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### LEAKING UNDERGROUND STORAGE TANK SITE ASSESSMENT REPORT

#### VOLUME II APPENDICES

Building TC-341 MARINE CORPS BASE CAMP LEJEUNE, NORTH CAROLINA

**Prepared For:** 

Commander Naval Facilities Engineering Command Atlantic Division Norfolk, Virginia 23511-6287

**Prepared By:** 

Law Engineering, Inc. 3301 Atlantic Avenue Raleigh, North Carolina 27604

April 13, 1994

Law Engineering Job No. 475-09183-01

APPENDIX A

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# COMPREHENSIVE SITE ASSESSMENT WORKPLAN

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## LEAKING UNDERGROUND STORAGE TANK SITE ASSESSMENT WORKPLAN

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## HEATING PLANT BUILDING TC-341 MARINE CORPS AIR STATION CAMP LEJEUNE, NORTH CAROLINA

Issued: December 2, 1993 Navy Contract No. 62470-93-D-4020 Law Engineering Job No. 475-09183-01

> Law Engineering, Inc. Raleigh, North Carolina

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December 2, 1993

LANTNAVFACENGCOM 1510 Gilbert Street Atlantic Division Naval Facilities Engineering Command Norfolk, Virginia 23511-6287

Attention: Trueman Seamans, Code 1821 Engineer-in-Charge

Subject: LEAKING UNDERGROUND STORAGE TANK SITE ASSESSMENT WORKPLAN HEATING PLANT BUILDING TC-341 MARINE CORP AIR STATION CAMP LEJEUNE, NORTH CAROLINA NAVY CONTRACT NO. N62470-93-D-4020 LAW ENGINEERING JOB NO. 475-09183-01

Dear Mr. Seamans:

Please find enclosed one copy of the above referenced Workplan document. This document covers those tasks designed to identify and delineate subsurface petroleum-related contamination and estimate its direction and rate of movement at the above referenced site. Please review the enclosed document and contact us regarding any questions or comments. Also note that we plan to begin field activities on or about January 26, 1993. Law Engineering appreciates the opportunity to continue to provide services to you and LANTDIV on your environmental projects. We look forward to hearing from you soon.

Sincerely,

#### LAW ENGINEERING, INC.

Brian J. Bellis, P.G. Principal Hydrogeologist Jeffrey B. Tyburski Project Geologist

BJB/JBT/pjp

ENCLOSURES

cc: Kathy Molino - Contracts, correspondence only Deborah Pickett - Environmental Management Division - Camp LeJeune Tom Morris - Environmental Management Division - Camp LeJeune

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A - Health and Safety Plan

#### 1.0 INTRODUCTION

#### 1.1 <u>Purpose and Scope of Investigation</u>

The purpose of this Leaking Underground Storage Tank (LUST) Site Assessment Workplan (Workplan) is to serve as a guidance document and procedural manual for performing tasks to aid in determining the magnitude and extent of soil and ground-water contamination; identifying possible free product accumulation; and assessing potential exposure to possible subsurface petroleum-related contaminants in the vicinity of Heating Plant Building TC-341, also known as the former Mess Hall Heating Plant, Camp Geiger, Camp Lejeune Marine Corps Base. The release was detected after petroleum constituents were encountered in soil and ground-water samples obtained near the former location of a number 6 heating oil tank of unknown size that was reportedly installed around 1941. A 6-inch diameter below ground fuel supply line reportedly connected the tank to the adjacent Camp Geiger Fuel Farm which is located to the east of the site. The UST and associated pipeline reportedly have been abandoned in place. The location of the project site is shown in Drawing 1.1. The location of the former USTs with respect to the surrounding area is shown in Figure 2.1.

This Workplan was prepared in accordance with the Scope of Work (SOW) developed by the Naval Facilities Engineering Command and requirements listed as Tasks I through X of the document entitled "Comprehensive Site Assessments at LUST Sites: Groundwater Section Guidelines for the Investigation and Remediation of Soils and Groundwater" prepared by the Groundwater Section of the North Carolina Department of Environment, Health and Natural Resources (NCDEHNR), March, 1993. The objective of the Comprehensive Site Assessment is to provide sufficient data to meet the requirements of Sections 280.63 and 280.65 of 40 CFR Part 280, Federal Technical Standards for Underground Storage Tanks and Sections .0704 and .0706 of Title 15A, Chapter 2, Subchapter 2N, North Carolina Criteria and Standards Applicable to Underground Storage Tanks.

The project will include the advancement of fourteen soil borings into which twelve Type II and two Type III monitoring wells will be installed. Samples will be collected from the soil borings (soil) and monitoring wells (ground water) as well as from the three existing Type II monitoring wells that surround the UST for both on-site and offsite laboratory analysis. The on-site laboratory results will be available within 24 to 72 hours to provide data to assist in determining the location of subsequently installed wells. At least three of the Type II monitoring wells will be located crossgradient and upgradient of the tank. The remaining Type II wells will be used to assess the horizontal extent of the contaminant plume. One Type II monitoring well will be paired with each of the two Type III monitoring wells to evaluate the vertical extent of contamination. The first well pair will be located near the downgradient side of the UST. The second well pair will be located at the estimated leading edge of the contaminant plume. Slug tests will be conducted on three of the Type II monitoring wells to evaluate the hydraulic conductivity of the shallow aquifer system.

#### 2.0 PREVIOUS INVESTIGATIONS, REMEDIATION AND/OR CLOSURES

A suspected release from the UST was first documented by Law Engineering, Inc. in September of 1991 during the investigation of the adjacent Camp Geiger Fuel Farm. The study identified the number 6 heating oil UST and associated piping as a potential source of contamination. One soil boring was advanced adjacent to the UST to provide a preliminary determination as to whether or not the tank had leaked. The analysis of two soil samples collected from the boring at 3 to 4.5 feet and 8.5 to 10 (at ground water) feet BGS detected total petroleum hydrocarbons (TPH) at 8,400 and 5,100 parts per million (ppm), respectively, by EPA Methods 3550 and 5030 (Law Engineering, 1991).

Based upon the findings presented by Law Engineering, Inc. a three well site check was performed at the subject site by ATEC Associates, Inc. in June of 1992. Results of this work are presented in ATEC's report dated September 24, 1993. Each of the three Type II monitoring wells were installed to a depth of 20 feet bgs with 10 feet of 0.010-inch slotted polyvinyl chloride (PVC) screen and 10 feet of PVC riser. Ground water was measured between 9 and 10 feet bgs.

Headspace analysis of soil collected from the three monitor well soil borings yielded readings ranging from 0 to 119 ppm. Analysis of three soil samples collected from the approximate depth of ground water from each of the three monitoring well borings indicated concentrations of TPH (EPA Method 8015) in each sample ranging from 110 to 2,000 ppm. Analysis of the soil samples for benzene, toluene, ethylbenzene, and xylenes (BTEX) detected total BTEX concentrations in MWS-1 and MWS-2 from 155 parts per billion (ppb) to 5,530 ppb, respectively (ATEC, 1992).

Ground-water samples were collected from each of the three monitoring wells and were also analyzed for BTEX. Analytical results indicated total BTEX concentrations of 34 ppb in MW-2. BTEX was not detected in ground-water samples collected from MW-1 and MW-3 (ATEC, 1992).

Ground-water was measured to flow to the east. The rate of groundwater flow in the surficial aquifer was calculated by assuming a porosity of 30 percent, a measured water table gradient of 0.005 ft/ft, and an assumed hydraulic conductivity of 0.28 ft/day for a fine sand aquifer. Based upon this information, a ground-water flow velocity of 0.005 ft per day was calculated (ATEC, 1992).

### 3.0 SITE DESCRIPTION

The site description involves the collection of information regarding the history and physical characteristics of the site to identify and evaluate known and/or potential source(s) of contamination and conditions that will assist in determining, in part, sample locations. Potential contaminant migration pathways that may influence subsurface contaminant migration characteristics and limit intrusive subsurface investigation will also be identified. These typically include the presence of surface or near surface features, such as asphalt pavement, surface water impoundments, and buried utility lines or storm drains.

#### 3.1 Area of Investigation

The site is located east of D Street between Third Street and Fourth Streets. The UST included in this study is located approximately 90 feet west of building TC-341 and 20 feet east of D Street. The exact location of the UST is not clearly marked or identified on base drawings but can reportedly be identified as a slight cresting of the ground surface. The topography in the vicinity of the site is relatively flat and is at an elevation of approximately 15 feet above mean sea level (msl). Most of the area is not serviced by storm sewers. Runoff generally travels by sheet flow before entering drainage ditches which discharge into Brinson Creek which is located approximately 1000 feet northeast of the site.

#### 3.2 Site History and Operation

The abandoned UST was used to supply number 6 heating oil to a heating plant which has since been demolished. The UST was reportedly installed around 1941. An underground fuel distribution supply line connected the UST to the Camp Geiger Fuel Farm.

#### 3.3 <u>Contaminant Source Inventory</u>

At this time, no determination has been made as to whether the leak occurred from the heating oil UST and/or the associated fuel line. Several building structures were once located east of the site which have since been demolished and include an ice house and a gasoline filling station. The Camp Geiger Fuel Farm also is located east of the site. Suspected or known areas of soil and ground-water contamination have been documented for these sites, all of which are located downgradient of the study area with respect to shallow ground-water flow direction.

#### 3.4 <u>Water Well Inventory/Water Supply</u>

Six water supply wells are located within a 1/2-mile radius of the site and are generally located to the northwest. Five of the six wells are located on the perimeter of the 1/2-mile radius and one is located approximately 800 feet north of the site. All of the wells reportedly are installed in the Castle Hayne Formation.

#### 3.5 <u>Utility Survey</u>

Underground utilities within the project area include underground sewer, water, and electric lines. A water line runs parallel to the east side of D Street. The sewer line generally runs along the north side of fourth street. The abandoned 6-inch underground fuel line to the UST is also expected to still be intact. Underground utilities will be located with the assistance of base personnel prior to drilling.

#### 4.0 SITE CHARACTERIZATION

The Site Characterization involves the collection of information to characterize the physical setting of the project area. Information regarding the geology/hydrogeology, topography, and other physical characteristics of the site and vicinity will be evaluated to identify conditions that could potentially affect the migration of petroleum contaminants. The information available at this time has revealed the following:

#### 4.1 <u>Regional Geology/Hydrogeology</u>

In the Camp Lejeune area, sediments deposited in marine or near-marine environments are about 1,500 feet thick and overlie igneous and metamorphic basement rocks. The aquifers of the Camp Lejeune area are the surficial, Castle Hayne, Beaufort, Peedee, Black Creek, and upper and lower Cape Fear aquifers. They are separated by less

permeable clay and silt beds (confining units) that serve to impede the flow of ground water between the aquifers (Harned, 1989).

The surficial aquifer is a series of sediments, primarily sand and clay, which commonly extend to depths of 50 to 100 feet. This unit is not used for water supply on the Base. The principal water supply aquifer for the Base is the series of sand and limestone beds that occur between 50 and 300 feet below land surface. This series of sediments generally is known as the Castle Hayne aquifer. The Castle Hayne aquifer is about 150 to 350 feet thick in the area and is the most productive aquifer in North Carolina. It is a critical water-supply source, not only for Camp Lejeune but also for the southern coast and east-central Coastal Plain of North Carolina (Harned, 1989).

Camp Lejeune/Camp Geiger is situated in an area where the Castle Hayne aquifer contains fresh water, although the proximity of saltwater in deeper layers just below the aquifer and in the New River estuary is of concern in managing water withdrawals from the aquifer. The aquifers that lie below the Castle Hayne consist of a thick sequence of sand and clay. Although some of these aquifers are used for water supply elsewhere in the Coastal Plain, they contain saltwater in the Camp Lejeune area (Harned, 1989).

Water levels in wells tapping the surficial aquifer vary seasonally. The surficial aquifer receives more recharge in the winter than in the summer when much of the water evaporates or is transpired by plants before it can reach the water table. Therefore, the water table generally is highest in the winter months and lowest in summer or early fall. The hydraulic head in a confined aquifer, such as the Castle Hayne, shows a different pattern of variation over time than that in an unconfined aquifer. Some seasonal variation also is common in the water levels of the Castle Hayne aquifer, but the changes tend to be slower and over a smaller range than for water-table wells (Harned, 1989).

#### 4.2 <u>Site Geology/Hydrogeology and Soils</u>

Soils encountered in each of the ATEC monitor well locations reportedly consist of a surficial brown to gray silty sand to 4 feet bgs which is underlain by a brown to gray medium sand to 10 feet bgs. Greenish gray fine to medium sands were encountered from 13 to 15 feet bgs, followed by greenish gray to gray medium sands from 18 to 20 feet bgs.

### 4.3 <u>Site Topography and Other Surface Characteristics</u>

The project area is at an elevation of approximately 15 feet above mean sea level (USGS 1971). The project area is relatively flat. Much of the site consists of open grassed areas. The location of the UST reportedly can be identified by a slight crest of the ground.

#### 5.0 POTENTIAL RECEPTORS

The information collected in sections 2.0, 3.0, and 4.0 will be evaluated to provide a preliminary listing of potential receptors that could be affected by the known/suspected release of petroleum. Potential receptors of contamination, as defined by the North Carolina Division of Environmental Management, include surface water bodies, ground water supply wells, and subsurface building structures.

One water supply well is mapped within 1,000 feet of the site and is located approximately 800 feet to the north. Based upon the local groundwater flow direction, which is generally to the east to northeast, it appears unlikely for the well to be effected by a release from the UST being investigated in this study.

Brinson Creek is located approximately 1000 feet northeast of the site. Local groundwater flow and surfacewater drainage generally flows toward Brinson Creek. It is expected that wetlands are associated with this surface water body.

#### 6.0 SUBSURFACE METHODOLOGY INVESTIGATION

The major objectives of the subsurface investigation are to (1) define the approximate lateral and vertical extent of free product accumulation (if any) and dissolved-phase ground-water contamination resulting from possible discharge of petroleum fuels at the site; and (2) determine the approximate direction and rate of migration of ground-water contaminant constituents at the project site including the identification of preferential pathways of contaminant migration. To accomplish this, fourteen soil borings will be advanced to install twelve Type II, three Type III monitoring wells. Field activities will be performed in adherence to procedures and guidelines contained in the project Health and Safety Plan (Appendix A). The specific methods to accomplish these objectives are outlined below:

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### 6.1. Soil Test Borings

Fourteen soil test borings will be advanced on the site by a truck-mounted drill rig to install twelve Type II and two Type III monitoring wells. Hollow-stem augers will be used to advance the soil borings utilizing split spoons for soil sample collection at five-foot intervals as described in Section 7.2.

The on-site geologist/engineer will examine the soils from the borings to obtain lithological data to define near-surface geologic conditions and continuously monitor soils for evidence of contamination using visual and olfactory methods, and field screening using head-space analysis as described in Section 7.1. Special emphasis will be placed on visual evaluation of soils by field personnel for evidence of contamination since the presence of heavier hydrocarbons characteristically cannot be entirely detected by a photoionization detector (PID) or flame ionization detector (FID) using the field headspace methods.

The soil borings for the Type II monitoring wells will be advanced to a terminal depth of approximately five feet below the shallow ground-water table. The soil borings for the Type III wells will be installed to a maximum depth of 50 feet BGS. If a confining unit is encountered within 50 feet BGS, a soil sample will be collected from the confining unit for grain size distribution analysis and the boring will be terminated at the surface of the confining unit. Boring depths and well configurations may be modified slightly based on actual hydrogeological characteristics. The final locations of the borings will be subject to subsurface utility clearance.

#### 6.2 Monitoring Well Design, Installation, and Development

A total of twelve Type II (shallow) wells and two Type III (deep) monitoring wells will be installed during the project. The information will be used to obtain data necessary to:

- 1) further define the lithology beneath the project site;
- 2) develop a water-table contour map and determine the direction of ground-water flow across the project site;
- 3) ascertain the lateral extent and approximate thickness of the free product plume, if present;
- 4) establish the approximate geometric dimensions (vertical and lateral) of the dissolved-phase contaminant plume(s), if present; and
- 5) provide for reproducible sampling points in the upper and lower portions of the surficial aquifer.

The assigned well identification numbers for this site are as follows:

#### TC-341MW-4 through TC-341MW-15

#### 6.2.1 Monitoring Well Locations

The locations of the monitoring wells are based upon the results of previous subsurface investigations, geologic and hydrologic information, site topography, and visual assessment of the site. At least one Type II well will be located upgradient and two cross-gradient of the suspected/known source of contamination. The remaining Type II wells will be located at downgradient positions to delineate the horizontal extent of contamination. The Type III wells will be paired with selected Type II wells and will be aligned along the downgradient axis of the suspected plume to ascertain vertical components of flow gradient and assess the vertical extent of contamination with respect to distance from the source. When the first three monitoring wells have been installed in the vicinity of the UST, Law field personnel will conduct a preliminary survey of the newly installed and existing wells to provide an updated calculation of the approximate direction of shallow groundwater flow. The results will compared against those presented in previous reports and assessed to determine if the locations of the wells shown in Drawing 2.1 are appropriate. We anticipate that wells will be located within the study area shaded on Drawing 2.1.

#### 6.2.2 Monitoring Well Design and Construction

The monitoring wells will be constructed of 2-inch diameter PVC, machine slotted well screens and 2-inch diameter, Schedule 40 PVC riser pipe, except in traffic areas, where Schedule 80 PVC riser pipe will be utilized. Piping will be flush jointed and threaded, and wells will be constructed without the use of glue. Sand packs will be constructed of washed silica Torpedo sand (ASTM C190).

The well drilling will be performed by a truck-mounted rig fully equipped for dry auger drilling. All wells will be installed by a qualified driller registered in the State of North Carolina and well installation will be supervised in the field by an experienced staff or project level geologist or engineer specializing in subsurface investigation. No grease or oil will be used on drill pipe joints. However, Teflon tape, vegetable oil, or phosphate-free laboratory detergent such as Liquinox will be used for lubrication, if required.

#### 6.2.3 Detailed Monitoring Well Installation Procedures

The PVC screen and riser pipe used in well construction will be pre-cleaned and packaged by the manufacturer. All well casing and screens will be transported and stored at the site in original packaging. Personnel handling these items will not handle tools or drilling equipment while installing the well. Clean, new disposable latex rubber gloves will be worn when handling well screens or casing. Personnel who are handling the drilling equipment will not be allowed to handle the well screens or casing until a new "clean" pair of gloves are worn.

The Type II monitoring wells will be installed as follows:

- Boreholes will typically be advanced with 4.25-inch I.D. hollow stem auger to a maximum depth of 25 feet BGS or less to intersect the shallow water table, collect soil samples, and install the well. The final depth of the monitor well soil boring will be determined by installing approximately half of the length of the well screen below the water table. A total of ten feet of well screen is desired; however, fifteen foot sections of well screen may be used if necessary. The length of well screen utilized must be consistent throughout the project. The final depth of the monitoring wells should take into account seasonal variations in the depth to groundwater.
- If "heaving or running" sands are encountered, a 2.5-inch I.D. auger may initially be advanced to collect split spoon soil samples followed by the 4.25-inch I.D. hollow stem auger with a bottom plug.
- Soil samples for chemical analysis will be collected via split spoon sampling in accordance with procedures outlined in Sections 4.1.1 and 4.3 of this Workplan.
- At one well location that is representative of the surficial aquifer, one soil sample will be collected in the saturated zone and analyzed for grain size distribution to obtain additional information regarding the hydraulic and physical properties of the aquifer material.
- The desired sections of 2-inch well screen and riser pipe will be assembled and lowered to the bottom of the augers.

- The lengths of all screen and riser casing sections and bottom plugs will be measured and recorded.
- Washed silica filter sand will be poured into the augers to construct a continuous filter pack within the augers which will extend from approximately one foot below the bottom of the well screen to a maximum of two feet above the slotted section. The depth to the sand pack will be frequently measured through the augers using a decontaminated weight attached to a fiberglass measuring tape while removing the augers from the boring without rotating them to maintain the sand inside the augers as the filter pack is constructed.
- A 2-foot-thick bentonite seal will be emplaced above the sand filter pack by pouring bentonite pellets through the augers in the manner described above if necessary or will be installed directly into the annular space. Distilled water will be added to the annular space at ten-minute intervals to aid in the hydration of the bentonite seal. The bentonite seal will be allowed to hydrate in accordance with manufacturer's recommendations.
- The annular space above the bentonite seal will be tremie grouted from the bottom to within approximately 3 feet of land surface with neat cement grout.
- After allowing the grout to set, the concrete pad and well head cover will be installed to complete the installation.
- In non-traffic areas, each well head will be protected with three Schedule 40, protective steel pipes, 3-inch I.D., imbedded in a minimum of 2.5feet of 3,000 psi concrete. A security pipe with a hinged locking cap, having an embedment depth of 2.5 feet into the concrete, will be installed over the well casing. The security pipes will extend 3.0 feet above the ground surface and will be filled with concrete and painted day-glow yellow or an equivalent. A concrete apron constructed of 3,000 psi concrete and measuring 5-foot by 5-foot by 0.5 foot will be constructed around each well located in non-traffic areas (Drawing 6.2.3-A). All wells will be secured with a No. 4 brass Master Lock padlock.

In traffic areas, a flush manhole cover will be built into a three foot square, concrete collar, which will be 9 inches thick. If the well is installed through a paved or concrete surface, the annular space between the casing and the borehole will be grouted to a depth of at least 2.5 feet and finished with a concrete collar. If the well is not installed through a paved or concrete surface, then a concrete apron, measuring 5 foot by 5 foot by 0.5 foot will be constructed around each well. The collar and pad will be constructed of 3,000 psi concrete and will be crowned to meet the finished grade of surrounding pavement as required. All wells will be secured with a No. 4 brass Master padlock (Drawing 6.2.3-B).

• Final well construction details will be provided on the forms included as Drawing 6.2.3.

The Type III monitoring wells will be installed in two phases, as follows:

- The Type III wells will be constructed in two stages and will be paired with a Type II monitoring well. The borehole for the first stage will be advanced with 8.25-inch I.D. (12.25-inch O.D.) hollow stem auger drilling technique to a depth of approximately 40 feet BGS or to approximately ten feet above the first confining layer below the water table, which ever is encountered first.
- A sample of the confining unit will be collected and analyzed for grainsize distribution.
- An appropriate number of schedule 40, 6-inch diameter PVC pipe sections will be assembled and lowered to the bottom of the augers to complete the first stage of the Type III monitoring well.
- The 6-inch pipe will be grouted into place and allowed to set for a period of 24 to 48 hours prior to installation of the second stage of the well so that the structural integrity of the grout will not be compromised.
- Utilizing the roller cone drilling techniques, a 5 7/8-inch diameter hole will be drilled through the bottom of the 6-inch outer casing to a terminal depth of 10 feet below the 6-inch casing (on top of the confining unit) or to a maximum depth of 50 feet BGS if no confining unit is encountered.

- A five foot length of 2-inch diameter PVC screen will be installed at the bottom of the boring with 2-inch diameter PVC riser pipe to the surface.
- The lengths of all screen and riser pipe sections and bottom plugs will be measured and recorded.
- Washed silica filter sand will be poured into the boring to construct a continuous filter pack within the augers which will extend from below the bottom of the well screen to a maximum of two feet above the slotted section. The depth to the sand pack will be frequently measured using a decontaminated weight attached to a fiberglass measuring tape.
- A 2-foot-thick bentonite seal will be emplaced above the sand filter pack by pouring bentonite pellets into the borehole in the manner described above.
- The annular space above the bentonite seal will be tremie grouted from bottom to within approximately 3 feet of land surface with neat cement grout.
- After allowing the grout to set, the concrete pad and well head cover will be installed to complete the installation. The well head will be completed in accordance with the specifications for the Type II wells.
- A vertical separation of at least 15 feet should exist between the bottom of the adjacent Type II well and the top of the screened portion of the Type III well.

#### 6.2.4 Monitoring Well Development

Well development will be performed no sooner than 24 hours after grouting is completed for Type II wells or 48 hours for Type III well. Wells will be developed by continuous low yield pumping or bailing and the pumps will be set near the bottom of each well. As the wells are developed, ground-water turbidity will be monitored as an indicator parameter and be noted visually and recorded. Well development will continue until the turbidity stabilizes. Monitoring Well Development Worksheets, as shown in Drawing 6.2.4, will be used to record the results of the field analyses. Water generated during the well development activities will be handled according the procedures specified in Section 6.3.

#### 6.2.5 Ground-Water Level and Free Product Thickness Measurement

Prior to well purging for sample collection, water level and free product thickness, measurements will be obtained in all monitoring wells at the site no sooner than 48 hours after completion of well development activities. Measurements will be obtained in all monitoring wells at the site on the same day to provide a complete set of comparable measurements. These measurements will be used to calculate hydraulic gradients, determine direction of ground-water flow at the site, and estimate thickness of free product (if present) in the subsurface beneath the site.

Water level and free product thickness measurements will be obtained using an electronic interface probe. The liquid levels will be measured by slowly lowering the interface probe into the well. When the probe reaches the water or free product surface, the circuit is completed and a buzzer is activated. A constant buzzing indicates the presence of free product while an intermittent buzzing indicates water. The distance from the surveyed marker on the top of the well casing to either the water or free product level is then read off the measuring tape attached to the probe and recorded. If free product is present, the thickness will be measured to the nearest 0.01 foot. Depth to water will also be measured to the nearest 0.01 foot. The interface probe will be decontaminated between wells by detergent wash and distilled water rinse. A complete set of water level measurements taken on the same day will be recorded on the Water Elevation Worksheet (Drawing 6.4).

#### 6.3 Disposal of Borehole Cuttings and Wastewater

Borehole cuttings will be containerized in a roll-off box at or near the project site. The roll-off box will be covered with plastic or tarp at the end of each work day to prevent infiltration of rainwater and release of windblown particles. Ultimate disposal of the material at a permitted facility will be based on analytical results and/or regulatory consultation to ascertain whether the waste material is designated hazardous or non-hazardous. Development and purge water will be containerized and removed from the site for disposal of an off-site permitted facility. All soil and ground-water will be placed in DOT-approved containers and properly labeled prior to any shipment. Manifests will be prepared for all waste shipped from the site.

#### 6.4 <u>Surveying</u>

Horizontal and vertical locations of site wellheads will be surveyed in reference to mean sea level. Surveys will be supervised by a registered land surveyor.

### 7.0 SAMPLE COLLECTION METHODOLOGY

1.

The following sections describe the methods that will be utilized to collect soil and groundwater samples for this project. All samples will be collected by OSHA-certified personnel who are trained and experienced in sample collection procedures.

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#### 7.1 Test Boring Soil Sample Collection and Field Screening Methodology

Field screening will be conducted during drilling of the test borings to determine if petroleum hydrocarbons are present in the unsaturated zone and to identify areas of suspected near-surface releases. Soil samples for general site characterization will be obtained from the test borings at five-foot intervals (or shorter intervals under shallow groundwater conditions) starting at 0 to 1.5 feet. The soil samples will be obtained using a split spoon sampler driven in general accordance with ASTM D-1586. Soil samples will be classified in the field by an engineer or geologist trained in using visual/manual techniques as described in ASTM D-2487 and D-2488. The soils will be classified in accordance with the Unified Soils Classification System and a test boring record of each borehole will be produced. A sample test boring record used for final presentation of test boring data is shown as Drawing 6.1.

Two soil samples will be obtained from the vadose zone in each boring for field screening and laboratory analysis. The first laboratory sample will be obtained from 2 to 5 feet BGS. The second soil sample will be collected near the water table to 5 feet above the water table. For Type III wells, the second soil sample will be collected from the first few feet of the confining unit (if encountered). If a confining unit is not encountered, no sample will be collected from the saturated zone.

For each collected soil sample, two equal portions will be removed from the splitspoon sampler. One portion will be placed into appropriate pre-labeled laboratory sample jars with the other portion placed into a pre-labeled, airtight, plastic bag. Soil collected in the laboratory jars will be immediately placed on ice. The air tight plastic bag of soil will either be placed in direct sunlight (if above 70 degrees Fahrenheit) or on the hood or dashboard of a vehicle (with the engine/heater running) to sufficiently heat the sample in order to volatilize any petroleum product contained within the soil. After several minutes, the vapors contained in the void area within the bags (headspace) will be tested with a PID or an FID. The headspace method involves placing a consistent amount of a representative soil sample in a zip lock plastic bag. After a several minute waiting period to allow volatile organic compounds to vaporize within the bag headspace, a portable PID or FID is used to test for the presence of volatile organics that are within the detection limits of the instrument. For each site, approximately the first 50% of the soil samples collected by the method described above will sent to the on-site laboratory and the remainder will be sent to the off-site laboratory. Soil samples that are selected for on-site laboratory analysis will be handled and analyzed in accordance with procedures outlined in Section 7.5.2 of this Workplan. No change in screening or on-site laboratory instrumentation will occur during the site investigation in order to enhance consistency of results, unless the instrumentation is damaged and needs replacement.

Analysis for TCLP metals, flash point and pH will be performed on selected soil samples which exhibit obvious signs of contamination or high headspace readings. These samples will be obtained during the soil boring process.

All soil samples collected for laboratory analyses will be placed on ice. Soil will be placed into containers in the following order in accordance with the type of analyses scheduled for that sample:

Collection Order	Bottle Size and Type	Total Number of Bottles per Sample, On-site/Off-Site Labs	Preservative
TPH 5030	Glass Septae Jar, 4 oz.	2/2	<4°C
TPH 3550	Amber Glass Wide Mouth/ 8 oz.	1/2	<4°C
TPH SW846/9071	Amber Glass Wide Mouth/8 oz.	1/1	<4°C
TCLP Metals	Amber Glass Wide Mouth/8 oz.	NA/1	<4°C
Flash Point	Amber Glass Wide Mouth/8 oz.	NA/1	<4°C
pН	Glass or Plastic Wide Mouth/8 oz.	NA/1	<4°C

NA = Not Applicable. Analysis not scheduled for on-site laboratory.

See Section 8.0 for the specific type and quantity of analyses that will be conducted for this project.

#### 7.2 Monitoring Well Ground-water Sample Collection

The ground-water sampling program has been developed to aid in the assessment of the magnitude and extent of free product accumulation and dissolved-phase ground-water contamination that may be present as a result of petroleum fuel releases at the project site. The sampling program will consist of collecting one ground-water sample from each of the newly constructed wells and the three existing monitoring wells that were recently installed by ATEC. After all monitoring wells have been installed and developed, purging and sampling of the three existing and newly installed wells will proceed from the least contaminated areas to the highest contaminated areas based on observations made during the well installations, measurement of free phase product, and distance from the known source of contamination. The sampling program will include collection of samples for both on and off-site laboratory analysis; field analysis of pH, specific conductance, and temperature; static ground-water level measurements; and product thickness measurements.

The Law Engineering Monitoring Well Sampling and Field Data Worksheet (Drawing 7.3) will be used to record all measurements made during well purging and sampling activities. This form was designed to be used as a checklist and to provide documentation for all ground-water sampling activities for each individual well.

Each well will be purged prior to sample collection to remove potentially stagnant water from the well in an effort to collect samples that are representative of the surrounding aquifer. A volume of water equivalent to at least three times the amount of water standing in the well will be removed from the well during the purging process, or the well will be bailed to dryness. Specific conductance, pH, and water temperature will be measured periodically during well purging. Wells that can be purged to dryness while purging less than three well volumes will be sampled as soon as the well has recovered to yield sufficient water volume for a sample. All purge water removed from the wells will be disposed of in accordance with procedures for disposal of development water as described in Section 6.3 of this Workplan.

Well purging will be conducted using decontaminated, clear Teflon bailers. New nylon rope will be used at each monitoring well location. Care will be taken to prevent contact between the rope and the ground during well purging and sample collection. Purging techniques will be performed in accordance with standard practices followed by comparable professionals working in the petroleum contamination assessment field. The volume of water to be purged is calculated using the following equation:

$$V = \pi r^2 h$$

where:

π = 3.14159
 r = Radius of well casing
 h = Height of water column in well (total well depth - depth to ground water prior to purging)
 V = Volume of water in well (standing well volume)

Minimum purge volume =  $V \times 3$ 

Samples will be collected within 24 hours of the completion of the purging process. The following sample handling procedures will apply to all ground-water samples:

- Chemical preservatives, if applicable, will be added to sample bottles by the laboratory.
- Sample bottles will be labeled prior to sample collection.
- Sample bottles will be filled directly from the Teflon bailer.
- The pH, temperature, and specific conductance of the sample will be measured and recorded. These measurements will be taken from a sample decanted into a separate container. Visual characteristics of the sample, including the presence of insoluble materials, will be recorded on field sampling forms.
- Caps will be secured on bottles.
- Volatile organic sample containers will be placed in plastic bags and the bags sealed.

All monitoring well ground-water samples collected for laboratory analyses will be placed immediately on ice. Ground-water will be collected and placed into containers in the following order based upon the type of laboratory analyses scheduled for that sample:

Collection Order	Bottle Size and Type	Total Number of Bottles per Sample On-Site/Off-Site Lab	Preservative
602	Clear Glass Vial/40 ml	2/3	HCL
610	Amber Glass/1 Liter Jar	1/2	<4°C
8 RCRA Metals	Plastic/1000 ml	NA/1	Nitric Acid

NA = Not Applicable. Analysis not scheduled for on-site Laboratory.

See Section 8.0 for the specific type and quantity of analyses that will be conducted for this project.

#### 7.3 <u>Sample Identification</u>

Prior to collecting each soil and groundwater sample, associated sample bottles will be labeled with the following information:

- Date and time of sample collection;
- Project identification number;
- Sample location number;
- Initials of person who collected sample;
- Type of preservative added to sample; and
- Parameter(s) or parameter group to be analyzed.

Additional specific information, such as sampling interval, may be added. The sample location number on the label will correspond to the sample location numbers assigned on the field site map.

#### 7.4 Chain of Custody and Transportation Procedures

Chain of Custody (COC) procedures will be followed to establish documentation to trace sample possession from the time of collection until completion of analysis for both the on-site and off-site laboratories. In order to accomplish this objective, as few people as possible will handle the sample(s) and the sampler will be responsible for the care and custody of the samples until they are delivered to the on-site laboratory or dispatched for shipment to the off-site laboratory. An accurate record of sample collection, transport and analysis will be maintained and documented.

The COC Record will be used by personnel responsible for ensuring the integrity of samples from the time of collection to shipment to both the on and off-site laboratories. The laboratory will not proceed with sample analysis without a correctly prepared COC Record and an Analytical Request Form. The laboratory will be responsible for maintaining COC of the sample(s) from the time of receipt to disposal. COC procedures will be instituted and followed throughout the investigation.

The COC Record will be signed by each individual who has maintained custody of the sample(s). General preparation of the COC Record for samples to be delivered to the on-site and off-site laboratories will be as follows:

- Samples will be accompanied by a COC at all times.
- The COC Record will be initiated in the field by the person collecting the sample(s). Every sample will be assigned a unique identification number as described in Section 7.4 that is entered on the COC Record. The date and time of sample collection will also be recorded on the COC Record.
- The COC Record will be completed in the field and will identify the project, sampling team, LAW assigned project number, and other pertinent project information.
- If the person collecting the sample does not transport the samples to the laboratory or deliver the sample containers for shipment, the first block for "Relinquished By \_\_\_\_\_\_" will be signed by the sampler.
- The person transporting the samples to the laboratory or delivering them for shipment will sign the Record as "Relinquished By \_\_\_\_\_."

#### 7.4.1 Off-Site Laboratory

Collected soil and ground-water samples will be transported on a daily basis by courier to Law's Analytical Laboratory in Pensacola Florida. Prior to the start of the field investigation, necessary arrangements will be made with the laboratory to assure proper and prompt delivery and log in of the collected samples. Shipment and COC procedures are as follows: I incoming the second operation of the second operation.

- Samples will be packed properly for shipment so that bottles will not dislodge and/or break. The samples will be kept cool using either ice packs or zip-lock bags full of ice.
- Samples will be shipped each day via an overnight delivery service and the air bill number will be recorded to facilitate tracking of the package.
- The waybill will serve as an extension of the COC Record between the final field custodian and receipt in the laboratory.
- The COC record will be sealed in a watertight container and placed in the shipping container. The shipping container will be sealed with packing tape prior to being given to the carrier.
- The shipping container will be marked "fragile" to notify all handlers that special care should be taken in handling the samples.

### 7.4.2 On-Site Laboratory

An on-site mobile laboratory will provide analytical data at accelerated turnaround times to assist in determining the placement of sample locations. The mobile laboratory will be set up at a location central to other projects concurrently being conducted in the area. Relocation of the laboratory will avoided once it is set up since moving the laboratory would involve a recalibration of instrumentation which will delay the project schedule. Base personnel will pre-approve the proposed location of the mobile laboratory. Shipment and COC procedures are as follows:

- The samples will be packed properly for transport so that bottles will not dislodge/and or break. The samples will be kept cool using either ice packs or zip-lock bags full of ice.
- Once the samples are properly packed, the container will be adequately secured for transport to the laboratory.
- The COC Record will be maintained as described in Section 7.5.

Each Site Manager will be responsible for coordinating sample drop off and analysis schedules with on-site laboratory personnel. Responsibilities will include, but are not limited to, providing notice of the number and type of samples (soil and water) and corresponding analyses for each work week and coordinating on-site laboratory

activities with other Site Managers in order to develop a comprehensive schedule for base activities.

#### 7.5 Equipment Decontamination

A decontamination area will be located in an area central to other investigations concurrently being conducted in the area. All decontamination water will be discharged into an oil/water separator. The water supply at the decontamination area will be sampled prior to the start of work and analyzed for volatiles (EPA Methods 602) and PAHs (EPA Method 610).

#### 7.5.1 Drill Rig

The drill rig will be cleaned and handled in accordance with the following guidelines:

- Drill rigs and all support equipment will be cleaned of excess grease, oils and caked-on soil prior to arrival at the site. Equipment which leaks fuel, coolant, or lubricants will not be used on site.
- Equipment such as pumps and pump lines will be flushed thoroughly with potable water prior to use.

#### 7.5.2 Soil and Ground-water Sample Collection Equipment

Teflon bailers used for ground-water sampling will be routinely decontaminated and stored after each sampling event as follows:

- Washed with phosphate-free detergent and tap water using a brush to remove any particulate matter or surface film.
- Hot tap-water rinse (if available) or distilled or deionized water rinse.
- Rinsed thoroughly with a 10% nitric acid mixture.
- Rinsed thoroughly with distilled or deionized water.
- Rinsed with isopropanol.
- Rinsed thoroughly with distilled or deionized water.

- Allowed to air dry.
- Wrapped completely with aluminum foil and sealed in airtight plastic bags.

Split spoons, submersible well development pump equipment, and other sample collection equipment will be decontaminated between sample events as follows:

- Tap water rinse.
- Washed with phosphate-free detergent and tap water using a brush to remove any particulate matter or surface film.
- Tap water rinse.
- Rinsed thoroughly with distilled or deionized water.
- Rinsed with isopropanol.\*
- Allowed to air dry or rinse with distilled or deionized water.\*
- Wrapped completely with aluminum foil and sealed in airtight plastic bags or placed on clean plastic if planned for immediate reuse.
- \* These items may be excluded in the decontamination process for split spoons.

Hollow stem augers, rods, and other downhole equipment will be decontaminated between borings as follows:

- High temperature and pressure water rinse
- If noticeable petroleum hydrocarbon film is present, wash with phosphate-free detergent and tap water using a brush.
- High temperature and pressure tap water rinse.
- Allowed to air dry.
- Placed and covered with clean plastic until next use.

#### 7.5.3 Rinsate Sample Collection Methodology

Water rinsate samples will be collected for QA/QC purposes. Water from the same brand or batch of distilled or deionized water that is used in the decontamination process outlined above will be used to pour over previously decontaminated split spoons, Teflon bailers, and Hydropunch penetrometers. The rinsate water will be directly collected into the sample bottles. The number of rinsate samples to be collected and corresponding analytical parameters are listed in Section 8.0. The analytical results will be used to confirm that equipment decontamination is being conducted adequately and that no cross contamination is occurring between sample locations. If the rinsate samples reveal the presence of contamination, a sample of the source rinsate water will be collected and analyzed for the same laboratory parameters.

#### 7.5.4 Duplicate Sample Collection Methodology

Soil and water duplicate samples will be collected for QA/QC purposes. The duplicate sample will consist of two soil or water samples of equal volume that are collected from the same sample location/depth. Each sample will be analyzed for the same parameters as outlined in Section 8.0. At least one of the duplicate samples will be split between the off-site and on-site laboratories to compare each lab's analytical report with the other. The remaining duplicate samples will be either sent to the on-site laboratory and/or to the off-site laboratory to assess the lab's ability to reproduce analytical results.

#### 8.0 SAMPLE ANALYSIS

The majority of the samples collected during the investigation will be analyzed by the on-site mobile laboratory. The analytical methods for this project are outlined below and in the referenced tables for both the on-site and off-site laboratories.

8.1 Off-Site Laboratory

Samples will be analyzed at Law's Pensacola, Florida and Kennesaw, Georgia analytical laboratories. Analytical methods for soils include TPH (EPA Methods 3550, 5030 and SW 846/9071), TCLP Metals, pH (EPA Method 9045), and flash point. Ground-water samples will be analyzed for purgeable aromatics (EPA Method 602) and the eight RCRA metals. Grain size analyses will be conducted by Law's soils

laboratory in Raleigh, North Carolina. The number and type of samples to be analyzed and the types of analyses to be conducted are summarized in Table 8.1.1.

#### 8.2 <u>On-Site Laboratory</u>

Soil samples submitted to the on-site laboratory will be analyzed for TPH (EPA Method 5030/3550). Ground-water samples will be analyzed for purgeable aromatics (EPA Method EPA 602), and polynuclear aromatic hydrocarbons (EPA Method 610). The number and type of samples to be analyzed and the types of analysis to be conducted are summarized in Table 8.2.1.

#### 9.0 COLLECTION AND ANALYSIS OF AQUIFER CHARACTERISTICS DATA

#### 9.1 Slug Tests

Subsequent to development of the shallow monitoring wells, an attempt will be made to conduct three standard slug tests at three shallow Type II wells which do not contain free product. To date, our experience has been that the shallow aquifer at the base recovers too quickly allow for accurate measurement of ground-water recovery in a shallow well. If this is the case at the project site, then we will rely on grain size analysis result and published data to assess the aquifer characteristics at the site.

Slug tests will be conducted by lowering a solid "slug" into the well and allowing the water level to stabilize back to static conditions. The slug will then be quickly removed from the well and the rate of water level recovery back to the static level will be measured and recorded. This rate will be used to calculate an estimate of the hydraulic conductivity of the aquifer immediately surrounding the well screen using the method of Hvorslev (1951). The hydraulic conductivity (k) will be calculated as follows:

$$k = \frac{r^2 \ln (L/R)}{2LT_o}$$

where:

- r = well radius (ft) L = saturated sandpack length (ft)
  - R = borehole radius (ft)
  - $T_o =$  Time required for the recovering water level to be within 37 percent of the static water level with respect to the total drawdown created.

## 10.0 EVALUATION OF ASSESSMENT DATA

An evaluation of the data generated during the assessment will be performed to establish and map the spatial boundaries of contaminant plume(s) and concentration gradients throughout the area. Accomplishment of this objective will aid in; (1) identifying contaminant source areas, migration pathways and potential receptors; and; if necessary, (2) establishing a basis for corrective action plans.

The initial step in the evaluation process involves data reduction. Analytical results will be reviewed and plotted by sample location on site map. The following data will be presented in tabular form:

- Sampling point identification number (or quality control designation).
- Sampling date.
- Practical quantitation limit.
- Reported concentration.
- Reported approximate concentration, if below practical quantitation limit.

A quantitative ranking of constituent concentration/sampling point combinations will be performed to identify likely source areas, delineate the approximate boundaries of the contamination plume, and establish concentration gradients of detected contaminants within the plume. Based on these results, horizontal and vertical limits of the plume area(s) and contaminant isopleth contours will be plotted on site maps and cross-sections.

## 11.0 ESTIMATION OF THE RATE OF CONSTITUENT MIGRATION

Ground-water travel time or average linear ground-water flow velocity will serve as the basis for estimating the rate of contaminant migration at the facility. Groundwater flow rates should represent the maximum rate of contaminant migration with variations among contaminants due to geohydrochemical processes including molecular diffusion, mechanical mixing, sorption-desorption, ion-exchange, hydrolysis and biodegradation. However, due to the difficulties associated with estimating the effects of many of these processes on contaminant migration rates and the desire to produce relatively conservative (higher) estimates, only sorption processes will be incorporated into rate calculations. Ground-water flow velocities will be calculated using the following modification of Darcy's Law:

$$V = K/n_e(dh/dl)$$

where:

K = Hydraulic conductivity (ft/day) n<sub>e</sub> = Effective porosity (unitless) dh/dl = Hydraulic gradient (ft/ft)

Initial estimates of hydraulic conductivity will be determined from results of grain size distribution analyses of soil samples and slug tests. Estimates of hydraulic conductivity will be refined based on pumping test data as discussed in Section 9.0. Estimates of effective porosity for soils of similar grain size distribution to those at the site will be obtained from the literature. Hydraulic gradients will be calculated from water level measurements obtained as described in Section 6.2.5.

Distribution coefficients for metals will be obtained directly from published literature, whereas, distribution coefficients for organic chemicals will be calculated from octanol water partitioning coefficients and estimates of organic carbon content of the aquifer media. Octanol-water partitioning coefficients for organic constituents will be obtained directly from published literature. Estimates of bulk density and porosity will be determined from results of visual/manual classification of soils and standard penetration resistance tests as described in Section 6.1.2. Average velocities of contaminant constituents will then be calculated in accordance with the following equation (USEPA, 1985):

$$v_c = v/R$$

where:

 $v_c = Average velocity of contaminant constituent (ft/day)$  v = Average linear groundwater flow velocity (ft/day)R = Retardation factor (unitless)

#### 12.0 PROJECT SCHEDULE

A schedule for implementation of the Comprehensive Site Assessment Workplan, along with appropriate milestones, is exhibited in Drawing 12.1. One drill rig and Site Manager will be dedicated to the site throughout all of its phases of investigation.

The site investigation will be scheduled concurrently with other sites on the base. Development, purging, sampling and testing of the wells will occur after all of the wells have been installed.

