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U.S. Army Toxic and Hazardous Materials Agency

REMEDIAL ACTION TECHNICAL
SUPPORT SERVICES (RATSS)

Task Order 9
Tooele Army Depot-
North Area
Remedial Investigation

Final
Remedial Investigation Report

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FINAL REPORT OF REMEDIAL INVESTIGATION FOR TOOELE ARMY DEPOT - NORTH AREA TOOELE, UTAH

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Contract No. DAAA15-87-D-0007
Task Order 9

FINAL REPORT OF REMEDIAL INVESTIGATION FOR TOOELE ARMY DEPOT - NORTH AREA TOOELE, UTAH

Prepared for:

U.S. Army Toxic and Hazardous Materials Agency (USATHAMA)
Aberdeen Proving Ground
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EXECUTIVE SUMMARY

Roy F. Weston, Inc. (WESTON) was retained by the United States Army Toxic and Hazardous Materials Agency (USATHAMA) under the Remedial Investigation/Feasibility Study Contract - Number DAAA15-87-D-0007, Task Order 9, to perform a remedial investigation (RI) at the Tooele Army Depot (TEAD), Utah, North and South Areas. This report describes the investigation of five areas within the North Area of TEAD (N-TEAD):

- TNT Washout Facility
- Sanitary Landfill
- Drum Storage Areas
- Old Burn Area
- Chemical Range

The study areas are shown as shaded regions in Figure ES-1.

The objective of the RI is to characterize each study area with respect to environmental concern. The scope of the RI included the following major elements:

- Review available information.
- Perform a comprehensive field investigation to include:
  - nonintrusive geophysical surveys.
  - surface water and sediment sampling.
  - borehole drilling and soil sampling.
  - monitor well installation and groundwater sampling.
  - chemical analysis of selected borehole soil samples and all surface water, sediment, and groundwater samples.
- Assess contamination and characterize sources.
- Conduct an endangerment assessment, comprised of a human health and an environmental risk assessment.
- Produce an RI report for the study areas.

TNT WASHOUT FACILITY

The TNT Washout Facility was used primarily from 1948 to 1958 and from 1960 to 1965 to remove and recycle explosive material from munitions.

Contaminant sources at the TNT Washout Facility include the active and inactive (covered) TNT washout evaporation/percolation (E/P) ponds, the septic tank and suspected leach field, the active laundry effluent pond, and the underground piping that conveys flow to the septic tank and the laundry effluent pond.

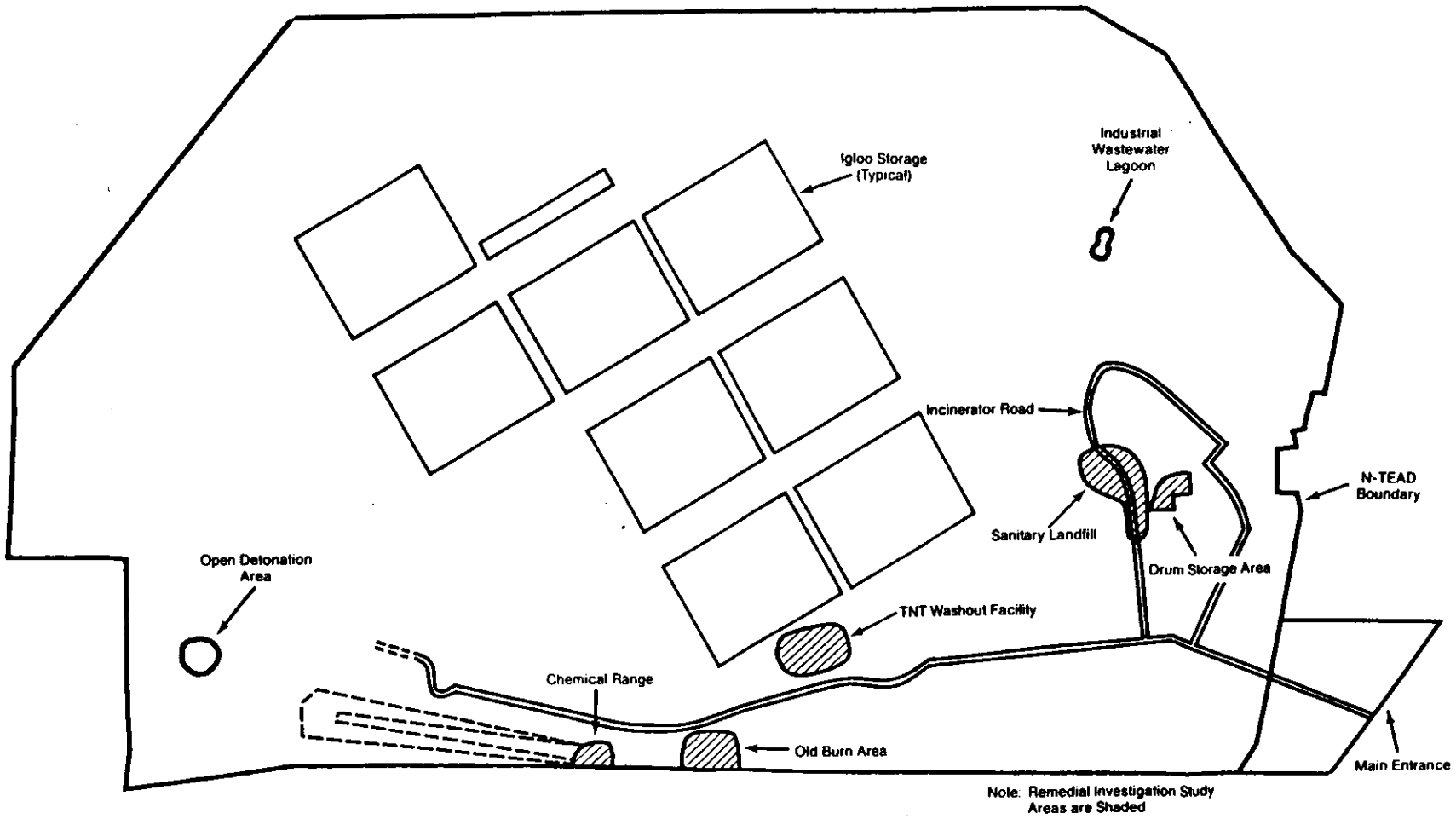

FIGURE ES-1 LOCATION OF STUDY AREAS IN THE REMEDIAL INVESTIGATION

The geology of the upper 75 to 100 feet consists mostly of thin interbedded layers of fine-grained sands, silts, and clays. Below these depths, coarse-grained gravels with occasional layers of sand predominate. Groundwater flow is to the north-northwest.

Localized perched zones, encountered during borehole drilling, varied in depth from approximately 17 to 49 feet below ground surface. The localized low-permeability perching lenses create saturated pockets of mixed wastewater and infiltrated precipitation in the vadose zone that can eventually leach to the regional aquifer, which is 200 to 250 feet below the surface. The variability in depth to the perched zones suggests either numerous vertically spaced localized perched zones, or that the leading edge of a zone of saturation spreading along low-permeability perching lenses was encountered during drilling.

As part of the geophysical survey conducted at the TNT Washout Facility, the Ground Penetrating Radar (GPR) survey identified four pipelines south of the inactive laundry effluent pond used for rinsewater flow. The electromagnetometer (EM) survey detected apparent elevated conductivity values associated with the former TNT washout E/P ponds. These elevated values did not extend far from the pond boundaries; therefore, no significant lateral migration from these ponds or the active laundry effluent pond was indicated by the geophysical survey. However, in a groundwater sample collected from one shallow well (N-3F) approximately 300 feet from the nearest pond, explosive contamination was found (270 ug/L of RDX) in the shallow groundwater, indicating substantial lateral migration due to clayey perching layers (or a former unidentified source).

Levels of explosives near reporting limits were detected in shallow soils primarily adjacent to the TNT washout E/P ponds, the suspected leach field, and the underground piping. In addition, chloride, nitrate/nitrite, and sulfate were consistently detected. There are no pathways by which individuals could be directly exposed to chemicals in the subsurface soil, although the chemicals can leach to the underlying groundwater.

Both shallow and deep wells in the vicinity of the contaminant source areas contained RDX (up to 270 ug/L) and one also contained HMX (23 ug/L). Newly installed deep wells downgradient of the facility did not contain either of these explosives, but all four did contain low levels of 2,4,6-TNT (less than 2.0 ug/L). Since these compounds have similar mobility, these results suggest that 2,4,6-TNT was present in the wastewater prior to RDX or HMX; consequently, its infiltration to groundwater has preceeded those compounds. Given the available data, there is a greater than 95 percent probability that nitrate/nitrite and sulfate concentrations in groundwater at the TNT Washout Facility exceeded background concentrations.

Some lateral spreading of contaminants may occur above the low-permeability lenses. The groundwater in these shallow, locally saturated zones may spread to the outer edges of the lenses before continuing its vertical migration. However, based on the results of the EM survey, the extent of the lateral migration appeared limited around both the TNT and laundry effluent E/P ponds. The lateral extent of explosive contamination cannot be delineated since the outermost shallow and deep groundwater samples contained them. However, the levels in each of the four most downgradient deep wells were less than 2.0 ug/L.

Potential future exposures to chemicals in both the shallow and deep regional groundwater zones were evaluated. However, it is unlikely that the shallow perched zone could be used as a drinking water source because of its limited water holding capacity. In fact, most wells screened in the perched zone were dry during RI sampling since the thin perching layers were penetrated by the well screens. However, this locally perched zone will act as a source of chemicals for the deep regional aquifer, which could be used as a drinking water source.

In the shallow perched zone and the deep aquifer, either the mean or maximum concentrations (or both) of sulfate and RDX exceeded applicable or relevant and appropriate requirements (ARARs).

For all carcinogens detected, the upper-bound excess lifetime cancer risks exceeded 10^{-6} for both the average and plausible maximum cases in the shallow perched zone and the plausible maximum exposure case for the deep aquifer. In all cases, the risks were due to RDX. For noncarcinogens, the hazard indices exceeded 1 under both the average and plausible maximum cases for both the shallow perched zone and the deep aquifer due to nitrate/nitrite.

To further characterize the horizontal and vertical extent of the localized perched zones, continuous soil sampling techniques should be employed. By establishing a grid system over the entire TNT Washout Facility, the areal extent of the perched zones could be established.

The lagoons received wastewater primarily during 1948-1958 and 1960-1965. Due to the long time period of potential release, a plume containing explosives and other contaminants may have migrated north of the TNT Washout Facility beyond the outermost monitor wells. Therefore, additional deep monitor wells are recommended further downgradient of the facility to determine the presence of such a plume.

A preliminary screening of remedial technologies applicable to the TNT Washout Facility was performed. Institutional control should be implemented by N-TEAD that would prevent the installation of drinking water wells in or immediately downgradient of

the TNT Washout Facility. It is recommended that if contaminants (primarily explosives) are found to be migrating at significant concentrations toward the northern boundary of the installation, the plume should be contained and treated by a groundwater withdrawal and treatment system.

The extent of explosive contamination and concentrations further downgradient of the facility should first be determined by analyzing groundwater samples for explosives from existing wells N-3B and No. 6, which are near N-TEAD's northern boundary. These and other wells were installed to monitor the plume from the industrial waste lagoon, which was not part of the RI scope. Analysis of groundwater samples from these wells for explosives would help determine the presence of a plume from the TNT Washout Facility.

It is possible that no remedial action may be warranted due to natural dispersion of contaminants in the regional aquifer. Column leaching tests of subsoils from the TNT Washout Facility would be needed to estimate attenuation rates prior to modeling to assess whether the explosives are reaching or could reach offsite users.

Explosives, the major class of contaminants at the TNT Washout Facility, were found in 4 of the 12 boreholes. Total explosive concentrations exceeded 5 ug/g only in the subsoil samples adjacent to the former TNT washout ponds (N-109-88) and the underground laundry effluent pipe (N-108-88). Explosives are generally quite soluble and most appear to have already been leached from the soil. A preliminary water balance covering the period since the first operation of the TNT washout E/P ponds indicated approximately 3 to 1 dilution of seepage containing explosives from the ponds. Leach tests on soil collected near source areas would aid in determining whether the levels of explosives found in some subsurface soil samples will leach significant concentrations to groundwater.

Surface source areas should also be addressed. Further analysis of the contents of the active laundry effluent pond is recommended. The construction of an evaporation pond with a low-permeability liner should be considered. If use of the TNT Washout Facility is required, the existing pond should also be lined. The septic tank, suspected leach field, and underground pipes should be further investigated to determine contributors to the wastewater flow, the volume of flow, and the quality of the wastewater to determine if wastewater treatment is necessary. If the present septic system is abandoned, the tank and leach field may need to be capped or excavated to mitigate future impact on groundwater.

SANITARY LANDFILL

The 100-acre Sanitary Landfill has received a wide variety of wastes since 1942. The regional aquifer is at depths generally

exceeding 250 feet and flows to the northwest under a low gradient (0.0016 ft/ft). The geology consists primarily of coarse-grained gravels interbedded with sands and an occasional fine-grained clay or clayey sand. The strata are very heterogeneous. Locally perched groundwater was encountered east of the landfill, adjacent to the Drum Storage Areas.

The geophysical survey was performed at the Sanitary Landfill over an area of approximately 16.5 acres to help delineate the extent of waste burial and migration of contaminants. Anomalous EM and magnetic measurements occurred west of the fence in the western part of the landfill. However, these measurements were probably due to metal objects and metal debris present on ground surface and it is very likely that waste burial activities did not occur west of the fence. EM measurements did not indicate migration of contaminants laterally away from the landfill or the inactive evaporation ponds.

Contaminants detected in the subsurface soil at the Sanitary Landfill were limited. VOCs and explosives were not detected. Bis(2-ethylhexyl)phthalate, a common laboratory contaminant, was detected at a low level (less than 1.0 ug/g) in a subsurface soil sample. Of the inorganic parameters, only nickel had a geometric mean concentration exceeding background.

The most significant contamination detected in this area was benzene, trans-1,2-DCE, and TCE in the groundwater. The presence of TCE and trans-1,2-DCE in the four downgradient wells indicates that the landfill may be the source of these compounds in the deep regional aquifer. The highest level of TCE detected in groundwater at the Sanitary Landfill was 47.6 ug/L in downgradient well N-116-88. The landfill also appears to be a source of unidentified hydrocarbons (found in four wells at concentrations totaling 120 to 700 ug/L) and RDX (found in N-115-88 at 8.6 ug/L). The mean concentration of silver, arsenic, copper, nickel, lead, and zinc exceeded their mean background concentration. However, the downgradient levels of silver and arsenic were less than or equal to the levels in the wells upgradient of the landfill; therefore, the landfill's contribution of silver and arsenic to the groundwater is questionable.

Potential future exposure to onsite workers by chemicals in the regional aquifer was evaluated, although use of the groundwater at the Sanitary Landfill is considered unlikely. In the downgradient wells, the mean and maximum concentrations of TCE and the maximum concentrations of RDX exceeded the ARARs. Some concentrations of lead and nickel exceeded ARARs in downgradient and crossgradient wells. The upper-bound excess lifetime risks exceeded 10^{-6} for both the average and plausible maximum cases in both the downgradient and crossgradient wells due to the presence of arsenic and TCE. The hazard indices (for noncarcinogens) were less than 1 in both cases.

Continued monitoring of groundwater downgradient of the Sanitary Landfill is warranted. Since contaminants from the landfill (primarily chlorinated solvents) are similar to those emanating from the IWL, groundwater remediation downgradient of the IWL could also feasibly accommodate groundwater flowing from the Sanitary Landfill.

Since the newly installed deep wells have been sampled only once, additional groundwater samples should be collected to develop a trend analysis. Column leach tests for the Sanitary Landfill soils also appear warranted and are recommended. To determine whether the landfill is a significant source of air contaminants (e.g., methane and volatile organics), a screening air sampling program at areas within N-TEAD is recommended.

DRUM STORAGE AREAS

The Drum Storage Areas have been used at least since 1953 to store containers of chemicals. The regional aquifer lies between 300 and 320 feet below the surface and flows to the northwest toward the Sanitary Landfill. A shallow water zone was encountered in two boreholes/wells between the Drum Storage Areas and the Sanitary Landfill. Water was not recoverable from the well screened in this zone because of the narrow thickness of the perching layer and the completion technique used to install the well.

The geology consists primarily of coarse-grained gravels interbedded with sands and an occasional fine-grained clay or clayey sand. The strata are very heterogeneous. Tuffaceous sediments were encountered at the bottom of one (N-114-88) of the two boreholes.

Surface soil sampling at the Drum Storage Areas indicated the presence of base-neutral-acid extractable organic compounds (BNAs) (mostly nonpriority pollutants) in most of the samples, with some attenuation with depth. Much of the BNA contamination was due to PAHs, which are constituents of asphalt (which covers most of the site) and are probably not related to drum storage. No explosives were detected in surface soil samples, and concentrations of inorganics were comparable to background concentrations. Therefore, no chemicals of potential concern were identified in surface soil.

Subsurface soil samples were collected from three boreholes between the Drum Storage Areas and the Sanitary Landfill. Bis(2-ethylhexyl)phthalate was detected in two subsurface soil samples, but may be indicative of laboratory or field contamination. Three unknown BNAs were detected at low concentrations (1.0 ug/g) in three samples. No VOCs or explosives were detected. Of the inorganic parameters, the geometric mean concentration of selenium exceeded background.

Bis(2-ethylhexyl)phthalate was detected at 790 ug/L in one of the two groundwater samples downgradient of the Drum Storage Areas. A soil sample from the same location did not contain this compound; therefore, its detection in groundwater may have been due to laboratory or field contamination. No VOCs or explosives were detected in groundwater samples. Silver, arsenic, beryllium, chromium, copper, nickel, lead, and zinc were detected in groundwater in either total or dissolved forms at geometric mean concentrations exceeding those in the background samples. The mean and maximum concentrations of total lead and total nickel exceeded the ARARs. The maximum concentrations of total chromium and dissolved nickel also exceeded the ARARs.

Potential future exposure to chemicals in the regional aquifer by onsite workers was evaluated, although use of the groundwater immediately downgradient of the Drum Storage Areas is considered unlikely. The upper-bound excess lifetime cancer risks were 1×10^{-5} (average case) and 8×10^{-5} (plausible maximum case). For the average case, the risks were due primarily to arsenic. For the plausible maximum case, the risks were due to arsenic and bis(2-ethylhexyl)phthalate. The hazard indices (for noncarcinogens) were less than 1 for both cases.

Overall, based on the current limited data, the surface at the Drum Storage Areas appears to create no adverse impact on human health or the environment. Subsurface soil and groundwater appeared to have been minimally impacted by activities in the area based on the current limited data. No remediation appears warranted at this time. Additional monitoring, sampling, and analysis, both upgradient and downgradient of the Drum Storage Areas, are needed to determine if the concentrations of inorganic chemicals detected in the groundwater are actually site-related or are naturally occurring.

A shallow groundwater zone was encountered from 35 to 62 feet in two boreholes immediately west of the Drum Storage Areas to the east. A monitor well installation attempted in this zone failed due to penetration of the perching layer. A well should be installed above the perching layer to allow groundwater sampling and analysis in this zone.

OLD BURN AREA

Testing of munitions, fuses, and propellants was conducted at the Old Burn Area along the south-central N-TEAD boundary from 1942 until the early 1970s. The potential for unexploded ordnance in the Old Burn Area limited the investigation to geophysical surveys and soil boring sampling at the perimeter of the area.

The magnetometer survey indicated buried materials containing ferrous material in a large part of the eastern half of the area, including the area under the revetments. The distribution of anomalous magnetic values indicated that the waste burial

sites extended eastward and southward beyond the area investigated. The EM survey indicated buried waste in a smaller, central part of the Old Burn Area and in a larger, eastern part extending southward outside the area surveyed. The GPR survey indicated buried wastes in three areas within the larger areas of buried wastes in the eastern part of the site identified by the other two geophysical techniques.

Four soil borings were drilled to a depth of 50 feet. The soils were fairly coarse-grained sands and sandy silts.

Chemical analysis of subsurface soil sample collected in the Old Burn Area (but outside of the suspected contaminated areas) did not indicate site-related contamination by explosives or inorganics. Surface and subsurface soil samples within suspected contaminated areas should be collected to better characterize contamination in these areas once explosion hazards have been characterized and removed.

To assess the vertical migration of explosives or other potential contaminants, soil borings should be drilled in the trenches to depths of 50 to 100 feet. Precautions regarding the avoidance or removal of possible unexploded ordnance in the trenches must be taken. If significant soil contamination is found, monitor well installation would be warranted.

CHEMICAL RANGE

The Chemical Range consists of a surveillance area, fire course, and chemical range located along the southern boundary of N-TEAD. Chemical and pyrotechnic munitions were tested from 1941 until the late 1960s or early 1970s.

A magnetometer survey conducted during the RI at the Chemical Range indicated a 7,000-square-foot area of buried ferrous material located south of the two open trenches. The highest magnetic values were measured in the central and northern part of this area.

The sampling of the Chemical Range was limited to the surface soil sampling of berms adjacent to the disposal trenches. No explosives were found above reporting limits. Of the inorganic parameters, only nickel and zinc geometric mean concentrations exceeded those of background samples.

The Chemical Range is no longer used; therefore, there are no pathways by which personnel could be exposed to potential chemicals of concern in the surface soils. However, potential impacts on terrestrial wildlife and plants through exposure to chemicals in soils at the Chemical Range were evaluated. Any impacts on terrestrial wildlife (primarily soil invertebrates) are likely to be limited and would not be expected to significantly impact the health of other soil communities or wildlife populations at N-TEAD. Effects of zinc on plants are possible,

but are likely to be limited to localized hot spots and would be expected to have minor impacts on the plant community at the Chemical Range and the overall and habitat quality of N-TEAD.

Sampling at the Chemical Range was limited due to possible unexploded ordnance (UXO). Soil borings in the trenches at the Chemical Range are needed to determine if vertical migration of any chemical has occurred. If significant contamination is detected, groundwater monitor wells would be needed to evaluate any migration of mobile (soluble) chemicals. The possible installation of upgradient and downgradient wells at the Chemical Range and the Old Burn Area would be coordinated. Based on the small estimated quantity of known source materials and the depth to groundwater of approximately 300 feet, substantial contamination to subsurface soils or regional groundwater is not expected.

SECTION 1

INTRODUCTION

1.1 PURPOSE OF REPORT

Roy F. Weston, Inc. (WESTON) has been contracted by the U.S. Army Toxic and Hazardous Materials Agency (USATHAMA) under the Remedial Investigation/Feasibility Study Contract - Number DAAA15-87-D-0007, Task Order 9, to conduct a Remedial Investigation (RI) at the Tooele Army Depot (TEAD), Utah. USATHAMA is responsible for the U.S. Army Installation Restoration (IR) Program. The objective of this program is to identify contamination resulting from past operations at U.S. Army properties throughout the United States. The program consists of three phases: preliminary assessment/site investigation (PA/SI); remedial investigation/feasibility study (RI/FS); and remedial design/remedial actions.

The first phase of the program at TEAD, the PA/SI, was conducted by EA Engineering, Science, and Technology, Inc. (EA) in 1986-88. The objectives of the PA/SI were: (1) using the existing available database, identify sites that present a known or potential threat to the environment and/or public health and welfare as a result of past installation activities; (2) to determine the existence of environmental contamination, if any, in soils, groundwater, and surface water at those sites identified; (3) to evaluate the potential for offsite contaminant migration; and (4) to identify any off-post site that may be impacting the environmental quality of TEAD. The results of the PA/SI identified data gaps that were to be addressed in the RI.

The purpose of this report is to summarize the investigations performed, data collected, and conclusions drawn from the second phase (RI segment) of the program. The overall purpose of this RI is to provide initial RI data for each of the five site areas being investigated at TEAD and to evaluate the data by performing contamination and baseline risk assessments. The results of this RI are the basis for recommendations regarding: (1) investigating any remaining data gaps; (2) identifying potential general response actions to be developed in the FS; and (3) evaluating whether an emergency response action is warranted for any site area. A follow-on RI and feasibility study will be performed, followed by remedial actions, as warranted, to complete the overall program at TEAD.

1.2 SITE BACKGROUND

1.2.1 Site Description

TEAD consists of three physically separated facilities: the North Area (24,700 acres), the South Area (19,400 acres), and

the Non-Tactical Generator and Rail Shop Division (less than 10 acres) at the Hill Air Force Base (HAFB), as shown in Figure 1-1. This RI report addresses the information collected and the data obtained from only the North Area of the Tooele Army Depot (N-TEAD). The South Area of the Tooele Army Depot (S-TEAD) RI report was submitted by WESTON to USATHAMA in April 1989. HAFB is not included in this program as it is under the U.S. Air Force Installation Restoration Program (IRP). The major missions of the North Area include the maintenance, renovation, and storage of wheeled vehicles and the storage of conventional ammunition. The South Area has served primarily as a facility for the storage and maintenance of both bulk chemical agents and chemical weapons. TEAD's activity at HAFB, located in eight buildings, involves the building and repairing of diesel locomotives and rail cars.

N-TEAD, originally known as the Tooele Ordnance Depot (TOD), is located approximately 17 miles north of S-TEAD and 35 miles southwest of Salt Lake City, in Tooele County, Utah. Figure 1-2 presents the USGS quadrangle for Tooele, Utah. N-TEAD is bounded on the west by the Stansbury Mountains, on the east by the Oquirrh Mountains, and on the south by the Stockton Bar and South Mountain. To the north is the Great Salt Lake. The City of Grantsville (1980 population 4,419) is located approximately 2 miles north of N-TEAD, and the City of Tooele (1980 population 14,335) is located immediately to the east.

This N-TEAD RI report focuses on five study areas identified from previous investigations as potential or known sources of contamination that require further investigation. The five study areas are:

- The TNT Washout Facility.
- The Sanitary Landfill.
- The Drum Storage Areas.
- The Old Burn Area.
- The Chemical Range.

The locations of the five study areas of potential concern are presented in Figure 1-3. A description of each of the five site areas is presented in the following subsections.

1.2.1.1 TNT Washout and Laundry Effluent Facility

The TNT Washout and Laundry Effluent Facility (hereafter called the TNT Washout Facility) is located along East Workshop Road near the south-central boundary of N-TEAD (see Figure 1-4). The TNT Washout Facility includes the following units:

- The TNT Washout Building 1245.
- Four old TNT washout evaporation/percolation (E/P) ponds.

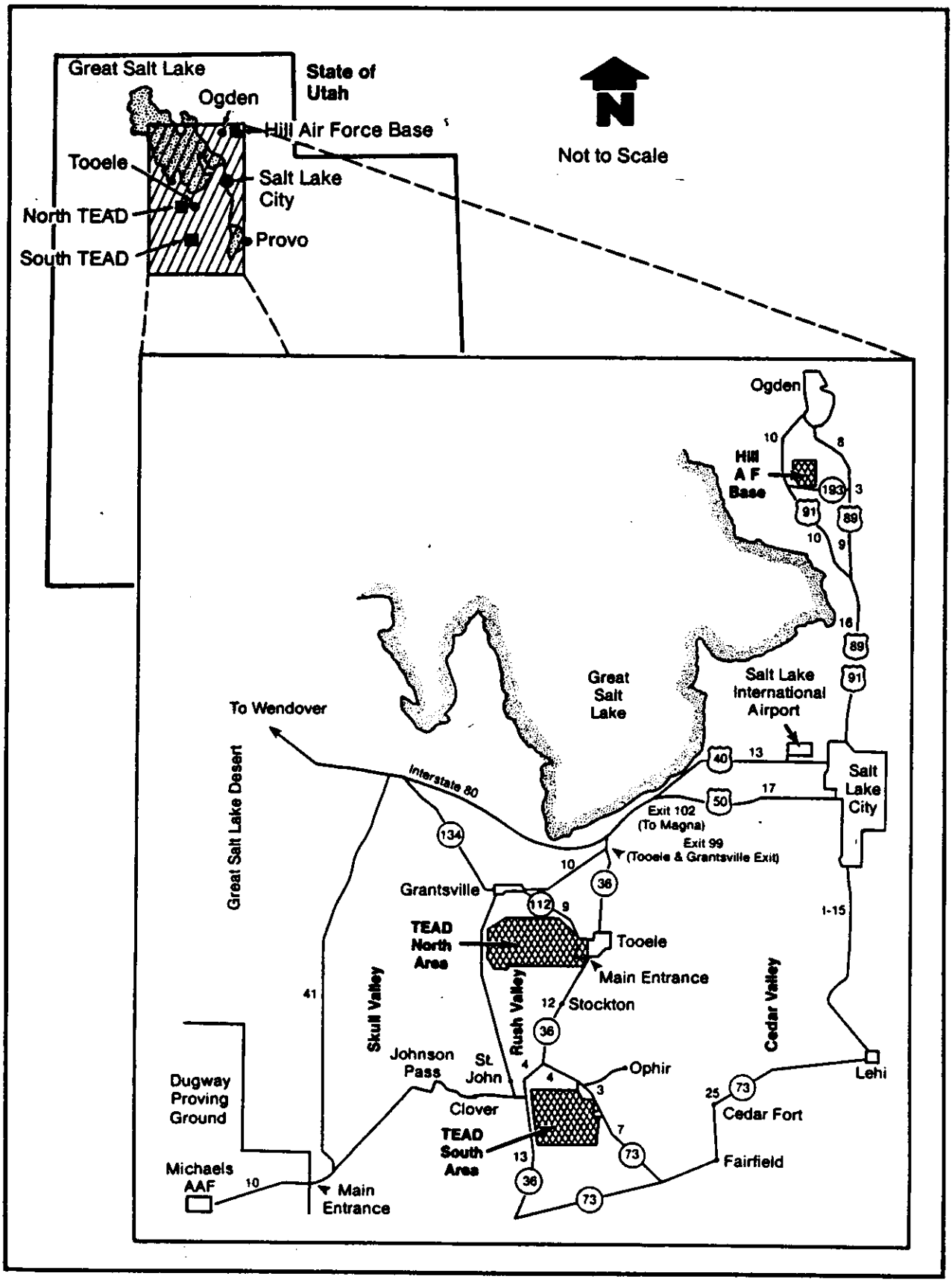

FIGURE 1-1 GENERAL LOCATION AND AREA MAP OF THE TOOELE ARMY DEPOT (TEAD)

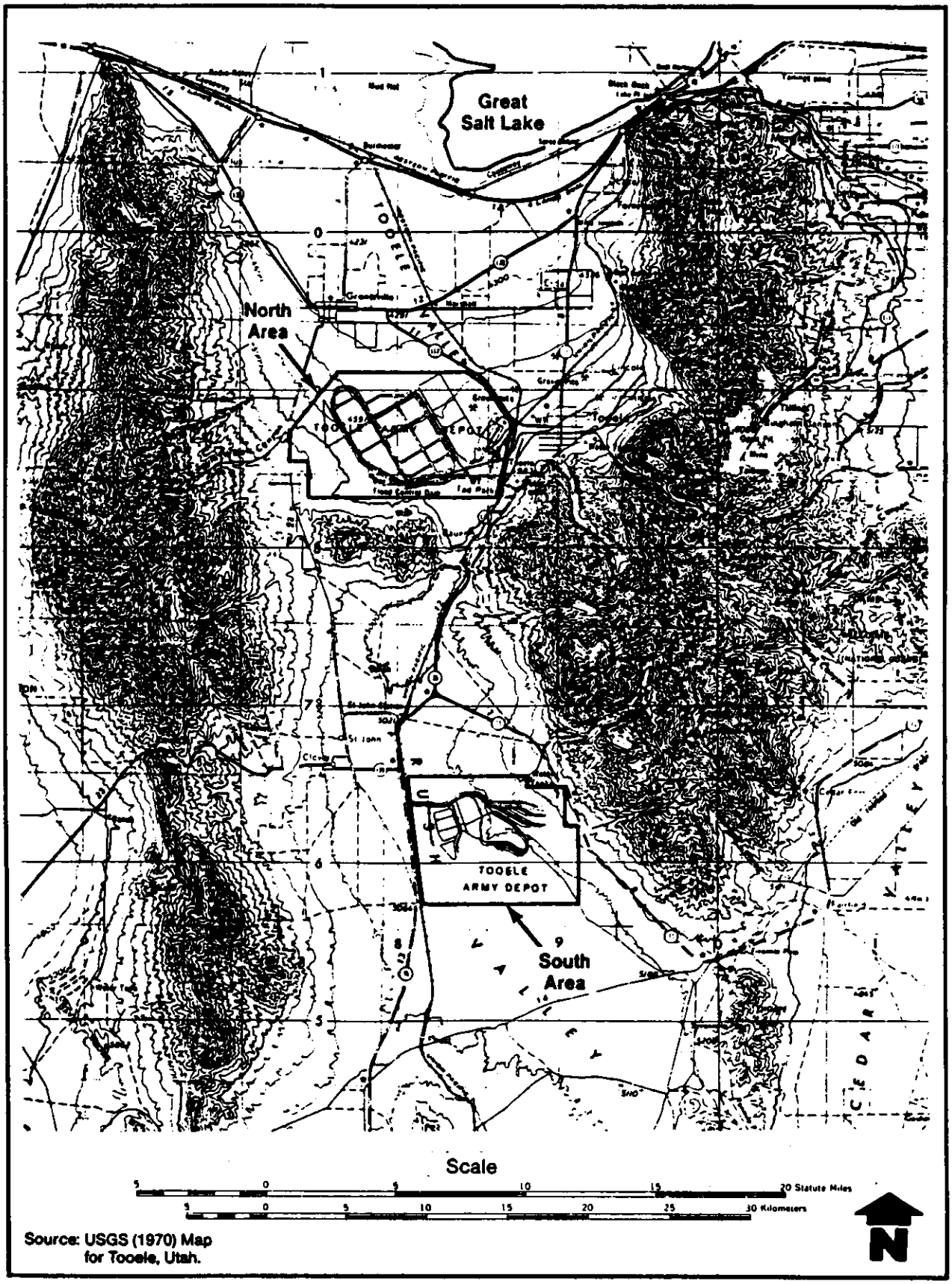

FIGURE 1-2 TOPOGRAPHIC MAP OF N-TEAD AREA

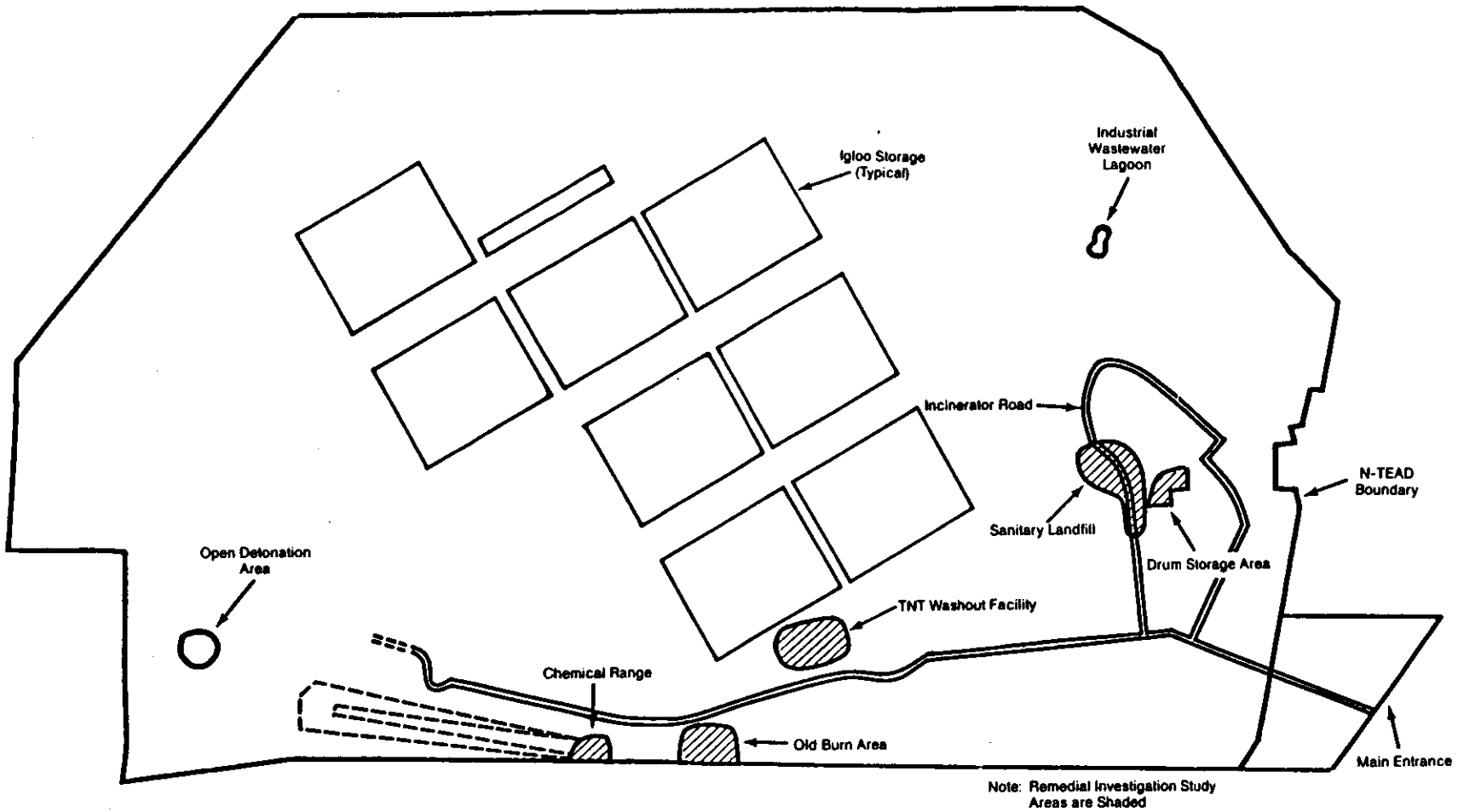

FIGURE 1-3 LOCATION OF STUDY AREAS IN THE REMEDIAL INVESTIGATION

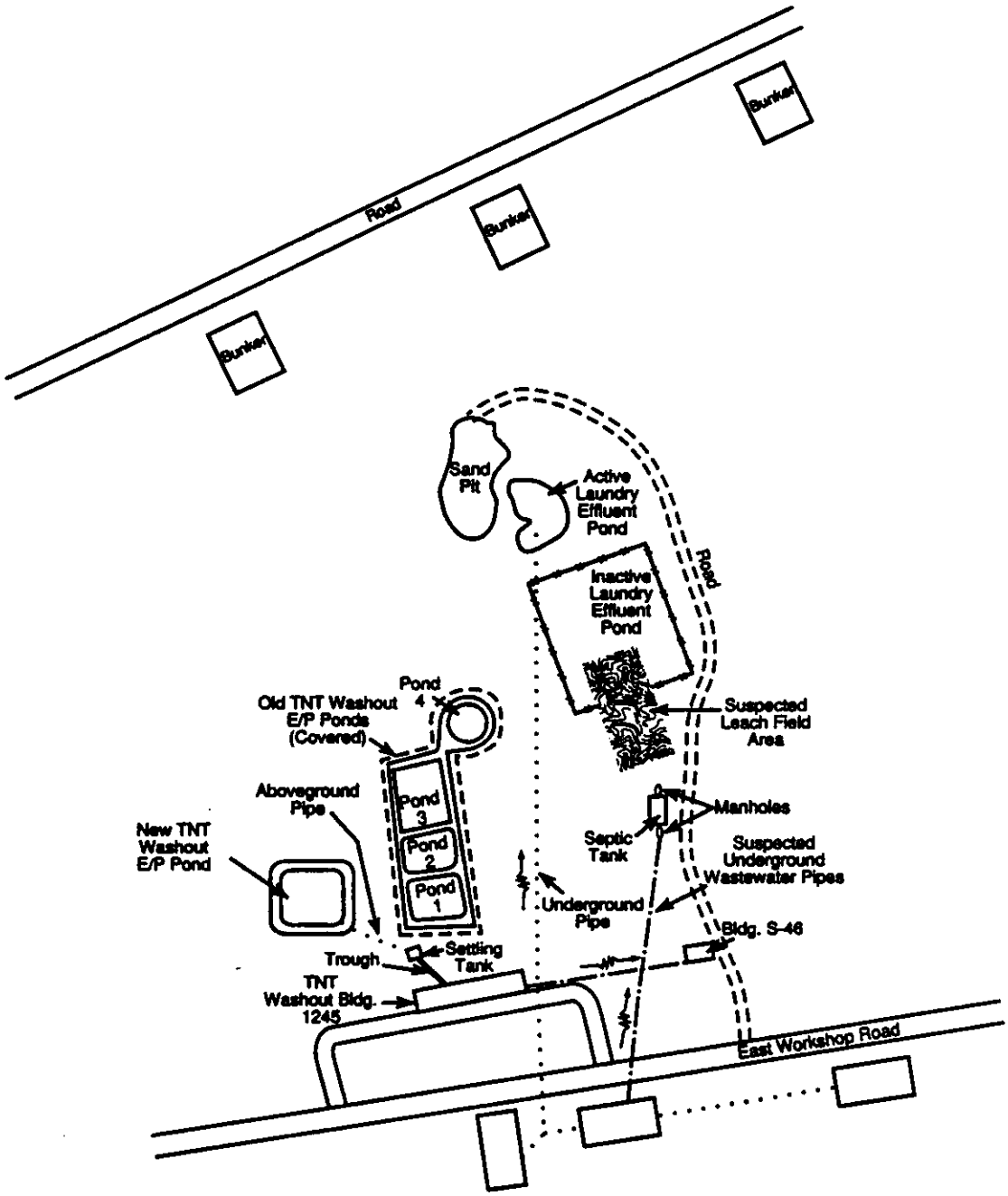

FIGURE 1-4 TNT WASHOUT FACILITY

- The new TNT washout E/P pond.
- The laundry effluent ponds (one active and one inactive).
- A septic tank and suspected leach field.
- Effluent conveyance pipes from TNT and laundry buildings.

The TNT Washout Facility was constructed in 1947-1948 for the purpose of decommissioning munitions and was extensively operated for this purpose from 1948 to 1958, and again from 1960 to 1965. Items decommissioned in the facility included projectiles, bombs, and rocket heads filled with TNT, Composition B, RDX, and tritonal (EA, 1988).

The washout operation generally consisted of cutting the munition casing and removing and recycling the explosive material. After cutting, the casings were rinsed with water to remove residual explosive material. The rinse water then passed through a series of pelletizing separators where a large portion of the residual explosive was recovered. The explosive recovered from this step of the operation was bagged and either sold or destroyed in the demolition area (USATHAMA, 1979). The rinse water effluent was then routed outside and north of the facility through a metal trough to a small, baffled, cement settling tank. Overflow from the cement settling tank then flowed into the first of a series of four unlined E/P ponds (the "old" TNT washout E/P ponds) connected by overflow pipes that encompassed a total area of approximately 1 acre.

Effluent rinse water reportedly flowed continuously into the old E/P ponds during washout operations. The typical time of operation, during which rinse water flowed from the facility to the E/P ponds, was estimated to be 8 hours per day (occuring during a normal 5-day work week). However, for a 4-year period, the facility was reported to have been operated on a continuous basis (i.e., 24 hours a day, 7 days a week). Records of actual rinse water flow volumes were not kept. However, it was estimated that the rinse water flowed from the facility to the E/P ponds at an average rate of 20 gpm, and that the flow was generally contained within the first two E/P ponds (EA, 1988).

In addition to receiving explosives-laden water, residual explosives obtained from the settling tanks during "clean out" operations were also reported to have been discharged to the E/P ponds. The E/P ponds were also reported to have overflowed and/or flooded during its period of operation, resulting in contamination of the surrounding soils with explosive compounds (EA, 1988). However, soil sampling conducted during the PA/SI did not detect any explosive contamination.

Since 1965, the TNT Washout Facility has reportedly not been in frequent operation. The total time the facility has been in operation since 1965 is estimated to be approximately 6 months (EA, 1988). During the mid-1960s (approximately 1965), the facility was expanded and a 35,000-gallon indoor settling tank was installed for the purpose of recycling the rinsewater and aiding in the recovery of residual explosives. In 1983, a charcoal filtration system was installed to further aid in the recovery of explosives and provide for a "closed-loop" washout system, thereby eliminating continuous effluent rinse water flow to the E/P ponds. In the fall of 1984, TEAD closed the old E/P ponds by flattening the berm surrounding the ponds and filling the depressions with clean soil and fill. A synthetic membrane cap made of polyvinyl chloride (PVC) was then placed over the area and covered with soil. Following the installation of the charcoal filtration system in the facility and closure of the old E/P ponds, a new, smaller (approximately 2,500 square feet) unlined E/P pond was constructed approximately 100 feet northwest of the washout facility (Figure 1-4). This new pond reportedly receives rinse water from the charcoal filtration system during backwash operations and rinse water (periodically) from the 35,000-gallon indoor settling tank (EA, 1988).

Northeast of the old E/P ponds are two shallow, unlined laundry effluent ponds. The southernmost laundry effluent pond was constructed for the purpose of receiving laundry effluent. It consists of a bermed catchment on the land surface. Because an adequate gradient was not provided for conveying effluent from the laundry facility to this catchment, it reportedly has never received laundry effluent. However, standing water and lush vegetation were observed over an area of approximately 6 feet by 6 feet in the pond's center during the RI site survey (possibly associated with the septic tank/leach field effluent).

The northernmost pond currently receives laundry and shower wastewaters from Building 67 at a reported rate of 7,200 gallons per day (Ertec, 1982). For a 2-year period, effluent flow to this pond was diverted into the old TNT washout E/P pond 3 due to lint clogging problems within the effluent discharge pipe. A sump was installed to rectify the problem, and the pipe from the laundry building to the effluent pond was replaced in 1984 (EA, 1988). This effluent pond has reportedly overflowed onto the surrounding landscape in a northerly direction (Ertec, 1982). The date or period of time this occurred is unknown. Standing water was observed in the pond; however, overflow from the holding pond onto the surrounding landscape was not apparent during the RI site inspections performed by WESTON during the RI field program from September 1987 to July 1988. Livestock were observed drinking from this pond during RI activities in February 1988.

The septic tank, located directly south of the laundry effluent ponds, has not previously been addressed as part of the reports by USATHAMA in 1979, Ertec in 1982, or EA in 1988. The septic

tank is believed to receive waste from three buildings: the TNT washout building, the laundry building, and a building to the southwest of the site. All of the buildings may feed into one sewer line that goes directly to the septic tank. The septic tank area is located adjacent to three manholes within a fenced area and one manhole located outside the fence to the north.

It is suspected that the septic tank may either leak or have a leach field that discharges under the southernmost inactive laundry effluent pond. If this is the case, it may be an additional source contributing to the mounding of localized perched water in the area.

The TNT Washout Facility has undergone several investigations to define the nature and extent of soil and groundwater contamination in this area. Investigations were conducted by the U.S. Army Environmental Hygiene Agency (AEHA) in 1981, by Ertec in 1982, and by EA in 1987. A summary of the findings of these previous sampling programs is presented in Subsection 1.2.3.

1.2.1.2 Sanitary Landfill

The N-TEAD Sanitary Landfill is located at the southern end of the open revetment storage area, partially within an arroyo. The landfill consists of two fill areas separated by Incinerator Road (see Figure 1-5). The facilty, approximately 100 acres, is unlined and has been in operation since 1942. In addition to conventional sanitary wastes (scrap metal, rubber tires, paper, garbage, scrap wood, etc.) from the Army Depot, the landfill received untreated paint sludges (zinc chromate primer used), grease and oil, and paper-type filters (approximately 30 per year) used to filter oil containing PCBs for reuse in electrical transformers. It was estimated that each filter contained approximately 0.5 liters of PCB-laden oil. Waste streams containing heavy metals from metal plating operations and other metal treatment operations were also disposed of in this landfill (USATHAMA, 1979). Paint containers, empty paint thinner and stripper containers, battery acid containers, pesticide and herbicide containers, and used ethylene glycol were also disposed of in the landfill (EA, 1988). The landfill received salts produced from the demilitarization of hydrogen cyanide bombs (NUS, 1987). Asbestos-containing materials were also disposed of in both the east and west portions of the landfill.

Areas of current landfilling operations are shown in Figure 1-5. Primarily, scrap wood and miscellaneous debris are being deposited on the eastern side. The landfill operation consists of placing the waste in the natural depression of the arroyo and then covering it with alluvial deposits that are bulldozed from the upper rim of the arroyo. Cover material is placed

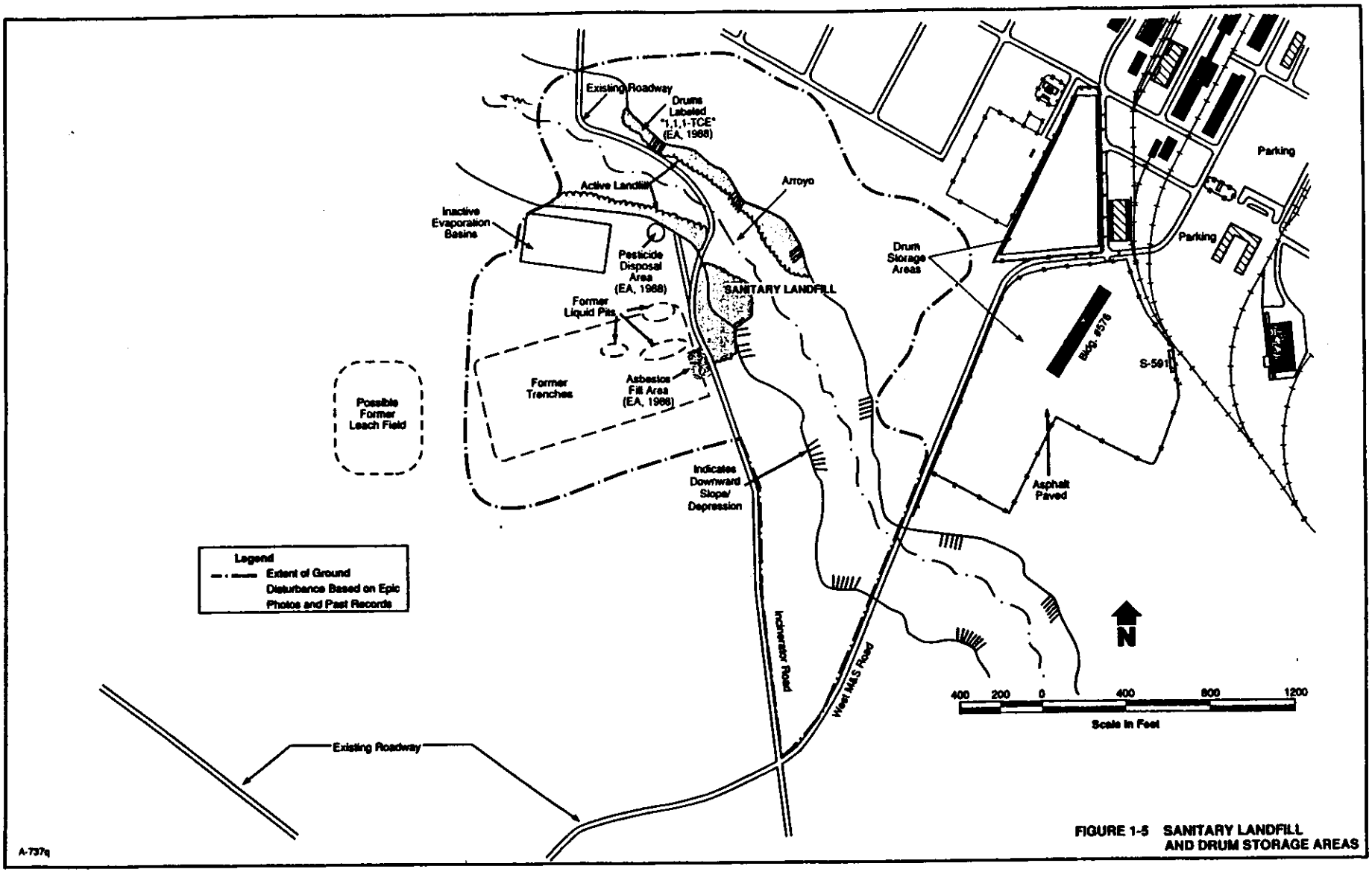

FIGURE 1-5 SANITARY LANDFILL AND DRUM STORAGE AREAS

over the wastes every 2 to 3 months according to site personnel. The cover material is primarily composed of silty sands containing varying amounts of small and large rounded gravel.

During a site visit by EA Engineering in December 1985, a small trench filled with 55-gallon drums marked 1,1,1-TCE was observed in a fill area located on the northernmost section of the general fill area. Also observed in the currently operated fill area on the east side of Incinerator Road was a gravel pit where liquid boiler residues and fuels from the boiler building (Building 637) have been disposed. During the fall of 1985, approximately 2 to 3 cubic yards per week of this material were placed in the pit. The estimated total waste volume from all sources in the gravel pit is 16 cubic yards.

The area on the west side of Incinerator Road has been designated for the disposal of pesticides, herbicides, and asbestos, and is posted with warning signs. Asbestos-contaminated materials are put in plastic bags prior to disposal. Sixty to seventy cubic yards of asbestos material has been placed in this section of the landfill. In the past, asbestos materials were disposed of in the area designated for nonhazardous materials disposal (east of Incinerator Road).

Pesticide containers observed at the landfill were empty; however, it is not known if in the past any full containers were placed in the landfill. No banned-from-use pesticides (i.e., DDT; 2,4,5-T) are known to have been buried in the landfill.

Adjacent to and north of the asbestos fill area is an old sewage leach field. Sewage from the administration area was channeled into this area before the sewage lagoons were constructed in 1972.

A monitor well (N-4) was installed 1,200 feet north-northwest of the sewage lagoons during the Ertec (1982) investigation to evaluate the potential for groundwater contamination resulting from the sewage lagoons and the Sanitary Landfill. Analysis of a sample collected from this well showed the presence of trichloroethene, nickel, and zinc. There is no record of other environmental investigations having been conducted at the Sanitary Landfill to evaluate the potential for soil and/or groundwater contamination.

1.2.1.3 Drum Storage Areas

The Drum Storage Areas are located southwest of the maintenance and warehouse area and east of the Sanitary Landfill, as shown in Figure 1-5. The areas are separated by the West M and S Road and consist of: (1) an approximate 35-acre triangular area, of which a small portion is currently used as a 90-day or less

Drum Storage Area; and (2) an approximate 18.5-acre area containing an active drum storage building (Building 576).

Environmental Photographic Interpretation Center (EPIC) photos from 1953 to 1981 showed a variety of containers (probably drums) on the ground in the storage lot. Ground staining within the Drum Storage Areas can be observed from the EPIC photos. In the 1953 EPIC photo, a large number of drums can be seen in the smaller triangular area (U.S. EPA, 1982)

It has been reported (EA, 1988) that open drums were turned upside down to prevent rain or snow accumulation in the drums. Remaining contents were spilled onto the gravel or asphalt surface. This procedure is no longer practiced. Currently, drums remain sealed in the open 90-day storage area and in the storage building.

There are no existing sampling data from the Drum Storage Areas.

1.2.1.4 Old Burn Area

The Old Burn Area is located in south-central N-TEAD along the Depot's southern boundary, just east of the Chemical Range (Figure 1-6). Another name for this area is the Surveillance Test Area. The area was used for the testing of HC-filled munitions, fuses, and propellants until the early 1970s. Surveillance Division personnel also conducted hot and cold testing of munitions.

A revetment area (test area) is located in the eastern portion of the site. Pieces of grenades, projectiles, detonators, metal, and melted glass were observed during the initial RI site visit. A large field approximately 1/4-mile by 1/2-mile is located just west of the test site. The area slopes from south to north and has undulating areas that appear to be graded-over trenches. Scrap metal, detonators, and metal canisters were observed at the surface in this area during the site visit.

The EPIC photographs indicated that trenches were located in several other areas of the site in the past. These features are shown in Figure 1-6.

The revetment area and the burning trenches within the revetment area along the east side of the Old Burn Area are the only evidence of activity visible at the ground surface. Any other disturbed areas have been leveled to ground surface.

There is no record of any environmental investigations having been conducted at the Old Burn Area to evaluate the potential for soil and/or groundwater contamination.

Located adjacent to and north of the Old Burn Area is a large pit 8 to 13 feet deep (Figure 1-6). The pit is gravel-lined and

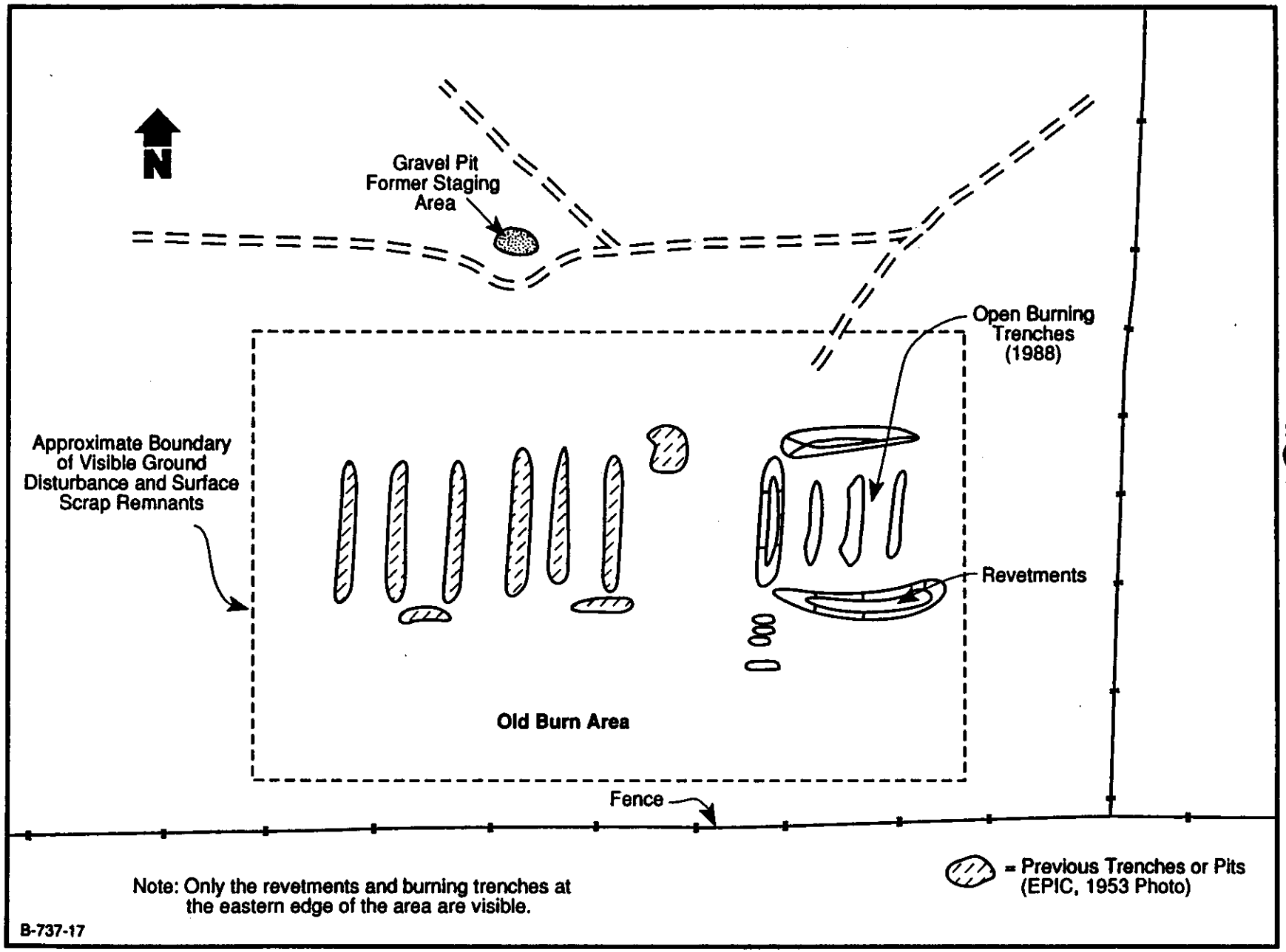

FIGURE 1-6 OLD BURN AREA

has two cuts in the north bank with dirt roads leading into and away from the site. Small amounts of scrap wood and steel bands were observed scattered throughout the site. Dark material was apparent in the 1959 EPIC photograph, but was not apparent in the 1966 and 1981 photographs. In the 1953 photograph, three small trenches were located in the center of the pit (U.S. EPA, 1982). The site appears to have been used primarily as a staging area for materials used at the Surveillance Test site and not as a disposal area. Based on available information, this site does not appear to present a threat to the environment or to public health (EA, 1988) and is not part of the RI scope.

1.2.1.5 Chemical Range Trenches

The Chemical Range consists of a surveillance area (the Old Burn Area described above), a fire course, and a small building area located on the southern boundary in southwest N-TEAD (Figure 1-7). The Chemical Range trenches are located between the surveillance area and the fire course, and north of the building. The Chemical Range trenches are referred to hereafter as the Chemical Range. The Old Burn Area is included in this RI as a separate study area.

Chemical and pyrotechnic-type munitions, excluding toxic agent-filled, were tested on the Chemical Range. Munitions tested included grenades and projectiles, incendiary items such as bombs, grenades, pouch and document destroyers, riot-control agent-filled munitions, and flame thrower igniters. The Chemical Range was used from 1942 until the early 1970s. Three trenches were observed during the initial RI site visit in the northeast area near the surveillance buildings. Two of the three trenches were open and contained various unburned munitions canisters, scrap metal, and metal containers labeled "smoke pot-floating-HC-M4A2". There has been no sampling and analysis of the soil or groundwater in this area.

1.2.2 Installation History and Mission (EA, 1988)

The Tooele Ordnance Depot (TOD) was established 7 April 1942 by the Army Ordnance Department. Construction of the facilities, including igloos, magazines, administration buildings, military and civilian housing, roads, hardstands for vehicle storage, and other allied appurtenances, was completed in January 1943.

More than 1,625,000 tons of material were shipped and received by TOD during World War II. In addition, the Depot overhauled 997 major automotive vehicles, 1,347 major artillery pieces, and salvaged 896 tanks. Within a period of less than 3 years, the proceeds from the brass salvage of the Depot totaled almost $10 million.

The TOD was redesignated the Tooele Army Depot (TEAD) in August 1962. Since that time, TEAD's mission has been gradually altered

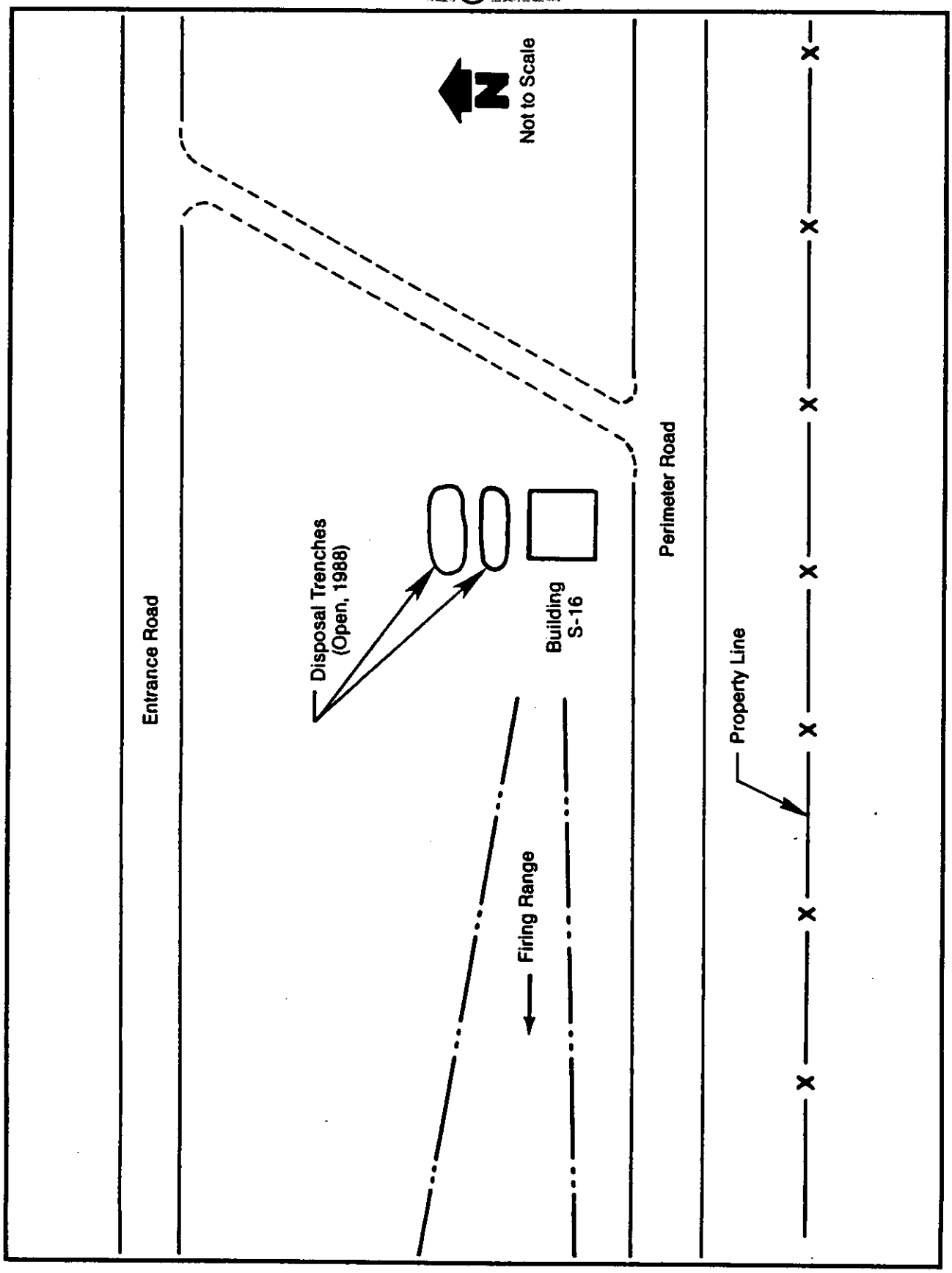

FIGURE 1-7 CHEMICAL RANGE, N-TEAD

and expanded to include support of other Army installations throughout the western United States. Today, TEAD is one of the major ammunition storage and equipment maintenance installations in the continental United States.

The mission of TEAD is to provide for the receipt, storage, issue, maintenance, and disposal of assigned commodities; to provide installation support to attached organizations; and to operate other facilities as may be assigned. The administrative headquarters for the TEAD complex are situated in the North Area (N-TEAD).

The installation's first mission, assigned on 8 December 1942, was to store vehicles, small arms, and fire-control equipment for export. Other mission functions included overhauling and modifying tanks and track vehicles and their armaments. In general, Tooele was designated as a backup depot for the Stockton Ordnance Depot and Benicia Arsenal, both in California.

In 1970, N-TEAD assumed maintenance mission responsibilities for topographic equipment, troop support items, construction equipment, power generators, and serviceable assets from Granite City Army Depot (Illinois), which was subsequently closed.

Currently, the maintenance missions at TEAD include the repair of tactical wheeled vehicles and power generation equipment. Along with these missions, all the secondary items of the components are rebuilt, including engine and power trains. Approximately 4,500 engines and 12,000 power train components are overhauled each year. In addition, TEAD has been named as the support depot for most of the Army's new tactical wheeled vehicles purchased as part of the Army's force modernization.

Activities at TEAD are the responsibility of nine directorates: Administration and Services; Ammunition Equipment; Chemical Agent Munitions Disposal System (CAMDS); Maintenance; Management Information Systems; Quality Assurance; Resources Management; Supply; and Ammunition Operations. In addition to these directories, TEAD provides space for eight tenants: the Agency for International Development; Atmospheric Sciences Laboratory Meteorological Team; Defense Property Disposal Office; U.S. Army Communication Command; U.S. Army Health Clinic; U.S. Army TSARCOM Mobil Rail Shop No. 3; U.S. Army Reserves; and U.S. Army Toxic and Hazardous Materials Agency (USATHAMA).

The major functions of TEAD are listed below:

- Stock distribution and storage of general supplies and ammunition in the FSC groups assigned by AMCR 780-5, as directed by responsible NICPS.
- Storage of General Services Administration strategic and critical materials.

- Depot maintenance of general supplies and ammunition in the commodity categories assigned by AMCR 780-5.
- Clipping and linking of small arms ammunition.
- Demilitarization of ammunition.
- Surveillance of ammunition.
- Processing of general supply and ammunition returned material in the same commodity categories specified in AMCR 780-5 for depot maintenance.
- Training supervision of assigned units and provision of logistical support and training assistance to U.S. Army Reserve Units.
- Design, manufacture, procurement, storage, testing of ammunition equipment for demilitarization, renovation, modification, modernization, and normal maintenance of conventional ammunition.
- Assembly of basic issue item sets and fabrication of radio harnesses, and assembly of sets from component parts or repair parts as requested by the commodity manager.

1.2.3 Summary of Previous Investigations

The following section provides a summary of the scope and findings of previous environmental investigations conducted at N-TEAD prior to the RI field program. The following summaries will focus on the findings of these investigations that cover the N-TEAD general and specific areas that relate to the five site areas investigated during the RI. The summary of the RCRA Facility Assessment will include information on other SWMUs besides the five sites addressed in this RI. The data provided in these previous investigations were used as background to develop the field program for this RI and to evaluate the RI data. Of the five site areas investigated during the RI, previous sampling and analysis of soil and groundwater has been performed only in the TNT Washout Facility site area. (One groundwater sample from well N-4 was also analyzed from the Sanitary Landfill.) A summary of the previous data on this site area is provided in this section.

1.2.3.1 Environmental Assessment of Tooele Army Depot, Report No. 141

This report was prepared in 1979 for the U.S. Army Chemical Demilitarization and Installation Restoration Agency, now USATHAMA, to assess the environmental quality of TEAD with regard to the use, storage, treatment, and disposal of toxic and hazardous materials and to define any conditions that may

adversely impact public health and welfare or the environment. The assessment involved the performance of a records search to identify sites of potential environmental contamination (e.g., burial sites, testing areas, explosives washout areas, industrial areas, and old burning/old detonation areas). The major contaminants of concern for N-TEAD and S-TEAD included explosives, chemical agents, and plating rinse waters.

The report presented the following findings for N-TEAD:

- Industrial operations have generated wastewaters containing heavy metals, petroleum, oil, lubricants, and cleaning wastes. The outfall flow percolates into the soil.

- Testing and disposal of high explosives (HE), white phosphorous (WP), and pyrotechnic material is a continuing operation at N-TEAD.

- Mustard agent was stored at N-TEAD until 1977. Repair of luminous devices involved radium-activated paint (Building 605).

- No natural surface water system exists at N-TEAD. Soil beneath the industrial wastewater lagoon outfalls was determined to contain 36 mg/kg of chromium. Chloride and sulfate concentrations in Supply Well No. 1 equalled or exceeded the drinking water standards.

- The Sanitary Landfill reportedly contains plating wastes, PCBs, and paint primer (zinc).

- Three holding ponds (lagoons) were identified at N-TEAD: the x-ray lagoon (lined), the TNT Washout Facility ponds (unlined), and the industrial wastewater lagoon (gravel-lined) (see Figure 1-8).

- The demolition and burning ground is located in the southwestern portion of N-TEAD (see Figure 1-8) and is used for HE and HE-contaminated items, pyrotechnics (Chemical Range), riot control agents, and WP. Facilities are available for demilitarization of small caliber ammunition (popping furnaces).

- The following demilitarization sites were identified:

  - Building 1245 - ammunition workshop;
  - Building 520 - small arms;
  - Building 539 - experimental popping furnace;
  - Building 1303 - HE munition sawing;

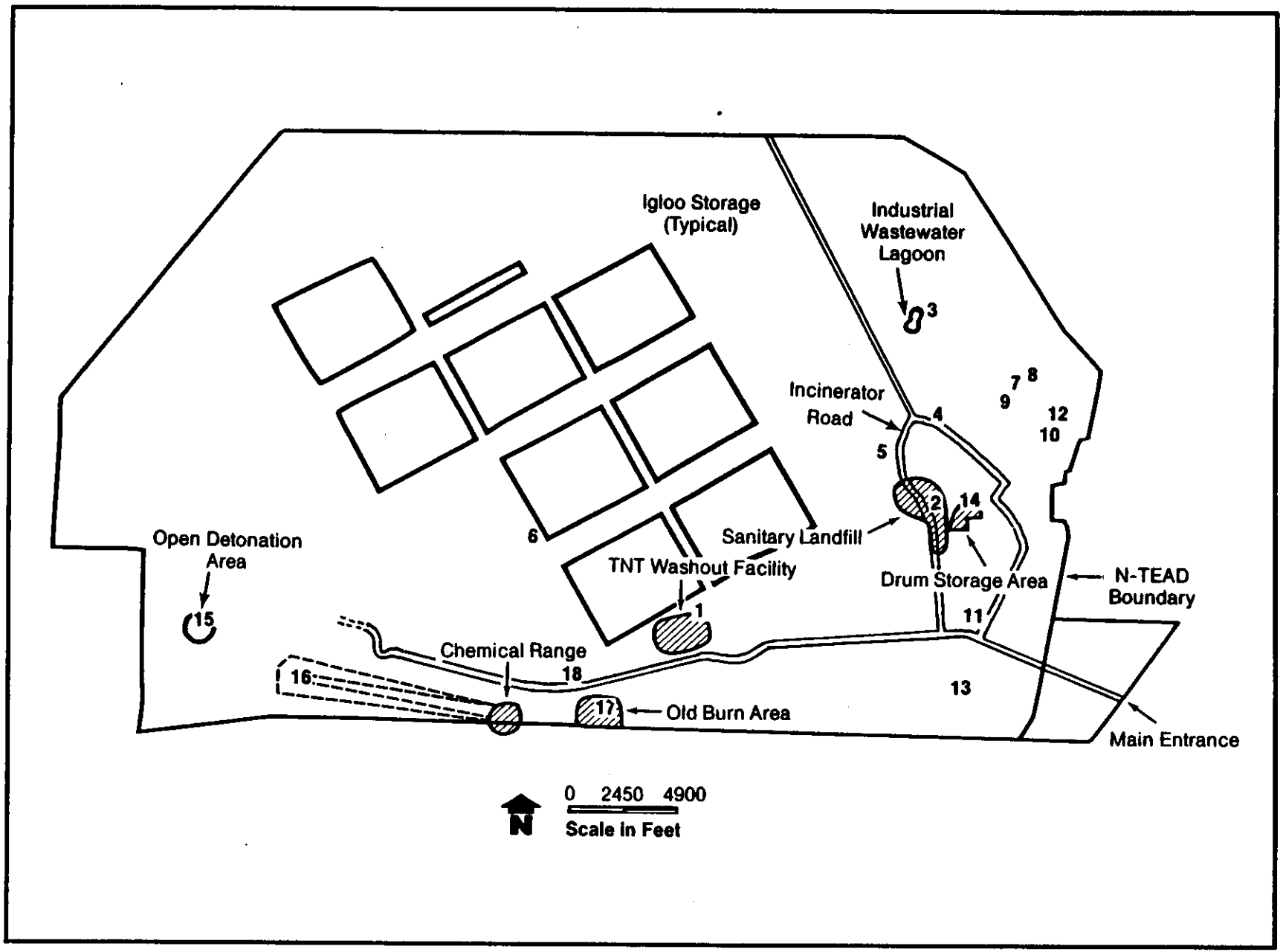

FIGURE 1-8 LOCATION OF POTENTIAL HAZARDOUS WASTE SITES, N-TEAD

Legend for Figure 1-8

Site No.*	Name	Waste Type/Contaminant of Concern
1	TNT Washout Facility Area	Laundry and washout facility effluent; explosives; TNT, RDX, and Composition B, nitrates, phosphates, and heavy metals.
2	Sanitary Landfill	Domestic refuse; construction rubble, paint, solvents, paint thinner and stripper motor oil and antifreeze, and pesticide containers; sludge; scrap metals; asbestos-contaminated materials.
3	Industrial Waste Lagoon	Wastewater from vapor degreasing; metal cleaning, stripping, cleaning, anodizing, electroplating, and other industrial operations; acids, caustic, solvents, detergents, oils, and grease; heavy metals.
4	Old Industrial Waste Lagoon Area	Wastewater from vapor degreasing; metal cleaning, stripping, cleaning, electroplating, and other industrial operations; acids, caustic solvents, detergents, oils, and grease; heavy metals.
5	Sewage Lagoon	Sanitary wastewater
6	X-Ray Lagoon	X-ray development rinse water
7	Former Transformer Storage Site	PCB-contaminated oil
8	Transformer Boring Site	PCB-contaminated oil
9	PCB Spill Site	PCB-contaminated oil
10	PCB Storage Area	PCB-contaminated oil
11	Pesticide/Herbicide Handling and Storage	Pesticides and herbicides

Legend for Figure 1-8
(continued)

Site No.*	Name	Waste Type/Contaminant of Concern
12	Radiological Storage Area	Radioactive material: tritium H3, radium, and uranium-238
13	Wastewater Spreading Area	Domestic wastewater
14	Barrel Storage Area	Residual contents of used drums: solvents, petroleum products, antifreeze, etc.
15	Open Burn/Open Detonation Area	Explosives: RDX, TNT, and HMX; heavy metals
16	Chemical Range	Explosives
17	Surveillance Test Site (Old Burn Area)	Explosives
18	Staging Area Near Surveillance Test Site	Explosives

*See Figure 1-8 for site locations.

- Buildings 1351, 1320, 1344 - deactivation furnace;
- Building 1356 - flashing furnace.

- A transformer oil spill occurred near Pole 184.

The following conclusions were presented in the installation assessment report:

- The potential exists for contaminant migration via groundwater flow from the demolition grounds and the industrial wastewater outfall.

- As a result of the wastewater discharge at the N-TEAD industrial outfall (Industrial Wastewater Lagoon), the soil has become contaminated by heavy metals from plating operations. Since there are no adequate restraints, grazing cattle entering the area to feed may ingest contaminated vegetation.

- The increasing chloride and sulfate levels in Supply Well 1 are compromising its use as a source of potable water. (Chemical analysis during the RI reported sulfate levels from 187 to 280 mg/L; chloride was not a chemical parameter.)

- The leachate potential from the landfill and the composition of surface runoff from the area cannot be characterized. This is due to lack of information, absence of National Pollutant Discharge Elimination System (NPDES) permit requirements, and minimal requirements for landfill management.

- The soil near Pool 184 may be contaminated with PCBs as a result of a transformer oil spill.

- Because of the thin gauge (4 milliliters) of the x-ray wastewater pond liner, the useful life of the pond is anticipated to be of limited duration.

1.2.3.2 Ertec Exploratory Environmental Contamination Assessment Report

The Earth Technology Corporation (Ertec), under the direction of USATHAMA, performed an investigation to identify and characterize areas of potential contamination at TEAD (both North and South Areas). The investigation was conducted in a two-phase approach. The first phase involved utilizing existing data and preliminary site visits to identify potentially contaminated sites. The second phase involved the installation of monitor wells, the performance of geophysical surveys, and the sampling/analysis of soil, sediment, and water at sites identified as having the greatest potential environmental contamination.

The major findings and conclusions of this study, with respect to N-TEAD, were as follows.

- Contamination and migration of contaminants were found to be minimal at N-TEAD. Two areas of concern were identified through the collection and analysis of soil, sediment, surface water, and groundwater samples. These areas were: (1) Headquarters Area, consisting of the Industrial Waste Pond, and outfalls and ditches from the Maintenance Area and the Sewage Lagoon; and (2) the TNT Washout Facility/Laundry Ponds Area.

- A contaminated zone was found to exist in the vicinity of the industrial waste pond. Specific contaminants from this source were identified as having a high probability of migrating toward the Depot boundary and towards N-TEAD Supply Well No. 2. Contaminants found to be anomalously high were zinc, chloride, fluoride, phosphate, sodium, 1,2-dichloroethane, trans-1,2-dichloroethene, trichloroethene, and possibly 2,4,6-trinitrotoluene. The travel time of contaminated groundwater from this source to the north boundary of the Depot was estimated at 55 years from the time contaminants first reached the water table.

- Contaminated water from the Industrial Waste Pond may have entered fractures and solution channels in the underlying carbonate bedrock above the regional water table. It was determined that if this contamination existed and was extensive, it could provide a long-term source of contamination to the alluvial aquifier by slow drainage. The geometry and the impact of this contamination was not assessed under this exploratory study.

- The impact of contaminated water seepage from industrial wastewater outfalls B through E could not be determined.

- A groundwater mound has built up beneath the sewage lagoon. This water was determined to be flowing toward the north N-TEAD boundary and toward N-TEAD water supply wells 1 and 2. Water supply well 1 is regionally upgradient of the sewage lagoon. Well 2 is cross-gradient to upgradient. While no contaminants were found to exceed U.S. EPA standards in the one well that taps this perched zone, the levels of nickel and nitrate approach U.S. EPA standards. In addition, high levels of zinc, chloride, fluoride, sulfate, gross beta, sodium, and trichloroethene were found. Travel time for these contaminants to reach the north boundary was estimated to be on the order of 55 years from the time they first reached the groundwater system.

- A locally perched water table was determined to exist below the TNT Washout Facility. Seepage of laundry effluent through soils contaminated with explosives from TNT washout operations was identified as a continuing mechanism for flushing contaminants to the groundwater.

- Groundwater in the regional aquifier beneath the TNT Washout Facility was contaminated with RDX and explosive derivatives such as nitrates, which were found at levels six times greater than U.S. EPA and Utah standards. Although this groundwater was contaminated, it was estimated that it would take 125 years to reach the N-TEAD boundary.

- DNT and TNT have migrated at least 45 feet down through the soil beneath the contaminated area surrounding the TNT Washout Facility. A "slug" of RDX had migrated to a depth of 100 feet.

- The areal extent of explosives contamination in the surface soil around the TNT Washout Facility area was not determined under this Exploratory Study.

- No evidence was found to suggest that contamination was being carried past the N-TEAD boundary surface water.

- Based upon one sampling point installed in an attempt to intercept groundwater flow from the contaminated areas, contaminated groundwater was not determined to be moving past this portion of the northern boundary. All groundwater flow exits N-TEAD along the northern boundary.

1.2.3.3 Interim Groundwater Quality Assessment Report

This report, prepared by Woodward-Clyde Consultants (1985) for the U.S. Army Corps of Engineers, presents the results of the first phase of an investigation to assess the extent of groundwater contamination in the vicinity of the unlined Industrial Wastewater Lagoon (IWL) and connecting wastewater ditches at N-TEAD. The Phase I investigation included sampling and laboratory analysis of the lagoon liquid, accumulated sludge in the lagoon, soils from below the lagoon and adjacent to the wastewater ditches, and groundwater samples from existing monitor and water supply wells in the vicinity of the lagoon. The lagoon has been used for approximately 40 years for the disposal of wastewater from metal cleaning and finishing operations. The lagoon is currently scheduled to be closed by the placement of a membrane and soil cap by November 1989.

Groundwater contamination was found downgradient from the lagoon; however, the extent of contamination could not be established from the existing monitor well network. Accordingly, this

report was submitted as an interim report. It includes recommendations for additional groundwater monitor wells to be drilled, developed, sampled, and analyzed within and beyond the limits of the existing monitor well networks as part of a Phase II investigation.

The following findings were presented in the report:

- The groundwater flow velocity was calculated to range from 6×10^{-4} to 1×10^{-2} cm/sec (665 to 11,400 feet per year) in the alluvium.
- The IWL wastewater, sludge, and soil samples contained concentrations of various volatile and semivolatile organic compounds and metals. Soil samples from near the wastewater ditches contained lower concentrations of metals than the soil/sludge samples from the IWL.
- Groundwater beneath the IWL was found to be contaminated with TCE, tetrachloroethane, 1,1,1-TCA, and 1,1-DCA.

The following conclusions were based on the results of the first phase of this investigation:

- Groundwater contamination was limited to volatile organic compounds. BNA(s) and possibly several metals have migrated to the perched zone beneath the IWL and can potentially move into the groundwater.
- Groundwater flows toward the northwest beneath the site. Contaminated groundwater has probably moved offsite towards the northwest in the alluvial aquifer.
- Groundwater in both the bedrock and unconsolidated sediments contains organic contaminants. The bedrock groundwater appears to be hydraulically connected to the unconfined alluvial aquifer.
- Water supply well WW-2 was contaminated with low concentrations of an organic solvent (TCE).
- Organic contaminants were found in samples from all the existing wells downgradient of the wastewater ditches and the IWL, except for well USGS-2.
- Contaminated groundwater has probably migrated beyond all the existing data collection points. In other words, contaminants have probably migrated beyond the northern boundary of N-TEAD.

1.2.3.4 Army Environmental Health Agency (AEHA) Investigations at the Open Burning/Open Detonation Area

AEHA conducted a four-phase investigation of seven open burning/open detonation (OB/OD) facilities, including the N-TEAD OB/OD area located in the southwestern region of the Depot west of the Chemical Range and Old Burn Area. The investigations were performed to evaluate potential environmental contamination with respect to Federal hazardous waste regulations and to determine which sites should be used for continued OB/OD operations. The investigation was performed from March 1981 through August 1984.

Phase I involved screening installations for potential soil, surface water, and groundwater contamination in and around the OB/OD areas (AEHA, 1982). Phase II involved a series of field studies to sample surface soils at the OB/OD areas (AEHA, 1983). Phase III involved summarizing all of the Phase II studies into one overall evaluation of OB/OD sites (AEHA, 1984). Phase IV involved resampling selected OB/OD sites to determine the horizontal and vertical extent of contamination identified during the Phase II studies (AEHA, 1985).

Results of the Phase I study indicated that the Tooele Army Depot presented a potential for low-level contamination and was recommended to be included for Phase II investigation. Phase II study results are summarized below:

Area Sampled	Explosives Analysis	EP Toxicity Metals Analysis
Main Demolition Area	Measurable quantities of RDX and HMX in virtually all samples, ranging up to 149 ug/g RDX.	Seven of 24 samples had Cd levels over the RCRA limit of 1.0 mg/L, four others were 0.97 to 0.98 mg/L. Small amounts of Ba and Hg were detected, but not in concentrations approaching RCRA limits.
Cluster Bomb Demolition Area	One sample with RDX and one with tetryl and TNT. No concentrations over 2.2 ug/g. No others were detected.	No metals were detected at levels approaching RCRA limits. Small quantities of As, Ba, Hg, and Pb were detected in samples.
Propellant Burn Area	Small amounts of explosives present in several samples, no concentrations exceeding 52 ug/g.	No metals were detected at levels approaching RCRA limits. Small quantities of As and Hg were detecte in several samples.

Area Sampled	Explosives Analysis	EP Toxicity Metals Analysis
Trash Burn Pits	One sample with 4.6 ug/g TNT.	No metals were detected at levels approaching RCRA limits. Small amounts of Ba, As, and Hg were detected.

Compilation and review of OB/OD investigations resulted in the following conclusions:

- While the residues and soils were potentially reactive, in reality it is unlikely that the concentrations of explosives found in this study would present a reactive danger according to the newly accepted Bureau of Mines reactivity tests.
- The EP Toxicity metals of concern from the study are lead, cadmium, and to a limited extent, barium.
- The explosives most frequently encountered in the analyses were 2,4,6-TNT, RDX, and HMX.
- The chemical content of certain explosives in residues may present a real toxicity danger, which must be researched, to human health and to the environment.
- Any data on EP Toxicity metals, reactivity, or chemical toxicity must be tempered with a full geohydrological site evaluation to interpret a site's total impact to human health and aquatic biota.

It was recommended in Phase III that an expanded Phase IV study be conducted at the N-TEAD OB/OD area. Phase IV was conducted from 27 July to 10 August 1984, and involved soil sampling and analysis from seven boreholes (35 soil samples) and eight surface locations within the OB area for determining the presence of metals and explosives. It was concluded from the soil analysis that no significant amount of explosive compounds were present and that the soil in the OB areas was not hazardous as determined by the EP Toxicity tests. AEHA indicated that the OB operations at N-TEAD did not present any conceivable risk to the environmental quality of TEAD and recommended no remedial action be conducted at the site.

1.2.3.5 The Environmental Photographic Interpretation Center Report

The Environmental Photographic Interpretation Center (EPIC), through an interagency agreement between the U.S. EPA and USATHAMA, was requested to provide imagery analysis support for the USATHAMA Installation Assessment Program. This report

involved historical analysis of 17 selected installations to identify possible areas of past use, storage, treatment, and disposal of potentially toxic and hazardous materials (U.S. EPA, 1982).

Archival black and white aerial photography of an appropriate scale was acquired from the imagery libraries of the U.S. Geological Survey and the Agricultural Stabilization and Conservation Service, in addition to other government and private sources. An attempt was made to locate imagery that would provide photo coverage for each installation every 5 years from 1940 to 1980. However, in some of the less populated sections of the country, where only sparse photo coverage exists, this was not possible.

Aerial photographs of N-TEAD from 1953, 1959, 1966, and 1981 were analyzed to determine the potential environmental impact of past and present installation activities. With the exception of the 1981 low altitude color infrared imagery, all analyses were performed with black and white imagery flown at scales ranging from 1:20,000 to 1:24,000. A 1:27,790 scale mosaic of the Tooele Army Depot was constructed from the 1966 imagery. Potentially hazardous sites, ground scars, and surface drainage are annotated on the mosaic. A complete listing of the sites with a description of the changes that occurred between each interval of coverage was provided. Black and white enlargements of seven significant areas of the installation were also provided.

1.2.3.6 Final Interim RCRA Facility Assessment, Tooele Army Depot - North Area, EPA Contract No. 68-01-7310, December 1987

The RCRA facility assessment (RFA), performed by the NUS Corporation (NUS), is designed to evaluate releases of hazardous waste or hazardous constituents and to identify corrective actions, as necessary, under the Hazardous and Solid Waste Amendments of 1984. The RFA provides information on Solid Waste Management Units (SWMUs) at RCRA facilities, evaluates the potential for releases to the environment, and determines the need for further investigation.

Initially, NUS conducted a review of existing EPA files on Tooele to develop a preliminary list of SWMUs and potential releases. A visual site inspection was conducted from 11 May through 13 May 1987 to add information to the RFA, provide visual confirmation of SWMU characteristics and releases, identify additional SWMUs, and identify locations and rationale for onsite sampling, if required, at a later date (NUS, 1987).

A total of 29 SWMUs were identified at N-TEAD based on a review of available literature. Figure 1-9 shows the locations of the 29 SWMUs at N-TEAD, which are listed below.

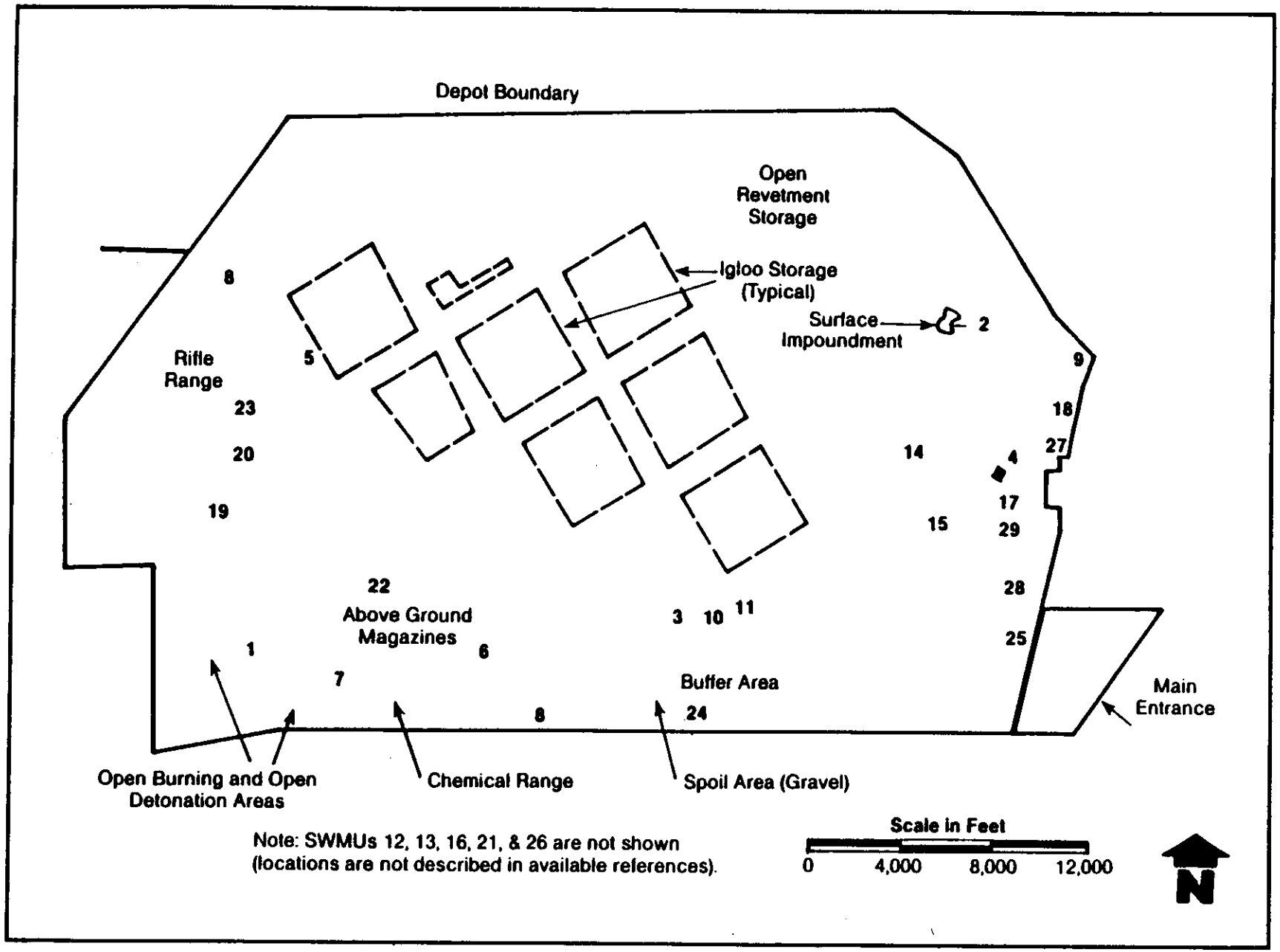

FIGURE 1-9 LOCATION OF SOLID WASTE MANAGEMENT UNIT (SWMUs) ON N-TEAD

The conclusions and recommendations of this report for each unit are listed below:

- Unit No. 1: Demolition Grounds - Even though the potential for groundwater contamination was considered to be low, a groundwater sampling investigation was proposed for this unit because of the large area affected by demolition activities, the confirmed presence of soil contamination, and the location of this unit in a major groundwater recharge area.

- Unit No. 2: Industrial Wastewater Lagoon and Outfall Area - Extensive groundwater and soil contamination occurred as a result of waste disposal operations at this unit. Because this unit was the subject of a RCRA closure investigation, recommendations for further action were deferred to the U.S. EPA and state RCRA programs.

- Unit No. 3: L-23 Pond - There was a potential for releases to soils and groundwater associated with this unit. A sampling investigation was recommended to determine whether the unit has affected groundwater.

- Unit No. 4: Sandblast Area - The potential for releases from this unit was considered low. No further action was recommended pending a thorough evaluation of waste handling practices and inspection of the unit.

- Unit No. 5: K-281 PCB Spill - There was a potential for soil and possibly particulate air contamination associated with this unit. A sampling investigation was recommended to sample surface soils for PCBs, dichlorobenzenes, and trichlorobenzenes to locate the spill.

- Unit No. 6: Surveillance Test Range - The potential for significant releases from this unit was considered low. No further action was recommended.

- Unit No. 7: Chemical Range - The potential for significant releases from this unit was considered low. No further action was recommended at this time.

- Unit No. 8: Firing Ranges - The potential for significant releases from this unit was considered low. No further action was recommended at this time.

- Unit No. 9: Radioactive Waste Storage Area - Little was known about waste volumes and waste handling operations at this unit. It was recommended that additional data be gathered regarding this unit and a

sampling investigation be conducted to determine whether or not radioactive wastes are present.

- Unit No. 10: Bomb Washout Facility - Studies performed at this unit documented the existence of widespread soil and groundwater contamination associated with the evaporation/infiltration ponds. Because the unit was the subject of a CERCLA investigation, recommendations for further action were deferred to the U.S. EPA and state programs overseeing the investigation.

- Unit No. 11: Laundry Effluent Ponds - Soil and groundwater contamination was attributed to this unit. However, the major effect of the unit may have been the periodic overflow from this unit inundating the nearby TNT Washout Facility and evaporation/infiltration ponds and transporting washout wastes to the water table through infiltration through site soils. Corrective measures were recommended to prevent further overflows from the unit, followed by an RI to determine the effect of the effluent ponds on soils and groundwater.

- Unit No. 12: Pesticide Storage Facility (Building 518) - The main concern regarding environmental impacts at this unit centered on the past practice of dumping drummed wastes on the ground outside the unit. A sampling investigation was recommended to determine whether soils were contaminated. Soils were recommended to be analyzed for pesticides/herbicides. It was recommended that the need to sample and analyze groundwater be assessed after soil data are evaluated.

- Unit No. 13: Hazardous Wastewater Storage Tanks - There was no mention in the files of any release from this unit, and containment structures, if properly designed, constructed, and maintained, should be adequate to prevent releases in the event of a spill. No further action was recommended at this time pending inspection of the unit and a thorough analysis of waste handling practices.

- Unit No. 14: Sewage Lagoons - Groundwater sampling at this unit revealed elevated levels of nickel, nitrate, zinc, chloride, fluoride, sulfate, gross beta, sodium, and trichloroethene. An RI structured to determine the extent of groundwater and soil contamination was recommended.

- Unit No. 15: Sanitary Landfill - There was a significant potential for groundwater contamination associated with this unit because of past waste disposal practices. A sampling investigation was recommended to determine whether groundwater has been affected.

- Unit No. 16: Septic Tanks - The potential for soil and groundwater contamination with hazardous constituents was regarded as low for this unit. No action beyond the ongoing periodic sampling was recommended. The sampling parameters for each septic tank should be reviewed to ensure that the analytes are appropriate for the activities associated with the building serviced by the septic tanks.

- Unit No. 17: Maintenance/Storage Area - Available literature mentioned a spill of PCB oil occurring at this unit. A sampling investigation was recommended to determine whether PCB-contaminated soils exist at the site. Analyses should also include dichlorobenzenes and trichlorobenzenes.

- Unit No. 18: Radioactive Waste Storage (Building S-659) - No further action was recommended at this unit since no spills were documented and the wastes were reportedly handled in an EPA-approved manner.

- Unit No. 19: Ammunition Equipment Office (AEO) Demilitarization Facility - No action was recommended at this unit as the potential for releases to the environment was regarded as low and there was no record of any problems associated with the unit.

- Unit No. 20: AEO Deactivation Furnace Site - If this unit operated without air pollution equipment for any length of time, the potential exists for deposition of metal-contaminated particulates on surrounding soils. Information concerning the date the existing baghouse was installed was needed to evaluate the potential for soil contamination. If this potential is confirmed, soil sampling around the unit was recommended to define the extent of contaminated soil.

- Unit No. 21: Deactivation Furnace, Building 1320 - If this unit operated without air pollution equipment for any length of time, the potential exists for deposition of metal-contaminated particulates on surrounding soils. Information concerning the date the existing baghouse was installed was needed to evaluate the potential for soil contamination. If this potential is confirmed, soil sampling around the unit was recommended to define the extent of contaminated soil.

- Unit No. 22: Building 1303 and Leaching Pond - There appeared to be a significant potential for soil and groundwater contamination because of waste handling operations at this unit. A sampling investigation was

recommended to evaluate soil and groundwater quality in the area of the leaching pond.

- Unit No. 23: Bomb and Shell Reconditioning Building - Specifics regarding waste handling practices were not described in the available literature. However, the potential for releases was considered low since the wastes were reportedly handled in accordance with Army and U.S. EPA policies. No further action was recommended at this time pending inspection of the unit and review of waste handling practices.

- Unit No. 24: Tire Disposal Site - No further action was recommended for this unit at this time because no known hazardous wastes are disposed at this unit and the release of hazardous constituents was considered unlikely.

- Unit No. 25: Battery Pit - Acid wastes and lead were dumped at this unit. Soils should be sampled and analyzed for pH and metals to determine the extent of waste migration/mobilization in subsurface soils. The need for groundwater monitoring should be based on analysis of soil sampling data.

- Unit No. 26: Battery Shop - No further action was recommended at this unit because the current waste handling practices within the shop appear to be adequate pending inspection of the unit.

- Unit No. 27: DPDO Storage Yards - Additional information concerning the types of wastes handled at this unit and the methods of wastes handling and storage was needed to evaluate the potential for spills. If no additional information was available, a limited surface soil sampling program was recommended.

- Unit No. 28: Permanent Drum Storage Area - This unit was periodically inspected by state officials. Since no documentation of releases from this unit was found, no further action beyond the ongoing inspections was recommended.

- Unit No. 29: 90-Day Drum Storage Area - This unit was periodically inspected by state officials. Since no documentation of releases from this unit was found, no further action beyond the ongoing inspections was recommended.

1.2.3.7 Industrial Wastewater Lagoon and Ditches - Groundwater Quality Assessment Report, Corrective Action Plan, and Record of Decision

Under the terms of the Consent Decree (Civil C85-C-1080G) filed on 13 January 1986 in the U.S. District Court for the District of Utah, Central Division, the State of Utah has required the Tooele Army Depot to conduct a Groundwater Quality Assessment (GWQA) in the vicinity of the IWL. The GWQA Engineering Report, Corrective Action Plan, and Record of Decision (ROD) were prepared by James M. Montgomery Consulting Engineers, Inc. (JMM) for the U.S. Army Corps of Engineers.

The purpose of the GWQA was to define the extent and magnitude of groundwater contaminated by industrial wastewater leaking from the IWL. The GWQA was divided into three phases. The objective of Phase I was to characterize the geologic conditions and groundwater flow regime in the vicinity of the IWL. Phase I activities included the installation of 28 dual-point and three single-point piezometers, the construction and testing of two test wells, borehole geophysical logging, a surface gravity survey, bedrock coring and permeability testing in three boreholes, and periodic groundwater level measurements in each of the piezometers. Phase I was carried out between 31 March 1986 and 28 August 1986. The objective of Phase II was to estimate the extent and magnitude of groundwater contamination in the vicinity of the IWL. The primary activities conducted during Phase II included the installation of 25 monitor wells and the collection and analysis of two rounds of groundwater samples from the TEAD monitoring network. Phase II was initiated on 10 June 1986 and culminated with the submittal of a GWQA Engineering Report. The objective of Phase III was to analyze remedial alternatives to mitigate the potential threat to human health and the environment by groundwater contamination at TEAD.

The following conclusions were presented in the GWQA report (JMM, 1987):

- Although other hazardous constituents were also present to some degree, TCE was detected in groundwater samples more often and at higher concentrations than any other contaminant. Metals such as lead, cadmium, and arsenic are attenuated by the alkaline soil and sludge beneath the IWL and wastewater ditches.

- The extent of chromium contamination is limited to the immediate vicinity of the wastewater ditches. Few of the concentrations exceeded drinking water standards.

- Volatile organic compounds (VOCs), particularly trichloroethane and carbon tetrachloride, have created areally extensive plumes in the groundwater system, but neither of the plumes approach the size of the TCE plume. In addition, few of the VOC concentrations

exceed proposed drinking water standards. Therefore, because of the large plume and the low proposed maximum contaminant level (MCL) (5 ug/L), TCE is the primary contaminant of concern in the groundwater system.

- TCE concentrations in groundwater ranged from less than 0.1 ug/L to 230 ug/L. The highest concentrations were detected in samples from monitor wells completed adjacent to the wastewater ditches south of the IWL. The concentrations decrease with distance from the wastewater ditches and are lowest near the northern boundary. The plume has been estimated to be at least 260 feet thick and contains an estimated 45 billion gallons of groundwater with TCE concentrations greater than 5 ug/L. The estimated volume was later revised to 36 billion gallons (JMM, 1989a).

- The maximum rate of groundwater movement occurs in areas to the west and northwest of the IWL in the alluvial aquifer. In these areas, the rate of movement of the contaminant plume was estimated to be 700 to 1,200 feet per year. Contaminant velocities in other parts of the aquifer are much lower, specifically beneath the wastewater ditches and in the bedrock block.

- The range of contaminant velocities reported above are sufficiently high to enable TCE-contaminated groundwater to migrate offsite. TCE-contaminated groundwater may be present north of the TEAD boundary, although the 5 ug/L isoconcentration line does not extend past the northern boundary (JMM, 1989a).

The Corrective Action Plan for Ground-Water Remediation (JMM, 1989a) and the ROD for Ground-Water Remediation (JMM, 1989b) summarized the results of the GWQA and outlined remedial objectives and alternatives for the remediation of contaminated groundwater. The screening of technologies yielded a conceptual remedial system. Under the proposed plan, groundwater would be pumped from extraction well fields near the northern boundary of N-TEAD, passed through an air-stripper treatment system, and returned to the aquifer through an injection well field. A three-dimensional groundwater flow and contaminant transport model will be used to predict extraction and injection rates, the duration of remediation, well locations, and impacts on the groundwater system in the vicinity of N-TEAD. Remediation was estimated to require up to 30 years of operation to meet cleanup levels outlined in the ROD.

1.2.3.8 Preliminary Assessment/Site Investigation Report

Under the direction of USATHAMA, EA Engineering, Science, and Technology (EA) was contracted in 1986 to conduct a preliminary assessment/site investigation (PA/SI) of TEAD. The objectives of the PA/SI were to: (1) use the existing database to identify

TEAD sites that presented a known or potential threat to the environment and/or public health and welfare as a result of past installation activities; (2) determine the existence of environmental contamination, if any, in soils, groundwater, and surface water at those sites identified; (3) evaluate the potential for offsite contaminant migration; and (4) identify any off-post sites that may be impacting the environmental quality of TEAD (EA, 1988).

Following a review of the available database and performance of the onsite visit, a field sampling design plan was prepared that described nineteen N-TEAD sites and three off-Depot sites identified as potential sources of environmental contamination. Of these sites, four N-TEAD sites were considered to present a significant potential threat to the environment and/or public health and welfare: (1) the TNT Washout Facility; (2) the former transformer storage area; (3) a PCB spill site; and (4) the open burn/open detonation (OB/OD) grounds.

The PA/SI field effort at the TNT Washout Facility involved the installation of five monitor wells (four shallow and one deep) and four lysimeters and the sampling/analysis of groundwater from existing and previously installed wells, surficial soils, wastewater and sediment from the active laundry effluent pond, sediment from the new TNT washout E/P pond, and soils from four old TNT washout E/P ponds. All samples were analyzed for explosives, the major contaminant of concern, and selected samples were analyzed for metals and organic priority pollutants. The major findings of the PA/SI activities performed in this area are summarized below:

- The bottom sediment and the soil directly beneath (to a depth of a least 5 feet below) the old TNT washout E/P ponds was found to be contaminated with significant levels of various explosive compounds. Bottom sediment samples analyzed contained TNT at concentration levels as high as 20,733 ppm.

- The bottom sediment within the new TNT washout E/P pond was found to be contaminated with relatively low levels of TNT (11.3 ppm) and nitrobenzene (19.5 ppm).

- Surficial soils in the vicinity of the old TNT washout E/P ponds were not found to be contaminated with explosives.

- The deep regional aquifer beneath the site, which is used as a drinking water source, was not found to be contaminated with explosives in excess of certified reporting limits. However, significant levels of sodium (220,000 ppb) and nitrate/nitrite nitrogen (61,000 ppb) were detected.

- Effluent within the active laundry effluent pond was found to contain various metals; however, no concentrations exceeded Federal and state water quality standards. Nitrate/nitrite nitrogen was detected in both effluent and sediment at levels of 1,180 ppm and <0.2 ppm, respectively. No volatile organics, BNA(s), or explosives were detected in the effluent or sediment.

- A shallow perched groundwater zone was found in the immediate vicinity of the active laundry effluent pond as a result of effluent seepage from the pond. This perched groundwater was found to contain detectable levels of explosive compounds. Based on the data obtained, it appears that the laundry effluent pond provides a mechanism for the mobilization of explosives in subsurface soils at the site.

- The potential exists for the migration of explosives from the perched groundwater zone to the deeper regional aquifer. However, whether the perched groundwater zone is in direct communication with the deep regional aquifer beneath the site could not be determined from this study with certainty. Available data suggests that it may not be.

The PA/SI recommended that TEAD either relocate or discontinue operation of the laundry effluent pond or install an impermeable liner beneath the pond. The performance of soil borings and the installation of additional monitor wells (screened into the deep regional aquifer and the perched groundwater zone) was also recommended to further determine the presence and extent of subsurface explosives contamination at the site. Furthermore, it was recommended that a health risk/endangerment assessment be performed from the available database of information for the site.

Composite surficial soil samples were collected during the PA/SI at two sites identified as potential sources of PCB contamination: the former transformer storage area and a PCB spill site. The highest PCB concentration detected was 0.19 ug/g. The Federal regulations (40 CFR 761D) for PCBs require contaminated soils with PCB concentrations greater than 50 ug/g to be removed and properly disposed of. These regulations do not apply to soils containing PCB concentrations less than 50 ug/g. Results of PCB determinations conducted on the samples obtained indicated that the former transformer storage area and PCB spill site do not present a threat to the environment or to the public health and welfare.

The OB/OD grounds, located in the southwest corner of N-TEAD, have been used extensively for the detonation of conventional

munitions. The sampling of surficial soils within the detonation pits during a previous investigation revealed the presence of explosives. Two Depot water supply wells are located downgradient of this area; therefore, a potential public health risk was considered to exist. Due to the great depth to groundwater (>700 feet) and the potential for unexploded ordnance in the area, groundwater monitor wells were not installed at the site. Instead, water samples were collected from the two downgradient drinking water supply wells for priority pollutant and explosives content determination in order to evaluate if the supply wells had been adversely impacted. Results of the sampling and analysis showed that the water quality of both wells had not been impacted from activities conducted at this site.

Eight sites at N-TEAD were assessed during the PA/SI by records review, personnel interviews, and an onsite visit, and were found not to present a significant potential for environmental contamination. These sites were: (1) the transformer boxing site; (2) the radiological storage facility; (3) the pesticide/herbicide storage facility; (4) the x-ray lagoon; (5) the sewage lagoons; (6) the PCB storage facility; (7) the domestic wastewater spreading grounds; and (8) the staging area near the Surveillance Test Site. In addition, an off-Depot site (the Hercules Coal Resin Facility) was determined not to present a significant threat to the groundwater quality of N-TEAD. The potential impact of two other off-Depot sites investigated (Bauer Mine Tailings and Anaconda Deep Mine sites) on the quality of groundwater at N-TEAD was not determined due to the unavailability of groundwater analytical chemistry data for the sites.

The PA/SI further recommended that soils in the Drum Storage Areas, Chemical Range, and Old Burn Area (Surveillance Test Site) be sampled and analyzed to determine the presence/absence of contamination in these areas. If soils proved to be contaminated, it was further recommended that monitor wells be installed at these sites to determine if groundwater contamination had also occurred.

A visual inspection of the bottom liner within the x-ray lagoon was recommended. The installation of groundwater monitor wells was recommended if the integrity of the liner was found to be compromised.

The installation of a minimum of three groundwater monitor wells around the perimeter of the Sanitary Landfill was recommended to evaluate the potential existence of groundwater contamination at this site.

The PA/SI also stated that a potential for soil contamination exists at the TEAD rail shops located at Hill Air Force Base (HAFB). The U.S. Air Force has included, and is currently

investigating, this site as part of its IRP Phase II Field Investigation of sites at HAFB. It was recommended that further activities for this site be based on the results and findings of the Air Force's Phase II Sampling and Analytical Program.

1.2.3.9 Summary of Previous Findings at the TNT Washout Facility

This subsection presents the findings of previous studies at the TNT Washout Facility. Sampling and analysis programs at the TNT Washout Facility have been performed by AEHA (1981), Ertec (1982), and EA (1988). The results of these studies have been summarized in the previous subsections, but are presented here in more detail and completeness. Sampling and analysis programs have not been conducted at the other four site areas investigated during this RI.

The subsurface conditions at the TNT Washout Facility have been described in the PA/SI based on soil borings by Ertec and EA as consisting of approximately 80 feet of unconsolidated lacustrine (former Lake Bonneville) deposits underlain by unconsolidated valley alluvial deposits. The unconsolidated lacustrine deposits are comprised of very fine sands, silt, and clay. Cross sections of the underlying deposits in the TNT Washout Facility developed by EA are provided in Figures 1-10, 1-11, and 1-12. Physical property analysis of a soil boring sample obtained from the bottom depth of the former TNT washout E/P ponds classified the materials as a fine sand with little or no silt or clay (SP) having a moderate permeability of 1.2 to 1.5 x 10^{-3} cm/sec.

Laboratory analysis of soil samples obtained by AEHA (1981) from a borehole approximately 35 feet west of old ponds 2 and 3 from depths of 26 to 78 feet below land surface classified the subsoils as silts and clays (ML and CL) having a relatively low permeability rate of 3.22 x 10^{-6} cm/sec to 4.42 x 10^{-7} cm/sec (Table 1-1). A general fining gradation with depth was reported within the lacustrine deposits. Thin alternating layers of clay and sand (2 to 3 inches in thickness) were also reported within the lacustrine deposits from a depth interval of approximately 40 feet below land surface to the terminal depth of the borings. The unconsolidated valley alluvial deposits are comprised of coarse gravels, sand, and silt. The actual thickness of the alluvial deposits and the total depth to bedrock at the site is not known. However, based upon regional data provided in Ertec (1982), the thickness of these deposits and the total depth to bedrock in the area of the TNT Washout Facility is estimated to be 1,420 and 1,500 feet, respectively.

The PA/SI also identified perched groundwater conditions within the immediate vicinity of the laundry effluent pond at the site. In this area of the site, continuous effluent seepage from the pond was sufficient to overcome the specific retention of the

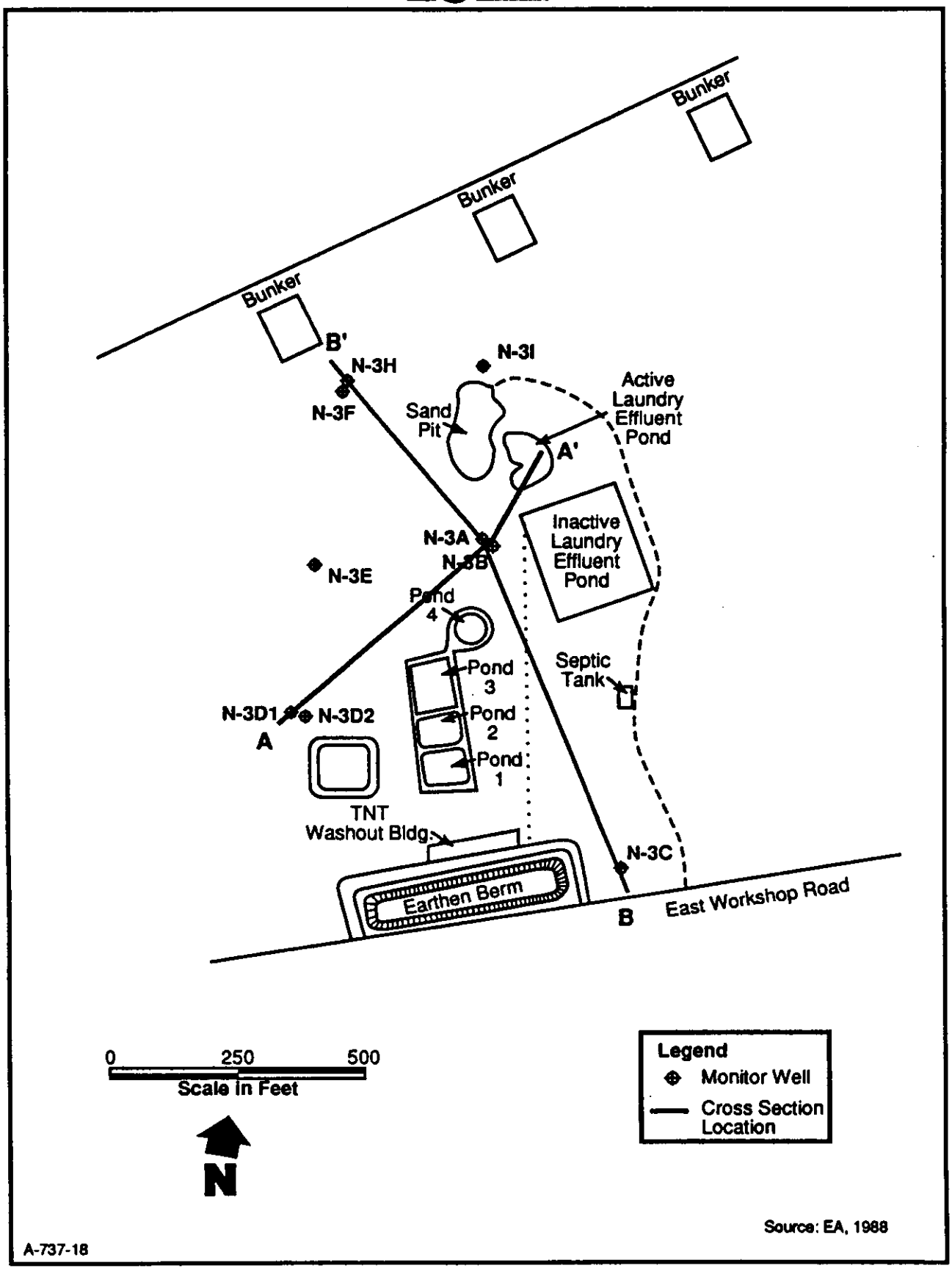

FIGURE 1-10 TNT WASHOUT FACILITY, PLAN VIEW OF CROSS-SECTIONS FROM PA/SI

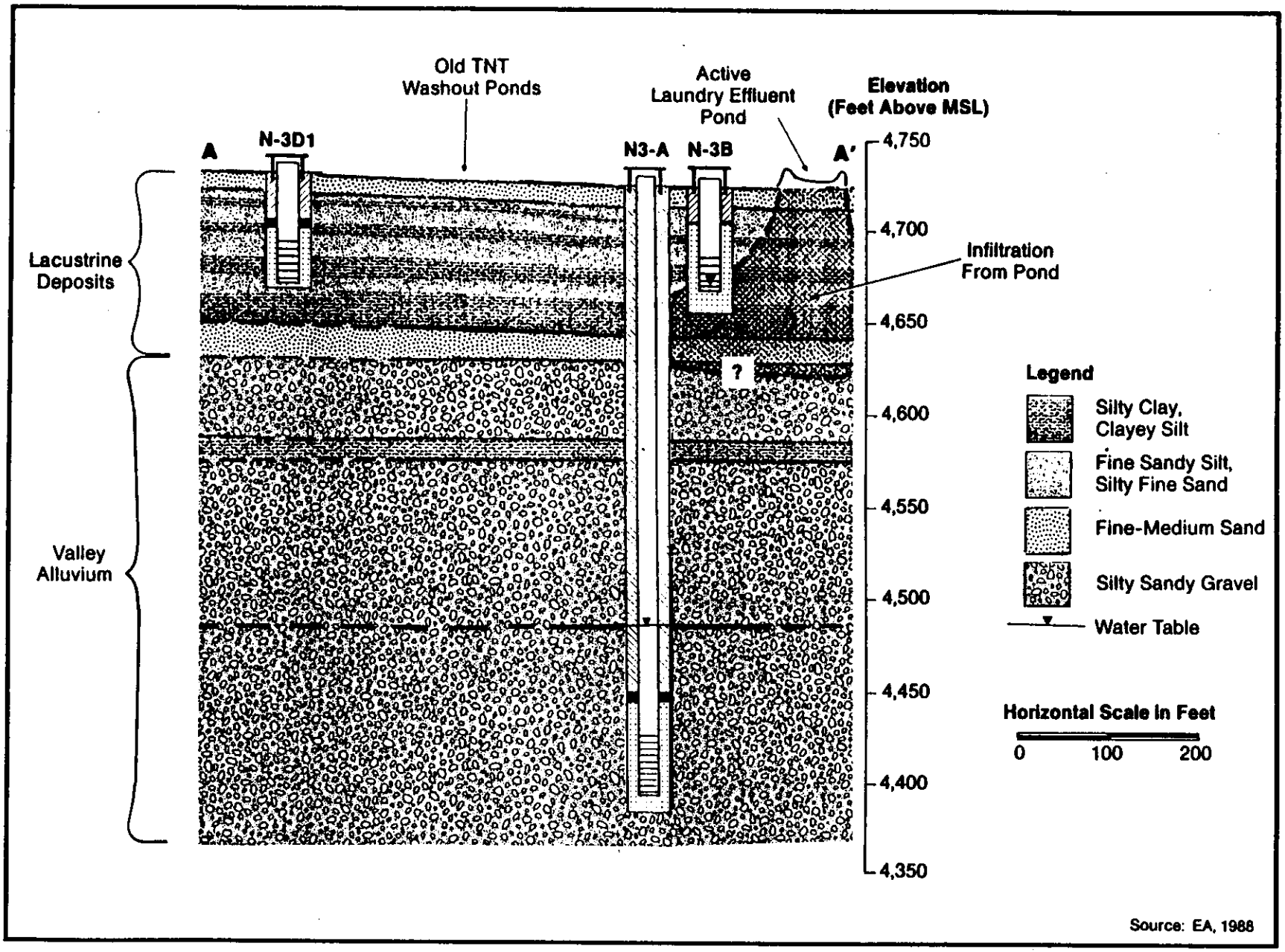

FIGURE 1-11 HYDROGEOLOGIC CROSS-SECTION A-A', TNT WASHOUT FACILITY

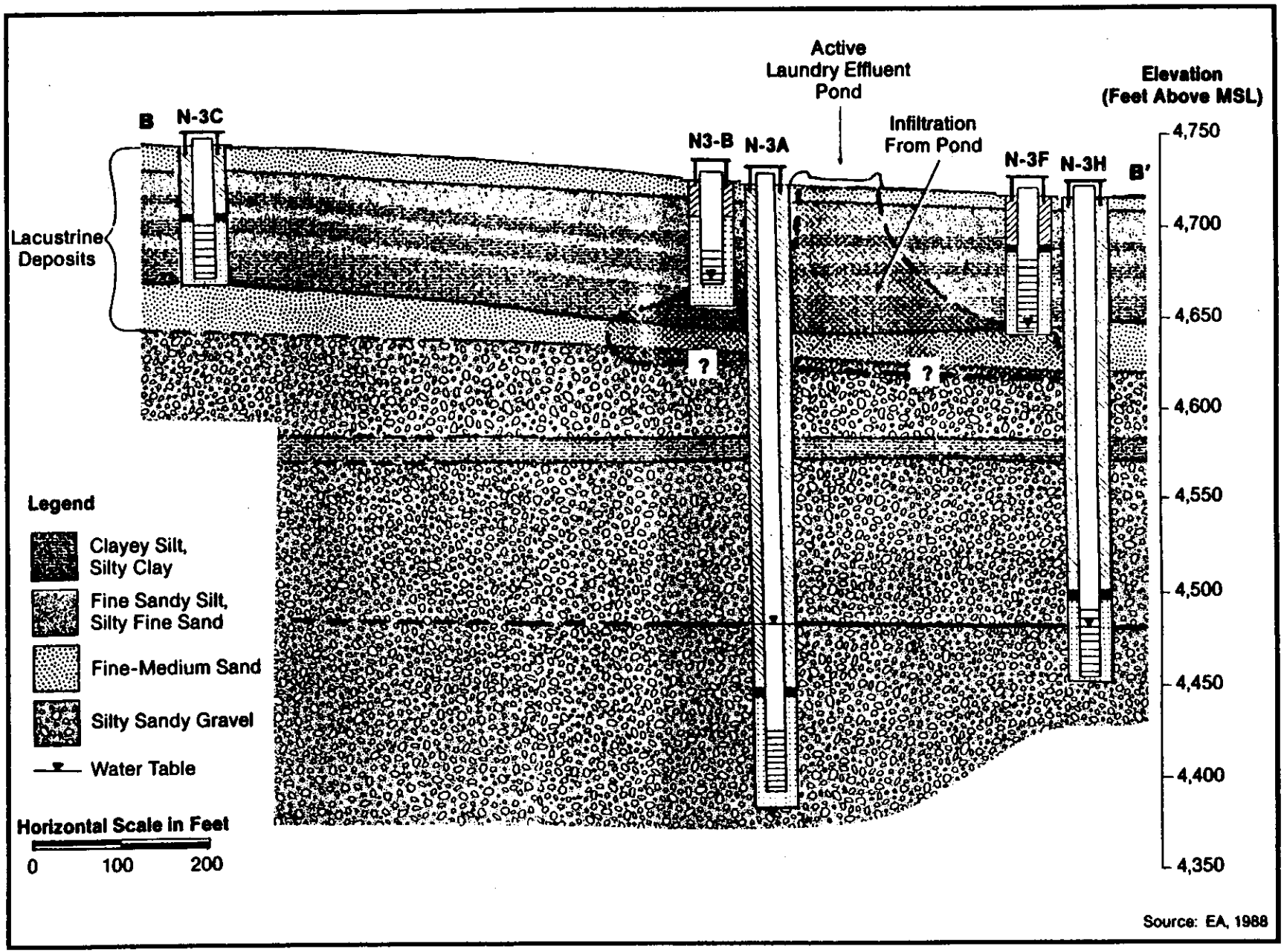

FIGURE 1-12 HYDROGEOLOGIC CROSS-SECTION B-B', TNT WASHOUT FACILITY

Table 1-1

Physical Properties of Subsurface Soil Samples
Collected by AEHA at the TNT Washout Facility,
August 1981

Depth of Sample (ft)	26-28	43-44	76-78	76-78
Sample Type	Bag	Bag	Bag 3A	Bag 3B
Grain Size Analysis				
% Passing No. 4 (sieve)	99.8	100.0	100.0	100.0
% Passing No. 10 (sieve)	99.7	100.0	100.0	100.0
% Passing No. 20 (sieve)	99.4	99.9	100.0	100.0
% Passing No. 40 (sieve)	98.8	99.7	99.9	99.9
% Passing No. 100 (sieve)	96.2	99.2	98.9	99.0
% Passing No. 200 (sieve)	83.8	93.6	86.8	90.8
Atterburg Limits				
Liquid Limit W_L	24.7	28.8	26.7	27.9
Plastic Limit W_P	18.4	20.6	22.8	22.3
Plastic Index I_P	6.3	8.2	3.9	5.6
Unified Soil Classification	CL-ML	CL	ML	ML
Permeability (K), cm/sec (remolded samples)	3.22×10^{-6}	2.24×10^{-7}	4.42×10^{-7}	---
Specific Gravity		2.634		

Note: Borehole location was approximately 35 feet west of ponds 2 and 3.

Source: AEHA (1981).

formation and clay smeared borehole to supply water (effluent) to wells N-3B, N-3F, and N-3I (Figure 1-10) (EA,1988). Naturally occurring wet-to-saturated formation conditions were also encountered within the screened interval of the lacustrine deposits at all other well/lysimeter locations. However, the wet conditions were not sufficient to overcome the specific retention of the formation and the clay-smeared boreholes; therefore, water was not supplied to the wells and lysimeters at these locations (EA, 1988). The regional water table aquifer occurs at a depth of approximately 240 feet beneath the site. The direction of groundwater flow within the regional aquifer is assumed to occur in a general northerly direction based on regional and site-specific topographic data (EA, 1988). The nearest water supply well in a downgradient direction of the TNT Washout Facility lies approximately 5 miles to the north.

The installation of additional deep and shallow wells at the TNT Washout Facility during the RI provided further information on the subsurface conditions and the nature of contaminant migration in this area. The chemical results are presented in Section 4.

The results of previous investigations by AEHA, Ertec, and EA at the TNT Washout Facility are presented below. The results are presented for four separate units within the area that were identified as either contaminated or are a potential source of environmental contamination. These units are:

- The old TNT washout E/P ponds.
- The new TNT washout E/P pond.
- The laundry effluent ponds.
- The area of surface contamination.

Old TNT Washout E/P Ponds

The old TNT washout E/P ponds were located approximately 100 feet due north of Building 1245 (Figure 1-13). They consisted of a series of four unlined, bermed evaporation/percolation ponds encompassing a combined area of approximately 1 acre. The ponds received rinse waters containing residual explosives during washout facility operation. The ponds were also reported to periodically overflow/flood onto the surrounding ground surface (Ertec, 1982).

In August 1981, the U.S. Army Environmental Hygiene Agency (AEHA) conducted limited sampling and analysis of soils in the vicinity of the TNT Washout Facility (AEHA, 1981). A surface sediment sample was obtained from pond No. 2 and a soil boring was drilled at a location approximately 35 feet west of pond Nos. 2 and 3. The soil samples collected were analyzed for TNT, RDX, heavy metals, content, and physical properties determination. The analytical results are shown in Table 1-2. Analysis

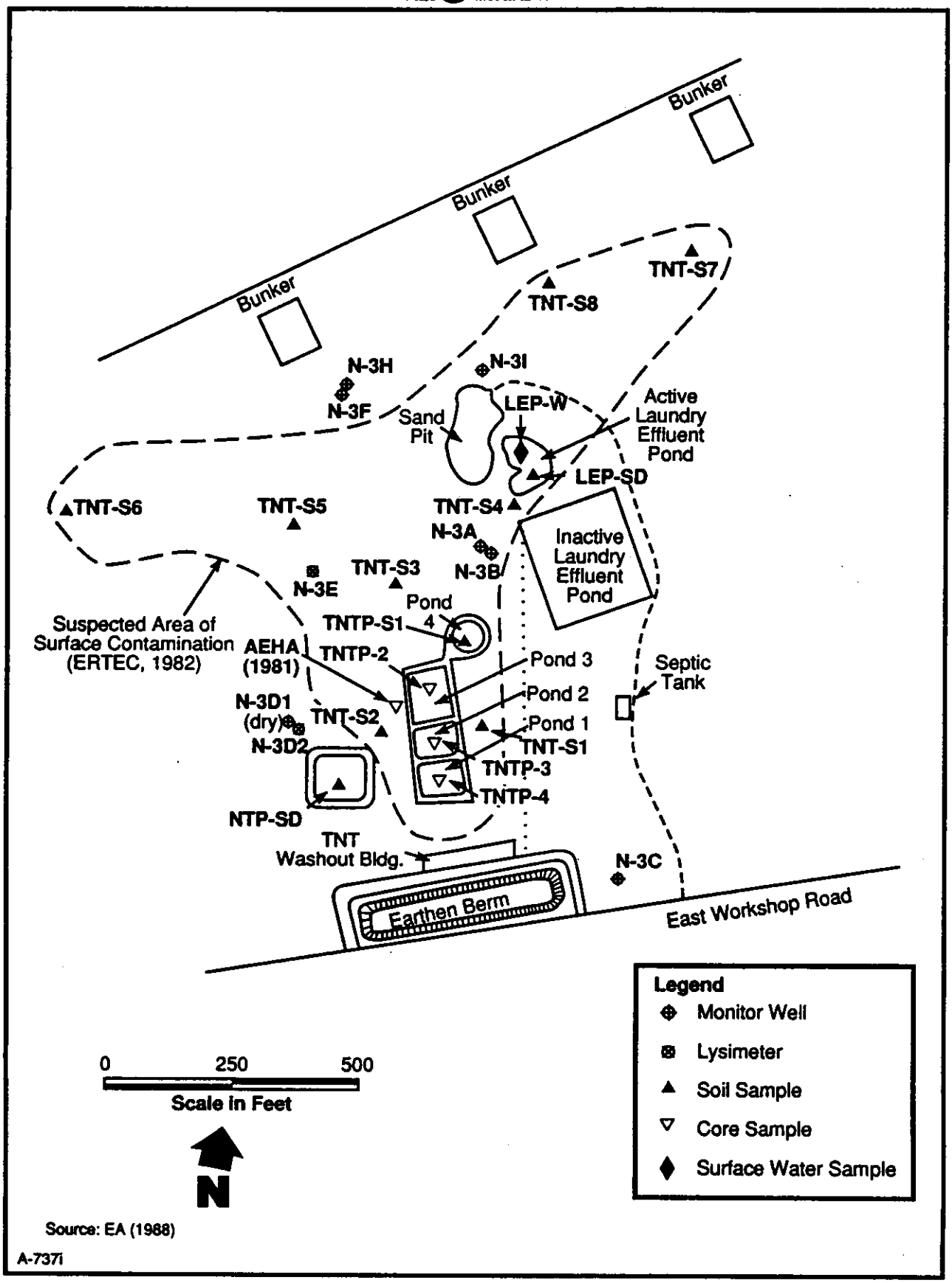

FIGURE 1- 13 TNT WASHOUT FACILITY PREVIOUS SAMPLING LOCATIONS

Table 1-2

Results for Soil Samples Collected by AEHA at the TNT Washout Facility, August 1981

Sample Location	Sample Depth (ft)	Parameter (ppm) TNT	RDX	As	Ba	Cd	Cr	Pb	Hg	Se	Ag
Sediment From TNT Washout Pond No. 2	Surface	57,000	<0.1	<0.50	<10	<0.10	<0.50	<0.50	<0.020	<0.10	<0.50
Borehole	8.5-10	8.7	2.8	<0.50	<10	<0.10	<0.50	<0.050	<0.020	<0.10	<0.50
Borehole	13.5-15	7.1	5.9	<0.50	<10	<0.10	<0.50	<0.050	<0.020	<0.10	<0.50
Borehole	23.5-25	<0.1	18	<0.50	<10	<0.10	<0.50	<0.050	<0.020	<0.10	<0.50
Borehole	26-28	—	—	—	—	—	—	—	—	—	—
Borehole	34-35.5	—	49	—	—	—	—	—	—	—	—
Borehole	43-44	—	—	—	—	—	—	—	—	—	—
Borehole	49-50.5	—	17	—	—	—	—	—	—	—	—
Borehole	74-75.5	—	<0.1	—	—	—	—	—	—	—	—
Borehole	76-78	—	—	—	—	—	—	—	—	—	—

Notes: Concentrations of heavy metals were determined using EP Toxicity methods.
Borehole location was approximately 35 feet west of ponds 2 and 3.

Source: AEHA (1981).

of the pond surface sediment sample showed a high concentration of TNT (57,000 parts per million (ppm)). The concentration of RDX and metals in the surface sediment sample was below the detection limit. Results of analyses conducted in the boring samples showed the presence of TNT (7.1 ppm) to a depth of 15 feet. RDX was detected in subsurface soils to a depth of 35 feet below land surface (BLS). The concentration of metals in subsurface soils was below detection limits (EA, 1988).

In 1982, USATHAMA completed an exploratory environmental assessment survey at TEAD (Ertec, 1982) that included an evaluation of the TNT Washout Facility. The results of the exploratory study revealed the presence of RDX (0.013 ppm) and nitrates (264 ppm) in the regional aquifer downgradient of the ponds. In addition, 2,4,6-TNT (0.104 ppm), 2,4-DNT (0.017 ppm), and RDX (0.242 ppm) were detected in soil samples obtained during well installation at depths of 40, 50, and 60 feet, respectively (Tables 1-3 and 1-4) (EA, 1988).

In the fall of 1984, TEAD implemented remedial actions on the washout ponds. The remedial actions included covering the ponds with soil (from the berms of the pond) and clean sand. A PVC liner was then installed over the fill and additional soil placed on top of the liner (EA, 1988).

On 14 January 1985, U.S. EPA, TEAD, and State of Utah personnel inspected the TNT Washout Facility. Based on the findings of the Ertec report, the HRS scoring of N-TEAD, and the onsite inspection, the U.S. EPA determined that the old TNT washout E/P ponds were CERCLA-regulated waste disposal units. The washout evaporation/percolation ponds, collectively, were subsequently proposed for designation as a National Priority List (Superfund) site (Camp, Dresser, and McKee, Inc., 1985; and EA, 1988).

In 1987, EA conducted a sampling program at the old TNT washout E/P ponds for the PA/SI. Sampling included 5-foot core samples from each of the four ponds. Soil samples were collected for explosives and nitrate/nitrite nitrogen analysis at depths of 0 to 4 inches (bottom sediment) and at 1 foot below the original bottom of the pond.

Each of the core sampling locations is shown in Figure 1-13. The analytical results for the samples obtained are summarized in Table 1-5. Results of the textural and permeability analysis classified the material directly underlying the former pond bottoms as a fine sand with little or no fines (SP) having a permeability of 1.2 to 1.5 x 10^{-3} cm/sec.

As indicated in Table 1-5, quantifiable levels of TNT, HMX, 1,3,5-TNB, and 2,4-DNT were detected in soil samples obtained

Table 1-3

Analytical Results for Groundwater and Surface Water Samples Collected by Ertec at the TNT Washout Facility

Parameter	Concentrations (ug/L) Groundwater N-3A	Groundwater N-3B	Laundry Effluent N-SW1	Detection Limit
Volatiles				
1,1,1-TCA	---	---	1.8	2
Semivolatiles				
2-Methyl-4,6-dinitrophenol	---	27	---	40
Explosives				
RDX	13	---	---	2
Metals				
As	---	46	---	4
Ni	33	---	8	4
Zn	38	69	48	3
Cr	11	8	12	20
Cu	---	9	7	6
Pb	46	---	41	30
Anions				
Cl	872,100	>16,700	33,500	1,000
F	>890	6,640	8,850	1,000
NO_3	264,200	22,200	12,200	1,000
SO_4	779,500	>18,500	222,000	1,000
Na	296,000	251,000	19,200	1,000
Gross Beta Radiation (pCi/L)	15±6	15±3	---	6

Source: Ertec (1982).

Table 1-4

Analytical Results for Soil and Sediment Samples Collected by Ertec at the TNT Washout Facility

Sample Location and Interval	Explosives				Metals		Anions			Cations
	2,4-DNT	2,6-DNT	2,4,6-TNT	RDX	Ni	Zn	NO_3	PO_4	SO_4	Na
	Concentrations in ug/g[a]									
N-SD3	—	—	—	—	9	19	—	2,760	>20,400	14,700
N-3A (0.5-1.5 ft)	84	256	31	1,024	7	8	3,330	1,840	>970	1,190
N-3A (10-11.5 ft)	—	—	—	5	—	—	—	—	—	—
N-3A (20-21.5 ft)	—	—	—	19	—	—	—	—	—	—
N-3A (40-41.5 ft)	—	—	104	—	—	—	—	—	—	—
N-3A (50-51.5 ft)	17	—	—	—	—	—	—	—	—	—
N-3A (60-61.5 ft)	—	—	—	242	—	—	—	—	—	—
N-3A (70-71.5 ft)	—	—	—	11		—	—	—	—	—
N-3A (80-81.5 ft)	—	—	—	26	—	—	—	—	—	—
N-3A (90-91.5 ft)	—	—	—	28	—	—	—	—	—	—
Limits of Detection	15	20	5	10	4	3	1,000	800	1,000	1,000

[a]Concentrations are listed as ug/L by Ertec, but appear to be ug/g.

Note: See Figure 1-13 for sample locations.

Source: Ertec (1982).

Table 1-5

Analytical Results for Subsoil Samples Obtained From the Old (Closed) TNT Washout Facility Ponds

Sample Location/No.	Sample Interval (ft below pond bottom)	2,4,6-TNT	HMX	1,3,5-TNB	2,4-DNT	2,6-DNT	1,3-DNB	NB	$NO_3 + NO_2$
		Concentrations in ug/g							
Pond No. 1									
TNTP-4A	0-0.42	1,292	17.6	18.0	<3.4	<0.54	<0.83	<3.8	18.9
TNTP-4B	1.0-1.33	15,080	<9.9	15.3	<3.4	<0.54	<0.83	<3.8	52.8
TNTP-4C	2.0-2.33	8,119	<9.9	11.3	<3.4	<0.54	<0.83	<3.8	48.9
TNTP-4D	3.0-3.33	4,268	17.2	9.5	<3.4	<0.54	<0.83	<3.8	58.5
TNTP-4E	4.0-4.33	68.7	<9.9	7.4	<3.4	<0.54	<0.83	<3.8	55.6
TNTP-4F	5.0-5.33	132.8	<9.9	5.9	<3.4	<0.54	<0.83	<3.8	20.1
Pond No. 2									
TNTP-3A	0-0.42	20,733	95.2	47.0	8.2	<0.54	<0.83	<3.8	60.8
TNTP-3B	1.0-1.33	822	18.2	14.4	<3.4	<0.54	<0.83	<3.8	57.2
Pond No. 3									
TNTP-2A	0-0.33	5.1	<9.9	10.0	<3.4	<0.54	<0.83	<3.8	17.1
TNTP-2B	1.0-1.42	200.7	<9.9	18.4	<3.4	<0.54	<0.83	<3.8	18.9
Pond No. 4									
TNTP-1A	0-0.33	8.6	<9.9	<0.5	<3.4	<0.54	<0.83	<3.8	8.81
TNTP-1B	1.0-1.33	<0.5	<9.9	<0.5	<3.4	<0.54	<0.83	<3.8	18.9

Notes: Units are in ug/g (ppm).
TNT = trinitrotoluene.
HMX = octahydro-tetranito-tetrazocine.
TNB = trinitrobenzene.
DNT = dinitrotoluene.
NB = nitrobenzene.
NO3 + NO2 = nitrate/nitrite as nitrogen.

See Figure 1-14 for sample locations.

Source: EA (1988).

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from each of the ponds, with the most elevated levels of these compounds appearing in samples obtained from pond Nos. 1 and 2 (e.g., the highest TNT concentration levels ranged from 8.6 ug/g and 200.7 ug/g in samples obtained from pond Nos. 4 and 3, respectively, to 20,733 ug/g and 15,080 ug/g in pond Nos. 2 and 1, respectively). Concentration levels for 2,6-DNT and 1,3-DNB were below the certified reporting limit (CRL). Nitrobenzene was not detected in any sample; 2,4-DNT was detected at a concentration of 8.2 ug/g at pond 2 only, and was less than the CRL in all other cases. In addition to a general decrease in explosive concentrations horizontally from south to north (ponds 1 to 4) for the compounds detected, a general decrease in explosive concentrations with depth (vertically) was also evident in most cases (EA, 1988).

New TNT Washout E/P Pond

The new TNT washout E/P pond consists of an unlined, square-shaped depression (approximately 125 by 125 feet) surrounded by a berm (approximately 5 feet) situated west of the old TNT washout ponds and approximately 100 feet northwest of the TNT washout building. This basin reportedly received backwash rinse water from the charcoal filtration system during facility "clean-out" operations and rinse water from a large (35,000 gallons) process water recovery (settling) tank within the washout facility. The charcoal filtration system was installed in 1983 to further aid in the recovery of residual explosives and provide for a "closed loop" washout system. EA reported during their onsite survey (December 1985) that the basin was dry, and no visible evidence of TNT contamination (e.g., pink soils) was observed (EA, 1988). However, during an onsite visit performed by U.S. EPA representatives (Camp, Dresser, and McKee, Inc. 1985) in December 1984, "a certain amount" of standing water was observed within the pond.

A composite sediment sample (NTP-SD) was taken during the PA/SI from the new TNT washout pond and analyzed for explosives and nitrate/nitrite nitrogen content. The analytical results are provided in Table 1-6.

The concentration levels for all other explosive compounds analyzed were less than the CRL. Nitrate/nitrite nitrogen was detected at a level of 0.2 ppm. Based on the sampling and analysis performed, the new TNT washout E/P pond does not appear to be a significant source of explosives contamination at the TNT Washout Facility (EA, 1988).

Laundry Effluent Ponds

Northeast of the old TNT washout E/P ponds are two shallow, unlined laundry effluent holding ponds (Figure 1-13). The northernmost of the ponds receives laundry and shower wastewaters from Building 67 at a reported rate of 7,200 gal/day (Ertec, 1982). Standing water and effluent flow into the pond was

Table 1-6

Analytical Results From PA/SI for Surface Soil Samples Collected From Suspected Overflow Areas at the TNT Washout Facility, 3 March 1987, and for a Composite Sediment Sample From the New TNT Washout Pond

Parameter	TNT-S1	TNT-S2	TNT-S3	TNT-S4	TNT-S5	TNT-S6	TNT-S7	TNT-S8	N-3C	N-3D	N-3E	N-3H	N-3I	(Sediment) NTP-SD
	Concentrations in ug/g													
Explosives														
HMX	<9.2	<9.2	<9.2	<9.2	<9.2	<9.2	<9.2	<9.2	<9.2	<9.2	<9.2	<9.2	<9.2	<14
RDX	<6.69	<6.69	<6.69	<6.69	<6.69	<6.69	<6.69	<6.69	<6.69	<6.69	<6.69	<6.69	<6.69	<12
Nitrobenzene	<9.2	<9.2	<9.2	<9.2	<9.2	<9.2	<9.2	<9.2	<9.2	<9.2	<9.2	<9.2	<9.2	<3.8
1,3-DNB	<0.83	<0.83	<0.83	<0.83	<0.83	<0.83	<0.83	<0.83	<0.83	<0.83	<0.83	<0.83	<0.83	<3.0
1,3,5-TNB	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<4.6
2,4-DNT	<3.4	<3.4	<3.4	<3.4	<3.4	<3.4	<3.4	<3.4	<3.4	<3.4	<3.4	<3.4	<3.4	<2.1
2,6-DNT	<0.54	<0.54	<0.54	<0.54	<0.54	<0.54	<0.54	<0.54	<0.54	<0.54	<0.54	<0.54	<0.54	<3.3
2,4,6-TNT	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<3.3
Tetryl	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Inorganics														
Nitrate/Nitrite (as Nitrogen)	<11.1	<11.1	<11.1	<11.1	<11.1	<11.1	<11.1	<11.1	<11.1	<11.1	<11.1	<11.1	<11.1	0.20

Notes: ND indicates a compound not assigned a certified reporting limit (CRL) and not found above the analytical detection limit.

See Figure 1-14 for sample locations.

Source: EA (1988).

observed during the PA/SI site visit in 1985. The effluent ponds reportedly overflowed onto the surrounding landscape in a northerly direction (Ertec, 1982); the date or period of time when this occurred is unknown. No overflow from the holding pond was apparent during the RI. The southernmost effluent holding pond was originally constructed for the purpose of receiving laundry effluent. It consists of a dry, bermed catchment on the land's surface. Because an adequate gradient was not provided for conveying effluent from the laundry facility to this catchment, it reportedly was never used as a holding pond and never received laundry effluent (EA, 1988).

One surface water sample and one sediment sample were obtained for analysis from the northern laundry effluent pond as part of the exploratory survey of TNT Washout Facility (Ertec, 1982). Analysis of these samples showed no detectable levels of explosive compounds, but relatively high concentrations of sodium, sulfate, and chloride (Tables 1-3 and 1-4). A low concentration level of 1,1,1-trichloroethene (1.8 ug/L) was also detected in the surface water. The effluent holding pond was reported to be the source and mechanism by which contaminants are continually flushed to the underlying aquifers (Ertec, 1982).

One composite surface water (effluent) sample and one composite sediment sample (each comprised of five discrete samples) were obtained from the laundry effluent pond during the PA/SI (EA, 1988). Samples were obtained using grab sampling methods. The sampling locations are shown in Figure 1-13.

Determinations for volatile and BNA(s), explosives, metals, surfactants, and nitrate/nitrite nitrogen were conducted on both samples. Results of parameters detected in the effluent and sediment samples are summarized in Table 1-7. No volatile organics, BNA(s), or explosives were detected in the water or sediment samples. A number of metals were found at detectable concentrations; however, no concentrations exceeded the Federal or state drinking water standards. Nitrate/nitrite (as nitrogen) in water and sediment were at levels of 1,180 mg/L and <0.2 ug/g, respectively. The disparity in the results between the aqueous and sediment samples in the PA/SI indicated that these forms of nitrogen are present mainly in the dissolved state. The elevated level of nitrate/nitrite detected in the aqueous sample was also concluded to be due to detergents containing nitrate/nitrite (EA, 1988).

Table 1-7

Analytical Results From PA/SI (EA, 1988) for a Wastewater and Sediment Sample Collected From the Laundry Effluent Pond, TNT Washout Facility, 3 March 1987

Parameter	Sediment N-LEP-SD (ug/g)	Effluent N-LEP-W (ug/L)
Explosives	BCRL	BCRL
Volatile Organics	BCRL	BCRL
BNA(s)	BCRL	BCRL
Inorganics		
Cyanide, Total	---	<30
Nitrate/Nitrite (as Nitrogen)	<0.2	1,180
Metals		
Antimony	<0.35	11.2
Arsenic	4.3	2.7
Barium	39.8	61
Beryllium	<0.042	<0.83
Cadmium	<0.6	<12
Chromium	5.5	15
Copper	4.0	32
Lead	2.44	4.4
Mercury	<0.22	<1.1
Nickel	5.1	<65
Selenium	<0.13	<2.5
Silver	0.020	0.15
Sodium	400	320,000
Thallium	<0.085	<1.7
Zinc	16.2	80

Notes: BCRL = Below certified reporting limit for all parameters tested.

See Figure 1-14 for sample locations.

Elevated levels of sodium were detected in both the water (320,000 mg/L) and sediment samples (400 ug/g). It was concluded in the PA/SI that these levels of sodium are due to the natural saline soil conditions prevalent at N-TEAD.

Area of Surface Contamination

The old TNT E/P washout and laundry effluent ponds reportedly overflowed and/or flooded, which potentially resulted in the contamination of the surrounding soils with explosive compounds. Soil samples obtained and analyzed by Ertec (1982) during borehole drilling of well N-3A, which was installed within the reported area of surface contamination, contained 2,4-DNT, 2,6-DNT, 2,4,6-TNT, and RDX (Table 1-4). The potential area of surface contamination, as delineated by Ertec (1982), is shown in Figure 1-13.

A total of 13 surface soil samples were obtained during the PA/SI (EA, 1988) throughout the TNT Washout Facility for explosives and nitrate/nitrite nitrogen content determination. Eight samples were collected from within an area defined by Ertec (1982) as having a high potential for surface contamination, and a total of five additional samples were obtained at each of the well/lysimeter locations. Samples were obtained from a depth of approximately 1 foot. The sampling locations are shown in Figure 1-13. The analytical results are provided in Table 1-6. The concentrations of explosive compounds in all samples collected were below the CRL. Nitrate/nitrite nitrogen was detected in seven of the 13 samples at relatively low concentrations ranging from 0.28 to 0.89 ug/g.

Groundwater Sampling and Analysis

The location of groundwater monitor wells installed by Ertec and by EA during the PA/SI at the TNT Washout Facility are shown in Figure 1-13. Monitor wells N-3A and N-3H were screened in the deep regional aquifer, which is used as a water supply source at the Depot and surrounding area. All other monitor wells at the site were screened at a depth interval that intercepts perched groundwater at the site.

Wells N-3C and N-3D1 were reported dry at the time of sampling; therefore, groundwater samples were not collected at these locations. Also, it was reported that samples could not be obtained from the lysimeters (N-3D2 and N-3E) at the time of sampling. The localized presence of groundwater in the shallow monitor wells N-3B, N-3F, and N-3I was concluded to be the direct result of effluent seepage from the active laundry effluent pond. It was further concluded that this seepage does not appear to extend (horizontally) beneath the TNT Washout Facility (EA, 1988).

Groundwater samples were analyzed for volatile and BNA(s), explosives, metals, cyanide, and nitrate/nitrite nitrogen. Table 1-8 presents a summary of the parameters detected.

Table 1-8

Analytical Results From PA/SI for Samples From Monitor Wells
Located at the TNT Washout Facility,
28 February 1987

Parameter	Monitor Wells N-3A (Deep)	N-3H (Deep)	N-3B (Shallow)	N-3F (Shallow)	N-3I (Shallow)	Utah Standards	U.S. EPA Water Quality Criteria[a]
	Concentrations in ug/L						
Volatile Organics							
Chloroform	ND	ND	ND	ND	2	—	100
Toluene	2	13	ND	ND	6	—	15,000
BNA(s)							
Benyl alcohol	ND	ND	ND	ND	8	—	—
Butyl benzyl phthalate	ND	ND	ND	ND	ND	—	—
Bis (2-ethylhexyl) phthalate	ND	10[b]	ND	ND	ND	—	—
Phenol	ND	1	ND	ND	3	—	3,500
Explosives							
HMX	<5.1	<5.1	17.6	<5.1	12.2	—	—
RDX	<4.2	<4.2	100	>160	76.1	—	—
1,3-DNB	<9.1	<9.1	<9.1	<9.1	<9.1	—	—
1,3,5-TNB	<5.8	<5.8	>100	<5.8	<5.8	—	—
2,4,6-TNT	<6.3	<6.3	37.4	<6.3	<6.3	—	—
2,4-DNT	<2.2	>20.0	7.5	<2.2	<2.2	—	—
2,6-DNT	<5.7	<5.7	<5.7	<5.7	<5.7	—	—
Tetryl	<4.4	<4.4	<4.4	<4.4	<4.4	—	—
Metals							
Antimony	<7.0	<7.0	<7.0	<7.0	<7.0	—	146
Arsenic	7.1	5.2	110	18.3	74	50	50
Barium	52	46	81	23	94	1,000	1,000
Beryllium	<0.83	<0.83	<0.83	<0.83	<0.83	—	—
Cadmium	<12	<12	<12	<12	<12	10	10
Chromium	<10.8	15	12	12	<10.8	50	50
Copper	<21.3	<21.3	33	28	<21.3	1,000[c]	1,000
Lead	<1.5	9.8	2.3	<1.5	<1.5	50	50
Mercury	<1.1	<1.1	<1.1	<1.1	<1.1	2.0	2.0
Nickel	<65.2	<65.2	<65.2	<65.2	<65.2	—	13.4
Selenium	<2.5	<2.5	<2.5	<2.5	<2.5	10	10
Silver	0.46	<0.14	0.23	0.60	0.18	50	50
Sodium	220,000	180,000	320,000	1,400,000	600,000	—	—
Thallium	<1.7	<1.7	<1.7	3.4	<1.7	—	13
Zinc	20	90	30	30	30	500[c]	500

Table 1-8

Analytical Results From PA/SI for Samples From Monitor Wells
Located at the TNT Washout Facility,
28 February 1987
(continued)

Parameter	Monitor Wells N-3A (Deep)	N-3H (Deep)	N-3B (Shallow)	N-3F (Shallow)	N-3I (Shallow)	Utah Standards	U.S. EPA Water Quality Criteria[a]
	Concentrations in ug/L						
Inorganics							
Cyanide, total	<30	<30	<30	<30	<30	—	200
Nitrate/Nitrite (as Nitrogen)	61,000	9,400	780	35,000	12,700	10,000[d]	10,000[d]

[a]Groundwater levels were evaluated using U.S. EPA Drinking Water Standards - Maximum Contaminant Limits (MCLs). If MCLs were not available, the Clean Water Act Water Quality Criteria for Human Health (Fish and Drinking Water) are provided (U.S. EPA, 1985).
[b]Probable laboratory contamination.
[c]Secondary standards.
[d]For nitrate (as N).

Notes: ND indicates a compound not assigned a certified reporting limit and not found above the analytical detection limit.
Dashes (—) indicate not available.

Source: EA (1988).

Quantifiable levels of at least one of these explosive compounds (HMX; 1,3,5-TNB; 2-4-DNT; 2,4,6-TNT) were detected in each of the three shallow monitor well samples obtained from the site (Table 1-8). Elevated levels of sodium and nitrate/nitrite nitrogen were also detected. The arsenic concentration in these samples obtained from wells N-3B (110 ug/L) and N-3I (74 ug/L) were above the Federal and state drinking water standards (50 ug/L). Chloroform (2 ug/L) and toluene (6 ug/L) were detected in the sample from well N-3I; however, their source was not known (EA, 1988).

Groundwater samples obtained during the PA/SI from the deep regional aquifer (wells N-3A and N-3H) indicated that concentrations of explosives, semivolatiles, and cyanide were below the limits of detection. Total metal concentrations in the deep aquifer samples were less than Federal and state primary drinking water standards. However, significant levels of sodium (220,000 ug/L and 180,000 ug/L) and nitrate/nitrite nitrogen (61,000 ug/L and 9,400 ug/L) were detected in the groundwater samples obtained from both wells N-3A and N-3H, respectively. It was concluded that the elevated levels of sodium detected in both samples is likely due to the natural saline soil conditions prevalent at TEAD.

Toluene was the only volatile organic compound detected in deep wells N-3A and N-3H, at levels of 2 ug/L and 13 ug/L, respectively. The source of toluene was not known.

Additional sampling of the shallow and deep aquifer was performed during the RI to determine if contamination has migrated to the deep regional aquifer.

1.3 SCOPE OF WORK

The following major elements were included in the scope of the RI:

- Planning meeting between USATHAMA and WESTON that set up the initial site visit between USATHAMA, TEAD, and WESTON and initiated preparation of plans and task management.
- Review of the background information and documents collected during and after the site visit (existing reports, aerial photographs, and existing engineering drawings of facilities).
- Development of a comprehensive scope of field investigations to be completed as part of the RI program for TEAD. These RI activities were scoped to fill existing data gaps for groundwater and source area contaminants.

- Prepare a set of project plans to describe the technical and management approach for the RI program.

- Identify and stake the locations in the field for the monitor wells to be installed as part of the RI investigation.

- Identify and stake the locations in the field for the soil boring samples, surface soil samples, and hand auger boring samples to be collected as part of the investigation.

- Conduct monitor well installations, soil borings, and hand auger boring programs to include the following provisions:

  - Provide drilling logs and construction details for all boreholes drilled and wells installed.

  - Provide representative soil samples for the chemical analysis of specified target analytes from soil borings.

  - Provide visual soil descriptions and representative soil samples for the chemical analysis of target analytes from hand auger borings.

  - Provide horizontal and vertical control of all borings and wells drilled and installed as part of the RI. Additionally, selected existing wells, structures, and surface features were included in the current survey.

  - Ensure that all data are incorporated into the Installation Restoration Data Management System (IRDMS).

- Obtain representative groundwater samples for chemical analysis of the designated target analytes from monitor wells installed during this investigation, along with the existing monitor wells.

- Perform chemical analysis and required analytical QC/QA.

- Perform a contamination assessment to describe the groundwater, surface water, soil, and sediment contamination situation based upon the monitor well samples

obtained during the program, as well as a source area characterization based on soil sampling activities completed during the program.

- Perform an endangerment assessment to address the potential human and environmental impacts associated with N-TEAD in the absence of remedial action.

- Develop a comprehensive RI report for the five areas at N-TEAD that integrates the results of the RI field work, laboratory results, contamination assessment, and endangerment assessment.

- Include in the final RI report results from previous and ongoing non-USATHAMA studies at N-TEAD, where possible, to provide an overview of site contamination.

The project planning phase of this RI program encompassed approximately 20 weeks (September 1987 to January 1988). The RI field activities at N-TEAD covered approximately 40 weeks (February 1988 to November 1988). The laboratory analysis, data evaluation, and reporting covered approximately 70 weeks (March 1988 to August 1989).

1.4 REPORT ORGANIZATION

Section 1 provides an introduction to the N-TEAD RI, including site background information, scope of work, data quality objectives, and ARARs. Section 2 provides an outline of RI field activities and procedures. Section 3 presents the physical characteristics of N-TEAD based on previous investigations and findings of the RI. Section 4 is the contaminant assessment for the five site areas and presents the results of the analytical program. Section 5 includes the endangerment assessment. Section 6 presents the RI conclusions and recommendations. Section 7 provides a list of references for this RI, followed by the appendices.

This report is organized based on "Guidance for Conducting Remediation Investigations and Feasibility Studies Under the Comprehensive Environmental Response, Compensation, and Liability Act" (U.S. EPA, 1988). The USATHAMA Geotechnical Specifications (1987) and Quality Assurance Plan (last revised in March 1987) were utilized to establish the geotechnical, sampling, and analytical protocols for this RI.

1.5 Data Quality Objectives - Planning and Implementation

1.5.1 General

In order to facilitate collection of the data needed to perform initial contamination and endangerment assessments (concerning

both field sampling rationale and analytical testing methods), data quality objectives were established for this RI program.

By definition, according to the U.S. EPA guidance document entitled "Data Quality Objectives" (U.S. EPA, 1987b), data quality objectives are: "Statements that specify the data needed to support decisions regarding remedial response activities."

Three stages of development and use of data quality objectives are identified by the U.S. EPA and are described in the following sections.

1.5.2 Use of Data Quality Objectives in This RI

All three stages of data quality objective application have been considered for the N-TEAD RI. The following discussion presents the specific and relevant considerations given to each stage and for each site area, as applicable.

1.5.2.1 Stage 1 Data Quality Objectives

The four primary components of this stage in developing data quality objectives are discussed individually below.

- Identify and Involve Data Users - The data users identified for the N-TEAD RI are TEAD, USATHAMA, the State of Utah, EPA Region VIII, and related or involved contractors/consultants. Meetings have been held between these parties to discuss the RI prior to the preparation of the Technical Plan (which includes a plan for sampling and analysis) and the quality assurance/quality control (QA/QC) plan. Copies of these plans were reviewed and commented on by all involved parties.

- Evaluate Available Data - As presented in the Technical Sampling and Analysis Plan and in Section 1 of this document, a review of the existing database and previous studies performed at N-TEAD was conducted and summaries provided. In addition, operating and monitoring records of TEAD environmental office personnel were reviewed and base mapping was obtained from the TEAD Facilities Department during the project planning phase of this RI.

- Develop Conceptual Exposure Models - A conceptual model was developed for each of the five N-TEAD site areas under investigation. These models were developed with consideration to the source areas for contaminants, types of contaminants, extent of contamination, migration pathways and extent of contamination, and

potential human and environmental receptors. Figures 1-14 through 1-16 depict the conceptual models developed for the TNT Washout Facility, the Sanitary Landfill, and the Drum Storage Areas. Conceptual exposure models for the Old Burn Area and the Chemical Range can be summarized as the potential leaching of contaminants (primarily explosives) to the groundwater (although groundwater is over 300 feet below the surface) and the potential transport of surface contaminants (if any) in stormwater runoff. A preliminary discussion of the conceptual exposure models is provided in Section 4 for each site. A detailed discussion of exposure scenarios is provided in the endangerment assessment (Section 5).

- Objectives/Decisions - From the evaluation of the conceptual models, certain RI objectives were developed for each site area in order to fill data gaps and meet data requirements for RI assessment. These objectives were listed in the Technical Plan and are further discussed in Subsections 4.2 through 4.6 of this RI.

In general, the overall RI objectives developed for each area are presented below.

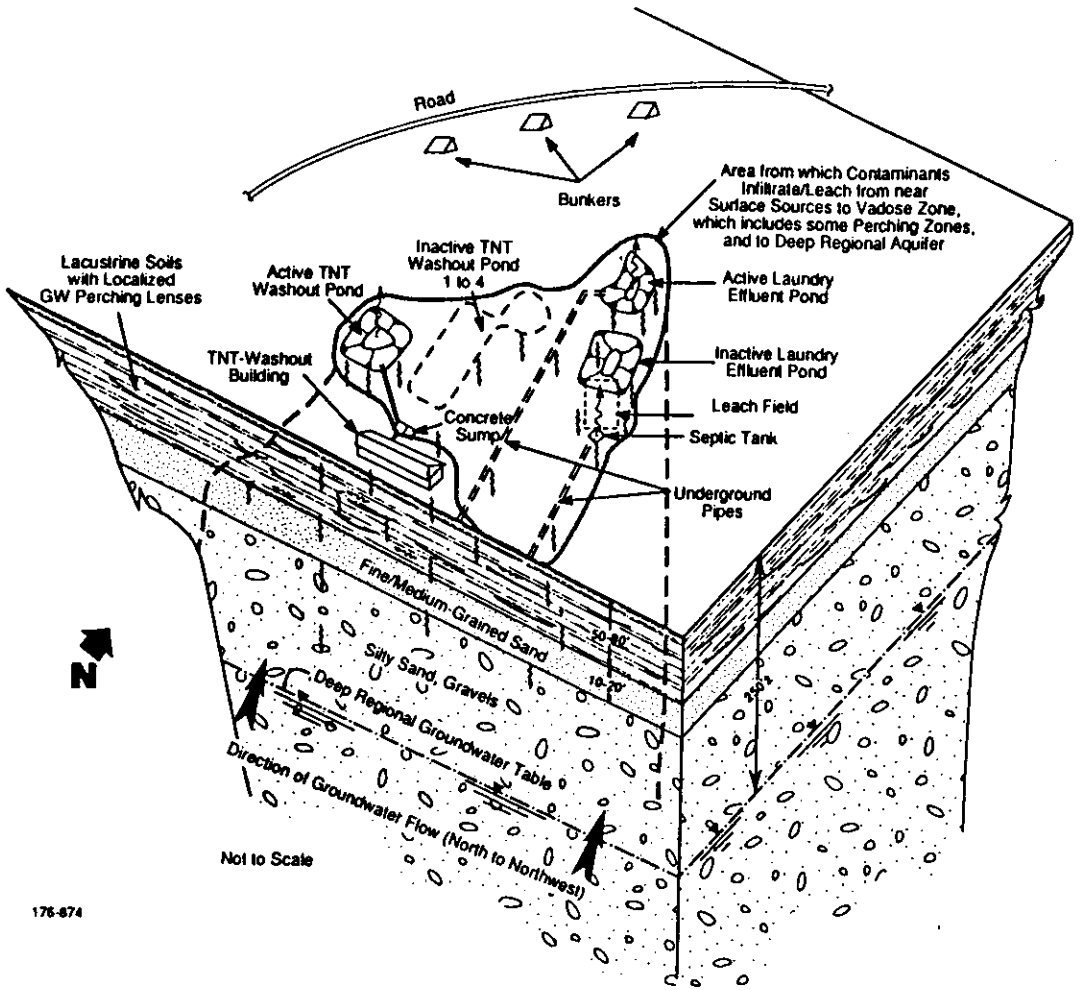
TNT Washout Facility - Further define the horizontal and vertical extent of soil and groundwater contamination. Determine if the deep regional groundwater has been impacted. Identify contaminant migration pathways and receptors.

Sanitary Landfill - Assess the contaminant migration potential in the groundwater. Investigate the areal extent of a contaminant plume, should one exist. Identify contaminant migration pathways and receptors.

Drum Storage Areas - Define the nature and extent of surface soil contamination and determine whether any impact has occurred to the groundwater downgradient of these areas. Identify contaminant migration pathways and receptors.

Old Burn Area - Determine the nature and extent of potential contamination sources in the subsurface perimeter of this area. Identify contaminant migration pathways and receptors.

Chemical Range - Determine the nature and extent of potential contamination in the vicinity of the trenches identified in this area. Identify contaminant migration pathways and receptors.



Note:
The existing water bodies (active laundry effluent pond and the concrete sump/overflow upgradient of the active TNT washout pond) are surface water sources. No real surface water pathways exist, however, since source areas are either subsurface or depressions in the surface that do not drain freely.

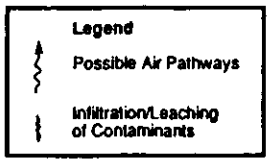


FIGURE 1-14 CONCEPTUAL EXPOSURE PATHWAY MODEL, TNT WASHOUT FACILITY

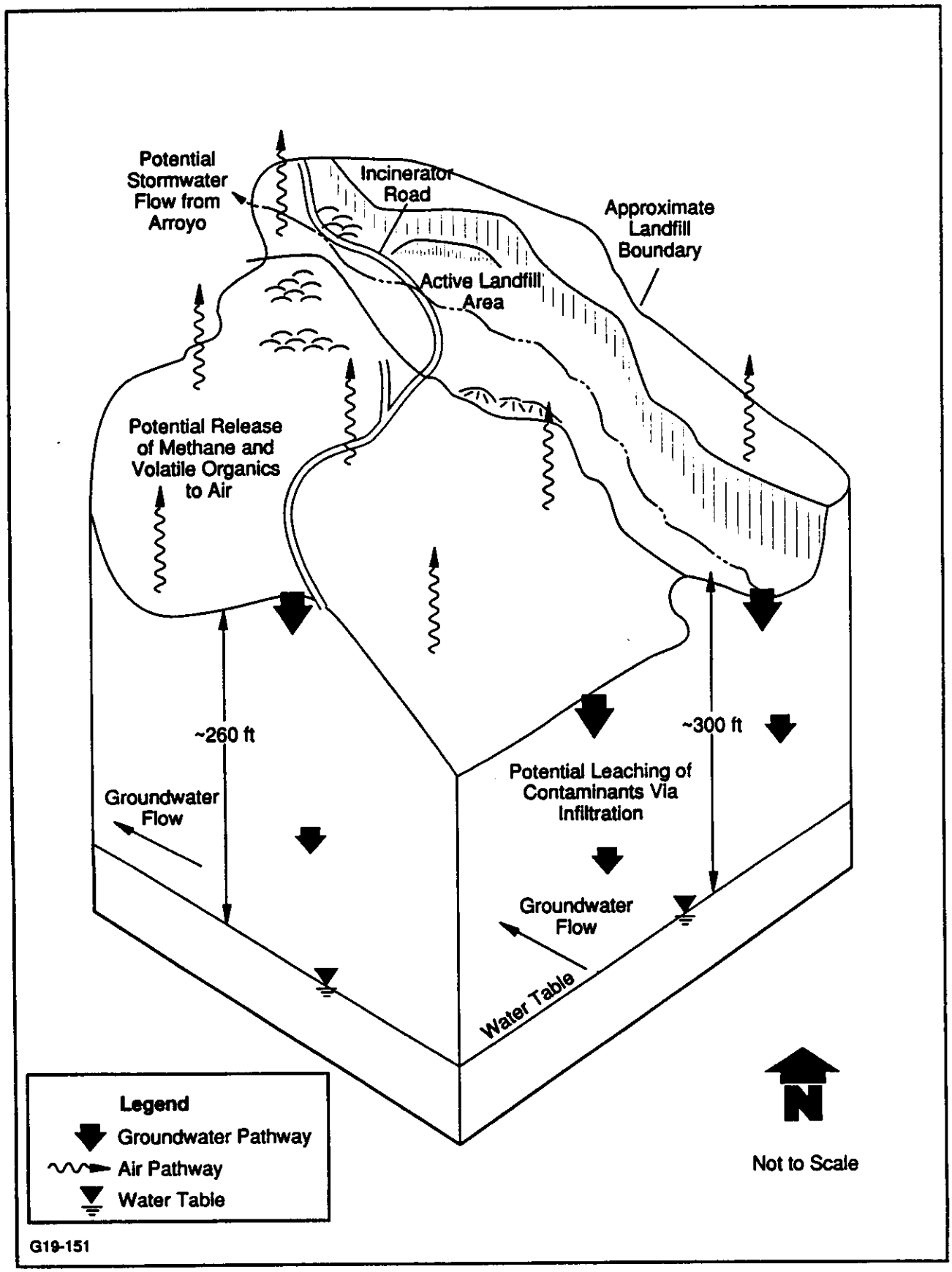


FIGURE 1-15 CONCEPTUAL EXPOSURE PATHWAY MODEL, SANITARY LANDFILL

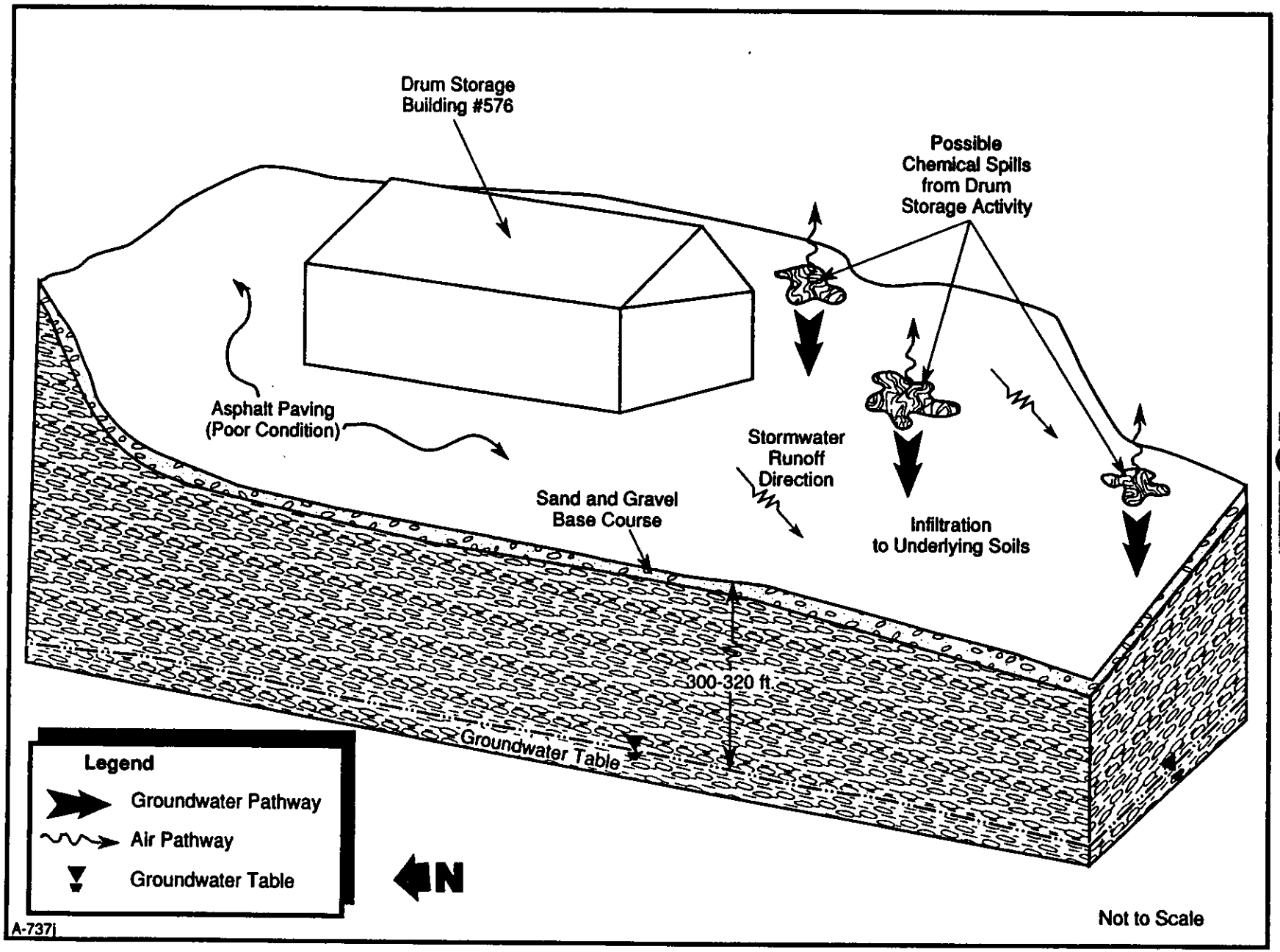


FIGURE 1-16 CONCEPTUAL EXPOSURE PATHWAY MODEL, DRUM STORAGE AREA

1.5.2.2 Stage 2 Data Quality Objectives

The five primary components to be considered in this stage of developing data quality objectives are discussed individually below:

- Identify and Involve Data Users - Same as for Stage 1.

- Identify Data Types - In order to provide data that possess the level of quality required for this RI, three levels of data quality were established and utilized. The three levels were field screening data; EPA Level 4 analytical data (Contract Laboratory Program (CLP) constituents) for organics, metals, and anions; and analytical data (non-CLP constituents) for explosives. The field screening level of data included data obtained from monitoring equipment (photoionization detector and organic vapor analyzer).

  Each site investigation performed has resulted in both field screening and EPA-type Level 4 analytical data being generated.

- Identify Data Quality Needs - The USATHAMA Quality Assurance Plan established the field and analytical sampling protocols that were used. Precision, accuracy, representativeness, comparability, and completeness standards are part of the USATHAMA Quality Assurance Plan and laboratory certification requirements. For non-USATHAMA-certified organic compounds, the analytical methods used are pursuant to the EPA-CLP Program. WESTON's Analytics Division, where these samples were analyzed, is a CLP-certified laboratory.

  The rationale for sampling locations and the resultant quality of the field representativeness of samples collected were specified in the Technical Plan.

- Identify Data Quantity Needs - RI sampling and analysis programs were performed at four of the five areas. A limited sampling and analysis program was performed at the perimeter of the Old Burn Area based on the potential of unexploded ordnance hazards at the site area. No special consideration to the statistical basis for the sample collection program was given beyond attempts to verify and calibrate any past noted contamination via resampling in this RI and the collection of multiple samples downgradient of potential source areas, where possible. Background quality was established by evaluating all available data.

- Evaluate Sampling/Analysis Options - Based on a review of the existing data from each site, the funding, and the allowable schedule for completion of this RI, the sampling and analysis options for each site were evaluated.

1.5.2.3 Stage 3 Data Quality Objectives

The two primary components of this stage in developing data quality objectives are discussed below:

- Assemble data collection components.
- Develop data collection documentation.

These two components are addressed and satisfied by the loading, transmission, and approval of data by/to the USATHAMA Installation Restoration Data Management System (IRDMS). This system includes group and record checks prior to final checking for compliance with the USATHAMA Quality Assurance Plan and geotechnical specifications. A permanent record of these data is present on computer disk and in the USATHAMA mainframe computer at Edgewood, Maryland.

1.5.3 Use of Data Quality Objectives to Direct Future Remedial Activities

In order to provide direction for future remedial activities to be performed at N-TEAD, the RI recommendations section of this report outlines the types, quantity, and quality of data indicated to be required to fill remaining data gaps and/or verify results obtained to date. The work plans for any future activities will follow and expand on the guidelines developed and presented herein.

1.6 APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS (ARARs)

TEAD is required to adhere to Federal, state, and local environmental regulations that have specific application to the areas under study. Information concerning ARARs were obtained from a variety of sources, including regulatory literature, TEAD environmental personnel, and State of Utah regulatory personnel from the Department of Health (Division of Environmental Health), Bureau of Solid and Hazardous Waste. The chemical and location-specific ARARs for each area are discussed in detail in Section 5. The general application of Federal, state, and local ARARs for all areas is described below.

Federal regulations that apply to the inactive areas under study are obtained from the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) and the Superfund Amendments and Reauthorization Act of 1986 (SARA). SARA regulations concerning groundwater and surface water require

that onsite remedial actions should be designed to meet the primary drinking water standards, as defined by the maximum contaminant levels (MCL) under the Federal Safe Drinking Water Act and/or the water quality criteria under the Clean Water Act when these criteria are relevant and appropriate. The comparison of drinking water standards to the areas under investigation will only be considered for areas where a potential migration pathway into a public water supply is possible.

SARA assigns authority to administer and enforce environmental regulations with the stipulation that any onsite remedial activity must achieve a level of control that is at least that of any applicable or relevant and appropriate Federal standard, requirement, criteria, or limitation. In effect, SARA raised state standards from requirements that should be considered to requirements that are mandatory, provided that they are equivalent or more stringent than Federal requirements.

Federal regulations do not define specific concentration levels in soils. Therefore, contamination data in soils will be compared to background soil data collected at each location and regional background data collected by the USGS and others.

The State of UTAH ARARs for groundwater, surface water, sediments, and soils are outlined in a draft document entitled "Potential ARARs for the State of Utah," which was obtained by WESTON from the Bureau of Solid and Hazardous Waste in December 1988 (see Appendix A).

Also included in Appendix A is a copy of "Proposed Groundwater Quality Protection Regulations," issued in January 1989. Groundwater terminology is defined therein and aquifer classifications ranging from Class 1A (pristine) groundwater through Class IV (saline) groundwater and Class U (unclassified) are discussed. Classification is based primarily on the concentration of total dissolved solids (TDS). Groundwater in the vicinity of N-TEAD has not been classified by the State of Utah. The average concentration of TDS in the five areas investigated ranges from 1,000 to 3,000 ppm (EA, 1988); therefore, the groundwater in the uppermost regional aquifer beneath these areas would likely be designated Class II drinking water quality groundwater by the State of Utah.

Also, under these new proposed regulations, owners/operators of any new hazardous waste management facility that may discharge to the groundwater must apply for a groundwater discharge permit within 180 days before commencement of said new discharge. Ambient background water quality must be established as part of the permitting process.

Although not specifically stated in the ARARs, it is believed that state ARARs for both organic and inorganic contaminants in soil are to be applied based on the risks associated with the

contaminated soil. Background samples and regional data are normally used in other states to assess the level of contamination. In addition, these data are usually to be supplemented with information concerning the persistence, toxicity, leachability, and expected mobility of the contaminants in the soil.

The location-specific ARARs and any permitting requirements for each area under investigation are addressed in Section 5.

The State of Utah requires that monitor wells be registered with the Department of Natural Resources, Division of Water Rights. WESTON, in conjunction with the two drilling subcontractors used for this project, has provided the State of Utah (as well as USATHAMA) with details concerning the construction and location of each monitor well installed during the course of this investigation.

SECTION 2

STUDY AREA INVESTIGATION

2.1 FIELD ACTIVITIES AND PROCEDURES

This section presents the procedures followed during the RI field activities conducted in accordance with the approved Technical Plan dated November 1988. The RI field sampling program was developed based on the overall RI objectives (see Subsection 1.5.2.1). These objectives include addressing data gaps identified in previous studies, especially the PA/SI, and obtaining sufficient data on the five study areas to prepare contamination and baseline endangerment assessments. Sampling locations were selected based on previous studies and on the findings of the initial site visit. Geophysical surveys using ground penetrating radar (GPR), electromagnetic terrain conductivity (EM), and/or magnetometry were conducted at the TNT Washout Facility, the Sanitary Landfill, the Old Burn Area, and the Chemical Range to provide information on buried objects (pipes, metal debris, etc.), disturbed areas (former trenches, pits, etc.), and subsurface stratigraphy.

The RI field activities performed and the procedures followed are discussed below. The media investigated include soils (surface and subsurface) and groundwater. Table 2-1 summarizes the locations and frequency of sampling conducted during this RI.

2.1.1 Soil Investigation

The soil sampling methods used during the field investigation are described below. A summary of the field soil sampling program is provided in Table 2-2.

2.1.1.1 Hand Auger Sampling

Near surface soil samples were collected in the Drum Storage Areas from shallow boreholes at depths ranging from 0 to 6 inches, 6 to 12 inches, and 12 to 24 inches (see Figure 2-1). A screw-type hand auger was used to advance the borehole to each sample interval. All of the soil samples were visually examined and described by the sampling personnel as to the general lithologic nature of the soil sample. Observations were recorded in the field logbook. Upon completion of sampling, the shallow hand auger boreholes were backfilled with the cuttings from the hole. All samples were analyzed for explosives, VOCs, SOCs, metals, anions, PCBs, and pesticides. The anlytical results are discussed in Section 4 of this document.

Table 2-1

N-TEAD Remedial Investigation Sample Location and Frequency

Site	New Groundwater Wells Installed		GW Samples From New Wells		Borehole Depth (ft)		GW Samples From Existing GW Wells		Borehole Samples Collected for Chemical Analysis		Hand Auger Samples		Scoop Samples		Test Borings[j]	
	Plan.	Act.	Plan.	Act.	Plan.	Act.	Plan.	Act.	Plan.	Act.	Plan.	Act.	Plan.	Act.	Plan.	Act.
Sanitary Landfill	7 D	7	7 D	7	150-350	240-338	1	1	14	5[f]	-	-	-	-	-	-
Drum Storage Areas	0 S 3 D	1[a] 2[a]	1 S 2 D	0[b] 2	- 250-350	59 332-340	-	-	-	- 7[g]	21	24[g]	-	-	-	-
TNT Washout Facility	9 S 5 D	9 5	9 S 5 D	0[c] 5	35-75 250-350	24-49.5 242-318	5 2	2[d] 4[e]	18 4	24[i] 4	-	-	-	-	0	-
Old Burn Area	-	-	-	-	-	-	-	-	32	32[h]	-	-	-	-	-	-
Chemical Range	-	-	-	-	-	-	-	-	-	-	-	-	12	12	-	-
TOTALS	24	24	24	14	3365-5925	4386.3	8	7	74	72	21	24	12	12	0	2

[a]After a perched water zone was encountered, a shallow well was installed to replace a proposed deep well.
[b]Well N-113-88 could not be sampled - dry.
[c]The nine shallow wells could not be sampled - dry.
[d]Most of the existing shallow wells were dry.
[e]Deep wells N-3A and N-3H were sampled twice to investigate explosives in the regional aquifer.
[f]All samples planned could not be taken due to poor sample recovery in gravelly soils.
[g]Extra sample(s) were taken to better characterize the site.
[h]Eight samples collected from each of the four borings.
[i]For lithologic description purposes only; field change during RI field program.
D = Deep.
S = Shallow.
Plan. = Planned.
Act. = Actual.

Table 2-2

Summary of Remedial Investigation Field Soil Sampling Program
Conducted at N-TEAD

Site	Sample Source	Explosives	VOCs	SOCs	Metals	Anions[a]	PCBs/ Pesticides
Sanitary Landfill	Borings, planned	14	14	14	14	14	14
	Borings, actual[b]	5	5	5	5	5	5
Drum Storage Areas	Borings, planned	6	6	6	6	6	6
	Borings, actual[c]	7	7	7	7	7	7
	Hand auger, planned	21	21	21	21	21	21
	Hand auger, actual[d]	24	24	24	24	24	24
TNT Washout Facility	Borings, planned	28	28	-	-	28	-
	Borings, actual[e]	28	21	-	-	28	-
Old Burn Area	Borings, planned	32	-	-	32	32	-
	Borings, actual	32	-	-	32	32	-
Chemical Range	Trowel, planned	12	-	-	12	12	-
	Trowel, actual	12	-	-	12	12	-
Totals	Soil, planned	113	69	41	85	113	41
	Soil, actual	108	57	36	80	108	36

[a]Includes only nitrate/nitrite and sulfate.
[b]Fewer samples were collected than planned due to poor sample recovery in gravelly areas and to the use of a mud-rotary in N-115-88.
[c]One additional soil boring sample from N-114-88 was taken to better characterize the area.
[d]Three additional hand auger samples from one location were taken to better characterize the area.
[e]Seven samples were not requested for VOC analysis.

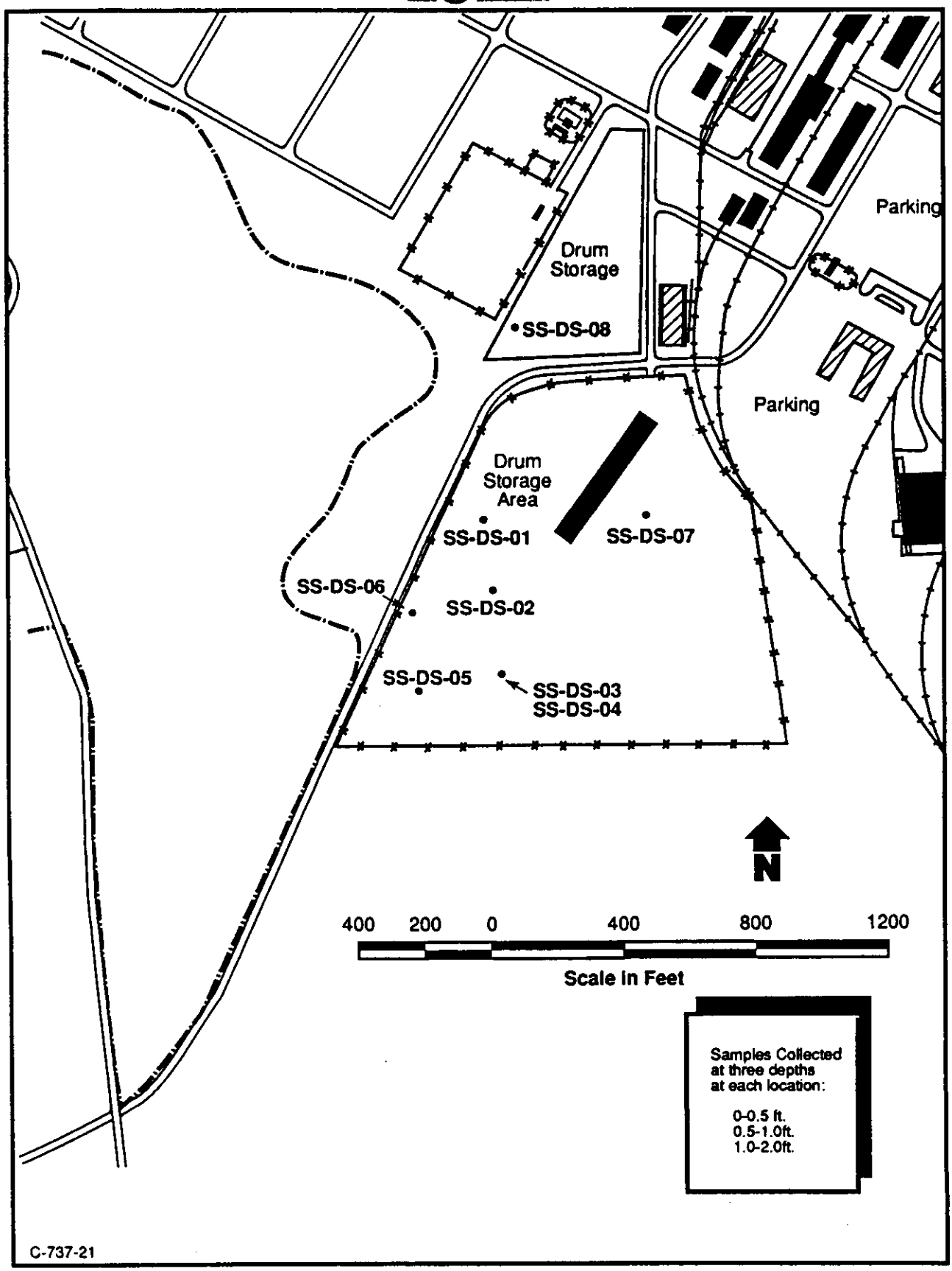


FIGURE 2-1 SURFACE SOIL SAMPLING LOCATIONS AT THE DRUM STORAGE AREA

2.1.1.2 Scoop Sampling

Near surface soils were collected from the Chemical Range at 0.5 to 1 foot below the ground surface (Figure 2-2). Samples were collected using a stainless steel scoop and were analyzed for explosives, metals, and anions. Analytical results are discussed in Section 4.

2.1.1.3 Drill Rig Subsurface Sampling

A total of 30 boreholes were drilled at N-TEAD for the purpose of characterizing the subsurface stratigraphy by collecting soil samples for visual inspection and chemical or physical analysis. These samples were collected from the TNT Washout Facility, the Sanitary Landfill, the Drum Storage Areas, and the Old Burn Area. Upon completion of drilling, 24 of those boreholes were converted into groundwater monitor wells. Four boreholes were for soil sampling and the remaining two boreholes were used as test holes to determine subsurface stratigraphy. See Figures 2-3, 2-4, and 2-5 for borehole location maps of these areas.

Borehole drilling was accomplished by using a hollow-stem auger (HSA), an air-rotary with drive casing, or a mud-rotary technique. Fifteen boreholes, N-101-88 through N-109-88 and N-121-88 through N-126-88, were drilled with HSA. One borehole, N-115-88, was drilled to 200 feet with the air-rotary, but the casing could not be driven past 200 feet. At that depth, the mud-rotary was used to complete the borehole. The remaining 14 deeper boreholes, N-110-88 through N-114-88, N-116-88 through N-120-88, and N-127-88 through N-130-88, were drilled using the air-rotary with drive casing.

The HSA drill rig used two HSA sizes. Two boreholes, N-101-88 and N-102-88, were augered with 6-1/2 to 7 inches outside diameter (OD), 3-1/4-inch (ID), HSAs. The remaining borings were augered with 11 to 12-inch OD, 6-5/8-inch ID, HSAs.

The air-rotary with drive casing technique involved driving an 9-inch ID steel casing behind an advancing tricone drill bit. As the drill bit advanced, an air hammer pushed the steel casing downward. At the drill bit, compressed air was injected to pick up the drill cuttings and carry them upward inside the steel casing to the ground surface.

Soil samples were collected during borehole drilling using two different methods. During HSA, soil samples were collected at 5-foot intervals beginning 5 feet below ground surface and extending to the bottom of the borehole. A split-barrel sampling device 18 inches in length was used to collect the soil sample. The split-barrel sampler was driven by a 140-pound hammer falling 30 inches, and the number of blows required to drive the sampler 18 inches was recorded for the shallow

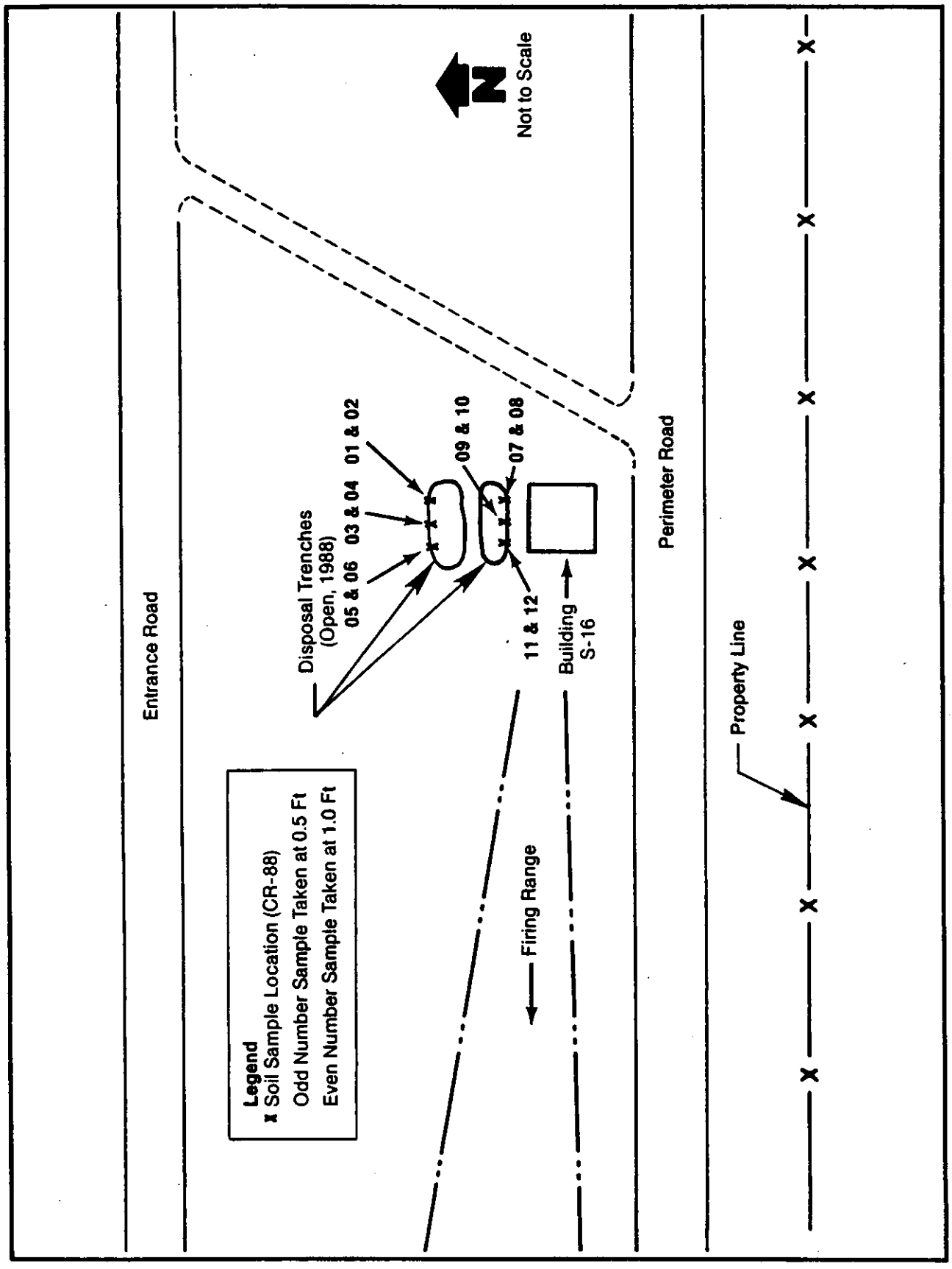


FIGURE 2-2 CHEMICAL RANGE SAMPLING LOCATIONS

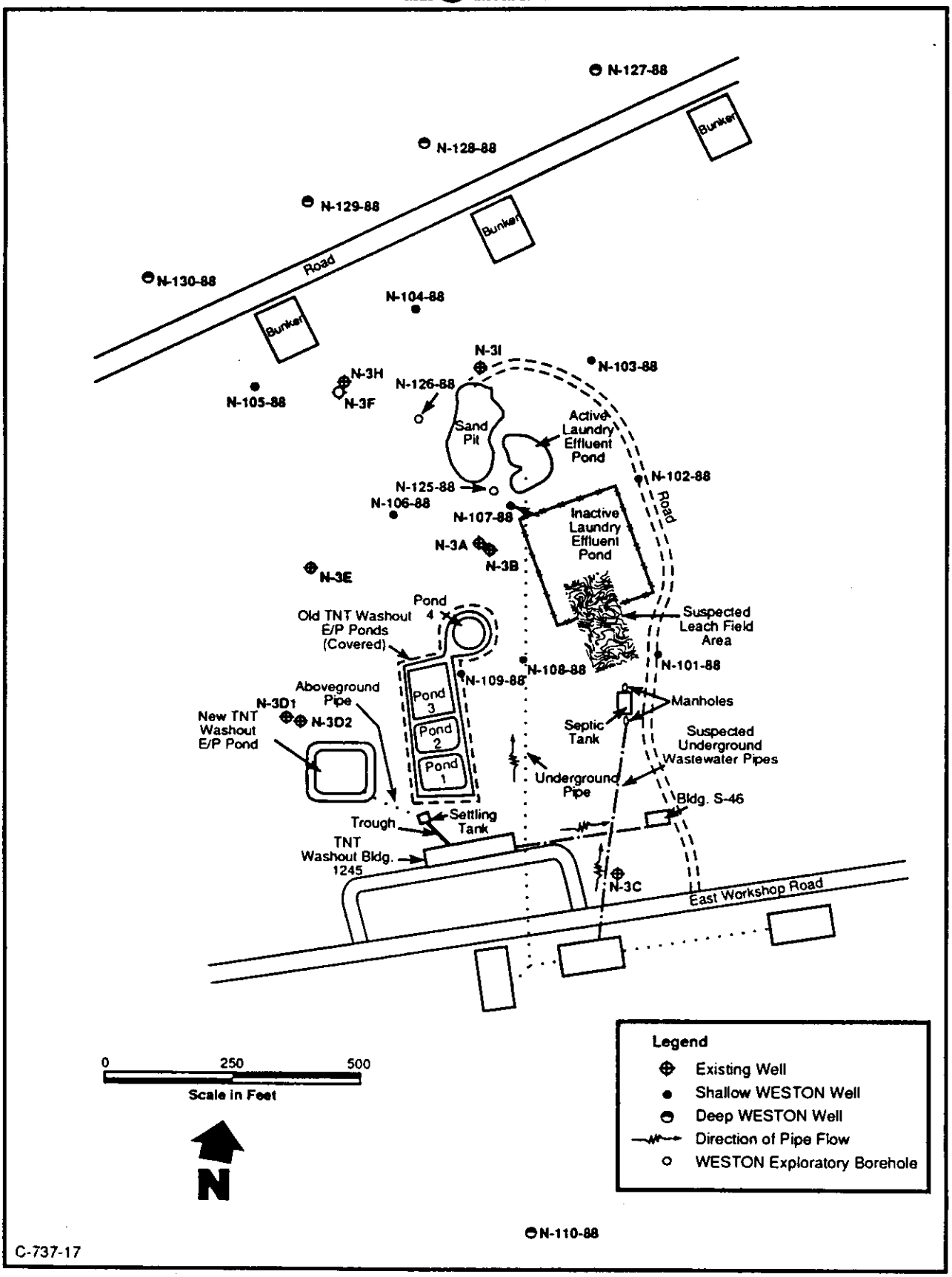


FIGURE 2-3 TNT WASHOUT FACILITY, BOREHOLE AND MONITOR WELL LOCATIONS

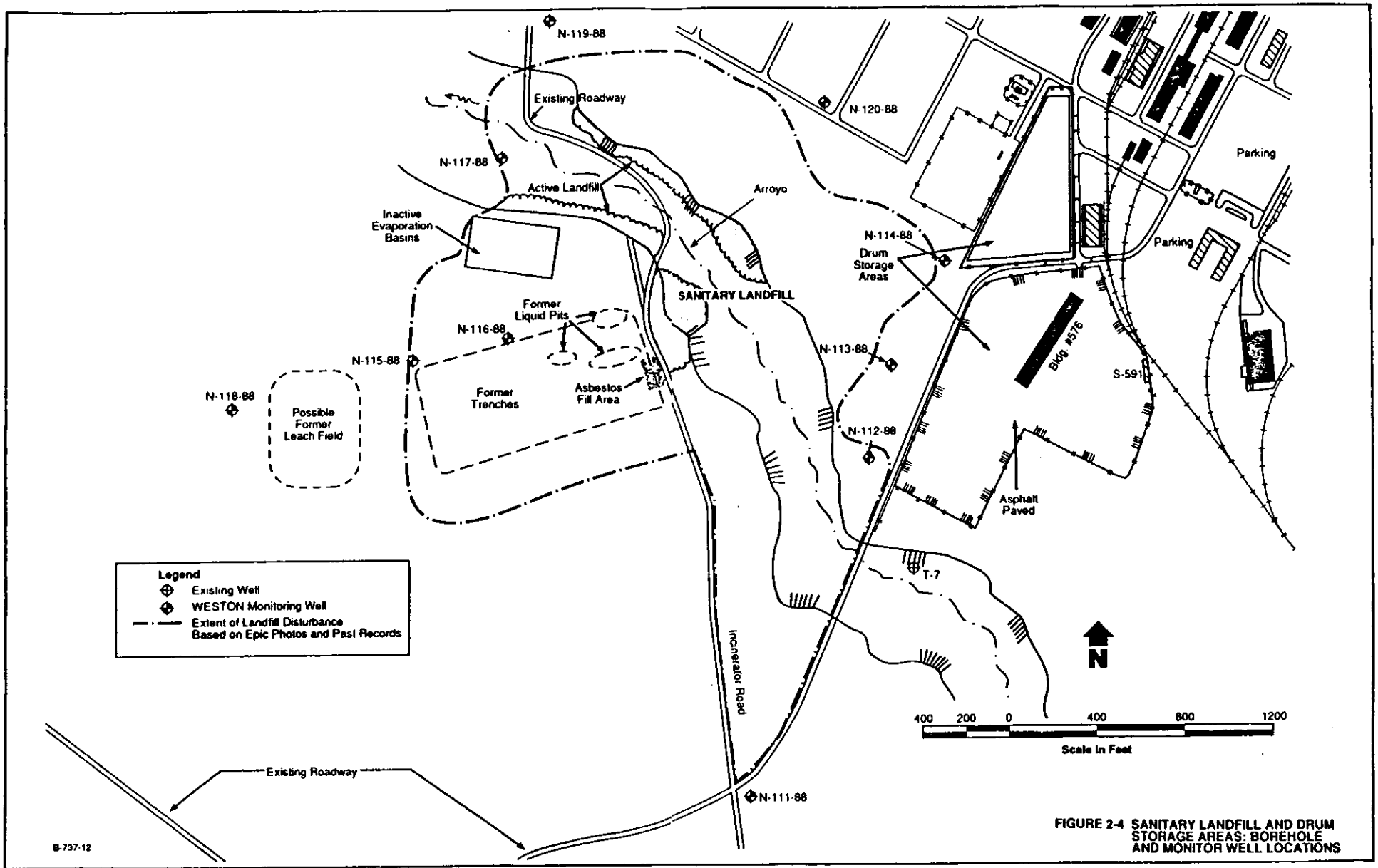


FIGURE 2-4 SANITARY LANDFILL AND DRUM STORAGE AREAS: BOREHOLE AND MONITOR WELL LOCATIONS

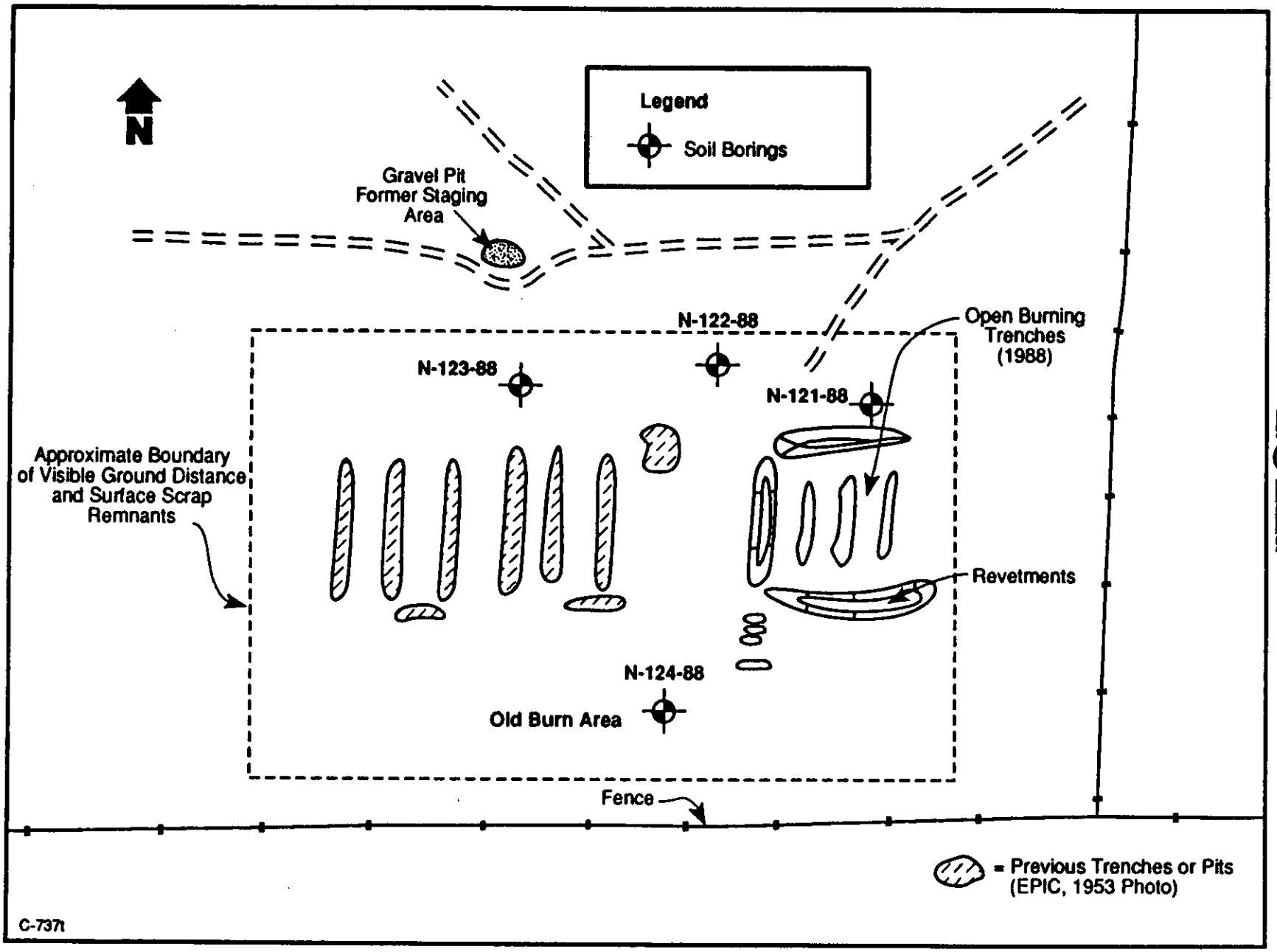


FIGURE 2-5 OLD BURN AREA BOREHOLE SAMPLING LOCATIONS

boreholes (Standard Penetration Test). During air-rotary drilling, grab soil samples were collected from the drill cuttings coming out of the borehole at the ground surface. The reason for the variance of sampling methods is described below.

Because of the very coarse-grained nature of the subsurface soils encountered during air-rotary drilling of the deep boreholes, a split-barrel sampling device was often ineffective for obtaining a soil sample. However, the split-barrel sampler was effective in fine-grained material for obtaining a sample. Therefore, when drilling in coarse-grained material, a soil sample was retrieved by catching the cuttings as they were being discharged at the top of the hole. Since air-rotary was the primary drilling method used in drilling coarse-grained materials, this method was used consistently at N-TEAD. Since the technique involves a rapid agitation of the soil, it also provides representative soil samples at the surface within a few seconds of encountering soils in the subsurface.

The purpose of subsurface soil sampling was to collect a soil sample for lithologic description and possible chemical and/or physical laboratory testing. The USATHAMA Geotechnical Specifications (1987) were used as a guideline for logging all boreholes. Copies of the drilling logs for the 30 boreholes are presented in Appendix B.

For the lithologic description, each sample was described using the Unified Soil Classification System (USCS). Colors were described using the Munsell Soil Color Chart. In addition to the lithologic description, the following procedural descriptions were recorded on the drill rigs:

- Blow counts, hammer weight, and drive distance of all equipment for each drill rig configuration used.
- The length of sampled interval.
- Depth to first and subsequent water encountered, along with the method of determination.
- Description of the drill rig configuration, manufacturer, model pump type, bit type, rod sizes, and tool specifications.
- All special problems/events encountered while drilling.

The drilling log represents information gathered in the field by the field geologist at the time of drilling. As such, the information on the logs may have been further refined at a later date due to clarification from a land survey or by geotechnical laboratory analyses. This should be recognized when reviewing/ using the information shown on the logs that were developed in

the field. A detailed discussion of the findings from the RI borehole sampling is presented in Section 3 of this report.

2.1.1.4 Geotechnical (Physical) Testing of Borehole Samples

Physical testing of 28 selected samples was performed on the soil samples collected in accordance with procedures and equipment described in either the current U.S. Army Corps of Engineering Manual (EM1110-2-1906, "Laboratory Soils Testing", revised 31 March 1972), or current American Society for Testing and Materials (ASTM) procedures. The samples tested were primarily fine-grained silts, clays, and silty sands. Coarse-grained materials were not tested because of the air-rotary drilling method employed when drilling in coarse-grained materials. The bit used in air-rotary drilling chops up the coarse-grained material and therefore does not provide a sample that is indicative of in-place material. The following laboratory tests were performed by Northern Engineering and Testing, Salt Lake City, Utah:

- Atterburg Limits (ASTM D4318-84)
- Moisture Content (ASTM D2216-80)
- Specific Gravity (ASTM D854-88)
- Mechanical Sieve Analysis with Hydrometer (ASTM D422-85)

The complete geotechnical testing program results are presented in Appendix C and are summarized in Subsection 3.4.3. In a few cases, the amount of soil sample available for testing was insufficient to perform all of the tests described above. The samples tested were fine-grained materials collected from split-barrel sampling operations. In some instances, the volume of sample collected in a split-barrel sampler was enough to provide a visual description of the subsurface materials but insufficient to perform all of the geotechnical testing required.

2.1.1.5 Selection of Borehole Soil Samples for Chemical Analysis

Selected soil samples that were collected during borehole drilling were packaged, cooled, and shipped to the applicable analytical laboratory for chemical analysis. These samples were collected from boreholes drilled at or around the Sanitary Landfill, the Drum Storage Areas, the TNT Washout Facility, and the Old Burn Area, as previously outlined in Tables 2-1 and 2-2.

In general, a soil sample was selected for chemical analysis near the saturated soil interface (top of water table) from each borehole. An additional sample was selected if organics were detected by onsite monitoring and/or if stained soils were noted. Section 4 contains a detailed summary and discussion of the analytical results obtained from the soil boring sample chemical analyses performed.

All soil boring samples that were collected during the RI drilling but not selected for analysis, were jarred, boxed, and turned over to TEAD environmental personnel for future use.

2.1.2 Groundwater Investigation

Groundwater monitor wells were installed and groundwater samples were collected at or around the Sanitary Landfill, the Drum Storage Areas, and the TNT Washout Facility. The following subsections discuss the well construction and development procedures for the 24 monitor wells installed at N-TEAD as part of the RI. The activities and procedures used for groundwater sampling, groundwater level measurements, and site surveying are also discussed.

Sanitary Landfill

Eight groundwater samples from seven new wells and one existing well were collected from the regional aquifer under the Sanitary Landfill. These samples were collected and analyzed to investigate whether contamination of the regional aquifer currently exists. Samples were analyzed for explosives, VOCs, SOCs, metals, anions, PCBs, and pesticides, as shown in Table 2-3.

Drum Storage Areas

Three groundwater samples were planned to be collected from new wells at the Drum Storage Areas to investigate the regional aquifer beneath the areas. An existing well, T-7, is considered an upgradient well to the Drum Storage Area and was also sampled. However, one of the new wells, N-113-88, was dry at the time of sampling. The two new wells were sampled and analyzed for explosives, VOCs, SOCs, metals, anions, PCBs, and pesticides.

TNT Washout Facility

Fifteen groundwater samples were planned to be collected at the TNT Washout Facility. Fourteen samples were to be collected from monitor wells installed in perched water and one sample was to be collected from a monitor well installed in the regional aquifer.

Most of the shallow wells installed during the RI, as well as existing shallow wells, were found to be dry and could not be sampled. The shallow groundwater beneath this site appears to be noncontinuous and located somewhat randomly, present only at locations above localized clayey lenses. Two shallow existing monitor wells, N-3H and N-3I, were found to contain water and could be sampled. These wells were sampled and analyzed for explosives, VOCs, and anions.

Table 2-3

Summary of RI Field Groundwater Sampling Program
Conducted at N-TEAD

Site	Sample Source	Explosives	VOCs	SOCs	Metals[a]	Anions[b]	Pesticides
Sanitary Landfill	Planned	8	8	8	8	8	8
	Actual	8	8	8	8	8	8
Drum Storage Areas	Planned	3	3	3	3	3	3
	Actual[c]	2	2	2	2	2	2
TNT Washout Facility	Planned	21	21	-	-	21	-
	Actual[d]	11	9	-	-	9	-
Totals	Planned	32	32	11	11	32	11
	Actual	21	19	10	10	19	10

[a]Total and dissolved (water matrix, separate bottles).
[b]Includes only nitrate/nitrite and sulfate.
[c]N-113-88 was completed in shallow water-bearing unit, but was dry.
[d]Only wells that contained water could be sampled (no continuous perched water zone was found to exist).

Five deep groundwater samples were collected from five newly installed monitor wells screened in the regional aquifer, N-110-88 and N-127-88 through N-130-88. Additionally, samples were collected from existing deep wells N-3A and N-3F in the regional aquifer. Samples were analyzed for explosives, VOCs, and anions.

Although no groundwater samples could be taken from the majority of the shallow wells, the soil samples collected at the moist zones, where these wells were screened, were analyzed for explosives, VOCs, and anions. These samples provided valuable information on the localized pockets of saturated subsoils beneath the TNT Washout Facility.

Sections 3 and 4 of this report provide detailed evaluations of the shallow, locally perched groundwater situation and analytical results from the TNT Washout Facility.

2.1.2.1 Drilling

Twenty-four monitor wells for the N-TEAD RI program were constructed within the boreholes that were drilled as previously described. The drilling contractors were Sergent, Hauskins, and Beckwith in Salt Lake City, Utah, (hollow-stem auger), and Dave's Drilling Company, Salt Lake City, Utah (air and mud-rotary). Nine of the wells were installed to monitor conditions in the shallow subsoils beneath the TNT Washout Facility. The depths of these wells varied from 24 to 47 feet. Fourteen of the remaining 15 wells were installed to monitor the groundwater quality in the regional aquifer. The depths of these wells varied from 234.5 to 338 feet. The last remaining well was installed to intercept a shallow water zone found at a depth of 40 to 50 feet in an area adjacent to the Drum Storage Areas (depth of well was 59 feet).

2.1.2.2 Well Construction

The design and construction of the monitor wells were based on the USATHAMA specifications (USATHAMA, 1987) and the lithology encountered. Individual well construction summaries are provided in Appendix D.

Materials used in well construction were approved by the USATHAMA geologic representative. The materials and methods used in well construction included those described below:

- The well casing was 4-inch ID Schedule 40 PVC with flush-threaded joints.
- The bottom of the well casing was fitted with a threaded PVC end cap.

- One to four 10-foot sections of 4-inch ID Schedule 40 PVC well screen were used, depending on the size of the zone to be screened. The screens were of commercial manufacture with slotted openings measuring 0.01 inch.

- The screen filter pack material was a medium to coarse-grained siliceous sand material compatible with the screen and aquifer material. The sand pack extends from 6 inches below the bottom of the well screen to approximately 3 to 5 feet above the top of the screen. The final depth to the top of the sand pack was measured and recorded.

- Bentonite pellets were used as the seal material above the sand pack. The seals range in thickness from 3 to 5 feet above the filter pack.

- Annular space grout seals were composed of a 20:1 cement to bentonite slurry. The cement was a commercial Portland cement, Type II and/or V. A maximum of 8 gallons of approved water per 94-pound bag of cement and 5 pounds of bentonite were used to make the grout slurry. The grout was placed using tremie techniques.

- In the instance where the annular space was greater than 100 feet in depth (deep wells), the annular space grout was placed in lifts. Each lift was allowed to set for at least 12 hours before the next grout lift was placed. This procedure was done to ensure that the weight of the grout did not collapse the PVC casing.

- The top of the monitor well casing was fitted with a PVC slip cap.

- Each monitor well was fitted with its own 2-inch OD, 3-foot long, Teflon bailer. The bailer was attached to the underside of the PVC slip cap by a polypropylene rope attached to an eye hook sunk into the PVC cap. The bailer and rope were allowed to hang freely inside the monitor well at a point above the water level.

- A 5-foot length of 6-inch ID steel pipe was used as a protective casing over the 4-inch PVC casing. This protective casing included a sleeve-type locking cap and was set in approximately 2 feet of grout seal.

- For protection, concrete filled 2-inch steel pipes were placed in a triangular configuration around the well.

- An approximate 8-foot diameter gravel blanket/pad was placed around the outer base of the protective casing. The thickness of this gravel pad is approximately 6 inches.

- Each well was identified with markings denoting its designation.

- All wells have key locking systems. TEAD personnel have replaced locks so that all locks are keyed alike.

During monitor well installation, the drill casing or HSA was extracted in such a manner as to ensure a continuous placement of sand pack, bentonite seal, and grout. Installed wells were periodically checked after completion for grout subsidence. Prior to the installation of the gravel pad, any depression around the steel protective casing was filled with a grout mixture to ground surface.

Several shallow monitor wells (N-101-88, N-104-88, N-105-88, N-107-88, N-108-88, N-109-88, and N-113-88) were drilled and abandoned as part of this project. Upon approval by USATHAMA, monitor wells were abandoned by first pulling the steel protective casing and then overdrilling the PVC well casing and screen. A tremie pipe was then placed to the bottom of the borehole and grout was pumped into the open hole until the grout flowed at the ground surface. Since all of the monitor wells that were abandoned were shallow, this method was effective.

2.1.2.3 Well Development

All wells were developed after the internal mortar collar had set (at least 48 hours) around each well. Of the 24 wells installed, only one well was set in a borehole that had drilling mud in it (N-115-88).

The well completion logs represent information gathered in the field by the field geologist at the time of well installation. As such, this information may have been refined at a later date due to clarification from a land survey. Individual well construction logs are presented in Appendix D.

Well development details are summarized and presented in Appendix E. The following methods and procedures were used during well development:

- Wells completed in low-permeable materials were developed initially by jetting water into the screened area of the well and then inserting steel or plastic piping down to the well bottom and using compressed air to remove any standing water. Water used was tested and approved by USATHAMA prior to use. This procedure was

done periodically for a minimum of 2 days. After 2 days, a bailer apparatus was then used to remove any water standing in the borehole.

- Wells completed in high-permeable materials were developed by pumping, using a submersible pump capable of pumping 2 to 50 gallons per minute. Water in the well was continuously discharged at a maximum sustainable flow rate until the water was clear.

- In wells completed in the high-permeable zones, a minimum of 5 times the standing water volume in the well, which included the screen and casing plus saturated annulus (assuming 30 percent porosity), was removed during well development. If any water or drilling fluid was lost during drilling, 5 times that amount (in addition to 5 times the standing water volume) was removed. All spent well development water was discharged onsite and directed away from the well site.

- A 1-pint sample of the last water removed during development was obtained and left with the environmental personnel at TEAD. No preservation of this sample was required.

- All pumps and bailers were washed and rinsed with approved water before each well was developed.

The following data were recorded as part of well development:

- Beginning and ending water levels.

- Open depth to bottom of well.

- Type of bailer or pump used.

- Description of water being discharged from well.

- Total amount of water removed from each well.

- Specific conductivity, temperature, and pH at the start of development, during development, and at the conclusion of development.

2.1.2.4 Groundwater Sampling

Groundwater sampling was conducted a minimum of 14 days after well development. In addition, all samples were collected immediately after presample purging. Groundwater samples were collected from the TNT Washout Facility, the Sanitary Landfill, and the Drum Storage Areas. Table 2-3 summarizes the site-specific groundwater sampling program. All groundwater sampling

data collection forms are presented in Appendix F. The following is a list of the procedures that were used for the collection of groundwater samples:

- The depth from the top of the casing to the top of the water was measured and recorded. All measuring devices used in the well were thoroughly rinsed with USATHAMA-approved water before use.

- The depth from the top of the casing to the bottom of the well casing (total depth of well) was measured for the initial sampling of each well.

- The depth to the top of the water was subtracted from the depth to the bottom of the casing to determine the height of standing water in the casing and was recorded.

- The well was purged by removing a quantity of water equal to 5 times the calculated volume of water in the well, including the filter pack, then a sample was collected.

- If the well went dry during presample purging, the following procedures were followed: as much water as practical was removed from the well, and the well was then allowed to stabilize for 24 hours. Afterward, as much water as practical was again removed from the well, and the well was allowed to stabilize for 24 hours. After 48 hours had elapsed from the initial bore volume removal (and assuming a stabilized water level reading), samples were collected.

- Temperature, pH, and specific conductance were measured and recorded at the start, twice during, and at the conclusion of presample purging. All measurements for each well were made in the field from the outflow of the pump or bailer used to purge the well.

- The submersible pump was scrubbed with water from the approved drilling water source after sampling to prevent cross-contamination between wells. Materials incidental to sampling, such as pump tubing, were also flushed with this water. Sampling equipment was protected from the ground surface by clean plastic sheeting.

- A sample was obtained for chemical analysis immediately after presample purging was completed. Sampling was conducted when contamination by wind-blown particles was minimal.

- All wells were equipped with Teflon bailers dedicated to each well. When the bailers were not being used, they were hung in the monitor well above the water level using polypropylene rope.

- Groundwater samples designated for dissolved metal and anion analyses were filtered at the well head through a 0.45-micron filter paper using a decontaminated vacuum filter apparatus. Samples designated for total metal analysis were not filtered. Samples were preserved at the time of sample collection. Samples designated for organic analysis were placed in amber glass bottles. The bottles were filled to capacity to preclude aeration. The organic samples were filtered in the laboratory before extraction.

- Sample bottle and cap rinsing with sample water was done three times before sample collection.

- All samples for organic chemical analysis were placed in specially cleaned glass bottles or vials with Teflon-lined lids. Samples for inorganic chemical analysis were placed in polyethylene bottles. The bottles were filled to the top and securely capped. Sample bottles were placed in a temperature-controlled 4°C chest immediately after sealing and delivered to the laboratory as soon as possible.

- A minimum of one field blank (rinse blank) was collected for each sampling trip to verify the effectiveness of decontamination procedures according to required QA/QC protocol.

2.1.2.5 Slug Testing

Slug tests proposed for the wells at the TNT Washout Facility were not performed. None of the wells in the perched zone had the minimum required 5 feet of water. This depth of water is required prior to using the slug testing equipment. The high hydraulic conductivities of the deep regional aquifer materials, as determined from aquifer testing in the vicinity of the Industrial Waste Lagoon of N-TEAD (JMM, 1987; WCC, 1985), made slug testing an inappropriate testing method for this aquifer.

2.1.2.6 Groundwater Level Measurements

To measure water levels in the wells, an electric sounder was used that attained an accuracy of 0.01 feet. Water levels in the monitor wells were allowed to stabilize for a minimum of 24 hours after well construction and development before taking measurements.

The equipment was placed on a plastic sheet while the locked well cap was removed. The location, time of day, and water level measurement were recorded in the field logbook. The well cap was removed and the electric sounder probe was lowered into the well until the water surface was encountered. The distance from the water surface to the reference measuring point on the well casing was measured and recorded. The electric sounder probe was then removed and the well casing cap and the locking well cap were replaced. The electric sounder was then decontaminated.

Initial and subsequent groundwater levels recorded for wells at N-TEAD are presented in Table 2-4. The hydrogeology of the study areas is discussed in Section 3.

2.1.3 Land Survey

Land surveys were conducted by AAA Engineering and Drafting, Inc. of Salt Lake City, Utah, to locate borehole and groundwater monitor wells, establish grid systems for geophysical surveys, and locate buildings and other cultural features for the purpose of making a detailed map.

Land surveys in support of the surface geophysical program were conducted to establish the grid system at the TNT Washout Facility, the Sanitary Landfill, the Chemical Range, and the Old Burn Area. Grids established at these areas were on 50 to 100-foot centers.

At the TNT Washout Facility, a more extensive survey was performed. This survey focused on buildings and other cultural features that were needed to develop a detailed map of the TNT Washout Facility.

Following completion of the 24 new monitor wells, location coordinates and elevations were surveyed. The location coordinates were referenced to the TEAD monument system. Elevations were carried with a vertical control of 0.05 feet. The horizontal location coordinates of each monitor well were surveyed based on the 1983 North American Datum (N.A.D.) State Plane along the boundary of N-TEAD. A horizontal control of 3 feet was maintained.

Location coordinates and elevations were entered into the Installation Restoration Database Management System (IRDMS) for TEAD. The IRDMS allowed for location coordinates to be entered in one of three coordinate systems: the State Plane coordinate system (N.A.D.), the Universal Transverse Mercator (UTM) grid, or the local (military) grid system. The State Plane coordinate system utilized by the IRDMS is the 1927 N.A.D. system (which now has been superseded by the 1983 N.A.D. system). Therefore,

Table 2-4

Summary of Groundwater Level Data, N-TEAD

Monitor Well Number	Screened Interval[a] (ft)	Elevation, MSL Top of PVC Casing (ft)	Stickup Value (ft)	Water Level Elevations (ft) Initial Date	Initial Elevation (ft MSL)	Subsequent Date	Subsequent Elevation (ft MSL)
N-101-88[b]	26.5-46.5	4,734.86	2.21	2/22/88	c	11/5/88	c
N-102-88	18.2-38.2	4,727.46	2.25	4/7/88	4,691.76	11/5/88	c
N-103-88	14.0-34.0	4,722.39	2.16	4/7/88	4,688.69	11/5/88	c
N-104-88[b]	14.0-34.0	4,714.69	2.27	2/25/88	c	11/5/88	c
N-105-88[b]	13.0-23.0	4.715.56	2.21	2/26/88	c	11/5/88	c
N-106-88	20.5-40.5	4,726.71	2.63	2/26/88	c	11/5/88	c
N-107-88[b]	13.0-33.0	4,726.82	2.12	2/26/88	c	11/5/88	c
N-108-88[b]	10.5-30.5	4,732.11	2.16	2/27/88	c	11/5/88	c
N-109-88[b]	20.5-30.5	4,732.28	2.45	2/28/88	c	11/5/88	c
N-110-88	278.0-317.0	4,786.11	2.45	8/5/88	4,484.11	11/5/88	4,481.78
N-111-88	317.0-337.3	4,805.31	1.67	3/30/88	4,493.61	11/5/88	4,486.81
N-112-88	310.1-329.56	4,801.38	1.88	4/21/88	4,489.38	11/5/88	4,485.63
N-113-88	36.6-56.05	4,799.07	2.30	5/3/88	4,740.97	11/5/88	c
N-114-88	314.5-333.9	4,797.82	1.88	5/10/88	4,490.62	11/5/88	4,485.32
N-115-88	275.5-294.95	4,752.01	2.08	6/22/88	4,543.11	11/5/88	4,482.64
N-116-88	265.25-284.5	4,756.23	1.92	6/18/88	4,490.63	11/5/88	4,483.19
N-117-88	220.25-239.5	4,703.32	2.21	7/7/88	4,485.32	11/5/88	4,481.07
N-118-88	240.25-259.75	4,713.61	2.58	7/12/88	4,491.61	11/5/88	4,482.74
N-119-88	266.15-275.15	4,751.74	2.67	7/21/88	4,486.74	11/5/88	4,481.03
N-120-88	300.0-319.5	4,779.34	1.29	7/26/88	4,486.34	11/5/88	4,482.74
N-127-88	222.0-242.0	4,705.34	1.96	10/16/88	4,482.14	11/5/88	4,478.51
N-128-88	234.7-253.7	4,704.93	2.04	10/13/88	4,482.73	11/5/88	4,478.47
N-129-88	223.0-242.85	4,705.54	2.08	10/19/88	4,482.34	11/5/88	4,477.46
N-130-88	224.7-244.4	4,707.03	1.96	10/27/88	4,482.43	11/5/88	4,478.20

[a]Measured from ground surface.
[b]Wells abandoned; casing pulled and holes grouted to surface.
[c]Dry.

Note: Top of casing elevation based on land survey data.

the coordinates received from AAA Engineering and Drafting, Inc. were not accepted by the IRDMS. Review of the mapping information in the IRDMS for TEAD and other survey information collected for this RI resulted in the decision to use the local (military) grid system for the reporting of the location coordinates into the IRDMS. AAA Engineering and Drafting, Inc. was instructed to convert the coordinates for the 16 new monitor wells to the local (military) grid system.

The top of PVC pipe casing, top of protective metal pipe casing, base of protective metal pipe casing, and the ground surface were surveyed at each well location. Certain wells installed as part of this RI were later abandoned. These locations only had the top of PVC casing and ground elevation surveyed. Table 2-5 summarizes the survey data for N-TEAD. Appendix G contains the survey notes collected as part of this RI.

2.1.4 Geophysical Investigations

Reconnaissance surveys utilizing three geophysical techniques were performed at four of the study areas within N-TEAD. The three geophysical techniques used in the investigation were magnetometry, electromagnetic terrain conductivity, and Ground Penetrating Radar (GPR). The four areas where reconnaissance geophysical surveys were performed were the Sanitary Landfill, the TNT Washout Facility, the Old Burn Area, and the Chemical Range. The geophysical techniques that were used are described in the following subsections.

2.1.4.1 Electromagnetic Terrain Conductivity Technique

Reconnaissance surveys with the electromagnetic terrain conductivity technique (EM) were performed at the Sanitary Landfill, the TNT Washout Facility, and the Old Burn Area. The EM technique measures the apparent conductivity of materials in the subsurface. Changes in conductivity may be related to buried wastes, the presence of fluids with high concentrations of total dissolved solids, variation in the moisture regime in geologic materials, and variation in the lithologies of geologic materials.

The EM surveys were conducted using a Geonics® EM 34-3 terrain conductivity meter. The EM 34-3 instrument consists of a transmitting coil, a receiving coil, phase-sensing circuits, and an amplifier. The unit operates at a frequency of 6.5 kHz and is battery powered.

The measurement depth of the Geonics EM 34-3 is controlled by the orientation of the two coils (either horizontal or vertical) and by the distance separating the coils. Deeper measurements are obtained by increasing the distance between the transmitter and the receiver coils. Measurements taken with the coils

Table 2-5

Summary of Survey Data, N-TEAD

Location ID	Military Grid Coordinates		Elevation[a]			
	Northing	Easting	Top of PVC Casing	Top of Metal Casing	Base of Metal Casing (Concrete)	Ground Elevation
N-101-88	10,213.1	18,508.5	4,734.86	c	c	4,732.65
N-102-88	9,892.6	18,557.4	4,727.46	4,727.81	c	4,725.24
N-103-88	9,682.5	18,661.8	4,722.39	4,722.74	4,720.19	4,720.17
N-104-88	9,618.5	18,993.5	4,714.69	c	c	4,712.42
N-105-88	9,788.1	19,257.5	4,715.56	c	c	4,713.35
N-106-88	10,000.6	18,981.7	4,726.71	4,726.97	4,724.26	4,724.10
N-107-88	9,973.9	18,753.3	4,726.82	c	c	4,724.70
N-108-88	10,247.1	18,728.1	4,732.11	c	c	4,729.95
N-109-88	10,278.8	18,848.8	4,732.28	c	c	4,729.83
N-110-88	11,496.4	18,354.7	4,786.11	4,786.26	4,783.66	4,783.30
N-111-88	6,950.4	7,325.6	4,805.31	4,805.76	4,803.55	4,803.42
N-112-88	5,396.1	6,751.6	4,801.38	4,801.59	4,799.18	4,799.09
N-113-88	4,975.6	6,624.2	4,799.07	c	c	4,796.77
N-114-88	4,511.5	6,381.2	4,797.82	4,798.02	4,795.62	4,795.51
N-115-88	4,947.0	8,867.7	4,752.01	4,752.26	4,749.59	4,749.59
N-116-88	4,850.5	8,428.1	4,756.23	4,756.44	4,753.91	4,753.50
N-117-88	4,007.4	8,463.4	4,703.32	4,703.55	4,700.94	4,700.61
N-118-88	5,157.7	9,699.9	4,713.61	4,713.79	4,710.82	4,710.82
N-119-88	3,428.9	8,271.0	4,751.74	4,751.87	4,748.95	4,748.60
N-120-88	3,764.8	6,928.7	4,779.34	4,779.49	4,777.41	4,777.41
N-121-88[d]	13,995.1	21,369.4	-	-	-	-
N-122-88[d]	13,878.2	21,664.0	-	-	-	-
N-123-88[d]	13,892.7	22,264.7	-	-	-	-
N-124-88[d]	14,562.9	21,898.0	-	-	-	-
N-125-88[e]	-	-	-	-	-	-
N-126-88[e]	-	-	-	-	-	-
N-127-88	9,140.5	18,702.6	4,705.34	4,705.53	c	4,702.86
N-128-88	9,240.5	18,902.2	4,704.93	4,705.11	c	4,702.44
N-129-88	9,412.9	19,197.4	4,705.54	4,705.78	4,703.22	4,703.05
N-130-88	9,588.9	19,465.2	4,707.03	4,707.22	4,704.74	4,704.74

[a]Datum for elevation is feet above mean sea level.
[b]Wells abandoned; casing pulled and holes grouted to surface.
[c]Not surveyed.
[d]Borehole drilled for soil sampling only. No monitor well installed.
[e]Test holes only. No horizontal or vertical survey performed.

oriented vertically are affected more by shallow materials. Measurements taken with the coils oriented horizontally are relatively transparent to conductivities of shallow materials and are more affected by the conductivities of deeper materials. The horizontal coil measurements are affected most by materials at a depth of 0.4 times the intercoil spacing (McNeil, 1980).

The conductivity values measured with the Geonics® EM 34-3 terrain conductivity meter represent a cumulative response for the materials in the subsurface that are within the half-space of the included electromagnetic field. If the materials within the half-space were electrically uniform, the measured value would be the true conductivity. However, the vertical distribution of soils, sediments, and rocks generally results in layers with different electrical properties. Therefore, the measured value is a cumulative response that is referred to as an apparent conductivity.

Apparent conductivity measurements at N-TEAD were taken with coil separation distances of 33 feet and 66 feet. Most measurements were taken with the coils in the horizontal plane. At the Sanitary Landfill and the TNT Washout Area, measurements were also taken with the coils in the vertical plane. The effective depths of measurements for horizontal and vertical coils for the two coil separation distances are summarized in Table 2-6.

Electromagnetic measurements were taken at grid nodes and recorded either in a field notebook or electronically recorded. Cultural features that could interfere with measurements, such as buildings, fences, powerlines, metal debris, etc., were noted during the field survey. The effects of cultural features on the electromagnetic data were corrected during interpretation.

2.1.4.2 Magnetometry Technique

Reconnaissance surveys with the magnetometry technique were performed at the Sanitary Landfill, the Old Burn Area, and the Chemical Range. The magnetometry technique detects variations in the magnetic susceptibility of materials. The technique can be used to locate buried ferromagnetic materials (steel and iron) because these materials have magnetic susceptibilities that are several orders of magnitude greater than the magnetic susceptibilities of natural soils and rocks. The magnetometry technique only detects ferromagnetic targets. Nonferrous metals such as aluminum, brass, and copper are not detected.

The reconnaissance magnetic surveys were performed using an E.G. & G. Geometrics Model G-856 proton precession magnetometer. At each station, measurements were taken of the total intensity of the earth's magnetic field. The total field measurements can be

Table 2-6

Geonics® EM-34-3 Depth of Investigation

Coil Separation Distance (ft)	Coil Orientation	Approximate Total Effective Depth (ft)	Depth of Major Response
33	Vertical	25	<10 feet
33	Horizontal	50	13 feet
66	Vertical	50	<20 feet
66	Horizontal	100	26 feet

considered as the sum of the earth's ambient magnetic field and the component of an induced field that may be in the same direction or in the opposite direction of the induced field (Breiner, 1973). The induced field is the product of the magnetic susceptibility of materials in the subsurface and the magnitude of the earth's field. Therefore, the presence of buried ferromagnetic materials creates induced magnetic fields that cause local deviations from the total field. Both positive and negative deviations are produced, which lead to magnetic "highs" and "lows" or positive and negative anomalies, respectively.

The intensity and shape of magnetic anomalies is affected by the properties of the buried objects and also by the characteristics of the earth's magnetic field. The important properties of the objects are mass, magnetic susceptibility, and depth of burial. Under ideal conditions, a single 55-gallon steel drum can be detected to a depth of 12 to 15 feet.

Ferromagnetic wastes buried at a shallow depth generally respond to the earth's magnetic field as weak magnets (dipoles). The shape of the magnetic anomaly measured above a dipole is affected by the inclination angle of the earth's magnetic field. The inclination angle for the region of the TEAD is approximately 53 degrees (Breiner, 1973). The inclination angle has an affect on the geometry of magnetic anomalies above buried ferromagnetic objects. The anomalies have asymmetrical shapes from north to south, with a positive anomaly above the buried objects and a negative anomaly north, east, and west of the objects. Total field measurements will integrate a collection of closely buried objects into a single anomaly.

The reconnaissance geophysical surveys were designed to identify general areas where buried ferromagnetic wastes are present. The large spacing between individual magnetic measurements at N-TEAD do not provide the detailed information necessary to accurately map the shape and intensity of all magnetic anomalies.

Magnetic measurements were electronically recorded. Total field measurements taken periodically at base stations were used to evaluate diurnal variation in the intensity of the earth's magnetic field. The earth's magnetic field showed little variation during the time periods that magnetic measurements were taken, and it was not necessary to perform a diurnal correction on the field data.

2.1.4.3 Ground Penetrating Radar Technique

Reconnaissance surveys with the ground penetrating radar technique (GPR) were conducted at the TNT Washout Facility and the Old Burn Area. The GPR technique detects lateral and vertical changes in dielectric properties of shallow subsurface materials. The dielectric constant is a physical property of matter

that measures the electrical polarization resulting from an applied electric field. Metals such as copper or iron have dielectric constants generally around one (Ulriksen, 1982). The dielectric properties of soils and rocks are strongly affected by moisture content. For example, the dielectric constant of loamy soils varies from approximately 2.5 to 19, depending on whether the soil is dry or wet, respectively (Ulriksen, 1982).

In the GPR technique, pulses of very high frequency (10^8 to 10^9 Hz) electromagnetic energy are directed into the subsurface by an antenna as it is moved over the land surface. These pulses propagate into the earth and are reflected from subsurface objects and interfaces that have discontinuities in dielectric properties. A receiving antenna measures the amplitude of the reflected energy versus time in nanoseconds. By pulling the antenna along traverses, profiles are generated on paper records that have great similarity to sonar records used in marine surveys. The objectives of the reconnaissance GPR surveys performed at N-TEAD were to locate buried pipe at the TNT Washout Facility and to locate boundaries of waste burial sites at the Old Burn Area.

2.2 SAMPLE CHAIN-OF-CUSTODY, PRESERVATION, AND SHIPMENT PROTOCOLS

2.2.1 Chain of Custody

All water and soil samples collected at N-TEAD were identified and documented by the procedures described in Subsection 9.2 of the USATHAMA Quality Assurance Plan. The samples collected were labeled at the time of collection. The label indicated location, date and time of sampling, sampler's initials, preservation, and analyses to be performed. This information was recorded with an indelible marker, and the label was covered with waterproof transparent tape to protect it from water. The sample containers were placed in coolers and surrounded by vermiculite or bubble pack and ice for shipment to the laboratory(ies).

The chain-of-custody form was completed before sealing the cooler. One copy of the chain-of-custody form was retained by the sampling team, and the other copies were placed in a plastic Ziploc bag and taped to the inside of the cooler lid. See Appendix H for copies of the completed chain-of-custody forms for N-TEAD samples.

The cooler was secured with packing tape and sealed with a custody seal. The seal was placed on the cooler so that opening the cooler caused the seal to break. This prevented unauthorized opening of the cooler. In order to meet the specified holding times, samples were immediately transported from N-TEAD to the various laboratories contracted to do the analytical work.

2.2.2 Preservation and Shipment

To prevent or retard the degradation/modification of chemicals in samples during transportation and storage, all samples were preserved and stored as outlined in Appendix H of the USATHAMA Quality Assurance Plan. Efforts to preserve the integrity of the samples were initiated at the time of sampling and continued until the analyses were performed.

All samples were cooled to 4°C. Additional preservation techniques for various water samples are summarized below:

- Metals samples were preserved with nitric acid to pH 2.0.
- Anion samples were preserved with sulfuric acid to pH 2.0.

Samples for metals and anions were collected in polyethylene bottles. Amber glass containers were used to collect organic samples, except for volatile organic samples, which were collected in 40-ml glass VOA vials (no air bubbles).

In addition to selecting the proper sample container type, all containers were cleaned and the reuse of containers was not permitted. The following procedures were used by laboratory personnel to ensure that the containers were properly cleaned:

- Polyethylene Bottles and Polyethylene Caps.
  - Rinse bottles and lids with 5 percent sodium hydroxide.
  - Rinse with deionized water.
  - Rinse with 5 percent Ultrex (or equivalent) nitric acid in deionized water.
  - Rinse with deionized water.
  - Drain and air dry.
- Amber Glass Bottles.
  - Scrub and wash bottles in detergent.
  - Rinse with copious amounts of distilled water.
  - Rinse with acetone.
  - Rinse with methylene chloride (nanograde or equivalent).
  - Rinse with hexane (nanograde or equivalent).
  - Air dry.
  - Heat to 200°C.
  - Allow to cool.
  - Cap with clean caps having Teflon liners.

- Bottle Caps.
  - Remove paper liners from caps.
  - Wash with detergent.
  - Rinse with distilled water.
  - Dry at 40°C.
- Teflon Liners (avoid contact with fingers).
  - Wash with detergent.
  - Rinse with distilled water.
  - Rinse with acetone.
  - Rinse with hexane (nanograde or equivalent).
  - Air dry.
  - Place liners in cleaned caps.
  - Heat to 40°C for 2 hours.
  - Allow to cool.
  - Use to cap cleaned bottles.

2.2.3 Laboratories Utilized for Sample Analysis

The following laboratories were utilized by WESTON to perform analytical work on this project. The parameters analyzed by each laboratory are also listed below:

Type of Analysis (Water and Soil)	Laboratory
VOCs	WESTON Analytics Division MetaTrace, Inc. Environmental Science and Engineering, Inc.
SOCs (including pesticides/PCBs), metals, and explosives	WESTON Analytics Division
Anions: nitrate/nitrite, sulfate, chloride, bromide, and fluoride	WESTON Analytics Division MetaTrace, Inc.

2.2.4 Methods of Analysis

Analytical methods are provided in the QA/QC Plan for the TEAD RI (WESTON, 1989). All analyses were conducted as per USATHAMA certification requirements by the respective laboratories, except those listed below. Extracts exceeding the calibration of the certified range were diluted into the certified range to produce a valid result.

Non-USATHAMA-Certified Analyses Performed (Water and/or Soil)

- Certain (the majority of) VOCs/SOCs.
- Anions.

No SOCs in water were run by USATHAMA-approved and certified protocols. Uncertified compounds were assigned a USATHAMA target reporting limit (TRL).

Table 2-7 lists the TRLs for all noncertified VOCs/SOCs; the TRLs for certified VOCs/SOCs, pesticides/PCBs, explosives, and metals; and the reporting limits for anions.

2.2.5 Data Management

The following data were input into the IRDMS from this RI program:

- Map file coordinate data (all new sampling points).
- Chemical analysis results.
- Geologic logs of well construction.
- Groundwater elevation data.

Table 2-7

USATHAMA Target Reporting Limits (TRLs) and
USATHAMA-Certified Reporting Limits (CRLs)

	TRL Water (ug/L)	TRL Soil (ug/g)	USATHAMA CRL Water[a] (ug/L)	USATHAMA CRL Soil[a] (ug/g)
Volatiles				
1,1,1-Trichloroethane	5	0.6		
1,1,2-Trichloroethane	5	0.6		
1,1-Dichloroethylene		0.6	1.9/200	
1,1-Dichloroethane	5	0.6		
1,2-Dichloroethane	5	0.6		
1,2-Dichloropropane	5	0.6		
Bromodichloromethane	5	0.6		
Trans-1,3-Dichloropropylene	5	0.6		
Vinyl Chloride		1	3.9/200	
Chloroethane	10	1		
Benzene		0.6	0.67/200	
Carbon Tetrachloride	5	0.6		
Methylene Chloride	5	0.6		
Bromomethane	10	1		
Chloromethane	10	1		
Bromoform	5	0.6		
Chloroform	5	0.6		
Chlorobenzene	5	0.6		
Dibromochloromethane	5	0.6		
Ethylbenzene	5	0.6		
Toluene	5	0.6		
Trans-1,2-Dichloroethylene		0.6	1.7/200	
1,1,2,2-Tetrachloroethane	5	0.6		
Tetrachloroethylene	5	0.6		
Trichloroethylene			0.71/200	0.14/25
Acetone	10	1		
Carbon Disulfide	5	0.6		
2-Butanone (Methyl Ethyl Ketone)	10	1		
Vinyl Acetate	10	1		
Cis-1,3-Dichloropropene	5	0.6		
4-Methyl-2-Pentanone	10	1		

Table 2-7

USATHAMA Target Reporting Limits (TRLs) and
USATHAMA-Certified Reporting Limits (CRLs)
(continued)

	TRL Water (ug/L)	TRL Soil (ug/g)	USATHAMA CRL Water[a] (ug/L)	USATHAMA CRL Soil[a] (ug/g)
Volatiles (continued)				
2-Hexanone	10	1		
Styrene	5	0.6		
Xylenes (Total)	5	0.6		
2-Chloroethylvinyl Ether	5	0.6		
Semivolatiles				
1,2-Dichlorobenzene	10	0.3		
1,3-Dichlorobenzene	10	0.3		
1,4-Dichlorobenzene	10	0.3		
1,2,4-Trichlorobenzene	10	0.3		
2,4,6-Trichlorophenol	10	0.3		
2,4-Dichlorophenol	10	0.3		
2,4-Dimethylphenol	10	0.3		
2,4-Dinitrophenol	50	2		
2,4-Dinitrotoluene			0.60/60	0.42/60
2,6-Dinitrotoluene			0.55/55	0.40/60
2-Chlorophenol	10	0.3		
2-Chloronaphthalene	10	0.3		
2-Nitrophenol	10	0.3		
3,3'-Dichlorobenzidine	20	0.7		
4-Bromophenylphenyl Ether	10	0.3		
4-Chlorophenylphenyl Ether	10	0.3		
4-Nitrophenol	50	2		
Acenaphthene	10	0.3		
Acenaphthylene	10	0.3		
Anthracene	10	0.3		
Bis(2-chloroethoxy) Methane	10	0.3		
Bis(2-chloroisopropyl) Ether	10	0.3		
Bis(2-ethylhexyl) Phthalate	10	0.3		

Table 2-7

USATHAMA Target Reporting Limits (TRLs) and
USATHAMA-Certified Reporting Limits (CRLs)
(continued)

	TRL Water (ug/L)	TRL Soil (ug/g)	USATHAMA CRL Water[a] (ug/L)	USATHAMA CRL Soil[a] (ug/g)
Semivolatiles (continued)				
Benzo (a) Anthracene	10	0.3		
Benzo (b) Fluoranthene	10	0.3		
Butylbenzyl Phthalate	10	0.3		
Benzo (g,h,i) Perylene	10	0.3		
Benzo (k) Fluoranthene	10	0.3		
Benzo (a) Pyrene	10	0.3		
Chrysene	10	0.3		
Hexachlorobenzene	10	0.3		
Hexachlorocyclopentadiene	10	0.3		
Hexachloroethane	10	0.3		
Dibenz (a,h) Anthracene	10	0.3		
Diethyl Phthalate	10	0.3		
Dimethyl Phthalate	10	0.3		
Di-N-Butyl Phthalate	10	0.3		
Di-N-Octyl Phthalate	10	0.3		
Fluoranthene	10	0.3		
Fluorene	10	0.3		
Hexachlorobutadiene	10	0.3		
Indeno (1,2,3-c,d) Pyrene	10	0.3		
Isophorone	10	0.3		
Naphthalene	10	0.3		
Nitrobenzene	10	0.3		
N-Nitroso-Di-N-Propylamine	10	0.3		
N-Nitroso Diphenylamine	10	0.3		
Pentachlorophenol	50	2		
Phenanthrene	10	0.3		
Phenol	10	0.3		
Pyrene	10	0.3		
Benzyl Alcohol	10	0.3		
2-Methylphenol	10	0.3		
4-Methylphenol	10	0.3		
Benzoic Acid	50	2		

Table 2-7

USATHAMA Target Reporting Limits (TRLs) and
USATHAMA-Certified Reporting Limits (CRLs)
(continued)

	TRL Water (ug/L)	TRL Soil (ug/g)	USATHAMA CRL Water[a] (ug/L)	USATHAMA CRL Soil[a] (ug/g)
Semivolatiles (continued)				
4-Chloroaniline	10	0.3		
4-Chloro-3-Methlyphenol	10	0.3		
2-Methylnaphthalene	10	0.3		
2,4,5-Trichlorophenol	50	2		
2-Nitroaniline	50	2		
3-Nitroaniline	50	2		
Dibenzofuran	10	0.3		
4-Nitroaniline	50	2		
4,6-Dinitro-2-Methylphenol	50	2		
1,2-Diphenylhydrazine	10	0.3		
4,6-Dinitro-2-Cresol	50	2		
4-Chloro-3-Cresol	10	0.3		
Benzadine	50	2		
N-Nitroso-Dimethylamine	10	0.3		
Pesticides/PCBs				
Alpha-Benzenehexachloride	3	0.5		
Alpha-Endosulfan	3	0.5		
Aldrin	3	0.5		
Beta-Benzenehexachloride	3	0.5		
Beta-Endosulfan	6	1		
Delta-Benzenehexachloride	3	0.5		
Dieldrin	6	1		
Endrin	6	1		
Endosulfan Sulfate	6	1		
Heptachlor	3	0.5		
Heptachlor Epoxide	3	0.5		
Lindane			1.0/160	0.066/5.3

Table 2-7

USATHAMA Target Reporting Limits (TRLs) and
USATHAMA-Certified Reporting Limits (CRLs)
(continued)

	TRL Water (ug/L)	TRL Soil (ug/g)	USATHAMA CRL Water[a] (ug/L)	USATHAMA CRL Soil[a] (ug/g)
Pesticides/PCBs (continued)				
Aroclor 1016	30	5		
Aroclor 1221	30	5		
Aroclor 1232	30	5		
Aroclor 1242	30	5		
Aroclor 1248	30	5		
Aroclor 1254	60	10		
Aroclor 1260	60	10		
Toxaphene	60	10		
Methoxychlor	30	5		
4,4'-DDE	6			0.094
4,4'-DDD	6	1		
4,4'-DDT	6			0.51
Endrin Ketone	6	1		
Alpha-Chlordane	30	5		
Gamma-Chlordane	30	5		
Dibutylchlorendate			0.3	12/120
Endrin Aldehyde	20	0.7		
Explosives				
1,3,5-Trinitrobenzene			0.56/53.8	2.09/60.0
1,3-Dinitrobenzene			0.61/60.5	0.59/60.0
2,4-Dinitrotoluene			0.60/60.0	0.42/60.0
2,6-Dinitrotoluene			0.55/54.8	0.40/60.0
2,4,6-Trinitrotoluene			0.78/75.3	1.92/100
Cyclotetramethylenetetranitramine (HMX)			1.30/94.1	1.27/140
Nitrobenzene			1.13/49.2	0.42/60.0
Cyclotrimethylenetrinitramine (RDX)			0.63/63.3	0.98/80.0
Nitramine (Tetryl)			0.66/66.4	0.25/80.0
Metals				
Mercury			0.17/10.8	0.10/5.46
Silver			0.19/20.0	0.65/20.00
Arsenic			5.00/50.0	5.70/50.00

Table 2-7

USATHAMA Target Reporting Limits (TRLs) and
USATHAMA-Certified Reporting Limits (CRLs)
(continued)

	TRL Water (ug/L)	TRL Soil (ug/g)	USATHAMA CRL Water[a] (ug/L)	USATHAMA CRL Soil[a] (ug/g)
Metals (continued)				
Beryllium			0.10/3.30	0.33/1.60
Cadmium			5.10/100	0.70/10.00
Chromium			37.5/500	2.50/50.00
Copper			1.78/49.0	3.82/49.00
Lead			2.50/50.0	4.78/50.00
Antimony			3.00/98.0	25.30/98.00
Selenium			5.00/100	2.10/10.00
Thallium			5.00/100	7.93/59.00
Nickel			9.60/1,920	4.80/96.00
Zinc			17.2/1,053	52.00/1,053
Anions[b]				
Bromide	125,000/2,500,000	12,500/250,000		
Chloride	125,000/2,500,000	12,500/250,000		
Fluoride	50/1,000	5/100		
Nitrite/Nitrate	500/10,0000	500/10,000		
Sulfate	125,000/2,500,000	12,500/250,000		

[a]First number is USATHAMA CRL. Second number is upper reporting range for CRL.
[b]Analytical method detection limits and upper reporting limits are presented for anions.

Notes: SRLs and CRLs are nominal detection limits. Values may vary due to sample dilutions, sampling size, and moisture content of soil samples.

SECTION 3

PHYSICAL CHARACTERISTICS OF THE STUDY AREA

This section presents information on the meteorology, physiography, surface water hydrology, hydrogeology, natural resources, water supplies, demography, and land use for Tooele Valley, in general, and for N-TEAD, in particular. Much of this information comes from previous investigations and reports, primarily "Tooele Army Depot, Preliminary Assessment/Site Investigation Final Draft Report, Volume I - North Area" (EA, 1988). Updated information obtained from the RI on soil and geologic conditions, hydrogeology, and location of disposal areas associated with the five study areas is also provided.

Tooele Valley is characterized by a hot, dry summer, cool spring and fall, moderately cold winter, and a year-round lack of precipitation. The higher elevations of the adjacent mountains experience greater amounts of precipitation and somewhat cooler temperatures.

Most precipitation occurs as snow between early fall and late spring, when the valley is affected by the continental winter storm track. Summers are generally dry, but showers and thunderstorms occur occasionally. The largest amount of precipitation occurs in the mountains, creating a potential for flash floods and erosion. The Town of Grantsville, located approximately 2 to 3 miles northwest of N-TEAD, has an average annual precipitation of 11 inches and Tooele has an average of 16.5 inches.

Low humidity is a characteristic of the valley climate and visibility is generally good. However, during the winter months, storm fronts are usually followed by high-pressure fronts that occasionally last for several weeks. These fronts trap the cold air in the valley and create temperature inversions that can result in significant fog and smog problems.

The Salt Lake Basin forms a large, generally enclosed air basin of 7,500 square miles that is large enough to create a classical sea breeze circulation. The sea breeze-type circulation moving through the air basin is called the local wind circulation (LWC). The LWC is caused by the uneven heating and cooling of the land and water surfaces. This diurnal wind tends to blow downslope towards the lake at night when the lake is warmer than the land. During the day, when the land is warmer than the lake, the winds flow upslope into the valleys and mountains. This tends to cause a mixing of air in the center of the lake along a north/south axis during the day. The LWC is the predominant wind factor in the basin, and winds rarely exceed 10 miles per hour, although passing storms cause higher wind velocities.

The LWC produces a constant interchange of air in the basin, but only limited exchange with air external to the basin.

Annually, average daily temperatures range from a high of 80°F to a low of 30°F. The highest recorded temperature during the period 1965 to 1975 was 110°F, while the lowest for the same period was -14°F. The average spring and fall frost dates are 1 April and 25 October, respectively (Inland Pacific Engineering Company, 1982).

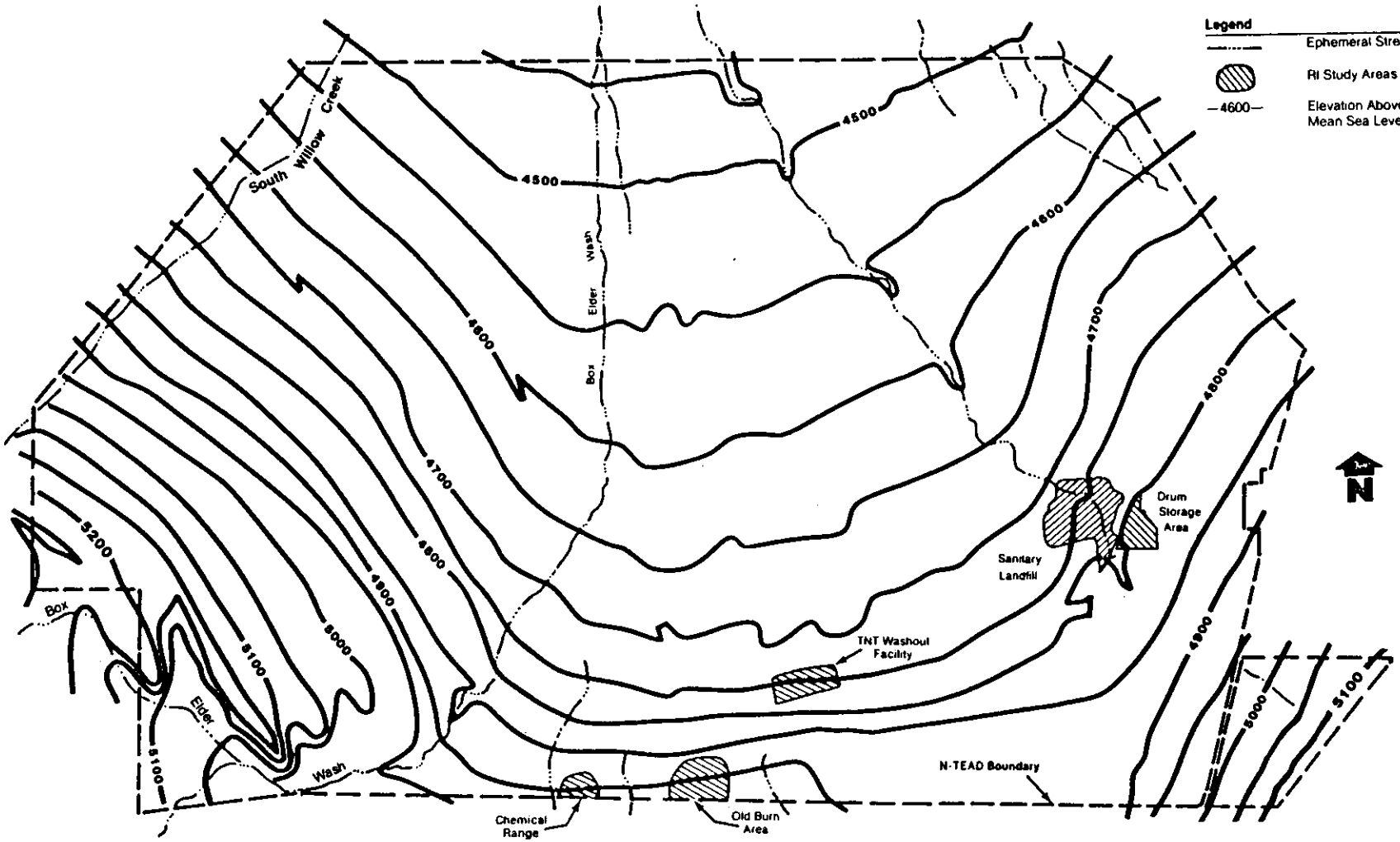
3.1 SURFACE WATER HYDROLOGY

The topography of N-TEAD and the surrounding area is illustrated in Figure 3-1. N-TEAD is located in Tooele Valley, which is a northward-plunging structural basin ringed by coalescing alluvial fans that slope generally to the north at about 40 feet per mile and have been greatly modified by the shoreline erosion of Lake Bonneville (Everitt and Kaliser, 1980). The valley is bordered on the north by the Great Salt Lake at an elevation of 4,200 feet. The valley is bordered by the Oquirrh Mountains to the east and the Stansbury Mountains to the west. Maximum elevations of these mountains are 10,350 feet and 11,031 feet, respectively. Tooele Valley is separated from Rush Valley to the south by South Mountain, a low transverse divide, and by the Stockton Bar, which was deposited by Lake Bonneville during the Pleistocene epoch.

There are five perennial streams in Tooele Valley, with a combined water yield of about 13,930 acre-ft per year (Razem and Steiger, 1981). These streams originate in the mountains and disappear in the valley floor. Two of these streams originate in the central Oquirrh Mountains at the eastern side of the valley and enter the valley near the Town of Tooele. The other three streams originate in the central Stansbury Mountains on the west side of the valley. South Willow Creek is near the northwest boundary and is the largest of the streams in the Tooele Valley, with an annual flow of 4,830 acre-ft. Box Elder Wash has an annual flow of 900 acre-ft and enters N-TEAD as an intermittent stream in the southwest, crossing from south to north.

There are also four large springs in the central Tooele Valley, located several miles north and northeast of the facility boundary. Their combined flow is about 17,000 acre-ft. A few minor seeps also occur in the basin, but none within N-TEAD. The streambeds located within the TEAD boundaries carry intermittent flow from perennial streams originating in the surrounding mountains.

No perennial streams exist within N-TEAD. However, perennial reaches of streams exist southeast and southwest of N-TEAD in the South Willow and Box Elder Canyon, and northeast of N-TEAD in Settlement Canyon. The perennial flows of these streams infiltrate the alluvial fan materials before reaching the valley



Source: USGS Quadrangles Tooele (1969), Grantsville (1955), Stockton (1980), and South Mountain (1980)

FIGURE 3-1 TOPOGRAPHIC RELIEF AND SURFACE WATER DRAINAGE AT N-TEAD

floor, which lies to the north of N-TEAD.

Manmade drainage systems have been constructed to transport storm runoff from several areas at N-TEAD. All of these systems either end in spreading depression areas or in natural drainage channels within N-TEAD.

3.2 SOILS

Soil characteristics within Tooele Valley result largely from the past inundation of the valley bottoms by Pleistocene lakes. Increasing amounts of salt were deposited in the soils of the Great Basin valleys by drying lakes in the Holocene era. Today, the valley bottoms tend to be saline, the middle slopes slightly saline, and the upper parts of the valleys nonsaline.

The soils at N-TEAD are generally low in fertility and are farmed only under irrigation (Inland Pacific Engineering Company, 1982). Four general soil groups occur on the facility (Inland Pacific Engineering Company, 1982). Group 1 consists of relatively thin loamy soil over either gravel or a sand and gravel mixture. Group 1 covers approximately 43 percent of the site, on slopes of 1 to 5 percent, on the higher eastern and western parts of the facility. Group 2 consists of deep loam or silty loam overlying silty or gravelly clay loam. These soils are moderately saline and alkaline, exhibit some gullying under native conditions, and may be poorly drained. They occupy 25 percent of the site, mostly in lower portions of the northern site, and extend up drainageways. Group 3 consists of medium-textured deep loams over a loam subsoil, covering approximately 10 percent of the site. Group 4 consists of deep sandy loams, occupying 25 percent of the site, mostly in the center. They are highly susceptible to wind erosion and experienced heavy erosion and devegetation in the 1930s.

Group 2 soils have high water erosion potential, while the other groups have moderate water erosion potential. About 1,600 acres have been covered over or are used for open storage. Additional areas may have been impacted during the facility's operation by compaction, mechanical disruption, or contamination.

3.3 GEOLOGY/LITHOLOGY

The regional and site geologic setting of Tooele Valley, Utah, within which N-TEAD is located, is described below.

3.3.1 Regional Geology

N-TEAD is located in the Basin and Range Geologic Province, approximately 35 miles west of the Wasatch Fold and fault belt

of the Overthrust Geologic Province. The Basin and Range Province is characterized by large enechelon fault blocks bounded by "down-on-the-west" normal faults that trend approximately north to south. Movement along the faults has been extensive since the late Miocene epoch, with displacement of hundreds to thousands of feet in places. This has promoted the formation of large interior drainage basins between the fault blocks, with extensive alluvial and lacustrine deposits forming within (Hintze, 1975).

The North Area of TEAD is located in a large interior drainage basin (Great Salt Lake Basin), bounded on the north and east by the Great Salt Lake and the Oquirrh Mountain fault block, on the south by the Sheeprock and Tintic Mountain fault blocks, and on the west by the Stansbury Mountain fault block. Displacement along the control faults has been extensive, exposing rocks ranging in age from pre-Cambrian and Cambrian (approximately 600 million years ago) to Tertiary and Quaternary. Interspersed within these rocks are igneous (volcanic) rocks of geologically recent age (Tertiary) intruding into the fault block mountains simultaneously with fault displacement (Moore, 1979).

Alluvial and lacustrine sediments lie in the valleys between these fault block mountains and were deposited as pediment slopes from mountain drainage courses and as lake bed deposits in the large intermountain Lake Bonneville of the late Tertiary period. The regional surface geology of Tooele Valley is shown in Figure 3-2.

3.3.2 Site Geology (From Available Literature Sources)

Valley fill deposits of lacustrine, colluvial, and alluvial sediments comprise most of the surficial geology. The valley fill is over 8,000 feet thick in the north-central part of Tooele Valley and thins toward the margins (Everitt and Kaliser, 1980). The valley fill is over 1,500 feet thick onsite at a well ((C-3-5)22dab) located approximately 4.5 miles northwest of N-TEAD, but probably thins out southeast and southwest from the North Area (Razem and Steiger, 1981). Another well ((C-3-4)29cba), located just east of the site, penetrates limestone bedrock at a depth of 582 feet (Razem and Steiger, 1981). Limestone and quartzite bedrock crops out in the northeast portion of N-TEAD, and another body of rock crops out along the southern boundary.

The valley fill deposits consist of an older sequence of Tertiary age and a younger sequence of Quaternary age. The older sequence comprises the Salt Lake Group and consists of moderately consolidated sand, gravels, silts, and clays with an abundance of volcanic ash (Everitt and Kaliser, 1980). The group is characterized by considerable deformation by tectonic processes. Razem and Steiger (1981) noted an increase in the

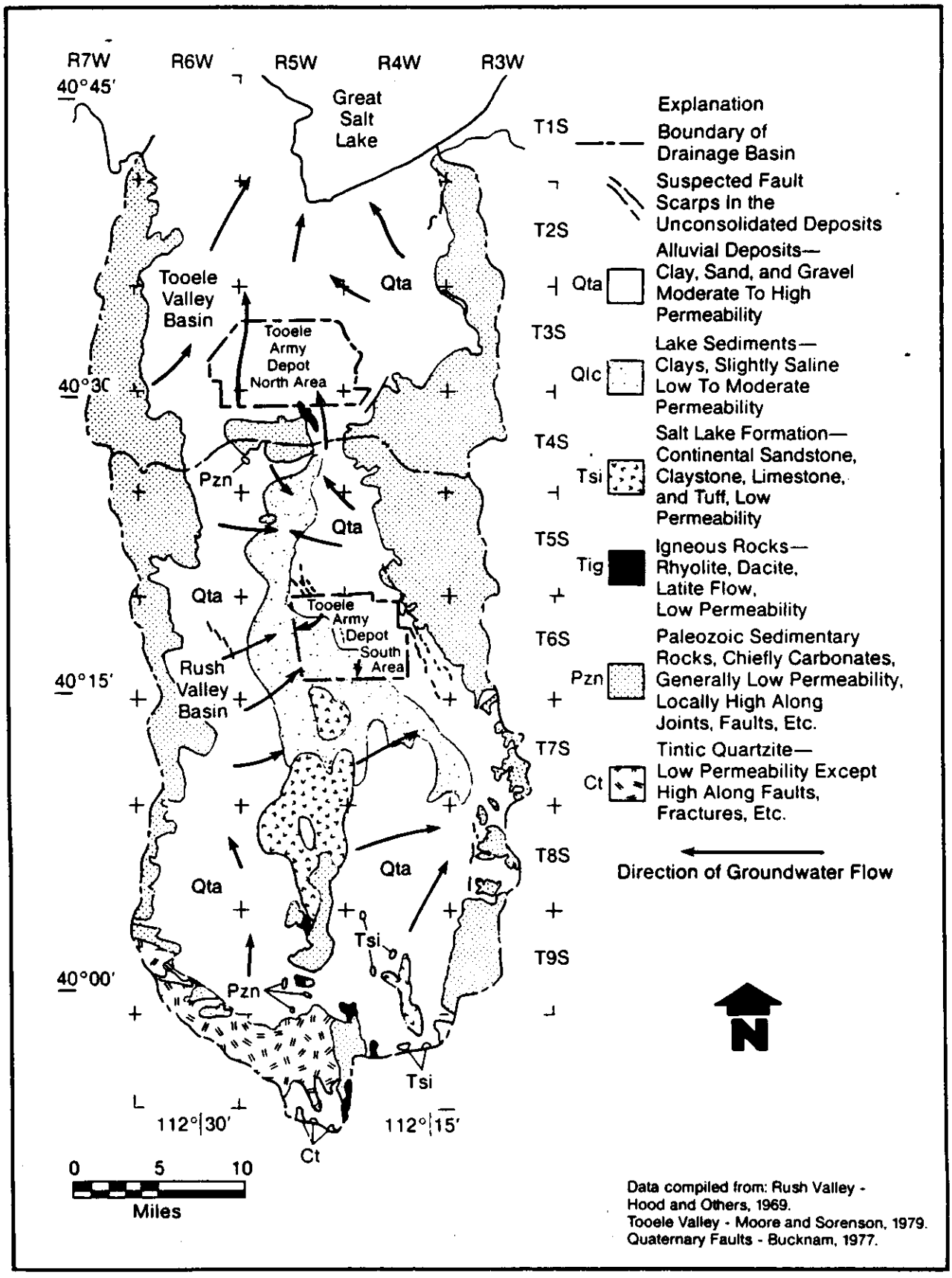


FIGURE 3-2 SURFICIAL REGIONAL GEOLOGY

fraction of finer-grained materials at a depth of 800 to 900 feet and suggest that this level may mark the top of Tertiary age sediments.

The younger sequence of the valley fill unconformably overlies the Salt Lake Group and consists of deposits of mostly unconsolidated sand, gravel, silt, and clay of Quaternary age (Everitt and Kaliser, 1980). This sequence includes pre-Lake Bonneville alluvium of Pleistocene age, Lake Bonneville deposits of Pleistocene age, and deposits of recent age that include alluvium, lake beds, and dune sands (Gates, 1965).

The sediments of the younger valley fill occur in irregular, interfingering layers. Alluvial and lacustrine deposition environments alternated several times during the Tertiary and Quaternary ages (Gates, 1965), although alluvial processes probably dominated around basin margins, with lacustrine processes dominating toward the center. Beds of alluvial gravel thin and pinch out between beds of silt and clay toward the center of the basin (Everitt and Kaliser, 1980).

The bedrock underneath the valley fill is comprised of carbonate rock of Palezoic age. These rocks are similar to those that crop out at two places on TEAD and comprise the mountains to the east, south, and west of TEAD.

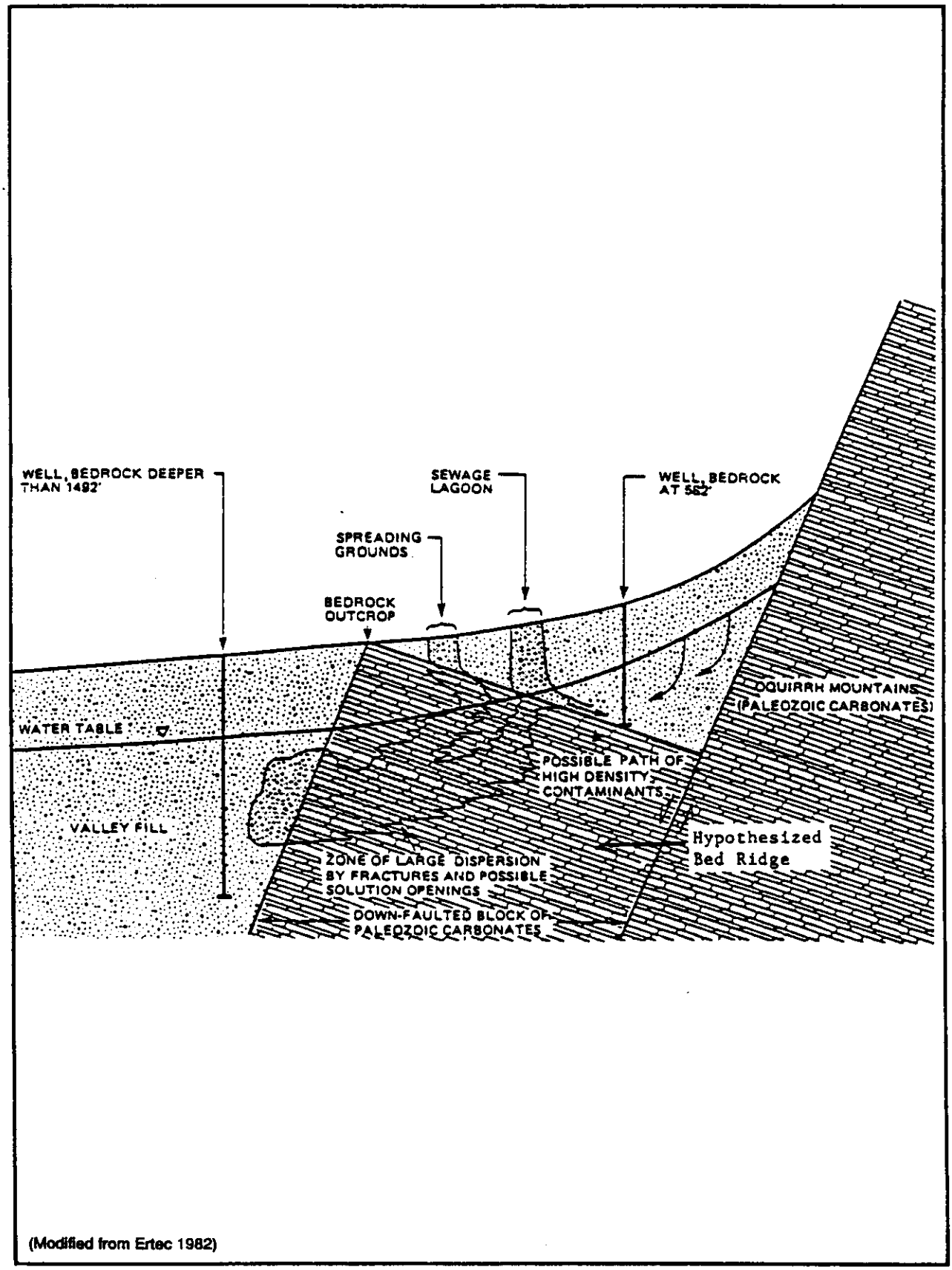
In addition to the unconsolidated valley fill deposits and carbonate bedrock, zones of cemented conglomerates or fanglomerates also exist at N-TEAD. Through a study of a number of faults running through the valley and several bedrock outcrops occurring in the northeast and south-central portions of N-TEAD, Ertec (1982) hypothesized the existence of a buried bedrock ridge running diagonally across N-TEAD. This hypothesized bedrock ridge is illustrated in Figure 3-3.

3.3.3 RI Subsurface Investigation

3.3.3.1 TNT Washout Facility

To further characterize the nature of the subsoils and the extent of the perched water system in the vicinity of the TNT Washout Facility, nine shallow borings, N-101-88 through N-109-88, were drilled to a depth of 10 feet below the first occurrence of the perched zone. Figure 3-4 presents the locations of the boreholes drilled at the TNT Washout Facility. Upon completion of borehole drilling, a groundwater monitor well was installed in each borehole.

Borings N-101-88 and N-102-88 were drilled with a Central Mine Equipment (CME) drill rig using 6-1/2 to 7-inch OD, 3-1/4-inch ID, HSA. Borings N-103-88 through N-109-88 were drilled using the same drill rig, except that an 11 to 12-inch OD, 6-5/8-ID, hollow-stem auger was used.



(Modified from Ertec 1982)

FIGURE 3-3 HYPOTHESIZED BEDROCK RIDGE, N-TEAD

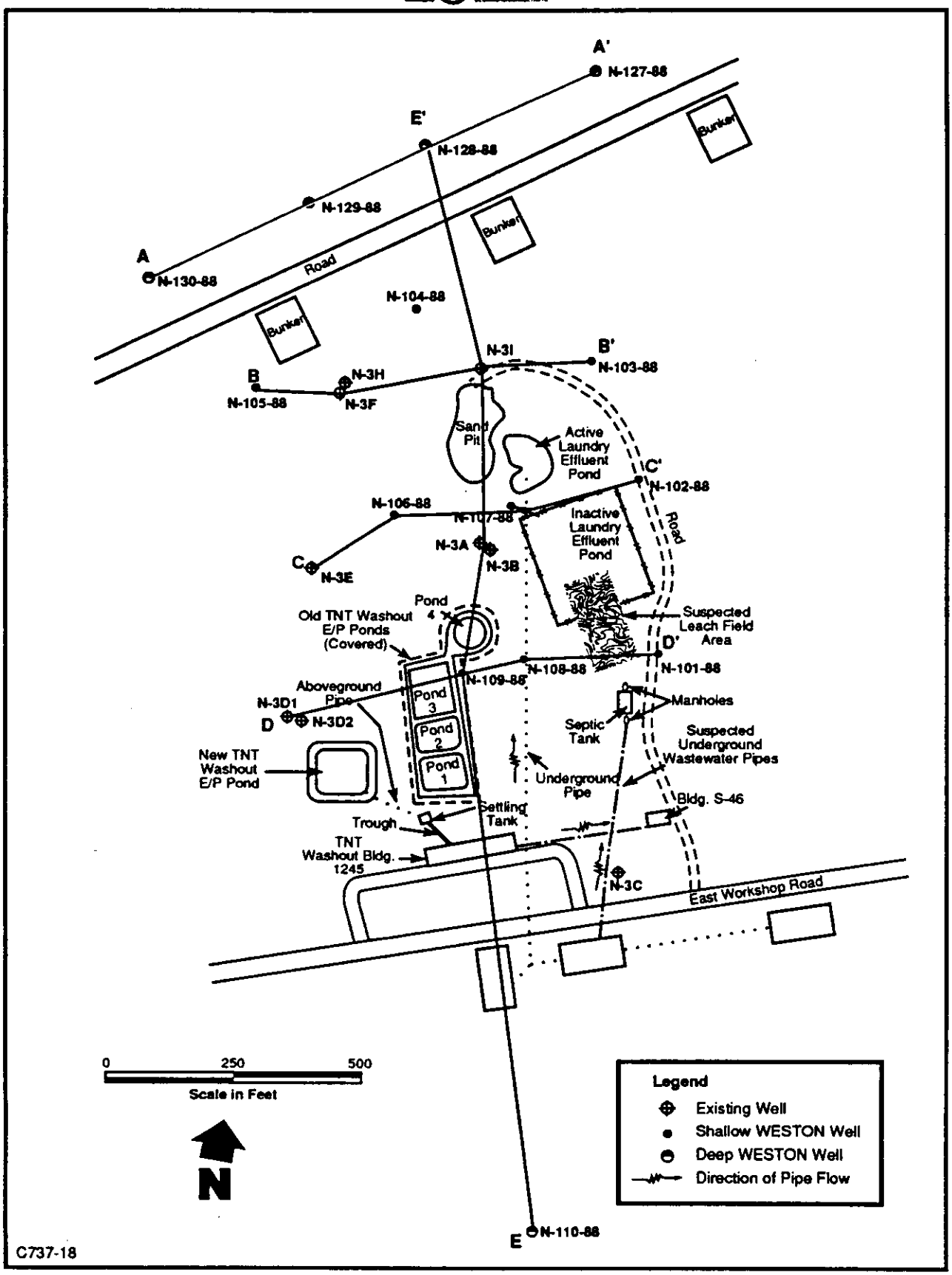


FIGURE 3-4 TNT WASHOUT FACILITY PLAN VIEW OF CROSS SECTIONS

Two additional shallow boreholes, N-125-88 and N-126-88, were drilled west and southwest, respectively, of the laundry effluent pond. These two boreholes were drilled as test holes to more precisely determine the lithologic nature of the perched zones. Soil samples were collected at 5-foot intervals from these two boreholes, but none were sent to a laboratory for further chemical or physical testing. These boreholes were left open for 4 to 12 hours at various depths to determine if there would be enough free water to install a monitor well and to retrieve a groundwater sample. It was determined that there was not enough free water; therefore, no groundwater monitor well was installed in either of these two boreholes.

