D-49-10-92-2

DRAFT
SITE INSPECTION REPORT

SITE 07: TARAWA TERRACE DUMP
MARINE CORPS BASE
CAMP LEJEUNE
JACKSONVILLE, NORTH CAROLINA

HALLIBURTON NUS PROJECT NUMBER 2F36

OCTOBER 1992

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Environmental Corporation

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MARINE CORPS BASE, CAMP LEJEUNE
JACKSONVILLE, NORTH CAROLINA

A/E CONTRACT NO. N62470-90-B-7629

Prepared by:

HALLIBURTON NUS Environmental Corporation
661 Andersen Drive
Pittsburgh, Pennsylvania 15220

Prepared For:

DEPARTMENT OF THE NAVY
ATLANTIC DIVISION
NAVAL FACILITIES ENGINEERING COMMAND
NORFOLK, VIRGINIA

HALLIBURTON NUS PROJECT NUMBER 2F36

OCTOBER 1992

SUBMITTED FOR HALLIBURTON NUS BY:	APPROVED BY:
DARYL HUTSON	VICKI L. BOMBERGER, LPG
PROJECT MANAGER	PROGRAM MANAGER

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EXECUTIVE SUMMARY

This report documents the results of a site investigation, and preliminary risk assessment completed by HALLIBURTON NUS Environmental Corporation, Inc. (HALLIBURTON NUS) for a site within the Marine Corps Air Station (MCAS), New River as part of Marine Corps Base (MCB) Camp Lejeune. This section presents a brief site history, a description of the field activities performed during the investigation, and conclusions based on the results of the investigation.

SITE HISTORY

Tarawa Terrace Dump is an inactive landfill, but the precise years of operation are unknown. It was used during the construction of the base housing located in Tarawa Terrace. The landfill was closed in 1972. As far as is known, no hazardous materials were disposed of in this facility. Only construction debris, sewage treatment plant filter media, and household trash are known to have been disposed.

FIELD ACTIVITIES

Five soil borings were completed as part of the field investigation. In addition, three monitoring well borings were also sampled for subsurface soils during installation. A total of 8 surface and 5 subsurface soil samples were analyzed for Target Compound List organics and inorganics, including cyanide.

Three monitoring wells were installed at the site as part of the site investigation. The well locations were selected based on the suspected source areas, the overall expected groundwater flow pattern, and the data requirements stated in the Final Sampling and Analysis Plan. The wells were installed to provide the necessary data to determine the lateral extent of any groundwater contamination and to provide data for determining groundwater flow direction. The newly installed monitoring wells were sampled during the investigation. Details of the field investigation performed at this site are summarized in Section 2.0 of this report.

CONCLUSIONS

The primary purpose of the investigation was to determine whether a contamination problem existed on the site due to its previous use as a landfill. The analytical data were validated and a preliminary risk assessment was performed. The results of the risk assessment are discussed in detail in Section 5.0 of this document. A brief discussion of the results are presented below by media.

Three potential chemicals of concern (dieldrin, Aroclor-1260, and beryllium) were detected in soil samples at concentrations exceeding preliminary remediation goals based on an incremental cancer risk of 10^{-6} (transient military personnel). However, none of the estimated cancer risks associated with these chemicals exceed the upper bound of the EPA's target risk range (ie., 10^{-4}). Under current site conditions and based on existing information, soil contamination at the Tarawa Terrace Dump Site does not pose a substantial risk to public health.

Numerous inorganic constituent were detected in unfiltered groundwater samples at concentrations exceeding Federal or State standards/criteria. Shallow groundwater at the site is not currently used as a potable water source and hence exposure pathways/routes associated with groundwater use are incomplete. Metal concentrations do not clearly indicate that the site is the source of inorganic contamination. Metals concentrations may be indicative of the presence of naturally occurring suspended solid that are relatively high in metals content.

RECOMMENDATIONS

Recommendations for future actions include surface water and sediment sampling to characterize the extent of contaminant migration. Additional work may include an environmental risk assessment for the ecosystem at and near the discharge point of the drainage ditches into Northeast Creek. Additionally, installation of a clearly defined background monitoring well and sampling and analysis of groundwater samples for both total and dissolved metals is considered appropriate.

1.0 SITE BACKGROUND

This section presents the location, layout, and brief history of Site 07: Tarawa Terrace Dump.

1.1 INTRODUCTION

HALLIBURTON NUS Environmental Corporation (HALLIBURTON NUS), under Contract Number N62470-90-R-7629, prepared this report for the Department of the Navy, Atlantic Division, for Marine Corps Base (MCB) Camp Lejeune. This report presents the results of the Site Investigation (SI) conducted at Site 07: Tarawa Terrace Dump.

This site was reviewed in the Initial Assessment Study (IAS) (Water and Air Research, 1983) and recommended for "No Further Action." It was determined to obtain field data and perform a risk assessment to further support this decision. There have been no previous investigations performed at this site. This section summarizes the scope and objectives of the investigation. Included are descriptions of the site, relevant background information, and the organization of this document.

This investigation was conducted in accordance with the Scope of Work prepared by Department of Navy personnel, which was incorporated in the Final Work Plan prepared by HALLIBURTON NUS (HALLIBURTON NUS, August 1991). The objective of this investigation was to determine, via sampling and analysis activities, whether specific toxic and hazardous materials identified, and possibly other contaminants, exist in concentrations considered to be hazardous.

The field investigation for the project was conducted in June 1991 to meet the above objective. This report presents the findings and conclusions of these studies.

1.2 SITE LOCATION

MCB Camp Lejeune is located in Onslow County, North Carolina. Figure 1-1 is a location map of Camp Lejeune that identifies approximate locations of the sites covered in the Final Work Plan prepared by HALLIBURTON NUS (HALLIBURTON NUS, August 1991). The facility currently covers approximately 170 square miles and is bisected by the New River. The Atlantic Ocean forms the southeastern boundary of the base. The western and northeastern boundaries are U.S. 17 and State Road 24, respectively.

Tarawa Terrace Dump is a landfill located east of the sewage treatment plant and south of the Community Center between Tarawa boulevard and Northeast Creek (PDWM coordinates 3,F4). The general location of the site is shown in Figure 1-2. Its size is estimated at 4 acres. The elevation range for Tarawa Terrace Dump is 2.24-12.92 feet above mean sea level (MSL).

1.3 SITE LAYOUT

Tarawa Terrace Dump is a landfill located east of the sewage treatment plant and south of the Community Center between Tarawa boulevard and Northeast Creek (PDWM coordinates 3,F4). The general layout of the site is shown in Figure 1-2. Its size is estimated at 4 acres. The elevation range for Tarawa Terrace Dump is 2.24-12.92 feet above (MSL).

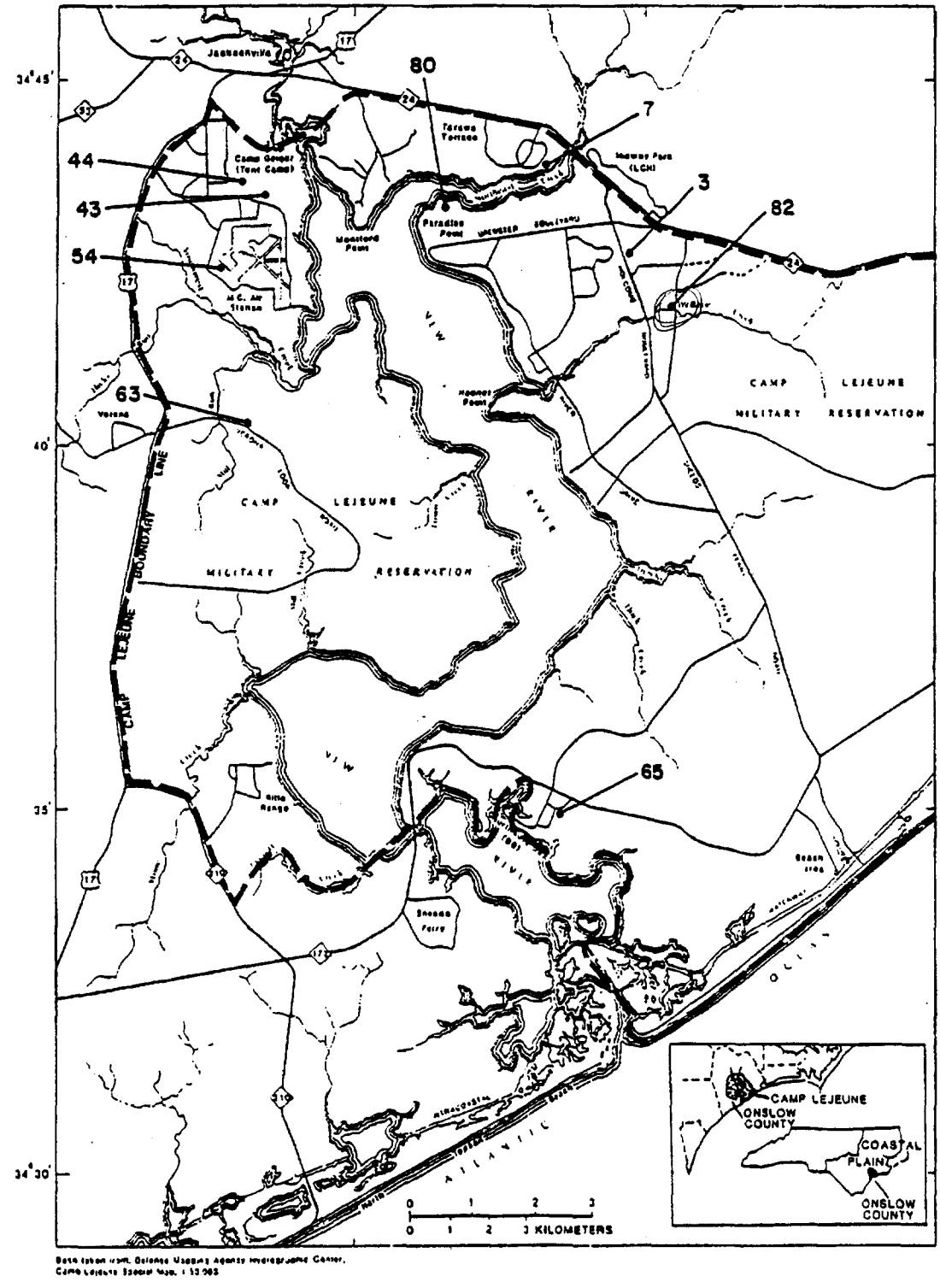

FIGURE 1-1
LOCATION MAP
MCB CAMP LEJEUNE

IAS site numbers are identified above with approximate locations.

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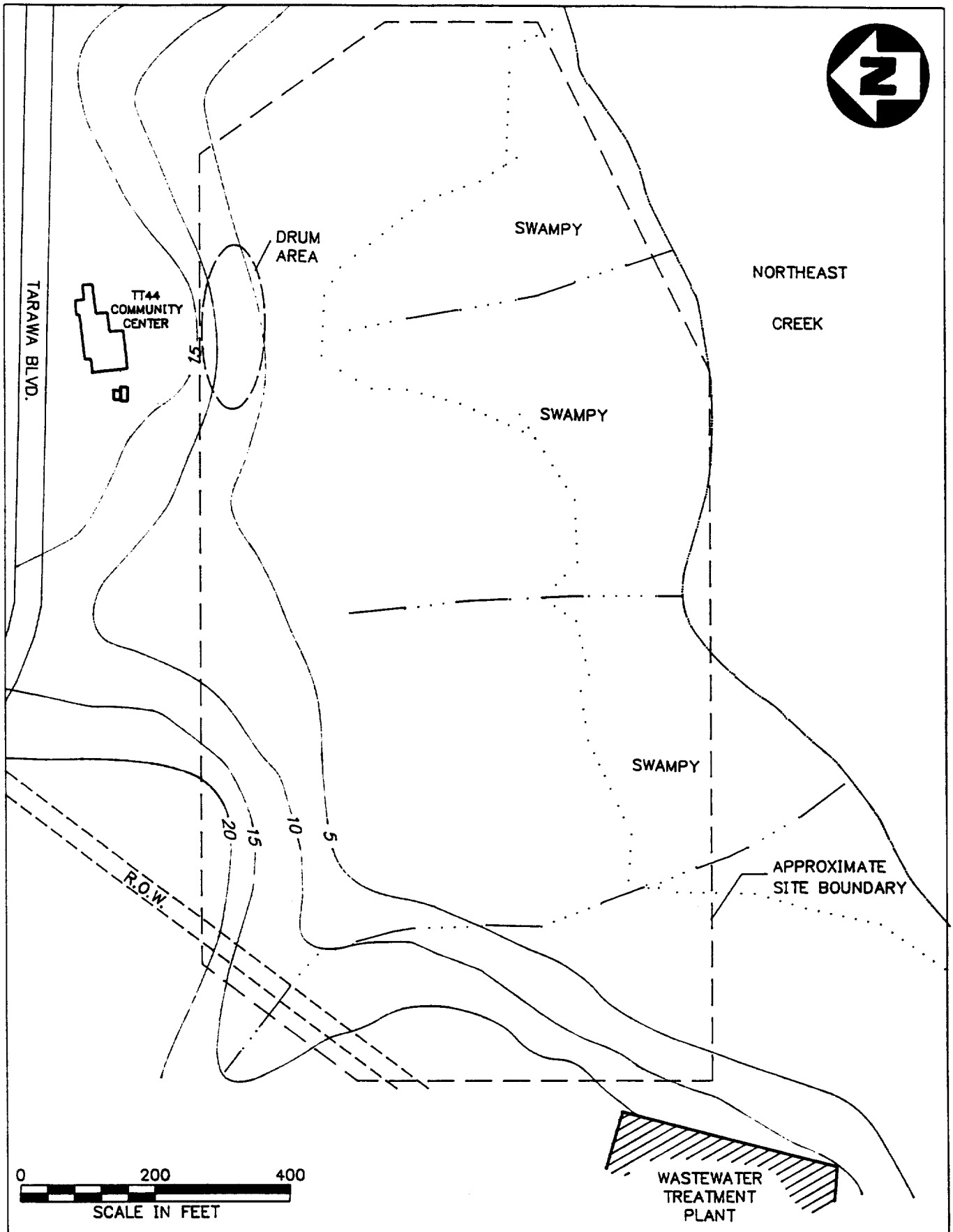

FIGURE 1-2

SITE LOCATION MAP
SITE 07: TARAWA TERRACE DUMP
MCB CAMP LEJEUNE

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Environmental Corporation

1.4 SITE OWNERSHIP HISTORY

This environmental investigation was performed for the Department of the Navy, Atlantic Division. Tarawa Terrace Dump is a landfill, but the precise years of operation are unknown. It was used during the construction of the base housing located in Tarawa Terrace. The landfill was closed in 1972. As far as is known, no hazardous materials were disposed of in this facility. Only construction debris, sewage treatment plant filter media, and household trash are known to have been disposed.

1.5 PERMIT AND REGULATORY HISTORY

This study was conducted at MCB Camp Lejeune as part of the Department of the Navy's Installation Restoration Program (IRP). The Initial Assessment Study (IAS) (Water and Air Research, Inc., March 1983), essentially equivalent to EPA's Superfund Program Preliminary Assessment (PA), collected and evaluated historical evidence indicating the existence of pollutants that may have contaminated the site. This study concluded with the recommendation for "No Further Action." It was determined to further investigate this site to support this decision. This report presents the results of the additional data gathering and preliminary risk assessment performed to determine whether the contaminants present at the site pose a risk to human health or the environment.

1.6 REMEDIAL ACTIONS TO DATE

As stated in Section 1.3, Tarawa Terrace Dump is a landfill located east of the sewage treatment plant and south of the Community Center between Tarawa boulevard and Northeast Creek. Barrier tape was erected at the perimeter of the site behind the community center to prevent entry to the site by unauthorized personnel. With the exception of the barrier tape installation, no other remedial actions have been performed to date.

1.7 SITE INVESTIGATION SUMMARY

Several field investigation tasks were developed to support the objective of performing a preliminary risk assessment to determine if there is a threat to human health or the environment from this site. The field investigation activities, as developed in the Final Sampling and Analysis Plan (HALLIBURTON NUS, August 1991), are briefly summarized in the following sections. The specific tasks covered are subsurface soil investigation, hydrogeologic investigation, and surveying. Table 1-1 summarizes all field activities that were conducted in June 1991. Figure 1-3 depicts the sampling locations.

1.7.1 Subsurface Soil Investigation

Five soil borings were completed as part of the SI field investigation conducted at the Tarawa Terrace Dump. In addition, three monitoring well borings were also sampled for subsurface soils. All borings were located on site and are depicted in Figure 1-3. The purpose of the soil borings was to obtain subsurface soil samples for chemical analysis, for physical classification, and to determine the nature and extent of subsurface soil contamination at the site. A HALLIBURTON NUS geologist classified the subsurface soil samples based on grain size, color, moisture, and organic content.

All drilling was performed by Hardin-Huber, Inc., under sub-contract to HALLIBURTON NUS and directed in the field by HALLIBURTON NUS representatives. A CME-55 all-terrain drilling rig equipped with 6-1/4-inch inside diameter hollow-stem augers was used for drilling and sampling. An electromagnetometer (Heliflux) was used at each location prior to drilling in order to avoid contact with buried metallic debris.

TABLE 1-1

FIELD INVESTIGATION SUMMARY
SITE 07 - TARAWA TERRACE DUMP
MCB CAMP LEJEUNE
JACKSONVILLE, NORTH CAROLINA

Component	Purpose	Description
Soil/Well Borings	To obtain subsurface soil samples for chemical and physical analysis (site characterization).	Three on-site soil borings including a total of seven subsurface soil samples.
Subsurface Soil Sampling	Soil contaminant characterization.	Six samples for chemical analysis of the on-site subsurface soils.
Monitoring Wells	Dissolved contaminant identification.	Drilling, installation, and development of one new overburden monitoring wells.
Groundwater Sampling	Detailed groundwater contamination characterization.	One round of sampling for chemical analysis from one new and two existing monitoring wells.
Background Sampling	To provide an estimate of background soil concentrations of metals.	Three off-site soil samples analyzed for TAL inorganics.
Surveying	Locate all sampling sites.	Survey all sampling locations.

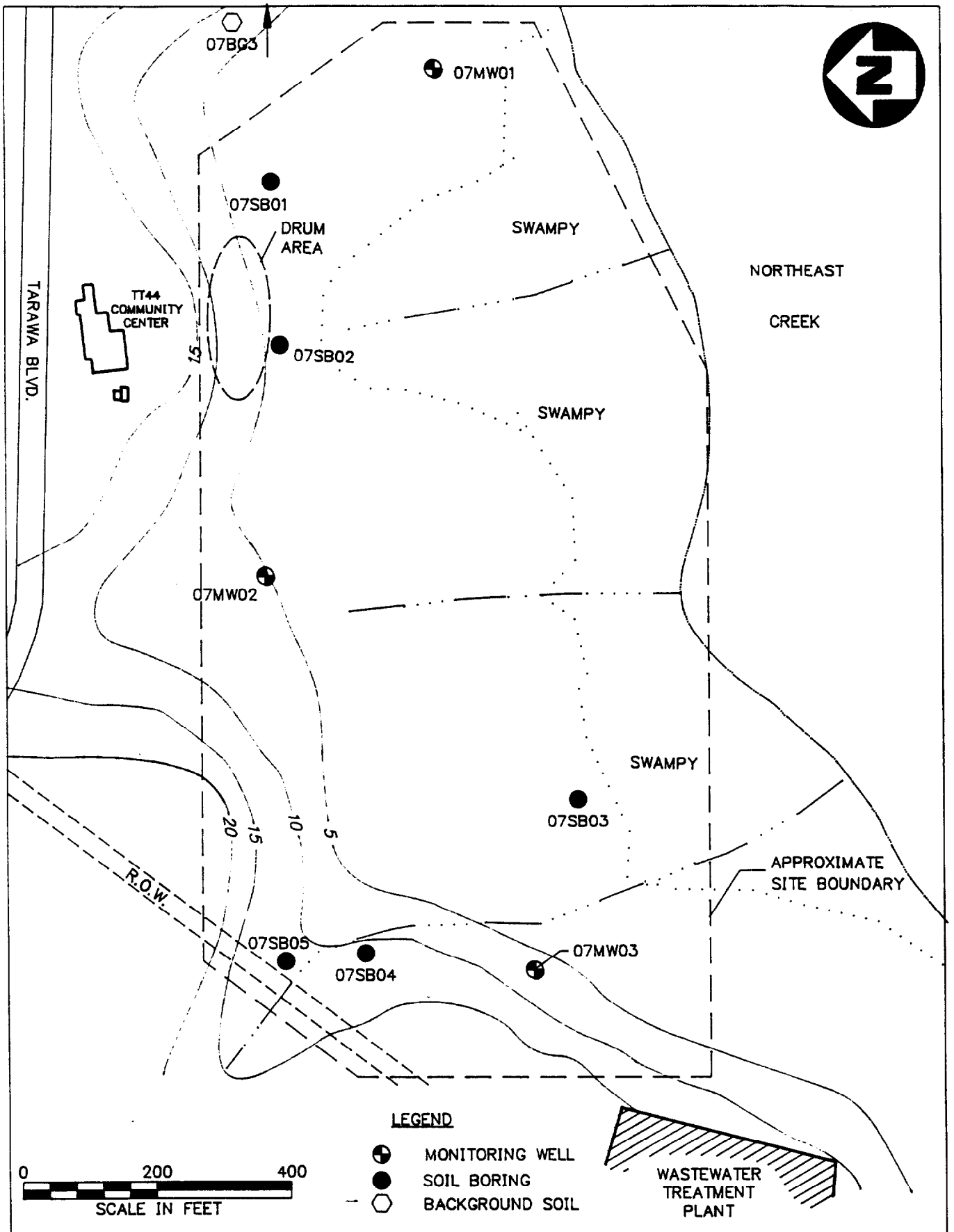

FIGURE 1-3

SAMPLING LOCATION MAP
SITE 07: TARAWA TERRACE DUMP
MCB CAMP LEJEUNE

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Sixteen subsurface soil samples were obtained using a 2-1/2 inch outside diameter by 24 inch long split-barrel sampler. All split-barrel samplers, augers, and the drill rig were decontaminated between borings in accordance with the Final Sampling and Analysis Plan. Soil samples were obtained beginning at the ground surface and at five foot intervals until the total depth was reached. All sampling was performed in accordance with ASTM method D1586-84. Well borings were terminated approximately 5 feet below the water table at depths that range from 7.0 to 15.0 feet. Soil borings were terminated at or just below the water table. Two borings, 07SB01 and 07SB03, were advanced with hand equipment to depths of approximately 3.0 feet due to the very shallow depth to groundwater.

The soils sampled ranged from very loose to medium dense, black to brown-tan, fine clayey sand with silty sand and clay lenses. USCS classifications for the soils, based on visual analysis, are predominantly SC and SM.

During the soil boring program, HALLIBURTON NUS personnel continually monitored the breathing zone with a photoionization detector (Hnu). As the subsurface soils were exposed upon opening of the split-barrel sampler, they also were monitored with the Hnu. Hnu readings ranging from 0 to 3 parts per million (ppm) were observed when the subsurface soils were exposed. No measurable readings were obtained in the breathing zone. Upon completion of the three monitoring well borings, an attempt was made to obtain a 0-hour water-level measurement, after which a monitoring well was installed to the proposed depth as outlined in the Final Sampling and Analysis Plan. Attached in Appendix A are the boring logs.

With the exception of soil borings 07SB01 and 07SB03, and well boring 07MW03, two subsurface soil samples were obtained from each for analytical testing. The first sample taken for analytical testing was from the ground surface to a depth of two feet. The second sample was obtained immediately above or at the water table. In the three shallow boring locations previously mentioned, groundwater was at a depth of less than five feet, thus only one sample, from the ground surface to a depth of two feet, was taken for chemical analysis. All other subsurface soil samples obtained during drilling were used for lithologic description only and retained on site.

A total of thirteen subsurface soil samples were analyzed by the Versar Laboratory in Springfield, Virginia, for volatile organics, semivolatile organics, pesticides, PCBs, total lead, and cyanide. Appropriate QA/QC samples were incorporated in the sampling round. These included one duplicate, one rinsate blank, and one trip blank. The trip blank accompanying the samples was analyzed for volatile organics only.

1.7.2 Hydrogeologic Investigation

Three monitoring wells were installed at the Tarawa Terrace Dump as part of the site investigation. The locations of the monitoring wells are shown in Figure 1-2. The well locations were selected based on the suspected source areas, the overall expected groundwater flow pattern, and the data requirements stated in the Final Sampling and Analysis Plan. The wells were installed to provide the necessary data to determine the lateral extent of any groundwater contamination and to provide data for determining groundwater flow direction.

Each monitoring well boring was initially drilled as a soil boring to obtain subsurface soil samples. The soil borings were then enlarged, using 6-1/4 inch inside diameter hollow-stem augers. Cuttings were containerized into 55 gallon DOT approved open-top drums, sealed and bolted, labeled, and left on site.

When the anticipated installation depth was reached, the augers were left in the boring to provide a temporary casing during well installation. Well construction materials consisted of 2-inch inside diameter, Schedule 40, flush-jointed, threaded PVC riser pipe and 0.02-inch slotted well screen. The screened sections were 5 to 10 feet in length, depending on the depth to the watertable. The screened section and riser pipe

was then inserted into the borehole to a depth that resulted in the water level in the well being located within the upper portion of the screened interval.

The annular space between the PVC pipe and the wall of the borehole was filled using silica sand from the bottom of the borehole to a point approximately 1 to 2 feet above the top of the screened section. The hollow-stem augers which were originally left in to maintain the integrity of the hole were slowly withdrawn from the borehole during installation of the sand. An approximate 1/2 to 2-foot-thick bentonite pellet seal was installed within the annular space above the sand. After the pellets were allowed to fully hydrate, a grout mixture of cement, bentonite powder, and potable water was installed into the annular space above the bentonite seal using a tremie pipe. A 5-foot section of 4-inch diameter steel protective casing was placed into the grout so that approximately 2 to 3 feet of pipe was below ground surface and 2 to 3 feet remained aboveground. The protective casing was equipped with a locking cap to secure the well. Finally, an approximately 2-foot by 2-foot square, 6-inch thick concrete pad was constructed around each well. The three monitoring wells were completed at depths ranging from 7.0 feet to 15.0 feet. Due to the extremely shallow depth to groundwater at well 07MW03 (approximately 1 foot below ground surface), depth and thickness of well installation materials were modified to accommodate the existing site conditions.

The drilling and installation of the monitoring wells followed the Final Sampling and Analysis Plan concerning decontamination procedures and health and safety monitoring. All drilling was completed in Level "D" personal protection. Additional details regarding the monitoring well installation can be found on the Boring Logs in Appendix B and the Well Construction Diagrams in Appendix C. Table 1-2 presents a summary of the well construction data.

One round of groundwater sampling was conducted on June 26, 1991 from the three newly installed monitoring wells. All monitoring wells were developed after installation and purged prior to sampling in accordance with the Final Sampling and Analysis Plan. A dedicated stainless steel bailer was used for purging and sampling. Appropriate QA/QC samples were incorporated in the sampling round.
These included one duplicate, one rinsate blank, one field blank, and one trip blank. All samples were analyzed for volatile organics, semivolatile organics, pesticides, PCBs, total lead, and cyanide. The trip blank accompanying the samples was analyzed for volatile organics only.

1.7.3 Background Soils

Three soil samples were obtained at different locations on the base to provide an estimation of the background concentrations of metals in the soils at the base. One of the three (BS-3) was obtained near the Tarawa Terrace Dump site approximately 400 feet east of the Community Center in a wooded area south of Tarawa Boulevard. Background soil sample BS-1 was obtained from a wooded area east of the Piney Green Road VOC site. Background soil sample BS-2 was obtained from a wooded area east of the Old Creosote Plant site. The samples were collected from the ground surface to a depth of approximately 0.5 feet with hand equipment and analyzed for TCL inorganics (no cyanide) only.

1.7.4 Surveying

Surveying of the Tarawa Terrance Dump Site was performed by Murphy Yelle Environmental Surveyors, professional land surveyors. All work was performed under a sub-contract with HALLIBURTON NUS and was directed in the field by representatives of HALLIBURTON NUS.

During completion of the field activities, the contractor surveyed the vertical and horizontal locations of the five soil borings and the background soil sample. Additionally, the surveyor also surveyed the vertical and horizontal locations of the three installed monitoring wells, including ground surface, top of riser pipe and top of protective casing. The location map included as Figure 1-2 depicts these surveyed locations. Table 1-3 lists the coordinates and elevations of all surveyed sampling points at the Tarawa Terrace Dump.

TABLE 1-2

MONITORING WELL SUMMARY
SITE 07 - TARAWA TERRANCE DUMP
MCB CAMP LEJEUNE
JACKSONVILLE, NORTH CAROLINA

Well Number	Ground Elevation[1]	Top of Casing Elevation[1]	Total Depth (feet)[2]	Screened Interval (feet)[2]	Depth to Water (feet)[3]	Water Level Elevation[1]
07MW01	2.63	6.11	13.5(4)	3.0-13.0[4]	3.75	2.360
07MW02	6.44	9.70	15.0(4)	4.0-14.0[4]	3.50	6.20
07MW03	2.85	6.14	7.0	2.5-5.5	3.99	2.15

[1] Feet above Mean Sea Level (MSL)
[2] Feet below ground surface
[3] Measured from top of PVC well casing (6-13-91)
[4] Existing well depths based on ES&E report, 1990

TABLE 1-3

DETAILED SURVEY SUMMARY
SITE 07 - TARAWA TERRACE DUMP
MCB CAMP LEJEUNE
JACKSONVILLE, NORTH CAROLINA

Well/ Boring Number	Ground Elevation[1]	Top of PVC Casing Elevation[1]	Top of Steel Casing Elevation[1]	Total Depth (feet)[2]	Northing Coordinate[3]	Easting Coordinate[3]
07MW01	2.63	6.11	6.54	13.5	360765.243	2489312.774
07MW02	6.44	9.70	10.14	15.0	360068.364	2488930.548
07MW03	2.85	6.14	6.36	7.0	359423.133	2489222.259
07SB01	2.43	NA	NA	3.0	360643.986	2489043.435
07SB02	5.56	NA	NA	9.0	360402.635	2489013.280
07SB03	2.24	NA	NA	2.0	359661.051	2489331.980
07SB04	12.22	NA	NA	9.0	359491.082	2488977.797
07SB05	12.92	NA	NA	12.0	359500.546	2488857.843
BS-3	18.0	NA	NA	0.5	361067.574	2489060.685

[1] Feet above Mean Sea Level (MSL)
[2] Feet below ground surface
[3] Coordinates based on NAD 27 values

2.0 ENVIRONMENTAL SETTING

This section describes the different site features of the Tarawa Terrace Dump Site. Specifically it will cover the surface features, climatology, surface water hydrology, geologic setting, hydrogeologic setting, and land use and natural resources.

Additional site information can be found in the following documents:

- Continuous Seismic Reflection Profiling of Hydrogeologic Features Beneath New River, Camp Lejeune, North Carolina (U.S. Geological Survey, 1990)
- Initial Assessment Study (IAS) of Marine Corps Base Camp Lejeune, North Carolina (Water and Air Research, 1983).
- Hydrogeologic Framework of U.S. Marine Corps Base, Camp Lejeune, North Carolina (Department of the Navy, 1990)
- Provisional Draft - Assessment of Hydrologic and Hydrogeologic Data at Camp Lejeune Marine Corps Base, North Carolina (U.S. Geological Survey, 1989)

2.1 TOPOGRAPHY

The surface topography of the inland portion of MCB Camp Lejeune is related to (1) undisected, nearly level marine sediments which comprise the interstream areas, (2) short, convex slopes and narrow valleys made by streams, and (3) low ridges formed by wind deposits of coastal sand with associated tidal marshes as at the Outer Banks. The elevation of MCB Camp Lejeune ranges from mean sea level (MSL) to about 72 feet above MSL, with an the average elevation of 20 feet.

The Tarawa Terrace Dump Site is located within Marine Corps Base (MCB) Camp Lejeune, which lies southeast of Jacksonville in Onslow County, North Carolina. MCB Camp Lejeune covers approximately 170 square miles and is bisected by the New River. The base lies within the Tidewater Region of the Atlantic Coastal Plain physiographic province. Rivers in the Tidewater Region are affected by oceanic tides due to the area's proximity to the ocean and low relief. Surface elevations generally are below 50 feet, with an average elevation of 20 feet.

The site lies near the south end of the Tarawa Terrace residential area in a low lying, swampy, wooded area north of Northeast Creek. See Figure 1-2 for the general site location map. No visible contamination exists at the site with the exception of a few decomposed drums on the ground surface behind the Community Center. Site elevations vary from 0 to approximately 20 feet above Mean Sea Level (MSL).

2.2 SURFACE WATERS

This section covers the surface water hydrology from a regional perspective as well as site specific conditions.

2.2.1 Regional Surface Water Conditions

The surface-water hydrology of the Jacksonville area is dominated by the New River estuary, which is approximately 30 square miles in area or about 20 percent of the total base area. The New River has a maximum depth of approximately 15 feet but averages from 2 to 5 feet in depth in most areas. It is brackish, shallow, and warm with a normal tidal range of 3.0 to 3.6 feet. Surface water drainage at Camp Lejeune is predominately toward the New River, although areas near the coast drain directly to the Atlantic Ocean though the Intracoastal Waterway.

Flooding is a potential problem for those base areas located within the 100-year floodplain. This is compounded by the large percentage of developed areas where natural drainage has been changed by extensive paved areas. In general, drainage on the base is poor and soils are often wet.

2.2.2 Site Surface Water Conditions

Several surface-water bodies and drainages within the vicinity of the Tarawa Terrace Dump site are considered significant to this site investigation. These include surface waters within the site boundaries as well as Northeast Creek and the New River.

Surface waters and runoff from the site flow in a southerly direction into Northeast Creek. Three storm water runoff ditches dissect the site and merge into one ditch that discharges directly into Northeast Creek. Another runoff ditch flows along the eastern edge of the site and also discharges into Northeast Creek. Northeast Creek flows in a southwesterly direction along the south edge of the site and flows into the New River approximately 3 miles downstream.

Northeast Creek and the four storm water runoff ditches are strongly influenced by the tides. Water was noted to rise approximately one foot in Northeast Creek during high tide, which in turn raised the standing water level in the ditches to approximately two feet. During high tide much of the area is covered with ponded water.

2.3 GEOLOGY AND SOILS

This section discusses the geologic setting from a regional perspective as well as from a site specific basis.

2.3.1 Regional Geology

As mentioned earlier in this report, Camp Lejeune lies within the Tidewater Region of the Atlantic Coastal Plain physiographic province. The geology of the Atlantic Coastal Plain is a seaward-thickening wedge of clastic sediments consisting of sequences of interbedded sands, clays, calcareous clays, shell beds, sandstones, and limestones that overly a basement complex of igneous and metamorphic rocks. These Coastal Plain sediments were deposited in marine and non-marine environments and vary in age from Cretaceous to Recent. The sediment sequence is approximately 1,500 feet thick at Camp Lejeune and thickens to over 5,000 feet off the North Carolina coast.

The soils on the flood plains are classified according to the soil conservation service as poorly drained Muckalle loam; very poorly drained Dorovan muck; and poorly drained Bohicket silty clay loam, which occurs on wide estuarial flood plains of coastal creeks. The soils on the broad, nearly level interstream areas are somewhat poorly drained Lenoir loam, Lynchburg fine sandy loam, and Stallings fine sandy loam. Near the center part of the interstream areas are poorly drained Leon fine sand, Rains fine sandy loam, and

Woodington loamy fine sand soils. Approximately 70 percent of MCB Camp Lejeune is in the broad, flat interstream area.

2.3.2 General Site Geology

Due to the shallow water table at the site, the field drilling program was confined to the top 20 feet of the subsurface. As a result, the geologic conditions at the site have been defined only to a depth of 20 feet.

The shallow subsurface geology of the study area consists of a surficial layer of unconsolidated fine grained sand loam with varying amounts of silt and clay. This surficial layer is underlain by fine grained clayey sand with thin, discontinuous silty sand and clay lenses. Soil density ranged from very loose to medium dense. Because of the relative homogeneity of the site soils and the small number of data points available, no cross-sections have been included in this report.

2.4 GROUNDWATER

This section discusses the hydrogeologic conditions from a regional perspective as well as from a site specific basis.

2.4.1 Regional Hydrogeology

The Coastal Plain consists of a sequence of aquifers made up of interbedded sands and permeable limestones separated by confining units of less permeable clays and calcareous clays. The surficial aquifer and the Castle Hayne aquifer are the principal aquifers of concern in this report.

