

PHASE II
LIMITED SITE ASSESSMENT

SCOTCHMAN #139

WORSLEY COMPANIES, INC.

HUBERT, NORTH CAROLINA

DELTA PROJECT NO. X0NC-170

**PHASE II LIMITED SITE ASSESSMENT
SCOTCHMAN #139
101 HIGHWAY 172 AND HIGHWAY 24
HUBERT, ONSLOW COUNTY, NORTH CAROLINA
AUGUST 8, 2000**

Facility ID:	0-021332
Property Owner:	Patrick Partnership c/o George Patrick 102 Hollihaven Drive Hubert, NC 28539
Facility Owner:	Worsley Companies, Inc. P.O. Box 3227 10 S. Cardinal Drive Wilmington, NC 28406
UST Owner:	Worsley Companies, Inc. P.O. Box 3227 10 S. Cardinal Drive Wilmington, NC 28406 (910) 395-5300
Release Information:	Discovery Date: November 1996 - quantity unknown.
Cause of Release:	Failed tank tightness test on UST system consisting of 1-2,000 gallon diesel UST and 1-8,000 gallon diesel UST.
Latitude:	34.7106 N
Longitude:	77.2335 W

Prepared for:
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P.O. Box 3227
Wilmington, NC 28406

Prepared by:
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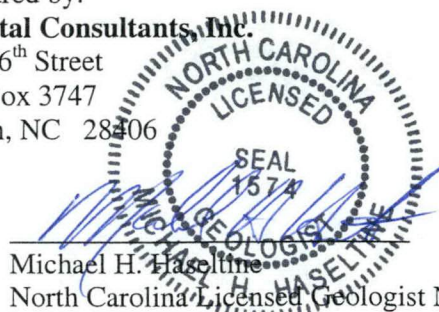


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**PHASE II
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On behalf of the Worsley Companies, Inc. (WCI), Delta Environmental Consultants, Inc. (Delta) has prepared the following Phase II Limited Site Assessment (LSA) Report on assessment activities performed at the Scotchman #139 facility in Hubert, Onslow County, North Carolina. This report has been prepared pursuant to Title 15A, North Carolina Administrative Code (NCAC), Chapter 2, Subchapter 2L, Section .0115(4) and in accordance with the *Groundwater Section Guidelines for the Investigation and Remediation of Soil and Groundwater*, Volume II, January 2, 1998.

1.0 SITE HISTORY, SOURCE CHARACTERIZATION, AND TANK OWNERSHIP

1.1 Site History

The subject facility is located at 101 Highway 172 and Highway 24 in Hubert, Onslow County, North Carolina (Figures 1 and 2). The facility, owned by Patrick Partnership c/o Mr. George Patrick, operates as a convenience market and retail fuel outlet.

On December 19, 1997, the North Carolina Department of Environment and Natural Resources (NCDENR) issued a Notice of Regulatory Requirements (NORR) to WCI regarding the subject facility. The NORR was issued in response to the suspected failure of an underground storage tank (UST) system tightness test, performed in November 1996. The NORR stated the failure indicated a product release might have occurred from the facility's diesel UST systems. WCI retained the services of Clark Environmental Services, P.C. (CES) to assist them in addressing the NORR.

Subsequently, on April 1, 1998, CES installed one monitoring well (MW-1) adjacent to the southern diesel UST area. During drilling for the monitoring well installation, soil samples were collected from the borehole at two and seven feet below ground surface (bgs). In addition to the collection of soil samples, a groundwater sample was collected from the monitoring well on April 30, 1998. Upon receipt of the analytical results, CES prepared a Subsurface Petroleum Detection Summary Report documenting the field activities and laboratory data. The report, dated June 25, 1998, was submitted to the NCDENR.

On October 26, 1999, the NCDENR forwarded a letter of comment to WCI regarding the referenced CES report. The letter noted that appropriate test methods were not performed on the soil samples. The NCDENR requested that additional samples be collected and submitted for the required analyses. In August of 1999, WCI retained the services of Delta to assist them in addressing the deficiencies noted in the NCDENR's October 26, 1999 letter.