In addition to the 11 shallow borings in the TNT Washout Facility, five deep boreholes, N-110-88 and N-127-88 through N-130-88, were drilled to further characterize the nature of the subsoils and the regional aquifer beneath the TNT Washout Facility. These boreholes were drilled to a depth of 20 feet below the first occurrence of saturated materials of the uppermost aquifer. These five borings were drilled with a rotary drill rig using a drilling technique called air-rotary with drive casing. Water was injected to aid in dust control and to remove the drill cuttings from the bottom of the hole. The boring was advanced by an 8-inch tricone drill bit, behind which a 9-inch OD steel casing was pushed to the bottom of the borehole.

One of these five wells, N-110-88, is located approximately 1,200 feet south, or upgradient, of N-109-88, which is centrally located in the TNT Washout Facility. The remaining four boreholes, N-127-88 through N-130-88, are all located north, or downgradient of N-109-88, at distances ranging from approximately 1,200 to 1,400 feet from N-109-88.

Selected soil samples from both the shallow and deep boreholes were sent to a geotechnical laboratory for analysis (Table 3-1). The complete suite of geotechnical analyses is provided in Appendix C.

Geologic cross-sections A-A' through E-E' (Figures 3-5 through 3-9) depict the subsurface geology beneath the TNT Washout Facility. Geologic cross-sections A-A' and E-E' depict the deeper subsurface geology, while cross-sections B-B' through D-D' depict the shallow subsurface geology beneath the TNT Washout Facility. The geology of the upper 75 to 100 feet consists mostly of thin interbedded layers of fine-grained sands, silts, and clays. Below these depths, coarse-grained gravels with occasional layers of sand predominate. All of these materials represent some stage of Lake Bonneville/Great Salt Lake alluvial of lacustrine or valley fill deposition.

Table 3-1

Summary of Geotechnical Laboratory Analysis of Selected Subsurface Soil Samples From the TNT Washout Facility, N-TEAD[a]

Sample Location	Depth Range (ft)	USCS Classification[b]	Visual Description[c]	Natural Moisture Content (%)	Specific Gravity[d]	Atterburg Limits[e] Liquid Limit (%)	Plastic Limit (%)	Plasticity Limit (%)
N-101-88	19.5-20.0	SM	Sand, medium grained	11.3	2.69	—	—	—
N-102-88	19.5-21.0	SM	Sand, fine grained	24.0	2.63	—	—	—
N-102-88	24.5-26.0	SM	Sand, clayey fine grained	24.4	2.61	—	—	—
N-103-88	34.5-36.0	SM	Sand, clayey	19.5	2.68	—	—	—
N-104-88	34.0-35.5	SM	Sand	5.6	2.65	—	—	—
N-105-88	14.0-15.5	SM	Silt, sandy	4.8	2.60	—	—	—
N-106-88	24.0-25.0	SM	Silt, sandy	19.8	2.65	—	—	—
N-106-88	39.0-40.5	CL	Silt, clayey	27.6	2.68	32	21	11
N-107-88	14.0-15.5	SM	Silt, sandy	6.0	2.65	—	—	—
N-109-88	24.0-76.0	SM	Silt, sandy	23.7	2.63	—	—	—
N-110-88	60.0-61.0	CL	Silt, clayey	12.8	2.63	30	22	8
N-110-88	75.0-76.0	CH	Clay	31.4	[f]	60	23	37
N-127-88	65.0	CL	Clay, sandy silty	14.0	2.67	36	21	15
N-128-88	44.5	CL	Clay	38.1	2.70	49	23	26
N-128-88	75.0-77.0	CH	Clay	39.6	2.67	58	23	35

Table 3-1

Summary of Geotechnical Laboratory Analysis of Selected Subsurface Soil Samples From the TNT Washout Facility, N-TEAD[a]
(continued)

Sample Location	Depth Range (ft)	USCS Classification[b]	Visual Description[c]	Natural Moisture Content (%)	Specific Gravity[d]	Atterburg Limits[e]		
						Liquid Limit (%)	Plastic Limit (%)	Plasticity Limit (%)
N-129-88	45.0-47.0	CL	Clay	35.1	2.67	42	22	20
N-129-88	60.0-62.0	CL	Clay	38.6	2.66	47	23	24
N-130-88	55.0	CL	Silt, clayey	3.9	[f]	47	17	30

[a]Laboratory analyses performed by Northern Engineering and Testing, Inc.
[b]Formula: U.S. Army Corps of Engineering Manual (EM 1110-2-1906, "Laboratory Soils Testing", revised March 31, 1972).
[c]Visual description from borehole log.
[d]ASTM D854.
[e]ASTM D4318.
[f]Insufficient sample size prohibited performance of all tests requested.

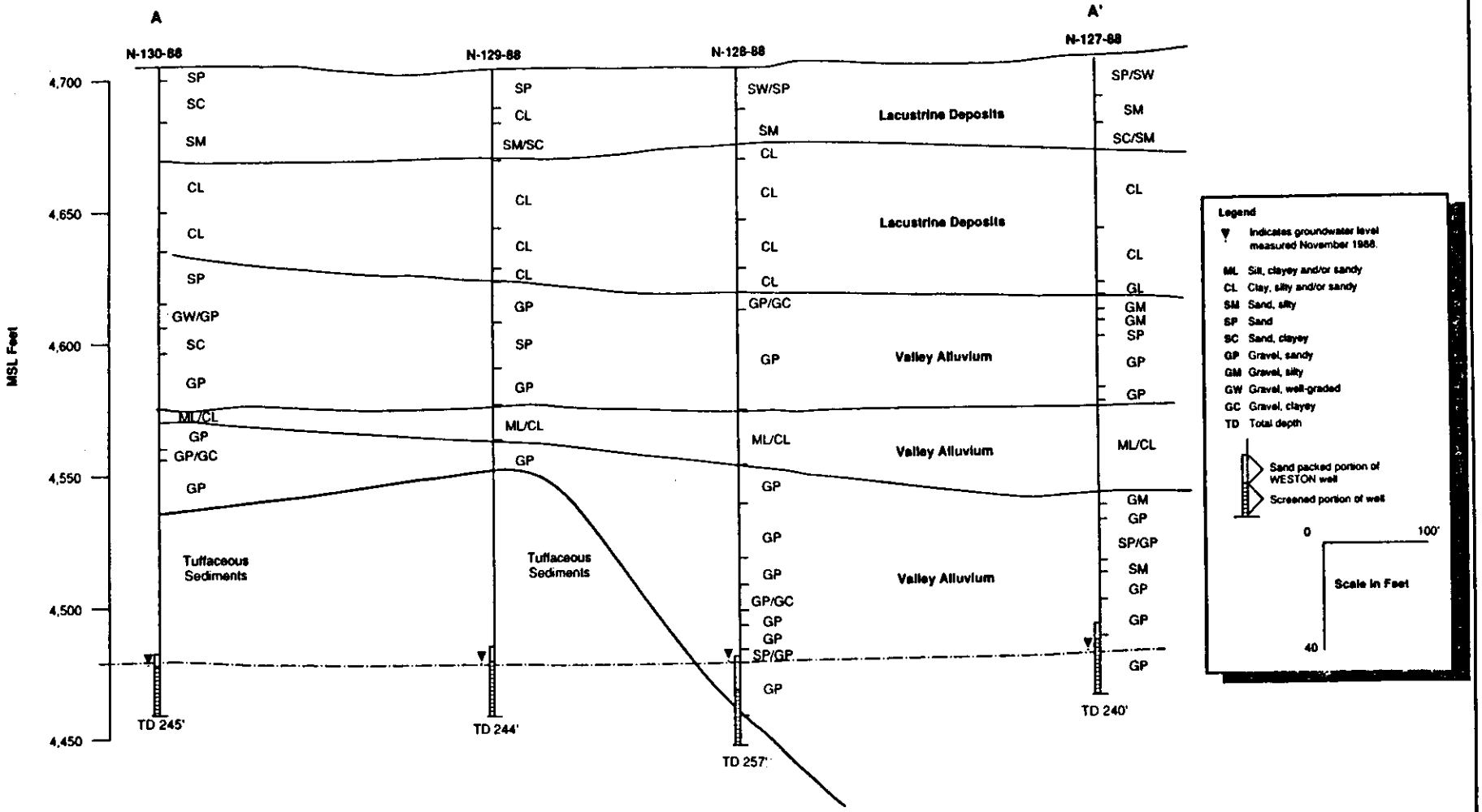


FIGURE 3-5 GEOLOGIC CROSS-SECTION A-A', TNT WASHOUT FACILITY

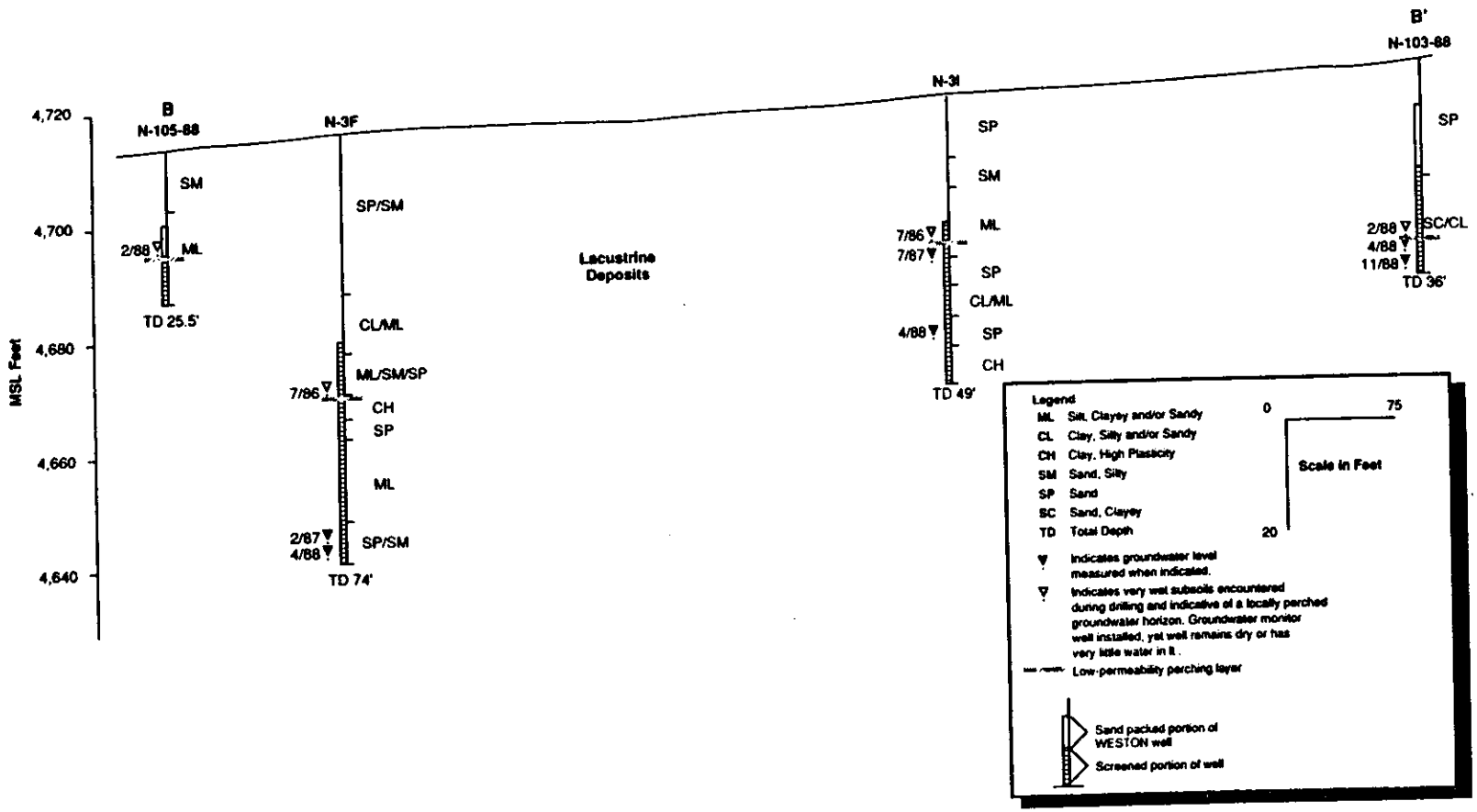


FIGURE 3-6 GEOLOGIC CROSS-SECTION B-B', TNT WASHOUT FACILITY

A-737f

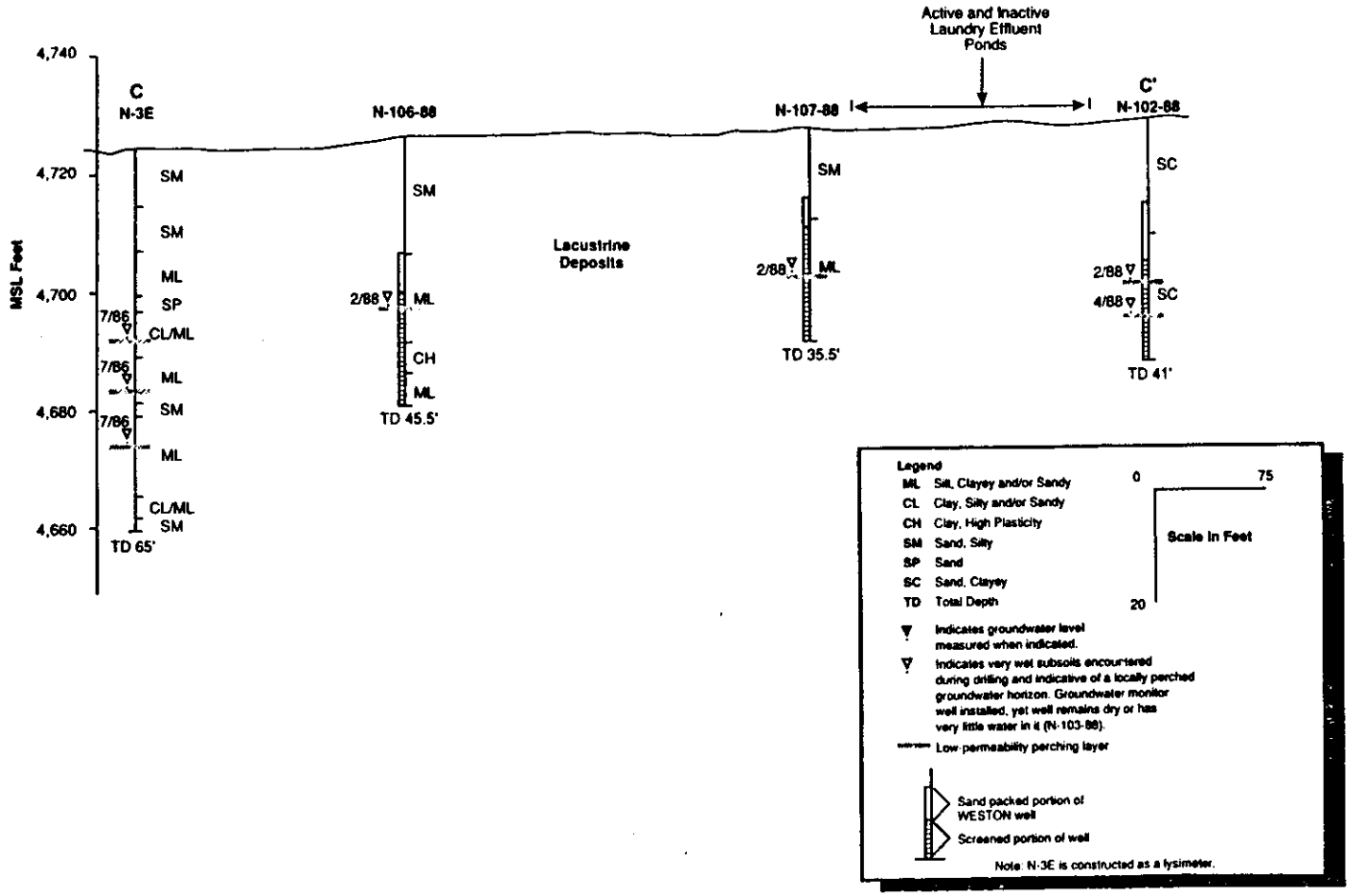


FIGURE 3-7 GEOLOGIC CROSS-SECTION C-C', TNT WASHOUT FACILITY

C-7371

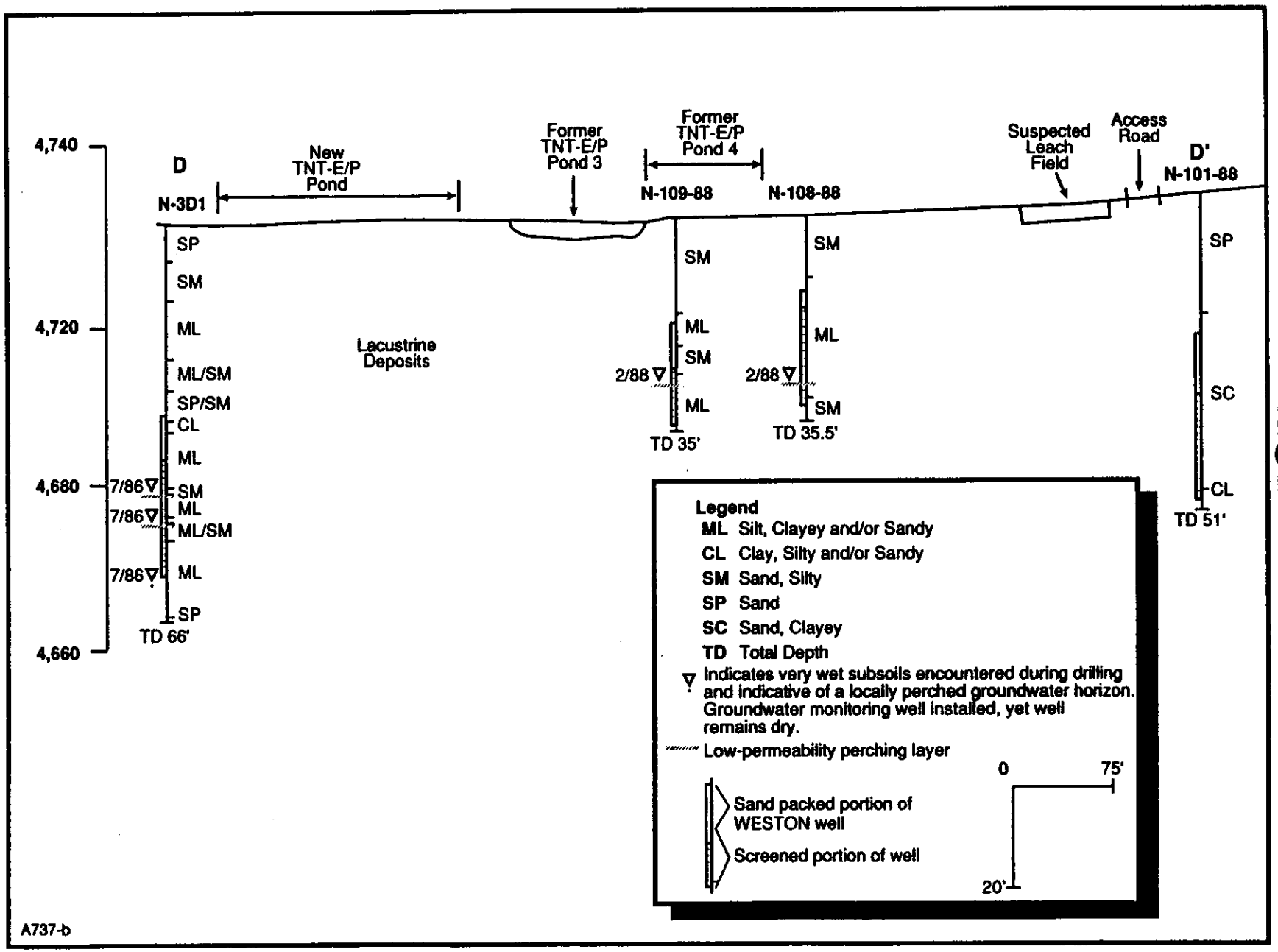


FIGURE 3-8 GEOLOGIC CROSS-SECTION D-D', TNT WASHOUT FACILITY

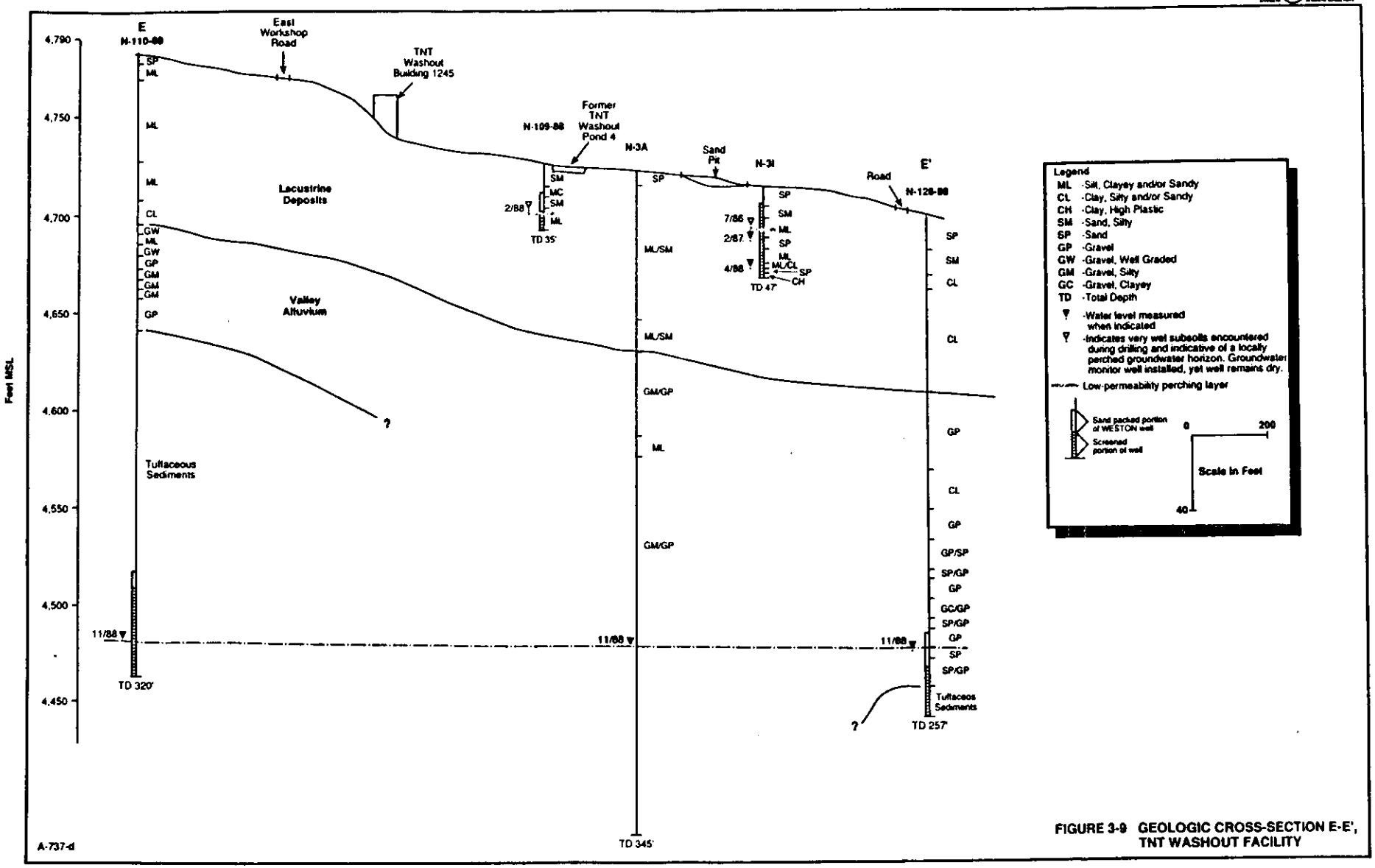


FIGURE 3-9 GEOLOGIC CROSS-SECTION E-E', TNT WASHOUT FACILITY

Below these unconsolidated alluvial and lacustrine sediments lies tuffaceous bedrock. The TNT Washout Facility lies just to the north of South Mountain, a volcanic intrusive-extrusive complex that forms the southern flank of Tooele Valley. The tuffaceous strata encountered at depths below the TNT Washout Facility are South Mountain tuffaceous strata that have been mantled by lacustrine and valley fill sediments. Figures 3-5 through 3-9 (cross-sections A-A' through E-E') show a great amount of relief atop these tuffaceous strata.

As shown in the cross sections and borehole logs, the shallow geologic materials that predominate in the TNT Washout Facility are thin interbedded layers of fine-grained sands, silts, and clays. The clay layers are very thin, 1 to 2 inches thick, and comprise the strata that act as the perching layer beneath the TNT Washout Facility. Due to the narrow thickness of these clays, in most cases the soil sampling interval did not pick up these thin layers during borehole soil sampling.

Wet to very wet soils, hereafter called perched or locally perched zones, were encountered in all 11 shallow borings at the TNT Washout Facility. During drilling and soil sampling, the soil sample would be wet to very wet for one or two sampling intervals and moist to dry for the next soil sample. This contrast in subsoil moisture demarcates the bottom of the locally perched zone. Further discussion of the locally perched zones is given in Subsection 3.5.

In the 14 borings (excluding N-125-88 and N-126-88), two soil samples from each borehole were collected for chemical analysis. Of these two soil samples, one was collected at the groundwater interface and one was collected 5 to 20 feet below this interface. This testing interval represents the approximate location of the groundwater monitor well screen. Subsurface soil samples from the TNT Washout Facility were analyzed for explosives, VOCs, and the anions nitrate/nitrite (as nitrogen) and sulfate.

Two samples each from N-101-88, N-102-88, and N-103-88, and one sample from N-104-88 were not analyzed for VOCs due to an oversight by the field sampling personnel. In N-109-88, located immediately adjacent to the northeast corner of TNT washout pond 3, eight samples plus one duplicate sample were collected and analyzed for the previously described parameters. This was done in order to provide a chemical profile of subsurface soils adjacent and in a downgradient direction from the former TNT washout ponds (1-4) to a depth of approximately 32 feet. No soil samples from N-110-88 or N-127-88 were sent to the laboratory for chemical analysis due to poor sample recovery in the coarse gravels.

Groundwater monitor wells were installed in all of the boreholes drilled at the TNT Washout Facility, with the exception of test holes N-125-88 and N-126-88. The groundwater monitor wells were installed to monitor groundwater conditions in the perched zones and the regional aquifer. A discussion on the situation of those wells installed in the perched zones is given in Subsection 3.5.

3.3.3.2 Sanitary Landfill

To characterize the nature of the subsoils and the regional groundwater aquifer beneath the Sanitary Landfill, seven deep borings (N-111-88 and N-115-88 through N-120-88) were drilled to a depth of 20 feet below the first occurrence of the regional aquifer. Figure 3-10 depicts the locations of all boreholes drilled at the Sanitary Landfill and the locations of the geologic cross-section. Upon completion of borehole drilling, a groundwater monitor well was installed in each borehole.

These seven borings were drilled with a rotary drill rig using a drilling technique called air-rotary with drive casing. Only compressed air and an occasional injection of potable water were used as drilling fluid mediums. The boring was advanced by an 8-inch tricone drill bit, behind which a 9-inch steel casing was pushed to the bottom of the borehole. One borehole, N-115-88, was initially started with the air-rotary with drive casing method, but a coarse gravel layer from 180 to 200 feet was encountered that prevented the casing from being driven past 200 feet. At 200 feet, the borehole was completed by using a mud-rotary drilling technique.

Of these seven monitor wells, only N-111-88 is located upgradient of the Sanitary Landfill. The remaining six boreholes, N-115-88 through N-120-88, are all located within, directly adjacent to, or downgradient of the Sanitary Landfill.

Soil samples were taken at 10-foot intervals beginning at 10 feet below surface grade and extending to the bottom of the borehole. Due to the very coarse-grained nature of the subsurface soils encountered during the deep borehole drilling at the Sanitary Landfill, the normal sampling method of using a split-barrel sampling device was often ineffective for obtaining a soil sample. It was determined that when drilling in fine-grained material, the split-barrel sampler would be used to obtain a sample. When drilling in coarse-grained material, the method of retrieving a soil sample would be to catch a sample of the hole. Since air was the primary drilling fluid, and the drilling method used provided a representative soil sample at the surface within a few seconds of being encountered in the subsurface, this method of soil sampling was appropriate.

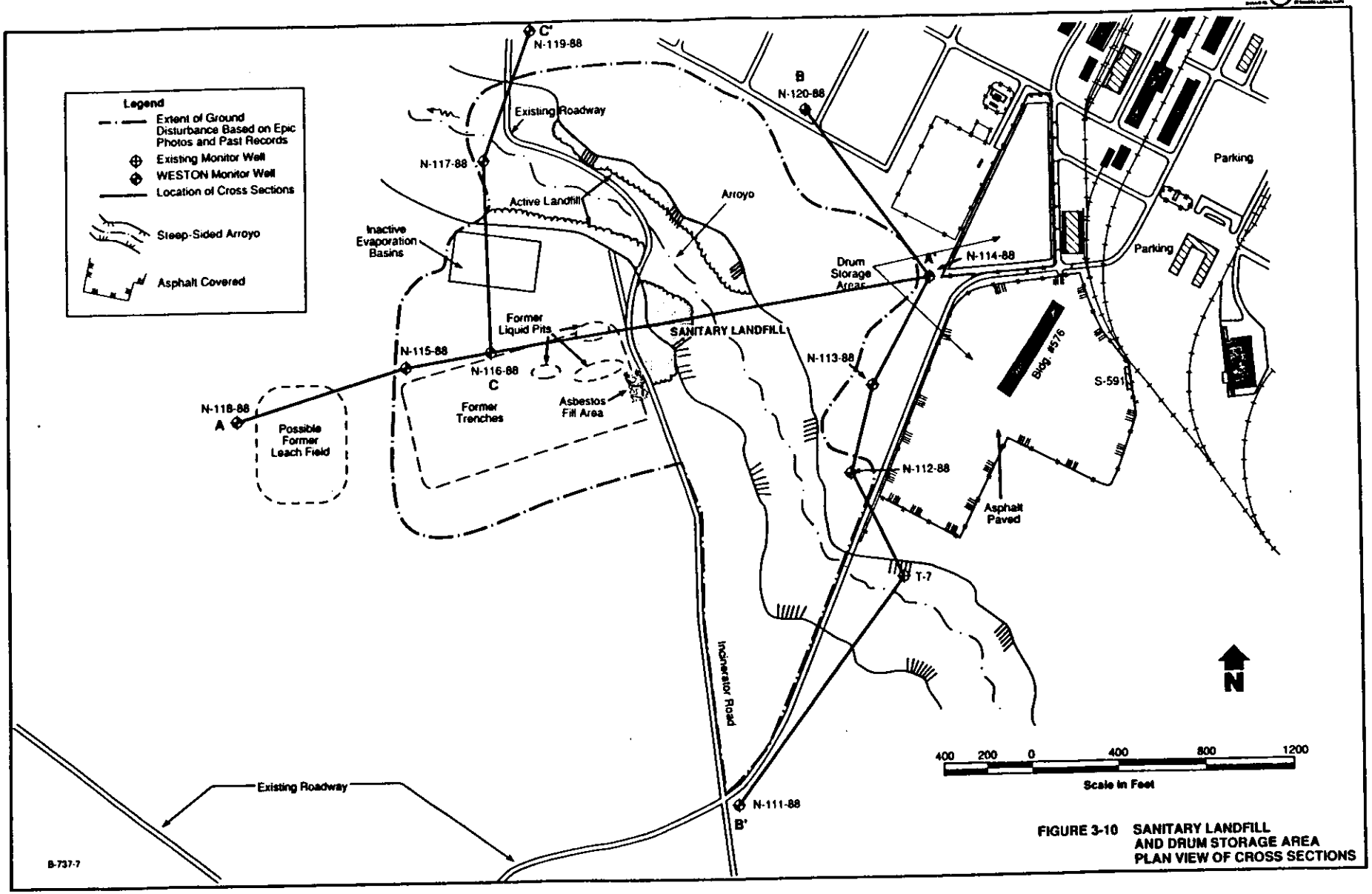


FIGURE 3-10 SANITARY LANDFILL AND DRUM STORAGE AREA PLAN VIEW OF CROSS SECTIONS

Selected soil samples from the boreholes were sent to a geotechnical laboratory for analysis. Table 3-2 summarizes the geotechnical laboratory analysis. The complete suite of geotechnical analyses is given in Appendix C.

Geologic cross-sections A-A' through C-C' (Figures 3-11 through 3-13) depict the subsurface geology beneath the Sanitary Landfill and the Drum Storage Areas. The geology depicted by these cross sections consists predominately of coarse-grained gravels interbedded with sands and an occasional fine-grained clay or clayey sand. The strata are very heterogeneous and marker strata cannot be readily distinguished on these cross sections. All of these materials represent some stage of Lake Bonneville/Great Salt Lake alluvial, lacustrine, or valley fill deposition.

In N-114-88, drilled as part of the Drum Storage Areas investigation, tuffaceous sediments were encountered at the bottom of the hole. The hills east of N-TEAD are comprised of volcanic intrusive-extrusive rocks that form the eastern flank of Tooele Valley. The tuffaceous sediments encountered in N-114-88 are the same tuffaceous rocks that have been mantled by lacustrine and valley fill sediments.

Two soil samples were collected from N-115-88 and N-117-88 for chemical analysis. At these locations, one sample was collected at the groundwater interface and one was collected 10 to 20 feet below the interface. This sampling interval represents the approximate location of the groundwater monitor well screen. In N-111-88, only one sample was collected (at the groundwater interface) due to the great depth of the borehole (336 feet). The subsurface soil samples were analyzed for explosives, VOCs, SOCs, metals, anions, PCBs, and pesticides. No soil samples from borings N-116-88 and N-118-88 through N-120-88 were sent to the laboratory for chemical analysis due to poor sample recovery.

Groundwater monitor wells were installed in all of the boreholes drilled at the Sanitary Landfill. A discussion on the situation of these wells is given in Subsection 3.5.

3.3.3.3 Drum Storage Areas

To characterize the nature of the subsoils and the regional groundwater aquifer beneath the Drum Storage Areas, two deep borings, N-112-88 and N-114-88, were drilled 20 feet into the regional aquifer. A third boring, N-113-88, was drilled into a shallow groundwater zone that was first encountered while drilling N-112-88. Figure 3-10 depicts the location of all boreholes drilled at the Drum Storage Areas. Upon completion of borehole drilling, a groundwater monitor well was installed in each borehole.

Table 3-2

Summary of Geotechnical Laboratory Analysis of Selected Subsurface Soil Samples From the Sanitary Landfill/Drum Storage Areas, N-TEAD[a]

Sample Location	Depth Range (ft)	USCS Classification[b]	Visual Description[c]	Natural Moisture Content (%)	Specific Gravity[d]	Atterburg Limits[e] Liquid Limit (%)	Plastic Limit (%)	Plasticity Index (%)
N-111-88	70.0	SM	Gravel, sandy and clayey	16.7	2.63	—	—	—
N-112-88	156.5-158.0	CL	Sand, silty and clayey	14.2	2.64	24	15	9
N-120-68	12.0	GP	Gravel, sandy	5.8	[f]	—	—	—

[a]Laboratory analyses performed by Northern Engineering and Testing, Inc.
[b]Formula: NAUVAC DM-7.1 (1982).
[c]Visual description from borehole log.
[d]ASTM D854.
[e]ASTM D4318.
[f]Insufficient sample size prohibited performance of all tests requested.

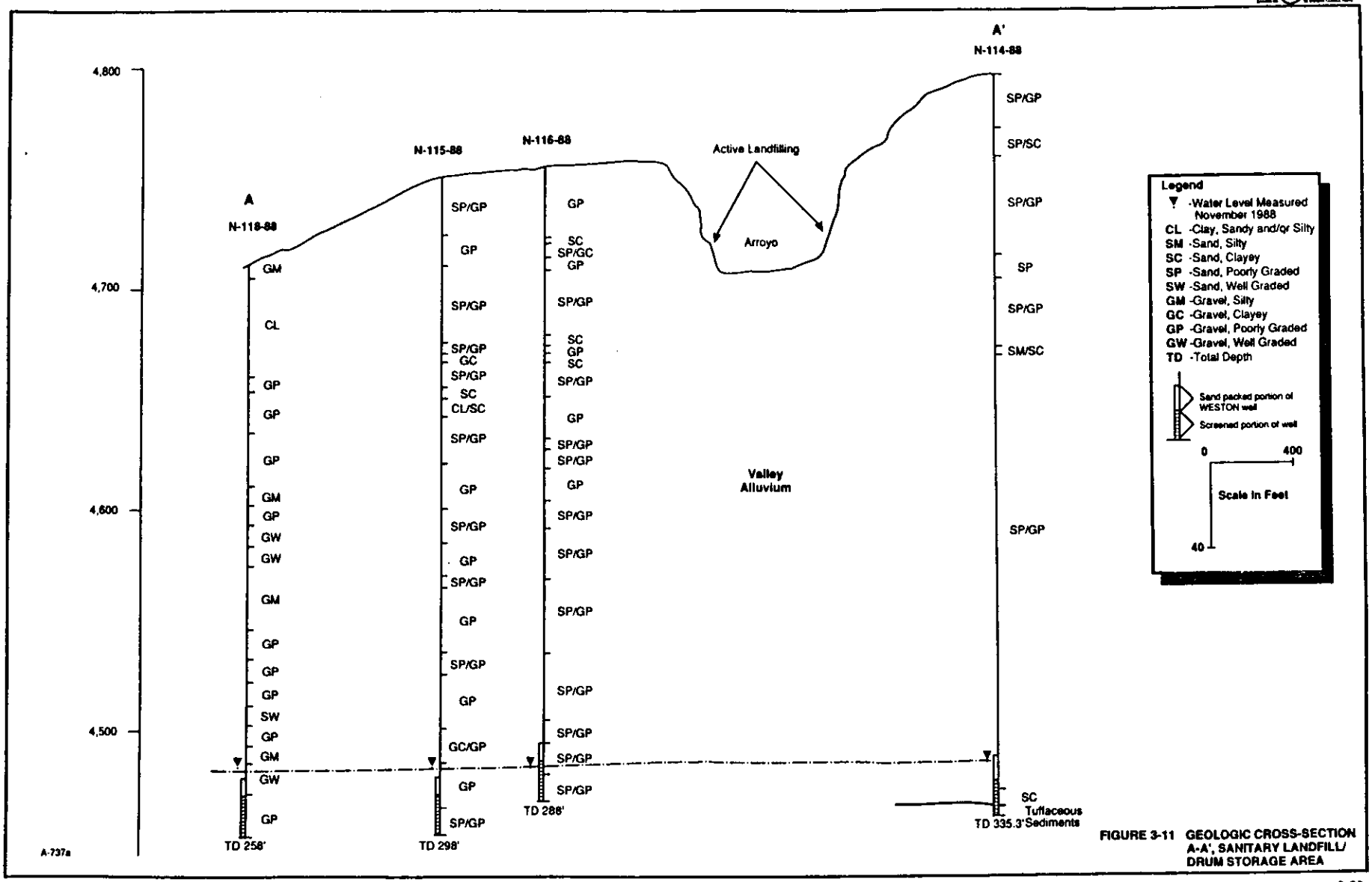


FIGURE 3-11 GEOLOGIC CROSS-SECTION A-A', SANITARY LANDFILL/ DRUM STORAGE AREA

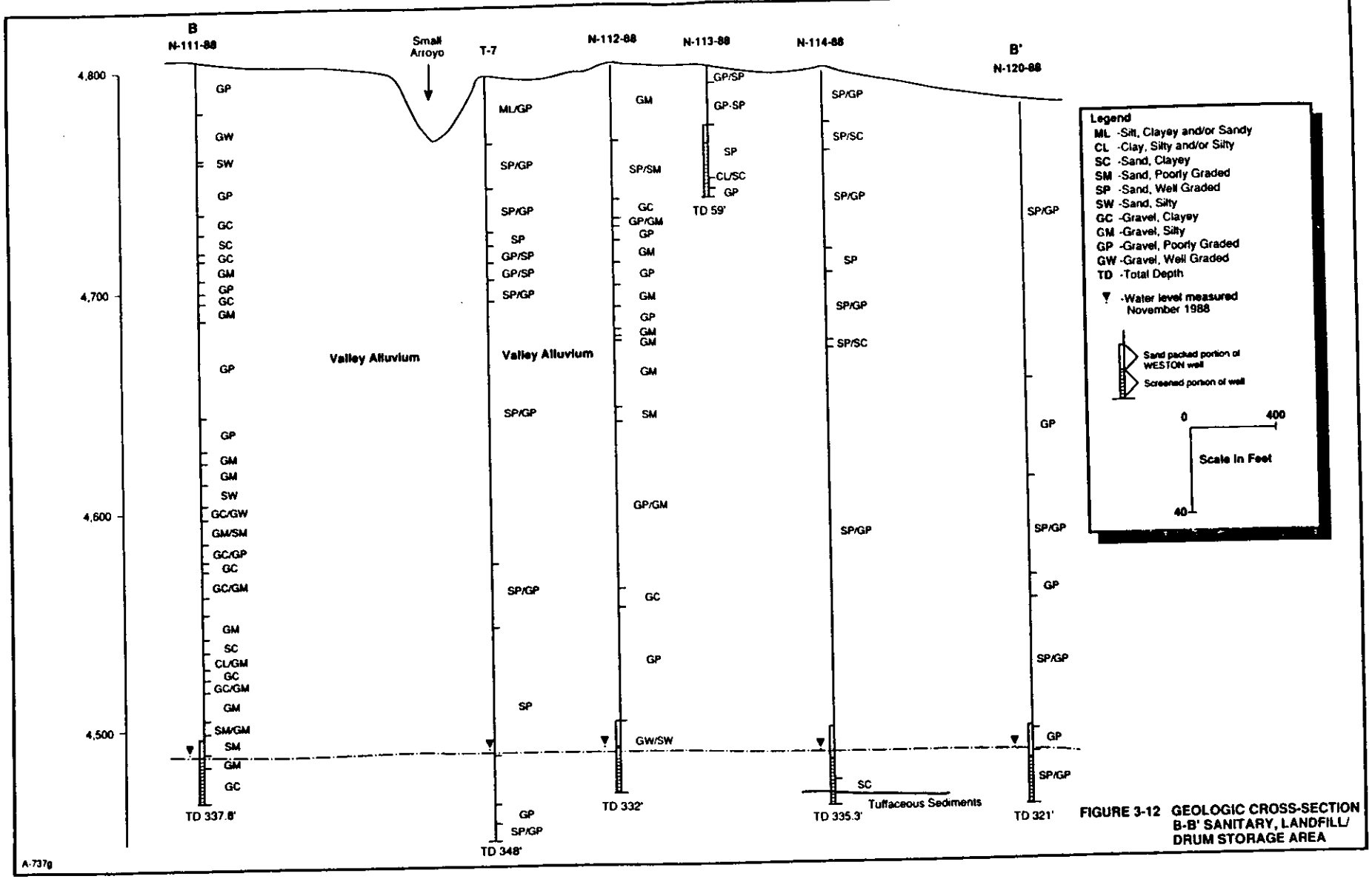


FIGURE 3-12 GEOLOGIC CROSS-SECTION B-B' SANITARY, LANDFILL/ DRUM STORAGE AREA

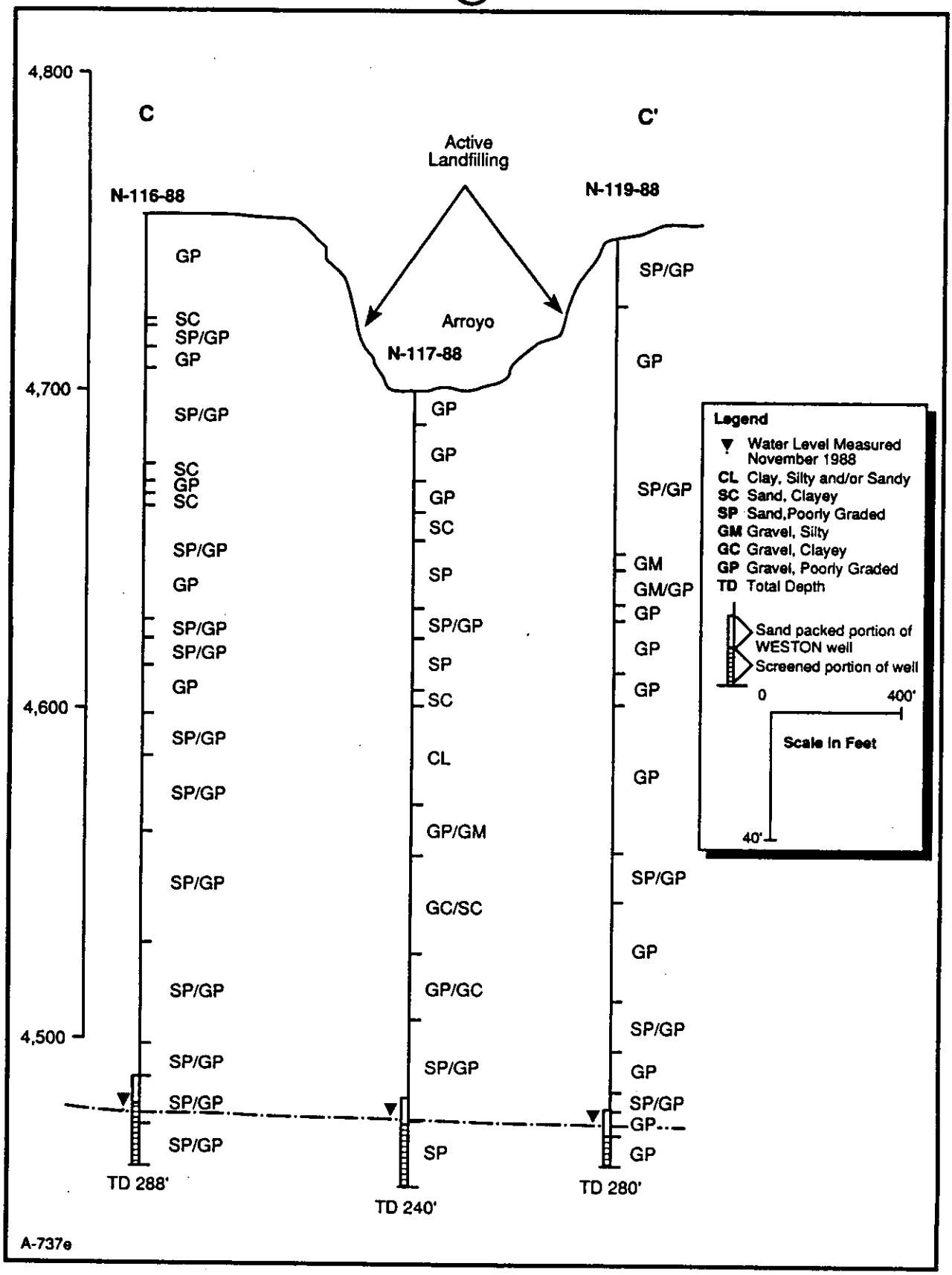


FIGURE 3-13 GEOLOGIC CROSS-SECTION C-C', SANITARY LANDFILL

All three of these borings were drilled with a rotary drill rig using a drilling technique called an air-rotary with drive casing. The drilling method and sampling procedures have been previously described.

In these three borings, two soil samples from N-112-88 and N-113-88 and three soil samples from N-114-88 were collected for chemical analysis. Of these soil samples, one was collected at the groundwater interface and one was collected at 10 to 20 feet below the interface. This sampling interval represents the approximate location of the groundwater monitor well screen. The reason for three samples at N-114-88 was that two were soil and the third was a soil/water mixture.

Selected soil samples from the boreholes were sent to a geotechnical laboratory for analysis. Table 3-2 summarizes the geotechnical laboratory analysis. The complete suite of geotechnical analyses is provided in Appendix C. Due to the very coarse-grained nature of the subsoils, sample recovery was minimal. Drilling broke down the gravels and a representative sample was hard to collect. Therefore, only a few samples were sent to the geotechnical laboratory for physical testing.

Geologic cross-section B-B' (Figure 3-12) depicts the subsurface geology downgradient of the Drum Storage Areas. The geology consists predominately of coarse-grained gravels interbedded with sands and an occasional fine-grained clay or clayey sand. The strata are very heterogeneous. All of these strata represent some stage of Lake Bonneville/Great Salt Lake alluvial, lacustrine, or valley fill deposition.

Tuffaceous strata was encountered in N-114-88 at the bottom of the borehole. The hills east of N-TEAD are comprised of volcanic intrusive-extrusive rocks that form the eastern flank of Tooele Valley. The tuffaceous strata encountered in N-114-88 are the same tuffaceous rocks that have been mantled by lacustrine or valley fill sediments.

The subsurface soils were analyzed for explosives, VOCs, SOCs, metals, anions (nitrate/nitrite and sulfate), PCBs, and pesticides.

Groundwater monitor wells were installed in all of the boreholes drilled at the Drum Storage Areas. A discussion on these wells is provided in Subsection 3.5.

3.3.3.4 Old Burn Area (and Chemical Range)

In an attempt to identify and characterize potential contaminants and the vertical extent of any contamination without drilling through areas of possible unexploded ordnance, four boreholes were drilled around the Old Burn Area to 50 feet below surface grade. Figure 3-14 shows the locations of these four borings.

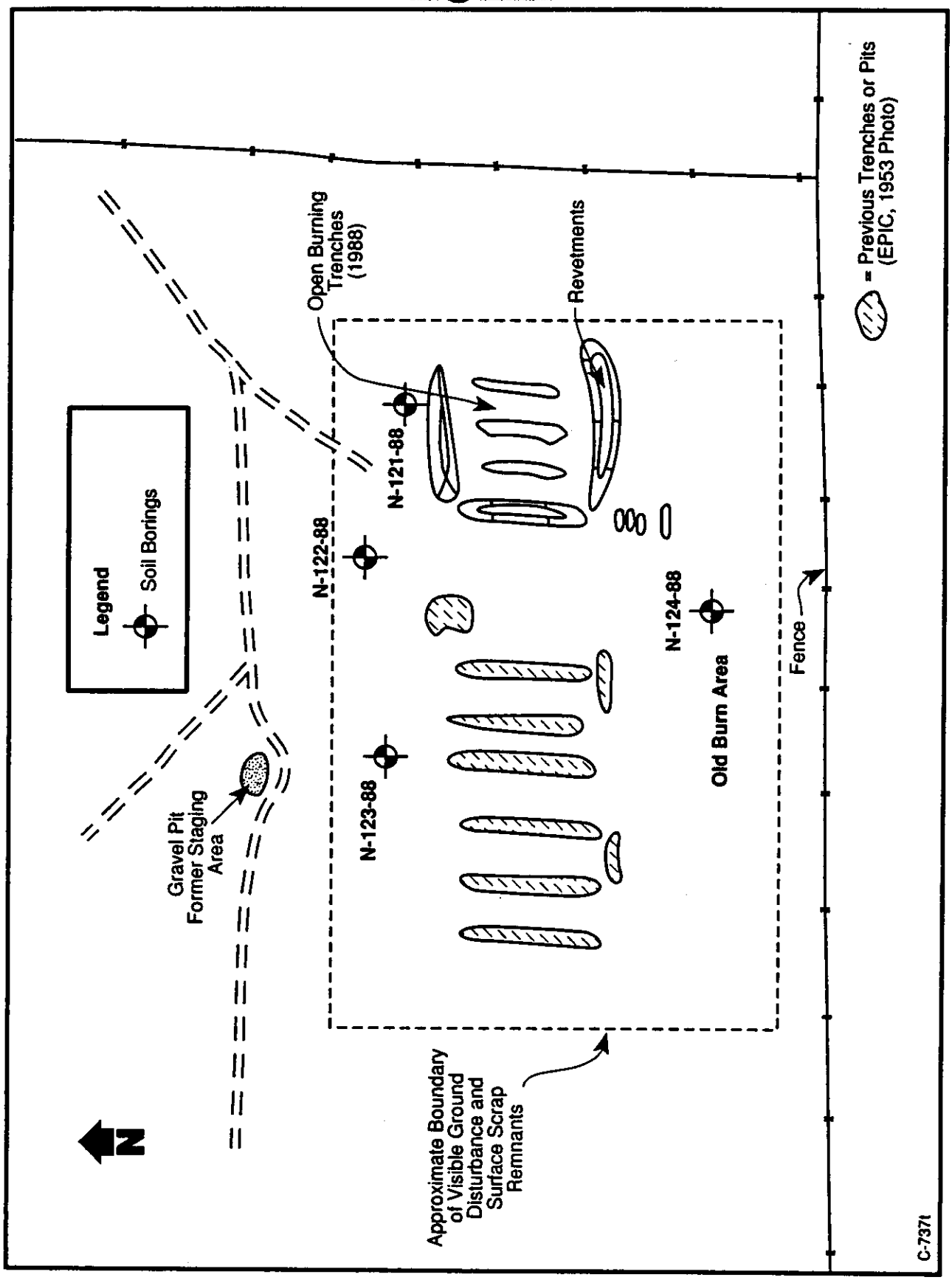


FIGURE 3-14 OLD BURN AREA BOREHOLE SAMPLING LOCATIONS

A CME 75 drill rig using 6-1/2 to 7-inch OD, 3-1/4-inch ID HSA was used to auger the boreholes. Soil samples were taken at 5-foot intervals, beginning at 5 feet below surface grade and extending to 30 feet and 10 feet thereafter. Samples were collected with a 1-foot long, 2-inch ID split-barrel sampling device.

In general, the soils encountered to the depth drilled (50 feet) in each of the four boreholes at the Old Burn Area appear to be fairly coarse-grained sands and sandy silts.

Soil samples that were collected were analyzed for explosives, metals, and the anions nitrate/nitrite and sulfate. Additionally, selected soil samples from these boreholes were sent to a geotechnical laboratory for analysis. Table 3-3 summarizes the geotechnical analysis. The complete suite of geotechnical analyses is given in Appendix C.

Since the Chemical Range is located near the Old Burn Area, the subsurface conditions for both areas are assumed to be similar.

3.4 GEOPHYSICAL SURVEY

3.4.1 TNT Washout Facility

3.4.1.1 Electromagnetic Terrain Conductivity Survey

Two separate reconnaissance surveys with the electromagnetic terrain conductivity technique (EM) were conducted at the TNT Washout Facility. The first survey was performed on 12 February 1988. After analysis of the data, a decision was made to extend the area of investigation to the west and north. The geophysical survey in the expanded area was conducted on 8 July 1988.

In the February 1988 survey, EM measurements were taken with the instrument coils in the horizontal plane (vertical dipole) with a separation distance between coils of 66 feet. In this configuration, the major response is from sediments at a depth of approximately 26 feet (refer to Table 2-6). However, the values measured by the instrument may reflect conductivity of sediments present to a total depth of approximately 100 feet. In the February 1988 survey, EM measurements were taken on an even 50-foot grid. All measurements were referenced to a surveyed grid staked on 50-foot centers.

The July 1988 survey was also performed with a 66-foot separation between instrument coils. However, EM measurements were taken with the coils in the vertical plane as well as the horizontal plane (vertical dipole). The measurements taken in the vertical plane are most affected by sediments shallower than

Table 3-3

Summary of Geotechnical Laboratory Analysis of Selected Subsurface Soil Samples From the Old Burn Area, N-TEAD[a]

Sample Location	Depth Range (ft)	Uses Classification[b]	Visual Description[c]	Natural Moisture Content (%)	Specific Gravity[d]	Atterburg Limits[e]		
						Liquid Limit (%)	Plastic Limit (%)	Plasticity Limit (%)
N-121-88	50.0-51.5	SM	Sand, silty	31.6	2.67	—	—	—
N-122-88	30.0-31.0	CL/ML	Gravel, sandy	31.06	2.65	28	22	6
N-122-88	39.5-40.5	SM	Sand, silty	13.6	2.68	—	—	—
N-122-88	40.0-41.5	SM	Sand, silty	27.0	2.65	—	—	—
N-122-88	45.0-46.5	CL	Sand, silty, clayey	35.2	[f]	50	24	26
N-123-88	39.5-40.5	SM	Sand, silty	9.2	2.65	—	—	—
N-123-88	49.5-50.5	CL/ML	Sand, clayey	24.4	2.65	30	23	7

[a]Laboratory analyses performed by Northern Engineering and Testing, Inc.
[b]Formula: NAUVAC DM-7.1 (1982).
[c]Visual description from borehole log.
[d]ASTM D854.
[e]ASTM D4318.
[f]Insufficient sample size prohibited performance of all tests requested.

20 feet, but sediments present to a total depth of approximately 50 feet may contribute to the measured values (refer to Table 2-6). The EM measurements in the July 1988 survey were collected on an even 25-foot spacing. All measurements were referenced to surveyed grids staked on 50-foot centers.

Postings in Figure 3-15 show the locations for EM measurements in the two surveys over the TNT Washout Facility. The two surveys covered approximately 14 acres. Appendix I lists all EM measurements in the area of the TNT Washout Facility, including measurements at base stations.

Contour lines in Figure 3-15 present the change in apparent conductivity that occurs over the area of the two surveys for EM measurements with horizontal coils. Apparent conductivity values range from 20 millimhos/meter in the southeast corner of the area to 98 millimhos/meter in the northwest part of the area. Apparent conductivity values in the southern-half of the area are generally less than 35 millimhos/meter. Apparent conductivity values in the northern and northwestern parts of the area increase to the north and northwest. A similar pattern of increased valves in apparent conductivity is shown by the contour lines in Figure 3-16 for EM measurements taken with vertical coils. The trend in apparent conductivity values increasing to the north and northwest of the TNT Washout Facility is interpreted to be strongly related to natural salinity in the soil and to the subsurface geology rather than waste disposal practices at the TNT Washout Facility. An apparent conductivity of 100 millimhos/meter is equivalent to an apparent resistivity of 10 ohm meters. These resistivity values are low for most natural sediments, but may occur in soil profiles and sediments that contain natural salts. The regional distribution of high apparent conductivities away from the TNT Washout Facility is not consistent with the concept that they are related to irrigation of fluids with high total dissolved solids.

The elevated apparent conductivity values that are associated with the inactive impoundments and pits are located in the southern part of the TNT Washout Facility. The most elevated apparent conductivity values range from 40 to 52 millimhos/meter compared to background values of 30 to 35 millimhos/meter. The locally elevated values in association with the old impoundments, disposal pits, and leach field are much lower than the conductivity values of greater than 70 millimhos/meter that occur north and northwest of the facility. The highest values are located east of pond 3 in association with old impoundments and disposal pits. The elevated values indicate the presence of conductive wastes in the subsurface in the area of the old pits and impoundments. The regional distribution of apparent conductivity values does not indicate significant lateral migration of contaminants away from the inactive disposal sites.

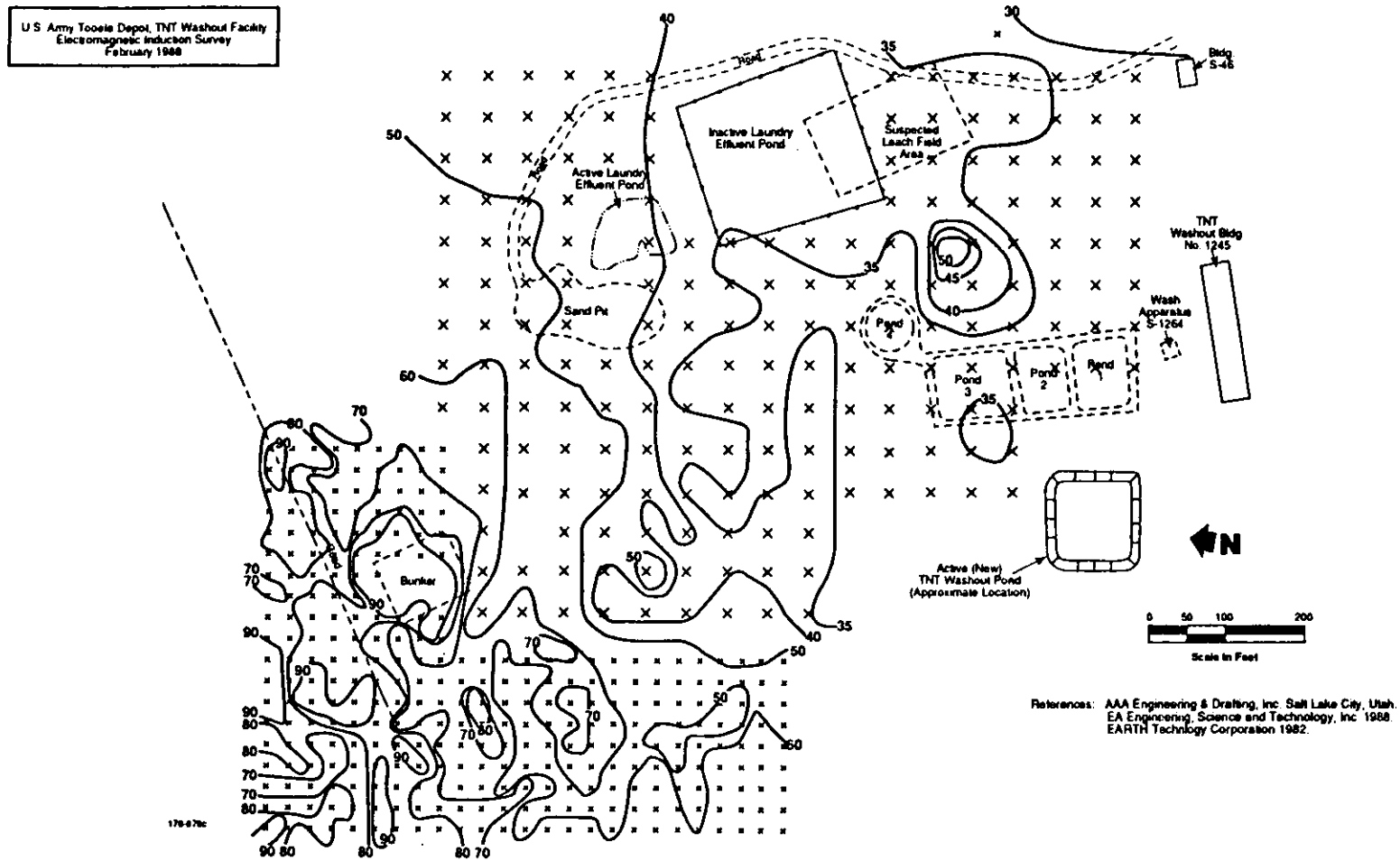


FIGURE 3-15 VARIATION IN VERTICAL DIPOLE CONDUCTIVITY VALUES, FEBRUARY, 1988 TNT WASHOUT FACILITY

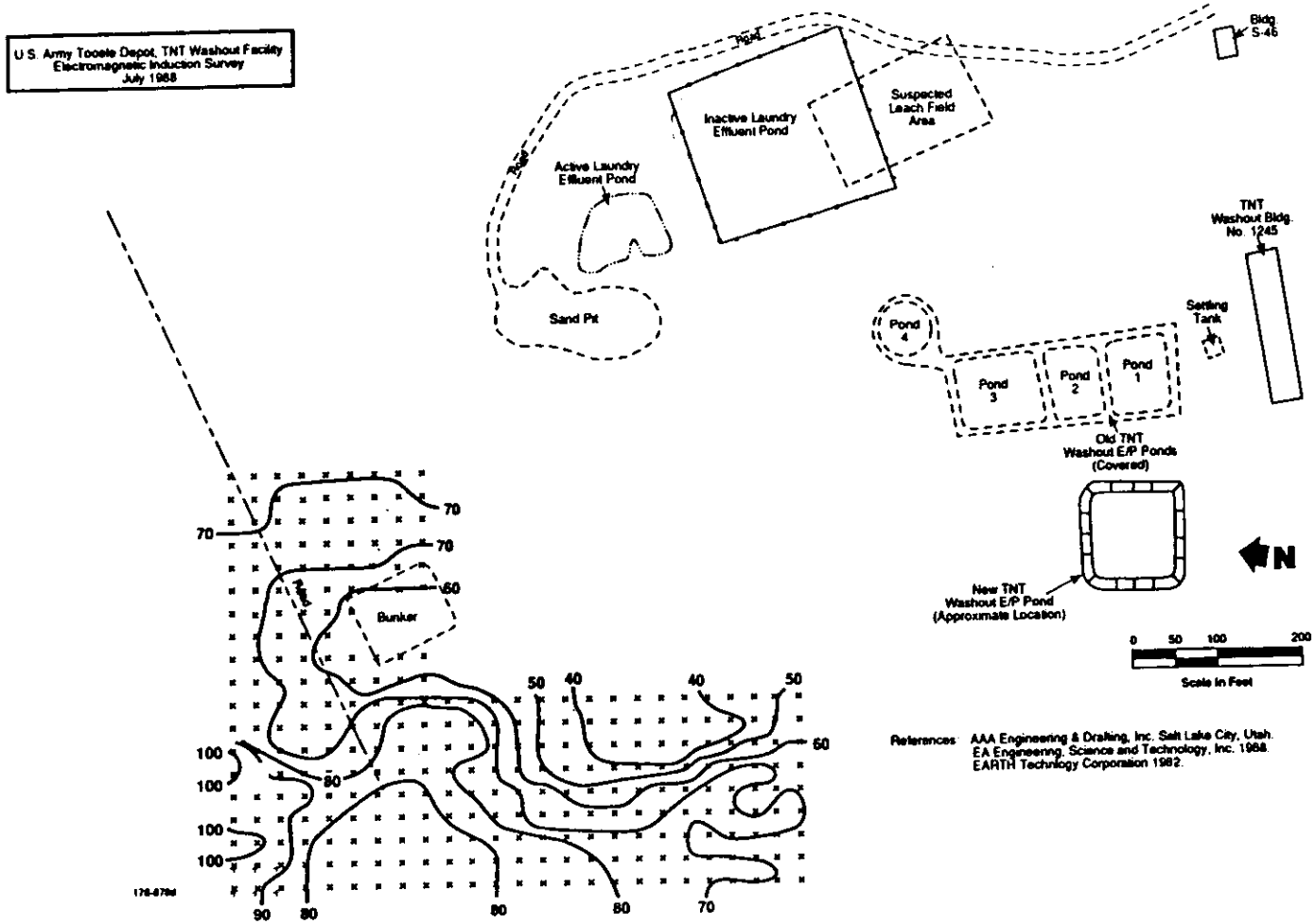


FIGURE 3-16 VARIATION IN HORIZONTAL DIPOLE CONDUCTIVITY VALUES, JULY 1988, TNT WASHOUT FACILITY

Apparent elevated conductivity values were also measured in the area of the leach field. Over the field, values range to 40 millimhos/meter compared to background values of 30 to 32 millimhos/meter.

Apparent conductivity values in the vicinity of the active laundry effluent pond do not exhibit a variation that can be associated with the lateral migration of effluent from the pond. There is a variation in apparent conductivity in the vicinity of the pond. However, this variation is part of the regional change related to electrical properties of the natural sediments.

3.4.1.2 Ground Penetrating Radar Survey

A ground penetrating radar (GPR) survey was conducted in the southern part of the TNT Washout Facility to define the location of buried pipelines. The GPR survey was performed on 16 February 1988 with a 500-mHz antenna. Radar profiles were collected on west-east traverse lines that were spaced 50 feet apart. The GPR traverse lines were referenced to the surveyed grid used for the EM terrain conductivity survey. The area covered by the GPR survey is shown in Figure 3-17. The locations of GPR traverse lines are marked on this figure.

The locations of four buried pipelines determined from interpretation of the GPR profiles are shown in Figure 3-17. The longest pipeline trends north-south along coordinate -205 West, a distance of approximately 400 feet between coordinates 0 and 400 North. During the field investigation, cleanout boxes were observed at ground surface along the alignment of this pipeline at coordinates 100 North and 200 North. Also, a north-south trending buried clay pipe was observed in an open hole at coordinate 200 North. The field observations directly support the GPR records.

A second pipeline was detected along a north-south alignment at coordinate -230 West. This buried pipeline is parallel to the pipeline previously described at a distance of 25 feet to the west. The pipeline is present over a distance of 200 feet between coordinates 0 to 200 North.

Two buried pipelines of shorter length were detected in the leach field, located in the eastern part of the area surveyed. One pipeline trends north-south along coordinate -25 West, along a line approximately 100 to 150 feet between coordinates 150 North and 250 North. The other buried pipeline in the leach field trends northwest from coordinate -10 West, 150 North to -75 West, and 250 North. The length of this pipeline, as determined by GPR, is approximately 150 feet.

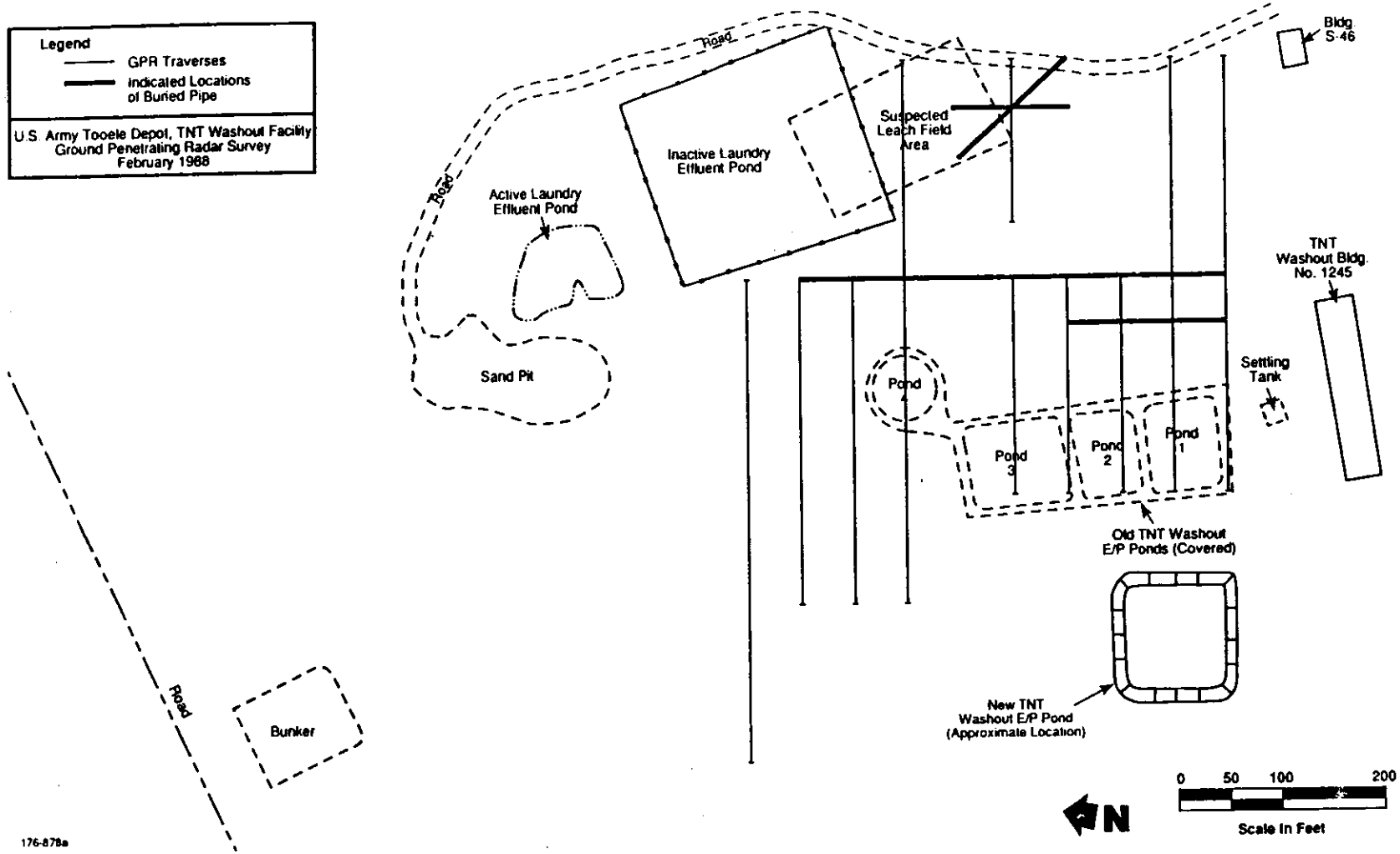


FIGURE 3-17 LOCATION OF BURIED PIPE AS DETERMINED FROM GPR PROFILES

3.4.2 Sanitary Landfill

Magnetometer and EM surveys were conducted at the Sanitary Landfill within the area outlined in Figure 3-18. The objectives of the geophysical surveys were to define the general boundaries of waste disposal activities and to identify specific locations where high concentrations of wastes were buried. The magnetometer method was used to identify buried waste that contained ferrous metals. The EM method was used to define buried wastes with high conductivity.

3.4.2.1 Magnetometer Survey

Two separate reconnaissance surveys with the magnetometry technique were conducted in the area of the Sanitary Landfill. The first was performed on 19 February 1988. After analysis of the data, a decision was made to extend the area of investigation to the west. The magnetometer survey in the expanded area was conducted on 6 July 1988. Both surveys were performed with the same proton procession magnetometer. In the first survey, measurements were taken on an even grid with a 50-foot spacing. In the second survey, measurements were taken on an even grid with a 25-foot spacing. All measurements were referenced to a surveyed grid staked on 50-foot centers. Figure 3-18 shows the 28-acre area investigated with the magnetic surveys and the locations of total field measurements. Appendix I lists all magnetic measurements in the areas of the Sanitary Landfill, including measurements taken at base stations. The base station measurements exhibited little variation and it was not necessary to correct the field measurements for diurnal change.

Figure 3-19 presents the results of the two magnetic surveys in the area of the Sanitary Landfill. The map was constructed by removing a background value of 54,100 gammas from the field data. Therefore, the contour lines on the map represent deviation of measured values from the background value for the total magnetic field. The background value represents the median value for all magnetic measurements taken in the two surveys.

A dashed line in Figure 3-19 marks the boundary of buried wastes as determined by anomalous magnetic readings. The approximate area within the boundary is 16.5 acres. The boundary parallels the fence that trends northwest to southeast in the western part of the area. Magnetic anomalies west of the fence are associated with surface features such as steel rails, tanks, and drums. The fence also interfered with magnetic measurements. The presence of the fence and the ferrous objects on the ground surface west of the fence present difficulty in identifying the westward extent of buried ferrous wastes in the landfill. The fence may mark the western boundary of the landfill. However, a dashed line with question marks is shown to incorporate the magnetic anomaly west of the fence. All of

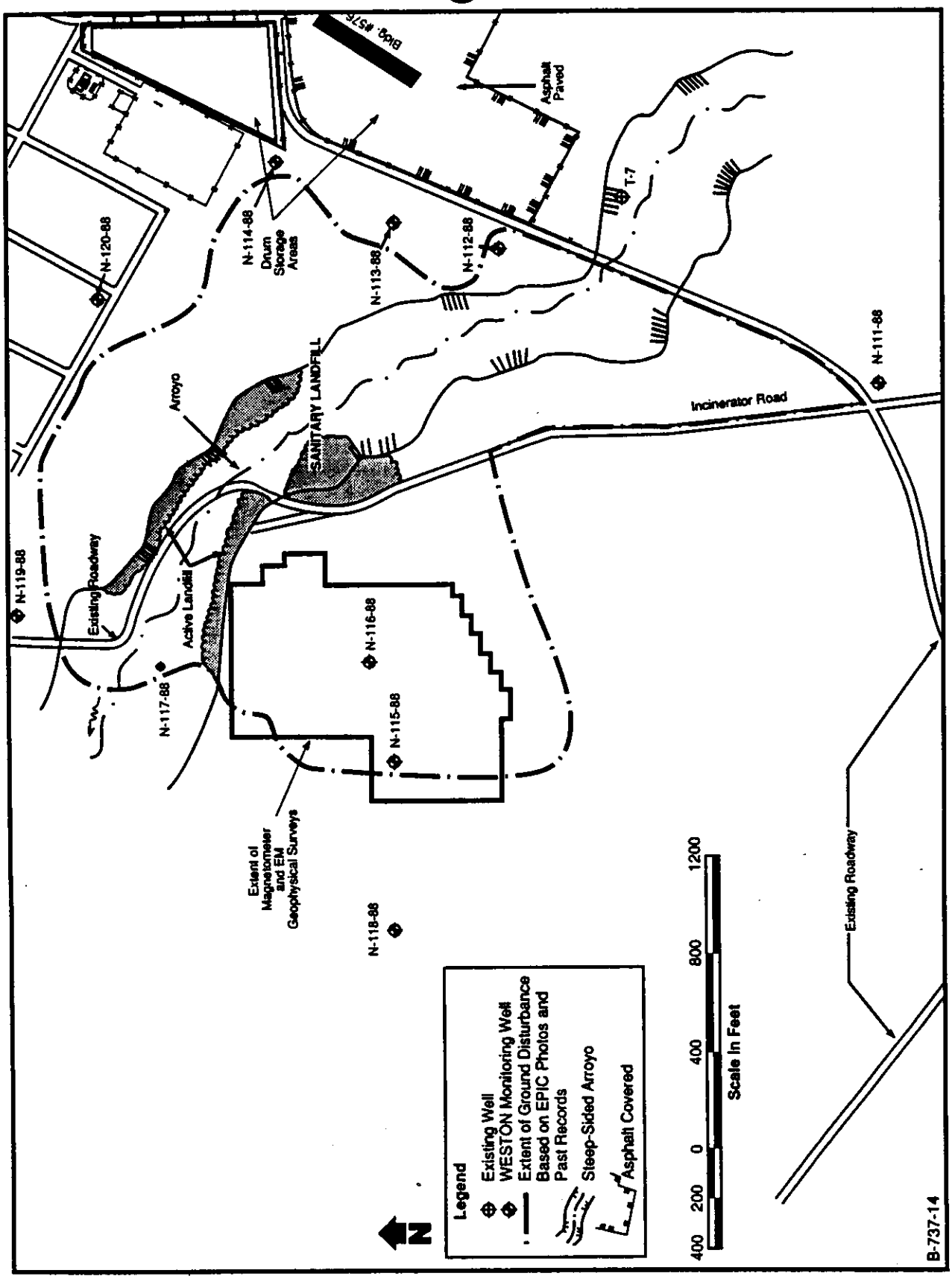
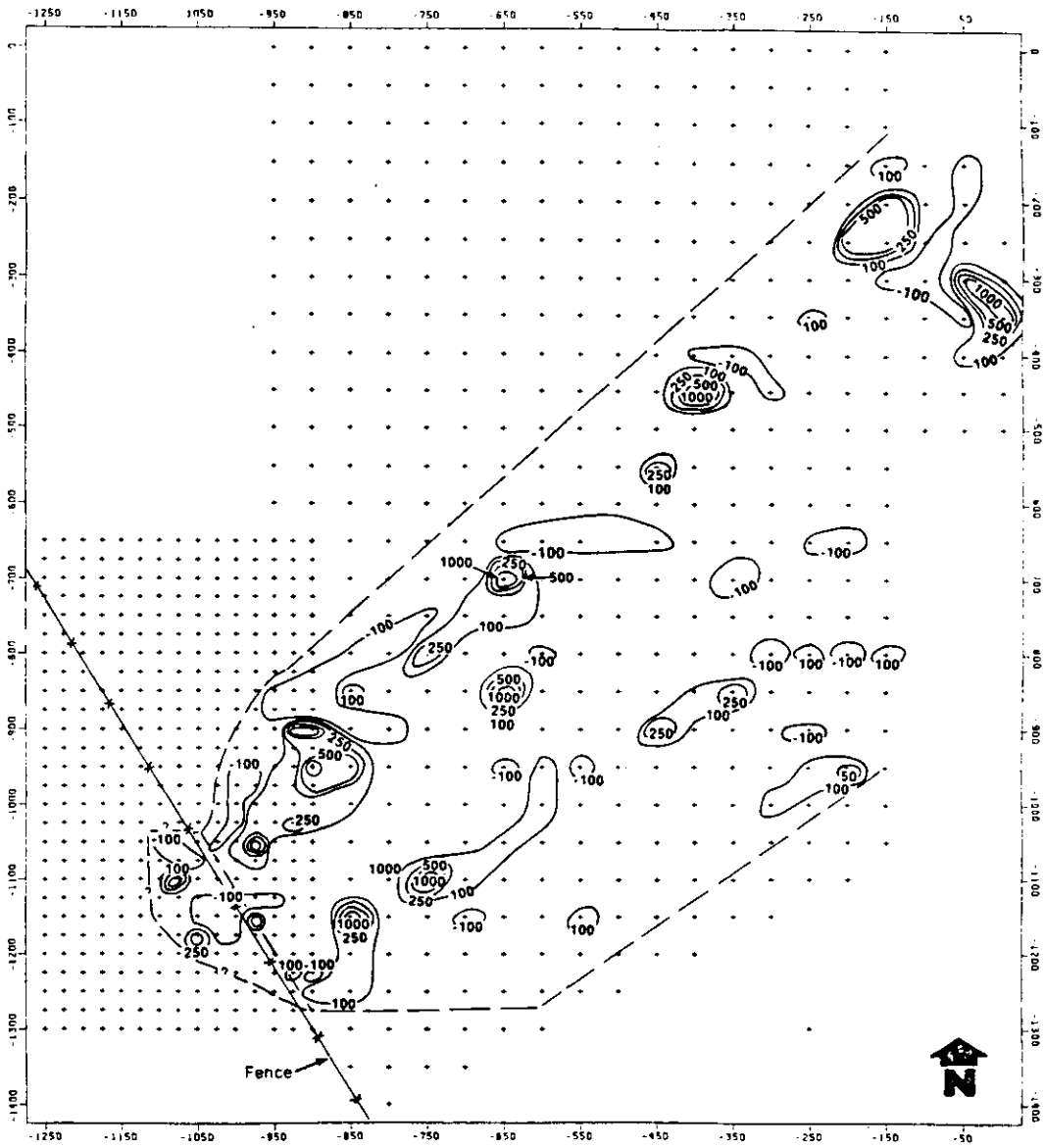


FIGURE 3-18 AREA OF GEOPHYSICAL SURVEYS CONDUCTED AT THE SANITARY LANDFILL



U.S. Army Tooele Depot - Sanitary Landfill
Magnetometer Survey - February and July 1988
Magnetic Anomaly - Gammas
Data Have Had the Mean Removed.

Legend

- 100 — Magnetometer Measurement Contours (Gammas) - Reflects Subtraction of Background Values
- Estimated Boundary of Landfill as Determined From Magnetic Measurements
- Estimated Boundary of Areas Where Magnetic Anomalies Are Primarily Due to Metal On The Land Surface

FIGURE 3-19 VARIATION IN TOTAL MAGNETIC FIELD, SANITARY LANDFILL

the anomaly west of the fence may be related to surface features. However, there is also the possibility that ferrous wastes are buried west of the fence in this area.

Solid contour lines on the map outline the areas of positive magnetic anomalies that range from 100 gammas to greater than 2,000 gammas. The positive anomalies lie over concentrations of ferromagnetic wastes. Contour lines in Figure 3-19 outline areas of negative magnetic anomalies that range from -100 gammas to less than -1,000 gammas. Most negative anomalies occur north of positive anomalies in the association predicted by theory for positive and negative magnetic dipoles. The poor association between a few positive and negative magnetic anomalies is due to the wide spacing between measurements in the reconnaissance survey.

3.4.2.2 Electromagnetic Terrain Conductivity Survey

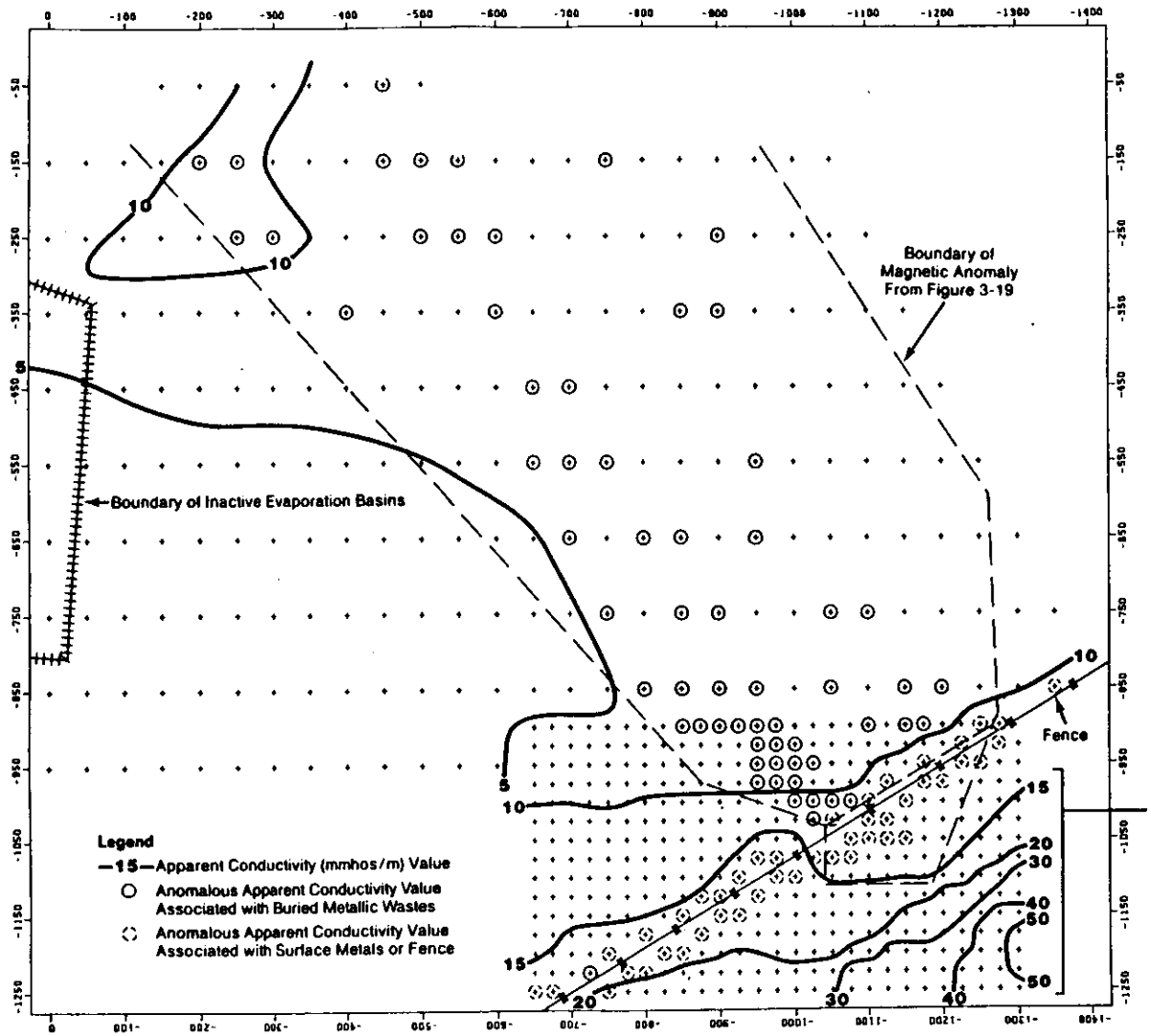
Two separate reconnaissance surveys with the electromagnetic terrain conductivity technique (EM) were conducted at the Sanitary Landfill. The first survey was performed on 19 February 1988. After analysis of the data, a decision was made to extend the area of investigation to the west. The geophysical survey in the expanded area was conducted on 7 July 1988.

In the February 1988 survey, EM measurements were taken with the transmitter and receiver coils in the horizontal plane for a coil separation distance of 33 feet. The measurements were taken at a spacing of 50 feet along north-south traverse lines that were spaced 100 feet apart. All measurements were referenced to a surveyed grid staked on 50-foot centers.

In the July 1988 survey, the EM measurements were also taken with a coil separation distance of 33 feet. However, measurements were taken on an even 25-foot grid spacing. All measurements were referenced to a surveyed grid staked on 50-foot centers. In the July 1988 survey, EM measurements were taken with the instrument coils in the vertical plane as well as the horizontal plane.

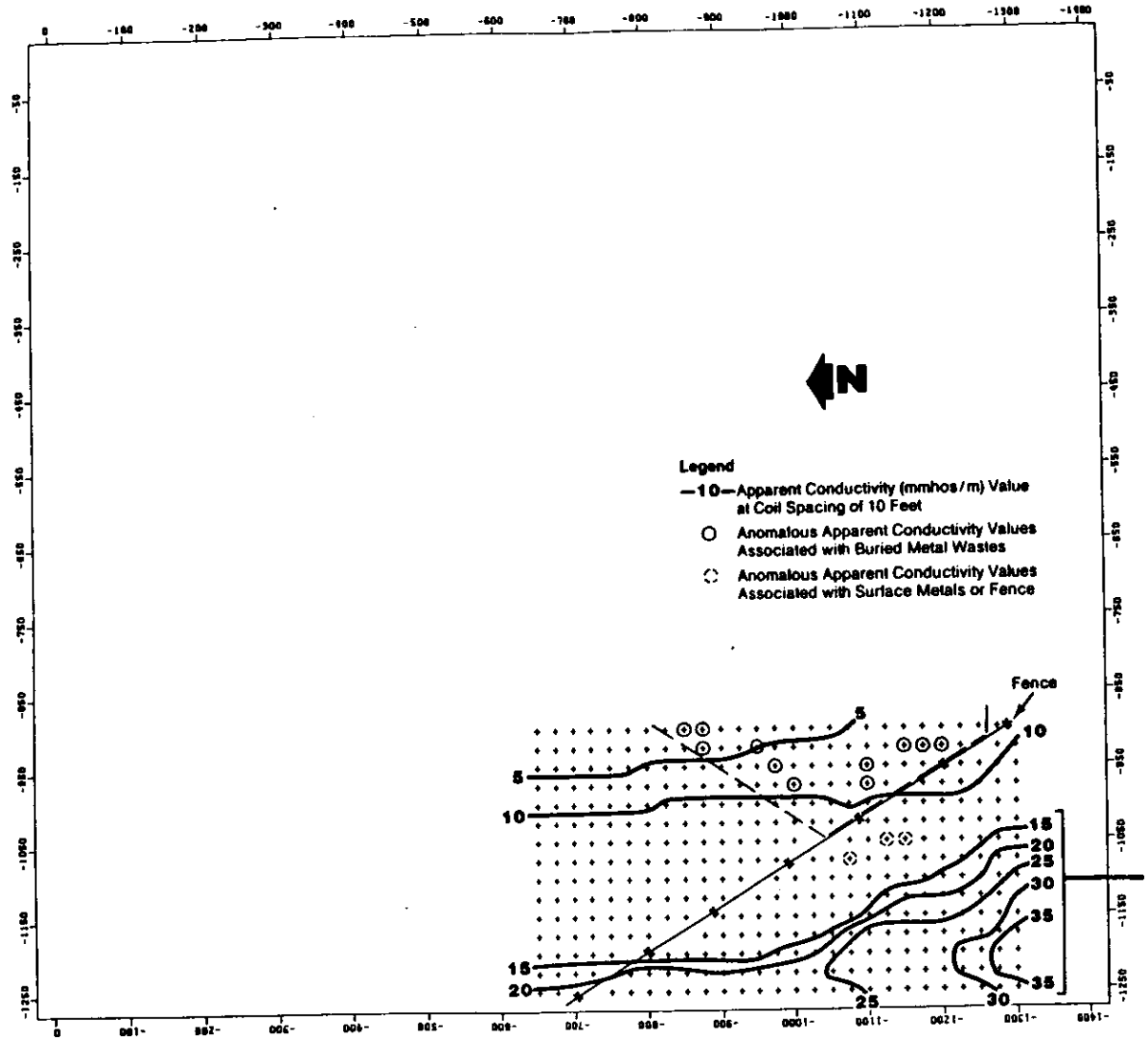
Figures 3-20 and 3-21 show the area of the Sanitary Landfill that was investigated with the EM surveys. The locations of discrete measurements are shown on the figures. Appendix I lists all EM measurements in the area of the Sanitary Landfill, including measurements at base stations.

Figure 3-20 shows the variation in apparent conductivities across the entire area for EM measurements with the instrument coils in the horizontal plane. As shown in Table 2-6, the measurements are most affected by materials present at a depth of approximately 13 feet. However, materials present to a total depth of approximately 50 feet contribute to the measured value. Figure 3-20 also shows a large change in apparent conductivities across the area surveyed. Values of less than 5 millimhos/meter were measured in the northwest part of the area. Apparent



U.S. Army Tooele Depot, Sanitary Landfill Electromagnetic Surveys-February and July 1988, Vertical Dipole mmhos/m, Coil Separation of 33 Feet

FIGURE 3-20 VARIATION IN VERTICAL DIPOLE CONDUCTIVITY VALUES, SANITARY LANDFILL



U.S. Army Tooele Depot, Sanitary Landfill
Electromagnetic Surveys-July 1988,
Vertical Dipole mmhos/m, Coil
Separation of 33 Feet

FIGURE 3-21 VARIATION IN HORIZONTAL DIPOLE CONDUCTIVITY VALUES, SANITARY LANDFILL

conductivities increase to the east, south, and west, with the highest values (greater than 50 millimhos/meter) measured in the southwest corner of the area investigated. Figure 3-20 shows that the greatest change in apparent conductivity occurs in the southwestern part of the area. This change is due to a change in the natural salinity of the soil and due to a change in geologic materials rather than waste disposal practices. The low apparent conductivity values (less than 10 millimhos/meter) in the northeastern part of the area reflect the presence of coarse-grained sand and gravel deposits. The increase in apparent conductivity values to the southwest is related to an increase in natural salinity of the soil and to the presence of interbedded fine sands, silts, and clays that were deposited in a brackish environment. These fine-grained sediments have high apparent conductivities because of a high concentration of natural salts.

Figure 3-21 is a contour map that shows the variation in apparent conductivity for the western part of the study area where EM measurements were taken with the instrument coils in the vertical plane. As shown in Table 2-6, measurements are most affected by sediments that are shallower than 10 feet, with the total response including sediments present to a depth of approximately 25 feet. Apparent conductivities ranged from 5 to 35 millimhos/meter. Apparent conductivities increase from the south and to the southwest, with the highest values measured in the southwest corner of the area surveyed. Figures 3-20 and 3-21 show the same trend for apparent conductivity values, with the variation related to a natural increase of salinity in the soils.

The impact of waste disposal practices on apparent conductivities are superimposed on the regional variation due to changes in soil salinity and geology. The presence of buried metal wastes can result in EM values that have anomalous positive or negative values. The anomalous values are due to the properties of the wastes and the geometry between the buried metal wastes and the transmitter and receiver coils of the EM instrument. The affect of buried metal wastes on the EM measurements severely impacts the value of the technique to determine the presence of nonmetallic wastes that have high conductivities. Measurement stations with anomalous positive or negative values are marked in Figures 3-20 and 3-21. These figures also show the boundary of buried wastes in the Sanitary Landfill that was determined by the magnetic survey. There is a good agreement between the magnetic and EM measurements over the area of the Sanitary Landfill. All of the anomalous EM measurements that are not associated with cultural features are located within the boundary determined by the magnetic survey. In the area investigated by the first geophysical survey, the magnetic measurements were taken on a closer grid spacing than the EM measurements and therefore provide better resolution of the boundaries of buried wastes.

Figure 3-20 shows that EM measurements in the northern part of the area surveyed were located over and adjacent to inactive evaporation basins. The southern boundary of the basins is marked on the figure. Apparent conductivity values over and adjacent to the evaporation basins are not markedly different from background values. Apparent conductivity values trend from 2.8 millimhos/meter in the western part of the evaporation basins to 7.4 millimhos/meter in the southeast corner. However, this trend also occurs in the region away from the basins. There is no evidence of a marked increase in apparent conductivity associated with the evaporation basins.

3.4.3 Old Burn Area

3.4.3.1 Magnetometer Survey

A reconnaissance survey with the magnetometry technique was conducted in the Old Burn Area on 10 and 11 February 1988. The survey was performed over an area of 33.7 acres. The dimensions of the area are 700 feet north-south by 2,100 feet east-west. Magnetic measurement locations over the Old Burn Area are shown in Figure 3-22. Measurements of the intensity of the total magnetic field were taken on an even grid with 50-foot centers. All measurements were referenced to a surveyed grid staked on 50-foot centers.

The total field values measured over the area investigated and the values measured at a base station are listed in Appendix I. Figure 3-22 is a contour map of the variation in the total magnetic field in the Old Burn Area. The map was constructed by subtracting a background value of 54,050 gammas from the field data. Therefore, the contour lines on the map represent deviation of measured values from the background value for the total magnetic field. The background value was selected from an analysis of the variation in magnetic values across the area.

A bold dashed line in Figure 3-22 marks the boundaries of two areas where magnetic measurements indicate the presence of burial sites that contain ferrous materials.

The burial site located in the central part of the Old Burn Area has approximate dimensions of 250 feet east-west by 250 feet north-south for a surface area of 1.4 acres. Total field values across the site range from -450 gammas to +225 gammas. The highest values occur in the northern part of the site.

The magnetometer survey determined that buried ferrous materials are present over a large part of the eastern half of the Old Burn Area. The distribution of the anomalous magnetic values determined that the waste burial sites extend eastward and southward beyond the area investigated. The anomalous magnetic values are present over a surface area that is greater than 15 acres.

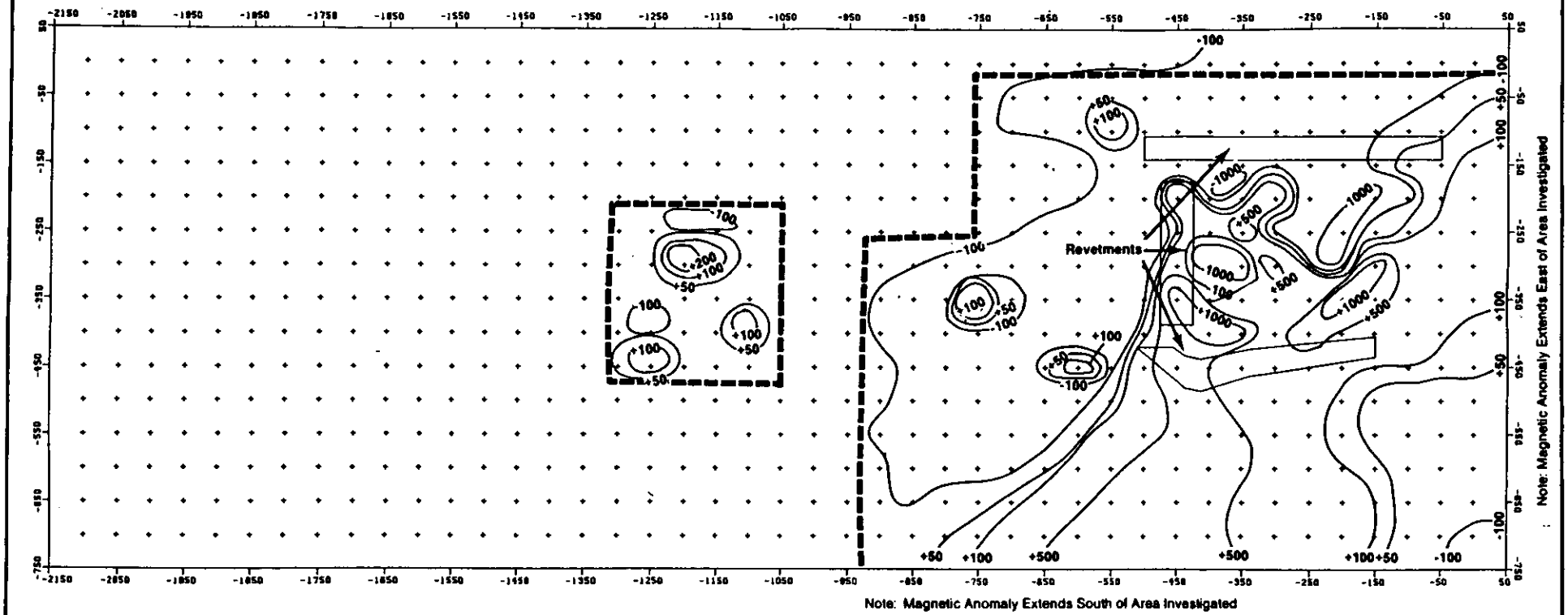


FIGURE 3-22 VARIATION IN TOTAL MAGNETIC FIELD, OLD BURN AREA

Magnetic values over the eastern-half of the Old Burn Area range from -3,000 gammas to +2,500 gammas. The exact distribution of positive and negative anomalies cannot be determined because of the wide spacing (50 feet) between individual measurements in the reconnaissance survey. The distribution of positive magnetic values indicate that ferrous materials are buried over the entire area, including beneath the earthen revetment areas.

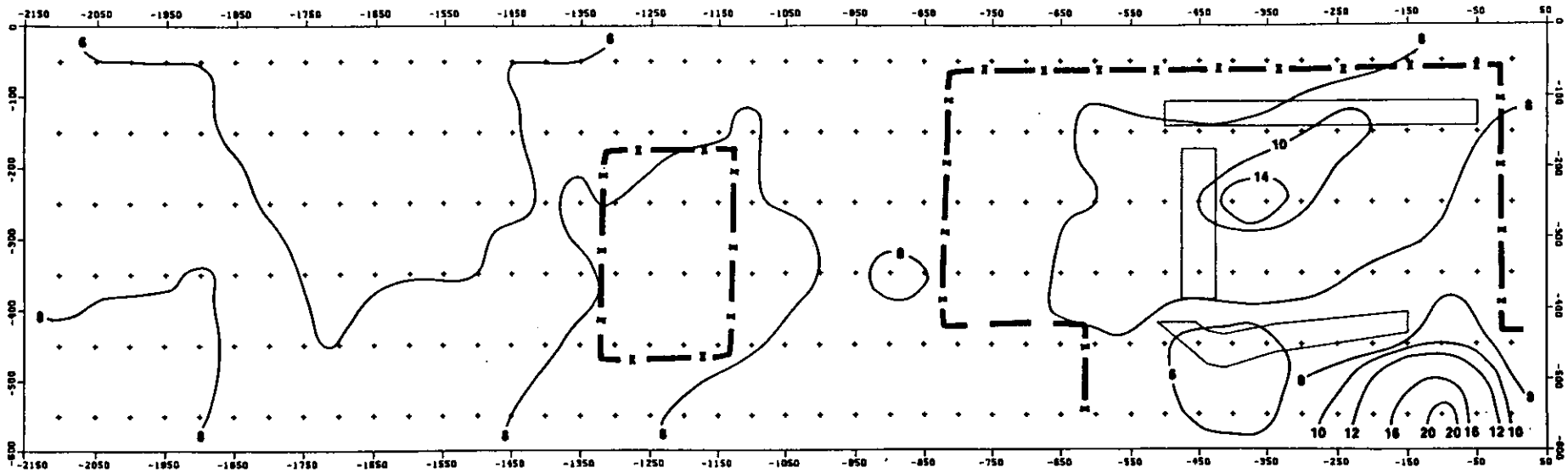
3.4.3.2 Electromagnetic Terrain Conductivity Survey

A reconnaissance survey with the electromagnetic terrain conductivity technique (EM) was conducted in the Old Burn Area on 11 February 1988. EM measurements were taken with the transmitter and receiver coils in the horizontal plane for a coil separation of 33 feet. The measurements were taken at a spacing of 50 feet along east-west traverse lines that were spaced 100 feet apart. All measurements were referenced to a surveyed grid staked on 50-foot centers. Figure 3-23 shows the locations for EM measurements taken in the Old Burn Area. The measurements were taken over an area of 24.1 acres. The dimensions of the area are 500 feet north-south by 2,100 feet east-west. Appendix I lists apparent conductivity values measured at each field location along with the values measured at a base station.

Figure 3-23 is a contour map of the variation in apparent conductivity values that occur in the Old Burn Area. Values over most of the area range from 6 to 10 millimhos/meter and are typical of apparent conductivities of the natural soils and sediments present in this region of N-TEAD. A wide range of apparent conductivity values may be measured above buried wastes, including values that are similar to background conditions. In general, apparent conductivity values above buried wastes will vary greatly between adjacent stations. This is especially true when the buried wastes contain ferrous materials. Extremely high, extremely low, and background apparent conductivity values may be measured above burial sites that contain ferrous wastes. The highly variable apparent conductivity values in the Old Burn Area occur where the magnetometer survey determined ferrous wastes to be present.

In Figure 3-23, a bold dashed line marks the approximate boundaries of two areas where the EM measurements indicated the presence of buried wastes. The smaller area is located in the central part of the Old Burn Area and has a surface area of approximately 50,000 square feet. Apparent conductivity values measured in this central area range from 8 to 12 millimhos/meter. The values greater than 10 millimhos/meter were measured in the northeastern part of the area.

The larger area where anomalous EM values were measured is in the eastern part of the Old Burn Area. The EM data indicate



U.S. Army Tooele Depot, Old Burn Area
Electromagnetic Survey - February 1988

FIGURE 3-23 VARIATION IN VERTICAL DIPOLE CONDUCTIVITY VALUES, OLD BURN AREA

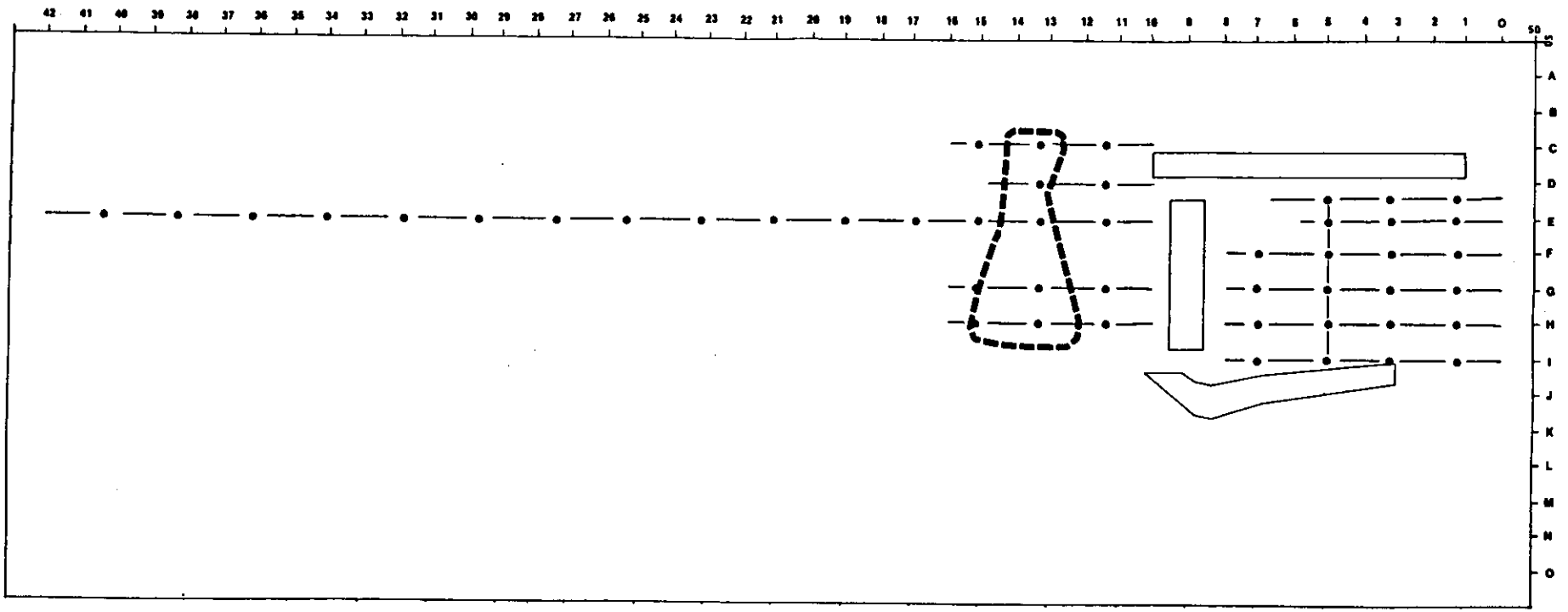
that buried wastes extend southward outside of the area surveyed. The magnetometry data (Figure 3-23) support this interpretation. EM values measured over the eastern part of the Old Burn Area range from 0.6 millimhos/meter to greater than 300 millimhos/meter. The extremely low and extremely high values represent the presence of buried wastes that contain ferrous materials.

3.4.3.3 Ground Penetrating Radar Survey

A Ground Penetrating Radar survey (GPR) was performed over part of the Old Burn Area on 17 and 18 February 1988. The GPR survey was performed with a GSSI System 3 instrument and a 300-mHz antenna. The objective of the survey was to locate the boundaries of buried trenches. The locations of GPR traverse lines in the Old Burn Area are shown in Figure 3-24. The major effort with the GPR survey was in the eastern part of the Old Burn Area. However, one east-west traverse line was performed over the western part of the Old Burn Area to search for buried wastes. Buried wastes were not identified on GPR profiles collected along this traverse line in the western part of the Old Burn Area. Buried wastes were detected on the GPR profiles collected in the eastern part of the Old Burn Area. Figure 3-24 shows the approximate boundaries for three areas where the set of GPR records indicated buried wastes and disturbed soils.

3.4.3.4 Summary of Geophysical Survey Results for the Old Burn Area

Figure 3-25 presents the findings from the EM survey, the magnetic survey, and the GPR survey for the Old Burn Area. The interpretations for each technique were done independently of findings from the other techniques. The results from the three surveys compare closely. The three waste burial sites identified with GPR are located within the EM and magnetic boundaries for buried wastes in the eastern part of the Old Burn Area. The EM boundary generally lies within the magnetic boundary. The magnetic boundary has a higher resolution because magnetic measurements were taken at a closer spacing and over a larger area than the EM measurements. Figure 3-25 shows that EM and magnetic boundaries compare closely for the buried waste site located in the central part of the Old Burn Area. The southern, western, and northern boundaries are essentially identical. The eastern boundary of the magnetic anomaly is located approximately 75 feet east of the EM boundary. The GPR traverse line that extended over the central part of the Old Burn Area was located immediately north of the waste burial site and did not detect disturbed soils or buried wastes.



Note: All GPR Lines run from east to west or west to east except for traverse from D5 to I5, which was run from north to south

N

Legend

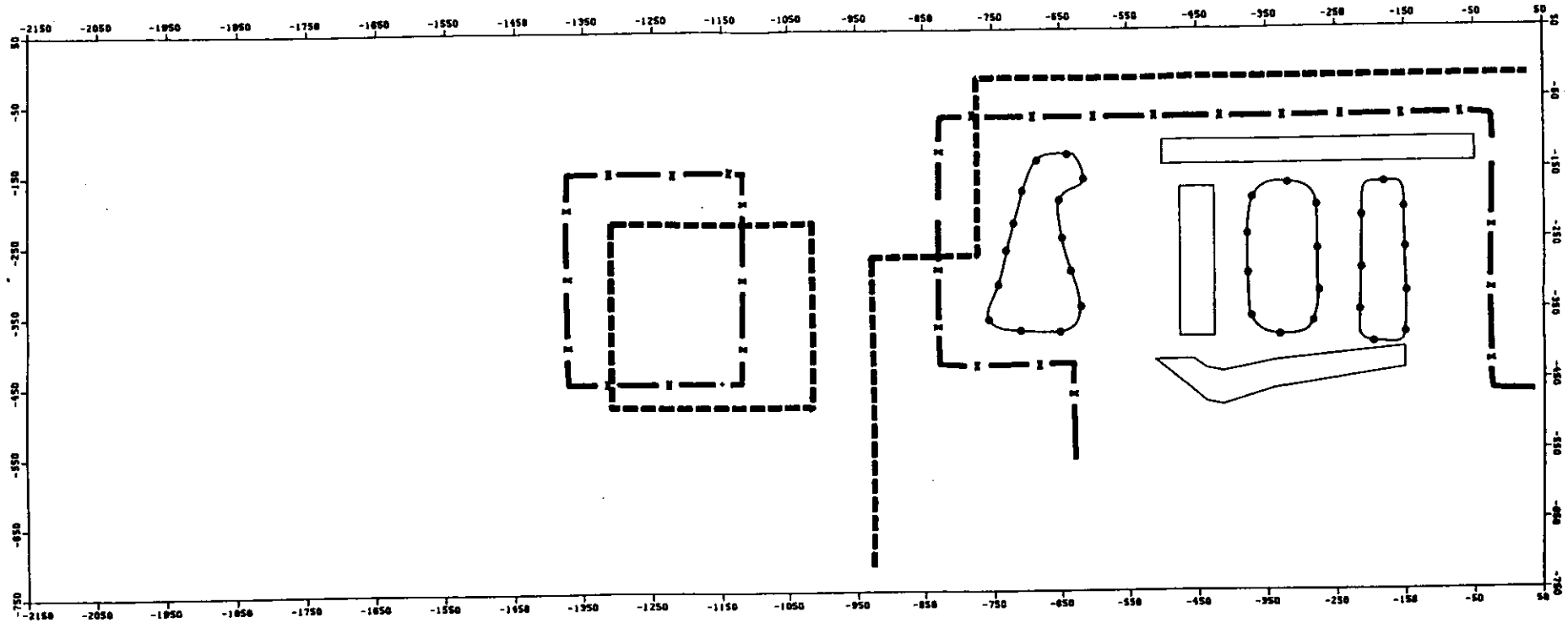
GPR Traverses

Boundary of Earth Berms

Approximate Trench Boundaries

U.S. Army Tooele Depot, Old Burn Area
Ground Penetrating Radar Survey - February 1988

FIGURE 3-24 GPR TRAVERSE LOCATIONS, OLD BURN AREA



Legend

- Approximate Boundary of Magnetic Measurements Associated With Buried Wastes
- Approximate Boundary of EM Measurements Associated With Buried Wastes
- Approximate Boundary of GPR Measurements Associated With Buried Wastes
- Approximate Boundary of Earth Berms

N

U.S. Army Tooele Depot, Old Burn Area
February 1988 Geophysical Surveys

FIGURE 3-25 COMPARISON OF FINDINGS OF GEOPHYSICAL SURVEYS, OLD BURN AREA

3.4.4 Chemical Range Geophysical Investigation and Results

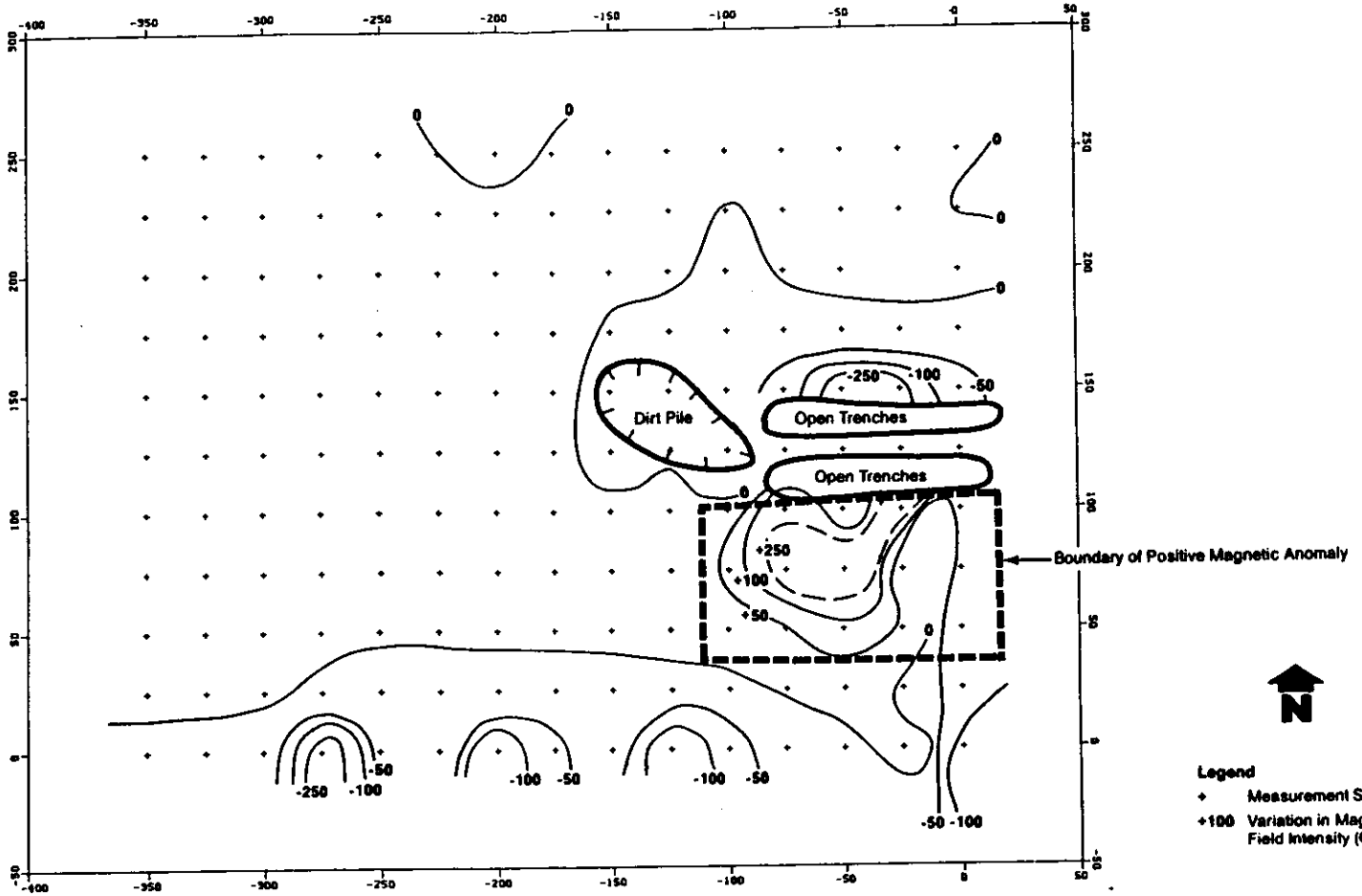
A reconnaissance survey with the magnetometry technique was conducted in the area of the Chemical Range on 9 February 1989. The survey was performed over an area of 2 acres. The dimensions of the surveyed area are 250 feet north-south by 350 feet east-west. Measurements of the intensity of the total magnetic field were made over the area on 25-foot centers. All measurements were referenced to a surveyed grid staked on 25-foot centers. Locations of magnetic measurements are presented in Figure 3-26. Appendix I lists the total field values recorded at each measurement location and the values recorded at the base station.

A contour map of the variation in the total magnetic field over the investigation area of the Chemical Range was constructed by subtracting a background value of 54,050 gammas from the field data. The background value was determined by an analysis of the variation of magnetic values across the area investigated. Therefore, the contour lines on the map represent deviation of measured values from the background value for the total magnetic field. Cultural features at the Chemical Range that could interfere with magnetic measurements were noted during interpretation of the data. These features include ferrous wastes present in open trenches and metal drums present on the land surface in the space between the two trenches. The locations of the open trenches and the drums are shown in Figure 3-26.

The contour lines in Figure 3-26 indicate that background values for the total magnetic field are present over most of the area that was investigated. Magnetic anomalies are present in the area of the open trenches and drum storage. The negative magnetic values measured north of the open trenches is due to ferrous materials present in the trenches.

The positive magnetic values measured south of the two open trenches are due to buried wastes that contain ferrous materials. A bold dashed line marks the approximate boundary where anomalous magnetic values are associated with buried wastes. The dimensions of this area are approximately 100 feet east-west by 70 feet north-south for a surface area of 7,000 square feet (0.16 acres). The greatest magnetic anomaly values are present in the central and northern part of the area, with the highest values greater than 400 gammas.

The contour lines in Figure 3-26 indicate that negative magnetic values occur along the southern side of the Chemical Range. Values of less than -125 gammas are common, with the negative values ranging up to -440 gammas. The cause of the negative values is not certain. They are probably due to the boundary fence of N-TEAD located to the south of the Chemical Range.



U.S. Army Tooele Depot, Chemical Range Area
Magnetometer Survey - February 1988, Gammas
Data Corrected (54,050 Subtracted From All Z-Values)

FIGURE 3-26 VARIATION IN TOTAL MAGNETIC FIELD, CHEMICAL RANGE

3.5 HYDROGEOLOGY

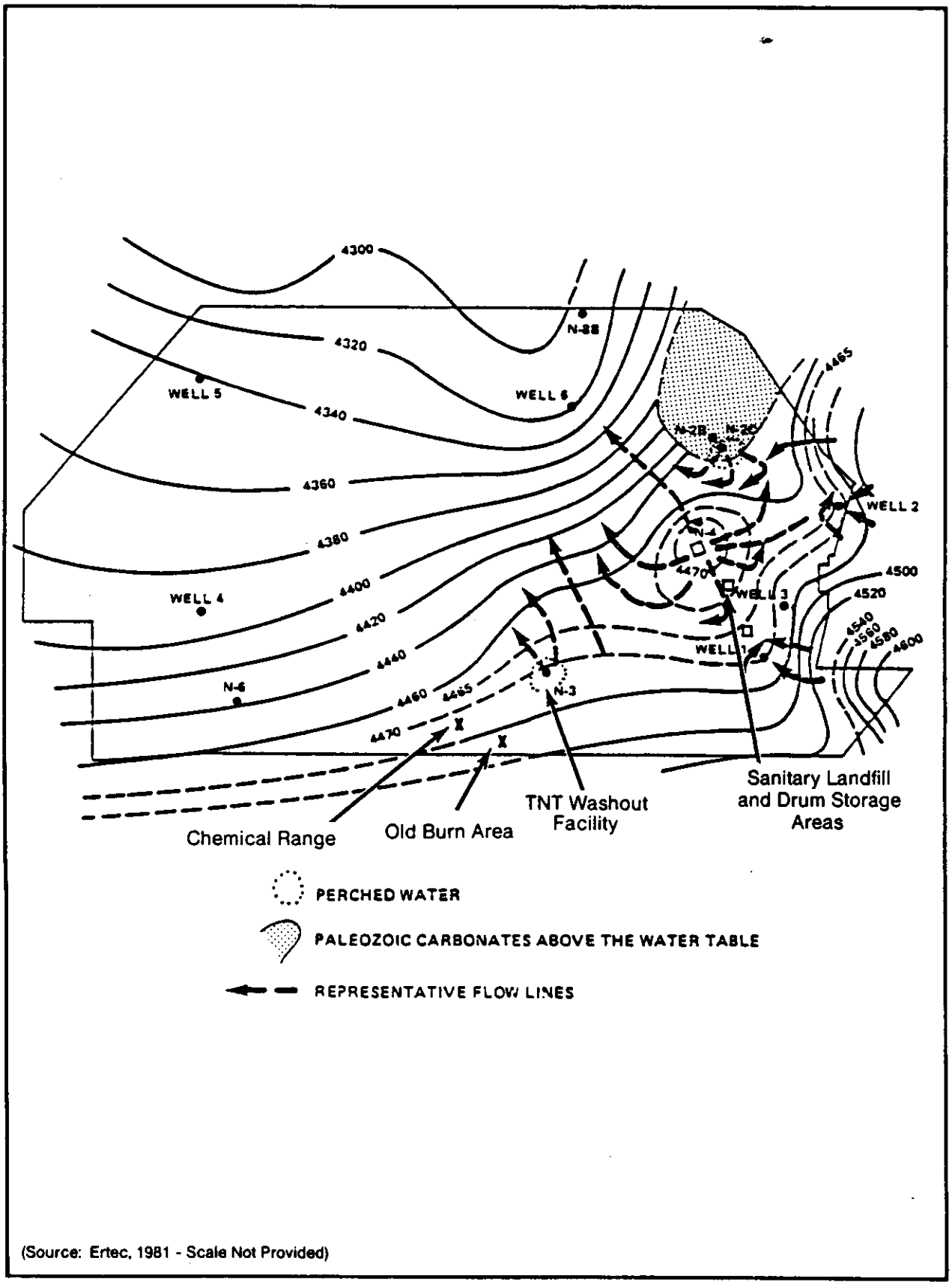
Groundwater flow at TEAD is part of a larger regional system that includes Rush Valley and Tooele Valley. Superimposed upon the regional features, however, are local sources and sinks of water that are important in the local movement of groundwater and contaminants. Figure 3-27 illustrates this regional flow system and the general directions of groundwater movement.

Groundwater within the regional flow system moves from areas of recharge to areas of discharge. The recharge areas lie along the edges of the valleys and are primarily fed by water loss from streams that originate in the mountain ranges. These streams typically disappear as they travel across the coalesced colluvial fans that slope from the mountain front towards the center of the valleys. Recharge from mountain streams are also concentrated along narrow zones where basin boundary faults cut across the colluvial fans.

Discharge areas for the regional flow system are of two types. Discharge may occur to adjacent flow systems through connected alluvial valleys. An example of this is the discharge of approximately 5,000 acre-ft/yr from the Rush Valley to the Tooele Valley under the Stockton Bar (Razen and Steiger, 1981). The other major type of discharge area for the regional flow system occurs in the low portions of the valleys where groundwater is lost to evapotranspiration and surface water bodies. The major discharge area for the regional groundwater system at N-TEAD is the Great Salt Lake.

Groundwater in N-TEAD occurs under confined, unconfined, perched, and mounded conditions. Figure 3-27 shows the potentiometric contours of the regional groundwater under N-TEAD and illustrates the direction of groundwater flow from the mounded zones around the industrial wastewater lagoon (near Well N-2C), locally perched zones around the TNT Washout Facility (near Well N-3B), and the mounded conditions around the sewage lagoon (Well N-4). The general direction of groundwater flow is from the east and south towards the center of the valley, and ultimately north to the Great Salt Lake. The depth to static water level at N-TEAD ranges from less than 200 feet in the north-central area to over 600 feet in the southwest area. The transmissivity and storage coefficients have been estimated to be 60,000 ft^2/day and 0.002, respectively (Ertec, 1982).

The general flow of groundwater through N-TEAD is towards the north. This movement occurs principally as unconfined groundwater flow through the upper portion of the valley fill materials. Confined conditions probably exist in materials at depth under N-TEAD. This flow pattern is distorted by recharge from the east along the Oquirrh Mountains.



(Source: Ertec, 1981 - Scale Not Provided)

FIGURE 3-27 1981 N-TEAD POTENTIOMETRIC SURFACE CONTOURS

According to Ertec (1982), recharge water flowing west onto N-TEAD may become "stacked up" behind a less permeable carbonate ridge, which has been hypothesized to be present in this area, until it gradually flows to the north. Additional recharge occurs from South Mountain, with water flowing to the north and gradually to the northeast. At times, this recharge area extends onto N-TEAD in the vicinity of the Chemical Range and Demolition Areas. This occurs at peak precipitation periods when there is flow in Box Elder Wash.

A subsequent study conducted by JMM (1989) for the U.S. Army Corps of Engineers indicated that the groundwater system beneath N-TEAD consists of two hydraulically interconnected aquifers: one in the heterogeneous alluvium, and the other in fractured Paleozoic bedrock. Together, the alluvial and bedrock aquifers comprise the uppermost aquifer beneath TEAD.

The unconsolidated alluvial aquifer is primarily composed of gravels with major interbedded zones of varying amounts of sands, silts, and clays. Although the gravels vary in composition, they generally consist of quartzite fragments with minor amounts of limestone, sandstone, and volcanics, all of which are primarily derived from the Oquirrh Mountains east of N-TEAD (JMM, 1989).

The bedrock aquifer at N-TEAD is an upthrown block of highly fractured interbedded carbonates, quartzites, and sandstones of Paleozoic age. The unfractured bedrock is relatively impermeable, but fractured and dissolution zones have high hydraulic conductivities. Depth to bedrock in the vicinity of the Industrial Wastewater Lagoon (IWL) ranges from 25 to 650 feet below ground surface. The bedrock crops out approximately 1,200 feet northwest of the IWL (JMM, 1989).

While both the alluvial and bedrock aquifers have different hydraulic characteristics, they are hydraulically connected and therefore are considered to comprise a single aquifer system. This condition results in relatively complex groundwater flow patterns at N-TEAD. In general, groundwater flows northward from the southeast, south, and southwest, and converges at the northwest part of the N-TEAD site.

Groundwater occurs under water table conditions in the alluvial aquifer underlying N-TEAD. It becomes confined toward the center of the basin, north of the N-TEAD boundary, where it is overlain by low-permeability, fine-grained sediments. Hydraulic conductivity values were found to vary dramatically throughout the study area, a phenomenon typical of alluvial aquifers (JMM, 1989). Pump-test data demonstrated that the aquifer exhibits both vertical and horizontal anistropy, which means that the aquifer properties vary with both direction and depth.

The bedrock aquifer lies directly beneath the IWL and crops out immediately to the north. The bedrock aquifer has a nearly uniformly flat groundwater surface. Interconnection with the alluvium is shown by the groundwater surface elevation contours, which generally parallel the north and south faces of the bedrock block. Groundwater enters the bedrock from the southeast, south, and northeast sides, where flow is impeded along the downgradient side, as indicated by the relatively steep contours along the northern edge of the bedrock block. Steep hydraulic gradients also characterize the area south and southwest of the IWL, probably as a result of a surficial-weathered skin on the bedrock (JMM, 1989).

Throughout the southern part of the N-TEAD site, groundwater flows downward in response to vertical hydraulic gradients. In contrast, at the northern boundary the vertical gradients are updward, causing groundwater to rise in that general area. Thus, not only does lateral groundwater flow converge at the northern area boundary, there is also a contribution of groundwater flow from deeper portions of the aquifer (JMM, 1989).

Distortion of regional groundwater flow through N-TEAD is caused by the pumping of water supply Wells 1 and 2. The cones of depression produced by the pumping of these two wells over a period of time has caused the potentiometric surface distortion, as shown in Figure 3-27. These wells tap the unconsolidated water table aquifer and are periodically pumped throughout the day at their rated combined capacities of approximately 560 gallons per minute (gpm).

Additional groundwater discharge by large irrigation wells may occur immediately to the northwest of the northern boundary. These wells are pumped in the summer months and their effect on the hydrogeology of N-TEAD has not been determined.

The existence of a groundwater mound from effluent seepage has been established in the vicinity of the sewage lagoons at N-TEAD. Well N-4 intercepts this mound at about 1,200 feet from the lagoon. At this point, the toe of the mound is approximately 34 feet above the predicted regional groundwater table. Flow lines in Figure 3-27 show the movement of groundwater away from the mounded area.

Mounded groundwater around the TNT Washout Facility was produced by the seepage of laundry effluent, TNT washout effluent, and, potentially, wastewater from the suspected leach field. The movement of water from this perched zone is to the north-northwest.

3.5.1 TNT Washout Facility

Characterization efforts at the TNT Washout Facility primarily focused on defining the extent and quality of the shallow

perched water beneath the area, and secondarily on the quality of the deeper unconfined regional aquifer.

Groundwater samples were analyzed for the same parameters as the subsurface soil samples collected at the TNT Washout Facility. These include explosives, VOCs, and the anions nitrate/nitrite and sulfate.

The localized perched zone encountered during borehole drilling and soil sampling varied in depth from approximately 17 to 49 feet below ground surface. The variance in the depth to the perched zone, given the relatively small size of the TNT Washout Facility (approximately 10 acres), indicates the possibility of numerous vertically spaced localized perched zones. Another explanation might be that the leading edge of the zone of saturation was encountered as it moves horizontally and vertically away from the source.

Nine groundwater monitor wells were installed into the shallow perched zone beneath the TNT Washout Facility. Of the nine monitor wells installed in the perched zone, wells N-102-88 and N-103-88 had a few feet of water in them from the time they were installed until late October 1988. The other seven wells were dry shortly after well construction. Previous groundwater investigations have also run into the problem of installing dry wells and lysimeters in the perched zones beneath the TNT Washout Facility (EA, 1988).

At the time of the November 1988 sampling, wells N-102-88, N-103-88, and N-106-88 had a trace of water in them. The water level in each of these three wells was so low that a sample could not be taken with a bailer. The other six new shallow perched zone monitor wells were dry. Existing wells N-3F and N-3I, shallow wells monitoring portions of the localized perched zone, had water in them allowing for a sample to be taken.

Table 3-4 is a summary of water level data from wells in the TNT Washout Facility. As can be seen from this table and from geologic cross-sections B-B' through D-D' (Figures 3-6 through 3-8), perched water levels have been declining. Low precipitation during 1988 contributed to this decline.

The reason for dry wells in the perched zone is likely related to the screen length. According to the specifications, a minimum of 10 feet of screen was required for each well. During borehole drilling, once wet to very wet soils were encountered, which indicated the perched zone, the borehole was to be drilled a minimum of 10 feet into or below these soils to accommodate the 10-foot well screen. The geologic nature of the localized perching layers, 1 to 2-inch thick clay layers, appeared to be such that once penetrated by the boring and kept open by the

Table 3-4

Summary of Water Level Data Obtained During
RI Program, TNT Washout Facility[a]

Well No.	Land Elevation (ft)	Measured Depth to Water 3/82	5/86	2/87	4/88	11/88	Water Level Elevation 11/88 (ft)	Total Depth of Well[a] (ft)
N-101-88	4,732.65	b	b	b	dry	dry	NA	47
N-102-88	4,725.55	b	b	b	35.7	e	NA	39.2
N-103-88	4,720.46	b	b	b	33.7	37.27	4,683.19	39.5
N-104-88	4,712.42	b	b	b	dry	dry	NA	35
N-105-88	4,713.35	b	b	b	dry	dry	NA	23.5
N-106-88	4,724.45	b	b	b	dry	dry	NA	41.0
N-107-88	4,724.70	b	b	b	dry	dry	NA	33.5
N-108-88	4,729.95	b	b	b	dry	dry	NA	31.0
N-109-88	4,729.03	b	b	b	dry	dry	NA	31.0
N-110-88	4,783.30	b	b	b	b	301.52	4,481.78	317.3
N-127-88	4,702.86	b	b	b	b	224.35	4,478.51	242
N-128-88	4,702.44	b	b	b	b	223.97	4,478.47	253.7
N-129-88	4,703.05	b	b	b	b	225.59	4,477.40	242.85
N-130-88	4,704.74	b	b	b	b	226.54	4,478.20	244.4
N-3A	4,725.00	252.5	242.89	242.23	245.77	245.04	4,479.96	345
N-3B	4,725.00	50.9	55.86	56.34	58.98	d	NA	65
N-3C	4,744.25	b	b	dry	dry	d	NA	71
N-3D1	4,731.10	b	b	dry	dry	d	NA	59
N-3D2	4,731.50	b	b	c	c	c	NA	64
N-3E	4,724.20	b	b	c	c	c	NA	64
N-3F	4,714.95	b	b	70.95	72.44	72.38	4,642.57	74
N-3H	4,715.05	b	b	234.38	4	236.37	4,478.68	263
N-3I	4,717.00	b	b	28.52	41.42	42.08	4,674.92	49

[a]From ground surface in feet, datum Mean Sea Level (MSL).
[b]Not yet installed.
[c]Lysimeter did not function.
[d]Not measured.
[e]2 to 6 inches of water in bottom of well.

NA = Water elevation not applicable because well or lysimeter is dry or water level was not measured.

well completion techniques, a vertical conduit was created by the filter pack placed around the well screen. Groundwater above the perching layer moved horizontally along the top of the perching layer and into the filter pack materials. Groundwater then moved vertically downward through the filter pack. The filter packed annular space of the monitor well is in contact with dry silts and sands that lie below the perching clay layer. The water moves from the filter pack materials outward into the subsoils and not into the monitor well. Although the well screen had been placed in the wet to very wet portion of the perched zone, no water enters the well and it remains dry. (Recommendations for further characterization of the extent of the localized perched zones are presented in Section 6).

Five wells were installed into the regional unconfined groundwater system beneath the TNT Washout Facility. These wells are N-110-88 and N-127-88 through N-130-88.

Groundwater samples were collected in November 1988 from seven wells monitoring the deep regional groundwater system. These wells include the five new wells and the two existing wells (N-3A and N-3H). Wells N-3A and N-3H were also sampled in June 1988.

Water level elevations from seven wells in the regional aquifer, the five new wells and existing wells N-3A and N-3H, show the groundwater's potentiometric surface to be very flat. Figure 3-28 shows the potentiometric surface of the regional aquifer beneath the TNT Washout Facility. The gradient from N-110-88 to N-127-88 is approximately 0.0025 ft/ft. This is calculated by a groundwater elevation difference of 5.43 feet and a horizontal distance of 2,150 feet between these two wells.

Slug tests were proposed for the wells in the TNT Washout Facility; however, none was performed. No well in the perched zone had the required minimum of 5 feet of water in the well required prior to using the slug testing equipment. The high hydraulic conductivities of the deep regional aquifer materials, as determined from aquifer testing in the vicinity of the industrial waste lagoon of N-TEAD, make slug testing an inappropriate testing method (JMM, 1987; and WCC, 1986). Therefore, none was performed in the regional aquifer beneath the TNT Washout Facility.

Hydraulic conductivities of the alluvial aquifer, as determined from aquifer pumping tests, range from approximately 10^{-3} to 10^{-2} cm/sec (WCC, 1986). JMM (1987) estimated hydraulic conductivities of the alluvial aquifer to range from 1 to 1,500 gpd/ft^2 with an arithmetic mean of 593 gpd/ft^2 (0.028 cm/sec). JMM (1987) estimated the groundwater velocity to range from 300 to 1,500 ft/yr in the horizontal direction and 220 ft/yr in the vertical direction. WCC (1986) estimated a groundwater velocity (horizontal) of 240 ft/yr.

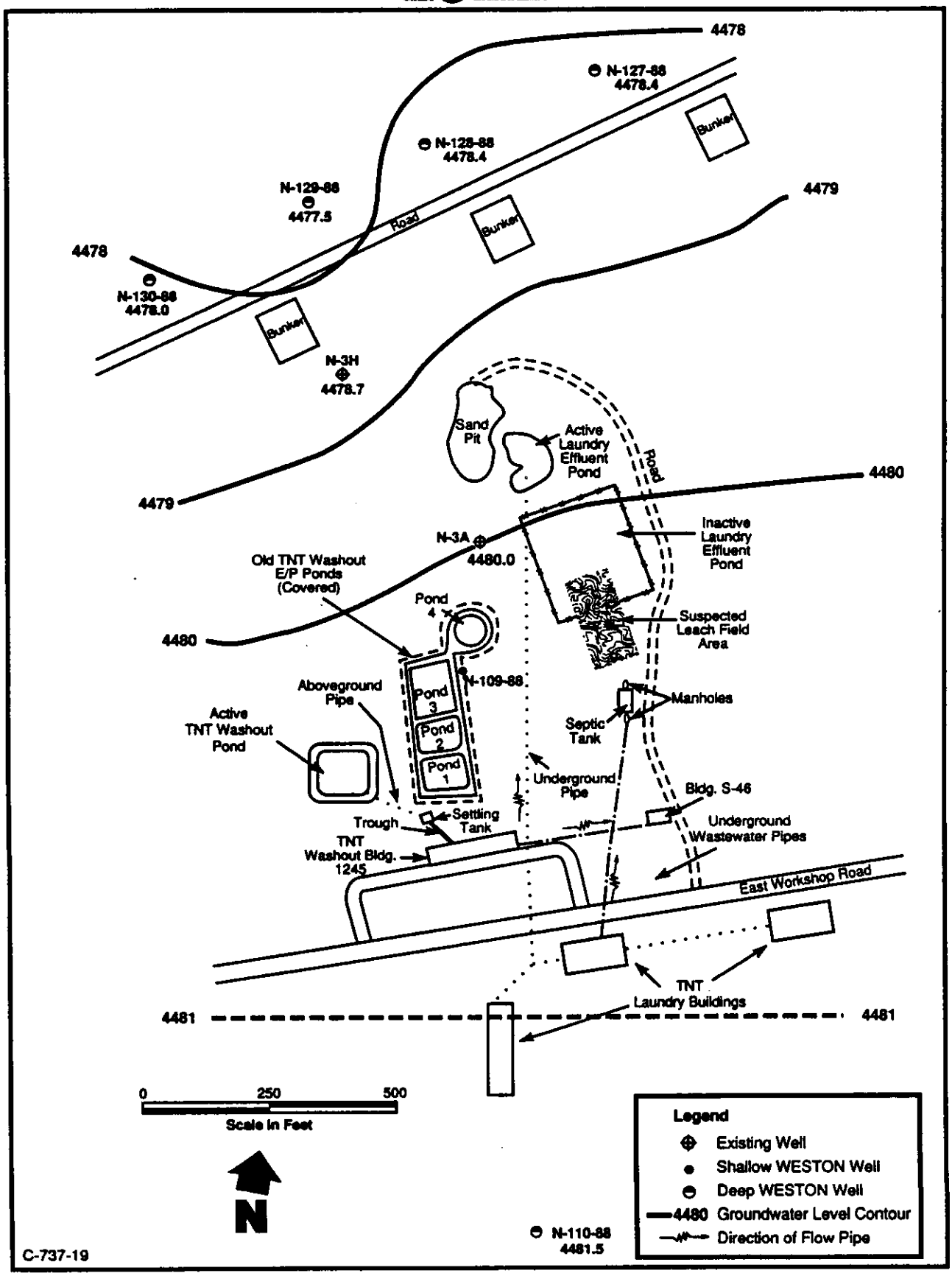


FIGURE 3-28 TNT WASHOUT FACILITY POTENTIOMETRIC SURFACE MAP (REGIONAL AQUIFER)

Both of these aquifer pumping tests were conducted in the eastern area of N-TEAD near the industrial waste lagoon. In review of the logs of the boreholes in which these tests were performed and the boreholes WESTON drilled in and around the Sanitary Landfill and Drum Storage Area, the geologic materials encountered in these holes are similar to the geologic materials encountered in the deep boreholes drilled at the TNT Washout Facility. Therefore, it is reasonable to extrapolate hydraulic conductivities of the alluvial aquifer in the vicinity of the industrial waste lagoon to the area of the TNT Washout Facility based on the geologic properties being the same at all three locations.

Using a groundwater velocity ranging from 300 to 1,500 ft/yr, regional groundwater under the TNT Washout Facility would reach the north perimeter fence (approximately 20,000 feet away) in 13 to 69 years. Therefore, since operations at the facility began in 1948, contaminants could potentially have reached the installation's northern boundary. Wells near the northern boundary have not had samples analyzed for explosives.

The estimated groundwater flow velocities and travel times can be considered only general estimates of possible contaminant movement over the site. These estimates do not reflect the possible effects on the retardation and dispersion of contaminants in groundwater. Retardation slows the transport of contaminants as they sorb to soil particles, and dispersion spreads or smears the contaminant front. Evaluation of these processes is beyond the scope of this investigation. Column leaching studies would be needed, utilizing the regional aquifer soil materials, to evaluate these effects.

3.5.2 Sanitary Landfill

Characterization efforts at the Sanitary Landfill focused on defining the quality of the unconfined regional aquifer. Seven wells, N-111-88 and N-115-88 through N-120-88, were installed in the regional groundwater system beneath the Sanitary Landfill.

Groundwater samples from the seven new wells and the one existing well were analyzed for the same parameters as the subsurface soil samples collected at the Sanitary Landfill. These include explosives, VOCs, SOCs, metals, and the anions nitrate/nitrite and sulfate.

Water level elevations from eight wells in the regional aquifer, the seven new wells and existing well T-7, are summarized in Table 3-5 and show the groundwater's potentiometric surface to be flat. Figure 3-29 shows the potentiometric surface of the regional aquifer beneath the Sanitary Landfill and the Drum Storage Areas. The gradient from N-111-88 through N-119-88 is approximately 0.0016 ft/ft. This is calculated by a groundwater elevation difference of 5.65 feet and a horizontal distance of 3,600 feet between these two wells.

Table 3-5

Summary of Groundwater Level Data Obtained
During RI Program, Drum Storage Areas and
Sanitary Landfill

Well No.	Land Elevation[a]	Depth to Water[b,c]	Water Level Elevation[a]	Total Well Depth[b]	Total Drilled Depth[b]
N-111-88	4,803.42	318.50	4,486.81	337.6	337.77
N-112-88	4,799.09	315.75	4,485.63	332	332
N-113-88	4,796.77	e	e	59	59
N-114-88	4,795.51	312.50	4,485.32	334.6	340
N-115-88	4,749.59	269.37	4,482.64	295.6	298
N-116-88	4,753.50	273.04	4,483.19	288	288
N-117-88	4,700.61	222.25	4,481.07	239.5	240
N-118-88	4,710.82	230.87	4,482.74	259.75	260.5
N-119-88	4,748.60	270.71	4,481.03	275.15	280
N-120-88	4,777.41	296.42	4,482.92	319.5	321
T-7	4,793.2	308.50	4,484.70	336.6	348

[a]Feet above mean sea level.
[b]From ground surface, in feet.
[c]Measured November 1988.
[d]Well abandoned; casing pulled and hole grouted to surface.
[e]Dry.

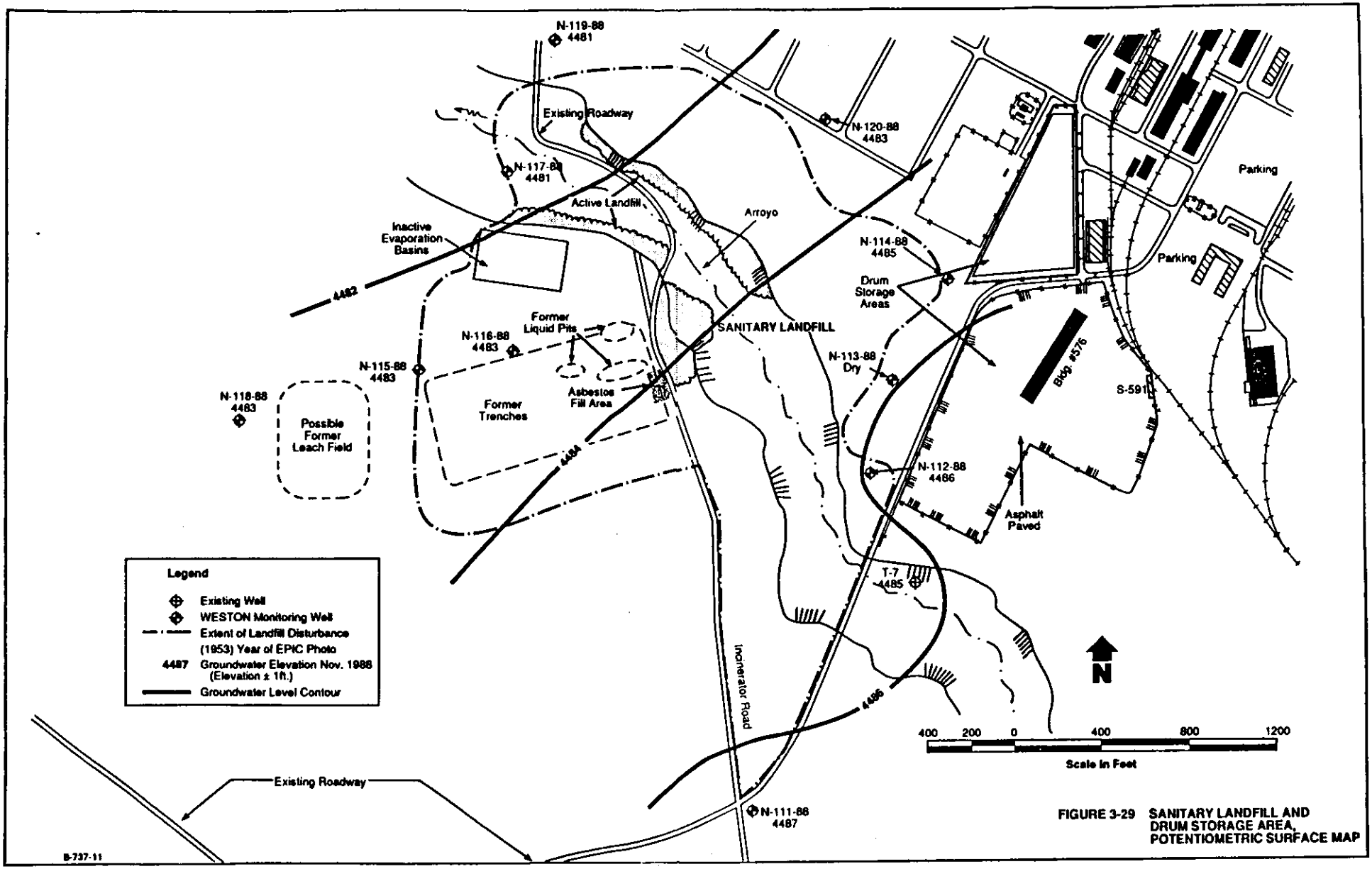


FIGURE 3-29 SANITARY LANDFILL AND DRUM STORAGE AREA, POTENTIOMETRIC SURFACE MAP

Figure 3-30 shows the potentiometric surface of the regional aquifer as it lies beneath the eastern-third of N-TEAD. This map has been developed in conjunction with JMM's (1987) hydrogeological investigation of the IWL and the surrounding area.

Extensive hydrogeologic characterization of the alluvial aquifer in the vicinity of the Sanitary Landfill has produced sufficient information on which to base estimates of the hydraulic conductivities of the alluvial aquifer beneath the Sanitary Landfill (JMM, 1987; WCC, 1986).

Hydraulic conductivities of the alluvial aquifer range from approximately 10^{-3} to 10^{-2} cm/sec (WCC, 1986). JMM (1987) estimated hydraulic conductivities of the alluvial aquifer to range from 1 to 1,500 gpd/ft^2 with an arithmetic mean of 593 gpd/ft^2 (0.028 cm/sec). JMM (1987) estimated the groundwater velocity ranges from 300 to 1,500 ft/yr in the horizontal direction and 220 ft/yr in the vertical direction. WCC (1985) estimated a groundwater velocity (horizontal) of 240 ft/yr.

Using a groundwater velocity ranging from 300 to 1,500 ft/yr, groundwater from the Sanitary Landfill or Drum Storage Areas would take 10 to 50 years to reach the north perimeter fence (approximately 15,000 feet).

The estimated groundwater flow velocities and travel times can be considered only general estimates of possible contaminant movement over the site. Retardation slows the transport of contaminants as they sorb to soil particles, and dispersion spreads or smears the contaminant front. Evaluation of these processes are beyond the scope of this investigation. As previously mentioned, column leaching studies would be needed to evaluate these factors.

3.5.3 Drum Storage Areas

Characterization efforts at the Drum Storage Areas focused on defining the quality of the regional aquifer. Three wells were installed downgradient of the Drum Storage Areas. While drilling N-112-88, a shallow water zone was encountered from 35 to 61.5 feet. N-112-88 was drilled and a well was completed into the deeper groundwater system. The shallow water zone was the target completion interval for N-113-88. This shallow water zone was screened from 36.6 to 56.1 feet in N-113-88. Shortly after N-113-88 was completed, it did not produce any water. The reason for this is the same as for the dry monitor wells in the TNT Washout Facility. The shallow water zone lies atop a thin sandy clay to clayey sand stratum. N-113-88 was drilled to 59 feet, which is a few feet below the perching layer. Water flows into the completion zone of the well and then downward towards the bottom of the well. If there is no confining layer at the

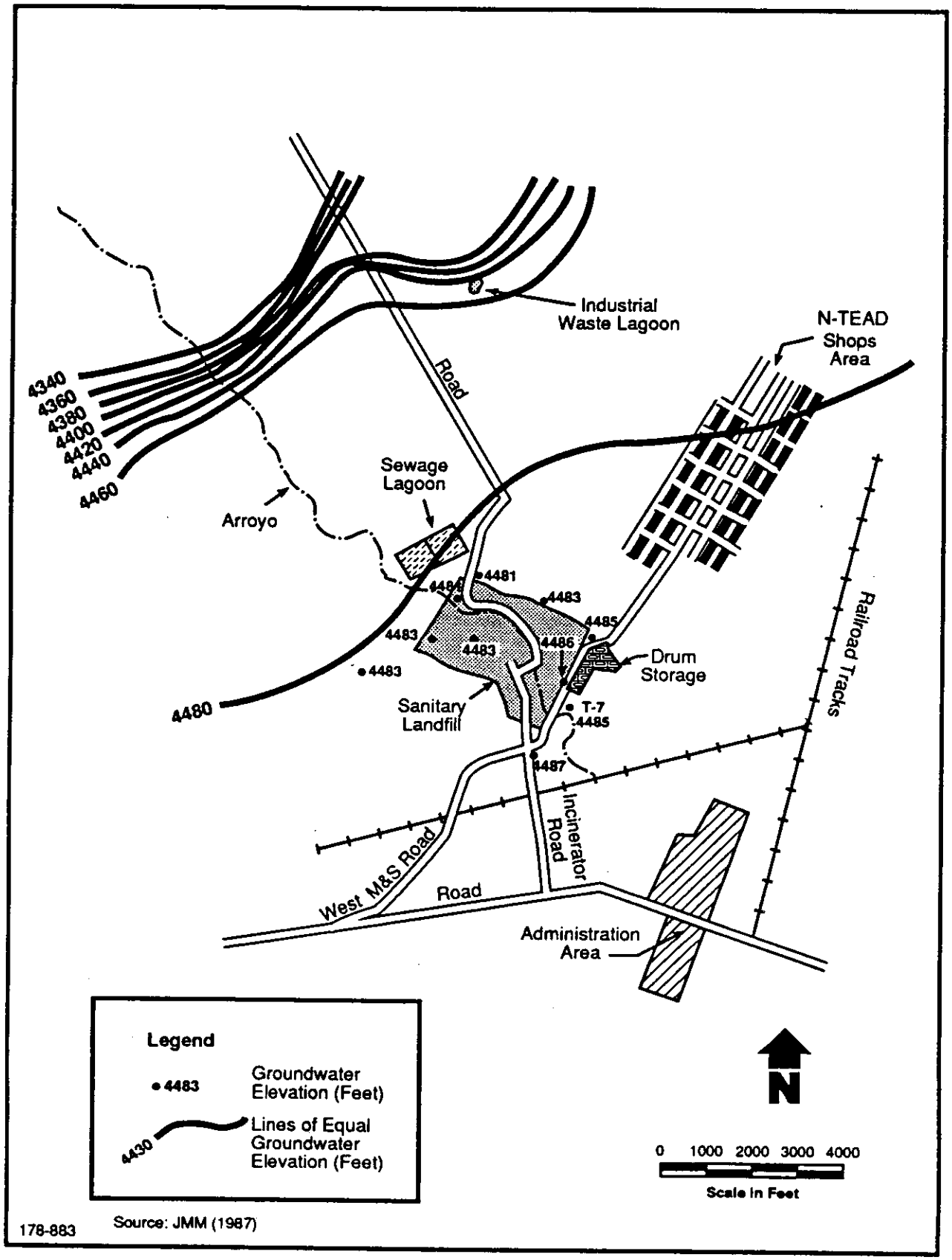


FIGURE 3-30 POTENTIOMETRIC SURFACE OF THE REGIONAL AQUIFER IN THE EASTERN THIRD OF N-TEAD, 1988

bottom of the completion zone of the well, or if the strata below the perching layer has a high hydraulic conductivity (in the case of N-113-88 the perching layer is a sandy clay to clayey sand and the underlying stratum is a sand), then water will not stay in the completion zone of the well, but will migrate outward into the formation.

Groundwater samples from N-112-88 and N-114-88 were analyzed for the same parameters as the subsurface soil samples collected at the Drum Storage Areas. These include explosives, VOCs, SOCs, metals, the anions nitrate/nitrite and sulfate, PCBs, and pesticides.

Since the Drum Storage Areas lie adjacent to the Sanitary Landfill, the discussion of estimated hydraulic conductivities and travel times for the Sanitary Landfill is applicable to the Drum Storage Areas.

3.6 NATURAL RESOURCES

3.6.1 Flora

Climate has had a profound influence on the flora of Tooele Valley. Drought conditions are especially critical to plant growth and reproduction. The lack of precipitation, the low humidity, and the light winds have forced plants to adapt to a very high rate of evapotranspiration.

Temperature is also critical in the growth and reproduction of plants in the area. The "killing frost" period normally occurs from 25 October to 1 April, when most plants in the area are either dormant (perennials) or in seed form (annuals). The summer heat causes many of the plants to enter another period of dormancy. These climatic conditions limit the periods of growth and reproduction to the cooler, wetter periods between 1 April and 25 October, unless they are adapted like phreatophytes, which tap groundwater.

Soils are a significant determinant of flora in the area. Some of the soils are nearly impervious to water and root action. Other soils lack sufficient nutrients to support much plant life. Soils may also have a limiting pH; most of the area's soils are alkaline. In addition, saline soils exist in numerous areas. Many plants have adapted to these conditions, in addition to low soil moisture, lack of humus, high mineral ion content, and varying soil depths and types, but these factors also tend to limit the number of plants.

Surface water in the area is limited. Lack of surface water and topsoil moisture has forced root adaptations, such as the development of roots reaching groundwater and the development of plants with expanded shallow roots that gather precipitation quickly after a rainfall. Surface water also leaches out minerals and due to rapid evaporation, mineral salts are concentrated on the surface or just below it.

N-TEAD is in the area classified as an Artemisia Biome, which is characterized by sagebrush (Artemisia) and saltbrush. This general classification is broken down into smaller areas (ranges) based on predominant vegetation types and soil ranges.

The Desert Bench Range has medium surface soil and slowly permeable subsoil. The dominant vegetation is winterfat, budsage, Indian rice grass, and western wheat grass. There are low areas within this range that support greasewood, shadscale, and gray Molly. In areas where puddling occurs after a heavy rainfall, greasewood and inkweed are dominant.

The Sandy Hills Range has two soil types. The first and most westerly has moderately light surface soil texture and rapidly permeable subsoil. The dominant plants are juniper, low sagebrush, big sagebrush, ephedra, Indian rice grass, sand dropseed, shadscale, and needle and thread grass. The second and central soil type has moderately light surface soil texture and rapidly permeable subsoil. Dominant vegetation consists of juniper, big sagebrush, ephedra, sand dropseed, and Indian rice grass. In areas not covered by the juniper trees, the dominant vegetation is big sagebrush, rubber rabbitbrush, bluebunch wheat grass, Indian rice grass, and sand dropseed. The lower parts of both areas have big sagebrush, greasewood, gray Molly, shadscale, and horsebrush.

The Foothill Range has three soil types. The first is in the eastern part of the range and has a gravelly surface condition consisting of gravel or cobble mixed with medium-textured soil material. The dominant vegetation is spiked wheat grass, nature blue, thread and needle grass, western wheat grass, Indian rice grass, sweet vetch, balsam root, and yarrow. This area is being invaded by low sagebrush and big sagebrush. To the southeast, the Foothill Range has medium-textured soil and moderately permeable subsoil. The dominant vegetation for this area is spiked wheat grass, nature blue, needle and thread grass, western wheat grass, Indian rice grass, sweet vetch, balsam root, and yarrow.

This range is also being invaded by Halogeton and cheatgrass. The third soil type is in the south and southwest areas of the range. It is gravelly or cobbly without medium-textured soil. The dominant species here are Indian rice grass, spiked wheat grass, nature blue, needle and thread grass, western wheat grass, sweet vetch, balsam root, and yarrow. This area has pockets of big sagebrush and shadscale.

The Upland Loam Range has two soil types. The first, toward the southwest corner of TEAD, has medium surface soil texture and low-permeable subsoil. The second, near the south boundary of TEAD, has moderate-texture surface soil with moderately

permeable subsoil. In both areas, the dominant plants are cheat grass, Indian rice grass, snakeweed, and fesque. Also present are big sagebrush, bitter vetch, yellow brush, lupine, rabbit-brush, and paint brush (Inland Pacific Engineering Co., 1982).

3.6.2 Fauna

The condensed growth and reproduction of the plant communities in Tooele Valley limit the ecological niches available to animal species. Not only is competition for food sources severe during the hot, dry summer and winter dormancy periods, but the animals must adapt to the same climatic conditions. They have adapted as hibernators, estivators, diurnals, or nocturnals, or have physiological adaptions that enable them to survive drought and heat or cold and snow.

The vicinity of N-TEAD is inhabited by a wide variety of animal species ranging from protozoans to mammals, including 20 species of parasitic flatworks; 79 species of free-living, soil-inhabiting, or parasitic roundworms; 36 species of slugs and snails; 150 species of mites, ticks, spiders, pseudo-scorpions, solpugids, and scorpions; 1,300 (and probably many more) species of insects; one species of amphibian; 6 species of lizards; 2 species of snakes; 69 species of migrant birds; 11 species of winter resident birds; 71 species of summer resident birds; 63 species of birds in permanent residence; and 40 species of mammals.

Several species of game animals exist in the vicinity of N-TEAD. Mule deer, mountain cottontail, and desert cottontail inhabit the area. Fur-bearing animals include coyote and bobcat. Game birds include sage grouse, Gambil's quail, short-tailed grouse, blue grouse, ruffed grouse, and the imported ring-necked pheasant and chukar. In addition to the local game birds, there are 37 species of migratory waterfowl that use the flyways through TEAD.

Several species have been eliminated from the areas, including bison, grizzly bear, elk, black bear, pronghorned antelope, and mountain sheep. The mountain sheep, pronghorned antelope, and elk have been or are being reintroduced, mainly in the mountains.

There are 603 verified species of vertebrate wildlife in Utah. Of these, 507 are protected by the Division of Wildlife Resources of the Utah State Department of Natural Resources, including all birds, fish, amphibians, reptiles, and 29 mammals. Off-base hunting is permitted for all 57 game species (in season) and population control is largely due to hunter pressure. Management is achieved by varying the length of the season, the number of licenses, and limits. The Division of Wildlife Resources participates in range rehabilitation; studies the effects on wildlife of livestock grazing; stocks

streams, ponds, and reservoirs with adapted fish; constructs desert mountain guzzlers; releases chukars and Hungarian partridge in adapted areas; develops waterfowl management areas; and surveys game. The Division of Wildlife Resources alsoregulates trapping under Section 23-13-2(28) of the Utah Code Annotated, as amended.

Two threatened or endangered species are known to be in the vicinity of N-TEAD: the bald eagle and the peregrine falcon. Bald eagle habitat in the area is considered critical, encompassing an extensive area in Utah, including TEAD. The area required by the bald eagle to roost, hunt, behave normally without disruption, and provide shelter is relatively large and encompasses many smaller habitats. Bald eagles are protected by United States Code 16, Section 668-668d.

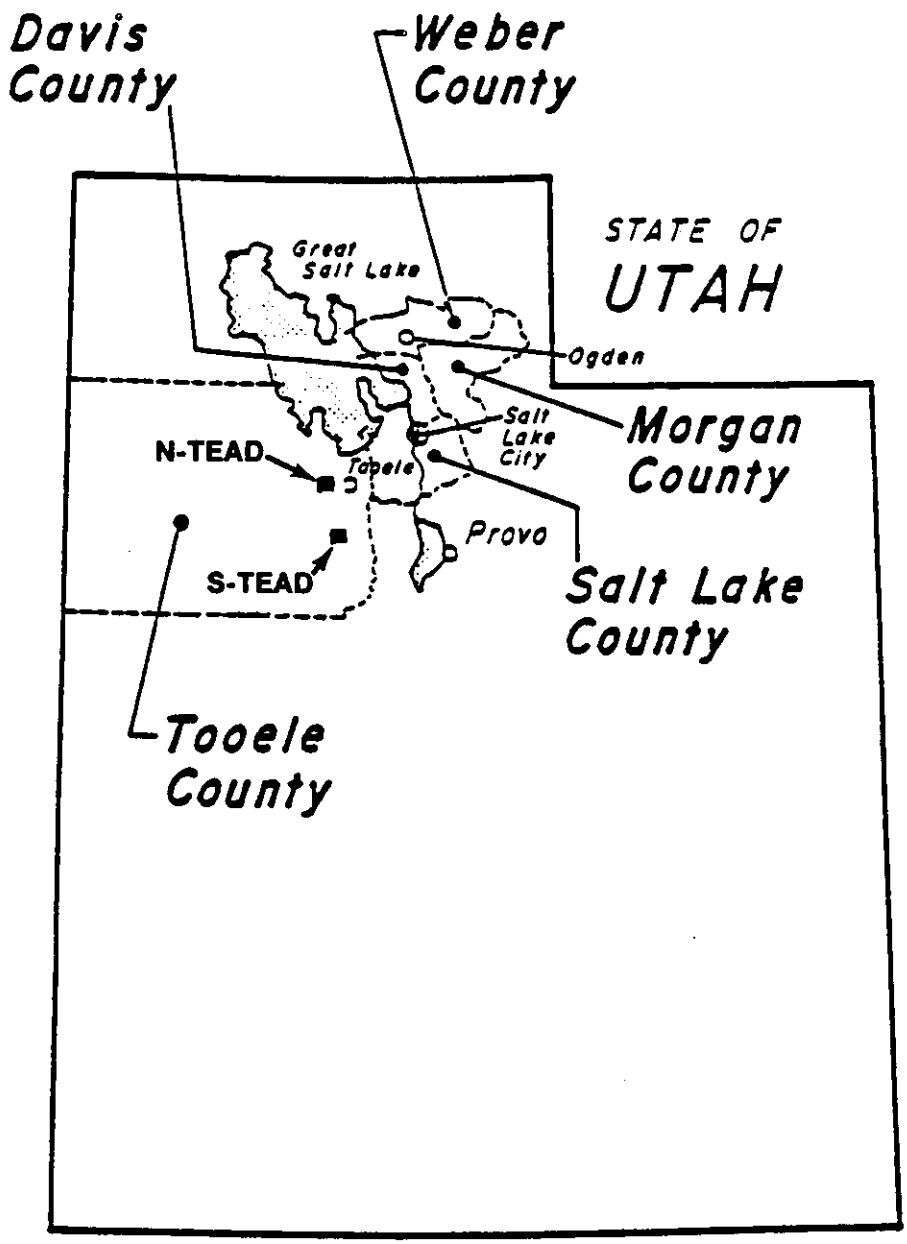
Peregrine falcons have been sighted in the area. The range of peregrine falcons has been shrinking due to housing and agricultural pressure. Its prey is being depleted by the use of pesticides and rodenticides, especially substances containing the dioxin TCDD, PCB, mercury, or lead. Peregrine falcons are protected by the Endangered Species Act.

Zoonotic (transmittable from animals to man) diseases reported in the area are tularemia, rabies, Rocky Mountain spotted fever, Q fever, brucellosis, encephalomyelitis, plague, psittacosis, Anthrax, and hyated disease. The instance of disease in the area is lower than in most of the country, probably due to climate and elevation. Tularemis is an exception; one of the world's epicenters for tularemia is Delta, Utah. Delta lies northeast of Tooele in the Jordan River Valley. There was an outbreak in Grantsville and Delta in 1970 (Inland Pacific Engineering Co., 1982).

3.6.3 Demography and Land Use

Tooele County, where N-TEAD is located, is one of five counties comprising the Wasatch Front Multi-County Planning District (Figure 3-31). The other counties are Davis, Morgan, Salt Lake, and Weber. The Wasatch Front District, the most populous and urbanized district in the state, contained 67 percent of the state's population in 1970 and 64.7 percent in 1980. Between 1970 and 1980, the district grew by 32.7 percent, while the rest of the state grew by 48.6 percent. The district's growth was negatively impacted by population declines in the Cities of Salt Lake and Ogden. At the same time, smaller cities and unincorporated areas to the south and east of Salt Lake City outside the Wasatch Front District grew at rates of 50 percent or more in many cases (Table 3-6).

Tooele County, located west of Salt Lake City, has exhibited a slower growth rate than most other Wasatch Front counties. Population growth in Tooele County has been subject to major



(Source: EA 1988)

FIGURE 3-31 WASATCH FRONT MULTI-COUNTY PLANNING DISTRICT

Table 3-6

Profile of Growth Within Tooele County

	1970	1980	% Change
Tooele County	21,545	26,033	20.8
Unincorporated Areas	4,208	5,164	22.7
Incorporated Areas	17,337	20,869	20.4
Tooele City	12,539	14,335	14.3
Grantsville City	2,931	4,419	50.8
Stockton Town	469	437	-6.8
Rush Valley Town	541	356	-34.2
Vernon Town	NA	181	--
Ophir Town	76	42	-44.7

Source: U.S. Department of Commerce, Bureau of Census, 1980 Census of Population and Housing (March 1981).

fluctuations, reflecting mining and military activities. From 1950 to 1970, the total county population increased 47.2 percent, from 14,636 to 21,545.

The greatest increases of population occurred in three distinct time periods: 1950-1952, 1961-1963, and 1965-1968. These population increases were related directly to government military employment connected with activity in the Korean and Vietnamese conflicts. The lack of significant employment generators and the arid nature of these counties has prevented large population concentrations. In addition, the heavy Federal ownership of land in this part of the state reduces the acreage available for private development. However, there are signs that given the right conditions, bedroom-type communities could develop in Tooele County servicing Salt Lake City.

Within Tooele County, growth is concentrated in areas along I-80 and in proximity to N-TEAD. Cities in these areas, such as Tooele and Grantsville, have had positive growth, while the more southern areas of Stockton, Rush Valley, and Ophir have experienced a population loss. A profile of growth within Tooele County is provided in Table 3-6.

The population of the area surrounding N-TEAD, primarily Tooele County, has increased approximately 16.7 percent during the period of 1970-1980, while the City of Tooele has experienced an 11.9 percent increase according to preliminary 1980 census figures. Since 1980, population growth in Tooele County has practically ceased, primarily as a result of drastic cutbacks in the local mining industry. During this period, Anaconda Copper dropped from a workforce of more than 700 to a caretaker force of less than 20. Kennecott Copper has reduced from a 7,000-plus workforce to a small caretaker contingent, and the Mercur gold mine operation has changed hands several times and is reducing its scope of operations. The Tooele County Master Plan predicts a 60 percent increase in the Tooele County population by 1990 (Inland Pacific Engineering Co., 1982; Tooele Army Depot, 1985).

N-TEAD is located in Tooele Valley, which is bounded on the north by the Great Salt Lake, on the east by the Oquirrh Mountains, on the south by South Mountain, and on the west by the Stansbury Mountains. With the exception of Grantsville, the City of Tooele, Stockton, and occasional residential developments north of the City of Tooele, Tooele Valley is predominately undeveloped. Grazing and limited cultivation predominate. Grantsville is located approximately 2 miles north of the northwest corner of N-TEAD; the City of Tooele lies adjacent to the northeast corner; and Stockton is located approximately 3 miles to the south along State Route (SR) 36.

With the exception of the City of Tooele, properties immediately adjacent to the N-TEAD boundaries are undeveloped. The properties to the north are used as pasture or are cultivated, and

the properties to the west and south are used for rangeland grazing. The properties to the east of N-TEAD consist of the City of Tooele and undeveloped rangeland along the lower western slopes of the Oquirrh Mountains. Scattered gravel pitsare also located southeast of N-TEAD along SR 36. With the exception of the southeastern portion (bounded by SR 36), N-TEAD is bounded on the east by the Union Pacific Railroad right-of-way. Residential development within the City of Tooele boundaries abuts the northern boundary of this portion of N-TEAD. The Tooele Municipal Airport and some scattered residential uses are located along the eastern boundary north to SR 112. SR 112 forms the northeastern boundary of N-TEAD. The area northeast of SR 112 is presently undeveloped.

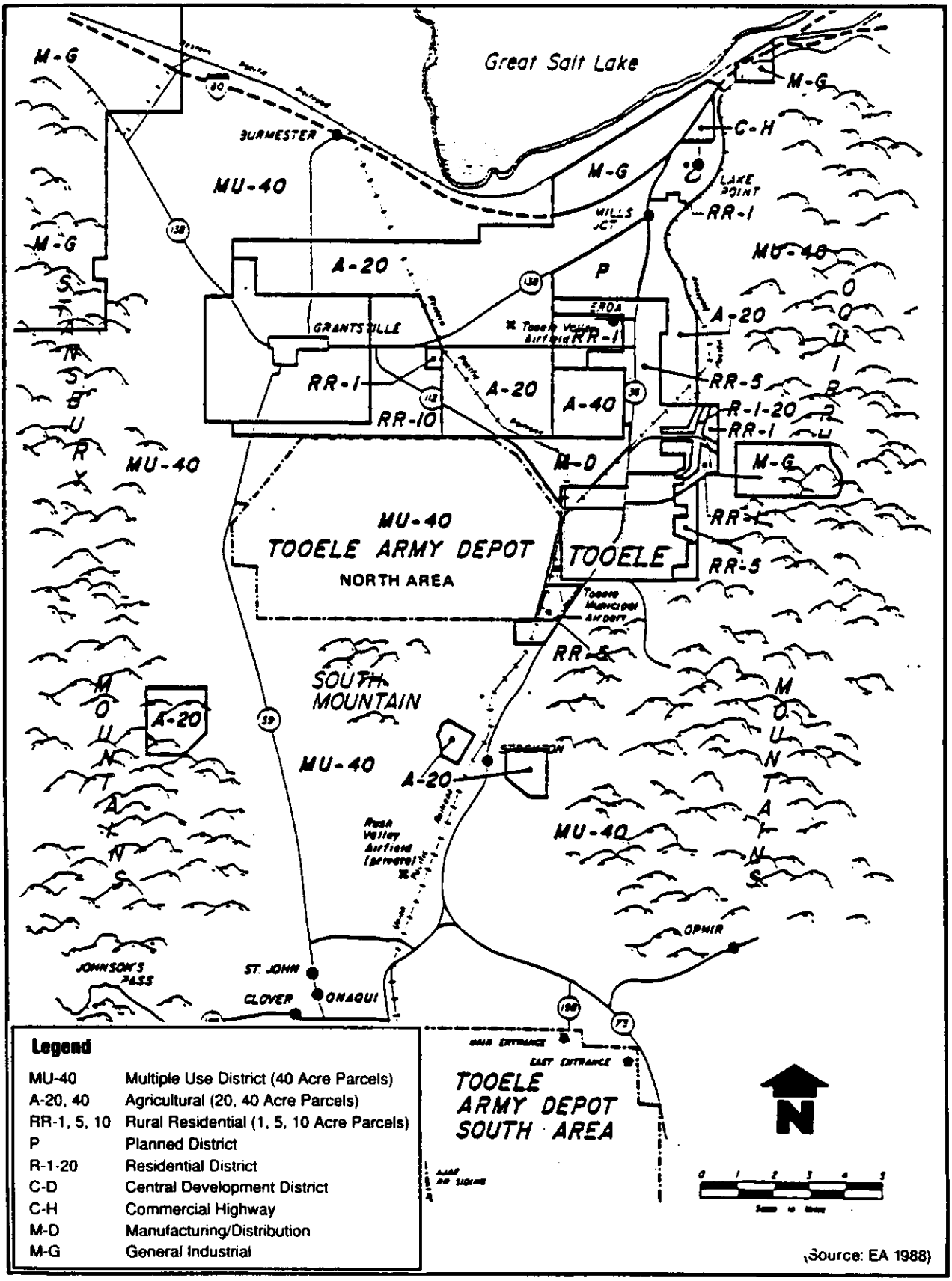
Land use guidelines for Tooele County are provided in "A Master Plan for Tooele County (1972)," and the Tooele County Zoning Ordinances and Map (October 1981). The Master Plan map designates the area surrounding N-TEAD as MU-40 (with the exception of the area included within the corporate limits of the City of Tooele). The county zoning map designates the area south and west of N-TEAD as MU-40; the area to the north as A-20, RR-10, and M-D; and the unincorporated area to the east as RR-5 and M-D. Figure 3-32 shows the existing zoning for Tooele County and N-TEAD, and Figure 3-33 shows the existing land uses at N-TEAD.

The MU-40, or Multiple Use District, is intended as a low-density zone with limited human habitation and public utility/service requirement. The primary uses are agricultural and open space. The minimum parcel size per dwelling unit is 40 acres.

The A-20, or Agricultural District, is intended to promote and preserve conditions favorable to agriculture in appropriate areas and to maintain greenbelt open spaces. The minimum parcel size for dwelling units within this district is 20 acres.

The RR-10, or Rural Residential District, is intended to promote and preserve conditions favorable to large-lot family life, the keeping of limited numbers of animals and fowl, and reduced requirements for public utilities. The minimum lot size per dwelling unit is 10 acres. The RR-5 District has the same intent as the RR-10 District, but the minimum allowable lot size is 5 acres.

The M-D, or Manufacturing/Distribution District, is intended to provide areas for light manufacturing, industrial processes, and warehousing that do not produce objectionable effects (Inland Pacific Engineering Co., 1982).

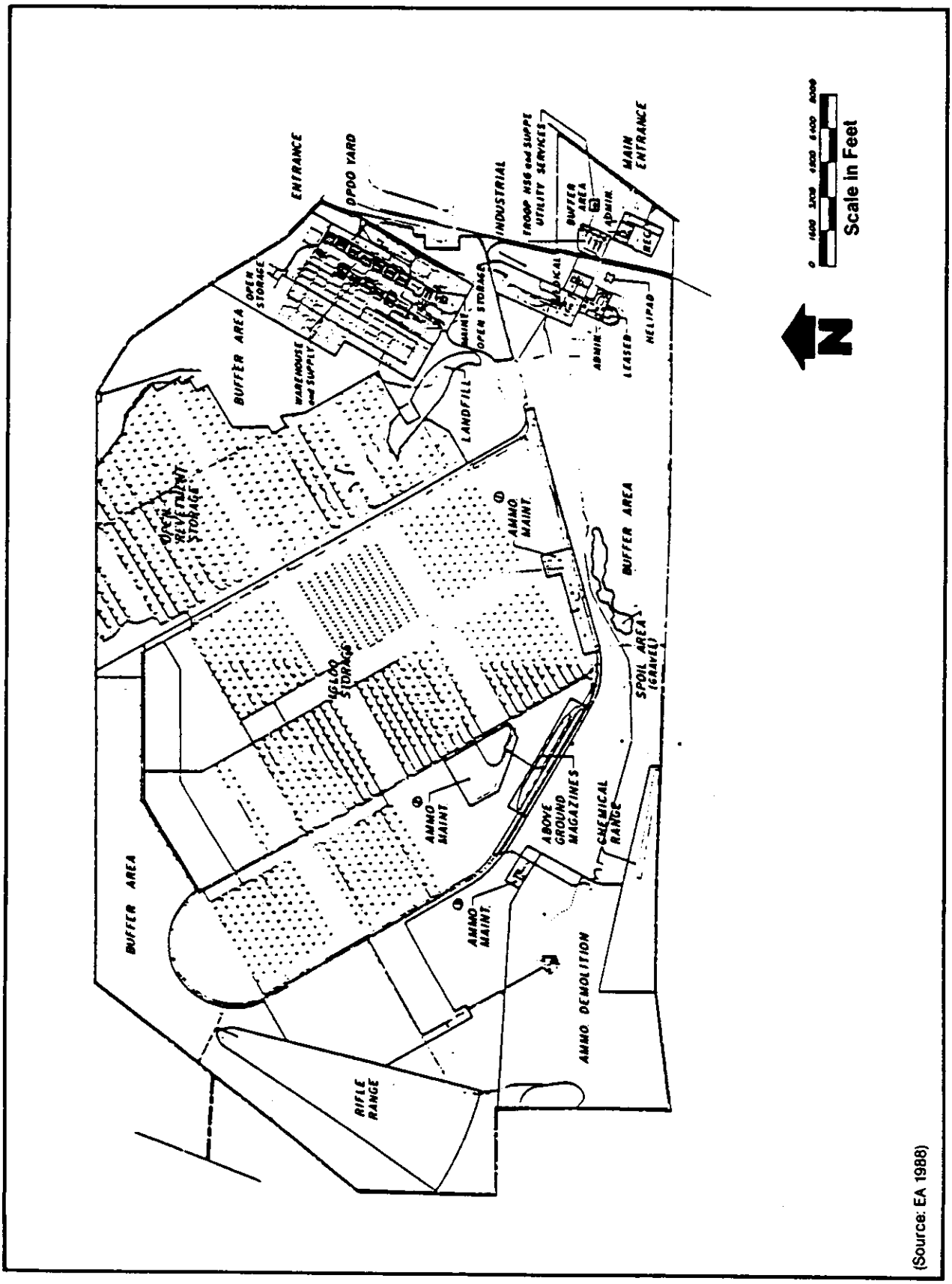


Legend

MU-40	Multiple Use District (40 Acre Parcels)
A-20, 40	Agricultural (20, 40 Acre Parcels)
RR-1, 5, 10	Rural Residential (1, 5, 10 Acre Parcels)
P	Planned District
R-1-20	Residential District
C-D	Central Development District
C-H	Commercial Highway
M-D	Manufacturing/Distribution
M-G	General Industrial

(Source: EA 1988)

FIGURE 3-32 TOOELE COUNTY ZONING MAP



(Source: EA 1988)

FIGURE 3-33 N-TEAD LAND USE MAP

SECTION 4

CONTAMINATION ASSESSMENT

4.1 INTRODUCTION

4.1.1 Contaminants of Concern

The following subsections present the contamination assessments for each of the five sites investigated for this RI. A summary of past sampling and analysis programs and of suspected contaminants is presented in the following sections for each of the five sites. A summary of the general contaminant groups of concern for each media at the five N-TEAD sites is presented below:

- TNT Washout Facility
  - Subsurface Soil: Explosives, volatile organic compounds (VOCs), and anions.
  - Groundwater: Explosives, VOCs, and anions.
- Sanitary Landfill
  - Subsurface Soil: Explosives, VOCs, BNA(s) (SOCs), metals, and anions.
  - Groundwater: Explosives, VOCs, SOCs, metals, and anions.
- Drum Storage Areas
  - Surface Soil: Explosives, VOCs, SOCs, metals, and anions.
  - Subsurface Soil: Explosives, VOCs, SOCs, metals, and anions.
  - Groundwater: Explosives, VOCs, SOCs, metals, and anions.
- Old Burn Area
  - Subsurface Soils: Explosives, metals, and anions.
- Chemical Range
  - Surface Soils: Explosives, metals, and anions.

Table 4-1 provides a list of the typical explosives and propellants demilitarized at TEAD.

Table 4-1

Typical Explosives and Propellants Demilitarized
at Tooele Army Depot

Propellant/ Explosive	Chemical Formula	Composition	Uses
RDX	$C_3H_6N_6O_6$	C-16.3% H-2.7% N-37.8% O-43.2%	Detonating Cord Primers Component of Mixed Explosives Detonators Booster for Antitank Mines Burster in Small Caliber Ammo
TNT	$C_7H_5N_3O_6$	C-37.0% H-2.2% N-18.5% O-42.3%	Component of Other Explosives Demolition Blocks Bursters Mines Primers
Tritonal	See TNT	Aluminum 20%, TNT 80% Aluminum 30%, TNT 70% Aluminum 40%, TNT 60%	Mines Torpedo Warheads Depth Charges Bombs
PETN	$C_5H_8N_4O_{12}$	C-19.0% N-2.5% N-17.7% O-60.8%	See RDX
Pentolite Series			
50/50	See TNT & PETN	TNT 50%, PETN 50%	Shaped Charges Bursting Charges in Bombs Projectiles
10/90	See TNT & PETN	PETN 10%, TNT 90%	
Nitrostarch	Nitrated Starch	Nitrostarch 49%, Barium Nitrate 40%	Projectiles Bombs
		Mononitronaphthalene 7%, Para-Nitroaniline 3%, Oil 1%	Depth Charges Small Caliber Ammo Spotting Charges

Table 4-1

Typical Explosives and Propellants Demilitarized
at Tooele Army Depot
(continued)

Propellant/ Explosive	Chemical Formula	Composition	Uses
Minol-2	NH_4NO_3 TNT Aluminum	Ammonium Nitrate 40%, TNT 40%, Aluminum 20%	See Nitrostarch
HBX-1	See RDX, TNT, & Aluminum	RDX 40%, TNT 38%, Aluminum 17%, Desensitizer Comp D2 5%	See Nitrostarch Depth Charges Torpedos Rockets Mines Bombs
HBX-3	See HBX-1	RDX 31%, TNT 29%, Aluminum 35%, Comp D2 5%	See HBX-1
Explosive D	$C_6H_6N_4O_7$	C-29.3% H-2.4% N-22.7% O-45.6%	Bombs Projectiles Grenades Depth Charges
Dynamites			
Medium Velocity	See RDX & TNT	RDX 73%, TNT 15%, Starch 5%, Oil 4%, Polyisobutylene 1%	Excavation, Demolition, and Cratering
Low Velocity	See RDX & TNT	RDX 17.5% TNT 67.8%, Tripentaerythritol 8.6%, Binder 4.1%, Cellulose Acetate 2%	Same as Above

Table 4-1

Typical Explosives and Propellants Demilitarized
at Tooele Army Depot
(continued)

Propellant/ Explosive	Chemical Formula	Composition	Uses
Dynamites (cont.)			
Cyclotol	See RDX & TNT	RDX 60%, TNT 40% RDX 65%, TNT 35% RDX 70%, TNT 30% RDX 75%, TNT 25%	See Explosive D
Comp. B Series			
Comp. B	See RDX & TNT	RDX 60%, TNT 39%, WAX 1%	Projectiles Mines Rockets Grenades Bombs
Comp. B2	See Above	RDX 60%, TNT 40%	Same as Above
Comp. B3	See Above	RDX 59.5%, TNT 40.5%	Same as Above
Comp. B4	See Above	RDX 60%, TNT 39.5%, Calcium Silicate 0.5%	Same as Above
Comp. C Series			
Comp. C	See RDX	RDX 88.3%, Plastisizer (nonexplosive) 11.7%	Demolition Explosive
Comp. C2	See RDX	RDX 78.7%, Plastisizer 21.3%	Demolition Explosive
Comp. C3	See RDX	RDX 77%, Plastisizer 23%	
Comp. C4	See RDX	RDX 91% Polyisobutylene 2.1%, Oil 1.6%, Di (2-ethylhexyl) Sebacate 5.3%	Demolition Explosive

Table 4-1

Typical Explosives and Propellants Demilitarized
at Tooele Army Depot
(continued)

Propellant/ Explosive	Chemical Formula	Composition	Uses
Black Powder			
Classes 1-7 & 9		Potassium Nitrate 74.0% ± 1.0%, Sulfur 10.4% ± 1.0%, Charcoal 15.6% ± 1.0%	Ignitors Primers Propellants
Class 8		Potassium Nitrate 74.0% ± 1.0-2.0%, Sulfur 10.4% ± 1.5-1.0%, Charcoal 15.6% ± 1.5-1.0%	Detonators Hand Grenades Signal Rockets Depth Charges Torpedos
Amatol Series			
50/50	See TNT	NH_4NO_3 50%, TNT 50%	Bombs Projectiles Cratering Charges Bangalore Torpedos
60/40	See TNT	NH_4NO_3 60%, TNT 40%	
80/20	See TNT	NH_4NO_3 80%, TNT 20%	

Source: NUS (1987).

4.1.2 Analytical Reporting Limits

WESTON's Analytics Division maintains USATHAMA certification for analytical methods for explosives, metals, and certain volatile and BNA(s). For these certified analytes, the analytical reporting limits are the USATHAMA certified reporting limits (CRLs). For the compounds/analytes that WESTON's Analytics Division is not currently USATHAMA certified (most volatile and semivolatile organics), the data reporting limits are those specified by USATHAMA as standard reporting limits (SRLs). In the summary data tables within this chapter, if the compounds/analytes are detected at or below established CRLs or SRLs, the space is left blank or denoted as less than (LT) the reporting limit. If the compounds are detected above established CRLs or SRLs, the detected value is reported in the data tables. Table 2-7 presented the CRLs and SRLs for each certified and noncertified analyte.

Volatile and BNA(s) that were detected, but do not appear on the priority pollutant list, were labeled as unknowns. The identities or concentrations of these compounds cannot be conclusively determined and reporting limits have not been established. Analytical standards are not run for these compounds, so there is less certainty in the sample concentrations than for compounds on the priority pollutant list. Unknown compounds are subjected to library searches in an attempt to identify the compounds. Tentative matches between the mass spectrum of the unknown compound and the mass spectra from the library search are reviewed for congruency. This tentative identification can range from identification of a particular compound type to a varied class of compounds. Compounds for which a match cannot be found are, in fact, unknowns and are reported as such. The three best fits from the mass spectral library are determined for these unknowns and are submitted to USATHAMA.

There are no CRLs or SRLs for unknown volatile and BNA(s). Unknowns, as well as those with tentative identifications, that exceeded 10 ug/L in water or 1 ug/g in soil are presented in data tables in this report below the priority pollutants. The concentrations of similarly identified compounds within one sample (e.g., hydrocarbons, pyrene derivatives) are totaled. A complete list of these compounds is provided in Appendix J.

4.1.3 Background Concentration Evaluation

To assess the indigenous concentrations of naturally occurring chemicals, upgradient background locations were sampled for groundwater. As depicted in Table 4-2, background groundwater concentrations were estimated by sampling N-TEAD well No. 1, which is the supply well for N-TEAD, and N-110-88, which is located near the southern perimeter of N-TEAD upgradient of the

Table 4-2

Analyses of Background Groundwater Samples at N-TEAD

Sampling Date	N-TEAD Well No. 1 9/16/87	11/8/88	11/22/88	11/20/88	N-110-88 11/22/88	Est Bkgd Range[a]	Geo-metric Mean[b]	Water Reporting Limit
Parameters	Concentrations in ug/L or as noted							
Metals				NA	NA			
Silver, total	LT 10					LT	LT	0.19
Silver, dissolved	NA					LT	LT	0.19
Arsenic, total	LT 10					LT	LT	5.0
Arsenic, dissolved	NA					LT	LT	5.0
Beryllium, total	LT 5					LT	LT	0.103
Beryllium, dissolved	NA					LT	LT	0.103
Cadmium, total	LT 5					LT	LT	5.1
Cadmium, dissolved	NA					LT	LT	5.1
Chromium, total	LT 10					LT	LT	37.5
Chromium, dissolved	NA					LT	LT	37.5
Copper, total	LT 25	2.89	LT			LT-2.89	1.9	1.8
Copper, dissolved	NA	6.43	2.68			LT-6.43	1.9	1.8
Mercury, total	LT 0.2					LT	LT	0.17
Mercury, dissolved	NA					LT	LT	0.17
Sodium, total	96,800	NA	NA	NA	NA	0-194,000	NC	500
Sodium, dissolved	NA	NA	NA	NA	NA	NC	NC	NA
Nickel, total	LT 40					LT	LT	9.6
Nickel, dissolved	NA		12.3			LT-12.3	6.1	9.6
Lead, total	LT 5	3.44				LT-3.44	(1.8)	2.5
Lead, dissolved	NA	2.73				LT-2.73	(1.5)	2.5
Antimony, total	LT 60					LT	LT	3.0
Antimony, dissolved	NA					LT	LT	3.0
Selenium, total	6.2					LT-6.2	(3.0)	5.0
Selenium, dissolved	NA					LT	LT	5.0
Thallium, total	LT 10					LT	LT	5.0
Thallium, dissolved	NA					LT	LT	5.0
Zinc, total	LT 20	28.3	40.5			LT-40.5	(15.3)	17.2
Zinc, dissolved	NA	65.0	41.3			LT-65.0	(21.1)	17.2
Anions, mg/L								
Nitrate/Nitrite	NA	LT	5	LT	LT	LT-5	(3.0)	5
Sulfate	NA	186	268	187	224	186-268	214	125

Table 4-2

Analyses of Background Groundwater Samples at N-TEAD
(continued)

Sampling Date	N-TEAD Well No. 1 9/16/87	11/8/88	11/22/88	11/20/88	N-110-88 11/22/88	Est Bkgd Range[a]	Geo-metric Mean[b]	Water Reporting Limit
Parameters	Concentrations in ug/L or as noted							
Volatile Organics	ND	ND		NA	NA			
Benzene			1.62					
Hydrocarbons			1,670					
Ketone			14					
Cycloalkane			13					
Semivolatile Organics	ND		ND	NA	NA			
Bis(2-ethylhexyl) phthalate		57						
Explosives	ND	ND	ND	ND	ND			

[a]Computed for naturally occurring inorganic parameters.
[b]Computed for inorganic parameters that were analyzed in three or more samples.
( ) = Geometric mean is below the reporting limit.
NC = Not computed due to insufficient number of samples.
ND = Parameters within this class of compounds were not detected.
NA = Not analyzed.

Notes: Samples analyzed for all parameters shown unless indicated by NA. A blank or LT indicates that the parameter concentration was less than the reporting limit.

TNT Washout Facility. N-TEAD well No. 1 was sampled on four dates as shown in Table 4-2. Reporting limits are also presented for metals and anions. The first sample collected from N-TEAD well No. 1 was analyzed in September 1987 under an earlier protocol, so reporting limits varied from those in the rest of the program.

If a parameter was analyzed in three or more background samples, a geometric mean background concentration was also computed. For the purposes of calculating the geometric mean, measurements below the reporting limit were taken to be one-half the reporting limit. If only two background samples were analyzed for a particular parameter, the background range was taken to be the range of the two concentrations. Results from samples collected for metals and anions were compared to established background concentrations using Cochran's approximation to the Behren's-Fisher Student's T-Test (40 CFR Part 264, Appendix IV). If the geometric mean concentration statistically (95 percent confidence) exceeded the geometric mean background concentration, it was considered likely that the constituent was present at least in part due to site activities. If the parameter was not detected in background sample(s), detection of the parameter in a sample was considered to be above the background level.

To assess whether inorganic compounds found in soil samples from the study area were indicative of site activities their concentrations were compared to those from analytical results compiled by the United States Geologic Survey (USGS). The USGS maintains a regional database of analytical soil data, including data from Tooele County (see Table 4-3). Inorganic data from two locations north of N-TEAD near Interstate 80 were available for use as regional indicators. The samples indicated low levels of arsenic, chromium, copper, mercury, sodium, nickel, lead, selenium, and fluoride at both locations. The geometric mean concentrations of these parameters were compared to the geometric mean concentrations of soil samples from a given study area.

Comparison to background levels is not meant to assess the environmental risk associated with the contaminants, which is addressed in the endangerment assessment (Section 5). The objectives of the contamination assessments contained in this section are to evaluate the degree, extent, transport pathways, and probable sources of the contaminants.

4.1.3.1 Offsite Wells

On file at the Utah Bureau of Drinking Water/Sanitation are the analytical results for four offsite groundwater supplies (wells and springs) located within 10 miles of N-TEAD. Results from the past 5 years are presented in Table 4-4. The sample

Table 4-3

Inorganic Analyses of Soils in Tooele County

Parameter	Concentrations in Tooele County[a] (ug/g) I-80 at Grantville	I-80 45 Miles East of Wendover
Silver	NA	NA
Arsenic	48	9.3
Beryllium	ND	ND
Cadmium[b]	NA	NA
Chromium	30	30
Copper	100	30
Mercury	0.09	0.03
Sodium	10,000	15,000
Nickel	15	7
Lead	70	15
Antimony	NA	NA
Selenium	0.3	LT 0.1
Thallium	ND	ND
Zinc	80	40
Bromide	ND	ND
Chloride	NA	NA
Fluoride	440	440
Nitrate/Nitrite	NA	NA
Sulfate	NA	NA

[a]From Boerngen, J.G. and Shacklette, H.T., 1981.
[b]Cadmium ranged from <1 to 1 ppm in another USGS study: Conner and Shacklette, 1975.

LT = Less than.

Notes: Samples analyzed for all parameters listed unless indi- by NA (not analyzed). ND indicates that the parameter was not detected. Except for selenium, detection limits were not available.

Table 4-4

Analyses of Municipal Water Supplies in the Vicinity of N-TEAD

Parameters	Well No. 10[a]		Left Hand Fork[b]		Stockton, Ben Harrison Spring[c]	Martin Springs[d]
Miles From N-TEAD[e]	3 (east)		4.5 (east)		6.5 (southeast)	10 (southeast)
Ground Elevation	5,500 ft		6,100 ft		6,700 ft	7,000 ft
Date of Sampling	August 1988	April 1985	July 1988	March 1985	July 1985	April 1985
Metals, ug/L						
Silver						
Arsenic						
Cadmium						
Chromium						
Copper			20			
Iron		180	260			
Lead			9.0			
Manganese						
Mercury						
Nickel					NA	
Selenium					16	2
Zinc		9,999	2,020	3	22	
Sodium, mg/L	25	7	15	18	36	30
Anions mg/L						
Chloride	48	85	35	22	57	108
Fluoride	0.17	0.17	0.21	0.15	0.15	0.17
Nitrate	0.47	0.68	0.67	0.80	0.46	1.6
Nitrite						
Sulfate	24	50	25	62	82	48
TDS, mg/L	345	398	325	NA	NA	576
Gross Alpha, pCi/L	4		3	NA		NA

[a]Located approximately 1 mile south of Town of Tooele in Settlement Canyon. Latitude 40° 30' 48", longitude 112° 17' 46". Sample was also collected in June 1988 and analyzed for Utah "Regulated" and "Unregulated" organic compounds, but none were detected.

[b]Located approximately 2 miles south of Town of Tooele near Settlement Canyon. Latitude 40° 29' 42", longitude 112° 15' 51".

[c]Located approximately 4.5 miles west of Stockton in Soldier Canyon near Soldier Creek. Latitude 40° 26' 10", longitude 112° 16' 58".

[d]Located approximately 2 miles northeast of Town of Ophir near the headwaters of Ophir Creek. Latitude 40° 23' 05", longitude 112° 13' 58".

[e]Distance from N-TEAD well No. 1, located in the southeastern region of N-TEAD.

Notes: Samples analyzed for all parameters listed unless indicated by NA. Blanks indicate that parameter value was less than reporting limit.

locations, which are in the Oquirrh Mountains east of Tooele Valley and in Rush Valley, are upgradient of N-TEAD. Water from the two locations closest to N-TEAD were sampled twice during this period.

Few metals were detected and anions were reported within a relatively small range. Zinc concentrations were quite elevated in one sampling of well No. 10 (9,999 ug/L) and the spring at Left Hand Fork (2,020 ug/L). Since the zinc concentrations were at 3 ug/L or less during the other sampling episodes at the respective locations, the zinc measurements may be suspect. Copper (20 mg/L) and lead (9 ug/L) were also detected during 1988 in the spring at Left Hand Fork.

4.1.4 Applicable or Relevant and Appropriate Requirements (ARARs)

Chemical-specific Federal, state, and local ARARs are presented in the endangerment assessment (Section 5). Action and location-specific ARARs are limited with regard to N-TEAD due to its relatively isolated location and arid climate. Action and location-specific ARARs are discussed briefly below.

The Fish and Wildlife Conservation Act limits any action that may be harmful to wildlife. The potential effects on local wildlife are assessed in Section 5. There are 603 verified species of vertebrate wildlife in Utah. Of these, 507 are protected by the Division of Wildlife Resources of the Utah State Department of Natural Resources, including birds, fish, amphibians, reptiles, and 29 mammals.

Two threatened and endangered species are known to be in the vicinity of N-TEAD: the bald eagle and the peregrine falcon. Bald eagle habitat in the area is considered critical, encompassing an extensive area in Utah, including TEAD. Bald eagles are protected by United States Code 16, Section 668-668d. Peregrine falcons have been sighted in the area. Peregrine falcons are protected by the Endangered Species Act. A more detailed discussion of wildlife in the vicinity is contained in Section 5.

Detectable analytical results for groundwater, surface water, sediments, and surface soils are compared to chemical-specific ARARs in the endangerment assessment. Analytical results for metals and specific anions were compared to estimated background ranges as described in the previous section.

4.2 CONTAMINATION ASSESSMENT: TNT WASHOUT FACILITY

4.2.1 Site Description

The TNT Washout Facility was constructed in 1948 for the purpose of decommissioning munitions, and was used extensively from 1948 to 1958 and again from 1960 to 1965. The facility includes four

covered former TNT washout evaporation/percolation (E/P) ponds, one new occasionally active TNT washout E/P pond, a septic tank, an unlined pit for the disposal of laundry fluids, an unlined pit constructed with a berm, a suspected leach field, and associated underground piping.

The washout operation consisted of cutting the munition casing and removing and recycling the explosive material. After cutting, the casings were rinsed with water/steam to remove explosive residues. The rinse water was then passed through a series of pelletizing separators, where a large portion of the residue explosive was removed. The rinse water effluent was routed outside and north of the facility through a metal gutter to a small, baffled cement settling tank. Overflow from the cement settling tank then flowed into the first of a series of unlined E/P ponds connected by overflow pipes that encompassed a total area of approximately 1 acre.

Effluent rinse water reportedly flowed continuously into the E/P ponds during washout operations. Since its period of inactivity, the ponds have been covered in the following manner: the containment berms were pushed in towards the center of the ponds, a plastic cover was placed over the ponds, and clean soil was filled in over the synthetic liner.

The laundry effluent ponds consist of two shallow unlined ponds. The active pond, which is north of the inactive pond, receives laundry and shower effluent from Building No. 67 at a reported rate of 7,200 gallons a day (Ertec, 1982). The inactive pond was originally built for the same purpose, but was reportedly unused due to an inadequate gradient. Both ponds have reportedly overflowed onto the surrounding terrain to the north. No evidence of overflow was observed during the RI. The inactive pond contained only a 10 to 15-foot diameter saturated area in the middle of the pond. The active pond contained effluent since it continuously received discharge. A shallow sand pit along the northwest side of the active laundry effluent pond is no more than 10 feet deep at its deepest extent and slopes to the south. The bottom of the sand pit lies approximately 5 feet below the standing water level in the adjacent pond. Although within approximately 8 feet of the edge of the pond, no seepage was observed in the sand pit. The direction of groundwater flow in the near surface sandy soils in the vadose zone is apparently vertical.

The septic tank located directly south of the laundry effluent pond was not addressed as part of earlier studies by Ertec (1982), EA Engineering, Science, and Technology (1988), or USATHAMA (1979). The septic tank receives waste from at least three buildings: the TNT washout building, the laundry building, and a building to the southwest of the site. All three buildings feed into one sewer line that goes directly into the septic tank. The septic tank area is located north of the building near three manholes within a fenced area and one manhole outside the fence.

The localized perched zone, encountered during borehole drilling soil sampling, varied in depth from approximately 17 to 49 feet below ground surface. The variance in the depth to the perched zone, given the relatively small size of the TNT Washout Facility (approximately 10 acres), indicates the possibility of numerous vertically spaced localized perched zones. Another explanation might be that the leading edge of the zone of saturation was encountered as it moves horizontally and vertically away from the source.

It is suspected that the septic tank may leak and/or have a leach field under the inactive laundry effluent pond. The GPR survey identified two pipes in the suspected leach field area that may be an additional source contributing to the mounding of the perched water table in the area (see Subsection 3.4.1). As part of the TNT Washout Facility, this area was investigated to determine its contribution to the locally perched groundwater and contamination in the area.

Surface and near surface infiltration of water from the laundry effluent ponds, septic tank, and leach field may sustain the perched groundwater system present beneath the TNT Washout Facility since the new TNT washout E/P pond is used infrequently. The sources may therefore enhance migration of the explosive contamination. Since the laundry effluent may contain explosives washed from clothing, the laundry effluent pond may be a past and/or present source of contamination. However, explosives were not detected in a laundry effluent sample collected by Ertec (1982) or EA (1988).

4.2.1.1 Water Balance

Wastewater seepage from the various sources within the TNT Washout Facility are diluted by infiltrating precipitation as it reaches the shallow perching zones. In an attempt to quantify this dilution, a preliminary water balance incorporating wastewater seepage, precipitation, and infiltration since 1948 was performed. The water balance analysis given in this section is only an approximation due to uncertainty with input data. Furthermore, the approach was somewhat simplified to yield preliminary estimates. Although six potential sources of contamination are listed, accurate flow conditions and the period of operation were available only for the old TNT washout E/P ponds. No records of flow to the new TNT washout E/P pond were available. Flow conditions for the laundry effluent pond were available, but the period of operation was not clear. It was assumed that the active laundry effluent pond was in operation constantly since 1948.

Based on discussions with N-TEAD personnel, it was estimated that 20 people typically occupied the buildings connected to the septic tank/suspected leach field. The average flow rate was assumed to be 15 gallons/person/day for a 5-day week. The

estimated volume of wastewater flowing to the septic tank/leach field was comparatively small (approximately 10,000 ft^3/year).

An area surrounding all the potential sources and contaminated soil samples (approximately 21 acres) was considered for estimating precipitation and evaporation. This area encompasses locations where contaminants were detected. Precipitation in this area would be a source of dilution water for the seeping effluent in the subsurface. Tooele has an annual precipitation of 16.5 inches and an annual evaporation of 42 inches. Potential groundwater recharge totals 1.57 inches per year, primarily during November through February (JMM, 1988).

Data on the area, active period, operating condition (40 hours per week or continuous), and annual flow rate are provided in Table 4-5 for each potential source. Operational periods at the TNT Washout Facility can be defined by the volume of effluent discharged to the old TNT washout ponds. For four of the years between 1960 and 1965, flow to these ponds was high. During the 11 years from 1948 to 1958, the flow was moderate. During 27 of the years between 1959 and 1989, the TNT washout ponds reportedly received no flow, so all of the effluent was from the laundry effluent ponds and the septic tank/leach field.

Infiltration estimates are presented in Table 4-6. Since the amount of annual evaporation for a given surface area is constant, during high effluent, flow seepage of effluent exceeded evaporation, while during low effluent, flow evaporation exceeded seepage.

If wastewater from all the potential source areas is considered contaminated, it is estimated that the effluent seepage has been diluted by more than 1 to 2 by precipitation during the 42-year period. Dilution of explosives would be expected to be greater because the laundry effluent, which provided the majority of the wastewater seepage, contains little or no nitroaromatics (EA, 1988). Seepage from the old TNT washout E/P ponds, which accounted for approximately 57 percent of the effluent seepage, would therefore have accounted for about 36 percent of the total effluent seepage plus infiltration at the TNT Washout Facility. The explosives would therefore have been diluted by almost 2 to 1. It should be noted, however, that while precipitation infiltration dilutes the effluent infiltration, evaporation would tend to concentrate contaminants in the wastewater that seeps.

4.2.1.2 Conceptual Model

The conceptual model for the TNT Washout Facility can be summarized as follows:

- Sources - The six potential sources of contamination at this facility are the new E/P pond, the four inactive E/P ponds (now covered with a PVC liner), the active

Table 4-5

Areas and Flow Rates Used in a Water Balance for the TNT Washout Facility

Infiltration - December to February = 1.57 inches
Net Evaporation - March to November = 27.07 inches

Total Area Influenced = 927,400 ft^2 = 21.3 acres

	Area (ft^2)	Active Period	Operating Condition	Flow Rate cu.ft/year
Old TNT Washout E/P Ponds	29,040 (0.67 acres)	1948-1958 1960-1965*	Typical Continuous	335,000 1,403,700
New TNT Washout E/P Pond	15,625 (0.36 acres)	1984-	Unknown	Unknown
Laundry Effluent Pond	15,000 (0.34 acres)	1948-Present	Typical	250,000
Septic Tank/ Leach Field	47,100 (1.08 acres)	1948-Present	Typical	10,000
Total Area Influenced	927,400 (21.3 acres)	---	---	---

Typical = 40 hours a week.
Continuous = 24 hours a day, 7 days a week.

*Active for 4 years during this period.

Table 4-6

Water Balance for the TNT Washout Facility

Effluent Flow (ft^3/yr)	Period of Operation (yrs)	Percent of Effluent Seeping	Volume of Effluent Seeping (ft^3)	Volume of Precipitation Infiltrating (ft^3)
1,664,000	4	82	5.47×10^6	0.850×10^6
602,400	11	56	3.72×10^6	1.98×10^6
260,000	27	40	2.60×10^6	3.91×10^6

$$\frac{\text{Infiltration from Effluent}}{\text{Total Infiltration}} = \frac{1.18 \times 10^7}{1.18 \times 10^7 + 6.74 \times 10^6} = 0.64$$

64 percent of infiltrated water is from effluent.

laundry effluent pond, the inactive laundry effluent pond, the septic tank/leach field, and the underground piping that conveys flow to the laundry effluent pond and septic tank. Rinse water from casings containing trace levels of explosives was disposed of in the E/P ponds. Shower and laundry effluent wastewaters (possibly containing trace levels of explosives) were/are disposed of in the laundry effluent ponds and septic tank/leach field.

- Pathways - Rinse waters and wastewaters infiltrate through the vadose zone in the lacustrine and alluvial valley deposits to the deep (regional) groundwater (approximately 300 feet deep). The leaching is recharged and diluted by rainfall infiltration (minimal in this arid climate). Localized low-permeability perching lenses create pockets of saturated contaminated areas in the vadose zone that can continue to leach to the regional aquifer. Volatilization of contaminants is possible from the active TNT washout pond, the active laundry effluent pond, and the septic tank manhole.

- Receptors - Potential receptors include groundwater users, if any. Contaminants from the TNT Washout Facility may be present at detectable levels in downgradient groundwater use areas. Since most of the area is no longer active, the primary receptors of contamination by direct contact with contaminated soil or by inhalation of volatile chemicals would be occasional passers-by. Cattle were observed drinking from the active laundry pond during the RI.

The objectives of the RI at the TNT Washout Facility were to determine the effect of the area on groundwater quality based on any correlation between analytical results of soil and groundwater samples, to determine whether the contaminant levels pose a public health and/or environmental risk to potential receptors, and to conduct a preliminary screening of remedial technologies (Subsection 6.1.1).

4.2.2 Field Investigations and Results

Field investigations of the subsurface soils and the shallow, locally perched groundwater zone and the regional aquifer were conducted at the TNT Washout Facility. The objectives of these investigations were as follows:

- Subsurface Soil - To determine the depth to which contaminated wastewater and/or rinse water have potentially infiltrated, and to compare these data with shallow and deep groundwater data.

- Groundwater - To determine whether the TNT Washout Facility has impacted regional groundwater quality under the source areas and, if so, whether the contamination has spread downgradient in this aquifer. Included in this work is analysis and interpretation of contamination present in shallow, locally perched groundwater.

The chemical analysis performed on both the soil and groundwater samples included VOCs, explosives, metals, and anions.

The field investigations conducted on the subsurface soils also included geophysical surveys. Both electromagnetic conductivity (EM) and ground penetrating radar (GPR) surveys were performed at the TNT Washout Facility. Results of the surveys identified four of the pipelines south of the inactive laundry effluent pond that were used for transport of rinse water and wastewater effluent. The EM survey conducted at the TNT Washout Facility detected elevated apparent conductivity values associated with the former TNT washout E/P ponds, with the highest values east of pond 3. No significant lateral migration from the former TNT washout ponds or the active laundry effluent in the vadose zone was indicated. The surveys are described in detail in Subsection 3.4.1.

4.2.2.1 Subsurface Soil Analyses

Sixteen soil borings were installed for the TNT Washout Facility investigation. Chemical samples were collected from 12 of those borings (see Figure 4-1):

- Two samples were collected from each of the shallow borings numbered N-101-88 through N-108-88.
- Eight samples were collected from shallow boring N-109-88.
- One sample was collected from each of the deep borings N-128-88 and N-129-88.
- Two samples were collected from deep boring N-130-88.

Samples were collected as described in Sections 2 and 3 of this report. Soil samples were collected at the first encountered saturated zone, except at N-109-88, where a vertical profile was established. The analytical results are provided in Table 4-7.

4.2.2.1.1 Volatile Organics

No VOCs were detected in any of the borings for which the analysis was performed, except in N-129-88 and N-130-88. The detected compounds could not be identified by the laboratory GC scan, with the exception of 1,1,1-trichloroethane, which was

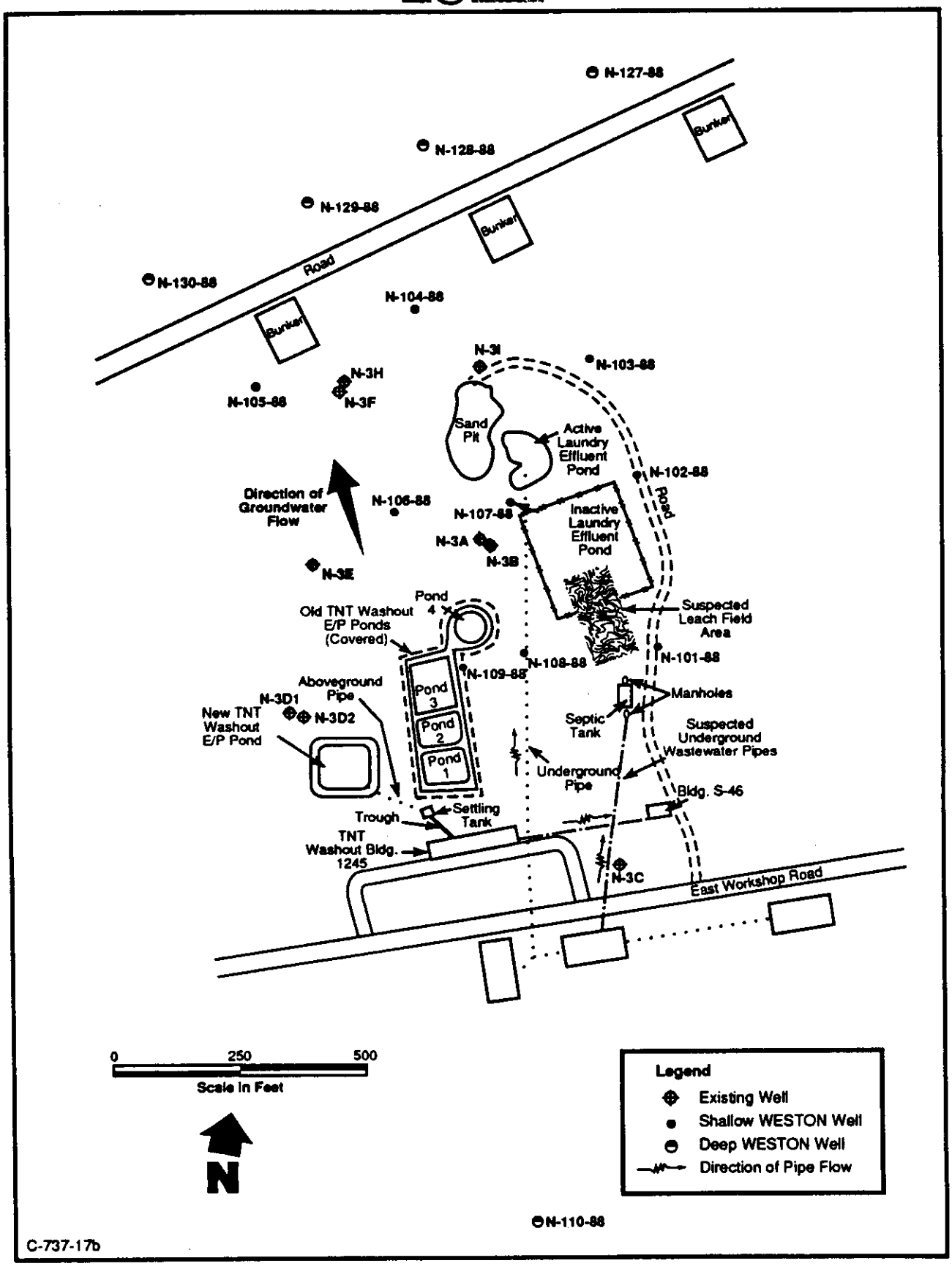


FIGURE 4-1 TNT WASHOUT FACILITY, BOREHOLE AND MONITOR WELL LOCATIONS

Table 4-7

Analyses of Borehole Samples From the TNT Washout Facility

Parameters	N-101-88-6	N-101-88-8	N-102-88-6	N-102-88-8	N-103-88-5	N-103-88-6	N-104-88-5	N-104-88-7
	Sample Locations							
	Concentrations in ug/g or as noted							
Depth (ft)	29.5	39.5	29.5	39.5	24.5	29.5	24.5	34.5
Volatile Organics	NA	NA	NA	NA	NA	NA	ND	NA
Explosives		ND	ND	ND	ND	ND	ND	
HMX								
RDX								1.6
1,3,5-TNB	3.7							
Anions								ND
Bromide								
Chloride	13,300	14,900	12,000	15,400	13,000	17,600	12,500	
Fluoride								
Nitrate/Nitrite								
Sulfate		20,900		26,000				
Metals								
Sodium	243	226	207	405	796	819	669	359

Table 4-7

Analyses of Borehole Samples From the TNT Washout Facility
(continued)

Parameter	N-105-88-2	N-105-88-4	N-106-88-6	N-106-88-9	N-107-88-6	N-107-88-8	N-108-88-7	N-108-88-8
	Sample Locations							
	Concentrations in ug/g or as noted							
Depth (ft)	9.5	19.5	29	44	29.5	39.5	27	34
Volatile Organics	ND	ND	ND	ND	ND	ND	ND	ND
Explosives	ND	ND	ND	ND	ND	ND	ND	
HMX								1.7
RDX								4.1
1,3,5-Trinitro-benzene								8.2
Anions								
Nitrate/Nitrite							617	
Metals								
Sodium								

Table 4-7

Analyses of Borehole Samples from the TNT Washout Facility
(continued)

Parameter	N-109-88-1	N-109-88-2	N-109-88-3	N-109-88-4	N-109-88-5	N-109-88-6	N-109-88-7	N-109-88-7D	N-128-88-26	N-129-88-24	N-130-88-22	N-130-88-24
	Sample Locations											
	Concentrations in ug/g or as noted											
Depth (ft)	4.5	9.5	14.5	19.5	24.5	29.5	34.5	34.5	257	240	215	243
Volatile Organics	ND	ND	ND	ND	ND	ND	ND	ND	ND			
1,1,1-Trichloroethane												0.635
C6/C9 Oxygenated Compound											3.2	
C7 Aromatic Compound										1.55		
Cycloalkane Hydrocarbons											1	1
											13.5	14
Explosives							ND			ND	ND	ND
2,4-Dinitrotoluene			0.8			0.49		0.56				
HMX	1.6	1.3	2.9			1.4		2.6				
RDX	2.7	2.5	5.7	4.3	6.5	8.3		4.3				
1,3,5-Trinitrobenzene		3.5	18	8.3	12	20		3.9				
Anions												
Nitrate/Nitrite									1,100			

ND = Parameters within this class of compounds were not detected.

Notes: Samples analyzed for all parameters listed unless indicated by NA (not analyzed). A blank indicates that the parameter concentration was less than the reporting limit.

End number on sample ID indicates sequence of sampling in each borehole, increasing with depth.

indicated at a concentration of 0.635 ug/g at a depth of 243 feet (top of sample) in boring N-130-88. The other VOCs were found at a maximum level of 14 ug/g, primarily in soil boring N-130-88, as shown in Table 4-7.

4.2.2.1.2 Explosives

Concentrations of explosives above detection limits were found in soil borings N-101-88, N-104-88, N-108-88, and N-109-88. A majority of the explosives were found in soil boring N-109-88, which is immediately adjacent to pond 3. This borehole was sampled every 5 feet for 35 feet to establish a vertical profile of contamination. In general, little or no attenuation with depth was observed. The highest concentrations were noted at depths between approximately 15 and 30 feet below ground surface, including maximum values for 2,4-DNT (0.8 ug/g); HMX (2.9 ug/g); RDX (8.3 ug/g); and 1,3,5-TNB (20 ug/g). Soil boring N-108-88, located just downgradient of N-109-88, also indicated concentrations of explosives above detection limits at a depth of 34 feet: HMX (1.7 ug/g); RDX (4.1 ug/g); and 1,3,5-TNB (8.2 ug/g). Soil boring N-101-88, located further downgradient of borings N-109-88 and N-108-88, indicated 3.7 ug/g of 1,3,5-TNB at a depth of 29.5 feet. The final boring that indicated explosives above the detection limit was N-104-88, which indicated 1.6 ug/g of RDX at a depth of 40 feet.

4.2.2.1.3 Inorganics

Anions and metals were analyzed in samples collected from several of the soil borings, with results shown in Table 4-5. The levels of chlorides and sulfates in N-101-88, N-102-88, N-103-88, and N-104-88 ranged from 12,000 to 17,600 ug/g, and below the reporting limit to 26,000 ug/g, respectively. The levels of sodium ranged from 207 to 819 ug/g. Nitrates/nitrites were analyzed in all of the samples, but were indicated above detection limits in only two of the samples. At a depth of 257 feet in soil boring N-128-88, 1,100 ug/g nitrate/nitrite was found, and at a depth of 27 feet in soil boring N-108-88, 617 ug/g nitrate/nitrite was detected.

4.2.2.1.4 Comparison to Previous Investigations

Similar explosives and nitrate/nitrite were detected in soil samples in the TNT Washout Facility in previous studies (see Section 1). AEHA (1981) found RDX and TNT in a soil boring near ponds 2 and 3. Ertec found RDX, 2,4-DNT, 2,6-DNT, 2,4,6-TNT, and nitrate/nitrite in N-3A at various depths. RDX was found in seven of the nine samples from the borehole, with the highest concentration at 0.5 to 1.5 feet (1,024 ug/g). Nitrate was found only in the sample from 0.5 to 1.5 feet (3,300 ug/g). EA (1988) found 2,4,6-TNT and nitrate/nitrite in sediments from all four closed ponds, 1,3,5-TNB in three of the ponds, HMX in two of the ponds, and 2,4-DNT in one pond.

4.2.2.2 Groundwater Sampling Results

A total of nine monitor wells were sampled in the TNT Washout Facility:

- Two existing shallow wells, N-3F and N-3I.
- Five new deep wells, N-110-88 and N-127-88 through N-130-88.
- Two existing deep wells, N-3A and N-3H.

The remaining new monitor wells were not sampled due to the lack of water in the wells, which was discussed in Section 3. Groundwater samples were analyzed for VOCs, explosives, nitrate/nitrite, and sulfate.

4.2.2.2.1 Volatile Organics

As shown in Table 4-8, the highest concentration of VOCs (total) was detected in N-128, which is located downgradient of the ponds. The majority of VOCs detected were unknown compounds, although acetone and methylene chloride were also detected at concentrations less than 20 ug/L. Acetone and methylene chloride are common laboratory contaminants, although these compounds were not detected in the associated laboratory blanks. Acetone was also found above the detection limit in N-127, N-129, and N-130.

4.2.2.2.2 Explosives

Groundwater contamination of 2,4,6-TNT was noted, ranging from 1.0 to 1.86 ug/L in the newly installed downgradient wells. RDX and HMX were detected only in the previously installed wells. Well N-3F, a shallow, existing well, exhibited the highest concentration of RDX, at 270 ug/L. RDX was also detected in this well in 1987 at >160 ug/L (EA, 1988). Well N-3I, another shallow, existing well in close proximity to N-3F, indicated RDX at 57 mg/L and HMX at 23 ug/L (the sole occurrence of HMX in this area). RDX and HMX were also found at this well in 1987 at similar concentrations (76.1 and 12.2 ug/L, respectively). The deeper, existing wells, N-3H and N-3A, exhibited maximum values of RDX at 17 and 34 ug/L, respectively. RDX was not found in these wells in 1987, but RDX was detected in N-3A in 1981 at 13 ug/L (Ertec, 1982).

It is interesting to note that RDX was found in each of the groundwater samples near the potential sources, but not in the new wells further downgradient across the road, and that 2,4,6-TNT was detected in each of the wells across the road but not near the potential sources (Figure 4-2). This segregation of

Table 4-8

Analyses of Groundwater Samples From the TNT Washout Facility

Parameter	Deep Wells									Shallow Wells	
	N-110[a]	N-127	N-128	N-129	N-130	N-3A[b]	N-3A	N-3H[b]	N-3H	N-3F	N-3I
	Concentrations in ug/L or as noted										
Volatile Organics	ND					NA	ND	NA	ND	ND	ND
Acetone		37.9	15.6	14	30.4						
Methylene Chloride			19.9								
Unknowns			50.8								
Explosives	ND										
HMX											23.0
RDX						24.0	34.0	1.60	17.0	270	57.0
2,4,6-TNT		1.07	1.35	1.0	1.86						
Anions, mg/L						NA		NA			
Nitrate/Nitrite		9.5	13	11	17		44		19	49	12
Sulfate	224	438	1,840	243	177		963		299	1,210	671

[a]Upgradient.
[b]First analyzed for explosives only to assess conflicting explosives results from a previous study (EA, 1988).
ND = Parameters within this class of compounds were not detected.

Notes: Unless noted otherwise, samples analyzed for all parameters shown. A blank indicates that the parameter concentration was less than the reporting limit.

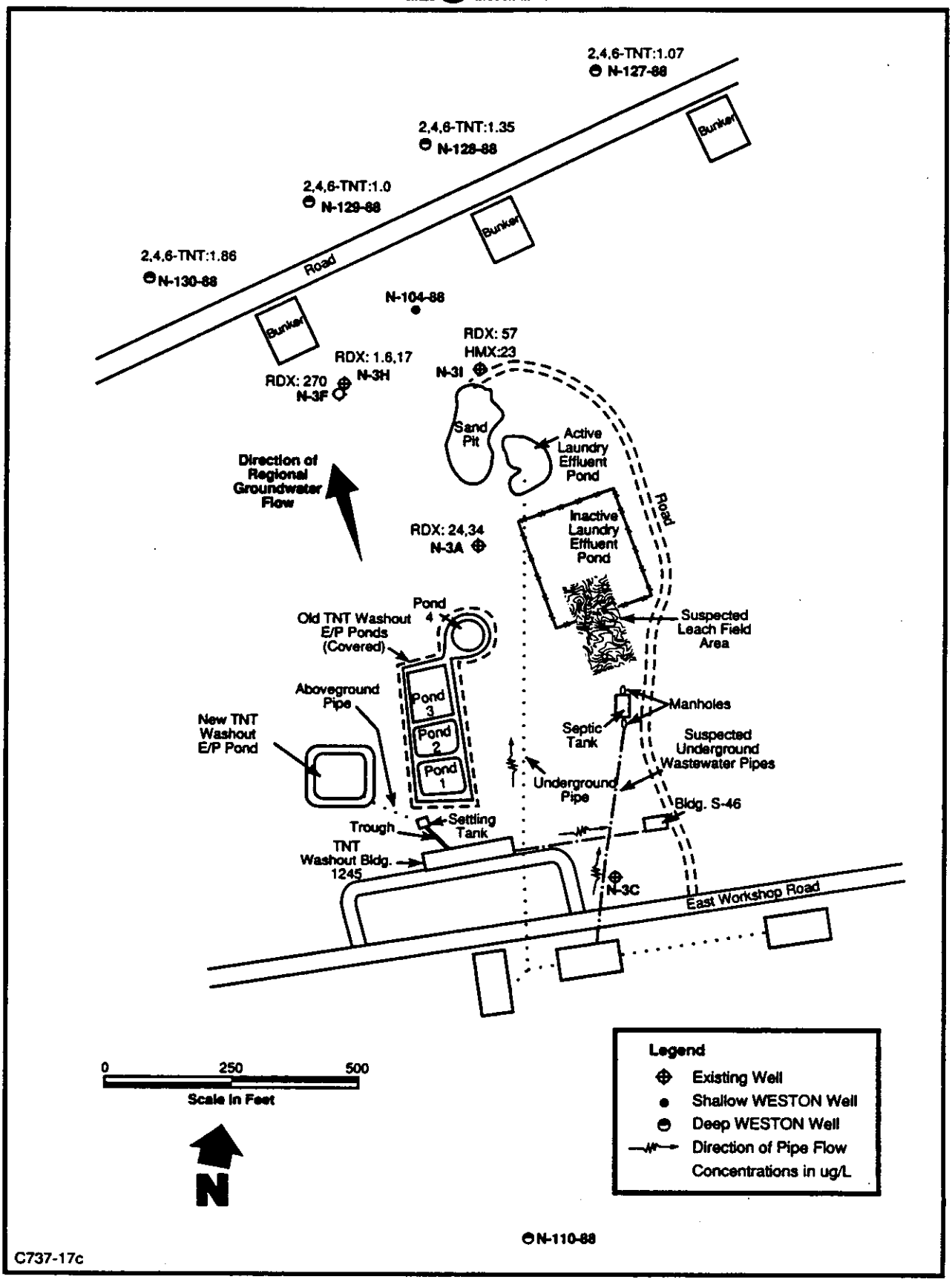


FIGURE 4-2 NITROAROMATICS IN GROUNDWATER AT THE TNT WASHOUT FACILITY

contaminants could be explained if RDX degraded to 2,4,6-TNT as it moved further downgradient; however, no such degraded pathway is known to exist. The solubilities and partition coefficients for both compounds are similar, so preferential migration of 2,4,6-TNT further from the sources is not expected. A more likely explanation is that RDX became present in the source areas at a later date than 2,4,6-TNT, and therefore RDX has had less time to migrate than 2,4,6-TNT.

4.2.2.2.3 Anions

Nitrate/nitrite was found in both the shallow and deeper groundwater. The highest levels were found in deep well N-3A (44 mg/L) and shallow well N-3F (49 mg/L). The values of sulfate ranged from 177 to 1,840 mg/L. A statistical analysis performed on the data indicated that the nitrate/nitrite and sulfate levels in the TNT Washout Facility exceeded background levels by a statistically significant amount (95 percent confidence). Therefore, based on statistical comparison with designated background levels, the TNT Washout Facility appears to have contributed nitrate/nitrite and sulfate contamination to the groundwater. The nitrate/nitrite sources are probably a combination of laundry effluent and the breakdown of explosives in the area. Laundry effluent is probably the major source of sulfate. Previous analyses of laundry effluent found nitrate/nitrite levels from 1.2 to 12 mg/L and a sulfate level of 222 mg/L (Ertec, 1982; EA, 1988).

Levels of nitrate/nitrite in previously existing wells were within a factor of two of those found in 1987 (EA, 1988). Nitrate/nitrite concentrations have steadily decreased since 1981 in N-3A: 264 mg/L in 1981 (Ertec, 1982), 61 mg/L in 1987 (EA, 1987), and 44 mg/L in 1988.

4.2.3 Data Summary and Conclusions

The analytical data collected in the TNT Washout Facility indicated the presence of low-level explosives in shallow soils and groundwater. In particular, soils immediately downgradient (northeast) of pond 3 and groundwater further downgradient (north) of all four ponds indicated contamination by RDX and HMX, with the two highest concentrations in the shallow groundwater and the lower levels in the regional aquifer. Newly installed deep wells downgradient of the facility did not contain HMX or RDX, but all four did contain low levels of 2,4,6-TNT. In general, however, soil samples did not contain explosives except in shallow samples collected adjacent to the inactive TNT washout ponds (N-109-88) or an underground laundry effluent pipe (N-108-88). Low levels of VOCs (mostly nonpriority pollutants) were detected in three deep borehole samples downgradient of the site.

Some lateral spreading of contaminants may occur above low-permeability silt and/or clay lenses. The groundwater in this shallow saturated zone spreads to the outer edges of the lenses before continuing its vertical migration. However, based on the results of the EM survey, the extent of the lateral migration around the inactive TNT washout ponds appears to be limited. Nevertheless, RDX was detected at its highest concentration at the site (270 ug/L) in shallow well N-3F, located approximately 300 feet from the nearest known potential source (the active laundry effluent pond). The lateral extent of explosive contamination cannot be delineated since the outermost shallow and deep groundwater samples contain aromatics. However, the levels in each of the four outermost deep wells were less than 2.0 ug/L.

Consistent with the finding that low levels of explosives contamination has been noted onsite, statistically significant nitrate/nitrite concentrations above background concentrations were noted for the area. The detection of RDX, HMX, and nitrate/nitrite confirmed their presence and levels in shallow (locally perched) groundwater zones in existing wells as determined in the PA/SI in 1987. explosives and nitrate/nitrite found in soils samples will continue to be a source of groundwater contamination in the future. No significant concentrations of VOCs were found in either the soils or groundwater in the area. The presence of acetone and methylene chloride in the new wells may be indicative of laboratory contamination.

The lagoons received wastewater primarily during 1948-1958 and 1960-1965. Therefore, a plume containing explosives and other contaminants may have migrated north of the TNT Washout Facility beyond the outermost monitor wells. Therefore, additional deep monitor wells are recommended further downgradient of the facility to determine the presence of such a plume.

4.3 CONTAMINATION ASSESSMENT: SANITARY LANDFILL

4.3.1 Site Background

The Sanitary Landfill is located in a natural drainage channel in the east-central portion of N-TEAD. The fill area is approximately 115 acres and consists of several specific disposal areas, as well as general solid waste disposal sites. The landfill area is divided by a road that follows the old ephemeral streambed or arroyo. The landfill has been in use since 1942, and the practice of excavating a pit or trench into the site of the arroyo and then backfilling the area with the excavated material when the pit or trench is full is still employed.

Locally perched groundwater was encountered between the Sanitary Landfill and the Drum Storage Areas, but not in the eight wells drilled at the Sanitary Landfill. The potentiometric surface of

the regional (deep) aquifer is rather flat (0.0016 ft/ft) and the gradient is toward the northwest (see Section 3).

The geophysical surveys were performed during the RI at the Sanitary Landfill to determine the extent of buried waste in portions of the landfill. Buried waste was determined to be present in a study area of approximately 16.5 acres (see Subsection 3.4.2). Anomalous EM measurements agreed with magnetic measurements indicating buried ferrous wastes. The fence located in the southwestern part of the area apparently indicates the western boundary of the landfill. Anomalous EM and magnetic measurements in an area west of the fence appear to be related to metal objects and debris on the ground surface rather than buried waste. Anomalous EM measurements appear to agree with magnetic measurements that indicated buried ferrous wastes. Therefore, elevated EM measurements without corresponding magnetic measurements may reflect buried metal rather than buried waste with high conductivities. EM measurements do not indicate lateral migration of contaminants away from the landfill or from the inactive evaporation ponds.

The conceptual model for the Sanitary Landfill can be summarized as follows:

- Sources - The buried wastes are potential sources of contamination.

- Pathways - Infiltration can leach contaminants from the landfill and transport them to deep (regional) groundwater. No seeps from the landfill have been identified. The practice of excavating a pit for waste disposal reduces contaminant transport via surface runoff, although runoff from the side slopes is likely during storm events. The air may provide a pathway for the release of methane, volatile organic compounds, and particulate emissions, especially in the active portion of the landfill. Air sampling was not a part of the scope in this stage of the RI.

- Receptors - Potential receptors include downgradient groundwater users, if any. Contaminants from the landfill may or may not be at detectable levels in downgradient groundwater use areas. Landfill operators and workers in nearby areas are potential receptors of airborne contaminants, if any. Direct contact with wastes being landfilled is also possible.

The focus of the RI sampling and analysis for the Sanitary Landfill was to determine the effect, if any, of the landfill on groundwater quality; whether contaminants in subsurface soil samples could be correlated with groundwater contaminants; and whether the concentrations of contaminants pose a public health and/or environmental risk to potential receptors.

4.3.2 Field Investigations and Results

Field investigations of the subsurface soil and groundwater were conducted at the Sanitary Landfill. The objectives of these investigations were as follows:

- Subsurface Soil - To determine whether contamination from buried refuse extended to the screened depth of selected wells, and to compare these data with the groundwater data.
- Groundwater - To determine whether the Sanitary Landfill has impacted groundwater quality around the landfill.

The samples were analyzed for VOCs, SOCs, explosives, metals, and anions. A summary of the sampling activities is presented in Tables 2-2 (soil) and 2-3 (groundwater).

4.3.2.1 Subsurface Soil Analyses

Five subsurface soil samples were collected for chemical analysis from three boreholes around the perimeter of the Sanitary Landfill (see Figure 4-3). One sample was collected from N-111-88, which is located south (upgradient) of the landfill. Two samples each were collected from N-115-88 and N-117-88, located along the western perimeter of the landfill. The samples were collected as described in Sections 2 and 3 of this report. The analytical results are provided in Table 4-9.

4.3.2.1.1 Organic Compounds

No explosive compounds or VOCs were detected in any of the subsurface soils samples (only the downgradient samples were analyzed for explosives). SOCs were detected in one of the samples. The sample from 107 feet in N-117-88 contained a trace level (0.8 ug/g) of bis(2-ethylhexyl)phthalate. Phthalates are common sampling and laboratory contaminants, but in this instance were not detected in laboratory or field blanks. No phthalates were detected in groundwater from N-117-88.

4.3.2.1.2 Inorganic Compounds

Cadmium, chromium, copper, and zinc were found at the highest concentrations in Sanitary Landfill soil from N-111-88. This sample, unlike the other four, was collected from the saturated zone, which may have altered its chemical makeup due to contact

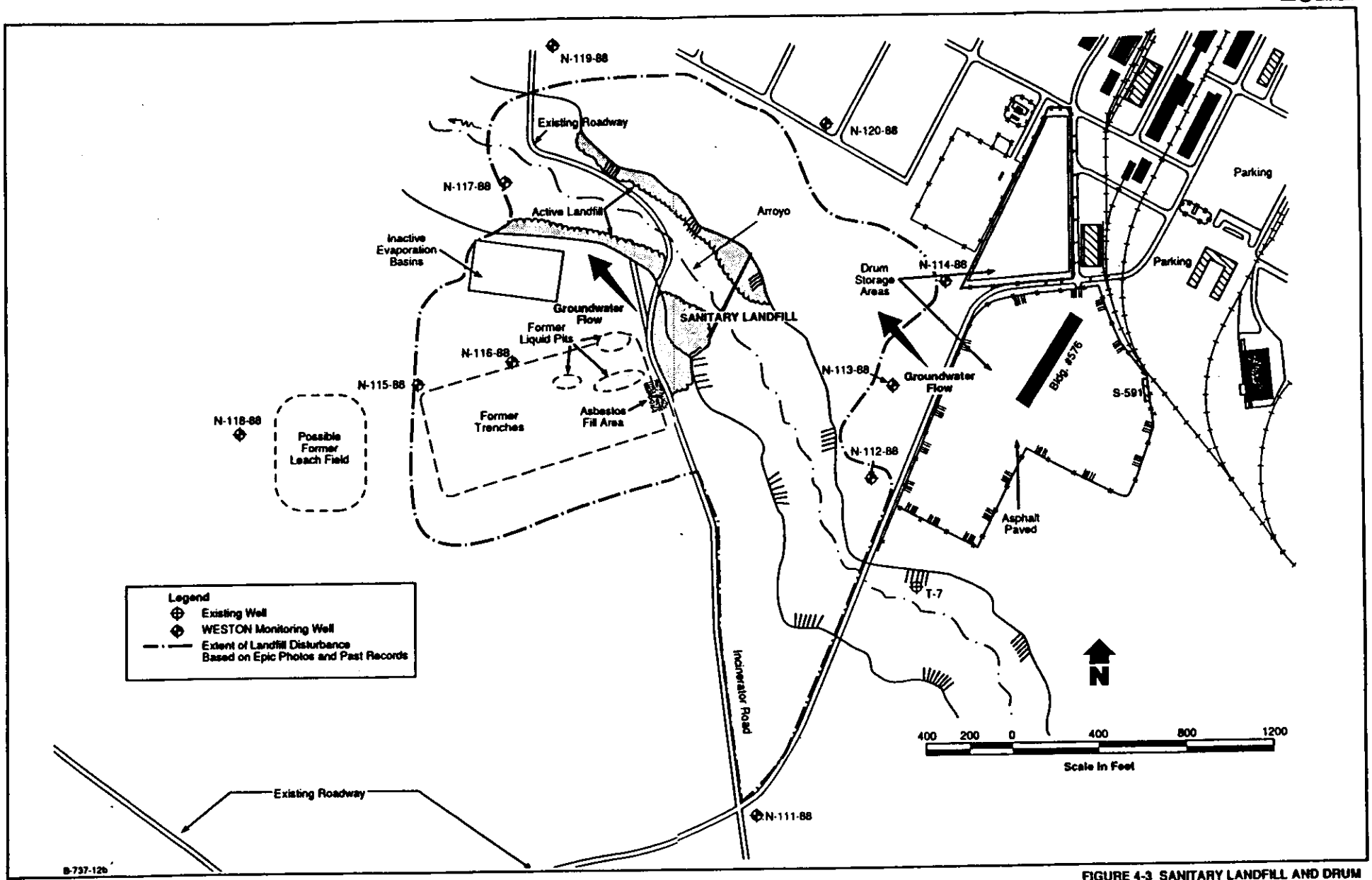


FIGURE 4-3 SANITARY LANDFILL AND DRUM STORAGE AREAS: BOREHOLE AND MONITOR WELL LOCATIONS

Table 4-9

Analyses of Borehole Samples From the Sanitary Landfill

Parameter	N-111-88-37[a]	N-115-88-6	N-115-88-8	N-117-88-8	N-117-88-11
	Concentrations in ug/g				
Depth (ft)	336	60	80	78	107
Volatile Organics	ND	ND	ND	ND	ND
Semivolatile Organics	ND	ND	ND	ND	
Bis(2-ethylhexyl) Phthalate					0.8
Explosives	NA	ND	ND	ND	ND
Metals					
Silver					
Arsenic					
Beryllium					0.422
Cadmium	9.60				
Chromium	350	12.7	12.5	15.2	26.2
Copper	11.7	5.00		6.53	9.98
Mercury					
Sodium		282	370	209	634
Nickel		15.5	17.9	17.8	14.7
Lead					7.59
Antimony					
Selenium					
Thallium					
Zinc	54.1				
Anions					
Bromide					
Chloride	8,090				
Fluoride		6.44	9.07	1.6	1.3
Nitrate/Nitrite					
Sulfate					

[a]Upgradient.
ND = Parameters within this class of compounds were not detected.

Notes: Samples analyzed for all parameters listed unless indicated by NA. A blank indicates that the parameter concentration was less than the reporting limit.

End number on sample 10 indicates sequence of sampling in each borehole, increasing with depth.

with groundwater. Copper and zinc were also found in groundwater at this location; however, cadmium and chromium were not detected (see Subsection 4.3.2.2). The natural soil makeup may also be different from the other subsurface soil samples, since N-111-88-37 was a clayey gravel, unlike the other samples in this area.

Beryllium and lead were detected at low levels (within two times their reporting limits) in N-117-88-11. Chromium and copper were also slightly higher than in the other downgradient samples, but did not exceed the concentrations found in N-111-88-37. Nickel (14.7 to 17.9 ug/g), sodium (209 to 634 ug/g), and fluoride (1.3 to 9.07 ug/g) were found within fairly narrow ranges in samples from the downgradient samples. Chloride (8,090 ug/g) was detected in N-111-88-37, probably due to contact with groundwater, which tends to be saline in this region. Of the metals detected, only nickel had a geometric mean concentration that exceeded the geometric mean concentration of soil samples from Tooele County (USGS, 1981). For all other metals, the geometric mean was either less than that from the USGS study or less than the reporting limit. If the metal was not detected in a sample, the concentration was taken to be one-half the reporting limit for the purpose of computing a geometric mean.

4.3.2.2 Groundwater Sampling Results

Seven new monitor wells and one existing monitor well in the area of the Sanitary Landfill were sampled for VOCs, BNAs, explosives, metals, and anions. Wells N-111-88 and T-7 are located southeast (upgradient) of the landfill (Figure 4-3). Wells N-115-88, N-110-88, N-117-88, and N-119-88 are located northwest to west (downgradient) of the landfill. Wells N-120-88 and N-118-88 are located to the north (cross gradient).

As part of the assessment of groundwater quality at the Sanitary Landfill, it must be noted that the Drum Storage Areas are upgradient of the landfill. The results from wells N-112-88 and N-114-88 (discussed in Subsection 4.4.2.3), located between the Drum Storage Areas and the Sanitary Landfill, aid in determining the contribution of contaminants solely from the landfill, if any. In addition, the contamination of groundwater by seepage (primarily of TCE and chromium) from industrial wastewater ditches north of the landfill has been documented (JMM, 1987). Although groundwater flows generally to the northwest, contaminants from the ditches may have spread to the south toward the northern end of the landfill near N-119-88 due to the low hydraulic gradient. Therefore, the industrial wastewater ditches could impact groundwater immediately north of the Sanitary Landfill.

4.3.2.2.1 Volatile Organics

VOCs were detected in each of the four downgradient wells and in one of the cross-gradient wells (see Table 4-10 and Figure 4-4).

Table 4-10

Analyses of Groundwater Samples From the Sanitary Landfill

Parameter	N-111-88[a]	N-115-88[b]	N-116-88[b]	N-117-88[b]	N-118-88[c]	N-119-88[b]	N-120-88[c]	T-7[a]
	Concentrations in ug/L or as noted							
Volatile Organics	ND				ND			ND
Benzene						0.848		
Trans-1,2-Dichloroethylene			11.1	2.6				
Trichloroethylene		4.17	47.6	20.5		18.4	1.11	
Cycloalkanes		13	60			11	10	
Hydrocarbon		190	700			1,080	120	
Oxygenated Hydrocarbon			40			21		
Oxygenated Compound		50						
Semivolatile Organics	ND	ND	ND	ND	ND	ND	ND	ND
Explosives	ND		ND	ND	ND	ND	ND	ND
RDX		8.56						
Metals, total/dissolved								
Silver	0.213/LT	LT/0.532	0.319/LT					0.319/LT
Arsenic	17.6/LT	5.38/LT	8.90/LT	5.49/LT		8.9/LT	5.38/LT	11.1/5.28
Beryllium	0.402/LT							0.201/LT
Cadmium								
Chromium						46.2/LT		
Copper	37.7/3.11	17/6.54	36.4/3.0	26.7/4.61	19.3/9.11	65.0/3.97	23/4.07	25.4/LT
Mercury								
Nickel	42.2/LT	58.3/LT	39.7/LT	11.1/LT	25.8/18.5	37.7/24.2	38.4/LT	20.1/11.4
Lead	14.1/2.53	17.8/4.15	21.3/LT	8.49/LT	10.6/LT	16.1/4.35	37.4/5.26	18.1/LT
Antimony								
Selenium					7.98/8.75			
Thallium								
Zinc	125/21.1	1,900/2,400	156/35.2	529/302	1,000/1,000	151/60.8	1,900/364	180/104
Anions, mg/L								
Nitrate/Nitrite			7.5	8	5.6	8		8
Sulfate	216	174	184	169	280	178	141	166

[a]Upgradient.
[b]Downgradient.
[c]Crossgradient.
ND = Parameters within this class of compounds were not detected.

Notes: Samples analyzed for all parameters listed. A blank or LT indicates that the parameter concentration was less than the reporting limit.

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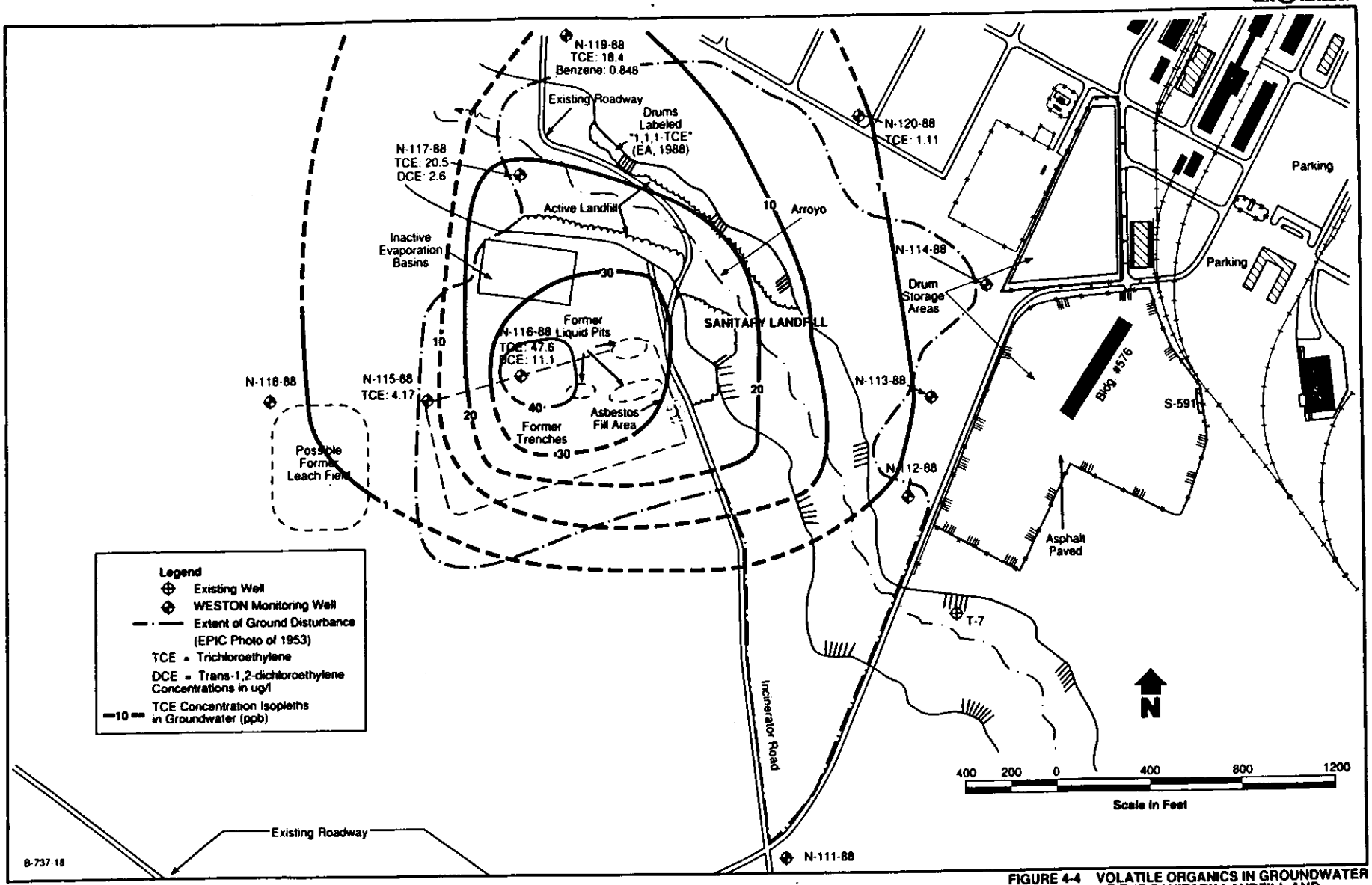

FIGURE 4-4 VOLATILE ORGANICS IN GROUNDWATER AT THE SANITARY LANDFILL AND DRUM STORAGE AREAS

Either TCE or trans-1,2-DCE (or both) were found in most of the downgradient wells, with the highest concentrations of each found at N-116-88 (47.6 ug/L TCE and 11.1 ug/L trans-1,2-DCE). A sample from N-115-88 contained 4.17 ug/L TCE. N-117-88 is downgradient of N-116-88, and contained 20.5 ug/L TCE and 2.6 ug/L of trans-1,2-DCE. Some TCE and trans-1,2-DCE appears to be attenuating prior to reaching N-117-88. Furthermore, N-117-88 may not be directly downgradient of the same source of chlorinated solvents within the landfill as N-116-88.

Well N-119-88 contained slightly less TCE (18.4 ug/L) than N-117-88. Benzene was also detected in N-119-88 (0.848 ug/L) at a concentration just above its reporting limit. TCE was also detected in N-120-88 (1.11 ug/L). The presence of the low level of TCE in N-120-88 may be attributed to the spread of TCE from the industrial wastewater ditches since this well is to the north and cross-gradient of the Sanitary Landfill, or from the former Drum Storage Areas. Although N-119-88 is also north of the landfill, its location directly downgradient of the landfill and the higher level of TCE (compared to N-120-88) indicates that the majority of the compound originates from the nearby Sanitary Landfill.

The landfill also appears to be a source of unidentified hydrocarbons, which were detected in N-115-88, N-116-88, N-119-88, and N-120-88. The tentative identification of these VOCs and their concentrations are presented in Table 4-10. The concentrations of hydrocarbons (nonoxygenated) ranged from 120 to 1,080 ug/L.

Inactive evaporation ponds, with soil berms and flood gates, were observed during the RI in the western portion of the Sanitary Landfill. Several shallow trenches lead from the inactive pond area to an area west of the landfill. Furthermore, before the industrial wastewater lagoon was developed, aerial photographs show the industrial wastewater ditches leading from the machine shops toward the landfill. Therefore, the liquids in the past from these evaporation ponds and trenches/ditches may be the source for the chlorinated solvents, hydrocarbons, and possibly other contaminants found in the groundwater.

4.3.2.2.2 BNAs and Explosives

No BNA compounds were found in groundwater samples. The explosive compound RDX was detected in one sample, N-115-88, at 8.56 ug/L.

4.3.2.2.3 Metals

Wells upgradient of the landfill, N-111-88 and T-7, contained levels of silver, arsenic, beryllium, nickel (N-111-88 only),

and lead (T-7 only) greater than those found in site background samples from North Area well No. 1. In all crossgradient and downgradient wells, copper, nickel, lead, and zinc exceeded site background levels. Some of these wells contained levels of silver (N-115-88 and N-116-88), arsenic (all wells except N-118-88), and chromium (N-119-88) exceeding the levels in background samples.

To evaluate the contribution of metals to groundwater from the landfill, the levels in wells downgradient or crossgradient to the landfill were compared to background. Chromium was found in only one of six downgradient/crossgradient wells, and the estimated mean concentration was below the reporting limit, so its detection was not considered significant. Similarly, selenium was found in only one well, at a level comparable to the total background concentration. Its detection did not indicate the landfill as a signficant source.

Arsenic was detected at lower levels in each downgradient or crossgradient well compared to the two wells (N-111-88 and T-7) immediately upgradient of the landfill; therefore, the landfill does not appear to be a source of arsenic. However, arsenic levels still exceeded site background levels and will be considered in the endangerment assessment. Other metals exceeding background (by statistical comparison) were silver, copper, nickel, lead, and zinc.

4.3.2.2.4 Anions

The anions nitrate/nitrite and sulfate were analyzed in each of the wells at the Sanitary Landfill. The levels were found to be comparable to the background concentrations.

4.3.3 Data Summary and Conclusions

The detection of contaminants in the subsurface soil around the perimeter of the Sanitary Landfill was limited. VOCs and explosive compounds were not detected in subsurface soil. Bis(2-ethylhexyl)phthalate was detected at a low level (less than 1 ug/g) in a subsurface soil sample from N-117-88. The highest concentrations of several metals were detected in the upgradient soil borehole sample, the only soil sample in this area that was collected in the saturated zone. Only nickel had a geometric mean concentration that exceeded the geometric mean concentration of soil samples from Tooele County (USGS, 1981). Overall, the analysis of subsurface soil samples around the perimeter of the Sanitary Landfill did not indicate significant soil contamination.

The most significant contamination detected in this area was from benzene, trans-1,2-DCE, and TCE in the groundwater. The presence of TCE and trans-1,2-DCE in the four downgradient wells indicates that the landfill may be the source of these

compounds. The highest level of TCE detected was 47.6 ug/L in N-116-88. The landfill also appears to be a source of unidentified hydrocarbons (found in four wells) and RDX (found in N-115-88). The mean concentrations of silver and arsenic exceeded the mean background concentrations. However, the downgradient levels were less than or equal to the levels in the wells upgradient of the landfill; therefore, the landfill's contribution of silver and arsenic to the groundwater is questionable. The concentrations of silver and arsenic, as well as copper, nickel, lead, and zinc, will be evaluated in the endangerment assessment.

4.4 CONTAMINATION ASSESSMENT: DRUM STORAGE AREAS

4.4.1 Site Description

The Drum Storage Areas are located southwest of the maintenance and warehouse area and adjacent to the Sanitary Landfill on its eastern side, as shown in Figure 4-3. The area is separated by a road into two areas: (1) an approximate 2,000-square-foot triangular area of which a small portion is currently used as a 90-day drum storage area; and (2) an approximate 83,000-square-foot area containing an active drum storage building. Both of these areas have been used in the past as storage areas for reusable drums and barrels. It has been reported that drums containing original contents were turned upside-down to prevent rain or snow accumulation in the drums. The remaining contents were spilled onto the gravel or asphalt surface. This practice has ceased and drums remain sealed in the 90-day storage area and in the storage building.

The small triangular area is predominately an unvegetated gravel surface, although the western portion, which has not been used for several years, is grass covered. Surface water flows across the smaller area from east to west toward the landfill. The larger storage area is covered by compacted granular fill, and in most portions is overlain by 1 to 2 inches of asphalt which is generally broken up and in poor condition. The larger area drains toward the southwest to a large ditch that continues across the road embankment to the landfill where it has been filled in. This large ditch served as a temporary stream channel.

Groundwater exists between 300 and 320 feet below the ground surface at the Drum Storage Areas and flows to the northwest. A water supply well is located less than 100 feet from the Drum Storage Areas; however, it is upgradient of the areas.

Prior to the RI, there were no sampling data from the Drum Storage Areas to confirm or deny contamination in these areas.

The conceptual exposure model for the Drum Storage Areas can be summarized as follows:

- Sources - The primary potential source of contamination is soil that has been contaminated by past spills and leaks from drums. The overall quantity of contaminated spills and leaks is expected to be small compared to releases from the landfill or industrial wastewater lagoon.

- Pathways - Stormwater runoff may carry contaminants and/or contaminated runoff to the west or southwest toward the landfill. Infiltration may leach contaminants from the soil and eventually into the groundwater. The regional groundwater is deep and infiltration from precipitation small; therefore, migration of contaminants vertically through the vadose zone to the groundwater may be slow. Contaminants may also volatilize to the air.

- Receptors - Workers at the Drum Storage Areas may be exposed to volatilizing chemicals via inhalation, although the area surrounding the building is not frequently used. Workers may also directly contact contaminated soil and face exposure via skin absorption or incidental ingestion. Groundwater may be ingested downgradient of the area.

4.4.2 Field Investigation and Results

The objectives of the investigation at the Drum Storage Areas were as follows:

- To determine whether surface soil has become contaminated from past spills and leaks.

- To determine whether contamination has reached deeper soil and relate any contamination to that found in groundwater.

- To determine whether contamination from the Drum Storage Areas is present in downgradient groundwater to the west.

4.4.2.1 Surface Soil Sampling Results

The purpose of the surface soil sampling and analysis program at the Drum Storage Areas was to determine if soils in the area

have become contaminated as a result of past activities. Soil samples were collected at depths of 0 to 6 inches, 6 inches to 1 foot, and 1 to 2 feet below the existing ground surface using stainless steel trowels. Seven shallow boreholes were advanced using a power hand-held auger, pick ax, and shovel. All sampling and drilling equipment was scrubbed and rinsed between sampling locations using approved rinsate from N-TEAD well No.1 (WW-1).

Sample locations were selected by visually identifying stained surface soils. The locations of the surface soil samples are presented in Figure 4-5. Most of the site area is covered by a compacted gravel surface and overlain by 1/2 to 1 inch of asphalt pavement. Underlying the gravel and asphalt surface is a dense, silty, medium-to-coarse sand and gravel base course layer containing trace amounts of clay. The sand and gravel base course extends to approximately 2 feet below the existing ground surface. Samples obtained for chemical analysis were taken from the base course layer. Wet to saturated conditions were observed within the base course at most of the sampling locations, indicating that the underlying subgrade is poorly drained, and most of the infiltration in this area remains perched in the sand and gravel base course.

Surface soil samples collected at the Drum Storage Areas were analyzed for volatile organic compounds, semivolatile compounds, explosives, metals, and anions. The results of the analytical program are summarized in Table 4-11.

4.4.2.1.1 Organic Compounds

No VOCs or explosives were detected in the Drum Storage Areas surface soil samples.

Priority pollutant BNAs were detected in 7 of the 24 samples. Almost all of these BNAs were polynuclear aromatic hydrocarbons (PAHs) at concentrations less than 1 ug/g. Individual PAH concentrations exceeding 1 ug/g were chrysene in SSDS-04-01 (1.65 ug/g) and pyrene in SSDS-04-01 (5.4 ug/g) and SSDS-06-01 (1.65 ug/g). SSDS-04-01 and SSDS-06-01 were the only samples with total concentrations of priority pollutant BNAs exceeding 1 ug/g. PAHs are constituents of asphalt, so the detection of these compounds can be primarily attributed to the asphalt pavement. The asphalt is broken up in parts of the Drum Storage Areas, enabling its constituents to mix with the base materials that were sampled. Low concentrations of phthalates were detected in SSDS-05-03 (0.04 ug/g) and SSDS-06-01 (0.21 ug/g). Phthalates are common sampling or laboratory contaminants. Di-n-octyl phthalate was detected in a control sample at 0.04 ug/g and therefore is not considered to be site related.

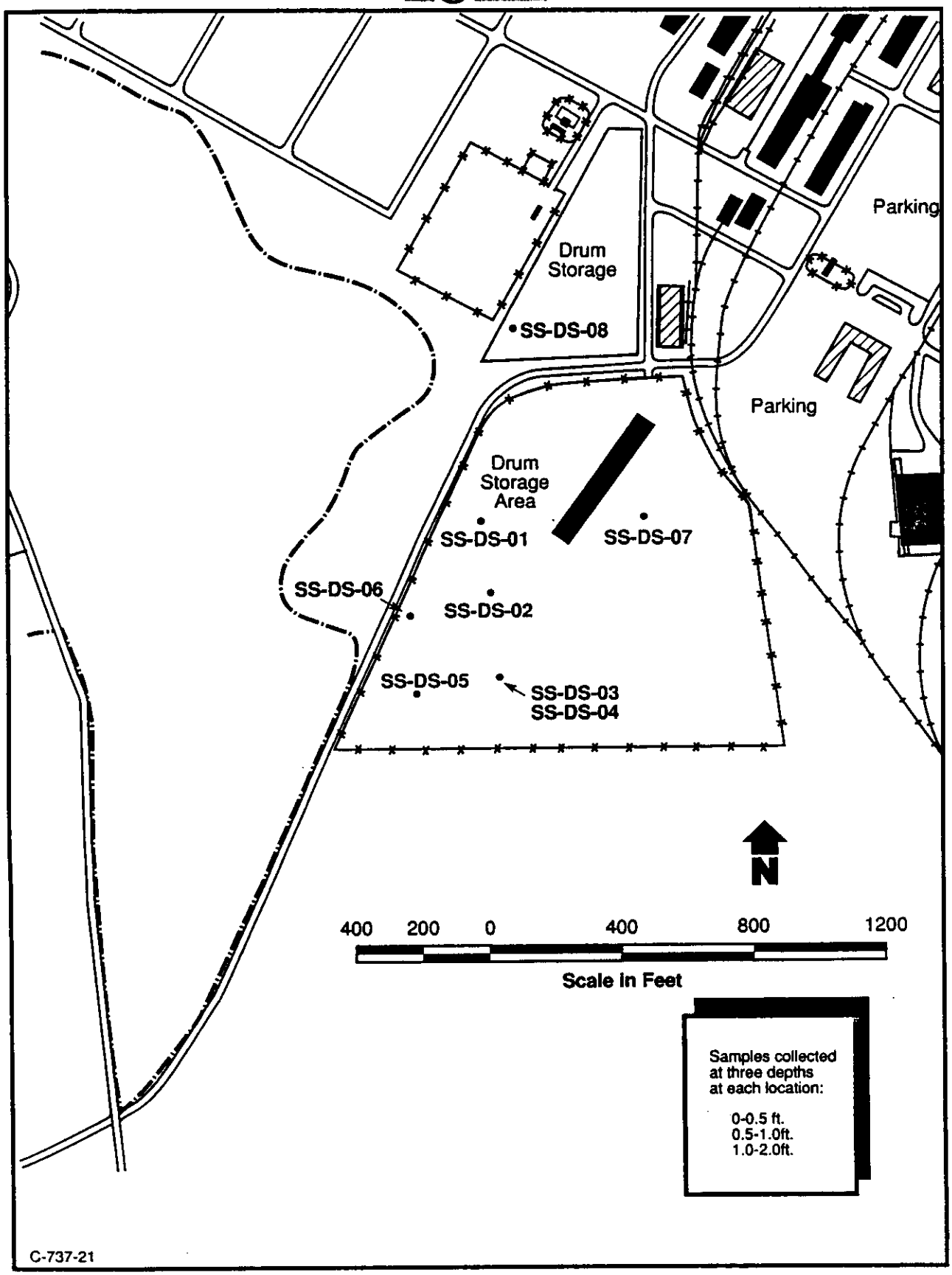

FIGURE 4-5 SURFACE SOIL SAMPLING LOCATIONS AT THE DRUM STORAGE AREAS

Table 4-11

Analyses of Surface Soil Samples From the Drum Storage Areas

Parameter	01-01	01-02	01-03	02-01	02-02	02-03	03-01	03-02	03-03	04-01	04-02	04-03
	Concentrations in ug/g											
Volatile Organics	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Semivolatile Organics												
Benzo(a)Anthracene										0.5		
Benzo(a)Pyrene										0.66		
Benzo(b)Fluoranthene										0.6		
Chrysene										1.65	0.41	
Fluoranthene								0:61				
Pyrene										5.4		
Benzo(b)Naphtho(1,2-D) Thiophene								2.86				
HXAB2E[a]	1.22	1.61	3.24	8.31	8.01	8.51	24.3	30.8	5.11	24.6	7.88	
Phenanthrene Derivatives			1.33				25	1.98		28		
Pyrene Derivatives							44.6	8.78		31	1.82	
Unknown Hydrocarbons	1.01	3.03	1.33				158	7.38		34.3		
Unknown PAH Derivatives								15.8	1.14	65.9	3.49	1.35
Unknown					1.43		85.5	22.7		46.9	2.12	
Explosives	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Metals												
Silver												
Arsenic			6.32	7.52	6.53		8.56	13.0		21.4	9.27	7.82
Beryllium												
Cadmium					1.08		1.15	1.53		3.30	1.23	1.06
Chromium	18.5	18.6	17.4	24.2	19.7	24.4	13.7	24.9	21.3	29.2	21.1	26.6
Copper	12.2	14.5	11.1	18.6	16.1	16.4	13.4	14.4	17.9	27.0	21.6	19.2
Mercury												
Sodium	111	183	70.6	115	139	152	69.6	124	192	59.6	160	159
Nickel	5.67	7.22	81.0	9.82	9.41	10.9	5.39	9.61	9.07		8.66	8.07
Lead				12.1	16.8	9.43	37.2	35.3	16.0	10.7	28.9	27.3
Antimony												
Selenium												
Thallium												
Zinc					228						143	1,100
Anions	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Bromide												
Chloride												
Fluoride												
Nitrate/Nitrite												
Sulfate												

Table 4-11

Analyses of Surface Soil Samples From the Drum Storage Areas
(continued)

Parameter	05-01	05-02	05-03	06-01	06-02	06-03	07-01	07-02	07-03	08-01	08-02	08-03	Rinse Blank	Rinse Blank
	Concentrations in ug/g													ug/L
Volatile Organics	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Semivolatile Organics														
Benzo(a)Anthracene				0.33									ND	ND
Benzo(a)Pyrene				0.44										
Chrysene				0.63										
Pyrene				1.65										
HXAB2E[a]		1.01			4.95	1.63	5.07	3.21	5.82	1.96	6.84			
Phenanthrene Derivatives				11										
Pyrene Derivatives	1.4			12.8										
Unknown CHO Derivatives						1.12		1.11	1.01					
Unknown Hydrocarbons	1.56	1.1		18.4										
Unknown PAH Derivatives	3.34													
Unknown	10.2			10.8			2.12			1.41	1.13	1		
Explosives	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NA
Metals														NA
Silver														
Arsenic	6.24	6.19	6.94				9.79			6.33	7.36	7.34		
Beryllium														
Cadmium							1.26			1.62	1.18	1.42		
Chromium	12.5	13.2	19.8	11.3	20.1	19.9	15.9	12.5	16.1	14.3	33.1	33.2		
Copper	12.2	14.2	15.0	12.3	13.4	16.0	22.9	10.5	13.8	23.3	28.1	28.2		
Mercury														
Sodium	118	148	195	102	191	162	149	152	112	183	156	141	13,000	
Nickel	5.37	7.02	8.53	8.81	10.8	9.16	6.67	8.59	6.13	9.75	7.89	18.8		
Lead	8.38	7.4	9.48				35.6	7.19		30.3	16.6	16.4		
Antimony														
Selenium														
Thallium														
Zinc	1030									75.7			92.6	

Table 4-11

Analyses of Surface Soil Samples From the Drum Storage Areas
(continued)

Parameter	05-01	05-02	05-03	06-01	06-02	06-03	07-01	07-02	07-03	08-01	08-02	08-03	Rinse Blank	Rinse Blank
	Concentrations in ug/g												ug/L	
Anions	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND		ND		NA
Bromide														
Chloride											12,800		276,000	
Fluoride													306.5	
Nitrate/Nitrite													36.1	
Sulfate													185,500	

[a]1,2-Benzenedicarboxylic acid, ester derivative. Also found in method blank at 4.0 ug/g.
[b]Also found in control sample at 0.04 ug/g.
ND = Parameters within this class of compounds were not detected.

Notes: Samples analyzed for all parameters listed unless indicated by NA. A blank or LT indicates that the parameter concentration was less than the reporting limit. All samples prefixed by SSDS. Suffixes 01, 02, and 03 indicate sampling intervals of 0 to 0.5, 0.5 to 1, and 1.5 to 2 feet, respectively. Water for blanks obtained from South Area Well No. 1.

Tentatively identified BNAs were detected in each of the surface soil samples. Most of the tentatively identified compounds were hydrocarbons or PAH derivatives, which can also be traced to the asphalt pavement in the area. Samples with the highest total concentrations of tentatively identified compounds (exceeding 100 ug/g) were found in samples SSDS-03-01 (337 ug/g) and SSDS-04-01 (231 ug/g).

4.4.2.1.2 Metals

The results of the metals analysis is also presented in Table 4-11. The analytical results indicated the presence of arsenic in 15 of the 24 samples at concentrations ranging from below the detection limit to 21.4 ug/g, with a (geometric) mean concentration of 8.7 ug/g. Cadmium was detected in 10 samples at concentrations ranging from below the detection limit to 3.3 ug/g, with a mean concentration of 1.48 ug/g. Chromium was detected in all 24 samples at concentrations ranging from 11.3 to 33.2 ug/g, with a mean concentration of 20.56 ug/g. Copper, sodium, nickel, and lead were detected in over two-thirds of the samples at means of 17.2, 139, 11.8, and 19.1 ug/g, respectively. Zinc was detected in five samples at concentrations ranging from 75.7 to 1,100 ug/g, with a mean concentration of 515 ug/g. Silver, beryllium, mercury, antimony, selenium, and thallium were not detected above the reporting limit. Sodium and zinc were detected in the rinse blank at concentrations of 13,000 and 92.6 ug/L, respectively.

The geometric mean concentrations of inorganics were found to be less than those in offsite soil samples from Tooele County (USGS, 1981). Cadmium, which was not analyzed for in the USGS study, had a geometric mean concentration in samples from the Drum Storage Areas surface soil below the reporting limit. Overall, no inorganics appear to be at levels of concern in surface soil samples at the Drum Storage Areas..

4.4.2.1.3 Anions

The results of the anion analysis are presented in Table 4-11. The only anion detected above the reporting limit was chloride, detected at a concentration of 12,800 ug/g in sample DS-08-02. Chloride was also detected in the rinse blank at a concentration of 276,000 ug/L.

4.4.2.2 Subsurface Soil Sampling Results

Eight subsurface soil samples were analyzed from three boreholes located west of the Drum Storage Areas (see Figure 4-3). Two deep samples were collected from N-112-88; two shallow samples were collected from N-113-88; and four samples, one shallow and three deep, were collected from N-114-88. The shallow sample

from N-114-88 was collected in a shallow groundwater zone. All of the deep samples were collected at or below the water table. The samples were analyzed for VOCs, BNAs, explosive compounds, metals, and anions.

4.4.2.2.1 Organic Compounds

No volatile organics or explosive compounds were detected in any of the subsurface soil samples from the Drum Storage Areas (see Table 4-12). Bis(2-ethylhexyl)phthalate, detected in the two samples from N-112-88, was the only priority pollutant list organic compound found above reporting limits in the samples. An organic acid ester was detected in one sample, but was also found in the laboratory method blank, so it was not considered to be present in the soil sample. Unknown BNAs were detected in three other borehole samples, each at a concentration of 1.0 ug/g.

4.4.2.2.2 Inorganic Chemicals

Of the metals detected in the subsurface soil samples, chromium, copper, and nickel were found in at least half of the samples within fairly narrow concentration ranges. Lead and selenium were found only in borehole N-113-88-5. This well was dry, so comparable groundwater data are not available. Borehole N-112-88-34 contained the only arsenic detected (24.1 ug/g). Arsenic was found in the groundwater from well N-112-88, but at a concentration within the background range. Sodium was detected in all eight samples, with the highest concentration (375 ug/g) in borehole N-114-88-3. Fluoride was detected in half of the samples at concentrations just above the reporting limit. Of the metals detected in subsurface soils samples from the Drum Storage Areas, only the geometric mean concentrations for mercury and selenium concentrations exceeded those in the offsite soils samples from Tooele County (USGS, 1981), and therefore were considered chemicals of potential concern in the endangerment assessment.

4.4.2.3 Groundwater Sampling Results

Groundwater from wells N-112-88 and N-114-88 were sampled and analyzed for VOCs, BNAs, explosives, metals, nitrate/nitrite, and sulfate. No VOCs or explosives were detected in the samples (see Table 4-13). Bis(2-ethylhexyl)phthalate was detected at 790 ug/L in well N-114-88. This compound, which sorbs strongly to soil, was not detected in soil samples in the saturated zone at this location. Bis(2-ethylhexyl)phthalate is a common laboratory or sampling contaminant, and the fact the compound was not detected in the soil samples suggests that the compound was not present in the groundwater.

Table 4-12

Analyses of Borehole Samples From the Drum Storage Areas

Parameter	N-112-88-34	N-112-88-35	N-113-88-4	N-113-88-5	N-114-88-3	N-114-88-31	N-114-88-33	N-114-88-34
	Concentrations in ug/g							
Depth (ft)	326	328	39	49	28	310	328	338
Volatile Organics	ND	ND	ND	ND	ND	ND	ND	ND
Semivolatile Organics			ND			ND	ND	
Bis(2-ethylhexyl) Phthalate	4.45	0.785						
Unknown	1.0			1.0				1.0
Organic Acid Ester					5.0[a]			
Explosives	ND	ND	ND	ND	ND	ND	ND	ND
Metals								
Silver								
Arsenic	24.1							
Beryllium								
Cadmium								
Chromium	19.8	13.9		19.8	19.1	7.2	5.75	9.78
Copper	6.16	10.5		5.58	5.38			
Mercury								
Sodium	72.6	61.2	209	270	375	75.2	52.4	143
Nickel	5.08	13.3	6.91	9.52	10.1			25.7
Lead				8.07				
Antimony								
Selenium				5.63				
Thallium								
Zinc								
Anions	ND	ND				ND		ND
Bromide								
Chloride								
Flouride			17	12.2	20.7		6.09	
Nitrate/Nitrite								
Sulfate								

[a]Also found in method blank at 10 ug/g.
ND = Parameters within this class of compounds were not detected.

Notes: Samples analyzed for all parameters indicated. A blank indicates that the parameter concentration was less than the reporting limit.

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Table 4-13

Analyses of Groundwater Samples From the Drum Storage Areas

Parameter	N-112-88	N-114-88
	Concentrations in ug/L or as noted	
Volatile Organics	ND	ND
Semivolatile Organics		
Bis(2-ethylhexyl)Phthalate	ND	790
Explosives	ND	ND
Metals, total/dissolved		
Silver	2.56/0.213	
Arsenic	6.11/LT	7.66/LT
Beryllium	1.61/LT	
Cadmium		
Chromium	51.9/LT	
Copper	220/LT	37.3/12.3
Mercury		
Nickel	184/42	294/LT
Lead	45.1/LT	24.2/LT
Antimony		
Selenium	LT/6.15	
Thallium		
Zinc	438/65.7	470/64.6
Anions, mg/L		
Nitrate/Nitrite	10	5
Sulfate	154	218

Notes: Samples analyzed for all parameters indicated. A blank or LT indicates that the parameter concentration was less than the reporting limit.

A variety of metals were detected in each of the wells. Geometric mean concentrations for silver, arsenic, beryllium, chromium, copper, nickel, lead, and zinc in wells N-112-88 and N-114-88 exceeded the geometric mean background concentrations. Potential risks from these eight metals found at levels exceeding background were evaluated in the endangerment assessment. Nitrate/nitrite and sulfate concentrations were comparable to those found in background samples.

4.4.3 Data Summary and Conclusions

Low levels of BNAs (mostly nonpriority pollutants) were detected at almost all soil sample locations and depths at the Drum Storage Areas. The results indicated an attenuation of organic contaminants with depth, although this trend is not consistent at every sample location. The highest concentrations of BNAs were encountered at SS-DS-03 and SS-DS-04. Much of the BNA contamination was from PAHs, which are constituents of asphalt and are probably not related to drum storage.

No explosive compounds were detected in any of the surface soil samples at the Drum Storage Areas.

Arsenic, cadmium, chromium, copper, sodium, nickel, and lead were detected in most of the surface soil samples. However, on average, none of the metals' concentrations exceeded the mean concentrations in background samples (USGS, 1981). No conclusive trend with regard to depth or sample location was observed for the metals analysis.

Bis(2-ethylhexyl)phthalate was found in two subsurface soil samples and in a groundwater sample, but at different locations. This compound is often a sampling or laboratory contaminant, and the fact that the soil and groundwater detections of the compound do not correlate supports this. Several unknown BNAs were detected in subsurface soil samples at low concentrations (1.0 ug/g in three samples). No VOCs or explosive compounds were detected in subsurface soil in these areas.

Most of the metals and fluoride in the subsurface soil were detected within a rather narrow concentration range, suggesting that they may be of natural origin. However, mercury and selenium mean concentrations exceeded those in offsite soil samples from Tooele County (USGS, 1981) and were considered as chemicals of potential concern in the endangerment assessment. Although mercury and selenium were detected in some of the soil samples, the corresponding groundwater concentrations were within the background range.

No VOCs or explosive compounds were detected in groundwater in this area. Silver, arsenic, beryllium, chromium, copper, nickel, lead, and zinc were detected in groundwater in either the total

or dissolved forms at geometric mean concentrations exceeding those found in background samples. Potential risks from these eight metals were evaluated in the endangerment assessment.

4.5 CONTAMINATION ASSESSMENT: OLD BURN AREA

4.5.1 Site Description

The Old Burn Area is located in the south-central portion of N-TEAD along the southern boundary. The area is located east of the Chemical Range and southwest of the TNT Washout Facility. The site has also been called the Surveillance Test Site. From 1942 to the 1960s, functional testing on munitions was conducted at this site, as well as the hot and cold treatment of munitions. Also, there is evidence that burning and burial in trenches occurred at this site.

The only previous data available concerning the Old Burn Area are from the EPIC photos. These indicated the existence of a minimum of eight trenches over 300 feet in length and aligned in rows. The Old Burn Area covers approximately 21 acres and measures 500 feet by 1,800 feet.

The conceptual model for the Old Burn Area can be summarized as follows:

- Sources - Potential contaminant sources from the Old Burn Area include the eight burial/burning trenches where munitions were disposed.

- Pathways - Infiltration is the primary pathway by which contaminants from the trenches can migrate. Surface soil contaminants may be transported via wind erosion.

- Receptors - Potential receptors include groundwater users, if any. The area is inactive, so wind-blown surface soil, if contaminated, would not result in exposures.

4.5.2 Field Investigations and Results

Field investigations of the subsurface soil were conducted at the Old Burn Area. These investigations consisted of geophysical surveys within the suspected contamination area and soil boring installation/sampling outside this area (due to hazards from unexploded ordnance). The geophysical surveys consisted of magnetometry EM and GPR. Results of these surveys are discussed in Section 3. Since they were collected outside the suspected area of contamination, the subsurface soil samples do not directly characterize the contaminants that might migrate to groundwater from the Old Burn Area.