The surficial aquifer is composed of a series of sands and thin, discontinuous clays that overlie the Castle Hayne. These deposits range in thickness from 25 to 100 feet and are not used directly for water supply at the base. There are several areas where the surficial aquifer has been contaminated by waste disposal activities (Putnam, 1983).

The Castle Hayne aquifer is composed of a series of sand, limestone, and clay beds that are of the Oligocene River Bend Formation and the middle Eocene Castle Hayne Formation. Most supply wells in the vicinity tap this aquifer at depths of 50 to 300 feet. The aquifer ranges in thickness from 250 to 400 feet but brackish water is usually found deeper than 300 feet below MSL (Shiver, 1982).

Confining beds that lie between the two aquifers restrict the exchange of groundwater between the two aquifers and protect the Castle Hayne aquifer from contaminant migration from the surficial aquifer. Research indicates however that there are some interconnections between the two aquifers, and that vertical faulting of the deeper sediments might be the cause (Harned and Lloyd, 1988). A later seismic reflection profiling investigation showed that faulting is not the cause of water migration into the Castle Hayne, but that some hydraulic connection between the two aquifers does exist (Dept. of the Navy, 1990).

The Beaufort, Peedee, Black Creek, and upper and lower Cape Fear aquifers make up the remaining aquifer sequence in the region, but due to their great depth and high salinity, are not of concern to this study.

2.4.2 General Site Hydrogeology

The water table at the Tarawa Terrace Dump site is located in the near surface sands at depths of approximately 3 to 4 feet during low tide. The water table fluctuates approximately 1 to 2 feet with tidal advances to rise to near the ground surface during high tide.

Based on the potentiometric surface map shown in Figure 2-1, groundwater flow direction across the site is to the south toward Northeast Creek. The hydraulic conductivity (K) of soils present at the base are discussed in the USGS provisional draft report Assessment of Hydrologic And Hydrogeologic Data At Camp Lejeune Marine Corps Base, North Carolina, 1989, and is estimated to be 35 feet/day. The hydraulic gradient (i) at the site is calculated to be approximately 0.01 based on one round of synoptic water level measurements taken in the three newly installed wells, and surveyed well elevations. Based on this information, as well as the general topography of the site, it is likely that groundwater discharges into Northeast Creek.

2.5 CLIMATE AND METEOROLOGY

MCB Camp Lejeune typically experiences mild winters with average daily temperature ranges from 33°F to 53°F. Summers are warm and humid with average daily temperature ranges from 71°F to 88°F. The mean daily temperature is about 61°F.

Rainfall averages 55.96 inches per year with potential evapotranspiration varying from 34 to 36 inches of rainfall equivalent per year. The greatest amount of precipitation occurs during the summer months of July and August.
During the summer months winds are generally south-southwesterly, while north-northwest winds predominate during the winter. The growing season is approximately 230 days (Water and Air Research Inc., 1983).

2.6 LAND USE & NATURAL RESOURCES

MCB Camp Lejeune presently covers an area of 170 square miles, including 30 square miles of the New River. The MCB Camp Lejeune is predominately tree covered, with large amounts of softwood and substantial stands of hardwood species. Of MCB Camp Lejeune's 112,000 acres, more than 60,000 are under forestry management. Timber-producing areas are under even-aged management with the exception of those areas along major streams and swamps. These areas are managed to provide for both wildlife habitat and erosion control. Smaller areas are managed for the benefit of threatened or endangered wildlife species.

The natural resources that could be affected by site contamination include Southwest Creek, the New River, and local groundwater. Southwest Creek flows into the New River, which is a productive estuary supporting commercial finfish and shellfish industries. Some areas of the New River at MCB Camp Lejeune are classified under Title 15 of the North Carolina Administrative Code as Class SC; usable for fishing and secondary recreation, but not for primary recreation or shellfish marketing. Many other areas are classified as SA, the highest estuarine classification; usable for shellfish marketing.

Within 15 miles of Camp Lejeune are three large, publicly owned forests - Croatan National Forest, Hofmann Forest, and Camp Davis Forest. Because of the large amount of low lying area and the area's close proximity to the coast, wetlands form a significant portion of this area. The remaining land is primarily agricultural with typical crops being soybeans, small grains, and tobacco.

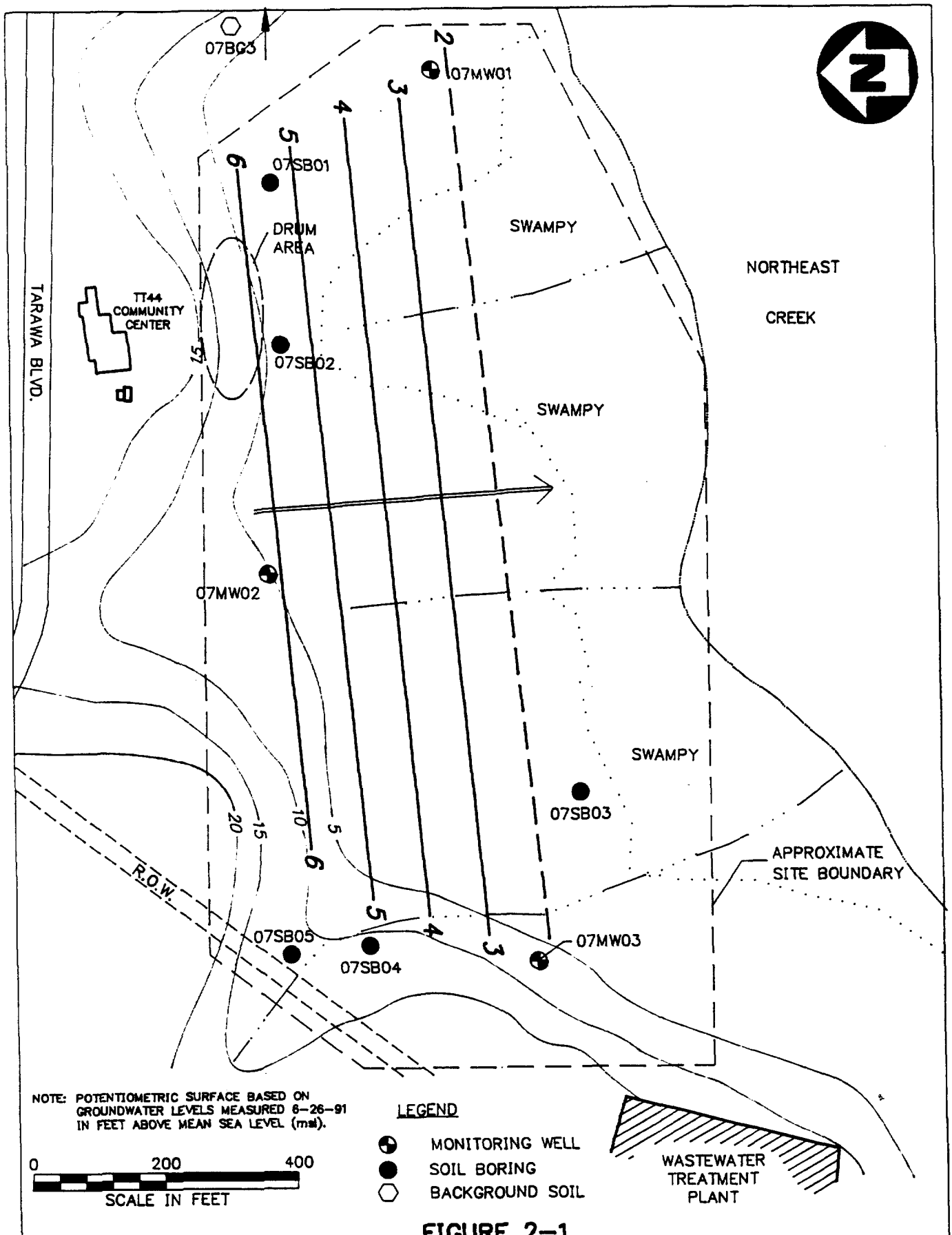

FIGURE 2-1

POTENTIOMETRIC SURFACE MAP
SITE 07: TARAWA TERRACE DUMP
MCB CAMP LEJEUNE

HALLIBURTON NUS
Environmental Corporation

ACAD: 2F36\SITE-7.DWG 11/19/91 MJJ

2.7 POPULATION DISTRIBUTION

The total current military and civilian population at MCB Camp Lejeune is approximately 60,000 people. During the past 10-year period, urbanization has rapidly increased in Onslow County. Residential development has flourished adjacent to all Base boundaries, except in areas where adverse soil conditions limited the use of septic tanks and central sewage treatment facilities were unavailable. Based on the monthly Camp Lejeune Area Population report, 1985, the military population of Camp Lejeune was approximately 40,928 active duty personnel. The military dependant community was in excess of 32,081. About one half of these personnel and dependents reside in Base housing units. The remaining personnel and dependents live off base and have had dramatic effects on the surrounding area. Several thousand additional civilian employees perform facilities management and support functions. The population of Onslow County had grown from 17,939 in 1940 (Federal Census, 1940), prior to the formation of the Base, to 121,350 in 1985 (Office of State Budget and Management Report, 27 Sept. 1985). Due to the location of the Tarawa Terrace military personnel and their dependents live in the proximity of the site.

2.8 WATER SUPPLY

The water supply for MCB Camp Lejeune is entirely from water wells located within the boundaries of the installation. Groundwater is the source of water for MCB Camp Lejeune, as is the for most of the Coastal Plain of North Carolina. Information regarding groundwater conditions in the Coastal Plain is provided in the report Groundwater Evaluation in the Coastal Plain of North Carolina, prepared by the North Carolina Department of Natural Resources and Community Development.

More than 100 water supply well have been drilled and in 1986, groundwater withdrawal rates from the base wells ranked among the largest in the State and were estimated at 7.5 million gallons per day (Harned and Lloyd, 1988). There are currently 95 water wells at the Base, of which 77 are operational and are scheduled to remain in service. The other wells were either scheduled to be replaced, repaired, or are out of service. Additionally, many other wells are to be completed in the near future, including 20 wells involved in the program to expand the Holcomb Boulevard Treatment Plant. Also, there are many wells throughout the installation that have been removed from service for various reasons. Operational wells were of the following depth and yield:

System	Average Depth (feet)	Average Yield (gpm)
Hadnot Point	177	177
Holcomb Boulevard	240	236
Tarawa Terrace	95	109
Montford Point	98	121
MCAS New River	207	150
Camp Geiger	113	130
Rifle Range	138	184
Courthouse Bay	118	174
Onslow Beach	108	213

The shallow wells at Tarawa Terrace and Montford Point provide the lower yield; furthermore, the quality of water is not good because of iron content and hardness. The hardness is due primarily to calcium bicarbonate. The most recently constructed wells at MCB Camp Lejeune characteristically are deeper wells with better water quality. The 20 wells proposed for expansion of Holcomb Boulevard Treatment Plant are spaced approximately 2,000 feet apart to minimize overlapping drawdown effects between the wells (Camp Lejeune, North Carolina, 1987).

2.9 CRITICAL ENVIRONMENTS

The ecosystems found at MCB Camp Lejeune include terrestrial (or upland), wetland, and aquatic communities. The terrestrial ecosystems contain four habitat types--long leaf pine, loblolly pine, loblolly pine/hardwood, and oak/hickory. Loblolly pine is the main timber stand of the area. The wetlands ecosystems vary from those bordering freshwater streams to salt marshes along coastal estuaries. The aquatic ecosystems consist of small lakes, the New River estuary, numerous tributary creeks, and part of the Intracoastal Waterway.

The wetland ecosystems on MCB Camp Lejeune include five habitat types--pond pine or pocosin, sweet gum/water oak/cypress/tupelo, sweet bog/swamp black gum/red maple, tidal marshes, and coastal beaches. The tidal marsh at the mouth of the New River on MCB Camp Lejeune is one of the few remaining North Carolina coastal areas relatively free from filling or other man-made changes. Coastal beaches along the Outer Banks and Intracoastal Waterway of MCB Camp Lejeune are used for recreation and to house a small military command unit on the beach. The Marines also conduct beach assault training maneuvers ranging from company-size units to combined Second Division, Force Troops, and Marine Air Wing units. These exercises involve the use of heavy equipment; however, heavy-tracked vehicles are permitted to cross the dunes only in restricted areas to protect the ecologically sensitive coastal barrier dunes.

The aquatic ecosystems on MCB Camp Lejeune are important as a freshwater and marine fisheries resource, as a habitat for local and migratory bird species, as a recreational resource for pleasure boating, and as a commercial resource for year-round barge traffic. The aquatic ecosystem contains a wide variety of fresh and salt water fish species, local shore bird species, and migratory bird species.

MCB Camp Lejeune is also used for training exercises involving the use of large numbers of tracked and wheeled vehicles and live ordnance. The use of these items are restricted and carefully controlled to protect human health and safety and the environment.

According to the master plan, there are two major corridors of developable land in the area of MCB Camp Lejeune. These extend south from New Bern along U.S. 17 and U.S. 58, and from Swansboro northwest to Jacksonville and Richlands along Routes 24 and 258. The principal economic base of the area is MCB Camp Lejeune and associated military activities. More than 46,000 military personnel are stationed at the base and more than 110,000 people are either employed or are eligible for support (ES&E, 1990).

3.0 WASTE CHARACTERIZATIONS

3.1 WASTE TYPES

The Tarawa Terrace Dump is a landfill, but the precise years of operation are unknown. It was used during the construction of the base housing located in Tarawa Terrace. The landfill was closed in 1972. As far as is known, no hazardous materials were disposed of in this facility. Only construction debris, sewage treatment plant filter media, and household trash are known to have been disposed. Potential contaminants at the site include petroleum hydrocarbons and lead from unburned fuels, PCBs from transformer waste oils, sewage treatment by-products, and metals from construction wastes. Chemical analyses of the media collected at the site was designed to characterize these potential contaminants.

3.2 WASTE LOCATIONS

The Tarawa Terrace Dump is a landfill, but the precise years of operation are unknown. It was used during the construction of the base housing located in Tarawa Terrace. The landfill was closed in 1972. As far as is known, no hazardous materials were disposed of in this facility. Only construction debris, sewage treatment plant filter media, and household trash are known to have been disposed. The waste is known to be within the boundries of the the landfill. The actual locations of the landfill boundries and waste are not known, thus sample locations and types were chosen in an attempt to determine the actual waste locations.

4.0 LABORATORY DATA

This section provides a description of the methodologies employed by the analytical laboratory and during data evaluation (validation). The last subsection describes the nature and extent of contamination based on a systematic review of the analytical data.

4.1 ANALYTICAL METHODOLOGIES AND RESULTS

As discussed in Section 1.7, soil samples were collected and analyzed for TCL volatile organics, TCL semivolatile organics, pesticides, polychlorinated biphenyls (PCBs), total lead and cyanide. Groundwater samples were also analyzed for TCL volatile organics, TCL semivolatile organics, pesticides, polychlorinated biphenyls (PCBs), total lead and cyanide.

Analysis of the organic compounds (TCL volatiles, TCL semivolatiles, PCBs, and pesticides) was performed according to the USEPA Contract Laboratory Program (CLP) Statement Of Work (SOW) dated February 1988 (2/88). Total lead and cyanide were analyzed in accordance with EPA CLP SOW dated July 1988 (7/88).

Results reported by the laboratory were validated and qualified analytical data were compiled in a database. The validation procedure is described in Section 4.2. The validated analytical data are presented in Appendix C.

4.2 DATA VALIDATION

All data were generated in accordance with Naval Energy and Environmental Support Activity (NEESA) Level D Quality Assurance/Quality Control (QA/QC) requirements.

The analytical results and raw data were reviewed in accordance with NEESA Level D data validation requirements. Organic analytical data were validated with reference to the "Laboratory Data Validation Functional Guidelines for Evaluating Organics Analyses" (USEPA, February 1, 1988). Inorganic analytical data were validated with reference to the "Laboratory Data Validation Functional Guidelines for Evaluating Inorganics Analyses" (USEPA, June 13, 1988).

Results of data validation were summarized in letter reports to the Project Manager. The reports summarize the data qualifiers that were applied to the data and the rationale for the actions. Copies of the letter reports are available upon request. The validated data were compiled into a database that is presented in Appendix C.

4.3 NATURE AND EXTENT OF CONTAMINATION

This section contains a description of the nature and extent of chemical contamination at Site 7. Subsurface soils are discussed in Section 4.3.1 and groundwater is discussed in Section 4.3.2. The information presented in this section is based on the validated chemical analytical data base, which is contained in its entirety in Appendix C. All sample locations are shown in Figure 2-1.

4.3.1 SOIL

A total of 14 soil samples were collected from 5 boring locations and 3 monitoring well borings at Site 7, broken out as follows:

- 8 surface soil samples (0 to 2 feet)
- 1 surface soil duplicate sample (0 to 2 feet)
- 5 subsurface soil samples (3 to 12 feet)

All soil samples were analyzed for Target Compound List organics and inorganics, including cyanide. Table 4-1 presents a summary of the chemical analytical results. The results for the duplicate samples were averaged using one-half the detection limit for nondetects and counted as one sample for presentation in this table.

4.3.1.1 Organics

No volatile organics were detected in any of the samples. Bis(2-ethylhexyl)phthalate was found in one sample location (SB02, 0 to 2 feet) at a concentration of 1000 μg/kg. Two other semivolatile organic chemicals (fluoranthene and benzoic acid) were at Site 7. Fluoranthene was found at a maximum concentration of 290 μg/kg at location SB01 (0 to 2 feet). Benzoic acid was found at location MW01 (15,000 μg/kg at 0 to 2 feet and 7900 μg/kg at 3 to 5 feet) and at location MW03 (6,300 μg/kg at 0 to 2 feet).

4.3.1.2 Pesticides and Polychlorinated Biphenyls

Pesticides and polychlorinated biphenyls (PCBs) were detected in both the surface and the subsurface soil samples. The samples that contained the greatest variety and concentrations of pesticides were collected from locations SB01, SB02, and MW02, which are all located along the northern edge of the site. At several locations, notable concentrations were found in samples collected from depths of 7/7.5 feet. This fact indicates that some soil disturbance may have occurred during landfilling activities. At other locations, only the surface samples contained pesticides.

Aldrin and 4,4'-DDE were found only in single surface soil samples at concentrations of 4.3 μg/kg and 240 μg/kg, respectively. The maximum concentration of 4,4'-DDD (210 μg/kg) was also found in a surface soil sample. On the other hand, the maximum concentrations of dieldrin (2,500 μg/kg) and endrin (1,300 μg/kg) were found at location MW02 (7.5 to 9.5 feet) and the maximum concentration of endosulfan II (2,000 μg/kg) was found in the 7 to 9 foot deep sample from location SB02.

Aroclor-1260 was detected in seven surface and subsurface soil samples at concentrations ranging from 108 μg/kg (average of two duplicate surface soil samples at location SB05) to 25,000 μg/kg (at location MW02, 7.5 to 9.5 feet).

4.3.1.3 Inorganics

Inorganics were also detected in the soil samples. Three background soil samples collected from outlying areas of the base were collected and analyzed for inorganics. This was intended to provide a point of comparison for the concentrations in onsite samples to determine whether the metals are naturally occurring or are possibly site-related. Table 4-2 presents the analytical results for the three background soil samples.

TABLE 4-1

NATURE AND EXTENT OF SOIL CONTAMINATION[1]
SITE 7 - TARAWA TERRACE DUMP
MCB CAMP LEJEUNE
JACKSONVILLE, NORTH CAROLINA

Analyte	Surface Soil (0-2 feet)		Subsurface Soil (3-12 feet)	
	No. of Positive Detections/ No. of Samples	Range of Positive Detections	No. of Positive Detections/ No. of Samples	Range of Positive Detections
		(µg/kg)		(µg/kg)
Bis(2-ethylhexyl)phthalate	1/8	1,000	0/5	ND
Fluoranthene	2/8	220-290	0/5	ND
Benzoic acid	2/8	6,300-15,000	1/5	7,900
Aldrin	1/8	4.3	0/5	ND
4,4'-DDD	3/8	12*-20	2/5	58-190
4,4'-DDE	1/8	240	0/5	ND
Dieldrin	3/8	12*-540	3/5	400-2,500
Endosulfan II	3/8	7.6*-1,400	3/5	73-2,000
Endrin	2/8	91-140	4/5	14-1,300
Aroclor-1260	3/8	108*-12,000	4/5	660-25,000
		(mg/kg)		(mg/kg)
Aluminum	8/8	3,690*-9,700	5/5	1,030-5,030
Arsenic	3/8	1.1-1.7	3/5	1.1-1.5
Barium	8/8	9.1-223	5/5	6.6-72.8
Beryllium	4/8	0.26-2.1	3/5	0.29-3.6
Cadmium	8/8	1.1-5.0	5/5	1.2-4.5
Calcium	7/8	190-58,200	3/5	3,660-9,990
Chromium (III)	8/8	4.2-10.6	5/5	5.2-12.5

TABLE 4-1
NATURE AND EXTENT OF SOIL CONTAMINATION[1]
SITE 7 - TARAWA TERRACE DUMP
MCB CAMP LEJEUNE
JACKSONVILLE, NORTH CAROLINA
PAGE TWO

Analyte	Surface Soil (0-2 feet)		Subsurface Soil (3-12 feet)	
	No. of Positive Detections/ No. of Samples	Range of Positive Detections	No. of Positive Detections/ No. of Samples	Range of Positive Detections
		(mg/kg)		(mg/kg)
Cobalt	8/8	1.7-8.1	5/5	1.9-10.2
Iron	8/8	876-5,330	5/5	981-5,490
Lead	8/8	3.0-114	5/5	2.4-17.0
Magnesium	8/8	104-1,150	4/5	99.9-541
Manganese	8/8	3.2-69.0	5/5	3.0-47.7
Mercury	8/8	0.11-0.53	5/5	0.12-0.45
Nickel	8/8	2.8-13.1	5/5	3.1-11.7
Potassium	6/8	110-507	4/5	120-452
Selenium	1/8	0.54*	0/5	ND
Silver	8/8	0.66-3.0	5/5	0.72-2.7
Sodium	1/8	754	1/5	1,020
Thallium	8/8	0.44-2.0	5/5	0.47-1.8
Vanadium	8/8	4.5-18.1	5/5	4.5-9.8
Zinc	2/8	1.1-44.5	3/5	1.2-4.5
Cyanide	8/8	0.54-2.5	5/5	0.60-2.3

ND Not detected.
* Results reported are the average of two duplicate samples.
[1] Complete data base in Appendix C.

TABLE 4-2

CONCENTRATION OF INORGANICS IN BACKGROUND SOILS
SITE 7 - TARAWA TERRACE DUMP
CAMP LEJEUNE MILITARY RESERVATION
JACKSONVILLE, NORTH CAROLINA

Analyte	Concentration (mg/kg)			
	BS-1	BS-2[1]	BS-3	Average[2]
Aluminum	765	1,510	13,900	5,390
Antimony	ND (2.7)	ND (31)	ND (3.1)	ND
Arsenic	0.73	0.76	4.1	1.9
Barium	5.6	21.0	15.5	14.0
Beryllium	ND (0.32)	ND (0.37)	ND (0.36)	ND
Cadmium	0.79	ND (0.95)	0.90	0.72
Calcium	267	571	113	317
Chromium	1.0	ND (1.6)	18.9	6.9
Cobalt	ND (0.79)	ND (0.94)	1.1	0.66
Copper	2.4	1.0	2.9	2.1
Iron	439	670	14,100	5,070
Lead	9.0	7.9	22.2	13.0
Magnesium	31.9	73.9	571	226
Manganese	7.4	1.7	7.0	5.4
Mercury	ND (0.10)	ND (0.09)	ND (0.10)	ND
Nickel	ND (1.3)	ND (1.5)	ND (2.9)	ND
Potassium	ND (76.7)	ND (91.2)	817	300
Selenium	ND (0.73)	0.79	ND (0.78)	0.52
Silver	ND (0.32)	0.43	ND (0.36)	0.26
Sodium	ND (20.7)	ND (37.2)	ND (44.6)	ND
Thallium	ND (0.19)	ND (0.19)	ND (0.26)	ND
Vanadium	0.98	2.4	25.8	9.7
Zinc	ND (3.2)	ND (2.8)	10.3	4.4

ND Not detected at the detection limit shown in parentheses.

(1) Results reported are the average of results for samples BS-2 and BS-2-D, calculated using 1/2 the detection limit for nondetects.

(2) Arithmetic average calculated using 1/2 the detection limit for nondetects.

Comparison of the results in the two tables indicates that several metals were found at concentrations that exceed the range of results for the background samples. The maximum metals concentrations were not found in a few locations but rather were more widespread geographically (locations MW01, SB03, and SB01), with the majority at location SB03. The concentration ranges for barium, beryllium, cadmium, cobalt, lead, manganese, mercury, nickel, silver, thallium, and zinc were much larger than those for the background samples.

Cyanide was found in all onsite soil samples, at concentrations ranging from 0.54 mg/kg (average of two duplicate samples from location SB05) to 2.5 mg/kg (at location SB03).

4.3.2 GROUNDWATER

Three monitoring wells were installed at the site, two of which are located in the downgradient direction (MW01 and MW03) and one of which is located at the break in slope on the northern end of the site. One sample was collected from each well and analyzed for Target Compound List organics and inorganics (including cyanide), and the analytical results are summarized in Table 4-3.

4.3.2.1 Volatile Organics

No volatile organic compounds were detected in the wells, which is consistent with the fact that volatile organics were not detected in any of the soil samples. Benzoic acid, which was found in three soil samples collected from the borings for wells MW01 and MW03, was detected in groundwater samples from those two wells. The concentrations of benzoic acid were 9 μg/L and 12 μg/L.

4.3.2.2 Pesticides and Polychlorinated Biphenyls

Dieldrin and endrin ketone were both detected only in well MW02, at concentrations of 0.63 μg/L and 0.09 μg/L, respectively. The maximum concentration of dieldrin in soil was found in a sample collected from the MW02 boring; however endrin ketone was not detected in any of the soil samples. Dieldrin is not highly soluble, as will be described in Section 5.1.3, and therefore the presence of dieldrin in the groundwater maybe indicative of suspended sediment in the sample rather than dissolved (and mobile) dieldrin.

4.3.2.3 Inorganics

The inorganic analytical results are also presented in Table 4-3. Groundwater samples were not filtered, and therefore the analytical results may reflect to some extent, suspended solids rather than dissolved metals. Nonetheless, the results may be summarized as follows.

The concentrations of some metals such as lead and cobalt were relatively consistent between wells. Other metals, such as manganese and vanadium, showed much wider variation between wells. No patterns of contamination were obvious when all the data were displayed, in that the maximum concentrations of different metals were found in all wells.

TABLE 4-3

NATURE AND EXTENT OF GROUNDWATER CONTAMINATION[1]
SITE 7 - TARAWA TERRACE DUMP
MCB CAMP LEJEUNE
JACKSONVILLE, NORTH CAROLINA

Analyte	No. of Positive Detections/ No. of Samples	Range of Positive Detections (µg/L)	Location of Maximum Concentration
Benzoic acid	2/3	9-12	MW03
Dieldrin	1/3	0.63*	MW02
Endrin ketone	1/3	0.09*	MW02
Aluminum	3/3	29,000-137,000*	MW02
Antimony	1/3	4.75*	MW02
Barium	3/3	427-706*	MW02
Beryllium	2/3	3.1-9.4*	MW02
Chromium (III)	3/3	47.8-251*	MW02
Cobalt	2/3	9.6*-21.7	MW01
Copper	3/3	17.7-41.6*	MW02
Iron	3/3	26,400-228,000*	MW02
Lead	3/3	30.3-37.3	MW01
Magnesium	1/3	13,500	MW01
Manganese	3/3	56.9-220	MW01
Mercury	2/3	0.24-0.36	MW03
Potassium	1/3	5,240*	MW02
Selenium	1/3	3.4	MW01
Sodium	1/3	156,000	MW01
Vanadium	3/3	37.8-442*	MW02
Zinc	3/3	83.6-151*	MW02

(1) Complete data base in Appendix C.
* Results reported are the average of two duplicate samples.

5.0 PRELIMINARY RISK ASSESSMENT

This section provides a characterization of potential impacts on human health and the environment based upon an evaluation of analytical results, migration pathways, exposure routes, and potential receptors. The characterization is qualitative in nature and is based on comparison of site-specific concentrations with Applicable, or Relevant and Appropriate Requirements (ARARs), guidelines or criteria To Be Considered (TBCs), and Preliminary Risk-Based Remediation Goals (PRGs) developed in accordance with Part B of Risk Assessment Guidance for Superfund (USEPA, December 1991).

The organization and contents of this section may be summarized as follows:

- Section 5.1 - Fate and Transport. Discusses physical properties of site contaminants and relevant contaminant migration pathways and mechanisms.
- Section 5.2 - Potential Receptors, Exposure Pathways, and Sensitive Environments. Identifies and discusses existing exposure pathways and routes and provides a general description of sensitive environments in the site vicinity.
- Section 5.3 - ARARs, TBCs, and PRGs. Presents a textual description and tabular summary of regulatory standards, guidelines, and risk-based criteria for site media.
- Section 5.4 - Comparison with Criteria. Discusses the frequency of detection (number of detections/number of samples) and the number of detections which exceed ARARs/TBCs/PRGs on a media-specific basis.
- Section 5.5 - Summary and Conclusions. General summary of preliminary risk assessment with recommendations of future remedial or investigative actions.

5.1 CONTAMINANT FATE AND TRANSPORT

This section discusses the chemical and physical characteristics of chemicals detected at the Tarawa Terrace Dump Site as they pertain to contaminant migration. The characteristics discussed in this section include water solubility, the organic carbon partition coefficient (K_{oc}), the Henry's Law Constant, and the diffusion coefficient (air) for chemicals of concern identified as a result of comparison with background. In addition, potential migration pathways are identified for each media.

5.1.1 Physical/Chemical Properties

5.1.1.1 Solubility

The rate at which a chemical is leached from a waste deposit by infiltrating precipitation is in part proportional to its water solubility. More soluble chemicals are more readily leached than less soluble chemicals. Many of the chemicals detected in site media have relatively high solubilities.

5.1.1.2 Organic Carbon Partition Coefficient (K_{oc})

The organic carbon partition coefficient is a measure of the tendency of a chemical to bind to soil particles containing organic carbon. Chemicals with high K_{oc}s generally have low water solubilities and vice versa. This parameter may be used to infer the relative rates at which chemicals are transported in the groundwater. Chemicals such as volatile organics may be relatively mobile in the environment, but may be retarded to some extent by adsorption.

5.1.1.3 Henry's Law Constant

Henry's Law states that the partial pressure of a chemical above a solution is proportional to the chemical concentration in the solution. The ratio of the vapor pressure to the solubility (the Henry's Law Constant) is used to calculate the equilibrium contaminant concentration in the vapor (air) versus the liquid (water) phases for the dilute solutions encountered in environmental settings. In general, chemicals having a Henry's Law Constant greater than 5×10^{-6} atm-m^3/mole could be expected to be present in the atmosphere or in soil gas.

5.1.1.4 Diffusion Coefficient

Diffusive transport of a chemical in a fluid is mathematically expressed as the product of the concentration difference over a specified distance (the concentration gradient) and the diffusion coefficient of the material in the appropriate fluid (liquid or gas). For chemical emissions from contaminated media, diffusion coefficients in air for chemicals of concern are used to determine volatilization rates.

5.1.2 Transport Properties of Chemicals in Site Media

5.1.2.1 Soil

As discussed in Section 4.3, potential organic chemicals of concern for soil include bis(2-ethylhexyl)phthalate, benzoic acid, fluoranthene, aldrin, 4,4'-DDE, and Aroclor-1260. Potential inorganic chemicals of concern include barium, beryllium, cadmium, cobalt, lead, manganese, mercury, nickel, silver, thallium, and zinc.

Table 5-1 presents a summary of the chemical and physical properties for the organic chemicals detected in soils at Site 7. Table 5-2 presents a summary of inorganic properties (molecular weight and the soil/water distribution coefficient) for the potential inorganic chemicals of concern. As shown in Table 5-1, the majority of the organic soil contaminants are relatively immobile (with the exception of benzoic acid).

5.1.2.2 Groundwater

As discussed in Section 4.4, potential chemicals of concern for groundwater include benzoic acid, dieldrin, endrin ketone, antimony, arsenic, barium, beryllium, cadmium, chromium (III), cobalt, copper, lead, manganese, mercury, selenium, vanadium, and zinc. Physical/chemical properties of these chemicals are also included in Tables 5-1 and 5-2.

5.1.2.3 Surface Water

No surface water samples were collected during the Site Investigation at Site 7.

5.1.2.4 Sediment

No sediment samples were collected during the Site Investigation at Site 7.

5.1.3 Migration Pathways

5.1.3.1 Air

Transport of contaminants in air can be a result of chemical volatilization from the source media and from emission of fugitive dust particulates as a result of wind erosion of partially vegetated ground surface. For Site 7, these migration pathways are applicable to soil only, because volatile chemicals were not detected in surface water, the only other potential source media for air transport.

TABLE 5-1

ENVIRONMENTAL FATE AND TRANSPORT PARAMETERS FOR ORGANIC CHEMICALS
SITE 7 - TARAWA TERRACE DUMP
MCB CAMP LEJEUNE
JACKSONVILLE, NORTH CAROLINA

CAS Number	Chemical	Molecular Weight[1][2]	Specific Gravity (20/4 °C)[2]	Vapor Pressure (mm Hg @ 20°C)[1][2]	Water Solubility (mg/L @ 20°C)[1]	Octanol/Water Partition Coefficient (Kow)[1]	Organic Carbon Partition Coefficient (Koc)[1]	Henry's Law Constant (atm-m^3/mole)[1]	Diffusion Coefficient in Air (cm^2/s)
65-85-0	Benzoic acid	122.13	1.27×10^{0}	4.5×10^{-3}[4]	2.9×10^{3}	7.4×10^{1}	NA	7.0×10^{-8}[4]	NA[7]
117-81-7	Bis(2-ethylhexyl) phthalate	391	9.9×10^{-1} (20°C/20°C)	2.0×10^{-7}	4.0×10^{-1} (@ 25°C)	4.1×10^{9}	2.0×10^{9}	3.0×10^{-7}	NA
206-44-0	Fluoranthene	202.3	NA	5.0×10^{-6} (@ 25°C)	2.6×10^{-1} (@ 25°C)	7.9×10^{4}	3.8×10^{4}	6.5×10^{-6}	NA
309-99-2	Aldrin	365	1.65×10^{0}[6]	6.0 x 10-6 (@ 25°C)	1.8×10^{-1} (@ 25°C)	2.0×10^{5}	9.6×10^{4}	1.6×10^{-5}	NA
60-57-1	Dieldrin	381	1.75×10^{0}	1.78×10^{-7}	1.95×10^{-1} (@ 25°C)	3.5×10^{3}	1.7×10^{3}	4.57×10^{-10}	NA
72-20-8	Endrin	381	1.65×10^{0}[6]	2.0×10^{-7}	2.5×10^{-1} (@ 25°C)	3.5×10^{3}	1.7×10^{3}	4.0×10^{-7}	NA
115-29-7	Endosulfan II	406.9	NA	1.0×10^{-5} (@ 25°C)	2.8×10^{-1} (@ 25°C)	2.0×10^{-2}	9.6×10^{-3}	1.91×10^{-5}	NA
74-54-8	4,4'-DDD	320	NA	1.4×10^{-6}	7.0×10^{-2}	1.6×10^{6}	7.7×10^{5}	2.2×10^{-4}	NA
72-55-9	4,4'-DDE	318	NA	6.4×10^{-6}	4.0×10^{-2}	9.1×10^{6}	4.4×10^{6}	6.8×10^{-5}	NA
11096-82-5	Aroclor 1260	375.7	1.58 x 100	4.05×10^{-5} (@ 25°C)	2.7×10^{-3} (@ 25°C)	1.4×10^{7}	6.7×10^{6}	7.4×10^{-1}	NA

(1) U.S. EPA, December 1982.
(2) Verscheuren, 1983.
(3) U.S. EPA, December 1979.
(4) Howard, 1989.
(5) Lyman, et al., 1990, eq. 5-2.
(6) Weiss, 1980.
(7) NA - Value not available or not applicable (nonvolatile constituents not subject to volatile emissions from soil).