On December 3, 1999, Delta personnel performed soil sampling activities adjacent to monitoring well MW-1. The soil samples were collected at two and seven feet bgs. Upon receipt of the analytical results, Delta prepared a Subsurface Petroleum Detection Summary Report Addendum. The report, dated December 22, 1999, was submitted to the NCDENR.

The NCDENR forwarded a review of the referenced Delta addendum to WCI on February 11, 2000. The review noted that an apparent petroleum release from the subject facility's diesel UST

system did not occur and a No Further Action letter was issued. However, the Division noted that the December 19, 1997 NORR referenced that two diesel UST systems were present at the subject facility. Therefore, the Division required WCI to perform an environmental assessment of the other diesel UST system, located on the northern side of the property.

On April 19, 2000, Delta personnel supervised the installation of monitoring well MW-2 in the vicinity of the second diesel UST area. A soil sample was collected from the borehole for the monitoring well at five to seven feet bgs. In addition to the collection of a soil sample, a groundwater sample was collected from the monitoring well on April 25, 2000. Upon receipt of the laboratory analytical results, Delta initiated Phase II Limited Site Assessment activities.

Copies of referenced state regulatory correspondence are presented in **Appendix A**.

1.2 Source Characterization

The UST system locations are depicted in **Figure 2**, and specific UST data are tabulated below.

TANK	GALLONS	CONTENTS	DATE INSTALLED	DATE REMOVED
1	4,000	Gasoline	1987	NA
2	6,000	Gasoline	1987	NA
3	2,000	Diesel	1987	NA
4	8,000	Diesel	1987	NA
5	4,000	Kerosene	1987	NA

NOTE:

1) NA denotes not applicable. USTs have not been removed from subject facility.

Laboratory analyses of soil samples collected by CES during installation of monitoring well MW-1 did not identify the presence of petroleum-related compounds above laboratory method detection limits (MDLs) associated with the diesel UST. Soil samples collected by Delta adjacent to monitoring well MW-1 were analyzed by appropriate laboratory methods. Target compound concentrations were not detected above MDLs. The soil sample locations are depicted in **Figure 2**. Additionally, laboratory analysis of the soil sample collected from the borehole for monitoring well MW-2 were not detected target compound concentrations at or above MDLs.

Laboratory analyses of a groundwater sample collected from monitoring well MW-1 did not detect target compound concentrations above MDLs. However, laboratory analyses of a groundwater sample collected from monitoring well MW-2 detected dissolved petroleum hydrocarbon concentrations above Title 15A NCAC 2L Standards (2L Standards).

On June 6, 2000, Delta field personnel initiated the Limited Site Assessment activities by installing three additional shallow monitoring wells (MW-3 through MW-5) and a deep monitoring well (DW-1). Further discussion on the event is presented in Section 2.2.

1.3 Underground Storage Tank Ownership

The UST system is owned by:

Worsley Companies, Inc.
Post Office Box 3227
10 S. Cardinal Drive
Wilmington, North Carolina 28406
(910) 395-5300

2.0 METHODS OF LIMITED SITE ASSESSMENT ACTIVITIES

The limited site assessment activities performed to collect data for this LSA Report included researching site-specific, local and regional data, installing monitoring wells, performing groundwater sampling, and submitting groundwater samples for analytical testing. The following sections discuss specific methodologies used in conducting these limited site assessment activities.

2.1 Review of Site-Specific, Local, and Regional Data

A review of available site-specific, local and regional data was performed to include:

- A well survey within a 1,500-foot radius of the subject facility, including a records inquiry and a visual survey for water meters and pump houses.
- Identification of wellhead protection areas.
- Researching geology and hydrogeology of the region, including topography, soil types, and surface water drainage patterns.
- Identification of surface waters within a 1,500-foot radius of the subject facility.
- Land use observations (site reconnaissance) and zoning classifications.
- A visual survey for subsurface structures and potential impacts from the source area.
- Gathering information on adjacent property owners and occupants.