Geophysical investigations were conducted during the RI in the Old Burn Area (see Subsection 3.4.3). The magnetometer survey indicated buried waste containing ferrous materials in a large part of the eastern-half of the area, including the area under the revetments. The distribution of anomalous magnetic values indicated that the waste burial sites extended eastward and southward beyond the area investigated. The EM survey indicated buried waste in a smaller, central part of the Old Burn Area and in a larger, eastern part extending southward outside the area surveyed. The GPR survey indicated buried wastes in three areas within the larger areas of buried wastes in the eastern part of the site identified by the other two geophysical techniques.

Chemical analysis of the subsurface soil samples included explosives, metals, and anions collected from eight depths in four borehole locations (see Figure 4-6). The data, presented in Table 4-14, indicate that neither explosives nor nitrate/nitrite were present above the reporting limits in the soil borings to a depth of 50 feet in the Old Burn Area. The only anion present in concentrations above the reporting limit was fluoride, which was found at 6.18 and 7.28 ug/g near the surface (less than 10 feet deep) in borehole N-121-88. Borehole N-121-88 is immediately downgradient of the three easternmost burn trenches. Borehole N-121-88 also exhibited the highest concentrations of metals, particularly within the 15 to 20-foot depth. Metals detected include arsenic, beryllium, chromium, copper, nickel, and lead. Considerable levels of nickel were also detected in borehole N-123-88 at 20 feet and in borehole N-124-88 at 50 feet, where the levels were 44.5 ug/g and 64 ug/g, respectively. However, compared to offsite soils from Tooele County (USGS, 1981), the geometric mean concentrations of all metals at the Old Burn Area were less than the geometric means of the offsite soils. Among the metals not detected or analyzed for in the offsite study, beryllium was detected in only 6 of 32 samples from the Old Burn Area. Its geometric mean concentration was below the reporting limit and is not considered to be present at concentrations of concern. Cadmium was detected at low levels in only 2 of 32 samples and its presence is not considered to be of concern. Overall, no inorganics appear to be present at levels of concern in soils from the Old Burn Area.

No groundwater samples were collected from the Old Burn Area.

4.5.3 Data Summary and Conclusions

Chemical analysis of samples collected in the Old Burn Area (but outside the suspected contaminated areas) did not indicate explosives or anion contamination. Low levels of metals were detected. In particular, subsurface soil samples north of the three easternmost burn trenches indicated low levels of arsenic, beryllium, chromium, copper, nickel, and lead. However, the

Table 4-14

Analyses of Borehole Samples From the Old Burn Area

Parameter	Borehole N-121-88								Borehole N-122-88							
	1	2	3	4	5	6	7	8	1	2	3	4	5	6	7	8
	Concentrations in ug/g															
Depth (ft)	4.5	9.5	14.5	19.5	24.5	29.5	39.5	49.5	4.5	9.5	14.5	19.5	24.5	29.5	39.5	49.5
Explosives																
Metals																
Silver																
Arsenic	10.9		15.8	10.7												
Beryllium	0.47		1.03	0.79												0.337
Cadmium				1.06												
Chromium	45.9	5.43	70.0	62.0	6.87	5.96	7.47	10.6	11.5	11.0	13.6	6.90	10.1	9.64	8.35	15.1
Copper	33.8	6.50	41.7	51.0	4.75			6.57	6.93	10.1	8.30				6.72	8.36
Mercury																
Sodium	96.3	68.5	45.4	97.5	187	213	431	206	102	56.8	97.6	127	394	138	627	78.4
Nickel		7.52	6.52	5.25				10.1	14.9	7.40	15.6			5.70	8.06	12.7
Lead	10.6		12.9	15.4												
Antimony																
Selenium																
Thallium																
Zinc																
Anions																
Bromide																
Chloride																
Fluoride	6.18	7.28														
Nitrate/Nitrite																
Sulfate																

Table 4-14

Analyses of Borehole Samples From the Old Burn Area
(continued)

Concentrations in ug/g

Parameter	Borehole N-123-88								Borehole N-124-88							
	1	2	3	4	5	6	7	8	1	2	3	4	5	6	7	8
Depth (ft)	4.5	9.5	14.5	19.5	24.5	29.5	39.5	49.5	4.5	9.5	14.5	19.5	24.5	29.5	39.5	49.5
Explosives	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Metals																
Silver																
Arsenic																
Beryllium								0.419								0.787
Cadmium										2.36						
Chromium					6.03	4.33	6.45	13.5			5.1	5.22		7.97	8.31	53.6
Copper					6.38		6.88	8.83					5.22	6.92	4.89	25.7
Mercury																
Sodium	97.0	79.7	96.1	80	163	66.2	606	97.9	65.9	62.3	95.3	148	160	95.4	518	109
Nickel		8.18		44.5			10.5	13.5					7.03	23	6.81	64
Lead				10.1												
Antimony																
Selenium																
Thallium																
Zinc																69.2
Anions	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Bromide																
Chloride																
Fluoride																
Nitrate/Nitrite																
Sulfate																

ND = Parameters within this class of compounds were not detected.

Notes: Samples analyzed for all parameters indicated. A blank indicates that the parameter concentration was below the reporting limit.

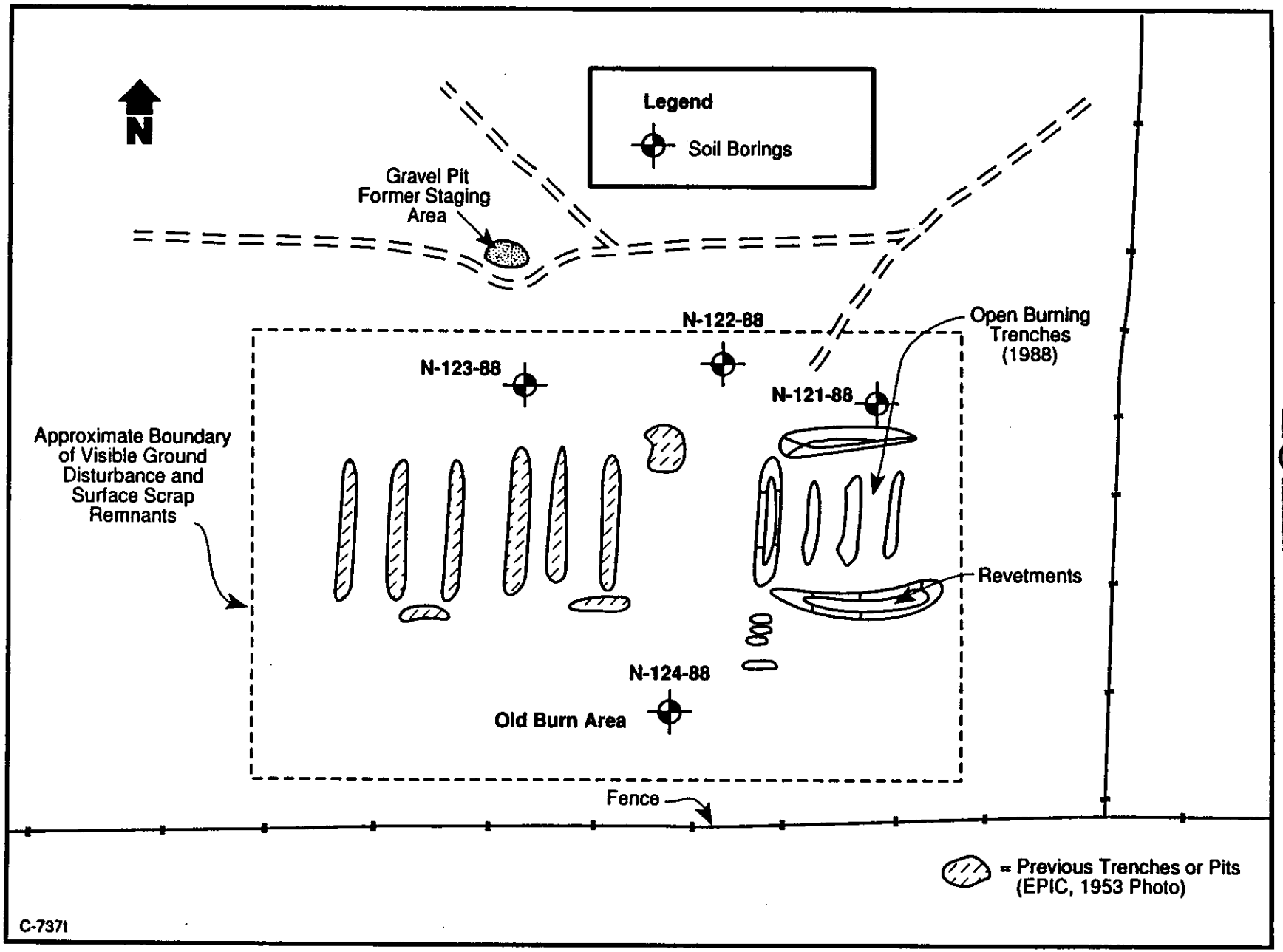

FIGURE 4-6 OLD BURN AREA BOREHOLE SAMPLING LOCATIONS

concentrations were not greater than concentrations from offsite soil analysis (USGS, 1981). Chemical analysis of soil samples from the suspected contaminated areas would be required to determine the presence and extent of contamination. No groundwater samples were collected from this study area.

4.6 CONTAMINATION ASSESSMENT: CHEMICAL RANGE

4.6.1 Site Background

The Chemical Range consists of a surveillance area, fire course, and chemical range area located on the southern boundary in the southwest section of N-TEAD. Chemical and pyrotechnic-type munitions were tested on the Chemical Range. Munitions tested included grenades, projectiles, and incendiary items such as bombs, grenades, pouch and document destroyers, riot-control agent-filled munitions, and flame thrower igniters. The Chemical Range was used from 1941 until the late 1960s or early 1970s. Two open trenches were observed during the site investigation in the northeast area near the surveillance buildings that were used for munition disposal.

No pre-existing sampling data were available for this site. The only information other than interviews of personnel, are the EPIC photos. These photos do not show any detail regarding the number or locations of old trenches.

The conceptual site model for the Chemical Range can be summarized as follows:

- Sources - Potential contaminant sources from the Chemical Range include the two open trenches used for munition disposal.
- Pathways - Infiltration is the primary pathway by which contaminants from the trenches can migrate. Direct contact and air dispersion are other potential pathways due to the trenches being open (as of the RI site investigations). These open trenches also allow potential surface water drainage/runoff, although it is not probable due to high evaporation rates.
- Receptors - Potential receptors include groundwater users, if any. Direct contact by passers-by is also possible.

4.6.2 Field Investigations and Results

Field investigations of the near surface soils were conducted at the Chemical Range. The objectives of these investigations were to assess soil contamination near the disposal trenches.

The subsurface investigation involved geophysical surveys using magnetometry. The results indicated the potential for buried ferrous materials, as described in Subsection 3.2.3.4. The surface soil investigation was limited to the sampling and analysis of 12 locations in the vicinity of the two disposal trenches in the Chemical Range (see Figure 4-7). The samples were collected from the berms adjacent the disposal trenches in approximately 6 to 12-inch intervals below the soil surface. Samples were analyzed for explosives, metals, and anions, as indicated in Table 4-15.

A magnetometer survey conducted during the RI at the Chemical Range indicated a 7,000-square-foot area of buried waste containing ferrous materials located south of the two open trenches (see Subsection 3.4.4). The highest magnetic values were measured in the central and northern part of this area.

Results of the near surface soil sampling indicated low-level metals contamination only. None of the explosives were found above detection limits. The only anion found above detection limits was fluoride, at an average concentration of 6.2 ug/g at four locations. The metals analysis indicated that the following analytes were not above reporting limits: silver, arsenic, mercury, antimony, selenium, and thallium. Beryllium was found in concentrations just exceeding the reporting limit of 0.33 ug/g. Cadmium, chromium, and copper were all found within one order of magnitude above their reporting limits. The highest reported concentrations for sodium, nickel, and lead were 213 ug/g, 26.9 ug/g, and 37.1 ug/g, respectively. Zinc was found at a maximum concentration of 2,000 ug/g at location CR-88-02. Overall, only nickel and zinc were present at concentrations exceeding those found in soils during the USGS study (1981) based on a comparison of geometric mean concentrations.

4.6.3 Data Summary and Conclusions

Chemical data collected from the Chemical Range did not indicate explosive or anion contamination, but did indicate low-level metal contamination in the near surface soils of the Chemical Range. Nickel and zinc appeared to be at levels exceeding background concentrations. No groundwater samples were collected in the Chemical Range.

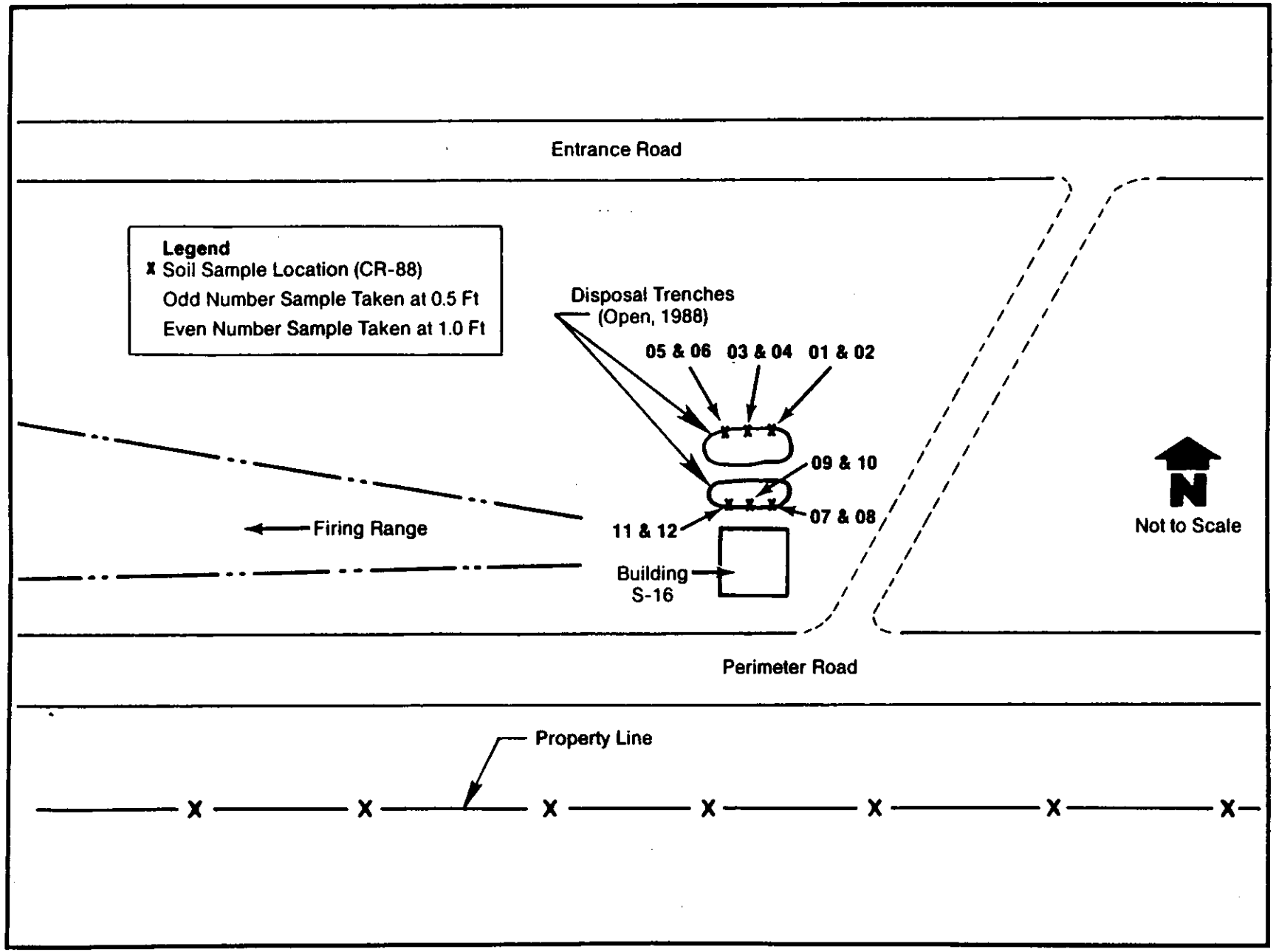

FIGURE 4-7 CHEMICAL RANGE SAMPLING LOCATIONS

Table 4-15

Analyses of Soil Samples From the Chemical Range

Parameters	CR-88-01	CR-88-02	CR-88-03	CR-88-04	CR-88-05	CR-88-06	CR-88-07	CR-88-08	CR-88-09	CR-88-10	CR-88-11	CR-88-12
	Concentrations in ug/g											
Explosives	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Metals												
Silver												
Arsenic												
Beryllium	0.381	0.328	0.331	0.375	0.403	0.411		0.292	0.431	0.511	0.361	0.398
Cadmium	1.66						3.19				1.51	
Chromium	18.7	14.8	15.3	20.0	19.6	21.4	17.3	17.7	21.8	21.7	20.4	17.9
Copper	19.8	11.6	12.2	9.75	16.9	12.2	15.8	8.73	11.5	11.6	22.4	11.3
Mercury												
Sodium	119	13.2	50.2	213	149	144	108	117	117	112	116	131
Nickel	17.9			17.7	20.0	16.7	17.4	26.9	15.5	23.9	19.3	21.1
Lead	10.8	37.1	7.91	6.22	9.77	7.24	8.29		8.87	7.51	13.7	8.64
Antimony												
Selenium												
Thallium												
Zinc	384	2,000	137	118	111	77.2	752		70.5		886	125
Anions	ND	ND	ND	ND	ND	ND				ND	ND	
Bromide												
Chloride												
Fluoride							5.86	6.45	6.2			6.26
Nitrate/Nitrite												
Sulfate												

Notes: Samples analyzed for all parameters indicated. A blank indicates that the parameter concentration was less than the reporting limit. Sampling interval was 0.5 to 1 foot below soil surface.

SECTION 5
ENDANGERMENT ASSESSMENT

This Endangerment Assessment has been prepared by Clement Associates, Inc., 9300 Lee Highway, Fairfax, Virginia 22031, under subcontract to Roy F. Weston (Weston) and is part of Weston's Remedial Investigation (RI) report prepared for the United States Army Toxic and Hazardous Materials Agency (USATHAMA).

5.1 INTRODUCTION

This endangerment assessment addresses the potential human health and environmental impacts associated with North Tooele Army Depot (N-TEAD), in Tooele, Utah under the no-action alternative--that is, in the absence of remedial (corrective) action. Evaluation of the no-action alternative is required under Section 300.68 (f)(v) of the National Contingency Plan.

This assessment follows EPA guidance for risk assessment in general and for Superfund sites in particular (EPA 1986a,b,c,d) and is based primarily on data discussed in earlier sections of this report. This assessment is generally regarded as a preliminary assessment, since the RI sampling plan was not designed to completely characterize chemical contamination in all of the study areas at N-TEAD. Consequently, assessments of risks for this site are generally regarded as preliminary. However, based on these preliminary evaluations of risk, it may be determined that no further actions are needed in some study areas.

The assessment is organized as follows:

- Section 5.2 Identification of Chemicals of Potential Concern. Chemicals detected above reportable levels in sampled media (soil and groundwater) are identified, and chemicals considered to be site-related are selected for evaluation. Reportable levels are defined as concentrations which are above USATHAMA certified reporting levels (CRLs). In the absence of CRLs, reportable levels are defined as concentrations above the USATHAMA standard reporting levels (SRLs)[1].

[1]USATHAMA CRLs and SRLs are listed in Table 2-7 in Section 2 of the RI report.

The next three sections, 5.3, 5.4, and 5.5, constitute the components of the human health endangerment assessment.

- Section 5.3 Human Exposure Assessment. Mechanisms and pathways of contaminant migration are discussed, and pathways through which human populations are potentially exposed to site-related chemicals are characterized. In addition, concentrations of chemicals in environmental media at potential exposure points are identified. Exposure point concentrations are derived using available sampling data.

- Section 5.4 Human Toxicity Assessment. Chemicals of potential concern are characterized with respect to their toxic effects in humans, and health effects criteria are identified.

- Section 5.5 Human Risk Characterization. As one measure of risk, concentrations of site-related chemicals in environmental media at exposure points are compared with applicable or relevant and appropriate requirements (ARARs). In addition, quantitative risk estimates are developed by combining the estimated intakes of potentially exposed populations (derived using conservative assumptions regarding exposure duration, route, frequency, and absorption of chemicals) with health effects criteria.

- Section 5.6 Environmental Assessment. Risks are evaluated for plants and animals potentially exposed to site-related chemicals. Potential receptors are identified, exposure is assessed, and relevant toxicity data are summarized. Then, information on exposure and toxicity are combined to evaluate potential impacts in the selected receptor species.

- Section 5.7 Uncertainties. The uncertainties and limitations of the endangerment assessment are discussed.

- Section 5.8 Summary and Conclusions. The main features and conclusions of the endangerment assessment are summarized.

5.2 IDENTIFICATION OF CHEMICALS OF POTENTIAL CONCERN

As discussed in earlier sections of this report, the RI at N-TEAD has focussed on five study areas: 1) TNT Washout Facility, 2) Sanitary Landfill, 3) Drum Storage Area, 4) Old Burn Area, and 5) Chemical Range. The extent of contamination in each of these areas has been discussed and evaluated in previous sections of this report, and therefore will not be repeated in this section. However, summary data are presented for those chemicals selected in Section 4 for further evaluation. From this summary data, chemicals of potential concern are selected for each medium sampled in each study area. (Not all media were sampled in each study area; air was not sampled in any study area.) Chemicals of potential concern are defined to be those chemicals present at the site because of past activities and include only those chemicals detected[2] at concentrations above naturally occurring levels which have not been determined definitely to be sampling or laboratory artifacts. The comparisons to naturally occurring (background) levels were conducted by Weston and have been discussed in detail in Section 4 of this report. Chemicals determined to be present at background concentrations were eliminated from further evaluation.

Data are summarized by presenting frequency of detection and geometric mean and maximum concentrations for each chemical in each medium in each study area. The following guidelines were used in summarizing data:

- To calculate geometric means for media in which a chemical was positively detected in at least one sample, nondetects were included in the mean calculation by using one-half of the USATHAMA CRL or SRL. The one-half value is commonly assigned to nondetects when averaging data for risk assessment purposes because the actual value could be between 0 and a value just below the detection limit.

- Concentrations reported for duplicate samples from a given sampling point were first averaged by calculating a geometric mean of the sample and its duplicate.

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[2]Throughout this endangerment assessment, the term "detected" means detected above a reportable level (i.e., the USATHAMA CRLs or SRLs).

- Data for polycyclic aromatic hydrocarbons (PAHs) were summarized for the individual PAHs and for total carcinogenic and noncarcinogenic PAHs.

- For metals present in groundwater above background concentrations, data are presented for unfiltered (total) and filtered (dissolved) concentrations.

The data summary tables in this section do not include information on those compounds that were detected at the site but were not positively identified chemically, although sampling results for these chemicals (referred to in the text as unknowns or tentatively identified compounds) are discussed in this section. These compounds cannot be evaluated quantitatively in this endangerment assessment because of the uncertainty surrounding their identity and concentrations.

Chemicals of potential concern are discussed below by study area and medium.

5.2.1 TNT WASHOUT FACILITY

Subsurface soil and groundwater were sampled at the TNT Washout Facility.

5.2.1.1 Subsurface Soil

Subsurface soil samples were collected from twelve soil borings (N-101-88 through N-109-88 and N-128-88 through N-130-88) at the TNT Washout Facility. Sample depths for samples N-101-88 through N-109-109 were between 4.5 and 44 feet; those for samples N-128-88 through N-130-88 were greater than 200 feet. Table 5-1 summarizes the sampling data for the positively identified organic chemicals and for the inorganic chemicals detected above background concentrations (as determined in Section 4.2). Data for each boring in which chemicals were detected are presented separately. The chemical concentration value given is the mean of the concentrations at different depths within the boring.

1,1,1-TCA, 2,4-DNT, HMX, RDX, and 1,3,5-TNB were the organic chemicals positively identified in these samples and are selected as chemicals of potential concern for the subsurface soils of this area. The explosives (i.e., 2,4-DNT, HMX, RDX) and explosive-related compounds (1,3,5-TNB) were detected in the highest concentrations in shallow boring samples N-109-88 and N-108-88 (although still at relatively low concentrations). Soil

TABLE 5-1

SUMMARY OF GEOMETRIC MEAN CHEMICAL CONCENTRATIONS IN SOIL BORINGS AT THE TNT WASHOUT FACILITY AT N-TEAD (a)

(Concentration in mg/kg)

CHEMICAL (b)	SAMPLE (c) 101	102	103	104	108	109	128 (d)	130 (d)
Organic Chemicals								
1,1,1-Trichloroethane	NA	NA	NA	--	NA	--	--	0.44
2,4-Dinitrotoluene	--	--	--	--	--	0.31	--	--
HMX	--	--	--	--	1.0	1.2	--	--
RDX	--	--	--	0.89	1.4	3.9	--	--
1,3,5-Trinitrobenzene	2.0	--	--	--	2.9	6.0	--	--
Inorganic Chemicals (e)								
Chloride	14,000	14,000	15,000	8,800	NA	NA	NA	NA
Nitrate/Nitrite	--	--	--	--	393	--	1,100	--
Sulfate	11,000	13,000	--	--	--	NA	NA	NA

(a) Concentrations averaged across depth within each soil boring. Concentrations rounded to two significant figures.

(b) All chemicals listed are selected as chemicals of potential concern.

(c) Complete sample name is preceded by an "N" and followed by -88. Shallow borings (4.5 to 44 feet) except as noted. No chemicals detected in borehole samples N-105-88, N-106-88, N-107-88, and N-129-88. Chemical analyses limited to nitroaromatics, nitrate/nitrite and sodium analysis in N-105-88, N-106-88 and N-107-88; and to VOCs, nitroaromatics and nitrate/nitrite analyses in N-129-88.

(d) Deep boring (>200 feet).

(e) Inorganic chemical analyses were for anions and sodium only.

NA = Sample not analyzed for this chemical.

-- = Chemical not detected at a concentration above the reportable level. See Table 2-7 for chemical-specific reportable level.

boring N-109-88 is located immediately downgradient of the e/p ponds and soil boring N-108-88 is located slightly downgradient of boring N-109-88. The only organic chemical detected in the borings sampled at greater than 200 feet was 1,1,1-TCA, which was detected in soil boring sample N-130-88 at a depth of 243 feet. Soil boring N-130-88 is located approximately 1,000 feet downgradient of the e/p ponds. Unidentified hydrocarbons also were detected in this soil boring.

Chloride, nitrate/nitrite, and sulfate were the inorganic chemicals detected in the subsurface soil samples from the TNT Washout Facility (samples were not analyzed for metals). As discussed in Section 4, background concentrations of these potentially naturally occurring chemicals in soil were not available for comparison with the measured concentrations, therefore all of the inorganic chemicals detected are selected by default as chemicals of potential concern for this area. Nitrate/nitrite was detected at a maximum concentration in deep boring N-128-88, located about 1,000 feet downgradient of the e/p ponds. The only other boring in which nitrate/nitrite was detected was shallow boring N-108-88, located slightly downgradient of the e/p ponds. Chloride was detected at the highest concentration in boring N-103-88. Sulfate was detected at a maximum concentration in boring N-102-88. Samples N-102-88 and N-103-88 are located slightly downgradient of the laundry effluent pond and approximately 500 feet downgradient of the e/p ponds.

5.2.1.2 Groundwater

Groundwater samples were collected at the TNT Washout Facility from six deep wells (N-3A, N-3H, and N-127 through N-130) and two shallow wells (N-3F and N-3I) located downgradient of the e/p ponds. Table 5-2 summarizes the sampling data for the positively identified organic chemicals and for the inorganic chemicals detected above background concentrations (as determined in Section 4.2). (Inorganic chemical analyses were limited to nitrate/nitrite and sulfate.) Data for shallow wells (perched groundwater) and deep wells (regional aquifer) are presented separately.

HMX and RDX were the only organic chemicals detected in the shallow groundwater zone and are selected as chemicals of potential concern. Nitrate/nitrite and sulfur were detected in the shallow groundwater zone at concentrations above background concentrations and also are selected as chemicals of potential concern.

TABLE 5-2

SUMMARY OF CHEMICALS POSITIVELY IDENTIFIED IN GROUNDWATER
AT THE TNT WASHOUT FACILITY AT N-TEAD

(Concentration in ug/l)

GROUNDWATER/ CHEMICAL (a)	FREQUENCY OF DETECTION	CONCENTRATION (b) GEOMETRIC MEAN	CONCENTRATION (b) MAXIMUM
SHALLOW (c)			
Organic Chemicals			
HMX	1/2	3.9	23
RDX	2/2	120	270
Inorganic Chemicals (d)			
Nitrate/Nitrite	2/2	24,000	49,000
Sulfate	2/2	900,000	1,200,000
DEEP (e)			
Organic Chemicals			
Acetone	4/6	14	38
Methylene chloride	1/6	3.5	20
RDX	2/6	1.1	29
2,4,6-TNT	4/6	0.86	1.9
Inorganic Chemicals (d)			
Nitrate/Nitrite	6/6	16,000	44,000
Sulfate	6/6	460,000	1,800,000

(a) All chemicals listed are selected as chemicals of potential concern.

(b) Concentration rounded to two significant figures.

(c) Wells N-3F and N-3I.

(d) Inorganic chemical analyses limited to nitrate/nitrite and sulfate.

(e) Wells N-3A, N-3H, N-127, N-128, N-129, and N-130.

In the deep aquifer, RDX, TNT, acetone, and methylene chloride were the organic chemicals detected. Acetone and methylene chloride are common sampling and laboratory contaminants and may be present in the deep groundwater samples as a result of sampling and/or laboratory contamination, rather than as a result of site-related activities. However, these two chemicals were not present in laboratory blanks at concentrations above the SRL or CRL. Therefore, these chemicals are selected as chemicals of potential concern along with the other organic chemicals detected in the deep groundwater. Nitrate/nitrite and sulfur were detected in the deep groundwater at concentrations above background concentrations and also are selected as chemicals of potential concern. Unknown VOCs were also detected in deep groundwater of the area.

Only RDX, nitrate/nitrite and sulfate were detected in both the shallow groundwater zone and the deep aquifer. RDX was at much higher concentrations in the shallow groundwater zone compared to the deep aquifer, with a mean concentration approximately 100 times greater in the shallow groundwater zone. Nitrate/nitrite and sulfate concentrations were slightly greater in the shallow groundwater zone compared to the deep aquifer. HMX was detected only in the shallow groundwater zone; acetone, methylene chloride and TNT were detected only in the deep aquifer.

5.2.2 SANITARY LANDFILL

Subsurface soil and groundwater were sampled at the Sanitary Landfill.

5.2.2.1 Subsurface Soil

Subsurface soil samples were collected from two soil borings (N-115-88 and N-117-88) located downgradient of the Sanitary Landfill at sample depths between 60 and 110 feet. Table 5-3 summarizes the sampling data for the positively identified organic chemicals and for the inorganic chemicals detected above background concentrations (as determined in Section 4.3). Data for each boring are presented separately. The chemical concentration value given is the mean of the concentrations at different depths within the boring.

Bis(2-ethylhexyl)phthalate, detected at a trace level (0.8 mg/kg) in sample N-117-88, was the only organic chemical detected in the subsurface soil samples. This chemical is a common laboratory contaminant and may have been present in the sample as a result of analytical procedures, rather than as a result of site-related

TABLE 5-3

SUMMARY OF GEOMETRIC MEAN CHEMICAL CONCENTRATIONS IN SOIL BORINGS AT THE SANITARY LANDFILL AT N-TEAD (a)

(concentrations in mg/kg)

CHEMICAL (b)	SAMPLE N-115-88	SAMPLE N-117-88
Organic Chemicals		
Bis(2-ethylhexyl)phthalate	--	0.35
Inorganic Chemicals (c)		
Nickel	17	16

(a) Concentrations averaged across depth within a boring (depths between 60 and 110 feet). Concentrations rounded to two significant figures.

(b) All chemicals listed are selected as chemicals of of potential concern.

(c) Nickel was the only inorganic chemical detected above background concentrations. See text.

-- = Chemical not detected in this boring at a concentration above the reportable level. See Table 2-7 for chemical-specific reportable level.

activities, although it was not detected in laboratory blanks at concentrations above the reportable level. Because this chemical may be site-related, it is selected as a chemical of potential concern for the subsurface soil of this area. Nickel, detected in both soil borings, was the only inorganic chemical detected at a concentration above background concentrations and also is selected as a chemical of potential concern.

5.2.2.2 Groundwater

Groundwater samples in the Sanitary Landfill were collected from four downgradient wells (N-115-88, N-116-88, N-117-88 and N-119-88) and two crossgradient wells (N-118-88 and N-120-88). Groundwater samples also were collected from two wells (T-7 and N-111-88) upgradient of the landfill but are not used here in the evaluation of the potential groundwater impacts associated with the landfill. These wells also were not used to characterize background concentrations (see Section 4.0 for a discussion) Depth to groundwater in this area is approximately 250 to 300 feet. Table 5-4 summarizes the sampling data for the positively identified organic chemicals in these wells and for the inorganic chemicals detected above background concentrations (as determined in Section 4.3).

For the downgradient wells, benzene, trans-1,2-DCE, TCE, and RDX were the organic chemicals positively identified in groundwater samples and are selected as chemicals of potential concern. Unidentified hydrocarbons and other tentatively identified compounds also were detected in the downgradient groundwater samples. Benzene and RDX were detected in only one of four samples; benzene was detected in well N-119-88, located at the northern edge of the landfill and RDX was detected in well N-115-88, located at the western edge. Arsenic, copper, lead, nickel, silver, and zinc were detected in groundwater at concentrations above that detected in background samples. These inorganic chemicals are selected as chemicals of potential concern for the downgradient wells.

The only organic chemical positively identified in the crossgradient well samples was TCE (detected in well N-120-88). Well N-120-88 is located near the northern border of the landfill. As discussed in Section 4.3, the presence of TCE in this well may be unrelated to the landfill but may be due to overland transport of TCE from the industrial wastewater ditches (located northeast of the landfill) and subsequent infiltration to groundwater[3]. TCE is selected as a chemical of potential

[3]Investigation of the industrial wastewater lagoon and ditches are not a part of this remedial investigation.

TABLE 5-4

SUMMARY OF CHEMICALS POSITIVELY IDENTIFIED IN GROUNDWATER AT THE SANITARY LANDFILL AT N-TEAD

(Concentration in ug/l)

LOCATION/ CHEMICAL (a)	FREQUENCY OF DETECTION	CONCENTRATION (b) GEOMETRIC MEAN	CONCENTRATION (b) MAXIMUM
DOWNGRADIENT (c)			
Organic Chemicals			
Benzene	1/4	0.42	0.85
trans-1,2-Dichloroethene	2/4	2.1	11
Trichloroethene	4/4	17	48
RDX	1/4	0.72	8.6
Inorganic Chemicals (d)			
Arsenic			
Total	4/4	7.0	8.9
Copper			
Total	4/4	32	65
Dissolved	4/4	4.4	6.5
Lead			
Total	4/4	15	21
Dissolved	2/4	2.3	4.4
Nickel			
Total	4/4	31	58
Dissolved	1/4	7.2	24
Silver			
Total	1/4	0.13	0.32
Dissolved	1/4	0.15	0.53
Zinc			
Total	4/4	390	1,900
Dissolved	4/4	200	2,400
CROSSGRADIENT (e,f)			
Organic Chemicals			
Trichloroethene	1/2	0.63	1.1
Inorganic Chemicals			
Arsenic			
Total	1/2	3.7	5.4
Copper			
Total	2/2	21	23
Dissolved	2/2	6.1	9.1
Lead			
Total	2/2	20	37
Dissolved	1/2	2.6	5.3
Nickel			
Total	2/2	32	38
Dissolved	1/2	9.4	19
Zinc			
Total	2/2	1,400	1,900
Dissolved	2/2	600	1,000

(a) All chemicals listed are selected as chemicals of potential concern.

(b) Concentration rounded to two significant figures.

(c) Wells N-115-88, N-116-88, N-117-88, and N-119-88.

(d) Arsenic, copper, lead, nickel, silver, and zinc were the only inorganic chemicals detected at concentrations above background concentrations. See text.

(e) Wells N-118-88 and N-120-88.

(f) Arsenic, copper, lead, nickel, and zinc were the only inorganic chemicals detected at concentrations above background concentrations. See text.

concern for the crossgradient wells, however, because it also was detected in groundwater samples from downgradient wells and may be related to the landfill. The inorganic chemicals detected in crossgradient wells at concentrations above those detected in background samples and therefore selected as chemicals of potential concern are arsenic, copper, lead, nickel, and zinc. Several unidentified hydrocarbons were detected in well N-120-88.

5.2.3 DRUM STORAGE AREA

Soil and groundwater were sampled in the Drum Storage Area.

5.2.3.1 Surface and Near-Surface Soil

Surface soil (0 to 6 inches) and near-surface soil (6 to 24 inches) samples were collected from the Drum Storage Area. Table 5-5 summarizes the sampling data for the positively identified organic chemicals in the surface soil samples; Table 5-6 summarizes this data across all depths. No inorganic chemicals were detected in surface or near surface soil samples at concentrations statistically greater than background concentrations (see Section 4.4).

PAHs were the only organic chemicals positively identified in both surface and near-surface soil samples. In addition, unknown hydrocarbons, unknown PAH derivatives, and two tentatively identified compounds (benzo[b]naptho[1,2-D]thiophene and an unspecified phthalate ester) were detected in soil samples from the Drum Storage Area.

PAHs are not selected as chemicals of potential concern. As discussed in Section 4.4, most of the Drum Storage Area is covered by a compacted gravel surface and overlain by one-half to one inch of asphalt. PAHs are known constituents of asphalt. Concentrations ranging over 50 mg/kg have been reported for individual PAHs in certain grades of asphalt cements, with total PAH concentrations exceeding 200 mg/kg (IARC 1985). Given this information as well as the low concentrations of PAHs in the soil samples relative to that in asphalt, it is possible that the positively identified PAHs in the soil samples of the Drum Storage Area are present as a result of leaching from the surrounding asphalt rather than past waste disposal practices at the site. Therefore, no chemicals of potential concern are selected for the soils of this area. Asphalt also may be the source of some of the unknown and tentatively identified compounds detected in the soil samples of this area.

TABLE 5-5

ORGANIC CHEMICALS POSITIVELY IDENTIFIED IN SURFACE SOIL
AT THE DRUM STORAGE AREA AT N-TEAD (SUMMARY FOR 0-6")(a)

(Concentration in mg/kg)

CHEMICAL	FREQUENCY OF DETECTION	CONCENTRATION (b)	
		GEOMETRIC MEAN	MAXIMUM
ORGANIC CHEMICALS			
PAHs (carcinogenic)			
Benzo(a)anthracene	2/8	0.19	0.5
Benzo(a)pyrene	2/8	0.21	0.66
Benzo(b)fluoranthene	1/8	0.18	0.6
Chrysene	2/8	0.24	1.7
Total	2/8	0.84	3.4
PAHs (noncarcinogenic)			
Pyrene	2/8	0.32	5.4
Total	2/8	0.32	5.4

(a) Samples SS-DS-01-01 through SS-DS-08-01. No inorganic chemicals were detected at concentrations above background concentrations.

(b) Concentrations rounded to two significant figures.

TABLE 5-6

ORGANIC CHEMICALS POSITIVELY IDENTIFIED IN SURFACE AND NEAR-SURFACE SOIL AT THE DRUM STORAGE AREA AT N-TEAD (SUMMARY FOR 0-2')(a)

(Concentration in mg/kg)

CHEMICAL	FREQUENCY OF DETECTION	CONCENTRATION (b)	
		GEOMETRIC MEAN (c)	MAXIMUM (d)
ORGANIC CHEMICALS			
PAHs (Carcinogenic)			
Benzo(a)anthracene	2/8	0.16	0.22
Benzo(a)pyrene	2/8	0.17	0.25
Benzo(b)fluoranthene	1/8	0.16	0.24
Chrysene	2/8	0.18	0.47
Total	2/8	0.68	1.20
PAHs (Noncarcinogenic)			
Fluoranthene	1/8	0.16	0.24
Pyrene	2/8	0.20	0.5
Total	3/8	0.38	0.79

(a) Samples SS-DS-01 through SS-DS-08, across all depths. No inorganic chemicals were detected at concentrations above background concentrations.

(b) Concentration rounded to two significant figures.

(c) Calculated by first averaging across depth within a sample and then across samples.

(d) Maximum average concentration across depth.

5.2.3.2 Subsurface Soil

Subsurface soil was collected from three soil borings (N-112-88, N-113-88 and N-114-88) in the Drum Storage Area. Shallow samples were collected from depths between 28 and 50 feet, and deep samples were collected from depths between 310 and 340 feet. Table 5-7 summarizes the sampling data for the shallow and deep samples for the positively identified organic chemicals and for the inorganic chemicals detected above background concentrations (as determined in Section 4.4).

No organic chemicals were positively identified in the shallow boring samples. Selenium (sample N-113-88) was the only inorganic chemical detected at a concentration above background concentrations, and is selected as a chemical of potential concern for the shallow subsurface soil. Bis(2-ethylhexyl) phthalate was the only organic chemical positively identified in the deep subsurface soil samples. Although the presence of this chemical in the sample may not be site-related (for reasons discussed previously), it is selected as a chemical of potential concern in the absence of more definitive information regarding its source. No inorganic chemicals were detected in the deep subsurface soil samples at concentrations above those detected in background samples. Unknown semivolatile chemicals were identified in both shallow and deep subsurface samples.

5.2.3.3 Groundwater

Groundwater was sampled from two wells (N-112-88 and N-114-88) in the Drum Storage Area. Depth to groundwater in this area is approximately 300 feet. Table 5-8 presents the sampling results for organic chemicals and for inorganic chemicals detected at concentrations above background concentrations (as determined in Section 4.4). Bis(2-ethylhexyl)phthalate was the only organic chemical detected in the groundwater. This chemical was detected in well N-114-88 at a maximum concentration of 790 ug/liter. This chemical also was detected in background well sample N-TEAD #1. This fact along with the fact that bis(2-ethylhexyl) phthalate is a common laboratory contaminant suggests that the compound may not be present in the Drum Storage Area groundwater as a result of past activities at the Drum Storage Area. Nevertheless, it is conservatively selected as a chemical of potential concern for this area.

Arsenic, beryllium, chromium, copper, lead, nickel, silver, and zinc were the inorganic chemicals detected in groundwater at concentrations above background concentrations. None of these chemicals was detected in any soil sample (deep or shallow) from the area at concentrations above background concentrations.

TABLE 5-7

SUMMARY OF GEOMETRIC MEAN CHEMICAL CONCENTRATIONS IN SOIL BORINGS AT THE DRUM STORAGE AREA AT N-TEAD

(Concentration in mg/kg)

CHEMICAL (c)	SHALLOW SAMPLES (a)		DEEP SAMPLES (b)	
	N-113-88	N-114-88	N-112-88	N-114-88
Organic Chemicals				
Bis(2-ethylhexyl)phthalate	--	--	1.9	--
Inorganic Chemicals (d)				
Selenium	3.8	--	--	--

(a) Sample depths between 28 and 50 feet. Concentrations averaged across depths and rounded to two significant figures.

(b) Sample depths between 310 and 340 feet. Concentration averaged across depths and rounded to two significant figures.

(c) All chemicals listed are selected as chemicals of potential concern.

(d) Selenium was the only inorganic chemical detected at a concentration above background. See text.

-- = Chemical not detected at a concentration above the reportable level. See Table 2-7 for chemical-specific reportable level.

TABLE 5-8

SUMMARY OF CHEMICALS POSITIVELY IDENTIFIED IN GROUNDWATER AT THE DRUM STORAGE AREA AT N-TEAD (a)

(Concentration in ug/l)

CHEMICAL (b)	FREQUENCY OF DETECTION	CONCENTRATION (c) GEOMETRIC MEAN	CONCENTRATION (c) MAXIMUM
Organic Chemicals			
Bis(2-ethylhexyl)phthalate	1/2	o3	790
Inorganic Chemicals (d)			
Arsenic			
Total	2/2	6.8	7.7
Beryllium			
Total	1/2	0.28	1.6
Chromium			
Total	1/2	31	52
Copper			
Total	1/2	91	220
Dissolved	2/2	3.3	12
Lead			
Total	2/2	33	45
Nickel			
Total	2/2	230	290
Dissolved	1/2	14	42
Silver			
Total	1/2	0.49	2.6
Dissolved	1/2	0.14	0.21
Zinc			
Total	2/2	450	470
Dissolved	2/2	65	66

(a) Wells N-112-88 and N-114-88.

(b) All chemicals listed are selected as chemicals of potential concern.

(c) Concentration rounded to two significant figures.

(d) Only inorganic chemicals detected above background concentrations are presented.

5.2.4 OLD BURN AREA

Subsurface soils were sampled from four borings (N-121-88 through N-124-88) located along the perimeter of the Old Burn Area. Sample depths ranged from 4.5 to 49.5 feet. No organic chemicals were detected in the samples, and no inorganic chemicals were detected at concentrations above background concentrations (as discussed in Section 4.5). Therefore, no chemicals of potential concern were selected for the Old Burn Area.

5.2.5 CHEMICAL RANGE

Near-surface (6 or 12 inch depths) soil samples were collected from 12 locations adjacent to 2 disposal trenches at the Chemical Range. No organic chemicals were detected. Nickel and zinc (detected in 10 out of 12 samples) were the only inorganic chemicals detected at concentrations above background concentrations and these chemicals are selected as chemicals of potential concern for this area. Sampling data for these chemicals is presented in Table 5-9.

5.2.6 SUMMARY OF CHEMICALS OF POTENTIAL CONCERN

Table 5-10 summarizes the chemicals of potential concern by medium within each study area. No chemicals of potential concern were identified for the Old Burn Area or in the surface and near-surface soils of the Drum Storage Area. Chemicals of potential concern include explosives at the TNT Washout Facility and Sanitary Landfill; nitrate/nitrite at the TNT Washout Facility; volatile organic chemicals at the Sanitary Landfill; and metals at the Drum Storage Area, Chemical Range, and Sanitary Landfill. A few organic chemicals detected at the TNT Washout Facility, Sanitary Landfill, and Drum Storage Area are suspected laboratory contaminants, although they were not detected in laboratory blanks at concentrations above the reporting limit.

5.3 EXPOSURE ASSESSMENT

This section addresses the potential pathways by which human populations may be exposed to chemicals of potential concern at, or originating from, the study areas at the N-TEAD. Both current and likely future land-use of the site and surrounding areas are considered when identifying potential exposure pathways. In addition, the mechanisms by which the chemicals of potential concern at the site may migrate in the environment are considered. Such an evaluation is an important step in

TABLE 5-9

SUMMARY OF CHEMICALS DETECTED IN NEAR-SURFACE SOIL
AT THE CHEMICAL RANGE AT N-TEAD (a)

(Concentration in mg/kg)

CHEMICAL (b)	FREQUENCY OF DECTECTION	CONCENTRATION (c)	
		GEOMETRIC MEAN	MAXIMUM
Nickel	10/12	14	27
Zinc	10/12	170	2000

(a) No organic chemicals were detected. Nickel and zinc were the only inorganic chemicals detected at concentrations above background concentrations. See text.

(b) Selected as chemicals of potential concern.

(c) Concentration rounded to two significant figures.

TABLE 5-10

SUMMARY OF CHEMICALS OF POTENTIAL CONCERN FOR N-TEAD

TNT WASHOUT FACILITY

Subsurface Soil:

- 2,4-Dinitrotoluene
- HMX
- RDX
- 1,1,1-Trichloroethane
- 1,3,5-Trinitrobenzene
- Chloride
- Nitrate/Nitrite
- Sulfate

Groundwater:

- Acetone
- HMX
- RDX
- Methylene Chloride
- 2,4,6-TNT
- Nitrate/Nitrite
- Sulfate

OLD BURN AREA

- No chemicals selected

CHEMICAL RANGE

Near-Surface Soil:

- Nickel
- Zinc

SANITARY LANDFILL

Subsurface Soil:

- Bis(2-ethylhexyl)phthalate
- Nickel

Groundwater:

- Benzene
- trans-1,2-Dichloroethene
- RDX
- Trichloroethene
- Arsenic
- Copper
- Lead
- Nickel
- Silver
- Zinc

DRUM STORAGE AREA

Surface and Near-Surface Soil:

- No chemicals selected

Subsurface Soil:

- Bis(2-ethylhexyl)phthalate
- Selenium

Groundwater:

- Bis(2-ethylhexyl)phthalate
- Arsenic
- Beryllium
- Chromium
- Copper
- Lead
- Nickel
- Silver
- Zinc

identifying potential exposure pathways because chemical migration can result in the movement of a chemical from a source to a potentially exposed population.

Chemical migration pathways are discussed in Section 5.3.1 followed in Section 5.3.2 by a discussion of potential exposure pathways and an identification of the exposure pathways and exposure point concentrations that will be evaluated in this assessment. Section 5.3.3 summarizes the human exposure pathways to be evaluated in this assessment.

5.3.1 CHEMICAL MIGRATION PATHWAYS

The transport of chemicals at N-TEAD is influenced by the environmental characteristics of the site, the characteristics of the source areas, and the physical and chemical properties of the chemicals. Site environmental and source area characteristics have been discussed in previous sections of this RI report. In this section, the physical and chemical properties of the chemicals of potential concern are discussed. Then this information is combined with information on site and source characteristics to identify potential migration pathways.

5.3.1.1 Physical and Chemical Properties of the Chemicals of Potential Concern

The chemicals of potential concern can be classified into the following general categories according to their similarity in chemical structure and/or physicochemical properties (i.e., factors that would influence mobility and transformation in the environment):

- Simple Non-chlorinated Aromatics: benzene
- Chlorinated Aliphatics: TCE, 1,1,1-TCA, trans-1,2-DCE, and methylene chloride
- Ketones: acetone
- Nitroaromatic/Nitrocyclic compounds: 2,4-DNT, TNT, 1,3,5-TNB, HMX, and RDX
- Phthalates: bis(2-ethylhexyl)phthalate
- Inorganic chemicals: metals, chloride, sulfate, nitrate/nitrite

The numerical values of the physicochemical properties of the organic chemicals of potential concern listed above that are germane to transport processes are summarized in Table 5-11. A similar table is not presented for metals and other inorganic chemicals because, for these chemicals, migration is greatly dependent upon external factors which are seldom measured as part of a site investigation. These include several site-specific factors such as the identity of other ions which enhance or limit mobility through competitive complex formation; the pH of the medium; the cation exchange capacity of the soil; the presence of humic materials, hydrous oxides, silicates and carbonate minerals; oxidizing or reducing conditions; and the presence of microbes. Moreover, physicochemical properties such as solubility depend upon the identity of the metal complex, which is rarely known.

However, the values listed in Table 5-11 do provide important information for interpreting or predicting the movement and fate of the organic chemicals at the site. A brief discussion of the relevance of the parameters listed in Table 5-11 to the migration of the organic chemicals of potential concern in the environment follows.

The water solubility of a substance is a critical property affecting environmental fate; highly soluble chemicals can be leached from wastes and soils and are mobile in surface water and groundwater.

Volatilization of a compound from environmental media will depend on its vapor pressure, water solubility, and diffusion coefficient. For estimating releases from water to air, the Henry's Law constant, the partition coefficient which expresses the ratio of the chemical concentration between air and water at equilibrium, is more appropriate than vapor pressure alone. Although it is frequently measured for volatile chemicals, the Henry's Law constant can be estimated for chemicals of low aqueous solubility (less than a few percent) by the ratio of vapor pressure and solubility at similar temperatures (Mackay and Shiu 1981). Compounds with Henry's law constants in the range of 10^{-3} atm m^3/mole and larger can be expected to volatilize readily from water; those with values ranging from 10^{-3} to 10^{-5} atm m^3/mole are associated with significant, but lesser, volatilization, while compounds with values less than 10^{-5} atm m^3/mole volatilize from water only to a limited extent (Lyman et al. 1982).

The octanol-water partition coefficient (K_{ow}) is often used to estimate the extent to which a chemical will partition from water into lipophilic parts of organisms for example, animal fat. The

TABLE 5-11

PHYSICAL-CHEMICAL PROPERTIES OF ORGANIC CHEMICALS OF POTENTIAL CONCERN
AT N-TEAD

Chemical Name	Molecular Weight (g/mol)	Solubility in Water 20-25 C (mg/l)	WSol Reference	Vapor Pressure 20-25 C (mm Hg)	VP Reference	Henry's Law Constant 20-25 C (atm-m3/mol)	HL Reference	Koc (ml/g)	Koc Reference	Log Kow	Kow Reference
Simple Non-chlorinated Aromatics											
Benzene	78.00	1.75E+03	16	9.52E+01	1	5.43E-03	11	8.30E+01	6	2.13	17
Chlorinated Aliphatics											
Trichloroethene	131.29	1.47E+03	16	5.79E+01	4	8.90E-03	11	1.26E+02	5	2.42	16
1,1,1-Trichloroethane	133.41	1.33E+03	16	1.23E+02	3	2.80E-02	11	1.52E+02	5	2.47	16
trans-1,2-Dichloroethene	96.94	6.30E+03	2	3.24E+02	2	6.60E-03	11	5.90E+01	5	2.09	5
Methylene chloride	84.93	1.80E+04	13	3.62E+02	5	2.60E-03	11	8.80E+00	5	1.51	17
Nitroaromatic/Nitrocyclic compounds											
2,4-Dinitrotoluene	182.1	2.80E+02	15	2.17E-04	15	1.86E-07	15	2.51E+02	15	1.98	17
2,4,6-Trinitrotoluene	227.13	1.50E+02	18	5.51E-06	18	1.10E-08	19	5.25E+02	19	1.84	17
1,3,5-Trinitrobenzene	213.1	3.85E+02	15	3.03E-06	15	2.21E-09	15	2.00E+01	15	1.18	15
HMX	296.2	5.00E+00	15	3.30E-14	15	2.60E-15	15	3.47E+00	15	0.26	15
RDX	222.15	6.00E+01	15	4.03E-09	15	1.96E-11	15	1.00E+02	15	0.87	15
Ketones											
Acetone	58.00	miscible		2.70E+02	7	3.67E-05	12	2.20E+00	8	-0.24	7
Phthalates											
Bis(2-ethylhexyl)phthalate	391.00	4.00E-01	9	2.00E-07	5	4.40E-07	14	8.74E+04	10	5.11	9

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higher the K_{ow} value, the greater is a chemical's tendency to partition into fat. Similarly, the organic carbon partition coefficient (K_{oc}) reflects the propensity of a compound to adsorb to the organic carbon found in soil. The higher the K_{oc} value, the greater is a chemical's tendency to adsorb to soil organic carbon. In addition to organic carbon, sorption to soil is also a function of the surface area of the soil particle as well as the size, shape and surface area of the adsorbing molecule.

5.3.1.2 Migration Pathways

Potential migration pathways are discussed below by study area.

5.3.1.2.1 TNT Washout Facility

As discussed in Section 4, the TNT Washout Facility was constructed in 1948 for the purpose of decommissioning munitions. The facility operated from 1948 until 1958 and again from 1960 to 1965. The washout operation consisted of cutting munitions casings and removing and recycling the explosive material. Rinse water from the operation was passed through a series of separators and a settling tank and then was routed to a series of four unlined e/p ponds. These ponds, as well as a nearby septic tank and laundry effluent pond, represent the primary potential source areas at the facility.

Chemicals released to these source areas may partition to pond sediments or soils, remain in solution and be transported to groundwater or subsurface soils, or volatilize; overland transport of chemicals via surface water runoff would not be expected to have occurred in this area because the ponds were bermed to prevent such transport. Given the time since these areas were used for waste disposal, it is likely that any volatile or soluble chemicals have already been removed from the surface areas by volatilization or by vertical downward transport in solution to groundwater or subsurface soils. More hydrophobic chemicals may still remain in the surface soils of the disposal areas, but these areas have not been sampled as part of the RI.

Sampling data collected at the TNT Washout Facility revealed the presence of low-level explosives in shallow soils and groundwater of the area, indicating that migration has occurred. Concentrations were highest in shallow groundwater closest to the suspected source (e/p ponds). Chlorinated aliphatic chemicals (methylene chloride and 1,1,1-TCA) and a ketone (acetone) also were detected at low levels in the deep soils and/or groundwater in samples collected furthest downgradient of the suspected

source areas. In addition, nitrate/nitrite, chloride, and sulfate were detected in soils of the area; nitrate/nitrite and sulfate also were detected in groundwater (groundwater was not analyzed for any other inorganic chemicals).

Chemicals transported to groundwater may remain in solution and be transported with groundwater or may sorb to subsurface soils. The degree to which a chemical remains in solution or sorbs to soils depends directly on its physical/chemical properties.

Judged on a K_{oc} basis, the nitroaromatic/nitrocyclic compounds, chlorinated aliphatic compounds, and acetone are relatively mobile in groundwater and could potentially migrate further from the source area. In general, nitrate/nitrite and chloride are extremely mobile in groundwater; sulfate mobility could be reduced by complexation and precipitation processes. For the more mobile chemicals, both vertical migration from the source area through the perched groundwater to the deep, regional aquifer, and horizontal migration towards the northern boundary of N-TEAD are expected. The concentrations of these compounds ultimately reaching the northern boundary of N-TEAD would depend upon transformation processes, as well as dispersion and dilution processes that would occur during transport.

Biotransformation of nitroaromatic explosives is known to occur under aerobic and anerobic conditions (Mitchell et al. 1982, Spanggord et al. 1980, McCormick et al. 1976, 1978). Biodegradation products from 2,4-DNT include 2-amino-4-nitrotoluene and 4-amino-2-nitrotoluene; those from TNT include 4-amino-2,6-dinitrotoluene, 4,6-dinitro-2-aminotoluene and 3,5-dinitroaniline. Biodegradation of RDX has been observed under anaerobic conditions, but this degradation depends heavily upon the presence of other organic nutrients (Spanggord 1980). In the absence of such nutrients, RDX could be persistent in groundwater at N-TEAD.

Chlorinated aliphatic chemicals have been found to undergo biological reductive dechlorination reactions (Bouwer et al. 1981. Kobayashi and Rittman 1982). During such processes, methylene chloride is converted to methylchloride and 1,1,1-TCA is converted to 1,1-DCA and eventually chloroethane. 1,1,1-TCA also can be chemically converted to 1,1-DCE which then can be biologically converted to vinyl chloride. None of these degradation products has been detected in the groundwater at the TNT Washout Facility. However, given the low levels of methylene chloride and 1,1,1-TCA detected at the facility, it is possible that if any breakdown products do exist, they are present at concentrations below reporting limits. It also is possible that

methylene chloride, a common laboratory contaminant, is not actually present in the groundwater of this area.

Transformation processes such as those discussed above would result in reduced concentrations of the parent compounds as they migrate from the source area towards the N-TEAD boundary (although the concentration of breakdown products would increase). Dispersion and dilution processes also can reduce the concentrations of chemicals (both parent and breakdown products) that may migrate towards the N-TEAD boundary. The TNT Washout Facility is approximately 4 miles south of the northern boundary of N-TEAD. Given this distance and the generally low concentrations of the chemicals in groundwater and soils at the TNT Washout Facility, it is likely that chemical concentrations in groundwater potentially reaching the northern boundary would be negligible. These conclusions are based on the knowledge of <u>current</u> chemical concentrations at the TNT Washout Facility. However, the extent of the plume from the TNT Washout Facility has not been established. It is possible that chemicals at higher concentrations than those currently measured have already migrated past the farthest downgradient wells towards the northern boundary of N-TEAD. If this is the case, concentrations reaching the boundary could be higher than those predicted.

5.3.1.2.2 <u>Sanitary Landfill</u>

The Sanitary Landfill has been in operation since 1942 and has been used primarily for the disposal of nonhazardous materials (e.g., building rubble), although some hazardous materials (e.g., waste solvents, PCB filters) have been disposed in the landfill. The landfill is unlined and waste material is dumped directly into excavated pits, which are backfilled when full. Chemicals buried in the landfill can migrate to subsurface soils or can leach to groundwater, where partitioning to soil or transport with groundwater could occur.

Sampling data from the area suggest that some transport to the groundwater has occurred. Benzene, trans-1,2-DCE, TCE, and RDX were detected at low concentrations in wells located downgradient of the landfill and are possibly related to the past dumping of waste solvents and munitions compounds in the landfill. Another possible source of these chemicals is the Drum Storage Area, which is located upgradient of the landfill, although none of these chemicals were detected at the Drum Storage Area. Arsenic, copper, lead, nickel, silver and zinc in the groundwater and nickel and bis(2-ethylhexyl)phthalate in the soil also were detected at low concentrations in the landfill area. Bis(2-ethylhexyl)phthalate is a suspected laboratory contaminant.

Judged on a K_{oc} and solubility basis, benzene and the chlorinated aliphatic chemicals are expected to be mobile in groundwater, as is RDX. These chemicals can be expected to migrate towards the northern boundary of N-TEAD. The mobility of nickel and silver depends upon a variety of site-specific factors, but in general, these chemicals are not expected to be very mobile in groundwater.

As was the case in the TNT Washout Facility, concentrations of the chemicals transported in groundwater can be expected to be reduced as a result of transformation processes and/or because of dispersion and dilution. RDX, benzene, and the chlorinated aliphatic compounds all can undergo biological degradation under anerobic conditions. The degree of biodegradation depends upon the presence of microbial populations, the availability of nutrients, and time. For example, benzene has been observed to biodegrade under anerobic conditions, but only over long periods of time (Wilson et al. 1986). Biodegradation also will be limited if few microbial populations are present or insufficient nutrients are available. However, the presence of trans-1,2-DCE suggests that some biological transformation is occurring. trans-1,2-DCE is a biological degradation product of TCE, which is the organic chemical present at the landfill groundwater at the highest concentrations (48 ug/l maximum). trans-1,2-DCE can be further degraded to vinyl chloride.

Dispersion and dilution processes also can reduce the concentrations of chemicals (both parent and breakdown products) that may migrate towards the N-TEAD boundary. Given that the Sanitary Landfill is approximately 3 miles south of the northern boundary of N-TEAD and that the chemical concentrations detected in the area are generally low, it is anticipated that the concentrations of chemicals migrating from the landfill and potentially reaching the northern N-TEAD boundary would be negligible. Again, however, it is possible that chemicals at higher concentrations than those currently measured have migrated past the farthest downgradient wells and are migrating towards the N-TEAD boundary. Therefore, concentrations eventually reaching the boundary could be higher than those predicted.

5.3.1.2.3 Drum Storage Area

The Drum Storage Area is located adjacent to and upgradient of the Sanitary Landfill. This area had been used previously as a temporary storage area for reusable drums. It has been reported that in the past drums containing original contents were turned upside down to prevent rain or snow accumulation in the drums, resulting in the remaining contents being spilled onto the gravel

and asphalt surface. Chemicals released to the surface could flow via surface runoff towards the Sanitary Landfill, partition to surface soil in areas not covered by asphalt, or could leach from surface soils to groundwater.

No site-related chemicals were detected in the surface soils of the Drum Storage Area, suggesting that any chemicals released to this area volatilized following release or have been transported to deeper soils and/or groundwater at the Drum Storage Area or transported overland to the Sanitary Landfill (landfill surface soils were not sampled as part of the RI). Bis(2-ethylhexyl) phthalate and metals were the only chemicals of potential concern identified for the Drum Storage Area. Bis(2-ethylhexyl)phthalate is a suspected laboratory contaminant. This chemical has a very low solubility and exhibits a high propensity to bind soil organic matter. Therefore, it is considered unlikely that this chemical could have migrated from the surface soils at the Drum Storage Area to a depth of greater of 300 feet to the subsurface soils and groundwater of this area. It is possible that some of the metals detected in groundwater and soils of the area, particularly the potentially more mobile metals such as arsenic or chromium (VI), could have migrated the 300 feet from the surface soils of the Drum Storage Area to the subsurface. However, the mobility of the majority of these chemicals is expected to be limited. It is possible that the presence of these chemicals in groundwater and subsurface soils may actually be related to natural sources. If these chemicals are site-related, migration in groundwater from the Drum Storage Area towards the northern boundary of N-TEAD is expected to be limited, although this cannot be definitively stated without more information on the subsurface chemistry of the area and the form of the metals.

5.3.1.2.4 Chemical Range

The Chemical Range was used from 1941 to the late 1960s or early 1970s to test chemical and pyrotechnic-type munitions. Two trenches at the Chemical Range were used for munitions disposal. Chemicals disposed in the trenches could leach to groundwater or partition to soils.

Near-surface soil was sampled as part of the RI. Nickel and zinc were the only site-related chemicals detected in the samples. The transport of these chemicals cannot be completely evaluated because of important chemical and site-specific information is not available and because groundwater was not sampled in this area. However, in general these chemicals are not expected to be

very mobile in subsurface environments and will likely remain sorbed to soils in the Chemical Range Area.

5.3.2 POTENTIAL EXPOSURE PATHWAYS

In this section, the pathways by which humans may be exposed to the chemicals of potential concern at the N-TEAD site are identified. Section 5.3.2.1 discusses potential exposure pathways which may exist under current land use conditions and Section 5.3.2.2 discusses additional pathways which may exist under hypothetical future land-use conditions.

5.3.2.1 Potential Exposure Pathways Under Current Land Use Conditions

N-TEAD is located in rural Tooele Valley adjacent to the town of Tooele, Utah. With the exception of the city of Tooele, properties immediately adjacent to N-TEAD boundaries are undeveloped and are zoned primarily for agricultural use and open space, with some low density housing (e.g., minimum parcel size per dwelling of 20 to 40 acres). Grazing and limited cultivation are the predominate land uses. The properties to the north of N-TEAD are used as pasture or farm land, and the properties to the west and south are used for rangeland grazing. Properties east of N-TEAD consist of the city of Tooele and rangeland.

The nearest residences are in the city of Tooele, which abuts the eastern boundary of N-TEAD. The town of Grantsville is located approximately 2 miles north of the northwest corner of N-TEAD and the town of Stockton is located approximately 3 miles to the south.

It is considered unlikely that any of these residential populations could be exposed under current use conditions to chemicals of potential concern in soil or groundwater migrating from the site, although offsite transport of chemicals in groundwater and subsurface soils (via groundwater) could occur. Groundwater flows from N-TEAD to the north towards the Great Salt Lake. As discussed previously, land to the north of N-TEAD is used as pasture or farm land[4], although conceivably a few homes also may occur in the area. It is possible that groundwater in this area could be used to provide drinking water for cattle, for

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[4]Grantsville occurs to the north of N-TEAD, but is located northwest (i.e, crossgradient) of groundwater flow from the N-TEAD study areas.

irrigation of crops, or to provide drinking water to scattered residents (if any). Residents could then be exposed to chemicals in groundwater that have accumulated in cattle, that have volatilized during irrigation, or that are ingested as drinking water.

None of these potential pathways is regarded as likely to result in any significant exposure. As discussed in the previous section, because of the distance between the study areas and the downgradient (northern) boundary of N-TEAD (3 to 4 miles), and because of the generally low concentrations of the chemicals in groundwater and soil, it is probable the chemical concentrations in groundwater potentially reaching offsite receptors would be negligible.[5] Consequently, potential exposures also would be negligible. In addition, none of the chemicals of potential concern in groundwater are anticipated to be accumulated to any significant degree in cattle, thereby further reducing the potential for any significant exposure via this pathway. Finally, significant exposures to chemicals that have volatilized from groundwater during irrigation also are considered unlikely because the expected low chemical concentrations in groundwater in conjunction with dispersion and dilution processes in air would result in negligible air concentrations at potential exposure points (residences).

Given this information, the only potentially significant exposure pathways under current use conditions at N-TEAD are on-site exposures. The only human populations that frequent N-TEAD are workers. Because the facility is fenced and access is controlled, no other individuals (e.g., trespassers) come onto the site. Possible on-site worker exposure pathways are discussed below for current land use conditions. The discussion is organized around the four study areas for which chemicals of potential concern have been identified: TNT Washout Facility, Sanitary Landfill, Drum Storage Area, and the Chemical Range.

5.3.2.1.1 TNT Washout Facility

Subsurface soil and groundwater were sampled at the TNT Washout Facility. No personnel currently use the TNT Washout Facility. Consequently, potentially exposed populations would be limited to

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[5]Again, such a conclusion is made based on current measured concentrations. It is not known if chemicals at concentrations higher than those measured have already migrated past the farthest downgradient wells and are migrating towards the boundary.

guards who may occasionally patrol the area or other personnel using nearby roads. However, there are no pathways by which these individuals could be exposed to chemicals of potential concern in the subsurface soil or groundwater (groundwater of the area is not used by N-TEAD personnel nor is it upgradient of any wells that are used).

5.3.2.1.2 Sanitary Landfill

Subsurface soil and groundwater were sampled at the Sanitary Landfill. The potentially exposed population in this area are workers at the landfill. Worker activities in this area involve dumping of trash from trucks, excavation of trenches for trash disposal, and back filling of full trenches. Conceivably, workers could be exposed to the chemicals of potential concern in subsurface soil (bis[2-ethylhexyl]phthalate and nickel) during the digging and filling of disposal trenches. However, it is unlikely that disposal trenches would be dug to a depths between 60 and 110 feet, the depth at which subsurface soil samples were collected. Therefore, potential exposures to chemicals in the subsurface soil of the landfill are not likely to occur. No pathways exist under current use conditions by which exposures to chemicals in groundwater could occur since the groundwater of the landfill area is not used by N-TEAD personnel nor is it upgradient of any wells that are used.

5.3.2.1.3 Drum Storage Area

Chemicals of potential concern were identified in the subsurface soils and groundwater of the Drum Storage Area. Worker activity in the area consists of loading and unloading drums for storage or transport. However, there are no pathways exist by which workers can be exposed under current use conditions to chemicals of potential concern in the subsurface soils or groundwater of this area.

5.3.2.1.4 Chemical Range

Near-surface soils were sampled in the Chemical Range. The Chemical Range is no longer used and therefore, the only population potentially exposed to chemicals in near-surface soil is guards who may occasionally patrol the area or other personnel using nearby roads. However, there are no pathways by which these individuals could be exposed to chemicals of potential concern in the subsurface soils of this area.

5.3.2.2 Potential Exposure Pathways Under Future Land Use Conditions

Although not likely, it is possible that land use at the N-TEAD study areas could change in the future, resulting in additional exposure pathways that do not exist under current land use conditions. The most plausible land use changes at N-TEAD would be additional development or use of some of the study areas by the Army. Development of N-TEAD as a residential area or other public use area is considered highly unlikely given the low population density and the availability of adjacent, non-Army land for public development. Further, the Army has no current plans to "excess" any land of the N-TEAD. (The N-TEAD was not on the December 29, 1988 published list of military bases proposed for closing.)

The only future land use scenarios considered reasonably plausible is the use of groundwater from the TNT Washout Facility, the Sanitary Landfill, or the Drum Storage Area by Army personnel as a drinking water source. Future use of groundwater from these areas by workers is considered unlikely because the current groundwater well located in the southeast corner of N-TEAD is adequate to supply water for the entire complex under current use conditions, as well as under any reasonably anticipated future uses, and because the Army has no plans to develop groundwater wells in these areas. Nevertheless, the future use of groundwater as drinking water will be evaluated to provide a quantitative, health-based measure of the impacts of the N-TEAD source areas on groundwater quality in these areas. The exposure point concentrations for this pathway are the mean and maximum chemical concentrations in groundwater reported in Tables 5-2, 5-4, and 5-8.

For the TNT Washout Area, potential exposures to chemicals in both the shallow (perched) groundwater zone and deep (regional) aquifer will be evaluated. It is unlikely, however, that the shallow, perched zone at the TNT Washout Facility could ever be used as a drinking water source because of its limited water holding capacity. In fact, most monitoring wells screened in the perched zone were dry during RI sampling. However, this zone can act as a source of chemicals for the deep, regional aquifer, which could be used as a drinking water source. Therefore, the evaluation of potential risks associated with ingestion of groundwater from the shallow groundwater zone are assessed to provide a health-based measure of potential impacts of the shallow groundwater zone on the groundwater quality in the deep, regional aquifer.

It also is possible that in the future, homes could be built adjacent to the northern border of N-TEAD at a point downgradient of the current study areas, and residents could be exposed to chemicals in groundwater used as drinking water. However, as discussed previously, the concentrations of the chemicals of potential concern in groundwater reaching the northern boundary are likely to be negligible given the distance to the northern border and the likely concentration dilution as chemicals disperse in groundwater as it moves across N-TEAD.

As was the case under current use conditions, exposure to chemicals of potential concern in soils is not considered likely. These chemicals could act as source of future groundwater contamination. However, given the relatively low concentrations of the chemicals detected in soil samples of the study areas (with the exception of zinc at the Chemical Range), it is anticipated that they will have a negligible impact on the groundwater of the study areas. Although zinc was detected at a relatively high concentration in the Chemical Range soils, it is expected to have limited mobility and thus not impact groundwater to any significant extent.

5.3.3 SUMMARY OF EXPOSURE PATHWAYS SELECTED FOR QUANTITATIVE EVALUATION

No exposure pathways were selected for quantitative evaluation under current use conditions. Ingestion of groundwater from the TNT Washout Area, the Sanitary Landfill and the Drum Storage Area by workers was selected for quantitative evaluation under hypothetical future use conditions.

5.4 TOXICITY ASSESSMENT

The general methodology for the classification of health effects and the development of health effects criteria is described in Section 5.4.1 to provide the analytical framework for the characterization of human health impacts in Section 5.5. In Section 5.4.2 the health effects criteria that will be used in the quantitative endangerment assessment are presented and the toxicity of the chemicals of potential concern briefly discussed.

5.4.1 HEALTH EFFECTS CLASSIFICATION AND CRITERIA DEVELOPMENT

For risk assessment purposes, individual pollutants are separated into two categories of chemical toxicity depending on whether they exhibit noncarcinogenic or carcinogenic effects. This

distinction relates to the currently held scientific opinion that the mechanism of action for each category is different. For the purpose of assessing risks associated with potential carcinogens, EPA has adopted the scientific position that a small number of molecular events can cause changes in a single cell or a small number of cells that can lead to tumor formation. This is described as a no-threshold mechanism, because there is essentially no level of exposure (i.e., a threshold) to a carcinogen which will not result in some finite possibility of causing the disease. In the case of chemicals exhibiting noncarcinogenic effects however, it is believed that organisms have protective mechanisms that must be overcome before the toxic endpoint is manifested. For example, if a large number of cells performs the same or similar functions, it would be necessary for significant damage or depletion of these cells to occur before an effect could be seen. This threshold view holds that a range of exposures from just above zero to some finite value can be tolerated by the organism without appreciable risk of causing the disease.

5.4.1.1 Health Effects Criteria for Noncarcinogens

Health criteria for chemicals exhibiting noncarcinogenic effects are generally developed using reference doses (RfDs) developed by the EPA RfD Work Group, or RfDs obtained from Health Effects Assessments (HEAs) or drinking water health advisories (HA). The RfD, expressed in units of mg/kg-day, is an estimate of the daily exposure to the human population (including sensitive subpopulations) that is likely to be without an appreciable risk of deleterious effects during a lifetime. RfDs are usually derived either from human studies involving work-place exposures or from animal studies, and are adjusted using uncertainty factors. The RfD provides a benchmark to which chemical intakes by other routes (e.g., via exposure to contaminated environmental media) may be compared.

5.4.1.2 Health Effects Criteria for Potential Carcinogens

Cancer potency factors, developed by EPA's Carcinogen Assessment Group (CAG) for potentially carcinogenic chemicals and expressed in units of $(mg/kg\text{-}day)^{-1}$, are derived from the results of human epidemiological studies or chronic animal bioassays. The animal studies must usually be conducted using relatively high doses to detect possible adverse effects. Because humans are expected to be exposed to doses lower than those used in the animal studies, the data are adjusted by using mathematical models. The data from animal studies are typically fitted to the linearized

multistage model to obtain a dose-response curve. The 95th percentile upper confidence limit slope of the dose-response curve is subjected to various adjustments and an interspecies scaling factor is applied to derive the cancer potency factor for humans. Thus, the actual risks associated with exposure to a potential carcinogen quantitatively evaluated based on animal data are not likely to exceed the risks estimated using these cancer potency factors, but they may be much lower. Dose-response data derived from human epidemiological studies are fitted to dose-time-response curves on an *ad hoc* basis. These models provide rough, but plausible, estimates of the upper limits on lifetime risk. Cancer potency factors based on human epidemiological data are also derived using very conservative assumptions and, as such, they too are unlikely to underestimate risks. Therefore, while the actual risks associated with exposures to potential carcinogens are unlikely to be higher than the risks calculated using a cancer potency factor, they could be considerably lower.

EPA assigns weight-of-evidence classifications to potential carcinogens. Under this system, chemicals are classified as either Group A, Group B1, Group B2, Group C, Group D, or Group E. Group A chemicals (human carcinogens) are agents for which there is sufficient evidence to support the causal association between exposure to the agents in humans and cancer. Groups B1 and B2 chemicals (probable human carcinogens) are agents for which there is limited (B1) or inadequate (B2) evidence of carcinogenicity from human studies but for which there is sufficient evidence of carcinogenicity from animal studies. Group C chemicals (possible human carcinogens) are agents for which there is limited evidence of carcinogenicity in animals, and Group D chemicals (not classified as to human carcinogenicity) are agents with inadequate human and animal evidence of carcinogenicity or for which no data are available. Group E chemicals (evidence of non-carcinogenicity in humans) are agents for which there is no evidence of carcinogenicity in adequate human or animal studies.

5.4.2 HEALTH EFFECTS CRITERIA AND TOXICITY SUMMARIES

Table 5-12 presents the health effects criteria that will be used to evaluate potential health risks posed by the chemicals of potential concern at the N-TEAD site. Criteria are presented for noncarcinogenic chemicals and potential carcinogenic chemicals and are presented only for those chemicals for which exposures will be quantified (i.e., chemicals in groundwater). No human health effects criteria are available for sulfate and therefore, potential risk associated with exposure to this chemical cannot be evaluated quantitatively in this human health assessment. A

TABLE 5-12

HEALTH EFFECTS CRITERIA FOR CHEMICALS OF POTENTIAL CONCERN AT N-TEAD

Chemical (a)	Oral RfD (mg/kg/day)	Safety Factor (b)	Source (c)	EPA/CAG Oral Cancer Potency Factor (mg/kg/day)-1	Weight of Evidence (d)
Acetone	1.0E-01	1000	IRIS	---	D
Arsenic	---*	---	---	2.0 (e)	A
Benzene	---*	---	---	2.9E-02	A
Beryllium	5.0E-03	100	IRIS	---	D
Bis(2-ethylhexyl)phthalate	2.0E-02	1000	IRIS	1.4E-02	B2
Chromium (VI)	5.0E-03	500	IRIS	---	D
Copper	4.0E-02 (f)	(f)	(f)	---	D
trans-1,2-Dichloroethene	2.0E-02	1000	IRIS	---	D
HMX	5.0E-02	1000	IRIS	---	D
Lead	--- (g)	---	---	--- (g)	B2
Methylene Chloride	6.0E-02	100	IRIS	7.5E-03	B2
Nickel	2.0E-02	300	IRIS	---	D
Nitrite	1.0E-01	10	IRIS	---	D
RDX	3.0E-03	100	IRIS	1.1E-01	C
Silver	3.0E-03	2	IRIS	---	D
Sulfate	---	---	---	---	D
2,4,6-TNT	5.0E-04	1000	IRIS	3.0E-02	C
Trichloroethene	7.4E-03 *	1000	HA	1.1E-02	B2
Zinc	2.0E-01	10	HEA	---	D

(a) Only chemicals of potential concern for which human exposure will be evaluated are listed here.

(b) Safety factors used to develop reference doses are the products of uncertainty and modifying factors. Uncertainty factors consist of multiples of 10, each factor representing a specific area of uncertainty inherent in the data available. The standard uncertainty factors include:
- A 10-fold factor to account for the variation in sensitivity among the members of the human population;
- A 10-fold factor to account for the uncertainty in extrapolating animal data to the case of humans;
- A 10-fold factor to account for uncertainty in extrapolating from less than chronic NOAELS to chronic NOAELs; and
- A 10-fold factor to account for the uncertainty in extrapolating from LOAELS to NOAELs.

(c) Source of Reference Doses: IRIS = chemical files of the Integrated Risk Information System as of 6/27/89; HEA= Health Effects Assessment; HA = Health Advisory

(d) Weight of evidence classification scheme for carcinogens: A--Human Carcinogen, sufficient evidence from human epidemiological studies; B1--Probably Human Carcinogen, limited evidence from epidemiological studies and adequate evidence from animal studies; B2--Probably Human Carcinogen, inadequate evidence from epidemiological studies and adequate evidence from animal studies; C--Possible Human Carcinogen, limited evidence in animals in the absence of human data; D--Not Classified as to human carcinogenicity; and E--Evidence of Noncarcinogenicity.

(e) EPA. 1988. Special report on Ingested Inorganic Arsenic: Skin Cancer; Nutritional Essentiality. Risk Assessment Forum, EPA, Washington, DC. EPA 625/3-87/013F

(f) RfD calculated based on proposed drinking water standard. See text. Not an EPA verified RfD.

(g) EPA has not developed an RfD or cancer potency factor for lead. See text.

* = Currently under review by EPA.

--- = RfD or potency factor not developed for this chemical.

qualitative discussion of sulfate's toxicity is provided in this section.

No health effects criteria are presented for lead. EPA has classified lead as a probable human carcinogen but has not developed a potency factor. Further, EPA considers it inappropriate to derive an RfD for lead since many of the health effects associated with lead intake occur essentially without a threshold. Former approaches adopted in past risk assessments which derived a RfD for lead based on proposed drinking water standards are now considered inappropriate by the Agency. A full-scale quantitative risk assessment for lead (i.e., using biokinetic models) is not warrented by the concentrations present at the site. Lead concentrations in groundwater will be evaluated by comparing them to State and federal drinking water standards.

The toxicological properties of the chemicals of potential concern and the toxicological basis for the health effects criteria presented in Table 5-12 are discussed briefly below.

5.4.2.1 Acetone

Acetone is absorbed in humans and animals following oral or inhalation exposure (EPA 1984). Acetone vapors as high as 2,150 ppm produce irritation of the mucosal membranes in humans (EPA 1984). In rats, slight increases in organ weights and decreases in body weights have been observed following long-term exposure to acetone (EPA 1986).

EPA (1989) derived an oral RfD for acetone of 0.1 mg/kg-day based on a study sponsored by the EPA Office of Solid Waste (EPA 1986) in which increased liver and kidney weights and nephrotoxicity were observed in rats exposed orally to acetone; an uncertainty factor of 1,000 was used to derive the RfD.

5.4.2.2 Arsenic

Both inorganic and organic forms of arsenic are readily absorbed via the oral and inhalation routes. Soluble forms are more readily absorbed than the insoluble forms (EPA 1984). Approximately 95 percent of soluble inorganic arsenic administered to rats is absorbed from the gastrointestinal tract (Coulson et al. 1935, Ray-Bettley and O'Shea 1975). Approximately 70 to 80 percent of arsenic deposited in the respiratory tract of humans has been shown to be absorbed (Holland et al. 1959). Dermal absorption is not significant (EPA

1984). Acute exposure of humans to metallic arsenic has been associated with gastrointestinal effects, hemolysis, and neuropathy (EPA 1984). Chronic exposure of humans to this metal can produce toxic effects on both the peripheral and central nervous systems, keratosis, hyperpigmentation, precancerous dermal lesions, and cardiovascular damage (EPA 1984). Arsenic is embryotoxic, fetotoxic, and teratogenic in several animals species (EPA 1984). Arsenic is a known human carcinogen. Epidemiological studies of workers in smelters and in plants manufacturing arsenical pesticides have shown that inhalation of arsenic is strongly associated with lung cancer and perhaps with hepatic angiosarcoma (EPA 1984). Ingestion of arsenic has been linked to a form of skin cancer and more recently to bladder, liver, and lung cancer (Tseng 1977, Tseng et al. 1968, Chen et al. 1986).

EPA has classified arsenic in Group A—Human Carcinogen—and has developed inhalation (EPA 1989) and oral cancer potency factors (EPA 1988) of 50 $(mg/kg\text{-}day)^{-1}$ and 2.0 $(mg/kg\text{-}day)^{-1}$, respectively. The inhalation potency factor is the geometric mean value of potency factors derived from four occupational exposure studies on two different exposure populations (EPA 1984). The oral cancer potency factor was based on an epidemiological study in Taiwan which indicated an increased incidence of skin cancer in individuals exposed to arsenic in drinking water (Tseng 1977). A risk assessment for noncarcinogenic effects of arsenic is currently under review by EPA (1989).

5.4.2.3 Benzene

Benzene is readily absorbed following oral and inhalation exposure (EPA 1985). The toxic effects of benzene in humans and other animals following exposure by inhalation include central nervous system effects, hematological effects, and immune system depression. In humans, acute exposures to high concentrations of benzene vapors has been associated with dizziness, nausea, vomiting, headache, drowsiness, narcosis, coma, and death (NAS 1976). Chronic exposure to benzene vapors can produce reduced leukocyte, platelet, and red blood cell counts (EPA 1985). Benzene induced both solid tumors and leukemias in rats exposed by gavage (Maltoni et al. 1985). Many studies have also described a causal relationship between exposure to benzene by inhalation (either alone or in combination with other chemicals) and leukemia in humans (IARC 1982).

Applying EPA's criteria for evaluating the overall evidence of carcinogenicity to humans, benzene is classified in Group A

(Human Carcinogen) based on adequate evidence of carcinogenicity from epidemiological studies. EPA (1989) derived both an oral and an inhalation cancer potency factor for benzene of 2.9×10^{-2} $(mg/kg\text{-}day)^{-1}$. This value was based on several studies in which increased incidences of nonlymphocytic leukemia were observed in humans occupationally exposed to benzene principally by inhalation (Rinsky 1981, Ott 1978, Wong 1983). EPA (1989) is currently reviewing an oral RfD for benzene and its status is pending.

5.4.2.4 Beryllium

Beryllium is not readily absorbed by any route of exposure. Occupational exposure to beryllium results in bone, liver and kidney disposition (EPA 1986). In humans, acute respiratory effects due to beryllium exposure include rhinitis, pharyngitis, tracheobronchitis, and acute pneumonitis. Dermal exposure to soluble beryllium compounds can cause contact dermatitis, ulceration and granulomas (Hammond and Beliles 1980). Ocular effects include conjunctivitis and corneal ulceration from splash burns. The most common clinical symptom caused by chronic beryllium exposure is granulomatous lung inflammation (IARC 1980, EPA 1986). Chronic skin lesions sometimes appear after a long latent period in conjunction with the pulmonary effects. Systemic effects from beryllium exposure may include right heart enlargement with accompanying cardiac failure, liver and spleen enlargement, cyanosis, digital clubbing, and kidney stone development (EPA 1986). Beryllium has been shown to be carcinogenic in experimental animals resulting primarily in lung and/or bone tumors when given by injection, intratracheal administration, or inhalation (EPA 1986). Several epidemiological studies have suggested that occupational exposure to beryllium may result in an increased lung cancer risk although the data are inconclusive (EPA 1986).

Beryllium has been classified by EPA in Group B2--Probable Human Carcinogen based on increased incidences of lung cancer and osteosarcomas in animals (EPA 1989). EPA (1989) has calculated an inhalation cancer potency factor of 8.4 $(mg/kg\text{-}day)^{-1}$ based on the relative risk for lung cancer, estimated from an epidemiological study by Wagoner et al. (1980). EPA (1989) has also developed an oral RfD for beryllium of 5.0×10^{-3} mg/kg-day based on a study by Schroeder and Mitchner (1975) in which rats exposed to 0.54 mg/kg-day beryllium sulfate (the highest dose tested) in drinking water for a lifetime did not exhibit adverse effects; an uncertainty factor of 100 was used to develop the RfD.

5.4.2.5 Bis(2-ethylhexyl)phthalate

Bis(2-ethylhexyl)phthalate, also known as di-ethylhexyl phthalate (DEHP), is readily absorbed following oral or inhalation exposure (EPA 1980). Chronic exposure to relatively high concentrations of DEHP in the diet can cause retardation of growth and increased liver and kidney weights in laboratory animals (NTP 1982, EPA 1980, Carpenter et al. 1953). Reduced fetal weight and increased number of resorptions have been observed in rats exposed orally to DEHP (EPA 1980). DEHP is reported to be carcinogenic in rats and mice, causing increased incidences of hepatocellular carcinomas or neoplastic nodules following oral administration (NTP 1982).

DEHP has been classified in Group B2--Probable Human Carcinogen (EPA 1986, 1989). EPA (1989) calculated an oral cancer potency factor for DEHP of 1.4×10^{-2} $(mg/kg\text{-}day)^{-1}$ based on data from the NTP (1982) study. EPA has recommended an oral RfD for DEHP of 0.02 mg/kg-day based on a study by Carpenter et al. (1953) in which increased liver weight was observed in female guinea pigs exposed to 19 mg/kg bw/day in the diet for 1 year (EPA 1989); an uncertainty factor of 1,000 was used to develop the RfD.

5.4.2.6 Chromium

Chromium exists in two states, as chromium (III) and as chromium (VI). Following oral exposure, absorption of chromium (III) is low while absorption of chromium (VI) is high (EPA 1987). Chromium is an essential micronutrient and is not toxic in trace quantities (EPA 1980). High levels of soluble chromium (VI) and chromium (III) can produce kidney and liver damage following acute oral exposure; target organs affected by chronic oral exposure remain unidentified (EPA 1984). Chronic inhalation exposure may cause respiratory system damage (EPA 1984). Further, epidemiological studies of worker populations have clearly established that inhaled chromium (VI) is a human carcinogen; the respiratory passages and the lungs are the target organs (Mancuso 1975, EPA 1984). Inhalation of chromium (III) or ingestion of chromium (VI) or (III) has not been associated with carcinogenicity in humans or experimental animals (EPA 1984). Certain chromium salts have been shown to be teratogenic and embryotoxic in mice and hamsters following intravenous or intraperitoneal injection (EPA 1984).

EPA has classified inhaled chromium (VI) in Group A--Probable Human Carcinogen by the inhalation route (EPA 1989). Inhaled chromium (III) and ingested chromium (III) and (VI) have not been classified with respect to carcinogenicity (EPA 1989). EPA

(1989) developed an inhalation cancer potency factor of 41 $(mg/kg\text{-}day)^{-1}$ for chromium (VI) based on an increased incidence of lung cancer in workers exposed to chromium over a 6 year period, and followed for approximately 40 years (Mancuso 1975).

EPA (1989) derived an oral RfD of 5.0×10^{-3} mg/kg-day for chromium (VI) based on a study by MacKenzie et al. (1958) in which no observable adverse effects were observed in rats exposed to 2.4 mg chromium (VI)/kg/day in drinking water for 1 year. A safety factor of 500 was used to derive the RfD. EPA (1989) developed an oral RfD of 1 mg/kg-day for chromium (III) based on a study in which rats were exposed to chromic oxide baked in bread; no effects due to chromic oxide treatment were observed at any dose level (Ivankovic and Preussman 1975). A safety factor of 1000 was used to calculate the oral RfD. Because the form of chromium at the site is not known, the RfD for chromium (VI) will be used in this assessment.

5.4.2.7 Copper

Copper is an essential element. A daily copper intake of 2 mg is considered to be adequate for normal health and nutrition; the minimum daily requirement is 10 µg/kg (EPA 1985). In humans, absorption of copper following oral exposure is approximately 60 percent and is influenced by competition with other metals and the level of dietary protein and ascorbic acid in both humans and animals (EPA 1984). Copper is absorbed following inhalation exposures, although quantitative data on the extent of absorption are unavailable (EPA 1984). Adverse effects in humans resulting from acute exposure to copper at concentrations that exceed these recommended levels by ingestion include salivation, gastrointestinal irritation, nausea, vomiting, hemorrhagic gastritis, and diarrhea (ACGIH 1986). Dermal or ocular exposure of humans to copper salts can produce irritation (ACGIH 1986). Acute inhalation of dusts or mists of copper salts by humans may produce irritation of the mucous membranes and pharynx, ulceration of the nasal septum, and metal fume fever. The latter condition is characterized by chills, fever, headache, and muscle pain. Limited data are available on the chronic toxicity of copper; however, chronic over-exposure to copper by humans has been associated with anemia (ACGIH 1986) and local gastrointestinal irritation (EPA 1987). Results of several animal bioassays suggest that copper compounds are not carcinogenic by oral administration; however, some copper compounds can induce injection-site tumors in mice (EPA 1985).

EPA (1989) has reported the drinking water standard of 1.3 mg/liter as an oral RfD based on local gastrointestinal

irritation (EPA 1987). Assuming a 70-kg adult ingests 2 liters of water per day, this concentration is equivalent to an approximate dose of 4.0×10^{-2} mg/kg-day. This value will be used in this endangerment assessment to quantitatively evaluate potential health effects associated with exposure to copper. This value is not an EPA verified RfD.

5.4.2.8 trans-1,2-Dichloroethene (trans-1,2-DCE)

trans-1,2-DCE is expected to be absorbed by any route of exposure. Information on the health effects of *trans*-1,2-DCE is limited. In humans, *trans*-1,2-DCE is a central nervous system depressant, and exposure to high concentrations can result in anesthetic effects (Irish 1963). Inhalation exposure of rats to 200 ppm has been associated with pneumonic infiltration of the lungs and progressive fatty degeneration of the liver (Freundt et al. 1977). Acute exposure to higher dose levels can cause narcosis and death in rats (Torkelson and Rowe 1981).

EPA (1985) proposed a maximum contaminant level goal (MCLG) of 70 µg/liter for both *cis*- and *trans*-1,2-DCE based on the adjusted acceptable daily intake (AADI) of 350 µg/liter, assuming 20% of the exposure is via drinking water. EPA (1989) has derived an oral reference dose (RfD) of 2×10^{-2} mg/kg/day for *trans*-1,2-DCE based on a 90-day drinking water study conducted in mice (Barnes et al. 1985). A no-observed-adverse-effect level (NOAEL) of 17 mg/kg/day for increased serum alkaline phosphatase and an uncertainty factor of 1,000 were used to derive the RfD.

5.4.2.9 HMX (Octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine)

HMX is absorbed to a very limited extent following oral exposure. In rats and mice, between 70 and 85 percent of the administered dose was eliminated in the feces within 4 days (Cameron 1986). No data were found in the available literature regarding pulmonary or dermal absorption.

EPA (1989) reported an RfD based on a subchronic study in which groups of 20 male and 20 female Fischer 344 rats received HMX in the diet for 13 weeks (Everett et al. 1985). Dietary concentrations corresponded to dosages of 0, 50, 150, 450, 1350 and 4000 mg/kg bw for males and 0, 50, 115, 270, 620 and 1500 mg/kg bw for the females. Histopathologic changes were observed in the liver of males at the three highest dose levels, and in the kidneys of females in the three highest dose groups, indicating sexual differences in the target organ responses of rats. Based on these results, LOAELs of 150 and 270 mg/kg-day

and NOAELs of 50 and 115 mg/kg-day were identified for males and females, respectively. The RfD of 0.05 mg/kg-day was derived by applying an uncertainty factor of 1000 to the NOAEL for male rats.

5.4.2.10 Lead

Absorption of lead from the gastrointestinal tract of adult humans is estimated at 8 to 45 percent. In children, absorption from non-paint sources ranges from 30 to 50 percent (Hammond and Beliles 1980, EPA 1986). There are other interpretations of the data (Duggan 1983) which suggest this may be as high as 70 percent. For adult humans, the deposition rate of particulate airborne lead is 30 to 50 percent, and essentially all of the lead deposited is absorbed. Lead is stored in the body in the kidney, liver and bone (EPA 1984). The major adverse effects in humans caused by lead include alterations in the hematopoietic and nervous systems. The toxic effects are generally related to the concentration of this metal in blood. Blood concentration levels of over 80 µg/dl in children and over 100 µg/dl in sensitive adults can cause severe, irreversible brain damage, encephalopathy, and possible death. The Centers for Disease Control (CDC 1985) have used the value of 25 µg/dl as an acceptable level of blood lead. Recent information, however (EPA 1988), indicates that physiological and/or biochemical effects can occur even at lower levels. These include enzyme inhibition (16 µg/dl), elevated erythrocyte protoporphyrin (15 µg/dl), interference with Vitamin D metabolism, cognitive dysfunction in infants (10 to 15 µg/dl), electrophysiological dysfunction (6 µg/dl), and reduced childhood growth (4 µg/dl). Decreased fertility, fetotoxic effects, and skeletal malformations have been observed in experimental animals exposed to lead (EPA 1984). Chronic oral ingestion of certain lead salts (lead acetate, lead phosphate, lead subacetate) has been associated in experimental animals with increased renal tumors. Doses of lead that induced kidney tumors were high and were beyond the lethal dose in humans (EPA 1985).

EPA classified certain lead salts in Group B2--Probable Human Carcinogen, although no cancer potency factor has been established (EPA 1989). This category applies to those agents for which there is sufficient evidence of carcinogenicity in animals and inadequate evidence of carcinogenicity in humans. As mentioned previously, EPA (1989) considers it inappropriate to develop a RfD for inorganic lead and lead compounds, since many of the health effects associated with lead intake occur essentially without a threshold.

5.4.2.11 Methylene Chloride (Dichloromethane)

Methylene chloride is absorbed following oral and inhalation exposure. The amount of airborne methylene chloride absorbed following inhalation exposure increases in direct proportion to its concentration in inspired air, the duration of exposure, and physical activity. Dermal absorption has not been accurately measured (EPA 1985a). Acute human exposure to methylene chloride may result in irritation of eyes, skin, and respiratory tract; central nervous system depression; elevated carboxyhemoglobin levels; and circulatory disorders that may be fatal (EPA 1980). Chronic exposure of animals can produce renal and hepatic toxicity (NCA 1982). Methylene chloride is mutagenic for *Salmonella typhimurium* and produces mitotic recombination in yeast (EPA 1989a). Several inhalation studies conducted in animals provide clear evidence of methylene chloride's carcinogenicity. There is only suggestive evidence in experimental animals that hepatocellular carcinomas and neoplastic nodules arise from oral exposure (EPA 1985a,b).

EPA (1989a) classified methylene chloride in Group B2--Probable Human Carcinogen. It has been concluded by EPA (1985b) that the induction of distant site tumors from inhalation exposure and the borderline significance for induction of tumors in a drinking water study are an adequate basis for concluding that methylene chloride be considered a probable human carcinogen via ingestion as well as inhalation. EPA (1989a) derived an inhalation cancer potency factor of 1.4×10^{-2} $(mg/kg\text{-}day)^{-1}$ based on the results of a National Toxicology Program (NTP) inhalation bioassay conducted in rats and mice (NTP 1986). Mammary tumors were noted in rats, while lung and liver tumors were observed in mice. EPA (1989a) determined an oral cancer potency factor of 7.5×10^{-3} $(mg/kg\text{-}day)^{-1}$ based on the results of the NTP (1986) inhalation bioassay and on an ingestion bioassay conducted by the National Coffee Association (NCA 1983). In the NCA study, hepatocellular adenomas and/or carcinomas were observed in male mice. An oral RfD of 0.06 mg/kg-day has been developed by EPA (1989a) based on a 2-year rat drinking water bioassay (NCA 1982) that identified no-observed-effect levels (NOELs) of 5.85 and 6.47 mg/kg-day for male and female rats, respectively. Liver toxicity was observed at doses of 52.58 and 58.32 mg/kg-day for males and females, respectively. An uncertainty factor of 100 was used to derive the RfD. EPA (1989b) has established an inhalation RfD of 3 mg/m^3 based on a study by Nitschke et al. (1988) in which rats were exposed to 200 ppm (694.8 mg/m^3) for 2 years. A safety factor of 100 was used to derive the RfD. This RfD is currently undergoing verification by EPA (1989a).

5.4.2.12 Nickel

Nickel compounds can be absorbed following inhalation, ingestion, or dermal exposure. The amount absorbed depends on the dose administered and the chemical and physical form of the particular nickel compound (EPA 1986). Dermal exposure of humans to nickel produces allergic contact dermatitis (EPA 1986). Adverse effects associated with acute exposure in animals have included depressed weight gain, altered hematological parameters, and increased iron deposition in blood, heart, liver, and testes (EPA 1987). Chronic or subchronic exposure of experimental animals to nickel has been associated with reduced weight gain, degenerative lesions of the male reproductive tract, asthma, nasal septal perforations, rhinitis, sinusitis, hyperglycemia, decreased prolactin levels, decreased iodine uptake, and vasoconstriction of the coronary vessels (EPA 1986). Teratogenic and fetotoxic effects have been observed in the offspring of exposed animals (EPA 1986). Inhalation exposure of experimental animals to nickel carbonyl or nickel subsulfide induces pulmonary tumors (EPA 1986). Several nickel salts cause localized tumors when administered by subcutaneous injection or implantation. Epidemiological evidence indicates that inhalation of nickel refinery dust and nickel subsulfide is associated with cancers of the nasal cavity, lung, larynx, kidney, and prostate (EPA 1986).

Nickel refinery dust and nickel subsulfide are both categorized in Group A--Human Carcinogens. These classifications are based on an increase incidence of lung and nasal tumors observed in workers occupationally exposed to nickel refinery dust. These materials have inhalation cancer potency factors of 0.84 $(mg/kg\text{-}day)^{-1}$ and 1.7 $(mg/kg\text{-}day)^{-1}$, respectively (EPA 1989). Nickel carbonyl is categorized in Group B2--Probable Human Carcinogen; however, a potency factor has not been derived for nickel carbonyl (EPA 1989). EPA (1989) derived an oral RfD for nickel of $2x10^{-2}$ mg/kg-day based on a study by Ambrose et al. (1976) in which rats administered 5 mg/kg-day (NOAEL) nickel in the diet for 2 years did not experience decreased weight gain observed in animals administered 50 mg/kg/day (LOAEL). A safety factor of 300 was used to calculate the RfD.

5.4.2.13 Nitrate/Nitrite

Both nitrate and nitrite are readily absorbed from the gastrointestinal tract after oral exposure (EPA 1987). Following intratracheal instillation or i.v. injection, nitrate is reduced to nitrite by bacteria in the stomach (Parks et al. 1981). Nitrite reacts with hemoglobin in blood producing methemoglobin, thereby reducing the oxygen-carrying ability of red blood cells.

Oral exposure to nitrite has been reported to result in acute toxic effects such as nausea, palpitations, numbness, and cyanosis due to methemoglobinemia in humans (EPA 1985, Walton 1951). Similar cardiovascular effects were observed in animals following acute oral exposure to high levels of nitrate (EPA 1987). Ingestion of large doses of sodium nitrate and sodium nitrite resulted in amyloidosis and hemosiderosis in ICR mice (EPA 1987). Chronic exposure to both nitrate and nitrite may lead to central nervous system toxicity in animals (EPA 1985). Nitrate and nitrite have not been associated with teratogenic effects in humans or laboratory animals and studies completed on livestock have not shown any relationship between nitrate and reproductive effects. However, developmental effects such as growth retardation and histological abnormalities of the liver, lungs and spleens were observed in a three-generation study in rats following oral ingestion of nitrite (EPA 1985).

An oral RfD of 1 mg/kg-day and 0.1 mg/kg-day for nitrate and nitrite, respectively have been derived by EPA (1989). These values were based on an epidemiologic study by Walton (1951) in which the occurrence of methemoglobinemia was evaluated in infants that consumed formula that was prepared with water containing various levels of nitrate. A NOAEL of 1.0 mg/kg-day was derived for both nitrite and nitrate and a safety factor of 1 and 10 were used in the calculation of the RfD's for nitrate and nitrite respectively (EPA 1989). In this assessment, the RfD for nitrite will be conservatively used to assess exposure to nitrate/nitrite.

5.4.2.14 RDX (Hexahydro-1,3,5-trinitro-1,3,5-triazine)

RDX is slowly absorbed in humans and laboratory animals following oral and inhalation exposures (Etnier 1986). No data are available regarding dermal absorption, but because RDX is relatively lipid insoluble, skin absorption is unlikely (Rosenblatt 1980). In humans, the toxic effects of RDX have been on the central nervous system (CNS). Chronic exposures in humans have been associated with generalized convulsions and unconsciousness, followed by temporary amnesia and disorientation (Stokinger et al. 1982). In animals, hepatotoxicity, anemia, and testicular and urogenital lesions have been reported following chronic exposures, in addition to CNS effects (Levine et al. 1983a,b).

No conclusive evidence of carcinogenicity has been shown for RDX. RDX was not found to be carcinogenic in Fisher 344 rats (Levine et al. 1983a,b) or Sparague-Dawley rats (Hart 1977) exposed to RDX in the diet for 2 years. However, Lish et al. (1984)

reported a statistically significant increase in the combined incidence of hepatocellular carcinomas and adenomas in female B6C3F1 mice fed RDX in the diet for two years.

EPA (1989a) reported a RfD of 0.003 mg/kg-day for RDX based on a chronic study in which male and female Fischer rats received RDX in the diet for 24 months at dosages of 0, 0.3, 1.5, 8.0, or 40 mg/kg bw/day (Levine et al. 1983a,b).
Rats in the three highest dose groups experienced statistically significant increases in mortality, anemia with secondary splenic lesions, hepatotoxicity, cataracts, and urogenital lesions. A LOAEL of 1.5 mg/kg-day was identified based on suppurative inflammation of the prostate. The NOAEL was 0.3 mg/kg-day.

EPA (1989b) has classified RDX in Group C -- possible human carcinogen and has developed an oral potency factor of 0.11 $(mg/kg\text{-}day)^{-1}$. The potency factor was based on the increased incidence of combined hepatocellular carcinomas and adenomas in female mice receiving RDX in the diet for two years at doses of 7, 35 or 100 mg/kg.

5.4.2.15 Silver

Silver in various forms is absorbed to a limited extent following oral and inhalation exposures (EPA 1985). The acute toxic effects in humans following oral exposure to silver include corrosive damage to the GI tract leading to shock, convulsions, and death. In animals, acute exposure has been shown to affect the central nervous system and to cause respiratory paralysis (Hill and Pillsbury 1939). The primary effect of silver in humans following chronic exposures, is argyria, a permanent bluish-metallic discoloration of the skin and mucous membranes, which can be either localized or generalized. Silver also accumulates in the blood vessels and connective tissue (EPA 1985).

EPA (1989) derived an oral RfD of 3.0×10^{-3} mg/kg-day for silver based on the human case reports of Gaul and Staud (1935), Blumberg and Carey (1934), and East et al. (1980). In these studies, argyria was observed at an average dose of silver of 0.0052 mg/kg-day, to which an uncertainty factor of 2 was applied.

5.4.2.16 Sulfate

Low doses of sulfate are absorbed at a high rate from the gastrointestinal tract, whereas larger doses may exceed

absorptive capacity and are subsequently excreted (EPA 1985a). Sulfate has few effects on humans and animals except at high doses. The primary toxic effects of excessive sulfate ingestion are attributable to the cathartic effects of the chemical, although some injury to the kidney and intestinal mucosa may occur. Human infants appear to be more sensitive to excess sulfate than adults. Chronic oral ingestion of sulfate by children via drinking water resulted in gastric distress (Chien et al. 1968). In chickens, very high amounts of sulfate consumed in drinking water have been shown to cause renal damage (Adams et al. 1975). There is no evidence that sulfate is mutagenic, carcinogenic or teratogenic. No health based criteria have been developed for sulfate by EPA.

5.4.2.17 Trichloroethene (TCE)

Absorption of TCE from the gastrointestinal tract is virtually complete. Absorption following inhalation exposure is proportional to concentration and duration of exposure (EPA 1985). TCE is a central nervous system depressant following acute and chronic exposures. In humans, single oral doses of 15 to 25 ml (21 to 35 grams) of TCE have resulted in vomiting and abdominal pain, followed by transient unconsciousness (Stephens 1945). High-level exposure can result in death due to respiratory and cardiac failure (EPA 1985). Hepatotoxicity has been reported in human and animal studies following acute exposure to TCE (EPA 1985). Nephrotoxicity has been observed in animals following acute exposure to TCE vapors (ACGIH 1986, Torkelson and Rowe 1981). Subacute inhalation exposures of mice have resulted in transient TCE-induced increased liver weights (Kjellstrand et al. 1983). Industrial use of TCE is often associated with adverse dermatological effects including reddening and skin burns on contact with the liquid form, and dermatitis resulting from vapors. These effects are usually the result of contact with concentrated solvent, however, and no effects have been reported after exposure to TCE in dilute, aqueous solutions (EPA 1985). TCE has caused significant increases in the incidence of hepatocellular carcinomas in mice (NCI 1976) and renal tubular-cell neoplasms in rats exposed by gavage (NTP 1983), and pulmonary adenocarcinomas in mice following inhalation exposure (Fukuda et al. 1983). TCE was mutagenic in *Salmonella typhimurium* and in *E. coli* (strain K-12), utilizing liver microsomes for activation (Greim et al. 1977).

EPA (1989) classified TCE in Group B2--Probable Human Carcinogen based on inadequate evidence in humans and sufficient evidence of carcinogenicity from animals studies. An oral cancer potency factor of 1.1×10^{-2} $(mg/kg\text{-}day)^{-1}$ and an inhalation cancer potency

factor of $4.6x10^{-3}$ $(mg/kg-day)^{-1}$ (EPA 1984) have been derived for TCE based on the mouse liver tumor data in the NCI (1976) and NTP (1983) gavage studies. EPA (1987) developed an oral RfD of $7.35x10^{-3}$ mg/kg-day based on a subchronic inhalation study in rats in which elevated liver weights were observed following exposure to 55 ppm, 5 days/week for 14 weeks (Kimmerle and Eben 1973). A safety factor of 1,000 was used to calculate the RfD. However, this RfD has been withdrawn by EPA and is currently under review.

5.4.2.18 2,4,6-Trinitrotoluene (TNT)

TNT is absorbed by humans and laboratory animals following oral, inhalation and dermal exposure. Once absorbed, TNT is distributed throughout the body and is metabolized extensively. The hematopoietic system and the liver are the principle targets of TNT toxicity in humans and experimental animals. Increased incidences of cataracts have been observed in humans occupationally exposed to TNT, and testicular atrophy and degeneration have been observed in rats experimentally exposed to TNT in the diet. Some data also suggest that TNT is carcinogenic.

Recently, EPA (1989a) reported a RfD for TNT based on a study in beagle dogs in which an increased incidence of liver effects were observed (Levine et al. 1983). Animals received TNT in gelatin at daily oral doses of 0, 0.5, 2.0, 8.0 or 32 mg/kg/bw for 26 weeks. Histologic examination revealed toxic liver effects and/or lesions in all dose groups with lesions in the low dose group (0.5 mg/kg-day) described as trace to mild. No lesions were observed in the control animals. The 0.5 mg/kg-day dose is the LOAEL for this study. An RfD of 0.0005 mg/kg-day was derived based on this LOAEL and an uncertainty factor of 1000.

EPA (1989b) has classified TNT in group C -- Possible Human Carcinogen and has developed an oral potency factor of 0.03 $(mg/kg-day)^{-1}$. The potency factor was based on a lifetime feeding study in rats (Freudi et al. 1984a,b) in which female rats in the highest dose group (50 mg/kg-day) experienced a statistically significant increase in the combined incidence of transitional cell papilloma and transitional cell carcinoma of the bladder (EPA 1989b).

5.4.2.19 Zinc

Zinc is absorbed in humans following oral exposure; however, insufficient data are available to evaluate absorption following

inhalation exposure (EPA 1984). Zinc is an essential trace element that is necessary for normal health and metabolism and therefore is nontoxic in trace quantities (Hammond and Beliles 1980). However exposure to zinc at concentrations that exceed recommended levels has been associated with a variety of adverse effects. Chronic and subchronic inhalation exposure of humans to zinc has been associated with gastrointestinal disturbances, dermatitis, and metal fume fever, a condition characterized by fever, chills, coughing, dyspnea, and muscle pain (EPA 1984). Chronic oral exposure of humans to zinc may cause anemia and altered hematological parameters. Reduced body weights have been observed in studies in which rats were administered zinc in the diet. There is no evidence that zinc is teratogenic or carcinogenic (EPA 1984).

EPA (1989) has derived an oral RfD of $2x10^{-1}$ mg/kg-day based on studies in which anemia and reduced blood copper were observed in humans exposed to oral zinc doses of 2.14 mg/kg-day (Pories et al. 1967, Prasad et al. 1975). A safety factor of 10 was used in developing the RfD.

5.5 HUMAN RISK CHARACTERIZATION

According to guidelines for preparing risk assessments as part of the RI/FS process (EPA 1986a, PRC 1985), the potential adverse effects on human health should be assessed where possible by comparing chemical concentrations found in environmental media (groundwater, surface water, air, soil, sediments) at or near the site with applicable or relevant and appropriate requirements (ARARs) or other guidance that have been developed for the protection of human health or the environment. If ARARs are available for all chemicals in all environmental media, then a comparison to ARARs constitutes the risk assessment. If not, quantitative risk estimates also are developed, by combining the estimated intakes of potentially exposed populations (derived using conservative assumptions regarding exposure duration, route, frequency, and absorption of chemicals) with health effects criteria. Because ARARs or other guidance are not available for all site-related chemicals in each medium, a quantitative risk characterization will be conducted for the exposure pathways selected for evaluation in Section 5.3.

A comparison with ARARs is presented below in Section 5.5.1, followed by the quantitative risk characterization in Section 5.5.2. Section 5.5.3 summarizes the results of the human risk characterization.

5.5.1 COMPARISON WITH APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS (ARARs) OR OTHER CRITERIA

Section 121 (d) of CERCLA, as amended by the Superfund Amendments and Reauthorization Act of 1986 (SARA), requires that remedial actions at Superfund sites comply with requirements or standards under federal or state environmental laws that are "applicable" or "relevant and appropriate" to the hazardous substances, pollutants, or contaminants at a site or the circumstances of the release. A requirement may be either applicable or relevant and appropriate to a remedial action, but not both. An applicable requirement is one that specifically addresses a hazardous substance, pollutant, contaminant, remedial action, location, or other circumstance at a hazardous waste site. Relevant and appropriate requirements, while not applicable, address problems or situations sufficiently similar to those encountered at a hazardous waste site that their use is well suited to the particular site (52 FR 32497, August 27, 1987). EPA makes the final determination on the applicability or relevance and appropriateness of a requirement based on such factors as the characteristics of the remedial action and the physical circumstances of the site.

In the sections below, potential human health ARARs are discussed by medium and are compared with measured or estimated concentrations of chemicals of potential concern for the N-TEAD site, where appropriate.

5.5.1.1 Soil

No federal or State standards, criteria or guidelines have been identified for chemicals of potential concern in soils at N-TEAD.

5.5.1.2 Groundwater

Potential ARARs and other guidance values for the chemicals of potential concern in the groundwater at the N-TEAD are presented in Table 5-13 and are discussed below.

5.5.1.2.1 State Standards

The State of Utah's Bureau of Drinking Water Sanitation has established primary and secondary Maximum Contaminant Levels (MCLs) for "routinely measurable substances which may be found in water supplies" (UBPWS 1986). Primary standards are established for the protection of human health. Secondary standards are

TABLE 5-13

STATE AND FEDERAL ARARS AND OTHER GUIDANCE VALUES
FOR THE CHEMICALS OF POTENTIAL CONCERN IN GROUNDWATER OF THE N-TEAD SITE
(ug/l)

CHEMICAL	ARARS		OTHER FEDERAL GUIDANCE		
	UTAH MCLs (a)	FEDERAL MCLs (b)	MCLGs (b)	DRINKING WATER (c) HEALTH ADVISORY	AWQC (d) ADJUSTED FOR DRINKING WATER ONLY
ORGANIC CHEMICALS					
Benzene	--	5	0	--	0(0.67)
Bis(2-ethylhexyl)phthalate	--	--	--	--	21,000
trans-1,2-Dichloroethene	--	100(P,e)	100(P,e)	70	--
HMX	--	--	--	400(h)	--
RDX	--	--	--	2(i)	--
Trichloroethene	--	5	0	--	0(2.8)
2,4,6-Trinitrotoluene	--	--	--	2(j)	--
INORGANIC CHEMICALS					
Arsenic	50	50(f)	50(P,g)	--	0(0.025)
Chromium	50	50; 100 (P,e)	100 (P,e)	120	--
Copper	1,000(S)	1,300(P,g) 1,000(S)	1,300(P,g)	1,000(k)	1,000(k)
Lead	50	50; 5(P,g)	0(P,g)	--	50
Nickel	--	--	--	150	15.4
Nitrate (as N)	10,000	10,000	10,000(P,e)	10,000	--
Nitrite (as N)	--	1,000(P,e)	1,000(P,e)	1,000	--
Nitrate + Nitrite (as N)	--	10,000(P,e)	10,000(P,e)	--	--
Silver	50	50; 90(S,P,e)	--	--	50
Sulfate	1,000,000 250,000(S)	250,000(S)			
Zinc	5,000(S)	5,000(S)	--	--	5,000

(a) State of Utah Maximum Contaminant Level. The State of Utah Public Drinking Water Regulations are currently under revision.
(b) Federal Maximum Contaminant Level. Except as noted, source of value is 40 CFR, Part 141 - National Primary Drinking Water Regulations.
(c) Except as noted, source is Drinking Water Health Advisories, EPA Office of Drinking Water. March 1987.
(d) Adjusted Ambient Water Quality Criteria. Superfund Public Health Evaluation Manual EPA (1986). For potential carcinogens, value in parentheses is drinking water concentration corresponding to a 10E-06 risk.
(e) Federal Register. 54: 22062-22160. (1989)
(f) Federal Register. 50: 46935-47025. (1985)
(g) Federal Register. 53: 31515-31578. (1988)
(h) Environmental Protection Agency (EPA). 1988. Health Advisory for Octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine (HMX). Office of Drinking Water. Washington, D.C. November, 1988.
(i) Environmental Protection Agency (EPA). 1988. Health Advisory for Hexahydro-1,3,5-trinitro-1,3,5-triazine (RDX). Office of Drinking Water. Washington, D.C. November, 1988.
(j) Environmental Protection Agency (EPA). 1989. Health Advisory on 2,4,6-Trinitrotoluene. Office of Drinking Water. Washington, D.C. January, 1989.
(k) Based on organoleptic properties.

(S) Secondary Maximum Contaminant Level. Established for protection of aesthetic qualities of water.
(P) Proposed value.
-- Standard not developed for this chemical.

established to provide guidance in evaluating the aesthetic qualities of drinking water. The applicable primary standards must be met by all public drinking water systems. The secondary standards are recommended levels which should be met to avoid consumer complaint. Public drinking water systems are defined as systems that provide water for human consumption or other domestic uses and that regularly serve an average of at least 25 individuals for at least 60 days out of the year, or that have at least 15 service connections. Although the groundwater of the N-TEAD site is not a public drinking water system under current use conditions, most would be classified as potable and could become a drinking water system under future use conditions (e.g., if used as an on-site drinking water source). Therefore, the Utah MCLs are regarded as relevant and appropriate standards for comparison of chemical concentrations detected in the groundwater at N-TEAD.

The State of Utah is in the process of developing groundwater quality protection regulations (UWPCC 1989). Under these regulations, it is proposed that all groundwater in the state be classified based on existing groundwater quality rather than on use because it is difficult to predict what use groundwater in a particular area may be put to in the future. Although these regulations have not been promulgated as of yet, and are not regarded as ARARs, they are useful to this endangerment assessment because they indicate that the groundwater at N-TEAD may be regulated in the future as a resource itself, regardless of the current or intended uses of the groundwater by the Army.

5.5.1.2.2 Federal

The federal government has developed chemical-specific standards or criteria that may be considered ARARs or "other guidance" values for groundwater. These include Maximum Contaminant Levels (MCLs), Maximum Contaminant Level Goals (MCLGs), Health Advisories, and Ambient Water Quality Criteria adjusted for drinking water only.

EPA guidance describes MCLGs and MCLs as follows (52 FR 32499):

> MCLGs are developed under the Safe Drinking Water Act as chemical-specific health goals used in setting enforceable drinking water standards, known as Maximum Contaminant Levels (MCLs), for public water supply systems. MCLGs are based entirely on health considerations and do not take cost or feasibility into account. Moreover, as health goals, MCLGs are set at levels where no known or anticipated health effects may occur, including an adequate margin of safety.

MCLs are required to be set as close as feasible to the respective MCLG, taking into consideration the best technology, treatment techniques, and other factors (including cost). However, as the standard for public water supplies, MCLs are fully protective of human health and (for carcinogens) fall within the acceptable risk range of 10^{-4} to 10^{-7}. Furthermore, for noncarcinogens, which are the majority of contaminants, MCLs will nearly always be set at the same level as the respective MCLGs. Also, these standards assure that even sensitive populations will experience no adverse health effects, Thus, there will be no difference in the protectiveness of MCLGs and MCLs for most contaminants, and, as discussed above, MCLs provide a sufficient level of protectiveness even for carcinogens.

The use or potential use of the groundwater (potable or potentially potable) must be considered in determining potential ARARs. According to the previously cited guidance, MCLs will generally be considered ARARs for all Class I and Class II groundwater or surface water that is or may be used for drinking water. Groundwater at N-TEAD is potable (i.e., Class I or Class II), and therefore, federal MCLs are considered ARARs for this evaluation. MCLGs are regarded here as "other guidance".

In addition to MCLs and MCLGs, EPA provides drinking water suppliers with guidance on various chemicals that may be encountered in a water system which are known as health advisories. The Office of Drinking Water's nonregulatory health advisories (HAs) are concentrations of contaminants in drinking water at which adverse effects would not be anticipated to occur. A margin of safety is included to protect sensitive members of the population. The health advisory numbers are developed from data describing noncarcinogenic end-points of toxicity. They do not incorporate quantitatively any potential carcinogenic risk from such exposure. Lifetime health advisories are calculated for a 70-kg adult assumed to drink 2 liters of water per day.

Water Quality Criteria adjusted for drinking water intake only also may be regarded as other guidance for the evaluation of groundwater exposures, but because some of these criteria are based on older toxicological studies, caution must be exercised in using them. When based on the most recent information, these criteria usually equal the MCLGs. The water quality criteria for potential carcinogens are set at zero based on the assumption that there is no concentration below which there are no toxic effects. Because this level is not technologically attainable (or not measurable if it is attainable), the concentrations corresponding to a 10^{-6} lifetime incremental cancer risk are

given in parentheses in Table 5-13 and will be used in this assessment.

5.5.1.2.3 Comparison to Groundwater ARARs and Other Guidance Values

Comparison of sample groundwater concentrations with available ARARs is made below for the TNT Washout Facility, the Sanitary Landfill, and the Drum Storage Area. Comparison with other guidance values (e.g., MCLGs, HAs) will be considered only for those chemicals for which MCLs are not available. The ARARs and other guidance values were presented previously in Table 5-13. Groundwater chemical concentration data were presented in the following tables: Table 5-2 for the TNT Washout Facility; Table 5-4 for the Sanitary Landfill; and Table 5-8 for the Drum Storage Area.

- TNT Washout Facility. In the shallow groundwater zone, the mean and maximum concentrations of nitrate/nitrite (24,000 and 49,000 ug/l, respectively) exceed the State and federal MCLs for nitrate (10,000 ug/l), as well as the proposed federal MCLs for nitrite (1,000 ug/l) and for nitrate + nitrite (10,000 ug/l). The maximum concentration of sulfate (1,200 mg/l) exceeds the State MCL (1,000 mg/l), and both the mean and maximum concentrations (900 and 1,200 mg/l, respectively) exceed the State and federal secondary MCL (250 mg/l). Also, the mean and maximum concentrations of RDX (120 and 270 ug/l, respectively) exceed the federal HA.

  In the deep aquifer, the mean and maximum concentrations of nitrate/nitrite (16,000 and 44,000 ug/l, respectively) exceed the State and federal MCLs for nitrate (10,000 ug/l), as well as the proposed federal MCLs for nitrite (1,000 ug/l) and for nitrate + nitrite (10,000 ug/l). The maximum concentration of sulfate (1,800 mg/l) exceeds the State MCL (1,000 mg/l), and both the mean and maximum concentrations (460 and 1,800 mg/l, respectively) exceed the State and federal secondary MCL (250 mg/l). Also, the maximum concentration of RDX (29 ug/l) exceeds the federal HA (2 ug/l).

- Sanitary Landfill. In downgradient wells, the mean and maximum concentrations of TCE (17 and 48 ug/l) exceed the federal MCL (5 ug/l) and the maximum concentration of RDX (8.6 ug/l) exceeds the federal HA (2 ug/l). The

mean and maximum concentrations of total lead (15 and 21 ug/l) exceed the proposed federal MCL (5 ug/l). The mean and maximum concentrations of total nickel (31 and 58 ug/l) and the maximum concentration of dissolved nickel (24 ug/l) exceed the adjusted AWQC (15.4 ug/l).

In crossgradient wells, the mean and maximum concentrations of total lead (20 and 37 ug/l) and the maximum concentration of dissolved lead (5.3 ug/l) exceed the proposed federal MCL (5 ug/l). The mean and maximum concentrations of total nickel (32 and 38 ug/l) and the maximum concentration of dissolved nickel (19 ug/l) exceed the adjusted AWQC (15.4 ug/l).

- Drum Storage Area. The maximum concentration of total chromium (52 ug/l) slightly exceeds the State and federal MCL (50 ug/l). The mean and maximum concentrations of total lead (33 and 45 ug/l) exceed the proposed federal MCL (5 ug/l). The mean and maximum concentrations of total nickel (230 and 290 ug/l) exceed federal HA (150 ug/l) and the adjusted AWQC (15.4 ug/l); the maximum concentration of dissolved nickel (42 ug/l) also exceeds the adjusted AWQC.

5.5.2 QUANTITATIVE RISK CHARACTERIZATION

As noted above, a quantitative risk characterization must be completed because ARARs are not available for all of the chemicals in each medium. Therefore, a quantitative risk characterization is performed for the previously selected exposure pathways at the N-TEAD site. Ingestion of groundwater under hypothetical future use conditions was the only pathway selected for quantitative evaluation in this assessment. To quantitatively assess risks to human health associated with this pathway, the groundwater concentrations presented in Section 5.2 are converted to chronic daily intakes (CDIs). CDIs are expressed as the amount of a substance taken into the body per unit body weight per unit time, or mg/kg-day. A CDI is averaged over a lifetime for carcinogens (EPA 1986b) and over the exposure period for noncarcinogens (EPA 1986c).

For potential carcinogens, excess lifetime cancer risks are obtained by multiplying the daily intake of the contaminant under consideration by its cancer potency factor. EPA recommends that the total cancer risk to individuals resulting from exposure at a Superfund site be reduced to zero where possible. EPA has implemented actions under Superfund associated with total cancer

risks ranging from 10^{-4} to 10^{-7} (i.e., the probability of one excess cancer is one in 10,000 or 10,000,000, respectively, under the conditions of exposure) (EPA 1986a).

Potential risks for noncarcinogens are presented as the ratio of the chronic daily intake exposure to the reference dose (CDI:RfD). The sum of all of the ratios of chemicals under consideration for a given pathway is called the hazard index. The hazard index is useful as a reference point for gauging the potential effects of environmental exposures to complex mixtures. In general, hazard indices which are less than one are not likely to be associated with any health risks, and are therefore less likely to be of regulatory concern than hazard indices greater than one. A conclusion should not be categorically drawn, however, that all hazard indices less than one are "acceptable" or that hazard indices greater than one are "unacceptable". This is a consequence of the perhaps one order of magnitude or greater uncertainty inherent in estimates of the RfD and CDI.

In the absence of specific information on the toxicity of the mixture to be assessed or on similar mixtures, EPA guidelines generally recommend assuming that the effects of different components on the mixtures are additive when affecting a particular organ or system. Synergistic or antagonistic interactions may be taken into account if there is specific information on particular combinations of chemicals (EPA 1986d). Information on the toxic effects of the specific chemical mixtures at the N-TEAD site are not available. Accordingly, it is assumed in this assessment that the toxic effects of the chemical of potential concern are additive. Thus, lifetime excess cancer risks and the CDI:RfD ratios are summed to indicate the potential risks associated with mixtures of potential carcinogens and noncarcinogens, respectively.

In the remaining portions of this section, information on chemical concentrations at the site area used to estimate the extent of potential human exposure. An average and a plausible maximum exposure case are estimated for the selected exposure pathways. The average case scenario is intended to represent possible exposures to a typical individual; however, even in this case, use of inherently conservative health criteria will likely still result in an overestimate of risk. The maximum plausible scenario is intended to place an upper bound on the potential risks by combining maximum plausible exposure estimates with upper bound health effects criteria. After exposure estimates have been derived, they are combined with toxicity criteria to estimate risk for each pathway.

The only pathway selected for quantitative evaluation for the N-TEAD study areas was ingestion of groundwater under hypothetical future land use conditions. No other exposure pathways, either under current or future land use conditions, were complete or were believed likely to result in significant exposure. Although exposures to chemicals of potential concern in soils is not considered likely, these chemicals could act as source of future groundwater contamination and thus contribute to potential exposures.

It is important to note that the hypothetical future uses of groundwater at this site are probably very unlikely. The primary purpose of the evaluation of the groundwater as a drinking water source is to provide a health-based quantitative measure of the impacts of N-TEAD source areas on the groundwater quality of the area.

5.5.2.1 Estimates of Exposure and Risk Under Future Land Use Conditions

In the future, it is possible that groundwater in the TNT Washout Facility area, the Sanitary Landfill area, or the Drum Storage Area could be used by N-TEAD personnel as a drinking water source. The mean and maximum chemical concentrations reported for these areas in Tables 5-2, 5-4, and 5-8 are used as the exposure point concentrations for this pathway. For metals, the exposure point concentration is the total concentration. Workers are assumed to weigh 70 kg and ingest 1 liter of water each day during working hours. In addition, workers are assumed to work and be exposed to chemicals in groundwater 200 days per year, based a 50-week work year and a 4-day work week (4 day work week occurs at N-TEAD). A worker is assumed to remain at N-TEAD for 10 years (average case) or 30 years (plausible maximum case) of a 75-year lifetime (lifetime value as recommended in EPA 1989).

Using these assumptions, CDI estimates are calculated using the equation below:

$$CDI = \frac{(C_w)(IR)(E)(YR)}{(BW)(DY)(YL)}$$

where

CDI = chronic daily intake (mg/kg-day);

C_w = chemical concentration in water (mg/l);

IR = ingestion rate (1 liter/day);

E = exposure days per year (200 days/year)

YR = duration of exposure (10 or 30 yr);

BW = average body weight over period of exposure (70 kg);

DY = days in a year (365 days/year); and

Y = period over which risk is being estimated; i.e., a lifetime (75 years) for potential carcinogens and the period of exposure for noncarcinogens (10 or 30 years).

The CDIs for workers ingesting groundwater from the TNT Washout Facility area, the Sanitary Landfill area, and the Drum Storage Area are discussed below along with estimates of risk.

5.5.2.1.1 TNT Washout Facility

Potential exposures to chemicals in both the shallow (perched) groundwater zone and deep (regional) aquifer were evaluated for the TNT Washout Facility. As discussed in Section 5.3, it is unlikely that the shallow, perched zone at the TNT Washout Facility could ever be used as a drinking water source because of its limited water holding capacity. This zone, however, can act as a source of chemicals for the deep, regional aquifer, which could be used as a drinking water source. The evaluation of potential risks associated with ingestion of groundwater from the shallow groundwater zone provides a health-based measure of potential impacts on the deep, regional aquifer. Table 5-14 presents the estimated CDIs and associated carcinogenic risks and noncarcinogenic hazard indices for this pathway.

For the shallow groundwater zone, the upper bound excess lifetime cancer risks are $1x10^{-5}$ (average case) and $9x10^{-5}$ (plausible maximum case). For the deep aquifer, the upper bound excess lifetime cancer risks are $2x10^{-7}$ (average case) and $1x10^{-5}$ (plausible maximum case). In all cases, risks are due to RDX. RDX has been classified by EPA as possible human carcinogen (Group C), which means there is limited evidence that this chemical is a carcinogen.

Potential exposure to noncarcinogens in the shallow groundwater zone is associated with a hazard index greater than 1 under both the average and the plausible maximum exposure cases. In both cases, the individual CDI:RfD ratio for nitrate/nitrite exceeds 1. For the deep aquifer, potential exposure to noncarcinogens

TABLE 5-14

POTENTIAL WORKER EXPOSURES AND RISKS ASSOCIATED WITH INGESTION OF GROUNDWATER FROM THE TNT WASHOUT FACILITY AT N-TEAD (HYPOTHETICAL FUTURE USE)

POTENTIAL CARCINOGENS

Groundwater/Chemical	Groundwater Concentration (mg/liter) (a)		Chronic Daily Intake (b) (mg/kg-day)		Potency Factor (c) (mg/kg-day)-1	Lifetime Upper Bound Excess Cancer Risk (d)	
	Geometric Mean	Maximum	Average Case	Plausible Maximum Case		Average Case	Plausible Maximum Case
Shallow (e)							
RDX	1.2E-01	2.7E-01	1.3E-04	8.5E-04	1.1E-01	1E-05	9E-05
Deep (f)							
Methylene Chloride	3.5E-03	2.0E-02	3.7E-06	6.3E-05	7.5E-03	3E-08	5E-07
RDX	1.1E-03	2.9E-02	1.1E-06	9.1E-05	1.1E-01	1E-07	1E-05
2,4,6-TNT	8.6E-04	1.9E-03	9.0E-07	5.9E-06	3.0E-02	3E-08	2E-07
TOTAL	--	--	--	--	--	2E-07	1E-05

NONCARCINOGENS

Groundwater/Chemical	Groundwater Concentration (mg/liter) (a)		Chronic Daily Intake (b) (mg/kg-day)		(Rfd) (c) (mg/kg-day)	Ratio CDI:RfD (g)	
	Geometric Mean	Maximum	Average Case	Plausible Maximum Case		Average Case	Plausible Maximum Case
Shallow (e)							
HMX	3.9E-03	2.3E-02	3.1E-05	1.8E-04	5.0E-02	6E-04	4E-03
Nitrate/Nitrite	2.4E+01	4.9E+01	1.9E-01	3.8E-01	1.0E-01	2E+00	4E+00
RDX	1.2E-01	2.7E-01	9.4E-04	2.1E-03	3.0E-03	3E-01	7E-01
HAZARD INDEX	--	--	--	--	--	> 1 (2)	> 1 (5)
Deep (f)							
Acetone	1.4E-02	3.8E-02	1.1E-04	3.0E-04	1.0E-01	1E-03	3E-03
Methylene Chloride	3.5E-03	2.0E-02	2.7E-05	1.6E-04	6.0E-02	5E-04	3E-03
Nitrate/Nitrite	1.6E+01	4.4E+01	1.3E-01	3.4E-01	1.0E-01	1E+00	3E+00
RDX	1.1E-03	2.9E-02	8.6E-06	2.3E-04	3.0E-03	3E-03	8E-02
2,4,6-TNT	8.6E-04	1.9E-03	6.7E-06	1.5E-05	5.0E-04	1E-02	3E-02
HAZARD INDEX	--	--	--	--	--	> 1 (~1)	> 1 (3)

(a) Concentrations as reported in Table 5-2. Converted to mg/l.
(b) See text for methodology. Calculated using equation 1 and assumptions discussed in Section 5.5.2.1.
(c) Reported previously in Table 5-12.
(d) Calculated by multiplying the CDI by the potency factor.
(e) Wells 3F and 31.
(f) Wells 3A, 3H, 127, 128, 129 and 130.
(g) Calculated by dividing the CDI by the RfD.

also is associated with a hazard index greater than 1 under the average and plausible maximum cases due to nitrate/nitrite.

For both aquifers, the evaluation of nitrate/nitrite was conducted using the RfD for nitrite, assuming that all the measured nitrate/nitrite is in the form of nitrite. This is a conservative assumption because nitrite is generally less stable in the environment than nitrate. The RfD for nitrite is 10 times lower than the RfD for nitrate. Thus, potential noncarcinogenic hazards associated with ingestion of groundwater from the TNT Washout Facility could be overestimated by up to an order of magnitude. If the RfD for nitrate is used to evaluate nitrate/nitrite exposure, the hazard index would be less than 1 in all cases.

These evaluations do not include an evaluation of potential risks associated with exposure to sulfate or the unknown volatile organic chemicals present in the groundwater of this area. Exposure to these compounds could add to the estimates of overall impact.

5.5.2.1.2 Sanitary Landfill

Potential exposures to chemicals in both downgradient and crossgradient wells were evaluated for the Sanitary Landfill. Table 5-15 presents the estimated CDIs and associated carcinogenic risks and noncarcinogenic hazard indices for this pathway.

For the downgradient wells, the upper bound excess lifetime cancer risks are $1x10^{-5}$ (average case) and $7x10^{-5}$ (plausible maximum). The risks under the average case are due to arsenic and under the plausible maximum case are due to arsenic, TCE, and RDX. As discussed above, RDX has been classified as a Group C carcinogen, meaning there is limited evidence that it is a carcinogen. The hazard index is less than 1 under both cases.

For the cross gradient wells, the upper bound excess lifetime cancer risks are $8x10^{-6}$ (average case) and $3x10^{-5}$ (plausible maximum). The risks under both cases are due to arsenic. The hazard index is less than 1 under both cases. Again, potential risks associated with exposure to the unknown hydrocarbons present in the groundwater of this area could add to the estimates of overall impact.

TABLE 5-15

POTENTIAL WORKER EXPOSURES AND RISKS ASSOCIATED WITH INGESTION
OF GROUNDWATER FROM THE SANITARY LANDFILL AT N-TEAD
(HYPOTHETICAL FUTURE USE)

POTENTIAL CARCINOGENS

Well/Chemical	Groundwater Concentration (mg/liter) (a)		Chronic Daily Intake (b) (mg/kg-day)		Potency Factor (c) (mg/kg-day)-1	Lifetime Upper Bound Excess Cancer Risk (d)	
	Geometric Mean	Maximum	Average Case	Plausible Maximum Case		Average Case	Plausible Maximum Case
Downgradient Wells (e)							
Arsenic	7.0E-03	8.9E-03	7.3E-06	2.8E-05	2.0E+00	1E-05	6E-05
Benzene	4.2E-04	8.5E-04	4.4E-07	2.7E-06	2.9E-02	1E-08	8E-08
RDX	7.2E-04	8.6E-03	7.5E-07	2.7E-05	1.1E-01	8E-08	3E-06
Trichloroethene	1.7E-02	4.8E-02	1.8E-05	1.5E-04	1.1E-02	2E-07	2E-06
TOTAL	--	--	--	--	--	1E-05	7E-05
Crossgradient Wells (f)							
Arsenic	3.7E-03	5.4E-03	3.9E-06	1.7E-05	2.0E+00	8E-06	3E-05
Trichloroethene	6.3E-04	1.1E-03	6.6E-07	3.4E-06	1.1E-02	7E-09	4E-08
TOTAL	--	--	--	--	--	8E-06	3E-05

NONCARCINOGENS

Well/Chemical	Groundwater Concentration (mg/liter) (a)		Chronic Daily Intake (b) (mg/kg-day)		(Rfd) (c) (mg/kg-day)	Ratio CDI:RfD (g)	
	Geometric Mean	Maximum	Average Case	Plausible Maximum Case		Average Case	Plausible Maximum Case
Downgradient Wells (e)							
Copper	3.2E-02	6.5E-02	2.5E-04	5.1E-04	4.0E-02	6E-03	1E-02
t-1,2-Dichlorethene	2.1E-03	1.1E-02	1.6E-05	8.6E-05	2.0E-02	8E-04	4E-03
Nickel	3.1E-02	5.8E-02	2.4E-04	4.5E-04	2.0E-02	1E-02	2E-02
RDX	7.2E-04	8.6E-03	5.6E-06	6.7E-05	3.0E-03	2E-03	2E-02
Trichloroethene	1.7E-02	4.8E-02	1.3E-04	3.8E-04	7.4E-03	2E-02	5E-02
Silver	1.2E-04	3.2E-04	9.4E-07	2.5E-06	3.0E-03	3E-04	8E-04
Zinc	3.9E-01	1.9E+00	3.1E-03	1.5E-02	2.0E-01	2E-02	7E-02
HAZARD INDEX	--	--	--	--	--	< 1	< 1
Crossgradient Wells (f)							
Copper	2.1E-02	2.3E-02	1.6E-04	1.8E-04	4.0E-02	4E-03	5E-03
Nickel	3.2E-02	3.8E-02	2.5E-04	3.0E-04	2.0E-02	1E-02	1E-02
Trichloroethene	6.3E-04	1.1E-03	4.9E-06	8.6E-06	7.4E-03	7E-04	1E-03
Zinc	1.4E+00	1.9E+00	1.1E-02	1.5E-02	2.0E-01	5E-02	7E-02
HAZARD INDEX	--	--	--	--	--	< 1	< 1

(a) Concentrations as reported in Table 5-4. Converted to mg/l.
(b) See text for methodology. Calculated using equation 1 and assumptions discussed in Section 5.5.2.1.
(c) Reported previously in Table 5-12.
(d) Calculated by multiplying the CDI by the potency factor.
(e) Wells 115, 116, 117 and 119.
(f) Wells 118 and 120.
(g) Calculated by dividing the CDI by the RfD.

5.5.2.1.3 Drum Storage Area

Table 5-16 presents the estimated CDIs and associated carcinogenic risks and noncarcinogenic hazard indices associated with ingestion of groundwater from the Drum Storage Area. The upper bound excess lifetime cancer risks are $1x10^{-5}$ (average case) and $8x10^{-5}$ (plausible maximum). For the average case, the risks are due primarily to arsenic, and for the plausible maximum case, the risks are due to both arsenic and bis(2-ethylhexyl)phthalate. The hazard index for both cases is less than 1.

As discussed previously, it is possible that bis(2-ethylhexyl)phthalate is not in the groundwater at the Drum Storage Area. This chemical was not detected in subsurface soil samples in this area even though it has a propensity to sorb to soil. Bis(2-ethylhexyl)phthalate is a common laboratory contaminant and may have been present in the samples due to analytical procedures.

The evaluation of potential risks associated with ingestion of groundwater from the Drum Storage Area does not include potential risks associated with exposure to lead or the unknown hydrocarbons present in the groundwater of this area. Lead is a probable human carcinogen and can cause a variety of other health effects following exposures to low doses. Thus, exposure to lead, as well as to the unknown hydrocarbons could increase estimates of overall impact associated with ingestion of groundwater from this area.

5.6 ENVIRONMENTAL ASSESSMENT

This section assesses potential impacts to nonhuman receptors associated with the chemicals of potential concern at N-TEAD. Below, potentially exposed populations (receptors) are identified and then potential exposures and impacts on these receptors are evaluated.

5.6.1 RECEPTOR CHARACTERIZATION

N-TEAD lies in the semiarid Tooele Valley. The vegetation of the site is typical of semiarid regions, and is primarily a mixture of shrubs and grasses. Sagebrush and saltbrush are the dominant plants of the area. Associated species include wheat grass, shadscale, needle and thread grass, Indian rice grass, and cheat grass.

TABLE 5-16

POTENTIAL WORKER EXPOSURES AND RISKS ASSOCIATED WITH INGESTION OF GROUNDWATER FROM THE DRUM STORAGE AREA AT N-TEAD (HYPOTHETICAL FUTURE USE)

POTENTIAL CARCINOGENS

Chemical	Groundwater Concentration (mg/liter) (a)		Chronic Daily Intake (b) (mg/kg-day)		Potency Factor (c) (mg/kg-day)-1	Lifetime Upper Bound Excess Cancer Risk (d)	
	Geometric Mean	Maximum	Average Case	Plausible Maximum Case		Average Case	Plausible Maximum Case
Arsenic	6.8E-03	7.7E-03	7.1E-06	2.4E-05	2.0E+00	1E-05	5E-05
Bis(2-ethylhexyl) phthalate	6.3E-02	7.9E-01	6.6E-05	2.5E-03	1.4E-02	9E-07	3E-05
TOTAL	--	--	--	--	--	1E-05	8E-05

NONCARCINOGENS

Chemical	Groundwater Concentration (mg/liter) (a)		Chronic Daily Intake (b) (mg/kg-day)		(Rfd) (c) (mg/kg-day)	Ratio CDI:RfD (e)	
	Geometric Mean	Maximum	Average Case	Plausible Maximum Case		Average Case	Plausible Maximum Case
Beryllium	2.8E-04	1.6E-03	2.2E-06	1.3E-05	5.0E-03	4E-04	3E-03
Bis(2-ethylhexyl) phthalate	6.3E-02	7.9E-01	4.9E-04	6.2E-03	2.0E-02	2E-02	3E-01
Chromium	3.1E-02	5.2E-02	2.4E-04	4.1E-04	5.0E-03	5E-02	8E-02
Copper	9.1E-02	2.2E-01	7.1E-04	1.7E-03	4.0E-02	2E-02	4E-02
Nickel	2.3E-01	2.9E-01	1.8E-03	2.3E-03	2.0E-02	9E-02	1E-01
Silver	4.9E-04	2.6E-03	3.8E-06	2.0E-05	3.0E-02	1E-04	7E-04
Zinc	4.5E-01	4.7E-01	3.5E-03	3.7E-03	2.0E-01	2E-02	2E-02
HAZARD INDEX	--	--	--	--	--	< 1	< 1

(a) Concentrations as reported in Table 5-8. Converted to mg/l.
(b) See text for methodology. Calculated using equation 1 and assumptions discussed in Section 5.5.2.1.
(c) Reported previously in Table 5-12.
(d) Calculated by multiplying the CDI by the potency factor.
(e) Calculated by dividing the CDI by the RfD.

N-TEAD supports a variety of animal species. Mammals include mule deer, coyote, bobcat, blacktailed jackrabbit, dessert cottontail, and mountain cottontail. Resident bird species include Gambil's quail, sage grouse, short-tailed grouse, blue grouse, ruffed grouse and the imported ring-necked pheasant and chukar. In addition, summer and winter residents include hawks and 37 species of migratory waterfowl.

Two endangered species, bald eagle and peregrine falcon, are known to occur in the vicinity of N-TEAD. Bald eagle habitat in this area of Utah is considered critical, encompassing an extensive area of the State, including N-TEAD.

Surface water at N-TEAD is limited to intermittent flow in drainage ditches during spring thaw and other wet periods. Therefore, aquatic life at the site would be limited to a few species that only rely of an aquatic habitat during certain periods of the year (e.g., some breeding insects).

5.6.2 POTENTIAL EXPOSURES AND ASSESSMENT OF POSSIBLE IMPACT

Surface soil (0 to 6 inches), near-surface soil (6 to 24 inches), subsurface soil and groundwater were sampled in the various study areas at N-TEAD. No pathways exist by which plants or wildlife can be exposed to chemicals of potential concern in subsurface soils or groundwater, since these media are not accessible by these potential receptors. Therefore, the assessment of potential impacts will be limited to an evaluation of potential exposures to chemicals in surface and near-surface soils.

Surface and near-surface soils were sampled in the Drum Storage Area and the Chemical Range. No chemicals of potential concern were detected in these soils in the Drum Storage Area; however, nickel and zinc were the chemicals of potential concern at the Chemical Range. Soil samples in this area were collected at approximate depths of 6 and 12 inches.

5.6.2.1 Terrestrial Wildlife

Given the depth of the soil samples at the Chemical Range, direct wildlife exposures would generally be limited to soil invertebrates. Terrestrial wildlife could be exposed indirectly to nickel and zinc that have accumulated in plants or soil invertebrates, but exposures via this pathway are not likely to result in significant exposures given the size of the Chemical Range relative to the size of the foraging area of many of the wildlife species present at N-TEAD. Exposures to small amounts

of nickel and zinc in food are unlikely to be associated with adverse effects as these chemicals exhibit relatively low toxicity in wildlife. Potential impacts on soil invertebrates cannot be evaluated because toxicity data for these chemicals in such species are generally lacking. Any impacts on soil communities would, however, likely be limited to the Chemical Range Area, and would not be expected to significantly impact the health of other soil communities or wildlife populations at N-TEAD.

5.6.2.2 Terrestrial Plants

Terrestrial plants may be exposed to chemical contaminants in soil at the Chemical Range. Exposure is generally limited to those chemicals that occur within the root zone, and exposure results from plant uptake through the roots. The depth of the root zone varies with species, but for grasses and small shrubs such as those at the Chemical Range, the root zone can be expected to be limited to the top one to two feet of soil. As mentioned above, soil samples at the Chemical Range were taken at depths of 6 and 12 inches, therefore, plant exposure is possible.

Few data area available on the phytotoxicity of nickel and zinc. However, Kabata-Pendias and Pendias (1984) reviewed the literature on metal phytotoxicity and identified the total concentrations of selected metals in surface soils that were phytotoxically excessive. The phytotoxic concentration for nickel, based on results from five authors, was 100 mg/kg. For zinc, the mean phytotoxic concentration in soil was 270 mg/kg, based on the results from 6 authors.

The geometric mean and maximum concentrations of nickel in the Chemical Range soil (14 and 27 mg/kg, respectively) are below the phytotoxic level identified by Kabata-Pendias and Pendias (1984), as is the mean concentration of zinc (170 mg/kg). However, the maximum concentration of 2,000 mg/kg exceeds the soil level identified as phytotoxic. This comparison suggest that zinc could be impacting vegetation at the Chemical Range. If effects are occurring, they are likely to be limited to localized hot spots and would be expected to have minor impacts on the plant community at the Chemical Range and negligible impacts on the overall plant community and habitat quality of N-TEAD.

5.7 UNCERTAINTIES IN THE ENDANGERMENT ASSESSMENT

As in any risk assessment, the estimates of risk for the N-TEAD site have many associated uncertainties. In general, the primary sources of uncertainty are the following:

- Environmental chemistry sampling and analysis
- Environmental parameter measurement
- Fate and transport modeling
- Exposure parameter estimation
- Toxicological data

In addition to these limitations, at this site there also are limitations associated with the sampling data collected as part of the RI. Because the RI sampling was not designed to exhaustively characterize chemical contamination in each of the study areas, the results of the RI and this endangerment assessment should be regarded largely as preliminary.

5.7.1 ENVIRONMENTAL CHEMISTRY SAMPLING AND ANALYSIS

Environmental chemistry analysis error can stem from several sources including the characteristics of the matrix being sampled or errors inherent in the analytical methods. At this site, it is possible that chemicals detected in several of the soil and groundwater samples are actually present as a result of laboratory contamination, rather than being related to contamination at the site. These chemicals were nevertheless retained as part of the endangerment assessment since more definitive information regarding their source is lacking.

In addition, some chemicals in soil and groundwater could not be positively identified analytically and therefore could not be quantitatively evaluated in this risk assessment. However, some of these "unknown" chemicals were detected at high concentrations relative to the positively identified chemicals. The potential health effects of these chemicals cannot be evaluated, although conceivably, they could be more toxic than some of the positively identified compounds. Exposure to these chemicals could contribute to estimates of potential risks at the site.

5.7.2 ENVIRONMENTAL PARAMETER MEASUREMENT

Environmental parameter measurements primarily contribute to uncertainty because little verified information is available. Lack of site-specific measurements requires that estimates be made on the basis of literature values, extrapolations from

regression equations, and/or best professional judgement. At this site, specific information on the physical, chemical, and microbiological characteristics of the subsurface environment was not available, necessitating assumptions regarding the chemical forms of some of the compounds in groundwater. Such assumptions contribute to the uncertainty associated with estimates of risk. For example, nitrate/nitrite was assumed to be completely in the form of nitrite, even though nitrite is generally less stable in the environment than nitrate. Nitrite has an RfD that is 10 times lower than the RfD for nitrate. Consequently, estimates of noncarcinogenic hazards could be overestimated by up to an order of magnitude.

5.7.3 FATE AND TRANSPORT MODELING

Modeling error also can arise from the use of an inappropriate model or the use of an appropriate model with inappropriate boundary conditions. Other uncertainties can stem from a lack of validation or verification of the models. Although specific fate and transport models were not used in this assessment, an important assumption in this assessment is that the chemical concentrations in groundwater remain constant during the period of exposure and that the chemical source is unlimited. Such assumptions could result in over- or underestimates of exposure, depending upon whether sources at the site are continuing to release chemicals to the groundwater. As discussed previously, contaminated soils at the site could be acting as a continuing source of chemicals to groundwater. However, the extent of this source contribution to groundwater at the N-TEAD site is difficult to evaluate, particularly in the Sanitary Landfill where only two borings were sampled over a large area.

5.7.4 EXPOSURE PARAMETER ESTIMATION

Assumptions regarding exposure parameters also contribute to uncertainty in exposure estimates and the consequent assessment of risks. For example, uncertainties are associated with assumptions of how often, if at all, an individual would come into contact with the chemicals of concern and the period of time over which such exposures would occur. Conservative assumptions were made regarding periods of exposure and it is possible that these time estimates will overestimate the risks associated with potential exposure to chemicals in groundwater. Other assumptions used in this assessment (e.g., ingestion of 1 liter of water per day by workers, 70-kg average body weight, and 75-year lifetime), are assumed to represent upper bounds of potential exposure and were used when site-specific data were not

available. Risks for certain individuals within an exposed population will be higher or lower depending on their actual drinking water intakes, body weights, etc.

5.7.5 TOXICOLOGICAL DATA

The toxicity assessment in this report also contributes to uncertainty. For example, potential risks associated with exposures to the unknown and tentatively identified chemicals could not be quantitatively evaluated because adequate quantitative toxicity information is not available.

EPA notes in its Guidelines for Carcinogenic Risk Assessment (EPA 1986b): There are major uncertainties in extrapolating both from animals to humans and from high to low doses. There are important species differences in uptake, metabolism, and organ distribution of carcinogens, as well as species and strain differences in target site susceptibility. Human populations are variable with respect to genetic constitution, diet, occupational and home environment, activity patterns and other cultural factors.

There is also a great deal of uncertainty in assessing the toxicity of a mixture of chemicals. In this assessment, the effects of exposure to each of the contaminants present in the environmental media have initially been considered separately. However, these substances occur together at the site, and individuals may be exposed to mixtures of the chemicals. Prediction of how these mixtures of toxicants will interact must be based on an understanding of the mechanisms of such interactions. The interactions of the individual components of chemical mixtures may occur during absorption, distribution, metabolism, excretion, or activity at the receptor site. Individual compounds may interact chemically, yielding a new toxic component or causing a change in the biological availability of an existing component, or may interact by causing different effects at different receptor sites. Suitable data are not currently available to rigorously characterize the effects of chemical mixtures similar to those present at the N-TEAD site. Consequently, as recommended in EPA's Superfund Public Health Evaluation Manual (EPA 1986a) and in EPA's Guidelines for Health Risk Assessment of Chemical Mixtures (EPA 1986c), chemicals present at the N-TEAD site were assumed to act additively, and potential health risks were evaluated by summing excess cancer risks and calculating hazard indices for chemicals exhibiting carcinogenic and noncarcinogenic effects, respectively. This approach to assessing the risk associated with mixtures of chemicals assumes that there are no synergistic or antagonistic

interactions among the chemicals considered and that all chemicals have the same toxic end points and mechanisms of action. To the extent that these assumptions are incorrect, the actual risk could be under- or overestimated.

There also is considerable uncertainty associated with the toxicity of the chemicals of potential concern to plants. In this assessment, generic phytotoxicity values most likely derived from studies in crop species, were used to assess potential impacts of zinc and nickel to plants in the Chemical Range. Use of these values could result in over- or underestimates of potential impacts.

As a result of the uncertainties described above, this endangerment assessment should not be construed as presenting an absolute estimate of risks to human or environmental populations. Rather, it is rather a conservative analysis intended to indicate the potential for adverse impacts to occur. Moreover, this assessment is generally considered preliminary based on the data collected as part of the RI.

5.8 SUMMARY AND CONCLUSIONS OF THE ENDANGERMENT ASSESSMENT

The endangerment assessment conducted for the N-TEAD site is a baseline assessment that addresses potential hazards to human health and the environment posed by contamination at the site study areas in the absence of remedial actions. The purpose of a baseline assessment is to provide information to aid in the determination of whether 1)"no action" is an appropriate remedial alternative for any areas, 2) further sampling should be performed, or 3) remedial actions should be undertaken. It should be noted that remedial actions include institutional controls which can be placed to preclude use of a resource in an area where such use is extremely unlikely.

This assessment is generally regarded as a preliminary assessment, since the RI sampling plan was not designed to completely characterize chemical contamination in all of the study areas at N-TEAD. Based on these preliminary evaluations of risk, it may be determined that no further actions are needed in some study areas. In other areas, further sampling may be needed to reduce uncertainties regarding the nature and extent of contamination.

The main components and results of the human health assessment are summarized below in Sections 5.8.1 through 5.8.3. The conclusions of the environmental assessment are summarized in

Section 5.8.4. Data needs identified as a result of this assessment are discussed in Section 5.8.5.

5.8.1 CHEMICALS OF POTENTIAL CONCERN

Based on an evaluation of the RI sampling results, chemicals of potential concern (chemicals to be evaluated in the endangerment assessment) were identified for four study areas. No chemicals of potential concern were identified for the Old Burn Area or in the surface and near-surface soils of the Drum Storage Area. Chemicals of potential concern included explosives at the TNT Washout Facility and Sanitary Landfill; nitrate/nitrite at the TNT Washout Facility; volatile organic chemicals at the Sanitary Landfill; and metals at the Drum Storage Area, Chemical Range and Sanitary Landfill. A few organic chemicals detected at the TNT Washout Facility, Sanitary Landfill, and Drum Storage Area are suspected laboratory contaminants, although these chemicals were not detected in laboratory blanks above reportable levels.

5.8.2 HUMAN EXPOSURE PATHWAYS

The only pathway selected for quantitative evaluation for the N-TEAD study areas was worker ingestion of groundwater from the TNT Washout Facility, the Sanitary Landfill, and the Drum Storage Area under hypothetical future land use conditions. No other exposure pathways, either under current or future land use conditions, were complete or were believed likely to result in significant exposure. Although exposures to chemicals of potential concern in soils is not considered likely, these chemicals could act as source of future groundwater contamination and thus contribute to potential exposures. However, given the relatively low concentrations of the chemicals detected in soils or their expected limited mobility, it is anticipated that they will have negligible impact on the groundwater in the study areas.

It is important to note that the hypothetical future use of groundwater at this site are probably very unlikely. The primary purpose of the evaluation of the groundwater as a drinking water source is to provide a health-based quantitative measure of the impacts of N-TEAD source areas on the groundwater quality of the area.

The exposure point concentrations for this pathway were the mean and maximum concentrations of chemicals detected in groundwater in each of the study areas. Concentrations in groundwater were assumed to remain constant over the duration of exposure. Such

an assumption could result in over- or under-estimates of exposure, depending upon the characteristics of the sources at the site. In general, however, an assumption of steady-state conditions is believed to be a conservative assumption because source depletion and contaminant dispersion are likely to result in reduced chemical concentrations over time.

5.8.3 RISK CHARACTERIZATION

Potential risks were evaluated by comparing estimated exposure point concentrations to Applicable or Relevant and Appropriate Requirements (ARARs) and by quantitative risk characterization.

5.8.3.1 Comparison to ARARs

ARARs were available only for chemicals of potential concern in groundwater at N-TEAD. These ARARs were the State and federal Maximum Contaminant Levels (MCLs). Chemical concentrations also were compared with other, health-based guidance values if MCLs were not available. One or more State and/or federal ARARs or guidance values was exceeded in all study areas. The primary chemicals present at concentrations above ARARs or other guidance values were RDX, nitrate/nitrite and sulfate at the TNT Washout Facility; RDX and TCE in the Sanitary Landfill; and lead and chromium in the Drum Storage Area. Specific comparisons are as follows:

- TNT Washout Facility. In the shallow groundwater zone, the mean and maximum concentrations of nitrate/nitrite (24,000 and 49,000 ug/l, respectively) exceed the State and federal MCLs for nitrate (10,000 ug/l), as well as the proposed federal MCLs for nitrite (1,000 ug/l) and for nitrate + nitrite (10,000 ug/l). The maximum concentration of sulfate (1,200 mg/l) exceeds the state MCL (1,000 mg/l), and both the mean and maximum concentrations (900 and 1,200 mg/l, respectively) exceed the State and federal secondary MCL (250 mg/l). Also, the mean and maximum concentrations of RDX (120 and 270 ug/l, respectively) exceed the federal HA.

  In the deep aquifer, the mean and maximum concentrations of nitrate/nitrite (16,000 and 44,000 ug/l, respectively) exceed the State and federal MCLs for nitrate (10,000 ug/l), as well as the proposed federal MCLs for nitrite (1,000 ug/l) and for nitrate + nitrite (10,000 ug/l). The

maximum concentration of sulfate (1,800 mg/l) exceeds the State MCL (1,000 mg/l), and both the mean and maximum concentrations (460 and 1,800 mg/l, respectively) exceed the State and federal secondary MCL (250 mg/l). Also, the maximum concentration of RDX (29 ug/l) exceeds the federal HA (2 ug/l).

- Sanitary Landfill. In downgradient wells, the mean and maximum concentrations of TCE (17 and 48 ug/l) exceed the federal MCL (5 ug/l) and the maximum concentration of RDX (8.6 ug/l) exceeds the federal HA (2 ug/l). The mean and maximum concentrations of total lead (15 and 21 ug/l) exceed the proposed federal MCL (5 ug/l). The mean and maximum concentrations of total nickel (31 and 58 ug/l) and the maximum concentration of dissolved nickel (24 ug/l) exceed the adjusted AWQC (15.4 ug/l).

  In crossgradient wells, the mean and maximum concentrations of total lead (20 and 37 ug/l) and the maximum concentration of dissolved lead (5.3 ug/l) exceed the proposed federal MCL (5 ug/l). The mean and maximum concentrations of total nickel (32 and 38 ug/l) and the maximum concentration of dissolved nickel (19 ug/l) exceed the adjusted AWQC (15.4 ug/l).

- Drum Storage Area. The maximum concentration of total chromium (52 ug/l) slightly exceeds the State and federal MCL (50 ug/l). The mean and maximum concentrations of total lead (33 and 45 ug/l) exceed the proposed federal MCL (5 ug/l). The mean and maximum concentrations of total nickel (230 and 290 ug/l) exceed federal HA (150 ug/l) and the adjusted AWQC (15.4 ug/l); the maximum concentration of dissolved nickel (42 ug/l) also exceeds the adjusted AWQC.

5.8.3.2 Quantitative Risk Characterization

Because ARARs or other guidance were not available for all chemicals of concern at the N-TEAD study areas, a quantitative endangerment assessment was conducted for the groundwater ingestion pathway noted above. Quantitative risk assessment involves estimating intakes by potentially exposed populations based on the assumed exposure scenario. These intakes are then combined with reference doses (RfDs, defined as acceptable daily doses for noncarcinogens) or cancer potency factors (for potential carcinogens) to derive estimates of noncarcinogenic

hazard or excess upperbound lifetime cancer risks of the potentially exposed populations. For carcinogens, the excess lifetime cancer risk is expressed as a probability. A 10^{-6} risk indicates that, as a result of the exposure being considered, an exposed individual has a lifetime probability of one in a million of getting cancer.

Quantitative risk estimates were derived for ingestion of groundwater by workers under hypothetical future use conditions. The conclusions of the human health endangerment assessment are as follows:

- TNT Washout Facility. Potential exposures to chemicals in both the shallow (perched) groundwater zone and deep (regional) aquifer were evaluated for the TNT Washout Facility. Although the water capacity of the perched zone is probably not sufficient to support drinking water use, potential risks for this pathway were evaluated to provide a health-based measure of potential impacts of the shallow groundwater zone on the deep, regional aquifer.

- For the shallow groundwater zone, the upper bound excess lifetime cancer risks are $1x10^{-5}$ (average case) and $9x10^{-5}$ (plausible maximum case). For the deep aquifer, the upper bound excess lifetime cancer risks are $2x10^{-7}$ (average case) and $1x10^{-5}$ (plausible maximum case). In all cases, risks are due to RDX. RDX has been classified by EPA as possible human carcinogen (Group C), which means there is limited evidence that this chemical is a carcinogen.

- Potential exposure to noncarcinogens in the shallow groundwater zone is associated with a hazard index greater than 1 under both the average and the plausible maximum exposure cases. In both cases, the individual CDI:RfD ratio for nitrate/nitrite exceeds 1. For the deep aquifer, potential exposure to noncarcinogens also is associated with a hazard index greater than 1 under the average case and plausible maximum cases due to nitrate/nitrite.

- Sanitary Landfill. Potential exposures to chemicals in both downgradient and crossgradient wells were evaluated for the Sanitary Landfill. For the downgradient wells, the upper bound excess

lifetime cancer risks are $1x10^{-5}$ (average case) and $7x10^{-5}$ (plausible maximum). The risks under the average case are due to arsenic and under the plausible maximum case are due to arsenic, TCE, and RDX (a Group C carcinogen). The hazard index is less than 1 under both cases.

For the cross gradient wells, the upper bound excess lifetime cancer risks are $8x10^{-6}$ (average case) and $3x10^{-5}$ (plausible maximum). The risks under the average case are due to arsenic and under the plausible maximum case are due to arsenic and bis(2-ethylhexyl)phthalate (a suspected laboratory contaminant). The hazard index is less than 1 under both cases.

- Drum Storage Area. The upper bound excess lifetime cancer risks are $1x10^{-5}$ (average case) and $8x10^{-5}$ (plausible maximum). For the average case, the risks are due primarily to arsenic and for the plausible maximum case the risks are due to both arsenic and bis(2-ethylhexyl)phthalate. The hazard index for both cases is less than 1.

  It is possible that bis(2-ethylhexyl)phthalate is not in the groundwater at the Drum Storage Area, but was present in samples due to laboratory contamination. This chemical was not detected in subsurface soil samples in this area.

The evaluation of potential risks associated with ingestion of groundwater from the three study areas does not include potential risks associated with exposure to lead or the unknown chemicals and tentatively identified chemicals detected in samples, some of which were detected at concentrations much higher than the positively identified compounds. Lead is a probable human carcinogen and can cause a variety of other health effects following low exposures. The potential health effects of the unknown chemicals cannot be evaluated, although conceivably some of these chemicals could be more toxic than those quantitatively evaluated. Exposure to both lead and these other compounds could add to the estimates of overall impact.

5.8.4 ENVIRONMENTAL ASSESSMENT

Potential impacts associated with exposure to chemicals in soils at the Chemical Range were evaluated for plants and terrestrial

wildlife. Zinc and nickel were the chemicals of potential concern in this study area.

- Terrestrial Wildlife. Potential direct wildlife exposures are generally limited to soil invertebrates. Terrestrial wildlife could be exposed indirectly to nickel and zinc that have accumulated in plants or soil invertebrates, but exposures via this pathway are not likely to result in significant exposures or impacts. Potential impacts on soil invertebrates could not be quantitatively evaluated because of a lack of appropriate toxicity data. However, it is believed that any impacts on soil communities are likely be limited to the Chemical Range Area, and would not be expected to significantly impact the health of other soil communities or wildlife populations at N-TEAD.

- Terrestrial Plants. Terrestrial plants may be exposed to chemical contaminants in soil as a result of uptake through the roots. Nickel concentrations were below soil levels known to be phytotoxic in some plant species. The maximum concentration of zinc exceeded the soil level identified as phytotoxic, suggesting that zinc could be impacting vegetation at the Chemical Range. If effects are occurring, however, they are likely to be limited to localized hot spots and would be expected to have minor impacts on the plant community at the Chemical Range and the overall plant community and habitat quality of N-TEAD.

There are many uncertainties associated with the estimates of impacts in this assessment, and therefore these results should not be construed as presenting absolute estimates of risks to human or environmental populations. Rather, this assessment is meant to be a conservative analysis intended to indicate the potential for adverse impact to occur.

5.8.5 DATA NEEDS

Data needed to further address potential human health and environmental impacts associated with N-TEAD are as follows:

- Because the extent of the plume has not been defined, additional monitoring wells at the TNT Washout Facility downgradient of current monitoring wells would be needed

to fully evaluate the extent of contamination from this source area.

- Additional monitoring wells and soil borings in the Drum Storage Area and additional background groundwater samples would be needed to determine if the inorganic chemicals detected in the groundwater at the Drum Storage Area indicate contamination, or are at naturally occurring levels.

- Deep soil samples from the Chemical Range and Old Burn Area would be needed to better characterize the contaminant source in this area. If deep soil samples indicate vertical migration of contaminants, groundwater samples would be needed to evaluate the migration of chemicals from the source area.

- To evaluate potential exposures from wind-blown dust, surface soil samples would be needed from those study areas where surface discharge of wastes may have occurred in the past (e.g., Sanitary Landfill, TNT Washout Area). Screening-level air sampling would support evaluation of the air exposure pathway (both dust exposures and exposure to volatile compounds).

- Further effort should be made to identify unknown and tentatively identified compounds, particularly those that were detected at high concentrations relative to other chemicals.

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SECTION 6

CONCLUSIONS AND RECOMMENDATIONS

The conclusions and recommendations for the study areas summarized in this section are based on the RI field investigation, the contamination assessment, and the endangerment assessment. In summary, site-related contamination was found in subsurface soil and shallow, locally perched groundwater at the TNT Washout Facility, and to a lesser degree in the regional aquifer at the TNT Washout Facility and the Sanitary Landfill. Widespread contamination was not detected in subsurface soil at the Sanitary Landfill; in surface soil, subsurface soil, or regional groundwater at the Drum Storage Areas; in the perimeter subsurface soils at the Old Burn Area; or in surface soil adjacent to trenches at the Chemical Range.

6.1 TNT WASHOUT FACILITY

6.1.1 RI Conclusions

Contaminant sources at the TNT Washout Facility include the active and inactive (covered) TNT washout E/P ponds, the septic tank and suspected leach field, the active laundry effluent pond, and the underground piping that conveys flow to the septic tank and the laundry effluent pond.

The geology of the upper 75 to 100 feet consists mostly of thin interbedded layers of fine-grained sands, silts, and clays. Below these depths, coarse-grained gravels with occasional layers of sand predominate. Groundwater flow is to the north-northwest.

Localized perched zones, encountered during borehole drilling, varied in depth from approximately 17 to 49 feet below ground surface. The localized low-permeability clayey lenses create saturated pockets of mixed wastewater and infiltrated precipitation in the vadose zone that can eventually leach to the regional aquifer, which is 200 to 250 feet below the surface. The variability in depth to the perched zones suggests either numerous vertically spaced localized perched zones, or that the leading edge of a zone of saturation spreading along low-permeability perching lenses was encountered during drilling.

As part of the geophysical survey conducted at the TNT Washout Facility, the Ground Penetrating Radar (GPR) survey identified four pipelines south of the inactive laundry effluent pond used for rinsewater flow. The EM survey detected elevated apparent conductivity values associated with the old TNT washout E/P ponds. These elevated values did not extend far from the pond

boundaries; therefore, no significant lateral migration from these ponds or the active laundry effluent pond was indicated by the geophysical survey. However, in a groundwater sample collected from one shallow well (N-3F) approximately 300 feet from the nearest pond, explosive contamination was found (270 ug/L) in the shallow groundwater, indicating substantial lateral migration due to clayey perching layers (or from a former unidentified source).

Low level explosives were detected in shallow soils primarily adjacent to the TNT washout E/P ponds, the suspected leach field, and the underground piping. In addition, chloride, nitrate/nitrite, and sulfate were consistently detected. There are no pathways by which individuals could be directly exposed to chemicals in the subsurface soil, although the chemicals can leach to the underlying groundwater.

Shallow and deep wells in the vicinity of the contaminant source areas both contained RDX and one also contained HMX. Newly installed deep wells downgradient of the facility did not contain either of these explosives, but all four did contain low levels of 2,4,6-TNT. Since these compounds have similar mobility, these results suggest that 2,4,6-TNT was present in the wastewater prior to RDX or HMX; consequently, its infiltration to groundwater has preceeded those compounds. Nitrate/nitrite and sulfate concentrations in groundwater at the TNT Washout Facility statistically exceeded background concentrations.

Some lateral spreading of contaminants may occur above the low-permeability lenses. The groundwater in these shallow, locally saturated zones may spread to the outer edges of the lenses before continuing its vertical migration. However, based on the results of the EM survey, the overall extent of the lateral migration appeared limited around both the TNT and laundry effluent E/P ponds. The lateral extent of explosive contamination cannot be delineated since the outermost shallow and deep groundwater samples contained aromatics. However, the levels in each of the four most downgradient deep wells were less than 2.0 ug/L.

Potential future exposures to chemicals in both the shallow and deep groundwater zones were evaluated. However, it is unlikely that the shallow perched zone could be used as a drinking water source because of its limited water holding capacity. In fact, most wells screened in the perched zone were dry during RI sampling since the thin perching layers were penetrated by the well screens. However, this locally perched zone will act as a source of chemicals for the deep regional aquifer, which could be used as a drinking water source.

In the shallow perched zone and the deep aquifer, either the mean or maximum concentrations (or both) of sulfate and RDX exceeded ARARs. For all carcinogens detected, the upper-bound

excess lifetime cancer risks exceeded 10^{-6} for both the average and plausible maximum cases in the shallow perched zone and the plausible maximum exposure case for the deep aquifer. In all cases, the risks were due to RDX. For noncarcinogens, the hazard indices exceeded 1 under both the average and plausible maximum cases for both the shallow perched zone and the deep aquifer due to nitrate/nitrite.

6.1.2 Recommendations (Prior to Remediation)

- The extent of explosives contamination further downgradient of the facility should be determined by analyzing groundwater samples for explosives from existing wells N-3B and No. 6, which are near N-TEAD's northern boundary.

- Additional deep monitor wells are also recommended downgradient of the facility to determine the presence of such a plume.

- Column leaching tests of subsoils are needed to estimate attenuation rates prior to modeling to assess whether the explosives are reaching or could reach offsite users.

- To further characterize the horizontal and vertical extent of the localized perched zones, continuous soil sampling on a 100-foot grid across the facility is recommended.

- Aquifer parameters of the deep alluvial aquifer should be determined to allow modeling of groundwater flow and contaminant transport from the TNT Washout Facility.

6.1.3 Preliminary Screening of Remedial Technologies

Potential remedial objectives for the TNT Washout Facility are designed to mitigate effects on human health and the environment from past and present activities at the facility. Specifically, these potential remedial objectives include:

- Mitigation of onsite (N-TEAD) exposure to contaminants that have reached the regional aquifer.

- Mitigation of offsite exposure to contaminants that have reached the regional aquifer.

- Removal or treatment of contaminated subsurface soil that leach contaminants to groundwater.

- Removal, treatment, or containment of past and present source areas that contribute contaminants to subsurface soil and groundwater, or modification of operating procedures in active areas.

General response actions designed to address each of the remedial objectives are described in the following subsections.

6.1.3.1 Mitigation of Onsite Exposure to Groundwater

Since no present exposure pathway is complete, no significant risks are presently posed by contaminants at the TNT Washout Facility. However, if drinking water wells were installed in the regional aquifer at the facility, significant exposures to RDX and nitrate/nitrite might result. Existing water supply wells appear to be sufficient and the installation of additional wells at the TNT Washout Facility is unlikely. However, institutional controls should be implemented that would prevent the installation of drinking water wells in or immediately downgradient of the TNT Washout Facility.

6.1.3.2 Mitigation of Offsite Exposure to Groundwater

Based on the relatively low levels (less than 2.0 ug/L) of explosive contamination found in monitor wells downgradient of the TNT Washout Facility and the distance (approximately 6 miles) to the nearest known downgradient groundwater users (in the Town of Grantsville), it is probable that the concentrations in groundwater reaching offsite users would be negligible. However, it is not known if chemicals at concentrations higher than those measured have already migrated past the wells downgradient of the TNT Washout Facility or have not yet reached them. Therefore, remediation of the regional groundwater prior to migration across the N-TEAD boundary may be appropriate. General response actions could include the following:

- No Action - Continued monitoring of groundwater. Piezocones could be installed to further characterize the extent of contamination in the shallow, locally perched zones that act as contaminant sources for the regional aquifer. Column leach testing would aid in modeling contaminant transport between these two zones.

- Institutional Actions - Offsite residents could be provided with an alternative water supply. Supply wells vulnerable to contamination could be sealed and deed restrictions would prohibit their use and the installation of new wells. Monitoring of groundwater quality would continue to track the contaminant plume, if any. The extent of the migration of explosives further downgradient of the facility should be determined.

- Pump and Treat Groundwater at the TNT Washout Facility - Groundwater from the regional aquifer beneath the facility could be extracted and treated to remove or detoxify the contaminants. Collection of contaminated groundwater in the shallow perched zone would be difficult since the perching layers are quite thin and

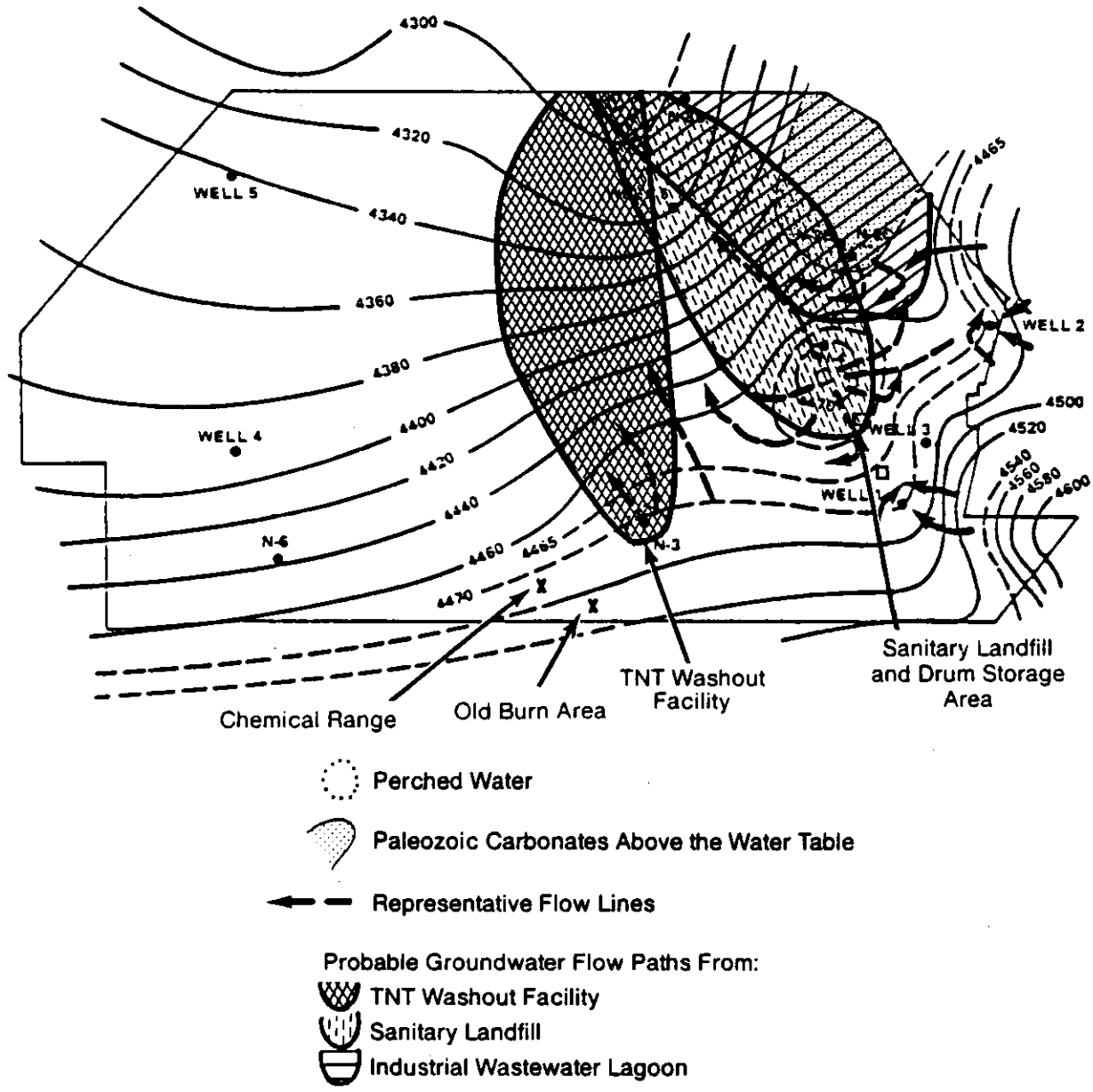
discontinuous. If the peak concentrations of the contaminant plume have already migrated past the facility, the effectiveness of a pump-and-treat system at the facility would be limited. A trend analysis based on several groundwater sampling episodes over time would help determine whether the peak concentrations have already passed existing monitor wells.

- Pump and Treat Groundwater Between the TNT Washout Facility and the N-TEAD Boundary - Groundwater from the regional aquifer could be extracted further downgradient and treated for contaminants, if present. The regional aquifer downgradient of the facility is impacted by the large contaminant plume (containing primarily TCE and chromium) emanating from the Industrial Wastewater Lagoon (IWL). TEAD and the State of Utah have entered into a Consent Decree to address the collection and treatment of this plume. Groundwater flow from the TNT Washout Facility and the IWL overlap considerably near the N-TEAD northern border (Figure 6-1). Collection of the groundwater downgradient of the TNT Washout Facility could be coordinated with the collection of groundwater downgradient of the IWL. However, treatment processes would be different since the class of contaminants is different. Dual treatment systems may be required.

The lagoons received wastewater primarily during 1948-1958 and 1960-1965. Therefore, a plume containing explosives and other contaminants may have migrated north of the TNT Washout Facility beyond the outermost monitor wells. Therefore, additional deep monitor wells are recommended further downgradient of the facility to determine the presence of such a plume. The extent of explosive contamination and concentrations further downgradient of the facility should be determined by analyzing groundwater samples for explosives from existing wells N-3B and No. 6, which are near N-TEAD's northern boundary. It is possible that no remedial action may be warranted due to natural dispersion of contaminants in the regional aquifer. Column leaching tests of subsoils from the TNT Washout Facility would be needed to estimate attenuation rates prior to modeling to assess whether the nitroaromatics are reaching or could reach offsite users.

6.1.3.3 Contaminated Subsurface Soil

Subsurface soils, particularly near and under sources of leaching contaminants, have been impacted by explosives. In turn, these subsurface soils can leach contaminants to the regional



(Source: Ertec 1982 - Scale Not Provided)

FIGURE 6-1 PROBABLE GROUNDWATER FLOW PATHS FROM CONTAMINANT SOURCE AREAS AT N-TEAD

aquifer. General response actions to remediate contaminated subsurface soils could include the following:

- No Action - No measures would be taken.

- In Situ Soil Flushing - An injection/percolation and collection system could be used to flush water through the contaminated soils to leach the contaminants bound to the soil. Collection of this water would likely be difficult due to low yields from the shallow soils. Groundwater that would be collected could then be treated. However, since the soil sampling program showed that most of the subsurface soil was not contaminated, recovery of contamination by soil flushing would be limited.

- Excavation - Contaminated soil could be excavated for treatment or disposal. However, excavation may prove difficult because of the capped old TNT washout E/P ponds, the underground pipes, and the depth of contaminated soils, which is at least 40 feet in some areas, such as near the old TNT washout ponds.

- Capping - Capping reduces the impact of contaminated subsurface soils on groundwater by minimizing infiltration and therefore leaching of contaminants from the soil. Soils containing some level of explosives were found in separate areas of the facility. Therefore, a majority of the facility beyond the source areas (approximately 21 acres) would need to be capped to minimize infiltration through these soils.

Explosives, the major class of contaminants at the TNT Washout Facility, were found in 4 of the 12 boreholes. Total explosive concentrations exceeded 5 ug/g only in the samples adjacent to the former TNT washout ponds (N-109-88) and the underground laundry effluent pipe (N-108-88). Explosives are generally soluble and most appear to have already been leached from the soil. A preliminary water balance covering the period since the first operation of the TNT washout E/P ponds (Section 4) indicated approximately 3 to 1 dilution of seepage from the ponds containing explosives. Leach tests on soil collected near source areas would aid in determining whether the levels of explosives found in some subsurface soil samples would leach significant concentrations to groundwater.

6.1.3.4 Surface Source Areas

Active and inactive source areas at the TNT Washout Facility are contributing to subsurface soil and groundwater contamination. Significant source areas can either be closed and contained or operations modified to reduce the release of

contaminants. Remedial or operational measures for each of the source areas are discussed below:

- No Action - No measures would be taken.

- Active Laundry Effluent Pond - A sample from the pond collected during the PA/SI did not contain detectable levels of any organics or explosives, but did contain 1.18 mg/L of nitrate/nitrite. The removal of this parameter via treatment prior to discharge to the pond could be pursued. Additional samples should be collected to confirm the absence of explosives. Alternatively, construction of an evaporation pond with a low-permeability liner could be installed to convert the E/P pond to an evaporation pond. The liner would mitigate the effect of the laundry effluent on groundwater by essentially eliminating infiltration. If the present pond is closed, the area could be filled in and capped with a low-permeability material.

- Active TNT Washout E/P Pond - This pond periodically receives backwash water from the charcoal filtration system during facility "cleanout" operations and from a process water settling tank. EA (1988) stated that the active TNT washout pond "does not appear to be a significant source" of explosives contamination. However, the rinsewater that the pond receives needs to be monitored and the flow (if any) quantified. A low-permeability liner could be installed to convert the E/P pond to an evaporation pond. The liner would mitigate the effect of the rinsewater on groundwater by essentially eliminating infiltration. If the present pond is closed, the area could be filled in and capped with a low-permeability material.

- Septic Tank and Suspected Leach Field - Although the septic tank and suspected leach field may not contribute explosives to the groundwater, nitrate/nitrite may be leached. In addition, the infiltration enhances the migration of contaminants from other nearby sources. Contributors to the septic tank/leach field need to be determined to assess the volume and likely quality of the wastewater. Collection and treatment of the wastewater may be warranted. If the present system is abandoned, the tank and leach field may need to be capped or excavated to mitigate future impact on groundwater.

6.2 SANITARY LANDFILL

6.2.1 Conclusions

The 115-acre Sanitary Landfill has received a wide variety of wastes since 1942. The regional aquifer is at depths generally

exceeding 250 feet and flows to the northwest under a low gradient (0.0016 ft/ft). The geology consists primarily of coarse-grained gravels interbedded with sands and an occasional fine-grained clay or clayey sand. The strata are very heterogenous. Locally perched groundwater was encountered east of the landfill, adjacent to the Drum Storage Areas.

The geophysical survey performed at the Sanitary Landfill detected buried wastes over an area of approximately 16.5 acres. Anomalous EM and magnetic measurements occurred west of the fence in the western part of the landfill. However, these measurements were probably due to metal objects and metal debris present on ground surface, and it is likely that waste burial activities did not occur west of the fence. EM measurements did not indicate migration of contaminants laterally away from the landfill or the inactive evaporation ponds.

The detection of contaminants in the subsurface soil at the Sanitary Landfill was limited. VOCs and explosives were not detected. Bis(2-ethylhexyl)phthalate, a common laboratory contaminant, was detected at a low level (less than 1.0 ug/g) in a subsurface soil sample. Of the inorganic parameters, only nickel had a geometric mean concentration exceeding background.

The most significant contamination detected in this area was benzene, trans-1,2-DCE, and TCE in the groundwater. The presence of TCE and trans-1,2-DCE in the four downgradient wells indicates that the landfill may be the source of these compounds in the regional aquifer. The highest level of TCE detected in groundwater at the Sanitary Landfill was 47.6 ug/L in downgradient well N-116-88. The landfill also appears to be a source of unidentified hydrocarbons (found in four wells at concentrations totaling 120 to 700 ug/L) and RDX (found in N-115-88 at 8.6 ug/L). The mean concentrations of silver, arsenic, copper, nickel, lead, and zinc exceeded their mean background concentrations. However, the downgradient levels of silver and arsenic were less than or equal to the levels in the wells upgradient of the landfill; therefore, the landfill's contribution of silver and arsenic to the groundwater is questionable.

Potential future exposure to chemicals in the regional aquifer by onsite workers was evaluated, although use of the groundwater at the Sanitary Landfill is considered unlikely. In the downgradient wells, the mean and maximum concentrations of TCE and the maximum concentrations of RDX exceeded ARARs. Some concentrations of lead and nickel exceeded ARARs in downgradient and crossgradient wells. The upper-bound excess lifetime risks exceeded 10^{-6} for both the average and plausible maximum cases in both the downgradient and crossgradient wells due to the presence of arsenic and TCE. The hazard indices (for noncarcinogens) were less than 1 in both cases.

6.2.2 Recommendations

Continued monitoring of groundwater downgradient of the Sanitary Landfill is warranted. Since contaminants from the landfill (primarily chlorinated solvents) are similar to those emanating from the IWL, groundwater remediation downgradient of the IWL could also feasibly accommodate groundwater from the Sanitary Landfill (see Figure 6-1).

Since the newly installed deep wells have been sampled only once, additional groundwater samples should be collected to develop a trend analysis. Column leach tests also appear warranted and are recommended.

To determine whether the landfill is a significant source of air contaminants (e.g., methane and volatile organics), a screening air sampling program at areas within N-TEAD is recommended.

6.3 DRUM STORAGE AREAS

6.3.1 Conclusions

The Drum Storage Areas have been used at least since 1953 to store containers of chemicals. The regional aquifer lies between 300 and 320 feet below the surface and flows to the northwest toward the Sanitary Landfill. A shallow water zone was encountered in two boreholes/wells between the Drum Storage Areas and the Sanitary Landfill. Water was not recoverable from the well screened in this zone because of the narrow thickness of the perching layer and the completion technique used to install the well.

The geology consists primarily of coarse-grained gravels interbedded with sands and an occasional fine-grained clay or clayey sand. The strata are very heterogeneous. Tuffaceous sediments were encountered at the bottom of one (N-114-88) of the two boreholes.

Surface soil sampling at the Drum Storage Areas indicated the presence of BNAs (mostly nonpriority pollutants) in most of the samples, with some attenuation with depth. Much of the BNA contamination was from PAHs, which are constituents of asphalt (which covers most of the site) and are probably not related to drum storage. No explosives were detected in surface soil samples, and concentrations of inorganics were comparable to background concentrations. Therefore, no chemicals of potential concern were identified in surface soil.

Subsurface soil samples were collected from three boreholes between the Drum Storage Areas and the Sanitary Landfill. Bis(2-ethylhexyl)phthalate was detected in two subsurface soil

samples, but may be indicative of laboratory or field contamination. Three unknown BNAs were detected at low concentrations (1.0 ug/g) in three samples. No VOCs or explosives were detected. Of the inorganic parameters, the geometric mean concentration of selenium exceeded background.

Bis(2-ethylhexyl)phthalate was detected at 790 ug/L in one of the two groundwater samples downgradient of the Drum Storage Areas. A soil sample from the same location did not contain this compound; therefore, its detection in groundwater may have been due to laboratory or field contamination. No VOCs or explosives were detected in groundwater samples. Silver, arsenic, beryllium, chromium, copper, nickel, lead, and zinc were detected in groundwater in either the total or dissolved forms at geometric mean concentrations exceeding those in the background samples.

Potential future exposure to chemicals in the regional aquifer by onsite workers was evaluated, although use of the groundwater immediately downgradient of the Drum Storage Areas is considered unlikely. The mean and maximum concentrations of total lead and total nickel exceeded ARARs. The maximum concentrations of total chromium and dissolved nickel also exceeded ARARs. The upper-bound excess lifetime cancer risks were 1×10^{-5} (average case) and 8×10^{-5} (plausible maximum case). For the average case, the risks were due primarily to arsenic, and for the plausible maximum case, the risks were due to arsenic and bis(2-ethylhexyl) phthalate. The hazard indices (for noncarcinogens) were less than 1 for both cases.

Overall, based on the current limited data, the surface at the Drum Storage Areas appears to create no adverse impact on human health or the environment. Subsurface soil and groundwater appeared to have been minimally impacted by activities in the area based on the current limited data.

6.3.2 Recommendations

No remediation appears warranted at this time. Additional monitoring, sampling, and analysis, both upgradient and downgradient of the Drum Storage Areas, are needed to determine if the concentrations of inorganic chemicals detected in the groundwater are actually site-related or are naturally occurring.

A shallow groundwater zone was encountered from 35 to 62 feet in two boreholes immediately west of the Drum Storage Areas to the east. No monitor wells in the Drum Storage Areas or the Sanitary Landfill to the west are completed in this groundwater zone. Borehole drilling, monitor well installation, and groundwater sampling and analysis should be performed to determine the areal extent and quality of this groundwater zone.

6.4 OLD BURN AREA

6.4.1 Conclusions

Testing of munitions, fuses, and propellants has been conducted at the Old Burn Area at the south-central N-TEAD boundary from 1942 until the early 1970s. The potential for unexploded ordnance in the Old Burn Area limited the investigation to geophysical surveys and soil boring samples at the perimeter of the area.

The magnetometer survey indicated buried waste containing ferrous material in a large part of the eastern-half of the area, including the area under the revetments. The distribution of anomalous magnetic values indicated that the waste burial sites extended eastward and southward beyond the area investigated. The EM survey indicated buried waste in a smaller, central part of the Old Burn Area and in a larger, eastern part extending southward outside the area surveyed. The GPR survey indicated buried wastes in three areas within the larger areas of buried wastes in the eastern part of the site identified by the other two geophysical techniques.

Four soil borings were drilled to a depth of 50 feet. The soils were fairly coarse-grained sands and sandy silts.

Chemical analysis of subsurface soil samples collected in the Old Burn Area (but outside of the suspected contaminated areas) did not indicate site-related contamination by explosives or inorganics. Surface and subsurface soil samples within suspected contaminated areas would need to be collected to better characterize contamination in these areas; however, explosion hazards limit drilling in the area.

6.4.2 Recommendations

To assess the vertical migration of explosives or other potential contaminants, soil borings should be drilled in the trenches to depths of 50 to 100 feet. Precautions regarding the avoidance or removal of possible unexploded ordnance in the trenches must be taken. If significant soil contamination is found, monitor well installation would be warranted.

6.5 CHEMICAL RANGE

6.5.1 Conclusions

The Chemical Range consists of a surveillance area, fire course, and chemical range located along the southern boundary of N-TEAD. Chemical and pyrotechnic munitions were tested from 1941 until the late 1960s or early 1970s.

A magnetometer survey conducted during the RI at the Chemical Range indicated a 7,000-square-foot area of buried waste contain-

ing ferrous material located south of the two open trenches. The highest magnetic values were measured in the central and northern part of this area.

The sampling of the Chemical Range was limited to the surface soil sampling of berms adjacent to the disposal trenches. No explosives were found above reporting limits. Of the inorganic parameters, only nickel and zinc geometric mean concentrations exceeded those of background samples.

The Chemical Range is no longer used; therefore, there are no pathways by which personnel could be exposed to potential chemicals of concern in the surface soils. However, potential impacts associated with exposure to chemicals in soils at the Chemical Range were evaluated for terrestrial wildlife and plants. Any impacts on terrestrial wildlife (primarily soil invertebrates) are likely to be limited and would not be expected to significantly impact the health of other soil communities or wildlife populations at N-TEAD. Effects on plants from zinc are possible, but are likely to be limited to localized hot spots and would be expected to have minor impacts on the plant community at the Chemical Range and the overall habitat quality of N-TEAD.

6.5.2 Recommendations

Sampling at the Chemical Range was limited due to potential UXO. Soil borings in the trenches at the Chemical Range are needed to determine if vertical migration of any chemical has occurred. If significant soil contamination is detected, groundwater samples would be needed to evaluate any migration of mobile (soluble) chemicals. The possible installation of upgradient and downgradient wells at the Chemical Range and the Old Burn Area could be coordinated. Based on the small estimated quantity of known source materials and the depth to groundwater of approximately 300 feet, substantial contamination to subsurface soils or regional groundwater is not expected.

SECTION 7

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U.S. Army Toxic and Hazardous Materials Agency

REMEDIAL ACTION TECHNICAL
SUPPORT SERVICES (RATSS)

Task Order 9
Tooele Army Depot-
North Area
Remedial Investigation

Final
Remedial Investigation Report

Contract Number DAAA15-87-D-0007

Volume 2

December 1990

Prepared for:
U.S. ARMY TOXIC AND HAZARDOUS MATERIALS AGENCY
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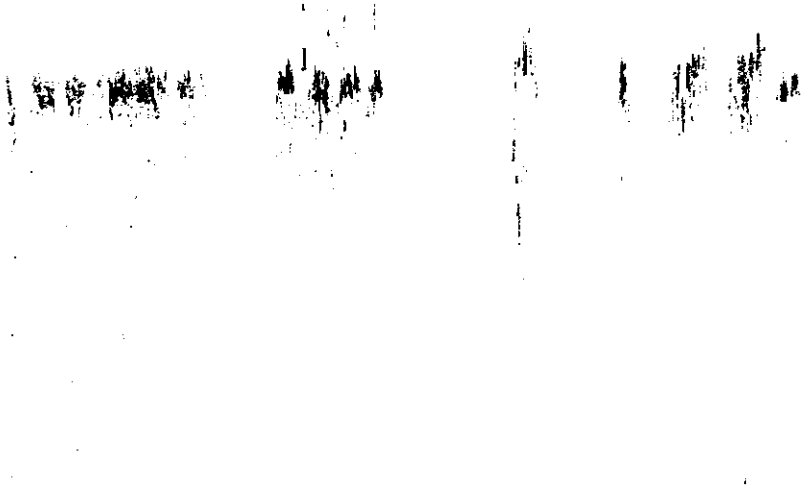

Contract No. DAAA15-87-D-0007
Task Order 9

FINAL REPORT OF REMEDIAL INVESTIGATION FOR TOOELE ARMY DEPOT - NORTH AREA TOOELE, UTAH

Volume 2

Prepared for:

U.S. Army Toxic and Hazardous Materials Agency (USATHAMA)
Aberdeen Proving Ground
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Requests for this document must be referred to Commander,
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APPENDIX A

POTENTIAL ARARs AND PROPOSED UTAH GROUNDWATER QUALITY PROTECTION REGULATIONS

DRAFT
FOR DISCUSSION ONLY

POTENTIAL ARARS FOR THE STATE OF UTAH

A. DEPARTMENT OF AGRICULTURE

1. Subject: Pesticide control -- safe and appropriate use of pesticides.
   Statute: Title 4, Chapter 14, Utah Code Annotated (U.C.A.)
   Rule: R68-07, Utah Administrative Code (U.A.C.)
   Remarks: See particularly R68-07-10, U.A.C., regarding storage, transport and disposal, and R68-07-11, U.A.C., regarding other unlawful acts.

B. DIVISION OF WILDLIFE RESOURCES, DEPARTMENT OF NATURAL RESOURCES

1. Subject: General definitions -- definitions for Wildlife Resources Code, Title 23, Chapter 13, U.C.A.
   Statute: 23-13-2, U.C.A.
   Rule: None.

2. Subject: Diversion of water -- diversion endangering protected aquatic wildlife prohibited.
   Statute: 23-15-3, U.C.A.
   Rule: None.

3. Subject: Water pollution -- pollution of waters containing protected aquatic wild life (including specified invertebrates) unlawful.
   Statute: 23-15-6, U.C.A.
   Rule: None.

C. DIVISION OF OIL, GAS AND MINING, DEPARTMENT OF NATURAL RESOURCES

1. Subject: Mine Safety Provisions -- provisions regarding subsidence, fire protection and first aid materials.
   Statute: Title 40, Chapter 5, U.C.A.
   Rule: None.

2. Subject: Reclamation of lands mined for minerals -- specifies standards for such reclamation.
   Statute: Title 40, Chapter 8, U.C.A.
   Rule: R13-1M, U.A.C.
   Remarks: See particularly R13-1M-10, U.A.C.

3. Subject: Mining Standards -- standards governing operation and reclamation of strip mines.
   Statute: Title 40, Chapter 10, U.C.A.
   Rule: R614, U.A.C.
   Remarks: See particularly 40-10-17, U.C.A.

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D. STATE ENGINEER, DEPARTMENT OF NATURAL RESOURCES

1. Subject: Well drilling standards -- standards for drilling and abandonment of wells.
   Statute: 73-3-25, U.C.A.
   Rule: R625-4, U.A.C.
   Remarks: Includes such requirements as performance standards for casing joints, requirements for abandoning a well.

2. Subject: Relocation of natural streams -- procedures and standards governing rechanneling of stream beds.
   Statute: 73-3-29, U.C.A.
   Rule: None.

3. Subject: Dam Safety -- standards governing integrity of water impoundment structures, including construction design and removal.
   Statute: 73-5-5 through 7 and 73-5-12, U.C.A.
   Rule: R625-3, U.A.C.
   Remarks: See particularly R625-3-10 and 11, U.A.C.

E. DIVISION OF STATE HISTORY, DEPARTMENT OF COMMUNITY AND ECONOMIC DEVELOPMENT

1. Subject: Protection of archaeological, anthropological and paleontological resources
   Statute: 63-18-18 through 38, U.C.A.
   Rule: R224, U.A.C.
   Remarks: See particularly Section 63-18-18, U.C.A., stating legiglative interest in preservation of archaeological, anthropological and paleontological resources, Section 63-18-25, U.C.A., regarding historical resources on state lands, and Section 63-18-37, U.C.A. regarding projects by state agencies.

F. INDUSTRIAL COMMISSION

1. Subject: Utah Occupational Safety and Health Standards
   Statute: Title 35, Chapter 9, U.C.A.
   Rule: R500, U.A.C.
   Remarks: These rules are identical to federal OSHA regulations.

G. BUREAU OF SOLID AND HAZARDOUS WASTE, DIVISION OF ENVIRONMENTAL HEALTH, DEPARTMENT OF HEALTH

1. Subject: Solid Waste
   Statute: Title 26, Chapter 14, U.C.A.
   Rule: Not yet codified; copy available from the Bureau of Solid and Hazardous Waste.
   Remarks: These rules govern solid waste landfills.

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2. Subject: Solid and Hazardous waste
   Statute: Title 26, Chapter 11, U.C.A.
   Rule: R450, U.A.C.
   Remarks: These rules are substantively identical to the federal rules promulgated under the Resource Conservation and Recovery Act, with the following exceptions:

   - o R450-2-1 (Table 2-III): listings for K048 and K051 (separator sludges) are broader than federal listings;
   - o R450-2-1 (Table 2-I): listing for F999 (military agent) has no corresponding federal provision;
   - o R450-9, regarding spill reporting requirements, has no corresponding federal provisions;
   - o R450-101, which will be promulgated shortly, lists criteria to be considered in establishing clean-up standards.

H. BUREAU OF WATER POLLUTION CONTROL, DIVISION OF ENVIRONMENTAL HEALTH, DEPARTMENT OF HEALTH

1. Subject: Definitions for Water Pollution Rules and General Requirements
   Statute: Title 26, Chapter 11, U.C.A.
   Rule: R448-1

2. Subject: Standards for Quality for Waters of the State
   Statute: Title 26, Chapter 11, U.C.A.
   Rule: R448-2
   Remarks: These rules are specific to Utah waters, though they are derived in part by using federal criteria. See particularly the non-degredation policy in R448-2-3.

3. Subject: Sewers and wastewater treatment works
   Statute: Title 26, Chapter 11, U.C.A.
   Rule: R448-3, U.A.C.
   Remarks: Construction and performance requirements.

4. Subject: Large underground wastewater disposal systems
   Statute: Title 26, Chapter 11, U.C.A.
   Rule: R448-5, U.A.C.
   Remarks: Governs domestic wastewater systems.

5. Subject: Surface disposal of produced water from gas and oil wells
   Statute: Title 26, Chapter 11, U.C.A.
   Rule: R448-6, U.A.C.

6. Subject: Underground injection control
   Statute: Title 26, Chapter 11, U.C.A.
   Rule: R448-7, U.A.C.
   Remarks: See particularly R448-7-9 specifying technical requirements.

7. Subject: Utah pollution discharge elimination system
   Statute: Title 26, Chapter 11, U.C.A.
   Rule: R448-8, U.A.C.
   Remarks: See particularly R448-8-7 specifying criteria and standards.

8. Subject: Ground water protection
   Statute: Title 26, Chapter 11, U.C.A.
   Rule: Not yet assigned.
   Remarks: The Bureau of Water Pollution Control, in cooperation with other bureaus in the Division, will soon be promulgating ground water protection standards. There is no corresponding federal program.

I. BUREAU OF AIR QUALITY, DIVISION OF ENVIRONMENTAL HEALTH, DEPARTMENT OF HEALTH

1. Subject: Utah Air Conservation Rules.
   Statute: Title 26, Chapter 13, U.C.A.
   Rule: R446-1
   Remarks: These rules are substantively identical to corresponding federal regulations, with the following exceptions:

   - R446-1-1.25 and R446-1-3.1.8, which require application of best available control technology for any source;
   - R446-1-3.11, which lists criteria to be considered in establishing visibility standards;
   - R446-1-4.1, which sets visible emission standards;
   - R446-1-4.2, which sets standards for sulfur content in fuels;
   - R446-1-4.5, which regulates fugitive dust emissions; and
   - R446-1-5.1, which allows the State to require temporary closure of air pollution sources in the event of an air pollution emergency episode.

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J. BUREAU OF DRINKING WATER/SANITATION, DIVISION OF ENVIRONMENTAL HEALTH, DEPARTMENT OF HEALTH

1. Subject: Utah Public Drinking Water Rules
   Statute: Title 26, Chapter 12.
   Rule: R449, U.A.C.
   Remarks: See particularly R449-103 establishing drinking water standards. These standards are identical to federal standards except with respect to sulfate, TDS and flouride.

K. BUREAU OF RADIATION CONTROL, DIVISION OF ENVIRONMENTAL HEALTH, DEPARTMENT OF HEALTH

1. Subject: General provisions -- definitions and other provisions applicable to following subjects.
   Statute: 26-1-5, U.C.A., and 26-1-27 through 29, U.C.A.
   Rule: R447-12, U.A.C.

2. Subject: Licensing requirements for handling radioactive materials.
   Statute: 26-1-5, U.C.A., and 26-1-27 through 29, U.C.A.
   Rule: R447-19, 21 and 22, U.A.C.
   Remarks: Although these provisions relate primarily to licensing requirements, they also contain some substantive standards. See, e.g., R447-19-500 regarding standards for transportation.

Proposed Ground Water Quality Protection Regulations

PREAMBLE

Background

The proposed ground water quality protection regulations are the culmination of several years of effort in developing a more formalized program to protect the quality of ground water in Utah. A ground water policy was issued in 1984 by the Governor calling for the development of a state ground water quality protection strategy. The protection strategy was completed in 1986. In the public meetings that were held around the state in 1986 to receive comment on the strategy, those attending made it clear that it was very important that ground water be protected from contamination. Subsequently, the staff in the Bureau of Water Pollution Control prepared a concept paper on ground water aquifer classification and standards. This was discussed with various interest groups around the state in late 1987 and early 1988.

In the 1988 legislative session, the Utah legislature passed Senate Joint Resolution 1, expressing to Congress the request that any federal ground water legislation give primary responsibility to the states, and expressing the intent of the state to proceed with a ground water quality protection program. The regulation now being proposed includes the prior proposals on ground water classification and standards, and proposes a new permitting system to implement those standards. An earlier draft of the regulation has been subject to comment through public meetings and meetings with various interest groups. This proposed regulation and preamble reflects the comments that were received.

The ground water regulation is written to protect existing beneficial uses and quality of ground water, and to protect probable future beneficial uses based on water quality. Statutory authority for this regulation is contained in Chapter 26-11, Utah Code Annotated, which gives the Water Pollution Control Committee the responsibility to prevent, control, and abate pollution of waters of the state, including ground water.

Because it is difficult or impossible and in any event very costly to clean up a contaminated aquifer, and because it may take decades or longer for natural processes of dilution and purification to occur, it is generally recognized that prevention of contamination is far preferable to attempting to clean up contamination. For this reason, the focus of this regulation is on prevention, rather than clean up.

Ground water quality must be protected not just for the next ten or twenty years, but for future generations. This calls for a program to prevent ground water contamination to the greatest extent practical. The intent of this regulation is to establish a framework for overall protection of ground water quality. It is not intended to replace or duplicate existing regulatory programs which are providing protection of ground water adequately. For example, hazardous waste disposal regulatory programs, which are targeted primarily to protect ground water, will continue under the direction of the Bureau of Solid and Hazardous Wastes, and will not be replaced by this regulation.

A great deal of discussion has taken place concerning whether the state should have a policy of non-degradation or anti-degradation of ground water quality. This draft regulation is based on the concept of anti-degradation for the following reasons. Non-degradation means no degradation. While non-degradation may be an appropriate general goal, if this were applied literally, it would mean that no activities of a modern economy could take place, because almost every activity on the land surface can potentially affect the quality of ground water. Obviously this is not a practical approach. A number of states have non-degradation goals, but in actual practice function with an anti-degradation regulatory program. We feel that it is more realistic to adopt an antidegradation policy, recognizing that there will be some effect on ground water from man's activities, but minimizing those effects to acceptable levels. The draft regulation also uses a differential protection approach, providing a higher level of protection to higher quality ground water.

It is the intent of the Bureau of Water Pollution Control to work with local officials in providing data and other assistance, so they may have the information they need to make wise land use decisions to protect high quality aquifers. In areas with very high ground water quality, classified as pristine water, the protection levels to be applied are very stringent, and in effect it will require essentially no discharge of most pollutants from facilities located there. However, we do not intend to officially designate non-degradation areas, as this would essentially prohibit any kind of activity or development. These kinds of decisions are more properly dealt with at the local level through zoning and other land use planning authorities. Public water suppliers, through the wellhead protection program, also have a responsibility to take the necessary measures to protect their water sources in those wellhead protection areas.

In many places in the regulation, discretion is given to the Executive Secretary of the Water Pollution Control Committee to make various judgments and decisions. Some may feel that the Executive Secretary is given too much discretion as compared to the Committee itself. The Committee is the policy and rulemaking body for the water pollution control program in Utah. Most of the day-to-day operation of the water pollution control program is carried out by the Executive Secretary and Bureau staff as delegated by the Committee. However, the Committee retains ultimate authority, and any decision of the Executive Secretary can be reviewed, upon request, by the Committee. A formal hearing may also be requested before the Committee. Except for case-by-case decisions of a policy nature that may require Committee action, most day-to-day regulatory decisions are made by the Executive Secretary.

The draft regulation contains five major sections: 1) ground water quality standards which provide a baseline against which water quality can be compared; 2) a ground water classification system, based on the existing quality of ground water 3) ground water class protection levels, which specifies the ground water quality criteria which must be met in order to be in compliance with the regulation; 4) the ground water classification procedure; and 5) implementation, which specifies activities which require permits, the permitting process, and compliance requirements.

1. Ground Water Quality Standards.

   These standards are numerical criteria which are essentially equivalent to the Maximum Contaminant Levels (MCL's) established by the U.S. Environmental Protection Agency (EPA)for drinking water in the National Primary Drinking Water Regulations as authorized by the federal Safe Drinking Water Act. At the present time, only those constituents for which EPA has promulgated standards are included in this regulation. As EPA establishes additional standards, they will be reviewed and considered for adoption into this regulation.

This procedure of using EPA adopted criteria is followed because of the time and expense in developing standards. If is felt that these standards will protect the water for drinking and most other uses. If it becomes necessary to establish standards for other pollutants or other uses, the Water Pollution Control Committee will utilize the most current and scientifically valid information in establishing a numerical standard. The drinking water standards are not being applied directly to other beneficial uses, but are only used as reference levels. These standards are not intended to be the level to which ground water can be polluted, but are a baseline from which protection levels and numerical criteria will be developed which will be utilized in writing permits and determining compliance with the regulation.

2. Ground Water Classes

The ground water classification system is based on ground water quality. The classification in turn determines the protection level that applies to activities that may discharge to the ground water. It is felt that classification should be based on quality rather than existing use, because it is difficult to predict what use ground water in a particular area may be put to in the future. Where aquifers are classified, it will be based on available data. Until these aquifer classifications occur, however, ground water will be protected to the degree commensurate with current and potential future uses, based on the existing ground water quality. Most of the aquifers in the state will not be classified initially. This does not mean that these waters are unprotected. While an aquifer may not be classified, the ground water in a particular area will be protected through application of the protection levels commensurate with the ground water quality in that particular area. This approach will ensure against ground water being protected at a level less than its water quality would require.

Four major classes of ground water are defined in the regulation (Classes I through IV) and two special use subclasses, Class 1B and 1C. Class 1A, 1B and II waters are classified and protected as drinking water sources, except that Class 1A water, defined as pristine ground water, would have less than 500 mg/l total dissolved solids (TDS), and Class 1B ground water would be considered irreplaceable based on the cost of providing an alternative source of drinking water if the ground water were to become contaminated. Class II ground water includes water up to 3000 TDS. Some may feel that the range of TDS for Class II waters is too broad and provides unnecessary protection to a poor quality ground water. While at the present time water of 3000 mg/l TDS would not be suitable for drinking without expensive treatment or dilution with a better quality water, it is very possible in the future, due to improved technology, that such water may become a source of drinking water. Class III limited use ground water may have TDS levels up to 10,000 mg/l, but according to several federal laws is still considered a potential source of drinking water, therefore it is still protected from chemical contamination to a significant extent. Class III would also apply to any water where one or more of the MCL's are exceeded. In some cases, Class III water may be relatively high quality with just a single MCL exceeded. It may be practical to treat this water to remove the excessive contaminant thereby providing a high quality source of drinking water.

In a Class III area where the TDS may be near 10,000 mg/l, a 25% increase in TDS may result in exceeding the 10,000 mg/l limit. This would be allowed because it would not seem to be wise to discourage an activity from locating in a poor water quality area. Nevertheless, the ground water classification would continue to be Class III.

Aquifers having TDS greater than 10,000 mg/l are considered saline and would not be regulated under this regulation.

Class 1C, ground water considered ecologically important, is intended to protect the quality of surfacing ground water that is necessary for the habitat of aquatic wildlife.

Because 1C ground water must come to the surface before it would have an aquatic wildlife use, the surface water standards for the protection of aquatic wildlife (R448-2) would be applied in the surface water to protect these uses. Any discharge subject to a ground water discharge permit will have to be evaluated for its possible impact on surface water quality at the point where the ground water may come to the surface and on the beneficial uses of that surface water. Because criteria to protect aquatic wildlife are often more restrictive than those for drinking water, special attention must be paid to this use. Permit requirements will be developed on a case-by-case basis.

3. Ground Water Class Protection Levels

The protection levels are criteria which will be applied for activities which may result in a discharge to ground water, and are based generally on percentages of the standards for drinking water.

The concept of establishing protection levels is to provide a determinable methodology for identifying contamination while avoiding destruction of the water's beneficial use. By requiring notification before an MCL is approached, corrective action can be taken before the ground water quality has been degraded to the point that it is no longer suitable for its beneficial use. This approach may appear to some to be relatively stringent, but it is justified by the importance of protecting ground water, and can be supported using currently available technology. It is also an approach that has been successfully utilized in many other states in their ground water protection programs.

The following table summarizes in a general way the protection levels:

Class	TDS	Other Contaminants	
		Not detectable	Detectable
1A	May not increase above 1.1 times background, but not more than 500 mg/l.	May not exceed 0.1 times standard, or the limit of detection, whichever is greater.	May not exceed 0.1 times standard, or 1.1 times background, whichever is greater.
1B	Same as above except TDS may not exceed 2,000 mg/l	Same as above	Same as above
II	May not increase over 1.25 times background, but in no case more than 3000 mg/l	May not exceed 0.25 times standard, or the limit of detection, whichever is greater.	May not exceed 0.25 times standard, or 1.25 times background whichever is greater.
III	May not increase above 1.25 times background.	May not exceed 0.5 times the standard, or the limit of detection, whichever is greater.	May not exceed 0.5 times standard, or 1.5 times background whichever is greater.

In no case can the standards be exceeded for Class I, II, or III, even if the background level is near the standard.

An upper limit of 2,000 mg/l TDS is applied to class 1B, irreplaceable ground water, as this is the current upper regulatory limit for drinking water.

Class IC (ecologically important ground water) standards will be established on a case-by-case basis, as needed. As discussed above, because 1C ground water must come to the surface before it would have an aquatic wildlife use, the surface water standards for the protection of aquatic wildlife (R488-2) would be applied in the surface water to protect these uses. Protection levels would also be established on a case-by-case basis.

Class IV ground water will be protected in accordance with existing regulations of the Underground Injection Control, Utah Pollutant Discharge Elimination System, and Utah Hazardous Waste Management programs.

In most cases the protection levels are low, and in a few cases below levels that can presently be detected by presently available laboratory equipment. Therefore, these standards can be considered as relatively stringent.

The intent of the protection levels is to minimize pollution discharged to ground water. New facilities will be required to apply best available technology to protect ground water, and in most cases designed to contain all pollutants and not allow a discharge.

It is expected that potential dischargers would not look upon the protection levels as a target, but as a boundary to be avoided. Protective measures should be initiated once any increase in contaminant level is indicated. Reaching a protection level indicates a need for immediate action to present further contamination.

4. Ground Water Aquifer Classification

Classification of an aquifer will not be necessary before a ground water discharge permit can be written and issued. In an unclassified area, the entity requesting a permit will be expected to provide data on existing ground water quality in order for the appropriate ground water class to be determined. The permit will then be written based on the appropriate class protection level. Aquifers will be classified by the state as data are compiled.

Where data are available, entire aquifers or parts of aquifers can be formally classified, which will allow everyone to know up front the classification in a particular area.

Aquifers furnishing water to community public drinking water systems with ground water meeting Class 1A criteria will be classified as Class 1A within the well head protection area. Other ground water aquifers of the state will be unclassified. Aquifers will be appropriately classified as data become available.

5. Implementation

The ground water discharge permitting system provides a mechanism to implement the above standards and protection levels. This would be similar in some ways to the current discharge permit system for point source discharges to surface waters. Any person or entity proposing to construct or operate a new facility which could result in a release of contaminants to ground water would be required to apply for and obtain a permit before beginning that activity.

The intent is to require a permit for a facility or activity which, in the normal conduct of the activity or facility, may have a release to ground water. Such facilities as ponds and lagoons lined or unlined, mining operations and heap leach pads, ponds and piles, would be included. It is not the intent to require permits for above ground storage tanks, pipelines, process piping, etc., where a discharge would occur only if there were a break or a spill that would not normally be expected. Spills will not require a permit.

It is not intended that a separate ground water discharge permit would be required if a facility is also required to obtain a construction permit from the Water Pollution Control Committee, or a hazardous waste disposal permit from the Solid and Hazardous Wastes Committee. However, the substantive provisions of this regulation would have to be met before those permits are issued. For example, if a company requests a construction permit from the Committee for construction of a new wastewater disposal facility, the company would have to submit information as required by this regulation, and the requirements of this regulation would be incorporated into that construction permit.

The initial emphasis of the permitting program will be on new facilities. Existing facilities, would not be required immediately to apply for a permit, but would be required to notify the Executive Secretary of the Water Pollution Control Committee of the nature and location of their discharge so an inventory of potential sources of contamination could be developed. As staff resources are available or as problems are apparent, these existing sources will be required to apply for permits as they are so notified by the Executive Secretary.

A new facility is one for which construction or modification begins at least 180 days after the effective date of the regulation. Conversely, an existing facility or activity is defined as one which is in operation, or for which construction begins, within 180 days after the effective date of the regulation. This is to provide a period of time for facilities which are in the planning phase at the time the regulation is adopted to apply for and receive a ground water discharge permit.

For existing facilities which are notified in the future of the need to apply for and receive a ground water discharge permit, a period of time will be negotiated in which to prepare the information for the permit application. The permit conditions will be written on a case-by-case basis, and a schedule for compliance with permit conditions will be negotiated. It is anticipated that the facility will at least apply current technology that is commonly used in similar industries or activities in the country. As permits for existing facilities will probably only be required where there is an existing problem which needs to be addressed, there may be situations which ground water standards are already exceeded and cleanup may be required. In these cases, it is expected that ground water will be returned to background conditions, or to the MCL levels, unless alternate concentration limits are approved.

Exemptions

Because it is not practical to require permits for all activities which pose little or no threat to ground water quality, many activities will be exempt from the permitting requirements. Such activities or facilities would include, for example, clean water discharges, normal residential or agricultural irrigation, application of agricultural chemicals used in accordance with manufacturer's recommendations, septic tank and drainfield systems approved by the local or state health department, natural infiltration, land application, of livestock wastes, and hazardous waste management units permitted under the Utah Hazardous Waste Management Regulations, discharge from flood control systems, small mining operations, small feed lot and dairy operations, wells permitted under the Underground Injection Control permit program, produced water pits or reserve pits regulated by the Division of Oil, Gas, and Mining, storage tanks regulated by the Bureau of Solid and Hazardous Waste, and coal mining facilities regulated by the Division of Oil, Gas, and Mining.

These exempted facilities or activities are exempt only from the requirement to obtain a separate ground water discharge permit. They are not exempt from the prohibition against polluting ground water, and must not violate the levels of protection established in the regulation. The Executive Secretary can require a discharge permit for any facility or activity, exempt or not, if he determines it constitutes a threat to ground water quality.

Application for Permit

The application for a ground water discharge permit must include sufficient information to describe the extent and quality of the ground water, the quality of the discharge, how the discharge will be controlled so as to meet protection levels (including appropriate engineering plans and specifications), the proposed inspection and monitoring plans to ensure compliance with the permit conditions, and a contingency plan to bring the facility into compliance should there be a release of contaminants beyond that allowed in the permit. For existing facilities, there would have to be a plan to remedy violations of standards which may have resulted from discharges occurring prior to issuance of the ground water discharge permit.

The Executive Secretary may choose to publish a Notice of Intent to Approve, and provide 30 days for public comment, before issuing the permit, but this is not a requirement.

Alternate Concentration Limits

In very limited situations, the Water Pollution Control Committee may approve alternative concentration limits which may be less stringent than the standards or the protection levels. For new facilities this would be considered only in Class III ground water areas and where it is determined to be in the best interest of the State. For example, if it was found in a particular area that it was highly unlikely that the ground water could or would ever be put to beneficial use, and that the benefits would outweigh any cost or damages, then an alternate concentration limit could be approved if requested. However, this is expected to be a very rare situation. If it is felt that such a request has merit, at least one public hearing would be held in the area affected, and the approval must be given by the Water Pollution Control Committee in a scheduled meeting.

Permit Term

The ground water discharge permit would have a term of no more than 5 years, at which time the permit would be reviewed. This term would also apply to the ground water section of a construction permit. The permit will be automatically extended for another 5 year term if no changes are needed. If limited staff resources does not allow a full review of an expiring permit, it will be automatically extended. If a permit expires without official action to renew or extend a permit, the original permit will remain in effect until it is reviewed or extended.

Monitoring and Compliance

For a permitted facility, there will normally be points of compliance where monitoring wells will be located. These compliance monitoring points will be as close as practicable to the source of discharge to ground water. It will normally be the responsibility of the permittee to do monitoring at the monitoring wells to determine permit compliance. It is the intent of the State, within resource capabilities, to spot check by sampling monitoring wells on a random basis.

If monitoring at a facility reveals that the permit limits are being exceeded, it will be the responsibility of the owner to immediately take action to correct the violations and to take whatever corrective action may be necessary to clean up the ground water. Determination of compliance or non-compliance will be based on a statistical evaluation of the data available, as explained in the regulation.

When permit conditions are violated, the State has authority to take compliance actions, including the issuing of orders and the assessment of penalties. According to Section 26-11-13, Utah Code Annotated, penalties can be up to $10,000 per day of violation.

The question has arisen concerning violations of the standards or protection levels where there is no single identifiable source of contamination. This would be analogous to nonpoint source pollution in surface waters. We know that there may be some general degradation of ground water quality from general surface activity. It is not the intent of this regulation to attempt to regulate all such activities. However, if water quality monitoring shows that contamination is occurring in a particular area, that would be a trigger signaling the need to undertake studies to determine, the sources of contamination, and develop management programs to change activities to the extent feasible to minimize or eliminate the problem. This would be especially important in drinking water source recharge areas.

Fiscal Impact

Upon implementation there will be costs associated with an initial reporting requirement for facilities and/or activities discharging to ground water and subsequent costs for existing facilities and new facilities that pose a threat of contaminating ground water.

The ground water regulations are structured to prevent ground water contamination through control or elimination at the source. In this manner the entities responsible for the pollution bear the cost of its control or elimination. The responsible entity may either pass the costs on to their customers with a relatively small increase in the cost of their goods or services distributed over a large user base or absorb the cost.

If ground water contamination is not prevented, then even greater cost will occur due to use of alternative supplies of water, additional treatment of water prior to use or increased health costs because of exposure of the populace to contaminants. Each of these has serious drawbacks in shifting the cost and burden of responsibility to the public at large or to a public agency. This results in the ultimate costs being carried by the public and the taxpayers.

After-the-fact cleanup of ground water is very expensive and rarely very successful in restoring the ground water to prior beneficial uses. The cleanups are usually directed at containing the spread of contaminants present in the ground water. To determine the success of these efforts usually requires continued long-term monitoring of ground water quality.

The most significant benefit derived from the implementation of ground water protection regulations is the protection of human health and the environment. This includes the prevention of long-term illness and associated medical care costs and insurance premiums; increased productivity; and the reduction of human suffering. The environmental benefits include the protection of a valuable resource for the present and future generations for their use and enjoyment.

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R448-6 Ground Water Quality Protection

R448-6-1 Definitions

1.1 "Aquifer" means a geologic formation, group of geologic formations or part of a geologic formation that contains sufficiently saturated permeable material to yield useable quantities of water to wells and springs.

1.2 "Background Concentration" means the concentration of a pollutant in ground water upgradient from a facility, practice or activity, and which has not been affected by that facility, practice or activity.

1.3 "Best Available Technology" means the application of design, equipment, work practice, operation standard or combination thereof, at a facility to effect the maximum reduction of a pollutant achievable by available processes and methods taking into account energy, public health, environmental and economic impacts and other costs.

1.4 "Committee" means the Utah Water Pollution Control Committee.

1.5 "Community Drinking Water System" means a public drinking water system which serves at least fifteen service connections used by year-round residents or regularly serves at least twenty-five year-round residents.

1.6 "Comparable Quality (Source)" means a potential alternative source of water supply which has the same general quality as the source with the same types of contaminants and same relative concentrations.

1.7 "Comparable Quantity (Source)" means an alternative source capable of reliably supplying water in quantities sufficient to meet the year-round needs of the users served by the ground water source.

1.8 "Compliance Monitoring Point" means a well located where ground water is monitored to determine compliance with applicable ground water quality standards and protection levels.

1.9 "Contaminant" means any physical, chemical, biological or radiological substance or matter in water.

1.10 "Conventional Treatment" means normal and usual treatment of water for distribution in public drinking water supply systems including flocculation, sedimentation, filtration, disinfection and storage.

1.11 "Discharge" means the release of a pollutant directly or indirectly into subsurface waters of the state.

1.12 "Existing Facility" means a facility or activity that was in operation or under construction within 180 days after the effective date of this regulation.

1.13 "Economically Infeasible" means the cost to the typical water user for replacement water would exceed the community's ability to pay.

1.14 "Executive Secretary" means the Executive Secretary of the Utah Water Pollution Control Committee.

1.15 "Facility" means any building or contiguous group of buildings, or structures and any processing, handling or storage equipment or activity.

1.16 "Gradient" means the change in total water pressure head per unit of distance.

1.17 "Ground Water" means subsurface water in the zone of saturation including perched ground water.

1.18 "Ground Water Quality Standards" means numerical contaminant concentration limits adopted by the Committee for the protection of the subsurface waters of the State.

1.19 "Infiltration" means the movement of water through the pores of rock, soil or sediment.

1.20 "Institutional Constraints" means legal or other restrictions that preclude replacement water delivery and which cannot be alleviated through administrative procedures or market transactions.

1.21 "Limit of Detection" means the concentration of a chemical below which it can not be detected using currently accepted sampling and analytical techniques for drinking water as determined by the U.S. Environmental Protection Agency.

1.22 "New Facility" means a facility or activity for which construction or modification is initiated 180 days or more after the effective date of these regulations.

1.23 "Person" means any individual, corporation, partnership, association, company or body politic, including any agency or instrumentality of the United States Government.

1.24 "Point of Discharge" means the outermost location at which effluent or leachate has been stored, applied, disposed of, or discharged; for a diked facility, the outermost edge of the dikes.

1.25 "Pollutant" means dredged spoil, solid waste, incinerator residue, sewage, sewage sludge, garbage, munitions, trash, chemical waste, biological material, radioactive material, heat, wrecked or discarded equipment, rock, sand, or any industrial, municipal or agricultural waste discharged into waters of the state.

1.26 "Pollution" means such contamination, or other alteration of the physical, chemical, or biological properties of any waters of the State, or such discharge of any liquid, gaseous, or solid substance into any waters of the state as will create a nuisance or render such waters harmful or detrimental or injurious to public health, safety, or welfare, or to domestic, commercial, industrial, agricultural, recreational, or other legitimate beneficial uses, or to livestock, wild animals, birds, fish or other aquatic life.

1.27 "Protection Level" means a percentage of a ground water quality standard or background concentration or a contaminant concentration limit based upon the ground water class, used for establishing performance standards for a facility or activity that discharges or may discharge to ground water.

1.28 "Substantial Treatment" means treatment of water utilizing specialized treatment methods including ion exchange, reverse osmosis, electrodialysis and other methods needed to upgrade water quality to meet standards for public water systems.

1.29 "Total Dissolved Solids (TDS)" means the quantity of dissolved material in a sample of water which is determined by weighing the solid residue obtained by evaporating a measured volume of a filtered sample to dryness; or for many waters that contain more than 1000 mg/l, the sum of the chemical constituents.

1.30 "Radius of Influence" means the radial distance from the center of a well bore to the point where there is no lowering of the water table or potentiometric surface because of pumping of the well; the edge of the cone of depression.

1.31 "Upgradient" means a point located hydraulically above a facility such that the ground water at that point has not been impacted by the facility.

1.32 "Vadose Zone" means the zone of aeration including soil and capillary water. The zone is bound above by the land surface and below by the water table.

1.33 "Water Table" means the top of the saturated zone of a body of unconfined ground water at which the pressure is equal to that of the atmosphere.

1.34 "Water Table Aquifer" means an aquifer extending downward from the water table to the first confining bed.

1.35 "Waters of the State" means all streams, lakes, ponds, marshes, water courses, water ways, wells, springs, irrigation systems, drainage systems, and all other bodies or accumulations of water, surface and underground, natural or artificial, public or private, which are contained within, flow through, or border upon this state or any portion thereof; except bodies of water confined to and retained within the limits of private property, and which do not develop into or constitute a nuisance or a public health hazard, or a menace to fish and wildlife, shall not be considered to be "waters of the state" under this definition.

1.36 "Wellhead Protection Area" means the surface and subsurface area surrounding a water well or wellfield supplying a public water system, through which contaminants are reasonably likely to move toward and reach such water well or well field (Safe Drinking Water Act Amendments of 1986).

1.37 "Zone of Influence" means the area contained by the outer edge of the drawdown cone of a water well.

R448-6-2 Ground Water Quality Standards

The following Ground Water Quality Standards as listed in Table I are adopted for protection of ground water quality.

Table 1

Ground Water Quality Standards

Parameter	Miligrams per liter (mg/l) unless noted otherwise and based on analysis of filtered sample except for Mercury and organic compounds
Physical Characteristics	
Color (units)	15.0
Corrositivity (characteristic)	noncorrosive
Odor (threshold number)	3.0
pH (units)	6.5-8.5
Inorganic Chemicals	
Fluoride	2.4
Foaming agents	0.5
Nitrate (as N)	10.0
Metals	
Arsenic	0.05
Barium	1.0
Cadmium	0.01
Chromium	0.05
Copper	1.0
Lead	0.05
Mercury	0.002
Selenium	0.01
Silver	0.05
Zinc	5.0
Organic Chemicals	
Pesticides	
2, 4-D	0.1
Endrin	0.0002
Lindane	0.004
Methoxychlor	0.1
Toxaphene	0.005
2, 4, 5-TP Silvex	0.01
Volatile Organic Chemicals	
Trichloroethylene	0.005
Carbon tetrachloride	0.005
Vinyl chloride	0.002
1, 2 - Dichloroethane	0.005
Benzene	0.005

1,1 - Dichloroethylene	0.007
1,1,1 - Trichloroethane	0.200
para - Dichlorobenzene	0.075

Other Organic Chemicals

Trihalomethanes	0.1

Radionuclides

The following are the maximum contaminant levels for Radium-226 and Radium-228, and gross alpha particle radioactivity:
Combined Radium-226 and Radium-228.....5pCi/l.
Gross alpha particle activity, including radium-226 but excluding Radon and Uranium 15.....pCi/l.
Beta particle and photon radioactivity from man-made radionuclides:
The average annual concentration of beta particle and photon radioactivity from man-made radionuclides shall not produce an annual dose equivalent to the total body or any internal organ greater than four millirem/year.
Except for the radionuclides listed in the table below, the concentration of man-made radionuclides causing four millirem total body or organ dose equivalents shall be calculated on the basis of a two liter per day drinking water intake using the 168 hour data listed in "Maximum Permissible Body Burden and Maximum Permissible Concentration Exposure", NBS Handbook 69 as amended August 1962, U.S. Department of Commerce. If two or more radionuclides are present, the sum of their annual dose equivalent to the total body or to any organ shall not exceed four millirem/year.

Average annual concentrations assumed to produce a total body or organ dose of four millirem/year.

Radionuclide	Critical Organ	pCi per liter
Tritium	Total Body	20,000
Strontium-90	Bone Marrow	8

R448-6-3 Ground Water Classes

3.1 GENERAL

The following ground water classes are established: Class IA - Pristine Ground Water; Class 1B - Irreplaceable Ground Water; Class IC - Ecologically Important Ground Water; Class II - Drinking Water Quality Ground Water; Class III - Limited Use Ground Water; Class IV - Saline Ground Water and Unclassified.

3.2 CLASS 1A - PRISTINE GROUND WATER

Class IA ground water has the following characteristics:
A. The ground water has total dissolved solids of less than 500 mg/l.
B. The ground water does not have concentrations of any contaminants that exceed the ground water quality standards listed in Table 1.

3.3 CLASS IB - IRREPLACEABLE GROUND WATER

Class IB ground water has the following characteristics: ground water is a source of water for a community public drinking water system for which no reliable supply of comparable quality and quantity is available because of economic or institutional constraints.

3.4 CLASS IC - ECOLOGICALLY IMPORTANT GROUND WATER

Class IC ground water has the following characteristics: the Class 1C area is a source for ground water discharge important to the continued existence of wildlife habitat.

3.5 CLASS II - DRINKING WATER QUALITY GROUND WATER

Class II ground water has the following characteristics:
A. The ground water has total dissolved solids less than 3000 mg/l.

B. The ground water does not have concentrations of any contaminants that exceed ground water quality standards in Table 1.

3.6 CLASS III - LIMITED USE GROUND WATER

Class III ground water has one or both of the following characteristics:

A. the ground water has total dissolved solids greater than 3000 mg/l and less than 10,000 mg/l, or;

B. The ground water has contaminants that exceed the ground water quality standards listed in Table 1.

3.7 CLASS IV - SALINE GROUND WATER

Class IV ground water has the following characteristics:

A. The ground water has total dissolved solids greater than 10,000 mg/l.

B. The ground water may have contaminants that exceed the ground water quality standards listed in Table 1.

3.8 UNCLASSIFIED GROUND WATER

Unclassified designates ground water that has not been classified as Class I through Class IV. The quality of ground water will be protected to a degree commensurate with current and probable future uses as determined by the existing ground water quality in unclassified areas.

R448-6-4 Ground Water Class Protection Levels

4.1 GENERAL

A. The ground water class Protection Levels set ground water numerical criteria for the conduct of activities that discharge or may discharge to ground water. The class Protection Levels utilize site-specific ground water quality numerical values that are: a percentage of established ground water quality standards or background concentrations; or a limit on contaminant concentration.

B. For the physical characteristics and radionuclides listed in Table 1, the values listed are the protection levels for all ground water classes.

C. All persons constructing or installing facilities or conducting activities that discharge or may discharge to ground water must meet the ground water quality numerical criteria for the ground water that may be adversely affected by the discharge.

4.2 CLASS IA PROTECTION LEVELS

A. Class IA ground water will be protected to the maximum extent feasible from degradation due to activities that discharge or may discharge to ground water.

B. The following protection levels will apply:

1. Total dissolved solids may not increase above 1.1 times the background value.

2. In no case will the total dissolved solids increase above 500 mg/l.

3. When a contaminant is not present in a detectable amount as a background concentration, the concentration of the contaminant may not exceed 0.1 times the ground water quality standard value, or exceed the limit of detection whichever is greater.

4. When a contaminant is present in a detectable amount as a background concentration, the concentration of the contaminant may not exceed 1.1 times the background concentration or exceed 0.1 times the ground water quality standard whichever is greater.

5. In no case will the concentration of a contaminant be allowed to exceed the ground water quality standard.

4.3 CLASS IB PROTECTION LEVELS

A. Class IB ground water will be protected as an irreplaceable source of drinking water.

B. The following protection levels will apply:

1. Total dissolved solids may not increase above 1.1 times the background value and can not exceed 2000 mg/l.

2. When a contaminant is not present in a detectable amount as a background concentration, the concentration of the contaminant may not exceed 0.1 times the ground water quality standard, or the limit of detection whichever is greater.

3. When a contaminant is present in a detectable amount as a background concentration, the concentration of the contaminant may not exceed 1.1 times the background concentration or exceed 0.1 times the ground water quality standard whichever is greater.

4. In no case will the concentration of a contaminant be allowed to exceed the ground water quality standard.

4.4 CLASS IC PROTECTION LEVELS

Class IC ground water will be protected as a source of water for potentially affected wildlife habitat. Limits on increases of total dissolved solids and organic and inorganic chemical compounds will be determined on a case-by-case basis to meet appropriate surface water standards.

4.5 CLASS II PROTECTION LEVELS

A. Class II the ground water will be protected for use as drinking water or other similar beneficial use with conventional treatment prior to use.

B. The following protection level will apply:

1. Total dissolved solids may not increase above 1.25 times the background value.

2. In no case will the total dissolved solids increase above 3000 mg/l.

3. When a contaminant is not present in a detectable amount as a background concentration, the concentration of the contaminant may not exceed 0.25 times the ground water quality standards value, or exceed the limit of detection whichever is greater.

4. When a contaminant is present in a detectable amount as a background concentration, the concentration of the contaminant may not exceed 1.25 times the background concentration or exceed 0.25 times the ground water quality standard whichever is greater.

5. In no case will the concentration of a contaminant be allowed to exceed the ground water quality standard.

4.6 CLASS III PROTECTION LEVELS

A. Class III ground water will be protected as a potential source of drinking water, after substantial treatment, and as a source of water for industry and agriculture.

B. The following protection levels will apply:

1. Total dissolved solids may not increase above 1.25 times the background concentration level.

2. When a contaminant is not present in a detectable amount as a background concentration, the concentration of the contaminant may not exceed 0.5 times the ground water quality standard, or the limit of detection whichever is greater.

3. When a contaminant is present in a detectable amount as a background concentration, the concentration of the contaminant may not exceed 1.5 times the background concentration or exceed 0.5 times the ground water quality standard whichever is greater.

4. In no case will the concentration of a contaminant be allowed to exceed the ground water quality standard. If the background concentration exceeds the ground water quality standard no increase will be allowed.

4.7 CLASS IV PROTECTION LEVELS

Class IV ground water will be protected in accordance with existing regulations of the Underground Injection Control, Utah Pollutant Discharge Elimination System and Utah Hazardous Waste Management programs.

4.8 PROTECTION LEVELS FOR UNCLASSIFIED

The ground water protection levels for unclassified ground water areas will be determined by the existing ground water quality within a 2-mile radius of the facility or activity.

R448-6-5 Ground Water Classification for Aquifers

5.1 GENERAL

A. When sufficient information is available, entire aquifers may be classified by the Water Pollution Control Committee according to the quality of ground water contained therein and commensurate protection levels will be applied.

B. Ground water sources furnishing water to community public drinking water systems with ground water meeting Class IA criteria are classified as Class IA within the well head protection area.

5.2 CLASSIFICATION AND RECLASSIFICATION PROCEDURE

A. The Committee may initiate classification or reclassification.

B. Individuals, companies, cities, counties, state agencies, federal agencies and state regulated public water suppliers may petition the Committee for classification and reclassification.

C. Boundaries for class areas will be delineated so as to enclose distinct ground water classes as nearly as known facts permit. Boundaries will be based on hydrogeologic properties, existing ground water quality and for Class IB and IC, current use. Parts of an aquifer may be classified differently.

D. The petitioner requesting reclassification will provide sufficient information to determine if reclassification is in the best interest of the beneficial users.

E. The petition for classification and reclassification will include:

1. factual data supporting the change in classification;
2. a description of the proposed ground waters to be reclassified;
3. potential contamination sources;
4. ground water flow direction;
5. current beneficial uses of the ground water; and
6. location of all water wells in the area to be reclassified.

F. One or more public hearings will be held to receive comment on classification and reclassification proposals.

G. The Committee will determine the disposition of all petitions for classification and reclassification.

R448-6-6 Implementation

6.1 DUTY TO APPLY FOR A GROUND WATER DISCHARGE PERMIT

A. All persons who construct, modify, install, or operate any new facility, not exempt as specified in Section 6.2, which stores, discharges or would probably result in a discharge of pollutants that may move directly or indirectly into ground water, including, but not limited to land application of wastes; waste storage pits; waste storage piles; landfills and dumps; large feedlots; mining, milling and metalurgical operations, including heap leach facilities; and pits, ponds, and lagoons whether lined or not, must apply to the Executive Secretary of the Committee for an approved ground water discharge permit at least 180 days before any discharge. A ground water discharge permit must be obtained prior to commencement of construction and/or operation of the new facilities.

B. All persons who construct, modify, install, or operate any existing facility, including facilities under construction, not exempt as specified in Section 6.2, which stores, discharges or would probably result in a discharge of pollutants that may move directly or indirectly into ground water, including, but not limited to land application of wastes; waste storage pits; waste storage piles; landfills and dumps; large feedlots; and mining, milling metalurgical operations, including heap leach facilities; and pits, ponds, and lagoons whether lined or not, must submit a notification of the nature and location of the discharge to the Executive Secretary within 180 days following the effective date of these Regulations and must submit an application for a ground water discharge permit within one year after receipt of written notice from the Executive Secretary that a ground water discharge permit is required.

6.2 EXEMPTIONS FROM GROUND WATER DISCHARGE PERMIT

A. The following except under the provisions of section R448-6-6.2(B) do not require a ground water discharge permit under this section:

1. facilities with effluent or leachate which has been demonstrated to the satisfaction of the Executive Secretary to conform to the ground water quality standards and protection levels or do not contain any contaminant that may present a threat to human health, the environment or its potential beneficial uses. The Executive Secretary may require samples be analyzed for the presence of contaminants before the effluent or leachate discharges directly or indirectly into ground water.

If the discharge is by seepage through natural or altered natural materials, the Executive Secretary may require samples of the solution be analyzed for the presence of pollutants before or after seepage;

2. water used for watering of lawns, gardens, or shrubs or for irrigation for the revegetation of a disturbed land area except for the direct land application of wastewater;

3. application of agricultural chemicals including fertilizers, herbicides, insecticides fungicides, rodenticides and fumigants when used in accordance with current scientifically based manufacturer's recommendations for the crop, soil, and climate and in accordance with state and federal statutes, regulations, permits, and orders adopted to avoid ground water contamination;

4. water used for irrigated agriculture except for the direct land application of waste water from municipal, industrial or mining facilities;

5. discharge from flood control systems located in urbanized areas including detention basins, catch basins and wetland treatment facilities used for collecting or conveying storm water runoff;

6. natural ground water seeping or flowing into conventional mine workings which re-enters the ground by natural gravity flow prior to pumping or transporting out of the mine and without being used in any mining process;

7. leachate which results entirely from the direct natural infiltration of precipitation through undisturbed materials;

8. wells permitted under the underground injection control (UIC) program;

9. land application of livestock wastes, within expected crop nitrogen uptake;

10. individual subsurface wastewater disposal systems approved by local health departments or large subsurface wastewater disposal systems approved by the Committee;

11. produced water pits, built, operated, regulated and maintained under Sections R615-9-1 through R615-9-9 of the Oil and Gas Conservation General Rules of the Division of Oil, Gas, and Mining;

12. reserve pits regulated under Section R615-3-16 of the Oil and Gas Conservation General Rules by the Division of Oil, Gas, and Mining;

13. storage tanks installed or operated under regulations adopted by the Utah Solid and Hazardous Waste Committee;

14. coal mining facilities regulated under the Coal Mining and Reclamation Act by the Utah Division of Oil, Gas, and Mining;

15. hazardous waste management units permitted under the Utah Hazardous Waste Management Regulations;

16. facilities or portions of facilities with active ground water remediation programs conducted under the Resources Conservation and Recovery Act or Comprehensive Environmental Response, Compensation and Liability Act;

17. feedlots not in excess of the "criteria of number only" as specified in section R448-8-3.5(5)(a) for NPDES permits;

18. mining, or processing or milling facilities handling less than 10 tons per day of metallic and/or nonmetallic ore and waste rock;

19. pipelines and above-ground storage tanks; and,

20. facilities which the Executive Secretary determines after a review of the application will have a de minimus actual or potential effect on ground water quality.

B. The submission of an application for a ground water discharge permit may be required for any exempted discharge if it is determined that the discharge may be causing or is likely to cause violations of the ground water quality standards or protection levels.

6.3 APPLICATION REQUIREMENTS FOR A GROUND WATER DISCHARGE PERMIT APPROVAL.

A. Unless otherwise determined by the Executive Secretary, the application for approval of a permit to discharge wastes or pollutants to ground water shall include, but is not limited to, the following complete information:

1. the name and address of the owner and operator of the project and the name and address of the operator if different than the owner. A corporate application must be signed by the officers of the corporation. The name and address of the contact, if different than above, and telephone numbers for all listed names shall be included;

2. the legal location of the facility by county, quarter-quarter section, township, and range;

3. the name of the project or facility and the type of operation, facility, or development, including the expected project life;

4. a plat map showing all wells, water bodies, drainages, natural or man-made structures and water usage within a one-mile radius of the discharge. The plat map must show the location and depth of existing or proposed wells to be used for monitoring ground water quality;

5. geologic, hydrologic, and agricultural description of the area of review, including topography, soil types, aquifers, ground water flow direction, ground water quality, aquifer material, and well logs. The hydrologic description must include a projected area of influence;

6. the type, source, and chemical, physical, radiological, and toxic characteristics of the effluent or leachate to be discharged; the average and maximum daily amount of effluent of leachate discharged (gpd), the discharge rate (gpm), and the expected concentrations of any contaminant (mg/l) listed in the ground water quality standards in each discharge or combination of discharges. If more than one discharge point is used, information for each point must be given individually;

7. information which shows that the discharge can be controlled and will not migrate into or adversely affect the quality of any other waters of the state, including the applicable surface water quality standards, that the discharge is compatible with the receiving ground water, and that the discharge will comply with the ground water quality standards and class protection level;

8. for areas where the ground water has not been classified by the Committee, information on the quality of the receiving ground water sufficient to determine the applicable protection levels;

9. a proposed monitoring plan, which includes a description, where appropriate, of the following:

a. ground water monitoring to, at a minimum, determine ground water flow direction and gradient, background quality at the site, and the quality of ground water at the compliance monitoring point;

b. the installation, use and maintenance of monitoring devices;

c. the description of the compliance monitoring area defined by the compliance monitoring points including the dimensions and hydrologic and geologic data used to determine the dimensions;

d. monitoring of the vadose zone;

e. measures to prevent ground water contamination after the cessation of operation, including post-operational monitoring;

f. monitoring well construction and ground water sampling which conform to A Guide to the Selection of Materials for Monitoring Well Construction and Ground Water Sampling, (1983) and RCRA Ground Water Monitoring Technical Enforcement Guidance Manual (1986), unless otherwise specified by the Executive Secretary;

g. description and justification of parameters to be monitored.

10. the plans and specifications relating to construction, modification, and operation of discharge systems;

11. a description of the ground water most likely to be affected by the discharge, including water quality information of the receiving ground water prior to discharge, a description of the aquifer in which the ground water occurs, the depth to the ground water, the saturated thickness, flow direction, porosity, hydraulic conductivity, and flow systems characteristics;

12. a distance to the nearest well, the use and the water quality of that well, and a listing of all water wells within a 2-mile radius of the area of review and the status of each;

13. a compliance sampling plan which includes provisions for sampling of effluent and for flow monitoring, to determine the volume and chemistry of the discharge onto or below the surface of the ground and a plan for sampling monitoring wells and appropriate nearby water wells including the parameters to be sampled. Sampling and analytical methods must conform with the following references and analysis performed by certified laboratories unless otherwise specified by the Executive Secretary:

a. Standard Methods for the Examination of Water and Wastewater, sixteenth edition, 1985;

b. E.P.A. Methods.Methods for Chemical Analysis of Water and Wastes, 1983;

c. Techniques of Water Resource Investigation of the U.S. Geological Survey, (1982);

d. Federal Register, latest methods published for monitoring pursuant to 40 CFR parts 141 and 142, 1975-1987, Primary Drinking Water Regulations and 40 CFR parts 264 and 270, including Appendix IX, July 9, 1987;

e. National Handbook of Recommended Methods for Water-Data Acquisition, GSA-GS edition;

f. Manual of Analytical Methods for the Analysis of Pesticide in Humans and Environmental Samples, 1980;

14. a description of the flooding potential of the discharge site, including the 100-year flood plan, and any applicable flood protection measures;

15. a contingency plan for bringing the facility into compliance if permitted allowable limits are exceeded;

16. the methods and procedures for inspections of the facility operations and for detecting failure of the system; and,

17. for any existing source, a corrective action plan or identification of other response measures to be taken to remedy any violation of ground water quality standards which has resulted from discharges occurring prior to issuance of a ground water discharge permit.

6.4 ISSUANCE OF DISCHARGE PERMIT

A. The Executive Secretary shall issue a ground water discharge permit for a new facility provided it is determined that:

1. The applicant demonstrates that the ground water quality standards and protection levels will be met or the Water Pollution Control Committee has approved an alternate concentration limit as described in section R448-6-6.4(B). If the applicant requests approval to discharge a contaminant for which no ground water quality standard is established, the Executive Secretary shall, on a case by case basis, establish in the permit a discharge limit for that contaminant necessary to protect the public health and the environment;

2. the monitoring plan, sampling and reporting requirements are adequate to determine compliance with applicable requirements;

3. the applicant is using best available treatment and methods to minimize any discharge of a contaminant; and,

4. there is no impairment of present and future beneficial uses of the ground water.

B. The Water Pollution Control Committee may approve an alternate concentration limit for a new facility if:

1. The applicant submits a petition for an alternate concentration limit showing the extent to which the discharge will exceed the ground water standards or applicable protection levels and demonstrates that:

a. the facility is to be located in an area of Class III ground water;

b. the discharge plan incorporates the use of best available technology;

c. the alternate concentration limit is justified based on substantial overriding social and economic benefits; and,

d. the discharge would pose no threat to human health and the environment.

2. The application has been forwarded to the Executive Secretary for review and recommendation; and

3. one or more public hearings have been held by the Committee in nearby communities to solicit comment.

C. The Executive Secretary shall issue a ground water discharge permit for an existing facility provided it is determined that:

1. the applicant demonstrates that the ground water quality standards and protection levels can be met or the Water Pollution Control Committee has approved an alternate concentration limit as described in section R448-6-6.4(D). If the applicant is discharging a contaminant for which no ground water quality standard is established, the Executive Secretary shall, on a case by case basis, establish in the permit a discharge limit for that contaminant necessary to protect the public health and the environment;

2. the monitoring plan, sampling and reporting requirements are adequate to determine compliance with applicable requirements;

3. the applicant utilizes treatment and discharge minimization technology commensurate with plant process design capability and similar or equivalent to that utilized by facilities that produce similar products or services with similar production process technology; and,

4. there is no current or anticipated impairment of present and future beneficial uses of the ground water.

D. The Water Pollution Control Committee may approve an alternate concentration limit for a pollutant in ground water at an existing facility if the applicant for a ground water discharge permit shows the extent the discharge exceeds the ground water standards and applicable protection levels and demonstrates that:

1. steps are being taken to correct the source of contamination. This shall include a program and timetable for completion;

2. the pollution poses no threat to human health and the environment; and

3. the alternate concentration limit is justified based on overriding social and economic benefits.

6.5 NOTICE OF INTENT TO APPROVE

If determined to be appropriate or necessary, by the Executive Secretary, a notice of intent to approve shall be published in a newspaper in the affected area. The notice of intent shall include a description of the project and any permit conditions and shall allow 30 days in which interested persons may comment. Final action will be taken by the Executive Secretary following the 30-day comment period.

6.6 PERMIT TERM

A. The permit term will run for 5 years from the date of issuance. Permits may be renewed for 5 year periods or extended for a period to be determined by the Executive Secretary but not to exceed 5 years.

B. In the event that new ground water quality standards are adopted by the Water Pollution Control Committee, permits may be reopened to extend the terms of the permit or contaminants covered by the new standards. Holder of a permit may apply for a variance under the conditions outlined in paragraph R448-6-6.4(D).

6.7 GROUND WATER DISCHARGE PERMIT RENEWAL

The owner and operator of a ground water discharge facility must apply for a renewal or extension for a ground water discharge permit at least 180 days prior to the expiration of the existing permit. If a permit expires before an application for renewal or extension is acted upon by the Executive Secretary, the permit will continue in effect until it is renewed, extended or denied.

6.8 TERMINATION OF A GROUND WATER DISCHARGE PERMIT BY THE EXECUTIVE SECRETARY

A ground water discharge permit approval may be terminated or a renewal denied by the Executive Secretary if one of the following applies:

A. noncompliance by the owner and operator with any condition of the approved permit where the owner or operator has failed to take appropriate action in a timely manner to remedy the permit violation;

B. the owner's and operator's failure in the application or during the permit approval process to disclose fully all relevant facts at any time;

C. a determination that the permitted activity endangers human health or the environment and can only be regulated to acceptable levels by plan modification or termination; or

D. a change in any condition that requires either a temporary or permanent reduction or elimination of any discharge controlled by the plan.

6.9 POINTS OF COMPLIANCE

A. The Executive Secretary may issue a ground water discharge permit that includes compliance monitoring points where ground water quality standards and class protection levels are to be met. The distance to the compliance monitoring points must be as close as practical to the point of discharge.

B. The Executive Secretary may adjust the location of the compliance monitoring point depending upon the hydrology, type of contaminants, and other factors that may affect the ground water quality. In no event shall the compliance monitoring point be beyond the property boundaries of the permitted facility, or be located within the radius of influence of any beneficial use water supply.

6.10 BACKGROUND WATER QUALITY DETERMINATION

A. Background water quality contaminant concentrations shall be determined and specified in the ground water discharge permit.

B. A monitoring plan to determine background water quality shall be submitted to the Executive Secretary for approval prior to data collection. Any existing information or data may be accepted by the Executive Secretary as adequate, provided it is demonstrated that the data properly determines background water quality. No less than 2 up-gradient wells are required for each potential discharge site.

C. Facilities submitting applications for ground water discharge permit approval after the effective date of these rules shall at a minimum collect four ground water samples from each applicable well over a six-month period with no two samples taken in the same month. The arithmetic mean plus one standard deviation of the sample data shall represent background water quality at the time of permit issuance.

D. Thereafter, background water quality contaminant concentrations shall be updated to reflect natural fluctuations in concentrations by including applicable up-gradient, on-site ground water monitoring data for the ground water quality permit monitoring report.

6.11 NOTICE OF COMMENCEMENT AND DISCONTINUANCE OF GROUND WATER DISCHARGE OPERATIONS

A. The owner and operator shall orally notify the Executive Secretary of the ground water discharge date immediately upon commencement of discharge and submit a written notice within 30 days.

B. The owner and operator shall orally notify the Executive Secretary of the date and reason of discontinuance of ground water discharge within 10 days and shall submit a written notice confirming the oral report within 30 days. If a discontinuance is due to a spill, leak, or other accidental release, the Executive Secretary must be notified immediately.

6.12 PERIODIC SUBMISSION OF MONITORING REPORTS

Reports of results obtained pursuant to any monitoring requirements in the discharge permit and the methods used to obtain these results shall be periodically submitted to the Executive Secretary according to the schedule specified in the approved ground water discharge permit.

6.13 REPORTING OF MECHANICAL PROBLEMS OR DISCHARGE SYSTEM FAILURES

The operator of a ground water discharge facility shall immediately notify the Executive Secretary of any mechanical or discharge system failures. A written statement confirming the oral report shall be submitted to the Executive Secretary within 30 days.

6.14 CORRECTION OF ADVERSE EFFECTS REQUIRED

If monitoring or testing indicates that the permit conditions may be or are being violated by ground water discharge operations, the owner and operator of the discharge operations shall promptly make corrections to the system to cease violations of the discharge permit. The owner and operator may be required to take immediate corrective action to clean up the ground water.

6.15 DETERMINATION OF PROBABLE OUT-OF-COMPLIANCE STATUS

A. Determination of probable out-of-compliance status shall be based on the sample value for any one ground water contaminant that exceeds the permitted allowable limit, within the established laboratory quality assurance, in any one sample from the compliance monitoring point.

B. An accelerated schedule of monitoring is required upon determination of probable out-of-compliance status. The accelerated schedule requires monthly or other periodic sampling as determined by the Executive Secretary of the compliance monitoring point for the water contaminant for two months or until the facility is brought into compliance.

6.16 OUT-OF-COMPLIANCE STATUS

A. Out-of-compliance status shall be based upon two consecutive samples which exceed the permitted allowable limit by two standard deviations as calculated for the ground water contaminant at the compliance monitoring point or statistically higher concentrations in the compliance monitoring point over that of the permitted allowable limit. The statistical significance shall be determined using the statistical methods described in Statistical Methods for Evaluating Ground Water Monitoring Data from Hazardous Waste Facilities, vol. 53, No. 196 of the Federal Register, Oct. 11, 1988.

6.17 PROCEDURE WHEN A FACILITY IS OUT-OF-COMPLIANCE

A. If a facility is out of compliance the following is required:

1. The permittee or responsible party shall notify by telephone the Executive Secretary within 24 hours after detection, followed by a written notice within 5 days.

2. The permittee or responsible party shall institute an accelerated monitoring schedule requiring at least monthly sampling for two months and monthly sampling thereafter or on a sampling schedule determined by the Executive Secretary until the facility is brought into compliance.

3. The permittee or responsible party shall prepare and submit within 30 days to the Executive Secretary a plan and time schedule for assessment of the source, extent and potential dispersion of the contamination, and the evaluation of potential remedial action to restore and maintain ground water quality and insure that the ground water quality standards will not be exceeded at the compliance monitoring point.

4. The Executive Secretary may require immediate implementation of the contingency plan submitted with the original ground water discharge permit in order to regain and maintain compliance with the standards at the compliance monitoring point.

6.18 GROUND WATER DISCHARGE PERMIT TRANSFER

A. The owner and operator of a ground water discharge facility which is operating pursuant to an approved discharge permit shall give written notice to the Executive Secretary of intention to transfer the ground water discharge permit, by sale or other ownership transfer of the facility within 30 days of the change of ownership.

B. The notice shall include a written agreement between the existing and new permittees containing a specific date for transfer of permit responsibility, coverage and liability between them.

6.19 ENFORCEMENT

A. These regulations are subject to enforcement under Section 26-11-16 of the Utah Water Pollution Control Act.

6.20 HEARING AND APPEALS

A. Any person who:

1. is denied an exemption by the Executive Secretary under paragraphs 1 and 20, of exemptions from ground water discharge permit;

2. objects to a discharge limit established by the Executive Secretary;

3. objects to conditions or limitations proposed or established by the Executive Secretary in the discharge permit; or

4. objects to monitoring, sampling, information, or other requests or requirements made by the Executive Secretary;

may request a hearing before the Committee for review of that issue or decision.

B. Any person who is denied a permit or whose permit is proposed to be terminated or revoked by the Executive Secretary may appeal that decision to the Executive Director of the Department of Health pursuant to Section 26-11-13(2).

KEY: Water Pollution, Ground Water
1989 26-11

1156p

APPENDIX B

DRILLING RECORDS

BORING LOG GENERAL DATA

Project: USATHAMA N-TEAD Boring: N-101-88 Page: 1 of 2

Driller & Company: Ed Adams, SERGENT HAUSKINS & BECKWITH

Geologist/Logger & Company: J. Bacchus WESTON Signature:

Date Boring Started: 2-22-88 Completed: 2-22-88

Water Levels (from Ground Surface) SEE NOTE Drilling Rig: "Hollow Stem Auger"

First Encountered: Date:

While Drilling: Date:

NOTE: MOIST @ 9.5'-10.0', DAMP @ 19.5'-21.0' & MOIST @ 29.5'-31.0',

At Boring Completion: Date:

Drilling Shifts:

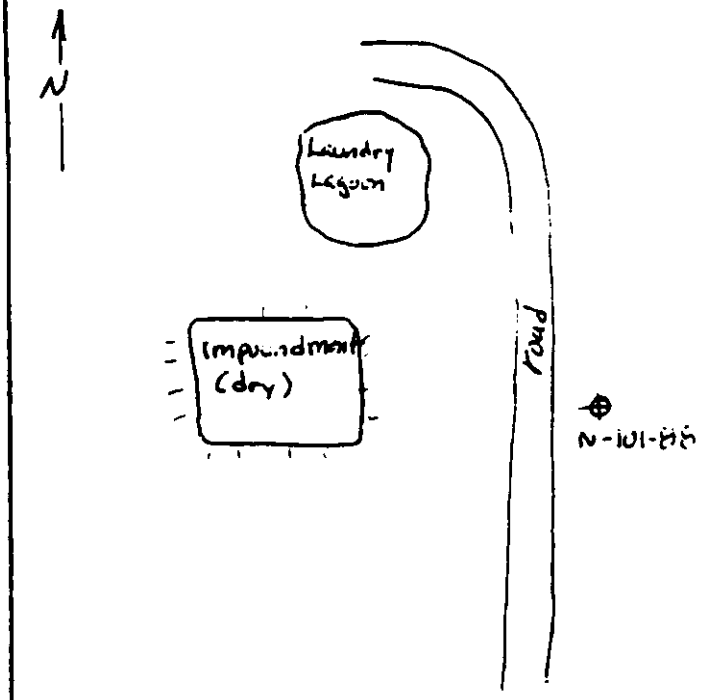
Date	Time		Depth of Drilling Per Shift		Date	Time		Depth of Drilling Per Shift	
	Start	End	Start	End		Start	End	Start	End
17 Feb 90	1300	1354	0.0	31.0					

Abbreviations:

Abbr	Meaning
NP	non plastic
NAB	No apparent bedding

Colors from Munsell Soil Color Chart

Location Sketch:



Project:	Boring:	Page: 2 of 2

Depth/ Elevation	USCS Symbol/ Core Sketch	Soil/Rock Description	Sample Number & Depth	Blow Count & Recovery	Drilling Data
0 ft	SP	Sand: light brown, 10YR 6/3, medium grained; rounded; non plastic (NP); loose slightly moist; no apparent bedding (NAB) Alluvial lake deposit.			
5					
10		Sand, light gray, 10YR 7/2, medium grained NP, Subrounded, loose; moist. Bedding approximately ½" thick. iron stains at bedding surfaces. Alluvial lake deposit		9/7/10	9.5' 11.'
15					
20	SC	Clayey Sand; light brown, 10YR 7/2. 25% clay, low plasticity. loose, moist, very fissile, Subangular Alluvial lake deposit.		9/9/9	19.5 21
25					
30	SC	Clayey Sand, 10% clay; light gray 10YR 7/2, Subrounded, low plasticity, slightly stiff, slightly dense, moist, fissile. Alluvial lake deposit		3/6/10	29.5 31
35					
40		Clayey Sand; 20% clay dark gray, 10YR 4/1 low plasticity, slightly stiff, moist. ½" beds with iron stains at bedding surfaces.		4/3/3	39.5 41
45					
50	CL	Sandy Clay bands of light gray, 10YR 7/2 & dark gray 5Y 4/1. 30% Sand, Subrounded NAB; Slightly plastic, med stiff, dry. Alluvial lake deposit			49.5' drilled to 49.5' Sampled to 51.0'

Refusal 51'

BORING LOG GENERAL DATA

Project: USATHAMA N-TEAD Boring: N-102-88 Page: 1 of 2

Driller & Company: Ed Adams, Sergent, Hauskins & Beckwith

Geologist/Logger & Company: Jim Bacchus - WESTON Signature: [signature]

Date Boring Started: 2-23-88 Completed: 2-23-88

Water Levels (from Ground Surface) See Note below Drilling Rig: —

First Encountered: Date:

While Drilling: Date:

Note: Damp @ 19.5'-21.0' Damp @ 39.5'-41.0'
Moist @ 24.5'-26.0'
Moist to wet @ 34.5'-36.0'

At Boring Completion: Date:

Drilling Shifts:

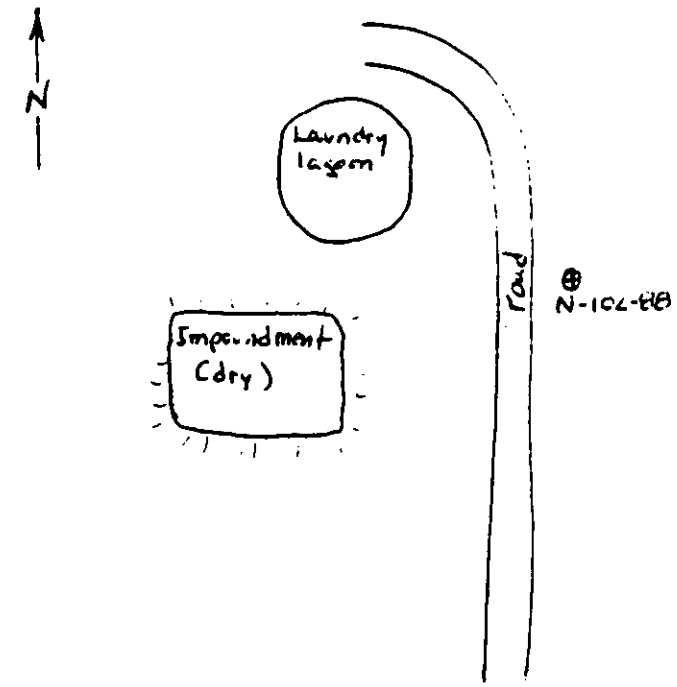
Date	Time		Depth of Drilling Per Shift		Date	Time		Depth of Drilling Per Shift	
	Start	End	Start	End		Start	End	Start	End
23Feb90	1050	1202	0.0	41.0					

Abbreviations:

Abbr	Meaning
NP.	Non plastic
NOB	No apparent bedding

Colors from Munsell Soil Color Chart

Location Sketch:



Project: USATHAMA N-TEAD | Boring: N-102-88 | Page: 2 of 2

Depth/ Elevation	USCS Symbol/ Core Sketch	Soil/Rock Description	Sample Number & Depth	Blow Count & Recovery	Drilling Data
0	SP	Sand, dark brown, 10YR 4/1, fine grained, subrounded; NP; loose, moist, NAB. Alluvial lake deposit			
5		Sand, as above, except medium dense		4.5 7/8/11 6	
10		Sand, as above		5.5 11/12/15 11	
15		Sand, as above, except dry		14.5 11/7/12 16	
20		Clayey Sand, light brown 10YR 6/3 trace (5-15%) clay. Subangular, slightly plastic, medium dense, moist, fissile. Alluvial lake deposit		19.5 4/5/7 21	
25		Clayey Sand, as above, except dark yellowish brown		24.5 5/7/9 26.0	
30		Estimated perched water zone at 28ft.		29.5 4/5/7 31	
35	SC	Clayey Sand, as above, except moist to wet.		34.5 12/8/7 37	
40		3% Sand: med plasticity, med stiff, damp. fissil, NAB		39.5 3/4/5 41.0	drilled to 39.5', sampled to 41.0'
45					
50					

BORING LOG GENERAL DATA

Project: USA THAMA N-TEAD Boring: N-103-66 Page: 1 of 2

Driller & Company: Ed. Adams, Sergent, Hauskins, Beckwith

Geologist/Logger & Company: John Bacchus · Weston Signature:

Date Boring Started: 2-23-88 Completed: 2-23-88

Water Levels (from Ground Surface) See note below — Drilling Rig:

First Encountered: Date:

While Drilling: Date:

NOTE: Moist @ 14.5'-16.0', Dampe @ 19.5'-21.0', Moist to wet @ 24.5'-26.0', Wet @ 29.5'-31.0', Moist @ 34.5-36.0'

At Boring Completion: Date:

Drilling Shifts:

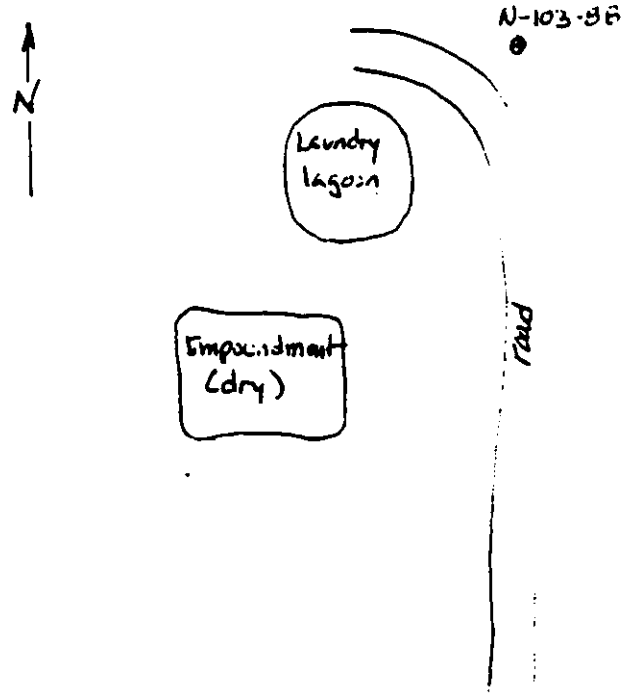
Date	Time		Depth of Drilling Per Shift		Date	Time		Depth of Drilling Per Shift	
	Start	End	Start	End		Start	End	Start	End
23FEB90	1440	1550	0.0	36.0					

Abbreviations:

Abbr	Meaning
NP.	Non plastic
pl -	plasticity - plastic
NAB	No apparent bedding
mod	moderate

Colors from Soil Color Chart.

Location Sketch:



Project: USATHAMA N-TEAD | Boring: N-103-88 | Page: 2 of 2

Depth/ Elevation (ft)	USCS Symbol/ Core Sketch	Soil/Rock Description	Sample Number & Depth	Blow Count & Recovery	Drilling Data
0	SP	Sand: brown, 7.5 YR 4/2 Subangular n.p. wet, moist, NAB. Alluvial lake deposit.			
5		Sand; light brown, 10YR 6/3; fine grained. Subangular. NP. wet, dry. NAB. Alluvial lake deposit.		4.5' 2/10/12 6'	
10		Sand; same as above.		9.5' 2/10/13 11'	
15		Sand, same as above, except moist		14.5' 6/7/7 16'	
20	SC	Clayey Sand; yellowish brown 2.5YR6/4 25% clay, Subangular, slightly pl, moderately dense; NAB.		19.5' 5/6/7 21.0'	
25		Clayey Sand, as above; except moist.		24.5 3/3/4 26	
30	CL	Sandy Clay: brown 7.5 YR 4/2. 40% Sand - Subangular mod. pl. Stiff, wet. NAB Alluvial lake deposit		29.5' 2/3/2 31'	
35	SC	Clayey Sand, yellowish brown 2.5Y 6/4. 30% clay. Subangular, mod pl, dense, moist, fissile Alluvial lake deposit.		2/10/13	drilled to 34.5 ft Sampled to 36.0 ft.
40					
45					
50					

BORING LOG GENERAL DATA

Project: USATHAMA N-TEAD Boring: N-104-88 Page: 1 of 2

Driller & Company: Ed Adams, Sergent Hauskins Beckwith

Geologist/Logger & Company: John Bacchus, WESTON Signature: [signature]

Date Boring Started: 2-25-88 Completed: 2-25-88

Water Levels (from Ground Surface) See note below Drilling Rig:

First Encountered: Date:

While Drilling: 24 ft Date: 2-25-88

NOTE: Slightly damp @ 14.0'—15.5' Moist @ 29.5-30.5
Moist @ 19.0'—21.5'
Water @ 24.0'

At Boring Completion: Date:

Drilling Shifts:

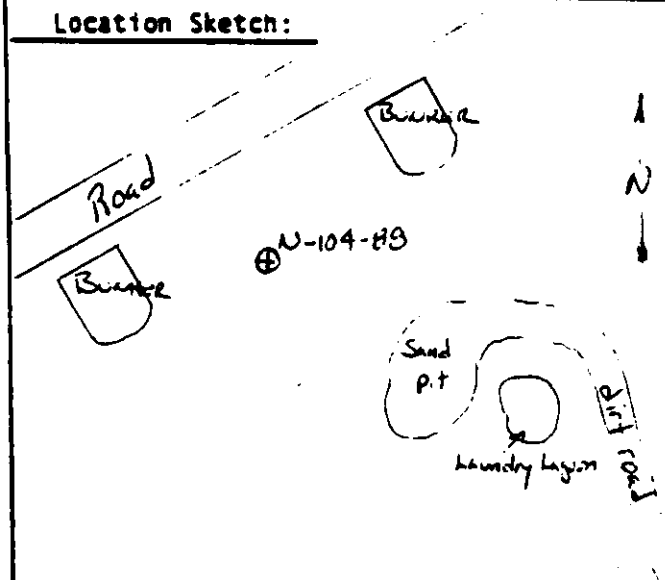
Date	Time		Depth of Drilling Per Shift		Date	Time		Depth of Drilling Per Shift	
	Start	End	Start	End		Start	End	Start	End
25 FEB 90	1155	1314	0.0	35.5					

Abbreviations:

Abbr	Meaning
NP.	non plastic
Pl	- plastic, plasticity
NAB	- No apparent bedding.

Colors from Munsell Color Chart

Location Sketch:



Project: USATHAMA N-TERD | Boring: N-104-88 | Page: 2 of 2

Depth/ Elevation ft	USCS Symbol/ Core Sketch	Soil/Rock Description	Sample Number & Depth	Blow Count & Recovery	Drilling Data
0					
5	SP	Sand: light brown, 7.5yr6/4 dry, dark brown, moist. Subrounded, loose, n.p NAB; wet auger .5', dry in lower 1ft. Alluvial lake deposit		4/5/9	4.5 – 6
10	SP	Sand: light brown, 7.5yr6/4; 10% clay 5% silt: subangular, n.p. loose, dry, NAB.		9/10/13	9.5 – 11
15	SC	Silty Sand: light brown; 5% clay, 20% silt. Angular, firm, NP. NAB Alluvial lake deposit		4/4/6	14.5 – 16
20	SC	Clayey Sand; yellowish brown, 10YR 5/4 20% clay, 10% silt. Angular, low pl, Slightly dense, NAB. Alluvial lake deposit		6/7/8	19.5 – 21
25		Clayey Sand, as above, crept wet.		5/5/6	24.5 – 26.0
30	CL	Sandy clay. 30% sand, 10% silt. yellowish brown 10YR 5/4. Subrounded, high pl, Soft, moist, NAB. Alluvial lake deposit		3/3/4	29.5 – 31.
35	SC	Sand, 10% clay: light brown interbedded with dark brown, 10YR 3/3: subrounded low pl. loose, dry, uneven bedding. Alluvial lake deposit.		4/4/5	34.5 – 36. Drilled to 34.5ft Sampled to 36.0ft
40					
45					
50					

BORING LOG GENERAL DATA

Project: USATHAMA N-TEAD Boring: N-105-88 Page: 1 of

Driller & Company: Ed Adams, Sergent, Hauskins Beckwith

Geologist/Logger & Company: John Bacchus WESTON Signature:

Date Boring Started: 2-26-88 Completed: 2-26-88

Water Levels (from Ground Surface) See note below Drilling Rig:

First Encountered: Date:

While Drilling: Date:

NOTE: 19.0'-20.5' moist to wet

At Boring Completion: Date:

Drilling Shifts:

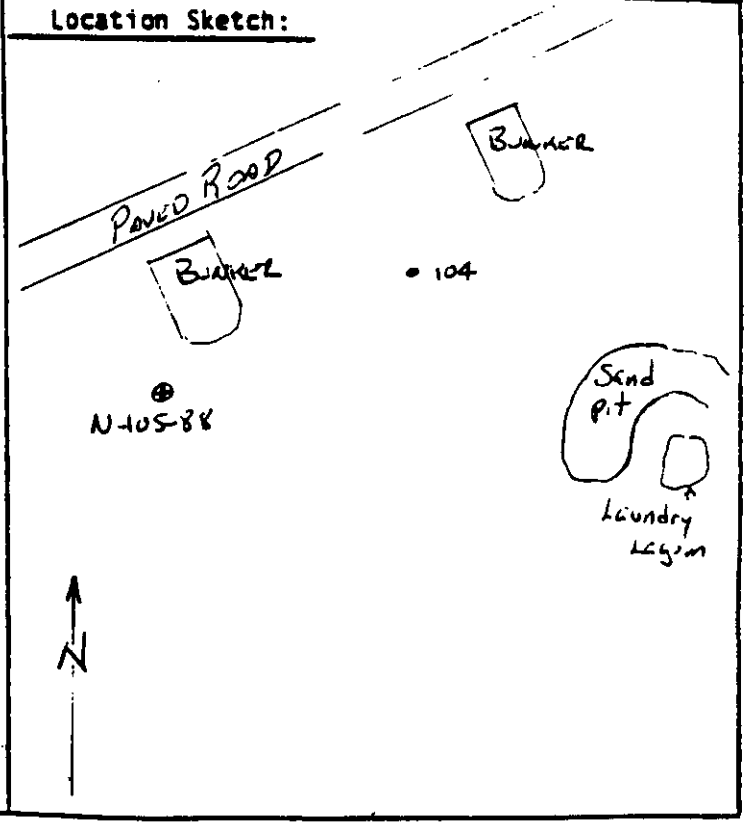
Date	Time		Depth of Drilling Per Shift		Date	Time		Depth of Drilling Per Shift	
	Start	End	Start	End		Start	End	Start	End
26Feb90	0758	0900	0.0	25.5'					

Abbreviations:

Abbr	Meaning
NP	Non plastic
PI	plasticity
NAB	No apparent bedding

Colors from Munsell color chart

Location Sketch:



Project: USATHAMA N-TEAD | Boring: N-105-BB | Page: of

Depth/ Elevation (ft)	USCS Symbol/ Core Sketch	Soil/Rock Description	Sample Number & Depth	Blow Count & Recovery	Drilling Data
0					
5	SC	Silty Sand, 20% silt, light brown 7.5YR6/4, angular, low pl. loose, dry, NAB		5/6/8 (4.0 – 5.5')	
10		Silty Sand, as above, except firm stained		9/10/12 (9.0 – 10.')	
15	SC	Sandy Silt, 30% Sand, light brown 7.5YR6/4, angular. N.P, Slightly dense, NAB - Alluvial lake deposit.		6/8/10 (14.0 – 15.5)	
		(water table due to cutting).			
20		Same as above, except some large pebbles and is moist to wet.		7/7/7 (19 – 20.5)	
25		Same as above, except dry		14/17/17 (24 – 25.5)	drilled to 24 ft sampled to 25.5 ft
30					
35					
40					
45					
50					

BORING LOG GENERAL DATA

Project: USATHAMA N-TEAD Boring: N-106-88 Page: 1 of 2

Driller & Company: Ed Adams Sergent, Hauskins & Beckwith

Geologist/Logger & Company: Jd Bachus Weston Signature: [signature]

Date Boring Started: 2-26-88 Completed: 2-26-88

Water Levels (from Ground Surface) See note below Drilling Rig:

First Encountered: Date:

While Drilling: Date:

NOTE: 29.5'-30.5' wet zone of 6 inches.