TABLE 5-2

ENVIRONMENTAL FATE AND TRANSPORT PARAMETERS
INORGANIC CHEMICALS
SITE 7 - TARAWA TERRACE DUMP
MCB CAMP LEJEUNE
JACKSONVILLE, NORTH CAROLINA

Element	Molecular Weight (g/mol)	Soil/Water Distribution Coefficient (Kd) Range[1] (mL/g)
Antimony	121.75	NR[2]
Arsenic (III)	74.92	1.0 - 8.3
Barium	137.34	NR
Beryllium	9.01	NR
Cadmium	112.40	1.3 - 27
Chromium (III)	51.99	470 - 150,000
Cobalt	58.93	0.2 - 3,800
Copper	63.54	1.4 - 333
Lead	207.19	4.5 - 7,640
Manganese	54.94	0.2 - 10,000
Mercury	200.59	NR
Nickel	58.71	150[3]
Selenium	78.96	1.2 - 8.6
Silver	107.87	10 - 1,000
Thallium	204.37	2,000 - 510,000
Vanadium	50.94	NR
Zinc	65.38	0.1 - 8,000

(1) Dragun, 1988.
(2) NR - Not reported.
(3) USDOE, September 1984.

5.1.3.2 Soil

Chemicals contained in soil bind to the particles in the matrix. One potential migration pathway of contaminants in soil is the physical movement of the soil itself. This is evident from the transport of soil contaminants during storm events as silt. Chemicals contained in soil can also act as sources for water contamination when chemical desorption occurs.

5.1.2.2 Groundwater

Transport of chemicals by groundwater flow and diffusion are the only routes of migration for groundwater chemicals in solution. The discharge of groundwater to surface water bodies and/or removal of groundwater from a well are the only potential migration pathways that may result in exposure to dissolved chemicals. Chemicals dissolved in groundwater can also exhibit partitioning and adsorption onto stationary media (i.e. soils in the saturated zone).

5.1.2.3 Surface Water

Contaminant migration of soluble chemicals dissolved in surface waters can occur via the runoff of the surface water to another body of water or as a result of groundwater recharge. Partitioning from the dissolved phase may also occur, thereby becoming a source for sediment or soils. No site-specific results are currently available to assess the potential impact of Site 7 on proximate surface water bodies (i.e., drainages and Northeast Creek).

5.1.2.4 Sediment

Migration pathways for sediment in bulk are limited, as only transport by surface water during storm events can mobilize appreciable quantities of sediments. However, sediments can act as a source of contamination through desorption from the sediment particles into solution. No site-specific results are currently available to assess the potential impact of Site 7 on proximate surface water bodies and sediments (i.e., drainages and Northeast Creek).

5.2 POTENTIAL RECEPTORS, EXPOSURE PATHWAYS, AND SENSITIVE ENVIRONMENTS

This section provides identification of current receptors to chemical exposure. Also discussed are the exposure pathways and mechanisms by which the identified receptors can come into contact with media containing chemicals of concern. In the last subsection, sensitive environments are identified that suffer potential adverse effects from exposure to site related contaminants.

5.2.1 Receptors

Based on current land uses, receptors include transient military personnel and civilian base employees. Exposure by these individuals is dependent upon the activities in which they are engaged.

5.2.2 Exposure Pathways

Exposure pathways developed for the receptors identified in Section 5.2.1 must account for all media and potential means of exposure that a receptor may encounter during normal activity and under current conditions. Several exposure routes per media can be identified.

5.2.2.1 Air

Exposures to chemicals in air are the result of inhalation by a receptor. Potential exposure pathways include the inhalation of volatile chemicals generated in and around the immediate site, and the inhalation of fugitive dust generated when wind passes over partially vegetated ground surfaces. In both of these exposure routes, actual absorption of chemicals occurs in the lungs. In the latter pathway, absorption in the gastrointestinal tract results from ingestion of soil laden sputum ejected from the lungs.

5.2.2.2 Soil

Exposures to chemicals contained in soil can be the result of direct dermal contact with soil and incidental ingestion of soil as a result of hand-to-mouth contact.

5.2.2.3 Groundwater

Groundwater chemical exposure occurs only from the use of water that is pumped from a contaminated aquifer. Under the current groundwater use scenario, no exposure pathway exists because no domestic or production wells are located at or near Site 7.

5.2.2.4 Surface Water

Exposure to surface water near the Tarawa Terrace Dump Site cannot be assessed based on the existing information.

5.2.2.5 Sediment

Exposure to sediment near the Tarawa Terrace Dump Site cannot be assessed based on the existing information.

5.2.3 Sensitive Environments

Northeast Creek could potentially be affected by contamination migrating from the Tarawa Terrace Dump Site via overland runoff or possibly as a result of groundwater discharge. Northeast Creek is a tidally influenced water body which ultimately discharges to the New River which is a productive estuary supported commercial finfish and shellfish.

5.3 APPLICABLE, OR RELEVANT AND APPROPRIATE REQUIREMENTS (ARARS), CRITERIA TO BE CONSIDERED (TBCS), AND PRELIMINARY REMEDIATION GOALS

This section provides a brief description of state and federal requirements and criteria and summarizes risk-based criteria for potential chemicals of concern at the Tarawa Terrace Dump Site.

5.3.1 Applicable, or Relevant and Appropriate Regulations (ARARs) and Criteria To Be Considered (TBCs)

This section presents the available regulatory standards or guidelines for all of the chemicals of concern at Site 7.

5.3.1.1 Maximum Contaminant Levels (MCLs)

MCLs are enforceable standards promulgated under the Safe Drinking Water Act and are designed for the protection of human health. MCLs are based on laboratory or epidemiologic studies and apply to drinking water supplies consumed by a minimum of 25 persons. They are designed for prevention of human health

effects associated with lifetime exposure (70 years) of an average adult (weighing 70 kg) who consumes 2 liters of water per day, but they also reflect the technical feasibility of removing the contaminant from the water. These enforceable standards also reflect the fraction of toxicant expected to be absorbed by the gastrointestinal tract.

5.3.1.2 Ambient Water Quality Criteria (AWQC)

AWQC are not enforceable Federal regulatory guidelines and are of primary utility in assessing the potential for toxic effects in aquatic organisms. They may also be used to identify the potential for human health risks. AWQC consider both the acute and toxic effects from ingestion of both water (2 L/day) and aquatic organisms (6.5 g/day), and from ingestion of water alone. The AWQC for protection of human health for carcinogenic substances are based on the USEPA's specified incremental cancer risk range of one additional case of cancer in an exposed population of 10,000,000 to 100,000 persons (i.e., the 10^{-7} to 10^{-5} range) and are generally based on older toxicologic data.

5.3.1.3 Health Advisories

Health Advisories are guidelines developed by the USEPA Office of Drinking Water for nonregulated contaminants in drinking water. These guidelines are designed to consider both acute and chronic toxic effects in children (with an assumed body weight of 10 kg) who consume 1 liter of water per day, or in adults (with an assumed body weight of 70 kg) who consume 2 liters of water per day. Health Advisories are generally available for acute (1-day), subchronic (10-day), and chronic (longer-term or lifetime) exposure scenarios. These guidelines are designed to consider only threshold effects and, as such, are not used to set acceptable levels of known or probable human carcinogens.

5.3.1.4 Lead

Soil cleanup goals for lead contamination have been established by the United States Environmental Protection Agency at 500 to 1000 parts per million. The exact goal is dependent upon site conditions and potential receptors. These values are based on toxicological studies of lead exposure by children and are the lower range values that result in an increase in blood lead levels above background levels (USEPA Office of Solid Waste and Remedial Response, OSWER Directive #9355.4-02, September 7,1989).

5.3.1.5 Background Concentrations

As discussed in Section 4.3 , background samples were taken from three locations in and around Camp Lejeune in areas suspected to be free of contamination to determine native concentrations of metals. A summary of results of these metal analyses was provided in Table 4-2. These background results were used for comparison to results for soil samples collected at Site 7, and several potential inorganic chemicals of concern were thus identified (Section 5.1.2.1).

5.3.2 Risk-Based Criteria

Enforceable standards have not been specified for many of the chemicals of concern at Site 7; therefore, other regulatory guidelines may be used for comparative purposes to infer health risks and environmental impacts.

5.3.2.1 Noncarcinogenicity and Reference Doses (RfDs)

The RfD is developed by the USEPA for chronic and/or subchronic human exposure to hazardous chemicals and is solely based on the noncarcinogenic health effects imparted by a chemical. The RfD is usually expressed as a dose (mg) per unit body weight (kg) per unit time (day). It is generally derived by dividing a no-observed-(adverse)-effect-level (NOEL or NOAEL) or a lowest-observed-adverse-effect-level (LOAEL)

by an appropriate uncertainty factor. NOAELs, etc., are determined from laboratory or epidemiological toxicity studies. The uncertainty factor is based on the availability of toxicity data.

Uncertainty factors are generally applied as multiples of 10 to represent specific areas of uncertainty in the available data. A factor of 10 is used to account for variations in the general population (to protect sensitive subpopulations), when extrapolating test results from animals to humans (to account for interspecies variability), when a NOAEL derived from a subchronic study (instead of a chronic study) is used to develop the RfD, and when a LOAEL is used instead of a NOAEL. In addition, the USEPA reserves the use of a modifying factor of up to 10 for professional judgment of uncertainties in the data base not already accounted for. The default value of the modifying factor is 1.

The RfD incorporates the surety of the evidence for chronic human health effects. Even if applicable human data exist, the RfD (as diminished by the uncertainty factor) still maintains a margin of safety so that chronic human health effects are not underestimated. Thus the RfD is an acceptable guideline for evaluation of noncarcinogenic risk, although the associated uncertainties preclude its use for precise risk quantitation.

5.3.2.2 Carcinogenicity and Cancer Slope Factor (CSF)

CSFs are applicable for estimating the lifetime probability (assuming a 70-year lifetime) of human receptors developing cancer as a result of exposure to known or potential carcinogens. This factor is generally reported by the USEPA in units of $(mg/kg/day)^{-1}$ and is derived through an assumed low-dosage linear relationship and an extrapolation from high to low dose responses determined from animal studies. The value used in reporting the CSF is the upper 95 percent confidence limit.

5.3.2.3 Weight of Evidence

The weight of evidence designations indicate the likelihood that a chemical is a human carcinogen, based on both animal and human studies. The classification is as follows:

- A - Known human carcinogen
- B - Potential human carcinogen. B1 indicates that limited human data are available. B2 indicates that there is sufficient evidence of carcinogenicity in animals, but inadequate or no evidence in humans.
- C - Possible human carcinogen
- D - Not classifiable as to human carcinogenicity
- E - Evidence of noncarcinogenicity in humans

5.3.2.4 Risk-based Preliminary Remediation Goals (PRGs)

In accordance with United States Environmental Protection Agency (USEPA) risk assessment guidance, the development of risk-based PRGs provide initial clean-up goals for chemicals of concern that are protective of human health and comply with ARARs (USEPA, RAGS Volume I, Part B, 1991). The goals are chemical, media, and site specific and consider land and water usage patterns, receptors, exposure parameters, and chemical toxicity and carcinogenicity.

PRGs developed for soil at Site 7 are based on a current use scenario under an industrial setting. The receptors are assumed to be only transient military personnel. Exposure duration is for 2 years, and the routes of exposure evaluated are incidental ingestion and inhalation of volatiles and particulates. The minimum concentration goal calculated for target carcinogenic (1×10^{-6}) and noncarcinogenic (unity) risks is presented as the PRG for the specific chemical of concern.

5.3.3 Summary

Table 5-3 presents the values of the available State and Federal ARARs and dose-response parameters for both carcinogenic and noncarcinogenic chemicals of concern. All available toxicity information is included in this table. However, if a parameter is not available, previously published values from the USEPA or other sources are presented. For example, the Reference Dose for lead has been revoked pending an evaluation of its carcinogenicity, but because lead is considered to be a site-related contaminant, an older published value is presented. Table 5-4 presents a summary of the North Carolina State Class GA groundwater and Class C surface water criteria (for potential future reference).

5.4 COMPARISON WITH CRITERIA

This section provides a media-specific comparison of analytical data for Site 7 to standards, criteria, and/or preliminary remediation goals.

5.4.1 Soil

Twenty-two potential chemicals of concern were detected in soil at the Tarawa Terrace Dump Site. No Federal or State standards or criteria exist for the chemicals detected in soil at Site 7. Therefore, Preliminary Remediation Goals (PRGs) were developed for comparative purposes.

The frequency of detection of the potential chemicals of concern, the observed concentration range, and the PRGs are summarized in Table 5-5. As shown in Table 5-5, two pesticides and one inorganic chemical were detected at concentrations exceeding the PRGs.

Dieldrin was detected in four soil samples at concentrations above the PRG of 0.36 mg/kg based on potential carcinogenic effects.

Dieldrin concentrations ranged as high as 2.5 mg/kg. This concentration corresponds to an estimated incremental cancer risk of approximately 7×10^{-6} ($2.5/0.36 \times 10^{-6}$) based on the exposure conditions considered in the analysis. This estimated cancer risk is well below the upper bound of EPA's target risk range of 10^{-4}.

Aroclor-1260 was also detected in four samples at concentrations exceeding the PRG of 0.75 mg/kg based on potential carcinogenic effects. Aroclor-1260 concentrations ranged as high as 25 mg/kg. This concentration corresponds to an incremental cancer risk of approximately 3×10^{-5} ($25/0.75 \times 10^{-6}$) based on the exposure conditions considered in the analysis. This estimated cancer risk is below the upper bound of the EPA's target risk range.

Beryllium was detected in two samples at concentrations exceeding the PRG based on carcinogenic effects (1.35 mg/kg). Beryllium concentrations ranged as high as 3.6 mg/kg. This concentration corresponds to an estimated incremental cancer risk of approximately 3×10^{-7} ($3.6/1.35 \times 10^{-6}$) under the exposure conditions considered. This estimated cancer risk is below the upper bound of the EPA's target risk range.

5.4.2 Groundwater

Table 5-6 provides a comparison of concentrations of potential chemicals of concern detected in at least one of the three groundwater samples collected at the Tarawa Terrace Dump Site. As shown in Table 5-6, antimony, beryllium, cadmium, chromium (III), lead, and manganese exceed criteria based on either the Federal MCLs, the North Carolina Class GA Groundwater Standards, or the action level for lead at the tap. The minimum value of these criteria was used for comparative purposes.

TABLE 5-3

REGULATORY REQUIREMENTS AND DOSE-RESPONSE PARAMETERS FOR CHEMICALS OF CONCERN
SITE 7 - TARAWA TERRACE DUMP
MCB CAMP LEJEUNE
JACKSONVILLE, NORTH CAROLINA

Chemical	Safe Drinking Water Act Maximum Contaminant Level (mg/L) (SDWA MCL)[1]	Reference Dose[2] (mg/kg/day)		Ambient Water Quality Criteria[3] (mg/L)		Health Advisory[1] (mg/L)	Cancer Slope Factor[2] (mg/kg/day)$^{-1}$		EPA Weight of Evidence[2]
		Oral	Inhalation	Federal	EPA Region IV		Oral	Inhalation	
Fluoranthene		4×10^{-2}			0.0398				D
Bis(2-ethylhexyl) phthalate	0.004[a]	2×10^{-2}			0.0003		1.4×10^{-2}		B2
Aroclor 1260	0.0005				1.4×10^{-5}		7.7×10^{0}		B2
Benzoic Acid		4×10^{0}							D
Aldrin		3×10^{-5}			0.0003	1-Day/Child: 0.0003 10-Day/Child: 0.0003 Longer-term/Child: 0.0003 Longer-term/Adult: 0.0003	1.7×10^{1}	1.7×10^{1}	B2
4,4'-DDD					6.4×10^{-6}		2.4×10^{-1}		B2
4,4'-DDE					0.0105		3.4×10^{-1}		B2
Dieldrin		5×10^{-5}			1.9×10^{-6}	1-Day/Child: 0.0005 10-Day/Child: 0.0005 Longer-term/Child: 0.0005 Longer-term/Adult: 0.002	1.6×10^{1}	1.6×10^{1}	B2
Endosulfan II		5×10^{-5}			5.6×10^{-5}				D
Endrin	0.002[2]	3×10^{-4}			2.3×10^{-6}	1-Day/Child: 0.02 10-Day/Child: 0.02 Longer-term/Child: 0.002 Longer-term/Adult: 0.02 Lifetime/Adult: 0.002			D
Antimony	0.01/0.005[a]	4×10^{-4}			0.16	1-Day/Child: 0.015 10-Day/Child: 0.015 Longer-term/Child: 0.015 Longer-term/Adult: 0.015 Lifetime/Adult: 0.003			D

TABLE 5-3
REGULATORY REQUIREMENTS AND DOSE-RESPONSE PARAMETERS FOR CHEMICALS OF CONCERN
SITE 7 - TARAWA TERRACE DUMP
MCB CAMP LEJEUNE
JACKSONVILLE, NORTH CAROLINA
PAGE TWO

Chemical	Safe Drinking Water Act Maximum Contaminant Level (mg/L) (SDWA MCL)[1]	Reference Dose[2] (mg/kg/day)		Ambient Water Quality Criteria[2][3] (mg/L)		Health Advisory[1] (mg/L)	Cancer Slope Factor[2] $(mg/kg/day)^{-1}$		EPA Weight of Evidence[2]
		Oral	Inhalation	Federal	EPA Region IV		Oral	Inhalation	
Arsenic	0.050	3×10^{-4}		0.360 0.190	0.190			1.75×10^{1}	A
Barium	2	7×10^{-2}	1×10^{-4}[e]			Lifetime/Adult: 2			D
Beryllium	0.001	5×10^{-3}			0.00053	1-Day/Child: 30 10-Day/Child: 30 Longer-term/Child: 4 Longer-term/Adult: 20	4.3×10^{0}	8.75×10^{0}	B2
Cadmium	0.005[a]	5×10^{-4}		0.0039 0.0010	0.00066	1-Day/Child: 0.04 10-Day/Child: 0.04 Longer-term/Child: 0.005 Longer-term/Adult: 0.02 Lifetime/Adult: 0.005		5.8×10^{0}	B1
Chromium (III)	0.1[b]	1×10^{0}	6×10^{-7}[e]	1.7 0.21	0.117	1-Day/Child: 1 10-Day/Child: 1 Longer-term/Child: 0.2 Longer-term/Adult: 0.8 Lifetime/Adult: 0.1			D
Cobalt		8×10^{-2}[c]							D
Copper	1.3[a,d] / 1[f]			0.018 0.012	0.00654				D
Lead	0.015[d]	1.4×10^{-3}[e]	4.3×10^{-4}[e]	0.082 0.0032	0.00132				B2
Manganese	0.05[f]	1×10^{-1}	1×10^{-4}						D

TABLE 5-3
REGULATORY REQUIREMENTS AND DOSE-RESPONSE PARAMETERS FOR CHEMICALS OF CONCERN
SITE 7 - TARAWA TERRACE DUMP
MCB CAMP LEJEUNE
JACKSONVILLE, NORTH CAROLINA
PAGE THREE

Chemical	Safe Drinking Water Act Maximum Contaminant Level (mg/L) (SDWA MCL)[1]	Reference Dose[2] (mg/kg/day)		Ambient Water Quality Criteria[3] (mg/L)		Health Advisory[1] (mg/L)	Cancer Slope Factor[2] (mg/kg/day)$^{-1}$		EPA Weight of Evidence[2]
		Oral	Inhalation	Federal	EPA Region IV		Oral	Inhalation	
Mercury	0.002	3×10^{-4}[e]	9×10^{-5}[e]	0.0024 0.000012	0.000012	Longer-term/Adult: 0.002 Lifetime/Adult: 0.002			D
Nickel	0.1[e]	2×10^{-2}		1.4 0.16	0.08771	1-Day/Child: 1 10-Day/Child: 1 Longer-term/Child: 0.5 Longer-term/Adult: 1.7 Lifetime/Adult: 0.1		8.4×10^{-1}	A
Selenium	0.050	5×10^{-3}		0.020 0.005	0.005				D
Silver	0.05	5×10^{-3}		0.0041 NR	1.2×10^{-5}	1-Day/Child: 0.2 10-Day/Child: 0.2 Longer-term/Child: 0.2 Longer-term/Adult: 0.2 Lifetime/Adult: 0.1			D
Vanadium		7×10^{-3}[g]				1-Day/Child: 0.08 10-Day/Child: 0.08 Longer-term/Child: 0.03 Longer-term/Adult: 0.11 Lifetime/Adult: 0.02			D
Zinc	5[f]	2×10^{-1}[g]		0.12 0.11	0.05891	Lifetime/Adult: 2.1			D

TABLE 5-3
REGULATORY REQUIREMENTS AND DOSE-RESPONSE PARAMETERS FOR CHEMICALS OF CONCERN
SITE 7 - TARAWA TERRACE DUMP
MCB CAMP LEJEUNE
JACKSONVILLE, NORTH CAROLINA
PAGE FOUR

Chemical	Safe Drinking Water Act Maximum Contaminant Level (mg/L) (SDWA MCL)[1]	Reference Dose[2] (mg/kg/day)		Ambient Water Quality Criteria[3][4](mg/L)		Health Advisory[1] (mg/L)		Cancer Slope Factor[2] $(mg/kg/day)^{-1}$		EPA Weight of Evidence[2]
		Oral	Inhalation	Federal	EPA Region IV			Oral	Inhalation	
Cyanide	0.2[4][6]	2×10^{-2}			0.0052	1-Day/Child: 10-Day/Child: Longer-term/Child: Longer-term/Adult: Lifetime/Adult:	0.2 0.2 0.2 0.8 0.2			D

[1] U.S. EPA, April 1992.
[2] U.S. EPA, January 1991.
[3] U.S. EPA, October 1986.
[4] U.S. EPA, July 1, 1991.
[5] U.S. EPA, June 7, 1991.
[6] U.S. EPA, March 1992.

[a] Proposed.
[b] Total chromium.
[c] Developed by HALLIBURTON NUS.
[d] Action level for lead at the tap.
[e] Reference Dose has been revoked pending determination of carcinogenicity and/or noncarcinogenicity.
[f] Secondary MCL.

TABLE 5-4

STATE OF NORTH CAROLINA WATER QUALITY STANDARDS[1]
SITE 7 - TARAWA TERRACE DUMP
MCB CAMP LEJEUNE
JACKSONVILLE, NORTH CAROLINA

Chemical	Class GA Groundwater Standard (mg/L)[2]	Class SC Surface Water Standard (mg/L)[3]
Benzoic acid	NR[5]	NR[5]
Dieldrin	NR[5]	2×10^{-6}
Endrin ketone	NR[5]	NR[5]
Antimony	NR[5]	NR[5]
Arsenic	5×10^{-2}	5×10^{-2}
Barium	1×10^{0}	NR[5]
Beryllium	NR[5]	NR[5]
Cadmium	5×10^{-3}	5×10^{-3}
Chromium (Total)	5×10^{-2}	2×10^{-2}
Cobalt	NR[5]	NR[5]
Copper	1×10^{0}	3×10^{-3}[4]
Lead	5×10^{-2}	2.5×10^{-2}
Manganese	5×10^{-2}	NR[5]
Mercury	1.1×10^{-3}	2.5×10^{-5}
Selenium	1.0×10^{-2}	7.1×10^{-2}
Vanadium	NR[5]	NR[5]
Zinc	5×10^{0}	8.6×10^{-2}[4]

[1] NCAC, Title 15, Subchapter 2L (December 1989) and NCAC, Title 15A, Subchapter 2B (August 1990).
[2] Chloride concentration less than 250 mg/L.
[3] Standard for protection of aquatic life.
[4] Action Level.
[5] NR - Not reported.

TABLE 5-5

OBSERVED CONCENTRATIONS VERSUS STANDARDS/CRITERIA - SOIL
SITE 7 - TARAWA TERRACE DUMP
MCB CAMP LEJEUNE
JACKSONVILLE, NORTH CAROLINA

Chemical of Concern	Frequency of Detection[1]	Range of Detections (mg/kg)	Standard or Criteria (mg/kg)	Frequency of Exceedences[2]
bis(2-ethylhexyl)phthalate	1/13	1	414[5]	0/1
Fluoranthene	2/13	0.22 - 0.29	81,600[4]	0/2
Benzoic acid	3/13	6.3 - 15	1,000,000[4]	0/3
Aldrin	1/13	0.0043[3]	0.34[5]	0/1
4,4'-DDD	5/13	0.012 - 0.190	24[5]	0/5
4,4'-DDE	1/13	0.24	17[5]	0/1
Dieldrin	6/13	0.012[3] - 2.5	0.36[5]	4/6
Endosulfan II	6/13	0.0076[3] - 2.0	102[4]	0/6
Endrin	6/13	0.014 - 1.3	612[4]	0/6
Aroclor 1260	7/13	0.108[3] - 25.0	0.75[5]	4/7
Barium	13/13	6.6 - 223	142,800[4]	0/13
Beryllium	7/13	0.26 - 3.6	1.35[5]	2/7
Cadmium	13/13	1.1 - 5.0	1,020[4]	0/13
Cobalt	13/13	1.7 - 10.2	NR[6]	NA[6]
Lead	13/13	2.4 - 114	500[7]	0/13
Manganese	13/13	3.0 - 69	204,000[4]	0/13
Mercury	13/13	0.11 - 0.53	612[4]	0/13
Nickel	13/13	2.8 - 13.1	40,800[4]	0/13

TABLE 5-5
OBSERVED CONCENTRATIONS VERSUS STANDARDS/CRITERIA - SOIL
SITE 7 - TARAWA TERRACE DUMP
MCB CAMP LEJEUNE
JACKSONVILLE, NORTH CAROLINA
PAGE TWO

Chemical of Concern	Frequency of Detection[1]	Range of Detections (mg/kg)	Standard or Criteria (mg/kg)	Frequency of Exceedences[2]
Silver	13/13	0.66 - 3.0	10,200[4]	0/13
Thallium	13/13	0.44 - 2.0	14,280[4]	0/13
Zinc	5/13	1.1 - 44.5	408,000[4]	0/5
Cyanide	13/13	0.51 - 2.5	40,800[4]	0/13

(1) Number of positive detections per number of samples.
(2) Number of exceedences per number of positive detections.
(3) Result is the arithmetic average of duplicate results.
(4) Criteria based on a Hazard Quotient of 1.0. See Appendix D.
(5) Criteria based on a 1×10^{-6} cancer risk. See Appendix D.
(6) NR - Not Reported, no dose-response data available, NA - Not Applicable.
(7) U.S. EPA, September 7, 1989.

TABLE 5-6

OBSERVED CONCENTRATIONS VERSUS STANDARDS/CRITERIA - GROUNDWATER
SITE 7 - TARAWA TERRACE DUMP
MCB CAMP LEJEUNE
JACKSONVILLE, NORTH CAROLINA

Chemical of Concern	Frequency of Detection[1]	Range of Detections (µg/L)	Standard or Criteria (µg/L)	Frequency of Exceedences[2]
Benzoic acid	2/3	9 - 12	NR[4]	NA[4]
Dieldrin	1/3	0.63[3]	NR[4]	NA[4]
Endrin ketone	1/3	0.09[3]	NR[4]	NA[4]
Antimony	1/3	47.5[3]	10[5]	1/1
Arsenic	1/3	25.9(3)	50[5,6]	0/1
Barium	3/3	427 - 706	1,000[6]	0/3
Beryllium	2/3	3.1 - 9.4[3]	1[5]	2/2
Cadmium	1/3	12.4[3]	5[5,6]	1/1
Chromium (III)	3/3	47.8 - 251[3]	50[6]	2/3
Cobalt	2/3	9.6[3] - 21.7	NR[4]	NA[4]
Copper	3/3	17.7 - 41.6[3]	1,000[6]	0/3
Lead	3/3	30.3 - 37.3	15[7]	3/3
Manganese	3/3	56.9 - 220	50[5,6]	3/3
Mercury	2/3	0.24 - 0.36	1.1[6]	0/2
Selenium	1/3	3.4	10[6]	0/1
Vanadium	3/3	37.8 - 442[3]	NR[4]	NA[4]
Zinc	3/3	83.6 - 151	5,000[5,6]	0/3

(1) Number of positive detections per number of samples.
(2) Number of exceedences per number of positive detections.
(3) Result is the arithmetic average of duplicate results.
(4) NR - Not Reported; NA - Not Applicable.
(5) Federal MCL.
(6) NC State Class GA Groundwater Standard.
(7) Action level for lead at tap.

Antimony was detected in one sample at 47.5 ug/L, which exceeds the Federal MCL of 10 ug/L. Beryllium was detected in excess of the MCL of 1 ug/L in two groundwater samples exhibiting concentrations ranging to 9.4 ug/L. Cadmium was detected at a concentration of 12.4 ug/L in one sample which exceeds both the Federal MCL and the North Carolina State Class GA Groundwater Standard. Chromium (III) was detected in two of three groundwater samples at concentrations in excess of the State standard. Chromium (III) concentrations ranged as high as 251 ug/L. Lead was detected in all three samples above the action level (15 ug/L) at concentration ranging from 30.3 to 37.3 ug/L. Finally manganese was detected above the Federal and State standard of (50 ug/L) in all three groundwater samples. Manganese concentrations ranged from 56.9 to 220 ug/L.

Metals concentrations in all groundwater samples were based on total rather than dissolved metal analysis. Therefore, these concentrations are indicative of concentrations in both the dissolved form and that which is associated with suspended solids. Groundwater concentrations based on total metal analysis would be indicative of concentrations to which a receptor would be exposed if a potable water well were installed at the site, without any form of filtering or sedimentation potential (i.e., storage tank). These concentrations are not considered indicative of the potential for significant migration of inorganics from the site. As discussed in Section 4, no clear pattern of inorganic contamination suggesting that the site is the source may be discerned.

5.5 SUMMARY AND CONCLUSIONS

This section provides a summary of the preliminary risk assessment and presents recommendations for future activities at Site 7.

5.5.1 Preliminary Risk Assessment

The results of the preliminary risk assessment will be discussed on a media-specific basis. All chemicals of concern are identified based upon exceedence of criteria on a media-specific basis.

Three potential chemicals of concern (dieldrin, Aroclor-1260, and beryllium) were detected in soil samples at concentrations exceeding preliminary remediation goals based on an incremental cancer risk of 10^{-5} (transient military personnel). However, none of the estimated cancer risks associated with these chemicals exceed the upper bound of the EPA's target risk range (ie., 10^{-4}). Under current site conditions and based on existing information, soil contamination at the Tarawa Terrace Dump Site does not pose a substantial risk to public health.

Numerous inorganic constituent were detected in unfiltered groundwater samples at concentrations exceeding Federal or State standards/criteria. Shallow groundwater at the site is not currently used as a potable water source and hence exposure pathways/routes associated with groundwater use are incomplete. Metal concentrations do not clearly indicate that the site is the source of inorganic contamination. Metals concentrations may be indicative of the presence of naturally occurring suspended solid that are relatively high in metals content.

5.5.2 Recommendations

Recommendations for future actions include surface water and sediment sampling to characterize the extent of contaminant migration. Additional work may include an environmental risk assessment for the ecosystem at and near the discharge point of the drainage ditches into Northeast Creek. Additionally, installation of a clearly defined background monitoring well and sampling and analysis of groundwater samples for both total and dissolved metals is considered appropriate.

6.0 CONCLUSIONS AND RECOMMENDATIONS

This section presents a summary of the field investigation for Site 7: Tarawa Terrace Dump, as well as several recommendations for future activities at the site.

6.1 CONCLUSIONS

The field investigation performed at this site is summarized in Section 1.7 of this report. The primary purpose was to determine whether a contamination problem existed on the site from its previous use as a landfill. The analytical data were validated and a preliminary risk assessment was performed. The results of the risk assessment are discussed in detail in Section 5.0 of this document. The results are discussed by media below.

Three potential chemicals of concern (dieldrin, Aroclor-1260, and beryllium) were detected in soil samples at concentrations exceeding preliminary remediation goals based on an incremental cancer risk of 10^{-6} (transient military personnel). However, none of the estimated cancer risks associated with these chemicals exceed the upper bound of the EPA's target risk range (ie., 10^{-4}). Under current site conditions and based on existing information, soil contamination at the Tarawa Terrace Dump Site does not pose a substantial risk to public health.

Numerous inorganic constituent were detected in unfiltered groundwater samples at concentrations exceeding Federal or State standards/criteria. Shallow groundwater at the site is not currently used as a potable water source and hence exposure pathways/routes associated with groundwater use are incomplete. Metal concentrations do not clearly indicate that the site is the source of inorganic contamination. Metals concentrations may be indicative of the presence of naturally occurring suspended solid that are relatively high in metals content.

6.2 RECOMMENDATIONS

Recommendations for future actions include surface water and sediment sampling to characterize the extent of contaminant migration. Additional work may include an environmental risk assessment for the ecosystem at and near the discharge point of the drainage ditches into Northeast Creek. Additionally, installation of a clearly defined background monitoring well and sampling and analysis of groundwater samples for both total and dissolved metals is considered appropriate.

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APPENDIX A

BORING LOGS

BORING LOG — **NUS CORPORATION**

PROJECT: Camp Lejeune — BORING NO: 07SB01
PROJECT NO.: 2F36 — DATE: 6-25-91 — DRILLER: NA
ELEVATION: 2.43 — FIELD GEOLOGIST: A. Kendrick
WATER LEVEL DATA:
(Date, Time & Conditions)

SAMPLE NO. & TYPE OR ROD	DEPTH (ft) OR RUN NO.	BLOWS 6" OR ROD (%)	SAMPLE RECOVERY SAMPLE LENGTH	LITHOLOGY CHANGE (Depth ft.) OR SCREENED INTERVAL	MATERIAL DESCRIPTION: SOIL DENSITY CONSISTENCY OR ROCK HARDNESS	COLOR	MATERIAL CLASSIFICATION	SOURCE OF UNIFIED SOILS CLASS	REMARKS
S-1	1.0				V. loose	Brn/Blk	Silt, sand & clay	ML	High % of organic matter and vegetation Swampy.
0.0-3.0	2.0								
	3.0			3.0					
	4.0						EOB @ 3.0		
	5.0								
							Sample taken by hand w/ trowel + shovel. 0.0-3.0		

REMARKS: No Drilling Equip.

