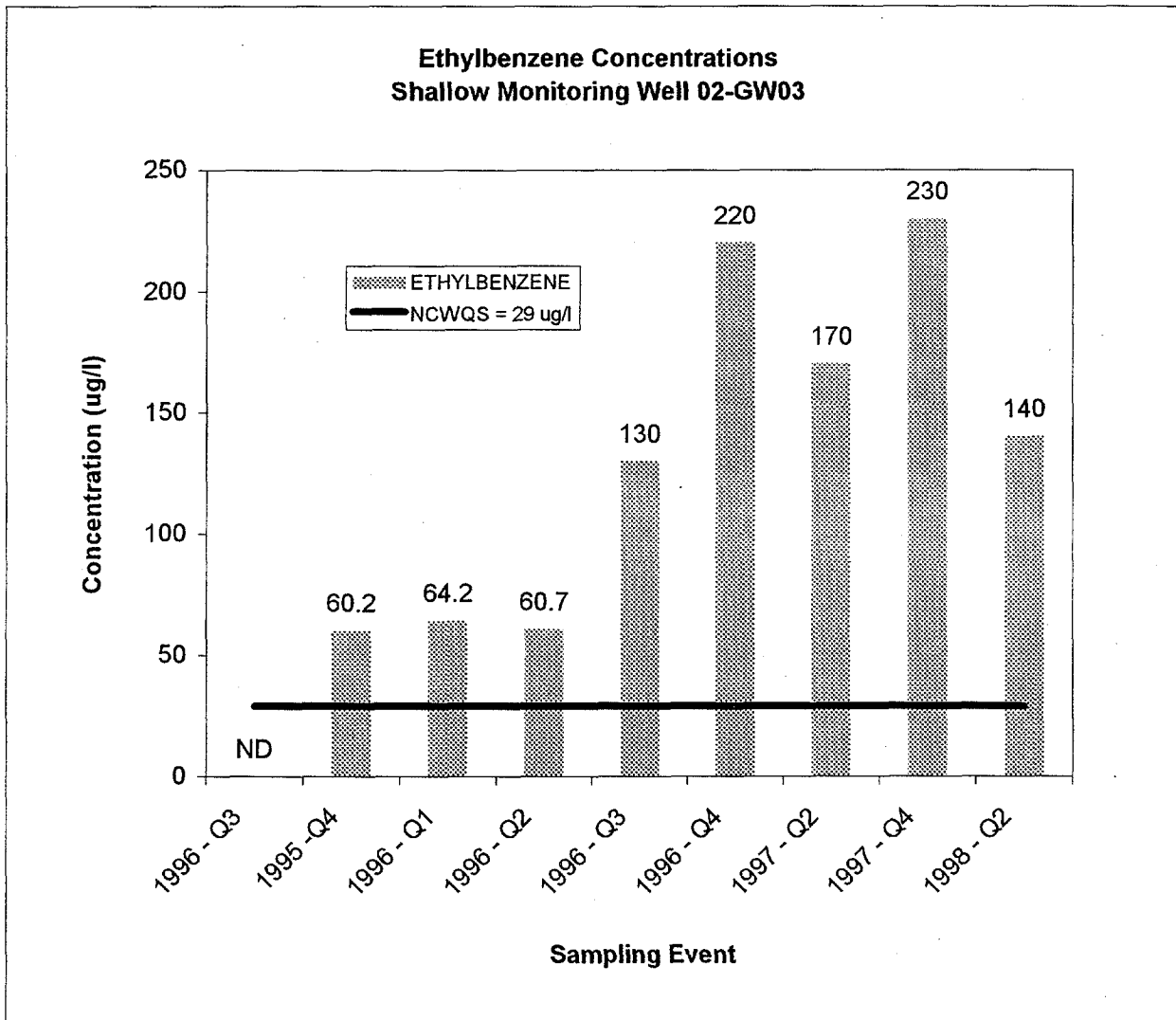
Federal Maximum Contaminant Level (MCL) = 10,000 micrograms per liter (ug/l)

North Carolina Water Quality Standard (NCWQS) = 530 micrograms per liter (ug/l)

Contaminant	Mean Detection	Median Detection	Detection Frequency	Detections Above Standards
TOTAL XYLENES	1258	1200	9/9	9/9

FIGURE 5

**ETHYLBENZENE RESULTS FROM 02-GW03
OPERABLE UNIT NO. 5 - SITE 2
MONITORING AND O&M SUPPORT, CTO-0367
MCB, CAMP LEJEUNE, NORTH CAROLINA**



Q1 - Quarter 1 (January - March)