At Boring Completion: Date:

Drilling Shifts:

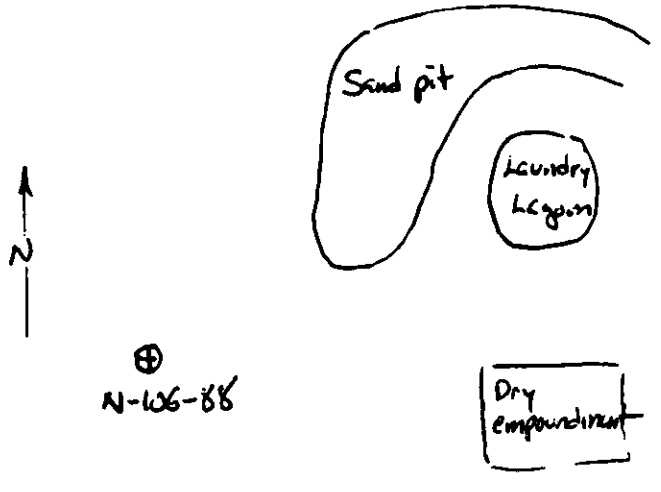
Date	Time		Depth of Drilling Per Shift		Date	Time		Depth of Drilling Per Shift	
	Start	End	Start	End		Start	End	Start	End
26 Feb 90	1115	1334	0.0	45.5'					

Abbreviations:

Abbr	Meaning
NP	Nm plastic
pl	plasticity
NAB	No apparent bedding

Colors from Munsell soil color chart.

Location Sketch:



Project: USATHAMA N-TEAD | Boring: N-106-88 | Page: 2 of 2

Depth/ Elevation (ft)	USCS Symbol/ Core Sketch	Soil/Rock Description	Sample Number & Depth	Blow Count & Recovery	Drilling Data
0					
5	SC	Silty Sand, light brown 7.5yr 6/4, 30% Silt. Subangular, NP, loose, dry NAB.		4/4/4	4 5.5
10		Same as above except iron staining and slightly moist.		4/6/8	9 10.5
15		Same as above, except 45% Silt.		5/6/7	14 15.5
20	MH	Sandy Silt; light brown 7.5yr 6/4; 10% Sand, Subangular; NP, loose, dry, NAB; Alluvial lake deposit.		5/6/8	19 20.5
25		Sandy Silt, as above, except slightly moist.		14/14/9	24 25.5
30		Sandy Silt, as above, except 6in. wet Zone about 30ft. down.		8/7/9	29 30.5
35	CH	Clay; light brown, 7.5yr 6/4. with yellowish brown stain, Stiff, highly pl NAB; very moist. Alluvial lake deposit.		10/1/11	34 35.5
40	ML	Clayey Silt. 25% clay, 10% Sand. Olive gray, 5y 4/2, with reddish brown mottling, dense, pl NAB, very moist Alluvial lake deposit		9/10/9	39 40.5
45		-Sandy Silt; olive gray 5y 4/2; 30% Sand. loose, NP NAB; slightly moist. Alluvial lake deposit.		19/10/28	Drilled to 44ft Sampled to 45.5ft.
50					

BORING LOG GENERAL DATA

Project: USATHAMA N-TEAD Boring: N-107-88 Page: 1 of 2

Driller & Company: Ed Adams ; Sergent, Hauskins, Beckwith

Geologist/Logger & Company: John Bacchus, WESTON Signature: [signature]

Date Boring Started: 2-26-88 Completed: 2-26-88

Water Levels (from Ground Surface) See note below — Drilling Rig:

First Encountered: Date:

While Drilling: Date:

NOTE: Moist @ 19.0'-20.5'
wet @ 24.0'

At Boring Completion: Date:

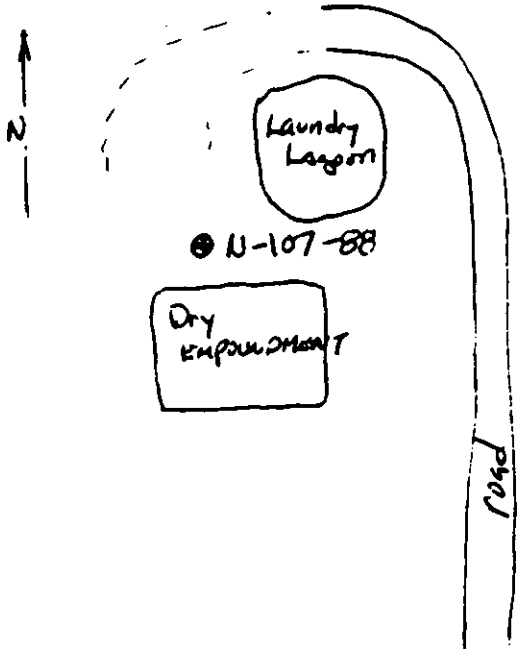
Drilling Shifts:

Date	Time		Depth of Drilling Per Shift		Date	Time		Depth of Drilling Per Shift	
	Start	End	Start	End		Start	End	Start	End
26Feb90	1424	1540	0.0	35.5'					

Abbreviations:

Abbr	Meaning
pl	plasticity, plastic
NAB	No apparent bedding

Location Sketch:



Project: USATHAMA N-TEAD | Boring: N-107-BB | Page: 2 of 2

Depth/ Elevation (Ft.)	USCS Symbol/ Core Sketch	Soil/Rock Description	Sample Number & Depth	Blow Count & Recovery	Drilling Data
0					
5	CS	Silty Sand, light brown, 7.5YR 6/4; 20% silt, Subangular, low pl, NAB, loose, dry;		4' 7/6/6 5.5'	
10		Silty Sand, same as above		9 5/5/4 10.5	
15	MH	Sandy SILT. Light brown, 7.5YR 6/4; 10% Sand - Subangular; low pl, loose, dry; NAB, Alluvial lake deposit		14 4/5/6 15.5	
20		Same as above		19 4/4/7 20.5	
25		Same as above, except wet		24 7/6/6 25.5	
30		Sandy Silt; same as above		29 7/6/6 30.5	
35		Sandy Silt; same as above, except slightly moist.		34 7/7/2 35.5	Drilling to 34ft Sampled to 35.5 ft.
40					
45					
50					

BORING LOG GENERAL DATA

Project: USATHAMA N-TEAD Boring: N-108-88 Page: 1 of 2

Driller & Company: Ed Adams: SURGENT, HOUSKINS & BETKOWITH

Geologist/Logger & Company: John Bacchus, WESTON Signature:

Date Boring Started: 2-27-88 Completed: 2-27-88

Water Levels (from Ground Surface) See note below Drilling Rig:

First Encountered: Date:

While Drilling: Date:

Note: Driller said water encountered @ 27'

At Boring Completion: Date:

Drilling Shifts:

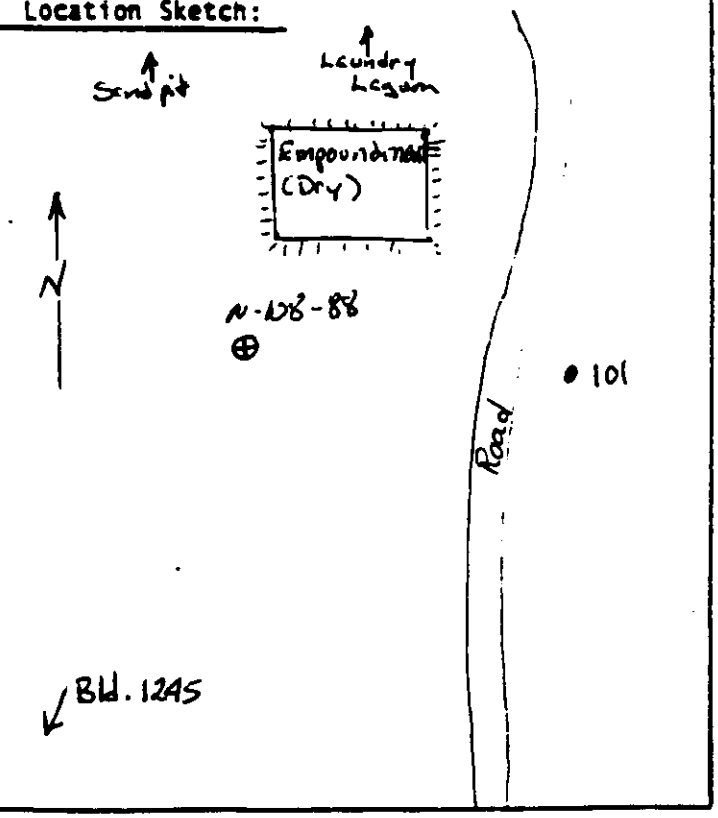
Date	Time		Depth of Drilling Per Shift		Date	Time		Depth of Drilling Per Shift	
	Start	End	Start	End		Start	End	Start	End
27Feb90	1310	1417	0.0	35.5					

Abbreviations:

Abbr	Meaning
NP	Non plastic
PI	plasticity
NAB	No Apparent bedding

Colors from Munsell Color Chart

Location Sketch:



Project: | Boring: | Page: 2 of 2

Depth/ Elevation (ft)	USCS Symbol/ Core Sketch	Soil/Rock Description	Sample Number & Depth	Blow Count & Recovery	Drilling Data
0	SC	Silty Sand; 20% silt; light brown 7.5YR6/4, fine grained, subangular; NP, loose, dry, NAB,		3/4/6	4.0' 5.5'
10		Silty Sand; as above, except 15% silt and medium to fine sand.		6/8/6	9.0' 10.5'
15	MH	Sandy Silt, light brown, 7.5YR 6/4; 30% fine Sand, subangular; NP, loose dry; horizontal laminations. Alluvial lake deposit.		6/9/7	14.' 15.5'
20		Sandy Silt; as above, except 40% Sand, moist to dry.		5/4/6	19 20.5
25		Sandy Silt; as above, except moist		4/7/8	24 25.5
		(water table, determined through cutting and sound of the rig.)			
30	SC	Silty Sand, dark brown 7.5YR 4/2, ~15% Silt; fine to med grained, subangular; NP; loose, slightly moist; NAB. Alluvial lake deposit		6/7/9	29 30.5
35		Silty Sand; AS ABOVE		7/8/9	34 35.5
40					Drilled to 34 ft Sampled to 35.5ft.
45					
50					

BORING LOG GENERAL DATA

Project: USA THAMA N-TEAD Boring: N-109-88 Page: 1 of 2

Driller & Company: Ed Adams; Sergent, Hauskins, & Beckwith

Geologist/Logger & Company: J. Bacchus; Weston Signature:

Date Boring Started: 2-28-88 Completed: 2-28-88

Water Levels (from Ground Surface) Drilling Rig:

First Encountered: 26ft Date: 2-28-88

While Drilling: Date:

At Boring Completion: Date:

Drilling Shifts:

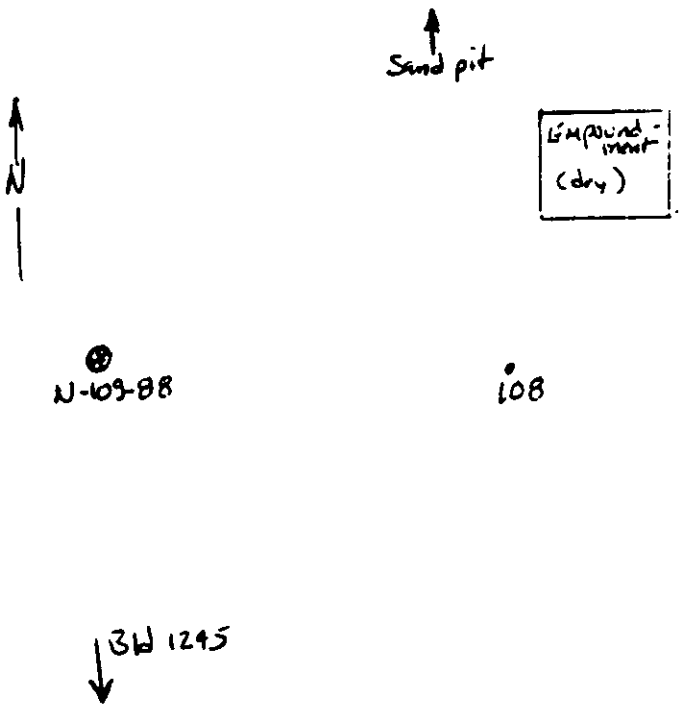
Date	Time		Depth of Drilling Per Shift		Date	Time		Depth of Drilling Per Shift	
	Start	End	Start	End		Start	End	Start	End
28 Feb 88	1000	1130	0.0	35.5'					

Abbreviations:

Abbr	Meaning
NP	Non plastic
NOB	No apparent bedding

Colors from Munsell Color chart.

Location Sketch:



Project: USATHAMA N-TLAD | Boring: N-103-BB | Page: 2 of 2

Depth/ Elevation	USCS Symbol/ Core Sketch	Soil/Rock Description	Sample Number & Depth	Blow Count & Recovery	Drilling Data
0					
5	SL	Silty Sand, 20% Silt; light brown 7.5YR 6/4, Subangular. NP. loose moist. NAB		6/8	4 5
10		Silty Sand, as above, except 10% Silt and more moist		7/8/13	10 10.5
15	MH	Sandy Silt; 40% Sand, light brown 7.5YR 6/4 NP. Stiff, slightly moist. faint horizontal bedding. Alluvial lake deposit.		8/4/3	14 15.5
20	SL	Silty Sand, 10% Silt; light gray 10YR 7/1, with yellowish brown stain, 10YR 5/4. Subrounded; NP. loose, slightly moist. NAB -- alluvial lake deposit.		7/9/8	
25	MH	Sandy Silt; 30% Sand; light gray 10YR 7/1 with yellowish brown stain NP; moist; loose; uneven bedding.		6/8	24 25
		(water table by cuttings and sound of the rig)			
30		Sandy Silt, as above, except very moist		28/40/55	29 30.5
35	MH	Sandy Silt, 20% Sand; light gray, 10YR 7/1 with yellish brown stain, 10YR 5/4. Sand! Subangular. NP, slightly moist. thin uneven bedding Alluvial lake deposit			34 35 Drilled to 34ft Sampled to 35ft
40					
45					
50					

BORING LOG GENERAL DATA

Project: USATHAMA N-TLEAD Boring: N-110-88 Page: 1 of 8

Driller & Company: Marty Peterson; DAVIS DRILLING

Geologist/Logger & Company: Joe Fritz; WESTON Signature:

Date Boring Started: 8/2/88 Completed: 8/4/88

Water Levels (from Ground Surface) Drilling Rig: Chicago Pneumatic

First Encountered: Date:

While Drilling: Date:

Static 302', 8/5/88, 08:05AM, 18 hrs after drilling stopped
304 8/4/88 at 12:45PM
- installed well

At Boring Completion: Date:

Drilling Shifts:

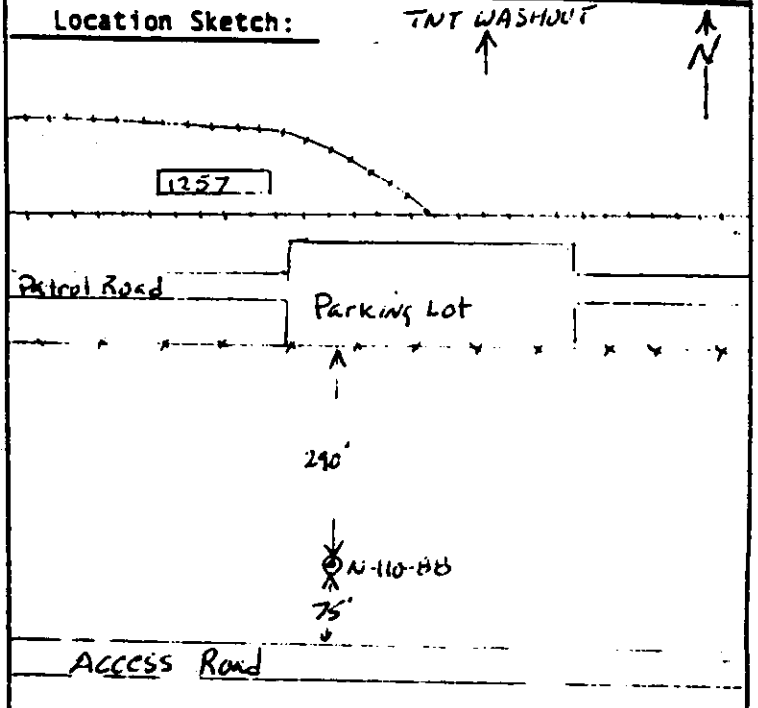
Date	Time		Depth of Drilling Per Shift		Date	Time		Depth of Drilling Per Shift	
	Start	End	Start	End		Start	End	Start	End
8/2/88	8:00AM	5:00PM	0'	105'					
8/3/88	7:00AM	2:30PM	105	165'					
8/4/88	7:00AM	2:30PM	165'	320					
				Stopped					

Abbreviations:

Abbr	Meaning
SS	Split spoons
trace	0-15%
some	15-30%
NP	non plastic
V	very
pl	plasticity
med	medium

Notes: Spit spoons were pushed, no blow counts available
Samples allowed to dry before assigning color, via Munsell soil color chart.
rotary air 0-33'
rotary air with water 33-165'
rotary air 165-320'

Location Sketch:



Project: USATHAMA N-TEAD	Boring: N-110-88	Page: 2 of 8

Depth/ Elevation ft.	USCS Symbol/ Core Sketch	Soil/Rock Description	Sample Number & Depth	Blow Count & Recovery	Drilling Data
					HNU b.g = 0.2
5	SP	Sand; trace silt. 10YR 7/2, light gray. N.P dry, subrounded, poorly graded, fine, lake deposit.	001		
10	ML	Silt; some sand, v. fine, subrounded, poorly graded, 10YR 7/2 · light grey N.P dry, lake deposit, oxidation.	002		SS
15	ML	Silt; trace sand, v fine, subrounded poorly graded, 10YR 8/3 v pale brown. N.P. dry, lake deposit.			
20			003		HNU = 0.2
25					
30		Same, but oxidation	004		SS
35					
40		Same silt, trace sand	005		HNU = 0.2
45		Same	006		SS
50					

Project: USATHAMA N-TEAD | Boring: N-113-88 | Page: 3 of 8

Depth/ Elevation ft	USCS Symbol/ Core Sketch	Soil/Rock Description	Sample Number & Depth	Blow Count & Recovery	Drilling Data
55					HNU=0.2
55	ML	Clayey Silt (some clay) 10YR 7/3 (v. pale brown), v. low pl dry, lake deposit.			
60			007		SS
65					
70					HNU=0.2
75	CL	Clay, 2.5Y 6/2 light brownish gray low turned pl dry, lake deposit.	008		SS
80					
85			009		no more ss
90	GW	Sandy Gravel; some well graded, Subrounded Sand 10YR 7/3 (v pale brown) Gravel is well graded, w.p. subrounded lake deposit	010		
95	ML	Sandy Silt, some well graded u fine Subrounded Sand, 10YR 7/3 (v. pale brown) N.P dry, lake deposit	011		unable to retrieve mock sample
		over for description			
100			012		HNU=0.2

Project: USATHAMA N-TEAD | Boring: N-110-88 | Page: 6 of 8

Depth/ Elevation ft	USCS Symbol/ Core Sketch	Soil/Rock Description	Sample Number & Depth	Blow Count & Recovery	Drilling Data
200		Tuff.	021		
205					
210			022		
215					
220			023		
225					
230			024		
235					
240			025		
245					
250					

Project: USATHAMA N-TEAD | Boring: N-110-83 | Page: 7 of 8

Depth/ Elevation	USCS Symbol/ Core Sketch	Soil/Rock Description	Sample Number & Depth	Blow Count & Recovery	Drilling Data
250		Tuff.	026		
255					
260			027		
265					
270			028		
275					
280					
285			029		V. hard drilling 283-284' Sl. moist ≈285-30
290			030		
295					
300					

Project: USATHAMA | Boring: N-110-BB | Page: 8 of 8

Depth/ Elevation ft	USCS Symbol/ Core Sketch	Soil/Rock Description	Sample Number & Depth	Blow Count & Recovery	Drilling Data
300		Tuff	031		dry cuttings
305					
310			032		
315					
320					Stopped drilling
325					

BORING LOG GENERAL DATA

Project: N-TEAD USATHAMA Boring: N-111-88 Page: 1 of 8

Driller & Company: MARTI PETERSON OF DAVE'S DRILLING LIC # 405

Geologist/Logger & Company: DOUGLAS E. PERRY OF RFW KAREN D HULLIWAY WESTON Signature: Douglas E. Perry Karen D Hulliway

Date Boring Started: 880317 Completed: 880330

Water Levels (from Ground Surface) 60' - perched Drilling Rig: CP-7000

First Encountered: 60' (perched) Date: 3/19

While Drilling: 206-210' (gravelly sand) dried up quick Date: 3/23

318' - 326' 3/29

At Boring Completion: 311.7' Date: MARCH 1988

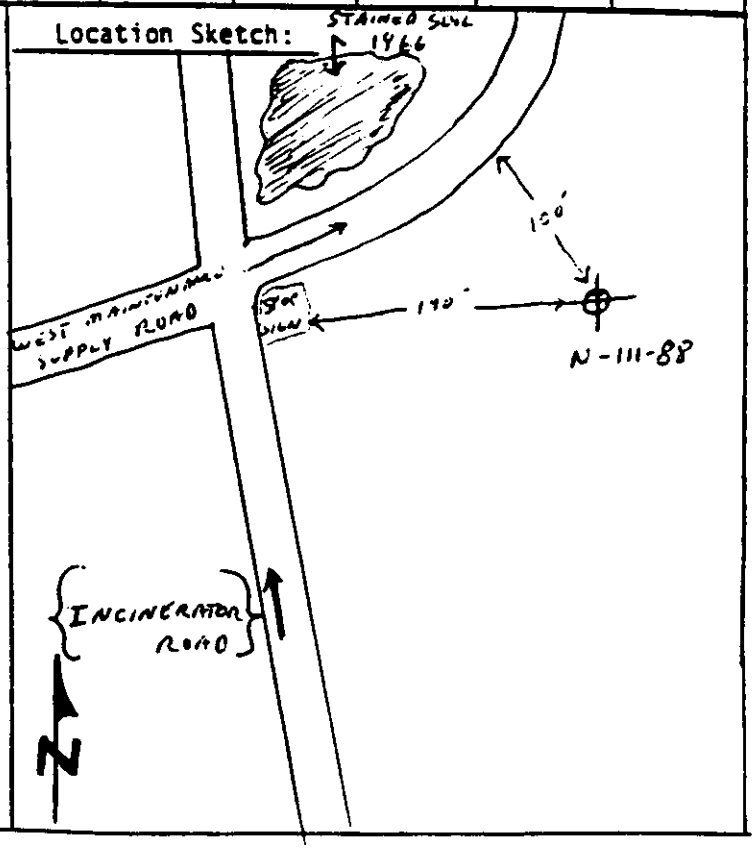
Drilling Shifts:

Date 1988	Time Start	Time End	Depth of Drilling Per Shift Start	Depth of Drilling Per Shift End	Date 1988	Time Start	Time End	Depth of Drilling Per Shift Start	Depth of Drilling Per Shift End
17 MAR	1100	1545	0'	37.5'	28 MAR	1615	1720	260.0'	280.0'
18 MAR	1200	1730	37.5'	58.5'	29 MAR	1040	1743	280.0'	330.0'
19 MAR	0730	1715	58.5'	119.5'	30 MAR	0855	0930	330.0'	336'
20 MAR	0840	1345	119.5'	140.0'	31 MAR	WELL CONSTRUCTION		337.77'	180'
21 MAR	1420	1545	140.0'	160.0'	1 APR	WELL CONSTRUCTION		180'	0.0'
22 MAR	0800	1230	160.0'	200.0'					
23 MAR	0915	1615	200.0'	260.0'					

Abbreviations:

Abbr		Meaning
RFW	=	ROY F. WESTON
TRACE	=	< 10%
SOME	=	10% - 25%
F	=	FINE
C	=	COARSE
M	=	MEDIUM
L	=	LENGTH
QTZITE	=	QUARTZITE
SAT	=	SATURATED
V. MOIST	=	VERY MOIST
CARB	=	CARBONATE
GSA	=	GEOLOGICAL SOCIETY OF AMERICA MUNSELL COLOR CHART
V.	=	VERY

Location Sketch:



Project: N-TEAD USATHAMA	Boring: N-111-88	Page: 2 of 8

NOTE: ALL COLORS FROM MUNSELL SOIL COLORS CHART.

Depth/ Elevation (FEET)	USCS Symbol/ Core Sketch	Soil/Rock Description (GROUND SURFACE)	Sample Number & Depth	HNU READING ~~Blow Count & Recovery~~	Drilling Data
	TOPSOIL	ORG SOIL - TOPSOIL - ROOT MAT V-MOIST, DK BROWN - LOOSE GRAVELS TRANSITIONAL		HNU-0	NOTES: 1) ALL DEPTHS IN FEET 2) 140psi ON CP-7000 RIG 3) FIRST CASE = 19.0' LONG
5'	GP	SAND & GRAVEL / TRACE FINES F = 10YR 8/2, SUBROUNDED COARSE PEBBLES to SMALL GRAVELS CARBONATE & QTZITE GRAVELS, 0.2'	1/5	GRAB SAMPLE	
10'		SANDS & GRAVEL / TRACE FINES-SILT F = 10YR 8/2 M-C GRAVELS 0.3' AVERAGE L NO APPARENT BEDDING	2/10	GRAB SAMPLE	
15'		SLIGHT MOIST SAND & GRAVEL 40% QTZITE 60% CARB. F = 10YR 8/4-8/3 TRACE - SILT M-C GRAVELS 0.25' AVERAGE L ALLUVIAL MATERIAL, LOOSE, DRY	3/15	GRAB SAMPLE	
20'			4/20	HNU-0 GRAB SAMPLE	ADD CASING & WELDING. 1130 = TIME BIT 2.0' BELOW CASING 1345 DRILLING AGAIN
22'	GW	SMALLER GRAVEL to PEBBLE SIZE BETTER SORTING = 0.05' AVERAGE SAND & GRAVEL F = 10YR 8/2 TRACE PINK QTZITE ~ 10R 5/4 LOOSE, DRY, QTZITE HAS $CaCO_3$ CEMENTATION	DEP		
25'			5/30	GRAB SAMPLE	
30'		.15' SIZE AVERAGE STILL GOOD SORTING NO APPARENT BEDDING, LOOSE, DRY CARBONATES EFFERVESCENT TO HCL			
35'		SAME AS 25'-30' COARSE SAND & GRAVEL LOOSE, DRY 40% QUARTZITE 60% CARBONATE	DEP	HNU-0	* PULL BIT OUT TO CHECK 2 CONES ARE BAD - NO BEARINGS - NO BACK-UP BIT. END 17 MAR 88
				HNU-0	START OF SHIFT 18 MAR 88
40'		SAND & GRAVEL SAME AS 35' 0.05' AVERAGE L	6/40	GRAB SAMPLE	NEW BIT MAKING COARSE CUTTINGS SMALLER DUE TO GRINDING UP.
43'	DEP	HIT A SAND LAYER 10YR 7/3 1.0' THICK - VERY SLIGHT MOISTURE	7/43	GRAB SAMPLE	TOOK SAMPLE OF SAND LAYER
45'	SW				
47'	GP	SAND AND GRAVEL AVERAGE L = 0.1' LOOSE, DRY			
50'		SAME AS 35' LEVEL	8/50	GRAB SAMPLE	

Project: N-TEAD USATHAMA | Boring: N-111-88 | Page: 3 of 8

Depth/ Elevation	USCS Symbol/ Core Sketch	Soil/Rock Description	Sample Number & Depth	HNU Reading / Blow Count & Recovery	Drilling Data
50.0'		50.0' LEVEL			1) ALL DEPTHS IN FEET
55'	GP	SANDY GRAVEL 70% CARBONATES 30% QTZITE, MAJORITY OF PEBBLES ARE SUB-PRISMOIDAL (SPHERICITY) + ROUNDED (ROUNDNESS) LOOSE, DRY			END OF MANUAL ADD CASING & WELD — 57'
58.5'				HNU=0	END DRILLING
60'		SANDY GRAVEL WITH TRACE FINES MOIST - FINES ADHERING TO VERY LARGE % 35' C = COBBLES M-C SMALL COBBLES 10 YR - 5/4 MOIST SAND COLOR	9/60	HNU=0	GRAB SAMPLE - PERCHED WATER TABLE ENCOUNTERED 60'
65'					
69'					
70'	GC	CLAYEY GRAVELS - GRAVEL/SAND/CLAY MIXTURE. V-MOIST - SAT SOIL WILL ROLL OUT = CLAY F = 10 YR 5/2 TRACE CLAY / TRACE SILT TRACE GRAVEL UP TO .05' 75% SAND	10/70	GRAB SAMPLE	HAVING TROUBLE CLEANING HOLE - MORE MOISTURE.
75'	GRADE INTO				
77.5'					
80'	SC	CLAYEY SANDS WITH TRACE SILT SAND 85% - 90% TRACE CLAY V-MOIST - SAT	11/80	GRAB SAMPLE HNU=0	79' DOGGIN / ADD CASING & WELDING. 81' HAVING TROUBLE GETTING CUTTINGS OUT OF DRILL STRING & CASING.
85'					
86'	GC	NOTICABLY MORE GRAVEL; CLAY ≈ 2% SAND + SILT GRAVEL = 90% CARB = 60% QTZITE = 40% MOIST			DRILL RIG & LITTLE JASPER GOING
90'	GM	SILTY GRAVEL - GRAVEL SAND SILT MIXTURE FINES ADHERING TO GRAVEL TRACE CLAY - CAN ROLL OUT / F = 10YR 5/2 MOIST	12/90	GRAB SAMPLE	
95'		GRAVELS SIZE = .08' COARSE PEBBLE SLIGHTLY MOIST			
		GRAVEL SIZE INCREASE TO .1'			
98'	GP	SLIGHT MOIST LOOSE F-ADHERING TO PEBBLES. PEBBLES; AT 98' 0.2', LOOSE, SPHERICITY = SUB PRISMOIDAL ROUNDNESS = ROUNDED	13/100	GRAB SAMPLE HNU=0	
100.0'					

FEET
50'
55'
57'
58.5'
60'
75'
100'

Project: N-TEAD USATHAMA	Boring: N-111-88	Page: 4 of 8

Depth/ Elevation	USCS Symbol/ Core Sketch	Soil/Rock Description	Sample Number & Depth	~~Blow Count & Recovery~~ HNU Reading	Drilling Data
100'		100'.0' LEVEL			
	GP	98% GRAVEL SOME SAND SOME PINK QTZITE 10R 5/4 TRACE SAND + SILT			DALL DEPTHS IN FEET DRILLING VERY EASY
104'	DEP	60% CARB M-GRAVEL 50% 40% QTZITE F-GRAVEL 50% LOOSE, DRY			
105'	GC	104' C-GRAVEL Sp-spherical/sub rounded SLIGHT MOIST FINES ADHER TO 1" SIZE 105' 2½" ≈ .2 Feet SM cobbel size	14/110	GRAB SAMPLE	
DEP 110'	GM	SANDY GRAVEL - SILT SAND GRAVEL MIX MOIST, LOOSE. F = 10YR 5/4			
113'		Dry loose @ 113	HNU-0 SOIL		
115'					3/19/88
116'	GP	GRAVEL - FINER ½" AVE SIZE DRY, LOOSE, TRACE SILT TRACE SAND 70% CARB 30% QTZITE			61.0' DRILLED TODAY ADD CASING & WELD END DRILLING 119.5'
120'		SAME AS 116.0' SLIGHT MOISTURE	HNU-BELOW ZERO 15/120	GRAB SAMPLE	~~DRILL~~ START DRILLING OFF
123'		GRAVEL SIZE INCREASE .23 Feet SLIGHT MOIST FINES ADHERING TO			
125'		SM cobbel sized GRAVEL. 2 FOOT INTERVAL SAME AS 116.0' SLT MOISTURE			
130'		SANDY GRAVEL .05" SIZE 60% CARB SLIGHTLY MOIST 40% QTZITE TRACE SILT, $CaCO_3$ CEMENTATION IN QTZITE	16/130	GRAB SAMPLE	
		DRY LOOSE ↓			
135'					3/20/88 END 140'
140'		SANDY GRAVEL 70% CARB DRY, LOOSE 30% QTZ TRACE SAND + SILT FINES 10YR 7/1 MORE CARB DUST BOTH CARBONATES + SOME QUARTZITE EFFERVESCES WITH HCL ACID - QTZITE HAS CARBONATE CEMENTING POSSIBLY	17/140	GRAB SAMPLE	DRILL TO 140' ADD CASING 20' + WELD CHANGING DRILL BIT AGAIN. WILL USE WATER ON REMAINDER OF HOLE. * WATER HAS HELPED ALOT LARGER PIECES ARE COMING UP 3" SIZE. DRILLING IS SMOOTHER.
145'					
150'.0					

Project: N-TEAD USATHAMA | Boring: N-111-66 | Page: 5 of 8

Depth/ Elevation	USCS Symbol/ Core Sketch	Soil/Rock Description	Sample Number & Depth	Blow Count & Recovery	Drilling Data
150	GP	SANDY GRAVEL: 70% CARBONATES 30% QUARTZITE, browns + blacks; medium pebbles to small cobbles, subrounded to angular; poorly sorted, quartzite with CaCO3 cementation trace very coarse grained sand.	18/150' Grab Sample		Geologist changed to Ed Hellman
155'					
160'		160' SANDY GRAVEL. 60% CARBONATES 40% QUARTZITE, browns + blacks, fine pebbles to trace (<1%) large cobbles, subangular to brecciform; poorly sorted. CaCO3 cemented quartzite, some fines of sand, coarse grained. Encountered a 11" cobble, white (10YR 8/1) subrounded, highly effervescent to HCl, possibly chert, very hard.	19/160' Grab Sample	HNU=0	END 3/21/88 TOTAL DEPTH 160'
165'	GP	160-166' SANDY GRAVEL with many fines - possibly from settling of water in hole overnight.			Add casing + welding 3/22/88 Start at 160' cutting back to 190' water.
170'	GP	170' SANDY GRAVEL 60% CARBONATES 30% QUARTZITE, 10% FINES, browns + blacks, subangular and angular, moderately sorted, CaCO3 cemented quartzite. Very coarse pebbles to medium grained sand, trace chert pebbles.	20/170' Grab Sample		
175'					
176'	GM	176' SANDY GRAVEL: 60% GRAVEL, 40% FINES. GRAVEL: 60% CARBONATES, 40% QTZITE subrounded and subangular FINES: 70% SAND, 30% SILT/CLAY			
180'	GM	180' SANDY GRAVEL: 70% GRAVEL, 30% FINES (clay/silt/sand). GRAVEL: 60% CARBONATES, 40% QTZITE subrounded to rounded, blacks, browns, fine CaCO3 cemented quartzite, moderately sorted, v. coarse pebbles to small cobbles. FINES: 60% SAND, 40% SILT AND CLAY moderate yellowish brown (10YR 4/2 GSA) subangular, moderately sorted, medium pebbles to medium grained sands	21/180' Grab Sample	HNU=0	180': Adding casing and welding, Drilled for ~ 70 min x 1 gal/min = 70 gals water used in drilling
185'					
190'			22/190' Grab Sample		185-190' Easy drilling v. small gravels
195'	GW	190' SANDY GRAVEL: 60% CARBONATES 40% QTZITE, trace fines; size extremes medium pebbles to coarse sand mostly fine pebbles, moderately sorted subangular with trace angular and subrounded, fairly clean gravels. 195' Larger gravel from very coarse pebbles to small cobbles mixed with the finer gravel			

Project: N-TCAD WATHAMA	Boring: N-111-38	Page: 6 of 8

Depth/ Elevation	USCS Symbol/ Core Sketch	Soil/Rock Description	Sample Number & Depth	Blow Count & Recovery	Drilling Data
200	GC/GM	200': SANDY GRAVEL: 40% CARBONATES 30% QTZITE, 30% FINES. Poorly sorted. GRAVEL: blacks and browns, poorly sorted, very coarse sand to small cobbles subrounding with trace rounded FINES: coarse to medium grained sand. subrounded trace rounded, white and carb sand grains, trace clay, moderately sorted, occasional chert pebbles. Sand gravel mixture	23/200 Grab Sample	HNU=0	180-200' Easy drilling due to small finer gravels 200' Adding casing + welding. Drilled for approx 45 min x 1 gal/min = approx 45 gals water used in drilling Drilled 40' 3/22/88
205	GM/SM				
210		203-204 SANDY GRAVEL: 50% CARBONATES 50% QTZITE, fine pebbles to coarse grained sand with some fine grained sand, fairly well sorted, subrounded.	24/210 Grab Sample		3/23/88 Starting at 200' (0913) 206': Hit a zone of saturation to 210' in a gravelly sand. No water pumped down hole.
215		206': GRAVELLY SAND: 80% SAND/CLAY/SILT 20% GRAVEL, saturated.			
218	GP/GC	210': GRAVELLY SAND: 80% SAND/CLAY/SILT 20% GRAVEL, greyish orange 10YR7/4 (USA) to moderate yellowish brown 10YR5/4 (USA) very fine grained to medium grained, subrounded; 40% CLAY, saturated.	25/220 Grab Sample	HNU=0	220' Adding casing and welding. Drilled for 40 min x 1 gal/min = 50 gals water used in drilling 200-220' (didn't use water all the time.
225		GRAVEL: 70% CARB, 30% QTZITE, poorly sorted broken to subangular fine pebbles to small cobbles.			
225.5	SC	218' SANDY GRAVEL 220': SANDY GRAVEL: 50% CARBONATES 30% QTZITE 20% FINES (SAND/CLAY): moderate yellowish brown 10YR5/4, angular to subangular, small cobbles to medium pebbles, some very fine grained sand and clayey silt.			
230	GP/GC	226.5': CLAYEY SAND AND GRAVEL 80% CLAYEY SAND, 20% GRAVEL very fine to coarse pebbles subrounded, clayey sand adhering to pebbles, sand fairly well sorted, medium grained	26/230 Grab Sample		234' drilling became harder, gravel pretty broken up
235		228': SANDY GRAVEL			
240		235': SANDY GRAVEL: 70% GRAVEL 30% SAND/CLAY. GRAVEL: 70% CARBS 30% QTZITE: blacks + browns, angular and subangular, very coarse pebbles to very fine pebbles, SAND/CLAY: pale yellowish brown 10YR6/2 to dark yellowish brown 10YR4/2, qtzite + carb pebbles reds, white, brown, black subangular very coarse to medium grained sands, poorly sorted	27/240 Grab Sample	HNU=0	240' Adding + welding casing. Drilled for 60 min x 1 gal/min = 60 gals water used in drilling 220-240'.
245		240' SANDY GRAVEL: 60% GRAVEL 40% SAND/CLAY: same as above except medium and coarse pebbles subangular, a little better sorted than above			
250					

Project: N-TEAD USATHAMA	Boring: N-111-88	Page: 7 of 9

Depth/ Elevation	USCS Symbol/ Core Sketch	Soil/Rock Description	Sample Number & Depth	Blow Count & Recovery	Drilling Data
250	GM	250': SANDY GRAVEL: 70% CARBS 30% QTZITE, black, browns, white (chert) subangular to subrounded, v. fine to coarse pebbles, medium grained sand. FINES: pale yel brown 10YR 6/2 to dark yel brown 10YR 4/2 (GSA), moderately sorted, moist.	28/250' Grab Sample		
255'					257': Encountered very hard drilling, need water to help in drilling.
260'		260': SANDY GRAVEL: 70% CARBS, 30% QTZITE - same as above except poor sorting and v. fine to v. coarse pebbles and occassional small cobbles	29/260' Grab Sample	HWU=0	END OF DAY 3/23/88 DRILLED 60' 200-260'
261'	SC	261': SANDY CLAY: 50% CLAY, 40% SAND 10% GRAVEL - KDH angular v. fine pebbles to few coarse pebbles; SAND - subangular, fine (3.0-2.5Ø) to medium (2.0-1.5Ø) - grained sand, fairly well sorted, firm, damp.			CLEANING OUT HOLE GOOD BLOWING OUT ANY WATER THAT HAS BEEN USED IN DRILLING
265'					BEGIN 3/28/88 @ 260'
268'	CL/SC	268' (270' SAMPLE): SILTY CLAY: 70% CLAY 25% SILT/SAND, 5% GRAVEL: pale yel brown 10 YR 6/2 (GSA), v. fine-grained fairly well sorted, gravel coated with clayey material, size from v. fine pebbles to small cobbles damp.	30/270' Grab Sample		260-280' No water used in drilling. No water detected in the hole on 3/28/88 from previous use of water.
270'					
275'	GC	275': CLAYEY SAND + GRAVEL: fine grained sand to medium size pebbles, subangular and angular, 60% CLAYEY SAND, 40% GRAVEL (CARBS); slightly damp.			END OF DAY 3/28-88 drilled 20' - 260-280' ~~260' Adding~~
280'	GM/SC	280': SILTY SAND + GRAVEL: 60% GRAVEL, 40% SILTY SAND; pale yel brown 10YR 6/2 (GSA) v. fine-grained subrounded to subangular, gravel coated w/ silty sand, carbonates w/ possible xtalline type material, v. fine pebbles to occasional small cobbles, v. slightly damp to dry.	31/280' Grab Sample	HWU=0	280' Adding casing + welding 3/29/88. In drilling losing lots of fines. Using no water to aid in drilling, material out of hole is broken
285'					
286	GM	281-280 CLAYEY SAND + GRAVEL (damp) alternating in 1-2' intervals w/ SILTY SAND + GRAVEL (dry) - same description as 275' and 280'.			
290'	GM	290': SILTY SAND + GRAVEL - 60% SILTY SAND 40% GRAVEL (CARBS); very pale orange 10YR 8/2 (GSA), v. fine-grained, fairly well sorted sand, overall poorly sorted, gravel - subangular to angular + broken, size from v. fine grained sand to gravel of v. coarse-grained sand to medium pebbles (<5%), mostly fine pebbles, dry.	32/290' Grab Sample		
295'					
300'				HWU=0	298': Adding casing + welding.

Project: N-TEAD USAHUAMA | Boring: N-111-56 | Page: 8 of 8

Depth/ Elevation	USCS Symbol/ Core Sketch	Soil/Rock Description	Sample Number & Depth	Blow Count & Recovery	Drilling Data
300'	SM/GM	291-298': SILTY SAND + GRAVEL: same as above except + finer grained Material overall; 294-295' zone of gravel that is longer in medium pebble to v. coarse pebble range	33/300 Grab Sample		
305'	SM	300': SANDY GRAVEL: 70% SAND, 30% GRAVEL (mostly carbs) moderate yel brown 10YR5/4 (GSA) poorly sorted, sub-angular + angular. Size - medium-grained sand to fine pebbles (8mm) (<10%), slightly damp.			305': Really hard drilling, crushing Material so have Massive fines. Bit is probably starting to wear.
310'		308': SILTY SAND - fine grained to coarse grained sand, 15% medium to coarse size pebbles.	34/310' Grab Sample		
314'	GM	310': SILTY SAND: 60% SILT, 40% SAND; pale yel brown 10YR6/2 to grayish orange 10YR7/4 (GSA) Subangular, v. fine-grained to vr coarse grained, dry.			
315'		314': SANDY GRAVEL: 60% SAND/SILT 40% GRAVEL (mostly carbs) - v. coarse sand to coarse pebbles, subangular to broken, fines same as 310'; dry. CLAY?	35/320' Grab Sample	HSA TO	319': Adding casing + welding. In cleaning out the hole some, started getting some water up the casing
320'	GC	320': SANDY GRAVEL, 15% GRAVEL, 35% SAND, 50% CLAY (50% CLAY, 50% SAND), brownish yellow pieces, white, grams CARBONATES, OOLITE, trace LIMESTONE (white) subangular to angular, very fine to coarse size pebbles, some v. coarse grained sand to trace medium grained sand, saturated.			318': Encountered water 326': Less water. END OF DAY 3/29/88 - 330' Drilled 280 - 330' = 50'
325'		323': More clay than sand content (all gravel is coming out in clumps), saturated. At 326' Just Moist			
330'	GC	330': SANDY CLAY +GRAVEL: 60% SANDY CLAY, 40% GRAVEL (mostly carbs) Moderate yel brown 10YR5/4 (GSA), gravel is coated w/ sandy clay, subangular and angular, sand v. fine grained (3.5-8.0) to medium grained (2.0-2.50), moist. (60% CLAY, 80% SAND)	36/330' Grab Sample		3/30/88 Hole at 330' Water measured at 282.4' Will have to drill to joint in order to take split spoon. Hole at 336.3'.
335'			37/336 Split Spoon	336.3'-337.8 19/6" 60/6" 154/6"	Split spoon taken dropping 150 lb hammer approx. 30".
337.77'	TD	334' CLAYEY SAND +GRAVEL: 60% GRAVEL 40% SANDY CLAY (30% CLAY, 70% SAND) Mod yel brown 10YR5/4 (GSA), gravel is from coarse pebbles to mostly small cobbles (pieces broken in drilling) subrounded, subangular and broken from drilling. GRAVEL 60% CARBS, 40% OOLITE			TOTAL DEPTH: 337.77' Well construction: 3/31 - 4/1 - 88
340'		336': GRAVEL: 80% CARBS, 20% OOLITE Subrounded, subangular to broken from sampling, fine pebbles to small cobbles, some limestone, trace sand.			
345'					
350'					

BORING LOG GENERAL DATA

Project: USHITHAMA N-TEAD Boring: N-11[illegible]-88 Page: 1 of 8

Driller & Company: Marty Peterson / Dave's Drilling

Geologist/Logger & Company: Karen Hallimay / WESTON
John McDonnell / Weston Signature: [signature]

Date Boring Started: 06 April 1988 Completed: 21 April 1988

Water Levels (from Ground Surface) Drilling Rig: CP 7000

First Encountered: 35'-61.5' Date: 4-8-88

While Drilling: 326'-quad return Date: 4-20-88

At Boring Completion: 312' Date: 4-21-88

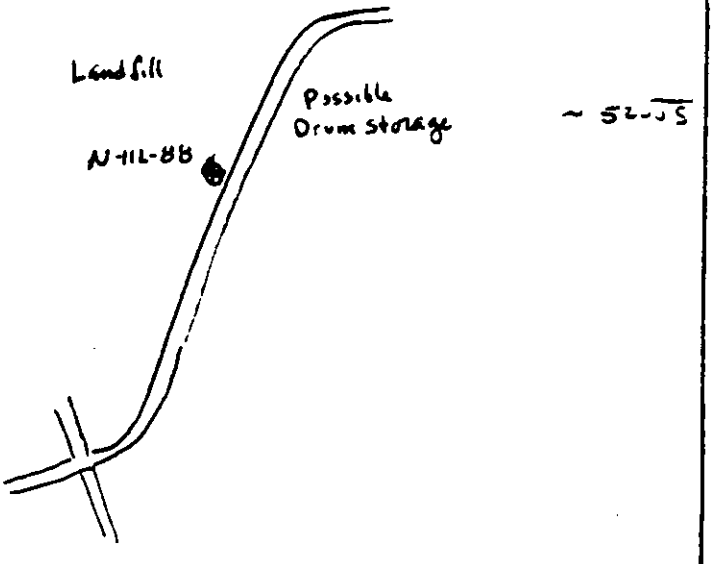
Drilling Shifts:

Date 1988	Time Start	Time End	Depth of Drilling Per Shift Start	Depth of Drilling Per Shift End	Date	Time Start	Time End	Depth of Drilling Per Shift Start	Depth of Drilling Per Shift End
06 APRIL	1105	1435	0.0'	31.0'	19 April	0800	1800	251'	291
08 APRIL	0900	1600	31.0	56.0'	20 April	0800	1800	291	326
10 APRIL	0915	1335	56.0'	96.0'	21 April	0800	1800	326	332
11 APRIL	0811	1620	96.0'	156.0'					
12 APRIL	0930	1520	156.0'	216.0'					
13 APRIL	0952	1400	216.0'	250.0'					

Abbreviations:

Abbr	Meaning
trace	<10%
some	10% - 25%
xfg	very fine-grained/graded
fg	fine-grained/graded
mg	medium-grained/graded
cg	coarse-grained/graded
v	very
Qtzite	Quartzite
carbs	Carbonates
GSA	Geological Society of America Munsell color chart
sm	small
~	approximately
gpm	gallons per minute
lm'c	limonitic
hmic	hematitic
grn	grain
gy	grey
or	orange
yl	yellow

Location Sketch:



Project: USATHAMA N-TEAD	Boring: N-112-88	Page: 2 of 8

Depth/ Elevation	USCS Symbol/ Core Sketch	Soil/Rock Description	Sample Number & Depth	Blow Count & Recovery	Drilling Data
	TOPSOIL	SILTY CLAY AND GRAVEL: dark brown, trace sand, organic, gravel subangular, vfg, transitional, slightly damp.		HNU=0	NOTES: All depths in feet ground surface. Air Rotary capable of 900 psi external compressor 1200 psi. Commence drilling 4-6-88. Tri-cone bit. Typical Pumping pressure = First casing = 18.5'
5'	GM	3.0' SILTY SAND + GRAVEL 5.0' SILTY SAND + GRAVEL: 70% silty sand, 30% gravel, very pale orange 10YR 8/2 (GSA), vfg, subrounded, qtzite + carbs gravel, vf to cg pebbles, poorly sorted, dry. Alluvial deposit.			
10'	GM	10.0' SILTY SAND + PEBBLES: 60% SAND, 40% PEBBLES, varied colored grays, browns, blacks, moderately sorted pebbles, subrounded + subangular, qtzite, carbs, mg sand to fg pebbles w/ occasional mg-cg pebbles, some silt, sand fg-mg, dry. Alluvial deposit.	N-112-88-01 (Grab) @ 10'	HNU = Bkgd	
15'					
20'		20.0' SAND + PEBBLES: 70% PEBBLES (QTZITE + CARBS), 30% SAND, varying grays, blacks, vf to fine pebbles, subrounded and subangular occassional mg pebbles, sand fg, moderately sorted, alluvial deposit, trace silt, dry. Alluvial deposit	N-112-88-02 (Grab) @ 20'	HNU=0	18.5' Welding next casing = 20.8' Having problems with hammer driving the casing
25'					
30'		30.0' SILTY SAND AND GRAVEL: 70% GRAVEL, 30% SILTY SAND: varied blacks, grays 60% CARBS, 40% QTZITE, subrounded to broken, poorly sorted fg pebbles to vcg pebbles w/ occassional sm cobbles. Sand vfg (3.5-4.0 ø) to fg (3.0-2.5 ø) well sorted, some silt, trace clay, slightly damp to damp. Alluvial deposit	N-112-88-03 (grab) @ 30'		END OF DAY 4/6/88 - RIG DOWN FOR REPAIR DOWN 4/7/88 30' BEGIN 4/8/88
35'	SP/SM	35.0' SILTY CLAYEY SAND: 90% SAND, 10% CLAY, fg to vfg sand, fairly well sorted, fairly uniform, trace silt, saturated	04 Grab @ 35'	HNU=0	35.0' very easy drilling Saturated Zone 35-61.5'
40'	SP/SM	40.0' (SILTY CLAYEY) SAND: 80% SAND 10% SILT 10% CLAY dark yellowish brown 10YR 4/2 (GSA) vfg sand, fairly well sorted, soft to medium stiffness. silt, saturated, becomes siltier at 43.0'.			38.0' Adding and welding next section of casing 19.7'
45'					
50'					

Project: USATHAMA N-TEAD	Boring: N-112-88	Page: 3 of 8

Depth/ Elevation	USCS Symbol/ Core Sketch	Soil/Rock Description	Sample Number & Depth	Blow Count & Recovery	Drilling Data
50'	SP/SM	50': (SILTY CLAYEY) SAND: 80% SAND, 20% SILT AND CLAY, Same as above. Moist	05 grab @ 50'		Pushed Split Spoon 56-57.5'
55'	SP/SM	56-57.5' SPLIT SPOON SAMPLE: SILTY SAND: 80% SAND, 20% SILT AND CLAY Grading to 50% SAND, 40% SILT @ 57'; yellowish gray 10% CLAY 5Y7/2 to light olive gray 5Y5/2 (GSA), medium stiffness, vfg, fairly well sorted, saturated to moist.	SPLIT SPOON N-112-88-06	pushed 100% R	END OF DAY 08 APRIL Add & weld Next Section = 19.65' BEGIN 10 APRIL @ 56' Water in hole from saturated section
60'	GC	62': CLAY + GRAVEL, subrounded to broken, slightly damp	56-57.5'		61.5': End of Saturated zone, 62': Hit a gravel but have too much sand and clay in annulus to bring material out of the hole. 63.5' begin adding water to clean out the annulus. 2gpm @ 936 until 1020 = 44 min x 2 gpm ~ 88 gal
65'					
70'	GC/GM	70': SANDY GRAVEL: 60% CARBS, 40% QTZITE; varying browns, blacks, grays, whites, subrounded to broken, poorly sorted, sm. cobbles to vfg pebbles with trace cg sand, trace clay, alluvial deposit, damp	N-112-88-07 grab @ 69.5'		
75'	GP	74': GRAVEL: 60% CARBS, 40% QTZITE Many sm. cobbles to cg pebbles, moderately sorted, subrounded.			
80'	GM	80': SANDY GRAVEL: 70% GRAVEL (70% CARBS, 30% QTZITE), 30% SAND; varying blacks, browns, grays, whites, subrounded + subangular to broken, cg pebbles to cg sand, trace clay, poorly sorted, alluvial deposit.	N-112-88-08 grab @ 80.5	HNU=0	78': Adding and welding next section of casing = 19.7' Using water at 2gpm 1140-1230 = 50 min x 2 gpm ~ 100 gals
85'		85': SANDY GRAVEL: fg pebbles to mg sands, subrounded + subangular, fairly well sorted alluvial deposit.			
90'	GP	90': SANDY GRAVEL: 70% CARBS, 30% QTZITE, varying browns, blacks, grays, angular to broken, fg pebbles to mg pebbles w/ occassional cg pebbles, Moderately sorted, trace sand, alluvial deposit	N-112-88-09 grab @ 90'		Need more water. basically drilling inside of casing need to clean out annulus. Using 2gpm starting at 1315-1333 = 18 min ~ 36 gal
95'				HNU=0	96.5 Adding and welding casing = 19.7' END OF 10 APRIL
100'					11 APRIL using 2 gpm water 0811-0920 = 69 min

138 gals water

Project: USATHAMA N-TEAD	Boring: N-112-88	Page: 4 of 8

Depth/ Elevation	USCS Symbol/ Core Sketch	Soil/Rock Description	Sample Number & Depth	Blow Count & Recovery	Drilling Data
100	GM	101' SAND & GRAVEL: 70% GRAVEL (70% CARBS, 30% ATZITE), 30% SAND, varying browns, blacks, poorly sorted subangular to broken, mg sand to occassional SM. cobbles, alluvial deposit.	10 @ 101' grab		
105'					
110'	GP	110': SAND & GRAVEL: 40% GRAVEL (70% CARBS, 30% ATZITE) 60% SAND, varying browns, blacks, moderately sorted, fg pebbles to SM. cobbles most cg to vcg pebbles, subangular to mostly broken	N-112-88-11 @ 109.5'		
115'				HAM=0	116.5': Adding and Welding casing section 20.6' Using 2gpm water to aid drilling, start 1100. End 1155 - didnt use water for 10 minutes so 45 min x 2 gpm = 90 gals
120'	GM	120' SAND & GRAVEL: 80% GRAVEL (70% CARBS, 30% ATZITE), 20% SAND, varying browns & blacks with pale yellowish brown 10YR6/2 (GSA)	N-112-88-12 @ 120'		
123	GP	sand - fg to cg sand, poorly sorted fg pebbles to cg pebbles subangular to broken, alluvial deposit.			
125'	GM/GP	123.5' GRAVEL: mg pebbles to sm. cobbles			Drilling 1231 to 1300 = 29 min x 2 gpm = gals
130'	GM	131': SAND & GRAVEL: 70% GRAVEL, (70% CARBS, 30% ATZITE), 30% SAND; varying browns, blacks with some white possibly shell fragments, poorly sorted subrounded to broken, fg sand to mg pebbles, trace silt and clay. Sand pale yellowish brown 10YR6/2 (GSA)	grab N-112-88-13 @ 131'		
135'				HAM=0	137.5': Adding and welding casing section 20.45'. Blowing hole and well removing water. Tripping in and out to change the bit
140'	GM	140': SAND & GRAVEL: same as above. 141': SAND & GRAVEL: mg pebbles to sm cobbles otherwise same as above.	N-112-88-14 grab @ 140'		
145'					Begin drilling 1537 using 1 gpm water, End 1645 = 35 min x 1 gpm ~38 gals
150'	GM	149': SAND + GRAVEL: 70% SAND, 30% GRAVEL. Moderate Yellowish brown			

Project: USATHAMA N-TEAD | Boring: N-112-88 | Page: 5 of 8

Depth/ Elevation	USCS Symbol/ Core Sketch	Soil/Rock Description	Sample Number & Depth	Blow Count & Recovery	Drilling Data
150'		10YR 5/4 (GSA), sand vcg, clayey, silty, sm to lg cobbles subrounded and subangular, some cg to mg pebbles, damp to slightly moist	N-112-88-15 grab @ 152'		
155'		156.5-158.0': CLAYEY, SILTY SAND: dark yellowish brown (10YR 4/2) to light olive gray 5Y 6/1 (GSA), stiff, moderately sorted, vfg to fg, some silt, occasional gravels, subangular and subrounded, carbs and qtzite; fg pebbles to cg pebbles, slightly moist.			156.5-158' SPLIT SPOON Pushed
156.5	SM			WOH=0	END OF 11 APRIL
			16 SPLIT SPOON	156.5-158 Pushed	
160'		163': SAND + GRAVEL: poorly sorted fg pebbles to cg pebbles, subangular to broken, fg sand, trace clay.		100% Recovered	START 12 APRIL Adding and welding Next Section = 19.75' Using 1gpm water in drilling 0935-1010 = 35 min x 1 gpm ~35 gals
163	GM				
165'					
170'	GM/GP	169': SANDY GRAVEL: 60% GRAVEL (70% CARBS, 30% QTZITE) 20% SAND: varying blacks, browns, moderate yellowish brown 10YR 5/4 (GSA), poorly sorted gravels: fg pebbles to vcg pebbles with occasional sme cobbles; sand - fg to cg sands, trace silt and clay; subangular, angular and broken, alluvial deposit.	N-112-88-17 grab @ 168'		
175'					
180'	GP/GM	179': SANDY GRAVEL 60% CARBS, 40% QTZITE, moderately sorted cg sand to fg pebbles with occasional mg pebbles, subangular, angular to broken, varying blacks, browns, whites	N-112-88-18 grab @ 180.5'	WOH=0	177': Adding and welding casing section = 19.75' Using 1 gpm water drilling @ 1151-1235 = 44 min x 1 gpm ~44 gals
184': SANDY GRAVEL. Same as above except more mg to cg pebbles and not as broken-up.					
185'					
190'	GP/GM	190': SANDY GRAVEL: 60% CARBS, 40% QTZITE, varying blacks, browns, grays white, poorly sorted fg to cg sand with fg to cg pebbles, subangular and mostly angular to broken, alluvial deposits.	N-112-88-19 grab @ 190'		
195'				WOH=100 to 1.2 units	197': Adding and welding casing section 19.68'. Using 1gpm water in drilling 1440-1520 = 40 min x 1 gpm ~40 gals
200'					

Project: USATHAMA N-TEAD	Boring: N-112-88	Page: 6 of 8

Depth/ Elevation	USCS Symbol/ Core Sketch	Soil/Rock Description	Sample Number & Depth	Blow Count & Recovery	Drilling Data
200	GP/6M	200': SANDY GRAVEL: 60% CARBS, 40% QTZITE, varying blacks, browns, grays, whites, poorly sorted, subangular (trace) angular to broken, some fg to cg sand and fg to mg pebbles with occassional cg pebbles; trace clay, alluvial deposit.	N-112-88-20 @ 200' grab		200': Drilling is really breaking/crushing the formation
205'		205': SANDY GRAVEL: Same as above except gravel size mg to cg pebbles.			209': Extremely hard drilling, only gained w/ 1 ft over 10 minutes. Formation really broken up
210'	GP/6M	209.5': SANDY GRAVEL: 60% QTZITE, 40% CARBS - Same as above, alluvial deposit.	N-112-88-21 grab @ 209.5'		
215'					216': Adding + welding Casing Section = 19.54'
					END OF DAY 12 APRIL
220'	GP/6M	220': SANDY GRAVEL: 60% CARBS, 40% QTZITE: varying browns, blacks, sand and clay moderate yellowish brown 10YR 5/4 (GSA); poorly to moderately sorted, vfg to mg pebbles, subangular + angular to broken, alluvial deposit.	N-112-88-22 grab @ 220'	HNU=0	START 13 APRIL 0932 Begin drilling using 1 gpm water until 1105 63 min x 1 gpm = ~ 63 gals
225'					
230'	GP/6M	230': SANDY GRAVEL: 60% CARBS, 40% QTZITE: some fg to cg sand, trace clay, poorly sorted fg to cg pebbles, subangular and angular to broken, colors same as above, alluvial deposit.	N-112-88-23 grab @ 230.5'	HNU=0	234': Adding + welding Casing Section = 19.71' Begin drilling @ 1350 using 1 gpm water until 1380 30 min x 1 gpm = ~ 30 gals.
235'					
239.5' 240'	GC	239.5': CLAYEY GRAVEL: 70% GRAVEL, 30% SANDY CLAY: GRAVEL: 70% CARBS, 30% QTZITE, varying browns, blacks, whites, grays, reds, clay is grayish orange 10YR 7/4 (GSA); Moderately sorted subangular to broken, vfg sand, fg to mg pebbles w/ occassional cg pebbles; alluvial deposit	N-112-88-24 grab @ 141'		
245'					
247	GP/6M	247' SANDY GRAVEL: fg to cg pebbles			
250'					

Project: USATAMA N-TEAP	Boring: N-112-88	Page: 7 of 8

Depth/ Elevation	USCS Symbol/ Core Sketch	Soil/Rock Description	Sample Number & Depth	Blow Count & Recovery	Drilling Data
250'	GP	250': SAND AND GRAVEL: 60% CARBS, 40% QTZITE, varying blacks, browns, grays, whites, clayey sand is moderate yellowish brown 10 YR 5/4 (GSA), poorly sorted, subangular to broken, fg to mg pebbles with occassional cg pebbles, mg to cg sand, trace clay, alluvial deposit.	N-112-88-25 grab @ 250'		250': stopped drilling, cleaned out hole to set for the 4-days of break. END OF DAY 13 APRIL
255'					Start 4-14-88
260'		c. gravel: w̄ cbls and fraqs of qtzite, varying tan w̄ min lm'c specs (5y 6/2), yl/or tan w̄ lm'c spotting (2.5y 6/4), lt grey (2.5y 7/2) carbs: gy w̄ 2nd y calc (~20%) (2.5y 5) v.f.n.g. fraqs: dark gy to black with hm'c alt. ccc. small elongate pbl, ~3/4 x 3/8 in.	N-112 88-26 grab at 260'	HAW 20	
265'		260 gravel aa. w̄ c. sand. qzose w̄ phlogopite flake - prot ground rock.			
270'		270 gravel: thumb nail sized cuttings and smaller chips. qtzite, mg. or tan (10 YR 5/4) qzite, f.g. gn gy (5y 6/2) carb. dark gy)		HAW 20	
275'		275 AA. larger chunks			
280'		280	N-112-88-28 at 280'		~278-280 loosing circ. no returns. 280. regained recovery surge of returns.
285'		Gravel: w̄ fraqs of qzite, f.g. gn gy (5y 6/1), redd'sh (2.5 YR 4/2). elongate pebbles, dk gy - fraqs of hm'c alt hornblende granite.			
290'		290 Gravel, f.g (?) small fraqs. irreg. poorly rounded pbble. w̄ clayey sand matrix (10 YR 5/6)	N-112-88-29 at 290'		291'. Start 4-20-88 returns moist. no water back up hole - dry. injection water returning
		293 Gravel, sandy w̄ poorly rd'd pebbles of qzite and carbs. Sandy material - to rock fraqs: matrix clayey sand, dark redd'sh brown (10 YR 5/6) rd'd cobbles qzite. lt tn to rd'n. (2.5y 8/4) to lt tan (10 YR 6/8 = ~60%.			
295'					
300'		300 - carb dark to lt gy v.f.g. (~40%)			

Project: USATHAMA N-TEAD	Boring: N-112-88	Page: 8 of 8

Depth/ Elevation	USCS Symbol/ Core Sketch	Soil/Rock Description	Sample Number & Depth	Blow Count & Recovery	Drilling Data
300	GW/SW	Gravel, w̄ pbls & cbls of qtzite, var. m.f.g br-gy (2.5YR 4/2) m.g rz-tan (10YR 6/8) m.f.g gray (10YR 5/1-7/1) +	N-112-88 -30 @300		
305		Carbs. f.g dk-gray to black plus. Sandy matrix, slightly clayey. quartz grains as from qtzite. Prob mix of matrix and crushed rock.			
310	GW/SW	Gravel w̄ bk, v.f.g carb frag, and qtzite var. red-vr, yl-tan, lt lt gray AA. and Sandy matrix, lt. yl-tan.	N-112-88 -31 @ 310'	HNUCO	
315	GW/SW	Gravel, AA. w̄ lt. tan. f.g. Sand; Sly clayey-Silty; micas. 317 Gravel, f. w̄ small, irreg, Poorly rounded to sub angular frag.			316 returns coming up gloppy, no injection water.
320			N-112-88 -32 @ 320		
325		Cobble/Gravel; qtzite and carbs. w̄ silty Sand quartz and rock frag, well graded, w̄ min lm. Prob includes cutting debris.	N-112-88 -33 @326-327		Hit water at 326 4-20-88 326: Tripped to Sample: No returns in spoon
330		Vhard: qtzite and bk carb plus Sand, sw. lt yl tan (2.5YR 7/4) 330	N-112-88 -34 @328-329		329: end of casing collapsing - bit chewing metal 4-21-88, drilled 326-332.
TO332		To 332: In rock. prob v.hard erratic.			

BORING LOG GENERAL DATA

Project: USATHAMA - N-TEAD Boring: N-113-88 Page: 1 of 3

Driller & Company: Robert Armstrong / Dave's Drilling

Geologist/Logger & Company: John McDonnell / Weston Signature: John McDonnell

Date Boring Started: 5-2-88 Completed: 5-3-88

Water Levels (from Ground Surface) Drilling Rig: CP-7000

First Encountered: -48ft (in Sprom) Date: 5-2-88

While Drilling: —52ft — Date: — 5-3-88

CP 7000, Top drive/casing hammer
Gardner-Denver 1200 CFM, Mod. SAUTWB Aux Compressor

At Boring Completion: 58.1 Date: 5-3-88

Drilling Shifts:

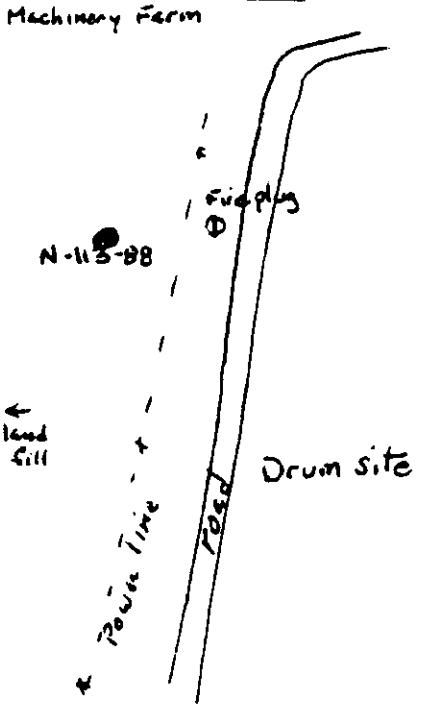
Date	Time		Depth of Drilling Per Shift		Date	Time		Depth of Drilling Per Shift	
	Start	End	Start	End		Start	End	Start	End
5-2-88	2:00 PM	6:00 PM	0'	49'					
5-3-88	8:00 AM		49'	59'					

Abbreviations:

Abbr	Meaning
qtz	quartz
qtzite	quartzite
carb	Carbonates
lm	limonite
hm	hematite
f.g	fine grained
vf.g	very fine grained
m.g, md.g	medium grained
c.g.	coarse grained
rd'd	rounded
rd	red
gn	green
gy	grey
tn	tan
br	brown

Colors: MUNSELL SOIL COLOR CHARTS

Location Sketch:



Project: USATHAMA N-TEAD | Boring: N-113-88 | Page: 2 of 3

Depth/ Elevation	USCS Symbol/ Core Sketch	Soil/Rock Description	Sample Number & Depth	Blow Count & Recovery	Drilling Data
5		Gravel, Sandy (GW/SP.) Pbls poorly to mod rd'd, gen flat. ½" to 1½" long dim. Cmpn vbl sdkgy - blk (2.5y 4/0 - 5/0) Cwl qtzite, mfg, off wht - ltbrn (5y 6/3) 40% Sand - well sorted, lt brn. (5y 7/2) qtz			
10		Gravel, f-md (GW) pbl size and larger Cmpn dk poorly rd'd, large frac, to 2" (2.5y 3/3) Sdst. qtzite, Small amt br-lt-brn, m.g. w lm specs. (2.5y 6/4) sd. Fines blown away.	N-113-88-10 taken 6-10'		
15		Sandy Gravel (GW-GP/SP) w pbls coarser than above; to 1" ø, mod. Comp of qtzite 50/50 Two size subset, Smaller more rounded ¼-½" larger ~1" ø. Dark Cmpn, larger, (5y 5/1 - 2.5y 5/1 Small qtzite, lt brn - lt brown (5y 7/3)			Running 1200 CFM @ 90 PSI from our compressor Not misting.
20		Gravel, hard, mostly broken chips Cmpn dk sdy, (2.5y 5/2 - 3/2) ~ sdst. v.f. qtzite. m.g. pinkish/gritted & w or lm specks - br-tan (2.5y 7/4) ~ sdst.	N-113-88-20 taken 18'-20'		
25		Gravel, Sandy - Cobbly. w pieces to 2" + mod rounded. gen flat. Stream worn. Cmpn. md-sdy, (2.5y 4/2) - large frac. qtzite. m.g. lt yl-tn w lm specs, (2.5y 7/2 - 7/4) Sand; f.g, lt tan. Drill Grit-AA	N-113-88-30		Color change - from spruce lt-tan blow out to heavier darker orange brown.
30		Sand f. md br (7.5y 6/6) clayey, Clayey Sandy Clay - Clayey Sand (CS/SC) m.f.g. qtz sd, well sorted (SP) w clay fract. brown-greenish, w lm specs throughout (2.5y 6/6 - 5y 6/6)			
35		35' ← Sand lens on top Clayey Sand (SP-SC) well sorted (poorly graded) md-mf.g. qtz w lm dk specs - varying clay Heavy; overall gm-sdy (5y 6/3) - more clayey at bottom of sample			Tripod for Spoon sample Casing at 38 ft.
40		- lm/hm thin horiz to dipping rd/sh brown lm/hm streaks ~40' ~ specks throughout. 40.1	N-113-88-40 C 39-40.5'		
45		(Spoon samples) 44 Clayey Sand, lt brown (10YR 6/4) Clay Sdy (SC) mit bet clay. gm-sdy (5y 6/3) Clay (CC) mod-sdy (5y 6/2), Smooth, not Sandy! lm streaks throughout Clayey Sand: m-sil sdy (5y 4/3) wet			
50		50.1	N-113-88-50 C 49-50.1'		Tripped for Spoon Sample Casing at 48 ft.

Project:	Boring: 113	Page: 3 of 3

Depth/ Elevation	USCS Symbol/ Core Sketch	Soil/Rock Description	Sample Number & Depth	Blow Count & Recovery	Drilling Data
55		Clayey Sand & Sandy Clay (SC/CS) Cont. from above;			Blowing water from formation.
55 54		Gravel. (returns mixed with V.f.g. Silty Sand greenish grey (2.5YR 7/2) Prob wash out from drill string.)			Injecting water to bring up cutting.
59		TD	N-113-88-60 @ 59'		Drilling dry - formation seems dry. Tripped for spoon: No returns.

BORING LOG GENERAL DATA

Project: USATHAMA N-TEAD Boring: N-114-88 Page: 1 of 8

Driller & Company: Robert Armstrong / Dave's Drilling

Geologist/Logger & Company: John McDonnell/Weston Signature: John McDonnell

Date Boring Started: 5-8-88 Completed:

Water Levels (from Ground Surface) Drilling Rig: CP7000

First Encountered: 304' damp sand Date: 5-9-88

While Drilling: 328 - 340 TD - good flows Date: 5-9-88

Gardner Denver Compressor @ 1200 CFM

At Boring Completion: 307.2 Date: 5-10-88

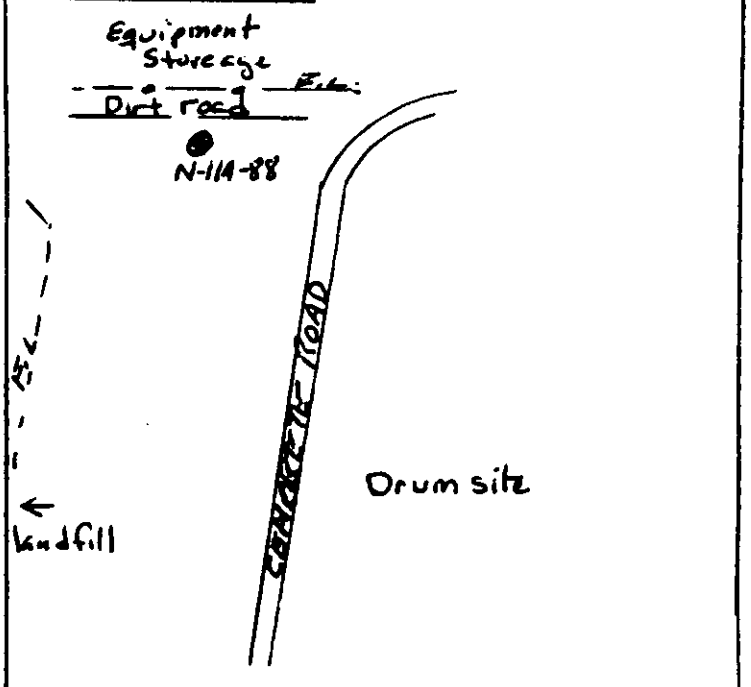
Drilling Shifts:

Date	Time		Depth of Drilling Per Shift		Date	Time		Depth of Drilling Per Shift	
	Start	End	Start	End		Start	End	Start	End
5-5-88	8:00	18:00	0	60					
5-6-88	7:00	17:00	60	160					
5-7-88	7:00	17:00	160	240					
5-8-88	7:00	17:00	240	290					
5-9-88	7:00	17:00	240	340					

Abbreviations:

Abbr	Meaning	Abbr	Meaning
f; f-g	fine, fine grained		
med, m-g	medium, medium grained		
C c-g,	coarse, coarse grained		
gvl	gravel		
Pb(s)	pebble(s)		
Cb(s)	cobble(s)		
Sd	Sand		
qtz, qtzite:	quartz, quartzite		
Carbs	: carbonates, ls,		
rd, rd'd	; round, rounded		
subA	subangular		
lm, lmtc;	limonite, limonitic		
rd, rd'sh;	red, reddish		
or	orange	Abbr	meaning
yl	yellow	Var	varied
gn	green	V	very
GY	grey	Sl'y	Slightly
bn	brown	AA	As above
tn	tan	w	with
BK	black		

Location Sketch:



Project: USATHAMA N-TEAD | Boring: N-114-88 | Page: 2 of 8

Depth/ Elevation	USCS Symbol/ Core Sketch	Soil/Rock Description	Sample Number & Depth	Blow Count & Recovery	Drilling Data
0		Gravely soil			
		Sandy Gravel			
5		Very-Sandy Gravel (GP/GS). fairly uniform 1"-2" predom. mod rd'd-Sub angular. carbs, f.g. dk gy → bk (2.5Y4/0 - 3/0) & qtzite, m-f.g. lt br-ltbr (2.5-5Y 6/2) w/ lm specs. Sand; qtz, f.g, sub rd.			Drilling w/ A.R. ~1200 cfm ↓ - Sand returns leaner
10		Sly lm'c. lt-br. (2.5 y 7/4) Gravel (GP), fairly Sandy (GS) comp. as above (4-9.5'); Sd: f.g. mod rd-sub ∠. qtz; Sly lm'c lt br (5y 7/4)	N-114 8'-1 (6-10)		
15		Sandy, lo mod. Gravel (GW-GP) qtzite (60%) Carbs (~40%) AA: Sand; f.g. mod rd-sly ∠. lt br (2.5y 7/4)			
20		Small Gravel (GP), gen ¼"-¾" sub rd'-sub ∠ qtzite (~60%) var: f.g dense, br-tn (2.5yr6/4) yl-tn, m.g. pitted, w/ lm specs (2.5y 7/4) & m.g. dense, rd'sh (2.5yr 6/4) as mixes. & Carbs: md-dk gy. AA & AA	N-114-88-2 (18-20')		
25		Sandy Gravel (GP/GS). qtzite (~60%) Carbs (~40%) AA: Slightly Ksegn: Jn bottom ft. qtzite Pebs var: f.m.ly spaced (1m). f.m.ly pitted, lt-tn (10yr6/4), f.g. br-gy (10yr 5/1) w/ v. min lm's c.g m-yl (10yr 6/4)			
30		Sand & Clayey Sd (SP): well sorted. moist, mod cohesive: mod-well rd'd; m-f.g qtz & other minors. brown wet (2.5 yr 6/4). ltgy clay streaks if given when rubbed.	N-114-88-3 (28-29.5')		Triggered for spoon sample (1 hr)
35		1 w/ clay zones as in spoon sample core. Grilly Sly Sand ← Grilly Sly Gravel (GW) gr-gy	Sdy chy-clayey sd; 28-28.3 Sandstone gray Clay (2.5YR6/2) w/ pump. splotches (7.5yr 6/2; 28.3-28.8 1m bounded, Sdy clay (CS) 28.8-29.1 clayey sd (SC) f.m.g; micaceous -29.5'		
40		Sandy Gravel (GW-GP)(SW): vr-bn w/ qtzite (~20%). var bn-gy-tn (10yr 5/4) Carbs (~30%). Sand: m-c.g; qtz. v. hard w/ slight clayey feel yl-br-wet (10yr 5/6)	N-114-88-4 (38-40')		
45		Sandy, Grilly Gravel (GW) Sharp gvl. w/ small chips; qtz & Carbs. Sand (SW) poorly Sort'd, Poorly rd'd - sub ∠ qtz + other; m-tn (2.5yr 7/4)			
50			N-114-88-5 (51-52')		

Project: USA THAMA N-TEAD | Boring: N-114-88 | Page: 3 of 8

Depth/ Elevation	USCS Symbol/ Core Sketch	Soil/Rock Description	Sample Number & Depth	Blow Count & Recovery	Drilling Data
50		Gravels (GW-GP) Small to med size: (1/4"-1"±) pbls and small to med. sharp chip: qtzite, carb, slates. Sand & Clayey sand variable.			w̄ air @ ~1200 CFM
55					
60			N-114-88-6 (58-60')		
65					
70			N-114-88-7 (68-72')		
75					
80	82	Gritty Sand (SW) f-c.g. poorly srt'd Subrd-subc qtz & rock frags. dk oz-brown (10YR 5/4) damp. (w̄ v. small gvl chips)	N-114-88-8 (80-82')		
85	86	Pea Gravel, (Sandy, Pebbly)			
	88	Sand (SW) qtz; f-m.c.g. Poorly srt'd -subc. Brown (~10YR 5/4)	N-114-88-9 (90-92')		
90	92	Sandy Gravels (GW) w̄ var chips. lt & dk; qtzite, carb; slates pbls mod subc-subrd.			
95					
	98		N-114-88-10 (100-102')		
100					

Project: USATHAMA N-TEAD	Boring: N-114-88	Page: 4 of 8

Depth/ Elevation	USCS Symbol/ Core Sketch	Soil/Rock Description	Sample Number & Depth	Blow Count & Recovery	Drilling Data
100		98' Sandy Gravels: gen small 1/2" ± pbls; subc - poorly rd'd & chips - (unit varies in tightness) ~60% Mx or qtzites 40% dark carb & slates			
105					
110			N-114-88-11 (108-110)		
115					
120			N-114-88-12 (120-122)		
125	124	Silty-Clayey Sand (SP/SM-C) f.g. dR rd'sh brown (10YR4/3) (mud cohesive, sly plastic)			
	126	Sandy Gravel. (GS)			
	128	Clayey Sand (SC)	N-114-88-13 (128-130)		
130		Sandy Gravel (GS) as 126-128'			136' - started injecting (dry returns clogging hammer housing)
135	135	Sand			
	136	Sandy-gritty Gravels (GW) hard: small-large chips + gritty fract. mixed slates, carb & var. qtzites subrd - subc			
140			N-114-88-14 (138-140)		
145					
150			N-114-88-15 (150-152		

Project: USATHAMA N-TEAD	Boring: N-114-88	Page: 5 of 8

Depth/ Elevation	USCS Symbol/ Core Sketch	Soil/Rock Description	Sample Number & Depth	Blow Count & Recovery	Drilling Data
150		Sandy Gravels (cont.)			
155					
160	160	Small gravel w red'sh br. Sd (7.5YR7/8 - mostly chips	N-114-88-16 (160-164)		— Start 5-7-88 —
162	166	Sandy gritty pea w small gravels (GP-GW/GS): ≥ 60% yl-tn qtzite and ≈ 40% dark - Carb/slate. overall greyish cast (7.5YR6-7/0) - (164-170) incl larger 1" SubC pbls) (170-174) predom. pea gravel -			- injection water returning cutting in slugge. - drilling ~1 ft, driving casing a ft.
165					
170	170		N-114-88-17 (170-172)		
175		(174-182) incl 1" + SubC pbls. overall greyish to 182".			
180	182	Gravel with f. silty sand (GP+SM) fine w injection water pinkish (7.5YR 8/2) (Slopes)	N-114-88-18) (182-184)		
185	?	Coarse Sandy Gravel (GS) - 1/2" - 1" + SubC - subrd pbls w c. grit & sds: pbb gen. flatlsh. mixed vcc qtzite & carb & slates.			
190			N-114-88-19 (190-192)		
195					
200	196		N-114-88-20 (200-202)		

Project: USATHAMA N-TEAD	Boring: N-114-88	Page: 6 of 8

Depth/ Elevation	USCS Symbol/ Core Sketch	Soil/Rock Description	Sample Number & Depth	Blow Count & Recovery	Drilling Data
200	GW/GS	Sandy, gritty Gravel. pbls subL-subrd. ¼"-1" qtzite scarbs: SD: vf-silty. qtz, micas, darks. min metallics. overall Hyl'sh			
205	GS	Gravels, similar to above: pbls, subrd-subL tend to be flattish. Sd: m-fg; poorly rd'd qtz. poss. mostly ground qtzite. overall grayish.	HNFO		
210			N-114-88-21 (210-214)		
215	GS	Sandy, gritty. Gravel; pbls to ~1" plus chips. SD: Hbn (2.5yR 6-7/4) Bottom 2', small chips, ~70% qtzite Similar to 200-204'. overall: H. yellowish.			
220			N-114-88-22 (220-222)		
	GS/GM	Sandy Gravel: pbls >1". subL. w̄ gritty, sdy returns. Sd: fg-silty; qtz, darks, micas.			
225					
230			N-114-88-23 (230)		
235					
240	GW GS	Sandy Gravel: pbls to >1". subL-subrd. As above. Sd: Hyl bn (2.5y 6/4) dries with a brownish cast.	N-114-88-24 (240-242)		Start 5-8-8 returns sloppy. injection water & fines
245					
250					

Project: USATHAMA N-TEAD	Boring: N-114-88	Page: 7 of 8

Depth/ Elevation	USCS Symbol/ Core Sketch	Soil/Rock Description	Sample Number & Depth	Blow Count & Recovery	Drilling Data
250					Drilling w̄ Air & water injection
255	GW	Gravel; 1/4"=1" pbls. var metamorphics A.A. qtzite cuts smaller. dries w̄ blue grey cast.			
260			N-114-88-26 (260-262)		
265	G-	Gravel w̄ silty sand: qtz, darks, micas, frag of qtzites. pinkish tan (10YR 7/3) wet.			
270	GW/GS	Sandy, silty Gravel; pbls subrd. -to 1" & larger. qtzite, carbs; tend to be flat. Dries with blue grey cast.	N-114-88-27 (268-272)		returns very wet ~all injection water returning
275					
280			N-114-88-28 (280-282)		
285	G-	Tight Gravel Mix of large & small chips yellowish small cast			
290			N-114-88-29 (290-292)		
295					
300					Start 5-9-88 damp-drying out

Project: USATHAMA N-TEAD	Boring: N-114-88	Page: 8 of 8

Depth/ Elevation -248	USCS Symbol/ Core Sketch	Soil/Rock Description	Sample Number & Depth	Blow Count & Recovery	Drilling Data
300		Sandy Gravel; wt N. yl. gy. Sd: f-c.g. rd'd - qtz-darks; qtzite frag - (ground rock)			Drilling with air only, returns damp.
305	SW/SG	Brown Sand w̄ sharp gravel chips. SD: yl. bn (wyr 5/4) p. sorted. mostly qtz grains: Sly cohesive.			
		Hard Gravel; w̄ Sd/grit. small pbls chips: Sand, fan (2.5yr 7/4) f-c.g. qtzite frag; w̄ 2-7 darks.			
310	GP/GS	Sandy Pebble Gravel; sly lmt. pbls gen <1", Sub L.	N-114-88-31 (310-312		
315		Hard, Sandy Gravel; as in 307-310			
320	GS GP	Sandy, Pebble Gravel	N-114-88-32 (318-320)		319' wet gvl. water spirting from discharge after adding casing. Diminished when drilling continued.
325		Sly Clayey Sands; gn'sh bn. w̄ gvl returns: sub spherical - sub L pbls/chips: drier overall blue gray.	N-114-88-33 (228-330)		328: Inc water flow casing very difficult to drive, ~ stuck. drilled open hole to 340'
330		Tight unit. Gravel & Sand returns; gen fine chips - pbl frag mod. rd'd - mod. qtzite & darks Sd: f-c.g; sl. lg.			
335		Crystal tuffs: w̄ hornblende, tarnished biotite K-spar relicts in qtz-aphanite matrix. Glassy qtzite w̄ lmt alt; wh (1wy 8/0) - overall blue gray (5y 7/1)	N-114-88-34 338-340		
340		340 TD			

BORING LOG GENERAL DATA

Project: USATHAMA N-TEAD Boring: N-115-88 Page: 1 of 7

Driller & Company: Robert Armstrong / Dave's Drilling

Geologist/Logger & Company: John McDonnell Weston Signature: [signature]

Date Boring Started: 5-20-88 Completed: 6-19-88

Water Levels (from Ground Surface) Drilling Rig: CP 700 0-200' 200-248 90

First Encountered: Date:

While Drilling: — Date: --

At Boring Completion: 208.9 Date: 6-22-88

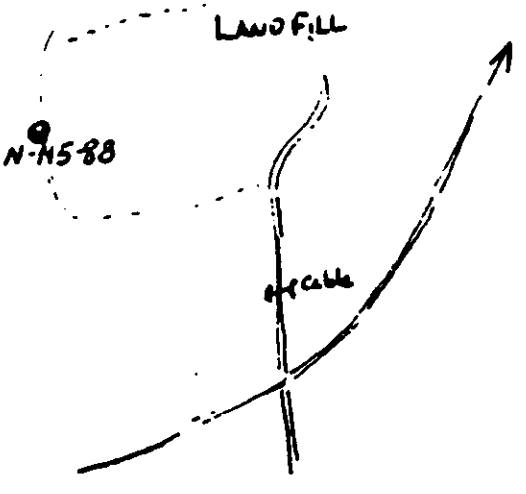
Drilling Shifts:

Date	Time		Depth of Drilling Per Shift		Date	Time		Depth of Drilling Per Shift	
	Start	End	Start	End		Start	End	Start	End
5-20-88	8:00 AM	6:PM	0'	90'					
5-21-88	7:00 AM	5:PM	90	170'					
5-22-88	8:00 AM	12:AM	170	180'					
5-23-88	8:00 AM	12:00 N	180	190					
5-31-88	7:00 AM	12:00 N	190	200'					
6-18-88	7:30 AM	5:00 PM	200	255					
6-19-88	7:30 AM	5:00 PM	255	248					

Abbreviations:

Abbr	Meaning
qtz, qtzite:	quartz, quartzite
carb	carbonate(s)
lm	limonite
feox	iron oxide
f.g	fine grained
m.g	medium grained
c.g	coarse grained
v	very
sly	slightly
w	with
var	variable/varies
rd'd	rounded
s.rd'd	subrounded
sub ∠	sub angular
pbl(s)	pebble(s)
SD	Sand

Location Sketch:



Project: USATHAMA N-TEAD	Boring: N-115-88	Page: 2 of 7

Depth/ Elevation	USCS Symbol/ Core Sketch	Soil/Rock Description	Sample Number & Depth	Blow Count & Recovery	Drilling Data
0	GP/SW	Gravely soil. coarse sandy Gravel. Pbls: qtzite & dark carbs. Sd: p.srt'd - p.rd'd, qtz.			Drilling w̄ air
5	GS	Sandy Gravel; pea & small chips Sd: 44			
10	GW/GS	Sandy Pebble Gravel. Pbls ~1/2"-1" in upper part, rd'd, gen flattish. Predom. 1"-2" & elongate in lower part. Mix dark carbs & lighter qtzites. Sd: f-mg; wh&tn qz. 0.4. Hbn (2.5y 7/2)	N-115-88-01 (8'-12')		Injecting for dust control back to drilling w̄ air only
15	GW/GS	Sandy Gravel; ~above Pbls ~1/2"-2", rd'd - subspherical - elongate ~50% chips. Sd: f-mg qz 44.	HNU 0		
20	GP	Pea & Small Pebble Gravel.	N-115-88-02 (20-22')		
		Small chips & pea gvl. 44; carbs & qtzite occ. "granitic"			
25	GP/GW	Small Gravels; < 1/2"-1"; gen. w. rd'd some tending flat.			
30		Gravel; w̄ mod large pbls, to ~2". mod. w. rd'd, elongate, to flat. mixed qtzite & darks. (32-40' missing - probably same)	N-115-88-03 (30-32')		
35					
40	GP/S-	Sandy Gravel; pbls small, Sd: yl-tn.	N-115-88-04 (40-42')		
45	GP	Pea and Small-Pebble Gravel. Subr-Sub rd'd - m.g. qtzite plus carbs.			
50					

Project: USATHAMA N-TEAD | Boring: N-115-88 | Page: 3 of 7

Depth/ Elevation	USCS Symbol/ Core Sketch	Soil/Rock Description	Sample Number & Depth	Blow Count & Recovery	Drilling Data
50		Coarse, sandy Gravel, (GW/GS) Pbls: ~½" to 1"+, & chips. - mixed ver. qtzite & darks.	N-115-88-5 (50-52')		Drilling with air.
55					
60		Bottom surface Gravels; Top first Sand Seq. V. Sandy Gravel (GW/GS). chips to 1½" - cobbles? - (graded contact w fill in)	N-115-88-6 (60-62') HNU=0		
		SO: m-f.g m.rd'd, olive-gray (5Y 6/3, damp) (5Y 7/3, dry)			
65		olive-gray Sand (SW) (5Y 4/3 dry). Slightly Cohesive damp m-f.g. qtz + ~10% dark constituents.			
		olive-grey Sand (5Y 6/3). m-f.g qtz Inc. gvl. w depth.			
70		V. Sandy pea to mixed pbl. gravel (GP/SP) pbls: to 1"±, Lower portion of Chips in Lower 2ft. [gvl interfinger w stringer]	N-115-88-7 (70-72')		
75		Sand, yl-brn (10YR 5/4, damp) m-f.g. m.rd'd rd'd qtz. plus some incl. size gvl.			
		V. Sandy, grilly, Gravel (GW/GS). Pea to 1½" chips: Sand, yl-brn. AA (74-76') [gvl interfinger w stringer]			
80		Brown, Sly Clayey Sand (SP/SC) (10YR 5/4 dry) f-g w rd'd qtz. Forms clods.	N-115-88-8 (80-82') Fm Analysis.		
		Brown Sand, grit, pea gravel mix (2.5Y 6/2)			
85		Sandy Gravel (GW-GP)(GS) mixed pbls; pea to small pbl. sub rd-sbrd. Grey SD. (2.5Y 7/2)			Tried for spoon sample - returns nil.
90		Sandy pea - small gravel. (GP-)(GS) Pbls to ~½" range: sub rd-Sub A. Smaller: mod. to rd'd. SD. ~44 (84-88)	N-115-88-9 (88-90')		
95		Ruby Brown, Gravely, Clayey Sand (SG/SC) (10YR 6/3)			
		Brown, Silty, mod clayey Sand (SG/SC) (2.5YR 2/4)			
		olive, Sandy, pea to pbl gravel (5Y 3/3)			
100					

Project: USATHAMA N-TEAD	Boring: N-115-88	Page: 4 of 7

Depth/ Elevation	USCS Symbol/ Core Sketch	Soil/Rock Description	Sample Number & Depth	Blow Count & Recovery	Drilling Data
100		Brown sand (SP) (10YR 5/4 damp, w/ gray f-m.g. mod rd'd qtz + minor consolid. vcl. pebs	N-115-88-10 (100-102)		Drilling w/ ACR ↓
		gvly, clayey SAND, brown AA. small pebs + pea gvl			
105		SC/ clay - clayey SC gravel: SC: brown AA. f-g. cohesive pebs to 1" +: rd'd, flattish			
		Yl brown - Sandy clay / clayey SC. Gvl. Thumb size clods: SC f-g (10 YR 5/6 damp, - CL dry)			
		gvl - small pebs/chips - (Stringer)	(N-115-88-11)		
110		Yl-brn. Gravely SAND (2.5Y 7/6)	(110-112)		
		Cgvl: pea + small peb + chips)			
		Gy-SGy. Peas & Small Gravel (5Y 7/2)			
		(SP. 110-114: f-m.g: qtz, p. sorted; w micas			
115		U. Sdy, Small peb; Prob incl crushed qtz to Gravel (SP/SW). U Small, Sub-w rd'd pbl.			
		SC: f-UC.g. grad'd - subC qtz. micaceous			
		Lt gy (2.5Y 7/1): prob qtz & derived			
		Small Gravel (Stringer)			
		olv-gy - SAND f-g - gvlly w/ qtz pebs/cobbles			
120		med gvly. (5Y 7/2 dry)	(N-115-88-12		
		gvlly SAND w gvl: (5Y 6/3-2)	(118-122)		
		f-g-C.g. w micas - gvl: w-Sub rd			
		SAND, pea w small gravel: Mod w rd'd			
125		pea size: Sub w rd'd - Sub C' (yl + tan			
		SC: f-g - silty (SC: 2.5Y 6/2 (lt brn-gy)			
		Mixed f-pea-Sdy-grit			
		w. gvl chips - mostly dacite			
		SC/grit (qtz/ls) Gray (5Y 7/1)			
130		Gravel: to 1"	(N-115-88-13		
			(130-132')		
135		Pea & small gravel — SubC-Subrd			
140		Fine clips	(N-115-88-14) (138-142')		
		Pea & small gravel			
		Dk gy ( )			
145		Small gravel - w/ pea size			
		- Sly lighter than above			
		↓			↓
150					

Project: USA THOMA N-TEAD	Boring: N-115-88	Page: 5 of 7

Depth/ Elevation	USCS Symbol/ Core Sketch	Soil/Rock Description	Sample Number & Depth	Blow Count & Recovery	Drilling Data
150		SANDY GRAVEL: irreg-quadrate chips, 1" & less. SAND, lt bn (10YR 6/3), f.g-silty/clayey - w̄ min lm'c/hm'c spotting.	N-115-88-15 (150-152)		Drilling with AIR & injection
155					
160			N-115-88-16 (160')		
165		GRAVEL: chips 1/2" and less w̄ f.g. silty SAND:			
170			N-115-88-17 (170')		
175					
180		REDDISH BROWN SANDY GRAVEL 1/2" to pea size Pbls and chips - SAND: (10YR 7/6) f.g.	N-115-88-18 (180')		
185		Coarse GRAVEL >1/2" to 1/ <1/2" to >1"; SANDY: f-mg. lt bn (10YR 7/4)			
190			N-115-88-19 (190')		
195					
200					

Project: USATHAMA N-TEAD	Boring: N-115-88	Page: 6 of 7

Depth/ Elevation	USCS Symbol/ Core Sketch	Soil/Rock Description	Sample Number & Depth	Blow Count & Recovery	Drilling Data
200		GRAVEL w̄ silty, clayey SAND & sandy clay. fine chips; qtzite & carb: w̄ feOx alt.	N-115-88-20 (200-205)		Drilling with mud 200 - bottom.
205		CLAYEY SAND; lt bn (10YR6/2) f.g			
210			N-115-88-21 (210-215)		
215		VERY SANDY GRAVEL: AA. SAND: md. lt bn (10YR6/2) f.g - clayey.			
220		SANDY GRAVEL: qtzite & carb - feOx alt. CLAYEY SAND AS 200-215.	N-115-88-22 (220-225)		
225		GRAVEL, w̄ med SAND. m-c.g qtzite, w̄ lm'c alt (feOx) dark carb: qtzite - claystone (tuff?) contact viz in chip.			
230		GRAVEL; dark carb and slightly to very feOx alt m-c.g, clear - brown qtzites. Poss. Tuff & manganese(?)/hm. violets. - (Sliver in sample)	N-115-88-23 230-235		
235					
240		GRAVEL: w̄ feOx alt qtzite and pieces of alt. tuff.	N-115-88-24 (240-245)		
245					
250					

Project: USATHAMA N-TEAD | Boring: N-115-88 | Page: 7 of 7

Depth/ Elevation	USCS Symbol/ Core Sketch	Soil/Rock Description	Sample Number & Depth	Blow Count & Recovery	Drilling Data
250			N-115-88-25 (250-255)		Drilling with mud from 250' to bottom
255		CLAYEY, SANDY GRAVEL. VAR. qtzites & carbs, A.A. w. H.bn (10YR 3/4) f.g-silty/clayey SAND & SANDY CLAY.			
260			N-115-88-26 (260-265)		
265					
270		GRAVEL: VAR qtzites & carbs. feOx Alt. w pnk'sh bn (10YR 7/3) clay.	N-115-88-27 (270-275)		
275					
280		GRAVEL with CREAMY white (10YR 8/2 - 8/3) CLAY (~50-50). (prob. alt tuff)	N-115-88-28 (280-285)		
285		SANDY GRAVEL SAND: lt bn-tn, m-f.g) feOx alt. (10YR 8/3)			
290			N-115-88-29 (290-295)		
295		Var qtzites w pervasive feOx alt. - (alt tuffs → clays)			
298	TD		N-115-88-30 (298')		

BORING LOG GENERAL DATA

Project: USA THAMA N-TEAD Boring: N-116-88 Page: 1 of 7

Driller & Company: Robert Armstrong / Dave's Drilling

Geologist/Logger & Company: John McDonnell / WESTON Signature: John Donnell

Date Boring Started: 6-8-88 Completed: 6-17-88

Water Levels (from Ground Surface) Drilling Rig: CP-700

First Encountered: — Date: —

While Drilling: ~280' Date: 6-17-88

At Boring Completion: 2656 Date: 6-18-88

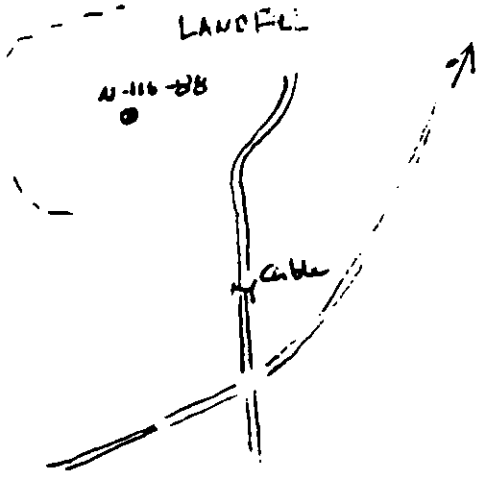
Drilling Shifts:

Date	Time		Depth of Drilling Per Shift		Date	Time		Depth of Drilling Per Shift	
	Start	End	Start	End		Start	End	Start	End
6-48-88	7:30 A	4:30 P	0	60					
6-13-88	7:30	4:30	60	120					
6-14-88	7:30	4:30	120	170					
6-15 88	7:30	4:30	170	230					
6-16-88	7:30	4:30	230	260					
6-17-88	7:30	4:00	260	288					

Abbreviations:

Abbr	Meaning
qtz qtzite	quartz, quartzite
Carbs	Carbonate
lm'c	limonitic
Subrd	Subround
Subr	Subangular
mod	moderately
Sdy	Sandy
f.g	fine grained
m.g	medium grained
C.g	Coarse grained
Pbls	pebbles
Var	Varies
lt.	light
dk	dark
yl	yellow
bn	brown

Location Sketch:



Project: USATHAMA N-ROAD	Boring: N-116-88	Page: 2 of 7

Depth/ Elevation	USCS Symbol/ Core Sketch	Soil/Rock Description	Sample Number & Depth	Blow Count & Recovery	Drilling Data
5		GRAVEL (G - Sandy - peasized & larger (cobbles by surface expression)			Drilled 6-8-88 with air ↓
		Lm'c Stained Gravel (G) 10YR 8/4)	N-116-88-1 (8-40')		
10		GRAVEL (G). Sandy, gritty, <1/4 to occ 1" & larger. mod rd'd · grey overall 10YR 7/2 - 5/0)			
15					
20		Lm'c stained Gravel (G) (10YR 7/2) gen small; 1/2" and less Sub rd - Subc - elongate - flat.	N-116-88-2 (20'-27')		
25					
30			N-116-88-3 (30'-32')		
		Clayey SAND (SC) f.g. lt bn (10YR 7/2 dry)			
35		SANDY, COARSE GRAVEL (GP-GS) 2" ± pbls, mod rd'd w̄ sd & small gravel. lt bn. O.A.			
		small-pea Gravel (GP/GS) w̄ occ larger pbl			
40		GRAVEL (GP-GW) pea to large pbl chips. mod rd'd - flat. tan & grey. (10YR 7/3 - 10YR 5/0)	N116-88-4 (40'-47')		
45		SANDY COARSE GRAVEL (G-/GS) pbls to ~1". Sub rd - rd'd - flattish			
50					

Project: USATHAMA N-TEAD | Boring: N-116-88 | Page: 3 of 7

Depth/ Elevation	USCS Symbol/ Core Sketch	Soil/Rock Description	Sample Number & Depth	Blow Count & Recovery	Drilling Data
50	G-	Gravel; mod. sdy; pbls to 1" & smaller			
55					
60					
	GS	Sandy Gravel: small pbls			
65		Gravels; < 1/4"-1" pbls; sandy.			
70					
75					
	SC	Clayey Sand; bn (10YR 6/3)			
80	GW	Gravel; small-pea, w/ f-m.g. lm's, bn. sd.			
85	SC	Clayey Sand; rdish bn (10YR 6/3) dry.			
		Clayey, Sandy Gravel			
90		Gravel; grithy - pea - small pbl. ≤ 1/2" 1" flat pbls 96-98' ~1/2" pbls 98-101 @ bottom of unit. Sub to well rd'd pbls, ~ 1" & smaller. Subspherical, elongate & flat.			
95					
100					

Project: USATHAMA N. TEAD	Boring: N-116-88	Page: 4 of 7

Depth/ Elevation	USCS Symbol/ Core Sketch	Soil/Rock Description	Sample Number & Depth	Blow Count & Recovery	Drilling Data
100		Large Pebble Gravel			Drilling with Air ↓
		Sandy GRAVEL Lt bn (10YR 8/2)			
105		GRAVEL (GW). Grey OA (L.S.R. 4/2) hard. Fine chips & pbls of mx qtzite & dk carbs w/ 1/4"-pea size fract & m-f.g. sand.			
110					
		Large Pebble GRAVEL: w/ pbls 1-1 1/2" subrd'd. & m.f. sand.			
115		↓ (graded contact) SANDY GRAVEL: 1/4" to 1" Pbls & chips mixed tan & Grey (qtzite & carb)			
120					
		SANDY GRAVEL: Smaller, predom 1/2 & less in upper, mc to 1/2-1" predom. in lower: subrd, elong. to flattish: SD: m-f.g. poorly rd'd.			
125		HARD GRAVEL: FINE CHIPS			
		SANDY, LARGE PEBBLE GRAVEL: SD: dk rd'sh bn (10YR 7/3)			
130		SANDY GRAVEL: Pbls ~1" & less: Similar to 128-130. SD: lt yl bn: (10YR 7/2) f.g.			
		SANDY SMALL GRAVEL: 1/4" & smaller:			
135		GRAVEL: 1" & smaller:			
		SANDY GRAVEL: SD: sub c-subrd: poorly sorted			
		GRAVEL: ↓			
140					
145					
150					

Project: USA THAMA N-TEAO	Boring: N-116-88	Page: 5 of 7

Depth/ Elevation	USCS Symbol/ Core Sketch	Soil/Rock Description	Sample Number & Depth	Blow Count & Recovery	Drilling Data
150		SANDY GRAVEL (GW/GS) w̄ pbl's to 1"+ of qtzite & carbs. - mixed elongate & flat.			
155		SAND: dark yl bn, clayey, f-m.g. - beads up. (10YR 7/2-7/3)			
160					160' - WENT TO DRILLING WITH WATER INJECTION TO BRING UP CUTTINGS
165		SANDY GRAVEL (GS) Pbl's & chips to 1"+, sub - poorly rd'd.			
170		SAND (SW) lt-bn (2.5YR 8/2 dry) f-c.g.			
175					YELLOW-BROWN RETURN WATER.
180					
185					
190		VERY SANDY GRAVEL (GS) Pebbles & chips to 1 1/2". SAND, lt bn (1 YR 7/3): f-c.g. - poorly sorted.			
195					
200					

Project: USA THAMA N TEAD	Boring: N-116-38	Page: 6 of 7

Depth/ Elevation	USCS Symbol/ Core Sketch	Soil/Rock Description	Sample Number & Depth	Blow Count & Recovery	Drilling Data
200					Drilling with water injection.
205					
		VERY-SANDY GRAVEL (GW/GS) Pbls & chips, over 1"-down to grit size. SAND: lt. pale brn, mc-fg; var: silty, clayey. (2.5YR 8/2-4)			
210					
215					
220		VERY-SANDY GRAVEL. mostly fine chips, ~20% pbl frags to ~1". SAND: yl brn; f-c.g. Subl. pird.			
225					
		Dark-yellow-brown-SANDY GRAVEL. Frags from <1/4 to over 1"-large, quadrate. SAND: v.c.g.-Subl. pird.-silty. (SW) (10YR 7/4)			
230					
		SANDY GRAVEL (GS) Pbls to 1 1/2" in 232-234			
235		SAND, overall; lt brn (10YR 8/3) f-c.g (SW)			
240		"Hard zone" - small chips.			
245		Pbls to over 1"			
250					

Project: USATHAMA N-TEAD	Boring: N-116-88	Page: 7 of 7

Depth/ Elevation	USCS Symbol/ Core Sketch	Soil/Rock Description	Sample Number & Depth	Blow Count & Recovery	Drilling Data
250	G	Gravel.			
255					
260	GS	Sandy Gravel; pbls & chips to ~1" qtzite & carb. - Sand: Salmon bn (10YR 7/6) dry; f-m.g silty.			
265	GS	Sandy Gravel; pbls & chips to >1". prob mel. cbls. Sand: lt bn (2.5Y 8/4) f-c.g, silty, p-w rd'd - prob. qtzite derived.			▲ W.T. 265.6 A.M. 6-18-88
270	G	Hard gravel; small chips, qtzite & dark carbs.			
275					
280	GS	Sandy Gravel: Sd: yl bn (2.5YR 7/4) f-m.g; sly clayey - silty. V. Sdy in 282-284 interval.			
285	GS	Sandy Gravel: V. coarse gvl. frag. cbls & large pbls. - to 1½". Sand: clear-white & yl qtz. f-c.g; subk-p. rd'd; + accessories.			285' blowing water no injection
290	TD 288				finished 6-17-88
295					
300					

BORING LOG GENERAL DATA

Project: USATHAMA N-TEAD Boring: N-117-88 Page: 1 of 6

Driller & Company: Robert Armstrong ; Dave's Drilling

Geologist/Logger & Company: John McDonnell, WESTON Signature: John McDonnell

Date Boring Started: 6-27-88 Completed: 7-7-88

Water Levels (from Ground Surface) Drilling Rig: CP 7000

First Encountered: Date:

While Drilling: 220' Date: 7-7-88

At Boring Completion: 218 Date: 7-7-88

Drilling Shifts:

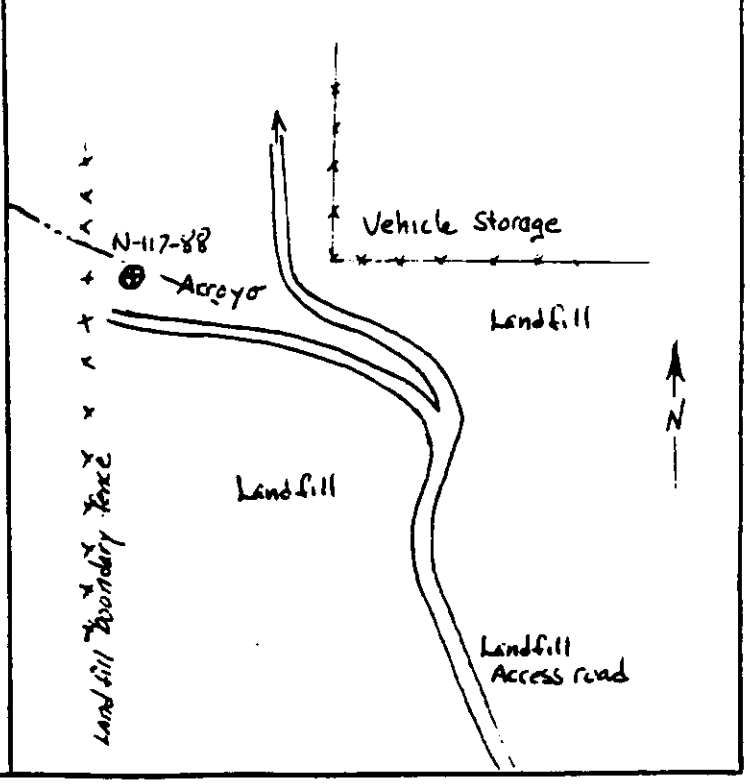
Date	Time		Depth of Drilling Per Shift		Date	Time		Depth of Drilling Per Shift	
	Start	End	Start	End		Start	End	Start	End
6-27-88	8:00 AM	6:00 PM	0	95					
6-28-88	7:00 AM	5:30 PM	95	165					
6-29-88	7:00 AM	12:00 noon	165	200					
7-6-88	12:00 noon	5:00 PM	200	225					
7-7-88	7:00 AM	5:00 PM	220	241					

Abbreviations:

Abbr	Meaning
Sd.	Sand
gvl	gravel
pbl	pebble
cbl	cobble
lm	limonite
qtzte	quartzite
Carb(s)	Carbonate(s)
f.g	fine grained
m.g.	medium grained
c.g	coarse grained
rd'd	rounded
subrd	sub rounded
p.rd.d	poorly rounded
subA.	subangular
rd	red
yl	yellow
bn	brown
gy	gray
lt.	light
sly	slightly
mod	moderately
bl - blue	
olv - olive	
min - minimal	
var. various/varieties	

Colors from Munsell Color Chart.

Location Sketch:



Project: USA THEMA N-TEAD	Boring: N-117-88	Page: 2 of 6

Depth/ Elevation	USCS Symbol/ Core Sketch	Soil/Rock Description	Sample Number & Depth	Blow Count & Recovery	Drilling Data
5		Gravel; lt grey, sandy. Small chips, predom qtzite, subrd carbs. Sand: lt brown (10YR 8/2), m-f.g. p.rd'd, incl rock debris.			Drilling with air alt 1 ft advances, 1 ft casing drives. ↓
10		SAND (SW) lt. olv bn (2.5Y 7/2) m qtz-wh & yl-gn bn. w̄ subrd darks & micas. Incl f.g. fraction.	N-117-88-1 (-10')		
15					
20			N-117-88-2 (-20) HNU = 0		
25		Becomes gravely toward base			
30		GRAVEL: <1/2"-1" chips & pbls. Vol qtzites and dark carbs. w̄ m-cg, subr-p.rd'd, lt bn (10YR 6/2) SAND.	N-117-88-3 (30')		
35					
40		Clayey SAND and GRAVEL: c.gvl, >1". SD (SW) poorly sorted, vc-f.g. ruddy-lt bn (-10YR 7/3)	N-117-88-4 (38-40') HNU = 0		
45		SAND, brown (10YR 6/4), mod gvly, -f.g. clayey.			
50			N-117-88-5 (-50')		

Project: USA TRIAMA N-TEAD | Boring: N-117-88 | Page: 3 of 6

Depth/ Elevation	USCS Symbol/ Core Sketch	Soil/Rock Description	Sample Number & Depth	Blow Count & Recovery	Drilling Data
50		Sand: lt. rd'sh bn (10yr 5/4) sly clayey; f-m.g. clods up.			
55					
60		Sand, as above sly cohesive-damp crumbles when balled-up.			
65	GW/SW	Sand and Pea Gravel. sd: f.g-gritty lt bn (10yR 7/3)	N-117-88-06 -65'		
70	GS	Sandy Gravel; <½"-1" subrd-subl pbls	N-117-88-07 -70'		
75	SW	Sand, yl bn (10yR 7/3), m-f.g. subrd w/ lm specs.			
		Incl. large-pble gvl.			
	CS	Sandy Clay, dk olv bn & grey clay (10yR 7/1)	N-117-88-08 (78')		Drilling with water injection to bring up cuttings.
80	SM/SC	Sand, lt. bn (10yR 7/2-7/3) f.g silty, clayey; dries hard.			
85					
			N-117-88-09 88-90'		
90		Clayey Sand, lt-gy bn (10yR 8/2)			
95		Clay; lt. grey (10yR 8/1) w/ min fece splotching			
			N-117-88-10 100'		
100					

Project: USATHAMA N-TEAD | Boring: N-117-88 | Page: 4 of 6

Depth/ Elevation	USCS Symbol/ Core Sketch	Soil/Rock Description	Sample Number & Depth	Blow Count & Recovery	Drilling Data
100	C-	Clay; lt bl-gy. (10YR 7-8/1) w occ gvl.			Drilling w injection return fluid turning grey from brownish
105		107-108'. Split spoon grey, sticky clay w lmc specks & dk brn films (prob organic)	N-117-88-11 107'-108'		
110					
115			N-117-88-12 115'-		
120					
125	SW GW	Clayey, gravely Sand; lt gy (10YR 7/2) dry. SO: f-g-c-g. mod. rd'd.			
130			N-117-88-13 130'-		
135					
140		Coarse, Clayey, Sandy Gravel. pbls >1"; subrd-subl; flattish.	N-117-88-14 140'		
145					
150			N-117-88-15 150'		

Project: USA THAMA N-TEAD	Boring: N-117-88	Page: 5 of 6

Depth/ Elevation	USCS Symbol/ Core Sketch	Soil/Rock Description	Sample Number & Depth	Blow Count & Recovery	Drilling Data
150	GS/GC	Sandy, clayey Gravel	MNU=	0	
155					
160			N-117-88-16 160'		
165					
170		very Sandy Gravel. sd: pale brown (10YR 6/3); m-f.g mod rd'd.	N-117-88-17 170'+		
175	GC/GS)	Clayey, Sandy Gravel. brown (10YR 6/3) - wet.			
180					
185			N-117-88-18 185'		
190	G.S	Sandy, pea & small gravel. chips to ≃2". - carbs & var. qtzite Sand. - c.g.	N-117-88-19 190'		
195					
200					

Project: USATHEMA - N-TEAD	Boring: N-117-88	Page: 6 of 6

Depth/ Elevation	USCS Symbol/ Core Sketch	Soil/Rock Description	Sample Number & Depth	Blow Count & Recovery	Drilling Data
200		Brown SANDY GRAVEL (GW) - irreg chips 1" & less. SAND: f.g-silty: 10YR6/6 dry to 5/4 moist. (yl bns)	N-117-88-20 (200') HAN = 0		Drilling w/ air and water injection.
205		SANDY GRAVEL (GW); pea to large pbl & poss cbl - Mx qtz, lt & carbs. SD. (SW) m-c.g, & F-silty. 10YR7/2 (lt gy) & 2.5YR7/4	(N-117-88-21) (208-210')		Color change from dark brown to dark yl.
210		SANDY GRAVEL (GW). pea to 1" chips - incl. red SS pbs as minor constit. Sd: f-c.g, (SW) poorly rd'd to sbl qtz. dark orange alt. around spinels. - in part crushed rock. (10YR7/2 lt gy)			
215		Ruddy Brown SANDY GRAVEL c. chips. Sd: m-f.g-silty 10YR6/6 - brownish yl.	(N-117-88-22) (218-220)		Water indicated in hole returns dark reddish brown - 218-220' Turning yl. grey after 220'
220		SAND GVL (GW/GS): w/ SD, f.g: pale brown (10YR7/3			
225		SANDY pea & small gravel. (GS) pbls subrd-subc; occ 1" chips. Sd: m.f.g-subrd; yl bn, 10YR3/4 moist			
230		Pea to Coarse GRAVEL w/ Silty SAND: 10YR7/2, lt. gy	N-117-88-23 (229-230) HAN = 0		
235			N-117-88-40 (236-230.)		
240		C. GRAVEL; poss. cobbles at bottom.			Returns. Vi lt/whitish grey.
	240 TD				
245					
250					

BORING LOG GENERAL DATA

Project: USATHAMA N-TEAD Boring: N-118-88 Page: 1 of 7

Driller & Company: Marty Peterson, Daves Drilling

Geologist/Logger & Company: Joe Fritts WESTON Signature:

Date Boring Started: 7/8/88 Completed: 7/11/88

Water Levels (from Ground Surface) Drilling Rig: Chicago Pneumatic Zoom

First Encountered: 18' very moist Date: 7/8/88

While Drilling: 235' Date: 7/11/88

At Boring Completion: Static 222' Date: 7/12/88

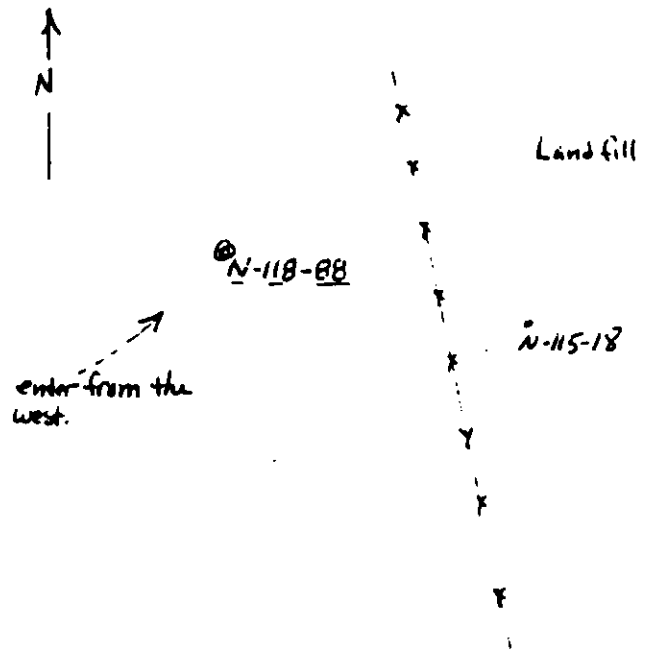
Drilling Shifts:

Date	Time		Depth of Drilling Per Shift		Date	Time		Depth of Drilling Per Shift	
	Start	End	Start	End		Start	End	Start	End
7-8-88	12:00 PM	5:00 PM	0'	58'					
7-9-88	8:00	2:00	58	98					
7-10-88	10:00	1:30	98	178'					
7-11-88	8:00	3:30	178	258					

Abbreviations:

Abbr	Meaning
trace	<15%
Some	15-30%
med	medium
pl	plasticity
V	very

Location Sketch:



Project: USATHAMA N-TLEAD | Boring: N-118-88 | Page: 2 of 7

Depth/ Elevation ft	USCS Symbol/ Core Sketch	Soil/Rock Description	Sample Number & Depth	Blow Count & Recovery	Drilling Data
0	GM	Silty gravel, 30% Silt, trace fine Sand. light gray 10YR 7/1, gravels are poorly sorted Subrounded to angular, loose, dry, alluvial			drill w/ rotary air
5					
	CL	Clay, trace Silt, light gray 10 yr 7/1. med pl, loose, dry; alluvial.	001		7-8' HNU = 0
10					
15			002		17-18
	CL	Same as above, but v. moist			
20					
25					
			003		27-28' gw to water injection to clean wet clay.
30		note: no longer to give moisture content - drilling w/ injectum.			
35					
40		Same as above, but some interbedding of v. fine Sand	004		38-40, split spoon HNU c.l
45					
			005		45-48
50					

Project: USATHAMA N TEAD | Boring: N-118-88 | Page: 3 of 7

Depth/ Elevation ft	USCS Symbol/ Core Sketch	Soil/Rock Description	Sample Number & Depth	Blow Count & Recovery	Drilling Data
50	GP	Gravel, some poorly sorted, subrounded sand, light gray 10YR 7/1; subrounded to subangular. Loose, alluvial gravels poorly sorted.	006		50-51'
55					
	GP	Gravel, trace poorly sorted, subrounded sand, light gray 10YR 7/1, subangular loose, poorly sorted, alluvial	007		▽ 7-4-88 60-61' HAND AUGER
60					
65					
70					
75	C	Clay			
	GP	Sandy gravel, 35% fine to coarse subangular sand, 10YR 7/3. Subrounded, loose, fine to coarse gravels; alluvial.	008		76-77'
80					
85					
		Same, except gravels are rounded to subrounded.	009		87-88 HAND AUGER
90					
95					
100					▽ 7-10-88

Project: USA THAMA N-TEAD | Boring: N-118-88 | Page: 4 of 7

Depth/ Elevation	USCS Symbol/ Core Sketch	Soil/Rock Description	Sample Number & Depth	Blow Count & Recovery	Drilling Data
105	GM	Silty Gravel, trace Sand, 35% Silt, 10Y 7/3 (V. pale brown). loose gravel, is Subrounded, poorly sorted, alluvial	010		100-101'
110	GP	Sandy Gravel, trace Silt. Subrounded, poorly Sorted Sand. 10YR7/3 V. pale brown, loose. Gravel is subrounded, fine, alluvial.	011		110-111' HNU=.1
115					
120	GW	Gravel, 10YR 7/3, light gray subrounded to Subangular medium gravel, alluvial	012		120-121
125					
130	GW	GRAVEL, trace Sand. Sand is angular, course, 10YR 7/3 light gray loose, Subangular to angular, fine gravel; alluvial	013		130-131' HNU=0
135					
140	GM	Silty Gravel, trace Sand, 30% Silt 10YR 5/3 brown, loose. Subangular, poorly Sorted, fine to medium gravel alluvial	014		140-141
145					
150					

Project: USATHEMA N-TEAD | Boring: N-118-88 | Page: 5 of 7

Depth/ Elevation ft	USCS Symbol/ Core Sketch	Soil/Rock Description	Sample Number & Depth	Blow Count & Recovery	Drilling Data
150		Same ↓	015		150-151
155					
160		Same, except gravels are fine to coarse	016		160-161 HNUC.1
165	GP	Gravel, trace Sand. Sand is Subangular, coarse. 10YR 7/3 v. pale brown, loose. Angular to Subangular, fine to med gravels; alluvial			
170			017		170-171
175					
180	GP	Gravel, trace Sand. Sand is Subangular to Subrounded, coarse 10YR 7/3 v pale brown. Round to Subrounded med gravels alluvial.	018		180-181 HNUC.1
185					
190	GP	Gravel, trace Sand, Sand is Subangular, coarse. 10YR 6/1 gray loose, Angular. fine to med gravel alluvial	019		190-191
145					
200					

Project: USA THAMA N-TEAD | Boring: N-113-88 | Page: 6 of 7

Depth/ Elevation	USCS Symbol/ Core Sketch	Soil/Rock Description	Sample Number & Depth	Blow Count & Recovery	Drilling Data
200	SW	Sand. 10YR 7/3, V. pale brown Subangular, well sorted, coarse Sand	020		220-221 HNU=1
205					
210	GP	Sandy gravel. 40% Subrounded, fine to med. poorly sorted Sand. 10 YR 7/3 V. pale brown. loose Angular to subangular, fine to med gravel, alluvial	021		210-211
215					
220	GM	Silty Gravel, 45% Silt 10YR 7/3, V. pale brown, mod pl Stiff. Subrounded, fine to med poorly sorted gravel, alluvial	022		220-221 HNU=0
225					
230	GW	Gravel, 10YR6/1, gray. loose, Angular, poorly sorted, fine to medium gravel; alluvial	023		230 231
235					Water at 235'
240	GP	Gravel, Some Sand. Sand is sub-rounded, poorly sorted, fine to coarse 10YR6/1. gray. loose Subrounded to subangular, V. Poorly sorted fine to coarse (up to 2½") gravel, alluvial	024		240-241
245					
250					

Project: USA THAMA N-TERO | Boring: N-113-88 | Page: 7 of 7

Depth/ Elevation	USCS Symbol/ Core Sketch	Soil/Rock Description	Sample Number & Depth	Blow Count & Recovery	Drilling Data
253		Some gravel	025		25'-25'
255					Stop drilling, 258'
260					

BORING LOG GENERAL DATA

Project: USA THAMA N-TEAD Boring: N-119-88 Page: 1 of 7

Driller & Company: Marty Peterson, Dave's Drilling

Geologist/Logger & Company: John McDonnell, WESTON Signature: J. McDonnell

Date Boring Started: 7-13-88 Completed: 7-20-88

Water Levels (from Ground Surface) Drilling Rig: CP 7000

First Encountered:	270	Date:	7-14-88
While Drilling:	275	Date:	7-20-88
At Boring Completion:	265	Date:	7-21-88

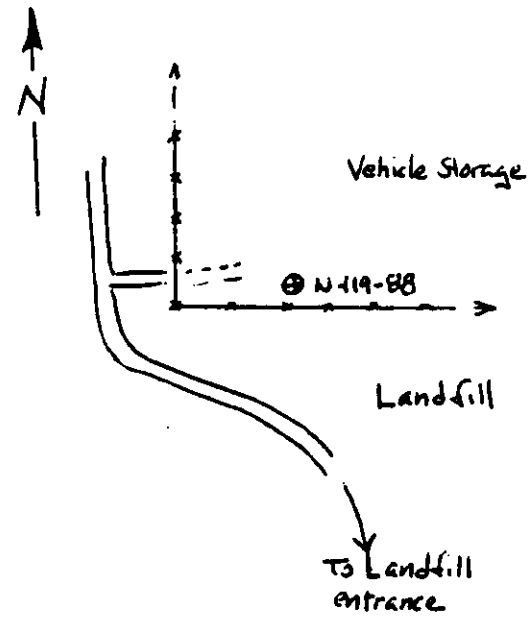
Drilling Shifts:

Date	Time		Depth of Drilling Per Shift		Date	Time		Depth of Drilling Per Shift	
	Start	End	Start	End		Start	End	Start	End
7-13-88	7:00AM	3:30 PM	0	60'					
7-18-88	7:00	5:00	60	165'					
7-19-88	7:00	5:00	165'	255					
7-20-88	7:00AM	5:00 PM	255	280					

Abbreviations:

Abbr	Meaning	
Sd	Sand	sdy - Sandy
gvl	gravel	cal - Caliche
pbl	pebble	cmt - Cement
cbl	cobble	
feox	iron oxide	
qtzite	quartzite	
carbs	carbonates	
f.g	fine grained	
m.g	medium grained	
c.g	coarse grained	
rd'd	rounded	
∠	angular	
Sub -	sub	
p.	poorly	
rd	red	
br	brown	
yl	yellow	
gy	gray	
lt.	light	
drk	dark	

Location Sketch:



Project: USATHAMA N-TEAD	Boring: N-119-88	Page: 2 of 7

Depth/ Elevation	USCS Symbol/ Core Sketch	Soil/Rock Description	Sample Number & Depth	Blow Count & Recovery	Drilling Data
		Sandy Gravel w/ large cobbles; 7.5YR 8/2 w/ silt/stone lenses 1-2cm thick - 5Y 7/2)			
5		Small Pbl Gravel, sandy, gritty. - pbls 1" in sc, elongate, flattish, p.rd'd			
10			N-119-88-1 (8-10')		
		Pea & small pbl gravel			
15					
		Bimodal Gravel; Ltbn Sandy (GP-GP/GS). Large pbls to 1½" subc - poorly rd'd, flattish, small, gen less than ½" to pea size. SD: mf. sc. p.rd 10YR 8/2			
20			N-119-88-2 (18-20')		
		Gravel: mixed; pea to large pbl; >1½" range. (GW/GS) Sandy; f-mc.g. p.rd'd. qtz. 10YR 7/2 - lt. gy.			
25					
30			N-119-88-3 (30')		
35		"Hard" Gravel mixed small (≈½") pbls and chips.			
40			N-119-88-4 (40')		
45					
50		Gravel. Mixed small to large pbl			

Project: USATHAMA N-TEAD	Boring: N-119-88	Page: 3 of 7

Depth/ Elevation	USCS Symbol/ Core Sketch	Soil/Rock Description	Sample Number & Depth	Blow Count & Recovery	Drilling Data
50		↓	N-119-88-5 (50')		
55		COARSE SANDY LARGE PEBBLE GRAVELS Pbls to 2" n more. Sub rd, gen flat. · Stream warn. fines: Sands & Grits; — c.g. sub-rd (smaller pbls in 1" to pea size range) ↓ Sand; 10YR 7/3 Pale Brown			
60			N-119-88-6 (60')		
65					
70			N-119-88-7 (70')		
75					
80			N-119-88-8 (80')		
85					
90		↓	N-119-88-9 (90')		
95		Lt. brown (10YR 6/3) Silty Gravel Small pbl: ≈ 1/2" Matrix fine grained – silty ↓ becoming light grey below 100 ft			
100					

Project: USATHAMA N-TEAD | Boring: N-119-88 | Page: 4 of 7

Depth/ Elevation	USCS Symbol/ Core Sketch	Soil/Rock Description	Sample Number & Depth	Blow Count & Recovery	Drilling Data
100		(Grey, Silty/SANDY GRAVEL, Cont. from 94', previous page.)	N-119-88-10 (100-)		
105					
110		LARGE PEBBLE GRAVEL (to 2" max.) with Silty, limy cement.) (2.5Y 8/1)	N-119-88-11 (110-)		
115		CLAY, lt. green (5Y 8/1) dry)	N-119-88-12 (115-117)		
120					
125		Brown (10YR 8/3) Silty CLAY and GRAVEL. Silt (10YR 8/3)			
130		GRAVEL; w Silty, limy, f-mc. Sandy matrix - 10YR 8/1	N-119-88-13 (128-132)		
135					
140		COARSE GRAVEL w Silty, limy f-c g. Sandy matrix 10YR 8/2 (Lighter than above, prob. marlime)	N-119-88-14 (138-140')		
145					
150					

Project: USATHAMA N-TEAD | Boring: N-119-88 | Page: 5 of 7

Depth/ Elevation	USCS Symbol/ Core Sketch	Soil/Rock Description	Sample Number & Depth	Blow Count & Recovery	Drilling Data
150	G	Gravel; w/ limy f-m.c.g Sd. lt.gy. - Cemented.	N-119-88-15 148-150'		
155					
160		Coarse at bottom, large Pbls & poss cbl frags	N-119-88-16 158-160'		
165	G.	Large-Pebble Gravel w/ v. Sdy Cal. Cmt. pbl frags ± 1½" ±			
			N-119-88-17 168-170'		
170					
175					
180			N-119-88-18 178-180		
185	GS	Sandy Gravel large pbls - poss cbls. Sd; lt.bn — c.g, silty.			
190			N-119-88-19 188-190		
195					
200			N-119-88-20 198 200'		

Project: USATHAMA N·TEAD	Boring: N-119-88	Page: 6 of 7

Depth/ Elevation	USCS Symbol/ Core Sketch	Soil/Rock Description	Sample Number & Depth	Blow Count & Recovery	Drilling Data
200	G-	Gravel; coarse, rough frags. to >2"; qtzites & carbs w̄ silty, sandy cal. cmt. Tuffaceous. Fe ox spotting. Sd. 10YR 8/1-7/2			
205					
210			N-119-88-21 208-210		
215					
220			N-119-88-22 218-220		
225	GS	Very large pebble & cobble bed. Frags to >3". Sand matrix lt bn (10YR 7/3); silty.	N-119-88-23 230		
230	GS	Sandy Gravel, lt bn (10YR 7/3). Gvl: pea size to >1". Pbls subl-p.rd'd. carbs & qtzite. Sd: f-m.g, silty. phlogopite noted.			
235					
240			N-119-88-24 238-240		
245	GW	Gravel pea to large pbl w̄ andesite & pink tuff frags.	N-119-88-25 248-250		
250					

Project: USA THAMA N-TEAD	Boring: N-119-88	Page: 7 of 7

Depth/ Elevation	USCS Symbol/ Core Sketch	Soil/Rock Description	Sample Number & Depth	Blow Count & Recovery	Drilling Data
250					
255		Contains pink'sh ppl. porphyritic tuffs w̄ dk'rd hm'c alt on pyroxenes.			
260		~10 YR 8/4 Brown Sandy GRAVEL: (GW/GS) mixed qtzites & carb, <1/2 to 2"+ pbls & poss clds. min alt duff returns Sand: as coarse grand: FeOx alt pervasive micas	N-119-88-26 (258-260)		
265		Coarse Gravel, pbls to 2"+ qtzite, carb: occ. frags of Tuff - unit cemented w̄ sandy caliche: FeOx alt in planes in qtzite. (DIA. Fines 10YR 7/4)			
270		Yellow brown (10YR 7/4-6) Silty Sandy Gravel (GW, GS).	N-119-88-27 (270-272)		
275		Coarse Gravel w̄ sandy caliche cement; lt. grey 10YR 8/1-2) small gravels, gen <1" to pea size. matrix silty (clayey?) m-c.g Sd.			~275: hit abundant water sudden inc in flow cast injecting.
280	TD		N-119-88-28 (278-280)		

BORING LOG GENERAL DATA

Project: USATHAMA N-TEAD Boring: N-120-88 Page: 1 of 8

Driller & Company: Marty Peterson ; Dave's Drilling

Geologist/Logger & Company: John McDonnell, WESTON Signature: [signature]

Date Boring Started: 7-21-88 Completed: 7-26-88

Water Levels (from Ground Surface) Drilling Rig: CP 7000

First Encountered: 295 Date: 7-26-88

While Drilling: - Date: -

At Boring Completion: 293 Date: 7-26-88

Drilling Shifts:

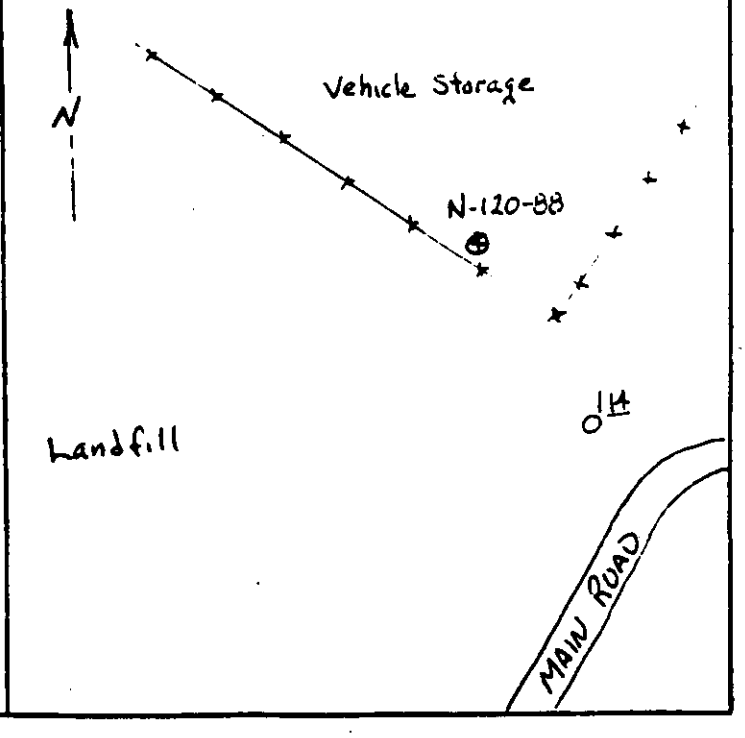
Date	Time		Depth of Drilling Per Shift		Date	Time		Depth of Drilling Per Shift	
	Start	End	Start	End		Start	End	Start	End
7-21-88	7:00 AM	5:00 PM	0'	35'					
7-22-88	7:00	5:00	35	105					
7-23-88	7:00	5:00	105	210					
7-24-88	7:00	5:00	210	236					
7-25-88	7:00	5:00	236	276					
7-26-88	7:00 AM	4:00 PM	276	321'					

Abbreviations:

Abbr	Meaning
Sd	Sand
gvl	gravel
pbl	pebble
cbl	cobble
qtz	quartz
qtzite	quartzite
carbs	carbonates
cal	calcareous, caliche
f.g	fine grained
m.g	medium grained
c.g.	coarse grained
f.	fine
c.	coarse
subrd	subround
subc	subangular
rd	red
yl	yellow
bn	brown
gy	grey
lt	light
dk	dark

Colors from Munsell Color chart.

Location Sketch:



Project: USATHAMA N-TEAD	Boring: N-120-88	Page: 2 of 8

Depth/ Elevation	USCS Symbol/ Core Sketch	Soil/Rock Description	Sample Number & Depth	Blow Count & Recovery	Drilling Data
0	GW/GS	Sandy Gravel: Small-med. qtzite & carb pbls Sd: lt bn (10YR 8/2) silty			Drilling with Air.
5					
10			N-120-88-01 10'		
15					Drilling with water injection.
20	GP/GS	Large pebble Gravel. lt.yl bn (10YR 8/4)	N-120-88-02 20'		
25	GW SW	Mix. Cobble gravel & lt gn-gy fine silty Sand. (Cobbles may be fall in - returns a mix of both units)			
30			N-120-88-03 30'		
35	GS	Sandy Gravel: pea size to ~1" pbls - occ. to >3", qtzite & carbs.			
40			N-120-88-04 40'		
45	GP/GS	Very Sandy, large pebble & Cobble Gravel to 4" rock returns; caliche, (10YR 8/1)			
50			N-120-88-05 50'		

Project: USATHAMA N-TEAD | Boring: N-120-88 | Page: 3 of 8

Depth/ Elevation	USCS Symbol/ Core Sketch	Soil/Rock Description	Sample Number & Depth	Blow Count & Recovery	Drilling Data
55	GW	Coarse Gravel. pbls&frags to 6.5" · Subrd. w/ qtzite & carbs, w/ cal.			Drilling w/ water injection ↓
55	GW/GS	Sandy, Cobble Gravel: pbls small-7 3". flattish & elongate. Sd: lt brn (10yr 7/2) m-c.g.			
60	GS	Sandy Gravel; pea size - gritty. lt brn (10yr 7/2-7/3)	N-120 60'	88-06	
65	GS	Very Sandy, large-pebble Gravel. pbls to >2", Subrd - Subl. Sd. lt brn (10yr 7/2 - 7/3) f.-c.g.			
70	GW	Gravel: small pbls & chips to >3" larger fraction tends to be elongate flat, smaller fraction: Subrd-Subl.	N-120 70'	88-07	
75					
80			N-120 80'	88-08	
85					
90	GS	very Sandy, Coarse Gravel pbls to ~2", qtzite & carbs, Subl-Subrd. Sd: lt brn (10yr 6/6) f.g-Silty.	N-120 90'	88-09	
95					
100			N-120 NO'	88-10	

Project: USA THAMA N-TEAD | Boring: N-120-88 | Page: 4 of 8

Depth/ Elevation	USCS Symbol/ Core Sketch	Soil/Rock Description	Sample Number & Depth	Blow Count & Recovery	Drilling Data
100		brown, coarse, Sandy Gravels cont. from 90'			
105					
110		Large pbls - >2", Subl, quartzite inc to 4" in Sz.	N-120-88-11 110'		
115		very Sandy - esp. 115-120' H bn (10yR 5/4) f.s - Silty.			
120		cobbles - 120-125'	N-120-88-12 112'		
125	G-	Gravel: peak to <1"			
130		Sandy, large pbl/cbl. Gravel Sd: H bn (10yR 7/3)	N-120-88-13 130'		
135		Peak Small pebble Gravels - Sandy. H bn (10yR 7/3)			
140			N-120-88-14 140'		
145					
150			N-120-88-15 15'		

Project: USATHAMA N-TEAD	Boring: N-120-88	Page: 5 of 8

Depth/ Elevation	USCS Symbol/ Core Sketch	Soil/Rock Description	Sample Number & Depth	Blow Count & Recovery	Drilling Data
150	GW/ GS	Sandy, large-pebble/cobble gravel pbls <½" to >2"; Subl; larger nd do be flattish. - mix qtzites & carbs. Sd: lt bn (wyr 8/2) - f.g. - silty.			Drilling w̄ air & water injection.
155					
160			N-120-88-16 160		
165					
170	GS	Sandy Gravel, w̄ coarse streaks. pbls & frags, pea to 1". - qtzites & carbs.	N-120-88-17 170'		
175					
180			N-120-88-18 180'		
185		streak w̄ 2"+ chips			
190			N-120-88-19 190'		
195		streak w̄ 2"+ pbls & chips			
200			N-120-88-20 120'		

Project: USATHAMA N-TEAD	Boring: N-120-88	Page: 6 of 8

Depth/ Elevation	USCS Symbol/ Core Sketch	Soil/Rock Description	Sample Number & Depth	Blow Count & Recovery	Drilling Data
200	GS	Sandy Gravel Pbls to ~1", qtzite & carbs. feox specs.			Drilling w air & water injection.
205					
210	GS	Small gravel with Sd; lt bn (10YR 8-7/2) f.g.	N-120-88-21 210		
215	GP	Coarse Gravel; pbls to ~1½"			
220			N-120-88-22 220'		
	G-	Gravel; small pbl & pea size. - qtzite & carbs.			
225	GS	Sandy Gravel hard. - pbls & chips to ~2". Calc.			
230			N-120-88-23 230		
235					
240			N-120-88-24 240'		
245					
250			N-120-88-25 250'		

Project: USA THAMA N-TEAD	Boring: N-120-88	Page: 7 of 8

Depth/ Elevation	USCS Symbol/ Core Sketch	Soil/Rock Description	Sample Number & Depth	Blow Count & Recovery	Drilling Data
250	GS	Sandy Gravel; hard. frag to 2" - Calc.			
255					
260			N-120-88-26 260'		
265	GS	H. brown Sandy Gravel: to ~1" frag. SO: H.brn (10YR 8/2) - m-f-g.			
270			N-120-88-27 270'		
275					
280			N-120-88-28 280'		
285	G	Gravel: pea to 2" pbls w̄ Hgy (2.5YR 8/1) Sdy Cal.			
290			N-120-88-29 290'		
295	GS	Sandy Gravel; pbls to 2" Sd: H brn (2.5YR 8/2)	N-120-88-30 300'		
300					

Project: USATHAMA N-TEAD	Boring: N-120-88	Page: 8 of 8

Depth/ Elevation	USCS Symbol/ Core Sketch	Soil/Rock Description	Sample Number & Depth	Blow Count & Recovery	Drilling Data
300	GS	Sandy Gravel: pbls to ~1". qtzites & carbs feox alt in sub< pbls Sd: m.f.g.			
305					
			N-120-88-31 310'		
310					
315					
			N-120-88-32 320'		
320		TD 321'			
325					

BORING LOG GENERAL DATA

Project: USATHAMA N-TEAD Boring: N-121-88 Page: 1 of 4

Driller & Company: DALE ZAHN SERGENT, HAUSKINS & BECKWITH

Geologist/Logger & Company: DUG PERRY, WATSON Signature:

Date Boring Started: 5-17-88 Completed: 5-17-88

Water Levels (from Ground Surface) N/A Drilling Rig: CME-55

First Encountered: Date:

While Drilling: Date:

At Boring Completion: Date:

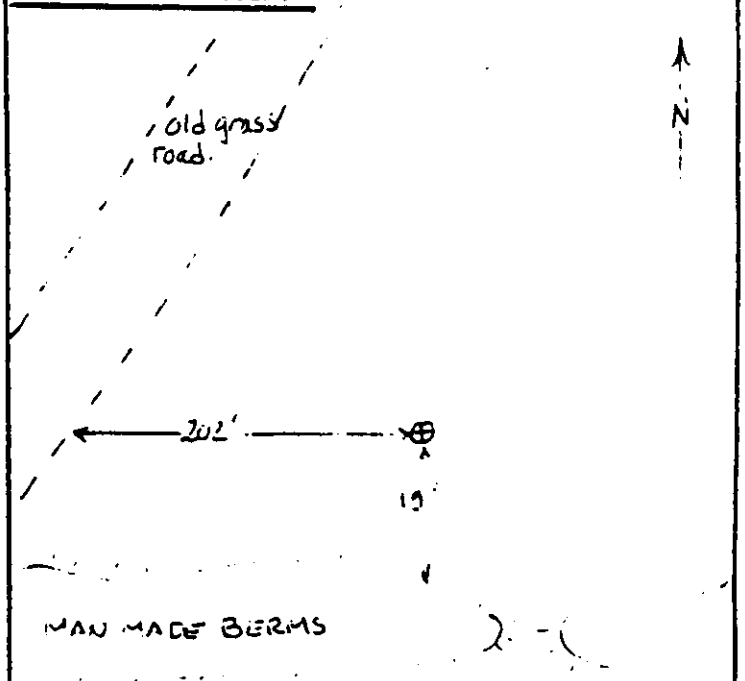
Drilling Shifts:

Date	Time		Depth of Drilling Per Shift		Date	Time		Depth of Drilling Per Shift	
	Start	End	Start	End		Start	End	Start	End
5-17-88	1.50PM	4:15PM	0'	53'					

Abbreviations:

Abbr	Meaning
Trace	<10%
Some	10-25%
NAB	No Apparent bedding
qtzite	quartzite
Carb	Carbonates
V.	Very

Location Sketch:



Project: USATHAMA N-TEAD | Boring: N-121-88 | Page: 2 of 4

Depth/ Elevation (ft)	USCS Symbol/ Core Sketch	Soil/Rock Description All colors reference to Munsell Soil Color Charts	Sample Number & Depth	Blow Count & Recovery	Drilling Data - Using ring sampler 140 lb hammer dropped 30"
0		Ground Surface Surface gravels bulldozed			- Hollow Stem Auger - USING catcher screen in bottom of 1ft x 2in sampler; due to gravels falling out.
	GM	Observed from cuttings. Raining. Top layer saturated.			
2		- Silty Gravels: gravel-Sand-Silt mixture 70% qtzite, 30% carbs. Small Cobble size up to .4' (SIZE) Trace fine sand & silt.			HNU = background
4					4.5'
	GP	Poorly graded gravels - gravel Sand mixture. 1.5-1.0 ϕ size sands. very pale brown (10YR 8/3). Trace Silt. moist, NAB.	N-121-88-01	50 49	75% recovery 0.75' 5.5'
6					
8					9.5'
10	GP	- Poorly graded gravels. weak red qtzite, 10R 4/4 Alluvial deposit, NAB.	N-121-88-02	44 56	50% recovery 0.5' 10.5'
12					Drilling is easier HNU = background
14		- more sand evident Sand is finer; 3.0-3.5 ϕ size, V. pale brown, NAB, dry - Cobbly qtzite gravels	N-121-88-03	100	14.5 50% recovery 0.5' 15.5
16					
18	GP	Pinkish white quartz, 5YR 8/2 carbs ~ 30%, qtzite ~ 70% V. dark gray - black carbs, 2.5Y 4/3 - N/2 NAB, dry.	N-121-88-04		
20					

Project: USATHAMA N-TEAD	Boring: N-121-88	Page: 3 of 4

Depth/ Elevation	USCS Symbol/ Core Sketch	Soil/Rock Description	Sample Number & Depth	Blow Count & Recovery	Drilling Data
23'	GP	Poorly graded gravels: altered physically. Cobbles are subprismoidal to spherical/rounded to well rounded - alluvial deposit.			
22'		{less sand. back to dry gravels} at 19.5-20.5			
24'	GP	-24.5', poorly graded gravels {pale olive colored 5Y 6/3 qtzite white 10YR 8/1, possibly from impact with spoon. NAB Dry.	N-121-88-05	48 52	24.5 50% recovery .5' 2nd try. 25.5 1st attempt 3" mly w/ 100 count.
26'		Sand; ≃2.5-2.0 ϕ size			very easy drilling ↓
28'	Grading into SM.	≃ 20% Sand. still in gravels			
30'			N-121-88-06	42 50	29.5 100% recovery 30.5
32'	SM	very uniform silty sands. 3.0-2.5 ϕ size			
34'					
36'					
38'		Sands: 95-98% quartz. white, 10YR 8/2 with rust colors, 7.5YR 5/8. looks like beach sand	N-121-88-07		39.5
40'				18 22	100% recovery 40.5

Project: USATHAMA N-TEAD | Boring: N-121-88 | Page: 4 of 4

Depth/ Elevation	USCS Symbol/ Core Sketch	Soil/Rock Description	Sample Number & Depth	Blow Count & Recovery	Drilling Data
40'					
42'					
44'	SM				
46'					
48'					
50'		- Silty Sand. Color change, olive yellow 2.5Y 6/8 non-plastic, damp, NAB. Look like a beach sand.		20 19	49.5 100% recovery 50.5

BORING LOG GENERAL DATA

Project: USA THAMA N-TEAD Boring: N-122-88 Page: 1 of 4

Driller & Company: DALE ZAHN; SERGENT HAUSKINS & BECKWITH

Geologist/Logger & Company: Douglas Perry, WESTON Signature:

Date Boring Started: 5-18-88 Completed: 5-18-88

Water Levels (from Ground Surface) N/A Drilling Rig: CME-55

First Encountered: Date:

While Drilling: Date:

At Boring Completion: Date:

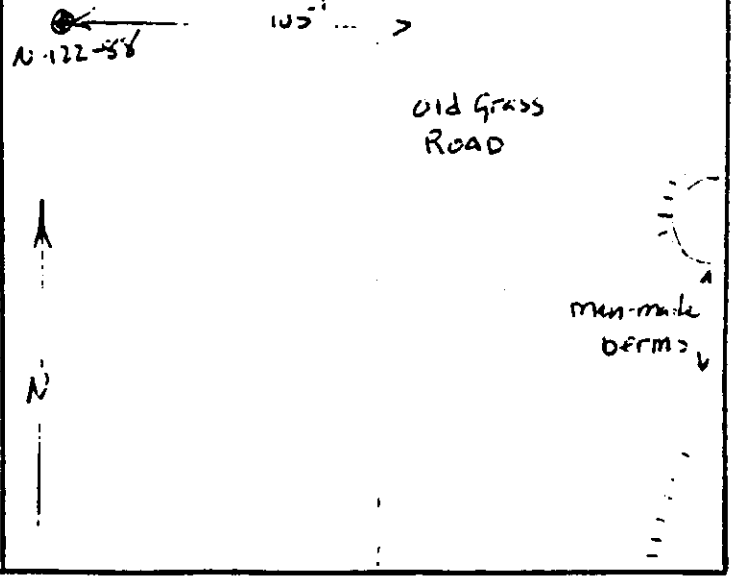
Drilling Shifts:

Date	Time		Depth of Drilling Per Shift		Date	Time		Depth of Drilling Per Shift	
	Start	End	Start	End		Start	End	Start	End
5-18-88	07.40AM	11.15AM	0.0'	50.0'					

Abbreviations:

Abbr	Meaning
GSA	Geological society of America
NAB	No Apparent bedding
Nonpl	Non plastic
qzite	quartzite
Carb	Carbonate rocks
trace	less than 10%
Some	10-25%
Ave	Average

Location Sketch:



Project: USA THAMA N TEAD	Boring: N-122-88	Page: 2 of 4

Depth/ Elevation	USCS Symbol/ Core Sketch	Soil/Rock Description *all Colors, use GSA Munsell Color charts	Sample Number & Depth	Blow Count & Recovery	Drilling Data • using ring sampler w/ 100 lb weight dropped 30"
0'		Top soil & roots mixed with gravels saturated raining outside very hard drilling			• Hollow stem auger • using catcher screen due to gravels falling out of sampler
2'	GP				
4'		Poorly graded gravel, sand mixture gravel. coarse - v. coarse 30% carb - 70% qtzite. pinkish white quartz 5YR 8/2 + 10R 4/4	N-122-88-01	45 50	4.5 75% recovery 5.5
6'		Sand: ave 1.5-1.0 ø size subangular to subrounded, very pale brown, 10YR 7/4, NAB nonpl sl. damp. loose, Alluvial deposit.			
8'					drilling is rough
	GP	Gravels, ave .4', cobbles Lt grey quartz 10YR 7/1 Same as above - all else	N-122-88-02	32 63	9.5 80% recovery 10.5
10'					
12					
14	GP	more sand evident - sandy gravel, gravel sand mixture. Damp NAB nonpl, qtz gravel pale olive color 5Y 6/3 Alluvial deposit	N-122-88-03	20 42	14.5 85% recovery 15.5
16					
18		more sand evident. finer size, 2.5-2.0 ø subrounded.	N-122-88-4		
20				40 60	19.5 70% recovery 20.5

Project: USATHAMA N-TEAD	Boring: N-122-88	Page: 3 of 4

Depth/ Elevation	USCS Symbol/ Core Sketch	Soil/Rock Description	Sample Number & Depth	Blow Count & Recovery	Drilling Data
20					Drilling [illegible]
22	GP				
24		- Cobble sized gravels about 0.3' long; rounded & well rounded Carts, ≈ 30%, big qtzite, ≈ 70% NAB, NON Pl. Sand matrix, Sligh moist Alluvial deposit.	N-122-88 05	100	24.5 20% recovery 25.5
26					
28					
30		- Sandy Gravel mixture, Sands lighter in color, light grey 10YR 7/2, still in Cobble size gravels NAB, Nmpl, Dry.	N-122-88 06	75 60	29.5 10% recovery - tried 3 times - hit boulder
32	GP				
34	?				- Driller felt rit [illegible] sand, very smooth drilling [illegible] 34 ft.
	SM				
36					
38		Silty Sands, moist, NAB. Nmpl & color change, yellow 2.5Y 7/8	N-122-88 07		
40				16 20	39.5 4.5

Project: USATHAMA N-TEAD | Boring: N-122-88 | Page: 4 of 4

Depth/ Elevation	USCS Symbol/ Core Sketch	Soil/Rock Description	Sample Number & Depth	Blow Count & Recovery	Drilling Data
40					
42					
44					
46	SM				
48		- Silty, clayey Sand. Trace clay, trace Silt. 40% fine Sands, NAB, moist Slight plasticity, rolls some Rusty marks throughout Sample strong brown color 7.5YR 4/6, Hematitic alteration.	N-122-88-08	11	49.5 100% recovery
50				10	50.5

BORING LOG GENERAL DATA

Project: USATHAMA N-TEAD Boring: N-123-88 Page: 1 of 4

Driller & Company: DALE ZAHN SEGERT HAWKINS & BECKWITH

Geologist/Logger & Company: DOUGLAS PERRY, WESTON Signature:

Date Boring Started: 5-18-88 Completed: 5-18-88

Water Levels (from Ground Surface) N/A Drilling Rig: CME-55

First Encountered: Date:

While Drilling: Date:

At Boring Completion: Date:

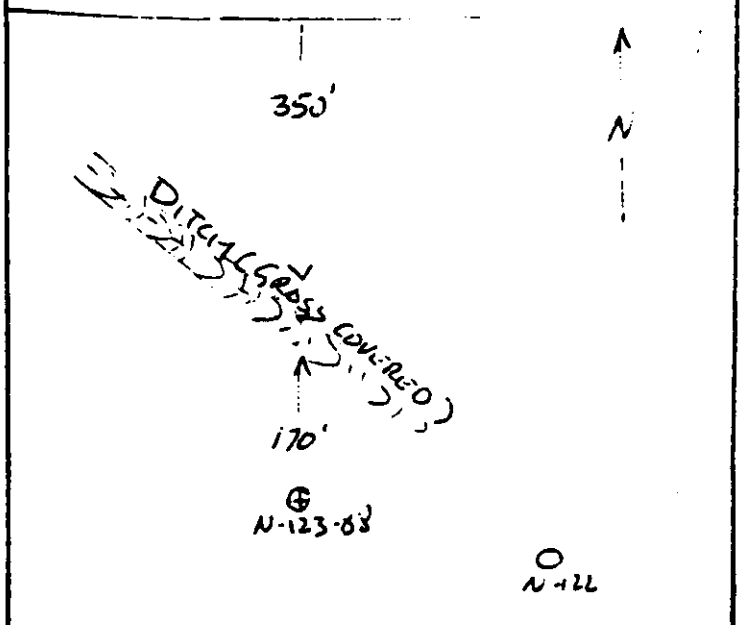
Drilling Shifts:

Date	Time		Depth of Drilling Per Shift		Date	Time		Depth of Drilling Per Shift	
	Start	End	Start	End		Start	End	Start	End
5-18-88	12:00	1:15pm	0.0'	50.0'					

Abbreviations:

Abbr	Meaning
GSA	Geological Society of America
Nnpl.	non plastic
NAB	No apparent bedding
qtzite	quartzite
Calc	Carbonates
trace	less than 10%
Some	10% - 25%
~	Similar To
Vi	very

Location Sketch:



Project: USA THAMA N-TEAD	Boring: N-123-88	Page: 2 of 4

Depth/ Elevation	USCS Symbol/ Core Sketch	Soil/Rock Description All colors using GSA Munsell color chart	Sample Number & Depth	Blow Count & Recovery	Drilling Data Using ring sampler, 1.4 ft x 3 in, w/ 100 lb weight drop = 30 in.
0	Top Soil	Dark organic & top soil. Alot of roots & gravels mixed w/ black organic dirt.			• Hollow stem auger • Using catcher screen to collect sample due to high gravel contents
2	SP	Sandy Gravels ≃ 50/50 med-fine pebble size gravels ave. ≃.05: NAB, damp n.n.pl.			Drilling is easy
4		Sandy gravels - pea size gravel NAB, damp, nmpl. More than half of coarse fraction is smaller than #4 sieve	N-123-88-01	30 46	4.5 100% recovery 5.5'
6		Sand is pale brown, 10YR6/3 3.0-2.5 ϕ size			
8					
10	GP.	10'±; gravel size increased and sand amount went below 50%. - back to cobble size, 0.3', NAB, nm.pl, almost dry alluvial deposit.	N-123-88-02	25 40	9.5 90% recovery 10.5
12					11' Drilling has become very hard at ~11 ft.
14					13.5; drilling eased some, - smoother.
16	GP.	Back to pea size gravels & inc. in sand. Some gravel 0.1'. NAB moist, nm.pl. Sand is light yellowish brown 10YR6/4 2.5-2.0 ϕ size. Alluvial deposit	N-123-88-03	18 16	14.5 100% recovery 15.5
18			N-123-88-04		
20		Sand is a sugary brown texture, reddish yellow 7.5 YR6/6. Gravels; coarse pebble in size		10	19.5 80% recovery
				22	20.5

Project: USATHAMA N-TEAD	Boring: N-123-88	Page: 3 of 4

Depth/ Elevation	USCS Symbol/ Core Sketch	Soil/Rock Description	Sample Number & Depth	Blow Count & Recovery	Drilling Data
20	GP	moist, NAB, non-pl, loose alluvial deposit			HNU = background
22					
24	GC	Very coarse Sandy Gravel. Sand size 0.5-0.0φ. V. moist. Sl. plasticity. Clay will roll out some. Clay: brown, 7.5YR 4/2 Sand, strong brown 7.5YR 5/6 - lenses of alternating clay-gravels - Sands.	N-123-88-05	9 17	23' ↓ very smooth, easy, drilling. 24.5 100% recovery 25.5
26	SP				
28					
30	SC	Sands described above 1.5-0.0φ Clay fine Sands 2.0-1.5% pale brown 10YR 7/3	N-123-88-06	35 35	24.5 100% recovery 30.5
32	Sm				
34		Dry, NAB, Nm pl, loose. Subrounded grains (looks like beach Sand)			
36					
38	SM	Silty Sands. V. fine grained, 3.0-2.5φ size. Very pale brown 10YR 7/4, very moist, Nm pl - Greyish green & yellowish bands of Sand			
40					

Project: USATHAMA N-TEAD | Boring: N-123-88 | Page: 4 of 4

Depth/ Elevation	USCS Symbol/ Core Sketch	Soil/Rock Description	Sample Number & Depth	Blow Count & Recovery	Drilling Data
40			N-123-88-07	9 12	31.5 100% recovery 40.5 Very easy and smooth drilling
42					
44	SM				
46					
48	SC	Clayey Sands, Sand-clay mixture trace clay ~10%, trace silt. 85% Sand pl. - will roll out, near saturated iron stained - strong brown color 7.5YR 4/6 clay is a light olive gray 5Y6/2			49.5
50			N-123-88-08	12 15	100% recovery 50.5

BORING LOG GENERAL DATA

Project: USATHAMA N-TEAD Boring: N-124-88 Page: 1 of 4

Driller & Company: DALE ZAHN SERGENT, HAUSKINS & BECKWITH

Geologist/Logger & Company: Dave Perry WESTON Signature:

Date Boring Started: 5-13-88 Completed: 5-18-88

Water Levels (from Ground Surface) N/A Drilling Rig: CME-55

First Encountered: Date:

While Drilling: Date:

At Boring Completion: Date:

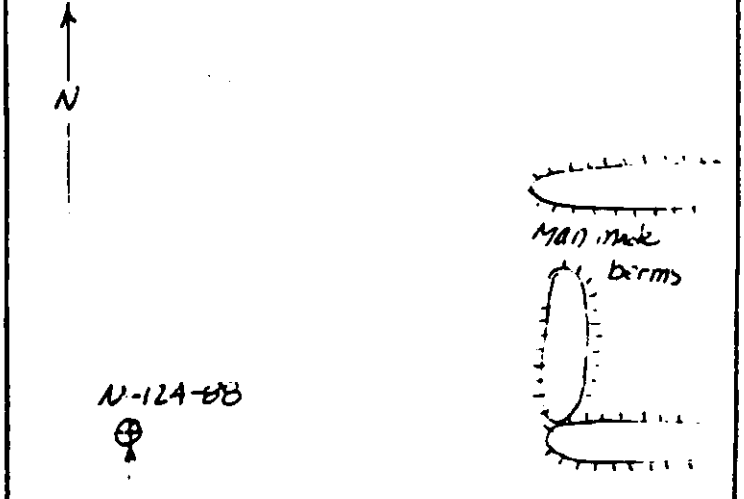
Drilling Shifts:

Date	Time		Depth of Drilling Per Shift		Date	Time		Depth of Drilling Per Shift	
	Start	End	Start	End		Start	End	Start	End
5-18-88	2:15pm	5:00pm	0.0'	50.0'					

Abbreviations:

Abbr	Meaning
GSA	Geological Society of America
Nimpl.	non plastic
NAB	No apparent bedding
Qtzyte	Quartzite
Trace	less than 10%
Some	10-20%
Ave	Average

Location Sketch:



Project: USA THAMA N-TEAD	Boring: N-124-88	Page: 2 of 4

Depth/ Elevation	USCS Symbol/ Core Sketch	Soil/Rock Description All colors using GSA Munsell Color charts. - Ground surface -	Sample Number & Depth	Blow Count & Recovery	Drilling Data - Using ring sampler 1 ft x 3 in. w/100 lb weight drop = 30 in.
1		Top Soil - thick roots Dirt, gravels & sands			• Hollow stem auger using catcher screen to collect sample due to high gravel contents
2					
3		Sandy Gravels: gravel-sand mixture non pl, NAB, V. slight moisture.			Drilling gets very hard
4	GP	Sand: pink, 7.5YR 7/4; Size: 2.5-2 ϕ - Alluvial			4.5
5			N-124-88-01	45 54	100% recovery 5.5
6					
7					
8					HNU = 0
9					9.5
10	GP	SANDY GRAVEL MIXTURE. DRY, NAB, Nmpl, loose Sand is 10YR 8/2; quartz pebbles	N-124-88-02	14 31	70% recovery 10.5
11					
12					
13					
14					14.5
15	GP	Still sandy gravel; 10YR 8/2, white non pl, NAB, alluvial deposit Sand: 2.5-2 ϕ size; subrounded to rounded. Gravel is rounded to well rounded	N-124-88-03		95% recovery 15.5
16					
16					
18					
19					
20					

Project: USATHAMA N-TEAD | Boring: N-124-88 | Page: 3 of 4

Depth/ Elevation	USCS Symbol/ Core Sketch	Soil/Rock Description	Sample Number & Depth	Blow Count & Recovery	Drilling Data
				14.5	
20	GP	Poorly graded Gravels.		100	85% recovery
21		Sand-gravel mixture,			20.5
22		Gravels are in the large cobble size, 0.5:	N-124-88-04		Drilling hard
23		Sands are 2.0-1.5 ϕ size,			
24		light gray, 10YR 7/2, NAB,			24.5
25		Dry, loose, alluvial deposit		20	65% recovery
26		Carb = 15%, qtzite = 85%	N-124-88-05	80	25.5
27	← Grades into SP				
28	SP	Sand gravel mixture,			Drilling easy
29		gravels are med-fine pebble sized			
30		← 2 in clayey sand lense, low pl.		43	29.5
31	SM	Clay, light gray, 10YR 7/4; fines ~40%	N-124-88-06	31	30.5
32		Silty Sands 10YR 7/4			
33					
34					
35					
36					
37					
38					
39		Sands are very pale brown			Drilling hardest to date
40		10YR 7/4 ↓ Hit top of Volcanic unit	N-124-88-07	100	Samples plugged by volcanic unit

Project: USATHAMA N-TEAD | Boring: N-124-88 | Page: 4 of 4

Depth/ Elevation	USCS Symbol/ Core Sketch	Soil/Rock Description	Sample Number & Depth	Blow Count & Recovery	Drilling Data
40					
42					Drilling is extremely hard.
44					
46		Extrusive volcanic rock Severely altered hornblende phenocrysts. Hematitic alteration predominately darkred, 10YR 3/6 to yellow, 5Y 7/8. Altered zones, bright colors			
48					
50			N-124-88-48	75 25	49.5 85% recovery 50.5

BORING LOG GENERAL DATA

Project: USATHAMA N-TEAD Boring: N-125-88 Page: 1 of 3

Driller & Company: John Crawford; DOVE'S DRILLING

Geologist/Logger & Company: LeFritts, WESTON Signature: [signature]

Date Boring Started: 7/19/88 Completed: 7/21/88

Water Levels (from Ground Surface) Drilling Rig: Mobil Drill 61

First Encountered: 24' wet Date: 7/19/88

While Drilling: Date:

Drilled with 10 in. OD, 6 1/2 ID auger

At Boring Completion: Date:

Drilling Shifts:

Date	Time		Depth of Drilling Per Shift		Date	Time		Depth of Drilling Per Shift	
	Start	End	Start	End		Start	End	Start	End
7/19/88	11:00AM	5:00pm	0'	41.5'					
7/20/88	7:00AM	5:30pm	41.5	71.5					

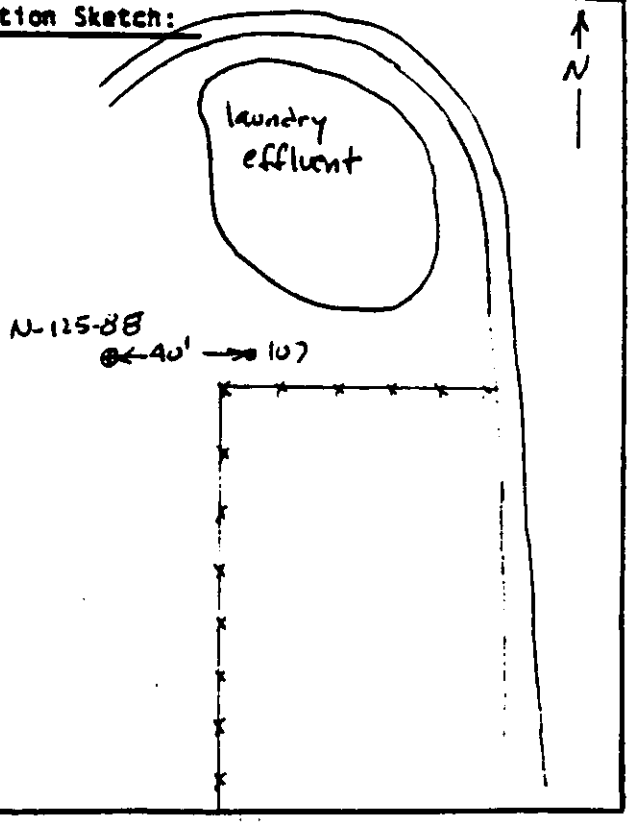
Abbreviations:

Abbr	Meaning
trace	0-15%
Some	15-30%
pl	plasticity
med.	medium
SS	Split spoon

used munsell soil chart for color classification

Note: hole grouted to surface on 7/20/88 according to USATHAMA Specs.

Location Sketch:



Project: USA THAMA N-TEAD | Boring: N-125-88 | Page: 2 of 3

Depth/ Elevation	USCS Symbol/ Core Sketch	Soil/Rock Description	Sample Number & Depth	Blow Count & Recovery	Drilling Data
					b.g. HNU=0.
0	ML	Silty Sand, 30% Silt 10YR 6/3 (pale brown) low pl. loose, dry. Sand is well sorted, fine, Subrounded; lake deposit.			
5			4-5'		
10			9-10'		HNU=0.2
15	ML	Silty Sand, 45% Silt 10YR 6/2 (light brownish gray); low pl, loose Slightly moist; Sand is well Sorted, fine, Subrounded; lake deposit.	14-15		
20	CL	Silty Clay, 40% Silt, 10YR 6/2 (light brownish gray), low pl. moist. lake deposit	19.5-20		
25	ML	Clayey Silt, 25% clay, 10YR 6/2 (light brownish gray) low pl wet, oxidation, lake deposit	24-25 001	10-11-14 16"	SS
30	CL	Clay, Some Silt, 2.5Y 6/2 (light brownish gray), low pl Saturated carbonaceous material; lake deposit.	002 30-30.5	1-2-3 18"	HNU=.2 SS
35			003 35-36.5	-	SS
40		Clay, trace silt, 2.5Y 6/2 (light brownish gray) med pl dry. possibly a confining layer			
	SM	Silty Sand, 2.5Y 6/6 (olive yellow) no. pl, Sl moist to dry	004 40-41.5	7-16-15	7/20/88. 7:30 no measurable water
45					driller reports harder drilling 46-48'
50					

Project: USA THAMA N-TEAD | Boring: N-125-88 | Page: 3 of 3

Depth/ Elevation ft	USCS Symbol/ Core Sketch	Soil/Rock Description	Sample Number & Depth	Blow Count & Recovery	Drilling Data
50	SM	Silty Sand, 10YR 6/2 (light brownish gray) no pl, loose, moist to wet. Sand is well sorted, fine, subrounded; lake deposit	005 50-51.5	4-11-12 15"	
55	ML	Sandy Silt, 10YR 6/2 (light brownish gray) Some sand, low pl. moist, lake deposit	006 55-56.5	5-8-11 17"	
60			007 60-61.5	9-11-13 17"	
	ML	Clayey Silt, 10YR 6/2 (light brownish gray) Some clay, low pl sl. moist. trace 1" gravel; lake deposit.	008 70-71.5	6-7-12 17"	HNU = .1
70	ML	Sandy Silt, 10YR 6/2 (light brownish gray) Some sand, no pl, sl. moist, shells. lake deposit	009 70-71.5	7-15-20 18"	Stop 7/20/08 1:00 PM Augered to 70 ft Sampled, Split spoon, to 71.5 ft After 2 hrs, < 6" water in well.
75					

Project: USATHAMA N-TLAD | Boring: N-122-88 | Page: 2 of 3

Depth/ Elevation ft	USCS Symbol/ Core Sketch	Soil/Rock Description	Sample Number & Depth	Blow Count & Recovery	Drilling Data
					b.g. HNU = 0.2
0	ML	Sandy Silt; some V. fine Sand. Subrounded, well sorted. 10YR 7/3 (V. pale brown) n.p. dry; lake deposit.			
5			4-5'		
10		Same, but 10YR 7/2 (light grey)	9-10'		
15	ML	Silt, trace V. fine sand, subround well sorted 10yr 6/3 (pale brown) n.p. dry; lake deposit.	14-15		HNU = 0.2
20		Silt, trace clay, 10YR 6/3 (pale brown) n.p. dry. moist, lake moist			darken due to moisture content. wet cuttings at 23.5ft.
25			24-25'		
30	ML	Clayey Silt; some clay 10YR 5/2 (Grayish brown) low pl moist. Carbonaceous material & oxidation are evident; lake deposit	001 30-31.5	1-3-2 17"	Begin Split-spoons every 5ft.
35		Same, but interbedded (<1") Sandy Silt - some Sand, V. fine, well sorted, 10YR 5/6 (yellowish brown) due to oxidation, n.p moist; lake deposit	002 35-36.5	4-5-6 18"	HNU = 0.4
40	ML	Sandy Silt, some V. fine, subrounded well sorted Sand, 10 YR 5/2 (grayish brown, n.p moist; lake deposit	003 40-41.5	8-13-13 15"	hand drilling 41-44'
45	CL	Clay; 2.5 y 6/2 (light brownish gray) med pl.; lake deposit	004 45-46.5	8-8-8 16"	
45	SM	Silty Sand, 10YR 5/1 (gry) some silt - n.p wet			(observed in end of bit)

Project: USATHAMA N-TEAD | Boring: N-126-B8 | Page: 3 of 3

Depth/ Elevation ft	USCS Symbol/ Core Sketch	Soil/Rock Description	Sample Number & Depth	Blow Count & Recovery	Drilling Data
55	CL	Clay, trace fine sand, 2.5 Y 6/2 (light brownish gray). med pl, moist oxidation, shells; lake deg.	005 55-55.5	2-4-2 16"	
55	CL	Gravelly Silt, 40% poorly sorted subrounded gravel, trace sand 10YR 7/1 (light gray) n.p moist, lake deposit	006 55-55.5	12-15-15 9.5"	Augered to 55ft Sampled @ 56.5ft
60					

BORING LOG GENERAL DATA

Project: USATHAMA - N-TEAD Boring: N-127-88 Page: 1 of 5

Driller & Company: Robert Armstrong, Dave's Drilling

Geologist/Logger & Company: John M'Donnell, WESTON Signature: John M'Donnell

Date Boring Started: 9-28-88 Completed: 10-13-88

Water Levels (from Ground Surface) Drilling Rig: CP-7000

First Encountered: Date:

While Drilling: — Date: —

At Boring Completion: 223.2' Date: 10-1-88

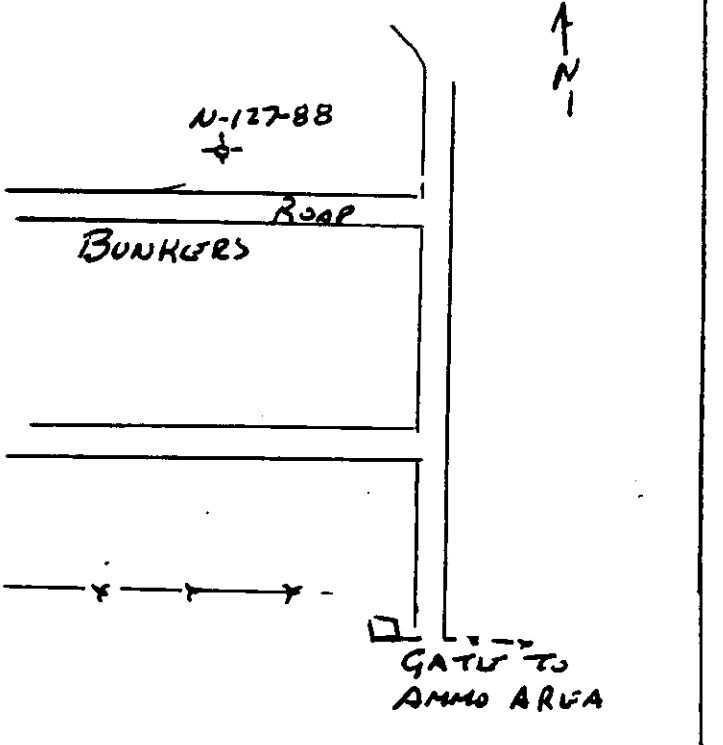
Drilling Shifts:

Date	Time		Depth of Drilling Per Shift		Date	Time		Depth of Drilling Per Shift	
	Start	End	Start	End		Start	End	Start	End
9-28-88	07:00 AM	5:00 PM	0	80					
9-29-88	7:00 A	5:00 P	80	165					
9:30-88	↓	↓	165	165					
10-1-88			165	215					
10-2-88			215	215					
10-3-88			215	225'					
10-13-88			225	240'					

Abbreviations:

Abbr	Meaning
Sd, sdy	Sand, Sandy
Slt, Sly	Silt, Silty
Cly, y	Clay, ey
Gvl	gravel
Pbl	Pebble
rd, rd'd	round, rounded
∠, subℓ.	angular, Subangular
bn	brown
bk	black
tn	tan
rd'sh	reddish
yl, y'sh	yellow, yellowish
gn, gn'sh	green, greenish
bl, b'sh	blue, bluish
gy	grey
dk	dark
lt.	Light

Location Sketch:



Project: USA THAMA	Boring: N-121-88	Page: 4 of 6

Depth/ Elevation	USCS Symbol/ Core Sketch	Soil/Rock Description	Sample Number & Depth	Blow Count & Recovery	Drilling Data
100		Sand (S-). Gravely (pea size) Sd: drab, m-f.qtz w/ 2ndy dk rd min. specs. Sd: 5y 8/2			
105		GRAVEL (G-): Small pbls & chips, predom. <1/4", occ to ~1" ~75% lt. qtzite; remainder dk. carb etc. qtzite var. 10yR 8/1-2 + 7.5yR 7/4 Carb. gray ~ 7.5yR 6/0			
110			N-121-88-11 (110')		
115					
120			N-121-88-12 (112')		
125		Pea Gravel; gritty, c. sandy			
130		Sandy Clay (C.S) ltgn gray - Sd: f.g-sty; → cly'y sd.	N-121-88-13 (130-140')		
135					
140			N-121-88-14 (140')		
145					
150			N-121-88-15 (150') HNU = 0↑		

Project: USA THAMA	Boring: N-121-88	Page: 5 of 6

Depth/ Elevation	USCS Symbol/ Core Sketch	Soil/Rock Description	Sample Number & Depth	Blow Count & Recovery	Drilling Data
150		Silty Sandy Clay (CM-CS) -grlshgy - cont. from 135'. 5Y 8/1			
155		↓			
160		few large pbls in bottom ft. or So.			- bottom of hole wet.
165		V. Silty Gravel (GM) -gvl: small-pea size, silt: limy? silt: ~2.5Y 8/2	N-121-88-16 (165')		St. 10-1-88 drilling w/air hole drying
170		Small, Sandy, Gravel (GS) Sd: yl bn; m-f.g; sub c-sub rd qtz. etc.; hbl. vol. (dark). matrix/sd matl: 10YR 8/2	N-121-88-17 (170')		
175		Gravely Sand (SG) Sd: f-c.g, fines predom. qtz + 2dy darks - incl rock debris.			
180		pbls/frage gen < 1/2" occ → 1" Sdy matle light creamy color.	(N-121-88-18) (180')		
185		pbls/frage: < 1/2" Sdy matle light brownish to base (190')			
		pbls/frage ↓ 1" or So / MBTRY 10YR 8/3 dry)			
190		Silty Sand (SM) Sly damp. dk yl; f-vf. grained - 10YR 7/3, dry.	(N-121-88-14) (190')		
195		Gravel, CG. pbls & chips gen small & irreg.			
200		↓ cont.	N-121-88-20 (200') HNU=0 ↑		

Project: USA THAMA	Boring: N-127-88	Page: 6 of 6

Depth/ Elevation	USCS Symbol/ Core Sketch	Soil/Rock Description	Sample Number & Depth	Blow Count & Recovery	Drilling Data
200		Gravel from 195' -qtzites & carb. grayish overall ~7.5YR 5/.			
205		V. Coarse, Sandy, Gravel (GP GS) pbls & rock frags predom 1" n sv in size. Sd: f-mc grained; subl-subrd.	N-127-88-21 (210')		
210		Pbls bl. grey carb 2.5y/5 - lt. qtzite ~10YR8/3 + Secondary volcanics			
215					Start. 10-3-88 New bottom-bit Very difficult to drive casing (Shut down temp.)
220		V. Sdy "pea" gravel; mdrd Sh bn, Small pbls, subrd'd	N-127-88-22 (220')		
225		Sand (Sw), f-c.g. poorly sorted subc-subrd qtz & other mins. mod ferruginous. - damp. - becoming coarser with depth 10YR6/4			St. 10-13-88 drilled dry
230			N-127-88-23 (230')		
		Fcox alt qtzites & alt. volcs			
240	TD	Pbls & Frags to ~1"; rd'd.-subl. Sdy mat'l: 10YR8/3 (dry)	N-127-88-24 (240')		blowing water at 240 ft
		242			

BORING LOG GENERAL DATA

Project: USATHAMA N-TEAD Boring: N-128-88 Page: 1 of 2

Driller & Company: Robert Armstrong / DAVE'S DRILLING

Geologist/Logger & Company: John McDonnell / WESTON Signature:

Date Boring Started: 10-4-88 Completed: 10-12-88

Water Levels (from Ground Surface) Drilling Rig: CP 700

First Encountered: 239' Date: 10-12-88

While Drilling: — Date: —

At Boring Completion: 222.2' Date: 10-13-88

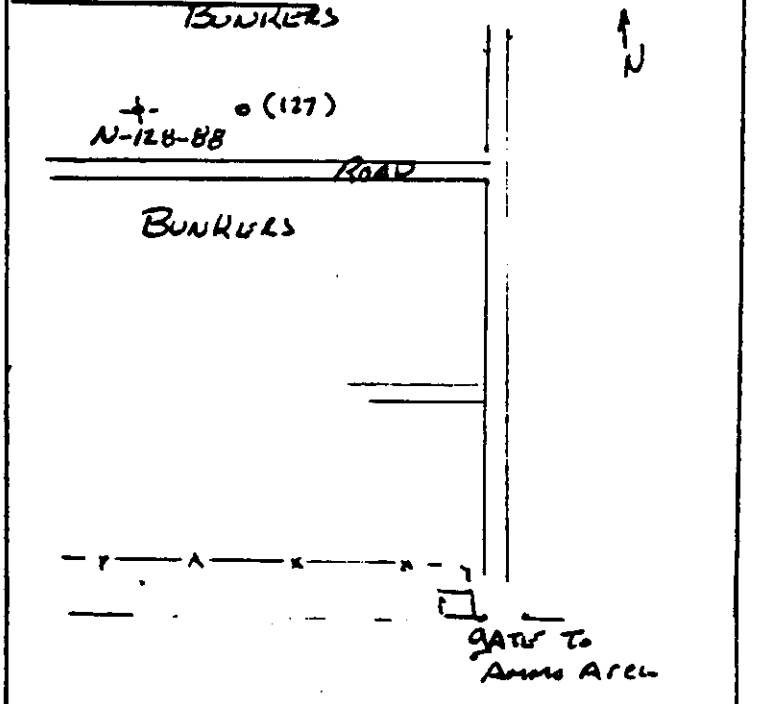
Drilling Shifts:

Date	Time		Depth of Drilling Per Shift		Date	Time		Depth of Drilling Per Shift	
	Start	End	Start	End		Start	End	Start	End
10-4-88	7:00AM	5:00PM	0	45					
10-5-88	"	"	45	70					
10-6-88	"	"	70	135					
10-11-88	"	"	135	225					
10-12-88	"	"	225	257					

Abbreviations:

Abbr	Meaning
Sd, Sdy	Sand, Sandy
Slt, Sty	Silt, Silty
Cly'y	Clayey
Gvl	gravel
Pbl	Pebble
rd, rd'd	round, rounded
∠, subℓ	angular, Subangular
C.g	Coarse grained
md, m.g	medium, mediumgrained
Fn, f.g	fine, fine grained.
V.	very
Sl,	Slightly
bn	brown
blk	black
tn	tan
gy	grey
rd'sh	reddish
yl, ylsh	yellow
grn, grnish	green, greenish
bl, blsh	blue, bluish
dk	dark
lt.	light.

Location Sketch:



Project:	Boring: N-128-88	Page: 2 of 6

Depth/ Elevation	USCS Symbol/ Core Sketch	Soil/Rock Description	Sample Number & Depth	Blow Count & Recovery	Drilling Data
0		SAND (SW) lt gy f-c grained: S-bz - frosted qtz & other mins. dry in first 5 ft. becoming damp, 5-10'. (qtz - frosted grains, dk rock frags, rd'd micas, Feox alt.) 2.5y 8/2 yl-white			Drilling - rig air only 10-4-88
5					
10			N-128-88-1 (10')		
		SAND (SP): md yl bn, well sorted; fine w occ m.g. qtz etc. sly micaceous. damp. 2.5y 7/2			
15		Silty Sand (SM): sly-mod clayey. yl'sh brown, damp. Balls up wt 1/2 pellets & less. SD: f-c grained 2.5y 6/4			
20			N-128-88-2 (20')		Aux compressor on line
25		Silty Sand (SM) light drab. predom. fine grained. Plasticity: low ~5y 7/3			
30	? CS	Sdy CLAY sample .4' V. Sdy Clay (CS): lt-md gy w feox splotches 1' V. Sdy Clay (CS) bn w ruddy feox ppl tn org. mat.	N-128-88-3 (30')		Spoon sample 100%; cuttings sticky.
35					added water injection at 35'
	C-	CLAY (C-) gn'sh gy .2' V. Sdy Clay (CS) mr bn-gy w org matter; feox splotching			
40		5y 7/2 Mn. NyR 6/6			
45		44' incl. 7.5' CLAY (C-) 46' gn gy. w vert. seams with feox fillings. occ. small gastropods	N-128-88-4 (44.5')		St. 10-5-88 Spoon sample, 100%
50			HNU = zero		

Project: USATHEMA	Boring: N-128-88	Page: 3 of 6

Depth/ Elevation	USCS Symbol/ Core Sketch	Soil/Rock Description	Sample Number & Depth	Blow Count & Recovery	Drilling Data
50		CLAY: gn'sh brown; w̄ feox. cont. from above.			
55		5Y 7/1-2	N-128-88-5 (55')		
60		CLAY (C): dk bl'sh grey fair plasticity. 5Y 6/1	N-128-88-6 (60')		
65					
70		becoming darker towards 75'			-St. 10-6-88
75		-75-76.4; v dark grey clay; (CO) -stiff.	N-128-88-7 (75-77')		-Spoon Sample -100%
		CLAY (CO) olive grey 76.4-77'. olive grey clay (CO). w̄ reddish & dk gy organic			
80		(5Y 6/1-5/2 w̄ 2.5Y 4-5/0 streaks.)	N-128-88-8 (80')		
85		Sandy, clayey Gravel (GS/GC) 5Y 7/2			
90		SANDY Gravel (GS): small sub r'd pbls & p-srt'd, f-c.g sd: Sd: 2.5Y 7/4, pale yl.	N-128-88-9 (90')		Spoon Sample (~12.5% recovery)
95					
100			HNU = zero		

Project: USATHAMA	Boring: N-128-88	Page: 4 of 6

Depth/ Elevation	USCS Symbol/ Core Sketch	Soil/Rock Description	Sample Number & Depth	Blow Count & Recovery	Drilling Data
100		SANDY GRAVEL (GS) Pbls frm ~1" down to pea size. Sub-L-Sub rd qtzite. Sd: bn, m-f.g. 2.5y 8/4 o.t.	N-128-88-10 (100)		
105					
110			N-128-88-11 (110)		
115					
120			N-128-88-12 (120')		
125					
130		CLAY (C-): lt. gn'sh gy. dries off white. 5y 8-7/2 damp.	N-128-88-13 (130		
135					- St. 10-11-88 drilling air w injection
140			N-128-88-14 (140')		
145					
150			HNU = 0		

Project: USATHAMA	Boring: N-128-88	Page: 5 of 6

Depth/ Elevation	USCS Symbol/ Core Sketch	Soil/Rock Description	Sample Number & Depth	Blow Count & Recovery	Drilling Data
150		GRAVEL (GS) Angular pbls/chips to ~1" Sdy-clay'y matrix: lt gn'sh gy (may include material from above) - pbls: dk qtzite w̄ min caliche. 2.5Y 8/2 poly 1			drilling w̄ air & injection
155					
160			N-128-88-16 (160)		
165		Sandy Gravel (GS) Incl. large frags to 1½", flat. Sd: fn-c.g, Sty. "pbls": qtzite, shot w̄ lim'c alt. 10YR 6/4			
170			N-128-88-17 (170')		
175		Very Sandy Gravel (GS)			
180		Gravely Sand (SG) SD: f-c.g. mixed bk & dk red rock frags & qtz; sty. 10YR 7/3	N-128-88-18 (180')		
185		GRAVEL (GW): inch-size & Larger sub rd - flat pbls & small "pea" size & sv chips in bimodal dist. Sdy.			
190			N-128-88-19 (190')		
195		Clayey, Sandy Gravel (GS/GC) Sub - gn dark - to ~1" Sd; lt bn; f-m.g. MATRX 10YR 6/3 pale brown			
200			H/NU = 0		

Project: USATHAMA	Boring: N-128-88	Page: 6 of 6

Depth/ Elevation	USCS Symbol/ Core Sketch	Soil/Rock Description	Sample Number & Depth	Blow Count & Recovery	Drilling Data
200		cont.			
205		SAND & GRAVEL Lt. bn. sticky 10YR6/3 pale bn			
210		Coarse Gravel mixed w C. Sand & Grit	N-128-88-21 (-210)		
215					
220		Gravely SAND - sdy mal: C.g: 10YR6/4.	N-128-88-22 (-220')		
225		Volcanic GRAVEL? Mixed - w Alt. hornblends.			Start 6-12-88 - Drilling with air and injection
230		V. Sandy Gravel? Volcs & V. alt qtzites. SD: f-c.g. subc.	N-128-88-23 (-230')		
235		Sandy Gravel: qtzite & dark volcs (basaltic-andesitic)			Drilling air only - drying hole
240					Hit water immediately after making joint.
245		Volcanics v. alt: hmc: Secondary Silica - Large chunks - / MATRX - sdy mal: v. pale Bn. 10YR7/3	N-128-88-24 (240')		
250			HNU=0 ↑		

↓ 257

↓ To bottom

BORING LOG GENERAL DATA

Project: USATHAMA Boring: N-129-88 Page: 1 of 6

Driller & Company: Robert Armstrong / Dever Drilling

Geologist/Logger & Company: [illegible] Signature: [illegible]

Date Boring Started: 10-15-88 Completed: 10-18-88

Water Levels (from Ground Surface) Drilling Rig: CP700

First Encountered: Date:

While Drilling: -240' Date: 10-18-88

At Boring Completion: 223.2 Date: 10-19-88

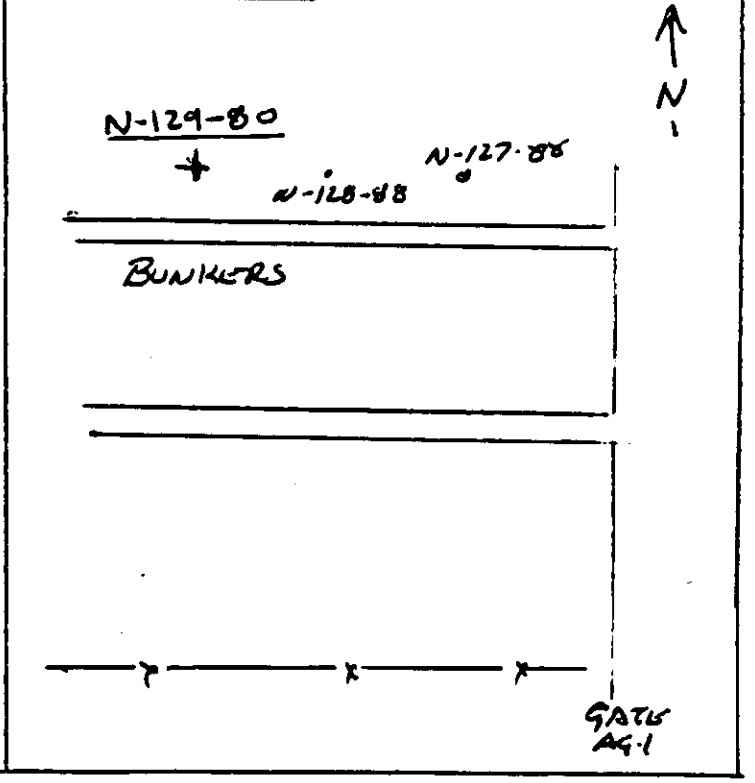
Drilling Shifts:

Date	Time		Depth of Drilling Per Shift		Date	Time		Depth of Drilling Per Shift	
	Start	End	Start	End		Start	End	Start	End
10-15-88	7:30	5:30	0	105					
10-16-88	7:30	5:30	105	165					
10-17-88	7:30	5:30	165	225					
10-18-88	7:30	5:30	225	242					

Abbreviations:

Abbr	Meaning
Sd, Sdy	Sand, Sandy
Slt, Sty	Silt Silty
Gvl	: gravel
Cly'y	: clayey
qtz, qtzite	: quartz, quartzite
Vclc	: Volcanic
Pbl	: Pebble
rd, rd's	: round, rounded
<, subC	: angular, Sub Angular
f, m, c:	fine, medium, coarse
Sly	: Slightly
V	: very
W	: with
bn	brown
gy	: grey
tn	: tan
yl	: yellow
rd	red
gn	green
Lt:	Light
dk:	dark
AA.	As Above

Location Sketch:



Project: USATHAMA | Boring: U-129-88 | Page: 2 of 6

Depth/ Elevation	USCS Symbol/ Core Sketch	Soil/Rock Description	Sample Number & Depth	Blow Count & Recovery	Drilling Data
0		Lt. yl. brn. Sand. fine grained; becoming sly clayy in lower portion. 2.5y 8/2			Drilling w/ mud only
5					
10			U-129-88-1 (-13)		
15		Sandy clay: Balls up in pellets. 5y 8/2			
20			U-129-88-2 (20')		Adding injection ↓
25		Lt. Brown, silty, clayey Sand, (SP/SC-M). F-m.g. mod well rounded. (5y 8/1-2 dry)			
30			U-129-88-3 (30')		
35					
40		Mottled grey; limonitic, Clay, (CL) - lt d. md gray olive with limonitic specks. (5y 8/1 - 5y 7/2)			
45		Spoon Sample, 45-47' lt olv. gy Clay, shot thru w/ gen. vert. limonitic seams & splotches. contains occ irreg layering. Tiny gastropods locally abundant	U-129-88-4 (45-47')		Spoon Sample (1.5')
50					

Project: USATHAMA | Boring: N-129-88 | Page: 3 of 6

Depth/ Elevation	USCS Symbol/ Core Sketch	Soil/Rock Description	Sample Number & Depth	Blow Count & Recovery	Drilling Data
50		Olive brown Sandy Clay w limonitic spots - cont. from above			
55			N-129-88-5 (55')		
60		Dark, blue Gray Clay	N-129-88-6 (60-62')		Spoon Sample 100%
65		Spoon sample 60-62' · 2'. bn. sdy Clay · 5' v. org-carbonaceous clay. 1.3' bl sdy clay w thin carbonaceous seams & irreg. sdy zones. (~5Y 7/1 dry)			
75		md Grey, Sandy Clay. (2.5Y 8/1 dry)	N-129-88-7 (75')		
80		Sandy Gravel; ruddy-yl brown. predom. small qtzite pbls to ½"+ subrd. with cg. subrd qtz sand. (~5Y 8/1)	N-129-88-8 (80'+)		
85					
90			N-129-88-9 (90')		
95		Sand. (SW): fine-md grained lt. brown. (5Y 8/1)	N-129-88-10 (100')		
100					

Project: USATHAMA	Boring: N-129-88	Page: 4 of 6

Depth/ Elevation	USCS Symbol/ Core Sketch	Soil/Rock Description	Sample Number & Depth	Blow Count & Recovery	Drilling Data
100		Sand. m-f-g: sty. lt. yl/sh tn; 2.5y 8-2			
105					St. 10-1-88 drilling due w/ water [illegible]
110			N-129-88-11 (113)		
		GRAVEL: qtzite [illegible] pbls to 1" and smaller; mod rd'd, sharp chips. sdy matrix: light tn (~2.5y 7/2)			
115					
120			N-129-88-12 (123)		
125		Silt. pale yl; 5y 8/3 damp white 5y 8/1 - dry			
130			N-129-88-13 (130')		
135					
140		Sandy, gritty GRAVEL (GS) SD: f-c.g. lt tn, v. lt gy (5y 8/1-2 dry)	N-129-88-14 (140)		
145		Gvl: pbls/chip to 1" + in size			
150			N-129-88-15 (150')		

Project: USATHAMA	Boring: N-129-88	Page: 5 of 6

Depth/ Elevation	USCS Symbol/ Core Sketch	Soil/Rock Description	Sample Number & Depth	Blow Count & Recovery	Drilling Data
150		Volcanics,			
		lt. tn & bn qtzite. (10yR 7/4 -			
		Alt, hbl-volcs: Sericitic/Kaolinitic (2.5y 6/0 -			
155		Coarse returns: <1/4' - 2".			
		Sub< - quadrate chips			
		Sandy material, coarse grained prob rock derived			
160		Silty material prob from alt.	N-129-88-16 (160)		
		[Gravely returns prob from upper Volcaniclastic unit (?)]			
165		Alt: variegated Volcanics			St. 10-17-88
		k yl bn ss/qtzite.			
		returns generally <1/2"			
170		lt bn qtzite/ss and alt volcs A.A.			
		volcs - intermediate to basic - bedrock?			
175			N-129-88-17 (-175')		
180			N-129-88-18 (-180')		
185		V. sty. dark variegated Volcanics			
		cly'y-sty mat'l from Kaolinitic - Sericitic alteration.			
		volcs: predom dark gy. incl 5y 8/3			
190		w̄ lt gn. alt hmt porphyry 5y 8/2 and rd'sh alt felsitics ~2.5yR 5/4	N-129-88-19 (-190')		
195		Mixed volcs.			
		predom lt gn pyroxene? bearing. -2.5y 5/2 - w̄ rev alt pyroboles			
		rd'sh bn alt 5yR 5/3	N-129-88-20 (-200')		
200		w̄ yl bn ss 2.5y 6/0.			

Project: USATHAMA	Boring: N-129-88	Page: 6 of 6

Depth/ Elevation	USCS Symbol/ Core Sketch	Soil/Rock Description	Sample Number & Depth	Blow Count & Recovery	Drilling Data
200		Alt volcanics cont. from 195			drilling air w injection
205		Sandy returns			
210			N-129-88-21 (210)		
		As per 195-200 - intermediate - Andesite -			
215					
220			N-129-88-22 (220)		
		OVERALL CAST: Very light bl. gy 5y 8/1 - 7/1			
225					St. 10/12/88 Drilling w air only
		Mixed volcanics - highly alt. generally dark rd'ish bn - dk bn w silicrous/sericitic & FeOx alt. - contains c.g. qtzitic material			
230			N-129-88-23 (230)		cuttings becoming more and more moist
		overall color: light purplish grey 7.5y R6/4			
235					
240			N-129-88-24 (240)		
	244 TD				
			HNu = 0		

BORING LOG GENERAL DATA

Project: USATHAMA Boring: N-130-88 Page: 1 of C

Driller & Company: Robert Armstrong / DAVE's DRILLING

Geologist/Logger & Company: John McDonnell / WESTON Signature: [signature]

Date Boring Started: 10-19-88 Completed: 10-26-88

Water Levels (from Ground Surface) Drilling Rig: CP7000

First Encountered: Date:

While Drilling: Date:

At Boring Completion: 10-27-88 Date: 224.6'

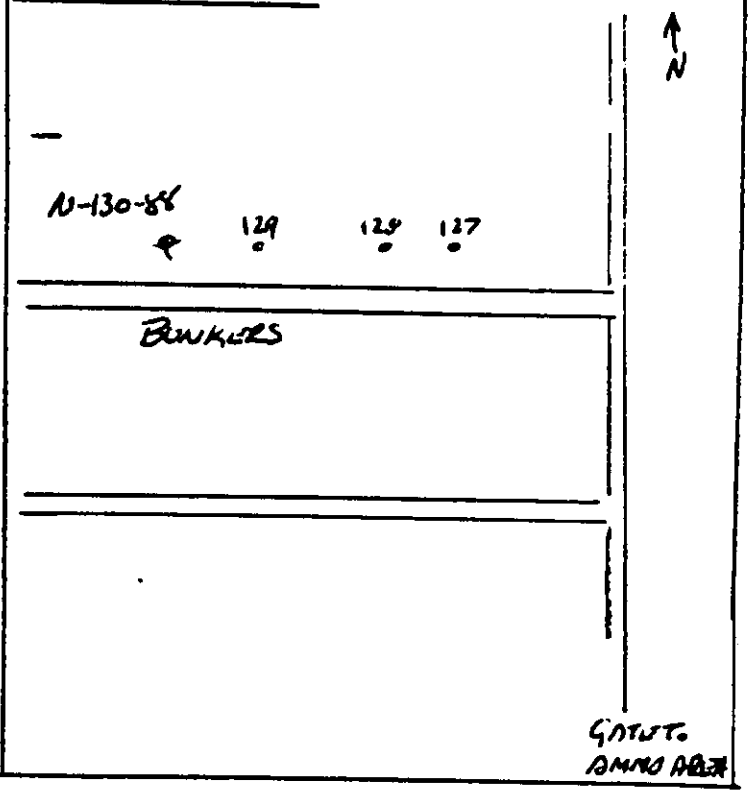
Drilling Shifts:

Date	Time		Depth of Drilling Per Shift		Date	Time		Depth of Drilling Per Shift	
	Start	End	Start	End		Start	End	Start	End
10-19-88	7:30	5:30	0	75					
10-20-88	"	"	75	120					
10-25-88	"	"	120	180					
10-26-88	"	"	180	245					

Abbreviations:

Abbr	Meaning
Sd, sdy	Sand, Sandy
Slt, sty	Silt Silty
Cly'y	Clayey
Gvl	Gravel
Pbl	Pebble
Cbl	Cobble
bldr	boulder
rd, rdd	round, rounded
∠.	Angular
Volc	Volcanic
w̄	with
Sly	Slightly
V.	Very
fg.	fine grained
m	medium
c	Coarse
bn	brown
bk	black
rd	red
yl	yellow
gn	green
bl	blue
gy	grey
dk	dark
lt	light

Location Sketch:



Project: USATHAMA	Boring: N-130-88	Page: 2 of 6

Depth/ Elevation	USCS Symbol/ Core Sketch	Soil/Rock Description	Sample Number & Depth	Blow Count & Recovery	Drilling Data
0		Fine Sand (SP), Hyl tn (2.5y 7/2) -m-f.g; p.rd'd - subL. frosted qtz w/ lmt alt & acc micas.			Drilling w/ air mly
5		Clayey Sand (SC), lt whish gy (5y 7/1) m-f.g.	N-130-88-1 (- 10')		
10					
15		Clayey Sand (SC) lt.bn (5y7/2) f.g. ferruginous			
20		Silty Sand (SM): v.f. pale yl. (2.5y 7/4), damp.	N-130-88-2 (- 20')		Drilling w/ air & water injection.
25					
30			N-130-88-3 (- 30')		
35		Sandy, Silty Clay (CM/CS) olive gray, (5y 6/2)			
40			N-130-88-4 (- 40')		
		Becoming more silty ↓			
45					
50					

Project: USATHEMA	Boring: N-130-88	Page: 3 of 6

Depth/ Elevation	USCS Symbol/ Core Sketch	Soil/Rock Description	Sample Number & Depth	Blow Count & Recovery	Drilling Data
50		↓ Olive Grey clayey Silt. (from 35'	N-130-88-5 (-55')		
55		Clay, (C-) w̄ lm'c spotting. lt. bl'sh gy. ↓ becoming sandy			
60			N-130-88-6 (-60')		spoon sample 60-62
65		Gravely at base. w̄ well rd'd - flatish pbls.			
70		wh. SAND: fine grained; off-white - silty -	N-130-88-7 (-70')		
75					— Start 10-20-88 drilling w̄ air injection
80		2.5y 8/2 dry 6/2, damp	N-130-88-8 (-80')		
85					
90		Gravel; (GW) pea' to md. pbl (-1½') Mod well rd'd	N-130-88-9 (-90')		
95		Gravel (GP?) Mod rd'd - Mostly ~½" - flattish -			
100			N-130-88-10 (-100')		

Project: USASAMA	Boring: N-130-88	Page: 4 of 6

Depth/ Elevation	USCS Symbol/ Core Sketch	Soil/Rock Description	Sample Number & Depth	Blow Count & Recovery	Drilling Data
100		Clayey SAND (SC). Grey (10YR 7-8/1): V.f. grained			
105					
			N-130-88-11 (-110')		
110		GRAVEL (GW/GS), Sandy. Qtzite & Carb. pbls to ~1". well rd'd. Sd: lt.tn (2.5YR 8/2); f-m.c.g.			
			N-130-88-12 (-115')		
115					
120					-- Start 10-25-88, drilling w/ air & water injection.
125					
130		Clayey Silt. lt.yl. (2.5Y 8/2)			
135		SANDY GRAVEL (GS) Predom. blocky, ∠. few cft. Qtzite clasts - cbl frags to 2", 2ndary intrusives. SD: c.g - gritty.	N-130-88-13 (-135')		
140			N-130-88-14 (-140')		
145		Gravely, Clayey Sand (SG-SC) - lt yl (2.5YR 8/2); f-m.c.g. w/ pea gravel.			Drilling w/ air only to dry hole
			N-130-88-15 (-150'		
150					

Project: USATHAMA	Boring: N-130-88	Page: 5 of 6

Depth/ Elevation	USCS Symbol/ Core Sketch	Soil/Rock Description	Sample Number & Depth	Blow Count & Recovery	Drilling Data
150		Very Coarse Gravel (GP, GS) w̄ large (to 3") bldr n cbl frags.			
155			N-130-88-16 (- 155')		
160		Coarse Gravel predom. SS-qtzite			
165					
170		Andesite (?) (vol w̄ lt-dk gn aphanitic groundmass & pyrobole phenocrysts. Sharp, angular quadrate rock chips w̄ sandy calc. cement on joints n fracts.	N-130-88-17 (- 170'		
175					
180		Sandstone; yl. bn ( ) sub∠. chips. Some dk bn-silicified (scarn).	N-130-88-18 (- 180)		Start 10-26-88 drilling w̄ air only
185		(F-c. sd prob. crushed rock - in part.)			
190			N-130-88-19 (- 190)		
195					
200			N-130-88-20 (- 200')		

210'

Project: USATHAMA	Boring: N-130-88	Page: 6 of 6

Depth/ Elevation	USCS Symbol/ Core Sketch	Soil/Rock Description	Sample Number & Depth	Blow Count & Recovery	Drilling Data
200		Grey, fine grained-amorph rock cuttings w̄ hornblende? w̄ var yl hm-rd'bn feox alt rims (some cupritic red); occ garnet -some hbl(?) completely leached or w̄ remnant lim in vugs. -poss metased ∓ cuttings angular -sub∠.			
205			N-130-88-21 (-210)		
210		Volc. gvl(?): Andesite, tuff; — Sub rd pbl-like clasts. w̄. hm'c alt qtz'ts.	N-130-88-22 (-215')		
215					
220		Volc gvl (?) ∠. clasts w̄ fluffy, sdy-clayey coatings -cement? -hbl bearing rock w̄ 2ndy qtz.			
225					
230					
235			N-130-88-23 (-235')		
240		Alt. crystal-lithic tuffs - Tuffs: v. sdy text; matrix variable alt to clay. Lithic frags gen andesitic? -dark volc, some w̄ green amorph alt. minerals	N-130-88-24 (242-244)		WATER BEARIN
245	TP	↓			

APPENDIX C

GEOTECHNICAL TESTING PROGRAM RESULTS

rthern
Engineering and Testing, Inc.
400 West 900 North
Building #8
P. O. Box 281
North Salt Lake City, Utah 84054
(801) 298-9314

TECHNICAL REPORT

REPORT TO:
Weston
Attention: Mr. Paul Darr
5301 Central Avenue, NE, Suite 1000
Albuquerque, NM 87108

DATE: December 9, 1988
JOB NUMBER: 88-2371
SHEET: 1 **OF** 11
INVOICE NO.: 4545U

REPORT OF: Geotechnical Laboratory Tests for the U.S.A.T.H.A.M.A. Tooele Army Depot; Tooele, Utah

Sample Identification

On November 4, 1988, your personnel delivered to our laboratory Bore Hole Samples reported to be from the above referenced project. At your request, we performed the following tests in accordance with the indicated standard:

Test Description	Test Method
Moisture Content	ASTM D2216
Liquid Limit, Plastic Limit, and Plasticity Index of Soil	ASTM D4318
Mechanical Analysis	ASTM D422
Specific Gravity	ASTM D854

The test results are summarized as follows:

Test Results

AS A MUTUAL PROTECTION TO CLIENTS THE PUBLIC AND OURSELVES ALL REPORTS ARE SUBMITTED AS THE CONFIDENTIAL PROPERTY OF OUR CLIENTS AND AUTHORIZATION FOR PUBLICATION OF STATEMENTS CONCLUSIONS OR EXTRACTS FROM OR REGARDING OUR REPORTS IS RESERVED PENDING OUR WRITTEN APPROVAL SAMPLES WILL BE DISPOSED OF AFTER TESTING IS COMPLETED UNLESS OTHER ARRANGEMENTS ARE AGREED TO IN WRITING

Sample No.	N-101-88	N-102-88	N-102-88
Depth	19.5 - 20.0	19.5 - 21.0	24.5 - 26.0
Lab No.	24628	24629	24630

Gradation

Sieve Size or Particle Dia., mm.	Percent Passing	Sieve Size or Particle Dia., mm.	Percent Passing	Sieve Size or Particle Dia., mm.	Percent Passing
1 1/2"	100				
1"	89				
3/4"	89			3/4"	100
1/2"	89			1/2"	98
3/8"	89			3/8"	98
No. 4	89			No. 4	98
No. 10	89			No. 10	98
No. 20	88	No. 20	100	No. 20	98
No. 40	87	No. 40	99	No. 40	97
No. 80	85	No. 80	99	No. 80	95
No. 100	83	No. 100	98	No. 100	94
No. 200	68	No. 200	91	No. 200	84
0.059	58	0.057	81	0.057	72
0.044	48	0.042	71	0.043	61
0.028	31	0.027	52	0.027	43
0.024	28	0.024	47	0.024	39
0.016	17	0.016	35	0.016	27
0.012	15	0.012	27	0.012	24
0.007	12	0.007	21	0.007	17
0.005	10	0.005	18	0.005	15
0.003	8	0.003	14	0.003	10
0.002	6	0.002	12	0.002	9
0.001	4	0.001	7	0.001	8
Specific Gravity	2.69		2.63		2.61

Moisture Content

Natural Moisture Content, %	11.3	24.0	24.4

Atterberg Limits

Liquid Limit, %	--	--	--
Plastic Limit, %	--	--	--
Plasticity Index, %	Granular Non-Plastic	Granular Non-Plastic	Granular Non-Plastic

Sample No.	N-103-88	N-104-88-35	N-105-88-3
Depth	34.5 - 36.0	34.0 - 35.5	14.0 - 15.5
Lab No.	24631	24632	24633

Gradation

Sieve Size or Particle Dia., mm.	Percent Passing	Sieve Size or Particle Dia., mm.	Percent Passing	Sieve Size or Particle Dia., mm.	Percent Passing
				No. 4	100
		No. 10	100	No. 10	99
		No. 20	99	No. 20	99
		No. 40	98	No. 40	98
		No. 80	79	No. 80	96
No. 100	100	No. 100	68	No. 100	96
No. 200	88	No. 200	39	No. 200	87
0.059	66	0.068	37	0.058	76
0.045	50	0.049	30	0.044	64
0.028	30	0.029	24	0.027	45
0.024	26	0.024	22	0.024	41
0.016	21	0.016	19	0.016	29
0.012	17	0.012	16	0.012	25
0.007	12	0.007	13	0.007	20
0.005	10	0.005	12	0.005	17
0.003	9	0.003	10	0.003	14
0.002	8	0.002	9	0.002	13
0.001	7	0.001	7	0.001	8
Specific Gravity	2.68		2.65		2.60

Moisture Content

Natural Moisture Content, %	19.5	5.6	21.8

Atterberg Limits

Liquid Limit, %	--	--	--
Plastic Limit, %	--	--	--
Plasticity Index, %	Granular Non-Plastic	Granular Non-Plastic	Granular Non-Platic

Sample No.	N-106-88-5	N-106-88-8	N-107-88-3
Depth	24.0 - 25.0	39.0 - 40.5	14.0 - 15.5
Lab No.	24634	24635	24636

Gradation

Sieve Size or Particle Dia., mm.	Percent Passing	Sieve Size or Particle Dia., mm.	Percent Passing	Sieve Size or Particle Dia., mm.	Percent Passing
No. 10	100				
No. 20	99				
No. 40	98	No. 40	100	No. 40	100
No. 80	97	No. 80	99	No. 80	99
No. 100	96	No. 100	99	No. 100	97
No. 200	87	No. 200	97	No. 200	79
0.057	75	0.055	83	0.061	63
0.043	65	0.041	75	0.046	48
0.027	46	0.026	57	0.029	30
0.024	42	0.022	54	0.025	27
0.016	29	0.015	43	0.016	19
0.011	28	0.011	39	0.012	14
0.007	21	0.006	29	0.007	10
0.005	19	0.004	26	0.005	9
0.003	16	0.003	23	0.003	7
0.002	13	0.002	20	0.002	6
0.001	10	0.001	14	0.001	5

Specific Gravity	2.65	2.67	2.65

Moisture Content

Natural Moisture Content, %	19.8	27.6	6.0

Atterberg Limits

Liquid Limit, %	--	32	--
Plastic Limit, %	--	21	--
Plasticity Index, %	Granular Non-Plastic	11	Granular Non-Plastic

Sample No.	N-109-5	N-110-88	N-110-88
Depth	24.0 - 25.5	60.0 - 61.0	75.0 - 76.0
Lab No.	24637	24638	24639*

Gradation

Sieve Size or Particle Dia., mm.	Percent Passing	Sieve Size or Particle Dia., mm.	Percent Passing	Sieve Size or Particle Dia., mm.	Percent Passing
No. 40	100				
No. 80	99				
No. 100	99	No. 100	100		
No. 200	90	No. 200	98	No. 200	100
0.059	75	0.052	79		
0.044	62	0.042	70		
0.028	42	0.026	55		
0.024	38	0.023	52		
0.016	28	0.014	45		
0.012	22	0.011	36		
0.007	17	0.007	27		
0.005	15	0.005	21		
0.003	13	0.003	19		
0.002	11	0.002	18		
0.001	8	0.001	12		
Specific Gravity	2.63		2.63		

Moisture Content

Natural Moisture Content, %	23.7	12.8	31.4

Atterberg Limits

Liquid Limit, %	--	30	60
Plastic Limit, %	--	22	23
Plasticity Index, %	Granular Non-Plastic	8	37

*Insufficient Sample Prohibited Performance of all the Tests Requested.

Sample No.	N-111-88	N-112-88-16	N-120-88-12
Depth	70.0	156.5 - 158.0	12.0
Lab No.	24640	24641	24642*

Gradation

Sieve Size or Particle Dia., mm.	Percent Passing	Sieve Size or Particle Dia., mm.	Percent Passing	Sieve Size or Particle Dia., mm.	Percent Passing
		1 1/2"	100	1 1/2"	100
1"	100	1"	83	1"	49
3/4"	94	3/4"	83	3/4"	42
1/2"	90	1/2"	83	1/2"	39
3/8"	90	3/8"	82	3/8"	37
No. 4	89	No. 4	81	No. 4	33
No. 10	88	No. 10	79	No. 10	31
No. 20	88	No. 20	77	No. 20	29
No. 40	88	No. 40	76	No. 40	29
No. 80	85	No. 80	72	No. 80	27
No. 100	82	No. 100	70	No. 100	26
No. 200	61	No. 200	60	No. 200	21
0.067	42	0.058	59		
0.048	37	0.045	45		
0.029	29	0.027	38		
0.025	27	0.023	37		
0.016	24	0.015	32		
0.012	19	0.011	28		
0.007	18	0.006	24		
0.005	17	0.005	22		
0.003	15	0.003	19		
0.002	13	0.002	18		
0.001	11	0.001	15		

Specific Gravity	2.63	2.64	--
Moisture Content			
Natural Moisture Content, %	16.7	14.2	5.8
Atterberg Limits			
Liquid Limit, %	--	24	--
Plastic Limit, %	--	15	--
Plasticity Index, %	Granular Non-Plastic	9	--

*Insufficient Sample Prohibited Performance of all the Tests Requested.

Sample No.	N-121-88	N-121-88	N-122-88
Depth	50.0 - 51.5	60.0 - 61.5	30.0 - 31.0
Lab No.	24643	24644	24645

Gradation

Sieve Size or Particle Dia., mm.	Percent Passing	Sieve Size or Particle Dia., mm.	Percent Passing	Sieve Size or Particle Dia., mm.	Percent Passing
				No. 20	100
				No. 40	99
		No. 80	100	No. 80	99
No. 100	100	No. 100	99	No. 100	99
No. 200	87	No. 200	91	No. 200	96
0.062	65	0.060	77	0.055	91
0.046	56	0.044	67	0.042	79
0.028	40	0.027	51	0.025	65
0.024	33	0.024	45	0.022	61
0.016	24	0.016	33	0.015	49
0.012	21	0.012	29	0.011	41
0.007	18	0.007	22	0.006	32
0.005	14	0.005	18	0.005	27
0.003	12	0.003	15	0.003	23
0.002	10	0.002	12	0.002	21
0.001	8	0.001	8	0.001	14
Specific Gravity	2.67		2.63		2.65

Moisture Content

Natural Moisture Content, %	31.6	40.3	31.6

Atterberg Limits

Liquid Limit, %	--	--	28
Plastic Limit, %	--	--	22
Plasticity Index, %	Granular Non-Plastic	Granular Non-Plastic	6

Sample No.	N-122-88-7	N-122-88	N-122-88
Depth	39.5 - 40.5	40.0 - 41.5	45.0 - 46.5
Lab No.	24646	24647	24648*

Gradation

Sieve Size or Particle Dia., mm.	Percent Passing	Sieve Size or Particle Dia., mm.	Percent Passing	Sieve Size or Particle Dia., mm.	Percent Passing
No. 20	100				
No. 40	99				
No. 80	99	No. 80	100		
No. 100	99	No. 100	99		
No. 200	82	No. 200	86	No. 200	100
0.061	62	0.060	67		
0.045	53	0.047	44		
0.027	39	0.030	16		
0.024	35	0.026	14		
0.016	27	0.017	12		
0.012	21	0.012	10		
0.007	16	0.007	9		
0.005	12	0.005	9		
0.003	9	0.003	7		
0.002	8	0.002	6		
0.001	7	0.001	5		
Specific Gravity	2.68		2.65		--

Moisture Content

Natural Moisture Content, %	13.6	27.0	35.2

Atterberg Limits

Liquid Limit, %	--	--	50
Plastic Limit, %	--	--	24
Plasticity Index, %	Granular Non-Plastic	Granular Non-Plastic	26

*Insufficient Sample Prohibited Performance of all the Tests Requested.

Sample No.	N-123-88-7	N-123-88-8	N-127-88-6
Depth	39.5 - 40.5	49.5 - 50.5	65.0
Lab No.	24649	24650	24651

Gradation

Sieve Size or Particle Dia., mm.	Percent Passing	Sieve Size or Particle Dia., mm.	Percent Passing	Sieve Size or Particle Dia., mm.	Percent Passing
1/2"	100				
3/8"	99				
No. 4	99				
No. 10	99				
No. 20	99				
No. 40	99	No. 40	100		
No. 80	98	No. 80	99		
No. 100	97	No. 100	99		
No. 200	73	No. 200	96	No. 200	100
0.063	57	0.056	82	0.054	95
0.047	44	0.042	72	0.040	87
0.028	32	0.026	57	0.025	73
0.025	29	0.023	50	0.022	67
0.016	24	0.015	38	0.014	59
0.012	19	0.011	32	0.011	51
0.007	15	0.007	26	0.006	49
0.005	12	0.005	22	0.004	39
0.003	11	0.003	19	0.003	34
0.002	10	0.002	17	0.002	26
0.001	7	0.001	13	0.001	20

Specific Gravity	2.65	2.65	2.67

Moisture Content

Natural Moisture Content, %	9.2	24.4	14.0

Atterberg Limits

Liquid Limit, %	--	30	36
Plastic Limit, %	--	23	21
Plasticity Index, %	Granular Non-Plastic	7	15

Sample No.	N-128-88-4	N-128-88-7	N-129-88-4
Depth	44.5	75.0 - 77.0	45.0 - 47.0
Lab No.	24652	24653	24654

Gradation

Sieve Size or Particle Dia., mm.	Percent Passing	Sieve Size or Particle Dia., mm.	Percent Passing	Sieve Size or Particle Dia., mm.	Percent Passing
No. 20	100				
No. 40	99				
No. 80	99	No. 80	100		
No. 100	98	No. 100	99	No. 100	100
No. 200	98	No. 200	99	No. 200	99
0.051	93	0.050	97	0.051	97
0.036	91	0.036	96	0.037	93
0.022	88	0.021	94	0.022	84
0.019	86	0.018	92	0.020	82
0.012	84	0.012	89	0.013	73
0.009	76	0.009	84	0.010	64
0.005	69	0.005	74	0.006	53
0.004	54	0.004	69	0.004	44
0.003	46	0.003	61	0.003	37
0.002	37	0.002	53	0.002	31
0.001	27	0.001	42	0.001	23
Specific Gravity	2.70		2.67		2.67

Moisture Content

Natural Moisture Content, %	38.1	39.6	35.1

Atterberg Limits

Liquid Limit, %	49	58	42
Plastic Limit, %	23	23	22
Plasticity Index, %	26	35	20

Sample No.	N-129-88-6	N-130-88-5
Depth	60.0 - 62.0	55.0
Lab No.	24655	24656*

Gradation

Sieve Size or Particle Dia., mm.	Percent Passing	Sieve Size or Particle Dia., mm.	Percent Passing
No. 200	100	No. 200	100
0.051	95		
0.037	93		
0.022	88		
0.019	86		
0.013	80		
0.009	74		
0.006	62		
0.004	52		
0.003	44		
0.002	37		
0.001	28		
Specific Gravity	2.66		--

Moisture Content

Natural Moisture Content, %	38.6	3.9

Atterberg Limits

Liquid Limit, %	47	47
Plastic Limit, %	23	17
Plasticity Index, %	24	30

*Insufficient Sample Prohibited Performance of all the Tests Requested.

Reviewed by

APPENDIX D

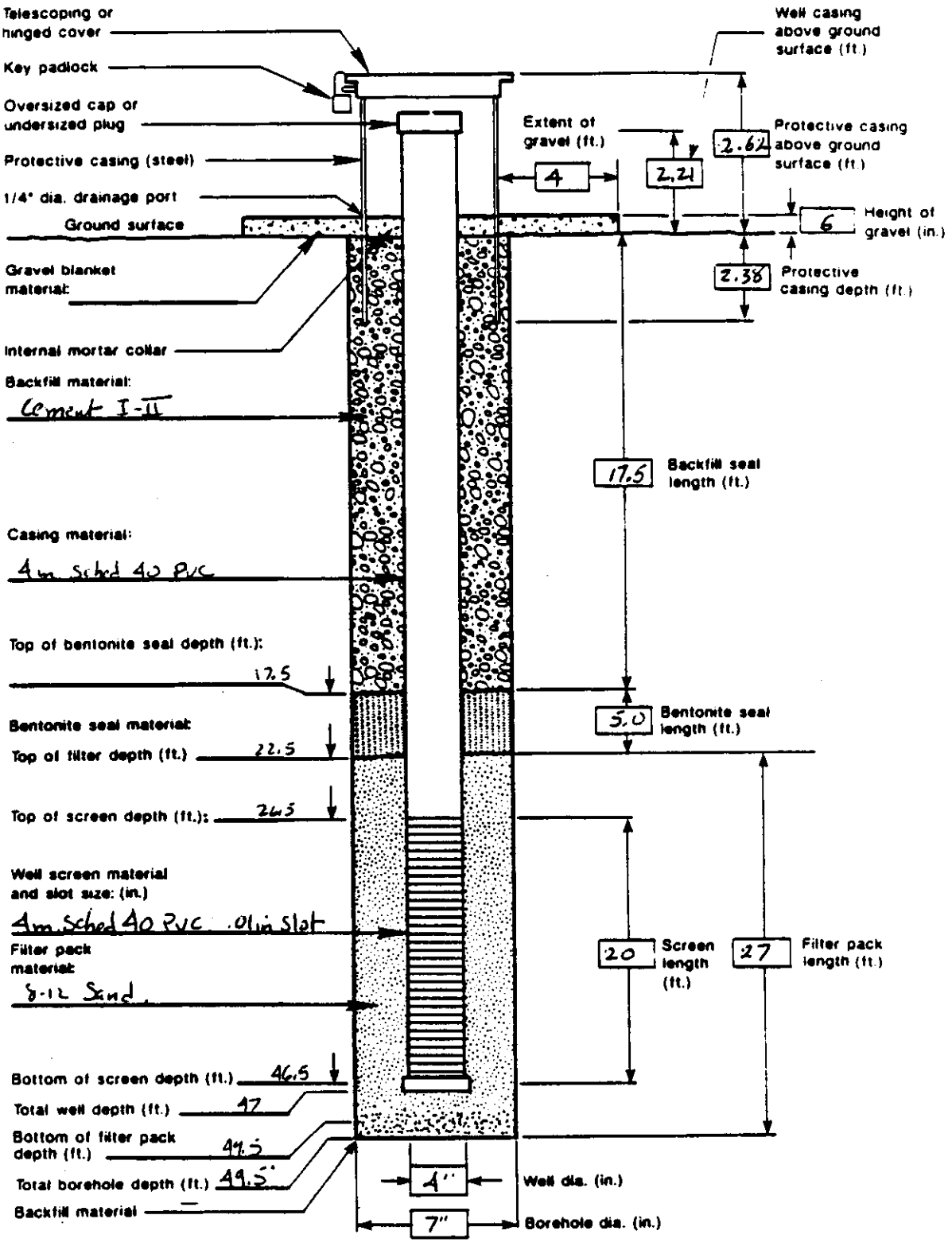
WELL CONSTRUCTION DETAILS

Well Construction Information Form

WELL DESIGNATION: N-101-88 INSTALLATION START DATE: 2-23-88

LOCATION: N-TEAD TNT washout INSTALLATION COMPLETION DATE: 2-23-88

COMMENTS: Well abandoned Well pulled and hole grouted up to surface.



[illegible] Donnell / G. J. Buxchus 2-1-89

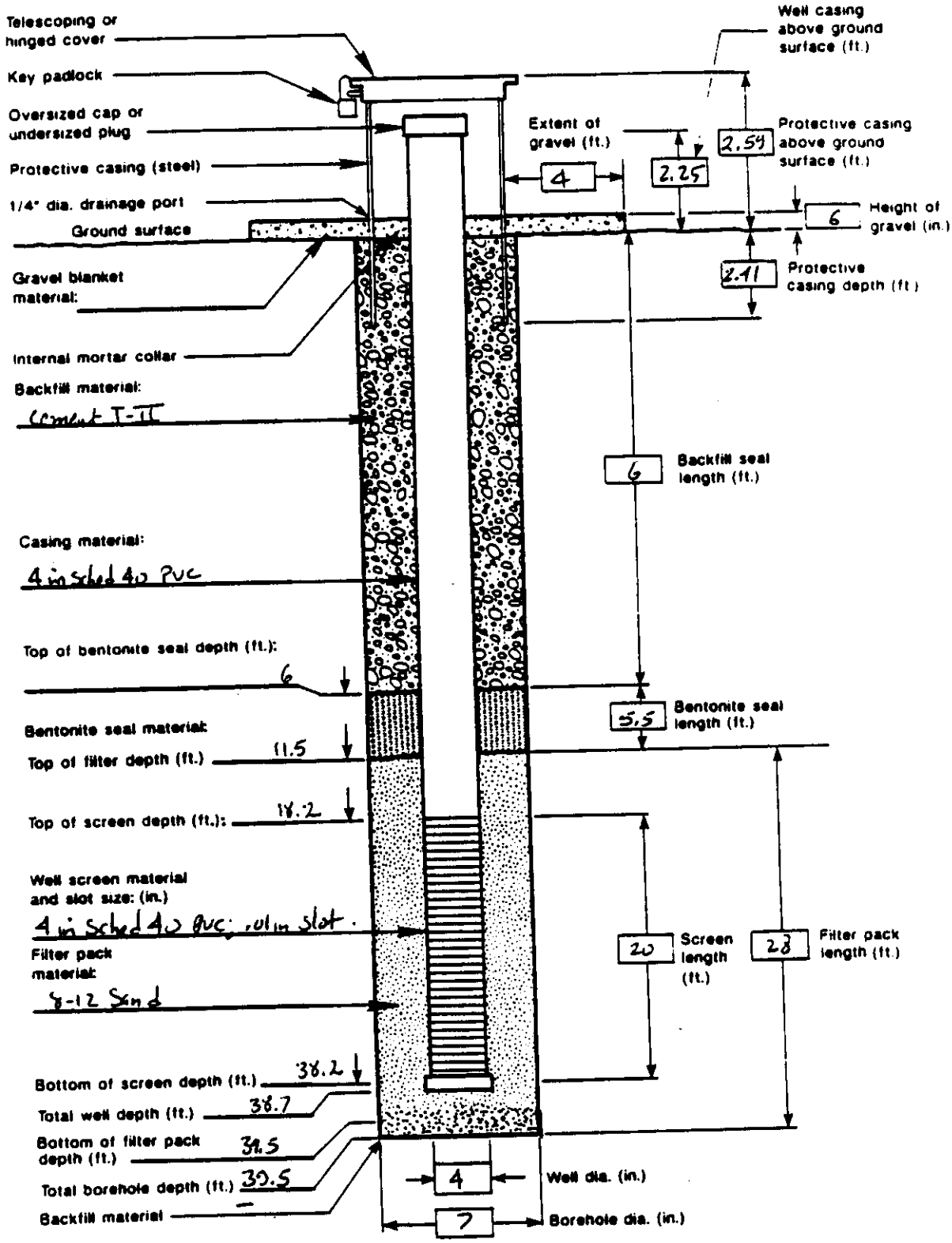
FORM COMPLETED BY/ DATE

Well Construction Information Form

WELL DESIGNATION: N-102-88 INSTALLATION START DATE: 2-23-88

LOCATION: N-TEAD INT WASHOUT INSTALLATION COMPLETION DATE: 2-23-88

COMMENTS: _____



J. McDonnell / C. J. Rocchio 2-1-89

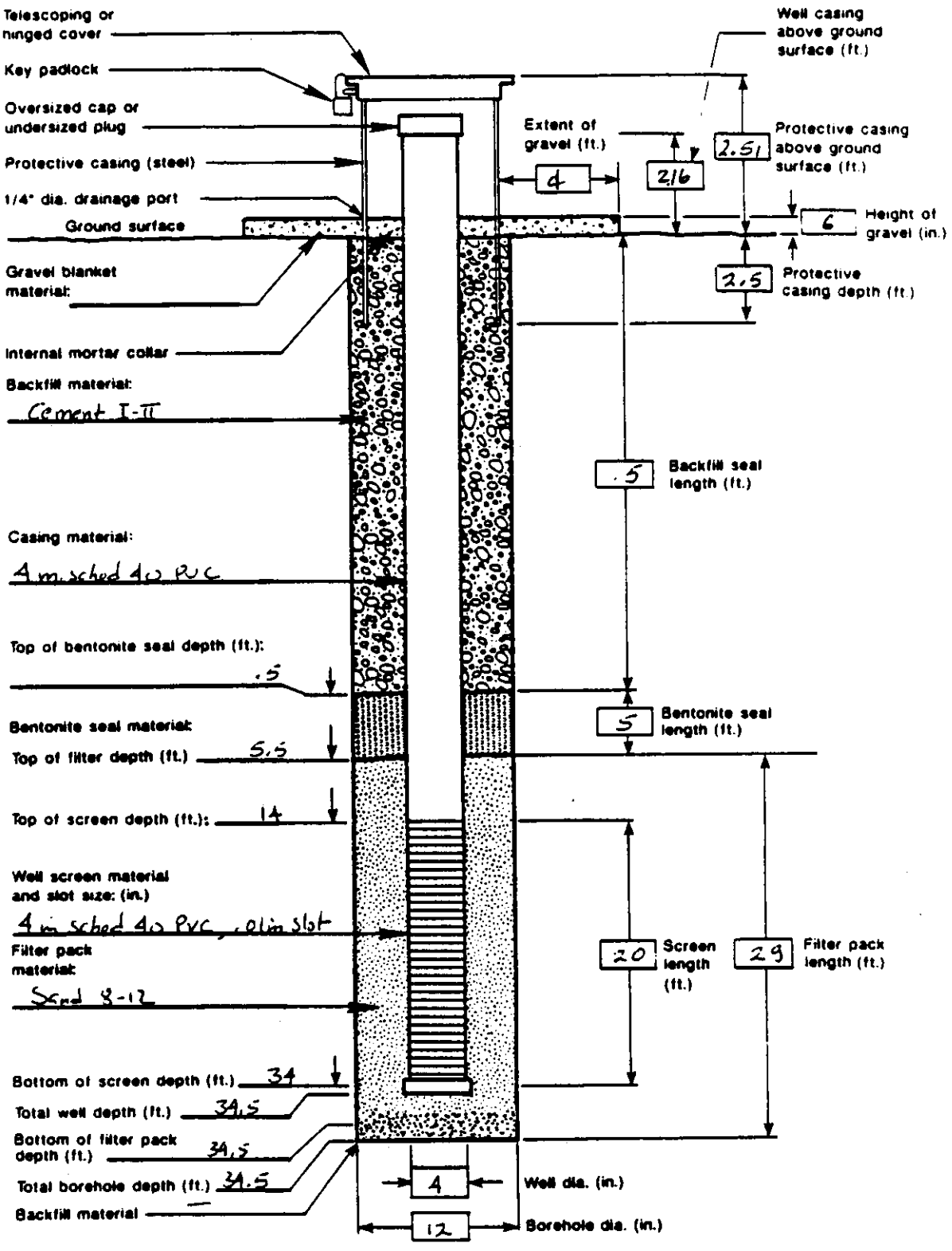
FORM COMPLETED BY/ DATE

Well Construction Information Form

WELL DESIGNATION: N-103-88 INSTALLATION START DATE: 2-24-8

LOCATION: N-TEAD TNT WASHOUT INSTALLATION COMPLETION DATE: 2-24-88

COMMENTS: _____



V. McDonnell/G. Bocchus 2-1-89

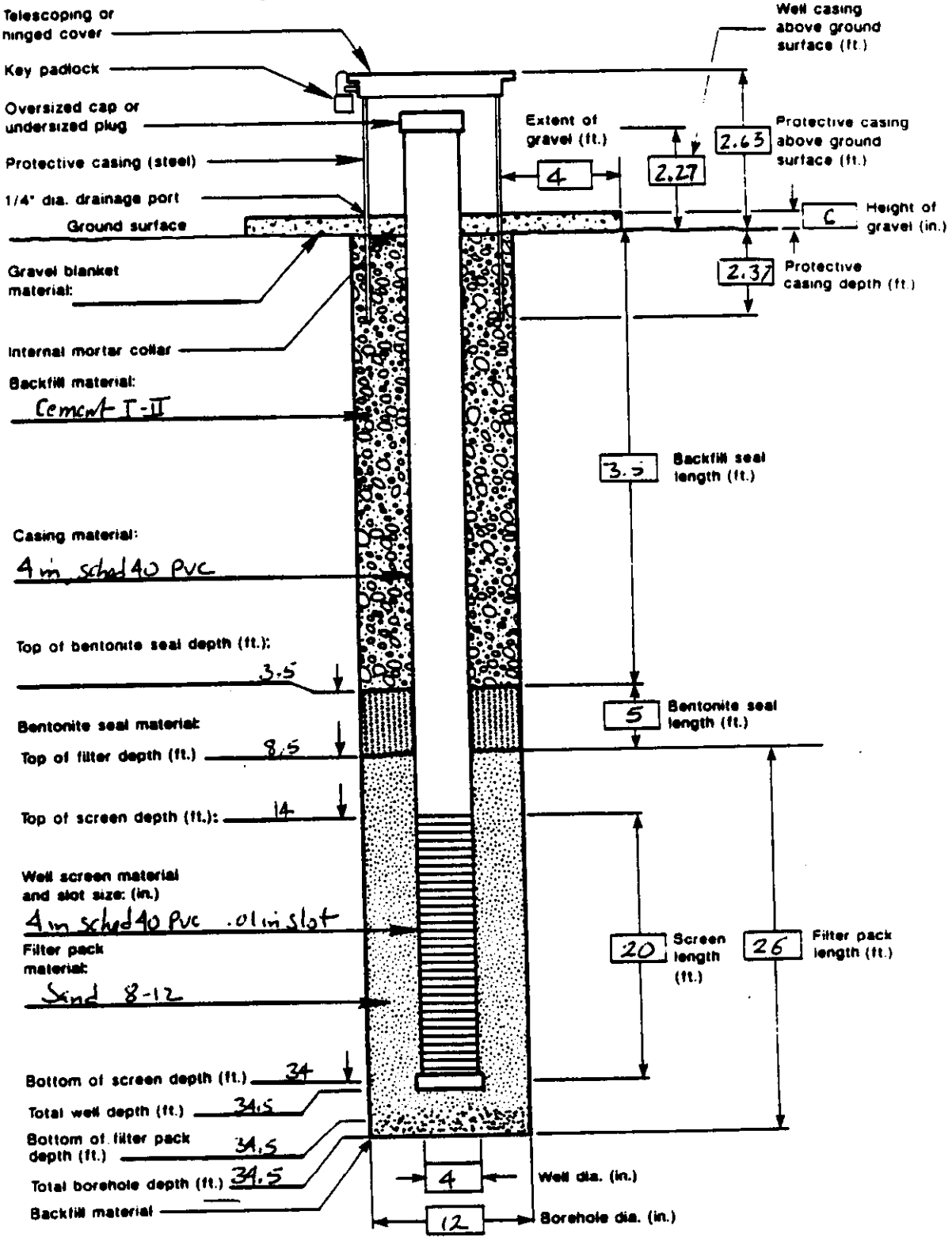
FORM COMPLETED BY/ DATE

Well Construction Information Form

WELL DESIGNATION: N-104-88 INSTALLATION START DATE: 2-25-88

LOCATION: N-TEAD TNT washout INSTALLATION COMPLETION DATE: 2-25-88

COMMENTS: Well abandoned Well pulled and hole grouted up to surface.



[signature] 2-1-89

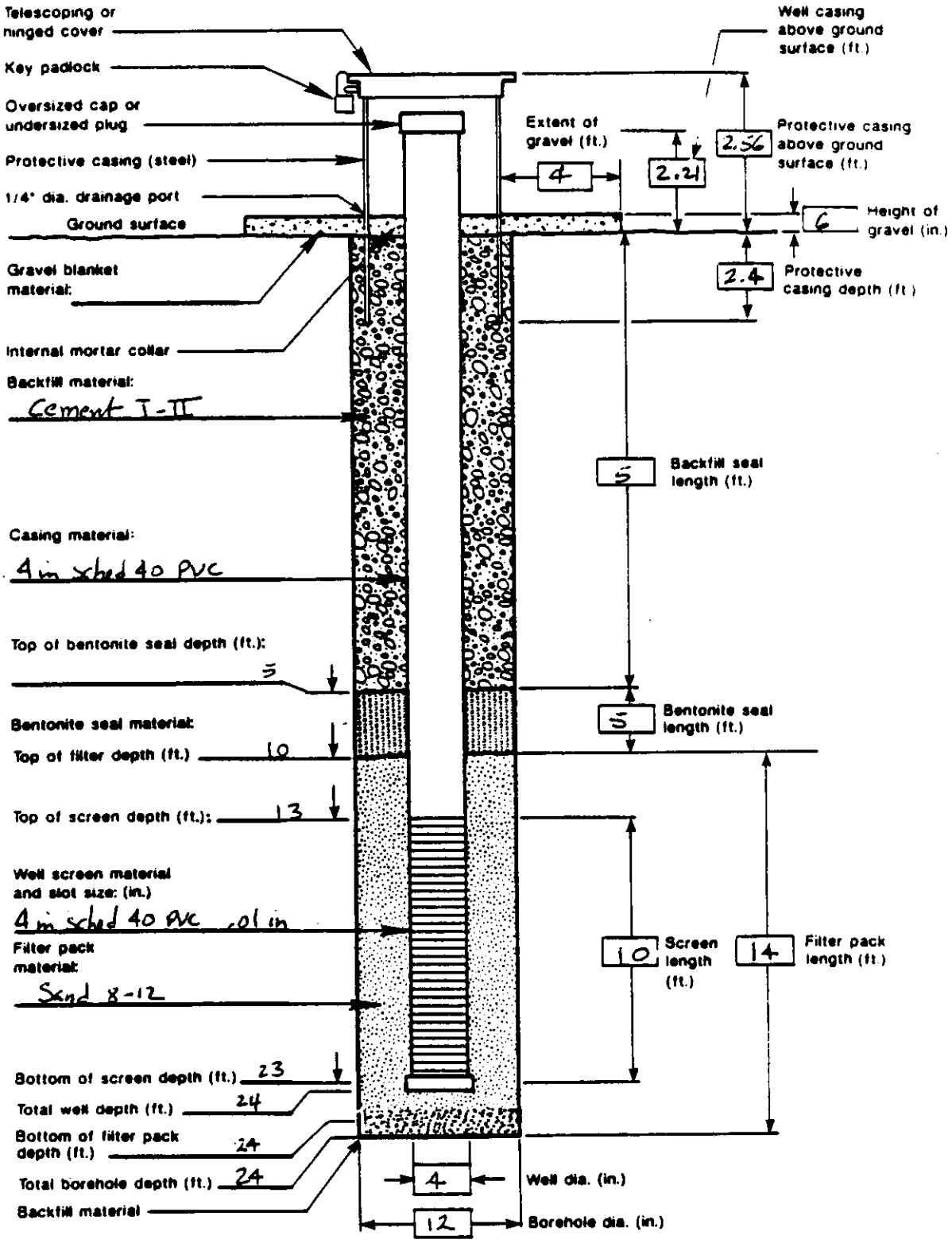
FORM COMPLETED BY / DATE

Well Construction Information Form

WELL DESIGNATION: N-105-88 INSTALLATION START DATE: 2-26-88

LOCATION: N. TEAD TWP WASHOUT INSTALLATION COMPLETION DATE: 2-26-88

COMMENTS: Well abandoned. Well pulled and hole grouted up to surface.



W. McDonnell L.J. Baccaus 2-1-89

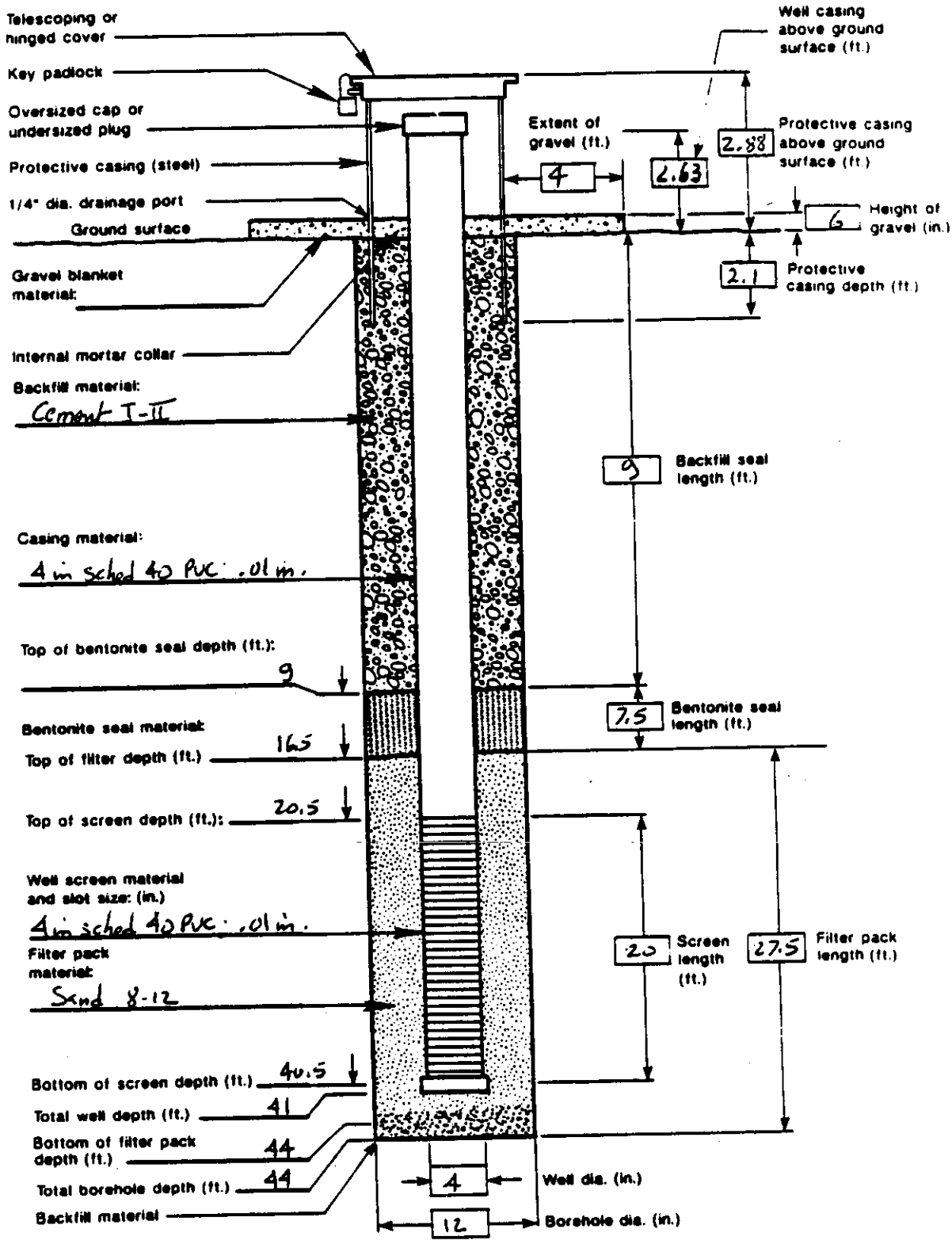
FORM COMPLETED BY/ DATE

Well Construction Information Form

WELL DESIGNATION: N-106-88 INSTALLATION START DATE: 2-27-88

LOCATION: N-T&O TNT Washout INSTALLATION COMPLETION DATE: 2-27-88

COMMENTS: _____



J. McDonald / J. Baccaus 2-1-89

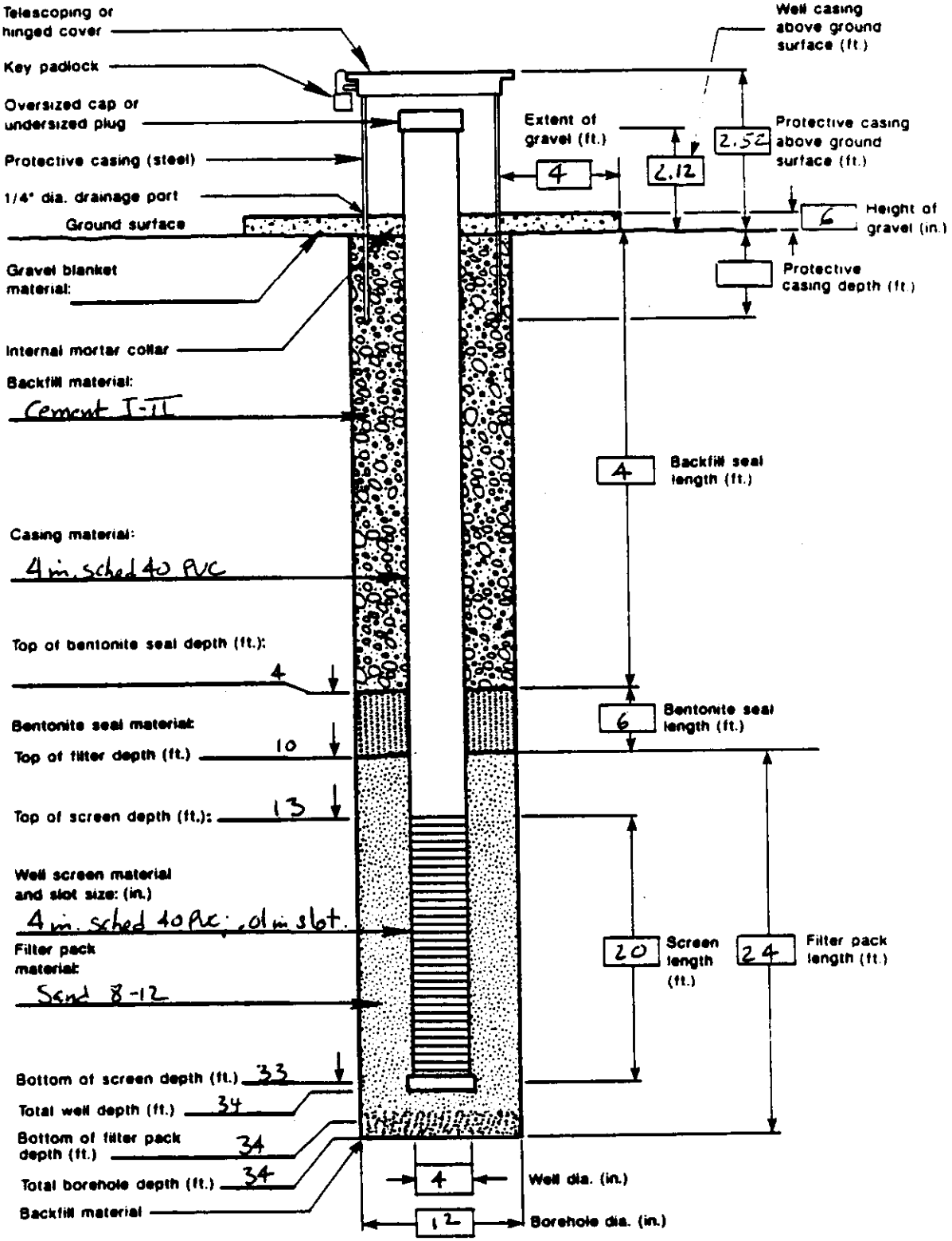
FORM COMPLETED BY / DATE

Well Construction Information Form

WELL DESIGNATION: N-107-88 INSTALLATION START DATE: 2-27-88

LOCATION: N-TEAD TNT washout INSTALLATION COMPLETION DATE: 2-27-88

COMMENTS: Well abandoned. Well pulled and grouted to surface.



John McDonnell & J Baccus 2-1-89

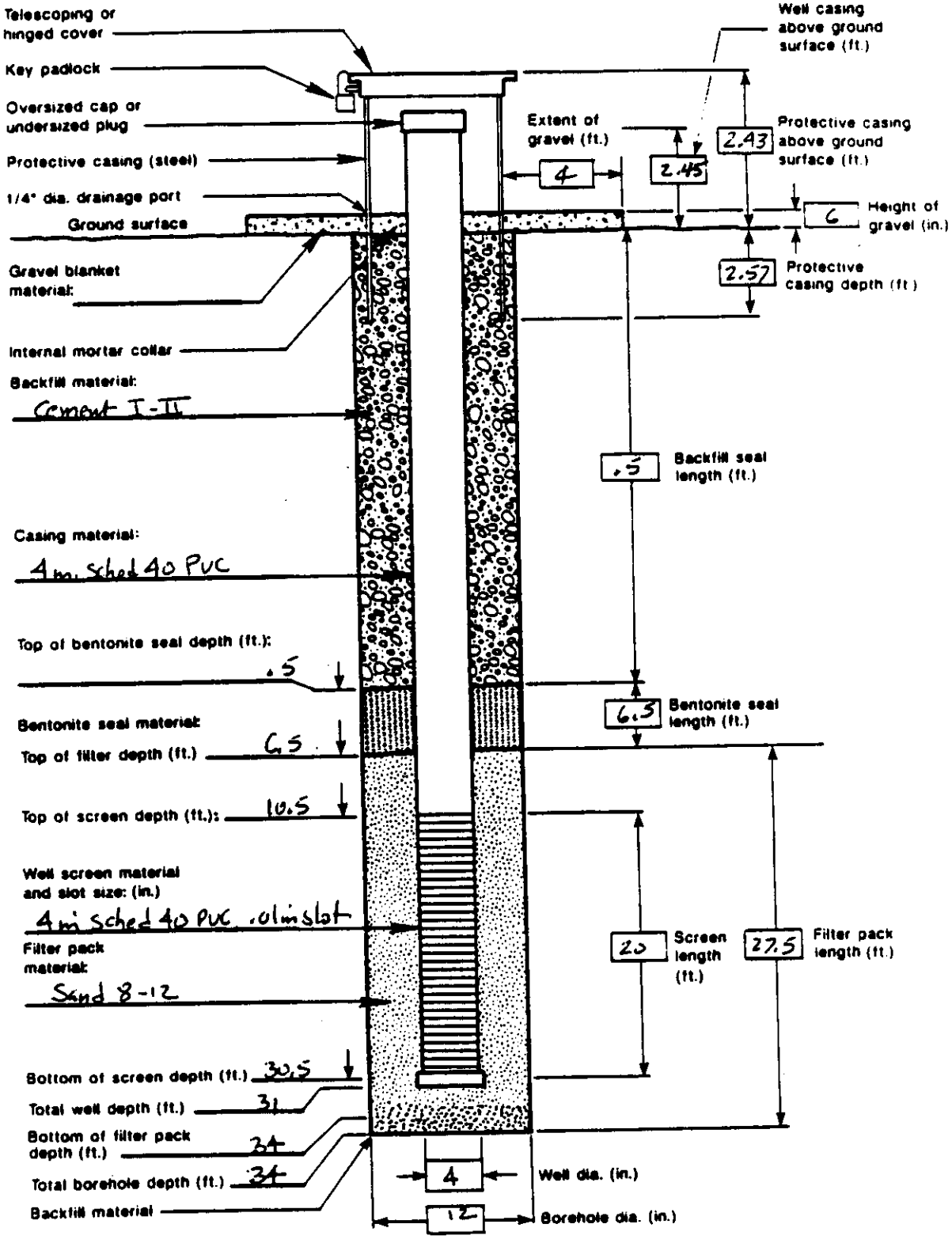
FORM COMPLETED BY/ DATE

Well Construction Information Form

WELL DESIGNATION: N-108-88 INSTALLATION START DATE: 2-28-88

LOCATION: N-Tract TNT Washout INSTALLATION COMPLETION DATE: 2-28-88

COMMENTS: Well abandoned. Well pulled and grouted up to surface



J.L. McDonnell C.J. Barnes 2-1-89

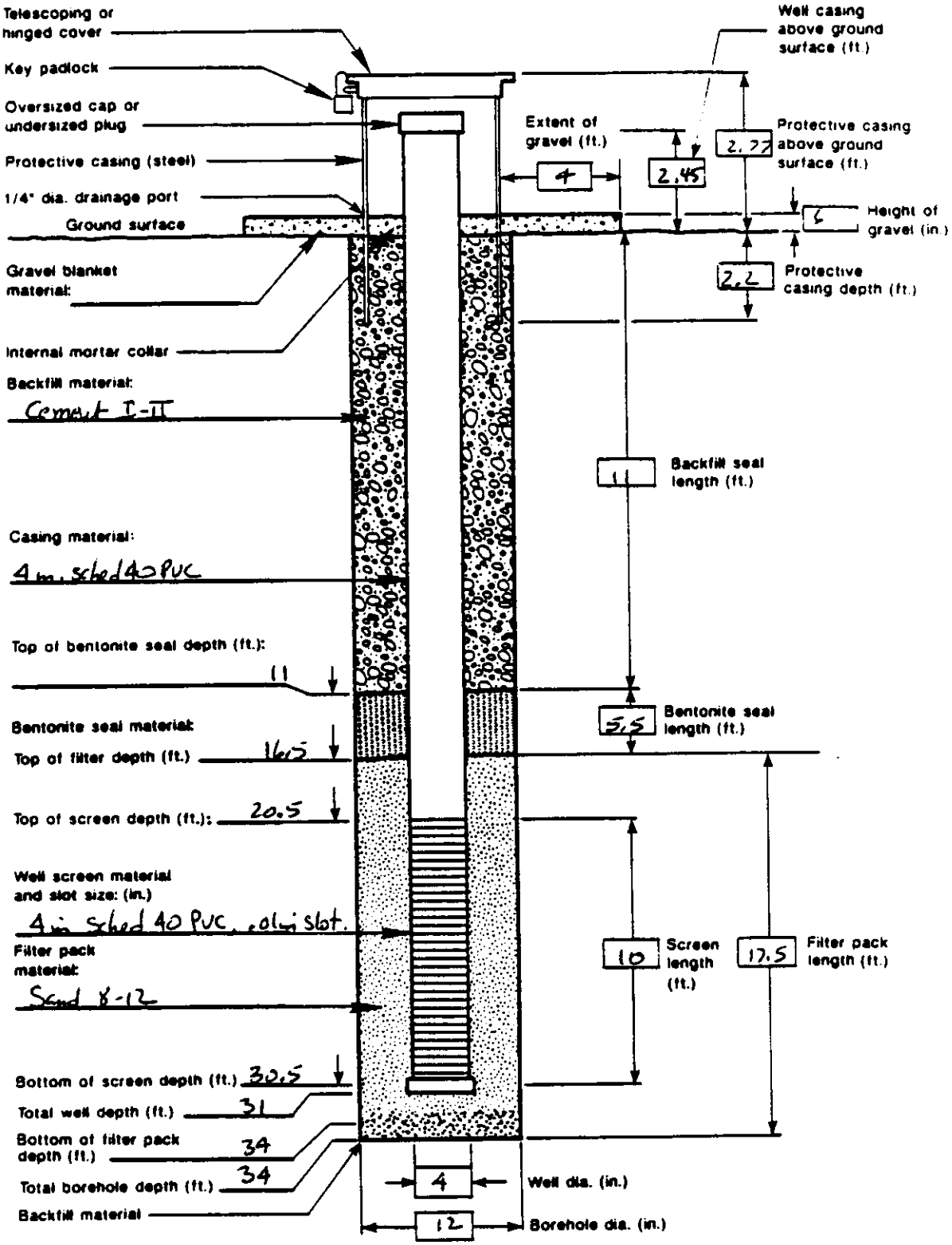
FORM COMPLETED BY/ DATE

Well Construction Information Form

WELL DESIGNATION: N-109-88 INSTALLATION START DATE: 2-28-88

LOCATION: N-TEAD TNT Washout INSTALLATION COMPLETION DATE: 2-28-88

COMMENTS: Well abandoned. Well casing pulled and hole grouted to surface.



[signature] for J. Boccius 2-1-89

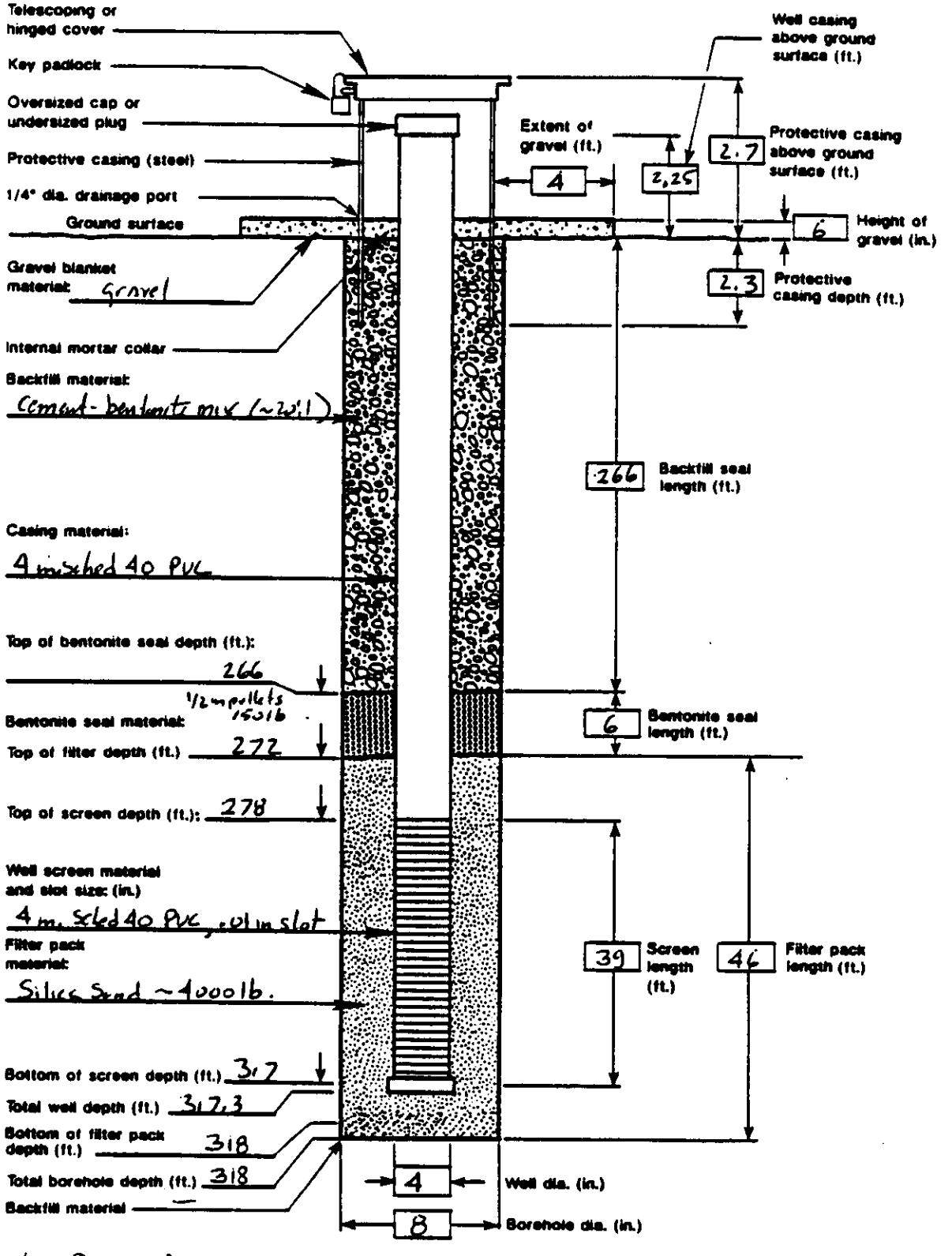
FORM COMPLETED BY/ DATE

Well Construction Information Form

WELL DESIGNATION: N-110-88 INSTALLATION START DATE: 8-5-88

LOCATION: N-TAD S. of TNT workout INSTALLATION COMPLETION DATE: 8-6-88

COMMENTS:



J. McDonald / L.J. Fitts 2-1-89

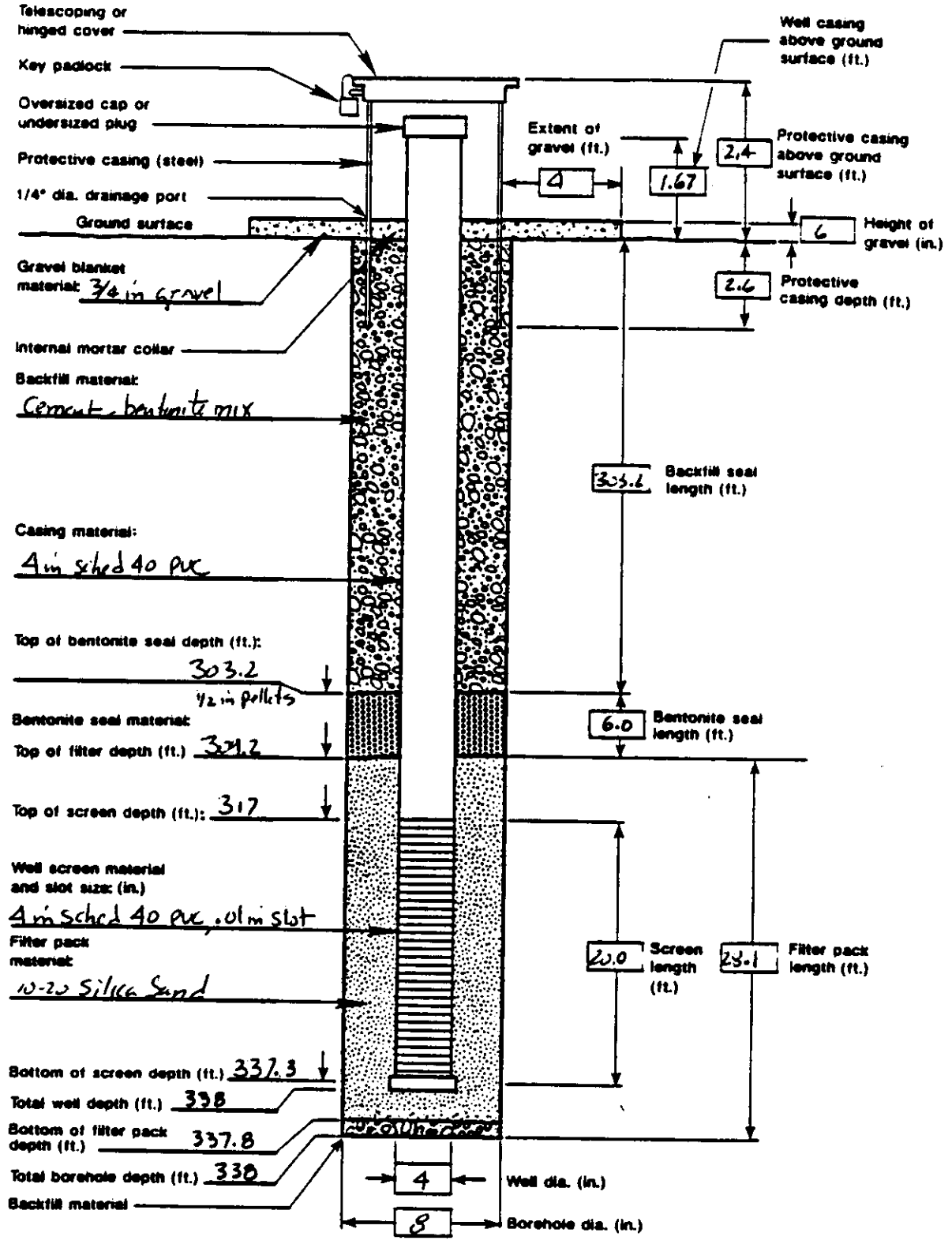
FORM COMPLETED BY/ DATE

Well Construction Information Form

WELL DESIGNATION: N-111-88 INSTALLATION START DATE: 3-31-88

LOCATION: N-TEAD Drum Storage INSTALLATION COMPLETION DATE: 4-5-88

COMMENTS: _____



W. McDonald for K Holliday 2-1-89

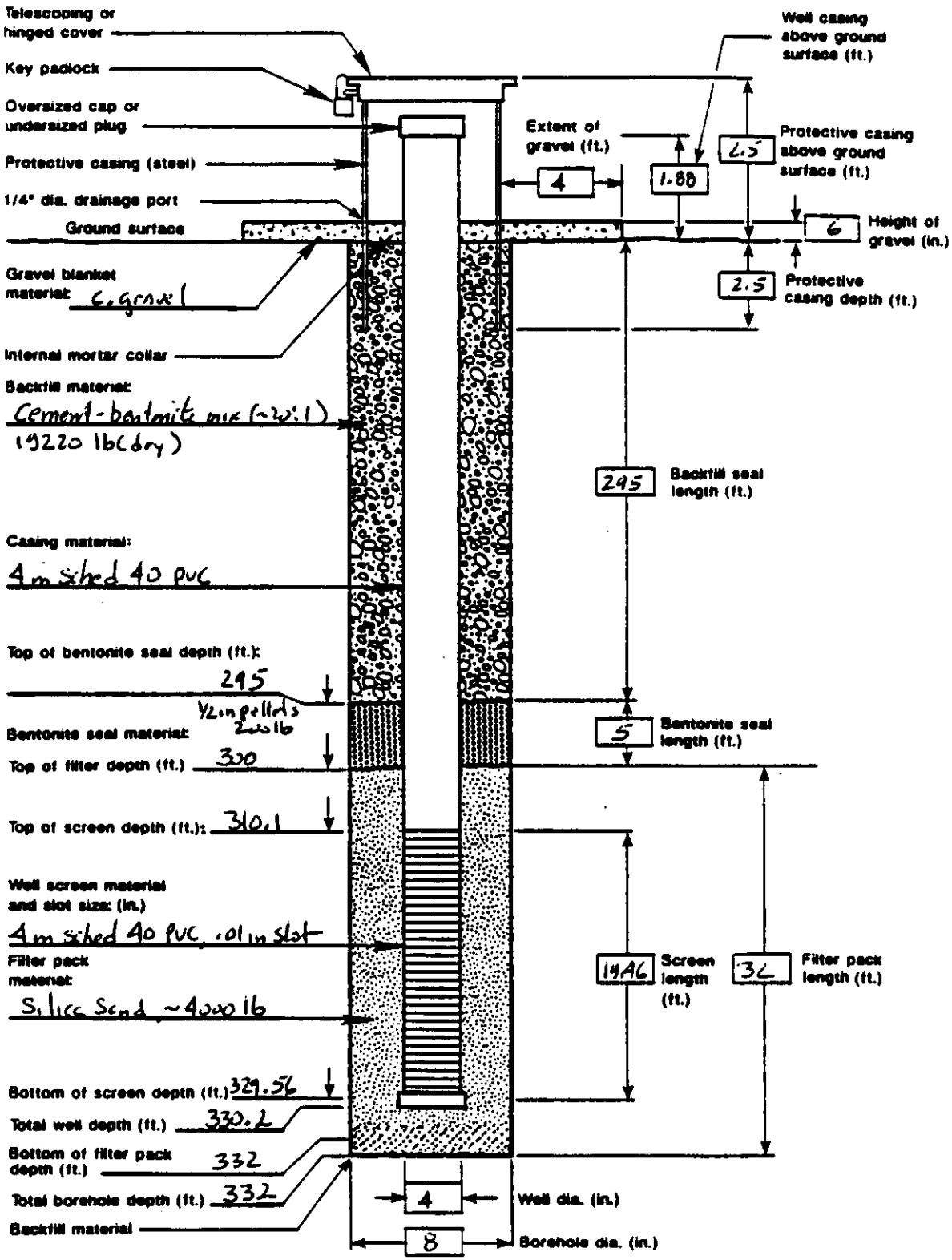
FORM COMPLETED BY/ DATE

Well Construction Information Form

WELL DESIGNATION: N-112-88 INSTALLATION START DATE: 4-23-88

LOCATION: N-Tead Dump Storage INSTALLATION COMPLETION DATE: 4-27-88

COMMENTS: _____



John McDonnell 2-1-89

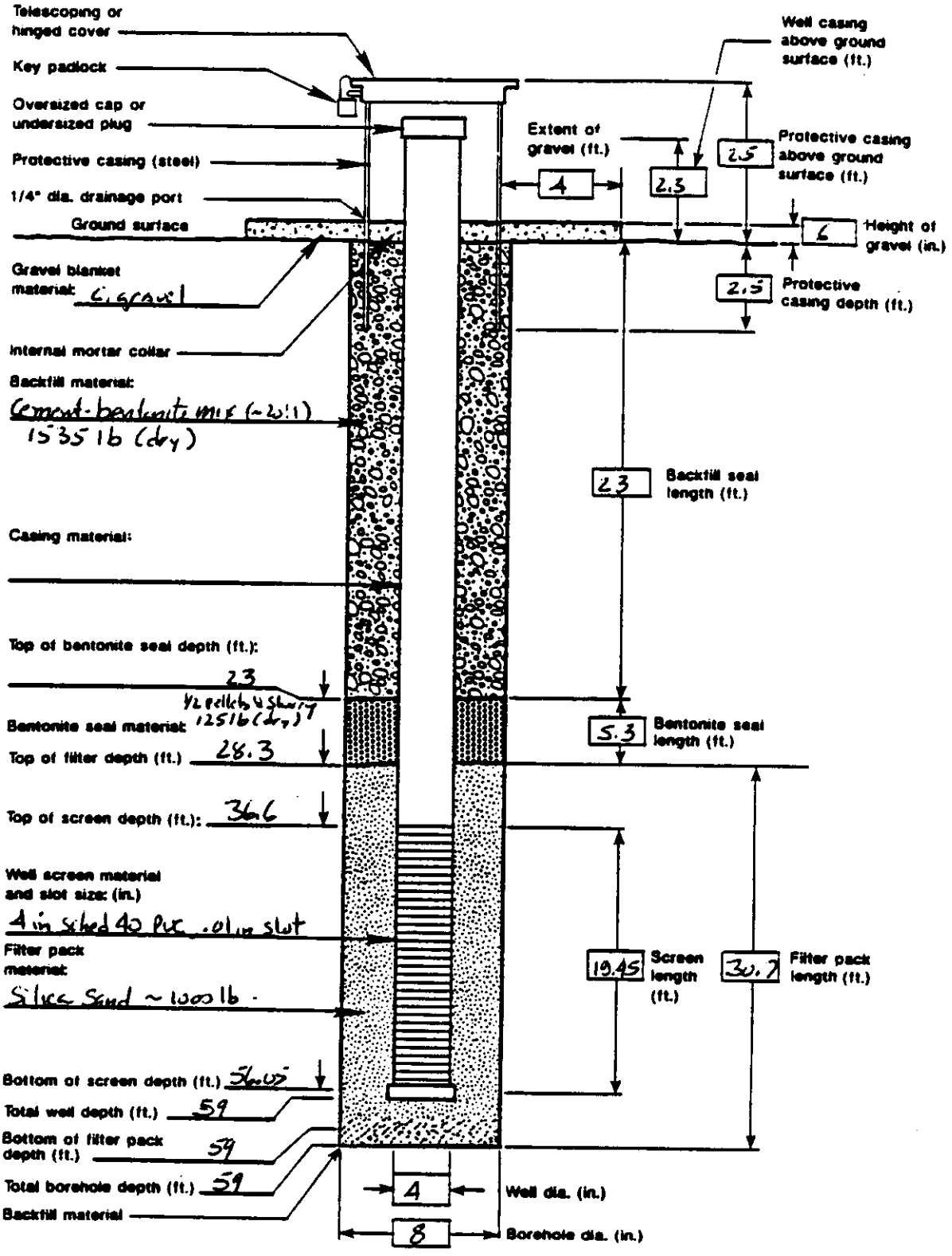
FORM COMPLETED BY/ DATE

Well Construction Information Form

WELL DESIGNATION: N-113-88 INSTALLATION START DATE: 5-3-88

LOCATION: N Tead Drum Storage INSTALLATION COMPLETION DATE: 5-3-88

COMMENTS: Well abandoned. Well casing pulled and grouted to surface.