2.2 Monitoring Well Installations

On April 19, 2000 and during the period of June 6 through June 7, 2000, five additional monitoring wells were installed at the subject facility. Geologic Exploration, Inc. installed the monitoring wells, with oversight provided by Delta. The monitoring well installed in April 2000 was labeled MW-2 and the newly installed wells were labeled MW-3, MW-4, MW-5, and DW-1. Monitoring wells MW-2 through MW-5 are shallow wells, installed to an approximate average depth of 17.5 feet bgs. Monitoring well DW-1 is a deep well, installed to a depth of 39 feet bgs. Placement of the additional four monitoring wells was based on locations of pre-existing wells, location of the UST basin, an estimated direction of groundwater flow, and available analytical data. The deep well was placed adjacent to existing, shallow monitoring well MW-2. The newly installed monitoring well locations are presented in **Figure 2**.

The outer casing installation for the deep well and casing installations for the shallow monitoring wells were performed using the hollow-stem auger drilling method. The mud rotary drilling method was used to install the inner casing and screen for the deep well.

The shallow wells are constructed with two-inch diameter, flush-joint, threaded schedule 40 PVC. The PVC well screens are 0.010-inch slot with screened intervals of 12 and 13 feet. The shallow wells were installed at 17 to 18 feet below ground surface (bgs). A coarse sand pack (filter pack) was used to backfill the well annuli to a depth of one-foot above the well screen. A two to five-foot thick bentonite seal was placed above the filter pack in the shallow monitoring wells, and Portland cement was used to fill the remaining, open, well annuli to ground surface.

The outer casing for the deep well is six-inch diameter, schedule-40 PVC. The casing was set at 30 feet bgs. The inner casing is two-inch diameter flush-joint, threaded schedule-40 PVC. The PVC well screen is 0.010-inch slot with a screened interval of five feet. The total well depth is 39 feet bgs. During installation of the deep well, split-barrel samples were collected for the purpose of logging the borehole lithology.

The filter pack for the deep well was placed in the well annulus to one-foot above the well screen. A four-foot bentonite seal was placed above the filter pack, and neat cement was used to fill the remaining 29 feet of well annulus to ground surface.

Appropriate decontamination protocols were adhered to during the monitoring well installations to prevent cross-contamination. The wells are flush-mounted and have been provided with sealing and locking caps. Protective manhole-type covers were placed over each well upon completion. The monitoring well construction records and as-built details are presented in **Appendix B** and the boring logs are provided in **Appendix C**.

2.3 Soil Sampling

Borehole logging was performed by Delta during drilling for the monitoring wells. One soil sample, for analytical testing, was collected from above the saturated zone in monitoring well borehole MW-2. Additionally, Delta performed an organic vapor soil screening on soil samples collected from boreholes MW-3 through MW-5 and DW-1. Screened samples were collected from approximate one-foot intervals to above the saturated zone. The screening was conducted with a photoionization detector (PID). The results have been noted on the boring logs in **Appendix C**.

Appropriate decontamination protocols were adhered to between sampling locations to prevent cross-contamination. The soil sample from monitoring well MW-2 was collected from approximately 5.0 to 7.0 feet bgs. This sample interval was selected based on PID readings. The sample was obtained with a split spoon. Upon collection, the soil sample was placed in laboratory-supplied containers, labeled, and placed on ice for delivery to the project laboratory. The sample was inventoried on the chain-of-custody document and submitted for analyses by EPA Methods 8260 and 8270, (volatiles and semi-volatiles) and MADEP-VPH and -EPH (volatile petroleum hydrocarbon and extractable petroleum hydrocarbon fractions). The analytical results are discussed in Section 6.1.

2.4 Groundwater Sampling

Prior to collecting groundwater samples, the monitoring wells were allowed to stabilize for a minimum of seven days after development. On April 25, 2000, the depth-to-groundwater was recorded for monitoring wells MW-1 and MW-2. The respective purge volume for monitoring well MW-2 was calculated. Additionally, on June 12, 2000, the depth-to-groundwater was recorded for each well included in this assessment, and the respective purge volumes were calculated. Before sample collection was initiated, a minimum of three purge volumes was removed from each well column to ensure the replacement of stagnant water with representative formation water.