Q3 - Quarter 3 (July - September)

Q2 - Quarter 2 (April - June)

Q4 - Quarter 4 (October - December)

Notes:

Federal Maximum Contaminant Level (MCL) = 700 micrograms per liter (ug/l)

North Carolina Water Quality Standard (NCWQS) = 29 micrograms per liter (ug/l)

Contaminant	Mean Detection	Median Detection	Detection Frequency	Detections Above Standards
ETHYLBENZENE	120	130	8/9	8/9

ATTACHMENTS

ATTACHMENT A
CHAIN-OF-CUSTODY DOCUMENTATION

Chain of Custody Record



CHAIN OF CUSTODY NUMBER

COC# 367-006-98B



* 0 0 1 0 6 5 - 0 0 1 *

QUA-4149-1

Client Baker Environmental, Inc.			Project Manager Tom Trebilcock			Date 04/09/1998			Page <u>1</u> of <u>1</u>		
Address Airport Office Park Bldg 3			Telephone Number (Area Code)/Fax Number (412) 269-6000 / (000)			Lab Location QUANTERRA - KNOXVILL			Analysis		
City Coraopolis	State PA	Zip Code 15108	Site Contact Tom Trebilcock								
Project Number/Name Camp LeJeune			Carrier/Waybill Number FedEx 802769750949								
Contract/Purchase Order/Quote Number CONTRACT / PURCHASE ORDER # : 1998			QUOTE: 21108								

Sample I.D. Number and Description	Date	Time	Sample Type	Containers			Preservative	Condition on Receipt/Comments	
				Volume	Type	No.			
IR02-GW03-98B	4-20	0900	WATER	40mL	VIAL	3	1:1 HCL		X
IR02-GW03IW-98B		0920	WATER	40mL	VIAL	3	1:1 HCL		X
IR02-GW05-98B		1325	WATER	40mL	VIAL	3	1:1 HCL		X
IR02-GW07-98B		1050	WATER	40mL	VIAL	3	1:1 HCL		X
IR02-GW08-98B		0910	WATER	40mL	VIAL	3	1:1 HCL		X
IR02-GW10-98B		1155	WATER	40mL	VIAL	3	1:1 HCL		X
IR02-GW11-98B		1300	WATER	40mL	VIAL	3	1:1 HCL		X
IR02-GW12-98B		1035	WATER	40mL	VIAL	3	1:1 HCL		X
IR02-TB01-98B		0700	Water	40ml	Vial	3	1:1 HCL		X

Special Instructions

Possible Hazard Identification				Sample Disposal				(A fee may be assessed if samples are retained longer than 3 months)			
<input type="checkbox"/> Non-Hazard	<input type="checkbox"/> Flammable	<input type="checkbox"/> Skin Irritant	<input type="checkbox"/> Poison B	<input type="checkbox"/> Unknown	<input type="checkbox"/> Return To Client	<input checked="" type="checkbox"/> Disposal By Lab	<input type="checkbox"/> Archive For				

Turn Around Time Required			QC Level			Project Specific Requirements (Specify)					
<input checked="" type="checkbox"/> Normal	<input type="checkbox"/> Rush	<input type="checkbox"/> Other	<input type="checkbox"/> I.	<input type="checkbox"/> II.	<input type="checkbox"/> III.						

1. Relinquished By TL F. Zehel	Date 4-20-98	Time 1700	1. Received By FedEx	Date 4-20-98	Time 1700
2. Relinquished By	Date	Time	2. Received By	Date	Time
3. Relinquished By	Date	Time	3. Received By	Date	Time

Comments

ATTACHMENT B
MONITORING PROGRAM ANALYTICAL RESULTS

**GROUNDWATER ANALYTICAL RESULTS
OPERABLE UNIT NO. 5 - SITE 2
MONITORING AND O&M SUPPORT, CTO-0367
MCB, CAMP LEJEUNE, NORTH CAROLINA**