BORING 07SB01

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BORING LOG — **NUS CORPORATION**

PROJECT: CAMP LEJEUNE — BORING NO.: 075602
PROJECT NO.: 2F36 — DATE: 6-25-91 — DRILLER: G.CHISM (H.N.I.)
ELEVATION: 5.56 — FIELD GEOLOGIST: D. YOST
WATER LEVEL DATA :
(Date, Time & Conditions)

SAMPLE NO. & TYPE OR ROD	DEPTH (ft.) OR RUN NO.	BLOWS 6" OR ROD (%)	SAMPLE RECOVERY SAMPLE LENGTH	LITHOLOGY CHANGE (Depth ft.) OR SCREENED INTERVAL	MATERIAL DESCRIPTION: SOIL DENSITY CONSISTENCY OR ROCK HARDNESS	COLOR	MATERIAL CLASSIFICATION	UNIFIED SOIL CLASS.	REMARKS
	0.0	2 1		1.0		BROWN	SAND SILT CLAY ORGANICS		
S-1 0930	2.0	2 2	1.0 2.0		V.LOOSE	BROWN	SAND SOME SILT, CLAY	SM	S-1 0-2' * SENT TO LAB DAMP-MOIST
		3 3				BROWN	CLAYEY SAND SOME SILT	SC	SOME PERCHED WATER
S-2 0932	4.0	4 2	2.0 2.0		MEDIUM STIFF	BROWN	SANDY CLAY SOME SILT	CL	S-2 2-4' DAMP-MOIST
		5 4							
S-3 0935	6.0	5 6	2.0 2.0		LOOSE	TAN-BROWN	CLAYEY SAND SOME SILT	SC	S-3 4-6 DAMP-MOIST
				7.0					
	8.0	3 3				ORANGE			
S-4 0950		3 5	2.0 2.0		LOOSE	TAN-BROWN	CLAYEY SAND	SC	S-4 7-9' * SENT TO SATURATED LAB
	10.0			9.0					
							SPLIT SPOON 7-9		
							2-3" SPOONS 2-2" SPOONS		
							EOB 9.0		

REMARKS CME 55 ATV. 4¼ INCH I.D HOLLOW STEM AUGERS. 2" I.D SPOONS FOR SAMPLES

BORING 075602

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BORING LOG — NUS CORPORATION

PROJECT: Camp Lejeune — BORING NO: 075B03
PROJECT NO.: 2F36 — DATE: 6-25-91 — DRILLER: NA
ELEVATION: 2.24 — FIELD GEOLOGIST: A. Kendrick
WATER LEVEL DATA:
(Date, Time & Conditions)

SAMPLE NO. & TYPE OR ROD	DEPTH (ft.) OR RUN NO.	BLOWS 6" OR ROD (%)	SAMPLE RECOVERY SAMPLE LENGTH	LITHOLOGY CHANGE (Depth ft.) OR SCREENED INTERVAL	MATERIAL DESCRIPTION: SOIL DENSITY CONSISTENCY OR ROCK HARDNESS	COLOR	MATERIAL CLASSIFICATION	ORGANIC VAPOR USE CONCENTRATIONS	REMARKS
S-1	1.0				V. loose	Brn/Blk	silt + clay, little sand	MW/A	High % of
0.0-2.0	2.0								organic mater and vegetatio
	3.0			2.0			EOB @ 2.0		Swampy with
	4.0								Standing Wat
	5.0						Sample taken by		
							hand w/ trowel		
							& shovel 0.0-2.0		

REMARKS: No Drilling Equip

BORING 075B

PAGE 1

BORING LOG — **NUS CORPORATION**

PROJECT: CAMP LEJEUNE — BORING NO.: 07 SB04
PROJECT NO.: ZF36 — DATE: 6-24-91 — DRILLER: C. CH/SM (H. L.)
ELEVATION: 12.22 — FIELD GEOLOGIST: D. YOST
WATER LEVEL DATA:
(Date, Time & Conditions)

SAMPLE NO. & TYPE OR ROD	DEPTH (ft.) OR RUN NO.	BLOWS 6" OR ROD (%)	SAMPLE RECOVERY SAMPLE LENGTH	LITHOLOGY CHANGE (Depth, ft.) OR SCREENED INTERVAL	MATERIAL DESCRIPTION: SOIL DENSITY CONSISTENCY OR ROCK HARDNESS	COLOR	MATERIAL CLASSIFICATION	BORE HOLE USCS CORE SAMPLE	• REMARKS
	0.0	2 3		1.0		ORANGE	FILTER MEDIUM - 1' THICK		
S-1 1135	2.0	3 2	2.0 2.0		LOOSE	TAN-BROWN	F.NE-MEDIUM SAND TR SILT	SM	S-1 0-2' SENT TO LABAMA
	4.0								
	6.0	2 4				↓	↓		
S-2 1142		5 11	0.3 2.0	7.0	LOOSE	TAN-BROWN	SAND - F - medium TR SILT	SM/SP	S-2 5-7 MOIST - WATER
	8.0	4 5							
S-3 1200		6 7	2.0 2.0		MEDIUM DENSE	TAN-BROWN	SAND - TR SILT	SM/SP	S-3 7-9' SENT TO SATURATED LAB
	10.0			9.0			MEDIUM - FINE GRAINED		
							SPLIT SPOON 7-9'		
							1-3" SPOON		
							1-2" SPOON		
							^		
							EOB 9.0		

REMARKS CME 55 ATV. 4¼ INCH I.D HOLLOW STEM AUGERS. 3" I.D SPLIT SPOONS FOR SAMPLES

BORING 07SB04

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BORING LOG — **NUS CORPORATION**

PROJECT: CAMP LEJEUNE — BORING NO.: 07 5805
PROJECT NO.: 2F36 — DATE: 6-24-91 — DRILLER: G. CHISM (H.H.I.)
ELEVATION: 12.92 — FIELD GEOLOGIST: D. YOST
WATER LEVEL DATA:
(Date, Time & Conditions)

SAMPLE NO. & TYPE OR ROD	DEPTH (ft.) OR RUN NO.	BLOWS 6" OR ROD (%)	SAMPLE RECOVERY SAMPLE LENGTH	LITHOLOGY CHANGE (Depth ft.) OR SCREENED INTERVAL	MATERIAL DESCRIPTION: SOIL DENSITY CONSISTENCY OR ROCK HARDNESS	COLOR	MATERIAL CLASSIFICATION	BOREHOLE CONSTRUCTION	REMARKS
	0.0	1 3				TAN-BROWN	SAND TR SILT CLAY ROOTS		2' THICK FILL
S-1 1010	2.0	3 3	0.5 / 2.0	2.0		TAN-BRN	SAND TR SILT CLAY	SM	S-1 0-2' DUPLICATE SAMP. DRY-DAMP. POOR RECOV
					LOOSE	TAN BROWN	SAND TR SILT	SM/SP	DUE TO BRICK IN SPOON EXTRA 2" SPOON
	4.0								
							SAND COARSE N S		
	6.0	6 5							
S-2 1016		5 8	2.0 / 2.0		LOOSE	TAN-WHITE	FINE-MEDIUM SAND WELL SORTED	SM/SP	S-2 5-7' DAMP-MOIST
	8.0								
									WATER - 9.5'
	10.0			10.0					
		6 7					WELL SORTED		
S-3 1135	12.0	10 10	2.0 / 2.0		MEDIUM DENSE	TAN-BROWN	FINE-MEDIUM GRAINED SAND	SM/SP	S-3 10-12 & SENT TO SATURATED LAB
				12.0					
							SPLIT SPOON 10-12		
									2 - 3" SPOONS
									1 - 2" SPOON
							EOB - 12.0'		

REMARKS: CME 55 ATV 4¼ INCH I.D HOLLOW STEM AUGERS 3" I.D SPLIT SPOONS FOR SAMPLES.

BORING 07560

PAGE 1 : 1

BORING LOG — **NUS CORPORATION**

PROJECT: CAMP LEJEUNE — BORING NO.: 07MW01
PROJECT NO.: 2F36 — DATE: 6-25-91 — DRILLER: C. CHISM (HAND AUGER)
ELEVATION: 2.63 — FIELD GEOLOGIST: D. YOST
WATER LEVEL DATA:
(Date, Time & Conditions)

SAMPLE NO. & TYPE OR ROD	DEPTH (ft.) OR RUN NO.	BLOWS 6" OR ROD (%)	SAMPLE RECOVERY SAMPLE LENGTH	LITHOLOGY CHANGE (Depth, ft.) OR SCREENED INTERVAL	MATERIAL DESCRIPTION: SOIL DENSITY, CONSISTENCY OR ROCK HARDNESS	COLOR	MATERIAL CLASSIFICATION	USCS SOIL CONSISTENCY	REMARKS
	0.0	1/1				BLACK-BROWN	SAND, SILT AND CLAY + ORGANICS		
S-1 1515	2.0	1/1	0.2/2.0		V. LOOSE	BLACK	SAND SILT N CLAY + ORGANICS	SM	S-1 0-2' MOIST
				3.0		BLACK	CLAYEY SAND	SC	STRONG ORGANIC ODOR
	4.0								
S-2 1525			2.0/2.0		V. LOOSE	BLACK	CLAYEY SAND	SC	S-2 3-5' SATURATED
	6.0								STRONG ORGANIC ODOR
	8.0								
					V. LOOSE	BLACK	CLAYEY SAND	SC	SATURATED
	10.0								
	12.0								
				13.0		BLACK	CLAYEY SAND	SC	SATURATED
	14.0								
							4 - 2 INCH SPOONS		
							BOTM - 13.0		

REMARKS: CME 55 ATV. 4 1/4 INCH I.D. HOLLOW STEM AUGERS
2" SPOONS FOR SAMPLES. WELL LOCATED IN SWAMP!

BORING 07MW01
PAGE 1 : 1

BORING LOG — **NUS CORPORATION**

PROJECT: CAMP LEJEUNE — BORING NO.: 07MW02
PROJECT NO.: 2F36 — DATE: 6-24-91 — DRILLER: C.C.H.S.M.C.N.H.I.
ELEVATION: 6.44 — FIELD GEOLOGIST: D. YOST
WATER LEVEL DATA:
(Date, Time & Conditions)

SAMPLE NO. & TYPE OR ROD	DEPTH (ft.) OR RUN NO.	BLOWS 6" OR ROD (%)	SAMPLE RECOVERY SAMPLE LENGTH	LITHOLOGY CHANGE (Depth,ft.) OR SCREENED INTERVAL	MATERIAL DESCRIPTION: SOIL DENSITY CONSISTENCY OR ROCK HARDNESS	COLOR	MATERIAL CLASSIFICATION	USCS OR ROCK CORE SCRS	REMARKS
	0.0	2 1		0.5		BLACK	SAND, SILT, CLAY - 1.0 THICK		ORGANIC 1' THICK
S-1 1800	2.0	1 1	1.6/2.0		U.SOFT	TAN-BROWN	CLAY SOME SAND	CL	S-1 0-2' RAMP
									3PPM - HNU HEAD SPACE
	4.0								
						GRAY	CLAY SOME SAND	CL	
	6.0	2 7							
S-2 1802		7 5	2.0/2.0		STIFF	GRAY	CLAY - SOME SAND	CL	S-2 5-7' RAMP
	8.0	3 1		7.5		TAN-BROWN	FINE-MEDIUM SAND LITTLE SILT		3PPM - HNU - HEAD PACE
S-3 1808		4 6	2.0/2.0		LOOSE	TAN-BROWN	FINE-MEDIUM SAND LITTLE SILT	SM	S-3 7.5-9.5 SATURATED
	10.0					ORANGE			7PPM HNU - SPOON
	12.0								
	14.0					RED-BRN			
				15.0	LOOSE	TAN ORANGE	FINE-MEDIUM SAND LITTLE SILT	SM	SATURATED
									SCREEN SET 4-14'
									1' OF CAVING
							BOTM 15.0		

REMARKS: CME 55 ATV. 4 1/4 INCH I.D. HOLLOW STEM AUGERS. 3' I.D. SPLIT SPOON FOR SAMPLES

BORING 07MW02

PAGE 1 : 1

BORING LOG — **NUS CORPORATION**

PROJECT: CAMP LEJEUNE — BORING NO.: 07MW03
PROJECT NO.: 2F36 — DATE: 6-24-91 — DRILLER: C. SH. SM (M.H.I.)
ELEVATION: 2.85 — FIELD GEOLOGIST: D. LYOST
WATER LEVEL DATA:
(Date, Time & Conditions)

SAMPLE NO. & TYPE OR ROD	DEPTH (ft.) OR RUN NO.	BLOWS 6" OR ROD (%)	SAMPLE RECOVERY SAMPLE LENGTH	LITHOLOGY CHANGE (Depth, ft.) OR SCREENED INTERVAL	MATERIAL DESCRIPTION: SOIL DENSITY CONSISTENCY OR ROCK HARDNESS	COLOR	MATERIAL CLASSIFICATION	BORE HOLE USCS CONSTRUCTION	REMARKS
	0.0	0 1				BLACK	SILT SAND SOME CLAY	OL	ORGANIC MATTER IN 1
S-1 1535	2.0	0 0	1.5/2.0		V. SOFT	BLACK	SILT SAND SOME CLAY	OL	S-1 0-2' SATURATED
						BLACK	SILT SAND TR CLAY	OL	WATER – 0.5'
	4.0					↓	↓	↓	
	6.0								
				7.0		BLACK	SILT SAND TR CLAY	OL	
	8.0								
	10.0								
	12.0								
	14.0								
							1-2" I.D SPOON		
							BOTM - 7.0		

REMARKS: CME 55 ATV. 4¼ INCH ID HOLLOW STEM AUGERS. 3" I.D. SPLIT SPOONS FOR SAMPLES. DRILLING IN A SWAMP

BORING 07MWC

PAGE 1

APPENDIX B

WELL CONSTRUCTION DIAGRAMS

NUS CORPORATION
A Halliburton Company

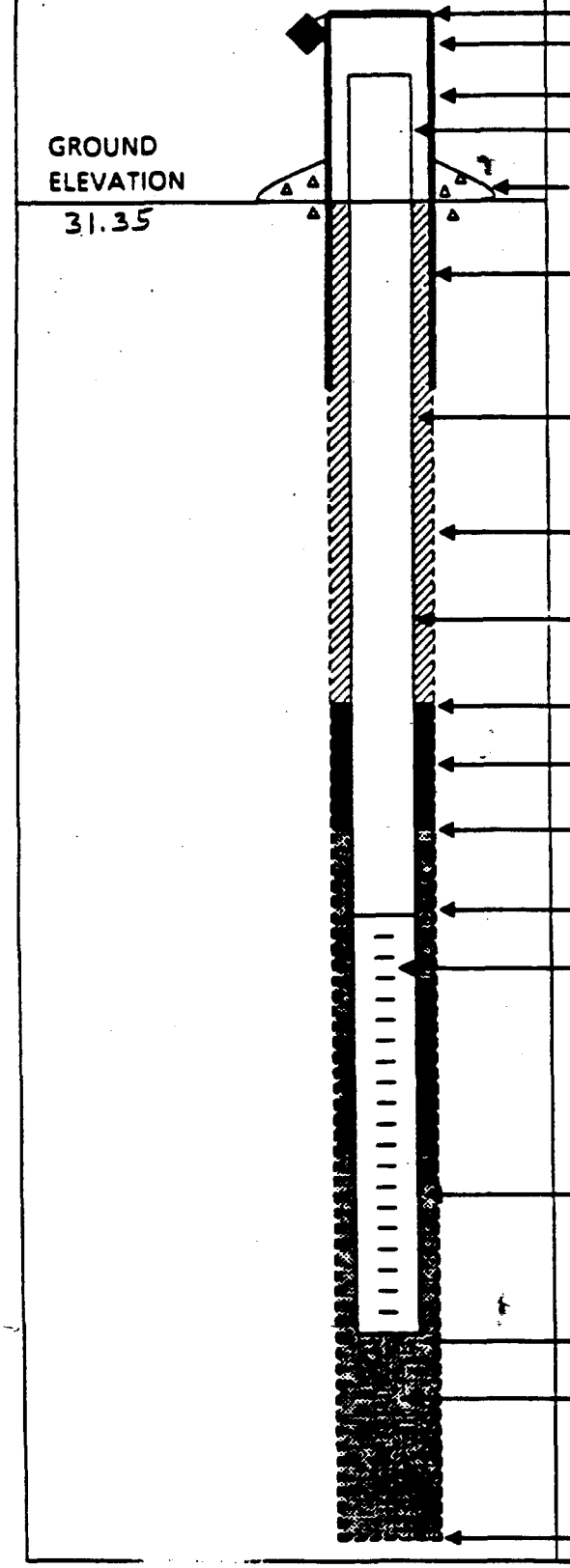
BORING NO. [illegible]

OVERBURDEN
MONITORING WELL SHEET

PROJECT: CAMP LEJEUNE
PROJECT NO.: 2F36
ELEVATION: 31.35
FIELD GEOLOGIST: D. Yost

LOCATION: CAMP LEJEUNE NC
BORING: C7MW01
DATE: 6-25-91

DRILLER: C. CHEM (M & E)
DRILLING METHOD: H S A
DEVELOPMENT METHOD: SS BAILER



ELEVATION OF TOP OF SURFACE CASING: 35.67
ELEVATION OF TOP OF RISER PIPE: 35.40
STICK - UP TOP OF SURFACE CASING: 4.32
STICK - UP RISER PIPE: 4.05
TYPE OF SURFACE SEAL: CEMENT / GROUT
I.D. OF SURFACE CASING: 4 INCH
TYPE OF SURFACE CASING: STEEL
RISER PIPE I.D. 2 INCH
TYPE OF RISER PIPE: PVC
BOREHOLE DIAMETER: 9 1/4 INCH
TYPE OF BACKFILL: CEMENT / GROUT
ELEVATION / DEPTH TOP OF SEAL: 10
TYPE OF SEAL: BENTONITE
DEPTH TOP OF SAND PACK: 20
ELEVATION / DEPTH TOP OF SCREEN: 30
TYPE OF SCREEN: PVC
SLOT SIZE x LENGTH: 0.02 x 10'
I.D. OF SCREEN: 2 INCH
TYPE OF SAND PACK: #2 [illegible] SAND
ELEVATION / DEPTH BOTTOM OF SCREEN: 130
ELEVATION / DEPTH BOTTOM OF SAND PACK: 130
TYPE OF BACKFILL BELOW OBSERVATION WELL: Cuttings
ELEVATION / DEPTH OF HOLE: [illegible]

NUS CORPORATION
A Halliburton Company

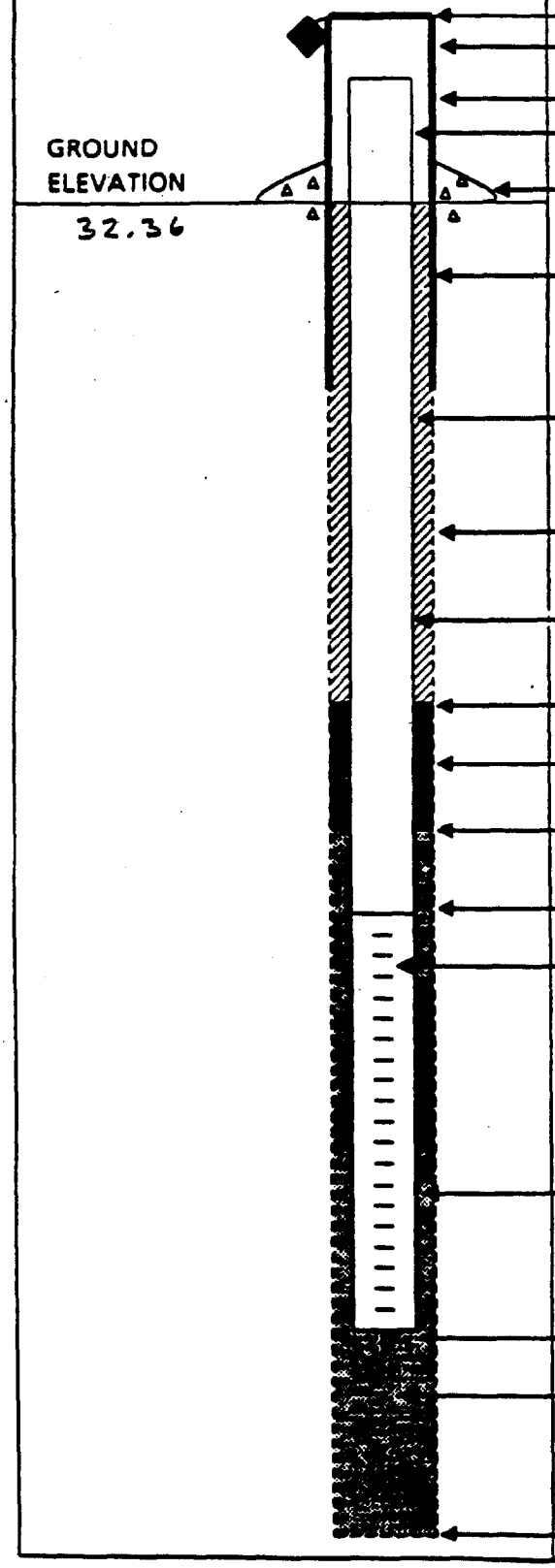
BORING NO. 07MW02

OVERBURDEN
MONITORING WELL SHEET

PROJECT CAMP LEJEUNE
PROJECT NO. 2F36
ELEVATION 32.36
FIELD GEOLOGIST D. YOST

LOCATION CAMP LEJEUNE N.C
BORING 07MW02
DATE 6-18-91

DRILLER [illegible]
DRILLING METHOD HSA
DEVELOPMENT METHOD SS BAILER



ELEVATION OF TOP OF SURFACE CASING: 36.59
ELEVATION OF TOP OF RISER PIPE: 35.91
STICK - UP TOP OF SURFACE CASING: 4.23
STICK - UP RISER PIPE: 3.55
TYPE OF SURFACE SEAL: CEMENT / GROUT
I.D. OF SURFACE CASING: 4 INCH
TYPE OF SURFACE CASING: STEEL
RISER PIPE I.D. 2 INCH
TYPE OF RISER PIPE: PVC
BOREHOLE DIAMETER: 8 1/4 INCH
TYPE OF BACKFILL: CEMENT / GROUT
ELEVATION / DEPTH TOP OF SEAL: 1.0
TYPE OF SEAL: BENTONITE
DEPTH TOP OF SAND PACK: 2.0
ELEVATION / DEPTH TOP OF SCREEN: 4'
TYPE OF SCREEN: PVC
SLOT SIZE x LENGTH [illegible]
I.D. OF SCREEN: 2 INCH
TYPE OF SAND PACK: #2 SILICA SAND
ELEVATION / DEPTH BOTTOM OF SCREEN: 14'
ELEVATION / DEPTH BOTTOM OF SAND PACK: 14'
TYPE OF BACKFILL BELOW OBSERVATION WELL: CUTTINGS
ELEVATION / DEPTH OF HOLE: 15'

NUS CORPORATION
A Halliburton Company

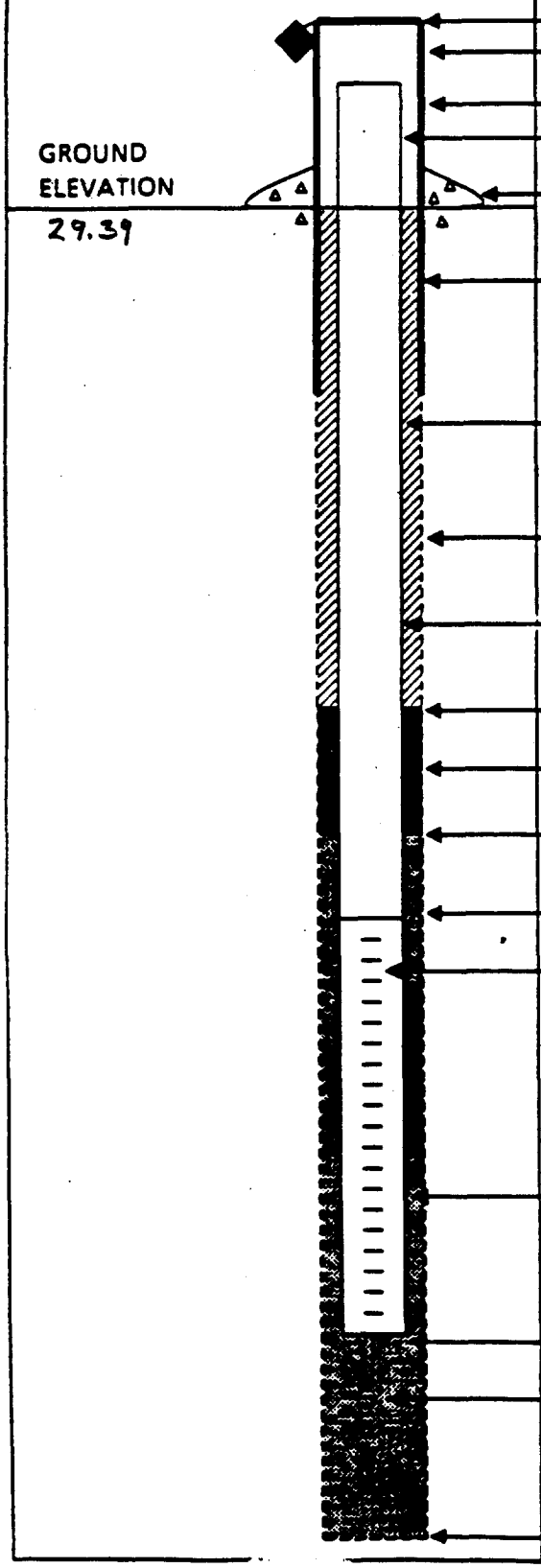
BORING NO. 07MW03

OVERBURDEN
MONITORING WELL SHEET

PROJECT CAMP LEJEUNE
PROJECT NO. ZF36
ELEVATION 29.39
FIELD GEOLOGIST D. Yost

LOCATION CAMP LEJEUNE N C
BORING 07MW03
DATE 6-24-91

DRILLER CGMSM
DRILLING METHOD HSA
DEVELOPMENT METHOD SS BAILER



ELEVATION OF TOP OF SURFACE CASING: 32.88
ELEVATION OF TOP OF RISER PIPE: 32.66
STICK - UP TOP OF SURFACE CASING: 3.49
STICK - UP RISER PIPE: 3.27
TYPE OF SURFACE SEAL: CEMENT / GROUT
I.D. OF SURFACE CASING: 4 INCH
TYPE OF SURFACE CASING: STEEL
RISER PIPE I.D. 2 INCH
TYPE OF RISER PIPE: PVC
BOREHOLE DIAMETER: 8 1/4 INCH
TYPE OF BACKFILL: CEMENT / GROUT
ELEVATION / DEPTH TOP OF SEAL: 1.0
TYPE OF SEAL: BENTONITE
DEPTH TOP OF SAND PACK: 2.0
ELEVATION / DEPTH TOP OF SCREEN: 2.5
TYPE OF SCREEN: PVC
SLOT SIZE x LENGTH: 0.02 x 3'
I.D. OF SCREEN: 2 INCH
TYPE OF SAND PACK: #2 SILICA SAND
ELEVATION / DEPTH BOTTOM OF SCREEN: 5.5
ELEVATION / DEPTH BOTTOM OF SAND PACK: 5.5
TYPE OF BACKFILL BELOW OBSERVATION WELL: CUTTINGS
ELEVATION / DEPTH OF HOLE: 7.0

APPENDIX C

CHEMICAL ANALYTICAL RESULTS

INORGANIC ANALYSIS (mg/kg)
SITE: CAMP LEJEUNE - BACKGROUND SOIL
CASE: 5012
LABORATORY:

SAMPLE LOCATION:	ANALYTICAL	BS-1	BS-2	BS-2-D	BS-3	
SAMPLE NUMBER:	METHOD					
QC DESIGNATION:				FIELD DUPLICATE		CRQL
ALUMINUM	P	765 J	1530 J	1490 J	13900 J	40
ANTIMONY	P	2.7 U	3.1 U	3.3 U	3.1 U	12
ARSENIC	F	0.73 UJ	0.75 UJ	0.77 J	4.1 J	2
BARIUM	P	5.6	23.7	18.2	15.5	40
BERYLLIUM	P	0.32 U	0.37 U	0.38 U	0.36 U	1
CADMIUM	P	0.79 UJ	0.93 UJ	0.96 UJ	0.90 UJ	1
CALCIUM	P	267	647	495	113	1000
CHROMIUM	P	1.0 UJ	1.8 UJ	1.5 UJ	18.9	2
COBALT	P	0.79 U	0.93 U	0.96 U	1.1	10
COPPER	P	2.4	1.6	0.96 U	2.9	5
IRON	P	439	667	673	14100	20
LEAD	F	9.0	8.6	7.2	22.2	0.6
MAGNESIUM	P	31.9 J	80.9 J	66.8 J	571 J	1000
MANGANESE	P	7.4	1.8	1.5	7.0	3
MERCURY	CV	0.10 U	0.09 U	0.10 U	0.10 U	0.04
NICKEL	P	1.3 U	1.5 U	1.5 U	2.9 UJ	8
POTASSIUM	P	76.7 U	89.4 U	92.9 U	817	1000
SELENIUM	F	0.73 UJ	0.75 UJ	1.2 J	0.78 UJ	1
SILVER	P	0.32 UJ	0.37 UJ	0.68 J	0.36 UJ	2
SODIUM	P	20.7 UJ	37.2 UJ	43.0 UJ	44.6 UJ	1000
THALLIUM	F	0.19 UJ	0.19 U	0.19 UJ	0.26 UJ	2
TIN	P	NA	NA	NA	NA	8
VANADIUM	P	0.98	2.3	2.5	25.8	10
ZINC	P	3.2 UJ	3.5 UJ	2.1 UJ	10.3	4
CYANIDE	C	NA	NA	NA	NA	2
% MOISTURE:		0	0	0	0	
DILUTION FACTOR:		1.0	1.0	1.0	1.0	
DATE SAMPLED:		6/18/91	6/18/91	6/18/91	6/18/91	
ASSOCIATED BLANKS:		BS-1-R	BS-1-R	BS-1-R	BS-1-R	

ANALYTICAL METHOD
F - FURNACE
P - ICP/FLAME AA
CV - COLD VAPOR
C - COLORMETRIC

J - QUANTITATION IS APPROXIMATE DUE TO LIMITATIONS IDENTIFIED IN THE QUALITY CONTROL REVIEW (DATA REVIEW)
R - VALUE IS REJECTED.
-- VALUE IS NON-DETECTED
NA- NOT ANALYZED

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VOLATILE ANALYSIS (ug/kg)
SITE: CAMP LEJEUNE - SITE 07
CASE: 5054

SAMPLE LOCATION:		SB01-0002	SB02-0002	SB02-0709	SB03-0002	SB04-0002	SB04-0709	SB05-0002	SB05-0002-D
SAMPLE NUMBER:									
QC DESIGNATION:	CRQL								FIELD DUPLICATE
CHLOROMETHANE	10	19 UJ	12 UJ	12 UJ	53 UJ	11 UJ	12 UJ	11 U	11 U
BROMOMETHANE	10	19 UJ	12 UJ	12 UJ	53 UJ	11 UJ	12 UJ	11 UJ	11 UJ
VINYL CHLORIDE	10	19 U	12 U	12 U	53 UJ	11 U	12 U	11 U	11 U
CHLOROETHANE	10	19 U	12 U	12 U	53 UJ	11 U	12 U	11 U	11 U
METHYLENE CHLORIDE	5	10 U	4 UJ	5 UJ	30 UJ	6 U	6 U	6 U	6 U
ACETONE	10	19 U	12 U	12 U	53 UJ	11 U	12 U	11 U	11 U
CARBON DISULFIDE	5	10 U	6 U	6 U	26 UJ	6 U	6 U	6 U	6 U
1,1-DICHLOROETHENE	5	10 U	6 U	6 U	26 UJ	6 U	6 U	6 U	6 U
1,1-DICHLOROETHANE	5	10 U	6 U	6 U	26 UJ	6 U	6 U	6 U	6 U
1,2-DICHLOROETHENE (TOTAL)	5	10 U	6 U	6 U	26 UJ	6 U	6 U	6 U	6 U
CHLOROFORM	5	10 U	6 U	6 U	26 UJ	6 U	6 U	6 U	6 U
1,2-DICHLOROETHANE	5	10 U	6 U	6 U	26 UJ	6 U	6 U	6 U	6 U
2-BUTANONE	10	19 U	12 U	12 U	53 UJ	11 U	12 U	11 UJ	11 U
1,1,1-TRICHLOROETHANE	5	10 U	6 U	6 U	26 UJ	6 U	6 U	6 UJ	6 U
CARBON TETRACHLORIDE	5	10 U	6 U	6 U	26 UJ	6 U	6 U	6 UJ	6 U
VINYL ACETATE	10	19 U	12 U	12 U	53 UJ	11 U	12 U	11 UJ	11 U
BROMODICHLOROMETHANE	5	10 U	6 U	6 U	26 UJ	6 U	6 U	6 UJ	6 U
1,2-DICHLOROPROPANE	5	10 U	6 U	6 U	26 UJ	6 U	6 U	6 UJ	6 U
CIS-1,3-DICHLOROPROPENE	5	10 U	6 U	6 U	26 UJ	6 U	6 U	6 UJ	6 U
TRICHLOROETHENE	5	10 U	6 U	6 U	26 UJ	6 U	6 U	6 UJ	6 U
DIBROMOCHLOROMETHANE	5	10 U	6 U	6 U	26 UJ	6 U	6 U	6 UJ	6 U
1,1,2-TRICHLOROETHANE	5	10 U	6 U	6 U	26 UJ	6 U	6 U	6 UJ	6 U
BENZENE	5	10 U	6 U	6 U	26 UJ	6 U	6 U	6 UJ	6 U
TRANS-1,3-DICHLOROPROPENE	5	10 U	6 U	6 U	26 UJ	6 U	6 U	6 UJ	6 U
BROMOFORM	5	10 U	6 U	6 U	26 UJ	6 U	6 U	6 UJ	6 U
4-METHYL-2-PENTANONE	10	19 U	12 U	12 U	53 UJ	11 U	12 U	11 UJ	11 U
2-HEXANONE	10	19 U	12 U	12 U	53 UJ	11 U	12 U	11 UJ	11 U
TETRACHLOROETHENE	5	10 U	6 U	6 U	26 UJ	6 U	6 U	6 UJ	6 U
1,1,2,2-TETRACHLOROETHANE	5	10 U	6 U	6 U	26 UJ	6 U	6 U	6 UJ	6 U
TOLUENE	5	10 U	6 U	6 U	26 UJ	6 U	6 U	6 UJ	6 U
CHLOROBENZENE	5	10 U	6 U	6 U	26 UJ	6 U	6 U	6 UJ	6 U
ETHYL BENZENE	5	10 U	6 U	6 U	26 UJ	6 U	6 U	6 UJ	6 U
STYRENE	5	10 U	6 U	6 U	26 UJ	6 U	6 U	6 UJ	6 U
TOTAL XYLENES	5	10 U	6 U	6 U	26 UJ	6 U	6 U	6 UJ	6 U
% MOISTURE:		48	15	20	81	11	19	13	13
DILUTION FACTOR:		1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
DATE SAMPLED:		6/25/91	6/25/91	6/25/91	6/25/91	6/24/91	6/24/91	6/24/91	6/24/91
DATE ANALYZED:		7/05/91	7/05/91	7/05/91	7/05/91	7/05/91	7/05/91	7/04/91	7/04/91
ASSOCIATED BLANKS:		07SB05-T	07SB05-T	07SB05-T	07SB05-T	07SB05-T	07SB05-T	07SB05-T	07SB05-T
		07SB05-R	07SB05-R	07SB05-R	07SB05-R	07SB05-R	07SB05-R	07SB05-R	07SB05-R

VOLATILE ANALYSIS (ug/kg)
SITE: CAMP LEJEUNE - SITE 07
CASE: 5054

SAMPLE LOCATION:		SB05-1012	MW01-0002	MW01-0305	MW02-0002	MW02-7595	MW03-0002
SAMPLE NUMBER:							
QC DESIGNATION:	CRQL						
CHLOROMETHANE	10	12 UJ	36 UJ	45 UJ	12 UJ	13 UJ	48 UJ
BROMOMETHANE	10	12 UJ	36 UJ	45 UJ	12 UJ	13 UJ	48 UJ
VINYL CHLORIDE	10	12 U	36 U	45 UJ	12 U	13 U	48 U
CHLOROETHANE	10	12 U	36 U	45 UJ	12 U	13 U	48 U
METHYLENE CHLORIDE	5	6 U	18 U	23 UJ	4 UJ	6 UJ	24 U
ACETONE	10	12 U	36 U	45 UJ	12 U	13 U	48 U
CARBON DISULFIDE	5	6 U	18 U	23 UJ	6 U	6 U	24 U
1,1-DICHLOROETHENE	5	6 U	18 U	23 UJ	6 U	6 U	24 U
1,1-DICHLOROETHANE	5	6 U	18 U	23 UJ	6 U	6 U	24 U
1,2-DICHLOROETHENE (TOTAL)	5	6 U	18 U	23 UJ	6 U	6 U	24 U
CHLOROFORM	5	6 U	18 U	23 UJ	6 U	6 U	24 U
1,2-DICHLOROETHANE	5	6 U	18 U	23 UJ	6 U	6 U	24 U
2-BUTANONE	10	12 U	36 U	45 UJ	12 U	13 U	48 U
1,1,1-TRICHLOROETHANE	5	6 U	18 U	23 UJ	6 U	6 U	24 U
CARBON TETRACHLORIDE	5	6 U	18 U	23 UJ	6 U	6 U	24 U
VINYL ACETATE	10	12 U	36 U	45 UJ	12 U	13 U	48 U
BROMODICHLOROMETHANE	5	6 U	18 U	23 UJ	6 U	6 U	24 U
1,2-DICHLOROPROPANE	5	6 U	18 U	23 UJ	6 U	6 U	24 U
CIS-1,3-DICHLOROPROPENE	5	6 U	18 U	23 UJ	6 U	6 U	24 U
TRICHLOROETHENE	5	6 U	18 U	23 UJ	6 U	6 U	24 U
DIBROMOCHLOROMETHANE	5	6 U	18 U	23 UJ	6 U	6 U	24 U
1,1,2-TRICHLOROETHANE	5	6 U	18 U	23 UJ	6 U	6 U	24 U
BENZENE	5	6 U	18 U	23 UJ	6 U	6 U	24 U
TRANS-1,3-DICHLOROPROPENE	5	6 U	18 U	23 UJ	6 U	6 U	24 U
BROMOFORM	5	6 U	18 U	23 UJ	6 U	6 U	24 U
4-METHYL-2-PENTANONE	10	12 U	36 U	45 UJ	12 U	13 U	48 U
2-HEXANONE	10	12 U	36 U	45 UJ	12 U	13 U	48 U
TETRACHLOROETHENE	5	6 U	18 U	23 UJ	6 U	6 U	24 U
1,1,2,2-TETRACHLOROETHANE	5	6 U	18 U	23 UJ	6 U	6 U	24 U
TOLUENE	5	6 U	18 U	23 UJ	6 U	6 U	24 U
CHLOROBENZENE	5	6 U	18 U	23 UJ	6 U	6 U	24 U
ETHYL BENZENE	5	6 U	18 U	23 UJ	6 U	6 U	24 U
STYRENE	5	6 U	18 U	23 UJ	6 U	6 U	24 U
TOTAL XYLENES	5	6 U	18 U	23 UJ	6 U	6 U	24 U
% MOISTURE:		19	72	78	18	23	79
DILUTION FACTOR:		1.0	1.0	1.0	1.0	1.0	1.0
DATE SAMPLED:		6/24/91	6/25/91	6/25/91	6/24/91	6/24/91	6/24/91
DATE ANALYZED:		7/05/91	7/05/91	7/05/91	7/05/91	7/05/91	7/05/91
ASSOCIATED BLANKS:		07SB05-T	07SB05-T	07SB05-T	07SB05-T	07SB05-T	07SB05-T
		07SB05-R	07SB05-R	07SB05-R	07SB05-R	07SB05-R	07SB05-R

