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QUARTERLY MONITORING REPORT
OPERABLE UNIT NO. 1 – SITES 24 AND 78

SECOND QUARTER 1997 (APR – JUN 97)

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SECOND QUARTER 1997 GROUNDWATER MONITORING REPORT

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DQOs	Data Quality Objectives
gpm	gallons per minute
IR	Installation Restoration
MCB	Marine Corps Base
MCLs	maximum contaminant levels
NCWQSs	North Carolina Water Quality Standards
NFESC	Naval Facilities Engineering Service Center
NTU	Neophelmetic Turbidity Units
OU	Operable Unit
ppm	parts per million
QA/QC	Quality Assurance/Quality Control
RI	Remedial Investigation
ROD	Record of Decision
SWMU	solid waste management unit
TAL	target analyte list
TCL	target compound list
TDS	total dissolved solids
TOC	top-of-casing
TSS	total suspended solids
USEPA	United States Environmental Protection Agency
UST	underground storage tank
VOCs	volatile organic compounds
mg/L	milligrams per liter
µg/L	micrograms per liter

1.0 INTRODUCTION

The following quarterly monitoring report presents the sampling procedures and analytical findings of the monitoring program at Operable Unit (OU) No. 1 (Sites 24 and 78), Marine Corps Base (MCB) Camp Lejeune, North Carolina. Operational data and an evaluation of the groundwater treatment system at Site 78 are also provided within this quarterly monitoring report. The report describes the activities completed at Sites 24 and 78 during the second quarter of 1997 and presents recommendations concerning the monitoring program and groundwater treatment systems.

1.1 Report Organization

This quarterly monitoring report is comprised of five sections. Section 1.0 describes the sampling program procedures and methodology. Section 1.0 also provides groundwater elevation data, groundwater flow direction, and various field observations. Analytical results and findings are presented in Section 2.0. A comparison of previous analytical findings versus the most recent results is also included within Section 2.0. An evaluation of the northern and southern groundwater treatment systems at Site 78 is presented in Section 3.0. Section 4.0 provides recommendations to improve the groundwater treatment system at Site 78 and the quarterly sampling program at both Sites 24 and 78. Finally, references used during preparation of this report are included in Section 5.0. All tables, figures, and attachments are provided after the text portion of the report.

1.2 Quarterly Sampling Program

The second quarter sampling event commenced on April 26, 1997 and continued through May 1, 1997. Sampling at Site 24 involved the collection of groundwater samples from the three shallow monitoring wells depicted in Figure 1-1. Groundwater samples from Site 78 were collected from 15 shallow, 2 intermediate, and 2 deep monitoring wells. Figure 1-2 depicts the groundwater sampling locations at Site 78.

During the quarterly sampling event a low flow purge and sampling technique was employed. The sampling methodology was developed in response to standard operating procedures (SOPs) issued by the United States Environmental Protection Agency (USEPA - Region IV, 1996). Prior to groundwater purging, water level and total depth measurements from each monitoring well were obtained. Water level and well depth measurements were used to calculate the volume of water necessary to purge each well. Table 1-1 provides a summary of monitoring well construction details.

A peristaltic pump, with the intake set two to four feet above the bottom of the well was used to purge each of the monitoring wells. While purging groundwater, a flow rate of less than 0.25 gallons per minute (gpm) was maintained. Groundwater samples were obtained directly from the pump discharge. Dedicated sections of polyethylene and silicon pump-head tubing were used during purge and sampling activities at each monitoring well. A minimum of three well volumes were purged from each monitoring well prior to sampling. Measurements of pH, specific conductance, dissolved oxygen, temperature, and turbidity were recorded to ensure that groundwater characteristics had stabilized before sampling. These measurements were recorded in a field logbook and are provided in Table 1-2.

Groundwater samples were collected to assess whether contamination, detected during previous investigative activities, was present in the shallow aquifer. Based upon previous sampling results

and decision documents, the contaminants of concern at Site 24 were volatile organic compounds (VOCs), pesticides, and select metals. Contaminants of concern at Site 78 were limited to VOCs only. Groundwater samples obtained from Site 24 were analyzed for target compound list (TCL) volatile organics, TCL pesticides, select target analyte list (TAL) metals, total dissolved solids (TDS), and total suspended solids (TSS). Groundwater samples obtained from Site 78 were analyzed for TCL volatile organics only. Samples were preserved at the time of collection with hydrochloric acid for volatile analyses, nitric acid for metal analyses, and sodium hydroxide for suspended and dissolved solids analyses. Table 1-3 provides a summary of requested analyses and groundwater samples submitted during the quarterly monitoring event. Groundwater samples were analyzed using various analytical methods, as provided in Table 1-3, and Level III Data Quality Objectives (DQOs). DQO Level III is equivalent to the Naval Facilities Engineering Service Center (NFESC) Level C, as specified in the "Sampling and Chemical Analysis Quality Assurance Requirements for the Navy Installation Restoration Programs" document. Table 1-4 provides the various analytical method detection limits and comparative state and federal groundwater quality standards.

Trip blanks were prepared by the laboratory prior to the sampling event, placed in sample storage containers, and kept with the investigative samples throughout the sampling event. The trip blanks were then packaged for shipment with the environmental samples and sent for analysis. Trip blanks were used to determine if samples were cross-contaminated during storage and transportation to the laboratory.

Sample information, such as 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 groundwater samples to the laboratory. Chain-of-custody forms were then compared to the monitoring plan; this comparison was used to verify that appropriate laboratory analyses had been requested. Upon receipt of the laboratory analytical results, a further comparison was performed to verify that each sample was analyzed for the requested analyses. Sample tracking documentation is provided as Attachment B. The sample designation format used during the monitoring program at Sites 24 and 78 is provided in Attachment C.

1.3 Groundwater Elevation and Flow Direction

The following sections provide information concerning groundwater flow patterns at Sites 24 and 78. Static water level measurements were collected after all well sampling activities had been completed. Measurements were recorded from top-of-casing (TOC) reference points marked on each monitoring well. Groundwater measurements were recorded to the nearest 0.01-foot using an electric measuring tape. The elevation data were obtained by subtracting the measured depth to groundwater from the surveyed reference elevation. For ease of discussion, groundwater elevation and flow direction for the two sites are presented separately.

1.3.1 Site 24

Water level measurements were collected at Site 24 on April 30, 1997. Table 1-5 provides a summary of the water level measurements and Figure 1-3 depicts the static elevations and approximate flow direction of groundwater. The general direction of groundwater flow at Site 24 is south, in the direction of a series of tributaries which lead to Cogdels Creek. As shown in Figure 1-3, the flow direction near monitoring wells 24-GW07 and 24-GW08 is toward the south

and southeast. Groundwater flow near wells 24-GW03 and 24-GW10 is generally toward the south and southwest. The slight difference in groundwater flow directions across Site 24 is most likely a result of the local topography and the influence of the surface water features.

1.3.2 Site 78

Water level measurements at Site 78 were collected on May 1, 1997. Table 1- 6 provides a summary of the water level measurements and Figure 1-4 depicts the static elevations and approximate flow direction of groundwater. The groundwater flow regime at Site 78 is relatively consistent. Groundwater flow is generally toward the west-southwest, in the direction of an unnamed tributary to Cogdels Creek and the New River.

As depicted in Figure 1-4, groundwater in the northern most and southern most portions of the study area tends to flow in a radial direction. The areas in which groundwater appears to be mounded are most likely localized entrance points for groundwater recharge.

1.4 Field Observations

Field observations have been recorded during each groundwater sampling event at Sites 24 and 78. Recommendations regarding the field observations which follow are presented in Section 3.0.

Groundwater samples from several of the monitoring wells throughout Site 78 exhibited sediment after having been purged for a reasonable amount of time. This suggests that the monitoring wells have either begun to deteriorate or were poorly constructed. Turbidity readings collected during groundwater sampling activities have been consistently high in a few cases. Turbidity readings have ranged, in those few cases, between 100 nephlometric turbidity units (NTUs) and 200 NTUs. In general, it is preferred that groundwater samples be collected after turbidity readings stabilize at less than ten NTUs. In many cases, the older monitoring wells do not reach this turbidity level, resulting in less than ideal sampling conditions.

2.0 ANALYTICAL RESULTS AND FINDINGS

The section which follows presents analytical results and findings from groundwater monitoring performed at Sites 24 and 78 during the second quarter of 1997. Groundwater samples from Site 24 were obtained from three shallow monitoring wells. Quarterly sampling activities at Site 78 entailed the collection of groundwater samples from 15 shallow monitoring wells, 2 intermediate monitoring wells, and 2 deep monitoring wells. A summary of groundwater analytical results for Sites 24 and 78 are provided in Table 2-1 and Table 2-2, respectively. Positive detection summaries for Sites 24 and 78 are provided in Table 2-3 and Table 2-4.

Trip blanks accompanied the groundwater samples during field collection, shipment, and laboratory analysis. No organic compounds were detected among the two trip blanks submitted during the quarterly sampling event. Analytical results from the two trip blanks are presented in Table 2-5.

2.1 Site 24

The following sections present analytical results and findings from monitoring activities conducted at Site 24 during the second quarter of 1997.

2.1.1 Organic Compounds

As provided in Table 2-1, only one volatile organic compound was detected among the three groundwater samples extracted from the shallow aquifer at Site 24. Chloroform was detected in the sample obtained from monitoring well 24-GW08 at a concentration of 2 micrograms per liter (µg/L). The chloroform concentration exceeds the North Carolina Water Quality Standard (NCWQSs) of 0.19 µg/L, but is less than the Federal Maximum Contaminant Level (MCL) of 100 µg/L. Chloroform is a common laboratory contaminant that is frequently detected among environmental and laboratory quality assurance and quality control (QA/QC) samples. Chloroform has not been detected among groundwater samples obtained from Site 24 during any of the three previous monitoring events. Based upon this information, chloroform is considered to have been introduced during laboratory sample preparation and analysis. There were no other VOCs detected among groundwater samples obtained from Site 24 during the second quarter event. In addition, pesticide compounds were not detected among samples obtained from the three monitoring wells at Site 24.

Groundwater samples were also analyzed for oil and grease according to USEPA Solid Waste Method 9071. Oil and grease were detected in the groundwater sample obtained from monitoring well 24-GW10 at a concentration of 30.6 milligrams per liter (mg/L). During the first quarter sampling event at Site 24, oil and grease were detected at similar concentrations in the groundwater sample obtained from monitoring well 24-GW09. The observed concentrations of oil and grease at the site are low and the detections appear to be infrequent and scattered across the site. There are no state or federal water quality standards for oil and grease parameters.

2.1.2 Selected Total Metals

Positive detections of total metals are presented in Table 2-3. Antimony, beryllium, chromium, iron, lead, and manganese were detected among the three groundwater samples submitted for analyses from Site 24. Chromium, iron, and lead were detected in each of the three samples, manganese was detected in two of the three sample and antimony and beryllium were detected in only one sample.

The sample obtained from monitoring well 24-GW08 exhibited the only positive total metal detection that exceeded an applicable water quality standard. Iron was detected in the sample obtained from monitoring well 24-GW08 at a concentration of 368 µg/L, which slightly exceeds the NCWQSs of 300 µg/L.

The observed concentration of iron is typical of previous sampling events and analytical results obtained during numerous other groundwater investigations conducted throughout MCB Camp Lejeune. Although the concentration of metals among groundwater samples often exceed established water quality standards, the levels are generally characteristic of natural site conditions. Soils found within the coastal plain of North Carolina are naturally rich in metals. The observed total metal concentrations in groundwater are due more to geologic conditions (i.e., naturally occurring metals bound to unconsolidated soil particles) and sample acquisition methods than to mobile metal concentrations in the surficial aquifer. The presence of certain metals, such as iron, is often a reflection of solids or colloids in samples. In order to limit the amount of solids and obtain a more representative groundwater samples, a low-flow purge method was employed during sampling. However, the low-flow purge method can only reduce, not eliminate the amount of solids that are frequently present among groundwater samples.

2.1.3 Suspended and Dissolved Solids

Suspended solids were detected at a concentration of 6 mg/L in the sample obtained from 24-GW08. No other suspended solids were detected among the other two groundwater samples obtained at Site 24. All three of the shallow groundwater samples had detectable concentrations of dissolved solids, however. As provided in Table 2-3, monitoring wells 24-GW08, 24-GW09, and 24-GW10 had dissolved solid concentrations of 78, 44, and 68 mg/L, respectively. The detected concentrations of dissolved solids were below the NCWQS of 500 mg/L.

2.2 Site 78

The following sections present analytical results and findings from the monitoring event conducted at Site 78 during the second quarter of 1997. Positive VOC detections were primarily limited to samples obtained from the uppermost portion of the surficial aquifer (i.e., less than 25 feet below ground surface).

Two deep and two intermediate groundwater samples were collected from monitoring wells at Site 78. Of the four samples, only one VOC was detected. The limited number of positive VOC detections among samples obtained from the deeper portion of the surficial aquifer and the Castle Hayne Aquifer suggests that VOCs are limited to the upper portion of the surficial aquifer only, with little migration of contaminants to the deeper zones. The sections which follow discuss the findings of groundwater monitoring at Site 78 in further detail.

2.2.1 Shallow and Intermediate Groundwater

Groundwater conditions within the upper portion of the surficial aquifer were evaluated at Site 78 through collection and analysis of samples from 15 shallow monitoring wells (refer to Table 1-2 for well construction details and Figure 1-2 for well locations). Two additional groundwater samples were obtained from intermediate wells set in the lower portion of the surficial aquifer (i.e., between 50 and 75 feet below ground surface). In addition, two samples were collected from deep monitoring wells, which are set approximately 130 to 150 feet below ground surface. The

paragraphs which follow provide not only an evaluation of the most recent analytical data, but a comparison of those findings versus previous results.

A summary of groundwater analytical results is provided in Table 2-2; a graphic depiction of VOC results and their locations throughout the study area is presented in Figure 2-1. In general, the analytical data suggest two primary areas of chlorinated solvent contamination within Site 78. The two chlorinated solvent contaminant plumes are limited to the uppermost portion of the surficial aquifer at Site 78. One area of contamination is located within the northern portion of the site and the other is located within the southern portion of the site. The northern plume area is located in the vicinity of 900 series buildings (i.e., 900, 901, 902, 903, 904). The southern plume area appears to be concentrated near the intersection of Fir and East Streets, adjacent to monitoring well cluster 78-GW09. The southern contaminant plume extends to the southwest toward monitoring wells 78-GW01 and 78-GW04-1.

A total of six VOCs were detected among samples associated with the southern contaminant plume. As depicted in Figure 2-1, positive VOC detections in the southern portion of Site 78 were limited to shallow monitoring wells 78-GW01, 78-GW04-1, and 78-GW09-1, and intermediate well 78-GW09-2. Among these wells, the sample obtained from well 78-GW09-1 exhibited the highest concentrations of each chlorinated solvent identified. As presented in Table 2-4, the solvents 1,1,1-trichloroethane, 1,1-dichloroethane, 1,1-dichloroethene, 1,2-dichloroethene (total), and trichloroethene were detected in the sample obtained from well 78-GW09-1 at concentrations of 480, 67, 140, 300, and 580 µg/L, respectively. Figure 2-2 depicts total chlorinated solvent concentrations in samples obtained from well 78-GW09-1 during the past eight quarterly monitoring events. This figure includes analytical data from monitoring well 78-GW09-1 beginning in the third quarter of 1995 and continuing through the second quarter of 1997.

The median concentration of total chlorinated solvents detected among samples obtained from well 78-GW09-1 over the last eight quarters is 1,494 µg/L. As shown on Figure 2-2, chlorinated solvents have been detected in samples obtained from well 78-GW09-1 during each of the sampling events. Figures 2-3, 2-4, and 2-5 depict the concentrations of specific organic compounds in samples obtained from monitoring well 78-GW09-1. The figures provide concentrations through time for compounds 1,1-dichloroethene, 1,1,1-trichloroethane, and trichloroethene detected among samples obtained from well 78-GW09-1 during previous sampling events. As depicted in the figures, each of the VOCs have consistently been detected at concentrations exceeding the NCWQS. Indicators of central tendency, including mean and median, have been calculated for each of the various compounds and are provided in Figures 2-2 through 2-5. As depicted in the figures, the concentration of 1,1-dichloroethene has increased since the last sampling episode, while the concentrations of 1,1,1-trichloroethane and trichloroethene have decreased slightly since the previous sampling event. Concentrations of each of the compounds, however, remain above applicable water quality standards.

As presented in Figure 2-1, 1,2-dichloroethene (total) was detected at 3 µg/L in the sample obtained from intermediate well 78-GW09-2; the NCWQS for 1,2-dichloroethene (total) is 70 µg/L. Intermediate well 78-GW09-2 is located approximately 150 feet southwest of shallow well 78-GW09-1. Similar concentrations of 1,2-dichloroethene (total) have been exhibited among samples obtained from intermediate well 78-GW09-2 during previous sampling events. The frequent detections of 1,2-dichloroethene (total) suggests that VOCs may have migrated to the deeper portion of the surficial aquifer in this area of Site 78. As depicted in Figure 2-1, the detected concentrations are significantly lower than the NCWQS the presence of this compound in the deeper

portion of the shallow aquifer is notable. Additional sampling activities at Site 78 will be employed to monitor the presence of VOCs in the intermediate zone. As indicated, concentrations of 1,2-dichloroethene (total) detected during previous sampling quarters did not exceed applicable water quality standards. In addition, there have been no detections of VOCs in samples obtained from deep monitoring well 78-GW09-3, located nearly 200 feet east of 78-GW09-1. These analytical results suggest that the identified chlorinated solvents are primarily located in the uppermost portion of the surficial aquifer in the southern plume area of Site 78, with limited vertical migration.

A total of four chlorinated solvents were detected among samples associated with the northern contaminant plume. As depicted in Figure 2-1, positive VOC detections in the northern portion of Site 78 were limited to samples obtained from shallow monitoring wells 78-GW23, 78-GW24-1 and 78-GW25. As presented in Table 2-4, the chlorinated solvents vinyl chloride, 1,2-dichloroethene (total) and trichloroethene were detected in samples obtained from wells 78-GW23, 78-GW24-1 and 78-GW25. The sample obtained from monitoring well 78-GW23 had the highest detected concentrations of contaminants. Concentrations of vinyl chloride and 1,2-dichloroethene were 340 and 9,500 µg/L, respectively. Figure 2-6 depicts total chlorinated solvent concentrations in samples obtained from well 78-GW23 during the previous eight quarterly monitoring events. The increased concentration of total chlorinated solvents detected in well 78-GW23 during the last four quarters is the result of differing laboratory analyses; not until the third quarter of 1996 were groundwater samples submitted for 1,2-dichloroethene (total) analyses. Figures 2-7 and 2-8 depict the concentrations vinyl chloride and trichloroethene previously detected in samples obtained from monitoring well 78-GW23. In general, concentrations of these compounds have been significantly greater than the respective state water quality standards. The NCWQS for vinyl chloride is 0.015 µg/L and the median concentration of this compound over eight quarters of sampling is 180 µg/L. The median concentration of trichloroethene over the sampling period is 47 µg/L, as compared to the NCWQS of 2.8 µg/L.

Within the northern contaminant plume, petroleum related compounds including benzene, toluene, ethylbenzene, and xylene (total) have been detected among shallow groundwater samples. However, none of these contaminants were detected during the most recent sampling event. The presence of petroleum-related compounds in the northern portion of Site 78 have also been confirmed in lower portions of the surficial aquifer. Previous data collected from intermediate monitoring well 78-GW24-2, located adjacent to shallow well 78GW24-1, have indicated petroleum related compounds. The data suggest that these compounds may have begun to migrate vertically from the surficial aquifer. Additional sampling data will be required to delineate the horizontal and the vertical extent of the petroleum related compounds within the surficial aquifer.

Shallow monitoring wells 78-GW15 and 78-GW39 are situated in areas removed from the main contaminant plumes at Site 78; however, VOCs have been detected among samples obtained from these wells during this sampling event and previous events. For example, trichloroethene was detected at a concentration of 1 µg/L in the sample obtained from well 78-GW15. In addition, the sample obtained from monitoring well 78-GW39 exhibited a low concentration of tetrachloroethene during the second quarter of 1997. The detections of contaminants in samples obtained from monitoring wells 78-GW15 and 78-GW39 demonstrate that VOCs are present at low concentrations in areas of the site removed from the main contaminant plumes.

2.2.2 Deep Groundwater

The following section presents analytical results and findings from two deep groundwater samples obtained at Site 78 during the second quarter of 1997 (i.e., collected from depths greater than 100 feet below ground surface). As provided in Table 2-4, no VOCs were detected among the two groundwater samples obtained from the deep aquifer. Toluene was detected at a concentration of 0.8 µg/L in a sample collected from deep well 78-GW24-3 during a previous quarterly monitoring event. The detection was considerably less than both the NCWQS and MCL of 1,000 µg/L. No other analytical results have indicated the presence of VOCs in the deep aquifer, implying that volatile contaminants have not migrated vertically from the shallow aquifer to the deep aquifer. Deep groundwater samples will continue to be collected during future sampling events at the site. This data will help to determine if VOCs have migrated to the Castle Hayne Aquifer at Site 78.