J. L. McDonnell 2-1-89

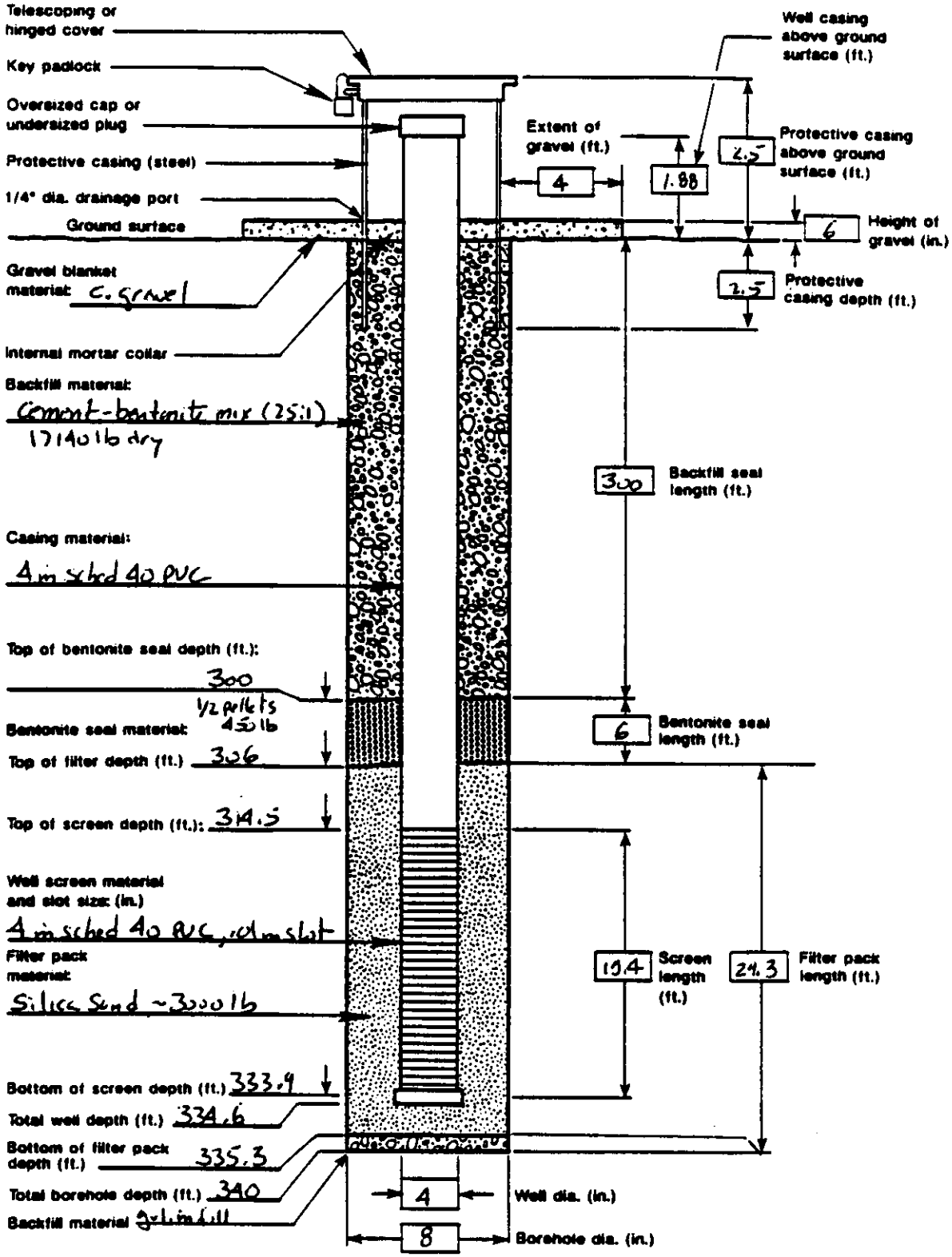
FORM COMPLETED BY/ DATE

Well Construction Information Form

WELL DESIGNATION: N-114-88 INSTALLATION START DATE: 6-2-88

LOCATION: N-Tead Drum Storage INSTALLATION COMPLETION DATE: 6-7-88

COMMENTS:



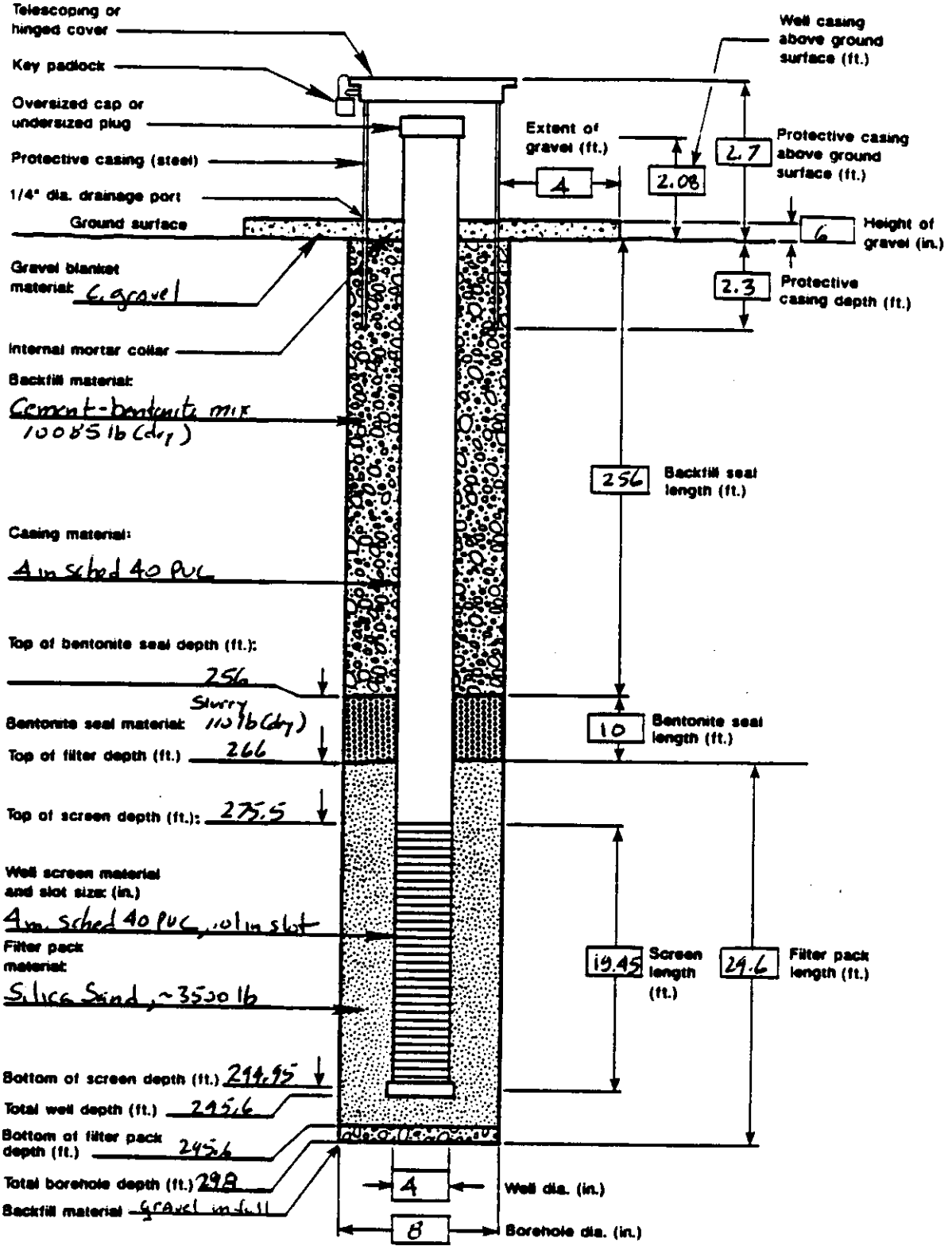
John McDonnell 2-1-89
FORM COMPLETED BY/ DATE

Well Construction Information Form

WELL DESIGNATION: N-115-88 INSTALLATION START DATE: 6-19-88

LOCATION: N-Tead, landfill INSTALLATION COMPLETION DATE: 6-21-88

COMMENTS: _____



John McDonnell 2-1-89

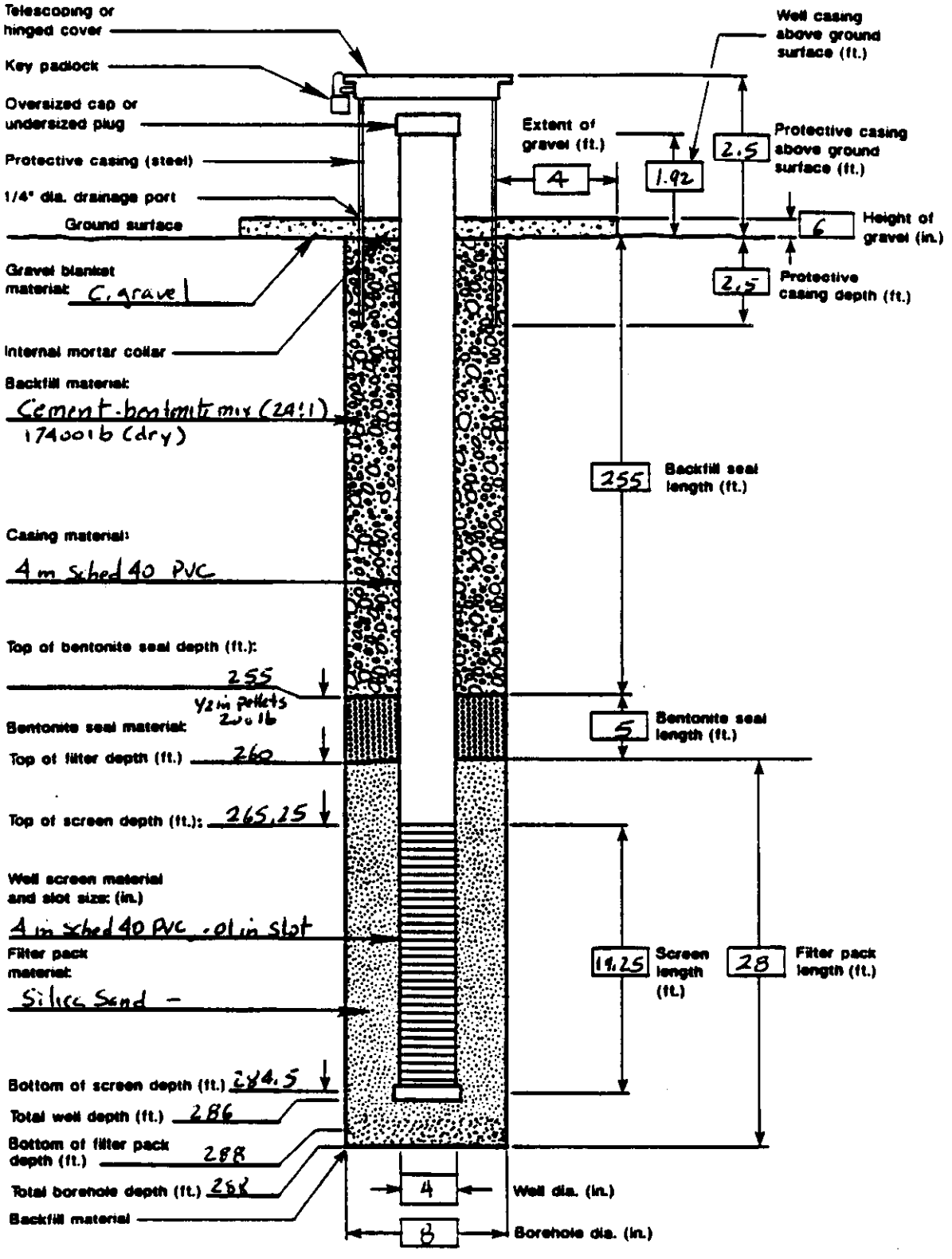
FORM COMPLETED BY/ DATE

Well Construction Information Form

WELL DESIGNATION: N-116-88 INSTALLATION START DATE: 7-5-88

LOCATION: N-Tank landfill INSTALLATION COMPLETION DATE: 7-8-88

COMMENTS: _____



John McDonnell 2-1-89

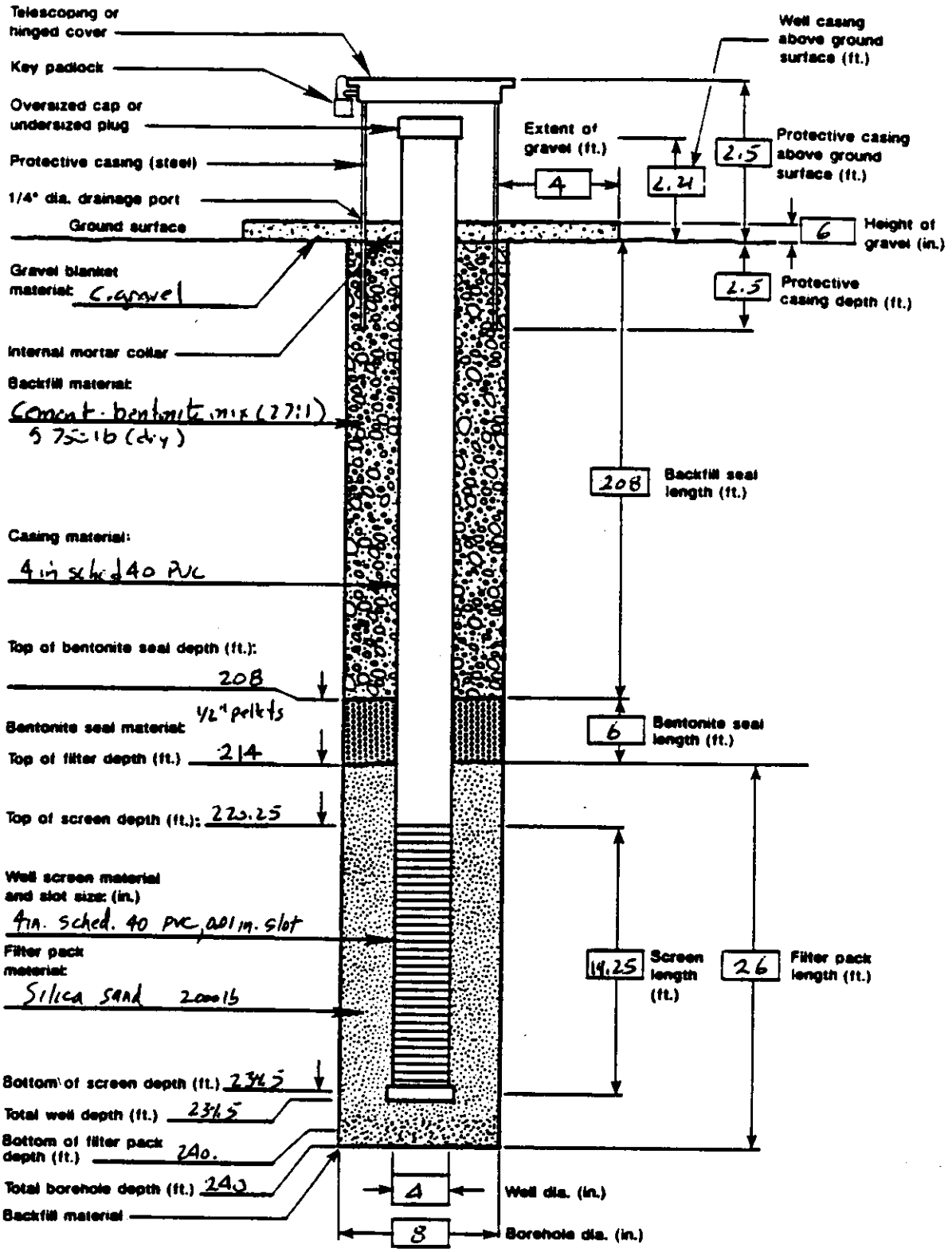
FORM COMPLETED BY/ DATE

Well Construction Information Form

WELL DESIGNATION: N-117-88 INSTALLATION START DATE: 7-9-88

LOCATION: N Tead, landfill INSTALLATION COMPLETION DATE: 7-12-88

COMMENTS:



John McDonnell 2-1-89

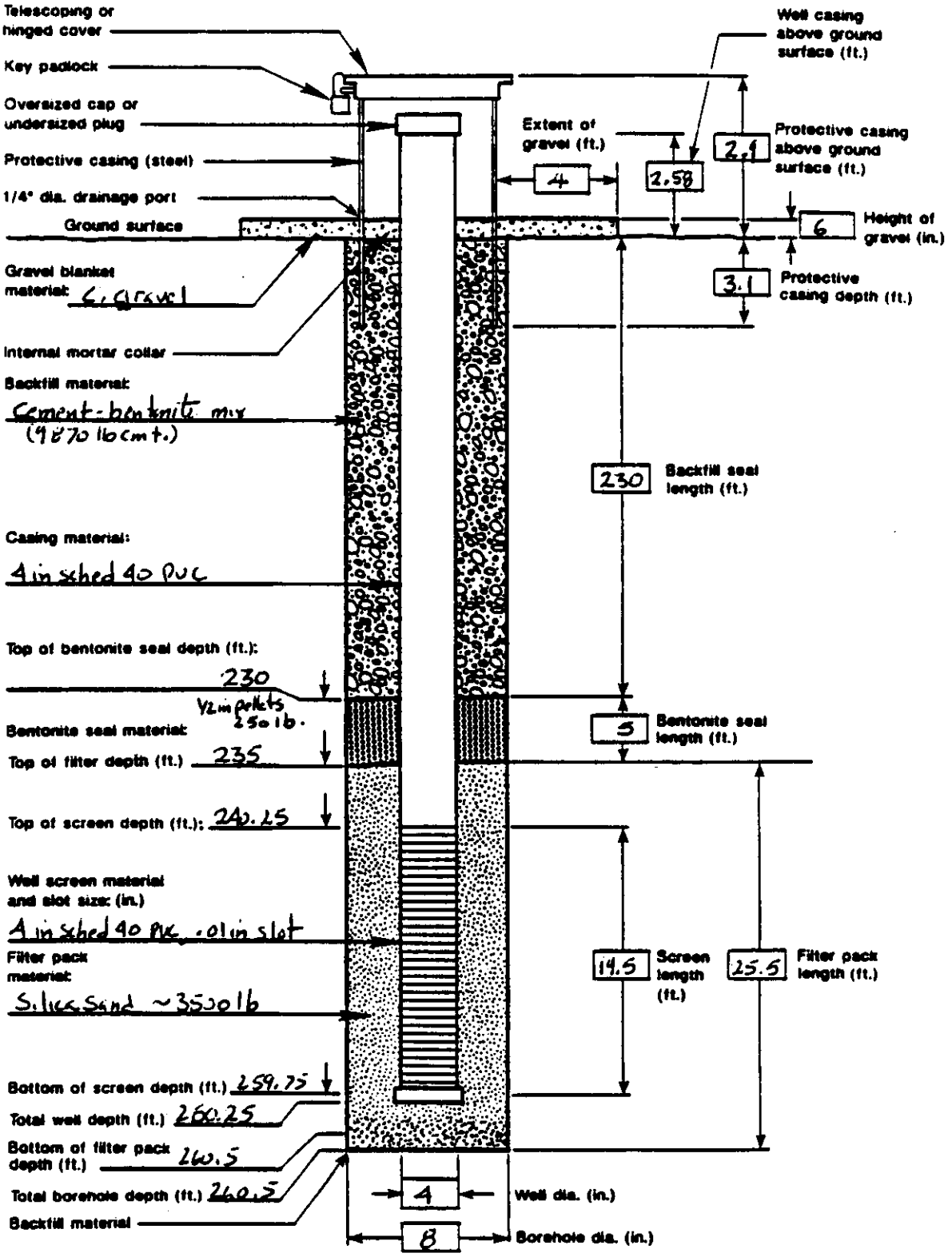
FORM COMPLETED BY/ DATE

Well Construction Information Form

WELL DESIGNATION: N-118-88 INSTALLATION START DATE: 7-22-88

LOCATION: N Toad, West of landfill INSTALLATION COMPLETION DATE: 7-24-88

COMMENTS: _____



[illegible] 2-1-89

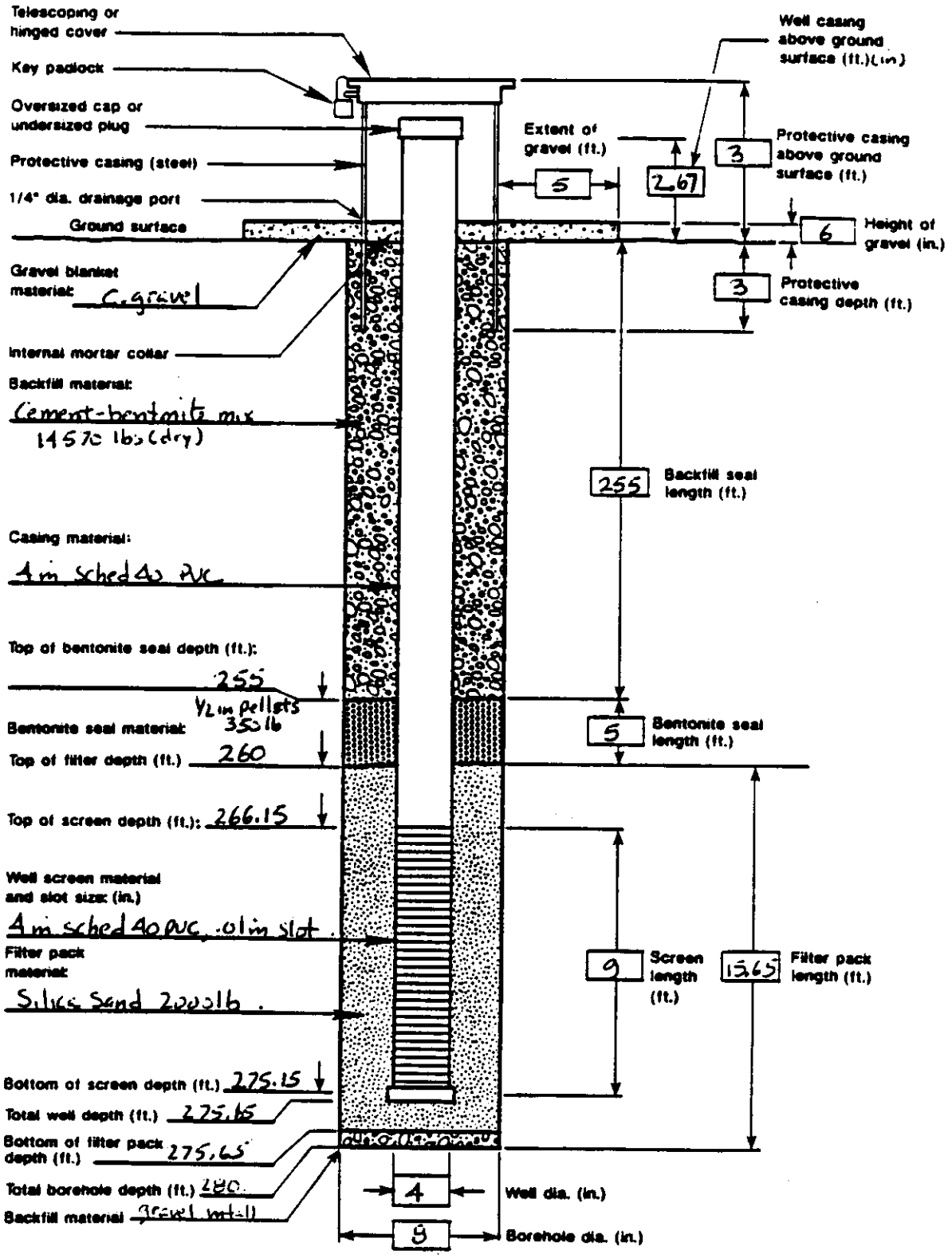
FORM COMPLETED BY/ DATE

Well Construction Information Form

WELL DESIGNATION: N-119-88 INSTALLATION START DATE: 7-24-88

LOCATION: N. tead, landfill INSTALLATION COMPLETION DATE: 7-27-88

COMMENTS:



[signature] 2-1-89

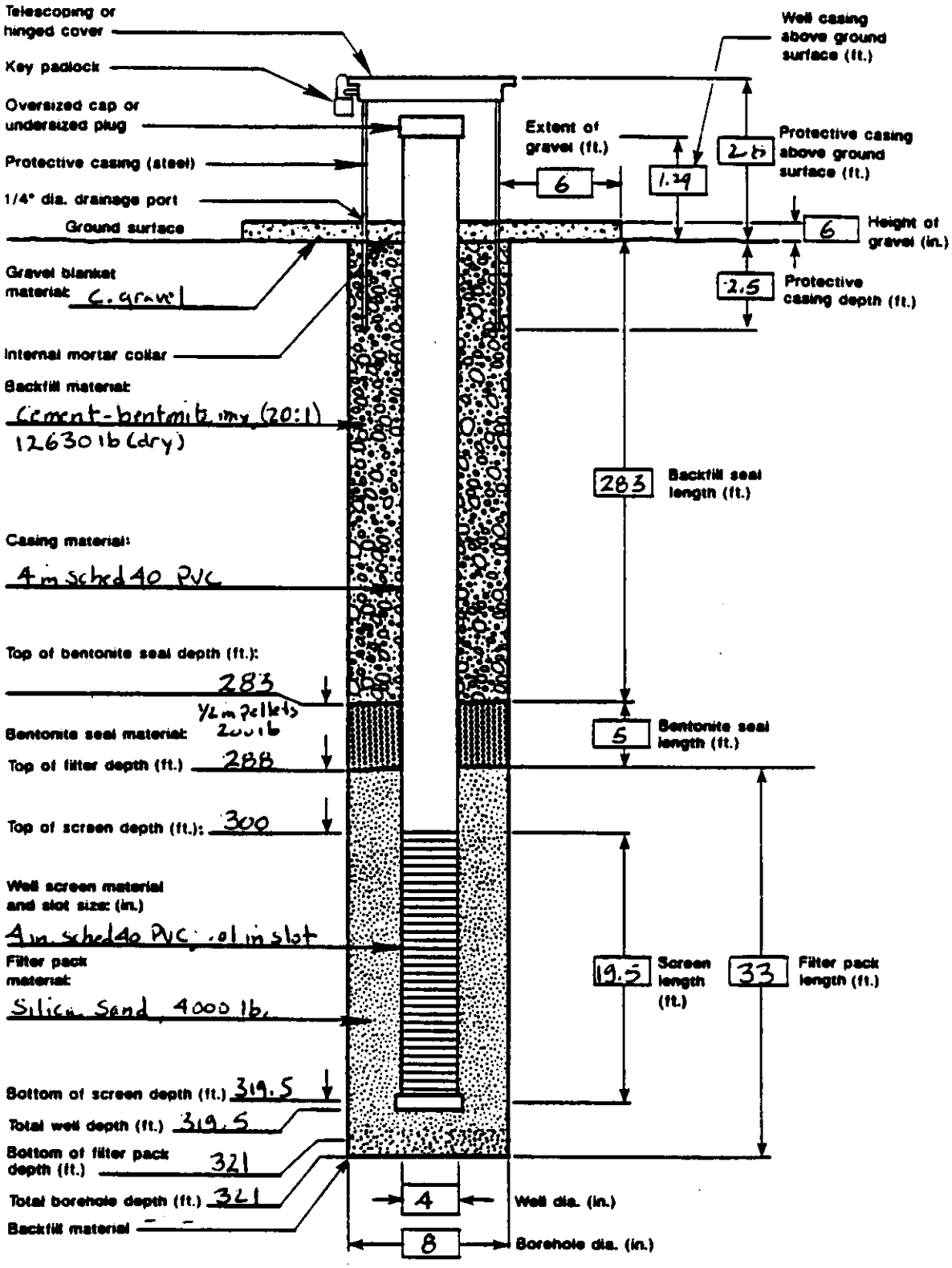
FORM COMPLETED BY/ DATE

Well Construction Information Form

WELL DESIGNATION: N-120-88 INSTALLATION START DATE: 8-1-88

LOCATION: N-road landfill INSTALLATION COMPLETION DATE: 8-3-88

COMMENTS: Present Stick-up: 1.29 ft: change due to repair of top of well



John McDonnell 2-1-89

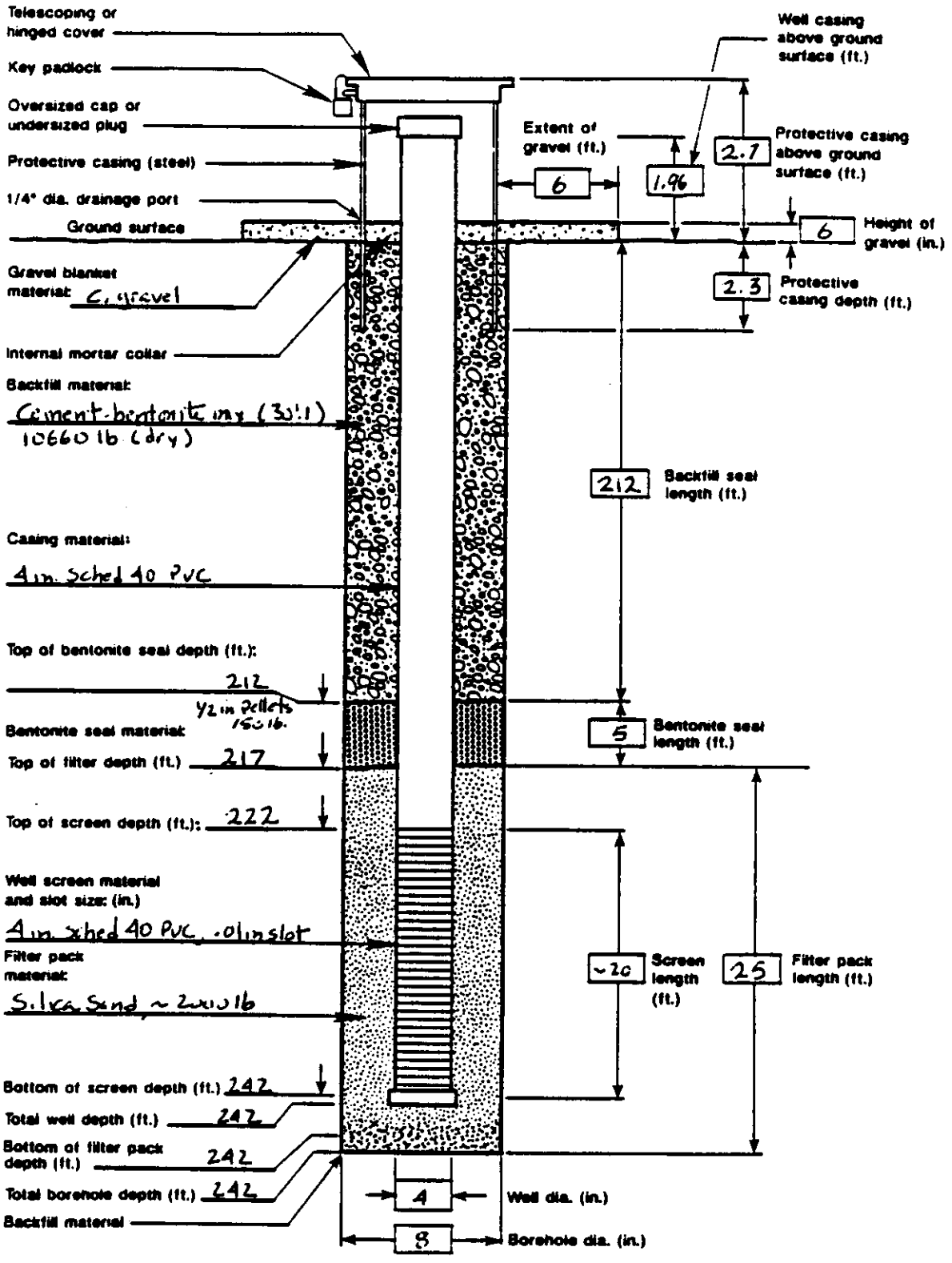
FORM COMPLETED BY/ DATE

Well Construction Information Form

WELL DESIGNATION: N-127-88 INSTALLATION START DATE: 10-17-88

LOCATION: N-TAD N/TNT Washout INSTALLATION COMPLETION DATE: 10-19-88

COMMENTS:



John McDonnell 2-1-89

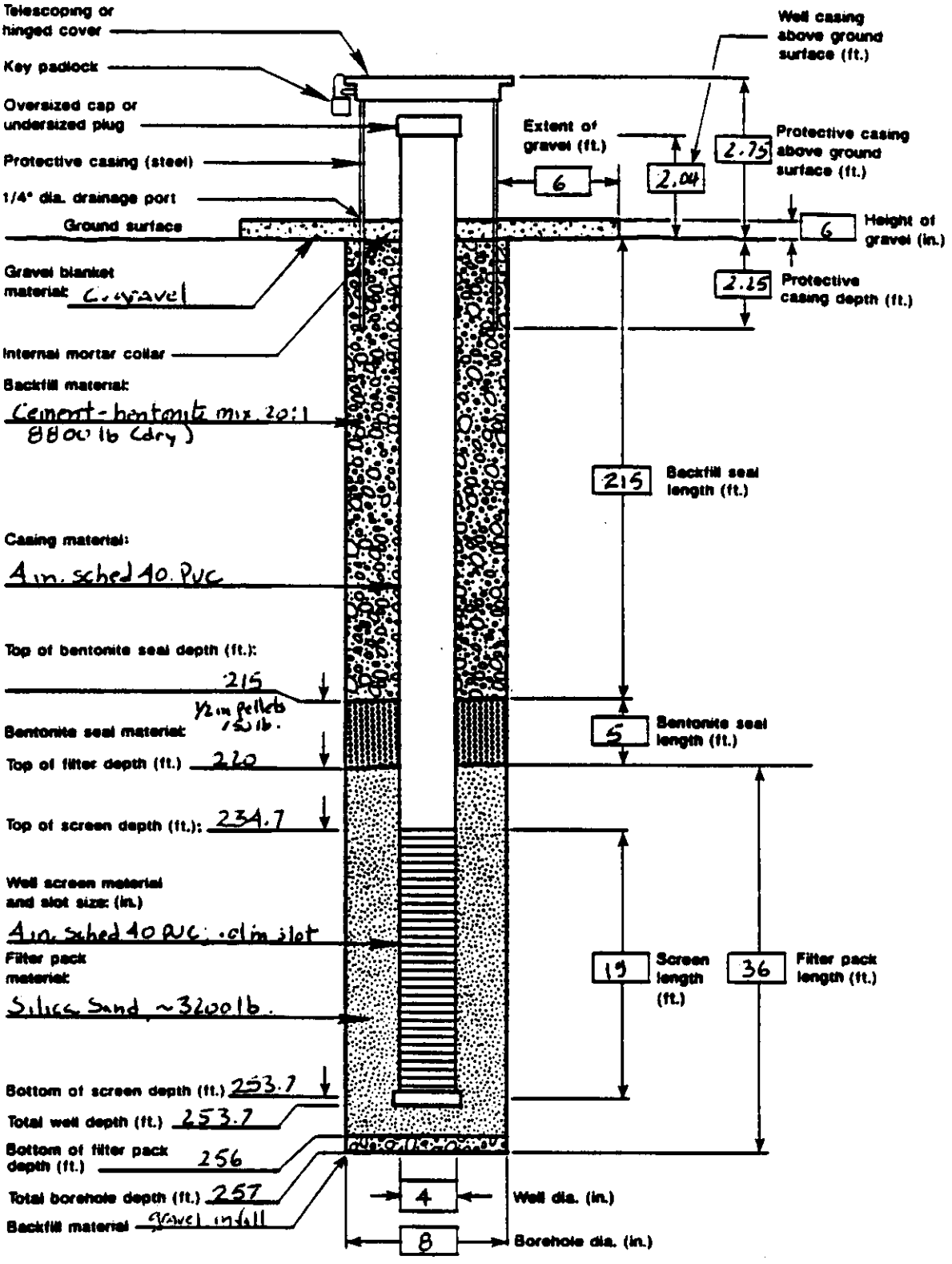
FORM COMPLETED BY/ DATE

Well Construction Information Form

WELL DESIGNATION: N-128-88 INSTALLATION START DATE: 10-14-88

LOCATION: D-Tract, N of TAT Washout INSTALLATION COMPLETION DATE: 10-16-88

COMMENTS:



John McDonnell 2-1-89

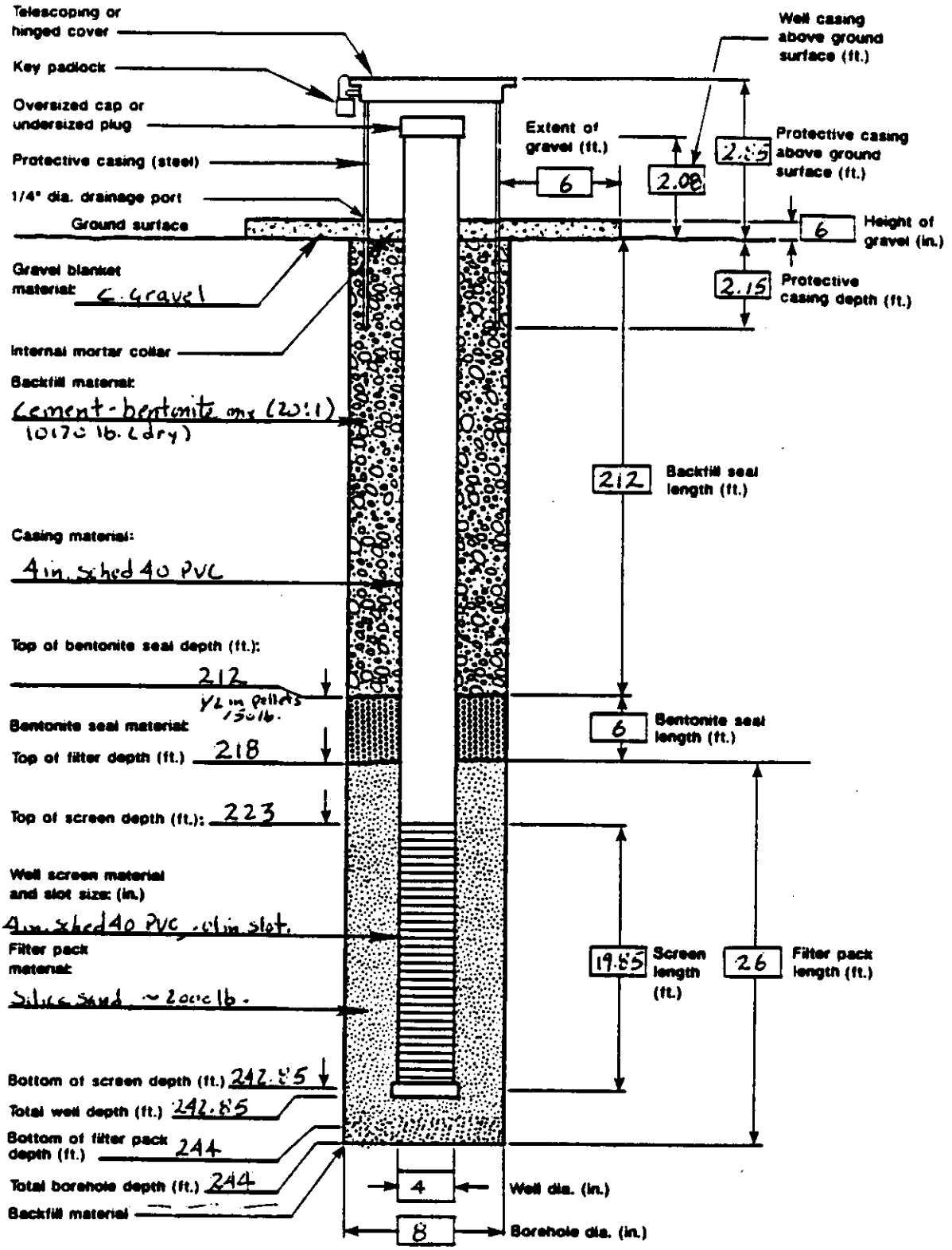
FORM COMPLETED BY/ DATE

Well Construction Information Form

WELL DESIGNATION: N-129-88 INSTALLATION START DATE: 10-20-88

LOCATION: N-TEAD N of TNT Washout INSTALLATION COMPLETION DATE: 10-25-88

COMMENTS:



John McDonnell 2-1-89

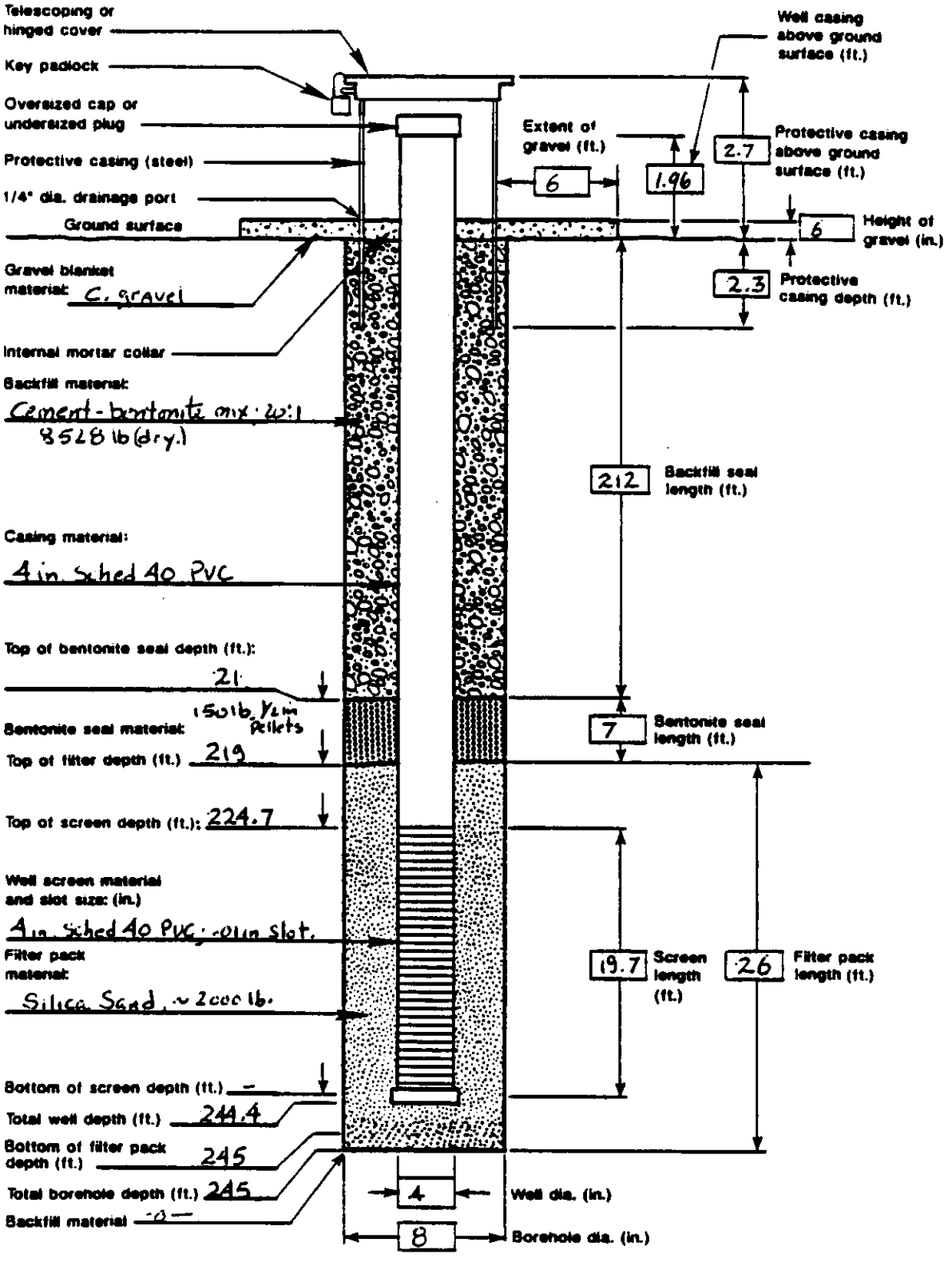
FORM COMPLETED BY/ DATE

Well Construction Information Form

WELL DESIGNATION: N-130-88 INSTALLATION START DATE: 10-27-88

LOCATION: N. TEAD NAT TANT WASHINGT INSTALLATION COMPLETION DATE: 10-28-88

COMMENTS: _____



John McDonnell 2-1-89

FORM COMPLETED BY/ DATE

APPENDIX E

WELL DEVELOPMENT RECORDS

WELL DEVELOPMENT RECORD

FACILITY CODE USATHAMA N-TEAD LOG DATE 4-19-88
LOCATION ID N-101-88 ACCEPTANCE CODE
LOGGER CODE RFW

INSTALLATION DATE(S) 2-23-88
BOREHOLE TOTAL DEPTH (FT) 49.5 WELL TOTAL DEPTH [h_3] (FT) 47
BOTTOM OF FILTER PACK [h_2] (FT) WELL CASING DIAMETER [d_2] (FT) 2"
BOREHOLE DIAMETER [d_1] (FT) SCREEN LENGTH (FT) 20
SCREENED INTERVAL (FT) 26.5 - 46.5
DEPTH-TO-WATER [h_1] BEFORE WELL DEVELOPMENT (FT) dry

BOREHOLE VOLUME [V_1] CALCULATION (in gals)

$\frac{d_1^2\ 3.1415}{4} (h_2 - h_1) \times 7.48 \left(\frac{gal}{ft^3}\right)$ = ____ [V_1] gals per 1 bore volume

WELL CASING VOLUME [V_2] CALCULATION (in gals)

$\frac{d_2^2\ 3.1415}{4} (h_3 - h_1) \times 7.48 \left(\frac{gal}{ft^3}\right)$ = ____ [V_2] gals per 1 well volume

ASSUME THE FILTER PACK IN THE ANNULUS BETWEEN THE BOREHOLE AND WELL CASING TO HAVE A POROSITY OF 30%. THEREFORE:

$V_1 - V_2 * 0.30$ = ____ [V_3] GALS IN THE FILTER PACK BETWEEN THE BOREHOLE AND WELL CASING. IN SUMMARY, 1 FILTER PACK AND WELL CASING VOLUME EQUALS [$V_2 + V_3$] ____ GALS.

QUANTITY OF MUD/WATER -

LOST DURING DRILLING (GAL) N/A
REMOVED BEFORE WELL INSERTION (GAL) N/A
ADDED DURING GRANULAR FILTER PLACEMENT (GAL) N/A
ADDED DURING WELL DEVELOPMENT (GAL) 28

TYPE AND SIZE CAPACITY OF PUMP AND/OR BAILER Above ground homelite 2" trash pump
TYPICAL PUMPING RATE (GAL/MIN) 8 gpm
ESTIMATED RECHARGE RATE (GAL/MIN)
DESCRIPTION OF DEVELOPMENT TECHNIQUE Put in 28 gals - air surged with 3/4" hose, using well casing as eductor pipe to clean well screen a little more then - water added last to completion.

COMPLETE BOLDED DATA FOR ENTRY IN TIMS
WDR147 (1/88)

FORM COMPLETED BY/DATE 7/4/88

TECHNICAL REVIEWER/DATA

N-101-88

WELL DEVELOPMENT RECORD

INITIAL DEVELOPMENT WATER (dry)

COLOR

ODOR

CLARITY

PARTICULATES

FINAL DEVELOPMENT WATER — NRL

COLOR

ODOR

CLARITY

PARTICULATES

INSTRUMENT DESCRIPTIONS

WATER LEVEL INDICATOR MODEL NUMBER Powers well sounder

pH METER MODEL AND SERIAL NUMBER Cole Palmer # 505244

CONDUCTIVITY MODEL AND METER SERIAL NUMBER yellow spring #15692

TURBIDITY METER MODEL AND SERIAL NUMBER —

OTHER

COMMENTS — none pumped - water lost to formation. Monitor well completed into perched water zone. Perched water zone very small in relationship to screened interval of this well. Completion interval of this well has essentially acted as a conduit whereby the perching layer has been bridged and the perched water is allowed to flow vertically along the completion interval and out into the formation and not into the well.

COMPLETE BOLDED DATA FOR ENTRY IN TIMS
WDR147B (1/88)

[signature] 7/3/89
FORM COMPLETED BY/DATE

TECHNICAL REVIEWER/DATA

N-101-88

WELL DEVELOPMENT RECORD
PARAMETER MEASUREMENTS

DATE	TIME	TOTAL VOL. WITHDRAWN		pH	Ec (µmhos/cm)	TEMP (°C)	TURB. (NTU)	IM CONE (ml of sed.)	COMMENTS
		GALS	BORE VOL.						
4/19/88	7:30	—	—						dry; added 28 gps.
4/20/88	7:10	1.3							2.3' standing in well
									- no measurements taken.
									well was developed
									down on 4/19/88

COMPLETE BOLDED DATA FOR ENTRY IN TIMS
WDR147C (9/88)

FORM COMPLETED BY/DATE

TECHNICAL REVIEWER/DATA

WELL DEVELOPMENT RECORD

FACILITY CODE USATHAMA N-TEAD LOG DATE _____
LOCATION ID N-106-88 ACCEPTANCE CODE _____
LOGGER CODE _____

INSTALLATION DATE(S) 2-27-88
BOREHOLE TOTAL DEPTH (FT) 44 WELL TOTAL DEPTH [h_3] (FT) 41
BOTTOM OF FILTER PACK [h_2] (FT) 44 WELL CASING DIAMETER [d_2] (FT) .33
BOREHOLE DIAMETER [d_1] (FT) 1.00 SCREEN LENGTH (FT) 20
SCREENED INTERVAL (FT) 20.5 - 40.5
DEPTH-TO-WATER [h_1] BEFORE WELL DEVELOPMENT (FT) dry

BOREHOLE VOLUME [V_1] CALCULATION (in gals)

$$\frac{d_1^2\, 3.1415}{4}\left(h_2 - h_1\right) \times 7.48 \left(\frac{gal}{ft^3}\right)$$ ✓ [V_1] gals per 1 bore volume

WELL CASING VOLUME [V_2] CALCULATION (in gals)

$$\frac{d_2^2\, 3.1415}{4}\left(h_3 - h_1\right) \times 7.48 \left(\frac{gal}{ft^3}\right)$$ ✓ [V_2] gals per 1 well volume

ASSUME THE FILTER PACK IN THE ANNULUS BETWEEN THE BOREHOLE AND WELL CASING TO HAVE A POROSITY OF 30%. THEREFORE:

$V_1 - V_2 * 0.30 =$ ✓ [V_3] GALS IN THE FILTER PACK BETWEEN THE BOREHOLE AND WELL CASING. IN SUMMARY, 1 FILTER PACK AND WELL CASING VOLUME EQUALS [$V_2 + V_3$] ✓ GALS.

QUANTITY OF MUD/WATER –
LOST DURING DRILLING (GAL) N/A
REMOVED BEFORE WELL INSERTION (GAL) N/A
ADDED DURING GRANULAR FILTER PLACEMENT (GAL) N/A
ADDED DURING WELL DEVELOPMENT (GAL) 40 gal.

TYPE AND SIZE CAPACITY OF PUMP AND/OR BAILER Above ground Homelite 2" Trash pump -
TYPICAL PUMPING RATE (GAL/MIN) _____
ESTIMATED RECHARGE RATE (GAL/MIN) _____
DESCRIPTION OF DEVELOPMENT TECHNIQUE Added 40 gals to fill screen interval air purged with 3/4" ID hole to force water into annulus and formation and to remove fines.

COMPLETE BOLDED DATA FOR ENTRY IN TIMS
WDR147 (1/89)

[signature] 7/3/89
FORM COMPLETED BY/DATE

_____
TECHNICAL REVIEWER/DATA

N-106-88

WELL DEVELOPMENT RECORD

INITIAL DEVELOPMENT WATER — NONE

COLOR

ODOR

CLARITY

PARTICULATES

FINAL DEVELOPMENT WATER — NONE

COLOR

ODOR

CLARITY

PARTICULATES

INSTRUMENT DESCRIPTIONS

WATER LEVEL INDICATOR MODEL NUMBER Powers well Sounder

pH METER MODEL AND SERIAL NUMBER Colepaimer # 505244

CONDUCTIVITY MODEL AND METER SERIAL NUMBER Yellowspring #15692

TURBIDITY METER MODEL AND SERIAL NUMBER —

OTHER —

COMMENTS — Monitor well completed into perched water zone. Perched water zone very small in relationship to screened interval of this well. Completion interval of this well has essentially acted as a conduit whereby the perching layer has been bridged and the perched water is allowed to flow vertically along the completion interval and out into the formation and not into the well.

COMPLETE BOLDED DATA FOR ENTRY IN TIMS
WDR147B (1/88)

[signature] 7/3/89
FORM COMPLETED BY/DATE

TECHNICAL REVIEWER/DATA

N-106-58

WELL DEVELOPMENT RECORD
PARAMETER MEASUREMENTS

DATE	TIME	TOTAL VOL. WITHDRAWN		pH	Ec (µmhos/cm)	TEMP (°C)	TURB. (NTU)	IM CONE (ml of sed.)	COMMENTS
		GALS	BORE VOL.						
4/20/88				X	X	X			added 40 gals. min surged let stand.
4/21/88				X	X	X			well essentially dry, water added last to formation

COMPLETE BOLDED DATA FOR ENTRY IN TIMS
WDR147C (8/88)

John M. Arnold 7/3/88
FORM COMPLETED BY/DATE

TECHNICAL REVIEWER/DATA

WELL DEVELOPMENT RECORD

FACILITY CODE USATHAMA- N-TEAD LOG DATE 8/9/89
LOCATION ID N-110-88 ACCEPTANCE CODE
LOGGER CODE RFW

INSTALLATION DATE(S) 8-5-89 & 8-6-88
BOREHOLE TOTAL DEPTH (FT) 318 WELL TOTAL DEPTH [h_3] (FT) 317.3
BOTTOM OF FILTER PACK [h_2] (FT) 318 WELL CASING DIAMETER [d_2] (FT) 0.33
BOREHOLE DIAMETER [d_1] (FT) 0.67 SCREEN LENGTH (FT) 39
SCREENED INTERVAL (FT) 278-317.3
DEPTH-TO-WATER [h_1] BEFORE WELL DEVELOPMENT (FT) 304

BOREHOLE VOLUME [V_1] CALCULATION (in gals)

$$\frac{d_1^2\ 3.1415}{4}\left(h_2 - h_1\right) \times 7.48\left(\frac{gal}{ft^3}\right)$$

36.9 [V_1] gals per 1 bore volume

WELL CASING VOLUME [V_2] CALCULATION (in gals)

$$\frac{d_2^2\ 3.1415}{4}\left(h_3 - h_1\right) \times 7.48\left(\frac{gal}{ft^3}\right)$$

8.5 [V_2] gals per 1 well volume

ASSUME THE FILTER PACK IN THE ANNULUS BETWEEN THE BOREHOLE AND WELL CASING TO HAVE A POROSITY OF 30%. THEREFORE:

$V_1 - V_2 * 0.30 =$ 8.5 [V_3] GALS IN THE FILTER PACK BETWEEN THE BOREHOLE AND WELL CASING. IN SUMMARY, 1 FILTER PACK AND WELL CASING VOLUME EQUALS [$V_2 + V_3$] 17 GALS.

QUANTITY OF MUD/WATER -
LOST DURING DRILLING (GAL) N/A
REMOVED BEFORE WELL INSERTION (GAL) NA
ADDED DURING GRANULAR FILTER PLACEMENT (GAL) NA
ADDED DURING WELL DEVELOPMENT (GAL) NA
TYPE AND SIZE CAPACITY OF PUMP AND/OR BAILER 3hp electric Submersible
TYPICAL PUMPING RATE (GAL/MIN) 2.5 gpm
ESTIMATED RECHARGE RATE (GAL/MIN) slow est ~2 gpm
DESCRIPTION OF DEVELOPMENT TECHNIQUE Installed pump with gauge hose - established rate - pumped for allotted time - took measurements & removed pump.

COMPLETE BOLDED DATA FOR ENTRY IN TIMS
WDR147 (1/88)

John McDonald 7/3/89
FORM COMPLETED BY/DATE

TECHNICAL REVIEWER/DATA

N-110-88

WELL DEVELOPMENT RECORD

INITIAL DEVELOPMENT WATER

COLOR Brown

ODOR none

CLARITY Murky

PARTICULATES Silty

FINAL DEVELOPMENT WATER

COLOR none

ODOR none

CLARITY clear

PARTICULATES ~ none

INSTRUMENT DESCRIPTIONS

WATER LEVEL INDICATOR MODEL NUMBER Powers well Sounder

pH METER MODEL AND SERIAL NUMBER Cole Parmer - 5524A

CONDUCTIVITY MODEL AND METER SERIAL NUMBER Yellow Springs # 15692

TURBIDITY METER MODEL AND SERIAL NUMBER

OTHER

COMMENTS

COMPLETE BOLDED DATA FOR ENTRY IN TIMS
WDR1478 (1/99)

7/3/89
FORM COMPLETED BY/DATE

TECHNICAL REVIEWER/DATA

N-110-88

WELL DEVELOPMENT RECORD
PARAMETER MEASUREMENTS

DATE	TIME	TOTAL VOL. WITHDRAWN		pH	Ec (µmhos/cm)	TEMP (°C)	TURB. (NTU)	IM CONE (ml of sed.)	COMMENTS
		GALS	BORE VOL.						
8/4/81	4:05p	5	.3	7.4	1800	25			
	4:31	50	2.9	7.2	1500	24			
	5:05	110	6.5	7.1	1450	24			
	5:41	170	10.	7.1	1450	21			—

COMPLETE BOLDED DATA FOR ENTRY IN TIMS
WDR147C (9/86)

FORM COMPLETED BY/DATE

TECHNICAL REVIEWER/DATA

WELL DEVELOPMENT RECORD

FACILITY CODE USATHAMA N-TEAD LOG DATE 5/29/88
LOCATION ID N-111-88 ACCEPTANCE CODE
LOGGER CODE

INSTALLATION DATE(S) 3/31/88-4/5/88
BOREHOLE TOTAL DEPTH (FT) 332.77 WELL TOTAL DEPTH [h_3] (FT) 332.57
BOTTOM OF FILTER PACK [h_2] (FT) 332.77 WELL CASING DIAMETER [d_2] (FT) .33
BOREHOLE DIAMETER [d_1] (FT) .67 SCREEN LENGTH (FT) 20.26
SCREENED INTERVAL (FT) 312 - 332.26
DEPTH-TO-WATER [h_1] BEFORE WELL DEVELOPMENT (FT) 313.6

BOREHOLE VOLUME [V_1] CALCULATION (in gals)

$\frac{d_1^2\ 3.1415}{4}\left(h_2 - h_1\right) \times 7.48\left(\frac{gal}{ft^3}\right)$ 21.5 [V_1] gals per 1 bore volume

WELL CASING VOLUME [V_2] CALCULATION (in gals)

$\frac{d_2^2\ 3.1415}{4}\left(h_3 - h_1\right) \times 7.48\left(\frac{gal}{ft^3}\right)$ 15.3 [V_2] gals per 1 well volume

ASSUME THE FILTER PACK IN THE ANNULUS BETWEEN THE BOREHOLE AND WELL CASING TO HAVE A POROSITY OF 30%. THEREFORE:

$V_1 - V_2 * 0.30 =$ 1.85 [V_3] GALS IN THE FILTER PACK BETWEEN THE BOREHOLE AND WELL CASING. IN SUMMARY, 1 FILTER PACK AND WELL CASING VOLUME EQUALS [$V_2 + V_3$] 17 GALS.

QUANTITY OF MUD/WATER -

LOST DURING DRILLING (GAL) 25 gal
REMOVED BEFORE WELL INSERTION (GAL) ~400 gal
ADDED DURING GRANULAR FILTER PLACEMENT (GAL) N/A
ADDED DURING WELL DEVELOPMENT (GAL) N/A
TYPE AND SIZE CAPACITY OF PUMP AND/OR BAILER 3 HP electric Submersible
TYPICAL PUMPING RATE (GAL/MIN) 15 GPM
ESTIMATED RECHARGE RATE (GAL/MIN) was immediately
DESCRIPTION OF DEVELOPMENT TECHNIQUE installed pump with pump truck unit - established rate - pumped for allotted time, took measurements, removed pump -

COMPLETE BOLDED DATA FOR ENTRY IN TIMS
WDR147 (1/88)

[signature] 7/3/89
FORM COMPLETED BY/DATE

TECHNICAL REVIEWER/DATE

N-111-88

WELL DEVELOPMENT RECORD

INITIAL DEVELOPMENT WATER

COLOR Brown

ODOR —

CLARITY Cloudy

PARTICULATES Silt

FINAL DEVELOPMENT WATER

COLOR none

ODOR none

CLARITY clear

PARTICULATES thin silt on bottom sample jar

INSTRUMENT DESCRIPTIONS

WATER LEVEL INDICATOR MODEL NUMBER Power well Sounder

pH METER MODEL AND SERIAL NUMBER Cole Palmer 505244

CONDUCTIVITY MODEL AND METER SERIAL NUMBER Yellow Springs 1592

TURBIDITY METER MODEL AND SERIAL NUMBER —

OTHER —

COMMENTS —

COMPLETE BOLDED DATA FOR ENTRY IN TIMS
WDR1478 (1/89)

John M. Arnold 7/3/89
FORM COMPLETED BY/DATE

TECHNICAL REVIEWER/DATA

N-111-85

WELL DEVELOPMENT RECORD
PARAMETER MEASUREMENTS

DATE	TIME	TOTAL VOL. WITHDRAWN		pH	Ec (µmhos/cm)	TEMP (°C)	TURB. (NTU)	IM CONE (ml of sed.)	COMMENTS
		GALS	BORE VOL.						
5/20/86	11:45			7.28	1400	17.5			
	-			7.10	1390	15.6			
	--			7.27	1400	16.1			
	---			7.32	1400	16.1			
									removed ~585 gals in
									~90 minutes.

COMPLETE SOLIDS DATA FOR ENTRY IN TMS
WDR147C (8/86)

FORM COMPLETED BY/DATE

TECHNICAL REVIEWER/DATE

WELL DEVELOPMENT RECORD

FACILITY CODE USATHAMA N-TEAD
LOG DATE 5-25-85
LOCATION ID N-112-88
ACCEPTANCE CODE
LOGGER CODE

INSTALLATION DATE(S) 4-23-88 thru 4-27-88

BOREHOLE TOTAL DEPTH (FT) 332
WELL TOTAL DEPTH [h_3] (FT) 330.2
BOTTOM OF FILTER PACK [h_2] (FT) 332
WELL CASING DIAMETER [d_2] (FT) 0.33
BOREHOLE DIAMETER [d_1] (FT) 0.67
SCREEN LENGTH (FT) 19.5
SCREENED INTERVAL (FT) 310.1 - 329.6
DEPTH-TO-WATER [h_1] BEFORE WELL DEVELOPMENT (FT) 310.8

BOREHOLE VOLUME [V_1] CALCULATION (in gals)

$$\frac{d_1^2\, 3.1415}{4}\left(h_2 - h_1\right) \times 7.48 \left(\frac{gal}{ft^3}\right)$$ 55.9 [V_1] gals per 1 bore volume

WELL CASING VOLUME [V_2] CALCULATION (in gals)

$$\frac{d_2^2\, 3.1415}{4}\left(h_3 - h_1\right) \times 7.48 \left(\frac{gal}{ft^3}\right)$$ 12.4 [V_2] gals per 1 well volume

ASSUME THE FILTER PACK IN THE ANNULUS BETWEEN THE BOREHOLE AND WELL CASING TO HAVE A POROSITY OF 30%. THEREFORE:

$V_1 - V_2 * 0.30 =$ 13.05 [V_3] GALS IN THE FILTER PACK BETWEEN THE BOREHOLE AND WELL CASING. IN SUMMARY, 1 FILTER PACK AND WELL CASING VOLUME EQUALS [$V_2 + V_3$] 25.5 GALS.

QUANTITY OF MUD/WATER –

LOST DURING DRILLING (GAL) N/A
REMOVED BEFORE WELL INSERTION (GAL) N/A
ADDED DURING GRANULAR FILTER PLACEMENT (GAL) N/A
ADDED DURING WELL DEVELOPMENT (GAL) N/A

TYPE AND SIZE CAPACITY OF PUMP AND/OR BAILER 3 HP Submersible
TYPICAL PUMPING RATE (GAL/MIN) 15 gpm
ESTIMATED RECHARGE RATE (GAL/MIN) almost immedate
DESCRIPTION OF DEVELOPMENT TECHNIQUE installed pump with pump truck winch - established rate - pumped for alloted time - took measurements - removed pump

COMPLETE BOLDED DATA FOR ENTRY IN TIMS
WDR147 (1/88)

[signature] 7/3/88
FORM COMPLETED BY/DATE

TECHNICAL REVIEWER/DATA

N-112-88

WELL DEVELOPMENT RECORD

INITIAL DEVELOPMENT WATER

COLOR Brown

ODOR Earthy

CLARITY Very Cloudy

PARTICULATES Very Silty

FINAL DEVELOPMENT WATER

COLOR Colorless

ODOR none

CLARITY clear

PARTICULATES minor silt - thin film at bottom of jar.

INSTRUMENT DESCRIPTIONS

WATER LEVEL INDICATOR MODEL NUMBER Powers well sounder

pH METER MODEL AND SERIAL NUMBER Cole-Parmer 505244

CONDUCTIVITY MODEL AND METER SERIAL NUMBER Yellow Springs Mod 33

TURBIDITY METER MODEL AND SERIAL NUMBER -n/a-

OTHER —

COMMENTS well started clearing in 16 min. - clear at about 25 min -

COMPLETE BOLDED DATA FOR ENTRY IN TIMS
WDR1478 (1/89)

John McDonald 7/3/87
FORM COMPLETED BY/DATE

TECHNICAL REVIEWER/DATA

N-112-85

WELL DEVELOPMENT RECORD
PARAMETER MEASUREMENTS

DATE	TIME	TOTAL VOL. WITHDRAWN		pH	Ec (µmhos/cm)	TEMP (°C)	TURB. (NTU)	IM CONE (ml of sed.)	COMMENTS
		GALS	BORE VOL.						
5-25-85	8:25A			7.18	1300	16.8	—	—	
"				7.10	1320	15.1	—	—	
"				7.22	1330	15.4			
"	9:31	720	28	7.13	1330	15.0			
									Removed ~ 577 gal in ~ 48 minutes

COMPLETE BOLDED DATA FOR ENTRY IN TIMS
WDR147C (9/86)

John McDonald 7/3/85
FORM COMPLETED BY/DATE

TECHNICAL REVIEWER/DATE

WELL DEVELOPMENT RECORD

FACILITY CODE USATHAMA N-TEAD LOG DATE 7-7-88
LOCATION ID N-114-88 ACCEPTANCE CODE
LOGGER CODE

INSTALLATION DATE(S) 6-2-88 & 6-7-88
BOREHOLE TOTAL DEPTH (FT) 340 WELL TOTAL DEPTH [h_3] (FT) 334.6
BOTTOM OF FILTER PACK [h_2] (FT) 335.3 WELL CASING DIAMETER [d_2] (FT) .33
BOREHOLE DIAMETER [d_1] (FT) .67 SCREEN LENGTH (FT) 19.4
SCREENED INTERVAL (FT) 314.5 - 333.9
DEPTH-TO-WATER [h_1] BEFORE WELL DEVELOPMENT (FT) 308.9

BOREHOLE VOLUME [V_1] CALCULATION (in gals)

$$\frac{d_1^2\ 3.1415}{4}\left(h_2 - h_1\right) \times 7.48\left(\frac{gal}{ft^3}\right)$$

69.6 [V_1] gals per 1 bore volume

WELL CASING VOLUME [V_2] CALCULATION (in gals)

$$\frac{d_2^2\ 3.1415}{4}\left(h_3 - h_1\right) \times 7.48\left(\frac{gal}{ft^3}\right)$$

16.4 [V_2] gals per 1 well volume

ASSUME THE FILTER PACK IN THE ANNULUS BETWEEN THE BOREHOLE AND WELL CASING TO HAVE A POROSITY OF 30%. THEREFORE:

$V_1 - V_2 * 0.30 =$ 15.9 [V_3] GALS IN THE FILTER PACK BETWEEN THE BOREHOLE AND WELL CASING. IN SUMMARY, 1 FILTER PACK AND WELL CASING VOLUME EQUALS [$V_2 + V_3$] 32.3 GALS.

QUANTITY OF MUD/WATER -

LOST DURING DRILLING (GAL) N/A
REMOVED BEFORE WELL INSERTION (GAL) N/A
ADDED DURING GRANULAR FILTER PLACEMENT (GAL) N/A
ADDED DURING WELL DEVELOPMENT (GAL) N/A
TYPE AND SIZE CAPACITY OF PUMP AND/OR BAILER Electric Submersible
TYPICAL PUMPING RATE (GAL/MIN) 10 gpm
ESTIMATED RECHARGE RATE (GAL/MIN)
DESCRIPTION OF DEVELOPMENT TECHNIQUE Installed pump with pump truck winch, established rate - pumped for allotted time - took measurements removed pump.

COMPLETE BOLDED DATA FOR ENTRY IN TIMS
WDR147 (1/88)

John McDonald 7/7/88
FORM COMPLETED BY/DATE

TECHNICAL REVIEWER/DATA

N-114-89

WELL DEVELOPMENT RECORD

INITIAL DEVELOPMENT WATER

COLOR light brown

ODOR none

CLARITY cloudy

PARTICULATES silty

FINAL DEVELOPMENT WATER

COLOR none

ODOR none

CLARITY clear

PARTICULATES none

INSTRUMENT DESCRIPTIONS

WATER LEVEL INDICATOR MODEL NUMBER Powers Well Sounder

pH METER MODEL AND SERIAL NUMBER Cole Palmer 505244

CONDUCTIVITY MODEL AND METER SERIAL NUMBER Yellow Springs Mod 33 15682

TURBIDITY METER MODEL AND SERIAL NUMBER —

OTHER —

COMMENTS

COMPLETE BOLDED DATA FOR ENTRY IN TIMS
WDR1478 (1/89)

FORM COMPLETED BY/DATE 7/3/89

TECHNICAL REVIEWER/DATA

WELL DEVELOPMENT RECORD
PARAMETER MEASUREMENTS

DATE	TIME	TOTAL VOL. WITHDRAWN		pH	Ec (µmhos/cm)	TEMP (°C)	TURB. (NTU)	IM CONE (ml of sed.)	COMMENTS
		GALS	BORE VOL.						
7/7/88	9:30+	–	–	6.44	1250	27			
		100	3	6.86	1025	17.5			
		200	6	6.84	1000	17.5			
	10:00+	300	~9.3	6.95	1025	17.5			
									removed 3 weight ~30 min.

COMPLETE BOLDED DATA FOR ENTRY IN TIMS
WDR147C (9/88)

John McDonnell 7/3/89
FORM COMPLETED BY/DATE

TECHNICAL REVIEWER/DATA

WELL DEVELOPMENT RECORD

FACILITY CODE USATHAMA N-TEAD
LOG DATE 7/7/88 - 7/11/78
LOCATION ID N-115-88
ACCEPTANCE CODE
LOGGER CODE RFW

INSTALLATION DATE(S) 6-19-88 & 6-21-88

BOREHOLE TOTAL DEPTH (FT) 298
WELL TOTAL DEPTH [h_3] (FT) 295.6
BOTTOM OF FILTER PACK [h_2] (FT) 295.6
WELL CASING DIAMETER [d_2] (FT) .33
BOREHOLE DIAMETER [d_1] (FT) .67
SCREEN LENGTH (FT) 19.45
SCREENED INTERVAL (FT) 275.5 - 294.95
DEPTH-TO-WATER [h_1] BEFORE WELL DEVELOPMENT (FT) 263.65

BOREHOLE VOLUME [V_1] CALCULATION (in gals)

$$\frac{d_1^2\, 3.1415}{4}\left(h_2 - h_1\right) \times 7.48 \left(\frac{gal}{ft^3}\right)$$

84.2 [V_1] gals per 1 bore volume

WELL CASING VOLUME [V_2] CALCULATION (in gals)

$$\frac{d_2^2\, 3.1415}{4}\left(h_3 - h_1\right) \times 7.48 \left(\frac{gal}{ft^3}\right)$$

20.4 [V_2] gals per 1 well volume

ASSUME THE FILTER PACK IN THE ANNULUS BETWEEN THE BOREHOLE AND WELL CASING TO HAVE A POROSITY OF 30%. THEREFORE:

$V_1 - V_2 * 0.30 =$ 19 [V_3] GALS IN THE FILTER PACK BETWEEN THE BOREHOLE AND WELL CASING. IN SUMMARY, 1 FILTER PACK AND WELL CASING VOLUME EQUALS [$V_2 + V_3$] 294 GALS.

QUANTITY OF MUD/WATER –

LOST DURING DRILLING (GAL) Est. 21,000
REMOVED BEFORE WELL INSERTION (GAL) – N/A –
ADDED DURING GRANULAR FILTER PLACEMENT (GAL) – N/A –
ADDED DURING WELL DEVELOPMENT (GAL) N/A –

TYPE AND SIZE CAPACITY OF PUMP AND/OR BAILER Electric Submersible
TYPICAL PUMPING RATE (GAL/MIN) 8 gpm
ESTIMATED RECHARGE RATE (GAL/MIN) Good
DESCRIPTION OF DEVELOPMENT TECHNIQUE Lowered pump into well with pump truck wire - established rate - pumped for alloted time - tool measurements - removed pump: Blew out hole with air before to surge and initiate flow

COMPLETE BOLDED DATA FOR ENTRY IN TIMS
WDR147 (1/88)

[signature] 7/3/89
FORM COMPLETED BY/DATE

TECHNICAL REVIEWER/DATA

N-115-08

WELL DEVELOPMENT RECORD

INITIAL DEVELOPMENT WATER 7/7/88 7/11/88

COLOR brown Light brown

ODOR none none

CLARITY cloudy cloudy

PARTICULATES silt silt

FINAL DEVELOPMENT WATER 7/11/88

COLOR none

ODOR none

CLARITY clear

PARTICULATES - none

INSTRUMENT DESCRIPTIONS

WATER LEVEL INDICATOR MODEL NUMBER Power well sounder

pH METER MODEL AND SERIAL NUMBER Cole-Parmer 505244

CONDUCTIVITY MODEL AND METER SERIAL NUMBER Yellow Spring 15696

TURBIDITY METER MODEL AND SERIAL NUMBER —

OTHER —

COMMENTS

COMPLETE BOLDED DATA FOR ENTRY IN TIMS
WDR147B (1/88)

John M. Daniel 7/3/89
FORM COMPLETED BY/DATE

TECHNICAL REVIEWER/DATA

WELL DEVELOPMENT RECORD
PARAMETER MEASUREMENTS

DATE	TIME	TOTAL VOL. WITHDRAWN		pH	Ec (µmhos/cm)	TEMP (°C)	TURB. (NTU)	IM CONE (ml of sed.)	COMMENTS
		GALS	BORE VOL.						
7/7/88	-	-	-	11.52	380	25			blowing with air.
		60	2	10.00	1400	23			
		70	2.38	8.3	1500	23			—
7/11/88	-	-							with electric submersible
		120	4	7.00	1400	22			
		320	10.9	6.99	1450	22			
		420	14.3	7.02	1400	22	—		—

COMPLETE BOLDED DATA FOR ENTRY IN TIMS
WDR147C (9/88)

[signature] 7/3/89
FORM COMPLETED BY/DATE

TECHNICAL REVIEWER/DATA

WELL DEVELOPMENT RECORD

FACILITY CODE USATHAMA N-TEAD LOG DATE 7-12-88
LOCATION ID N-116-88 ACCEPTANCE CODE
LOGGER CODE RFW

INSTALLATION DATE(S) 7-5-88 thru 7-8-88
BOREHOLE TOTAL DEPTH (FT) 288 WELL TOTAL DEPTH [h_3] (FT) 286
BOTTOM OF FILTER PACK [h_2] (FT) 288 WELL CASING DIAMETER [d_2] (FT) .33
BOREHOLE DIAMETER [d_1] (FT) .67 SCREEN LENGTH (FT) 19.25
SCREENED INTERVAL (FT) 265.25 - 284.5
DEPTH-TO-WATER [h_1] BEFORE WELL DEVELOPMENT (FT) 267.9

BOREHOLE VOLUME [V_1] CALCULATION (in gals)

$$\frac{d_1^2\, 3.1415}{4}\left(h_2 - h_1\right) \times 7.48 \left(\frac{gal}{ft^3}\right)$$ 47.2 [V_1] gals per 1 bore volume

WELL CASING VOLUME [V_2] CALCULATION (in gals)

$$\frac{d_2^2\, 3.1415}{4}\left(h_3 - h_1\right) \times 7.48 \left(\frac{gal}{ft^3}\right)$$ 11.6 [V_2] gals per 1 well volume

ASSUME THE FILTER PACK IN THE ANNULUS BETWEEN THE BOREHOLE AND WELL CASING TO HAVE A POROSITY OF 30%. THEREFORE:

$V_1 - V_2 * 0.30 =$ 10.8 [V_3] GALS IN THE FILTER PACK BETWEEN THE BOREHOLE AND WELL CASING. IN SUMMARY, 1 FILTER PACK AND WELL CASING VOLUME EQUALS [$V_2 + V_3$] 22.4 GALS.

QUANTITY OF MUD/WATER -

LOST DURING DRILLING (GAL) N/A
REMOVED BEFORE WELL INSERTION (GAL) N/A
ADDED DURING GRANULAR FILTER PLACEMENT (GAL) N/A
ADDED DURING WELL DEVELOPMENT (GAL) N/A.

TYPE AND SIZE CAPACITY OF PUMP AND/OR BAILER electric submersible
TYPICAL PUMPING RATE (GAL/MIN) 8
ESTIMATED RECHARGE RATE (GAL/MIN) - very good
DESCRIPTION OF DEVELOPMENT TECHNIQUE lowered pump - pumped out water for one hr - 360 gal - cleanned up well.

COMPLETE BOLDED DATA FOR ENTRY IN TIMS
WDR147 (1/88)

[signature] 7/3/89
FORM COMPLETED BY/DATE

TECHNICAL REVIEWER/DATA

N-116-88

WELL DEVELOPMENT RECORD

INITIAL DEVELOPMENT WATER

COLOR dark brown

ODOR none

CLARITY cloudy

PARTICULATES Sand & Silt.

FINAL DEVELOPMENT WATER

COLOR none

ODOR none

CLARITY clear

PARTICULATES none

INSTRUMENT DESCRIPTIONS

WATER LEVEL INDICATOR MODEL NUMBER Power Well Sounder

pH METER MODEL AND SERIAL NUMBER Cole-Parmer 505294

CONDUCTIVITY MODEL AND METER SERIAL NUMBER Yellow Springs 15692

TURBIDITY METER MODEL AND SERIAL NUMBER —

OTHER —

COMMENTS — Cleaned up nice.

COMPLETE BOLDED DATA FOR ENTRY IN TIMS
WDR1478 (1/88)

John McDonald 2/3/89
FORM COMPLETED BY/DATE

TECHNICAL REVIEWER/DATA

N-116-88

WELL DEVELOPMENT RECORD
PARAMETER MEASUREMENTS

DATE	TIME	TOTAL VOL. WITHDRAWN		pH	Ec (µmhos/cm)	TEMP (°C)	TURB. (NTU)	IM CONE (ml of sed.)	COMMENTS
		GALS	BORE VOL.						
7-12-88	9:30	—		7.03	1800	28			
		120	—	6.99	1400	21			
		240	—	7.05	1400	20			
	10:30	360	16	7.25	1400	20			—

COMPLETE BOLDED DATA FOR ENTRY IN TIMS
WDR147C (9/88)

J. M. Smith 7/13/89
FORM COMPLETED BY/DATE

TECHNICAL REVIEWER/DATA

WELL DEVELOPMENT RECORD

FACILITY CODE USATHAMA N-TEAD LOG DATE 8-4-88
LOCATION ID N-117-88 ACCEPTANCE CODE
LOGGER CODE RFW

INSTALLATION DATE(S) 7-8-88 thru 7-12-88
BOREHOLE TOTAL DEPTH (FT) 240 WELL TOTAL DEPTH [h_3] (FT) 239.5
BOTTOM OF FILTER PACK [h_2] (FT) 240 WELL CASING DIAMETER [d_2] (FT) .33
BOREHOLE DIAMETER [d_1] (FT) .67 SCREEN LENGTH (FT) 19.25
SCREENED INTERVAL (FT) 220.25 - 239.5
DEPTH-TO-WATER [h_1] BEFORE WELL DEVELOPMENT (FT) 217.3

BOREHOLE VOLUME [V_1] CALCULATION (in gals)

$$\frac{d_1^2\, 3.1415}{4}\left(h_2 - h_1\right) \times 7.48 \left(\frac{gal}{ft^3}\right)$$ 59.86 [V_1] gals per 1 bore volume

WELL CASING VOLUME [V_2] CALCULATION (in gals)

$$\frac{d_2^2\, 3.1415}{4}\left(h_3 - h_1\right) \times 7.48 \left(\frac{gal}{ft^3}\right)$$ 14.2 [V_2] gals per 1 well volume

ASSUME THE FILTER PACK IN THE ANNULUS BETWEEN THE BOREHOLE AND WELL CASING TO HAVE A POROSITY OF 30%. THEREFORE:

$V_1 - V_2 * 0.30 =$ 13.7 [V_3] GALS IN THE FILTER PACK BETWEEN THE BOREHOLE AND WELL CASING. IN SUMMARY, 1 FILTER PACK AND WELL CASING VOLUME EQUALS [$V_2 + V_3$] 27.9 GALS.

QUANTITY OF MUD/WATER –

LOST DURING DRILLING (GAL) N/A
REMOVED BEFORE WELL INSERTION (GAL) N/A
ADDED DURING GRANULAR FILTER PLACEMENT (GAL) N/A
ADDED DURING WELL DEVELOPMENT (GAL) N/A

TYPE AND SIZE CAPACITY OF PUMP AND/OR BAILER 3 Hp. electric submersible
TYPICAL PUMPING RATE (GAL/MIN) 20
ESTIMATED RECHARGE RATE (GAL/MIN) ~immediate
DESCRIPTION OF DEVELOPMENT TECHNIQUE Installed pump - lowered with pump truck - timed discharge for rate - pumped for alloted time as took measurements

COMPLETE BOLDED DATA FOR ENTRY IN TIMS
WDR147 (1/88)

[signature] 2/3/89
FORM COMPLETED BY/DATE

TECHNICAL REVIEWER/DATA

N-117-86

WELL DEVELOPMENT RECORD

INITIAL DEVELOPMENT WATER

COLOR Brown

ODOR --

CLARITY cloudy

PARTICULATES Silty

FINAL DEVELOPMENT WATER

COLOR none

ODOR none

CLARITY clear

PARTICULATES min, fine, silty

INSTRUMENT DESCRIPTIONS

WATER LEVEL INDICATOR MODEL NUMBER Powers well Sounder

pH METER MODEL AND SERIAL NUMBER Cole Parmer 5vj144

CONDUCTIVITY MODEL AND METER SERIAL NUMBER Yellow Springs 15692

TURBIDITY METER MODEL AND SERIAL NUMBER —

OTHER —

COMMENTS Cleared up in ~10 min.

COMPLETE BOLDED DATA FOR ENTRY IN TIMS
WDR1478 (1/89)

John McDonald 2/3/89
FORM COMPLETED BY/DATE

TECHNICAL REVIEWER/DATA

WELL DEVELOPMENT RECORD
PARAMETER MEASUREMENTS

DATE	TIME	TOTAL VOL. WITHDRAWN		pH	Ec (µmhos/cm)	TEMP (°C)	TURB. (NTU)	IM CONE (ml of sed.)	COMMENTS
		GALS	BORE VOL.						
8/4/88	3:00 P			7.64	1340	16.8			
				7.02	—	16.4			
				7.10	1360	16.8			
				7.01	1300	16.2			
	422	440	16						removed 440 gal
									≅ 16 bore vols.

COMPLETE SOLDED DATA FOR ENTRY IN TMS
WDR147C (9/88)

John M Donnell 2/3/89
FORM COMPLETED BY/DATE

TECHNICAL REVIEWER/DATA

WELL DEVELOPMENT RECORD

FACILITY CODE USATHAMA N-TEAD LOG DATE 8-3-88
LOCATION ID U-118-88 ACCEPTANCE CODE
LOGGER CODE RFW

INSTALLATION DATE(S) 7-22-88 thru 7-29-88
BOREHOLE TOTAL DEPTH (FT) 260.5 WELL TOTAL DEPTH [h_3] (FT) 260.25
BOTTOM OF FILTER PACK [h_2] (FT) 260.5 WELL CASING DIAMETER [d_2] (FT) .33
BOREHOLE DIAMETER [d_1] (FT) .67 SCREEN LENGTH (FT) 19.5
SCREENED INTERVAL (FT) 240.25 - 259.75
DEPTH-TO-WATER [h_1] BEFORE WELL DEVELOPMENT (FT) 226.35

BOREHOLE VOLUME [V_1] CALCULATION (in gals)

$\frac{d_1^2\ 3.1415}{4} (h_2 - h_1) \times 7.48 \left(\frac{gal}{ft^3}\right)$ 90 [V_1] gals per 1 bore volume

WELL CASING VOLUME [V_2] CALCULATION (in gals)

$\frac{d_2^2\ 3.1415}{4} (h_3 - h_1) \times 7.48 \left(\frac{gal}{ft^3}\right)$ 21.7 [V_2] gals per 1 well volume

ASSUME THE FILTER PACK IN THE ANNULUS BETWEEN THE BOREHOLE AND WELL CASING TO HAVE A POROSITY OF 30%. THEREFORE:

$V_1 - V_2 * 0.30 =$ 20.5 [V_3] GALS IN THE FILTER PACK BETWEEN THE BOREHOLE AND WELL CASING. IN SUMMARY, 1 FILTER PACK AND WELL CASING VOLUME EQUALS [$V_2 + V_3$] 42.2 GALS.

QUANTITY OF MUD/WATER -

LOST DURING DRILLING (GAL) N/A
REMOVED BEFORE WELL INSERTION (GAL) N/A
ADDED DURING GRANULAR FILTER PLACEMENT (GAL) N/A
ADDED DURING WELL DEVELOPMENT (GAL) N/A
TYPE AND SIZE CAPACITY OF PUMP AND/OR BAILER 3hp electric submersible
TYPICAL PUMPING RATE (GAL/MIN) 20
ESTIMATED RECHARGE RATE (GAL/MIN) - Very fast -
DESCRIPTION OF DEVELOPMENT TECHNIQUE lowered pump with pump truck winch - verified discharge rate - pumped for alloted time and took measurements

COMPLETE BOLDED DATA FOR ENTRY IN TIMS
WDR147 (1/89)

John McDonald 2/3/89
FORM COMPLETED BY/DATE

TECHNICAL REVIEWER/DATE

WELL DEVELOPMENT RECORD

INITIAL DEVELOPMENT WATER

COLOR Brown

ODOR -

CLARITY -cloudy

PARTICULATES -Silt

FINAL DEVELOPMENT WATER

COLOR none

ODOR none

CLARITY clear

PARTICULATES ~none

INSTRUMENT DESCRIPTIONS

WATER LEVEL INDICATOR MODEL NUMBER Powers well Sounder

pH METER MODEL AND SERIAL NUMBER Cole-Parmer 5.5244

CONDUCTIVITY MODEL AND METER SERIAL NUMBER Yellow Springs 15C92

TURBIDITY METER MODEL AND SERIAL NUMBER —

OTHER —

COMMENTS Water cleared in about 8 minutes

COMPLETE BOLDED DATA FOR ENTRY IN TIMS
WDR1478 (1/88)

John M. Arnold 2/3/89
FORM COMPLETED BY/DATE

TECHNICAL REVIEWER/DATA

WELL DEVELOPMENT RECORD
PARAMETER MEASUREMENTS

DATE	TIME	TOTAL VOL. WITHDRAWN		pH	Ec (µmhos/cm)	TEMP (°C)	TURB. (NTU)	IM CONE (ml of sed.)	COMMENTS
		GALS	BORE VOL.						
8/3/87	11:10			7.17	1750	17.6			
	"	"		7.30	1740	17.0			
	"	"		6.81	1740	16.5			
	"	—		6.72	1700	16.5			
	"	—							Pumped total of 500 Gals in 20 minutes = 11.8 bore vols.

COMPLETE BOLDED DATA FOR ENTRY IN TIMS
WDR147C (9/88)

FORM COMPLETED BY/DATE

TECHNICAL REVIEWER/DATA

WELL DEVELOPMENT RECORD

FACILITY CODE USATHAMA - N-TEAD
LOG DATE 8/15/88
LOCATION ID N-119-88
ACCEPTANCE CODE
LOGGER CODE REW

INSTALLATION DATE(S) 7/24/88 - 7/27/88
BOREHOLE TOTAL DEPTH (FT) 280
WELL TOTAL DEPTH [h_3] (FT) 275.65
BOTTOM OF FILTER PACK [h_2] (FT) 275.65
WELL CASING DIAMETER [d_2] (FT) .33
BOREHOLE DIAMETER [d_1] (FT) .67
SCREEN LENGTH (FT) 9
SCREENED INTERVAL (FT) 266.15 - 275.15
DEPTH-TO-WATER [h_1] BEFORE WELL DEVELOPMENT (FT) 258.1

BOREHOLE VOLUME [V_1] CALCULATION (in gals)

$\frac{d_1^2\ 3.1415}{4} (h_2 - h_1) \times 7.48 \left(\frac{gal}{ft^3}\right)$ 46.3 [V_1] gals per 1 bore volume

WELL CASING VOLUME [V_2] CALCULATION (in gals)

$\frac{d_2^2\ 3.1415}{4} (h_3 - h_1) \times 7.48 \left(\frac{gal}{ft^3}\right)$ 11.2 [V_2] gals per 1 well volume

ASSUME THE FILTER PACK IN THE ANNULUS BETWEEN THE BOREHOLE AND WELL CASING TO HAVE A POROSITY OF 30%. THEREFORE:

$V_1 - V_2 * 0.30 =$ 10.5 [V_3] GALS IN THE FILTER PACK BETWEEN THE BOREHOLE AND WELL CASING. IN SUMMARY, 1 FILTER PACK AND WELL CASING VOLUME EQUALS [$V_2 + V_3$] 21.7 GALS.

QUANTITY OF MUD/WATER -

LOST DURING DRILLING (GAL) N/A
REMOVED BEFORE WELL INSERTION (GAL) N/A
ADDED DURING GRANULAR FILTER PLACEMENT (GAL) N/A
ADDED DURING WELL DEVELOPMENT (GAL) N/A
TYPE AND SIZE CAPACITY OF PUMP AND/OR BAILER 3hp electric submersible
TYPICAL PUMPING RATE (GAL/MIN) 20
ESTIMATED RECHARGE RATE (GAL/MIN) ~ immediate
DESCRIPTION OF DEVELOPMENT TECHNIQUE lowered pump with pump truck unit - established pumping rate - pumped for allotted time and took measurements

COMPLETE BOLDED DATA FOR ENTRY IN TIMS
WDR147 (1/89)

FORM COMPLETED BY/DATE 2/3/89

TECHNICAL REVIEWER/DATA

D-119-88

WELL DEVELOPMENT RECORD

INITIAL DEVELOPMENT WATER

COLOR Brown

ODOR —

CLARITY cloudy

PARTICULATES Silt

FINAL DEVELOPMENT WATER

COLOR none

ODOR none

CLARITY clear

PARTICULATES none

INSTRUMENT DESCRIPTIONS

WATER LEVEL INDICATOR MODEL NUMBER Power well Sounder

pH METER MODEL AND SERIAL NUMBER Cole-Parmer 35242

CONDUCTIVITY MODEL AND METER SERIAL NUMBER Yellow Spring - 15642

TURBIDITY METER MODEL AND SERIAL NUMBER —

OTHER —

COMMENTS Water cleared up in ~10 min.

COMPLETE BOLDED DATA FOR ENTRY IN TIMS
WDR1478 (1/88)

FORM COMPLETED BY/DATE 2/3/89

TECHNICAL REVIEWER/DATA

N-119-6Y

WELL DEVELOPMENT RECORD
PARAMETER MEASUREMENTS

DATE	TIME	TOTAL VOL WITHDRAWN		pH	Ec (µmhos/cm)	TEMP (°C)	TURB. (NTU)	IM CONE (ml of sed.)	COMMENTS
		GALS	BORE VOL						
8/5/88	7:04			7.17	1450	17			
	—	—	—	7.07	1340	15			
	—	—	—	7.06	1330	15			
	—	—		7.02	1310	14.5			
									Pumped 360 gal in ~18 min = 16 bore vols

COMPLETE BOLDED DATA FOR ENTRY IN TIMS
WDR147C (9/88)

Peter McDonald 2/3/89
FORM COMPLETED BY/DATE

TECHNICAL REVIEWER/DATE

WELL DEVELOPMENT RECORD

FACILITY CODE USATHAMA N-TUAD LOG DATE _____

LOCATION ID N-127-88 ACCEPTANCE CODE _____

LOGGER CODE _____

INSTALLATION DATE(S) 10/12/88 - 10/19/88

BOREHOLE TOTAL DEPTH (FT) 242 WELL TOTAL DEPTH [h_3] (FT) 242

BOTTOM OF FILTER PACK [h_2] (FT) 242 WELL CASING DIAMETER [d_2] (FT) .03

BOREHOLE DIAMETER [d_1] (FT) " SCREEN LENGTH (FT) ~20'

SCREENED INTERVAL (FT) 222 - 242

DEPTH-TO-WATER [h_1] BEFORE WELL DEVELOPMENT (FT) 222.85

BOREHOLE VOLUME [V_1] CALCULATION (in gals)

$\frac{d_1^2\ 3.1415}{4} (h_2 - h_1) \times 7.48 \left(\frac{gal}{ft^3}\right)$ 50.5 [V_1] gals per 1 bore volume

WELL CASING VOLUME [V_2] CALCULATION (in gals)

$\frac{d_2^2\ 3.1415}{4} (h_3 - h_1) \times 7.48 \left(\frac{gal}{ft^3}\right)$ 12.2 [V_2] gals per 1 well volume

ASSUME THE FILTER PACK IN THE ANNULUS BETWEEN THE BOREHOLE AND WELL CASING TO HAVE A POROSITY OF 30%. THEREFORE:

$V_1 - V_2 * 0.30 =$ 11.5 [V_3] GALS IN THE FILTER PACK BETWEEN THE BOREHOLE AND WELL CASING. IN SUMMARY, 1 FILTER PACK AND WELL CASING VOLUME EQUALS [$V_2 + V_3$] 23.7 GALS.

QUANTITY OF MUD/WATER -

LOST DURING DRILLING (GAL) NA

REMOVED BEFORE WELL INSERTION (GAL) NA

ADDED DURING GRANULAR FILTER PLACEMENT (GAL) NA

ADDED DURING WELL DEVELOPMENT (GAL) NA

TYPE AND SIZE CAPACITY OF PUMP AND/OR BAILER Grundfos 1.5HP electric Submersible

TYPICAL PUMPING RATE (GAL/MIN) 10

ESTIMATED RECHARGE RATE (GAL/MIN) ~immediate

DESCRIPTION OF DEVELOPMENT TECHNIQUE installed pump with pump test unit established rate, purged for allotted time - took measurements - removed pump. - purged slowly to avoid too much drawdown

COMPLETE BOLDED DATA FOR ENTRY IN TIMS
WDR147 (1/88)

FORM COMPLETED BY/DATE 2/3/89

TECHNICAL REVIEWER/DATA

N-127-84

WELL DEVELOPMENT RECORD

INITIAL DEVELOPMENT WATER

COLOR brown

ODOR clayey

CLARITY cloudy

PARTICULATES —

FINAL DEVELOPMENT WATER

COLOR none

ODOR none

CLARITY clear

PARTICULATES ~ none

INSTRUMENT DESCRIPTIONS

WATER LEVEL INDICATOR MODEL NUMBER Power well Sounder

pH METER MODEL AND SERIAL NUMBER Cole Parmer 423380

CONDUCTIVITY MODEL AND METER SERIAL NUMBER Yellow Springs 15692

TURBIDITY METER MODEL AND SERIAL NUMBER —

OTHER —

COMMENTS

COMPLETE BOLDED DATA FOR ENTRY IN TIMS
WDR1478 (1/89)

John M Donnell 2/3/89
FORM COMPLETED BY/DATE

TECHNICAL REVIEWER/DATA

N-127-58

WELL DEVELOPMENT RECORD
PARAMETER MEASUREMENTS

DATE	TIME	TOTAL VOL. WITHDRAWN		pH	Ec (µmhoe/cm)	TEMP (°C)	TURB. (NTU)	IM CONE (ml of sed.)	COMMENTS
		GALS	BORE VOL.						
10/31/88	9:55	—		7.46	2900	16			
	+10m	100	4.2	7.34	2750	14.5			
	+18m	180	7.6	7.32	2900	16°			Semi-clear
	+22m	220	9.3	7.32	2720	16.5			~clear
	+27	270	11.4						Sample taken
									removed 270 gals in 27min

COMPLETE BOLDED DATA FOR ENTRY IN TIMS
WDR147C (9/88)

K. McDonald 2/3/89
FORM COMPLETED BY/DATE

TECHNICAL REVIEWER/DATA

WELL DEVELOPMENT RECORD

FACILITY CODE NSATHAMA N-TEAD LOG DATE 10/31/88
LOCATION ID N-128-88 ACCEPTANCE CODE
LOGGER CODE RFW

INSTALLATION DATE(S) 10/14/88 - 10/16/88
BOREHOLE TOTAL DEPTH (FT) 257 WELL TOTAL DEPTH [h_3] (FT) 253.7
BOTTOM OF FILTER PACK [h_2] (FT) 256 WELL CASING DIAMETER [d_2] (FT) .33
BOREHOLE DIAMETER [d_1] (FT) .67 SCREEN LENGTH (FT) ~19
SCREENED INTERVAL (FT) 234.7 - 253.7
DEPTH-TO-WATER [h_1] BEFORE WELL DEVELOPMENT (FT) 222.5

BOREHOLE VOLUME [V_1] CALCULATION (in gals)

$\frac{d_1^2\ 3.1415}{4} (h_2 - h_1) \times 7.48 \left(\frac{gal}{ft^3}\right)$ 88.3 [V_1] gals per 1 bore volume

WELL CASING VOLUME [V_2] CALCULATION (in gals)

$\frac{d_2^2\ 3.1415}{4} (h_3 - h_1) \times 7.48 \left(\frac{gal}{ft^3}\right)$ 19.96 [V_2] gals per 1 well volume

ASSUME THE FILTER PACK IN THE ANNULUS BETWEEN THE BOREHOLE AND WELL CASING TO HAVE A POROSITY OF 30%. THEREFORE:

$V_1 - V_2 * 0.30 =$ 20.5 [V_3] GALS IN THE FILTER PACK BETWEEN THE BOREHOLE AND WELL CASING. IN SUMMARY, 1 FILTER PACK AND WELL CASING VOLUME EQUALS [$V_2 + V_3$] 40.5 GALS.

QUANTITY OF MUD/WATER -

LOST DURING DRILLING (GAL) NA
REMOVED BEFORE WELL INSERTION (GAL) NA
ADDED DURING GRANULAR FILTER PLACEMENT (GAL) NA
ADDED DURING WELL DEVELOPMENT (GAL) n/a

TYPE AND SIZE CAPACITY OF PUMP AND/OR BAILER Grundfos 1.5hp electric Submersible
TYPICAL PUMPING RATE (GAL/MIN) 12 gpm
ESTIMATED RECHARGE RATE (GAL/MIN) ~immediate
DESCRIPTION OF DEVELOPMENT TECHNIQUE lowered pump with pumptruck winch. established rate - pumped for alloted time - took measurement & removed pump.

COMPLETE BOLDED DATA FOR ENTRY IN TIMS
WDR147 (1/88)

L. McDonald 2/3/89
FORM COMPLETED BY/DATE

TECHNICAL REVIEWER/DATE

N-128-88

WELL DEVELOPMENT RECORD

INITIAL DEVELOPMENT WATER

COLOR reddish brown

ODOR dirt

CLARITY V. cloudy

PARTICULATES fine Sand & Silt

FINAL DEVELOPMENT WATER

COLOR none

ODOR none

CLARITY clear

PARTICULATES ~none

INSTRUMENT DESCRIPTIONS

WATER LEVEL INDICATOR MODEL NUMBER Power well Sounder

pH METER MODEL AND SERIAL NUMBER Cole-Palmer 423380

CONDUCTIVITY MODEL AND METER SERIAL NUMBER Yellow Springs 15692

TURBIDITY METER MODEL AND SERIAL NUMBER —

OTHER —

COMMENTS

COMPLETE BOLDED DATA FOR ENTRY IN TIMS
WDR1478 (1/89)

John McDonald 2/3/89
FORM COMPLETED BY/DATE

TECHNICAL REVIEWER/DATA

N-125-88

WELL DEVELOPMENT RECORD
PARAMETER MEASUREMENTS

DATE	TIME	TOTAL VOL. WITHDRAWN		pH	Ec (µmhos/cm)	TEMP (°C)	TURB. (NTU)	IM CONE (ml of sed.)	COMMENTS
		GALS	BORE VOL.						
12/31/68	2:15p			—	1620	19.5			
	+10	120	~3	7.25	1610	16.8			
	+16	192	4.7	7.18	1710	17.			
	+20	240	~6	6.85	1710	16.8			
	+24	288	7.1						Strongly removed 288 gals in 24 minutes.

COMPLETE BOLDED DATA FOR ENTRY IN TIMS
WDR147C (9/88)

FORM COMPLETED BY/DATE 2/3/89

TECHNICAL REVIEWER/DATA

WELL DEVELOPMENT RECORD

FACILITY CODE	USATHAMA N-TEAD	LOG DATE	11-1-88
LOCATION ID	N-129-88	ACCEPTANCE CODE	
LOGGER CODE	RFW		

INSTALLATION DATE(S) 10/20/88 – 10/25/88

BOREHOLE TOTAL DEPTH (FT) 244 WELL TOTAL DEPTH [h_3] (FT) 242.85

BOTTOM OF FILTER PACK [h_2] (FT) 244 WELL CASING DIAMETER [d_2] (FT) .33

BOREHOLE DIAMETER [d_1] (FT) .67 SCREEN LENGTH (FT) 19.85

SCREENED INTERVAL (FT) 223 - 242.85

DEPTH–TO–WATER [h_1] BEFORE WELL DEVELOPMENT (FT) 223.8

BOREHOLE VOLUME [V_1] CALCULATION (in gals)

$$\frac{d_1^2\, 3.1415}{4}\left(h_2 - h_1\right) \times 7.48 \left(\frac{gal}{ft^3}\right)$$ 53.27 [V_1] gals per 1 bore volume

WELL CASING VOLUME [V_2] CALCULATION (in gals)

$$\frac{d_2^2\, 3.1415}{4}\left(h_3 - h_1\right) \times 7.48 \left(\frac{gal}{ft^3}\right)$$ 12.19 [V_2] gals per 1 well volume

ASSUME THE FILTER PACK IN THE ANNULUS BETWEEN THE BOREHOLE AND WELL CASING TO HAVE A POROSITY OF 30%. THEREFORE:

$V_1 - V_2 * 0.30 =$ 12.32 [V_3] GALS IN THE FILTER PACK BETWEEN THE BOREHOLE AND WELL CASING. IN SUMMARY, 1 FILTER PACK AND WELL CASING VOLUME EQUALS [$V_2 + V_3$] 24.5 GALS.

QUANTITY OF MUD/WATER –

LOST DURING DRILLING (GAL) NA

REMOVED BEFORE WELL INSERTION (GAL) NA

ADDED DURING GRANULAR FILTER PLACEMENT (GAL) NA

ADDED DURING WELL DEVELOPMENT (GAL) NA

TYPE AND SIZE CAPACITY OF PUMP AND/OR BAILER Grundfos 1.5 HP electric submersible

TYPICAL PUMPING RATE (GAL/MIN) 15 gpm

ESTIMATED RECHARGE RATE (GAL/MIN) ~immediate

DESCRIPTION OF DEVELOPMENT TECHNIQUE installed pump with pump truck winch established rate – pumped for alloted time – took measurements removed pump.

COMPLETE BOLDED DATA FOR ENTRY IN TIMS
WDR147 (1/88)

[signature] 2/3/89
FORM COMPLETED BY/DATE

TECHNICAL REVIEWER/DATA

A-129-88

WELL DEVELOPMENT RECORD

INITIAL DEVELOPMENT WATER

COLOR Brown

ODOR "Sly Sandy"

CLARITY V. cloudy

PARTICULATES Sand-Silt

FINAL DEVELOPMENT WATER

COLOR none

ODOR none

CLARITY clear

PARTICULATES ~none

INSTRUMENT DESCRIPTIONS

WATER LEVEL INDICATOR MODEL NUMBER Powers well sounder

pH METER MODEL AND SERIAL NUMBER Cole palmer # 42336-

CONDUCTIVITY MODEL AND METER SERIAL NUMBER Yellow Springs 15692

TURBIDITY METER MODEL AND SERIAL NUMBER —

OTHER —

COMMENTS

COMPLETE BOLDED DATA FOR ENTRY IN TIMS
WDR1478 (1/89)

Kim McDonald 2/3/89
FORM COMPLETED BY/DATE

TECHNICAL REVIEWER/DATA

W-129-86

WELL DEVELOPMENT RECORD
PARAMETER MEASUREMENTS

DATE	TIME	TOTAL VOL. WITHDRAWN		pH	Ec (µmhos/cm)	TEMP (°C)	TURB. (NTU)	IM CONE (ml of sed.)	COMMENTS
		GALS	BORE VOL.						
11/1/86	8:42			7.24	3090	18			
	+4	90	3.7	7.23	1900	16			
	+4	165	6.7	7.14	1880	16			
	+20	300	12.3	7.15	1880	16			
	+24	360	14.7						Sample : removed 3 vols
									Note high initial pH &
									Conductivity - calibrations
									verified.

COMPLETE BOLDED DATA FOR ENTRY IN TIMS
WDR147C (9/86)

John McDonald 2/13/87
FORM COMPLETED BY/DATE

TECHNICAL REVIEWER/DATE

WELL DEVELOPMENT RECORD

FACILITY CODE USATHAMA N-TEAD LOG DATE 11-1-88
LOCATION ID N-130-88 ACCEPTANCE CODE
LOGGER CODE RFW

INSTALLATION DATE(S) 10/27/88 - 10/28/88
BOREHOLE TOTAL DEPTH (FT) 245 WELL TOTAL DEPTH [h_3] (FT) 244.4
BOTTOM OF FILTER PACK [h_2] (FT) 245 WELL CASING DIAMETER [d_2] (FT) .33
BOREHOLE DIAMETER [d_1] (FT) .67 SCREEN LENGTH (FT) 19.7
SCREENED INTERVAL (FT) 224.7 - 244.4
DEPTH-TO-WATER [h_1] BEFORE WELL DEVELOPMENT (FT) 224.5

BOREHOLE VOLUME [V_1] CALCULATION (in gals)

$$\frac{d_1^2\, 3.1415}{4}\left(h_2 - h_1\right) \times 7.48 \left(\frac{gal}{ft^3}\right)$$ 54.06 [V_1] gals per 1 bore volume

WELL CASING VOLUME [V_2] CALCULATION (in gals)

$$\frac{d_2^2\, 3.1415}{4}\left(h_3 - h_1\right) \times 7.48 \left(\frac{gal}{ft^3}\right)$$ 12.7 [V_2] gals per 1 well volume

ASSUME THE FILTER PACK IN THE ANNULUS BETWEEN THE BOREHOLE AND WELL CASING TO HAVE A POROSITY OF 30%. THEREFORE:

$V_1 - V_2 * 0.30 =$ 12.4 [V_3] GALS IN THE FILTER PACK BETWEEN THE BOREHOLE AND WELL CASING. IN SUMMARY, 1 FILTER PACK AND WELL CASING VOLUME EQUALS [$V_2 + V_3$] 25.1 GALS.

QUANTITY OF MUD/WATER -
LOST DURING DRILLING (GAL) NA
REMOVED BEFORE WELL INSERTION (GAL) NA
ADDED DURING GRANULAR FILTER PLACEMENT (GAL) NA
ADDED DURING WELL DEVELOPMENT (GAL) NA
TYPE AND SIZE CAPACITY OF PUMP AND/OR BAILER Grundfos 1.5HP electric Submersible
TYPICAL PUMPING RATE (GAL/MIN) 10 gpm
ESTIMATED RECHARGE RATE (GAL/MIN) ~ immediate
DESCRIPTION OF DEVELOPMENT TECHNIQUE installed pump with pump truck winch. established rate - pumped for alloted time - took measurement - removed pump.

COMPLETE BOLDED DATA FOR ENTRY IN TIMS
WDR147 (1/88)

[signature] 2/3/87
FORM COMPLETED BY/DATE

TECHNICAL REVIEWER/DATA

N-130-88

WELL DEVELOPMENT RECORD

INITIAL DEVELOPMENT WATER

COLOR reddish brown

ODOR —

CLARITY cloudy

PARTICULATES Silty

FINAL DEVELOPMENT WATER

COLOR none

ODOR none

CLARITY clear

PARTICULATES ~none

INSTRUMENT DESCRIPTIONS

WATER LEVEL INDICATOR MODEL NUMBER Power Well Sounder

pH METER MODEL AND SERIAL NUMBER Cole Palmer #423380

CONDUCTIVITY MODEL AND METER SERIAL NUMBER Yellow Springs 15692

TURBIDITY METER MODEL AND SERIAL NUMBER —

OTHER —

COMMENTS

COMPLETE BOLDED DATA FOR ENTRY IN TIMS
WDR147B (1/89)

John McDonald 2/5/89
FORM COMPLETED BY/DATE

TECHNICAL REVIEWER/DATA

N-130-8Y

WELL DEVELOPMENT RECORD
PARAMETER MEASUREMENTS

DATE	TIME	TOTAL VOL. WITHDRAWN		pH	Ec (µmhos/cm)	TEMP (°C)	TURB. (NTU)	IM CONE (ml of sed.)	COMMENTS
		GALS	BORE VOL.						
4/1/88	11:18			7.65	—	21			
	+6	40	1.6	7.48	1800	16.8			
	+10	100	4	7.41	1780	16.3			
	+14	140	5.6	7.39	1790	16.0			
	+19	190	7.6	—					Sample

COMPLETE BOLDED DATA FOR ENTRY IN TIMS
WDR147C (9/88)

John M Linnell 2/3/89
FORM COMPLETED BY/DATE

TECHNICAL REVIEWER/DATA

APPENDIX F

GROUNDWATER SAMPLE COLLECTION FORMS

GULF COAST LABORATORIES, INC.
FIELD SURVEY FORM

N-TEAD

Facility Name: INT WASHOUT
Purge Date: 11-20-98
Purge Time: 1105
Sample Date: —
Sample Time: —

Sample Point I.D.: N-103-98
*Casing Vol. (gals.): 0.65
Vol. Purged (gals.): —
Sample Method: 3" PVC BAILER

Elevation: —
Water Level: 37.27'
GW Elevation: —

Total Well Depth: 37.80'
Stick-Up: 2.04'
Sample Temp. (°C): —

Weather Conditions: (1ST PURGE) MOSTLY CLOUDY, ~35°F, WINDS ~5MPH N
Sample Appearance: NO SAMPLE OBTAINED.
Sampler Comments: *WELL VOLUME PLUS SANDPACK. PURGED WELL DRY, ~750ml.
INITIAL PURGE WATER APPEARANCE: TAN, CLOUDY, NO ODOR.

Unable To Obtain Sample (X): X Reason: WELL RECHARGED LESS THAN 1 INCH IN 24 HRS.
Sample Composited (X): ____ Procedure/Proportions: ____

	1105			
pH	7.89			
Sp. Cond. (umhos)	2670			
	11.7%			

INITIAL READING (1ST PURGE)

~~Lab~~ Comments: WELL CASING VOLUME: 0.33 GAL

I certify that sampling procedures were in accordance with EPA and corporate protocols.
Sampler Name: (print) JAMES A. O'MALLEY Signature: James A. O'Malley

GCL # ____

GULF COAST LABORATORIES, INC.
FIELD SURVEY FORM

N-TEMP

Facility Name: TNT WASHOUT
Purge Date: 11-22-88
Purge Time: 1530
Sample Date: 11-22-88
Sample Time: 1630

Sample Point I.D.: N-110-88
*Casing Vol. (gals.): 16.25
Vol. Purged (gals.): 85
Sample Method: 3" PVC BAILER

Elevation:
Water Level: 304.33'
GW Elevation:

* Total Well Depth: 317.30'
Stick-Up: 2.25'
Sample Temp. (°C): 16.5°

Weather Conditions: SUNNY, ~45°F, WINDS ~5-10 MPH S
Sample Appearance: COLORLESS, SLIGHTLY CLOUDY, NO ODOR
Sampler Comments: * WELL VOLUME PER SAMPLER'S USED SUBMERSIBLE PUMP TO PURGE WELL INITIAL PURGE WATER APPEARANCE: TAN, CLOUDY, NO ODOR. REFERENCE MEASUREMENT TAKEN FROM CASING.

Unable To Obtain Sample (X): ____ Reason:
Sample Composited (X): ____ Procedure/Proportions:

	1530	1544	1558	N/2
pH	7.50	7.37	7.42	~~7.58~~ 7.52 @ 11-22-88
Sp. Cond. (umhos)	1680 / 15.2°C	1750 / 16.4°C	1690 / 16.2°C	1670 / 16.5°C
	INITIAL READING (~1 GAL)	2ND (~8 GAL)	3RD (~56 GAL)	FINAL

FIELD ~~Lab~~ Comments: END OF PURGE WATER APPEARANCE FROM SUBMERSIBLE IS CLOUDY, NO ODOR.

I certify that sampling procedures were in accordance with EPA and corporate protocols.
Sampler Name: (print) JAMES A. O'MALLEY Signature: James A. O'Malley

GCL #

N-TEAD

GULF COAST LABORATORIES, INC.
FIELD SURVEY FORM

Facility Name: Drum Storage
Purge Date: 11-6-88
Purge Time: 1437
Sample Date: 11-6-88
Sample Time: 1542

Sample Point I.D.: N-111-88
*Casing Vol. (gals.): 23.52
Vol. Purged (gals.): 125
Sample Method: 3" PVC Bailer

Elevation:
Water Level: 318.50'
GW Elevation:

*Total Well Depth: 337.54'
Stick-Up: 1.67'
Sample Temp. (°C): 14.0

Weather Conditions: Mostly Sunny, ~55°F, Winds ~3-5 mph N
Sample Appearance: Tan, Cloudy, No Odor
Sampler Comments: *Well Casing Plus Sandpack. *Reference Measurement Taken From Driller's Log. Used Submersible Pump To Purge Well. Initial Purge Water Appearance: Orange Tan, Turbid, No Odor.

Unable To Obtain Sample (X): ____ Reason:
Sample Composited (X): ____ Procedure/Proportions:

	1438	1444	1452	
pH	6.97	7.21	7.18	7.28
Sp. Cond. (umhos)	1750	1810	1810	1790
	15.1°C	14.5°C	14.3°C	
	Initial Reading (~40 gal)	2nd (~80 gal)	3rd (~120 gal)	Final

Field ~~Lab~~ Comments: End of Purge Water Appearance From Submersible Pump Was Clear, No Odor.

I certify that sampling procedures were in accordance with EPA and corporate protocols.
Sampler Name: (print) James A. O'Malley Signature: James A. O'Malley

GCL #

GULF COAST LABORATORIES, INC.
FIELD SURVEY FORM

N-TEAD

Facility Name: DRUM STORAGE
Purge Date: 11-7-88
Purge Time: 1119
Sample Date: 11-7-88
Sample Time: 1215

Sample Point I.D.: N-112-88
* Casing Vol. (gals.): 20.8
Vol. Purged (gals.): 110
Sample Method: 3" PVC BAILER

Elevation:
Water Level: 315.75'
GW Elevation:

* Total Well Depth: 332.00
Stick-Up: 1.88
Sample Temp. (°C): 14.0

Weather Conditions: SUNNY, ~45°F, WINDS ~ 5-10 MPH S
Sample Appearance: BROWN, TURBID, NO ODOR.
Sampler Comments: * WELL VOLUME PLUS SAND PACK. • REFERENCE MEASUREMENT TAKEN FROM DRILLERS LOG. USED SUBMERSIBLE PUMP TO PURGE WELL. INITIAL PURGE WATER APPEARANCE: DARK BROWN, TURBID, NO ODOR.

Unable To Obtain Sample (X): ____ Reason:
Sample Composited (X): ____ Procedure/Proportions:

	1119	1126	1133	
pH	7.48	7.69	7.82	7.86
Sp. Cond. (umhos)	1980	1810	1700	1680
	13.3°C	13.7°C	14.0°C	
	INITIAL PERIOD (~3 GAL)	2ND (~3 GAL)	3RD (~10 GAL)	FINAL

Field ~~Lab~~ Comments: END OF PURGE WATER APPEARANCE FROM SUBMERSIBLE PUMP WAS LIGHT GRAY, SLIGHTLY CLOUDY, NO ODOR.

I certify that sampling procedures were in accordance with EPA and corporate protocols.
Sampler Name: (print) JAMES A. O'MALLEY Signature: James A. O'Malley

GCL #

GULF COAST LABORATORIES, INC.
FIELD SURVEY FORM

N-TEAD

Facility Name: DRUM STORAGE
Purge Date: 11-7-88
Purge Time: 1423
Sample Date: 11-7-88
Sample Time: 1515

Sample Point I.D.: N-114-88
*Casing Vol. (gals.): 21.6
Vol. Purged (gals.): 110
Sample Method: 3" PVC BAILER

Elevation:
Water Level: 312.50'
GW Elevation:

• Total Well Depth: 334.60'
Stick-Up: 1.88
Sample Temp. (°C): 15.1

Weather Conditions: SUNNY, ~50°F, WINDS ~5-10mph S
Sample Appearance: LIGHT TAN, SLIGHTLY CLOUDY, NO ODOR
Sampler Comments: * WELL VOLUME PLUS SAND PACK. • REFERENCE MEASUREMENT TAKEN FROM DRILLERS LOG. USED SUBMERSIBLE PUMP TO PURGE WELL. INITIAL PURGE WATER APPEARANCE: TAN, CLOUDY, NO ODOR

Unable To Obtain Sample (X): ____ Reason:
Sample Composited (X): ____ Procedure/Proportions:

	1423	1431	1438	
pH	7.74	7.50	7.47	7.66
Sp. Cond. (umhos)	1360	~~1380~~ 1380	1370	1380
	15.1°C	15.0°C	15.0°C	15.1
	INITIAL (1 CASING)	2ND (3 GAL)	3RD (7 GAL)	FINAL

Field Lab Comments: END OF PURGE WATER APPEARANCE FROM SUBMERSIBLE PUMP WAS COLORLESS, SLIGHTLY CLOUDY, NO ODOR

I certify that sampling procedures were in accordance with EPA and corporate protocols.
Sampler Name: (print) JAMES A. O'MALLEY Signature: James A. O'Malley

GCL # ____

GULF COAST LABORATORIES, INC.
FIELD SURVEY FORM

N-TEAD

Facility Name: SANITARY LANDFILL
Purge Date: 11-15-88
Purge Time: 1048
Sample Date: 11-15-88
Sample Time: 1137

Sample Point I.D.: N-115-88
*Casing Vol. (gals.): 24.86
Vol. Purged (gals.): 130
Sample Method: 3" PVC BAILER

Elevation:
Water Level: 269.37'
GW Elevation:

*Total Well Depth: 295.60'
Stick-Up: 2.08'
Sample Temp. (°C): 14.3

Weather Conditions: SUNNY, ~40°F, WINDS S-SE ~2-3 mph
Sample Appearance: COLORLESS, VERY SLIGHTLY CLOUDY, NO ODOR
Sampler Comments: * WELL VOLUME PER SAMPLE. REFERENCE MEASUREMENT TAKEN FROM ORIGINAL LOG. USED SUBMERSIBLE PUMP TO PURGE WELL. INITIAL PURGE WATER APPEARANCE: TAN, CLOUDY, NO ODOR

Unable To Obtain Sample (X): ____ Reason:
Sample Composited (X): ____ Procedure/Proportions:

	1048	1055	1102	
pH	6.99	7.23	7.39	7.56
Sp. Cond. (umhos)	1790 / 12.4°C	1640 / 14.0°C	1650 / 14.3°C	~~1650~~ 1650 TO 11-15-88
	1 VOLUME REMOVED (3 GAL)	2ND (43 GAL)	3RD (84 GAL)	FINAL

Field ~~Lab~~ Comments: END OF PURGE WATER APPEARANCE FROM SUBMERSIBLE PUMP: CLEAR, NO ODOR

I certify that sampling procedures were in accordance with EPA and corporate protocols.
Sampler Name: (print) JAMES A. O'MALLEY Signature: James A. O'Malley

GCL #

GULF COAST LABORATORIES, INC.
FIELD SURVEY FORM

N-TEAD

Facility Name: SANITARY LANDFILL
Purge Date: 11-15-88
Purge Time: 1339
Sample Date: 11-15-88
Sample Time: 1456

Sample Point I.D.: N-116-88
*Casing Vol. (gals.): 10.62
Vol. Purged (gals.): 100
Sample Method: 3" PVC BAILER

Elevation:
Water Level: 273.04'
GW Elevation:

• Total Well Depth: 286.00'
Stick-Up: 1.92'
Sample Temp. (°C): 13.6

Weather Conditions: SUNNY, ~40°F, WINDY LIGHT AND VARIABLE
Sample Appearance: TAN, CLOUDY, NO ODOR
Sampler Comments: *WELL VOLUME PLUS SAMPLE. • REFERENCE MEASUREMENT TAKEN FROM DRILLERS LOG. USED SUBMERSIBLE PUMP TO PURGE WELL. INITIAL PURGE WATER APPEARANCE: BROWN, TURBID, NO ODOR.

Unable To Obtain Sample (X): ____ Reason:
Sample Composited (X): ____ Procedure/Proportions:

	1339	1346	1353	
pH	7.57	7.31	7.56	7.57
Sp. Cond. (umhos)	1750 / 13.5°C	1690 / 13.2°C	1650 / 13.7°C	1640
	INITIAL READING (~3 GAL)	2ND (~33 GAL)	3RD (~67 GAL)	FINAL

Field Lab Comments: END OF PURGE WATER APPEARANCE FROM SUBMERSIBLE PUMP: LIGHT TAN, CLOUDY, NO ODOR.

I certify that sampling procedures were in accordance with EPA and corporate protocols.
Sampler Name: (print) JAMES A. O'MALLEY Signature: James A. O'Malley

GCL # ____

GULF COAST LABORATORIES, INC.
FIELD SURVEY FORM

N-TEAD

Facility Name: Sanitary Landfill
Purge Date: 11-22-88
Purge Time: 0900
Sample Date: 11-22-88
Sample Time: 0948

Sample Point I.D.: N-117-BB
*Casing Vol. (gals.): 22.05
Vol. Purged (gals.): 120
Sample Method: 3" PVC Bailer

Elevation:
Water Level: 222.25'
GW Elevation:

*Total Well Depth: 240.00'
Stick-Up: 2.21'
Sample Temp. (°C): 14.3

Weather Conditions: Partly Cloudy, ~40°F, Winds ~5-10 mph SE
Sample Appearance: Light Tan Tint, Slightly Cloudy, No Odor
Sampler Comments: *Well Volume Plus Saturation. *Reference Measurement Taken From Previous Log. Used Submersible Pump To Purge Well. Initial Purge Water Appearance: Tan, Cloudy, No Odor.

Unable To Obtain Sample (X): ____ Reason:
Sample Composited (X): ____ Procedure/Proportions:

	0900	0910	0920	
pH	6.89	7.61	7.65	7.57
Sp. Cond. (umhos)	1790 / 12.9°C	1780 / 12.9°C	1810 / 13.8°C	1750
	Initial Reading (~2 gal)	2nd (~39 gal)	3rd (~75 gal)	Final

Field ~~Lab~~ Comments: End of Purge Water Appearance From Submersible Pump Is Clear, No Odor.

Sampled Well With Stainless Steel Grundfos Pump Still In Well. Pt Submersible Pump ~2-3ft Above Grundfos.

I certify that sampling procedures were in accordance with EPA and corporate protocols.
Sampler Name: (print) James A. O'Malley Signature: James A. O'Malley

GCL #

GULF COAST LABORATORIES, INC.
FIELD SURVEY FORM

N-TEAD

Facility Name: SANITARY LANDFILL
Purge Date: 11-8-88
Purge Time: 1155
Sample Date: 11-8-88
Sample Time: 1300

Sample Point I.D.: N-11B-88
*Casing Vol. (gals.): 37.24
Vol. Purged (gals.): 255
Sample Method: 3" PVC BAILER

Elevation:
Water Level: 230.87'
GW Elevation:

Total Well Depth: 260.25'
Stick-Up: 2.58'
Sample Temp. (°C): 14.9°

Weather Conditions: SUNNY, ~55°F, WINDS ~2-3 MPH N
Sample Appearance: COLORLESS, VERY SLIGHTLY CLOUDY, NO ODOR
Sampler Comments: *WELL VOLUME PLUS SUBMERGE. REFERENCE MEASUREMENT TAKEN FROM BAILERS LOG. USED SUBMERSIBLE PUMP TO PURGE WELL. INITIAL PURGE WATER APPEARANCE: BROWN, TURBID, NO ODOR

Unable To Obtain Sample (X): ____ Reason:
Sample Composited (X): ____ Procedure/Proportions:

	1155	1208	1222	
pH	7.48	7.40	7.31	7.40
Sp. Cond. (umhos)	2130	2160	2190	2220
	14.8°C	14.7°C	14.8°C	14.9°C
	INITIAL READING (~3 GAL)	2ND (~7 GAL)	3RD (~11 GAL)	FINAL

Field ~~Lab~~ Comments: END OF PURGE WATER APPEARANCE FROM SUBMERSIBLE PUMP WAS: CLEAR, NO ODOR

I certify that sampling procedures were in accordance with EPA and corporate protocols.
Sampler Name: (print) JAMES A. O'MALLEY Signature: James A. O'Malley

GCL # ____

GULF COAST LABORATORIES, INC.
FIELD SURVEY FORM

N-TEAD

Facility Name: ~~TNT WASHOUT~~ SANITARY LANDFILL

Purge Date: 11-22-88

Purge Time: 1050

Sample Date: 11-22-88

Sample Time: 1122

Sample Point I.D.: N-119-88

*Casing Vol. (gals.): 6.24

Vol. Purged (gals.): 35

Sample Method: 3" PVC BAILER

Elevation:

Water Level: 270.71'

GW Elevation:

Total Well Depth: 275.65'

Stick-Up: 2.67'

Sample Temp. (°C): 14.3

Weather Conditions: MOSTLY CLOUDY, ~48°F, WINDS ~5-10MPH S

Sample Appearance: TAN, CLOUDY, NO ODOR

Sampler Comments: * WELL VOLUME PLUG SANDPACK. USED SUBMERSIBLE PUMP TO PURGE WELL. INITIAL PURGE WATER APPEARANCE: BROWN, CLOUDY, NO ODOR.

Unable To Obtain Sample (X): ____ Reason:

Sample Composited (X): ____ Procedure/Proportions:

	1050	1054	1059	
pH	7.70	7.52	7.54	7.58
Sp. Cond. (umhos)	1710	1700	1710	1720
	12.6°C	13.4°C	14.2°C	
	INITIAL READING (~7 GAL)	2ND (~11 GAL)	3RD (~23 GAL)	FINAL

~~Lab~~ FIELD Comments: END OF PURGE WATER APPEARANCE FROM SUBMERSIBLE PUMP IS CLEAR, NO ODOR

I certify that sampling procedures were in accordance with EPA and corporate protocols.

Sampler Name: (print) JAMES A. O'MALLEY Signature: James A. O'Malley

GCL #

GULF COAST LABORATORIES, INC.
FIELD SURVEY FORM

N-TEAD

Facility Name: SANITARY LANDFILL
Purge Date: 11-22-88
Purge Time: 1225
Sample Date: 11-22-88
Sample Time: 1350

Sample Point I.D.: N-120-88
Casing Vol. (gals.): 29.9
Vol. Purged (gals.): 160
Sample Method: 3" PVC BAILER

Elevation:
Water Level: 296.42'
GW Elevation:

Total Well Depth: 320.00'
Stick-Up: 1.29'
Sample Temp. (°C): 14.3

Weather Conditions: SUNNY, ~45°F, WINDS ~ 5-10MPH S
Sample Appearance: COLORLESS, VERY SLIGHTLY CLOUDY, NO ODOR.
Sampler Comments: * WELL VOLUME PLUS SANDPACK. USED SUBMERSIBLE PUMP TO PURGE WELL. INITIAL PURGE WATER APPEARANCE: TAN, CLOUDY, NO ODOR. WATER IN ANNULAR SPACE.

Unable To Obtain Sample (X): ____ Reason:
Sample Composited (X): ____ Procedure/Proportions:

	1225	1246	1307	
pH	7.84	7.84	7.69	7.79
Sp. Cond. (umhos)	1430 @ 13.7°C	1450 @ 14.3°C	1460 @ 14.3°C	1480
	INITIAL PURGING (~2GA)	2ND (~52GA)	3RD (~10 5GA)	FINAL

FIELD Lab Comments: END OF PURGE WATER APPEARANCE FROM SUBMERSIBLE PUMP IS CLEAR, NO ODOR.

I certify that sampling procedures were in accordance with EPA and corporate protocols.
Sampler Name: (print) JAMES A. O'MALLEY Signature: James A. O'Malley

GCL #

GULF COAST LABORATORIES, INC.
FIELD SURVEY FORM

N-TEAD

Facility Name: TNT WALNUT
Purge Date: 11-21-00
Purge Time: 0847
Sample Date: 11-21-00
Sample Time: 0932

Sample Point I.D.: N-127-BB
*Casing Vol. (gals.): 22.46
Vol. Purged (gals.): 120
Sample Method: 3" PVC BAILER

Elevation:
Water Level: 226.83'
GW Elevation:

Total Well Depth: 244.83'
Stick-Up: 1.96'
Sample Temp. (°C): 15.0°

Weather Conditions: SUNNY, ~70°F, WINDS ~5-10 MPH S
Sample Appearance: COLORLESS, CLEAR, NO ODOR
Sampler Comments: * WELL VOLUME PER SPREADSHEET. USED SUBMERSIBLE PUMP TO PURGE WELL. INITIAL PURGE WATER APPEARANCE: CHARGED, CLOUDY, NO ODOR

Unable To Obtain Sample (X): ____ Reason:
Sample Composited (X): ____ Procedure/Proportions:

	0847	0857	0907	
pH	6.99	7.43	7.48	7.46
Sp. Cond. (umhos)	2000 / 13.5°C	2740 / 14.6°C	2840 / 14.9°C	2820-2810
	INITIAL REMOVAL (~2 GAL)	2ND (~40 GAL)	3RD (80 GAL)	FINAL

Field ~~Lab~~ Comments: END OF PURGE WATER APPEARANCE FROM SUBMERSIBLE PUMP: CLEAR, NO ODOR

I certify that sampling procedures were in accordance with EPA and corporate protocols.
Sampler Name: (print) JAMES A. D'MALLEY Signature: James A. D'Malley

GCL #

GULF COAST LABORATORIES, INC.
FIELD SURVEY FORM

N-TEAD

Facility Name: TNT WASHOUT
Purge Date: 11-21-88
Purge Time: 1016
Sample Date: 11-21-88
Sample Time: 1123

Sample Point I.D.: N-128-88
* Casing Vol. (gals.): 38.54
Vol. Purged (gals.): 200
Sample Method: 3" PVC BAILER

Elevation:
Water Level: 226.46'
GW Elevation:

Total Well Depth: 257.08'
Stick-Up: 2.04'
Sample Temp. (°C): 15.5°

Weather Conditions: SUNNY, ~30F, WINDS ~5-10MPH S
Sample Appearance: COLORLESS, SLIGHTLY CLOUDY, NO ODOR
Sampler Comments: * WELL VOLUME PER SAMPLER. USED SUBMERSIBLE PUMP TO PURGE. INITIAL PURGE WATER APPEARANCE: SLIGHTLY TAN, CLOUDY, NO ODOR.

Unable To Obtain Sample (X): ____ Reason:
Sample Composited (X): ____ Procedure/Proportions:

	1016	1033	1050	
pH	7.74	7.50	7.56	7.58
Sp. Cond. (umhos)	1930 / 14.5°C	1950 / 15.3°C	1920 / 15.7°C	1910
	INITIAL READING (1 GAL)	2ND (4 GAL)	3RD (~15 GAL)	FINAL

Field ~~Lab~~ Comments: END OF PURGE WATER APPEARANCE FROM SUBMERSIBLE PUMP: CLEAR, NO ODOR.

I certify that sampling procedures were in accordance with EPA and corporate protocols.
Sampler Name: (print) JAMES A. O'MALLEY Signature: James A. O'Malley

GCL # ____

GULF COAST LABORATORIES, INC.
FIELD SURVEY FORM

N-TEAD

Facility Name: TNT WASHOUT
Purge Date: 11-21-88
Purge Time: 1429
Sample Date: 11-21-88
Sample Time: 1518

Sample Point I.D.: N-129-88
* Casing Vol. (gals.): 23.66
Vol. Purged (gals.): 125
Sample Method: 3" PVC BAILER

Elevation:
Water Level: 228.08'
GW Elevation:

Total Well Depth: 246.83'
Stick-Up: 2.08'
Sample Temp. (°C): 15.6°

Weather Conditions: SUNNY, ~35°F, WINDS ~5-10mph S
Sample Appearance: SLIGHT TAN TINT, CLOUDY, NO ODOR.
Sampler Comments: * WELL VOLUME PLUS SANDPACK. USED SUBMERSIBLE PUMP TO PURGE WELL. INITIAL PURGE WATER APPEARANCE: TAN, CLOUDY, NO ODOR.

Unable To Obtain Sample (X): ____ Reason:
Sample Composited (X): ____ Procedure/Proportions:

	1429	1439	1449	
pH	10.60	7.94	7.72	7.79
Sp. Cond. (umhos)	3410	2310	2320	2340
	15.3°C	15.6°C	15.6°C	
	INITIAL READING (~4 GAL)	2ND (40 GAL)	3RD (80 GAL)	FINAL

~~Lab~~ FIELD Comments: END OF PURGE WATER APPEARANCE FROM SUBMERSIBLE PUMP IS CLEAR, NO ODOR.

I certify that sampling procedures were in accordance with EPA and corporate protocols.
Sampler Name: (print) JAMES H. O'MALLEY Signature: James H. O'Malley

GCL #

GULF COAST LABORATORIES, INC.
FIELD SURVEY FORM

N-TEAD

Facility Name: TNT WASHOUT
Purge Date: 11-21-88
Purge Time: 1546
Sample Date: 11-21-88
Sample Time: 1633

Sample Point I.D.: N-130-88
*Casing Vol. (gals.): 24.86
Vol. Purged (gals.): 130
Sample Method: 3" PVC BAILER

Elevation:
Water Level: 228.83'
GW Elevation:

Total Well Depth: 248.00'
Stick-Up: 1.96'
Sample Temp. (°C): 16.0°

Weather Conditions: MOSTLY SUNNY, ~35°F, WINDS ~5-10 MPH S
Sample Appearance: COLORLESS, SLIGHTLY CLOUDY, NO ODOR
Sampler Comments: * WELL VOLUME PLUS SANDPACK. USED SUBMERSIBLE PUMP TO PURGE WELL. INITIAL PURGE WATER APPEARANCE: TAN, CLOUDY, NO ODOR.

Unable To Obtain Sample (X): ____ Reason:
Sample Composited (X): ____ Procedure/Proportions:

	1546	1557	1608	
pH	7.14	7.37	7.69	7.60
Sp. Cond. (umhos)	1880 14.9°C	2010 15.4°C	1970 15.8°C	2020
	INITIAL READING (~2 GAL)	2ND (~14 GAL)	3RD (~88 GAL)	FINAL

~~Lab~~ FIELD Comments: END OF PURGE WATER APPEARANCE FROM SUBMERSIBLE PUMP IS CLEAR, NO ODOR.

I certify that sampling procedures were in accordance with EPA and corporate protocols.
Sampler Name: (print) JAMES A. O'MALLEY Signature: James A. O'Malley

GCL #

GULF COAST LABORATORIES, INC.
FIELD SURVEY FORM

N-TEAD

Facility Name: TNT WASHOUT
Purge Date: 6-2-88
Purge Time: 0939
Sample Date: 6-2-88
Sample Time: 1310

Sample Point I.D.: N-3A
*Casing Vol. (gals.): 83.30
Vol. Purged (gals.): 420
Sample Method: 3" SUBMERSIBLE PUMP

Elevation:
Water Level: 246.33'
GW Elevation:

• Total Well Depth: 337.00'
Stick-Up: 2.10'
Sample Temp. (°C): 18.2

Weather Conditions: SUNNY, ~65°F, WINDS ~5-10 MPH S
Sample Appearance: CLEAR, NO ODOR
Sampler Comments: * WELL VOLUME PLUS SAMPLING. • TOTAL DEPTH TAKEN FROM DRILLERS LOG. USED SUBMERSIBLE PUMP TO PURGE AND SAMPLE. INITIAL PURGE WATER APPEARANCE: CLOUDY, SLIGHT GREY, NO ODOR

Unable To Obtain Sample (X): ____ Reason:
Sample Composited (X): ____ Procedure/Proportions:

	0942	1052	1201	1310
pH	7.23	7.33	7.24	7.35
Sp. Cond. (umhos)	3730 / 16.4°C	3840 / 18.4°C	3820 / 18.2°C	3820 / 18.2°C
	INITIAL READING (~5gal)	2ND (~140 GAL)	3RD (~280 GAL)	FINAL (~420 GAL)

Lab Comments:

I certify that sampling procedures were in accordance with EPA and corporate protocols.
Sampler Name: (print) JAMES A. O'MALLEY Signature: James A. O'Malley

GCL #

GULF COAST LABORATORIES, INC.
FIELD SURVEY FORM

N-TEAD

Facility Name: TNT Washout
Purge Date: 11-21-88
Purge Time: 1920
Sample Date: 11-21-88
Sample Time: 2240

Sample Point I.D.: N-3A
*Casing Vol. (gals.): 111.66
Vol. Purged (gals.): 560
Sample Method: 3" PVC Bailer

Elevation:
Water Level: 247.33'
GW Elevation:

Total Well Depth: 337.00
Stick-Up: 2.29
Sample Temp. (°C): 15.6°

Weather Conditions: Partly Cloudy, ~30°F, Winds ~10-20 mph S (Night)
Sample Appearance: Clear, No Odor
Sampler Comments: *Well Volume Plus Standard. Used Submersible Pump To Purge Well. Initial Purge Water Appearance: Clear, No Odor. Potentiometric Measurement Taken From Previous Log.

Unable To Obtain Sample (X): ____ Reason:
Sample Composited (X): ____ Procedure/Proportions:

	1920	2020	2120	
pH	6.71	6.86	6.97	6.92
Sp. Cond. (umhos)	3610 / 14.8°C	3870 / 15.8°C	3030 / 15.6°C	3690
	Initial Reading (1 Gal)	2nd (~112 Gal)	3rd (~225 Gal)	Final

Field Lab Comments: End of Purge Water Appearance From Submersible Pumped Clear, No Odor.

I certify that sampling procedures were in accordance with EPA and corporate protocols.
Sampler Name: (print) James F. O'Malley Signature: James F. O'Malley

GCL # ____

GULF COAST LABORATORIES, INC.
FIELD SURVEY FORM

N-TEAD

Facility Name: TNT WASHOUT
Purge Date: 11-18-88
Purge Time: 1552
Sample Date: 11-20-88
Sample Time: 1215

Sample Point I.D.: N-3F
*Casing Vol. (gals.): 5.04
Vol. Purged (gals.): 4.0
Sample Method: 3" PVC BAILER

Elevation:
Water Level: 73.96'
GW Elevation:

Total Well Depth: 77.00'
Stick-Up: 1.58'
Sample Temp. (°C): 13.3°

Weather Conditions: (1st Purge) MOSTLY CLOUDY, ~35°F, WINDS ~5mph N
Sample Appearance: CLEAR, NO ODOR
Sampler Comments: *WELL VOLUME PLUS SANDPACK. INITIAL PURGE WATER APPEARANCE: COLORLESS, SLIGHTLY CLOUDY, NO ODOR. WELL PURGED DRY AT 1555, ~2.5 GAL. PURGED. RETURNED TO PURGE DRY 11-19-88 AT 1513 (4 GAL TOTAL)

Unable To Obtain Sample (X): ____ Reason:
Sample Composited (X): ____ Procedure/Proportions:

	1552	1513		
pH	7.34	7.87	7.98	
Sp. Cond. (umhos)	10700	10900	10800	
	11.7°C	13.1°C		

INITIAL READING (1st BAILER) 2ND (1st BAILER ~3 GAL) FINAL

~~Lab~~ FIELD Comments: WELL CASING VOLUME: 1.98 GALLONS

SAMPLE WEATHER: SUNNY, ~25°F, WINDS ~10-15mph S

I certify that sampling procedures were in accordance with EPA and corporate protocols.
Sampler Name: (print) JAMES A. O'MALLEY Signature: James A. O'Malley

GCL #

GULF COAST LABORATORIES, INC.
FIELD SURVEY FORM

N-TEAD

Facility Name: TNT WASHOUT
Purge Date: 6-1-88
Purge Time: 1555
Sample Date: 6-1-88
Sample Time: 1745

Sample Point I.D.: N-3H
*Casing Vol. (gals.): 45.17
Vol. Purged (gals.): ~225
Sample Method: 3" SUBMERSIBLE PUMP

Elevation:
Water Level: 236.52'
GW Elevation:

Total Well Depth: 262.17'
Stick-Up: 2.33'
Sample Temp. (°C): 16.9

Weather Conditions: CLOUDY, ~50°F, WINDS ~20-25 MPH SW
Sample Appearance: COLORLESS, CLEAR, NO ODOR
Sampler Comments: *WELL CASING AND SAND PACK. USED SUBMERSIBLE PUMP TO SAMPLE AND PURGE. SAMPLED FOR EXPLOSIVES ONLY. INITIAL PURGE WATER APPEARANCE: GRAY, CLOUDY, NO ODOR

Unable To Obtain Sample (X): ____ Reason:
Sample Composited (X): ____ Procedure/Proportions:

	1604	1635	1710	1745
pH	7.44	7.44	7.33	7.36
Sp. Cond. (umhos)	2240	2460	2490	2510
	16.7°C	16.4°C	17.1°C	

INITIAL RECOVERY (~10 MIN) 2ND (60 MIN) 3RD (~150 MIN) FINAL

Lab Comments:

I certify that sampling procedures were in accordance with EPA and corporate protocols.
Sampler Name: (print) JAMES A. O'MALLEY Signature: James A. O'Malley

GCL #

GULF COAST LABORATORIES, INC.
FIELD SURVEY FORM

N-TEAD

Facility Name: TNT WASHOUT
Purge Date: 11-21-88
Purge Time: 2319
Sample Date: 11-22-88
Sample Time: 0036

Sample Point I.D.: N-3H
*Casing Vol. (gals.): 31.0
Vol. Purged (gals.): 160
Sample Method: 3" PVC BAILER

Elevation:
Water Level: 238.79'
GW Elevation:

Total Well Depth: 263.00'
Stick-Up: 2.42'
Sample Temp. (°C): 15.9

Weather Conditions: PARTLY CLOUDY, ~30°F, WINDS ~10-20 MPH S
Sample Appearance: COLORLESS, SLIGHTLY CLOUDY, NO ODOR
Sampler Comments: * WELL YIELDING RUN SNAPPER. USED SUBMERSIBLE PUMP TO PURGE WELL. INITIAL PURGE WATER APPEARANCE: COLORLESS, SLIGHTLY CLOUDY, NO ODOR.

Unable To Obtain Sample (X): ____ Reason:
Sample Composited (X): ____ Procedure/Proportions:

	2319	2337	2355	
pH	7.06	7.13	7.27	7.19
Sp. Cond. (umhos)	2010 / 14.3°C	2210 / 15.5°C	2290 / 15.1°C	2350
	INITIAL REMOVAL (~1 GAL)	2ND (~80 GAL)	3RD (~105 GAL)	FINAL

Field ~~Lab~~ Comments: END OF PURGE WATER APPEARANCE FROM SUBMERSIBLE PUMP IS CLEAR, NO ODOR

I certify that sampling procedures were in accordance with EPA and corporate protocols.
Sampler Name: (print) JAMES A. O'MALLEY Signature: James A. O'Malley

GCL # _____

GULF COAST LABORATORIES, INC.
FIELD SURVEY FORM

N-TEAD

Facility Name: INT WASHOUT
Purge Date: 11-18-88
Purge Time: 1515
Sample Date: 11-20-88
Sample Time: 1136

Sample Point I.D.: N-3I
*Casing Vol. (gals.): 7.51
Vol. Purged (gals.): 7.0
Sample Method: 3" PVC BAILER

Elevation:
Water Level: 43.25'
GW Elevation:

Total Well Depth: 49.08'
Stick-Up: 1.17'
Sample Temp. (°C): 12.2°

Weather Conditions: (1st Round) MOSTLY CLOUDY, ~35°F, WINDS ~5MPH N
Sample Appearance: COLORLESS TO SLIGHTLY CLOUDY, NO ODOR
Sampler Comments: * WELL VOLUME PLUS SAMPLING. INITIAL PURGE WATER APPEARANCE: LIGHT TAN, CLOUDY, NO ODOR. WELL PURGE DRY AT 1520, 4 GALLONS PURGED. RETURNED TO PURGE ON 11-19-88 AT 1457 (-1 GAL TOTAL)

Unable To Obtain Sample (X): ____ Reason:
Sample Composited (X): ____ Procedure/Proportions:

	1515	1457 (11-19-88) ~~1520 (11-19)~~		
pH	7.44	7.35	7.57	
Sp. Cond. (umhos)	~~32~~ 3720 12.1°C	3910 12.9°C	3890 12.2°C	
	INITIAL READING (1st ROUND)	2ND (1ST ROUND + 4 GAL)	FINAL	

Field Lab Comments: WELL CASING VOLUME: 3.81 GALLONS

SUNDAY WEATHER: SUNNY, ~25°F, WINDS S ~10-15MPH

I certify that sampling procedures were in accordance with EPA and corporate protocols.
Sampler Name: (print) JAMES A. O'MALLEY Signature: James A. O'Malley

GCL #

GULF COAST LABORATORIES, INC.
FIELD SURVEY FORM

N-TEAD

Facility Name: Drum Storage
Purge Date: #
Purge Time:
Sample Date: 11-8-88
Sample Time: 0910

Sample Point I.D.: 01FB
Casing Vol. (gals.): —
Vol. Purged (gals.): —
Sample Method: Pour

Elevation:
Water Level: —
GW Elevation:

Total Well Depth: —
Stick-Up:
Sample Temp. (°C): 12.5

Weather Conditions: Cloudy, ~50°F, Winds Light N
Sample Appearance: Clear, No Odor
Sampler Comments: Field Blank Poured Near T-7 Sample Poured Through Bailer Rod Filter Apparatus. Water From Pump House in N-TEAD.

Unable To Obtain Sample (X): ____ Reason:
Sample Composited (X): ____ Procedure/Proportions:

pH	7.47			
Sp. Cond. (umhos)	1540			

Lab Comments:

I certify that sampling procedures were in accordance with EPA and corporate protocols.
Sampler Name: (print) James A. O'Malley Signature: James A. O'Malley

GCL #

N-TEAD

GULF COAST LABORATORIES, INC.
FIELD SURVEY FORM

Facility Name: SANITARY LANDFILL
Sample Point I.D.: 02FB
Purge Date: —
Casing Vol. (gals.): —
Purge Time: —
Vol. Purged (gals.): —
Sample Date: 11-22-88
Sample Method: POUR
Sample Time: 1250

Elevation: _____
Total Well Depth: —
Water Level: —
Stick-Up: _____
GW Elevation: _____
Sample Temp. (°C): 9.9

Weather Conditions: SUNNY, ~45°F, WINDS ~5-10 mph S
Sample Appearance: CLEAR, NO ODOR, A WHITE FIBROUS MATERIAL FLOATING
Sampler Comments: POURED FIELD BLANK H2O THROUGH BAILER AND FILTER APPARATUS NEAR WELL N-120-88. THE ~~PUMP HOUSE~~ TO

Unable To Obtain Sample (X): ____ Reason: _____
Sample Composited (X): ____ Procedure/Proportions: _____

pH	7.81			
Sp. Cond. (umhos)	1980			

~~Field~~ ~~Lab~~ Comments: THE PUMP HOUSE, WHERE WE GET THE DEION WATER (USED FIELD BLANK H2O), WAS TURNED OFF WHEN WE ARRIVED TO GET DEION WATER — FIELD BLANK WATER THEY TURNED IT ON SHORTLY AFTER WE ARRIVED.

I certify that sampling ~~procedures~~ were in accordance with EPA and corporate protocols.
Sampler Name: (print) JAMES A. O'MALLEY Signature: James A. O'Malley

GCL # _____

GULF COAST LABORATORIES, INC.
FIELD SURVEY FORM

N-TEAD

Facility Name: TNT- WASHOUT
Purge Date: —
Purge Time: —
Sample Date: 11-20-88
Sample Time: 1200

Sample Point I.D.: 03FB
Casing Vol. (gals.): —
Vol. Purged (gals.): —
Sample Method: POUR

Elevation:
Water Level: —
GW Elevation:

Total Well Depth: —
Stick-Up:
Sample Temp. (°C): 9.0°

Weather Conditions: SUNNY, ~75°F, WINDS ~10-15MPH S
Sample Appearance: CLEAR, NO ODOR
Sampler Comments: POURED SAMPLE THROUGH BAILER AND FILTER APPARATUS NEAR WELL N-3F.

Unable To Obtain Sample (X): Reason:
Sample Composited (X): Procedure/Proportions:

pH 7.40
Sp. Cond. (umhos) 1500

Lab Comments:

I certify that sampling procedures were in accordance with EPA and corporate protocols.
Sampler Name: (print) JAMES A. O'MALLEY Signature: James A. O'Malley

GCL #

GULF COAST LABORATORIES, INC.
FIELD SURVEY FORM

N-TEAD

Facility Name: DRUM STORAGE
Purge Date: 11-8-88
Purge Time: 0847
Sample Date: 11-8-88
Sample Time: 1000

Sample Point I.D.: T-7
*Casing Vol. (gals.): 48.42
Vol. Purged (gals.): 255
Sample Method: 3" PVC BAILER

Elevation:
Water Level: 309.67'
GW Elevation:

Total Well Depth: 340.00'
Stick-Up: 1.17'
Sample Temp. (°C): 14.0

Weather Conditions: MOSTLY SUNNY, ~ 50°F, WINDS LIGHT N
Sample Appearance: LIGHT TAN, SLIGHTLY CLOUDY, NO ODOR
Sampler Comments: * NOM. VOLUME PLUS SANDPACK. REFERENCE MEASUREMENT TAKEN FROM DRILLERS LOG. USED SUBMERSIBLE PUMP TO PURGE WELL. INITIAL PURGE WATER APPEARANCE: BROWN, TURBID, NO ODOR.

Unable To Obtain Sample (X): ____ Reason:
Sample Composited (X): ____ Procedure/Proportions:

	0847	0906	0921	
pH	7.24	7.48	7.70	7.53
Sp. Cond. (umhos)	1530	1560	1490	1480
	12.9°C	13.8°C	14.0°C	
	1st Pump Capacity (~4 gal)	2nd (~85 gal)	3rd (~168 gal)	FINAL

Field ~~Lab~~ Comments: END OF PURGE WATER APPEARANCE FROM SUBMERSIBLE PUMP WAS: CLEAR, NO ODOR

I certify that sampling procedures were in accordance with EPA and corporate protocols.
Sampler Name: (print) JAMES H. O'MALLEY Signature: James H. O'Malley

GCL #

WESTERN.

APPENDIX G

SURVEY DATA

Tooele Army Depot Elevations
North Area

September 1989

Landfill

N-117-88	Top of PVC Pipe Casing	4703.32
	Top of Metal Pipe Casing	4703.55
	Base of Metal Pipe Casing (Conc)	4700.94
	Ground 1.2' East	4700.61
N-118-88	Top of PVC Pipe Casing	4713.61
	Top of Metal Pipe Casing	4713.79
	Base of Metal Pipe Casing (Conc)	4710.82
	Ground 1.0' NE	4710.82
N-119-88	Top of PVC Pipe Casing	4751.74
	Top of Metal Pipe Casing	4751.87
	Base of Metal Pipe Casing (Conc)	4748.95
	Ground 1.0' SW	4748.60
N-120-88	Top of PVC Pipe Casing	4779.34
	Top of Metal Pipe Casing	4779.49
	Base of Metal Pipe Casing (Ground)	4777.41
N-116-88	Top of PVC Pipe Casing	4756.23
	Top of Metal Pipe Casing	4756.44
	Base of Metal Pipe Casing (Conc)	4753.91
	Ground 1.8' SW	4753.50
N-115-88	Top of PVC Pipe Casing	4752.01
	Top of Metal Pipe Casing	4752.26
	Base of Metal Pipe Casing (Conc)	4749.59
	Ground 1.4' NE	4749.59
N-114-88	Top of PVC Pipe Casing	4797.82
	Top of Metal Pipe Casing	4798.02
	Base of Metal Pipe Casing (Conc)	4795.62
	Ground 1.2' South	4795.51
N-113-88	Removed	
N-112-88	Top of PVC Pipe Casing	4801.38
	Top of Metal Pipe Casing	4801.59
	Base of Metal Pipe Casing (Conc)	4799.18
	Ground 1.5' NE	4799.09
N-111-88	Top of PVC Pipe Casing	4805.31
	Top of Metal Pipe Casing	4805.76
	Base of Metal Pipe Casing (Conc)	4803.55
	Ground 1.0' North	4803.42

AAA ENGINEERING & DRAFTING, INC.

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TNT Washout Area

N-3I	Top of PVC Pipe Casing	4718.35
	Top of Metal Pipe Casing	4718.74
	Base of Metal Pipe Casing (Ground)	4717.36
N-3H	Top of PVC Pipe Casing	4717.39
	Top of Metal Pipe Casing	4717.66
	Base of Metal Pipe Casing (Conc)	4714.97
	Ground 0.5' East	4714.91
N-3F	Top of PVC Pipe Casing	4716.55
	Top of Metal Pipe Casing	4716.92
	Ground 1.0' North	4714.68
N-3E	Top of PVC Pipe Casing	4726.10
	Top of Metal Pipe Casing	4726.72
	Base of Metal Pipe Casing (Ground)	4724.13
N-3D2	Top of PVC Pipe Casing	4733.54
	Top of Metal Pipe Casing	4734.09
	Base of Metal Pipe Casing (Conc)	4731.55
	Ground 0.8' East	4731.61
N-3D1	Top of PVC Pipe Casing	4732.80
	Top of Metal Pipe Casing	4733.28
	Base of Metal Pipe Casing (Conc)	4731.77
	Ground 1.0' North	4731.46
N-3B	Top of PVC Pipe Casing	4727.42
	Top of Metal Pipe Casing	4727.92
	Ground Base of Casing	4725.01
N-3A	Top of PVC Pipe Casing	4727.33
	Top of Metal Pipe Casing	4727.90
	Ground	4725.04
N-102-88	Top of PVC Pipe Casing	4727.46
	Top of Metal Pipe Casing	4727.81
	Ground Base of Casing	4725.24
N-103-88	Top of PVC Pipe Casing	4722.39
	Top of Metal Pipe Casing	4722.74
	Base of Metal Pipe Casing (Conc.)	4720.19
	Ground 0.5' North	4720.17
N-110-88	Top of PVC Pipe Casing	4786.11
	Top of Metal Pipe Casing	4786.26
	Base of Metal Pipe Casing (Conc.)	4783.66
	Ground 2.0' East	4783.30
N-127-88	Top of PVC Pipe Casing	4705.34
	Top of Metal Pipe Casing	4705.53
	Base of Metal Pipe Casing (Ground)	4702.86

N-128-88	Top of PVC Pipe Casing	4704.93
	Top of Metal Pipe Casing	4705.11
	Ground Base of Metal Casing	4702.44
N-129-88	Top of PVC Pipe Casing	4705.54
	Top of Metal Pipe Casing	4705.78
	Base of Metal Pipe Casing (Conc)	4703.22
	Ground 1.0' SE	4703.05
N-130-88	Top of PVC Pipe Casing	4707.03
	Top of Metal Pipe Casing	4707.22
	Base of Metal Pipe Casing (Conc)	4704.74
	Ground 1.0' South	4704.51
N-106-88	Top of PVC Pipe Casing	4726.71
	Top of Metal Pipe Casing	4726.97
	Base of Metal Pipe Casing (Conc)	4724.26
	Ground 1.4' South	4724.10

AAA ENGINEERING AND DRAFTING, INC
1865 SOUTH MAIN STREET
SALT LAKE CITY, UTAH 84115
(801)-487-1794

DATE 12/20/88

LIST COORDINATES

DEPOT COORINATES NORTH AREA

Point #		Northing	Easting
279	N-123-88	- 13,892.72761	- 22,264.74668
280	N-122-88	- 13,878.21549	- 21,664.01425
281	N-121-88	- 13,995.16614	- 21,369.43795
282	N-124-88	- 14,562.99508	- 21,898.05522
283		- 13,913.00346	- 18,591.17550
284		- 9,621.04770	- 18,597.20982
285		- 10,473.62759	- 18,508.33134
286	N-127-88	- 9,140.55959	- 18,702.64443
287	N-128-88	- 9,240.54474	- 18,902.20165
288	N-129-88	- 9,412.99483	- 19,197.46592
289	N-130-88	- 9,588.98568	- 19,465.26791
290	N-110-88	- 11,496.46143	- 18,354.76399
291	N-103-88	- 9,682.58622	- 18,661.83790
292	N-104-88	- 9,618.54950	- 18,993.58195
293	N-3H	- 9,771.85481	- 19,094.22410
294	N-3F	- 9,785.21061	- 19,099.71434
295	N-105-88	- 9,788.16710	- 19,257.59194
296	N-3E	- 10,109.07682	- 19,124.71021
297	N-106-88	- 10,000.65321	- 18,981.71647
298	NO.3	- 10,042.22169	- 18,823.10706
299	NO.4	- 10,044.62394	- 18,813.31730
300	N-107-88	- 9,973.98415	- 18,753.31912
301	N-102-88	- 9,892.69794	- 18,557.41219
302	N-3I	- 9,714.83747	- 18,854.06175
303	N-101-88	- 10,213.15768	- 18,508.55485
304	N-108-88	- 10,247.19836	- 18,728.15067
305	N-109-88	- 10,278.86111	- 18,848.89118
306	N-3D2	- 10,389.28185	- 19,122.36541
307	N-3D1	- 10,389.27436	- 19,146.30892
308		- 4,550.05016	- 8,843.19939
309		- 4,647.67864	- 8,046.96229
310		- 4,325.50874	- 8,806.44274
311	N-118-88	- 5,157.74380	- 9,699.97324
312	N-115-88	- 4,947.09132	- 8,867.76369
313	N-110-88	- 4,850.53815	- 8,428.19733
314	N-119-88	- 3,428.92815	- 8,271.07165
315	N-117-88	- 4,007.43742	- 8,463.49764
316	N-111-88	- 6,950.40614	- 7,325.67842
317	N-112-88	- 5,396.12966	- 6,751.69657
318	N-113-88	- 4,975.69118	- 6,624.21259
319	N-114-88	- 4,511.53479	- 6,381.28701
320	N-120-88	- 3,764.86169	- 6,928.79271

There are no unused coordinates between 279 and 320 .

9-14-89

T. L. PETERSON

AND D. PEECE

70° CLEAR

WESTON CORP.

TOOELE ARMY DEPOT

LANDFILL AREA

STA	+	HI	-	ELEV
MON				4714.02
	2.48	4716.50		
			8.18	4708.32
	0.57	4708.89		
			5.57	4703.32
			5.34	4703.55
			7.95	4700.94
			8.28	4700.61
	4.40	4708.06		
			1.07	4706.86
	12.52	4715.86		
			2.48	4714.02

DEPOT MON. 3900 S 9100 W

TOP OF RVC PIPE CASING N-11788

TOP OF METAL PIPE CASING

BASE OF " " CASING (COVE)

GROUND 1.2' EAST OF M. CASING.

DEPOT MON. 3900 S 9100 W.

CLOSURE 0.00

STA	+	HI	−	ELEV.
				4714.02
	8.13	4722.15		
			1.52	4720.63
	9.75	4730.38		
			0.34	4730.04
	11.87	4741.91		
			0.55	4741.36
	10.26	4751.62		
			4.35	4747.27
	5.38	4752.65		
			0.91	4751.74
			0.78	4751.87
			3.70	4748.95
			4.05	4748.60
	3.77	4752.37		
			7.04	4745.33
	0.57	4745.90		
			8.06	4737.84
	0.08	4737.92		
			13.03	4724.89
	0.94	4725.83		
			6.02	4719.81
	1.68	4721.49		
			7.48	4714.01

DEPOT MON 39005 3100 W

TOP OF PVC PIPE CASING N-119-88

TOP OF METAL PIPE CASING

BASE OF METAL PIPE CASING (FOUND BURIED) 1.0' SW

DEPOT MON. CLOSURE 0.01

STA	F	HI	-	ELEV.	
				4703.55	TOP OF METAL CASING N-11-88
	3.51	4707.06			
			0.98	4706.08	
	12.07	4718.16			
			5.98	4712.17	
	3.90	4716.07			
			2.89	4713.18	
	5.04	4718.22			
			6.76	4711.46	
	4.18	4715.64			
			4.53	4711.11	
	4.74	4715.85			
			2.24	4713.61	TOP OF PVC PIPE CASING N-11-88
			2.06	4713.79	TOP OF METAL " " "
			4.99	4710.86	BASE OF " " " (Conc.)
			5.03	4710.82	GROUND I.P. NE
	5.59	4716.41			
			5.66	4710.75	
	7.97	4718.72			
			5.46	4713.26	
	6.49	4719.75			
			4.23	4715.52	
	9.68	4725.20			
			8.54	4716.66	

STA	+	HI	−	ELEV
	1.98	4718.64		
			12.05	4706.59
	0.65	4707.24		
	"	"	3.68	4703.56

TOP OF METAL PIPE CLOSURE 11-17-88
CLOSURE ± 0.01

STA	+	HI	−	ELEV.
				4703.55
	3.69	4707.24		
			1.38	4705.86
	15.73	4721.59		
			0.62	4720.97
	11.72	4732.69		
			1.83	4730.86
	17.36	4748.22		
			1.18	4747.04
	11.23	4758.27		
			6.26	4752.01
			6.01	4752.26
			8.68	4749.59
			8.68	4749.59
	9.85	4759.44		
			3.21	4756.23
			3.00	4756.44
			5.53	4753.91
			5.94	4753.50
	3.39	4756.89		
			7.99	4748.90
	0.67	4749.57		
			17.34	4732.23

TOP OF METAL PIPE CASING N-117-88

TOP OF PVC PIPE CASING N-115-88
TOP OF METAL PIPE CASING "
BASE OF METAL PIPE CASING (CONC)
GROUND 1.4' NE.

TOP OF PVC PIPE CASING N-116-88
TOP OF METAL PIPE CASING
BASE OF METAL PIPE CASING (CONC)
GROUND 1.8' SW

STA	+	HI	−	ELEV
	1.80	4734.03		
			17.00	4717.03
	0.73	4717.76		
			15.62	4702.14
	4.32	4706.46		
			2.89	4703.57

TOP OF METAL PIPE CASING M-117-88
CLOSURE + 0.02

STA	+	HI	-	ELEV	
				4751.87	TOP OF METAL CASING N-119-88
	4.19	4756.06			
			0.86	4755.20	
	8.06	4763.26			
			1.70	4761.56	
	11.25	4772.81			
			0.64	4772.17	
	6.86	4779.03			
			4.08	4774.95	
	6.39	4781.34			
			2.00	4779.34	TOP OF PKE PIPE CASING N-120-88
			1.85	4779.49	TOP OF METAL PIPE CASING - GROUND
			3.93	4777.41	
	2.32	4779.73			
			6.24	4773.49	
	1.39	4774.88			
			11.31	4763.57	
	0.66	4764.23			
			6.52	4757.71	
	2.51	4760.22			
			11.19	4749.03	
	4.45	4753.48			
			1.59	4751.89	TOP OF METAL PIPE CASING N-119-88
					CLOSURE +0.02

9-18-89
A.L. PETERSON
ROD D. PREECE
CLOUDY 65°

LANDFILL
TOOGLE

STA	+	HI	−	ELEV.
				4756.44
	4.56	4761.00		
			3.01	4757.99
	12.15	4770.14		
			1.84	4768.30
	6.23	4774.53		
			2.08	4766.46
	20.44	4785.89		
			0.69	4785.20
	8.63	4793.83		
			1.11	4792.72
	7.29	4800.01		
			2.19	4797.82
			1.99	4798.02
			4.39	4795.62
			4.50	4795.51
	4.94	4800.45		
			3.23	4796.72
	7.63	4804.35		
			2.97	4801.38
			2.76	4801.59
			5.17	4799.18
			5.26	4799.09
	2.90	4801.99		

TOP OF METAL PIPE CASING N-116.88

TOP OF PVC PIPE CASING N-114.88
TOP OF METAL PIPE CASING
BASE OF METAL PIPE CASING (LONG)
GROUND 1.2' SOUTH

TOP OF PVC PIPE CASING N-112.88
TOP OF METAL PIPE CASING
BASE OF METAL PIPE CASING
GROUND 1.5' NE

STA	+	HI	-	ELEV
			12.51	4789.48
	2.30	4791.78		
			16.06	4775.72
	1.31	4777.03		
			5.88	4771.15
	2.58	4773.73		
			8.39	4765.34
	3.19	4768.53		
			12.17	4756.36
	3.80	4760.16		
			3.70	4756.46

N

TOP OF METAL CASING W-116-88

CLOSURE +0.02

STA	+	HI	−	ELEV.
				4801.59
	5.11	4806.70		
			9.94	4796.76
	1.23	4797.99		
			11.01	4786.98
	7.60	4794.58		
			0.21	4794.37
	15.93	4810.30		
			4.06	4806.24
	4.60	4810.84		
			5.53	4805.31
			5.08	4805.76
			7.29	4803.55
			7.42	4803.42
	6.60	4810.02		
			5.98	4804.04
	0.26	4804.30		
			16.88	4787.42
	5.56	4792.98		
			0.62	4792.36
	10.51	4802.87		
			1.49	4801.38
	5.75	4807.13		
			5.51	4801.62

TOP OF METAL PIPE CASING N-112.88

TOP OF PVC PIPE CASING N-111.88
TOP OF METAL PIPE CASING
BASE OF METAL CASING (CAVE)
GROUND 1.0' UNDER FILL

TOP OF METAL PIPE CASING N-112.88
CLOSURE + 0.03

STA	+	HI	-	ELEV.

TNT WASHOUT
AREA

STA	+	HI	-	ELEV	
				4718.18	AAA #2 TOP OF CAP.
	6.49	4724.67			
			6.32	4718.35	TOP OF PVC PIPE CASING N-3I
			5.93	4718.74	TOP OF METAL PIPE CASING
			7.31	4717.36	BASE OF METAL CASING (GROUND)
	3.62	4720.98			
			3.59	4717.39	TOP OF PVC PIPE CASING N-3H
			3.32	4717.66	TOP OF METAL PIPE CASING
			6.01	4714.97	BASE OF METAL CASING (CONC)
			6.07	4714.91	GROUND 0.5' EAST.
			4.43	4716.55	TOP OF PVC PIPE CASING N-3F
			4.06	4716.92	TOP OF METAL PIPE CASING
			6.30	4714.68	GROUND 1.0' NORTH
	11.36	4726.04			
			1.80	4724.24	
	5.17	4729.41			
			3.31	4726.10	TOP OF PVC PIPE CASING N-3E
			2.69	4726.72	TOP OF METAL PIPE CASING
			5.28	4724.13	BASE OF METAL CASING (GROUND)
	10.08	4734.21			
			0.67	4733.54	TOP OF PVC PIPE CASING N-3D2
			0.12	4734.09	TOP OF METAL CASING
			2.66	4731.55	BASE OF METAL PIPE (CONC.)
			2.60	4731.61	GROUND 0.8' EAST

STA	+	HI	-	ELEV	
			1.41	4732.80	TOP OF PVC PIAG CASING N-301
			0.93	4733.28	TOP OF METAL PIPE CASING
			2.44	4731.77	BASE OF METAL CASING (CONC)
			2.75	4731.46	GROUND 1.0' NORTH
	3.51	473497			
			10.28	4724.69	
	3.77	472846			
			12.49	4715.97	
	8.21	4724.18			
			5.97	4718.21	AAA #2 TOP OF CAP
					CLOSURE +0.03

9-19-89

T. L. PETERSON
ROD D. PREECE
CLEAR 68°
NICE
BREEZY

TNT WASHOUT
AREA

STA	- +	HI	-	ELEV	
				4718.18	AAA #2 TOP OF CAP
	6.61	4724.79			
			2.40	4722.39	TOP OF PVC PIPE CASING N-103-88
			2.05	4722.74	TOP OF METAL PIPE CASING
			4.69	4720.19	BASE OF METAL CASING (CONC)
			4.62	4720.47	GROUND -0.51 (DEPTH
	8.18	4728.35			
			0.89	4727.46	TOP OF PVC PIPE CASING N-102-88
			0.54	4727.81	TOP OF METAL PIPE CASING
			3.11	4725.24	GROUND BASE OF CASING
	1.91	4726.65			
			8.46	4718.19	AAA #2 TOP OF CAP.
					CHECK +0.01
				4718.18	AAA #2 TOP OF CAP
	2.59	4720.77			
			12.70	4708.07	
	3.44	4711.51			
			6.17	4705.34	TOP OF PVC. PIPE CASING N-127-88
			5.98	4705.53	TOP OF METAL PIPE CASING (~~CONC~~)
			8.65	4702.86	GROUND BASE OF METAL CASING
	8.42	4711.28			

STA	+	HI	-	ELEV.
			6.35	4704.93
			6.17	4705.11
			8.84	4702.44
	10.69	4713.13	.13	
			7.69	4705.44
			7.85	4705.28
			9.91	4703.22
			10.08	4703.05
	9.82	4713.87		
			5.84	4708.03
			5.65	4708.22
			8.13	4705.74
			8.86	4705.01
	7.76	4712.27		
			2.36	4709.91
	11.41	4721.32		
			3.14	4718.18

16

Top of PVC Pipe Casing N-128-88

Top of Metal Pipe Casing N-128-88

Ground

Top of PVC Pipe Casing N-129-38

" " Metal " " "

Base of Metal Pipe Casing (Conc)

Ground 1.0' South

Top of PVC Pipe Casing N-130-98

" " Metal " " "

Base " " " " (Conc)

Ground 1.0' South

AAA #2 Top of Cap

STA	+	HI	-	ELEV
				4718.18
	8.75	4726.93		
			2.75	4724.18
	8.38	4722.56		
			2.14	4727.42
			1.64	4727.92
			4.55	4725.01
			2.23	4727.33
			1.66	4727.90
			4.82	4725.04
			2.85	4726.71
			2.59	4726.97
			5.30	4724.26
			5.46	4724.10
	0.51	4724.61		
			7.40	4717.21
	9.50	4726.71		
			8.51	4718.20

AAA #3 Top of Cap

Top of RIC PIPE CASING N-3B

Top of METAL " "

GROUND

Top of PVC PIPE CASING N-3A

Top of METAL " "

GROUND

Top of PVC PIPE CASING N-10A-88

Top of METAL " "

BASE OF " " (CONC)

GROUND 1.4' SOUTH

AAA #2 Top of Cap

CLOSURE +0.02

STA	+	HI	-	ELEV
				4718.18
	8.51	4726.69		
			2.53	4724.16
	11.01	4735.17		
			0.78	4734.39
	11.14	4745.53		
			0.56	4744.97
	12.07	4757.04		
			3.97	4753.07
	16.91	4769.98		
			2.48	4767.50
	18.17	4785.67		
			3.74	4781.93
	4.52	4786.45		
			0.34	4786.11
			0.19	4786.26
			2.79	4783.66
			3.15	4783.30
	3.46	4786.76		
			19.25	4767.51
	1.64	4769.15		
			16.39	4752.76
	2.29	4755.05		
			14.55	4740.50

AAA #2 TOP OF CAP.

TOP OF PVC PIPE CASING N-110-88
" " METAL " "
BASE OF " " " (CONC)
GROUND 2.0' EAST

STA	+	HI	−	ELEV
	0.59	4741.10		
			12.10	4728.99
	1.30	4730.29		
			7.90	4722.39
	3.36	4725.75		
			7.54	4718.21

AAA #2 TOP OF COP

CLOSURE 40.03

APPENDIX H

CHAIN-OF-CUSTODY FORMS

Frank Unger, Geo. Denise, Carter, Dianne, Leo, Book, PM, Die
Mike

WESTON

Custody Transfer Record/Lab Work Request

Received By P. Geiger
Date 6/3/88
Assigned to

Client Tooele Army Depot
Client Contact
Phone

RFW Contact Les Eng
Date Due 7-1-88
Project Number 2281-05-09

8806-569

SAMPLE IDENTIFICATION

ANALYSES REQUESTED

Sample No.	Client ID No.	Description	Matrix	Date Collected	Container/Preservative	Explosives
✓ 001	N-3H	Groundwater Sample	W	6-1-88	1 Gal. am./NP	✓
✓ 2	N-3A	Groundwater Sample	W	6-2-88	1 Gal. am./NP	✓

Revision 6/4/88
Explosives
246TNT, 26DNT, 24DNT, 135TNB
13DNB, TETRYL, NB, HMX, RDX.

Urathama Special QC/Del

Matrix:
S- Soil
W- Water
O- Oil
DS- Drum Solids
DL- Drum Liquids
X- Other

Special Instructions:

EXPEDITE

Items/Reason	Relinquished By	Received By	Date	Time	Items/Reason	Relinquished By	Received By	Date	Time
Samples/Transport to Lab	[signature]	Federal Express	6-2-88	1500					
	[signature]	P. Geiger	6/4/88						

RFW 21-21-001/A-3/86

WESTERN

Custody Transfer Record/Lab Work Request

Received By M Hoffman
Date 11/8/88
Assigned to

Client Tooele Army Depot
Client Contact Bert Keenan
Phone 505/255-1445

RFW Contact Les Eng
Date Due 12/6/88
Project Number 88-1C382

88IC382

Usathama-TN

Sample No.	Client ID No.	Description	Matrix	Date Collected	Container/Preservative	ANALYSES REQUESTED						
						Explosives		VOA				
001	N-111-88	Groundwater Monitor	W	11-6-88	2-1L amber; 2-500ml amber	✓	✓	✓	✓	✓	✓	✓
002	N-112-88	"	W	11-7-88	"	✓	✓	✓	✓	✓	✓	✓
003	N-114-88	"	W	11-7-88	"	✓	✓	✓	✓	✓	✓	✓
004	N-111-88		W	11-6-88	"	✓	✓	✓	✓	✓	✓	✓
005	N-113-88		W	11-6-88	"					✓		
006	N-114-88		W	11-7-88	"					✓		

Matrix:
S- Soil DS- Drum Solids
W- Water DL- Drum Liquids
O- Oil X- Other

Special Instructions: QC/DEL = SPECIAL
EXPLOSIVES = 246 TNT, 26 DNT, 24 ONT, 135 TNB, 13 DNB, TETRYL, NB, HMX, RDX
VOA's subbed to ESE 11/16/88

Items/Reason	Relinquished By	Received By	Date	Time
SAMPLES TRANSFERRED TO LAB	Joan E. Bivan	Federal Express	11-7-88	1730
" "	Fed Ex	M Hoffman	11/8/88	9:34
Extraction	M Hoffman	Jan Hobbs	11/14/88	3:00 pm
Analysis	Jan Hobbs	M Peterson	11/28/88	1:30
Final	M Peterson	D. Shrout	11/30	11:31

Items/Reason	Relinquished By	Received By	Date	Time
N3 N2		Joan E Bivan	12/6/88	9:00
Store	Joan E Bivan		12/5/88	4:00
Metals		Ed Redlinger	12/9	4:30
	Ed Redlinger		12/9	12:00

W 21-21-001/A-3/86
BA/A-red

D. Shrout 11/30/88 — updated D. Shrout

88IK402

Date 11/9/88

Assigned to

Client Contact Berg Kuzman

Phone 505/255-1445

RFW Contact [illegible]

Date Due

Project Number 2281-05-09-0030

USATHAMA-TN

SAMPLE IDENTIFICATION

Sample No.	Client ID No.	Description	Matrix	Date Collected	Container/Preservative	Explosives	VOA	[illegible]	Total Metals	Diss. Metals	Inorg. NO_3 + NO_2	Inorg. Sulfate	
001	T-7	Groundwater Sample	W	11-8-88	[illegible]	✓	✓	✓	✓	✓	✓	✓	
002	01FB	Field Blank - Drum Storage	W	11-8-88	"	✓	✓	✓	✓	✓	✓	✓	
003	N-118-88	Groundwater Sample	W	11-8-88	"	✓	✓	✓	✓	✓	✓	✓	
004	T-7									✓			
005	01FB									✓			
006	N-118-88									✓			

Matrix:
S- Soil
W- Water
O- Oil
DS- Drum Solids
DL- Drum Liquids
X- Other

Special Instructions:

VOA's Enclosed to E.S+E 11/16/88

Items/Reason	Relinquished By	Received By	Date	Time	Items/Reason	Relinquished By	Received By	Date	Time
Samples/Transport to LAB	[illegible]	Federal Express	11-8-88	1700	Hg		M. Lakose	11-29	9-
" "	[illegible]	M. [illegible]	11/9/88	9:30 am	Hg	M. Lakose		11-29	5-
Extraction	K. Holley	[illegible]	11/13/88	5:00 pm	anions		[illegible]	11/30/88	[illegible]
6 Expt. H_2O's	[illegible]	[illegible]	11/14/88	9:30 pm	Metals		[illegible]	1219	
"	[illegible]	[illegible]	11/14/88	5:30 pm		[illegible]		1219	

RFW 21-21-001/A-3/86

BNA [illegible]

[illegible] 1-3-89 12- used all sample [illegible]

Dianne, Book, Vinh, Carter, Geof, Linda, gems, Dee, gt, Gerry Ken, Bob, Tammy, Wade, Nicki Steph Mike FM Gary Long

WESTON

Custody Transfer Record/Lab Work Request

Received By Meigs
Date 11/17/88
Assigned to

Client Usathama-TN
Client Contact Meng Koenig
Phone 505/255-1445

RFW Contact Lab Eng
Date Due 12/15/88
Project Number 2781-05-09-0130 ICS04

88111508

SAMPLE IDENTIFICATION

ANALYSES REQUESTED

Sample No.	Client ID No.	Description	Matrix	Date Collected	Container/Preservative	Explosives	VOA	Aud, Rad Screening	Total Metals	Diss. Metals	Cyanide NO3+NO2	Cyanide Sulfide	
001	N-115-88	Groundwater Sample	W	11/15/88	2-1L AG; 2-1L Poly; 1-500mL Poly; 1-Vial w/ Septum	✓	✓	✓	✓	✓	✓	✓	
002	N-116-88	"	W	11/15/88	"	✓	✓	✓	✓	✓	✓	✓	
003	N-115-88		1	1						✓			
004	N-116-88									✓			

Usathama Special QC/Del.

Explosives: 24DNT, 26DNT, 24ANT, 135TNB, 13DNB, TETRYL, NB, HMX, RDX

Matrix:
S- Soil DS- Drum Solids
W- Water DL- Drum Liquids
O- Oil X- Other

Special Instructions:

Items/Reason	Relinquished By	Received By	Date	Time	Items/Reason	Relinquished By	Received By	Date	Time
24dnt, 26dnt, TRANSPORT TO LAB	Dianne M. O'Malley	Federal Express	11/16/88	1900	N2Na		Joan E Bevan	12/5/88	9:00
		Meigs	11/17/88	9:30	Steve	Joan E Bevan		12/5/88	4:00
BNA		D. Dodd	11/21/88	12:15	N2Na		Joan E Bevan	12/6/88	9:00
EXPL		K. Hannon	11/22/88	1:50	Bill	K. Hannon		11/23/88	5 pm
anions		M. Perrone	11/29/88	1:50	Steve	Joan E Bevan		12/6/88	4:00
	M. Perrone		11/30	4:30	VOA			12/2/88	2:30

RFW-2-8/10/88/AB/86

Diane, Book, Vinh, Kathy, George + Typing, GCMS, Anne, Expl, Terry, Ken, Bob, Jamar
W/Lab Copies, Mike PM, Gloud, Chang

WESTON Custody Transfer Record/Lab Work Request

Received By _____
Date 11/23/88
Assigned to _____

Client Tooele Army Depot
Client Contact Barry Vanderwall
Phone 582/882-1445

RFW Contact Jeff Eng
Date Due 12/21/88
Project Number 2681-05-09-0050

8811594

SAMPLE IDENTIFICATION

USATHAMA - TNORDW WWP ANALYSES REQUESTED

Sample No.	Client ID No.	Description	Matrix	Date Collected	Container/Preservative	Explosives	VOA	Diss. Metals	Total Metals	Diss. Metals	Chloride	Sulfate	
001	N-110-88	Groundwater Sample	W	11-22-88	[illegible]	✓	✓				✓	✓	
002	N-3A	"	W	11-21-88	"	✓	✓				✓	✓	
003	N-3H	"	W	11-22-88	"	✓	✓				✓	✓	
004	N-117-88	"	W	11-22-88	[illegible]	✓	✓	✓	✓	✓	✓	✓	
005	N-117-88		W	↓	↓					✓			

VOA Method Trip Blank 11/23/88

Explosives: 246 TNT, 26DNT, 24DNT, 135TNB, 13DNB, Tetryl, NB, HMX, RDX

QC + Del = Special

Special Instructions: THIS IS IT FOR THE GROUNDWATER SAMPLES FROM TOOELE ARMY DEPOT

Matrix:
S- Soil DS- Drum Solids
W- Water DL- Drum Liquids
O- Oil X- Other

Items/Reason	Relinquished By	Received By	Date	Time	Items/Reason	Relinquished By	Received By	Date	Time
Samples transferred to LAB	[illegible]	Federal Express	11-22-88	1900	N2 N1		Joan E Beran	12/5/88	9:00
	Did Ex	M Gilmore	11-23-88	5:30pm	Store	Joan E Beran		12/9/88	4:00
Explosives RDX		Linda J Mackey	11/21/88	11:00am	ambient		T D Peterson	11/23/88	1:57
"	Linda J Mackey		11/22/88	1:45pm	storage	T D Peterson		11/23	4:30
1 VOA SET		S Schneider	11/22-	2pm	N2 N1		Joan E Beran	12/6/88	9:00
					Store	Joan E Beran		12/9/88	4:00

RFW 21-21-001/A-3/86

Diane, Boor, Vina, Carver, Stewart, Stanley, Cox, Ingram, Jane, Eck, Jerry, Ken, Lou, Tammy, Kathy, Ted, Mike, Pat, Gloria, Clara

WESTERN

Custody Transfer Record/Lab Work Request

Received By M Hesse
Date 11/23/88
Assigned to

Client Tooele Army Depot
Client Contact Bob Kershaw
Phone 801/833-1445

RFW Contact Jane Eck
Date Due 12/21/88
Project Number 2001-05-09-0030

88116002

SAMPLE IDENTIFICATION

ANALYSES REQUESTED

Sample No.	Client ID No.	Description	Matrix	Date Collected	Container/Preservative	Explosives	VOA					
001	N-119-88	Groundwater Sample	W	11-22-88		✓	✓	✓	✓	✓	✓	✓
002	N-120-88	"	W	11-22-88	"	✓	✓	✓	✓	✓	✓	✓
003	02FB	Field Blank	W	11-22-88	"	✓	✓	✓	✓	✓	✓	✓
004	N-115-88									✓		
005	N-120-88									✓		
006	02FB									✓		

Explosives 24b TNT, 26DNT, 24DNT, 35TNB, 13DNB, TETRYL, NB, HMX, RDX

QC = Del = Special

Matrix:
S- Soil DS- Drum Solids
W- Water DL- Drum Liquids
O- Oil X- Other

Special Instructions: THIS IS IT FOR THE GROUNDWATER SAMPLES FROM TOOELE ARMY DEPOT

Items/Reason	Relinquished By	Received By	Date	Time	Items/Reason	Relinquished By	Received By	Date	Time
SAMPLES/TRANSFER PAPERS	Ted Eck	Federal Express	11-23-88	1900	1,2,3 Dinitrobenzene		S. Saunders	11-25-88	1500
		M Cifuentes	11-23-88	2330	N2		Joan E Beeson	12/5/88	9:00
K and A		T Beeson	11-24-88	10:30	Store	Joan E Beeson		12/5/88	4:00
Explo Items		Judy Nebeker	11/28/88	11:30	VOA		Y Hall	12/6/88	2:00
4	Judy Nebeker		11/28/88	1:40	Del		Joan E Beeson		

RFW 21-21-001/A-3/86

[illegible] Ken, [illegible] Chang Peg Book Judy

WESTON

Custody Transfer Record/Lab Work Request

Received By [illegible]
Date 11/23/88
Assigned to

Client [illegible]
Client Contact [illegible]
Phone 505/255-1445

RFW Contact Les Eng
Date Due 12/21/88
Project Number [illegible]-05-07-0050

8811C594

SAMPLE IDENTIFICATION USATHAMA - TN [illegible] 6XP ANALYSES REQUESTED

Sample No.	Client ID No.	Description	Matrix	Date Collected	Container/Preservative	Explosives	VOA	[illegible]	Total Metals	[illegible]	[illegible]	[illegible]
001	N-110-88	[illegible] Sample	W	11-22-88	[illegible]	✓	✓	[illegible]	PP		[illegible]	✓
002	N-3A	[illegible]	W	11-21-88	"	✓	✓				[illegible]	✓
003	N-3H	[illegible]	W	11-22-88	"	✓	✓				[illegible]	✓
004	N-117-88	[illegible]	W	11-22-88	[illegible]	✓	✓	✓	✓	[illegible]	[illegible]	✓
005	N-117-88	[illegible]	W	↓	↓					✓	[illegible]	

VOA's Subbed to Metatrace 11/23/88

Explosives: 246 TNT, 26 DTNT, 24 DNT, 35 TNB, 13 DND, TETRYL, NB, HMX, RDX

QC + Del - Special

Matrix:
S- Soil
W- Water
O- Oil
DS- Drum Solids
DL- Drum Liquids
X- Other

Special Instructions: THIS IS IT FOR THE GROUNDWATER SAMPLES FROM TOOELE ARMY DEPOT

Items/Reason	Relinquished By	Received By	Date	Time	Items/Reason	Relinquished By	Received By	Date	Time
SAMPLES / TRANSPORT TO LAB	[illegible]	Federal Express	11-22-88	1900	[illegible]				
	Ded Ex	M Gifford	11-23-88	9:30					

RFW 21 21-001/A-3/86

WESTERN

Custody Transfer Record/Lab Work Request

Received By J. Welsh
Date 11/22/88
Assigned to

Client Army Depot
Client Contact Chris Hannan
Phone 925/455-4445

RFW Contact Jeff Eng
Date Due 12/20/88
Project Number 2811.05.07.1030

88111-571

SAMPLE IDENTIFICATION — TOOELE ARMY DEPOT — EXPLOSIVES, 8270 PAH, TPH

Sample No.	Client ID No.	Description	Matrix	Date Collected	Container/Preservative	8330 Explosives	8270	8270 PAH	TPH 418.1				
001	N-3I	Groundwater Sample	W	11-20-88	1 qt. - 1 liter, 2 - 40 ml vials (HCl)	✓	✓	✓	✓				
002	N-3F	"	W	11-20-88	"	✓	✓	✓	✓				
003	03FB	Field Blank	W	11-20-88	"	✓	✓	✓	✓				
004	N-1C7-88	Groundwater Sample	W	11-21-88	"	✓	✓	✓	✓				
005	N-12B-88	"	W	11-21-88	"	✓	✓	✓	✓				
006	N-1C2-88	"	W	11-21-88	"	✓	✓	✓	✓				
007	N-130-88	"	W	11-21-88	"	✓	✓	✓	✓				

GC+DLC=Special

Explosives: 24DNT, 26DNT, 24/6TNT, TETRYL, NB, HMX, RDX

Matrix:
S- Soil
W- Water
O- Oil
DS- Drum Solids
DL- Drum Liquids
X- Other

Special Instructions: THE LAST OF THE TOOELE ARMY DEPOT GROUNDWATER SAMPLES FROM N-TEAD SHOULD GET THERE BY 11-23-88 (MONDAY) — 8:30 AM.

Items/Reason	Relinquished By	Received By	Date	Time	Items/Reason	Relinquished By	Received By	Date	Time
SAMPLES Including T.B.	Mary A. DeMello RedEx	Federal Express Jeffrey Welsh	11/23/88	1900					

RFW 21-21-081/A 3/86

TAMY, KEN, LOOD, SETH, LINDA, [illegible], CARTER, GLENN, T.A., [illegible], MIKE, DAN, GLORIA, T. CHANG
LEG BOOK DIANNE

WESTON

Custody Transfer Record/Lab Work Request

8810-198

Received By [illegible]
Date 10/21/98
Assigned to [illegible]

Client USATHAMA - TN
Client Contact Mary Heppard
Phone (601) 634-3126

RFW Contact Barry Kerlin
Date Due 11/25/98
Project Number 12211-029-09

SAMPLE IDENTIFICATION

ANALYSES REQUESTED

	Sample No.	Client ID No.	Description	Matrix	Date Collected	Container/Preservative	PPNT	Expl	DNA	Acrylo	Aniline	SVOC		USA
001	U-130-SS-22		Six Hour Sample	S	8/26/10	3x2 ml Amber	✓	✓	✓	✓	✓	✓		
	U-130 SS-22		[illegible] 22'	S	↓	"	✓	✓	✓	✓	✓	✓		
	U-131-SS-22		[illegible]	S	↓	USA								✓
002	U-130-SS-24		Six Hour Sample	S	8/26/10	3x2 ml Amber	✓	✓	✓	✓	✓	✓		
	U-130-SS-24		[illegible] 24'	S	↓	"	✓	✓	✓	✓	✓	✓		
	U-130-SS-24		[illegible]	S	↓	USA								✓

QC/DEC = SPECIAL

Matrix:
S- Soil DS- Drum Solids
W- Water DL- Drum Liquids
O- Oil X- Other

Special Instructions: SULFATE TO BE DONE BY IC

EXPL. = 2,4,6 TNT, 2,6 DNT, 2,4 DNT, 1,3,5 TNB, 1,3 DNB, TETRYL, NB, HMX, RDX

Items/Reason	Relinquished By	Received By	Date	Time	Items/Reason	Relinquished By	Received By	Date	Time
	U. McDonnell	Fed Ex	10/27/98	3:00					
	Fed Ex	[illegible]	10/28/98	9:00 am					

Mike, J. Chang, Pm, Gloria, Ken, Ed, Steph, Pat, gems, Sue, Terry, W. Jaks, Diane, John, Book

WESTERN

Custody Transfer Record/Lab Work Request

8810-072

Received by Mary Anderson
Date 10/19/88
Assigned to

Client USATHAMA-Tootle
Client Contact MARY Hepner
Phone 601/634-3326

RFW Contact Barry Kohlmeier, 206-255-1945
Date Due 11/16/88
Project Number 2281-05-29

Carter George Rhodes

SAMPLE IDENTIFICATION

ANALYSES REQUESTED

Sample No.	Client ID No.	Description	Matrix	Date Collected	Container/Preservative	8270	8240	BNA	Metals	Metals	5M42		DOA
001	U-128-88-24	Jackson Slough	S	8/10-12	3oz w/ Teflon	✓	✓	✓	✓	✓	✓		
001	U-128-88-24	from Pelagos Base	S	8/10-12	" "	✓	✓	✓	✓	✓	✓		
002	U-129-88-24		S	8/10-18	" "	✓	✓	✓	✓	✓	✓		
002	U-129-88-24		S	8/10-18	" "	✓	✓	✓	/	/	/		✓
002	U-129-88-24		S	8/10-18	VOA								

Revision
Nb3 Voa logged in together as Valle. 10/19/88 eg

Revision
11 isps
Nb3 pelagos
Batch # 8811471

QC/Del = Special

Explosives = 24 DNT, 2,6 DNT, 2 Nitro, Bs Tetryl, 13 DNB, NB, Hmx, RDX

Special Instructions: metals P.P. = mapped in water
VOA - BNA PP.

Matrix:
S- Soil
W- Water
O- Oil
DS- Drum Solids
DL- Drum Liquids
X- Other

Items/Reason	Relinquished By	Received By	Date	Time	Items/Reason	Relinquished By	Received By	Date	Time
	Kathy McDonnell FedX	Falcon	10/19/88	6:30	8 Soils	Blade Mackey		10/21/88	4:00
		Mary Anderson	10/19/88	9:30pm	VOA		J. Ault	10/24/88	11:30
10 Soil		M. DeRose	10-21	9	BNA		T Seyore		
10 Soil	M. Lokken		10-21	5	Storage	T Seyore			
4 Soils		Blade Mackey	2:30	10-11 88	N3 NL		Joan E Bleam	11/4/88	11:30

WESTON

Custody Transfer Record/Lab Work Request

TEAD
NORTH AREA
8209-2877

Received By _____ Client USATHAMA RFW Contact [illegible]
Date _____ Client Contact TULELE ARMY Date Due 10/15/87
Assigned to _____ Phone _____ DEPOT, UTAH Project Number 2281-05-09

(TEAD)

WELL #1

SAMPLE IDENTIFICATION / ANALYSES REQUESTED

Sample No.	Client ID No.	Description	Matrix	Date Collected	Container/Preservative	VOA	BNA	PEST/PCB	Explos	Amp	Metals	[illegible]	[illegible]
001		(2) 40 ml VIALS	VOA	16 Sep 87		X							
		(2) 1 l amber	BNA				X						
		(2) " "	PEST/PCB					X					
		(2) " plastic	Metals + Na		w/HNO3						X		
		(2) 250 ml amber	Explosives						X				
		(2) 1 l plastic	Al Fl Be										X
		(2) 1 l Amber	THIODIGLYCOL									X	
		(2) 1 l "	DAMP							X			
002		(1) VOA TRIP BLANK				X							

Matrix:
S- Soil
W- Water
O- Oil
DS- Drum Solids
DL- Drum Liquids
X- Other

Special Instructions:

Explosives - USATHAMA QC
STD QC for everything else

Items/Reason	Relinquished By	Received By	Date	Time	Items/Reason	Relinquished By	Received By	Date	Time
			[illegible]	[illegible]					
		[illegible]	9/17/87	[illegible]					

RFW 21-21-001/A-3/86

WESTERN ENVIRONMENTAL

Custody Transfer Record/Lab Work Request

Received By B Jones
Date 1-22-88
Assigned to
Client Williams - Tooele
Client Contact
Phone
RFW Contact
Date Due 2/19
Project Number 1281-05-09

8801-294

SAMPLE IDENTIFICATION

Sample No.	Client ID No.	Description	Matrix	Date Collected	Container/Preservative	BC-	NO2-NO3						
001			W	1-21-88		✓	✓	✓	✓	✓	✓	✓	✓

Matrix:
S- Soil DS- Drum Solids
W- Water DL- Drum Liquids
O- Oil X- Other

Special Instructions:
Special QC + Lab

Items/Reason	Relinquished By	Received By	Date	Time	Items/Reason	Relinquished By	Received By	Date	Time
	Fed Ex	B Jones	1-22-88	7:30					

RFW 21-21-001/A-3/88

M.C WESTON EPM

Custody Transfer Record/Lab Work Request

Received By B Jones
Date 1-22-88
Assigned to

Client Usathama/Toolle
Client Contact
Phone

RFW Contact
Date Due 2/19
Project Number 3281-0509

8801-294

SAMPLE IDENTIFICATION

ANALYSES REQUESTED

Sample No.	Client ID No.	Description	Matrix	Date Collected	Container/Preservative	EXP	VOA	BNA	Metals	NA	CL	FLOR	SO4
001			W	1-21-88		✓	✓	✓	✓	✓	✓	✓	✓

Matrix:
S- Soil
W- Water
O- Oil
DS- Drum Solids
DL- Drum Liquids
X- Other

Special Instructions: ~~Dump~~ special oc + del

Items/Reason	Relinquished By	Received By	Date	Time	Items/Reason	Relinquished By	Received By	Date	Time
	fed ex	B Jones	1-22-88	9:30					

RFW 21-21-001/A-3/86

Carter Mike Ext 4045 HM Alex

WESTON

Custody Transfer Record/Lab Work Request

Received By [signature] Client USATHAMA-Tooele RFW Contact

Date 1/23/88 Client Contact Date Due 2/20/88

Assigned to Phone Project Number 2281-05-09

8801-316-

SAMPLE IDENTIFICATION

ANALYSES REQUESTED

Sample No.	Client ID No.	Description	Matrix	Date Collected	Container/Preservative	PP							
001		DW-9-2	W	1/21/88		[illegible]							

Matrix:
S- Soil DS- Drum Solids
W- Water DL- Drum Liquids
O- Oil X- Other

Special Instructions: subbed to Metatrace 1-27-88

Items/Reason	Relinquished By	Received By	Date	Time	Items/Reason	Relinquished By	Received By	Date	Time
[signature]	Fed Ex	[signature]	1/23	3:40					

RFW 21-21-001/A-3/86

Wheb, Steph, Mike, PM, Gloria, Chang, Dianne, Book

Custody Transfer Record/Lab Work Request

WESTON

WESTON Analytics Use Only
8811L471

Client: Upatham - TN
Work Order: 2381-05-09
Date Rec'd.: 11/15/88 Date Due: 12/13/88
RFW Contact:
Client Contact/Phone:

WA Use Only Lab ID	Client ID/Description	Matrix	Date Collected	Refrigerator# / #/Type Container / Volume / Preservative / ANALYSES REQUESTED	
001	N-128-88-26	S	10/12/88		8810-072-001
002	N-129-88-24	S	10/12/88		⊥ ⊥ -002
003	N-130-88-22	S	10/26/88		8810-198-001
004	N-130-88-24	S	10/26/88		⊥ ⊥ 002

Samples relogged per S Eng 11/15/88 Sample #3 001+002 out of hold.

QC/Del = Special

Matrix: S - Soil, SE - Sediment, SO - Solid, W - Water, O - Oil, A - Air, WI - Wipe, DS - Drum Solids, DL - Drum Liquids, F - Fish, X - Other

Special Instructions: actual Dates Rec'd 10/19/88 10/20/88

Item/Reason	Relinquished by	Received by	Date	Time	Item/Reason	Relinquished by	Received by	Date	Time
relogged		[illegible]	11/15/88	12:30					

WESTON Analytics Use Only

Samples Were:
1 Shipped or Hand-Delivered
NOTES:
2 Ambient or Chilled
NOTES:
3 Received Broken/Leaking (Improperly Sealed) Y N
NOTES:
4 Properly Preserved Y
NOTES: See Batches
5 Received Within Holding Times Y
NOTES: 8810-074 8810-098

COC Tape Was:
1 Present on Outer Package Y N
2 Unbroken on Outer Package Y N
3 Present on Sample Y N
4 Unbroken on Sample Y N
NOTES:

COC Record Was:
1 Present Upon Receipt of Samples Y N

Discrepancies Between Sample Labels and COC Record? Y N
NOTES:

7-115

RFW 21-21-001/A-7/88

Liz Lev Dwight George Denise Vicki Carter Jeff Gen Joe Jeff Ken Deb Jodi Nicky PM

PAGE 1 OF 2

WESTON

Custody Transfer Record / Lab Work Request

Received By B Jones
Date 2/29/88
Assigned to

Client TOOELE ARMY DEPOT
Client Contact MARY ELLEN HENRY
Phone (801) 671-3921 - OFFICE (801) 833-2701 - FIELD

RFW Contact JANE YOUNG
Date Due 14 MARCH 88
Project Number 2281-05-09-0030

8802-515

SAMPLE IDENTIFICATION

ANALYSES REQUESTED

Sample No.	Client ID No.	Description	Matrix	Date Collected	Container/Preservative	EP Tox Metals	VOA	Metals	TOC	BNA/PEST			
001	SS1DS-01-01 ✓	8026 16:15	S	23FEB88	COOL	✓	✓	✓	✓	✓			
002	SS1DS-01-02 ✓	9:20	S	24FEB88									
003	SS1DS-01-03 ✓	9:35	S	24FEB88									
004	SS1DS-02-01 ✓	9:45	S	24FEB88									
005	SS1DS-02-02 ✓	10:00	S										
006	SS1DS-02-03 ✓	10:10	S										
007	SS1DS-03-01 ✓	10:10	S										
008	SS1DS-03-02 ✓	10:30	S										
009	SS1DS-03-03 ✓	10:40	S										
010	SS1DS-04-01 ✓	10:10	S										
011	SS1DS-04-02 ✓	10:30	S										
012	SS1DS-04-03 ✓	10:40	S										
013	SS1DS-05-01 ✓	11:05	S										
014	SS1DS-05-02 ✓	11:15	S										
015	SS1DS-05-03 ✓	11:30	S										
016	SS1DS060 01 ✓	12:10	S										
017	SS1DS060 02 ✓	12:10	S										
018	SS1DS060 03 ✓	12:20		24FEB88	COOL	✓	✓	✓	✓	✓			

Matrix:
S- Soil DS- Drum Solids
W- Water DL- Drum Liquids
O- Oil X- Other

Special Instructions: *(CL FL Bromide) Sodium Sulfate NO2 NO3
Vertheave Special QC + Lab ** 2HGT NT, 2HGT NT, 2ND NT, 13 5 TNB
5 DNB 4HT BYL, NB, NMXRDX

Items/Reason	Relinquished By	Received By	Date	Time	Items/Reason	Relinquished By	Received By	Date	Time
	[illegible]	B Jones	2/25/88	9:30	Metals	B Jones	P. Judd	2/26/88	1600
BNA/PEST	P Reagin	B Reach	2/26/88	930		P. Judd	B Jones	2/26/88	1700
Hg	B Jones	D Weidner	2/29/88	930	Metals	B Jones	P. Judd	3/1/88	1600
	D Weidner	B Jones	2/29/88	1500		P. Judd	B Jones	3/1/88	1300
Von	B Jones	[illegible]	3/1/88	1700		B Jones	A Mouw	3/13/88	
			3/16/88	1600		A Mouw	B Jones	3/17/88	1130
			3/17/88	1200					

RFW 2/92/1001/A-3/86

WESTON

Custody Transfer Record/Lab Work Request

Received By B Jones
Date 2/25/88
Assigned to

Client Tooele Army Depot
Client Contact Mary Ellen Hetner
Phone (301) 671-3921 - office
(801) 833-2701 - field

RFW Contact Dave Pohl
Date Due 24 March 88
Project Number 2281-05-09-0530

8802-575

SAMPLE IDENTIFICATION / ANALYSES REQUESTED

Sample No.	Client ID No.	Description	Matrix	Date Collected	Container/Preservative	Ecro-sives	VOA	Metals	Wong	BNA/Pest/PCB			
019	SS/DS-07-01	BORE ✓ 14:10	S	24 Feb 88	Cool	✓	✓	✓	✓	✓			
020	SS/DS-07-02	✓ 14:20	S										
021	SS/DS-07-03	✓ 14:30	S										
022	SS/DS-08-01	✓ 15:10	S										
023	SS/DS-08-02	✓ 15:20	S										
024	SS/DS-08-03	✓ 15:30	S										
025	SS/DS-10	S-10 WELL 10:50	W		Cool/Metals Fixed	✓	✓	✓	✓	✓			
026	SS-DS-09	17:15	W		Cool		✓						

3-21-88 revision
CL, FL, Bromide
To be run - unsertified
method - can be done
here as per Les Eng

Trip Blank's per Dave Pohl 11/2/88

Matrix:
S- Soil
W- Water
O- Oil
DS- Drum Solids
DL- Drum Liquids
X- Other

Special Instructions: NOTE: DATES ON SAMPLE JARS ARE INCORRECT - ONE DAY SHOULD BE ADDED TO THE DATES ON THE LABLES

Items/Reason	Relinquished By	Received By	Date	Time	Items/Reason	Relinquished By	Received By	Date	Time
	[illegible]	B Jones	2/25/88	9:30		J Weidner	B Jones	2/29/88	1500
BNA Pest Sol	[illegible]	B Roach	2/26/88	930	Metals	B Jones	R Toth	2/26/88	1600
BNA	B Jones	Tenn Snyder	2/29/88	9:00		R Toth	B Jones	2/26/88	2400
NO_3/NO_2	B Jones	Kurt Leal	2/29/88	0910	Metals	B Jones	R Toth	3/1/88	1600
Hg	B Jones	J Weidner	2/29/88	930		R Toth	B Jones	3/1/88	2300
D: Expl, Water	B Jones	Daniel C. Hecker	2/29/88	2:30		B Jones	Andy Brown	3/3/88	1100

RFW 21-21-001/A-3/86

WESTON

Custody Transfer Record/Lab Work Request

Received By _____
Date 2/26/88
Assigned to _____

Client TOOELE ARMY DEPOT
Client Contact KON LARSON
Phone 801-833-3504

RFW Contact DAVE RUH
Date Due ~~MARCH 88~~ 3/25/88
Project Number 2201-05-09

8802-589

ANALYSES REQUESTED

Sample No.	Client ID No.	Description	Matrix	Date Collected	Container/Preservative	TCL VOA	TCL BNA	TCL Pest/PCB	TAL Metals	TCL VOA	TAL Inorg	PTHC	BNA	Metals		
N-101-55 V 11	N-1-88	39.5-41.0	SS	2-21-88	Cool	X					X					
V 12	N-1-88	29.5-31.0		2-21-88												
N-102-35 V 13	N-2-88	29.5-31.0		2-23-88												
V 14	N-2-88	39.5-41.0		2-23-88												
N-103-45 V 15	N-3-88	24.5-26.0		2-23-88												
V 16	N-3-88	29.5-31.0		2-23-88												
V 17	N-104-88	24.0-25.5		2-25-88												
V 18	N-104-88	34.0-35.5		2-25-88							X					
V 19	SS-DF-01-01		S	2-25-88		X					X	X	X			
V 20	SS-DF-10		W	2-25-88		X					X	X	X	X		
V 21	SS/DF-09		W	2-25-88		X										

DO NOT ANALYZE THESE FOR INORGANICS — ANDREWS

to be pulled

Matrix:
S- Soil DS- Drum Solids
W- Water DL- Drum Liquids
O- Oil X- Other

Special Instructions:

* (Cl-, F-, bromide) Sodium, Sulfate NO3 NO2 Alkalinity, Turbidity, Color, TDS, TSS, 13 DNA, TETRA, NO3, HMX, RDX.

Items/Reason	Relinquished By	Received By	Date	Time	Items/Reason	Relinquished By	Received By	Date	Time
	[signature]	[signature]	[illegible]						

Vick Carter eff Joe Jeff Ken w lab George Denise Jodi TN Mike Ed Lt Dave

WESTON

Custody Transfer Record/Lab Work Request

Received By B Jones
Date 2/27/88
Assigned to

Client TEAD OGDEN
Client Contact Mr. Dick Hoover
Phone TOOLE

RFW Contact Dave Pohl
Date Due 3/28/88
Project Number 2281-05-09

8802-102

SAMPLE IDENTIFICATION Tooele Army Depot

Sample No.	Client ID No.	Description	Matrix	Date Collected	Container/Preservative	VOA	VOC 1107	Extr	Fe/TIC	ICP Metals 1004	PP Metals		
V001	N-106-88	-6 [illegible]	S	2-26-88	Tr cool 4°C	✓	✓	✓					
V002	N-106-88	-9 [illegible]	S			✓	✓	✓					
V003	N-104-88	-5 245-260	S			✓	✓	✓					
V004	N-105-88	-2 [illegible]	S			✓	✓	✓					
V005	N-107-88	-6 [illegible]	S		40ml	✓	✓	✓					
V006	N-105-88	-4 [illegible]	S			✓	✓	✓					
V007	N-107-88	-8 [illegible]	S		40ml	✓	✓	✓					
V008	SSDT-01	-02 (5m)	S		2) 40ml	✓		✓	✓	✓			
V009	SSDT-01	-03 (5:20pm)	S		2) 40ml	✓		✓	✓	✓			
V010	SSDT-01	-04 (5:40pm)	S		2) 40ml	✓		✓	✓	✓			
V011	SSD-17	DTCH	W					✓			✓		
V012	SSDT-01	-05	W		Preserved 2) 40ml	✓							

Matrix:
S- Soil DS- Drum Solids
W- Water DL- Drum Liquids
O- Oil X- Other

Special Instructions: (Time)* 24/6 TNT, 26DNT, 24DNT, 135 TNB, 13 DNB, TETRYL, NB, HMX, RDX

Items/Reason	Relinquished By	Received By	Date	Time	Items/Reason	Relinquished By	Received By	Date	Time
cooler/Ashaw	[illegible] 2/27/88					JJMackey	B Jones	3/3/88	5:15
	Pat Lt	B Jones	2/27/88	9:30					
Ag 011	B Jones	JJ Mackey	3/2/88	11:00	VOA	B Jones	Jill	3/6/88	12:00
	JJ Mackey	B Jones	3/2/88	16:00		Ashaw Metcalf	B Jones	3/7/88	11:30
9 Soils 1 H_2O	B Jones	Linda Mackey	3/3/88	2:15					

RFW 21-21-001/A-3/86

Vicki Carter w/lab Jodie Jones Diane Edles

Custody Transfer Record/Lab Work Request

WESTERN

Received By [redacted] Client Tooele Army Depot RFW Contact Diane

Date ~~3-29-88~~ 3/1/88 Client Contact _____ Date Due 3/29/88

Assigned to _____ Phone _____ Project Number 2251-05-09 Mike

8803-618

SAMPLE IDENTIFICATION

ANALYSES REQUESTED

Sample No.	Client ID No.	Description	Matrix	Date Collected	Container/Preservative								
	~~N-109-88-4~~	~~4 Bottles~~	~~S~~	~~2-28-88~~		~~VOA~~	~~NO_3-NO_2~~	~~Explosives~~					
001	N-109-88-4	2 Bottles 10.5 - 11	S	2-28-88		VOA	NO_2-NO_3	Explosives					
002	N-109-88-6	21.5 - 21		2-28-88									
003	N-109-88-7	24.5		2-28-88									
004	N-109-88-7	24.5 - 26		2-28-88									
005	N-109-88-7	11.5 - 11.0		2-28-88									
006	N-109-88-5	24.5 - 26.0		2-28-88									
007	N-109-88-1	4.5 to 6		2-28-88									
008	N-109-88-3	14.5 - 16		2-28-88									
009	N-109-88-6	27 - 34 (from cuttings)		2-27-88	822.8 - 1036.2	(822 - 1036)							
010	N-109-88-7	34.0 - 35.5		2-27-88	1036.2 - 1081.4	1036 - 1082							

Matrix:
S- Soil DS- Drum Solids
W- Water DL- Drum Liquids
O- Oil X- Other

Special Instructions: → Use these special QC + Det

Items/Reason	Relinquished By	Received By	Date	Time	Items/Reason	Relinquished By	Received By	Date	Time
	T. Bush								
	Fedex	BJones	3/1/88	8:30					

RFW 21-01-001/A-2/85

WESTON

Custody Transfer Record/Lab Work Request

Received By [illegible]
Date 3/31/88
Assigned to

Client [illegible]-TOOELE
Client Contact [illegible]
Phone [illegible]

RFW Contact [illegible]
Date Due 4-25-88
Project Number [illegible]

8803 913

SAMPLE IDENTIFICATION / ANALYSES REQUESTED

	Sample No.	Client ID No.	Description	Matrix	Date Collected	Container/Preservative	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	VOA
005	[illegible]		[illegible]	S	[illegible]	[illegible]	✓	✓	✓	-	✓	✓	[illegible]	
						[illegible]								
006	[illegible]		[illegible]		[illegible]	[illegible]	VOA							✓
						[illegible]								
						[illegible]								

Matrix:
S- Soil DS- Drum Solids
W- Water DL- Drum Liquids
O- Oil X- Other

Special Instructions: [illegible] Sulfides [illegible] Per Tech Plan

AIRBILL # 5472084730

Items/Reason	Relinquished By	Received By	Date	Time	Items/Reason	Relinquished By	Received By	Date	Time
	[illegible]	[illegible]	[illegible]	[illegible]					

Les, Dianne, gcms, Carter, pft, Wlab, Jodi, Ken, Roger, Geo, Denise, Vinh, Mike, PM, Dee Book.

WESTON

Custody Transfer Record/Lab Work Request

Received By [illegible]
Date 4/22/88
Assigned to

Client USATHAMA-TOOELE
Client Contact Mary Heppner
Phone (604) 634-3326

RFW Contact Bey Keshian
Date Due 5/20/88
Project Number 2281-05-09

8804-168.

SAMPLE IDENTIFICATION

	Sample No.	Client ID No.	Description	Matrix	Date Collected	Container/Preservative	BNA	Inorganic	Explosives	[illegible]	[illegible]	Total metals	[illegible]	VOA
001	N-112-88-34	✓	Soil Sample, 326-327	S	4-21-88	2, 300 ml Amber	✓	✓	✓	[illegible]	[illegible]	✓	[illegible]	
	N-112-88-34		Soil Sample, 326-327	S	4-21-88	2, 120 ml clear								✓
002	N-112-88-35	✓	Soil Sample, 328-329	S	4-21-88	2, 300 ml Amber	✓	✓	✓	[illegible]	[illegible]	✓	[illegible]	
	N-112-88-35		Soil Sample, 328-329	S	4-21-88	1, 800 ml clear								✓

Usathama Special QC/Del

** inorg - Cl, Fl, Bromide, SO4 by IC, Sodium, NO3 NO3

Matrix:
S- Soil
W- Water
O- Oil
DS- Drum Solids
DL- Drum Liquids
[illegible]

Special Instructions:

Cooled to 4°C. * Exp - 246TNT, 26DNT, 24DNT, 135TNB, 13DNB, TETRYL, NB, [illegible]

TN

WESTON

Custody Transfer Record/Lab Work Request

Received By P. Berger
Date 5/4/88
Assigned to

Client USATHAMA-TOOELE
Client Contact Mary Hepner
Phone (601) 634-3326

RFW Contact Bay Keshwa
Date Due 6-1-88
Project Number 2281-05-04

8805-276

SAMPLE IDENTIFICATION / ANALYSES REQUESTED

	Sample No.	Client ID No.	Description	Matrix	Date Collected	Container/Preservative	BNA	Inorganics	Expl.	[illegible]	Total metals	dissolv. metals	[illegible]	VOA
001	W113-5540	✓	Soil Sample	S	5-2-88	2, 300 ml glass	✓	✓	✓	[illegible]	✓	[illegible]	[illegible]	
	8840		Soil Sample	S	5-2-88	1, 500 ml glass								✓
002	8850		Soil Sample	S	5-2-88	2, 300 ml glass	✓	✓	✓	[illegible]	✓	[illegible]	[illegible]	
	8850	✓	Soil Sample	S	5-2-88	1, 500 ml glass								

Explosives - 246 TNT, 26 ANT, 24 ANT, [illegible], 13 DNA, TETRYL, [illegible], [illegible], RDX

Inorganics - ICCL, FL, ICBR, [illegible], ICSO4, N3H2

Matrix:
S- Soil DS- Drum Solids
W- Water DL- Drum Liquids
O- Oil X- Other

Special Instructions: Cooled to 4°C
Usathama Special QC/Del.

Items/Reason	Relinquished By	Received By	Date	Time	Items/Reason	Relinquished By	Received By	Date	Time
		P. Berger	5/4/88	9:30 am					

[illegible] Dee, Denise, Wlab-Ken Roger [illegible]

WESTON

Custody Transfer Record/Lab Work Request

Received By [illegible]
Date 5/7/88
Assigned to

Client USATHAMA-TOOELE
Client Contact Mary Heppner
Phone (601) 634-3326

RFW Contact Bing Keshian
Date Due 6-4-88
Project Number 22B1-05-[illegible]

Dee

8805-321

SAMPLE IDENTIFICATION

ANALYSES REQUESTED

Sample No.	Client ID No.	Description	Matrix	Date Collected	Container/Preservative	BNA	[illegible]	[illegible]	Expl	Inorg	TSS [illegible]	[illegible]	VOA
001 N-114-88-33	✓	Soil ([illegible])	S	[illegible]	Bottom Amber	✓	[illegible]	—	✓	✓	✓	—	
[illegible] N-114-88-33		Soil	S	[illegible]	Bottom Amber	✓	[illegible]	—	✓	✓	✓	—	
[illegible] N-114-88-3		Soil	S	[illegible]	Bottom Clear								✓
N-114-88-3		at 25ft (perched clay zone)											
		** 246 TNT, 26 DNT, 24 DNT, 135 TNB, 13 DNA, TETRYL, NB, HMX, RDX											
					Usathama special [illegible]								

Matrix:
S- Soil DS- Drum Solids
W- Water DL- Drum Liquids
O- Oil X- Other

Special Instructions: *CL, [illegible], Drum by IC chilled to 4°C
Flow [illegible], N3N2 FL

Items/Reason	Relinquished By	Received By	Date	Time	Items/Reason	Relinquished By	Received By	Date	Time
	[illegible]	[illegible]	[illegible]	[illegible]					
	[illegible]	[illegible]	5/7/88	[illegible]					

gems, Carter, Pat, Whab, Ken, Roger, Jodi, Vinh, Geo, Denise, Mike, PM, Dee, Les, Diann, Book, Pat

WESTON

Custody Transfer Record/Lab Work Request

Received By P Geiger
Date 5/10/88
Assigned to

Client USATHAMA - TOOELE
Client Contact MARY HEPPNER
Phone (601) 634-3326

RFW Contact Berg Keshian
Date Due 6-7-88
Project Number 2281-65-09

8805-327

SAMPLE IDENTIFICATION

ANALYSES REQUESTED

	Sample No.	Client ID No.	Description	Matrix	Date Collected	Container/Preservative	BNA	Inorg	Pest/	PCB/	Cyl	TSMP	[illegible]	VOA
							0625P *							0624P
V001	N-114-88-31	—	Soil/cuttings S	[redacted]	88-5-9	300 ml Amber glass	✓	✓	~~✓~~	~~✓~~	✓	✓	[illegible]	
	N-114-88-31		Soil/cuttings S	[redacted]	88-5-9	"	✓	✓	~~✓~~	~~✓~~	✓	✓	[illegible]	
	N-114-88-31		Soil/cuttings S	[redacted]	88-5-9	500 ml clear								✓
V2	N-114-88-33		Soil/cuttings S	[redacted]	88-5-9	300 ml Amber glass	✓	✓	~~✓~~	~~✓~~	✓	✓	[illegible]	
	N-114-88-33		Soil/cuttings S	[redacted]	88-5-9	" "	✓	✓	~~✓~~	~~✓~~	✓	✓	[illegible]	
	N-114-88-33		water S	[redacted]	88-5-9	500 ml clear								✓
V3	N-114-88-34		Water & cuttings S	[redacted]	88-5-9	300 ml Amber glass	✓	✓	~~✓~~	~~✓~~	✓	✓	[illegible]	
	N-114-88-34		Water & cuttings S	[redacted]	88-5-9	" "	✓	✓	~~✓~~	~~✓~~	✓	✓	[illegible]	
	N-114-88-34		water S	[redacted]	88-5-9	500 ml clear								✓

All samples to be run as a soil - No more sample to be sampled please conserve per Paul Darr 5/11/88

*inorganics - ICCL - ICBR, ICSO4, Fl, NO3 NO2 Sodium

**Explosives - 246 TNT, 26 DNT, 24 DNT, 135 TNB, 13 DNA, TETRYL, NB, HMX, RDX.

Paul Darr

Usathama Special QC/Del

Packed in ice to 4°C

Matrix:
S- Soil
W- Water
O- Oil
DS- Drum Solids
DL- Drum Liquids
X- Other

Special Instructions:

Items/Reason	Relinquished By	Received By	Date	Time	Items/Reason	Relinquished By	Received By	Date	Time
	John Powell	Fedex	5/9/88	5:30 pm					
	Fedex	P Geiger	5/10/88	9:30 am					

WESTON

Custody Transfer Record/Lab Work Request

Received By [illegible]
Date 5.21.88
Assigned to

Client USATHAMA
Client Contact Mary Heppner
Phone (601) 634-3326

RFW Contact Bea Kashin
Date Due 6-18-88
Project Number 2281-03-09

8805-417

SAMPLE IDENTIFICATION

ANALYSES REQUESTED

	Sample No.	Client ID No.	Description	Matrix	Date Collected	Container/Preservative	BNA	Mag	Expl	Pest	PCB	Tot Met	[illegible]	IZSL
013	N-115-88-L	✓	Soil 88-52	S	88520	300 ml amber (1)	✓	✓	✓	✓	✓	✓	✓	
[illegible]	N-115-88-L		Soil	S	88520	" " " (1)	✓	✓	✓	✓	✓	✓	✓	
014	N115-88-8	✓	Soil 88-52	S	88520	" " " (1)	✓	✓	✓	✓	✓	✓	✓	
[illegible]	N115-88-8		Soil	S	88520	" " " (1)	✓	✓	✓	✓	✓	✓	✓	
										BA 5/21/88	BA 5/21/88		BA 5/21/88	

Matrix:
S- Soil
W- Water
O- Oil
DS- Drum Solids
DL- Drum Liquids
X- Other

Special Instructions:
AB 7-0-2-18/154

Items/Reason	Relinquished By	Received By	Date	Time	Items/Reason	Relinquished By	Received By	Date	Time
	[illegible]	[illegible]	5/20/88	7:00					
	[illegible]	[illegible]	5/21/88	9:30					

Kevin Dianne ext Carter gems wlet Ken Ed Jodi Vinh George Denise Nick PM Dec-

WESTON

Custody Transfer Record/Lab Work Request

Received By B Jones
Date 6-29-88
Assigned to

Client USATHAMA Tooele
Client Contact Mary Heppner
Phone (601) 634-3326

RFW Contact Berg Keshian
Date Due 7-27-88
Project Number 2281-05-09

Frank Jung

8806-844

SAMPLE IDENTIFICATION / ANALYSES REQUESTED

Sample No.	Client ID No.	Description	Matrix	Date Collected	Container/Preservative	PP BWA	* Inorg	~~PCB~~	~~Pest~~	~~Expl.~~	~~Metals~~	PP Tot. Metals	PP Vin	** Exp.
N-117-88-8		Soil	S	880627	300ml amber	✓	✓	—	—	—	—	—		✓
N-117-88-8	001 ✓	Soil 10-115	S	880627	300ml amber	✓	✓	—	—	—	—	✓		✓
N-117-88-8		Soil	S	880627	50ml clear								✓	
N-117-88-11		Soil	S	880628	300ml amber	✓	✓	—	—	—	—	✓		✓
N-117-88-11	002 ✓	Soil 107-118	S	880628	300ml amber	✓	✓	—	—	—	—	✓		✓
N-117-88-11		Soil	S	880628	50ml clear								✓	

ICCL [illegible]

* INORGANICS — CL, BROM, SO4 by IC
FLOR, SODIUM, NO3 NO2

** Explosives 246TNT, 26DNT, 24DNT, 135TNB, 13DNB, TETRYL, NB, HMX, RDX

Usathama Special QC + Del

Matrix:
S- Soil
W- Water
O- Oil
DS- Drum Solids
DL- Drum Liquids
X- Other

Special Instructions: Cooled to ±4° - refrigerated before shipment.

Items/Reason	Relinquished By	Received By	Date	Time	Items/Reason	Relinquished By	Received By	Date	Time
	[illegible]	[illegible]	6-28-88	6:00					
	[illegible]								
	[illegible]	B Jones	6-29-88	9:30					

RFW 21 21 001/A 3/86

Lee, Dexter, Carter, Ken, Roger, John, Walt, Jeff, Deanna, Mike, PM, Dee, Book

WESTON

Custody Transfer Record / Lab Work Request

Received By P Berger
Date 5/16/88 0
Assigned to

Client USATHAMA-TOELE
Client Contact MARY HEPPNER
Phone (801) 834-3326

RFW Contact BURG KUSHIMI (505) 255-14
Date Due ~~5.6/17/88~~
Project Number 2281-05-09

8805-436

SAMPLE IDENTIFICATION

Sample No.	Client ID No.	Description	Matrix	Date Collected	Container/Preservative	EXP	METALS	ANIONS	** ANALYSES REQUESTED
V001	V-121-88-01	Soil sampling 4.5-5.5	S	880517	GLASS-AMBER	✓	✓	✓	Uranium Spec. RAD/Alpha
V 2	V-121-88-02	9.5-10.5	S	880517	GLASS-AMBER	✓	✓	✓	
V 3	V-121-88-03	14.5-15.5	S	880517	GLASS-AMBER	✓	✓	✓	
V 4	V-121-88-04	19.5-20.5	S	880517	GLASS-AMBER	✓	✓	✓	
V 5	V-121-88-05	24.5-25.5	S	880517	" "	✓	✓	✓	** Explosives - 2,4,6 TNT, 2,6 DNT, 2,4 DNB, 1,3 DNB, TETRYL, NB, HMX, RDX
V 6	V-121-88-06	29.5-30.5	S	880517	" "	✓	✓	✓	
V 7	V-121-88-07	39.5-40.5	S	880517	" "	✓	✓	✓	
V 8	V-121-88-08	49.5-50.5	S	880517	" "	✓	✓	✓	
V 9	V-122-88-01	4.5-5.5	S	880518	GLASS-AMBER	✓	✓	✓	
V 10	V-122-88-02	9.5-10.5	S	880518	" "	✓	✓	✓	
V 11	V-122-88-03	14.5-15.5	S	880518	" "	✓	✓	✓	** Pesticides
V 12	V-122-88-04	19.5-20.5	S	880518	" "	✓	✓	✓	
V 13	V-122-88-05	24.5-25.5	S	880518	GLASS-AMBER	✓	✓	✓	Cl, Herbicides 8040 by TC
V 14	V-122-88-06	29.5-30.5	S	880518	" "	✓	✓	✓	
V 15	V-122-88-07	39.5-40.5	S	880518	" "	✓	✓	✓	FL, Ugilla, Perfluoro
V 16	V-122-88-08	49.5-50.5	S	880518	" "	✓	✓	✓	
V 17	V-123-88-01	4.5-5.5	S	880518	GLASS-AMBER	✓	✓	✓	
V 18	V-123-88-02	9.5-10.5	S	880518	" "	✓	✓	✓	
V 19	V-123-88-03	14.5-15.5	S	880518	" "	✓	✓	✓	
V 20	V-123-88-04	19.5-20.5	S	880518	GLASS-AMBER	✓	✓	✓	

Matrix:
S- Soil DS- Drum Solids
W- Water DL- Drum Liquids
O- Oil X- Other

Special Instructions:
AIR Bill #: 4029948985

~~* Full Explosives~~
~~# Short Explosives - to Interest~~
Propellants and Explosives

Items/Reason	Relinquished By	Received By	Date	Time	Items/Reason	Relinquished By	Received By	Date	Time
	Penelope E. Perry	[illegible]	5/18/88	7:00					
	[illegible]	[illegible]	5/18/88	5:30					
	[illegible]	P Berger	5/18/88	9:30					

Custody Transfer Record/Lab Work Request

WESTON

Received By [illegible] Client USA THAMA RFW Contact Barry Koshlan

Date 5/6/88 Client Contact Meg Heppner Date Due See below Calculations

Assigned to _____ Phone (601) 634-3326 Project Number 2281-05-09

8805-4/36

SAMPLE IDENTIFICATION **ANALYSES REQUESTED**

Sample No.	Client ID No.	Description	Matrix	Date Collected	Container/Preservative	Expl	Prtl	Inorg*					
✓021	N-125-SB-05	Soil Sample, 4.5-5.5	S	5/4/88	Glass-Amber	✓	✓	✓					
✓22	N-125-SB-06	29.5-30.5	S	5/4/88	" "	✓	✓	✓					
✓23	N-125-SB-07	39.5-40.5	S	5/4/88	" "	✓	✓	✓					
✓24	N-125-SB-08	49.5-50.5	S	5/4/88	" "	✓	✓	✓					
✓25	N-124-SB-01	4.5-5.5	S	5/4/88	Glass-Amber	✓	✓	✓					
✓26	N-124-SB-02	9.5-10.5	S	5/4/88	" "	✓	✓	✓					
✓27	N-124-SB-03	14.5-15.5	S	5/4/88	" "	✓	✓						
✓28	N-124-SB-04	19.5-20.5	S	5/4/88	" "	✓	✓	✓					
✓029	N-124-SB-05	24.5-25.5	S	5/4/88	Glass-Amber	✓	✓	✓					
✓30	N-124-SB-06	29.5-30.5	S	5/4/88	" "	✓	✓	✓					
✓31	N-124-SB-07	39.5-40.5	S	5/4/88	" "	✓	✓	✓					
✓32	N-124-SB-08	49.5-50.5	S	5/4/88	" "	✓	✓	✓					

Matrix:
S- Soil DS- Drum Solids
W- Water DL- Drum Liquids
O- Oil X- Other

Special Instructions: 1118311 11:42 4848965

*Inorganics include, NO_3, NO_2, NH_3, & Sulfate.

Items/Reason	Relinquished By	Received By	Date	Time	Items/Reason	Relinquished By	Received By	Date	Time
	[illegible]	[illegible]	5/4/88	8:30					
	[illegible]	[illegible]	5/5/88	9:30 pm					

SENT BY:Xerox Telecopier 7020 ;12- 8-88 ; 2:05PM ; 2155247503→ 5052583876:# 7

MIKE, J CHANG, Pm, GLORIA, Ken, Ed, Steph, ert, gems, Sue, Terry, John, Barb

WESTERN

Custody Transfer Record/Lab Work Request

8810-072

Received By Mary Heppner
Date 10/8/88
Assigned to

Client USATHAMA-Tooele
Client Contact Mary Heppner
Phone 601/634-3326

RFW Contact Berg, Kathleen, 206-285-1945
Date Due 11/16/88
Project Number 2291-05-01

SAMPLE IDENTIFICATION

Sample No.	Client ID No.	Description	Matrix	Date Collected	Container/Preservative	Phen.	Pest	BNAs	Metals	Inorg.	SAVOA		DOA
001	001	Jackson Slough	S	10-10-88	3oz unpres.	✓	-	✓	✓	-	✓		
002	002	Jackson Slough	S	10-10-88	"	✓	✓	✓	✓	✓	✓		
003	003	Jackson Slough	S	10-10-88	"	✓	✓	✓	✓	✓	✓		
004	004	Jackson Slough	S	10-10-88	"	✓	✓	✓	/	✓	/		
005	005	Jackson Slough	S	10-10-88	"								✓
006	006	Jackson Slough	S	10-10-88	VOA								

ANALYSES REQUESTED

Revision
Also Hex Chrom
on Jackson Slough
10/11/88

Revision
Also Hex Chrom
on Jackson Slough
Batch #8811471

QC/Del = Special

Explosives = 24 6TNT, 2A DNT, 2A DNT, BCTAB, 13DNB, totals, NB, Hmx, RDX

Special Instructions: metals P.P. = mapTOX
VOA = BNA PP.

Matrix:
S- Soil
W- Water
O- Oil
DS- Drum Solids
DL- Drum Liquids
X- Other

Items/Reason	Relinquished By	Received By	Date	Time	Items/Reason	Relinquished By	Received By	Date	Time
	John O'Donnell	Federal Express	10/8/88	6:30	6 Soils	Gladys Mackey		10/12/88	4:00
		Mary Heppner	10/12/88	9:30 am	VOA		J. Ash	10/28/88	4:30
Yosef		Mr. Bakore	10/21	2-	BNA		T. Seyore		
Fred	M. Lakore		10-21	5-	Strong	T. Seyore			
M. Gills		Gladys Mackey	2:30	10-21-88	N2 ML		Jean E. Brown	11/8/88	11:3

SENT BY:Xerox Telecopier 7020 :12- 8-88 : 2:05PM : 2155247503→ 5052583876:# 6

TAMY, KEN, BOB, STEPH, LINDA, GEORGE, CARTER, GLENN, EXT., SUE, BURKE, TH
LES, BOOK, DIANNE MIKE, DAN, GLORIA, T. CHANG

WESTON

Custody Transfer Record/Lab Work Request

8810-198

Received By _____
Date 10/26/10
Assigned to _____

Client USATHAMA-TN
Client Contact Mike Hargrave
Phone (601) 634-3326

RFW Contact Barry Kelly
Date Due 11/25/10
Project Number 12281-US-04

SAMPLE IDENTIFICATION

ANALYSES REQUESTED

Sample No.	Client ID No.	Description	Matrix	Date Collected	Container/Preservative	PPMT	Fuel	DNA	Arhole	Anlab	Sulfate		UDA
001	U-130-SS-22	Surface Samples	S	8/26/10	3x2 ml brass	✓	✓	✓	✓	✓	✓		
	U-130 SS-22	[redacted] 22'	S	↓	"	✓	✓	✓	✓	✓	✓		
	U-131-SS-22		S	↓	UDA								✓
002	U-130 SS-24	Subsurface Samples	S	8/26/10	3x2 ml brass	✓	✓	✓	✓	✓	✓		
	U-130 SS-24	[redacted] 24'	S	↓	"	✓	✓	✓	✓	✓	✓		
	U-132-SS-24		S	↓	UDA								✓

QC/DEC = SPECIAL

Matrix:
S- Soil DS- Drum Solids
W- Water DL- Drum Liquids
O- Oil X- Other

Special Instructions: SULFATE TO BE DONE BY IC
EXPL. = 246TNT, 26DNT, 24DNT, 135TNB, 13DNAT-TRYL, NB, HMX, RDX

Name/Reason	Relinquished By	Received By	Date	Time	Name/Reason	Relinquished By	Received By	Date	Time
	J. McDonnell FedEx	Fedex MFF	10/27/10	3:45pm					
			10/28/10	9:30am					

SENT BY:Xerox Telecopier 7020 :12- 9-88 ; 2:04PM ; 2155247503→ 5052563876:# 5

White Steph, Mike, PM, Gloria, Charge, Dianne, Book

Custody Transfer Record/Lab Work Request

WESTON

WESTON Analytics Use Only
8811L471

Client — Unatuna - TN
Work Order — 2381-05-09
Date Rec'd. — 11/15/88 Date Due — 12/13/88
RFW Contact —
Client Contact/Phone —

WA Use Only Lab ID	Client ID/Description	Matrix	Date Collected	Refrigerated	# Type Container	Volume	Preservative	ANALYSES REQUESTED →									
								Volatiles						Original & FF Diss			
001	N-108-88-26	S	10/18/88	1										8810-082-001			
002	N-129-88-24	S	10/12/88											1	1	1	002
003	N-130-88-22	S	10/24/88											8810-108-001			
004	N-130-88-24	S	10/24/88	1										1	1	1	002

Sample collected 10/18/88 and 10/24/88 Sample #'s 001 and 002 outlined.

QC Data = Special

Matrix: S - Soil, SE - Sediment, SO - Solid, W - Water, O - Oil, A - Air, W - Wipe, DS - Drum Solids, DL - Drum Liquids, F - Fish, X - Other

Special Instructions: actual Date Collected 10/19/88 10/24/88

Item/Reason	Relinquished by	Received by	Date	Time
Sampled		Mugia	11/15/88	1230

Item/Reason	Relinquished by	Received by	Date	Time

WESTON Analytics Use Only

Samples Were:
1 Shipped or Hand-Delivered
NOTES:

2 Ambient or Chilled
NOTES:

3 Received Broken/Leaking (Improperly Sealed) Y N
NOTES:

4 Properly Preserved Y N
NOTES:

5 Received Within Holding Times Y N
NOTES: 8810-07 8810-08

COC Tape Was:
1 Present on Outer Package Y N
2 Unbroken on Outer Package Y N
3 Present on Sample Y N
4 Unbroken on Sample Y N
NOTES:

COC Record Was:
1 Present Upon Receipt of Samples Y N

Discrepancies Between Sample Labels and COC Record? Y N
NOTES:

7-116

RFW 21-21-001/A-7/88

APPENDIX I

GEOPHYSICAL RESULTS

-400.00	200.00	30.0
-450.00	200.00	36.0
-500.00	200.00	33.0
-500.00	250.00	34.0
-450.00	250.00	32.0
-400.00	250.00	34.0
-350.00	250.00	34.0
-300.00	250.00	44.0
-250.00	250.00	52.0
-200.00	250.00	36.0
-150.00	250.00	36.0
-100.00	250.00	36.0
-50.00	250.00	36.0
0.00	250.00	32.0
0.00	300.00	34.0
-50.00	300.00	40.0
-200.00	300.00	36.0
-250.00	300.00	31.0
-300.00	300.00	33.0
-350.00	300.00	30.0
-400.00	300.00	31.0
-450.00	300.00	34.0
-500.00	300.00	34.0
-500.00	350.00	34.0
-450.00	350.00	33.0
-400.00	350.00	34.0
-350.00	350.00	32.0
-300.00	350.00	31.0
-250.00	350.00	36.0
-250.00	400.00	36.0
-300.00	400.00	32.0
-350.00	400.00	36.0
-400.00	400.00	36.0
-450.00	400.00	36.0
-500.00	400.00	36.0
-550.00	400.00	36.0
-600.00	400.00	38.0
-650.00	400.00	34.0
-650.00	450.00	42.0
-600.00	450.00	36.0
-550.00	450.00	36.0
-500.00	450.00	34.0
-450.00	450.00	34.0
-400.00	450.00	28.0
-350.00	450.00	34.0
-300.00	450.00	34.0
-250.00	500.00	34.0
-300.00	500.00	38.0
-350.00	500.00	34.0
-400.00	500.00	34.0
-450.00	500.00	36.0
-500.00	500.00	36.0
-550.00	500.00	34.0
-600.00	500.00	40.0

-650.00	500.00	42.0
-650.00	550.00	36.0
-600.00	550.00	35.0
-550.00	550.00	40.0
-500.00	550.00	34.0
-450.00	550.00	36.0
-400.00	550.00	32.0
-350.00	550.00	36.0
-300.00	550.00	36.0
-250.00	550.00	38.0
-200.00	550.00	36.0
0.00	600.00	42.0
-50.00	600.00	40.0
-250.00	600.00	42.0
-350.00	600.00	36.0
-400.00	600.00	40.0
-450.00	600.00	40.0
-500.00	600.00	42.0
-550.00	600.00	36.0
-600.00	600.00	58.0
-650.00	600.00	30.0
-650.00	650.00	30.0
-600.00	650.00	40.0
-550.00	650.00	42.0
-500.00	650.00	52.0
-450.00	650.00	52.0
-400.00	650.00	40.0
-350.00	650.00	44.0
-100.00	650.00	42.0
-50.00	650.00	42.0
0.00	650.00	38.0
0.00	700.00	42.0
-50.00	700.00	44.0
-100.00	700.00	48.0
-150.00	700.00	42.0
-200.00	700.00	42.0
-250.00	700.00	46.0
-300.00	700.00	50.0
-350.00	700.00	40.0
-400.00	700.00	58.0
-450.00	700.00	58.0
-500.00	700.00	62.0
-550.00	700.00	56.0
-600.00	700.00	56.0
-650.00	700.00	54.0
-650.00	750.00	66.0
-600.00	750.00	50.0
-500.00	750.00	50.0
-450.00	750.00	58.0
-400.00	750.00	58.0
-350.00	750.00	52.0
-300.00	750.00	52.0
-250.00	750.00	50.0
-200.00	750.00	52.0

-150.00	750.00	48.0
-100.00	750.00	42.0
-50.00	750.00	44.0
0.00	750.00	46.0
0.00	800.00	42.0
-50.00	800.00	42.0
-100.00	800.00	48.0
-150.00	800.00	48.0
-200.00	800.00	52.0
-250.00	800.00	54.0
-300.00	800.00	52.0
-350.00	800.00	56.0
-400.00	800.00	64.0
-450.00	800.00	64.0
-500.00	800.00	68.0
-550.00	800.00	70.0
-600.00	800.00	62.0
-650.00	800.00	58.0
-400.00	850.00	60.0
-350.00	850.00	58.0
-300.00	850.00	50.0
-250.00	850.00	50.0
-200.00	850.00	50.0
-150.00	850.00	50.0
-100.00	850.00	46.0
-50.00	850.00	44.0
0.00	850.00	48.0

GEOPHYSICAL DATA FOR N-TEAD

TNT WASHOUT AREA

ELECTROMAGNETIC MEASUREMENTS ON JULY 8, 1988

COORDINATES		APPARENT CONDUCTIVITY	
NORTHING (FT.)	EASTING (FT.)	HORIZONTAL COILS (MILLIMHO/METER)	VERTICAL COILS (MILLIMHO/METER)
-900.00	450.00	67.3	79.9
-900.00	475.00	66.6	58.8
-900.00	500.00	68.2	70.3
-900.00	525.00	68.1	69.0
-900.00	550.00	70.6	60.1
-900.00	575.00	69.6	68.9
-900.00	600.00	72.5	63.1
-900.00	625.00	78.2	56.4
-900.00	650.00	81.0	60.5
-900.00	675.00	87.8	74.2
-900.00	700.00	87.0	75.8
-900.00	725.00	83.6	74.6
-900.00	750.00	81.9	53.2
-900.00	775.00	74.5	61.1
-900.00	800.00	70.8	70.5
-900.00	825.00	66.0	80.7
-900.00	850.00	65.2	77.0
-900.00	875.00	66.3	86.1
-900.00	900.00	69.4	87.5
-900.00	925.00	72.8	97.2
-900.00	950.00	77.1	74.3
-900.00	975.00	83.7	66.6
-900.00	1000.00	87.4	105.9
-900.00	1025.00	91.7	60.9
-900.00	1050.00	91.5	94.0
-900.00	1050.00	94.2	93.7
-875.00	450.00	68.6	69.5
-875.00	475.00	70.6	68.1
-875.00	500.00	71.8	64.1
-875.00	525.00	71.7	65.0
-875.00	550.00	70.6	57.4
-875.00	575.00	71.1	73.6
-875.00	600.00	73.2	65.3
-875.00	625.00	77.1	76.5
-875.00	650.00	80.6	48.1
-875.00	675.00	85.9	44.1
-875.00	700.00	88.2	42.9
-875.00	725.00	85.3	51.2
-875.00	750.00	81.8	54.2
-875.00	775.00	78.0	73.0
-875.00	800.00	72.7	72.8
-875.00	825.00	69.7	74.0
-875.00	850.00	67.3	79.2

-875.00	875.00	67.2	76.4
-875.00	900.00	68.8	88.5
-875.00	925.00	72.7	93.0
-875.00	950.00	77.9	78.2
-875.00	975.00	86.6	89.6
-875.00	1000.00	91.8	77.4
-875.00	1025.00	96.7	76.5
-875.00	1050.00	99.7	72.1
-850.00	450.00	69.8	68.0
-850.00	475.00	69.7	65.4
-850.00	500.00	68.9	61.2
-850.00	525.00	68.5	72.8
-850.00	550.00	69.5	59.7
-850.00	575.00	71.0	61.3
-850.00	600.00	73.6	60.1
-850.00	625.00	74.8	66.8
-850.00	650.00	76.0	58.5
-850.00	675.00	78.6	62.4
-850.00	700.00	80.5	58.9
-850.00	725.00	81.0	66.3
-850.00	750.00	81.4	76.4
-850.00	775.00	79.8	57.5
-850.00	800.00	76.5	63.8
-850.00	825.00	73.4	68.2
-850.00	850.00	68.3	69.9
-850.00	875.00	67.7	75.3
-850.00	900.00	68.6	85.6
-850.00	925.00	72.5	91.5
-850.00	950.00	0.0	77.0
-850.00	975.00	86.3	83.9
-850.00	1000.00	94.5	57.6
-850.00	1025.00	101.2	66.9
-850.00	1050.00	107.1	65.6
-825.00	450.00	71.7	71.4
-825.00	475.00	70.1	60.0
-825.00	500.00	70.2	66.4
-825.00	525.00	70.4	65.0
-825.00	550.00	69.3	58.9
-825.00	575.00	70.7	47.9
-825.00	600.00	68.5	65.1
-825.00	625.00	67.1	53.2
-825.00	650.00	67.1	56.1
-825.00	675.00	67.4	66.8
-825.00	700.00	68.9	69.7
-825.00	725.00	69.4	58.4
-825.00	750.00	76.4	59.6
-825.00	775.00	80.8	67.4
-825.00	800.00	82.5	68.2
-825.00	825.00	75.7	65.8
-825.00	850.00	70.9	79.7
-825.00	875.00	73.5	93.1
-825.00	900.00	75.1	68.6
-825.00	925.00	76.5	96.1
-825.00	950.00	82.7	77.3

-825.00	975.00	88.4	56.7
-825.00	1000.00	91.0	77.1
-825.00	1025.00	94.6	114.3
-825.00	1050.00	96.7	78.8
-800.00	450.00	70.3	60.4
-800.00	475.00	69.8	63.0
-800.00	500.00	69.9	52.1
-800.00	525.00	70.4	52.8
-800.00	550.00	71.1	51.7
-800.00	575.00	66.4	45.9
-800.00	600.00	63.8	44.4
-800.00	625.00	58.1	56.2
-800.00	650.00	55.5	67.9
-800.00	675.00	57.7	70.4
-800.00	700.00	61.6	73.8
-800.00	725.00	64.7	53.0
-800.00	750.00	71.9	54.6
-800.00	775.00	77.7	70.4
-800.00	800.00	80.4	70.1
-800.00	825.00	82.5	65.5
-800.00	850.00	77.1	67.9
-800.00	875.00	77.1	84.3
-800.00	900.00	80.0	92.5
-800.00	925.00	81.8	80.6
-800.00	950.00	84.5	79.6
-800.00	975.00	93.4	67.5
-800.00	1000.00	96.6	65.7
-800.00	1025.00	98.4	77.0
-800.00	1050.00	97.4	94.2
-775.00	450.00	68.9	45.8
-775.00	475.00	70.0	60.3
-775.00	500.00	70.9	44.3
-775.00	525.00	61.3	42.8
-775.00	550.00	57.5	58.5
-775.00	575.00	48.6	51.9
-775.00	600.00	44.2	52.3
-775.00	625.00	41.7	58.5
-775.00	650.00	41.2	62.4
-775.00	675.00	43.2	73.4
-775.00	700.00	50.3	66.7
-775.00	725.00	55.7	60.6
-775.00	750.00	62.5	54.3
-775.00	775.00	71.6	67.5
-775.00	800.00	79.0	83.1
-775.00	825.00	81.9	51.0
-775.00	850.00	87.7	79.2
-775.00	875.00	84.8	69.6
-775.00	900.00	81.6	63.4
-775.00	925.00	80.0	89.9
-775.00	950.00	74.5	94.5
-775.00	975.00	80.3	94.3
-775.00	1000.00	88.0	83.9
-775.00	1025.00	99.5	76.3
-775.00	1050.00	108.6	62.8

-750.00	450.00	62.6	52.8
-750.00	475.00	59.4	53.0
-750.00	500.00	53.1	47.9
-750.00	525.00	47.0	61.3
-750.00	550.00	40.3	63.2
-750.00	575.00	36.7	59.4
-750.00	600.00	34.9	53.2
-750.00	625.00	34.5	58.7
-750.00	650.00	36.6	59.1
-750.00	675.00	40.7	71.9
-750.00	700.00	46.0	77.0
-750.00	725.00	54.0	61.7
-750.00	750.00	65.1	43.0
-750.00	775.00	79.6	56.1
-750.00	800.00	89.1	82.8
-750.00	825.00	91.9	69.7
-750.00	850.00	92.2	61.8
-750.00	875.00	86.9	49.9
-750.00	900.00	77.6	82.3
-750.00	925.00	72.2	89.8
-750.00	950.00	66.6	96.2
-750.00	975.00	64.4	87.9
-750.00	1000.00	68.1	100.2
-750.00	1025.00	73.1	94.2
-750.00	1050.00	77.5	53.5
-725.00	450.00	52.9	54.5
-725.00	475.00	46.4	50.1
-725.00	500.00	40.5	56.3
-725.00	525.00	35.3	55.8
-725.00	550.00	33.8	59.6
-725.00	575.00	32.7	59.3
-725.00	600.00	32.3	54.0
-725.00	625.00	32.8	52.2
-725.00	650.00	35.8	53.8
-725.00	675.00	40.1	64.4
-725.00	700.00	47.6	68.7
-725.00	725.00	54.3	59.6
-725.00	750.00	65.1	59.0
-725.00	775.00	76.3	52.2
-725.00	800.00	87.9	48.1
-725.00	825.00	90.3	60.3
-725.00	850.00	87.6	67.8
-725.00	875.00	81.9	62.7
-725.00	900.00	71.7	74.2
-725.00	925.00	68.9	89.2
-725.00	950.00	66.1	82.2
-725.00	975.00	64.9	79.1
-725.00	1000.00	68.1	94.5
-725.00	1025.00	70.4	82.2
-725.00	1050.00	72.0	67.6
-700.00	450.00	51.8	49.9
-700.00	475.00	49.8	45.2
-700.00	500.00	45.5	46.1
-700.00	525.00	41.6	44.8

-700.00	550.00	38.6	50.4
-700.00	575.00	35.4	51.7
-700.00	600.00	35.1	56.6
-700.00	625.00	35.8	51.7
-700.00	650.00	36.5	56.3
-700.00	675.00	39.8	58.4
-700.00	700.00	44.7	70.8
-700.00	725.00	50.8	76.8
-700.00	750.00	58.2	63.7
-700.00	775.00	64.1	45.9
-700.00	800.00	69.6	66.6
-700.00	825.00	69.5	70.2
-700.00	850.00	68.5	77.0
-700.00	875.00	67.1	81.5
-700.00	900.00	66.1	67.7
-700.00	925.00	63.8	76.1
-700.00	950.00	65.0	83.1
-700.00	975.00	65.8	81.6
-700.00	1000.00	71.3	82.9
-700.00	1025.00	75.7	89.1
-700.00	1050.00	79.7	65.8
-675.00	850.00	63.9	89.5
-675.00	875.00	60.1	94.8
-675.00	900.00	58.3	69.9
-675.00	925.00	59.4	79.3
-675.00	950.00	64.0	80.6
-675.00	975.00	65.3	83.7
-675.00	1000.00	69.0	81.2
-675.00	1025.00	75.8	75.8
-675.00	1050.00	79.9	76.7
-650.00	850.00	50.7	99.6
-650.00	875.00	24.7	86.5
-650.00	900.00	42.2	96.1
-650.00	925.00	19.5	99.4
-650.00	950.00	56.9	79.6
-650.00	975.00	63.6	82.8
-650.00	1000.00	65.4	86.3
-650.00	1025.00	69.2	93.7
-650.00	1050.00	75.9	73.0
-625.00	950.00	69.6	94.1
-625.00	975.00	64.4	78.6
-625.00	1000.00	66.7	84.3
-625.00	1025.00	72.0	75.8
-625.00	1050.00	78.3	65.1
-600.00	925.00	34.3	99.4
-600.00	950.00	63.3	95.8
-600.00	975.00	63.5	78.8
-600.00	1000.00	65.5	74.7
-600.00	1025.00	70.4	87.4
-600.00	1050.00	76.7	71.3
-575.00	850.00	61.2	84.1
-575.00	875.00	66.4	86.4
-575.00	900.00	63.6	96.6
-575.00	925.00	69.7	95.1

-575.00	950.00	68.0	85.0
-575.00	975.00	65.7	70.0
-575.00	1000.00	69.4	94.7
-575.00	1025.00	71.2	88.9
-575.00	1050.00	71.7	90.7
-550.00	850.00	69.6	73.0
-550.00	875.00	68.8	73.0
-550.00	900.00	73.5	96.3
-550.00	925.00	70.8	87.3
-550.00	950.00	75.6	74.7
-550.00	975.00	71.5	61.6
-550.00	1000.00	71.0	78.3
-550.00	1025.00	72.4	84.0
-550.00	1050.00	71.8	80.7
-525.00	850.00	72.9	71.3
-525.00	875.00	74.1	77.0
-525.00	900.00	75.8	73.9
-525.00	925.00	79.3	77.1
-525.00	950.00	77.4	65.2
-525.00	975.00	74.1	66.1
-525.00	1000.00	71.5	71.3
-525.00	1025.00	70.4	84.6
-525.00	1050.00	72.5	87.9
-500.00	850.00	73.7	69.3
-500.00	875.00	78.1	72.8
-500.00	900.00	77.0	78.2
-500.00	925.00	78.4	79.1
-500.00	950.00	78.1	67.1
-500.00	975.00	75.9	62.6
-500.00	1000.00	72.4	62.3
-500.00	1025.00	69.7	71.1
-500.00	1050.00	68.2	95.1
-475.00	850.00	67.0	63.8
-475.00	875.00	72.3	64.8
-475.00	900.00	74.7	71.8
-475.00	925.00	77.9	57.2
-475.00	950.00	78.0	54.9
-475.00	975.00	73.8	62.7
-475.00	1000.00	72.1	81.4
-475.00	1025.00	64.7	80.2
-475.00	1050.00	61.7	95.8
-450.00	850.00	58.9	62.7
-450.00	875.00	62.2	60.0
-450.00	900.00	66.7	65.0
-450.00	925.00	68.0	66.8
-450.00	950.00	68.1	73.6
-450.00	975.00	65.0	72.6
-450.00	1000.00	63.7	67.6
-450.00	1025.00	61.3	81.6
-450.00	1050.00	60.5	81.6→

GEOPHYSICAL DATA FOR N-TEAD

SANITARY LANDFILL

ELECTROMAGNETIC MEASUREMENTS ON FEBRUARY 19, 1988

COORDINATES		APPARENT CONDUCTIVITY
NORTHING (FT.)	EASTING (FT.)	HORIZONTAL COILS (MILLIMHO/METER)
-50.00	-150.00	8.6
-50.00	-200.00	8.6
-50.00	-250.00	10.0
-50.00	-300.00	12.0
-50.00	-350.00	9.0
-50.00	-400.00	6.4
-50.00	-450.00	18.0
-50.00	-500.00	10.0
-150.00	-1050.00	7.7
-150.00	-1000.00	8.4
-150.00	-950.00	8.3
-150.00	-900.00	7.6
-150.00	-850.00	6.4
-150.00	-800.00	5.4
-150.00	-750.00	12.0
-150.00	-700.00	6.5
-150.00	-650.00	10.0
-150.00	-600.00	8.2
-150.00	-550.00	11.0
-150.00	-500.00	46.0
-150.00	-450.00	19.0
-150.00	-400.00	10.0
-150.00	-350.00	9.0
-150.00	-300.00	8.7
-150.00	-250.00	14.0
-150.00	-200.00	13.0
-150.00	-150.00	9.0
-150.00	-100.00	8.0
-150.00	-50.00	9.0
-150.00	0.00	9.0
-250.00	0.00	9.0
-250.00	-50.00	9.7
-250.00	-100.00	10.0
-250.00	-150.00	10.0
-250.00	-200.00	11.0
-250.00	-250.00	12.0
-250.00	-300.00	10.0
-250.00	-350.00	10.0
-250.00	-400.00	9.0
-250.00	-450.00	9.0
-250.00	-500.00	14.0

-250.00	-550.00	300.0
-250.00	-600.00	10.0
-250.00	-650.00	8.0
-250.00	-700.00	6.3
-250.00	-750.00	6.3
-250.00	-800.00	8.2
-250.00	-850.00	4.8
-250.00	-900.00	300.0
-250.00	-950.00	6.0
-250.00	-1000.00	7.0
-250.00	-1050.00	6.8
-250.00	-1100.00	6.7
-350.00	-1150.00	5.8
-350.00	-1100.00	5.9
-350.00	-1050.00	6.5
-350.00	-1000.00	5.6
-350.00	-950.00	6.8
-350.00	-900.00	3.2
-350.00	-850.00	2.2
-350.00	-800.00	8.6
-350.00	-750.00	8.2
-350.00	-700.00	5.5
-350.00	-650.00	1.2
-350.00	-600.00	300.0
-350.00	-550.00	6.2
-350.00	-500.00	7.2
-350.00	-450.00	9.2
-350.00	-400.00	16.0
-350.00	-350.00	8.0
-350.00	-300.00	7.8
-350.00	-250.00	8.0
-350.00	-200.00	8.8
-350.00	-150.00	8.4
-350.00	-100.00	9.3
-350.00	-50.00	7.4
-350.00	0.00	7.0
-450.00	0.00	4.6
-450.00	-50.00	4.5
-450.00	-100.00	5.3
-450.00	-150.00	6.0
-450.00	-200.00	6.8
-450.00	-250.00	5.8
-450.00	-300.00	5.4
-450.00	-350.00	5.8
-450.00	-400.00	5.5
-450.00	-450.00	6.3
-450.00	-500.00	5.6
-450.00	-550.00	6.6
-450.00	-600.00	7.5
-450.00	-650.00	44.0
-450.00	-700.00	22.0
-450.00	-750.00	7.4
-450.00	-800.00	5.5
-450.00	-850.00	5.4

-450.00	-900.00	6.0
-450.00	-950.00	5.3
-450.00	-1000.00	5.2
-450.00	-1050.00	5.0
-450.00	-1100.00	5.0
-450.00	-1150.00	5.9
-450.00	-1200.00	5.8
-550.00	-1250.00	6.0
-550.00	-1200.00	6.4
-550.00	-1150.00	7.0
-550.00	-1100.00	6.0
-550.00	-1050.00	6.0
-550.00	-1000.00	7.0
-550.00	-950.00	300.0
-550.00	-900.00	6.8
-550.00	-850.00	6.6
-550.00	-800.00	6.4
-550.00	-750.00	300.0
-550.00	-700.00	12.0
-550.00	-650.00	10.0
-550.00	-600.00	5.2
-550.00	-550.00	5.2
-550.00	-500.00	4.4
-550.00	-450.00	4.2
-550.00	-400.00	4.2
-550.00	-350.00	4.6
-550.00	-300.00	4.0
-550.00	-250.00	4.8
-550.00	-200.00	4.0
-550.00	-150.00	3.8
-550.00	-100.00	3.6
-550.00	-50.00	3.3
-550.00	0.00	2.8
-650.00	0.00	3.0
-650.00	-50.00	2.7
-650.00	-100.00	2.9
-650.00	-150.00	2.7
-650.00	-200.00	3.0
-650.00	-250.00	3.0
-650.00	-300.00	3.0
-650.00	-350.00	3.0
-650.00	-400.00	3.4
-650.00	-450.00	3.2
-650.00	-500.00	3.2
-650.00	-550.00	4.6
-650.00	-600.00	4.3
-650.00	-650.00	4.5
-650.00	-700.00	18.0
-650.00	-750.00	4.7
-650.00	-800.00	300.0
-650.00	-850.00	300.0
-650.00	-900.00	5.2
-650.00	-950.00	2.2
-650.00	-1000.00	5.2

-650.00	-1050.00	5.8
-650.00	-1100.00	6.7
-650.00	-1150.00	5.6
-650.00	-1200.00	5.2
-650.00	-1250.00	6.0
-650.00	-1300.00	6.3
-750.00	-1350.00	7.3
-750.00	-1300.00	6.4
-750.00	-1250.00	6.0
-750.00	-1200.00	4.6
-750.00	-1150.00	5.4
-750.00	-1100.00	300.0
-750.00	-1050.00	1.8
-750.00	-1000.00	4.4
-750.00	-950.00	5.4
-750.00	-900.00	8.2
-750.00	-850.00	300.0
-750.00	-800.00	6.6
-750.00	-750.00	300.0
-750.00	-700.00	4.2
-750.00	-650.00	3.6
-750.00	-600.00	3.4
-750.00	-550.00	3.6
-750.00	-500.00	3.4
-750.00	-450.00	3.4
-750.00	-400.00	3.4
-750.00	-350.00	2.7
-750.00	-300.00	2.6
-750.00	-250.00	2.7
-750.00	-200.00	2.6
-750.00	-150.00	3.0
-750.00	-100.00	2.7
-750.00	-50.00	2.6
-750.00	0.00	2.8
-850.00	0.00	3.0
-850.00	-50.00	2.9
-850.00	-100.00	3.1
-850.00	-150.00	3.1
-850.00	-200.00	3.3
-850.00	-250.00	2.8
-850.00	-300.00	2.9
-850.00	-350.00	3.3
-850.00	-400.00	3.4
-850.00	-450.00	3.8
-850.00	-500.00	3.8
-850.00	-550.00	3.9
-850.00	-600.00	3.6
-850.00	-650.00	4.0
-850.00	-700.00	3.8
-850.00	-750.00	4.0
-850.00	-800.00	300.0
-850.00	-850.00	17.0
-850.00	-900.00	300.0
-850.00	-950.00	27.5

-850.00	-1000.00	5.4
-850.00	-1050.00	4.0
-850.00	-1100.00	6.3
-850.00	-1150.00	13.5
-850.00	-1200.00	3.7
-850.00	-1250.00	5.4
-850.00	-1300.00	9.2
-850.00	-1350.00	17.5
-950.00	-1050.00	5.8
-950.00	-1000.00	300.0
-950.00	-950.00	13.5
-950.00	-900.00	5.4
-950.00	-850.00	4.8
-950.00	-800.00	4.2
-950.00	-750.00	4.5
-950.00	-700.00	4.3
-950.00	-650.00	4.1
-950.00	-600.00	4.8
-950.00	-550.00	4.2
-950.00	-500.00	4.0
-950.00	-450.00	3.9
-950.00	-400.00	3.8
-950.00	-350.00	3.3
-950.00	-300.00	3.6
-950.00	-250.00	3.7
-950.00	-200.00	3.8
-950.00	-150.00	3.8
-950.00	-100.00	3.8
-950.00	-50.00	3.7
-950.00	0.00	3.6→

GEOPHYSICAL DATA FOR N-TEAD

SANITARY LANDFILL

ELECTROMAGNETIC MEASUREMENTS ON JULY 7, 1988

COORDINATES		APPARENT CONDUCTIVITY	
NORTHING (FT.)	EASTING (FT.)	HORIZONTAL COILS (MILLIMHO/METER)	VERTICAL COILS (MILLIMHO/METER)
-1250.00	-1300.00	33.8	48.9
-1250.00	-1275.00	31.0	49.6
-1250.00	-1250.00	28.9	43.8
-1250.00	-1225.00	27.2	40.4
-1250.00	-1200.00	26.7	38.4
-1250.00	-1175.00	25.4	35.4
-1250.00	-1150.00	25.0	33.0
-1250.00	-1125.00	24.7	37.5
-1250.00	-1100.00	25.4	35.7
-1250.00	-1075.00	24.9	32.7
-1250.00	-1050.00	23.3	28.3
-1250.00	-1025.00	22.9	29.0
-1250.00	-1000.00	22.6	24.0
-1250.00	-975.00	23.1	26.4
-1250.00	-950.00	23.3	25.8
-1250.00	-925.00	23.1	25.4
-1250.00	-900.00	23.9	26.7
-1250.00	-875.00	25.1	27.4
-1250.00	-850.00	26.5	27.6
-1250.00	-825.00	26.5	28.5
-1250.00	-800.00	27.1	29.2
-1250.00	-775.00	27.9	32.0
-1250.00	-750.00	28.1	42.2
-1225.00	-775.00	32.2	64.1
-1225.00	-800.00	23.7	29.2
-1225.00	-825.00	22.8	23.7
-1225.00	-850.00	20.9	20.9
-1225.00	-875.00	19.6	20.9
-1225.00	-900.00	19.5	20.2
-1225.00	-925.00	20.4	20.9
-1225.00	-950.00	20.7	20.8
-1225.00	-975.00	20.7	21.4
-1225.00	-1000.00	20.7	22.5
-1225.00	-1025.00	22.0	25.8
-1225.00	-1050.00	25.1	25.5
-1225.00	-1075.00	25.8	30.7
-1225.00	-1100.00	25.6	32.9
-1225.00	-1125.00	25.7	33.5
-1225.00	-1150.00	25.3	34.6
-1225.00	-1175.00	27.1	33.9
-1225.00	-1200.00	29.2	37.7

-1225.00	-1225.00	32.0	41.1
-1225.00	-1250.00	33.6	44.4
-1225.00	-1275.00	36.2	49.7
-1225.00	-1300.00	38.2	55.3
-1200.00	-1300.00	40.8	58.5
-1200.00	-1275.00	37.6	46.6
-1200.00	-1250.00	36.2	41.6
-1200.00	-1225.00	33.2	32.9
-1200.00	-1200.00	28.7	35.7
-1200.00	-1175.00	25.8	32.4
-1200.00	-1150.00	26.3	32.1
-1200.00	-1125.00	29.4	32.0
-1200.00	-1100.00	31.3	27.9
-1200.00	-1075.00	27.4	27.3
-1200.00	-1050.00	24.4	17.1
-1200.00	-1025.00	20.0	19.1
-1200.00	-1000.00	16.9	19.7
-1200.00	-975.00	14.6	19.5
-1200.00	-950.00	13.5	20.6
-1200.00	-925.00	14.3	20.5
-1200.00	-900.00	15.1	19.7
-1200.00	-875.00	14.2	20.6
-1200.00	-850.00	14.1	24.4
-1200.00	-825.00	14.3	41.9
-1175.00	-875.00	13.1	30.0
-1175.00	-900.00	14.0	19.6
-1175.00	-925.00	13.5	17.8
-1175.00	-950.00	13.4	17.5
-1175.00	-975.00	13.3	17.0
-1175.00	-1000.00	13.5	17.6
-1175.00	-1025.00	14.4	20.3
-1175.00	-1050.00	17.2	18.4
-1175.00	-1075.00	24.1	17.8
-1175.00	-1100.00	27.7	18.7
-1175.00	-1125.00	28.4	25.8
-1175.00	-1150.00	25.9	28.4
-1175.00	-1175.00	25.2	26.7
-1175.00	-1200.00	25.8	30.3
-1175.00	-1225.00	25.7	37.4
-1175.00	-1250.00	28.4	42.5
-1175.00	-1275.00	33.2	43.2
-1175.00	-1300.00	38.8	52.8
-1150.00	-1300.00	34.4	41.5
-1150.00	-1275.00	28.7	40.5
-1150.00	-1250.00	25.4	35.0
-1150.00	-1225.00	25.0	28.1
-1150.00	-1200.00	24.5	24.4
-1150.00	-1175.00	23.1	22.1
-1150.00	-1150.00	23.2	21.0
-1150.00	-1125.00	21.8	18.0
-1150.00	-1100.00	19.2	14.8
-1150.00	-1075.00	14.6	18.1
-1150.00	-1050.00	12.8	3460.0
-1150.00	-1025.00	12.4	16.5

-1150.00	-1000.00	11.9	15.7
-1150.00	-975.00	12.2	16.5
-1150.00	-950.00	12.5	17.3
-1150.00	-925.00	12.4	22.2
-1150.00	-900.00	19.6	52.3
-1125.00	-950.00	15.8	39.8
-1125.00	-975.00	12.0	18.6
-1125.00	-1000.00	11.5	16.2
-1125.00	-1025.00	11.8	15.8
-1125.00	-1050.00	11.9	15.5
-1125.00	-1075.00	12.0	16.2
-1125.00	-1100.00	13.1	45.3
-1125.00	-1125.00	17.1	21.6
-1125.00	-1150.00	20.2	13.2
-1125.00	-1175.00	20.5	17.1
-1125.00	-1200.00	19.6	20.8
-1125.00	-1225.00	20.8	21.2
-1125.00	-1250.00	22.5	26.0
-1125.00	-1275.00	26.2	32.7
-1125.00	-1300.00	30.2	34.1
-1100.00	-1300.00	26.7	33.1
-1100.00	-1275.00	22.6	24.2
-1100.00	-1250.00	19.2	21.9
-1100.00	-1225.00	16.6	19.2
-1100.00	-1200.00	15.7	17.7
-1100.00	-1175.00	14.3	14.7
-1100.00	-1150.00	12.5	15.4
-1100.00	-1125.00	11.9	12.0
-1100.00	-1100.00	10.9	15.0
-1100.00	-1075.00	11.3	14.9
-1100.00	-1050.00	11.3	14.6
-1100.00	-1025.00	11.8	17.3
-1100.00	-1000.00	11.3	25.7
-1100.00	-975.00	19.9	64.7
-1075.00	-1025.00	9.4	55.9
-1075.00	-1050.00	10.6	20.4
-1075.00	-1075.00	5.5	-50.0
-1075.00	-1100.00	12.2	16.3
-1075.00	-1125.00	10.8	15.2
-1075.00	-1150.00	10.4	14.2
-1075.00	-1175.00	11.3	14.3
-1075.00	-1200.00	12.3	14.4
-1075.00	-1225.00	14.4	17.6
-1075.00	-1250.00	18.0	17.0
-1075.00	-1275.00	20.7	17.2
-1075.00	-1300.00	22.6	27.7
-1050.00	-1300.00	19.0	15.6
-1050.00	-1275.00	16.2	15.4
-1050.00	-1250.00	12.8	15.9
-1050.00	-1225.00	11.7	14.7
-1050.00	-1200.00	11.1	14.1
-1050.00	-1175.00	10.5	13.9
-1050.00	-1150.00	-4.1	40.0
-1050.00	-1125.00	0.9	25.5

-1050.00	-1100.00	11.7	24.8
-1050.00	-1075.00	12.7	27.9
-1025.00	-1100.00	28.4	62.3
-1025.00	-1125.00	11.5	19.9
-1025.00	-1150.00	10.6	15.2
-1025.00	-1175.00	11.2	14.8
-1025.00	-1200.00	10.9	13.7
-1025.00	-1225.00	10.8	13.8
-1025.00	-1250.00	10.6	14.5
-1025.00	-1275.00	10.8	3200.0
-1025.00	-1300.00	12.3	16.8
-1000.00	-1300.00	11.5	15.3
-1000.00	-1275.00	10.9	14.1
-1000.00	-1250.00	10.6	13.5
-1000.00	-1225.00	10.1	13.4
-1000.00	-1200.00	10.0	13.8
-1000.00	-1175.00	10.3	15.3
-1000.00	-1150.00	10.9	29.3
-975.00	-1175.00	19.8	90.7
-975.00	-1200.00	9.7	21.3
-975.00	-1225.00	10.3	14.5
-975.00	-1250.00	10.0	13.6
-975.00	-1275.00	10.0	13.7
-975.00	-1300.00	10.2	14.0
-950.00	-1300.00	10.8	13.3
-950.00	-1275.00	10.0	14.2
-950.00	-1250.00	10.1	18.4
-950.00	-1225.00	11.4	46.7
-925.00	-1275.00	15.6	41.3
-925.00	-1300.00	10.7	17.5
-900.00	-650.00	3.7	5.2
-900.00	-675.00	3.9	5.1
-900.00	-700.00	3.8	5.1
-900.00	-725.00	4.0	5.4
-900.00	-750.00	4.1	5.0
-900.00	-775.00	3.7	5.2
-900.00	-800.00	4.2	4.7
-900.00	-825.00	4.5	6.1
-900.00	-850.00	2.8	11.7
-900.00	-875.00	2.7	-0.6
-900.00	-900.00	4.1	-8.6
-900.00	-925.00	6.0	1.7
-900.00	-950.00	4.9	-6.7
-900.00	-975.00	5.7	25.1
-900.00	-1000.00	4.4	8.5
-900.00	-1025.00	4.5	7.0
-900.00	-1050.00	4.8	6.9
-900.00	-1075.00	5.0	7.1
-900.00	-1100.00	5.5	2.4
-900.00	-1125.00	6.7	6.9
-900.00	-1150.00	5.5	4.2
-900.00	-1175.00	5.8	960.0
-900.00	-1200.00	5.6	8.6
-900.00	-1225.00	5.2	10.6

-900.00	-1250.00	5.9		20.3
-900.00	-1275.00	-3.0		74.5
-925.00	-1225.00	-4.0		56.6
-925.00	-1200.00	4.1		18.5
-925.00	-1175.00	4.1		11.4
-925.00	-1150.00	2.4		11.7
-925.00	-1125.00	5.2		6.9
-925.00	-1100.00	4.7		6.0
-925.00	-1075.00	5.1		5.5
-925.00	-1050.00	4.7		6.8
-925.00	-1025.00	5.6		4.4
-925.00	-1000.00	6.6		10.9
-925.00	-975.00	4.8		-14.8
-925.00	-950.00	2.6		27.6
-925.00	-925.00	5.1		8.9
-925.00	-900.00	4.0		8.9
-925.00	-875.00	2.5		8.5
-925.00	-850.00	4.6		6.3
-925.00	-825.00	4.5		5.5
-925.00	-800.00	4.1		5.3
-925.00	-775.00	4.0		5.1
-925.00	-750.00	4.3		5.1
-925.00	-725.00	4.3		5.3
-925.00	-700.00	4.3		5.1
-925.00	-675.00	4.3		5.2
-925.00	-650.00	4.1		5.6
-950.00	-650.00	4.8		6.2
-950.00	-675.00	4.4		5.1
-950.00	-700.00	4.6		5.7
-950.00	-725.00	4.9		6.0
-950.00	-750.00	4.7		6.0
-950.00	-775.00	4.9		5.7
-950.00	-800.00	5.3		6.7
-950.00	-825.00	5.2		6.4
-950.00	-850.00	5.3		7.1
-950.00	-875.00	5.5		6.4
-950.00	-900.00	5.5		6.3
-950.00	-925.00	5.9		4.9
-950.00	-950.00	7.4		16.6
-950.00	-975.00	3.7	-18.9	
-950.00	-1000.00	8.1	-14.7	
-950.00	-1025.00	6.5		10.7
-950.00	-1050.00	6.2		6.9
-950.00	-1075.00	5.9		8.8
-950.00	-1100.00	4.2		10.3
-950.00	-1125.00	6.0		11.4
-950.00	-1150.00	6.5		12.1
-950.00	-1175.00	5.4		33.4
-975.00	-1125.00	8.6		3.6
-975.00	-1100.00	5.8		11.2
-975.00	-1075.00	8.2		10.1
-975.00	-1050.00	7.7		9.9
-975.00	-1025.00	17.0		4.3
-975.00	-1000.00	9.8	-160.0	

-975.00	-975.00	7.9	16.0
-975.00	-950.00	4.9	16.2
-975.00	-925.00	6.1	8.7
-975.00	-900.00	6.2	8.1
-975.00	-875.00	5.9	7.8
-975.00	-850.00	6.2	7.6
-975.00	-825.00	6.7	7.7
-975.00	-800.00	6.2	8.1
-975.00	-775.00	5.9	7.3
-975.00	-750.00	5.8	7.2
-975.00	-725.00	5.8	7.3
-975.00	-700.00	5.6	7.0
-975.00	-675.00	5.8	7.2
-975.00	-650.00	6.0	6.9
-1000.00	-650.00	6.3	9.5
-1000.00	-675.00	8.0	10.1
-1000.00	-700.00	8.3	10.3
-1000.00	-725.00	8.1	9.3
-1000.00	-750.00	8.3	9.9
-1000.00	-775.00	8.0	9.4
-1000.00	-800.00	8.3	14.1
-1000.00	-825.00	12.4	14.3
-1000.00	-850.00	12.5	13.9
-1000.00	-875.00	12.3	14.9
-1000.00	-900.00	12.0	13.9
-1000.00	-925.00	12.3	13.6
-1000.00	-950.00	11.7	13.9
-1000.00	-975.00	11.9	14.1
-1000.00	-1000.00	11.9	22.6
-1000.00	-1025.00	10.2	5.0
-1000.00	-1050.00	8.9	23.9
-1000.00	-1075.00	11.7	21.7
-1000.00	-1100.00	22.2	56.6
-1025.00	-1050.00	10.3	34.5
-1025.00	-1025.00	12.0	28.7
-1025.00	-1000.00	12.3	16.8
-1025.00	-975.00	12.0	15.5
-1025.00	-950.00	12.1	14.1
-1025.00	-925.00	12.0	13.8
-1025.00	-900.00	12.0	13.3
-1025.00	-875.00	11.8	13.8
-1025.00	-850.00	11.4	13.2
-1025.00	-825.00	11.7	13.3
-1025.00	-800.00	11.1	12.9
-1025.00	-775.00	10.9	12.2
-1025.00	-750.00	11.1	12.3
-1025.00	-725.00	11.0	11.8
-1025.00	-700.00	10.8	11.9
-1025.00	-675.00	10.5	12.2
-1025.00	-650.00	10.8	12.1
-1050.00	-650.00	11.3	12.0
-1050.00	-675.00	11.1	12.6
-1050.00	-700.00	10.8	12.8
-1050.00	-725.00	10.7	13.2

-1050.00	-750.00	10.8	12.3
-1050.00	-775.00	11.4	13.0
-1050.00	-800.00	11.2	13.4
-1050.00	-825.00	10.9	13.1
-1050.00	-850.00	11.1	13.4
-1050.00	-875.00	11.3	13.8
-1050.00	-900.00	11.9	13.7
-1050.00	-925.00	11.8	14.7
-1050.00	-950.00	11.2	15.2
-1050.00	-975.00	11.5	17.4
-1050.00	-1000.00	11.6	23.9
-1075.00	-975.00	9.0	56.0
-1075.00	-950.00	11.8	21.2
-1075.00	-925.00	11.4	15.9
-1075.00	-900.00	11.3	13.9
-1075.00	-875.00	11.2	13.6
-1075.00	-850.00	11.1	13.2
-1075.00	-825.00	11.2	12.8
-1075.00	-800.00	10.5	12.9
-1075.00	-775.00	10.6	12.2
-1075.00	-750.00	10.7	11.7
-1075.00	-725.00	10.2	12.3
-1075.00	-700.00	10.3	11.5
-1075.00	-675.00	10.1	11.9
-1075.00	-650.00	9.9	11.5
-1100.00	-650.00	10.1	11.9
-1100.00	-675.00	9.9	11.8
-1100.00	-700.00	10.2	12.1
-1100.00	-725.00	10.5	12.4
-1100.00	-750.00	10.5	12.0
-1100.00	-775.00	10.9	13.2
-1100.00	-800.00	9.9	13.1
-1100.00	-825.00	11.0	13.3
-1100.00	-850.00	10.6	13.5
-1100.00	-875.00	10.9	14.7
-1100.00	-900.00	11.0	16.7
-1100.00	-925.00	10.9	26.8
-1125.00	-900.00	31.6	70.1
-1125.00	-875.00	11.2	22.0
-1125.00	-850.00	11.7	16.5
-1125.00	-825.00	11.1	14.0
-1125.00	-800.00	11.3	13.5
-1125.00	-775.00	10.5	13.3
-1125.00	-750.00	10.6	12.7
-1125.00	-725.00	10.8	13.1
-1125.00	-700.00	10.6	12.8
-1125.00	-675.00	11.0	12.4
-1125.00	-650.00	10.5	12.4
-1150.00	-650.00	10.7	13.9
-1150.00	-675.00	11.4	13.9
-1150.00	-700.00	11.2	12.8
-1150.00	-725.00	11.2	13.1
-1150.00	-750.00	11.3	13.8
-1150.00	-775.00	11.1	14.7

-1150.00	-800.00	11.9	15.4
-1150.00	-825.00	11.5	18.9
-1150.00	-850.00	11.7	35.0
-1175.00	-800.00	11.9	28.7
-1175.00	-775.00	11.2	18.3
-1175.00	-750.00	11.9	16.5
-1175.00	-725.00	11.2	15.2
-1175.00	-700.00	11.2	14.6
-1175.00	-675.00	11.5	13.9
-1175.00	-650.00	11.7	14.7
-1200.00	-650.00	8.5	13.8
-1200.00	-675.00	8.4	14.8
-1200.00	-700.00	6.7	14.7
-1200.00	-725.00	7.0	13.2
-1200.00	-750.00	7.7	20.4
-1225.00	-725.00	18.5	40.3
-1225.00	-700.00	18.2	16.8
-1225.00	-675.00	17.6	16.1
-1225.00	-650.00	17.4	13.0
-1250.00	-650.00	20.8	26.8
-1250.00	-675.00	21.4	39.2

GEOPHYSICAL DATA FOR N-TEAD

SANITARY LANDFILL

MAGNETIC MEASUREMENTS ON FEBRUARY 19, 1988

COORDINATES		
NORTHING (FT.)	EASTING (FT.)	TOTAL FIELD INTENSITY (GAMMAS)
0.00	-250.00	54108.4
0.00	-300.00	53998.0
0.00	-350.00	55504.0
0.00	-400.00	54138.6
0.00	-450.00	54066.3
0.00	-500.00	54008.1
-50.00	-500.00	54084.8
-50.00	-450.00	54093.2
-50.00	-400.00	54316.0
-50.00	-350.00	53061.0
-50.00	-300.00	55344.0
-50.00	-250.00	54072.3
-50.00	-200.00	53977.1
-50.00	-150.00	53972.6
-100.00	-150.00	54035.6
-100.00	-200.00	54065.2
-100.00	-250.00	53865.5
-100.00	-300.00	53989.6
-100.00	-350.00	54006.0
-100.00	-400.00	54070.9
-100.00	-450.00	54037.8
-100.00	-500.00	54132.3
-150.00	-1050.00	54086.9
-150.00	-1000.00	54095.2
-150.00	-950.00	54083.2
-150.00	-900.00	54035.2
-150.00	-850.00	54060.8
-150.00	-800.00	54248.0
-150.00	-750.00	54145.2
-150.00	-700.00	54151.4
-150.00	-650.00	54087.9
-150.00	-600.00	54124.1
-150.00	-550.00	54087.2
-150.00	-500.00	54089.8
-150.00	-450.00	54007.7
-150.00	-400.00	54085.3
-150.00	-350.00	54061.1
-150.00	-300.00	53724.0
-150.00	-250.00	54625.2
-150.00	-200.00	54928.2
-150.00	-150.00	53987.4
-150.00	-100.00	54064.4

-150.00	-50.00	54067.7
-150.00	0.00	54079.4
-200.00	0.00	54078.5
-200.00	-50.00	54076.6
-200.00	-100.00	54058.3
-200.00	-150.00	54047.0
-200.00	-200.00	54027.4
-200.00	-250.00	54787.0
-200.00	-300.00	54055.5
-200.00	-350.00	54046.3
-200.00	-400.00	54113.9
-200.00	-450.00	54141.2
-200.00	-500.00	54077.2
-200.00	-550.00	54047.4
-200.00	-600.00	54072.7
-200.00	-650.00	53962.2
-200.00	-700.00	54111.3
-200.00	-750.00	54075.7
-200.00	-800.00	53911.8
-200.00	-850.00	54019.1
-200.00	-900.00	54049.7
-200.00	-950.00	54586.0
-200.00	-1000.00	54081.0
-200.00	-1050.00	54083.3
-200.00	-1100.00	54084.8
-250.00	-1100.00	54085.9
-250.00	-1050.00	54089.2
-250.00	-1000.00	54168.1
-250.00	-950.00	54254.2
-250.00	-900.00	53712.8
-250.00	-850.00	54122.5
-250.00	-800.00	54277.6
-250.00	-750.00	54092.3
-250.00	-700.00	54190.2
-250.00	-650.00	53982.8
-250.00	-600.00	54091.1
-250.00	-550.00	54069.0
-250.00	-500.00	54106.9
-250.00	-450.00	54042.2
-250.00	-400.00	54018.1
-250.00	-350.00	53990.9
-250.00	-300.00	54042.5
-250.00	-250.00	53970.8
-250.00	-200.00	54055.0
-250.00	-150.00	54070.1
-250.00	-100.00	54076.5
-250.00	-50.00	54082.7
-250.00	0.00	54083.7
-300.00	0.00	54085.8
-300.00	-50.00	54085.7
-300.00	-100.00	54083.8
-300.00	-150.00	54080.2
-300.00	-200.00	54072.9
-300.00	-250.00	53999.9