Groundwater samples were collected using disposable bailers. Samples were slowly poured from the bailers into laboratory-supplied containers. The containers were sealed, labeled, and immediately placed on ice for delivery to the project laboratory. The samples were inventoried on the chain-of-custody documents and submitted for analyses by EPA Methods 601/602 (volatiles), 625 plus 10 highest peaks (semi-volatiles), 504.1 (ethylene dibromide - EDB), 3030C (lead), and MADEP-VPH and EPH. The analytical results are discussed in Section 6.2.

3.0 LIMITED SITE ASSESSMENT RISK CLASSIFICATION AND LANDUSE

Part 1 – Groundwater/Surface water/Vapor Impacts

High Risk:

1. *Has the discharge or release contaminated any water supply well including any used for non-drinking purposes?* **NO**
2. *Is a water supply well used for drinking water located within 1,000 feet of the source area of the discharge or release?* **YES**

Four Onslow County production wells were identified within 1,000 feet of the source area. Water supply wells used for purposes other than potable water were not identified within 1,000 feet of the source area. The subject facility and vicinity have the option of being connected to a municipal water supply system.

3. *Is a water supply well used for any purpose (e.g. irrigation, washing cars, industrial cooling water, filling swimming pools) located within 250 feet of the source area of the release or discharge?* **NO**

Water supply wells used for purposes other than potable water were not identified within 250 feet of the source area of the release or discharge.

4. *Does groundwater within 500 feet of the source area of the discharge or release have the potential for future use in that there is no other source of water supply other than the groundwater?* **NO**

The groundwater within 500 feet of the release or discharge could have the potential for future use as there are no restrictions; however, the likelihood that potable wells will be constructed is minimal due to the fact that a public water system is available to the area.

5. *Do vapors from the discharge or release pose a threat of explosion because of accumulation of the vapors in a confined space or pose any other serious threat to public health, public safety, or the environment?* **NO**

Two storm drains (catch basins) are located in the right-of-way along Highway 172. On June 6, 2000, the storm drains were visually inspected for petroleum-related impacts. The storm drains were dry and no evidence of petroleum-related impact was visually detected.

6. *Are there any other factors that would cause the discharge or release to pose an imminent danger to public health, public safety, or the environment?* **NO**

7. *Is a surface water body located within 500 feet of the source area of the discharge or release?* **NO**

An unnamed tributary of Bell Swamp is located approximately 600 feet east of the subject facility. Additionally, Queen Creek lies approximately 4,000 feet northeast and Bell Swamp lies approximately 2,700 feet southeast of the facility. Surface water bodies were not identified within 500 feet of the suspected source area.

If yes, does the maximum groundwater contaminant concentration exceed the surface water quality standards and criteria found in 15A NCAC 2B .0200 by a factor of 10? **NA**

8. *Is the source area of the discharge or release located within a designated wellhead protection area as defined in 42 USC 300h-7(e)?* **NO**

The source area is not known to be located within a designated wellhead protection area as defined by 42 USC 300h-7(e).

9. *Is the discharge or release located in the Coastal Plain Physiographic Region as designated on a map entitled "Geology of North Carolina" published by the Department in 1985?* **YES**

If yes, is the source area of the discharge or release located in an area in which there is recharge to an unconfined or semi-confined aquifer that is being used or may be used as a source of drinking water?

Within most areas of Onslow County, the surficial aquifer lies within 10 to 30 feet of ground surface and is capable of supplying sufficient water for domestic use. Due to the nature of the surficial aquifer, recharge to the aquifer has the potential to occur in proximity to the subject facility. Although it is possible that some wells in the vicinity may draw water from the surficial aquifer, water supplies in the majority of the area are likely drawn from deeper aquifers, including the Castle Hayne and Peedee aquifers. Throughout the Coastal Plain groundwater-system, recharge to aquifers can be expected to occur in interstream areas but, under most conditions, streams and flood plains act as discharge areas. Therefore, due to the presence and proximity of the unnamed tributary, Queen Creek and Bell Swamp, these water features likely act as discharge points for the area's aquifers. Points of significant recharge to deeper aquifers in the immediate area would not be expected.