3.0 TREATMENT SYSTEM EVALUATION

Two independent groundwater extraction and treatment systems have been operating within the Hadnot Point Industrial Area since December 1994. The systems were designed to collect and treat VOC-contaminated shallow groundwater from both the northern and southern portions of Site 78. The systems were also designed to mitigate the potential for off-site contaminant migration.

As depicted in Figure 3-1, the northern treatment system currently includes one active recovery well (RW-10) and five inactive recovery wells (RW-1, RW-2, RW-3, RW-4, and RW-11). The southern treatment system includes four active recovery wells (RW-5, RW-6, RW-7, and RW-8) and one inactive recovery well (RW-9). Shallow groundwater extracted via the five active recovery wells is treated at either the northern or southern treatment systems, then discharged to the Hadnot Point Sewage Treatment Plant. Five of the six currently inactive recovery wells were taken off-line during 1996 due to low concentrations of contaminants being extracted. The sixth inactive recovery well was taken off-line during 1996 due to high concentrations of solids within the extracted groundwater. The concentration of solids within groundwater extracted via RW-11 may be a result of poor well construction methods during the installation.

The following treatment system evaluation is divided into two sections. The first section focuses upon system components located within each treatment plant. These in-plant components include oil and water separators, metals removal systems, low-profile air strippers, and liquid-phase carbon adsorption units. The second section focuses upon groundwater recovery components that are located outside of each treatment plant. These recovery components include recovery wells, piping, and pumps.

3.1 In-Plant Components

Both the northern and southern treatment plants contain oil and water separators; metals removal systems including flocculation tanks, settling tanks, and sand filters; low profile air strippers; and liquid-phase carbon adsorption units. Monitoring activities at both treatment plants include sampling of plant influent, plant effluent, oil and water separator effluent, sand filter effluent, and air stripper effluent. Tables 3-1 and 3-2 present monthly sampling results obtained during April and May 1997 for the northern and southern treatment plants, respectively. The following assessment of treatment components is based on monthly sampling results provided in Tables 3-1 and 3-2.

Analytical results indicate that in-plant treatment components of both the northern and southern systems are functioning effectively. The treatment components are either treating contamination to the remediation levels or are eliminating contamination altogether. Influent to both the northern and southern treatment plants has historically contained the VOCs trans-1,2-dichloroethene, trichloroethylene, vinyl chloride, benzene, and cis-1,2-dichloroethylene at concentrations exceeding remediation levels. Based on VOC concentrations in the air stripper effluent samples, the air stripper has successfully treated these contaminants to concentrations that are below the remediation levels, and in most cases, below the detection levels. Similarly, VOC concentrations in the plant effluent have been below the remediation levels and, frequently, below the detection levels. This indicates that VOC treatment is functioning effectively.

In addition to VOCs, plant influent has consistently contained metals, dissolved solids, and suspended solids. Based on sampling results from the sand filter effluent, the majority of metals have been reduced to below the remediation levels and suspended solids have been reduced to below

the discharge limits. Calcium and dissolved solid concentrations, however, are not adequately being reduced during treatment and have resulted in the need for continued cleaning and maintenance. In addition, Monthly Progress Reports have suggested that suspended solids are clogging many of the treatment subsystems. In fact, many of the maintenance items cited in prior Monthly Progress Reports have related to the presence of either calcium build-up or sludge.

Finally, oil and grease influent concentrations have typically been below the discharge limit of 1.00 parts per million (ppm). As a result, the effectiveness of the oil and water separators cannot be adequately determined at this time.

3.2 Groundwater Recovery Components

Recovery wells RW-10 and RW-11 are situated within a portion of the northern contaminant plume which has exhibited relatively high concentrations of VOCs. As a result, the two recovery wells have historically extracted groundwater with concentrations of VOCs at nearly the same rate and efficiency. However, recovery well RW-11 was taken off-line due to high concentrations of solids within groundwater extracted during its operation. In addition, RW-10 is located approximately 140 feet upgradient of monitoring well 78-GW23, where VOCs have been detected at levels well above water quality standards.

The southern recovery wells are situated in a line as a downgradient contaminant barrier. The recovery wells are positioned to limit contaminant migration and intercept the contaminated plume as it travels in the direction of groundwater flow. Because the southern recovery wells are located at the downgradient edge of the contaminant plume, these recovery wells have been extracting groundwater with lower VOC concentrations when compared to the northern recovery wells. Recovery wells RW-5 and RW-6 have typically removed VOCs at relatively higher concentrations than recovery wells RW-7 and RW-8 because they are positioned closer to the most highly contaminated portion of the suspected contaminant plume.

Compared to the southern recovery system, the northern recovery system has been extracting higher concentrations of VOCs. The northern recovery system is positioned in the portion of the suspected contaminant plume that contains relatively higher VOC concentrations. The southern recovery system is positioned at the downgradient edge of the suspected contaminant plume rather than within the most highly contaminated area.

The northern and the southern treatment systems were designed to handle a maximum influent of 80 gallons per minute. Because the actual pumping rates are lower than 80 gpm, the treatment systems are currently operating well below their maximum capacity. Based on past experience at MCB Camp Lejeune, a 100-foot radius of influence can be expected for a recovery well that is pumping at 5 gpm (Baker, April 1996). For the recovery wells at Site 78, the most recently observed pumping rates were between 2.9 and 3.5 gpm. Thus, a radius of influence closer to 75 feet may be expected for each recovery well at Site 78.

4.0 RECOMMENDATIONS

The ROD for OU1 stipulates that groundwater samples from Site 24 and Site 78 be collected periodically and possible off-site migration of known contaminants be monitored through laboratory analyses (Baker, 1994a). Groundwater sampling at Sites 24 and 78 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 recently been implemented and recommendations which are proposed for future consideration.

4.1 Implemented Recommendations

Information pertaining to recommendations, implemented prior to the second quarter of 1997, is provided within the previous groundwater monitoring reports. Final disposition of each recommendation is also presented within the previous reports. It is the intent of this report to provide a thorough and up-to-date listing of only those recommendations and implemented actions which have recently been implemented.

4.2 Proposed Recommendations

Based upon the observations and findings presented in Sections 1.0, 2.0, and 3.0 of this quarterly monitoring report, the following recommendations for the OU1 monitoring program are provided. If non-significant changes are made to a component of the selected remedy described in the ROD, the changes must be recorded in a post-decision document file. If significant changes are made to a component of the selected remedy, the changes will need to be presented in an Explanation of Significant Differences document.

4.2.1 Install Additional Recovery Wells

As indicated in Section 3.0, a majority of treatment system capacity for both the northern and southern treatment plants is currently underutilized. In addition, the recovery well systems are not extracting groundwater from the most contaminated portions of the two suspected chlorinated solvent plumes. Three additional recovery wells, supplementing the nine existing recovery wells (RW-1 through RW-9), were proposed as part of the selected remedy for OU1. Two of the three additional wells (RW-10 and RW-11) were installed within the northern contaminant plume at Site 78. The third recovery well, proposed for the most contaminated portion of the southern plume, was never installed. It is therefore recommended that at least one recovery well be added to the southern treatment system. The additional recovery well should be installed between 75 and 100 feet south of monitoring well 78-GW09-1. Groundwater samples obtained from 78-GW09-1 have consistently exhibited the highest concentrations of chlorinated solvents within the southern portion of Site 78. Continued groundwater monitoring activities and treatment system analyses may, in the future, require that additional recovery wells be installed within the southern contaminant plume.

The northern treatment system is actively treating groundwater contaminants extracted from only one recovery well (RW-10) within the northern contaminant plume. Although the active recovery well is extracting contamination from the surficial aquifer, it is situated upgradient of monitoring well 78-GW23. Groundwater samples obtained from 78-GW23 have consistently exhibited concentrations of chlorinated solvents in excess of applicable water quality standards. Vinyl chloride has been detected at concentrations ranging from 6 to 360 µg/L in each of the previous

seven samples obtained from well 78-GW23 during the monitoring program. The expected radius of influence for RW-10, however, does not intercept 78-GW23. Based upon this information, it is recommended that at least one additional recovery well be installed 75 to 100 feet southwest of monitoring well 78-GW23 to extract contaminated groundwater from the northern contaminant plume.

During January 1997, recovery well RW-11 was taken off-line due to high concentrations of solids within groundwater extracted during its operation. Although situated within the northern contaminant plume, operation of RW-11 will no longer be feasible due to high sediment load. The well may have been installed within very loose surficial soils or may have been installed improperly. Based upon this information, it is recommended that RW-11 be removed and reinstalled or retrofitted if possible. If repairs are not possible a replacement well is recommended to be installed approximately 50 feet northeast of its current location. Continued groundwater monitoring activities and treatment system analyses may, in the future, require that additional recovery wells be installed within the northern contaminant plume.

In order to provide a more detailed assessment of treatment system efficiency in the future, it is recommended that additional recovery wells be placed near existing shallow monitoring wells (i.e., within 75 to 100 feet). The monitoring wells will serve to confirm the presence of contamination prior to recovery well installation. In addition, nearby monitoring wells can be employed to roughly determine the capture zone (i.e., radius of influence) of each recovery well and monitor contaminant concentrations as treatment activities continue in the future. If an existing monitoring well is not situated within the proposed capture zone or underground utilities would make installation of a new recovery well near an existing monitoring well prohibitive, it is recommended that a new monitoring well be installed prior to recovery well installation.

The depth, design, and general construction of any additional recovery wells should be similar to existing recovery wells currently operating as part of the northern and southern treatment systems. In addition to current systems, a sampling port installed at each active recovery well is recommended. Discrete samples could be obtained from each recovery well via the sampling port. Contaminant concentrations in groundwater extracted from each recovery well could then be determined; providing a measure of recovery well efficiency. If additional recovery wells are to be added to the treatment systems, details concerning their placement and design can be provided prior to installation.

4.2.2 Discontinue Groundwater Sampling Site 24

It is recommended that Site 24 be eliminated from the OU1 monitoring program. Although positive total metal detections have exceeded applicable North Carolina standards, these analyses have not been necessary to determine the presence of heptachlor epoxide; the contaminant of concern identified in the Final ROD (Baker, 1994a). In addition, VOCs have not been detected during any of the three monitoring events.

Analytical results from soil samples collected throughout Site 24 during the RI confirm the presence of pesticides; at concentrations reflective of their base-wide application and use. In general, pesticides have a tendency to adhere to soil material. Suspended soil particles, or colloids, in the groundwater samples from Site 24 were likely to have been the cause of the detected pesticide contaminant during the 1993 RI. A low-flow purge method was used during recent sample collection activities to reduce the amount of suspended material in samples and more accurately

reflect true aquifer conditions. As a result, the lack of groundwater pesticide contamination at Site 24 has been confirmed by two consecutive sampling events. Based upon this information and pending analytical results from a third confirmatory sampling event, it is recommended that Site 24 be eliminated from the monitoring program.

4.2.3 Modify Sampling Frequency

The majority of groundwater samples obtained from Site 78 during the past seven sampling quarters have exhibited similar concentrations of the same VOCs. In fact, several laboratory results have remained nearly constant throughout the monitoring program. Although groundwater is actively being extracted and treated, none of the groundwater recovery wells have monitoring wells within their expected capture zones. Without means to monitor the progress of active treatment systems, groundwater samples currently being obtained serve only to confirm the presence of site contaminants. Based upon this information, a reduction in the number of yearly sampling events from four to two is recommended. Semiannual sampling will sufficiently monitor site contaminants in groundwater at Site 78, given current treatment system components. If treatment system components are modified in the future, an alternate sampling frequency may be developed.

4.2.4 Further Define Horizontal Extent of Contamination

Additional monitoring wells within the northern and southern contaminant plume areas will need to be either identified or installed for future sampling. Monitoring wells installed as part of any number of unrelated investigations may be employed to better define the extent of the two suspected groundwater contaminant plumes. In addition, a network of temporary monitoring wells is recommended for installation within the northern and southern contaminant plume areas. Based upon results obtained during the temporary well investigation, additional permanent monitoring wells may be installed. Any additional sampling data acquired from supplemental investigations will also aid in the placement of future recovery wells. A Groundwater Monitoring Well Coverage Plan is currently being prepared for MCB Camp Lejeune. Information presented in the Groundwater Monitoring Well Coverage Plan document will be used to identify other existing monitoring wells within Site 78. Additional monitoring wells, however, may need to be installed in the future if an adequate amount of supplemental data can not be acquired.

A number of monitoring wells have recently been installed in the northern portion of Site 78. The newly installed monitoring wells are associated with ongoing Underground Storage Tank (UST) investigations adjacent to Building 900. The monitoring wells are situated within or immediately adjacent to the northern contaminant plume. Other monitoring wells adjacent to Buildings 1601 and 1607, located within the suspected southern plume area, may also be employed as sampling points in the future. Well construction details and previous analytical data will be used to determine which monitoring wells are appropriate to sample in the future; possibly two monitoring wells near Building 900 and one monitoring well near Building 1600.

Monitoring wells 78-GW02 and 78-GW03 are located approximately 110 and 270 feet respectively from recovery well RW-05. The monitoring wells may be used to monitor the presence of contamination in uppermost portion of the shallow aquifer surrounding the southern treatment plant. Samples obtained from the two existing monitoring wells could also possibly provide more information regarding the effectiveness of the treatment system. Based upon this information, it is recommended that groundwater samples be obtained from 78-GW02 and 78-GW03 as part of the monitoring program.

5.0 REFERENCES

Baker Environmental, Inc. (Baker). October 1996. Corrective Action Plan for Operable Unit No. 1 (Sites 21, 24, and 78). Revised Final. Prepared for the Navy Atlantic Division Naval Facilities Engineering Command, Norfolk, Virginia.

Baker Environmental, Inc. (Baker). April 1996. Basewide Groundwater Remediation Study (BRAGS). Prepared for the Navy Atlantic Division Naval Facilities Engineering Command, Norfolk, Virginia.

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OHM Remediation Services Corporation. November 1996. Work Plan for Systems Cleaning for North and South Groundwater Treatment Plants, Operable Unit 1, Site 78. Prepared for the Navy Atlantic Division Naval Facilities Engineering Command, Norfolk, Virginia.

U.S. Environmental Protection Agency, Region IV. May 1996. Environmental Investigations Standard Operating Procedures and Quality Assurance Manual.

TABLES

TABLE 1-1

SUMMARY OF WELL CONSTRUCTION DETAILS
OPERABLE UNIT NO. 1 - SITES 24 AND 78
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)
24-GW08	1993	26.20	23.60	19.0	19.0	9.1-18.2	7.0	5.0	NA
24-GW09	1993	16.55	13.80	12.5	12.5	2.6-11.7	1.5	0.5	NA
24-GW10	1993	19.33	17.30	18.0	18.0	8.0-17.2	6.0	4.0	NA
78-GW01	1986	NA	NA	27.0	25.0	5.0-25.0	3.0	2.0	1.8
78-GW04-1	1986	31.63	28.90	27.0	24.5	4.5-24.5	3.0	2.0	2.6
78-GW08	1986	28.72	26.30	27.0	25.0	5.0-25.0	3.0	2.0	3.12
78-GW09-1	1987	NA	NA	27.0	25.0	5.0-25.0	3.0	2.0	0.00
78-GW09-2	1987	27.60	25.40	76.0	75.0	55.0-75.0	52.0	49.0	0.00
78-GW09-3	1986	26.97	24.70	152	150	130-150	105	10.0	0.00
78-GW10	1986	28.13	25.70	27.0	25.0	5.0-25.0	3.0	2.0	2.22
78-GW11	1986	28.22	25.50	25.5	25.0	5.0-25.0	3.0	2.0	2.49
78-GW14	1986	27.32	25.00	25.5	25.0	5.0-25.0	3.0	2.0	1.92
78-GW15	1986	27.03	26.80	25.5	25.0	5.0-25.0	3.0	2.0	0.00
78-GW17-1	1986	30.00	27.50	25.5	25.0	5.0-25.0	3.0	2.0	2.16
78-GW21	1986	33.51	31.20	25.0	25.0	5.0-25.0	3.0	2.0	NA
78-GW22	1986	32.36	30.40	25.0	25.0	5.0-25.0	3.0	2.0	NA
78-GW23	1986	32.08	30.00	25.5	25.0	5.0-25.0	3.0	2.0	1.82
78-GW24-1	1986	32.84	30.50	25.5	25.0	5.0-25.0	3.0	2.0	1.55
78-GW24-2	1987	33.73	30.40	80.0	76.6	56.6-76.6	51.6	48.6	2.88
78-GW24-3	1987	32.32	30.50	155	148	128-148	90.0	84.0	2.24
78-GW25	1986	32.58	30.10	25.5	25.0	5.0-25.0	5.0	3.0	2.17
78-GW39	1993	19.44	16.80	20.0	20.0	10.0-20.0	8.0	6.0	19.44

Notes:

ags = Above ground surface
bgs = Below ground surface
msl = Mean Sea Level
NA = Information not available

TABLE 1-2

SUMMARY OF GROUNDWATER FIELD PARAMETERS
OPERABLE UNIT NO. 1 - SITES 24 AND 78
MONITORING AND O&M SUPPORT, CTO-0367
MCB CAMP LEJEUNE, NORTH CAROLINA

Well Number/ Date of Measurement	Measuring Time	Well Volumes	Field Parameters				
			Dissolved Oxygen (mg/L)	Specific Conductance (µmhos/cm)	Temperature (°C)	pH (S.U.)	Turbidity (N.T.U.)
24-GW08 04/26/97	1110	1.0	2.0	154.3	17.6	6.08	5.3
	1115	1.5	2.5	161.9	17.1	6.17	7.6
	1120	2.0	2.0	157.2	17.3	6.15	9.0
	1127	2.5	2.0	159.4	17.0	6.14	10.3
	1134	3.0	1.9	160.8	16.9	6.16	11.2
24-GW09 04/26/97	1000	1.0	2.3	100.0	16.8	4.38	8.2
	1011	1.5	2.0	99.4	16.3	4.47	10.1
	1022	2.0	2.0	103.6	16.4	4.49	10.0
	1033	2.5	2.2	101.9	17.3	4.51	5.6
	1044	3.0	2.1	102.3	17.1	4.48	4.7
24-GW10 04/26/97	0800	1.0	3.3	65.8	15.4	4.58	1.9
	0812	1.5	3.2	63.5	15.2	4.63	1.4
	0819	2.0	3.2	62.7	15.4	4.62	1.3
	0826	2.5	3.1	62.5	15.4	4.62	1.3
	0834	3.0	3.2	61.8	15.8	4.63	1.0
78-GW01 04/30/97	0928	1.0	2.5	496.6	16.5	5.09	128.5
	0943	1.5	2.3	471.5	16.5	5.21	131.2
	0958	2.0	2.1	463.0	16.4	5.27	13.7
	1013	2.5	2.5	466.7	16.4	5.29	9.3
	1028	3.0	2.7	470.1	16.4	5.31	5.0
78-GW04-1 04/27/97	0915	1.0	1.8	229.4	21.2	6.03	200+
	0922	2.0	1.9	313.5	21.6	6.18	120.6
	0929	3.0	2.0	374.2	21.8	6.21	72.3
	0936	4.0	2.0	408.1	21.9	6.23	50.9
	0943	5.0	2.3	406.3	21.8	6.20	32.8
	0950	6.0	2.0	405.2	21.9	6.21	27.2
78-GW08 04/29/97	1622	1.0	2.2	193.1	19.4	5.21	75.4
	1629	1.5	2.7	192.7	19.5	5.32	51.4
	1636	2.0	2.5	192.7	19.5	5.35	41.7
	1643	2.5	2.3	192.3	19.5	5.36	29.8
	1650	3.0	2.7	190.4	19.4	5.37	25.4
	1657	3.5	2.4	187.9	19.5	5.39	18.7

TABLE 1-2 (Continued)

SUMMARY OF GROUNDWATER FIELD PARAMETERS
OPERABLE UNIT NO. 1 - SITES 24 AND 78
MONITORING AND O&M SUPPORT, CTO-0367
MCB CAMP LEJEUNE, NORTH CAROLINA