-300.00	-300.00	54016.0
-300.00	-350.00	54083.0
-300.00	-400.00	54054.6
-300.00	-450.00	53959.7
-300.00	-500.00	54057.3
-300.00	-550.00	54051.9
-300.00	-600.00	54142.1
-300.00	-650.00	54012.8
-300.00	-700.00	54074.0
-300.00	-750.00	54142.3
-300.00	-800.00	53977.6
-300.00	-850.00	54110.1
-300.00	-900.00	53998.7
-300.00	-950.00	54145.5
-300.00	-1000.00	54224.7
-300.00	-1050.00	54104.9
-300.00	-1100.00	54084.2
-300.00	-1150.00	54082.9
-350.00	-1150.00	54082.2
-350.00	-1100.00	54083.7
-350.00	-1050.00	54164.5
-350.00	-1000.00	54172.3
-350.00	-950.00	54046.6
-350.00	-900.00	54024.2
-350.00	-850.00	54412.2
-350.00	-800.00	54008.9
-350.00	-750.00	54044.2
-350.00	-700.00	53906.6
-350.00	-650.00	54073.2
-350.00	-600.00	54080.3
-350.00	-550.00	54121.6
-350.00	-500.00	54112.2
-350.00	-450.00	54079.6
-350.00	-400.00	52064.0
-350.00	-350.00	54063.3
-350.00	-300.00	54064.9
-350.00	-250.00	54068.8
-350.00	-200.00	54074.9
-350.00	-150.00	54078.3
-350.00	-100.00	54080.1
-350.00	-50.00	54080.4
-350.00	0.00	54079.4
-400.00	0.00	54079.7
-400.00	-50.00	54076.6
-400.00	-100.00	54076.3
-400.00	-150.00	54077.7
-400.00	-200.00	54075.2
-400.00	-250.00	54073.9
-400.00	-300.00	54066.1
-400.00	-350.00	54028.1
-400.00	-400.00	53928.8
-400.00	-450.00	55110.0
-400.00	-500.00	54034.8
-400.00	-550.00	54023.7

-400.00	-600.00	54060.0
-400.00	-650.00	54058.1
-400.00	-700.00	54073.1
-400.00	-750.00	54070.3
-400.00	-800.00	54076.3
-400.00	-850.00	54268.8
-400.00	-900.00	54156.6
-400.00	-950.00	54115.0
-400.00	-1000.00	54004.0
-400.00	-1050.00	54037.9
-400.00	-1100.00	54087.8
-400.00	-1150.00	54070.4
-400.00	-1200.00	54071.2
-450.00	-1200.00	54070.3
-450.00	-1150.00	54072.5
-450.00	-1100.00	54128.1
-450.00	-1050.00	54167.3
-450.00	-1000.00	54009.7
-450.00	-950.00	54003.2
-450.00	-900.00	54368.0
-450.00	-850.00	54174.1
-450.00	-800.00	54056.4
-450.00	-750.00	54010.0
-450.00	-700.00	54083.8
-450.00	-650.00	53966.3
-450.00	-600.00	54116.4
-450.00	-550.00	54436.0
-450.00	-500.00	54075.5
-450.00	-450.00	54095.9
-450.00	-400.00	54050.0
-450.00	-350.00	54052.6
-450.00	-300.00	54063.5
-450.00	-250.00	54066.6
-450.00	-200.00	54120.8
-450.00	-150.00	54122.9
-450.00	-100.00	54111.9
-450.00	-50.00	54087.2
-450.00	0.00	54071.0
-500.00	0.00	54072.4
-500.00	-50.00	54071.6
-500.00	-100.00	54071.8
-500.00	-150.00	54073.0
-500.00	-200.00	54069.7
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-500.00	-300.00	54067.9
-500.00	-350.00	54065.2
-500.00	-400.00	54066.6
-500.00	-450.00	54068.1
-500.00	-500.00	54070.0
-500.00	-550.00	54060.5
-500.00	-600.00	54010.0
-500.00	-650.00	53949.7
-500.00	-700.00	54103.2
-500.00	-750.00	54084.9

-500.00	-800.00	54007.7
-500.00	-850.00	54152.3
-500.00	-900.00	54028.0
-500.00	-950.00	54187.7
-500.00	-1000.00	54069.4
-500.00	-1050.00	54172.2
-500.00	-1100.00	54042.8
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-550.00	-1250.00	54063.7
-550.00	-1200.00	54064.4
-550.00	-1150.00	54302.0
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-550.00	-1050.00	54023.4
-550.00	-1000.00	54021.3
-550.00	-950.00	53921.9
-550.00	-900.00	54042.8
-550.00	-850.00	53943.2
-550.00	-800.00	54057.0
-550.00	-750.00	54031.4
-550.00	-700.00	54063.4
-550.00	-650.00	53722.0
-550.00	-600.00	54012.2
-550.00	-550.00	54067.5
-550.00	-500.00	54072.7
-550.00	-450.00	54074.1
-550.00	-400.00	54072.7
-550.00	-350.00	54071.9
-550.00	-300.00	54070.0
-550.00	-250.00	54068.4
-550.00	-200.00	54070.1
-550.00	-150.00	54160.6
-550.00	-100.00	54063.6
-550.00	-50.00	54098.3
-550.00	0.00	54069.6
-600.00	0.00	54074.6
-600.00	-50.00	54074.8
-600.00	-100.00	54074.6
-600.00	-150.00	54073.3
-600.00	-200.00	54073.1
-600.00	-250.00	54072.6
-600.00	-300.00	54072.6
-600.00	-350.00	54078.5
-600.00	-400.00	54083.6
-600.00	-450.00	54073.1
-600.00	-500.00	54074.5
-600.00	-550.00	54069.4
-600.00	-600.00	54014.1
-600.00	-650.00	53921.9
-600.00	-700.00	54106.3
-600.00	-750.00	54047.0
-600.00	-800.00	53954.1
-600.00	-850.00	54038.7

-600.00	-900.00	54051.3
-600.00	-950.00	54206.5
-600.00	-1000.00	54254.1
-600.00	-1050.00	54097.9
-600.00	-1100.00	54094.1
-600.00	-1150.00	54141.4
-600.00	-1200.00	54135.3
-600.00	-1250.00	54068.1
-600.00	-1300.00	54068.9
-650.00	-1300.00	54070.0
-650.00	-1250.00	54076.7
-650.00	-1200.00	54043.1
-650.00	-1150.00	54075.4
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-650.00	-1000.00	54022.6
-650.00	-950.00	53989.3
-650.00	-900.00	54006.5
-650.00	-850.00	55445.0
-650.00	-800.00	54081.5
-650.00	-750.00	54281.6
-650.00	-700.00	55220.0
-650.00	-650.00	53959.1
-650.00	-600.00	54058.0
-650.00	-550.00	54074.7
-650.00	-500.00	54078.8
-650.00	-450.00	54077.4
-650.00	-400.00	54080.3
-650.00	-350.00	54079.1
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-650.00	-200.00	54077.3
-650.00	-150.00	54079.0
-650.00	-100.00	54080.8
-650.00	-50.00	54081.5
-650.00	0.00	54086.3
-700.00	0.00	54085.2
-700.00	-50.00	54083.8
-700.00	-100.00	54083.4
-700.00	-150.00	54089.7
-700.00	-200.00	54107.8
-700.00	-250.00	54081.2
-700.00	-300.00	54080.8
-700.00	-350.00	54083.0
-700.00	-400.00	54083.7
-700.00	-450.00	54083.9
-700.00	-500.00	54082.5
-700.00	-550.00	54081.4
-700.00	-600.00	54072.2
-700.00	-650.00	54052.7
-700.00	-700.00	54003.9
-700.00	-750.00	54292.6
-700.00	-800.00	54032.9
-700.00	-850.00	54030.7

-700.00	-900.00	54114.6
-700.00	-950.00	54051.1
-700.00	-1000.00	54052.4
-700.00	-1050.00	53478.0
-700.00	-1100.00	54242.2
-700.00	-1150.00	53992.2
-700.00	-1200.00	54096.8
-700.00	-1250.00	54088.9
-700.00	-1300.00	54073.6
-700.00	-1350.00	54070.9
-750.00	-1350.00	54071.1
-750.00	-1300.00	54070.8
-750.00	-1250.00	54071.5
-750.00	-1200.00	54143.7
-750.00	-1150.00	54103.3
-750.00	-1100.00	55350.0
-750.00	-1050.00	54073.6
-750.00	-1000.00	54114.3
-750.00	-950.00	54038.6
-750.00	-900.00	54036.0
-750.00	-850.00	54050.7
-750.00	-800.00	54433.1
-750.00	-750.00	53763.0
-750.00	-700.00	54038.6
-750.00	-650.00	54072.2
-750.00	-600.00	54078.3
-750.00	-550.00	54081.9
-750.00	-500.00	54084.0
-750.00	-450.00	54085.6
-750.00	-400.00	54086.6
-750.00	-350.00	54085.5
-750.00	-300.00	54084.4
-750.00	-250.00	54084.2
-750.00	-200.00	54084.6
-750.00	-150.00	54084.5
-750.00	-100.00	54086.3
-750.00	-50.00	54086.4
-750.00	0.00	54086.7
-800.00	-1400.00	54065.6
-800.00	-1350.00	54073.5
-800.00	-1300.00	54075.7
-800.00	-1250.00	54101.1
-800.00	-1200.00	54044.8
-800.00	-1150.00	54129.1
-800.00	-1100.00	53844.6
-800.00	-1050.00	53969.6
-800.00	-1000.00	53985.0
-800.00	-950.00	54030.3
-800.00	-900.00	53898.4
-800.00	-850.00	54096.6
-800.00	-800.00	53865.3
-800.00	-750.00	54037.2
-800.00	-700.00	54066.3
-800.00	-650.00	54075.4

-800.00	-600.00	54079.7
-800.00	-550.00	54082.5
-800.00	-500.00	54084.9
-800.00	-450.00	54116.0
-800.00	-400.00	54085.5
-800.00	-350.00	54086.6
-800.00	-300.00	54086.1
-800.00	-250.00	54085.7
-800.00	-200.00	54085.3
-800.00	-150.00	54086.3
-800.00	-100.00	54086.6
-800.00	-50.00	54086.4
-800.00	0.00	54089.3
-850.00	0.00	54090.8
-850.00	-50.00	54090.3
-850.00	-100.00	54090.5
-850.00	-150.00	54090.5
-850.00	-200.00	54090.6
-850.00	-250.00	54089.1
-850.00	-300.00	54088.9
-850.00	-350.00	54088.8
-850.00	-400.00	54088.6
-850.00	-450.00	54087.9
-850.00	-500.00	54086.4
-850.00	-550.00	54083.8
-850.00	-600.00	54082.6
-850.00	-650.00	54081.1
-850.00	-700.00	54078.8
-850.00	-750.00	54074.4
-850.00	-800.00	53934.4
-850.00	-850.00	54205.0
-850.00	-900.00	51616.0
-850.00	-950.00	54702.4
-850.00	-1000.00	54213.5
-850.00	-1050.00	54086.7
-850.00	-1100.00	54058.0
-850.00	-1150.00	55534.0
-850.00	-1200.00	54183.0
-850.00	-1250.00	54202.7
-850.00	-1300.00	54074.3
-850.00	-1350.00	54048.9
-900.00	-1250.00	54213.6
-900.00	-1200.00	54015.4
-900.00	-1150.00	53955.1
-900.00	-1100.00	54031.2
-900.00	-1050.00	54073.9
-900.00	-1000.00	54151.6
-900.00	-950.00	56291.0
-900.00	-900.00	54879.0
-900.00	-850.00	52791.0
-900.00	-800.00	54047.6
-900.00	-750.00	54082.1
-900.00	-700.00	54085.0
-900.00	-650.00	54085.1

-900.00	-600.00	54086.0
-900.00	-550.00	54087.8
-900.00	-500.00	54090.3
-900.00	-450.00	54090.6
-900.00	-400.00	54092.1
-900.00	-350.00	54091.8
-900.00	-300.00	54093.1
-900.00	-250.00	54094.0
-900.00	-200.00	54094.4
-900.00	-150.00	54094.9
-900.00	-100.00	54094.5
-900.00	-50.00	54095.5
-900.00	0.00	54093.9
-950.00	0.00	54099.6
-950.00	-50.00	54095.6
-950.00	-100.00	54095.5
-950.00	-150.00	54095.0
-950.00	-200.00	54096.8
-950.00	-250.00	54094.8
-950.00	-300.00	54092.5
-950.00	-350.00	54093.1
-950.00	-400.00	54092.3
-950.00	-450.00	54091.9
-950.00	-500.00	54090.1
-950.00	-550.00	54088.0
-950.00	-600.00	54086.8
-950.00	-650.00	54085.8
-950.00	-700.00	54084.5
-950.00	-750.00	54079.9
-950.00	-800.00	54062.0
-950.00	-850.00	53978.6
-950.00	-900.00	54093.1
-950.00	-950.00	54301.0
-950.00	-1000.00	54083.5
-950.00	-1050.00	54012.3

GEOPHYSICAL DATA FOR N-TEAD

SANITARY LANDFILL

MAGNETIC MEASUREMENTS ON JULY 6, 1988

COORDINATES		
NORTHING (FT.)	EASTING (FT.)	TOTAL FIELD INTENSITY (GAMMAS)
-1250.00	-1300.00	54099.4
-1250.00	-1275.00	54089.3
-1250.00	-1250.00	54091.5
-1250.00	-1225.00	54086.0
-1250.00	-1200.00	54091.3
-1250.00	-1175.00	54084.8
-1250.00	-1150.00	54085.0
-1250.00	-1125.00	54083.4
-1250.00	-1100.00	54095.0
-1250.00	-1075.00	54086.1
-1250.00	-1050.00	54091.9
-1250.00	-1025.00	54089.3
-1250.00	-1000.00	54085.4
-1250.00	-975.00	54089.8
-1250.00	-950.00	54086.4
-1250.00	-925.00	54093.0
-1250.00	-900.00	54090.6
-1250.00	-875.00	54089.3
-1250.00	-850.00	54092.8
-1250.00	-825.00	54090.1
-1250.00	-800.00	54087.0
-1250.00	-775.00	54095.8
-1250.00	-750.00	54092.0
-1250.00	-725.00	54074.3
-1225.00	-750.00	54247.4
-1225.00	-775.00	54080.6
-1225.00	-800.00	54087.0
-1225.00	-825.00	54094.4
-1225.00	-850.00	54100.4
-1225.00	-875.00	54100.1
-1225.00	-900.00	54096.4
-1225.00	-925.00	54098.7
-1225.00	-950.00	54096.9
-1225.00	-975.00	54101.7
-1225.00	-1000.00	54097.4
-1225.00	-1025.00	54096.2
-1225.00	-1050.00	54085.6
-1225.00	-1075.00	54100.3
-1225.00	-1100.00	54092.7
-1225.00	-1125.00	54093.8
-1225.00	-1150.00	54087.4
-1225.00	-1175.00	54104.1
-1225.00	-1200.00	54096.6

-1225.00	-1225.00	54091.9
-1225.00	-1250.00	54098.1
-1225.00	-1275.00	54095.2
-1225.00	-1300.00	54094.9
-1200.00	-1300.00	54090.9
-1200.00	-1275.00	54087.0
-1200.00	-1250.00	54092.8
-1200.00	-1225.00	54094.5
-1200.00	-1200.00	54094.3
-1200.00	-1175.00	54085.3
-1200.00	-1150.00	54092.4
-1200.00	-1125.00	54085.9
-1200.00	-1100.00	54089.2
-1200.00	-1075.00	54094.0
-1200.00	-1050.00	54096.0
-1200.00	-1025.00	54099.2
-1200.00	-1000.00	54094.0
-1200.00	-975.00	54101.5
-1200.00	-950.00	54089.8
-1200.00	-925.00	54095.6
-1200.00	-900.00	54091.8
-1200.00	-875.00	54106.8
-1200.00	-850.00	54097.0
-1200.00	-825.00	54082.5
-1200.00	-800.00	54107.1
-1175.00	-850.00	54056.9
-1175.00	-875.00	54089.2
-1175.00	-900.00	54091.4
-1175.00	-925.00	54088.4
-1175.00	-950.00	54093.6
-1175.00	-975.00	54097.8
-1175.00	-1000.00	54098.8
-1175.00	-1025.00	54097.3
-1175.00	-1050.00	54079.2
-1175.00	-1075.00	54096.6
-1175.00	-1100.00	54094.1
-1175.00	-1125.00	54100.0
-1175.00	-1150.00	54098.8
-1175.00	-1175.00	54105.9
-1175.00	-1200.00	54101.6
-1175.00	-1225.00	54099.2
-1175.00	-1250.00	54100.9
-1175.00	-1275.00	54100.4
-1175.00	-1300.00	54100.5
-1150.00	-1300.00	54098.2
-1150.00	-1275.00	54101.0
-1150.00	-1250.00	54098.2
-1150.00	-1225.00	54106.3
-1150.00	-1200.00	54113.2
-1150.00	-1175.00	54095.9
-1150.00	-1150.00	54100.1
-1150.00	-1125.00	54090.8
-1150.00	-1100.00	54092.6
-1150.00	-1075.00	54089.8

-1150.00	-1050.00	54088.2
-1150.00	-1025.00	54091.7
-1150.00	-1000.00	54092.9
-1150.00	-975.00	54093.8
-1150.00	-950.00	54094.4
-1150.00	-925.00	54087.7
-1150.00	-900.00	54089.3
-1125.00	-925.00	54139.9
-1125.00	-950.00	54077.1
-1125.00	-975.00	54080.6
-1125.00	-1000.00	54087.3
-1125.00	-1025.00	54080.2
-1125.00	-1050.00	54077.2
-1125.00	-1075.00	54070.3
-1125.00	-1100.00	54010.0
-1125.00	-1125.00	54114.7
-1125.00	-1150.00	54101.2
-1125.00	-1175.00	54093.5
-1125.00	-1200.00	54103.3
-1125.00	-1225.00	54111.2
-1125.00	-1250.00	54115.6
-1125.00	-1275.00	54094.0
-1125.00	-1300.00	54095.1
-1100.00	-1300.00	54091.3
-1100.00	-1275.00	54106.8
-1100.00	-1250.00	54109.3
-1100.00	-1225.00	54098.8
-1100.00	-1200.00	54083.9
-1100.00	-1175.00	54096.7
-1100.00	-1150.00	54118.2
-1100.00	-1125.00	54165.9
-1100.00	-1100.00	54077.6
-1100.00	-1075.00	54061.7
-1100.00	-1050.00	53991.5
-1100.00	-1025.00	54096.3
-1100.00	-1000.00	54064.2
-1100.00	-975.00	54062.9
-1075.00	-1000.00	54111.1
-1075.00	-1025.00	54054.5
-1075.00	-1050.00	53928.8
-1075.00	-1075.00	53999.7
-1075.00	-1100.00	55873.3
-1075.00	-1125.00	54145.5
-1075.00	-1150.00	54110.1
-1075.00	-1175.00	54053.6
-1075.00	-1200.00	54093.5
-1075.00	-1225.00	54087.1
-1075.00	-1250.00	54084.6
-1075.00	-1275.00	54093.4
-1075.00	-1300.00	54087.3
-251.00	-1300.00	54077.1
-1050.00	-1300.00	54088.0
-1050.00	-1275.00	54092.9
-1050.00	-1250.00	54087.8

-1050.00	-1225.00	54092.1
-1050.00	-1200.00	54103.7
-1050.00	-1175.00	54412.2
-1050.00	-1150.00	52268.3
-1050.00	-1125.00	53664.9
-1050.00	-1100.00	54070.9
-1050.00	-1075.00	53989.3
-1050.00	-1050.00	54015.3
-1025.00	-1100.00	54094.3
-1025.00	-1125.00	53988.1
-1025.00	-1150.00	53407.1
-1025.00	-1175.00	53817.2
-1025.00	-1200.00	54073.3
-1025.00	-1225.00	54080.8
-1025.00	-1250.00	54074.8
-1025.00	-1275.00	54079.7
-1025.00	-1300.00	54081.6
-1000.00	-1300.00	54089.6
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-1000.00	-1250.00	54081.4
-1000.00	-1225.00	54074.4
-1000.00	-1200.00	54059.8
-1000.00	-1175.00	53987.1
-1000.00	-1150.00	53885.2
-1000.00	-1125.00	53907.3
-975.00	-1175.00	54086.5
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-975.00	-1225.00	54081.3
-975.00	-1250.00	54079.3
-975.00	-1275.00	54080.4
-950.00	-1300.00	54080.6
-950.00	-1275.00	54082.7
-950.00	-1250.00	54058.6
-950.00	-1225.00	54046.4
-925.00	-1250.00	54332.4
-925.00	-1275.00	54050.2
-925.00	-1300.00	54066.7
-900.00	-1300.00	54064.8
-251.00	-1300.00	54093.7
-1250.00	-650.00	54104.6
-1250.00	-675.00	54096.9
-1250.00	-700.00	54049.7
-1225.00	-725.00	54097.9
-1225.00	-700.00	54112.2
-1225.00	-674.00	54111.1
-1225.00	-650.00	54117.9
-1200.00	-650.00	54113.2
-1200.00	-675.00	54110.5
-1200.00	-700.00	54107.3
-1200.00	-725.00	54106.8
-1200.00	-750.00	54103.8
-1200.00	-775.00	54077.5
-1175.00	-800.00	54083.5
-1175.00	-775.00	54101.5

-1175.00	-750.00	54117.1
-1175.00	-725.00	54110.3
-1175.00	-700.00	54115.5
-1175.00	-675.00	54107.4
-1175.00	-650.00	54124.6
-1150.00	-650.00	54107.3
-1150.00	-675.00	54111.4
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-1150.00	-750.00	54112.9
-1150.00	-775.00	54107.6
-1150.00	-800.00	54108.3
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-1125.00	-875.00	54100.4
-1125.00	-850.00	54106.6
-1125.00	-825.00	54112.0
-1125.00	-800.00	54116.8
-1125.00	-775.00	54115.8
-1125.00	-750.00	54117.2
-1125.00	-725.00	54118.0
-1125.00	-700.00	54117.5
-1125.00	-675.00	54122.0
-1125.00	-650.00	54116.2
-1100.00	-650.00	54115.2
-1100.00	-675.00	54111.0
-1100.00	-700.00	54118.3
-1100.00	-725.00	54116.1
-1100.00	-750.00	54105.0
-1100.00	-775.00	54112.5
-1100.00	-800.00	54109.5
-1100.00	-825.00	54108.3
-1100.00	-850.00	54104.6
-1100.00	-875.00	54113.5
-1100.00	-900.00	54094.2
-1100.00	-925.00	54092.7
-1100.00	-950.00	54076.2
-1075.00	-975.00	54060.0
-1075.00	-950.00	54094.5
-1075.00	-925.00	54107.8
-1075.00	-900.00	54112.3
-1075.00	-875.00	54110.6
-1075.00	-850.00	54109.7
-1075.00	-825.00	54113.1
-1075.00	-800.00	54107.8
-1075.00	-775.00	54117.8
-1075.00	-750.00	54116.4
-1075.00	-725.00	54125.1
-1075.00	-700.00	54125.2
-1075.00	-675.00	54128.7
-1075.00	-650.00	54126.0
-1050.00	-650.00	54119.2

-1050.00	-675.00	54127.3
-1050.00	-700.00	54113.7
-1050.00	-725.00	54097.9
-1050.00	-750.00	54109.8
-1050.00	-775.00	54109.6
-1050.00	-800.00	54109.6
-1050.00	-825.00	54105.8
-1050.00	-850.00	54100.6
-1050.00	-875.00	54100.6
-1050.00	-900.00	54099.7
-1050.00	-925.00	54096.6
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-1050.00	-1000.00	54071.9
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-1025.00	-950.00	54084.7
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-1025.00	-875.00	54104.6
-1025.00	-850.00	54112.7
-1025.00	-825.00	54108.4
-1025.00	-800.00	54119.8
-1025.00	-775.00	54118.3
-1025.00	-750.00	54121.6
-1025.00	-725.00	54131.0
-1025.00	-700.00	54126.8
-1025.00	-675.00	54121.5
-1025.00	-650.00	54118.7
-1000.00	-650.00	54105.8
-1000.00	-675.00	54106.3
-1000.00	-700.00	54101.2
-1000.00	-725.00	54107.8
-1000.00	-750.00	54106.1
-1000.00	-775.00	54105.3
-1000.00	-800.00	54096.0
-1000.00	-825.00	54082.6
-1000.00	-850.00	54076.9
-1000.00	-875.00	54071.2
-1000.00	-900.00	54073.5
-1000.00	-925.00	54071.3
-1000.00	-950.00	54007.7
-1000.00	-975.00	53940.1
-1000.00	-1000.00	53848.2
-1000.00	-1025.00	53859.6
-1000.00	-1050.00	54312.8
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-975.00	-1150.00	56296.5
-975.00	-1125.00	53544.9

-975.00	-1100.00	54091.1
-975.00	-1075.00	54357.6
-975.00	-1050.00	55944.2
-975.00	-1025.00	54245.8
-975.00	-1000.00	55123.3
-975.00	-975.00	53771.9
-975.00	-950.00	53955.8
-975.00	-925.00	54054.7
-975.00	-900.00	54065.2
-975.00	-875.00	54056.3
-975.00	-850.00	54065.8
-975.00	-825.00	54089.6
-975.00	-800.00	54098.8
-975.00	-775.00	54111.9
-975.00	-750.00	54118.7
-975.00	-725.00	54115.2
-975.00	-700.00	54121.9
-975.00	-675.00	54118.5
-975.00	-650.00	54125.8
-950.00	-650.00	54092.2
-950.00	-675.00	54095.6
-950.00	-700.00	54091.8
-950.00	-725.00	54098.0
-950.00	-750.00	54105.4
-950.00	-775.00	54098.4
-950.00	-800.00	54086.7
-950.00	-825.00	54063.8
-950.00	-850.00	54003.9
-950.00	-875.00	53953.4
-950.00	-900.00	54108.6
-950.00	-925.00	54038.2
-950.00	-950.00	54465.9
-950.00	-975.00	54057.2
-950.00	-1000.00	54084.6
-950.00	-1025.00	54015.3
-950.00	-1050.00	54007.0
-950.00	-1075.00	54076.8
-950.00	-1100.00	54063.1
-950.00	-1125.00	53886.2
-950.00	-1150.00	54160.0
-950.00	-1175.00	53972.3
-950.00	-1200.00	54104.7
-925.00	-1225.00	54336.4
-925.00	-1200.00	54127.9
-925.00	-1175.00	54067.0
-925.00	-1150.00	54164.3
-925.00	-1125.00	54042.8
-925.00	-1100.00	54154.5
-925.00	-1075.00	54045.1
-925.00	-1050.00	54111.5
-925.00	-1025.00	54378.4
-925.00	-1000.00	53947.5
-925.00	-975.00	54019.0
-925.00	-950.00	54121.2

-925.00	-925.00	54194.7
-925.00	-900.00	56586.2
-925.00	-875.00	53327.7
-925.00	-850.00	53903.3
-925.00	-825.00	54055.6
-925.00	-800.00	54087.9
-925.00	-775.00	54111.5
-925.00	-750.00	54118.6
-925.00	-725.00	54121.0
-925.00	-700.00	54121.2
-925.00	-675.00	54104.0
-925.00	-650.00	54100.2
-900.00	-650.00	54117.5
-900.00	-675.00	54113.8
-900.00	-700.00	54116.6
-900.00	-725.00	54119.4
-900.00	-750.00	54113.1
-900.00	-775.00	54103.2
-900.00	-800.00	54088.9
-900.00	-825.00	53927.0
-900.00	-850.00	52902.2
-900.00	-875.00	52209.2
-900.00	-900.00	55504.3
-900.00	-925.00	54412.4
-900.00	-950.00	56782.3
-900.00	-975.00	54828.3
-900.00	-1000.00	54121.6
-900.00	-1025.00	54240.6
-900.00	-1050.00	54099.7
-900.00	-1075.00	54079.5
-900.00	-1100.00	54063.8
-900.00	-1125.00	53995.9
-900.00	-1150.00	53954.0
-900.00	-1175.00	54199.4
-900.00	-1200.00	54028.4
-900.00	-1225.00	53991.6
-900.00	-1250.00	54269.1
-900.00	-1275.00	54099.6
-251.00	-1300.00	54109.0

GEOPHYSICAL DATA FOR N-TEAD

OLD BURN AREA

ELECTROMAGNETIC MEASUREMENTS ON FEBRUARY 11, 1988

COORDINATES		APPARENT CONDUCTIVITY
NORTHING (FT.)	EASTING (FT.)	HORIZONTAL COILS (MILLIMHO/METER)
0.00	-50.00	10.5
-50.00	-50.00	9.0
-100.00	-50.00	8.0
-150.00	-50.00	8.0
-200.00	-50.00	7.0
-250.00	-50.00	6.0
-300.00	-50.00	6.0
-350.00	-50.00	5.0
-400.00	-50.00	6.0
-450.00	-50.00	6.0
-500.00	-50.00	5.0
-550.00	-50.00	4.0
-600.00	-50.00	6.0
-650.00	-50.00	6.0
-700.00	-50.00	5.0
-750.00	-50.00	6.0
-800.00	-50.00	6.0
-850.00	-50.00	4.0
-900.00	-50.00	6.0
-950.00	-50.00	6.0
-1000.00	-50.00	7.0
-1050.00	-50.00	8.0
-1100.00	-50.00	8.0
-1150.00	-50.00	8.0
-1200.00	-50.00	7.0
-1250.00	-50.00	8.0
-1300.00	-50.00	8.0
-1350.00	-50.00	6.0
-1400.00	-50.00	6.0
-1450.00	-50.00	6.0
-1500.00	-50.00	6.0
-1550.00	-50.00	6.0
-1600.00	-50.00	6.0
-1650.00	-50.00	6.0
-1700.00	-50.00	6.0
-1750.00	-50.00	6.0
-1800.00	-50.00	6.0
-1850.00	-50.00	6.0
-1900.00	-50.00	6.0
-1950.00	-50.00	6.0
-2000.00	-50.00	6.0
-2050.00	-50.00	6.0

-2100.00	-50.00	8.0
-2100.00	-150.00	7.5
-2050.00	-150.00	7.5
-2000.00	-150.00	6.7
-1950.00	-150.00	6.5
-1900.00	-150.00	6.5
-1850.00	-150.00	5.7
-1800.00	-150.00	5.6
-1750.00	-150.00	5.5
-1700.00	-150.00	5.3
-1650.00	-150.00	5.5
-1600.00	-150.00	5.4
-1550.00	-150.00	5.2
-1500.00	-150.00	5.8
-1450.00	-150.00	5.8
-1400.00	-150.00	6.9
-1350.00	-150.00	7.6
-1300.00	-150.00	7.4
-1250.00	-150.00	7.4
-1200.00	-150.00	7.6
-1150.00	-150.00	7.8
-1100.00	-150.00	8.2
-1050.00	-150.00	6.5
-1000.00	-150.00	6.4
-950.00	-150.00	6.9
-900.00	-150.00	6.2
-850.00	-150.00	7.3
-800.00	-150.00	7.2
-750.00	-150.00	6.3
-700.00	-150.00	2.1
-650.00	-150.00	10.5
-600.00	-150.00	8.7
-550.00	-150.00	8.4
-500.00	-150.00	8.2
-450.00	-150.00	8.2
-400.00	-150.00	8.4
-350.00	-150.00	8.4
-300.00	-150.00	9.8
-250.00	-150.00	10.5
-200.00	-150.00	10.0
-150.00	-150.00	8.7
-100.00	-150.00	8.4
-50.00	-150.00	8.4
0.00	-150.00	7.8
0.00	-250.00	6.4
-50.00	-250.00	6.5
-100.00	-250.00	8.6
-150.00	-250.00	300.0
-200.00	-250.00	300.0
-250.00	-250.00	8.8
-300.00	-250.00	11.0
-350.00	-250.00	300.0
-400.00	-250.00	15.0
-450.00	-250.00	10.0

-500.00	-250.00	9.0
-550.00	-250.00	7.4
-600.00	-250.00	8.0
-650.00	-250.00	7.5
-700.00	-250.00	7.8
-750.00	-250.00	7.3
-800.00	-250.00	7.4
-850.00	-250.00	7.5
-900.00	-250.00	6.9
-950.00	-250.00	6.4
-1000.00	-250.00	6.2
-1050.00	-250.00	7.9
-1100.00	-250.00	7.6
-1150.00	-250.00	12.0
-1200.00	-250.00	11.0
-1250.00	-250.00	8.3
-1300.00	-250.00	8.0
-1350.00	-250.00	8.3
-1400.00	-250.00	6.0
-1450.00	-250.00	5.8
-1500.00	-250.00	5.2
-1550.00	-250.00	4.8
-1600.00	-250.00	5.2
-1650.00	-250.00	5.8
-1700.00	-250.00	6.0
-1750.00	-250.00	5.4
-1800.00	-250.00	5.9
-1850.00	-250.00	7.0
-1900.00	-250.00	7.3
-1950.00	-250.00	7.8
-2000.00	-250.00	7.8
-2050.00	-250.00	6.8
-2100.00	-250.00	7.0
-2100.00	-350.00	6.8
-2050.00	-350.00	7.6
-2000.00	-350.00	7.8
-1950.00	-350.00	7.8
-1900.00	-350.00	8.2
-1850.00	-350.00	7.4
-1800.00	-350.00	6.8
-1750.00	-350.00	6.0
-1700.00	-350.00	6.0
-1650.00	-350.00	6.0
-1600.00	-350.00	6.1
-1550.00	-350.00	6.0
-1500.00	-350.00	6.0
-1450.00	-350.00	6.6
-1400.00	-350.00	7.4
-1350.00	-350.00	6.6
-1300.00	-350.00	8.6
-1250.00	-350.00	8.7
-1200.00	-350.00	8.8
-1150.00	-350.00	9.4
-1100.00	-350.00	8.7

-1050.00	-350.00	8.7
-1000.00	-350.00	8.0
-950.00	-350.00	7.4
-900.00	-350.00	8.4
-850.00	-350.00	8.0
-800.00	-350.00	7.8
-750.00	-350.00	8.4
-700.00	-350.00	7.4
-650.00	-350.00	9.8
-600.00	-350.00	300.0
-550.00	-350.00	2.4
-500.00	-350.00	9.2
-450.00	-350.00	9.4
-400.00	-350.00	0.6
-350.00	-350.00	300.0
-300.00	-350.00	7.6
-250.00	-350.00	8.4
-200.00	-350.00	7.6
-150.00	-350.00	6.6
-100.00	-350.00	6.8
-50.00	-350.00	6.9
0.00	-350.00	6.7
0.00	-450.00	7.0
-50.00	-450.00	9.0
-100.00	-450.00	9.7
-150.00	-450.00	7.8
-200.00	-450.00	7.5
-250.00	-450.00	7.4
-300.00	-450.00	8.6
-350.00	-450.00	4.6
-400.00	-450.00	5.0
-450.00	-450.00	5.2
-500.00	-450.00	6.2
-550.00	-450.00	8.1
-600.00	-450.00	7.2
-650.00	-450.00	7.9
-700.00	-450.00	7.4
-750.00	-450.00	7.2
-800.00	-450.00	7.0
-850.00	-450.00	6.6
-900.00	-450.00	6.8
-950.00	-450.00	6.4
-1000.00	-450.00	7.2
-1050.00	-450.00	7.2
-1100.00	-450.00	8.2
-1150.00	-450.00	8.1
-1200.00	-450.00	8.4
-1250.00	-450.00	8.6
-1300.00	-450.00	9.6
-1350.00	-450.00	8.6
-1400.00	-450.00	7.5
-1450.00	-450.00	7.2
-1500.00	-450.00	7.6
-1550.00	-450.00	7.0

-1600.00	-450.00	6.6
-1650.00	-450.00	6.5
-1700.00	-450.00	6.0
-1750.00	-450.00	6.3
-1800.00	-450.00	7.1
-1850.00	-450.00	7.6
-1900.00	-450.00	10.0
-1950.00	-450.00	9.0
-2000.00	-450.00	9.2
-2050.00	-450.00	9.5
-2100.00	-450.00	8.2
-2100.00	-550.00	7.5
-2050.00	-550.00	8.8
-2000.00	-550.00	8.8
-1950.00	-550.00	9.3
-1900.00	-550.00	8.8
-1850.00	-550.00	6.1
-1800.00	-550.00	8.1
-1750.00	-550.00	7.4
-1700.00	-550.00	7.5
-1650.00	-550.00	8.4
-1600.00	-550.00	8.8
-1550.00	-550.00	9.1
-1500.00	-550.00	8.2
-1450.00	-550.00	8.0
-1400.00	-550.00	7.6
-1350.00	-550.00	7.4
-1300.00	-550.00	8.2
-1250.00	-550.00	8.2
-1200.00	-550.00	6.8
-1150.00	-550.00	7.0
-1100.00	-550.00	7.8
-1050.00	-550.00	8.0
-1000.00	-550.00	6.9
-950.00	-550.00	6.2
-900.00	-550.00	6.0
-850.00	-550.00	6.5
-800.00	-550.00	8.2
-750.00	-550.00	7.4
-700.00	-550.00	7.7
-650.00	-550.00	7.6
-600.00	-550.00	6.6
-550.00	-550.00	7.2
-500.00	-550.00	6.6
-450.00	-550.00	2.2
-400.00	-550.00	6.4
-350.00	-550.00	6.3
-300.00	-550.00	7.6
-250.00	-550.00	12.0
-200.00	-550.00	12.0
-150.00	-550.00	18.0
-100.00	-550.00	21.0
-50.00	-550.00	14.0
0.00	-550.00	9.4

GEOPHYSICAL DATA FOR N-TEAD

OLD BURN AREA

MAGNETIC MEASUREMENTS ON FEBRUARY 10-11, 1988

COORDINATES NORTHING (FT.)	EASTING (FT.)	TOTAL FIELD INTENSITY (GAMMAS)
0.00	0.00	53874.5
-50.00	0.00	53807.6
-100.00	0.00	53791.3
-150.00	0.00	53801.8
-200.00	0.00	53829.0
-250.00	0.00	53863.5
-300.00	0.00	53894.8
-350.00	0.00	53921.2
-400.00	0.00	53942.2
-450.00	0.00	53956.0
-500.00	0.00	53966.2
-550.00	0.00	53981.0
-600.00	0.00	53997.5
-650.00	0.00	54012.1
-700.00	0.00	54009.1
-750.00	0.00	54005.9
-800.00	0.00	54009.4
-850.00	0.00	54015.2
-900.00	0.00	54022.8
-950.00	0.00	54028.6
-1000.00	0.00	54031.7
-1050.00	0.00	54036.8
-1100.00	0.00	54038.3
-1150.00	0.00	54038.6
-1200.00	0.00	54039.6
-1250.00	0.00	54041.4
-1300.00	0.00	54047.6
-1350.00	0.00	54041.7
-1400.00	0.00	54047.9
-1450.00	0.00	54049.2
-1500.00	0.00	54051.4
-1550.00	0.00	54053.3
-1600.00	0.00	54056.4
-1650.00	0.00	54058.5
-1700.00	0.00	54058.7
-1750.00	0.00	54060.8
-1800.00	0.00	54061.3
-1850.00	0.00	54061.1
-1900.00	0.00	54061.8
-1950.00	0.00	54062.4
-2000.00	0.00	54061.5
-2050.00	0.00	54060.7
-2100.00	0.00	54064.8

-2100.00	-50.00	54070.7
-2050.00	-50.00	54065.6
-2000.00	-50.00	54062.1
-1950.00	-50.00	54062.1
-1900.00	-50.00	54060.9
-1850.00	-50.00	54059.0
-1800.00	-50.00	54060.4
-1750.00	-50.00	54058.0
-1700.00	-50.00	54058.0
-1650.00	-50.00	54056.8
-1600.00	-50.00	54055.2
-1550.00	-50.00	54052.9
-1500.00	-50.00	54051.6
-1450.00	-50.00	54049.7
-1400.00	-50.00	54047.4
-1350.00	-50.00	54049.2
-1300.00	-50.00	54047.3
-1250.00	-50.00	54043.2
-1200.00	-50.00	54041.3
-1150.00	-50.00	54038.1
-1100.00	-50.00	54040.7
-1050.00	-50.00	54035.2
-1000.00	-50.00	54029.8
-950.00	-50.00	54020.8
-900.00	-50.00	54016.0
-850.00	-50.00	53979.0
-800.00	-50.00	54015.6
-750.00	-50.00	53969.6
-700.00	-50.00	53955.5
-650.00	-50.00	53893.3
-600.00	-50.00	53772.0
-550.00	-50.00	53441.1
-500.00	-50.00	53943.6
-450.00	-50.00	53943.6
-400.00	-50.00	53934.8
-350.00	-50.00	53909.0
-300.00	-50.00	53875.3
-250.00	-50.00	53844.8
-200.00	-50.00	53826.4
-150.00	-50.00	53829.7
-100.00	-50.00	53843.1
-50.00	-50.00	53880.1
0.00	-50.00	53934.1
0.00	-100.00	54069.0
-50.00	-100.00	53969.9
-100.00	-100.00	53914.9
-150.00	-100.00	53894.7
-200.00	-100.00	53848.3
-250.00	-100.00	53822.3
-300.00	-100.00	53827.4
-350.00	-100.00	53860.0
-400.00	-100.00	53896.9
-450.00	-100.00	53876.5
-500.00	-100.00	53900.0

-550.00	-100.00	54149.2
-600.00	-100.00	53526.1
-650.00	-100.00	53131.9
-700.00	-100.00	53149.4
-750.00	-100.00	54004.3
-800.00	-100.00	53972.4
-850.00	-100.00	54009.3
-900.00	-100.00	54016.4
-950.00	-100.00	54026.7
-1000.00	-100.00	54030.3
-1050.00	-100.00	54035.8
-1100.00	-100.00	54038.0
-1150.00	-100.00	54038.4
-1200.00	-100.00	54040.7
-1250.00	-100.00	54047.3
-1300.00	-100.00	54043.9
-1350.00	-100.00	53900.8
-1400.00	-100.00	54048.3
-1450.00	-100.00	54048.0
-1500.00	-100.00	54048.6
-1550.00	-100.00	54050.1
-1600.00	-100.00	54051.9
-1650.00	-100.00	54052.1
-1700.00	-100.00	54051.2
-1750.00	-100.00	54053.8
-1800.00	-100.00	54055.0
-1850.00	-100.00	54055.4
-1900.00	-100.00	54056.4
-1950.00	-100.00	54055.9
-2000.00	-100.00	54057.1
-2050.00	-100.00	54060.3
-2100.00	-100.00	54061.6
-2100.00	-150.00	54059.6
-2050.00	-150.00	54060.3
-2000.00	-150.00	54056.1
-1950.00	-150.00	54053.2
-1900.00	-150.00	54052.0
-1850.00	-150.00	54053.2
-1800.00	-150.00	54053.5
-1750.00	-150.00	54054.1
-1700.00	-150.00	54052.4
-1650.00	-150.00	54053.1
-1600.00	-150.00	54057.2
-1550.00	-150.00	54055.8
-1500.00	-150.00	54056.5
-1450.00	-150.00	54055.3
-1400.00	-150.00	54052.4
-1350.00	-150.00	54053.5
-1300.00	-150.00	54052.1
-1250.00	-150.00	54046.0
-1200.00	-150.00	54048.7
-1150.00	-150.00	54056.9
-1100.00	-150.00	54057.5
-1050.00	-150.00	54051.3

-1000.00	-150.00	54011.8
-950.00	-150.00	53985.5
-900.00	-150.00	54048.5
-850.00	-150.00	53969.6
-800.00	-150.00	53986.8
-750.00	-150.00	53991.9
-700.00	-150.00	56562.3
-650.00	-150.00	54263.7
-600.00	-150.00	53996.6
-550.00	-150.00	53909.6
-500.00	-150.00	53883.1
-450.00	-150.00	53780.4
-400.00	-150.00	53939.6
-350.00	-150.00	53977.4
-300.00	-150.00	53737.5
-250.00	-150.00	53845.7
-200.00	-150.00	54111.9
-150.00	-150.00	53959.4
-100.00	-150.00	54039.9
-50.00	-150.00	54049.0
0.00	-150.00	54165.1
0.00	-200.00	54211.9
-50.00	-200.00	54087.0
-100.00	-200.00	53646.3
-150.00	-200.00	52488.5
-200.00	-200.00	53444.0
-250.00	-200.00	53789.2
-300.00	-200.00	54205.5
-350.00	-200.00	51840.2
-400.00	-200.00	53613.4
-450.00	-200.00	54195.4
-500.00	-200.00	53866.8
-550.00	-200.00	53884.9
-600.00	-200.00	53956.8
-650.00	-200.00	54066.8
-700.00	-200.00	54454.1
-750.00	-200.00	54060.1
-800.00	-200.00	53970.6
-850.00	-200.00	53995.4
-900.00	-200.00	53985.9
-950.00	-200.00	54045.2
-1000.00	-200.00	53996.6
-1050.00	-200.00	54012.9
-1100.00	-200.00	53984.4
-1150.00	-200.00	54007.9
-1200.00	-200.00	54023.0
-1250.00	-200.00	54046.3
-1300.00	-200.00	54055.2
-1350.00	-200.00	54055.4
-1400.00	-200.00	53967.2
-1450.00	-200.00	54090.2
-1500.00	-200.00	54037.9
-1550.00	-200.00	54068.3
-1600.00	-200.00	54053.9

-1650.00	-200.00	54059.2
-1700.00	-200.00	54053.4
-1750.00	-200.00	54056.8
-1800.00	-200.00	54055.9
-1850.00	-200.00	54057.5
-1900.00	-200.00	54056.7
-1950.00	-200.00	54057.6
-2000.00	-200.00	54060.5
-2050.00	-200.00	54060.4
-2100.00	-200.00	54057.8
-2100.00	-250.00	54061.0
-2050.00	-250.00	54060.5
-2000.00	-250.00	54060.0
-1950.00	-250.00	54074.6
-1900.00	-250.00	54062.3
-1850.00	-250.00	54056.8
-1800.00	-250.00	54056.4
-1750.00	-250.00	54053.2
-1700.00	-250.00	54052.3
-1650.00	-250.00	54056.0
-1600.00	-250.00	54069.0
-1550.00	-250.00	54023.4
-1500.00	-250.00	54016.0
-1450.00	-250.00	54037.8
-1400.00	-250.00	54018.7
-1350.00	-250.00	54034.2
-1300.00	-250.00	54027.8
-1250.00	-250.00	53963.0
-1200.00	-250.00	53775.0
-1150.00	-250.00	53578.1
-1100.00	-250.00	53955.7
-1050.00	-250.00	53978.6
-1000.00	-250.00	53969.3
-950.00	-250.00	53965.6
-900.00	-250.00	54017.1
-850.00	-250.00	54027.4
-800.00	-250.00	53981.5
-750.00	-250.00	54006.4
-700.00	-250.00	53971.3
-650.00	-250.00	53878.6
-600.00	-250.00	53888.8
-550.00	-250.00	53829.3
-500.00	-250.00	53773.0
-450.00	-250.00	53557.2
-400.00	-250.00	54334.0
-350.00	-250.00	54600.6
-300.00	-250.00	53458.8
-250.00	-250.00	53862.6
-200.00	-250.00	52978.1
-150.00	-250.00	53995.5
-100.00	-250.00	54114.8
-50.00	-250.00	54148.3
0.00	-250.00	54229.6
0.00	-300.00	54236.1

-50.00	-300.00	54216.0
-100.00	-300.00	54233.3
-150.00	-300.00	55381.8
-200.00	-300.00	52062.4
-250.00	-300.00	54035.7
-300.00	-300.00	54966.6
-350.00	-300.00	51497.6
-400.00	-300.00	50919.6
-450.00	-300.00	54450.9
-500.00	-300.00	53749.1
-550.00	-300.00	53681.6
-600.00	-300.00	52945.1
-650.00	-300.00	53265.2
-700.00	-300.00	53784.2
-750.00	-300.00	53767.1
-800.00	-300.00	53891.4
-850.00	-300.00	53983.6
-900.00	-300.00	53984.8
-950.00	-300.00	54036.3
-1000.00	-300.00	53985.3
-1050.00	-300.00	54011.0
-1100.00	-300.00	53988.4
-1150.00	-300.00	54226.0
-1200.00	-300.00	54288.9
-1250.00	-300.00	54054.2
-1300.00	-300.00	54059.5
-1350.00	-300.00	54076.8
-1400.00	-300.00	54077.8
-1450.00	-300.00	54063.9
-1500.00	-300.00	54072.5
-1550.00	-300.00	54071.8
-1600.00	-300.00	54066.0
-1650.00	-300.00	54075.9
-1700.00	-300.00	54063.5
-1750.00	-300.00	54055.0
-1800.00	-300.00	54042.9
-1850.00	-300.00	54050.8
-1900.00	-300.00	54053.8
-1950.00	-300.00	54051.5
-2000.00	-300.00	54052.0
-2050.00	-300.00	54053.7
-2100.00	-300.00	54052.4
-2100.00	-350.00	54057.0
-2050.00	-350.00	54054.0
-2000.00	-350.00	54052.6
-1950.00	-350.00	54052.2
-1900.00	-350.00	54053.8
-1850.00	-350.00	54053.2
-1800.00	-350.00	54057.6
-1750.00	-350.00	54052.9
-1700.00	-350.00	54054.5
-1650.00	-350.00	54055.3
-1600.00	-350.00	54013.5
-1550.00	-350.00	54027.9

-1500.00	-350.00	54007.5
-1450.00	-350.00	54020.6
-1400.00	-350.00	54049.2
-1350.00	-350.00	54018.1
-1300.00	-350.00	53996.6
-1250.00	-350.00	54093.7
-1200.00	-350.00	54093.4
-1150.00	-350.00	54055.0
-1100.00	-350.00	54016.0
-1050.00	-350.00	54088.1
-1000.00	-350.00	54002.6
-950.00	-350.00	53952.4
-900.00	-350.00	53910.8
-850.00	-350.00	53938.8
-800.00	-350.00	53858.3
-750.00	-350.00	54470.4
-700.00	-350.00	53797.6
-650.00	-350.00	53934.4
-600.00	-350.00	53953.6
-550.00	-350.00	53640.0
-500.00	-350.00	53849.0
-450.00	-350.00	55082.1
-400.00	-350.00	54425.9
-350.00	-350.00	53144.6
-300.00	-350.00	54288.6
-250.00	-350.00	54264.3
-200.00	-350.00	56030.6
-150.00	-350.00	54808.0
-100.00	-350.00	54349.7
-50.00	-350.00	54253.8
0.00	-350.00	54223.8
0.00	-400.00	54033.0
-50.00	-400.00	54203.3
-100.00	-400.00	54257.5
-150.00	-400.00	54324.7
-200.00	-400.00	54352.3
-250.00	-400.00	54826.7
-300.00	-400.00	54022.2
-350.00	-400.00	56490.7
-400.00	-400.00	55998.3
-450.00	-400.00	54856.8
-500.00	-400.00	54031.5
-550.00	-400.00	53735.4
-600.00	-400.00	53672.1
-650.00	-400.00	53919.8
-700.00	-400.00	53822.1
-750.00	-400.00	53896.1
-800.00	-400.00	53941.4
-850.00	-400.00	53980.2
-900.00	-400.00	53947.5
-950.00	-400.00	54045.1
-1000.00	-400.00	53972.4
-1050.00	-400.00	54000.9
-1100.00	-400.00	54247.4

-1150.00	-400.00	53994.4
-1200.00	-400.00	54019.3
-1250.00	-400.00	53872.2
-1300.00	-400.00	53996.5
-1350.00	-400.00	54041.7
-1400.00	-400.00	54087.9
-1450.00	-400.00	54012.0
-1500.00	-400.00	54075.2
-1550.00	-400.00	54045.9
-1600.00	-400.00	54036.2
-1650.00	-400.00	53985.0
-1700.00	-400.00	54034.5
-1750.00	-400.00	54038.1
-1800.00	-400.00	54067.0
-1850.00	-400.00	54058.7
-1900.00	-400.00	54054.4
-1950.00	-400.00	54054.4
-2000.00	-400.00	54055.5
-2050.00	-400.00	54056.6
-2100.00	-400.00	54054.3
-2100.00	-450.00	54048.2
-2050.00	-450.00	54012.8
-2000.00	-450.00	54056.8
-1950.00	-450.00	54051.6
-1900.00	-450.00	54065.8
-1850.00	-450.00	54010.9
-1800.00	-450.00	54017.8
-1750.00	-450.00	54054.7
-1700.00	-450.00	54027.3
-1650.00	-450.00	54016.0
-1600.00	-450.00	54099.5
-1550.00	-450.00	54033.8
-1500.00	-450.00	54016.4
-1450.00	-450.00	54126.0
-1400.00	-450.00	53998.3
-1350.00	-450.00	54064.0
-1300.00	-450.00	54041.4
-1250.00	-450.00	54225.6
-1200.00	-450.00	54018.8
-1150.00	-450.00	53991.6
-1100.00	-450.00	54025.8
-1050.00	-450.00	53969.4
-1000.00	-450.00	53943.4
-950.00	-450.00	54028.0
-900.00	-450.00	53978.0
-850.00	-450.00	53949.6
-800.00	-450.00	53901.8
-750.00	-450.00	53858.7
-700.00	-450.00	53828.8
-650.00	-450.00	54086.5
-600.00	-450.00	54361.3
-550.00	-450.00	53899.0
-500.00	-450.00	54214.4
-450.00	-450.00	54969.1

-400.00	-450.00	54501.0
-350.00	-450.00	54334.1
-300.00	-450.00	54356.8
-250.00	-450.00	54303.4
-200.00	-450.00	54192.6
-150.00	-450.00	54131.4
-100.00	-450.00	54114.2
-50.00	-450.00	54105.9
0.00	-450.00	54092.4
0.00	-500.00	54038.1
-50.00	-500.00	54028.2
-100.00	-500.00	54015.8
-150.00	-500.00	54024.1
-200.00	-500.00	54120.5
-250.00	-500.00	54285.6
-300.00	-500.00	54397.0
-350.00	-500.00	54537.7
-400.00	-500.00	54621.0
-450.00	-500.00	54548.6
-500.00	-500.00	54322.7
-550.00	-500.00	53980.8
-600.00	-500.00	53843.3
-650.00	-500.00	53800.9
-700.00	-500.00	53775.9
-750.00	-500.00	53816.3
-800.00	-500.00	53865.6
-850.00	-500.00	53929.0
-900.00	-500.00	53960.7
-950.00	-500.00	53982.6
-1000.00	-500.00	54000.7
-1050.00	-500.00	54013.4
-1100.00	-500.00	53949.1
-1150.00	-500.00	53967.9
-1200.00	-500.00	54004.6
-1250.00	-500.00	54082.9
-1300.00	-500.00	54052.9
-1350.00	-500.00	53973.4
-1400.00	-500.00	53975.3
-1450.00	-500.00	54092.0
-1500.00	-500.00	53953.8
-1550.00	-500.00	53935.9
-1600.00	-500.00	54011.8
-1650.00	-500.00	53974.5
-1700.00	-500.00	53962.4
-1750.00	-500.00	54066.6
-1800.00	-500.00	54019.2
-1850.00	-500.00	54077.4
-1900.00	-500.00	54018.7
-1950.00	-500.00	54081.5
-2000.00	-500.00	54070.2
-2050.00	-500.00	54038.9
-2100.00	-500.00	54049.0
-2100.00	-550.00	54049.7
-2050.00	-550.00	54052.3

-2000.00	-550.00	54045.4
-1950.00	-550.00	54051.9
-1900.00	-550.00	54063.8
-1850.00	-550.00	54073.4
-1800.00	-550.00	53995.3
-1750.00	-550.00	54050.5
-1700.00	-550.00	54042.2
-1650.00	-550.00	54045.1
-1600.00	-550.00	54042.2
-1550.00	-550.00	54054.6
-1500.00	-550.00	54042.3
-1450.00	-550.00	54036.8
-1400.00	-550.00	54037.8
-1350.00	-550.00	54038.2
-1300.00	-550.00	54029.8
-1250.00	-550.00	54030.5
-1200.00	-550.00	54035.1
-1150.00	-550.00	54037.0
-1100.00	-550.00	54022.2
-1050.00	-550.00	54003.7
-1000.00	-550.00	53990.9
-950.00	-550.00	53974.2
-900.00	-550.00	53943.0
-850.00	-550.00	53901.3
-800.00	-550.00	53891.5
-750.00	-550.00	53768.3
-700.00	-550.00	53761.0
-650.00	-550.00	53772.8
-600.00	-550.00	54034.4
-550.00	-550.00	54302.8
-500.00	-550.00	54430.2
-450.00	-550.00	54597.8
-400.00	-550.00	54762.4
-350.00	-550.00	54660.0
-300.00	-550.00	54458.4
-250.00	-550.00	54293.5
-200.00	-550.00	54118.5
-150.00	-550.00	53996.7
-100.00	-550.00	53971.6
-50.00	-550.00	53983.8
0.00	-550.00	53963.8
0.00	-600.00	53982.3
-50.00	-600.00	53992.5
-100.00	-600.00	54010.6
-150.00	-600.00	54093.2
-200.00	-600.00	54184.4
-250.00	-600.00	54288.5
-300.00	-600.00	54422.5
-350.00	-600.00	54645.6
-400.00	-600.00	54693.2
-450.00	-600.00	54676.0
-500.00	-600.00	54616.3
-550.00	-600.00	54547.9
-600.00	-600.00	54372.6

-650.00	-600.00	54018.1
-700.00	-600.00	53889.1
-750.00	-600.00	53850.1
-800.00	-600.00	53864.0
-850.00	-600.00	53905.4
-900.00	-600.00	53954.2
-950.00	-600.00	53987.5
-1000.00	-600.00	54011.4
-1050.00	-600.00	54022.3
-1100.00	-600.00	54028.9
-1150.00	-600.00	54041.7
-1200.00	-600.00	54042.3
-1250.00	-600.00	54046.9
-1300.00	-600.00	54050.0
-1350.00	-600.00	54052.6
-1400.00	-600.00	54053.5
-1450.00	-600.00	54054.5
-1500.00	-600.00	54058.8
-1550.00	-600.00	54061.4
-1600.00	-600.00	54058.1
-1650.00	-600.00	54065.6
-1700.00	-600.00	54064.3
-1750.00	-600.00	54076.9
-1800.00	-600.00	54073.9
-1850.00	-600.00	54072.6
-1900.00	-600.00	54079.8
-1950.00	-600.00	54070.5
-2000.00	-600.00	54070.7
-2050.00	-600.00	54071.6
-2100.00	-600.00	54069.3
-2100.00	-650.00	54070.9
-2050.00	-650.00	54073.7
-2000.00	-650.00	54071.9
-1950.00	-650.00	54071.5
-1900.00	-650.00	54070.9
-1850.00	-650.00	54067.8
-1800.00	-650.00	54074.1
-1750.00	-650.00	54069.4
-1700.00	-650.00	54065.9
-1650.00	-650.00	54071.1
-1600.00	-650.00	54070.3
-1550.00	-650.00	54065.1
-1500.00	-650.00	54066.1
-1450.00	-650.00	54059.0
-1400.00	-650.00	54061.8
-1350.00	-650.00	54062.1
-1300.00	-650.00	54054.3
-1250.00	-650.00	54068.6
-1200.00	-650.00	54046.1
-1150.00	-650.00	54045.0
-1100.00	-650.00	54028.1
-1050.00	-650.00	54018.8
-1000.00	-650.00	54010.7
-950.00	-650.00	53987.0

-900.00	-650.00	53956.5
-850.00	-650.00	53936.3
-800.00	-650.00	53987.7
-750.00	-650.00	54016.7
-700.00	-650.00	54060.4
-650.00	-650.00	54205.3
-600.00	-650.00	54481.0
-550.00	-650.00	54686.5
-500.00	-650.00	54702.3
-450.00	-650.00	54666.3
-400.00	-650.00	54661.3
-350.00	-650.00	54536.5
-300.00	-650.00	54438.4
-250.00	-650.00	54388.8
-200.00	-650.00	54328.9
-150.00	-650.00	54217.7
-100.00	-650.00	54065.0
-50.00	-650.00	54005.4
0.00	-650.00	53992.3
0.00	-700.00	53219.8
-50.00	-700.00	54020.6
-100.00	-700.00	54086.7
-150.00	-700.00	54268.9
-200.00	-700.00	54434.7
-250.00	-700.00	54459.0
-300.00	-700.00	54501.3
-350.00	-700.00	54542.9
-400.00	-700.00	54614.9
-450.00	-700.00	54629.8
-500.00	-700.00	54628.0
-550.00	-700.00	54722.0
-600.00	-700.00	54704.3
-650.00	-700.00	54447.2
-700.00	-700.00	54207.1
-750.00	-700.00	54148.5
-800.00	-700.00	54063.5
-850.00	-700.00	53978.8
-900.00	-700.00	53973.6
-950.00	-700.00	53992.9
-1000.00	-700.00	54011.4
-1050.00	-700.00	54019.4
-1100.00	-700.00	54026.2
-1150.00	-700.00	54026.1
-1200.00	-700.00	54032.4
-1250.00	-700.00	54031.0
-1300.00	-700.00	54028.2
-1350.00	-700.00	54015.0
-1400.00	-700.00	54038.6
-1450.00	-700.00	54049.4
-1500.00	-700.00	54051.0
-1550.00	-700.00	54051.5
-1600.00	-700.00	54056.2
-1650.00	-700.00	54055.8
-1700.00	-700.00	54062.4

-1750.00	-700.00	54055.9
-1800.00	-700.00	54063.9
-1850.00	-700.00	54064.2
-1900.00	-700.00	54064.5
-1950.00	-700.00	54064.6
-2000.00	-700.00	54065.7
-2050.00	-700.00	54063.5
-2100.00	-700.00	54057.5

GEOPHYSICAL DATA FOR N-TEAD

CHEMICAL RANGE AREA

MAGNETIC MEASUREMENTS ON FEBRUARY 9, 1988

COORDINATES NORTHING (FT.)	EASTING (FT.)	TOTAL FIELD INTENSITY (GAMMAS)
0.00	0.00	53920.1
-25.00	0.00	54072.0
-50.00	0.00	54002.2
-75.00	0.00	54022.4
-100.00	0.00	53987.9
-125.00	0.00	53859.4
-150.00	0.00	54016.5
-175.00	0.00	54001.9
-200.00	0.00	53891.7
-225.00	0.00	54027.0
-250.00	0.00	54008.6
-275.00	0.00	53603.9
-300.00	0.00	54014.5
-325.00	0.00	54025.2
-350.00	0.00	54025.4
-350.00	25.00	54058.1
-325.00	25.00	54057.0
-300.00	25.00	54054.8
-275.00	25.00	54045.3
-250.00	25.00	54046.8
-225.00	25.00	54045.9
-200.00	25.00	54039.1
-175.00	25.00	54042.9
-150.00	25.00	54045.3
-125.00	25.00	54038.3
-100.00	25.00	54043.8
-75.00	25.00	54050.5
-50.00	25.00	54062.9
-25.00	25.00	54044.6
0.00	25.00	53979.9
0.00	50.00	53960.4
-25.00	50.00	54100.3
-50.00	50.00	54138.2
-75.00	50.00	54094.5
-100.00	50.00	54068.5
-125.00	50.00	54055.1
-150.00	50.00	54051.5
-175.00	50.00	54050.7
-200.00	50.00	54051.8
-225.00	50.00	54050.0
-250.00	50.00	54051.8
-275.00	50.00	54053.4
-300.00	50.00	54056.8

-325.00	50.00	54055.2
-350.00	50.00	54053.9
-350.00	75.00	54055.9
-325.00	75.00	54058.2
-300.00	75.00	54056.6
-275.00	75.00	54054.5
-250.00	75.00	54051.9
-225.00	75.00	54050.9
-200.00	75.00	54053.8
-175.00	75.00	54054.2
-150.00	75.00	54059.2
-125.00	75.00	54062.5
-100.00	75.00	54101.7
-75.00	75.00	54400.8
-50.00	75.00	54473.0
-25.00	75.00	54051.1
0.00	75.00	53997.5
0.00	100.00	53981.8
-25.00	100.00	54490.6
-50.00	100.00	54061.3
-75.00	100.00	54279.2
-100.00	100.00	54051.1
-125.00	100.00	54052.8
-150.00	100.00	54051.2
-175.00	100.00	54052.3
-200.00	100.00	54055.2
-225.00	100.00	54058.4
-250.00	100.00	54061.1
-275.00	100.00	54060.2
-300.00	100.00	54059.1
-325.00	100.00	54056.4
-350.00	100.00	54053.8
-350.00	125.00	54060.8
-325.00	125.00	54056.5
-300.00	125.00	54057.3
-275.00	125.00	54055.2
-250.00	125.00	54055.3
-225.00	125.00	54055.4
-200.00	125.00	54054.7
-175.00	125.00	54051.7
-150.00	125.00	54047.5
-125.00	125.00	54049.9
-100.00	125.00	54027.5
-75.00	125.00	53938.7
-50.00	125.00	54030.3
-25.00	125.00	54232.2
0.00	125.00	53880.5
0.00	150.00	53962.0
-25.00	150.00	53786.5
-50.00	150.00	53796.5
-75.00	150.00	53960.5
-100.00	150.00	54031.3
-125.00	150.00	54053.6
-150.00	150.00	54046.8

-175.00	150.00	54052.8
-200.00	150.00	54057.0
-225.00	150.00	54060.4
-250.00	150.00	54058.0
-275.00	150.00	54055.9
-300.00	150.00	54055.4
-325.00	150.00	54056.5
-350.00	150.00	54057.0
-350.00	175.00	54058.1
-325.00	175.00	54057.6
-300.00	175.00	54060.6
-275.00	175.00	54057.1
-250.00	175.00	54058.2
-225.00	175.00	54058.1
-200.00	175.00	54058.7
-175.00	175.00	54053.2
-150.00	175.00	54046.8
-125.00	175.00	54040.6
-100.00	175.00	54035.9
-75.00	175.00	54029.6
-50.00	175.00	54031.6
-25.00	175.00	54031.6
0.00	175.00	54038.8
0.00	200.00	54057.5
-50.00	200.00	54063.9
-75.00	200.00	54053.3
-100.00	200.00	54048.7
-125.00	200.00	54050.6
-150.00	200.00	54052.8
-175.00	200.00	54056.5
-200.00	200.00	54062.2
-225.00	200.00	54057.5
-250.00	200.00	54058.8
-275.00	200.00	54057.1
-300.00	200.00	54056.4
-325.00	200.00	54057.9
-350.00	200.00	54058.9
-350.00	225.00	54063.9
-325.00	225.00	54061.3
-300.00	225.00	54057.9
-275.00	225.00	54058.3
-250.00	225.00	54054.7
-225.00	225.00	54054.2
-200.00	225.00	54056.3
-175.00	225.00	54058.6
-150.00	225.00	54055.9
-125.00	225.00	54051.1
-100.00	225.00	54049.2
-75.00	225.00	54057.4
-50.00	225.00	54060.8
-25.00	225.00	54056.6
0.00	225.00	54049.7
0.00	250.00	54050.3
-25.00	250.00	54052.5

-50.00	250.00	54062.3
-75.00	250.00	54060.5
-100.00	250.00	54053.6
-125.00	250.00	54053.8
-150.00	250.00	54054.1
-175.00	250.00	54050.2
-200.00	250.00	54045.9
-225.00	250.00	54050.0
-250.00	250.00	54053.1
-275.00	250.00	54050.4
-300.00	250.00	54057.9
-325.00	250.00	54059.1
-350.00	250.00	54059.6

TNT Washout Facility

Base Station EM Measurements on 12 February 1988

Coordinates Northing (ft)	Coordinates Easting (ft)	Time Hour	Time Minute	Apparent Conductivity Horizontal Coils (Millimho/Meter)
0	0	08	00	14
0	0			21
0	0			21
0	0	11	45	19

Base Station EM Measurements on 8 July 1988

Coordinates Northing (ft)	Coordinates Easting (ft)	Time	Apparent Conductivity Horizontal Coils (Millimho/Meter)	Apparent Conductivity Vertical Coils (Millimho/Meter)
-650	-1,250		91	88
-650	-1,250		90	90.5

Sanitary Landfill

Base Station Magnetometer Measurements on 6 July 1988

Coordinates Northing (ft)	Coordinates Easting (ft)	Time Hour	Time Minute	Total Field Intensity (Gammas)
-1,300	-1,250	13	28	54,099
-1,300	-1,250	14	32	54,098
-1,300	-1,250	15	10	54,093
-1,300	-1,250	17	04	54,109

Base Station EM Measurements on 7 July 1988

Coordinates Northing (ft)	Coordinates Easting (ft)	Time Hour	Time Minute	Apparent Conductivity Horizontal Coils (Millimho/Meter)	Apparent Conductivity Vertical Coils (Millimho/Meter)
-1,300	-1,250	08	00	47	32
-1,300	-1,250	11	47	46	30
-1,300	- 900	13	48	6	4
-1,300	- 900	17	13	7	6

APPENDIX J

LABORATORY ANALYTICAL RESULTS

INSTALLATION RESTORATION PROGRAM

CHEMICAL REPORT
Tue Nov 27 10:02:00 1990

For Parameters :

Installation = Tooele AD (North Area)
Beginning Date = 01-jan-1988
Ending Date = 27-nov-90
Media Type = Chemical Ground Water (CGW)
Maximum (X, Y) = (399450, 4505264)
Minimum (X, Y) = (374200, 4483142)
Booleans = Y

Analytical Results for Chemical Ground Water
From: 01-jan-1988 To: 27-nov-90

Site: WELL N-110-88

SAMPLE DEPTH (ft)	SAMPLE DATE	TEST METHOD	COMPOUND	BOOL	CONCENTRATION	UNITS
298.0	22-nov-1988	TF01	NIT	LT	5000.000	UGL
298.0	22-nov-1988	TT01	SO4		224000.000	UGL
298.0	22-nov-1988	UW01	135TNB	LT	0.560	UGL
298.0	22-nov-1988	UW01	13DNB	LT	0.610	UGL
298.0	22-nov-1988	UW01	246TNT	LT	0.780	UGL
298.0	22-nov-1988	UW01	24DNT	LT	0.600	UGL
298.0	22-nov-1988	UW01	26DNT	LT	0.550	UGL
298.0	22-nov-1988	UW01	HMX	LT	1.300	UGL
298.0	22-nov-1988	UW01	NB	LT	1.130	UGL
298.0	22-nov-1988	UW01	RDX	LT	0.630	UGL
298.0	22-nov-1988	UW01	TETRYL	LT	0.660	UGL

Site: WELL N-111-88

SAMPLE DEPTH (ft)	SAMPLE DATE	TEST METHOD	COMPOUND	BOOL	CONCENTRATION	UNITS
327.1	06-nov-1988	99	124TCB	ND	10.000	UGL
327.1	06-nov-1988	99	12DCLB	ND	10.000	UGL
327.1	06-nov-1988	99	12DPH	ND	10.000	UGL
327.1	06-nov-1988	99	13DCLB	ND	10.000	UGL
327.1	06-nov-1988	99	14DCLB	ND	10.000	UGL
327.1	06-nov-1988	99	246TCP	ND	10.000	UGL
327.1	06-nov-1988	99	24DCLP	ND	10.000	UGL
327.1	06-nov-1988	99	24DMPN	ND	10.000	UGL
327.1	06-nov-1988	99	24DNP	ND	10.000	UGL
327.1	06-nov-1988	99	24DNT	ND	10.000	UGL
327.1	06-nov-1988	99	26DNT	ND	10.000	UGL
327.1	06-nov-1988	99	2CLP	ND	10.000	UGL
327.1	06-nov-1988	99	2CNAP	ND	10.000	UGL
327.1	06-nov-1988	99	2NP	ND	10.000	UGL
327.1	06-nov-1988	99	33DCBD	ND	20.000	UGL
327.1	06-nov-1988	99	46DN2C	ND	50.000	UGL
327.1	06-nov-1988	99	4CL3C	ND	10.000	UGL
327.1	06-nov-1988	99	4CLPPE	ND	10.000	UGL
327.1	06-nov-1988	99	ABHC	ND	3.000	UGL
327.1	06-nov-1988	99	AENSLF	ND	3.000	UGL
327.1	06-nov-1988	99	ALDRN	ND	3.000	UGL
327.1	06-nov-1988	99	ANAPNE	ND	10.000	UGL
327.1	06-nov-1988	99	ANAPYL	ND	10.000	UGL
327.1	06-nov-1988	99	ANTRC	ND	10.000	UGL
327.1	06-nov-1988	99	B2CEXM	ND	10.000	UGL
327.1	06-nov-1988	99	B2CLEE	ND	10.000	UGL
327.1	06-nov-1988	99	B2EHP	ND	10.000	UGL
327.1	06-nov-1988	99	BAANTR	ND	10.000	UGL

Analytical Results for Chemical Ground Water
From: 01-jan-1988 To: 27-nov-90

Site: WELL N-111-88 (continued)

SAMPLE DEPTH (ft)	SAMPLE DATE	TEST METHOD	COMPOUND	BOOL	CONCENTRATION	UNITS
327.1	06-nov-1988	99	BAPYR	ND	10.000	UGL
327.1	06-nov-1988	99	BBFANT	ND	10.000	UGL
327.1	06-nov-1988	99	BBHC	ND	3.000	UGL
327.1	06-nov-1988	99	BBZP	ND	10.000	UGL
327.1	06-nov-1988	99	BENSLF	ND	6.000	UGL
327.1	06-nov-1988	99	BENZID	ND	50.000	UGL
327.1	06-nov-1988	99	BGHIPY	ND	10.000	UGL
327.1	06-nov-1988	99	BKFANT	ND	10.000	UGL
327.1	06-nov-1988	99	CHRY	ND	10.000	UGL
327.1	06-nov-1988	99	CL6BZ	ND	10.000	UGL
327.1	06-nov-1988	99	CL6CP	ND	10.000	UGL
327.1	06-nov-1988	99	CL6ET	ND	10.000	UGL
327.1	06-nov-1988	99	CLDAN	ND	3.000	UGL
327.1	06-nov-1988	99	DBAHA	ND	10.000	UGL
327.1	06-nov-1988	99	DBHC	ND	3.000	UGL
327.1	06-nov-1988	99	DEP	ND	10.000	UGL
327.1	06-nov-1988	99	DLDRN	ND	6.000	UGL
327.1	06-nov-1988	99	DMP	ND	10.000	UGL
327.1	06-nov-1988	99	DNBP	ND	10.000	UGL
327.1	06-nov-1988	99	DNOP	ND	10.000	UGL
327.1	06-nov-1988	99	ENDRN	ND	6.000	UGL
327.1	06-nov-1988	99	ENDRNA	ND	20.000	UGL
327.1	06-nov-1988	99	ESFSO4	ND	6.000	UGL
327.1	06-nov-1988	99	FANT	ND	10.000	UGL
327.1	06-nov-1988	99	FLRENE	ND	10.000	UGL
327.1	06-nov-1988	99	HCBD	ND	10.000	UGL
327.1	06-nov-1988	99	HPCL	ND	3.000	UGL
327.1	06-nov-1988	99	HPCLE	ND	3.000	UGL
327.1	06-nov-1988	99	ICDPYR	ND	10.000	UGL
327.1	06-nov-1988	99	ISOPHR	ND	10.000	UGL
327.1	06-nov-1988	99	LIN	LT	1.090	UGL
327.1	06-nov-1988	99	NAP	ND	10.000	UGL
327.1	06-nov-1988	99	NB	ND	10.000	UGL
327.1	06-nov-1988	99	NNDMEA	ND	10.000	UGL
327.1	06-nov-1988	99	NNDPA	ND	10.000	UGL
327.1	06-nov-1988	99	PCB016	ND	30.000	UGL
327.1	06-nov-1988	99	PCB221	ND	30.000	UGL
327.1	06-nov-1988	99	PCB232	ND	30.000	UGL
327.1	06-nov-1988	99	PCB242	ND	30.000	UGL
327.1	06-nov-1988	99	PCB248	ND	30.000	UGL
327.1	06-nov-1988	99	PCB254	ND	60.000	UGL
327.1	06-nov-1988	99	PCB260	ND	60.000	UGL
327.1	06-nov-1988	99	PCP	ND	50.000	UGL
327.1	06-nov-1988	99	PHANTR	ND	10.000	UGL
327.1	06-nov-1988	99	PHENOL	ND	10.000	UGL
327.1	06-nov-1988	99	PPDDD	ND	6.000	UGL
327.1	06-nov-1988	99	PYR	ND	10.000	UGL
327.1	06-nov-1988	99	TXPHEN	ND	60.000	UGL

Analytical Results for Chemical Ground Water
From: 01-jan-1988 To: 27-nov-90

Site: WELL N-111-88 (continued)

SAMPLE DEPTH (ft)	SAMPLE DATE	TEST METHOD	COMPOUND	BOOL	CONCENTRATION	UNITS
327.1	06-nov-1988	SB09	HG	LT	0.170	UGL
327.1	06-nov-1988	SB09	HG	LT	0.170	UGL
327.1	06-nov-1988	SD01	AG		0.213	UGL
327.1	06-nov-1988	SD01	AG	LT	0.202	UGL
327.1	06-nov-1988	SD01	AS		17.600	UGL
327.1	06-nov-1988	SD01	AS	LT	5.180	UGL
327.1	06-nov-1988	SD01	BE		0.402	UGL
327.1	06-nov-1988	SD01	BE	LT	0.104	UGL
327.1	06-nov-1988	SD01	CD	LT	5.480	UGL
327.1	06-nov-1988	SD01	CD	LT	5.480	UGL
327.1	06-nov-1988	SD01	CR	LT	36.100	UGL
327.1	06-nov-1988	SD01	CR	LT	36.100	UGL
327.1	06-nov-1988	SD01	CU		37.700	UGL
327.1	06-nov-1988	SD01	CU		3.110	UGL
327.1	06-nov-1988	SD01	PB		14.100	UGL
327.1	06-nov-1988	SD01	PB		2.530	UGL
327.1	06-nov-1988	SD01	SB	LT	3.410	UGL
327.1	06-nov-1988	SD01	SB	LT	3.410	UGL
327.1	06-nov-1988	SD01	SE	LT	4.810	UGL
327.1	06-nov-1988	SD01	SE	LT	4.810	UGL
327.1	06-nov-1988	SD01	TL	LT	5.040	UGL
327.1	06-nov-1988	SD01	TL	LT	5.040	UGL
327.1	06-nov-1988	SS07	BA		137.000	UGL
327.1	06-nov-1988	SS07	BA		70.700	UGL
327.1	06-nov-1988	SS07	NI		42.200	UGL
327.1	06-nov-1988	SS07	NI	LT	9.600	UGL
327.1	06-nov-1988	SS07	ZN		125.000	UGL
327.1	06-nov-1988	SS07	ZN		21.100	UGL
327.1	06-nov-1988	TF01	NIT	LT	5000.000	UGL
327.1	06-nov-1988	TT01	SO4		216000.000	UGL
3.2	06-nov-1988	UM20	111TCE	LT	0.500	UGL
3.2	06-nov-1988	UM20	112TCE	LT	1.200	UGL
3.2	06-nov-1988	UM20	11DCE	LT	0.500	UGL
3.2	06-nov-1988	UM20	11DCLE	LT	0.680	UGL
3.2	06-nov-1988	UM20	12DCE	LT	0.500	UGL
3.2	06-nov-1988	UM20	12DCLE	LT	0.500	UGL
3.2	06-nov-1988	UM20	12DCLP	LT	0.500	UGL
3.2	06-nov-1988	UM20	2CLEVE	LT	0.710	UGL
3.2	06-nov-1988	UM20	ACET	LT	13.000	UGL
3.2	06-nov-1988	UM20	ACROLN	ND	100.000	UGL
3.2	06-nov-1988	UM20	ACRYLO	ND	100.000	UGL
3.2	06-nov-1988	UM20	BRDCLM	LT	0.590	UGL
3.2	06-nov-1988	UM20	C13DCP	LT	0.580	UGL

Analytical Results for Chemical Ground Water
From: 01-jan-1988 To: 27-nov-90

Site: WELL N-111-88 (continued)

SAMPLE DEPTH (ft)	SAMPLE DATE	TEST METHOD	COMPOUND	BOOL	CONCENTRATION	UNITS
3.2	06-nov-1988	UM20	C2AVE	LT	8.300	UGL
3.2	06-nov-1988	UM20	C2H3CL	LT	2.600	UGL
3.2	06-nov-1988	UM20	C2H5CL	LT	1.900	UGL
3.2	06-nov-1988	UM20	C6H6	LT	0.500	UGL
3.2	06-nov-1988	UM20	CCL3F	LT	1.400	UGL
3.2	06-nov-1988	UM20	CCL4	LT	0.580	UGL
3.2	06-nov-1988	UM20	CH2CL2	LT	2.300	UGL
3.2	06-nov-1988	UM20	CH3BR	LT	5.800	UGL
3.2	06-nov-1988	UM20	CH3CL	LT	3.200	UGL
3.2	06-nov-1988	UM20	CHBR3	LT	2.600	UGL
3.2	06-nov-1988	UM20	CHCL3	LT	0.500	UGL
3.2	06-nov-1988	UM20	CL2BZ	ND	10.000	UGL
3.2	06-nov-1988	UM20	CLC6H5	LT	0.500	UGL
3.2	06-nov-1988	UM20	CS2	LT	0.500	UGL
3.2	06-nov-1988	UM20	DBRCLM	LT	0.670	UGL
3.2	06-nov-1988	UM20	ETC6H5	LT	0.500	UGL
3.2	06-nov-1988	UM20	MEC6H5	LT	0.500	UGL
3.2	06-nov-1988	UM20	MEK	LT	6.400	UGL
3.2	06-nov-1988	UM20	MIBK	LT	3.000	UGL
3.2	06-nov-1988	UM20	MNBK	LT	3.600	UGL
3.2	06-nov-1988	UM20	STYR	LT	0.500	UGL
3.2	06-nov-1988	UM20	T13DCP	LT	0.700	UGL
3.2	06-nov-1988	UM20	TCLEA	LT	0.510	UGL
3.2	06-nov-1988	UM20	TCLEE	LT	1.600	UGL
3.2	06-nov-1988	UM20	TPCLE	LT	0.500	UGL
3.2	06-nov-1988	UM20	XYLEN	LT	0.840	UGL
327.1	06-nov-1988	UW01	135TNB	LT	0.560	UGL
327.1	06-nov-1988	UW01	13DNB	LT	0.610	UGL
327.1	06-nov-1988	UW01	246TNT	LT	0.780	UGL
327.1	06-nov-1988	UW01	24DNT	LT	0.600	UGL
327.1	06-nov-1988	UW01	26DNT	LT	0.550	UGL
327.1	06-nov-1988	UW01	HMX	LT	1.300	UGL
327.1	06-nov-1988	UW01	NB	LT	1.130	UGL
327.1	06-nov-1988	UW01	RDX	LT	0.630	UGL
327.1	06-nov-1988	UW01	TETRYL	LT	0.660	UGL

Analytical Results for Chemical Ground Water
From: 01-jan-1988 To: 27-nov-90

Site: WELL N-112-88

SAMPLE DEPTH (ft)	SAMPLE DATE	TEST METHOD	COMPOUND	BOOL	CONCENTRATION	UNITS
319.2	07-nov-1988	99	124TCB	ND	10.000	UGL
319.2	07-nov-1988	99	12DCLB	ND	10.000	UGL
319.2	07-nov-1988	99	12DPH	ND	10.000	UGL
319.2	07-nov-1988	99	13DCLB	ND	10.000	UGL
319.2	07-nov-1988	99	14DCLB	ND	10.000	UGL
319.2	07-nov-1988	99	246TCP	ND	10.000	UGL
319.2	07-nov-1988	99	24DCLP	ND	10.000	UGL
319.2	07-nov-1988	99	24DMPN	ND	10.000	UGL
319.2	07-nov-1988	99	24DNP	ND	10.000	UGL
319.2	07-nov-1988	99	24DNT	ND	10.000	UGL
319.2	07-nov-1988	99	26DNT	ND	10.000	UGL
319.2	07-nov-1988	99	2CLP	ND	10.000	UGL
319.2	07-nov-1988	99	2CNAP	ND	10.000	UGL
319.2	07-nov-1988	99	2NP	ND	10.000	UGL
319.2	07-nov-1988	99	33DCBD	ND	20.000	UGL
319.2	07-nov-1988	99	46DN2C	ND	50.000	UGL
319.2	07-nov-1988	99	4CL3C	ND	10.000	UGL
319.2	07-nov-1988	99	4CLPPE	ND	10.000	UGL
319.2	07-nov-1988	99	ABHC	ND	3.000	UGL
319.2	07-nov-1988	99	AENSLF	ND	3.000	UGL
319.2	07-nov-1988	99	ALDRN	ND	3.000	UGL
319.2	07-nov-1988	99	ANAPNE	ND	10.000	UGL
319.2	07-nov-1988	99	ANAPYL	ND	10.000	UGL
319.2	07-nov-1988	99	ANTRC	ND	10.000	UGL
319.2	07-nov-1988	99	B2CEXM	ND	10.000	UGL
319.2	07-nov-1988	99	B2CLEE	ND	10.000	UGL
319.2	07-nov-1988	99	B2EHP	ND	10.000	UGL
319.2	07-nov-1988	99	BAANTR	ND	10.000	UGL
319.2	07-nov-1988	99	BAPYR	ND	10.000	UGL
319.2	07-nov-1988	99	BBFANT	ND	10.000	UGL
319.2	07-nov-1988	99	BBHC	ND	3.000	UGL
319.2	07-nov-1988	99	BBZP	ND	10.000	UGL
319.2	07-nov-1988	99	BENSLF	ND	6.000	UGL
319.2	07-nov-1988	99	BENZID	ND	50.000	UGL
319.2	07-nov-1988	99	BGHIPY	ND	10.000	UGL
319.2	07-nov-1988	99	BKFANT	ND	10.000	UGL
319.2	07-nov-1988	99	CHRY	ND	10.000	UGL
319.2	07-nov-1988	99	CL6BZ	ND	10.000	UGL
319.2	07-nov-1988	99	CL6CP	ND	10.000	UGL
319.2	07-nov-1988	99	CL6ET	ND	10.000	UGL
319.2	07-nov-1988	99	CLDAN	ND	3.000	UGL
319.2	07-nov-1988	99	DBAHA	ND	10.000	UGL
319.2	07-nov-1988	99	DBHC	ND	3.000	UGL
319.2	07-nov-1988	99	DEP	ND	10.000	UGL
319.2	07-nov-1988	99	DLDRN	ND	6.000	UGL
319.2	07-nov-1988	99	DMP	ND	10.000	UGL
319.2	07-nov-1988	99	DNBP	ND	10.000	UGL
319.2	07-nov-1988	99	DNOP	ND	10.000	UGL

Analytical Results for Chemical Ground Water
From: 01-jan-1988 To: 27-nov-90

Site: WELL N-112-88 (continued)

SAMPLE DEPTH (ft)	SAMPLE DATE	TEST METHOD	COMPOUND	BOOL	CONCENTRATION	UNITS
319.2	07-nov-1988	99	ENDRN	ND	6.000	UGL
319.2	07-nov-1988	99	ENDRNA	ND	20.000	UGL
319.2	07-nov-1988	99	ESFSO4	ND	6.000	UGL
319.2	07-nov-1988	99	FANT	ND	10.000	UGL
319.2	07-nov-1988	99	FLRENE	ND	10.000	UGL
319.2	07-nov-1988	99	HCBD	ND	10.000	UGL
319.2	07-nov-1988	99	HPCL	ND	3.000	UGL
319.2	07-nov-1988	99	HPCLE	ND	3.000	UGL
319.2	07-nov-1988	99	ICDPYR	ND	10.000	UGL
319.2	07-nov-1988	99	ISOPHR	ND	10.000	UGL
319.2	07-nov-1988	99	LIN	LT	1.090	UGL
319.2	07-nov-1988	99	NAP	ND	10.000	UGL
319.2	07-nov-1988	99	NB	ND	10.000	UGL
319.2	07-nov-1988	99	NNDMEA	ND	10.000	UGL
319.2	07-nov-1988	99	NNDPA	ND	10.000	UGL
319.2	07-nov-1988	99	PCB016	ND	30.000	UGL
319.2	07-nov-1988	99	PCB221	ND	30.000	UGL
319.2	07-nov-1988	99	PCB232	ND	30.000	UGL
319.2	07-nov-1988	99	PCB242	ND	30.000	UGL
319.2	07-nov-1988	99	PCB248	ND	30.000	UGL
319.2	07-nov-1988	99	PCB254	ND	60.000	UGL
319.2	07-nov-1988	99	PCB260	ND	60.000	UGL
319.2	07-nov-1988	99	PCP	ND	50.000	UGL
319.2	07-nov-1988	99	PHANTR	ND	10.000	UGL
319.2	07-nov-1988	99	PHENOL	ND	10.000	UGL
319.2	07-nov-1988	99	PPDDD	ND	6.000	UGL
319.2	07-nov-1988	99	PYR	ND	10.000	UGL
319.2	07-nov-1988	99	TXPHEN	ND	60.000	UGL
319.2	07-nov-1988	SB09	HG	LT	0.170	UGL
319.2	07-nov-1988	SB09	HG	LT	0.170	UGL
319.2	07-nov-1988	SD01	AG		2.560	UGL
319.2	07-nov-1988	SD01	AG		0.213	UGL
319.2	07-nov-1988	SD01	AS		6.110	UGL
319.2	07-nov-1988	SD01	AS	LT	5.180	UGL
319.2	07-nov-1988	SD01	BE		1.610	UGL
319.2	07-nov-1988	SD01	BE	LT	0.104	UGL
319.2	07-nov-1988	SD01	CD	LT	5.480	UGL
319.2	07-nov-1988	SD01	CD	LT	5.480	UGL
319.2	07-nov-1988	SD01	CR		51.900	UGL
319.2	07-nov-1988	SD01	CR	LT	36.100	UGL
319.2	07-nov-1988	SD01	CU		220.000	UGL
319.2	07-nov-1988	SD01	CU	LT	1.910	UGL
319.2	07-nov-1988	SD01	PB		45.100	UGL
319.2	07-nov-1988	SD01	PB	LT	2.530	UGL
319.2	07-nov-1988	SD01	SB	LT	3.410	UGL
319.2	07-nov-1988	SD01	SB	LT	3.410	UGL

Analytical Results for Chemical Ground Water
From: 01-jan-1988 To: 27-nov-90

Site: WELL N-112-88 (continued)

SAMPLE DEPTH (ft)	SAMPLE DATE	TEST METHOD	COMPOUND	BOOL	CONCENTRATION	UNITS
319.2	07-nov-1988	SD01	SE	LT	4.810	UGL
319.2	07-nov-1988	SD01	SE		6.150	UGL
319.2	07-nov-1988	SD01	TL	LT	5.040	UGL
319.2	07-nov-1988	SD01	TL	LT	5.040	UGL
319.2	07-nov-1988	SS07	BA		488.000	UGL
319.2	07-nov-1988	SS07	BA		83.400	UGL
319.2	07-nov-1988	SS07	NI		184.000	UGL
319.2	07-nov-1988	SS07	NI		42.000	UGL
319.2	07-nov-1988	SS07	ZN		438.000	UGL
319.2	07-nov-1988	SS07	ZN		65.700	UGL
319.2	07-nov-1988	TF01	NIT		10000.000	UGL
319.2	07-nov-1988	TT01	SO4		154000.000	UGL
3.1	07-nov-1988	UM20	111TCE	LT	0.500	UGL
3.1	07-nov-1988	UM20	112TCE	LT	1.200	UGL
3.1	07-nov-1988	UM20	11DCE	LT	0.500	UGL
3.1	07-nov-1988	UM20	11DCLE	LT	0.680	UGL
3.1	07-nov-1988	UM20	12DCE	LT	0.500	UGL
3.1	07-nov-1988	UM20	12DCLE	LT	0.500	UGL
3.1	07-nov-1988	UM20	12DCLP	LT	0.500	UGL
3.1	07-nov-1988	UM20	2CLEVE	LT	0.710	UGL
3.1	07-nov-1988	UM20	ACET	LT	13.000	UGL
3.1	07-nov-1988	UM20	ACROLN	ND	100.000	UGL
3.1	07-nov-1988	UM20	ACRYLO	ND	100.000	UGL
3.1	07-nov-1988	UM20	BRDCLM	LT	0.590	UGL
3.1	07-nov-1988	UM20	C13DCP	LT	0.580	UGL
3.1	07-nov-1988	UM20	C2AVE	LT	8.300	UGL
3.1	07-nov-1988	UM20	C2H3CL	LT	2.600	UGL
3.1	07-nov-1988	UM20	C2H5CL	LT	1.900	UGL
3.1	07-nov-1988	UM20	C6H6	LT	0.500	UGL
3.1	07-nov-1988	UM20	CCL3F	LT	1.400	UGL
3.1	07-nov-1988	UM20	CCL4	LT	0.580	UGL
3.1	07-nov-1988	UM20	CH2CL2	LT	2.300	UGL
3.1	07-nov-1988	UM20	CH3BR	LT	5.800	UGL
3.1	07-nov-1988	UM20	CH3CL	LT	3.200	UGL
3.1	07-nov-1988	UM20	CHBR3	LT	2.600	UGL
3.1	07-nov-1988	UM20	CHCL3	LT	0.500	UGL
3.1	07-nov-1988	UM20	CL2BZ	ND	10.000	UGL
3.1	07-nov-1988	UM20	CLC6H5	LT	0.500	UGL
3.1	07-nov-1988	UM20	CS2	LT	0.500	UGL
3.1	07-nov-1988	UM20	DBRCLM	LT	0.670	UGL
3.1	07-nov-1988	UM20	ETC6H5	LT	0.500	UGL
3.1	07-nov-1988	UM20	MEC6H5	LT	0.500	UGL
3.1	07-nov-1988	UM20	MEK	LT	6.400	UGL
3.1	07-nov-1988	UM20	MIBK	LT	3.000	UGL

Analytical Results for Chemical Ground Water
From: 01-jan-1988 To: 27-nov-90

Site: WELL N-112-88 (continued)

SAMPLE DEPTH (ft)	SAMPLE DATE	TEST METHOD	COMPOUND	BOOL	CONCENTRATION	UNITS
3.1	07-nov-1988	UM20	MNBK	LT	3.600	UGL
3.1	07-nov-1988	UM20	STYR	LT	0.500	UGL
3.1	07-nov-1988	UM20	T13DCP	LT	0.700	UGL
3.1	07-nov-1988	UM20	TCLEA	LT	0.510	UGL
3.1	07-nov-1988	UM20	TCLEE	LT	1.600	UGL
3.1	07-nov-1988	UM20	TRCLE	LT	0.500	UGL
3.1	07-nov-1988	UM20	XYLEN	LT	0.840	UGL
319.2	07-nov-1988	UW01	135TNB	LT	0.560	UGL
319.2	07-nov-1988	UW01	13DNB	LT	0.610	UGL
319.2	07-nov-1988	UW01	246TNT	LT	0.780	UGL
319.2	07-nov-1988	UW01	24DNT	LT	0.600	UGL
319.2	07-nov-1988	UW01	26DNT	LT	0.550	UGL
319.2	07-nov-1988	UW01	HMX	LT	1.300	UGL
319.2	07-nov-1988	UW01	NB	LT	1.130	UGL
319.2	07-nov-1988	UW01	RDX	LT	0.630	UGL
319.2	07-nov-1988	UW01	TETRYL	LT	0.660	UGL

Site: WELL N-114-88

SAMPLE DEPTH (ft)	SAMPLE DATE	TEST METHOD	COMPOUND	BOOL	CONCENTRATION	UNITS
324.2	07-nov-1988	99	124TCB	ND	10.000	UGL
324.2	07-nov-1988	99	12DCLB	ND	10.000	UGL
324.2	07-nov-1988	99	12DPH	ND	10.000	UGL
324.2	07-nov-1988	99	13DCLB	ND	10.000	UGL
324.2	07-nov-1988	99	14DCLB	ND	10.000	UGL
324.2	07-nov-1988	99	246TCP	ND	10.000	UGL
324.2	07-nov-1988	99	24DCLP	ND	10.000	UGL
324.2	07-nov-1988	99	24DMPN	ND	10.000	UGL
324.2	07-nov-1988	99	24DNP	ND	10.000	UGL
324.2	07-nov-1988	99	24DNT	ND	10.000	UGL
324.2	07-nov-1988	99	26DNT	ND	10.000	UGL
324.2	07-nov-1988	99	2CLP	ND	10.000	UGL
324.2	07-nov-1988	99	2CNAP	ND	10.000	UGL
324.2	07-nov-1988	99	2NP	ND	10.000	UGL
324.2	07-nov-1988	99	33DCBD	ND	20.000	UGL
324.2	07-nov-1988	99	46DN2C	ND	50.000	UGL
324.2	07-nov-1988	99	4CL3C	ND	10.000	UGL
324.2	07-nov-1988	99	4CLPPE	ND	10.000	UGL
324.2	07-nov-1988	99	ABHC	ND	3.000	UGL
324.2	07-nov-1988	99	AENSLF	ND	3.000	UGL
324.2	07-nov-1988	99	ALDRN	ND	3.000	UGL
324.2	07-nov-1988	99	ANAPNE	ND	10.000	UGL
324.2	07-nov-1988	99	ANAPYL	ND	10.000	UGL
324.2	07-nov-1988	99	ANTRC	ND	10.000	UGL

Analytical Results for Chemical Ground Water
From: 01-jan-1988 To: 27-nov-90

Site: WELL N-114-88 (continued)

SAMPLE DEPTH (ft)	SAMPLE DATE	TEST METHOD	COMPOUND	BOOL	CONCENTRATION	UNITS
324.2	07-nov-1988	99	B2CEXM	ND	10.000	UGL
324.2	07-nov-1988	99	B2CLEE	ND	10.000	UGL
324.2	07-nov-1988	99	B2EHP		790.000	UGL
324.2	07-nov-1988	99	BAANTR	ND	10.000	UGL
324.2	07-nov-1988	99	BAPYR	ND	10.000	UGL
324.2	07-nov-1988	99	BBFANT	ND	10.000	UGL
324.2	07-nov-1988	99	BBHC	ND	3.000	UGL
324.2	07-nov-1988	99	BBZP	ND	10.000	UGL
324.2	07-nov-1988	99	BENSLF	ND	6.000	UGL
324.2	07-nov-1988	99	BENZID	ND	50.000	UGL
324.2	07-nov-1988	99	BGHIPY	ND	10.000	UGL
324.2	07-nov-1988	99	BKFANT	ND	10.000	UGL
324.2	07-nov-1988	99	CHRY	ND	10.000	UGL
324.2	07-nov-1988	99	CL6BZ	ND	10.000	UGL
324.2	07-nov-1988	99	CL6CP	ND	10.000	UGL
324.2	07-nov-1988	99	CL6ET	ND	10.000	UGL
324.2	07-nov-1988	99	CLDAN	ND	3.000	UGL
324.2	07-nov-1988	99	DBAHA	ND	10.000	UGL
324.2	07-nov-1988	99	DBHC	ND	3.000	UGL
324.2	07-nov-1988	99	DEP	ND	10.000	UGL
324.2	07-nov-1988	99	DLDRN	ND	6.000	UGL
324.2	07-nov-1988	99	DMP	ND	10.000	UGL
324.2	07-nov-1988	99	DNBP	ND	10.000	UGL
324.2	07-nov-1988	99	DNOP	ND	10.000	UGL
324.2	07-nov-1988	99	ENDRN	ND	6.000	UGL
324.2	07-nov-1988	99	ENDRNA	ND	20.000	UGL
324.2	07-nov-1988	99	ESFSO4	ND	6.000	UGL
324.2	07-nov-1988	99	FANT	ND	10.000	UGL
324.2	07-nov-1988	99	FLRENE	ND	10.000	UGL
324.2	07-nov-1988	99	HCBD	ND	10.000	UGL
324.2	07-nov-1988	99	HPCL	ND	3.000	UGL
324.2	07-nov-1988	99	HPCLE	ND	3.000	UGL
324.2	07-nov-1988	99	ICDPYR	ND	10.000	UGL
324.2	07-nov-1988	99	ISOPHR	ND	10.000	UGL
324.2	07-nov-1988	99	LIN	LT	1.090	UGL
324.2	07-nov-1988	99	NAP	ND	10.000	UGL
324.2	07-nov-1988	99	NB	ND	10.000	UGL
324.2	07-nov-1988	99	NNDMEA	ND	10.000	UGL
324.2	07-nov-1988	99	NNDPA	ND	10.000	UGL
324.2	07-nov-1988	99	PCB016	ND	30.000	UGL
324.2	07-nov-1988	99	PCB221	ND	30.000	UGL
324.2	07-nov-1988	99	PCB232	ND	30.000	UGL
324.2	07-nov-1988	99	PCB242	ND	30.000	UGL
324.2	07-nov-1988	99	PCB248	ND	30.000	UGL
324.2	07-nov-1988	99	PCB254	ND	60.000	UGL
324.2	07-nov-1988	99	PCB260	ND	60.000	UGL
324.2	07-nov-1988	99	PCP	ND	50.000	UGL
324.2	07-nov-1988	99	PHANTR	ND	10.000	UGL

Analytical Results for Chemical Ground Water
From: 01-jan-1988 To: 27-nov-90

Site: WELL N-114-88 (continued)

SAMPLE DEPTH (ft)	SAMPLE DATE	TEST METHOD	COMPOUND	BOOL	CONCENTRATION	UNITS
324.2	07-nov-1988	99	PHENOL	ND	10.000	UGL
324.2	07-nov-1988	99	PPDDD	ND	6.000	UGL
324.2	07-nov-1988	99	PYR	ND	10.000	UGL
324.2	07-nov-1988	99	TXPHEN	ND	60.000	UGL
324.2	07-nov-1988	SB09	HG	LT	0.170	UGL
324.2	07-nov-1988	SB09	HG	LT	0.170	UGL
324.2	07-nov-1988	SD01	AG	LT	0.202	UGL
324.2	07-nov-1988	SD01	AG	LT	0.202	UGL
324.2	07-nov-1988	SD01	AS		7.660	UGL
324.2	07-nov-1988	SD01	AS	LT	5.180	UGL
324.2	07-nov-1988	SD01	BE	LT	0.104	UGL
324.2	07-nov-1988	SD01	BE	LT	0.104	UGL
324.2	07-nov-1988	SD01	CD	LT	5.480	UGL
324.2	07-nov-1988	SD01	CD	LT	5.480	UGL
324.2	07-nov-1988	SD01	CR	LT	36.100	UGL
324.2	07-nov-1988	SD01	CR	LT	36.100	UGL
324.2	07-nov-1988	SD01	CU		37.300	UGL
324.2	07-nov-1988	SD01	CU		12.300	UGL
324.2	07-nov-1988	SD01	PB		24.200	UGL
324.2	07-nov-1988	SD01	PB	LT	2.530	UGL
324.2	07-nov-1988	SD01	SB	LT	3.410	UGL
324.2	07-nov-1988	SD01	SB	LT	3.410	UGL
324.2	07-nov-1988	SD01	SE	LT	4.810	UGL
324.2	07-nov-1988	SD01	SE	LT	4.810	UGL
324.2	07-nov-1988	SD01	TL	LT	5.040	UGL
324.2	07-nov-1988	SD01	TL	LT	5.040	UGL
324.2	07-nov-1988	SS07	BA		107.000	UGL
324.2	07-nov-1988	SS07	BA		93.200	UGL
324.2	07-nov-1988	SS07	NI		294.000	UGL
324.2	07-nov-1988	SS07	NI	LT	9.600	UGL
324.2	07-nov-1988	SS07	ZN		470.000	UGL
324.2	07-nov-1988	SS07	ZN		64.600	UGL
324.2	07-nov-1988	TF01	NIT		5000.000	UGL
324.2	07-nov-1988	TT01	SO4		218000.000	UGL
3.2	07-nov-1988	UM20	111TCE	LT	0.500	UGL
3.2	07-nov-1988	UM20	112TCE	LT	1.200	UGL
3.2	07-nov-1988	UM20	11DCE	LT	0.500	UGL
3.2	07-nov-1988	UM20	11DCLE	LT	0.680	UGL
3.2	07-nov-1988	UM20	12DCE	LT	0.500	UGL
3.2	07-nov-1988	UM20	12DCLE	LT	0.500	UGL
3.2	07-nov-1988	UM20	12DCLP	LT	0.500	UGL
3.2	07-nov-1988	UM20	2CLEVE	LT	0.710	UGL

Analytical Results for Chemical Ground Water
From: 01-jan-1988 To: 27-nov-90

Site: WELL N-114-88 (continued)

SAMPLE DEPTH (ft)	SAMPLE DATE	TEST METHOD	COMPOUND	BOOL	CONCENTRATION	UNITS
3.2	07-nov-1988	UM20	ACET	LT	13.000	UGL
3.2	07-nov-1988	UM20	ACROLN	ND	100.000	UGL
3.2	07-nov-1988	UM20	ACRYLO	ND	100.000	UGL
3.2	07-nov-1988	UM20	BRDCLM	LT	0.590	UGL
3.2	07-nov-1988	UM20	C13DCP	LT	0.580	UGL
3.2	07-nov-1988	UM20	C2AVE	LT	8.300	UGL
3.2	07-nov-1988	UM20	C2H3CL	LT	2.600	UGL
3.2	07-nov-1988	UM20	C2H5CL	LT	1.900	UGL
3.2	07-nov-1988	UM20	C6H6	LT	0.500	UGL
3.2	07-nov-1988	UM20	CCL3F	LT	1.400	UGL
3.2	07-nov-1988	UM20	CCL4	LT	0.580	UGL
3.2	07-nov-1988	UM20	CH2CL2	LT	2.300	UGL
3.2	07-nov-1988	UM20	CH3BR	LT	5.800	UGL
3.2	07-nov-1988	UM20	CH3CL	LT	3.200	UGL
3.2	07-nov-1988	UM20	CHBR3	LT	2.600	UGL
3.2	07-nov-1988	UM20	CHCL3	LT	0.500	UGL
3.2	07-nov-1988	UM20	CL2BZ	ND	10.000	UGL
3.2	07-nov-1988	UM20	CLC6H5	LT	0.500	UGL
3.2	07-nov-1988	UM20	CS2	LT	0.500	UGL
3.2	07-nov-1988	UM20	DBRCLM	LT	0.670	UGL
3.2	07-nov-1988	UM20	ETC6H5	LT	0.500	UGL
3.2	07-nov-1988	UM20	MEC6H5	LT	0.500	UGL
3.2	07-nov-1988	UM20	MEK	LT	6.400	UGL
3.2	07-nov-1988	UM20	MIBK	LT	3.000	UGL
3.2	07-nov-1988	UM20	MNBK	LT	3.600	UGL
3.2	07-nov-1988	UM20	STYR	LT	0.500	UGL
3.2	07-nov-1988	UM20	T13DCP	LT	0.700	UGL
3.2	07-nov-1988	UM20	TCLEA	LT	0.510	UGL
3.2	07-nov-1988	UM20	TCLEE	LT	1.600	UGL
3.2	07-nov-1988	UM20	TRCLE	LT	0.500	UGL
3.2	07-nov-1988	UM20	XYLEN	LT	0.840	UGL
324.2	07-nov-1988	UW01	135TNB	LT	0.560	UGL
324.2	07-nov-1988	UW01	13DNB	LT	0.610	UGL
324.2	07-nov-1988	UW01	246TNT	LT	0.780	UGL
324.2	07-nov-1988	UW01	24DNT	LT	0.600	UGL
324.2	07-nov-1988	UW01	26DNT	LT	0.550	UGL
324.2	07-nov-1988	UW01	HMX	LT	1.300	UGL
324.2	07-nov-1988	UW01	NB	LT	1.130	UGL
324.2	07-nov-1988	UW01	RDX	LT	0.630	UGL
324.2	07-nov-1988	UW01	TETRYL	LT	0.660	UGL

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From: 01-jan-1988 To: 27-nov-90

Site: WELL N-115-88

SAMPLE DEPTH (ft)	SAMPLE DATE	TEST METHOD	COMPOUND	BOOL	CONCENTRATION	UNITS
285.9	15-nov-1988	99	111TCE	ND	5.000	UGL
285.9	15-nov-1988	99	112TCE	ND	5.000	UGL
285.9	15-nov-1988	99	11DCE	LT	1.920	UGL
285.9	15-nov-1988	99	11DCLE	ND	5.000	UGL
286.0	15-nov-1988	99	124TCB	ND	10.000	UGL
286.0	15-nov-1988	99	12DCLB	ND	10.000	UGL
285.9	15-nov-1988	99	12DCLB	ND	10.000	UGL
285.9	15-nov-1988	99	12DCLE	ND	5.000	UGL
285.9	15-nov-1988	99	12DCLP	ND	5.000	UGL
286.0	15-nov-1988	99	12DPH	ND	10.000	UGL
286.0	15-nov-1988	99	13DCLB	ND	10.000	UGL
285.9	15-nov-1988	99	13DCLB	ND	10.000	UGL
286.0	15-nov-1988	99	14DCLB	ND	10.000	UGL
285.9	15-nov-1988	99	14DCLB	ND	10.000	UGL
286.0	15-nov-1988	99	246TCP	ND	10.000	UGL
286.0	15-nov-1988	99	24DCLP	ND	10.000	UGL
286.0	15-nov-1988	99	24DMPN	ND	10.000	UGL
286.0	15-nov-1988	99	24DNP	ND	10.000	UGL
286.0	15-nov-1988	99	24DNT	ND	10.000	UGL
286.0	15-nov-1988	99	26DNT	ND	10.000	UGL
285.9	15-nov-1988	99	2CLEVE	ND	5.000	UGL
286.0	15-nov-1988	99	2CLP	ND	10.000	UGL
286.0	15-nov-1988	99	2CNAP	ND	10.000	UGL
286.0	15-nov-1988	99	2NP	ND	10.000	UGL
286.0	15-nov-1988	99	33DCBD	ND	20.000	UGL
286.0	15-nov-1988	99	46DN2C	ND	50.000	UGL
286.0	15-nov-1988	99	4CL3C	ND	10.000	UGL
286.0	15-nov-1988	99	4CLPPE	ND	10.000	UGL
286.0	15-nov-1988	99	ABHC	ND	3.000	UGL
286.0	15-nov-1988	99	AENSLF	ND	3.000	UGL
286.0	15-nov-1988	99	ALDRN	ND	3.000	UGL
286.0	15-nov-1988	99	ANAPNE	ND	10.000	UGL
286.0	15-nov-1988	99	ANAPYL	ND	10.000	UGL
286.0	15-nov-1988	99	ANTRC	ND	10.000	UGL
286.0	15-nov-1988	99	B2CEXM	ND	10.000	UGL
286.0	15-nov-1988	99	B2CLEE	ND	10.000	UGL
286.0	15-nov-1988	99	B2ENP	ND	10.000	UGL
286.0	15-nov-1988	99	BAANTR	ND	10.000	UGL
286.0	15-nov-1988	99	BAPYR	ND	10.000	UGL
286.0	15-nov-1988	99	BBFANT	ND	10.000	UGL
286.0	15-nov-1988	99	BBHC	ND	3.000	UGL
286.0	15-nov-1988	99	BBZP	ND	10.000	UGL
286.0	15-nov-1988	99	BENSLF	ND	6.000	UGL
286.0	15-nov-1988	99	BENZID	ND	50.000	UGL
286.0	15-nov-1988	99	BGHIPY	ND	10.000	UGL
286.0	15-nov-1988	99	BKFANT	ND	10.000	UGL
285.9	15-nov-1988	99	BRDCLM	ND	5.000	UGL
285.9	15-nov-1988	99	C13DCP	ND	5.000	UGL

Analytical Results for Chemical Ground Water
From: 01-jan-1988 To: 27-nov-90

Site: WELL N-115-88 (continued)

SAMPLE DEPTH (ft)	SAMPLE DATE	TEST METHOD	COMPOUND	BOOL	CONCENTRATION	UNITS
285.9	15-nov-1988	99	C2H3CL	LT	3.860	UGL
285.9	15-nov-1988	99	C2H5CL	ND	10.000	UGL
285.9	15-nov-1988	99	C6H6	LT	0.673	UGL
285.9	15-nov-1988	99	CCL4	ND	5.000	UGL
285.9	15-nov-1988	99	CH2CL2	ND	5.000	UGL
285.9	15-nov-1988	99	CH3BR	ND	10.000	UGL
285.9	15-nov-1988	99	CH3CL	ND	10.000	UGL
285.9	15-nov-1988	99	CHBR3	ND	5.000	UGL
285.9	15-nov-1988	99	CHCL3	ND	5.000	UGL
286.0	15-nov-1988	99	CHRY	ND	10.000	UGL
286.0	15-nov-1988	99	CL6BZ	ND	10.000	UGL
286.0	15-nov-1988	99	CL6CP	ND	10.000	UGL
286.0	15-nov-1988	99	CL6ET	ND	10.000	UGL
285.9	15-nov-1988	99	CLC6H5	ND	5.000	UGL
286.0	15-nov-1988	99	CLDAN	ND	3.000	UGL
286.0	15-nov-1988	99	DBAHA	ND	10.000	UGL
286.0	15-nov-1988	99	DBHC	ND	3.000	UGL
285.9	15-nov-1988	99	DBRCLM	ND	5.000	UGL
286.0	15-nov-1988	99	DEP	ND	10.000	UGL
286.0	15-nov-1988	99	DLDRN	ND	6.000	UGL
286.0	15-nov-1988	99	DMP	ND	10.000	UGL
286.0	15-nov-1988	99	DNBP	ND	10.000	UGL
286.0	15-nov-1988	99	DNOP	ND	10.000	UGL
286.0	15-nov-1988	99	ENDRN	ND	6.000	UGL
286.0	15-nov-1988	99	ENDRNA	ND	20.000	UGL
286.0	15-nov-1988	99	ESFSO4	ND	6.000	UGL
285.9	15-nov-1988	99	ETC6H5	ND	5.000	UGL
286.0	15-nov-1988	99	FANT	ND	10.000	UGL
286.0	15-nov-1988	99	FLRENE	ND	10.000	UGL
286.0	15-nov-1988	99	HCBD	ND	10.000	UGL
286.0	15-nov-1988	99	HPCL	ND	3.000	UGL
286.0	15-nov-1988	99	HPCLE	ND	3.000	UGL
286.0	15-nov-1988	99	ICDPYR	ND	10.000	UGL
286.0	15-nov-1988	99	ISOPHR	ND	10.000	UGL
286.0	15-nov-1988	99	LIN	LT	1.090	UGL
285.9	15-nov-1988	99	MEC6H5	ND	5.000	UGL
286.0	15-nov-1988	99	NAP	ND	10.000	UGL
286.0	15-nov-1988	99	NB	ND	10.000	UGL
286.0	15-nov-1988	99	NNDMEA	ND	10.000	UGL
286.0	15-nov-1988	99	NNDPA	ND	10.000	UGL
286.0	15-nov-1988	99	PCB016	ND	30.000	UGL
286.0	15-nov-1988	99	PCB221	ND	30.000	UGL
286.0	15-nov-1988	99	PCB232	ND	30.000	UGL
286.0	15-nov-1988	99	PCB242	ND	30.000	UGL
286.0	15-nov-1988	99	PCB248	ND	30.000	UGL
286.0	15-nov-1988	99	PCB254	ND	60.000	UGL
286.0	15-nov-1988	99	PCB260	ND	60.000	UGL
286.0	15-nov-1988	99	PCP	ND	50.000	UGL

Analytical Results for Chemical Ground Water
From: 01-jan-1988 To: 27-nov-90

Site: WELL N-115-88 (continued)

SAMPLE DEPTH (ft)	SAMPLE DATE	TEST METHOD	COMPOUND	BOOL	CONCENTRATION	UNITS
286.0	15-nov-1988	99	PHANTR	ND	10.000	UGL
286.0	15-nov-1988	99	PHENOL	ND	10.000	UGL
286.0	15-nov-1988	99	PPDDD	ND	6.000	UGL
286.0	15-nov-1988	99	PYR	ND	10.000	UGL
285.9	15-nov-1988	99	T12DCE	LT	1.720	UGL
285.9	15-nov-1988	99	T13DCP	ND	5.000	UGL
285.9	15-nov-1988	99	TCLEA	ND	5.000	UGL
285.9	15-nov-1988	99	TCLEE	ND	5.000	UGL
285.9	15-nov-1988	99	TRCLE		4.170	UGL
286.0	15-nov-1988	99	TXPHEN	ND	60.000	UGL
285.9	15-nov-1988	99	UNK105		13.000	UGL
285.9	15-nov-1988	99	UNK141		190.000	UGL
285.9	15-nov-1988	99	UNK156		50.000	UGL
285.9	15-nov-1988	S809	HG	LT	0.170	UGL
285.9	15-nov-1988	S809	HG	LT	0.170	UGL
286.0	15-nov-1988	SD01	AG	LT	0.202	UGL
286.0	15-nov-1988	SD01	AG		0.532	UGL
286.0	15-nov-1988	SD01	AS		5.380	UGL
286.0	15-nov-1988	SD01	AS	LT	5.180	UGL
286.0	15-nov-1988	SD01	BE	LT	0.104	UGL
286.0	15-nov-1988	SD01	BE	LT	0.104	UGL
286.0	15-nov-1988	SD01	CD	LT	5.480	UGL
286.0	15-nov-1988	SD01	CD	LT	5.480	UGL
286.0	15-nov-1988	SD01	CR	LT	36.100	UGL
286.0	15-nov-1988	SD01	CR	LT	36.100	UGL
286.0	15-nov-1988	SD01	CU		17.000	UGL
286.0	15-nov-1988	SD01	CU		6.540	UGL
286.0	15-nov-1988	SD01	PB		17.800	UGL
286.0	15-nov-1988	SD01	PB		4.150	UGL
286.0	15-nov-1988	SD01	SB	LT	3.410	UGL
286.0	15-nov-1988	SD01	SB	LT	3.410	UGL
286.0	15-nov-1988	SD01	SE	LT	4.810	UGL
286.0	15-nov-1988	SD01	SE	LT	4.810	UGL
286.0	15-nov-1988	SD01	TL	LT	5.040	UGL
286.0	15-nov-1988	SD01	TL	LT	5.040	UGL
286.0	15-nov-1988	SS07	BA		99.700	UGL
286.0	15-nov-1988	SS07	BA		107.000	UGL
286.0	15-nov-1988	SS07	NI		58.300	UGL
286.0	15-nov-1988	SS07	NI	LT	9.600	UGL
286.0	15-nov-1988	SS07	ZN		1900.000	UGL
286.0	15-nov-1988	SS07	ZN		2400.000	UGL
286.0	15-nov-1988	TF01	NIT		174000.000	UGL
285.9	15-nov-1988	TT01	SO4		174000.000	UGL

Analytical Results for Chemical Ground Water
From: 01-jan-1988 To: 27-nov-90

Site: WELL N-115-88 (continued)

SAMPLE DEPTH (ft)	SAMPLE DATE	TEST METHOD	COMPOUND	BOOL	CONCENTRATION	UNITS
285.9	15-nov-1988	UW01	135TNB	LT	0.560	UGL
285.9	15-nov-1988	UW01	13DNB	LT	0.610	UGL
285.9	15-nov-1988	UW01	246TNT	LT	0.780	UGL
285.9	15-nov-1988	UW01	24DNT	LT	0.600	UGL
285.9	15-nov-1988	UW01	26DNT	LT	0.550	UGL
285.9	15-nov-1988	UW01	HMX	LT	1.300	UGL
285.9	15-nov-1988	UW01	NB	LT	1.130	UGL
285.9	15-nov-1988	UW01	RDX		8.560	UGL
285.9	15-nov-1988	UW01	TETRYL	LT	0.660	UGL

Site: WELL N-116-88

SAMPLE DEPTH (ft)	SAMPLE DATE	TEST METHOD	COMPOUND	BOOL	CONCENTRATION	UNITS
274.9	15-nov-1988	99	111TCE	ND	5.000	UGL
274.9	15-nov-1988	99	112TCE	ND	5.000	UGL
274.9	15-nov-1988	99	11DCE	LT	1.920	UGL
274.9	15-nov-1988	99	11DCLE	ND	5.000	UGL
275.0	15-nov-1988	99	124TCB	ND	10.000	UGL
275.0	15-nov-1988	99	12DCLB	ND	10.000	UGL
274.9	15-nov-1988	99	12DCLB	ND	10.000	UGL
274.9	15-nov-1988	99	12DCLE	ND	5.000	UGL
274.9	15-nov-1988	99	12DCLP	ND	5.000	UGL
275.0	15-nov-1988	99	12DPH	ND	10.000	UGL
275.0	15-nov-1988	99	13DCLB	ND	10.000	UGL
274.9	15-nov-1988	99	13DCLB	ND	10.000	UGL
275.0	15-nov-1988	99	14DCLB	ND	10.000	UGL
274.9	15-nov-1988	99	14DCLB	ND	10.000	UGL
275.0	15-nov-1988	99	246TCP	ND	10.000	UGL
275.0	15-nov-1988	99	24DCLP	ND	10.000	UGL
275.0	15-nov-1988	99	24DMPN	ND	10.000	UGL
275.0	15-nov-1988	99	24DNP	ND	10.000	UGL
275.0	15-nov-1988	99	24DNT	ND	10.000	UGL
275.0	15-nov-1988	99	26DNT	ND	10.000	UGL
274.9	15-nov-1988	99	2CLEVE	ND	5.000	UGL
275.0	15-nov-1988	99	2CLP	ND	10.000	UGL
275.0	15-nov-1988	99	2CNAP	ND	10.000	UGL
275.0	15-nov-1988	99	2NP	ND	10.000	UGL
275.0	15-nov-1988	99	33DCBD	ND	20.000	UGL
275.0	15-nov-1988	99	46DN2C	ND	50.000	UGL
275.0	15-nov-1988	99	4CL3C	ND	10.000	UGL
275.0	15-nov-1988	99	4CLPPE	ND	10.000	UGL
275.0	15-nov-1988	99	ABHC	ND	3.000	UGL
275.0	15-nov-1988	99	AENSLF	ND	3.000	UGL
275.0	15-nov-1988	99	ALDRN	ND	3.000	UGL
275.0	15-nov-1988	99	ANAPNE	ND	10.000	UGL

Analytical Results for Chemical Ground Water
From: 01-jan-1988 To: 27-nov-90

Site: WELL N-116-88 (continued)

SAMPLE DEPTH (ft)	SAMPLE DATE	TEST METHOD	COMPOUND	BOOL	CONCENTRATION	UNITS
275.0	15-nov-1988	99	ANAPYL	ND	10.000	UGL
275.0	15-nov-1988	99	ANTRC	ND	10.000	UGL
275.0	15-nov-1988	99	B2CEXM	ND	10.000	UGL
275.0	15-nov-1988	99	B2CLEE	ND	10.000	UGL
275.0	15-nov-1988	99	B2EHP	ND	10.000	UGL
275.0	15-nov-1988	99	BAANTR	ND	10.000	UGL
275.0	15-nov-1988	99	BAPYR	ND	10.000	UGL
275.0	15-nov-1988	99	BBFANT	ND	10.000	UGL
275.0	15-nov-1988	99	BBHC	ND	3.000	UGL
275.0	15-nov-1988	99	BBZP	ND	10.000	UGL
275.0	15-nov-1988	99	BENSLF	ND	6.000	UGL
275.0	15-nov-1988	99	BENZID	ND	50.000	UGL
275.0	15-nov-1988	99	BGHIPY	ND	10.000	UGL
275.0	15-nov-1988	99	BKFANT	ND	10.000	UGL
274.9	15-nov-1988	99	BRDCLM	ND	5.000	UGL
274.9	15-nov-1988	99	C13DCP	ND	5.000	UGL
274.9	15-nov-1988	99	C2H3CL	LT	3.860	UGL
274.9	15-nov-1988	99	C2H5CL	ND	10.000	UGL
274.9	15-nov-1988	99	C6H6	LT	0.673	UGL
274.9	15-nov-1988	99	CCL4	ND	5.000	UGL
274.9	15-nov-1988	99	CH2CL2	ND	5.000	UGL
274.9	15-nov-1988	99	CH3BR	ND	10.000	UGL
274.9	15-nov-1988	99	CH3CL	ND	10.000	UGL
274.9	15-nov-1988	99	CHBR3	ND	5.000	UGL
274.9	15-nov-1988	99	CHCL3	ND	5.000	UGL
275.0	15-nov-1988	99	CHRY	ND	10.000	UGL
275.0	15-nov-1988	99	CL6BZ	ND	10.000	UGL
275.0	15-nov-1988	99	CL6CP	ND	10.000	UGL
275.0	15-nov-1988	99	CL6ET	ND	10.000	UGL
274.9	15-nov-1988	99	CLC6H5	ND	5.000	UGL
275.0	15-nov-1988	99	CLDAN	ND	3.000	UGL
275.0	15-nov-1988	99	DBAHA	ND	10.000	UGL
275.0	15-nov-1988	99	DBHC	ND	3.000	UGL
274.9	15-nov-1988	99	DBRCLM	ND	5.000	UGL
275.0	15-nov-1988	99	DEP	ND	10.000	UGL
275.0	15-nov-1988	99	DLDRN	ND	6.000	UGL
275.0	15-nov-1988	99	DMP	ND	10.000	UGL
275.0	15-nov-1988	99	DNBP	ND	10.000	UGL
275.0	15-nov-1988	99	DNOP	ND	10.000	UGL
275.0	15-nov-1988	99	ENDRN	ND	6.000	UGL
275.0	15-nov-1988	99	ENDRNA	ND	20.000	UGL
275.0	15-nov-1988	99	ESFSO4	ND	6.000	UGL
274.9	15-nov-1988	99	ETC6H5	ND	5.000	UGL
275.0	15-nov-1988	99	FANT	ND	10.000	UGL
275.0	15-nov-1988	99	FLRENE	ND	10.000	UGL
275.0	15-nov-1988	99	HC8D	ND	10.000	UGL
275.0	15-nov-1988	99	HPCL	ND	3.000	UGL
275.0	15-nov-1988	99	HPCLE	ND	3.000	UGL

Analytical Results for Chemical Ground Water
From: 01-jan-1988 To: 27-nov-90

Site: WELL N-116-88 (continued)

SAMPLE DEPTH (ft)	SAMPLE DATE	TEST METHOD	COMPOUND	BOOL	CONCENTRATION	UNITS
275.0	15-nov-1988	99	ICDPYR	ND	10.000	UGL
275.0	15-nov-1988	99	ISOPHR	ND	10.000	UGL
275.0	15-nov-1988	99	LIN	LT	1.090	UGL
274.9	15-nov-1988	99	MEC6H5	ND	5.000	UGL
275.0	15-nov-1988	99	NAP	ND	10.000	UGL
275.0	15-nov-1988	99	NB	ND	10.000	UGL
275.0	15-nov-1988	99	NNDMEA	ND	10.000	UGL
275.0	15-nov-1988	99	NNDPA	ND	10.000	UGL
275.0	15-nov-1988	99	PCB016	ND	30.000	UGL
275.0	15-nov-1988	99	PCB221	ND	30.000	UGL
275.0	15-nov-1988	99	PCB232	ND	30.000	UGL
275.0	15-nov-1988	99	PCB242	ND	30.000	UGL
275.0	15-nov-1988	99	PCB248	ND	30.000	UGL
275.0	15-nov-1988	99	PCB254	ND	60.000	UGL
275.0	15-nov-1988	99	PCB260	ND	60.000	UGL
275.0	15-nov-1988	99	PCP	ND	50.000	UGL
275.0	15-nov-1988	99	PHANTR	ND	10.000	UGL
275.0	15-nov-1988	99	PHENOL	ND	10.000	UGL
275.0	15-nov-1988	99	PPDDD	ND	6.000	UGL
275.0	15-nov-1988	99	PYR	ND	10.000	UGL
274.9	15-nov-1988	99	T12DCE		11.100	UGL
274.9	15-nov-1988	99	T13DCP	ND	5.000	UGL
274.9	15-nov-1988	99	TCLEA	ND	5.000	UGL
274.9	15-nov-1988	99	TCLEE	ND	5.000	UGL
274.9	15-nov-1988	99	TRCLE		47.600	UGL
275.0	15-nov-1988	99	TXPHEN	ND	60.000	UGL
274.9	15-nov-1988	99	UNK111		60.000	UGL
274.9	15-nov-1988	99	UNK142		40.000	UGL
274.9	15-nov-1988	99	UNK148		700.000	UGL
274.9	15-nov-1988	SB09	HG	LT	0.170	UGL
275.0	15-nov-1988	SB09	HG	LT	0.170	UGL
275.0	15-nov-1988	SD01	AG		0.319	UGL
275.0	15-nov-1988	SD01	AG	LT	0.202	UGL
275.0	15-nov-1988	SD01	AS		8.900	UGL
275.0	15-nov-1988	SD01	AS	LT	5.180	UGL
275.0	15-nov-1988	SD01	BE	LT	0.104	UGL
275.0	15-nov-1988	SD01	BE	LT	0.104	UGL
275.0	15-nov-1988	SD01	CD	LT	5.480	UGL
275.0	15-nov-1988	SD01	CD	LT	5.480	UGL
275.0	15-nov-1988	SD01	CR	LT	36.100	UGL
275.0	15-nov-1988	SD01	CR	LT	36.100	UGL
275.0	15-nov-1988	SD01	CU		36.400	UGL
275.0	15-nov-1988	SD01	CU		3.000	UGL
275.0	15-nov-1988	SD01	PB		21.300	UGL
275.0	15-nov-1988	SD01	PB	LT	2.530	UGL
275.0	15-nov-1988	SD01	SB	LT	3.410	UGL

Analytical Results for Chemical Ground Water
From: 01-jan-1988 To: 27-nov-90

Site: WELL N-116-88 (continued)

SAMPLE DEPTH (ft)	SAMPLE DATE	TEST METHOD	COMPOUND	BOOL	CONCENTRATION	UNITS
275.0	15-nov-1988	SD01	SB	LT	3.410	UGL
275.0	15-nov-1988	SD01	SE	LT	4.810	UGL
275.0	15-nov-1988	SD01	SE	LT	4.810	UGL
275.0	15-nov-1988	SD01	TL	LT	5.040	UGL
275.0	15-nov-1988	SD01	TL	LT	5.040	UGL
275.0	15-nov-1988	SS07	BA		110.000	UGL
275.0	15-nov-1988	SS07	BA		70.500	UGL
275.0	15-nov-1988	SS07	NI		39.700	UGL
275.0	15-nov-1988	SS07	NI	LT	9.600	UGL
275.0	15-nov-1988	SS07	ZN		156.000	UGL
275.0	15-nov-1988	SS07	ZN		35.200	UGL
275.0	15-nov-1988	TF01	NIT		184000.000	UGL
274.9	15-nov-1988	TT01	SO4		184000.000	UGL
274.9	15-nov-1988	UW01	135TNB	LT	0.560	UGL
274.9	15-nov-1988	UW01	13DNB	LT	0.610	UGL
274.9	15-nov-1988	UW01	246TNT	LT	0.780	UGL
274.9	15-nov-1988	UW01	24DNT	LT	0.600	UGL
274.9	15-nov-1988	UW01	26DNT	LT	0.550	UGL
274.9	15-nov-1988	UW01	HMX	LT	1.300	UGL
274.9	15-nov-1988	UW01	NB	LT	1.130	UGL
274.9	15-nov-1988	UW01	RDX	LT	3.150	UGL
274.9	15-nov-1988	UW01	TETRYL	LT	0.660	UGL

Site: WELL N-117-88

SAMPLE DEPTH (ft)	SAMPLE DATE	TEST METHOD	COMPOUND	BOOL	CONCENTRATION	UNITS
230.0	20-nov-1988	SB09	HG	LT	0.170	UGL
230.0	22-nov-1988	SB09	HG	LT	0.170	UGL
230.0	22-nov-1988	SD01	AG	LT	0.202	UGL
230.0	22-nov-1988	SD01	AG	LT	0.202	UGL
230.0	22-nov-1988	SD01	AS		5.490	UGL
230.0	22-nov-1988	SD01	AS	LT	5.180	UGL
230.0	22-nov-1988	SD01	BE	LT	0.104	UGL
230.0	22-nov-1988	SD01	BE	LT	0.104	UGL
230.0	22-nov-1988	SD01	CD	LT	5.480	UGL
230.0	22-nov-1988	SD01	CD	LT	5.480	UGL
230.0	22-nov-1988	SD01	CR	LT	36.100	UGL
230.0	22-nov-1988	SD01	CR	LT	36.100	UGL
230.0	22-nov-1988	SD01	CU		26.700	UGL
230.0	22-nov-1988	SD01	CU		4.610	UGL

Analytical Results for Chemical Ground Water
From: 01-jan-1988 To: 27-nov-90

Site: WELL N-117-88 (continued)

SAMPLE DEPTH (ft)	SAMPLE DATE	TEST METHOD	COMPOUND	BOOL	CONCENTRATION	UNITS
230.0	22-nov-1988	SD01	PB		8.490	UGL
230.0	22-nov-1988	SD01	PB	LT	2.530	UGL
230.0	22-nov-1988	SD01	SB	LT	3.410	UGL
230.0	22-nov-1988	SD01	SB	LT	3.410	UGL
230.0	22-nov-1988	SD01	SE	LT	4.810	UGL
230.0	22-nov-1988	SD01	SE	LT	4.810	UGL
230.0	22-nov-1988	SD01	TL	LT	5.040	UGL
230.0	22-nov-1988	SD01	TL	LT	5.040	UGL
230.0	22-nov-1988	SS07	BA		94.800	UGL
230.0	22-nov-1988	SS07	BA		111.000	UGL
230.0	22-nov-1988	SS07	NI		11.100	UGL
230.0	22-nov-1988	SS07	NI	LT	9.600	UGL
230.0	22-nov-1988	SS07	ZN		529.000	UGL
230.0	22-nov-1988	SS07	ZN		302.000	UGL
230.0	22-nov-1988	TF01	NIT		8000.000	UGL
230.0	22-nov-1988	TT01	SO4		169000.000	UGL
229.9	22-nov-1988	UM15	124TCB	ND	10.000	UGL
229.9	22-nov-1988	UM15	12DCLB	ND	10.000	UGL
229.9	22-nov-1988	UM15	12DPH	ND	10.000	UGL
229.9	22-nov-1988	UM15	13DCLB	ND	10.000	UGL
229.9	22-nov-1988	UM15	14DCLB	ND	10.000	UGL
229.9	22-nov-1988	UM15	246TCP	ND	10.000	UGL
229.9	22-nov-1988	UM15	24DCLP	ND	10.000	UGL
229.9	22-nov-1988	UM15	24DMPN	ND	10.000	UGL
229.9	22-nov-1988	UM15	24DNP	ND	10.000	UGL
229.9	22-nov-1988	UM15	24DNT	ND	10.000	UGL
229.9	22-nov-1988	UM15	26DNT	ND	10.000	UGL
229.9	22-nov-1988	UM15	2CLP	ND	10.000	UGL
229.9	22-nov-1988	UM15	2CNAP	ND	10.000	UGL
229.9	22-nov-1988	UM15	2NP	ND	10.000	UGL
229.9	22-nov-1988	UM15	33DCBD	ND	20.000	UGL
229.9	22-nov-1988	UM15	46DN2C	ND	50.000	UGL
229.9	22-nov-1988	UM15	4CL3C	ND	10.000	UGL
229.9	22-nov-1988	UM15	4CLPPE	ND	10.000	UGL
229.9	22-nov-1988	UM15	ABHC	ND	3.000	UGL
229.9	22-nov-1988	UM15	AENSLF	ND	3.000	UGL
229.9	22-nov-1988	UM15	ALDRN	ND	3.000	UGL
229.9	22-nov-1988	UM15	ANAPNE	ND	10.000	UGL
229.9	22-nov-1988	UM15	ANAPYL	ND	10.000	UGL
229.9	22-nov-1988	UM15	ANTRC	ND	10.000	UGL
229.9	22-nov-1988	UM15	B2CEXM	ND	10.000	UGL
229.9	22-nov-1988	UM15	B2CLEE	ND	10.000	UGL
229.9	22-nov-1988	UM15	B2EHP	ND	10.000	UGL
229.9	22-nov-1988	UM15	BAANTR	ND	10.000	UGL

Analytical Results for Chemical Ground Water
From: 01-jan-1988 To: 27-nov-90

Site: WELL N-117-88 (continued)

SAMPLE DEPTH (ft)	SAMPLE DATE	TEST METHOD	COMPOUND	BOOL	CONCENTRATION	UNITS
229.9	22-nov-1988	UM15	BAPYR	ND	10.000	UGL
229.9	22-nov-1988	UM15	BBFANT	ND	10.000	UGL
229.9	22-nov-1988	UM15	BBHC	ND	3.000	UGL
229.9	22-nov-1988	UM15	BBZP	ND	10.000	UGL
229.9	22-nov-1988	UM15	BENSLF	ND	6.000	UGL
229.9	22-nov-1988	UM15	BENZID	ND	50.000	UGL
229.9	22-nov-1988	UM15	BGHIPY	ND	10.000	UGL
229.9	22-nov-1988	UM15	BKFANT	ND	10.000	UGL
229.9	22-nov-1988	UM15	CHRY	ND	10.000	UGL
229.9	22-nov-1988	UM15	CL6BZ	ND	10.000	UGL
229.9	22-nov-1988	UM15	CL6CP	ND	10.000	UGL
229.9	22-nov-1988	UM15	CL6ET	ND	10.000	UGL
229.9	22-nov-1988	UM15	CLDAN	ND	3.000	UGL
229.9	22-nov-1988	UM15	DBAHA	ND	10.000	UGL
229.9	22-nov-1988	UM15	DBHC	ND	3.000	UGL
229.9	22-nov-1988	UM15	DEP	ND	10.000	UGL
229.9	22-nov-1988	UM15	DLDRN	ND	6.000	UGL
229.9	22-nov-1988	UM15	DMP	ND	10.000	UGL
229.9	22-nov-1988	UM15	DNBP	ND	10.000	UGL
229.9	22-nov-1988	UM15	DNOP	ND	10.000	UGL
229.9	22-nov-1988	UM15	ENDRN	ND	6.000	UGL
229.9	22-nov-1988	UM15	ENDRNA	ND	20.000	UGL
229.9	22-nov-1988	UM15	ESFSO4	ND	6.000	UGL
229.9	22-nov-1988	UM15	FANT	ND	10.000	UGL
229.9	22-nov-1988	UM15	FLRENE	ND	10.000	UGL
229.9	22-nov-1988	UM15	HCBD	ND	10.000	UGL
229.9	22-nov-1988	UM15	HPCL	ND	3.000	UGL
229.9	22-nov-1988	UM15	HPCLE	ND	3.000	UGL
229.9	22-nov-1988	UM15	ICDPYR	ND	10.000	UGL
229.9	22-nov-1988	UM15	ISOPHR	ND	10.000	UGL
229.9	22-nov-1988	UM15	LIN	LT	1.090	UGL
229.9	22-nov-1988	UM15	NAP	ND	10.000	UGL
229.9	22-nov-1988	UM15	NB	ND	10.000	UGL
229.9	22-nov-1988	UM15	NNDMEA	ND	10.000	UGL
229.9	22-nov-1988	UM15	NNDPA	ND	10.000	UGL
229.9	22-nov-1988	UM15	PCB016	ND	30.000	UGL
229.9	22-nov-1988	UM15	PCB221	ND	30.000	UGL
229.9	22-nov-1988	UM15	PCB232	ND	30.000	UGL
229.9	22-nov-1988	UM15	PCB242	ND	30.000	UGL
229.9	22-nov-1988	UM15	PCB248	ND	30.000	UGL
229.9	22-nov-1988	UM15	PCB254	ND	60.000	UGL
229.9	22-nov-1988	UM15	PCB260	ND	60.000	UGL
229.9	22-nov-1988	UM15	PCP	ND	50.000	UGL
229.9	22-nov-1988	UM15	PHANTR	ND	10.000	UGL
229.9	22-nov-1988	UM15	PHENOL	ND	10.000	UGL
229.9	22-nov-1988	UM15	PPDDD	ND	6.000	UGL
229.9	22-nov-1988	UM15	PYR	ND	10.000	UGL
229.9	22-nov-1988	UM15	TXPHEN	ND	60.000	UGL

Analytical Results for Chemical Ground Water
From: 01-jan-1988 To: 27-nov-90

Site: WELL N-117-88 (continued)

SAMPLE DEPTH (ft)	SAMPLE DATE	TEST METHOD	COMPOUND	BOOL	CONCENTRATION	UNITS
230.0	22-nov-1988	UW01	135TNB	LT	0.560	UGL
230.0	22-nov-1988	UW01	13DNB	LT	0.610	UGL
230.0	22-nov-1988	UW01	246TNT	LT	0.780	UGL
230.0	22-nov-1988	UW01	24DNT	LT	0.600	UGL
230.0	22-nov-1988	UW01	26DNT	LT	0.550	UGL
230.0	22-nov-1988	UW01	HMX	LT	1.300	UGL
230.0	22-nov-1988	UW01	NB	LT	1.130	UGL
230.0	22-nov-1988	UW01	RDX	LT	0.630	UGL
230.0	22-nov-1988	UW01	TETRYL	LT	0.660	UGL

Site: WELL N-118-88

SAMPLE DEPTH (ft)	SAMPLE DATE	TEST METHOD	COMPOUND	BOOL	CONCENTRATION	UNITS
0.0	08-nov-1988	99	124TCB	ND	10.000	UGL
250.0	08-nov-1988	99	124TCB	ND	10.000	UGL
0.0	08-nov-1988	99	12DCLB	ND	10.000	UGL
250.0	08-nov-1988	99	12DCLB	ND	10.000	UGL
0.0	08-nov-1988	99	12DPH	ND	10.000	UGL
250.0	08-nov-1988	99	12DPH	ND	10.000	UGL
0.0	08-nov-1988	99	13DCLB	ND	10.000	UGL
250.0	08-nov-1988	99	13DCLB	ND	10.000	UGL
0.0	08-nov-1988	99	14DCLB	ND	10.000	UGL
250.0	08-nov-1988	99	14DCLB	ND	10.000	UGL
0.0	08-nov-1988	99	246TCP	ND	10.000	UGL
250.0	08-nov-1988	99	246TCP	ND	10.000	UGL
0.0	08-nov-1988	99	24DCLP	ND	10.000	UGL
250.0	08-nov-1988	99	24DCLP	ND	10.000	UGL
0.0	08-nov-1988	99	24DMPN	ND	10.000	UGL
250.0	08-nov-1988	99	24DMPN	ND	10.000	UGL
0.0	08-nov-1988	99	24DNP	ND	10.000	UGL
250.0	08-nov-1988	99	24DNP	ND	10.000	UGL
0.0	08-nov-1988	99	24DNT	ND	10.000	UGL
250.0	08-nov-1988	99	24DNT	ND	10.000	UGL
0.0	08-nov-1988	99	26DNT	ND	10.000	UGL
250.0	08-nov-1988	99	26DNT	ND	10.000	UGL
0.0	08-nov-1988	99	2CLP	ND	10.000	UGL
250.0	08-nov-1988	99	2CLP	ND	10.000	UGL
0.0	08-nov-1988	99	2CNAP	ND	10.000	UGL
250.0	08-nov-1988	99	2CNAP	ND	10.000	UGL
0.0	08-nov-1988	99	2NP	ND	10.000	UGL
250.0	08-nov-1988	99	2NP	ND	10.000	UGL
0.0	08-nov-1988	99	33DCBD	ND	20.000	UGL
250.0	08-nov-1988	99	33DCBD	ND	20.000	UGL
0.0	08-nov-1988	99	46DN2C	ND	50.000	UGL
250.0	08-nov-1988	99	46DN2C	ND	50.000	UGL

Analytical Results for Chemical Ground Water
From: 01-jan-1988 To: 27-nov-90

Site: WELL N-118-88 (continued)

SAMPLE DEPTH (ft)	SAMPLE DATE	TEST METHOD	COMPOUND	BOOL	CONCENTRATION	UNITS
0.0	08-nov-1988	99	4CL3C	ND	10.000	UGL
250.0	08-nov-1988	99	4CL3C	ND	10.000	UGL
0.0	08-nov-1988	99	4CLPPE	ND	10.000	UGL
250.0	08-nov-1988	99	4CLPPE	ND	10.000	UGL
0.0	08-nov-1988	99	ABHC	ND	3.000	UGL
250.0	08-nov-1988	99	ABHC	ND	3.000	UGL
0.0	08-nov-1988	99	AENSLF	ND	3.000	UGL
250.0	08-nov-1988	99	AENSLF	ND	3.000	UGL
0.0	08-nov-1988	99	ALDRN	ND	3.000	UGL
250.0	08-nov-1988	99	ALDRN	ND	3.000	UGL
0.0	08-nov-1988	99	ANAPNE	ND	10.000	UGL
250.0	08-nov-1988	99	ANAPNE	ND	10.000	UGL
0.0	08-nov-1988	99	ANAPYL	ND	10.000	UGL
250.0	08-nov-1988	99	ANAPYL	ND	10.000	UGL
0.0	08-nov-1988	99	ANTRC	ND	10.000	UGL
250.0	08-nov-1988	99	ANTRC	ND	10.000	UGL
0.0	08-nov-1988	99	B2CEXM	ND	10.000	UGL
250.0	08-nov-1988	99	B2CEXM	ND	10.000	UGL
0.0	08-nov-1988	99	B2CLEE	ND	10.000	UGL
250.0	08-nov-1988	99	B2CLEE	ND	10.000	UGL
0.0	08-nov-1988	99	B2EHP		57.000	UGL
250.0	08-nov-1988	99	B2EHP	ND	10.000	UGL
0.0	08-nov-1988	99	BAANTR	ND	10.000	UGL
250.0	08-nov-1988	99	BAANTR	ND	10.000	UGL
0.0	08-nov-1988	99	BAPYR	ND	10.000	UGL
250.0	08-nov-1988	99	BAPYR	ND	10.000	UGL
0.0	08-nov-1988	99	BBFANT	ND	10.000	UGL
250.0	08-nov-1988	99	BBFANT	ND	10.000	UGL
0.0	08-nov-1988	99	BBHC	ND	3.000	UGL
250.0	08-nov-1988	99	BBHC	ND	3.000	UGL
0.0	08-nov-1988	99	BBZP	ND	10.000	UGL
250.0	08-nov-1988	99	BBZP	ND	10.000	UGL
0.0	08-nov-1988	99	BENSLF	ND	6.000	UGL
250.0	08-nov-1988	99	BENSLF	ND	6.000	UGL
0.0	08-nov-1988	99	BENZID	ND	50.000	UGL
250.0	08-nov-1988	99	BENZID	ND	50.000	UGL
0.0	08-nov-1988	99	BGHIPY	ND	10.000	UGL
250.0	08-nov-1988	99	BGHIPY	ND	10.000	UGL
0.0	08-nov-1988	99	BKFANT	ND	10.000	UGL
250.0	08-nov-1988	99	BKFANT	ND	10.000	UGL
0.0	08-nov-1988	99	CHRY	ND	10.000	UGL
250.0	08-nov-1988	99	CHRY	ND	10.000	UGL
0.0	08-nov-1988	99	CL6BZ	ND	10.000	UGL
250.0	08-nov-1988	99	CL6BZ	ND	10.000	UGL
0.0	08-nov-1988	99	CL6CP	ND	10.000	UGL
250.0	08-nov-1988	99	CL6CP	ND	10.000	UGL
0.0	08-nov-1988	99	CL6ET	ND	10.000	UGL
250.0	08-nov-1988	99	CL6ET	ND	10.000	UGL

Analytical Results for Chemical Ground Water
From: 01-jan-1988 To: 27-nov-90

Site: WELL N-118-88 (continued)

SAMPLE DEPTH (ft)	SAMPLE DATE	TEST METHOD	COMPOUND	BOOL	CONCENTRATION	UNITS
0.0	08-nov-1988	99	CLDAN	ND	3.000	UGL
250.0	08-nov-1988	99	CLDAN	ND	3.000	UGL
0.0	08-nov-1988	99	DBAHA	ND	10.000	UGL
250.0	08-nov-1988	99	DBAHA	ND	10.000	UGL
0.0	08-nov-1988	99	DBHC	ND	3.000	UGL
250.0	08-nov-1988	99	DBHC	ND	3.000	UGL
0.0	08-nov-1988	99	DEP	ND	10.000	UGL
250.0	08-nov-1988	99	DEP	ND	10.000	UGL
0.0	08-nov-1988	99	DLDRN	ND	6.000	UGL
250.0	08-nov-1988	99	DLDRN	ND	6.000	UGL
0.0	08-nov-1988	99	DMP	ND	10.000	UGL
250.0	08-nov-1988	99	DMP	ND	10.000	UGL
0.0	08-nov-1988	99	DNBP	ND	10.000	UGL
250.0	08-nov-1988	99	DNBP	ND	10.000	UGL
0.0	08-nov-1988	99	DNOP	ND	10.000	UGL
250.0	08-nov-1988	99	DNOP	ND	10.000	UGL
0.0	08-nov-1988	99	ENDRN	ND	6.000	UGL
250.0	08-nov-1988	99	ENDRN	ND	6.000	UGL
0.0	08-nov-1988	99	ENDRNA	ND	20.000	UGL
250.0	08-nov-1988	99	ENDRNA	ND	20.000	UGL
0.0	08-nov-1988	99	ESFSO4	ND	6.000	UGL
250.0	08-nov-1988	99	ESFSO4	ND	6.000	UGL
0.0	08-nov-1988	99	FANT	ND	10.000	UGL
250.0	08-nov-1988	99	FANT	ND	10.000	UGL
0.0	08-nov-1988	99	FLRENE	ND	10.000	UGL
250.0	08-nov-1988	99	FLRENE	ND	10.000	UGL
0.0	08-nov-1988	99	HCBD	ND	10.000	UGL
250.0	08-nov-1988	99	HCBD	ND	10.000	UGL
0.0	08-nov-1988	99	HPCL	ND	3.000	UGL
250.0	08-nov-1988	99	HPCL	ND	3.000	UGL
0.0	08-nov-1988	99	HPCLE	ND	3.000	UGL
250.0	08-nov-1988	99	HPCLE	ND	3.000	UGL
0.0	08-nov-1988	99	ICDPYR	ND	10.000	UGL
250.0	08-nov-1988	99	ICDPYR	ND	10.000	UGL
0.0	08-nov-1988	99	ISOPHR	ND	10.000	UGL
250.0	08-nov-1988	99	ISOPHR	ND	10.000	UGL
0.0	08-nov-1988	99	LIN	LT	1.090	UGL
250.0	08-nov-1988	99	LIN	LT	1.090	UGL
0.0	08-nov-1988	99	NAP	ND	10.000	UGL
250.0	08-nov-1988	99	NAP	ND	10.000	UGL
0.0	08-nov-1988	99	NB	ND	10.000	UGL
250.0	08-nov-1988	99	NB	ND	10.000	UGL
0.0	08-nov-1988	99	NNDMEA	ND	10.000	UGL
250.0	08-nov-1988	99	NNDMEA	ND	10.000	UGL
0.0	08-nov-1988	99	NNDPA	ND	10.000	UGL
250.0	08-nov-1988	99	NNDPA	ND	10.000	UGL
0.0	08-nov-1988	99	PCB016	ND	30.000	UGL
250.0	08-nov-1988	99	PCB016	ND	30.000	UGL

Analytical Results for Chemical Ground Water
From: 01-jan-1988 To: 27-nov-90

Site: WELL N-118-88 (continued)

SAMPLE DEPTH (ft)	SAMPLE DATE	TEST METHOD	COMPOUND	BOOL	CONCENTRATION	UNITS
0.0	08-nov-1988	99	PCB221	ND	30.000	UGL
250.0	08-nov-1988	99	PCB221	ND	30.000	UGL
0.0	08-nov-1988	99	PCB232	ND	30.000	UGL
250.0	08-nov-1988	99	PCB232	ND	30.000	UGL
0.0	08-nov-1988	99	PCB242	ND	30.000	UGL
250.0	08-nov-1988	99	PCB242	ND	30.000	UGL
0.0	08-nov-1988	99	PCB248	ND	30.000	UGL
250.0	08-nov-1988	99	PCB248	ND	30.000	UGL
0.0	08-nov-1988	99	PCB254	ND	60.000	UGL
250.0	08-nov-1988	99	PCB254	ND	60.000	UGL
0.0	08-nov-1988	99	PCB260	ND	60.000	UGL
250.0	08-nov-1988	99	PCB260	ND	60.000	UGL
0.0	08-nov-1988	99	PCP	ND	50.000	UGL
250.0	08-nov-1988	99	PCP	ND	50.000	UGL
0.0	08-nov-1988	99	PHANTR	ND	10.000	UGL
250.0	08-nov-1988	99	PHANTR	ND	10.000	UGL
0.0	08-nov-1988	99	PHENOL	ND	10.000	UGL
250.0	08-nov-1988	99	PHENOL	ND	10.000	UGL
0.0	08-nov-1988	99	PPDDD	ND	6.000	UGL
250.0	08-nov-1988	99	PPDDD	ND	6.000	UGL
0.0	08-nov-1988	99	PYR	ND	10.000	UGL
250.0	08-nov-1988	99	PYR	ND	10.000	UGL
0.0	08-nov-1988	99	TXPHEN	ND	60.000	UGL
250.0	08-nov-1988	99	TXPHEN	ND	60.000	UGL
250.0	08-nov-1988	SB09	HG	LT	0.171	UGL
250.0	08-nov-1988	SB09	HG	LT	0.171	UGL
250.0	08-nov-1988	SD01	AG	LT	0.202	UGL
250.0	08-nov-1988	SD01	AG	LT	0.202	UGL
250.0	08-nov-1988	SD01	AS	LT	5.180	UGL
250.0	08-nov-1988	SD01	AS	LT	5.180	UGL
250.0	08-nov-1988	SD01	BE	LT	0.104	UGL
250.0	08-nov-1988	SD01	BE	LT	0.104	UGL
250.0	08-nov-1988	SD01	CD	LT	5.480	UGL
250.0	08-nov-1988	SD01	CD	LT	5.480	UGL
250.0	08-nov-1988	SD01	CR	LT	36.100	UGL
250.0	08-nov-1988	SD01	CR	LT	36.100	UGL
250.0	08-nov-1988	SD01	CU		19.300	UGL
250.0	08-nov-1988	SD01	CU		9.110	UGL
250.0	08-nov-1988	SD01	PB		10.600	UGL
250.0	08-nov-1988	SD01	PB	LT	2.530	UGL
250.0	08-nov-1988	SD01	SB	LT	3.410	UGL
250.0	08-nov-1988	SD01	SB	LT	3.410	UGL
250.0	08-nov-1988	SD01	SE		7.980	UGL
250.0	08-nov-1988	SD01	SE		8.750	UGL
250.0	08-nov-1988	SD01	TL	LT	5.040	UGL
250.0	08-nov-1988	SD01	TL	LT	5.040	UGL

Analytical Results for Chemical Ground Water
From: 01-jan-1988 To: 27-nov-90

Site: WELL N-118-88 (continued)

SAMPLE DEPTH (ft)	SAMPLE DATE	TEST METHOD	COMPOUND	BOOL	CONCENTRATION	UNITS
250.0	08-nov-1988	SS07	BA		107.000	UGL
250.0	08-nov-1988	SS07	BA		118.000	UGL
250.0	08-nov-1988	SS07	NI		25.800	UGL
250.0	08-nov-1988	SS07	NI		18.500	UGL
250.0	08-nov-1988	SS07	ZN		1100.000	UGL
250.0	08-nov-1988	SS07	ZN		1000.000	UGL
250.0	08-nov-1988	TF01	NIT		5600.000	UGL
0.0	08-nov-1988	TT01	SO4		186000.000	UGL
250.0	08-nov-1988	TT01	SO4		280000.000	UGL
0.0	08-nov-1988	UM20	111TCE	LT	0.500	UGL
2.5	08-nov-1988	UM20	111TCE	LT	0.500	UGL
0.0	08-nov-1988	UM20	112TCE	LT	1.200	UGL
2.5	08-nov-1988	UM20	112TCE	LT	1.200	UGL
0.0	08-nov-1988	UM20	11DCE	LT	0.500	UGL
2.5	08-nov-1988	UM20	11DCE	LT	0.500	UGL
0.0	08-nov-1988	UM20	11DCLE	LT	0.680	UGL
2.5	08-nov-1988	UM20	11DCLE	LT	0.680	UGL
0.0	08-nov-1988	UM20	12DCE	LT	0.500	UGL
2.5	08-nov-1988	UM20	12DCE	LT	0.500	UGL
0.0	08-nov-1988	UM20	12DCLE	LT	0.500	UGL
2.5	08-nov-1988	UM20	12DCLE	LT	0.500	UGL
0.0	08-nov-1988	UM20	12DCLP	LT	0.500	UGL
2.5	08-nov-1988	UM20	12DCLP	LT	0.500	UGL
0.0	08-nov-1988	UM20	2CLEVE	LT	0.710	UGL
2.5	08-nov-1988	UM20	2CLEVE	LT	0.710	UGL
0.0	08-nov-1988	UM20	ACET	LT	13.000	UGL
2.5	08-nov-1988	UM20	ACET	LT	13.000	UGL
0.0	08-nov-1988	UM20	ACROLN	ND	100.000	UGL
2.5	08-nov-1988	UM20	ACROLN	ND	100.000	UGL
0.0	08-nov-1988	UM20	ACRYLO	ND	100.000	UGL
2.5	08-nov-1988	UM20	ACRYLO	ND	100.000	UGL
0.0	08-nov-1988	UM20	BRDCLM	LT	0.590	UGL
2.5	08-nov-1988	UM20	BRDCLM	LT	0.590	UGL
0.0	08-nov-1988	UM20	C13DCP	LT	0.580	UGL
2.5	08-nov-1988	UM20	C13DCP	LT	0.580	UGL
0.0	08-nov-1988	UM20	C2AVE	LT	8.300	UGL
2.5	08-nov-1988	UM20	C2AVE	LT	8.300	UGL
0.0	08-nov-1988	UM20	C2H3CL	LT	2.600	UGL
2.5	08-nov-1988	UM20	C2H3CL	LT	2.600	UGL
0.0	08-nov-1988	UM20	C2H5CL	LT	1.900	UGL
2.5	08-nov-1988	UM20	C2H5CL	LT	1.900	UGL
0.0	08-nov-1988	UM20	C6H6	LT	0.500	UGL
2.5	08-nov-1988	UM20	C6H6	LT	0.500	UGL
0.0	08-nov-1988	UM20	CCL3F	LT	1.400	UGL
2.5	08-nov-1988	UM20	CCL3F	LT	1.400	UGL

Analytical Results for Chemical Ground Water
From: 01-jan-1988 To: 27-nov-90

Site: WELL N-118-88 (continued)

SAMPLE DEPTH (ft)	SAMPLE DATE	TEST METHOD	COMPOUND	BOOL	CONCENTRATION	UNITS
0.0	08-nov-1988	UM20	CCL4	LT	0.580	UGL
2.5	08-nov-1988	UM20	CCL4	LT	0.580	UGL
0.0	08-nov-1988	UM20	CH2CL2	LT	2.300	UGL
2.5	08-nov-1988	UM20	CH2CL2	LT	2.300	UGL
0.0	08-nov-1988	UM20	CH3BR	LT	5.800	UGL
2.5	08-nov-1988	UM20	CH3BR	LT	5.800	UGL
0.0	08-nov-1988	UM20	CH3CL	LT	3.200	UGL
2.5	08-nov-1988	UM20	CH3CL	LT	3.200	UGL
0.0	08-nov-1988	UM20	CHBR3	LT	2.600	UGL
2.5	08-nov-1988	UM20	CHBR3	LT	2.600	UGL
0.0	08-nov-1988	UM20	CHCL3	LT	0.500	UGL
2.5	08-nov-1988	UM20	CHCL3	LT	0.500	UGL
0.0	08-nov-1988	UM20	CL2BZ	ND	10.000	UGL
2.5	08-nov-1988	UM20	CL2BZ	ND	10.000	UGL
0.0	08-nov-1988	UM20	CLC6H5	LT	0.500	UGL
2.5	08-nov-1988	UM20	CLC6H5	LT	0.500	UGL
0.0	08-nov-1988	UM20	CS2	LT	0.500	UGL
2.5	08-nov-1988	UM20	CS2	LT	0.500	UGL
0.0	08-nov-1988	UM20	DBRCLM	LT	0.670	UGL
2.5	08-nov-1988	UM20	DBRCLM	LT	0.670	UGL
0.0	08-nov-1988	UM20	ETC6H5	LT	0.500	UGL
2.5	08-nov-1988	UM20	ETC6H5	LT	0.500	UGL
0.0	08-nov-1988	UM20	MEC6H5	LT	0.500	UGL
2.5	08-nov-1988	UM20	MEC6H5	LT	0.500	UGL
0.0	08-nov-1988	UM20	MEK	LT	6.400	UGL
2.5	08-nov-1988	UM20	MEK	LT	6.400	UGL
0.0	08-nov-1988	UM20	MIBK	LT	3.000	UGL
2.5	08-nov-1988	UM20	MIBK	LT	3.000	UGL
0.0	08-nov-1988	UM20	MNBK	LT	3.600	UGL
2.5	08-nov-1988	UM20	MNBK	LT	3.600	UGL
0.0	08-nov-1988	UM20	STYR	LT	0.500	UGL
2.5	08-nov-1988	UM20	STYR	LT	0.500	UGL
0.0	08-nov-1988	UM20	T13DCP	LT	0.700	UGL
2.5	08-nov-1988	UM20	T13DCP	LT	0.700	UGL
0.0	08-nov-1988	UM20	TCLEA	LT	0.510	UGL
2.5	08-nov-1988	UM20	TCLEA	LT	0.510	UGL
0.0	08-nov-1988	UM20	TCLEE	LT	1.600	UGL
2.5	08-nov-1988	UM20	TCLEE	LT	1.600	UGL
0.0	08-nov-1988	UM20	TRCLE	LT	0.500	UGL
2.5	08-nov-1988	UM20	TRCLE	LT	0.500	UGL
0.0	08-nov-1988	UM20	XYLEN	LT	0.840	UGL
2.5	08-nov-1988	UM20	XYLEN	LT	0.840	UGL
250.0	08-nov-1988	UW01	135TNB	LT	0.560	UGL
250.0	08-nov-1988	UW01	13DNB	LT	0.610	UGL
250.0	08-nov-1988	UW01	246TNT	LT	0.780	UGL
250.0	08-nov-1988	UW01	24DNT	LT	0.600	UGL
250.0	08-nov-1988	UW01	26DNT	LT	0.550	UGL

Analytical Results for Chemical Ground Water
From: 01-jan-1988 To: 27-nov-90

Site: WELL N-118-88 (continued)

SAMPLE DEPTH (ft)	SAMPLE DATE	OD	COMPOUND	BOOL	CONCENTRATION	UNITS
250.0	08-nov-1988	01	HMX	LT	1.300	UGL
250.0	08-nov-1988	01	NB	LT	1.130	UGL
250.0	08-nov-1988	01	RDX	LT	0.730	UGL
250.0	08-nov-1988	01	TETRYL	LT	0.660	UGL

Site: WELL N-119-88

SAMPLE DEPTH (ft)	SAMPLE DATE	TEST METHOD	COMPOUND	BOOL	CONCENTRATION	UNITS
270.0	22-nov-19	99	111TCE	ND	5.000	UGL
0.0	22-nov-19	99	111TCE	ND	5.000	UGL
270.0	22-nov-19	99	112TCE	ND	5.000	UGL
0.0	22-nov-19	99	112TCE	ND	5.000	UGL
270.0	22-nov-19	99	11DCE	LT	1.920	UGL
0.0	22-nov-19	99	11DCE	LT	1.920	UGL
270.0	22-nov-19	99	11DCLE	ND	5.000	UGL
0.0	22-nov-19	99	11DCLE	ND	5.000	UGL
270.0	22-nov-198	99	12DCLB	ND	10.000	UGL
0.0	22-nov-198	99	12DCLB	ND	10.000	UGL
270.0	22-nov-198	99	12DCLE	ND	5.000	UGL
0.0	22-nov-198	99	12DCLE	ND	5.000	UGL
270.0	22-nov-198	99	12DCLP	ND	5.000	UGL
0.0	22-nov-198	99	12DCLP	ND	5.000	UGL
270.0	22-nov-198	99	13DCLB	ND	10.000	UGL
0.0	22-nov-198	99	13DCLB	ND	10.000	UGL
270.0	22-nov-198	99	14DCLB	ND	10.000	UGL
0.0	22-nov-198	99	14DCLB	ND	10.000	UGL
270.0	22-nov-198	99	2CLEVE	ND	5.000	UGL
0.0	22-nov-198	99	2CLEVE	ND	5.000	UGL
270.0	22-nov-198	99	BRDCLM	ND	5.000	UGL
0.0	22-nov-198	99	BRDCLM	ND	5.000	UGL
270.0	22-nov-198	99	C13DCP	ND	5.000	UGL
0.0	22-nov-198	99	C13DCP	ND	5.000	UGL
270.0	22-nov-198	99	C2H3CL	LT	3.860	UGL
0.0	22-nov-198	99	C2H3CL	LT	3.860	UGL
270.0	22-nov-198	99	C2H5CL	ND	10.000	UGL
0.0	22-nov-198	99	C2H5CL	ND	10.000	UGL
270.0	22-nov-198	99	C6H6		0.848	UGL
0.0	22-nov-198	99	C6H6		1.620	UGL
270.0	22-nov-198	99	CCL4	ND	5.000	UGL
0.0	22-nov-198	99	CCL4	ND	5.000	UGL
270.0	22-nov-198	99	CH2CL2	ND	5.000	UGL
0.0	22-nov-198	99	CH2CL2	ND	5.000	UGL
270.0	22-nov-198	99	CH3BR	ND	10.000	UGL
0.0	22-nov-19	99	CH3BR	ND	10.000	UGL
270.0	22-nov-19	99	CH3CL	ND	10.000	UGL

Analytical Results for Chemical Ground Water
From: 01-jan-1988 To: 27-nov-90

Site: WELL N-119-88 (continued)

SAMPLE DEPTH (ft)	SAMPLE DATE	TEST METHOD	COMPOUND	BOOL	CONCENTRATION	UNITS
0.0	22-nov-1988	99	CH3CL	ND	10.000	UGL
270.0	22-nov-1988	99	CHBR3	ND	5.000	UGL
0.0	22-nov-1988	99	CHBR3	ND	5.000	UGL
270.0	22-nov-1988	99	CHCL3	ND	5.000	UGL
0.0	22-nov-1988	99	CHCL3	ND	5.000	UGL
270.0	22-nov-1988	99	CLC6H5	ND	5.000	UGL
0.0	22-nov-1988	99	CLC6H5	ND	5.000	UGL
270.0	22-nov-1988	99	DBRCLM	ND	5.000	UGL
0.0	22-nov-1988	99	DBRCLM	ND	5.000	UGL
270.0	22-nov-1988	99	ETC6H5	ND	5.000	UGL
0.0	22-nov-1988	99	ETC6H5	ND	5.000	UGL
270.0	22-nov-1988	99	MEC6H5	ND	5.000	UGL
0.0	22-nov-1988	99	MEC6H5	ND	5.000	UGL
270.0	22-nov-1988	99	T12DCE	LT	1.720	UGL
0.0	22-nov-1988	99	T12DCE	LT	1.720	UGL
270.0	22-nov-1988	99	T13DCP	ND	5.000	UGL
0.0	22-nov-1988	99	T13DCP	ND	5.000	UGL
270.0	22-nov-1988	99	TCLEA	ND	5.000	UGL
0.0	22-nov-1988	99	TCLEA	ND	5.000	UGL
270.0	22-nov-1988	99	TCLEE	ND	5.000	UGL
0.0	22-nov-1988	99	TCLEE	ND	5.000	UGL
270.0	22-nov-1988	99	TRCLE		18.400	UGL
0.0	22-nov-1988	99	TRCLE	LT	0.706	UGL
270.0	22-nov-1988	99	UNK105		11.000	UGL
0.0	22-nov-1988	99	UNK105		13.000	UGL
0.0	22-nov-1988	99	UNK107		14.000	UGL
0.0	22-nov-1988	99	UNK126		48.000	UGL
0.0	22-nov-1988	99	UNK127		28.000	UGL
270.0	22-nov-1988	99	UNK141		1080.000	UGL
0.0	22-nov-1988	99	UNK141		1600.000	UGL
270.0	22-nov-1988	99	UNK143		21.000	UGL
270.0	22-nov-1988	SB09	HG	LT	0.170	UGL
270.0	22-nov-1988	SB09	HG	LT	0.170	UGL
270.0	22-nov-1988	SD01	AG	LT	0.202	UGL
270.0	22-nov-1988	SD01	AG	LT	0.202	UGL
270.0	22-nov-1988	SD01	AS		8.900	UGL
270.0	22-nov-1988	SD01	AS	LT	5.180	UGL
270.0	22-nov-1988	SD01	BE	LT	0.104	UGL
270.0	22-nov-1988	SD01	BE	LT	0.104	UGL
270.0	22-nov-1988	SD01	CD	LT	5.480	UGL
270.0	22-nov-1988	SD01	CD	LT	5.480	UGL
270.0	22-nov-1988	SD01	CR		46.200	UGL
270.0	22-nov-1988	SD01	CR	LT	36.100	UGL
270.0	22-nov-1988	SD01	CU		65.000	UGL
270.0	22-nov-1988	SD01	CU		3.970	UGL
270.0	22-nov-1988	SD01	PB		16.100	UGL

Analytical Results for Chemical Ground Water
From: 01-jan-1988 To: 27-nov-90

Site: WELL N-119-88 (continued)

SAMPLE DEPTH (ft)	SAMPLE DATE	TEST METHOD	COMPOUND	BOOL	CONCENTRATION	UNITS
270.0	22-nov-1988	SD01	PB		4.350	UGL
270.0	22-nov-1988	SD01	SB	LT	3.410	UGL
270.0	22-nov-1988	SD01	SB	LT	3.410	UGL
270.0	22-nov-1988	SD01	SE	LT	4.810	UGL
270.0	22-nov-1988	SD01	SE	LT	4.810	UGL
270.0	22-nov-1988	SD01	TL	LT	5.040	UGL
270.0	22-nov-1988	SD01	TL	LT	5.040	UGL
270.0	22-nov-1988	SS07	BA		121.000	UGL
270.0	22-nov-1988	SS07	BA		87.400	UGL
270.0	22-nov-1988	SS07	NI		37.700	UGL
270.0	22-nov-1988	SS07	NI		24.200	UGL
270.0	22-nov-1988	SS07	ZN		151.000	UGL
270.0	22-nov-1988	SS07	ZN		60.800	UGL
270.0	22-nov-1988	TF01	NIT		8000.000	UGL
270.0	22-nov-1988	TT01	SO4		178000.000	UGL
270.0	22-nov-1988	UM15	124TCB	ND	10.000	UGL
0.0	22-nov-1988	UM15	124TCB	ND	10.000	UGL
270.0	22-nov-1988	UM15	12DCLB	ND	10.000	UGL
0.0	22-nov-1988	UM15	12DCLB	ND	10.000	UGL
270.0	22-nov-1988	UM15	12DPH	ND	10.000	UGL
0.0	22-nov-1988	UM15	12DPH	ND	10.000	UGL
270.0	22-nov-1988	UM15	13DCLB	ND	10.000	UGL
0.0	22-nov-1988	UM15	13DCLB	ND	10.000	UGL
270.0	22-nov-1988	UM15	14DCLB	ND	10.000	UGL
0.0	22-nov-1988	UM15	14DCLB	ND	10.000	UGL
270.0	22-nov-1988	UM15	246TCP	ND	10.000	UGL
0.0	22-nov-1988	UM15	246TCP	ND	10.000	UGL
270.0	22-nov-1988	UM15	24DCLP	ND	10.000	UGL
0.0	22-nov-1988	UM15	24DCLP	ND	10.000	UGL
270.0	22-nov-1988	UM15	24DMPN	ND	10.000	UGL
0.0	22-nov-1988	UM15	24DMPN	ND	10.000	UGL
270.0	22-nov-1988	UM15	24DNP	ND	10.000	UGL
0.0	22-nov-1988	UM15	24DNP	ND	10.000	UGL
270.0	22-nov-1988	UM15	24DNT	ND	10.000	UGL
0.0	22-nov-1988	UM15	24DNT	ND	10.000	UGL
270.0	22-nov-1988	UM15	26DNT	ND	10.000	UGL
0.0	22-nov-1988	UM15	26DNT	ND	10.000	UGL
270.0	22-nov-1988	UM15	2CLP	ND	10.000	UGL
0.0	22-nov-1988	UM15	2CLP	ND	10.000	UGL
270.0	22-nov-1988	UM15	2CNAP	ND	10.000	UGL
0.0	22-nov-1988	UM15	2CNAP	ND	10.000	UGL
270.0	22-nov-1988	UM15	2NP	ND	10.000	UGL
0.0	22-nov-1988	UM15	2NP	ND	10.000	UGL
270.0	22-nov-1988	UM15	33DCBD	ND	20.000	UGL

Analytical Results for Chemical Ground Water
From: 01-jan-1988 To: 27-nov-90

Site: WELL N-119-88 (continued)

SAMPLE DEPTH (ft)	SAMPLE DATE	TEST METHOD	COMPOUND	BOOL	CONCENTRATION	UNITS
0.0	22-nov-1988	UM15	33DCBD	ND	20.000	UGL
270.0	22-nov-1988	UM15	46DN2C	ND	50.000	UGL
0.0	22-nov-1988	UM15	46DN2C	ND	50.000	UGL
270.0	22-nov-1988	UM15	4CL3C	ND	10.000	UGL
0.0	22-nov-1988	UM15	4CL3C	ND	10.000	UGL
270.0	22-nov-1988	UM15	4CLPPE	ND	10.000	UGL
0.0	22-nov-1988	UM15	4CLPPE	ND	10.000	UGL
270.0	22-nov-1988	UM15	ABHC	ND	3.000	UGL
0.0	22-nov-1988	UM15	ABHC	ND	3.000	UGL
270.0	22-nov-1988	UM15	AENSLF	ND	3.000	UGL
0.0	22-nov-1988	UM15	AENSLF	ND	3.000	UGL
270.0	22-nov-1988	UM15	ALDRN	ND	3.000	UGL
0.0	22-nov-1988	UM15	ALDRN	ND	3.000	UGL
270.0	22-nov-1988	UM15	ANAPNE	ND	10.000	UGL
0.0	22-nov-1988	UM15	ANAPNE	ND	10.000	UGL
270.0	22-nov-1988	UM15	ANAPYL	ND	10.000	UGL
0.0	22-nov-1988	UM15	ANAPYL	ND	10.000	UGL
270.0	22-nov-1988	UM15	ANTRC	ND	10.000	UGL
0.0	22-nov-1988	UM15	ANTRC	ND	10.000	UGL
270.0	22-nov-1988	UM15	B2CEXM	ND	10.000	UGL
0.0	22-nov-1988	UM15	B2CEXM	ND	10.000	UGL
270.0	22-nov-1988	UM15	B2CLEE	ND	10.000	UGL
0.0	22-nov-1988	UM15	B2CLEE	ND	10.000	UGL
270.0	22-nov-1988	UM15	B2EHP	ND	10.000	UGL
0.0	22-nov-1988	UM15	B2EHP	ND	10.000	UGL
270.0	22-nov-1988	UM15	BAANTR	ND	10.000	UGL
0.0	22-nov-1988	UM15	BAANTR	ND	10.000	UGL
270.0	22-nov-1988	UM15	BAPYR	ND	10.000	UGL
0.0	22-nov-1988	UM15	BAPYR	ND	10.000	UGL
270.0	22-nov-1988	UM15	BBFANT	ND	10.000	UGL
0.0	22-nov-1988	UM15	BBFANT	ND	10.000	UGL
270.0	22-nov-1988	UM15	BBHC	ND	3.000	UGL
0.0	22-nov-1988	UM15	BBHC	ND	3.000	UGL
270.0	22-nov-1988	UM15	BBZP	ND	10.000	UGL
0.0	22-nov-1988	UM15	BBZP	ND	10.000	UGL
270.0	22-nov-1988	UM15	BENSLF	ND	6.000	UGL
0.0	22-nov-1988	UM15	BENSLF	ND	6.000	UGL
270.0	22-nov-1988	UM15	BENZID	ND	50.000	UGL
0.0	22-nov-1988	UM15	BENZID	ND	50.000	UGL
270.0	22-nov-1988	UM15	BGHIPY	ND	10.000	UGL
0.0	22-nov-1988	UM15	BGHIPY	ND	10.000	UGL
270.0	22-nov-1988	UM15	BKFANT	ND	10.000	UGL
0.0	22-nov-1988	UM15	BKFANT	ND	10.000	UGL
270.0	22-nov-1988	UM15	CHRY	ND	10.000	UGL
0.0	22-nov-1988	UM15	CHRY	ND	10.000	UGL
270.0	22-nov-1988	UM15	CL6BZ	ND	10.000	UGL
0.0	22-nov-1988	UM15	CL6BZ	ND	10.000	UGL
270.0	22-nov-1988	UM15	CL6CP	ND	10.000	UGL

Analytical Results for Chemical Ground Water
From: 01-jan-1988 To: 27-nov-90

Site: WELL N-119-88 (continued)

SAMPLE DEPTH (ft)	SAMPLE DATE	TEST METHOD	COMPOUND	BOOL	CONCENTRATION	UNITS
0.0	22-nov-1988	UM15	CL6CP	ND	10.000	UGL
270.0	22-nov-1988	UM15	CL6ET	ND	10.000	UGL
0.0	22-nov-1988	UM15	CL6ET	ND	10.000	UGL
270.0	22-nov-1988	UM15	CLDAN	ND	3.000	UGL
0.0	22-nov-1988	UM15	CLDAN	ND	3.000	UGL
270.0	22-nov-1988	UM15	DBAHA	ND	10.000	UGL
0.0	22-nov-1988	UM15	DBAHA	ND	10.000	UGL
270.0	22-nov-1988	UM15	DBHC	ND	3.000	UGL
0.0	22-nov-1988	UM15	DBHC	ND	3.000	UGL
270.0	22-nov-1988	UM15	DEP	ND	10.000	UGL
0.0	22-nov-1988	UM15	DEP	ND	10.000	UGL
270.0	22-nov-1988	UM15	DLDRN	ND	6.000	UGL
0.0	22-nov-1988	UM15	DLDRN	ND	6.000	UGL
270.0	22-nov-1988	UM15	DMP	ND	10.000	UGL
0.0	22-nov-1988	UM15	DMP	ND	10.000	UGL
270.0	22-nov-1988	UM15	DNBP	ND	10.000	UGL
0.0	22-nov-1988	UM15	DNBP	ND	10.000	UGL
270.0	22-nov-1988	UM15	DNOP	ND	10.000	UGL
0.0	22-nov-1988	UM15	DNOP	ND	10.000	UGL
270.0	22-nov-1988	UM15	ENDRN	ND	6.000	UGL
0.0	22-nov-1988	UM15	ENDRN	ND	6.000	UGL
270.0	22-nov-1988	UM15	ENDRNA	ND	20.000	UGL
0.0	22-nov-1988	UM15	ENDRNA	ND	20.000	UGL
270.0	22-nov-1988	UM15	ESFSO4	ND	6.000	UGL
0.0	22-nov-1988	UM15	ESFSO4	ND	6.000	UGL
270.0	22-nov-1988	UM15	FANT	ND	10.000	UGL
0.0	22-nov-1988	UM15	FANT	ND	10.000	UGL
270.0	22-nov-1988	UM15	FLRENE	ND	10.000	UGL
0.0	22-nov-1988	UM15	FLRENE	ND	10.000	UGL
270.0	22-nov-1988	UM15	HCBD	ND	10.000	UGL
0.0	22-nov-1988	UM15	HCBD	ND	10.000	UGL
270.0	22-nov-1988	UM15	HPCL	ND	3.000	UGL
0.0	22-nov-1988	UM15	HPCL	ND	3.000	UGL
270.0	22-nov-1988	UM15	HPCLE	ND	3.000	UGL
0.0	22-nov-1988	UM15	HPCLE	ND	3.000	UGL
270.0	22-nov-1988	UM15	ICDPYR	ND	10.000	UGL
0.0	22-nov-1988	UM15	ICDPYR	ND	10.000	UGL
270.0	22-nov-1988	UM15	ISOPHR	ND	10.000	UGL
0.0	22-nov-1988	UM15	ISOPHR	ND	10.000	UGL
270.0	22-nov-1988	UM15	LIN	LT	1.090	UGL
0.0	22-nov-1988	UM15	LIN	LT	1.090	UGL
270.0	22-nov-1988	UM15	NAP	ND	10.000	UGL
0.0	22-nov-1988	UM15	NAP	ND	10.000	UGL
270.0	22-nov-1988	UM15	NB	ND	10.000	UGL
0.0	22-nov-1988	UM15	NB	ND	10.000	UGL
270.0	22-nov-1988	UM15	NNDMEA	ND	10.000	UGL
0.0	22-nov-1988	UM15	NNDMEA	ND	10.000	UGL
270.0	22-nov-1988	UM15	NNDPA	ND	10.000	UGL

Analytical Results for Chemical Ground Water
From: 01-jan-1988 To: 27-nov-90

Site: WELL N-119-88 (continued)

SAMPLE DEPTH (ft)	SAMPLE DATE	TEST METHOD	COMPOUND	BOOL	CONCENTRATION	UNITS
0.0	22-nov-1988	UM15	NNDPA	ND	10.000	UGL
270.0	22-nov-1988	UM15	PCB016	ND	30.000	UGL
0.0	22-nov-1988	UM15	PCB016	ND	30.000	UGL
270.0	22-nov-1988	UM15	PCB221	ND	30.000	UGL
0.0	22-nov-1988	UM15	PCB221	ND	30.000	UGL
270.0	22-nov-1988	UM15	PCB232	ND	30.000	UGL
0.0	22-nov-1988	UM15	PCB232	ND	30.000	UGL
270.0	22-nov-1988	UM15	PCB242	ND	30.000	UGL
0.0	22-nov-1988	UM15	PCB242	ND	30.000	UGL
270.0	22-nov-1988	UM15	PCB248	ND	30.000	UGL
0.0	22-nov-1988	UM15	PCB248	ND	30.000	UGL
270.0	22-nov-1988	UM15	PCB254	ND	60.000	UGL
0.0	22-nov-1988	UM15	PCB254	ND	60.000	UGL
270.0	22-nov-1988	UM15	PCB260	ND	60.000	UGL
0.0	22-nov-1988	UM15	PCB260	ND	60.000	UGL
270.0	22-nov-1988	UM15	PCP	ND	50.000	UGL
0.0	22-nov-1988	UM15	PCP	ND	50.000	UGL
270.0	22-nov-1988	UM15	PHANTR	ND	10.000	UGL
0.0	22-nov-1988	UM15	PHANTR	ND	10.000	UGL
270.0	22-nov-1988	UM15	PHENOL	ND	10.000	UGL
0.0	22-nov-1988	UM15	PHENOL	ND	10.000	UGL
270.0	22-nov-1988	UM15	PPDDD	ND	6.000	UGL
0.0	22-nov-1988	UM15	PPDDD	ND	6.000	UGL
270.0	22-nov-1988	UM15	PYR	ND	10.000	UGL
0.0	22-nov-1988	UM15	PYR	ND	10.000	UGL
270.0	22-nov-1988	UM15	TXPHEN	ND	60.000	UGL
0.0	22-nov-1988	UM15	TXPHEN	ND	60.000	UGL
270.0	22-nov-1988	UW01	135TNB	LT	0.560	UGL
270.0	22-nov-1988	UW01	13DNB	LT	0.610	UGL
270.0	22-nov-1988	UW01	246TNT	LT	0.780	UGL
270.0	22-nov-1988	UW01	24DNT	LT	0.600	UGL
270.0	22-nov-1988	UW01	26DNT	LT	0.550	UGL
270.0	22-nov-1988	UW01	HMX	LT	1.300	UGL
270.0	22-nov-1988	UW01	NB	LT	1.130	UGL
270.0	22-nov-1988	UW01	RDX	LT	0.630	UGL
270.0	22-nov-1988	UW01	TETRYL	LT	0.660	UGL

Analytical Results for Chemical Ground Water
From: 01-jan-1988 To: 27-nov-90

Site: WELL N-120-88

SAMPLE DEPTH (ft)	SAMPLE DATE	TEST METHOD	COMPOUND	BOOL	CONCENTRATION	UNITS
310.2	22-nov-1988	99	111TCE	ND	5.000	UGL
310.2	22-nov-1988	99	112TCE	ND	5.000	UGL
310.2	22-nov-1988	99	11DCE	LT	1.920	UGL
310.2	22-nov-1988	99	11DCLE	ND	5.000	UGL
310.2	22-nov-1988	99	12DCLB	ND	10.000	UGL
310.2	22-nov-1988	99	12DCLE	ND	5.000	UGL
310.2	22-nov-1988	99	12DCLP	ND	5.000	UGL
310.2	22-nov-1988	99	13DCLB	ND	10.000	UGL
310.2	22-nov-1988	99	14DCLB	ND	10.000	UGL
310.2	22-nov-1988	99	2CLEVE	ND	5.000	UGL
310.2	22-nov-1988	99	BRDCLM	ND	5.000	UGL
310.2	22-nov-1988	99	C13DCP	ND	5.000	UGL
310.2	22-nov-1988	99	C2H3CL	LT	3.860	UGL
310.2	22-nov-1988	99	C2H5CL	ND	10.000	UGL
310.2	22-nov-1988	99	C6H6	LT	0.673	UGL
310.2	22-nov-1988	99	CCL4	ND	5.000	UGL
310.2	22-nov-1988	99	CH2CL2	ND	5.000	UGL
310.2	22-nov-1988	99	CH3BR	ND	10.000	UGL
310.2	22-nov-1988	99	CH3CL	ND	10.000	UGL
310.2	22-nov-1988	99	CHBR3	ND	5.000	UGL
310.2	22-nov-1988	99	CHCL3	ND	5.000	UGL
310.2	22-nov-1988	99	CLC6H5	ND	5.000	UGL
310.2	22-nov-1988	99	DBRCLM	ND	5.000	UGL
310.2	22-nov-1988	99	ETC6H5	ND	5.000	UGL
310.2	22-nov-1988	99	MEC6H5	ND	5.000	UGL
310.2	22-nov-1988	99	T12DCE	LT	1.720	UGL
310.2	22-nov-1988	99	T13DCP	ND	5.000	UGL
310.2	22-nov-1988	99	TCLEA	ND	5.000	UGL
310.2	22-nov-1988	99	TCLEE	ND	5.000	UGL
310.2	22-nov-1988	99	TRCLE		1.110	UGL
310.2	22-nov-1988	99	UNK105		10.000	UGL
310.2	22-nov-1988	99	UNK141		1100.000	UGL
310.2	22-nov-1988	SB09	HG	LT	0.170	UGL
310.2	22-nov-1988	SB09	HG	LT	0.170	UGL
310.0	22-nov-1988	SD01	AG	LT	0.202	UGL
310.0	22-nov-1988	SD01	AG	LT	0.202	UGL
310.0	22-nov-1988	SD01	AS		5.380	UGL
310.0	22-nov-1988	SD01	AS	LT	5.180	UGL
310.0	22-nov-1988	SD01	BE	LT	0.104	UGL
310.0	22-nov-1988	SD01	BE	LT	0.104	UGL
310.0	22-nov-1988	SD01	CD	LT	5.480	UGL
310.0	22-nov-1988	SD01	CD	LT	5.480	UGL
310.0	22-nov-1988	SD01	CR	LT	36.100	UGL
310.0	22-nov-1988	SD01	CR	LT	36.100	UGL
310.0	22-nov-1988	SD01	CU		23.000	UGL
310.0	22-nov-1988	SD01	CU		4.070	UGL

Analytical Results for Chemical Ground Water
From: 01-jan-1988 To: 27-nov-90

Site: WELL N-120-88 (continued)

SAMPLE DEPTH (ft)	SAMPLE DATE	TEST METHOD	COMPOUND	BOOL	CONCENTRATION	UNITS
310.0	22-nov-1988	SD01	PB		37.400	UGL
310.0	22-nov-1988	SD01	PB		5.260	UGL
310.0	22-nov-1988	SD01	SB	LT	3.410	UGL
310.0	22-nov-1988	SD01	SB	LT	3.410	UGL
310.0	22-nov-1988	SD01	SE	LT	4.810	UGL
310.0	22-nov-1988	SD01	SE	LT	4.810	UGL
310.0	22-nov-1988	SD01	TL	LT	5.040	UGL
310.0	22-nov-1988	SD01	TL	LT	5.040	UGL
310.0	22-nov-1988	SS07	BA		96.500	UGL
310.0	22-nov-1988	SS07	BA		96.000	UGL
310.0	22-nov-1988	SS07	NI		38.400	UGL
310.0	22-nov-1988	SS07	NI	LT	9.600	UGL
310.0	22-nov-1988	SS07	ZN		1900.000	UGL
310.0	22-nov-1988	SS07	ZN		364.000	UGL
310.0	22-nov-1988	TF01	NIT	LT	5000.000	UGL
310.0	22-nov-1988	TT01	SO4		141000.000	UGL
310.2	22-nov-1988	UM15	124TCB	ND	10.000	UGL
310.2	22-nov-1988	UM15	12DCLB	ND	10.000	UGL
310.2	22-nov-1988	UM15	12DPH	ND	10.000	UGL
310.2	22-nov-1988	UM15	13DCLB	ND	10.000	UGL
310.2	22-nov-1988	UM15	14DCLB	ND	10.000	UGL
310.2	22-nov-1988	UM15	246TCP	ND	10.000	UGL
310.2	22-nov-1988	UM15	24DCLP	ND	10.000	UGL
310.2	22-nov-1988	UM15	24DMPN	ND	10.000	UGL
310.2	22-nov-1988	UM15	24DNP	ND	10.000	UGL
310.2	22-nov-1988	UM15	24DNT	ND	10.000	UGL
310.2	22-nov-1988	UM15	26DNT	ND	10.000	UGL
310.2	22-nov-1988	UM15	2CLP	ND	10.000	UGL
310.2	22-nov-1988	UM15	2CNAP	ND	10.000	UGL
310.2	22-nov-1988	UM15	2NP	ND	10.000	UGL
310.2	22-nov-1988	UM15	33DCBD	ND	20.000	UGL
310.2	22-nov-1988	UM15	46DN2C	ND	50.000	UGL
310.2	22-nov-1988	UM15	4CL3C	ND	10.000	UGL
310.2	22-nov-1988	UM15	4CLPPE	ND	10.000	UGL
310.2	22-nov-1988	UM15	ABHC	ND	3.000	UGL
310.2	22-nov-1988	UM15	AENSLF	ND	3.000	UGL
310.2	22-nov-1988	UM15	ALDRN	ND	3.000	UGL
310.2	22-nov-1988	UM15	ANAPNE	ND	10.000	UGL
310.2	22-nov-1988	UM15	ANAPYL	ND	10.000	UGL
310.2	22-nov-1988	UM15	ANTRC	ND	10.000	UGL
310.2	22-nov-1988	UM15	B2CEXM	ND	10.000	UGL
310.2	22-nov-1988	UM15	B2CLEE	ND	10.000	UGL
310.2	22-nov-1988	UM15	B2EHP	ND	10.000	UGL
310.2	22-nov-1988	UM15	BAANTR	ND	10.000	UGL

Analytical Results for Chemical Ground Water
From: 01-jan-1988 To: 27-nov-90

Site: WELL N-120-88 (continued)

SAMPLE DEPTH (ft)	SAMPLE DATE	TEST METHOD	COMPOUND	BOOL	CONCENTRATION	UNITS
310.2	22-nov-1988	UM15	BAPYR	ND	10.000	UGL
310.2	22-nov-1988	UM15	BBFANT	ND	10.000	UGL
310.2	22-nov-1988	UM15	BBHC	ND	3.000	UGL
310.2	22-nov-1988	UM15	BBZP	ND	10.000	UGL
310.2	22-nov-1988	UM15	BENSLF	ND	6.000	UGL
310.2	22-nov-1988	UM15	BENZID	ND	50.000	UGL
310.2	22-nov-1988	UM15	BGHIPY	ND	10.000	UGL
310.2	22-nov-1988	UM15	BKFANT	ND	10.000	UGL
310.2	22-nov-1988	UM15	CHRY	ND	10.000	UGL
310.2	22-nov-1988	UM15	CL6BZ	ND	10.000	UGL
310.2	22-nov-1988	UM15	CL6CP	ND	10.000	UGL
310.2	22-nov-1988	UM15	CL6ET	ND	10.000	UGL
310.2	22-nov-1988	UM15	CLDAN	ND	3.000	UGL
310.2	22-nov-1988	UM15	DBAHA	ND	10.000	UGL
310.2	22-nov-1988	UM15	DBHC	ND	3.000	UGL
310.2	22-nov-1988	UM15	DEP	ND	10.000	UGL
310.2	22-nov-1988	UM15	DLDRN	ND	6.000	UGL
310.2	22-nov-1988	UM15	DMP	ND	10.000	UGL
310.2	22-nov-1988	UM15	DNBP	ND	10.000	UGL
310.2	22-nov-1988	UM15	DNOP	ND	10.000	UGL
310.2	22-nov-1988	UM15	ENDRN	ND	6.000	UGL
310.2	22-nov-1988	UM15	ENDRNA	ND	20.000	UGL
310.2	22-nov-1988	UM15	ESFSO4	ND	6.000	UGL
310.2	22-nov-1988	UM15	FANT	ND	10.000	UGL
310.2	22-nov-1988	UM15	FLRENE	ND	10.000	UGL
310.2	22-nov-1988	UM15	HCBD	ND	10.000	UGL
310.2	22-nov-1988	UM15	HPCL	ND	3.000	UGL
310.2	22-nov-1988	UM15	HPCLE	ND	3.000	UGL
310.2	22-nov-1988	UM15	ICDPYR	ND	10.000	UGL
310.2	22-nov-1988	UM15	ISOPHR	ND	10.000	UGL
310.2	22-nov-1988	UM15	LIN	LT	1.090	UGL
310.2	22-nov-1988	UM15	NAP	ND	10.000	UGL
310.2	22-nov-1988	UM15	NB	ND	10.000	UGL
310.2	22-nov-1988	UM15	NNDMEA	ND	10.000	UGL
310.2	22-nov-1988	UM15	NNDPA	ND	10.000	UGL
310.2	22-nov-1988	UM15	PCB016	ND	30.000	UGL
310.2	22-nov-1988	UM15	PCB221	ND	30.000	UGL
310.2	22-nov-1988	UM15	PCB232	ND	30.000	UGL
310.2	22-nov-1988	UM15	PCB242	ND	30.000	UGL
310.2	22-nov-1988	UM15	PCB248	ND	30.000	UGL
310.2	22-nov-1988	UM15	PCB254	ND	60.000	UGL
310.2	22-nov-1988	UM15	PCB260	ND	60.000	UGL
310.2	22-nov-1988	UM15	PCP	ND	50.000	UGL
310.2	22-nov-1988	UM15	PHANTR	ND	10.000	UGL
310.2	22-nov-1988	UM15	PHENOL	ND	10.000	UGL
310.2	22-nov-1988	UM15	PPDDD	ND	6.000	UGL
310.2	22-nov-1988	UM15	PYR	ND	10.000	UGL
310.2	22-nov-1988	UM15	TXPHEN	ND	60.000	UGL

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Site: WELL N-120-88 (continued)

SAMPLE DEPTH (ft)	SAMPLE DATE	TEST METHOD	COMPOUND	BOOL	CONCENTRATION	UNITS
310.0	22-nov-1988	UW01	135TNB	LT	0.560	UGL
310.0	22-nov-1988	UW01	13DNB	LT	0.610	UGL
310.0	22-nov-1988	UW01	246TNT	LT	0.780	UGL
310.0	22-nov-1988	UW01	24DNT	LT	0.600	UGL
310.0	22-nov-1988	UW01	26DNT	LT	0.550	UGL
310.0	22-nov-1988	UW01	HMX	LT	1.300	UGL
310.0	22-nov-1988	UW01	NB	LT	1.130	UGL
310.0	22-nov-1988	UW01	RDX	LT	0.630	UGL
310.0	22-nov-1988	UW01	TETRYL	LT	0.660	UGL

Site: WELL N-127-88

SAMPLE DEPTH (ft)	SAMPLE DATE	TEST METHOD	COMPOUND	BOOL	CONCENTRATION	UNITS
232.0	21-nov-1988	TF01	NIT		9500.000	UGL
232.0	21-nov-1988	TT01	SO4		438000.000	UGL
232.0	21-nov-1988	UW01	135TNB	LT	0.560	UGL
232.0	21-nov-1988	UW01	13DNB	LT	0.610	UGL
232.0	21-nov-1988	UW01	246TNT		1.070	UGL
232.0	21-nov-1988	UW01	24DNT	LT	0.600	UGL
232.0	21-nov-1988	UW01	26DNT	LT	0.550	UGL
232.0	21-nov-1988	UW01	HMX	LT	1.300	UGL
232.0	21-nov-1988	UW01	NB	LT	1.130	UGL
232.0	21-nov-1988	UW01	RDX	LT	0.630	UGL
232.0	21-nov-1988	UW01	TETRYL	LT	0.660	UGL

Site: WELL N-128-88

SAMPLE DEPTH (ft)	SAMPLE DATE	TEST METHOD	COMPOUND	BOOL	CONCENTRATION	UNITS
244.0	21-nov-1988	TF01	NIT		13000.000	UGL
244.0	21-nov-1988	TT01	SO4		1840000.000	UGL
244.0	21-nov-1988	UW01	135TNB	LT	0.560	UGL
244.0	21-nov-1988	UW01	13DNB	LT	0.610	UGL
244.0	21-nov-1988	UW01	246TNT		1.350	UGL
244.0	21-nov-1988	UW01	24DNT	LT	0.600	UGL
244.0	21-nov-1988	UW01	26DNT	LT	0.550	UGL
244.0	21-nov-1988	UW01	HMX	LT	1.300	UGL
244.0	21-nov-1988	UW01	NB	LT	1.130	UGL
244.0	21-nov-1988	UW01	RDX	LT	0.630	UGL

Site: WELL N-128-88 (continued)

SAMPLE DEPTH (ft)	SAMPLE DATE	TEST METHOD	COMPOUND	BOOL	CONCENTRATION	UNITS
244.0	21-nov-1988	UW01	TETRYL	LT	0.660	UGL

Site: WELL N-129-88

SAMPLE DEPTH (ft)	SAMPLE DATE	TEST METHOD	COMPOUND	BOOL	CONCENTRATION	UNITS
233.0	21-nov-1988	TF01	NIT		11000.000	UGL
233.0	21-nov-1988	TT01	SO4		243000.000	UGL
233.0	21-nov-1988	UW01	135TNB	LT	0.560	UGL
233.0	21-nov-1988	UW01	13DNB	LT	0.610	UGL
233.0	21-nov-1988	UW01	246TNT		1.000	UGL
233.0	21-nov-1988	UW01	24DNT	LT	0.600	UGL
233.0	21-nov-1988	UW01	26DNT	LT	0.550	UGL
233.0	21-nov-1988	UW01	HMX	LT	1.300	UGL
233.0	21-nov-1988	UW01	NB	LT	1.130	UGL
233.0	21-nov-1988	UW01	RDX	LT	0.630	UGL
233.0	21-nov-1988	UW01	TETRYL	LT	0.660	UGL

Site: WELL N-130-88

SAMPLE DEPTH (ft)	SAMPLE DATE	TEST METHOD	COMPOUND	BOOL	CONCENTRATION	UNITS
235.0	21-nov-1988	TF01	NIT		17000.000	UGL
235.0	21-nov-1988	TT01	SO4		177000.000	UGL
235.0	21-nov-1988	UW01	135TNB	LT	0.560	UGL
235.0	21-nov-1988	UW01	13DNB	LT	0.610	UGL
235.0	21-nov-1988	UW01	246TNT		1.860	UGL
235.0	21-nov-1988	UW01	24DNT	LT	0.600	UGL
235.0	21-nov-1988	UW01	26DNT	LT	0.550	UGL
235.0	21-nov-1988	UW01	HMX	LT	1.300	UGL
235.0	21-nov-1988	UW01	NB	LT	1.130	UGL
235.0	21-nov-1988	UW01	RDX	LT	0.630	UGL
235.0	21-nov-1988	UW01	TETRYL	LT	0.660	UGL

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From: 01-jan-1988 To: 27-nov-90

Site: WELL N-3A

SAMPLE DEPTH (ft)	SAMPLE DATE	TEST METHOD	COMPOUND	BOOL	CONCENTRATION	UNITS
317.0	21-nov-1988	TF01	NIT		44000.000	UGL
317.0	21-nov-1988	TT01	SO4		963000.000	UGL
317.4	02-jun-1988	UW01	135TNB	LT	0.560	UGL
317.0	21-nov-1988	UW01	135TNB	LT	0.560	UGL
317.4	02-jun-1988	UW01	13DNB	LT	0.610	UGL
317.0	21-nov-1988	UW01	13DNB	LT	0.610	UGL
317.4	02-jun-1988	UW01	246TNT	LT	0.780	UGL
317.0	21-nov-1988	UW01	246TNT	LT	0.780	UGL
317.4	02-jun-1988	UW01	24DNT	LT	0.600	UGL
317.0	21-nov-1988	UW01	24DNT	LT	0.600	UGL
317.4	02-jun-1988	UW01	26DNT	LT	0.550	UGL
317.0	21-nov-1988	UW01	26DNT	LT	0.550	UGL
317.4	02-jun-1988	UW01	HMX	LT	1.300	UGL
317.0	21-nov-1988	UW01	HMX	LT	1.300	UGL
317.4	02-jun-1988	UW01	NB	LT	1.130	UGL
317.0	21-nov-1988	UW01	NB	LT	1.130	UGL
317.4	02-jun-1988	UW01	RDX		24.000	UGL
317.0	21-nov-1988	UW01	RDX		34.000	UGL
317.4	02-jun-1988	UW01	TETRYL	LT	0.660	UGL
317.0	21-nov-1988	UW01	TETRYL	LT	0.660	UGL

Site: WELL N-3F

SAMPLE DEPTH (ft)	SAMPLE DATE	TEST METHOD	COMPOUND	BOOL	CONCENTRATION	UNITS
54.0	20-nov-1988	TF01	NIT		49000.000	UGL
54.0	20-nov-1988	TT01	SO4		1210000.000	UGL
0.0	20-nov-1988	TT01	SO4		187000.000	UGL
54.0	20-nov-1988	UW01	135TNB	LT	0.560	UGL
54.0	20-nov-1988	UW01	13DNB	LT	0.610	UGL
54.0	20-nov-1988	UW01	246TNT	LT	0.780	UGL
54.0	20-nov-1988	UW01	24DNT	LT	0.600	UGL
54.0	20-nov-1988	UW01	26DNT	LT	0.550	UGL
54.0	20-nov-1988	UW01	HMX	LT	13.000	UGL
54.0	20-nov-1988	UW01	NB	LT	1.130	UGL
54.0	20-nov-1988	UW01	RDX		270.000	UGL
54.0	20-nov-1988	UW01	TETRYL	LT	0.660	UGL

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Site: WELL N-3H

SAMPLE DEPTH (ft)	SAMPLE DATE	TEST METHOD	COMPOUND	BOOL	CONCENTRATION	UNITS
243.0	22-nov-1988	TF01	NIT		19000.000	UGL
243.0	22-nov-1988	TT01	SO4		299000.000	UGL
231.2	01-jun-1988	UW01	135TNB	LT	0.560	UGL
243.0	22-nov-1988	UW01	135TNB	LT	0.560	UGL
231.2	01-jun-1988	UW01	13DNB	LT	0.610	UGL
243.0	22-nov-1988	UW01	13DNB	LT	0.610	UGL
231.2	01-jun-1988	UW01	246TNT	LT	0.780	UGL
243.0	22-nov-1988	UW01	246TNT	LT	1.560	UGL
231.2	01-jun-1988	UW01	24DNT	LT	0.600	UGL
243.0	22-nov-1988	UW01	24DNT	LT	0.600	UGL
231.2	01-jun-1988	UW01	26DNT	LT	0.550	UGL
243.0	22-nov-1988	UW01	26DNT	LT	0.550	UGL
231.2	01-jun-1988	UW01	HMX	LT	1.300	UGL
243.0	22-nov-1988	UW01	HMX	LT	1.300	UGL
231.2	01-jun-1988	UW01	NB	LT	1.130	UGL
243.0	22-nov-1988	UW01	NB	LT	1.130	UGL
231.2	01-jun-1988	UW01	RDX		1.600	UGL
243.0	22-nov-1988	UW01	RDX		17.000	UGL
231.2	01-jun-1988	UW01	TETRYL	LT	0.660	UGL
243.0	22-nov-1988	UW01	TETRYL	LT	0.660	UGL

Site: WELL N-3I

SAMPLE DEPTH (ft)	SAMPLE DATE	TEST METHOD	COMPOUND	BOOL	CONCENTRATION	UNITS
10.5	20-nov-1988	TF01	NIT		12000.000	UGL
10.5	20-nov-1988	TT01	SO4		671000.000	UGL
10.5	20-nov-1988	UW01	135TNB	LT	0.560	UGL
10.5	20-nov-1988	UW01	13DNB	LT	0.610	UGL
10.5	20-nov-1988	UW01	246TNT	LT	0.780	UGL
10.5	20-nov-1988	UW01	24DNT	LT	0.600	UGL
10.5	20-nov-1988	UW01	26DNT	LT	0.550	UGL
10.5	20-nov-1988	UW01	HMX		23.000	UGL
10.5	20-nov-1988	UW01	NB	LT	1.130	UGL
10.5	20-nov-1988	UW01	RDX		57.000	UGL
10.5	20-nov-1988	UW01	TETRYL	LT	0.660	UGL

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Site: WELL T-7

SAMPLE DEPTH (ft)	SAMPLE DATE	TEST METHOD	COMPOUND	BOOL	CONCENTRATION	UNITS
322.0	08-nov-1988	99	124TCB	ND	10.000	UGL
322.0	08-nov-1988	99	12DCLB	ND	10.000	UGL
322.0	08-nov-1988	99	12DPH	ND	10.000	UGL
322.0	08-nov-1988	99	13DCLB	ND	10.000	UGL
322.0	08-nov-1988	99	14DCLB	ND	10.000	UGL
322.0	08-nov-1988	99	246TCP	ND	10.000	UGL
322.0	08-nov-1988	99	24DCLP	ND	10.000	UGL
322.0	08-nov-1988	99	24DMPN	ND	10.000	UGL
322.0	08-nov-1988	99	24DNP	ND	10.000	UGL
322.0	08-nov-1988	99	24DNT	ND	10.000	UGL
322.0	08-nov-1988	99	26DNT	ND	10.000	UGL
322.0	08-nov-1988	99	2CLP	ND	10.000	UGL
322.0	08-nov-1988	99	2CNAP	ND	10.000	UGL
322.0	08-nov-1988	99	2NP	ND	10.000	UGL
322.0	08-nov-1988	99	33DCBD	ND	20.000	UGL
322.0	08-nov-1988	99	46DN2C	ND	50.000	UGL
322.0	08-nov-1988	99	4CL3C	ND	10.000	UGL
322.0	08-nov-1988	99	4CLPPE	ND	10.000	UGL
322.0	08-nov-1988	99	ABHC	ND	3.000	UGL
322.0	08-nov-1988	99	AENSLF	ND	3.000	UGL
322.0	08-nov-1988	99	ALDRN	ND	3.000	UGL
322.0	08-nov-1988	99	ANAPNE	ND	10.000	UGL
322.0	08-nov-1988	99	ANAPYL	ND	10.000	UGL
322.0	08-nov-1988	99	ANTRC	ND	10.000	UGL
322.0	08-nov-1988	99	B2CEXM	ND	10.000	UGL
322.0	08-nov-1988	99	B2CLEE	ND	10.000	UGL
322.0	08-nov-1988	99	B2EHP	ND	10.000	UGL
322.0	08-nov-1988	99	BAANTR	ND	10.000	UGL
322.0	08-nov-1988	99	BAPYR	ND	10.000	UGL
322.0	08-nov-1988	99	BBFANT	ND	10.000	UGL
322.0	08-nov-1988	99	BBHC	ND	3.000	UGL
322.0	08-nov-1988	99	BBZP	ND	10.000	UGL
322.0	08-nov-1988	99	BENSLF	ND	6.000	UGL
322.0	08-nov-1988	99	BENZID	ND	50.000	UGL
322.0	08-nov-1988	99	BGHIPY	ND	10.000	UGL
322.0	08-nov-1988	99	BKFANT	ND	10.000	UGL
322.0	08-nov-1988	99	CHRY	ND	10.000	UGL
322.0	08-nov-1988	99	CL6BZ	ND	10.000	UGL
322.0	08-nov-1988	99	CL6CP	ND	10.000	UGL
322.0	08-nov-1988	99	CL6ET	ND	10.000	UGL
322.0	08-nov-1988	99	CLDAN	ND	3.000	UGL
322.0	08-nov-1988	99	DBAHA	ND	10.000	UGL
322.0	08-nov-1988	99	DBHC	ND	3.000	UGL
322.0	08-nov-1988	99	DEP	ND	10.000	UGL
322.0	08-nov-1988	99	DLDRN	ND	6.000	UGL
322.0	08-nov-1988	99	DMP	ND	10.000	UGL
322.0	08-nov-1988	99	DNBP	ND	10.000	UGL
322.0	08-nov-1988	99	DNOP	ND	10.000	UGL

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Site: WELL T-7 (continued)

SAMPLE DEPTH (ft)	SAMPLE DATE	TEST METHOD	COMPOUND	BOOL	CONCENTRATION	UNITS
322.0	08-nov-1988	99	ENDRN	ND	6.000	UGL
322.0	08-nov-1988	99	ENDRNA	ND	20.000	UGL
322.0	08-nov-1988	99	ESFSO4	ND	6.000	UGL
322.0	08-nov-1988	99	FANT	ND	10.000	UGL
322.0	08-nov-1988	99	FLRENE	ND	10.000	UGL
322.0	08-nov-1988	99	HCBD	ND	10.000	UGL
322.0	08-nov-1988	99	HPCL	ND	3.000	UGL
322.0	08-nov-1988	99	HPCLE	ND	3.000	UGL
322.0	08-nov-1988	99	ICDPYR	ND	10.000	UGL
322.0	08-nov-1988	99	ISOPHR	ND	10.000	UGL
322.0	08-nov-1988	99	LIN	LT	1.090	UGL
322.0	08-nov-1988	99	NAP	ND	10.000	UGL
322.0	08-nov-1988	99	NB	ND	10.000	UGL
322.0	08-nov-1988	99	NNDMEA	ND	10.000	UGL
322.0	08-nov-1988	99	NNDPA	ND	10.000	UGL
322.0	08-nov-1988	99	PCB016	ND	30.000	UGL
322.0	08-nov-1988	99	PCB221	ND	30.000	UGL
322.0	08-nov-1988	99	PCB232	ND	30.000	UGL
322.0	08-nov-1988	99	PCB242	ND	30.000	UGL
322.0	08-nov-1988	99	PCB248	ND	30.000	UGL
322.0	08-nov-1988	99	PCB254	ND	60.000	UGL
322.0	08-nov-1988	99	PCB260	ND	60.000	UGL
322.0	08-nov-1988	99	PCP	ND	50.000	UGL
322.0	08-nov-1988	99	PHANTR	ND	10.000	UGL
322.0	08-nov-1988	99	PHENOL	ND	10.000	UGL
322.0	08-nov-1988	99	PPDDD	ND	6.000	UGL
322.0	08-nov-1988	99	PYR	ND	10.000	UGL
322.0	08-nov-1988	99	TXPHEN	ND	60.000	UGL
322.0	08-nov-1988	SB09	HG	LT	0.171	UGL
322.0	08-nov-1988	SB09	HG	LT	0.171	UGL
322.0	08-nov-1988	SD01	AG		0.319	UGL
322.0	08-nov-1988	SD01	AG	LT	0.202	UGL
322.0	08-nov-1988	SD01	AS		11.100	UGL
322.0	08-nov-1988	SD01	AS		5.280	UGL
322.0	08-nov-1988	SD01	BE		0.201	UGL
322.0	08-nov-1988	SD01	BE	LT	0.104	UGL
322.0	08-nov-1988	SD01	CD	LT	5.480	UGL
322.0	08-nov-1988	SD01	CD	LT	5.480	UGL
322.0	08-nov-1988	SD01	CR	LT	36.100	UGL
322.0	08-nov-1988	SD01	CR	LT	36.100	UGL
322.0	08-nov-1988	SD01	CU		25.400	UGL
322.0	08-nov-1988	SD01	CU	LT	1.910	UGL
322.0	08-nov-1988	SD01	PB		18.100	UGL
322.0	08-nov-1988	SD01	PB	LT	2.530	UGL
322.0	08-nov-1988	SD01	SB	LT	3.410	UGL
322.0	08-nov-1988	SD01	SB	LT	3.410	UGL

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Site: WELL T-7 (continued)

SAMPLE DEPTH (ft)	SAMPLE DATE	TEST METHOD	COMPOUND	BOOL	CONCENTRATION	UNITS
322.0	08-nov-1988	SD01	SE	LT	4.810	UGL
322.0	08-nov-1988	SD01	SE	LT	4.810	UGL
322.0	08-nov-1988	SD01	TL	LT	5.040	UGL
322.0	08-nov-1988	SD01	TL	LT	5.040	UGL
322.0	08-nov-1988	SS07	BA		113.000	UGL
322.0	08-nov-1988	SS07	BA		77.300	UGL
322.0	08-nov-1988	SS07	NI		20.100	UGL
322.0	08-nov-1988	SS07	NI		11.400	UGL
322.0	08-nov-1988	SS07	ZN		180.000	UGL
322.0	08-nov-1988	SS07	ZN		104.000	UGL
322.0	08-nov-1988	TF01	NIT		8000.000	UGL
322.0	08-nov-1988	TT01	SO4		166000.000	UGL
3.2	08-nov-1988	UM20	111TCE	LT	0.500	UGL
3.2	08-nov-1988	UM20	112TCE	LT	1.200	UGL
3.2	08-nov-1988	UM20	11DCE	LT	0.500	UGL
3.2	08-nov-1988	UM20	11DCLE	LT	0.680	UGL
3.2	08-nov-1988	UM20	12DCE	LT	0.500	UGL
3.2	08-nov-1988	UM20	12DCLE	LT	0.500	UGL
3.2	08-nov-1988	UM20	12DCLP	LT	0.500	UGL
3.2	08-nov-1988	UM20	2CLEVE	LT	0.710	UGL
3.2	08-nov-1988	UM20	ACET	LT	13.000	UGL
3.2	08-nov-1988	UM20	ACROLN	ND	100.000	UGL
3.2	08-nov-1988	UM20	ACRYLO	ND	100.000	UGL
3.2	08-nov-1988	UM20	BRDCLM	LT	0.590	UGL
3.2	08-nov-1988	UM20	C13DCP	LT	0.580	UGL
3.2	08-nov-1988	UM20	C2AVE	LT	8.300	UGL
3.2	08-nov-1988	UM20	C2H3CL	LT	2.600	UGL
3.2	08-nov-1988	UM20	C2H5CL	LT	1.900	UGL
3.2	08-nov-1988	UM20	C6H6	LT	0.500	UGL
3.2	08-nov-1988	UM20	CCL3F	LT	1.400	UGL
3.2	08-nov-1988	UM20	CCL4	LT	0.580	UGL
3.2	08-nov-1988	UM20	CH2CL2	LT	2.300	UGL
3.2	08-nov-1988	UM20	CH3BR	LT	5.800	UGL
3.2	08-nov-1988	UM20	CH3CL	LT	3.200	UGL
3.2	08-nov-1988	UM20	CHBR3	LT	2.600	UGL
3.2	08-nov-1988	UM20	CHCL3	LT	0.500	UGL
3.2	08-nov-1988	UM20	CL2BZ	ND	10.000	UGL
3.2	08-nov-1988	UM20	CLC6H5	LT	0.500	UGL
3.2	08-nov-1988	UM20	CS2	LT	0.500	UGL
3.2	08-nov-1988	UM20	DBRCLM	LT	0.670	UGL
3.2	08-nov-1988	UM20	ETC6H5	LT	0.500	UGL
3.2	08-nov-1988	UM20	MEC6H5	LT	0.500	UGL
3.2	08-nov-1988	UM20	MEK	LT	6.400	UGL
3.2	08-nov-1988	UM20	MIBK	LT	3.000	UGL

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Site: WELL T-7 (continued)

SAMPLE DEPTH (ft)	SAMPLE DATE	TEST METHOD	COMPOUND	BOOL	CONCENTRATION	UNITS
3.2	08-nov-1988	UM20	MNBK	LT	3.600	UGL
3.2	08-nov-1988	UM20	STYR	LT	0.500	UGL
3.2	08-nov-1988	UM20	T13DCP	LT	0.700	UGL
3.2	08-nov-1988	UM20	TCLEA	LT	0.510	UGL
3.2	08-nov-1988	UM20	TCLEE	LT	1.600	UGL
3.2	08-nov-1988	UM20	TRCLE	LT	0.500	UGL
3.2	08-nov-1988	UM20	XYLEN	LT	0.840	UGL
322.0	08-nov-1988	UW01	135TNB	LT	0.560	UGL
322.0	08-nov-1988	UW01	13DNB	LT	0.610	UGL
322.0	08-nov-1988	UW01	246TNT	LT	0.780	UGL
322.0	08-nov-1988	UW01	24DNT	LT	0.600	UGL
322.0	08-nov-1988	UW01	26DNT	LT	0.550	UGL
322.0	08-nov-1988	UW01	HMX	LT	1.300	UGL
322.0	08-nov-1988	UW01	NB	LT	1.130	UGL
322.0	08-nov-1988	UW01	RDX	LT	1.260	UGL
322.0	08-nov-1988	UW01	TETRYL	LT	0.660	UGL

Site: WELL WW-1

SAMPLE DEPTH (ft)	SAMPLE DATE	TEST METHOD	COMPOUND	BOOL	CONCENTRATION	UNITS
0.0	11-jun-1990	00	TPHC	LT	100.000	UGL
0.0	11-jun-1990	AX8	AS	LT	2.350	UGL
0.0	11-jun-1990	CC8	HG	LT	0.100	UGL
0.0	11-jun-1990	LL8	NIT		3700.000	UGL
0.0	11-jun-1990	SD25	SE		6.260	UGL
0.0	11-jun-1990	SS12	AG	LT	10.000	UGL
0.0	11-jun-1990	SS12	AL	LT	112.000	UGL
0.0	11-jun-1990	SS12	BA		45.500	UGL
0.0	11-jun-1990	SS12	BE	LT	1.120	UGL
0.0	11-jun-1990	SS12	CA		280000.000	UGL
0.0	11-jun-1990	SS12	CD	LT	6.780	UGL
0.0	11-jun-1990	SS12	CO	LT	25.000	UGL
0.0	11-jun-1990	SS12	CR	LT	16.800	UGL
0.0	11-jun-1990	SS12	CU	LT	18.800	UGL
0.0	11-jun-1990	SS12	FE	LT	77.500	UGL
0.0	11-jun-1990	SS12	K		6840.000	UGL
0.0	11-jun-1990	SS12	MG		94200.000	UGL
0.0	11-jun-1990	SS12	MN	LT	9.670	UGL
0.0	11-jun-1990	SS12	NA		180000.000	UGL

Analytical Results for Chemical Ground Water
From: 01-jan-1988 To: 27-nov-90

Site: WELL WW-1 (continued)

SAMPLE DEPTH (ft)	SAMPLE DATE	TEST METHOD	COMPOUND	BOOL	CONCENTRATION	UNITS
0.0	11-jun-1990	SS12	NI	LT	32.100	UGL
0.0	11-jun-1990	SS12	PB	LT	43.400	UGL
0.0	11-jun-1990	SS12	SB	LT	60.000	UGL
0.0	11-jun-1990	SS12	TL	LT	125.000	UGL
0.0	11-jun-1990	SS12	V	LT	27.600	UGL
0.0	11-jun-1990	SS12	ZN		94.200	UGL
0.0	11-jun-1990	TF20	CYN	LT	5.000	UGL
0.0	11-jun-1990	TF29	P4		20.600	UGL
0.0	11-jun-1990	TT09	CL		400000.000	UGL
0.0	11-jun-1990	TT09	SO4		360000.000	UGL
0.0	11-jun-1990	UH20	ABHC	LT	0.002	UGL
0.0	11-jun-1990	UH20	AENSLF	LT	0.002	UGL
0.0	11-jun-1990	UH20	ALDRN	LT	0.007	UGL
0.0	11-jun-1990	UH20	BBHC	LT	0.010	UGL
0.0	11-jun-1990	UH20	BENSLF	LT	0.008	UGL
0.0	11-jun-1990	UH20	CLDAN	LT	0.031	UGL
0.0	11-jun-1990	UH20	DBHC	LT	0.003	UGL
0.0	11-jun-1990	UH20	DLDRN	LT	0.007	UGL
0.0	11-jun-1990	UH20	ENDRN	LT	0.018	UGL
0.0	11-jun-1990	UH20	ENDRNA	LT	0.050	UGL
0.0	11-jun-1990	UH20	HPCL	LT	0.002	UGL
0.0	11-jun-1990	UH20	ISODR	LT	0.002	UGL
0.0	11-jun-1990	UH20	LIN	LT	0.002	UGL
0.0	11-jun-1990	UH20	MEXCLR	LT	0.075	UGL
0.0	11-jun-1990	UH20	PCB016	LT	0.385	UGL
0.0	11-jun-1990	UH20	PCB260	LT	0.176	UGL
0.0	11-jun-1990	UH20	PPDDT	LT	0.002	UGL
0.0	11-jun-1990	UM21	111TCE	LT	1.000	UGL
0.0	11-jun-1990	UM21	112TCE	LT	1.000	UGL
0.0	11-jun-1990	UM21	11DCE	LT	1.000	UGL
0.0	11-jun-1990	UM21	11DCLE	LT	1.000	UGL
0.0	11-jun-1990	UM21	12DCE	LT	5.000	UGL
0.0	11-jun-1990	UM21	12DCLE	LT	1.000	UGL
0.0	11-jun-1990	UM21	12DCLP	LT	1.000	UGL
0.0	11-jun-1990	UM21	13DCLB	LT	1.000	UGL
0.0	11-jun-1990	UM21	13DCP	LT	4.800	UGL
0.0	11-jun-1990	UM21	13DMB	LT	1.000	UGL
0.0	11-jun-1990	UM21	2CLEVE	LT	3.500	UGL
0.0	11-jun-1990	UM21	ACET	LT	8.000	UGL
0.0	11-jun-1990	UM21	ACRYLO	LT	8.400	UGL
0.0	11-jun-1990	UM21	BRDCLM	LT	1.000	UGL
0.0	11-jun-1990	UM21	C2H3CL	LT	12.000	UGL
0.0	11-jun-1990	UM21	C2H5CL	LT	8.000	UGL

Analytical Results for Chemical Ground Water
From: 01-jan-1988 To: 27-nov-90

Site: WELL WW-1 (continued)

SAMPLE DEPTH (ft)	SAMPLE DATE	TEST METHOD	COMPOUND	BOOL	CONCENTRATION	UNITS
0.0	11-jun-1990	UM21	C6H6	LT	1.000	UGL
0.0	11-jun-1990	UM21	CCL3F	LT	1.000	UGL
0.0	11-jun-1990	UM21	CCL4	LT	1.000	UGL
0.0	11-jun-1990	UM21	CH2CL2	LT	1.000	UGL
0.0	11-jun-1990	UM21	CH3BR	LT	14.000	UGL
0.0	11-jun-1990	UM21	CH3CL	LT	1.200	UGL
0.0	11-jun-1990	UM21	CHBR3	LT	11.000	UGL
0.0	11-jun-1990	UM21	CHCL3	LT	1.000	UGL
0.0	11-jun-1990	UM21	CLC6H5	LT	1.000	UGL
0.0	11-jun-1990	UM21	DBRCLM	LT	1.000	UGL
0.0	11-jun-1990	UM21	DCLB	LT	2.000	UGL
0.0	11-jun-1990	UM21	ETC6H5	LT	1.000	UGL
0.0	11-jun-1990	UM21	MEC6H5	LT	1.000	UGL
0.0	11-jun-1990	UM21	MEK	LT	10.000	UGL
0.0	11-jun-1990	UM21	MIBK	LT	1.400	UGL
0.0	11-jun-1990	UM21	TCLEA	LT	1.500	UGL
0.0	11-jun-1990	UM21	TCLEE		1.110	UGL
0.0	11-jun-1990	UM21	TRCLE	LT	1.000	UGL
0.0	11-jun-1990	UM21	XYLEN	LT	2.000	UGL
0.0	11-jun-1990	UM25	236TCP	LT	1.700	UGL
0.0	11-jun-1990	UM25	245TCP	LT	2.800	UGL
0.0	11-jun-1990	UM25	246TCP	LT	3.600	UGL
0.0	11-jun-1990	UM25	24DCLP	LT	8.400	UGL
0.0	11-jun-1990	UM25	24DMPN	LT	4.400	UGL
0.0	11-jun-1990	UM25	24DNP	LT	176.000	UGL
0.0	11-jun-1990	UM25	2CLP	LT	2.800	UGL
0.0	11-jun-1990	UM25	2MP	LT	3.600	UGL
0.0	11-jun-1990	UM25	2NP	LT	8.200	UGL
0.0	11-jun-1990	UM25	4CL3C	LT	8.500	UGL
0.0	11-jun-1990	UM25	4MP	LT	2.800	UGL
0.0	11-jun-1990	UM25	4NP	LT	96.000	UGL
0.0	11-jun-1990	UM25	ALDRN	LT	13.000	UGL
0.0	11-jun-1990	UM25	ATZ	LT	5.900	UGL
0.0	11-jun-1990	UM25	CL6CP	LT	54.000	UGL
0.0	11-jun-1990	UM25	CLDAN	LT	37.000	UGL
0.0	11-jun-1990	UM25	CPMS	LT	10.000	UGL
0.0	11-jun-1990	UM25	CPMSO	LT	15.000	UGL
0.0	11-jun-1990	UM25	CPMSO2	LT	5.300	UGL
0.0	11-jun-1990	UM25	DBCP	LT	12.000	UGL
0.0	11-jun-1990	UM25	DCPD	LT	5.500	UGL
0.0	11-jun-1990	UM25	DDVP	LT	8.500	UGL
0.0	11-jun-1990	UM25	DIMP	LT	21.000	UGL
0.0	11-jun-1990	UM25	DITH	LT	3.300	UGL
0.0	11-jun-1990	UM25	DLDRN	LT	26.000	UGL
0.0	11-jun-1990	UM25	DMMP	LT	130.000	UGL
0.0	11-jun-1990	UM25	ENDRN	LT	18.000	UGL
0.0	11-jun-1990	UM25	ISODR	LT	7.800	UGL

Analytical Results for Chemical Ground Water
From: 01-jan-1988 To: 27-nov-90

Site: WELL WW-1 (continued)

SAMPLE DEPTH (ft)	SAMPLE DATE	TEST METHOD	COMPOUND	BOOL	CONCENTRATION	UNITS
0.0	11-jun-1990	UM25	MLTHN	LT	21.000	UGL
0.0	11-jun-1990	UM25	OXAT	LT	27.000	UGL
0.0	11-jun-1990	UM25	PCP	LT	9.100	UGL
0.0	11-jun-1990	UM25	PHENOL	LT	2.200	UGL
0.0	11-jun-1990	UM25	PPDDE	LT	14.000	UGL
0.0	11-jun-1990	UM25	PPDDT	LT	18.000	UGL
0.0	11-jun-1990	UM25	PRTHN	LT	37.000	UGL
0.0	11-jun-1990	UM25	SUPONA	LT	19.000	UGL
0.0	11-jun-1990	UW25	135TNB	LT	0.210	UGL
0.0	11-jun-1990	UW25	13DNB	LT	0.458	UGL
0.0	11-jun-1990	UW25	246TNT	LT	0.426	UGL
0.0	11-jun-1990	UW25	24DNT	LT	0.397	UGL
0.0	11-jun-1990	UW25	26DNT	LT	0.600	UGL
0.0	11-jun-1990	UW25	HMX	LT	0.533	UGL
0.0	11-jun-1990	UW25	NB	LT	0.682	UGL
0.0	11-jun-1990	UW25	RDX	LT	0.416	UGL
0.0	11-jun-1990	UW25	TETRYL	LT	0.631	UGL

Program ended normally.

INSTALLATION RESTORATION PROGRAM

CHEMICAL REPORT
Tue Nov 27 10:06:25 1990

For Parameters :

Installation = Tooele AD (North Area)
Beginning Date = 01-jan-1988
Ending Date = 27-nov-90
Media Type = Chemical Soil (CSO)
Maximum (X, Y) = (399450, 4505264)
Minimum (X, Y) = (374200, 4483142)
Booleans = Y

Analytical Results for Chemical Soil
From: 01-jan-1988 To: 27-nov-90

Site: BORE CR-88-01

SAMPLE DEPTH (ft)	SAMPLE DATE	TEST METHOD	COMPOUND	BOOL	CONCENTRATION	UNITS
0.0	20-may-1988	99	BR	LT	12500.000	UGG
0.0	20-may-1988	99	CL	LT	12500.000	UGG
0.0	20-may-1988	99	F	LT	5.000	UGG
0.0	20-may-1988	99	NA		119.000	UGG
0.0	20-may-1988	JB08	HG	LT	0.100	UGG
0.0	20-may-1988	JD01	AG	LT	0.648	UGG
0.0	20-may-1988	JD01	AS	LT	5.700	UGG
0.0	20-may-1988	JD01	BE		0.381	UGG
0.0	20-may-1988	JD01	CD		1.660	UGG
0.0	20-may-1988	JD01	CR		18.700	UGG
0.0	20-may-1988	JD01	CU		19.800	UGG
0.0	20-may-1988	JD01	PB		10.800	UGG
0.0	20-may-1988	JD01	SB	LT	25.300	UGG
0.0	20-may-1988	JD01	SE	LT	2.100	UGG
0.0	20-may-1988	JD01	TL	LT	7.930	UGG
0.0	20-may-1988	JS07	NI		17.900	UGG
0.0	20-may-1988	JS07	ZN		384.000	UGG
0.0	20-may-1988	KF02	NIT	LT	500.000	UGG
0.0	20-may-1988	KT01	SO4	LT	12500.000	UGG
0.0	20-may-1988	LW02	135TNB	LT	1.800	UGG
0.0	20-may-1988	LW02	13DNB	LT	0.580	UGG
0.0	20-may-1988	LW02	246TNT	LT	1.900	UGG
0.0	20-may-1988	LW02	24DNT	LT	0.410	UGG
0.0	20-may-1988	LW02	26DNT	LT	0.390	UGG
0.0	20-may-1988	LW02	HMX	LT	1.300	UGG
0.0	20-may-1988	LW02	NB	LT	0.420	UGG
0.0	20-may-1988	LW02	RDX	LT	0.890	UGG
0.0	20-may-1988	LW02	TETRYL	LT	0.270	UGG

Site: BORE CR-88-02

SAMPLE DEPTH (ft)	SAMPLE DATE	TEST METHOD	COMPOUND	BOOL	CONCENTRATION	UNITS
0.5	20-may-1988	99	BR	LT	12500.000	UGG
0.5	20-may-1988	99	CL	LT	12500.000	UGG
0.5	20-may-1988	99	F	LT	5.000	UGG
0.5	20-may-1988	99	NA		13.200	UGG
0.5	20-may-1988	JB08	HG	LT	0.100	UGG

Analytical Results for Chemical Soil
From: 01-jan-1988 To: 27-nov-90

Site: BORE CR-88-02 (continued)

SAMPLE DEPTH (ft)	SAMPLE DATE	TEST METHOD	COMPOUND	BOOL	CONCENTRATION	UNITS
0.5	20-may-1988	JD01	AG	LT	0.648	UGG
0.5	20-may-1988	JD01	AS	LT	5.700	UGG
0.5	20-may-1988	JD01	BE		0.328	UGG
0.5	20-may-1988	JD01	CD	LT	0.700	UGG
0.5	20-may-1988	JD01	CR		14.800	UGG
0.5	20-may-1988	JD01	CU		11.600	UGG
0.5	20-may-1988	JD01	PB		37.100	UGG
0.5	20-may-1988	JD01	SB	LT	25.300	UGG
0.5	20-may-1988	JD01	SE	LT	2.100	UGG
0.5	20-may-1988	JD01	TL	LT	7.930	UGG
0.5	20-may-1988	JS07	NI	LT	4.800	UGG
0.5	20-may-1988	JS07	ZN		2000.000	UGG
0.5	20-may-1988	KF02	NIT	LT	500.000	UGG
0.5	20-may-1988	KT01	SO4	LT	12500.000	UGG
0.5	20-may-1988	LW02	135TNB	LT	1.800	UGG
0.5	20-may-1988	LW02	13DNB	LT	0.590	UGG
0.5	20-may-1988	LW02	246TNT	LT	1.900	UGG
0.5	20-may-1988	LW02	24DNT	LT	0.420	UGG
0.5	20-may-1988	LW02	26DNT	LT	0.400	UGG
0.5	20-may-1988	LW02	HMX	LT	1.300	UGG
0.5	20-may-1988	LW02	NB	LT	0.430	UGG
0.5	20-may-1988	LW02	RDX	LT	0.900	UGG
0.5	20-may-1988	LW02	TETRYL	LT	0.280	UGG

Site: BORE CR-88-03

SAMPLE DEPTH (ft)	SAMPLE DATE	TEST METHOD	COMPOUND	BOOL	CONCENTRATION	UNITS
0.0	20-may-1988	99	BR	LT	12500.000	UGG
0.0	20-may-1988	99	CL	LT	12500.000	UGG
0.0	20-may-1988	99	F	LT	5.000	UGG
0.0	20-may-1988	99	NA		50.200	UGG
0.0	20-may-1988	J808	HG	LT	0.100	UGG
0.0	20-may-1988	JD01	AG	LT	0.648	UGG
0.0	20-may-1988	JD01	AS	LT	5.700	UGG
0.0	20-may-1988	JD01	BE		0.331	UGG
0.0	20-may-1988	JD01	CD	LT	0.700	UGG
0.0	20-may-1988	JD01	CR		15.300	UGG
0.0	20-may-1988	JD01	CU		12.200	UGG
0.0	20-may-1988	JD01	PB		7.910	UGG

Analytical Results for Chemical Soil
From: 01-jan-1988 To: 27-nov-90

Site: BORE CR-88-03 (continued)

SAMPLE DEPTH (ft)	SAMPLE DATE	TEST METHOD	COMPOUND	BOOL	CONCENTRATION	UNITS
0.0	20-may-1988	JD01	SB	LT	25.300	UGG
0.0	20-may-1988	JD01	SE	LT	2.100	UGG
0.0	20-may-1988	JD01	TL	LT	7.930	UGG
0.0	20-may-1988	JS07	NI	LT	4.800	UGG
0.0	20-may-1988	JS07	ZN		137.000	UGG
0.0	20-may-1988	KF02	NIT	LT	500.000	UGG
0.0	20-may-1988	KT01	SO4	LT	12500.000	UGG
0.0	20-may-1988	LW02	135TNB	LT	1.900	UGG
0.0	20-may-1988	LW02	13DNB	LT	0.600	UGG
0.0	20-may-1988	LW02	246TNT	LT	1.900	UGG
0.0	20-may-1988	LW02	24DNT	LT	0.430	UGG
0.0	20-may-1988	LW02	26DNT	LT	0.410	UGG
0.0	20-may-1988	LW02	HMX	LT	1.300	UGG
0.0	20-may-1988	LW02	NB	LT	0.430	UGG
0.0	20-may-1988	LW02	RDX	LT	0.920	UGG
0.0	20-may-1988	LW02	TETRYL	LT	0.280	UGG

Site: BORE CR-88-04

SAMPLE DEPTH (ft)	SAMPLE DATE	TEST METHOD	COMPOUND	BOOL	CONCENTRATION	UNITS
0.5	20-may-1988	99	BR	LT	12500.000	UGG
0.5	20-may-1988	99	CL	LT	12500.000	UGG
0.5	20-may-1988	99	F	LT	5.000	UGG
0.5	20-may-1988	99	NA		213.000	UGG
0.5	20-may-1988	JB08	HG	LT	0.100	UGG
0.5	20-may-1988	JD01	AG	LT	0.648	UGG
0.5	20-may-1988	JD01	AS	LT	5.700	UGG
0.5	20-may-1988	JD01	BE		0.375	UGG
0.5	20-may-1988	JD01	CD	LT	0.700	UGG
0.5	20-may-1988	JD01	CR		20.000	UGG
0.5	20-may-1988	JD01	CU		9.750	UGG
0.5	20-may-1988	JD01	PB		6.220	UGG
0.5	20-may-1988	JD01	SB	LT	25.300	UGG
0.5	20-may-1988	JD01	SE	LT	2.100	UGG
0.5	20-may-1988	JD01	TL	LT	7.930	UGG
0.5	20-may-1988	JS07	NI		17.700	UGG
0.5	20-may-1988	JS07	ZN		118.000	UGG

Analytical Results for Chemical Soil
From: 01-jan-1988 To: 27-nov-90

Site: BORE CR-88-04 (continued)

SAMPLE DEPTH (ft)	SAMPLE DATE	TEST METHOD	COMPOUND	BOOL	CONCENTRATION	UNITS
0.5	20-may-1988	KF02	NIT	LT	500.000	UGG
0.5	20-may-1988	KT01	SO4	LT	12500.000	UGG
0.5	20-may-1988	LW02	135TNB	LT	1.800	UGG
0.5	20-may-1988	LW02	13DNB	LT	0.590	UGG
0.5	20-may-1988	LW02	246TNT	LT	1.900	UGG
0.5	20-may-1988	LW02	24DNT	LT	0.420	UGG
0.5	20-may-1988	LW02	26DNT	LT	0.400	UGG
0.5	20-may-1988	LW02	HMX	LT	1.300	UGG
0.5	20-may-1988	LW02	NB	LT	0.430	UGG
0.5	20-may-1988	LW02	RDX	LT	0.900	UGG
0.5	20-may-1988	LW02	TETRYL	LT	0.280	UGG

Site: BORE CR-88-05

SAMPLE DEPTH (ft)	SAMPLE DATE	TEST METHOD	COMPOUND	BOOL	CONCENTRATION	UNITS
0.0	20-may-1988	99	BR	LT	12500.000	UGG
0.0	20-may-1988	99	CL	LT	12500.000	UGG
0.0	20-may-1988	99	F	LT	5.000	UGG
0.0	20-may-1988	99	NA		149.000	UGG
0.0	20-may-1988	JB08	HG	LT	0.100	UGG
0.0	20-may-1988	JD01	AG	LT	0.648	UGG
0.0	20-may-1988	JD01	AS	LT	5.700	UGG
0.0	20-may-1988	JD01	BE		0.403	UGG
0.0	20-may-1988	JD01	CD	LT	0.700	UGG
0.0	20-may-1988	JD01	CR		19.600	UGG
0.0	20-may-1988	JD01	CU		16.900	UGG
0.0	20-may-1988	JD01	PB		9.770	UGG
0.0	20-may-1988	JD01	SB	LT	25.300	UGG
0.0	20-may-1988	JD01	SE	LT	2.100	UGG
0.0	20-may-1988	JD01	TL	LT	7.930	UGG
0.0	20-may-1988	JS07	NI		20.000	UGG
0.0	20-may-1988	JS07	ZN		111.000	UGG
0.0	20-may-1988	KF02	NIT	LT	500.000	UGG
0.0	20-may-1988	KT01	SO4	LT	12500.000	UGG
0.0	20-may-1988	LW02	135TNB	LT	1.800	UGG
0.0	20-may-1988	LW02	13DNB	LT	0.590	UGG
0.0	20-may-1988	LW02	246TNT	LT	1.900	UGG

Analytical Results for Chemical Soil
From: 01-jan-1988 To: 27-nov-90

Site: BORE CR-88-05 (continued)

SAMPLE DEPTH (ft)	SAMPLE DATE	TEST METHOD	COMPOUND	BOOL	CONCENTRATION	UNITS
0.0	20-may-1988	LW02	24DNT	LT	0.420	UGG
0.0	20-may-1988	LW02	26DNT	LT	0.400	UGG
0.0	20-may-1988	LW02	HMX	LT	1.300	UGG
0.0	20-may-1988	LW02	NB	LT	0.430	UGG
0.0	20-may-1988	LW02	RDX	LT	0.910	UGG
0.0	20-may-1988	LW02	TETRYL	LT	0.280	UGG

Site: BORE CR-88-06

SAMPLE DEPTH (ft)	SAMPLE DATE	TEST METHOD	COMPOUND	BOOL	CONCENTRATION	UNITS
0.5	20-may-1988	99	BR	LT	12500.000	UGG
0.5	20-may-1988	99	CL	LT	12500.000	UGG
0.5	20-may-1988	99	F	LT	5.000	UGG
0.5	20-may-1988	99	NA		144.000	UGG
0.5	20-may-1988	JB08	HG	LT	0.100	UGG
0.5	20-may-1988	JD01	AG	LT	0.648	UGG
0.5	20-may-1988	JD01	AS	LT	5.700	UGG
0.5	20-may-1988	JD01	BE		0.411	UGG
0.5	20-may-1988	JD01	CD	LT	0.700	UGG
0.5	20-may-1988	JD01	CR		21.400	UGG
0.5	20-may-1988	JD01	CU		12.200	UGG
0.5	20-may-1988	JD01	PB		7.240	UGG
0.5	20-may-1988	JD01	SB	LT	25.300	UGG
0.5	20-may-1988	JD01	SE	LT	2.100	UGG
0.5	20-may-1988	JD01	TL	LT	7.930	UGG
0.5	20-may-1988	JS07	NI		16.700	UGG
0.5	20-may-1988	JS07	ZN		77.200	UGG
0.5	20-may-1988	KF02	NIT	LT	500.000	UGG
0.5	20-may-1988	KT01	SO4	LT	12500.000	UGG
0.5	20-may-1988	LW02	135TNB	LT	1.800	UGG
0.5	20-may-1988	LW02	13DNB	LT	0.590	UGG
0.5	20-may-1988	LW02	246TNT	LT	1.900	UGG
0.5	20-may-1988	LW02	24DNT	LT	0.420	UGG
0.5	20-may-1988	LW02	26DNT	LT	0.400	UGG
0.5	20-may-1988	LW02	HMX	LT	1.300	UGG
0.5	20-may-1988	LW02	NB	LT	0.430	UGG
0.5	20-may-1988	LW02	RDX	LT	0.910	UGG
0.5	20-may-1988	LW02	TETRYL	LT	0.280	UGG

Analytical Results for Chemical Soil
From: 01-jan-1988 To: 27-nov-90

Site: BORE CR-88-07

SAMPLE DEPTH (ft)	SAMPLE DATE	TEST METHOD	COMPOUND	BOOL	CONCENTRATION	UNITS
0.0	20-may-1988	99	BR	LT	12500.000	UGG
0.0	20-may-1988	99	CL	LT	12500.000	UGG
0.0	20-may-1988	99	F		5.860	UGG
0.0	20-may-1988	99	NA		108.000	UGG
0.0	20-may-1988	JB08	HG	LT	0.100	UGG
0.0	20-may-1988	JD01	AG	LT	0.648	UGG
0.0	20-may-1988	JD01	AS	LT	5.700	UGG
0.0	20-may-1988	JD01	BE	LT	0.330	UGG
0.0	20-may-1988	JD01	CD		3.190	UGG
0.0	20-may-1988	JD01	CR		17.300	UGG
0.0	20-may-1988	JD01	CU		15.800	UGG
0.0	20-may-1988	JD01	PB		8.290	UGG
0.0	20-may-1988	JD01	SB	LT	25.300	UGG
0.0	20-may-1988	JD01	SE	LT	2.100	UGG
0.0	20-may-1988	JD01	TL	LT	7.930	UGG
0.0	20-may-1988	JS07	NI		17.400	UGG
0.0	20-may-1988	JS07	ZN		752.000	UGG
0.0	20-may-1988	KF02	NIT	LT	500.000	UGG
0.0	20-may-1988	KT01	SO4	LT	12500.000	UGG
0.0	20-may-1988	LW02	135TNB	LT	1.900	UGG
0.0	20-may-1988	LW02	13DNB	LT	0.600	UGG
0.0	20-may-1988	LW02	246TNT	LT	1.900	UGG
0.0	20-may-1988	LW02	24DNT	LT	0.430	UGG
0.0	20-may-1988	LW02	26DNT	LT	0.410	UGG
0.0	20-may-1988	LW02	HMX	LT	1.300	UGG
0.0	20-may-1988	LW02	NB	LT	0.430	UGG
0.0	20-may-1988	LW02	RDX	LT	0.920	UGG
0.0	20-may-1988	LW02	TETRYL	LT	0.280	UGG

Site: BORE CR-88-08

SAMPLE DEPTH (ft)	SAMPLE DATE	TEST METHOD	COMPOUND	BOOL	CONCENTRATION	UNITS
0.5	20-may-1988	99	BR	LT	12500.000	UGG
0.5	20-may-1988	99	CL	LT	12500.000	UGG
0.5	20-may-1988	99	F		6.450	UGG
0.5	20-may-1988	99	NA		117.000	UGG
0.5	20-may-1988	JB08	HG	LT	0.100	UGG

Analytical Results for Chemical Soil
From: 01-jan-1988 To: 27-nov-90

Site: BORE CR-88-08 (continued)

SAMPLE DEPTH (ft)	SAMPLE DATE	TEST METHOD	COMPOUND	BOOL	CONCENTRATION	UNITS
0.5	20-may-1988	JD01	AG	LT	0.648	UGG
0.5	20-may-1988	JD01	AS	LT	5.700	UGG
0.5	20-may-1988	JD01	BE		0.292	UGG
0.5	20-may-1988	JD01	CD	LT	0.700	UGG
0.5	20-may-1988	JD01	CR		17.700	UGG
0.5	20-may-1988	JD01	CU		8.730	UGG
0.5	20-may-1988	JD01	PB	LT	4.780	UGG
0.5	20-may-1988	JD01	SB	LT	25.300	UGG
0.5	20-may-1988	JD01	SE	LT	2.100	UGG
0.5	20-may-1988	JD01	TL	LT	7.930	UGG
0.5	20-may-1988	JS07	NI		26.900	UGG
0.5	20-may-1988	JS07	ZN	LT	52.000	UGG
0.5	20-may-1988	KF02	NIT	LT	500.000	UGG
0.5	20-may-1988	KT01	SO4	LT	12500.000	UGG
0.5	20-may-1988	LW02	135TNB	LT	1.800	UGG
0.5	20-may-1988	LW02	13DNB	LT	0.590	UGG
0.5	20-may-1988	LW02	246TNT	LT	1.900	UGG
0.5	20-may-1988	LW02	24DNT	LT	0.420	UGG
0.5	20-may-1988	LW02	26DNT	LT	0.400	UGG
0.5	20-may-1988	LW02	HMX	LT	1.300	UGG
0.5	20-may-1988	LW02	NB	LT	0.430	UGG
0.5	20-may-1988	LW02	RDX	LT	0.910	UGG
0.5	20-may-1988	LW02	TETRYL	LT	0.280	UGG

Site: BORE CR-88-09

SAMPLE DEPTH (ft)	SAMPLE DATE	TEST METHOD	COMPOUND	BOOL	CONCENTRATION	UNITS
0.0	20-may-1988	99	BR	LT	12500.000	UGG
0.0	20-may-1988	99	CL	LT	12500.000	UGG
0.0	20-may-1988	99	F		6.200	UGG
0.0	20-may-1988	99	NA		117.000	UGG
0.0	20-may-1988	JB08	HG	LT	0.100	UGG
0.0	20-may-1988	JD01	AG	LT	0.648	UGG
0.0	20-may-1988	JD01	AS	LT	5.700	UGG
0.0	20-may-1988	JD01	BE		0.431	UGG
0.0	20-may-1988	JD01	CD	LT	0.700	UGG
0.0	20-may-1988	JD01	CR		21.800	UGG
0.0	20-may-1988	JD01	CU		11.500	UGG
0.0	20-may-1988	JD01	PB		8.870	UGG

Analytical Results for Chemical Soil
From: 01-jan-1988 To: 27-nov-90

Site: BORE CR-88-09 (continued)

SAMPLE DEPTH (ft)	SAMPLE DATE	TEST METHOD	COMPOUND	BOOL	CONCENTRATION	UNITS
0.0	20-may-1988	JD01	SB	LT	25.300	UGG
0.0	20-may-1988	JD01	SE	LT	2.100	UGG
0.0	20-may-1988	JD01	TL	LT	7.930	UGG
0.0	20-may-1988	JS07	NI		15.500	UGG
0.0	20-may-1988	JS07	ZN		70.500	UGG
0.0	20-may-1988	KF02	NIT	LT	500.000	UGG
0.0	20-may-1988	KT01	SO4	LT	12500.000	UGG
0.0	20-may-1988	LW02	135TNB	LT	1.900	UGG
0.0	20-may-1988	LW02	13DNB	LT	0.610	UGG
0.0	20-may-1988	LW02	246TNT	LT	2.000	UGG
0.0	20-may-1988	LW02	24DNT	LT	0.430	UGG
0.0	20-may-1988	LW02	26DNT	LT	0.410	UGG
0.0	20-may-1988	LW02	HMX	LT	1.300	UGG
0.0	20-may-1988	LW02	NB	LT	0.440	UGG
0.0	20-may-1988	LW02	RDX	LT	0.930	UGG
0.0	20-may-1988	LW02	TETRYL	LT	0.290	UGG

Site: BORE CR-88-10

SAMPLE DEPTH (ft)	SAMPLE DATE	TEST METHOD	COMPOUND	BOOL	CONCENTRATION	UNITS
0.5	20-may-1988	99	BR	LT	12500.000	UGG
0.5	20-may-1988	99	CL	LT	12500.000	UGG
0.5	20-may-1988	99	F	LT	5.400	UGG
0.5	20-may-1988	99	NA		112.000	UGG
0.5	20-may-1988	JB08	HG	LT	0.100	UGG
0.5	20-may-1988	JD01	AG	LT	0.648	UGG
0.5	20-may-1988	JD01	AS	LT	5.700	UGG
0.5	20-may-1988	JD01	BE		0.511	UGG
0.5	20-may-1988	JD01	CD	LT	0.700	UGG
0.5	20-may-1988	JD01	CR		21.700	UGG
0.5	20-may-1988	JD01	CU		11.600	UGG
0.5	20-may-1988	JD01	PB		7.510	UGG
0.5	20-may-1988	JD01	SB	LT	25.300	UGG
0.5	20-may-1988	JD01	SE	LT	2.100	UGG
0.5	20-may-1988	JD01	TL	LT	7.930	UGG
0.5	20-may-1988	JS07	NI		23.900	UGG
0.5	20-may-1988	JS07	ZN	LT	52.000	UGG

Analytical Results for Chemical Soil
From: 01-jan-1988 To: 27-nov-90

Site: BORE CR-88-10 (continued)

SAMPLE DEPTH (ft)	SAMPLE DATE	TEST METHOD	COMPOUND	BOOL	CONCENTRATION	UNITS
0.5	20-may-1988	KF02	NIT	LT	500.000	UGG
0.5	20-may-1988	KT01	SO4	LT	12500.000	UGG
0.5	20-may-1988	KT01	SO4	LT	12500.000	UGG
0.5	20-may-1988	LW02	135TNB	LT	1.900	UGG
0.5	20-may-1988	LW02	13DNB	LT	0.600	UGG
0.5	20-may-1988	LW02	246TNT	LT	2.000	UGG
0.5	20-may-1988	LW02	24DNT	LT	0.430	UGG
0.5	20-may-1988	LW02	26DNT	LT	0.410	UGG
0.5	20-may-1988	LW02	HMX	LT	1.300	UGG
0.5	20-may-1988	LW02	NB	LT	0.430	UGG
0.5	20-may-1988	LW02	RDX	LT	0.920	UGG
0.5	20-may-1988	LW02	TETRYL	LT	0.280	UGG

Site: BORE CR-88-11

SAMPLE DEPTH (ft)	SAMPLE DATE	TEST METHOD	COMPOUND	BOOL	CONCENTRATION	UNITS
0.0	20-may-1988	99	BR	LT	12500.000	UGG
0.0	20-may-1988	99	CL	LT	12500.000	UGG
0.0	20-may-1988	99	F	LT	5.400	UGG
0.0	20-may-1988	99	NA		116.000	UGG
0.0	20-may-1988	JB08	HG	LT	0.100	UGG
0.0	20-may-1988	JD01	AG	LT	0.648	UGG
0.0	20-may-1988	JD01	AS	LT	5.700	UGG
0.0	20-may-1988	JD01	BE		0.361	UGG
0.0	20-may-1988	JD01	CD		1.510	UGG
0.0	20-may-1988	JD01	CR		20.400	UGG
0.0	20-may-1988	JD01	CU		22.400	UGG
0.0	20-may-1988	JD01	PB		13.700	UGG
0.0	20-may-1988	JD01	SB	LT	25.300	UGG
0.0	20-may-1988	JD01	SE	LT	2.100	UGG
0.0	20-may-1988	JD01	TL	LT	7.930	UGG
0.0	20-may-1988	JS07	NI		19.300	UGG
0.0	20-may-1988	JS07	ZN		886.000	UGG
0.0	20-may-1988	KF02	NIT	LT	500.000	UGG
0.0	20-may-1988	KT01	SO4	LT	12500.000	UGG
0.0	20-may-1988	LW02	135TNB	LT	1.800	UGG
0.0	20-may-1988	LW02	13DNB	LT	0.580	UGG

Analytical Results for Chemical Soil
From: 01-jan-1988 To: 27-nov-90

Site: BORE CR-88-11 (continued)

SAMPLE DEPTH (ft)	SAMPLE DATE	TEST METHOD	COMPOUND	BOOL	CONCENTRATION	UNITS
0.0	20-may-1988	LW02	246TNT	LT	1.900	UGG
0.0	20-may-1988	LW02	24DNT	LT	0.410	UGG
0.0	20-may-1988	LW02	26DNT	LT	0.390	UGG
0.0	20-may-1988	LW02	HMX	LT	1.300	UGG
0.0	20-may-1988	LW02	NB	LT	0.420	UGG
0.0	20-may-1988	LW02	RDX	LT	0.890	UGG
0.0	20-may-1988	LW02	TETRYL	LT	0.270	UGG

Site: BORE CR-88-12

SAMPLE DEPTH (ft)	SAMPLE DATE	TEST METHOD	COMPOUND	BOOL	CONCENTRATION	UNITS
0.5	20-may-1988	99	BR	LT	12500.000	UGG
0.5	20-may-1988	99	CL	LT	12500.000	UGG
0.5	20-may-1988	99	F		6.260	UGG
0.5	20-may-1988	99	NA		131.000	UGG
0.5	20-may-1988	JB08	HG	LT	0.100	UGG
0.5	20-may-1988	JD01	AG	LT	0.648	UGG
0.5	20-may-1988	JD01	AS	LT	5.700	UGG
0.5	20-may-1988	JD01	BE		0.398	UGG
0.5	20-may-1988	JD01	CD	LT	0.700	UGG
0.5	20-may-1988	JD01	CR		17.900	UGG
0.5	20-may-1988	JD01	CU		11.300	UGG
0.5	20-may-1988	JD01	PB		8.640	UGG
0.5	20-may-1988	JD01	SB	LT	25.300	UGG
0.5	20-may-1988	JD01	SE	LT	2.100	UGG
0.5	20-may-1988	JD01	TL	LT	7.930	UGG
0.5	20-may-1988	JS07	NI		21.100	UGG
0.5	20-may-1988	JS07	ZN		125.000	UGG
0.5	20-may-1988	KF02	NIT	LT	500.000	UGG
0.5	20-may-1988	KT01	SO4	LT	12500.000	UGG
0.5	20-may-1988	LW02	135TNB	LT	1.900	UGG
0.5	20-may-1988	LW02	13DNB	LT	0.600	UGG
0.5	20-may-1988	LW02	246TNT	LT	1.900	UGG
0.5	20-may-1988	LW02	24DNT	LT	0.430	UGG
0.5	20-may-1988	LW02	26DNT	LT	0.410	UGG
0.5	20-may-1988	LW02	HMX	LT	1.300	UGG
0.5	20-may-1988	LW02	NB	LT	0.430	UGG
0.5	20-may-1988	LW02	RDX	LT	0.920	UGG
0.5	20-may-1988	LW02	TETRYL	LT	0.280	UGG

Analytical Results for Chemical Soil
From: 01-jan-1988 To: 27-nov-90

Site: BORE N-101-88

SAMPLE DEPTH (ft)	SAMPLE DATE	TEST METHOD	COMPOUND	BOOL	CONCENTRATION	UNITS
39.5	21-feb-1988	99	BR	LT	1290.000	UGG
29.5	21-feb-1988	99	BR	LT	1220.000	UGG
39.5	21-feb-1988	99	CL		14900.000	UGG
29.5	21-feb-1988	99	CL		13300.000	UGG
39.5	21-feb-1988	99	F	LT	12.900	UGG
29.5	21-feb-1988	99	F	LT	11.900	UGG
39.5	21-feb-1988	99	NA		226.000	UGG
29.5	21-feb-1988	99	NA		243.000	UGG
39.5	21-feb-1988	99	NIT	LT	10100.000	UGG
39.5	21-feb-1988	99	NIT	LT	10100.000	UGG
39.5	21-feb-1988	99	SO4		20900.000	UGG
29.5	21-feb-1988	99	SO4	LT	15200.000	UGG
39.5	21-feb-1988	LW02	135TNB	LT	2.090	UGG
29.5	21-feb-1988	LW02	135TNB		3.700	UGG
39.5	21-feb-1988	LW02	13DNB	LT	0.590	UGG
29.5	21-feb-1988	LW02	13DNB	LT	0.590	UGG
39.5	21-feb-1988	LW02	246TNT	LT	1.920	UGG
29.5	21-feb-1988	LW02	246TNT	LT	1.920	UGG
39.5	21-feb-1988	LW02	24DNT	LT	0.420	UGG
29.5	21-feb-1988	LW02	24DNT	LT	0.420	UGG
39.5	21-feb-1988	LW02	26DNT	LT	0.400	UGG
29.5	21-feb-1988	LW02	26DNT	LT	0.400	UGG
39.5	21-feb-1988	LW02	HMX	LT	1.270	UGG
29.5	21-feb-1988	LW02	HMX	LT	1.270	UGG
39.5	21-feb-1988	LW02	NB	LT	0.420	UGG
29.5	21-feb-1988	LW02	NB	LT	0.420	UGG
39.5	21-feb-1988	LW02	RDX	LT	0.980	UGG
29.5	21-feb-1988	LW02	RDX	LT	0.980	UGG
39.5	21-feb-1988	LW02	TETRYL	LT	0.250	UGG
29.5	21-feb-1988	LW02	TETRYL	LT	0.250	UGG

Site: BORE N-102-88

SAMPLE DEPTH (ft)	SAMPLE DATE	TEST METHOD	COMPOUND	BOOL	CONCENTRATION	UNITS
29.5	23-feb-1988	99	BR	LT	1240.000	UGG
39.5	23-feb-1988	99	BR	LT	1320.000	UGG
29.5	23-feb-1988	99	CL		12000.000	UGG
39.5	23-feb-1988	99	CL		15400.000	UGG
29.5	23-feb-1988	99	F	LT	13.200	UGG
39.5	23-feb-1988	99	F	LT	12.400	UGG
29.5	23-feb-1988	99	NA		207.000	UGG
39.5	23-feb-1988	99	NA		405.000	UGG
39.5	23-feb-1988	99	NIT	LT	9190.000	UGG
29.5	23-feb-1988	99	SO4	LT	15600.000	UGG

Analytical Results for Chemical Soil
From: 01-jan-1988 To: 27-nov-90

Site: BORE N-102-88 (continued)

SAMPLE DEPTH (ft)	SAMPLE DATE	TEST METHOD	COMPOUND	BOOL	CONCENTRATION	UNITS
39.5	23-feb-1988	99	SO4		26000.000	UGG
29.5	23-feb-1988	LW02	135TNB	LT	2.090	UGG
39.5	23-feb-1988	LW02	135TNB	LT	2.090	UGG
29.5	23-feb-1988	LW02	13DNB	LT	0.590	UGG
39.5	23-feb-1988	LW02	13DNB	LT	0.590	UGG
29.5	23-feb-1988	LW02	246TNT	LT	1.920	UGG
39.5	23-feb-1988	LW02	246TNT	LT	1.920	UGG
29.5	23-feb-1988	LW02	24DNT	LT	0.420	UGG
39.5	23-feb-1988	LW02	24DNT	LT	0.420	UGG
29.5	23-feb-1988	LW02	26DNT	LT	0.400	UGG
39.5	23-feb-1988	LW02	26DNT	LT	0.400	UGG
29.5	23-feb-1988	LW02	HMX	LT	1.270	UGG
39.5	23-feb-1988	LW02	HMX	LT	1.270	UGG
29.5	23-feb-1988	LW02	NB	LT	0.420	UGG
39.5	23-feb-1988	LW02	NB	LT	0.420	UGG
29.5	23-feb-1988	LW02	RDX	LT	0.980	UGG
39.5	23-feb-1988	LW02	RDX	LT	0.980	UGG
29.5	23-feb-1988	LW02	TETRYL	LT	0.250	UGG
39.5	23-feb-1988	LW02	TETRYL	LT	0.250	UGG

Site: BORE N-103-88

SAMPLE DEPTH (ft)	SAMPLE DATE	TEST METHOD	COMPOUND	BOOL	CONCENTRATION	UNITS
24.5	23-feb-1988	99	BR	LT	1240.000	UGG
29.5	23-feb-1988	99	BR	LT	1310.000	UGG
24.5	23-feb-1988	99	CL		13000.000	UGG
29.5	23-feb-1988	99	CL		17600.000	UGG
24.5	23-feb-1988	99	F	LT	13.100	UGG
29.5	23-feb-1988	99	F	LT	12.300	UGG
24.5	23-feb-1988	99	NA		796.000	UGG
29.5	23-feb-1988	99	NA		819.000	UGG
24.5	23-feb-1988	99	NIT	LT	9190.000	UGG
29.5	23-feb-1988	99	NIT	LT	9190.000	UGG
24.5	23-feb-1988	99	SO4	LT	15500.000	UGG
29.5	23-feb-1988	99	SO4	LT	16400.000	UGG
24.5	23-feb-1988	LW02	135TNB	LT	2.090	UGG
29.5	23-feb-1988	LW02	135TNB	LT	2.090	UGG
24.5	23-feb-1988	LW02	13DNB	LT	0.590	UGG
29.5	23-feb-1988	LW02	13DNB	LT	0.590	UGG
24.5	23-feb-1988	LW02	246TNT	LT	1.920	UGG
29.5	23-feb-1988	LW02	246TNT	LT	1.920	UGG
24.5	23-feb-1988	LW02	24DNT	LT	0.420	UGG
29.5	23-feb-1988	LW02	24DNT	LT	0.420	UGG

Site: BORE N-103-88 (continued)

SAMPLE DEPTH (ft)	SAMPLE DATE	TEST METHOD	COMPOUND	BOOL	CONCENTRATION	UNITS
24.5	23-feb-1988	LW02	26DNT	LT	0.400	UGG
29.5	23-feb-1988	LW02	26DNT	LT	0.400	UGG
24.5	23-feb-1988	LW02	HMX	LT	1.270	UGG
29.5	23-feb-1988	LW02	HMX	LT	1.270	UGG
24.5	23-feb-1988	LW02	NB	LT	0.420	UGG
29.5	23-feb-1988	LW02	NB	LT	0.420	UGG
24.5	23-feb-1988	LW02	RDX	LT	0.980	UGG
29.5	23-feb-1988	LW02	RDX	LT	0.980	UGG
24.5	23-feb-1988	LW02	TETRYL	LT	0.250	UGG
29.5	23-feb-1988	LW02	TETRYL	LT	0.250	UGG

Site: BORE N-104-88

SAMPLE DEPTH (ft)	SAMPLE DATE	TEST METHOD	COMPOUND	BOOL	CONCENTRATION	UNITS
24.0	25-feb-1988	99	BR	LT	1230.000	UGG
34.0	25-feb-1988	99	BR	LT	1130.000	UGG
24.0	25-feb-1988	99	CL		12500.000	UGG
34.0	25-feb-1988	99	CL	LT	14200.000	UGG
34.0	25-feb-1988	99	CL	LT	14200.000	UGG
24.0	25-feb-1988	99	F	LT	11.400	UGG
34.0	25-feb-1988	99	F	LT	11.300	UGG
34.0	25-feb-1988	99	F	LT	11.300	UGG
24.0	25-feb-1988	99	NA		669.000	UGG
34.0	25-feb-1988	99	NA		359.000	UGG
24.0	25-feb-1988	99	NIT	LT	9190.000	UGG
34.0	25-feb-1988	99	NIT	LT	9190.000	UGG
24.5	26-feb-1988	99	NIT	LT	8700.000	UGG
24.0	25-feb-1988	99	SO4	LT	15400.000	UGG
34.0	25-feb-1988	99	SO4	LT	14200.000	UGG
34.0	25-feb-1988	99	SO4	LT	14200.000	UGG
24.5	26-feb-1988	LM13	111TCE	ND	0.050	UGG
24.5	26-feb-1988	LM13	112TCE	ND	0.050	UGG
24.5	26-feb-1988	LM13	11DCE	ND	0.050	UGG
24.5	26-feb-1988	LM13	11DCLE	ND	0.050	UGG
24.5	26-feb-1988	LM13	12DCLB	ND	0.300	UGG
24.5	26-feb-1988	LM13	12DCLE	ND	0.050	UGG
24.5	26-feb-1988	LM13	12DCLP	ND	0.050	UGG
24.5	26-feb-1988	LM13	13DCLB	ND	0.300	UGG
24.5	26-feb-1988	LM13	14DCLB	ND	0.300	UGG
24.5	26-feb-1988	LM13	2CLEVE	ND	0.600	UGG
24.5	26-feb-1988	LM13	BRDCLM	ND	0.050	UGG
24.5	26-feb-1988	LM13	C13DCP	ND	0.600	UGG
24.5	26-feb-1988	LM13	C2H3CL	ND	0.100	UGG
24.5	26-feb-1988	LM13	C2H5CL	ND	0.100	UGG

Analytical Results for Chemical Soil
From: 01-jan-1988 To: 27-nov-90

Site: BORE N-104-88 (continued)

SAMPLE DEPTH (ft)	SAMPLE DATE	TEST METHOD	COMPOUND	BOOL	CONCENTRATION	UNITS
24.5	26-feb-1988	LM13	C6H6	ND	0.600	UGG
24.5	26-feb-1988	LM13	CCL4	ND	0.050	UGG
24.5	26-feb-1988	LM13	CH2CL2	ND	0.050	UGG
24.5	26-feb-1988	LM13	CH3BR	ND	0.100	UGG
24.5	26-feb-1988	LM13	CH3CL	ND	0.100	UGG
24.5	26-feb-1988	LM13	CHBR3	ND	0.100	UGG
24.5	26-feb-1988	LM13	CHCL3	ND	0.050	UGG
24.5	26-feb-1988	LM13	CLC6H5	ND	0.630	UGG
24.5	26-feb-1988	LM13	DBRCLM	ND	0.050	UGG
24.5	26-feb-1988	LM13	ETC6H5	ND	0.050	UGG
24.5	26-feb-1988	LM13	MEC6H5	ND	0.050	UGG
24.5	26-feb-1988	LM13	T12DCE	ND	0.630	UGG
24.5	26-feb-1988	LM13	T13DCP	ND	0.050	UGG
24.5	26-feb-1988	LM13	TCLEA	ND	0.050	UGG
24.5	26-feb-1988	LM13	TCLEE	ND	0.050	UGG
24.5	26-feb-1988	LM13	TRCLE	LT	0.141	UGG
24.0	25-feb-1988	LW02	135TNB	LT	2.090	UGG
34.0	25-feb-1988	LW02	135TNB	LT	2.090	UGG
24.5	26-feb-1988	LW02	135TNB	LT	2.090	UGG
24.0	25-feb-1988	LW02	13DNB	LT	0.590	UGG
34.0	25-feb-1988	LW02	13DNB	LT	0.590	UGG
24.5	26-feb-1988	LW02	13DNB	LT	0.590	UGG
24.0	25-feb-1988	LW02	246TNT	LT	1.920	UGG
34.0	25-feb-1988	LW02	246TNT	LT	1.920	UGG
24.5	26-feb-1988	LW02	246TNT	LT	1.920	UGG
24.0	25-feb-1988	LW02	24DNT	LT	0.420	UGG
34.0	25-feb-1988	LW02	24DNT	LT	0.420	UGG
24.5	26-feb-1988	LW02	24DNT	LT	0.420	UGG
24.0	25-feb-1988	LW02	26DNT	LT	0.400	UGG
34.0	25-feb-1988	LW02	26DNT	LT	0.400	UGG
24.5	26-feb-1988	LW02	26DNT	LT	0.400	UGG
24.0	25-feb-1988	LW02	HMX	LT	1.270	UGG
34.0	25-feb-1988	LW02	HMX	LT	1.270	UGG
24.5	26-feb-1988	LW02	HMX	LT	1.270	UGG
24.0	25-feb-1988	LW02	NB	LT	0.420	UGG
34.0	25-feb-1988	LW02	NB	LT	0.420	UGG
24.5	26-feb-1988	LW02	NB	LT	0.420	UGG
24.0	25-feb-1988	LW02	RDX	LT	0.980	UGG
34.0	25-feb-1988	LW02	RDX		1.600	UGG
24.5	26-feb-1988	LW02	RDX	LT	0.980	UGG
24.0	25-feb-1988	LW02	TETRYL	LT	0.250	UGG
34.0	25-feb-1988	LW02	TETRYL	LT	0.250	UGG
24.5	26-feb-1988	LW02	TETRYL	LT	0.250	UGG

Analytical Results for Chemical Soil
From: 01-jan-1988 To: 27-nov-90

Site: BORE N-105-88

SAMPLE DEPTH (ft)	SAMPLE DATE	TEST METHOD	COMPOUND	BOOL	CONCENTRATION	UNITS
9.5	26-feb-1988	99	NIT	LT	8700.000	UGG
19.5	26-feb-1988	99	NIT	LT	8700.000	UGG
9.5	26-feb-1988	LM13	111TCE	ND	0.050	UGG
19.5	26-feb-1988	LM13	111TCE	ND	0.050	UGG
9.5	26-feb-1988	LM13	112TCE	ND	0.050	UGG
19.5	26-feb-1988	LM13	112TCE	ND	0.050	UGG
9.5	26-feb-1988	LM13	11DCE	ND	0.050	UGG
19.5	26-feb-1988	LM13	11DCE	ND	0.050	UGG
9.5	26-feb-1988	LM13	11DCLE	ND	0.050	UGG
19.5	26-feb-1988	LM13	11DCLE	ND	0.050	UGG
9.5	26-feb-1988	LM13	12DCLB	ND	0.300	UGG
19.5	26-feb-1988	LM13	12DCLB	ND	0.300	UGG
9.5	26-feb-1988	LM13	12DCLE	ND	0.050	UGG
19.5	26-feb-1988	LM13	12DCLE	ND	0.050	UGG
9.5	26-feb-1988	LM13	12DCLP	ND	0.050	UGG
19.5	26-feb-1988	LM13	12DCLP	ND	0.050	UGG
9.5	26-feb-1988	LM13	13DCLB	ND	0.300	UGG
19.5	26-feb-1988	LM13	13DCLB	ND	0.300	UGG
9.5	26-feb-1988	LM13	14DCLB	ND	0.300	UGG
19.5	26-feb-1988	LM13	14DCLB	ND	0.300	UGG
9.5	26-feb-1988	LM13	2CLEVE	ND	0.600	UGG
19.5	26-feb-1988	LM13	2CLEVE	ND	0.600	UGG
9.5	26-feb-1988	LM13	BRDCLM	ND	0.050	UGG
19.5	26-feb-1988	LM13	BRDCLM	ND	0.050	UGG
9.5	26-feb-1988	LM13	C13DCP	ND	0.600	UGG
19.5	26-feb-1988	LM13	C13DCP	ND	0.600	UGG
9.5	26-feb-1988	LM13	C2H3CL	ND	0.100	UGG
19.5	26-feb-1988	LM13	C2H3CL	ND	0.100	UGG
9.5	26-feb-1988	LM13	C2H5CL	ND	0.100	UGG
19.5	26-feb-1988	LM13	C2H5CL	ND	0.100	UGG
9.5	26-feb-1988	LM13	C6H6	ND	0.600	UGG
19.5	26-feb-1988	LM13	C6H6	ND	0.600	UGG
9.5	26-feb-1988	LM13	CCL4	ND	0.050	UGG
19.5	26-feb-1988	LM13	CCL4	ND	0.050	UGG
9.5	26-feb-1988	LM13	CH2CL2	ND	0.050	UGG
19.5	26-feb-1988	LM13	CH2CL2	ND	0.050	UGG
9.5	26-feb-1988	LM13	CH3BR	ND	0.100	UGG
19.5	26-feb-1988	LM13	CH3BR	ND	0.100	UGG
9.5	26-feb-1988	LM13	CH3CL	ND	0.100	UGG
19.5	26-feb-1988	LM13	CH3CL	ND	0.100	UGG
9.5	26-feb-1988	LM13	CHBR3	ND	0.100	UGG
19.5	26-feb-1988	LM13	CHBR3	ND	0.100	UGG
9.5	26-feb-1988	LM13	CHCL3	ND	0.050	UGG
19.5	26-feb-1988	LM13	CHCL3	ND	0.050	UGG
9.5	26-feb-1988	LM13	CLC6H5	ND	0.630	UGG
19.5	26-feb-1988	LM13	CLC6H5	ND	0.630	UGG
9.5	26-feb-1988	LM13	DBRCLM	ND	0.050	UGG

Analytical Results for Chemical Soil
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Site: BORE N-105-88 (continued)

SAMPLE DEPTH (ft)	SAMPLE DATE	TEST METHOD	COMPOUND	BOOL	CONCENTRATION	UNITS
19.5	26-feb-1988	LM13	DBRCLM	ND	0.050	UGG
9.5	26-feb-1988	LM13	ETC6H5	ND	0.050	UGG
19.5	26-feb-1988	LM13	ETC6H5	ND	0.050	UGG
9.5	26-feb-1988	LM13	MEC6H5	ND	0.050	UGG
19.5	26-feb-1988	LM13	MEC6H5	ND	0.050	UGG
9.5	26-feb-1988	LM13	T12DCE	ND	0.630	UGG
19.5	26-feb-1988	LM13	T12DCE	ND	0.630	UGG
9.5	26-feb-1988	LM13	T13DCP	ND	0.050	UGG
19.5	26-feb-1988	LM13	T13DCP	ND	0.050	UGG
9.5	26-feb-1988	LM13	TCLEA	ND	0.050	UGG
19.5	26-feb-1988	LM13	TCLEA	ND	0.050	UGG
9.5	26-feb-1988	LM13	TCLEE	ND	0.050	UGG
19.5	26-feb-1988	LM13	TCLEE	ND	0.050	UGG
9.5	26-feb-1988	LM13	TRCLE	LT	0.145	UGG
19.5	26-feb-1988	LM13	TRCLE	LT	0.145	UGG
9.5	26-feb-1988	LW02	135TNB	LT	2.090	UGG
19.5	26-feb-1988	LW02	135TNB	LT	2.090	UGG
9.5	26-feb-1988	LW02	13DNB	LT	0.590	UGG
19.5	26-feb-1988	LW02	13DNB	LT	0.590	UGG
9.5	26-feb-1988	LW02	246TNT	LT	1.920	UGG
19.5	26-feb-1988	LW02	246TNT	LT	1.920	UGG
9.5	26-feb-1988	LW02	24DNT	LT	0.420	UGG
19.5	26-feb-1988	LW02	24DNT	LT	0.420	UGG
9.5	26-feb-1988	LW02	26DNT	LT	0.400	UGG
19.5	26-feb-1988	LW02	26DNT	LT	0.400	UGG
9.5	26-feb-1988	LW02	HMX	LT	1.270	UGG
19.5	26-feb-1988	LW02	HMX	LT	1.270	UGG
9.5	26-feb-1988	LW02	NB	LT	0.420	UGG
19.5	26-feb-1988	LW02	NB	LT	0.420	UGG
9.5	26-feb-1988	LW02	RDX	LT	0.980	UGG
19.5	26-feb-1988	LW02	RDX	LT	0.980	UGG
9.5	26-feb-1988	LW02	TETRYL	LT	0.250	UGG
19.5	26-feb-1988	LW02	TETRYL	LT	0.250	UGG

Site: BORE N-106-88

SAMPLE DEPTH (ft)	SAMPLE DATE	TEST METHOD	COMPOUND	BOOL	CONCENTRATION	UNITS
29.0	26-feb-1988	99	NIT	LT	0.000	UGG
29.0	26-feb-1988	99	NIT	LT	0.000	UGG
44.0	26-feb-1988	99	NIT	LT	8700.000	UGG
29.0	26-feb-1988	LM13	111TCE	ND	0.050	UGG
44.0	26-feb-1988	LM13	111TCE	ND	0.050	UGG
29.0	26-feb-1988	LM13	112TCE	ND	0.050	UGG

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From: 01-jan-1988 To: 27-nov-90

Site: BORE N-106-88 (continued)

SAMPLE DEPTH (ft)	SAMPLE DATE	TEST METHOD	COMPOUND	BOOL	CONCENTRATION	UNITS
44.0	26-feb-1988	LM13	112TCE	ND	0.050	UGG
29.0	26-feb-1988	LM13	11DCE	ND	0.050	UGG
44.0	26-feb-1988	LM13	11DCE	ND	0.050	UGG
29.0	26-feb-1988	LM13	11DCLE	ND	0.050	UGG
44.0	26-feb-1988	LM13	11DCLE	ND	0.050	UGG
29.0	26-feb-1988	LM13	12DCLB	ND	0.300	UGG
44.0	26-feb-1988	LM13	12DCLB	ND	0.300	UGG
29.0	26-feb-1988	LM13	12DCLE	ND	0.050	UGG
44.0	26-feb-1988	LM13	12DCLE	ND	0.050	UGG
29.0	26-feb-1988	LM13	12DCLP	ND	0.050	UGG
44.0	26-feb-1988	LM13	12DCLP	ND	0.050	UGG
29.0	26-feb-1988	LM13	13DCLB	ND	0.300	UGG
44.0	26-feb-1988	LM13	13DCLB	ND	0.300	UGG
29.0	26-feb-1988	LM13	14DCLB	ND	0.300	UGG
44.0	26-feb-1988	LM13	14DCLB	ND	0.300	UGG
29.0	26-feb-1988	LM13	2CLEVE	ND	0.600	UGG
44.0	26-feb-1988	LM13	2CLEVE	ND	0.600	UGG
29.0	26-feb-1988	LM13	BRDCLM	ND	0.050	UGG
44.0	26-feb-1988	LM13	BRDCLM	ND	0.050	UGG
29.0	26-feb-1988	LM13	C13DCP	ND	0.600	UGG
44.0	26-feb-1988	LM13	C13DCP	ND	0.600	UGG
29.0	26-feb-1988	LM13	C2H3CL	ND	0.100	UGG
44.0	26-feb-1988	LM13	C2H3CL	ND	0.100	UGG
29.0	26-feb-1988	LM13	C2H5CL	ND	0.100	UGG
44.0	26-feb-1988	LM13	C2H5CL	ND	0.100	UGG
29.0	26-feb-1988	LM13	C6H6	ND	0.600	UGG
44.0	26-feb-1988	LM13	C6H6	ND	0.600	UGG
29.0	26-feb-1988	LM13	CCL4	ND	0.050	UGG
44.0	26-feb-1988	LM13	CCL4	ND	0.050	UGG
29.0	26-feb-1988	LM13	CH2CL2	ND	0.050	UGG
44.0	26-feb-1988	LM13	CH2CL2	ND	0.050	UGG
29.0	26-feb-1988	LM13	CH3BR	ND	0.100	UGG
44.0	26-feb-1988	LM13	CH3BR	ND	0.100	UGG
29.0	26-feb-1988	LM13	CH3CL	ND	0.100	UGG
44.0	26-feb-1988	LM13	CH3CL	ND	0.100	UGG
29.0	26-feb-1988	LM13	CHBR3	ND	0.100	UGG
44.0	26-feb-1988	LM13	CHBR3	ND	0.100	UGG
29.0	26-feb-1988	LM13	CHCL3	ND	0.050	UGG
44.0	26-feb-1988	LM13	CHCL3	ND	0.050	UGG
29.0	26-feb-1988	LM13	CLC6H5	ND	0.630	UGG
44.0	26-feb-1988	LM13	CLC6H5	ND	0.630	UGG
29.0	26-feb-1988	LM13	DBRCLM	ND	0.050	UGG
44.0	26-feb-1988	LM13	DBRCLM	ND	0.050	UGG
29.0	26-feb-1988	LM13	ETC6H5	ND	0.050	UGG
44.0	26-feb-1988	LM13	ETC6H5	ND	0.050	UGG
29.0	26-feb-1988	LM13	MEC6H5	ND	0.050	UGG
44.0	26-feb-1988	LM13	MEC6H5	ND	0.050	UGG
29.0	26-feb-1988	LM13	T12DCE	ND	0.630	UGG