10. *Do the levels of groundwater contamination for any contaminant exceed the gross contamination levels established by the Department?* **NO**

Part II – Land Use

Property Containing Source Area of Discharge or Release:

The questions below pertain to the property containing the source area of the release.

1. *Does the property contain one or more primary or secondary (permanent or temporary) residences?* **NO**

The property does not contain primary or secondary residences; however, single-family homes are present in proximity to the subject facility.

2. *Does the property contain a school, daycare center, hospital, playground, park, recreation area, church, nursing home, or other place of public assembly?* **NO**

The property does not contain places of public assembly.

3. *Does the property contain a commercial (e.g. retail, warehouse, office/business space, etc.) or industrial (e.g., manufacturing, utilities, industrial research and development, chemical/petroleum bulk storage, etc.) enterprise, and inactive commercial or industrial enterprise, or is the land undeveloped?* **YES**

The site is presently active as a retail fuel outlet and convenience market.

4. *Do children visit the property?* **YES**

The site is presently active and children visit the site consistent with its use.

5. *Is access to the property reliably restricted consistent with its use (e.g., by fences, security personnel or both)?* **YES**

The property is reliably restricted consistent with its use. A chain link fence is located along the northern edge of the property near Highway 24.

6. *Do pavement, building, or other structures cap the contaminated soil?* **YES**

Analytical results indicate that soil at the subject facility has not been impacted by petroleum hydrocarbons. However, the majority of the site is covered with asphalt and concrete.

If yes, what mechanisms are in place or can be put into place to ensure that the contaminated soil will remain capped in the foreseeable future?

At present, asphalt and concrete ensure soil will remain capped. Plans for future site development are not apparent at this time.

7. *What is the zoning status of the property?*

According to the Onslow County Tax Office, the subject facility is not currently zoned.

8. *Is the use of the property likely to change in the next 20 years?* **NO**

The subject facility is presently operating as a convenience market and retail fuel outlet. The use of the property is unlikely to change in the next 20 years.

Property Surrounding Source Area of Discharge or Release:

The questions below pertain to the area within 1,500 feet of the source area of the discharge or release (excludes property containing source area of the release):

9. *What is the distance from the source area of the release to the nearest primary or secondary residence (permanent or temporary)?*

A residence is located approximately 400 feet west, 500 feet south, 550 feet north, and 500 feet east of the source area of the discharge or release.

10. *What is the distance from the source area of the release to the nearest school, daycare center, hospital, playground, park, recreation area, church, nursing home, or other place of public assembly?*

A church (Queens Creek Methodist Church) is located approximately 800 feet southeast of the subject facility.

11. *What is the zoning status of properties in the surrounding area?*

Based on information obtained from Onslow County Tax Office, the area within a 1,500-foot radius of the subject facility is currently not zoned.

12. *Briefly characterize the use and activities of the land in the surrounding area.*

Land use in the immediate area is predominantly residential with some light commercial activity.

4.0 RECEPTOR PATHWAY INFORMATION

As defined by NCDENR, a receptor is "any human, plant or animal that is or has the potential to be adversely affected by the release or migration of contaminants." With respect to the subject facility, the following sections present information regarding potential receptor pathways for the migration of contaminants and pathway relationships to the facility.

4.1 Water Supply Wells

In an effort to gain complete and accurate data regarding water supply wells, Delta mailed water supply well surveys to property owners within a 1,500-foot radius of the subject facility. A copy

of the survey form is presented in **Appendix D**. A site reconnaissance also was conducted for visual evidence of pump houses and/or water meters.