SEMIVOLATILE ANALYSIS (ug/kg)

SITE: CAMP LEJEUNE - SITE 07

CASE: 5054

SAMPLE LOCATION:		SB01-0002	SB02-0002	SB02-0709	SB03-0002	SB04-0002	SB04-0709	SB05-0002	SB04-0002-D
SAMPLE NUMBER:									
QC DESIGNATION:	CRQL								FIELD DUPLICATE
PHENOL	330	680 U	870 U	440 U	2000 U	410 U	440 U	410 U	R
BIS(2-CHLOROETHYL)ETHER	330	680 U	870 U	440 U	2000 U	410 U	440 U	410 U	R
2-CHLOROPHENOL	330	680 U	870 U	440 U	2000 U	410 U	440 U	410 U	R
1,3-DICHLOROBENZENE	330	680 U	870 U	440 U	2000 U	410 UJ	440 U	410 U	R
1,4-DICHLOROBENZENE	330	680 U	870 U	440 U	2000 U	410 U	440 U	410 U	R
BENZYL ALCOHOL	330	680 U	870 U	440 U	2000 U	410 U	440 U	410 U	R
1,2-DICHLOROBENZENE	330	680 U	870 U	440 U	2000 U	410 UJ	440 U	410 U	R
2-METHYLPHENOL	330	680 U	870 U	440 U	2000 U	410 U	440 U	410 U	R
BIS(2-CHLOROISOPROPYL)ETHER	330	680 U	870 U	440 U	2000 U	410 U	440 U	410 U	R
4-METHYLPHENOL	330	680 U	870 U	440 U	2000 U	410 U	440 U	410 U	R
N-NITROSODI-N-PROPYLAMINE	330	680 U	870 U	440 U	2000 U	410 U	440 U	410 U	R
HEXACHLOROETHANE	330	680 U	870 U	440 U	2000 U	410 U	440 U	410 U	R
NITROBENZENE	330	680 U	870 U	440 U	2000 U	410 U	440 U	410 U	R
ISOPHORONE	330	680 U	870 U	440 U	2000 U	410 U	440 U	410 U	R
2-NITROPHENOL	330	680 U	870 U	440 U	2000 U	410 U	440 U	410 U	R
2,4-DIMETHYLPHENOL	330	680 U	870 U	440 U	2000 U	410 U	440 U	410 U	R
BENZOIC ACID	1600	3300 U	4200 U	2100 U	9900 U	2000 U	2100 U	2000 U	R
BIS(2-CHLOROETHOXY)METHANE	330	680 U	870 U	440 U	2000 U	410 U	440 U	410 U	R
2,4-DICHLOROPHENOL	330	680 U	870 U	440 U	2000 U	410 U	440 U	410 U	R
1,2,4-TRICHLOROBENZENE	330	680 U	870 U	440 U	2000 U	410 U	440 U	410 U	R
NAPHTHALENE	330	680 U	870 U	440 U	2000 U	410 U	440 U	410 U	R
4-CHLORANILINE	330	680 U	870 U	440 U	2000 U	410 U	440 U	410 U	R
HEXACHLOROBUTADIENE	330	680 U	870 U	440 U	2000 U	410 U	440 U	410 U	R
4-CHLORO-3-METHYLPHENOL	330	680 U	870 U	440 U	2000 U	410 U	440 U	410 U	R
2-METHYLNAPHTHALENE	330	680 U	870 U	440 U	2000 U	410 U	440 U	410 U	R
HEXACHLOROCYCLOPENTADIENE	330	680 U	870 U	440 U	2000 U	410 U	440 U	410 U	R
2,4,6-TRICHLOROPHENOL	330	680 U	870 U	440 U	2000 U	410 U	440 U	410 U	R
2,4,5-TRICHLOROPHENOL	1600	3300 U	4200 U	2100 U	9900 U	2000 U	2100 U	2000 U	R
2-CHLORONAPHTHALENE	330	680 U	870 U	440 U	2000 U	410 U	440 U	410 U	R
2-NITROANILINE	1600	3300 U	4200 U	2100 U	9900 U	2000 U	2100 U	2000 U	R
DIMETHYL PHTHALATE	330	680 U	870 U	440 U	2000 U	410 U	440 U	410 U	R
ACENAPHTHYLENE	330	680 U	870 U	440 U	2000 U	410 U	440 U	410 U	R
2,6-DINITROTOLUENE	330	680 U	870 U	440 U	2000 U	410 U	440 U	410 U	R
3-NITROANILINE	1600	3300 U	4200 U	2100 U	9900 U	2000 U	2100 U	2000 U	R
ACENAPHTHENE	330	680 U	870 U	440 U	2000 U	410 U	440 U	410 U	R
2,4-DINITROPHENOL	1600	3300 U	4200 U	2100 U	9900 U	2000 U	2100 U	2000 U	R
4-NITROPHENOL	1600	3300 U	4200 U	2100 U	9900 U	2000 U	2100 U	2000 U	R

SEMIVOLATILE ANALYSIS (ug/kg)
SITE: CAMP LEJEUNE - SITE 07
CASE: 5054

SAMPLE LOCATION:		SB01-0002	SB02-0002	SB02-0709	SB03-0002	SB04-0002	SB04-0709	SB05-0002	SB04-0002-D
SAMPLE NUMBER:									
QC DESIGNATION:	CRQL								FIELD DUPLICATE
DIBENZOFURAN	330	680 U	870 U	440 U	2000 U	410 U	440 U	410 U	R
2,4-DINITROTOLUENE	330	680 U	870 U	440 U	2000 U	410 U	440 U	410 U	R
DIETHYL PHTHALATE	330	680 U	870 U	440 U	2000 U	410 U	440 U	410 U	R
4-CHLOROPHENYL-PHENYLETHER	330	680 U	870 U	440 U	2000 U	410 U	440 U	410 U	R
FLUORENE	330	680 U	870 U	440 U	2000 U	410 U	440 U	410 U	R
4-NITROANILINE	1600	3300 U	4200 U	2100 U	9900 U	2000 U	2100 U	2000 U	R
4,6-DINITRO-2-METHYLPHENOL	1600	3300 U	4200 U	2100 U	9900 U	2000 U	2100 U	2000 U	R
N-NITROSODIPHENLYAMINE	330	680 U	870 U	440 U	2000 U	410 U	440 U	410 U	R
4-BROMOPHENYL-PHENYLETHER	330	680 U	870 U	440 U	2000 U	410 U	440 U	410 U	R
HEXACHLOROBENZENE	330	680 U	870 U	440 U	2000 U	410 U	440 U	410 U	R
PENTACHLOROPHENOL	1600	3300 U	4200 U	2100 U	9900 U	2000 U	2100 U	2000 U	R
PHENANTHRENE	330	680 U	870 U	440 U	2000 U	410 U	440 U	410 U	R
ANTHRACENE	330	680 U	870 U	440 U	2000 U	410 U	440 U	410 U	R
DI-N-BUTYLPHTHALATE	330	680 U	870 U	440 U	2000 U	410 U	440 U	410 U	R
FLUORANTHENE	330	290 J	870 U	440 U	2000 U	220 J	440 U	410 U	R
PYRENE	330	680 U	870 U	440 U	2000 U	410 U	440 U	410 U	R
BUTYLBENZYLPHTHALATE	330	680 U	870 U	440 U	2000 U	410 U	440 U	410 U	R
3,3'-DICHLOROBENZIDINE	660	1400 U	1700 U	870 U	4100 U	820 U	870 U	820 U	R
BENZO(a)ANTHRACENE	330	680 U	870 U	440 U	2000 U	410 U	440 U	410 U	R
CHRYSENE	330	680 U	870 U	440 U	2000 U	410 U	440 U	410 U	R
BIS(2-ETHYLHEXYL)PHTHALATE	330	680 U	1000	440 U	2000 U	410 U	440 U	410 U	R
DI-N-OCTYLPHTHALATE	330	680 U	870 U	440 U	2000 U	410 U	440 U	410 U	R
BENZO(b)FLUORANTHENE	330	680 U	870 U	440 U	2000 U	410 U	440 U	410 U	R
BENZO(k)FLUARANTHENE	330	680 U	870 U	440 U	2000 U	410 U	440 U	410 U	R
BENZO(a)PYRENE	330	680 U	870 U	440 U	2000 U	410 U	44[illegible] U	410 U	R
INDENO(1,2,3-cd)PYRENE	330	680 U	870 U	440 U	2000 U	410 U	44[illegible] U	410 U	R
DIBENZ(a,h)ANTHRACENE	330	680 U	870 U	440 U	2000 U	410 U	440 U	410 U	R
BENZO(ghi)PERYLENE	330	680 U	870 U	440 U	2000 U	410 U	440 U	410 U	R
% MOISTURE:		46	16	17	82	11	16	11	11
DILUTION FACTOR:		1.1	2.2	1.1	1.1	1.1	1.1	1.[illegible]	1.1
DATE SAMPLED:		6/25/91	6/25/91	6/25/91	6/25/91	6/24/91	6/24/91	6/24/91	6/24/91
DATE EXTRACTED:		7/01/91	7/01/91	7/01/91	7/01/91	7/01/91	7/01/91	7/01/91	7/01/91
DATE ANALYZED:		8/08/91	8/06/91	8/05/91	8/08/91	8/05/91	8/05/91	8/05/91	8/05/91
ASSOCIATED BLANKS:		07SB05-R	07SB05-R	07SB05-R	07SB05-R	07SB05-R	07SB05-R	07SB05-R	07SB05-R

SEMIVOLATILE ANALYSIS (ug/kg)
SITE: CAMP LEJEUNE - SITE 07
CASE: 5054

SAMPLE LOCATION:		SB05-1012	MW01-0002	MW01-0305	MW02-0002	MW02-7595	MW03-0002
SAMPLE NUMBER:							
QC DESIGNATION:	CRQL						
PHENOL	330	440 U	1900 U	2600 U	440 U	450 U	3500 U
BIS(2-CHLOROETHYL)ETHER	330	440 U	1900 U	2600 U	440 U	450 U	3500 U
2-CHLOROPHENOL	330	440 U	1900 U	2600 U	440 U	450 U	3500 U
1,3-DICHLOROBENZENE	330	440 U	1900 U	2600 U	440 U	450 U	3500 U
1,4-DICHLOROBENZENE	330	440 U	1900 U	2600 U	440 U	450 U	3500 U
BENZYL ALCOHOL	330	440 U	1900 U	2600 U	440 U	450 U	3500 U
1,2-DICHLOROBENZENE	330	440 U	1900 U	2600 U	440 U	450 U	3500 U
2-METHYLPHENOL	330	440 U	1900 U	2600 U	440 U	450 U	3500 U
BIS(2-CHLOROISOPROPYL)ETHER	330	440 U	1900 U	2600 U	440 U	450 U	3500 U
4-METHYLPHENOL	330	440 U	1900 U	2600 U	440 U	450 U	3500 U
N-NITROSODI-N-PROPYLAMINE	330	440 U	1900 U	2600 U	440 U	450 U	3500 U
HEXACHLOROETHANE	330	440 U	1900 U	2600 U	440 U	450 U	3500 U
NITROBENZENE	330	440 U	1900 U	2600 U	440 U	450 U	3500 U
ISOPHORONE	330	440 U	1900 U	2600 U	440 U	450 U	3500 U
2-NITROPHENOL	330	440 U	1900 U	2600 U	440 U	450 U	3500 U
2,4-DIMETHYLPHENOL	330	440 U	1900 U	2600 U	440 U	450 U	3500 U
BENZOIC ACID	1600	2100 U	15000	7900 J	2100 U	2200 U	6300 J
BIS(2-CHLOROETHOXY)METHANE	330	440 U	1900 U	2600 U	440 U	450 U	3500 U
2,4-DICHLOROPHENOL	330	440 U	1900 U	2600 U	440 U	450 U	3500 U
1,2,4-TRICHLOROBENZENE	330	440 U	1900 U	2600 U	440 U	450 U	3500 U
NAPHTHALENE	330	440 U	1900 U	2600 U	440 U	450 U	3500 U
4-CHLORANILINE	330	440 U	1900 U	2600 U	440 U	450 U	3500 U
HEXACHLOROBUTADIENE	330	440 U	1900 U	2600 U	440 U	450 U	3500 U
4-CHLORO-3-METHYLPHENOL	330	440 U	1900 U	2600 U	440 U	450 U	3500 U
2-METHYLNAPHTHALENE	330	440 U	1900 U	2600 U	440 U	450 U	3500 U
HEXACHLOROCYCLOPENTADIENE	330	440 U	1900 U	2600 U	440 U	450 U	3500 U
2,4,6-TRICHLOROPHENOL	330	440 U	1900 U	2600 U	440 U	450 U	3500 U
2,4,5-TRICHLOROPHENOL	1600	2100 U	9300 U	13000 U	2100 U	2200 U	17000 U
2-CHLORONAPHTHALENE	330	440 U	1900 U	2600 U	440 U	450 U	3500 U
2-NITROANILINE	1600	2100 U	9300 U	13000 U	2100 U	2200 U	17000 U
DIMETHYL PHTHALATE	330	440 U	1900 U	2600 U	440 U	450 U	3500 U
ACENAPHTHYLENE	330	440 U	1900 U	2600 U	440 U	450 U	3500 U
2,6-DINITROTOLUENE	330	440 U	1900 U	2600 U	440 U	450 U	3500 U
3-NITROANILINE	1600	2100 U	9300 U	13000 U	2100 U	2200 U	17000 U
ACENAPHTHENE	330	440 U	1900 U	2600 U	440 U	450 U	3500 U
2,4-DINITROPHENOL	1600	2100 U	9300 U	13000 U	2100 U	2200 U	17000 U
4-NITROPHENOL	1600	2100 U	9300 U	13000 U	2100 U	2200 U	17000 U

SEMIVOLATILE ANALYSIS (ug/kg)
SITE: CAMP LEJEUNE - SITE 07
CASE: 5054

SAMPLE LOCATION:		SB05-1012	MW01-0002	MW01-0305	MW02-0002	MW02-7595	MW03-0002
SAMPLE NUMBER:							
QC DESIGNATION:	CRQL						
DIBENZOFURAN	330	440 U	1900 U	2600 U	440 U	450 U	3500 U
2,4-DINITROTOLUENE	330	440 U	1900 U	2600 U	440 U	450 U	3500 U
DIETHYL PHTHALATE	330	440 U	1900 U	2600 U	440 U	450 U	3500 U
4-CHLOROPHENYL-PHENYLETHER	330	440 U	1900 U	2600 U	440 U	450 U	3500 U
FLUORENE	330	440 U	1900 U	2600 U	440 U	450 U	3500 U
4-NITROANILINE	1600	2100 U	9300 U	13000 U	2100 U	2200 U	17000 U
4,6-DINITRO-2-METHYLPHENOL	1600	2100 U	9300 U	13000 U	2100 U	2200 U	17000 U
N-NITROSODIPHENLYAMINE	330	440 U	1900 U	2600 U	440 U	450 U	3500 U
4-BROMOPHENYL-PHENYLETHER	330	440 U	1900 U	2600 U	440 U	450 U	3500 U
HEXACHLOROBENZENE	330	440 U	1900 U	2600 U	440 U	450 U	3500 U
PENTACHLOROPHENOL	1600	2100 U	9300 U	13000 U	2100 U	2200 U	17000 U
PHENANTHRENE	330	440 U	1900 U	2600 U	440 U	450 U	3500 U
ANTHRACENE	330	440 U	1900 U	2600 U	440 U	450 U	3500 U
DI-N-BUTYLPHTHALATE	330	440 U	1900 U	2600 U	440 U	450 U	3500 U
FLUORANTHENE	330	440 U	1900 U	2600 U	440 U	450 U	3500 U
PYRENE	330	440 U	1900 U	2600 U	440 U	450 U	3500 U
BUTYLBENZYLPHTHALATE	330	440 U	1900 U	2600 U	440 U	450 U	3500 U
3,3'-DICHLOROBENZIDINE	660	890 U	3800 U	5200 U	890 U	910 U	6900 U
BENZO(a)ANTHRACENE	330	440 U	1900 U	2600 U	440 U	450 U	3500 U
CHRYSENE	330	440 U	1900 U	2600 U	440 U	450 U	3500 U
BIS(2-ETHYLHEXYL)PHTHALATE	330	440 U	1900 U	2600 U	440 U	450 U	3500 U
DI-N-OCTYLPHTHALATE	330	440 U	1900 U	2600 U	440 U	450 U	3500 U
BENZO(b)FLUORANTHENE	330	440 U	1900 U	2600 U	440 U	450 U	3500 U
BENZO(k)FLUARANTHENE	330	440 U	1900 U	2600 U	440 U	450 U	3500 U
BENZO(a)PYRENE	330	440 U	1900 U	2600 U	440 U	450 U	3500 U
INDENO(1,2,3-cd)PYRENE	330	440 U	1900 U	2600 U	440 U	450 U	3500 U
DIBENZ(a,h)ANTHRACENE	330	440 U	1900 U	2600 U	440 U	450 U	3500 U
BENZO(ghi)PERYLENE	330	440 U	1900 U	2600 U	440 U	450 U	3500 U
% MOISTURE:		18	81	72	18	20	79
DILUTION FACTOR:		1.1	1.1	2.2	1.1	1.1	2.2
DATE SAMPLED:		6/24/91	6/25/91	6/25/91	6/24/91	6/24/91	6/24/91
DATE EXTRACTED:		7/01/91	7/01/91	7/01/91	7/01/91	7/01/91	7/01/91
DATE ANALYZED:		8/05/91	8/08/91	8/08/91	8/08/91	8/08/91	8/08/91
ASSOCIATED BLANKS:		07SB05-R	07SB05-R	07SB05-R	07SB05-R	07SB05-R	07SB05-R

PESTICIDE/PCB ANALYSIS (ug/kg)
SITE: CAMP LEJEUNE - SITE 07
CASE: 5054

SAMPLE LOCATION:		SB01-0002	SB02-0002	SB02-0709	SB03-0002	SB04-0002	SB04-0709	SB05-0002	SB05-0002-D
SAMPLE NUMBER:									
QC DESIGNATION:	CRQL								FIELD DUPLICATE
ALPHA-BHC	8.0	37 U	24 U	24 U	110 U	2.2 U	24 U	2.2 U	2.3 U
BETA-BHC	8.0	37 U	24 U	24 U	110 U	2.2 U	24 U	2.2 U	2.3 U
DELTA-BHC	8.0	37 U	24 U	24 U	110 U	2.2 U	24 U	2.2 U	2.3 U
GAMMA-BHC (LINDANE)	8.0	37 U	24 U	24 U	110 U	2.2 U	24 U	2.2 U	2.3 U
HEPTACHLOR	8.0	37 U	24 U	24 U	110 U	2.2 U	24 U	2.2 U	2.3 U
ALDRIN	8.0	37 U	24 U	24 U	110 U	2.2 U	24 U	2.2 U	7.6 J
HEPTACHLOR EPOXIDE	8.0	37 U	24 U	24 U	110 U	2.2 U	24 U	2.2 U	2.3 U
ENDOSULFAN I	8.0	37 U	24 U	24 U	110 U	2.2 U	24 U	2.2 U	2.3 U
DIELDRIN	16.0	160	47 U	830	220 U	4.4 U	400 J	14 J	9.6 J
4,4'-DDE	16.0	240 J	47 U	48 U	220 U	4.4 U	48 U	4.5 U	4.5 U
ENDRIN	16.0	91 J	47 U	430 J	220 U	4.4 U	260	4.5 U	4.5 U
ENDOSULFAN II	16.0	490 J	47 U	2000 J	220 U	4.4 U	48 U	7.0 J	8.1 J
4,4'-DDD	16.0	210 J	47 U	58 J	220 U	4.4 U	48 U	5.4 J	19 J
ENDOSULFAN SULFATE	16.0	74 U	47 U	48 U	220 U	4.4 U	48 U	4.5 U	4.5 U
4,4'-DDT	16.0	74 U	47 U	48 U	220 U	4.4 U	48 U	4.5 U	4.5 U
METHOXYCHLOR	80.0	370 U	240 U	240 U	1100 U	22 U	240 U	22 U	23 U
ENDRIN KETONE	16.0	74 U	47 U	48 U	220 U	4.4 U	48 U	4.5 U	4.5 U
ALPHA-CHLORODANE	80.0	370 U	240 U	240 U	1100 U	22 U	240 U	22 U	23 U
GAMMA-CHLORDANE	80.0	370 U	240 U	240 U	1100 U	22 U	240 U	22 U	23 U
TOXAPHENE	160.0	740 U	470 U	480 U	2200 U	44 U	480 U	45 U	45 U
AROCLOR 1016	80.0	370 U	240 U	240 U	1100 U	22 U	240 U	22 U	23 U
AROCLOR 1221	80.0	370 U	240 U	240 U	1100 U	22 U	240 U	22 U	23 U
AROCLOR 1232	80.0	370 U	240 U	240 U	1100 U	22 U	240 U	22 U	23 U
AROCLOR 1242	80.0	370 U	240 U	240 U	1100 U	22 U	240 U	22 U	23 U
AROCLOR 1248	80.0	370 U	240 U	240 U	1100 U	22 U	240 U	22 U	23 U
AROCLOR 1254	160.0	740 U	470 U	480 U	2200 U	44 U	480 U	45 U	45 U
AROCLOR 1260	160.0	2300	470 U	8200	2200 U	44 U	8500 J	120 J	96 J
% MOISTURE:		46	16	17	81.8	10.9	15.9	10.7	11.4
DILUTION FACTOR:		10.0	10.0	10.0	10.0	1.0	10.0	1.0	1.0
DATE SAMPLED:		6/25/91	6/25/91	6/25/91	6/25/91	6/24/91	6/24/91	6/24/91	6/24/91
DATE EXTRACTED:		7/01/91	7/01/91	7/01/91	7/01/91	7/01/91	7/01/91	7/01/91	7/01/91
DATE ANALYZED:		8/08/91	8/08/91	8/08/91	8/08/91	8/06/91	8/06/91	8/06/91	8/06/91
ASSOCIATED BLANKS:									

PESTICIDE/PCB ANALYSIS (ug/kg)
SITE: CAMP LEJEUNE - SITE 07
CASE: 5054

SAMPLE LOCATION:		SB05-1012	MW01-0002	MW01-0305	MW02-0002	MW02-7595	MW03-0002
SAMPLE NUMBER:							
QC DESIGNATION:	CRQL						
ALPHA-BHC	8.0	2.4 U	100 U	70 U	24 U	25 U	93 U
BETA-BHC	8.0	2.4 U	100 U	70 U	24 U	25 U	93 U
BHC	8.0	2.4 U	100 U	70 U	24 U	25 U	93 U
BHC (LINDANE)	8.0	2.4 U	100 U	70 U	24 U	25 U	93 U
HEPTACHLOR	8.0	2.4 U	100 U	70 U	24 U	25 U	93 U
ALDRIN	8.0	2.4 U	100 U	70 U	24 U	25 U	93 U
HEPTACHLOR EPOXIDE	8.0	2.4 U	100 U	70 U	24 U	25 U	93 U
ENDOSULFAN I	8.0	2.4 U	100 U	70 U	24 U	25 U	93 U
DIELDRIN	16.0	4.8 U	210 U	140 U	540 J	2500	190 U
4,4'-DDE	16.0	4.8 U	210 U	140 U	48 U	50 U	190 U
ENDRIN	16.0	14	210 U	140 U	140	1300 J	190 U
ENDOSULFAN II	16.0	73 J	210 U	140 U	1400 J	98 J	190 U
4,4'-DDD	16.0	4.8 U	210 U	140 U	53 J	190 J	190 U
ENDOSULFAN SULFATE	16.0	4.8 U	210 U	140 U	48 U	50 U	190 U
4,4'-DDT	16.0	4.8 U	210 U	140 U	48 U	50 U	190 U
METHOXYCHLOR	80.0	24 U	1000 U	700 U	240 U	250 U	930 U
ENDRIN KETONE	16.0	4.8 U	210 U	140 U	48 U	50 U	190 U
ALPHA-CHLORODANE	80.0	24 U	1000 U	700 U	240 U	250 U	930 U
GAMMA-CHLORDANE	80.0	24 U	1000 U	700 U	240 U	250 U	930 U
TOXAPHENE	160.0	48 U	2100 U	1400 U	490 U	500 U	1900 U
AROCLOR 1016	80.0	24 U	1000 U	700 U	240 U	250 U	930 U
AROCLOR 1221	80.0	24 U	1000 U	700 U	240 U	250 U	930 U
AROCLOR 1232	80.0	24 U	1000 U	700 U	240 U	250 U	930 U
AROCLOR 1242	80.0	24 U	1000 U	700 U	240 U	250 U	930 U
AROCLOR 1248	80.0	24 U	1000 U	700 U	240 U	250 U	930 U
AROCLOR 1254	160.0	48 U	2100 U	1400 U	490 U	500 U	1900 U
AROCLOR 1260	160.0	660 J	2100 U	1400 U	12000 J	25000	1900 U
% MOISTURE:		17.7	80.8	71.6	18.5	20	78.7
DILUTION FACTOR:		1.0	10.0	10.0	10.0	10.0	10.0
DATE SAMPLED:		6/24/91	6/25/91	6/25/91	6/24/91	6/24/91	6/24/91
DATE EXTRACTED:		7/01/91	7/01/91	7/01/91	7/01/91	7/01/91	7/01/91
DATE ANALYZED:		8/06/91	8/08/91	8/08/91	8/06/91	8/07/91	8/06/91
ASSOCIATED BLANKS:							

INORGANIC ANALYSIS (mg/kg)
SITE: CAMP LEJEUNE - SITE 07
CASE: 5054
LABORATORY:

SAMPLE LOCATION: / SAMPLE NUMBER: / QC DESIGNATION:	ANALYTICAL METHOD	SB01-0002	SB02-0002	SB02-0709	SB03-0002	SB04-0002	SB04-0709	SB05-0002	CRQL
ALUMINUM	P	8590	3940	5030	8000	5810	2400	3380	40
ANTIMONY	P	8.5 UJ	5.2 UJ	5.4 UJ	23.2 UJ	5.0 UJ	5.5 UJ	5.2 UJ	12
ARSENIC	F	1.5 UJ	0.90 UJ	1.1 J	4.0 UJ	1.1 J	0.95 UJ	0.90 UJ	2
BARIUM	P	51.5	9.1	11.5	223	18.3	45.8	16.3	40
BERYLLIUM	P	1.3 J	0.23 UJ	0.24 UJ	2.1 J	0.26 J	0.68 J	0.22 UJ	1
CADMIUM	P	1.8	1.1	1.2	5.0	1.1	1.2	1.1	1
CALCIUM	P	4350	33.8 UJ	61.3 UJ	30300	58200	7490	13800	1000
CHROMIUM	P	9.9 J	4.2 J	8.6 J	7.4 J	4.4 J	5.4 J	5.0 J	2
COBALT	P	2.9	1.8	1.9	8.1	1.7	1.9	1.8	10
COPPER	P	4.5 UJ	0.90 UJ	0.94 UJ	4.7 UJ	1.0 UJ	0.95 UJ	3.1 UJ	5
IRON	P	5330	876	5490	4620	2450	981	1920	20
LEAD	F	114	3.0	4.8	40.0	4.5	2.4	13.9	0.6
MAGNESIUM	P	328	104	211	1150	265	99.9	252	1000
MANGANESE	P	10.3	5.0	4.5	69.0	13.9	8.7	12.8	3
MERCURY	CV	0.19	0.11	0.12	0.53	0.11	0.12	0.11	0.04
NICKEL	P	4.8	2.9	3.1	13.1	2.8	3.1	2.9	8
POTASSIUM	P	260 UJ	114	219 UJ	507	110	120	113	1000
SELENIUM	F	1.1 UJ	0.68 UJ	0.72 UJ	3.0 UJ	0.66 UJ	0.72 UJ	0.67 UJ	1
SILVER	P	1.1	0.68	0.96	3.0	0.66	0.72	0.67	2
SODIUM	P	76.2 UJ	18.1 UJ	22.9 UJ	106 UJ	41.1 UJ	26.6 UJ	38.2 UJ	1000
THALLIUM	F	0.76	0.45	0.48	2.0	0.44	0.48	0.45	2
TIN	P	NA	NA	NA	NA	NA	NA	NA	8
VANADIUM	P	13.9	4.8	9.8	18.1	6.2	5.4	5.7	10
ZINC	P	33.4 UJ	1.1	1.6 UJ	44.5	4.7 UJ	1.2	15.0 UJ	4
CYANIDE	C	0.95	0.58	0.62	2.5	0.55	0.61	0.56	2
% MOISTURE:		48.2	15.0	20.0	81.1	10.3	19.4	12.6	
DILUTION FACTOR:		1.0	1.0	1.0	1.0	1.0	1.0	1.0	
DATE SAMPLED:		6/25/91	6/25/91	6/25/91	6/25/91	6/24/91	6/24/91	6/24/91	
ASSOCIATED BLANKS:		07SB05-R	07SB05-R	07SB05-R	07SB05-R	07SB05-R	07SB05-R	07SB05-R	
		54GW04-R	54GW04-R	54GW04-R	54GW04-R	54GW04-R	54GW04-R	54GW04-R	
		54GW04-F	54GW04-F	54GW04-F	54GW04-F	54GW04-F	54GW04-F	54GW04-F	

ANALYTICAL METHOD
F - FURNACE
P - ICP/FLAME AA
CV - COLD VAPOR
C - COLORMETRIC

J - QUANTITATION IS APPROXIMATE DUE TO LIMITATIONS IDENTIFIED IN THE QUALITY CONTROL REVIEW (DATA REVIEW)
R - VALUE IS REJECTED.
-- VALUE IS NON-DETECTED
NA- NOT ANALYZED

INORGANIC ANALYSIS (mg/kg)
SITE: CAMP LEJEUNE - SITE 07
CASE: 5054
LABORATORY:

SAMPLE LOCATION:	ANALYTICAL	SB05-0002-D	SB05-1012	MW01-0002	MW01-0305	MW02-0002	MW02-7595	MW03-0002	
SAMPLE NUMBER:	METHOD								
QC DESIGNATION:		FIELD DUPLICATE							CRQL
ALUMINUM	P	3990	3640	7350	3220	7650	1030	9700	40
ANTIMONY	P	5.0 UJ	5.6 UJ	15.9 UJ	20.7 UJ	5.4 UJ	5.9 UJ	20.9 UJ	12
ARSENIC	F	0.91 UJ	1.4 J	3.8 J	3.7 UJ	1.7 J	1.5 J	3.8 UJ	2
BARIUM	P	15.5	51.8	110	72.8	14.2	6.6	71.0	40
BERYLLIUM	P	0.22 UJ	0.29 J	0.69 UJ	3.6 J	0.52 J	0.26 UJ	0.91 UJ	1
CADMIUM	P	1.1	1.2	3.5	4.5	1.2	1.3	4.5	1
CALCIUM	P	15500	3660	7180	9990	190	61.0 UJ	772	1000
CHROMIUM	P	5.3 J	12.5 J	10.6 J	10.1 J	8.3 J	5.2 J	6.0 J	2
COBALT	P	1.8	1.9	5.5	10.2	1.9	2.1	7.3	10
COPPER	P	3.1 UJ	1.7 UJ	2.9 UJ	3.6 UJ	0.94 UJ	1.0 UJ	7.6 UJ	5
IRON	P	2130	2150	4720	1560	3250	2120	1940	20
LEAD	F	11.1	9.1	43.2	17.0	6.4	2.5	34.4	0.6
MAGNESIUM	P	299	168	731	541	207	46.6 UJ	380	1000
MANGANESE	P	14.3	12.5	14.6	47.7	3.2	3.0	11.5	3
MERCURY	CV	0.11	0.12	0.35	0.45	0.12	0.13	0.48	0.04
NICKEL	P	2.8	3.1	9.0	11.7	3.0	3.4	11.8	8
POTASSIUM	P	110	122	622 UJ	452	118	130	456	1000
SELENIUM	F	0.74 J	0.71 UJ	2.1 UJ	2.7 UJ	0.70 UJ	0.75 UJ	2.8 UJ	1
SILVER	P	0.66	0.73	2.1	2.7	0.70	0.97	2.7	2
SODIUM	P	44.1 UJ	34.0 UJ	754	1020	28.6 UJ	32.0 UJ	127 UJ	1000
THALLIUM	F	0.46	0.47	1.4	1.8	0.47	0.50	1.9	2
TIN	P	NA	NA	NA	NA	NA	NA	NA	8
VANADIUM	P	5.4	6.3	12.5	4.5	8.8	5.5	4.5	10
ZINC	P	16.0 UJ	6.8 UJ	12.9 UJ	4.5	2.0 UJ	1.3	8.6 UJ	4
CYANIDE	C	0.51	0.61	1.7	2.3	0.59	0.60	2.3	2
% MOISTURE:		13.0	19.0	71.7	78.8	17.9	23.3	79.0	
DILUTION FACTOR:		1.0	1.0	1.0	1.0	1.0	1.0	1.0	
DATE SAMPLED:		6/24/91	6/24/91	6/25/91	6/25/91	6/24/91	6/24/91	6/24/91	
ASSOCIATED BLANKS:		07SB05-R	07SB05-R	07SB05-R	07SB05-R	07SB05-R	07SB05-R	07SB05-R	
		54GW04-R	54GW04-R	54GW04-R	54GW04-R	54GW04-R	54GW04-R	54GW04-R	
		54GW04-F	54GW04-F	54GW04-F	54GW04-F	54GW04-F	54GW04-F	54GW04-F	

ANALYTICAL METHOD
F - FURNACE
P - ICP/FLAME AA
CV - COLD VAPOR
C - COLORMETRIC

VOLATILE ANALYSIS (ug/L)
SITE: CAMP LEJEUNE - SITE 07
CASE: 5075

SAMPLE LOCATION:		GW01	GW02	GW02-D	GW03
SAMPLE NUMBER:					
QC DESIGNATION:	CRQL			FIELD DUPLICATE	
CHLOROMETHANE	10	10 U	10 U	10 U	10 U
BROMOMETHANE	10	10 U	10 U	10 U	10 U
VINYL CHLORIDE	10	10 U	10 U	10 U	10 U
CHLOROETHANE	10	10 U	10 U	10 U	10 U
METHYLENE CHLORIDE	5	5 U	5 U	5 U	5 U
ACETONE	10	10 U	10 U	10 U	10 U
CARBON DISULFIDE	5	5 U	5 U	5 U	5 U
1,1-DICHLOROETHENE	5	5 U	5 U	5 U	5 U
1,1-DICHLOROETHANE	5	5 U	5 U	5 U	5 U
1,2-DICHLOROETHENE (TOTAL)	5	5 U	5 U	5 U	5 U
CHLOROFORM	5	5 U	3 UJ	5 U	5 U
1,2-DICHLOROETHANE	5	5 U	5 U	5 U	5 U
2-BUTANONE	10	10 U	10 U	10 U	10 U
1,1,1-TRICHLOROETHANE	5	5 U	5 U	5 U	5 U
CARBON TETRACHLORIDE	5	5 U	5 U	5 U	5 U
VINYL ACETATE	10	10 U	10 U	10 U	10 U
BROMODICHLOROMETHANE	5	5 U	5 U	5 U	5 U
1,2-DICHLOROPROPANE	5	5 U	5 U	5 U	5 U
CIS-1,3-DICHLOROPROPENE	5	5 U	5 U	5 U	5 U
TRICHLOROETHENE	5	5 U	5 U	5 U	5 U
DIBROMOCHLOROMETHANE	5	5 U	5 U	5 U	5 U
1,1,2-TRICHLOROETHANE	5	5 U	5 U	5 U	5 U
BENZENE	5	5 U	5 U	5 U	5 U
TRANS-1,3-DICHLOROPROPENE	5	5 U	5 U	5 U	5 U
BROMOFORM	5	5 U	5 U	5 U	5 U
4-METHYL-2-PENTANONE	10	10 U	10 U	10 U	10 U
2-HEXANONE	10	10 U	10 U	10 U	10 U
TETRACHLOROETHENE	5	5 U	5 U	5 U	5 U
1,1,2,2-TETRACHLOROETHANE	5	5 U	5 U	5 U	5 U
TOLUENE	5	5 U	5 U	5 U	5 U
CHLOROBENZENE	5	5 U	5 U	5 U	5 U
ETHYL BENZENE	5	5 U	5 U	5 U	5 U
STYRENE	5	5 U	5 U	5 U	5 U
TOTAL XYLENES	5	5 U	5 U	5 U	5 U
% MOISTURE:					
DILUTION FACTOR:		1.0	1.0	1.0	1.0
DATE SAMPLED:		6/26/91	6/26/91	6/26/91	6/26/91
DATE ANALYZED:		7/10/91	7/10/91	7/10/91	7/10/91
ASSOCIATED BLANKS:		07GW03-T	07GW03-T	07GW03-T	07GW03-T
		07GW03-R	07GW03-R	07GW03-R	07GW03-R
		80GW02-R	80GW02-R	80GW02-R	80GW02-R
		82GW01-F	82GW01-F	82GW01-F	82GW01-F
		82GW31-R	82GW31-R	82GW31-R	82GW31-R
		DECON-F	DECON-F	DECON-F	DECON-F