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From: 01-jan-1988 To: 27-nov-90

Site: BORE N-106-88 (continued)

SAMPLE DEPTH (ft)	SAMPLE DATE	TEST METHOD	COMPOUND	BOOL	CONCENTRATION	UNITS
44.0	26-feb-1988	LM13	T12DCE	ND	0.630	UGG
29.0	26-feb-1988	LM13	T13DCP	ND	0.050	UGG
44.0	26-feb-1988	LM13	T13DCP	ND	0.050	UGG
29.0	26-feb-1988	LM13	TCLEA	ND	0.050	UGG
44.0	26-feb-1988	LM13	TCLEA	ND	0.050	UGG
29.0	26-feb-1988	LM13	TCLEE	ND	0.050	UGG
44.0	26-feb-1988	LM13	TCLEE	ND	0.050	UGG
29.0	26-feb-1988	LM13	TRCLE	LT	0.141	UGG
44.0	26-feb-1988	LM13	TRCLE	LT	0.141	UGG
29.0	26-feb-1988	LW02	135TNB	LT	2.090	UGG
44.0	26-feb-1988	LW02	135TNB	LT	2.090	UGG
29.0	26-feb-1988	LW02	13DNB	LT	0.590	UGG
44.0	26-feb-1988	LW02	13DNB	LT	0.590	UGG
29.0	26-feb-1988	LW02	246TNT	LT	1.920	UGG
44.0	26-feb-1988	LW02	246TNT	LT	1.920	UGG
29.0	26-feb-1988	LW02	24DNT	LT	0.420	UGG
44.0	26-feb-1988	LW02	24DNT	LT	0.420	UGG
29.0	26-feb-1988	LW02	26DNT	LT	0.400	UGG
44.0	26-feb-1988	LW02	26DNT	LT	0.400	UGG
29.0	26-feb-1988	LW02	HMX	LT	1.270	UGG
44.0	26-feb-1988	LW02	HMX	LT	1.270	UGG
29.0	26-feb-1988	LW02	NB	LT	0.420	UGG
44.0	26-feb-1988	LW02	NB	LT	0.420	UGG
29.0	26-feb-1988	LW02	RDX	LT	0.980	UGG
44.0	26-feb-1988	LW02	RDX	LT	0.980	UGG
29.0	26-feb-1988	LW02	TETRYL	LT	0.250	UGG
44.0	26-feb-1988	LW02	TETRYL	LT	0.250	UGG

Site: BORE N-107-88

SAMPLE DEPTH (ft)	SAMPLE DATE	TEST METHOD	COMPOUND	BOOL	CONCENTRATION	UNITS
29.5	26-feb-1988	99	NIT	LT	8700.000	UGG
39.5	26-feb-1988	99	NIT	LT	8700.000	UGG
29.5	26-feb-1988	LM13	111TCE	ND	0.050	UGG
29.5	26-feb-1988	LM13	112TCE	ND	0.050	UGG
29.5	26-feb-1988	LM13	11DCE	ND	0.050	UGG
29.5	26-feb-1988	LM13	11DCLE	ND	0.050	UGG
29.5	26-feb-1988	LM13	12DCLB	ND	0.300	UGG
29.5	26-feb-1988	LM13	12DCLE	ND	0.050	UGG
29.5	26-feb-1988	LM13	12DCLP	ND	0.050	UGG
29.5	26-feb-1988	LM13	13DCLB	ND	0.300	UGG
29.5	26-feb-1988	LM13	14DCLB	ND	0.300	UGG
29.5	26-feb-1988	LM13	2CLEVE	ND	0.600	UGG

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From: 01-jan-1988 To: 27-nov-90

Site: BORE N-107-88 (continued)

SAMPLE DEPTH (ft)	SAMPLE DATE	TEST METHOD	COMPOUND	BOOL	CONCENTRATION	UNITS
29.5	26-feb-1988	LM13	BRDCLM	ND	0.050	UGG
29.5	26-feb-1988	LM13	C13DCP	ND	0.600	UGG
29.5	26-feb-1988	LM13	C2H3CL	ND	0.100	UGG
29.5	26-feb-1988	LM13	C2H5CL	ND	0.100	UGG
29.5	26-feb-1988	LM13	C6H6	ND	0.600	UGG
29.5	26-feb-1988	LM13	CCL4	ND	0.050	UGG
29.5	26-feb-1988	LM13	CH2CL2	ND	0.050	UGG
29.5	26-feb-1988	LM13	CH3BR	ND	0.100	UGG
29.5	26-feb-1988	LM13	CH3CL	ND	0.100	UGG
29.5	26-feb-1988	LM13	CHBR3	ND	0.100	UGG
29.5	26-feb-1988	LM13	CHCL3	ND	0.050	UGG
29.5	26-feb-1988	LM13	CLC6H5	ND	0.630	UGG
29.5	26-feb-1988	LM13	DBRCLM	ND	0.050	UGG
29.5	26-feb-1988	LM13	ETC6H5	ND	0.050	UGG
29.5	26-feb-1988	LM13	MEC6H5	ND	0.050	UGG
29.5	26-feb-1988	LM13	T12DCE	ND	0.630	UGG
29.5	26-feb-1988	LM13	T13DCP	ND	0.050	UGG
29.5	26-feb-1988	LM13	TCLEA	ND	0.050	UGG
29.5	26-feb-1988	LM13	TCLEE	ND	0.050	UGG
29.5	26-feb-1988	LM13	TRCLE	LT	0.145	UGG
29.5	26-feb-1988	LW02	135TNB	LT	2.090	UGG
39.5	26-feb-1988	LW02	135TNB	LT	2.090	UGG
29.5	26-feb-1988	LW02	13DNB	LT	0.590	UGG
39.5	26-feb-1988	LW02	13DNB	LT	0.590	UGG
29.5	26-feb-1988	LW02	246TNT	LT	1.920	UGG
39.5	26-feb-1988	LW02	246TNT	LT	1.920	UGG
29.5	26-feb-1988	LW02	24DNT	LT	0.420	UGG
39.5	26-feb-1988	LW02	24DNT	LT	0.420	UGG
29.5	26-feb-1988	LW02	26DNT	LT	0.400	UGG
39.5	26-feb-1988	LW02	26DNT	LT	0.400	UGG
29.5	26-feb-1988	LW02	HMX	LT	1.270	UGG
39.5	26-feb-1988	LW02	HMX	LT	1.270	UGG
29.5	26-feb-1988	LW02	NB	LT	0.420	UGG
39.5	26-feb-1988	LW02	NB	LT	0.420	UGG
29.5	26-feb-1988	LW02	RDX	LT	0.980	UGG
39.5	26-feb-1988	LW02	RDX	LT	0.980	UGG
29.5	26-feb-1988	LW02	TETRYL	LT	0.250	UGG
39.5	26-feb-1988	LW02	TETRYL	LT	0.250	UGG

Analytical Results for Chemical Soil
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Site: BORE N-108-88

SAMPLE DEPTH (ft)	SAMPLE DATE	TEST METHOD	COMPOUND	BOOL	CONCENTRATION	UNITS
21.8	27-feb-1988	99	NIT		617.000	UGG
21.8	27-feb-1988	99	NIT	LT	502.000	UGG
0.0	27-feb-1988	LM13	111TCE	ND	0.050	UGG
0.0	27-feb-1988	LM13	111TCE	ND	0.050	UGG
0.0	27-feb-1988	LM13	112TCE	ND	0.050	UGG
0.0	27-feb-1988	LM13	112TCE	ND	0.050	UGG
0.0	27-feb-1988	LM13	11DCE	ND	0.050	UGG
0.0	27-feb-1988	LM13	11DCE	ND	0.050	UGG
0.0	27-feb-1988	LM13	11DCLE	ND	0.050	UGG
0.0	27-feb-1988	LM13	11DCLE	ND	0.050	UGG
0.0	27-feb-1988	LM13	12DCLB	ND	0.300	UGG
0.0	27-feb-1988	LM13	12DCLB	ND	0.300	UGG
0.0	27-feb-1988	LM13	12DCLE	ND	0.050	UGG
0.0	27-feb-1988	LM13	12DCLE	ND	0.050	UGG
0.0	27-feb-1988	LM13	12DCLP	ND	0.050	UGG
0.0	27-feb-1988	LM13	12DCLP	ND	0.050	UGG
0.0	27-feb-1988	LM13	13DCLB	ND	0.300	UGG
0.0	27-feb-1988	LM13	13DCLB	ND	0.300	UGG
0.0	27-feb-1988	LM13	14DCLB	ND	0.300	UGG
0.0	27-feb-1988	LM13	14DCLB	ND	0.300	UGG
0.0	27-feb-1988	LM13	2CLEVE	ND	0.600	UGG
0.0	27-feb-1988	LM13	2CLEVE	ND	0.600	UGG
0.0	27-feb-1988	LM13	BRDCLM	ND	0.050	UGG
0.0	27-feb-1988	LM13	BRDCLM	ND	0.050	UGG
0.0	27-feb-1988	LM13	C13DCP	ND	0.600	UGG
0.0	27-feb-1988	LM13	C13DCP	ND	0.600	UGG
0.0	27-feb-1988	LM13	C2H3CL	ND	0.100	UGG
0.0	27-feb-1988	LM13	C2H3CL	ND	0.100	UGG
0.0	27-feb-1988	LM13	C2H5CL	ND	0.100	UGG
0.0	27-feb-1988	LM13	C2H5CL	ND	0.100	UGG
0.0	27-feb-1988	LM13	C6H6	ND	0.600	UGG
0.0	27-feb-1988	LM13	C6H6	ND	0.600	UGG
0.0	27-feb-1988	LM13	CCL4	ND	0.050	UGG
0.0	27-feb-1988	LM13	CCL4	ND	0.050	UGG
0.0	27-feb-1988	LM13	CH2CL2	ND	0.050	UGG
0.0	27-feb-1988	LM13	CH2CL2	ND	0.050	UGG
0.0	27-feb-1988	LM13	CH3BR	ND	0.100	UGG
0.0	27-feb-1988	LM13	CH3BR	ND	0.100	UGG
0.0	27-feb-1988	LM13	CH3CL	ND	0.100	UGG
0.0	27-feb-1988	LM13	CH3CL	ND	0.100	UGG
0.0	27-feb-1988	LM13	CHBR3	ND	0.100	UGG
0.0	27-feb-1988	LM13	CHBR3	ND	0.100	UGG
0.0	27-feb-1988	LM13	CHCL3	ND	0.050	UGG
0.0	27-feb-1988	LM13	CHCL3	ND	0.050	UGG
0.0	27-feb-1988	LM13	CLC6H5	ND	0.630	UGG
0.0	27-feb-1988	LM13	CLC6H5	ND	0.630	UGG
0.0	27-feb-1988	LM13	DBRCLM	ND	0.050	UGG

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From: 01-jan-1988 To: 27-nov-90

Site: BORE N-108-88 (continued)

SAMPLE DEPTH (ft)	SAMPLE DATE	TEST METHOD	COMPOUND	BOOL	CONCENTRATION	UNITS
0.0	27-feb-1988	LM13	DBRCLM	ND	0.050	UGG
0.0	27-feb-1988	LM13	ETC6H5	ND	0.050	UGG
0.0	27-feb-1988	LM13	ETC6H5	ND	0.050	UGG
0.0	27-feb-1988	LM13	MEC6H5	ND	0.050	UGG
0.0	27-feb-1988	LM13	MEC6H5	ND	0.050	UGG
0.0	27-feb-1988	LM13	T12DCE	ND	0.630	UGG
0.0	27-feb-1988	LM13	T12DCE	ND	0.630	UGG
0.0	27-feb-1988	LM13	T13DCP	ND	0.050	UGG
0.0	27-feb-1988	LM13	T13DCP	ND	0.050	UGG
0.0	27-feb-1988	LM13	TCLEA	ND	0.050	UGG
0.0	27-feb-1988	LM13	TCLEA	ND	0.050	UGG
0.0	27-feb-1988	LM13	TCLEE	ND	0.050	UGG
0.0	27-feb-1988	LM13	TCLEE	ND	0.050	UGG
0.0	27-feb-1988	LM13	TRCLE	LT	0.145	UGG
0.0	27-feb-1988	LM13	TRCLE	LT	0.145	UGG
0.0	27-feb-1988	LM13	TRCLE	LT	0.145	UGG
0.0	27-feb-1988	LW02	135TNB	LT	2.090	UGG
0.0	27-feb-1988	LW02	135TNB		8.200	UGG
0.0	27-feb-1988	LW02	13DNB	LT	0.590	UGG
0.0	27-feb-1988	LW02	13DNB	LT	0.590	UGG
0.0	27-feb-1988	LW02	246TNT	LT	1.920	UGG
0.0	27-feb-1988	LW02	246TNT	LT	1.920	UGG
0.0	27-feb-1988	LW02	24DNT	LT	0.420	UGG
0.0	27-feb-1988	LW02	24DNT	LT	0.420	UGG
0.0	27-feb-1988	LW02	26DNT	LT	0.400	UGG
0.0	27-feb-1988	LW02	26DNT	LT	0.400	UGG
0.0	27-feb-1988	LW02	HMX	LT	1.270	UGG
0.0	27-feb-1988	LW02	HMX		1.700	UGG
0.0	27-feb-1988	LW02	NB	LT	0.420	UGG
0.0	27-feb-1988	LW02	NB	LT	0.420	UGG
0.0	27-feb-1988	LW02	RDX	LT	0.980	UGG
0.0	27-feb-1988	LW02	RDX		4.100	UGG
0.0	27-feb-1988	LW02	TETRYL	LT	0.250	UGG
0.0	27-feb-1988	LW02	TETRYL	LT	0.250	UGG

Site: BORE N-109-88

SAMPLE DEPTH (ft)	SAMPLE DATE	TEST METHOD	COMPOUND	BOOL	CONCENTRATION	UNITS
19.5	28-feb-1988	99	NIT	LT	0.000	UGG
29.5	28-feb-1988	99	NIT	LT	8600.000	UGG
34.5	28-feb-1988	99	NIT	LT	8600.000	UGG
34.5	28-feb-1988	99	NIT	LT	8600.000	UGG
9.5	28-feb-1988	99	NIT	LT	8600.000	UGG
24.5	28-feb-1988	99	NIT	LT	8600.000	UGG

Analytical Results for Chemical Soil
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Site: BORE N-109-88 (continued)

SAMPLE DEPTH (ft)	SAMPLE DATE	TEST METHOD	COMPOUND	BOOL	CONCENTRATION	UNITS
4.5	28-feb-1988	99	NIT	LT	8600.000	UGG
14.5	28-feb-1988	99	NIT	LT	8600.000	UGG
19.5	28-feb-1988	LM13	111TCE	ND	0.050	UGG
29.5	28-feb-1988	LM13	111TCE	ND	0.050	UGG
34.5	28-feb-1988	LM13	111TCE	ND	0.050	UGG
34.5	28-feb-1988	LM13	111TCE	ND	0.050	UGG
9.5	28-feb-1988	LM13	111TCE	ND	0.050	UGG
19.5	28-feb-1988	LM13	112TCE	ND	0.050	UGG
29.5	28-feb-1988	LM13	112TCE	ND	0.050	UGG
34.5	28-feb-1988	LM13	112TCE	ND	0.050	UGG
34.5	28-feb-1988	LM13	112TCE	ND	0.050	UGG
9.5	28-feb-1988	LM13	112TCE	ND	0.050	UGG
19.5	28-feb-1988	LM13	11DCE	ND	0.050	UGG
29.5	28-feb-1988	LM13	11DCE	ND	0.050	UGG
34.5	28-feb-1988	LM13	11DCE	ND	0.050	UGG
34.5	28-feb-1988	LM13	11DCE	ND	0.050	UGG
9.5	28-feb-1988	LM13	11DCE	ND	0.050	UGG
19.5	28-feb-1988	LM13	11DCLE	ND	0.050	UGG
29.5	28-feb-1988	LM13	11DCLE	ND	0.050	UGG
34.5	28-feb-1988	LM13	11DCLE	ND	0.050	UGG
34.5	28-feb-1988	LM13	11DCLE	ND	0.050	UGG
9.5	28-feb-1988	LM13	11DCLE	ND	0.050	UGG
19.5	28-feb-1988	LM13	12DCLB	ND	0.300	UGG
29.5	28-feb-1988	LM13	12DCLB	ND	0.300	UGG
34.5	28-feb-1988	LM13	12DCLB	ND	0.300	UGG
34.5	28-feb-1988	LM13	12DCLB	ND	0.300	UGG
9.5	28-feb-1988	LM13	12DCLB	ND	0.300	UGG
19.5	28-feb-1988	LM13	12DCLE	ND	0.050	UGG
29.5	28-feb-1988	LM13	12DCLE	ND	0.050	UGG
34.5	28-feb-1988	LM13	12DCLE	ND	0.050	UGG
34.5	28-feb-1988	LM13	12DCLE	ND	0.050	UGG
9.5	28-feb-1988	LM13	12DCLE	ND	0.050	UGG
19.5	28-feb-1988	LM13	12DCLP	ND	0.050	UGG
29.5	28-feb-1988	LM13	12DCLP	ND	0.050	UGG
34.5	28-feb-1988	LM13	12DCLP	ND	0.050	UGG
34.5	28-feb-1988	LM13	12DCLP	ND	0.050	UGG
9.5	28-feb-1988	LM13	12DCLP	ND	0.050	UGG
19.5	28-feb-1988	LM13	13DCLB	ND	0.300	UGG
29.5	28-feb-1988	LM13	13DCLB	ND	0.300	UGG
34.5	28-feb-1988	LM13	13DCLB	ND	0.300	UGG
34.5	28-feb-1988	LM13	13DCLB	ND	0.300	UGG
9.5	28-feb-1988	LM13	13DCLB	ND	0.300	UGG
19.5	28-feb-1988	LM13	14DCLB	ND	0.300	UGG
29.5	28-feb-1988	LM13	14DCLB	ND	0.300	UGG
34.5	28-feb-1988	LM13	14DCLB	ND	0.300	UGG
34.5	28-feb-1988	LM13	14DCLB	ND	0.300	UGG
9.5	28-feb-1988	LM13	14DCLB	ND	0.300	UGG

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Site: BORE N-109-88 (continued)

SAMPLE DEPTH (ft)	SAMPLE DATE	TEST METHOD	COMPOUND	BOOL	CONCENTRATION	UNITS
19.5	28-feb-1988	LM13	2CLEVE	ND	0.600	UGG
29.5	28-feb-1988	LM13	2CLEVE	ND	0.600	UGG
34.5	28-feb-1988	LM13	2CLEVE	ND	0.600	UGG
34.5	28-feb-1988	LM13	2CLEVE	ND	0.600	UGG
9.5	28-feb-1988	LM13	2CLEVE	ND	0.600	UGG
19.5	28-feb-1988	LM13	BRDCLM	ND	0.050	UGG
29.5	28-feb-1988	LM13	BRDCLM	ND	0.050	UGG
34.5	28-feb-1988	LM13	BRDCLM	ND	0.050	UGG
34.5	28-feb-1988	LM13	BRDCLM	ND	0.050	UGG
9.5	28-feb-1988	LM13	BRDCLM	ND	0.050	UGG
19.5	28-feb-1988	LM13	C13DCP	ND	0.600	UGG
29.5	28-feb-1988	LM13	C13DCP	ND	0.600	UGG
34.5	28-feb-1988	LM13	C13DCP	ND	0.600	UGG
34.5	28-feb-1988	LM13	C13DCP	ND	0.600	UGG
9.5	28-feb-1988	LM13	C13DCP	ND	0.600	UGG
19.5	28-feb-1988	LM13	C2H3CL	ND	0.100	UGG
29.5	28-feb-1988	LM13	C2H3CL	ND	0.100	UGG
34.5	28-feb-1988	LM13	C2H3CL	ND	0.100	UGG
34.5	28-feb-1988	LM13	C2H3CL	ND	0.100	UGG
9.5	28-feb-1988	LM13	C2H3CL	ND	0.100	UGG
19.5	28-feb-1988	LM13	C2H5CL	ND	0.100	UGG
29.5	28-feb-1988	LM13	C2H5CL	ND	0.100	UGG
34.5	28-feb-1988	LM13	C2H5CL	ND	0.100	UGG
34.5	28-feb-1988	LM13	C2H5CL	ND	0.100	UGG
9.5	28-feb-1988	LM13	C2H5CL	ND	0.100	UGG
19.5	28-feb-1988	LM13	C6H6	ND	0.600	UGG
29.5	28-feb-1988	LM13	C6H6	ND	0.600	UGG
34.5	28-feb-1988	LM13	C6H6	ND	0.600	UGG
34.5	28-feb-1988	LM13	C6H6	ND	0.600	UGG
9.5	28-feb-1988	LM13	C6H6	ND	0.600	UGG
19.5	28-feb-1988	LM13	CCL4	ND	0.050	UGG
29.5	28-feb-1988	LM13	CCL4	ND	0.050	UGG
34.5	28-feb-1988	LM13	CCL4	ND	0.050	UGG
34.5	28-feb-1988	LM13	CCL4	ND	0.050	UGG
9.5	28-feb-1988	LM13	CCL4	ND	0.050	UGG
19.5	28-feb-1988	LM13	CH2CL2	ND	0.050	UGG
29.5	28-feb-1988	LM13	CH2CL2	ND	0.050	UGG
34.5	28-feb-1988	LM13	CH2CL2	ND	0.050	UGG
34.5	28-feb-1988	LM13	CH2CL2	ND	0.050	UGG
9.5	28-feb-1988	LM13	CH2CL2	ND	0.050	UGG
19.5	28-feb-1988	LM13	CH3BR	ND	0.100	UGG
29.5	28-feb-1988	LM13	CH3BR	ND	0.100	UGG
34.5	28-feb-1988	LM13	CH3BR	ND	0.100	UGG
34.5	28-feb-1988	LM13	CH3BR	ND	0.100	UGG
9.5	28-feb-1988	LM13	CH3BR	ND	0.100	UGG
19.5	28-feb-1988	LM13	CH3CL	ND	0.100	UGG
29.5	28-feb-1988	LM13	CH3CL	ND	0.100	UGG
34.5	28-feb-1988	LM13	CH3CL	ND	0.100	UGG

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Site: BORE N-109-88 (continued)

SAMPLE DEPTH (ft)	SAMPLE DATE	TEST METHOD	COMPOUND	BOOL	CONCENTRATION	UNITS
34.5	28-feb-1988	LM13	CH3CL	ND	0.100	UGG
9.5	28-feb-1988	LM13	CH3CL	ND	0.100	UGG
19.5	28-feb-1988	LM13	CHBR3	ND	0.100	UGG
29.5	28-feb-1988	LM13	CHBR3	ND	0.100	UGG
34.5	28-feb-1988	LM13	CHBR3	ND	0.100	UGG
34.5	28-feb-1988	LM13	CHBR3	ND	0.100	UGG
9.5	28-feb-1988	LM13	CHBR3	ND	0.100	UGG
19.5	28-feb-1988	LM13	CHCL3	ND	0.050	UGG
29.5	28-feb-1988	LM13	CHCL3	ND	0.050	UGG
34.5	28-feb-1988	LM13	CHCL3	ND	0.050	UGG
34.5	28-feb-1988	LM13	CHCL3	ND	0.050	UGG
9.5	28-feb-1988	LM13	CHCL3	ND	0.050	UGG
19.5	28-feb-1988	LM13	CLC6H5	ND	0.630	UGG
29.5	28-feb-1988	LM13	CLC6H5	ND	0.630	UGG
34.5	28-feb-1988	LM13	CLC6H5	ND	0.630	UGG
34.5	28-feb-1988	LM13	CLC6H5	ND	0.630	UGG
9.5	28-feb-1988	LM13	CLC6H5	ND	0.630	UGG
19.5	28-feb-1988	LM13	DBRCLM	ND	0.050	UGG
29.5	28-feb-1988	LM13	DBRCLM	ND	0.050	UGG
34.5	28-feb-1988	LM13	DBRCLM	ND	0.050	UGG
34.5	28-feb-1988	LM13	DBRCLM	ND	0.050	UGG
9.5	28-feb-1988	LM13	DBRCLM	ND	0.050	UGG
19.5	28-feb-1988	LM13	ETC6H5	ND	0.050	UGG
29.5	28-feb-1988	LM13	ETC6H5	ND	0.050	UGG
34.5	28-feb-1988	LM13	ETC6H5	ND	0.050	UGG
34.5	28-feb-1988	LM13	ETC6H5	ND	0.050	UGG
9.5	28-feb-1988	LM13	ETC6H5	ND	0.050	UGG
19.5	28-feb-1988	LM13	MEC6H5	ND	0.050	UGG
29.5	28-feb-1988	LM13	MEC6H5	ND	0.050	UGG
34.5	28-feb-1988	LM13	MEC6H5	ND	0.050	UGG
34.5	28-feb-1988	LM13	MEC6H5	ND	0.050	UGG
9.5	28-feb-1988	LM13	MEC6H5	ND	0.050	UGG
19.5	28-feb-1988	LM13	T12DCE	ND	0.630	UGG
29.5	28-feb-1988	LM13	T12DCE	ND	0.630	UGG
34.5	28-feb-1988	LM13	T12DCE	ND	0.630	UGG
34.5	28-feb-1988	LM13	T12DCE	ND	0.630	UGG
9.5	28-feb-1988	LM13	T12DCE	ND	0.630	UGG
19.5	28-feb-1988	LM13	T13DCP	ND	0.050	UGG
29.5	28-feb-1988	LM13	T13DCP	ND	0.050	UGG
34.5	28-feb-1988	LM13	T13DCP	ND	0.050	UGG
34.5	28-feb-1988	LM13	T13DCP	ND	0.050	UGG
9.5	28-feb-1988	LM13	T13DCP	ND	0.050	UGG
19.5	28-feb-1988	LM13	TCLEA	ND	0.050	UGG
29.5	28-feb-1988	LM13	TCLEA	ND	0.050	UGG
34.5	28-feb-1988	LM13	TCLEA	ND	0.050	UGG
34.5	28-feb-1988	LM13	TCLEA	ND	0.050	UGG
9.5	28-feb-1988	LM13	TCLEA	ND	0.050	UGG
19.5	28-feb-1988	LM13	TCLEE	ND	0.050	UGG

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Site: BORE N-109-88 (continued)

SAMPLE DEPTH (ft)	SAMPLE DATE	TEST METHOD	COMPOUND	BOOL	CONCENTRATION	UNITS
29.5	28-feb-1988	LM13	TCLEE	ND	0.050	UGG
34.5	28-feb-1988	LM13	TCLEE	ND	0.050	UGG
34.5	28-feb-1988	LM13	TCLEE	ND	0.050	UGG
9.5	28-feb-1988	LM13	TCLEE	ND	0.050	UGG
19.5	28-feb-1988	LM13	TRCLE	LT	0.145	UGG
29.5	28-feb-1988	LM13	TRCLE	LT	0.145	UGG
34.5	28-feb-1988	LM13	TRCLE	LT	0.145	UGG
34.5	28-feb-1988	LM13	TRCLE	LT	0.145	UGG
9.5	28-feb-1988	LM13	TRCLE	LT	0.145	UGG
24.5	28-feb-1988	LM13	TRCLE	LT	0.145	UGG
4.5	28-feb-1988	LM13	TRCLE	LT	0.145	UGG
14.5	28-feb-1988	LM13	TRCLE	ND	0.145	UGG
19.5	28-feb-1988	LW02	135TNB		8.300	UGG
29.5	28-feb-1988	LW02	135TNB		20.000	UGG
34.5	28-feb-1988	LW02	135TNB		3.900	UGG
34.5	28-feb-1988	LW02	135TNB	LT	2.090	UGG
9.5	28-feb-1988	LW02	135TNB		3.500	UGG
24.5	28-feb-1988	LW02	135TNB		12.000	UGG
4.5	28-feb-1988	LW02	135TNB	LT	2.090	UGG
14.5	28-feb-1988	LW02	135TNB		18.000	UGG
19.5	28-feb-1988	LW02	13DNB	LT	0.590	UGG
29.5	28-feb-1988	LW02	13DNB	LT	0.590	UGG
34.5	28-feb-1988	LW02	13DNB	LT	0.590	UGG
34.5	28-feb-1988	LW02	13DNB	LT	0.590	UGG
9.5	28-feb-1988	LW02	13DNB	LT	0.590	UGG
24.5	28-feb-1988	LW02	13DNB	LT	0.590	UGG
4.5	28-feb-1988	LW02	13DNB	LT	0.590	UGG
14.5	28-feb-1988	LW02	13DNB	LT	0.590	UGG
19.5	28-feb-1988	LW02	246TNT	LT	1.920	UGG
29.5	28-feb-1988	LW02	246TNT	LT	1.920	UGG
34.5	28-feb-1988	LW02	246TNT	LT	1.920	UGG
34.5	28-feb-1988	LW02	246TNT	LT	1.920	UGG
9.5	28-feb-1988	LW02	246TNT	LT	1.920	UGG
24.5	28-feb-1988	LW02	246TNT	LT	1.920	UGG
4.5	28-feb-1988	LW02	246TNT	LT	1.920	UGG
14.5	28-feb-1988	LW02	246TNT	LT	1.920	UGG
19.5	28-feb-1988	LW02	24DNT	LT	0.420	UGG
29.5	28-feb-1988	LW02	24DNT		0.490	UGG
34.5	28-feb-1988	LW02	24DNT		0.560	UGG
34.5	28-feb-1988	LW02	24DNT	LT	0.420	UGG
9.5	28-feb-1988	LW02	24DNT	LT	0.420	UGG
24.5	28-feb-1988	LW02	24DNT	LT	0.420	UGG
4.5	28-feb-1988	LW02	24DNT	LT	0.420	UGG
14.5	28-feb-1988	LW02	24DNT		0.800	UGG
19.5	28-feb-1988	LW02	26DNT	LT	0.400	UGG
29.5	28-feb-1988	LW02	26DNT	LT	0.400	UGG
34.5	28-feb-1988	LW02	26DNT	LT	0.400	UGG

Analytical Results for Chemical Soil
From: 01-jan-1988 To: 27-nov-90

Site: BORE N-109-88 (continued)

SAMPLE DEPTH (ft)	SAMPLE DATE	TEST METHOD	COMPOUND	BOOL	CONCENTRATION	UNITS
34.5	28-feb-1988	LW02	26DNT	LT	0.400	UGG
9.5	28-feb-1988	LW02	26DNT	LT	0.400	UGG
24.5	28-feb-1988	LW02	26DNT	LT	0.400	UGG
4.5	28-feb-1988	LW02	26DNT	LT	0.400	UGG
14.5	28-feb-1988	LW02	26DNT	LT	0.400	UGG
19.5	28-feb-1988	LW02	HMX	LT	1.270	UGG
29.5	28-feb-1988	LW02	HMX		1.400	UGG
34.5	28-feb-1988	LW02	HMX		2.600	UGG
34.5	28-feb-1988	LW02	HMX	LT	1.270	UGG
9.5	28-feb-1988	LW02	HMX		1.300	UGG
24.5	28-feb-1988	LW02	HMX	LT	1.270	UGG
4.5	28-feb-1988	LW02	HMX		1.600	UGG
14.5	28-feb-1988	LW02	HMX		2.900	UGG
19.5	28-feb-1988	LW02	NB	LT	0.420	UGG
29.5	28-feb-1988	LW02	NB	LT	0.420	UGG
34.5	28-feb-1988	LW02	NB	LT	0.420	UGG
34.5	28-feb-1988	LW02	NB	LT	0.420	UGG
9.5	28-feb-1988	LW02	NB	LT	0.420	UGG
24.5	28-feb-1988	LW02	NB	LT	0.420	UGG
4.5	28-feb-1988	LW02	NB	LT	0.420	UGG
14.5	28-feb-1988	LW02	NB	LT	0.420	UGG
19.5	28-feb-1988	LW02	RDX		4.300	UGG
29.5	28-feb-1988	LW02	RDX		8.300	UGG
34.5	28-feb-1988	LW02	RDX		4.300	UGG
34.5	28-feb-1988	LW02	RDX	LT	0.980	UGG
9.5	28-feb-1988	LW02	RDX		2.500	UGG
24.5	28-feb-1988	LW02	RDX		6.500	UGG
4.5	28-feb-1988	LW02	RDX		2.700	UGG
14.5	28-feb-1988	LW02	RDX		5.700	UGG
19.5	28-feb-1988	LW02	TETRYL	LT	0.250	UGG
29.5	28-feb-1988	LW02	TETRYL	LT	0.250	UGG
34.5	28-feb-1988	LW02	TETRYL	LT	0.250	UGG
34.5	28-feb-1988	LW02	TETRYL	LT	0.250	UGG
9.5	28-feb-1988	LW02	TETRYL	LT	0.250	UGG
24.5	28-feb-1988	LW02	TETRYL	LT	0.250	UGG
4.5	28-feb-1988	LW02	TETRYL	LT	0.250	UGG
14.5	28-feb-1988	LW02	TETRYL	LT	0.250	UGG

Analytical Results for Chemical Soil
From: 01-jan-1988 To: 27-nov-90

Site: BORE N-111-88

SAMPLE DEPTH (ft)	SAMPLE DATE	TEST METHOD	COMPOUND	BOOL	CONCENTRATION	UNITS
336.0	30-mar-1988	99	AG	LT	0.674	UGG
336.0	30-mar-1988	99	AS	LT	5.930	UGG
336.0	30-mar-1988	99	BE	LT	0.343	UGG
336.0	30-mar-1988	99	BR	LT	0.000	UGG
336.0	30-mar-1988	99	CD		7.280	UGG
336.0	30-mar-1988	99	CL		8090.000	UGG
336.0	30-mar-1988	99	CR		217.000	UGG
336.0	30-mar-1988	99	CU		10.600	UGG
336.0	30-mar-1988	99	F	LT	18.900	UGG
336.0	30-mar-1988	99	NA		37.900	UGG
336.0	30-mar-1988	99	NI	LT	4.800	UGG
336.0	30-mar-1988	99	NIT	LT	0.000	UGG
336.0	30-mar-1988	99	PB	LT	4.970	UGG
336.0	30-mar-1988	99	SB	LT	26.300	UGG
336.0	30-mar-1988	99	SE	LT	2.180	UGG
336.0	30-mar-1988	99	TL	LT	8.250	UGG
336.0	30-mar-1988	99	ZN		53.600	UGG
336.0	30-mar-1988	J808	HG	LT	0.106	UGG
336.0	30-mar-1988	KT01	SO4	LT	12500.000	UGG
336.0	30-mar-1988	LM13	111TCE	ND	0.050	UGG
336.0	30-mar-1988	LM13	112TCE	ND	0.050	UGG
336.0	30-mar-1988	LM13	11DCE	ND	0.050	UGG
336.0	30-mar-1988	LM13	11DCLE	ND	0.050	UGG
336.0	30-mar-1988	LM13	12DCLB	ND	0.300	UGG
336.0	30-mar-1988	LM13	12DCLE	ND	0.050	UGG
336.0	30-mar-1988	LM13	12DCLP	ND	0.050	UGG
336.0	30-mar-1988	LM13	13DCLB	ND	0.300	UGG
336.0	30-mar-1988	LM13	14DCLB	ND	0.300	UGG
336.0	30-mar-1988	LM13	2CLEVE	ND	0.600	UGG
336.0	30-mar-1988	LM13	BRDCLM	ND	0.050	UGG
336.0	30-mar-1988	LM13	C13DCP	ND	0.600	UGG
336.0	30-mar-1988	LM13	C2H3CL	ND	0.100	UGG
336.0	30-mar-1988	LM13	C2H5CL	ND	0.100	UGG
336.0	30-mar-1988	LM13	C6H6	ND	0.600	UGG
336.0	30-mar-1988	LM13	CCL4	ND	0.050	UGG
336.0	30-mar-1988	LM13	CH2CL2	ND	0.050	UGG
336.0	30-mar-1988	LM13	CH3BR	ND	0.100	UGG
336.0	30-mar-1988	LM13	CH3CL	ND	0.100	UGG
336.0	30-mar-1988	LM13	CHBR3	ND	0.100	UGG
336.0	30-mar-1988	LM13	CHCL3	ND	0.050	UGG
336.0	30-mar-1988	LM13	CLC6H5	ND	0.630	UGG
336.0	30-mar-1988	LM13	DBRCLM	ND	0.050	UGG
336.0	30-mar-1988	LM13	ETC6H5	ND	0.050	UGG
336.0	30-mar-1988	LM13	MEC6H5	ND	0.050	UGG
336.0	30-mar-1988	LM13	T12DCE	ND	0.630	UGG

Analytical Results for Chemical Soil
From: 01-jan-1988 To: 27-nov-90

Site: BORE N-111-88 (continued)

SAMPLE DEPTH (ft)	SAMPLE DATE	TEST METHOD	COMPOUND	BOOL	CONCENTRATION	UNITS
336.0	30-mar-1988	LM13	T13DCP	ND	0.050	UGG
336.0	30-mar-1988	LM13	TCLEA	ND	0.050	UGG
336.0	30-mar-1988	LM13	TCLEE	ND	0.050	UGG
336.0	30-mar-1988	LM13	TRCLE	LT	0.145	UGG
336.0	30-mar-1988	LM14	124TCB	ND	0.300	UGG
336.0	30-mar-1988	LM14	12DPH	ND	0.300	UGG
336.0	30-mar-1988	LM14	246TCP	ND	0.300	UGG
336.0	30-mar-1988	LM14	24DCLP	ND	0.300	UGG
336.0	30-mar-1988	LM14	24DMPN	ND	0.300	UGG
336.0	30-mar-1988	LM14	24DNP	ND	2.000	UGG
336.0	30-mar-1988	LM14	24DNT	ND	0.300	UGG
336.0	30-mar-1988	LM14	26DNT	ND	0.300	UGG
336.0	30-mar-1988	LM14	2CLP	ND	0.300	UGG
336.0	30-mar-1988	LM14	2CNAP	ND	0.300	UGG
336.0	30-mar-1988	LM14	2NP	ND	0.300	UGG
336.0	30-mar-1988	LM14	33DCBD	ND	0.700	UGG
336.0	30-mar-1988	LM14	46DN2C	ND	2.000	UGG
336.0	30-mar-1988	LM14	4BRPPE	ND	0.300	UGG
336.0	30-mar-1988	LM14	4CL3C	ND	0.300	UGG
336.0	30-mar-1988	LM14	4CLPPE	ND	0.300	UGG
336.0	30-mar-1988	LM14	4NP	ND	2.000	UGG
336.0	30-mar-1988	LM14	ABHC	ND	0.500	UGG
336.0	30-mar-1988	LM14	AENSLF	ND	0.500	UGG
336.0	30-mar-1988	LM14	ALDRN	ND	0.500	UGG
336.0	30-mar-1988	LM14	ANAPNE	ND	0.300	UGG
336.0	30-mar-1988	LM14	ANAPYL	ND	0.300	UGG
336.0	30-mar-1988	LM14	ANTRC	ND	0.300	UGG
336.0	30-mar-1988	LM14	B2CEXM	ND	0.300	UGG
336.0	30-mar-1988	LM14	B2CIPE	ND	0.300	UGG
336.0	30-mar-1988	LM14	B2CLEE	ND	0.300	UGG
336.0	30-mar-1988	LM14	B2EHP	ND	0.300	UGG
336.0	30-mar-1988	LM14	BAANTR	ND	0.300	UGG
336.0	30-mar-1988	LM14	BAPYR	ND	0.300	UGG
336.0	30-mar-1988	LM14	BBFANT	ND	0.300	UGG
336.0	30-mar-1988	LM14	BBHC	ND	0.500	UGG
336.0	30-mar-1988	LM14	BBZP	ND	0.300	UGG
336.0	30-mar-1988	LM14	BENSLF	ND	1.000	UGG
336.0	30-mar-1988	LM14	BENZID	ND	1.650	UGG
336.0	30-mar-1988	LM14	BGHIPY	ND	0.300	UGG
336.0	30-mar-1988	LM14	BKFANT	ND	0.300	UGG
336.0	30-mar-1988	LM14	C2H5CL	ND	0.100	UGG
336.0	30-mar-1988	LM14	CHRY	ND	0.300	UGG
336.0	30-mar-1988	LM14	CL6BZ	ND	0.300	UGG
336.0	30-mar-1988	LM14	CL6CP	ND	0.300	UGG
336.0	30-mar-1988	LM14	CL6ET	ND	0.300	UGG
336.0	30-mar-1988	LM14	CLDAN	ND	5.000	UGG
336.0	30-mar-1988	LM14	DBAHA	ND	0.300	UGG

Analytical Results for Chemical Soil
From: 01-jan-1988 To: 27-nov-90

Site: BORE N-111-88 (continued)

SAMPLE DEPTH (ft)	SAMPLE DATE	TEST METHOD	COMPOUND	BOOL	CONCENTRATION	UNITS
336.0	30-mar-1988	LM14	DBHC	ND	0.500	UGG
336.0	30-mar-1988	LM14	DEP	ND	0.300	UGG
336.0	30-mar-1988	LM14	DLDRN	ND	1.000	UGG
336.0	30-mar-1988	LM14	DMP	ND	0.300	UGG
336.0	30-mar-1988	LM14	DNBP	ND	0.300	UGG
336.0	30-mar-1988	LM14	DNOP	ND	0.300	UGG
336.0	30-mar-1988	LM14	ENDRN	ND	1.000	UGG
336.0	30-mar-1988	LM14	ENDRNA	ND	0.660	UGG
336.0	30-mar-1988	LM14	ESFSO4	ND	1.000	UGG
336.0	30-mar-1988	LM14	FANT	ND	0.300	UGG
336.0	30-mar-1988	LM14	FLRENE	ND	0.300	UGG
336.0	30-mar-1988	LM14	GBHC	ND	0.500	UGG
336.0	30-mar-1988	LM14	HCBD	ND	0.300	UGG
336.0	30-mar-1988	LM14	HPCL	ND	0.500	UGG
336.0	30-mar-1988	LM14	HPCLE	ND	0.500	UGG
336.0	30-mar-1988	LM14	ICDPYR	ND	0.300	UGG
336.0	30-mar-1988	LM14	ISOPHR	ND	0.300	UGG
336.0	30-mar-1988	LM14	LIN	LT	0.066	UGG
336.0	30-mar-1988	LM14	NAP	ND	0.300	UGG
336.0	30-mar-1988	LM14	NB	ND	0.300	UGG
336.0	30-mar-1988	LM14	NNDMEA	ND	0.330	UGG
336.0	30-mar-1988	LM14	NNDPA	ND	0.300	UGG
336.0	30-mar-1988	LM14	PCB016	ND	5.000	UGG
336.0	30-mar-1988	LM14	PCB221	ND	5.000	UGG
336.0	30-mar-1988	LM14	PCB232	ND	5.000	UGG
336.0	30-mar-1988	LM14	PCB242	ND	5.000	UGG
336.0	30-mar-1988	LM14	PCB248	ND	5.000	UGG
336.0	30-mar-1988	LM14	PCB254	ND	10.000	UGG
336.0	30-mar-1988	LM14	PCB260	ND	10.000	UGG
336.0	30-mar-1988	LM14	PCP	ND	2.000	UGG
336.0	30-mar-1988	LM14	PHANTR	ND	0.300	UGG
336.0	30-mar-1988	LM14	PHENOL	ND	0.300	UGG
336.0	30-mar-1988	LM14	PPDDD	ND	1.000	UGG
336.0	30-mar-1988	LM14	PPDDE	LT	0.094	UGG
336.0	30-mar-1988	LM14	PPDDT	LT	0.506	UGG
336.0	30-mar-1988	LM14	PYR	ND	0.300	UGG
336.0	30-mar-1988	LM14	TXPHEN	ND	7.000	UGG

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Site: BORE N-112-88

SAMPLE DEPTH (ft)	SAMPLE DATE	TEST METHOD	COMPOUND	BOOL	CONCENTRATION	UNITS
32.6	21-apr-1988	99	AG	LT	0.757	UGG
328.0	21-apr-1988	99	AG	LT	0.800	UGG
32.6	21-apr-1988	99	AS		25.100	UGG
328.0	21-apr-1988	99	AS	LT	7.030	UGG
32.6	21-apr-1988	99	BE	LT	0.385	UGG
328.0	21-apr-1988	99	BE	LT	0.407	UGG
3.2	21-apr-1988	99	BR	LT	25000.000	UGG
32.6	21-apr-1988	99	BR	LT	125000.000	UGG
328.0	21-apr-1988	99	BR	LT	125000.000	UGG
32.6	21-apr-1988	99	CD	LT	0.818	UGG
328.0	21-apr-1988	99	CD	LT	0.864	UGG
3.2	21-apr-1988	99	CL	LT	25000.000	UGG
3.2	21-apr-1988	99	CL	LT	25000.000	UGG
32.6	21-apr-1988	99	CL	LT	125000.000	UGG
32.6	21-apr-1988	99	CR		12.400	UGG
328.0	21-apr-1988	99	CR		8.710	UGG
32.6	21-apr-1988	99	CU		5.570	UGG
328.0	21-apr-1988	99	CU		9.490	UGG
32.6	21-apr-1988	99	F	LT	5.000	UGG
328.0	21-apr-1988	99	F	LT	5.000	UGG
32.6	21-apr-1988	99	NA		72.600	UGG
328.0	21-apr-1988	99	NA		61.200	UGG
328.0	21-apr-1988	99	NIT	LT	125000.000	UGG
32.6	21-apr-1988	99	PB	LT	5.580	UGG
328.0	21-apr-1988	99	PB	LT	5.900	UGG
32.6	21-apr-1988	99	SB	LT	29.600	UGG
328.0	21-apr-1988	99	SB	LT	31.200	UGG
32.6	21-apr-1988	99	SE	LT	2.450	UGG
328.0	21-apr-1988	99	SE	LT	2.590	UGG
32.6	21-apr-1988	99	SO4	LT	12500.000	UGG
328.0	21-apr-1988	99	SO4	LT	12500.000	UGG
32.6	21-apr-1988	99	TL	LT	9.260	UGG
328.0	21-apr-1988	99	TL	LT	9.790	UGG
32.6	21-apr-1988	JB08	HG	LT	0.119	UGG
328.0	21-apr-1988	JB08	HG	LT	0.126	UGG
32.6	21-apr-1988	JS07	NI		5.080	UGG
328.0	21-apr-1988	JS07	NI		13.300	UGG
32.6	21-apr-1988	JS07	ZN	LT	52.500	UGG
328.0	21-apr-1988	JS07	ZN	LT	52.500	UGG
328.0	21-apr-1988	KF02	NIT	LT	527.000	UGG
328.0	21-apr-1988	KF02	NIT	LT	527.000	UGG
32.6	21-apr-1988	LM13	111TCE	ND	0.050	UGG
328.0	21-apr-1988	LM13	111TCE	ND	0.050	UGG
32.6	21-apr-1988	LM13	112TCE	ND	0.050	UGG

Site: BORE N-112-88 (continued)

SAMPLE DEPTH (ft)	SAMPLE DATE	TEST METHOD	COMPOUND	BOOL	CONCENTRATION	UNITS
328.0	21-apr-1988	LM13	112TCE	ND	0.050	UGG
32.6	21-apr-1988	LM13	11DCE	ND	0.050	UGG
328.0	21-apr-1988	LM13	11DCE	ND	0.050	UGG
32.6	21-apr-1988	LM13	11DCLE	ND	0.050	UGG
328.0	21-apr-1988	LM13	11DCLE	ND	0.050	UGG
32.6	21-apr-1988	LM13	12DCLB	ND	0.300	UGG
328.0	21-apr-1988	LM13	12DCLB	ND	0.300	UGG
32.6	21-apr-1988	LM13	12DCLE	ND	0.050	UGG
328.0	21-apr-1988	LM13	12DCLE	ND	0.050	UGG
32.6	21-apr-1988	LM13	12DCLP	ND	0.050	UGG
328.0	21-apr-1988	LM13	12DCLP	ND	0.050	UGG
32.6	21-apr-1988	LM13	13DCLB	ND	0.300	UGG
328.0	21-apr-1988	LM13	13DCLB	ND	0.300	UGG
32.6	21-apr-1988	LM13	14DCLB	ND	0.300	UGG
328.0	21-apr-1988	LM13	14DCLB	ND	0.300	UGG
32.6	21-apr-1988	LM13	2CLEVE	ND	0.600	UGG
328.0	21-apr-1988	LM13	2CLEVE	ND	0.600	UGG
32.6	21-apr-1988	LM13	BRDCLM	ND	0.050	UGG
328.0	21-apr-1988	LM13	BRDCLM	ND	0.050	UGG
32.6	21-apr-1988	LM13	C13DCP	ND	0.600	UGG
328.0	21-apr-1988	LM13	C13DCP	ND	0.600	UGG
32.6	21-apr-1988	LM13	C2H3CL	ND	0.100	UGG
328.0	21-apr-1988	LM13	C2H3CL	ND	0.100	UGG
32.6	21-apr-1988	LM13	C2H5CL	ND	0.100	UGG
328.0	21-apr-1988	LM13	C2H5CL	ND	0.100	UGG
32.6	21-apr-1988	LM13	C6H6	ND	0.600	UGG
328.0	21-apr-1988	LM13	C6H6	ND	0.600	UGG
32.6	21-apr-1988	LM13	CCL4	ND	0.050	UGG
328.0	21-apr-1988	LM13	CCL4	ND	0.050	UGG
32.6	21-apr-1988	LM13	CH2CL2	ND	0.050	UGG
328.0	21-apr-1988	LM13	CH2CL2	ND	0.050	UGG
32.6	21-apr-1988	LM13	CH3BR	ND	0.100	UGG
328.0	21-apr-1988	LM13	CH3BR	ND	0.100	UGG
32.6	21-apr-1988	LM13	CH3CL	ND	0.100	UGG
328.0	21-apr-1988	LM13	CH3CL	ND	0.100	UGG
32.6	21-apr-1988	LM13	CHBR3	ND	0.100	UGG
328.0	21-apr-1988	LM13	CHBR3	ND	0.100	UGG
32.6	21-apr-1988	LM13	CHCL3	ND	0.050	UGG
328.0	21-apr-1988	LM13	CHCL3	ND	0.050	UGG
32.6	21-apr-1988	LM13	CLC6H5	ND	0.630	UGG
328.0	21-apr-1988	LM13	CLC6H5	ND	0.630	UGG
32.6	21-apr-1988	LM13	DBRCLM	ND	0.050	UGG
328.0	21-apr-1988	LM13	DBRCLM	ND	0.050	UGG
32.6	21-apr-1988	LM13	ETC6H5	ND	0.050	UGG
328.0	21-apr-1988	LM13	ETC6H5	ND	0.050	UGG
32.6	21-apr-1988	LM13	MEC6H5	ND	0.050	UGG
328.0	21-apr-1988	LM13	MEC6H5	ND	0.050	UGG
32.6	21-apr-1988	LM13	T12DCE	ND	0.630	UGG

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From: 01-jan-1988 To: 27-nov-90

Site: BORE N-112-88 (continued)

SAMPLE DEPTH (ft)	SAMPLE DATE	TEST METHOD	COMPOUND	BOOL	CONCENTRATION	UNITS
328.0	21-apr-1988	LM13	T12DCE	ND	0.630	UGG
32.6	21-apr-1988	LM13	T13DCP	ND	0.050	UGG
328.0	21-apr-1988	LM13	T13DCP	ND	0.050	UGG
32.6	21-apr-1988	LM13	TCLEA	ND	0.050	UGG
328.0	21-apr-1988	LM13	TCLEA	ND	0.050	UGG
32.6	21-apr-1988	LM13	TCLEE	ND	0.050	UGG
328.0	21-apr-1988	LM13	TCLEE	ND	0.050	UGG
32.6	21-apr-1988	LM13	TRCLE	LT	0.145	UGG
328.0	21-apr-1988	LM13	TRCLE	LT	0.145	UGG
32.6	21-apr-1988	LM14	124TCB	ND	0.300	UGG
328.0	21-apr-1988	LM14	124TCB	ND	0.300	UGG
32.6	21-apr-1988	LM14	12DPH	ND	0.300	UGG
328.0	21-apr-1988	LM14	12DPH	ND	0.300	UGG
32.6	21-apr-1988	LM14	246TCP	ND	0.300	UGG
328.0	21-apr-1988	LM14	246TCP	ND	0.300	UGG
32.6	21-apr-1988	LM14	24DCLP	ND	0.300	UGG
328.0	21-apr-1988	LM14	24DCLP	ND	0.300	UGG
32.6	21-apr-1988	LM14	24DMPN	ND	0.300	UGG
328.0	21-apr-1988	LM14	24DMPN	ND	0.300	UGG
32.6	21-apr-1988	LM14	24DNP	ND	2.000	UGG
328.0	21-apr-1988	LM14	24DNP	ND	2.000	UGG
32.6	21-apr-1988	LM14	24DNT	ND	0.300	UGG
328.0	21-apr-1988	LM14	24DNT	ND	0.300	UGG
32.6	21-apr-1988	LM14	26DNT	ND	0.300	UGG
328.0	21-apr-1988	LM14	26DNT	ND	0.300	UGG
32.6	21-apr-1988	LM14	2CLP	ND	0.300	UGG
328.0	21-apr-1988	LM14	2CLP	ND	0.300	UGG
32.6	21-apr-1988	LM14	2CNAP	ND	0.300	UGG
328.0	21-apr-1988	LM14	2CNAP	ND	0.300	UGG
32.6	21-apr-1988	LM14	2NP	ND	0.300	UGG
328.0	21-apr-1988	LM14	2NP	ND	0.300	UGG
32.6	21-apr-1988	LM14	33DCBD	ND	0.700	UGG
328.0	21-apr-1988	LM14	33DCBD	ND	0.700	UGG
32.6	21-apr-1988	LM14	46DN2C	ND	2.000	UGG
328.0	21-apr-1988	LM14	46DN2C	ND	2.000	UGG
32.6	21-apr-1988	LM14	4BRPPE	ND	0.300	UGG
328.0	21-apr-1988	LM14	4BRPPE	ND	0.300	UGG
32.6	21-apr-1988	LM14	4CL3C	ND	0.300	UGG
328.0	21-apr-1988	LM14	4CL3C	ND	0.300	UGG
32.6	21-apr-1988	LM14	4CLPPE	ND	0.300	UGG
328.0	21-apr-1988	LM14	4CLPPE	ND	0.300	UGG
32.6	21-apr-1988	LM14	4NP	ND	2.000	UGG
328.0	21-apr-1988	LM14	4NP	ND	2.000	UGG
32.6	21-apr-1988	LM14	ABHC	ND	0.500	UGG
328.0	21-apr-1988	LM14	ABHC	ND	0.500	UGG
32.6	21-apr-1988	LM14	AENSLF	ND	0.500	UGG
328.0	21-apr-1988	LM14	AENSLF	ND	0.500	UGG

Site: BORE N-112-88 (continued)

SAMPLE DEPTH (ft)	SAMPLE DATE	TEST METHOD	COMPOUND	BOOL	CONCENTRATION	UNITS
32.6	21-apr-1988	LM14	ALDRN	ND	0.500	UGG
328.0	21-apr-1988	LM14	ALDRN	ND	0.500	UGG
32.6	21-apr-1988	LM14	ANAPNE	ND	0.300	UGG
328.0	21-apr-1988	LM14	ANAPNE	ND	0.300	UGG
32.6	21-apr-1988	LM14	ANAPYL	ND	0.300	UGG
328.0	21-apr-1988	LM14	ANAPYL	ND	0.300	UGG
32.6	21-apr-1988	LM14	ANTRC	ND	0.300	UGG
328.0	21-apr-1988	LM14	ANTRC	ND	0.300	UGG
32.6	21-apr-1988	LM14	B2CEXM	ND	0.300	UGG
328.0	21-apr-1988	LM14	B2CEXM	ND	0.300	UGG
32.6	21-apr-1988	LM14	B2CIPE	ND	0.300	UGG
328.0	21-apr-1988	LM14	B2CIPE	ND	0.300	UGG
32.6	21-apr-1988	LM14	B2CLEE	ND	0.300	UGG
328.0	21-apr-1988	LM14	B2CLEE	ND	0.300	UGG
32.6	21-apr-1988	LM14	B2EHP		4.450	UGG
328.0	21-apr-1988	LM14	B2EHP		0.785	UGG
32.6	21-apr-1988	LM14	BAANTR	ND	0.300	UGG
328.0	21-apr-1988	LM14	BAANTR	ND	0.300	UGG
32.6	21-apr-1988	LM14	BAPYR	ND	0.300	UGG
328.0	21-apr-1988	LM14	BAPYR	ND	0.300	UGG
32.6	21-apr-1988	LM14	BBFANT	ND	0.300	UGG
328.0	21-apr-1988	LM14	BBFANT	ND	0.300	UGG
32.6	21-apr-1988	LM14	BBHC	ND	0.500	UGG
328.0	21-apr-1988	LM14	BBHC	ND	0.500	UGG
32.6	21-apr-1988	LM14	BBZP	ND	0.300	UGG
328.0	21-apr-1988	LM14	BBZP	ND	0.300	UGG
32.6	21-apr-1988	LM14	BENSLF	ND	1.000	UGG
328.0	21-apr-1988	LM14	BENSLF	ND	1.000	UGG
32.6	21-apr-1988	LM14	BENZID	ND	1.650	UGG
328.0	21-apr-1988	LM14	BENZID	ND	1.650	UGG
32.6	21-apr-1988	LM14	BGHIPY	ND	0.300	UGG
328.0	21-apr-1988	LM14	BGHIPY	ND	0.300	UGG
32.6	21-apr-1988	LM14	BKFANT	ND	0.300	UGG
328.0	21-apr-1988	LM14	BKFANT	ND	0.300	UGG
32.6	21-apr-1988	LM14	C2H5CL	ND	0.100	UGG
328.0	21-apr-1988	LM14	C2H5CL	ND	0.100	UGG
32.6	21-apr-1988	LM14	CHRY	ND	0.300	UGG
328.0	21-apr-1988	LM14	CHRY	ND	0.300	UGG
32.6	21-apr-1988	LM14	CL6BZ	ND	0.300	UGG
328.0	21-apr-1988	LM14	CL6BZ	ND	0.300	UGG
32.6	21-apr-1988	LM14	CL6CP	ND	0.300	UGG
328.0	21-apr-1988	LM14	CL6CP	ND	0.300	UGG
32.6	21-apr-1988	LM14	CL6ET	ND	0.300	UGG
328.0	21-apr-1988	LM14	CL6ET	ND	0.300	UGG
32.6	21-apr-1988	LM14	CLDAN	ND	5.000	UGG
328.0	21-apr-1988	LM14	CLDAN	ND	5.000	UGG
32.6	21-apr-1988	LM14	DBAHA	ND	0.300	UGG
328.0	21-apr-1988	LM14	DBAHA	ND	0.300	UGG

Analytical Results for Chemical Soil
From: 01-jan-1988 To: 27-nov-90

Site: BORE N-112-88 (continued)

SAMPLE DEPTH (ft)	SAMPLE DATE	TEST METHOD	COMPOUND	BOOL	CONCENTRATION	UNITS
32.6	21-apr-1988	LM14	DBHC	ND	0.500	UGG
328.0	21-apr-1988	LM14	DBHC	ND	0.500	UGG
32.6	21-apr-1988	LM14	DEP	ND	0.300	UGG
328.0	21-apr-1988	LM14	DEP	ND	0.300	UGG
32.6	21-apr-1988	LM14	DLDRN	ND	1.000	UGG
328.0	21-apr-1988	LM14	DLDRN	ND	1.000	UGG
32.6	21-apr-1988	LM14	DMP	ND	0.300	UGG
328.0	21-apr-1988	LM14	DMP	ND	0.300	UGG
32.6	21-apr-1988	LM14	DNBP	ND	0.300	UGG
328.0	21-apr-1988	LM14	DNBP	ND	0.300	UGG
32.6	21-apr-1988	LM14	DNOP	ND	0.300	UGG
328.0	21-apr-1988	LM14	DNOP	ND	0.300	UGG
32.6	21-apr-1988	LM14	ENDRN	ND	1.000	UGG
328.0	21-apr-1988	LM14	ENDRN	ND	1.000	UGG
32.6	21-apr-1988	LM14	ENDRNA	ND	0.660	UGG
328.0	21-apr-1988	LM14	ENDRNA	ND	0.660	UGG
32.6	21-apr-1988	LM14	ESFSO4	ND	1.000	UGG
328.0	21-apr-1988	LM14	ESFSO4	ND	1.000	UGG
32.6	21-apr-1988	LM14	FANT	ND	0.300	UGG
328.0	21-apr-1988	LM14	FANT	ND	0.300	UGG
32.6	21-apr-1988	LM14	FLRENE	ND	0.300	UGG
328.0	21-apr-1988	LM14	FLRENE	ND	0.300	UGG
32.6	21-apr-1988	LM14	HCBD	ND	0.300	UGG
328.0	21-apr-1988	LM14	HCBD	ND	0.300	UGG
32.6	21-apr-1988	LM14	HPCL	ND	0.500	UGG
328.0	21-apr-1988	LM14	HPCL	ND	0.500	UGG
32.6	21-apr-1988	LM14	HPCLE	ND	0.500	UGG
328.0	21-apr-1988	LM14	HPCLE	ND	0.500	UGG
32.6	21-apr-1988	LM14	ICDPYR	ND	0.300	UGG
328.0	21-apr-1988	LM14	ICDPYR	ND	0.300	UGG
32.6	21-apr-1988	LM14	ISOPHR	ND	0.300	UGG
328.0	21-apr-1988	LM14	ISOPHR	ND	0.300	UGG
32.6	21-apr-1988	LM14	LIN	LT	0.066	UGG
328.0	21-apr-1988	LM14	LIN	LT	0.066	UGG
32.6	21-apr-1988	LM14	NAP	ND	0.300	UGG
328.0	21-apr-1988	LM14	NAP	ND	0.300	UGG
32.6	21-apr-1988	LM14	NB	ND	0.300	UGG
328.0	21-apr-1988	LM14	NB	ND	0.300	UGG
32.6	21-apr-1988	LM14	NNDPA	ND	0.300	UGG
328.0	21-apr-1988	LM14	NNDPA	ND	0.300	UGG
32.6	21-apr-1988	LM14	PCB016	ND	5.000	UGG
328.0	21-apr-1988	LM14	PCB016	ND	5.000	UGG
32.6	21-apr-1988	LM14	PCB221	ND	5.000	UGG
328.0	21-apr-1988	LM14	PCB221	ND	5.000	UGG
32.6	21-apr-1988	LM14	PCB232	ND	5.000	UGG
328.0	21-apr-1988	LM14	PCB232	ND	5.000	UGG
32.6	21-apr-1988	LM14	PCB242	ND	5.000	UGG
328.0	21-apr-1988	LM14	PCB242	ND	5.000	UGG

Analytical Results for Chemical Soil
From: 01-jan-1988 To: 27-nov-90

Site: BORE N-112-88 (continued)

SAMPLE DEPTH (ft)	SAMPLE DATE	TEST METHOD	COMPOUND	BOOL	CONCENTRATION	UNITS
32.6	21-apr-1988	LM14	PCB248	ND	5.000	UGG
328.0	21-apr-1988	LM14	PCB248	ND	5.000	UGG
32.6	21-apr-1988	LM14	PCB254	ND	10.000	UGG
328.0	21-apr-1988	LM14	PCB254	ND	10.000	UGG
32.6	21-apr-1988	LM14	PCB260	ND	10.000	UGG
328.0	21-apr-1988	LM14	PCB260	ND	10.000	UGG
32.6	21-apr-1988	LM14	PCP	ND	2.000	UGG
328.0	21-apr-1988	LM14	PCP	ND	2.000	UGG
32.6	21-apr-1988	LM14	PHANTR	ND	0.300	UGG
328.0	21-apr-1988	LM14	PHANTR	ND	0.300	UGG
32.6	21-apr-1988	LM14	PHENOL	ND	0.300	UGG
328.0	21-apr-1988	LM14	PHENOL	ND	0.300	UGG
32.6	21-apr-1988	LM14	PPDDD	ND	1.000	UGG
328.0	21-apr-1988	LM14	PPDDD	ND	1.000	UGG
32.6	21-apr-1988	LM14	PPDDE	LT	0.094	UGG
328.0	21-apr-1988	LM14	PPDDE	LT	0.094	UGG
32.6	21-apr-1988	LM14	PPDDT	LT	0.506	UGG
328.0	21-apr-1988	LM14	PPDDT	LT	0.506	UGG
32.6	21-apr-1988	LM14	PYR	ND	0.300	UGG
328.0	21-apr-1988	LM14	PYR	ND	0.300	UGG
32.6	21-apr-1988	LM14	TXPHEN	ND	7.000	UGG
328.0	21-apr-1988	LM14	TXPHEN	ND	7.000	UGG
32.6	21-apr-1988	LM14	UNK594		0.900	UGG
32.6	21-apr-1988	LM14	UNK595		1.000	UGG
328.0	21-apr-1988	LM14	UNK603		0.400	UGG
328.0	21-apr-1988	LM14	UNK623		0.800	UGG
32.6	21-apr-1988	LW02	135TNB	LT	2.000	UGG
328.0	21-apr-1988	LW02	135TNB	LT	2.800	UGG
32.6	21-apr-1988	LW02	13DNB	LT	0.640	UGG
328.0	21-apr-1988	LW02	13DNB	LT	0.880	UGG
32.6	21-apr-1988	LW02	246TNT	LT	2.100	UGG
328.0	21-apr-1988	LW02	246TNT	LT	2.900	UGG
32.6	21-apr-1988	LW02	24DNT	LT	0.460	UGG
328.0	21-apr-1988	LW02	24DNT	LT	0.630	UGG
32.6	21-apr-1988	LW02	26DNT	LT	0.440	UGG
328.0	21-apr-1988	LW02	26DNT	LT	0.600	UGG
32.6	21-apr-1988	LW02	HMX	LT	1.400	UGG
328.0	21-apr-1988	LW02	HMX	LT	1.900	UGG
32.6	21-apr-1988	LW02	NB	LT	0.470	UGG
328.0	21-apr-1988	LW02	NB	LT	0.640	UGG
32.6	21-apr-1988	LW02	RDX	LT	0.990	UGG
328.0	21-apr-1988	LW02	RDX	LT	1.400	UGG
32.6	21-apr-1988	LW02	TETRYL	LT	0.300	UGG
328.0	21-apr-1988	LW02	TETRYL	LT	0.410	UGG

Analytical Results for Chemical Soil
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Site: BORE N-113-88

SAMPLE DEPTH (ft)	SAMPLE DATE	TEST METHOD	COMPOUND	BOOL	CONCENTRATION	UNITS
39.0	02-may-1988	99	124TCB	ND	0.300	UGG
49.0	02-may-1988	99	124TCB	ND	0.300	UGG
39.0	02-may-1988	99	12DPH	ND	0.300	UGG
49.0	02-may-1988	99	12DPH	ND	0.300	UGG
39.0	02-may-1988	99	246TCP	ND	0.300	UGG
49.0	02-may-1988	99	246TCP	ND	0.300	UGG
39.0	02-may-1988	99	24DCLP	ND	0.300	UGG
49.0	02-may-1988	99	24DCLP	ND	0.300	UGG
39.0	02-may-1988	99	24DMPN	ND	0.300	UGG
49.0	02-may-1988	99	24DMPN	ND	0.300	UGG
39.0	02-may-1988	99	24DNP	ND	2.000	UGG
49.0	02-may-1988	99	24DNP	ND	2.000	UGG
39.0	02-may-1988	99	24DNT	ND	0.300	UGG
49.0	02-may-1988	99	24DNT	ND	0.300	UGG
39.0	02-may-1988	99	26DNT	ND	0.300	UGG
49.0	02-may-1988	99	26DNT	ND	0.300	UGG
39.0	02-may-1988	99	2CLP	ND	0.300	UGG
49.0	02-may-1988	99	2CLP	ND	0.300	UGG
39.0	02-may-1988	99	2CNAP	ND	0.300	UGG
49.0	02-may-1988	99	2CNAP	ND	0.300	UGG
39.0	02-may-1988	99	2NP	ND	0.300	UGG
49.0	02-may-1988	99	2NP	ND	0.300	UGG
39.0	02-may-1988	99	33DCBD	ND	0.700	UGG
49.0	02-may-1988	99	33DCBD	ND	0.700	UGG
39.0	02-may-1988	99	46DN2C	ND	2.000	UGG
49.0	02-may-1988	99	46DN2C	ND	2.000	UGG
39.0	02-may-1988	99	4BRPPE	ND	0.300	UGG
49.0	02-may-1988	99	4BRPPE	ND	0.300	UGG
39.0	02-may-1988	99	4CL3C	ND	0.300	UGG
49.0	02-may-1988	99	4CL3C	ND	0.300	UGG
39.0	02-may-1988	99	4CLPPE	ND	0.300	UGG
49.0	02-may-1988	99	4CLPPE	ND	0.300	UGG
39.0	02-may-1988	99	4NP	ND	2.000	UGG
49.0	02-may-1988	99	4NP	ND	2.000	UGG
39.0	02-may-1988	99	ABHC	ND	0.500	UGG
49.0	02-may-1988	99	ABHC	ND	0.500	UGG
39.0	02-may-1988	99	AENSLF	ND	0.500	UGG
49.0	02-may-1988	99	AENSLF	ND	0.500	UGG
39.0	02-may-1988	99	AG	LT	0.763	UGG
49.0	02-may-1988	99	AG	LT	0.763	UGG
39.0	02-may-1988	99	ALDRN	ND	0.500	UGG
49.0	02-may-1988	99	ALDRN	ND	0.500	UGG
39.0	02-may-1988	99	ANAPNE	ND	0.300	UGG
49.0	02-may-1988	99	ANAPNE	ND	0.300	UGG
39.0	02-may-1988	99	ANAPYL	ND	0.300	UGG
49.0	02-may-1988	99	ANAPYL	ND	0.300	UGG
39.0	02-may-1988	99	ANTRC	ND	0.300	UGG
49.0	02-may-1988	99	ANTRC	ND	0.300	UGG

Analytical Results for Chemical Soil
From: 01-jan-1988 To: 27-nov-90

Site: BORE N-113-88 (continued)

SAMPLE DEPTH (ft)	SAMPLE DATE	TEST METHOD	COMPOUND	BOOL	CONCENTRATION	UNITS
39.0	02-may-1988	99	AS	LT	6.710	UGG
49.0	02-may-1988	99	AS	LT	6.710	UGG
39.0	02-may-1988	99	B2CEXM	ND	0.300	UGG
49.0	02-may-1988	99	B2CEXM	ND	0.300	UGG
39.0	02-may-1988	99	B2CIPE	ND	0.300	UGG
49.0	02-may-1988	99	B2CIPE	ND	0.300	UGG
39.0	02-may-1988	99	B2CLEE	ND	0.300	UGG
49.0	02-may-1988	99	B2CLEE	ND	0.300	UGG
39.0	02-may-1988	99	B2EHP	ND	0.300	UGG
49.0	02-may-1988	99	B2EHP	ND	0.300	UGG
39.0	02-may-1988	99	BAANTR	ND	0.300	UGG
49.0	02-may-1988	99	BAANTR	ND	0.300	UGG
39.0	02-may-1988	99	BAPYR	ND	0.300	UGG
49.0	02-may-1988	99	BAPYR	ND	0.300	UGG
39.0	02-may-1988	99	BBFANT	ND	0.300	UGG
49.0	02-may-1988	99	BBFANT	ND	0.300	UGG
39.0	02-may-1988	99	BBHC	ND	0.500	UGG
49.0	02-may-1988	99	BBHC	ND	0.500	UGG
39.0	02-may-1988	99	BBZP	ND	0.300	UGG
49.0	02-may-1988	99	BBZP	ND	0.300	UGG
39.0	02-may-1988	99	BE	LT	0.389	UGG
49.0	02-may-1988	99	BE	LT	0.389	UGG
39.0	02-may-1988	99	BENSLF	ND	1.000	UGG
49.0	02-may-1988	99	BENSLF	ND	1.000	UGG
39.0	02-may-1988	99	BENZID	ND	1.650	UGG
49.0	02-may-1988	99	BENZID	ND	1.650	UGG
39.0	02-may-1988	99	BGHIPY	ND	0.300	UGG
49.0	02-may-1988	99	BGHIPY	ND	0.300	UGG
39.0	02-may-1988	99	BKFANT	ND	0.300	UGG
49.0	02-may-1988	99	BKFANT	ND	0.300	UGG
3.9	02-may-1988	99	BR	LT	25000.000	UGG
4.9	02-may-1988	99	BR	LT	25000.000	UGG
39.0	02-may-1988	99	BR	LT	125000.000	UGG
49.0	02-may-1988	99	BR	LT	125000.000	UGG
39.0	02-may-1988	99	C2H5CL	ND	0.100	UGG
49.0	02-may-1988	99	C2H5CL	ND	0.100	UGG
39.0	02-may-1988	99	CD	LT	0.825	UGG
49.0	02-may-1988	99	CD	LT	0.825	UGG
39.0	02-may-1988	99	CHRY	ND	0.300	UGG
49.0	02-may-1988	99	CHRY	ND	0.300	UGG
3.9	02-may-1988	99	CL	LT	25000.000	UGG
4.9	02-may-1988	99	CL	LT	25000.000	UGG
39.0	02-may-1988	99	CL6BZ	ND	0.300	UGG
49.0	02-may-1988	99	CL6BZ	ND	0.300	UGG
39.0	02-may-1988	99	CL6CP	ND	0.300	UGG
49.0	02-may-1988	99	CL6CP	ND	0.300	UGG
39.0	02-may-1988	99	CL6ET	ND	0.300	UGG
49.0	02-may-1988	99	CL6ET	ND	0.300	UGG

Analytical Results for Chemical Soil
From: 01-jan-1988 To: 27-nov-90

Site: BORE N-113-88 (continued)

SAMPLE DEPTH (ft)	SAMPLE DATE	TEST METHOD	COMPOUND	BOOL	CONCENTRATION	UNITS
39.0	02-may-1988	99	CLDAN	ND	5.000	UGG
49.0	02-may-1988	99	CLDAN	ND	5.000	UGG
39.0	02-may-1988	99	CR	LT	2.940	UGG
49.0	02-may-1988	99	CR		12.400	UGG
39.0	02-may-1988	99	CU	LT	4.500	UGG
49.0	02-may-1988	99	CU		5.040	UGG
39.0	02-may-1988	99	DBAHA	ND	0.300	UGG
49.0	02-may-1988	99	DBAHA	ND	0.300	UGG
39.0	02-may-1988	99	DBHC	ND	0.500	UGG
49.0	02-may-1988	99	DBHC	ND	0.500	UGG
39.0	02-may-1988	99	DEP	ND	0.300	UGG
49.0	02-may-1988	99	DEP	ND	0.300	UGG
39.0	02-may-1988	99	DLDRN	ND	1.000	UGG
49.0	02-may-1988	99	DLDRN	ND	1.000	UGG
39.0	02-may-1988	99	DMP	ND	0.300	UGG
49.0	02-may-1988	99	DMP	ND	0.300	UGG
39.0	02-may-1988	99	DNBP	ND	0.300	UGG
49.0	02-may-1988	99	DNBP	ND	0.300	UGG
39.0	02-may-1988	99	DNOP	ND	0.300	UGG
49.0	02-may-1988	99	DNOP	ND	0.300	UGG
39.0	02-may-1988	99	ENDRN	ND	1.000	UGG
49.0	02-may-1988	99	ENDRN	ND	1.000	UGG
39.0	02-may-1988	99	ENDRNA	ND	0.660	UGG
49.0	02-may-1988	99	ENDRNA	ND	0.660	UGG
39.0	02-may-1988	99	ESFSO4	ND	1.000	UGG
49.0	02-may-1988	99	ESFSO4	ND	1.000	UGG
39.0	02-may-1988	99	F		17.000	UGG
39.0	02-may-1988	99	F		17.000	UGG
49.0	02-may-1988	99	F		12.200	UGG
39.0	02-may-1988	99	FANT	ND	0.300	UGG
49.0	02-may-1988	99	FANT	ND	0.300	UGG
39.0	02-may-1988	99	FLRENE	ND	0.300	UGG
49.0	02-may-1988	99	FLRENE	ND	0.300	UGG
39.0	02-may-1988	99	HCBD	ND	0.300	UGG
49.0	02-may-1988	99	HCBD	ND	0.300	UGG
39.0	02-may-1988	99	HG	LT	0.100	UGG
49.0	02-may-1988	99	HG	LT	0.100	UGG
39.0	02-may-1988	99	HPCL	ND	0.500	UGG
49.0	02-may-1988	99	HPCL	ND	0.500	UGG
39.0	02-may-1988	99	HPCLE	ND	0.500	UGG
49.0	02-may-1988	99	HPCLE	ND	0.500	UGG
39.0	02-may-1988	99	ICDPYR	ND	0.300	UGG
49.0	02-may-1988	99	ICDPYR	ND	0.300	UGG
39.0	02-may-1988	99	ISOPHR	ND	0.300	UGG
49.0	02-may-1988	99	ISOPHR	ND	0.300	UGG
39.0	02-may-1988	99	LIN	LT	0.066	UGG
49.0	02-may-1988	99	LIN	LT	0.066	UGG
39.0	02-may-1988	99	MA		209.000	UGG

Analytical Results for Chemical Soil
From: 01-jan-1988 To: 27-nov-90

Site: BORE N-113-88 (continued)

SAMPLE DEPTH (ft)	SAMPLE DATE	TEST METHOD	COMPOUND	BOOL	CONCENTRATION	UNITS
49.0	02-may-1988	99	NA		270.000	UGG
39.0	02-may-1988	99	NAP	ND	0.300	UGG
49.0	02-may-1988	99	NAP	ND	0.300	UGG
39.0	02-may-1988	99	NB	ND	0.300	UGG
49.0	02-may-1988	99	NB	ND	0.300	UGG
39.0	02-may-1988	99	NIT	LT	125000.000	UGG
49.0	02-may-1988	99	NIT	LT	125000.000	UGG
39.0	02-may-1988	99	NNDPA	ND	0.300	UGG
49.0	02-may-1988	99	NNDPA	ND	0.300	UGG
39.0	02-may-1988	99	PB	LT	5.630	UGG
49.0	02-may-1988	99	PB		7.460	UGG
39.0	02-may-1988	99	PCB016	ND	5.000	UGG
49.0	02-may-1988	99	PCB016	ND	5.000	UGG
39.0	02-may-1988	99	PCB221	ND	5.000	UGG
49.0	02-may-1988	99	PCB221	ND	5.000	UGG
39.0	02-may-1988	99	PCB232	ND	5.000	UGG
49.0	02-may-1988	99	PCB232	ND	5.000	UGG
39.0	02-may-1988	99	PCB242	ND	5.000	UGG
49.0	02-may-1988	99	PCB242	ND	5.000	UGG
39.0	02-may-1988	99	PCB248	ND	5.000	UGG
49.0	02-may-1988	99	PCB248	ND	5.000	UGG
39.0	02-may-1988	99	PCB254	ND	10.000	UGG
49.0	02-may-1988	99	PCB254	ND	10.000	UGG
39.0	02-may-1988	99	PCB260	ND	10.000	UGG
49.0	02-may-1988	99	PCB260	ND	10.000	UGG
39.0	02-may-1988	99	PCP	ND	2.000	UGG
49.0	02-may-1988	99	PCP	ND	2.000	UGG
39.0	02-may-1988	99	PHANTR	ND	0.300	UGG
49.0	02-may-1988	99	PHANTR	ND	0.300	UGG
39.0	02-may-1988	99	PHENOL	ND	0.300	UGG
49.0	02-may-1988	99	PHENOL	ND	0.300	UGG
39.0	02-may-1988	99	PPDDD	ND	1.000	UGG
49.0	02-may-1988	99	PPDDD	ND	1.000	UGG
39.0	02-may-1988	99	PPDDE	LT	0.094	UGG
49.0	02-may-1988	99	PPDDE	LT	0.094	UGG
39.0	02-may-1988	99	PPDDT	LT	0.506	UGG
49.0	02-may-1988	99	PPDDT	LT	0.506	UGG
39.0	02-may-1988	99	PYR	ND	0.300	UGG
49.0	02-may-1988	99	PYR	ND	0.300	UGG
39.0	02-may-1988	99	SB	LT	29.800	UGG
49.0	02-may-1988	99	SB	LT	29.800	UGG
39.0	02-may-1988	99	SE	LT	2.470	UGG
49.0	02-may-1988	99	SE		5.630	UGG
39.0	02-may-1988	99	SO4	LT	12500.000	UGG
49.0	02-may-1988	99	SO4	LT	12500.000	UGG
39.0	02-may-1988	99	TL	LT	9.340	UGG
49.0	02-may-1988	99	TL	LT	9.340	UGG
39.0	02-may-1988	99	TXPHEN	ND	7.000	UGG

Analytical Results for Chemical Soil
From: 01-jan-1988 To: 27-nov-90

Site: BORE N-113-88 (continued)

SAMPLE DEPTH (ft)	SAMPLE DATE	TEST METHOD	COMPOUND	BOOL	CONCENTRATION	UNITS
49.0	02-may-1988	99	TXPHEN	ND	7.000	UGG
49.0	02-may-1988	99	UNK595		1.000	UGG
39.0	02-may-1988	JS07	NI		6.910	UGG
49.0	02-may-1988	JS07	NI		9.520	UGG
39.0	02-may-1988	JS07	ZN	LT	52.500	UGG
49.0	02-may-1988	JS07	ZN	LT	52.500	UGG
39.0	02-may-1988	KF02	NIT	LT	527.000	UGG
39.0	02-may-1988	KF02	NIT	LT	527.000	UGG
49.0	02-may-1988	KF02	NIT	LT	527.000	UGG
39.0	02-may-1988	LM13	111TCE	ND	0.050	UGG
49.0	02-may-1988	LM13	111TCE	ND	0.050	UGG
39.0	02-may-1988	LM13	112TCE	ND	0.050	UGG
49.0	02-may-1988	LM13	112TCE	ND	0.050	UGG
39.0	02-may-1988	LM13	12DCLB	ND	0.300	UGG
49.0	02-may-1988	LM13	12DCLB	ND	0.300	UGG
39.0	02-may-1988	LM13	12DCLE	ND	0.050	UGG
49.0	02-may-1988	LM13	12DCLE	ND	0.050	UGG
39.0	02-may-1988	LM13	12DCLP	ND	0.050	UGG
49.0	02-may-1988	LM13	12DCLP	ND	0.050	UGG
39.0	02-may-1988	LM13	13DCLB	ND	0.300	UGG
49.0	02-may-1988	LM13	13DCLB	ND	0.300	UGG
39.0	02-may-1988	LM13	14DCLB	ND	0.300	UGG
49.0	02-may-1988	LM13	14DCLB	ND	0.300	UGG
39.0	02-may-1988	LM13	2CLEVE	ND	0.600	UGG
49.0	02-may-1988	LM13	2CLEVE	ND	0.600	UGG
39.0	02-may-1988	LM13	BRDCLM	ND	0.050	UGG
49.0	02-may-1988	LM13	BRDCLM	ND	0.050	UGG
39.0	02-may-1988	LM13	C13DCP	ND	0.600	UGG
49.0	02-may-1988	LM13	C13DCP	ND	0.600	UGG
39.0	02-may-1988	LM13	C2H3CL	ND	0.100	UGG
49.0	02-may-1988	LM13	C2H3CL	ND	0.100	UGG
39.0	02-may-1988	LM13	C2H5CL	ND	0.100	UGG
49.0	02-may-1988	LM13	C2H5CL	ND	0.100	UGG
39.0	02-may-1988	LM13	C6H6	ND	0.600	UGG
49.0	02-may-1988	LM13	C6H6	ND	0.600	UGG
39.0	02-may-1988	LM13	CCL4	ND	0.050	UGG
49.0	02-may-1988	LM13	CCL4	ND	0.050	UGG
39.0	02-may-1988	LM13	CH2CL2	ND	0.050	UGG
49.0	02-may-1988	LM13	CH2CL2	ND	0.050	UGG
39.0	02-may-1988	LM13	CH3BR	ND	0.100	UGG
49.0	02-may-1988	LM13	CH3BR	ND	0.100	UGG
39.0	02-may-1988	LM13	CH3CL	ND	0.100	UGG
49.0	02-may-1988	LM13	CH3CL	ND	0.100	UGG
39.0	02-may-1988	LM13	CHBR3	ND	0.100	UGG
49.0	02-may-1988	LM13	CHBR3	ND	0.100	UGG

Analytical Results for Chemical Soil
From: 01-jan-1988 To: 27-nov-90

Site: BORE N-113-88 (continued)

SAMPLE DEPTH (ft)	SAMPLE DATE	TEST METHOD	COMPOUND	BOOL	CONCENTRATION	UNITS
39.0	02-may-1988	LM13	CHCL3	ND	0.050	UGG
49.0	02-may-1988	LM13	CHCL3	ND	0.050	UGG
39.0	02-may-1988	LM13	CLC6H5	ND	0.630	UGG
49.0	02-may-1988	LM13	CLC6H5	ND	0.630	UGG
39.0	02-may-1988	LM13	DBRCLM	ND	0.050	UGG
49.0	02-may-1988	LM13	DBRCLM	ND	0.050	UGG
39.0	02-may-1988	LM13	ETC6H5	ND	0.050	UGG
49.0	02-may-1988	LM13	ETC6H5	ND	0.050	UGG
39.0	02-may-1988	LM13	MEC6H5	ND	0.050	UGG
49.0	02-may-1988	LM13	MEC6H5	ND	0.050	UGG
39.0	02-may-1988	LM13	T12DCE	ND	0.630	UGG
49.0	02-may-1988	LM13	T12DCE	ND	0.630	UGG
39.0	02-may-1988	LM13	T13DCP	ND	0.050	UGG
49.0	02-may-1988	LM13	T13DCP	ND	0.050	UGG
39.0	02-may-1988	LM13	TCLEA	ND	0.050	UGG
49.0	02-may-1988	LM13	TCLEA	ND	0.050	UGG
39.0	02-may-1988	LM13	TCLEE	ND	0.050	UGG
49.0	02-may-1988	LM13	TCLEE	ND	0.050	UGG
39.0	02-may-1988	LM13	TRCLE	LT	0.145	UGG
49.0	02-may-1988	LM13	TRCLE	LT	0.145	UGG
39.0	02-may-1988	LW02	135TNB	LT	2.090	UGG
49.0	02-may-1988	LW02	135TNB	LT	2.090	UGG
39.0	02-may-1988	LW02	13DNB	LT	0.590	UGG
49.0	02-may-1988	LW02	13DNB	LT	0.590	UGG
39.0	02-may-1988	LW02	246TNT	LT	1.920	UGG
49.0	02-may-1988	LW02	246TNT	LT	1.920	UGG
39.0	02-may-1988	LW02	24DNT	LT	0.420	UGG
49.0	02-may-1988	LW02	24DNT	LT	0.420	UGG
39.0	02-may-1988	LW02	26DNT	LT	0.400	UGG
49.0	02-may-1988	LW02	26DNT	LT	0.400	UGG
39.0	02-may-1988	LW02	HMX	LT	1.270	UGG
49.0	02-may-1988	LW02	HMX	LT	1.270	UGG
39.0	02-may-1988	LW02	NB	LT	0.420	UGG
49.0	02-may-1988	LW02	NB	LT	0.420	UGG
39.0	02-may-1988	LW02	RDX	LT	0.980	UGG
49.0	02-may-1988	LW02	RDX	LT	0.980	UGG
39.0	02-may-1988	LW02	TETRYL	LT	0.250	UGG
49.0	02-may-1988	LW02	TETRYL	LT	0.250	UGG

Analytical Results for Chemical Soil
From: 01-jan-1988 To: 27-nov-90

Site: BORE N-114-88

SAMPLE DEPTH (ft)	SAMPLE DATE	TEST METHOD	COMPOUND	BOOL	CONCENTRATION	UNITS
28.0	05-may-1988	99	124TCB	ND	0.300	UGG
310.0	09-may-1988	99	124TCB	ND	0.300	UGG
328.0	09-may-1988	99	124TCB	ND	0.300	UGG
338.0	09-may-1988	99	124TCB	ND	0.300	UGG
28.0	05-may-1988	99	12DPH	ND	0.300	UGG
310.0	09-may-1988	99	12DPH	ND	0.300	UGG
328.0	09-may-1988	99	12DPH	ND	0.300	UGG
338.0	09-may-1988	99	12DPH	ND	0.300	UGG
28.0	05-may-1988	99	246TCP	ND	0.300	UGG
310.0	09-may-1988	99	246TCP	ND	0.300	UGG
328.0	09-may-1988	99	246TCP	ND	0.300	UGG
338.0	09-may-1988	99	246TCP	ND	0.300	UGG
28.0	05-may-1988	99	24DCLP	ND	0.300	UGG
310.0	09-may-1988	99	24DCLP	ND	0.300	UGG
328.0	09-may-1988	99	24DCLP	ND	0.300	UGG
338.0	09-may-1988	99	24DCLP	ND	0.300	UGG
28.0	05-may-1988	99	24DMPN	ND	0.300	UGG
310.0	09-may-1988	99	24DMPN	ND	0.300	UGG
328.0	09-may-1988	99	24DMPN	ND	0.300	UGG
338.0	09-may-1988	99	24DMPN	ND	0.300	UGG
28.0	05-may-1988	99	24DNP	ND	2.000	UGG
310.0	09-may-1988	99	24DNP	ND	2.000	UGG
328.0	09-may-1988	99	24DNP	ND	2.000	UGG
338.0	09-may-1988	99	24DNP	ND	2.000	UGG
28.0	05-may-1988	99	24DNT	ND	0.300	UGG
310.0	09-may-1988	99	24DNT	ND	0.300	UGG
328.0	09-may-1988	99	24DNT	ND	0.300	UGG
338.0	09-may-1988	99	24DNT	ND	0.300	UGG
28.0	05-may-1988	99	26DNT	ND	0.300	UGG
310.0	09-may-1988	99	26DNT	ND	0.300	UGG
328.0	09-may-1988	99	26DNT	ND	0.300	UGG
338.0	09-may-1988	99	26DNT	ND	0.300	UGG
28.0	05-may-1988	99	2CLP	ND	0.300	UGG
310.0	09-may-1988	99	2CLP	ND	0.300	UGG
328.0	09-may-1988	99	2CLP	ND	0.300	UGG
338.0	09-may-1988	99	2CLP	ND	0.300	UGG
28.0	05-may-1988	99	2CNAP	ND	0.300	UGG
310.0	09-may-1988	99	2CNAP	ND	0.300	UGG
328.0	09-may-1988	99	2CNAP	ND	0.300	UGG
338.0	09-may-1988	99	2CNAP	ND	0.300	UGG
28.0	05-may-1988	99	2NP	ND	0.300	UGG
310.0	09-may-1988	99	2NP	ND	0.300	UGG
328.0	09-may-1988	99	2NP	ND	0.300	UGG
338.0	09-may-1988	99	2NP	ND	0.300	UGG
28.0	05-may-1988	99	33DCBD	ND	0.700	UGG
310.0	09-may-1988	99	33DCBD	ND	0.700	UGG
328.0	09-may-1988	99	33DCBD	ND	0.700	UGG
338.0	09-may-1988	99	33DCBD	ND	0.700	UGG

Analytical Results for Chemical Soil
From: 01-jan-1988 To: 27-nov-90

Site: BORE N-114-88 (continued)

SAMPLE DEPTH (ft)	SAMPLE DATE	TEST METHOD	COMPOUND	BOOL	CONCENTRATION	UNITS
28.0	05-may-1988	99	46DN2C	ND	2.000	UGG
310.0	09-may-1988	99	46DN2C	ND	2.000	UGG
328.0	09-may-1988	99	46DN2C	ND	2.000	UGG
338.0	09-may-1988	99	46DN2C	ND	2.000	UGG
28.0	05-may-1988	99	4BRPPE	ND	0.300	UGG
310.0	09-may-1988	99	4BRPPE	ND	0.300	UGG
328.0	09-may-1988	99	4BRPPE	ND	0.300	UGG
338.0	09-may-1988	99	4BRPPE	ND	0.300	UGG
28.0	05-may-1988	99	4CL3C	ND	0.300	UGG
310.0	09-may-1988	99	4CL3C	ND	0.300	UGG
328.0	09-may-1988	99	4CL3C	ND	0.300	UGG
338.0	09-may-1988	99	4CL3C	ND	0.300	UGG
28.0	05-may-1988	99	4CLPPE	ND	0.300	UGG
310.0	09-may-1988	99	4CLPPE	ND	0.300	UGG
328.0	09-may-1988	99	4CLPPE	ND	0.300	UGG
338.0	09-may-1988	99	4CLPPE	ND	0.300	UGG
28.0	05-may-1988	99	4NP	ND	2.000	UGG
310.0	09-may-1988	99	4NP	ND	2.000	UGG
328.0	09-may-1988	99	4NP	ND	2.000	UGG
338.0	09-may-1988	99	4NP	ND	2.000	UGG
28.0	05-may-1988	99	ABHC	ND	0.500	UGG
310.0	09-may-1988	99	ABHC	ND	0.500	UGG
328.0	09-may-1988	99	ABHC	ND	0.500	UGG
338.0	09-may-1988	99	ABHC	ND	0.500	UGG
28.0	05-may-1988	99	AENSLF	ND	0.500	UGG
310.0	09-may-1988	99	AENSLF	ND	0.500	UGG
328.0	09-may-1988	99	AENSLF	ND	0.500	UGG
338.0	09-may-1988	99	AENSLF	ND	0.500	UGG
28.0	05-may-1988	99	AG	LT	0.767	UGG
310.0	09-may-1988	99	AG	LT	0.767	UGG
328.0	09-may-1988	99	AG	LT	0.669	UGG
338.0	09-may-1988	99	AG	LT	0.766	UGG
28.0	05-may-1988	99	ALDRN	ND	0.500	UGG
310.0	09-may-1988	99	ALDRN	ND	0.500	UGG
328.0	09-may-1988	99	ALDRN	ND	0.500	UGG
338.0	09-may-1988	99	ALDRN	ND	0.500	UGG
28.0	05-may-1988	99	ANAPNE	ND	0.300	UGG
310.0	09-may-1988	99	ANAPNE	ND	0.300	UGG
328.0	09-may-1988	99	ANAPNE	ND	0.300	UGG
338.0	09-may-1988	99	ANAPNE	ND	0.300	UGG
28.0	05-may-1988	99	ANAPYL	ND	0.300	UGG
310.0	09-may-1988	99	ANAPYL	ND	0.300	UGG
328.0	09-may-1988	99	ANAPYL	ND	0.300	UGG
338.0	09-may-1988	99	ANAPYL	ND	0.300	UGG
28.0	05-may-1988	99	ANTRC	ND	0.300	UGG
310.0	09-may-1988	99	ANTRC	ND	0.300	UGG
328.0	09-may-1988	99	ANTRC	ND	0.300	UGG
338.0	09-may-1988	99	ANTRC	ND	0.300	UGG

Site: BORE N-114-88 (continued)

SAMPLE DEPTH (ft)	SAMPLE DATE	TEST METHOD	COMPOUND	BOOL	CONCENTRATION	UNITS
28.0	05-may-1988	99	AS	LT	6.740	UGG
310.0	09-may-1988	99	AS	LT	6.740	UGG
328.0	09-may-1988	99	AS	LT	5.880	UGG
338.0	09-may-1988	99	AS	LT	6.740	UGG
28.0	05-may-1988	99	B2CEXM	ND	0.300	UGG
310.0	09-may-1988	99	B2CEXM	ND	0.300	UGG
328.0	09-may-1988	99	B2CEXM	ND	0.300	UGG
338.0	09-may-1988	99	B2CEXM	ND	0.300	UGG
28.0	05-may-1988	99	B2CIPE	ND	0.300	UGG
310.0	09-may-1988	99	B2CIPE	ND	0.300	UGG
328.0	09-may-1988	99	B2CIPE	ND	0.300	UGG
338.0	09-may-1988	99	B2CIPE	ND	0.300	UGG
28.0	05-may-1988	99	B2CLEE	ND	0.300	UGG
310.0	09-may-1988	99	B2CLEE	ND	0.300	UGG
328.0	09-may-1988	99	B2CLEE	ND	0.300	UGG
338.0	09-may-1988	99	B2CLEE	ND	0.300	UGG
28.0	05-may-1988	99	B2EHP	ND	0.300	UGG
310.0	09-may-1988	99	B2EHP	ND	0.300	UGG
328.0	09-may-1988	99	B2EHP	ND	0.300	UGG
338.0	09-may-1988	99	B2EHP	ND	0.300	UGG
28.0	05-may-1988	99	BAANTR	ND	0.300	UGG
310.0	09-may-1988	99	BAANTR	ND	0.300	UGG
328.0	09-may-1988	99	BAANTR	ND	0.300	UGG
338.0	09-may-1988	99	BAANTR	ND	0.300	UGG
28.0	05-may-1988	99	BAPYR	ND	0.300	UGG
310.0	09-may-1988	99	BAPYR	ND	0.300	UGG
328.0	09-may-1988	99	BAPYR	ND	0.300	UGG
338.0	09-may-1988	99	BAPYR	ND	0.300	UGG
28.0	05-may-1988	99	BBFANT	ND	0.300	UGG
310.0	09-may-1988	99	BBFANT	ND	0.300	UGG
328.0	09-may-1988	99	BBFANT	ND	0.300	UGG
338.0	09-may-1988	99	BBFANT	ND	0.300	UGG
28.0	05-may-1988	99	BBHC	ND	0.500	UGG
310.0	09-may-1988	99	BBHC	ND	0.500	UGG
328.0	09-may-1988	99	BBHC	ND	0.500	UGG
338.0	09-may-1988	99	BBHC	ND	0.500	UGG
28.0	05-may-1988	99	BBZP	ND	0.300	UGG
310.0	09-may-1988	99	BBZP	ND	0.300	UGG
328.0	09-may-1988	99	BBZP	ND	0.300	UGG
338.0	09-may-1988	99	BBZP	ND	0.300	UGG
28.0	05-may-1988	99	BE	LT	0.390	UGG
310.0	09-may-1988	99	BE	LT	0.390	UGG
328.0	09-may-1988	99	BE	LT	0.341	UGG
338.0	09-may-1988	99	BE	LT	0.390	UGG
28.0	05-may-1988	99	BENSLF	ND	1.000	UGG
310.0	09-may-1988	99	BENSLF	ND	1.000	UGG
328.0	09-may-1988	99	BENSLF	ND	1.000	UGG
338.0	09-may-1988	99	BENSLF	ND	1.000	UGG

Site: BORE N-114-88 (continued)

SAMPLE DEPTH (ft)	SAMPLE DATE	TEST METHOD	COMPOUND	BOOL	CONCENTRATION	UNITS
28.0	05-may-1988	99	BENZID	ND	1.650	UGG
310.0	09-may-1988	99	BENZID	ND	1.650	UGG
328.0	09-may-1988	99	BENZID	ND	1.650	UGG
338.0	09-may-1988	99	BENZID	ND	1.650	UGG
28.0	05-may-1988	99	BGHIPY	ND	0.300	UGG
310.0	09-may-1988	99	BGHIPY	ND	0.300	UGG
328.0	09-may-1988	99	BGHIPY	ND	0.300	UGG
338.0	09-may-1988	99	BGHIPY	ND	0.300	UGG
28.0	05-may-1988	99	BKFANT	ND	0.300	UGG
310.0	09-may-1988	99	BKFANT	ND	0.300	UGG
328.0	09-may-1988	99	BKFANT	ND	0.300	UGG
338.0	09-may-1988	99	BKFANT	ND	0.300	UGG
2.7	05-may-1988	99	BR	LT	25000.000	UGG
28.0	05-may-1988	99	BR	LT	125000.000	UGG
3.1	09-may-1988	99	BR	LT	25000.000	UGG
3.2	09-may-1988	99	BR	LT	25000.000	UGG
3.3	09-may-1988	99	BR	LT	25000.000	UGG
310.0	09-may-1988	99	BR	LT	125000.000	UGG
328.0	09-may-1988	99	BR	LT	125000.000	UGG
338.0	09-may-1988	99	BR	LT	125000.000	UGG
28.0	05-may-1988	99	C2H5CL	ND	0.100	UGG
310.0	09-may-1988	99	C2H5CL	ND	0.100	UGG
328.0	09-may-1988	99	C2H5CL	ND	0.100	UGG
338.0	09-may-1988	99	C2H5CL	ND	0.100	UGG
28.0	05-may-1988	99	CD	LT	0.828	UGG
310.0	09-may-1988	99	CD	LT	0.828	UGG
328.0	09-may-1988	99	CD	LT	0.722	UGG
338.0	09-may-1988	99	CD	LT	0.827	UGG
28.0	05-may-1988	99	CHRY	ND	0.300	UGG
310.0	09-may-1988	99	CHRY	ND	0.300	UGG
328.0	09-may-1988	99	CHRY	ND	0.300	UGG
338.0	09-may-1988	99	CHRY	ND	0.300	UGG
2.7	05-may-1988	99	CL	LT	25000.000	UGG
3.1	09-may-1988	99	CL	LT	25000.000	UGG
3.2	09-may-1988	99	CL	LT	25000.000	UGG
3.3	09-may-1988	99	CL	LT	25000.000	UGG
28.0	05-may-1988	99	CL6BZ	ND	0.300	UGG
310.0	09-may-1988	99	CL6BZ	ND	0.300	UGG
328.0	09-may-1988	99	CL6BZ	ND	0.300	UGG
338.0	09-may-1988	99	CL6BZ	ND	0.300	UGG
28.0	05-may-1988	99	CL6CP	ND	0.300	UGG
310.0	09-may-1988	99	CL6CP	ND	0.300	UGG
328.0	09-may-1988	99	CL6CP	ND	0.300	UGG
338.0	09-may-1988	99	CL6CP	ND	0.300	UGG
28.0	05-may-1988	99	CL6ET	ND	0.300	UGG
310.0	09-may-1988	99	CL6ET	ND	0.300	UGG
328.0	09-may-1988	99	CL6ET	ND	0.300	UGG
338.0	09-may-1988	99	CL6ET	ND	0.300	UGG

Analytical Results for Chemical Soil
From: 01-jan-1988 To: 27-nov-90

Site: BORE N-114-88 (continued)

SAMPLE DEPTH (ft)	SAMPLE DATE	TEST METHOD	COMPOUND	BOOL	CONCENTRATION	UNITS
28.0	05-may-1988	99	CLDAN	ND	5.000	UGG
310.0	09-may-1988	99	CLDAN	ND	5.000	UGG
328.0	09-may-1988	99	CLDAN	ND	5.000	UGG
338.0	09-may-1988	99	CLDAN	ND	5.000	UGG
28.0	05-may-1988	99	CR		11.900	UGG
310.0	09-may-1988	99	CR		4.510	UGG
328.0	09-may-1988	99	CR		3.600	UGG
338.0	09-may-1988	99	CR		6.120	UGG
28.0	05-may-1988	99	CU		4.860	UGG
310.0	09-may-1988	99	CU	LT	4.520	UGG
328.0	09-may-1988	99	CU	LT	3.940	UGG
338.0	09-may-1988	99	CU	LT	4.520	UGG
28.0	05-may-1988	99	DBAHA	ND	0.300	UGG
310.0	09-may-1988	99	DBAHA	ND	0.300	UGG
328.0	09-may-1988	99	DBAHA	ND	0.300	UGG
338.0	09-may-1988	99	DBAHA	ND	0.300	UGG
28.0	05-may-1988	99	DBHC	ND	0.500	UGG
310.0	09-may-1988	99	DBHC	ND	0.500	UGG
328.0	09-may-1988	99	DBHC	ND	0.500	UGG
338.0	09-may-1988	99	DBHC	ND	0.500	UGG
28.0	05-may-1988	99	DEP	ND	0.300	UGG
310.0	09-may-1988	99	DEP	ND	0.300	UGG
328.0	09-may-1988	99	DEP	ND	0.300	UGG
338.0	09-may-1988	99	DEP	ND	0.300	UGG
28.0	05-may-1988	99	DLDRN	ND	1.000	UGG
310.0	09-may-1988	99	DLDRN	ND	1.000	UGG
328.0	09-may-1988	99	DLDRN	ND	1.000	UGG
338.0	09-may-1988	99	DLDRN	ND	1.000	UGG
28.0	05-may-1988	99	DMP	ND	0.300	UGG
310.0	09-may-1988	99	DMP	ND	0.300	UGG
328.0	09-may-1988	99	DMP	ND	0.300	UGG
338.0	09-may-1988	99	DMP	ND	0.300	UGG
28.0	05-may-1988	99	DNBP	ND	0.300	UGG
310.0	09-may-1988	99	DNBP	ND	0.300	UGG
328.0	09-may-1988	99	DNBP	ND	0.300	UGG
338.0	09-may-1988	99	DNBP	ND	0.300	UGG
28.0	05-may-1988	99	DNOP	ND	0.300	UGG
310.0	09-may-1988	99	DNOP	ND	0.300	UGG
328.0	09-may-1988	99	DNOP	ND	0.300	UGG
338.0	09-may-1988	99	DNOP	ND	0.300	UGG
28.0	05-may-1988	99	ENDRN	ND	1.000	UGG
310.0	09-may-1988	99	ENDRN	ND	1.000	UGG
328.0	09-may-1988	99	ENDRN	ND	1.000	UGG
338.0	09-may-1988	99	ENDRN	ND	1.000	UGG
28.0	05-may-1988	99	ENDRNA	ND	0.660	UGG
310.0	09-may-1988	99	ENDRNA	ND	0.660	UGG
328.0	09-may-1988	99	ENDRNA	ND	0.660	UGG
338.0	09-may-1988	99	ENDRNA	ND	0.660	UGG

Analytical Results for Chemical Soil
From: 01-jan-1988 To: 27-nov-90

Site: BORE N-114-88 (continued)

SAMPLE DEPTH (ft)	SAMPLE DATE	TEST METHOD	COMPOUND	BOOL	CONCENTRATION	UNITS
28.0	05-may-1988	99	ESFSO4	ND	1.000	UGG
310.0	09-may-1988	99	ESFSO4	ND	1.000	UGG
328.0	09-may-1988	99	ESFSO4	ND	1.000	UGG
338.0	09-may-1988	99	ESFSO4	ND	1.000	UGG
28.0	05-may-1988	99	F		20.700	UGG
310.0	09-may-1988	99	F	LT	6.000	UGG
328.0	09-may-1988	99	F		6.090	UGG
338.0	09-may-1988	99	F	LT	5.000	UGG
28.0	05-may-1988	99	FANT	ND	0.300	UGG
310.0	09-may-1988	99	FANT	ND	0.300	UGG
328.0	09-may-1988	99	FANT	ND	0.300	UGG
338.0	09-may-1988	99	FANT	ND	0.300	UGG
28.0	05-may-1988	99	FLRENE	ND	0.300	UGG
310.0	09-may-1988	99	FLRENE	ND	0.300	UGG
328.0	09-may-1988	99	FLRENE	ND	0.300	UGG
338.0	09-may-1988	99	FLRENE	ND	0.300	UGG
28.0	05-may-1988	99	HCBD	ND	0.300	UGG
310.0	09-may-1988	99	HCBD	ND	0.300	UGG
328.0	09-may-1988	99	HCBD	ND	0.300	UGG
338.0	09-may-1988	99	HCBD	ND	0.300	UGG
310.0	09-may-1988	99	HG	LT	0.100	UGG
310.0	09-may-1988	99	HG		0.557	UGG
328.0	09-may-1988	99	HG	LT	0.100	UGG
338.0	09-may-1988	99	HG	LT	0.100	UGG
28.0	05-may-1988	99	HPCL	ND	0.500	UGG
310.0	09-may-1988	99	HPCL	ND	0.500	UGG
328.0	09-may-1988	99	HPCL	ND	0.500	UGG
338.0	09-may-1988	99	HPCL	ND	0.500	UGG
28.0	05-may-1988	99	HPCLE	ND	0.500	UGG
310.0	09-may-1988	99	HPCLE	ND	0.500	UGG
328.0	09-may-1988	99	HPCLE	ND	0.500	UGG
338.0	09-may-1988	99	HPCLE	ND	0.500	UGG
28.0	05-may-1988	99	ICDPYR	ND	0.300	UGG
310.0	09-may-1988	99	ICDPYR	ND	0.300	UGG
328.0	09-may-1988	99	ICDPYR	ND	0.300	UGG
338.0	09-may-1988	99	ICDPYR	ND	0.300	UGG
28.0	05-may-1988	99	ISOPHR	ND	0.300	UGG
310.0	09-may-1988	99	ISOPHR	ND	0.300	UGG
328.0	09-may-1988	99	ISOPHR	ND	0.300	UGG
338.0	09-may-1988	99	ISOPHR	ND	0.300	UGG
28.0	05-may-1988	99	LIN	LT	0.066	UGG
310.0	09-may-1988	99	LIN	LT	0.066	UGG
328.0	09-may-1988	99	LIN	LT	0.066	UGG
338.0	09-may-1988	99	LIN	LT	0.066	UGG
28.0	05-may-1988	99	NA		375.000	UGG
310.0	09-may-1988	99	NA		75.200	UGG
328.0	09-may-1988	99	NA		52.400	UGG
338.0	09-may-1988	99	NA		143.000	UGG

Analytical Results for Chemical Soil
From: 01-jan-1988 To: 27-nov-90

Site: BORE N-114-88 (continued)

SAMPLE DEPTH (ft)	SAMPLE DATE	TEST METHOD	COMPOUND	BOOL	CONCENTRATION	UNITS
28.0	05-may-1988	99	NAP	ND	0.300	UGG
310.0	09-may-1988	99	NAP	ND	0.300	UGG
328.0	09-may-1988	99	NAP	ND	0.300	UGG
338.0	09-may-1988	99	NAP	ND	0.300	UGG
28.0	05-may-1988	99	NB	ND	0.300	UGG
310.0	09-may-1988	99	NB	ND	0.300	UGG
328.0	09-may-1988	99	NB	ND	0.300	UGG
338.0	09-may-1988	99	NB	ND	0.300	UGG
28.0	05-may-1988	99	NIT	LT	125000.000	UGG
310.0	09-may-1988	99	NIT	LT	125000.000	UGG
328.0	09-may-1988	99	NIT	LT	125000.000	UGG
338.0	09-may-1988	99	NIT	LT	125000.000	UGG
28.0	05-may-1988	99	NNDPA	ND	0.300	UGG
310.0	09-may-1988	99	NNDPA	ND	0.300	UGG
328.0	09-may-1988	99	NNDPA	ND	0.300	UGG
338.0	09-may-1988	99	NNDPA	ND	0.300	UGG
28.0	05-may-1988	99	PB	LT	5.650	UGG
310.0	09-may-1988	99	PB	LT	5.650	UGG
328.0	09-may-1988	99	PB	LT	4.930	UGG
338.0	09-may-1988	99	PB	LT	5.650	UGG
28.0	05-may-1988	99	PCB016	ND	5.000	UGG
310.0	09-may-1988	99	PCB016	ND	5.000	UGG
328.0	09-may-1988	99	PCB016	ND	5.000	UGG
338.0	09-may-1988	99	PCB016	ND	5.000	UGG
28.0	05-may-1988	99	PCB221	ND	5.000	UGG
310.0	09-may-1988	99	PCB221	ND	5.000	UGG
328.0	09-may-1988	99	PCB221	ND	5.000	UGG
338.0	09-may-1988	99	PCB221	ND	5.000	UGG
28.0	05-may-1988	99	PCB232	ND	5.000	UGG
310.0	09-may-1988	99	PCB232	ND	5.000	UGG
328.0	09-may-1988	99	PCB232	ND	5.000	UGG
338.0	09-may-1988	99	PCB232	ND	5.000	UGG
28.0	05-may-1988	99	PCB242	ND	5.000	UGG
310.0	09-may-1988	99	PCB242	ND	5.000	UGG
328.0	09-may-1988	99	PCB242	ND	5.000	UGG
338.0	09-may-1988	99	PCB242	ND	5.000	UGG
28.0	05-may-1988	99	PCB248	ND	5.000	UGG
310.0	09-may-1988	99	PCB248	ND	5.000	UGG
328.0	09-may-1988	99	PCB248	ND	5.000	UGG
338.0	09-may-1988	99	PCB248	ND	5.000	UGG
28.0	05-may-1988	99	PCB254	ND	10.000	UGG
310.0	09-may-1988	99	PCB254	ND	10.000	UGG
328.0	09-may-1988	99	PCB254	ND	10.000	UGG
338.0	09-may-1988	99	PCB254	ND	10.000	UGG
28.0	05-may-1988	99	PCB260	ND	10.000	UGG
310.0	09-may-1988	99	PCB260	ND	10.000	UGG
328.0	09-may-1988	99	PCB260	ND	10.000	UGG
338.0	09-may-1988	99	PCB260	ND	10.000	UGG

Site: BORE N-114-88 (continued)

SAMPLE DEPTH (ft)	SAMPLE DATE	TEST METHOD	COMPOUND	BOOL	CONCENTRATION	UNITS
28.0	05-may-1988	99	PCP	ND	2.000	UGG
310.0	09-may-1988	99	PCP	ND	2.000	UGG
328.0	09-may-1988	99	PCP	ND	2.000	UGG
338.0	09-may-1988	99	PCP	ND	2.000	UGG
28.0	05-may-1988	99	PHANTR	ND	0.300	UGG
310.0	09-may-1988	99	PHANTR	ND	0.300	UGG
328.0	09-may-1988	99	PHANTR	ND	0.300	UGG
338.0	09-may-1988	99	PHANTR	ND	0.300	UGG
28.0	05-may-1988	99	PHENOL	ND	0.300	UGG
310.0	09-may-1988	99	PHENOL	ND	0.300	UGG
328.0	09-may-1988	99	PHENOL	ND	0.300	UGG
338.0	09-may-1988	99	PHENOL	ND	0.300	UGG
28.0	05-may-1988	99	PPDDD	ND	1.000	UGG
310.0	09-may-1988	99	PPDDD	ND	1.000	UGG
328.0	09-may-1988	99	PPDDD	ND	1.000	UGG
338.0	09-may-1988	99	PPDDD	ND	1.000	UGG
28.0	05-may-1988	99	PPDDE	LT	0.094	UGG
310.0	09-may-1988	99	PPDDE	LT	0.094	UGG
328.0	09-may-1988	99	PPDDE	LT	0.094	UGG
338.0	09-may-1988	99	PPDDE	LT	0.094	UGG
28.0	05-may-1988	99	PPDDT	LT	0.506	UGG
310.0	09-may-1988	99	PPDDT	LT	0.506	UGG
328.0	09-may-1988	99	PPDDT	LT	0.506	UGG
338.0	09-may-1988	99	PPDDT	LT	0.506	UGG
28.0	05-may-1988	99	PYR	ND	0.300	UGG
310.0	09-may-1988	99	PYR	ND	0.300	UGG
328.0	09-may-1988	99	PYR	ND	0.300	UGG
338.0	09-may-1988	99	PYR	ND	0.300	UGG
28.0	05-may-1988	99	SB	LT	29.900	UGG
310.0	09-may-1988	99	SB	LT	29.900	UGG
328.0	09-may-1988	99	SB	LT	26.100	UGG
338.0	09-may-1988	99	SB	LT	29.900	UGG
28.0	05-may-1988	99	SE	LT	2.480	UGG
310.0	09-may-1988	99	SE	LT	2.480	UGG
328.0	09-may-1988	99	SE	LT	2.170	UGG
338.0	09-may-1988	99	SE	LT	2.480	UGG
28.0	05-may-1988	99	SO4	LT	12500.000	UGG
310.0	09-may-1988	99	SO4	LT	12500.000	UGG
328.0	09-may-1988	99	SO4	LT	12500.000	UGG
338.0	09-may-1988	99	SO4	LT	12500.000	UGG
28.0	05-may-1988	99	TL	LT	9.380	UGG
310.0	09-may-1988	99	TL	LT	9.380	UGG
328.0	09-may-1988	99	TL	LT	8.180	UGG
338.0	09-may-1988	99	TL	LT	9.370	UGG
28.0	05-may-1988	99	TXPHEN	ND	7.000	UGG
310.0	09-may-1988	99	TXPHEN	ND	7.000	UGG
328.0	09-may-1988	99	TXPHEN	ND	7.000	UGG
338.0	09-may-1988	99	TXPHEN	ND	7.000	UGG

Site: BORE N-114-88 (continued)

SAMPLE DEPTH (ft)	SAMPLE DATE	TEST METHOD	COMPOUND	BOOL	CONCENTRATION	UNITS
28.0	05-may-1988	99	UNK595		5.000	UGG
310.0	09-may-1988	99	UNK595		1.000	UGG
328.0	09-may-1988	99	UNK595		0.200	UGG
338.0	09-may-1988	99	UNK595		1.000	UGG
328.0	09-may-1988	99	UNK603		0.300	UGG
28.0	05-may-1988	JB08	HG	LT	0.100	UGG
28.0	05-may-1988	JS07	NI		10.100	UGG
310.0	09-may-1988	JS07	NI	LT	4.840	UGG
328.0	09-may-1988	JS07	NI	LT	4.840	UGG
338.0	09-may-1988	JS07	NI		25.700	UGG
28.0	05-may-1988	JS07	ZN	LT	52.500	UGG
310.0	09-may-1988	JS07	ZN	LT	52.500	UGG
328.0	09-may-1988	JS07	ZN	LT	52.500	UGG
338.0	09-may-1988	JS07	ZN	LT	52.500	UGG
28.0	05-may-1988	KF02	NIT	LT	527.000	UGG
310.0	09-may-1988	KF02	NIT	LT	527.000	UGG
328.0	09-may-1988	KF02	NIT	LT	527.000	UGG
338.0	09-may-1988	KF02	NIT	LT	527.000	UGG
28.0	05-may-1988	LM13	111TCE	ND	0.050	UGG
310.0	09-may-1988	LM13	111TCE	ND	0.050	UGG
328.0	09-may-1988	LM13	111TCE	ND	0.050	UGG
338.0	09-may-1988	LM13	111TCE	ND	0.050	UGG
28.0	05-may-1988	LM13	112TCE	ND	0.050	UGG
310.0	09-may-1988	LM13	112TCE	ND	0.050	UGG
328.0	09-may-1988	LM13	112TCE	ND	0.050	UGG
338.0	09-may-1988	LM13	112TCE	ND	0.050	UGG
310.0	09-may-1988	LM13	11DCE	ND	0.050	UGG
328.0	09-may-1988	LM13	11DCE	ND	0.050	UGG
338.0	09-may-1988	LM13	11DCE	ND	0.050	UGG
310.0	09-may-1988	LM13	11DCLE	ND	0.050	UGG
328.0	09-may-1988	LM13	11DCLE	ND	0.050	UGG
338.0	09-may-1988	LM13	11DCLE	ND	0.050	UGG
28.0	05-may-1988	LM13	12DCLB	ND	0.300	UGG
310.0	09-may-1988	LM13	12DCLB	ND	0.300	UGG
328.0	09-may-1988	LM13	12DCLB	ND	0.300	UGG
338.0	09-may-1988	LM13	12DCLB	ND	0.300	UGG
28.0	05-may-1988	LM13	12DCLE	ND	0.050	UGG
310.0	09-may-1988	LM13	12DCLE	ND	0.050	UGG
328.0	09-may-1988	LM13	12DCLE	ND	0.050	UGG
338.0	09-may-1988	LM13	12DCLE	ND	0.050	UGG
28.0	05-may-1988	LM13	12DCLP	ND	0.050	UGG
310.0	09-may-1988	LM13	12DCLP	ND	0.050	UGG
328.0	09-may-1988	LM13	12DCLP	ND	0.050	UGG
338.0	09-may-1988	LM13	12DCLP	ND	0.050	UGG

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From: 01-jan-1988 To: 27-nov-90

Site: BORE N-114-88 (continued)

SAMPLE DEPTH (ft)	SAMPLE DATE	TEST METHOD	COMPOUND	BOOL	CONCENTRATION	UNITS
28.0	05-may-1988	LM13	13DCLB	ND	0.300	UGG
310.0	09-may-1988	LM13	13DCLB	ND	0.300	UGG
328.0	09-may-1988	LM13	13DCLB	ND	0.300	UGG
338.0	09-may-1988	LM13	13DCLB	ND	0.300	UGG
28.0	05-may-1988	LM13	14DCLB	ND	0.300	UGG
310.0	09-may-1988	LM13	14DCLB	ND	0.300	UGG
328.0	09-may-1988	LM13	14DCLB	ND	0.300	UGG
338.0	09-may-1988	LM13	14DCLB	ND	0.300	UGG
28.0	05-may-1988	LM13	2CLEVE	ND	0.600	UGG
310.0	09-may-1988	LM13	2CLEVE	ND	0.600	UGG
328.0	09-may-1988	LM13	2CLEVE	ND	0.600	UGG
338.0	09-may-1988	LM13	2CLEVE	ND	0.600	UGG
28.0	05-may-1988	LM13	BRDCLM	ND	0.050	UGG
310.0	09-may-1988	LM13	BRDCLM	ND	0.050	UGG
328.0	09-may-1988	LM13	BRDCLM	ND	0.050	UGG
338.0	09-may-1988	LM13	BRDCLM	ND	0.050	UGG
28.0	05-may-1988	LM13	C13DCP	ND	0.600	UGG
310.0	09-may-1988	LM13	C13DCP	ND	0.600	UGG
328.0	09-may-1988	LM13	C13DCP	ND	0.600	UGG
338.0	09-may-1988	LM13	C13DCP	ND	0.600	UGG
28.0	05-may-1988	LM13	C2H3CL	ND	0.100	UGG
310.0	09-may-1988	LM13	C2H3CL	ND	0.100	UGG
328.0	09-may-1988	LM13	C2H3CL	ND	0.100	UGG
338.0	09-may-1988	LM13	C2H3CL	ND	0.100	UGG
28.0	05-may-1988	LM13	C2H5CL	ND	0.100	UGG
310.0	09-may-1988	LM13	C2H5CL	ND	0.100	UGG
328.0	09-may-1988	LM13	C2H5CL	ND	0.100	UGG
338.0	09-may-1988	LM13	C2H5CL	ND	0.100	UGG
28.0	05-may-1988	LM13	C6H6	ND	0.600	UGG
310.0	09-may-1988	LM13	C6H6	ND	0.600	UGG
328.0	09-may-1988	LM13	C6H6	ND	0.600	UGG
338.0	09-may-1988	LM13	C6H6	ND	0.600	UGG
28.0	05-may-1988	LM13	CCL4	ND	0.050	UGG
310.0	09-may-1988	LM13	CCL4	ND	0.050	UGG
328.0	09-may-1988	LM13	CCL4	ND	0.050	UGG
338.0	09-may-1988	LM13	CCL4	ND	0.050	UGG
28.0	05-may-1988	LM13	CH2CL2	ND	0.050	UGG
310.0	09-may-1988	LM13	CH2CL2	ND	0.050	UGG
328.0	09-may-1988	LM13	CH2CL2	ND	0.050	UGG
338.0	09-may-1988	LM13	CH2CL2	ND	0.050	UGG
28.0	05-may-1988	LM13	CH3BR	ND	0.100	UGG
328.0	09-may-1988	LM13	CH3BR	ND	0.100	UGG
338.0	09-may-1988	LM13	CH3BR	ND	0.100	UGG
28.0	05-may-1988	LM13	CH3CL	ND	0.100	UGG
328.0	09-may-1988	LM13	CH3CL	ND	0.100	UGG
338.0	09-may-1988	LM13	CH3CL	ND	0.100	UGG
28.0	05-may-1988	LM13	CHBR3	ND	0.100	UGG
310.0	09-may-1988	LM13	CHBR3	ND	0.100	UGG

Analytical Results for Chemical Soil
From: 01-jan-1988 To: 27-nov-90

Site: BORE N-114-88 (continued)

SAMPLE DEPTH (ft)	SAMPLE DATE	TEST METHOD	COMPOUND	BOOL	CONCENTRATION	UNITS
328.0	09-may-1988	LM13	CHBR3	ND	0.100	UGG
338.0	09-may-1988	LM13	CHBR3	ND	0.100	UGG
28.0	05-may-1988	LM13	CHCL3	ND	0.050	UGG
310.0	09-may-1988	LM13	CHCL3	ND	0.050	UGG
328.0	09-may-1988	LM13	CHCL3	ND	0.050	UGG
338.0	09-may-1988	LM13	CHCL3	ND	0.050	UGG
28.0	05-may-1988	LM13	CLC6H5	ND	0.630	UGG
310.0	09-may-1988	LM13	CLC6H5	ND	0.630	UGG
328.0	09-may-1988	LM13	CLC6H5	ND	0.630	UGG
338.0	09-may-1988	LM13	CLC6H5	ND	0.630	UGG
28.0	05-may-1988	LM13	DBRCLM	ND	0.050	UGG
310.0	09-may-1988	LM13	DBRCLM	ND	0.050	UGG
328.0	09-may-1988	LM13	DBRCLM	ND	0.050	UGG
338.0	09-may-1988	LM13	DBRCLM	ND	0.050	UGG
28.0	05-may-1988	LM13	ETC6H5	ND	0.050	UGG
310.0	09-may-1988	LM13	ETC6H5	ND	0.050	UGG
328.0	09-may-1988	LM13	ETC6H5	ND	0.050	UGG
338.0	09-may-1988	LM13	ETC6H5	ND	0.050	UGG
28.0	05-may-1988	LM13	MEC6H5	ND	0.050	UGG
310.0	09-may-1988	LM13	MEC6H5	ND	0.050	UGG
328.0	09-may-1988	LM13	MEC6H5	ND	0.050	UGG
338.0	09-may-1988	LM13	MEC6H5	ND	0.050	UGG
28.0	05-may-1988	LM13	T12DCE	ND	0.630	UGG
310.0	09-may-1988	LM13	T12DCE	ND	0.630	UGG
328.0	09-may-1988	LM13	T12DCE	ND	0.630	UGG
338.0	09-may-1988	LM13	T12DCE	ND	0.630	UGG
28.0	05-may-1988	LM13	T13DCP	ND	0.050	UGG
310.0	09-may-1988	LM13	T13DCP	ND	0.050	UGG
328.0	09-may-1988	LM13	T13DCP	ND	0.050	UGG
338.0	09-may-1988	LM13	T13DCP	ND	0.050	UGG
28.0	05-may-1988	LM13	TCLEA	ND	0.050	UGG
310.0	09-may-1988	LM13	TCLEA	ND	0.050	UGG
328.0	09-may-1988	LM13	TCLEA	ND	0.050	UGG
338.0	09-may-1988	LM13	TCLEA	ND	0.050	UGG
28.0	05-may-1988	LM13	TCLEE	ND	0.050	UGG
310.0	09-may-1988	LM13	TCLEE	ND	0.050	UGG
328.0	09-may-1988	LM13	TCLEE	ND	0.050	UGG
338.0	09-may-1988	LM13	TCLEE	ND	0.050	UGG
28.0	05-may-1988	LM13	TRCLE	LT	0.145	UGG
310.0	09-may-1988	LM13	TRCLE	LT	0.145	UGG
328.0	09-may-1988	LM13	TRCLE	LT	0.145	UGG
338.0	09-may-1988	LM13	TRCLE	LT	0.145	UGG
28.0	05-may-1988	LW02	135TNB	LT	2.100	UGG
328.0	09-may-1988	LW02	135TNB	LT	2.100	UGG
338.0	09-may-1988	LW02	135TNB	LT	2.100	UGG
28.0	05-may-1988	LW02	13DNB	LT	0.590	UGG
328.0	09-may-1988	LW02	13DNB	LT	0.590	UGG

Site: BORE N-114-88 (continued)

SAMPLE DEPTH (ft)	SAMPLE DATE	TEST METHOD	COMPOUND	BOOL	CONCENTRATION	UNITS
338.0	09-may-1988	LW02	13DNB	LT	0.590	UGG
28.0	05-may-1988	LW02	246TNT	LT	1.900	UGG
328.0	09-may-1988	LW02	246TNT	LT	1.900	UGG
338.0	09-may-1988	LW02	246TNT	LT	1.900	UGG
28.0	05-may-1988	LW02	24DNT	LT	0.420	UGG
328.0	09-may-1988	LW02	24DNT	LT	0.420	UGG
338.0	09-may-1988	LW02	24DNT	LT	0.420	UGG
28.0	05-may-1988	LW02	26DNT	LT	0.400	UGG
328.0	09-may-1988	LW02	26DNT	LT	0.400	UGG
338.0	09-may-1988	LW02	26DNT	LT	0.400	UGG
28.0	05-may-1988	LW02	HMX	LT	1.300	UGG
328.0	09-may-1988	LW02	HMX	LT	1.300	UGG
338.0	09-may-1988	LW02	HMX	LT	1.300	UGG
28.0	05-may-1988	LW02	NB	LT	0.420	UGG
328.0	09-may-1988	LW02	NB	LT	0.420	UGG
338.0	09-may-1988	LW02	NB	LT	0.420	UGG
28.0	05-may-1988	LW02	RDX	LT	0.980	UGG
328.0	09-may-1988	LW02	RDX	LT	0.980	UGG
338.0	09-may-1988	LW02	RDX	LT	0.980	UGG
28.0	05-may-1988	LW02	TETRYL	LT	0.250	UGG
328.0	09-may-1988	LW02	TETRYL	LT	0.250	UGG
338.0	09-may-1988	LW02	TETRYL	LT	0.250	UGG

Site: BORE N-115-88

SAMPLE DEPTH (ft)	SAMPLE DATE	TEST METHOD	COMPOUND	BOOL	CONCENTRATION	UNITS
60.0	20-may-1988	99	BR	LT	12500.000	UGG
80.0	20-may-1988	99	BR	LT	12500.000	UGG
60.0	20-may-1988	99	CL	LT	12500.000	UGG
80.0	20-may-1988	99	CL	LT	12500.000	UGG
60.0	20-may-1988	99	F		6.440	UGG
80.0	20-may-1988	99	F		9.070	UGG
60.0	20-may-1988	99	NA		282.000	UGG
80.0	20-may-1988	99	NA		370.000	UGG
60.0	20-may-1988	JB08	HG	LT	0.100	UGG
80.0	20-may-1988	JB08	HG	LT	0.100	UGG
60.0	20-may-1988	JD01	AG	LT	0.648	UGG
80.0	20-may-1988	JD01	AG	LT	0.648	UGG
60.0	20-may-1988	JD01	AS	LT	5.700	UGG
80.0	20-may-1988	JD01	AS	LT	5.700	UGG
60.0	20-may-1988	JD01	BE	LT	0.330	UGG
80.0	20-may-1988	JD01	BE	LT	0.330	UGG
60.0	20-may-1988	JD01	CD	LT	0.700	UGG

Analytical Results for Chemical Soil
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Site: BORE N-115-88 (continued)

SAMPLE DEPTH (ft)	SAMPLE DATE	TEST METHOD	COMPOUND	BOOL	CONCENTRATION	UNITS
80.0	20-may-1988	JD01	CD	LT	0.700	UGG
60.0	20-may-1988	JD01	CR		12.700	UGG
80.0	20-may-1988	JD01	CR		12.500	UGG
60.0	20-may-1988	JD01	CU		5.000	UGG
80.0	20-may-1988	JD01	CU	LT	3.820	UGG
60.0	20-may-1988	JD01	PB	LT	4.780	UGG
80.0	20-may-1988	JD01	PB	LT	4.780	UGG
60.0	20-may-1988	JD01	SB	LT	25.300	UGG
80.0	20-may-1988	JD01	SB	LT	25.300	UGG
60.0	20-may-1988	JD01	SE	LT	2.100	UGG
80.0	20-may-1988	JD01	SE	LT	2.100	UGG
60.0	20-may-1988	JD01	TL	LT	7.930	UGG
80.0	20-may-1988	JD01	TL	LT	7.930	UGG
60.0	20-may-1988	JS07	NI		15.500	UGG
80.0	20-may-1988	JS07	NI		17.900	UGG
60.0	20-may-1988	JS07	ZN	LT	52.000	UGG
80.0	20-may-1988	JS07	ZN	LT	52.000	UGG
60.0	20-may-1988	KF02	NIT	LT	500.000	UGG
80.0	20-may-1988	KF02	NIT	LT	500.000	UGG
60.0	20-may-1988	KT01	SO4	LT	12500.000	UGG
80.0	20-may-1988	KT01	SO4	LT	12500.000	UGG
80.0	20-may-1988	KT01	SO4	LT	12500.000	UGG
80.0	20-may-1988	LM14	124TCB	ND	0.329	UGG
60.0	20-may-1988	LM14	124TCB	ND	0.329	UGG
80.0	20-may-1988	LM14	12DPH	ND	0.329	UGG
60.0	20-may-1988	LM14	12DPH	ND	0.329	UGG
80.0	20-may-1988	LM14	246TCP	ND	0.329	UGG
60.0	20-may-1988	LM14	246TCP	ND	0.329	UGG
80.0	20-may-1988	LM14	24DCLP	ND	0.329	UGG
60.0	20-may-1988	LM14	24DCLP	ND	0.329	UGG
80.0	20-may-1988	LM14	24DMPN	ND	0.329	UGG
60.0	20-may-1988	LM14	24DMPN	ND	0.329	UGG
80.0	20-may-1988	LM14	24DNP	ND	2.200	UGG
60.0	20-may-1988	LM14	24DNP	ND	2.200	UGG
80.0	20-may-1988	LM14	24DNT	ND	0.329	UGG
60.0	20-may-1988	LM14	24DNT	ND	0.329	UGG
80.0	20-may-1988	LM14	26DNT	ND	0.329	UGG
60.0	20-may-1988	LM14	26DNT	ND	0.329	UGG
80.0	20-may-1988	LM14	2CLP	ND	0.329	UGG
60.0	20-may-1988	LM14	2CLP	ND	0.329	UGG
80.0	20-may-1988	LM14	2CNAP	ND	0.329	UGG
60.0	20-may-1988	LM14	2CNAP	ND	0.329	UGG
80.0	20-may-1988	LM14	2NP	ND	0.329	UGG
60.0	20-may-1988	LM14	2NP	ND	0.329	UGG

Analytical Results for Chemical Soil
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Site: BORE N-115-88 (continued)

SAMPLE DEPTH (ft)	SAMPLE DATE	TEST METHOD	COMPOUND	BOOL	CONCENTRATION	UNITS
80.0	20-may-1988	LM14	33DCBD	ND	0.769	UGG
60.0	20-may-1988	LM14	33DCBD	ND	0.769	UGG
80.0	20-may-1988	LM14	46DN2C	ND	2.200	UGG
60.0	20-may-1988	LM14	46DN2C	ND	2.200	UGG
80.0	20-may-1988	LM14	4BRPPE	ND	0.329	UGG
60.0	20-may-1988	LM14	4BRPPE	ND	0.329	UGG
80.0	20-may-1988	LM14	4CL3C	ND	0.329	UGG
60.0	20-may-1988	LM14	4CL3C	ND	0.329	UGG
80.0	20-may-1988	LM14	4CLPPE	ND	0.329	UGG
60.0	20-may-1988	LM14	4CLPPE	ND	0.329	UGG
80.0	20-may-1988	LM14	4NP	ND	2.200	UGG
60.0	20-may-1988	LM14	4NP	ND	2.200	UGG
80.0	20-may-1988	LM14	ABHC	ND	0.549	UGG
60.0	20-may-1988	LM14	ABHC	ND	0.549	UGG
80.0	20-may-1988	LM14	AENSLF	ND	0.549	UGG
60.0	20-may-1988	LM14	AENSLF	ND	0.549	UGG
80.0	20-may-1988	LM14	ALDRN	ND	0.549	UGG
60.0	20-may-1988	LM14	ALDRN	ND	0.549	UGG
80.0	20-may-1988	LM14	ANAPNE	ND	0.329	UGG
60.0	20-may-1988	LM14	ANAPNE	ND	0.329	UGG
80.0	20-may-1988	LM14	ANAPYL	ND	0.329	UGG
60.0	20-may-1988	LM14	ANAPYL	ND	0.329	UGG
80.0	20-may-1988	LM14	ANTRC	ND	0.329	UGG
60.0	20-may-1988	LM14	ANTRC	ND	0.329	UGG
80.0	20-may-1988	LM14	B2CEXM	ND	0.329	UGG
60.0	20-may-1988	LM14	B2CEXM	ND	0.329	UGG
80.0	20-may-1988	LM14	B2CIPE	ND	0.329	UGG
60.0	20-may-1988	LM14	B2CIPE	ND	0.329	UGG
80.0	20-may-1988	LM14	B2CLEE	ND	0.329	UGG
60.0	20-may-1988	LM14	B2CLEE	ND	0.329	UGG
80.0	20-may-1988	LM14	B2EHP	ND	0.329	UGG
60.0	20-may-1988	LM14	B2EHP	ND	0.329	UGG
80.0	20-may-1988	LM14	BAANTR	ND	0.329	UGG
60.0	20-may-1988	LM14	BAANTR	ND	0.329	UGG
80.0	20-may-1988	LM14	BAPYR	ND	0.329	UGG
60.0	20-may-1988	LM14	BAPYR	ND	0.329	UGG
80.0	20-may-1988	LM14	BBFANT	ND	0.329	UGG
60.0	20-may-1988	LM14	BBFANT	ND	0.329	UGG
80.0	20-may-1988	LM14	BBHC	ND	0.549	UGG
60.0	20-may-1988	LM14	BBHC	ND	0.549	UGG
80.0	20-may-1988	LM14	BBZP	ND	0.329	UGG
60.0	20-may-1988	LM14	BBZP	ND	0.329	UGG
80.0	20-may-1988	LM14	BENSLF	ND	1.100	UGG
60.0	20-may-1988	LM14	BENSLF	ND	1.100	UGG
80.0	20-may-1988	LM14	BENZID	ND	1.810	UGG
60.0	20-may-1988	LM14	BENZID	ND	1.810	UGG
80.0	20-may-1988	LM14	BGHIPY	ND	0.329	UGG
60.0	20-may-1988	LM14	BGHIPY	ND	0.329	UGG

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Site: BORE N-115-88 (continued)

SAMPLE DEPTH (ft)	SAMPLE DATE	TEST METHOD	COMPOUND	BOOL	CONCENTRATION	UNITS
80.0	20-may-1988	LM14	BKFANT	ND	0.329	UGG
60.0	20-may-1988	LM14	BKFANT	ND	0.329	UGG
80.0	20-may-1988	LM14	C2H5CL	ND	0.110	UGG
60.0	20-may-1988	LM14	C2H5CL	ND	0.110	UGG
80.0	20-may-1988	LM14	CHRY	ND	0.329	UGG
60.0	20-may-1988	LM14	CHRY	ND	0.329	UGG
80.0	20-may-1988	LM14	CL6BZ	ND	0.329	UGG
60.0	20-may-1988	LM14	CL6BZ	ND	0.329	UGG
80.0	20-may-1988	LM14	CL6CP	ND	0.329	UGG
60.0	20-may-1988	LM14	CL6CP	ND	0.329	UGG
80.0	20-may-1988	LM14	CL6ET	ND	0.329	UGG
60.0	20-may-1988	LM14	CL6ET	ND	0.329	UGG
80.0	20-may-1988	LM14	CLDAN	ND	5.490	UGG
60.0	20-may-1988	LM14	CLDAN	ND	5.490	UGG
80.0	20-may-1988	LM14	DBAHA	ND	0.329	UGG
60.0	20-may-1988	LM14	DBAHA	ND	0.329	UGG
80.0	20-may-1988	LM14	DBHC	ND	0.549	UGG
60.0	20-may-1988	LM14	DBHC	ND	0.549	UGG
80.0	20-may-1988	LM14	DEP	ND	0.329	UGG
60.0	20-may-1988	LM14	DEP	ND	0.329	UGG
80.0	20-may-1988	LM14	DLDRN	ND	1.100	UGG
60.0	20-may-1988	LM14	DLDRN	ND	1.100	UGG
80.0	20-may-1988	LM14	DMP	ND	0.329	UGG
60.0	20-may-1988	LM14	DMP	ND	0.329	UGG
80.0	20-may-1988	LM14	DNBP	ND	0.329	UGG
60.0	20-may-1988	LM14	DNBP	ND	0.329	UGG
80.0	20-may-1988	LM14	DNOP	ND	0.329	UGG
60.0	20-may-1988	LM14	DNOP	ND	0.329	UGG
80.0	20-may-1988	LM14	ENDRN	ND	1.100	UGG
60.0	20-may-1988	LM14	ENDRN	ND	1.100	UGG
80.0	20-may-1988	LM14	ENDRNA	ND	0.725	UGG
60.0	20-may-1988	LM14	ENDRNA	ND	0.725	UGG
80.0	20-may-1988	LM14	ESFSO4	ND	1.100	UGG
60.0	20-may-1988	LM14	ESFSO4	ND	1.100	UGG
80.0	20-may-1988	LM14	FANT	ND	0.329	UGG
60.0	20-may-1988	LM14	FANT	ND	0.329	UGG
80.0	20-may-1988	LM14	FLRENE	ND	0.329	UGG
60.0	20-may-1988	LM14	FLRENE	ND	0.329	UGG
80.0	20-may-1988	LM14	HCBD	ND	0.329	UGG
60.0	20-may-1988	LM14	HCBD	ND	0.329	UGG
80.0	20-may-1988	LM14	HPCL	ND	0.549	UGG
60.0	20-may-1988	LM14	HPCL	ND	0.549	UGG
80.0	20-may-1988	LM14	HPCLE	ND	0.549	UGG
60.0	20-may-1988	LM14	HPCLE	ND	0.549	UGG
80.0	20-may-1988	LM14	ICDPYR	ND	0.329	UGG
60.0	20-may-1988	LM14	ICDPYR	ND	0.329	UGG
80.0	20-may-1988	LM14	ISOPHR	ND	0.329	UGG
60.0	20-may-1988	LM14	ISOPHR	ND	0.329	UGG

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From: 01-jan-1988 To: 27-nov-90

Site: BORE N-115-88 (continued)

SAMPLE DEPTH (ft)	SAMPLE DATE	TEST METHOD	COMPOUND	BOOL	CONCENTRATION	UNITS
80.0	20-may-1988	LM14	LIN	LT	0.064	UGG
60.0	20-may-1988	LM14	LIN	LT	0.064	UGG
80.0	20-may-1988	LM14	NAP	ND	0.329	UGG
60.0	20-may-1988	LM14	NAP	ND	0.329	UGG
80.0	20-may-1988	LM14	NB	ND	0.329	UGG
60.0	20-may-1988	LM14	NB	ND	0.329	UGG
80.0	20-may-1988	LM14	NNDPA	ND	0.329	UGG
60.0	20-may-1988	LM14	NNDPA	ND	0.329	UGG
80.0	20-may-1988	LM14	PCB016	ND	5.490	UGG
60.0	20-may-1988	LM14	PCB016	ND	5.490	UGG
80.0	20-may-1988	LM14	PCB221	ND	5.490	UGG
60.0	20-may-1988	LM14	PCB221	ND	5.490	UGG
80.0	20-may-1988	LM14	PCB232	ND	5.490	UGG
60.0	20-may-1988	LM14	PCB232	ND	5.490	UGG
80.0	20-may-1988	LM14	PCB242	ND	5.490	UGG
60.0	20-may-1988	LM14	PCB242	ND	5.490	UGG
80.0	20-may-1988	LM14	PCB248	ND	5.490	UGG
60.0	20-may-1988	LM14	PCB248	ND	5.490	UGG
80.0	20-may-1988	LM14	PCB254	ND	11.000	UGG
60.0	20-may-1988	LM14	PCB254	ND	11.000	UGG
80.0	20-may-1988	LM14	PCB260	ND	11.000	UGG
60.0	20-may-1988	LM14	PCB260	ND	11.000	UGG
80.0	20-may-1988	LM14	PCP	ND	2.200	UGG
60.0	20-may-1988	LM14	PCP	ND	2.200	UGG
80.0	20-may-1988	LM14	PHANTR	ND	0.329	UGG
60.0	20-may-1988	LM14	PHANTR	ND	0.329	UGG
80.0	20-may-1988	LM14	PHENOL	ND	0.329	UGG
60.0	20-may-1988	LM14	PHENOL	ND	0.329	UGG
80.0	20-may-1988	LM14	PPDDD	ND	1.100	UGG
60.0	20-may-1988	LM14	PPDDD	ND	1.100	UGG
80.0	20-may-1988	LM14	PPDDE	LT	0.098	UGG
60.0	20-may-1988	LM14	PPDDE	LT	0.098	UGG
80.0	20-may-1988	LM14	PPDDT	LT	0.534	UGG
60.0	20-may-1988	LM14	PPDDT	LT	0.534	UGG
80.0	20-may-1988	LM14	PYR	ND	0.329	UGG
60.0	20-may-1988	LM14	PYR	ND	0.329	UGG
80.0	20-may-1988	LM14	TXPHEN	ND	7.690	UGG
60.0	20-may-1988	LM14	TXPHEN	ND	7.690	UGG
60.0	20-may-1988	LW02	135TNB	LT	1.800	UGG
60.0	20-may-1988	LW02	13DNB	LT	0.590	UGG
60.0	20-may-1988	LW02	246TNT	LT	1.900	UGG
60.0	20-may-1988	LW02	24DNT	LT	0.420	UGG
60.0	20-may-1988	LW02	26DNT	LT	0.400	UGG
60.0	20-may-1988	LW02	HMX	LT	1.300	UGG
60.0	20-may-1988	LW02	NB	LT	0.430	UGG
60.0	20-may-1988	LW02	RDX	LT	0.910	UGG
60.0	20-may-1988	LW02	TETRYL	LT	0.280	UGG

Analytical Results for Chemical Soil
From: 01-jan-1988 To: 27-nov-90

Site: BORE N-117-88

SAMPLE DEPTH (ft)	SAMPLE DATE	TEST METHOD	COMPOUND	BOOL	CONCENTRATION	UNITS
78.0	27-jun-1988	99	CL	LT	0.000	UGG
107.0	28-jun-1988	99	CL	LT	0.000	UGG
78.0	27-jun-1988	99	F		1.600	UGG
107.0	28-jun-1988	99	F		1.300	UGG
78.0	27-jun-1988	99	NA		664.000	UGG
107.0	28-jun-1988	99	NA		233.000	UGG
78.0	27-jun-1988	JB08	HG	LT	0.100	UGG
107.0	28-jun-1988	JB08	HG	LT	0.100	UGG
78.0	27-jun-1988	JD01	AG	LT	0.648	UGG
107.0	28-jun-1988	JD01	AG	LT	0.648	UGG
78.0	27-jun-1988	JD01	AS	LT	5.700	UGG
107.0	28-jun-1988	JD01	AS	LT	5.700	UGG
78.0	27-jun-1988	JD01	BE	LT	0.330	UGG
107.0	28-jun-1988	JD01	BE		0.422	UGG
78.0	27-jun-1988	JD01	CD	LT	0.700	UGG
107.0	28-jun-1988	JD01	CD	LT	0.700	UGG
78.0	27-jun-1988	JD01	CR		15.200	UGG
107.0	28-jun-1988	JD01	CR		26.200	UGG
78.0	27-jun-1988	JD01	CU		6.530	UGG
107.0	28-jun-1988	JD01	CU		9.980	UGG
78.0	27-jun-1988	JD01	PB	LT	4.780	UGG
107.0	28-jun-1988	JD01	PB		7.590	UGG
78.0	27-jun-1988	JD01	SB	LT	25.300	UGG
107.0	28-jun-1988	JD01	SB	LT	25.300	UGG
78.0	27-jun-1988	JD01	SE	LT	2.100	UGG
107.0	28-jun-1988	JD01	SE	LT	2.100	UGG
78.0	27-jun-1988	JD01	TL	LT	7.930	UGG
107.0	28-jun-1988	JD01	TL	LT	7.930	UGG
78.0	27-jun-1988	JS07	NI		17.800	UGG
107.0	28-jun-1988	JS07	NI		14.700	UGG
78.0	27-jun-1988	JS07	ZN	LT	52.000	UGG
107.0	28-jun-1988	JS07	ZN	LT	52.000	UGG
78.0	27-jun-1988	KF02	NIT	LT	500.000	UGG
107.0	28-jun-1988	KF02	NIT	LT	500.000	UGG
78.0	27-jun-1988	KT01	SO4	LT	12500.000	UGG
107.0	28-jun-1988	KT01	SO4	LT	12500.000	UGG
78.0	27-jun-1988	LM13	111TCE	ND	0.050	UGG
107.0	28-jun-1988	LM13	111TCE	ND	0.050	UGG
78.0	27-jun-1988	LM13	112TCE	ND	0.050	UGG
107.0	28-jun-1988	LM13	112TCE	ND	0.050	UGG
78.0	27-jun-1988	LM13	11DCE	ND	0.050	UGG
107.0	28-jun-1988	LM13	11DCE	ND	0.050	UGG

Analytical Results for Chemical Soil
From: 01-jan-1988 To: 27-nov-90

Site: BORE N-117-88 (continued)

SAMPLE DEPTH (ft)	SAMPLE DATE	TEST METHOD	COMPOUND	BOOL	CONCENTRATION	UNITS
78.0	27-jun-1988	LM13	11DCLE	ND	0.050	UGG
107.0	28-jun-1988	LM13	11DCLE	ND	0.050	UGG
78.0	27-jun-1988	LM13	12DCLB	ND	0.300	UGG
107.0	28-jun-1988	LM13	12DCLB	ND	0.300	UGG
78.0	27-jun-1988	LM13	12DCLE	ND	0.050	UGG
107.0	28-jun-1988	LM13	12DCLE	ND	0.050	UGG
78.0	27-jun-1988	LM13	12DCLP	ND	0.050	UGG
107.0	28-jun-1988	LM13	12DCLP	ND	0.050	UGG
78.0	27-jun-1988	LM13	13DCLB	ND	0.300	UGG
107.0	28-jun-1988	LM13	13DCLB	ND	0.300	UGG
78.0	27-jun-1988	LM13	14DCLB	ND	0.300	UGG
107.0	28-jun-1988	LM13	14DCLB	ND	0.300	UGG
78.0	27-jun-1988	LM13	2CLEVE	ND	0.600	UGG
107.0	28-jun-1988	LM13	2CLEVE	ND	0.600	UGG
78.0	27-jun-1988	LM13	BRDCLM	ND	0.050	UGG
107.0	28-jun-1988	LM13	BRDCLM	ND	0.050	UGG
78.0	27-jun-1988	LM13	C13DCP	ND	0.600	UGG
107.0	28-jun-1988	LM13	C13DCP	ND	0.600	UGG
78.0	27-jun-1988	LM13	C2H3CL	ND	0.100	UGG
107.0	28-jun-1988	LM13	C2H3CL	ND	0.100	UGG
78.0	27-jun-1988	LM13	C2H5CL	ND	0.100	UGG
107.0	28-jun-1988	LM13	C2H5CL	ND	0.100	UGG
78.0	27-jun-1988	LM13	C6H6	ND	0.600	UGG
107.0	28-jun-1988	LM13	C6H6	ND	0.600	UGG
78.0	27-jun-1988	LM13	CCL4	ND	0.050	UGG
107.0	28-jun-1988	LM13	CCL4	ND	0.050	UGG
78.0	27-jun-1988	LM13	CH2CL2	ND	0.050	UGG
107.0	28-jun-1988	LM13	CH2CL2	ND	0.050	UGG
78.0	27-jun-1988	LM13	CH3BR	ND	0.100	UGG
107.0	28-jun-1988	LM13	CH3BR	ND	0.100	UGG
78.0	27-jun-1988	LM13	CH3CL	ND	0.100	UGG
107.0	28-jun-1988	LM13	CH3CL	ND	0.100	UGG
78.0	27-jun-1988	LM13	CHBR3	ND	0.100	UGG
107.0	28-jun-1988	LM13	CHBR3	ND	0.100	UGG
78.0	27-jun-1988	LM13	CHCL3	ND	0.050	UGG
107.0	28-jun-1988	LM13	CHCL3	ND	0.050	UGG
78.0	27-jun-1988	LM13	CLC6H5	ND	0.630	UGG
107.0	28-jun-1988	LM13	CLC6H5	ND	0.630	UGG
78.0	27-jun-1988	LM13	DBRCLM	ND	0.050	UGG
107.0	28-jun-1988	LM13	DBRCLM	ND	0.050	UGG
78.0	27-jun-1988	LM13	ETC6H5	ND	0.050	UGG
107.0	28-jun-1988	LM13	ETC6H5	ND	0.050	UGG
78.0	27-jun-1988	LM13	MEC6H5	ND	0.050	UGG
107.0	28-jun-1988	LM13	MEC6H5	ND	0.050	UGG
78.0	27-jun-1988	LM13	T12DCE	ND	0.630	UGG
107.0	28-jun-1988	LM13	T12DCE	ND	0.630	UGG
78.0	27-jun-1988	LM13	T13DCP	ND	0.050	UGG
107.0	28-jun-1988	LM13	T13DCP	ND	0.050	UGG

Site: BORE N-117-88 (continued)

SAMPLE DEPTH (ft)	SAMPLE DATE	TEST METHOD	COMPOUND	BOOL	CONCENTRATION	UNITS
78.0	27-jun-1988	LM13	TCLEA	ND	0.050	UGG
107.0	28-jun-1988	LM13	TCLEA	ND	0.050	UGG
78.0	27-jun-1988	LM13	TCLEE	ND	0.050	UGG
107.0	28-jun-1988	LM13	TCLEE	ND	0.050	UGG
78.0	27-jun-1988	LM13	TRCLE	LT	0.145	UGG
107.0	28-jun-1988	LM13	TRCLE	LT	0.145	UGG
78.0	27-jun-1988	LM14	124TCB	ND	0.300	UGG
107.0	28-jun-1988	LM14	124TCB	ND	0.300	UGG
78.0	27-jun-1988	LM14	12DCLB	ND	0.300	UGG
107.0	28-jun-1988	LM14	12DCLB	ND	0.300	UGG
78.0	27-jun-1988	LM14	12DPH	ND	0.300	UGG
107.0	28-jun-1988	LM14	12DPH	ND	0.300	UGG
78.0	27-jun-1988	LM14	13DCLB	ND	0.300	UGG
107.0	28-jun-1988	LM14	13DCLB	ND	0.300	UGG
78.0	27-jun-1988	LM14	14DCLB	ND	0.300	UGG
107.0	28-jun-1988	LM14	14DCLB	ND	0.300	UGG
78.0	27-jun-1988	LM14	246TCP	ND	0.300	UGG
107.0	28-jun-1988	LM14	246TCP	ND	0.300	UGG
78.0	27-jun-1988	LM14	24DCLP	ND	0.300	UGG
107.0	28-jun-1988	LM14	24DCLP	ND	0.300	UGG
78.0	27-jun-1988	LM14	24DMPN	ND	0.300	UGG
107.0	28-jun-1988	LM14	24DMPN	ND	0.300	UGG
78.0	27-jun-1988	LM14	24DNP	ND	2.000	UGG
107.0	28-jun-1988	LM14	24DNP	ND	2.000	UGG
78.0	27-jun-1988	LM14	24DNT	ND	0.300	UGG
107.0	28-jun-1988	LM14	24DNT	ND	0.300	UGG
78.0	27-jun-1988	LM14	26DNT	ND	0.300	UGG
107.0	28-jun-1988	LM14	26DNT	ND	0.300	UGG
78.0	27-jun-1988	LM14	2CLP	ND	0.300	UGG
107.0	28-jun-1988	LM14	2CLP	ND	0.300	UGG
78.0	27-jun-1988	LM14	2CNAP	ND	0.300	UGG
107.0	28-jun-1988	LM14	2CNAP	ND	0.300	UGG
78.0	27-jun-1988	LM14	2NP	ND	0.300	UGG
107.0	28-jun-1988	LM14	2NP	ND	0.300	UGG
78.0	27-jun-1988	LM14	33DCBD	ND	0.700	UGG
107.0	28-jun-1988	LM14	33DCBD	ND	0.700	UGG
78.0	27-jun-1988	LM14	46DN2C	ND	2.000	UGG
107.0	28-jun-1988	LM14	46DN2C	ND	2.000	UGG
78.0	27-jun-1988	LM14	4CL3C	ND	0.300	UGG
107.0	28-jun-1988	LM14	4CL3C	ND	0.300	UGG
78.0	27-jun-1988	LM14	4CLPPE	ND	0.300	UGG
107.0	28-jun-1988	LM14	4CLPPE	ND	0.300	UGG
78.0	27-jun-1988	LM14	4NP	ND	2.000	UGG
107.0	28-jun-1988	LM14	4NP	ND	2.000	UGG
78.0	27-jun-1988	LM14	ABHC	ND	0.500	UGG
107.0	28-jun-1988	LM14	ABHC	ND	0.500	UGG
78.0	27-jun-1988	LM14	AENSLF	ND	0.500	UGG

Site: BORE N-117-88 (continued)

SAMPLE DEPTH (ft)	SAMPLE DATE	TEST METHOD	COMPOUND	BOOL	CONCENTRATION	UNITS
107.0	28-jun-1988	LM14	AENSLF	ND	0.500	UGG
78.0	27-jun-1988	LM14	ALDRN	ND	0.500	UGG
107.0	28-jun-1988	LM14	ALDRN	ND	0.500	UGG
78.0	27-jun-1988	LM14	ANAPNE	ND	0.300	UGG
107.0	28-jun-1988	LM14	ANAPNE	ND	0.300	UGG
78.0	27-jun-1988	LM14	ANAPYL	ND	0.300	UGG
107.0	28-jun-1988	LM14	ANAPYL	ND	0.300	UGG
78.0	27-jun-1988	LM14	ANTRC	ND	0.300	UGG
107.0	28-jun-1988	LM14	ANTRC	ND	0.300	UGG
78.0	27-jun-1988	LM14	B2CEXM	ND	0.300	UGG
107.0	28-jun-1988	LM14	B2CEXM	ND	0.300	UGG
78.0	27-jun-1988	LM14	B2CLEE	ND	0.300	UGG
107.0	28-jun-1988	LM14	B2CLEE	ND	0.300	UGG
78.0	27-jun-1988	LM14	B2EHP		0.800	UGG
107.0	28-jun-1988	LM14	B2EHP	ND	0.300	UGG
78.0	27-jun-1988	LM14	BAANTR	ND	0.300	UGG
107.0	28-jun-1988	LM14	BAANTR	ND	0.300	UGG
78.0	27-jun-1988	LM14	BAPYR	ND	0.300	UGG
107.0	28-jun-1988	LM14	BAPYR	ND	0.300	UGG
78.0	27-jun-1988	LM14	BBFANT	ND	0.300	UGG
107.0	28-jun-1988	LM14	BBFANT	ND	0.300	UGG
78.0	27-jun-1988	LM14	BBHC	ND	0.500	UGG
107.0	28-jun-1988	LM14	BBHC	ND	0.500	UGG
78.0	27-jun-1988	LM14	BBZP		0.500	UGG
107.0	28-jun-1988	LM14	BBZP	ND	0.300	UGG
78.0	27-jun-1988	LM14	BENSLF	ND	1.000	UGG
107.0	28-jun-1988	LM14	BENSLF	ND	1.000	UGG
78.0	27-jun-1988	LM14	BENZID	ND	1.650	UGG
107.0	28-jun-1988	LM14	BENZID	ND	1.650	UGG
78.0	27-jun-1988	LM14	BGHIPY	ND	0.300	UGG
107.0	28-jun-1988	LM14	BGHIPY	ND	0.300	UGG
78.0	27-jun-1988	LM14	BKFANT	ND	0.300	UGG
107.0	28-jun-1988	LM14	BKFANT	ND	0.300	UGG
78.0	27-jun-1988	LM14	CHRY	ND	0.300	UGG
107.0	28-jun-1988	LM14	CHRY	ND	0.300	UGG
78.0	27-jun-1988	LM14	CL6BZ	ND	0.300	UGG
107.0	28-jun-1988	LM14	CL6BZ	ND	0.300	UGG
78.0	27-jun-1988	LM14	CL6CP	ND	0.300	UGG
107.0	28-jun-1988	LM14	CL6CP	ND	0.300	UGG
78.0	27-jun-1988	LM14	CL6ET	ND	0.300	UGG
107.0	28-jun-1988	LM14	CL6ET	ND	0.300	UGG
78.0	27-jun-1988	LM14	CLDAN	ND	5.000	UGG
107.0	28-jun-1988	LM14	CLDAN	ND	5.000	UGG
78.0	27-jun-1988	LM14	DBAHA	ND	0.300	UGG
107.0	28-jun-1988	LM14	DBAHA	ND	0.300	UGG
78.0	27-jun-1988	LM14	DBHC	ND	0.500	UGG
107.0	28-jun-1988	LM14	DBHC	ND	0.500	UGG
78.0	27-jun-1988	LM14	DEP	ND	0.300	UGG

Site: BORE N-117-88 (continued)

SAMPLE DEPTH (ft)	SAMPLE DATE	TEST METHOD	COMPOUND	BOOL	CONCENTRATION	UNITS
107.0	28-jun-1988	LM14	DEP	ND	0.300	UGG
78.0	27-jun-1988	LM14	DLDRN	ND	1.000	UGG
107.0	28-jun-1988	LM14	DLDRN	ND	1.000	UGG
78.0	27-jun-1988	LM14	DMP	ND	0.300	UGG
107.0	28-jun-1988	LM14	DMP	ND	0.300	UGG
78.0	27-jun-1988	LM14	DNBP	ND	0.300	UGG
107.0	28-jun-1988	LM14	DNBP	ND	0.300	UGG
78.0	27-jun-1988	LM14	DNOP	ND	0.300	UGG
107.0	28-jun-1988	LM14	DNOP	ND	0.300	UGG
78.0	27-jun-1988	LM14	ENDRN	ND	1.000	UGG
107.0	28-jun-1988	LM14	ENDRN	ND	1.000	UGG
78.0	27-jun-1988	LM14	ENDRNA	ND	0.660	UGG
107.0	28-jun-1988	LM14	ENDRNA	ND	0.660	UGG
78.0	27-jun-1988	LM14	ESFSO4	ND	1.000	UGG
107.0	28-jun-1988	LM14	ESFSO4	ND	1.000	UGG
78.0	27-jun-1988	LM14	FANT	ND	0.300	UGG
107.0	28-jun-1988	LM14	FANT	ND	0.300	UGG
78.0	27-jun-1988	LM14	FLRENE	ND	0.300	UGG
107.0	28-jun-1988	LM14	FLRENE	ND	0.300	UGG
78.0	27-jun-1988	LM14	HCBD	ND	0.300	UGG
107.0	28-jun-1988	LM14	HCBD	ND	0.300	UGG
78.0	27-jun-1988	LM14	HPCL	ND	0.500	UGG
107.0	28-jun-1988	LM14	HPCL	ND	0.500	UGG
78.0	27-jun-1988	LM14	HPCLE	ND	0.500	UGG
107.0	28-jun-1988	LM14	HPCLE	ND	0.500	UGG
78.0	27-jun-1988	LM14	ICDPYR	ND	0.300	UGG
107.0	28-jun-1988	LM14	ICDPYR	ND	0.300	UGG
78.0	27-jun-1988	LM14	ISOPHR	ND	0.300	UGG
107.0	28-jun-1988	LM14	ISOPHR	ND	0.300	UGG
78.0	27-jun-1988	LM14	LIN	LT	0.066	UGG
107.0	28-jun-1988	LM14	LIN	LT	0.066	UGG
78.0	27-jun-1988	LM14	NAP	ND	0.300	UGG
107.0	28-jun-1988	LM14	NAP	ND	0.300	UGG
78.0	27-jun-1988	LM14	NB	ND	0.300	UGG
107.0	28-jun-1988	LM14	NB	ND	0.300	UGG
78.0	27-jun-1988	LM14	NNDMEA	ND	0.330	UGG
107.0	28-jun-1988	LM14	NNDMEA	ND	0.330	UGG
78.0	27-jun-1988	LM14	NNDPA	ND	0.300	UGG
107.0	28-jun-1988	LM14	NNDPA	ND	0.300	UGG
78.0	27-jun-1988	LM14	PCB016	ND	5.000	UGG
107.0	28-jun-1988	LM14	PCB016	ND	5.000	UGG
78.0	27-jun-1988	LM14	PCB221	ND	5.000	UGG
107.0	28-jun-1988	LM14	PCB221	ND	5.000	UGG
78.0	27-jun-1988	LM14	PCB232	ND	5.000	UGG
107.0	28-jun-1988	LM14	PCB232	ND	5.000	UGG
78.0	27-jun-1988	LM14	PCB242	ND	5.000	UGG
107.0	28-jun-1988	LM14	PCB242	ND	5.000	UGG
78.0	27-jun-1988	LM14	PCB248	ND	5.000	UGG

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From: 01-jan-1988 To: 27-nov-90

Site: BORE N-117-88 (continued)

SAMPLE DEPTH (ft)	SAMPLE DATE	TEST METHOD	COMPOUND	BOOL	CONCENTRATION	UNITS
107.0	28-jun-1988	LM14	PCB248	ND	5.000	UGG
78.0	27-jun-1988	LM14	PCB254	ND	10.000	UGG
107.0	28-jun-1988	LM14	PCB254	ND	10.000	UGG
78.0	27-jun-1988	LM14	PCB260	ND	10.000	UGG
107.0	28-jun-1988	LM14	PCB260	ND	10.000	UGG
78.0	27-jun-1988	LM14	PCP	ND	2.000	UGG
107.0	28-jun-1988	LM14	PCP	ND	2.000	UGG
78.0	27-jun-1988	LM14	PHANTR	ND	0.300	UGG
107.0	28-jun-1988	LM14	PHANTR	ND	0.300	UGG
78.0	27-jun-1988	LM14	PHENOL	ND	0.300	UGG
107.0	28-jun-1988	LM14	PHENOL	ND	0.300	UGG
78.0	27-jun-1988	LM14	PPDDD	ND	1.000	UGG
107.0	28-jun-1988	LM14	PPDDD	ND	1.000	UGG
78.0	27-jun-1988	LM14	PPDDE	LT	0.094	UGG
107.0	28-jun-1988	LM14	PPDDE	LT	0.094	UGG
78.0	27-jun-1988	LM14	PPDDT	LT	0.506	UGG
107.0	28-jun-1988	LM14	PPDDT	LT	0.506	UGG
78.0	27-jun-1988	LM14	PYR	ND	0.300	UGG
107.0	28-jun-1988	LM14	PYR	ND	0.300	UGG
78.0	27-jun-1988	LM14	TXPHEN	ND	7.000	UGG
107.0	28-jun-1988	LM14	TXPHEN	ND	7.000	UGG
78.0	27-jun-1988	LM14	UNK591		0.200	UGG
78.0	27-jun-1988	LM14	UNK593		0.200	UGG
107.0	28-jun-1988	LM14	UNK593		0.300	UGG
107.0	28-jun-1988	LM14	UNK594		0.200	UGG
78.0	27-jun-1988	LM14	UNK595		0.100	UGG
107.0	28-jun-1988	LM14	UNK595		0.200	UGG
78.0	27-jun-1988	LM14	UNK599		0.100	UGG
78.0	27-jun-1988	LM14	UNK603		0.300	UGG
107.0	28-jun-1988	LM14	UNK603		0.400	UGG
78.0	27-jun-1988	LW02	135TNB	LT	2.090	UGG
107.0	28-jun-1988	LW02	135TNB	LT	2.090	UGG
78.0	27-jun-1988	LW02	13DNB	LT	0.590	UGG
107.0	28-jun-1988	LW02	13DNB	LT	0.590	UGG
78.0	27-jun-1988	LW02	246TNT	LT	1.920	UGG
107.0	28-jun-1988	LW02	246TNT	LT	1.920	UGG
78.0	27-jun-1988	LW02	24DNT	LT	0.420	UGG
107.0	28-jun-1988	LW02	24DNT	LT	0.420	UGG
78.0	27-jun-1988	LW02	26DNT	LT	0.400	UGG
107.0	28-jun-1988	LW02	26DNT	LT	0.400	UGG
78.0	27-jun-1988	LW02	HMX	LT	1.270	UGG
107.0	28-jun-1988	LW02	HMX	LT	1.270	UGG
78.0	27-jun-1988	LW02	NB	LT	0.420	UGG
107.0	28-jun-1988	LW02	NB	LT	0.420	UGG
78.0	27-jun-1988	LW02	RDX	LT	0.980	UGG
107.0	28-jun-1988	LW02	RDX	LT	0.980	UGG
78.0	27-jun-1988	LW02	TETRYL	LT	0.250	UGG

Site: BORE N-117-88 (continued)

SAMPLE DEPTH (ft)	SAMPLE DATE	TEST METHOD	COMPOUND	BOOL	CONCENTRATION	UNITS
107.0	28-jun-1988	LW02	TETRYL	LT	0.250	UGG

Site: BORE N-121-88

SAMPLE DEPTH (ft)	SAMPLE DATE	TEST METHOD	COMPOUND	BOOL	CONCENTRATION	UNITS
4.4	17-may-1988	99	BR	LT	25000.000	UGG
9.5	17-may-1988	99	BR	LT	25000.000	UGG
1.4	17-may-1988	99	BR	LT	25000.000	UGG
1.9	17-may-1988	99	BR	LT	25000.000	UGG
2.4	17-may-1988	99	BR	LT	25000.000	UGG
2.9	17-may-1988	99	BR	LT	25000.000	UGG
3.9	17-may-1988	99	BR	LT	25000.000	UGG
4.9	17-may-1988	99	BR	LT	25000.000	UGG
4.5	17-may-1988	99	BR	LT	125000.000	UGG
9.5	17-may-1988	99	BR	LT	125000.000	UGG
14.5	17-may-1988	99	BR	LT	125000.000	UGG
19.5	17-may-1988	99	BR	LT	125000.000	UGG
24.5	17-may-1988	99	BR	LT	125000.000	UGG
29.5	17-may-1988	99	BR	LT	125000.000	UGG
39.5	17-may-1988	99	BR	LT	125000.000	UGG
49.5	17-may-1988	99	BR	LT	125000.000	UGG
49.5	17-may-1988	99	BR	LT	125000.000	UGG
4.4	17-may-1988	99	CL	LT	25000.000	UGG
9.5	17-may-1988	99	CL	LT	25000.000	UGG
1.4	17-may-1988	99	CL	LT	25000.000	UGG
2.4	17-may-1988	99	CL	LT	25000.000	UGG
2.9	17-may-1988	99	CL	LT	25000.000	UGG
3.9	17-may-1988	99	CL	LT	25000.000	UGG
4.9	17-may-1988	99	CL	LT	25000.000	UGG
4.5	17-may-1988	99	CL	LT	125000.000	UGG
9.5	17-may-1988	99	CL	LT	125000.000	UGG
14.5	17-may-1988	99	CL	LT	125000.000	UGG
19.5	17-may-1988	99	CL	LT	125000.000	UGG
24.5	17-may-1988	99	CL	LT	125000.000	UGG
29.5	17-may-1988	99	CL	LT	125000.000	UGG
39.5	17-may-1988	99	CL	LT	125000.000	UGG
49.5	17-may-1988	99	CL	LT	125000.000	UGG
49.5	17-may-1988	99	CL	LT	125000.000	UGG
4.5	17-may-1988	99	F		6.180	UGG
9.5	17-may-1988	99	F		7.280	UGG
14.5	17-may-1988	99	F	LT	5.000	UGG
19.5	17-may-1988	99	F	LT	5.000	UGG
24.5	17-may-1988	99	F	LT	5.000	UGG
29.5	17-may-1988	99	F	LT	5.000	UGG
39.5	17-may-1988	99	F	LT	5.000	UGG

Analytical Results for Chemical Soil
From: 01-jan-1988 To: 27-nov-90

Site: BORE N-121-88 (continued)

SAMPLE DEPTH (ft)	SAMPLE DATE	TEST METHOD	COMPOUND	BOOL	CONCENTRATION	UNITS
49.5	17-may-1988	99	F	LT	5.000	UGG
4.5	17-may-1988	99	NA		213.000	UGG
9.5	17-may-1988	99	NA		206.000	UGG
14.5	17-may-1988	99	NA		96.300	UGG
19.5	17-may-1988	99	NA		68.500	UGG
24.5	17-may-1988	99	NA		45.400	UGG
29.5	17-may-1988	99	NA		97.500	UGG
39.5	17-may-1988	99	NA		187.000	UGG
49.5	17-may-1988	99	NA		431.000	UGG
4.5	17-may-1988	99	SO4	LT	12500.000	UGG
9.5	17-may-1988	99	SO4	LT	12500.000	UGG
14.5	17-may-1988	99	SO4	LT	12500.000	UGG
19.5	17-may-1988	99	SO4	LT	12500.000	UGG
24.5	17-may-1988	99	SO4	LT	12500.000	UGG
29.5	17-may-1988	99	SO4	LT	12500.000	UGG
39.5	17-may-1988	99	SO4	LT	12500.000	UGG
49.5	17-may-1988	99	SO4	LT	12500.000	UGG
49.5	17-may-1988	99	SO4	LT	12500.000	UGG
4.5	17-may-1988	JB08	HG	LT	0.100	UGG
9.5	17-may-1988	JB08	HG	LT	0.100	UGG
14.5	17-may-1988	JB08	HG	LT	0.100	UGG
19.5	17-may-1988	JB08	HG	LT	0.100	UGG
24.5	17-may-1988	JB08	HG	LT	0.100	UGG
29.5	17-may-1988	JB08	HG	LT	0.100	UGG
39.5	17-may-1988	JB08	HG	LT	0.100	UGG
49.5	17-may-1988	JB08	HG	LT	0.100	UGG
4.5	17-may-1988	JD01	AG	LT	0.648	UGG
9.5	17-may-1988	JD01	AG	LT	0.648	UGG
14.5	17-may-1988	JD01	AG	LT	0.648	UGG
19.5	17-may-1988	JD01	AG	LT	0.648	UGG
24.5	17-may-1988	JD01	AG	LT	0.648	UGG
29.5	17-may-1988	JD01	AG	LT	0.648	UGG
39.5	17-may-1988	JD01	AG	LT	0.648	UGG
49.5	17-may-1988	JD01	AG	LT	0.648	UGG
4.5	17-may-1988	JD01	AS		10.900	UGG
9.5	17-may-1988	JD01	AS	LT	5.700	UGG
14.5	17-may-1988	JD01	AS		15.800	UGG
19.5	17-may-1988	JD01	AS		10.700	UGG
24.5	17-may-1988	JD01	AS	LT	5.700	UGG
29.5	17-may-1988	JD01	AS	LT	5.700	UGG
39.5	17-may-1988	JD01	AS	LT	5.700	UGG
49.5	17-may-1988	JD01	AS	LT	5.700	UGG
4.5	17-may-1988	JD01	BE		0.470	UGG
9.5	17-may-1988	JD01	BE	LT	0.330	UGG
14.5	17-may-1988	JD01	BE		1.030	UGG
19.5	17-may-1988	JD01	BE		0.790	UGG

Site: BORE N-121-88 (continued)

SAMPLE DEPTH (ft)	SAMPLE DATE	TEST METHOD	COMPOUND	BOOL	CONCENTRATION	UNITS
24.5	17-may-1988	JD01	BE	LT	0.330	UGG
29.5	17-may-1988	JD01	BE	LT	0.330	UGG
39.5	17-may-1988	JD01	BE	LT	0.330	UGG
49.5	17-may-1988	JD01	BE	LT	0.330	UGG
4.5	17-may-1988	JD01	CD	LT	0.700	UGG
9.5	17-may-1988	JD01	CD	LT	0.700	UGG
14.5	17-may-1988	JD01	CD	LT	0.700	UGG
19.5	17-may-1988	JD01	CD		1.060	UGG
24.5	17-may-1988	JD01	CD	LT	0.700	UGG
29.5	17-may-1988	JD01	CD	LT	0.700	UGG
39.5	17-may-1988	JD01	CD	LT	0.700	UGG
49.5	17-may-1988	JD01	CD	LT	0.700	UGG
4.5	17-may-1988	JD01	CR		45.900	UGG
9.5	17-may-1988	JD01	CR		5.430	UGG
14.5	17-may-1988	JD01	CR		70.000	UGG
19.5	17-may-1988	JD01	CR		62.000	UGG
24.5	17-may-1988	JD01	CR		6.870	UGG
29.5	17-may-1988	JD01	CR		5.960	UGG
39.5	17-may-1988	JD01	CR		7.470	UGG
49.5	17-may-1988	JD01	CR		10.600	UGG
4.5	17-may-1988	JD01	CU		33.800	UGG
9.5	17-may-1988	JD01	CU		6.500	UGG
14.5	17-may-1988	JD01	CU		41.700	UGG
19.5	17-may-1988	JD01	CU		51.000	UGG
24.5	17-may-1988	JD01	CU		4.750	UGG
29.5	17-may-1988	JD01	CU	LT	3.820	UGG
39.5	17-may-1988	JD01	CU	LT	3.820	UGG
49.5	17-may-1988	JD01	CU		6.570	UGG
4.5	17-may-1988	JD01	PB		10.600	UGG
9.5	17-may-1988	JD01	PB	LT	4.780	UGG
14.5	17-may-1988	JD01	PB		12.900	UGG
19.5	17-may-1988	JD01	PB		15.400	UGG
24.5	17-may-1988	JD01	PB	LT	4.780	UGG
29.5	17-may-1988	JD01	PB	LT	4.780	UGG
39.5	17-may-1988	JD01	PB	LT	4.780	UGG
49.5	17-may-1988	JD01	PB	LT	4.780	UGG
4.5	17-may-1988	JD01	SB	LT	25.300	UGG
9.5	17-may-1988	JD01	SB	LT	25.300	UGG
14.5	17-may-1988	JD01	SB	LT	25.300	UGG
19.5	17-may-1988	JD01	SB	LT	25.300	UGG
24.5	17-may-1988	JD01	SB	LT	25.300	UGG
29.5	17-may-1988	JD01	SB	LT	25.300	UGG
39.5	17-may-1988	JD01	SB	LT	25.300	UGG
49.5	17-may-1988	JD01	SB	LT	25.300	UGG
4.5	17-may-1988	JD01	SE	LT	2.100	UGG
9.5	17-may-1988	JD01	SE	LT	2.100	UGG
14.5	17-may-1988	JD01	SE	LT	2.100	UGG
19.5	17-may-1988	JD01	SE	LT	2.100	UGG

Analytical Results for Chemical Soil
From: 01-jan-1988 To: 27-nov-90

Site: BORE N-121-88 (continued)

SAMPLE DEPTH (ft)	SAMPLE DATE	TEST METHOD	COMPOUND	BOOL	CONCENTRATION	UNITS
24.5	17-may-1988	JD01	SE	LT	2.100	UGG
29.5	17-may-1988	JD01	SE	LT	2.100	UGG
39.5	17-may-1988	JD01	SE	LT	2.100	UGG
49.5	17-may-1988	JD01	SE	LT	2.100	UGG
4.5	17-may-1988	JD01	TL	LT	7.930	UGG
9.5	17-may-1988	JD01	TL	LT	7.930	UGG
14.5	17-may-1988	JD01	TL	LT	7.930	UGG
19.5	17-may-1988	JD01	TL	LT	7.930	UGG
24.5	17-may-1988	JD01	TL	LT	7.930	UGG
29.5	17-may-1988	JD01	TL	LT	7.930	UGG
39.5	17-may-1988	JD01	TL	LT	7.930	UGG
49.5	17-may-1988	JD01	TL	LT	7.930	UGG
4.5	17-may-1988	JS07	NI	LT	4.800	UGG
9.5	17-may-1988	JS07	NI		7.520	UGG
14.5	17-may-1988	JS07	NI		6.520	UGG
19.5	17-may-1988	JS07	NI		5.250	UGG
24.5	17-may-1988	JS07	NI	LT	4.800	UGG
29.5	17-may-1988	JS07	NI	LT	4.800	UGG
39.5	17-may-1988	JS07	NI	LT	4.800	UGG
49.5	17-may-1988	JS07	NI		10.100	UGG
4.5	17-may-1988	JS07	ZN	LT	52.000	UGG
9.5	17-may-1988	JS07	ZN	LT	52.000	UGG
14.5	17-may-1988	JS07	ZN	LT	52.000	UGG
19.5	17-may-1988	JS07	ZN	LT	52.000	UGG
24.5	17-may-1988	JS07	ZN	LT	52.000	UGG
29.5	17-may-1988	JS07	ZN	LT	52.000	UGG
39.5	17-may-1988	JS07	ZN	LT	52.000	UGG
49.5	17-may-1988	JS07	ZN	LT	52.000	UGG
4.5	17-may-1988	KF02	NIT	LT	500.000	UGG
9.5	17-may-1988	KF02	NIT	LT	500.000	UGG
14.5	17-may-1988	KF02	NIT	LT	500.000	UGG
19.5	17-may-1988	KF02	NIT	LT	500.000	UGG
24.5	17-may-1988	KF02	NIT	LT	500.000	UGG
29.5	17-may-1988	KF02	NIT	LT	500.000	UGG
39.5	17-may-1988	KF02	NIT	LT	500.000	UGG
49.5	17-may-1988	KF02	NIT	LT	500.000	UGG
4.5	17-may-1988	LW02	135TNB	LT	1.800	UGG
9.5	17-may-1988	LW02	135TNB	LT	1.900	UGG
14.5	17-may-1988	LW02	135TNB	LT	1.800	UGG
19.5	17-may-1988	LW02	135TNB	LT	1.700	UGG
24.5	17-may-1988	LW02	135TNB	LT	1.700	UGG
29.5	17-may-1988	LW02	135TNB	LT	1.700	UGG
39.5	17-may-1988	LW02	135TNB	LT	1.700	UGG
49.5	17-may-1988	LW02	135TNB	LT	1.900	UGG
4.5	17-may-1988	LW02	13DNB	LT	0.570	UGG

Analytical Results for Chemical Soil
From: 01-jan-1988 To: 27-nov-90

Site: BORE N-121-88 (continued)

SAMPLE DEPTH (ft)	SAMPLE DATE	TEST METHOD	COMPOUND	BOOL	CONCENTRATION	UNITS
9.5	17-may-1988	LW02	13DNB	LT	0.600	UGG
14.5	17-may-1988	LW02	13DNB	LT	0.580	UGG
19.5	17-may-1988	LW02	13DNB	LT	0.550	UGG
24.5	17-may-1988	LW02	13DNB	LT	0.540	UGG
29.5	17-may-1988	LW02	13DNB	LT	0.550	UGG
39.5	17-may-1988	LW02	13DNB	LT	0.560	UGG
49.5	17-may-1988	LW02	13DNB	LT	0.620	UGG
4.5	17-may-1988	LW02	246TNT	LT	1.900	UGG
9.5	17-may-1988	LW02	246TNT	LT	2.000	UGG
14.5	17-may-1988	LW02	246TNT	LT	1.900	UGG
19.5	17-may-1988	LW02	246TNT	LT	1.800	UGG
24.5	17-may-1988	LW02	246TNT	LT	1.700	UGG
29.5	17-may-1988	LW02	246TNT	LT	1.800	UGG
39.5	17-may-1988	LW02	246TNT	LT	1.800	UGG
49.5	17-may-1988	LW02	246TNT	LT	2.000	UGG
4.5	17-may-1988	LW02	24DNT	LT	0.410	UGG
9.5	17-may-1988	LW02	24DNT	LT	0.430	UGG
14.5	17-may-1988	LW02	24DNT	LT	0.420	UGG
19.5	17-may-1988	LW02	24DNT	LT	0.390	UGG
24.5	17-may-1988	LW02	24DNT	LT	0.380	UGG
29.5	17-may-1988	LW02	24DNT	LT	0.390	UGG
39.5	17-may-1988	LW02	24DNT	LT	0.400	UGG
49.5	17-may-1988	LW02	24DNT	LT	0.440	UGG
4.5	17-may-1988	LW02	26DNT	LT	0.390	UGG
9.5	17-may-1988	LW02	26DNT	LT	0.410	UGG
14.5	17-may-1988	LW02	26DNT	LT	0.400	UGG
19.5	17-may-1988	LW02	26DNT	LT	0.380	UGG
24.5	17-may-1988	LW02	26DNT	LT	0.360	UGG
29.5	17-may-1988	LW02	26DNT	LT	0.370	UGG
39.5	17-may-1988	LW02	26DNT	LT	0.380	UGG
49.5	17-may-1988	LW02	26DNT	LT	0.420	UGG
4.5	17-may-1988	LW02	HMX	LT	1.200	UGG
9.5	17-may-1988	LW02	HMX	LT	1.300	UGG
14.5	17-may-1988	LW02	HMX	LT	1.300	UGG
19.5	17-may-1988	LW02	HMX	LT	1.200	UGG
24.5	17-may-1988	LW02	HMX	LT	1.200	UGG
29.5	17-may-1988	LW02	HMX	LT	1.200	UGG
39.5	17-may-1988	LW02	HMX	LT	1.200	UGG
49.5	17-may-1988	LW02	HMX	LT	1.300	UGG
4.5	17-may-1988	LW02	NB	LT	0.410	UGG
9.5	17-may-1988	LW02	NB	LT	0.440	UGG
14.5	17-may-1988	LW02	NB	LT	0.420	UGG
19.5	17-may-1988	LW02	NB	LT	0.400	UGG
24.5	17-may-1988	LW02	NB	LT	0.390	UGG
29.5	17-may-1988	LW02	NB	LT	0.400	UGG
39.5	17-may-1988	LW02	NB	LT	0.400	UGG
49.5	17-may-1988	LW02	NB	LT	0.450	UGG
4.5	17-may-1988	LW02	RDX	LT	0.870	UGG

Analytical Results for Chemical Soil
From: 01-jan-1988 To: 27-nov-90

Site: BORE N-121-88 (continued)

SAMPLE DEPTH (ft)	SAMPLE DATE	TEST METHOD	COMPOUND	BOOL	CONCENTRATION	UNITS
9.5	17-may-1988	LW02	RDX	LT	0.920	UGG
14.5	17-may-1988	LW02	RDX	LT	0.900	UGG
19.5	17-may-1988	LW02	RDX	LT	0.850	UGG
24.5	17-may-1988	LW02	RDX	LT	0.830	UGG
29.5	17-may-1988	LW02	RDX	LT	0.840	UGG
39.5	17-may-1988	LW02	RDX	LT	0.860	UGG
49.5	17-may-1988	LW02	RDX	LT	0.950	UGG
4.5	17-may-1988	LW02	TETRYL	LT	0.270	UGG
9.5	17-may-1988	LW02	TETRYL	LT	0.280	UGG
14.5	17-may-1988	LW02	TETRYL	LT	0.270	UGG
19.5	17-may-1988	LW02	TETRYL	LT	0.260	UGG
24.5	17-may-1988	LW02	TETRYL	LT	0.250	UGG
29.5	17-may-1988	LW02	TETRYL	LT	0.260	UGG
39.5	17-may-1988	LW02	TETRYL	LT	0.260	UGG
49.5	17-may-1988	LW02	TETRYL	LT	0.290	UGG

Site: BORE N-122-88

SAMPLE DEPTH (ft)	SAMPLE DATE	TEST METHOD	COMPOUND	BOOL	CONCENTRATION	UNITS
24.5	18-may-1988	99	BR	LT	12500.000	UGG
29.5	18-may-1988	99	BR	LT	12500.000	UGG
39.5	18-may-1988	99	BR	LT	12500.000	UGG
49.5	18-may-1988	99	BR	LT	12500.000	UGG
4.4	18-may-1988	99	BR	LT	25000.000	UGG
9.5	18-may-1988	99	BR	LT	25000.000	UGG
1.4	18-may-1988	99	BR	LT	25000.000	UGG
1.9	18-may-1988	99	BR	LT	25000.000	UGG
4.5	18-may-1988	99	BR	LT	125000.000	UGG
9.5	18-may-1988	99	BR	LT	125000.000	UGG
14.5	18-may-1988	99	BR	LT	125000.000	UGG
19.5	18-may-1988	99	BR	LT	125000.000	UGG
24.5	18-may-1988	99	CL	LT	12500.000	UGG
29.5	18-may-1988	99	CL	LT	12500.000	UGG
39.5	18-may-1988	99	CL	LT	12500.000	UGG
49.5	18-may-1988	99	CL	LT	12500.000	UGG
4.4	18-may-1988	99	CL	LT	25000.000	UGG
9.5	18-may-1988	99	CL	LT	25000.000	UGG
1.4	18-may-1988	99	CL	LT	25000.000	UGG
1.9	18-may-1988	99	CL	LT	25000.000	UGG
4.5	18-may-1988	99	CL	LT	125000.000	UGG
9.5	18-may-1988	99	CL	LT	125000.000	UGG
14.5	18-may-1988	99	CL	LT	125000.000	UGG
19.5	18-may-1988	99	CL	LT	125000.000	UGG
4.5	18-may-1988	99	F	LT	5.000	UGG
9.5	18-may-1988	99	F	LT	5.000	UGG

Analytical Results for Chemical Soil
From: 01-jan-1988 To: 27-nov-90

Site: BORE N-122-88 (continued)

SAMPLE DEPTH (ft)	SAMPLE DATE	TEST METHOD	COMPOUND	BOOL	CONCENTRATION	UNITS
14.5	18-may-1988	99	F	LT	5.000	UGG
19.5	18-may-1988	99	F	LT	5.000	UGG
24.5	18-may-1988	99	F	LT	5.000	UGG
29.5	18-may-1988	99	F	LT	5.000	UGG
39.5	18-may-1988	99	F	LT	5.000	UGG
49.5	18-may-1988	99	F	LT	5.000	UGG
4.5	18-may-1988	99	NA		138.000	UGG
9.5	18-may-1988	99	NA		78.400	UGG
14.5	18-may-1988	99	NA		102.000	UGG
19.5	18-may-1988	99	NA		56.800	UGG
24.5	18-may-1988	99	NA		97.600	UGG
29.5	18-may-1988	99	NA		127.000	UGG
39.5	18-may-1988	99	NA		394.000	UGG
49.5	18-may-1988	99	NA		627.000	UGG
4.5	18-may-1988	99	SO4	LT	12500.000	UGG
9.5	18-may-1988	99	SO4	LT	12500.000	UGG
14.5	18-may-1988	99	SO4	LT	12500.000	UGG
19.5	18-may-1988	99	SO4	LT	12500.000	UGG
4.5	18-may-1988	JB08	HG	LT	0.100	UGG
9.5	18-may-1988	JB08	HG	LT	0.100	UGG
14.5	18-may-1988	JB08	HG	LT	0.100	UGG
19.5	18-may-1988	JB08	HG	LT	0.100	UGG
24.5	18-may-1988	JB08	HG	LT	0.100	UGG
29.5	18-may-1988	JB08	HG	LT	0.100	UGG
39.5	18-may-1988	JB08	HG	LT	0.100	UGG
49.5	18-may-1988	JB08	HG	LT	0.100	UGG
4.5	18-may-1988	JD01	AG	LT	0.648	UGG
9.5	18-may-1988	JD01	AG	LT	0.648	UGG
14.5	18-may-1988	JD01	AG	LT	0.648	UGG
19.5	18-may-1988	JD01	AG	LT	0.648	UGG
24.5	18-may-1988	JD01	AG	LT	0.648	UGG
29.5	18-may-1988	JD01	AG	LT	0.648	UGG
39.5	18-may-1988	JD01	AG	LT	0.648	UGG
49.5	18-may-1988	JD01	AG	LT	0.648	UGG
4.5	18-may-1988	JD01	AS	LT	5.700	UGG
9.5	18-may-1988	JD01	AS	LT	5.700	UGG
14.5	18-may-1988	JD01	AS	LT	5.700	UGG
19.5	18-may-1988	JD01	AS	LT	5.700	UGG
24.5	18-may-1988	JD01	AS	LT	5.700	UGG
29.5	18-may-1988	JD01	AS	LT	5.700	UGG
39.5	18-may-1988	JD01	AS	LT	5.700	UGG
49.5	18-may-1988	JD01	AS	LT	5.700	UGG
4.5	18-may-1988	JD01	BE	LT	0.330	UGG
9.5	18-may-1988	JD01	BE	LT	0.330	UGG
14.5	18-may-1988	JD01	BE	LT	0.330	UGG
19.5	18-may-1988	JD01	BE	LT	0.330	UGG

Analytical Results for Chemical Soil
From: 01-jan-1988 To: 27-nov-90

Site: BORE N-122-88 (continued)

SAMPLE DEPTH (ft)	SAMPLE DATE	TEST METHOD	COMPOUND	BOOL	CONCENTRATION	UNITS
24.5	18-may-1988	JD01	BE	LT	0.330	UGG
29.5	18-may-1988	JD01	BE	LT	0.330	UGG
39.5	18-may-1988	JD01	BE	LT	0.330	UGG
49.5	18-may-1988	JD01	BE		0.337	UGG
4.5	18-may-1988	JD01	CD	LT	0.700	UGG
9.5	18-may-1988	JD01	CD	LT	0.700	UGG
14.5	18-may-1988	JD01	CD	LT	0.700	UGG
19.5	18-may-1988	JD01	CD	LT	0.700	UGG
24.5	18-may-1988	JD01	CD	LT	0.700	UGG
29.5	18-may-1988	JD01	CD	LT	0.700	UGG
39.5	18-may-1988	JD01	CD	LT	0.700	UGG
49.5	18-may-1988	JD01	CD	LT	0.700	UGG
4.5	18-may-1988	JD01	CR		11.500	UGG
9.5	18-may-1988	JD01	CR		11.000	UGG
14.5	18-may-1988	JD01	CR		13.600	UGG
19.5	18-may-1988	JD01	CR		6.900	UGG
24.5	18-may-1988	JD01	CR		10.100	UGG
29.5	18-may-1988	JD01	CR		9.640	UGG
39.5	18-may-1988	JD01	CR		8.350	UGG
49.5	18-may-1988	JD01	CR		15.100	UGG
4.5	18-may-1988	JD01	CU		6.930	UGG
9.5	18-may-1988	JD01	CU		10.100	UGG
14.5	18-may-1988	JD01	CU		8.300	UGG
19.5	18-may-1988	JD01	CU	LT	3.820	UGG
24.5	18-may-1988	JD01	CU	LT	3.820	UGG
29.5	18-may-1988	JD01	CU	LT	3.820	UGG
39.5	18-may-1988	JD01	CU		6.720	UGG
49.5	18-may-1988	JD01	CU		8.360	UGG
4.5	18-may-1988	JD01	PB	LT	4.780	UGG
9.5	18-may-1988	JD01	PB	LT	4.780	UGG
14.5	18-may-1988	JD01	PB	LT	4.780	UGG
19.5	18-may-1988	JD01	PB	LT	4.780	UGG
24.5	18-may-1988	JD01	PB	LT	4.780	UGG
29.5	18-may-1988	JD01	PB	LT	4.780	UGG
39.5	18-may-1988	JD01	PB	LT	4.780	UGG
49.5	18-may-1988	JD01	PB	LT	4.780	UGG
4.5	18-may-1988	JD01	SB	LT	25.300	UGG
9.5	18-may-1988	JD01	SB	LT	25.300	UGG
14.5	18-may-1988	JD01	SB	LT	25.300	UGG
19.5	18-may-1988	JD01	SB	LT	25.300	UGG
24.5	18-may-1988	JD01	SB	LT	25.300	UGG
29.5	18-may-1988	JD01	SB	LT	25.300	UGG
39.5	18-may-1988	JD01	SB	LT	25.300	UGG
49.5	18-may-1988	JD01	SB	LT	25.300	UGG
4.5	18-may-1988	JD01	SE	LT	2.100	UGG
9.5	18-may-1988	JD01	SE	LT	2.100	UGG
14.5	18-may-1988	JD01	SE	LT	2.100	UGG
19.5	18-may-1988	JD01	SE	LT	2.100	UGG

Analytical Results for Chemical Soil
From: 01-jan-1988 To: 27-nov-90

Site: BORE N-122-88 (continued)

SAMPLE DEPTH (ft)	SAMPLE DATE	TEST METHOD	COMPOUND	BOOL	CONCENTRATION	UNITS
24.5	18-may-1988	JD01	SE	LT	2.100	UGG
29.5	18-may-1988	JD01	SE	LT	2.100	UGG
39.5	18-may-1988	JD01	SE	LT	2.100	UGG
49.5	18-may-1988	JD01	SE	LT	2.100	UGG
4.5	18-may-1988	JD01	TL	LT	7.930	UGG
9.5	18-may-1988	JD01	TL	LT	7.930	UGG
14.5	18-may-1988	JD01	TL	LT	7.930	UGG
19.5	18-may-1988	JD01	TL	LT	7.930	UGG
24.5	18-may-1988	JD01	TL	LT	7.930	UGG
29.5	18-may-1988	JD01	TL	LT	7.930	UGG
39.5	18-may-1988	JD01	TL	LT	7.930	UGG
49.5	18-may-1988	JD01	TL	LT	7.930	UGG
4.5	18-may-1988	JS07	NI		14.900	UGG
9.5	18-may-1988	JS07	NI		7.400	UGG
14.5	18-may-1988	JS07	NI		15.600	UGG
19.5	18-may-1988	JS07	NI	LT	4.800	UGG
24.5	18-may-1988	JS07	NI	LT	4.800	UGG
29.5	18-may-1988	JS07	NI		5.700	UGG
39.5	18-may-1988	JS07	NI		8.060	UGG
49.5	18-may-1988	JS07	NI		12.700	UGG
4.5	18-may-1988	JS07	ZN	LT	52.000	UGG
9.5	18-may-1988	JS07	ZN	LT	52.000	UGG
14.5	18-may-1988	JS07	ZN	LT	52.000	UGG
19.5	18-may-1988	JS07	ZN	LT	52.000	UGG
24.5	18-may-1988	JS07	ZN	LT	52.000	UGG
29.5	18-may-1988	JS07	ZN	LT	52.000	UGG
39.5	18-may-1988	JS07	ZN	LT	52.000	UGG
49.5	18-may-1988	JS07	ZN	LT	52.000	UGG
4.5	18-may-1988	KF02	NIT	LT	500.000	UGG
9.5	18-may-1988	KF02	NIT	LT	500.000	UGG
14.5	18-may-1988	KF02	NIT	LT	500.000	UGG
19.5	18-may-1988	KF02	NIT	LT	500.000	UGG
24.5	18-may-1988	KF02	NIT	LT	500.000	UGG
29.5	18-may-1988	KF02	NIT	LT	500.000	UGG
39.5	18-may-1988	KF02	NIT	LT	500.000	UGG
49.5	18-may-1988	KF02	NIT	LT	500.000	UGG
24.5	18-may-1988	KT01	SO4	LT	12500.000	UGG
29.5	18-may-1988	KT01	SO4	LT	12500.000	UGG
39.5	18-may-1988	KT01	SO4	LT	12500.000	UGG
49.5	18-may-1988	KT01	SO4	LT	12500.000	UGG
4.5	18-may-1988	LW02	135TNB	LT	1.800	UGG
9.5	18-may-1988	LW02	135TNB	LT	1.800	UGG
14.5	18-may-1988	LW02	135TNB	LT	1.800	UGG
19.5	18-may-1988	LW02	135TNB	LT	1.700	UGG

Analytical Results for Chemical Soil
From: 01-jan-1988 To: 27-nov-90

Site: BORE N-122-88 (continued)

SAMPLE DEPTH (ft)	SAMPLE DATE	TEST METHOD	COMPOUND	BOOL	CONCENTRATION	UNITS
24.5	18-may-1988	LW02	135TNB	LT	1.800	UGG
29.5	18-may-1988	LW02	135TNB	LT	1.700	UGG
39.5	18-may-1988	LW02	135TNB	LT	2.000	UGG
49.5	18-may-1988	LW02	135TNB	LT	1.900	UGG
4.5	18-may-1988	LW02	13DNB	LT	0.570	UGG
9.5	18-may-1988	LW02	13DNB	LT	0.570	UGG
14.5	18-may-1988	LW02	13DNB	LT	0.570	UGG
19.5	18-may-1988	LW02	13DNB	LT	0.550	UGG
24.5	18-may-1988	LW02	13DNB	LT	0.560	UGG
29.5	18-may-1988	LW02	13DNB	LT	0.550	UGG
39.5	18-may-1988	LW02	13DNB	LT	0.630	UGG
49.5	18-may-1988	LW02	13DNB	LT	0.620	UGG
4.5	18-may-1988	LW02	246TNT	LT	1.900	UGG
9.5	18-may-1988	LW02	246TNT	LT	1.800	UGG
14.5	18-may-1988	LW02	246TNT	LT	1.900	UGG
19.5	18-may-1988	LW02	246TNT	LT	1.800	UGG
24.5	18-may-1988	LW02	246TNT	LT	1.800	UGG
29.5	18-may-1988	LW02	246TNT	LT	1.800	UGG
39.5	18-may-1988	LW02	246TNT	LT	2.100	UGG
49.5	18-may-1988	LW02	246TNT	LT	2.000	UGG
4.5	18-may-1988	LW02	24DNT	LT	0.410	UGG
9.5	18-may-1988	LW02	24DNT	LT	0.400	UGG
14.5	18-may-1988	LW02	24DNT	LT	0.410	UGG
19.5	18-may-1988	LW02	24DNT	LT	0.390	UGG
24.5	18-may-1988	LW02	24DNT	LT	0.400	UGG
29.5	18-may-1988	LW02	24DNT	LT	0.390	UGG
39.5	18-may-1988	LW02	24DNT	LT	0.450	UGG
49.5	18-may-1988	LW02	24DNT	LT	0.440	UGG
4.5	18-may-1988	LW02	26DNT	LT	0.390	UGG
9.5	18-may-1988	LW02	26DNT	LT	0.380	UGG
14.5	18-may-1988	LW02	26DNT	LT	0.390	UGG
19.5	18-may-1988	LW02	26DNT	LT	0.370	UGG
24.5	18-may-1988	LW02	26DNT	LT	0.380	UGG
29.5	18-may-1988	LW02	26DNT	LT	0.370	UGG
39.5	18-may-1988	LW02	26DNT	LT	0.430	UGG
49.5	18-may-1988	LW02	26DNT	LT	0.420	UGG
4.5	18-may-1988	LW02	HMX	LT	1.200	UGG
9.5	18-may-1988	LW02	HMX	LT	1.200	UGG
14.5	18-may-1988	LW02	HMX	LT	1.200	UGG
19.5	18-may-1988	LW02	HMX	LT	1.200	UGG
24.5	18-may-1988	LW02	HMX	LT	1.200	UGG
29.5	18-may-1988	LW02	HMX	LT	1.200	UGG
39.5	18-may-1988	LW02	HMX	LT	1.400	UGG
49.5	18-may-1988	LW02	HMX	LT	1.300	UGG
4.5	18-may-1988	LW02	NB	LT	0.410	UGG
9.5	18-may-1988	LW02	NB	LT	0.410	UGG
14.5	18-may-1988	LW02	NB	LT	0.410	UGG
19.5	18-may-1988	LW02	NB	LT	0.400	UGG

Site: BORE N-122-88 (continued)

SAMPLE DEPTH (ft)	SAMPLE DATE	TEST METHOD	COMPOUND	BOOL	CONCENTRATION	UNITS
24.5	18-may-1988	LW02	NB	LT	0.410	UGG
29.5	18-may-1988	LW02	NB	LT	0.400	UGG
39.5	18-may-1988	LW02	NB	LT	0.460	UGG
49.5	18-may-1988	LW02	NB	LT	0.450	UGG
4.5	18-may-1988	LW02	RDX	LT	0.880	UGG
9.5	18-may-1988	LW02	RDX	LT	0.870	UGG
14.5	18-may-1988	LW02	RDX	LT	0.880	UGG
19.5	18-may-1988	LW02	RDX	LT	0.840	UGG
24.5	18-may-1988	LW02	RDX	LT	0.860	UGG
29.5	18-may-1988	LW02	RDX	LT	0.840	UGG
39.5	18-may-1988	LW02	RDX	LT	0.970	UGG
49.5	18-may-1988	LW02	RDX	LT	0.950	UGG
4.5	18-may-1988	LW02	TETRYL	LT	0.270	UGG
9.5	18-may-1988	LW02	TETRYL	LT	0.270	UGG
14.5	18-may-1988	LW02	TETRYL	LT	0.270	UGG
19.5	18-may-1988	LW02	TETRYL	LT	0.260	UGG
24.5	18-may-1988	LW02	TETRYL	LT	0.260	UGG
29.5	18-may-1988	LW02	TETRYL	LT	0.260	UGG
39.5	18-may-1988	LW02	TETRYL	LT	0.300	UGG
49.5	18-may-1988	LW02	TETRYL	LT	0.290	UGG

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SAMPLE DEPTH (ft)	SAMPLE DATE	TEST METHOD	COMPOUND	BOOL	CONCENTRATION	UNITS
4.5	18-may-1988	99	BR	LT	12500.000	UGG
9.5	18-may-1988	99	BR	LT	12500.000	UGG
14.5	18-may-1988	99	BR	LT	12500.000	UGG
19.5	18-may-1988	99	BR	LT	12500.000	UGG
24.5	18-may-1988	99	BR	LT	12500.000	UGG
29.5	18-may-1988	99	BR	LT	12500.000	UGG
39.5	18-may-1988	99	BR	LT	12500.000	UGG
49.5	18-may-1988	99	BR	LT	12500.000	UGG
4.5	18-may-1988	99	CL	LT	12500.000	UGG
9.5	18-may-1988	99	CL	LT	12500.000	UGG
14.5	18-may-1988	99	CL	LT	12500.000	UGG
19.5	18-may-1988	99	CL	LT	12500.000	UGG
24.5	18-may-1988	99	CL	LT	12500.000	UGG
29.5	18-may-1988	99	CL	LT	12500.000	UGG
39.5	18-may-1988	99	CL	LT	12500.000	UGG
49.5	18-may-1988	99	CL	LT	12500.000	UGG
4.5	18-may-1988	99	F	LT	5.000	UGG
9.5	18-may-1988	99	F	LT	5.000	UGG
14.5	18-may-1988	99	F	LT	5.000	UGG
19.5	18-may-1988	99	F	LT	5.000	UGG
24.5	18-may-1988	99	F	LT	5.000	UGG

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From: 01-jan-1988 To: 27-nov-90

Site: BORE N-123-88 (continued)

SAMPLE DEPTH (ft)	SAMPLE DATE	TEST METHOD	COMPOUND	BOOL	CONCENTRATION	UNITS
29.5	18-may-1988	99	F	LT	5.000	UGG
39.5	18-may-1988	99	F	LT	5.000	UGG
49.5	18-may-1988	99	F	LT	5.000	UGG
4.5	18-may-1988	99	NA		66.200	UGG
9.5	18-may-1988	99	NA		97.900	UGG
14.5	18-may-1988	99	NA		97.000	UGG
19.5	18-may-1988	99	NA		79.700	UGG
24.5	18-may-1988	99	NA		96.100	UGG
29.5	18-may-1988	99	NA		80.000	UGG
39.5	18-may-1988	99	NA		163.000	UGG
49.5	18-may-1988	99	NA		606.000	UGG
4.5	18-may-1988	JB08	HG	LT	0.100	UGG
9.5	18-may-1988	JB08	HG	LT	0.100	UGG
14.5	18-may-1988	JB08	HG	LT	0.100	UGG
19.5	18-may-1988	JB08	HG	LT	0.100	UGG
24.5	18-may-1988	JB08	HG	LT	0.100	UGG
29.5	18-may-1988	JB08	HG	LT	0.100	UGG
39.5	18-may-1988	JB08	HG	LT	0.100	UGG
49.5	18-may-1988	JB08	HG	LT	0.100	UGG
4.5	18-may-1988	JD01	AG	LT	0.648	UGG
9.5	18-may-1988	JD01	AG	LT	0.648	UGG
14.5	18-may-1988	JD01	AG	LT	0.648	UGG
19.5	18-may-1988	JD01	AG	LT	0.648	UGG
24.5	18-may-1988	JD01	AG	LT	0.648	UGG
29.5	18-may-1988	JD01	AG	LT	0.648	UGG
39.5	18-may-1988	JD01	AG	LT	0.648	UGG
49.5	18-may-1988	JD01	AG	LT	0.648	UGG
4.5	18-may-1988	JD01	AS	LT	5.700	UGG
9.5	18-may-1988	JD01	AS	LT	5.700	UGG
14.5	18-may-1988	JD01	AS	LT	5.700	UGG
19.5	18-may-1988	JD01	AS	LT	5.700	UGG
24.5	18-may-1988	JD01	AS	LT	5.700	UGG
29.5	18-may-1988	JD01	AS	LT	5.700	UGG
39.5	18-may-1988	JD01	AS	LT	5.700	UGG
49.5	18-may-1988	JD01	AS	LT	5.700	UGG
4.5	18-may-1988	JD01	BE	LT	0.330	UGG
9.5	18-may-1988	JD01	BE	LT	0.330	UGG
14.5	18-may-1988	JD01	BE	LT	0.330	UGG
19.5	18-may-1988	JD01	BE	LT	0.330	UGG
24.5	18-may-1988	JD01	BE	LT	0.330	UGG
29.5	18-may-1988	JD01	BE	LT	0.330	UGG
39.5	18-may-1988	JD01	BE	LT	0.330	UGG
49.5	18-may-1988	JD01	BE		0.419	UGG
4.5	18-may-1988	JD01	CD	LT	0.700	UGG
9.5	18-may-1988	JD01	CD	LT	0.700	UGG
14.5	18-may-1988	JD01	CD	LT	0.700	UGG

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From: 01-jan-1988 To: 27-nov-90

Site: BORE N-123-88 (continued)

SAMPLE DEPTH (ft)	SAMPLE DATE	TEST METHOD	COMPOUND	BOOL	CONCENTRATION	UNITS
19.5	18-may-1988	JD01	CD	LT	0.700	UGG
24.5	18-may-1988	JD01	CD	LT	0.700	UGG
29.5	18-may-1988	JD01	CD	LT	0.700	UGG
39.5	18-may-1988	JD01	CD	LT	0.700	UGG
49.5	18-may-1988	JD01	CD	LT	0.700	UGG
4.5	18-may-1988	JD01	CR	LT	2.500	UGG
9.5	18-may-1988	JD01	CR	LT	2.500	UGG
14.5	18-may-1988	JD01	CR	LT	2.500	UGG
19.5	18-may-1988	JD01	CR	LT	2.500	UGG
24.5	18-may-1988	JD01	CR		6.030	UGG
29.5	18-may-1988	JD01	CR		4.330	UGG
39.5	18-may-1988	JD01	CR		6.450	UGG
49.5	18-may-1988	JD01	CR		13.500	UGG
4.5	18-may-1988	JD01	CU	LT	3.820	UGG
9.5	18-may-1988	JD01	CU	LT	3.820	UGG
14.5	18-may-1988	JD01	CU	LT	3.820	UGG
19.5	18-may-1988	JD01	CU	LT	3.820	UGG
24.5	18-may-1988	JD01	CU		6.380	UGG
29.5	18-may-1988	JD01	CU	LT	3.820	UGG
39.5	18-may-1988	JD01	CU		6.880	UGG
49.5	18-may-1988	JD01	CU		8.830	UGG
4.5	18-may-1988	JD01	PB	LT	4.780	UGG
9.5	18-may-1988	JD01	PB	LT	4.780	UGG
14.5	18-may-1988	JD01	PB	LT	4.780	UGG
19.5	18-may-1988	JD01	PB		10.100	UGG
24.5	18-may-1988	JD01	PB	LT	4.780	UGG
29.5	18-may-1988	JD01	PB	LT	4.780	UGG
39.5	18-may-1988	JD01	PB	LT	4.780	UGG
49.5	18-may-1988	JD01	PB	LT	4.780	UGG
4.5	18-may-1988	JD01	SB	LT	25.300	UGG
9.5	18-may-1988	JD01	SB	LT	25.300	UGG
14.5	18-may-1988	JD01	SB	LT	25.300	UGG
19.5	18-may-1988	JD01	SB	LT	25.300	UGG
24.5	18-may-1988	JD01	SB	LT	25.300	UGG
29.5	18-may-1988	JD01	SB	LT	25.300	UGG
39.5	18-may-1988	JD01	SB	LT	25.300	UGG
49.5	18-may-1988	JD01	SB	LT	25.300	UGG
4.5	18-may-1988	JD01	SE	LT	2.100	UGG
9.5	18-may-1988	JD01	SE	LT	2.100	UGG
14.5	18-may-1988	JD01	SE	LT	2.100	UGG
19.5	18-may-1988	JD01	SE	LT	2.100	UGG
24.5	18-may-1988	JD01	SE	LT	2.100	UGG
29.5	18-may-1988	JD01	SE	LT	2.100	UGG
39.5	18-may-1988	JD01	SE	LT	2.100	UGG
49.5	18-may-1988	JD01	SE	LT	2.100	UGG
4.5	18-may-1988	JD01	TL	LT	7.930	UGG
9.5	18-may-1988	JD01	TL	LT	7.930	UGG
14.5	18-may-1988	JD01	TL	LT	7.930	UGG

Analytical Results for Chemical Soil
From: 01-jan-1988 To: 27-nov-90

Site: BORE N-123-88 (continued)

SAMPLE DEPTH (ft)	SAMPLE DATE	TEST METHOD	COMPOUND	BOOL	CONCENTRATION	UNITS
19.5	18-may-1988	JD01	TL	LT	7.930	UGG
24.5	18-may-1988	JD01	TL	LT	7.930	UGG
29.5	18-may-1988	JD01	TL	LT	7.930	UGG
39.5	18-may-1988	JD01	TL	LT	7.930	UGG
49.5	18-may-1988	JD01	TL	LT	7.930	UGG
4.5	18-may-1988	JS07	NI	LT	4.800	UGG
9.5	18-may-1988	JS07	NI		8.180	UGG
14.5	18-may-1988	JS07	NI	LT	4.800	UGG
19.5	18-may-1988	JS07	NI		44.500	UGG
24.5	18-may-1988	JS07	NI	LT	4.800	UGG
29.5	18-may-1988	JS07	NI	LT	4.800	UGG
39.5	18-may-1988	JS07	NI		10.500	UGG
49.5	18-may-1988	JS07	NI		13.500	UGG
4.5	18-may-1988	JS07	ZN	LT	52.000	UGG
9.5	18-may-1988	JS07	ZN	LT	52.000	UGG
14.5	18-may-1988	JS07	ZN	LT	52.000	UGG
19.5	18-may-1988	JS07	ZN	LT	52.000	UGG
24.5	18-may-1988	JS07	ZN	LT	52.000	UGG
29.5	18-may-1988	JS07	ZN	LT	52.000	UGG
39.5	18-may-1988	JS07	ZN	LT	52.000	UGG
49.5	18-may-1988	JS07	ZN	LT	52.000	UGG
4.5	18-may-1988	KF02	NIT	LT	500.000	UGG
9.5	18-may-1988	KF02	NIT	LT	500.000	UGG
14.5	18-may-1988	KF02	NIT	LT	500.000	UGG
19.5	18-may-1988	KF02	NIT	LT	500.000	UGG
24.5	18-may-1988	KF02	NIT	LT	500.000	UGG
29.5	18-may-1988	KF02	NIT	LT	500.000	UGG
39.5	18-may-1988	KF02	NIT	LT	500.000	UGG
49.5	18-may-1988	KF02	NIT	LT	500.000	UGG
4.5	18-may-1988	KT01	SO4	LT	12500.000	UGG
9.5	18-may-1988	KT01	SO4	LT	12500.000	UGG
14.5	18-may-1988	KT01	SO4	LT	12500.000	UGG
19.5	18-may-1988	KT01	SO4	LT	12500.000	UGG
24.5	18-may-1988	KT01	SO4	LT	12500.000	UGG
29.5	18-may-1988	KT01	SO4	LT	12500.000	UGG
29.5	18-may-1988	KT01	SO4	LT	12500.000	UGG
39.5	18-may-1988	KT01	SO4	LT	12500.000	UGG
49.5	18-may-1988	KT01	SO4	LT	12500.000	UGG
4.5	18-may-1988	LW02	135TNB	LT	1.700	UGG
9.5	18-may-1988	LW02	135TNB	LT	1.700	UGG
14.5	18-may-1988	LW02	135TNB	LT	1.800	UGG
19.5	18-may-1988	LW02	135TNB	LT	1.700	UGG
24.5	18-may-1988	LW02	135TNB	LT	1.800	UGG
29.5	18-may-1988	LW02	135TNB	LT	1.700	UGG

Analytical Results for Chemical Soil
From: 01-jan-1988 To: 27-nov-90

Site: BORE N-123-88 (continued)

SAMPLE DEPTH (ft)	SAMPLE DATE	TEST METHOD	COMPOUND	BOOL	CONCENTRATION	UNITS
39.5	18-may-1988	LW02	135TNB	LT	1.900	UGG
49.5	18-may-1988	LW02	135TNB	LT	2.000	UGG
4.5	18-may-1988	LW02	13DNB	LT	0.550	UGG
9.5	18-may-1988	LW02	13DNB	LT	0.550	UGG
14.5	18-may-1988	LW02	13DNB	LT	0.570	UGG
19.5	18-may-1988	LW02	13DNB	LT	0.560	UGG
24.5	18-may-1988	LW02	13DNB	LT	0.580	UGG
29.5	18-may-1988	LW02	13DNB	LT	0.550	UGG
39.5	18-may-1988	LW02	13DNB	LT	0.620	UGG
49.5	18-may-1988	LW02	13DNB	LT	0.650	UGG
4.5	18-may-1988	LW02	246TNT	LT	1.800	UGG
9.5	18-may-1988	LW02	246TNT	LT	1.800	UGG
14.5	18-may-1988	LW02	246TNT	LT	1.900	UGG
19.5	18-may-1988	LW02	246TNT	LT	1.800	UGG
24.5	18-may-1988	LW02	246TNT	LT	1.900	UGG
29.5	18-may-1988	LW02	246TNT	LT	1.800	UGG
39.5	18-may-1988	LW02	246TNT	LT	2.000	UGG
49.5	18-may-1988	LW02	246TNT	LT	2.100	UGG
4.5	18-may-1988	LW02	24DNT	LT	0.390	UGG
9.5	18-may-1988	LW02	24DNT	LT	0.390	UGG
14.5	18-may-1988	LW02	24DNT	LT	0.410	UGG
19.5	18-may-1988	LW02	24DNT	LT	0.400	UGG
24.5	18-may-1988	LW02	24DNT	LT	0.410	UGG
29.5	18-may-1988	LW02	24DNT	LT	0.390	UGG
39.5	18-may-1988	LW02	24DNT	LT	0.440	UGG
49.5	18-may-1988	LW02	24DNT	LT	0.460	UGG
4.5	18-may-1988	LW02	26DNT	LT	0.370	UGG
9.5	18-may-1988	LW02	26DNT	LT	0.370	UGG
14.5	18-may-1988	LW02	26DNT	LT	0.390	UGG
19.5	18-may-1988	LW02	26DNT	LT	0.380	UGG
24.5	18-may-1988	LW02	26DNT	LT	0.390	UGG
29.5	18-may-1988	LW02	26DNT	LT	0.380	UGG
39.5	18-may-1988	LW02	26DNT	LT	0.420	UGG
49.5	18-may-1988	LW02	26DNT	LT	0.440	UGG
4.5	18-may-1988	LW02	HMX	LT	1.200	UGG
9.5	18-may-1988	LW02	HMX	LT	1.200	UGG
14.5	18-may-1988	LW02	HMX	LT	1.200	UGG
19.5	18-may-1988	LW02	HMX	LT	1.200	UGG
24.5	18-may-1988	LW02	HMX	LT	1.300	UGG
29.5	18-may-1988	LW02	HMX	LT	1.200	UGG
39.5	18-may-1988	LW02	HMX	LT	1.400	UGG
49.5	18-may-1988	LW02	HMX	LT	1.400	UGG
4.5	18-may-1988	LW02	NB	LT	0.400	UGG
9.5	18-may-1988	LW02	NB	LT	0.400	UGG
14.5	18-may-1988	LW02	NB	LT	0.410	UGG
19.5	18-may-1988	LW02	NB	LT	0.400	UGG
24.5	18-may-1988	LW02	NB	LT	0.420	UGG
29.5	18-may-1988	LW02	NB	LT	0.400	UGG

Analytical Results for Chemical Soil
From: 01-jan-1988 To: 27-nov-90

Site: BORE N-123-88 (continued)

SAMPLE DEPTH (ft)	SAMPLE DATE	TEST METHOD	COMPOUND	BOOL	CONCENTRATION	UNITS
39.5	18-may-1988	LW02	NB	LT	0.450	UGG
49.5	18-may-1988	LW02	NB	LT	0.470	UGG
4.5	18-may-1988	LW02	RDX	LT	0.840	UGG
9.5	18-may-1988	LW02	RDX	LT	0.850	UGG
14.5	18-may-1988	LW02	RDX	LT	0.870	UGG
19.5	18-may-1988	LW02	RDX	LT	0.850	UGG
24.5	18-may-1988	LW02	RDX	LT	0.890	UGG
29.5	18-may-1988	LW02	RDX	LT	0.850	UGG
39.5	18-may-1988	LW02	RDX	LT	0.960	UGG
49.5	18-may-1988	LW02	RDX	LT	1.000	UGG
4.5	18-may-1988	LW02	TETRYL	LT	0.260	UGG
9.5	18-may-1988	LW02	TETRYL	LT	0.260	UGG
14.5	18-may-1988	LW02	TETRYL	LT	0.270	UGG
19.5	18-may-1988	LW02	TETRYL	LT	0.260	UGG
24.5	18-may-1988	LW02	TETRYL	LT	0.270	UGG
29.5	18-may-1988	LW02	TETRYL	LT	0.260	UGG
39.5	18-may-1988	LW02	TETRYL	LT	0.290	UGG
49.5	18-may-1988	LW02	TETRYL	LT	0.310	UGG

Site: BORE N-124-88

SAMPLE DEPTH (ft)	SAMPLE DATE	TEST METHOD	COMPOUND	BOOL	CONCENTRATION	UNITS
4.5	18-may-1988	99	BR	LT	12500.000	UGG
9.5	18-may-1988	99	BR	LT	12500.000	UGG
14.5	18-may-1988	99	BR	LT	12500.000	UGG
19.5	18-may-1988	99	BR	LT	12500.000	UGG
24.5	18-may-1988	99	BR	LT	12500.000	UGG
29.5	18-may-1988	99	BR	LT	12500.000	UGG
39.5	18-may-1988	99	BR	LT	12500.000	UGG
49.5	18-may-1988	99	BR	LT	12500.000	UGG
4.5	18-may-1988	99	CL	LT	12500.000	UGG
9.5	18-may-1988	99	CL	LT	12500.000	UGG
14.5	18-may-1988	99	CL	LT	12500.000	UGG
19.5	18-may-1988	99	CL	LT	12500.000	UGG
24.5	18-may-1988	99	CL	LT	12500.000	UGG
29.5	18-may-1988	99	CL	LT	12500.000	UGG
39.5	18-may-1988	99	CL	LT	12500.000	UGG
49.5	18-may-1988	99	CL	LT	12500.000	UGG
4.5	18-may-1988	99	F	LT	5.000	UGG
9.5	18-may-1988	99	F	LT	5.000	UGG
14.5	18-may-1988	99	F	LT	5.000	UGG
19.5	18-may-1988	99	F	LT	5.000	UGG
24.5	18-may-1988	99	F	LT	5.000	UGG
29.5	18-may-1988	99	F	LT	5.000	UGG
39.5	18-may-1988	99	F	LT	5.000	UGG

Analytical Results for Chemical Soil
From: 01-jan-1988 To: 27-nov-90

Site: BORE N-124-88 (continued)

SAMPLE DEPTH (ft)	SAMPLE DATE	TEST METHOD	COMPOUND	BOOL	CONCENTRATION	UNITS
49.5	18-may-1988	99	F	LT	5.000	UGG
4.5	18-may-1988	99	NA		95.400	UGG
9.5	18-may-1988	99	NA		109.000	UGG
14.5	18-may-1988	99	NA		65.900	UGG
19.5	18-may-1988	99	NA		62.300	UGG
24.5	18-may-1988	99	NA		95.300	UGG
29.5	18-may-1988	99	NA		148.000	UGG
39.5	18-may-1988	99	NA		160.000	UGG
49.5	18-may-1988	99	NA		518.000	UGG
4.5	18-may-1988	JB08	HG	LT	0.100	UGG
9.5	18-may-1988	JB08	HG	LT	0.100	UGG
14.5	18-may-1988	JB08	HG	LT	0.100	UGG
19.5	18-may-1988	JB08	HG	LT	0.100	UGG
24.5	18-may-1988	JB08	HG	LT	0.100	UGG
29.5	18-may-1988	JB08	HG	LT	0.100	UGG
39.5	18-may-1988	JB08	HG	LT	0.100	UGG
49.5	18-may-1988	JB08	HG	LT	0.100	UGG
4.5	18-may-1988	JD01	AG	LT	0.648	UGG
9.5	18-may-1988	JD01	AG	LT	0.648	UGG
14.5	18-may-1988	JD01	AG	LT	0.648	UGG
19.5	18-may-1988	JD01	AG	LT	0.648	UGG
24.5	18-may-1988	JD01	AG	LT	0.648	UGG
29.5	18-may-1988	JD01	AG	LT	0.648	UGG
39.5	18-may-1988	JD01	AG	LT	0.648	UGG
49.5	18-may-1988	JD01	AG	LT	0.648	UGG
4.5	18-may-1988	JD01	AS	LT	5.700	UGG
9.5	18-may-1988	JD01	AS	LT	5.700	UGG
14.5	18-may-1988	JD01	AS	LT	5.700	UGG
19.5	18-may-1988	JD01	AS	LT	5.700	UGG
24.5	18-may-1988	JD01	AS	LT	5.700	UGG
29.5	18-may-1988	JD01	AS	LT	5.700	UGG
39.5	18-may-1988	JD01	AS	LT	5.700	UGG
49.5	18-may-1988	JD01	AS	LT	5.700	UGG
4.5	18-may-1988	JD01	BE	LT	0.330	UGG
9.5	18-may-1988	JD01	BE	LT	0.330	UGG
14.5	18-may-1988	JD01	BE	LT	0.330	UGG
19.5	18-may-1988	JD01	BE	LT	0.330	UGG
24.5	18-may-1988	JD01	BE	LT	0.330	UGG
29.5	18-may-1988	JD01	BE	LT	0.330	UGG
39.5	18-may-1988	JD01	BE	LT	0.330	UGG
49.5	18-may-1988	JD01	BE		0.787	UGG
4.5	18-may-1988	JD01	CD	LT	0.700	UGG
9.5	18-may-1988	JD01	CD		2.360	UGG
14.5	18-may-1988	JD01	CD	LT	0.700	UGG
19.5	18-may-1988	JD01	CD	LT	0.700	UGG
24.5	18-may-1988	JD01	CD	LT	0.700	UGG

Analytical Results for Chemical Soil
From: 01-jan-1988 To: 27-nov-90

Site: BORE N-124-88 (continued)

SAMPLE DEPTH (ft)	SAMPLE DATE	TEST METHOD	COMPOUND	BOOL	CONCENTRATION	UNITS
29.5	18-may-1988	JD01	CD	LT	0.700	UGG
39.5	18-may-1988	JD01	CD	LT	0.700	UGG
49.5	18-may-1988	JD01	CD	LT	0.700	UGG
4.5	18-may-1988	JD01	CR	LT	2.500	UGG
9.5	18-may-1988	JD01	CR	LT	2.500	UGG
14.5	18-may-1988	JD01	CR		5.100	UGG
19.5	18-may-1988	JD01	CR		5.220	UGG
24.5	18-may-1988	JD01	CR	LT	2.500	UGG
29.5	18-may-1988	JD01	CR		7.970	UGG
39.5	18-may-1988	JD01	CR		8.310	UGG
49.5	18-may-1988	JD01	CR		53.600	UGG
4.5	18-may-1988	JD01	CU	LT	3.820	UGG
9.5	18-may-1988	JD01	CU	LT	3.820	UGG
14.5	18-may-1988	JD01	CU	LT	3.820	UGG
19.5	18-may-1988	JD01	CU	LT	3.820	UGG
24.5	18-may-1988	JD01	CU		5.220	UGG
29.5	18-may-1988	JD01	CU		6.920	UGG
39.5	18-may-1988	JD01	CU		4.890	UGG
49.5	18-may-1988	JD01	CU		25.700	UGG
4.5	18-may-1988	JD01	PB	LT	4.780	UGG
9.5	18-may-1988	JD01	PB	LT	4.780	UGG
14.5	18-may-1988	JD01	PB	LT	4.780	UGG
19.5	18-may-1988	JD01	PB	LT	4.780	UGG
24.5	18-may-1988	JD01	PB	LT	4.780	UGG
29.5	18-may-1988	JD01	PB	LT	4.780	UGG
39.5	18-may-1988	JD01	PB	LT	4.780	UGG
49.5	18-may-1988	JD01	PB	LT	4.780	UGG
4.5	18-may-1988	JD01	SB	LT	25.300	UGG
9.5	18-may-1988	JD01	SB	LT	25.300	UGG
14.5	18-may-1988	JD01	SB	LT	25.300	UGG
19.5	18-may-1988	JD01	SB	LT	25.300	UGG
24.5	18-may-1988	JD01	SB	LT	25.300	UGG
29.5	18-may-1988	JD01	SB	LT	25.300	UGG
39.5	18-may-1988	JD01	SB	LT	25.300	UGG
49.5	18-may-1988	JD01	SB	LT	25.300	UGG
4.5	18-may-1988	JD01	SE	LT	2.100	UGG
9.5	18-may-1988	JD01	SE	LT	2.100	UGG
14.5	18-may-1988	JD01	SE	LT	2.100	UGG
19.5	18-may-1988	JD01	SE	LT	2.100	UGG
24.5	18-may-1988	JD01	SE	LT	2.100	UGG
29.5	18-may-1988	JD01	SE	LT	2.100	UGG
39.5	18-may-1988	JD01	SE	LT	2.100	UGG
49.5	18-may-1988	JD01	SE	LT	2.100	UGG
4.5	18-may-1988	JD01	TL	LT	7.930	UGG
9.5	18-may-1988	JD01	TL	LT	7.930	UGG
14.5	18-may-1988	JD01	TL	LT	7.930	UGG
19.5	18-may-1988	JD01	TL	LT	7.930	UGG
24.5	18-may-1988	JD01	TL	LT	7.930	UGG

Analytical Results for Chemical Soil
From: 01-jan-1988 To: 27-nov-90

Site: BORE N-124-88 (continued)

SAMPLE DEPTH (ft)	SAMPLE DATE	TEST METHOD	COMPOUND	BOOL	CONCENTRATION	UNITS
29.5	18-may-1988	JD01	TL	LT	7.930	UGG
39.5	18-may-1988	JD01	TL	LT	7.930	UGG
49.5	18-may-1988	JD01	TL	LT	7.930	UGG
4.5	18-may-1988	JS07	NI	LT	4.800	UGG
9.5	18-may-1988	JS07	NI	LT	4.800	UGG
14.5	18-may-1988	JS07	NI	LT	4.800	UGG
19.5	18-may-1988	JS07	NI	LT	4.800	UGG
24.5	18-may-1988	JS07	NI		7.030	UGG
29.5	18-may-1988	JS07	NI		23.000	UGG
39.5	18-may-1988	JS07	NI		6.810	UGG
49.5	18-may-1988	JS07	NI		64.000	UGG
4.5	18-may-1988	JS07	ZN	LT	52.000	UGG
9.5	18-may-1988	JS07	ZN	LT	52.000	UGG
14.5	18-may-1988	JS07	ZN	LT	52.000	UGG
19.5	18-may-1988	JS07	ZN	LT	52.000	UGG
24.5	18-may-1988	JS07	ZN	LT	52.000	UGG
29.5	18-may-1988	JS07	ZN	LT	52.000	UGG
39.5	18-may-1988	JS07	ZN	LT	52.000	UGG
49.5	18-may-1988	JS07	ZN		69.200	UGG
4.5	18-may-1988	KF02	NIT	LT	500.000	UGG
9.5	18-may-1988	KF02	NIT	LT	500.000	UGG
14.5	18-may-1988	KF02	NIT	LT	500.000	UGG
19.5	18-may-1988	KF02	NIT	LT	500.000	UGG
24.5	18-may-1988	KF02	NIT	LT	500.000	UGG
29.5	18-may-1988	KF02	NIT	LT	500.000	UGG
39.5	18-may-1988	KF02	NIT	LT	500.000	UGG
49.5	18-may-1988	KF02	NIT	LT	500.000	UGG
4.5	18-may-1988	KT01	SO4	LT	12500.000	UGG
9.5	18-may-1988	KT01	SO4	LT	12500.000	UGG
14.5	18-may-1988	KT01	SO4	LT	12500.000	UGG
19.5	18-may-1988	KT01	SO4	LT	12500.000	UGG
24.5	18-may-1988	KT01	SO4	LT	12500.000	UGG
29.5	18-may-1988	KT01	SO4	LT	12500.000	UGG
39.5	18-may-1988	KT01	SO4	LT	12500.000	UGG
49.5	18-may-1988	KT01	SO4	LT	12500.000	UGG
49.5	18-may-1988	KT01	SO4	LT	12500.000	UGG
4.5	18-may-1988	LW02	135TNB	LT	1.700	UGG
9.5	18-may-1988	LW02	135TNB	LT	1.700	UGG
14.5	18-may-1988	LW02	135TNB	LT	1.700	UGG
19.5	18-may-1988	LW02	135TNB	LT	1.700	UGG
24.5	18-may-1988	LW02	135TNB	LT	1.700	UGG
29.5	18-may-1988	LW02	135TNB	LT	1.900	UGG
39.5	18-may-1988	LW02	135TNB	LT	1.800	UGG
49.5	18-may-1988	LW02	135TNB	LT	1.900	UGG

Analytical Results for Chemical Soil
From: 01-jan-1988 To: 27-nov-90

Site: BORE N-124-88 (continued)

SAMPLE DEPTH (ft)	SAMPLE DATE	TEST METHOD	COMPOUND	BOOL	CONCENTRATION	UNITS
4.5	18-may-1988	LW02	13DNB	LT	0.550	UGG
9.5	18-may-1988	LW02	13DNB	LT	0.550	UGG
14.5	18-may-1988	LW02	13DNB	LT	0.540	UGG
19.5	18-may-1988	LW02	13DNB	LT	0.540	UGG
24.5	18-may-1988	LW02	13DNB	LT	0.550	UGG
29.5	18-may-1988	LW02	13DNB	LT	0.610	UGG
39.5	18-may-1988	LW02	13DNB	LT	0.570	UGG
49.5	18-may-1988	LW02	13DNB	LT	0.610	UGG
4.5	18-may-1988	LW02	246TNT	LT	1.800	UGG
9.5	18-may-1988	LW02	246TNT	LT	1.800	UGG
14.5	18-may-1988	LW02	246TNT	LT	1.800	UGG
19.5	18-may-1988	LW02	246TNT	LT	1.800	UGG
24.5	18-may-1988	LW02	246TNT	LT	1.800	UGG
29.5	18-may-1988	LW02	246TNT	LT	2.000	UGG
39.5	18-may-1988	LW02	246TNT	LT	1.800	UGG
49.5	18-may-1988	LW02	246TNT	LT	2.000	UGG
4.5	18-may-1988	LW02	24DNT	LT	0.390	UGG
9.5	18-may-1988	LW02	24DNT	LT	0.390	UGG
14.5	18-may-1988	LW02	24DNT	LT	0.390	UGG
19.5	18-may-1988	LW02	24DNT	LT	0.390	UGG
24.5	18-may-1988	LW02	24DNT	LT	0.390	UGG
29.5	18-may-1988	LW02	24DNT	LT	0.440	UGG
39.5	18-may-1988	LW02	24DNT	LT	0.400	UGG
49.5	18-may-1988	LW02	24DNT	LT	0.430	UGG
4.5	18-may-1988	LW02	26DNT	LT	0.370	UGG
9.5	18-may-1988	LW02	26DNT	LT	0.370	UGG
14.5	18-may-1988	LW02	26DNT	LT	0.370	UGG
19.5	18-may-1988	LW02	26DNT	LT	0.370	UGG
24.5	18-may-1988	LW02	26DNT	LT	0.370	UGG
29.5	18-may-1988	LW02	26DNT	LT	0.410	UGG
39.5	18-may-1988	LW02	26DNT	LT	0.380	UGG
49.5	18-may-1988	LW02	26DNT	LT	0.410	UGG
4.5	18-may-1988	LW02	HMX	LT	1.200	UGG
9.5	18-may-1988	LW02	HMX	LT	1.200	UGG
14.5	18-may-1988	LW02	HMX	LT	1.200	UGG
19.5	18-may-1988	LW02	HMX	LT	1.200	UGG
24.5	18-may-1988	LW02	HMX	LT	1.200	UGG
29.5	18-may-1988	LW02	HMX	LT	1.300	UGG
39.5	18-may-1988	LW02	HMX	LT	1.200	UGG
49.5	18-may-1988	LW02	HMX	LT	1.300	UGG
4.5	18-may-1988	LW02	NB	LT	0.400	UGG
9.5	18-may-1988	LW02	NB	LT	0.400	UGG
14.5	18-may-1988	LW02	NB	LT	0.390	UGG
19.5	18-may-1988	LW02	NB	LT	0.390	UGG
24.5	18-may-1988	LW02	NB	LT	0.400	UGG
29.5	18-may-1988	LW02	NB	LT	0.440	UGG
39.5	18-may-1988	LW02	NB	LT	0.410	UGG
49.5	18-may-1988	LW02	NB	LT	0.440	UGG

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Site: BORE N-124-88 (continued)

SAMPLE DEPTH (ft)	SAMPLE DATE	TEST METHOD	COMPOUND	BOOL	CONCENTRATION	UNITS
4.5	18-may-1988	LW02	RDX	LT	0.840	UGG
9.5	18-may-1988	LW02	RDX	LT	0.840	UGG
14.5	18-may-1988	LW02	RDX	LT	0.830	UGG
19.5	18-may-1988	LW02	RDX	LT	0.830	UGG
24.5	18-may-1988	LW02	RDX	LT	0.840	UGG
29.5	18-may-1988	LW02	RDX	LT	0.940	UGG
39.5	18-may-1988	LW02	RDX	LT	0.870	UGG
49.5	18-may-1988	LW02	RDX	LT	0.940	UGG
4.5	18-may-1988	LW02	TETRYL	LT	0.260	UGG
9.5	18-may-1988	LW02	TETRYL	LT	0.260	UGG
14.5	18-may-1988	LW02	TETRYL	LT	0.250	UGG
19.5	18-may-1988	LW02	TETRYL	LT	0.260	UGG
24.5	18-may-1988	LW02	TETRYL	LT	0.260	UGG
29.5	18-may-1988	LW02	TETRYL	LT	0.290	UGG
39.5	18-may-1988	LW02	TETRYL	LT	0.270	UGG
49.5	18-may-1988	LW02	TETRYL	LT	0.290	UGG

Site: BORE N-128-88

SAMPLE DEPTH (ft)	SAMPLE DATE	TEST METHOD	COMPOUND	BOOL	CONCENTRATION	UNITS
257.0	12-oct-1988	99	NIT		1050.000	UGG
257.0	12-oct-1988	99	SO4	LT	14700.000	UGG
257.0	12-oct-1988	LW02	135TNB	LT	1.850	UGG
257.0	12-oct-1988	LW02	13DNB	LT	0.594	UGG
257.0	12-oct-1988	LW02	246TNT	LT	1.930	UGG
257.0	12-oct-1988	LW02	24DNT	LT	0.423	UGG
257.0	12-oct-1988	LW02	26DNT	LT	0.403	UGG
257.0	12-oct-1988	LW02	HMX	LT	1.290	UGG
257.0	12-oct-1988	LW02	NB	LT	0.431	UGG
257.0	12-oct-1988	LW02	RDX	LT	0.913	UGG
257.0	12-oct-1988	LW02	TETRYL	LT	0.280	UGG

Site: BORE N-129-88

SAMPLE DEPTH (ft)	SAMPLE DATE	TEST METHOD	COMPOUND	BOOL	CONCENTRATION	UNITS
240.0	12-oct-1988	99	NIT	LT	545.000	UGG
240.0	18-oct-1988	99	SO4	LT	13600.000	UGG
240.0	18-oct-1988	LM13	111TCE	ND	0.050	UGG
240.0	18-oct-1988	LM13	112TCE	ND	0.050	UGG
240.0	18-oct-1988	LM13	11DCE	ND	0.050	UGG

Analytical Results for Chemical Soil
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Site: BORE N-129-88 (continued)

SAMPLE DEPTH (ft)	SAMPLE DATE	TEST METHOD	COMPOUND	BOOL	CONCENTRATION	UNITS
240.0	18-oct-1988	LM13	11DCLE	ND	0.050	UGG
240.0	18-oct-1988	LM13	12DCLB	ND	0.300	UGG
240.0	18-oct-1988	LM13	12DCLE	ND	0.050	UGG
240.0	18-oct-1988	LM13	12DCLP	ND	0.050	UGG
240.0	18-oct-1988	LM13	13DCLB	ND	0.300	UGG
240.0	18-oct-1988	LM13	14DCLB	ND	0.300	UGG
240.0	18-oct-1988	LM13	2CLEVE	ND	0.600	UGG
240.0	18-oct-1988	LM13	BRDCLM	ND	0.050	UGG
240.0	18-oct-1988	LM13	C13DCP	ND	0.600	UGG
240.0	18-oct-1988	LM13	C2H3CL	ND	0.100	UGG
240.0	18-oct-1988	LM13	C2H5CL	ND	0.100	UGG
240.0	18-oct-1988	LM13	C6H6	ND	0.600	UGG
240.0	18-oct-1988	LM13	CCL4	ND	0.050	UGG
240.0	18-oct-1988	LM13	CH2CL2	ND	0.050	UGG
240.0	18-oct-1988	LM13	CH3BR	ND	0.100	UGG
240.0	18-oct-1988	LM13	CH3CL	ND	0.100	UGG
240.0	18-oct-1988	LM13	CHBR3	ND	0.100	UGG
240.0	18-oct-1988	LM13	CHCL3	ND	0.050	UGG
240.0	18-oct-1988	LM13	CLC6H5	ND	0.630	UGG
240.0	18-oct-1988	LM13	DBRCLM	ND	0.050	UGG
240.0	18-oct-1988	LM13	ETC6H5	ND	0.050	UGG
240.0	18-oct-1988	LM13	MEC6H5	ND	0.050	UGG
240.0	18-oct-1988	LM13	T12DCE	ND	0.630	UGG
240.0	18-oct-1988	LM13	T13DCP	ND	0.050	UGG
240.0	18-oct-1988	LM13	TCLEA	ND	0.050	UGG
240.0	18-oct-1988	LM13	TCLEE	ND	0.050	UGG
240.0	18-oct-1988	LM13	TRCLE	LT	0.141	UGG
240.0	18-oct-1988	LM13	UNK126		1.550	UGG
240.0	18-oct-1988	LW02	135TNB	LT	1.820	UGG
240.0	18-oct-1988	LW02	13DNB	LT	0.583	UGG
240.0	18-oct-1988	LW02	246TNT	LT	1.900	UGG
240.0	18-oct-1988	LW02	24DNT	LT	0.415	UGG
240.0	18-oct-1988	LW02	26DNT	LT	0.395	UGG
240.0	18-oct-1988	LW02	HMX	LT	1.270	UGG
240.0	18-oct-1988	LW02	NB	LT	0.422	UGG
240.0	18-oct-1988	LW02	RDX	LT	0.895	UGG
240.0	18-oct-1988	LW02	TETRYL	LT	0.274	UGG

Analytical Results for Chemical Soil
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Site: BORE N-130-88

SAMPLE DEPTH (ft)	SAMPLE DATE	TEST METHOD	COMPOUND	BOOL	CONCENTRATION	UNITS
215.0	26-oct-1988	99	111TCE	ND	0.050	UGG
243.0	26-oct-1988	99	111TCE		0.635	UGG
215.0	26-oct-1988	99	112TCE	ND	0.050	UGG
243.0	26-oct-1988	99	112TCE	ND	0.050	UGG
215.0	26-oct-1988	99	11DCE	ND	0.050	UGG
243.0	26-oct-1988	99	11DCE	ND	0.050	UGG
215.0	26-oct-1988	99	11DCLE	ND	0.050	UGG
243.0	26-oct-1988	99	11DCLE	ND	0.050	UGG
215.0	26-oct-1988	99	12DCLB	ND	0.300	UGG
243.0	26-oct-1988	99	12DCLB	ND	0.300	UGG
215.0	26-oct-1988	99	12DCLE	ND	0.050	UGG
243.0	26-oct-1988	99	12DCLE	ND	0.050	UGG
215.0	26-oct-1988	99	12DCLP	ND	0.050	UGG
243.0	26-oct-1988	99	12DCLP	ND	0.050	UGG
215.0	26-oct-1988	99	13DCLB	ND	0.300	UGG
243.0	26-oct-1988	99	13DCLB	ND	0.300	UGG
215.0	26-oct-1988	99	14DCLB	ND	0.300	UGG
243.0	26-oct-1988	99	14DCLB	ND	0.300	UGG
215.0	26-oct-1988	99	2CLEVE	ND	0.600	UGG
243.0	26-oct-1988	99	2CLEVE	ND	0.600	UGG
215.0	26-oct-1988	99	BRDCLM	ND	0.050	UGG
243.0	26-oct-1988	99	BRDCLM	ND	0.050	UGG
215.0	26-oct-1988	99	C13DCP	ND	0.600	UGG
243.0	26-oct-1988	99	C13DCP	ND	0.600	UGG
215.0	26-oct-1988	99	C2H3CL	ND	0.100	UGG
243.0	26-oct-1988	99	C2H3CL	ND	0.100	UGG
215.0	26-oct-1988	99	C2H5CL	ND	0.100	UGG
243.0	26-oct-1988	99	C2H5CL	ND	0.100	UGG
215.0	26-oct-1988	99	C6H6	ND	0.600	UGG
243.0	26-oct-1988	99	C6H6	ND	0.600	UGG
215.0	26-oct-1988	99	CCL4	ND	0.050	UGG
243.0	26-oct-1988	99	CCL4	ND	0.050	UGG
215.0	26-oct-1988	99	CH2CL2	ND	0.050	UGG
243.0	26-oct-1988	99	CH2CL2	ND	0.050	UGG
215.0	26-oct-1988	99	CH3BR	ND	0.100	UGG
243.0	26-oct-1988	99	CH3BR	ND	0.100	UGG
215.0	26-oct-1988	99	CH3CL	ND	0.100	UGG
243.0	26-oct-1988	99	CH3CL	ND	0.100	UGG
215.0	26-oct-1988	99	CHBR3	ND	0.100	UGG
243.0	26-oct-1988	99	CHBR3	ND	0.100	UGG
215.0	26-oct-1988	99	CHCL3	ND	0.050	UGG
243.0	26-oct-1988	99	CHCL3	ND	0.050	UGG
215.0	26-oct-1988	99	CLC6H5	ND	0.630	UGG
243.0	26-oct-1988	99	CLC6H5	ND	0.630	UGG
215.0	26-oct-1988	99	DBRCLM	ND	0.050	UGG
243.0	26-oct-1988	99	DBRCLM	ND	0.050	UGG
215.0	26-oct-1988	99	ETC6H5	ND	0.050	UGG
243.0	26-oct-1988	99	ETC6H5	ND	0.050	UGG

Analytical Results for Chemical Soil
From: 01-jan-1988 To: 27-nov-90

Site: BORE N-130-88 (continued)

SAMPLE DEPTH (ft)	SAMPLE DATE	TEST METHOD	COMPOUND	BOOL	CONCENTRATION	UNITS
215.0	26-oct-1988	99	MEC6H5	ND	0.050	UGG
243.0	26-oct-1988	99	MEC6H5	ND	0.050	UGG
215.0	26-oct-1988	99	NIT	LT	531.000	UGG
243.0	26-oct-1988	99	NIT	LT	574.000	UGG
215.0	26-oct-1988	99	SO4	LT	13300.000	UGG
243.0	26-oct-1988	99	SO4	LT	14300.000	UGG
215.0	26-oct-1988	99	T12DCE	ND	0.630	UGG
243.0	26-oct-1988	99	T12DCE	ND	0.630	UGG
215.0	26-oct-1988	99	T13DCP	ND	0.050	UGG
243.0	26-oct-1988	99	T13DCP	ND	0.050	UGG
215.0	26-oct-1988	99	TCLEA	ND	0.050	UGG
243.0	26-oct-1988	99	TCLEA	ND	0.050	UGG
215.0	26-oct-1988	99	TCLEE	ND	0.050	UGG
243.0	26-oct-1988	99	TCLEE	ND	0.050	UGG
215.0	26-oct-1988	99	TRCLE	LT	0.145	UGG
243.0	26-oct-1988	99	TRCLE	LT	0.145	UGG
243.0	26-oct-1988	99	UNK069		0.800	UGG
215.0	26-oct-1988	99	UNK076		3.200	UGG
215.0	26-oct-1988	99	UNK105		1.000	UGG
243.0	26-oct-1988	99	UNK105		1.000	UGG
243.0	26-oct-1988	99	UNK141		14.000	UGG
215.0	26-oct-1988	99	UNK148		13.500	UGG
215.0	26-oct-1988	LW02	135TNB	LT	2.090	UGG
243.0	26-oct-1988	LW02	135TNB	LT	2.090	UGG
215.0	26-oct-1988	LW02	13DNB	LT	0.590	UGG
243.0	26-oct-1988	LW02	13DNB	LT	0.590	UGG
215.0	26-oct-1988	LW02	246TNT	LT	1.920	UGG
243.0	26-oct-1988	LW02	246TNT	LT	1.920	UGG
215.0	26-oct-1988	LW02	24DNT	LT	0.420	UGG
243.0	26-oct-1988	LW02	24DNT	LT	0.420	UGG
215.0	26-oct-1988	LW02	26DNT	LT	0.400	UGG
243.0	26-oct-1988	LW02	26DNT	LT	0.400	UGG
215.0	26-oct-1988	LW02	HMX	LT	1.270	UGG
243.0	26-oct-1988	LW02	HMX	LT	1.270	UGG
215.0	26-oct-1988	LW02	NB	LT	0.420	UGG
243.0	26-oct-1988	LW02	NB	LT	0.420	UGG
215.0	26-oct-1988	LW02	RDX	LT	0.980	UGG
243.0	26-oct-1988	LW02	RDX	LT	0.980	UGG
215.0	26-oct-1988	LW02	TETRYL	LT	0.250	UGG
243.0	26-oct-1988	LW02	TETRYL	LT	0.250	UGG

Analytical Results for Chemical Soil
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Site: BORE SSDS-01-01

SAMPLE DEPTH (ft)	SAMPLE DATE	TEST METHOD	COMPOUND	BOOL	CONCENTRATION	UNITS
0.0	23-feb-1988	99	AG	LT	0.722	UGG
0.0	23-feb-1988	99	AS	LT	6.350	UGG
0.0	23-feb-1988	99	BE	LT	0.368	UGG
0.0	23-feb-1988	99	BR	LT	100.000	UGG
0.0	23-feb-1988	99	CD	LT	0.780	UGG
0.0	23-feb-1988	99	CL	LT	12500.000	UGG
0.0	23-feb-1988	99	CR		11.600	UGG
0.0	23-feb-1988	99	CU		11.000	UGG
0.0	23-feb-1988	99	F	LT	10.000	UGG
0.0	23-feb-1988	99	NA		124.000	UGG
0.0	23-feb-1988	99	NI		5.630	UGG
0.0	23-feb-1988	99	NIT	LT	0.000	UGG
0.0	23-feb-1988	99	NIT	LT	0.000	UGG
0.0	23-feb-1988	99	PB	LT	5.320	UGG
0.0	23-feb-1988	99	SB	LT	28.200	UGG
0.0	23-feb-1988	99	SE	LT	2.340	UGG
0.0	23-feb-1988	99	SO4	LT	12500.000	UGG
0.0	23-feb-1988	99	TL	LT	8.830	UGG
0.0	23-feb-1988	99	ZN	LT	57.900	UGG
0.0	23-feb-1988	JB08	HG	LT	0.114	UGG
0.0	23-feb-1988	LM13	111TCE	ND	0.056	UGG
0.0	23-feb-1988	LM13	112TCE	ND	0.056	UGG
0.0	23-feb-1988	LM13	11DCE	ND	0.056	UGG
0.0	23-feb-1988	LM13	12DCLB	ND	0.339	UGG
0.0	23-feb-1988	LM13	12DCLE	ND	0.056	UGG
0.0	23-feb-1988	LM13	12DCLP	ND	0.056	UGG
0.0	23-feb-1988	LM13	13DCLB	ND	0.339	UGG
0.0	23-feb-1988	LM13	14DCLB	ND	0.339	UGG
0.0	23-feb-1988	LM13	2CLEVE	ND	0.677	UGG
0.0	23-feb-1988	LM13	BRDCLM	ND	0.050	UGG
0.0	23-feb-1988	LM13	C13DCP	ND	0.677	UGG
0.0	23-feb-1988	LM13	C2H3CL	ND	0.113	UGG
0.0	23-feb-1988	LM13	C2H5CL	ND	0.113	UGG
0.0	23-feb-1988	LM13	C6H6	ND	0.677	UGG
0.0	23-feb-1988	LM13	CCL4	ND	0.056	UGG
0.0	23-feb-1988	LM13	CH2CL2	ND	0.056	UGG
0.0	23-feb-1988	LM13	CH3BR	ND	0.113	UGG
0.0	23-feb-1988	LM13	CH3CL	ND	0.113	UGG
0.0	23-feb-1988	LM13	CHBR3	ND	0.113	UGG
0.0	23-feb-1988	LM13	CHCL3	ND	0.056	UGG
0.0	23-feb-1988	LM13	CLC6H5	ND	0.711	UGG
0.0	23-feb-1988	LM13	DBRCLM	ND	0.056	UGG
0.0	23-feb-1988	LM13	ETC6H5	ND	0.056	UGG
0.0	23-feb-1988	LM13	MEC6H5	ND	0.056	UGG
0.0	23-feb-1988	LM13	T12DCE	ND	0.711	UGG
0.0	23-feb-1988	LM13	T13DCP	ND	0.056	UGG

Analytical Results for Chemical Soil
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Site: BORE SSDS-01-01 (continued)

SAMPLE DEPTH (ft)	SAMPLE DATE	TEST METHOD	COMPOUND	BOOL	CONCENTRATION	UNITS
0.0	23-feb-1988	LM13	TCLEE	ND	0.056	UGG
0.0	23-feb-1988	LM13	TRCLE	LT	0.159	UGG
0.0	23-feb-1988	LM14	124TCB	ND	0.330	UGG
0.0	23-feb-1988	LM14	12DPH	ND	0.330	UGG
0.0	23-feb-1988	LM14	246TCP	ND	0.330	UGG
0.0	23-feb-1988	LM14	24DCLP	ND	0.330	UGG
0.0	23-feb-1988	LM14	24DMPN	ND	0.330	UGG
0.0	23-feb-1988	LM14	24DNP	ND	1.650	UGG
0.0	23-feb-1988	LM14	24DNT	ND	0.330	UGG
0.0	23-feb-1988	LM14	26DNT	ND	0.330	UGG
0.0	23-feb-1988	LM14	2CLP	ND	0.330	UGG
0.0	23-feb-1988	LM14	2CNAP	ND	0.330	UGG
0.0	23-feb-1988	LM14	2NP	ND	0.330	UGG
0.0	23-feb-1988	LM14	33DCBD	ND	0.660	UGG
0.0	23-feb-1988	LM14	46DN2C	ND	1.650	UGG
0.0	23-feb-1988	LM14	4BRPPE	ND	0.330	UGG
0.0	23-feb-1988	LM14	4CL3C	ND	0.330	UGG
0.0	23-feb-1988	LM14	4CLPPE	ND	0.330	UGG
0.0	23-feb-1988	LM14	4NP	ND	1.650	UGG
0.0	23-feb-1988	LM14	ABHC	ND	0.660	UGG
0.0	23-feb-1988	LM14	AENSLF	ND	0.330	UGG
0.0	23-feb-1988	LM14	ALDRN	ND	0.660	UGG
0.0	23-feb-1988	LM14	ANAPNE	ND	0.330	UGG
0.0	23-feb-1988	LM14	ANAPYL	ND	0.330	UGG
0.0	23-feb-1988	LM14	ANTRC	ND	0.330	UGG
0.0	23-feb-1988	LM14	B2CEXM	ND	0.330	UGG
0.0	23-feb-1988	LM14	B2CIPE	ND	0.330	UGG
0.0	23-feb-1988	LM14	B2CLEE	ND	0.330	UGG
0.0	23-feb-1988	LM14	B2EHP	ND	0.330	UGG
0.0	23-feb-1988	LM14	BAANTR	ND	0.330	UGG
0.0	23-feb-1988	LM14	BAPYR	ND	0.330	UGG
0.0	23-feb-1988	LM14	BBFANT	ND	0.330	UGG
0.0	23-feb-1988	LM14	BBHC	ND	0.660	UGG
0.0	23-feb-1988	LM14	BBZP	ND	0.330	UGG
0.0	23-feb-1988	LM14	BENSLF	ND	0.330	UGG
0.0	23-feb-1988	LM14	BENZID	ND	1.650	UGG
0.0	23-feb-1988	LM14	BGHIPY	ND	0.330	UGG
0.0	23-feb-1988	LM14	BKFANT	ND	0.330	UGG
0.0	23-feb-1988	LM14	C2H5CL	ND	1.250	UGG
0.0	23-feb-1988	LM14	CHRY	ND	0.330	UGG
0.0	23-feb-1988	LM14	CL6BZ	ND	0.330	UGG
0.0	23-feb-1988	LM14	CL6CP	ND	0.330	UGG
0.0	23-feb-1988	LM14	CL6ET	ND	0.330	UGG
0.0	23-feb-1988	LM14	CLDAN	ND	0.330	UGG
0.0	23-feb-1988	LM14	DBAHA	ND	0.330	UGG
0.0	23-feb-1988	LM14	DBHC	ND	0.660	UGG
0.0	23-feb-1988	LM14	DEP	ND	0.330	UGG

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Site: BORE SSDS-01-01 (continued)

SAMPLE DEPTH (ft)	SAMPLE DATE	TEST METHOD	COMPOUND	BOOL	CONCENTRATION	UNITS
0.0	23-feb-1988	LM14	DLDRN	ND	0.660	UGG
0.0	23-feb-1988	LM14	DMP	ND	0.330	UGG
0.0	23-feb-1988	LM14	DNBP	ND	0.330	UGG
0.0	23-feb-1988	LM14	DNOP	ND	0.330	UGG
0.0	23-feb-1988	LM14	ENDRN	ND	0.660	UGG
0.0	23-feb-1988	LM14	ENDRNA	ND	0.660	UGG
0.0	23-feb-1988	LM14	ESFSO4	ND	0.660	UGG
0.0	23-feb-1988	LM14	FANT	ND	0.330	UGG
0.0	23-feb-1988	LM14	FLRENE	ND	0.330	UGG
0.0	23-feb-1988	LM14	GBHC	ND	0.330	UGG
0.0	23-feb-1988	LM14	HCBD	ND	0.330	UGG
0.0	23-feb-1988	LM14	HPCL	ND	0.660	UGG
0.0	23-feb-1988	LM14	HPCLE	ND	0.660	UGG
0.0	23-feb-1988	LM14	ICDPYR	ND	0.330	UGG
0.0	23-feb-1988	LM14	ISOPHR	ND	0.330	UGG
0.0	23-feb-1988	LM14	LIN	LT	0.058	UGG
0.0	23-feb-1988	LM14	NAP	ND	0.330	UGG
0.0	23-feb-1988	LM14	NB	ND	0.330	UGG
0.0	23-feb-1988	LM14	NNDMEA	ND	0.330	UGG
0.0	23-feb-1988	LM14	NNDPA	ND	0.330	UGG
0.0	23-feb-1988	LM14	PCB016	ND	0.330	UGG
0.0	23-feb-1988	LM14	PCB221	ND	0.330	UGG
0.0	23-feb-1988	LM14	PCB232	ND	0.330	UGG
0.0	23-feb-1988	LM14	PCB242	ND	0.330	UGG
0.0	23-feb-1988	LM14	PCB248	ND	0.330	UGG
0.0	23-feb-1988	LM14	PCB254	ND	0.330	UGG
0.0	23-feb-1988	LM14	PCB260	ND	1.650	UGG
0.0	23-feb-1988	LM14	PCP	ND	0.330	UGG
0.0	23-feb-1988	LM14	PHANTR	ND	0.230	UGG
0.0	23-feb-1988	LM14	PHENOL	ND	0.660	UGG
0.0	23-feb-1988	LM14	PPDDD	ND	0.090	UGG
0.0	23-feb-1988	LM14	PPDDE	LT	0.090	UGG
0.0	23-feb-1988	LM14	PPDDT	LT	0.487	UGG
0.0	23-feb-1988	LM14	PYR	ND	0.060	UGG
0.0	23-feb-1988	LM14	TXPHEN	ND	20.000	UGG
0.0	23-feb-1988	LM14	UNK591		6.700	UGG
0.0	23-feb-1988	LM14	UNK592		1.010	UGG
0.0	23-feb-1988	LM14	UNK593		0.340	UGG
0.0	23-feb-1988	LM14	UNK594		0.680	UGG
0.0	23-feb-1988	LM14	UNK595		0.340	UGG
0.0	23-feb-1988	LM14	UNK596		0.440	UGG
0.0	23-feb-1988	LM14	UNK597		0.330	UGG
0.0	23-feb-1988	LM14	UNK598		0.360	UGG
0.0	23-feb-1988	LM14	UNK599		0.330	UGG
0.0	23-feb-1988	LM14	UNK600		1.220	UGG
0.0	23-feb-1988	LM14	UNK601		0.420	UGG
0.0	23-feb-1988	LM14	UNK602		0.770	UGG
0.0	23-feb-1988	LM14	UNK603		0.960	UGG

Site: BORE SSDS-01-01 (continued)

SAMPLE DEPTH (ft)	SAMPLE DATE	TEST METHOD	COMPOUND	BOOL	CONCENTRATION	UNITS
0.0	23-feb-1988	LM14	UNK604		0.280	UGG
0.0	23-feb-1988	LM14	UNK605		0.330	UGG
0.0	23-feb-1988	LM14	UNK606		0.540	UGG
0.0	23-feb-1988	LM14	UNK607		0.830	UGG
0.0	23-feb-1988	LW02	135TNB	LT	1.830	UGG
0.0	23-feb-1988	LW02	13DNB	LT	1.170	UGG
0.0	23-feb-1988	LW02	246TNT	LT	1.900	UGG
0.0	23-feb-1988	LW02	24DNT	LT	0.417	UGG
0.0	23-feb-1988	LW02	26DNT	LT	0.397	UGG
0.0	23-feb-1988	LW02	HMX	LT	1.270	UGG
0.0	23-feb-1988	LW02	NB	LT	0.424	UGG
0.0	23-feb-1988	LW02	RDX	LT	0.899	UGG
0.0	23-feb-1988	LW02	TETRYL	LT	0.275	UGG

Site: BORE SSDS-01-02

SAMPLE DEPTH (ft)	SAMPLE DATE	TEST METHOD	COMPOUND	BOOL	CONCENTRATION	UNITS
0.5	24-feb-1988	99	AG	LT	0.763	UGG
0.5	24-feb-1988	99	AS	LT	6.710	UGG
0.5	24-feb-1988	99	BE	LT	0.389	UGG
0.5	24-feb-1988	99	BR	LT	100.000	UGG
0.5	24-feb-1988	99	CD	LT	0.825	UGG
0.5	24-feb-1988	99	CL	LT	14700.000	UGG
0.5	24-feb-1988	99	CR		11.600	UGG
0.5	24-feb-1988	99	CU		13.100	UGG
0.5	24-feb-1988	99	F	LT	11.800	UGG
0.5	24-feb-1988	99	NA		216.000	UGG
0.5	24-feb-1988	99	NI		7.160	UGG
0.5	24-feb-1988	99	NIT	LT	0.000	UGG
0.5	24-feb-1988	99	PB	LT	5.630	UGG
0.5	24-feb-1988	99	SB	LT	29.800	UGG
0.5	24-feb-1988	99	SE	LT	2.470	UGG
0.5	24-feb-1988	99	SO4	LT	14700.000	UGG
0.5	24-feb-1988	99	TL	LT	9.340	UGG
0.5	24-feb-1988	99	ZN	LT	61.300	UGG
0.5	24-feb-1988	J808	HG	LT	0.120	UGG
0.5	24-feb-1988	LM13	111TCE	ND	0.050	UGG
0.5	24-feb-1988	LM13	112TCE	ND	0.050	UGG
0.5	24-feb-1988	LM13	11DCE	ND	0.050	UGG
0.5	24-feb-1988	LM13	12DCLB	ND	0.300	UGG
0.5	24-feb-1988	LM13	12DCLE	ND	0.050	UGG
0.5	24-feb-1988	LM13	12DCLP	ND	0.050	UGG

Site: BORE SSDS-01-02 (continued)

SAMPLE DEPTH (ft)	SAMPLE DATE	TEST METHOD	COMPOUND	BOOL	CONCENTRATION	UNITS
0.5	24-feb-1988	LM13	13DCLB	ND	0.300	UGG
0.5	24-feb-1988	LM13	14DCLB	ND	0.300	UGG
0.5	24-feb-1988	LM13	2CLEVE	ND	0.600	UGG
0.5	24-feb-1988	LM13	BRDCLM	ND	0.050	UGG
0.5	24-feb-1988	LM13	C13DCP	ND	0.600	UGG
0.5	24-feb-1988	LM13	C2H3CL	ND	0.125	UGG
0.5	24-feb-1988	LM13	C2H5CL	ND	0.125	UGG
0.5	24-feb-1988	LM13	C6H6	ND	0.600	UGG
0.5	24-feb-1988	LM13	CCL4	ND	0.050	UGG
0.5	24-feb-1988	LM13	CH2CL2	ND	0.050	UGG
0.5	24-feb-1988	LM13	CH3BR	ND	0.125	UGG
0.5	24-feb-1988	LM13	CH3CL	ND	0.125	UGG
0.5	24-feb-1988	LM13	CHBR3	ND	0.100	UGG
0.5	24-feb-1988	LM13	CHCL3	ND	0.050	UGG
0.5	24-feb-1988	LM13	CLC6H5	ND	0.630	UGG
0.5	24-feb-1988	LM13	DBRCLM	ND	0.050	UGG
0.5	24-feb-1988	LM13	ETC6H5	ND	0.050	UGG
0.5	24-feb-1988	LM13	MEC6H5	ND	0.050	UGG
0.5	24-feb-1988	LM13	T12DCE	ND	0.630	UGG
0.5	24-feb-1988	LM13	T13DCP	ND	0.050	UGG
0.5	24-feb-1988	LM13	TCLEE	ND	0.050	UGG
0.5	24-feb-1988	LM13	TRCLE	LT	0.176	UGG
0.5	24-feb-1988	LM14	124TCB	ND	0.330	UGG
0.5	24-feb-1988	LM14	12DPH	ND	0.330	UGG
0.5	24-feb-1988	LM14	246TCP	ND	0.330	UGG
0.5	24-feb-1988	LM14	24DCLP	ND	0.330	UGG
0.5	24-feb-1988	LM14	24DMPN	ND	0.330	UGG
0.5	24-feb-1988	LM14	24DNP	ND	1.650	UGG
0.5	24-feb-1988	LM14	24DNT	ND	0.330	UGG
0.5	24-feb-1988	LM14	26DNT	ND	0.330	UGG
0.5	24-feb-1988	LM14	2CLP	ND	0.330	UGG
0.5	24-feb-1988	LM14	2CNAP	ND	0.330	UGG
0.5	24-feb-1988	LM14	2NP	ND	0.330	UGG
0.5	24-feb-1988	LM14	33DCBD	ND	0.660	UGG
0.5	24-feb-1988	LM14	46DN2C	ND	1.650	UGG
0.5	24-feb-1988	LM14	4BRPPE	ND	0.330	UGG
0.5	24-feb-1988	LM14	4CL3C	ND	0.330	UGG
0.5	24-feb-1988	LM14	4CLPPE	ND	0.330	UGG
0.5	24-feb-1988	LM14	4NP	ND	1.650	UGG
0.5	24-feb-1988	LM14	ABHC	ND	0.660	UGG
0.5	24-feb-1988	LM14	AENSLF	ND	0.330	UGG
0.5	24-feb-1988	LM14	ALDRN	ND	0.660	UGG
0.5	24-feb-1988	LM14	ANAPNE	ND	0.330	UGG
0.5	24-feb-1988	LM14	ANAPYL	ND	0.330	UGG
0.5	24-feb-1988	LM14	ANTRC	ND	0.330	UGG
0.5	24-feb-1988	LM14	B2CEXM	ND	0.330	UGG
0.5	24-feb-1988	LM14	B2CIPE	ND	0.330	UGG

Site: BORE SSDS-01-02 (continued)

SAMPLE DEPTH (ft)	SAMPLE DATE	TEST METHOD	COMPOUND	BOOL	CONCENTRATION	UNITS
0.5	24-feb-1988	LM14	B2CLEE	ND	0.330	UGG
0.5	24-feb-1988	LM14	B2EHP	ND	0.330	UGG
0.5	24-feb-1988	LM14	BAANTR	ND	0.330	UGG
0.5	24-feb-1988	LM14	BAPYR	ND	0.330	UGG
0.5	24-feb-1988	LM14	BBFANT	ND	0.330	UGG
0.5	24-feb-1988	LM14	BBHC	ND	0.660	UGG
0.5	24-feb-1988	LM14	BBZP	ND	0.330	UGG
0.5	24-feb-1988	LM14	BENSLF	ND	0.330	UGG
0.5	24-feb-1988	LM14	BENZID	ND	1.650	UGG
0.5	24-feb-1988	LM14	BGHIPY	ND	0.330	UGG
0.5	24-feb-1988	LM14	BKFANT	ND	0.330	UGG
0.5	24-feb-1988	LM14	C2H5CL	ND	1.250	UGG
0.5	24-feb-1988	LM14	CHRY	ND	0.330	UGG
0.5	24-feb-1988	LM14	CL68Z	ND	0.330	UGG
0.5	24-feb-1988	LM14	CL6CP	ND	0.330	UGG
0.5	24-feb-1988	LM14	CL6ET	ND	0.330	UGG
0.5	24-feb-1988	LM14	CLDAN	ND	0.330	UGG
0.5	24-feb-1988	LM14	DBAHA	ND	0.330	UGG
0.5	24-feb-1988	LM14	DBHC	ND	0.660	UGG
0.5	24-feb-1988	LM14	DEP	ND	0.330	UGG
0.5	24-feb-1988	LM14	DLDRN	ND	0.660	UGG
0.5	24-feb-1988	LM14	DMP	ND	0.330	UGG
0.5	24-feb-1988	LM14	DNBP	ND	0.330	UGG
0.5	24-feb-1988	LM14	DNOP	ND	0.330	UGG
0.5	24-feb-1988	LM14	ENDRN	ND	0.660	UGG
0.5	24-feb-1988	LM14	ENDRNA	ND	0.660	UGG
0.5	24-feb-1988	LM14	ESFSO4	ND	0.660	UGG
0.5	24-feb-1988	LM14	FANT	ND	0.330	UGG
0.5	24-feb-1988	LM14	FLRENE	ND	0.330	UGG
0.5	24-feb-1988	LM14	GBHC	ND	0.330	UGG
0.5	24-feb-1988	LM14	HCBD	ND	0.330	UGG
0.5	24-feb-1988	LM14	HPCL	ND	0.660	UGG
0.5	24-feb-1988	LM14	HPCLE	ND	0.660	UGG
0.5	24-feb-1988	LM14	HXAB2E		1.610	UGG
0.5	24-feb-1988	LM14	ICDPYR	ND	0.330	UGG
0.5	24-feb-1988	LM14	ISOPHR	ND	0.330	UGG
0.5	24-feb-1988	LM14	LIN	LT	0.058	UGG
0.5	24-feb-1988	LM14	NAP	ND	0.330	UGG
0.5	24-feb-1988	LM14	NB	ND	0.330	UGG
0.5	24-feb-1988	LM14	NNDMEA	ND	0.330	UGG
0.5	24-feb-1988	LM14	NNDPA	ND	0.330	UGG
0.5	24-feb-1988	LM14	PCB016	ND	0.330	UGG
0.5	24-feb-1988	LM14	PCB221	ND	0.330	UGG
0.5	24-feb-1988	LM14	PCB232	ND	0.330	UGG
0.5	24-feb-1988	LM14	PCB242	ND	0.330	UGG
0.5	24-feb-1988	LM14	PCB248	ND	0.330	UGG
0.5	24-feb-1988	LM14	PCB254	ND	0.330	UGG
0.5	24-feb-1988	LM14	PCB260	ND	1.650	UGG

Analytical Results for Chemical Soil
From: 01-jan-1988 To: 27-nov-90

Site: BORE SSDS-01-02 (continued)

SAMPLE DEPTH (ft)	SAMPLE DATE	TEST METHOD	COMPOUND	BOOL	CONCENTRATION	UNITS
0.5	24-feb-1988	LM14	PCP	ND	0.330	UGG
0.5	24-feb-1988	LM14	PHANTR	ND	0.230	UGG
0.5	24-feb-1988	LM14	PHENOL	ND	0.660	UGG
0.5	24-feb-1988	LM14	PPDDD	ND	0.090	UGG
0.5	24-feb-1988	LM14	PPDDE	LT	0.090	UGG
0.5	24-feb-1988	LM14	PPDDT	LT	0.487	UGG
0.5	24-feb-1988	LM14	PYR	ND	0.060	UGG
0.5	24-feb-1988	LM14	TXPHEN	ND	20.000	UGG
0.5	24-feb-1988	LM14	UNK589		2.000	UGG
0.5	24-feb-1988	LM14	UNK590		0.560	UGG
0.5	24-feb-1988	LM14	UNK591		0.330	UGG
0.5	24-feb-1988	LM14	UNK592		0.410	UGG
0.5	24-feb-1988	LM14	UNK593		0.310	UGG
0.5	24-feb-1988	LM14	UNK594		0.730	UGG
0.5	24-feb-1988	LM14	UNK595		0.380	UGG
0.5	24-feb-1988	LM14	UNK597		0.410	UGG
0.5	24-feb-1988	LM14	UNK598		0.440	UGG
0.5	24-feb-1988	LM14	UNK599		0.410	UGG
0.5	24-feb-1988	LM14	UNK600		0.520	UGG
0.5	24-feb-1988	LM14	UNK601		0.530	UGG
0.5	24-feb-1988	LM14	UNK603		1.030	UGG
0.5	24-feb-1988	LM14	UNK604		0.420	UGG
0.5	24-feb-1988	LM14	UNK605		0.390	UGG
0.5	24-feb-1988	LM14	UNK606		0.420	UGG
0.5	24-feb-1988	LM14	UNK607		0.410	UGG
0.5	24-feb-1988	LW02	135TNB	LT	2.040	UGG
0.5	24-feb-1988	LW02	13DNB	LT	0.654	UGG
0.5	24-feb-1988	LW02	246TNT	LT	2.130	UGG
0.5	24-feb-1988	LW02	24DNT	LT	0.466	UGG
0.5	24-feb-1988	LW02	26DNT	LT	0.444	UGG
0.5	24-feb-1988	LW02	HMX	LT	1.420	UGG
0.5	24-feb-1988	LW02	NB	LT	0.474	UGG
0.5	24-feb-1988	LW02	RDX	LT	1.010	UGG
0.5	24-feb-1988	LW02	TETRYL	LT	0.308	UGG

Site: BORE SSDS-01-03

SAMPLE DEPTH (ft)	SAMPLE DATE	TEST METHOD	COMPOUND	BOOL	CONCENTRATION	UNITS
1.0	24-feb-1988	99	AG	LT	0.737	UGG
1.0	24-feb-1988	99	AS		6.570	UGG
1.0	24-feb-1988	99	BE	LT	0.375	UGG
1.0	24-feb-1988	99	BR	LT	100.000	UGG
1.0	24-feb-1988	99	CD	LT	0.796	UGG
1.0	24-feb-1988	99	CL	LT	14200.000	UGG

Analytical Results for Chemical Soil
From: 01-jan-1988 To: 27-nov-90

Site: BORE SSDS-01-03 (continued)

SAMPLE DEPTH (ft)	SAMPLE DATE	TEST METHOD	COMPOUND	BOOL	CONCENTRATION	UNITS
1.0	24-feb-1988	99	CR		10.900	UGG
1.0	24-feb-1988	99	CU		10.100	UGG
1.0	24-feb-1988	99	F	LT	11.400	UGG
1.0	24-feb-1988	99	NA		80.300	UGG
1.0	24-feb-1988	99	NI		80.400	UGG
1.0	24-feb-1988	99	NIT	LT	0.000	UGG
1.0	24-feb-1988	99	PB	LT	5.430	UGG
1.0	24-feb-1988	99	SB	LT	28.800	UGG
1.0	24-feb-1988	99	SE	LT	2.390	UGG
1.0	24-feb-1988	99	SO4	LT	14200.000	UGG
1.0	24-feb-1988	99	TL	LT	9.020	UGG
1.0	24-feb-1988	99	ZN	LT	59.100	UGG
1.0	24-feb-1988	JB08	HG	LT	0.116	UGG
1.0	24-feb-1988	LM13	111TCE	ND	0.050	UGG
1.0	24-feb-1988	LM13	111TCE	ND	0.050	UGG
1.0	24-feb-1988	LM13	112TCE	ND	0.050	UGG
1.0	24-feb-1988	LM13	112TCE	ND	0.050	UGG
1.0	24-feb-1988	LM13	11DCE	ND	0.050	UGG
1.0	24-feb-1988	LM13	11DCE	ND	0.050	UGG
1.0	24-feb-1988	LM13	12DCLB	ND	0.300	UGG
1.0	24-feb-1988	LM13	12DCLB	ND	0.300	UGG
1.0	24-feb-1988	LM13	12DCLE	ND	0.050	UGG
1.0	24-feb-1988	LM13	12DCLE	ND	0.050	UGG
1.0	24-feb-1988	LM13	12DCLP	ND	0.050	UGG
1.0	24-feb-1988	LM13	12DCLP	ND	0.050	UGG
1.0	24-feb-1988	LM13	13DCLB	ND	0.300	UGG
1.0	24-feb-1988	LM13	13DCLB	ND	0.300	UGG
1.0	24-feb-1988	LM13	14DCLB	ND	0.300	UGG
1.0	24-feb-1988	LM13	14DCLB	ND	0.300	UGG
1.0	24-feb-1988	LM13	2CLEVE	ND	0.600	UGG
1.0	24-feb-1988	LM13	2CLEVE	ND	0.600	UGG
1.0	24-feb-1988	LM13	BRDCLM	ND	0.050	UGG
1.0	24-feb-1988	LM13	BRDCLM	ND	0.050	UGG
1.0	24-feb-1988	LM13	C13DCP	ND	0.600	UGG
1.0	24-feb-1988	LM13	C13DCP	ND	0.600	UGG
1.0	24-feb-1988	LM13	C2H3CL	ND	0.100	UGG
1.0	24-feb-1988	LM13	C2H3CL	ND	0.100	UGG
1.0	24-feb-1988	LM13	C2H5CL	ND	0.100	UGG
1.0	24-feb-1988	LM13	C2H5CL	ND	0.100	UGG
1.0	24-feb-1988	LM13	C6H6	ND	0.600	UGG
1.0	24-feb-1988	LM13	C6H6	ND	0.600	UGG
1.0	24-feb-1988	LM13	CCL4	ND	0.050	UGG
1.0	24-feb-1988	LM13	CCL4	ND	0.050	UGG
1.0	24-feb-1988	LM13	CH2CL2	ND	0.050	UGG
1.0	24-feb-1988	LM13	CH2CL2	ND	0.050	UGG
1.0	24-feb-1988	LM13	CH3BR	ND	0.100	UGG