Information collected during the mail-survey process is detailed below. The survey resulted in a 65 percent return of responses from property owners. Based on the responses received, the survey data have been summarized and are presented in **Table 1**. A water supply well location map is presented in **Figure 3** and is cross-referenced with **Table 1**.

- A total of 17 water supply wells were identified within a 1,500-foot radius of the subject site.
- One (1) operational water supply well (parcel 1301-7) is used for potable purposes. It is located approximately 1,450 feet from the subject facility.
- Four (4) operational water supply wells (parcels 1302-19.2, 1302-1.8, 1302-1.6, and 1302-1.1) are Onslow County production wells. They are located approximately 700 to 1,100 feet north/northwest of the subject facility. Three of the production wells are cased to a depth of 201 feet bgs and open to a depth of 240 feet bgs. The fourth production well is cased to a depth of 153 feet bgs and open to a depth of 176 feet bgs. The production wells obtain potable water from the deep Castle Hayne aquifer.
- Seven (7) water supply wells are used for non-potable purposes.
- Five (5) water supply wells are non-operational. Available information did not indicate whether or not these wells have been properly abandoned.

4.2 Public Water Supplies

Municipal water service is presently available to the Town of Hubert. Per a telephone conversation with the Onslow County Water Department (June 14, 2000), Delta was informed that a municipal water system is available to the Town of Hubert from Onslow County; however, it is not mandatory for properties to be connected to the municipal water service. Presently, sanitary sewer services are not available so properties within Hubert utilize septic tanks.

4.3 Surface Water Bodies

An unnamed tributary to Bell Swamp is located approximately 600 feet east of the subject facility. Additionally, Queen Creek is located approximately 4,000 feet to the northeast and Bell Swamp is located approximately 2,700 feet to the southeast of the subject facility. Surface water bodies were not identified within 500 feet of the suspected source area.

4.4 Wellhead Protection Areas

At the time of this assessment, a designated wellhead protection area, as defined in 42 USC 300h-7(e), is not reported to exist within 1,500 feet of the source area.

4.5 Deep Aquifers in the Coastal Plain Province

As part of the Tidewater Region or Outer Atlantic Coastal Plain province, Onslow County has four predominant aquifer systems. These aquifers include surficial sands of post-Miocene age, the Castle Hayne Formation of Eocene age, the Beaufort Formation of Paleocene age, and late Cretaceous sediments of the Peedee Formation (in descending order). The names of deep aquifers in the Coastal Plain province of North Carolina are generally taken from the predominant

geologic formation with which an aquifer is associated (e.g., the surficial aquifer, Castle Hayne aquifer, and Peedee aquifer). The lithology of each formation is significant with respect to the manner in which it will influence aquifer properties (e.g., groundwater chemistry, hydraulic conductivity, groundwater velocity, vertical movement, etc.).

The formations capable of yielding good water quality (potable water) are those not older than the late Cretaceous. The deep, older formations generally contain water too salty for potable use. The potable water aquifers, lying within the late Cretaceous and younger sediments, are generally comprised of imperfectly connected sand beds, limestone, to unconsolidated sediments of the surficial sands. Confining units may also be present, which separate the major aquifers. These confining units consist of clay beds or groups of clay beds and silt with varying amounts of sand. The lithology of a confining unit tends to retard the vertical exchange (movement) of groundwater between upper and lower aquifer systems.

The surficial aquifer is of major importance due to its extended coverage throughout the Coastal Plain. Precipitation infiltrating this aquifer is responsible for the bulk of water recharging the Coastal Plain aquifer system. The Atlantic Coastal Plain province consists of two natural subdivisions, the Tidewater region and the Inner Coastal Plain. The Tidewater region is coastal, existing where large streams and their tributaries are tidally influenced. Additionally, the topographic relief in this region is generally below 50 feet above mean sea level and swampy. The surficial aquifer in the Tidewater region is composed of fine sand, silt, clay, shell, peat beds, and scattered deposits of coarser-grained material with an average thickness of 35 feet. Hubert is located within the Tidewater region, east of the Inner Coastal Plain boundary. Within the Inner Coastal Plain, the unconsolidated sediments of the surficial aquifer become coarser grained and more poorly sorted.