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#### 13.0 REFERENCES

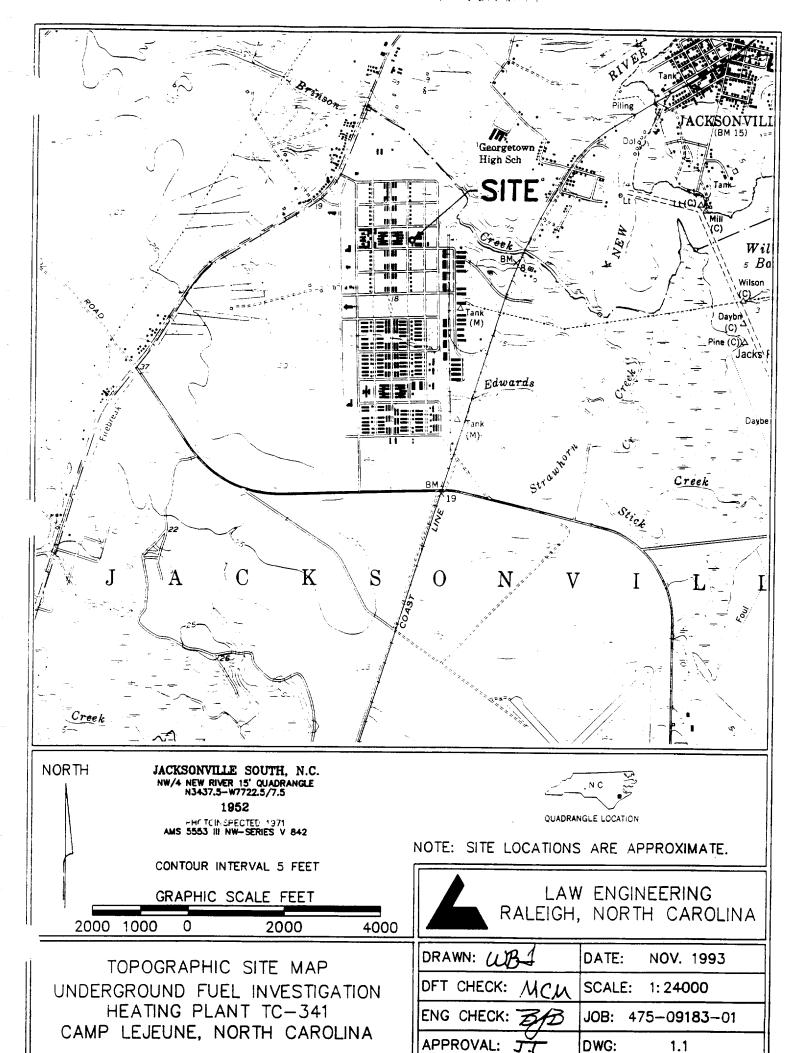
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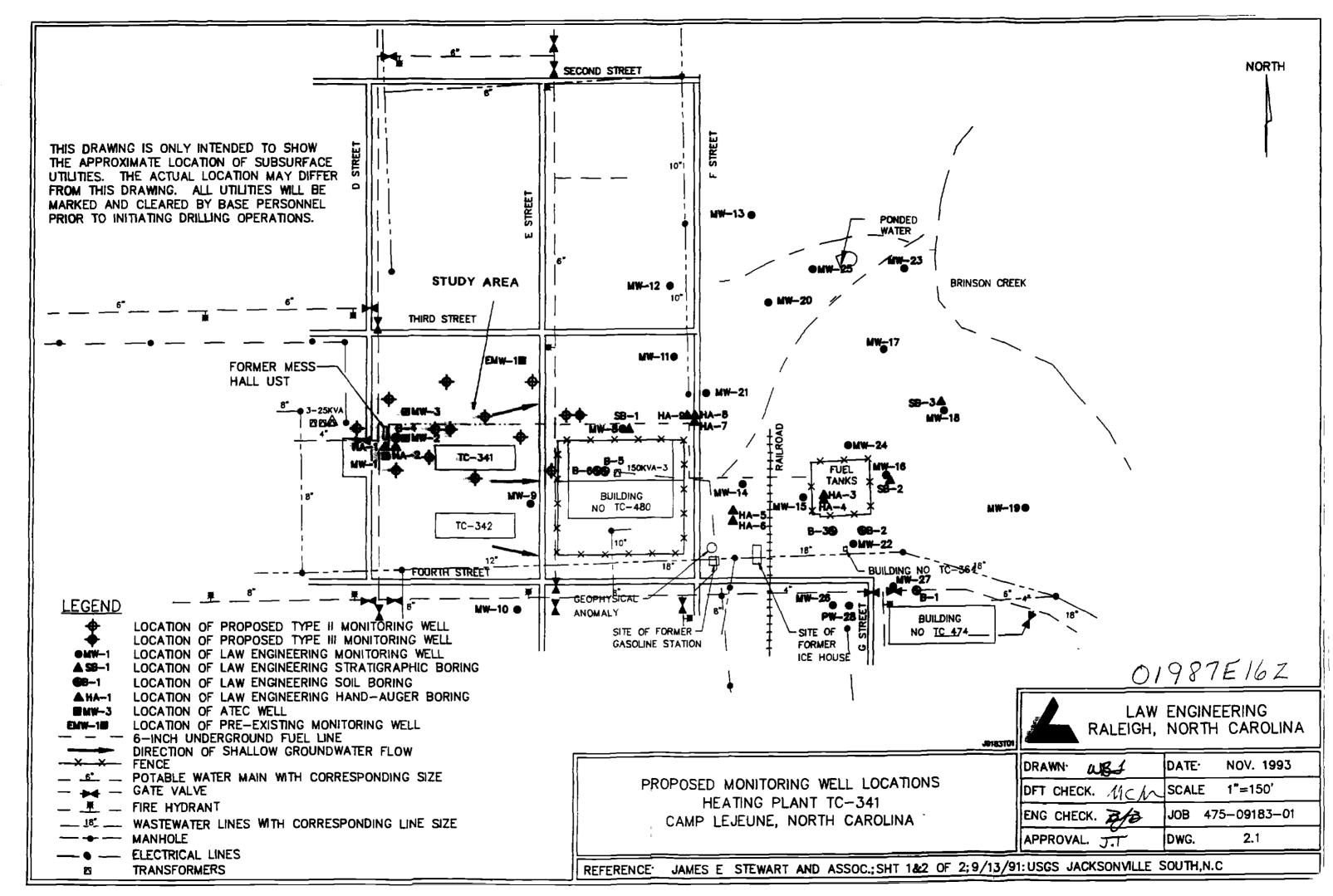
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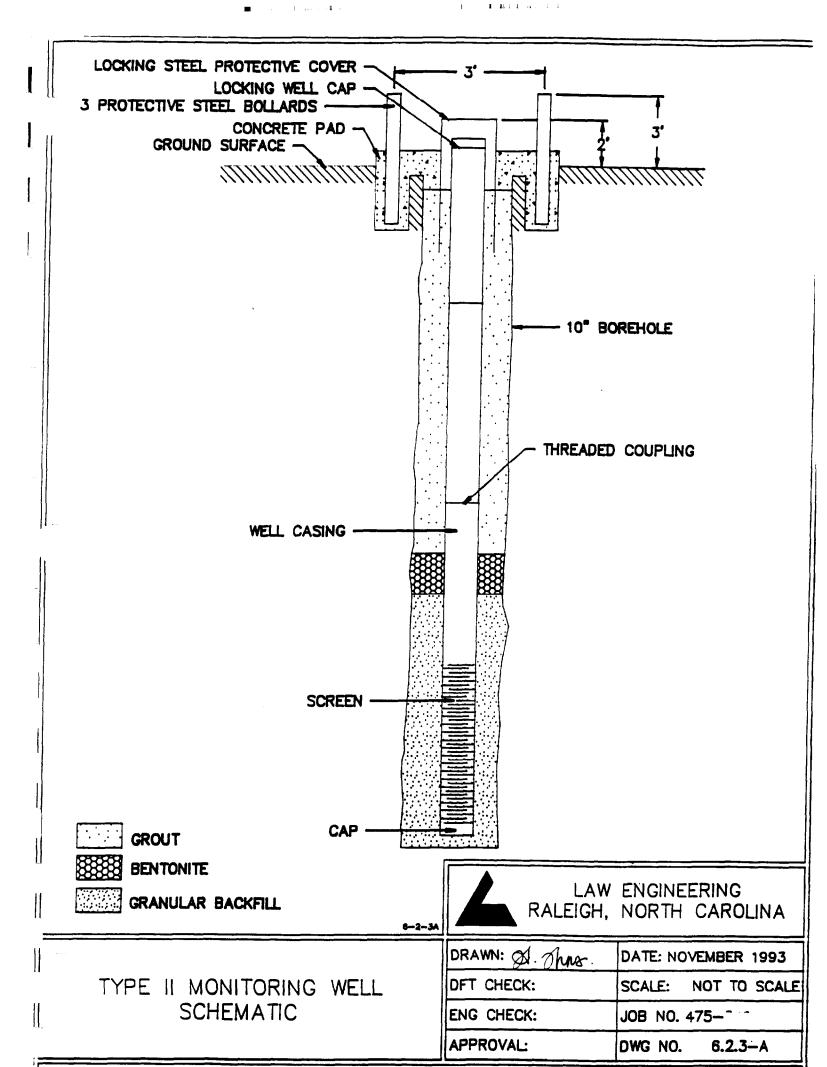
### SEE KEY SHEET FOR EXPLANATION OF SYMBOLS AND ABBREVIATIONS USED ABOVE

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Asing Terminat accordance w YIELD (gpn WATER ZC CHLORINA CASING: From From From GROUT:	at/or below lai           with 15A NCAC 20           n):N           DNES (depth):N          N           Depth          To	FT. Abo nd surfsce is illeg : .0118 IETHOD OF TE  Diameter Ft _ Ft _ Ft _ Ft Mate _ Ft	Ve Land Surface* Init unless a variance is EST Amount Wall Thickness or Weight/Ft. Mat	issued	additional space LOC, direction and dis	is needed use back of form ATION SKETCH_ tance from at least two State
Asing Terminat accordance w YIELD (gpn WATER ZC CHLORINA CASING: From From GROUT: From From From	at/or below lai           with 15A NCAC 20           n):N           DNES (depth):N          N           Depth          To	FT. Abo nd surfsce is illeg : .0118 IETHOD OF TE  Diameter Ft _ Ft _ Ft _ Ft Mate _ Ft	Wall Thickness or Weight/Ft. Mat	issued	additional space LOC, direction and dis	is needed use back of form ATION SKETCH_ tance from at least two State
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asing Terminat accordance w YIELD (gpn WATER ZC CHLORINA CASING: From From GROUT: From SCREEN: From	at/or below lai           with 15A NCAC 20           n):N           DNES (depth):N           Depth          To	FT. Abo	ove Land Surface" al unless a variance is EST Amount Wall Thickness or Weight/Ft. Mat erial Method dt Size Materia	issued	additional space LOC, direction and dis	is needed use back of form ATION SKETCH_ tance from at least two State
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asing Terminat accordance w YIELD (gpn WATER ZC CHLORINA CASING: From From From From From SCREEN: From From	at/or below lai         with 15A NCAC 20         n):N         DNES (depth):N         Depth        To        Fro        Fro        Fro        Fro        Fro        Fro        Fro	FT. Abo nd surfsce is illeg : .0118 IETHOD OF TE  Diameter  Ft Ft Ft Diameter Sh t in t in	ove Land Surface*  al unless a variance is  EST Amount Wall Thickness or Weight/Ft. Mat  arial Method  ot Size Materiain in	issued	additional space LOC, direction and dis	is needed use back of form ATION SKETCH_ tance from at least two State
asing Terminat accordance w YIELD (gpn WATER ZC CHLORINA CASING: From From From From SCREEN: From From From From	at/or below lai         with 15A NCAC 20         n):N         DNES (depth):N         Depth        To        Fro        Fro        Fro        Fro        Fro        Fro        Fro	FT. Abo nd surfsce is illeg : .0118 IETHOD OF TE  Diameter  Ft Ft Ft Diameter State t in Size	Ve Land Surface* Init unless a variance is EST Amount Wall Thickness or Weight/Fit, Material Waterial Method Material Material	issued	additional space LOC, direction and dis	is needed use back of form ATION SKETCH_ tance from at least two State
Asing Terminate accordance w YIELD (gpn WATER ZC CHLORINA CASING: From From From SCREEN: From From From From From From From From From From From	at/or below lai         with 15A NCAC 20         m):N         DNES (depth):N         Depth        To        Fi         To        To        Fi         To        To        Fi         To        Fi         To        To	FT. Abo nd surfsce is illeg : .0118 IETHOD OF TE  Diameter  Ft Ft Diameter Sh t in t in Size 	ove Land Surface*  al unless a variance is  EST Amount Wall Thickness or Weight/Ft. Mat  arial Method  ot Size Materiain in	issued	additional space LOC, direction and dis	is needed use back of form ATION SKETCH_ tance from at least two State

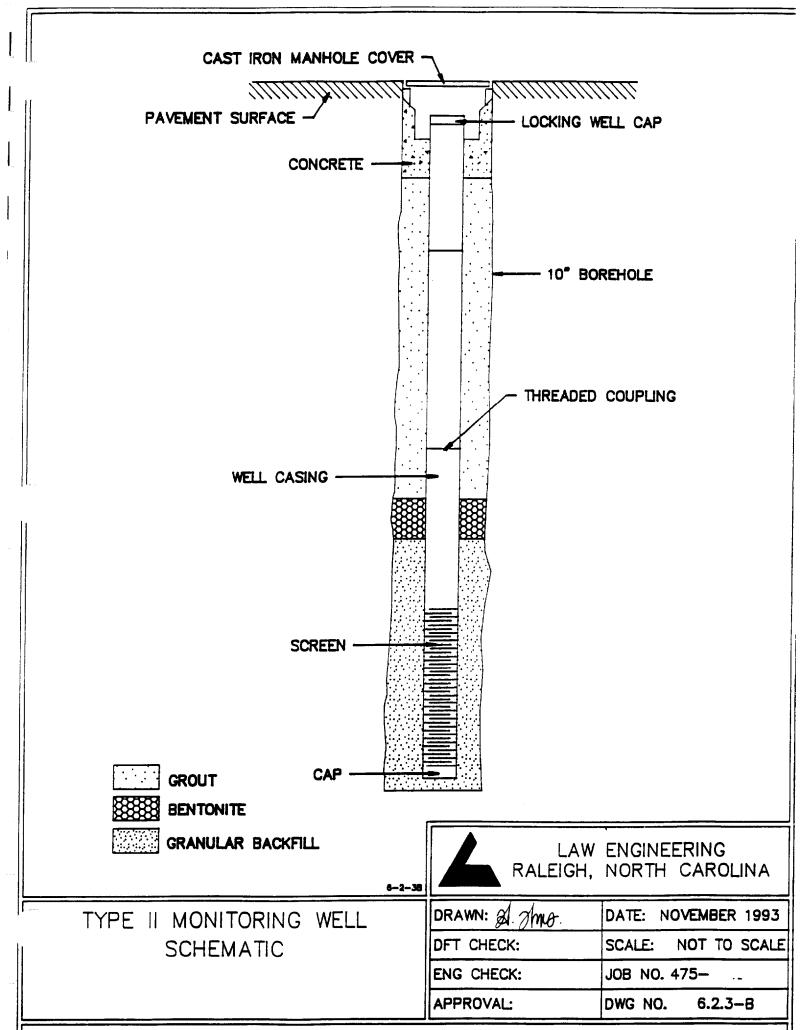
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DO HEREBY CERTIFY THAT THIS WELL WAS CONSTRUCTED IN ACCORDANCE WITH 15A NCAC 2C, WELL CONSTRUCTION STANDARDS, AND THAT A COPY OF THIS RECORD HAS BEEN PROVIDED TO THE WELL OWNER.







DRAWING 6.2.4

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	R		TIC AVENUE CAROLINA 27604	
	N	IONITORING WE	LL DEVELOPMENT	
	-		SHEET	
LAW JOB NUMBER		ORING WELL NUMBI	ER	
SITE NAME				
DATE (MO/DAY/YR)		(Y	<u></u>	
WEATHER CONDITIONS				
TOTAL WELL DEPTH (TWD)			1/10 FT. (DE	PTH BELOW MEASURING POINT)
HEIGHT OF MEASURING POINT ABOVE LAI	ND SURFACE			1/10 FT.
DESCRIPTION OF MEASURING POINT				
DEPTH TO GROUNDWATER (DGW)			1/100 FT. (DEF	TH BELOW MEASURING POINT
METHOD OF WELL EVACUATION TEFLON	BAILER	OTHER:		
TOTAL VOLUME OF WATER REMOVED		1/10 GAL.	CASING DIAMETER	In.
CASING MATERIAL PVC	S. <b>S</b>		N	OTHER
SCREENED INTERVAL (FROM ID PLATE)			DEPTHS BELOW LAND	SURFACE - FT.)
STEEL GUARD PIPE AROUND CASING	YES M	NO COMM	IENTS	
LOCKING CAP	YES N	NO	<u> </u>	
PROTECTIVE POST/ABUTMENT	YES N	VO		
NONPOTABLE LABEL	YES N	10		
ID PLATE	YES N	10	- <u></u>	
WELL INTEGRITY SATISFACTORY	YES N	10		
WELL YIELD LOW MODER	ATE HK	3H COMMI		
	Fil	ELD ANALYSES		
VOLUME (1/10 GAL.)		- <u></u>		
TURBIDITY .		<u></u>	<u></u>	
•VISUAL DETERMINATION ONLY (1) CLEAR (2) SLIGHT (3) MODERATE (4) HIG	н			

DRAWING 6.4

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			MONITOR	33 RALEIGH ENVIRG	LAW ENGINEER 01 ATLANTIC A 1. NORTH CARO DNMENTAL DEP 51NG AND WATE	VENUE LINA 27604	RKSHEET
FIELD PERSO	NNEL	DATUM					
WELL NUMBER	MEASU ROD HEIGHT (FT)	RING POINT CALC INSTRUMENT HEIGHT (FT)	ELEV OF MEASURING POINT (1) (FT)	DEPTH TO WATER (FT)	ELEV OF WATER (FT)	PRODUCT THICKNESS (FT)	COMMENTS (ODOR, WELL COND. PROTECTIVE COVER CONDITION)

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(1) Measuring point top of casing unless otherwise noted. ND = None detected: equipment capable of measuring  $\geq 0.01$  feet.

Page \_\_\_\_\_ of \_\_\_\_\_

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		3301 ATLA	GINEERING NTIC AVENUE I CAROLINA 27604	
			UL AND SAMPLING	
LAW JOB NUMBER		MONITORING WEL		
		······		
DATE (MO/DAY/YR)	TIME	(MILITARY)		
				·
WEATHER CONDITIONS	<u></u>			
TOTAL WELL DEPTH (TWD)	- <u></u>		1/10 FT. (DEPTH	BELOW MEASURING POINT)
HEIGHT OF MEASURING PO	INT ABOVE LAND SURFACE		1/10	FT.
DESCRIPTION OF MEASURIN	NG POINT	• · · · · · · · · · · · · · · · · · · ·		
DEPTH TO GROUNDWATER	(DGW)		1/100 FT. (DEPTH E	BELOW MEASURING POINT)
LENGTH OF WATER COLUM	$N (LWC) = TWD \cdot DGW = _$		1/100 FT.	
ONE STANDING WELL VOLU	IME (SWV) = LWC X		1/10 GAL.	
THREE STANDING WELL VO	LUMES = 3XSWV =		1/10 GAL = STANDAR	TD EVACUATION VOLUME
METHOD OF WELL EVACUA	TION TEFLON BAILER	OTHER:		
TOTAL VOLUME OF WATER	REMOVED	1/10 GAL.	CASING DIAMETER	In.
CASING MATERIAL PVC	S.S	TEFLO	отни	IER
SCREENED INTERVAL (FRO	M ID PLATE)	·····	OEPTHS BELOW LAND SUR	FACE - FT.)
STEEL GUARD PIPE AROUND	CASING YES	NO	COMMENTS	
LOCKING CAP	YES	NO		
PROTECTIVE POST/ABUTME	NT YES	NO		
NONPOTABLE LABEL	YES	NO		
ID PLATE	YES	NO		
WELL INTEGRITY SATISFACT	TORY YES	NO		
WELL YIELD LOW	MODERATE	HIGH		
		FIELD ANALYSES		
VOLUME (1/10 GAL.)				
рН (S.U.)		<u>.</u>		
SP. COND. (µMHOS/CM)				
WATER TEMP. (C)				
TURBIDITY*				
•VISUAL DETERMINATION O (1) CLEAR (2) SLIGHT (3) MO				

Enclosed in the second seco

UKAWING 1.2

	HEADS	PACE ANALYSI	S RESULTS				
SITE/JOB	NAME			DAT	ΓΕ		
JOB NUMI	Ber						DY
SAMPLE	SAMPLE DEPTH	SOIL TYPE/	DESCRIPTION	RE	GROUND ADING PPM)	SAMPLE READING (PPM)	ACTUAL READING (PPM)
	<u></u>						
PID or FID M	lodel			C#	UBRATIO	w SJ	
				Dete			
	pration Gas _			Time			

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		NA 721 PE	V ENVIR FIONAL L 5 PINE F VSACOL/ 4) 944-9	ABOR/ OREST	ATORIE	S		IN	OF MPLIN FORMA	G TION			DY NAME STRE	OF I	ACILI	TY: _														
DJECT		1		_ <u></u>	· · · <u>· · · · · · · · ·</u>		JOB NO	•			-		/	7	7/	7	7	/	7	7	7	7	7	7	7	7	7	77	77	7
<b>IPLERS</b>	( <b>8</b> 1G	NATI	JRE)		·····				VERS 0		ALMER	Wr.	/ /							, WA										
PLING	DATI		÷						TOTAL NO. OF CONTAINERS	6	ALAN . S	NAI'S	s/_	.m		4 <b>3</b> /	~~/s	57 / S	AN ASP											
TIME	3	aj B	SOURCE CODE		SAMI	LE STA	TION DESCRIP	TION	- 20	8	anio"	S BO	8 5.40 202		soni /	N. N.		9		A KOR	P. WIN	A LE L	HI A					/ L	ENL LAB	J NO.
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					DATE	/ TIME	RECEIVED BY:					DATE	TIME	RE	LINGLIS	HEDB	Y:		<u>.</u>		PIE	CENE		LABOR	ATOR	¥:	•		DATE /	TIME
TRIBLE			RIGINAL					ISIGNATURE	SHIPME					1-		(5	IGNAT	IJAE)						(5)	GNATI	MRE)				L
MARKS	6	P	INK COP	Y RET	AINED E	Y SAM	PLERS. YELI	LOIV COPY H	ETAINE	D BY	LABO	DRAT	<b>ORY</b> .	···						ry we NITO		RW				NPDE	ES DI		ige - Ní A - Dw	

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# 4933

#### DRAWING 7.5.1

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Law Environmental, Inc. 7215 Pine Forest Road Pensacola, Florida 32526 904/944-9772

I I I I A i i i

Analytical Request Form

To:	A	ttn:		
From:(Branch/Com	pany Name)	( Dep	t or Name	)
COC Number:				
Project Name:	P1	oject Number:		<u> </u>
Date Shipped:	Da	ite results requ	lested:	
Sample ID	Analysis Requested	Detection Limits Req.		Method
				·····
	•			
	·			· · · · · · · · · · · · · · · · · · ·
				<u></u>

Comments:

# FIGURE 12.1 PROJECT SCHEDULE

# **BUILDING TC-341**

T I North	Chart	End		1993			1994	4	
Task Name	Start	Ena	Oct	Nov	Dec	Jan	Feb	Mar	A
TASK 1	Oct/15/93	Oct/29/93							
Work Plan / H&S Plan Prep.	Oct/15/93	Oct/29/93							
Work Plan Due	Oct/29/93	Oct/29/93	1						
TASK 2	Jan/26/94	Feb/04/94							
Soil Sampling/Well Installation	Jan/26/94	Feb/04/94					÷		
TASK 3	Feb/04/94	Feb/15/94							
Surveying	Feb/08/94	Feb/08/94					1		
Well Development	Feb/04/94	Feb/08/94							
Well Sampling	Feb/11/94	Feb/15/94							
TASK 4	Jan/26/94	Mar/09/94							
On-Site Lab Analysis	Jan/26/94	Feb/08/94							
Off-Site Lab Analysis-soil	Feb/04/94	Feb/18/94							
Off-Site Lab Analysis-water	Feb/05/94	Mar/09/94							
TASK 5	Feb/15/94	Mar/31/94							
Data Analysis/Draft Report	Feb/15/94	Mar/31/94							
Draft Report Due	Mar/22/94	Mar/22/94						1	
TASK 6	Feb/22/94	Apr/07/94							<u> </u>
Navy Review Period (projected)	Feb/22/94	Mar/23/94							
Final Report	Mar/23/94	Apr/07/94							
		·····							
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				1					
				<u> </u>				<u> </u>	<u> </u>
					Mile	estone	$\triangle$ s	Summary 🔳	11111

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TABLES

			연 · 영 · 여				TABLE ANALYSIS FF-SITE LAI	SUMMARY T	ABLE					HEATII		IT BUILDING	6 TC-341
SAMPLE	NUMBER OF							TOTAL A	NALYSIS O	UANT	TY						
COLLECTION METHOD	SAMPLE LOCATIONS					s	OIL							w	ATER		
		TPH 3550/ 5030	трн 3550	трн 5030	трн 9071/ 8021	трн 9071	TOTAL LEAD	TCLP METALS	FLASH POINT	РН	GRAIN SIZE	502.2	601	602	610	B RCRA METAL\$	TOTAL LEAD (H <sup>2</sup> O)
Existing Wells	3														3		
Type II Wells/ Borings	12	12				8		2	8	8	1				4	2	
Type III Wells/ Borings	2	2				2			2	2	1						
6-Inch Well/ Borings	0																
Trip Blank	1														1		
Duplicate	1	1	o														
Rinsate	0	·															
Total Number of An	alyses	15	0	0	0	10	0	2	10	10	2	0	0	0	8	2	0

Included with 3550/5030 analysis

.

		S	AMPLE ANA	TABLE 8. ALYSIS SU ITE LABO	JMMARY		HEATI	NG PLAN	t Buili	DING T	C-341
SAMPLE	NUMBER OF		MPLE			TOTAL	ANALYSIS	QUANTI	ſY		
COLLECTION METHOD	SAMPLE LOCATIONS	(2) (2) (2) (2) (2) (3) (4) (4) (4) (4) (4) (4) (4) (4) (4) (4	TITY FOR			SOIL	7	n a a a aga se na est		WATE	R
				ТРН	ТРН	ТРН	9071/	ТРН	601	602	610
		SOIL	WATER	3550/ 5030	3550	5030	8021	9071			
Soil Test Borings	0	0	0								
Hydropunch Penetrometers	0	0	0								
Existing Wells	3	0	0								
Type II Wells/ Boring	12	12	8	12						3	8
Type III Wells/ Boring	2	2	2	2						2	2
6-Inch Well/ Boring	0	0	0								
Duplicate	1	1		1							
Rinsate	1		1							1	1

## APPENDIX A

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## HEALTH AND SAFETY PLAN

## HEALTH AND SAFETY PLAN SOIL AND GROUND WATER ASSESSMENT ACTIVITIES

## HEATING PLANT BUILDING TC-341 MARINE CORPS AIR STATION CAMP LEJEUNE, NORTH CAROLINA

Issued: December 2, 1993 Navy Contract No. 62470-93-D-4020 Law Engineering Job No. 475-09183-01

> Law Engineering, Inc. Raleigh, North Carolina

#### HEALTH AND SAFETY PLAN SOIL AND GROUND WATER ASSESSMENT ACTIVITIES

يبد الثاملة ال

Lorenza Martin

PROJECT: LOCATION OF SITE: LAW JOB NO. CLIENT: LJSA, Heating Plant Building TC-341 Camp Lejeune Marine Corps Air Station 475-09183-01 United States Navy - Atlantic Division

#### **REVIEW AND APPROVAL**

Principal Engineer

W. Douglass Dixon, P.E. \_\_\_\_

Project Manager

Brian J. Bellis, P.G.

#### DATE OF PLAN PREPARATION

December 2, 1993

#### DATES OF PLANNED FIELD ACTIVITIES

January 22, 1994 through February 28, 1994

SAFETY MEETING CONDUCTED: (LOCATION)\_\_\_\_\_(DATE):\_\_\_\_\_

#### EMERGENCY PHONE NUMBERS

Activity Contact:

Hospital: Building No. NH100 Off-site hospital route is shown on attached Drawing 1.

Hospital: EMS: Fire: Police: Operator:		OFF BASE 577-2243 346-6760 455-8080 455-1472 0	
Information:	451-1115	411	
•	ject Professional:	W. Douglass Dixon, P.E.	
	Safety Officer: ering Contact:	Hope Williams Brian J. Bellis, P.G.	(919) 876-0416 (919) 876-0416

Location for on-site emergency gathering will be determined during Site Safety Meeting.

Tom Morris

(919) 451-5063

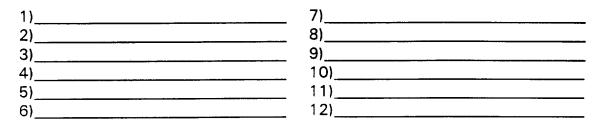
#### DESCRIPTION OF POTENTIAL HAZARDS

-Fire or explosion

-Exposure to petroleum fuels through inhalation, skin absorption or ingestion -Vehicular traffic

#### PERSONNEL ACCESS

Personnel who attended LAW's site safety meeting and are authorized to enter this site:



Other personnel authorized to enter on a limited basis with an escort:

1)	 	_
2)	 	_

#### PLANNED FIELD ACTIVITIES

Install twelve Type II and two Type III monitoring wells, one 6-inch pumping well, advance 10 Hydropunch penetrometer probes, develop monitoring wells, collect soil and ground-water samples, conduct slug and pumping tests, and survey well locations.

#### **MONITORING PROCEDURES**

Ambient air monitoring for the presence of volatile organic compounds with a photoionization detector (PID) or organic vapor analyzer (OVA) will periodically be performed in the work area. Testing will be conducted for approximately three minutes at a minimum of one test per hour or at other times when site conditions (e.g. evidence of free product, increase in detectable odors, site workers sensitivity) exhibit the need for additional testing. In the event that ambient PID/OVA readings exceed a level of 50 ppm for more than one-half of any three-minute testing interval, the work area will be evacuated pending additional testing. The action level of 50 ppm represents the permissible exposure limit (PEL) for naphtha and coal tars as established by the Occupational Safety and Health Administration (OSHA) and the threshold limit value for butanol. If further testing reveals that ambient air contains volatile organic compounds in excess of 50 ppm, respirators designed for removal of toxic organics will required for

all site workers. Should concentrations exceed 1000 ppm, all site work will cease and the site will be evacuated pending guidance from the Corporate Health and Safety Officer.

#### **DECONTAMINATION** (Petroleum products)

Skin	-	wash with soap and water
Clothing	-	wash with detergent and rinse thoroughly
Equipment	-	steam clean or detergent wash

#### MEDICAL SURVEILLANCE

Avoid frequent or prolonged skin contact. Monitor skin and eyes for dermatitis, allergic reaction, and eye irritation. If these or other symptoms develop, seek qualified medical attention. Workers with histories of liver, kidney, or nervous disorders should be advised as to possible increased risk.

Symptoms of Acute Exposure to Volatile Organics: High vapor levels can cause irritation of the respiratory tract, headaches, nausea and mental confusion. Loss of consciousness occurs with very high concentrations. Liquid contact with skin may cause defatting, drying and irritation. Both vapor and liquid phases are irritating to the eyes.

#### EMERGENCY PROCEDURES (Petroleum products)

Skin	-	wash with soap and water, rinse well
Inhalation	-	move to fresh air at least 50 feet upwind from vapor source. Seek
		qualified medical attention.
Eyes	-	flush for a minimum of ten minutes with clean water while holding
		eyes open. Seek qualified medical attention.
Ingestion	-	do not induce vomiting. If conscious, give water or milk to drink.
-		Seek qualified medical attention.

#### HEAT STRESS

Symptoms of heat stress include pale, cool or moist skin, excessive sweating, dizziness, nausea, and muscle spasms. Symptoms of heat stroke include red, hot and unusually dry skin, reduced perspiration, nausea, dizziness or confusion, rapid pulse rate and coma.

To prevent heat stress, adjust work schedule, provide shaded rest areas, and maintain body fluids.

### CLOTHING AND PROTECTIVE GEAR\*\*

Nitrile rubber gloves, latex gloves, steel-toes boots, protective eyewear, hard hats, and hearing protection and respirator shall be available at the work site.

\*\*The Project Manager or the Principal Professional should be contacted prior to changes in personal protective equipment usage.

### IN THE EVENT OF PERSONNEL INJURY

Provide basic first aid procedures as required and note time and circumstances of injuries. In the event of serious injury, the base hospital may be used (Drawing 1). Minor injuries and non-emergency cases should be treated off-base at Carteret General Hospital, 3500 Arendell Street in Morehead City. Notify Health and Safety Officer and Principal Project Professional.

### IN THE EVENT OF POTENTIAL OR ACTUAL FIRE OR EXPLOSION

Evacuate the area immediately. Assemble in the predesigned area and conduct a head count of all personnel. Notify fire department. <u>DO NOT</u> attempt to fight the fire. Notify Project Manager.

#### WORK PRECAUTIONS

- 1) No smoking, eating, drinking or chewing of gum or tobacco products while on the site. Avoid hand to mouth contact. A designated smoking and break area may be established off-site. Any such facility must be a minimum of 100 feet from any vapor source and shall be tested for flammable gasses and vapors at the start of work and prior to scheduled break periods each day.
- Hard hats, safety glasses and steel-toed boots are required to be worn at all times during drilling activities. Persons exposed to vehicular traffic will wear warning vests.
- 3) When the potential exists for skin contact with liquid hydrocarbons, impervious gloves and foot coverings are required to be worn.
- 4) Decontamination of equipment, clothing and personnel shall be in accordance with the previous section entitled "Decontamination".
- 5) Personnel must wash all exposed skin areas with soap and water before departing the site or going on break.
- 6) Prior to the start of work, all LAW employees and Subcontractor personnel shall be briefed on the contents of this plan by the LAW Field Representative.

### FIELD REPRESENTATIVE SUMMARY

During the work covered by this Safety Plan, there were:

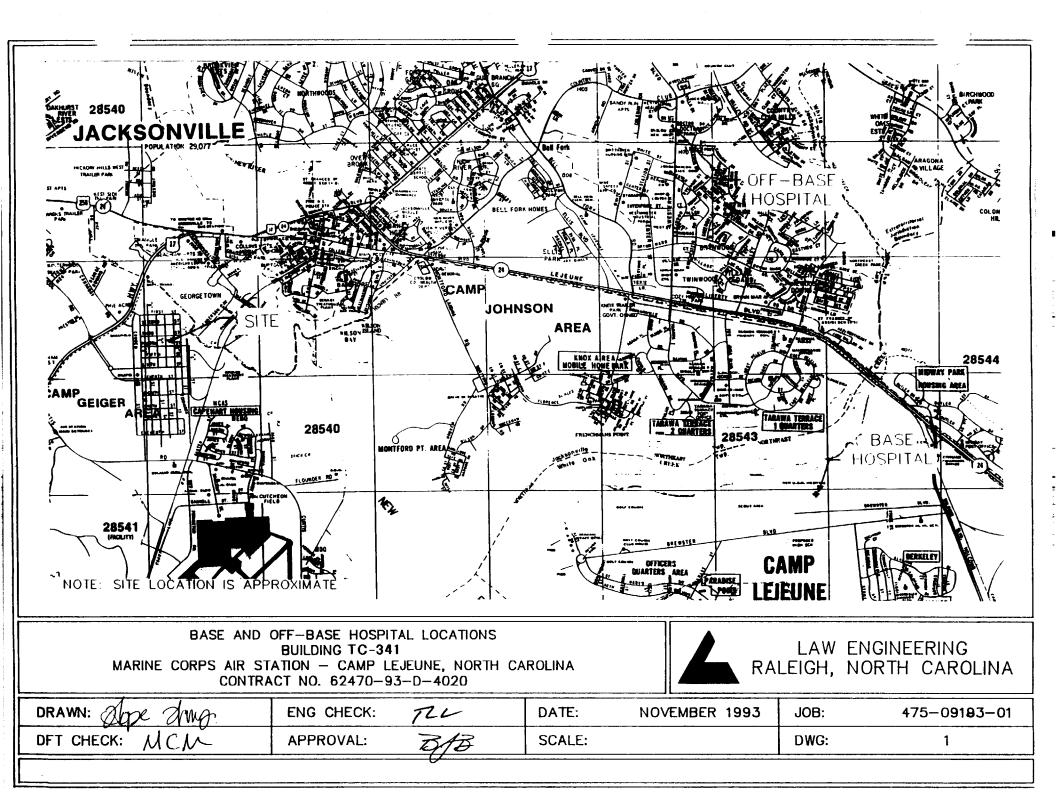
\_\_\_\_No observed violations of the Safety Plan provisions.

\_\_\_\_The following violations of the Safety Plan provisions (give details in space below and indicate corrective action taken for each violation noted).

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Signature\_\_\_\_\_Date\_\_\_\_\_ Field Representative <u>Attachments</u> Drawing 1 Hospital Route Map







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## APPENDIX B

# SOIL TEST BORING RECORDS

EPTH FT.)	I DESCRIPTION		REAL REAL	FIL	• PENET	RAI	ION -	BLO	WS/FO	OT	
0.0				0	10	20	30 4	0	60 80	100	1
1.0	Topsoil (medium to dark brown slightly silty fin SAND). (SM)	e									[
	Brownish tan slightly silty fine SAND. (SM)		- / 1								11
3.5											
	Light tan with orange brown mottling clayey fin SAND to slightly clayey fine sand. (SC)	e			•						7
	on the to suggity energy fine saint. (50)								╡┼┼	╡╴╢	Í
8.5											
8.8 9.2	Light tan clayey fine SAND. (SC) Light gray slightly silty medium to coarse SAND	<u> </u>									8
	1(SM)		_ / [] []-						╋╌┼╌┼		0
	Orange slightly silty medium to coarse SAND. (SM)										ł
13.5											
15.0	Medium to dark gray slightly silty fine SAND. (SM)										*WH
				<b>—</b>					+	+1	
									+	-+	
									╀╌┼╌┼	╶┼╌┥╽	
				+					┼╌┼╌┾	┽╌┥╎	
									┼─┼╶┼╴	++	
				ļ							
					-						
L	REMARKS:				1						
	Boring terminated at 15.0 feet. Type II				TEST I	ORI	¥G RI	COR	p		
	monitoring well installed upon boring completion See Well Construction Records for details.	•			DED	CU1 4					
	*Weight of hammer			RING NUM FE DRILLE		(W-4	1, 199				

PAGE 1 OF 1

PROJECT

PROJECT NUMBER

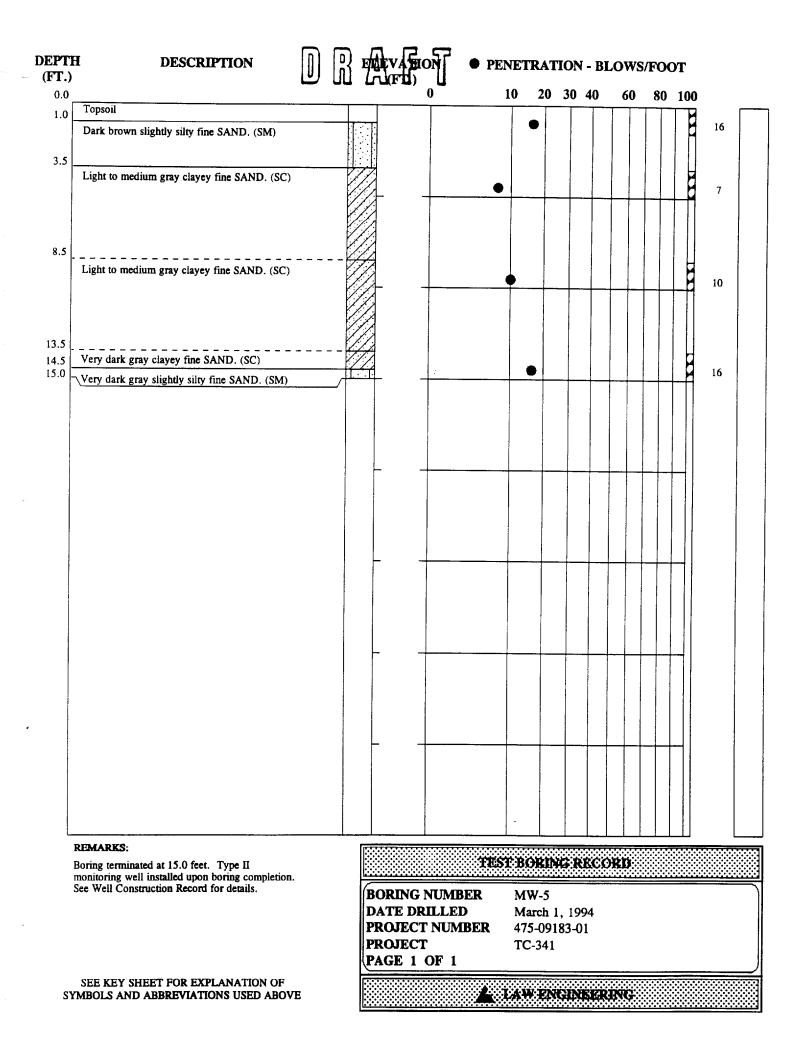
🚣 LAW ENGINEERING

475-09183-01

TC-341

SEE KEY SHEET FOR EXPLANATION OF SYMBOLS AND ABBREVIATIONS USED ABOVE





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<b>ТН</b> Г.)	DESCRIPTION		ELEVATE	Jro			RATI	ON - 1	BLOW	S/FO	ОТ	
	il, dark brown slightly silty fine SAND.			0		10	20	30 40	60	80	100	
.0 (SM)					•							5
	ish tan clayey fine SAND. (SC)										Π	
.5 Brown silty cl	ish tan to light gray clayey fine sand to ayey fine to medium SAND. (SC)			_	•						Š	4
.5												
SAND	ghtly clayey, slightly silty fine to medium . (SM)							-				16
.5 Very d	ark gray slightly silty fine SAND. (SM)	<b></b>			•							3
<b>REMAR</b> Boring ta	erminated at 15.0 feet. Type II				TES	T BC	RIN	G REC	ORD			
monitori See Well	ng well installed upon boring completion. Construction Record for details.		BORING DATE DR PROJECT	ILLEI	)		rch 1,	, 1994 33-01		<u></u>		

PROJECT

PAGE 1 OF 1

LAW ENGINEERING

TC-341

## B ELAY A FONT • PENETRATION - BLOWS/FOOT DEPTH DESCRIPTION (FT.) Γ<sup>0.0</sup> 10 20 30 40 60 80 100 0.5 1.0 Topsoil g Brownish tan slightly clayey fine SAND. (SM) 11 Brownish tan fine sandy CLAY. (CL) 3.5 . . . . . . . 4.0 Brownish tan fine sandy CLAY. (CL) 22 Gray and yellowish brown slightly silty fine to medium SAND. (SM) 8.5 Brownish tan clayey fine SAND. (SC) 9.8 • 16 Orange slightly silty fine to medium SAND. (SM) 13.5 ł Orange brown slightly silty fine SAND. (SM) 7 Ô 15.0 **REMARKS**:

a di di serata serata serata serata serata serata serata serata serata serata serata serata serata serata serat

i no e site i

Boring terminated at 15.0 feet. Type II monitoring well installed upon boring completion. See Well Construction Record for details.

# TEST BORING RECORD

BORING NUMBER DATE DRILLED PROJECT NUMBER PROJECT PAGE 1 OF 1 MW-7 March 1, 1994 475-09183-01 TC-341

LAW ENGINEERING

DEPTI (FT.)	H DESCRIPTION	D N T	AVATION	• 1			(ON - B	LOWS	5/FOC	T	
0.0		 	0		10	20	30 40	60	80	100	
0.5	– Topsoil Dark brown slightly silty fine SAND. (SM)				•					ľ	13
4.0	Gray and orange slightly fine sandy CLAY. (CL) Light gray slightly silty fine SAND. (SM)									Ĕ	15
8.5											
9.3	Grayish brown slightly silty fine sandy CLAY. (CL)				•						6
13.5	Dark gray to tan to black slightly silty fine SAND (SM)										
14.0 15.0	Grayish brown slightly silty fine to coarse SAND. (SM)	 ,									10
	Grayish brown slightly silty fine to very coarse SAND. (SM)										
J											
							+				
	REMARKS: Boring terminated at 15.0 feet. Type II	 		Ŧ	LST B	ORIN	G REC	ORD:			
	monitoring well installed upon boring completion. See Well Construction Record for details.	]	BORING NU DATE DRILI PROJECT NI PROJECT PAGE 1 OF	.ED J <b>MBER</b>	M 47	W-8 arch 1 5-091 C-341	, 1994 83-01				
S	SEE KEY SHEET FOR EXPLANATION OF YMBOLS AND ABBREVIATIONS USED ABOVE				LA	¥ EN	GINEE	RING			

.)		UK	1	rints [					BLOWS			
.0	·····			0	1	0	20	30 40	60	80	100	
.3	Topsoil Medium to dark gray slightly silty fine SAND.	^									T H	
	(SM)	Į.			•						$ \mathbf{R} $	6
_				•								
.5	Brownish gray slightly silty fine SAND. (SM)		-	-								
	brownish gray signily sity line SAIAD. (SMI)				•							5
		ŀ.		· ·								
					-							
		[]										
5				•								
	Light brownish tan silty fine to medium SAND. (SM)			•	•						19	10
											TT.	
		H										
				•								
5				•							H	
	Dark gray slightly silty fine SAND. (SM)			•							I A	*WH
		ļ.										
5				•							H	
0	Very light gray slightly silty to silty fine SAND (SM) with shell fragments.											28
	Very light gray slightly silty to silty fine SAND											40
	(SM) with shell fragments.										I M	40
5	Light gray slightly silty fine to very coarse SAN											
	(SM) with shell fragments.			·								47
5	Light gray slightly silty fine to coarse SAND (SM											
0	with shells/shell fragments.	1)						•				39
	\											
				┝ ┥──						$\left  \right $	$\left  \right $	
		ļ			ļ							
L	DIMADEC.				l							
	REMARKS: Boring terminated at 30.0 feet. Type III				TEST	BO	RIN	G REG	ORD			
	monitoring well installed upon boring completion. See Well Construction Record for details.											
	*Weight of hammer		_ [()	BORING NUME	BER	M٧	V-9					

PROJECT

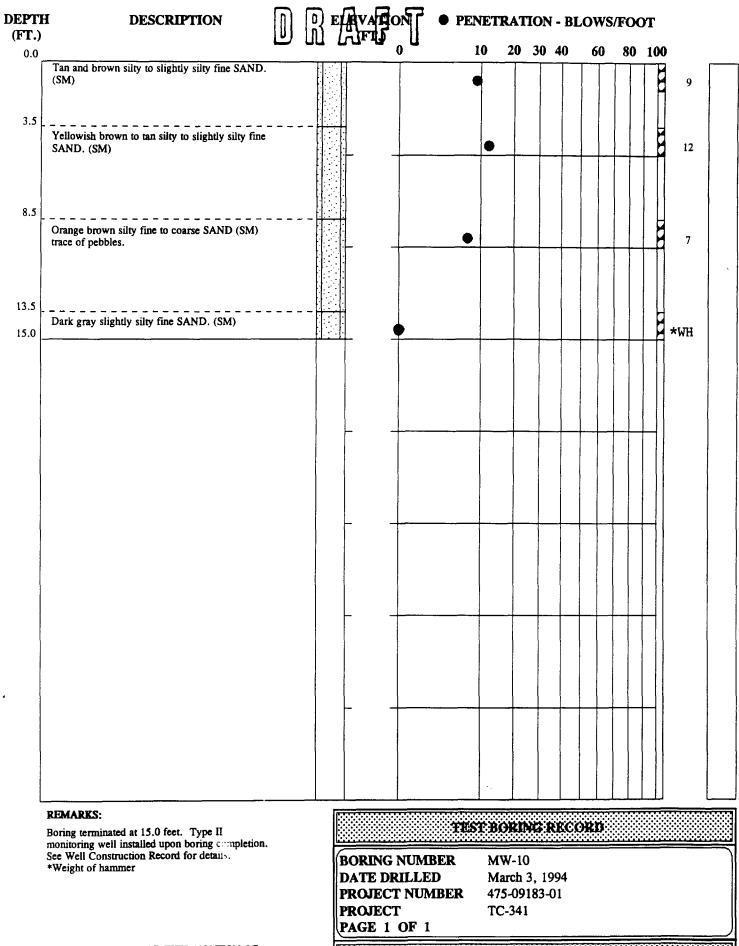
PAGE 1 OF 1

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TC-341





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**L**ULAW:ENGINEERING

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PTH T.)	DESCRIPTION		R E	AVAR	<u>ן</u> אכ	• PEI	NETH	RATI	ON - E	SLO	NS/	FOC	т	
0.0					0 <b>U</b>		10	20	30 40	6	0	80	100	
	Topsoil			1	<b>.</b>		T							r
	Tan and dark brown silty to slightly silty fine SAND. (SM)					٠								7
3.5	Medium gray, yellowish brown and dark brown clayey fine SAND. (SC)	·		ż			•							11
3.5 9.2	Tan and dark brown slightly clayey fine SAND.	· <b></b> -				•								7
	Orange brown and tan slightly silty to silty fine to very coarse SAND. (SM)	)												
.3 .	Orange brown and tan slightly silty medium to very coarse SAND. (SM)		-			٠								6
	Very dark grayish brown slightly silty fine SAND (SM)	).	/											
								-						
F	EMARKS:		بر میار					-	. 1					
В	Boring terminated at 15.0 feet. Type II monitoring well installed upon boring completion. we Well Construction Record for details.					TES	твo	RIM	<b>FRE</b> C	ORI				
S	ee Well Construction Record for details.		6	BORING	NUMB	ER	MW	7-11						

DATE DRILLED

PAGE 1 OF 1

PROJECT

PROJECT NUMBER

LAW ENGINEERING

March 4, 1994

475-09183-01

TC-341

DEPTH	I DESCRIPTION		NOTION	• PENET	TRAT	ION - B	LOWS	5/FO	тс	
0.0		ك		10	20	30 40	60	80	100	
0.5	Topsoil Black and dark tan slightly silty fine SAND. (SM	ſ)		•						12
3.5	Medium to dark gray slightly silty fine SAND. (SM)			•						4
8.5	Tan to yellowish brown slightly silty to silty fine to coarse SAND. (SM)			•						2
13.5										
15.0	Dark gray slightly silty fine SAND. (SM)		• •							*WH
	<b>REMARKS:</b> Boring terminated at 15.0 feet. Type II monitoring well installed upon boring completion.			TESTI	ORI	¥G REC	ORD			

monitoring well installed upon boring completion. See Well Construction Record for details. \*Weight of hammer

SEE KEY SHEET FOR EXPLANATION OF SYMBOLS AND ABBREVIATIONS USED ABOVE

BORING NUMBER DATE DRILLED PROJECT NUMBER PROJECT PAGE 1 OF 1

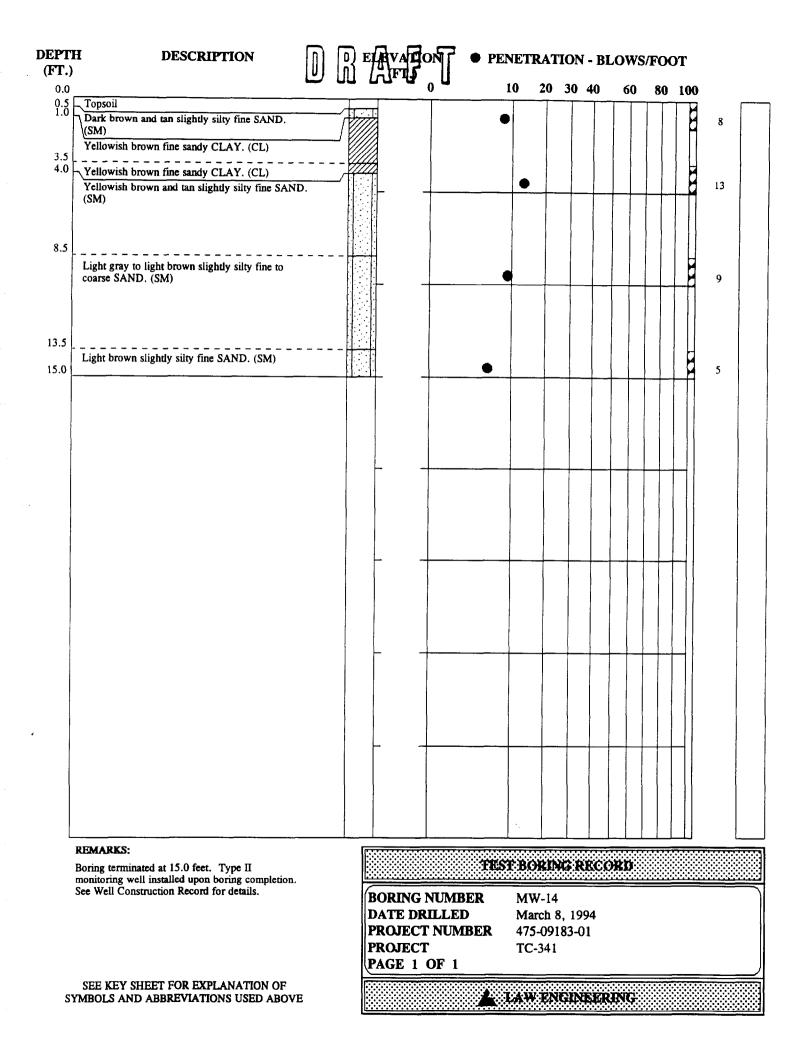
MW-12 March 7, 1994 475-09183-01 TC-341

LAW ENGINEERING

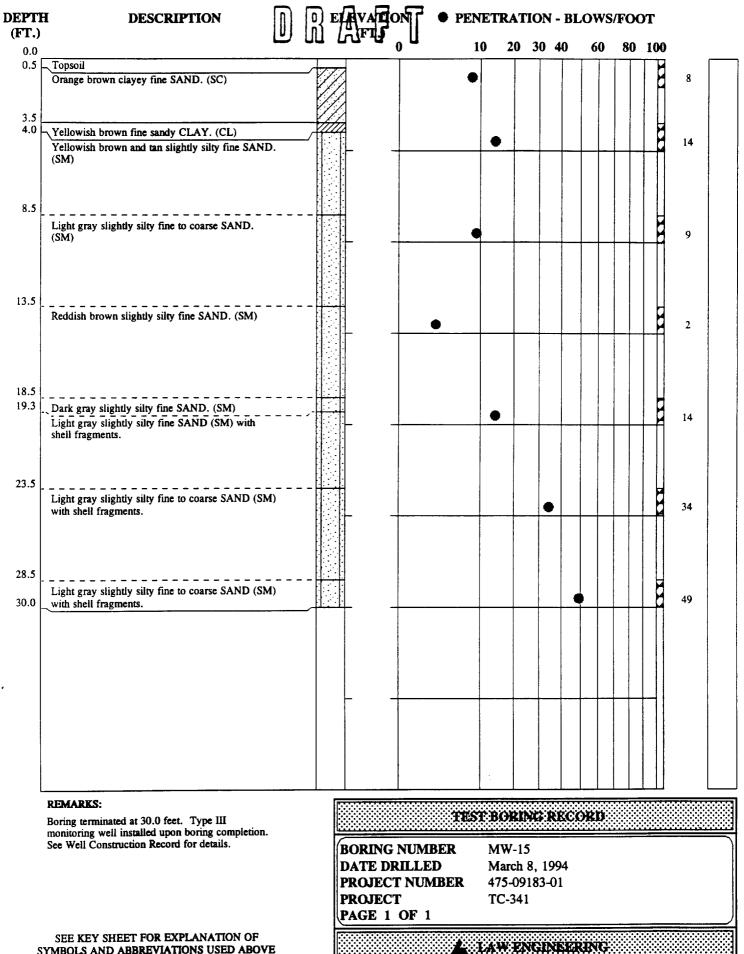
DEPT	H DESCRIPTION		VACION	• PENET	RATION	- BLOWS	/FOOT	·
0.0	•			10	20 30	40 60	80 100	
0.5	Yellowish brown slightly clayey fine SAND. (SC) Yellowish brown fine sandy CLAY. (CL)			•				7
3.5	Brownish tan slightly silty fine to medium SAND. (SM)			•				7
8.5 9.0 9.5	Brownish tan slightly silty fine to coarse SAND. (SM) Brownish orange fine sandy CLAY. (SC)			•				10
13.5	Dark gray slightly silty fine SAND. (SM) Light gray to dark gray slightly silty fine SAND. (SM)			•				2
		-						
	REMARKS: Boring terminated at 15.0 feet. Type II			TEST B	) BRING RE	CORD		
	monitoring well installed upon boring completion. See Well Construction Record for details.	DAT PRO PRO	UNG NUMI E DRILLE NECT NUM NECT E 1 OF 1	BER M D Ma BER 47	W-13 arch 7, 199 5-09183-01 C-341	4		
	SEE KEY SHEET FOR EXPLANATION OF	100000						