SAMPLE ID	IR02-GW03-98B	IR02-GW03IW-98B	IR02-GW05-98B	IR02-GW07-98B	IR02-GW08-98B	IR02-GW10-98B	IR02-GW11-98B	IR02-GW12-98B
DATE SAMPLED	04-20-1998	04-20-1998	04-20-1998	04-20-1998	04-20-1998	04-20-1998	04-20-1998	04-20-1998
VOLATILES (ug/l)								
1,1,1-Trichloroethane	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,1,2,2-Tetrachloroethane	2.7 J	1.1 J	5 U	0.59 J	5 U	5 U	5 U	5 U
1,1,2-Trichloroethane	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,1-Dichloroethane	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,1-Dichloroethene	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,2-Dichloroethane	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,2-Dichloroethene (total)	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,2-Dichloropropane	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
2-Butanone	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U
2-Hexanone	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U
4-Methyl-2-pentanone	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U
Acetone	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U
Benzene	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Bromodichloromethane	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Bromoform	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Bromomethane	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Carbon disulfide	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Carbon tetrachloride	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Chlorobenzene	1.4 J	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Chloroethane	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Chloroform	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Chloromethane	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
cis-1,3-Dichloropropene	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Dibromochloromethane	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Ethylbenzene	140	5 U	5 U	5 U	5 U	5 U	5 U	5.2
Methylene chloride	5 U	5 U	5 U	1.3 JB	2.8 JB	2.7 JB	3.4 JB	2.5 JB
Styrene	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Tetrachloroethene	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Toluene	5.5	5 U	5 U	5 U	5 U	5 U	5 U	5 U
trans-1,3-Dichloropropene	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Trichloroethene	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Vinyl chloride	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Xylenes (total)	1500 D	3 J	5 U	6.5	5 U	5 U	5 U	71

ATTACHMENT C
ANALYTICAL LABORATORY DATA SHEETS

BAKER ENVIRONMENTAL, INC.

Lab Name:QUANTERRA

SDG Number:

Matrix: (soil/water) WATER

Lab Sample ID:H8D210162 001

Method: SW846 8260A

Volatile Organics, GC/MS (8260A)

Sample WT/Vol: 5 / mL

Date Received: 04/21/98

Work Order: CGKQF101

Date Extracted:04/27/98

Dilution factor: 1

Date Analyzed: 04/27/98

Moisture %:NA

QC Batch: 8115124

Client Sample Id: IR02-GW03-98B

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	5.0	U
67-64-1	Acetone	20	U
75-15-0	Carbon disulfide	5.0	U
75-35-4	1,1-Dichloroethene	5.0	U
75-34-3	1,1-Dichloroethane	5.0	U
540-59-0	1,2-Dichloroethene (total)	5.0	U
67-66-3	Chloroform	5.0	U
107-06-2	1,2-Dichloroethane	5.0	U
78-93-3	2-Butanone	20	U
71-55-6	1,1,1-Trichloroethane	5.0	U
56-23-5	Carbon tetrachloride	5.0	U
75-27-4	Bromodichloromethane	5.0	U
78-87-5	1,2-Dichloropropane	5.0	U
10061-01-5	cis-1,3-Dichloropropene	5.0	U
79-01-6	Trichloroethene	5.0	U
124-48-1	Dibromochloromethane	5.0	U
79-00-5	1,1,2-Trichloroethane	5.0	U
71-43-2	Benzene	5.0	U
10061-02-6	trans-1,3-Dichloropropene	5.0	U
75-25-2	Bromoform	5.0	U
108-10-1	4-Methyl-2-pentanone	20	U
591-78-6	2-Hexanone	20	U
127-18-4	Tetrachloroethene	5.0	U
79-34-5	1,1,2,2-Tetrachloroethane	2.7	J

BAKER ENVIRONMENTAL, INC.

Lab Name:QUANTERRA

SDG Number:

Matrix: (soil/water) WATER

Lab Sample ID:H8D210162 001

Method: SW846 8260A

Volatile Organics, GC/MS (8260A)

Sample WT/Vol: 5 / mL

Date Received: 04/21/98

Work Order: CGKQF101

Date Extracted:04/27/98

Dilution factor: 1

Date Analyzed: 04/27/98

Moisture %:NA

QC Batch: 8115124

Client Sample Id: IR02-GW03-98B

CAS NO.	COMPOUND	CONCENTRATION UNITS:	
		(ug/L or ug/kg)	ug/L
108-88-3	Toluene	5.5	Q
108-90-7	Chlorobenzene	1.4	J
100-41-4	Ethylbenzene	140	
100-42-5	Styrene	5.0	U
1330-20-7	Xylenes (total)	1200	E

BAKER ENVIRONMENTAL, INC.

Lab Name:QUANTERRA

SDG Number:

Matrix: (soil/water) WATER

Lab Sample ID:H8D210162 001

Method: SW846 8260A

Volatile Organics, GC/MS (8260A)

Sample WT/Vol: 5 / mL

Date Received: 04/21/98

Work Order: CGKQF301

Date Extracted:05/01/98

Dilution factor: 3.33

Date Analyzed: 05/01/98

Moisture %:NA

QC Batch: 8120146

Client Sample Id: IR02-GW03-98B -RE 2

CAS NO.	COMPOUND	CONCENTRATION UNITS:		Q
		(ug/L or ug/kg)	ug/L	
1330-20-7	Xylenes (total)	1500	D	

BAKER ENVIRONMENTAL, INC.