Well Number/ Date of Measurement	Measuring Time	Well Volumes	Field Parameters				
			Dissolved Oxygen (mg/L)	Specific Conductance (µmhos/cm)	Temperature (°C)	pH (S.U.)	Turbidity (N.T.U.)
78-GW09-1 04/27/97	1138	1.0	3.2	447.6	18.0	5.94	5.2
	1143	1.5	2.2	460.7	18.7	5.18	4.5
	1150	2.0	2.0	460.2	18.4	6.20	2.8
	1157	2.5	2.0	461.6	18.5	6.22	1.8
	1204	3.0	2.1	463.1	18.6	6.23	1.5
78-GW09-2 04/27/97	1320	1.0	1.2	550.0	20.2	7.39	0.6
	1340	1.5	0.9	552.0	20.6	7.47	0.6
	1400	2.0	0.8	552.0	20.6	7.61	0.5
	1420	2.5	0.8	551.0	20.6	7.63	0.5
	1440	3.0	0.8	551.0	20.5	7.62	0.4
78-GW09-3 04/27/97	1600	1.0	3.0	434.7	20.2	8.15	0.7
	1640	1.5	2.4	438.9	20.4	8.03	0.6
	1720	2.0	2.2	432.1	20.3	8.06	0.6
	1800	2.5	2.1	429.7	20.3	8.12	0.6
	1840	3.0	2.2	426.2	20.3	8.10	0.5
78-GW10 04/29/97	1742	1.0	2.8	258.0	18.3	5.37	38.9
	1750	1.5	2.5	266.0	18.9	5.45	29.7
	1757	2.0	2.4	267.0	18.7	5.48	25.3
	1804	2.5	2.2	267.0	18.6	5.62	23.6
	1812	3.0	2.3	267.0	18.7	5.54	27.1
78-GW11 04/29/97	1447	1.0	3.5	118.7	18.0	4.30	10.3
	1454	1.5	3.3	116.4	17.9	4.40	7.8
	1458	2.0	3.0	116.6	17.9	4.47	8.8
	1504	2.5	3.0	117.7	17.9	4.52	7.6
	1510	3.0	3.1	116.8	17.9	4.54	5.5
78-GW14 04/27/97	0742	1.0	2.4	262.5	19.2	4.61	43.6
	0751	1.5	2.1	256.0	19.6	4.58	22.4
	0800	2.0	2.0	255.8	19.7	4.50	17.1
	0809	2.5	2.0	255.6	19.6	4.54	11.1
	0818	3.0	2.0	253.8	19.7	5.56	8.6
78-GW15 04/30/97	1414	1.0	4.2	358.9	21.9	5.12	15.1
	1419	1.5	4.0	361.1	21.4	5.22	7.4
	1427	2.0	4.2	365.5	21.3	5.27	5.0
	1434	2.5	4.3	349.6	21.3	5.26	4.3
	1441	3.0	4.1	345.7	21.2	5.26	2.9

TABLE 1-2 (Continued)

SUMMARY OF GROUNDWATER FIELD PARAMETERS
OPERABLE UNIT NO. 1 - SITES 24 AND 78
MONITORING AND O&M SUPPORT, CTO-0367
MCB CAMP LEJEUNE, NORTH CAROLINA

Well Number/ Date of Measurement	Measuring Time	Well Volumes	Field Parameters				
			Dissolved Oxygen (mg/L)	Specific Conductance (µmhos/cm)	Temperature (°C)	pH (S.U.)	Turbidity (N.T.U.)
78-GW17-1 04/29/97	1852	1.0	3.9	515.0	17.6	5.89	16.4
	1858	1.5	4.2	524.0	17.9	6.11	10.2
	1904	2.0	4.4	525.0	17.8	6.15	8.0
	1910	2.5	4.5	528.0	17.7	6.20	6.1
	1916	3.0	4.4	526.0	17.7	6.30	6.9
	1922	3.5	4.2	526.0	17.9	6.31	5.0
	1928	4.0	4.3	524.0	17.6	6.30	4.6
78-GW21 04/28/97	1535	1.0	2.1	252.1	19.0	5.03	2.9
	1542	1.5	2.2	257.9	19.5	5.10	2.0
	1550	2.0	1.8	257.3	19.5	5.12	1.3
	1557	2.5	1.7	257.2	19.4	5.09	1.6
	1604	3.0	2.1	256.5	19.4	5.10	1.1
78-GW22 04/28/97	0852	1.0	1.8	279.2	17.5	6.23	7.0
	0902	1.5	1.2	286.3	17.3	6.29	8.2
	0910	2.0	0.8	288.2	17.2	6.25	5.4
	0918	2.5	0.7	291.9	17.2	6.26	4.3
	0926	3.0	0.8	293.1	17.1	6.24	8.1
78-GW23 04/28/97	0745	1.0	1.7	245.4	18.4	4.50	3.0
	0752	1.5	1.4	247.2	18.3	4.56	5.0
	0759	2.0	1.2	238.8	18.3	4.57	6.9
	0806	2.5	1.2	231.4	18.4	4.56	5.4
	0813	3.0	1.1	224.9	18.4	4.55	13.5
78-GW24-1 04/29/97	1138	1.0	2.6	240.1	15.3	5.80	4.1
	1145	1.5	2.0	244.5	15.5	5.92	3.8
	1152	2.0	1.8	244.6	15.8	5.88	3.1
	1159	2.5	2.1	237.2	15.7	5.81	2.9
	1206	3.0	1.0	234.7	15.7	5.77	1.1
78-GW24-2 04/29/97	0930	1.0	1.9	537.0	18.6	6.51	3.7
	0950	1.5	2.1	540.0	18.1	6.66	2.2
	1020	2.0	2.0	538.0	18.2	6.70	2.6
	1040	2.5	2.1	539.0	18.6	6.76	1.5
	1100	3.0	2.2	535.0	18.8	6.76	2.3

TABLE 1-2 (Continued)

SUMMARY OF GROUNDWATER FIELD PARAMETERS
OPERABLE UNIT NO. 1 - SITES 24 AND 78
MONITORING AND O&M SUPPORT, CTO-0367
MCB CAMP LEJEUNE, NORTH CAROLINA

Well Number/ Date of Measurement	Measuring Time	Well Volumes	Field Parameters				
			Dissolved Oxygen (mg/L)	Specific Conductance (µmhos/cm)	Temperature (°C)	pH (S.U.)	Turbidity (N.T.U.)
78-GW24-3 04/29/97	1000	1.0	1.5	389.4	18.8	7.03	1.6
	1030	1.5	1.9	374.9	18.4	7.27	9.6
	1100	2.0	1.9	373.8	19.0	7.25	11.4
	1130	2.5	1.3	364.9	18.9	7.23	20.7
	1230	3.0	1.8	367.5	18.9	7.21	17.2
78-GW25 04/28/97	1425	1.0	2.9	345.5	17.4	5.25	6.6
	1432	1.5	2.0	342.1	17.2	5.33	3.8
	1440	2.0	1.9	337.7	17.2	5.36	1.6
	1447	2.5	1.8	336.1	17.1	5.38	1.6
	1454	3.0	1.8	332.9	17.2	5.37	1.5
78-GW39 04/30/97	0805	1.0	3.9	325.3	16.4	3.86	0.4
	0814	1.5	3.4	330.7	16.7	4.09	0.1
	0823	2.0	3.6	307.5	17.2	4.10	0.1
	0832	2.5	3.7	316.6	17.2	4.10	0.1
	0841	3.0	3.5	309.8	17.3	4.14	0.0

Notes:

°C = Degrees Centigrade
S.U. = Standard Units
mg\L = Milligrams per Liter
µmhos\cm = µmhos per Centimeter
ppt = Parts per Thousand
N.T.U. = Neophelometric Turbitity Units
mV = millivolt

TABLE 1-3

GROUNDWATER SAMPLING SUMMARY
OPERABLE UNIT NO. 1 - SITES 24 AND 78
MONITORING AND O&M SUPPORT, CTO-0367
MCB CAMP LEJEUNE, NORTH CAROLINA

Sample Location	Media	TCL Volatiles[1]	TCL Pesticides[2]	TAL Metals[3]	Oil & Grease[4]	Total Dissolved Solids[5]	Total Suspended Solids[5]	Sample Identification
24-GW08	GW	X	X	X	X	X	X	24-GW08-97B
24-GW09	GW	X	X	X	X	X	X	24-GW09-97B
24-GW10	GW	X	X	X	X	X	X	24-GW10-97B
78-GW01	GW	X						78-GW01-97B
78-GW04-1	GW	X						78-GW04-97B
78-GW08	GW	X						78-GW08-97B
78-GW09-1	GW	X						78-GW09-97B
78-GW09-2	GW	X						78-GW09IW-97B
78-GW09-3	GW	X						78-GW09DW-97B
78-GW10	GW	X						78-GW10-97B
78-GW11	GW	X						78-GW11-97B
78-GW14	GW	X						78-GW14-97B
78-GW15	GW	X						78-GW15-97B
78-GW17-1	GW	X						78-GW17-97B
78-GW21	GW	X						78-GW21-97B
78-GW22	GW	X						78-GW22A-97B
78-GW23	GW	X						78-GW23-97B
78-GW24-1	GW	X						78-GW24-97B
78-GW24-2	GW	X						78-GW24IW-97B
78-GW24-3	GW	X						78-GW24DW-97B
78-GW25	GW	X						78-GW25-97B
78-GW39	GW	X						78-GW39-97B

Notes:

[1] Target Compound List (TCL) Organics by U.S. Environmental Protection Agency (EPA) Method 8260.
[2] TCL Pesticides by USEPA, Contract Laboratory Program, Scope of Work, Document Number OLM01.8.
[3] Selected Target Analyte List Metals (Antimony, Arsenic, Beryllium, Chromium, Iron, Lead, Manganese, Mercury, Nickel) by Solid Waste Method 6010.
[4] Oil and Grease by Solid Waste Method 9070.
[5] Total Suspended and Dissolved Solids by Solid Waste Method 160.1 and 160.2.

GW = Groundwater
X = Requested Analyses

TABLE 1-4

ANALYTICAL METHOD DETECTION LIMITS
OPERABLE UNIT NO. 1 - SITES 24 AND 78
MONITORING AND O&M SUPPORT, CTO-0367
MCB CAMP LEJEUNE, NORTH CAROLINA

Parameter	Analytical Method	MDL or CRQL	NCWQS	MCL
Volatile Organics µg/L:				
Chloromethane	8260	0.5	NA	NA
Vinyl Chloride	8260	0.5(1)	0.015	2
Bromomethane	8260	0.5	NA	NA
Chloroethane	8260	0.5	NA	NA
1,1-dichloroethene	8260	0.5	7	7
Acetone	8260	2	700	NA
Carbon Disulfide	8260	2	700	NA
Methylene Chloride	8260	0.5	5	5
1,2-dichloroethene (Total)	8260	0.5	70	70
1,1-dichloroethane	8260	0.5	700	NA
2-butanone	8260	2	NA	NA
Chloroform	8260	0.5(1)	0.19	100
1,1,1-trichloroethane	8260	0.5	200	200
Carbon Tetrachloride	8260	0.5(1)	0.3	5
Benzene	8260	0.5	1	5
1,2-dichloroethane	8260	0.5(1)	0.38	5
Trichloroethene	8260	0.5	NA	5
1,2-dichloropropane	8260	0.5	0.56	5
Bromodichloromethane	8260	0.5	0.6	100
Cis-1,3-dichloropropene	8260	0.5	NA	NA
4-methyl-2-pentanone	8260	2	NA	NA
Toluene	8260	0.5	1000	1000
Trans-1,3-dichloropropene	8260	0.5(1)	0.2	NA
1,1,2-trichloroethane	8260	0.5	NA	5
Tetrachloroethene	8260	0.5	0.7	5
2-hexanone	8260	2	NA	NA
Dibromochloromethane	8260	0.5	NA	NA
Chlorobenzene	8260	0.5	50	100
Ethylbenzene	8260	0.5	29	700
Xylene, Total	8260	0.5	530	10000
Styrene	8260	0.5	100	100
Bromoform	8260	0.5(1)	0.19	100
1,1,2,2-tetrachloroethane	8260	0.5	NA	NA

TABLE 1-4 (Continued)

ANALYTICAL METHOD DETECTION LIMITS
OPERABLE UNIT NO. 1 - SITES 24 AND 78
MONITORING AND O&M SUPPORT, CTO-0367
MCB, CAMP LEJEUNE, NORTH CAROLINA

Parameter	Analytical Method	MDL or CRQL	NCWQS	MCL
Pesticides (µg/L):				
alpha-BHC	OLM01.8	0.05	NA	NA
beta-BHC	OLM01.8	0.05	NA	NA
delta-BHC	OLM01.8	0.05	NA	NA
gamma-BHC (Lindane)	OLM01.8	0.05	0.2	0.2
Heptachlor	OLM01.8	0.05 (2)	0.008	0.4
Aldrin	OLM01.8	0.05	NA	NA
Heptachlor epoxide	OLM01.8	0.05 (2)	0.004	0.2
Endosulfan I	OLM01.8	0.05	NA	NA
Dieldrin	OLM01.8	0.1	NA	NA
4,4'-DDE	OLM01.8	0.1	NA	NA
Endrin	OLM01.8	0.1	2	2
Endosulfan II	OLM01.8	0.1	NA	NA
4,4'-DDD	OLM01.8	0.1	NA	NA
Endosulfan sulfate	OLM01.8	0.1	NA	NA
4,4'-DDT	OLM01.8	0.1	NA	NA
Methoxychlor	OLM01.8	0.1	35	40
Endrin ketone	OLM01.8	0.1	NA	NA
Endrin aldehyde	OLM01.8	0.1	NA	NA
alpha-Chlordane	OLM01.8	0.1 (2)	0.027	NA
gamma-Chlordane	OLM01.8	0.1 (2)	0.027	NA
Toxaphene	OLM01.8	0.1 (2)	0.031	3
Metals (µg/L):				
Barium, Total	6010A	1.4	2000	2000
Beryllium, Total	6010A	0.7	NA	4
Cadmium, Total	6010A	2.6	5	5
Chromium, Total	6010A	3.3	50	100
Lead, Total	7421	1.2	15	15
Manganese, Total	6010A	1.6	NA	50

TABLE 1-4 (Continued)

ANALYTICAL METHOD DETECTION LIMITS
OPERABLE UNIT NO. 1 - SITES 24 AND 78
MONITORING AND O&M SUPPORT, CTO-0367
MCB, CAMP LEJEUNE, NORTH CAROLINA

Parameter	Analytical Method	MDL or CRQL	NCWQS	MCL
Wet Chemistry (mg/L):				
Total Dissolved Solids	160.1	10	500	500
Total Suspended Solids	160.2	5	NA	NA

Notes:

(1) Method Detection Limit greater than North Carolina Water Quality Standard
(2) Contract Required Quantitation Limit greater than North Carolina Water Quality Standard.

CRQL = Contract Required Quantitation Limit
MCL = Federal Maximum Contaminant Level. Maximum permissible level of a contaminant in water which is delivered to any user of a public water system. (U.S. Environmental Protection Agency - Drinking Water Regulations and Health Advisories.)
MDL = Method Detection Limit
NA = Standard not available
NCWQS = North Carolina Water Quality Standards. Values Applicable to Groundwater (North Carolina Administrative Code, Title 15A, Subchapter 2L).
mg/L = Milligrams per liter or parts per million
µg/L = Micrograms per liter or parts per billion

TABLE 1-5

SUMMARY OF WATER LEVEL MEASUREMENTS
OPERABLE UNIT NO. 1 - SITE 24
INDUSTRIAL AREA FLY ASH DUMP
MCB CAMP LEJEUNE, NORTH CAROLINA

Well ID	Reference Elevation [1]	Third Quarter 1996 SWE (Date 7-30-96)	Fourth Quarter 1996 SWE (Date 11-7-96)	First Quarter 1997 SWE (Date 2-5-97)	Second Quarter 1997 SWE (Date 4-30-97)
24-GW03	15.88	10.74	11.24	10.88	11.08
24-GW04	19.17	10.28	10.79	10.47	10.57
24-GW06	12.70	7.75	NA [2]	7.79	7.84
24-GW07	29.82	14.39	15.88	14.11	15.01
24-GW08	26.20	10.44	11.72	11.02	10.99
24-GW09	16.55	10.89	10.62	10.40	10.99
24-GW10	19.93	8.87	8.86	8.72	8.53

Notes:

[1] Top of PVC well casing (in feet above mean sea level [MSL])

SWL = Static water level taken from top of PVC well casing
SWE = Static water elevation (in feet above MSL)
NA = Data not available

TABLE 1-6

SUMMARY OF WATER LEVEL MEASUREMENTS
OPERABLE UNIT NO. 1 - SITE 78
HADNOT POINT INDUSTRIAL AREA
MCB CAMP LEJEUNE, NORTH CAROLINA

Well ID	Reference Elevation [1]	Third Quarter 1996 SWE (Date 8-9-96)	Fourth Quarter 1996 SWE (Date 11-7-96)	First Quarter 1997 SWE (Date 2-25-97)	Second Quarter 1997 SWE (Date 5-1-97)
78-GW02	32.15	NA	NA	NA	24.24
78-GW03	31.85	NA	NA	NA	26.03
78-GW04-1	31.63	12.32	13.12	12.84	11.88
78-GW05	28.63	19.72	19.62	19.87	19.30
78-GW06	27.94	NA	NA	14.53	13.73
78-GW07	27.83	NA	NA	NA	14.74
78-GW08	28.72	16.42	17.11	16.64	16.14
78-GW09-2	24.76[2]	14.05	14.64	14.00	13.72
78-GW09-3	26.97	14.21	14.80	14.17	13.87
78-GW10	28.13	17.34	17.44	17.09	16.78
78-GW11	27.93[2]	16.57	16.52	15.94	15.77
78-GW12	30.08	NA	NA	19.82	18.67
78-GW14	24.67[2]	17.61	17.91	17.61	17.10
78-GW15	26.55[2]	18.33	19.53	19.04	18.85
78-GW16	32.40	NA	NA	21.65	21.22
78-GW17-1	30.00	19.06	20.35	20.06	19.82
78-GW19	29.07	22.43	21.37	21.94	21.74
78-GW21	33.51	23.66	24.11	23.87	23.70
78-GW22	32.36	26.65	25.74	26.66	26.71
78-GW23	32.08	23.45	23.62	23.81	23.01
78-GW24-1	32.84	26.99	26.02	26.82	26.27
78-GW24-2	32.50[2]	22.40	22.27	22.21	21.75
78-GW24-3	32.32	21.98	22.19	21.78	21.30
78-GW25	32.58	26.27	25.51	25.96	25.53
78-GW31-3	25.99	16.78	17.22	16.83	16.41
78-GW33	29.84	NA	NA	NA	23.48
78-GW39	19.44	4.63	NA	4.61	4.44

Notes:

[1] Elevation of top of PVC well casing (feet above mean sea level [MSL])
[2] New elevation of top of PVC well casing after monitoring well maintenance or conversion (feet above MSL)

SWE = Static water elevation (in feet above MSL)
NA = Data not available

TABLE 2-1

SUMMARY OF GROUNDWATER ANALYTICAL RESULTS - APRIL 1997
OPERABLE UNIT No. 1 - SITE 24
MONITORING AND O&M SUPPORT, CTO-0367
MCB, CAMP LEJEUNE, NORTH CAROLINA

Fraction (units)	Detected Contaminants or Analytes	Comparison Criteria		Min.	Max.	Location of Maximum Detection	Detection Frequency	Detections Above	
		NCWQS	MCL					NCWQS	MCL
Volatile Organics (µg/L)	Chloroform	0.19	100	2	2	24-GW08	1/3	1	0
Other Organics (µg/L)	Pesticides	NA	NA	ND	ND	NA	0/3	NA	NA
	Oil and Grease	NE	NE	30.6	30.6	24-GW10	1/3	NA	NA
Total Metals (µg/L)	Antimony, Total	NE	6	2.1	2.1	24-GW08	1/3	NA	0
	Beryllium, Total	NE	4	0.13	0.13	24-GW09	1/3	NA	0
	Chromium, Total	50	100	0.36	1.1	24-GW08	3/3	0	0
	Iron, Total	300	300	15.3	368	24-GW08	3/3	1	1
	Lead, Total	15	15	3.1	3.8	24-GW08	3/3	0	0
	Manganese, Total	50	50	2.7	25.8	24-GW09	2/3	0	0
Wet Chemistry (mg/L)	Total Dissolved Solids	500	NE	44	78	24-GW08	3/3	0	NA
	Total Suspended Solids	NE	NE	6	6	24-GW08	1/3	NA	NA

Notes:

- Concentrations presented in micrograms per liter (µg/L) or parts per billion for organic and metal results, wet chemistry results presented in milligrams per liter (mg/L) or parts per million.

NA - Not applicable

NCWQS - North Carolina Water Quality Standards (North Carolina Administrative Code, Title 15A, Subchapter 2L).

ND - Not detected

NE - Not established

MCL - Federal Maximum Contaminant Level. Maximum permissible level of a contaminant in water which is delivered to any user of a public water system (U.S. Environmental Protection Agency - Drinking Water Regulations and Health Advisories).