SEMIVOLATILE AQUEOUS ANALYSIS (ug/L)
SITE: CAMP LEJEUNE - SITE 07
CASE: 5075

SAMPLE LOCATION:		GW01	GW02	GW02-D	GW03
SAMPLE NUMBER:					
QC DESIGNATION:	CRQL			FIELD DUPLICATE	
PHENOL	10	10 U	10 U	10 U	11 U
BIS(2-CHLOROETHYL)ETHER	10	10 U	10 U	10 U	11 U
2-CHLOROPHENOL	10	10 U	10 U	10 U	11 U
1,3-DICHLOROBENZENE	10	10 U	10 U	10 U	11 U
1,4-DICHLOROBENZENE	10	10 U	10 U	10 U	11 U
BENZYL ALCOHOL	10	10 U	10 U	10 U	11 U
1,2-DICHLOROBENZENE	10	10 U	10 U	10 U	11 U
2-METHYLPHENOL	10	10 U	10 U	10 U	11 U
BIS(2-CHLOROISOPROPYL)ETHER	10	10 U	10 U	10 U	11 U
4-METHYLPHENOL	10	10 U	10 U	10 U	11 U
N-NITROSODI-N-PROPYLAMINE	10	10 U	10 U	10 U	11 U
HEXACHLOROETHANE	10	10 U	10 U	10 U	11 U
NITROBENZENE	10	10 U	10 U	10 U	11 U
ISOPHORONE	10	10 U	10 U	10 U	11 U
2-NITROPHENOL	10	10 U	10 U	10 U	11 U
2,4-DIMETHYLPHENOL	10	10 U	10 U	10 U	11 U
BENZOIC ACID	50	9 J	52 U	52 U	12 J
BIS(2-CHLOROETHOXY)METHANE	10	10 U	10 U	10 U	11 U
2,4-DICHLOROPHENOL	10	10 U	10 U	10 U	11 U
1,2,4-TRICHLOROBENZENE	10	10 U	10 U	10 U	11 U
NAPHTHALENE	10	10 U	10 U	10 U	11 U
4-CHLORANILINE	10	10 U	10 U	10 U	11 U
HEXACHLOROBUTADIENE	10	10 U	10 U	10 U	11 U
4-CHLORO-3-METHYLPHENOL	10	10 U	10 U	10 U	11 U
2-METHYLNAPHTHALENE	10	10 U	10 U	10 U	11 U
HEXACHLOROCYCLOPENTADIENE	10	10 U	10 U	10 U	11 U
2,4,6-TRICHLOROPHENOL	10	10 U	10 U	10 U	11 U
2,4,5-TRICHLOROPHENOL	50	52 U	52 U	52 U	54 U
2-CHLORONAPHTHALENE	10	10 U	10 U	10 U	11 U
2-NITROANILINE	50	52 U	52 U	52 U	54 U
DIMETHYL PHTHALATE	10	10 U	10 U	10 U	11 U
ACENAPHTHYLENE	10	10 U	10 U	10 U	11 U
2,6-DINITROTOLUENE	10	10 U	10 U	10 U	11 U
3-NITROANILINE	50	52 U	52 U	52 U	54 U
ACENAPHTHENE	10	10 U	10 U	10 U	11 U
2,4-DINITROPHENOL	50	52 U	52 U	52 U	54 U
4-NITROPHENOL	50	U	52 U	U	

SEMIVOLATILE AQUEOUS ANALYSIS (ug/L)
SITE: CAMP LEJEUNE - SITE 07
CASE: 5075

SAMPLE LOCATION:		GW01	GW02	GW02-D	GW03
SAMPLE NUMBER:					
QC DESIGNATION:	CRQL			FIELD DUPLICATE	
DIBENZOFURAN	10	10 U	10 U	10 U	11 U
2,4-DINITROTOLUENE	10	10 U	10 U	10 U	11 U
DIETHYL PHTHALATE	10	10 U	10 U	10 U	11 U
4-CHLOROPHENYL-PHENYLETHER	10	10 U	10 U	10 U	11 U
FLUORENE	10	10 U	10 U	10 U	11 U
4-NITROANILINE	50	52 U	52 U	52 U	54 U
4,6-DINITRO-2-METHYLPHENOL	50	52 U	52 U	52 U	54 U
N-NITROSODIPHENLYAMINE	10	10 U	10 U	10 U	11 U
4-BROMOPHENYL-PHENYLETHER	10	10 U	10 U	10 U	11 U
HEXACHLOROBENZENE	10	10 U	10 U	10 U	11 U
PENTACHLOROPHENOL	50	52 U	52 U	52 U	54 U
PHENANTHRENE	10	10 U	10 U	10 U	11 U
ANTHRACENE	10	10 U	10 U	10 U	11 U
DI-N-BUTYLPHTHALATE	10	10 U	10 U	10 U	11 U
FLUORANTHENE	10	10 U	10 U	10 U	11 U
PYRENE	10	10 U	10 U	10 U	11 U
BUTYLBENZYLPHTHALATE	10	10 U	10 U	10 U	11 U
3,3'-DICHLOROBENZIDINE	20	21 U	21 U	21 U	22 U
BENZO(a)ANTHRACENE	10	10 U	10 U	10 U	11 U
CHRYSENE	10	10 U	10 U	10 U	11 U
BIS(2-ETHYLHEXYL)PHTHALATE	10	10 U	10 UJ	10 U	11 U
DI-N-OCTYLPHTHALATE	10	10 U	10 U	10 U	11 U
BENZO(b)FLUORANTHENE	10	10 U	10 U	10 U	11 U
BENZO(k)FLUARANTHENE	10	10 U	10 U	10 U	11 U
BENZO(a)PYRENE	10	10 U	10 U	10 U	11 U
INDENO(1,2,3-cd)PYRENE	10	10 U	10 U	10 U	11 U
DIBENZ(a,h)ANTHRACENE	10	10 U	10 U	10 U	11 U
BENZO(ghi)PERYLENE	10	10 U	10 U	10 U	11 U
% MOISTURE:					
DILUTION FACTOR:		1.0	1.0	1.0	1.0
DATE SAMPLED:		6/26/91	6/26/91	6/26/91	6/26/91
DATE EXTRACTED:		7/01/91	7/01/91	7/01/91	7/01/91
DATE ANALYZED:		8/02/91	8/02/91	8/02/91	8/02/91
ASSOCIATED BLANKS:		07GW03-F	07GW03-F	07GW03-F	07GW03-F
		07GW03-R	07GW03-R	07GW03-R	07GW03-R

PESTICIDE/PCB AQUEOUS ANALYSIS (ug/L)
SITE: CAMP LEJEUNE - SITE 07
CASE: 5075

SAMPLE LOCATION:		GW01	GW02	GW02-D	GW03
SAMPLE NUMBER:					
QC DESIGNATION:	CRQL			FIELD DUPLICATE	
ALPHA-BHC	0.05	0.05 U	0.05 U	0.05 U	0.05 U
BETA-BHC	0.05	0.05 U	0.05 U	0.05 U	0.05 U
DELTA-BHC	0.05	0.05 U	0.05 U	0.05 U	0.05 U
GAMMA-BHC (LINDANE)	0.05	0.05 U	0.05 U	0.05 U	0.05 U
HEPTACHLOR	0.05	0.05 U	0.05 U	0.05 U	0.05 U
ALDRIN	0.05	0.05 U	0.05 U	0.05 U	0.05 U
HEPTACHLOR EPOXIDE	0.05	0.05 U	0.05 U	0.05 U	0.05 U
ENDOSULFAN I	0.05	0.05 U	0.05 U	0.05 U	0.05 U
DIELDRIN	0.10	0.10 U	0.72	0.54	0.1
4,4'-DDE	0.10	0.10 U	0.10 U	0.10 U	0.1
ENDRIN	0.10	0.10 U	0.10 U	0.10 U	0.10 U
ENDOSULFAN II	0.10	0.10 U	0.10 U	0.10 U	0.10 U
4,4'-DDD	0.10	0.10 U	0.10 U	0.10 U	0.10 U
ENDOSULFAN SULFATE	0.10	0.10 U	0.10 U	0.10 U	0.10
4,4'-DDT	0.10	0.10 U	0.10 U	0.10 U	0.10
METHOXYCHLOR	0.5	0.49 U	0.50 U	0.50 U	0.50 U
ENDRIN KETONE	0.10	0.10 U	0.12	0.10 U	0.10 U
ALPHA-CHLORODANE	0.5	0.49 U	0.50 U	0.50 U	0.50 U
GAMMA-CHLORDANE	0.5	0.49 U	0.50 U	0.50 U	0.50 U
TOXAPHENE	1.0	0.98 U	1.0 U	1.0 U	1.0 U
AROCLOR 1016	0.5	0.49 U	0.50 U	0.50 U	0.50 U
AROCLOR 1221	0.5	0.49 U	0.50 U	0.50 U	0.50 U
AROCLOR 1232	0.5	0.49 U	0.50 U	0.50 U	0.50 U
AROCLOR 1242	0.5	0.49 U	0.50 U	0.50 U	0.50 U
AROCLOR 1248	0.5	0.49 U	0.50 U	0.50 U	0.50 U
AROCLOR 1254	1.0	0.98 U	1.0 U	1.0 U	1.0 U
AROCLOR 1260	1.0	0.98 U	1.0 U	1.0 U	1.0 U
% MOISTURE:					
DILUTION FACTOR:		1.0	1.0	1.0	1.0
DATE SAMPLED:		6/26/91	6/26/91	6/26/91	6/26/91
DATE EXTRACTED:		7/03/91	7/03/91	7/04/91	7/03/91
DATE ANALYZED:		8/08/91	8/08/91	8/12/91	8/08/91
ASSOCIATED BLANKS:		07GW03-R	07GW03-R	07GW03-R	07GW03-R
		07GW03-F	07GW03-F	07GW03-F	07GW03-F
		80GW02-R	80GW02-R	80GW02-R	80GW02-R
		82GW01-F	82GW01-F	82GW01-F	82GW01-F
		82GW31-R	82GW31-R	82GW31-R	82GW31-R
		DECON-F	DECON-F	DECON-F	DECON-F

INORGANIC AQUEOUS ANALYSIS (ug/L)
SITE: CAMP LEJEUNE - SITE 07
CASE: 5075
LABORATORY:

SAMPLE LOCATION:	ANALYTICAL	GW01	GW02	GW02-D	GW03	
SAMPLE NUMBER:	METHOD					
QC DESIGNATION:				FIELD DUPLICATE		CRQL
ALUMINUM	P	29000 J	113000 J	160000 J	98500 J	200
ANTIMONY	P	17.0 U	53.0	42.2	17.0 U	60
ARSENIC	F	3.0 UJ	43.4 J	16.7 UJ	4.7 UJ	10
BARIUM	P	427	641	771	428	200
BERYLLIUM	P	3.1 J	10.3 J	8.4 J	2.0 UJ	5
CADMIUM	P	5.0 UJ	5.0 UJ	22.3 J	5.0 UJ	5
CALCIUM	P	51300 UJ	6640 UJ	7500 UJ	5050 UJ	5000
CHROMIUM	P	47.8	220	282	124	10
COBALT	P	21.7	7.5	11.7	5.0 U	50
COPPER	P	17.7	34.0	49.2	36.4	25
IRON	P	28600	227000	228000	26400	100
LEAD	F	37.3 J	23.0 J	42.7 J	30.3 J	3
MAGNESIUM	P	13500	5750 UJ	7860 UJ	5090 UJ	5000
MANGANESE	P	220 J	78.9 J	106 J	56.9 J	15
MERCURY	CV	0.20 U	0.23	0.25	0.36	0.2
NICKEL	P	32.3 UJ	29.6 UJ	29.1 UJ	37.7 UJ	40
POTASSIUM	P	5450 UJ	5580 UJ	7680	4640 UJ	5000
SELENIUM	F	3.4 J	3.0 UJ	3.0 UJ	30.0 UJ	5
SILVER	P	3.0 UJ	2.0 U	2.0 U	2.3 UJ	10
SODIUM	P	156000	9590 UJ	9840 UJ	7040 UJ	5000
THALLIUM	F	10.0 UJ	2.0 U	2.0 U	2.0 U	10
TIN	P	NA	NA	NA	NA	40
VANADIUM	P	37.8	423	460	152	50
ZINC	P	83.6 J	133 J	168 J	86.4 J	20
CYANIDE	C	10.0 UJ	10.0 UJ	10.0 UJ	10.0 UJ	10
% SOLIDS:						
DILUTION FACTOR:		1.0	1.0	1.0	1.0	
DATE SAMPLED:		6/26/91	6/26/91	6/26/91	6/26/91	
ASSOCIATED BLANKS:						

ANALYTICAL METHOD
F - FURNACE
P - ICP/FLAME AA
CV - COLD VAPOR
C - COLORMETRIC

J - QUANTITATION IS APPROXIMATE DUE TO LIMITATIONS IDENTIFIED IN THE QUALITY CONTROL REVIEW (DATA REVIEW)
R - VALUE IS REJECTED.
-- VALUE IS NON-DETECTED
NA- NOT ANALYZED

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VOLATILE ANALYSIS (ug/L)
SITE: CAMP LEJEUNE - TRIP BLANKS
CASE: 5075/5054/5064/4961/4997/5013/5019/5005

SAMPLE LOCATION:		07GW03-T	07SB05-T	54GW03-T	54SB02-T	80SB04-T	82MW02-0002-T	82SB03-T	82SW02-T
SAMPLE NUMBER:									
QC DESIGNATION:	CRQL								
CHLOROMETHANE	10	10 U	10 U	NA	NA	20 U	10 U	10 U	10 U
BROMOMETHANE	10	10 U	10 U	NA	NA	20 U	10 U	10 U	10 U
VINYL CHLORIDE	10	10 U	10 U	NA	NA	20 U	10 U	10 U	10 U
CHLOROETHANE	10	10 U	10 U	NA	NA	20 U	10 U	10 U	10 U
METHYLENE CHLORIDE	5	5 U	8 J	NA	NA	17	4 J	7	9
ACETONE	10	54 J	150	NA	NA	160 J	37 J	160	290 J
CARBON DISULFIDE	5	5 U	5 U	NA	NA	10 U	5 U	5 U	5 U
1,1-DICHLOROETHENE	5	5 U	5 U	NA	NA	10 U	5 U	5 U	5 U
1,1-DICHLOROETHANE	5	5 U	5 U	NA	NA	10 U	5 U	5 U	5 U
1,2-DICHLOROETHENE (TOTAL)	5	5 U	5 U	NA	NA	10 U	5 U	5 U	5 U
CHLOROFORM	5	30	35	NA	NA	31	30	32	32
1,2-DICHLOROETHANE	5	5 U	5 U	NA	NA	10 U	5 U	5 U	5 U
2-BUTANONE	10	10 U	10 U	NA	NA	20 U	10 U	10 U	10 UJ
1,1,1-TRICHLOROETHANE	5	5 U	5 U	NA	NA	10 U	5 U	5 U	5 U
CARBON TETRACHLORIDE	5	5 U	5 U	NA	NA	10 U	5 U	5 U	5 U
VINYL ACETATE	10	10 U	10 U	NA	NA	20 U	10 U	10 U	10 U
BROMODICHLOROMETHANE	5	5 U	5 U	NA	NA	10 U	5 U	5 U	5 U
1,2-DICHLOROPROPANE	5	5 U	5 U	NA	NA	10 U	5 U	5 U	5 U
CIS-1,3-DICHLOROPROPENE	5	5 U	5 U	NA	NA	10 U	5 U	5 U	5 U
TRICHLOROETHENE	5	5 U	5 U	NA	NA	10 U	5 U	5 U	5 U
DIBROMOCHLOROMETHANE	5	5 U	5 U	NA	NA	10 U	5 U	5 U	5 U
1,1,2-TRICHLOROETHANE	5	5 U	5 U	NA	NA	10 U	5 U	5 U	5 U
BENZENE	5	5 U	5 U	5 U	5 U	10 U	5 U	5 U	5 U
TRANS-1,3-DICHLOROPROPENE	5	5 U	5 U	NA	NA	10 U	5 U	5 U	5 U
BROMOFORM	5	5 U	5 U	NA	NA	10 U	5 U	5 U	5 U
4-METHYL-2-PENTANONE	10	10 U	10 U	NA	NA	20 U	10 U	10 U	10 U
2-HEXANONE	10	10 U	10 U	NA	NA	20 U	10 U	10 U	10 UJ
TETRACHLOROETHENE	5	5 U	5 U	NA	NA	10 U	5 U	5 U	5 U
1,1,2,2-TETRACHLOROETHANE	5	5 U	5 U	NA	NA	10 U	5 U	5 U	5 U
TOLUENE	5	5 U	5 U	5 U	5 U	10 U	5 U	5 U	5 U
CHLOROBENZENE	5	5 U	5 U	NA	NA	10 U	5 U	5 U	5 U
ETHYL BENZENE	5	5 U	5 U	5 U	5 U	10 U	5 U	5 U	5 U
STYRENE	5	5 U	5 U	NA	NA	10 U	5 U	5 U	5 U
TOTAL XYLENES	5	5 U	5 U	5 U	5 U	10 U	5 U	5 U	5 U
DILUTION FACTOR:		1.0	1.0	1.0	1.0	2.0	1.0	1.0	1.0
DATE SAMPLED:		6/26/91	6/24/91	6/26/91	6/12/91	6/13/91	6/17/91	6/19/91	6/16/91
DATE ANALYZED:		7/10/91	6/28/91	7/10/91	6/19/91	6/25/91	6/25/91	6/25/91	6/23/91
ASSOCIATED BLANKS:									

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VOLATILE ANALYSIS (ug/L)
SITE: CAMP LEJEUNE - FIELD BLANKS
CASE: 5075/4961/5054

SAMPLE LOCATION:		DECON-F	03SD02-F	07GW03-F	54GW04-F	82GW01-F
SAMPLE NUMBER:						
QC DESIGNATION:	CRQL					
CHLOROMETHANE	10	10 U	NA	NA	NA	10 U
BROMOMETHANE	10	10 U	NA	NA	NA	10 U
VINYL CHLORIDE	10	10 U	NA	NA	NA	10 U
CHLOROETHANE	10	10 U	NA	NA	NA	10 U
METHYLENE CHLORIDE	5	4 J	NA	NA	NA	5 U
ACETONE	10	10 U	NA	NA	NA	32 J
CARBON DISULFIDE	5	5 U	NA	NA	NA	5 U
1,1-DICHLOROETHENE	5	5 U	NA	NA	NA	5 U
1,1-DICHLOROETHANE	5	5 U	NA	NA	NA	5 U
1,2-DICHLOROETHENE (TOTAL)	5	5 U	NA	NA	NA	5 U
CHLOROFORM	5	31	NA	NA	NA	5 U
1,2-DICHLOROETHANE	5	5 U	NA	NA	NA	5 U
2-BUTANONE	10	10 U	NA	NA	NA	10 U
1,1,1-TRICHLOROETHANE	5	5 U	NA	NA	NA	5 U
CARBON TETRACHLORIDE	5	5 U	NA	NA	NA	5 U
VINYL ACETATE	10	10 U	NA	NA	NA	10 U
BROMODICHLOROMETHANE	5	11	NA	NA	NA	5 U
1,2-DICHLOROPROPANE	5	5 U	NA	NA	NA	5 U
CIS-1,3-DICHLOROPROPENE	5	5 U	NA	NA	NA	5 U
TRICHLOROETHENE	5	5 U	NA	NA	NA	5 U
DIBROMOCHLOROMETHANE	5	3 J	NA	NA	NA	5 U
1,1,2-TRICHLOROETHANE	5	5 U	NA	NA	NA	5 U
BENZENE	5	5 U	NA	NA	5 U	5 U
TRANS-1,3-DICHLOROPROPENE	5	5 U	NA	NA	NA	5 U
BROMOFORM	5	5 U	NA	NA	NA	5 U
4-METHYL-2-PENTANONE	10	10 U	NA	NA	NA	10 U
2-HEXANONE	10	10 U	NA	NA	NA	10 U
TETRACHLOROETHENE	5	5 U	NA	NA	NA	5 U
1,1,2,2-TETRACHLOROETHANE	5	5 U	NA	NA	NA	5 U
TOLUENE	5	5 U	NA	NA	5 U	5 U
CHLOROBENZENE	5	5 U	NA	NA	NA	5 U
ETHYL BENZENE	5	5 U	NA	NA	5 U	5 U
STYRENE	5	5 U	NA	NA	NA	5 U
TOTAL XYLENES	5	5 U	NA	NA	5 U	5 U
DILUTION FACTOR:		1.0			1.0	1.0
DATE SAMPLED:		6/27/91			6/25/91	6/27/91
DATE ANALYZED:		7/10/91			7/08/91	7/10/91
ASSOCIATED BLANKS:						

SEMIVOLATILE AQUEOUS ANALYSIS (ug/L)
SITE: CAMP LEJEUNE - FIELD BLANKS
CASE: 5075/4961

SAMPLE LOCATION:		DECON-F	03SD02-F	07GW03-F	54GW04-F	82GW01-F
SAMPLE NUMBER:						
QC DESIGNATION:	CRQL					
PHENOL	10	10 U	10 U	10 U	NA	NA
BIS(2-CHLOROETHYL)ETHER	10	10 U	10 U	10 U	NA	NA
2-CHLOROPHENOL	10	10 U	10 U	10 U	NA	NA
1,3-DICHLOROBENZENE	10	10 U	10 U	10 U	NA	NA
1,4-DICHLOROBENZENE	10	10 U	10 U	10 U	NA	NA
BENZYL ALCOHOL	10	10 U	10 U	10 U	NA	NA
1,2-DICHLOROBENZENE	10	10 U	10 U	10 U	NA	NA
2-METHYLPHENOL	10	10 U	10 U	10 U	NA	NA
BIS(2-CHLOR[illegible]PROPYL)ETHER	10	10 U	10 U	10 U	NA	NA
4-METHYLPHENOL	10	10 U	10 U	10 U	NA	NA
N-NITROSODI-N-PROP[illegible]INE	10	10 U	10 U	10 U	NA	NA
HEXACHLOROETHANE	10	10 U	10 U	10 U	NA	NA
NITROBENZENE	10	10 U	10 U	10 U	NA	NA
ISOPHORONE	10	10 U	10 U	10 U	NA	NA
2-NITROPHENOL	10	10 U	10 U	10 U	NA	NA
2,4-DIMETHYLPHENOL	10	10 U	10 U	10 U	NA	NA
BENZOIC ACID	50	50 U	50 U	51 U	NA	NA
BIS(2-CHLOROETHOXY)METHANE	10	10 U	10 U	10 U	NA	NA
2,4-DICHLOROPHENOL	10	10 U	10 U	10 U	NA	NA
1,2,4-TRICHLOROBENZENE	10	10 U	10 U	10 U	NA	NA
NAPHTHALENE	10	10 U	10 U	10 U	NA	NA
4-CHLORANILINE	10	10 U	10 U	10 U	NA	NA
HEXACHLOROBUTADIENE	10	10 U	10 U	10 U	NA	NA
4-CHLORO-3-METHYLPHENOL	10	10 U	10 U	10 U	NA	NA
2-METHYLNAPHTHALENE	10	10 U	10 U	10 U	NA	NA
HEXACHLOROCYCLOPENTADIENE	10	10 U	10 U	10 U	NA	NA
2,4,6-TRICHLOROPHENOL	10	10 U	10 U	10 U	NA	NA
2,4,5-TRICHLOROPHENOL	50	50 U	50 U	51 U	NA	NA
2-CHLORONAPHTHALENE	10	10 U	10 U	10 U	NA	NA
2-NITROANILINE	50	50 U	50 U	51 U	NA	NA
DIMETHYL PHTHALATE	10	10 U	10 U	10 U	NA	NA
ACENAPHTHYLENE	10	10 U	10 U	10 U	NA	NA
2,6-DINITROTOLUENE	10	10 U	10 U	10 U	NA	NA
3-NITROANILINE	50	50 U	50 U	51 U	NA	NA
ACENAPHTHENE	10	10 U	10 U	10 U	NA	NA
2,4-DINITROPHENOL	50	50 U	50 U	51 U	NA	NA
[illegible]-NITR[illegible]NOL	50	[illegible] U	50 [illegible] U	[illegible]	[illegible]A	[illegible]

SEMIVOLATILE AQUEOUS ANALYSIS (ug/L)
SITE: CAMP LEJEUNE - FIELD BLANKS
CASE: 5075/4961

SAMPLE LOCATION:		DECON-F	03SD02-F	07GW03-F	54GW04-F	82GW01-F
SAMPLE NUMBER:						
QC DESIGNATION:	CRQL					
DIBENZOFURAN	10	10 U	10 U	10 U	NA	NA
2,4-DINITROTOLUENE	10	10 U	10 U	10 U	NA	NA
DIETHYL PHTHALATE	10	10 U	10 UJ	10 U	NA	NA
4-CHLOROPHENYL-PHENYLETHER	10	10 U	10 U	10 U	NA	NA
FLUORENE	10	10 U	10 U	10 U	NA	NA
4-NITROANILINE	50	50 U	50 U	51 U	NA	NA
4,6-DINITRO-2-METHYLPHENOL	50	50 U	50 U	51 U	NA	NA
N-NITROSODIPHENLYAMINE	10	10 U	10 U	10 U	NA	NA
4-BROMOPHENYL-PHENYLETHER	10	10 U	10 U	10 U	NA	NA
HEXACHLOROBENZENE	10	10 U	10 U	10 U	NA	NA
PENTACHLOROPHENOL	50	50 U	50 U	51 U	NA	NA
PHENANTHRENE	10	10 U	10 U	10 U	NA	NA
ANTHRACENE	10	10 U	10 U	10 U	NA	NA
DI-N-BUTYLPHTHALATE	10	10 U	10 U	10 U	NA	NA
FLUORANTHENE	10	10 U	10 U	10 U	NA	NA
PYRENE	10	10 U	10 U	10 U	NA	NA
BUTYLBENZYLPHTHALATE	10	10 U	10 U	10 U	NA	NA
3,3'-DICHLOROBENZIDINE	20	20 U	20 U	20 U	NA	NA
BENZO(a)ANTHRACENE	10	10 U	10 U	10 U	NA	NA
CHRYSENE	10	10 U	10 U	10 U	NA	NA
BIS(2-ETHYLHEXYL)PHTHALATE	10	10 U	10 U	10 U	NA	NA
DI-N-OCTYLPHTHALATE	10	10 U	10 U	10 U	NA	NA
BENZO(b)FLUORANTHENE	10	10 U	10 U	10 U	NA	NA
BENZO(k)FLUARANTHENE	10	10 U	10 U	10 U	NA	NA
BENZO(a)PYRENE	10	10 U	10 U	10 U	NA	NA
INDENO(1,2,3-cd)PYRENE	10	10 U	10 U	10 U	NA	NA
DIBENZ(a,h)ANTHRACENE	10	10 U	10 U	10 U	NA	NA
BENZO(ghi)PERYLENE	10	10 U	10 U	10 U	NA	NA

DILUTION FACTOR:	1.0	1.0	1.0
DATE SAMPLED:	6/27/91	6/10/91	6/26/91
DATE EXTRACTED:	7/01/91	6/14/91	7/01/91
DATE ANALYZED:	8/02/91	7/16/91	8/02/91
ASSOCIATED BLANKS:			

PESTICIDE/PCB AQUEOUS ANALYSIS (ug/L)
SITE: CAMP LEJEUNE - FIELD BLANKS
CASE: 5075

SAMPLE LOCATION:		DECON-F	03SD02-F	07GW03-F	54GW04-F	82GW01-F
SAMPLE NUMBER:						
QC DESIGNATION:	CRQL					
ALPHA-BHC	0.05	0.05 U	NA	0.05 U	NA	0.05 U
BETA-BHC	0.05	0.05 U	NA	0.05 U	NA	0.05 U
DELTA-BHC	0.05	0.05 U	NA	0.05 U	NA	0.05 U
GAMMA-BHC (LINDANE)	0.05	0.05 U	NA	0.05 U	NA	0.05 U
HEPTACHLOR	0.05	0.05 U	NA	0.05 U	NA	0.05 U
ALDRIN	0.05	0.05 U	NA	0.05 U	NA	0.05 U
HEPTACHLOR EPOXIDE	0.05	0.05 U	NA	0.05 U	NA	0.05 U
ENDOSULFAN I	0.05	0.05 U	NA	0.05 U	NA	0.05 U
DIELDRIN	0.10	0.10 U	NA	0.10 U	NA	0.10 U
4,4'-DDE	0.10	0.10 U	NA	0.10 U	NA	0.10 U
ENDRIN	0.10	0.10 U	NA	0.10 U	NA	0.10 U
ENDOSULFAN II	0.10	0.10 U	NA	0.10 U	NA	0.10 U
4,4'-DDD	0.10	0.10 U	NA	0.10 U	NA	0.10 U
ENDOSULFAN SULFATE	0.10	0.10 U	NA	0.10 U	NA	0.10 U
4,4'-DDT	0.10	0.10 U	NA	0.10 U	NA	0.10 U
METHOXYCHLOR	0.5	0.49 U	NA	0.50 U	NA	0.49 U
ENDRIN KETONE	0.10	0.10 U	NA	0.10 U	NA	0.10 U
ALPHA-CHLORODANE	0.5	0.49 U	NA	0.50 U	NA	0.49 U
GAMMA-CHLORDANE	0.5	0.49 U	NA	0.50 U	NA	0.49 U
TOXAPHENE	1.0	0.98 U	NA	1.0 U	NA	0.99 U
AROCLOR 1016	0.5	0.49 U	NA	0.50 U	0.50 U	0.49 U
AROCLOR 1221	0.5	0.49 U	NA	0.50 U	0.50 U	0.49 U
AROCLOR 1232	0.5	0.49 U	NA	0.50 U	0.50 U	0.49 U
AROCLOR 1242	0.5	0.49 U	NA	0.50 U	0.50 U	0.49 U
AROCLOR 1248	0.5	0.49 U	NA	0.50 U	0.50 U	0.49 U
AROCLOR 1254	1.0	0.98 U	NA	1.0 U	1.0 U	0.99 U
AROCLOR 1260	1.0	0.98 U	NA	1.0 U	1.0 U	0.99 U
DILUTION FACTOR:		1.0		1.0	1.0	1.0
DATE SAMPLED:		6/27/91		6/26/91	6/25/91	6/27/91
DATE EXTRACTED:		7/03/91		7/03/91	6/28/91	7/03/91
DATE ANALYZED:		8/12/91		8/08/91	7/31/91	8/12/91
ASSOCIATED BLANKS:						

HERBICIDE ANALYSIS (ug/L)
SITE: CAMP LEJEUNE - FIELD BLANKS
CASE: 5075

SAMPLE LOCATION:		DECON-F	03SD02-F	07GW03-F	54GW04-F	82GW01-F
SAMPLE NUMBER:						
QC DESIGNATION:	CRQL					
2,4-D	0.2	0.20 U	NA	NA	NA	NA
SILVEX	0.2	0.20 U	NA	NA	NA	NA
2,4,5-T	0.2	0.20 U	NA	NA	NA	NA
DINOSEB	0.2	0.20 U	NA	NA	NA	NA
DILUTION FACTOR:		1.0				
DATE SAMPLED:		6/27/91				
DATE EXTRACTED:		7/03/91				
DATE ANALYZED:		7/15/91				
ASSOCIATED BLANKS:						

INORGANIC AQUEOUS ANALYSIS (ug/L)
SITE: CAMP LEJEUNE - FIELD BLANKS
CASE: 5075/5054
LABORATORY:

SAMPLE LOCATION:	ANALYTICAL	DECON-F	03SD02-F	07GW03-F	54GW04-F	82GW01-F	
SAMPLE NUMBER:	METHOD						
QC DESIGNATION:							CRQL
ALUMINUM	P	133	NA	NA	10.0	NA	200
ANTIMONY	P	17.0 U	NA	NA	23.0	NA	60
ARSENIC	F	3.0 U	NA	NA	4.0 UJ	NA	10
BARIUM	P	5.5	NA	NA	1.0	NA	200
BERYLLIUM	P	2.0 U	NA	NA	1.0	NA	5
CADMIUM	P	5.0 UJ	NA	NA	5.0 UJ	NA	5
CALCIUM	P	21500	NA	NA	72.0	NA	5000
CHROMIUM	P	4.0 U	NA	NA	5.0 UJ	NA	10
COBALT	P	5.0 U	NA	NA	8.0	NA	50
COPPER	P	5.0 U	NA	NA	15.0	NA	25
IRON	P	23.0	NA	NA	5.2 J	NA	100
LEAD	F	2.0 UJ	NA	NA	2.0 UJ	NA	3
MAGNESIUM	P	2200	NA	NA	14.2	NA	5000
MANGANESE	P	2.0 U	NA	NA	2.0 UJ	NA	15
MERCURY	CV	0.20 U	NA	NA	0.20	NA	0.2
NICKEL	P	8.0 U	NA	NA	13.0	NA	40
POTASSIUM	P	1440	NA	NA	503	NA	5000
SELENIUM	F	3.0 UJ	NA	NA	R	NA	5
SILVER	P	4.0	NA	NA	3.0	NA	10
SODIUM	P	7550	NA	NA	37.7	NA	5000
THALLIUM	F	2.0 UJ	NA	NA	2.0 UJ	NA	10
TIN	P	NA	NA	NA	NA	NA	40
VANADIUM	P	3.0 U	NA	NA	5.0 UJ	NA	50
ZINC	P	13.2	NA	NA	17.0 J	NA	20
CYANIDE	C	NA	NA	NA	R	NA	10
HEXAVALENT CHROMIUM	P	NA	NA	NA	10.0 U	NA	10
DILUTION FACTOR:		1.0			1.0		
DATE SAMPLED:		6/27/91			6/25/91		
ASSOCIATED BLANKS:							

ANALYTICAL METHOD
F - FURNACE
P - ICP/FLAME AA
CV - COLD VAPOR
C - COLORMETRIC

J - QUANTITATION IS APPROXIMATE DUE TO LIMITATIONS IDENTIFIED IN THE QUALITY CONTROL REVIEW (DATA REVIEW)
R - VALUE IS REJECTED.
-- VALUE IS NON-DETECTED
NA- NOT ANALYZED