Lab Name:QUANTERRA

SDG Number:

Matrix: (soil/water) WATER

Lab Sample ID:H8D210162 002

Method: SW846 8260A

Volatile Organics, GC/MS (8260A)

Sample WT/Vol: 5 / mL

Date Received: 04/21/98

Work Order: CGKQG101

Date Extracted:04/27/98

Dilution factor: 1

Date Analyzed: 04/27/98

Moisture %:NA

QC Batch: 8115124

Client Sample Id: IR02-GW03IW-98B

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	5.0	U
67-64-1	Acetone	20	U
75-15-0	Carbon disulfide	5.0	U
75-35-4	1,1-Dichloroethene	5.0	U
75-34-3	1,1-Dichloroethane	5.0	U
540-59-0	1,2-Dichloroethene (total)	5.0	U
67-66-3	Chloroform	5.0	U
107-06-2	1,2-Dichloroethane	5.0	U
78-93-3	2-Butanone	20	U
71-55-6	1,1,1-Trichloroethane	5.0	U
56-23-5	Carbon tetrachloride	5.0	U
75-27-4	Bromodichloromethane	5.0	U
78-87-5	1,2-Dichloropropane	5.0	U
10061-01-5	cis-1,3-Dichloropropene	5.0	U
79-01-6	Trichloroethene	5.0	U
124-48-1	Dibromochloromethane	5.0	U
79-00-5	1,1,2-Trichloroethane	5.0	U
71-43-2	Benzene	5.0	U
10061-02-6	trans-1,3-Dichloropropene	5.0	U
75-25-2	Bromoform	5.0	U
108-10-1	4-Methyl-2-pentanone	20	U
591-78-6	2-Hexanone	20	U
127-18-4	Tetrachloroethene	5.0	U
79-34-5	1,1,2,2-Tetrachloroethane	1.1	J

BAKER ENVIRONMENTAL, INC.

Lab Name:QUANTERRA

SDG Number:

Matrix: (soil/water) WATER

Lab Sample ID:H8D210162 002

Method: SW846 8260A

Volatile Organics, GC/MS (8260A)

Sample WT/Vol: 5 / mL

Date Received: 04/21/98

Work Order: CGKQG101

Date Extracted:04/27/98

Dilution factor: 1

Date Analyzed: 04/27/98

Moisture %:NA

QC Batch: 8115124

Client Sample Id: IR02-GW03IW-98B

CAS NO.	COMPOUND	CONCENTRATION UNITS:	
		(ug/L or ug/kg)	ug/L Q
108-88-3	Toluene	5.0	U
108-90-7	Chlorobenzene	5.0	U
100-41-4	Ethylbenzene	5.0	U
100-42-5	Styrene	5.0	U
1330-20-7	Xylenes (total)	3.0	J

BAKER ENVIRONMENTAL, INC.

Lab Name:QUANTERRA

SDG Number:

Matrix: (soil/water) WATER

Lab Sample ID:H8D210162 003

Method: SW846 8260A

Volatile Organics, GC/MS (8260A)

Sample WT/Vol: 5 / mL

Date Received: 04/21/98

Work Order: CGKQH101

Date Extracted:04/27/98

Dilution factor: 1

Date Analyzed: 04/27/98

Moisture %:NA

QC Batch: 8115124

Client Sample Id: IR02-GW05-98B

CAS NO.	COMPOUND	CONCENTRATION UNITS:		Q
		(ug/L or ug/kg)	ug/L	
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	5.0		U
67-64-1	Acetone	20		U
75-15-0	Carbon disulfide	5.0		U
75-35-4	1,1-Dichloroethene	5.0		U
75-34-3	1,1-Dichloroethane	5.0		U
540-59-0	1,2-Dichloroethene (total)	5.0		U
67-66-3	Chloroform	5.0		U
107-06-2	1,2-Dichloroethane	5.0		U
78-93-3	2-Butanone	20		U
71-55-6	1,1,1-Trichloroethane	5.0		U
56-23-5	Carbon tetrachloride	5.0		U
75-27-4	Bromodichloromethane	5.0		U
78-87-5	1,2-Dichloropropane	5.0		U
10061-01-5	cis-1,3-Dichloropropene	5.0		U
79-01-6	Trichloroethene	5.0		U
124-48-1	Dibromochloromethane	5.0		U
79-00-5	1,1,2-Trichloroethane	5.0		U
71-43-2	Benzene	5.0		U
10061-02-6	trans-1,3-Dichloropropene	5.0		U
75-25-2	Bromoform	5.0		U
108-10-1	4-Methyl-2-pentanone	20		U
591-78-6	2-Hexanone	20		U
127-18-4	Tetrachloroethene	5.0		U
79-34-5	1,1,2,2-Tetrachloroethane	5.0		U

BAKER ENVIRONMENTAL, INC.