TABLE 2-2

SUMMARY OF GROUNDWATER ANALYTICAL RESULTS - APRIL 1997
OPERABLE UNIT No. 1 - SITE 78
MONITORING AND O&M SUPPORT, CTO-0367
MCB CAMP LEJEUNE, NORTH CAROLINA

Fraction (units)	Detected Contaminants or Analytes	Comparison Criteria		Min.	Max.	Location of Maximum Detection	Detection Frequency	Detections Above	
		NCWQS	MCL					NCWQS	MCL
Volatile Organics (µg/L)	Vinyl Chloride	0.015	2.0	4	340	78-GW23	2/19	2	2
	Acetone	700	NE	3	3	78-GW01	1/19	0	NA
	1,1-Dichloroethene	7.0	7.0	140	140	78-GW09-1	1/19	1	1
	1,1-Dichloroethane	700	NE	67	67	78-GW09-1	1/19	0	NA
	1,2-Dichloroethene (Total)	70	70	0.7	9,500	78-GW23	7/19	3	3
	Chloroform	0.19	100	2.0	2.0	78-GW09-1	1/19	1	0
	1,1,1-Trichloroethane	200	200	480	480	78-GW09-1	1/19	1	1
	Trichloroethene	2.8	5	1.0	580	78-GW09-1	5/19	4	4
	Tetrachloroethene	0.7	5	0.8	0.8	78-GW39	1/19	1	0

Notes:

- Concentrations presented in micrograms per liter (µg/L) or parts per billion.
NA - Not applicable
NCWQS - North Carolina Water Quality Standards (North Carolina Administrative Code, Title 15A, Subchapter 2L).
NE - Not established
MCL - Federal Maximum Contaminant Level. Maximum permissible level of a contaminant in water which is delivered to any user of a public wat a public water system (U.S. Environmental Protection Agency - Drinking Water Regulations and Health Advisories).

TABLE 2-3
POSITIVE DETECTIONS IN GROUNDWATER
OPERABLE UNIT NO.1 - SITE 24
MONITORING AND O SUPPORT, CTO-0367
MCB CAMP LEJEUNE, NORTH CAROLINA

SAMPLE ID	24-GW08-97B	24-GW09-97B	24-GW10-97B
DATE SAMPLED	04/26/97	04/26/97	04/26/97
VOLATILES (ug/L)			
CHLOROFORM	2	0.5 U	0.5 U
OIL & GREASE (mg/L)			
OIL & GREASE, GRAV.	5.3 U	5.4 U	30.6
WET CHEMISTRY (mg/L)			
TOTAL DISSOLVED SOLIDS	78	44	68
TOTAL SUSPENDED SOLIDS	6	4 U	4 U
TOTAL METALS (ug/L)			
ANTIMONY, TOTAL	2.1	1.6 U	1.6 U
BERYLLIUM, TOTAL	0.1 U	0.13	0.1 U
CHROMIUM, TOTAL	1.1	0.73	0.36
IRON, TOTAL	368	297	15.3
LEAD, TOTAL	3.8	3.1	3.3
MANGANESE, TOTAL	2.7	25.8	0.4 U

NOTES
ug/L = micrograms per liter
mg/L = milligrams per liter
U = not detected

TABLE 2-4
POSITIVE DETECTIONS IN GROUNDWATER
OPERABLE UNIT NO.1 - SITE 78
MONITORING AND O SUPPORT, CTO-0367
MCB CAMP LEJEUNE, NORTH CAROLINA

SAMPLE ID	78-GW01-97B	78-GW04-97B	78-GW08-97B	78-GW09-97B	78-GW09DW-97B	78-GW09IW-97B
DATE SAMPLED	04/30/97	04/27/97	04/29/97	04/27/97	04/27/97	04/27/97
VOLATILES (ug/L)						
VINYL CHLORIDE	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,1-DICHLOROETHENE	0.5 U	0.5 U	0.5 U	140	0.5 U	0.5 U
ACETONE	3	2 U	2 U	2 U	2 U	2 U
1,2-DICHLOROETHENE (TOTAL)	4	2	0.5 U	300	0.5 U	3
1,1-DICHLOROETHANE	0.5 U	0.5 U	0.5 U	67	0.5 U	0.5 U
CHLOROFORM	0.5 U	0.5 U	0.5 U	2	0.5 U	0.5 U
1,1,1-TRICHLOROETHANE	0.5 U	0.5 U	0.5 U	480	0.5 U	0.5 U
TRICHLOROETHENE	18	7	0.5 U	580	0.5 U	0.5 U
TETRACHLOROETHENE	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U

NOTES
ug/L = micrograms per liter
U = not detected

TABLE 2-4
POSITIVE DETECTIONS IN GROUNDWATER
OPERABLE UNIT NO.1 - SITE 78
MONITORING AND O SUPPORT, CTO-0367
MCB CAMP LEJEUNE, NORTH CAROLINA

SAMPLE ID	78-GW10-97B	78-GW11-97B	78-GW14-97B	78-GW15-97B	78-GW17-97B	78-GW21-97B	78-GW22A-97B
DATE SAMPLED	04/29/97	04/29/97	04/27/97	04/30/97	04/29/97	04/28/97	04/28/97
VOLATILES (ug/L)							
VINYL CHLORIDE	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,1-DICHLOROETHENE	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
ACETONE	2 U	2 U	2 U	2 U	2 U	2 U	2 U
1,2-DICHLOROETHENE (TOTAL)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,1-DICHLOROETHANE	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
CHLOROFORM	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,1,1-TRICHLOROETHANE	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
TRICHLOROETHENE	0.5 U	0.5 U	0.5 U	1	0.5 U	0.5 U	0.5 U
TETRACHLOROETHENE	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U

NOTES
ug/L = micrograms per liter
U = not detected

TABLE 2-4
POSITIVE DETECTIONS IN GROUNDWATER
OPERABLE UNIT NO.1 - SITE 78
MONITORING AND O SUPPORT, CTO-0367
MCB CAMP LEJEUNE, NORTH CAROLINA

SAMPLE ID	78-GW23-97BDL	78-GW24-97B	78-GW24DW-97B	78-GW24IW-97B	78-GW25-97B	78-GW39-97B
DATE SAMPLED	04/28/97	04/29/97	04/29/97	04/29/97	04/28/97	04/30/97
VOLATILES (ug/L)						
VINYL CHLORIDE	340	4	0.5 U	0.5 U	0.5 U	0.5 U
1,1-DICHLOROETHENE	50 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
ACETONE	200 U	2 U	2 U	2 U	2 U	2 U
1,2-DICHLOROETHENE (TOTAL)	9500	130	0.5 U	0.5 U	0.7	0.5 U
1,1-DICHLOROETHANE	50 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
CHLOROFORM	50 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,1,1-TRICHLOROETHANE	50 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
TRICHLOROETHENE	50 U	17	0.5 U	0.5 U	0.5 U	0.5 U
TETRACHLOROETHENE	50 U	0.5 U	0.5 U	0.5 U	0.5 U	0.8

NOTES
ug/L = micrograms per liter
U = not detected

TABLE 2-5
TRIP BLANK ANALYTICAL RESULTS
OPERABLE UNIT NO.1 - SITE 78
MONITORING AND O SUPPORT, CTO-0367
MCB CAMP LEJEUNE, NORTH CAROLINA

SAMPLE ID	78-TB01-97B	78-TB02-97B
DATE SAMPLED	04/27/97	04/29/97
VOLATILES (ug/L)		
CHLOROMETHANE	0.5 U	0.5 U
VINYL CHLORIDE	0.5 U	0.5 U
BROMOMETHANE	0.5 U	0.5 U
CHLOROETHANE	0.5 U	0.5 U
1,1-DICHLOROETHENE	0.5 U	0.5 U
ACETONE	2 U	2 U
CARBON DISULFIDE	2 U	2 U
METHYLENE CHLORIDE	0.5 U	0.5 U
1,2-DICHLOROETHENE (TOTAL)	0.5 U	0.5 U
1,1-DICHLOROETHANE	0.5 U	0.5 U
2-BUTANONE	2 U	2 U
CHLOROFORM	0.5 U	0.5 U
1,1,1-TRICHLOROETHANE	0.5 U	0.5 U
CARBON TETRACHLORIDE	0.5 U	0.5 U
BENZENE	0.5 U	0.5 U
1,2-DICHLOROETHANE	0.5 U	0.5 U
TRICHLOROETHENE	0.5 U	0.5 U
1,2-DICHLOROPROPANE	0.5 U	0.5 U
BROMODICHLOROMETHANE	0.5 U	0.5 U
CIS-1,3-DICHLOROPROPENE	0.5 U	0.5 U
4-METHYL-2-PENTANONE	2 U	2 U
TOLUENE	0.5 U	0.5 U
TRANS-1,3-DICHLOROPROPENE	0.5 U	0.5 U
1,1,2-TRICHLOROETHANE	0.5 U	0.5 U
TETRACHLOROETHENE	0.5 U	0.5 U
2-HEXANONE	2 U	2 U
DIBROMOCHLOROMETHANE	0.5 U	0.5 U
CHLOROBENZENE	0.5 U	0.5 U
ETHYLBENZENE	0.5 U	0.5 U
XYLENE (TOTAL)	0.5 U	0.5 U
STYRENE	0.5 U	0.5 U
BROMOFORM	0.5 U	0.5 U
1,1,2,2-TETRACHLOROETHANE	0.5 U	0.5 U

NOTES
ug/L = micrograms per liter
U = not detected

TABLE 3-1

SAMPLING RESULTS - NORTHERN TREATMENT PLANT
SECOND QUARTER, 1997
MONITORING AND O&M SUPPORT, CTO-0367
MCB CAMP LEJEUNE, NORTH CAROLINA

Contaminant	April 1997					May 1997				
	Plant Influent	Oil/Water Separator Effluent	Air Stripper Effluent	Sand Filter Effluent	Final Effluent	Plant Influent	Oil/Water Separator Effluent	Air Stripper Effluent	Sand Filter Effluent	Final Effluent
Volatiles										
trans-1,2-Dichloroethene	0.0002	NA	<0.0005	NA	<0.0005	0.0006	NA	<0.0005	NA	<0.0005
Trichloroethylene	0.008	NA	<0.0005	NA	<0.0005	0.011	NA	<0.0005	NA	<0.0005
Vinyl Chloride	0.0003	NA	<0.0005	NA	<0.0005	0.001	NA	<0.0005	NA	<0.0005
Benzene	0.006	NA	<0.0005	NA	<0.0005	0.037	NA	<0.0005	NA	<0.0005
1,2-cis-Dichloroethylene	0.013	NA	<0.0005	NA	<0.0005	0.025	NA	<0.0005	NA	<0.0005
Total Metals										
Antimony	0.0013	NA	NA	<0.0013	<0.0013	<0.0013	NA	NA	0.0014	<0.0013
Arsenic	<0.0013	NA	NA	<0.0017	<0.0017	<0.0017	NA	NA	<0.0017	<0.0017
Beryllium	<0.001	NA	NA	<0.001	<0.001	<0.001	NA	NA	<0.001	<0.001
Calcium	77.0	NA	NA	71.60	64.900	744.0	NA	NA	63.0	64.7
Chromium	<0.0044	NA	NA	<0.0044	<0.0044	<0.0044	NA	NA	<0.0044	<0.0044
Iron	8.480	NA	NA	0.368	<0.0133	9.33	NA	NA	0.429	0.0309
Lead	<0.001	NA	NA	0.0333	0.0023	<0.001	NA	NA	0.0038	<0.001
Manganese	0.022	NA	NA	0.0097	0.0035	0.0618	NA	NA	0.0013	0.0025
Mercury	<0.00018	NA	NA	<0.00018	<0.00018	<0.00018	NA	NA	<0.00018	<0.00018
Nickel	<0.0074	NA	NA	<0.0074	<0.0074	<0.0074	NA	NA	<0.0074	0.177
Wet Chemistry										
Oil & Grease	<1.18	<1.15	NA	NA	<1.18	NA	<1.0	<1.0	NA	<1.0
Total Dissolved Solids (TDS)	207.0	NA	NA	211.0	209.0	NA	NA	225.0	216.0	217.0
Total Suspended Solids (TSS)	17.0	NA	NA	7.0	3.0	NA	NA	11.0	3.0	1.0
pH	17.47	NA	NA	NA	7.92	NA	NA	NA	NA	NA

Notes:

All concentrations are reported in milligrams per liter (mg/L) or parts per million.
NA = Not analyzed or note available.

TABLE 3-2

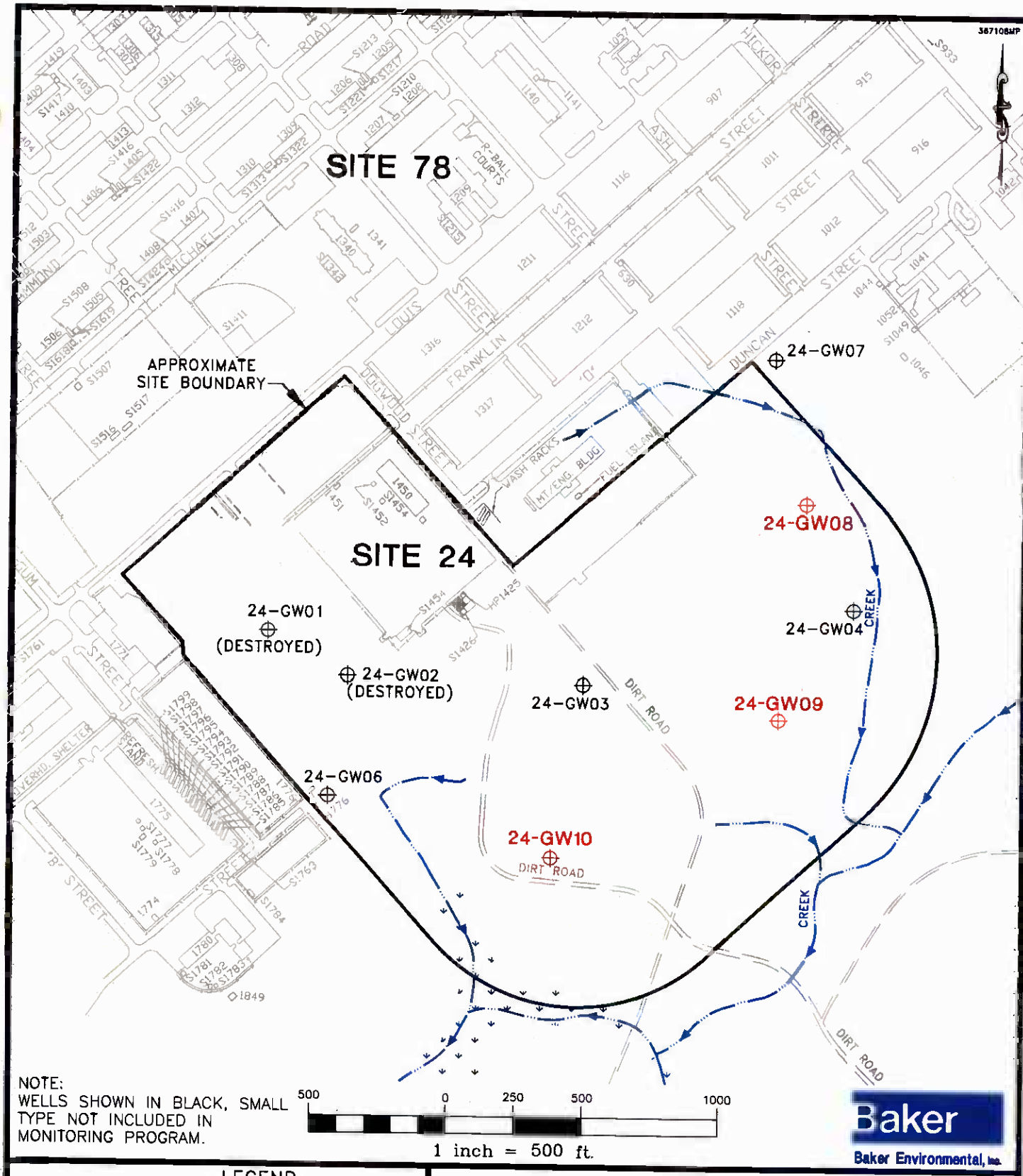
SAMPLING RESULTS - SOUTHERN TREATMENT PLANT
SECOND QUARTER 1997
MONITORING AND O&M SUPPORT, CTO-0367
MCB CAMP LEJEUNE, NORTH CAROLINA

Contaminant	April 1997					May 1997				
	Plant Influent	Oil/Water Separator Effluent	Air Stripper Effluent	Sand Filter Effluent	Final Effluent	Plant Influent	Oil/Water Separator Effluent	Air Stripper Effluent	Sand Filter Effluent	Final Effluent
Volatiles										
trans-1,2-Dichloroethene	<0.0003	NA	<0.0005	NA	<0.0005	<0.003	NA	<0.0005	NA	<0.0005
Trichloroethylene	0.031	NA	0.0007	NA	<0.0005	0.033	NA	<0.0005	NA	<0.0005
Vinyl Chloride	<0.0003	NA	<0.0005	NA	<0.0005	<0.003	NA	<0.0005	NA	<0.0005
Benzene	<0.0003	NA	<0.0005	NA	<0.0005	<0.003	NA	<0.0005	NA	<0.0005
1,2-cis-Dichloroethylene	0.120	NA	<0.0005	NA	<0.0005	0.120	NA	<0.0005	NA	<0.0005
Total Metals										
Antimony	<0.0013	NA	NA	<0.0013	<0.0013	<0.0013	NA	<0.0013	NA	<0.0013
Arsenic	<0.0017	NA	NA	<0.0017	<0.0017	<0.0017	NA	<0.0017	NA	<0.0017
Beryllium	<0.001	NA	NA	<0.0010	<0.0010	<0.001	NA	<0.001	NA	<0.001
Calcium	148.00	NA	NA	161.0	131.0	114.0	NA	128.0	NA	131.0
Chromium	<0.0044	NA	NA	<0.0044	<0.0044	<0.0044	NA	<0.0044	NA	<0.0044
Iron	0.829	NA	NA	<0.0133	0.0307	0.170	NA	0.228	NA	0.0555
Lead	<0.001	NA	NA	<0.0010	0.0034	<0.001	NA	0.0016	NA	0.0012
Manganese	0.0434	NA	NA	0.0061	0.0023	0.0281	NA	0.0082	NA	0.0026
Mercury	<0.00018	NA	NA	<0.00018	<0.00018	<0.00018	NA	<0.00018	NA	<0.00018
Nickel	<0.0074	NA	NA	0.0077	<0.0074	<0.0074	NA	<0.0074	NA	<0.0074
Wet Chemistry										
Oil & Grease	<1.18	<1.18	NA	NA	<1.22	<1.0	<1.0	NA	NA	<1.0
Total Dissolved Solids (TDS)	476.0	NA	NA	459.0	271.0	446.0	NA	NA	474.0	458.0
Total Suspended Solids (TSS)	6.0	NA	NA	6.0	2.0	1.0	NA	NA	1.0	2.0
pH	7.23	NA	NA	NA	8.12	NA	NA	NA	NA	NA

Notes:

Southern Treatment Plant off-line during January 1997.
All concentrations are reported in milligrams per liter (mg/L) or parts per million.
NA = Not analyzed or not available.