VOLATILE ANALYSIS (ug/L)
SITE: CAMP LEJEUNE - RINSATE BLANKS
CASE: 5075/5054/4961/5019/5064/5005/5000

SAMPLE LOCATION:		BS-1-R	03GW02-R	3SD02-R	07GW03-R	07SB05-R	54GW04-R	54SB02-R	54SD01-R
SAMPLE NUMBER:									
QC DESIGNATION:	CRQL								
CHLOROMETHANE	10	NA	NA	NA	10 U	10 U	NA	NA	NA
BROMOMETHANE	10	NA	NA	NA	10 U	10 U	NA	NA	NA
VINYL CHLORIDE	10	NA	NA	NA	10 U	10 U	NA	NA	NA
CHLOROETHANE	10	NA	NA	NA	10 U	10 U	NA	NA	NA
METHYLENE CHLORIDE	5	NA	NA	NA	5 U	5 U	NA	NA	NA
ACETONE	10	NA	NA	NA	34 J	38	NA	NA	NA
CARBON DISULFIDE	5	NA	NA	NA	5 U	5 U	NA	NA	NA
1,1-DICHLOROETHENE	5	NA	NA	NA	5 U	5 U	NA	NA	NA
1,1-DICHLOROETHANE	5	NA	NA	NA	5 U	5 U	NA	NA	NA
1,2-DICHLOROETHENE (TOTAL)	5	NA	NA	NA	5 U	5 U	NA	NA	NA
CHLOROFORM	5	NA	NA	NA	5 U	5 U	NA	NA	NA
1,2-DICHLOROETHANE	5	NA	NA	NA	5 U	5 U	NA	NA	NA
2-BUTANONE	10	NA	NA	NA	10 U	10 U	NA	NA	NA
1,1,1-TRICHLOROETHANE	5	NA	NA	NA	5 U	5 U	NA	NA	NA
CARBON TETRACHLORIDE	5	NA	NA	NA	5 U	5 U	NA	NA	NA
VINYL ACETATE	10	NA	NA	NA	10 U	10 U	NA	NA	NA
BROMODICHLOROMETHANE	5	NA	NA	NA	5 U	5 U	NA	NA	NA
1.2-DICHLOROPROPANE	5	NA	NA	NA	5 U	5 U	NA	NA	NA
CIS-1,3-DICHLOROPROPENE	5	NA	NA	NA	5 U	5 U	NA	NA	NA
TRICHLOROETHENE	5	NA	NA	NA	5 U	5 U	NA	NA	NA
DIBROMOCHLOROMETHANE	5	NA	NA	NA	5 U	5 U	NA	NA	NA
1,1,2-TRICHLOROETHANE	5	NA	NA	NA	5 U	5 U	NA	NA	NA
BENZENE	5	NA	NA	NA	5 U	5 U	5 U	5 U	5 U
TRANS-1,3-DICHLOROPROPENE	5	NA	NA	NA	5 U	5 U	NA	NA	NA
BROMOFORM	5	NA	NA	NA	5 U	5 U	NA	NA	NA
4-METHYL-2-PENTANONE	10	NA	NA	NA	10 U	10 U	NA	NA	NA
2-HEXANONE	10	NA	NA	NA	10 U	10 U	NA	NA	NA
TETRACHLOROETHENE	5	NA	NA	NA	5 U	5 U	NA	NA	NA
1,1,2,2-TETRACHLOROETHANE	5	NA	NA	NA	5 U	5 U	NA	NA	NA
TOLUENE	5	NA	NA	NA	5 U	5 U	5 U	5 U	5 U
CHLOROBENZENE	5	NA	NA	NA	5 U	5 U	NA	NA	NA
ETHYL BENZENE	5	NA	NA	NA	5 U	5 U	5 U	5 U	5 U
STYRENE	5	NA	NA	NA	5 U	5 U	NA	NA	NA
TOTAL XYLENES	5	NA	NA	NA	5 U	5 U	5 U	5 U	5 U
DILUTION FACTOR:					1.0	1.0	1.0	1.0	1.0
DATE SAMPLED:					6/26/91	6/25/91	6/25/91	6/12/91	6/19/91
DATE ANALYZED:					7/10/91	6/28/91	7/08/91	6/19/91	6/26/91
ASSOCIATED BLANKS:									

VOLATILE ANALYSIS (ug/L)
SITE: CAMP LEJEUNE - RINSATE BLANKS
CASE: 5075/5054/4961/5019/5064/5005/5000

SAMPLE LOCATION:		54SD03-R	54S[illegible]	80GW02-R	80GW03-R	80MW01-R	82GW31-R	82SB02-R	82SD06-R
SAMPLE NUMBER:									
QC DESIGNATION:	CRQL								
CHLOROMETHANE	10	NA	NA	10 U	10 U	10 U	10 U	10 U	10 U
BROMOMETHANE	10	NA	NA	10 U	10 U	10 U	10 U	10 U	10 U
VINYL CHLORIDE	10	NA	NA	10 U	10 U	10 U	10 U	10 U	10 U
CHLOROETHANE	10	NA	NA	10 U	10 U	10 U	10 U	10 U	10 U
METHYLENE CHLORIDE	5	NA	N?	5 U	5 U	5 U	5 U	5 U	5 U
ACETONE	10	NA	NA	30 J	10 UJ	9 J	81 J	18	10 U
CARBON DISULFIDE	5	NA	NA	5 U	5 U	5 U	5 U	5 U	5 U
1,1-DICHLOROETHENE	5	NA	NA	5 U	5 U	5 U	5 U	5 U	5 U
1,1-DICHLOROETHANE	5	NA	NA	5 U	5 U	5 U	5 U	5 U	5 U
1,2-DI[illegible]ETHENE (TOTAL)	5	NA	NA	5 U	5 U	5 U	5 U	5 U	5 U
CHLOROF[illegible]	5	NA	NA	5 U	5 U	5 U	5 U	5 U	5 U
1,2-DICHLOROETHANE	5	NA	NA	5 U	5 U	5 U	5 U	5 U	5 U
2-BUTANONE	10	NA	NA	10 U	10 UJ	10 UJ	10 U	10 U	10 U
1,1,1-TRICHLOROETHANE	5	NA	NA	5 U	5 U	5 U	5 U	5 U	5 U
CARBON TETRACHLORIDE	5	NA	NA	5 U	5 U	5 U	5 U	5 U	5 U
VINYL ACETATE	10	NA	NA	10 U	10 U	10 U	10 U	10 U	10 U
BROMODICHLOROMETHANE	5	NA	NA	5 U	5 U	5 U	5 U	5 U	5 U
1,2-DICHLOROPROPANE	5	NA	NA	5 U	5 U	5 U	5 U	5 U	5 U
CIS-1,3-DICHLOROPROPENE	5	NA	NA	5 U	5 U	5 U	5 U	5 U	5 U
TRICHLOROETHENE	5	NA	NA	5 U	5 U	5 U	5 U	5 U	5 U
DIBROMOCHLOROMETHANE	5	NA	NA	5 U	5 U	5 U	5 U	5 U	5 U
1,1,2-TRICHLOROETHANE	5	NA	NA	5 U	5 U	5 U	5 U	5 U	5 U
BENZENE	5	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
TRANS-1,3-DICHLOROPROPENE	5	NA	NA	5 U	5 U	5 U	5 U	5 U	5 U
BROMOFORM	5	NA	NA	5 U	5 U	5 U	5 U	5 U	5 U
4-METHYL-2-PENTANONE	10	NA	NA	10 U	10 U	10 U	10 U	10 U	10 U
2-HEXANONE	10	NA	NA	10 U	10 UJ	10 UJ	10 U	10 U	10 U
TETRACHLOROETHENE	5	NA	NA	5 U	5 U	5 U	5 U	5 U	5 U
1,1,2,2-TETRACHLOROETHANE	5	NA	NA	5 U	5 U	5 U	5 U	5 U	5 U
TOLUENE	5	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
CHLOROBENZENE	5	NA	NA	5 U	5 U	5 U	5 U	5 U	5 U
ETHYL BENZENE	5	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
STYRENE	5	NA	NA	5 U	5 U	5 U	5 U	5 U	5 U
TOTAL XYLENES	5	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
DILUTION FACTOR:		1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
DATE SAMPLED:		6/26/91	6/19/91	6/27/91	6/16/91	6/16/91	6/27/91	6/19/91	6/13/91
DATE ANALYZED:		7/10/91	6/26/91	7/10/91	6/23/91	6/23/91	7/10/91	6/25/91	6/25/91
ASSOCIATED BLANKS:									

VOLATILE ANALYSIS (ug/L)
SITE: CAMP LEJEUNE - RINSATE BLANKS
CASE: 5075/5054/4961/5019/5064/5005/5000

SAMPLE LOCATION:		82SW06-R	
SAMPLE NUMBER:			
QC DESIGNATION:	CRQL		
CHLOROMETHANE	10	10	U
BROMOMETHANE	10	10	U
VINYL CHLORIDE	10	10	U
CHLOROETHANE	10	10	U
METHYLENE CHLORIDE	5	5	U
ACETONE	10	10	U
CARBON DISULFIDE	5	5	U
1,1-DICHLOROETHENE	5	5	U
1,1-DICHLOROETHANE	5	5	U
1,2-DICHLOROETHENE (TOTAL)	5	5	U
CHLOROFORM	5	5	U
1,2-DICHLOROETHANE	5	5	U
2-BUTANONE	10	10	U
1,1,1-TRICHLOROETHANE	5	5	U
CARBON TETRACHLORIDE	5	5	U
VINYL ACETATE	10	10	U
BROMODICHLOROMETHANE	5	5	U
1,2-DICHLOROPROPANE	5	5	U
CIS-1,3-DICHLOROPROPENE	5	5	U
TRICHLOROETHENE	5	5	U
DIBROMOCHLOROMETHANE	5	5	U
1,1,2-TRICHLOROETHANE	5	5	U
BENZENE	5	5	U
TRANS-1,3-DICHLOROPROPENE	5	5	U
BROMOFORM	5	5	U
4-METHYL-2-PENTANONE	10	10	U
2-HEXANONE	10	10	U
TETRACHLOROETHENE	5	5	U
1,1,2,2-TETRACHLOROETHANE	5	5	U
TOLUENE	5	5	U
CHLOROBENZENE	5	5	U
ETHYL BENZENE	5	5	U
STYRENE	5	5	U
TOTAL XYLENES	5	5	U

DILUTION FACTOR:	1.0
DATE SAMPLED:	6/13/91
DATE ANALYZED:	6/25/91
ASSOCIATED BLANKS:	

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SEMIVOLATILE AQUEOUS ANALYSIS (ug/L)
SITE: CAMP LEJEUNE - RINSATE BLANKS
CASE: 5005/4961/5075/5054

SAMPLE LOCATION:		BS-1-R	03GW02-R	03SD02-R	07GW03-R	07SB05-R	54GW04-R	54SB02-R	54SD01-R
SAMPLE NUMBER:									
QC DESIGNATION:	CRQL								
PHENOL	10	NA	10 U	10 U	10 U	9 J	NA	NA	NA
BIS(2-CHLOROETHYL)ETHER	10	NA	10 U	10 U	10 U	10 U	NA	NA	NA
2-CHLOROPHENOL	10	NA	10 U	10 U	10 U	10 U	NA	NA	NA
1,3-DICHLOROBENZENE	10	NA	10 U	10 U	10 U	10 U	NA	NA	NA
1,4-DICHLOROBENZENE	10	NA	10 U	10 U	10 U	10 U	NA	NA	NA
BENZYL ALCOHOL	10	NA	10 U	10 U	10 U	10 U	NA	NA	NA
1,2-DICHLOROBENZENE	10	NA	10 U	10 U	10 U	10 U	NA	NA	NA
2-METHYLPHENOL	10	NA	10 U	10 U	10 U	10 U	NA	NA	NA
BIS(2-CHLOROISOPROPYL)ETHER	10	NA	10 U	10 U	10 U	10 U	NA	NA	NA
4-METHYLPHENOL	10	NA	10 U	10 U	10 U	10 U	NA	NA	NA
N-NITROSODI-N-PROPYLAMINE	10	NA	10 U	10 U	10 U	10 U	NA	NA	NA
HEXACHLOROETHANE	10	NA	10 U	10 U	10 U	10 U	NA	NA	NA
NITROBENZENE	10	NA	10 U	10 U	10 U	10 U	NA	NA	NA
ISOPHORONE	10	NA	10 U	10 U	10 U	10 U	NA	NA	NA
2-NITROPHENOL	10	NA	10 U	10 U	10 U	10 U	NA	NA	NA
2,4-DIMETHYLPHENOL	10	NA	10 U	10 U	10 U	10 U	NA	NA	NA
BENZOIC ACID	50	NA	50 U	50 U	52 U	23 J	NA	NA	NA
BIS(2-CHLOROETHOXY)METHANE	10	NA	10 U	10 U	10 U	10 U	NA	NA	NA
2,4-DICHLOROPHENOL	10	NA	10 U	10 U	10 U	10 U	NA	NA	NA
1,2,4-TRICHLOROBENZENE	10	NA	10 U	10 U	10 U	10 U	NA	NA	NA
NAPHTHALENE	10	NA	10 U	10 U	10 U	10 U	NA	NA	NA
4-CHLORANILINE	10	NA	10 U	10 U	10 U	10 U	NA	NA	NA
HEXACHLOROBUTADIENE	10	NA	10 U	10 U	10 U	10 U	NA	NA	NA
4-CHLORO-3-METHYLPHENOL	10	NA	10 U	10 U	10 U	10 U	NA	NA	NA
2-METHYLNAPHTHALENE	10	NA	10 U	10 U	10 U	10 U	NA	NA	NA
HEXACHLOROCYCLOPENTADIENE	10	NA	10 U	10 U	10 U	10 U	NA	NA	NA
2,4,6-TRICHLOROPHENOL	10	NA	10 U	10 U	10 U	10 U	NA	NA	NA
2,4,5-TRICHLOROPHENOL	50	NA	50 U	50 U	52 U	49 U	NA	NA	NA
2-CHLORONAPHTHALENE	10	NA	10 U	10 U	10 U	10 U	NA	NA	NA
2-NITROANILINE	50	NA	50 U	50 U	52 U	49 U	NA	NA	NA
DIMETHYL PHTHALATE	10	NA	10 U	10 U	10 U	10 U	NA	NA	NA
ACENAPHTHYLENE	10	NA	10 U	10 U	10 U	10 U	NA	NA	NA
2,6-DINITROTOLUENE	10	NA	10 U	10 U	10 U	10 U	NA	NA	NA
3-NITROANILINE	50	NA	50 U	50 U	52 U	49 U	NA	NA	NA
ACENAPHTHENE	10	NA	10 U	10 U	10 U	10 U	NA	NA	NA
2,4-DINITROPHENOL	50	NA	50 U	50 U	52 U	49 U	NA	NA	NA
4-NITROPHENOL	50	NA	50 U	50 UJ	52 U	49 U	NA	NA	NA

SEMIVOLATILE AQUEOUS ANALYSIS (ug/L)
SITE: CAMP LEJEUNE - RINSATE BLANKS
CASE: 5005/4961/5075/5054

SAMPLE LOCATION:		BS-1-R	03GW02-R	03SD02-R	07GW03-R	07SB05-R	54GW04-R	54SB02-R	54SD01-R
SAMPLE NUMBER:									
QC DESIGNATION:	CRQL								
DIBENZOFURAN	10	NA	10 U	10 U	10 U	10 U	NA	NA	NA
2,4-DINITROTOLUENE	10	NA	10 U	10 U	10 U	10 U	NA	NA	NA
DIETHYL PHTHALATE	10	NA	10 U	10 UJ	10 U	10 U	NA	NA	NA
4-CHLOROPHENYL-PHENYLETHER	10	NA	10 U	10 U	10 U	10 U	NA	NA	NA
FLUORENE	10	NA	10 U	10 U	10 U	10 U	NA	NA	NA
4-NITROANILINE	50	NA	50 U	50 U	52 U	49 U	NA	NA	NA
4,6-DINITRO-2-METHYLPHENOL	50	NA	50 U	50 U	52 U	49 U	NA	NA	NA
N-NITROSODIPHENLYAMINE	10	NA	10 U	10 U	10 U	10 U	NA	NA	NA
4-BROMOPHENYL-PHENYLETHER	10	NA	10 U	10 U	10 U	10 U		NA	NA
HEXACHLOROBENZENE	10	NA	10 U	10 U	10 U	10 U	NA	NA	NA
PENTACHLOROPHENOL	50	NA	50 U	50 U	52 U	49 U	NA	NA	NA
PHENANTHRENE	10	NA	10 U	10 U	10 U	10 U	NA	NA	NA
ANTHRACENE	10	NA	10 U	10 U	10 U	10 U	NA	NA	NA
DI-N-BUTYLPHTHALATE	10	NA	10 U	10 U	10 U	10 U	NA	NA	NA
FLUORANTHENE	10	NA	10 U	10 U	10 U	10 U	NA	NA	NA
PYRENE	10	NA	10 U	10 U	10 U	10 U	NA	NA	NA
BUTYLBENZYLPHTHALATE	10	NA	10 U	10 U	10 U	10 U	NA	NA	NA
3,3'-DICHLOROBENZIDINE	20	NA	20 U	20 U	21 U	20 U	NA	NA	NA
BENZO(a)ANTHRACENE	10	NA	10 U	10 U	10 U	10 U	NA	NA	NA
CHRYSENE	10	NA	10 U	10 U	10 U	10 U	NA	NA	NA
BIS(2-ETHYLHEXYL)PHTHALATE	10	NA	10 U	10 U	10 U	10 U	NA	NA	NA
DI-N-OCTYLPHTHALATE	10	NA	10 U	10 U	10 U	10 U	NA	NA	NA
BENZO(b)FLUORANTHENE	10	NA	10 U	10 U	10 U	10 U	NA	NA	NA
BENZO(k)FLUARANTHENE	10	NA	10 U	10 U	10 U	10 U	NA	NA	NA
BENZO(a)PYRENE	10	NA	10 U	10 U	10 U	10 U	NA	NA	NA
INDENO(1,2,3-cd)PYRENE	10	NA	10 U	10 U	10 U	10 U	NA	NA	NA
DIBENZ(a,h)ANTHRACENE	10	NA	10 U	10 U	10 U	10 U	NA	NA	NA
BENZO(ghi)PERYLENE	10	NA	10 U	10 U	10 U	10 U	NA	NA	NA
DILUTION FACTOR:			1.0	1.0	1.0	1.0			
DATE SAMPLED:			6/16/91	6/10/91	6/26/91	6/25/91			
DATE EXTRACTED:			6/21/91	6/14/91	7/01/91	6/27/91			
DATE ANALYZED:			8/01/91	7/16/91	8/02/91	7/31/91			
ASSOCIATED BLANKS:									

SEMIVOLATILE AQUEOUS ANALYSIS (ug/L)
SITE: CAMP LEJEUNE - RINSATE BLANKS
CASE: 5005/4961/5075/5054

SAMPLE LOCATION:		54SD03-R	54SW01-R	80GW02-R	80GW03-R	80MW01-R	82GW31-R	82SB02-R	82SD06-R
SAMPLE NUMBER:									
QC DESIGNATION:	CRQL								
PHENOL	10	NA	NA	NA	NA	NA	NA	NA	NA
BIS(2-CHLOROETHYL)ETHER	10	NA	NA	NA	NA	NA	NA	NA	NA
2-CHLOROPHENOL	10	NA	NA	NA	NA	NA	NA	NA	NA
1,3-DICHLOROBENZENE	10	NA	NA	NA	NA	NA	NA	NA	NA
1,4-DICHLOROBENZENE	10	NA	NA	NA	NA	NA	NA	NA	NA
BENZYL ALCOHOL	10	NA	NA	NA	NA	NA	NA	NA	NA
1,2-DICHLOROBENZENE	10	NA	NA	NA	NA	NA	NA	NA	NA
2-METHYLPHENOL	10	NA	NA	NA	NA	NA	NA	NA	NA
BIS(2-CHLOROISOPROPYL)ETHER	10	NA	NA	NA	NA	NA	NA	NA	NA
4-METHYLPHENOL	10	NA	NA	NA	NA	NA	NA	NA	NA
N-NITROSODI-N-PROPYLAMINE	10	NA	NA	NA	NA	NA	NA	NA	NA
HEXACHLOROETHANE	10	NA	NA	NA	NA	NA	NA	NA	NA
NITROBENZENE	10	NA	NA	NA	NA	NA	NA	NA	NA
ISOPHORONE	10	NA	NA	NA	NA	NA	NA	NA	NA
2-NITROPHENOL	10	NA	NA	NA	NA	NA	NA	NA	NA
2,4-DIMETHYLPHENOL	10	NA	NA	NA	NA	NA	NA	NA	NA
BENZOIC ACID	50	NA	NA	NA	NA	NA	NA	NA	NA
BIS(2-CHLOROETHOXY)METHANE	10	NA	NA	NA	NA	NA	NA	NA	NA
2,4-DICHLOROPHENOL	10	NA	NA	NA	NA	NA	NA	NA	NA
1,2,4-TRICHLOROBENZENE	10	NA	NA	NA	NA	NA	NA	NA	NA
NAPHTHALENE	10	NA	NA	NA	NA	NA	NA	NA	NA
4-CHLORANILINE	10	NA	NA	NA	NA	NA	NA	NA	NA
HEXACHLOROBUTADIENE	10	NA	NA	NA	NA	NA	NA	NA	NA
4-CHLORO-3-METHYLPHENOL	10	NA	NA	NA	NA	NA	NA	NA	NA
2-METHYLNAPHTHALENE	10	NA	NA	NA	NA	NA	NA	NA	NA
HEXACHLOROCYCLOPENTADIENE	10	NA	NA	NA	NA	NA	NA	NA	NA
2,4,6-TRICHLOROPHENOL	10	NA	NA	NA	NA	NA	NA	NA	NA
2,4,5-TRICHLOROPHENOL	50	NA	NA	NA	NA	NA	NA	NA	NA
2-CHLORONAPHTHALENE	10	NA	NA	NA	NA	NA	NA	NA	NA
2-NITROANILINE	50	NA	NA	NA	NA	NA	NA	NA	NA
DIMETHYL PHTHALATE	10	NA	NA	NA	NA	NA	NA	NA	NA
ACENAPHTHYLENE	10	NA	NA	NA	NA	NA	NA	NA	NA
2,6-DINITROTOLUENE	10	NA	NA	NA	NA	NA	NA	NA	NA
3-NITROANILINE	50	NA	NA	NA	NA	NA	NA	NA	NA
ACENAPHTHENE	10	NA	NA	NA	NA	NA	NA	NA	NA
2,4-DINITROPHENOL	50	NA	NA	NA	NA	NA	NA	NA	NA
4-NITROPHENOL	50	NA	NA	NA	NA	NA	NA	NA	NA

SEMIVOLATILE AQUEOUS ANALYSIS (ug/L)
SITE: CAMP LEJEUNE - RINSATE BLANKS
CASE: 5005/4961/5075/5054

SAMPLE LOCATION:		54SD03-R	54SW01-R	80GW02-R	80GW03-R	80MW01-R	82GW31-R	82SB02-R	82SD06-R
SAMPLE NUMBER:									
QC DESIGNATION:	CRQL								
DIBENZOFURAN	10	NA	NA	NA	NA	NA	NA	NA	NA
2,4-DINITROTOLUENE	10	NA	NA	NA	NA	NA	NA	NA	NA
DIETHYL PHTHALATE	10	NA	NA	NA	NA	NA	NA	NA	NA
4-CHLOROPHENYL-PHENYLETHER	10	NA	NA	NA	NA	NA	NA	NA	NA
FLUORENE	10	NA	NA	NA	NA	NA	NA	NA	NA
4-NITROANILINE	50	NA	NA	NA	NA	NA	NA	NA	NA
4,6-DINITRO-2 METHYLPHENOL	50	NA	NA	NA	NA	NA	NA	NA	NA
N-NITROSODIPHENLYAMINE	10	NA	NA	NA	NA	NA	NA	NA	NA
4-BROMOPHENYL-PHENYLETHER	10	NA	NA	NA	NA	NA	NA	NA	NA
HEXACHLOROBENZENE	10	NA	NA	NA	NA	NA	NA	NA	NA
PENTACHLOROPHENOL	50	NA	NA	NA	NA	NA	NA	NA	NA
PHENANTHRENE	10	NA	NA	NA	NA	NA	NA	NA	NA
ANTHRACENE	10	NA	NA	NA	NA	NA	NA	NA	NA
DI-N-BUTYLPHTHALATE	10	NA	NA	NA	NA	NA	NA	NA	NA
FLUORANTHENE	10	NA	NA	NA	NA	NA	NA	NA	NA
PYRENE	10	NA	NA	NA	NA	NA	NA	NA	NA
BUTYLBENZYLPHTHALATE	10	NA	NA	NA	NA	NA	NA	NA	NA
3,3'-DICHLOROBENZIDINE	20	NA	NA	NA	NA	NA	NA	NA	NA
BENZO(a)ANTHRACENE	10	NA	NA	NA	NA	NA	NA	NA	NA
CHRYSENE	10	NA	NA	NA	NA	NA	NA	NA	NA
BIS(2-ETHYLHEXYL)PHTHALATE	10	NA	NA	NA	NA	NA	NA	NA	NA
DI-N-OCTYLPHTHALATE	10	NA	NA	NA	NA	NA	NA	NA	NA
BENZO(b)FLUORANTHENE	10	NA	NA	NA	NA	NA	NA	NA	NA
BENZO(k)FLUARANTHENE	10	NA	NA	NA	NA	NA	NA	NA	NA
BENZO(a)PYRENE	10	NA	NA	NA	NA	NA	NA	NA	NA
INDENO(1,2,3-cd)PYRENE	10	NA	NA	NA	NA	NA	NA	NA	NA
DIBENZ(a,h)ANTHRACENE	10	NA	NA	NA	NA	NA	NA	NA	NA
BENZO(ghi)PERYLENE	10	NA	NA	NA	NA	NA	NA	NA	NA
DILUTION FACTOR:									
DATE SAMPLED:									
DATE EXTRACTED:									
DATE ANALYZED:									
ASSOCIATED BLANKS:									

SEMIVOLATILE AQUEOUS ANALYSIS (ug/L)
SITE: CAMP LEJEUNE - RINSATE BLANKS
CASE: 5005/4961/5075/5054

SAMPLE LOCATION:		82SW06-R
SAMPLE NUMBER:		
QC DESIGNATION:	CRQL	
PHENOL	10	NA
BIS(2-CHLOROETHYL)ETHER	10	NA
2-CHLOROPHENOL	10	NA
1,3-DICHLOROBENZENE	10	NA
1,4-DICHLOROBENZENE	10	NA
BENZYL ALCOHOL	10	NA
1,2-DICHLOROBENZENE	10	NA
2-METHYLPHENOL	10	NA
BIS(2-CHLOROISOPROPYL)ETHER	10	NA
4-METHYLPHENOL	10	NA
N-NITROSODI-N-PROPYLAMINE	10	NA
HEXACHLOROETHANE	10	NA
NITROBENZENE	10	NA
ISOPHORONE	10	NA
2-NITROPHENOL	10	NA
2,4-DIMETHYLPHENOL	10	NA
BENZOIC ACID	50	NA
BIS(2-CHLOROETHOXY)METHANE	10	NA
2,4-DICHLOROPHENOL	10	NA
1,2,4-TRICHLOROBENZENE	10	NA
NAPHTHALENE	10	NA
4-CHLORANILINE	10	NA
HEXACHLOROBUTADIENE	10	NA
4-CHLORO-3-METHYLPHENOL	10	NA
2-METHYLNAPHTHALENE	10	NA
HEXACHLOROCYCLOPENTADIENE	10	NA
2,4,6-TRICHLOROPHENOL	10	NA
2,4,5-TRICHLOROPHENOL	50	NA
2-CHLORONAPHTHALENE	10	NA
2-NITROANILINE	50	NA
DIMETHYL PHTHALATE	10	NA
ACENAPHTHYLENE	10	NA
2,6-DINITROTOLUENE	10	NA
3-NITROANILINE	50	NA
ACENAPHTHENE	10	NA
2,4-DINITROPHENOL	50	NA
4-NITROPHENOL	50	NA

SEMIVOLATILE AQUEOUS ANALYSIS (ug/L)
SITE: CAMP LEJEUNE - RINSATE BLANKS
CASE: 5005/4961/5075/5054

SAMPLE LOCATION:		82SW06-R
SAMPLE NUMBER:		
QC DESIGNATION:	CRQL	
DIBENZOFURAN	10	NA
2,4-DINITROTOLUENE	10	NA
DIETHYL PHTHALATE	10	NA
4-CHLOROPHENYL-PHENYLETHER	10	NA
FLUORENE	10	NA
4-NITROANILINE	50	NA
4,6-DINITRO-2-METHYLPHENOL	50	NA
N-NITROSODIPHENLYAMINE	10	NA
4-BROMOPHENYL-PHENYLETHER	10	NA
HEXACHLOROBENZENE	10	NA
PENTACHLOROPHENOL	50	NA
PHENANTHRENE	10	NA
ANTHRACENE	10	NA
DI-N-BUTYLPHTHALATE	10	NA
FLUORANTHENE	10	NA
PYRENE	10	NA
BUTYLBENZYLPHTHALATE	10	NA
3,3'-DICHLOROBENZIDINE	20	NA
BENZO(a)ANTHRACENE	10	NA
CHRYSENE	10	NA
BIS(2-ETHYLHEXYL)PHTHALATE	10	NA
DI-N-OCTYLPHTHALATE	10	NA
BENZO(b)FLUORANTHENE	10	NA
BENZO(k)FLUARANTHENE	10	NA
BENZO(a)PYRENE	10	NA
INDENO(1,2,3-cd)PYRENE	10	NA
DIBENZ(a,h)ANTHRACENE	10	NA
BENZO(ghi)PERYLENE	10	NA
DILUTION FACTOR:		
DATE SAMPLED:		
DATE EXTRACTED:		
DATE ANALYZED:		
ASSOCIATED BLANKS:		

PESTICIDE/PCB AQUEOUS ANALYSIS (ug/L)
SITE: CAMP LEJEUNE - RINSATE BLANKS
CASE: 5075/5054/4961/5019/5064/5005/5000

SAMPLE LOCATION:		BS-1-R	03GW02-R	03SD02-R	07GW03-R	07SB05-R	54GW04-R	54SB02-R	54SD01-R
SAMPLE NUMBER:									
QC DESIGNATION:	CRQL								
ALPHA-BHC	0.05	NA	NA	NA	0.05 U	NA	NA	NA	NA
BETA-BHC	0.05	NA	NA	NA	0.05 U	NA	NA	NA	NA
DELTA-BHC	0.05	NA	NA	NA	0.05 U	NA	NA	NA	NA
GAMMA-BHC (LINDANE)	0.05	NA	NA	NA	0.05 U	NA	NA	NA	NA
HEPTACHLOR	0.05	NA	NA	NA	0.05 U	NA	NA	NA	NA
ALDRIN	0.05	NA	NA	NA	0.05 U	NA	NA	NA	NA
HEPTACHLOR EPOXIDE	0.05	NA	NA	NA	0.05 U	NA	NA	NA	NA
ENDOSULFAN I	0.05	NA	NA	NA	0.05 U	NA	NA	NA	NA
DIELDRIN	0.10	NA	NA	NA	0.10 U	NA	NA	NA	NA
4,4'-DDE	0.10	NA	NA	NA	0.10 U	NA	NA	NA	NA
ENDRIN	0.10	NA	NA	NA	0.10 U	NA	NA	NA	NA
ENDOSULFAN II	0.10	NA	NA	NA	0.10 U	NA	NA	NA	NA
4,4'-DDD	0.10	NA	NA	NA	0.10 U	NA	NA	NA	NA
ENDOSULFAN SULFATE	0.10	NA	NA	NA	0.10 U	NA	NA	NA	NA
4,4'-DDT	0.10	NA	NA	NA	0.10 U	NA	NA	NA	NA
METHOXYCHLOR	0.5	NA	NA	NA	0.50 U	NA	NA	NA	NA
ENDRIN KETONE	0.10	NA	NA	NA	0.10 U	NA	NA	NA	NA
ALPHA-CHLORODANE	0.5	NA	NA	NA	0.50 U	NA	NA	NA	NA
GAMMA-CHLORDANE	0.5	NA	NA	NA	0.50 U	NA	NA	NA	NA
TOXAPHENE	1.0	NA	NA	NA	1.0 U	NA	NA	NA	NA
AROCLOR 1016	0.5	NA	NA	NA	0.50 U	NA	0.50 U	0.50 U	0.50 U
AROCLOR 1221	0.5	NA	NA	NA	0.50 U	NA	0.50 U	0.50 U	0.50 U
AROCLOR 1232	0.5	NA	NA	NA	0.50 U	NA	0.50 U	0.50 U	0.50 U
AROCLOR 1242	0.5	NA	NA	NA	0.50 U	NA	0.50 U	0.50 U	0.50 U
AROCLOR 1248	0.5	NA	NA	NA	0.50 U	NA	0.50 U	0.50 U	0.50 U
AROCLOR 1254	1.0	NA	NA	NA	1.0 U	NA	1.0 U	1.0 U	1.0 U
AROCLOR 1260	1.0	NA	NA	NA	1.0 U	NA	1.0 U	1.0 U	1.0 U
DILUTION FACTOR:					1.0		1.0	1.0	1.0
DATE SAMPLED:					6/26/91		6/25/91	6/12/91	6/19/91
DATE EXTRACTED:					7/03/91		6/28/91	6/14/91	6/24/91
DATE ANALYZED:					8/08/91		7/31/91	7/02/91	7/24/91
ASSOCIATED BLANKS:									

PESTICIDE/PCB AQUEOUS ANALYSIS (ug/L)
SITE: CAMP LEJEUNE - RINSATE BLANKS
CASE: 5075/5054/4961/5019/5064/5005/5000

SAMPLE LOCATION:		54SD03-R	54SW01-R	80GW02-R	80GW03-R	80MW01-R	82GW31-R	82SB02-R	82SD06-R
SAMPLE NUMBER:									
QC DESIGNATION:	CRQL								
ALPHA-BHC	0.05	NA	NA	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
BETA-BHC	0.05	NA	NA	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
DELTA-BHC	0.05	NA	NA	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
GAMMA-BHC (LINDANE)	0.05	NA	NA	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
HEPTACHLOR	0.05	NA	NA	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
ALDRIN	0.05	NA	NA	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
HEPTACHLOR EPOXIDE	0.05	NA	NA	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
ENDOSULFAN I	0.05	NA	NA	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
DIELDRIN	0.10	NA	NA	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U
4,4'-DDE	0.10	NA	NA	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U
ENDRIN	0.10	NA	NA	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U
ENDOSULFAN II	0.10	NA	NA	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U
4,4'-DDD	0.10	NA	NA	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U
ENDOSULFAN SULFATE	0.10	NA	NA	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U
4,4'-DDT	0.10	NA	NA	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U
METHOXYCHLOR	0.5	NA	NA	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.49 U
ENDRIN KETONE	0.10	NA	NA	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U
ALPHA-CHLORODANE	0.5	NA	NA	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.49 U
GAMMA-CHLORDANE	0.5	NA	NA	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.49 U
TOXAPHENE	1.0	NA	NA	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	0.98 U
AROCLOR 1016	0.5	0.50 U	0.52 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.49 U
AROCLOR 1221	0.5	0.50 U	0.52 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.49 U
AROCLOR 1232	0.5	0.50 U	0.52 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.49 U
AROCLOR 1242	0.5	0.50 U	0.52 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.49 U
AROCLOR 1248	0.5	0.50 U	0.52 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.49 U
AROCLOR 1254	1.0	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	0.98 U
AROCLOR 1260	1.0	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	0.98 U
DILUTION FACTOR:		1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
DATE SAMPLED:		6/26/91	6/19/91	6/27/91	6/16/91	6/16/91	6/27/91	6/19/91	6/13/91
DATE EXTRACTED:		6/28/91	6/24/91	7/03/91	6/20/91	6/20/91	7/03/91	6/24/91	6/20/91
DATE ANALYZED:		7/31/91	7/24/91	8/09/91	7/23/91	7/23/91	8/09/91	7/24/91	7/23/91
ASSOCIATED BLANKS:									

PESTICIDE/PCB AQUEOUS ANALYSIS (ug/L)
SITE: CAMP LEJEUNE - RINSATE BLANKS
CASE: 5075/5054/4961/5019/5064/5005/5000

SAMPLE LOCATION:		82SW06-R
SAMPLE NUMBER:		
QC DESIGNATION:	CRQL	

ALPHA-BHC	0.05	0.05	U
BETA-BHC	0.05	0.05	U
DELTA-BHC	0.05	0.05	U
GAMMA-BHC (LINDANE)	0.05	0.05	U
HEPTACHLOR	0.05	0.05	U
ALDRIN	0.05	0.05	U
HEPTACHLOR EPOXIDE	0.05	0.05	U
ENDOSULFAN I	0.05	0.05	U
DIELDRIN	0.10	0.10	U
4,4'-DDE	0.10	0.10	U
ENDRIN	0.10	0.10	U
ENDOSULFAN II	0.10	0.10	U
4,4'-DDD	0.10	0.10	U
ENDOSULFAN SULFATE	0.10	0.10	U
4,4'-DDT	0.10	0.10	U
METHOXYCHLOR	0.5	0.50	U
ENDRIN KETONE	0.10	0.10	U
ALPHA-CHLORODANE	0.5	0.50	U
GAMMA-CHLORDANE	0.5	0.50	U
TOXAPHENE	1.0	0.99	U
AROCLOR 1016	0.5	0.50	U
AROCLOR 1221	0.5	0.50	U
AROCLOR 1232	0.5	0.50	U
AROCLOR 1242	0.5	0.50	U
AROCLOR 1248	0.5	0.50	U
AROCLOR 1254	1.0	0.99	U
AROCLOR 1260	1.0	0.99	U