Lab Name:QUANTERRA

SDG Number:

Matrix: (soil/water) WATER

Lab Sample ID:H8D210162 003

Method: SW846 8260A

Volatile Organics, GC/MS (8260A)

Sample WT/Vol: 5 / mL

Date Received: 04/21/98

Work Order: CGKQH101

Date Extracted:04/27/98

Dilution factor: 1

Date Analyzed: 04/27/98

Moisture %:NA

QC Batch: 8115124

Client Sample Id: IR02-GW05-98B

CAS NO.	COMPOUND	CONCENTRATION UNITS:	
		(ug/L or ug/kg)	ug/L Q
108-88-3	Toluene	5.0	U
108-90-7	Chlorobenzene	5.0	U
100-41-4	Ethylbenzene	5.0	U
100-42-5	Styrene	5.0	U
1330-20-7	Xylenes (total)	5.0	U

BAKER ENVIRONMENTAL, INC.

Lab Name:QUANTERRA

SDG Number:

Matrix: (soil/water) WATER

Lab Sample ID:H8D210162 004

Method: SW846 8260A

Volatile Organics, GC/MS (8260A)

Sample WT/Vol: 5 / mL

Date Received: 04/21/98

Work Order: CGKQJ201

Date Extracted:05/01/98

Dilution factor: 1

Date Analyzed: 05/01/98

Moisture %:NA

QC Batch: 8120146

Client Sample Id: IR02-GW07-98B -RE 1

CAS NO.	COMPOUND	CONCENTRATION UNITS:	
		(ug/L or ug/kg)	ug/L
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	1.3	J B
67-64-1	Acetone	20	U
75-15-0	Carbon disulfide	5.0	U
75-35-4	1,1-Dichloroethene	5.0	U
75-34-3	1,1-Dichloroethane	5.0	U
540-59-0	1,2-Dichloroethene (total)	5.0	U
67-66-3	Chloroform	5.0	U
107-06-2	1,2-Dichloroethane	5.0	U
78-93-3	2-Butanone	20	U
71-55-6	1,1,1-Trichloroethane	5.0	U
56-23-5	Carbon tetrachloride	5.0	U
75-27-4	Bromodichloromethane	5.0	U
78-87-5	1,2-Dichloropropane	5.0	U
10061-01-5	cis-1,3-Dichloropropene	5.0	U
79-01-6	Trichloroethene	5.0	U
124-48-1	Dibromochloromethane	5.0	U
79-00-5	1,1,2-Trichloroethane	5.0	U
71-43-2	Benzene	5.0	U
10061-02-6	trans-1,3-Dichloropropene	5.0	U
75-25-2	Bromoform	5.0	U
108-10-1	4-Methyl-2-pentanone	20	U
591-78-6	2-Hexanone	20	U
127-18-4	Tetrachloroethene	5.0	U
79-34-5	1,1,2,2-Tetrachloroethane	0.59	J

BAKER ENVIRONMENTAL, INC.

Lab Name:QUANTERRA

SDG Number:

Matrix: (soil/water) WATER

Lab Sample ID:H8D210162 004

Method: SW846 8260A

Volatile Organics, GC/MS (8260A)

Sample WT/Vol: 5 / mL

Date Received: 04/21/98

Work Order: CGKQJ201

Date Extracted:05/01/98

Dilution factor: 1

Date Analyzed: 05/01/98

Moisture %:NA

QC Batch: 8120146

Client Sample Id: IR02-GW07-98B -RE 1

CAS NO.	COMPOUND	CONCENTRATION UNITS:	
		(ug/L or ug/kg)	ug/L
108-88-3	Toluene	5.0	U
108-90-7	Chlorobenzene	5.0	U
100-41-4	Ethylbenzene	5.0	U
100-42-5	Styrene	5.0	U
1330-20-7	Xylenes (total)	6.5	

BAKER ENVIRONMENTAL, INC.