FIGURES



LEGEND

- 24-GW08 ⊕ SHALLOW MONITORING WELL
- APPROXIMATE DIRECTION OF SURFACE WATER FLOW
- APPROXIMATE SITE BOUNDARY

SOURCE: LANTDIV, FEB. 1992

FIGURE 1-1
WELL LOCATION MAP
OPERABLE UNIT No. 1 - SITE 24
MONITORING AND O&M SUPPORT, CTO-0367

MARINE CORPS BASE, CAMP LEJEUNE
NORTH CAROLINA

01779JJB1Y

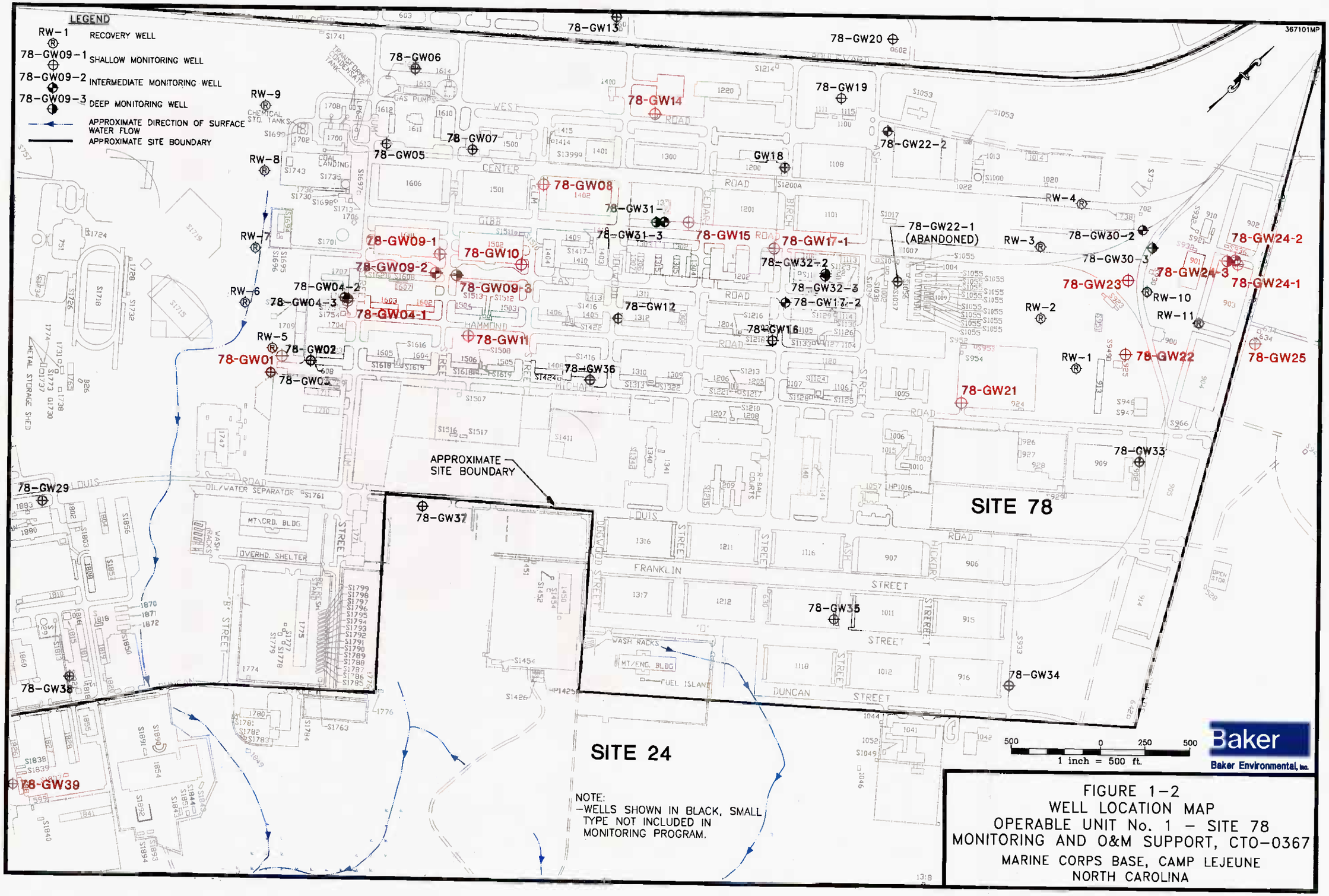
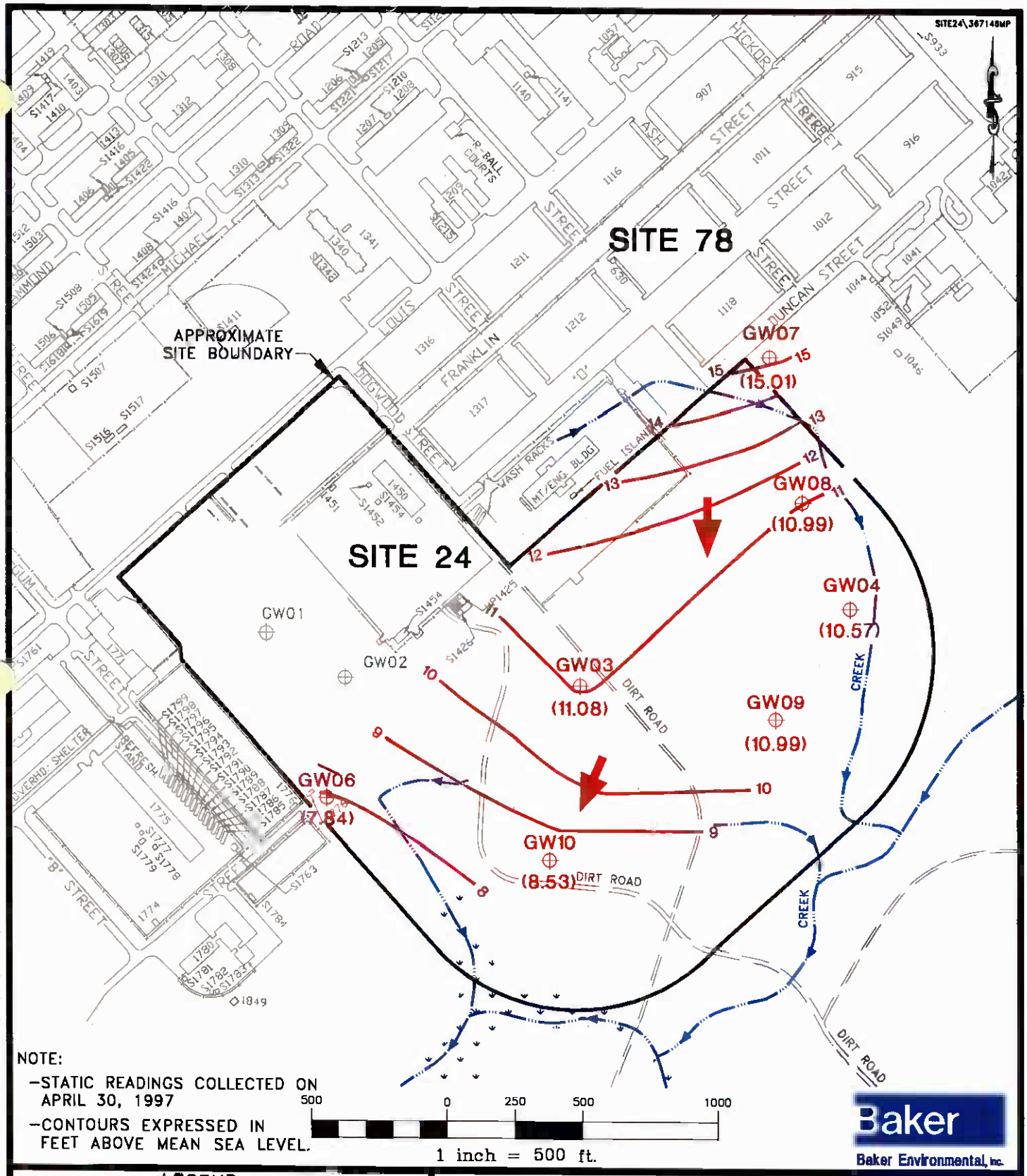


FIGURE 1-2
WELL LOCATION MAP
OPERABLE UNIT No. 1 – SITE 78
MONITORING AND O&M SUPPORT, CTO-0367
MARINE CORPS BASE, CAMP LEJEUNE
NORTH CAROLINA



NOTE:
- STATIC READINGS COLLECTED ON APRIL 30, 1997
- CONTOURS EXPRESSED IN FEET ABOVE MEAN SEA LEVEL.

500 0 250 500 1000

1 inch = 500 ft.

Baker Environmental, Inc.

LEGEND

- GW03 ⊕ SHALLOW MONITORING WELL
- (8.53) STATIC GROUNDWATER ELEVATION
- 13 GROUNDWATER ELEVATION CONTOUR
- APPROXIMATE DIRECTION OF GROUNDWATER FLOW
- APPROXIMATE DIRECTION OF SURFACE WATER FLOW
- APPROXIMATE SITE BOUNDARY

SOURCE: LANTDIV, FEB. 1992

FIGURE 1-3
SHALLOW GROUNDWATER CONTOUR MAP
APRIL 30, 1997
OPERABLE UNIT No. 1 – SITE 24
MONITORING AND O&M SUPPORT, CTO-0367
MARINE CORPS BASE, CAMP LEJEUNE
NORTH CAROLINA

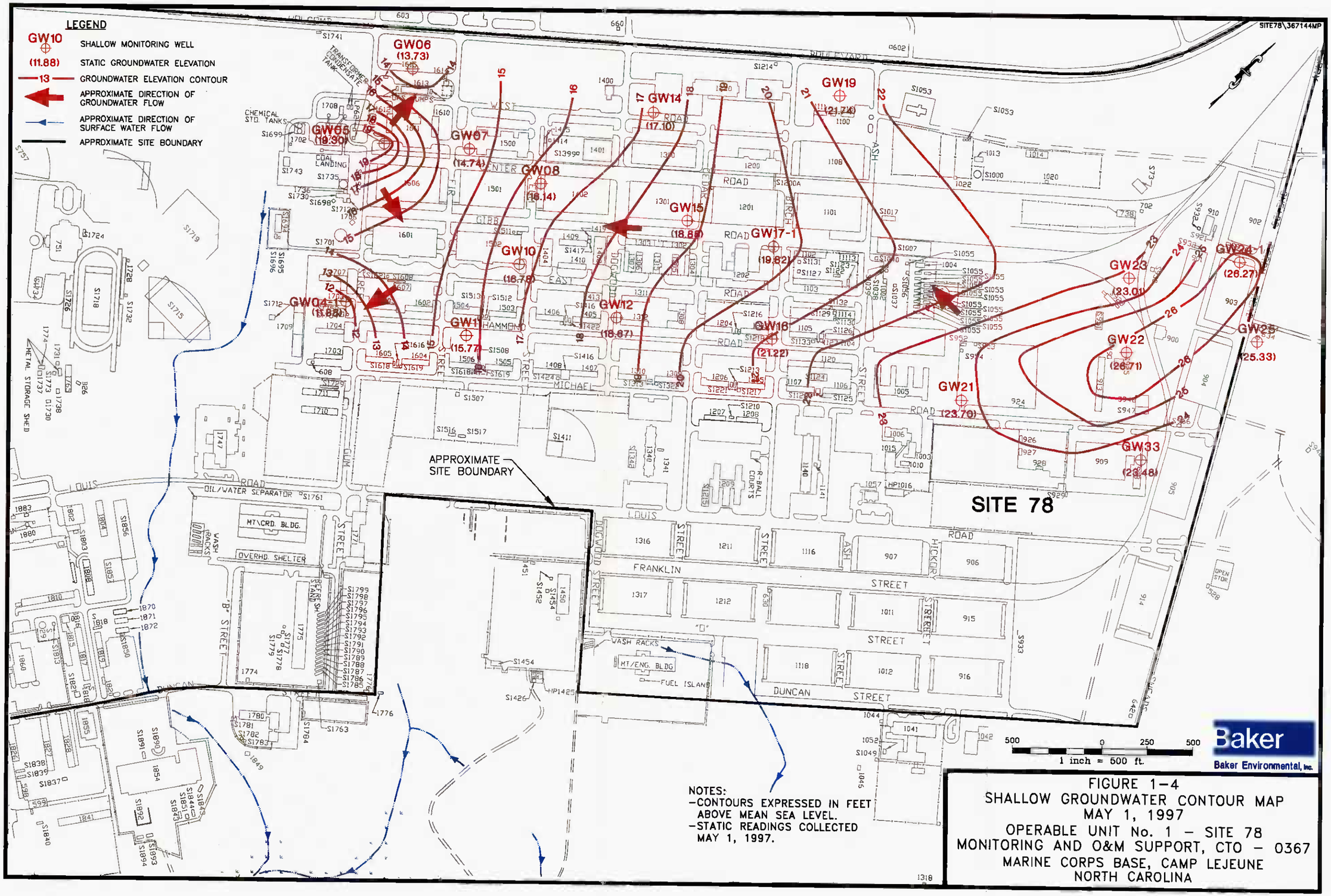


FIGURE 1-4
SHALLOW GROUNDWATER CONTOUR MAP
MAY 1, 1997
OPERABLE UNIT No. 1 – SITE 78
MONITORING AND O&M SUPPORT, CTO – 0367
MARINE CORPS BASE, CAMP LEJEUNE
NORTH CAROLINA

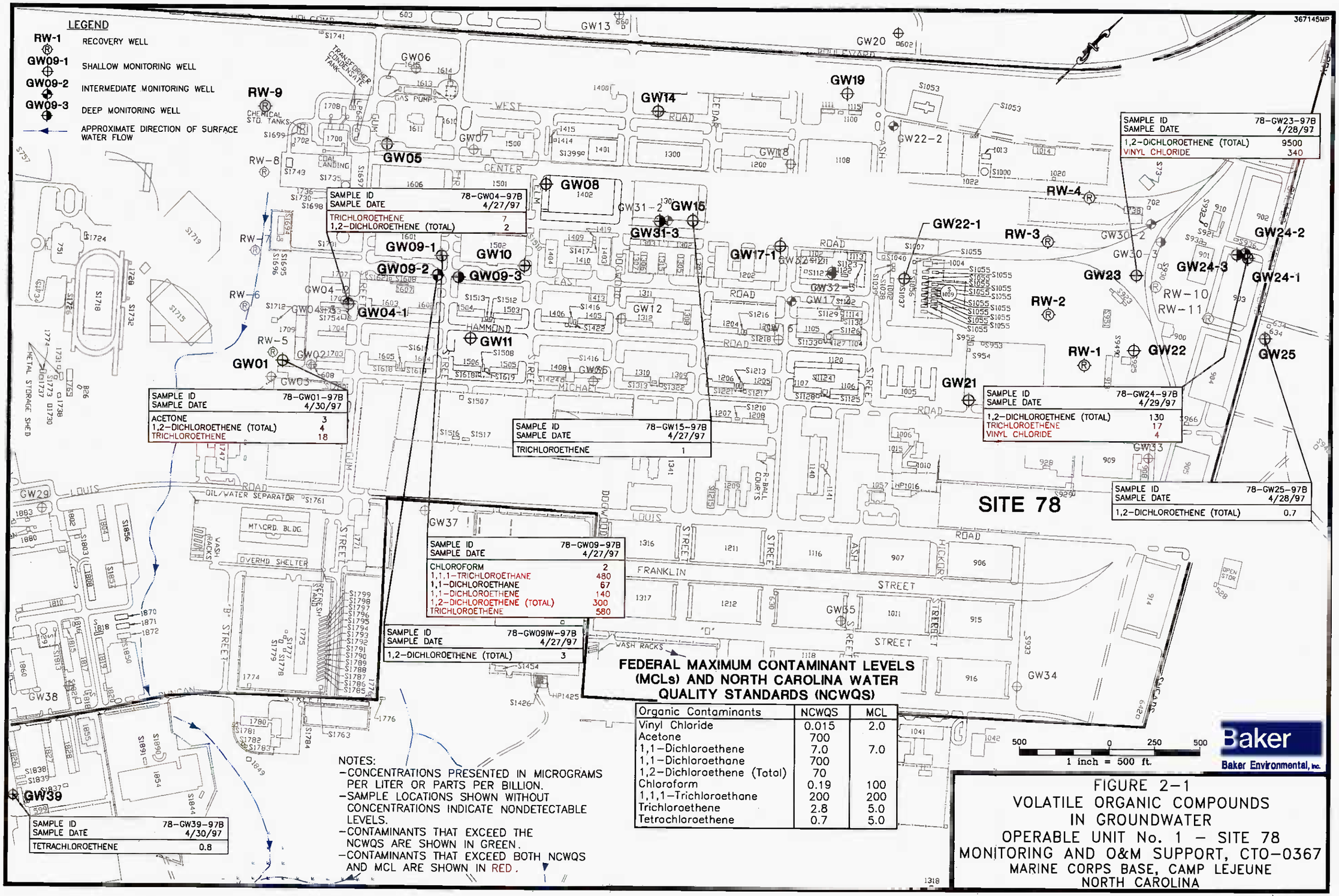
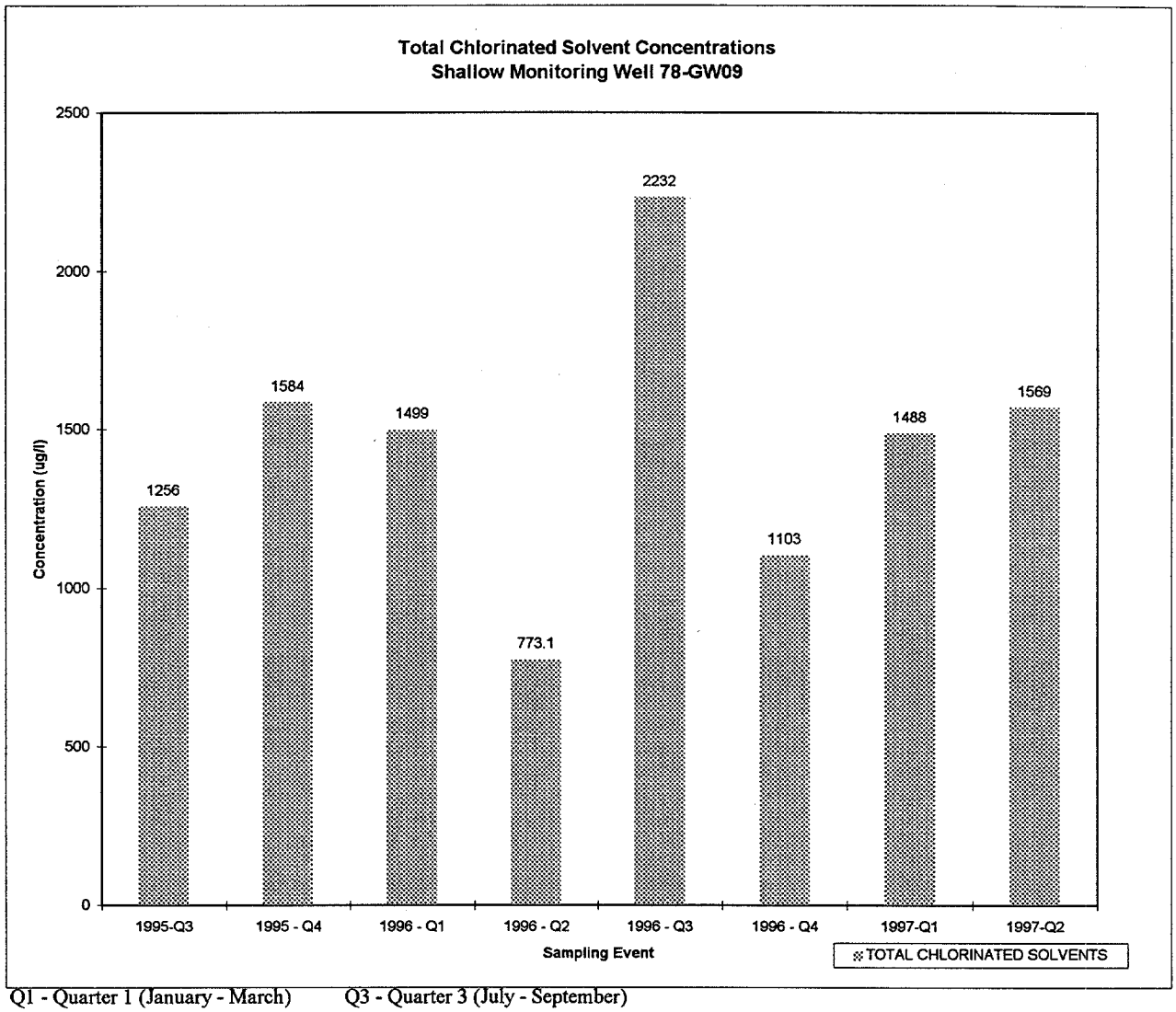