DILUTION FACTOR:	1.0
DATE SAMPLED:	6/13/91
DATE EXTRACTED:	6/20/91
DATE ANALYZED:	7/23/91
ASSOCIATED BLANKS:	

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HERBICIDE ANALYSIS (ug/L)
SITE: CAMP LEJEUNE - RINSATE BLANKS
CASE: 5075/5005

SAMPLE LOCATION:		BS-1-R	03GW02-R	03SD02-R	07GW03-R	07SB05-R	54GW04-R	54SB02-R	54SD01-R
SAMPLE NUMBER:									
QC DESIGNATION:	CRQL								
2,4-D	0.2	NA	NA	NA	NA	NA	NA	NA	NA
SILVEX	0.2	NA	NA	NA	NA	NA	NA	NA	NA
2,4,5-T	0.2	NA	NA	NA	NA	NA	NA	NA	NA
DINOSEB	0.2	NA	NA	NA	NA	NA	NA	NA	NA
DILUTION FACTOR:									
DATE SAMPLED:									
DATE EXTRACTED:									
DATE ANALYZED:									
ASSOCIATED BLANKS:									

HERBICIDE ANALYSIS (ug/L)
SITE: CAMP LEJEUNE - RINSATE BLANKS
CASE: 5075/5005

SAMPLE LOCATION:		54SD03-R	54SW01-R	80GW02-R	80GW03-R	80MW01-R	82GW31-R	82SB02-R	82SD06-R
SAMPLE NUMBER:									
QC DESIGNATION:	CRQL								
2,4-D	0.2	NA	NA	0.20 U	0.20 U	0.20 U	NA	NA	NA
SILVEX	0.2	NA	NA	0.20 U	0.20 U	0.20 U	NA	NA	NA
2,4,5-T	0.2	NA	NA	0.20 U	0.20 U	0.20 U	NA	NA	NA
DINOSEB	0.2	NA	NA	0.20 U	NA	NA	NA	NA	NA
DILUTION FACTOR:				1.0	1.0	1.0			
DATE SAMPLED:				6/27/91	6/16/91	6/16/91			
DATE EXTRACTED:				7/03/91	6/21/91	6/21/91			
DATE ANALYZED:				7/15/91	7/05/91	7/05/91			
ASSOCIATED BLANKS:									

HERBICIDE ANALYSIS (ug/L)
SITE: CAMP LEJEUNE - RINSATE BLANKS
CASE: 5075/5005

SAMPLE LOCATION:		82SW06-R
SAMPLE NUMBER:		
QC DESIGNATION:	CRQL	

2,4-D	0.2	NA
SILVEX	0.2	NA
2,4,5-T	0.2	NA
DINOSEB	0.2	NA

DILUTION FACTOR:	
DATE SAMPLED:	
DATE EXTRACTED:	
DATE ANALYZED:	
ASSOCIATED BLANKS:	

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INORGANIC AQUEOUS ANALYSIS (ug/L)
SITE: CAMP LEJEUNE - RINSATE BLANKS
CASE: 5013/5075/5054/4961/5019/5064
LABORATORY:

SAMPLE LOCATION:	ANALYTICAL	BS-1-R	03GW02-R	03SD02-R	07GW03-R	07SB05-R	54GW04-R	54SB02-R	
SAMPLE NUMBER:	METHOD								
QC DESIGNATION:									CRQL
ALUMINUM	P	13.0 UJ	NA	NA	40.3	10.0	13.1	NA	200
ANTIMONY	P	17.0 U	NA	NA	17.0 U	23.0	23.0	NA	60
ARSENIC	F	4.0 UJ	NA	NA	3.0 U	4.0 UJ	4.0 UJ	NA	10
BARIUM	P	1.0 U	NA	NA	1.3	1.0	1.0	NA	200
BERYLLIUM	P	2.0 U	NA	NA	2.0 U	1.0	1.0	NA	5
CADMIUM	P	5.0 UJ	NA	NA	5.0 UJ	5.0 UJ	5.0 UJ	NA	5
CALCIUM	P	88.8	NA	NA	69.0	73.7	88.2	NA	5000
CHROMIUM	P	4.0 U	NA	NA	4.0 U	5.0 UJ	5.5 J	NA	10
COBALT	P	5.0 U	NA	NA	5.0 U	8.0	8.0	NA	50
COPPER	P	5.0 U	NA	NA	5.0 U	15.0	15.0	NA	25
IRON	P	6.0 U	NA	NA	10.7	8.7 J	8.5 J	NA	100
LEAD	F	2.1 J	NA	NA	2.0 UJ	2.0	2.0	NA	3
MAGNESIUM	P	16.9	NA	NA	13.8	12.2	18.7	NA	5000
MANGANESE	P	2.0 U	NA	NA	2.0 U	2.0 UJ	2.0 UJ	NA	15
MERCURY	CV	0.20 U	NA	NA	0.20 U	0.20	0.20	NA	0.2
NICKEL	P	8.0 U	NA	NA	8.0 U	13.0	13.0	NA	40
POTASSIUM	P	483 U	NA	NA	483 U	503	503	NA	5000
SELENIUM	F	4.0 UJ	NA	NA	3.0 UJ	R	R	NA	5
SILVER	P	2.0 UJ	NA	NA	3.0	3.0	3.0	NA	10
SODIUM	P	63.4	NA	NA	90.8	40.5	39.1	NA	5000
THALLIUM	F	1.0 U	NA	NA	2.0 U	2.0 UJ	2.0 UJ	NA	10
TIN	P	NA	NA	NA	NA	NA	NA	NA	40
VANADIUM	P	3.0 U	NA	NA	3.0 U	5.0 UJ	5.0 UJ	NA	50
ZINC	P	8.6	NA	NA	10.5	9.0 J	9.0 J	NA	20
CYANIDE	C	NA	NA	NA	10.0 UJ	R	R	NA	10
HEXAVALENT CHROMIUM	P	NA	NA	NA	NA	NA	10.0 U	10.0 U	10
DILUTION FACTOR:		1.0			1.0	1.0	1.0	1.0	
DATE SAMPLED:		6/18/91			6/26/91	6/25/91	6/25/91	6/12/91	
ASSOCIATED BLANKS:									

ANALYTICAL METHOD
F - FURNACE
P - ICP/FLAME AA
CV - COLD VAPOR
C - COLORMETRIC

J - QUANTITATION IS APPROXIMATE DUE TO LIMITATIONS IDENTIFIED IN THE QUALITY CONTROL REVIEW (DATA REVIEW)
R - VALUE IS REJECTED.
-- VALUE IS NON-DETECTED
NA- NOT ANALYZED

INORGANIC AQUEOUS ANALYSIS (ug/L)
SITE: CAMP LEJEUNE - RINSATE BLANKS
CASE: 5013/5075/5054/4961/5019/5064
LABORATORY:

SAMPLE LOCATION:	ANALYTICAL	54SD01-R	54SD03-R	54SW01-R	80GW02-R	80GW03-R	80MW01-R	82GW31-R	
SAMPLE NUMBER:	METHOD								
QC DESIGNATION:									CRQL
ALUMINUM	P	13.0 U	57.6	13.0 U	NA	NA	NA	NA	200
ANTIMONY	P	17.0 U	17.0 U	17.0 U	NA	NA	NA	NA	60
ARSENIC	F	4.0 UJ	4.0 U	4.0 UJ	NA	NA	NA	NA	10
BARIUM	P	1.0 U	20.4	1.0 U	NA	NA	NA	NA	200
BERYLLIUM	P	2.0 U	2.0 U	2.0 U	NA	NA	NA	NA	5
CADMIUM	P	5.0 UJ	5.0 U	5.0 UJ	NA	NA	NA	NA	5
CALCIUM	P	67.7	72500	61.5	NA	NA	NA	NA	5000
CHROMIUM	P	4.0 UJ	4.0 U	4.0 UJ	NA	NA	NA	NA	10
COBALT	P	5.0 U	5.0 U	5.0 U	NA	NA	NA	NA	50
COPPER	P	5.0 UJ	5.0 U	5.0 UJ	NA	NA	NA	NA	25
IRON	P	13.3	7540	6.0 U	NA	NA	NA	NA	100
LEAD	F	4.7 J	2.0 U	1.0 UJ	NA	NA	NA	NA	3
MAGNESIUM	P	11.9	2690	11.4	NA	NA	NA	NA	5000
MANGANESE	P	2.1	289	2.0 U	NA	NA	NA	NA	15
MERCURY	CV	0.20 U	0.20 U	0.20 U	NA	NA	NA	NA	0.2
NICKEL	P	8.0 UJ	8.0 U	8.0 UJ	NA	NA	NA	NA	40
POTASSIUM	P	483 UJ	2040	483 UJ	NA	NA	NA	NA	5000
SELENIUM	F	4.0 UJ	2.0 UJ	4.0 UJ	NA	NA	NA	NA	5
SILVER	P	2.0 U	2.4	2.0 U	NA	NA	NA	NA	10
SODIUM	P	47.1	4010	40.4	NA	NA	NA	NA	5000
THALLIUM	F	2.0 U	2.0 UJ	2.0 U	NA	NA	NA	NA	10
TIN	P	NA	NA	NA	NA	NA	NA	NA	40
VANADIUM	P	3.0 U	3.0 U	3.0 U	NA	NA	NA	NA	50
ZINC	P	8.3 J	16.3	6.2 J	NA	NA	NA	NA	20
CYANIDE	C	10.0 U	10.0 U	10.0 U	NA	NA	NA	NA	10
HEXAVALENT CHROMIUM	P	10.0 U	10.0 U	10.0 U	NA	NA	NA	NA	10
DILUTION FACTOR:		1.0	1.0	1.0					
DATE SAMPLED:		6/19/91	6/26/91	6/19/91					
ASSOCIATED BLANKS:									

ANALYTICAL METHOD
F - FURNACE
P - ICP/FLAME AA
CV - COLD VAPOR
C - COLORMETRIC

J - QUANTITATION IS APPROXIMATE DUE TO LIMITATIONS IDENTIFIED IN THE QUALITY CONTROL REVIEW (DATA REVIEW)
R - VALUE IS REJECTED.
-- VALUE IS NON-DETECTED
NA- NOT ANALYZED

INORGANIC AQUEOUS ANALYSIS (ug/L)
SITE: CAMP LEJEUNE - RINSATE BLANKS
CASE: 5013/5075/5054/4961/5019/5064
LABORATORY:

SAMPLE LOCATION:	ANALYTICAL	82SB02-R	82SD06-R	82SW06-R	
SAMPLE NUMBER:	METHOD				
QC DESIGNATION:					CRQL
ALUMINUM	P	NA	NA	NA	200
ANTIMONY	P	NA	NA	NA	60
ARSENIC	F	NA	NA	NA	10
BARIUM	P	NA	NA	NA	200
BERYLLIUM	P	NA	NA	NA	5
CADMIUM	P	NA	NA	NA	5
CALCIUM	P	NA	NA	NA	5000
CHROMIUM	P	NA	NA	NA	10
COBALT	P	NA	NA	NA	50
COPPER	P	NA	NA	NA	25
IRON	P	NA	NA	NA	100
LEAD	F	NA	NA	NA	3
MAGNESIUM	P	NA	NA	NA	5000
MANGANESE	P	NA	NA	NA	15
MERCURY	CV	NA	NA	NA	0.2
NICKEL	P	NA	NA	NA	40
POTASSIUM	P	NA	NA	NA	5000
SELENIUM	F	NA	NA	NA	5
SILVER	P	NA	NA	NA	10
SODIUM	P	NA	NA	NA	5000
THALLIUM	F	NA	NA	NA	10
TIN	P	NA	NA	NA	40
VANADIUM	P	NA	NA	NA	50
ZINC	P	NA	NA	NA	20
CYANIDE	C	NA	NA	NA	10
HEXAVALENT CHROMIUM	P	NA	NA	NA	10

DILUTION FACTOR:
DATE SAMPLED:
ASSOCIATED BLANKS:

ANALYTICAL METHOD
F - FURNACE
P - ICP/FLAME AA
CV - COLD VAPOR
C - COLORMETRIC

J - QUANTITATION IS APPROXIMATE DUE TO LIMITATIONS IDENTIFIE
QUALITY CONTROL REVIEW (DATA REVIEW)
R - VALUE IS REJECTED.
-- VALUE IS NON-DETECTED
NA- NOT ANALYZED

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APPENDIX D

RISK ASSESSMENT CALCULATIONS

HALLIBURTON NUS Environmental Corporation and Subsidiaries			STANDARD CALCULATION SHEET
CLIENT: CAMP LEJEUNE	FILE NO.: 2F36	BY: NJS	PAGE 1 OF 2
SUBJECT: CALCULATION OF PARTICULATE EMISSION FACTOR		CHECKED BY: KMS	DATE: 09-28-92

PURPOSE: To calculate particulate emission factor in terms of site dimensions for locations at Camp Lejeune.

RELEVANT EQUATIONS:

$$PEF = \frac{LS \times V \times DH \times 3600}{A} \times \frac{1000}{0.036 \times (1 - V_g) \times \left(\frac{U_m}{U_t}\right)^3 \times F(x)}$$

WHERE:
- LS = WIDTH OF CONTAMINATED AREA (m)
- V = WINDSPEED IN MIXING ZONE (m/s)
- DH = DIFFUSION HEIGHT (m)
- 3600 = CONVERSION FACTOR (SEC/HOUR)
- A = AREA OF CONTAMINATION (m^2)
- 1000 = CONVERSION FACTOR (gm/kg)
- 0.036 = RESPIRABLE FRACTION ($gm/m^2 \cdot hr$)
- V_g = FRACTION OF VEGATATIVE COVER (UNITLESS)
- U_m = MEAN ANNUAL WINDSPEED (m/s)
- U_t = EQUIVALENT THRESHOLD VALUE OF WINDSPEED (m/s)
- $F(x)$ = FUNCTION DEPENDENT ON U_m/U_t (UNITLESS)

SAMPLE CALCULATION:

ASSUMPTIONS:		RATIONALE
$V = \frac{1}{2} U_m$		AS PER RAGS PART B GUIDANCE
$DH = 2$ m		RECEPTOR BREATHING ZONE
$V_g = 0$		ZERO PERCENT VEGETATIVE COVER
$U_m = 4.0$ m/s		MEAN ANNUAL WINDSPEED FOR WILMINGTON, NC
$U_t = 12.8$ m/s		DEFAULT VALUE FOR EROSION THRESHOLD WINDSPEE

(1) CALCULATE $F(x)$, $x = 0.886\left(\frac{U_t}{U_m}\right) = 0.886\left(\frac{12.8 \text{ m/s}}{4.0 \text{ m/s}}\right) = 2.84$ ✓

FOR $x > 2$ ▷ $F(x) = 0.18\left(8x^3 + 12x\right)\exp(-x^2)$

$$F(x) = 0.18\left[8(2.84)^3 + 12(2.84)^2\right]\exp -(2.34)^2 = \underline{0.0158}$$ ✓

② CALCULATE PEF

$$PEF = \left(\frac{LS}{A}\right) \times \left(\frac{\frac{1}{2} U_m \times DH \times 3600\ s/hr \times 1000\ g/kg}{0.036 \times (1-V_g) \times \left(\frac{U_m}{U_t}\right)^3 \times F(x)}\right)$$

$$= \left(\frac{LS}{A}\right)\left(\frac{\frac{1}{2}(4.0\ m/s) \times 2\ m \times 3600\ s/hr \times 1000\ g/kg}{0.036 \times (1-0) \times \left(\frac{4.0\ m/s}{12.8\ m/s}\right)^3 \times 0.0158}\right)$$

$$PEF\ \left(m^3/kg\right) = \left(\frac{LS}{A}\right)\left(8.30 \times 10^{11}\right) \quad \checkmark$$

REFERENCES:

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY (USEPA), RISK ASSESSMENT GUIDANCE FOR SUPERFUND, VOLUME I - HUMAN HEALTH EVALUATION MANUAL (PART B, DEVELOPMENT OF RISK-BASED PRELIMINARY REMEDIATION GOALS). INTERIM. OSWER DIRECTIVE 9285.7-01B. OFFICE of EMERGENCY and REMEDIAL RESPONSE. WASHINGTON, DC 20460.

COWHERD, J.A., G.E. MALESKI, P.J. ENGLEHART, and D.A. GILLETTE, 1984. RAPID ASSESSMENT of EXPOSURE TO PARTICULATE EMISSIONS FROM SURFACE CONTAMINATED SITES. MIDWEST RESEARCH INSTITUTE. KANSAS CITY, MISSOURI.

HALLIBURTON NUS Environmental Corporation and Subsidiaries			STANDARD CALCULATION SHEET
CLIENT: CAMP LEJEUNE	FILE NO.: 2F36	BY: TMS	PAGE 1 OF 1
SUBJECT: CALCULATION OF PEF FOR SITE 7		CHECKED BY: KMS	DATE: 10-2-92

PURPOSE: CALCULATE PARTICULATE EMISSION FACTOR FOR SITE 7.

RELEVANT EQUATION:

$$PEF = \left(\frac{LS}{A}\right)\left(8.30 \times 10^{11}\right)$$

WHERE: LS = WIDTH of CONTAMINATED ZONE (m)
A = AREA " " " (m^2)

SAMPLE CALCULATION:

WIDTH = 400 m
LS = 200 M
$A = (400\,m)(200\,m) = 80000\,m^2$

$$PEF = \left(\frac{200\ m}{80000\ m^2}\right)\left(8.30 \times 10^{11}\right)$$

$$\boxed{PEF = 2.08 \times 10^{9} \quad m^3/kg}$$

REFERENCE:

USEPA, RISK ASSESSMENT GUIDANCE FOR SUPERFUND (RAGS) - VOLUME I - HUMAN HEALTH EVALUATION MANUAL (PART B - DEVELOPMENT of RISK-BASED PRELIMINARY REMEDIATION GOALS) WASHINGTON DC 20460.

HALLIBURTON NUS Environmental Corporation and Subsidiaries			STANDARD CALCULATION SHEET
CLIENT: CAMP LEJEUNE	FILE NO.: 2F36	BY: NLS	PAGE 1 OF 7
SUBJECT: CALCULATION OF SOIL PRGS FOR SITE 7		CHECKED BY: [illegible]	DATE: 10-2-92

PURPOSE: TO CALCULATE PRELIMINARY REMEDIATION GOALS (PRGS) FOR CHEMICALS BASED CARCINOGENIC and NONCARCINOGENIC RISKS FOR SITE 7.

RELEVANT EQUATIONS:

(i) NONCARCINOGENIC EFFECTS – INDUSTRIAL/COMMERCIAL USAGE - SOIL

$$\text{CUMULATIVE NONCANCER RISK} = \text{INGESTION RISK} + \text{INHALATION RISK (VOLATILES)} + \text{INHALATION RISK (PARTICULATES)}$$

$$\text{CUMULATIVE RISK } (TR_N) = \left(\frac{1}{RfD_{ING}}\right)\left(\frac{C_{SOIL} \times IR_{SOIL} \times EF \times ED \times 10^{-6}}{BW \times AT}\right) + \left(\frac{1}{RfD_{INH}}\right)\left(\frac{C_{SOIL} \times EF \times ED \times IR_{AIR} \times \left(\frac{1}{VF}\right) \times \left(\frac{1}{PEF}\right)}{BW \times AT}\right)$$

WHERE: TR_N: TOTAL NONCARCINOGENIC RISK FOR A SPECIFIC CHEMICAL

RfD_{ING} = INGESTION REFERENCE DOSE (mg/kg/day)

RfD_{INH} = INHALATION " " (mg/kg/day)

C_{SOIL} = CONTAMINANT CHEMICAL CONCENTRATION IN SOIL (mg/kg)

IR_{SOIL} = SOIL INGESTION RATE (g/DAY)

EF = EXPOSURE FREQUENCY (DAYS/YR)

ED = EXPOSURE DURATION (YEARS)

IR_{AIR} = AIR INHALATION RATE (m^3/DAY)

VF = VOLATILIZATION FACTOR (m^3/kg)

PEF = PARTICULATE EMISSION FACTOR (m^3/kg)

BW = RECEPTOR BODY WEIGHT (kg)

AT = AVERAGING TIME (EQUAL TO ED × 365 days/YR FOR NONCARCINOGENS)

10^{-6} = CONVERSION FACTOR (kg/mg)

SOLVING FOR C_{SOIL} (PRG) YIELDS:

$$C_{SOIL}\,(mg/kg) = \frac{TR_N \times BW \times AT}{EF \times ED \times \left[\left(\frac{10^{-6} \times IR_{SOIL}}{RfD_{ING}}\right) + \left(\frac{IR_{AIR} \times \left(\frac{1}{VF}\right) \times \left(\frac{1}{PEF}\right)}{RfD_{INH}}\right)\right]} \quad (1)$$

(2) CARCINOGENIC EFFECTS - INDUSTRIAL/COMMERCIAL USAGE - SOIL

CUMULATIVE CANCER RISK = INGESTION CANCER RISK + INHALATION CANCER RISK (VOLATILES) + INHALATION CANCER RISK (PARTICULATES)

$$\text{CUMULATIVE RISK } (TR_c) = \left(CSF_{ING}\right)\left(\frac{C_{SOIL} \times IR_{SOIL} \times ED \times EF \times 10^{-6}}{BW \times AT}\right) + \left(CSF_{INH}\right)\left(\frac{C_{SOIL} \times IR_{AIR} \times ED \times EF \times \left(\frac{1}{VF}\right) \times \left(\frac{1}{PE}\right.\right.$$

WHERE: TR_c = TOTAL CARCINOGENIC CANCER RISK FOR A SPECIFIC CHEMICAL

CSF_{ING} = INGESTION CANCER SLOPE FACTOR $(mg/kg/day)^{-1}$

CSF_{INH} = INHALATION " " " $(mg/kg/day)^{-1}$

AT = AVERAGING TIME (DAYS) (EQUAL TO 70 YRS × 365 DAYS/YR FOR CARCINOGEN

SOLVING FOR C_{SOIL} YIELDS:

$$C_{SOIL} = \frac{TR_c \times BW \times AT}{ED \times EF \times \left[\left(CSF_{ING} \times IR_{SOIL} \times 10^{-6}\right) + \left(CSF_{INH} \times IR_{AIR} \times \left(\frac{1}{VF} + \frac{1}{PEF}\right)\right)\right]} \quad (2)$$

ASSUMING THE FOLLOWING DEFAULT VALUES:

		RATIONALE
TR_N	= 1.0	HAZARD QUOTIENT EQUALS UNITY FOR NC HEALTH EFFECTS
TR_c	= 10^{-6}	10^{-6} CANCER RISK
BW	= 70 kg	ADULT RECEPTOR
ED	= 25 YRS	BASE EMPLOYEE DURING CAREER
EF	= 250 DAYS/YR	EMPLOYMENT SCENARIO
IR_{SOIL}	= 50 mg/DAY	INCIDENTAL INGESTION
IR_{AIR}	= 20 m^3/DAY	WORKDAY INHALATION RATE

EQUATIONS (1) and (2) CAN BE REDUCED TO:

1)

$$C_{SOIL}\,(mg/kg) = \frac{(1.0)(70\ kg)(365\ day/yr)(ED)}{(250\ DAYS/YR)(ED)\left[\left(\frac{5\times10^{-5}\ kg/DAY}{RfD_{ING}}\right)+\left(\frac{20\ m^3/DAY}{RfD_{INH}}\right)\left(\frac{1}{VF}+\frac{1}{PEF}\right)\right]}$$

$$C_{SOIL}\,(mg/kg) = \frac{102\ (kg)}{\left[\left(\frac{5\times10^{-5}\ kg/day}{RfD_{ING}}\right)+\left(\frac{20}{VF}+\frac{20}{PEF}\right)\left(\frac{1}{RfD_{INH}}\right)\right]}$$

(REDUCED FORM EQUATION (1))

and

2)

$$C_{SOIL}\,(mg/kg) = \frac{(10^{-6})(70\ kg)(70\ YR)(365\ DAY/YR)}{(25\ YRS)(250\ DAYS/YR)\left[(5\times10^{-5}\ kg/DAY)(CSF_{ING})+(CSF_{INH})\left(\frac{20}{VF}+\frac{20}{PEF}\right)\right]}$$

$$C_{SOIL}\,(mg/kg) = \frac{2.9\times10^{-4}\ (kg)}{\left[(5\times10^{-5}\ kg/DAY)(CSF_{ING})+(CSF_{INH})\left(\frac{20}{VF}+\frac{20}{PEF}\right)\right]}$$

(REDUCED FORM EQUATION (2)) ✓

③ CALCULATION of VOLATILIZATION FACTOR (VF)

$$VF = \left(\frac{LS\times V\times DH}{A}\right)\times\left(\frac{(3.14\times\alpha\times T)^{0.5}}{2\times D_i\times E^{1.33}\times\left(\frac{41\ H}{K_d}\right)\times10^{-3}}\right)$$

$$\alpha = \frac{D_i^{(cm^2/s)}\times E^{1.33}}{E+\left[\frac{P_s(1-E)K_d}{41\ H}\right]} \qquad \text{and} \qquad K_d = K_{OC}\times f_{OC}\ \text{(ORGANICS)}$$

WHERE:

LS =	LENGTH of CONTAMINATED ZONE	(m)	
V =	WINDSPEED IN MIXING ZONE	(m/s)	
DH =	DIFFUSION HEIGHT	(m)	
A =	AREA of CONTAMINATION	(cm^2)	
T =	EXPOSURE INTERVAL	(sec)	
D_i =	DIFFUSION COEFFICIENT IN AIR	(cm^2/s)	
E =	SOIL POROSITY	(UNITLESS)	
H =	HENRY'S LAW CONSTANT	(atm m^3/mol)	
K_d =	SOIL/WATER PARTITION COEFFICIENT	(cm^3/gm)	= $K_{OC} \cdot f_{OC}$
10^{-3} =	CONVERSION FACTOR	(kg/gm)	
ρ_S =	SOIL DENSITY	(gm/cm^3)	
K_{OC} =	ORGANIC CARBON PARTITION COEFFICIENT	(cm^3/gm)	

SAMPLE CALCULATION:

ASSUMPTIONS:

DH =	2 m	
T =	7.88×10^8 sec	(25 yrs)
E =	0.35	
f_{OC} =	0.032	
ρ_S =	2.65	(gm/cm^3)
PEF =	2.08×10^9	(m^3/kg)

FOR BIS(2-ETHYLHEXYL) PHTHALATE THE FOLLOWING PHYSICAL CONSTANTS AND RISK-DOSE PARAMETERS ARE:

PARAMETER	(UNITS)	BIS(2-ETHYLHEXYL) PHTHALATE
D_i	(cm^2/s)	3.88×10^{-5}
H	(atm m^3/mol)	3.51×10^{-2}
K_{OC}	(cm^3/gm)	2×10^9
RfD_{ING}	(mg/kg/day)	2×10^{-2}
RfD_{INH}	(mg/kg/day)	—
CSF_{ING}	$(mg/kg/day)^{-1}$	1.4×10^{-2}
CSF_{INH}	$(mg/kg/day)^{-1}$	—

HALLIBURTON NUS Environmental Corporation and Subsidiaries			STANDARD CALCULATION SHEET
CLIENT: CAMPLEJEUNE	FILE NO.: 2F36	BY: NJS	PAGE 5 OF 7
SUBJECT: CALCULATION OF SOIL PRG FOR SITE 7.		CHECKED BY: KMS	DATE: 10-2-92

FOR SITE 7, THE FOLLOWING PHYSICAL DIMENSIONS APPLY:

LS = 200 m
V = 2.0 m/s (ONE-HALF OF MEAN WINDSPEED FOR WILMINGTON A
A = 8.00×10^8 cm^2

FOR SOIL PRG FOR BEHP (NONCARCINOGENIC):

① CALCULATE α:

$$\alpha = \frac{\left(3.88\times10^{-5}\ \frac{cm^2}{s}\right)(0.35)^{1.33}}{0.35 + \left[\frac{(2.65\ g/cm^3)(1-0.35)(2\times10^9\ cm^3/g)(0.032)}{41\left(3.51\times10^{-2}\ \frac{atm\cdot m^3}{mol}\right)}\right]} = \boxed{1.25\times10^{-13}\ cm^2/s}$$ ✓

② CALCULATE VF:

$$VF = \left(\frac{(200\ m)(2\ m/s)(2\ m)}{8\times10^8\ cm^2}\right)\left(\frac{\left((3.14)(1.25\times10^{-13}\ cm^2/s)(7.88\times10^8\ sec)\right)^{0.5}}{(2)(3.88\times10^{-5}\ cm^2/s)(0.35)^{1.33} \times \left(\frac{41(3.51\times10^{-2})}{(2\times10^9)(0.032)}\right)\times10^{-3}\ kg/g}\right)$$

$$\boxed{VF = 4.07\times10^7\ m^3/kg}$$ ✓

③ CALCULATE PRG:

$$C_{SOIL} = \frac{102}{\left[\frac{5\times10^{-5}\ kg/day}{2\times10^{-2}\ mg/kg\ bdy} + (0)\left(\frac{20\ m^3/day}{4.07\times10^7\ m^3/kg} + \frac{20\ m^3/day}{2.08\times10^9\ m^3/kg}\right)\right]}$$

$$\boxed{C_{SOIL} = 40800\ mg/kg}$$ ✓

HALLIBURTON NUS Environmental Corporation and Subsidiaries			STANDARD CALCULATION SHEET
CLIENT: CAMP LEJEUNE	FILE NO.: 2F36	BY: NJS	PAGE 6 OF 7
SUBJECT: CALCULATION of SOIL PRGS FOR SITE 7.		CHECKED BY: KMS	DATE: 10-2-92

FOR SOIL PRG FOR BEHP (CARCINOGENIC):

① CALCULATE α:

$\alpha = 1.25 \times 10^{-13}$ cm^2/s (as calculated on pg. 5)

② CALCULATE VF:

$VF = 4.07 \times 10^{7}$ m^3/kg (as calculated on pg. 5)

③ CALCULATE SOIL PRG:

$$C_{SOIL} = \frac{2.9 \times 10^{-4} \quad (kg)}{\left[\left(5 \times 10^{-5} \frac{kg}{day}\right)\left(1.4 \times 10^{-2} \frac{kg\,day}{mg}\right) + \left(0 \frac{kg\,day}{mg}\right)\left(\frac{20\ m^3/day}{4.07 \times 10^{7}\ m^3/kg} + \frac{20\ m^3/day}{2.03 \times 10^{9}\ m^3/kg}\right) \right]}$$

$$\boxed{C_{SOIL} = 414\ mg/kg}$$ ✓

REFERENCES:

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY (USEPA), RISK ASSESSMENT GUIDANCE FOR SUPERFUND, VOLUME I - HUMAN HEALTH EVALUATION MANUAL (PART B, DEVELOPMENT OF RISK-BASED PRELIMINARY REMEDIATION GOALS). INTERIM. OSWER DIRECTIVE 9285.7-01B. OFFICE of EMERGENCY and REMEDIAL RESPONSE. WASHINGTON, DC 20460.

COWHERD, J.A., G.E. MALESKI, P.J. ENGLEHART, and D.A. GILLETTE, 1984. RAPID ASSESSMENT of EXPOSURE TO PARTICULATE EMISSIONS FROM SURFACE CONTAMINATED SITES. MIDWEST RESEARCH INSTITUTE. KANSAS CITY, MISSOURI.

Development of Risk-Based PRGs
Scenario: Industrial Land Use of Soil

SITE: Camp Lejeune - IAS Site 07 - Tarawa Terrace Dump
LOCATION: Jacksonville, NC
MEDIA: Soil

Relevant Equations:
(reduced form for 1E-6 target cancer risk)
PRG = 2.9e-4 / ((5e-5 x CSFing) + (CSFinh x ((20/VF) + (20/PEF))))
(reduced form for target noncancer risk of unity)
PRG = 102 / ((5e-5 / RfDing) + (1/RfDinh)((20/VF) + (20/PEF)))

Input parameters:

LS =	200	(m)	ED =	7.88E+08	(sec)	PEF =	2.08E+09 (m2/kg)
V =	2.00	(m/s)	E =	0.350	(unitless)		
DH =	2.00	(m)	foc =	0.0320	(unitless)		
A =	8.00E+08	(cm2)	Ps =	2.65	(gm/cm3)		

Determine VF:
VF = (LS x V x DH / A)((sqrt(3.14 x a x ED))/(2 x Dei x E x Kas x 1e-3))
where: LS = Length of contaminated zone (m)
V = Wind speed in mixing zone (m/s)
DH = Diffusion height (m)
A = Area of contamination (cm2)
ED = Exposure duration (sec)
Dei = Effective diffusivity (cm2/s) = (Di x E^0.33)
E = Soil porosity (unitless)
Kas = Soil/air partition coefficient (gm soil/cm3 air) = (41 x H / (Koc x foc))
Di = Diffusion coefficient in air (cm2/s)
and: a = (Dei X E) / (E + (Ps(1-E)/Kas))
where: Ps = Soil density (gm/cm3)

Chemical	Reference Dose (Oral) (mg/kg/day)	Reference Dose (Inhalation) (mg/kg/day)	Oral Cancer Slope Factor (mg-day/kg)	Inhalation Cancer Slope Factor (mg-day/kg)	Molecular Diffusivity (cm2/sec)	Henry's Law Constant (atm-m3/mol)	Organic Carbon Partition Coefficient (Koc)	Soil-to-Air Volatilization Factor (m3/kg)	Preliminary Risk-based Goal (Noncarcinogens) (mg/kg)	Preliminary Risk-based Goal (Carcinogens) (mg/kg)	Final Risk-based Goal (mg/kg)
Bis(2-ethylhexyl)phthalate	2.00E-02		1.40E-02		3.86E-05	3.51E-02	2.00E+09	4.08E+07	40800.00	414.2857143	414.29
Fluoranthene	4.00E-02				5.70E-02		3.80E+04	0.00E+00	81600.00	0	81600.00
Benzoic acid	4.00E+00				1.82E-06			0.00E+00	* 8160000.00	0	1000000.00
Aldrin	3.00E-05		1.70E+01	1.70E+01	4.96E-04		9.60E+04	0.00E+00	61.20	0.341110714	0.34
4,4'-DDD			2.40E-01				7.70E+05	0.00E+00	0.00	24.16666667	24.17
4,4'-DDE			3.40E-01				4.40E+06	0.00E+00	0.00	17.05882353	17.06
Dieldrin	5.00E-05		1.60E+01	1.60E+01	5.94E-05		1.70E+03	0.00E+00	102.00	0.362430134	0.36
Endosulfan II	5.00E-05						9.60E-03	0.00E+00	102.00	0	102.00
Endrin	3.00E-04						1.70E+03	0.00E+00	612.00	0	612.00
Aroclor-1260	4.00E-04		7.70E+00		6.64E-04	6.00E-06	6.70E+06	3.83E+07	816.00	0.753246753	0.75
Barium	7.00E-02	1.00E-04						0.00E+00	125821.68	0	125821.68
Beryllium	5.00E-03		4.30E+00	8.75E+00				0.00E+00	10200.00	1.348308313	1.35
Cadmium	5.00E-04			5.80E+00			4.42E+02	0.00E+00	1020.00	5187.5	1020.00
Cobalt							5.94E+04	0.00E+00	0.00	0	0.00
Lead	8.00E-02	4.30E-04					1.19E+05	0.00E+00	157549.56	0	157549.56
Manganese	1.00E-01	1.00E-04					1.56E+05	0.00E+00	171030.30	0	171030.30
Mercury	3.00E-04	9.00E-05			1.14E-02			0.00E+00	611.61	0	611.61
Nickel	2.00E-02			8.40E-01				0.00E+00	40800.00	35818.45238	35818.45
Silver	5.00E-03						1.58E+04	0.00E+00	10200.00	0	10200.00
Thallium	7.00E-03						8.00E+06	0.00E+00	14280.00	0	14280.00
Zinc	2.00E-01						1.25E+05	0.00E+00	408000.00	0	408000.00
Cyanide	2.00E-02					2.70E-06		0.00E+00	40800.00	0	40800.00
								0.00E+00	0.00	0	0.00
								0.00E+00	0.00	0	0.00
								0.00E+00	0.00	0	0.00
								0.00E+00	0.00	0	0.00
								0.00E+00	0.00	0	0.00
								0.00E+00	0.00	0	0.00
								0.00E+00	0.00	0	0.00

(1) IRIS, On Line, September 1992.
(2) TSDF
(3) USEPA, December 1992.