Lab Name:QUANTERRA

SDG Number:

Matrix: (soil/water) WATER

Lab Sample ID:H8D210162 005

Method: SW846 8260A

Volatile Organics, GC/MS (8260A)

Sample WT/Vol: 5 / mL

Date Received: 04/21/98

Work Order: CGKQK101

Date Extracted:04/27/98

Dilution factor: 1

Date Analyzed: 04/27/98

Moisture %:NA

QC Batch: 8115124

Client Sample Id: IR02-GW08-98B

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	2.8	J B
67-64-1	Acetone	20	U
75-15-0	Carbon disulfide	5.0	U
75-35-4	1,1-Dichloroethene	5.0	U
75-34-3	1,1-Dichloroethane	5.0	U
540-59-0	1,2-Dichloroethene (total)	5.0	U
67-66-3	Chloroform	5.0	U
107-06-2	1,2-Dichloroethane	5.0	U
78-93-3	2-Butanone	20	U
71-55-6	1,1,1-Trichloroethane	5.0	U
56-23-5	Carbon tetrachloride	5.0	U
75-27-4	Bromodichloromethane	5.0	U
78-87-5	1,2-Dichloropropane	5.0	U
10061-01-5	cis-1,3-Dichloropropene	5.0	U
79-01-6	Trichloroethene	5.0	U
124-48-1	Dibromochloromethane	5.0	U
79-00-5	1,1,2-Trichloroethane	5.0	U
71-43-2	Benzene	5.0	U
10061-02-6	trans-1,3-Dichloropropene	5.0	U
75-25-2	Bromoform	5.0	U
108-10-1	4-Methyl-2-pentanone	20	U
591-78-6	2-Hexanone	20	U
127-18-4	Tetrachloroethene	5.0	U
79-34-5	1,1,2,2-Tetrachloroethane	5.0	U

BAKER ENVIRONMENTAL, INC.

Lab Name:QUANTERRA

SDG Number:

Matrix: (soil/water) WATER

Lab Sample ID:H8D210162 005

Method: SW846 8260A

Volatile Organics, GC/MS (8260A)

Sample WT/Vol: 5 / mL

Date Received: 04/21/98

Work Order: CGKQK101

Date Extracted:04/27/98

Dilution factor: 1

Date Analyzed: 04/27/98

Moisture %:NA

QC Batch: 8115124

Client Sample Id: IR02-GW08-98B

CAS NO.	COMPOUND	CONCENTRATION UNITS:	
		(ug/L or ug/kg)	ug/L Q
108-88-3	Toluene	5.0	U
108-90-7	Chlorobenzene	5.0	U
100-41-4	Ethylbenzene	5.0	U
100-42-5	Styrene	5.0	U
1330-20-7	Xylenes (total)	5.0	U

BAKER ENVIRONMENTAL, INC.

Lab Name:QUANTERRA

SDG Number:

Matrix: (soil/water) WATER

Lab Sample ID:H8D210162 006

Method: SW846 8260A

Volatile Organics, GC/MS (8260A)

Sample WT/Vol: 5 / mL

Date Received: 04/21/98

Work Order: CGKQL101

Date Extracted:04/27/98

Dilution factor: 1

Date Analyzed: 04/27/98

Moisture %:NA

QC Batch: 8115124

Client Sample Id: IR02-GW10-98B

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	2.7	J B
67-64-1	Acetone	20	U
75-15-0	Carbon disulfide	5.0	U
75-35-4	1,1-Dichloroethene	5.0	U
75-34-3	1,1-Dichloroethane	5.0	U
540-59-0	1,2-Dichloroethene (total)	5.0	U
67-66-3	Chloroform	5.0	U
107-06-2	1,2-Dichloroethane	5.0	U
78-93-3	2-Butanone	20	U
71-55-6	1,1,1-Trichloroethane	5.0	U
56-23-5	Carbon tetrachloride	5.0	U
75-27-4	Bromodichloromethane	5.0	U
78-87-5	1,2-Dichloropropane	5.0	U
10061-01-5	cis-1,3-Dichloropropene	5.0	U
79-01-6	Trichloroethene	5.0	U
124-48-1	Dibromochloromethane	5.0	U
79-00-5	1,1,2-Trichloroethane	5.0	U
71-43-2	Benzene	5.0	U
10061-02-6	trans-1,3-Dichloropropene	5.0	U
75-25-2	Bromoform	5.0	U
108-10-1	4-Methyl-2-pentanone	20	U
591-78-6	2-Hexanone	20	U
127-18-4	Tetrachloroethene	5.0	U
79-34-5	1,1,2,2-Tetrachloroethane	5.0	U

BAKER ENVIRONMENTAL, INC.