LEGEND
RW-1 RECOVERY WELL
GW09-1 SHALLOW MONITORING WELL
GW09-2 INTERMEDIATE MONITORING WELL
GW09-3 DEEP MONITORING WELL
APPROXIMATE DIRECTION OF SURFACE WATER FLOW
367145MP
SAMPLE ID 78-GW04-97B
SAMPLE DATE 4/27/97
TRICHLOROETHENE 7
1,2-DICHLOROETHENE (TOTAL) 2
SAMPLE ID 78-GW01-97B
SAMPLE DATE 4/30/97
ACETONE 3
1,2-DICHLOROETHENE (TOTAL) 4
TRICHLOROETHENE 18
SAMPLE ID 78-GW15-97B
SAMPLE DATE 4/27/97
TRICHLOROETHENE 1
SAMPLE ID 78-GW23-97B
SAMPLE DATE 4/28/97
1,2-DICHLOROETHENE (TOTAL) 9500
VINYL CHLORIDE 340
SAMPLE ID 78-GW24-97B
SAMPLE DATE 4/29/97
1,2-DICHLOROETHENE (TOTAL) 130
TRICHLOROETHENE 17
VINYL CHLORIDE 4
SAMPLE ID 78-GW25-97B
SAMPLE DATE 4/28/97
1,2-DICHLOROETHENE (TOTAL) 0.7
SAMPLE ID 78-GW09-97B
SAMPLE DATE 4/27/97
CHLOROFORM 2
1,1,1-TRICHLOROETHANE 480
1,1-DICHLOROETHANE 67
1,1-DICHLOROETHENE 140
1,2-DICHLOROETHENE (TOTAL) 300
TRICHLOROETHENE 580
SAMPLE ID 78-GW09IW-97B
SAMPLE DATE 4/27/97
1,2-DICHLOROETHENE (TOTAL) 3
SAMPLE ID 78-GW39-97B
SAMPLE DATE 4/30/97
TETRACHLOROETHENE 0.8
SITE 78
FEDERAL MAXIMUM CONTAMINANT LEVELS (MCLs) AND NORTH CAROLINA WATER QUALITY STANDARDS (NCWQS)
Organic Contaminants | NCWQS | MCL
Vinyl Chloride | 0.015 | 2.0
Acetone | 700 |
1,1-Dichloroethene | 7.0 | 7.0
1,1-Dichloroethane | 700 |
1,2-Dichloroethene (Total) | 70 |
Chloroform | 0.19 | 100
1,1,1-Trichloroethane | 200 | 200
Trichloroethene | 2.8 | 5.0
Tetrachloroethene | 0.7 | 5.0
NOTES:
-CONCENTRATIONS PRESENTED IN MICROGRAMS PER LITER OR PARTS PER BILLION.
-SAMPLE LOCATIONS SHOWN WITHOUT CONCENTRATIONS INDICATE NONDETECTABLE LEVELS.
-CONTAMINANTS THAT EXCEED THE NCWQS ARE SHOWN IN GREEN.
-CONTAMINANTS THAT EXCEED BOTH NCWQS AND MCL ARE SHOWN IN RED.
500 0 250 500
1 inch = 500 ft.
Baker
Baker Environmental, Inc.
FIGURE 2-1
VOLATILE ORGANIC COMPOUNDS IN GROUNDWATER
OPERABLE UNIT No. 1 - SITE 78
MONITORING AND O&M SUPPORT, CTO-0367
MARINE CORPS BASE, CAMP LEJEUNE
NORTH CAROLINA

FIGURE 2-2

TOTAL CHLORINATED SOLVENT RESULTS FROM 78-GW09
OPERABLE UNIT NO. 1 - SITE 78
MONITORING AND O&M SUPPORT, CTO-367
MCB, CAMP LEJEUNE, NORTH CAROLINA

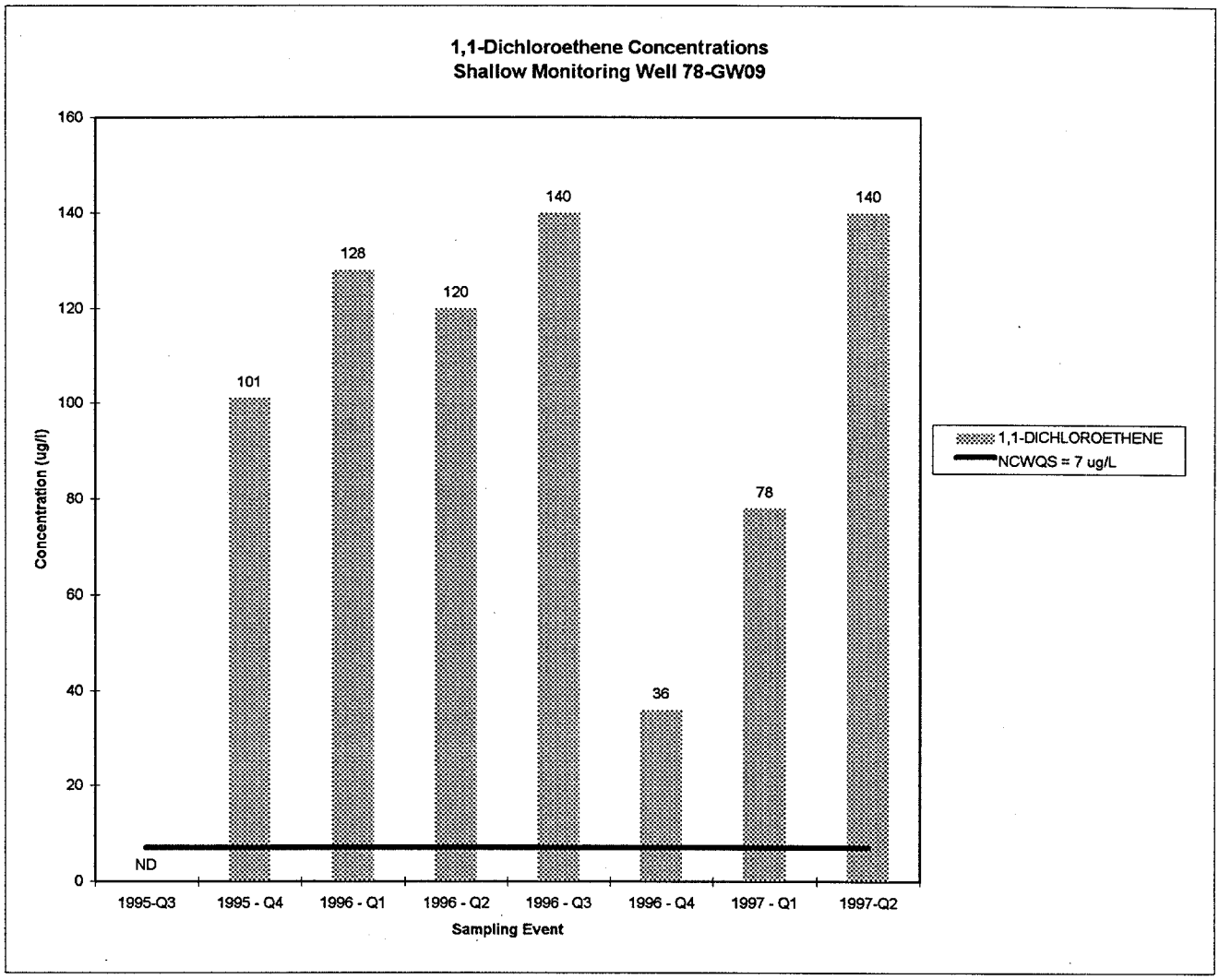


Q1 - Quarter 1 (January - March)
Q2 - Quarter 2 (April - June)
Q3 - Quarter 3 (July - September)
Q4 - Quarter 4 (October - December)

Contaminants	Mean Total (ug/L)	Median Total (ug/L)	Detection Frequency	Detections Above Standards
TOTAL CHLORINATED SOLVENTS	1438	1494	8/8	N/A

FIGURE 2-3

1,1-DICHLOROETHENE RESULTS FROM 78-GW09
OPERABLE UNIT NO. 1 - SITE 78
MONITORING AND O&M SUPPORT, CTO-367
MCB, CAMP LEJEUNE, NORTH CAROLINA



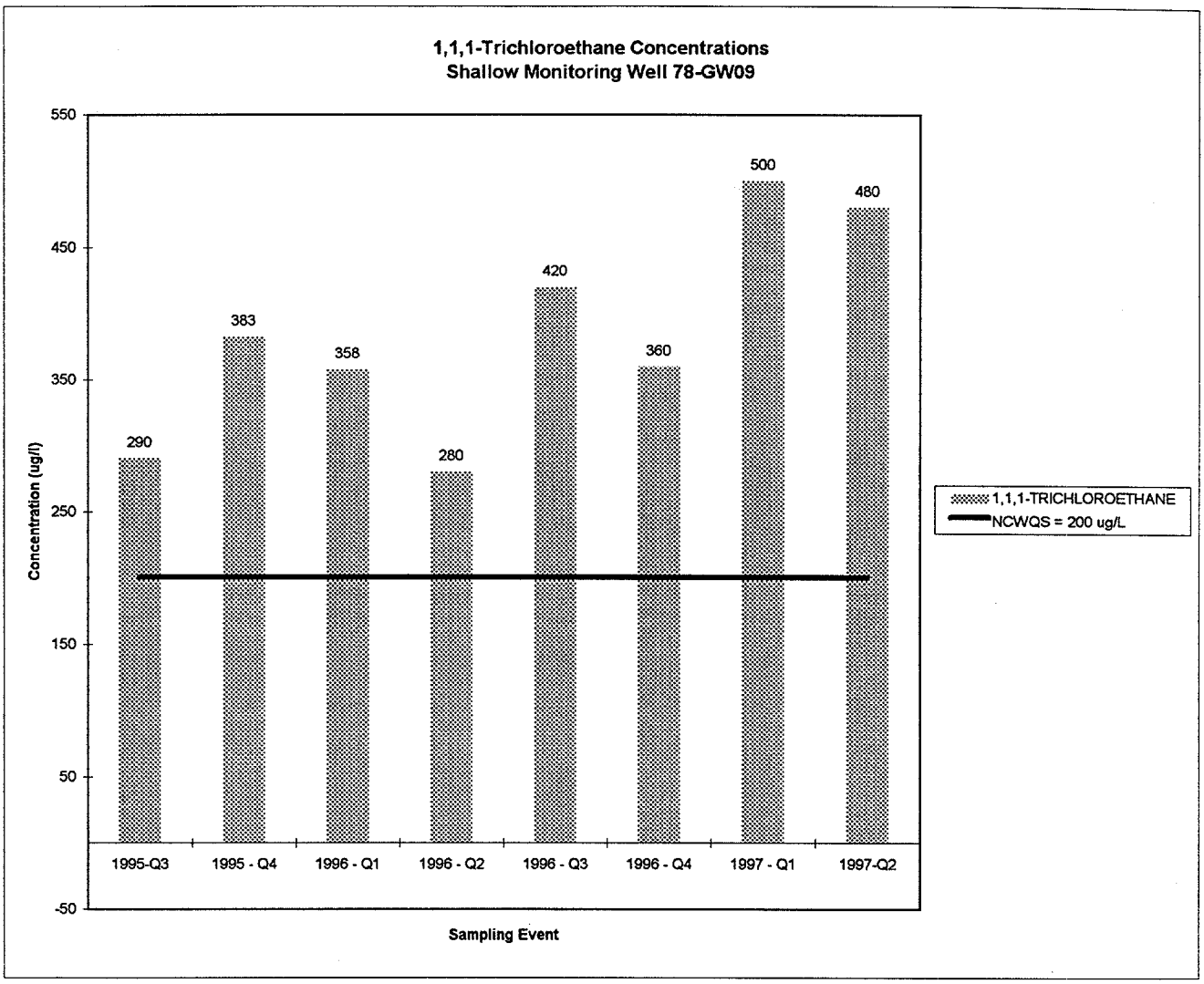
Q1 - Quarter 1 (January - March)
Q2 - Quarter 2 (April - June)
Q3 - Quarter 3 (July - September)
Q4 - Quarter 4 (October - December)

Notes:
Federal Maximum Contaminant Level (MCL) = 7 micrograms per liter (ug/L)
North Carolina Water Quality Standard (NCWQS) = 7 micrograms per liter (ug/L)
ND = Not Detected

Contaminant	Mean Detection (ug/L)	Median Detection (ug/L)	Detection Frequency	Detections Above Standards
1,1-DICHLOROETHENE	93	101	7/8	7/8

FIGURE 2-4

1,1,1-TRICHLOROETHANE RESULTS FROM 78-GW09
OPERABLE UNIT NO. 1 - SITE 78
MONITORING AND O&M SUPPORT, CTO-367
MCB, CAMP LEJEUNE, NORTH CAROLINA



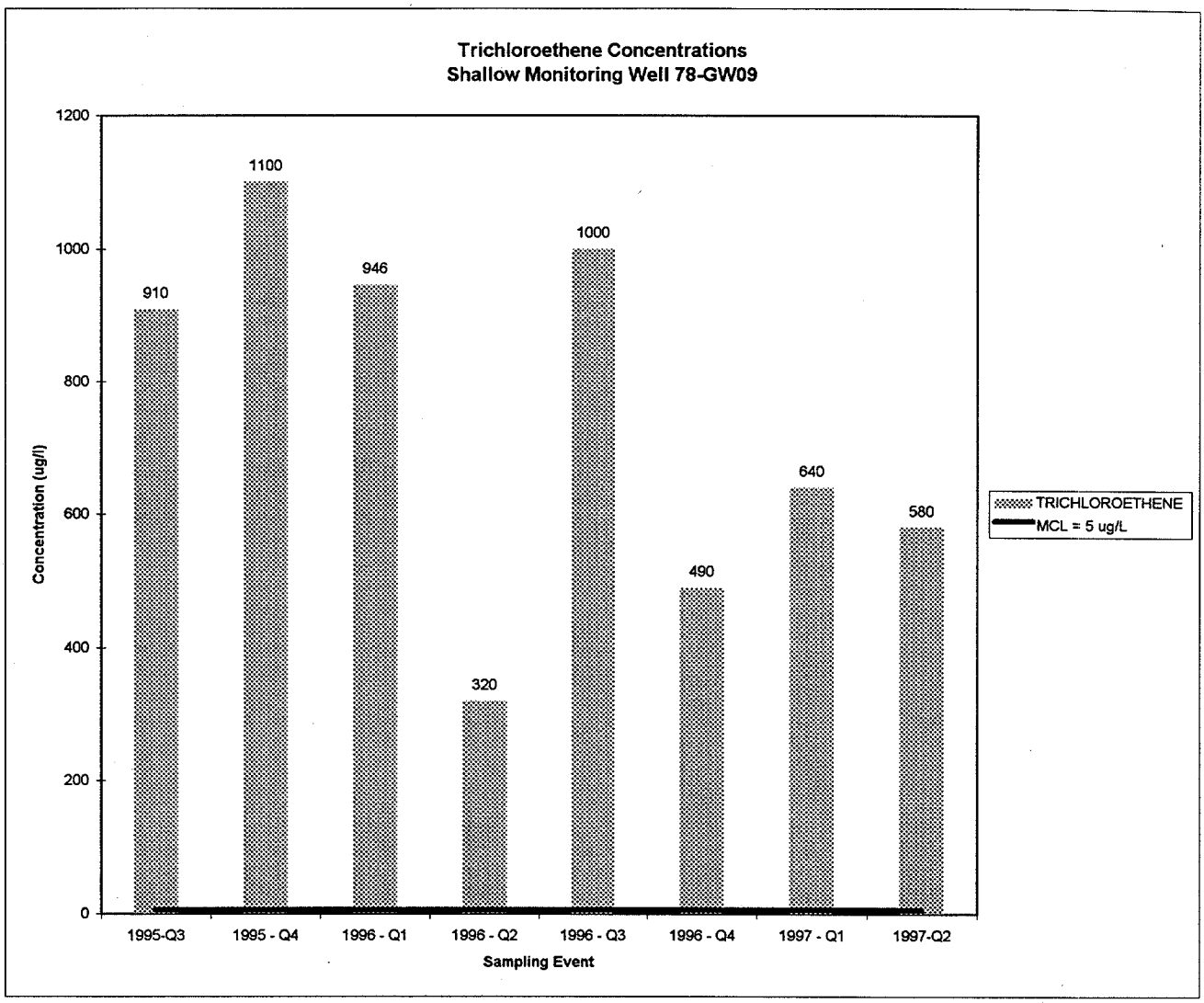
Q1 - Quarter 1 (January - March)
Q2 - Quarter 2 (April - June)
Q3 - Quarter 3 (July - September)
Q4 - Quarter 4 (October - December)

Notes:
Federal Maximum Contaminant Level (MCL) = 200 micrograms per liter (ug/L)
North Carolina Water Quality Standard (NCWQS) = 200 micrograms per liter (ug/L)

Contaminant	Mean Detection (ug/L)	Median Detection (ug/L)	Detection Frequency	Detections Above Standards
1,1,1-TRICHLOROETHANE	384	372	8/8	8/8

FIGURE 2-5

TRICHLOROETHENE RESULTS FROM 78-GW09
OPERABLE UNIT NO. 1 - SITE 78
MONITORING AND O&M SUPPORT, CTO-367
MCB, CAMP LEJEUNE, NORTH CAROLINA



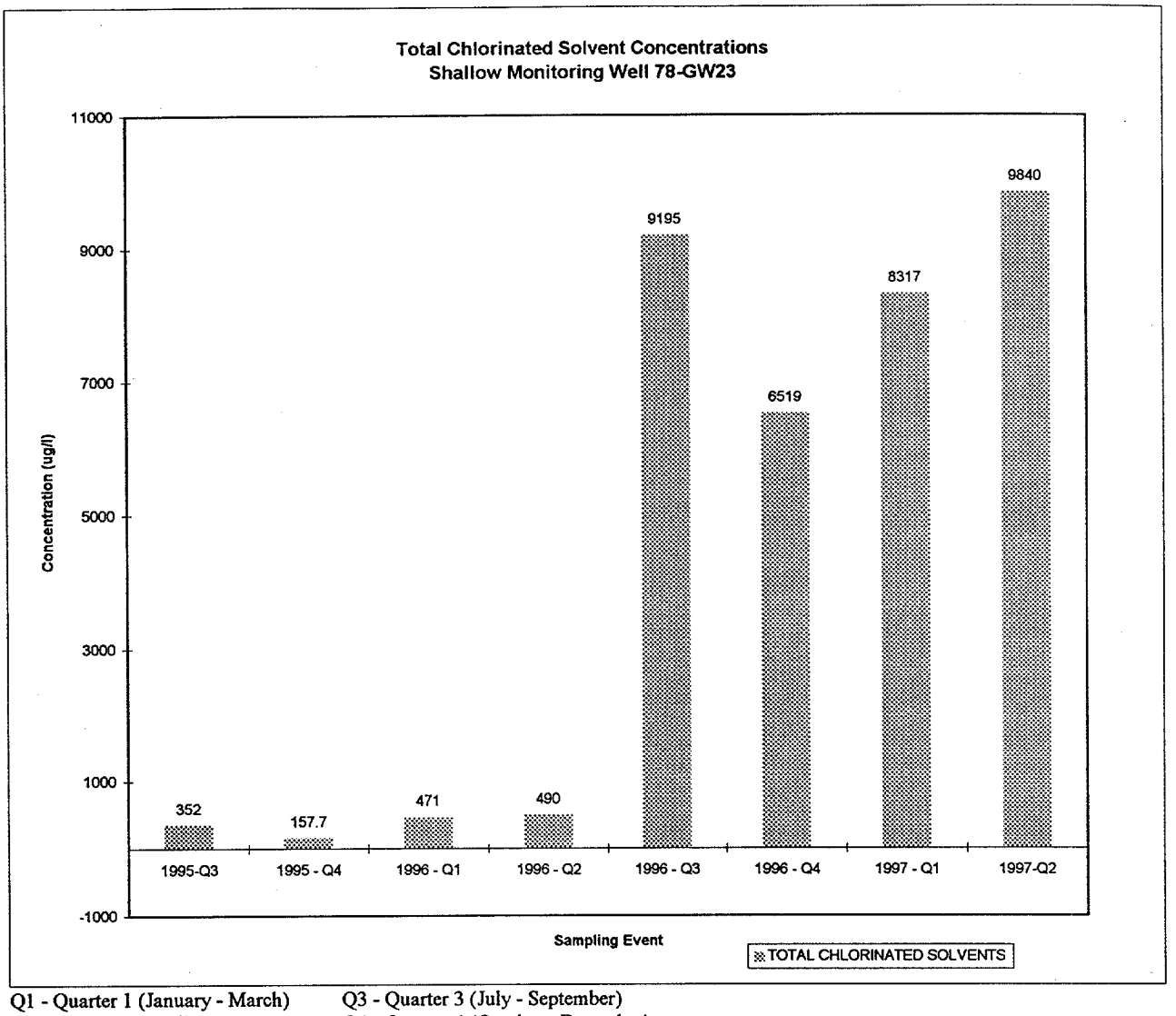
Q1 - Quarter 1 (January - March)
Q2 - Quarter 2 (April - June)
Q3 - Quarter 3 (July - September)
Q4 - Quarter 4 (October - December)

Notes:
Federal Maximum Contaminant Level (MCL) = 5 micrograms per liter (ug/L)
There is no North Carolina Water Quality Standard (NCWQS)

Contaminant	Mean Detection (ug/L)	Median Detection (ug/L)	Detection Frequency	Detections Above Standards
TRICHLOROETHENE	748	775	8/8	8/8

FIGURE 2-6

TOTAL CHLORINATED SOLVENT RESULTS FROM 78-GW23
OPERABLE UNIT NO. 1 - SITE 78
MONITORING AND O&M SUPPORT, CTO-367
MCB, CAMP LEJEUNE, NORTH CAROLINA