Site: BORE SSDS-01-03 (continued)

SAMPLE DEPTH (ft)	SAMPLE DATE	TEST METHOD	COMPOUND	BOOL	CONCENTRATION	UNITS
1.0	24-feb-1988	LM13	CH3BR	ND	0.100	UGG
1.0	24-feb-1988	LM13	CH3CL	ND	0.100	UGG
1.0	24-feb-1988	LM13	CH3CL	ND	0.100	UGG
1.0	24-feb-1988	LM13	CHBR3	ND	0.100	UGG
1.0	24-feb-1988	LM13	CHBR3	ND	0.100	UGG
1.0	24-feb-1988	LM13	CHCL3	ND	0.050	UGG
1.0	24-feb-1988	LM13	CHCL3	ND	0.050	UGG
1.0	24-feb-1988	LM13	CLC6H5	ND	0.630	UGG
1.0	24-feb-1988	LM13	CLC6H5	ND	0.630	UGG
1.0	24-feb-1988	LM13	DBRCLM	ND	0.050	UGG
1.0	24-feb-1988	LM13	DBRCLM	ND	0.050	UGG
1.0	24-feb-1988	LM13	ETC6H5	ND	0.050	UGG
1.0	24-feb-1988	LM13	ETC6H5	ND	0.050	UGG
1.0	24-feb-1988	LM13	MEC6H5	ND	0.050	UGG
1.0	24-feb-1988	LM13	MEC6H5	ND	0.050	UGG
1.0	24-feb-1988	LM13	T12DCE	ND	0.630	UGG
1.0	24-feb-1988	LM13	T12DCE	ND	0.630	UGG
1.0	24-feb-1988	LM13	T13DCP	ND	0.050	UGG
1.0	24-feb-1988	LM13	T13DCP	ND	0.050	UGG
1.0	24-feb-1988	LM13	TCLEE	ND	0.050	UGG
1.0	24-feb-1988	LM13	TCLEE	ND	0.050	UGG
1.0	24-feb-1988	LM13	TRCLE	LT	0.159	UGG
1.0	24-feb-1988	LM13	TRCLE	LT	0.159	UGG
1.0	24-feb-1988	LM14	124TCB	ND	0.330	UGG
1.0	24-feb-1988	LM14	12DPH	ND	0.330	UGG
1.0	24-feb-1988	LM14	246TCP	ND	0.330	UGG
1.0	24-feb-1988	LM14	24DCLP	ND	0.330	UGG
1.0	24-feb-1988	LM14	24DMPN	ND	0.330	UGG
1.0	24-feb-1988	LM14	24DNP	ND	1.650	UGG
1.0	24-feb-1988	LM14	24DNT	ND	0.330	UGG
1.0	24-feb-1988	LM14	26DNT	ND	0.330	UGG
1.0	24-feb-1988	LM14	2CLP	ND	0.330	UGG
1.0	24-feb-1988	LM14	2CNAP	ND	0.330	UGG
1.0	24-feb-1988	LM14	2NP	ND	0.330	UGG
1.0	24-feb-1988	LM14	33DCBD	ND	0.660	UGG
1.0	24-feb-1988	LM14	46DN2C	ND	1.650	UGG
1.0	24-feb-1988	LM14	4BRPPE	ND	0.330	UGG
1.0	24-feb-1988	LM14	4CL3C	ND	0.330	UGG
1.0	24-feb-1988	LM14	4CLPPE	ND	0.330	UGG
1.0	24-feb-1988	LM14	4NP	ND	1.650	UGG
1.0	24-feb-1988	LM14	ABHC	ND	0.660	UGG
1.0	24-feb-1988	LM14	AENSLF	ND	0.330	UGG
1.0	24-feb-1988	LM14	ALDRN	ND	0.660	UGG
1.0	24-feb-1988	LM14	ANAPNE	ND	0.330	UGG
1.0	24-feb-1988	LM14	ANAPYL	ND	0.330	UGG
1.0	24-feb-1988	LM14	ANTRC	ND	0.330	UGG
1.0	24-feb-1988	LM14	B2CEXM	ND	0.330	UGG

Analytical Results for Chemical Soil
From: 01-jan-1988 To: 27-nov-90

Site: BORE SSDS-01-03 (continued)

SAMPLE DEPTH (ft)	SAMPLE DATE	TEST METHOD	COMPOUND	BOOL	CONCENTRATION	UNITS
1.0	24-feb-1988	LM14	B2CIPE	ND	0.330	UGG
1.0	24-feb-1988	LM14	B2CLEE	ND	0.330	UGG
1.0	24-feb-1988	LM14	B2EHP	ND	0.330	UGG
1.0	24-feb-1988	LM14	BAANTR	ND	0.330	UGG
1.0	24-feb-1988	LM14	BAPYR	ND	0.330	UGG
1.0	24-feb-1988	LM14	BBFANT	ND	0.330	UGG
1.0	24-feb-1988	LM14	BBHC	ND	0.660	UGG
1.0	24-feb-1988	LM14	BBZP	ND	0.330	UGG
1.0	24-feb-1988	LM14	BENSLF	ND	0.330	UGG
1.0	24-feb-1988	LM14	BENZID	ND	1.650	UGG
1.0	24-feb-1988	LM14	BGHIPY	ND	0.330	UGG
1.0	24-feb-1988	LM14	BKFANT	ND	0.330	UGG
1.0	24-feb-1988	LM14	C2H5CL	ND	1.250	UGG
1.0	24-feb-1988	LM14	CHRY	ND	0.330	UGG
1.0	24-feb-1988	LM14	CL6BZ	ND	0.330	UGG
1.0	24-feb-1988	LM14	CL6CP	ND	0.330	UGG
1.0	24-feb-1988	LM14	CL6ET	ND	0.330	UGG
1.0	24-feb-1988	LM14	CLDAN	ND	0.330	UGG
1.0	24-feb-1988	LM14	DBAHA	ND	0.330	UGG
1.0	24-feb-1988	LM14	DBHC	ND	0.660	UGG
1.0	24-feb-1988	LM14	DEP	ND	0.330	UGG
1.0	24-feb-1988	LM14	DLDRN	ND	0.660	UGG
1.0	24-feb-1988	LM14	DMP	ND	0.330	UGG
1.0	24-feb-1988	LM14	DNBP	ND	0.330	UGG
1.0	24-feb-1988	LM14	DNOP	ND	0.330	UGG
1.0	24-feb-1988	LM14	ENDRN	ND	0.660	UGG
1.0	24-feb-1988	LM14	ENDRNA	ND	0.660	UGG
1.0	24-feb-1988	LM14	ESFSO4	ND	0.660	UGG
1.0	24-feb-1988	LM14	FANT	ND	0.330	UGG
1.0	24-feb-1988	LM14	FLRENE	ND	0.330	UGG
1.0	24-feb-1988	LM14	GBHC	ND	0.330	UGG
1.0	24-feb-1988	LM14	HCBD	ND	0.330	UGG
1.0	24-feb-1988	LM14	HPCL	ND	0.660	UGG
1.0	24-feb-1988	LM14	HPCLE	ND	0.660	UGG
1.0	24-feb-1988	LM14	HXAB2E		3.240	UGG
1.0	24-feb-1988	LM14	ICDPYR	ND	0.330	UGG
1.0	24-feb-1988	LM14	ISOPHR	ND	0.330	UGG
1.0	24-feb-1988	LM14	LIN	LT	0.058	UGG
1.0	24-feb-1988	LM14	NAP	ND	0.330	UGG
1.0	24-feb-1988	LM14	NB	ND	0.330	UGG
1.0	24-feb-1988	LM14	NNDMEA	ND	0.330	UGG
1.0	24-feb-1988	LM14	NNDPA	ND	0.330	UGG
1.0	24-feb-1988	LM14	PCB016	ND	0.330	UGG
1.0	24-feb-1988	LM14	PCB221	ND	0.330	UGG
1.0	24-feb-1988	LM14	PCB232	ND	0.330	UGG
1.0	24-feb-1988	LM14	PCB242	ND	0.330	UGG
1.0	24-feb-1988	LM14	PCB248	ND	0.330	UGG
1.0	24-feb-1988	LM14	PCB254	ND	0.330	UGG

Analytical Results for Chemical Soil
From: 01-jan-1988 To: 27-nov-90

Site: BORE SSDS-01-03 (continued)

SAMPLE DEPTH (ft)	SAMPLE DATE	TEST METHOD	COMPOUND	BOOL	CONCENTRATION	UNITS
1.0	24-feb-1988	LM14	PCB260	ND	1.650	UGG
1.0	24-feb-1988	LM14	PCP	ND	0.330	UGG
1.0	24-feb-1988	LM14	PHANTR	ND	0.230	UGG
1.0	24-feb-1988	LM14	PHENOL	ND	0.660	UGG
1.0	24-feb-1988	LM14	PPDDD	ND	0.090	UGG
1.0	24-feb-1988	LM14	PPDDE	LT	0.090	UGG
1.0	24-feb-1988	LM14	PPDDT	LT	0.487	UGG
1.0	24-feb-1988	LM14	PYR	ND	0.060	UGG
1.0	24-feb-1988	LM14	TXPHEN	ND	20.000	UGG
1.0	24-feb-1988	LM14	UNK591		0.580	UGG
1.0	24-feb-1988	LM14	UNK592		0.290	UGG
1.0	24-feb-1988	LM14	UNK593		1.330	UGG
1.0	24-feb-1988	LM14	UNK594		0.440	UGG
1.0	24-feb-1988	LM14	UNK595		0.500	UGG
1.0	24-feb-1988	LM14	UNK596		0.350	UGG
1.0	24-feb-1988	LM14	UNK597		0.410	UGG
1.0	24-feb-1988	LM14	UNK598		0.310	UGG
1.0	24-feb-1988	LM14	UNK599		0.350	UGG
1.0	24-feb-1988	LM14	UNK600		0.440	UGG
1.0	24-feb-1988	LM14	UNK601		0.840	UGG
1.0	24-feb-1988	LM14	UNK603		0.970	UGG
1.0	24-feb-1988	LM14	UNK605		0.300	UGG
1.0	24-feb-1988	LM14	UNK606		0.380	UGG
1.0	24-feb-1988	LM14	UNK607		0.370	UGG
1.0	24-feb-1988	LM14	UNK608		1.330	UGG
1.0	24-feb-1988	LM14	UNK609		0.950	UGG
1.0	24-feb-1988	LW02	135TNB	LT	1.880	UGG
1.0	24-feb-1988	LW02	13DNB	LT	0.603	UGG
1.0	24-feb-1988	LW02	246TNT	LT	1.960	UGG
1.0	24-feb-1988	LW02	24DNT	LT	0.429	UGG
1.0	24-feb-1988	LW02	26DNT	LT	0.409	UGG
1.0	24-feb-1988	LW02	HMX	LT	1.310	UGG
1.0	24-feb-1988	LW02	NB	LT	0.437	UGG
1.0	24-feb-1988	LW02	RDX	LT	0.926	UGG
1.0	24-feb-1988	LW02	TETRYL	LT	0.283	UGG

Analytical Results for Chemical Soil
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Site: BORE SSDS-02-01

SAMPLE DEPTH (ft)	SAMPLE DATE	TEST METHOD	COMPOUND	BOOL	CONCENTRATION	UNITS
0.0	24-feb-1988	99	AG	LT	0.732	UGG
0.0	24-feb-1988	99	AS		7.820	UGG
0.0	24-feb-1988	99	BE	LT	0.373	UGG
0.0	24-feb-1988	99	BR	LT	100.000	UGG
0.0	24-feb-1988	99	CD	LT	0.791	UGG
0.0	24-feb-1988	99	CL	LT	14100.000	UGG
0.0	24-feb-1988	99	CR		15.100	UGG
0.0	24-feb-1988	99	CU		16.800	UGG
0.0	24-feb-1988	99	F	LT	11.300	UGG
0.0	24-feb-1988	99	NA		130.000	UGG
0.0	24-feb-1988	99	NI		9.740	UGG
0.0	24-feb-1988	99	NIT	LT	0.000	UGG
0.0	24-feb-1988	99	PB		11.200	UGG
0.0	24-feb-1988	99	SB	LT	28.600	UGG
0.0	24-feb-1988	99	SE	LT	2.370	UGG
0.0	24-feb-1988	99	SO4	LT	14100.000	UGG
0.0	24-feb-1988	99	TL	LT	8.960	UGG
0.0	24-feb-1988	99	ZN	LT	58.800	UGG
0.0	24-feb-1988	JB08	HG	LT	0.115	UGG
0.0	24-feb-1988	LM13	111TCE	ND	0.050	UGG
0.0	24-feb-1988	LM13	112TCE	ND	0.050	UGG
0.0	24-feb-1988	LM13	11DCE	ND	0.050	UGG
0.0	24-feb-1988	LM13	12DCLB	ND	0.300	UGG
0.0	24-feb-1988	LM13	12DCLE	ND	0.050	UGG
0.0	24-feb-1988	LM13	12DCLP	ND	0.050	UGG
0.0	24-feb-1988	LM13	13DCLB	ND	0.300	UGG
0.0	24-feb-1988	LM13	14DCLB	ND	0.300	UGG
0.0	24-feb-1988	LM13	2CLEVE	ND	0.600	UGG
0.0	24-feb-1988	LM13	BRDCLM	ND	0.050	UGG
0.0	24-feb-1988	LM13	C13DCP	ND	0.600	UGG
0.0	24-feb-1988	LM13	C2H3CL	ND	0.100	UGG
0.0	24-feb-1988	LM13	C2H5CL	ND	0.100	UGG
0.0	24-feb-1988	LM13	C6H6	ND	0.600	UGG
0.0	24-feb-1988	LM13	CCL4	ND	0.050	UGG
0.0	24-feb-1988	LM13	CH2CL2	ND	0.050	UGG
0.0	24-feb-1988	LM13	CH3BR	ND	0.100	UGG
0.0	24-feb-1988	LM13	CH3CL	ND	0.100	UGG
0.0	24-feb-1988	LM13	CHBR3	ND	0.100	UGG
0.0	24-feb-1988	LM13	CHCL3	ND	0.050	UGG
0.0	24-feb-1988	LM13	CLC6H5	ND	0.630	UGG
0.0	24-feb-1988	LM13	DBRCLM	ND	0.050	UGG
0.0	24-feb-1988	LM13	ETC6H5	ND	0.050	UGG
0.0	24-feb-1988	LM13	MEC6H5	ND	0.050	UGG
0.0	24-feb-1988	LM13	T12DCE	ND	0.630	UGG
0.0	24-feb-1988	LM13	T13DCP	ND	0.050	UGG
0.0	24-feb-1988	LM13	TCLEE	ND	0.050	UGG

Analytical Results for Chemical Soil
From: 01-jan-1988 To: 27-nov-90

Site: BORE SSDS-02-01 (continued)

SAMPLE DEPTH (ft)	SAMPLE DATE	TEST METHOD	COMPOUND	BOOL	CONCENTRATION	UNITS
0.0	24-feb-1988	LM13	TRCLE	LT	0.160	UGG
0.0	24-feb-1988	LM14	124TCB	ND	0.330	UGG
0.0	24-feb-1988	LM14	12DPH	ND	0.330	UGG
0.0	24-feb-1988	LM14	246TCP	ND	0.330	UGG
0.0	24-feb-1988	LM14	24DCLP	ND	0.330	UGG
0.0	24-feb-1988	LM14	24DMPN	ND	0.330	UGG
0.0	24-feb-1988	LM14	24DNP	ND	1.650	UGG
0.0	24-feb-1988	LM14	24DNT	ND	0.330	UGG
0.0	24-feb-1988	LM14	26DNT	ND	0.330	UGG
0.0	24-feb-1988	LM14	2CLP	ND	0.330	UGG
0.0	24-feb-1988	LM14	2CNAP	ND	0.330	UGG
0.0	24-feb-1988	LM14	2NP	ND	0.330	UGG
0.0	24-feb-1988	LM14	33DCBD	ND	0.660	UGG
0.0	24-feb-1988	LM14	46DN2C	ND	1.650	UGG
0.0	24-feb-1988	LM14	48RPPE	ND	0.330	UGG
0.0	24-feb-1988	LM14	4CL3C	ND	0.330	UGG
0.0	24-feb-1988	LM14	4CLPPE	ND	0.330	UGG
0.0	24-feb-1988	LM14	4NP	ND	1.650	UGG
0.0	24-feb-1988	LM14	ABHC	ND	0.660	UGG
0.0	24-feb-1988	LM14	AENSLF	ND	0.330	UGG
0.0	24-feb-1988	LM14	ALDRN	ND	0.660	UGG
0.0	24-feb-1988	LM14	ANAPNE	ND	0.330	UGG
0.0	24-feb-1988	LM14	ANAPYL	ND	0.330	UGG
0.0	24-feb-1988	LM14	ANTRC	ND	0.330	UGG
0.0	24-feb-1988	LM14	B2CEXM	ND	0.330	UGG
0.0	24-feb-1988	LM14	B2CIPE	ND	0.330	UGG
0.0	24-feb-1988	LM14	B2CLEE	ND	0.330	UGG
0.0	24-feb-1988	LM14	B2EHP	ND	0.330	UGG
0.0	24-feb-1988	LM14	BAANTR	ND	0.330	UGG
0.0	24-feb-1988	LM14	BAPYR	ND	0.330	UGG
0.0	24-feb-1988	LM14	BBFANT	ND	0.330	UGG
0.0	24-feb-1988	LM14	BBHC	ND	0.660	UGG
0.0	24-feb-1988	LM14	BBZP	ND	0.330	UGG
0.0	24-feb-1988	LM14	BENSLF	ND	0.330	UGG
0.0	24-feb-1988	LM14	BENZAL		0.140	UGG
0.0	24-feb-1988	LM14	BENZID	ND	1.650	UGG
0.0	24-feb-1988	LM14	BGHIPY	ND	0.330	UGG
0.0	24-feb-1988	LM14	BKFANT	ND	0.330	UGG
0.0	24-feb-1988	LM14	C2H5CL	ND	1.250	UGG
0.0	24-feb-1988	LM14	CHRY	ND	0.330	UGG
0.0	24-feb-1988	LM14	CL6BZ	ND	0.330	UGG
0.0	24-feb-1988	LM14	CL6CP	ND	0.330	UGG
0.0	24-feb-1988	LM14	CL6ET	ND	0.330	UGG
0.0	24-feb-1988	LM14	CLDAN	ND	0.330	UGG
0.0	24-feb-1988	LM14	DBAHA	ND	0.330	UGG
0.0	24-feb-1988	LM14	DBHC	ND	0.660	UGG
0.0	24-feb-1988	LM14	DEP	ND	0.330	UGG

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Site: BORE SSDS-02-01 (continued)

SAMPLE DEPTH (ft)	SAMPLE DATE	TEST METHOD	COMPOUND	BOOL	CONCENTRATION	UNITS
0.0	24-feb-1988	LM14	DLDRN	ND	0.660	UGG
0.0	24-feb-1988	LM14	DMP	ND	0.330	UGG
0.0	24-feb-1988	LM14	DNBP	ND	0.330	UGG
0.0	24-feb-1988	LM14	DNOP	ND	0.330	UGG
0.0	24-feb-1988	LM14	ENDRN	ND	0.660	UGG
0.0	24-feb-1988	LM14	ENDRNA	ND	0.660	UGG
0.0	24-feb-1988	LM14	ESFSO4	ND	0.660	UGG
0.0	24-feb-1988	LM14	FANT	ND	0.330	UGG
0.0	24-feb-1988	LM14	FLRENE	ND	0.330	UGG
0.0	24-feb-1988	LM14	GBHC	ND	0.330	UGG
0.0	24-feb-1988	LM14	HCBD	ND	0.330	UGG
0.0	24-feb-1988	LM14	HPCL	ND	0.660	UGG
0.0	24-feb-1988	LM14	HPCLE	ND	0.660	UGG
0.0	24-feb-1988	LM14	HXAB2E		8.310	UGG
0.0	24-feb-1988	LM14	ICDPYR	ND	0.330	UGG
0.0	24-feb-1988	LM14	ISOPHR	ND	0.330	UGG
0.0	24-feb-1988	LM14	LIN	LT	0.058	UGG
0.0	24-feb-1988	LM14	NAP	ND	0.330	UGG
0.0	24-feb-1988	LM14	NB	ND	0.330	UGG
0.0	24-feb-1988	LM14	NNDMEA	ND	0.330	UGG
0.0	24-feb-1988	LM14	NNDPA	ND	0.330	UGG
0.0	24-feb-1988	LM14	PCB016	ND	0.330	UGG
0.0	24-feb-1988	LM14	PCB221	ND	0.330	UGG
0.0	24-feb-1988	LM14	PCB232	ND	0.330	UGG
0.0	24-feb-1988	LM14	PCB242	ND	0.330	UGG
0.0	24-feb-1988	LM14	PCB248	ND	0.330	UGG
0.0	24-feb-1988	LM14	PCB254	ND	0.330	UGG
0.0	24-feb-1988	LM14	PCB260	ND	1.650	UGG
0.0	24-feb-1988	LM14	PCP	ND	0.330	UGG
0.0	24-feb-1988	LM14	PHANTR	ND	0.230	UGG
0.0	24-feb-1988	LM14	PHENOL	ND	0.660	UGG
0.0	24-feb-1988	LM14	PPDDD	ND	0.090	UGG
0.0	24-feb-1988	LM14	PPDDE	LT	0.090	UGG
0.0	24-feb-1988	LM14	PPDDT	LT	0.487	UGG
0.0	24-feb-1988	LM14	PYR	ND	0.060	UGG
0.0	24-feb-1988	LM14	TXPHEN	ND	20.000	UGG
0.0	24-feb-1988	LM14	UNK543		0.180	UGG
0.0	24-feb-1988	LM14	UNK546		0.160	UGG
0.0	24-feb-1988	LM14	UNK562		0.740	UGG
0.0	24-feb-1988	LM14	UNK564		0.270	UGG
0.0	24-feb-1988	LM14	UNK580		0.600	UGG
0.0	24-feb-1988	LW02	135TNB	LT	1.880	UGG
0.0	24-feb-1988	LW02	13DNB	LT	0.603	UGG
0.0	24-feb-1988	LW02	246TNT	LT	1.960	UGG
0.0	24-feb-1988	LW02	24DNT	LT	0.429	UGG
0.0	24-feb-1988	LW02	26DNT	LT	0.409	UGG
0.0	24-feb-1988	LW02	HMX	LT	1.310	UGG

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Site: BORE SSDS-02-01 (continued)

SAMPLE DEPTH (ft)	SAMPLE DATE	TEST METHOD	COMPOUND	BOOL	CONCENTRATION	UNITS
0.0	24-feb-1988	LW02	NB	LT	0.437	UGG
0.0	24-feb-1988	LW02	RDX	LT	0.926	UGG
0.0	24-feb-1988	LW02	TETRYL	LT	0.283	UGG

Site: BORE SSDS-02-02

SAMPLE DEPTH (ft)	SAMPLE DATE	TEST METHOD	COMPOUND	BOOL	CONCENTRATION	UNITS
0.5	24-feb-1988	99	AG	LT	0.719	UGG
0.5	24-feb-1988	99	AS		6.790	UGG
0.5	24-feb-1988	99	BE	LT	0.366	UGG
0.5	24-feb-1988	99	BR	LT	100.000	UGG
0.5	24-feb-1988	99	CD		0.819	UGG
0.5	24-feb-1988	99	CL	LT	13900.000	UGG
0.5	24-feb-1988	99	CR		12.300	UGG
0.5	24-feb-1988	99	CU		14.500	UGG
0.5	24-feb-1988	99	F	LT	11.100	UGG
0.5	24-feb-1988	99	NA		154.000	UGG
0.5	24-feb-1988	99	NI		9.340	UGG
0.5	24-feb-1988	99	NIT	LT	0.000	UGG
0.5	24-feb-1988	99	PB		15.500	UGG
0.5	24-feb-1988	99	SB	LT	28.100	UGG
0.5	24-feb-1988	99	SE	LT	2.330	UGG
0.5	24-feb-1988	99	SO4	LT	13900.000	UGG
0.5	24-feb-1988	99	TL	LT	8.800	UGG
0.5	24-feb-1988	99	ZN		226.000	UGG
0.5	24-feb-1988	JB08	HG	LT	0.113	UGG
0.5	24-feb-1988	LM13	111TCE	ND	0.050	UGG
0.5	24-feb-1988	LM13	112TCE	ND	0.050	UGG
0.5	24-feb-1988	LM13	11DCE	ND	0.050	UGG
0.5	24-feb-1988	LM13	12DCLB	ND	0.300	UGG
0.5	24-feb-1988	LM13	12DCLE	ND	0.050	UGG
0.5	24-feb-1988	LM13	12DCLP	ND	0.050	UGG
0.5	24-feb-1988	LM13	13DCLB	ND	0.300	UGG
0.5	24-feb-1988	LM13	14DCLB	ND	0.300	UGG
0.5	24-feb-1988	LM13	2CLEVE	ND	0.600	UGG
0.5	24-feb-1988	LM13	BRDCLM	ND	0.050	UGG
0.5	24-feb-1988	LM13	C13DCP	ND	0.600	UGG
0.5	24-feb-1988	LM13	C2H3CL	ND	0.100	UGG
0.5	24-feb-1988	LM13	C2H5CL	ND	0.100	UGG
0.5	24-feb-1988	LM13	C6H6	ND	0.600	UGG
0.5	24-feb-1988	LM13	CCL4	ND	0.050	UGG
0.5	24-feb-1988	LM13	CH2CL2	ND	0.050	UGG
0.5	24-feb-1988	LM13	CH3BR	ND	0.100	UGG

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From: 01-jan-1988 To: 27-nov-90

Site: BORE SSDS-02-02 (continued)

SAMPLE DEPTH (ft)	SAMPLE DATE	TEST METHOD	COMPOUND	BOOL	CONCENTRATION	UNITS
0.5	24-feb-1988	LM13	CH3CL	ND	0.100	UGG
0.5	24-feb-1988	LM13	CHBR3	ND	0.100	UGG
0.5	24-feb-1988	LM13	CHCL3	ND	0.050	UGG
0.5	24-feb-1988	LM13	CLC6H5	ND	0.630	UGG
0.5	24-feb-1988	LM13	DBRCLM	ND	0.050	UGG
0.5	24-feb-1988	LM13	ETC6H5	ND	0.050	UGG
0.5	24-feb-1988	LM13	MEC6H5	ND	0.050	UGG
0.5	24-feb-1988	LM13	T12DCE	ND	0.630	UGG
0.5	24-feb-1988	LM13	T13DCP	ND	0.050	UGG
0.5	24-feb-1988	LM13	TCLEE	ND	0.050	UGG
0.5	24-feb-1988	LM13	TRCLE	LT	0.175	UGG
0.5	24-feb-1988	LM14	124TCB	ND	0.330	UGG
0.5	24-feb-1988	LM14	12DPH	ND	0.330	UGG
0.5	24-feb-1988	LM14	246TCP	ND	0.330	UGG
0.5	24-feb-1988	LM14	24DCLP	ND	0.330	UGG
0.5	24-feb-1988	LM14	24DMPN	ND	0.330	UGG
0.5	24-feb-1988	LM14	24DNP	ND	1.650	UGG
0.5	24-feb-1988	LM14	24DNT	ND	0.330	UGG
0.5	24-feb-1988	LM14	26DNT	ND	0.330	UGG
0.5	24-feb-1988	LM14	2CLP	ND	0.330	UGG
0.5	24-feb-1988	LM14	2CNAP	ND	0.330	UGG
0.5	24-feb-1988	LM14	2NP	ND	0.330	UGG
0.5	24-feb-1988	LM14	33DCBD	ND	0.660	UGG
0.5	24-feb-1988	LM14	46DN2C	ND	1.650	UGG
0.5	24-feb-1988	LM14	4BRPPE	ND	0.330	UGG
0.5	24-feb-1988	LM14	4CL3C	ND	0.330	UGG
0.5	24-feb-1988	LM14	4CLPPE	ND	0.330	UGG
0.5	24-feb-1988	LM14	4NP	ND	1.650	UGG
0.5	24-feb-1988	LM14	ABHC	ND	0.660	UGG
0.5	24-feb-1988	LM14	AENSLF	ND	0.330	UGG
0.5	24-feb-1988	LM14	ALDRN	ND	0.660	UGG
0.5	24-feb-1988	LM14	ANAPNE	ND	0.330	UGG
0.5	24-feb-1988	LM14	ANAPYL	ND	0.330	UGG
0.5	24-feb-1988	LM14	ANTRC	ND	0.330	UGG
0.5	24-feb-1988	LM14	B2CEXM	ND	0.330	UGG
0.5	24-feb-1988	LM14	B2CIPE	ND	0.330	UGG
0.5	24-feb-1988	LM14	B2CLEE	ND	0.330	UGG
0.5	24-feb-1988	LM14	B2EHP	ND	0.330	UGG
0.5	24-feb-1988	LM14	BAANTR	ND	0.330	UGG
0.5	24-feb-1988	LM14	BAPYR	ND	0.330	UGG
0.5	24-feb-1988	LM14	BBFANT	ND	0.330	UGG
0.5	24-feb-1988	LM14	BBHC	ND	0.660	UGG
0.5	24-feb-1988	LM14	BBZP	ND	0.330	UGG
0.5	24-feb-1988	LM14	BENSLF	ND	0.330	UGG
0.5	24-feb-1988	LM14	BENZID	ND	1.650	UGG
0.5	24-feb-1988	LM14	BGHIPY	ND	0.330	UGG
0.5	24-feb-1988	LM14	BKFANT	ND	0.330	UGG

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Site: BORE SSDS-02-02 (continued)

SAMPLE DEPTH (ft)	SAMPLE DATE	TEST METHOD	COMPOUND	BOOL	CONCENTRATION	UNITS
0.5	24-feb-1988	LM14	C2H5CL	ND	1.250	UGG
0.5	24-feb-1988	LM14	CHRY	ND	0.330	UGG
0.5	24-feb-1988	LM14	CL6BZ	ND	0.330	UGG
0.5	24-feb-1988	LM14	CL6CP	ND	0.330	UGG
0.5	24-feb-1988	LM14	CL6ET	ND	0.330	UGG
0.5	24-feb-1988	LM14	CLDAN	ND	0.330	UGG
0.5	24-feb-1988	LM14	DBAHA	ND	0.330	UGG
0.5	24-feb-1988	LM14	DBHC	ND	0.660	UGG
0.5	24-feb-1988	LM14	DEP	ND	0.330	UGG
0.5	24-feb-1988	LM14	DLDRN	ND	0.660	UGG
0.5	24-feb-1988	LM14	DMP	ND	0.330	UGG
0.5	24-feb-1988	LM14	DNBP	ND	0.330	UGG
0.5	24-feb-1988	LM14	DNOP	ND	0.330	UGG
0.5	24-feb-1988	LM14	ENDRN	ND	0.660	UGG
0.5	24-feb-1988	LM14	ENDRNA	ND	0.660	UGG
0.5	24-feb-1988	LM14	ESFSO4	ND	0.660	UGG
0.5	24-feb-1988	LM14	FANT	ND	0.330	UGG
0.5	24-feb-1988	LM14	FLRENE	ND	0.330	UGG
0.5	24-feb-1988	LM14	GBHC	ND	0.330	UGG
0.5	24-feb-1988	LM14	HCBD	ND	0.330	UGG
0.5	24-feb-1988	LM14	HPCL	ND	0.660	UGG
0.5	24-feb-1988	LM14	HPCLE	ND	0.660	UGG
0.5	24-feb-1988	LM14	ICDPYR	ND	0.330	UGG
0.5	24-feb-1988	LM14	ISOPHR	ND	0.330	UGG
0.5	24-feb-1988	LM14	LIN	LT	0.058	UGG
0.5	24-feb-1988	LM14	NAP	ND	0.330	UGG
0.5	24-feb-1988	LM14	NB	ND	0.330	UGG
0.5	24-feb-1988	LM14	NNDMEA	ND	0.330	UGG
0.5	24-feb-1988	LM14	NNDPA	ND	0.330	UGG
0.5	24-feb-1988	LM14	PCB016	ND	0.330	UGG
0.5	24-feb-1988	LM14	PCB221	ND	0.330	UGG
0.5	24-feb-1988	LM14	PCB232	ND	0.330	UGG
0.5	24-feb-1988	LM14	PCB242	ND	0.330	UGG
0.5	24-feb-1988	LM14	PCB248	ND	0.330	UGG
0.5	24-feb-1988	LM14	PCB254	ND	0.330	UGG
0.5	24-feb-1988	LM14	PCB260	ND	1.650	UGG
0.5	24-feb-1988	LM14	PCP	ND	0.330	UGG
0.5	24-feb-1988	LM14	PHANTR	ND	0.230	UGG
0.5	24-feb-1988	LM14	PHENOL	ND	0.660	UGG
0.5	24-feb-1988	LM14	PPDDD	ND	0.090	UGG
0.5	24-feb-1988	LM14	PPDDE	LT	0.090	UGG
0.5	24-feb-1988	LM14	PPDDT	LT	0.487	UGG
0.5	24-feb-1988	LM14	PYR	ND	0.060	UGG
0.5	24-feb-1988	LM14	TXPHEN	ND	20.000	UGG
0.5	24-feb-1988	LM14	UNK592		0.760	UGG
0.5	24-feb-1988	LM14	UNK593		0.340	UGG
0.5	24-feb-1988	LM14	UNK594		0.650	UGG
0.5	24-feb-1988	LM14	UNK595		0.550	UGG

Site: BORE SSDS-02-02 (continued)

SAMPLE DEPTH (ft)	SAMPLE DATE	TEST METHOD	COMPOUND	BOOL	CONCENTRATION	UNITS
0.5	24-feb-1988	LM14	UNK596		0.390	UGG
0.5	24-feb-1988	LM14	UNK597		0.320	UGG
0.5	24-feb-1988	LM14	UNK598		8.010	UGG
0.5	24-feb-1988	LM14	UNK600		3.700	UGG
0.5	24-feb-1988	LM14	UNK601		0.370	UGG
0.5	24-feb-1988	LM14	UNK602		0.410	UGG
0.5	24-feb-1988	LM14	UNK602		0.680	UGG
0.5	24-feb-1988	LM14	UNK603		0.310	UGG
0.5	24-feb-1988	LM14	UNK605		0.420	UGG
0.5	24-feb-1988	LM14	UNK606		0.170	UGG
0.5	24-feb-1988	LM14	UNK607		0.350	UGG
0.5	24-feb-1988	LM14	UNK608		0.270	UGG
0.5	24-feb-1988	LM14	UNK609		0.660	UGG
0.5	24-feb-1988	LM14	UNK610		0.560	UGG
0.5	24-feb-1988	LM14	UNK611		1.430	UGG
0.5	24-feb-1988	LW02	135TNB	LT	1.900	UGG
0.5	24-feb-1988	LW02	13DNB	LT	0.610	UGG
0.5	24-feb-1988	LW02	246TNT	LT	1.980	UGG
0.5	24-feb-1988	LW02	24DNT	LT	0.434	UGG
0.5	24-feb-1988	LW02	26DNT	LT	0.413	UGG
0.5	24-feb-1988	LW02	HMX	LT	1.320	UGG
0.5	24-feb-1988	LW02	NB	LT	0.442	UGG
0.5	24-feb-1988	LW02	RDX	LT	0.937	UGG
0.5	24-feb-1988	LW02	TETRYL	LT	0.287	UGG

Site: BORE SSDS-02-03

SAMPLE DEPTH (ft)	SAMPLE DATE	TEST METHOD	COMPOUND	BOOL	CONCENTRATION	UNITS
1.0	24-feb-1988	99	AG	LT	0.738	UGG
1.0	24-feb-1988	99	AS	LT	6.490	UGG
1.0	24-feb-1988	99	BE	LT	0.376	UGG
1.0	24-feb-1988	99	BR	LT	100.000	UGG
1.0	24-feb-1988	99	CD	LT	0.797	UGG
1.0	24-feb-1988	99	CL	LT	14200.000	UGG
1.0	24-feb-1988	99	CR		15.300	UGG
1.0	24-feb-1988	99	CU		14.800	UGG
1.0	24-feb-1988	99	F	LT	11.400	UGG
1.0	24-feb-1988	99	NA		173.000	UGG
1.0	24-feb-1988	99	NI		10.800	UGG
1.0	24-feb-1988	99	NIT	LT	0.000	UGG
1.0	24-feb-1988	99	PB		8.710	UGG
1.0	24-feb-1988	99	SB	LT	28.800	UGG
1.0	24-feb-1988	99	SE	LT	2.390	UGG
1.0	24-feb-1988	99	SO4	LT	14200.000	UGG

Site: BORE SSDS-02-03 (continued)

SAMPLE DEPTH (ft)	SAMPLE DATE	TEST METHOD	COMPOUND	BOOL	CONCENTRATION	UNITS
1.0	24-feb-1988	99	TL	LT	9.030	UGG
1.0	24-feb-1988	99	ZN	LT	59.200	UGG
1.0	24-feb-1988	JB08	HG	LT	0.113	UGG
1.0	24-feb-1988	LM13	111TCE	ND	0.050	UGG
1.0	24-feb-1988	LM13	112TCE	ND	0.050	UGG
1.0	24-feb-1988	LM13	11DCE	ND	0.050	UGG
1.0	24-feb-1988	LM13	12DCLB	ND	0.300	UGG
1.0	24-feb-1988	LM13	12DCLE	ND	0.050	UGG
1.0	24-feb-1988	LM13	12DCLP	ND	0.050	UGG
1.0	24-feb-1988	LM13	13DCLB	ND	0.300	UGG
1.0	24-feb-1988	LM13	14DCLB	ND	0.300	UGG
1.0	24-feb-1988	LM13	2CLEVE	ND	0.600	UGG
1.0	24-feb-1988	LM13	BRDCLM	ND	0.050	UGG
1.0	24-feb-1988	LM13	C13DCP	ND	0.600	UGG
1.0	24-feb-1988	LM13	C2H3CL	ND	0.100	UGG
1.0	24-feb-1988	LM13	C2H5CL	ND	0.100	UGG
1.0	24-feb-1988	LM13	C6H6	ND	0.600	UGG
1.0	24-feb-1988	LM13	CCL4	ND	0.050	UGG
1.0	24-feb-1988	LM13	CH2CL2	ND	0.050	UGG
1.0	24-feb-1988	LM13	CH3BR	ND	0.100	UGG
1.0	24-feb-1988	LM13	CH3CL	ND	0.100	UGG
1.0	24-feb-1988	LM13	CHBR3	ND	0.100	UGG
1.0	24-feb-1988	LM13	CHCL3	ND	0.050	UGG
1.0	24-feb-1988	LM13	CLC6H5	ND	0.630	UGG
1.0	24-feb-1988	LM13	DBRCLM	ND	0.050	UGG
1.0	24-feb-1988	LM13	ETC6H5	ND	0.050	UGG
1.0	24-feb-1988	LM13	MEC6H5	ND	0.050	UGG
1.0	24-feb-1988	LM13	T12DCE	ND	0.630	UGG
1.0	24-feb-1988	LM13	T13DCP	ND	0.050	UGG
1.0	24-feb-1988	LM13	TCLEE	ND	0.050	UGG
1.0	24-feb-1988	LM13	TRCLE	LT	0.156	UGG
1.0	24-feb-1988	LM14	124TCB	ND	0.330	UGG
1.0	24-feb-1988	LM14	12DPH	ND	0.330	UGG
1.0	24-feb-1988	LM14	246TCP	ND	0.330	UGG
1.0	24-feb-1988	LM14	24DCLP	ND	0.330	UGG
1.0	24-feb-1988	LM14	24DMPN	ND	0.330	UGG
1.0	24-feb-1988	LM14	24DNP	ND	1.650	UGG
1.0	24-feb-1988	LM14	24DNT	ND	0.330	UGG
1.0	24-feb-1988	LM14	26DNT	ND	0.330	UGG
1.0	24-feb-1988	LM14	2CLP	ND	0.330	UGG
1.0	24-feb-1988	LM14	2CNAP	ND	0.330	UGG
1.0	24-feb-1988	LM14	2NP	ND	0.330	UGG
1.0	24-feb-1988	LM14	33DCBD	ND	0.660	UGG
1.0	24-feb-1988	LM14	46DN2C	ND	1.650	UGG
1.0	24-feb-1988	LM14	4BRPPE	ND	0.330	UGG

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Site: BORE SSDS-02-03 (continued)

SAMPLE DEPTH (ft)	SAMPLE DATE	TEST METHOD	COMPOUND	BOOL	CONCENTRATION	UNITS
1.0	24-feb-1988	LM14	4CL3C	ND	0.330	UGG
1.0	24-feb-1988	LM14	4CLPPE	ND	0.330	UGG
1.0	24-feb-1988	LM14	4NP	ND	1.650	UGG
1.0	24-feb-1988	LM14	ABHC	ND	0.660	UGG
1.0	24-feb-1988	LM14	AENSLF	ND	0.330	UGG
1.0	24-feb-1988	LM14	ALDRN	ND	0.660	UGG
1.0	24-feb-1988	LM14	ANAPNE	ND	0.330	UGG
1.0	24-feb-1988	LM14	ANAPYL	ND	0.330	UGG
1.0	24-feb-1988	LM14	ANTRC	ND	0.330	UGG
1.0	24-feb-1988	LM14	B2CEXM	ND	0.330	UGG
1.0	24-feb-1988	LM14	B2CIPE	ND	0.330	UGG
1.0	24-feb-1988	LM14	B2CLEE	ND	0.330	UGG
1.0	24-feb-1988	LM14	B2EHP	ND	0.330	UGG
1.0	24-feb-1988	LM14	BAANTR	ND	0.330	UGG
1.0	24-feb-1988	LM14	BAPYR	ND	0.330	UGG
1.0	24-feb-1988	LM14	BBFANT	ND	0.330	UGG
1.0	24-feb-1988	LM14	BBHC	ND	0.660	UGG
1.0	24-feb-1988	LM14	BBZP	ND	0.330	UGG
1.0	24-feb-1988	LM14	BENSLF	ND	0.330	UGG
1.0	24-feb-1988	LM14	BENZAL		0.190	UGG
1.0	24-feb-1988	LM14	BENZID	ND	1.650	UGG
1.0	24-feb-1988	LM14	BGHIPY	ND	0.330	UGG
1.0	24-feb-1988	LM14	BKFANT	ND	0.330	UGG
1.0	24-feb-1988	LM14	C2H5CL	ND	1.250	UGG
1.0	24-feb-1988	LM14	CHRY	ND	0.330	UGG
1.0	24-feb-1988	LM14	CL6BZ	ND	0.330	UGG
1.0	24-feb-1988	LM14	CL6CP	ND	0.330	UGG
1.0	24-feb-1988	LM14	CL6ET	ND	0.330	UGG
1.0	24-feb-1988	LM14	CLDAN	ND	0.330	UGG
1.0	24-feb-1988	LM14	DBAHA	ND	0.330	UGG
1.0	24-feb-1988	LM14	DBHC	ND	0.660	UGG
1.0	24-feb-1988	LM14	DEP	ND	0.330	UGG
1.0	24-feb-1988	LM14	DLDRN	ND	0.660	UGG
1.0	24-feb-1988	LM14	DMP	ND	0.330	UGG
1.0	24-feb-1988	LM14	DNBP	ND	0.330	UGG
1.0	24-feb-1988	LM14	DNOP	ND	0.330	UGG
1.0	24-feb-1988	LM14	ENDRN	ND	0.660	UGG
1.0	24-feb-1988	LM14	ENDRNA	ND	0.660	UGG
1.0	24-feb-1988	LM14	ESFSO4	ND	0.660	UGG
1.0	24-feb-1988	LM14	FANT	ND	0.330	UGG
1.0	24-feb-1988	LM14	FLRENE	ND	0.330	UGG
1.0	24-feb-1988	LM14	GBHC	ND	0.330	UGG
1.0	24-feb-1988	LM14	HCBD	ND	0.330	UGG
1.0	24-feb-1988	LM14	HPCL	ND	0.660	UGG
1.0	24-feb-1988	LM14	HPCLE	ND	0.660	UGG
1.0	24-feb-1988	LM14	HXAB2E		8.510	UGG
1.0	24-feb-1988	LM14	ICDPYR	ND	0.330	UGG
1.0	24-feb-1988	LM14	ISOPHR	ND	0.330	UGG

Site: BORE SSDS-02-03 (continued)

SAMPLE DEPTH (ft)	SAMPLE DATE	TEST METHOD	COMPOUND	BOOL	CONCENTRATION	UNITS
1.0	24-feb-1988	LM14	LIN	LT	0.058	UGG
1.0	24-feb-1988	LM14	NAP	ND	0.330	UGG
1.0	24-feb-1988	LM14	NB	ND	0.330	UGG
1.0	24-feb-1988	LM14	NNDMEA	ND	0.330	UGG
1.0	24-feb-1988	LM14	NNDPA	ND	0.330	UGG
1.0	24-feb-1988	LM14	PCB016	ND	0.330	UGG
1.0	24-feb-1988	LM14	PCB221	ND	0.330	UGG
1.0	24-feb-1988	LM14	PCB232	ND	0.330	UGG
1.0	24-feb-1988	LM14	PCB242	ND	0.330	UGG
1.0	24-feb-1988	LM14	PCB248	ND	0.330	UGG
1.0	24-feb-1988	LM14	PCB254	ND	0.330	UGG
1.0	24-feb-1988	LM14	PCB260	ND	1.650	UGG
1.0	24-feb-1988	LM14	PCP	ND	0.330	UGG
1.0	24-feb-1988	LM14	PHANTR	ND	0.230	UGG
1.0	24-feb-1988	LM14	PHENOL	ND	0.660	UGG
1.0	24-feb-1988	LM14	PPDDD	ND	0.090	UGG
1.0	24-feb-1988	LM14	PPDDE	LT	0.090	UGG
1.0	24-feb-1988	LM14	PPDDT	LT	0.487	UGG
1.0	24-feb-1988	LM14	PYR	ND	0.060	UGG
1.0	24-feb-1988	LM14	TXPHEN	ND	20.000	UGG
1.0	24-feb-1988	LM14	UNK546		0.170	UGG
1.0	24-feb-1988	LM14	UNK564		0.750	UGG
1.0	24-feb-1988	LM14	UNK565		0.740	UGG
1.0	24-feb-1988	LM14	UNK580		0.710	UGG
1.0	24-feb-1988	LM14	UNK603		0.350	UGG
1.0	24-feb-1988	LM14	UNK604		0.200	UGG
1.0	24-feb-1988	LW02	135TNB	LT	1.900	UGG
1.0	24-feb-1988	LW02	13DNB	LT	0.609	UGG
1.0	24-feb-1988	LW02	246TNT	LT	1.980	UGG
1.0	24-feb-1988	LW02	24DNT	LT	0.434	UGG
1.0	24-feb-1988	LW02	26DNT	LT	0.413	UGG
1.0	24-feb-1988	LW02	HMX	LT	1.320	UGG
1.0	24-feb-1988	LW02	NB	LT	0.442	UGG
1.0	24-feb-1988	LW02	RDX	LT	0.936	UGG
1.0	24-feb-1988	LW02	TETRYL	LT	0.286	UGG

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Site: BORE SSDS-03-01

SAMPLE DEPTH (ft)	SAMPLE DATE	TEST METHOD	COMPOUND	BOOL	CONCENTRATION	UNITS
0.0	24-feb-1988	99	AG	LT	0.669	UGG
0.0	24-feb-1988	99	AS		8.900	UGG
0.0	24-feb-1988	99	BE	LT	0.341	UGG
0.0	24-feb-1988	99	BR	LT	100.000	UGG
0.0	24-feb-1988	99	CD		0.873	UGG
0.0	24-feb-1988	99	CL	LT	14200.000	UGG
0.0	24-feb-1988	99	CR		8.550	UGG
0.0	24-feb-1988	99	CU		12.100	UGG
0.0	24-feb-1988	99	F	LT	10.300	UGG
0.0	24-feb-1988	99	NA		71.900	UGG
0.0	24-feb-1988	99	NI		5.350	UGG
0.0	24-feb-1988	99	NIT	LT	0.000	UGG
0.0	24-feb-1988	99	PB		34.400	UGG
0.0	24-feb-1988	99	SB	LT	26.100	UGG
0.0	24-feb-1988	99	SE	LT	2.170	UGG
0.0	24-feb-1988	99	SO4	LT	14200.000	UGG
0.0	24-feb-1988	99	TL	LT	8.190	UGG
0.0	24-feb-1988	99	ZN	LT	53.700	UGG
0.0	24-feb-1988	JB08	HG	LT	0.105	UGG
0.0	24-feb-1988	LM13	111TCE	ND	0.050	UGG
0.0	24-feb-1988	LM13	111TCE	ND	0.050	UGG
0.0	24-feb-1988	LM13	112TCE	ND	0.050	UGG
0.0	24-feb-1988	LM13	112TCE	ND	0.050	UGG
0.0	24-feb-1988	LM13	11DCE	ND	0.050	UGG
0.0	24-feb-1988	LM13	11DCE	ND	0.050	UGG
0.0	24-feb-1988	LM13	11DCLE	ND	0.050	UGG
0.0	24-feb-1988	LM13	12DCLB	ND	0.300	UGG
0.0	24-feb-1988	LM13	12DCLB	ND	0.300	UGG
0.0	24-feb-1988	LM13	12DCLE	ND	0.050	UGG
0.0	24-feb-1988	LM13	12DCLE	ND	0.050	UGG
0.0	24-feb-1988	LM13	12DCLP	ND	0.050	UGG
0.0	24-feb-1988	LM13	12DCLP	ND	0.050	UGG
0.0	24-feb-1988	LM13	13DCLB	ND	0.300	UGG
0.0	24-feb-1988	LM13	13DCLB	ND	0.300	UGG
0.0	24-feb-1988	LM13	14DCLB	ND	0.300	UGG
0.0	24-feb-1988	LM13	14DCLB	ND	0.300	UGG
0.0	24-feb-1988	LM13	2CLEVE	ND	0.600	UGG
0.0	24-feb-1988	LM13	2CLEVE	ND	0.600	UGG
0.0	24-feb-1988	LM13	BRDCLM	ND	0.050	UGG
0.0	24-feb-1988	LM13	BRDCLM	ND	0.050	UGG
0.0	24-feb-1988	LM13	C13DCP	ND	0.600	UGG
0.0	24-feb-1988	LM13	C13DCP	ND	0.600	UGG
0.0	24-feb-1988	LM13	C2H3CL	ND	0.100	UGG
0.0	24-feb-1988	LM13	C2H3CL	ND	0.100	UGG
0.0	24-feb-1988	LM13	C2H5CL	ND	0.100	UGG
0.0	24-feb-1988	LM13	C2H5CL	ND	0.100	UGG

Analytical Results for Chemical Soil
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Site: BORE SSDS-03-01 (continued)

SAMPLE DEPTH (ft)	SAMPLE DATE	TEST METHOD	COMPOUND	BOOL	CONCENTRATION	UNITS
0.0	24-feb-1988	LM13	C6H6	ND	0.600	UGG
0.0	24-feb-1988	LM13	C6H6	ND	0.600	UGG
0.0	24-feb-1988	LM13	CCL4	ND	0.050	UGG
0.0	24-feb-1988	LM13	CCL4	ND	0.050	UGG
0.0	24-feb-1988	LM13	CH2CL2	ND	0.050	UGG
0.0	24-feb-1988	LM13	CH2CL2	ND	0.050	UGG
0.0	24-feb-1988	LM13	CH3BR	ND	0.100	UGG
0.0	24-feb-1988	LM13	CH3BR	ND	0.100	UGG
0.0	24-feb-1988	LM13	CH3CL	ND	0.100	UGG
0.0	24-feb-1988	LM13	CH3CL	ND	0.100	UGG
0.0	24-feb-1988	LM13	CHBR3	ND	0.100	UGG
0.0	24-feb-1988	LM13	CHBR3	ND	0.100	UGG
0.0	24-feb-1988	LM13	CHCL3	ND	0.050	UGG
0.0	24-feb-1988	LM13	CHCL3	ND	0.050	UGG
0.0	24-feb-1988	LM13	CLC6H5	ND	0.630	UGG
0.0	24-feb-1988	LM13	CLC6H5	ND	0.630	UGG
0.0	24-feb-1988	LM13	DBRCLM	ND	0.050	UGG
0.0	24-feb-1988	LM13	DBRCLM	ND	0.050	UGG
0.0	24-feb-1988	LM13	ETC6H5	ND	0.050	UGG
0.0	24-feb-1988	LM13	ETC6H5	ND	0.050	UGG
0.0	24-feb-1988	LM13	MEC6H5	ND	0.050	UGG
0.0	24-feb-1988	LM13	MEC6H5	ND	0.050	UGG
0.0	24-feb-1988	LM13	T12DCE	ND	0.630	UGG
0.0	24-feb-1988	LM13	T12DCE	ND	0.630	UGG
0.0	24-feb-1988	LM13	T13DCP	ND	0.050	UGG
0.0	24-feb-1988	LM13	T13DCP	ND	0.050	UGG
0.0	24-feb-1988	LM13	TCLEA	ND	0.050	UGG
0.0	24-feb-1988	LM13	TCLEE	ND	0.050	UGG
0.0	24-feb-1988	LM13	TCLEE	ND	0.050	UGG
0.0	24-feb-1988	LM13	TRCLE	LT	0.148	UGG
0.0	24-feb-1988	LM13	TRCLE	LT	0.141	UGG
0.0	24-feb-1988	LM14	124TCB	ND	0.330	UGG
0.0	24-feb-1988	LM14	12DPH	ND	0.330	UGG
0.0	24-feb-1988	LM14	246TCP	ND	0.330	UGG
0.0	24-feb-1988	LM14	24DCLP	ND	0.330	UGG
0.0	24-feb-1988	LM14	24DMPN	ND	0.330	UGG
0.0	24-feb-1988	LM14	24DNP	ND	1.650	UGG
0.0	24-feb-1988	LM14	24DNT	ND	0.330	UGG
0.0	24-feb-1988	LM14	26DNT	ND	0.330	UGG
0.0	24-feb-1988	LM14	2CLP	ND	0.330	UGG
0.0	24-feb-1988	LM14	2CNAP	ND	0.330	UGG
0.0	24-feb-1988	LM14	2NP	ND	0.330	UGG
0.0	24-feb-1988	LM14	33DCBD	ND	0.660	UGG
0.0	24-feb-1988	LM14	46DN2C	ND	1.650	UGG
0.0	24-feb-1988	LM14	4BRPPE	ND	0.330	UGG
0.0	24-feb-1988	LM14	4CL3C	ND	0.330	UGG
0.0	24-feb-1988	LM14	4CLPPE	ND	0.330	UGG

Analytical Results for Chemical Soil
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Site: BORE SSDS-03-01 (continued)

SAMPLE DEPTH (ft)	SAMPLE DATE	TEST METHOD	COMPOUND	BOOL	CONCENTRATION	UNITS
0.0	24-feb-1988	LM14	4NP	ND	1.650	UGG
0.0	24-feb-1988	LM14	ABHC	ND	0.660	UGG
0.0	24-feb-1988	LM14	AENSLF	ND	0.330	UGG
0.0	24-feb-1988	LM14	ALDRN	ND	0.660	UGG
0.0	24-feb-1988	LM14	ANAPNE	ND	0.330	UGG
0.0	24-feb-1988	LM14	ANAPYL	ND	0.330	UGG
0.0	24-feb-1988	LM14	ANTRC	ND	0.330	UGG
0.0	24-feb-1988	LM14	B2CEXM	ND	0.330	UGG
0.0	24-feb-1988	LM14	B2CIPE	ND	0.330	UGG
0.0	24-feb-1988	LM14	B2CLEE	ND	0.330	UGG
0.0	24-feb-1988	LM14	B2EHP	ND	0.330	UGG
0.0	24-feb-1988	LM14	BAANTR	ND	0.330	UGG
0.0	24-feb-1988	LM14	BAPYR	ND	0.330	UGG
0.0	24-feb-1988	LM14	BBFANT	ND	0.330	UGG
0.0	24-feb-1988	LM14	BBHC	ND	0.660	UGG
0.0	24-feb-1988	LM14	BBZP	ND	0.330	UGG
0.0	24-feb-1988	LM14	BENSLF	ND	0.330	UGG
0.0	24-feb-1988	LM14	BENZID	ND	1.650	UGG
0.0	24-feb-1988	LM14	BGHIPY	ND	0.330	UGG
0.0	24-feb-1988	LM14	BKFANT	ND	0.330	UGG
0.0	24-feb-1988	LM14	C2H5CL	ND	1.250	UGG
0.0	24-feb-1988	LM14	CHRY	ND	0.330	UGG
0.0	24-feb-1988	LM14	CL6BZ	ND	0.330	UGG
0.0	24-feb-1988	LM14	CL6CP	ND	0.330	UGG
0.0	24-feb-1988	LM14	CL6ET	ND	0.330	UGG
0.0	24-feb-1988	LM14	CLDAN	ND	0.330	UGG
0.0	24-feb-1988	LM14	DBAHA	ND	0.330	UGG
0.0	24-feb-1988	LM14	DBHC	ND	0.660	UGG
0.0	24-feb-1988	LM14	DEP	ND	0.330	UGG
0.0	24-feb-1988	LM14	DLDRN	ND	0.660	UGG
0.0	24-feb-1988	LM14	DMP	ND	0.330	UGG
0.0	24-feb-1988	LM14	DNBP	ND	0.330	UGG
0.0	24-feb-1988	LM14	DNOP	ND	0.330	UGG
0.0	24-feb-1988	LM14	ENDRN	ND	0.660	UGG
0.0	24-feb-1988	LM14	ENDRNA	ND	0.660	UGG
0.0	24-feb-1988	LM14	ESFSO4	ND	0.660	UGG
0.0	24-feb-1988	LM14	FANT	ND	0.330	UGG
0.0	24-feb-1988	LM14	FLRENE	ND	0.330	UGG
0.0	24-feb-1988	LM14	GBHC	ND	0.330	UGG
0.0	24-feb-1988	LM14	HCBD	ND	0.330	UGG
0.0	24-feb-1988	LM14	HPCL	ND	0.660	UGG
0.0	24-feb-1988	LM14	HPCLE	ND	0.660	UGG
0.0	24-feb-1988	LM14	ICDPYR	ND	0.330	UGG
0.0	24-feb-1988	LM14	ISOPHR	ND	0.330	UGG
0.0	24-feb-1988	LM14	LIN	LT	0.058	UGG
0.0	24-feb-1988	LM14	NAP	ND	0.330	UGG
0.0	24-feb-1988	LM14	NB	ND	0.330	UGG
0.0	24-feb-1988	LM14	NNDMEA	ND	0.330	UGG

Analytical Results for Chemical Soil
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Site: BORE SSDS-03-01 (continued)

SAMPLE DEPTH (ft)	SAMPLE DATE	TEST METHOD	COMPOUND	BOOL	CONCENTRATION	UNITS
0.0	24-feb-1988	LM14	NNDPA	ND	0.330	UGG
0.0	24-feb-1988	LM14	PCB016	ND	0.330	UGG
0.0	24-feb-1988	LM14	PCB221	ND	0.330	UGG
0.0	24-feb-1988	LM14	PCB232	ND	0.330	UGG
0.0	24-feb-1988	LM14	PCB242	ND	0.330	UGG
0.0	24-feb-1988	LM14	PCB248	ND	0.330	UGG
0.0	24-feb-1988	LM14	PCB254	ND	0.330	UGG
0.0	24-feb-1988	LM14	PCB260	ND	1.650	UGG
0.0	24-feb-1988	LM14	PCP	ND	0.330	UGG
0.0	24-feb-1988	LM14	PHANTR	ND	0.230	UGG
0.0	24-feb-1988	LM14	PHENOL	ND	0.660	UGG
0.0	24-feb-1988	LM14	PPDDD	ND	0.090	UGG
0.0	24-feb-1988	LM14	PPDDE	LT	0.090	UGG
0.0	24-feb-1988	LM14	PPDDT	LT	0.487	UGG
0.0	24-feb-1988	LM14	PYR	ND	0.060	UGG
0.0	24-feb-1988	LM14	TXPHEN	ND	20.000	UGG
0.0	24-feb-1988	LM14	UNK616		11.300	UGG
0.0	24-feb-1988	LM14	UNK617		20.100	UGG
0.0	24-feb-1988	LM14	UNK618		13.700	UGG
0.0	24-feb-1988	LM14	UNK619		15.900	UGG
0.0	24-feb-1988	LM14	UNK620		27.500	UGG
0.0	24-feb-1988	LM14	UNK621		28.000	UGG
0.0	24-feb-1988	LM14	UNK622		12.700	UGG
0.0	24-feb-1988	LM14	UNK623		19.600	UGG
0.0	24-feb-1988	LM14	UNK624		13.200	UGG
0.0	24-feb-1988	LM14	UNK625		14.600	UGG
0.0	24-feb-1988	LM14	UNK626		14.300	UGG
0.0	24-feb-1988	LM14	UNK627		20.000	UGG
0.0	24-feb-1988	LM14	UNK628		17.100	UGG
0.0	24-feb-1988	LM14	UNK629		17.200	UGG
0.0	24-feb-1988	LM14	UNK630		17.100	UGG
0.0	24-feb-1988	LM14	UNK631		16.300	UGG
0.0	24-feb-1988	LM14	UNK632		23.400	UGG
0.0	24-feb-1988	LM14	UNK633		10.700	UGG
0.0	24-feb-1988	LW02	135TNB	LT	1.750	UGG
0.0	24-feb-1988	LW02	13DNB	LT	0.560	UGG
0.0	24-feb-1988	LW02	246TNT	LT	1.820	UGG
0.0	24-feb-1988	LW02	24DNT	LT	0.398	UGG
0.0	24-feb-1988	LW02	26DNT	LT	0.379	UGG
0.0	24-feb-1988	LW02	HMX	LT	1.220	UGG
0.0	24-feb-1988	LW02	NB	LT	0.406	UGG
0.0	24-feb-1988	LW02	RDX	LT	0.860	UGG
0.0	24-feb-1988	LW02	TETRYL	LT	0.263	UGG

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Site: BORE SSDS-03-02

SAMPLE DEPTH (ft)	SAMPLE DATE	TEST METHOD	COMPOUND	BOOL	CONCENTRATION	UNITS
0.5	24-feb-1988	99	AG	LT	0.721	UGG
0.5	24-feb-1988	99	AS		13.600	UGG
0.5	24-feb-1988	99	BE	LT	0.367	UGG
0.5	24-feb-1988	99	BR	LT	100.000	UGG
0.5	24-feb-1988	99	CD		1.160	UGG
0.5	24-feb-1988	99	CL	LT	13900.000	UGG
0.5	24-feb-1988	99	CR		15.600	UGG
0.5	24-feb-1988	99	CU		13.000	UGG
0.5	24-feb-1988	99	F	LT	11.100	UGG
0.5	24-feb-1988	99	NA		138.000	UGG
0.5	24-feb-1988	99	NI		9.530	UGG
0.5	24-feb-1988	99	NIT	LT	0.000	UGG
0.5	24-feb-1988	99	PB		32.600	UGG
0.5	24-feb-1988	99	SB	LT	28.100	UGG
0.5	24-feb-1988	99	SE	LT	2.340	UGG
0.5	24-feb-1988	99	SO4	LT	13900.000	UGG
0.5	24-feb-1988	99	TL	LT	8.820	UGG
0.5	24-feb-1988	99	ZN	LT	57.800	UGG
0.5	24-feb-1988	JB08	HG	LT	0.113	UGG
0.5	24-feb-1988	LM13	111TCE	ND	0.050	UGG
0.5	24-feb-1988	LM13	112TCE	ND	0.050	UGG
0.5	24-feb-1988	LM13	11DCE	ND	0.050	UGG
0.5	24-feb-1988	LM13	12DCLB	ND	0.300	UGG
0.5	24-feb-1988	LM13	12DCLE	ND	0.050	UGG
0.5	24-feb-1988	LM13	12DCLP	ND	0.050	UGG
0.5	24-feb-1988	LM13	13DCLB	ND	0.300	UGG
0.5	24-feb-1988	LM13	14DCLB	ND	0.300	UGG
0.5	24-feb-1988	LM13	2CLEVE	ND	0.600	UGG
0.5	24-feb-1988	LM13	BRDCLM	ND	0.050	UGG
0.5	24-feb-1988	LM13	C13DCP	ND	0.600	UGG
0.5	24-feb-1988	LM13	C2H3CL	ND	0.100	UGG
0.5	24-feb-1988	LM13	C2H5CL	ND	0.100	UGG
0.5	24-feb-1988	LM13	C6H6	ND	0.600	UGG
0.5	24-feb-1988	LM13	CCL4	ND	0.050	UGG
0.5	24-feb-1988	LM13	CH2CL2	ND	0.050	UGG
0.5	24-feb-1988	LM13	CH3BR	ND	0.100	UGG
0.5	24-feb-1988	LM13	CH3CL	ND	0.100	UGG
0.5	24-feb-1988	LM13	CH8R3	ND	0.100	UGG
0.5	24-feb-1988	LM13	CHCL3	ND	0.050	UGG
0.5	24-feb-1988	LM13	CLC6H5	ND	0.630	UGG
0.5	24-feb-1988	LM13	DBRCLM	ND	0.050	UGG
0.5	24-feb-1988	LM13	ETC6H5	ND	0.050	UGG
0.5	24-feb-1988	LM13	MEC6H5	ND	0.050	UGG
0.5	24-feb-1988	LM13	T12DCE	ND	0.630	UGG
0.5	24-feb-1988	LM13	T13DCP	ND	0.050	UGG
0.5	24-feb-1988	LM13	TCLEE	ND	0.050	UGG

Site: BORE SSDS-03-02 (continued)

SAMPLE DEPTH (ft)	SAMPLE DATE	TEST METHOD	COMPOUND	BOOL	CONCENTRATION	UNITS
0.5	24-feb-1988	LM13	TRCLE	LT	0.145	UGG
0.5	24-feb-1988	LM14	124TCB	ND	0.300	UGG
0.5	24-feb-1988	LM14	12DPH	ND	0.300	UGG
0.5	24-feb-1988	LM14	246TCP	ND	0.300	UGG
0.5	24-feb-1988	LM14	24DCLP	ND	0.300	UGG
0.5	24-feb-1988	LM14	24DMPN	ND	0.300	UGG
0.5	24-feb-1988	LM14	24DNP	ND	2.000	UGG
0.5	24-feb-1988	LM14	24DNT	ND	0.300	UGG
0.5	24-feb-1988	LM14	26DNT	ND	0.300	UGG
0.5	24-feb-1988	LM14	2CLP	ND	0.300	UGG
0.5	24-feb-1988	LM14	2CNAP	ND	0.300	UGG
0.5	24-feb-1988	LM14	2NP	ND	0.300	UGG
0.5	24-feb-1988	LM14	33DCBD	ND	0.700	UGG
0.5	24-feb-1988	LM14	46DN2C	ND	2.000	UGG
0.5	24-feb-1988	LM14	4BRPPE	ND	0.300	UGG
0.5	24-feb-1988	LM14	4CL3C	ND	0.300	UGG
0.5	24-feb-1988	LM14	4CLPPE	ND	0.300	UGG
0.5	24-feb-1988	LM14	4NP	ND	2.000	UGG
0.5	24-feb-1988	LM14	ABHC	ND	0.500	UGG
0.5	24-feb-1988	LM14	AENSLF	ND	0.500	UGG
0.5	24-feb-1988	LM14	ALDRN	ND	0.500	UGG
0.5	24-feb-1988	LM14	ANAPNE	ND	0.300	UGG
0.5	24-feb-1988	LM14	ANAPYL	ND	0.300	UGG
0.5	24-feb-1988	LM14	ANTRC	ND	0.300	UGG
0.5	24-feb-1988	LM14	B2CEXM	ND	0.300	UGG
0.5	24-feb-1988	LM14	B2CIPE	ND	0.300	UGG
0.5	24-feb-1988	LM14	B2CLEE	ND	0.300	UGG
0.5	24-feb-1988	LM14	B2EHP	ND	0.300	UGG
0.5	24-feb-1988	LM14	BAANTR	ND	0.300	UGG
0.5	24-feb-1988	LM14	BAPYR	ND	0.300	UGG
0.5	24-feb-1988	LM14	BBFANT	ND	0.300	UGG
0.5	24-feb-1988	LM14	BBHC	ND	0.500	UGG
0.5	24-feb-1988	LM14	BBNTHP		2.860	UGG
0.5	24-feb-1988	LM14	BBZP	ND	0.300	UGG
0.5	24-feb-1988	LM14	BENSLF	ND	1.000	UGG
0.5	24-feb-1988	LM14	BENZID	ND	1.650	UGG
0.5	24-feb-1988	LM14	BGHIPY	ND	0.300	UGG
0.5	24-feb-1988	LM14	BKFANT	ND	0.300	UGG
0.5	24-feb-1988	LM14	C2H5CL	ND	0.100	UGG
0.5	24-feb-1988	LM14	CHRY	ND	0.300	UGG
0.5	24-feb-1988	LM14	CL6BZ	ND	0.300	UGG
0.5	24-feb-1988	LM14	CL6CP	ND	0.300	UGG
0.5	24-feb-1988	LM14	CL6ET	ND	0.300	UGG
0.5	24-feb-1988	LM14	CLDAN	ND	5.000	UGG
0.5	24-feb-1988	LM14	DBAHA	ND	0.300	UGG
0.5	24-feb-1988	LM14	DBHC	ND	0.500	UGG
0.5	24-feb-1988	LM14	DEP	ND	0.300	UGG

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Site: BORE SSDS-03-02 (continued)

SAMPLE DEPTH (ft)	SAMPLE DATE	TEST METHOD	COMPOUND	BOOL	CONCENTRATION	UNITS
0.5	24-feb-1988	LM14	DLDRN	ND	1.000	UGG
0.5	24-feb-1988	LM14	DMP	ND	0.300	UGG
0.5	24-feb-1988	LM14	DNBP	ND	0.300	UGG
0.5	24-feb-1988	LM14	DNOP	ND	0.300	UGG
0.5	24-feb-1988	LM14	ENDRN	ND	1.000	UGG
0.5	24-feb-1988	LM14	ENDRNA	ND	0.660	UGG
0.5	24-feb-1988	LM14	ESFSO4	ND	1.000	UGG
0.5	24-feb-1988	LM14	FANT		0.610	UGG
0.5	24-feb-1988	LM14	FLRENE	ND	0.300	UGG
0.5	24-feb-1988	LM14	GBHC	ND	0.500	UGG
0.5	24-feb-1988	LM14	HCBD	ND	0.300	UGG
0.5	24-feb-1988	LM14	HPCL	ND	0.500	UGG
0.5	24-feb-1988	LM14	HPCLE	ND	0.500	UGG
0.5	24-feb-1988	LM14	HXAB2E		30.800	UGG
0.5	24-feb-1988	LM14	ICDPYR	ND	0.300	UGG
0.5	24-feb-1988	LM14	ISOPHR	ND	0.300	UGG
0.5	24-feb-1988	LM14	LIN	ND	0.061	UGG
0.5	24-feb-1988	LM14	NAP	ND	0.300	UGG
0.5	24-feb-1988	LM14	NB	ND	0.300	UGG
0.5	24-feb-1988	LM14	NNDMEA	ND	0.330	UGG
0.5	24-feb-1988	LM14	NNDNPA	ND	0.330	UGG
0.5	24-feb-1988	LM14	PCB016	ND	5.000	UGG
0.5	24-feb-1988	LM14	PCB221	ND	5.000	UGG
0.5	24-feb-1988	LM14	PCB232	ND	5.000	UGG
0.5	24-feb-1988	LM14	PCB242	ND	5.000	UGG
0.5	24-feb-1988	LM14	PCB248	ND	5.000	UGG
0.5	24-feb-1988	LM14	PCB254	ND	10.000	UGG
0.5	24-feb-1988	LM14	PCB260	ND	10.000	UGG
0.5	24-feb-1988	LM14	PCP	ND	2.000	UGG
0.5	24-feb-1988	LM14	PHANTR	ND	0.300	UGG
0.5	24-feb-1988	LM14	PHENOL	ND	0.300	UGG
0.5	24-feb-1988	LM14	PPDDD	ND	1.000	UGG
0.5	24-feb-1988	LM14	PPDDE	LT	0.090	UGG
0.5	24-feb-1988	LM14	PPDDT	ND	0.490	UGG
0.5	24-feb-1988	LM14	PYR	ND	0.300	UGG
0.5	24-feb-1988	LM14	TXPHEN	ND	7.000	UGG
0.5	24-feb-1988	LM14	UNK118		1.960	UGG
0.5	24-feb-1988	LM14	UNK120		3.860	UGG
0.5	24-feb-1988	LM14	UNK121		3.180	UGG
0.5	24-feb-1988	LM14	UNK584		3.760	UGG
0.5	24-feb-1988	LM14	UNK585		4.860	UGG
0.5	24-feb-1988	LM14	UNK586		3.660	UGG
0.5	24-feb-1988	LM14	UNK587		2.800	UGG
0.5	24-feb-1988	LM14	UNK588		2.280	UGG
0.5	24-feb-1988	LM14	UNK589		2.420	UGG
0.5	24-feb-1988	LM14	UNK590		2.260	UGG
0.5	24-feb-1988	LM14	UNK591		4.520	UGG
0.5	24-feb-1988	LM14	UNK592		2.900	UGG

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Site: BORE SSDS-03-02 (continued)

SAMPLE DEPTH (ft)	SAMPLE DATE	TEST METHOD	COMPOUND	BOOL	CONCENTRATION	UNITS
0.5	24-feb-1988	LM14	UNK593		2.220	UGG
0.5	24-feb-1988	LM14	UNK594		2.860	UGG
0.5	24-feb-1988	LM14	UNK595		2.360	UGG
0.5	24-feb-1988	LW02	135TNB	LT	1.840	UGG
0.5	24-feb-1988	LW02	13DNB	LT	0.591	UGG
0.5	24-feb-1988	LW02	246TNT	LT	1.920	UGG
0.5	24-feb-1988	LW02	24DNT	LT	0.421	UGG
0.5	24-feb-1988	LW02	26DNT	LT	0.401	UGG
0.5	24-feb-1988	LW02	HMX	LT	1.280	UGG
0.5	24-feb-1988	LW02	NB	LT	0.428	UGG
0.5	24-feb-1988	LW02	RDX	LT	0.908	UGG
0.5	24-feb-1988	LW02	TETRYL	LT	0.278	UGG

Site: BORE SSDS-03-03

SAMPLE DEPTH (ft)	SAMPLE DATE	TEST METHOD	COMPOUND	BOOL	CONCENTRATION	UNITS
1.0	24-feb-1988	99	AG	LT	0.739	UGG
1.0	24-feb-1988	99	AS	LT	6.500	UGG
1.0	24-feb-1988	99	BE	LT	0.376	UGG
1.0	24-feb-1988	99	BR	LT	100.000	UGG
1.0	24-feb-1988	99	CD	LT	0.798	UGG
1.0	24-feb-1988	99	CL	LT	14200.000	UGG
1.0	24-feb-1988	99	CR		13.300	UGG
1.0	24-feb-1988	99	CU		16.200	UGG
1.0	24-feb-1988	99	F	LT	11.400	UGG
1.0	24-feb-1988	99	NA		219.000	UGG
1.0	24-feb-1988	99	NI		8.990	UGG
1.0	24-feb-1988	99	NIT	LT	0.000	UGG
1.0	24-feb-1988	99	PB		14.800	UGG
1.0	24-feb-1988	99	SB	LT	28.800	UGG
1.0	24-feb-1988	99	SE	LT	2.390	UGG
1.0	24-feb-1988	99	SO4	LT	14200.000	UGG
1.0	24-feb-1988	99	TL	LT	9.040	UGG
1.0	24-feb-1988	99	ZN	LT	59.300	UGG
1.0	24-feb-1988	J808	HG	LT	0.116	UGG
1.0	24-feb-1988	LM13	111TCE	ND	0.050	UGG
1.0	24-feb-1988	LM13	112TCE	ND	0.050	UGG
1.0	24-feb-1988	LM13	11DCE	ND	0.050	UGG
1.0	24-feb-1988	LM13	12DCLB	ND	0.300	UGG
1.0	24-feb-1988	LM13	12DCLE	ND	0.050	UGG
1.0	24-feb-1988	LM13	12DCLP	ND	0.050	UGG
1.0	24-feb-1988	LM13	13DCLB	ND	0.300	UGG

Analytical Results for Chemical Soil
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Site: BORE SSDS-03-03 (continued)

SAMPLE DEPTH (ft)	SAMPLE DATE	TEST METHOD	COMPOUND	BOOL	CONCENTRATION	UNITS
1.0	24-feb-1988	LM13	14DCLB	ND	0.300	UGG
1.0	24-feb-1988	LM13	2CLEVE	ND	0.600	UGG
1.0	24-feb-1988	LM13	BRDCLM	ND	0.050	UGG
1.0	24-feb-1988	LM13	C13DCP	ND	0.600	UGG
1.0	24-feb-1988	LM13	C2H3CL	ND	0.100	UGG
1.0	24-feb-1988	LM13	C2H5CL	ND	0.100	UGG
1.0	24-feb-1988	LM13	C6H6	ND	0.600	UGG
1.0	24-feb-1988	LM13	CCL4	ND	0.050	UGG
1.0	24-feb-1988	LM13	CH2CL2	ND	0.050	UGG
1.0	24-feb-1988	LM13	CH3BR	ND	0.100	UGG
1.0	24-feb-1988	LM13	CH3CL	ND	0.100	UGG
1.0	24-feb-1988	LM13	CHBR3	ND	0.100	UGG
1.0	24-feb-1988	LM13	CHCL3	ND	0.050	UGG
1.0	24-feb-1988	LM13	CLC6H5	ND	0.630	UGG
1.0	24-feb-1988	LM13	DBRCLM	ND	0.050	UGG
1.0	24-feb-1988	LM13	ETC6H5	ND	0.050	UGG
1.0	24-feb-1988	LM13	MEC6H5	ND	0.050	UGG
1.0	24-feb-1988	LM13	T12DCE	ND	0.630	UGG
1.0	24-feb-1988	LM13	T13DCP	ND	0.050	UGG
1.0	24-feb-1988	LM13	TCLEE	ND	0.050	UGG
1.0	24-feb-1988	LM13	TRCLE	LT	0.141	UGG
1.0	24-feb-1988	LM14	124TCB	ND	0.300	UGG
1.0	24-feb-1988	LM14	12DPH	ND	0.300	UGG
1.0	24-feb-1988	LM14	246TCP	ND	0.300	UGG
1.0	24-feb-1988	LM14	24DCLP	ND	0.300	UGG
1.0	24-feb-1988	LM14	24DMPN	ND	0.300	UGG
1.0	24-feb-1988	LM14	24DNP	ND	2.000	UGG
1.0	24-feb-1988	LM14	24DNT	ND	0.300	UGG
1.0	24-feb-1988	LM14	26DNT	ND	0.300	UGG
1.0	24-feb-1988	LM14	2CLP	ND	0.300	UGG
1.0	24-feb-1988	LM14	2CNAP	ND	0.300	UGG
1.0	24-feb-1988	LM14	2NP	ND	0.300	UGG
1.0	24-feb-1988	LM14	33DCBD	ND	0.700	UGG
1.0	24-feb-1988	LM14	46DN2C	ND	2.000	UGG
1.0	24-feb-1988	LM14	48RPPE	ND	0.300	UGG
1.0	24-feb-1988	LM14	4CL3C	ND	0.300	UGG
1.0	24-feb-1988	LM14	4CLPPE	ND	0.300	UGG
1.0	24-feb-1988	LM14	4NP	ND	2.000	UGG
1.0	24-feb-1988	LM14	ABHC	ND	0.500	UGG
1.0	24-feb-1988	LM14	AENSLF	ND	0.500	UGG
1.0	24-feb-1988	LM14	ALDRN	ND	0.500	UGG
1.0	24-feb-1988	LM14	ANAPNE	ND	0.300	UGG
1.0	24-feb-1988	LM14	ANAPYL	ND	0.300	UGG
1.0	24-feb-1988	LM14	ANTRC	ND	0.300	UGG
1.0	24-feb-1988	LM14	B2CEXM	ND	0.300	UGG
1.0	24-feb-1988	LM14	B2CIPE	ND	0.300	UGG
1.0	24-feb-1988	LM14	B2CLEE	ND	0.300	UGG

Analytical Results for Chemical Soil
From: 01-jan-1988 To: 27-nov-90

Site: BORE SSDS-03-03 (continued)

SAMPLE DEPTH (ft)	SAMPLE DATE	TEST METHOD	COMPOUND	BOOL	CONCENTRATION	UNITS
1.0	24-feb-1988	LM14	B2EHP	ND	0.300	UGG
1.0	24-feb-1988	LM14	BAANTR	ND	0.300	UGG
1.0	24-feb-1988	LM14	BAPYR	ND	0.300	UGG
1.0	24-feb-1988	LM14	BBFANT	ND	0.300	UGG
1.0	24-feb-1988	LM14	BBHC	ND	0.500	UGG
1.0	24-feb-1988	LM14	BBZP	ND	0.300	UGG
1.0	24-feb-1988	LM14	BENSLF	ND	1.000	UGG
1.0	24-feb-1988	LM14	BENZID	ND	1.650	UGG
1.0	24-feb-1988	LM14	BGHIPY	ND	0.300	UGG
1.0	24-feb-1988	LM14	BKFANT	ND	0.300	UGG
1.0	24-feb-1988	LM14	C2H5CL	ND	0.100	UGG
1.0	24-feb-1988	LM14	CHRY	ND	0.300	UGG
1.0	24-feb-1988	LM14	CL6BZ	ND	0.300	UGG
1.0	24-feb-1988	LM14	CL6CP	ND	0.300	UGG
1.0	24-feb-1988	LM14	CL6ET	ND	0.300	UGG
1.0	24-feb-1988	LM14	CLDAN	ND	5.000	UGG
1.0	24-feb-1988	LM14	DBAHA	ND	0.300	UGG
1.0	24-feb-1988	LM14	DBHC	ND	0.500	UGG
1.0	24-feb-1988	LM14	DEP	ND	0.300	UGG
1.0	24-feb-1988	LM14	DLDRN	ND	1.000	UGG
1.0	24-feb-1988	LM14	DMP	ND	0.300	UGG
1.0	24-feb-1988	LM14	DNBP	ND	0.300	UGG
1.0	24-feb-1988	LM14	DNOP	ND	0.300	UGG
1.0	24-feb-1988	LM14	ENDRN	ND	1.000	UGG
1.0	24-feb-1988	LM14	ENDRNA	ND	0.660	UGG
1.0	24-feb-1988	LM14	ESFSO4	ND	1.000	UGG
1.0	24-feb-1988	LM14	FANT	ND	0.300	UGG
1.0	24-feb-1988	LM14	FLRENE	ND	0.300	UGG
1.0	24-feb-1988	LM14	GBHC	ND	0.500	UGG
1.0	24-feb-1988	LM14	HCBD	ND	0.300	UGG
1.0	24-feb-1988	LM14	HPCL	ND	0.500	UGG
1.0	24-feb-1988	LM14	HPCLE	ND	0.500	UGG
1.0	24-feb-1988	LM14	HXA82E		5.110	UGG
1.0	24-feb-1988	LM14	ICDPYR	ND	0.300	UGG
1.0	24-feb-1988	LM14	ISOPHR	ND	0.300	UGG
1.0	24-feb-1988	LM14	LIN	ND	0.061	UGG
1.0	24-feb-1988	LM14	NAP	ND	0.300	UGG
1.0	24-feb-1988	LM14	NB	ND	0.300	UGG
1.0	24-feb-1988	LM14	NNDMEA	ND	0.330	UGG
1.0	24-feb-1988	LM14	NNDNPA	ND	0.330	UGG
1.0	24-feb-1988	LM14	PCB016	ND	5.000	UGG
1.0	24-feb-1988	LM14	PCB221	ND	5.000	UGG
1.0	24-feb-1988	LM14	PCB232	ND	5.000	UGG
1.0	24-feb-1988	LM14	PCB242	ND	5.000	UGG
1.0	24-feb-1988	LM14	PCB248	ND	5.000	UGG
1.0	24-feb-1988	LM14	PCB254	ND	10.000	UGG
1.0	24-feb-1988	LM14	PCB260	ND	10.000	UGG
1.0	24-feb-1988	LM14	PCP	ND	2.000	UGG

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Site: BORE SSDS-03-03 (continued)

SAMPLE DEPTH (ft)	SAMPLE DATE	TEST METHOD	COMPOUND	BOOL	CONCENTRATION	UNITS
1.0	24-feb-1988	LM14	PHANTR	ND	0.300	UGG
1.0	24-feb-1988	LM14	PHENOL	ND	0.300	UGG
1.0	24-feb-1988	LM14	PPDDD	ND	1.000	UGG
1.0	24-feb-1988	LM14	PPDDE	LT	0.090	UGG
1.0	24-feb-1988	LM14	PPDDT	ND	0.490	UGG
1.0	24-feb-1988	LM14	PYR	ND	0.300	UGG
1.0	24-feb-1988	LM14	TXPHEN	ND	7.000	UGG
1.0	24-feb-1988	LM14	UNK591		0.360	UGG
1.0	24-feb-1988	LM14	UNK592		0.480	UGG
1.0	24-feb-1988	LM14	UNK593		1.140	UGG
1.0	24-feb-1988	LM14	UNK594		0.800	UGG
1.0	24-feb-1988	LM14	UNK595		0.270	UGG
1.0	24-feb-1988	LM14	UNK596		0.620	UGG
1.0	24-feb-1988	LM14	UNK597		0.520	UGG
1.0	24-feb-1988	LM14	UNK598		0.500	UGG
1.0	24-feb-1988	LM14	UNK599		0.510	UGG
1.0	24-feb-1988	LM14	UNK600		0.350	UGG
1.0	24-feb-1988	LM14	UNK601		0.530	UGG
1.0	24-feb-1988	LM14	UNK602		0.540	UGG
1.0	24-feb-1988	LM14	UNK603		0.880	UGG
1.0	24-feb-1988	LM14	UNK604		0.370	UGG
1.0	24-feb-1988	LM14	UNK605		0.540	UGG
1.0	24-feb-1988	LM14	UNK606		0.440	UGG
1.0	24-feb-1988	LM14	UNK607		0.520	UGG
1.0	24-feb-1988	LM14	UNK608		0.370	UGG
1.0	24-feb-1988	LM14	UNK609		0.380	UGG
1.0	24-feb-1988	LW02	135TNB	LT	1.870	UGG
1.0	24-feb-1988	LW02	13DNB	LT	0.599	UGG
1.0	24-feb-1988	LW02	246TNT	LT	1.950	UGG
1.0	24-feb-1988	LW02	24DNT	LT	0.426	UGG
1.0	24-feb-1988	LW02	26DNT	LT	0.406	UGG
1.0	24-feb-1988	LW02	HMX	LT	1.300	UGG
1.0	24-feb-1988	LW02	NB	LT	0.434	UGG
1.0	24-feb-1988	LW02	RDX	LT	0.920	UGG
1.0	24-feb-1988	LW02	TETRYL	LT	0.281	UGG

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Site: BORE SSDS-04-01

SAMPLE DEPTH (ft)	SAMPLE DATE	TEST METHOD	COMPOUND	BOOL	CONCENTRATION	UNITS
0.0	24-feb-1988	99	AG	LT	0.680	UGG
0.0	24-feb-1988	99	AS		22.200	UGG
0.0	24-feb-1988	99	BE	LT	0.346	UGG
0.0	24-feb-1988	99	BR	LT	100.000	UGG
0.0	24-feb-1988	99	BR	LT	100.000	UGG
0.0	24-feb-1988	99	CD		2.500	UGG
0.0	24-feb-1988	99	CL	LT	13100.000	UGG
0.0	24-feb-1988	99	CL	LT	13100.000	UGG
0.0	24-feb-1988	99	CR		18.300	UGG
0.0	24-feb-1988	99	CU		24.400	UGG
0.0	24-feb-1988	99	F	LT	10.400	UGG
0.0	24-feb-1988	99	F	LT	10.400	UGG
0.0	24-feb-1988	99	NA		62.500	UGG
0.0	24-feb-1988	99	NI	LT	5.040	UGG
0.0	24-feb-1988	99	NIT	LT	0.000	UGG
0.0	24-feb-1988	99	PB		9.890	UGG
0.0	24-feb-1988	99	SB	LT	26.500	UGG
0.0	24-feb-1988	99	SE	LT	2.200	UGG
0.0	24-feb-1988	99	SO4	LT	13100.000	UGG
0.0	24-feb-1988	99	SO4	LT	13100.000	UGG
0.0	24-feb-1988	99	TL	LT	8.320	UGG
0.0	24-feb-1988	99	ZN	LT	54.500	UGG
0.0	24-feb-1988	JB08	HG	LT	0.107	UGG
0.0	24-feb-1988	LM13	111TCE	ND	0.050	UGG
0.0	24-feb-1988	LM13	111TCE	ND	0.050	UGG
0.0	24-feb-1988	LM13	112TCE	ND	0.050	UGG
0.0	24-feb-1988	LM13	112TCE	ND	0.050	UGG
0.0	24-feb-1988	LM13	11DCE	ND	0.050	UGG
0.0	24-feb-1988	LM13	11DCE	ND	0.050	UGG
0.0	24-feb-1988	LM13	11DCLE	ND	0.050	UGG
0.0	24-feb-1988	LM13	12DCLB	ND	0.300	UGG
0.0	24-feb-1988	LM13	12DCLB	ND	0.300	UGG
0.0	24-feb-1988	LM13	12DCLE	ND	0.050	UGG
0.0	24-feb-1988	LM13	12DCLE	ND	0.050	UGG
0.0	24-feb-1988	LM13	12DCLP	ND	0.050	UGG
0.0	24-feb-1988	LM13	12DCLP	ND	0.050	UGG
0.0	24-feb-1988	LM13	13DCLB	ND	0.300	UGG
0.0	24-feb-1988	LM13	13DCLB	ND	0.300	UGG
0.0	24-feb-1988	LM13	14DCLB	ND	0.300	UGG
0.0	24-feb-1988	LM13	14DCLB	ND	0.300	UGG
0.0	24-feb-1988	LM13	2CLEVE	ND	0.600	UGG
0.0	24-feb-1988	LM13	2CLEVE	ND	0.600	UGG
0.0	24-feb-1988	LM13	BRDCLM	ND	0.050	UGG
0.0	24-feb-1988	LM13	BRDCLM	ND	0.050	UGG
0.0	24-feb-1988	LM13	C13DCP	ND	0.600	UGG
0.0	24-feb-1988	LM13	C13DCP	ND	0.600	UGG

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Site: BORE SSDS-04-01 (continued)

SAMPLE DEPTH (ft)	SAMPLE DATE	TEST METHOD	COMPOUND	BOOL	CONCENTRATION	UNITS
0.0	24-feb-1988	LM13	C2H3CL	ND	0.100	UGG
0.0	24-feb-1988	LM13	C2H3CL	ND	0.100	UGG
0.0	24-feb-1988	LM13	C2H5CL	ND	0.100	UGG
0.0	24-feb-1988	LM13	C2H5CL	ND	0.100	UGG
0.0	24-feb-1988	LM13	C6H6	ND	0.600	UGG
0.0	24-feb-1988	LM13	C6H6	ND	0.600	UGG
0.0	24-feb-1988	LM13	CCL4	ND	0.050	UGG
0.0	24-feb-1988	LM13	CCL4	ND	0.050	UGG
0.0	24-feb-1988	LM13	CH2CL2	ND	0.050	UGG
0.0	24-feb-1988	LM13	CH2CL2	ND	0.050	UGG
0.0	24-feb-1988	LM13	CH3BR	ND	0.100	UGG
0.0	24-feb-1988	LM13	CH3BR	ND	0.100	UGG
0.0	24-feb-1988	LM13	CH3CL	ND	0.100	UGG
0.0	24-feb-1988	LM13	CH3CL	ND	0.100	UGG
0.0	24-feb-1988	LM13	CHBR3	ND	0.100	UGG
0.0	24-feb-1988	LM13	CHBR3	ND	0.100	UGG
0.0	24-feb-1988	LM13	CHCL3	ND	0.050	UGG
0.0	24-feb-1988	LM13	CHCL3	ND	0.050	UGG
0.0	24-feb-1988	LM13	CLC6H5	ND	0.630	UGG
0.0	24-feb-1988	LM13	CLC6H5	ND	0.630	UGG
0.0	24-feb-1988	LM13	DBRCLM	ND	0.050	UGG
0.0	24-feb-1988	LM13	DBRCLM	ND	0.050	UGG
0.0	24-feb-1988	LM13	ETC6H5	ND	0.050	UGG
0.0	24-feb-1988	LM13	ETC6H5	ND	0.050	UGG
0.0	24-feb-1988	LM13	MEC6H5	ND	0.050	UGG
0.0	24-feb-1988	LM13	MEC6H5	ND	0.050	UGG
0.0	24-feb-1988	LM13	T12DCE	ND	0.630	UGG
0.0	24-feb-1988	LM13	T12DCE	ND	0.630	UGG
0.0	24-feb-1988	LM13	T13DCP	ND	0.050	UGG
0.0	24-feb-1988	LM13	T13DCP	ND	0.050	UGG
0.0	24-feb-1988	LM13	TCLEA	ND	0.050	UGG
0.0	24-feb-1988	LM13	TCLEE	ND	0.050	UGG
0.0	24-feb-1988	LM13	TCLEE	ND	0.050	UGG
0.0	24-feb-1988	LM13	TRCLE	LT	0.145	UGG
0.0	24-feb-1988	LM13	TRCLE	LT	0.141	UGG
0.0	24-feb-1988	LM14	124TCB	ND	0.300	UGG
0.0	24-feb-1988	LM14	12DPH	ND	0.300	UGG
0.0	24-feb-1988	LM14	246TCP	ND	0.300	UGG
0.0	24-feb-1988	LM14	24DCLP	ND	0.300	UGG
0.0	24-feb-1988	LM14	24DMPN	ND	0.300	UGG
0.0	24-feb-1988	LM14	24DNP	ND	2.000	UGG
0.0	24-feb-1988	LM14	24DNT	ND	0.300	UGG
0.0	24-feb-1988	LM14	26DNT	ND	0.300	UGG
0.0	24-feb-1988	LM14	2CLP	ND	0.300	UGG
0.0	24-feb-1988	LM14	2CNAP	ND	0.300	UGG
0.0	24-feb-1988	LM14	2NP	ND	0.300	UGG
0.0	24-feb-1988	LM14	33DCBD	ND	0.700	UGG

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SAMPLE DEPTH (ft)	SAMPLE DATE	TEST METHOD	COMPOUND	BOOL	CONCENTRATION	UNITS
0.0	24-feb-1988	LM14	46DN2C	ND	2.000	UGG
0.0	24-feb-1988	LM14	4BRPPE	ND	0.300	UGG
0.0	24-feb-1988	LM14	4CL3C	ND	0.300	UGG
0.0	24-feb-1988	LM14	4CLPPE	ND	0.300	UGG
0.0	24-feb-1988	LM14	4NP	ND	2.000	UGG
0.0	24-feb-1988	LM14	ABHC	ND	0.500	UGG
0.0	24-feb-1988	LM14	AENSLF	ND	0.500	UGG
0.0	24-feb-1988	LM14	ALDRN	ND	0.500	UGG
0.0	24-feb-1988	LM14	ANAPNE	ND	0.300	UGG
0.0	24-feb-1988	LM14	ANAPYL	ND	0.300	UGG
0.0	24-feb-1988	LM14	ANTRC	ND	0.300	UGG
0.0	24-feb-1988	LM14	B2CEXM	ND	0.300	UGG
0.0	24-feb-1988	LM14	B2CIPE	ND	0.300	UGG
0.0	24-feb-1988	LM14	B2CLEE	ND	0.300	UGG
0.0	24-feb-1988	LM14	B2EHP	ND	0.300	UGG
0.0	24-feb-1988	LM14	BAANTR		0.500	UGG
0.0	24-feb-1988	LM14	BAPYR		0.660	UGG
0.0	24-feb-1988	LM14	BBFANT		0.600	UGG
0.0	24-feb-1988	LM14	BBHC	ND	0.500	UGG
0.0	24-feb-1988	LM14	BBZP	ND	0.300	UGG
0.0	24-feb-1988	LM14	BENSLF	ND	1.000	UGG
0.0	24-feb-1988	LM14	BENZID	ND	1.650	UGG
0.0	24-feb-1988	LM14	BGHIPY	ND	0.300	UGG
0.0	24-feb-1988	LM14	BKFANT	ND	0.300	UGG
0.0	24-feb-1988	LM14	C2H5CL	ND	0.100	UGG
0.0	24-feb-1988	LM14	CHRY		1.650	UGG
0.0	24-feb-1988	LM14	CL6BZ	ND	0.300	UGG
0.0	24-feb-1988	LM14	CL6CP	ND	0.300	UGG
0.0	24-feb-1988	LM14	CL6ET	ND	0.300	UGG
0.0	24-feb-1988	LM14	CLDAN	ND	5.000	UGG
0.0	24-feb-1988	LM14	DBAHA	ND	0.300	UGG
0.0	24-feb-1988	LM14	DBHC	ND	0.500	UGG
0.0	24-feb-1988	LM14	DEP	ND	0.300	UGG
0.0	24-feb-1988	LM14	DLDRN	ND	1.000	UGG
0.0	24-feb-1988	LM14	DMP	ND	0.300	UGG
0.0	24-feb-1988	LM14	DNBP	ND	0.300	UGG
0.0	24-feb-1988	LM14	DNOP	ND	0.300	UGG
0.0	24-feb-1988	LM14	ENDRN	ND	1.000	UGG
0.0	24-feb-1988	LM14	ENDRNA	ND	0.660	UGG
0.0	24-feb-1988	LM14	ESFSO4	ND	1.000	UGG
0.0	24-feb-1988	LM14	FANT	ND	0.300	UGG
0.0	24-feb-1988	LM14	FLRENE	ND	0.300	UGG
0.0	24-feb-1988	LM14	GBHC	ND	0.500	UGG
0.0	24-feb-1988	LM14	HCBD	ND	0.300	UGG
0.0	24-feb-1988	LM14	HPCL	ND	0.500	UGG
0.0	24-feb-1988	LM14	HPCLE	ND	0.500	UGG
0.0	24-feb-1988	LM14	HXAB2E		24.600	UGG
0.0	24-feb-1988	LM14	ICDPYR	ND	0.300	UGG

Analytical Results for Chemical Soil
From: 01-jan-1988 To: 27-nov-90

Site: BORE SSDS-04-01 (continued)

SAMPLE DEPTH (ft)	SAMPLE DATE	TEST METHOD	COMPOUND	BOOL	CONCENTRATION	UNITS
0.0	24-feb-1988	LM14	ISOPHR	ND	0.300	UGG
0.0	24-feb-1988	LM14	LIN	ND	0.061	UGG
0.0	24-feb-1988	LM14	NAP	ND	0.300	UGG
0.0	24-feb-1988	LM14	NB	ND	0.300	UGG
0.0	24-feb-1988	LM14	NNDMEA	ND	0.330	UGG
0.0	24-feb-1988	LM14	NNDNPA	ND	0.330	UGG
0.0	24-feb-1988	LM14	PCB016	ND	5.000	UGG
0.0	24-feb-1988	LM14	PCB221	ND	5.000	UGG
0.0	24-feb-1988	LM14	PCB232	ND	5.000	UGG
0.0	24-feb-1988	LM14	PCB242	ND	5.000	UGG
0.0	24-feb-1988	LM14	PCB248	ND	5.000	UGG
0.0	24-feb-1988	LM14	PCB254	ND	10.000	UGG
0.0	24-feb-1988	LM14	PCB260	ND	10.000	UGG
0.0	24-feb-1988	LM14	PCP	ND	2.000	UGG
0.0	24-feb-1988	LM14	PHANTR	ND	0.300	UGG
0.0	24-feb-1988	LM14	PHENOL	ND	0.300	UGG
0.0	24-feb-1988	LM14	PPDDD	ND	1.000	UGG
0.0	24-feb-1988	LM14	PPDDE	LT	0.090	UGG
0.0	24-feb-1988	LM14	PPDDT	ND	0.490	UGG
0.0	24-feb-1988	LM14	PYR		5.400	UGG
0.0	24-feb-1988	LM14	TXPHEN	ND	7.000	UGG
0.0	24-feb-1988	LM14	UNK585		10.600	UGG
0.0	24-feb-1988	LM14	UNK586		8.140	UGG
0.0	24-feb-1988	LM14	UNK587		7.010	UGG
0.0	24-feb-1988	LM14	UNK588		6.950	UGG
0.0	24-feb-1988	LM14	UNK589		10.700	UGG
0.0	24-feb-1988	LM14	UNK590		11.900	UGG
0.0	24-feb-1988	LM14	UNK591		10.300	UGG
0.0	24-feb-1988	LM14	UNK596		0.570	UGG
0.0	24-feb-1988	LM14	UNK597		1.060	UGG
0.0	24-feb-1988	LM14	UNK601		1.060	UGG
0.0	24-feb-1988	LM14	UNK602		0.820	UGG
0.0	24-feb-1988	LM14	UNK603		1.070	UGG
0.0	24-feb-1988	LM14	UNK604		0.560	UGG
0.0	24-feb-1988	LM14	UNK605		0.490	UGG
0.0	24-feb-1988	LM14	UNK606		0.470	UGG
0.0	24-feb-1988	LM14	UNK616		7.220	UGG
0.0	24-feb-1988	LM14	UNK617		14.200	UGG
0.0	24-feb-1988	LM14	UNK618		5.590	UGG
0.0	24-feb-1988	LM14	UNK619		10.600	UGG
0.0	24-feb-1988	LM14	UNK620		9.290	UGG
0.0	24-feb-1988	LM14	UNK621		14.500	UGG
0.0	24-feb-1988	LM14	UNK622		28.000	UGG
0.0	24-feb-1988	LM14	UNK623		11.500	UGG
0.0	24-feb-1988	LM14	UNK624		11.000	UGG
0.0	24-feb-1988	LM14	UNK625		7.310	UGG
0.0	24-feb-1988	LM14	UNK626		9.280	UGG
0.0	24-feb-1988	LM14	UNK627		12.700	UGG

Analytical Results for Chemical Soil
From: 01-jan-1988 To: 27-nov-90

Site: BORE SSDS-04-01 (continued)

SAMPLE DEPTH (ft)	SAMPLE DATE	TEST METHOD	COMPOUND	BOOL	CONCENTRATION	UNITS
0.0	24-feb-1988	LW02	135TNB	LT	1.740	UGG
0.0	24-feb-1988	LW02	13DN8	LT	0.558	UGG
0.0	24-feb-1988	LW02	246TNT	LT	1.820	UGG
0.0	24-feb-1988	LW02	24DNT	LT	0.397	UGG
0.0	24-feb-1988	LW02	26DNT	LT	0.378	UGG
0.0	24-feb-1988	LW02	HMX	LT	1.210	UGG
0.0	24-feb-1988	LW02	NB	LT	0.405	UGG
0.0	24-feb-1988	LW02	RDX	LT	0.858	UGG
0.0	24-feb-1988	LW02	TETRYL	LT	0.262	UGG

Site: BORE SSDS-04-02

SAMPLE DEPTH (ft)	SAMPLE DATE	TEST METHOD	COMPOUND	BOOL	CONCENTRATION	UNITS
0.5	24-feb-1988	99	AG	LT	0.708	UGG
0.5	24-feb-1988	99	AS		9.640	UGG
0.5	24-feb-1988	99	BE	LT	0.361	UGG
0.5	24-feb-1988	99	BR	LT	100.000	UGG
0.5	24-feb-1988	99	CD		0.933	UGG
0.5	24-feb-1988	99	CL	LT	13700.000	UGG
0.5	24-feb-1988	99	CR		13.200	UGG
0.5	24-feb-1988	99	CU		19.600	UGG
0.5	24-feb-1988	99	F	LT	10.700	UGG
0.5	24-feb-1988	99	NA		175.000	UGG
0.5	24-feb-1988	99	NI		9.480	UGG
0.5	24-feb-1988	99	NIT	LT	0.000	UGG
0.5	24-feb-1988	99	NIT	LT	0.000	UGG
0.5	24-feb-1988	99	PB		26.700	UGG
0.5	24-feb-1988	99	SB	LT	27.700	UGG
0.5	24-feb-1988	99	SE	LT	2.300	UGG
0.5	24-feb-1988	99	SO4	LT	13700.000	UGG
0.5	24-feb-1988	99	TL	LT	8.670	UGG
0.5	24-feb-1988	99	ZN		142.000	UGG
0.5	24-feb-1988	JB08	HG	LT	0.111	UGG
0.5	24-feb-1988	LM13	111TCE	ND	0.050	UGG
0.5	24-feb-1988	LM13	112TCE	ND	0.050	UGG
0.5	24-feb-1988	LM13	11DCE	ND	0.050	UGG
0.5	24-feb-1988	LM13	12DCLB	ND	0.300	UGG
0.5	24-feb-1988	LM13	12DCLE	ND	0.050	UGG
0.5	24-feb-1988	LM13	12DCLP	ND	0.050	UGG
0.5	24-feb-1988	LM13	13DCLB	ND	0.300	UGG
0.5	24-feb-1988	LM13	14DCLB	ND	0.300	UGG
0.5	24-feb-1988	LM13	2CLEVE	ND	0.600	UGG
0.5	24-feb-1988	LM13	BRDCLM	ND	0.050	UGG

Site: BORE SSDS-04-02 (continued)

SAMPLE DEPTH (ft)	SAMPLE DATE	TEST METHOD	COMPOUND	BOOL	CONCENTRATION	UNITS
0.5	24-feb-1988	LM13	C13DCP	ND	0.600	UGG
0.5	24-feb-1988	LM13	C2H3CL	ND	0.100	UGG
0.5	24-feb-1988	LM13	C2H5CL	ND	0.100	UGG
0.5	24-feb-1988	LM13	C6H6	ND	0.600	UGG
0.5	24-feb-1988	LM13	CCL4	ND	0.050	UGG
0.5	24-feb-1988	LM13	CH2CL2	ND	0.050	UGG
0.5	24-feb-1988	LM13	CH3BR	ND	0.100	UGG
0.5	24-feb-1988	LM13	CH3CL	ND	0.100	UGG
0.5	24-feb-1988	LM13	CHBR3	ND	0.100	UGG
0.5	24-feb-1988	LM13	CHCL3	ND	0.050	UGG
0.5	24-feb-1988	LM13	CLC6H5	ND	0.630	UGG
0.5	24-feb-1988	LM13	DBRCLM	ND	0.050	UGG
0.5	24-feb-1988	LM13	ETC6H5	ND	0.050	UGG
0.5	24-feb-1988	LM13	MEC6H5	ND	0.050	UGG
0.5	24-feb-1988	LM13	T12DCE	ND	0.630	UGG
0.5	24-feb-1988	LM13	T13DCP	ND	0.050	UGG
0.5	24-feb-1988	LM13	TCLEE	ND	0.050	UGG
0.5	24-feb-1988	LM13	TRCLE	LT	0.141	UGG
0.5	24-feb-1988	LM14	124TCB	ND	0.300	UGG
0.5	24-feb-1988	LM14	12DPH	ND	0.300	UGG
0.5	24-feb-1988	LM14	246TCP	ND	0.300	UGG
0.5	24-feb-1988	LM14	24DCLP	ND	0.300	UGG
0.5	24-feb-1988	LM14	24DMPN	ND	0.300	UGG
0.5	24-feb-1988	LM14	24DNP	ND	2.000	UGG
0.5	24-feb-1988	LM14	24DNT	ND	0.300	UGG
0.5	24-feb-1988	LM14	26DNT	ND	0.300	UGG
0.5	24-feb-1988	LM14	2CLP	ND	0.300	UGG
0.5	24-feb-1988	LM14	2CNAP	ND	0.300	UGG
0.5	24-feb-1988	LM14	2NP	ND	0.300	UGG
0.5	24-feb-1988	LM14	33DCBD	ND	0.700	UGG
0.5	24-feb-1988	LM14	4DN2C	ND	2.000	UGG
0.5	24-feb-1988	LM14	4BRPPE	ND	0.300	UGG
0.5	24-feb-1988	LM14	4CL3C	ND	0.300	UGG
0.5	24-feb-1988	LM14	4CLPPE	ND	0.300	UGG
0.5	24-feb-1988	LM14	4NP	ND	2.000	UGG
0.5	24-feb-1988	LM14	ABHC	ND	0.500	UGG
0.5	24-feb-1988	LM14	AENSLF	ND	0.500	UGG
0.5	24-feb-1988	LM14	ALDRN	ND	0.500	UGG
0.5	24-feb-1988	LM14	ANAPNE	ND	0.300	UGG
0.5	24-feb-1988	LM14	ANAPYL	ND	0.300	UGG
0.5	24-feb-1988	LM14	ANTRC	ND	0.300	UGG
0.5	24-feb-1988	LM14	B2CEXM	ND	0.300	UGG
0.5	24-feb-1988	LM14	B2CIPE	ND	0.300	UGG
0.5	24-feb-1988	LM14	B2CLEE	ND	0.300	UGG
0.5	24-feb-1988	LM14	B2EHP	ND	0.300	UGG
0.5	24-feb-1988	LM14	BAANTR	ND	0.300	UGG
0.5	24-feb-1988	LM14	BAPYR	ND	0.300	UGG

Analytical Results for Chemical Soil
From: 01-jan-1988 To: 27-nov-90

Site: BORE SSDS-04-02 (continued)

SAMPLE DEPTH (ft)	SAMPLE DATE	TEST METHOD	COMPOUND	BOOL	CONCENTRATION	UNITS
0.5	24-feb-1988	LM14	BBFANT	ND	0.300	UGG
0.5	24-feb-1988	LM14	BBHC	ND	0.500	UGG
0.5	24-feb-1988	LM14	BBZP	ND	0.300	UGG
0.5	24-feb-1988	LM14	BENSLF	ND	1.000	UGG
0.5	24-feb-1988	LM14	BENZID	ND	1.650	UGG
0.5	24-feb-1988	LM14	BGHIPY	ND	0.300	UGG
0.5	24-feb-1988	LM14	BKFANT	ND	0.300	UGG
0.5	24-feb-1988	LM14	C2H5CL	ND	0.100	UGG
0.5	24-feb-1988	LM14	CHRY		0.410	UGG
0.5	24-feb-1988	LM14	CL6BZ	ND	0.300	UGG
0.5	24-feb-1988	LM14	CL6CP	ND	0.300	UGG
0.5	24-feb-1988	LM14	CL6ET	ND	0.300	UGG
0.5	24-feb-1988	LM14	CLDAN	ND	5.000	UGG
0.5	24-feb-1988	LM14	DBAHA	ND	0.300	UGG
0.5	24-feb-1988	LM14	DBHC	ND	0.500	UGG
0.5	24-feb-1988	LM14	DEP	ND	0.300	UGG
0.5	24-feb-1988	LM14	DLDRN	ND	1.000	UGG
0.5	24-feb-1988	LM14	DMP	ND	0.300	UGG
0.5	24-feb-1988	LM14	DNBP	ND	0.300	UGG
0.5	24-feb-1988	LM14	DNOP	ND	0.300	UGG
0.5	24-feb-1988	LM14	ENDRN	ND	1.000	UGG
0.5	24-feb-1988	LM14	ENDRNA	ND	0.660	UGG
0.5	24-feb-1988	LM14	ESFSO4	ND	1.000	UGG
0.5	24-feb-1988	LM14	FANT	ND	0.300	UGG
0.5	24-feb-1988	LM14	FLRENE	ND	0.300	UGG
0.5	24-feb-1988	LM14	GBHC	ND	0.500	UGG
0.5	24-feb-1988	LM14	HCBD	ND	0.300	UGG
0.5	24-feb-1988	LM14	HPCL	ND	0.500	UGG
0.5	24-feb-1988	LM14	HPCLE	ND	0.500	UGG
0.5	24-feb-1988	LM14	ICDPYR	ND	0.300	UGG
0.5	24-feb-1988	LM14	ISOPHR	ND	0.300	UGG
0.5	24-feb-1988	LM14	LIN	ND	0.061	UGG
0.5	24-feb-1988	LM14	NAP	ND	0.300	UGG
0.5	24-feb-1988	LM14	NB	ND	0.300	UGG
0.5	24-feb-1988	LM14	NNDMEA	ND	0.330	UGG
0.5	24-feb-1988	LM14	NNDNPA	ND	0.330	UGG
0.5	24-feb-1988	LM14	PCB016	ND	5.000	UGG
0.5	24-feb-1988	LM14	PCB221	ND	5.000	UGG
0.5	24-feb-1988	LM14	PCB232	ND	5.000	UGG
0.5	24-feb-1988	LM14	PCB242	ND	5.000	UGG
0.5	24-feb-1988	LM14	PCB248	ND	5.000	UGG
0.5	24-feb-1988	LM14	PCB254	ND	10.000	UGG
0.5	24-feb-1988	LM14	PCB260	ND	10.000	UGG
0.5	24-feb-1988	LM14	PCP	ND	2.000	UGG
0.5	24-feb-1988	LM14	PHANTR	ND	0.300	UGG
0.5	24-feb-1988	LM14	PHENOL	ND	0.300	UGG
0.5	24-feb-1988	LM14	PPDDD	ND	1.000	UGG
0.5	24-feb-1988	LM14	PPDDE	LT	0.090	UGG

Site: BORE SSDS-04-02 (continued)

SAMPLE DEPTH (ft)	SAMPLE DATE	TEST METHOD	COMPOUND	BOOL	CONCENTRATION	UNITS
0.5	24-feb-1988	LM14	PPDDT	ND	0.490	UGG
0.5	24-feb-1988	LM14	PYR	ND	0.300	UGG
0.5	24-feb-1988	LM14	TXPHEN	ND	7.000	UGG
0.5	24-feb-1988	LM14	UNK543		0.660	UGG
0.5	24-feb-1988	LM14	UNK544		0.300	UGG
0.5	24-feb-1988	LM14	UNK590		0.500	UGG
0.5	24-feb-1988	LM14	UNK592		0.960	UGG
0.5	24-feb-1988	LM14	UNK593		1.820	UGG
0.5	24-feb-1988	LM14	UNK594		1.250	UGG
0.5	24-feb-1988	LM14	UNK595		1.350	UGG
0.5	24-feb-1988	LM14	UNK596		0.650	UGG
0.5	24-feb-1988	LM14	UNK597		0.470	UGG
0.5	24-feb-1988	LM14	UNK598		0.330	UGG
0.5	24-feb-1988	LM14	UNK599		0.350	UGG
0.5	24-feb-1988	LM14	UNK600		0.690	UGG
0.5	24-feb-1988	LM14	UNK601		0.300	UGG
0.5	24-feb-1988	LM14	UNK602		0.320	UGG
0.5	24-feb-1988	LM14	UNK603		0.910	UGG
0.5	24-feb-1988	LM14	UNK604		0.910	UGG
0.5	24-feb-1988	LM14	UNK605		0.350	UGG
0.5	24-feb-1988	LM14	UNK606		0.470	UGG
0.5	24-feb-1988	LM14	UNK607		0.450	UGG
0.5	24-feb-1988	LM14	UNK608		0.910	UGG
0.5	24-feb-1988	LM14	UNK609		0.760	UGG
0.5	24-feb-1988	LM14	UNK610		0.560	UGG
0.5	24-feb-1988	LM14	UNK611		0.510	UGG
0.5	24-feb-1988	LM14	UNK612		1.170	UGG
0.5	24-feb-1988	LM14	UNK613		0.500	UGG
0.5	24-feb-1988	LW02	135TNB	LT	1.800	UGG
0.5	24-feb-1988	LW02	13DNB	LT	0.578	UGG
0.5	24-feb-1988	LW02	246TNT	LT	1.880	UGG
0.5	24-feb-1988	LW02	24DNT	LT	0.412	UGG
0.5	24-feb-1988	LW02	26DNT	LT	0.392	UGG
0.5	24-feb-1988	LW02	HMX	LT	1.260	UGG
0.5	24-feb-1988	LW02	NB	LT	0.419	UGG
0.5	24-feb-1988	LW02	RDX	LT	0.889	UGG
0.5	24-feb-1988	LW02	TETRYL	LT	0.272	UGG

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From: 01-jan-1988 To: 27-nov-90

Site: BORE SSDS-04-03 (continued)

SAMPLE DEPTH (ft)	SAMPLE DATE	TEST METHOD	COMPOUND	BOOL	CONCENTRATION	UNITS
1.0	24-feb-1988	LM14	DMP	ND	0.300	UGG
1.0	24-feb-1988	LM14	DNBP	ND	0.300	UGG
1.0	24-feb-1988	LM14	DNOP	ND	0.300	UGG
1.0	24-feb-1988	LM14	ENDRN	ND	1.000	UGG
1.0	24-feb-1988	LM14	ENDRNA	ND	0.660	UGG
1.0	24-feb-1988	LM14	ESFSO4	ND	1.000	UGG
1.0	24-feb-1988	LM14	FANT	ND	0.300	UGG
1.0	24-feb-1988	LM14	FLRENE	ND	0.300	UGG
1.0	24-feb-1988	LM14	GBHC	ND	0.500	UGG
1.0	24-feb-1988	LM14	HCBD	ND	0.300	UGG
1.0	24-feb-1988	LM14	HPCL	ND	0.500	UGG
1.0	24-feb-1988	LM14	HPCLE	ND	0.500	UGG
1.0	24-feb-1988	LM14	ICDPYR	ND	0.300	UGG
1.0	24-feb-1988	LM14	ISOPHR	ND	0.300	UGG
1.0	24-feb-1988	LM14	LIN	ND	0.061	UGG
1.0	24-feb-1988	LM14	NAP	ND	0.300	UGG
1.0	24-feb-1988	LM14	NB	ND	0.300	UGG
1.0	24-feb-1988	LM14	NNDMEA	ND	0.330	UGG
1.0	24-feb-1988	LM14	NNDNPA	ND	0.330	UGG
1.0	24-feb-1988	LM14	PCB016	ND	5.000	UGG
1.0	24-feb-1988	LM14	PCB221	ND	5.000	UGG
1.0	24-feb-1988	LM14	PCB232	ND	5.000	UGG
1.0	24-feb-1988	LM14	PCB242	ND	5.000	UGG
1.0	24-feb-1988	LM14	PCB248	ND	5.000	UGG
1.0	24-feb-1988	LM14	PCB254	ND	10.000	UGG
1.0	24-feb-1988	LM14	PCB260	ND	10.000	UGG
1.0	24-feb-1988	LM14	PCP	ND	2.000	UGG
1.0	24-feb-1988	LM14	PHANTR	ND	0.300	UGG
1.0	24-feb-1988	LM14	PHENOL	ND	0.300	UGG
1.0	24-feb-1988	LM14	PPDDD	ND	1.000	UGG
1.0	24-feb-1988	LM14	PPDDE	LT	0.090	UGG
1.0	24-feb-1988	LM14	PPDDT	ND	0.490	UGG
1.0	24-feb-1988	LM14	PYR	ND	0.300	UGG
1.0	24-feb-1988	LM14	TXPHEN	ND	7.000	UGG
1.0	24-feb-1988	LM14	UNK586		0.630	UGG
1.0	24-feb-1988	LM14	UNK587		1.020	UGG
1.0	24-feb-1988	LM14	UNK588		0.640	UGG
1.0	24-feb-1988	LM14	UNK589		0.990	UGG
1.0	24-feb-1988	LM14	UNK590		1.040	UGG
1.0	24-feb-1988	LM14	UNK591		0.750	UGG
1.0	24-feb-1988	LM14	UNK592		1.080	UGG
1.0	24-feb-1988	LM14	UNK593		3.340	UGG
1.0	24-feb-1988	LM14	UNK594		0.810	UGG
1.0	24-feb-1988	LM14	UNK595		1.490	UGG
1.0	24-feb-1988	LM14	UNK596		0.790	UGG
1.0	24-feb-1988	LM14	UNK597		1.800	UGG
1.0	24-feb-1988	LM14	UNK598		1.690	UGG
1.0	24-feb-1988	LM14	UNK599		2.060	UGG

Site: BORE SSDS-04-03 (continued)

SAMPLE DEPTH (ft)	SAMPLE DATE	TEST METHOD	COMPOUND	BOOL	CONCENTRATION	UNITS
1.0	24-feb-1988	LM14	UNK603		0.370	UGG
1.0	24-feb-1988	LM14	UNK608		0.570	UGG
1.0	24-feb-1988	LM14	UNK609		0.470	UGG
1.0	24-feb-1988	LM14	UNK610		0.440	UGG
1.0	24-feb-1988	LM14	UNK611		0.320	UGG
1.0	24-feb-1988	LM14	UNK619		0.570	UGG
1.0	24-feb-1988	LM14	UNK621		0.560	UGG
1.0	24-feb-1988	LW02	135TNB	LT	1.890	UGG
1.0	24-feb-1988	LW02	13DNB	LT	0.606	UGG
1.0	24-feb-1988	LW02	246TNT	LT	1.970	UGG
1.0	24-feb-1988	LW02	24DNT	LT	0.431	UGG
1.0	24-feb-1988	LW02	26DNT	LT	0.411	UGG
1.0	24-feb-1988	LW02	HMX	LT	1.320	UGG
1.0	24-feb-1988	LW02	NB	LT	0.439	UGG
1.0	24-feb-1988	LW02	RDX	LT	0.931	UGG
1.0	24-feb-1988	LW02	TETRYL	LT	0.285	UGG

Site: BORE SSDS-05-01

SAMPLE DEPTH (ft)	SAMPLE DATE	TEST METHOD	COMPOUND	BOOL	CONCENTRATION	UNITS
0.0	24-feb-1988	99	AG	LT	0.695	UGG
0.0	24-feb-1988	99	AS		6.490	UGG
0.0	24-feb-1988	99	BE	LT	0.354	UGG
0.0	24-feb-1988	99	BR	LT	100.000	UGG
0.0	24-feb-1988	99	CD	LT	0.750	UGG
0.0	24-feb-1988	99	CL	LT	13400.000	UGG
0.0	24-feb-1988	99	CR		7.840	UGG
0.0	24-feb-1988	99	CU		11.000	UGG
0.0	24-feb-1988	99	F	LT	10.500	UGG
0.0	24-feb-1988	99	NA		126.000	UGG
0.0	24-feb-1988	99	NI		5.330	UGG
0.0	24-feb-1988	99	NIT	LT	0.000	UGG
0.0	24-feb-1988	99	PB		7.740	UGG
0.0	24-feb-1988	99	SB	LT	27.100	UGG
0.0	24-feb-1988	99	SE	LT	2.250	UGG
0.0	24-feb-1988	99	SO4	LT	13400.000	UGG
0.0	24-feb-1988	99	TL	LT	8.500	UGG
0.0	24-feb-1988	99	ZN		1020.000	UGG
0.0	24-feb-1988	JB08	HG	LT	0.109	UGG
0.0	24-feb-1988	LM13	111TCE	ND	0.050	UGG
0.0	24-feb-1988	LM13	112TCE	ND	0.050	UGG
0.0	24-feb-1988	LM13	11DCE	ND	0.050	UGG

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Site: BORE SSDS-05-01 (continued)

SAMPLE DEPTH (ft)	SAMPLE DATE	TEST METHOD	COMPOUND	BOOL	CONCENTRATION	UNITS
0.0	24-feb-1988	LM13	11DCLE	ND	0.050	UGG
0.0	24-feb-1988	LM13	12DCLB	ND	0.300	UGG
0.0	24-feb-1988	LM13	12DCLE	ND	0.050	UGG
0.0	24-feb-1988	LM13	12DCLP	ND	0.050	UGG
0.0	24-feb-1988	LM13	13DCLB	ND	0.300	UGG
0.0	24-feb-1988	LM13	14DCLB	ND	0.300	UGG
0.0	24-feb-1988	LM13	2CLEVE	ND	0.600	UGG
0.0	24-feb-1988	LM13	BRDCLM	ND	0.050	UGG
0.0	24-feb-1988	LM13	C13DCP	ND	0.600	UGG
0.0	24-feb-1988	LM13	C2H3CL	ND	0.100	UGG
0.0	24-feb-1988	LM13	C2H5CL	ND	0.100	UGG
0.0	24-feb-1988	LM13	C6H6	ND	0.600	UGG
0.0	24-feb-1988	LM13	CCL4	ND	0.050	UGG
0.0	24-feb-1988	LM13	CH2CL2	ND	0.050	UGG
0.0	24-feb-1988	LM13	CH3BR	ND	0.100	UGG
0.0	24-feb-1988	LM13	CH3CL	ND	0.100	UGG
0.0	24-feb-1988	LM13	CHBR3	ND	0.100	UGG
0.0	24-feb-1988	LM13	CHCL3	ND	0.050	UGG
0.0	24-feb-1988	LM13	CLC6H5	ND	0.630	UGG
0.0	24-feb-1988	LM13	DBRCLM	ND	0.050	UGG
0.0	24-feb-1988	LM13	ETC6H5	ND	0.050	UGG
0.0	24-feb-1988	LM13	MEC6H5	ND	0.050	UGG
0.0	24-feb-1988	LM13	T12DCE	ND	0.630	UGG
0.0	24-feb-1988	LM13	T13DCP	ND	0.050	UGG
0.0	24-feb-1988	LM13	TCLEA	ND	0.050	UGG
0.0	24-feb-1988	LM13	TCLEE	ND	0.050	UGG
0.0	24-feb-1988	LM13	TRCLE	LT	0.141	UGG
0.0	24-feb-1988	LM14	124TCB	ND	0.300	UGG
0.0	24-feb-1988	LM14	12DPH	ND	0.300	UGG
0.0	24-feb-1988	LM14	246TCP	ND	0.300	UGG
0.0	24-feb-1988	LM14	24DCLP	ND	0.300	UGG
0.0	24-feb-1988	LM14	24DMPN	ND	0.300	UGG
0.0	24-feb-1988	LM14	24DNP	ND	2.000	UGG
0.0	24-feb-1988	LM14	24DNT	ND	0.300	UGG
0.0	24-feb-1988	LM14	26DNT	ND	0.300	UGG
0.0	24-feb-1988	LM14	2CLP	ND	0.300	UGG
0.0	24-feb-1988	LM14	2CNAP	ND	0.300	UGG
0.0	24-feb-1988	LM14	2NP	ND	0.300	UGG
0.0	24-feb-1988	LM14	33DCBD	ND	0.700	UGG
0.0	24-feb-1988	LM14	46DN2C	ND	2.000	UGG
0.0	24-feb-1988	LM14	4BRPPE	ND	0.300	UGG
0.0	24-feb-1988	LM14	4CL3C	ND	0.300	UGG
0.0	24-feb-1988	LM14	4CLPPE	ND	0.300	UGG
0.0	24-feb-1988	LM14	4NP	ND	2.000	UGG
0.0	24-feb-1988	LM14	ABHC	ND	0.500	UGG
0.0	24-feb-1988	LM14	AENSLF	ND	0.500	UGG
0.0	24-feb-1988	LM14	ALDRN	ND	0.500	UGG

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Site: BORE SSDS-05-01 (continued)

SAMPLE DEPTH (ft)	SAMPLE DATE	TEST METHOD	COMPOUND	BOOL	CONCENTRATION	UNITS
0.0	24-feb-1988	LM14	ANAPNE	ND	0.300	UGG
0.0	24-feb-1988	LM14	ANAPYL	ND	0.300	UGG
0.0	24-feb-1988	LM14	ANTRC	ND	0.300	UGG
0.0	24-feb-1988	LM14	B2CEXM	ND	0.300	UGG
0.0	24-feb-1988	LM14	B2CIPE	ND	0.300	UGG
0.0	24-feb-1988	LM14	B2CLEE	ND	0.300	UGG
0.0	24-feb-1988	LM14	B2EHP	ND	0.300	UGG
0.0	24-feb-1988	LM14	BAANTR	ND	0.300	UGG
0.0	24-feb-1988	LM14	BAPYR	ND	0.300	UGG
0.0	24-feb-1988	LM14	BBFANT	ND	0.300	UGG
0.0	24-feb-1988	LM14	BBHC	ND	0.500	UGG
0.0	24-feb-1988	LM14	BBZP	ND	0.300	UGG
0.0	24-feb-1988	LM14	BENSLF	ND	1.000	UGG
0.0	24-feb-1988	LM14	BENZID	ND	1.650	UGG
0.0	24-feb-1988	LM14	BGHIPY	ND	0.300	UGG
0.0	24-feb-1988	LM14	BKFANT	ND	0.300	UGG
0.0	24-feb-1988	LM14	C2H5CL	ND	0.100	UGG
0.0	24-feb-1988	LM14	CHRY	ND	0.300	UGG
0.0	24-feb-1988	LM14	CL6BZ	ND	0.300	UGG
0.0	24-feb-1988	LM14	CL6CP	ND	0.300	UGG
0.0	24-feb-1988	LM14	CL6ET	ND	0.300	UGG
0.0	24-feb-1988	LM14	CLDAN	ND	5.000	UGG
0.0	24-feb-1988	LM14	DBAHA	ND	0.300	UGG
0.0	24-feb-1988	LM14	DBHC	ND	0.500	UGG
0.0	24-feb-1988	LM14	DEP	ND	0.300	UGG
0.0	24-feb-1988	LM14	DLDRN	ND	1.000	UGG
0.0	24-feb-1988	LM14	DMP	ND	0.300	UGG
0.0	24-feb-1988	LM14	DNBP	ND	0.300	UGG
0.0	24-feb-1988	LM14	DNOP	ND	0.300	UGG
0.0	24-feb-1988	LM14	ENDRN	ND	1.000	UGG
0.0	24-feb-1988	LM14	ENDRNA	ND	0.660	UGG
0.0	24-feb-1988	LM14	ESFSO4	ND	1.000	UGG
0.0	24-feb-1988	LM14	FANT	ND	0.300	UGG
0.0	24-feb-1988	LM14	FLRENE	ND	0.300	UGG
0.0	24-feb-1988	LM14	GBHC	ND	0.500	UGG
0.0	24-feb-1988	LM14	HCBD	ND	0.300	UGG
0.0	24-feb-1988	LM14	HPCL	ND	0.500	UGG
0.0	24-feb-1988	LM14	HPCLE	ND	0.500	UGG
0.0	24-feb-1988	LM14	HXAB2E		1.010	UGG
0.0	24-feb-1988	LM14	ICDPYR	ND	0.300	UGG
0.0	24-feb-1988	LM14	ISOPHR	ND	0.300	UGG
0.0	24-feb-1988	LM14	LIN	ND	0.061	UGG
0.0	24-feb-1988	LM14	NAP	ND	0.300	UGG
0.0	24-feb-1988	LM14	NB	ND	0.300	UGG
0.0	24-feb-1988	LM14	NNDMEA	ND	0.330	UGG
0.0	24-feb-1988	LM14	NNDNPA	ND	0.330	UGG
0.0	24-feb-1988	LM14	PCB016	ND	5.000	UGG
0.0	24-feb-1988	LM14	PCB221	ND	5.000	UGG

Site: BORE SSDS-05-01 (continued)

SAMPLE DEPTH (ft)	SAMPLE DATE	TEST METHOD	COMPOUND	BOOL	CONCENTRATION	UNITS
0.0	24-feb-1988	LM14	PCB232	ND	5.000	UGG
0.0	24-feb-1988	LM14	PCB242	ND	5.000	UGG
0.0	24-feb-1988	LM14	PCB248	ND	5.000	UGG
0.0	24-feb-1988	LM14	PCB254	ND	10.000	UGG
0.0	24-feb-1988	LM14	PCB260	ND	10.000	UGG
0.0	24-feb-1988	LM14	PCP	ND	2.000	UGG
0.0	24-feb-1988	LM14	PHANTR	ND	0.300	UGG
0.0	24-feb-1988	LM14	PHENOL	ND	0.300	UGG
0.0	24-feb-1988	LM14	PPDDD	ND	1.000	UGG
0.0	24-feb-1988	LM14	PPDDE	LT	0.090	UGG
0.0	24-feb-1988	LM14	PPDDT	ND	0.490	UGG
0.0	24-feb-1988	LM14	PYR	ND	0.300	UGG
0.0	24-feb-1988	LM14	TXPHEN	ND	7.000	UGG
0.0	24-feb-1988	LM14	UNK583		0.790	UGG
0.0	24-feb-1988	LM14	UNK584		1.400	UGG
0.0	24-feb-1988	LM14	UNK594		0.750	UGG
0.0	24-feb-1988	LM14	UNK595		0.730	UGG
0.0	24-feb-1988	LM14	UNK596		1.100	UGG
0.0	24-feb-1988	LM14	UNK598		0.310	UGG
0.0	24-feb-1988	LM14	UNK600		0.300	UGG
0.0	24-feb-1988	LM14	UNK603		0.280	UGG
0.0	24-feb-1988	LM14	UNK620		1.560	UGG
0.0	24-feb-1988	LW02	135TNB	LT	1.780	UGG
0.0	24-feb-1988	LW02	13DNB	LT	0.571	UGG
0.0	24-feb-1988	LW02	246TNT	LT	1.860	UGG
0.0	24-feb-1988	LW02	24DNT	LT	0.406	UGG
0.0	24-feb-1988	LW02	26DNT	LT	0.387	UGG
0.0	24-feb-1988	LW02	HMX	LT	1.240	UGG
0.0	24-feb-1988	LW02	NB	LT	0.414	UGG
0.0	24-feb-1988	LW02	RDX	LT	0.877	UGG
0.0	24-feb-1988	LW02	TETRYL	LT	0.269	UGG

Site: BORE SSDS-05-02

SAMPLE DEPTH (ft)	SAMPLE DATE	TEST METHOD	COMPOUND	BOOL	CONCENTRATION	UNITS
0.5	24-feb-1988	99	AG	LT	0.698	UGG
0.5	24-feb-1988	99	AS		6.440	UGG
0.5	24-feb-1988	99	BE	LT	0.355	UGG
0.5	24-feb-1988	99	BR	LT	100.000	UGG
0.5	24-feb-1988	99	CD	LT	0.754	UGG
0.5	24-feb-1988	99	CL	LT	13500.000	UGG
0.5	24-feb-1988	99	CR		8.270	UGG
0.5	24-feb-1988	99	CU		12.800	UGG
0.5	24-feb-1988	99	F	LT	11.300	UGG

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SAMPLE DEPTH (ft)	SAMPLE DATE	TEST METHOD	COMPOUND	BOOL	CONCENTRATION	UNITS
0.5	24-feb-1988	99	NA		149.000	UGG
0.5	24-feb-1988	99	NI		6.970	UGG
0.5	24-feb-1988	99	NIT	LT	0.000	UGG
0.5	24-feb-1988	99	PB		6.840	UGG
0.5	24-feb-1988	99	SB	LT	27.200	UGG
0.5	24-feb-1988	99	SE	LT	2.260	UGG
0.5	24-feb-1988	99	SO4	LT	13500.000	UGG
0.5	24-feb-1988	99	TL	LT	8.540	UGG
0.5	24-feb-1988	99	ZN	LT	56.000	UGG
0.5	24-feb-1988	J808	HG	LT	0.110	UGG
0.5	24-feb-1988	LM13	111TCE	ND	0.050	UGG
0.5	24-feb-1988	LM13	112TCE	ND	0.050	UGG
0.5	24-feb-1988	LM13	11DCE	ND	0.050	UGG
0.5	24-feb-1988	LM13	11DCLE	ND	0.050	UGG
0.5	24-feb-1988	LM13	12DCLB	ND	0.300	UGG
0.5	24-feb-1988	LM13	12DCLE	ND	0.050	UGG
0.5	24-feb-1988	LM13	12DCLP	ND	0.050	UGG
0.5	24-feb-1988	LM13	13DCLB	ND	0.300	UGG
0.5	24-feb-1988	LM13	14DCLB	ND	0.300	UGG
0.5	24-feb-1988	LM13	2CLEVE	ND	0.600	UGG
0.5	24-feb-1988	LM13	8RDCLM	ND	0.050	UGG
0.5	24-feb-1988	LM13	C13DCP	ND	0.600	UGG
0.5	24-feb-1988	LM13	C2H3CL	ND	0.100	UGG
0.5	24-feb-1988	LM13	C2H5CL	ND	0.100	UGG
0.5	24-feb-1988	LM13	C6H6	ND	0.600	UGG
0.5	24-feb-1988	LM13	CCL4	ND	0.050	UGG
0.5	24-feb-1988	LM13	CH2CL2	ND	0.050	UGG
0.5	24-feb-1988	LM13	CH3BR	ND	0.100	UGG
0.5	24-feb-1988	LM13	CH3CL	ND	0.100	UGG
0.5	24-feb-1988	LM13	CHBR3	ND	0.100	UGG
0.5	24-feb-1988	LM13	CHCL3	ND	0.050	UGG
0.5	24-feb-1988	LM13	CLC6H5	ND	0.630	UGG
0.5	24-feb-1988	LM13	DBRCLM	ND	0.050	UGG
0.5	24-feb-1988	LM13	ETC6H5	ND	0.050	UGG
0.5	24-feb-1988	LM13	MEC6H5	ND	0.050	UGG
0.5	24-feb-1988	LM13	T12DCE	ND	0.630	UGG
0.5	24-feb-1988	LM13	T13DCP	ND	0.050	UGG
0.5	24-feb-1988	LM13	TCLEA	ND	0.050	UGG
0.5	24-feb-1988	LM13	TCLEE	ND	0.050	UGG
0.5	24-feb-1988	LM13	TRCLE	LT	0.141	UGG
0.5	24-feb-1988	LM14	124TCB	ND	0.300	UGG
0.5	24-feb-1988	LM14	12DPH	ND	0.300	UGG
0.5	24-feb-1988	LM14	246TCP	ND	0.300	UGG
0.5	24-feb-1988	LM14	24DCLP	ND	0.300	UGG
0.5	24-feb-1988	LM14	24DMPN	ND	0.300	UGG

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SAMPLE DEPTH (ft)	SAMPLE DATE	TEST METHOD	COMPOUND	BOOL	CONCENTRATION	UNITS
0.5	24-feb-1988	LM14	24DNP	ND	2.000	UGG
0.5	24-feb-1988	LM14	24DNT	ND	0.300	UGG
0.5	24-feb-1988	LM14	26DNT	ND	0.300	UGG
0.5	24-feb-1988	LM14	2CLP	ND	0.300	UGG
0.5	24-feb-1988	LM14	2CNAP	ND	0.300	UGG
0.5	24-feb-1988	LM14	2NP	ND	0.300	UGG
0.5	24-feb-1988	LM14	33DCBD	ND	0.700	UGG
0.5	24-feb-1988	LM14	46DN2C	ND	2.000	UGG
0.5	24-feb-1988	LM14	4BRPPE	ND	0.300	UGG
0.5	24-feb-1988	LM14	4CL3C	ND	0.300	UGG
0.5	24-feb-1988	LM14	4CLPPE	ND	0.300	UGG
0.5	24-feb-1988	LM14	4NP	ND	2.000	UGG
0.5	24-feb-1988	LM14	ABHC	ND	0.500	UGG
0.5	24-feb-1988	LM14	AENSLF	ND	0.500	UGG
0.5	24-feb-1988	LM14	ALDRN	ND	0.500	UGG
0.5	24-feb-1988	LM14	ANAPNE	ND	0.300	UGG
0.5	24-feb-1988	LM14	ANAPYL	ND	0.300	UGG
0.5	24-feb-1988	LM14	ANTRC	ND	0.300	UGG
0.5	24-feb-1988	LM14	B2CEXM	ND	0.300	UGG
0.5	24-feb-1988	LM14	B2CIPE	ND	0.300	UGG
0.5	24-feb-1988	LM14	B2CLEE	ND	0.300	UGG
0.5	24-feb-1988	LM14	B2EHP	ND	0.300	UGG
0.5	24-feb-1988	LM14	BAANTR	ND	0.300	UGG
0.5	24-feb-1988	LM14	BAPYR	ND	0.300	UGG
0.5	24-feb-1988	LM14	BBFANT	ND	0.300	UGG
0.5	24-feb-1988	LM14	BBHC	ND	0.500	UGG
0.5	24-feb-1988	LM14	BBZP	ND	0.300	UGG
0.5	24-feb-1988	LM14	BENSLF	ND	1.000	UGG
0.5	24-feb-1988	LM14	BENZID	ND	1.650	UGG
0.5	24-feb-1988	LM14	BGHIPY	ND	0.300	UGG
0.5	24-feb-1988	LM14	BKFANT	ND	0.300	UGG
0.5	24-feb-1988	LM14	C2H5CL	ND	0.100	UGG
0.5	24-feb-1988	LM14	CHRY	ND	0.300	UGG
0.5	24-feb-1988	LM14	CL6BZ	ND	0.300	UGG
0.5	24-feb-1988	LM14	CL6CP	ND	0.300	UGG
0.5	24-feb-1988	LM14	CL6ET	ND	0.300	UGG
0.5	24-feb-1988	LM14	CLDAN	ND	5.000	UGG
0.5	24-feb-1988	LM14	DBAHA	ND	0.300	UGG
0.5	24-feb-1988	LM14	DBHC	ND	0.500	UGG
0.5	24-feb-1988	LM14	DEP	ND	0.300	UGG
0.5	24-feb-1988	LM14	DLDRN	ND	1.000	UGG
0.5	24-feb-1988	LM14	DMP	ND	0.300	UGG
0.5	24-feb-1988	LM14	DNBP	ND	0.300	UGG
0.5	24-feb-1988	LM14	DNOP	ND	0.300	UGG
0.5	24-feb-1988	LM14	ENDRN	ND	1.000	UGG
0.5	24-feb-1988	LM14	ENDRNA	ND	0.660	UGG
0.5	24-feb-1988	LM14	ESFSO4	ND	1.000	UGG
0.5	24-feb-1988	LM14	FANT	ND	0.300	UGG

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SAMPLE DEPTH (ft)	SAMPLE DATE	TEST METHOD	COMPOUND	BOOL	CONCENTRATION	UNITS
0.5	24-feb-1988	LM14	FLRENE	ND	0.300	UGG
0.5	24-feb-1988	LM14	GBHC	ND	0.500	UGG
0.5	24-feb-1988	LM14	HCBD	ND	0.300	UGG
0.5	24-feb-1988	LM14	HPCL	ND	0.500	UGG
0.5	24-feb-1988	LM14	HPCLE	ND	0.500	UGG
0.5	24-feb-1988	LM14	ICDPYR	ND	0.300	UGG
0.5	24-feb-1988	LM14	ISOPHR	ND	0.300	UGG
0.5	24-feb-1988	LM14	LIN	ND	0.061	UGG
0.5	24-feb-1988	LM14	NAP	ND	0.300	UGG
0.5	24-feb-1988	LM14	NB	ND	0.300	UGG
0.5	24-feb-1988	LM14	NNDMEA	ND	0.330	UGG
0.5	24-feb-1988	LM14	NNDNPA	ND	0.330	UGG
0.5	24-feb-1988	LM14	PCB016	ND	5.000	UGG
0.5	24-feb-1988	LM14	PCB221	ND	5.000	UGG
0.5	24-feb-1988	LM14	PCB232	ND	5.000	UGG
0.5	24-feb-1988	LM14	PCB242	ND	5.000	UGG
0.5	24-feb-1988	LM14	PCB248	ND	5.000	UGG
0.5	24-feb-1988	LM14	PCB254	ND	10.000	UGG
0.5	24-feb-1988	LM14	PCB260	ND	10.000	UGG
0.5	24-feb-1988	LM14	PCP	ND	2.000	UGG
0.5	24-feb-1988	LM14	PHANTR	ND	0.300	UGG
0.5	24-feb-1988	LM14	PHENOL	ND	0.300	UGG
0.5	24-feb-1988	LM14	PPDDD	ND	1.000	UGG
0.5	24-feb-1988	LM14	PPDDE	LT	0.090	UGG
0.5	24-feb-1988	LM14	PPDDT	ND	0.490	UGG
0.5	24-feb-1988	LM14	PYR	ND	0.300	UGG
0.5	24-feb-1988	LM14	TXPHEN	ND	7.000	UGG
0.5	24-feb-1988	LM14	UNK594		1.100	UGG
0.5	24-feb-1988	LM14	UNK595		0.506	UGG
0.5	24-feb-1988	LM14	UNK596		1.100	UGG
0.5	24-feb-1988	LM14	UNK597		0.730	UGG
0.5	24-feb-1988	LM14	UNK598		0.310	UGG
0.5	24-feb-1988	LM14	UNK599		0.290	UGG
0.5	24-feb-1988	LM14	UNK600		0.300	UGG
0.5	24-feb-1988	LM14	UNK601		0.330	UGG
0.5	24-feb-1988	LM14	UNK603		0.280	UGG
0.5	24-feb-1988	LM14	UNK604		0.560	UGG
0.5	24-feb-1988	LW02	135TNB	LT	1.810	UGG
0.5	24-feb-1988	LW02	13DNB	LT	0.580	UGG
0.5	24-feb-1988	LW02	246TNT	LT	1.890	UGG
0.5	24-feb-1988	LW02	24DNT	LT	0.413	UGG
0.5	24-feb-1988	LW02	26DNT	LT	0.394	UGG
0.5	24-feb-1988	LW02	HMX	LT	1.260	UGG
0.5	24-feb-1988	LW02	NB	LT	0.421	UGG
0.5	24-feb-1988	LW02	RDX	LT	0.892	UGG
0.5	24-feb-1988	LW02	TETRYL	LT	0.273	UGG

Analytical Results for Chemical Soil
From: 01-jan-1988 To: 27-nov-90

Site: BORE SSDS-05-03

SAMPLE DEPTH (ft)	SAMPLE DATE	TEST METHOD	COMPOUND	BOOL	CONCENTRATION	UNITS
1.0	24-feb-1988	99	AG	LT	0.717	UGG
1.0	24-feb-1988	99	AS		7.220	UGG
1.0	24-feb-1988	99	BE	LT	0.365	UGG
1.0	24-feb-1988	99	BR	LT	100.000	UGG
1.0	24-feb-1988	99	CD	LT	0.774	UGG
1.0	24-feb-1988	99	CL	LT	13800.000	UGG
1.0	24-feb-1988	99	CR		12.400	UGG
1.0	24-feb-1988	99	CU		13.600	UGG
1.0	24-feb-1988	99	F	LT	11.100	UGG
1.0	24-feb-1988	99	NA		216.000	UGG
1.0	24-feb-1988	99	NI		8.470	UGG
1.0	24-feb-1988	99	NIT	LT	0.000	UGG
1.0	24-feb-1988	99	PB		8.760	UGG
1.0	24-feb-1988	99	SB	LT	28.000	UGG
1.0	24-feb-1988	99	SE	LT	2.320	UGG
1.0	24-feb-1988	99	SO4	LT	13800.000	UGG
1.0	24-feb-1988	99	TL	LT	8.770	UGG
1.0	24-feb-1988	99	ZN	LT	57.500	UGG
1.0	24-feb-1988	JB08	HG	LT	0.113	UGG
1.0	24-feb-1988	LM13	111TCE	ND	0.050	UGG
1.0	24-feb-1988	LM13	112TCE	ND	0.050	UGG
1.0	24-feb-1988	LM13	11DCE	ND	0.050	UGG
1.0	24-feb-1988	LM13	11DCLE	ND	0.050	UGG
1.0	24-feb-1988	LM13	12DCLB	ND	0.300	UGG
1.0	24-feb-1988	LM13	12DCLE	ND	0.050	UGG
1.0	24-feb-1988	LM13	12DCLP	ND	0.050	UGG
1.0	24-feb-1988	LM13	13DCLB	ND	0.300	UGG
1.0	24-feb-1988	LM13	14DCLB	ND	0.300	UGG
1.0	24-feb-1988	LM13	2CLEVE	ND	0.600	UGG
1.0	24-feb-1988	LM13	BRDCLM	ND	0.050	UGG
1.0	24-feb-1988	LM13	C13DCP	ND	0.600	UGG
1.0	24-feb-1988	LM13	C2H3CL	ND	0.100	UGG
1.0	24-feb-1988	LM13	C2H5CL	ND	0.100	UGG
1.0	24-feb-1988	LM13	C6H6	ND	0.600	UGG
1.0	24-feb-1988	LM13	CCL4	ND	0.050	UGG
1.0	24-feb-1988	LM13	CH2CL2	ND	0.050	UGG
1.0	24-feb-1988	LM13	CH3BR	ND	0.100	UGG
1.0	24-feb-1988	LM13	CH3CL	ND	0.100	UGG
1.0	24-feb-1988	LM13	CHBR3	ND	0.100	UGG
1.0	24-feb-1988	LM13	CHCL3	ND	0.050	UGG
1.0	24-feb-1988	LM13	CLC6H5	ND	0.630	UGG
1.0	24-feb-1988	LM13	DBRCLM	ND	0.050	UGG
1.0	24-feb-1988	LM13	ETC6H5	ND	0.050	UGG
1.0	24-feb-1988	LM13	MEC6H5	ND	0.050	UGG
1.0	24-feb-1988	LM13	T12DCE	ND	0.630	UGG
1.0	24-feb-1988	LM13	T13DCP	ND	0.050	UGG

Analytical Results for Chemical Soil
From: 01-jan-1988 To: 27-nov-90

Site: BORE SSDS-05-03 (continued)

SAMPLE DEPTH (ft)	SAMPLE DATE	TEST METHOD	COMPOUND	BOOL	CONCENTRATION	UNITS
1.0	24-feb-1988	LM13	TCLEA	ND	0.050	UGG
1.0	24-feb-1988	LM13	TCLEE	ND	0.050	UGG
1.0	24-feb-1988	LM13	TRCLE	LT	0.141	UGG
1.0	24-feb-1988	LM14	124TCB	ND	0.330	UGG
1.0	24-feb-1988	LM14	12DCLB	ND	0.630	UGG
1.0	24-feb-1988	LM14	12DPH	ND	0.330	UGG
1.0	24-feb-1988	LM14	13DCLB	ND	0.630	UGG
1.0	24-feb-1988	LM14	14DCLB	ND	0.630	UGG
1.0	24-feb-1988	LM14	246TCP	ND	0.330	UGG
1.0	24-feb-1988	LM14	24DCLP	ND	0.330	UGG
1.0	24-feb-1988	LM14	24DMPN	ND	0.330	UGG
1.0	24-feb-1988	LM14	24DNP	ND	1.650	UGG
1.0	24-feb-1988	LM14	24DNT	ND	0.330	UGG
1.0	24-feb-1988	LM14	26DNT	ND	0.330	UGG
1.0	24-feb-1988	LM14	2CLP	ND	0.330	UGG
1.0	24-feb-1988	LM14	2CNAP	ND	0.330	UGG
1.0	24-feb-1988	LM14	2NP	ND	0.330	UGG
1.0	24-feb-1988	LM14	33DCBD	ND	0.660	UGG
1.0	24-feb-1988	LM14	46DN2C	ND	1.650	UGG
1.0	24-feb-1988	LM14	4CL3C	ND	0.330	UGG
1.0	24-feb-1988	LM14	4CLPPE	ND	0.330	UGG
1.0	24-feb-1988	LM14	4NP	ND	1.650	UGG
1.0	24-feb-1988	LM14	ABHC	ND	0.660	UGG
1.0	24-feb-1988	LM14	AENSLF	ND	0.330	UGG
1.0	24-feb-1988	LM14	ALDRN	ND	0.660	UGG
1.0	24-feb-1988	LM14	ANAPNE	ND	0.330	UGG
1.0	24-feb-1988	LM14	ANAPYL	ND	0.330	UGG
1.0	24-feb-1988	LM14	ANTRC	ND	0.330	UGG
1.0	24-feb-1988	LM14	B2CEXM	ND	0.330	UGG
1.0	24-feb-1988	LM14	B2CLEE	ND	0.330	UGG
1.0	24-feb-1988	LM14	B2EHP	ND	0.330	UGG
1.0	24-feb-1988	LM14	BAANTR		0.060	UGG
1.0	24-feb-1988	LM14	BAPYR	ND	0.330	UGG
1.0	24-feb-1988	LM14	BBFANT	ND	0.330	UGG
1.0	24-feb-1988	LM14	BBHC	ND	0.660	UGG
1.0	24-feb-1988	LM14	BBZP	ND	0.330	UGG
1.0	24-feb-1988	LM14	BENSLF	ND	0.330	UGG
1.0	24-feb-1988	LM14	BENZID	ND	1.650	UGG
1.0	24-feb-1988	LM14	BGHIPY	ND	0.330	UGG
1.0	24-feb-1988	LM14	BKFANT	ND	0.330	UGG
1.0	24-feb-1988	LM14	CHRY	ND	0.330	UGG
1.0	24-feb-1988	LM14	CL6BZ	ND	0.330	UGG
1.0	24-feb-1988	LM14	CL6CP	ND	0.330	UGG
1.0	24-feb-1988	LM14	CL6ET	ND	0.330	UGG
1.0	24-feb-1988	LM14	CLDAN	ND	0.330	UGG
1.0	24-feb-1988	LM14	DBAHA	ND	0.330	UGG
1.0	24-feb-1988	LM14	DBHC	ND	0.660	UGG

Analytical Results for Chemical Soil
From: 01-jan-1988 To: 27-nov-90

Site: BORE SSDS-05-03 (continued)

SAMPLE DEPTH (ft)	SAMPLE DATE	TEST METHOD	COMPOUND	BOOL	CONCENTRATION	UNITS
1.0	24-feb-1988	LM14	DEP	ND	0.330	UGG
1.0	24-feb-1988	LM14	DLDRN	ND	0.660	UGG
1.0	24-feb-1988	LM14	DMP	ND	0.330	UGG
1.0	24-feb-1988	LM14	DNBP	ND	0.330	UGG
1.0	24-feb-1988	LM14	DNOP		0.040	UGG
1.0	24-feb-1988	LM14	ENDRN	ND	0.660	UGG
1.0	24-feb-1988	LM14	ESFSO4	ND	0.660	UGG
1.0	24-feb-1988	LM14	FANT	ND	0.330	UGG
1.0	24-feb-1988	LM14	FLRENE	ND	0.330	UGG
1.0	24-feb-1988	LM14	HCBD	ND	0.330	UGG
1.0	24-feb-1988	LM14	HPCL	ND	0.660	UGG
1.0	24-feb-1988	LM14	HPCLE	ND	0.660	UGG
1.0	24-feb-1988	LM14	ICDPYR	ND	0.330	UGG
1.0	24-feb-1988	LM14	ISOPHR	ND	0.330	UGG
1.0	24-feb-1988	LM14	LIN	LT	0.058	UGG
1.0	24-feb-1988	LM14	NAP	ND	0.330	UGG
1.0	24-feb-1988	LM14	NB	ND	0.330	UGG
1.0	24-feb-1988	LM14	NNDMEA	ND	0.330	UGG
1.0	24-feb-1988	LM14	NNDPA	ND	0.330	UGG
1.0	24-feb-1988	LM14	PCB016	ND	0.330	UGG
1.0	24-feb-1988	LM14	PCB221	ND	0.330	UGG
1.0	24-feb-1988	LM14	PCB232	ND	0.330	UGG
1.0	24-feb-1988	LM14	PCB248	ND	0.330	UGG
1.0	24-feb-1988	LM14	PCB254	ND	0.330	UGG
1.0	24-feb-1988	LM14	PCB260	ND	1.650	UGG
1.0	24-feb-1988	LM14	PCP	ND	0.330	UGG
1.0	24-feb-1988	LM14	PHANTR	ND	0.230	UGG
1.0	24-feb-1988	LM14	PHENOL	ND	0.660	UGG
1.0	24-feb-1988	LM14	PPDOD	ND	0.090	UGG
1.0	24-feb-1988	LM14	PPDDE	LT	0.090	UGG
1.0	24-feb-1988	LM14	PPDDT	LT	0.487	UGG
1.0	24-feb-1988	LM14	PYR	ND	0.060	UGG
1.0	24-feb-1988	LM14	TXPHEN	ND	20.000	UGG
1.0	24-feb-1988	LM14	UNK590		0.560	UGG
1.0	24-feb-1988	LM14	UNK591		0.310	UGG
1.0	24-feb-1988	LM14	UNK592		0.280	UGG
1.0	24-feb-1988	LM14	UNK593		0.260	UGG
1.0	24-feb-1988	LM14	UNK594		0.380	UGG
1.0	24-feb-1988	LM14	UNK595		0.330	UGG
1.0	24-feb-1988	LM14	UNK596		0.590	UGG
1.0	24-feb-1988	LM14	UNK597		0.140	UGG
1.0	24-feb-1988	LM14	UNK598		0.200	UGG
1.0	24-feb-1988	LM14	UNK599		0.180	UGG
1.0	24-feb-1988	LM14	UNK600		0.200	UGG
1.0	24-feb-1988	LM14	UNK601		0.150	UGG
1.0	24-feb-1988	LM14	UNK602		0.170	UGG
1.0	24-feb-1988	LM14	UNK603		0.330	UGG
1.0	24-feb-1988	LM14	UNK606		0.150	UGG

Site: BORE SSDS-05-03 (continued)

SAMPLE DEPTH (ft)	SAMPLE DATE	TEST METHOD	COMPOUND	BOOL	CONCENTRATION	UNITS
1.0	24-feb-1988	LM14	UNK607		0.170	UGG
1.0	24-feb-1988	LM14	UNK608		0.160	UGG
1.0	24-feb-1988	LM14	UNK609		0.150	UGG
1.0	24-feb-1988	LM14	UNK610		0.150	UGG
1.0	24-feb-1988	LW02	135TNB	LT	1.820	UGG
1.0	24-feb-1988	LW02	13DNB	LT	0.583	UGG
1.0	24-feb-1988	LW02	246TNT	LT	1.900	UGG
1.0	24-feb-1988	LW02	24DNT	LT	0.415	UGG
1.0	24-feb-1988	LW02	26DNT	LT	0.395	UGG
1.0	24-feb-1988	LW02	HMX	LT	1.270	UGG
1.0	24-feb-1988	LW02	NB	LT	0.422	UGG
1.0	24-feb-1988	LW02	RDX	LT	0.895	UGG
1.0	24-feb-1988	LW02	TETRYL	LT	0.274	UGG

Site: BORE SSDS-06-01

SAMPLE DEPTH (ft)	SAMPLE DATE	TEST METHOD	COMPOUND	BOOL	CONCENTRATION	UNITS
0.0	24-feb-1988	99	AG	LT	0.682	UGG
0.0	24-feb-1988	99	AS	LT	6.000	UGG
0.0	24-feb-1988	99	BE	LT	0.347	UGG
0.0	24-feb-1988	99	BR	LT	100.000	UGG
0.0	24-feb-1988	99	BR	LT	100.000	UGG
0.0	24-feb-1988	99	CD	LT	0.737	UGG
0.0	24-feb-1988	99	CL	LT	13200.000	UGG
0.0	24-feb-1988	99	CR		7.070	UGG
0.0	24-feb-1988	99	CU		11.200	UGG
0.0	24-feb-1988	99	F	LT	10.700	UGG
0.0	24-feb-1988	99	NA		107.000	UGG
0.0	24-feb-1988	99	NI		8.740	UGG
0.0	24-feb-1988	99	NIT	LT	0.000	UGG
0.0	24-feb-1988	99	PB	LT	5.030	UGG
0.0	24-feb-1988	99	SB	LT	26.600	UGG
0.0	24-feb-1988	99	SE	LT	2.210	UGG
0.0	24-feb-1988	99	SO4	LT	13200.000	UGG
0.0	24-feb-1988	99	TL	LT	8.350	UGG
0.0	24-feb-1988	99	ZN	LT	54.800	UGG
0.0	24-feb-1988	JB08	HG	LT	0.107	UGG
0.0	24-feb-1988	LM13	111TCE	ND	0.050	UGG
0.0	24-feb-1988	LM13	112TCE	ND	0.050	UGG
0.0	24-feb-1988	LM13	11DCE	ND	0.050	UGG
0.0	24-feb-1988	LM13	11DCLE	ND	0.050	UGG
0.0	24-feb-1988	LM13	12DCLB	ND	0.300	UGG

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SAMPLE DEPTH (ft)	SAMPLE DATE	TEST METHOD	COMPOUND	BOOL	CONCENTRATION	UNITS
0.0	24-feb-1988	LM13	12DCLE	ND	0.050	UGG
0.0	24-feb-1988	LM13	12DCLP	ND	0.050	UGG
0.0	24-feb-1988	LM13	13DCLB	ND	0.300	UGG
0.0	24-feb-1988	LM13	14DCLB	ND	0.300	UGG
0.0	24-feb-1988	LM13	2CLEVE	ND	0.600	UGG
0.0	24-feb-1988	LM13	BRDCLM	ND	0.050	UGG
0.0	24-feb-1988	LM13	C13DCP	ND	0.600	UGG
0.0	24-feb-1988	LM13	C2H3CL	ND	0.100	UGG
0.0	24-feb-1988	LM13	C2H5CL	ND	0.100	UGG
0.0	24-feb-1988	LM13	C6H6	ND	0.600	UGG
0.0	24-feb-1988	LM13	CCL4	ND	0.050	UGG
0.0	24-feb-1988	LM13	CH2CL2	ND	0.050	UGG
0.0	24-feb-1988	LM13	CH3BR	ND	0.100	UGG
0.0	24-feb-1988	LM13	CH3CL	ND	0.100	UGG
0.0	24-feb-1988	LM13	CHBR3	ND	0.100	UGG
0.0	24-feb-1988	LM13	CHCL3	ND	0.050	UGG
0.0	24-feb-1988	LM13	CLC6H5	ND	0.630	UGG
0.0	24-feb-1988	LM13	DBRCLM	ND	0.050	UGG
0.0	24-feb-1988	LM13	ETC6H5	ND	0.050	UGG
0.0	24-feb-1988	LM13	MEC6H5	ND	0.050	UGG
0.0	24-feb-1988	LM13	T12DCE	ND	0.630	UGG
0.0	24-feb-1988	LM13	T13DCP	ND	0.050	UGG
0.0	24-feb-1988	LM13	TCLEA	ND	0.050	UGG
0.0	24-feb-1988	LM13	TCLEE	ND	0.050	UGG
0.0	24-feb-1988	LM13	TRCLE	LT	0.141	UGG
0.0	24-feb-1988	LM14	124TCB	ND	0.330	UGG
0.0	24-feb-1988	LM14	12DCLB	ND	0.630	UGG
0.0	24-feb-1988	LM14	12DPH	ND	0.330	UGG
0.0	24-feb-1988	LM14	13DCLB	ND	0.630	UGG
0.0	24-feb-1988	LM14	14DCLB	ND	0.630	UGG
0.0	24-feb-1988	LM14	246TCP	ND	0.330	UGG
0.0	24-feb-1988	LM14	24DCLP	ND	0.330	UGG
0.0	24-feb-1988	LM14	24DMPN	ND	0.330	UGG
0.0	24-feb-1988	LM14	24DNP	ND	1.650	UGG
0.0	24-feb-1988	LM14	24DNT	ND	0.330	UGG
0.0	24-feb-1988	LM14	26DNT	ND	0.330	UGG
0.0	24-feb-1988	LM14	2CLP	ND	0.330	UGG
0.0	24-feb-1988	LM14	2CNAP	ND	0.330	UGG
0.0	24-feb-1988	LM14	2NP	ND	0.330	UGG
0.0	24-feb-1988	LM14	33DCBD	ND	0.660	UGG
0.0	24-feb-1988	LM14	46DN2C	ND	1.650	UGG
0.0	24-feb-1988	LM14	4CL3C	ND	0.330	UGG
0.0	24-feb-1988	LM14	4CLPPE	ND	0.330	UGG
0.0	24-feb-1988	LM14	4NP	ND	1.650	UGG
0.0	24-feb-1988	LM14	ABHC	ND	0.660	UGG
0.0	24-feb-1988	LM14	AENSLF	ND	0.330	UGG
0.0	24-feb-1988	LM14	ALDRN	ND	0.660	UGG

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Site: BORE SSDS-06-01 (continued)

SAMPLE DEPTH (ft)	SAMPLE DATE	TEST METHOD	COMPOUND	BOOL	CONCENTRATION	UNITS
0.0	24-feb-1988	LM14	ANAPNE	ND	0.330	UGG
0.0	24-feb-1988	LM14	ANAPYL	ND	0.330	UGG
0.0	24-feb-1988	LM14	ANTRC	ND	0.330	UGG
0.0	24-feb-1988	LM14	B2CEXM	ND	0.330	UGG
0.0	24-feb-1988	LM14	B2CLEE	ND	0.330	UGG
0.0	24-feb-1988	LM14	B2EHP		0.070	UGG
0.0	24-feb-1988	LM14	BAANTR		0.330	UGG
0.0	24-feb-1988	LM14	BAPYR		0.440	UGG
0.0	24-feb-1988	LM14	BBFANT		0.220	UGG
0.0	24-feb-1988	LM14	BBHC	ND	0.660	UGG
0.0	24-feb-1988	LM14	BBZP	ND	0.330	UGG
0.0	24-feb-1988	LM14	BENSLF	ND	0.330	UGG
0.0	24-feb-1988	LM14	BENZID	ND	1.650	UGG
0.0	24-feb-1988	LM14	BGHIPY	ND	0.330	UGG
0.0	24-feb-1988	LM14	BKFANT	ND	0.330	UGG
0.0	24-feb-1988	LM14	CHRY		0.630	UGG
0.0	24-feb-1988	LM14	CL6BZ	ND	0.330	UGG
0.0	24-feb-1988	LM14	CL6CP	ND	0.330	UGG
0.0	24-feb-1988	LM14	CL6ET	ND	0.330	UGG
0.0	24-feb-1988	LM14	CLDAN	ND	0.330	UGG
0.0	24-feb-1988	LM14	DBAHA	ND	0.330	UGG
0.0	24-feb-1988	LM14	DBHC	ND	0.660	UGG
0.0	24-feb-1988	LM14	DEP	ND	0.330	UGG
0.0	24-feb-1988	LM14	DLDRN	ND	0.660	UGG
0.0	24-feb-1988	LM14	DMP	ND	0.330	UGG
0.0	24-feb-1988	LM14	DNBP	ND	0.330	UGG
0.0	24-feb-1988	LM14	DNOP		0.140	UGG
0.0	24-feb-1988	LM14	ENDRN	ND	0.660	UGG
0.0	24-feb-1988	LM14	ESFSO4	ND	0.660	UGG
0.0	24-feb-1988	LM14	FANT		0.090	UGG
0.0	24-feb-1988	LM14	FLRENE	ND	0.330	UGG
0.0	24-feb-1988	LM14	HC8D	ND	0.330	UGG
0.0	24-feb-1988	LM14	HPCL	ND	0.660	UGG
0.0	24-feb-1988	LM14	HPCLE	ND	0.660	UGG
0.0	24-feb-1988	LM14	ICDPYR	ND	0.330	UGG
0.0	24-feb-1988	LM14	ISOPHR	ND	0.330	UGG
0.0	24-feb-1988	LM14	LIN	LT	0.058	UGG
0.0	24-feb-1988	LM14	NAP	ND	0.330	UGG
0.0	24-feb-1988	LM14	NB	ND	0.330	UGG
0.0	24-feb-1988	LM14	NNDMEA	ND	0.330	UGG
0.0	24-feb-1988	LM14	NNDPA	ND	0.330	UGG
0.0	24-feb-1988	LM14	PCB016	ND	0.330	UGG
0.0	24-feb-1988	LM14	PCB221	ND	0.330	UGG
0.0	24-feb-1988	LM14	PCB232	ND	0.330	UGG
0.0	24-feb-1988	LM14	PCB248	ND	0.330	UGG
0.0	24-feb-1988	LM14	PCB254	ND	0.330	UGG
0.0	24-feb-1988	LM14	PCB260	ND	1.650	UGG
0.0	24-feb-1988	LM14	PCP	ND	0.330	UGG

Analytical Results for Chemical Soil
From: 01-jan-1988 To: 27-nov-90

Site: BORE SSDS-06-01 (continued)

SAMPLE DEPTH (ft)	SAMPLE DATE	TEST METHOD	COMPOUND	BOOL	CONCENTRATION	UNITS
0.0	24-feb-1988	LM14	PHANTR	ND	0.230	UGG
0.0	24-feb-1988	LM14	PHENOL	ND	0.660	UGG
0.0	24-feb-1988	LM14	PPDDD	ND	0.090	UGG
0.0	24-feb-1988	LM14	PPDDE	LT	0.090	UGG
0.0	24-feb-1988	LM14	PPDDT	LT	0.487	UGG
0.0	24-feb-1988	LM14	PYR		1.650	UGG
0.0	24-feb-1988	LM14	TXPHEN	ND	20.000	UGG
0.0	24-feb-1988	LM14	UNK584		2.200	UGG
0.0	24-feb-1988	LM14	UNK585		3.300	UGG
0.0	24-feb-1988	LM14	UNK586		5.100	UGG
0.0	24-feb-1988	LM14	UNK587		2.800	UGG
0.0	24-feb-1988	LM14	UNK588		3.300	UGG
0.0	24-feb-1988	LM14	UNK589		5.000	UGG
0.0	24-feb-1988	LM14	UNK590		2.100	UGG
0.0	24-feb-1988	LM14	UNK591		4.700	UGG
0.0	24-feb-1988	LM14	UNK607		1.700	UGG
0.0	24-feb-1988	LM14	UNK611		2.200	UGG
0.0	24-feb-1988	LM14	UNK612		2.060	UGG
0.0	24-feb-1988	LM14	UNK613		2.300	UGG
0.0	24-feb-1988	LM14	UNK614		2.300	UGG
0.0	24-feb-1988	LM14	UNK616		2.500	UGG
0.0	24-feb-1988	LM14	UNK619		2.200	UGG
0.0	24-feb-1988	LM14	UNK620		4.100	UGG
0.0	24-feb-1988	LM14	UNK621		2.400	UGG
0.0	24-feb-1988	LM14	UNK622		3.300	UGG
0.0	24-feb-1988	LM14	UNK623		1.600	UGG
0.0	24-feb-1988	LM14	UNK624		4.700	UGG
0.0	24-feb-1988	LW02	135TNB	LT	1.740	UGG
0.0	24-feb-1988	LW02	13DNB	LT	0.559	UGG
0.0	24-feb-1988	LW02	246TNT	LT	1.820	UGG
0.0	24-feb-1988	LW02	24DNT	LT	0.398	UGG
0.0	24-feb-1988	LW02	26DNT	LT	0.379	UGG
0.0	24-feb-1988	LW02	HMX	LT	1.210	UGG
0.0	24-feb-1988	LW02	NB	LT	0.405	UGG
0.0	24-feb-1988	LW02	RDX	LT	0.859	UGG
0.0	24-feb-1988	LW02	TETRYL	LT	0.263	UGG

Analytical Results for Chemical Soil
From: 01-jan-1988 To: 27-nov-90

Site: BORE SSDS-06-02

SAMPLE DEPTH (ft)	SAMPLE DATE	TEST METHOD	COMPOUND	BOOL	CONCENTRATION	UNITS
0.5	24-feb-1988	99	AG	LT	0.733	UGG
0.5	24-feb-1988	99	AS	LT	6.450	UGG
0.5	24-feb-1988	99	BE	LT	0.373	UGG
0.5	24-feb-1988	99	BR	LT	100.000	UGG
0.5	24-feb-1988	99	CD	LT	0.792	UGG
0.5	24-feb-1988	99	CL	LT	14100.000	UGG
0.5	24-feb-1988	99	CR		12.600	UGG
0.5	24-feb-1988	99	CU		12.100	UGG
0.5	24-feb-1988	99	F	LT	11.000	UGG
0.5	24-feb-1988	99	NA		216.000	UGG
0.5	24-feb-1988	99	NI		10.700	UGG
0.5	24-feb-1988	99	NIT	LT	0.000	UGG
0.5	24-feb-1988	99	PB	LT	5.410	UGG
0.5	24-feb-1988	99	SB	LT	28.600	UGG
0.5	24-feb-1988	99	SE	LT	2.380	UGG
0.5	24-feb-1988	99	SO4	LT	14100.000	UGG
0.5	24-feb-1988	99	TL	LT	8.970	UGG
0.5	24-feb-1988	99	ZN	LT	58.800	UGG
0.5	24-feb-1988	JB08	HG	LT	0.115	UGG
0.5	24-feb-1988	LM13	111TCE	ND	0.050	UGG
0.5	24-feb-1988	LM13	112TCE	ND	0.050	UGG
0.5	24-feb-1988	LM13	11DCE	ND	0.050	UGG
0.5	24-feb-1988	LM13	11DCLE	ND	0.050	UGG
0.5	24-feb-1988	LM13	12DCLB	ND	0.300	UGG
0.5	24-feb-1988	LM13	12DCLE	ND	0.050	UGG
0.5	24-feb-1988	LM13	12DCLP	ND	0.050	UGG
0.5	24-feb-1988	LM13	13DCLB	ND	0.300	UGG
0.5	24-feb-1988	LM13	14DCLB	ND	0.300	UGG
0.5	24-feb-1988	LM13	2CLEVE	ND	0.600	UGG
0.5	24-feb-1988	LM13	BRDCLM	ND	0.050	UGG
0.5	24-feb-1988	LM13	C13DCP	ND	0.600	UGG
0.5	24-feb-1988	LM13	C2H3CL	ND	0.100	UGG
0.5	24-feb-1988	LM13	C2H5CL	ND	0.100	UGG
0.5	24-feb-1988	LM13	C6H6	ND	0.600	UGG
0.5	24-feb-1988	LM13	CCL4	ND	0.050	UGG
0.5	24-feb-1988	LM13	CH2CL2	ND	0.050	UGG
0.5	24-feb-1988	LM13	CH3BR	ND	0.100	UGG
0.5	24-feb-1988	LM13	CH3CL	ND	0.100	UGG
0.5	24-feb-1988	LM13	CH8R3	ND	0.100	UGG
0.5	24-feb-1988	LM13	CHCL3	ND	0.050	UGG
0.5	24-feb-1988	LM13	CLC6H5	ND	0.630	UGG
0.5	24-feb-1988	LM13	DBRCLM	ND	0.050	UGG
0.5	24-feb-1988	LM13	ETC6H5	ND	0.050	UGG
0.5	24-feb-1988	LM13	MEC6H5	ND	0.050	UGG
0.5	24-feb-1988	LM13	T12DCE	ND	0.630	UGG
0.5	24-feb-1988	LM13	T13DCP	ND	0.050	UGG

Analytical Results for Chemical Soil
From: 01-jan-1988 To: 27-nov-90

Site: BORE SSDS-06-02 (continued)

SAMPLE DEPTH (ft)	SAMPLE DATE	TEST METHOD	COMPOUND	BOOL	CONCENTRATION	UNITS
0.5	24-feb-1988	LM13	TCLEA	ND	0.050	UGG
0.5	24-feb-1988	LM13	TCLEE	ND	0.050	UGG
0.5	24-feb-1988	LM13	TRCLE	LT	0.141	UGG
0.5	24-feb-1988	LM14	124TCB	ND	0.330	UGG
0.5	24-feb-1988	LM14	12DCLB	ND	0.630	UGG
0.5	24-feb-1988	LM14	12DPH	ND	0.330	UGG
0.5	24-feb-1988	LM14	13DCLB	ND	0.630	UGG
0.5	24-feb-1988	LM14	14DCLB	ND	0.630	UGG
0.5	24-feb-1988	LM14	246TCP	ND	0.330	UGG
0.5	24-feb-1988	LM14	24DCLP	ND	0.330	UGG
0.5	24-feb-1988	LM14	24DMPN	ND	0.330	UGG
0.5	24-feb-1988	LM14	24DNP	ND	1.650	UGG
0.5	24-feb-1988	LM14	24DNT	ND	0.330	UGG
0.5	24-feb-1988	LM14	26DNT	ND	0.330	UGG
0.5	24-feb-1988	LM14	2CLP	ND	0.330	UGG
0.5	24-feb-1988	LM14	2CNAP	ND	0.330	UGG
0.5	24-feb-1988	LM14	2NP	ND	0.330	UGG
0.5	24-feb-1988	LM14	33DCBD	ND	0.660	UGG
0.5	24-feb-1988	LM14	46DN2C	ND	1.650	UGG
0.5	24-feb-1988	LM14	4CL3C	ND	0.330	UGG
0.5	24-feb-1988	LM14	4CLPPE	ND	0.330	UGG
0.5	24-feb-1988	LM14	4NP	ND	1.650	UGG
0.5	24-feb-1988	LM14	ABHC	ND	0.660	UGG
0.5	24-feb-1988	LM14	AENSLF	ND	0.330	UGG
0.5	24-feb-1988	LM14	ALDRN	ND	0.660	UGG
0.5	24-feb-1988	LM14	ANAPNE	ND	0.330	UGG
0.5	24-feb-1988	LM14	ANAPYL	ND	0.330	UGG
0.5	24-feb-1988	LM14	ANTRC	ND	0.330	UGG
0.5	24-feb-1988	LM14	B2CEXM	ND	0.330	UGG
0.5	24-feb-1988	LM14	B2CLEE	ND	0.330	UGG
0.5	24-feb-1988	LM14	B2EHP	ND	0.330	UGG
0.5	24-feb-1988	LM14	BAANTR	ND	0.330	UGG
0.5	24-feb-1988	LM14	BAPYR	ND	0.330	UGG
0.5	24-feb-1988	LM14	BBFANT	ND	0.330	UGG
0.5	24-feb-1988	LM14	BBHC	ND	0.660	UGG
0.5	24-feb-1988	LM14	BBZP	ND	0.330	UGG
0.5	24-feb-1988	LM14	BENSLF	ND	0.330	UGG
0.5	24-feb-1988	LM14	BENZID	ND	1.650	UGG
0.5	24-feb-1988	LM14	BGHIPY	ND	0.330	UGG
0.5	24-feb-1988	LM14	BKFANT	ND	0.330	UGG
0.5	24-feb-1988	LM14	CHRY	ND	0.330	UGG
0.5	24-feb-1988	LM14	CL6BZ	ND	0.330	UGG
0.5	24-feb-1988	LM14	CL6CP	ND	0.330	UGG
0.5	24-feb-1988	LM14	CL6ET	ND	0.330	UGG
0.5	24-feb-1988	LM14	CLDAN	ND	0.330	UGG
0.5	24-feb-1988	LM14	DBAHA	ND	0.330	UGG
0.5	24-feb-1988	LM14	DBHC	ND	0.660	UGG

Analytical Results for Chemical Soil
From: 01-jan-1988 To: 27-nov-90

Site: BORE SSDS-06-02 (continued)

SAMPLE DEPTH (ft)	SAMPLE DATE	TEST METHOD	COMPOUND	BOOL	CONCENTRATION	UNITS
0.5	24-feb-1988	LM14	DEP	ND	0.330	UGG
0.5	24-feb-1988	LM14	DLDRN	ND	0.660	UGG
0.5	24-feb-1988	LM14	DMP	ND	0.330	UGG
0.5	24-feb-1988	LM14	DNBP	ND	0.330	UGG
0.5	24-feb-1988	LM14	DNOP	ND	0.330	UGG
0.5	24-feb-1988	LM14	ENDRN	ND	0.660	UGG
0.5	24-feb-1988	LM14	ESFSO4	ND	0.660	UGG
0.5	24-feb-1988	LM14	FANT	ND	0.330	UGG
0.5	24-feb-1988	LM14	FLRENE	ND	0.330	UGG
0.5	24-feb-1988	LM14	HCBD	ND	0.330	UGG
0.5	24-feb-1988	LM14	HPCL	ND	0.660	UGG
0.5	24-feb-1988	LM14	HPCLE	ND	0.660	UGG
0.5	24-feb-1988	LM14	ICDPYR	ND	0.330	UGG
0.5	24-feb-1988	LM14	ISOPHR	ND	0.330	UGG
0.5	24-feb-1988	LM14	LIN	LT	0.058	UGG
0.5	24-feb-1988	LM14	NAP	ND	0.330	UGG
0.5	24-feb-1988	LM14	NB	ND	0.330	UGG
0.5	24-feb-1988	LM14	NNDMEA	ND	0.330	UGG
0.5	24-feb-1988	LM14	NNDPA	ND	0.330	UGG
0.5	24-feb-1988	LM14	PCB016	ND	0.330	UGG
0.5	24-feb-1988	LM14	PCB221	ND	0.330	UGG
0.5	24-feb-1988	LM14	PCB232	ND	0.330	UGG
0.5	24-feb-1988	LM14	PCB248	ND	0.330	UGG
0.5	24-feb-1988	LM14	PCB254	ND	0.330	UGG
0.5	24-feb-1988	LM14	PCB260	ND	1.650	UGG
0.5	24-feb-1988	LM14	PCP	ND	0.330	UGG
0.5	24-feb-1988	LM14	PHANTR	ND	0.230	UGG
0.5	24-feb-1988	LM14	PHENOL	ND	0.660	UGG
0.5	24-feb-1988	LM14	PPDDD	ND	0.090	UGG
0.5	24-feb-1988	LM14	PPDDE	LT	0.090	UGG
0.5	24-feb-1988	LM14	PPDDT	LT	0.487	UGG
0.5	24-feb-1988	LM14	PYR		0.250	UGG
0.5	24-feb-1988	LM14	TXPHEN	ND	20.000	UGG
0.5	24-feb-1988	LM14	UNK563		0.600	UGG
0.5	24-feb-1988	LM14	UNK580		0.620	UGG
0.5	24-feb-1988	LM14	UNK589		0.310	UGG
0.5	24-feb-1988	LM14	UNK591		0.640	UGG
0.5	24-feb-1988	LM14	UNK592		0.260	UGG
0.5	24-feb-1988	LM14	UNK593		0.310	UGG
0.5	24-feb-1988	LM14	UNK594		0.180	UGG
0.5	24-feb-1988	LM14	UNK595		0.140	UGG
0.5	24-feb-1988	LM14	UNK596		0.270	UGG
0.5	24-feb-1988	LM14	UNK597		0.220	UGG
0.5	24-feb-1988	LM14	UNK598		0.180	UGG
0.5	24-feb-1988	LM14	UNK599		0.310	UGG
0.5	24-feb-1988	LM14	UNK600		0.180	UGG
0.5	24-feb-1988	LM14	UNK601		0.330	UGG
0.5	24-feb-1988	LM14	UNK602		0.590	UGG

Site: BORE SSDS-06-02 (continued)

SAMPLE DEPTH (ft)	SAMPLE DATE	TEST METHOD	COMPOUND	BOOL	CONCENTRATION	UNITS
0.5	24-feb-1988	LM14	UNK603		0.495	UGG
0.5	24-feb-1988	LM14	UNK604		0.440	UGG
0.5	24-feb-1988	LM14	UNK607		4.700	UGG
0.5	24-feb-1988	LW02	135TNB	LT	1.870	UGG
0.5	24-feb-1988	LW02	13DNB	LT	0.600	UGG
0.5	24-feb-1988	LW02	246TNT	LT	1.950	UGG
0.5	24-feb-1988	LW02	24DNT	LT	0.427	UGG
0.5	24-feb-1988	LW02	26DNT	LT	0.407	UGG
0.5	24-feb-1988	LW02	HMX	LT	1.300	UGG
0.5	24-feb-1988	LW02	NB	LT	0.435	UGG
0.5	24-feb-1988	LW02	RDX	LT	0.922	UGG
0.5	24-feb-1988	LW02	TETRYL	LT	0.282	UGG

Site: BORE SSDS-06-03

SAMPLE DEPTH (ft)	SAMPLE DATE	TEST METHOD	COMPOUND	BOOL	CONCENTRATION	UNITS
1.0	24-feb-1988	99	AG	LT	0.723	UGG
1.0	24-feb-1988	99	AS	LT	6.360	UGG
1.0	24-feb-1988	99	BE	LT	0.368	UGG
1.0	24-feb-1988	99	BR	LT	100.000	UGG
1.0	24-feb-1988	99	CD	LT	0.781	UGG
1.0	24-feb-1988	99	CL	LT	13900.000	UGG
1.0	24-feb-1988	99	CR		12.500	UGG
1.0	24-feb-1988	99	CU		14.500	UGG
1.0	24-feb-1988	99	F	LT	11.100	UGG
1.0	24-feb-1988	99	NA		180.000	UGG
1.0	24-feb-1988	99	NI		9.090	UGG
1.0	24-feb-1988	99	NIT	LT	0.000	UGG
1.0	24-feb-1988	99	PB	LT	5.330	UGG
1.0	24-feb-1988	99	SB	LT	28.200	UGG
1.0	24-feb-1988	99	SE	LT	2.340	UGG
1.0	24-feb-1988	99	SO4	LT	13900.000	UGG
1.0	24-feb-1988	99	TL	LT	8.840	UGG
1.0	24-feb-1988	99	ZN	LT	58.000	UGG
1.0	24-feb-1988	JB08	HG	LT	0.114	UGG
1.0	24-feb-1988	LM13	111TCE	ND	0.050	UGG
1.0	24-feb-1988	LM13	112TCE	ND	0.050	UGG
1.0	24-feb-1988	LM13	11DCE	ND	0.050	UGG
1.0	24-feb-1988	LM13	11DCLE	ND	0.050	UGG
1.0	24-feb-1988	LM13	12DCLB	ND	0.300	UGG
1.0	24-feb-1988	LM13	12DCLE	ND	0.050	UGG
1.0	24-feb-1988	LM13	12DCLP	ND	0.050	UGG

Site: BORE SSDS-06-03 (continued)

SAMPLE DEPTH (ft)	SAMPLE DATE	TEST METHOD	COMPOUND	BOOL	CONCENTRATION	UNITS
1.0	24-feb-1988	LM13	13DCL8	ND	0.300	UGG
1.0	24-feb-1988	LM13	14DCL8	ND	0.300	UGG
1.0	24-feb-1988	LM13	2CLEVE	ND	0.600	UGG
1.0	24-feb-1988	LM13	BRDCLM	ND	0.050	UGG
1.0	24-feb-1988	LM13	C13DCP	ND	0.600	UGG
1.0	24-feb-1988	LM13	C2H3CL	ND	0.100	UGG
1.0	24-feb-1988	LM13	C2H5CL	ND	0.100	UGG
1.0	24-feb-1988	LM13	C6H6	ND	0.600	UGG
1.0	24-feb-1988	LM13	CCL4	ND	0.050	UGG
1.0	24-feb-1988	LM13	CH2CL2	ND	0.050	UGG
1.0	24-feb-1988	LM13	CH3BR	ND	0.100	UGG
1.0	24-feb-1988	LM13	CH3CL	ND	0.100	UGG
1.0	24-feb-1988	LM13	CHBR3	ND	0.100	UGG
1.0	24-feb-1988	LM13	CHCL3	ND	0.050	UGG
1.0	24-feb-1988	LM13	CLC6H5	ND	0.630	UGG

1.0	24-feb-1988	LM13	DBRCLM	ND	0.050	UGG
1.0	24-feb-1988	LM13	ETC6H5	ND	0.050	UGG
1.0	24-feb-1988	LM13	MEC6H5	ND	0.050	UGG
1.0	24-feb-1988	LM13	T12DCE	ND	0.630	UGG
1.0	24-feb-1988	LM13	T13DCP	ND	0.050	UGG
1.0	24-feb-1988	LM13	TCLEA	ND	0.050	UGG
1.0	24-feb-1988	LM13	TCLEE	ND	0.050	UGG
1.0	24-feb-1988	LM13	TRCLE	LT	0.141	UGG
1.0	24-feb-1988	LM14	124TCB	ND	0.330	UGG
1.0	24-feb-1988	LM14	12DCLB	ND	0.630	UGG
1.0	24-feb-1988	LM14	12DPH	ND	0.330	UGG
1.0	24-feb-1988	LM14	13DCLB	ND	0.630	UGG
1.0	24-feb-1988	LM14	14DCLB	ND	0.630	UGG
1.0	24-feb-1988	LM14	246TCP	ND	0.330	UGG
1.0	24-feb-1988	LM14	24DCLP	ND	0.330	UGG
1.0	24-feb-1988	LM14	24DMPN	ND	0.330	UGG
1.0	24-feb-1988	LM14	24DNP	ND	1.650	UGG
1.0	24-feb-1988	LM14	24DNT	ND	0.330	UGG
1.0	24-feb-1988	LM14	26DNT	ND	0.330	UGG
1.0	24-feb-1988	LM14	2CLP	ND	0.330	UGG
1.0	24-feb-1988	LM14	2CNAP	ND	0.330	UGG
1.0	24-feb-1988	LM14	2NP	ND	0.330	UGG
1.0	24-feb-1988	LM14	33DCBD	ND	0.660	UGG
1.0	24-feb-1988	LM14	46DN2C	ND	1.650	UGG
1.0	24-feb-1988	LM14	4CL3C	ND	0.330	UGG
1.0	24-feb-1988	LM14	4CLPPE	ND	0.330	UGG
1.0	24-feb-1988	LM14	4NP	ND	1.650	UGG
1.0	24-feb-1988	LM14	ABHC	ND	0.660	UGG
1.0	24-feb-1988	LM14	AENSLF	ND	0.330	UGG
1.0	24-feb-1988	LM14	ALDRN	ND	0.660	UGG
1.0	24-feb-1988	LM14	ANAPNE	ND	0.330	UGG
1.0	24-feb-1988	LM14	ANAPYL	ND	0.330	UGG

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Site: BORE SSDS-06-03 (continued)

SAMPLE DEPTH (ft)	SAMPLE DATE	TEST METHOD	COMPOUND	BOOL	CONCENTRATION	UNITS
1.0	24-feb-1988	LM14	ANTRC	ND	0.330	UGG
1.0	24-feb-1988	LM14	B2CEXM	ND	0.330	UGG
1.0	24-feb-1988	LM14	B2CLEE	ND	0.330	UGG
1.0	24-feb-1988	LM14	B2EHP	ND	0.330	UGG
1.0	24-feb-1988	LM14	BAANTR	LT	0.330	UGG
1.0	24-feb-1988	LM14	BAPYR	ND	0.330	UGG
1.0	24-feb-1988	LM14	BBFANT	ND	0.330	UGG
1.0	24-feb-1988	LM14	BBHC	ND	0.660	UGG
1.0	24-feb-1988	LM14	BBZP	ND	0.330	UGG
1.0	24-feb-1988	LM14	BENSLF	ND	0.330	UGG
1.0	24-feb-1988	LM14	BENZAL		0.160	UGG
1.0	24-feb-1988	LM14	BENZID	ND	1.650	UGG
1.0	24-feb-1988	LM14	BGHIPY	ND	0.330	UGG
1.0	24-feb-1988	LM14	BKFANT	ND	0.330	UGG
1.0	24-feb-1988	LM14	CHRY	ND	0.330	UGG
1.0	24-feb-1988	LM14	CL6BZ	ND	0.330	UGG
1.0	24-feb-1988	LM14	CL6CP	ND	0.330	UGG
1.0	24-feb-1988	LM14	CL6ET	ND	0.330	UGG
1.0	24-feb-1988	LM14	CLDAN	ND	0.330	UGG
1.0	24-feb-1988	LM14	DBAHA	ND	0.330	UGG
1.0	24-feb-1988	LM14	DBHC	ND	0.660	UGG
1.0	24-feb-1988	LM14	DEP	ND	0.330	UGG
1.0	24-feb-1988	LM14	DLDRN	ND	0.660	UGG
1.0	24-feb-1988	LM14	DMP	ND	0.330	UGG
1.0	24-feb-1988	LM14	DNBP	ND	0.330	UGG
1.0	24-feb-1988	LM14	DNOP	LT	0.330	UGG
1.0	24-feb-1988	LM14	ENDRN	ND	0.660	UGG
1.0	24-feb-1988	LM14	ESFSO4	ND	0.660	UGG
1.0	24-feb-1988	LM14	FANT	ND	0.330	UGG
1.0	24-feb-1988	LM14	FLRENE	ND	0.330	UGG
1.0	24-feb-1988	LM14	HCBD	ND	0.330	UGG
1.0	24-feb-1988	LM14	HPCL	ND	0.660	UGG
1.0	24-feb-1988	LM14	HPCLE	ND	0.660	UGG
1.0	24-feb-1988	LM14	HXAB2E		1.630	UGG
1.0	24-feb-1988	LM14	ICDPYR	ND	0.330	UGG
1.0	24-feb-1988	LM14	ISOPHR	ND	0.330	UGG
1.0	24-feb-1988	LM14	LIN	LT	0.058	UGG
1.0	24-feb-1988	LM14	NAP	ND	0.330	UGG
1.0	24-feb-1988	LM14	NB	ND	0.330	UGG
1.0	24-feb-1988	LM14	NNDMEA	ND	0.330	UGG
1.0	24-feb-1988	LM14	NNDPA	ND	0.330	UGG
1.0	24-feb-1988	LM14	PCB016	ND	0.330	UGG
1.0	24-feb-1988	LM14	PCB221	ND	0.330	UGG
1.0	24-feb-1988	LM14	PCB232	ND	0.330	UGG
1.0	24-feb-1988	LM14	PCB248	ND	0.330	UGG
1.0	24-feb-1988	LM14	PCB254	ND	0.330	UGG
1.0	24-feb-1988	LM14	PCB260	ND	1.650	UGG
1.0	24-feb-1988	LM14	PCP	ND	0.330	UGG

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Site: BORE SSDS-06-03 (continued)

SAMPLE DEPTH (ft)	SAMPLE DATE	TEST METHOD	COMPOUND	BOOL	CONCENTRATION	UNITS
1.0	24-feb-1988	LM14	PHANTR	ND	0.230	UGG
1.0	24-feb-1988	LM14	PHENOL	ND	0.660	UGG
1.0	24-feb-1988	LM14	PPDDD	ND	0.090	UGG
1.0	24-feb-1988	LM14	PPDDE	LT	0.090	UGG
1.0	24-feb-1988	LM14	PPDDT	LT	0.487	UGG
1.0	24-feb-1988	LM14	PYR		0.080	UGG
1.0	24-feb-1988	LM14	TXPHEN	ND	20.000	UGG
1.0	24-feb-1988	LM14	UNK564		0.280	UGG
1.0	24-feb-1988	LM14	UNK579		0.700	UGG
1.0	24-feb-1988	LM14	UNK580		0.700	UGG
1.0	24-feb-1988	LM14	UNK593		0.300	UGG
1.0	24-feb-1988	LM14	UNK603		0.170	UGG
1.0	24-feb-1988	LW02	135TN8	LT	1.850	UGG
1.0	24-feb-1988	LW02	13DN8	LT	0.594	UGG
1.0	24-feb-1988	LW02	246TNT	LT	1.930	UGG
1.0	24-feb-1988	LW02	24DNT	LT	0.423	UGG
1.0	24-feb-1988	LW02	26DNT	LT	0.403	UGG
1.0	24-feb-1988	LW02	HMX	LT	1.290	UGG
1.0	24-feb-1988	LW02	NB	LT	0.431	UGG
1.0	24-feb-1988	LW02	RDX	LT	0.913	UGG
1.0	24-feb-1988	LW02	TETRYL	LT	0.280	UGG

Site: BORE SSDS-07-01

SAMPLE DEPTH (ft)	SAMPLE DATE	TEST METHOD	COMPOUND	BOOL	CONCENTRATION	UNITS
0.0	24-feb-1988	99	AG	LT	0.696	UGG
0.0	24-feb-1988	99	AS		10.200	UGG
0.0	24-feb-1988	99	BE	LT	0.354	UGG
0.0	24-feb-1988	99	BR	LT	100.000	UGG
0.0	24-feb-1988	99	BR	LT	100.000	UGG
0.0	24-feb-1988	99	CD		0.952	UGG
0.0	24-feb-1988	99	CL	LT	13400.000	UGG
0.0	24-feb-1988	99	CR		9.980	UGG
0.0	24-feb-1988	99	CU		20.700	UGG
0.0	24-feb-1988	99	F	LT	10.700	UGG
0.0	24-feb-1988	99	NA		160.000	UGG
0.0	24-feb-1988	99	NI		6.620	UGG
0.0	24-feb-1988	99	NIT	LT	0.000	UGG
0.0	24-feb-1988	99	PB		32.900	UGG
0.0	24-feb-1988	99	SB	LT	27.200	UGG
0.0	24-feb-1988	99	SE	LT	2.260	UGG
0.0	24-feb-1988	99	SO4	LT	13400.000	UGG
0.0	24-feb-1988	99	TL	LT	8.520	UGG
0.0	24-feb-1988	99	ZN	LT	55.800	UGG

Site: BORE SSDS-07-01 (continued)

SAMPLE DEPTH (ft)	SAMPLE DATE	TEST METHOD	COMPOUND	BOOL	CONCENTRATION	UNITS
0.0	24-feb-1988	JB08	HG	LT	0.109	UGG
0.0	24-feb-1988	LM13	111TCE	ND	0.050	UGG
0.0	24-feb-1988	LM13	112TCE	ND	0.050	UGG
0.0	24-feb-1988	LM13	11DCE	ND	0.050	UGG
0.0	24-feb-1988	LM13	11DCLE	ND	0.050	UGG
0.0	24-feb-1988	LM13	12DCLB	ND	0.300	UGG
0.0	24-feb-1988	LM13	12DCLE	ND	0.050	UGG
0.0	24-feb-1988	LM13	12DCLP	ND	0.050	UGG
0.0	24-feb-1988	LM13	13DCLB	ND	0.300	UGG
0.0	24-feb-1988	LM13	14DCLB	ND	0.300	UGG
0.0	24-feb-1988	LM13	2CLEVE	ND	0.600	UGG
0.0	24-feb-1988	LM13	BRDCLM	ND	0.050	UGG
0.0	24-feb-1988	LM13	C13DCP	ND	0.600	UGG
0.0	24-feb-1988	LM13	C2H3CL	ND	0.100	UGG
0.0	24-feb-1988	LM13	C2H5CL	ND	0.100	UGG
0.0	24-feb-1988	LM13	C6H6	ND	0.600	UGG
0.0	24-feb-1988	LM13	CCL4	ND	0.050	UGG
0.0	24-feb-1988	LM13	CH2CL2	ND	0.050	UGG
0.0	24-feb-1988	LM13	CH3BR	ND	0.100	UGG
0.0	24-feb-1988	LM13	CH3CL	ND	0.100	UGG
0.0	24-feb-1988	LM13	CHBR3	ND	0.100	UGG
0.0	24-feb-1988	LM13	CHCL3	ND	0.050	UGG
0.0	24-feb-1988	LM13	CLC6H5	ND	0.630	UGG
0.0	24-feb-1988	LM13	DBRCLM	ND	0.050	UGG
0.0	24-feb-1988	LM13	ETC6H5	ND	0.050	UGG
0.0	24-feb-1988	LM13	MEC6H5	ND	0.050	UGG
0.0	24-feb-1988	LM13	T12DCE	ND	0.630	UGG
0.0	24-feb-1988	LM13	T13DCP	ND	0.050	UGG
0.0	24-feb-1988	LM13	TCLEA	ND	0.050	UGG
0.0	24-feb-1988	LM13	TCLEE	ND	0.050	UGG
0.0	24-feb-1988	LM13	TRCLE	LT	0.141	UGG
0.0	24-feb-1988	LM14	124TCB	ND	0.330	UGG
0.0	24-feb-1988	LM14	12DCLB	ND	0.630	UGG
0.0	24-feb-1988	LM14	12DPH	ND	0.330	UGG
0.0	24-feb-1988	LM14	13DCLB	ND	0.630	UGG
0.0	24-feb-1988	LM14	14DCLB	ND	0.630	UGG
0.0	24-feb-1988	LM14	246TCP	ND	0.330	UGG
0.0	24-feb-1988	LM14	24DCLP	ND	0.330	UGG
0.0	24-feb-1988	LM14	24DMPN	ND	0.330	UGG
0.0	24-feb-1988	LM14	24DNP	ND	1.650	UGG
0.0	24-feb-1988	LM14	24DNT	ND	0.330	UGG
0.0	24-feb-1988	LM14	26DNT	ND	0.330	UGG
0.0	24-feb-1988	LM14	2CLP	ND	0.330	UGG
0.0	24-feb-1988	LM14	2CNAP	ND	0.330	UGG
0.0	24-feb-1988	LM14	2NP	ND	0.330	UGG
0.0	24-feb-1988	LM14	33DCBD	ND	0.660	UGG

Analytical Results for Chemical Soil
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Site: BORE SSDS-07-01 (continued)

SAMPLE DEPTH (ft)	SAMPLE DATE	TEST METHOD	COMPOUND	BOOL	CONCENTRATION	UNITS
0.0	24-feb-1988	LM14	46DN2C	ND	1.650	UGG
0.0	24-feb-1988	LM14	4CL3C	ND	0.330	UGG
0.0	24-feb-1988	LM14	4CLPPE	ND	0.330	UGG
0.0	24-feb-1988	LM14	4NP	ND	1.650	UGG
0.0	24-feb-1988	LM14	ABHC	ND	0.660	UGG
0.0	24-feb-1988	LM14	AENSLF	ND	0.330	UGG
0.0	24-feb-1988	LM14	ALDRN	ND	0.660	UGG
0.0	24-feb-1988	LM14	ANAPNE	ND	0.330	UGG
0.0	24-feb-1988	LM14	ANAPYL	ND	0.330	UGG
0.0	24-feb-1988	LM14	ANTRC	ND	0.330	UGG
0.0	24-feb-1988	LM14	B2CEXM	ND	0.330	UGG
0.0	24-feb-1988	LM14	B2CLEE	ND	0.330	UGG
0.0	24-feb-1988	LM14	B2EHP	ND	0.330	UGG
0.0	24-feb-1988	LM14	BAANTR	ND	0.330	UGG
0.0	24-feb-1988	LM14	BAPYR	ND	0.330	UGG
0.0	24-feb-1988	LM14	BBFANT	ND	0.330	UGG
0.0	24-feb-1988	LM14	BBHC	ND	0.660	UGG
0.0	24-feb-1988	LM14	BBZP	ND	0.330	UGG
0.0	24-feb-1988	LM14	BENSLF	ND	0.330	UGG
0.0	24-feb-1988	LM14	BENZAL		0.340	UGG
0.0	24-feb-1988	LM14	BENZID	ND	1.650	UGG
0.0	24-feb-1988	LM14	BGHIPY	ND	0.330	UGG
0.0	24-feb-1988	LM14	BKFANT	ND	0.330	UGG
0.0	24-feb-1988	LM14	CHRY	ND	0.330	UGG
0.0	24-feb-1988	LM14	CL6BZ	ND	0.330	UGG
0.0	24-feb-1988	LM14	CL6CP	ND	0.330	UGG
0.0	24-feb-1988	LM14	CL6ET	ND	0.330	UGG
0.0	24-feb-1988	LM14	CLDAN	ND	0.330	UGG
0.0	24-feb-1988	LM14	DBAHA	ND	0.330	UGG
0.0	24-feb-1988	LM14	DBHC	ND	0.660	UGG
0.0	24-feb-1988	LM14	DEP	ND	0.330	UGG
0.0	24-feb-1988	LM14	DLDRN	ND	0.660	UGG
0.0	24-feb-1988	LM14	DMP	ND	0.330	UGG
0.0	24-feb-1988	LM14	DNBP	ND	0.330	UGG
0.0	24-feb-1988	LM14	DNOP	ND	0.330	UGG
0.0	24-feb-1988	LM14	ENDRN	ND	0.660	UGG
0.0	24-feb-1988	LM14	ESFSO4	ND	0.660	UGG
0.0	24-feb-1988	LM14	FANT	ND	0.330	UGG
0.0	24-feb-1988	LM14	FLRENE	ND	0.330	UGG
0.0	24-feb-1988	LM14	HCBD	ND	0.330	UGG
0.0	24-feb-1988	LM14	HPCL	ND	0.660	UGG
0.0	24-feb-1988	LM14	HPCLE	ND	0.660	UGG
0.0	24-feb-1988	LM14	HXAB2E		5.070	UGG
0.0	24-feb-1988	LM14	ICDPYR	ND	0.330	UGG
0.0	24-feb-1988	LM14	ISOPHR	ND	0.330	UGG
0.0	24-feb-1988	LM14	LIN	LT	0.058	UGG
0.0	24-feb-1988	LM14	NAP	ND	0.330	UGG
0.0	24-feb-1988	LM14	NB	ND	0.330	UGG

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Site: BORE SSDS-07-01 (continued)

SAMPLE DEPTH (ft)	SAMPLE DATE	TEST METHOD	COMPOUND	BOOL	CONCENTRATION	UNITS
0.0	24-feb-1988	LM14	NNDMEA	ND	0.330	UGG
0.0	24-feb-1988	LM14	NNDPA	ND	0.330	UGG
0.0	24-feb-1988	LM14	PCB016	ND	0.330	UGG
0.0	24-feb-1988	LM14	PCB221	ND	0.330	UGG
0.0	24-feb-1988	LM14	PCB232	ND	0.330	UGG
0.0	24-feb-1988	LM14	PCB248	ND	0.330	UGG
0.0	24-feb-1988	LM14	PCB254	ND	0.330	UGG
0.0	24-feb-1988	LM14	PCB260	ND	1.650	UGG
0.0	24-feb-1988	LM14	PCP	ND	0.330	UGG
0.0	24-feb-1988	LM14	PHANTR	ND	0.230	UGG
0.0	24-feb-1988	LM14	PHENOL	ND	0.660	UGG
0.0	24-feb-1988	LM14	PPDDD	ND	0.090	UGG
0.0	24-feb-1988	LM14	PPDDE	LT	0.090	UGG
0.0	24-feb-1988	LM14	PPDDT	LT	0.487	UGG
0.0	24-feb-1988	LM14	PYR	ND	0.060	UGG
0.0	24-feb-1988	LM14	TXPHEN	ND	20.000	UGG
0.0	24-feb-1988	LM14	UNK563		2.120	UGG
0.0	24-feb-1988	LM14	UNK564		0.550	UGG
0.0	24-feb-1988	LM14	UNK565		0.730	UGG
0.0	24-feb-1988	LM14	UNK579		0.630	UGG
0.0	24-feb-1988	LM14	UNK580		0.860	UGG
0.0	24-feb-1988	LM14	UNK593		0.210	UGG
0.0	24-feb-1988	LM14	UNK596		0.390	UGG
0.0	24-feb-1988	LM14	UNK603		0.260	UGG
0.0	24-feb-1988	LW02	135TNB	LT	1.810	UGG
0.0	24-feb-1988	LW02	13DNB	LT	0.581	UGG
0.0	24-feb-1988	LW02	246TNT	LT	1.890	UGG
0.0	24-feb-1988	LW02	24DNT	LT	0.414	UGG
0.0	24-feb-1988	LW02	26DNT	LT	0.394	UGG
0.0	24-feb-1988	LW02	HMX	LT	1.260	UGG
0.0	24-feb-1988	LW02	NB	LT	0.421	UGG
0.0	24-feb-1988	LW02	RDX	LT	0.893	UGG
0.0	24-feb-1988	LW02	TETRYL	LT	0.273	UGG

Site: BORE SSDS-07-02

SAMPLE DEPTH (ft)	SAMPLE DATE	TEST METHOD	COMPOUND	BOOL	CONCENTRATION	UNITS
0.5	24-feb-1988	99	AG	LT	0.713	UGG
0.5	24-feb-1988	99	AS	LT	6.270	UGG
0.5	24-feb-1988	99	BE	LT	0.363	UGG
0.5	24-feb-1988	99	BR	LT	100.000	UGG
0.5	24-feb-1988	99	CD	LT	0.770	UGG
0.5	24-feb-1988	99	CL	LT	13800.000	UGG
0.5	24-feb-1988	99	CL	LT	13800.000	UGG

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Site: BORE SSDS-07-02 (continued)

SAMPLE DEPTH (ft)	SAMPLE DATE	TEST METHOD	COMPOUND	BOOL	CONCENTRATION	UNITS
0.5	24-feb-1988	99	CR		7.800	UGG
0.5	24-feb-1988	99	CU		9.540	UGG
0.5	24-feb-1988	99	F	LT	11.000	UGG
0.5	24-feb-1988	99	F	LT	11.000	UGG
0.5	24-feb-1988	99	NA		156.000	UGG
0.5	24-feb-1988	99	NI		8.530	UGG
0.5	24-feb-1988	99	NIT	LT	0.000	UGG
0.5	24-feb-1988	99	PB		6.640	UGG
0.5	24-feb-1988	99	SB	LT	27.800	UGG
0.5	24-feb-1988	99	SE	LT	2.310	UGG
0.5	24-feb-1988	99	SO4	LT	13800.000	UGG
0.5	24-feb-1988	99	SO4	LT	13800.000	UGG
0.5	24-feb-1988	99	TL	LT	8.720	UGG
0.5	24-feb-1988	99	ZN	LT	57.200	UGG
0.5	24-feb-1988	JB08	HG	LT	0.112	UGG
0.5	24-feb-1988	LM13	111TCE	ND	0.050	UGG
0.5	24-feb-1988	LM13	112TCE	ND	0.050	UGG
0.5	24-feb-1988	LM13	11DCE	ND	0.050	UGG
0.5	24-feb-1988	LM13	11DCLE	ND	0.050	UGG
0.5	24-feb-1988	LM13	12DCLB	ND	0.300	UGG
0.5	24-feb-1988	LM13	12DCLE	ND	0.050	UGG
0.5	24-feb-1988	LM13	12DCLP	ND	0.050	UGG
0.5	24-feb-1988	LM13	13DCLB	ND	0.300	UGG
0.5	24-feb-1988	LM13	14DCLB	ND	0.300	UGG
0.5	24-feb-1988	LM13	2CLEVE	ND	0.600	UGG
0.5	24-feb-1988	LM13	BRDCLM	ND	0.050	UGG
0.5	24-feb-1988	LM13	C13DCP	ND	0.600	UGG
0.5	24-feb-1988	LM13	C2H3CL	ND	0.100	UGG
0.5	24-feb-1988	LM13	C2H5CL	ND	0.100	UGG
0.5	24-feb-1988	LM13	C6H6	ND	0.600	UGG
0.5	24-feb-1988	LM13	CCL4	ND	0.050	UGG
0.5	24-feb-1988	LM13	CH2CL2	ND	0.050	UGG
0.5	24-feb-1988	LM13	CH3BR	ND	0.100	UGG
0.5	24-feb-1988	LM13	CH3CL	ND	0.100	UGG
0.5	24-feb-1988	LM13	CHBR3	ND	0.100	UGG
0.5	24-feb-1988	LM13	CHCL3	ND	0.050	UGG
0.5	24-feb-1988	LM13	CLC6H5	ND	0.630	UGG
0.5	24-feb-1988	LM13	DBRCLM	ND	0.050	UGG
0.5	24-feb-1988	LM13	ETC6H5	ND	0.050	UGG
0.5	24-feb-1988	LM13	MEC6H5	ND	0.050	UGG
0.5	24-feb-1988	LM13	T12DCE	ND	0.630	UGG
0.5	24-feb-1988	LM13	T13DCP	ND	0.050	UGG
0.5	24-feb-1988	LM13	TCLEA	ND	0.050	UGG
0.5	24-feb-1988	LM13	TCLEE	ND	0.050	UGG
0.5	24-feb-1988	LM13	TRCLE	LT	0.141	UGG

Analytical Results for Chemical Soil
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Site: BORE SSDS-07-02 (continued)

SAMPLE DEPTH (ft)	SAMPLE DATE	TEST METHOD	COMPOUND	BOOL	CONCENTRATION	UNITS
0.5	24-feb-1988	LM14	124TCB	ND	0.330	UGG
0.5	24-feb-1988	LM14	12DCLB	ND	0.630	UGG
0.5	24-feb-1988	LM14	12DPH	ND	0.330	UGG
0.5	24-feb-1988	LM14	13DCLB	ND	0.630	UGG
0.5	24-feb-1988	LM14	14DCLB	ND	0.630	UGG
0.5	24-feb-1988	LM14	246TCP	ND	0.330	UGG
0.5	24-feb-1988	LM14	24DCLP	ND	0.330	UGG
0.5	24-feb-1988	LM14	24DMPN	ND	0.330	UGG
0.5	24-feb-1988	LM14	24DNP	ND	1.650	UGG
0.5	24-feb-1988	LM14	24DNT	ND	0.330	UGG
0.5	24-feb-1988	LM14	26DNT	ND	0.330	UGG
0.5	24-feb-1988	LM14	2CLP	ND	0.330	UGG
0.5	24-feb-1988	LM14	2CNAP	ND	0.330	UGG
0.5	24-feb-1988	LM14	2NP	ND	0.330	UGG
0.5	24-feb-1988	LM14	33DCBD	ND	0.660	UGG
0.5	24-feb-1988	LM14	46DN2C	ND	1.650	UGG
0.5	24-feb-1988	LM14	4CL3C	ND	0.330	UGG
0.5	24-feb-1988	LM14	4CLPPE	ND	0.330	UGG
0.5	24-feb-1988	LM14	4NP	ND	1.650	UGG
0.5	24-feb-1988	LM14	ABHC	ND	0.660	UGG
0.5	24-feb-1988	LM14	AENSLF	ND	0.330	UGG
0.5	24-feb-1988	LM14	ALDRN	ND	0.660	UGG
0.5	24-feb-1988	LM14	ANAPNE	ND	0.330	UGG
0.5	24-feb-1988	LM14	ANAPYL	ND	0.330	UGG
0.5	24-feb-1988	LM14	ANTRC	ND	0.330	UGG
0.5	24-feb-1988	LM14	B2CEXM	ND	0.330	UGG
0.5	24-feb-1988	LM14	B2CLEE	ND	0.330	UGG
0.5	24-feb-1988	LM14	B2EHP	ND	0.330	UGG
0.5	24-feb-1988	LM14	BAANTR	ND	0.330	UGG
0.5	24-feb-1988	LM14	BAPYR	ND	0.330	UGG
0.5	24-feb-1988	LM14	BBFANT	ND	0.330	UGG
0.5	24-feb-1988	LM14	BBHC	ND	0.660	UGG
0.5	24-feb-1988	LM14	BBZP	ND	0.330	UGG
0.5	24-feb-1988	LM14	BENSLF	ND	0.330	UGG
0.5	24-feb-1988	LM14	BENZAL		2.300	UGG
0.5	24-feb-1988	LM14	BENZID	ND	1.650	UGG
0.5	24-feb-1988	LM14	BGHIPY	ND	0.330	UGG
0.5	24-feb-1988	LM14	BKFANT	ND	0.330	UGG
0.5	24-feb-1988	LM14	CHRY	ND	0.330	UGG
0.5	24-feb-1988	LM14	CL6BZ	ND	0.330	UGG
0.5	24-feb-1988	LM14	CL6CP	ND	0.330	UGG
0.5	24-feb-1988	LM14	CL6ET	ND	0.330	UGG
0.5	24-feb-1988	LM14	CLDAN	ND	0.330	UGG
0.5	24-feb-1988	LM14	DBAHA	ND	0.330	UGG
0.5	24-feb-1988	LM14	DBHC	ND	0.660	UGG
0.5	24-feb-1988	LM14	DEP	ND	0.330	UGG
0.5	24-feb-1988	LM14	DLDRN	ND	0.660	UGG
0.5	24-feb-1988	LM14	DMP	ND	0.330	UGG

Analytical Results for Chemical Soil
From: 01-jan-1988 To: 27-nov-90

Site: BORE SSDS-07-02 (continued)

SAMPLE DEPTH (ft)	SAMPLE DATE	TEST METHOD	COMPOUND	BOOL	CONCENTRATION	UNITS
0.5	24-feb-1988	LM14	DNBP	ND	0.330	UGG
0.5	24-feb-1988	LM14	DNOP	ND	0.330	UGG
0.5	24-feb-1988	LM14	ENDRN	ND	0.660	UGG
0.5	24-feb-1988	LM14	ESFSO4	ND	0.660	UGG
0.5	24-feb-1988	LM14	FANT	ND	0.330	UGG
0.5	24-feb-1988	LM14	FLRENE	ND	0.330	UGG
0.5	24-feb-1988	LM14	HCBD	ND	0.330	UGG
0.5	24-feb-1988	LM14	HPCL	ND	0.660	UGG
0.5	24-feb-1988	LM14	HPCLE	ND	0.660	UGG
0.5	24-feb-1988	LM14	HXAB2E		3.210	UGG
0.5	24-feb-1988	LM14	ICDPYR	ND	0.330	UGG
0.5	24-feb-1988	LM14	ISOPHR	ND	0.330	UGG
0.5	24-feb-1988	LM14	LIN	LT	0.058	UGG
0.5	24-feb-1988	LM14	NAP	ND	0.330	UGG
0.5	24-feb-1988	LM14	NB	ND	0.330	UGG
0.5	24-feb-1988	LM14	NNDMEA	ND	0.330	UGG
0.5	24-feb-1988	LM14	NNDPA	ND	0.330	UGG
0.5	24-feb-1988	LM14	PCB016	ND	0.330	UGG
0.5	24-feb-1988	LM14	PCB221	ND	0.330	UGG
0.5	24-feb-1988	LM14	PCB232	ND	0.330	UGG
0.5	24-feb-1988	LM14	PCB248	ND	0.330	UGG
0.5	24-feb-1988	LM14	PCB254	ND	0.330	UGG
0.5	24-feb-1988	LM14	PCB260	ND	1.650	UGG
0.5	24-feb-1988	LM14	PCP	ND	0.330	UGG
0.5	24-feb-1988	LM14	PHANTR	ND	0.230	UGG
0.5	24-feb-1988	LM14	PHENOL	ND	0.660	UGG
0.5	24-feb-1988	LM14	PPDDD	ND	0.090	UGG
0.5	24-feb-1988	LM14	PPDDE	LT	0.090	UGG
0.5	24-feb-1988	LM14	PPDDT	LT	0.487	UGG
0.5	24-feb-1988	LM14	PYR	ND	0.060	UGG
0.5	24-feb-1988	LM14	TXPHEN	ND	20.000	UGG
0.5	24-feb-1988	LM14	UNK563		0.520	UGG
0.5	24-feb-1988	LM14	UNK564		0.170	UGG
0.5	24-feb-1988	LM14	UNK579		0.450	UGG
0.5	24-feb-1988	LM14	UNK580		1.110	UGG
0.5	24-feb-1988	LM14	UNK593		1.300	UGG
0.5	24-feb-1988	LM14	UNK596		0.250	UGG
0.5	24-feb-1988	LW02	135TNB	LT	1.840	UGG
0.5	24-feb-1988	LW02	13DNB	LT	0.590	UGG
0.5	24-feb-1988	LW02	246TNT	LT	1.920	UGG
0.5	24-feb-1988	LW02	24DNT	LT	0.420	UGG
0.5	24-feb-1988	LW02	26DNT	LT	0.400	UGG
0.5	24-feb-1988	LW02	HMX	LT	1.280	UGG
0.5	24-feb-1988	LW02	NB	LT	0.428	UGG
0.5	24-feb-1988	LW02	RDX	LT	0.906	UGG
0.5	24-feb-1988	LW02	TETRYL	LT	0.277	UGG

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Site: BORE SSDS-07-03

SAMPLE DEPTH (ft)	SAMPLE DATE	TEST METHOD	COMPOUND	BOOL	CONCENTRATION	UNITS
1.0	24-feb-1988	99	AG	LT	0.723	UGG
1.0	24-feb-1988	99	AS	LT	6.360	UGG
1.0	24-feb-1988	99	BE	LT	0.368	UGG
1.0	24-feb-1988	99	BR	LT	100.000	UGG
1.0	24-feb-1988	99	CD	LT	0.781	UGG
1.0	24-feb-1988	99	CL	LT	13900.000	UGG
1.0	24-feb-1988	99	CR		10.100	UGG
1.0	24-feb-1988	99	CU		12.500	UGG
1.0	24-feb-1988	99	F	LT	11.200	UGG
1.0	24-feb-1988	99	NA		125.000	UGG
1.0	24-feb-1988	99	NI		6.840	UGG
1.0	24-feb-1988	99	NI		12.100	UGG
1.0	24-feb-1988	99	NIT	LT	0.000	UGG
1.0	24-feb-1988	99	NIT	LT	0.000	UGG
1.0	24-feb-1988	99	PB	LT	5.330	UGG
1.0	24-feb-1988	99	SB	LT	28.200	UGG
1.0	24-feb-1988	99	SE	LT	2.340	UGG
1.0	24-feb-1988	99	SO4	LT	13900.000	UGG
1.0	24-feb-1988	99	TL	LT	8.850	UGG
1.0	24-feb-1988	99	ZN	LT	58.000	UGG
1.0	24-feb-1988	JB08	HG	LT	0.112	UGG
1.0	24-feb-1988	LM13	111TCE	ND	0.050	UGG
1.0	24-feb-1988	LM13	112TCE	ND	0.050	UGG
1.0	24-feb-1988	LM13	11DCE	ND	0.050	UGG
1.0	24-feb-1988	LM13	11DCLE	ND	0.050	UGG
1.0	24-feb-1988	LM13	12DCLB	ND	0.300	UGG
1.0	24-feb-1988	LM13	12DCLE	ND	0.050	UGG
1.0	24-feb-1988	LM13	12DCLP	ND	0.050	UGG
1.0	24-feb-1988	LM13	13DCLB	ND	0.300	UGG
1.0	24-feb-1988	LM13	14DCLB	ND	0.300	UGG
1.0	24-feb-1988	LM13	2CLEVE	ND	0.600	UGG
1.0	24-feb-1988	LM13	BRDCLM	ND	0.050	UGG
1.0	24-feb-1988	LM13	C13DCP	ND	0.600	UGG
1.0	24-feb-1988	LM13	C2H3CL	ND	0.100	UGG
1.0	24-feb-1988	LM13	C2H5CL	ND	0.100	UGG
1.0	24-feb-1988	LM13	C6H6	ND	0.600	UGG
1.0	24-feb-1988	LM13	CCL4	ND	0.050	UGG
1.0	24-feb-1988	LM13	CH2CL2	ND	0.050	UGG
1.0	24-feb-1988	LM13	CH3BR	ND	0.100	UGG
1.0	24-feb-1988	LM13	CH3CL	ND	0.100	UGG
1.0	24-feb-1988	LM13	CHBR3	ND	0.100	UGG
1.0	24-feb-1988	LM13	CHCL3	ND	0.050	UGG
1.0	24-feb-1988	LM13	CLC6H5	ND	0.630	UGG
1.0	24-feb-1988	LM13	DBRCLM	ND	0.050	UGG
1.0	24-feb-1988	LM13	ETC6H5	ND	0.050	UGG
1.0	24-feb-1988	LM13	MEC6H5	ND	0.050	UGG

Analytical Results for Chemical Soil
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Site: BORE SSDS-07-03 (continued)

SAMPLE DEPTH (ft)	SAMPLE DATE	TEST METHOD	COMPOUND	BOOL	CONCENTRATION	UNITS
1.0	24-feb-1988	LM13	T12DCE	ND	0.630	UGG
1.0	24-feb-1988	LM13	T13DCP	ND	0.050	UGG
1.0	24-feb-1988	LM13	TCLEA	ND	0.050	UGG
1.0	24-feb-1988	LM13	TCLEE	ND	0.050	UGG
1.0	24-feb-1988	LM13	TRCLE	LT	0.141	UGG
1.0	24-feb-1988	LM14	124TC8	ND	0.330	UGG
1.0	24-feb-1988	LM14	12DCL8	ND	0.630	UGG
1.0	24-feb-1988	LM14	12DPH	ND	0.330	UGG
1.0	24-feb-1988	LM14	13DCLB	ND	0.630	UGG
1.0	24-feb-1988	LM14	14DCL8	ND	0.630	UGG
1.0	24-feb-1988	LM14	246TCP	ND	0.330	UGG
1.0	24-feb-1988	LM14	24DCLP	ND	0.330	UGG
1.0	24-feb-1988	LM14	24DMPN	ND	0.330	UGG
1.0	24-feb-1988	LM14	24DNP	ND	1.650	UGG
1.0	24-feb-1988	LM14	24DNT	ND	0.330	UGG
1.0	24-feb-1988	LM14	26DNT	ND	0.330	UGG
1.0	24-feb-1988	LM14	2CLP	ND	0.330	UGG
1.0	24-feb-1988	LM14	2CNAP	ND	0.330	UGG
1.0	24-feb-1988	LM14	2NP	ND	0.330	UGG
1.0	24-feb-1988	LM14	33DCBD	ND	0.660	UGG
1.0	24-feb-1988	LM14	46DN2C	ND	1.650	UGG
1.0	24-feb-1988	LM14	4CL3C	ND	0.330	UGG
1.0	24-feb-1988	LM14	4CLPPE	ND	0.330	UGG
1.0	24-feb-1988	LM14	4NP	ND	1.650	UGG
1.0	24-feb-1988	LM14	ABHC	ND	0.660	UGG
1.0	24-feb-1988	LM14	AENSLF	ND	0.330	UGG
1.0	24-feb-1988	LM14	ALDRN	ND	0.660	UGG
1.0	24-feb-1988	LM14	ANAPNE	ND	0.330	UGG
1.0	24-feb-1988	LM14	ANAPYL	ND	0.330	UGG
1.0	24-feb-1988	LM14	ANTRC	ND	0.330	UGG
1.0	24-feb-1988	LM14	B2CEXM	ND	0.330	UGG
1.0	24-feb-1988	LM14	B2CLEE	ND	0.330	UGG
1.0	24-feb-1988	LM14	B2EHP	ND	0.330	UGG
1.0	24-feb-1988	LM14	BAANTR	ND	0.330	UGG
1.0	24-feb-1988	LM14	BAPYR	ND	0.330	UGG
1.0	24-feb-1988	LM14	BBFANT	ND	0.330	UGG
1.0	24-feb-1988	LM14	BBHC	ND	0.660	UGG
1.0	24-feb-1988	LM14	BBZP	ND	0.330	UGG
1.0	24-feb-1988	LM14	BENSLF	ND	0.330	UGG
1.0	24-feb-1988	LM14	BENZAL		0.310	UGG
1.0	24-feb-1988	LM14	BENZID	ND	1.650	UGG
1.0	24-feb-1988	LM14	BGHIPY	ND	0.330	UGG
1.0	24-feb-1988	LM14	BKFANT	ND	0.330	UGG
1.0	24-feb-1988	LM14	CHRY	ND	0.330	UGG
1.0	24-feb-1988	LM14	CL6BZ	ND	0.330	UGG
1.0	24-feb-1988	LM14	CL6CP	ND	0.330	UGG
1.0	24-feb-1988	LM14	CL6ET	ND	0.330	UGG

Analytical Results for Chemical Soil
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Site: BORE SSDS-07-03 (continued)

SAMPLE DEPTH (ft)	SAMPLE DATE	TEST METHOD	COMPOUND	BOOL	CONCENTRATION	UNITS
1.0	24-feb-1988	LM14	CLDAN	ND	0.330	UGG
1.0	24-feb-1988	LM14	DBAHA	ND	0.330	UGG
1.0	24-feb-1988	LM14	DBHC	ND	0.660	UGG
1.0	24-feb-1988	LM14	DEP	ND	0.330	UGG
1.0	24-feb-1988	LM14	DLDRN	ND	0.660	UGG
1.0	24-feb-1988	LM14	DMP	ND	0.330	UGG
1.0	24-feb-1988	LM14	DNBP	ND	0.330	UGG
1.0	24-feb-1988	LM14	DNOP	ND	0.330	UGG
1.0	24-feb-1988	LM14	ENDRN	ND	0.660	UGG
1.0	24-feb-1988	LM14	ESFSO4	ND	0.660	UGG
1.0	24-feb-1988	LM14	FANT	ND	0.330	UGG
1.0	24-feb-1988	LM14	FLRENE	ND	0.330	UGG
1.0	24-feb-1988	LM14	HCBD	ND	0.330	UGG
1.0	24-feb-1988	LM14	HPCL	ND	0.660	UGG
1.0	24-feb-1988	LM14	HPCLE	ND	0.660	UGG
1.0	24-feb-1988	LM14	HXA82E		5.820	UGG
1.0	24-feb-1988	LM14	ICDPYR	ND	0.330	UGG
1.0	24-feb-1988	LM14	ISOPHR	ND	0.330	UGG
1.0	24-feb-1988	LM14	LIN	LT	0.058	UGG
1.0	24-feb-1988	LM14	NAP	ND	0.330	UGG
1.0	24-feb-1988	LM14	NB	ND	0.330	UGG
1.0	24-feb-1988	LM14	NNDMEA	ND	0.330	UGG
1.0	24-feb-1988	LM14	NNDPA	ND	0.330	UGG
1.0	24-feb-1988	LM14	PCB016	ND	0.330	UGG
1.0	24-feb-1988	LM14	PCB221	ND	0.330	UGG
1.0	24-feb-1988	LM14	PCB232	ND	0.330	UGG
1.0	24-feb-1988	LM14	PCB248	ND	0.330	UGG
1.0	24-feb-1988	LM14	PCB254	ND	0.330	UGG
1.0	24-feb-1988	LM14	PCB260	ND	1.650	UGG
1.0	24-feb-1988	LM14	PCP	ND	0.330	UGG
1.0	24-feb-1988	LM14	PHANTR	ND	0.230	UGG
1.0	24-feb-1988	LM14	PHENOL	ND	0.660	UGG
1.0	24-feb-1988	LM14	PPDDD	ND	0.090	UGG
1.0	24-feb-1988	LM14	PPDDE	LT	0.090	UGG
1.0	24-feb-1988	LM14	PPDDT	LT	0.487	UGG
1.0	24-feb-1988	LM14	PYR	ND	0.060	UGG
1.0	24-feb-1988	LM14	TXPHEN	ND	20.000	UGG
1.0	24-feb-1988	LM14	UNK563		0.700	UGG
1.0	24-feb-1988	LM14	UNK565		0.280	UGG
1.0	24-feb-1988	LM14	UNK579		0.560	UGG
1.0	24-feb-1988	LM14	UNK580		1.010	UGG
1.0	24-feb-1988	LM14	UNK593		0.160	UGG
1.0	24-feb-1988	LM14	UNK596		0.220	UGG
1.0	24-feb-1988	LM14	UNK598		0.260	UGG
1.0	24-feb-1988	LW02	135TNB	LT	1.840	UGG
1.0	24-feb-1988	LW02	13DNB	LT	0.590	UGG
1.0	24-feb-1988	LW02	246TNT	LT	1.920	UGG

Site: BORE SSDS-07-03 (continued)

SAMPLE DEPTH (ft)	SAMPLE DATE	TEST METHOD	COMPOUND	BOOL	CONCENTRATION	UNITS
1.0	24-feb-1988	LW02	24DNT	LT	0.420	UGG
1.0	24-feb-1988	LW02	26DNT	LT	0.400	UGG
1.0	24-feb-1988	LW02	HMX	LT	1.280	UGG
1.0	24-feb-1988	LW02	NB	LT	0.428	UGG
1.0	24-feb-1988	LW02	RDX	LT	0.906	UGG
1.0	24-feb-1988	LW02	TETRYL	LT	0.277	UGG

Site: BORE SSDS-08-01

SAMPLE DEPTH (ft)	SAMPLE DATE	TEST METHOD	COMPOUND	BOOL	CONCENTRATION	UNITS
0.0	24-feb-1988	99	AG	LT	0.717	UGG
0.0	24-feb-1988	99	AS		6.590	UGG
0.0	24-feb-1988	99	BE	LT	0.365	UGG
0.0	24-feb-1988	99	BR	LT	100.000	UGG
0.0	24-feb-1988	99	CD		1.230	UGG
0.0	24-feb-1988	99	CL	LT	13800.000	UGG
0.0	24-feb-1988	99	CR		8.960	UGG
0.0	24-feb-1988	99	CU		21.000	UGG
0.0	24-feb-1988	99	F	LT	11.100	UGG
0.0	24-feb-1988	99	NA		203.000	UGG
0.0	24-feb-1988	99	NI		9.550	UGG
0.0	24-feb-1988	99	NIT	LT	0.000	UGG
0.0	24-feb-1988	99	PB		28.000	UGG
0.0	24-feb-1988	99	SB	LT	28.000	UGG
0.0	24-feb-1988	99	SE	LT	2.320	UGG
0.0	24-feb-1988	99	SO4	LT	13800.000	UGG
0.0	24-feb-1988	99	TL	LT	8.780	UGG
0.0	24-feb-1988	99	ZN		75.100	UGG
0.0	24-feb-1988	JB08	HG	LT	0.113	UGG
0.0	24-feb-1988	LM13	111TCE	ND	0.050	UGG
0.0	24-feb-1988	LM13	112TCE	ND	0.050	UGG
0.0	24-feb-1988	LM13	11DCE	ND	0.050	UGG
0.0	24-feb-1988	LM13	11DCLE	ND	0.050	UGG
0.0	24-feb-1988	LM13	12DCLB	ND	0.300	UGG
0.0	24-feb-1988	LM13	12DCLE	ND	0.050	UGG
0.0	24-feb-1988	LM13	12DCLP	ND	0.050	UGG
0.0	24-feb-1988	LM13	13DCLB	ND	0.300	UGG
0.0	24-feb-1988	LM13	14DCLB	ND	0.300	UGG
0.0	24-feb-1988	LM13	2CLEVE	ND	0.600	UGG
0.0	24-feb-1988	LM13	BRDCLM	ND	0.050	UGG
0.0	24-feb-1988	LM13	C13DCP	ND	0.600	UGG
0.0	24-feb-1988	LM13	C2H3CL	ND	0.100	UGG
0.0	24-feb-1988	LM13	C2H5CL	ND	0.100	UGG

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Site: BORE SSDS-08-01 (continued)

SAMPLE DEPTH (ft)	SAMPLE DATE	TEST METHOD	COMPOUND	BOOL	CONCENTRATION	UNITS
0.0	24-feb-1988	LM13	C6H6	ND	0.600	UGG
0.0	24-feb-1988	LM13	CCL4	ND	0.050	UGG
0.0	24-feb-1988	LM13	CH2CL2	ND	0.050	UGG
0.0	24-feb-1988	LM13	CH3BR	ND	0.100	UGG
0.0	24-feb-1988	LM13	CH3CL	ND	0.100	UGG
0.0	24-feb-1988	LM13	CHBR3	ND	0.100	UGG
0.0	24-feb-1988	LM13	CHCL3	ND	0.050	UGG
0.0	24-feb-1988	LM13	CLC6H5	ND	0.630	UGG
0.0	24-feb-1988	LM13	DBRCLM	ND	0.050	UGG
0.0	24-feb-1988	LM13	ETC6H5	ND	0.050	UGG
0.0	24-feb-1988	LM13	MEC6H5	ND	0.050	UGG
0.0	24-feb-1988	LM13	T12DCE	ND	0.630	UGG
0.0	24-feb-1988	LM13	T13DCP	ND	0.050	UGG
0.0	24-feb-1988	LM13	TCLEA	ND	0.050	UGG
0.0	24-feb-1988	LM13	TCLEE	ND	0.050	UGG
0.0	24-feb-1988	LM13	TRCLE	LT	0.141	UGG
0.0	24-feb-1988	LM14	124TCB	ND	0.330	UGG
0.0	24-feb-1988	LM14	12DPH	ND	0.330	UGG
0.0	24-feb-1988	LM14	24DCLP	ND	0.330	UGG
0.0	24-feb-1988	LM14	24DMPN	ND	0.330	UGG
0.0	24-feb-1988	LM14	24DNP	ND	1.650	UGG
0.0	24-feb-1988	LM14	24DNT	ND	0.330	UGG
0.0	24-feb-1988	LM14	26DNT	ND	0.330	UGG
0.0	24-feb-1988	LM14	2CLP	ND	0.330	UGG
0.0	24-feb-1988	LM14	2CNAP	ND	0.330	UGG
0.0	24-feb-1988	LM14	2NP	ND	0.330	UGG
0.0	24-feb-1988	LM14	33DCBD	ND	0.660	UGG
0.0	24-feb-1988	LM14	46DN2C	ND	1.650	UGG
0.0	24-feb-1988	LM14	4BRPPE	ND	0.330	UGG
0.0	24-feb-1988	LM14	4CL3C	ND	0.330	UGG
0.0	24-feb-1988	LM14	4CLPPE	ND	0.330	UGG
0.0	24-feb-1988	LM14	4NP	ND	1.650	UGG
0.0	24-feb-1988	LM14	ABHC	ND	0.660	UGG
0.0	24-feb-1988	LM14	AENSLF	ND	0.330	UGG
0.0	24-feb-1988	LM14	ALDRN	ND	0.660	UGG
0.0	24-feb-1988	LM14	ANAPYL	ND	0.330	UGG
0.0	24-feb-1988	LM14	ANTRC	ND	0.330	UGG
0.0	24-feb-1988	LM14	B2CEXM	ND	0.330	UGG
0.0	24-feb-1988	LM14	B2CIPE	ND	0.330	UGG
0.0	24-feb-1988	LM14	B2CLEE	ND	0.330	UGG
0.0	24-feb-1988	LM14	B2EHP	ND	0.330	UGG
0.0	24-feb-1988	LM14	BAANTR	ND	0.330	UGG
0.0	24-feb-1988	LM14	BAPYR	ND	0.330	UGG
0.0	24-feb-1988	LM14	BBFANT	ND	0.330	UGG
0.0	24-feb-1988	LM14	BBHC	ND	0.660	UGG
0.0	24-feb-1988	LM14	BBZP	ND	0.330	UGG
0.0	24-feb-1988	LM14	BENSLF	ND	0.330	UGG

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Site: BORE SSDS-08-01 (continued)

SAMPLE DEPTH (ft)	SAMPLE DATE	TEST METHOD	COMPOUND	BOOL	CONCENTRATION	UNITS
0.0	24-feb-1988	LM14	BENZID	ND	1.650	UGG
0.0	24-feb-1988	LM14	BGHIPY	ND	0.330	UGG
0.0	24-feb-1988	LM14	BKFANT	ND	0.330	UGG
0.0	24-feb-1988	LM14	C2H5CL	ND	1.250	UGG
0.0	24-feb-1988	LM14	CHRY	ND	0.330	UGG
0.0	24-feb-1988	LM14	CL6BZ	ND	0.330	UGG
0.0	24-feb-1988	LM14	CL6CP	ND	0.330	UGG
0.0	24-feb-1988	LM14	CL6ET	ND	0.330	UGG
0.0	24-feb-1988	LM14	CLDAN	ND	0.330	UGG
0.0	24-feb-1988	LM14	DBAHA	ND	0.330	UGG
0.0	24-feb-1988	LM14	DBHC	ND	0.660	UGG
0.0	24-feb-1988	LM14	DEP	ND	0.330	UGG
0.0	24-feb-1988	LM14	DLDRN	ND	0.660	UGG
0.0	24-feb-1988	LM14	DMP	ND	0.330	UGG
0.0	24-feb-1988	LM14	DNBP	ND	0.330	UGG
0.0	24-feb-1988	LM14	DNOP	ND	0.330	UGG
0.0	24-feb-1988	LM14	ENDRN	ND	0.660	UGG
0.0	24-feb-1988	LM14	ENDRNA	ND	0.660	UGG
0.0	24-feb-1988	LM14	ESFSO4	ND	0.660	UGG
0.0	24-feb-1988	LM14	FANT	ND	0.330	UGG
0.0	24-feb-1988	LM14	FLRENE	ND	0.330	UGG
0.0	24-feb-1988	LM14	GBHC	ND	0.330	UGG
0.0	24-feb-1988	LM14	HCBD	ND	0.330	UGG
0.0	24-feb-1988	LM14	HPCL	ND	0.660	UGG
0.0	24-feb-1988	LM14	HPCLE	ND	0.660	UGG
0.0	24-feb-1988	LM14	ICDPYR	ND	0.330	UGG
0.0	24-feb-1988	LM14	ISOPHR	ND	0.330	UGG
0.0	24-feb-1988	LM14	LIN	LT	0.066	UGG
0.0	24-feb-1988	LM14	NAP	ND	0.330	UGG
0.0	24-feb-1988	LM14	NB	ND	0.330	UGG
0.0	24-feb-1988	LM14	NNDMEA	ND	0.330	UGG
0.0	24-feb-1988	LM14	PCB016	ND	0.330	UGG
0.0	24-feb-1988	LM14	PCB221	ND	0.330	UGG
0.0	24-feb-1988	LM14	PCB232	ND	0.330	UGG
0.0	24-feb-1988	LM14	PCB242	ND	0.330	UGG
0.0	24-feb-1988	LM14	PCB248	ND	0.330	UGG
0.0	24-feb-1988	LM14	PCB254	ND	0.330	UGG
0.0	24-feb-1988	LM14	PCB260	ND	1.650	UGG
0.0	24-feb-1988	LM14	PCP	ND	0.330	UGG
0.0	24-feb-1988	LM14	PHANTR	ND	0.230	UGG
0.0	24-feb-1988	LM14	PHENOL	ND	0.660	UGG
0.0	24-feb-1988	LM14	PPDDD	ND	0.090	UGG
0.0	24-feb-1988	LM14	PPDDE	LT	0.094	UGG
0.0	24-feb-1988	LM14	PPDDT	LT	0.506	UGG
0.0	24-feb-1988	LM14	PYR	ND	0.060	UGG
0.0	24-feb-1988	LM14	TXPHEN	ND	20.000	UGG
0.0	24-feb-1988	LM14	UNK101		0.280	UGG
0.0	24-feb-1988	LM14	UNK103		0.540	UGG

Analytical Results for Chemical Soil
From: 01-jan-1988 To: 27-nov-90

Site: BORE SSDS-08-01 (continued)

SAMPLE DEPTH (ft)	SAMPLE DATE	TEST METHOD	COMPOUND	BOOL	CONCENTRATION	UNITS
0.0	24-feb-1988	LM14	UNK104		0.240	UGG
0.0	24-feb-1988	LM14	UNK105		0.450	UGG
0.0	24-feb-1988	LM14	UNK106		0.180	UGG
0.0	24-feb-1988	LM14	UNK107		0.420	UGG
0.0	24-feb-1988	LM14	UNK108		0.340	UGG
0.0	24-feb-1988	LM14	UNK109		0.970	UGG
0.0	24-feb-1988	LM14	UNK547		0.210	UGG
0.0	24-feb-1988	LM14	UNK596		1.410	UGG
0.0	24-feb-1988	LM14	UNK598		0.230	UGG
0.0	24-feb-1988	LM14	UNK599		0.170	UGG
0.0	24-feb-1988	LW02	135TNB	LT	1.870	UGG
0.0	24-feb-1988	LW02	13DNB	LT	0.598	UGG
0.0	24-feb-1988	LW02	246TNT	LT	1.950	UGG
0.0	24-feb-1988	LW02	24DNT	LT	0.426	UGG
0.0	24-feb-1988	LW02	26DNT	LT	0.405	UGG
0.0	24-feb-1988	LW02	HMX	LT	1.300	UGG
0.0	24-feb-1988	LW02	NB	LT	0.433	UGG
0.0	24-feb-1988	LW02	RDX	LT	0.919	UGG
0.0	24-feb-1988	LW02	TETRYL	LT	0.281	UGG

Site: BORE SSDS-08-02

SAMPLE DEPTH (ft)	SAMPLE DATE	TEST METHOD	COMPOUND	BOOL	CONCENTRATION	UNITS
0.5	24-feb-1988	99	AG	LT	0.726	UGG
0.5	24-feb-1988	99	AS		7.660	UGG
0.5	24-feb-1988	99	BE	LT	0.370	UGG
0.5	24-feb-1988	99	BR	LT	100.000	UGG
0.5	24-feb-1988	99	CD		0.896	UGG
0.5	24-feb-1988	99	CL		12800.000	UGG
0.5	24-feb-1988	99	CR		20.700	UGG
0.5	24-feb-1988	99	CU		25.400	UGG
0.5	24-feb-1988	99	F	LT	11.200	UGG
0.5	24-feb-1988	99	NA		175.000	UGG
0.5	24-feb-1988	99	NI		7.860	UGG
0.5	24-feb-1988	99	NIT	LT	0.000	UGG
0.5	24-feb-1988	99	PB		15.400	UGG
0.5	24-feb-1988	99	SB	LT	28.400	UGG
0.5	24-feb-1988	99	SE	LT	2.350	UGG
0.5	24-feb-1988	99	SO4	LT	14000.000	UGG
0.5	24-feb-1988	99	TL	LT	8.890	UGG
0.5	24-feb-1988	99	ZN	LT	58.300	UGG
0.5	24-feb-1988	JB08	HG	LT	0.114	UGG

Analytical Results for Chemical Soil
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Site: BORE SSDS-08-02 (continued)

SAMPLE DEPTH (ft)	SAMPLE DATE	TEST METHOD	COMPOUND	BOOL	CONCENTRATION	UNITS
0.5	24-feb-1988	LM13	111TCE	ND	0.050	UGG
0.5	24-feb-1988	LM13	112TCE	ND	0.050	UGG
0.5	24-feb-1988	LM13	11DCE	ND	0.050	UGG
0.5	24-feb-1988	LM13	11DCLE	ND	0.050	UGG
0.5	24-feb-1988	LM13	12DCLB	ND	0.300	UGG
0.5	24-feb-1988	LM13	12DCLE	ND	0.050	UGG
0.5	24-feb-1988	LM13	12DCLP	ND	0.050	UGG
0.5	24-feb-1988	LM13	13DCLB	ND	0.300	UGG
0.5	24-feb-1988	LM13	14DCLB	ND	0.300	UGG
0.5	24-feb-1988	LM13	2CLEVE	ND	0.600	UGG
0.5	24-feb-1988	LM13	BRDCLM	ND	0.050	UGG
0.5	24-feb-1988	LM13	C13DCP	ND	0.600	UGG
0.5	24-feb-1988	LM13	C2H3CL	ND	0.100	UGG
0.5	24-feb-1988	LM13	C2H5CL	ND	0.100	UGG
0.5	24-feb-1988	LM13	C6H6	ND	0.600	UGG
0.5	24-feb-1988	LM13	CCL4	ND	0.050	UGG
0.5	24-feb-1988	LM13	CH2CL2	ND	0.050	UGG
0.5	24-feb-1988	LM13	CH3BR	ND	0.100	UGG
0.5	24-feb-1988	LM13	CH3CL	ND	0.100	UGG
0.5	24-feb-1988	LM13	CHBR3	ND	0.100	UGG
0.5	24-feb-1988	LM13	CHCL3	ND	0.050	UGG
0.5	24-feb-1988	LM13	CLC6H5	ND	0.630	UGG
0.5	24-feb-1988	LM13	DBRCLM	ND	0.050	UGG
0.5	24-feb-1988	LM13	ETC6H5	ND	0.050	UGG
0.5	24-feb-1988	LM13	MEC6H5	ND	0.050	UGG
0.5	24-feb-1988	LM13	T12DCE	ND	0.630	UGG
0.5	24-feb-1988	LM13	T13DCP	ND	0.050	UGG
0.5	24-feb-1988	LM13	TCLEA	ND	0.050	UGG
0.5	24-feb-1988	LM13	TCLEE	ND	0.050	UGG
0.5	24-feb-1988	LM13	TRCLE	LT	0.141	UGG
0.5	24-feb-1988	LM14	124TCB	ND	0.330	UGG
0.5	24-feb-1988	LM14	12DPH	ND	0.330	UGG
0.5	24-feb-1988	LM14	24DCLP	ND	0.330	UGG
0.5	24-feb-1988	LM14	24DMPN	ND	0.330	UGG
0.5	24-feb-1988	LM14	24DNP	ND	1.650	UGG
0.5	24-feb-1988	LM14	24DNT	ND	0.330	UGG
0.5	24-feb-1988	LM14	26DNT	ND	0.330	UGG
0.5	24-feb-1988	LM14	2CLP	ND	0.330	UGG
0.5	24-feb-1988	LM14	2CNAP	ND	0.330	UGG
0.5	24-feb-1988	LM14	2NP	ND	0.330	UGG
0.5	24-feb-1988	LM14	33DCBD	ND	0.660	UGG
0.5	24-feb-1988	LM14	46DN2C	ND	1.650	UGG
0.5	24-feb-1988	LM14	4BRPPE	ND	0.330	UGG
0.5	24-feb-1988	LM14	4CL3C	ND	0.330	UGG
0.5	24-feb-1988	LM14	4CLPPE	ND	0.330	UGG
0.5	24-feb-1988	LM14	4NP	ND	1.650	UGG
0.5	24-feb-1988	LM14	A8HC	ND	0.660	UGG

Analytical Results for Chemical Soil
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Site: BORE SSDS-08-02 (continued)

SAMPLE DEPTH (ft)	SAMPLE DATE	TEST METHOD	COMPOUND	BOOL	CONCENTRATION	UNITS
0.5	24-feb-1988	LM14	AENSLF	ND	0.330	UGG
0.5	24-feb-1988	LM14	ALDRN	ND	0.660	UGG
0.5	24-feb-1988	LM14	ANAPNE	ND	0.330	UGG
0.5	24-feb-1988	LM14	ANAPYL	ND	0.330	UGG
0.5	24-feb-1988	LM14	ANTRC	ND	0.330	UGG
0.5	24-feb-1988	LM14	B2CEXM	ND	0.330	UGG
0.5	24-feb-1988	LM14	B2CIPE	ND	0.330	UGG
0.5	24-feb-1988	LM14	B2CLEE	ND	0.330	UGG
0.5	24-feb-1988	LM14	B2EHP	ND	0.330	UGG
0.5	24-feb-1988	LM14	BAANTR	ND	0.330	UGG
0.5	24-feb-1988	LM14	BAPYR	ND	0.330	UGG
0.5	24-feb-1988	LM14	BBFANT	ND	0.330	UGG
0.5	24-feb-1988	LM14	BBHC	ND	0.660	UGG
0.5	24-feb-1988	LM14	BBZP	ND	0.330	UGG
0.5	24-feb-1988	LM14	BENSLF	ND	0.330	UGG
0.5	24-feb-1988	LM14	BENZAL		0.310	UGG
0.5	24-feb-1988	LM14	BENZID	ND	1.650	UGG
0.5	24-feb-1988	LM14	BGHIPY	ND	0.330	UGG
0.5	24-feb-1988	LM14	BKFANT	ND	0.330	UGG
0.5	24-feb-1988	LM14	C2H5CL	ND	1.250	UGG
0.5	24-feb-1988	LM14	CHRY	ND	0.330	UGG
0.5	24-feb-1988	LM14	CL6BZ	ND	0.330	UGG
0.5	24-feb-1988	LM14	CL6CP	ND	0.330	UGG
0.5	24-feb-1988	LM14	CL6ET	ND	0.330	UGG
0.5	24-feb-1988	LM14	CLDAN	ND	0.330	UGG
0.5	24-feb-1988	LM14	DBAHA	ND	0.330	UGG
0.5	24-feb-1988	LM14	DBHC	ND	0.660	UGG
0.5	24-feb-1988	LM14	DEP	ND	0.330	UGG
0.5	24-feb-1988	LM14	DLDRN	ND	0.660	UGG
0.5	24-feb-1988	LM14	DMP	ND	0.330	UGG
0.5	24-feb-1988	LM14	DNBP	ND	0.330	UGG
0.5	24-feb-1988	LM14	DNOP	ND	0.330	UGG
0.5	24-feb-1988	LM14	ENDRN	ND	0.660	UGG
0.5	24-feb-1988	LM14	ENDRNA	ND	0.660	UGG
0.5	24-feb-1988	LM14	ESFSO4	ND	0.660	UGG
0.5	24-feb-1988	LM14	FANT	ND	0.330	UGG
0.5	24-feb-1988	LM14	FLRENE	ND	0.330	UGG
0.5	24-feb-1988	LM14	GBHC	ND	0.330	UGG
0.5	24-feb-1988	LM14	HCBD	ND	0.330	UGG
0.5	24-feb-1988	LM14	HPCL	ND	0.660	UGG
0.5	24-feb-1988	LM14	HPCLE	ND	0.660	UGG
0.5	24-feb-1988	LM14	ICDPYR	ND	0.330	UGG
0.5	24-feb-1988	LM14	ISOPHR	ND	0.330	UGG
0.5	24-feb-1988	LM14	LIN	LT	0.066	UGG
0.5	24-feb-1988	LM14	NAP	ND	0.330	UGG
0.5	24-feb-1988	LM14	NB	ND	0.330	UGG
0.5	24-feb-1988	LM14	NNDMEA	ND	0.330	UGG
0.5	24-feb-1988	LM14	PCB016	ND	0.330	UGG

Site: BORE SSDS-08-02 (continued)

SAMPLE DEPTH (ft)	SAMPLE DATE	TEST METHOD	COMPOUND	BOOL	CONCENTRATION	UNITS
0.5	24-feb-1988	LM14	PCB221	ND	0.330	UGG
0.5	24-feb-1988	LM14	PCB232	ND	0.330	UGG
0.5	24-feb-1988	LM14	PCB242	ND	0.330	UGG
0.5	24-feb-1988	LM14	PCB248	ND	0.330	UGG
0.5	24-feb-1988	LM14	PCB254	ND	0.330	UGG
0.5	24-feb-1988	LM14	PCB260	ND	1.650	UGG
0.5	24-feb-1988	LM14	PCP	ND	0.330	UGG
0.5	24-feb-1988	LM14	PHANTR	ND	0.230	UGG
0.5	24-feb-1988	LM14	PHENOL	ND	0.660	UGG
0.5	24-feb-1988	LM14	PPODD	ND	0.090	UGG
0.5	24-feb-1988	LM14	PPODE	LT	0.094	UGG
0.5	24-feb-1988	LM14	PPODT	LT	0.506	UGG
0.5	24-feb-1988	LM14	PYR	ND	0.060	UGG
0.5	24-feb-1988	LM14	TXPHEN	ND	20.000	UGG
0.5	24-feb-1988	LM14	UNK563		0.800	UGG
0.5	24-feb-1988	LM14	UNK564		0.160	UGG
0.5	24-feb-1988	LM14	UNK565		0.350	UGG
0.5	24-feb-1988	LM14	UNK574		0.640	UGG
0.5	24-feb-1988	LM14	UNK580		1.130	UGG
0.5	24-feb-1988	LM14	UNK593		6.840	UGG
0.5	24-feb-1988	LM14	UNK596		0.140	UGG
0.5	24-feb-1988	LW02	135TNB	LT	1.890	UGG
0.5	24-feb-1988	LW02	13DNB	LT	0.606	UGG
0.5	24-feb-1988	LW02	246TNT	LT	1.970	UGG
0.5	24-feb-1988	LW02	24DNT	LT	0.432	UGG
0.5	24-feb-1988	LW02	26DNT	LT	0.411	UGG
0.5	24-feb-1988	LW02	HMX	LT	1.320	UGG
0.5	24-feb-1988	LW02	NB	LT	0.440	UGG
0.5	24-feb-1988	LW02	RDX	LT	0.932	UGG
0.5	24-feb-1988	LW02	TETRYL	LT	0.285	UGG

Site: BORE SSDS-08-03

SAMPLE DEPTH (ft)	SAMPLE DATE	TEST METHOD	COMPOUND	BOOL	CONCENTRATION	UNITS
0.0	24-feb-1988	99	124TCB	ND	10.000	UGL
0.0	24-feb-1988	99	12DCLB	ND	10.000	UGL
0.0	24-feb-1988	99	12DPH	ND	10.000	UGL
0.0	24-feb-1988	99	13DCLB	ND	10.000	UGL
0.0	24-feb-1988	99	14DCLB	ND	10.000	UGL
0.0	24-feb-1988	99	246TCP	ND	10.000	UGL
0.0	24-feb-1988	99	24DCLP	ND	10.000	UGL
0.0	24-feb-1988	99	24DMPN	ND	10.000	UGL
0.0	24-feb-1988	99	24DNP	ND	10.000	UGL
0.0	24-feb-1988	99	24DNT	ND	10.000	UGL

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Site: BORE SSDS-08-03 (continued)

SAMPLE DEPTH (ft)	SAMPLE DATE	TEST METHOD	COMPOUND	BOOL	CONCENTRATION	UNITS
0.0	24-feb-1988	99	26DNT	ND	10.000	UGL
0.0	24-feb-1988	99	2CLP	ND	10.000	UGL
0.0	24-feb-1988	99	2CNAP	ND	10.000	UGL
0.0	24-feb-1988	99	2NP	ND	10.000	UGL
0.0	24-feb-1988	99	33DCBD	ND	20.000	UGL
0.0	24-feb-1988	99	46DN2C	ND	50.000	UGL
0.0	24-feb-1988	99	4CL3C	ND	10.000	UGL
0.0	24-feb-1988	99	4CLPPE	ND	10.000	UGL
0.0	24-feb-1988	99	ABHC	ND	3.000	UGL
0.0	24-feb-1988	99	AENSLF	ND	3.000	UGL
1.0	24-feb-1988	99	AG	LT	0.724	UGG
0.0	24-feb-1988	99	ALDRN	ND	3.000	UGL
0.0	24-feb-1988	99	ANAPNE	ND	10.000	UGL
0.0	24-feb-1988	99	ANAPYL	ND	10.000	UGL
0.0	24-feb-1988	99	ANTRC	ND	10.000	UGL
1.0	24-feb-1988	99	AS		7.630	UGG
0.0	24-feb-1988	99	B2CEXM	ND	10.000	UGL
0.0	24-feb-1988	99	B2CLEE	ND	10.000	UGL
0.0	24-feb-1988	99	B2EHP	ND	10.000	UGL
0.0	24-feb-1988	99	BAANTR	ND	10.000	UGL
0.0	24-feb-1988	99	BAPYR	ND	10.000	UGL
0.0	24-feb-1988	99	BBFANT	ND	10.000	UGL
0.0	24-feb-1988	99	BBHC	ND	3.000	UGL
0.0	24-feb-1988	99	BBZP	ND	10.000	UGL
1.0	24-feb-1988	99	BE	LT	0.369	UGG
0.0	24-feb-1988	99	BENSLF	ND	6.000	UGL
0.0	24-feb-1988	99	BENZID	ND	50.000	UGL
0.0	24-feb-1988	99	BGHIPY	ND	10.000	UGL
0.0	24-feb-1988	99	BKFANT	ND	10.000	UGL
1.0	24-feb-1988	99	BR	LT	100.000	UGG
0.0	24-feb-1988	99	BR	LT	100.000	UGG
1.0	24-feb-1988	99	CD		1.080	UGG
0.0	24-feb-1988	99	CHRY	ND	10.000	UGL
1.0	24-feb-1988	99	CL	LT	14000.000	UGG
0.0	24-feb-1988	99	CL		278000.000	UGG
0.0	24-feb-1988	99	CL		274000.000	UGG
0.0	24-feb-1988	99	CL6BZ	ND	10.000	UGL
0.0	24-feb-1988	99	CL6CP	ND	10.000	UGL
0.0	24-feb-1988	99	CL6ET	ND	10.000	UGL
0.0	24-feb-1988	99	CLDAN	ND	3.000	UGL
1.0	24-feb-1988	99	CR		20.800	UGG
1.0	24-feb-1988	99	CU		25.500	UGG
0.0	24-feb-1988	99	DBAHA	ND	10.000	UGL
0.0	24-feb-1988	99	DBHC	ND	3.000	UGL
0.0	24-feb-1988	99	DEP	ND	10.000	UGL
0.0	24-feb-1988	99	DLDRN	ND	6.000	UGL
0.0	24-feb-1988	99	DMP	ND	10.000	UGL
0.0	24-feb-1988	99	DNBP	ND	10.000	UGL

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Site: BORE SSDS-08-03 (continued)

SAMPLE DEPTH (ft)	SAMPLE DATE	TEST METHOD	COMPOUND	BOOL	CONCENTRATION	UNITS
0.0	24-feb-1988	99	DNOP	ND	10.000	UGL
0.0	24-feb-1988	99	ENDRN	ND	6.000	UGL
0.0	24-feb-1988	99	ENDRNA	ND	20.000	UGL
0.0	24-feb-1988	99	ESFSO4	ND	6.000	UGL
1.0	24-feb-1988	99	F	LT	11.200	UGG
0.0	24-feb-1988	99	F		312.000	UGG
0.0	24-feb-1988	99	F		301.000	UGG
0.0	24-feb-1988	99	FANT	ND	10.000	UGL
0.0	24-feb-1988	99	FLRENE	ND	10.000	UGL
0.0	24-feb-1988	99	HCBD	ND	10.000	UGL
0.0	24-feb-1988	99	HPCL	ND	3.000	UGL
0.0	24-feb-1988	99	HPCLE	ND	3.000	UGL
0.0	24-feb-1988	99	ICDPYR	ND	10.000	UGL
0.0	24-feb-1988	99	ISOPHR	ND	10.000	UGL
0.0	24-feb-1988	99	LIN	LT	1.090	UGL
1.0	24-feb-1988	99	NA		157.000	UGG
0.0	24-feb-1988	99	NAP	ND	10.000	UGL
0.0	24-feb-1988	99	NB	ND	10.000	UGL
1.0	24-feb-1988	99	NI		19.000	UGG
1.0	24-feb-1988	99	NIT	LT	0.000	UGG
0.0	24-feb-1988	99	NIT	LT	500.000	UGL
0.0	24-feb-1988	99	NNDMEA	ND	10.000	UGL
0.0	24-feb-1988	99	NNDPA	ND	10.000	UGL
1.0	24-feb-1988	99	PB		15.200	UGG
0.0	24-feb-1988	99	PCB016	ND	30.000	UGL
0.0	24-feb-1988	99	PCB221	ND	30.000	UGL
0.0	24-feb-1988	99	PCB232	ND	30.000	UGL
0.0	24-feb-1988	99	PCB242	ND	30.000	UGL
0.0	24-feb-1988	99	PCB248	ND	30.000	UGL
0.0	24-feb-1988	99	PCB254	ND	60.000	UGL
0.0	24-feb-1988	99	PCB260	ND	60.000	UGL
0.0	24-feb-1988	99	PCP	ND	50.000	UGL
0.0	24-feb-1988	99	PHANTR	ND	10.000	UGL
0.0	24-feb-1988	99	PHENOL	ND	10.000	UGL
0.0	24-feb-1988	99	PPDDD	ND	6.000	UGL
0.0	24-feb-1988	99	PYR	ND	10.000	UGL
1.0	24-feb-1988	99	SB	LT	28.300	UGG
1.0	24-feb-1988	99	SE	LT	2.350	UGG
1.0	24-feb-1988	99	SO4	LT	14000.000	UGG
0.0	24-feb-1988	99	SO4		186000.000	UGG
0.0	24-feb-1988	99	SO4		185000.000	UGG
1.0	24-feb-1988	99	TL	LT	8.860	UGG
0.0	24-feb-1988	99	TXPHEN	ND	60.000	UGL
0.0	24-feb-1988	99	UNK105		7.000	UGL
0.0	24-feb-1988	99	UNK580		8.000	UGL
0.0	24-feb-1988	99	UNK594		4.000	UGL
0.0	24-feb-1988	99	UNK595		5.000	UGL
0.0	24-feb-1988	99	UNK596		5.000	UGL

Analytical Results for Chemical Soil
From: 01-jan-1988 To: 27-nov-90

Site: 80RE SSDS-08-03 (continued)

SAMPLE DEPTH (ft)	SAMPLE DATE	TEST METHOD	COMPOUND	BOOL	CONCENTRATION	UNITS
1.0	24-feb-1988	99	ZN	LT	58.100	UGG
1.0	24-feb-1988	JB08	HG	LT	0.114	UGG
0.0	24-feb-1988	JB08	HG	LT	0.102	UGG
1.0	24-feb-1988	LM13	111TCE	ND	0.050	UGG
1.0	24-feb-1988	LM13	112TCE	ND	0.050	UGG
1.0	24-feb-1988	LM13	11DCE	ND	0.050	UGG
1.0	24-feb-1988	LM13	11DCLE	ND	0.050	UGG
1.0	24-feb-1988	LM13	12DCLB	ND	0.300	UGG
1.0	24-feb-1988	LM13	12DCLE	ND	0.050	UGG
1.0	24-feb-1988	LM13	12DCLP	ND	0.050	UGG
1.0	24-feb-1988	LM13	13DCLB	ND	0.300	UGG
1.0	24-feb-1988	LM13	14DCLB	ND	0.300	UGG
1.0	24-feb-1988	LM13	2CLEVE	ND	0.600	UGG
1.0	24-feb-1988	LM13	BRDCLM	ND	0.050	UGG
1.0	24-feb-1988	LM13	C13DCP	ND	0.600	UGG
1.0	24-feb-1988	LM13	C2H3CL	ND	0.100	UGG
1.0	24-feb-1988	LM13	C2H5CL	ND	0.100	UGG
1.0	24-feb-1988	LM13	C6H6	ND	0.600	UGG
1.0	24-feb-1988	LM13	CCL4	ND	0.050	UGG
1.0	24-feb-1988	LM13	CH2CL2	ND	0.050	UGG
1.0	24-feb-1988	LM13	CH3BR	ND	0.100	UGG
1.0	24-feb-1988	LM13	CH3CL	ND	0.100	UGG
1.0	24-feb-1988	LM13	CHBR3	ND	0.100	UGG
1.0	24-feb-1988	LM13	CHCL3	ND	0.050	UGG
1.0	24-feb-1988	LM13	CLC6H5	ND	0.630	UGG
1.0	24-feb-1988	LM13	DBRCLM	ND	0.050	UGG
1.0	24-feb-1988	LM13	ETC6H5	ND	0.050	UGG
1.0	24-feb-1988	LM13	MEC6H5	ND	0.050	UGG
1.0	24-feb-1988	LM13	T12DCE	ND	0.630	UGG
1.0	24-feb-1988	LM13	T13DCP	ND	0.050	UGG
1.0	24-feb-1988	LM13	TCLEA	ND	0.050	UGG
1.0	24-feb-1988	LM13	TCLEE	ND	0.050	UGG
1.0	24-feb-1988	LM13	TRCLE	LT	0.141	UGG
1.0	24-feb-1988	LM14	124TCB	ND	0.330	UGG
1.0	24-feb-1988	LM14	12DPH	ND	0.330	UGG
1.0	24-feb-1988	LM14	24DCLP	ND	0.330	UGG
1.0	24-feb-1988	LM14	24DMPN	ND	0.330	UGG
1.0	24-feb-1988	LM14	24DNP	ND	1.650	UGG
1.0	24-feb-1988	LM14	24DNT	ND	0.330	UGG
1.0	24-feb-1988	LM14	26DNT	ND	0.330	UGG
1.0	24-feb-1988	LM14	2CLP	ND	0.330	UGG
1.0	24-feb-1988	LM14	2CNAP	ND	0.330	UGG
1.0	24-feb-1988	LM14	2NP	ND	0.330	UGG
1.0	24-feb-1988	LM14	33DCBD	ND	0.660	UGG
1.0	24-feb-1988	LM14	46DN2C	ND	1.650	UGG

Site: BORE SSDS-08-03 (continued)

SAMPLE DEPTH (ft)	SAMPLE DATE	TEST METHOD	COMPOUND	BOOL	CONCENTRATION	UNITS
1.0	24-feb-1988	LM14	4BRPPE	ND	0.330	UGG
1.0	24-feb-1988	LM14	4CL3C	ND	0.330	UGG
1.0	24-feb-1988	LM14	4CLPPE	ND	0.330	UGG
1.0	24-feb-1988	LM14	4NP	ND	1.650	UGG
1.0	24-feb-1988	LM14	ABHC	ND	0.660	UGG
1.0	24-feb-1988	LM14	AENSLF	ND	0.330	UGG
1.0	24-feb-1988	LM14	ALDRN	ND	0.660	UGG
1.0	24-feb-1988	LM14	ANAPNE	ND	0.330	UGG
1.0	24-feb-1988	LM14	ANAPYL	ND	0.330	UGG
1.0	24-feb-1988	LM14	ANTRC	ND	0.330	UGG
1.0	24-feb-1988	LM14	B2CEXM	ND	0.330	UGG
1.0	24-feb-1988	LM14	B2CIPE	ND	0.330	UGG
1.0	24-feb-1988	LM14	B2CLEE	ND	0.330	UGG
1.0	24-feb-1988	LM14	B2EHP	ND	0.330	UGG
1.0	24-feb-1988	LM14	BAANTR	ND	0.330	UGG
1.0	24-feb-1988	LM14	BAPYR	ND	0.330	UGG
1.0	24-feb-1988	LM14	BBFANT	ND	0.330	UGG
1.0	24-feb-1988	LM14	BBHC	ND	0.660	UGG
1.0	24-feb-1988	LM14	BBZP	ND	0.330	UGG
1.0	24-feb-1988	LM14	BENSLF	ND	0.330	UGG
1.0	24-feb-1988	LM14	BENZAL		0.310	UGG
1.0	24-feb-1988	LM14	BENZID	ND	1.650	UGG
1.0	24-feb-1988	LM14	BGHIPY	ND	0.330	UGG
1.0	24-feb-1988	LM14	BKFANT	ND	0.330	UGG
1.0	24-feb-1988	LM14	C2H5CL	ND	1.250	UGG
1.0	24-feb-1988	LM14	CHRY	ND	0.330	UGG
1.0	24-feb-1988	LM14	CL6BZ	ND	0.330	UGG
1.0	24-feb-1988	LM14	CL6CP	ND	0.330	UGG
1.0	24-feb-1988	LM14	CL6ET	ND	0.330	UGG
1.0	24-feb-1988	LM14	CLDAN	ND	0.330	UGG
1.0	24-feb-1988	LM14	DBAHA	ND	0.330	UGG
1.0	24-feb-1988	LM14	DBHC	ND	0.660	UGG
1.0	24-feb-1988	LM14	DEP	ND	0.330	UGG
1.0	24-feb-1988	LM14	DLDRN	ND	0.660	UGG
1.0	24-feb-1988	LM14	DMP	ND	0.330	UGG
1.0	24-feb-1988	LM14	DNBP	ND	0.330	UGG
1.0	24-feb-1988	LM14	DNOP	ND	0.330	UGG
1.0	24-feb-1988	LM14	ENDRN	ND	0.660	UGG
1.0	24-feb-1988	LM14	ENDRNA	ND	0.660	UGG
1.0	24-feb-1988	LM14	ESFSO4	ND	0.660	UGG
1.0	24-feb-1988	LM14	FANT	ND	0.330	UGG
1.0	24-feb-1988	LM14	FLRENE	ND	0.330	UGG
1.0	24-feb-1988	LM14	GBHC	ND	0.330	UGG
1.0	24-feb-1988	LM14	HCBD	ND	0.330	UGG
1.0	24-feb-1988	LM14	HPCL	ND	0.660	UGG
1.0	24-feb-1988	LM14	HPCLE	ND	0.660	UGG
1.0	24-feb-1988	LM14	HXA82E		0.820	UGG
1.0	24-feb-1988	LM14	ICDPYR	ND	0.330	UGG

Analytical Results for Chemical Soil
From: 01-jan-1988 To: 27-nov-90

Site: BORE SSDS-08-03 (continued)

SAMPLE DEPTH (ft)	SAMPLE DATE	TEST METHOD	COMPOUND	BOOL	CONCENTRATION	UNITS
1.0	24-feb-1988	LM14	ISOPHR	ND	0.330	UGG
1.0	24-feb-1988	LM14	LIN	LT	0.066	UGG
1.0	24-feb-1988	LM14	NAP	ND	0.330	UGG
1.0	24-feb-1988	LM14	NB	ND	0.330	UGG
1.0	24-feb-1988	LM14	NNDMEA	ND	0.330	UGG
1.0	24-feb-1988	LM14	PCB016	ND	0.330	UGG
1.0	24-feb-1988	LM14	PCB221	ND	0.330	UGG
1.0	24-feb-1988	LM14	PCB232	ND	0.330	UGG
1.0	24-feb-1988	LM14	PCB242	ND	0.330	UGG
1.0	24-feb-1988	LM14	PCB248	ND	0.330	UGG
1.0	24-feb-1988	LM14	PCB254	ND	0.330	UGG
1.0	24-feb-1988	LM14	PCB260	ND	1.650	UGG
1.0	24-feb-1988	LM14	PCP	ND	0.330	UGG
1.0	24-feb-1988	LM14	PHANTR	ND	0.230	UGG
1.0	24-feb-1988	LM14	PHENOL	ND	0.660	UGG
1.0	24-feb-1988	LM14	PPDDD	ND	0.090	UGG
1.0	24-feb-1988	LM14	PPDDE	LT	0.094	UGG
1.0	24-feb-1988	LM14	PPDDT	LT	0.506	UGG
1.0	24-feb-1988	LM14	PYR	ND	0.060	UGG
1.0	24-feb-1988	LM14	TXPHEN	ND	20.000	UGG
1.0	24-feb-1988	LM14	UNK565		0.450	UGG
1.0	24-feb-1988	LM14	UNK576		0.240	UGG
1.0	24-feb-1988	LM14	UNK580		1.000	UGG
1.0	24-feb-1988	LM14	UNK583		0.140	UGG
1.0	24-feb-1988	LM14	UNK593		0.160	UGG
1.0	24-feb-1988	LW02	135TNB	LT	1.880	UGG
1.0	24-feb-1988	LW02	13DNB	LT	0.604	UGG
1.0	24-feb-1988	LW02	246TNT	LT	1.960	UGG
1.0	24-feb-1988	LW02	24DNT	LT	0.430	UGG
1.0	24-feb-1988	LW02	26DNT	LT	0.409	UGG
1.0	24-feb-1988	LW02	HMX	LT	1.310	UGG
1.0	24-feb-1988	LW02	NB	LT	0.438	UGG
1.0	24-feb-1988	LW02	RDX	LT	0.928	UGG
1.0	24-feb-1988	LW02	TETRYL	LT	0.284	UGG
0.0	24-feb-1988	UM14	111TCE	ND	5.000	UGL
0.0	24-feb-1988	UM14	111TCE	ND	5.000	UGL
0.0	24-feb-1988	UM14	112TCE	ND	5.000	UGL
0.0	24-feb-1988	UM14	112TCE	ND	5.000	UGL
0.0	24-feb-1988	UM14	11DCE	LT	1.920	UGL
0.0	24-feb-1988	UM14	11DCE	LT	1.920	UGL
0.0	24-feb-1988	UM14	11DCLE	ND	5.000	UGL
0.0	24-feb-1988	UM14	11DCLE	ND	5.000	UGL
0.0	24-feb-1988	UM14	12DCLB	ND	10.000	UGL
0.0	24-feb-1988	UM14	12DCLB	ND	10.000	UGL
0.0	24-feb-1988	UM14	12DCLE	ND	5.000	UGL
0.0	24-feb-1988	UM14	12DCLE	ND	5.000	UGL

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Site: BORE SSDS-08-03 (continued)

SAMPLE DEPTH (ft)	SAMPLE DATE	TEST METHOD	COMPOUND	BOOL	CONCENTRATION	UNITS
0.0	24-feb-1988	UM14	12DCLP	ND	5.000	UGL
0.0	24-feb-1988	UM14	12DCLP	ND	5.000	UGL
0.0	24-feb-1988	UM14	13DCLB	ND	10.000	UGL
0.0	24-feb-1988	UM14	13DCLB	ND	10.000	UGL
0.0	24-feb-1988	UM14	14DCLB	ND	10.000	UGL
0.0	24-feb-1988	UM14	14DCLB	ND	10.000	UGL
0.0	24-feb-1988	UM14	2CLEVE	ND	5.000	UGL
0.0	24-feb-1988	UM14	2CLEVE	ND	5.000	UGL
0.0	24-feb-1988	UM14	BRDCLM	ND	5.000	UGL
0.0	24-feb-1988	UM14	BRDCLM	ND	5.000	UGL
0.0	24-feb-1988	UM14	C13DCP	ND	5.000	UGL
0.0	24-feb-1988	UM14	C13DCP	ND	5.000	UGL
0.0	24-feb-1988	UM14	C2H3CL	LT	3.860	UGL
0.0	24-feb-1988	UM14	C2H3CL	LT	3.860	UGL
0.0	24-feb-1988	UM14	C2H5CL	ND	10.000	UGL
0.0	24-feb-1988	UM14	C2H5CL	ND	10.000	UGL
0.0	24-feb-1988	UM14	C6H6	LT	0.673	UGL
0.0	24-feb-1988	UM14	C6H6	LT	0.673	UGL
0.0	24-feb-1988	UM14	CCL4	ND	5.000	UGL
0.0	24-feb-1988	UM14	CCL4	ND	5.000	UGL
0.0	24-feb-1988	UM14	CH2CL2	ND	5.000	UGL
0.0	24-feb-1988	UM14	CH2CL2	ND	5.000	UGL
0.0	24-feb-1988	UM14	CH3BR	ND	10.000	UGL
0.0	24-feb-1988	UM14	CH3BR	ND	10.000	UGL
0.0	24-feb-1988	UM14	CH3CL	ND	10.000	UGL
0.0	24-feb-1988	UM14	CH3CL	ND	10.000	UGL
0.0	24-feb-1988	UM14	CHBR3	ND	5.000	UGL
0.0	24-feb-1988	UM14	CHBR3	ND	5.000	UGL
0.0	24-feb-1988	UM14	CHCL3	ND	5.000	UGL
0.0	24-feb-1988	UM14	CHCL3	ND	5.000	UGL
0.0	24-feb-1988	UM14	CLC6H5	ND	5.000	UGL
0.0	24-feb-1988	UM14	CLC6H5	ND	5.000	UGL
0.0	24-feb-1988	UM14	DBRCLM	ND	5.000	UGL
0.0	24-feb-1988	UM14	DBRCLM	ND	5.000	UGL
0.0	24-feb-1988	UM14	ETC6H5	ND	5.000	UGL
0.0	24-feb-1988	UM14	ETC6H5	ND	5.000	UGL
0.0	24-feb-1988	UM14	MEC6H5	ND	5.000	UGL
0.0	24-feb-1988	UM14	MEC6H5	ND	5.000	UGL
0.0	24-feb-1988	UM14	T12DCE	LT	1.720	UGL
0.0	24-feb-1988	UM14	T12DCE	LT	1.720	UGL
0.0	24-feb-1988	UM14	T13DCP	ND	5.000	UGL
0.0	24-feb-1988	UM14	T13DCP	ND	5.000	UGL
0.0	24-feb-1988	UM14	TCLEA	ND	5.000	UGL
0.0	24-feb-1988	UM14	TCLEA	ND	5.000	UGL
0.0	24-feb-1988	UM14	TCLEE	ND	5.000	UGL
0.0	24-feb-1988	UM14	TCLEE	ND	5.000	UGL
0.0	24-feb-1988	UM14	TRCLE	LT	0.706	UGL
0.0	24-feb-1988	UM14	TRCLE	LT	0.706	UGL

Analytical Results for Chemical Soil
From: 01-jan-1988 To: 27-nov-90

Site: BORE SSDS-08-03 (continued)

SAMPLE DEPTH (ft)	SAMPLE DATE	TEST METHOD	COMPOUND	BOOL	CONCENTRATION	UNITS
0.0	24-feb-1988	UW01	135TNB	LT	0.560	UGL
0.0	25-feb-1988	UW01	135TNB	LT	0.560	UGL
0.0	24-feb-1988	UW01	13DNB	LT	0.610	UGL
0.0	25-feb-1988	UW01	13DNB	LT	0.610	UGL
0.0	24-feb-1988	UW01	246TNT	LT	0.780	UGL
0.0	25-feb-1988	UW01	246TNT	LT	0.780	UGL
0.0	24-feb-1988	UW01	24DNT	LT	0.600	UGL
0.0	25-feb-1988	UW01	24DNT	LT	0.600	UGL
0.0	24-feb-1988	UW01	26DNT	LT	0.550	UGL
0.0	25-feb-1988	UW01	26DNT	LT	0.550	UGL
0.0	24-feb-1988	UW01	HMX	LT	1.300	UGL
0.0	25-feb-1988	UW01	HMX	LT	1.300	UGL
0.0	24-feb-1988	UW01	NB	LT	1.130	UGL
0.0	25-feb-1988	UW01	NB	LT	1.130	UGL
0.0	24-feb-1988	UW01	RDX	LT	0.630	UGL
0.0	25-feb-1988	UW01	RDX	LT	0.630	UGL
0.0	24-feb-1988	UW01	TETRYL	LT	0.660	UGL
0.0	25-feb-1988	UW01	TETRYL	LT	0.660	UGL

Program ended normally.