Based on available well log information regarding the Hubert, North Carolina region, the surficial sands overlie the Castle Hayne Formation in the area. While recharge to Coastal Plain aquifers generally occurs within interstream areas and discharge occurs in streams and flood plains, recharge to the Castle Hayne aquifer can be facilitated in areas where the formation is shallow and overlain by flat-lying sandy material. This enables precipitation to readily infiltrate the aquifer.

The Castle Hayne confining unit is generally ten feet thick with less than 10 percent permeable material. Underlying the confining unit is the Castle Hayne aquifer, which consists of limestone and sand, with some minor amounts of clay. The aquifer is generally 312 feet thick with an estimated hydraulic conductivity of 45 feet/day (ft/dy). It consists of approximately 76 percent permeable material. The Castle Hayne aquifer overlies the Beaufort confining unit. This confining unit is approximately 20 feet thick and less than 10 percent permeable material. Underlying this confining unit is the Beaufort aquifer. The Beaufort aquifer is composed of fine to medium glauconitic sand, clayey sand, and clay beds of marine origin, with occasional shell and limestone beds. This aquifer is 80 feet thick and consists of 62 percent permeable material with a 55 ft/dy estimated hydraulic conductivity. The Peedee confining unit underlies the Beaufort aquifer. This confining unit is 42 feet thick and consists of an estimated 24 percent permeable material. The Peedee aquifer, underlying the confining unit, is composed of fine to medium grained sand interbedded with gray to black marine clay and silt. The Peedee aquifer consists of 75 percent permeable material and is approximately 145 feet thick. It has an estimated hydraulic conductivity of 65 ft/dy. (Source: U.S. Geological Survey, Professional Paper 1401-I, *Hydrogeologic Framework of the North Carolina Coastal Plain*, 1996).

4.6 Subsurface Structures

Storm water flow around the site is routed to an open storm water drainage area and an underground storm drain system. Two storm drain grates (catch basins) were observed in the right-of-way at the western side of the facility. Two open storm water drainage areas were located along the right-of-way on the southern and northern sides of the facility. The Town of Hubert is supplied water by the Onslow County municipal water system. The subject facility is on municipal water as a water meter was observed to be on-site. A sanitary sewer system is not currently available to the area. All residences and businesses use septic tank systems.

4.7 Land Use

Commercial and residential land uses have been identified within a 1,500-foot radius of the facility. In proximity to the site, land use is predominantly residential with light business activity. The site and surrounding properties are not zoned by Onslow County.

4.8 Adjacent Property Owners and Occupants

The names and addresses of property owners, having properties located adjacent to the source area, have been tabulated and are presented in **Table 1**. Additionally, a cross-reference map depicting the locations of adjacent properties is presented in **Figure 3**.

5.0 SITE GEOLOGY AND HYDROGEOLOGY

5.1 Description of Shallow Subsurface Geology

The surficial soil at the subject facility is classified as Baymeade fine sand (BaB) with 0-6% slopes (*U.S. Department of Agriculture: Soil Conservation Service, Soil Survey of Onslow County, North Carolina, 1992*). These soils are well drained and found on convex slopes near large drainageways and on low ridges. In these areas, infiltration is rapid and surface runoff is slow. The surficial soil is typically gray fine sand. The subsurface layer is light gray fine sand grading to light yellowish brown fine sand that has soft, dark yellowish brown nodules to approximately 15 inches bgs. From 15 to 30 inches bgs, the subsurface layer is described as white fine sand that has very pale brown mottles and a few thin bands of brownish yellow fine sandy loam. The subsoil is brownish yellow fine sandy loam to about three feet bgs. From three to approximately five feet bgs, the soil is a light yellowish brown fine sandy loam that has light gray mottles and thin layers of fine sand. Permeability is moderately rapid and available water capacity is low. The seasonal high water table is four to five feet bgs.