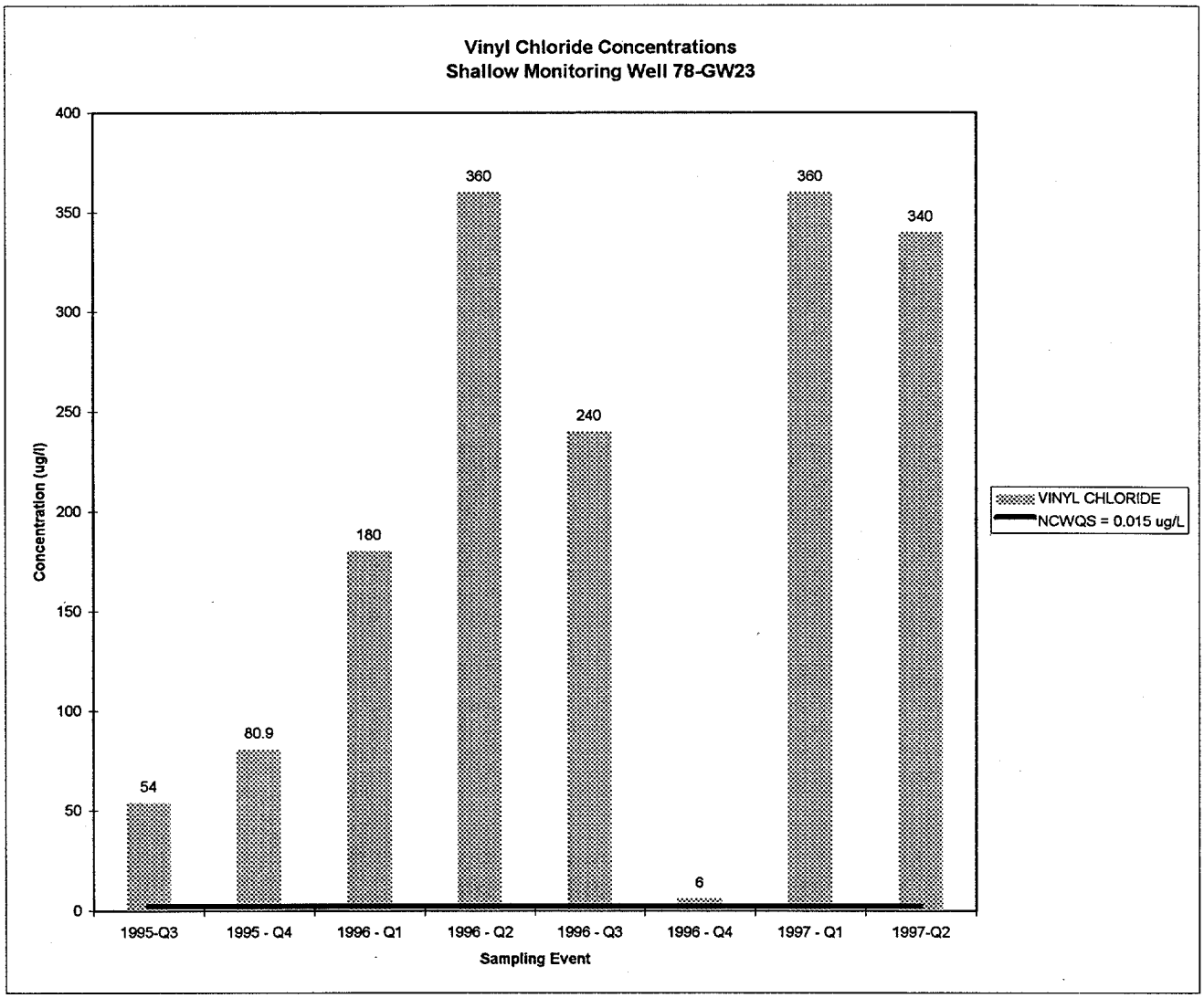


Q1 - Quarter 1 (January - March)
Q2 - Quarter 2 (April - June)
Q3 - Quarter 3 (July - September)
Q4 - Quarter 4 (October - December)

Contaminant	Mean Detection (ug/L)	Median Detection (ug/L)	Detection Frequency	Detections Above Standards
TOTAL CHLORINATED SOLVENTS	4418	3505	8/8	N/A

FIGURE 2-7

VINYL CHLORIDE RESULTS FROM 78-GW23
OPERABLE UNIT NO. 1 - SITE 78
MONITORING AND O&M SUPPORT, CTO-367
MCB, CAMP LEJEUNE, NORTH CAROLINA



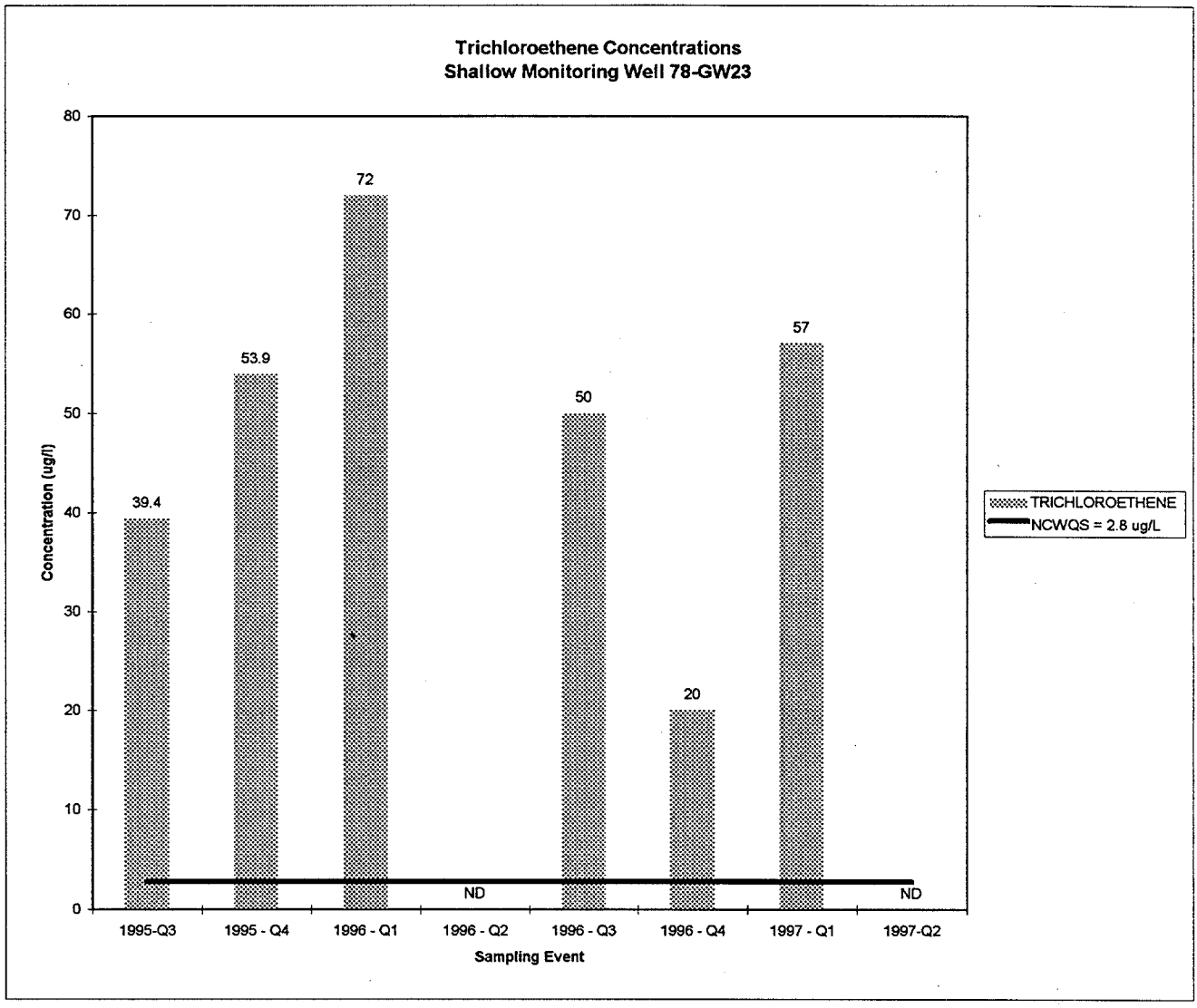
Q1 - Quarter 1 (January - March)
Q2 - Quarter 2 (April - June)
Q3 - Quarter 3 (July - September)
Q4 - Quarter 4 (October - December)

Notes:
Federal Maximum Contaminant Level (MCL) = 2 micrograms per liter (ug/L)
North Carolina Water Quality Standard (NCWQS) = 0.015 micrograms per liter (ug/L)

Contaminant	Mean Detection (ug/L)	Median Detection (ug/L)	Detection Frequency	Detections Above Standards
VINYL CHLORIDE	203	180	8/8	8/8

FIGURE 2-8

TRICHLOROETHENE RESULTS FROM 78-GW23
OPERABLE UNIT NO. 1 - SITE 78
MONITORING AND O&M SUPPORT, CTO-367
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) = 5 micrograms per liter (ug/L)
North Carolina Water Quality Standard (NCWQS) = 2.8 micrograms per liter (ug/L)
ND = Not Detected

Contaminant	Mean Detection (ug/L)	Median Detection (ug/L)	Detection Frequency	Detections Above Standards
TRICHLOROETHENE	37	47	6/8	6/8

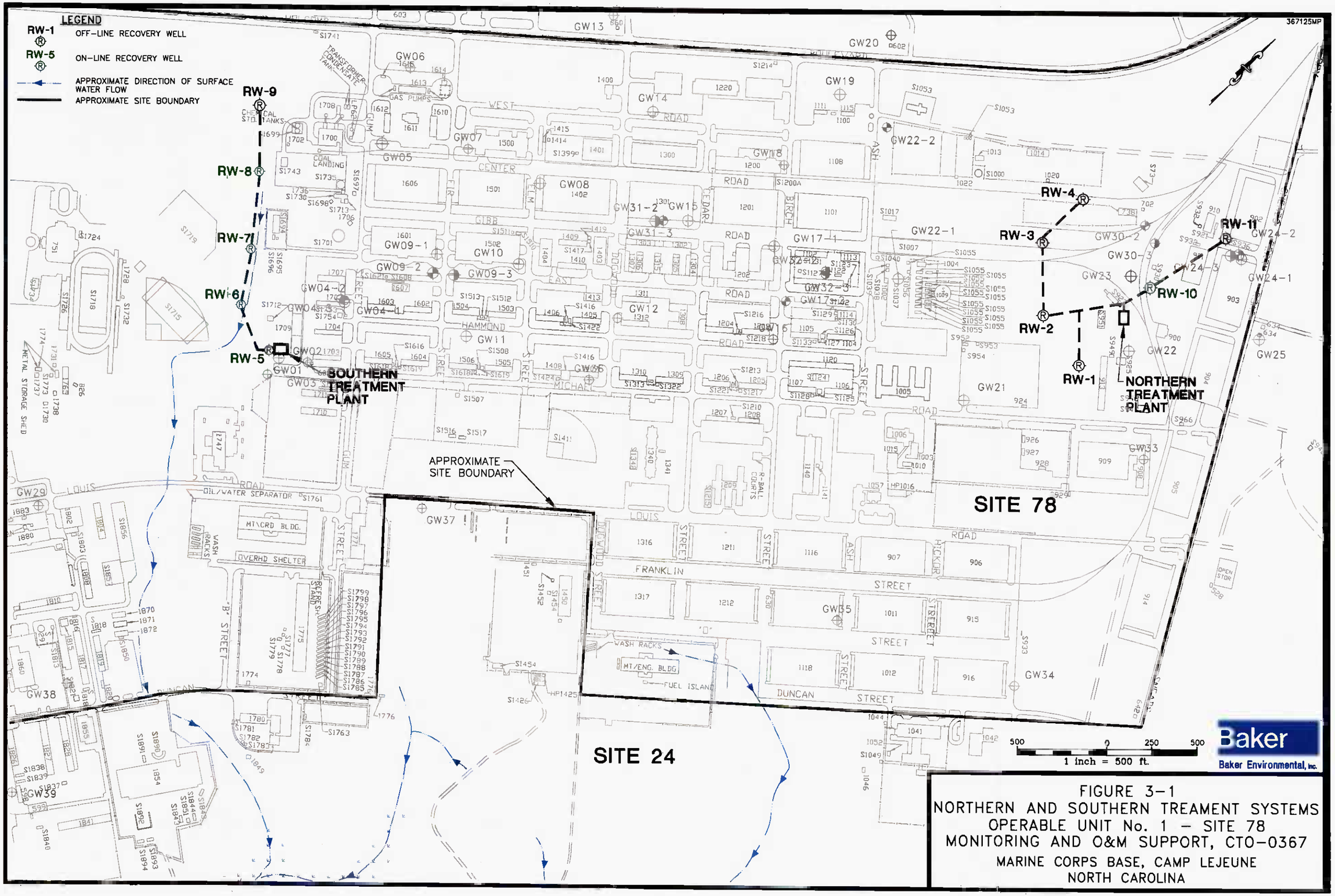


FIGURE 3-1
NORTHERN AND SOUTHERN TREAMENT SYSTEMS
OPERABLE UNIT No. 1 – SITE 78
MONITORING AND O&M SUPPORT, CTO-0367
MARINE CORPS BASE, CAMP LEJEUNE
NORTH CAROLINA

01779JJ01Y

ATTACHMENTS

ATTACHMENT A
CHAIN-OF-CUSTODY DOCUMENTATION

Baker Environmental, Inc.
Airport Office Park, Bldg. 3
420 Rouser Road
Coraopolis, PA 15108
412-269-6000
412-269-6097 (fax)

CHAIN-OF-CUSTODY RECORD

Pg. 1 of 1

Lab and BOA #: Weston
Delivery Order #:
Project Number:
Project Name: 367
Field Team: Tom Trebilcock
SEND RESULTS TO: Tom Trebilcock

Matrix ~~Sample Number~~	1997 Date	Time	Sample Location	Matrix Type (1) GB (1)	Matrix Type (1) COM (1)	Analytical Methods: VOAs by 8260	Pesticides	Oil & Grease	Select TAL Metals	TSS/TDS	General Comments / ~~Remarks~~
						Type of Container(s) (3)					COC # 36797B02
						G/2	G/1	G/1	P/1	P/1	Sample ID
						Number of Container(s)					
Blank	4/26	0700		X		X					24-TB01-97B
GW	4/26	0836	Site 24	X		X	X	X	X	X	24-GW10-97B
GW	4/26	1045	↓	X		X	X	X	X	X	24-GW09-97B
GW	4/26	1135	↓	X		X		X	X	X	24-GW08-97B

Relinquished By: [signature] Date: 4/26/97 Time: 1200
Received By: Date: Time:
Shipped by (check one): Hand ☐ Overnight ☐ Other ☐

Relinquished By: Date: Time:
Received By: Date: Time:
Shipped by (check one): Hand ☐ Overnight ☐ Other ☐

Relinquished By: Date: Time:
Received By: Date: Time:
Shipped by (check one): Hand ☐ Overnight ☐ Other ☐

Sample Stored at 4 Degrees C: Yes ☒ No ☐
Chain-of-custody seal on cooler: Yes ☒ Number: No ☐
Analysis turnaround: Priority ☐ hrs. Regular ☒
See Work Order ☐
See Analysis Request Form ☐
Sample Disposal Return to Baker ☐ Lab Disposal ☒
Archive until: (date)

NOTES:
(1) A - Air; GW - Groundwater; L - Leachate; S - Spring; SS - Surface Soil; SB - SubSurface Soil; SW - Surface Water; W - Waste; WP - Wipe; WW - Wastewater
(2) GB - Grab; COM - Composite
(3) P - Plastic; G - Glass

White - Return with analytical results; Yellow - Laboratory Copy; Pink - Field Copy

Courier Name: Fed Ex
Courier Pickup Number: 355827382 1
File Name:

Baker Environmental, Inc.
Airport Office Park, Bldg 3
420 Rouser Road
Coraopolis, PA 15108
412-269-6000
412-269-6097 (fax) Bosco

CHAIN-OF-CUSTODY RECORD

Lab and BOA #: Weston Ramirez
Delivery Order #: Weston
Project Number: 367
Project Name: Monitoring
Field Team: Trebilcock
SEND RESULTS TO: Trebilcock

Matrix ~~Sample Number~~	1997 Date	Time	Sample Location	Matrix Type (1) GB (1)	Matrix Type (1) COM (1)	Type of Container(s) (3) G/2	Type of Container(s) (3) G/1	Analytical Methods: by VOAs 8260	Analytical Methods: Tcl Pecticides	Number of Container(s)	~~Remarks~~ Sample ID
GW	4/26	1135	Site 24	GB			X			✓	24-GW08-97B
Blank	4/27	0760	Site 78	GB		X				✓	78-TB01-97B
GW	4/27	0820	Site 78	GB		X				✓	78-GW14-97B
GW	4/27	0955		GB		X				✓	78-GW04-97B
GW	4/27	1205		GB		X				✓	78-GW09-97B
GW	4/27	1445		GB		X				✓	78-GW09IW-97B
GW	4/27	1845		GB		X				✓	78-GW09DW-97B
GW	4/29	0815		GB		X				✓	78-GW23-97B
GW	4/28	0930		GB		X				✓	78-GW22A-97B
GW	4/28	1500	↓	GB		X				✓	78-GW25-97B

General Comments: COC # 36797B03

Relinquished By: W. F. Trebilcock Date: _____ Time: 1630
Received By: _____ Date: _____ Time: _____
Shipped by (check one): Hand ☐ Overnight ☒ Other ☐ _____

Relinquished By: _____ Date: _____ Time: _____
Received By: _____ Date: _____ Time: _____
Shipped by (check one): Hand ☐ Overnight ☐ Other ☐ _____

Relinquished By: _____ Date: _____ Time: _____
Received By: _____ Date: _____ Time: _____
Shipped by (check one): Hand ☐ Overnight ☐ Other ☐ _____

Sample Stored at 4 Degrees C: Yes ☒ No ☐
Chain-of-custody seal on cooler: Yes ☒ Number: _____ No ☐
Analysis turnaround: Priority ☐ _____ hrs. Regular ☒
See Work Order ☐
See Analysis Request Form ☐
Sample Disposal Return to Baker ☐ Lab Disposal ☒
Archive until: _____ (date)

NOTES:
(1) A - Air; GW - Groundwater; L - Leachate; S - Spring; SS - Surface Soil; SB - SubSurface Soil; SW - Surface Water; W - Waste; WP - Wipe; WW - Wastewater
(2) GB - Grab; COM - Composite
(3) P - Plastic; G - Glass

White - Return with analytical results; Yellow - Laboratory Copy; Pink - Field Copy

Courier Name: FEDEX
Courier Pickup Number: 3558273810
File Name: _____

Baker Environmental, Inc.
Airport Office Park, Bldg. 3
420 Rouser Road
Coraopolis, PA 15108
412-269-6000
412-269-6097 (fax)

CHAIN-OF-CUSTODY RECORD

Lab and BOA #: _____
Delivery Order # _____
Project Number: _____
Project Name: _____
Field Team: _____
SEND RESULTS TO: _____

Matrix ~~Sample Number~~	1997 Date	Time	Sample Location	Matrix Type (1) GB (1)	Matrix Type (1) COM (1)	Analytical Methods: VOAs by 8260	Type of Container(s) (2): G/z	Number of Container(s)	General Comments / ~~Remarks~~
GW	4/28	1605	Site 78	GB		X		1	78-GW21-97B

coc # 36797803

ID

Relinquished By: [signature] Date: 4/28/97 Time: 1630
Received By: _____ Date: _____ Time: _____
Shipped by (check one): Hand ☐ Overnight ☐ Other ☐ _____

Relinquished By: _____ Date: _____ Time: _____
Received By: _____ Date: _____ Time: _____
Shipped by (check one): Hand ☐ Overnight ☐ Other ☐ _____

Relinquished By: _____ Date: _____ Time: _____
Received By: _____ Date: _____ Time: _____
Shipped by (check one): Hand ☐ Overnight ☐ Other ☐ _____

Sample Stored at 4 Degrees C: Yes ☒ No ☐
Chain-of-custody seal on cooler: Yes ☒ Number: _____ No ☐
Analysis turnaround: Priority ☐ _____ hrs. Regular ☒
See Work Order ☐
See Analysis Request Form ☐

Sample Disposal Return to Baker ☐ Lab Disposal ☒
Archive until: _____ (date)

NOTES:
(1) A - Air; GW - Groundwater; L - Leachate; S - Spring; SS - Surface Soil; SB - SubSurface Soil; SW - Surface Water; W - Waste; WP - Wipe; WW - Wastewater
(1) GB - Grab; COM - Composite
(2) P - Plastic; G - Glass

White - Return with analytical results; Yellow - Laboratory Copy; Pink - Field Copy

Courier Name: Fed Ex
Courier Pickup Number: 3558273810
File Name: _____

Baker Environmental, Inc.
Airport Office Park, Bldg 3
420 Rouser Road
Coraopolis, PA 15108
412-269-6000
412-269-6097 (fax)

CHAIN-OF-CUSTODY RECORD

Lab and BOA #:
Delivery Order #
Project Number:
Project Name:
Field Team:
SEND RESULTS TO:

Matrix ~~Sample Number~~	1997 Date	Time	Sample Location	Matrix Type (1) GB (1)	Matrix Type (1) COM (1)	Analytical Methods: VOAs by 8260	Type of Container(s) (3): G/2	Number of Container(s)	General Comments: Sample ID ~~Remarks~~
Blank	4/29	0700	Site 78	GB		X			78-TB02-97B
GW	4/29	1111	Site 78	GB		X			78-GW24IW-97B
GW	4/29	1210	Site 78	GB		X			78-GW24-97B
GW	4/29	1240	"	"		X			78-GW24DW-97B
GW	4/29	1515	"	"		X			78-GW11-97B
GW	4/29	1700	"	"		X			78-GW08-97B
GW	4/29	1815	"	"		X			78-GW10-97B
GW	4/29	1930	"	"		X			78-GW17-97B
GW	4/30	0845	"	"		X			78-GW39-97B
GW	4/30	1030	"	"		X			78-GW01-97B

COC # 36797804

Relinquished By: [signature] Date: 4/30/97 Time: 1700
Received By: FedEx Date: Time:
Shipped by (check one): Hand ☐ Overnight ☒ Other ☐

Relinquished By: Date: Time:
Received By: Date: Time:
Shipped by (check one): Hand ☐ Overnight ☐ Other ☐

Relinquished By: Date: Time:
Received By: Date: Time:
Shipped by (check one): Hand ☐ Overnight ☐ Other ☐

Sample Stored at 4 Degrees C: Yes ☒ No ☐
Chain-of-custody seal on cooler: Yes ☒ Number: No ☐
Analysis turnaround: Priority ☐ hrs. Regular ☒
See Work Order ☐
See Analysis Request Form ☐
Sample Disposal Return to Baker ☐ Lab Disposal ☒
Archive until: (date)

NOTES:
(1) A - Air; GW - Groundwater; L - Leachate; S - Spring; SS - Surface Soil; SB - SubSurface Soil; SW - Surface Water; W - Waste; WP - Wipe; WW - Wastewater
(1) GB - Grab; COM - Composite
(3) P - Plastic; G - Glass

White - Return with analytical results; Yellow - Laboratory Copy; Pink - Field Copy

Courier Name: FedEx
Courier Pickup Number: 3558273806
File Name:

Baker

Baker Environmental, Inc.
Airport Office Park, Bldg. 3
420 Rouser Road
Coraopolis, PA 15108
412-269-6000
412-269-6097 (fax)

CHAIN-OF-CUSTODY RECORD

Lab and BOA #: Weston Ramirez
Delivery Order #:
Project Number: 367
Project Name: Monitoring
Field Team: Tom Trebilcock
SEND RESULTS TO: Tom Trebilcock

Matrix ~~Sample Number~~	1997 Date	Time	Sample Location	Matrix Type (1) GB (2)	COM (2)	Analytical Methods: VOAs by 8260	Type of Container(s) (3)	Number of Container(s)	General Comments: ~~Remarks~~
							G/2		Coc# 36797B04
GW	4/30	1445	Site 78	GB		X			Sample ID 78-GW15-97B

Relinquished By: [signature] Date: 4/30/97 Time: 1700
Received By: FedEx Date: _____ Time: _____
Shipped by (check one): Hand ☐ Overnight ☒ Other ☐ _____

Relinquished By: _____ Date: _____ Time: _____
Received By: _____ Date: _____ Time: _____
Shipped by (check one): Hand ☐ Overnight ☐ Other ☐ _____

Relinquished By: _____ Date: _____ Time: _____
Received By: _____ Date: _____ Time: _____
Shipped by (check one): Hand ☐ Overnight ☐ Other ☐ _____

Sample Stored at 4 Degrees C: Yes ☒ No ☐
Chain-of-custody seal on cooler: Yes ☒ Number: _____ No ☐
Analysis turnaround: Priority ☐ _____ hrs. Regular ☒
See Work Order ☐
See Analysis Request Form ☐
Sample Disposal: Return to Baker ☐ Lab Disposal ☒
Archive until: _____ (date)

NOTES:
(1) A - Air; GW - Groundwater; L - Leachate; S - Spring; SS - Surface Soil; SB - SubSurface Soil; SW - Surface Water; W - Waste; WP - Wipe; WW - Wastewater
(2) GB - Grab; COM - Composite
(3) P - Plastic; G - Glass

White - Return with analytical results; Yellow - Laboratory Copy; Pink - Field Copy

Courier Name: FedEx
Courier Pickup Number: 355827380 6
File Name: _____

ATTACHMENT B
SAMPLE TRACKING FORM

Sample Tracking and Chain-of-Custody Documentation - Sites 24 and78
Monitoring and O&M Program Support, CTO-367
MCB Camp Lejuene, North Carolina

MATRIX	SAMPLE ID	DATE SHIPPED	Analysis Requested						Analysis Received						DATE RECEIVED	TURNAROUND TIME	RFW #	COMMENTS
			TCL Volatiles (EPA 8260)	TAL Metals (SW 6010/7470)	Oil & Grease (SW 9070)	Total Dissolved Solids	Total Suspended Solids	Pesticides (SOW OLM01.8)	TCL Volatiles (EPA 8260)	TAL Metals (SW 6010/7470)	Oil & Grease (SW 9070)	Total Dissolved Solids	Total Suspended Solids	Pesticides (SOW OLM01.8)				
	COC# 36797B03																	
Groundwater	78-GW14-97B	4/28/97	X						X						5/29/97	31	9704G371	
	78-GW04-97B	4/28/97	X						X						5/29/97	31	9704G371	
	24-GW08-97B	4/28/97						X						X	5/29/97	31	9704G371	
	78-GW09-97B	4/28/97	X						X						5/29/97	31	9704G371	
	78-GW09IW-97B	4/28/97	X						X						5/29/97	31	9704G371	
	78-GW09DW-97B	4/28/97	X						X						5/29/97	31	9704G371	
	78-GW22A-97B	4/28/97	X						X						5/29/97	31	9704G371	
	78-GW23-97B	4/28/97	X						X						5/29/97	31	9704G371	
	78-GW25-97B	4/28/97	X						X						5/29/97	31	9704G371	
	78-TB01-97B	4/28/97	X						X						5/29/97	31	9704G371	
	78-GW21-97B	4/28/97	X						X						5/29/97	31	9704G371	
	COC# 36797B04																	
	78-GW08-97B	4/30/97	X						X						5/29/97	29	9704G371	
	78-GW10-97B	4/30/97	X						X						5/29/97	29	9704G371	
	78-GW17-97B	4/30/97	X						X						5/29/97	29	9704G371	
	78-GW01-97B	4/30/97	X						X						5/29/97	29	9704G371	
	78-GW11-97B	4/30/97	X						X						5/29/97	29	9704G371	
	78-GW15-97B	4/30/97	X						X						5/29/97	29	9704G371	
	78-GW24-97B	4/30/97	X						X						5/29/97	29	9704G371	
	78-GW24IW-97B	4/30/97	X						X						5/29/97	29	9704G371	
	78-GW24DW-97B	4/30/97	X						X						5/29/97	29	9704G371	
	78-GW39-97B	4/30/97	X						X						5/29/97	29	9704G371	
	78-TB02-97B	4/30/97	X						X						5/29/97	29	9704G371	
	COC# 36797B02																	
	24-GW09-97B	4/26/97	X	X	X	X	X	X	X	X	X	X	X	X	5/29/97	33	9704G371	
	24-GW10-97B	4/26/97	X	X	X	X	X	X	X	X	X	X	X	X	5/29/97	33	9704G371	
	24-GW08-97B	4/26/97	X	X	X	X	X		X	X	X	X	X		5/29/97	33	9704G371	
TOTALS			24	3	3	3	3	3	24	3	3	3	3	3				

TAL Metals (SW 6010/7470) - Antimony, Arsenic, Beryllium, Chromium, Iron, Lead, Nickel, Mercury, Manganese

ATTACHMENT C
SAMPLE DESIGNATIONS

SAMPLE DESIGNATIONS

In order to accurately identify and differentiate samples collected during the monitoring program, all samples were designated with a unique identification number. The unique sample number identifies the site, the sample media, the sampling station's number, and the quarter in which the sample was collected. The sample designation format is as follows:

Site Number - Sample Station Identifier - Year and Quarter

An explanation of each identifier is provided below:

Site Number	The investigation was conducted at Sites 24 and 78.
Sample Station Identifier	Each monitoring well has been assigned a unique identification number. The identification number may include the qualifiers "DW" which denotes a deep monitoring well, "IW" which denotes an intermediate monitoring well, or "GW" which denotes groundwater.
Year	The investigation was conducted during 1997.
Quarter	The investigation was conducted during the second quarter. The four quarters of year are identified by the first four letters of the alphabet (i.e., A, B, C and D).

Under this sample designation format the sample number 78-GW09DW-97B refers to:

78-GW09DW-97B	Site 78
78-GW09DW-97B	Groundwater sample
78-GW09DW-97B	Monitoring well No.9
78-GW09DW-97B	Deep monitoring well
78-GW09DW-97B	Year 1997
78-GW09DW-97B	The second quarter (i.e., April through June)

GROUNDWATER ANALYTICAL RESULTS
APRIL 1997
OPERABLE UNIT NO.1 - SITE 24
MONITORING AND O SUPPORT, CTO-0367
MCB CAMP LEJEUNE, NORTH CAROLINA
ORGANICS

SAMPLE ID	24-GW08-97B	24-GW09-97B	24-GW10-97B
DATE SAMPLED	04/26/97	04/26/97	04/26/97
VOLATILES (ug/l)			
CHLOROMETHANE	0.5 U	0.5 U	0.5 U
VINYL CHLORIDE	0.5 U	0.5 U	0.5 U
BROMOMETHANE	0.5 U	0.5 U	0.5 U
CHLOROETHANE	0.5 U	0.5 U	0.5 U
1,1-DICHLOROETHENE	0.5 U	0.5 U	0.5 U
ACETONE	2 U	2 U	2 U
CARBON DISULFIDE	2 U	2 U	2 U
METHYLENE CHLORIDE	0.5 U	0.5 U	0.5 U
1,2-DICHLOROETHENE (TOTAL)	0.5 U	0.5 U	0.5 U
1,1-DICHLOROETHANE	0.5 U	0.5 U	0.5 U
2-BUTANONE	2 U	2 U	2 U
CHLOROFORM	2	0.5 U	0.5 U
1,1,1-TRICHLOROETHANE	0.5 U	0.5 U	0.5 U
CARBON TETRACHLORIDE	0.5 U	0.5 U	0.5 U
BENZENE	0.5 U	0.5 U	0.5 U
1,2-DICHLOROETHANE	0.5 U	0.5 U	0.5 U
TRICHLOROETHENE	0.5 U	0.5 U	0.5 U
1,2-DICHLOROPROPANE	0.5 U	0.5 U	0.5 U
BROMODICHLOROMETHANE	0.5 U	0.5 U	0.5 U
CIS-1,3-DICHLOROPROPENE	0.5 U	0.5 U	0.5 U
4-METHYL-2-PENTANONE	2 U	2 U	2 U
TOLUENE	0.5 U	0.5 U	0.5 U
TRANS-1,3-DICHLOROPROPENE	0.5 U	0.5 U	0.5 U
1,1,2-TRICHLOROETHANE	0.5 U	0.5 U	0.5 U
TETRACHLOROETHENE	0.5 U	0.5 U	0.5 U
2-HEXANONE	2 U	2 U	2 U
DIBROMOCHLOROMETHANE	0.5 U	0.5 U	0.5 U
CHLOROBENZENE	0.5 U	0.5 U	0.5 U
ETHYLBENZENE	0.5 U	0.5 U	0.5 U
XYLENE (TOTAL)	0.5 U	0.5 U	0.5 U
STYRENE	0.5 U	0.5 U	0.5 U
BROMOFORM	0.5 U	0.5 U	0.5 U
1,1,2,2-TETRACHLOROETHANE	0.5 U	0.5 U	0.5 U

GROUNDWATER ANALYTICAL RESULTS
APRIL 1997
OPERABLE UNIT NO.1 - SITE 24
MONITORING AND O SUPPORT, CTO-0367
MCB CAMP LEJEUNE, NORTH CAROLINA
ORGANICS

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

GROUNDWATER ANALYTICAL RESULTS
APRIL 1997
OPERABLE UNIT NO.1 - SITE 24
MONITORING AND O SUPPORT, CTO-0367
MCB CAMP LEJEUNE, NORTH CAROLINA
INORGANICS

SAMPLE ID	24-GW08-97B	24-GW09-97B	24-GW10-97B
DATE SAMPLED	04/26/97	04/26/97	04/26/97
TOTAL INORGANICS (ug/L)			
ANTIMONY, TOTAL	2.1	1.6 U	1.6 U
ARSENIC, TOTAL	1.8 U	1.8 U	1.8 U
BERYLLIUM, TOTAL	0.1 U	0.13	0.1 U
CHROMIUM, TOTAL	1.1	0.73	0.36
IRON, TOTAL	368	297	15.3
LEAD, TOTAL	3.8	3.1	3.3
MANGANESE, TOTAL	2.7	25.8	0.4 U
MERCURY, TOTAL	0.1 U	0.1 U	0.1 U
NICKEL, TOTAL	0.7 U	0.7 U	0.7 U

GROUNDWATER ANALYTICAL RESULTS
APRIL 1997
OPERABLE UNIT NO.1 - SITE 24
MONITORING AND O SUPPORT, CTO-0367
MCB CAMP LEJEUNE, NORTH CAROLINIA
OIL, GREASE AND WET CHEMISTRY

SAMPLE ID	24-GW08-97B	24-GW09-97B	24-GW10-97B
DATE SAMPLED	04/26/97	04/26/97	04/26/97
OIL & GREASE (mg/L)			
OIL & GREASE, GRAV.	5.3 U	5.4 U	30.6
WET CHEMISTRY (mg/L)			
TOTAL DISSOLVED SOLIDS	78	44	68
TOTAL SUSPENDED SOLIDS	6	4 U	4 U

GROUNDWATER ANALYTICAL RESULTS
APRIL 1997
OPERABLE UNIT NO.1 - SITE 78
MONITORING AND O SUPPORT, CTO-0367
MCB CAMP LEJEUNE, NORTH CAROLINA
ORGANICS

SAMPLE ID	78-GW01-97B	78-GW04-97B	78-GW08-97B	78-GW09-97B	78-GW09DW-97B	78-GW09IW-97B
DATE SAMPLED	04/30/97	04/27/97	04/29/97	04/27/97	04/27/97	04/27/97
VOLATILES (ug/l)						
CHLOROMETHANE	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
VINYL CHLORIDE	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
BROMOMETHANE	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
CHLOROETHANE	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,1-DICHLOROETHENE	0.5 U	0.5 U	0.5 U	140	0.5 U	0.5 U
ACETONE	3	2 U	2 U	2 U	2 U	2 U
CARBON DISULFIDE	2 U	2 U	2 U	2 U	2 U	2 U
METHYLENE CHLORIDE	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,2-DICHLOROETHENE (TOTAL)	4	2	0.5 U	300	0.5 U	3
1,1-DICHLOROETHANE	0.5 U	0.5 U	0.5 U	67	0.5 U	0.5 U
2-BUTANONE	2 U	2 U	2 U	2 U	2 U	2 U
CHLOROFORM	0.5 U	0.5 U	0.5 U	2	0.5 U	0.5 U
1,1,1-TRICHLOROETHANE	0.5 U	0.5 U	0.5 U	480	0.5 U	0.5 U
CARBON TETRACHLORIDE	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
BENZENE	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,2-DICHLOROETHANE	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
TRICHLOROETHENE	18	7	0.5 U	580	0.5 U	0.5 U
1,2-DICHLOROPROPANE	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
BROMODICHLOROMETHANE	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
CIS-1,3-DICHLOROPROPENE	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
4-METHYL-2-PENTANONE	2 U	2 U	2 U	2 U	2 U	2 U
TOLUENE	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
TRANS-1,3-DICHLOROPROPENE	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,1,2-TRICHLOROETHANE	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
TETRACHLOROETHENE	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
2-HEXANONE	2 U	2 U	2 U	2 U	2 U	2 U
DIBROMOCHLOROMETHANE	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
CHLOROBENZENE	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
ETHYLBENZENE	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
XYLENE (TOTAL)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
STYRENE	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
BROMOFORM	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,1,2,2-TETRACHLOROETHANE	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U

GROUNDWATER ANALYTICAL RESULTS
APRIL 1997
OPERABLE UNIT NO.1 - SITE 78
MONITORING AND O SUPPORT, CTO-0367
MCB CAMP LEJEUNE, NORTH CAROLINA
ORGANICS

SAMPLE ID	78-GW10-97B	78-GW11-97B	78-GW14-97B	78-GW15-97B	78-GW17-97B	78-GW21-97B	78-GW22A-97B
DATE SAMPLED	04/29/97	04/29/97	04/27/97	04/30/97	04/29/97	04/28/97	04/28/97
VOLATILES (ug/l)							
CHLOROMETHANE	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
VINYL CHLORIDE	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
BROMOMETHANE	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
CHLOROETHANE	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,1-DICHLOROETHENE	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
ACETONE	2 U	2 U	2 U	2 U	2 U	2 U	2 U
CARBON DISULFIDE	2 U	2 U	2 U	2 U	2 U	2 U	2 U
METHYLENE CHLORIDE	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,2-DICHLOROETHENE (TOTAL)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,1-DICHLOROETHANE	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
2-BUTANONE	2 U	2 U	2 U	2 U	2 U	2 U	2 U
CHLOROFORM	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,1,1-TRICHLOROETHANE	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
CARBON TETRACHLORIDE	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
BENZENE	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,2-DICHLOROETHANE	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
TRICHLOROETHENE	0.5 U	0.5 U	0.5 U	1	0.5 U	0.5 U	0.5 U
1,2-DICHLOROPROPANE	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
BROMODICHLOROMETHANE	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
CIS-1,3-DICHLOROPROPENE	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
4-METHYL-2-PENTANONE	2 U	2 U	2 U	2 U	2 U	2 U	2 U
TOLUENE	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
TRANS-1,3-DICHLOROPROPENE	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,1,2-TRICHLOROETHANE	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
TETRACHLOROETHENE	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
2-HEXANONE	2 U	2 U	2 U	2 U	2 U	2 U	2 U
DIBROMOCHLOROMETHANE	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
CHLOROBENZENE	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
ETHYLBENZENE	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
XYLENE (TOTAL)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
STYRENE	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
BROMOFORM	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,1,2,2-TETRACHLOROETHANE	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U

GROUNDWATER ANALYTICAL RESULTS
APRIL 1997
OPERABLE UNIT NO.1 - SITE 78
MONITORING AND O SUPPORT, CTO-0367
MCB CAMP LEJEUNE, NORTH CAROLINA
ORGANICS

SAMPLE ID	78-GW23-97BDL	78-GW24-97B	78-GW24DW-97B	78-GW24IW-97B	78-GW25-97B	78-GW39-97B
DATE SAMPLED	04/28/97	04/29/97	04/29/97	04/29/97	04/28/97	04/30/97
VOLATILES (ug/l)						
CHLOROMETHANE	50 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
VINYL CHLORIDE	340	4	0.5 U	0.5 U	0.5 U	0.5 U
BROMOMETHANE	50 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
CHLOROETHANE	50 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,1-DICHLOROETHENE	50 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
ACETONE	200 U	2 U	2 U	2 U	2 U	2 U
CARBON DISULFIDE	200 U	2 U	2 U	2 U	2 U	2 U
METHYLENE CHLORIDE	50 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,2-DICHLOROETHENE (TOTAL)	9500	130	0.5 U	0.5 U	0.7	0.5 U
1,1-DICHLOROETHANE	50 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
2-BUTANONE	200 U	2 U	2 U	2 U	2 U	2 U
CHLOROFORM	50 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,1,1-TRICHLOROETHANE	50 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
CARBON TETRACHLORIDE	50 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
BENZENE	50 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,2-DICHLOROETHANE	50 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
TRICHLOROETHENE	50 U	17	0.5 U	0.5 U	0.5 U	0.5 U
1,2-DICHLOROPROPANE	50 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
BROMODICHLOROMETHANE	50 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
CIS-1,3-DICHLOROPROPENE	50 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
4-METHYL-2-PENTANONE	200 U	2 U	2 U	2 U	2 U	2 U
TOLUENE	50 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
TRANS-1,3-DICHLOROPROPENE	50 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,1,2-TRICHLOROETHANE	50 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
TETRACHLOROETHENE	50 U	0.5 U	0.5 U	0.5 U	0.5 U	0.8
2-HEXANONE	200 U	2 U	2 U	2 U	2 U	2 U
DIBROMOCHLOROMETHANE	50 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
CHLOROBENZENE	50 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
ETHYLBENZENE	50 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
XYLENE (TOTAL)	50 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
STYRENE	50 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
BROMOFORM	50 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,1,2,2-TETRACHLOROETHANE	50 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U