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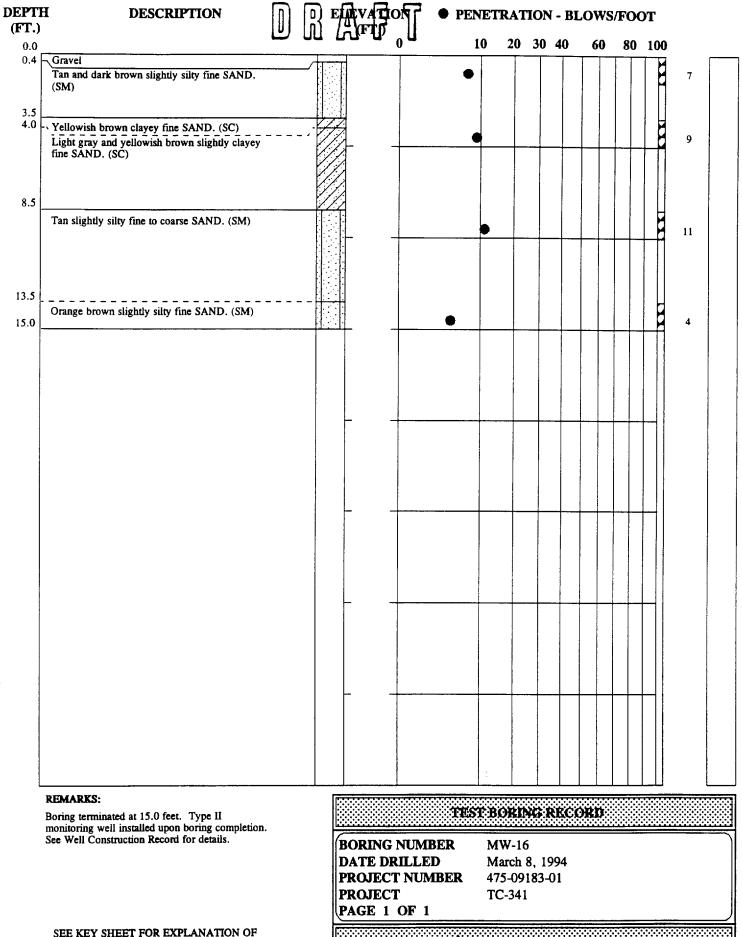


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SYMBOLS AND ABBREVIATIONS USED ABOVE

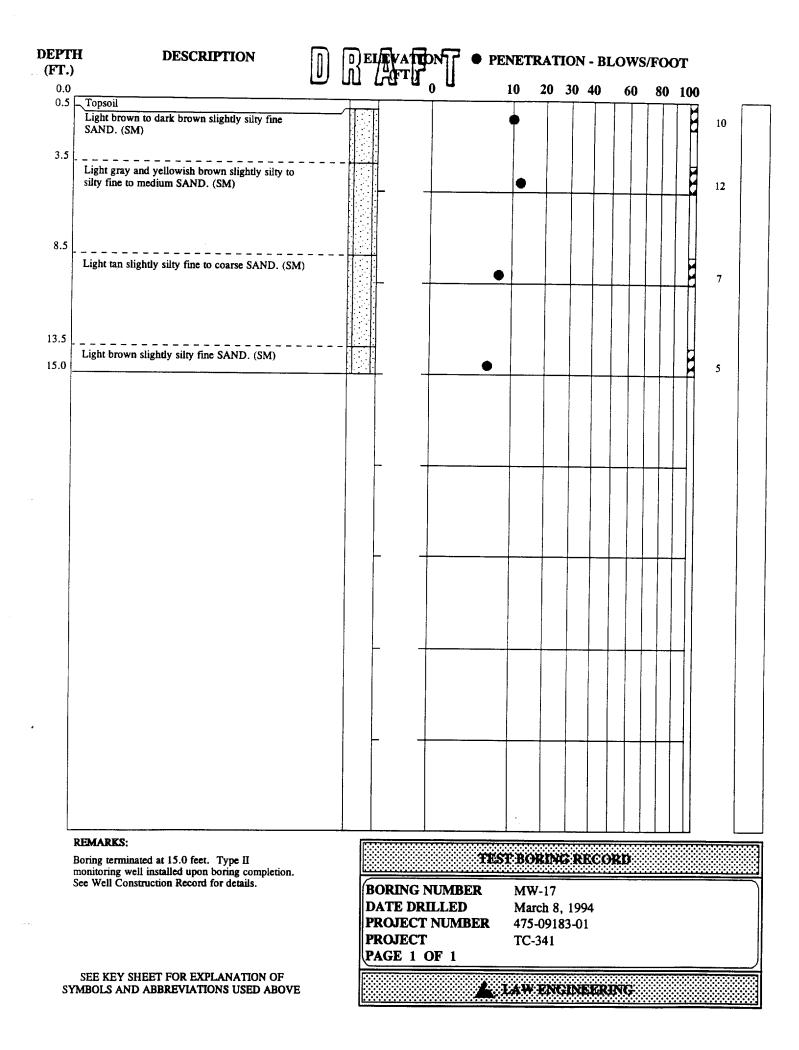
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SEE KEY SHEET FOR EXPLANATION OF SYMBOLS AND ABBREVIATIONS USED ABOVE

LAW ENGINEERING

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## APPENDIX C

## GRAIN SIZE DISTRIBUTION HYDRAULIC CONDUCTIVITY CALCULATIONS

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MW-7 DEPARTE CONDUCTIVITY: GRAIN SIZE

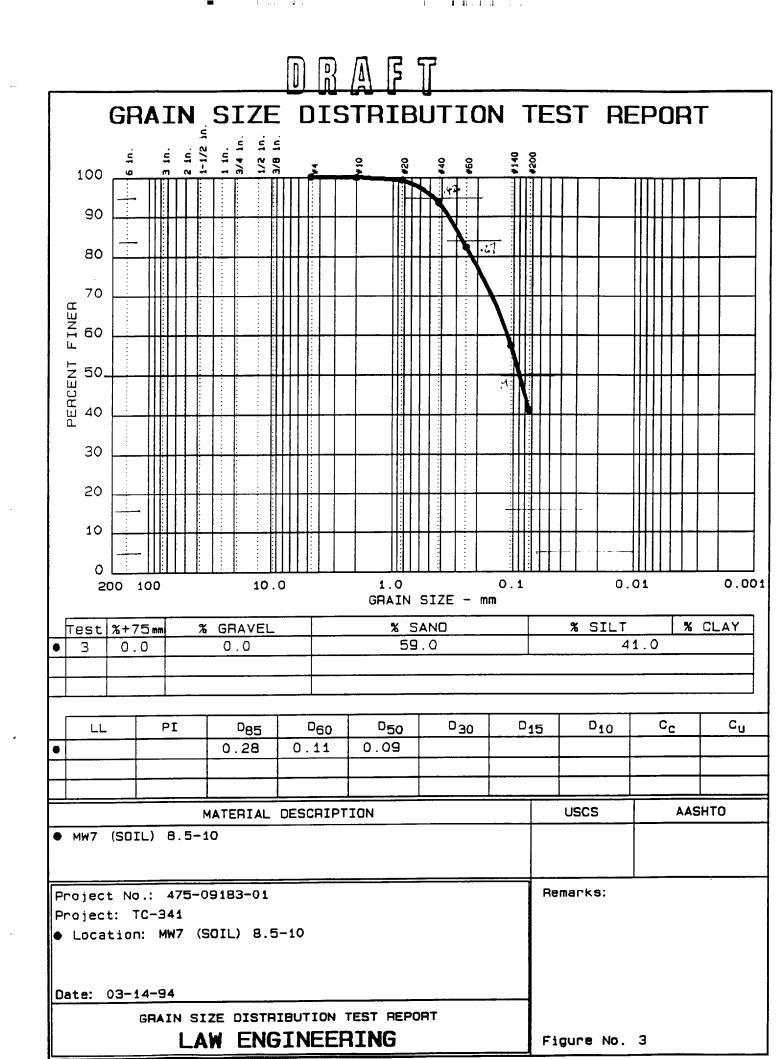
 $d_{16} = -102 \qquad \qquad D_{95} = \frac{D_{95}}{C_{16}(2)} = \frac{C_{10} - C_{15}}{C_{16}(3)} = + 0.544$   $d_{16} = -102 \qquad \qquad D_{16} = \frac{D_{16}}{C_{16}(2)} = \frac{C_{10} - C_{15}}{C_{16}(3)} = + 0.544$   $d_{16} = -102 \qquad \qquad D_{16} = \frac{377}{C_{16}(2)} = \frac{377}{C_{16}(2)} = \frac{1.25}{C_{16}(2)} = \frac{1.25}{$ 

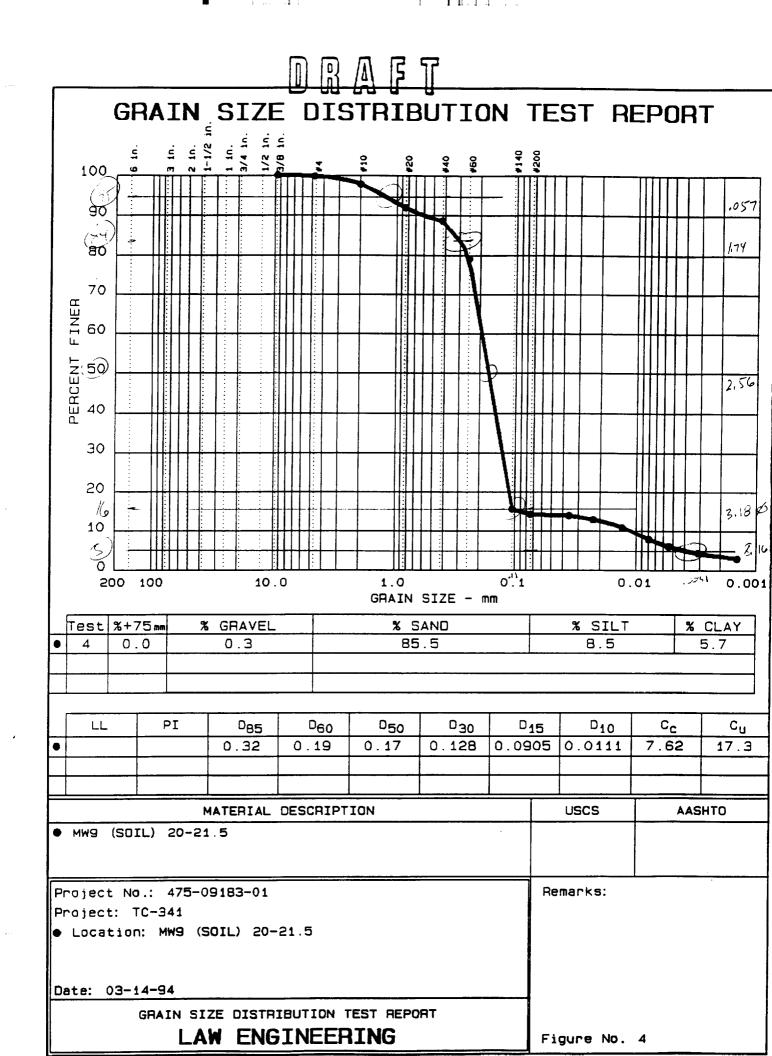
$$\frac{1}{284}$$

$$\frac{55}{26} = -\frac{2}{263} \left( \frac{107}{2} \right)$$

$$\frac{55}{261} = -2 \cdot \frac{1}{260} \left( \frac{107}{2} \right)$$

$$\frac{1}{261} = \frac{1}{261} = \frac$$





57 -----GRAIN SIZE DISTRIBUTION TEST DATA Test No.: 4 L. .: 03-14-94 Project No.: 475-09183-01 Project: TC-341 Sample Data Location of Sample: MW9 (SOIL) 20-21.5 Sample Description: MW9 (SOIL) 20-21.5 CCS Class: Liquid limit: .SHTO Class: Plasticity index: Walle Class. Lasters index. Notes lemarks: Fig. No.: 4 Mechanical Analysis Data Initial )ry sample and tare= 468.51 lare = 0.00 Dry sample weight = 468.51 le split on number 10 sieve c sample data: Sample and tare = 91.57 Tare = 0 Sample weight = 91.57 Cumulative weight retained tare= 0 'are for cumulative weight retained= 0 Cumul. Wt. Percent Sieve retained finer 0.375 inches 0.00 100.0 # 4 1.18 99.7 # 10 10.85 97.7 # 20 5.46 91.9 # 40 8.47 88.6 # 60 17.40 79.1 # 140 77.00 15.5 # 200 78.26 14.2 Hydrometer Analysis Data eparation sieve is number 10 Percent -# 10 based on complete sample= 97.7 Weight of hydrometer sample: 91.57 alculated biased weight= 93.74 Automatic temperature correction Composite correction at 20 deg C =-4.9 Meniscus correction only=-1

Elapsed time, min	Temp,	52H Eff Actual reading	corrected		294964 Rm	- 0.16 Eff. depth	4 x Rm Diameter	Percent finer
2.0	20.0			0.0136	17.0	-	0.0355	
				0.0136		13.7		
			10.2					
			7.4					
			5.6					
			4.1					
1279.0				0.0132			0.0014	2.9
, , , ,			Fractiona	1 Compon	ents			~~~~
vel/Sand d/Fines b + 75mm. = SILT = 8.	ased or 0.0	1 #200 si	<b>eve</b> L = 0.3	* SAND =	85.5		*****	

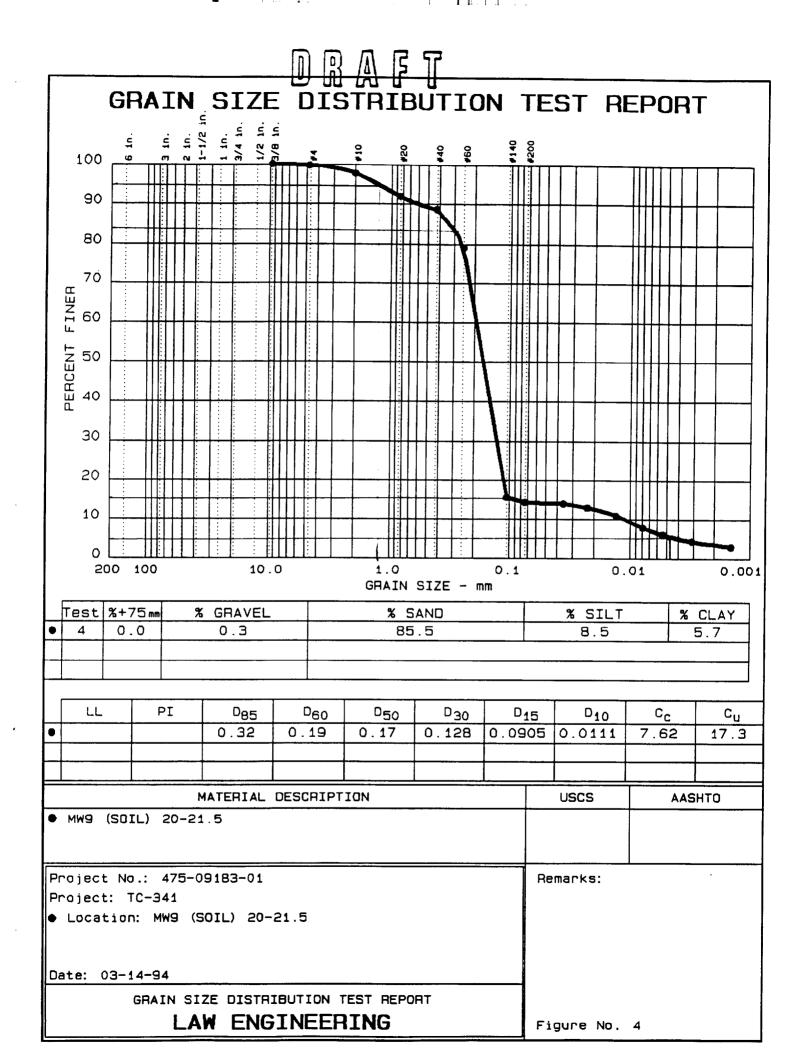
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l is a star i

Cc = 7.6208 Cu = 17.2982

.

JOB NO. 475-09183-01 SHEET\_ 1. - 144 JOB NAME TAUK TC-34 3301 ATLANTIC AVE P.O. BOX 18288 LAW ENGINEERING SUBJECT RALEIGH, NC 27619 919-876-0416 BY J.T DATE 4-13-94 GEOTECHNICAL, ENVIRONMENTAL & CONSTRUCTION MATERIALS , 50103 CHECKED BY\_72L CONSULTANTS DATE \_4.13.94 Calculation of Hydraulic Conductivity A) Hazen Method Reference: Groundwater Engineering, Kashef, P. 87  $K = C_h P_{10}^{2}$ where, Ch = 100  $C.1 < D_{10} < 3.0$ C4 5.0 Cannot jused Hozen ! 010 = 0.0111 / outside of range 1.0 hod B) March & Denny to krumben Inits O  $K = f(\sigma_{\overline{I}}, d_{so}).$  $B = -Ln(0.12 \text{ mm}) \Rightarrow B=3.06$  $Ln(2) = d_{16} = 3.06\Phi$ A16 7 Grain Size Data  $d_{84} \neq \beta = -Ln(0.30_{mm}) = \beta = 1.79$  $Ln(2) = d_{84} = 1.74 d$ 114 = 0.12 1:4 = 0.30  $d \leq 7 q = -Ln (0.005 mm) = p = 7.64$ Ln(2)  $d \leq 7.64 q$ 1, = 1.005  $\frac{1957}{L_{h}(2)} = -\frac{L_{h}(1.33mm)}{L_{h}(2)} = \frac{-0.41}{195} = -0.41$ 17- 1.33 -150 = 0.17mm  $d_{50} = -Ln(0.17mm) = 2.5$  $d_{50} = 2.56$ .56  $\frac{3.06 - 1.74}{4} + \frac{7.64 - (-0.41)}{6.6} =$  $\sigma_{\underline{T}} = \underline{q_{1c} - q_{8H}} + \underline{q_{5} - q_{q_{5}}}$ = 1.55~ OI  $= 7 T_{\pm} = 0.33 + 1.22 = 7$ 05G= 2.56 P/ (reference Masch + Venny, K= 0.49CM



GRAIN SIZE DISTRUBUTION TEST DATA Test No.: 4 ┍┍╴ ╸┝╡┺┺ӝ╕ᆕ┲╼╧╧╧┍╄═╘╕╧╝╛╧╧╧╧╪╦┲┿╦╧╼ L .: 03-14-94 Project No.: 475-09183-01 Project: TC-341 Sample Data Location of Sample: MW9 (SOIL) 20-21.5 Sample Description: MW9 (SOIL) 20-21.5 JSCS Class: Liquid limit: AASHTO Class: Plasticity index: Notes Remarks: Fig. No.: 4 Mechanical Analysis Data Initial )ry sample and tare= 468.51 'are = 0.00 Dry sample weight = 468.51 le split on number 10 sieve sample data: sample and tare = 91.57 Tare = 0 Sample weight = 91.57 Cumulative weight retained tare= 0 'are for cumulative weight retained= 0 Sieve Cumul. Wt. Percent retained finer 0.00 0.375 inches 100.0 # 4 1.18 99.7 # 10 10.85 97.7 5.46 8.47 # 20 91.9 # 40 88.6 # 60 17.40 79.1 77.00 # 140 15.5 # 200 78.26 14.2 Hydrometer Analysis Data eparation sieve is number 10 Percent -# 10 based on complete sample= 97.7 Weight of hydrometer sample: 91.57 alculated biased weight= 93.74 ..utomatic temperature correction Composite correction at 20 deg C =-4.9 eniscus correction only=-1

ան անհայտներին այն

### Specific gravity of solids= 2.65 0 Specific gravity correction factor=11/900 ometer type: 152H Effective depth L= 16.294964 - 0.164 x Rm

Elapsed time, min		Actual reading	Corrected reading	K	Rm	Eff. depth	Diameter mm	Percent finer
2.0	20.0	18.0	13.1	0.0136	17.0	13.5	0.0355	13.9
5.0	20.0	17.0	12.1	0.0136	16.0	13.7	0.0226	12.9
15.0	20.5	15.0	10.2	0.0136	14.0	14.0	0.0131	10.8
42.0	21.5	12.0	7.4	0.0134	11.0	14.5	0.0079	7.9
89.0	22.5	10.0	5.6	0.0132	9.0	14.8	0.0054	6.0
268.0	24.0	8.0	4.1	0.0130	7.0	15.1	0.0031	4.3
1279.0	23.0	7.0	2.8	0.0132	6.0	15.3	0.0014	2.9
			Fractiona	1 Compon	ents			
Gravel/Sand	based of	on #4 sie	 ve					

Sand/Fines based on #200 sieve % + 75mm. = 0.0 % GRAVEL = 0.3 % SAND = 85.5 % SILT = 8.5 % CLAY = 5.7

D85= 0.32 D60= 0.193 D50= 0.168 D30= 0.1278 D15= 0.09047 D10= 0.01113 C = 7.6208 Cu = 17.2982

0.				_	•		S	OI	LS	5	LA	B	0	AW R	AT	<b>NG</b> O	INE RY	ER Z		(' Sr	u	NME	NT	S	;								. <u></u>		
<b>\TE</b>		-7	14	_ JO	BN	AME		70		2	(					JO	B NO.	41		11	, **	<u>⊡</u> /IN CHAF	RGE	<del>!</del>	_ <u></u>	<u>)</u>	_ RE	QUE	STE	D CC	ϽϺΡι	ETIC	)N DA	ATE;	-10
S/ LO		E DN			Ρ	нүз	SICA	LP	ROF	PER	TIES						SI	REN	IGTH	I TE	STS			COM			СС	ONS	OLI	DAT	ION			SPEC	
			S (LI)	NT	II.	۲	S	S			AIN SI		۲T				JRVE				٩	<u>بر</u>	â	Ċ D			IN	DIC	ATE	LOA	٩DS				
BORING NO.	SAMPLE TYPE	SAMPLE DEPTH	COMBINED ANALYSIS (LI)	DISTURE CONTE	UNIT WEIGHT NAT. DEN. & MOIST. CONT.	SPECIFIC GRAVITY	ATTERBERG LIMITS	SHRINKAGE LIMITS	DRY	WASH 200 W/SEIVE	% <mark>F</mark> INER NO. 200	HYDROMETER	MAX. & MIN. DENSITY	SWELL TEST			UNCONFINED COMP. WITH/STRESS-STRAIN CURVE	UNCONFINED COMP. WITHOUT S-S CURVE	TRIAXIAL UU	TRIAXIAL CU	TRIAXIAL CU W/PP	CONFINING PRESSURES. KSF	STANDARD (A, B. C, D)	MODIFIED (A, B, C,	СВР			ELC	KIPS DAD	СҮС					
			б С	ž	Ż			σ		Ŵ	*						Š						S	~								_			
₽ <b>7</b>		70" 70"										¥¢.																		-					50
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# APPENDIX D

# WELL CONSTRUCTION RECORDS

		535 - Raleigh, N hone (919) 733-		ni U	U	Lat		SERIAL NO." RO." RO."
	WELL CO	NSTRUCTIC						
				-		Basin Code Header Ent		GW-1 Ent
DRIL	LING CONTRACTOR:	Law Engin	neering	CT I	TE MEL	L CONSTRU	CTION	GIWI CIL
ាខារ	LER REGISTRATION N	IMBER:	332	-			MW-4	
	WELL LOCATION: (Show				0	_		
ľ	Nearest Town: Jacks	onville	C	ounty:	Onslow	/		_
_	TC-341 Camp Gieg					DEPTH		
	(Road, Community, or Subdivi				E.			Formation Descripti
	OWNER <u>II.S. Mari</u>	<b>L</b>			0.			
• •	ADDRESS <u>Camp LeJ</u> (S	reet or Route No.)	)		0.	0 13.0		
	Jacksonville	NC						Soo attached
	City or Town	State	Zi	p Code				<u>See attached</u>
•••	DATE DRILLED	94 USE OF	WELL Monit	toring				
	OTAL DEPTH							<u> </u>
	CUTTINGS COLLECTED		NOL		- <u></u>			
	DOES WELL REPLACE E STATIC WATER LEVEL E			NO <u>X</u>	<u> </u>			
7. 3			Above Top of Ca					
8. T	OP OF CASING IS 2.0	,	•	•				· · · · · · · · · · · · · · · · · · ·
		N/A	Amount	N/A				
	CHLORINATION: Type	N/A			lf	additional spa	e is neede	d use back of form
	CHLORINATION: Type CASING:	N/A			if		ce is neede	
	CASING:	Diameter	Wall Thickness	Materiai		LC	CATION	
12. (	CASING: Depth	Diameter	Wall Thickness or Weight/Ft.	Materiai	(Show	LC	CATION S	SKETCH_ om at least two State
12. (	CASING:	Diameter Ω Ft. <u>2''</u>	Wall Thickness or Weight/Ft. SCH40	Materiai	(Show	LC direction and	CATION S	SKETCH_ om at least two State
12. ( F F	CASING: Depth From 0.0. To	Diameter 0 Ft!'	Wall Thickness or Weight/Ft. SCH_40	Material PVC	(Show	LC direction and	CATION S	SKETCH_ om at least two State
12. ( F F	CASING: 	Diameter 0 Ft!'	Wall Thickness or Weight/Ft. SCH_40	Material PVC	(Show	LC direction and	CATION S	SKETCH_ om at least two State
12. ( F F 13. (	CASING: Depth From 0.0 To 3. From To To 3. From To 5. GROUT: Depth	Diameter 0 Ft!' - Ft - Ft Mate	Wall Thickness or Weight/Ft. SCH_40   erial N	Material PVC	(Show Ro	LC direction and	OCATION S distance fro map referen	SKETCH orm at least two State nce points)
12. ( F F 13. (	CASING: Depth From 0.0 To 3. From To To 5. From To 5. BROUT: Depth	Diameter Ω Ft. <u>2''</u> Ft Ft	Wall Thickness or Weight/Ft. SCH_40   erial N	Material PVC	(Show Ro	LC direction and	CATION S	SKETCH orm at least two State nce points)
12. ( F F 13. ( F	CASING: Depth From 0.0 To 3. From To To 3. From To 5. GROUT: Depth	Diameter Ω Ft' - Ft - Ft Mate _ Ft	Wall Thickness or Weight/Ft. SCH_40   erial N	Material 	(Show Ro	LC direction and	OCATION S distance fro map referen	SKETCH orm at least two State nce points)
12. ( F F 13. ( F F	Depth           from 0.0         To 3.	Diameter Ω Ft' - Ft - Ft Mate _ Ft	Wall Thickness or Weight/Ft.    erial N eteCa	Material 	(Show Ro	LC direction and	OCATION S distance fro map referen	SKETCH orm at least two State nce points)
12. ( F F 13. ( F 14. S	Depth           from To           from To           from To           GROUT:           Depth           from To           GROUT:           Depth           From To           GROUT:           Depth           From To           GCREEN:           Depth	Diameter 0 Ft' - Ft - Ft Mate _ Ft _ Ft Diameter S	Wall Thickness or Weight/Ft. SCH_40  erial N eteCa lot Size N	Material  Method ast_in_P	(Show Ro	LC direction and	OCATION S distance fro map referen	SKETCH orm at least two State nce points)
12. ( F F 13. ( F 14. S	Depth           From 0.0         To3.           From To         To3.           From To         To           GROUT:         Depth           From 0.0         To	Diameter 0 Ft' - Ft - Ft Mate _ Ft _ Ft Diameter S	Wall Thickness or Weight/Ft. SCH_40  erial N eteCa lot Size N	Material  Method ast_in_P	(Show Ro	LC direction and	OCATION S distance fro map referen	SKETCH orm at least two State nce points)
12. C F F 13. C F 14. S	Depth           from To           from To           from To           GROUT:           Depth           from To           GROUT:           Depth           From To           GROUT:           Depth           From To           GCREEN:           Depth	Diameter 0 Ft - Ft - Ft - Ft - Ft Diameter S t in.	Wall Thickness or Weight/Ft.   erial N ete Ca  lot Size N 	Material  Method ast-in-P Material PVC	(Show Ro	LC direction and	OCATION S distance fro map referen	SKETCH orm at least two State nce points)
12. ( F F 13. ( F 14. S F F	CASING: Depth From 0.0 To 3. From To To 5. From To 5. GROUT: From 0.0 To 2.0 From 0.0 To 2.0 From 0.0 To 13.0 F From 3.0 To 13.0 F	Diameter 0 Ft - Ft - Ft Mate _ Ft - Ft Diameter S t in. t in.	Wall Thickness or Weight/Ft.  Brial N ete Lot Size N in	Materiai <u>PVC</u> Method ast-in-P Material PVC	(Show Ro	LC direction and	OCATION S distance fro map referen	SKETCH orm at least two State nce points)
12. C F F 13. C F 14. S F F F F	Depth           from 0.0         To 3.           From 0.0         To 3.           from 0.0         To 3.           From 0.0         To 3.           GROUT:         Depth           From 0.0         To 2.0           From 0.0         To 2.0           From 3.0         To 13.0           From 3.0         To 13.0	Diameter 0 Ft - Ft - Ft Mate _ Ft - Ft Diameter S t in. t in.	Wall Thickness or Weight/Ft.  Brial N ete Lot Size N in	Materiai <u>PVC</u> Method ast-in-P Material PVC	(Show Ro	LC direction and	OCATION S distance fro map referen	SKETCH orm at least two State nce points)
12. C F F 13. C F 14. S F F F 5. S	Depth           From 0.0         To 3.           From 0.0         To 3.           From 0.0         To 3.           From 0.0         To 2.0           From 0.0         To 2.0           From 0.0         To 2.0           From 3.0         To 13.0           From 3.0         To 13.0           From 70         From 70           SCREEN:         Depth           From 3.0         To 13.0           From 70         Form 70           From 70         Form 70	Diameter 0 Ft - Ft - Ft Mate - Ft - Ft Diameter S t in. t in. t in.	Wall Thickness or Weight/Ft. SCH_40 erial N eteCa lot Size N 0.010 in in in Materi	Materiai <u>PVC</u> Method ast-in-P Materiai PVC al	(Show Ro	LC direction and	OCATION S distance fro map referen	SKETCH orm at least two State nce points)
12. C F F 13. C F 14. S F F 15. S	Depth           From         0.0         To         3.           From         To         To	Diameter 0 Ft - Ft - Ft - Ft Diameter S t in. t in. t in. Size - Ft	Wall Thickness or Weight/Ft. SCH_40 erial N ete Ca lot Size N 0.010 in in in Materi doSand	Material  Method ast-in-P Material PVC	(Show Ro	LC direction and	OCATION S distance fro map referen	SKETCH orm at least two State nce points)
12. C F F 13. C F 14. S F F 15. S F F F	Depth           From         0.0         To         3.           From         To         To         3.           From         To         To         3.           GROUT:         Depth         To         2.0           From         0.0         To         2.0           From         0.0         To         2.0           From         3.0         To         13.0           From         3.0         To         13.0           From         To         To         F           From         To         To         F           SCREEN:         Depth         F           From         To         To         14.0           From         To         To         14.0	Diameter 0 Ft - Ft - Ft - Ft - Ft Diameter S. t in. t in. t in. t in. t in. t in. t in. Size - Ft	Wall Thickness or Weight/Ft.           SCH 40           SCH 40           erial         N           ete         Ca           lot Size         N           0.010 in.	Materiai <u>PVC</u> Method ast-in-P Material PVC jal	(Show Ro	LC direction and	OCATION S distance fro map referen	SKETCH orm at least two State nce points)
12. 0 F F 13. 0 F 14. S F F 15. S F F	Depth           From         0.0         To         3.           From         To         To	Diameter 0 Ft - Ft - Ft - Ft - Ft Diameter S. t in. t in. t in. t in. t in. t in. t in. Size - Ft	Wall Thickness or Weight/Ft.           SCH 40           SCH 40           erial         N           ete         Ca           lot Size         N           0.010 in.	Materiai <u>PVC</u> Method ast-in-P Material PVC jal	(Show Ro	LC direction and	OCATION S distance fro map referen	SKETCH orm at least two State nce points)

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Frame & Heckenson

North Carolina - Department of Environment, Health. Division of Environmental Management - Group P.O. Box 29535 - Raleigh, N.O2762 Phone (919) 733-3221	ind Nafilrai fielourca niwated Section 19535	ما لفا	OFFICE USE ONLY SERIAL NO: ngRO:
WELL CONSTRUCTION REC	ORD	Basin Code	
RILLING CONTRACTOR: Law Engineerin		Header Ent	GW-1 Ent:
	STATE	WELL CONSTRUCTION	_
DRILLER REGISTRATION NUMBER:   332	PERMN	TNUMBER:	
. WELL LOCATION: (Show sketch of the location b	)elow)		
Nearest Town: Jacksonville		Onslow	
TC-341 Camp Gieger	·		
(Road, Community, or Subdivision and Lot No.)	<u></u>	DEPTH	DRILLING LOG
OWNER U.S. Marine Corps		From To	Formation Description
ADDRESS Camp LeJeune		0.0 13.0	See attached
(Street or Route No.)			
Jacksonville NC	Zip Code		
. DATE DRILLED <u><math>3-1-94</math></u> USE OF WELL <u><math>1</math></u>	•		
TOTAL DEPTH USE OF WELL			
DOES WELL REPLACE EXISTING WELL? YES			. <u></u>
STATIC WATER LEVEL Below Top of Casing:		<u></u>	
(Use "+" if Above Top TOP OF CASING IS9 FT. Above Land \$			
Casing Terminated at/or below land surface is illegal unless a			
in accordance with 15A NCAC 2C .0118			
YIELD (gpm): <u>N/A</u> METHOD OF TEST	N/A	<u> </u>	
J. WATER ZONES (depth):N/A			
		If additional space is ne	eded use back of form
1. CHLORINATION: Type <u>N/A</u> Amo			
2. CASING:		LOCATIC	N SKETCH
Wall Thic Depth Diameter or Weig		(Show direction and distance	
From 0.0 To 3.0 Ft. 2" SCH		Roads, or other map ref	
From To Ft			
From To Ft			
3. GROUT:		Coo Doo	
Depth Material	Method	See Rep	ort.
From 0.0 To 2.0 Ft. Concrete	<u>Cast-in-Place</u>	e	
From To Ft			
4. SCREEN:			
Depth Diameter Slot Size	Material		
From <u>3.0 To 13.0 Ft 2</u> in. <u>0.010</u> ir	1. <u>PVC</u>		
From To Ft in ir			
From To Ft in ir			
5. SAND/GRAVEL PACK:			· ·
-	<b>Aater</b> ial		
	PVC		
From <u>2.0</u> To <u>14.0</u> Ft. <u>10rpedo</u>			
From <u>2.0</u> To <u>14.0</u> Ft. <u>Torpedo</u> From <u> </u>			

I Bits if one is a

1 10 1 10

I DO HEREBY CERTIFY THAT THIS WELL WAS CONSTRUCTED IN ACCORDANCE WITH 15A NCAC 2C, WELL CONSTRUCTION STANDARDS, AND THAT A COPY OF THIS RECORD HAS BEEN PROVIDED TO THE WELL OWNER.

Harme PS Wetenian

4-11-54

North Carolina - Department of Environment, Health, and Natiral Kesoul Division of Environmental Management - Groupowater Section P.O. Box 29535 - Raleigh, N.O. 27628 05357 J Phone (919) 733-3221			
WELL CONSTRUCTION RECORD			
RILLING CONTRACTOR: Law Engineering	Header Ent	GW-1 Ent:	
STA	RE WELL CONSTRUCTION		
RILLER REGISTRATION NUMBER: 332 PER		MW-6	
WELL LOCATION: (Show sketch of the location below)	- 1		
Nearest Town: Jacksonville County:	Onslow		
TC-341 Camp Geiger	DEPTH	DRILLINGLOG	
(Road. Community, or Subdivision and Lot No.) OWNER U.S. Marine Corps	From To	DRILLING LOG	
	0.0 13.0	See attached	
ADDRESS(Street or Route No.)	0.0 15.0	Dec allached	
Jacksonville NC			
City or Town State Zip Code			
DATE DRILLED <u>3-1-94</u> USE OF WELL <u>Monitoring</u>			
STATIC WATER LEVEL Below Top of Casing: FT.	. <u></u>		
(Use "+" if Above Top of Casing)			
TOP OF CASING IS $1.9$ FT. Above Land Surface* asing Terminated at/or below land surface is illegal unless a variance is issued			
n accordance with 15A NCAC 2C .0118		······	
YIELD (gpm):N/A METHOD OF TESTN/A			
. WATER ZONES (depth):N/A			
. CHLORINATION: Type <u>N/A</u> Amount <u>N/A</u>	If additional space is nee		
CASING:		N SKETCH	
Wall Thickness	(Show direction and distance		
Depth         Diameter         or Weight/Ft.         Material           From 0.0         To0         Ft. 2''        SCH_40	Roads, or other map refe		
From To Ft		· • • • • • • • • • • • • • • • • • • •	
From To Ft	See Rep	ort	
. GROUT:	See kep	JIL.	
Depth Material Method			
From 0.0 To 2.0 Ft. Concrete Cast-in-Plac	e		
From To Ft			
. SCREEN:			
Depth Diameter Slot Size Material			
From To Ft in 0.010 in			
From To Ft in in	<i></i>		
From To Ft in in			
. SAND/GRAVEL PACK:			
Depth Size Material		•	
From To Ft Torpedo Sand			
From To Ft			
. REMARKS:			

■ 44 × 4 × 1 × 1

and the second of

I DO HEREBY CERTIFY THAT THIS WELL WAS CONSTRUCTED IN ACCORDANCE WITH 15A NCAC 2C, WELL CONSTRUCTION STANDARDS, AND THAT A COPY OF THIS RECORD HAS BEEN PROVIDED TO THE WELL OWNER.

Farme h Kekinsin

11-54

	North Carolina - Department of Environment. Health and Natural Fesour Division of Environmental Management - Groupdwater Secura			FICE USE ONLY
	P.O. Box 29535 - Raleigh, N.C. 27624-05351		Long.	ROT
		Minor Basi	n	
	WELL CONSTRUCTION RECORD	Basin Code	•	
DE	RILLING CONTRACTOR: Law Engineering	Header En	t	GW-1 Ent:
0.	STAT	<b>FE WELL CONST</b>	RUCTION	
DF	RILLER REGISTRATION NUMBER: 332 PERI	MIT NUMBER:	MW	7
1	WELL LOCATION: (Show sketch of the location below)			
1.	Nearest Town: Jacksonville County:	Onslow	······	_
	,			
	TC-341 Camp Gieger (Road, Community, or Subdivision and Lot No.)	DEPTH		DRILLING LOG
2	OWNER U.S. Marine Corps	From To	1	Formation Description
<u>د.</u>	ADDRESS Camp LeJeune		.3.0	See attache
	(Street or Route No.)			
	Jacksonville NC			
	City or Town State Zip Code		<u> </u>	
3.	DATE DRILLED USE OF WELL Monitoring			
4.	TOTAL DEPTH 13.0	······		· · · · · · · · · · · · · · · · · · ·
5.				
6.		<u> </u>		
1.	STATIC WATER LEVEL Below Top of Casing: FT. (Use "+" if Above Top of Casing)			
• Ca in	TOP OF CASING IS <u>1.9</u> FT. Above Land Surface <sup>*</sup> asing Terminated at/or below land surface is illegal unless a variance is issued accordance with 15A NCAC 2C .0118			
• Ca in	TOP OF CASING IS <u>1.9</u> FT. Above Land Surface* asing Terminated at/or below land surface is illegal unless a variance is issued accordance with 15A NCAC 2C .0118 YIELD (gpm): <u>N/A</u> METHOD OF TEST <u>N/A</u> WATER ZONES (depth): <u>N/A</u>			d use back of form
• Ca in 10.	TOP OF CASING IS <u>1.9</u> FT. Above Land Surface* asing Terminated at/or below land surface is illegal unless a variance is issued accordance with 15A NCAC 2C .0118 YIELD (gpm): <u>N/A</u> METHOD OF TEST <u>N/A</u> WATER ZONES (depth): <u>N/A</u>		space is needed	
• Ca in 10.	TOP OF CASING IS1.9       FT. Above Land Surface*         asing Terminated at/or below land surface is illegal unless a variance is issued         accordance with 15A NCAC 2C .0118         YIELD (gpm):N/A       METHOD OF TESTN/A         WATER ZONES (depth):N/A         CHLORINATION: TypeN/A	If additional s	space is needed	SKETCH
• Ca in 10.	TOP OF CASING IS1.9       FT. Above Land Surface*         asing Terminated at/or below land surface is illegal unless a variance is issued         accordance with 15A NCAC 2C .0118         YIELD (gpm):N/A       METHOD OF TESTN/A         WATER ZONES (depth):N/A         CHLORINATION: TypeN/A         AmountN/A         CASING:         Wall Thickness         Depth	If additional s	space is needed LOCATION S nd distance fro	SKETCH_ m at least two State
• Ca in 10.	TOP OF CASING IS 1.9       FT. Above Land Surface*         asing Terminated at/or below land surface is illegal unless a variance is issued         accordance with 15A NCAC 2C .0118         YIELD (gpm): N/A       METHOD OF TEST N/A         WATER ZONES (depth): N/A         WATER ZONES (depth): N/A         CHLORINATION: Type N/A         Amount N/A         CASING:         Wall Thickness         Depth         Diameter         or Weight/Ft.         Material         From 0.0       To 3.0	If additional s	space is needed	SKETCH_ m at least two State
• Ca in 10.	TOP OF CASING IS1.9       FT. Above Land Surface*         asing Terminated at/or below land surface is illegal unless a variance is issued         accordance with 15A NCAC 2C .0118         YIELD (gpm):N/A       METHOD OF TESTN/A         WATER ZONES (depth):N/A         CHLORINATION: TypeN/A         AmountN/A         CHLORINATION: TypeN/A         AmountN/A         FromToFt*         SCH 40       PVC         FromToFt*	If additional s	space is needed LOCATION S nd distance fro	SKETCH_ m at least two State
• Ca in 10.	TOP OF CASING IS 1.9       FT. Above Land Surface*         asing Terminated at/or below land surface is illegal unless a variance is issued         accordance with 15A NCAC 2C .0118         YIELD (gpm): N/A       METHOD OF TEST N/A         WATER ZONES (depth): N/A         WATER ZONES (depth): N/A         CHLORINATION: Type N/A         Amount N/A         CASING:         Wall Thickness         Depth         Diameter         or Weight/Ft.         Material         From 0.0       To 3.0	If additional s	space is needer	SKETCH m at least two State nce points)
• Cs in 10.	TOP OF CASING IS1.9       FT. Above Land Surface*         asing Terminated at/or below land surface is illegal unless a variance is issued         accordance with 15A NCAC 2C .0118         YIELD (gpm):N/A       METHOD OF TESTN/A         WATER ZONES (depth):N/A         CHLORINATION: TypeN/A         AmountN/A         CHLORINATION: TypeN/A         AmountN/A         CASING:         Pepth         Diameter         or Weight/Ft.         Material         FromToFt         ToFt.	If additional s	space is needed LOCATION S nd distance fro	SKETCH m at least two State nce points)
• Cs in 10.	TOP OF CASING IS1.9FT. Above Land Surface*         asing Terminated at/or below land surface is illegal unless a variance is issued         accordance with 15A NCAC 2C .0118         YIELD (gpm):N/AMETHOD OF TESTN/A         WATER ZONES (depth):         MATER ZONES (depth):         MATER ZONES (depth):         MATER ZONES (depth):         MATER ZONES (depth):	If additional s	space is needer	SKETCH m at least two State nce points)
• Cs in 10.	TOP OF CASING IS 1.9       FT. Above Land Surface*         asing Terminated at/or below land surface is illegal unless a variance is issued         accordance with 15A NCAC 2C .0118         YIELD (gpm): N/A       METHOD OF TEST N/A         WATER ZONES (depth): N/A       N/A         CHLORINATION: Type       N/A         CASING:       Vall Thickness         Opepth       Diameter         Or Weight/Ft.       Material         From 0.0       To 3.0       Ft. 2"         SCH 40       PVC         From To       Ft.       —         GROUT:       Depth       Material         Material       Method	If additional s (Show direction a Roads, or oth	space is needer	SKETCH m at least two State nce points)
• Cs in 10.	TOP OF CASING IS1.9       FT. Above Land Surface*         asing Terminated at/or below land surface is illegal unless a variance is issued         accordance with 15A NCAC 2C .0118         YIELD (gpm):N/A       METHOD OF TESTN/A         WATER ZONES (depth):N/A         WATER ZONES (depth):N/A         CHLORINATION: TypeN/A         AmountN/A         CHLORINATION: TypeN/A         AmountN/A         CASING:         To Ft         SCH 40       PVC         From To Ft       SCH 40       PVC         From To Ft       GROUT:       Material       Method         From To Ft       Concrete Cast-in-Pla       Cast-in-Pla	If additional s (Show direction a Roads, or oth	space is needer	SKETCH m at least two State nce points)
• Cs in 10. 11. 12.	TOP OF CASING IS 1.9       FT. Above Land Surface*         asing Terminated at/or below land surface is illegal unless a variance is issued         accordance with 15A NCAC 2C .0118         YIELD (gpm):       N/A         MA       METHOD OF TEST         WATER ZONES (depth):       N/A         CHLORINATION:       Type         N/A       Amount         CASING:       Vall Thickness         Opepth       Diameter         or Weight/Ft.       Material         From       To         To       Ft.         Prom       To         GROUT:       Depth         Material       Method         From       0.0         To       2.0         From       0.0         To       2.0         From       Cast-in-Pla         From       To         Prom       To     <	If additional s (Show direction a Roads, or oth	space is needer	SKETCH m at least two State nce points)
• Cs in 10. 11. 12.	TOP OF CASING IS1.9       FT. Above Land Surface*         asing Terminated at/or below land surface is illegal unless a variance is issued         accordance with 15A NCAC 2C .0118         YIELD (gpm):N/AMETHOD OF TESTN/A         WATER ZONES (depth):	If additional s (Show direction a Roads, or oth	space is needer	SKETCH m at least two State nce points)
• Cs in 10. 11. 12.	TOP OF CASING IS1.9       FT. Above Land Surface*         asing Terminated at/or below land surface is illegal unless a variance is issued         accordance with 15A NCAC 2C .0118         YIELD (gpm):N/AMETHOD OF TESTN/A         WATER ZONES (depth):	If additional s (Show direction a Roads, or oth	space is needer	SKETCH m at least two State nce points)
• Cs in 10. 11. 12.	TOP OF CASING IS 1.9       FT. Above Land Surface*         asing Terminated at/or below land surface is illegal unless a variance is issued         accordance with 15A NCAC 2C .0118         YIELD (gpm): N/A       METHOD OF TEST N/A         WATER ZONES (depth): N/A         CHLORINATION: Type       N/A         CHLORINATION: Type       N/A         Amount       N/A         CASING:       Vali Thickness         Opeth       Diameter         From       0.0         To       3.0         From       To         CROUT:       Depth         Depth       Materiai         From       To         2.0       Ft.         Concrete       Cast-in-Pla         From       To         SCREEN:       Depth         Depth       Diameter         Sore Elsen:       Diameter         Sore 13.0       Ft         2"       in. 0.010	If additional s (Show direction a Roads, or oth	space is needer	SKETCH m at least two State nce points)
• Cs in 10. 11. 12.	TOP OF CASING IS 1.9       FT. Above Land Surface*         asing Terminated at/or below land surface is illegal unless a variance is issued         accordance with 15A NCAC 2C .0118         YIELD (gpm): N/A       METHOD OF TEST N/A         WATER ZONES (depth): N/A         WATER ZONES (depth): N/A         CHLORINATION: Type         N/A         Amount         CHLORINATION: Type         N/A         Amount         N/A         Popth         Diameter         or Weight/Ft.         Material         From         To         SCREEN:         Depth         Diameter         Slot Siz	If additional s (Show direction a Roads, or oth	space is needer	SKETCH m at least two State nce points)
• Ca in 10. 11. 12.	TOP OF CASING IS 1.9       FT. Above Land Surface*         asing Terminated at/or below land surface is illegal unless a variance is issued         accordance with 15A NCAC 2C .0118         YIELD (gpm):       N/A         WATER ZONES (depth):       N/A         CHLORINATION:       Type         N/A       Amount         CHLORINATION:       Type         N/A       Amount         CHLORINATION:       Type         N/A       Amount         CASING:       Vali Thickness         Opeth       Diameter         or Weight/Ft.       Material         From       To         To       SCH 40         PVC       From         From       To         SCRUT:       SCH 40         Peth       Material         Method       From         From       To         SCREEN:       Concrete         Depth       Diameter         SIGNUT:       Depth         Depth       Diameter         SCREEN:       Depth         Depth       Diameter         SIGNUT:       SIGNUT:         From       To         SIGNUT:       Di	If additional s (Show direction a Roads, or oth	space is needer	SKETCH m at least two State nce points)
• Ca in 10. 11. 12.	TOP OF CASING IS1.9FT. Above Land Surface*         assing Terminated at/or below land surface is illegal unless a variance is issued         accordance with 15A NCAC 2C .0118         Y1ELD (gpm):N/AMETHOD OF TEST	If additional s (Show direction a Roads, or oth	space is needer	SKETCH m at least two State nce points)
• Ca in 10. 11. 12.	TOP OF CASING IS 1.9       FT. Above Land Surface*         asing Terminated at/or below land surface is illegal unless a variance is issued         accordance with 15A NCAC 2C .0118         YIELD (gpm):       N/A         MATER ZONES (depth):       N/A         WATER ZONES (depth):       N/A         CHLORINATION:       Type         N/A       Amount         CHLORINATION:       Type         N/A       Amount         CASING:       Vall Thickness         Oppth       Diameter         or Weight/Ft.       Material         From       To         To       Ft.         Prom       To         SCH 40       PVC         From       To         Ft.       SCH 40         PVC       From         From       To         SCROUT:       Material         Depth       Material         Method       From         From       To         SCREEN:       Depth         Depth       Diameter         Slot Size       Material         From       To         To       Ft.         Internation       Interint	If additional s (Show direction a Roads, or oth	space is needer	SKETCH m at least two State nce points)
• Ca in 10. 11. 12.	TOP OF CASING IS 1.9       FT. Above Land Surface*         asing Terminated at/or below land surface is illegal unless a variance is issued         accordance with 15A NCAC 2C .0118         YIELD (gpm):       N/A         MATER ZONES (depth):       N/A         CHLORINATION:       Type         N/A       Amount         CHLORINATION:       Type         N/A       Amount         CHLORINATION:       Type         N/A       Amount         CHLORINATION:       Type         N/A       Amount         CASING:       Vall Thickness         Or 0.0       To       3.0       Ft.         From       To       SCH 40       PVC         From       To       Ft.       Concrete       Cast-in-Pla         From       To       Scht       Concrete       Cast-in-Pla <td>If additional s (Show direction a Roads, or oth</td> <td>space is needer</td> <td>SKETCH m at least two State nce points)</td>	If additional s (Show direction a Roads, or oth	space is needer	SKETCH m at least two State nce points)
Ca in 10. 11. 12. 13.	TOP OF CASING IS 1.9       FT. Above Land Surface*         asing Terminated at/or below land surface is illegal unless a variance is issued         accordance with 15A NCAC 2C .0118         YIELD (gpm):       N/A         MATER ZONES (depth):       N/A         WATER ZONES (depth):       N/A         CHLORINATION:       Type         N/A       Amount         CHLORINATION:       Type         N/A       Amount         CASING:       Vall Thickness         Oppth       Diameter         or Weight/Ft.       Material         From       To         To       Ft.         Prom       To         SCH 40       PVC         From       To         Ft.       SCH 40         PVC       From         From       To         SCROUT:       Material         Depth       Material         From       To         To       State         SCREEN:       Depth         Depth       Diameter         Slot Size       Material         From       To         To       Ft.         In       In	If additional s (Show direction a Roads, or oth	space is needer	SKETCH m at least two State nce points)

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North Carolina - Department of Environment Division of Environmental Manageme P.O. Box 29535 - Raleigh, N Phone (919) 733- WELL CONSTRUCTIO DRILLING CONTRACTOR: Law Eng	int - Gipunowiter Sign I.C. 22926 Jass Lou 3221 ON RECORD	CUAD. NO: Lat Minor Basin Basin Code Header Ent	_Long RO: 
RILLER REGISTRATION NUMBER:		STATE WELL CONSTRUCT PERMIT NUMBER:	10N 
. WELL LOCATION: (Show sketch of the k Nearest Town:	ocation below)	Onslow	
TC-341 Camp Gieger (Road, Community, or Subdivision and Lot No.) OWNER U.S. Marine Corps ADDRESS Camp LeJeune		<u>DEPTH</u> From To 0.0 13.0	DRILLING LOG Formation Description See attached
(Street or Route No.) Jacksonville NC City or Town State	Zip Code		
DOES WELL REPLACE EXISTING WELL STATIC WATER LEVEL Below Top of Ca		x	
TOP OF CASING IS <u>flush</u> FT. Abov Casing Terminated at/or below land surface is illege in accordance with 15A NCAC 2C .0118 YIELD (gpm): <u>N/A</u> METHOD OF TE	ve Land Surface* al unless a variance is is		
1. CHLORINATION: Type <u>N/A</u> 2. CASING:	AmountN/A		s needed use back of form
Depth         Diameter           From         0.0         To <sup>3.0</sup> Ft.         2"           From         To         Ft.         To	<u>SCH 40</u> PV	ial (Show direction and dista C Roads, or other map	TION SKETCH_ ance from at least two State preference points)
From To Ft B. GROUT:			Report
Depth         Mate           From ToFt         Concr           From ToFt         SCREEN:	rete <u>Cast-i</u>		
Depth         Diameter         Sk           From         3.0         To 13.0         Ft2" in. 0.           From         To         Ft in	.010 in. <u>PVC</u>		
From To Ft in           5. SAND/GRAVEL PACK:           Depth         Size           From 2.0         To 14.0         Ft. Torpedo	Material		

I DO HEREBY CERTIFY THAT THIS WELL WAS CONSTRUCTED IN ACCORDANCE WITH 15A NCAC 2C, WELL CONSTRUCTION STANDARDS, AND THAT A COPY OF THIS RECORD HAS BEEN PROVIDED TO THE WELL OWNER.