Lab Name:QUANTERRA

SDG Number:

Matrix: (soil/water) WATER

Lab Sample ID:H8D210162 006

Method: SW846 8260A

Volatile Organics, GC/MS (8260A)

Sample WT/Vol: 5 / mL

Date Received: 04/21/98

Work Order: CGKQL101

Date Extracted:04/27/98

Dilution factor: 1

Date Analyzed: 04/27/98

Moisture %:NA

QC Batch: 8115124

Client Sample Id: IR02-GW10-98B

CAS NO.	COMPOUND	CONCENTRATION UNITS:	
		(ug/L or ug/kg)	ug/L Q
108-88-3	Toluene	5.0	U
108-90-7	Chlorobenzene	5.0	U
100-41-4	Ethylbenzene	5.0	U
100-42-5	Styrene	5.0	U
1330-20-7	Xylenes (total)	5.0	U

BAKER ENVIRONMENTAL, INC.

Lab Name:QUANTERRA

SDG Number:

Matrix: (soil/water) WATER

Lab Sample ID:H8D210162 007

Method: SW846 8260A

Volatile Organics, GC/MS (8260A)

Sample WT/Vol: 5 / mL

Date Received: 04/21/98

Work Order: CGKQM101

Date Extracted:04/27/98

Dilution factor: 1

Date Analyzed: 04/27/98

Moisture %:NA

QC Batch: 8115124

Client Sample Id: IR02-GW11-98B

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	3.4	J B
67-64-1	Acetone	20	U
75-15-0	Carbon disulfide	5.0	U
75-35-4	1,1-Dichloroethene	5.0	U
75-34-3	1,1-Dichloroethane	5.0	U
540-59-0	1,2-Dichloroethene (total)	5.0	U
67-66-3	Chloroform	5.0	U
107-06-2	1,2-Dichloroethane	5.0	U
78-93-3	2-Butanone	20	U
71-55-6	1,1,1-Trichloroethane	5.0	U
56-23-5	Carbon tetrachloride	5.0	U
75-27-4	Bromodichloromethane	5.0	U
78-87-5	1,2-Dichloropropane	5.0	U
10061-01-5	cis-1,3-Dichloropropene	5.0	U
79-01-6	Trichloroethene	5.0	U
124-48-1	Dibromochloromethane	5.0	U
79-00-5	1,1,2-Trichloroethane	5.0	U
71-43-2	Benzene	5.0	U
10061-02-6	trans-1,3-Dichloropropene	5.0	U
75-25-2	Bromoform	5.0	U
108-10-1	4-Methyl-2-pentanone	20	U
591-78-6	2-Hexanone	20	U
127-18-4	Tetrachloroethene	5.0	U
79-34-5	1,1,2,2-Tetrachloroethane	5.0	U

BAKER ENVIRONMENTAL, INC.

Lab Name:QUANTERRA

SDG Number:

Matrix: (soil/water) WATER

Lab Sample ID:H8D210162 007

Method: SW846 8260A

Volatile Organics, GC/MS (8260A)

Sample WT/Vol: 5 / mL

Date Received: 04/21/98

Work Order: CGKQM101

Date Extracted:04/27/98

Dilution factor: 1

Date Analyzed: 04/27/98

Moisture %:NA

QC Batch: 8115124

Client Sample Id: IR02-GW11-98B

CAS NO.	COMPOUND	CONCENTRATION UNITS:	
		(ug/L or ug/kg)	ug/L Q
108-88-3	Toluene	5.0	U
108-90-7	Chlorobenzene	5.0	U
100-41-4	Ethylbenzene	5.0	U
100-42-5	Styrene	5.0	U
1330-20-7	Xylenes (total)	5.0	U

BAKER ENVIRONMENTAL, INC.

Lab Name:QUANTERRA

SDG Number:

Matrix: (soil/water) WATER

Lab Sample ID:H8D210162 008

Method: SW846 8260A

Volatile Organics, GC/MS (8260A)