Fielin Kam Fo

4-11-54

lorth Carolina - Department of Environment, Health, and Natural Division of Environmental Management - Groundward, Sed P.O. Box 29535 - Raleigh, N.C27628-05351		OR OFFICE USE ONLY	
P.O. Box 29535 - Raleigh, N.C. 27626.05151		Long ROT	
WELL CONSTRUCTION RECORD			
LING CONTRACTOR: Law Engineering		GW-1 Ent:	
LER REGISTRATION NUMBER: 332	STATE WELL CONSTRUCTION	DN MW-9	
ELL LOCATION: (Show sketch of the location below)	0 1		
earest Town:JacksonvilleCounty:	<u>Onslow</u>		
TC-341 Camp Gieger	DEPTH		
(Road, Community, or Subdivision and Lot No.) WNER U.S. Marine Corps		DRILLING LOG Formation Description	
	0.0 32.0	See attached	
DDRESS Camp LeJeune (Street or Route No.)			
Jacksonville NC			
City or Town State Zip Code			
ATE DRILLED 3-3-94 USE OF WELL Monitor	cing ———		
DTAL DEPTH			
TATIC WATER LEVEL Below Top of Casing: FT.			
(Use ++* if Above Top of Casing) OP OF CASING IS FT. Above Land Surface*	- <u> </u>		
g Terminated at/or below land surface is illegal unless a variance is is	ssued		
cordance with 15A NCAC 2C .0118			
ATER ZONES (depth):N/A			
ATER ZONES (depth):N/A HLORINATION: TypeN/AAmountN/A		needed use back of form	
ATER ZONES (depth):N/A	If additional space is	needed use back of form	
ATER ZONES (depth):N/A HLORINATION: TypeN/AAmountN/A ASING: Wall Thickness	If additional space is	needed use back of form	
ATER ZONES (depth):N/A HLORINATION: TypeAmountA ASING: Depth Diameter or Weight/Ft. Mate	If additional space is 	needed use back of form FION SKETCH nce from at least two State	
ATER ZONES (depth):N/A HLORINATION: TypeAmountA ASING: Depth or Weight/Ft. Mate or To 22_0 FtSCH_40PV	If additional space is LOCAT erial (Show direction and distant IC Roads, or other map	needed use back of form FION SKETCH nce from at least two State	
ATER ZONES (depth):         N/A           HLORINATION:         Type         N/A           ASING:         Wall Thickness           Opepth         Diameter         or Weight/Ft.           om         0.0         To 22.0         Ft.         6''           SCH         40         PW	If additional space is LOCAT erial (Show direction and distant IC Roads, or other map IC	needed use back of form FION SKETCH nce from at least two State reference points)	
ATER ZONES (depth):N/A HLORINATION: TypeAmountA ASING: Depth or Weight/Ft. Mate or To 22_0 FtSCH_40PV	If additional space is LOCAT erial (Show direction and distant IC Roads, or other map	needed use back of form FION SKETCH nce from at least two State reference points)	
ATER ZONES (depth):         N/A           HLORINATION:         Type         N/A           ASING:         Wall Thickness           Opepth         Diameter         or Weight/Ft.           om         0.0         To 22.0         Ft.         6''           SCH         40         PW	If additional space is LOCAT erial (Show direction and distant IC Roads, or other map IC	needed use back of form FION SKETCH nce from at least two State reference points)	
N/A         N/A         HLORINATION: TypeAmountA         AmountAmountA         AmountAmountA         AmountAmountA         AmountAmountA         AmountAmountA         Operation 10 22.0         Ft SCH 40PV         om SCH 40PV         om To 27.0       Ft         To 27.0       Ft         Om       SCH 40PV         Om       SCH 40PV         Addition 10 27.0       Ft	If additional space is <u>LOCA1</u> (Show direction and distant IC Roads, or other map) IC See Repo	needed use back of form FION SKETCH nce from at least two State reference points)	
Depth         Diameter         SCH 40         PV           om         0.0         To         27.0         Ft.         2''         SCH 40         PV           om	If additional space is <u>LOCA1</u> (Show direction and distant IC Roads, or other map) IC See Repo	needed use back of form FION SKETCH nce from at least two State reference points)	
N/A         N/A         HLORINATION: Type       N/A         Amount       N/A         Material       Material         Om       Cast-in-         Om       Cast-in-         Om       Cast-in-         Om       Cast-in-         Om       Cast-in-         Om       To       Cast-in-         Om       To       Cast-in-         Om       Cast-in-         O       To <th colsp<="" td=""><td>If additional space is LOCAT Orial (Show direction and distan IC Roads, or other map IC See Repo</td><td>needed use back of form FION SKETCH nce from at least two State reference points)</td></th>	<td>If additional space is LOCAT Orial (Show direction and distan IC Roads, or other map IC See Repo</td> <td>needed use back of form FION SKETCH nce from at least two State reference points)</td>	If additional space is LOCAT Orial (Show direction and distan IC Roads, or other map IC See Repo	needed use back of form FION SKETCH nce from at least two State reference points)
N/A         N/A         ATER ZONES (depth):       N/A         HLORINATION: Type       N/A         Amount       N/A         Operth       Diameter       or Weight/Ft.       Mater         om       O       To       27.0       Ft.       CH 40       PW         Om       To       2.0       Ft.       Cast-in-       and Bentonite         Om       O       To       2.0       Ft.       Cast-in-	If additional space is LOCAT Orial (Show direction and distan IC Roads, or other map IC See Repo	needed use back of form FION SKETCH nce from at least two State reference points)	
N/A         N/A         ATER ZONES (depth):       N/A         HLORINATION: Type       N/A         Amount N/A         Asing:         Wall Thickness         or Weight/Ft. Mater         Openth       Diameter       or Weight/Ft. Mater         om 0.0       To 22.0       Ft. 61"       SCH 40       PW         om 0.0       To 27.0       Ft. 21"       SCH 40       PW         om 0.0       To 27.0       Ft. 21"       SCH 40       PW         om 0.0       To 27.0       Ft. 21"       SCH 40       PW         om 0.0       To 3.0       Ft. Concrete       Cast-in-         Om 0.0       To 3.0       Ft. Concrete       Cast-in-         om 0.0       To 22.0       Ft.Portland Cement       Tem         Om 0.0       To 22.0       Ft.Portland Cement	If additional space is <u>LOCA1</u> brial (Show direction and distant ICRoads, or other map) ICSee Report ISee Report	needed use back of form FION SKETCH nce from at least two State reference points)	
N/A         N/A         ATER ZONES (depth):       N/A         HLORINATION: Type       N/A         Amount       N/A         Opepth       Diameter       Or Weight/Ft.       Mater         Om 0.0       To 27.0       Ft.       Colspan="2"       SCH 40       PV         Om 0.0       To 3.0       Ft. Concrete       Cast-in-         Om 0.0       To 3.0       Ft. Concrete       Cast-in-         Om 0.0       To 22.0       Ft.Port	If additional space is <u>LOCA</u> orial (Show direction and distant IC Roads, or other map IC See Repo	needed use back of form FION SKETCH nce from at least two State reference points)	
N/A         N/A         ATER ZONES (depth):       N/A         HLORINATION: Type       N/A         Amount       N/A         Opepth       Diameter       SCH 40       PV         Om       Colspan="2"       SCH 40       PV         Om       Colspan="2"       Materia         Materia       Method         Om       Colspan="2"       Materia         Depth       Diameter       Slot Size <th colspan<="" td=""><td>If additional space is <u>LOCA1</u> Dirial (Show direction and distant IC Roads, or other map) IC See Report I -Place Die Nie</td><td>needed use back of form FION SKETCH nce from at least two State reference points)</td></th>	<td>If additional space is <u>LOCA1</u> Dirial (Show direction and distant IC Roads, or other map) IC See Report I -Place Die Nie</td> <td>needed use back of form FION SKETCH nce from at least two State reference points)</td>	If additional space is <u>LOCA1</u> Dirial (Show direction and distant IC Roads, or other map) IC See Report I -Place Die Nie	needed use back of form FION SKETCH nce from at least two State reference points)
N/A         N/A         ATER ZONES (depth):       N/A         HORINATION: Type       N/A         Amount       N/A         Opepth       Diameter       or Weight/Ft.       Mater         Om 0.0       To 27.0       Ft.       Colspan="2"         Opepth       Materia       Method         Om 0.0       To 3.0       Ft.       Colspan="2"         Depth       Materia       Method         Om 0.0	If additional space is <u>LOCA1</u> Dirial (Show direction and distant IC Roads, or other map) IC See Report I -Place Diace	needed use back of form FION SKETCH nce from at least two State reference points)	
N/A         N/A         ATER ZONES (depth):	If additional space is <u>LOCA1</u> Dirial (Show direction and distant IC Roads, or other map) IC See Report I -Place Diace	needed use back of form FION SKETCH nce from at least two State reference points)	
ATER ZONES (depth):       N/A         HLORINATION:       Type       N/A         ASING:       Mall Thickness or Weight/Ft.       Material         Om       0.0       To 22.0       Ft.       6''.       SCH. 40       PW         om       0.0       To 27.0       Ft.       2''.       SCH. 40       PW         om       0.0       To 27.0       Ft.       2''.       SCH. 40       PW         om       0.0       To 27.0       Ft.       2''.       SCH. 40       PW         om       0.0       To 27.0       Ft.       2''.       SCH. 40       PW         om	If additional space is <u>LOCA1</u> Dirial (Show direction and distant IC Roads, or other map) IC See Report I -Place Diace	needed use back of form FION SKETCH nce from at least two State reference points)	
N/A         N/A         ATER ZONES (depth):       N/A         Amount N/A         Amount N/A         Amount N/A         Amount N/A         Amount N/A         Amount N/A         Amount N/A         Amount N/A         Amount N/A         Amount N/A         Amount N/A         Openth         Diameter       Or Weight/Ft. Mater         Materia       Materia         Om 0.0       To 27.0       Ft. 2''       SCH 40       PW         Om 0.0       To 3.0       Ft. Concrete       Cast-in-         Om 0.0       To 3.0       Ft. Concrete       Cast-in-         Om 0.0       To 3.0       Ft. Concrete       Cast-in-         Om 0.0       To 32.0 Ft       2"       in.       0.0       Other colspan="2"         Om 27.0 To 32.0 Ft       <	If additional space is <u>LOCA1</u> brial (Show direction and distant ICRoads, or other map) ICSee Report ISee Report I	needed use back of form FION SKETCH nce from at least two State reference points)	
ATER ZONES (depth):       N/A         HLORINATION:       Type       N/A         ASING:       Mail Thickness or Weight/Ft.       Mater         ASING:       Depth       Diameter       or Weight/Ft.         Om       0.0       To 22.0       Ft.       6''.       SCH. 40       PV         om       0.0       To 27.0       Ft.       2''.       SCH. 40       PV         om       0.0       To 27.0       Ft.       2''.       SCH. 40       PV         om       0.0       To 27.0       Ft.       2''.       SCH. 40       PV         om       0.0       To 27.0       Ft.       2''.       SCH. 40       PV         om       0.0       To 27.0       Ft.       Concrete       Cast-in-         ROUT:       Depth       Material       Method         om       0.0       To 2.0       Ft.       Concrete       Cast-in-         om       0.0       To 2.0       Ft.       Portland Cement       Trem         om       27.0       32.0       Ft.       0.010in,       PVC         om       27.0       32.0       Ft.       in.       in.       in.         om	If additional space is <u>LOCA</u> arial (Show direction and distan ICRoads, or other map ICSee Repo	needed use back of form FION SKETCH nce from at least two State reference points)	
N/A         N/A         ATER ZONES (depth):       N/A         Amount N/A         Amount N/A         Amount N/A         Amount N/A         Amount N/A         Amount N/A         Amount N/A         Amount N/A         Amount N/A         Amount N/A         Amount N/A         Openth         Diameter       Or Weight/Ft. Mater         Materia       Materia         Om 0.0       To 27.0       Ft. 2''       SCH 40       PW         Om 0.0       To 3.0       Ft. Concrete       Cast-in-         Om 0.0       To 3.0       Ft. Concrete       Cast-in-         Om 0.0       To 3.0       Ft. Concrete       Cast-in-         Om 0.0       To 32.0 Ft       2"       in.       0.0       Other colspan="2"         Om 27.0 To 32.0 Ft       <	If additional space is <u>LOCA</u> brial (Show direction and distant ICRoads, or other map) ICSee Report ISee Report I	needed use back of form FION SKETCH nce from at least two State reference points)	

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DO HEREBY CERTIFY THAT THIS WELL WAS CO	NSTRUCTED IN ACCOM	NUMINUE WITH TOAL	IUAU 20, IILLL
		S REEN PROVIDED	TO THE WELL OWNER
CONSTRUCTION STANDARDS, AND THAT A COPY			

Shanne & Preikinin 4-11-54

DATE

	North Carolina - Department of Environment, Health and Natural Record Division of Environmental Management - Broupowatel Section P.O. Box 29535 - Raleigh, N.O27625-6535	FOR OFFICE USE ONLY " QUAD. NO: SERIAL NO:
	P.O. Box 29535 - Haleign, N.Ove/16260555 C C C Phone (919) 733-3221	Lat Long ROT_
	WELL CONSTRUCTION RECORD	Minor Basin
	WELL CONSTRUCTION RECORD	Basin CodeGW-1 Ent:
DF	NILLING CONTRACTOR: Law Engineering	
		E WELL CONSTRUCTION
	RILLER REGISTRATION NUMBER: 332 PERM	
1.	WELL LOCATION: (Show sketch of the location below)	
	Nearest Town:JacksonvilleCounty:Ons.	low
	TC-341 Camp Gieger	
	(Road, Community, or Subdivision and Lot No.)	DEPTH DRILLING LOG
2.	OWNER U. S. Marine Corps	From To Formation Description
-	ADDRESS Camp LeJeune	0.0 13.0 See attached
	(Street or Route No.) Jacksonville, NC	
	City or Town State Zip Code -	
3.	DATE DRILLED 3-3-94 USE OF WELL Monitoring	······
4.	TOTAL DEPTH	
5.	CUTTINGS COLLECTED YES NO OC - DOES WELL REPLACE EXISTING WELL? YES NO C	
6. 7	STATIC WATER LEVEL Below Top of Casing: FT	
1.	(Use "+" if Above Top of Casing)	
	TOP OF CASING IS 1.95 FT. Above Land Surface	
• Ca	asing Terminated at/or below land surface is illegal unless a variance is issued —	
	accordance with 15A NCAC 2C .0118 -	
in		
	YIELD (gpm):N/AMETHOD OF TESTN/A	
	YIELD (gpm):N/A         METHOD OF TESTN/A	
10.	YIELD (gpm):N/A       METHOD OF TESTN/A	If additional space is needed use back of form
i0.	YIELD (gpm):N/A       METHOD OF TESTN/A	If additional space is needed use back of form
i0.	YIELD (gpm):       N/A       METHOD OF TEST       N/A         WATER ZONES (depth):       N/A       N/A         CHLORINATION:       Type       N/A       N/A         CASING:	If additional space is needed use back of form
i0.	YIELD (gpm):N/AMETHOD OF TESTN/A	If additional space is needed use back of form
i0.	YIELD (gpm):N/AMETHOD OF TESTN/A         WATER ZONES (depth):N/A         CHLORINATION: TypeN/A         AmountN/A         CASING:         Depth       Diameter         From0.0       To3.0         Ft!''       SCH 40         PVC	If additional space is needed use back of form
i0.	YIELD (gpm):N/AMETHOD OF TESTN/A	If additional space is needed use back of form <u>LOCATION SKETCH</u> (Show direction and distance from at least two State Roads, or other map reference points)
i0.	YIELD (gpm):N/AMETHOD OF TESTN/A         WATER ZONES (depth):N/A         CHLORINATION: TypeN/A         AmountN/A         CASING:         Depth       Diameter         From0.0       To3.0         Ft!''       SCH 40         PVC	If additional space is needed use back of form <u>LOCATION SKETCH</u> (Show direction and distance from at least two State
i0. 11. 12.	YIELD (gpm):N/AMETHOD OF TESTN/A	If additional space is needed use back of form <u>LOCATION SKETCH</u> (Show direction and distance from at least two State Roads, or other map reference points)
i0. 11. 12.	YIELD (gpm):N/AMETHOD OF TESTN/A	If additional space is needed use back of form <u>LOCATION SKETCH</u> (Show direction and distance from at least two State Roads. or other map reference points) See Report.
i0. 11. 12.	YIELD (gpm):N/AMETHOD OF TESTN/A         WATER ZONES (depth):N/A         CHLORINATION:       TypeN/A         AmountN/A         CASING:         Depth       Diameter         FromToFt         ToFt         FromToFt         GROUT:         FromToFt	If additional space is needed use back of form <u>LOCATION SKETCH</u> (Show direction and distance from at least two State Roads. or other map reference points) See Report.
10. 11. 12.	YIELD (gpm):N/AMETHOD OF TESTN/A         WATER ZONES (depth):N/A         CHLORINATION:       TypeN/A         AmountN/A         CASING:         Depth       Diameter         FromToFt         ToFt.         Material         FromToFt.         Material         GROUT:         FromToFt.         Material         Material         FromToFt.         Material         Method         Concrete       Cast-in-Place	If additional space is needed use back of form <u>LOCATION SKETCH</u> (Show direction and distance from at least two State Roads. or other map reference points) See Report.
10. 11. 12.	YIELD (gpm):N/AMETHOD OF TESTN/A	If additional space is needed use back of form <u>LOCATION SKETCH</u> (Show direction and distance from at least two State Roads. or other map reference points) See Report.
10. 11. 12.	YIELD (gpm):N/A       METHOD OF TESTN/A         WATER ZONES (depth):N/A       N/A         CHLORINATION:       TypeN/A         AmountN/A         CASING:         Depth       Diameter         FromOToOFt         SCH 40       PVC         FromToFt         GROUT:         FromToFt         Material         Material         FromToFt         Material         Method         FromToFt	If additional space is needed use back of form <u>LOCATION SKETCH</u> (Show direction and distance from at least two State Roads. or other map reference points) See Report.
10. 11. 12.	YIELD (gpm):N/A       METHOD OF TESTN/A         WATER ZONES (depth):N/A	If additional space is needed use back of form <u>LOCATION SKETCH</u> (Show direction and distance from at least two State Roads. or other map reference points) See Report.
10. 11. 12.	YIELD (gpm):N/A       METHOD OF TESTN/A         WATER ZONES (depth):N/A	If additional space is needed use back of form <u>LOCATION SKETCH</u> (Show direction and distance from at least two State Roads. or other map reference points) See Report.
10. 11. 12. 13.	YIELD (gpm):N/A       METHOD OF TESTN/A         WATER ZONES (depth):N/A	If additional space is needed use back of form <u>LOCATION SKETCH</u> (Show direction and distance from at least two State Roads. or other map reference points) See Report.
10. 11. 12. 13.	YIELD (gpm):N/A	If additional space is needed use back of form <u>LOCATION SKETCH</u> (Show direction and distance from at least two State Roads. or other map reference points) See Report.
10. 11. 12. 13.	YIELD (gpm):N/AMETHOD OF TESTN/A	If additional space is needed use back of form <u>LOCATION SKETCH</u> (Show direction and distance from at least two State Roads. or other map reference points) See Report.
10. 11. 12. 13.	YIELD (gpm):N/AMETHOD OF TESTN/A	If additional space is needed use back of form <u>LOCATION SKETCH</u> (Show direction and distance from at least two State Roads. or other map reference points) See Report.
10. 11. 12. 13. 14.	YIELD (gpm):N/AMETHOD OF TESTN/A	If additional space is needed use back of form <u>LOCATION SKETCH</u> (Show direction and distance from at least two State Roads. or other map reference points) See Report.

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Mayne A. T. Coleman	DATE

North Carolina - Department of Environment, Health, and Natural Fe Division of Environmental Management - Boundwated Secto P.O. Box 29535 - Raleigh, N.C <del>. 2</del> 7626-6535 Phone (919) 733-3221	QUAD. NO: SERIAL NO: Lat Long RO:
WELL CONSTRUCTION RECORD	Minor Basin Basin Code
DRILLING CONTRACTOR: Law Engineering	Header EntGW-1 Ent:
	STATE WELL CONSTRUCTION
DRILLER REGISTRATION NUMBER: 332	PERMIT NUMBER: <u>MW-11</u>
. WELL LOCATION: (Show sketch of the location below) Nearest Town:Jacksonville County:	Onslow
T€=341 Camp Gieger	
(Road, Community, or Subdivision and Lot No.)	DEPTH DRILLING LOG
OWNERU.S. Marine Corps	
ADDRESS Camp LeJeune	0.0 13.0 See attached
(Street or Route No.)	
Jacksonville NC City or Town State Zip Code	
DATE DRILLED 3-4-94 USE OF WELL Monitoring	
TOTAL DEPTH USE OF WELL MONITOFING	
DOES WELL REPLACE EXISTING WELL? YES DO	
STATIC WATER LEVEL Below Top of Casing: FT.	
TOP OF CASING IS <u>1.95</u> (Use "+" if Above Top of Casing) FT. Above Land Surface"	
TOP OF CASING ISFT. Above Land Surface* asing Terminated at/or below land surface is illegal unless a variance is iss	ued
accordance with 15A NCAC 2C .0118	
YIELD (gpm):N/AMETHOD OF TESTN/A	
. WATER ZONES (depth):N/A	
. CHLORINATION: TypeN/A AmountN/A	If additional space is needed use back of form
. CHLORINATION: Type <u>N/A</u> Amount <u>N/A</u> . CASING:	
. Casing.	LOCATION SKETCH
Wall Thickness Depth Diameter or Weight/Ft. Materia	
Depth         Diameter         or Weight/Ft.         Materia           FromToToToFtSCH_40PVC	
From To Ft	
From To Ft	See Report
GROUT:	
Depth Material Method	
From 0.0 To 2.0 Ft. Concrete Cast-in	_Place
From To Ft	_
SCREEN:	
Depth Diameter Slot Size Material	
From <u>3.0</u> To <u>13.0</u> Ft <u>2"</u> in. <u>0.010</u> in. <u>PVC</u>	_
From To Ft in in	
From To Ft in in           From To Ft in	
From To Ft in in	
From To Ft in in SAND/GRAVEL PACK: Depth Size Material	
From To Ft in in in	
From To Ft in in SAND/GRAVEL PACK: Depth Size Material	

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I DO HEREBY CERTIFY THAT THIS WELL WAS CONSTRUCTED IN ACCORDANCE WITH 15A NCAC 2C, WELL CONSTRUCTION STANDARDS, AND THAT A COPY OF THIS RECORD HAS BEEN PROVIDED TO THE WELL OWNER.

Kam horika 411-54

North Carolina - Department of Environment, Health, and Nat Division of Environmental Management - Groundwater P.O. Box 29535 - Raleigh, N.O27628.05357 Phone (919) 733-3221		QUAD. NO:	FOR OFFICE USE ONLY SERIAL NO _ Long RO
WELL CONSTRUCTION RECORD		Minor Basin Basin Code	
		Header Ent.	GW-1 Ent:
LLING CONTRACTOR: Law Engineering	STATE WEL	CONSTRUCT	
LLER REGISTRATION NUMBER: 332	PERMIT NUM		MW-12
WELL LOCATION: (Show sketch of the location below)			
Nearest Town: Jacksonville Co	unty: <u>Onslo</u>	<u>w</u>	·····
TC-341 Camp Gieger		OF OT L	
(Road, Community, or Subdivision and Lot No.)	_	DEPTH	DRILLING LOG
OWNER U.S. Marine Corps		om To	Formation Description
ADDRESS Camp LeJeune		13.0	See attached
( <b>Street or Route No.</b> ) Jacksonville NC			
	Code		······
DATE DRILLED USE OF WELL	itoring		
TOTAL DEPTH13.0			<u></u>
DOES WELL REPLACE EXISTING WELL? YES			
STATIC WATER LEVEL Below Top of Casing:	_FT		
(Use "+" if Above Top of Case TOP OF CASING IS FT. Above Land Surface			
ing Termineted atter below land surface is illegal upless a verified	ce is issued		
ing Terminated st/or below land surface is illegal unless a variant locordance with 15A.NCAC 2C .0118			
CCORDENCE with 15A NCAC 2C .0118 YIELD (gpm):N/AMETHOD OF TESTN/A		<u> </u>	
cordance with 15A NCAC 2C .0118			
VIELD (gpm): METHOD OF TEST N/A METHOD OF TEST N/A WATER ZONES (depth): N/A			
VIELD (gpm):N/AMETHOD OF TESTN/A		additional space is	s needed use back of form
VIELD (gpm): METHOD OF TEST N/A METHOD OF TEST N/A WATER ZONES (depth): N/A			
Incordance with 15A NCAC 2C .0118         YIELD (gpm):       N/A         WATER ZONES (depth):       N/A         CHLORINATION:       Type         N/A       Amount         CASING:       N/A			a needed use back of form
Incoordance with 15A NCAC 2C .0118         YIELD (gpm):       N/A         MATER ZONES (depth):       N/A         CHLORINATION:       Type         N/A       Amount         CASING:       Vall Thickness or Weight/FL	N/A If a	LOCA	
VIELD (gpm): N/A METHOD OF TEST N/A WATER ZONES (depth): N/A CHLORINATION: Type N/A Amount CASING:	N/A If a	LOCA	TION SKETCH
Incoordance with 15A NCAC 2C .0118         YIELD (gpm):       N/A         MATER ZONES (depth):       N/A         CHLORINATION:       Type         N/A       Amount         CASING:       Vall Thickness or Weight/FL	N/A If a Material (Show PVC Ro	LOCA direction and dista ads, or other map	TION SKETCH_ ance from at least two State preference points)
Depth         Diameter         Wall Thickness or Weight/Ft.           From         0.0         To         3.0         Ft.         2"         SCH_40	N/A If a Material (Show PVC Ro	LOCA direction and dista ads, or other map	TION SKETCH_ ance from at least two State
Depth         Diameter         Wall Thickness           From         0.0         To         3.0         Ft.         2"           Schull         Schull         Schull         Schull         Schull         Schull	N/A If a Material (Show PVC Ro	LOCA direction and dista ads, or other map	TION SKETCH_ ance from at least two State preference points)
Depth         Diameter         Wall Thickness or Weight/Ft.           From         To         3.0         Ft.         2"         SCH_40         -           From         To         Ft.         -	N/A If a Material (Show PVC Ro	LOCA direction and dista ads, or other map	TION SKETCH_ ance from at least two State preference points)
Depth         Diameter         Wall Thickness or Weight/Ft.           From         To         3.0         Ft.         2"         SCH_40         -           From         To         Ft.         -         -         -         -         -           GROUT:         Depth         Diameter         SCH_40         -	Material (Show PVC Ro	LOCA direction and dista ads, or other map	TION SKETCH_ ance from at least two State preference points)
Depth         Diameter         Or Weight/Ft.           From         0.0         To         2.0         Ft.         Concrete         Cast	Material (Show PVC Ro ethod t-in-Place	LOCA direction and dista ads, or other map	TION SKETCH_ ance from at least two State preference points)
Depth         Diameter         SCH_40           From         0.0         To         2.0         Ft.         Concrete         Cast           From         0.0         To         2.0         Ft.         Concrete         Cast	Material (Show PVC Ro ethod t-in-Place	LOCA direction and dista ads, or other map	TION SKETCH_ ance from at least two State preference points)
Depth         Diameter         SCH_40           From         0.0         To         2.0         Ft.         Concrete         Cast           From         To         Ft.         Concrete         Cast	Material (Show PVC Ro ethod t-in-Place	LOCA direction and dista ads, or other map	TION SKETCH_ ance from at least two State preference points)
Depth         Diameter         SCH_40           From         0.0         To         2.0         Ft.         Concrete         Cast           GROUT:         Depth         Diameter         SCH_40         SCH_40	Material (Show PVC Ro ethod t-in-Place	LOCA direction and dista ads, or other map	TION SKETCH_ ance from at least two State preference points)
Depth         Diameter         SCH_40           From         0.0         To         2.0         Ft.         Concrete         Cast           GROUT:         Depth         Diameter         SCH_40         SCH_40	Material (Show <u>PVC</u> Ro <u>ethod</u> <u>t-in-Pl</u> ace aterial C	LOCA direction and dista ads, or other map	TION SKETCH_ ance from at least two State preference points)
Depth         Material         M/A           WATER ZONES (depth):	Material (Show PVC Ro ethod t-in-Place	LOCA direction and dista ads, or other map	TION SKETCH_ ance from at least two State preference points)
Depth         Material         M/A           YIELD (gpm):         N/A         METHOD OF TEST         N/A           WATER ZONES (depth):         N/A         Amount	Material (Show PVC Ro ethod t-in-Place	LOCA direction and dista ads, or other map	TION SKETCH_ ance from at least two State preference points)
Depth         Material         Material           YIELD (gpm):         N/A         METHOD OF TEST         N/A           WATER ZONES (depth):         N/A         Machine term         N/A           CHLORINATION:         Type         N/A         Amount	Material (Show <u>PVC</u> Ro ethod t-in-Place aterial C	LOCA direction and dista ads, or other map	TION SKETCH_ ance from at least two State preference points)
Depth         Material         M/A           YIELD (gpm):         N/A         METHOD OF TEST         N/A           WATER ZONES (depth):         N/A         Amount	Material (Show <u>PVC</u> Ro ethod t-in-Place aterial C	LOCA direction and dista ads, or other map	TION SKETCH_ ance from at least two State preference points)
Depth         Diameter         N/A           MATER ZONES (depth):         N/A           WATER ZONES (depth):         N/A           CHLORINATION:         Type           N/A         Amount           CASING:         Wall Thickness           Or Weight/Ft.         or Weight/Ft.           From         0.0         To         3.0         Ft.         2''         SCH_40           From         To         3.0         Ft.         2''         SCH_40         -           From         To         SCH         40         -         -         -         -           From         To         SCH         40         -         -         -         -           GROUT:         Depth         Material	Material (Show PVC Ro ethod t-in-Place	LOCA direction and dista ads, or other map	TION SKETCH_ ance from at least two State preference points)
Depth         N/A         MATER ZONES (depth):         N/A           WATER ZONES (depth):         N/A           CHLORINATION: Type         N/A           OPEDIT         Wall Thickness           OF 5:         SCH_40           From         To           To         Concrete         Cast           From         O           Fo         Materia	N/A       If it         Material       (Show         PVC       Ro         ethod       Ro         t-in-Place       Ro         aterial       C	LOCA direction and dista ads, or other map	TION SKETCH_ ance from at least two State preference points)

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terms of the term

P.O. Box 295 PI	ntal Management - Gloundi 335 - Raleigh, N.C. 27626.0 10ne (919) 733-3221		QUAD. NO: Lo	OFFICE USE ONLY SERIAL NO.: ngRO.:
WELL CO	NSTRUCTION RECOR		Basin Code	
	Law Engineering		Header Ent	GW-1 Ent:
RILLER REGISTRATION NU	MBER: 332	PERMIT NU	LL CONSTRUCTION	<u>MW-13</u>
WELL LOCATION: (Show				
Nearest Town:Jacks	onville	_ County:(	Onslow	
TC-341 Camp Gi	eger			
(Road, Community, or Subdivis	ion and Lot No.)		DEPTH	DRILLING LOG
. OWNERU.S. Marin	ne Corps	f	From To	Formation Description
ADDRESS Camp LeJ			) 13.0	<u>See attached</u>
•	eet or Route No.)			- <u> </u>
Jacksonville City or Town	<u>NC</u>	Zip Code		
,		•		
DATE DRILLED3-7- TOTAL DEPTH13.0	194 USE OF WELL			
	YES X NO			
DOES WELL REPLACE EX				
STATIC WATER LEVEL BE	the second second second second second second second second second second second second second second second se	FT.		
	(Use "+" if Above Top of			
TOP OF CASING IS 2				
Casing Terminated at/or below land		riance is issued		
in accordance with 15A NCAC 2C YIELD (gpm): <u>N/A</u> ME				
J. WATER ZONES (depth):	N/A			
. WATER 201425 (depui)				
. CHLORINATION: Type _	N/A Amount		f additional space is nee	ded use back of form
2. CASING:		· · · · · · · · · · · · · · · · · · ·		
2. CASING.			LOCATIC	N SKETCH
Denth	Wall Thickne			from at least two State
Depth From <u>0.0</u> To <u>3.0</u>	Diameter or Weight/F	- DVG	loads, or other map refe	
			toaus, or other map ren	
From To				
FromTo	Ft		c.	See Report.
. GROUT:				
Depth	Material	Method		
From To				
From To	_Ft	· · · · · · · · · · · · · · · · · · ·		
. SCREEN:				
		Material		
From <u>3.0</u> To <u>13.0</u> Ft	<u>2"</u> in. <u>0.010</u> in	PVC		
From To Ft.				
From To Ft.	in in			
SAND/GRAVEL PACK:				. •
Depth	Size Mat	erial		
From 2.0 To 14.0	Ft. TorpedoS:	<u>ina</u>		
From To14_0	=			

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I DO HEREBY CERTIFY THAT THIS WELL WAS CONSTRUCTED IN ACCORDANCE WITH 15A NCAC 2C, WELL CONSTRUCTION STANDARDS, AND THAT A COPY OF THIS RECORD HAS BEEN PROVIDED TO THE WELL OWNER.

4-1-54 Hame In Kalin

Division of Environme P.O. Box 29	nt of Environment, H ental Management 9535 - Raleigh, N.O	Groupdwater Sector		FOR OFFICE USE ONLY
F	Phone (919) 733-32	221		Long RO:
WELL CO	ONSTRUCTION	RECORD	Minor Basin Basin Code	
ILLING CONTRACTOR:	Law Engin	eering	Header Ent.	GW-1 Ent.:
	Law_Engin	S	TATE WELL CONSTRUC	TION
ILLER REGISTRATION N	UMBER:	<u>332</u> P	ERMIT NUMBER:	MW-14
WELL LOCATION: (Show Nearest Town: Jacks			Onslow	
	Gieger	0001kty		
(Road, Community, or Subdivi			DEPTH	DRILLING LOG
OWNER U.S. Mari			From To	Formation Description
ADDRESS Camp LeJe	eune		0.0 13.0	See attached.
(S	itreet or Route No.)			
Jacksonville	NC	7in Oodo		······································
City or Town		Zip Code		
DATE DRILLED <u>3-8-9</u> TOTAL DEPTH <u>13.0</u>		ACCT WOUTCOLTUR		
CUTTINGS COLLECTED		$\sim$		
DOES WELL REPLACE E				
STATIC WATER LEVEL E				
	(Use "+" if At	ove Top of Casing)		
TOP OF CASING IS $_{f1}$				
sing Terminated at/or below lan		uniess a variance is issu	led	
accordance with 15A NCAC 2C YIELD (gpm): $\frac{N/A}{M}$ M	ETHOD OF TES	T N/A		
		•		
VIELD (gpm): <u>N/A</u> M WATER ZONES (depth): _				
WATER ZONES (depth): _	N/A			is needed use back of form
WATER ZONES (depth): CHLORINATION: Type				is needed use back of form
WATER ZONES (depth): CHLORINATION: Type	N/A N/A	_ AmountN/A	if additional space	a is needed use back of form
WATER ZONES (depth): CHLORINATION: Type CASING:	N/A N/A	_ AmountN/A	if additional space	
WATER ZONES (depth): - 	N/A N/A Diameter	_ AmountN/A	If additional space 	ATION SKETCH
WATER ZONES (depth): _ CHLORINATION: Type CASING: Depth From 0.0 To 3.0	N/A N/A Diameter	Amount <u>N/A</u> Wall Thickness or Weight/Ft. Materia SCH 40 PVC	If additional space LOC (Show direction and dis Roads, or other m	CATION SKETCH
WATER ZONES (depth): CHLORINATION: Type CASING: From 0.0 To 3.0 From To	N/A N/A Diameter Ft	AmountN/A Wall Thickness or Weight/Ft. Materia SCH 40 PVC		CATION SKETCH stance from at least two State ap reference points)
WATER ZONES (depth): CHLORINATION: Type CASING: From To 3.0 From To From To	N/A N/A Diameter Ft	AmountN/A Wall Thickness or Weight/Ft. Materia SCH 40 PVC		CATION SKETCH
WATER ZONES (depth): - CHLORINATION: Type CASING: From 0.0 To 3.0 From To From To GROUT:	N/A 	AmountN/A Wall Thickness or Weight/Ft. Materia SCH 40 PVC		CATION SKETCH stance from at least two State ap reference points)
WATER ZONES (depth): - 	N/A  Ft Ft Ft  Materia	AmountN/A Wall Thickness or Weight/Ft. Materia SCH 40 		CATION SKETCH stance from at least two State ap reference points)
WATER ZONES (depth):           CHLORINATION: Type           CASING:           Depth           From         0.0         To 3.0           From         To         To           From         To         To           GROUT:         Depth         To           Depth         To         To           From         0.0         To         2.0	N/A Diameter Ft Ft Ft Materia Ft Concre	Amount N/A Wall Thickness or Weight/Ft. Material SCH 40 PVC  al Method te		CATION SKETCH stance from at least two State ap reference points)
WATER ZONES (depth):           CHLORINATION: Type           CASING:           Depth           From         0.0         To 3.0           From         To         To           GROUT:         Depth           From         0.0         To         2.0           From         To         To         To	N/A Diameter Ft Ft Ft Materia Ft Concre	Amount N/A Wall Thickness or Weight/Ft. Material SCH 40 PVC  al Method te		CATION SKETCH stance from at least two State ap reference points)
WATER ZONES (depth):           CHLORINATION: Type           CASING:           Depth           From         0.0         To 3.0           From         To         To           From         To         To           GROUT:         Depth           From         0.0         To         2.0           From         To         To         SCREEN:	N/A Diameter Ft Ft Ft Materia Ft Ft	_ AmountN/A Wall Thickness or Weight/Ft. Material SCH 40  al te Cast_ir		CATION SKETCH
WATER ZONES (depth): CHLORINATION: Type CASING: From To 3.0 From To From To GROUT: From To From To SCREEN: Depth	N/A 	AmountN/A Wall Thickness or Weight/Ft. Material SCH 40 PVC  al Method teast_ir Size Material		CATION SKETCH
WATER ZONES (depth): - CHLORINATION: Type CASING: To To From To From To GROUT: From To From To SCREEN: Depth From To Depth From To From To Depth From To From To Depth	N/A Diameter Ft Ft Ft Materia Ft Materia Concre Ft Diameter Slot Ft Diameter Slot	AmountN/A Wall Thickness or Weight/Ft. Material SCH 40 PVC  al Method te Size Material 010_ inC		CATION SKETCH
WATER ZONES (depth): - CHLORINATION: Type CASING: To To From To From To GROUT: From To From To SCREEN: Depth From To Depth From To From To Depth From To	N/A Diameter Ft Ft Ft Materia Ft Materia Concre Ft Diameter Slot Ft Diameter Slot	AmountN/A Wall Thickness or Weight/Ft. Material SCH 40 PVC  al Method te Size Material 010_ inC		CATION SKETCH
WATER ZONES (depth): CHLORINATION: Type CASING: From 0.0 To 3.0 From To To From To GROUT: From To SCREEN: Depth From 3.0 To 13.0 F From To F	N/A Diameter Ft Ft Ft Ft Diameter Slot St it in	AmountN/A Wall Thickness or Weight/Ft. Material SCH 40 al Al Method te Size Size Material 010_ in		CATION SKETCH
WATER ZONES (depth): CHLORINATION: Type CASING: From To From To From To GROUT:	N/A Diameter Ft Ft Ft Ft Diameter Slot St it in	AmountN/A Wall Thickness or Weight/Ft. Material SCH 40 al Al Method te Size Size Material 010_ in		CATION SKETCH
WATER ZONES (depth): CHLORINATION: Type CASING: From To From To From To GROUT:	N/A         Diameter         Ft.         Ft.         Ft.         Materia         Materia         Ft.         Materia         Diameter         St.         Diameter         St.         in.         in.	AmountN/A Wall Thickness or Weight/Ft. Material SCH 40 al Al Method te Size Size Material 010_ in		CATION SKETCH
WATER ZONES (depth): CHLORINATION: Type CASING:	N/A Diameter Ft Ft Ft Materia Materia Ft Diameter Slot it in Size	AmountN/A		CATION SKETCH
WATER ZONES (depth):         CHLORINATION:       Type         CASING:          Prom       0.0       To 3.0         From        To         From        To         From        To         From        To         GROUT:        Depth         From        To         SCREEN:       Depth         From        To         From        To	N/A	AmountN/A	if additional space (Show direction and dia Roads, or other m 	CATION SKETCH
WATER ZONES (depth): CHLORINATION: Type CASING:	N/A Diameter Ft Ft Ft Materia Materia Materia Materia Materia Materia Materia Materia Materia Materia Size Ft Size Ft Ft Size Ft	AmountN/A		CATION SKETCH

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North Carolina - Department of Environment, Ha Division of Environmental Management P.O. Box 29535 - Raleign, N.O. Phone (919) 733-322	Groundwated Section		FOR OFFICE USE ONLY O:
WELL CONSTRUCTION	RECORD	Basin Coc	in
RILLING CONTRACTOR: Law Engineeri	Header E	ntGW-1 Ent:	
	S	TATE WELL CONST	TRUCTION
RILLER REGISTRATION NUMBER: 33	32PI	ERMIT NUMBER:	MW-L5
WELL LOCATION: (Show sketch of the local	tion below)		
Nearest Town: Jacksonville	County:	Onslow	
TC-341 Camp Gieger		_	
(Road, Community, or Subdivision and Lot No.)		DEPTH	
OWNER U.S. Marine Corps			
ADDRESS Camp LeJeune			See attached.
(Street or Route No.)			
Jacksonville NC City or Town State	Zip Code		
	•		
DATE DRILLED <u>3-8-94</u> USE OF WE TOTAL DEPTH <u>30.0</u>	ELL MONILOTING	—	
CUTTINGS COLLECTED YES I NO			
DOES WELL REPLACE EXISTING WELL?			
STATIC WATER LEVEL Below Top of Casin			
	ve Top of Casing)		
(Use "+" if Abov			
(Use *+* if Abov TOP OF CASING IS <u>flush</u> FT. Above L			
TOP OF CASING IS <u>flush</u> FT. Above L asing Terminated at/or below land surface is illegal un	and Surface*	ed	
TOP OF CASING IS <u>flush</u> FT. Above L asing Terminated at/or below land surface is illegal un accordance with 15A NCAC 2C .0118	and Surface" liess a variance is issu	<u></u>	
TOP OF CASING IS <u>flush</u> FT. Above L asing Terminated at/or below land surface is illegal un accordance with 15A NCAC 2C .0118 YIELD (gpm): <u>N/A</u> METHOD OF TEST	and Surface"		
TOP OF CASING IS <u>flush</u> FT. Above L asing Terminated at/or below land surface is illegal un accordance with 15A NCAC 2C .0118	and Surface"		
TOP OF CASING IS <u>flush</u> FT. Above L asing Terminated at/or below land surface is illegal un accordance with 15A NCAC 2C .0118 YIELD (gpm): <u>N/A</u> METHOD OF TEST WATER ZONES (depth): <u>N/A</u>	and Surface* nless a variance is issue		······································
TOP OF CASING IS <u>flush</u> FT. Above L asing Terminated at/or below land surface is illegal un accordance with 15A NCAC 2C .0118 YIELD (gpm): <u>N/A</u> METHOD OF TEST	and Surface* nless a variance is issue		space is needed use back of form
TOP OF CASING IS <u>flush</u> FT. Above L asing Terminated at/or below land surface is illegal un accordance with 15A NCAC 2C .0118 YIELD (gpm): <u>N/A</u> METHOD OF TEST WATER ZONES (depth): <u>N/A</u>	and Surface* nless a variance is issue	if additional	space is needed use back of form
TOP OF CASING IS <u>flush</u> FT. Above L asing Terminated at/or below land aurtace is illegal un accordance with 15A NCAC 2C .0118 YIELD (gpm): <u>N/A</u> METHOD OF TEST WATER ZONES (depth): <u>N/A</u> CHLORINATION: Type <u>N/A</u> CASING:	and Surface*	if additional	······································
TOP OF CASING IS <u>flush</u> FT. Above L asing Terminated at/or below land surface is illegal un accordance with 15A NCAC 2C .0118 YIELD (gpm): <u>N/A</u> METHOD OF TEST WATER ZONES (depth): <u>N/A</u> CHLORINATION: Type <u>N/A</u> CASING: Wa Depth Diameter or	and Surface* less a variance is issue N/A AmountA all Thickness r Weight/Ft. Material	f additional	space is needed use back of form
TOP OF CASING IS <u>flush</u> FT. Above L asing Terminated at/or below land aurface is illegal un accordance with 15A NCAC 2C .0118 YIELD (gpm): <u>N/A</u> METHOD OF TEST WATER ZONES (depth): <u>N/A</u> CHLORINATION: Type <u>N/A</u> CASING: Depth <u>Diameter</u> or From <u>0.0</u> To <u>22.0</u> Ft. <u>6''</u> SC	and Surface* less a variance is issue N/A AmountA all Thickness r Weight/Ft. Material H 40PVC	(Show direction a Roads, or ot	space is needed use back of form
TOP OF CASING IS <u>flush</u> FT. Above L asing Terminated at/or below land aurface is illegal un accordance with 15A NCAC 2C .0118 YIELD (gpm): <u>N/A</u> METHOD OF TEST WATER ZONES (depth): <u>N/A</u> CHLORINATION: Type <u>N/A</u> CASING: Depth <u>Diameter</u> or From <u>0.0</u> To <u>22.0</u> Ft. <u>6''</u> SC	and Surface* less a variance is issue N/A AmountA all Thickness r Weight/Ft. Material H 40PVC	(Show direction a Roads, or ot	space is needed use back of form LOCATION SKETCH and distance from at least two State
TOP OF CASING IS <u>flush</u> FT. Above L asing Terminated at/or below land surface is illegal un accordance with 15A NCAC 2C .0118 YIELD (gpm): <u>N/A</u> METHOD OF TEST WATER ZONES (depth): <u>N/A</u> CHLORINATION: Type <u>N/A</u> CASING: <u>Depth</u> <u>Diameter</u> or From <u>0.0</u> To <u>22.0</u> Ft. <u>6''</u> SC From <u>0.0</u> To <u>25.0</u> Ft. <u>2''</u> SC	and Surface* less a variance is issue 	(Show direction a Roads, or oth	space is needed use back of form LOCATION SKETCH and distance from at least two State
TOP OF CASING IS <u>flush</u> FT. Above L asing Terminated at/or below land aurface is illegal un accordance with 15A NCAC 2C .0118 YIELD (gpm): <u>N/A</u> METHOD OF TEST WATER ZONES (depth): <u>N/A</u> CHLORINATION: Type <u>N/A</u> CASING: <u>Depth</u> <u>Diameter</u> or From <u>0.0</u> To <u>22.0</u> Ft. <u>6''</u> SCI From <u>0.0</u> To <u>25.0</u> Ft. <u>2''</u> SCI From <u>To</u> Ft	and Surface* less a variance is issue 	(Show direction a Roads, or oth	space is needed use back of form LOCATION SKETCH and distance from at least two State her map reference points)
TOP OF CASING IS <u>flush</u> FT. Above L asing Terminated attor below land aurface is illegal un accordance with 15A NCAC 2C .0118 YIELD (gpm): <u>N/A</u> METHOD OF TEST WATER ZONES (depth): <u>N/A</u> CHLORINATION: Type <u>N/A</u> CASING: From <u>0.0</u> To <u>22.0</u> Ft. <u>6''</u> SC From <u>0.0</u> To <u>25.0</u> Ft. <u>2''</u> SC From <u>To</u> Ft. <u></u> GROUT: /Cement	and Surface* N/A Amount <u>N/A</u> all Thickness r Weight/Ft. Material H 40 PVC H 40 PVC	(Show direction a Roads, or oth	space is needed use back of form LOCATION SKETCH and distance from at least two State her map reference points)
TOP OF CASING IS <u>flush</u> FT. Above L asing Terminated at/or below land surface is illegal un accordance with 15A NCAC 2C .0118 YIELD (gpm): <u>N/A</u> METHOD OF TEST WATER ZONES (depth): <u>N/A</u> CHLORINATION: Type <u>N/A</u> CASING: <u>Depth</u> <u>Diameter</u> or From <u>0.0</u> To <u>22.0</u> Ft. <u>6''</u> SC From <u>0.0</u> To <u>25.0</u> Ft. <u>2''</u> SC From <u>To</u> Ft. <u></u> GROUT: /Cement Depth Material	and Surface* less a variance is issue 	(Show direction a Roads, or oth	space is needed use back of form LOCATION SKETCH and distance from at least two State her map reference points)
TOP OF CASING IS _flushFT. Above L         asing Terminated at/or below land aurface is illegal un         accordance with 15A NCAC 2C .0118         YIELD (gpm):N/AMETHOD OF TEST         WATER ZONES (depth):N/A         CHLORINATION: TypeN/A         CASING:         Vieway         FromO_0To _22.0Ft6'''SC         FromToFtSC         FromToFtSC         FromToFtSC         FromToFtSC         FromToFt         Depth       Material         From	and Surface* N/A Amount <u>N/A</u> Amount <u>N/A</u> all Thickness r Weight/Ft. Material <u>H 40 PVC</u> <u>H 40 PVC</u> <u>H 40 PVC</u>	(Show direction a Roads, or ot	space is needed use back of form LOCATION SKETCH and distance from at least two State her map reference points)
TOP OF CASING IS <u>flush</u> FT. Above L asing Terminated at/or below land aurface is illegal un accordance with 15A NCAC 2C .0118 YIELD (gpm): <u>N/A</u> METHOD OF TEST WATER ZONES (depth): <u>N/A</u> CHLORINATION: Type <u>N/A</u> CASING: Var Depth Diameter or From 0.0 To 22.0 Ft. 6'' SC From 0.0 To 25.0 Ft. 2'' SC From To Ft Cement GROUT: /Cement Depth Material From 0.0 To 22.0 Ft. Cement/Ber From 0.0 To 2.0 Ft. Concrete	and Surface* N/A Amount <u>N/A</u> Amount <u>N/A</u> all Thickness r Weight/Ft. Material <u>H 40 PVC</u> <u>H 40 PVC</u> <u>H 40 PVC</u>	(Show direction a Roads, or ot	space is needed use back of form LOCATION SKETCH and distance from at least two State her map reference points)
TOP OF CASING IS <u>flush</u> FT. Above L asing Terminated at/or below land aurface is illegal un accordance with 15A NCAC 2C .0118 YIELD (gpm): <u>N/A</u> METHOD OF TEST WATER ZONES (depth): <u>N/A</u> CHLORINATION: Type <u>N/A</u> CASING: <u>Depth</u> <u>Diameter</u> or From <u>0.0</u> To <u>22.0</u> Ft. <u>6''</u> SC From <u>0.0</u> To <u>25.0</u> Ft. <u>2''</u> SC From <u>0.0</u> To <u>25.0</u> Ft. <u>2''</u> SC From <u>0.0</u> To <u>22.0</u> Ft. <u>6''</u> SC From <u>0.0</u> To <u>22.0</u> Ft. <u>Cement/Ber</u> From <u>0.0</u> To <u>22.0</u> Ft. <u>Cement/Ber</u> From <u>0.0</u> To <u>22.0</u> Ft. <u>Concrete</u> SCREEN:	and Surface* N/A Amount <u>N/A</u> Amount <u>N/A</u> all Thickness r Weight/Ft. Material <u>H 40 PVC</u> <u>H 40 PVC</u> <u>H 40 PVC</u> <u>Method</u> <u>ntonite Tremie</u>	(Show direction a Roads, or ot	space is needed use back of form LOCATION SKETCH and distance from at least two State her map reference points)
TOP OF CASING IS <u>flush</u> FT. Above L asing Terminated at/or below land aurface is illegal un accordance with 15A NCAC 2C .0118 YIELD (gpm): <u>N/A</u> METHOD OF TEST WATER ZONES (depth): <u>N/A</u> CHLORINATION: Type <u>N/A</u> CHLORINATION: Type <u>N/A</u> CASING: <u>Depth</u> <u>Diameter</u> or From <u>0.0</u> To <u>22.0</u> Ft. <u>6''</u> SC From <u>0.0</u> To <u>25.0</u> Ft. <u>2''</u> SC From <u>0.0</u> To <u>25.0</u> Ft. <u>2''</u> SC From <u>0.0</u> To <u>22.0</u> Ft. <u>Cement/Ber</u> From <u>0.0</u> To <u>22.0</u> Ft. <u>Cement/Ber</u> From <u>0.0</u> To <u>2.0</u> Ft. <u>Concrete</u> SCREEN: <u>Depth</u> <u>Diameter</u> Slot S	and Surface* N/A N/A Amount <u>N/A</u> Amount <u>N/A</u> all Thickness r Weight/Ft. Material <u>H 40</u> <u>PVC</u> <u>H 40</u> <u>PVC</u> <u>Method</u> <u>ntonite Tremie</u> <u>Cast-in-P</u> Size Material	(Show direction a Roads, or ot	space is needed use back of form LOCATION SKETCH and distance from at least two State her map reference points)
TOP OF CASING IS <u>flush</u> FT. Above L asing Terminated at/or below land aurface is illegal un accordance with 15A NCAC 2C .0118 YIELD (gpm): <u>N/A</u> METHOD OF TEST WATER ZONES (depth): <u>N/A</u> CHLORINATION: Type <u>N/A</u> CASING: <u>Depth</u> <u>Diameter</u> or From <u>0.0</u> To <u>22.0</u> Ft. <u>6''</u> SC From <u>0.0</u> To <u>25.0</u> Ft. <u>2''</u> SC From <u>0.0</u> To <u>25.0</u> Ft. <u>2''</u> SC From <u>0.0</u> To <u>22.0</u> Ft. <u>6''</u> SC From <u>0.0</u> To <u>22.0</u> Ft. <u>Cement/Ber</u> From <u>0.0</u> To <u>22.0</u> Ft. <u>Cement/Ber</u> From <u>0.0</u> To <u>22.0</u> Ft. <u>Concrete</u> SCREEN:	and Surface* N/A N/A Amount <u>N/A</u> Amount <u>N/A</u> all Thickness r Weight/Ft. Material <u>H 40</u> <u>PVC</u> <u>H 40</u> <u>PVC</u> <u>Method</u> <u>ntonite Tremie</u> <u>Cast-in-P</u> Size Material	(Show direction a Roads, or other Hace	space is needed use back of form LOCATION SKETCH and distance from at least two State her map reference points)
TOP OF CASING IS <u>flush</u> FT. Above L asing Terminated at/or below land aurface is illegal un accordance with 15A NCAC 2C .0118 YIELD (gpm): <u>N/A</u> METHOD OF TEST WATER ZONES (depth): <u>N/A</u> CHLORINATION: Type <u>N/A</u> CHLORINATION: Type <u>N/A</u> CASING: <u>Depth</u> <u>Diameter</u> or From <u>0.0</u> To <u>22.0</u> Ft. <u>6''</u> SC From <u>0.0</u> To <u>25.0</u> Ft. <u>2''</u> SC From <u>0.0</u> To <u>25.0</u> Ft. <u>2''</u> SC From <u>0.0</u> To <u>22.0</u> Ft. <u>Cement/Ber</u> From <u>0.0</u> To <u>22.0</u> Ft. <u>Cement/Ber</u> From <u>0.0</u> To <u>2.0</u> Ft. <u>Concrete</u> SCREEN: <u>Depth</u> <u>Diameter</u> Slot S	and Surface* N/A Amount N/A Amount N/A all Thickness r Weight/Ft. Material H 40 PVC H 40 PVC Method ntonite Tremie Cast-in-P Size Material 10. in. PVC	(Show direction a Roads, or othe Hace	space is needed use back of form LOCATION SKETCH and distance from at least two State her map reference points)
TOP OF CASING IS <u>flush</u> FT. Above L asing Terminated at/or below land aurface is illegal un accordance with 15A NCAC 2C .0118 YIELD (gpm): <u>N/A</u> METHOD OF TEST WATER ZONES (depth): <u>N/A</u> CHLORINATION: Type <u>N/A</u> CASING: <u>Depth</u> <u>Diameter</u> or From <u>0.0</u> To <u>22.0</u> Ft. <u>6''</u> SC From <u>0.0</u> To <u>25.0</u> Ft. <u>2''</u> SC From <u>0.0</u> To <u>25.0</u> Ft. <u>2''</u> SC From <u>10</u> To <u>22.0</u> Ft. <u>Cement/Ben</u> From <u>0.0</u> To <u>22.0</u> Ft. <u>Cement/Ben</u> From <u>0.0</u> To <u>22.0</u> Ft. <u>Concrete</u> SCREEN: <u>Depth</u> <u>Diameter Slot S</u> From <u>25.0</u> To <u>30.0</u> Ft <u>2''</u> in. <u>0.0</u>	and Surface* N/A Amount N/A Amount N/A all Thickness r Weight/Ft. Material H 40 PVC H 40 PVC H 40 PVC Method ntonite Tremie Cast-in-P Size Material 10 in. PVC	(Show direction a Roads, or othe Hace	space is needed use back of form LOCATION SKETCH and distance from at least two State her map reference points)
TOP OF CASING IS <u>flush</u> FT. Above L asing Terminated at/or below land aurface is illegal un accordance with 15A NCAC 2C .0118 YIELD (gpm): <u>N/A</u> METHOD OF TEST WATER ZONES (depth): <u>N/A</u> CHLORINATION: Type <u>N/A</u> CHLORINATION: Type <u>N/A</u> CASING: <u>Depth</u> <u>Diameter</u> or From <u>0.0</u> To <u>22.0</u> Ft. <u>6''</u> SC From <u>0.0</u> To <u>25.0</u> Ft. <u>2''</u> SC From <u>0.0</u> To <u>25.0</u> Ft. <u>2''</u> SC From <u>0.0</u> To <u>22.0</u> Ft. <u>Cement/Ber</u> From <u>0.0</u> To <u>22.0</u> Ft. <u>Cement/Ber</u> From <u>0.0</u> To <u>2.0</u> Ft. <u>Concrete</u> SCREEN: <u>Depth</u> <u>Diameter</u> Slot S From <u>25.0</u> To <u>30.0</u> Ft <u>2''</u> in. <u>0.0</u> From <u>To</u> Ft in	and Surface* N/A Amount N/A Amount N/A all Thickness r Weight/Ft. Material H 40 PVC H 40 PVC H 40 PVC Method ntonite Tremie Cast-in-P Size Material 10 in. PVC	(Show direction a Roads, or othe Hace	space is needed use back of form LOCATION SKETCH and distance from at least two State her map reference points)
TOP OF CASING IS <u>flush</u> FT. Above L asing Terminated attor below land aurface is illegal un accordance with 15A NCAC 2C .0118 YIELD (gpm): <u>N/A</u> METHOD OF TEST WATER ZONES (depth): <u>N/A</u> CHLORINATION: Type <u>N/A</u> CASING: <u>Depth</u> <u>Diameter</u> or From <u>0.0</u> To <u>22.0</u> Ft. <u>6''</u> SC From <u>0.0</u> To <u>25.0</u> Ft. <u>2''</u> SC From <u>To Ft.</u> <u>-</u> GROUT: /Cement <u>Depth</u> <u>Material</u> From <u>0.0</u> To <u>22.0</u> Ft. <u>Cement/Ber</u> From <u>0.0</u> To <u>2.0</u> Ft. <u>Concrete</u> SCREEN: <u>Depth</u> <u>Diameter</u> Slot S From <u>25.0</u> To <u>30.0</u> Ft <u>2''</u> in. 0.0 From <u>To Ft.</u> in. <u>-</u> SAND/GRAVEL PACK:	and Surface* N/A Amount N/A Amount N/A all Thickness r Weight/Ft. Material H 40 PVC H 40 PVC H 40 PVC Method ntonite Tremie Cast-in-P Size Material 10 in. PVC in	(Show direction a Roads, or othe Hace	space is needed use back of form LOCATION SKETCH and distance from at least two State her map reference points)
TOP OF CASING IS <u>flush</u> FT. Above L asing Terminated at/or below land aurface is illegal un accordance with 15A NCAC 2C .0118 YIELD (gpm): <u>N/A</u> METHOD OF TEST WATER ZONES (depth): <u>N/A</u> CHLORINATION: Type <u>N/A</u> CASING: <u>Depth</u> <u>Diameter</u> or From <u>0.0</u> To <u>22.0</u> Ft. <u>6''</u> SC From <u>0.0</u> To <u>25.0</u> Ft. <u>2''</u> SC From <u>To</u> Ft. <u></u> GROUT: /Cement <u>Depth</u> <u>Material</u> From <u>0.0</u> To <u>22.0</u> Ft. <u>Cement/Ber</u> From <u>0.0</u> To <u>2.0</u> Ft. <u>Concrete</u> SCREEN: <u>Depth</u> <u>Diameter</u> Slot S From <u>25.0</u> To <u>30.0</u> Ft <u>2''</u> in. 0.0 From <u>To</u> Ft. <u></u> in. <u></u> SAND/GRAVEL PACK: <u>Depth</u> Size	and Surface* N/A Amount N/A Amount N/A all Thickness r Weight/Ft. Material H 40 PVC H 40 PVC H 40 PVC Method ntonite Tremie Cast-in-P Size Material 10. in. PVC in Material	(Show direction a Roads, or othe Hace	space is needed use back of form LOCATION SKETCH and distance from at least two State her map reference points)
TOP OF CASING IS <u>flush</u> FT. Above L asing Terminated at/or below land aurface is illegal un accordance with 15A NCAC 2C .0118 YIELD (gpm): <u>N/A</u> METHOD OF TEST WATER ZONES (depth): <u>N/A</u> CHLORINATION: Type <u>N/A</u> CHLORINATION: Type <u>N/A</u> CASING: <u>Depth</u> <u>Diameter</u> or From <u>0.0</u> To <u>22.0</u> Ft. <u>6''</u> SC From <u>0.0</u> To <u>25.0</u> Ft. <u>2''</u> SC From <u>0.0</u> To <u>25.0</u> Ft. <u>2''</u> SC From <u>0.0</u> To <u>22.0</u> Ft. <u>Cement/Ber</u> From <u>0.0</u> To <u>22.0</u> Ft. <u>Cement/Ber</u> From <u>0.0</u> To <u>22.0</u> Ft. <u>Cement/Ber</u> From <u>0.0</u> To <u>22.0</u> Ft. <u>Concrete</u> SCREEN: <u>Depth</u> <u>Diameter</u> Slot S From <u>25.0</u> To <u>30.0</u> Ft <u>2''</u> in. <u>0.0</u> From <u>To</u>	and Surface* N/A Amount <u>N/A</u> Amount <u>N/A</u> all Thickness r Weight/Ft. Material <u>H 40</u> <u>PVC</u> <u>H 40</u> <u>PVC</u> <u>H 40</u> <u>PVC</u> <u>Size</u> <u>Material</u> <u>10</u> in. <u>PVC</u> in. <u></u> <u>in</u> <u>Material</u> <u>Sand</u>	(Show direction a Roads, or ot	space is needed use back of form LOCATION SKETCH and distance from at least two State her map reference points)
TOP OF CASING IS <u>flush</u> FT. Above L asing Terminated at/or below land aurface is illegal un accordance with 15A NCAC 2C .0118 YIELD (gpm): <u>N/A</u> METHOD OF TEST WATER ZONES (depth): <u>N/A</u> CHLORINATION: Type <u>N/A</u> CASING: <u>Depth</u> <u>Diameter</u> or From <u>0.0</u> To <u>22.0</u> Ft. <u>6''</u> SC From <u>0.0</u> To <u>25.0</u> Ft. <u>2''</u> SC From <u>To</u> Ft. <u></u> GROUT: /Cement <u>Depth</u> <u>Material</u> From <u>0.0</u> To <u>22.0</u> Ft. <u>Cement/Ber</u> From <u>0.0</u> To <u>2.0</u> Ft. <u>Concrete</u> SCREEN: <u>Depth</u> <u>Diameter</u> Slot S From <u>25.0</u> To <u>30.0</u> Ft <u>2''</u> in. 0.0 From <u>To</u> Ft. <u></u> in. <u></u> SAND/GRAVEL PACK: <u>Depth</u> Size	and Surface* N/A Amount <u>N/A</u> Amount <u>N/A</u> all Thickness r Weight/Ft. Material <u>H 40</u> <u>PVC</u> <u>H 40</u> <u>PVC</u> <u>H 40</u> <u>PVC</u> <u>Size</u> <u>Material</u> <u>10</u> in. <u>PVC</u> in. <u></u> <u>in</u> <u>Material</u> <u>Sand</u>	(Show direction a Roads, or ot	space is needed use back of form LOCATION SKETCH and distance from at least two State her map reference points)

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f-11-54

North Carolina - Department of Environment, Health, and Natura Division of Environmental Management (Groundwald) So P.O. Box 29535 - Raleigh, N.G-27636-0518-1	Fesoulices FC	ROFFICE USE ONLY
P.O. Box 29535 - Raleigh, N.G. 27625-0515	QUAD. NO:	SERIAL NO
Phone (919) 733-3221	Lat	Long No
WELL CONSTRUCTION RECORD	Basin Code	
	Header Ent.	GW-1 Ent.
ILLING CONTRACTOR:Law_Engineering	STATE WELL CONSTRUCTIO	
ILLER REGISTRATION NUMBER: 332		<u>MW-16</u>
WELL LOCATION: (Show sketch of the location below)		
Nearest Town: Jacksonville Count	v:Onslow	
	·	
(Road, Community, or Subdivision and Lot No.)	DEPTH	DRILLING LOG
OWNER U.S. Marine Corps	From To	Formation Description
ADDRESS Camp LeJeune	0.0 13.0	See_attached
(Street or Route No.)		
Jacksonville NC		
City or Town State Zip Co		
DATE DRILLED <u>3-8-94</u> USE OF WELL Monitor: TOTAL DEPTH <u>13.0</u>	<u></u>	
	0 x	<u> </u>
	Г	
(Use "+" if Above Top of Casing)		
TOP OF CASING IS FT. Above Land Surface*	- locued	<u></u>
sing Terminated at/or below land surface is illegal unless a variance i accordance with 15A NCAC 2C .0118	; issued	
YIELD (gpm): N/A METHOD OF TESTN/A	·····	
WATER ZONES (depth):N/A		
		_
CHLORINATION: TypeN/A AmountN	I/A If additional space is n	needed use back of form
CASING:		
Wall Thickness		ION SKETCH
	aterial (Show direction and distan	
From 0.0 To 3.0 Ft. 2" SCH 40 1		eference points)
From To Ft		See Report.
From To Ft		see keport.
GROUT:		
Depth Material Meth		
From 0.0 To 2.0 Ft. Concrete Cast-		
From To Ft		
SCREEN:		
Depth Diameter Slot Size Mater		
From <u>3.0</u> To <u>13.0</u> Ft <u>2"</u> in. <u>0.010</u> in. <u>PVC</u>		
From To Ft in in		
From To Ft in in		
SAND/GRAVEL PACK:		· ·
Depth Size Material		·
From 2.0 To 14.0 Ft. Torpedo Sand		

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I DO HEREBY CERTIFY THAT THIS WELL WAS CONSTRUCTED IN ACCORDANCE WITH 15A NCAC 2C, WELL CONSTRUCTION STANDARDS, AND THAT A COPY OF THIS RECORD HAS BEEN PROVIDED TO THE WELL OWNER.

4-11-54 Starme ho Films

North Carolina - Department of Environment, Health, an Division of Environmental Management - Giound	water@ectio#		OFFICE USE ONLY
P.O. Box 29535 - Raleigh, N.C. 276254 Phone (919) 733-3221	63\$/~L 4 4		ng RO
WELL CONSTRUCTION RECO	Ph	Minor Basin	
		Basin Code Header Ent	GW-1 Ent:
RILLING CONTRACTOR: <u>Law Engineering</u>	STATE	WELL CONSTRUCTION	
RILLER REGISTRATION NUMBER:332			MW-17
WELL LOCATION: (Show sketch of the location be	low)		
Nearest Town: Jacksonville	County:0	nslow	
TC-341 Camp Gieger			
(Road, Community, or Subdivision and Lot No.)		DEPTH	DRILLING LOG
OWNER U.S. Marine Corps		From To 0.0 13.0	Form <b>aion Description</b> See attached
ADDRESS Camp LeJeune (Street or Route No.)		0.0 15.0	
(Street or House No.) Jacksonville NC			·
City or Town State	Zip Code		
DATE DRILLED 3-8-94 USE OF WELL Me	onitoring —		<u> </u>
TOTAL DEPTH 13.0			- <u></u>
DOES WELL REPLACE EXISTING WELL? YES [ STATIC WATER LEVEL Below Top of Casing:	NO[X]		
(Use *+* if Above Top of			
TOP OF CASING IS <u>fl</u> ush FT. Above Land Su			
Casing Terminated at/or below land surface is illegal unless a v	ariance is issued —		
In accordance with 15A NCAC 2C .0118 YIELD (gpm):N/A_METHOD OF TESTN/A	/A —		
). WATER ZONES (depth):N/A			
I. CHLORINATION: Type <u>N/A</u> Amoun	tN/A	If additional space is ne	eded use back of form
2. CASING:			
		LOCATIO	N SKETCH
Wall Thickr Depth Diameter or Weighv		Show direction and distance	from at least two State
From 0.0 To 3.0 Ft. 2" SCH 40	D PVC	Roads, or other map ref	erence points)
From To Ft			
From To Ft		See Report	•
0. GROUT:			
Depth Material	Method		
From 0.0 To 2.0 Ft. Concrete		e	
From To Ft			
. SCREEN:			
Depth Diameter Slot Size	Material		
From <u>3.0</u> To <u>13.0</u> Ft <u>2"</u> in <u>0.010</u> in.	PVC		
From To Ft in in.		<i></i>	
From To Ft in in.			
5. SAND/GRAVEL PACK:			
	terial		
Depth Size Ma			
Depth         Size         Ma           From To To Ft         Size         Size           From To Ft         Size         Size	and		

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DO HEREBY CERTIFY THAT THIS WELL WAS CONSTRUCTED IN ACCORDANCE WITH 15A NCAC 2C, WELL CONSTRUCTION STANDARDS, AND THAT A COPY OF THIS RECORD HAS BEEN PROVIDED TO THE WELL OWNER.



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### APPENDIX E

# MONITORING WELL CASING AND WATER ELEVATION WORKSHEETS

				LAW ENGI BEO1 ATLAN LEIGH, NORTH NVIRONMENTA			
		M	onitoring weli	L CASING AND	WATER ELEVA	TION WORKSHEE	T
ROJECT NAME_TC	-341 Camp Gei	ger	JOB	NUMBER <u>47</u>	5-09183-01		
CATION Camp L	.ejeune, North (	Carolina		DATE	3/30/94		
SCRIPTION OF SU						evation 19.21 fee	t MSL
ELD PERSONNEL <u>V</u>							
EASURING DEVICE			evel Meter				
	ISI SIOPE INGI	Jator (11VI) Water-L	EVELIVIETER				
WELL NUMBER	MEASU	RING POINT CALCI		DEPTH TO WATER (FT)	ELEV OF WATER (FT)	PRODUCT THICKNESS (FT)	COMMENTS (ODOR, WELL COND.,
	ROD HEIGHT (FT)	INSTRUMENT HEIGHT (FT)	ELEV OF MEASURING POINT (1) (FT)				PROTECTIVE COVER CONDITION) CORRECTED W.T.EL
<b>MW</b> -1			20.59	7.80	12.91	.15	Corrected Wate Table Elevation
MW-2			21.13	10.10	12.69	2.08	Corrected Wate Table Elevation
MW-3			20.49	7.68	12.81		Good Condition
MW-4			20.47	6.97	13.50		Good Condition
MW-5			19.79	6.54	13.25		Good Condition
MW-6			19.16	7.18	11.98		Good Condition
MW-7			19.12	7.28	11.84		Good Condition
MW-8			16.56	5.01	11.55		Good Condition
MW-9			19.36	7.32	12.04		Good Condition
MW-10			19.31	6.85	12.46		Good Condition
MW-11			19.21	6.90	12.31		Good Condition
MW-12			19.75	6.61	13.14		Good Condition
MW-13			17.79	6. <b>86</b>	10.93		Good Condition
MW-14			16.31	5.52	10.79		Good Condition
MW-15			16.20	5.69	10.51		Good Condition
MW-16			16.53	4.66	11.87		Good Condition
MW-17			16.14	5.03	11.11		Good Condition

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APPENDIX F

**GROUND-WATER FLOW DIRECTION** 

JOB NAME: BUILDING TC-341 JOB NO.: 475-09183-01 WELL NO.: MW-4

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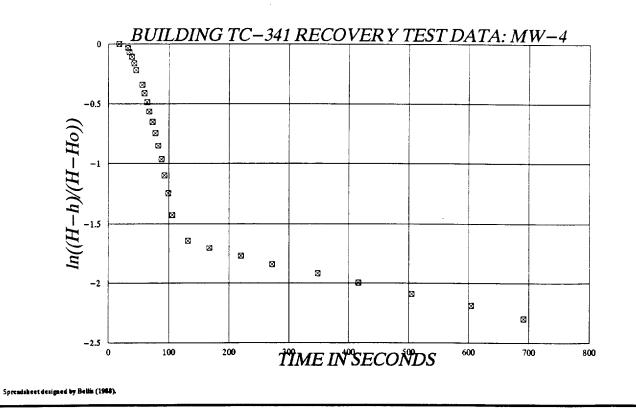
TEST BY/DATE: ENTERED BY/DATE: CHECKED/DATE:

WILKENSON/3-30-94 BELLIS/4-13-94 WILKENSON/4-13-94

#### HYDRAULIC CONDUCTIVITY (K) CALCULATION FROM SLUG OR RECOVERY TEST DATA USING HYORSLEV'S BASIC TIME-LAG METHOD FOR WELLS SCREENED ABOVE AND BELOW THE WATER TABLE

INPUT DATA					
Top of screen	5.0	Static Level (H) =	6.97 ft	r=	0.08 ft
(ft below meas. pt.)		(ft below meas, pt.)		R≠	0.33 ft
Bot of screen	15.0			L=	10 ft
(ft below meas. pt.)		Initial Reading (Ho) = (ft below meas. pt.)	11.25 ft	H-Ho=	-4.28 ft

	WATER LEVEL FT BELOW M.P.	L(13) ft	(H−h) ft	(H-h)/ (H-Ho)	LN(1) EL/	SEC			
i	11.25	3.75	-4.28	1.00	Y	x	K=r^2LN(Lft)/R)/	(2L(1)(H-h))*d(H-h)/dt	
+1	11.25	3.75	-4.28	1.00	0.00	18			
•	11.10	3.90	-4.13	0.96	-0.04	32	K (i to i+1)	0.00 f/d	0.0E+00 cm/s
•	10.95	4.05	- 3.98	0.93	-0.07	35	· · ·	0.48 f/d	1.7E-04 cm/s
•	10.80	4.20	-3.83	0.89	-0.11	39		2.29 f/d	8.1E-04 cm/s
•	10.60	4.40	-3.63	0.85	-0.16	43		1.74 f/d	6.1E-04 cm/s
•	10.40	4.60	-3.43	0.80	-0.22	48		2.37 f/d	8.4E-04 cm/s
•	10.00	5.00	-3.03	0.71	-0.35	56		3.25 f/d	1.1E-03 cm/s
•	9.80	5.20	-2.63	0.66	-0.41	60		2.05 f/d	7.2E-04 cm/s
•	9.60	5.40	-2.83	0.61	-0.49	64		2.72 f/d	9.6E-04 cm/s
•	9.40	5.60	-2.43	0.57	-0.57	68		2.85 f/d	1.0E-03 cm/s
•	9.20	5.80	-2.23	0.52	-0.65	73		3.00 f/d	1.1E-03 cm/s
•	9.00	6.00	-2.03	0.47	-0.75	78		2.55 f/d	9.0E-04 cm/s
•	8.80	6.20	-1.83	0.43	-0.85	83		2.72 f/d	9.6E-04 cm/s
•	8.60	6.40	-1.63	0.38	-0.97	88		2.94 f/d	1.0E-03 cm/s
•	8.40	6.60	-1.43	0.33	-1.10	93		3.21 f/d	1.1E-03 cm/s
•	8.20	6.80	-1.23	0.29	-1.25	99		3.56 f/d	1.3E-03 cm/s
•	8.00	7.00	-1.03	0.24	-1.42	106		3.34 f/d	1.2E-03 cm/s
•	7.80	7.20	-0.83	0.19	-1.64	132		3.31 f/d	1.2E-03 cm/s
•	7.75	7.25	-0.78	0.18	-1.70	168		1.06 f/d	3.7E-04 cm/s
•	7.70	7.30	-0.73	0.17	-1.77	220		0.22 f/d	7.7E-05 cm/s
•	7.65	7.35	-0.68	0.18	-1.84	272		0.16 f/d	5.7E-05 cm/s
•	7.60	7.40	-0. <b>63</b>	0.15	-1.92	348		0.17 f/d	6.0E-05 cm/s
•	7.55	7.45	0.58	0.14	-2.00	416		0.13 f/d	4.4E-05 cm/s
•	7.50	7.50	-0.53	0.12	-2.09	505		0.15 f/d	5.3E-05 cm/s
+n	7.45	7.55	-0.48	0.11	-2.19	604		0.13 f/d	4.4E-05 cm/s
n + 1)	7.40	7.60	-0.43	0.10	-2.30	691	K (i+n to	0.12 f/d	4.3E-05 cm/s
							i+(n+1))	0.16 f/d	5.5E05 cm/s
							Kavg =	1. <b>79 f/d</b>	6.3E-04 cm/s



•••			AFT			
	SLUG	<b>RECOVERY</b>	TEST DATA	FORM		
ŗ			~ 2111			
	JC	DB NAME		-		
· · [	10	DB NO. 475-	0192-01			
	JC	<b>BRO</b> . $40^{-1}$	01103-01			
	PREPARED BY	(nw	WELL IDENTITY	$M\omega$ - 4		i
	DATE	2-30-94	DEPTH TO TOP OF SCRI		-	
	CHECKED BY	<u></u>	DEPTH TO BOT. OF SCR		-	
	DATE		STATIC WATER LEVEL	6.97		
		F				
		CONDS ET (HNS)		WATER LEVEL		
	CLOCK TIME	ET (HMS)	ET (ACTUAL)	(1. 25	-	
	9:30	18 0 32 <b>30</b>	:3753	<u> </u>	-	4.28 dil x.9 = 3.85
		35 1:00	:35 .58	10.90	-	3.85
		39 1:30	:39 .65	10.80	-	+6.97
		43 2:00	:43 .72	10.60	-	
		46 3:00	:46 .77	10:40	-	7.4
		54 4:00	:56 .93	10.00		
		60 5:00	(:00 1.00	5.80		
		(e4 10:00	(:04 1.07	5.60	.	
		(28 15:00	1.08 1.13	5.40	-	
		73 20:00	1.13 1.22	9.20	-	
		78 25:00	1:18 1.30	9:00	.	
		83 30:00 88 40:00	1:23 1.38	8.30	.	
		88         40:00           93         50:00	1:33 1.55	8.60		
		99 1:00:00	1:39 1.65	8.20		
		106 1:10:00	1.46 1.77	8:00	•	
		(32 1:20:00	2.12 2.20	7.80		
		168 1:30:00	2:48 2.30	7.75		
		220 1:40:00	3:40 3.67	7.70		
•		272 1:50:00	4.32 4.53	7.65		-
		348 2:00:00	5.48 5.80	7.60		-
		4(6 2:30:00	10.54 6.93	7.55	, I	
		505 3:00:00	8.25 8.42	7.50	,	
		604 <u>3:30:00</u> (-91 <u>4:00:00</u>	10:04 10.07	7.45	EUT	
	9:42	<u>69</u> 4:30:00	11:31 11-52	7.40		
		5:00:00		• • • • • • • • • • • • • • • • • • •		
		5:30:00		<u> </u>		
		6:00:00				
	WATER-LEVEL MI	ETER MANUFACTURER				
		SERIAL NUMBER				
1		SLUG DIMENSIONS				

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JOB NAME: BUILDING TC-341 JOB NO.: 475-09183-01 WELL NO.: MW-7



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TEST BY/DATE: ENTERED BY/DATE: CHECKED/DATE:

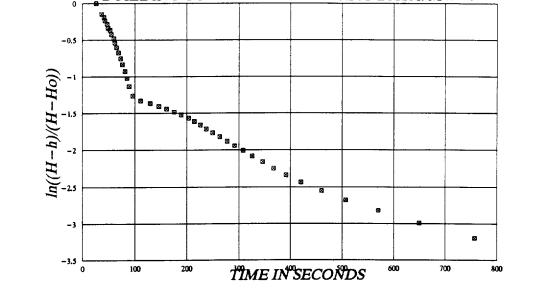
WILKENSON/3-30-94 BELLIS/4-13-94 WILKENSON/4-13-94

HYDRAULC CONDUCTIVITY (N) CALCULATION FROM SLUG OR RECOVERY TEST DATA USING HYORSLEV'S BASIC TIME - LAG METHOD FOR WELLS SCREENED ABOVE AND BELOW THE WATER TABLE

	INPUT DATA							
Top of screen (ft below meas. pt.)	5.0	Static Lavel (H) = (It below meas, pt.)	7.28 tt	r= A=	0.05 ft 0.33 ft			
Bot of screen (it below meas. pt.)	15.0	initial Reading (Ho) = (it below meas, pt.)	12.65 ft	L≕ H-Ho=	10 ft -5.37 ft			

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	WATER LEVEL FT BELOW M.P.	L(10) ft	(H—h) ft	(H-h)/ (H-Ho)	LN(1) EL	APSED TIME SEC			
i	12.65	2.35	-5.37	1.00	 Ү	x	K=r^2 LN(L0)/R	)/@L@(H-h))*d(H-h	n)/dt
+1′	12.65	2.35	-5.37	1.00	0.00	26		<b></b>	
•	11.90	3.10	-4.62	0.66	-0.15	37	K≬to i+1)	0.00 t/d	0.0E+00 cm/s
•	11.70	3.30	-4.42	0.82	-0.19	41		3.13 I/d	1.1E-03 cm/s
•	11.50	3.50	-4.22	0.79	-0.24	43		2.33 1/d	8.2E-04 cm/s
•	11.30	3.70	-4.02	0.75	-0.29	47		4.71 1/d	1.7E-03 cm/s
•	11.10	3.90	-3.82	0.71	-0.34	49		2.39 Vd	8.4E-04 cm/s
•	11.00	4.00	-3.72	0.69	-0.37	53		4.86 t/d	1.7E-03 cm/s
<u>.</u>	10.80	4.20	-3.52	0.66	-0.42	55		1.24 Vd	4.4E04 cm/s
•	10.60	4.40	-3.32	0.62	-0.48	60		5.03 t/d	1.6E++03 cm/s
:	10.40	4.60	-3.12	0.58	-0.54	62		2.07 (/d	7.3E-04 cm/s
	10.20	4.80	-2.92	0.54	-0.61	65		5.35 f/d	1.9E03 cm/s
2	10.00	5.00	-2.72	0.51	-0.68	69		3.70 t/d	1.3E-03 cm/s
2	9.60	5.20	-2.52	0.47	-0.76	73		2.90 f/d	1.0E-03 cm/s
:	9.60	5.40	-2.32 -2.12	0.43 0.39	-0.84 -0.93	76 81		3.04 f/d	1.1E-03 cm/s
	9.40	5.60 5.60	-1.92	0.36	-1.03	85		4.28 f/d	1.5E-03 cm/s
	9.20		-1.92	0.32	-1.14	89 89		2.73 f/d	9.6E-04 cm/s
	9.00 8.60	6.00 6.20	-1.72	0.32	-1.14	96		3.67 f/d 3.98 f/d	1.3E-03 cm/s
	8.70	6.30	-1.42	0.26	-1.33	111		2.50 1/d	1.4E-03 cm/s
	8.65	6.35	-1.37	0.26	-1.37	129		0.63 1/d	8.8E-04 cm/s 2.2E-04 cm/s
	8.60	6.40	-1.32	0.25	-1.40	146		0.28 1/d	2.22 -04 cm/s 9.7E-05 cm/s
	8.55	6.45	-1.27	0.24	-1.44	161		0.30 1/d	1.1E-04 cm/s
	8.50	6.50	-1.22	0.23	-1.48	175		0.35 t/d	1.2E-04 cm/s
	8.45	6.55	-1.17	0.22	-1.52	169		0.39 1/d	1.4E-04 cm/s
•	8.40	6.60	-1.12	0.21	-1.57	203		0.41 f/d	1.4E-04 cm/s
	8.35	6.65	-1.07	0.20	-1.61	214		0.42 1/d	1.5E-04 cm/s
•	8.30	6.70	-1.02	0.19	-1.66	226		0.56 t/d	2.0E-04 cm/s
•	8,25	6.75	-0.97	0.18	-1.71	237		0.53 t/d	1.9E-04 cm/s
	8,20	6.80	-0.92	0.17	-1.76	249		0.61 f/d	2.1E-04 cm/s
•	8.15	6.85	-0.87	0.16	-1.82	263		0.58 f/d	2.1E-04 cm/s
•	8.10	6.90	-0.62	0.15	-1.88	277		0.53 f/d	1.9E-04 cm/s
•	8.05	6.95	-0.77	0.14	-1.94	291		0.55 f/d	2.0E-04 cm/s
•	8.00	7.00	-0.72	0.13	-2.01	308		0.59 f/d	2.1E-04 cm/s
•	7.95	7.05	-0.67	0.12	-2.08	326		0.51 f/d	1.8E-04 cm/s
•	7.90	7.10	-0.62	0.12	-2.16	346		0.52 f/d	1.8E-04 cm/s
•	7.85	7.15	-0.57	0.11	-2.24	367		0.50 f/d	1.8E-04 cm/s
•	7.80	7.20	-0.52	0.10	-2.33	391		0.51 f/d	1.8E-04 cm/s
•	7.75	7.25	-0.47	0.09	-2.44	420		0.49 f/d	1.7E-04 cm/s
•	7.70	7.30	-0.42	0.08	-2.55	460		0.44 t/d	1.6E-04 cm/s
•	7.65	7.35	-0.37	0.07	-2.68	507		0.35 1/d	1.2E-04 cm/s
•	7.60	7.40	-0.32	0.08	-2.82	570		0.34 f/d	1.2E04 cm/s
i+n	7.55	7.45	-0.27	0.05	-2.99	649		0.29 1/d	1.0E-04 cm/s
(n+1)	7.50	7.50	-0.22	0.04	-3.19	7 <b>57</b>	K ≬+n to	0.27 1/d	9.4E05 cm/s
							i+(n+1))	0.23 t/d	8.3E05 cm/s
							Kavg =	1.68 t/d	5.9E-04 cm/s
									<u></u>



Spreadshoet designed by Bellis (1985).

SLUG	/REC	OVERY	TEST D	ATA F	ORM	
		ME TO	241			
JC	70 11A		=		(Pag	
JC	DB NO	475	-09183	3-01	(108	
		Ľ				
PREPARED BY	$\underline{\upsilon}$	<u></u>	WELL IDENTITY		Mw-7	
DATE CHECKED BY			DEPTH TO TOP DEPTH TO BOT			_
DATE			STATIC WATER	-	7.28	_
				-		
S	E CUND			1		
CLOCK TIME		(HMS)			WATER LEVEL	
10:32	26	30	.26	.43	12.65	_
	37	1:00	.37	. 62 . 68	11.90	_
	43	1:30	.43	. 72	11.50	—
	<u>-</u>	2:00	7	.78	((.30	-
	49	3:00	.49	. 82	11.10	
	53	4:00	.5.2	. 98	11.00	
	55	5:00	- 55	.92	10.080	
	60	10:00	(.00	1.00	10.60	_
	62	15:00	(.02	1.03	10:40	
	<u>65</u> 69	25:00	1:05	1.00	10.00	_
	73	30:00	1:17	1. 27	5.00	-
	76	40:00	1.6	1.27	5.60	
	81	50:00	(.21	1.35	5.40	-
	85	1:00:00	1.25		9.20	_
	89	1:10:00	1.29	(. +8	5.00	_
	96	1:20:00	1.34	1.60	8.80	-
	111	1:30:00	1.51	1.85	8.20	_
	129	1:50:00	2.29	<u>2.15</u> z.43	8.65 8.60	-
	_146	2:00:00	2.41	2.48	5.55	-
	101	2:30:00	2.55	2.92		-
	189	3:00:00	3:09	3.15	8.45	-
	203	3:30:00	3:23	3.78		_
	214	4:00:00	3.34	3. \$7	8.35	_
	226	4:30:00	38.46	<u>3.77</u>	8.30	-
	237	5:00:00	38.57	3.95	8.25	-
	249	5:30:00	4:05	4.15	8.20	-

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NOTES:

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<u></u>	G/RECOVERY			
	JOB NO. <u>475</u>		Pm	2
PREPARED BY	ww	WELL IDENTITY	Mw-7	
	E 3-30-94	DEPTH TO TOP OF SCRE		_
CHECKED BY	E	DEPTH TO BOT. OF SCRE STATIC WATER LEVEL	TEN 13' 7.28	
	ET			
CLOCK TIME	ET (HMS)	ET (ACTUAL)		
	277 0	4.37 4.62	4	<u></u>
	291 30	4.51 4.85		
	30 <b>8</b> 1:00 326 1:30	5.00 5.1		
<u></u>	346 2:00	5:44 5.7		
	367 3:00	6:07 6.12		_
	391 4:00	6:31 6.5		
	420 5:00	7:00 7.00		_
· <u>·····</u> ······························	4600 10:00	8:27 8.4.		
	<u>507</u> 15:00 570 20:00	<u>8:27 8.4</u> 9:30 9.50		
	649 25:00	10:49 10.8		
10:45	757 30:00	12:37 12.6		EOT
	40:00			_
	50:00			_
. <u></u>	1:00:00			-
	1:20:00			_
	1:30:00			_
	1:40:00			_ _
	1:50:00			_
	2:00:00			-
	3:00:00		<u></u>	_
	3:30:00		<u>_</u>	-
	4:00:00			_
	4:30:00			_
	5:00:00			-
	6:00:00			-
WATER-LEVE	METER MANUFACTURER			-
	SERIAL NUMBER			
	SLUG DIMENSIONS			

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JOB NAME: BUILDING TC-341 JOB NO.: 475-09183-01 WELL NO.: MW-9



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TEST BY/DATE: ENTERED BY/DATE: CHECKED/DATE:

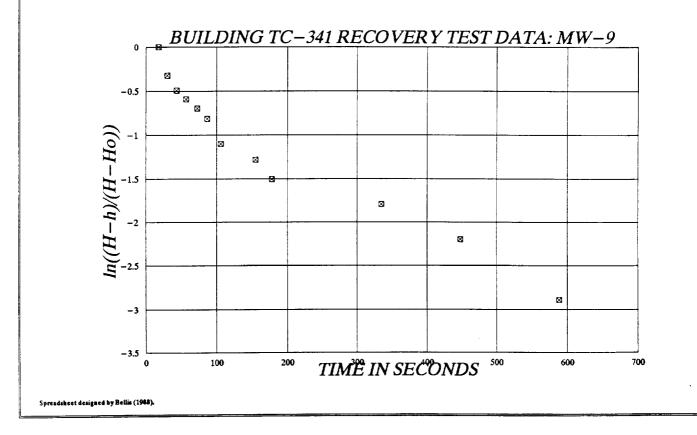
WILKENSON/3-30-94 BELLIS/4-13-94 WILKENSON/4-13-94

#### HYDRAULIC CONDUCTIVITY (K) CALCULATION FROM SLUG OR RECOVERY TEST DATA USING HYORSLEV'S BASIC TIME – LAG METHOD FOR WELLS SCREENED ABOVE AND BELOW THE WATER TABLE

		INPUT D	ATA			
Top of screen	29.0	Static Level (H) =	7.32 ft	f=	0.08 ft	
(ft below meas. pt.)		(ft below meas. pt.)		8=	0.33 ft	
Bot of screen	34.0			L=	10 ft	
(ft below meas. pt.)		Initial Reading (Ho) = (ft below meas. pt.)	7.50 ft	H-Ho=	-0.18 ft	

### CALCULATION OF HYDRAULIC CONDUCTIVITY (K)

	WATER LEVEL FT BELOW M.P.	L(1) ft	(H⊷h) ft	(Hh)/ (HHo)	LN(1) EL	APSED TIME SEC			
i	7.50	5.00	-0.18	1.00	Y	x	K=r^2LN(L(t)/R)/	(2L(t)(H-h))*d(H-h)	/dt
i+1	7.50	5.00	-0.18	1.00	0.00	18			
•	7.45	5.00	-0.13	0.72	-0.33	30	K (i to (+1)	0.00 f/d	0.0E+00 cm/s
•	7.43	5.00	-0.11	0.61	-0.49	43		4.33 f/d	1.5E~03 cm/s
•	7.42	5.00	-0.10	0.56	-0.59	56		2.07 f/d	7.3E-04 cm/s
•	7.41	5.00	-0.09	0.50	-0.69	72		1.18 f/d	4.2E-04 cm/s
•	7.40	5.00	-0.08	0.44	-0.81	86		1.06 f/d	3.7E-04 cm/s
•	7.38	5.00	-0.06	0.33	-1.10	106		1.36 f/d	4.8E-04 cm/s
•	7.37	5.00	-0.05	0.28	- 1.28	155		2.30 f/d	8.1E-04 cm/s
•	7.36	5.00	-0.04	0.22	- 1.50	178		0.60 f/d	2.1E-04 cm/s
•	7.35	5.00	-0.03	0.17	- 1.79	335		1.56 f/d	5.5E-04 cm/s
•	7.34	5.00	-0.02	0.11	2.20	448		0.29 f/d	1.0E-04 cm/s
i + (n + 1)	7.33	5.00	-0.01	0.06	-2.89	589	K (i+n to	0.57 f/d	2.0E-04 cm/s
. ,							i+(n+1))	0.76 f/d	2.7E-04 cm/s
							K avg =	1.48 f/d	5.2Ë-04 cm/s

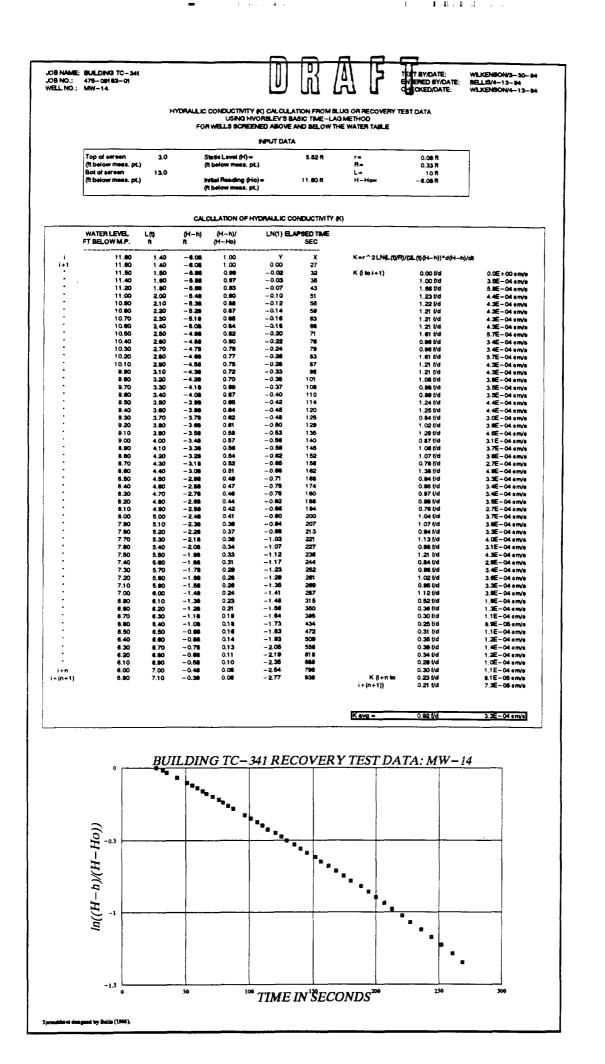


	ARECOV					
J	OB NAME	<u> </u>	- 54 (		-	
J	OB NO	+75-	09183	5-01		
PREPARED BY			WELL IDENTIT	~	MW-9	
	3-30-9	34	DEPTH TO TOP	POF SCRE	EN 25'	—
CHECKED BY			DEPTH TO BO	r. of SCR	EEN 301	
DATE			STATIC WATER			_
	ET					
CLOCK TIME	ET (HM	S)		UAL)	WATER LEVEL	_
10:05	18	0		.30	7.50	
	30	30	:30	.50	7.45	
	43	1:00	:43	.72	7.43	
<u> </u>	56	1:30	:50	.93	7.42	_
	72	2:00	1:12	1.20	7.41	
	86	4:00	<u>(:24</u> ]:44	1.43	7.40	_
<u></u>	106	5:00	2:35			_
		10:00	2:58		7.36	
<u></u>		15:00	3:35		7.35	<u> </u>
		20:00	7:28	7.47	7,34	_
10:15		25:00	9:49	9.82	7.33	_EOT
		30:00				
		40:00 50:00		+		_
		00:00				_
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	1:2	20:00				
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		\$0:00			·	
	.1	50:00	<u></u>			
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		00:00			· · · · · · · · · · · · · · · · · · ·	
	4:3	30:00				_
	5:0	00:00				_
		30:00				
		00:00	<u></u>			_
WATER-LEVEL	HETER MANUFAC					
	SERIAL NU SLUG DIMEN					

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	ORM	TEST DATA P	/RECOVERY	<u>SLUG</u>
_	_	- 341	DB NAME	JC
	Page	09183-01	<b>DB NO</b> . <u>475</u>	JC
	MW-14	ELL IDENTITY	ww	PREPARED BY
	EN <u>3'</u> EEN (3'	EPTH TO TOP OF SCRE	3-30-94	DATE
	EEN <u>(3</u>	EPTH TO BOT. OF SCR		CHECKED BY
	5.52	TATIC WATER LEVEL		DATE
	WATER LEVEL	ET (ACTUAL)	ET ECONDS ET (HMS)	
	-	35	0	4-3
	torista	itte	30	
	10.45		1:00	
		At .	1:30	
SPART	11.60	127 .45	27 2:00	11:07
	11.50	:32 .53	32 3:00	
	11.40	: 75 .58	35 4:00	
	11.20	: 43 .72	43 5:00	
	11.00	:52 .85	51 10:00	
	10:50	:55 .92	<u>55</u> 15:00	
	10:30	:59 .98 1:03 1.05		
	10:70	1.06 1.10	<u>ن 30:00</u> ماما	
	ر <u>م: می</u> ر <u>م:</u> در	(- // 1.18	71 40:00	
	10:40	1:16 1.27	76 50:00	
	(0:30	1:15 1.32	79 1:00:00	
	10:20	(-23 1.38	83 1:10:00	
	(0:10	1:27 1.45	87 1:20:00	
	4 ALE		1:30:00	
	9.90	1:34 1.60	96 1:40:00	
	9.80	1:41 1.68	101 1:50:00	
	<u>9.70</u>	1:46 1.77	106 2:00:00	
	5.60	1:50 1.83	(10 2:30:00	
	5:5	1.5× 1.90	114 3:00:00	
		2:00 2.00	120 3:30:00	
		2:05 2.08	<u>125</u> 4:00:00	
		<u>9.05</u> 2.15	E	
		2:15 2.2	5:00:00	
		2.20 2.3 2.25 2.4	145 6:00:00	

NOTES:

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					<u> </u>
SLUG	RECOVERY	TEST DAT	A FO	<u>RM</u>	
JC	B NAME	$t_{C-341}$			
				(1)	. ~)
JC	<b>DB NO</b> . <u>475-</u>	09183-01	<u>/</u>	Pros	
PREPARED BY	(vu	WELL IDENTITY		Mw-14	
DATE	3-30-94	DEPTH TO TOP OF	SCREEN		_
CHECKED BY	- /	DEPTH TO BOT. OF		(3'	_
DATE		STATIC WATER LEV	EL	5.52	-
	ET (HMS)	ET (ACTUAL	v I w		
	152 0	2:32			
	156 30	2.36			-
	162 1:00	2:42		3.60	-
	168 1:30			8-5-2	_
	174 2:00	2:54		8.40	-
	180 3:00	3.00	3.00	8.30	-
	188 4:00	3:08	3.13		
	194 5:00	3:14	3.23	8-10	_
	200 10:00	3:20	3.03	8.00	_
	207 15:00	3.27	3.45	\$ 7.20	-
	213 20:00	3:33	3.55	7.30	
	221 25:00	3:41	3.68	7.70	-
	227 30:00	3.47	3. 78	7.60	-
	236 40:00	3:56	1		-
	<u>244</u> 50:00 252 1:00:00	4:04	4.07	7.40	-
	1:10:00	4:12	4.20	7.30	-
	261 1:10:00 269 1:20:00	4:21 4:29	4.48	7.20	-
	1.00.00	4:47	4. 78	<u>7.(0</u> 7. <i>c</i> ru	-
	<u>287</u> 1:30:00 315 1:40:00	5:15	5.25	6.90	-
	350 1:50:00	5:50	5.83	6.00	-
	395 2:00:00		6.58	6.70	-
	434 2:30:00	7:14	7. 23	6.60	-
	472 3:00:00		7.87	(0.50	-
	509 3:30:00		8.48	6.40	•
	556 4:00:00	9:14	9.27	10.30	-
	h18 4:30:00		10.30	6.20	-
	688 5:00:00	11:28	11.47	6.10	
	795 5:30:00	13:15	13.25	6.00	
and the second second second second second second second second second second second second second second second	939 6:00:00	15:39	5.65	5.90	EOT
WATER-LEVEL ME					
	SERIAL NUMBER				
	SLUG DIMENSION8				

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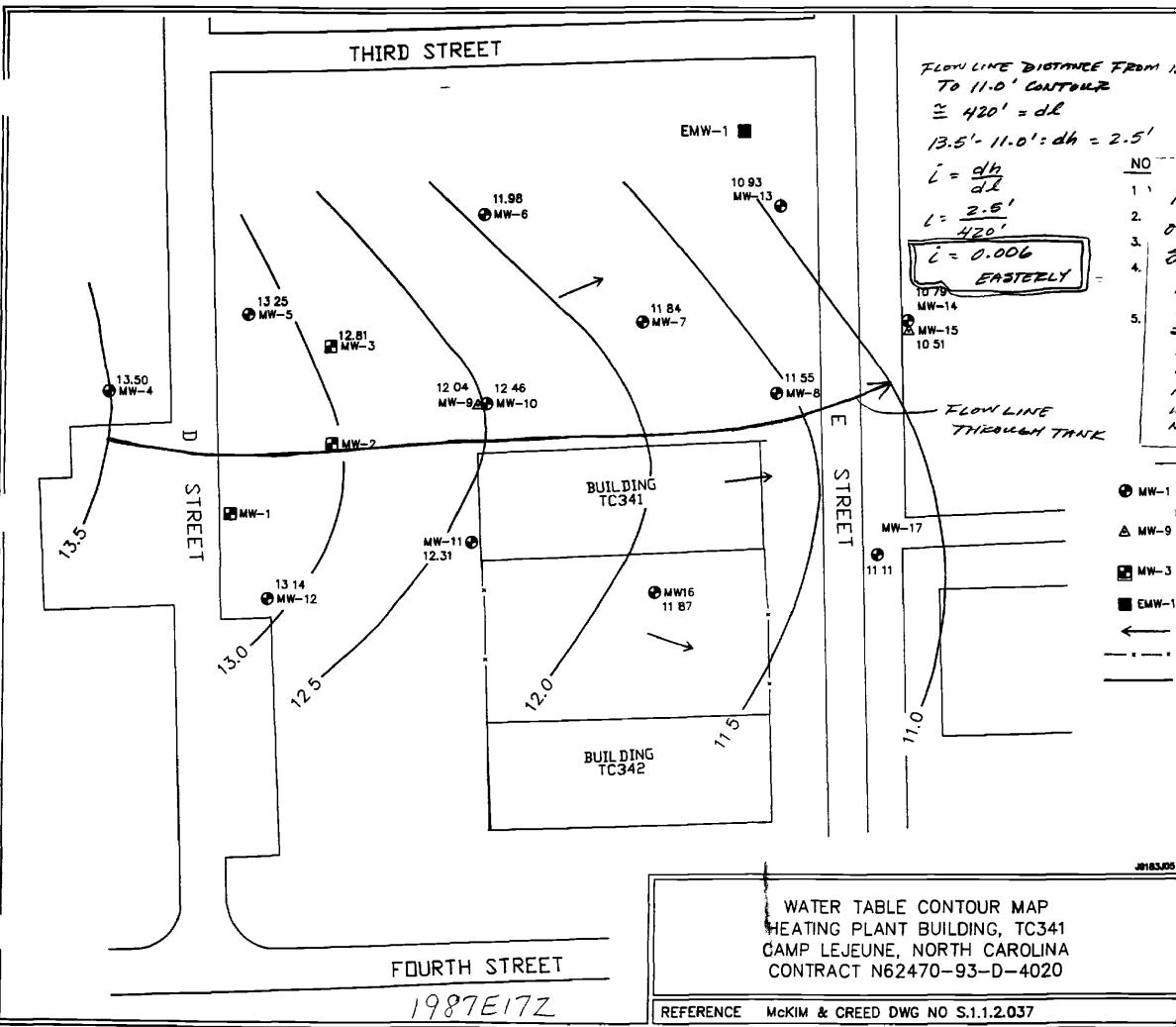


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### APPENDIX G

#### RECOVERY TEST DATA AND HYDRAULIC CONDUCTIVITY CALCULATIONS



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Add note @ E	AKEN
of legend (mor	e Dar 15
Fall () yout rea	
NOTE : NUMBERS 2	P AUTOCAD.DWG
WELLS ARE CHEMINA	TER NLY
275 3/30/94. FZEE P	ERENCED
WAS DETECTED IN WE	- CILT
MN-2 and MN-1 TA WATER TABLE ELEVAD	س هسم مدر در
THES	- NELLS
1 LOCATION OF LAW ENGINEER (MARCH 1994)	ING TYPE II MONITORING WELL
9 LOCATION OF LAW ENGINEER (MARCH 1994)	ING TYPE III MONIT <b>ORI</b> NG WELL
3 LOCATION OF ATEC WELL	
-1 LOCATION OF PRE-EXISTING	NONITORING WELL
- DIRECTION OF SHALLOW GRO	NUNDWATER FLOW
- CHAIN LINK FENCE	
- WATER TABLE ELEVATION CO	· -
GRAPHIC SCALE	
50 25 0	50 100
	FT
	ENGINEERING
	NORTH CAROLINA
DRAWN:	DATE APRIL 1994
DFT CHECK:	SCALE: 1"=50'
ENG CHECK:	JOB 475-09183-01
APPROVAL:	DWG. 5.1



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#### APPENDIX H

MONITORING WELL AND SAMPLING FIELD DATA WORKSHEETS

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		D ALDAN NORT	NGINEERING MTIC AVENUE CAROLINA 27604	
			<u>/ELL_SAMPLING_AND</u> A_WORKSHEET_	
LAW JOB NUMBER <u>475-09183-01</u>		MONITORING WE	ILL NUMBER MW-1	
SITE NAME <u>TC-341 (Camp Geiger)</u>				<u> </u>
DATE (MO/DAY/YR) 03/22/94	TIME	(MILITARY) 1255		
FIELD PERSONNEL Fischer/Whalen				
WEATHER CONDITIONS 65° Sunny				
TOTAL WELL DEPTH (TWD) <u>19.0</u>			1/10 FT. (DEPTH BELOW MEASURING	POINT)
HEIGHT OF MEASURING POINT ABO	/E LAND SURFACE	2.8	1/10 FT.	
DESCRIPTION OF MEASURING POINT	Top of Marked	Casing		
DEPTH TO GROUNDWATER (DGW)	7.8	• ···	1/100 FT. (DEPTH BELOW MEASURING	POINT)
LENGTH OF WATER COLUMN (LWC)	= TWD - DGW =		1/100 FT.	
ONE STANDING WELL VOLUME (SW	/) = LWC X		1/10 GAL.	
THREE STANDING WELL VOLUMES	= 3XSWV =		1/10 GAL = STANDARD EVACUATION VOL	UME
METHOD OF WELL EVACUATION	TEFLON BAILER	X OTHER		
TOTAL VOLUME OF WATER REMOV	Ð	1/10 GAL.	CASING DIAMETER In.	
CASING MATERIAL PVC X	S.S	TE	FLONOTHER	
SCREENED INTERVAL (FROM ID PL	ATE) <u>N/A</u>		(DEPTHS BELOW LAND SURFACE - F	т.)
STEEL GUARD PIPE AROUND CASING	G YES <u>X</u>	NO	COMMENTS	
LOCKING CAP	YES <u>X</u>	NO	No purging due to free product in MW.	
PROTECTIVE POST/ABUTMENT	YES <u>X</u>	NO	No I.D. Plate, label.	
NONPOTABLE LABEL	YES	NO <u>X</u>	Depth to FP: 7.65'	
ID PLATE	YES	NO <u>X</u>		
WELL INTEGRITY SATISFACTORY	YES <u>X</u>	NO		
WELL YIELD LOW	MODERATE	HIGH	COMMENTS	
		FIELD ANALYSE	S	
VOLUME (1/10 GAL.)				
pH (S.U.)				
SP. COND. (µMHOS/CM)				
WATER TEMP. (C)				
TURBIDITY*				
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	LAW ENGINEERING				
	MONITORING WELL SAMPLING AND				
	FIELD DATA WORKSHEET				
LAW JOB NUMBER 475-09183-01	MONITORING WELL NUMBER				
SITE NAME (Camp Geiger)					
DATE (MO/DAY/YR) 03/22/94 TIME	E (MILITARY) 1330				
FIELD PERSONNELFischer/Whalen					
WEATHER CONDITIONS 70° Sunny					
TOTAL WELL DEPTH (TWD)	1/10 FT. (DEPTH BELOW MEASURING POINT)				
HEIGHT OF MEASURING POINT ABOVE LAND SURFAC	CE <u>3.0</u> 1/10 FT.				
DESCRIPTION OF MEASURING POINT _ Top of Markee	d Casing				
DEPTH TO GROUNDWATER (DGW)	1/100 FT. (DEPTH BELOW MEASURING POINT)				
LENGTH OF WATER COLUMN (LWC) = TWD - DGW=	=1/100 FT.				
ONE STANDING WELL VOLUME (SWV) = LWC X1/10 GAL.					
THREE STANDING WELL VOLUMES = 3XSWV =	1/10 GAL = STANDARD EVACUATION VOLUME				
METHOD OF WELL EVACUATION TEFLON BAILE	R OTHER:				
I TOTAL VOLUME OF WATER REMOVED	1/10 GAL. CASING DIAMETER4 In.				
CASING MATERIAL PVCXS.S	TEFLON OTHER				
SCREENED INTERVAL (FROM ID PLATE)N/A	(DEPTHS BELOW LAND SURFACE - FT.)				
STEEL GUARD PIPE AROUND CASING YES_X	NO COMMENTS				
LOCKING CAP YES	NO X No purging due to free product in MW.				
PROTECTIVE POST/ABUTMENT YES_X	NONo lockable cap, I.D. Plate or non-potable label.				
NONPOTABLE LABEL YES	NO X Depth to FP: 8.02'				
ID PLATE YES	NO <u>X</u>				
WELL INTEGRITY SATISFACTORY YES_X	NO				
WELL YIELD LOW MODERATE	HIGH COMMENTS				
FIELD ANALYSES					
VOLUME (1/10 GAL.)					
рН (S.U.)					
SP. COND. (µMHOS/CM)					
WATER TEMP. (°C)					
TURBIDITY *					
*VISUAL DETERMINATION ONLY (1) CLEAR (2) SLIGHT (3) MODERATE (4) HIGH					

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			LL SAMPLING AND WORKSHEET	
LAW JOB NUMBER 475-09183-0	)1	MONITORING WELL	NUMBER MW-3	
SITE NAME	ler)			
DATE (MO/DAY/YR) 03/22/94	TIME	(MILITARY) <u>1540</u>		·····
FIELD PERSONNELFischer/What	alen		<u> </u>	
WEATHER CONDITIONS70° S	γυυλ	· · · · · · · · · · · · · · · · · · ·		
TOTAL WELL DEPTH (TWD) 19	.5		1/10 FT. (DEPTH B	
HEIGHT OF MEASURING POINT	ABOVE LAND SURFAC	E _ <u>2.6</u>	1/10	FT.
DESCRIPTION OF MEASURING P	OINT <u>Top of Marked</u>	l Casing	_	
DEPTH TO GROUNDWATER (DG	W) <u>7.44</u>		1/100 FT. (DEPTH I	
LENGTH OF WATER COLUMN (L	WC) = TWD - DGW =	14.66	1/100 FT.	
ONE STANDING WELL VOLUME	(SWV) = LWC X	9.7	1/10 GAL.	
THREE STANDING WELL VOLUN	ES = 3XSWV =	29.1	1/10 GAL=STANDA	RD EVACUATION VOL
METHOD OF WELL EVACUATION	TEFLON BAILE	R X OTHER:		
OTAL VOLUME OF WATER REM	10VED	1/10 GAL.	CASING DIAMETER4	In.
CASING MATERIAL PVC	<u>x                                    </u>	TEFLO	רסאכ	HER
SCREENED INTERVAL (FROM II	) PLATE)N/A		(DEPTHS BELOW	LAND SURFACE - FT.
STEEL GUARD PIPE AROUND CA	SING YES <u>X</u>	NO	COMMENTS	
LOCKING CAP	YES	NO <u>X</u>		
PROTECTIVE POST/ABUTMENT	YES <u>X</u>	NO		
NONPOTABLE LABEL	YES	NO <u>X</u>		
ID PLATE	YES	NO <u>X</u>		
WELL INTEGRITY SATISFACTOR	Y YES <u>X</u>	NO		
WELL YIELD LOW	MODERATE	<u>х</u> нідн	COMMENTS	
		FIELD ANALYSES		
VOLUME (1/10 GAL.)	0.0	14.6	29.1	
рН (S.U.)	6.36	6.49	6.46	
SP. COND. (µMHOS/CM)	250	240	230	
WATER TEMP. (C)	15.0	13.8	14.2	
TURBIDITY *	4	4	4	1

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	[[	MONITORING WE	GINEERING NTIC AVENUE CAROLINA 27604 ELL SAMPLING AND WORKSHEET	
LAW JOB NUMBER 475-09183-	01		L NUMBER <u>MW-4</u>	
SITE NAME	ger)			
DATE (MO/DAY/YR)_03/22/94	TIM	E (MILITARY) <u>1640</u>		
FIELD PERSONNEL _ Fischer/Wh	alen		·····	
WEATHER CONDITIONS 65° S	<u>unny</u>		·····	
TOTAL WELL DEPTH (TWD)	3.0		1/10 FT. (DEPTH BEL	OW MEASURING POINT)
HEIGHT OF MEASURING POINT	ABOVE LAND SURFA	CE	1/10 F	т.
DESCRIPTION OF MEASURING	OINT <u>Top of Marke</u>	d Casing		
DEPTH TO GROUNDWATER (DG	W) <u>6.85</u>		1/100 FT. (DEPTH BE	LOW MEASURING POINT
LENGTH OF WATER COLUMN (I	.WC) = TWD - DGW =	=8.25	1/100 FT.	
ONE STANDING WELL VOLUME	(SWV) = LWC X	1.4	1/10 GAL.	
THREE STANDING WELL VOLUM	1ES = 3XSWV =	4.2	1/10 GAL=STANDARD	EVACUATION VOLUME
METHOD OF WELL EVACUATIO	N TEFLON BAILI	ER X OTHER:	<u></u>	
TOTAL VOLUME OF WATER RE	MOVED	1/10 GAL.	CASING DIAMETER	In.
CASING MATERIAL PVC	<u>x</u> s.s	TEFL	. <b>ON</b> OTH	ER
SCREENED INTERVAL (FROM I	D PLATE)3.0'	-13.0′	(DEPTHS BELOW	LAND SURFACE - FT.)
STEEL GUARD PIPE AROUND C	ASING YES <u>X</u>	NO	COMMENTS	
LOCKING CAP	YES <u>X</u>	NO		· · · · · · · · · · · · · · · · · · ·
PROTECTIVE POST/ABUTMENT	YES <u>X</u>	NO		
NONPOTABLE LABEL	YES_X	NO	<u></u>	······
ID PLATE	YES_X	NO		
WELL INTEGRITY SATISFACTOR	RY YES <u>X</u>	NO		
WELL YIELD LOW	MODERATE	<u>x</u> HIGH	COMMENTS	
		FIELD ANALYSES		
VOLUME (1/10 GAL.)	0.0	2.1	4.2	
рН (S.U.)	6.41	6.50	6.43	
SP. COND. (µMHOS/CM)	125	120	100	
WATER TEMP. (°C)	15.5	14.6	14.2	
TURBIDITY*	4	4	4	_

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LAW ENGINEERING D AGO1 ATLANTIC AVENUE RALEIGH, NORTH CAROLINA 27604							
MONITORING WELL SAMPLING AND FIELD DATA WORKSHEET							
LAW JOB NUMBER 475-09	183-01		NUMBER <u>MW-5</u>				
SITE NAME TC-341 (Camp Geiger)							
DATE (MO/DAY/YR) 03/22/94 TIME (MILITARY) 1135							
FIELD PERSONNEL Fische	r/Whalen		·····	······································			
WEATHER CONDITIONS 6	5° Sunny						
TOTAL WELL DEPTH (TWD)	13.0		1/10 FT. (DEPTH BELOV	V MEASURING POINT)			
HEIGHT OF MEASURING PC	INT ABOVE LAND SURFAC	E <u>2.0</u>	1/10 FT.				
DESCRIPTION OF MEASURI	NG POINT <u>Top of Marked</u>	Casing					
DEPTH TO GROUNDWATER	(DGW) <u>6.38</u>		1/100 FT. (DEPTH BELC	W MEASURING POINT)			
LENGTH OF WATER COLUN	(LWC) = TWD - DGW =	8.62	1/100 FT.				
ONE STANDING WELL VOL	UME (SWV) = LWC X	1.5	1/10 GAL.				
THREE STANDING WELL VO	THREE STANDING WELL VOLUMES = $3XSWV = 4.5$ $1/10 \text{ GAL} = STANDARD EVACUATION VOLUME$						
METHOD OF WELL EVACUA	TION TEFLON BAILER	R X OTHER:					
OTAL VOLUME OF WATE	R REMOVED	1/10 GAL.	CASING DIAMETER	In.			
CASING MATERIAL PVC	<u>x</u> S.S	TEFL	ONOTHER	l			
SCREENED INTERVAL (FR	OM ID PLATE) 3.0' -:	13.0′	(DEPTHS BELOW LA	AND SURFACE - FT.)			
STEEL GUARD PIPE AROUN	D CASING YES X	NO	COMMENTS				
LOCKING CAP	YES <u>X</u>	NO					
PROTECTIVE POST/ABUTM	<b>EN</b> T YES <u>X</u>	NO					
NONPOTABLE LABEL	YES_X	NO					
ID PLATE	YES <u>X</u>	NO					
WELL INTEGRITY SATISFAC	CTORY YES <u>X</u>	NO					
WELL YIELD LOW	MODERATE	<u>х</u> нідн	COMMENTS				
FIELD ANALYSES							
VOLUME (1/10 GAL.)	0.0	2.3	4.5				
pH (S.U.)	6.05	5.83	5.76				
SP. COND. (µMHOS/CM)	60	65	65				
WATER TEMP. (C)	14.3	14.0	14.2	· · · · · · · · · · · · · · · · · · ·			
TURBIDITY*	4	4	4				
	*VISUAL DETERMINATION ONLY (1) CLEAR (2) SLIGHT (3) MODERATE (4) HIGH						

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D 3801 ATLANTIC AVENUE HALEGH, NORTH CAROLINA 27604						
			<u>ELL SAMPLING AND</u> A WORKSHEET			
LAW JOB NUMBER 475-0918	33-01	MONITORING WEL	L NUMBER <u>MW-6</u>			
SITE NAME _TC-341 (Camp (	Geiger)					
DATE (MO/DAY/YR) 03/22/94	1 TIME	(MILITARY) 1015		·		
FIELD PERSONNEL	Whalen					
WEATHER CONDITIONS _ 60	° Sunny					
TOTAL WELL DEPTH (TWD)	13.0		1/10 FT. (DEPTH BEL	OW MEASURING POINT)		
HEIGHT OF MEASURING POIN	IT ABOVE LAND SURFAC	E <u>2.0</u>	1/10 F	<b>-</b> Т.		
DESCRIPTION OF MEASURIN	G POINT <u>Top of Marked</u>	Casing	_			
DEPTH TO GROUNDWATER (	DGW) <u>7.13</u>		1/100 FT. (DEPTH BE	LOW MEASURING POINT)		
LENGTH OF WATER COLUMN	I (LWC) = TWD - DGW =	7.87	1/100 FT.			
ONE STANDING WELL VOLU	ME (SWV) = LWC X	1.3	1/10 GAL.			
THREE STANDING WELL VOL	UMES = 3XSWV =	3.9	1/10 GAL=STANDARD	EVACUATION VOLUME		
METHOD OF WELL EVACUAT	TON TEFLON BAILEF	R OTHER:_	. <u></u>			
OTAL VOLUME OF WATER	REMOVED	1/10 GAL.	CASING DIAMETER	In.		
CASING MATERIAL PVC	_X\$.\$	TEFL	.ON OTH	IER		
SCREENED INTERVAL (FRO	M ID PLATE) 3.0' -1	13.0'	(DEPTHS BELOW	LAND SURFACE - FT.)		
STEEL GUARD PIPE AROUND	CASING YES <u>X</u>	NO	COMMENTS			
LOCKING CAP	YES_X	NO				
PROTECTIVE POST/ABUTMEN	NT YES <u>X</u>	NO				
NONPOTABLE LABEL	YES <u>X</u>	NO		· · · · · · · · · · · · · · · · · · ·		
ID PLATE	YES <u>X</u>	NO	<u></u>			
WELL INTEGRITY SATISFACT	ORY YES <u>X</u>	NO	<u> </u>			
WELL YIELD LOW	MODERATE	<u>х</u> нісн	COMMENTS			
FIELD ANALYSES						
VOLUME (1/10 GAL.)	0.0	2.0	3.9			
pH (S.U.)	4.95	4.80	4.73			
SP. COND. (µMHOS/CM)	80	70	65			
WATER TEMP. (°C)	14.3	13.6	13.3			
TURBIDITY*	4	4	4			

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	-	D) 1101 ATLAN HALLIGH, NORTH MONITORING WEL FIELD DATA	L SAMPLING AND	
LAW JOB NUMBER 475-09183	-01	MONITORING WELL	NUMBER <u>MW-7</u>	
SITE NAME	iger)			
DATE (MO/DAY/YR) 03/16/94	тім	E (MILITARY) <u>1330</u>	<u>.</u>	
FIELD PERSONNEL				· · · · · · · · · · · · · · · · · · ·
WEATHER CONDITIONS 70° F	Partly Cloudy	<u>.</u>		
TOTAL WELL DEPTH (TWD) 1	3.0		1/10 FT. (DEPTH BEL	OW MEASURING PC
HEIGHT OF MEASURING POINT	ABOVE LAND SURFA	CE <u>2.0</u>	1/10	FT.
DESCRIPTION OF MEASURING	POINT <u>Top of Marke</u>	d Casing	_	
DEPTH TO GROUNDWATER (DO	6.6		1/100 FT. (DEPTH BE	LOW MEASURING P
LENGTH OF WATER COLUMN (	LWC) = TWD - DGW <del>≠</del>	8.4	1/100 FT.	
ONE STANDING WELL VOLUME	(SWV) = LWC X	.17 = 1.4	1/10 GAL.	
THREE STANDING WELL VOLUN	MES = 3XSWV =	4.3	1/10 GAL = STANDARD E	VACUATION VOLUM
METHOD OF WELL EVACUATIO	N TEFLON BAILE	R X OTHER:	- <b>.</b>	
TOTAL VOLUME OF WATER RE	MOVED4.3	1/10 GAL.	CASING DIAMETER 2	In.
CASING MATERIAL PVC	<u>x</u> s.s	TEFLO	N OTH	IER
SCREENED INTERVAL (FROM	D PLATE) 3.0'	- 13.0′	(DEPTHS BELOW	LAND SURFACE - F
STEEL GUARD PIPE AROUND C	ASING YES <u>X</u>	NO (	COMMENTS	
LOCKING CAP	YES <u>X</u>	NO		
PROTECTIVE POST/ABUTMENT	YES <u>X</u>	NO		
NONPOTABLE LABEL	YES <u>X</u>	NO		
ID PLATE	YES <u>X</u>	NO		
WELL INTEGRITY SATISFACTOR	RY YES <u>X</u>	NO		
WELL YIELD LOW	MODERATE	X HIGH	COMMENTS	
		FIELD ANALYSES		
VOLUME (1/10 GAL.)	0.0	2.2	4.3	
pH (S.U.)				
рн (S.U.) SP. COND. (µMHOS/CM)				

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LAW ENGINEERING D 3/301 AULANTIC AVENUE RALEIGHI NURTH CAROLINA 27604						
MONITORING WELL SAMPLING AND FIELD DATA WORKSHEET						
LAW JOB NUMBER <u>475-09</u>	183-01		ELL NUMBER <u>MW-8</u>			
SITE NAME _ TC-341 (Camp Geiger)						
DATE (MO/DAY/YR) 03/22/94 TIME (MILITARY) 1715						
FIELD PERSONNEL	r/Whalen					
WEATHER CONDITIONS _7	0° Sunny	·				
TOTAL WELL DEPTH (TWD)	13.0		1/10 FT. (DEPTH BELC	OW MEASURING POINT)		
			1/10 F <sup>-</sup>			
DESCRIPTION OF MEASURI	NG POINT <u>Top of Marked</u>	Casing				
DEPTH TO GROUNDWATER	R (DGW) _4.94		1/100 FT. (DEPTH BEI	OW MEASURING POINT)		
LENGTH OF WATER COLUN	(LWC) = TWD - DGW =	8.06	1/100 FT.			
ONE STANDING WELL VOL	UME (SWV) = LWC X	1.4	1/10 GAL.			
			1/10 GAL=STANDARD E	VACUATION VOLUME		
OTAL VOLUME OF WATE	REMOVED	1/10 GAL.	CASING DIAMETER	In.		
CASING MATERIAL PVC	<u>x</u> s.s	TEF	LONOTHE	R		
SCREENED INTERVAL (FR	OM ID PLATE)3.0' -1	13.0′	(DEPTHS BELOW I	LAND SURFACE - FT.)		
STEEL GUARD PIPE AROUN	D CASING YES X	NO	COMMENTS			
LOCKING CAP	YES <u>X</u>	NO				
PROTECTIVE POST/ABUTM	ENT YES	NO <u>X</u>				
NONPOTABLE LABEL	YES <u>X</u>	NO				
ID PLATE	YES_X	NO				
' WELL INTEGRITY SATISFAC	CTORY YES <u>X</u>	NO				
WELL YIELD LOW	MODERATE	<u>х</u> нідн	COMMENTS			
FIELD ANALYSES						
VOLUME (1/10 GAL.)	0.0	2.1	4.2			
рН (S.U.)	5.32	5.45	5.18	<u></u>		
SP. COND. (µMHOS/CM)	110	110	110	<u> </u>		
WATER TEMP. ('C)	14.6	14.3	13.7			
TURBIDITY*	4	4	4	- <del> </del>		
*VISUAL DETERMINATION (1) CLEAR (2) SLIGHT (3) M						

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		D 3101 AFLA	GINEERING MIC AVENUE CAROLINA 27604 ELL SAMPLING AND WORKSHEET	
LAW JOB NUMBER 475-09183	-01	MONITORING WEL	L NUMBER MW-9	
SITE NAME <u>TC-341 (Camp Ge</u>				
DATE (MO/DAY/YR) 03/22/94		E (MILITARY) 1050		
FIELD PERSONNEL				······································
WEATHER CONDITIONS _ 60° S			11	
TOTAL WELL DEPTH (TWD) <u>3</u>			1/10 ET (DEPTH BEI	
HEIGHT OF MEASURING POINT				
DESCRIPTION OF MEASURING			,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	
DEPTH TO GROUNDWATER (DO			 1/100 ET (DEPTH B)	
LENGTH OF WATER COLUMN (				
ONE STANDING WELL VOLUME				
THREE STANDING WELL VOLU				
METHOD OF WELL EVACUATIO				
OTAL VOLUME OF WATER RE				
CASING MATERIAL PVC				
SCREENED INTERVAL (FROM				
STEEL GUARD PIPE AROUND C				
LOCKING CAP	YES	NO X	No lockable cap.	
PROTECTIVE POST/ABUTMENT		NO		
	YES_X	NO		
	YES_X	NO		
ID PLATE WELL INTEGRITY SATISFACTO			- <u></u>	
		NO HIGH		
WELL YIELD LOW		FIELD ANALYSES		
VOLUME (1/10 GAL.)	0.0	6.3	12.6	
pH (S.U.)	6.48	7.24	7.86	
SP. COND. (µMHOS/CM)	480	490	470	
WATER TEMP. ('C)	18.2	19.0	18.9	
TURBIDITY*	3	3	3	
		1		1

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			L SAMPLING AND WORKSHEET	
LAW JOB NUMBER 475-09	183-01		NUMBER	
SITE NAME	p Geiger)			
DATE (MO/DAY/YR) 03/16	/94 TIM	E (MILITARY) 1430		
FIELD PERSONNEL	son			
WEATHER CONDITIONS	0° Partly Cloudy			
TOTAL WELL DEPTH (TWD	) _13.0		1/10 FT. (DEPTH BELO)	W MEASURING POIN
HEIGHT OF MEASURING PO	DINT ABOVE LAND SURFA	CE <u>2.0</u>	1/10 FT	
DESCRIPTION OF MEASUR	ING POINT <u>Top of Marke</u>	d Casing	_	
DEPTH TO GROUNDWATER	R (DGW) <u>5.0 <sup>5</sup></u> 0		1/100 FT. (DEPTH BELC	W MEASURING POIN
	MN (LWC) ≠ TWD - DGW=	=9.0	1/100 FT.	
ONE STANDING WELL VOL	UME (SWV) = LWC X	.17 = 1.5	1/10 GAL.	
THREE STANDING WELL V	DLUMES = 3XSWV =	4.6	1/10 GAL=STANDARD EVA	CUATION VOLUME
METHOD OF WELL EVACUA	ATION TEFLON BAIL	ERX OTHER:		
TOTAL VOLUME OF WATE	R REMOVED4.6	1/10 GAL.	CASING DIAMETER 2	_ In.
CASING MATERIAL PVC	S.S	TEFLO	N OTHER	۹
SCREENED INTERVAL (FR	OM ID PLATE) 3.0'	- 13.0′	(DEPTHS BELOW LA	ND SURFACE - FT.)
STEEL GUARD PIPE AROUN	ID CASING YES <u>X</u>	NO	COMMENTS	
LOCKING CAP	YES_X	NO		
PROTECTIVE POST/ABUTM	ENT YES <u>x</u>	NO		
NONPOTABLE LABEL	YES <u>X</u>	NO		
ID PLATE	YES <u>X</u>	NO		
WELL INTEGRITY SATISFA	CTORY YES <u>X</u>	NO		
WELL YIELD LOW_X	MODERATE	нісн	COMMENTS	
		FIELD ANALYSES		
VOLUME (1/10 GAL.)	0.0	2.3	4.6	
pH (S.U.)		ļ		
SP. COND. (µMHOS/CM)		<u> </u>		
WATER TEMP. ('C)		ļ		 
TURBIDITY	4	4	4	

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MONITORING WELL SAMPLING AND HELD DATA WORKSHEET           LAW JOB NUMBER 425-09183-01         MONITORING WELL NUMBER MW-11           SITE NAME TC 341 (Camp Geiger)         MONITORING WELL NUMBER MW-11           DATE (MO/DAYYR) 03/22/94         TIME (MILTARY) 1115           HELD PERSONNEL Fischer/Whalen         Image: Monitoring well numbers monitoring well numbers monitoring monitori				Cineering NTIC Avenue Carolina 27604	
SITE NAME         TC.341 (Camp Geiger)           DATE IMO/DAY/YR)         03/22/84         TIME (MILITARY)           FIELD PERSONNEL         Fischer/Mhalen           WEATHER CONDITIONS         68° Sunny           TOTAL WELL DEPTH (TWD)         13.0           HEIGHT OF MEASURING POINT ABOVE LAND SURFACE         1.9           DEECRIPTION OF MEASURING POINT ABOVE LAND SURFACE         1.9           DEECRIPTION OF MEASURING POINT Top of Marked Casing         1/100 FT.           DEETH TO GROUNDW-ATER (DGW)         5.90           LENGTH OF WATER COLUMN (LWC) = TWD - DGW =         8.0           SOME STANDING WELL VOLUME (SWV) = LWC X         1.4           THREE STANDING WELL VOLUME (SWV) = LWC X         1.4           THREE STANDING WELL VOLUMES = 3XSWV =         4.2           METHOD OF WELL EVACUATION         TEFLON BAILER           METHOD OF WELL EVACUATION         TEFLON BAILER           SCREENED INTERVAL         (FROM ID PLATE)           3.0' - 13.0'         IDEPTHS BELOW LAND SURFACE - FT.)           STEEL GUARD PIPE AROUND CASING YES X         NO           NONPOTABLE LABEL         YES X         NO           NONPOTABLE LABEL         YES X         NO           NONPOTABLE LABEL         YES X         NO           WELL YIELD <t< td=""><td></td><td></td><td></td><td></td><td></td></t<>					
DATE (MO/DAY/R)         05/22/94         TIME (MILITARY)         1115           FIELD PERSONNEL         Fischer/Whalen	LAW JOB NUMBER 475-09	183-01		L NUMBER MW-11	
FIELD PERSONNEL	SITE NAME	) Geiger)			······································
WEATHER CONDITIONS         65° SUNDY           TOTAL WELL DEPTH (TWO)	DATE (MO/DAY/YR) <u>03/22/</u>	94 TIME	(MILITARY) <u>1115</u>		
TOTAL WELL DEPTH (TWD)       13.0       1/10 FT. (DEPTH BELOW MEASURING POINT)         HEIGHT OF MEASURING POINT ABOVE LAND SURFACE       1.9       1/10 FT.         DESCRIPTION OF MEASURING POINT       Top of Marked Casing       1/100 FT.         DEPTH TO GROUNDWATER (DGW)       6.90       1/100 FT.         LENGTH OF WATER COLUMN (LWC)       TWD - DGW=       8.0       1/100 FT.         ONE STANDING WELL VOLUME (SWV)       LWC X       1.4       1/10 GAL.         THREE STANDING WELL VOLUME (SWV)       LWC X       1.4       1/10 GAL.         THREE STANDING WELL VOLUME S       3XSWV =       4.2       1/10 GAL.         THREE STANDING WELL VOLUME S       3XSWV =       4.2       1/10 GAL.         THREE STANDARD EVACUATION       TEFLON BAILER       X       OTHER:         JTAL VOLUME OF WATER REMOVED       4.2       1/10 GAL.       CASING DIAMETER         SCREENED INTERVAL (FROM ID PLATE)       3.0' - 13.0'       IDEPTHS BELOW LAND SURFACE - FT.)         STEEL GUARD PIPE AROUND CASING YES X       NO       COMMENTS         LOCKING CAP       YES X       NO       PROTECTIVE POST/ABUTMENT       YES X       NO         NOPPOTABLE LABEL       YES X       NO       PROTECTIVE POST/ABUTMENT       YES X       NO         WELL INTEGRITY SAT		r/Whalen	<u></u>		
TOTAL WELL DEPTH (TWD)       13.0       1/10 FT. (DEPTH BELOW MEASURING POINT)         HEIGHT OF MEASURING POINT ABOVE LAND SURFACE       1.9       1/10 FT.         DESCRIPTION OF MEASURING POINT       Top of Marked Casing       1/100 FT.         DEPTH TO GROUNDWATER (DGW)       6.90       1/100 FT.         LENGTH OF WATER COLUMN (LWC)       TWD - DGW=       8.0       1/100 FT.         ONE STANDING WELL VOLUME (SWV)       LWC X       1.4       1/10 GAL.         THREE STANDING WELL VOLUME (SWV)       LWC X       1.4       1/10 GAL.         THREE STANDING WELL VOLUME S       3XSWV =       4.2       1/10 GAL.         THREE STANDING WELL VOLUME S       3XSWV =       4.2       1/10 GAL.         THREE STANDARD EVACUATION       TEFLON BAILER       X       OTHER:         JTAL VOLUME OF WATER REMOVED       4.2       1/10 GAL.       CASING DIAMETER         SCREENED INTERVAL (FROM ID PLATE)       3.0' - 13.0'       IDEPTHS BELOW LAND SURFACE - FT.)         STEEL GUARD PIPE AROUND CASING YES X       NO       COMMENTS         LOCKING CAP       YES X       NO       PROTECTIVE POST/ABUTMENT       YES X       NO         NOPPOTABLE LABEL       YES X       NO       PROTECTIVE POST/ABUTMENT       YES X       NO         WELL INTEGRITY SAT	WEATHER CONDITIONS 6	5° Sunny			
DESCRIPTION OF ME ASURING POINT         Top of Marked Casing           DEPTH TO GROUNDWATER (DGW)         6.90         1/100 FT. (DEPTH BELOW MEASURING POINT           LENGTH OF WATER COLUMN (LWC)         TWD - DGW =         8.0         1/100 FT.           ONE STANDING WELL VOLUME (SWV)         LWC X         1.4         1/10 GAL.           THREE STANDING WELL VOLUMES = 3XSWV =         4.2         1/10 GAL.         1/10 GAL.           METHOD OF WELL EVACUATION         TEFLON BAILER         X         OTHER:           DTAL VOLUME OF WATER REMOVED         4.2         1/10 GAL.         CASING DIAMETER 2         in.           CASING MATERIAL PVC         X         S.S.         TEFLON         OTHER           SCREENED INTERVAL (FROM ID PLATE)         3.0' - 13.0'         (DEPTHS BELOW LAND SURFACE - FT.)           STEEL GUARD PIPE AROUND CASING YES X         NO         COMMENTS           LOCKING CAP         YES X         NO					W MEASURING POINT)
DEPTH TO GROUNDWATER (DGW)       6.90       1/100 FT. (DEPTH BELOW MEASURING POIN         LENGTH OF WATER COLUMN (LWC)       = TWD - DGW =8.0       1/100 FT.         ONE STANDING WELL VOLUME (SWV)       = LWC X       1.4       1/10 GAL.         THREE STANDING WELL VOLUMES = 3XSWV =	HEIGHT OF MEASURING PO	INT ABOVE LAND SURFACE	E	1/10 FT	
LENGTH OF WATER COLUMN (LWC) = TWD - DGW =					
ONE STANDING WELL VOLUME (SWV) = LWC X       1.4       1/10 GAL.         THREE STANDING WELL VOLUMES = 3XSWV =       4.2       1/10 GAL = STANDARD EVACUATION VOLUME         METHOD OF WELL EVACUATION       TEFLON BAILER       X       OTHER:         )TAL VOLUME OF WATER REMOVED       4.2       1/10 GAL.       CASING DIAMETER 2_ in.         CASING MATERIAL PVC       X       S.S.       TEFLON       OTHER         SCREENED INTERVAL (FROM ID PLATE)       3.0' - 13.0'       (DEPTHS BELOW LAND SURFACE - FT.)         STEEL GUARD PIPE AROUND CASING YES X       NO       (DEPTHS BELOW LAND SURFACE - FT.)         STEEL GUARD PIPE AROUND CASING YES X       NO       (DEPTHS BELOW LAND SURFACE - FT.)         STEEL GUARD PIPE AROUND CASING YES X       NO       (DEPTHS BELOW LAND SURFACE - FT.)         STEEL GUARD PIPE AROUND CASING YES X       NO       (DEPTHS BELOW LAND SURFACE - FT.)         STEEL GUARD PIPE AROUND CASING YES X       NO       (DEPTHS BELOW LAND SURFACE - FT.)         STEEL GUARD PIPE AROUND CASING YES X       NO       (DEPTHS BELOW LAND SURFACE - FT.)         STEEL GUARD PIPE AROUND CASING YES X       NO       (DEPTHS BELOW LAND SURFACE - FT.)         NOPOTABLE LABEL       YES X       NO       (DEPTHS BELOW LAND SURFACE - FT.)         WELL YIELD       LOW       MODERATE       NO       (DEPTHS BEL	DEPTH TO GROUNDWATER	(DGW) <u>6.90</u>		1/100 FT. (DEPTH BEL	OW MEASURING POINT)
THREE STANDING WELL VOLUMES = 3XSWV =       4.2       1/10 GAL = STANDARD EVACUATION VOLUME         METHOD OF WELL EVACUATION       TEFLON BAILERXOTHER:					
METHOD OF WELL EVACUATION         TEFLON BAILER         X         OTHER:           )TAL VOLUME OF WATER REMOVED         4.2         1/10 GAL.         CASING DIAMETER _2	ONE STANDING WELL VOLU	JME (SWV) = LWC X	1.4	1/10 GAL.	
TAL VOLUME OF WATER REMOVED       4.2       1/10 GAL.       CASING DIAMETER _ 2 In.         CASING MATERIAL PVC       X       S.S.       TEFLON       OTHER         SCREENED INTERVAL (FROM ID PLATE)       3.0' - 13.0'       (DEPTHS BELOW LAND SURFACE - FT.)         STEEL GUARD PIPE AROUND CASING YES_X       NO       COMMENTS         LOCKING CAP       YES_X       NO	THREE STANDING WELL VO	)LUMES = 3XSWV =	4.2	1/10 GAL = STANDARD E	ACUATION VOLUME
CASING MATERIAL PVCXS.STEFLONOTHEROTHER         SCREENED INTERVAL (FROM ID PLATE)       3.0' - 13.0'       (DEPTHS BELOW LAND SURFACE - FT.)         STEEL GUARD PIPE AROUND CASING YES_XNO       NOCOMMENTS       COMMENTS	METHOD OF WELL EVACUA	TION TEFLON BAILER	XOTHER:		
SCREENED INTERVAL (FROM ID PLATE)       3.0' - 13.0'       (DEPTHS BELOW LAND SURFACE - FT.)         STEEL GUARD PIPE AROUND CASING YES X       NO       COMMENTS         LOCKING CAP       YES X       NO	)TAL VOLUME OF WATEF	REMOVED 4.2	1/10 GAL.	CASING DIAMETER _ 2	In.
STEEL GUARD PIPE AROUND CASING YES X     N0 COMMENTS	CASING MATERIAL PVC	<u> </u>	TEFL	ON OTHE	R
LOCKING CAP       YES_X       N0         PROTECTIVE POST/ABUTMENT       YES_X       N0         NONPOTABLE LABEL       YES_X       N0         ID PLATE       YES_X       N0	SCREENED INTERVAL (FRO	OM ID PLATE) 3.0' - '	13.0′	(DEPTHS BELOW L	AND SURFACE - FT.)
PROTECTIVE POST/ABUTMENT       YES_X       NO         NONPOTABLE LABEL       YES_X       NO         ID PLATE       YES_X       NO         'WELL INTEGRITY SATISFACTORY       YES_X       NO         WELL YIELD       LOW       MODERATE_X       HIGHCOMMENTS	STEEL GUARD PIPE AROUN	D CASING YES X	NO	COMMENTS	
NONPOTABLE LABEL       YES_X       NO	LOCKING CAP	YES <u>X</u>	NO		
ID PLATE       YES_X       NO         'WELL INTEGRITY SATISFACTORY       YES_X       NO         WELL YIELD       LOW       MODERATE_X       HIGHCOMMENTS         FIELD ANALYSES         VOLUME (1/10 GAL.)       0.0       2.1       4.2         pH (S.U.)       6.32       5.96       5.86         SP. COND. (µMHOS/CM)       95       85       80         WATER TEMP. (*C)       16.4       15.4       15.0	PROTECTIVE POST/ABUTM	ENT YES <u>x</u>	NO		
WELL INTEGRITY SATISFACTORY       YES_X       NO         WELL YIELD       LOW       MODERATE_X       HIGHCOMMENTS         FIELD ANALYSES         VOLUME (1/10 GAL.)       0.0       2.1       4.2         pH (S.U.)       6.32       5.96       5.86         SP. COND. (µMHOS/CM)       95       85       80         WATER TEMP. (*C)       16.4       15.4       15.0	NONPOTABLE LABEL	YES <u>X</u>	NO		
WELL YIELD         LOW         MODERATEX         HIGH         COMMENTS           FIELD ANALYSES           VOLUME (1/10 GAL.)         0.0         2.1         4.2           pH (S.U.)         6.32         5.96         5.86           SP. COND. (µMHOS/CM)         95         85         80           WATER TEMP. (*C)         16.4         15.4         15.0	ID PLATE	YES <u>X</u>	NO		
FIELD ANALYSES         VOLUME (1/10 GAL.)       0.0       2.1       4.2         pH (S.U.)       6.32       5.96       5.86         SP. COND. (µMHOS/CM)       95       85       80         WATER TEMP. (*C)       16.4       15.4       15.0	WELL INTEGRITY SATISFAC	TORY YES X	NO		
VOLUME (1/10 GAL.)         0.0         2.1         4.2           pH (S.U.)         6.32         5.96         5.86           SP. COND. (µMHOS/CM)         95         85         80           WATER TEMP. (*C)         16.4         15.4         15.0	WELL YIELD LOW	MODERATE>	<u>к</u> Нідн	COMMENTS	·····
pH (S.U.)         6.32         5.96         5.86           SP. COND. (µMHOS/CM)         95         85         80           WATER TEMP. (*C)         16.4         15.4         15.0			FIELD ANALYSES		
SP. COND. (µMHOS/CM)         95         85         80           WATER TEMP. (*C)         16.4         15.4         15.0	VOLUME (1/10 GAL.)	0.0	2.1	4.2	
WATER TEMP. (*C)         16.4         15.4         15.0	pH (S.U.)	6.32	5.96	5.86	ļ,
	SP. COND. (µMHOS/CM)	95	85	80	
	WATER TEMP. (C)	16.4	15.4	15.0	
TURBIDITY* 4 4 4	TURBIDITY*	4	4	4	
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		BALENGH NORTH	L SAMPLING AND	
			WORKSHEET	
LAW JOB NUMBER 475-09183-0	01		NUMBER MW-12	
SITE NAME _TC-341 (Camp Gei				
DATE (MO/DAY/YR) 03/22/94	TIME	(MILITARY) 1655		-
FIELD PERSONNEL Fischer/Wh				
WEATHER CONDITIONS 70° S	unny		·····	
TOTAL WELL DEPTH (TWD) <u>13</u>	.0		1/10 FT. (DEPTH BE	LOW MEASURING PO
HEIGHT OF MEASURING POINT	ABOVE LAND SURFAC	E <u>2.0</u>	1/10	FT.
DESCRIPTION OF MEASURING P	OINT <u>Top of Marked</u>	Casing	_	
DEPTH TO GROUNDWATER (DG	W) <u>6.56</u>		1/100 FT. (DEPTH E	BELOW MEASURING
LENGTH OF WATER COLUMN (L	WC) = TWD - DGW =	8.44	1/100 FT.	
ONE STANDING WELL VOLUME	(SWV) = LWC X	1.4	1/10 GAL.	
THREE STANDING WELL VOLUM	ES = 3XSWV =	4.2	1/10 GAL=STANDARD	EVACUATION VOLU
METHOD OF WELL EVACUATION	TEFLON BAILEF	R X OTHER:		
OTAL VOLUME OF WATER REM	10VED 4.2	1/10 GAL.	CASING DIAMETER _ 2_	In.
CASING MATERIAL PVC	xs.s	TEFLO	ОТОТ	HER
SCREENED INTERVAL (FROM I	D PLATE) 3.0' -	13.0′	(DEPTHS BELOW	/ LAND SURFACE - F
STEEL GUARD PIPE AROUND CA				
LOCKING CAP	YES <u>X</u>	NO		
PROTECTIVE POST/ABUTMENT	YES <u>X</u>	NO		
NONPOTABLE LABEL	YES_X	NO		
ID PLATE	YES <u>X</u>	NO		
WELL INTEGRITY SATISFACTOR	Y YES <u>X</u>	NO		
WELL YIELD LOW	MODERATE	<u>х ніGн</u>	COMMENTS	
		FIELD ANALYSES		
VOLUME (1/10 GAL.)	0.0	2.1	4.2	
pH (S.U.)	6.44	6.91	7.09	
SP. COND. (µMHOS/CM)	330	340	335	
WATER TEMP. (C)	15.9	15.6	15.9	
	4	4	4	

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		D 3101 ACL	VGINEERING ANTIC AVENUE H CAROLINA 27604 <u>'ELL SAMPLING AND</u> A WORKSHEET	
LAW JOB NUMBER 475-09	9183-01		LL NUMBER <u>MW-13</u>	_
SITE NAME <u>TC-341 (Cam</u>	p Geiger)			
DATE (MO/DAY/YR) <u>03/22</u>	/94 TIME	(MILITARY) 0940		
FIELD PERSONNEL	er/Whalen			
WEATHER CONDITIONS	60° Sunny			
TOTAL WELL DEPTH (TWD	13.0		1/10 FT. (DEPTH BELO	W MEASURING POINT)
	DINT ABOVE LAND SURFAC	E <u>2.0</u>	1/10 F1	
	ING POINT Top of Marked			
DEPTH TO GROUNDWATE	R (DGW) <u>6.72</u>		1/100 FT. (DEPTH BEL	OW MEASURING POINT)
LENGTH OF WATER COLUM	MN (LWC) = TWD - DGW =	8.28	1/100 FT.	
ONE STANDING WELL VOL	UME (SWV) = LWC X	1.4	1/10 GAL.	
THREE STANDING WELL V	OLUMES = 3XSWV =	4.2	1/10 GAL = STANDARD E	ACUATION VOLUME
METHOD OF WELL EVACU	ATION TEFLON BAILEI	R <u>X</u> OTHER:		
OTAL VOLUME OF WATE	R REMOVED 4.2	1/10 GAL.	CASING DIAMETER	In.
CASING MATERIAL PVC	S.S	TEFI	LONOTHE	R
SCREENED INTERVAL (FR	OM ID PLATE) 3.0' -	13.0′	(DEPTHS BELOW L	AND SURFACE - FT.)
STEEL GUARD PIPE AROUN	ID CASING YES <u>X</u>	NO	COMMENTS	
LOCKING CAP	YES <u>X</u>	NO		
PROTECTIVE POST/ABUTM	IENT YES <u>X</u>	NO		
NONPOTABLE LABEL	YES_X	NO	**************************************	
ID PLATE	YES <u>X</u>	NO		
WELL INTEGRITY SATISFAC	CTORY YES <u>X</u>	NO		
WELL YIELD LOW	MODERATE	<u>х нідн</u>	COMMENTS	
		FIELD ANALYSES		and the second second second second second second second second second second second second second second second
VOLUME (1/10 GAL.)	0.0	2.1	4.2	
pH (S.U.)	5.73	5.61	5.47	
SP. COND. (µMHOS/CM)	55	50	50	
WATER TEMP. (°C)	13.9	13.5	13.1	
TURBIDITY *	4	4	4	
*VISUAL DETERMINATION (1) CLEAR (2) SLIGHT (3) M				