Sample WT/Vol: 5 / mL

Date Received: 04/21/98

Work Order: CGKQN101

Date Extracted:04/27/98

Dilution factor: 1

Date Analyzed: 04/27/98

Moisture %:NA

QC Batch: 8115124

Client Sample Id: IR02-GW12-98B

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	2.5	J B
67-64-1	Acetone	20	U
75-15-0	Carbon disulfide	5.0	U
75-35-4	1,1-Dichloroethene	5.0	U
75-34-3	1,1-Dichloroethane	5.0	U
540-59-0	1,2-Dichloroethene (total)	5.0	U
67-66-3	Chloroform	5.0	U
107-06-2	1,2-Dichloroethane	5.0	U
78-93-3	2-Butanone	20	U
71-55-6	1,1,1-Trichloroethane	5.0	U
56-23-5	Carbon tetrachloride	5.0	U
75-27-4	Bromodichloromethane	5.0	U
78-87-5	1,2-Dichloropropane	5.0	U
10061-01-5	cis-1,3-Dichloropropene	5.0	U
79-01-6	Trichloroethene	5.0	U
124-48-1	Dibromochloromethane	5.0	U
79-00-5	1,1,2-Trichloroethane	5.0	U
71-43-2	Benzene	5.0	U
10061-02-6	trans-1,3-Dichloropropene	5.0	U
75-25-2	Bromoform	5.0	U
108-10-1	4-Methyl-2-pentanone	20	U
591-78-6	2-Hexanone	20	U
127-18-4	Tetrachloroethene	5.0	U
79-34-5	1,1,2,2-Tetrachloroethane	5.0	U

BAKER ENVIRONMENTAL, INC.

Lab Name:QUANTERRA

SDG Number:

Matrix: (soil/water) WATER

Lab Sample ID:H8D210162 008

Method: SW846 8260A

Volatile Organics, GC/MS (8260A)

Sample WT/Vol: 5 / mL

Date Received: 04/21/98

Work Order: CGKQN101

Date Extracted:04/27/98

Dilution factor: 1

Date Analyzed: 04/27/98

Moisture %:NA

QC Batch: 8115124

Client Sample Id: IR02-GW12-98B

CAS NO.	COMPOUND	CONCENTRATION UNITS:	
		(ug/L or ug/kg)	ug/L Q
108-88-3	Toluene	5.0	U
108-90-7	Chlorobenzene	5.0	U
100-41-4	Ethylbenzene	5.2	
100-42-5	Styrene	5.0	U
1330-20-7	Xylenes (total)	71	

BAKER ENVIRONMENTAL, INC.

Lab Name:QUANTERRA

SDG Number:

Matrix: (soil/water) WATER

Lab Sample ID:H8D210162 009

Method: SW846 8260A

Volatile Organics, GC/MS (8260A)

Sample WT/Vol: 5 / mL

Date Received: 04/21/98

Work Order: CGKQP101

Date Extracted:05/01/98

Dilution factor: 1

Date Analyzed: 05/01/98

Moisture %:NA

QC Batch: 8120146

Client Sample Id: IR02-TB01-98B

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	1.3	J B
67-64-1	Acetone	20	U
75-15-0	Carbon disulfide	5.0	U
75-35-4	1,1-Dichloroethene	5.0	U
75-34-3	1,1-Dichloroethane	5.0	U
540-59-0	1,2-Dichloroethene (total)	5.0	U
67-66-3	Chloroform	5.0	U
107-06-2	1,2-Dichloroethane	5.0	U
78-93-3	2-Butanone	20	U
71-55-6	1,1,1-Trichloroethane	5.0	U
56-23-5	Carbon tetrachloride	5.0	U
75-27-4	Bromodichloromethane	5.0	U
78-87-5	1,2-Dichloropropane	5.0	U
10061-01-5	cis-1,3-Dichloropropene	5.0	U
79-01-6	Trichloroethene	5.0	U
124-48-1	Dibromochloromethane	5.0	U
79-00-5	1,1,2-Trichloroethane	5.0	U
71-43-2	Benzene	5.0	U
10061-02-6	trans-1,3-Dichloropropene	5.0	U
75-25-2	Bromoform	5.0	U
108-10-1	4-Methyl-2-pentanone	20	U
591-78-6	2-Hexanone	20	U
127-18-4	Tetrachloroethene	5.0	U
79-34-5	1,1,2,2-Tetrachloroethane	5.0	U

BAKER ENVIRONMENTAL, INC.

Lab Name:QUANTERRA

SDG Number:

Matrix: (soil/water) WATER

Lab Sample ID:H8D210162 009

Method: SW846 8260A

Volatile Organics, GC/MS (8260A)

Sample WT/Vol: 5 / mL

Date Received: 04/21/98

Work Order: CGKQP101

Date Extracted:05/01/98

Dilution factor: 1

Date Analyzed: 05/01/98

Moisture %:NA

QC Batch: 8120146

Client Sample Id: IR02-TB01-98B

CAS NO.	COMPOUND	CONCENTRATION UNITS:	
		(ug/L or ug/kg)	ug/L Q
108-88-3	Toluene	5.0	U
108-90-7	Chlorobenzene	5.0	U
100-41-4	Ethylbenzene	5.0	U
100-42-5	Styrene	5.0	U
1330-20-7	Xylenes (total)	5.0	U