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	U	MONITORING WE	CAROLINA 27604	
LAW JOB NUMBER 475-09183	-01	MONITORING WELL	NUMBER MW-14	
SITE NAME TC-341 (Camp Ge				
DATE (MO/DAY/YR) 03/22/94		(MILITARY) 0825		
FIELD PERSONNEL				
WEATHER CONDITIONS 60° S				
TOTAL WELL DEPTH (TWD) _1	3.0		1/10 FT. (DEPTH BEL	OW MEASURING PO
DESCRIPTION OF MEASURING				
DEPTH TO GROUNDWATER (DO	3W) _5.44		1/100 FT. (DEPTH B	ELOW MEASURING
LENGTH OF WATER COLUMN (	LWC) = TWD - DGW =	7.56	1/100 FT.	
ONE STANDING WELL VOLUME				
THREE STANDING WELL VOLUI	MES = 3XSWV =	3.9	1/10 GAL=STANDARD	EVACUATION VOLL
METHOD OF WELL EVACUATIO	IN TEFLON BAILE	R X OTHER:		
TOTAL VOLUME OF WATER RE	MOVED 3.0	1/10 GAL.	CASING DIAMETER _ 2	In.
CASING MATERIAL PVC				
SCREENED INTERVAL (FROM	ID PLATE) 3.0' -	13.0'	(DEPTHS BELOW	LAND SURFACE - F
STEEL GUARD PIPE AROUND C	ASING YES <u>X</u>	NO	COMMENTS	
LOCKING CAP	YES <u>X</u>	NO		
PROTECTIVE POST/ABUTMENT	YES	NO <u>X</u>		
NONPOTABLE LABEL	YES_X	NO		•
ID PLATE	YES <u>X</u>	NO	• <u> </u>	
WELL INTEGRITY SATISFACTO	RY YES <u>X</u>	NO	Dry at 3.0 gallon	
WELL YIELD LOW X	MODERATE	HIGH	COMMENTS Stre	ong Petroleum Odor
		FIELD ANALYSES		
VOLUME (1/10 GAL.)	0.0	2.0	3.0	
pH (S.U.)	5.95	6.29	6.21	
SP. COND. MHOS/CM)	360	355	360	
WATER TEMP. (C)	15.0	14.6	14.7	
TURBIDITY*	4	4	4	
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		MONITORING WE	CAROLINA 27604 LL SAMPLING AND WORKSHEET	
	01			
LAW JOB NUMBER <u>475-09183-</u> SITE NAME TC-341 (Camp Gei				<u> </u>
DATE (MO/DAY/YR) 03/22/94				
FIELD PERSONNEL Fischer/Wh		MILITANT) 0845		
WEATHER CONDITIONS 60° S				
TOTAL WELL DEPTH (TWD) _3			1/10 ET (DEPTH BEL	
HEIGHT OF MEASURING POINT				
DESCRIPTION OF MEASURING				
DEPTH TO GROUNDWATER (DO				
LENGTH OF WATER COLUMN (				
ONE STANDING WELL VOLUME				
THREE STANDING WELL VOLUME				
METHOD OF WELL EVACUATIO				
OTAL VOLUME OF WATER RE				
CASING MATERIAL PVC				
SCREENED INTERVAL (FROM				
SCREENED INTERVAL (FROM )				
	YES_X	NO		
PROTECTIVE POST/ABUTMENT				<u> </u>
NONPOTABLE LABEL	YES <u>X</u>	NO		<u></u>
ID PLATE	YES <u>X</u>	NO		
WELL INTEGRITY SATISFACTO		NO		
WELL YIELD LOW	MODERATE	HIGH>		
	I I	FIELD ANALYSES		1
VOLUME (1/10 GAL.)	0.0	6.2	12.3	
рН (S.U.)	6.61	7.24	7.50	
SP. COND. (µMHOS/CM)	600	550	600	
WATER TEMP. ('C)	17.5	17.6	18.3	_
TURBIDITY*	3	3	3	

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		D SHO1 ATLANT HALEGH, NORTHC MONITORING WELL FIELD DATA W	SAMPLING AND	
LAW JOB NUMBER 475-09183	01		UMBER MW-16	
SITE NAME TC-341 (Camp Ge				
DATE (MO/DAY/YR) 03/22/94		(MILITARY) 0750		
FIELD PERSONNEL				
WEATHER CONDITIONS _60° S				
TOTAL WELL DEPTH (TWD) _1			1/10 FT. (DEPTH BE	LOW MEASURING PO
HEIGHT OF MEASURING POINT				
DESCRIPTION OF MEASURING				
DEPTH TO GROUNDWATER (DO			1/100 FT. (DEPTH B	ELOW MEASURING F
LENGTH OF WATER COLUMN (				
ONE STANDING WELL VOLUME				
THREE STANDING WELL VOLUI				
METHOD OF WELL EVACUATIO				
OTAL VOLUME OF WATER RE				
CASING MATERIAL PVC				
SCREENED INTERVAL (FROM				
STEEL GUARD PIPE AROUND C				
LOCKING CAP	YES_X	NO		
PROTECTIVE POST/ABUTMENT				
NONPOTABLE LABEL	YES_X	NO		
	YES X	NO		
WELL INTEGRITY SATISFACTO				
WELL YIELD LOW		— х нідн	COMMENTS	
		FIELD ANALYSES		
VOLUME (1/10 GAL.)	0.0	2.1	4.2	
pH (S.U.)	5.14	5.03	5.01	
	100	95	95	
SP. COND. (µMHOS/CM)				
	14.3	13.7	13.9	

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			NGINEERING ANTIC AVENUE TH CAROLINA 27604	
			VELL SAMPLING AND A WORKSHEET	
LAW JOB NUMBER 475-09	183-01	MONITORING W	ELL NUMBER <u>MW-17</u>	
SITE NAME	) Geiger)		······································	
DATE (MO/DAY/YR) <u>03/22/</u>	9 <b>4</b> TIME	(MILITARY) <u>0915</u>		
FIELD PERSONNEL	r/Whalen			
WEATHER CONDITIONS 6	0° Sunny		······	
TOTAL WELL DEPTH (TWD)	13.0		1/10 FT. (DEPTH BEL	OW MEASURING POINT)
HEIGHT OF MEASURING PO	INT ABOVE LAND SURFAC	E <u>0.0</u>	1/10 F	т.
DESCRIPTION OF MEASURI	NG POINT <u>Top of Marked</u>	Casing		
DEPTH TO GROUNDWATER	(DGW) <u>5.02</u>		1/100 FT. (DEPTH BE	LOW MEASURING POINT)
LENGTH OF WATER COLUM	IN (LWC) = TWD - DGW =	7.98	1/100 FT.	
ONE STANDING WELL VOLU	JME (SWV) = LWC X	1.4	1/10 GAL.	
THREE STANDING WELL VC	UUMES = 3XSWV =	4.2	1/10 GAL = STANDARD EV	ACUATION VOLUME
METHOD OF WELL EVACUA	TION TEFLON BAILER		:	
OTAL VOLUME OF WATEF	REMOVED 4.2	1/10 GAL.	CASING DIAMETER _ 2	In.
CASING MATERIAL PVC	X S.S	TE	-LONOTH	ER
SCREENED INTERVAL (FRO	OM ID PLATE) 3.0'	13.0'	(DEPTHS BELOW I	AND SURFACE - FT.)
STEEL GUARD PIPE AROUN	D CASING YES <u>X</u>	NO	COMMENTS	
LOCKING CAP	YES <u>X</u>	NO	<u></u>	
PROTECTIVE POST/ABUTM	ENT YES	NO <u>X</u>		
NONPOTABLE LABEL	YES <u>X</u>	NO		
ID PLATE	YES <u>X</u>	NO		· · · · · · · · · · · · · · · · · · ·
WELL INTEGRITY SATISFAC	TORY YES <u>X</u>	NO		
WELL YIELD LOW	MODERATE	<u>х</u> нідн	COMMENTS	
			S	
VOLUME (1/10 GAL.)	0.0	2.1	4.2	
pH (S.U.)	5.62	5.22	4.98	
SP. COND. (µMHOS/CM)	180	175	165	
WATER TEMP. ('C)	15.4	14.7	14.5	
TURBIDITY*	4	4	44	
•VISUAL DETERMINATION ( (1) CLEAR (2) SLIGHT (3) M				

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### APPENDIX I

### LABORATORY ANALYTICAL TEST REPORTS CHAIN OF CUSTODY RECORDS

# GeoChern Alfa Forporated =

#### Environmental Laboratories

DECENTED BY

March 7, 1994

Mr. Brian Bellis Law Engineering P.O. Box 18288 Raleigh, NC 27619

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LAW ENGINEERING

#### Reference: TC-341 (weekly summary 02/27/94-03/05/94) 475-09183-01 GCI# 9403-002N

Dear Mr. Brian Bellis:

This is the analytical report for the above referenced project. On February 3, 1994 we received twelve soil samples for analysis. The analytical and quality control results are presented in separate tables for your convenience. Brief summaries of analytical methods employed are as follows. GeoChem analytical reports contain information based strictly on the analysis requested on the chain of custody (COC) accompanying this report. Non-target compounds are not identified or quantified.

#### TPH

Samples are analyzed by following the California U.S.T. manual. This methodology incorporates EPA purge and trap (meth. 5030) techniques for analysis of volatile fuels such as gasoline. Less volatile fuels such as diesel fuel and kerosene must be extracted using solvents prior to analysis (soils are sonicated, meth. 3550). A standard calibration curve is created from the pure fuel of interest. The standards serve two functions; they create a "finger print" pattern for comparisons and they allow the chemist to calculate the concentration of that fuel analyzed for.

If there are any technical questions please feel free to call me at 919-460-8093. Thank you for allowing **GEOCHEN** to serve your analytical needs.

Sincerely President

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### Environmental Laboratories

Project# mobile	summary 1	Site Name TC-341	
LAB ID. Date sampled	0229 03/01/94	0230 03/01/94	0231 03/01/94
DATE ANALYZED FIELD ID.	03/03/94 0.0-1.5(MW-8)	03/03/94 3.5-5.0(MW-8)	03/03/94 0.0-1.5(MW-7)
NETHOD			
ANALYTE	mg/kg pgl	mg/kg pgl	<u>mg/kg pgl</u>
TPH/gas	BDL 1.0	BDL 1.0	BDL 1.0
LAB ID. DATE SAMPLED	0232 03/01/94	0233 03/01/94	0234 03/01/94
DATE ANALYZED FIELD ID.	03/03/94 3.5-5.0(MW-7)	03/03/94 0.0-1.5(MW-4)	03/03/94 3.5-5.0(MN-4)
NETHOD			
ANALYTE	mg/kg pgl	mg/kg pgl	<u>mg/kg pql</u>

pql = practical quantitation limit due to matrix effects. bdl = below method detection limit. bql = below quantitation limit.

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### Environmental Laboratories

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Project# mobile	summary 2	Site Name TC-341	
LAB ID. DATE SAMPLED DATE ANALYZED FIELD ID.	0235 03/01/94 03/03/94 0.0-1.5(MW-5)	0236 03/01/94 03/03/94 3.5-5.0(MW-5)	0237 03/01/94 03/03/94 0.0-1.5(MW-6)
NETHOD			
ANALYTE	mg/kg pgl	mg/kg pgl	mg/kg pql
TPH/gas	BDL 1.0	BDL 1.0	BDL 1.0
LAB ID. DATE SAMPLED DATE ANALYZED FIELD ID.	0238 03/01/94 03/03/94 3.5-5.0(MW-6)	0239 03/03/94 03/03/94 0.0-1.5(MW-9)	0240 03/03/94 03/03/94 3.5-5.0(MW-9)
NETHOD			
ANALYTE	mg/kgpgl	mg/kg pgl	mg/kgpgl
TPH/gas	BDL 1.0	BDL 1.0	BDL 1.0

parts per million = mg/kg mg/l parts per billion = ug/kg ug/l pql = practical quantitation limit due to matrix effects. bdl = below method detection limit. bql = below quantitation limit.

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#### Environmental Laboratories

Project# mobile	summary 3	Site Name TC-341	
LAB ID. DATE SAMPLED DATE EXTRACTED FIELD ID.	0229 03/01/94 03/03/94 0.0-1.5(MW-8)	0230 03/01/94 03/03/94 3.5-5.0(MW-8)	0231 03/01/94 03/03/94 0.0-1.5(MM-7)
NETHOD			
ANALYTE	mg/kg pgl	mg/kg pgl	mg/kg pql
TPH/diesel	BDL 5.0	BDL 5.0	BDL 5.0
LAB ID. DATE SAMPLED DATE EXTRACTED FIELD ID.	0232 03/01/94 03/03/94 3.5-5.0(MW-7)	0233 03/01/94 03/03/94 0.0-1.5(MW-4)	0234 03/01/94 03/03/94 3.5-5.0(M-4)
NETHOD			
ANALYTE	mg/kg pql	mg/kg pgl	mg/kg pgl
TPH/diesel	BDL 5.0	BDL 5.0	BDL 5.0

parts per million = mg/kg mg/l parts per billion = ug/kg ug/l pql = practical quantitation limit due to matrix effects. bdl = below method detection limit. bql = below quantitation limit.

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#### Environmental Laboratories

Project# mobile :	summary 4	Site Name TC-341			
LAB ID. DATE SAMPLED DATE EXTRACTED FIELD ID.	0235 03/01/94 03/03/94 0.0-1.5(MW-5)	0236 03/01/94 03/03/94 3.5-5.0(MW-5)	0237 03/01/94 03/03/94 0.0-1.5(150-6)		
NETHOD					
ANALYTE	mg/kg pgl	mg/kg pgl	mg/kg pgl		
TPH/diesel	BDL 5.0	BDL 5.0	BDL 5.0		
LAB ID. DATE SAMPLED DATE EXTRACTED FIELD ID.	0238 03/01/94 03/03/94 3.5-5.0(MW-6)	0239 03/03/94 03/03/94 0.0-1.5(MW-9)	0240 03/03/94 03/03/94 3.5-5.0(MN-9)		
NETHOD					
ANALYTE	mg/kg pgl	mg/kg pgl	mg/kg pgl		
TPH/diesel	BDL 5.0	BDL 5.0	BDL 5.0		

parts per million = mg/kg mg/l parts per billion = ug/kg ug/l pql = practical quantitation limit due to matrix effects. bdl = below method detection limit. bql = below quantitation limit.

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### Environmental Laboratories

QUALITY CONTROL RESULTS

METHOD	RECOVERY	METHOD DETECTION LIMIT
TPH/gas	106 %	1.0 ppm
TPH/diesel	81 %	5.0 ppm

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			Env	iro	nme	enta	a 1	La	b	o r	a t	0	ries					
			2500		Morri	svill	e, <b>f</b>		27	56	0							
			Ch	nai	n of	Cu	st	00	ly	R	le	СС	ord					
PROJECT SITE			PO#	6		6		····	SEG	7	7	<u> </u>	11	GEOCHE	MPROJECT	#		
475-09 SITE NAME	1183-01			- <sup>2</sup>	/	en l	7	/	/	' / ·					103-0	<i>wzm</i>		
TC-34		_				∛ /			/	/	/	/	/ / 🗛		75 <i>AP</i>			
COLLECTED B	(Signatore)	ekins	~	NO. OF CONTAINERS		/ / /		/ /		' /	' /	/ /			HARDCOPK			
FIELD SAMPLE ID	TURNAROUND IN DAYS	SAMPLE MATRIX	DATE AND TIME COLLECTED	٦ S		//			/		/	/	$\square$		EMARKS		LAB (for lab	
ao-1.5 Mw-8	1-3	Soi'L	3-1-94 3:25	1	X		T										22	9
3.5-5.0 MW-8	~		3-1-94	1	X													Bal
0.0-1.5 MW-7	1,	47	3:32 3-1-74 1:42	1,	×				•									
3.5-5.0	1.	11	3-1-74			┼╌┼╌		┨──┤	-								23	Manager and Color
MW-7 0.0-1.5	×.	۰.	1.49 3-1-94	+	×	┟──┟─┉	+	╉─┤				<u> </u>				·····	23	
3.5-50			8:27 3-1-94	$\frac{l}{l}$	Y Y	$\left  - \right $		┼╌╌┤							-h		Z3	
MW-4 0.0-1.5		· · · ·	8:32- 3-1-54		×			$\downarrow$										34
MW-5	11	''	10:25	1	×												23	35
3.5-5.0 HW-5	()	i e	3-1-94	1	x												2	36
0.0-1.5 MW-6	LT	۴r	3-1-94 12:50	1	ĸ													37
3.5-5.2 MW-6	ι (	15	3-1-54 12:58	1	x		1		·	-					·····			38
0.0-1.5 MW-9	ч	4	3-3-54 8:55		×												23	
3.5-5.0	lr.	15	3-3-74		x		+		$\neg$									
REMARKS	L		9:08	<u>   (    </u>			ـــــــــــــــــــــــــــــــــــــ	1 11	 ~~ ^		d	į	BELINQUI	SHED BY			DATE 3-3-14	TIME 1:40Pr
RECEIVED BY:	where 3	DATE TIN 13/94 1-9	RELINQUISHED BY:		DATE	TIME	RE	CEIVE	DB	1:	· •		DATE	TIME	RELINQUIS	SHED BY:	DATE	TIME

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This Chain of Custody is considered a written contract to perform the services requested in the analyses section of this document.

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#### Environmental Laboratories

March 15, 1994

Mr. Brian Bellis Law Engineering P.O. 18288 Raleigh, NC 27619

#### Reference: TC 341 (weekly summary 03/06/94-03/12/94) 475-09183-01 GCI# 9403-003N

Dear Mr. Brian Bellis:

This is the analytical report for the above referenced project. On March 3, 1994 we received three soil samples for analysis. The analytical and quality control results are presented in separate tables for your convenience. Brief summaries of analytical methods employed are as follows. GeoChem analytical reports contain information based strictly on the analysis requested on the chain of custody (COC) accompanying this report. Non-target compounds are not identified or quantified.

#### TPH

Samples are analyzed by following the California U.S.T. manual. This methodology incorporates EPA purge and trap (meth. 5030) techniques for analysis of volatile fuels such as gasoline. Less volatile fuels such as diesel fuel and kerosene must be extracted using solvents prior to analysis (soils are sonicated, meth. 3550). A standard calibration curve is created from the pure fuel of interest. The standards serve two functions; they create a "finger print" pattern for comparisons and they allow the chemist to calculate the concentration of that fuel analyzed for.

If there are any technical questions please feel free to call me at 919-460-8093. Thank you for allowing **GROCHEN** to serve your analytical needs.

Sincerely, Dean Gokel President

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#### Environmental Laboratories

Project mobile	summary 1	Site Name TC 341			
LAB ID. DATE SAMPLED DATE ANALYZED FIELD ID.	0241 03/03/94 03/04/94 MW-10(0.0-1.5)	0242 03/03/94 03/04/94 Dup	0243 03/03/94 03/04/94 MW-10(3.5-5.0)		
NETHOD					
ANALYTE	<u>mq/kg pql</u>	mg/kg pgl	mg/kg pgl		
TPH/gas	BDL 1.0	BDL 1.0	BDL 1.0		
LAB ID. DATE SAMPLED DATE EXTRACTED FIELD ID.	0241 03/03/94 03/03/94 MW-10(0.0-1.5)	0242 03/03/94 03/03/94 Dup	0243 03/03/94 03/03/94 MW-10(3.5-5.0)		
NETHOD					
ANALYTE	mg/kg pgl	mg/kg pgl	mg/kg pgl		
TPH/diesel	BDL 5.0	BDL 5.0	100 5.0		

parts per million = mg/kg mg/l
parts per billion = ug/kg ug/l
pql = practical quantitation limit due to matrix effects.
bdl = below method detection limit.
bql = below quantitation limit.

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#### Environmental Laboratories

QUALITY CONTROL RESULTS

METHOD	RECOVERY	METHOD DETECTION LIMIT
TPH/gas	80 %	1.0 ppm
TPH/diesel	81 %	5.0 ppm

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Report To: BRIAN Bellis	2500	ironm Gate Wa Mori	enta ay Cer risville	I Lab htre Blv e, NC 27	<u>orato</u> d., Suit 7560	<u>ries</u> e 300	Bill To:		
PROJECT SITE NUMBER 475-09183-01 SITE NAME TC 341 COLLECTED DY (Signature) FIELD SAMPLE ID MW-10 0.0-1.5 1-3 Seice Dup 1-3 Seice	PO# DATE AND TIME COLLECTED 3:2-0 3-3-94	AINERS			y Reco	GEOCHE DATE DUE	MPROJECT # 9403 - 003r ASAC HARDCOPY IEMARKS		
Mu-10 315-5:0 1-3 Soul	2-2/94							243	
REMARKS RECEIVED BY: DATE Bus gue yahren 3/3/74			E TIME	RECEIVED		APLINOOISHEO AV	AYNE V-WIKKIN		TIME 6: 4 TIME

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This Chain of Custody is considered a written contract to perform the services requested in the analyses section of this document.

## $\Xi$ GeoChem And Forporated $\Xi$

### Environmental Laboratories

March 22, 1994

Mr. Brian Bellis Law Engineering P.O. Box 18288 Raleigh, NC 27619

#### Reference: TC-341 (weekly summary 03/13/94-03/19/94) 475-09183-01 GCI# 9403-014N

Dear Mr. Brian Bellis:

This is the analytical report for the above referenced project. On March 16, 1994 we received three water samples for analysis. The analytical and quality control results are presented in separate tables for your convenience. Brief summaries of analytical methods employed are as follows. GeoChem analytical reports contain information based strictly on the analysis requested on the chain of custody (COC) accompanying this report. Non-target compounds are not identified or quantified.

#### EPA method 602

Samples are loaded into a specially designed purging chamber at ambient temperature. Helium is bubbled through the sample. This drives the organics onto a sorbent trap. Once purging has been completed the sorbent column is rapidly heated. This efficiently transfers the organics into the gas chromatograph which separates the components of the sample. The purgeable organics are then detected using flame ionization and photo ionization detectors.

# $\equiv$ GeoChem Andorporated $\equiv$

### Environmental Laboratories

#### PAH (EPA Method 610)

This method covers the determination of certain polynuclear aromatic hydrocarbons (PAH). A measured volume of sample, approximately one liter, is extracted with methylene chloride using a separatory funnel or a continuous liquid to liquid extractor. The methylene chloride extract is then analyzed by gas chromatography using a flame ionization detector for compound identification.

If there are any technical questions please feel free to call me at 919-460-8093. Thank you for allowing **GEOCHEN** to serve your analytical needs.

Sincerely, Dean Gokel President

2500 Gate Way Centre Blvd., Suite 300 • Morrisville, NC 27580

# GeoChenn Aufdbrporated =

### Environmental Laboratories

LAB ID. DATE SAMPLED DATE ANALYZED FIELD ID.		16/94 16/94		16/94 16/94	0269 03/16/94 03/17/94 MW-10
KETHOD					
ANALYTE	<u>uq/1</u>	pql	<u>ug/1</u>	<u>pql</u>	ug/l po
EPA 602					
Benzene Toluene Chlorobenzene Ethylbenzene Xylenes 1,3 Dichlorobenzene 1,4 Dichlorobenzene 1,2 Dichlorobenzene	0.6 BDL BDL BDL BDL BDL BDL BDL	0.5	BDL O.7 BDL BDL BDL BDL BDL BDL	0.5	BQL 1. BQL BQL 1.6 BQL BQL BQL BQL

bdl = below method detection limit.

bql = below quantitation limit.

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Project mobile sum	mary	2	Site	Name TC-34	1			
LAB ID. DATE SAMPLED DATE EXTRACTED FIELD ID.	ATE SAMPLED 03/16/94 ATE EXTRACTED 03/16/94			16/94 16/94	03/: 03/:	0269 03/16/94 03/16/94 MW-10		
NETHOD ANALYTE 610	ug/l	pql	ug/l	pql	ug/l	pql		
Naphthalene Acenaphthylene Acenaphthene Fluorene Phenanthrene Anthracene Fluoranthene Pyrene Benzo(a)anthracene Chrysene Benzofluoranthenes Benzo(a)pyrene Indeno(1,2,3-cd)pyre Dibenzo(a,h)anthrace Benzo(g,h,i)perylene	neBQL	0.5 0.5 0.5 0.5 0.5 0.5 0.5 1.1 0.5 2.1 2.1 2.7 2.7	BDL BDL BDL BDL BDL BDL BDL BDL BDL BDL	0.5 0.5 0.5 0.5 0.5 0.5 0.5 1.0 0.5 2.0 2.0 2.5 2.5	32.6 BQL 19.3 BQL 8.9 2.1 BQL BQL BQL BQL BQL BQL BQL BQL BQL BQL	0.5 0.5 0.5 0.5 0.5 0.5 1.1 0.5 2.2 2.7 2.7		

<u>soil</u> water parts per million = mg/kg mg/l parts per billion = ug/kg ug/l pql = practical quantitation limit due to matrix effects. bql = below quantitation limit. bdl = below method detection limit

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### QUALITY CONTROL RESULTS

METHOD	REC	OVERY	METHOD DETECTION LIMI		
602					
Benzene	104	\$	0.5 ppb		
Toluene	97		0.5 Ptp		
Chlorobenzene	96				
Ethylbenzene	100				
Xylenes	98				
1,3-Dichlorobenzene	94	*			
1,2-Dichlorobenzene	87	8			
1,4-Dichlorobenzene	96	8			
610					
Naphthalene	96	ક	0.5 ppb		
Acenaphthene	103				
Phenanthrene	108	8			

REVIEWED BY

Janna Fogleman

REVIEWED BY Valeri G. Para

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			<u>Env</u> 2500	Gate	e W Moi	Vay rris	y C svi	er lle	ntre e, N	e B IC :	lv( 27	d., 56	<b>Sι</b> 0	ıit€	e 300					
SITE NAME TC- COLLECTED BY FIELD	9183- 341 (bignature) repree	Stick SAMPLE	DATE AND	NO. OF CONTAINERS PER LOCATION			610	/	AN		SES		/	/		re due		<u>23 - 014 °</u> AP		
SAMPLE ID <u>Mw-</u> ¶7 <u>Mw-</u> 4 <u>Mw-10</u>	IN DAYS 1-3 1-3 1-3	MATRIX WAR 11 11	TIME COLLECTED 1:30 3-16-94 2:00 3-16-94 2:30 3-16-94 2:30	333	ľ,	XXXXX XXXXX											REMARKS		20	20
																······································				
REMARKS									1 yn				D K	- · · ·				Kalson	DATE 3-16	TIME 2:45
RECEIVED BY:	Coelan	DATE TI						ME '	REC	CEIVE	ED B'	Y:			DATE	TIME	RELING	UISHED BY:	DATE	TIME

This Chain of Custody is considered a written contract to perform the services requested in the analyses section of this document.

## $\equiv$ GeoChern Andorporated $\equiv$

## Environmental Laboratories

March 29, 1994

Mr. Brian Bellis Law Engineering P.O. Box 18288 Raleigh, NC 27619

#### Reference: TC-341 (weekly summary 03/20/94-03/26/94) 475-09183-01 GCI# 9403-020M

Dear Mr. Brian Bellis:

This is the analytical report for the above referenced project. On March 23, 1994 we received nine groundwater samples for analysis. The analytical and quality control results are presented in separate tables for your convenience. Brief summaries of analytical methods employed are as follows. GeoChem analytical reports contain information based strictly on the analysis requested on the chain of custody (COC) accompanying this report. Non-target compounds are not identified or quantified.

#### PAH (EPA Nethod 610)

This method covers the determination of certain polynuclear aromatic hydrocarbons (PAH). A measured volume of sample, approximately one liter, is extracted with methylene chloride using a separatory funnel or a continuous liquid to liquid extractor. The methylene chloride extract is then analyzed by gas chromatography using a flame ionization detector for compound identification.

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#### EPA method 602

Samples are loaded into a specially designed purging chamber at ambient temperature. Helium is bubbled through the sample. This drives the organics onto a sorbent trap. Once purging has been completed the sorbent column is rapidly heated. This efficiently transfers the organics into the gas chromatograph which separates the components of the sample. The purgeable organics are then detected using flame ionization and photo ionization detectors.

If there are any technical questions please feel free to call me at 919-460-8093. Thank you for allowing **GEOCHEN** to serve your analytical needs.

Sincerely Deán Gokel President

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### Environmental Laboratories

Project mobile sum	mary	1	Site	Name TC-34	1	
AB ID. 0281 ATE SAMPLED 03/22/94 ATE EXTRACTED 03/23/94 IELD ID. TC341MW1		028 03/ 03/ TC3	03/ 03/	0283 03/22/94 03/23/94 TC341MW3		
NETHOD ANALYTE 610	ug/l	pql	<u>ug/1</u>	pql	<u>ug/1</u>	pql
Naphthalene Acenaphthylene Acenaphthene Fluorene Phenanthrene Anthracene Fluoranthene Pyrene Benzo(a)anthracene Chrysene Benzofluoranthenes Benzo(a)pyrene Indeno(1,2,3-cd)pyre Dibenzo(a,h)anthrace Benzo(g,h,i)perylene	neBQL	4.5 4.5 4.5 4.5 4.5 4.5 4.5 9.0 4.5 18.0 18.0 22.5 22.5	457 BQL 108 166 BQL BQL 12.2 136 BQL BQL BQL BQL BQL BQL BQL BQL BQL	4.5 4.5 4.5 4.5 4.5 4.5 4.5 9.0 4.5 18.0 18.0 22.5 22.5	BDL BDL BDL BDL BDL BDL BDL BDL BDL BDL	0.5 0.5 0.5 0.5 0.5 0.5 0.5 1.0 2.0 2.5 2.5

<u>soil</u> water parts per million = mg/kg mg/l parts per billion = ug/kg ug/l pql = practical quantitation limit due to matrix effects. bql = below quantitation limit. bdl = below method detection limit

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### Environmental Laboratories

Project mobile sum	mary	2	Site 1	Name TC-34	1	
AB ID.0284DATE SAMPLED03/22/94DATE EXTRACTED03/23/94TIELD ID.TC341MW5		03/	5 22/94 23/94 41MW6	03/2	2/94 3/94 1MW11	
ANALYTE	ug/l	pql	ug/l	<u>lpql</u>	<u>ug/1</u>	pql
610						
Naphthalene	BDL	0.5	BDL	0.5	BDL	0.5
Acenaphthylene	BDL	0.5	BDL	0.5	BDL	0.5
Acenaphthene	BDL	0.5	BDL	0.5	BDL	0.5
Fluorene	BDL	0.5	BDL	0.5	BDL	0.5
Phenanthrene	BDL	0.5	BDL	0.5	BDL	0.5
Anthracene	BDL	0.5	BDL	0.5	BDL	0.5
Fluoranthene	BDL	0.5	BDL	0.5	BDL	0.5
Pyrene	BDL	0.5	BDL	0.5	BDL	0.5
Benzo(a)anthracene	BDL	1.0	BDL	1.0	BDL	1.0
Chrysene	BDL	0.5	BDL	0.5	BDL	0.5
Benzofluoranthenes	BDL	2.0	BDL	2.0	BDL	2.0
Benzo(a)pyrene	BDL	2.0	BDL	2.0	BDL	2.0
Indeno(1,2,3-cd)pyre	neBDL	2.5	BDL	2.5	BDL	2.5
Dibenzo(a,h)anthrace		2.5	BDL	2.5	BDL	2.5
Benzo(g,h,i)perylene		2.5	BDL	2.5	BDL	2.5

<u>soil</u> water parts per million = mg/kg mg/l parts per billion = ug/kg ug/l pql = practical quantitation limit due to matrix effects. bql = below quantitation limit. bdl = below method detection limit

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## Environmental Laboratories

Project mobile sum	mary	3	Site I	Name TC-341	
LAB ID. DATE SAMPLED DATE EXTRACTED FIELD ID.	03	38 /22/94 /23/94 441MW12	03/2	) 22/94 23/94 se blank	<u></u>
NETHOD ANALYTE 610	ug/l	pq <u>1</u>	ug/l	pql	
Naphthalene Acenaphthylene Acenaphthene Fluorene Phenanthrene Anthracene Fluoranthene Pyrene Benzo(a)anthracene Chrysene Benzofluoranthenes Benzo(a)pyrene Indeno(1,2,3-cd)pyre Dibenzo(a,h)anthrace		0.5 0.5 0.5 0.5 0.5 0.5 0.5 1.0 0.5 2.0 2.0 2.5	BDL BDL BDL BDL BDL 0.7 0.9 1.4 1.0 2.0 BQL BQL BQL	0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 1.0 0.5 2.0 2.0 2.5 2.5	

<u>soil</u> water parts per million = mg/kg mg/l parts per billion = ug/kg ug/l pql = practical quantitation limit due to matrix effects. bql = below quantitation limit. bdl = below method detection limit

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LAB ID. DATE SAMPLED DATE ANALYZED FIELD ID.	03/	1 22/94 25/94 41MW1	03/	6 22/94 23/94 41MW8	0289 03/22/94 03/23/94 Rin <del>se</del> blan
NETHOD					
ANALYTE	<u>ug/1</u>	pql	ug/l	<u>pql</u>	ug/1 pg
BPA 602					
Benzene Toluene Chlorobenzene Ethylbenzene Xylenes 1,3 Dichlorobenzene 1,4 Dichlorobenzene 1,2 Dichlorobenzene	BQL BQL 4.0 1.8 BQL BQL BQL	1.3	BDL BDL BDL BDL BDL BDL BDL	0.5	BDL 0. BDL BDL BDL BDL BDL BDL BDL BDL BDL
<u>so</u> parts per million = mg, parts per billion = ug, pql = practical quantit bdl = below method dete bql = below quantitatio	/kg mg /kg ug tation l action l	/1 imit due to imit.	matrix effec	ts.	

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### Environmental Laboratories

#### QUALITY CONTROL RESULTS

METHOD	RECOVERY	METHOD DETECTION LIMIT
610		
Naphthalene	92 %	0.5 ppb
Acenaphthene	95 %	
Phenanthrene	114 %	
602		
Benzene	94 %	0.5 ppb
Toluene	94 %	
Chlorobenzene	94 %	
Ethylbenzene	96 %	
Xylenes	95 %	
1,3-Dichlorobenzene	92 %	
1,2-Dichlorobenzene	89 %	
1,4-Dichlorobenzene	96 %	

REVIEWED BY

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Law E.	Law Eng Raleigh Environmental Laboratories																			
				2500 (	Ν	<i>l</i> or	ri	svil	le, l	NC	27	56	0			)				
				Ch	all	n c	)f	Cı	JS	100	dy	R	e	CC	ord					
PROJECT SITE TC-341 SITE NAME 475-0 COLLECTED BY	<u>(Camp 6</u> 09183-0	eiger)	PO#		NO. OF CONTAINERS PER LOCATION		7			NALY	SES	7	/	/	/ /	ATE DUI	IEM PRO 940 ASP	<u>3- øzøm</u> ff		
Dar		Fisch			PERL		\$/ \$	J.	/ /	/ /										
FIELD SAMPLE ID	TURNAROUND IN DAYS	SAMPLE MATRIX	DATE A TIME COLL	ND ECTED	g_	V	/ `	1 /	' /		/	$\left  \right $	/ .		/		REMARI	<s< td=""><td>LAB (for lab</td><td>ID NO. use only)</td></s<>	LAB (for lab	ID NO. use only)
TC341mw1	24hr.	GH20	3.22.94/	1255	3	2	1												2.8	1-1-
TC-341MW2	Li	4	3-22-94/	1330	1		1												Z8	كسك
TC-341 mus	ч		3-22-94	1540			$\boldsymbol{L}$												28	
TC341MWS	( <u> </u>	4	3-22-94	1/35															28	4
TC341mW6	4	· · ·	3.22-94/	1015	1												_		28	'S
TC341MW8	1,	••	3-22-94	1715	à	2													28	6
TC341MWIL	ч	••	3-22-94	1115															Z8	
TC 341 MW12	۳		3-22-94	1655			1												Z8	8
Rinse Slunt	4	· · · ·	3 22-44/	0730	3	2	L												28	9
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REMARKS															RELINQU	ISHED E	IY:		DATE	TIME
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Law Environmental, Inc. D D A F T Pensacola Branch 7215 Pine Forest Road Pensacola, Florida 32526



March 21, 1994

Mr. Wayne Wilkinson - 475 Law Engineering, Inc. 3301 Atlantic Avenue Raleigh, NC 27604 Clt. #12024 Proj. #475-09183-01

Dear: Mr. Wilkinson:

Below are the results of analysis of 15 samples received for examination on March 11, 1994:

Sample I.D. AA51319 Purchase order number: 47509183 Location Description: MW-11 S-2 Sample collector: W. WILKINSON Sample collection date: 03/04/94 Lab submittal date: 03/11/94			
TEST PARAMETER	UNITS	TEST RESULT	DETECTION LIMIT
2323-Tot. Pet. Hydro. Prep. Soil		Done	
Multicomponent analysis: 2321-TP Diesel	HXS Cal-DHS mg/Kg	Not detected	3.0
Multicomponent analysis: 2321-TPH Gasoline	HVS Cal-DHS mg/Kg	Not detected	.23

Sample I.D. AA51320 Location code: 2TC341 Purchase order number: 47509183 Project account code: 12024 Location Description: MW-11 S-2 0.0-1.5 Sample collector: W. WILKINSON Sample collection date: 03/04/94 Time: 09:18 Lab submittal date: 03/11/94 Time: 13:58 UNITS TEST DETECTION RESULT LIMIT TEST PARAMETER 2323-Tot. Pet. Hydro. Prep. Soil Done Multicomponent analysis: 2321-TPHXS Cal-DHS Diesel mg/Kg 11 3.2 Multicomponent analysis: 2321-TPHVS Cal-DHS Gasoline Not detected .26 mg/Kg 

Page:	2	
March	21,	1994

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Sample I.D. AA51321 Purchase order number: 47509183 Location Description: MW-12 S-1 Sample collector: W. WILKINSON			
Sample collection date: 03/07/94 Lab submittal date: 03/11/94	Time: 13:58		
TEST PARAMETER	UNITS	TEST RESULT	DETECTION LIMIT
2323-Tot. Pet. Hydro. Prep. Soil		Done	
Multicomponent analysis: 2321-TPH Diesel	HXS Cal-DHS mg/Kg	Not detected	2.9
Multicomponent analysis: 2321-TPH Gasoline	IVS Cal-DHS mg/Kg	Not detected	.23
Sample I.D. AA51322 Purchase order number: 47509183 Location Description: MW-12 S-1 Sample collector: W. WILKINSON Sample collection date: 03/07/94 Lab submittal date: 03/11/94	3.5-5.0 Time: 14:46	2TC341 code: 12024	
TEST PARAMETER		TEST RESULT	
2323-Tot. Pet. Hydro. Prep. Soil		Done	
Multicomponent analysis: 2321-TPH Diesel	IXS Cal-DHS mg/Kg	Not detected	3.0
Multicomponent analysis: 2321-TPH Gasoline	IVS Cal-DHS mg/Kg	Not detected	.24
Purchase order number: 47509183	Location code: Project account 0.0-1.5	2TC341 code: 12024	
Sample collector: W. WILKINSON Sample collection date: 03/07/94			
Sample collector: W. WILKINSON Sample collection date: 03/07/94 Lab submittal date: 03/11/94 TEST PARAMETER	Time: 13:58  UNITS	RESULT	
Sample collector: W. WILKINSON Sample collection date: 03/07/94 Lab submittal date: 03/11/94 TEST	Time: 13:58  UNITS	RESULT	LIMIT

Page: 3 March 21, 1994 Mr. Wayne Wilkinson Sample I.D. AA51323 (continued)

TEST PARAMETER	UNITS	TEST RESULT	DETECTION LIMIT
Multicomponent analysis: 2321-TP Gasoline		Not detected	.22
Sample I.D. AA51324 Purchase order number: 47509183 Location Description: MW-13 S-2 Sample collector: W. WILKINSON Sample collection date: 03/07/94 Lab submittal date: 03/11/94	Location code: Project account 3.5-5.0 Time: 15:31		
TEST PARAMETER	UNITS	TEST RESULT	DETECTION LIMIT
2323-Tot. Pet. Hydro. Prep. Soil		Done	
Multicomponent analysis: 2321-TPH Diesel	IXS Cal-DHS mg/Kg	Not detected	3.0
Multicomponent analysis: 2321-TPF Gasoline		Not detected	.24
Sample I.D. AA51325 Purchase order number: 47509183 Location Description: MW-14 S-1 Sample collector: W. WILKINSON Sample collection date: 03/08/94 Lab submittal date: 03/11/94			
TEST PARAMETER	UNITS	RESULT	DETECTION LIMIT
2323-Tot. Pet. Hydro. Prep. Soil		Done	
Multicomponent analysis: 2321-TPH Diesel	XS Cal-DHS mg/Kg	Not detected	2.8
Multicomponent analysis: 2321-TPH Gasoline		Not detected	.23
Sample I.D. AA51326 Purchase order number: 47509183 Location Description: MW-14 S-2 Sample collector: W. WILKINSON Sample collection date: 03/08/94	3.5-5.0	2TC341 code: 12024	

Page: 4 March 21, 1994 Mr. Wayne Wilkinson

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Sample I.D. AA51326 (continued)

Lab submittal date: 03/11/94 Time: 13:58 TEST UNITS TEST TEST DETECTION RESULT LIMIT PARAMETER 2323-Tot. Pet. Hydro. Prep. Soil Done Multicomponent analysis: 2321-TPHXS Cal-DHS Diesel mg/Kg 800 3.0 Multicomponent analysis: 2321-TPHVS Cal-DHS Gasoline mg/Kg 4100 25 Sample I.D. AA51327 Location code: 2TC341 Purchase order number: 47509183 Project account code: 12024 Location Description: MW-15 S-1 0.0-1.5 Sample collector: W. WILKINSON Sample collection date: 03/08/94 Time: 09:45 Lab submittal date: 03/11/94 Time: 13:58 TEST UNITS TEST DETECTION LIMIT PARAMETER RESULT 2323-Tot. Pet. Hydro. Prep. Soil Done Multicomponent analysis: 2321-TPHXS Cal-DHS Diesel mg/Kg Not detected 3.0 Multicomponent analysis: 2321-TPHVS Cal-DHS Gasoline mg/Kg Not detected .24 Sample I.D. AA51328 Location code: 2TC341 Purchase order number: 47509183 Project account code: 12024 Location Description: MW-15 S-2 3.5-5.0 Sample collector: W. WILKINSON Sample collection date: 03/08/94 Time: 09:50 Lab submittal date: 03/11/94 Time: 13:58 TEST UNITS TEST DETECTION PARAMETER RESULT LIMIT 2323-Tot. Pet. Hydro. Prep. Soil Done Multicomponent analysis: 2321-TPHXS Cal-DHS Diesel mq/Kq 490 39 Multicomponent analysis: 2321-TPHVS Cal-DHS Gasoline mg/Kg 200 56

Page: 5 March 21, 1994

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Sample I.D. AA51329 Purchase order number: 47509183 Location Description: MW-16 S-1 Sample collector: W. WILKINSON Sample collection date: 03/08/94 Lab submittal date: 03/11/94			
TEST PARAMETER	UNITS	RESULT	LIMIT
2323-Tot. Pet. Hydro. Prep. Soil		Done	~~~~~~~~~~
Multicomponent analysis: 2321-TP Diesel		Not detected	3.0
Multicomponent analysis: 2321-TP Gasoline		Not detected	.24
Sample I.D. AA51330 Purchase order number: 47509183 Location Description: MW-16 S-2 Sample collector: W. WILKINSON	Location code: Project account 3.5-5.0		
Sample collection date: 03/08/94 Lab submittal date: 03/11/94			
TEST PARAMETER	UNITS	TEST RESULT	DETECTION
2323-Tot. Pet. Hydro. Prep. Soil			
2323-Tot. Pet. Hydro. Prep. Soil Multicomponent analysis: 2321-TPH	IXS Cal-DHS mg/Kg	Done Not detected	2.9
2323-Tot. Pet. Hydro. Prep. Soil Multicomponent analysis: 2321-TPH Diesel Multicomponent analysis: 2321-TPH	HXS Cal-DHS mg/Kg HVS Cal-DHS	Done Not detected	2.9
2323-Tot. Pet. Hydro. Prep. Soil Multicomponent analysis: 2321-TPH Diesel Multicomponent analysis: 2321-TPH Gasoline 	HXS Cal-DHS mg/Kg HVS Cal-DHS	Done Not detected Not detected 2TC341	2.9
<pre>2323-Tot. Pet. Hydro. Prep. Soil Multicomponent analysis: 2321-TPH Diesel Multicomponent analysis: 2321-TPH Gasoline </pre>	HXS Cal-DHS mg/Kg HVS Cal-DHS mg/Kg Location code: Project account 0.0-1.5 Time: 15:52	Done Not detected Not detected 2TC341	2.9
2323-Tot. Pet. Hydro. Prep. Soil Multicomponent analysis: 2321-TPH Diesel Multicomponent analysis: 2321-TPH Gasoline 	HXS Cal-DHS mg/Kg HVS Cal-DHS mg/Kg Location code: Project account 0.0-1.5 Time: 15:52 Time: 13:58 UNITS	Done Not detected Not detected 2TC341 code: 12024 TEST RESULT	2.9 .24 DETECTION LIMIT
2323-Tot. Pet. Hydro. Prep. Soil Multicomponent analysis: 2321-TPH Diesel Multicomponent analysis: 2321-TPH Gasoline 	HXS Cal-DHS mg/Kg HVS Cal-DHS mg/Kg Location code: Project account 0.0-1.5 Time: 15:52 Time: 13:58 UNITS	Done Not detected Not detected 2TC341 code: 12024 TEST RESULT	2.9 .24 DETECTION LIMIT

Page: 6 March 21, 1994 Mr. Wayne Wilkinson DRAFT Sample I.D. AA51331 (continued)

TESTUNITSTESTDETEPARAMETERRESULTLIMIMulticomponent analysis: 2321-TPHVS Cal-DHSGasolinemg/KgNot detected.23Sample I.D. AA51332Location code: 2TC341Purchase order number: 47509183Project account code: 12024Location Description: MW-17 S-23.5-5.0	CTION F
Gasoline mg/Kg Not detected .23 	
Purchase order number: 47509183 Project account code: 12024	
Purchase order number: 47509183 Project account code: 12024	
Sample collector: W. WILKINSON	
Sample collection date: 03/08/94 Time: 15:58 Lab submittal date: 03/11/94 Time: 13:58	
TEST UNITS TEST DETEC PARAMETER RESULT LIMIT	
2323-Tot. Pet. Hydro. Prep. Soil Done	
Multicomponent analysis: 2321-TPHXS Cal-DHS Diesel mg/Kg Not detected 3.0	
Multicomponent analysis:2321-TPHVS Cal-DHSGasolinemg/KgNot detected	
Sample I.D. AA51333Location code: 2TC341Purchase order number: 47509183Project account code: 12024Location Description: DuplicateSample collector: W. WILKINSONLab submittal date: 03/11/94Time: 13:58	
TEST UNITS TEST DETEC PARAMETER RESULT LIMIT	
2323-Tot. Pet. Hydro. Prep. Soil Done	
Multicomponent analysis: 2321-TPHXS Cal-DHS Diesel mg/Kg Not detected 3.0	
Multicomponent analysis: 2321-TPHVS Cal-DHS Gasoline mg/Kg Not detected .24	

Page: 7 March 21, 1994

## DRAFT

Please advise should you have questions concerning these data.

Respectfully submitted,

James M.G. Tucci, Laboratory Manager

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		PE		EFOREST ROAD LA, FLORIDA 325 •9772	526		SAMPLI INFORM NPDE	IATI	ON UMBER				FACILIT											
SAMPLERS	<u>-</u> _	3.		P	,	JOB NO. 475-01		2		1.19 <sup>2</sup>														/
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TIME	GRAB	COMP.	"SOURCE CODE	SAMPLE STATION DESCRIPTION			10m	$\mathcal{S}_{\mathbf{t}}$	MBER MIN	WIN 50.	ANDER HIND				02 2	nil 1	HON			LENL LAB N
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Law Environmental, Inc. 7215 Pine Forest Road Pensacola, Florida 32526 904/944-9772

## Analytical Request Form

TO: LENL		Attn: <u>Stuple</u>	RECEN	line
From: RALEICH (Branch/	Company Name)	(Dept	t or Name	)
COC Number:	9829/8608 TC-341	Project Number:	475-09	<b>පියි</b> ( <b>කීම</b> -  ය (
Date Shipped:		Date results requ		
Sample ID	Analysis Requested	Detection Limits Req.		Method
<u>Mw-11 3.5-5.0</u> <u>Mw-11 0.0-1.5</u>	TPH 3550 /5030		50,1	ETA 3554/54 30
$\frac{4w-11}{2000-1.5}$				
× MW-12 3.5-5.01				
MW-13 0.0-1.5 MW-13 0.0-1.5 MW-13 3.5-5.0				
- mw-14 0.0-1.5				
~ 12 -14 3.5-520 ~ 12 - 14 - 15 ~ 14 - 15 0 1.5 ~ 10 - 15 - 2 7 - 10 - 15 - 2 7 - 10 - 15 - 2 - 10 - 10 - 10 - 10 - 10 - 10 - 10 - 10				
MW-15 3.5-5-0 MW-16 0.0-1.5				
Mw-16 3.5-5.0				
$\frac{4\omega - 17}{2} = \frac{5}{-2}$ $\frac{4\omega - 17}{5-2}$ Comments:				
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Law Environmental, Inc. Pensacola Branch 7215 Pine Forest Road Pensacola, Florida 32526 RECEVED BY

MAR 2 8 1994

March 24, 1994

LAW ENGINEERING RALEIGH

Mr. Brian Bellis - 475 Law Engineering, Inc. 3301 Atlantic Avenue Raleigh, NC 27604 Clt. #12024 Proj. #475-09183-01

Dear: Mr. Bellis:

Below are the results of analysis of 19 samples received for examination on March 11, 1994:

Sample I.D. AA51280 Purchase order number: 47509183 Location Description: MW-16 S-2 3 Sample collector: W. WILKINSON Sample collection date: 03/08/94 Lab submittal date: 03/11/94	Time: 10:56		
TEST	UNITS	TEST	DETECTION
PARAMETER		RESULT	LIMIT
2310-pH Soil EPA 9045	units	6.55	+/-
2323-Ignitability EPA 1010	degrees F	No Flash	200

Sample I.D. AA51281 Purchase order number: 47509183 Location Description: MW-17 S-1 0 Sample collector: W. WILKINSON	Location code: Project account .0-1.5		
Sample collection date: 03/08/94 Lab submittal date: 03/11/94			
	Time: 10:50		
TEST - PARAMETER	UNITS	TEST RESULT	DETECTION LIMIT
2310-pH Soil EPA 9045 2323-Ignitability EPA 1010 2323-Tot.Rec. O&G Grav. EPA 9071	units degrees F mg/Kg	7.23 No Flash 11	+/- 200 11.0

Sample I.D. AA51282Location code: TC341Purchase order number: 47509183Project account code: 12024Location Description: MW-15 S-38.5-10.0Sample collector: W. WILKINSONSample collection date: 03/08/94Sample collection date: 03/11/94Time: 10:04

TEST	UNITS	TEST	DETECTION
PARAMETER		RESULT	LIMIT
2310-pH Soil EPA 9045	units	5.53	+/-
2323-Ignitability EPA 1010	degrees F	No Flash	200

Sample I.D. AA51283 Purchase order number: 47509183 Location Description: MW-11 S-3 Sample collector: W. WILKINSON	Location code: Project account 8.5-10.0		
Sample collection date: 03/04/94 Lab submittal date: 03/11/94	Time: 09:32 Time: 10:50		
TEST PARAMETER	UNITS	TEST RESULT	DETECTION LIMIT
2323-Tot.Rec. O&G Grav. EPA 9071	mg/Kg	Not Det	12.0

Sample I.D. AA51284 Purchase order number: 47509183 Location Description: MW-13 S-3 Sample collector: W. WILKINSON	Location code: Project account 8.5-10.0		
Sample collection date: 03/07/94 Lab submittal date: 03/11/94	Time: 15:34 Time: 10:50		
TEST PARAMETER	UNITS	TEST RESULT	DETECTION LIMIT
2323-Tot.Rec. O&G Grav. EPA 9071	mg/Kg	Not Det	12.0

Sample I.D. AA51285 Purchase order number: 47509183 Location Description: MW-15 S-4 Sample collector: W. WILKINSON	Location code: Project account 13.5-15.0	—	
Sample collection date: 03/08/94 Lab submittal date: 03/11/94	Time: 10:09 Time: 10:50		
TEST PARAMETER	UNITS	TEST RESULT	DETECTION LIMIT
2323-Tot.Rec. O&G Grav. EPA 9071	mg/Kg	Not Det	13.0

Sample I.D. AA51286Location code: TC341Purchase order number: 47509183Project account code: 12024Location Description: MW-16 S-38.5-10.0

### Page: 3 March 24, 1994 Mr. Brian Bellis Sample I.D. AA51286 (continued)

Sample collector: W. WILKINSON Sample collection date: 03/08/94 Lab submittal date: 03/11/94	Time: 11:00 Time: 10:50		
TEST PARAMETER	UNITS	TEST RESULT	DETECTION LIMIT
2323-Tot.Rec. 0&G Grav. EPA 9071	mg/Kg	Not Det	13.0

Sample I.D. AA51287 Purchase order number: 47509183 Location Description: MW-12 S-3 Sample collector: W. WILKINSON	Location code: Project account 8.5-10.0		
Sample collection date: 03/07/94 Lab submittal date: 03/11/94	Time: 14:50 Time: 10:50		_
TEST PARAMETER	UNITS	TEST RESULT	DETECTION LIMIT
2323-Tot.Rec. O&G Grav. EPA 9071	mg/Kg	Not Det	12.0

Sample I.D. AA51288 Location code: TC341 Purchase order number: 47509183 Project account code: 12024 Location Description: MW-14 S-3 8.5-10.0 Sample collector: W. WILKINSON Sample collection date: 03/08/94 Time: 08:56 Lab submittal date: 03/11/94 Time: 10:50 TEST UNITS TEST DETECTION PARAMETER RESULT LIMIT 2323-Tot.Rec. O&G Grav. EPA 9071 mg/Kg 350 12.0 

Purchase order number: 47509183 Location Description: MW-15 S-7 Sample collector: W. WILKINSON Sample collection date: 03/09/94		Code. 12024	
Lab submittal date: 03/11/94 TEST PARAMETER	Time: 10:50 UNITS	TEST RESULT	DETECTION LIMIT
2323-Tot.Rec. O&G Grav. EPA 9071	mg/Kg	Not Det	11.0

Page: 4 March 24, 1994

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DRAFT

<b>Sample I.D. AA51290</b> Purchase order number: 47509183 Location Description: MW-11 S-2 Sample collector: W. WILKINSON	Location code: Project account 3.5-5.0		
Sample collection date: 03/04/94 Lab submittal date: 03/11/94			
TEST PARAMETER	UNITS		DETECTION LIMIT
2310-TCLP Ext. Met. S. EPA 1311		Done	
Multicomponent analysis: 2310-TCL			
Arsenic Barium	ug/L ug/L	Not detected 400	
Cadmium	ug/L	Not detected	30 4.0
Chromium	ug/L	Not detected	
Lead	ug/L	Not detected	37
Selenium	ug/L	Not detected	79
Silver		Not detected	
Multicomponent analysis: 2310-TCL	P Mercury EPA 74	170	
Mercury	ug/L units	Not detected	.20
2310-pH Soil EPA 9045	units	6.52	+/-
2323-Ignitability EPA 1010	degrees F	No Flash	200
TEST PARAMETER	UNITS	TEST RESULT	DETECTION LIMIT
2323-Ignitability EPA 1010 2323-Tot.Rec. O&G Grav. EPA 9071	degrees F mg/Kg	No Flash Not Det	200 11.0
<b>Sample I.D. AA51292</b> Purchase order number: 47509183	Location code: Project account		

Purchase order number: 47509183 Location Description: MW-12 S-2 Sample collector: W. WILKINSON	Project account 3.5-5.0	code: 12024	
Sample collection date: 03/07/94 Lab submittal date: 03/11/94	Time: 14:46 Time: 10:50		
	TIME: 10:50		
TEST PARAMETER	UNITS	TEST RESULT	DETECTION LIMIT
2310-pH Soil EPA 9045 2323-Ignitability EPA 1010	units degrees F	7.26 No Flash	+/- 200

Page: 5 March 24, 1994

Sample I.D. AA51293 Purchase order number: 47509183 Location Description: MW-13 S-1 Sample collector: W. WILKINSON Sample collection date: 03/07/94 Lab submittal date: 03/11/94			
TEST	UNITS	TEST	DETECTION
PARAMETER		RESULT	LIMIT
2310-pH Soil EPA 9045	units	6.02	+/-
2323-Ignitability EPA 1010	degrees F	No Flash	200

Sample I.D. AA51294 Purchase order number: 47509183 Location Description: MW-13 S-2 Sample collector: W. WILKINSON	Location code: Project account 3.5-5.0		
Sample collection date: 03/07/94 Lab submittal date: 03/11/94	Time: 15:31 Time: 10:50		
TEST PARAMETER	UNITS	TEST RESULT	DETECTION LIMIT
2310-pH Soil EPA 9045	units	5.93	+/-

Sample I.D. AA51295 Purchase order number: 47509183 Location Description: MW-14 S-1 Sample collector: W. WILKINSON Sample collection date: 03/08/94 Lab submittal date: 03/11/94	Location code: Project account 0.0-1.5 Time: 08:15 Time: 10:50		
TEST	UNITS	TEST	DETECTION
PARAMETER		RESULT	LIMIT
2310-pH Soil EPA 9045	units	7.48	+/- 200
2323-Ignitability EPA 1010	degrees F	No Flash	

Sample I.D. AA51296 Purchase order number: 47509183 Location Description: MW-14 S-2 Sample collector: W. WILKINSON Sample collection date: 03/08/94 Lab submittal date: 03/11/94	Time: 08:20		:
TEST PARAMETER	UNITS	TEST RESULT	DETECTION LIMIT
2310-TCLP Ext. Met. S. EPA 1311		Done	

Page: 6 March 24, 1994 Mr. Brian Bellis Sample I.D. AA51296 (continued)

Multicomponent analysis: 2310-TCLF		RESULT	LIMIT
	Notale EDA 60	10	
Arsenic	ug/L	Not detected	42
Barium		260	30
Cadmium	ug/L	Not detected	4.0
Chromium	ug/L ug/L ug/L	Not detected	8.0
Lead	ug/L	Not detected	
Selenium	ug/L	Not detected	
Silver		Not detected	
Multicomponent analysis: 2310-TCLF	Mercury EPA 7	470	
Mercury	ug/L	Not detected	.20
2323-Ignitability EPA 1010 2323-Tot.Rec. O&G Grav. EPA 9071	degrees F	No Flash	200
0000 m-h D 000 0	mg/Kg	Not Det	12.0
<b>Sample I.D. AA51297</b> Purchase order number: 47509183			
Sample I.D. AA51297 Purchase order number: 47509183 Location Description: MW-15 S-2 3 Sample collector: W. WILKINSON Sample collection date: 03/08/94	Project accoun 3.5-5.0 Time: 09:50		
<b>Sample I.D. AA51297</b> Purchase order number: 47509183 Location Description: MW-15 S-2 3 Sample collector: W. WILKINSON Sample collection date: 03/08/94 Lab submittal date: 03/11/94	Project accoun 3.5-5.0 Time: 09:50 Time: 10:50	t code: 12024	
<b>Sample I.D. AA51297</b> Purchase order number: 47509183 Location Description: MW-15 S-2 3 Sample collector: W. WILKINSON Sample collection date: 03/08/94 Lab submittal date: 03/11/94 TEST	Project accoun 3.5-5.0 Time: 09:50	t code: 12024  TEST	DETECTION
<pre>sample I.D. AA51297 Purchase order number: 47509183 Location Description: MW-15 S-2 3 Sample collector: W. WILKINSON Sample collection date: 03/08/94 Lab submittal date: 03/11/94 TEST PARAMETER</pre>	Project accoun 3.5-5.0 Time: 09:50 Time: 10:50 UNITS	t code: 12024 TEST RESULT	DETECTION LIMIT +/-

TEST	UNITS	TEST	DETECTION
PARAMETER		RESULT	LIMIT
2310-pH Soil EPA 9045	units	5.56	+/-

Page: 7 March 24, 1994

## DRAFT

Please advise should you have questions concerning these data.

Respectfully submitted,

James M.G. Tucci, Laboratory Manager

7215 PME FOREST ROAD PENSACOLA, FLORIDA 32526 (BOA) 944-9772       SAMPLING INFORMATION INFORMATI	<i>i</i> l		/ <b>IRONMENTAL, INC</b> . L LABORATORIES	CHA		FCU	S	JY RI	ECO	DF						8615
$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	Ş	7215 PIN PENSACC	E FOREST ROAD DLA, FLORIDA 32526		INFORM	ATION	c									
TIME $\frac{3}{8}$ SOURCE       SAMPLE STATION DESCRIPTION       PS       SOURCE       SAMPLE STATION DESCRIPTION       PS       SOURCE       SOURCE       SAMPLE STATION DESCRIPTION       PS       SOURCE       SOURCE       SAMPLE STATION DESCRIPTION       PS       SOURCE       SOURCE       SOURCE       SAMPLE STATION DESCRIPTION       PS       SOURCE       SOURCE       SOURCE       SAMPLE STATION DESCRIPTION       PS       SOURCE       SOU	SAMPLERS USIGN	NATURE)		09(83-5)	/	ONIAN	A THPE				ccope 1	LA CHI			<u> </u>	
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$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	10:56 Y	Ма							l l						Í.	AA51280
10.04 x $Mw$ $Mw$ $15$ S-3 $8.5-10.0$ $2$ x $px$ <t< td=""><td></td><td>Ma</td><td></td><td>······································</td><td>-1-</td><td></td><td> ¥ _</td><td></td><td>P,H</td><td>1010</td><td>9071</td><td></td><td></td><td><u> </u></td><td>ļ_,</td><td>AASI</td></t<>		Ma		······································	-1-		¥ _		P,H	1010	9071			<u> </u>	ļ_,	AASI
$9:32 \times Mu$ $Mu - H$ $5-3$ $8.5 - 10.0$ $1$ $1$ $1$ $90 27$ $AR51588$ $3:34 \times Mu$ $Mu - H$ $5-3$ $8.5 - 10.0$ $1$ $1$ $1$ $90 27$ $AR51588$ $3:34 \times Mu$ $Mu - H$ $5-3$ $8.5 - 10.0$ $1$ $1$ $1$ $90 27$ $1$ <td< td=""><td>/</td><td></td><td>3/4</td><td></td><td></td><td></td><td>¥-</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td>Ħ</td><td></td></td<>	/		3/4				¥-								Ħ	
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11:00 Y Ma MW-16 5-3 8:5 10.0 / X 9071 AASIDBO	10:09 X	Mw	MW-15 5-4				x		9071							31951285
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ORIGINAL AND YELLOW COPIES ACCOMPANY SAMPLE SHIPMENT TO LABORATORY. PINK COPY RETAINED BY SAMPLERS. YELLOW COPY RETAINED BY LABORATORY.

REMARKS

RECOVERY WELL - RW RCRA MONITORING WELL - MW SOIL / SEDIMENT - SO SLUDGE - SL

#### **'SOURCE CODES**

NPDES DISCHARGE - ND DRINKING WATER - DW HAZARDOUS WASTE - HW SURFACE WATER - SW NON-AQUEOUS - NA

NATIONAL LABORATORIES	HAIN OF	CUS	DY RECORD		8620
7215 PINE FOREST ROAD PENSACOLA, FLORIDA 32526 (904) 944-9772	SAMPLING INFORMAT NPDES N	ION N	AME OF FACILITY		
PROJECT NAME TC-341 SAMPLERS (SIGNATURE) SAMPLING DATE SAMPLING  VO. OF	CONTAINER THE		Surve Level		
3-4-95     -3-54       TIME     Source code     Sample station description		60ml 10 ml 1	10 WM 50 HBC 10 1 50 1 50 1 50 1 50 1 50 1 50 1 50	2-17-19-19-19-19-19-19-19-19-19-19-19-19-19-	LENL LAB NO.
9:24 Y Mus Mus -11-5-2 3.5-5- 2:18 Y Mus Mus -11 - 5-2 3.5-5-		X	Metals P		HASIJAO
2:18 4 Mar Mar -12 5-1 0.0-	F5 2	¥ ¥	1010 9071		คครเสีย
2:44 × 140 12 5-2 3-5 3:27 × 400 100-13 5-1 0.0-	-5-0 2	X	PH 1010		AB51
3:31 × 10 10-13 5-2 3.5- 8:5 × 10 10-14 51 0.0-1 8:20 × 10 10 14 52 3.5-	5-0	× F	P.4		ମନ୍ଦ୍ର ଅନ୍ତ୍ର ମନ୍ଦ୍ର ଅନ୍ତ୍ର
8:20 × Ma Ma-14 5-2 3.5-	<i>1.5</i> ∂ <i>1.5</i> ∂	Ý	PN 1010 metals 101	0 307/	MASIQ95
		- ¥-			HA51296
9:50 × 10 10-15 51 0.0 9:50 × 10 10-155-2 3.5- 10.45 × 10 10 16 51 0.0-	6 6.2	Y Y	PN 1010 PN		HA51297
RELINGUISHED BY: Payou Victurin 3-5-54	NATURE)	DATE / TIME	RELINQUISHED BY	RECEIVED BY LABORATORY . NICO S. DLI (SIGNATURE)	AA51298 Kel 3/12/11ME 194 08:45

DISTRIBUTION: ORIGINAL AND YELLOW COPIES ACCOMPANY SAMPLE SHIPMENT TO LABORATORY. PINK COPY RETAINED BY SAMPLERS. YELLOW COPY RETAINED BY LABORATORY.

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REMARKS

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#### **\*SOURCE CODES**

RECOVERY WELL - RW RCRA MONITORING WELL - MW SOIL / SEDIMENT - SO SLUDGE - SL NPDES DISCHARGE - ND DRINKING WATER - DW HAZARDOUS WASTE - HW SURFACE WATER - SW NON-AQUEOUS - NA



Law Environmental, Inc. 7215 Pine Forest Road Pensacola, Florida 32526 904/944-9772

### Analytical Request Form

TO: LENL From: <u>Ratecik</u> Law ene (Branch/Company Name) 18620 8615 COC Number: Project Name: TC-341

Attn: Sample Receivin

(Dept or Name)

Project Number: 475-07183-01

Date Shipped: 3-9-54

Date results requested: 5 day TA

Sample ID	Analysis Requested	Detection Limits Req.	Sample Type	Method ·
Hw-11 35-2	METHS, pH	St2	Soil	EPA-
1-1-14 5-2 3.5-5-0	METALS	Stel	_Socil	
Kew-12 3.5-5.5	pH	Stel	5.4	
Mw-13 3.5-5.		<u>    (</u>	t t	
Mw-14 0.0-1.5	pH	<u> </u>	[ <i>t</i>	
Mw-15 5-2 -Mw-16 5-1 -Mw-16 0-0-1.5	pH	<u> </u>	L r	
-Mw-16: 0-0-1-5	ptt	. (	ч	
Ma-17 0.0-1.5	off -	( 1	Ý	
Mau-16 3.5-53	pt	<u> </u>	(,	
$M_{W} - 13  S = 1$ $M_{W} - 13  S = 3$ $M_{W} - 15  S = 3$ S = 3	eff	<u>с</u> е 2	د٠	
MW-15 8-3		د ر	4	
MW-15 8-5-10-0	FRASH PT	10	در	
MW-15 3.5-5.0 S-2	t tr	• ر	ر در	
<u>5-2</u> <u>Ma-16</u> 3.5-5-2 Comments:		ا ر	۲	



Law Environmental, Inc. 7215 Pine Forest Road Pensacola, Florida 32526 904/944-9772

### Analytical Request Form

TO: LENL From: Role (Low ENG (Branch/Company Name) 8615 هدكا COC Number: Project Name: TC-34(

Attn: \_\_\_\_\_Somple Receiving

(Dept or Name)

Project Number: 475-09183-01

Date Shipped: 3-5-54

Date results requested: 5 day

Sample ID	Anal Requ	ysis ested	Detection Limits Req.	Sample Type	Method ·
Mw-17 0-1-1.5	FLASH 1	dent	Sth	S.l	ERA
Mw-17 0-1.5 Mw-14 0-1.5	<u> </u>		ί (	د ر	
· MW-14 3.5-50	L L		ر ۲	٤ ٢	
Mu-13 0-0-1.5	U (		C t	4	
S-1 MW-12 0-0-1.5	<u>ι</u>		ι,	L)	
Mu-11 3-5-5-0	L		<b>ι</b> (	C e	
Mw-12 5.5-52	. (		د (	<u> </u>	
Mu-11 8.5-13-2	TPH ?	7071	(	×,	
$\frac{MW-14}{S-7} = 0.0 - 1.5$ $\frac{MW-14}{S-7} = 3.5 - 7.0$ $\frac{MW-13}{S-1} = 5.7$ $\frac{MW-12}{S-7} = 0.0 - 1.5$ $\frac{MW-12}{S-7} = 5.7$ $\frac{S-7}{S-7} = 5.7$ $\frac{MW-12}{S-7} = 5.7$		c (	• •		
		L t	L	(1	
MW-14 3 5-2	<u> </u>	ι	L L	(1	
Ma-15 3.5-15	<u>ə ((</u>	4	در	د ا	
VMW-16 8-5-10.0	- د ز	لر	۲	(1	
Mu-15 5-4 S-4 S-3 Mu-16 8-5-10-3 Mu-17 0.0-1-5	t v	در	ر د	۲٬	
Comments:					



Law Environmental, Inc. 7215 Pine Forest Road Pensacola, Florida 32526 904/944-9772

### Analytical Request Form

TO: LENC From: Mierch/Low Erce (Branch/Company Name)

Attn: Sample Recervi

(Dept or Name)

COC Number: 8615/8620 Project Name: TC-34/

Project Number: 475-09(83-21

Date Shipped: 3-5-54

Date results requested: 5 day TAt

Sample ID	Analysis Requested	Detection Limits Req.	Sample Type	Method ·
Mw-12 8-570.0 5-3 Mw-14 8-5-10.0 Nw-15 28.5-7 Nw-15 28.5-3.0	TPH 9071	Stal	Sail	EXP
Mw-14 8-5-10.0	<u>ر د</u> د ب	C r	<del>~</del>	
Ma-15 28.5-30-3		. 1	<u> </u>	
	·	-		
<u></u>	······································			
	-			
		-		
Comments:	l	_!	I	l



March 30, 1994

Mr. Brian Bellis Law Engineering, Inc. 3301 Atlantic Avenue Raleigh, NC 27604

Subject: Chemical Analysis of Samples Received on 03/24/94 Project Number: 475-09183-01

Dear Mr. Bellis:

Law Environmental National Laboratories has completed its analysis of your samples and reports the results on the following pages. These results relate only to the contents of the samples as submitted. This report shall not be reproduced except in full without the approval of Law Environmental National Laboratories.

If further assistance is needed, please feel free to contact Kelli Silvia or myself at (904) 944-9772.

Sincerely,

LAW ENVIRONMENTAL NATIONAL LABORATORIES

M.G. James M.G. Tuccì Laboratory Manager

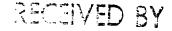
JMGT/kas

Enclosures: Data Report Invoice

LAW ENGINEERING, INC. 7215 PINE FOREST ROAD PENSACOLA, FL 32526

904-944-9772 FAX 904-944-9463

ONE OF THE LAW COMPANIES



HAR 3 1 1994

LAW ENGINEERING RALEIGH

--- Project Information

'30/94

...r. Brian Bellis - 475

Law Engineering, Inc.

3301 Atlantic Avenue

Raleigh, NC 27604

--- Sample Information ---

Station ID:TC341MW1Lab ID:AA51782Collector:GARY FISCHER

Page 1 Project Name: 3TC341 Clt. #12024 Proj. #475-09183-01

 Date Sampled:
 03/22/94

 Time Sampled:
 12:55

 Log In Date:
 03/24/94

 Log In Time:
 14:41

--- Test Information ---Analysis Units Det Lim Method Result Parameter Date Tech 2310-ICP Met Dig. W. BPA 3010 BPA 3010 Done 03/28/94 JG 2310-ICP Metals W. EPA 6010 ug/L EPA 6010 \_TITLE\_ 03/28/94 CH Arsenic ug/L EPA 6010 42 44 03/28/94 CH ug/L EPA 6010 30 Barium 390 03/28/94 CH EPA 6010 Cadmium ug/L 4.0 Not detected 03/28/94 CH ug/L EPA 6010 8.0 03/28/94 Chromium Not detected CH uq/L EPA 6010 37 03/28/94 Lead Not detected CH ug/L EPA 6010 79 Not detected 03/28/94 Selenium СН lver ug/L EPA 6010 8.0 Not detected 03/28/94 CH ug/L EPA 7470 0.2 Not Det 03/28/94 .0-Mercury Water EPA 7470 RAF

#### Remarks:

Digestion for this sample was performed by method 3030C.

70max 1444 Signed: James M.G. Tucci

Laboratory Manager

Information -

···/30/94

Station ID:

Lab ID:

Collector:

Brian Bellis - 475 Law Engineering, Inc. 3301 Atlantic Avenue Raleigh, NC 27604

TC341MW4

GARY FISCHER

AA51783

Page 1 Project Name: 3TC341 Clt. #12024 Proj. #475-09183-01

03/22/94

16:40

--- Sample Information --- Date Sampled: Time Sampled:

 Log In Date:
 03/24/94

 Log In Time:
 14:41

	Test Ir	nformation		Anal	Analysis	
Parameter	Units	Method	Det Lim	Result	Date	Tech
2310-ICP Met Dig. W. EPA 3010		EPA 3010		Done	03/28/94	JG
2310-ICP Metals W. EPA 6010	ug/L	EPA 6010		_TITLE_	03/28/94	CH
Arsenic	ug/L	EPA 6010	42	Not detected	03/28/94	CH
Barium	ug/L	EPA 6010	30	590	03/28/94	CH
Cadmium	ug/L	EPA 6010	4.0	11	03/28/94	CH
Chromium	ug/L	EPA 6010	8.0	31	03/28/94	CH
Lead	ug/L	EPA 6010	37	60	03/28/94	СН
Selenium	ug/L	EPA 6010	79	Not detected	03/28/94	СН
Silver	ug/L	EPA 6010	8.0	Not detected	03/28/94	CH
0-Mercury Water EPA 7470	ug/L	EPA 7470	0.2	Not Det	03/28/94	RAF

#### Remarks:

Digestion for this sample was performed by method 3030C.

30man14421 Signed: James M.G. Tucci Laboratory Manager

`/30/94

--- Project Information ---

r. Brian Bel	lis - 475		Page 1	
Law Engineer	ring, Inc.		Project Name:	3TC341
3301 Atlantic	Avenue		Clt. #12024 Proj.	#475-09183-01
Raleigh, NC	27604			
		Sample Information	Date Sampled:	03/22/94
Station ID:	TC341MW9		Time Sampled:	10:50
Lab ID:	AA51784		Log In Date:	03/24/94
Collector:	GARY FISCHER			14.41

--- Test Information ---Analysis Parameter Units Method Det Lim Result Date Tech 2323-LiqLiq Ext. EPA 3520 (FID) EPA 3520 Done 03/26/94 MWP 2321-PAH W. EPA 610 ug/L EPA 610 TITLE 03/29/94 MG EPA 610 Acenaphthene ug/L 1.1 Not detected 03/29/94 MG Acenaphthylene ug/L EPA 610 1.1 Not detected 03/29/94 MG Anthracene ug/L EPA 610 1.1 Not detected 03/29/94 MG Benzo(a]anthracene ug/L EPA 610 2.2 Not detected 03/29/94 MG Benzo[b]fluoranthene ug/L EPA 610 2.2 Not detected 03/29/94 MG Benzo[k]fluoranthene EPA 610 2.2 ug/L Not detected 03/29/94 MG nzo{ghi]perylene ug/L EPA 610 1.1 Not detected 03/29/94 MG .izo[a]pyrene ug/L EPA 610 1.1 Not detected 03/29/94 MG EPA 610 2.2 Chrysene ug/L Not detected 03/29/94 MG EPA 610 Dibenzo[a,h]anthracene ug/L 1.1 Not detected 03/29/94 MG EPA 610 1.1 Fluoranthene ug/L Not detected 03/29/94 MG Fluorene ug/L EPA 610 1.1 03/29/94 Not detected MG Indeno[1,2,3-cd]pyrene ug/L EPA 610 1.1 03/29/94 Not detected MG 1-Methylnaphthalene ug/L EPA 610 . 89 Not detected 03/29/94 MG 2-Methylnaphthalene ug/L EPA 610 . 89 03/29/94 Not detected MG Naphthalene ug/L EPA 610 1.1 Not detected 03/29/94 MG Phenanthrene ug/L EPA 610 1.1 Not detected 03/29/94 MG ug/L EPA 610 1.1 Not detected 03/29/94 Pyrene MG

Log In Time:

14:41

Remarks:

Signed: James M.G. Tucci

#### LAW ENVIRONMENTAL NATIONAL LABORATORIES TEST PATA REPORT ---- Project Information ---

^3/30/94

Station ID:

Lab ID:

Collector:

c. Brian Bellis - 475 Law Engineering, Inc. 3301 Atlantic Avenue Raleigh, NC 27604

TC341MW13

GARY FISCHER

AA51785

--- Sample Information ---

Page 1 Project Name: 3TC341 Clt. #12024 Proj. #475-09183-01

 Date Sampled:
 03/22/94

 Time Sampled:
 09:40

 Log In Date:
 03/24/94

 Log In Time:
 14:41

	Test Information				Analysis	
Parameter	Units	Method	Det Lim	Result	Date	Tech
2323-LiqLiq Ext. EPA 3520 (FID)		EPA 3520		Done	03/26/94	MWP
2321-PAH W. EPA 610	ug/L	EPA 610		_TITLB_	03/2 <b>9/94</b>	MG
Acenaphthene	ug/L	EPA 610	1.0	Not detected	03/29/94	MG
Acenaphthylene	ug/L	EPA 610	1.0	Not detected	03/29/94	MG
Anthracene	ug/L	EPA 610	1.0	Not detected	03/29/94	MG
Benzo[a]anthracene	ug/L	EPA 610	2.1	Not detected	03/29/94	MG
Benzo(b)fluoranthene	ug/L	EPA 610	2.1	Not detected	03/2 <b>9/94</b>	MG
Benzo[k]fluoranthene	ug/L	EPA 610	2.1	Not detected	03/29/94	MG
Penzo(ghi)perylene	ug/L	EPA 610	1.0	Not detected	03/29/94	MG
120[a]pyrene	ug/L	EPA 610	1.0	Not detected	03/2 <b>9/94</b>	MG
Chrysene	ug/L	EPA 610	2.1	Not detected	03/29/94	MG
Dibenzo(a,h]anthracene	ug/L	EPA 610	1.0	Not detected	03/29/94	MG
Fluoranthene	ug/L	EPA 610	1.0	Not detected	03/29/94	MG
Fluorene	ug/L	EPA 610	1.0	Not detected	03/29/94	MG
<pre>Indeno[1,2,3-cd]pyrene</pre>	ug/L	EPA 610	1.0	Not detected	03/2 <b>9/94</b>	MG
l-Methylnaphthalene	ug/L	EPA 610	. 83	Not detected	03/29/94	MG
2-Methylnaphthalene	ug/L	EPA 610	. 83	Not detected	03/29/94	MG
Naphthalene	ug/L	EPA 610	1.0	Not detected	03/29/94	MG
Phenanthrene	ug/L	EPA 610	1.0	Not detected	03/29/94	MG
Pyrene	ug/L	EPA 610	1.0	Not detected	03/29/94	MG

Remarks:

30 MAR 1994 Signed: James M.G. Tucci Laboratory Manager

'30/94

--- Project Information ---

Ar. Brian Bellis - 475 Law Engineering, Inc. 3301 Atlantic Avenue

Raleigh, NC 27604

--- Sample Information ---

Page 1 Project Name: 3TC341 Clt. #12024 Proj. #475-09183-01

Station ID:	TC341MW14
Lab ID:	AA51786
Collector:	GARY FISCHER

ation --- Date Sampled: Time Sampled:

Log In Date: 03/24/94

Log In Time:

03/22/94

08:25

14:41

--- Test Information ---Analysis Det Lim Parameter Units Method Result Date Tech 2323-LiqLiq Ext. EPA 3520 (FID) EPA 3520 Done 03/26/94 MWF 2321-PAH W. EPA 610 **EPA** 610 ug/L TITLE 03/30/94 MG Acenaphthene ug/L EPA 610 21 Not detected 03/30/94 MG Acenaphthylene ug/L EPA 610 21 Not detected 03/30/94 MG Anthracene EPA 610 21 520 ug/L 03/30/94 MG Benzo[a]anthracene ug/L BPA 610 42 Not detected 03/30/94 MG Benzo[b]fluoranthene ug/L EPA 610 42 Not detected 03/30/94 MG Benzo[k]fluoranthene EPA 610 ug/L 42 Not detected 03/30/94 MG \zo(ghi)perylene EPA 610 21 Not detected 03/30/94 ug/L MG ug/L EPA 610 21 .zo[a]pyrene Not detected 03/30/94 MG Chrysene ug/L EPA 610 42 Not detected 03/30/94 MG EPA 610 Not detected Dibenzo[a,h]anthracene ug/L 21 03/30/94 MG Fluoranthene ug/L **EPA** 610 21 Not detected 03/30/94 MG EPA 610 ug/L 21 Not detected 03/30/94 Fluorene MG Indeno[1,2,3-cd]pyrene ug/L EPA 610 21 Not detected 03/30/94 MG **BPA 610** 990 1-Methylnaphthalene ug/L 17 03/30/94 MG EPA 610 2-Methylnaphthalene ug/L 17 2500 03/30/94 MG EPA 610 620 Naphthalene ug/L 21 03/30/94 MG Phenanthrene ug/L EPA 610 21 610 03/30/94 MG ug/L EPA 610 21 Not detected 03/30/94 Pyrene MG

Remarks:

--- Project Information

'30/94

.r. Brian Bellis - 475 Law Engineering, Inc. 3301 Atlantic Avenue Raleigh, NC 27604

Page 1 Project Name: 3TC341 Clt. #12024 Proj. #475-09183-01

--- Sample Information ---

Station ID:	TC341MW15	1	
Lab ID:	AA51787		
Collector:	GARY FISCHER		

Date Sampled:	03/22/94
Time Sampled:	08:45
Log In Date:	03/24/94
Log In Time:	14:41

	Test Information					Analysis	
Parameter	Units	Method	Det Lim	Result	Date	Tech	
2323-LiqLiq Ext. EPA 3520 (FID)		EPA 3520		Done	03/26/94	HWP	
2321-PAH W. EPA 610	ug/L	EPA 610		_TITLE_	03/29/94	MG	
Acenaphthene	ug/L	EPA 610	1.0	Not detected	03/29/94	NG	
Acenaphthylene	ug/L	EPA 610	1.0	Not detected	03/29/94	MG	
Anthracene	ug/L	EPA 610	1.0	Not detected	03/29/94	MG	
Benzo(a]anthracene	ug/L	EPA 610	2.1	Not detected	03/29/94	MG	
Benzo[b]fluoranthene	ug/L	EPA 610	2.1	Not detected	03/29/94	MG	
Benzo[k]fluoranthene	ug/L	EPA 610	2.1	Not detected	03/29/94	MG	
nzo[ghi]perylene	ug/L	EPA 610	1.0	Not detected	03/29/94	MG	
.zo[a]pyrene	ug/L	EPA 610	1.0	Not detected	03/29/94	MG	
Chrysene	ug/L	EPA 610	2.1	Not detected	03/29/94	MG	
Dibenzo(a,h]anthracene	ug/L	EPA 610	1.0	Not detected	03/29/94	MG	
Fluoranthene	ug/L	EPA 610	1.0	Not detected	03/29/94	MG	
Fluorene	ug/L	EPA 610	1.0	Not detected	03/29/94	MG	
Indeno[1,2,3-cd]pyrene	ug/L	EPA 610	1.0	Not detected	03/29/94	MG	
l-Methylnaphthalene	ug/L	EPA 610	.83	Not detected	03/29/94	MG	
2-Methylnaphthalene	ug/L	EPA 610	.83	Not detected	03/29/94	MG	
Naphthalene	ug/L	EPA 610	1.0	Not detected	03/29/94	MG	
Phenanthrene	ug/L	EPA 610	1.0	Not detected	03/29/94	MG	
Pyrene	ug/L	EPA 610	1.0	Not detected	03/29/94	MG	

**Remarks:** 

\_30max1494 Mil Signed: James M.G. Tucci

--- Project Information

``3/30/94

Station ID:

Lab ID:

Collector:

.r. Brian Bellis - 475 Law Engineering, Inc. 3301 Atlantic Avenue

Raleigh, NC 27604

TC341MW16

GARY FISCHER

AA51788

--- Sample Information ---

 Page
 1

 Project Name:
 3TC341

 Clt. #12024 Proj. #475-09183-01

Date Sampled:	03/22/94
Time Sampled:	07:50
Log In Date:	03/24/94
Log In Time:	14:41

	Test Information				Analysi		
Parameter	Units	Method	Det Lim	Result	Date	Tech	
2323-LiqLiq Ext. BPA 3520 (FID)		EPA 3520		Done	03/26/94	MWP	
2321-PAH W. EPA 610	lg/L	EPA 610		_TITLE_	03/29/94	MG	
Acenaphthene	ug/L	EPA 610	1.0	Not detected	03/29/94	MG	
Acenaphthylene	ug/L	EPA 610	1.0	Not detected	03/29/94	MG	
Anthracene	ug/L	EPA 610	1.0	Not detected	03/29/94	MG	
Benzo(a)anthracene	ug/L	EPA 610	2.0	Not detected	03/29/94	NG	
Benzo(b)fluoranthene	ug/L	EPA 610	2.0	Not detected	03/29/94	MG	
Benzo[k]fluoranthene	ug/L	EPA 610	2.0	Not detected	03/29/94	MG	
<b>]</b> enzo[ghi]perylene	ug/L	EPA 610	1.0	Not detected	03/29/94	MG	
120[a]pyrene	ug/L	EPA 610	1.0	Not detected	03/29/94	MG	
Chrysene	ug/L	EPA 610	2.0	Not detected	03/29/94	MG	
Dibenzo[a,h]anthracene	ug/L	EPA 610	1.0	Not detected	03/29/94	MG	
Fluoranthene	ug/L	EPA 610	1.0	Not detected	03/29/94	MG	
Fluorene	ug/L	EPA 610	1.0	Not detected	03/29/94	MG	
Indeno[1,2,3-cd]pyrene	ug/L	EPA 610	1.0	Not detected	03/29/94	MG	
l-Methylnaphthalene	ug/L	<b>BPA 610</b>	0.8	Not detected	03/29/94	MG	
2-Methylnaphthalene	ug/L	EPA 610	0.8	Not detected	03/29/94	MG	
Naphthalene	ug/L	EPA 610	1.0	Not detected	03/29/94	MG	
Phenanthrene	ug/L	EPA 610	1.0	Not detected	03/29/94	MG	
Pyrene	ug/L	EPA 610	1.0	Not detected	03/29/94	MG	

Remarks:

30MAR 1942/ Signed: James M.G. Tucci Laboratory Manager

3/30/94 --- Project Information ---Mr. Brian Bellis - 475 Page 1 Law Engineering, Inc. **Project Name:** 3TC341 3301 Atlantic Avenue Clt. #12024 Proj. #475-09183-01 Raleigh, NC 27604 --- Sample Information ---Date Sampled: 03/22/94 Station ID: TC341MW17 Time Sampled: 09:15 Lab ID: AA51789 Log In Date: 03/24/94

Collector: GARY FISCHER

ug/L	Method BPA 3520 BPA 610	Det Lim	Result	Date	Tech
-			Done		
-	EPA 610			03/2 <b>6/94</b>	MWF
··- / T			_TITLB_	03/29/94	MG
ug/L	EPA 610	1.0	Not detected	03/29/94	MG
ug/L	EPA 610	1.0	Not detected	03/29/94	MG
ug/L	EPA 610	1.0	Not detected	03/29/94	MG
ug/L	BPA 610	2.0	Not detected	03/29/94	MG
ug/L	<b>EPA 610</b>	2.0	Not detected	03/29/94	MG
ug/L	BPA 610	2.0	Not detected	03/29/94	MG
ug/L	BPA 610	1.0	Not detected	03/29/94	MG
ug/L	BPA 610	1.0	Not detected	03/29/94	MG
ug/L	EPA 610	2.0	Not detected	03/29/94	MG
ug/L	BPA 610	1.0	Not detected	03/29/94	MG
ug/L	EPA 610	1.0	Not detected	03/29/94	MG
ug/L	BPA 610	1.0	Not detected	03/29/94	MG
ug/L	EPA 610	1.0	Not detected	03/29/94	MG
ug/L	BPA 610	0.8	Not detected	03/29/94	MG
ug/L	EPA 610	0.8	Not detected	03/29/94	MG
ug/L	EPA 610	1.0	Not detected	03/29/94	MG
ug/L	BPA 610	1.0	Not detected	03/2 <b>9/94</b>	MG
ug/L	EPA 610	1.0	Not detected	03/29/94	MG
	ug/L ug/L ug/L ug/L ug/L ug/L ug/L ug/L	ug/L       EPA 610         ug/L       EPA 610	ug/L       EPA 610       1.0         ug/L       EPA 610       1.0         ug/L       EPA 610       2.0         ug/L       EPA 610       2.0         ug/L       EPA 610       2.0         ug/L       EPA 610       2.0         ug/L       EPA 610       1.0         ug/L       EPA 610       0.8         ug/L       EPA 610       0.8         ug/L       EPA 610       0.8         ug/L       EPA 610       1.0         ug/L       EPA 610       1.0         ug/L       EPA 610       1.0         ug/L       EPA 610       1.0	ug/LEPA 6101.0Not detectedug/LEPA 6101.0Not detectedug/LEPA 6102.0Not detectedug/LEPA 6102.0Not detectedug/LEPA 6102.0Not detectedug/LEPA 6101.0Not detectedug/LEPA 6100.8Not detectedug/LEPA 6100.8Not detectedug/LEPA 6101.0Not detected	ug/L       EPA 610       1.0       Not detected       03/29/94         ug/L       EPA 610       1.0       Not detected       03/29/94         ug/L       EPA 610       2.0       Not detected       03/29/94         ug/L       EPA 610       1.0       Not detected       03/29/94         ug/L       EPA 610       0.8       Not detected       03/29/94         ug/L       EPA 610       0.8       Not detected       03/29/94         ug/L

Log In Time:

14:41

Remarks:

-30mar 149-1 Signed: James M.G. Tucci Laboratory Manager

--- Project Information -

'30/94

Station ID:

Lab ID:

.r. Brian Bellis - 475 Law Engineering, Inc. 3301 Atlantic Avenue

Raleigh, NC 27604

**TC341MW8** 

AA51790

--- Sample Information ---

Page 1 Project Name: 3TC341 Clt. #12024 Proj. #475-09183-01

Date Sampled:	03/22/94
Time Sampled:	17:15
Log In Date:	03/24/94
Log In Time:	14:41

Result

Not detected

Not detected

Done

\_TITLE\_

Analysis

Tech

HWP

MG

MG

Date

03/26/94

03/29/94

03/29/94

03/29/94 MG

Collector: GARY FISCHER --- Test Information ---Parameter Units Method Det Lim 2323-LiqLiq Ext. EPA 3520 (FID) EPA 3520 2321-PAH W. EPA 610 ug/L **EPA 610** Acenaphthene ug/L EPA 610 1.0 Ac Αr 86 Be Be

ug/L

Acenaphthylene	ug/L	EPA 610	1.0	Not detected	03/29/94	MG
Anthracene	ug/L	EPA 610	1.0	3.1	03/29/94	MG
Benzo(a]anthracene	ug/L	EPA 610	2.1	Not detected	03/29/94	MG
Benzo(b)fluoranthene	ug/L	EPA 610	2.1	Not detected	03/29/94	MG
Benzo[k]fluoranthene	ug/L	EPA 610	2.1	Not detected	03/29/94	MG
nzo[ghi]perylene	ug/L	EPA 610	1.0	Not detected	03/29/94	MG
zo{a]pyrene	ug/L	EPA 610	1.0	Not detected	03/29/94	MG
Chrysene	ug/L	EPA 610	2.1	Not detected	03/29/94	MG
Dibenzo[a,h]anthracene	ug/L	EPA 610	1.0	Not detected	03/29/94	MG
Fluoranthene	ug/L	EPA 610	1.0	Not detected	03/29/94	MG
Fluorene	ug/L	EPA 610	1.0	Not detected	03/29/94	MG
Indeno[1,2,3-cd]pyrene	ug/L	BPA 610	1.0	Not detected	03/29/94	NG
l-Methylnaphthalene	ug/L	EPA 610	. 82	1.4	03/29/94	MG
2-Methylnaphthalene	ug/L	EPA 610	. 82	4.3	03/29/94	MG
Naphthalene	ug/L	EPA 610	1.0	Not detected	03/29/94	MG
Phenanthrene	ug/L	EPA 610	1.0	5.8	03/29/94	MG

**EPA 610** 

1.0

**Remarks:** 

Pyrene

30mnx1994/ 1-4. T Signed: James M.G. Tucci

--- Project Information

30/94

Station ID:

Lab ID:

Collector:

A. Brian Bellis - 475
Law Engineering, Inc.
3301 Atlantic Avenue
Raleigh, NC 27604

Trip Blank

AA51791

GARY FISCHER

--- Sample Information ---

Page 1 Project Name: 3TC341 Clt. #12024 Proj. #475-09183-01

Date Sampled:03/22/94Time Sampled:Log In Date:03/24/94Log In Time:14:41

	Test In	formation			Anal	ysis
Parameter	Units	Method	Det Lim	Result	Date	Tech
2323-LiqLiq Ext. EPA 3520 (FID)		EPA 3520		Done	03/26/94	HWF
2321-PAH W. EPA 610	ug/L	EPA 610		_TITLE_	03/29/94	MG
Acenaphthene	ug/L	EPA 610	1.0	Not detected	03/29/94	MG
Acenaphthylene	ug/L	EPA 610	1.0	Not detected	03/29/94	MG
Anthracene	ug/L	EPA 610	1.0	Not detected	03/2 <b>9/94</b>	NG
Benzo[a]anthracene	ug/L	EPA 610	2.0	Not detected	03/29/94	MG
<pre>Benzo[b]fluoranthene</pre>	ug/L	EPA 610	2.0	Not detected	03/ <b>29/94</b>	MG
Benzo[k]fluoranthene	ug/L	EPA 610	2.0	Not detected	03/29/94	MG
Penzo(ghi]perylene	ug/L	EPA 610	1.0	Not detected	03/29/94	MG
<pre>izo[a]pyrene</pre>	ug/L	EPA 610	1.0	Not detected	03/29/94	NG
chrysene	ug/L	EPA 610	2.0	Not detected	03/29/94	MG
Dibenzo[a,h]anthracene	ug/L	EPA 610	1.0	Not detected	03/29/94	MG
Fluoranthene	ug/L	EPA 610	1.0	Not detected	03/29/94	MG
Fluorene	ug/L	EPA 610	1.0	Not detected	03/29/94	MG
Indeno[1,2,3-cd]pyrene	ug/L	EPA 610	1.0	Not detected	03/29/94	NG
1-Methylnaphthalene	ug/L	EPA 610	0.8	Not detected	03/29/94	MG
2-Methylnaphthalene	ug/L	EPA 610	0.8	Not detected	03/29/94	MG
Naphthalene	ug/L	EPA 610	1.0	Not detected	03/29/94	MG
Phenanthrene	ug/L	EPA 610	1.0	Not detected	03/2 <b>9/94</b>	MG
Pyrene	ug/L	EPA 610	1.0	Not detected	03/29/94	MG

**Remarks:** 

Signed: <u>James M.G. Tucci</u> Laboratory Manager

--- Project Information

'30/94

.r. Brian Bellis - 475 Law Engineering, Inc. 3301 Atlantic Avenue

Raleigh, NC 27604

--- Sample Information ---

Page 1 Project Name: 3TC341 Clt. #12024 Proj. #475-09183-01

 Date Sampled:
 03/22/94

 Time Sampled:
 10:00

 Log In Date:
 03/24/94

 Log In Time:
 14:41

Station ID:TC341MW7Lab ID:AA51792Collector:GARY FISCHER

	Test Ir	formation			Anal	ysis
Parameter	Units	Method	Det Lim	Result	Date	Tech
2323-LiqLiq Ext. EPA 3520 (FID)		EPA 3520		Done	03/26/94	MWP
2321-PAH W. EPA 610	ug/L	BPA 610		_TITLE_	03/29/94	NG
Acenaphthene	ug/L	EPA 610	1.1	Not detected	03/29/94	NG
Acenaphthylene	ug/L	EPA 610	1.1	Not detected	03/29/94	MG
Anthracene	ug/L	EPA 610	1.1	Not detected	03/29/94	MG
Benzo(a)anthracene	ug/L	EPA 610	2.1	Not detected	03/29/94	MG
Benzo[b]fluoranthene	ug/L	EPA 610	2.1	Not detected	03/29/94	MG
Benzo[k]fluoranthene	ug/L	EPA 610	2.1	Not detected	03/29/94	MG
<pre>nzo[ghi]perylene</pre>	ug/L	EPA 610	1.1	Not detected	03/29/94	MG
.zo[a]pyrene	ug/L	EPA 610	1.1	Not detected	03/29/94	MG
Chrysene	ug/L	EPA 610	2.1	Not detected	03/29/94	MG
Dibenzo[a,h]anthracene	ug/L	EPA 610	1.1	Not detected	03/29/94	MG
Fluoranthene	ug/L	EPA 610	1.1	Not detected	03/29/94	MG
Fluorene	ug/L	EPA 610	1.1	Not detected	03/29/94	MG
<pre>Indeno[1,2,3-cd]pyrene</pre>	ug/L	EPA 610	1.1	Not detected	03/29/94	MG
l-Methylnaphthalene	ug/L	EPA 610	. 85	Not detected	03/29/94	MG
2-Methylnaphthalene	ug/L	EPA 610	.85	Not detected	03/29/94	MG
Naphthalene	ug/L	EPA 610	1.1	Not detected	03/29/94	MG
Phenanthrene	ug/L	EPA 610	1.1	Not detected	03/29/94	MG
Pyrene	ug/L	BPA 610	1.1	Not detected	03/29/94	MG

Remarks:

ED MARIL 444 Signed: James M.G. Tucci

--- Project Information ---

3/30/94

Station ID:

Ar. Brian Bellis - 475

Law Engineering, Inc.

3301 Atlantic Avenue

Raleigh, NC 27604

--- Sample Information ---

Page	1	
Projec	t Name:	3TC341
<b>Clt. #</b> 1	12024 Proj	i. #475-0918 <b>3-01</b>

Date Sampled:	03/22/94
Time Sampled:	10:00
Log In Date:	03/24/94
Log In Time:	14:41

Lab ID: AA51792 Collector: GARY FISCHER

TC341MW7

--- Test Information ---

#### Analysis

Parameter	Units	Method	Det Lim	Result	Date	Tech
2323-LiqLiq Ext. EPA 3520 (FID)		BPA 3520		Done	03/26/94	HWP
2321-PAH W. EPA 610	ug/L	BPA 610		_TITLE_	03/29/94	NG
Acenaphthene	ug/L	BPA 610	1.1	Not detected	03/29/94	MG
Acenaphthylene	ug/L	EPA 610	1.1	Not detected	03/29/94	NG
Anthracene	ug/L	BPA 610	1.1	Not detected	03/29/94	NG
Benzo[a]anthracene	ug/L	EPA 610	2.1	Not detected	03/29/94	MG
Benzo(b)fluoranthene	ug/L	EPA 610	2.1	Not detected	03/29/94	NG
Benzo(k)fluoranthene	ug/L	EPA 610	2.1	Not detected	03/29/94	MG
<pre>`nzo(ghi)perylene</pre>	ug/L	EPA 610	1.1	Not detected	03/29/94	MG
nzo(a]pyrene	ug/L	EPA 610	1.1	Not detected	03/29/94	NG
Chrysene	ug/L	<b>EPA</b> 610	2.1	Not detected	03/29/94	MG
Dibenzo{a,h]anthracene	ug/L	BPA 610	1.1	Not detected	03/29/94	NG
Fluoranthene	ug/L	EPA 610	1.1	Not detected	03/29/94	MG
Fluorene	ug/L	BPA 610	1.1	Not detected	03/ <b>29/94</b>	MG
Indeno(1,2,3-cd)pyrene	ug/L	BPA 610	1.1	Not detected	03/29/94	MG
l-Methylnaphthalene	ug/L	EPA 610	. 85	Not detected	03/29/94	MG
2-Methylnaphthalene	ug/L	EPA 610	. 85	Not detected	03/29/94	MG
Naphthalene	ug/L	EPA 610	1.1	Not detected	03/2 <b>9/94</b>	MG
Phenanthrene	ug/L	BPA 610	1.1	Not detected	03/29/94	MG
Pyrene	ug/L	BPA 610	1.1	Not detected	03/2 <b>9/94</b>	NG

Remarks:

30 MAR1 494 Signed: James M.G. Tucci

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Law Environmental, Inc. 7215 Pine Forest Road Pensacola, Florida 32526 904/944-9772

#### Analytical Request Form

To: <u>LENL</u> From: <u>Law / Raleigh</u> (Branch/Company Name) Attn: <u>Sample Receiving</u> <u>Brian Bellis/ 47-5</u> (Dept or Name)

COC Number: <u>7992</u> Project Name: TC-341 (Camp 6454) Project Number: 475-09183-01

Date Shipped: 3 - 23 - 94 Date results requested: 5 day + urn.

Sample ID	Analysis Requested	Detection Limits Req.	Sample Type	Method
TC341MW1	8 RCRA metals w/3030c Prep.	Sto.	H20	
TC341mw4	SRCRA metals w/ 3030c Prep.	<u> </u>	и	
AC341 MWS	Polynuclea Aromatic Hydrocan	ou 4	4	EPA 610
TC341 mwg	Polynuclear Aremetic Hydrocobons	4	ч	EPA 610
TC341 MW13	Polynucles Arometic Hydracorbons	u	и	EPA 610
AC341 MW14	Poly Aucles Aromatic Hydroc or Sous	ч	4	EPA 610
AC341 MWIS	Polynutea Acomotic Approcabous	1	ч	EPA 610
AC341 MW16	Polyancles Aronotic Hydrocarbons	LI	Li	EPA 610
7(341 mw17	Polauller Aromatic Aydrocasbans			EPA 610
Mrip Slant	Polyan ter Arcatic Hidrac Sond	<i>C</i> 1 ::	<u> </u>	EPA 610
TC 341 MW 7	<u></u>		10	EPA 610
····				
Commonts				

Comments:

# DRAFT

### SAMPLE RECEIPT DISCREPANCY REPORT

Sample ID		
Sample ID	Lab ID	Discrepancy
AASTA86		
<u>TC341 MW14</u>	AA51786	- sample bottles 1072 Aprived broken in shipment!
<u>TC 341 MW17</u>	AASI789	- sample bottles 10fd parived broken in shiement!
<u>TC 341 MW7</u>	AA51792	- was not on COC, Added to C.O.C Apr
Follow-Up		
Contacted:		Contacted By:
There was enoug	h Remaining vol	une to run onalysis Requested
		coc + madytical request at lab.
	· <u> </u>	
		: 

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