During drilling for the monitoring wells, asphalt, stone, and gravel were encountered from approximately zero to one-half foot bgs. The surficial sediments generally were tan and gray silty sandy clay below one-half foot bgs. In the boring log for monitoring well MW-4, brown to tan clayey sandy silt was encountered to approximately two feet bgs. The soil below two feet bgs was predominantly yellowish-orange to gray silty sandy clay to approximately ten feet bgs. Below ten feet bgs, the soil graded into a yellowish-orange to light gray silty fine sand with some clay. The lithology became a gray fine sand at approximately 14 feet bgs. This graded into a tan

silty fine sand to approximately 38 feet bgs. From 38 to 40 feet bgs, the lithology became a brown silty fine sandy clay.

The boring logs are presented in **Appendix C**.

5.2 Groundwater Occurrence

On June 6, 2000, the apparently saturated soil was encountered at approximately four to six feet bgs during drilling activities. Depth-to-groundwater measurements were obtained on June 12, 2000 during the groundwater sampling event. On this date, the depth-to-groundwater was measured at an approximate average depth of 14.43 feet bgs.

5.3 Groundwater Flow Direction

In studying the Hubert Quadrangle map (7.5 minute series topographic map, U.S. Geological Survey –USGS), the predominant local influence on direction of surface water runoff appears related to the presence of Queen Creek and Bell Swamp, located east of the subject facility. Typically, the surficial groundwater in the vicinity would be expected to flow in an eastern direction, mirroring the topography. Data obtained during the June 12, 2000 groundwater sampling event indicate the groundwater flow direction generally conforms to the topographic influences. A summary of water table elevation data is presented in **Table 2**. Groundwater elevation contours have been derived from the water table elevation data and are mapped on **Figure 4**.

5.4 Vertical Movement

Water table elevations obtained on June 12, 2000 indicate a head difference between shallow monitoring well MW-2 and deep monitoring well DW-1. The head difference between the two wells is 0.66 feet, with the higher water table elevation being in the shallow well and the lower water table elevation being in the deeper well.

The apparent head difference suggests gravity potential for downward flow between the surficial aquifer and deeper underlying strata. Vertical permeability measurements were not obtained to quantitatively assess the potential for this occurrence. A summary of the water table elevation data is presented in **Table 2**.

6.0 ANALYTICAL RESULTS

A soil sample was submitted to Research and Analytical Laboratories, Inc. (RAL) of Kernersville, North Carolina. Groundwater samples were submitted to Paradigm Analytical Laboratories, Inc. of Wilmington, North Carolina and RAL. The following sections discuss the analytical data provided in the laboratory reports.

6.1 Soil Analytical Results

Laboratory analysis of the soil sample collected from monitoring well MW-2 did not indicate the presence of petroleum hydrocarbons above MDLs. Soil samples were not collected from the boreholes for monitoring wells MW-3 through MW-5 and DW-1, as PID readings did not

indicate impact by petroleum hydrocarbons. The laboratory report for the soil sample collected from the borehole for monitoring well MW-2 is provided in **Appendix E**.

6.2 Groundwater Analytical Results

Laboratory analyses detected dissolved petroleum hydrocarbon concentrations in groundwater samples from monitoring wells MW-2, MW-3, MW-4, and MW-5 above their respective 2L Standards. Dissolved petroleum hydrocarbon concentrations were not identified above laboratory MDLs in the groundwater samples collected from monitoring wells MW-1 and DW-1. A tabulated summary of the analytical results is presented in **Table 3**, and the laboratory report is provided in **Appendix F**. The estimated area of dissolved petroleum hydrocarbons above 2L Standards is depicted in **Figure 5**.

7.0 CONCLUSIONS AND RECOMMENDATIONS

7.1 Conclusions

Based on information obtained during this Limited Site Assessment, it appears a petroleum release from the UST system at the subject facility may have occurred. Additionally, the subject facility meets the criteria for a *High-Risk* classification.

- Impacted soil was not detected in the vicinity of the diesel UST.
- Dissolved petroleum hydrocarbon concentrations were identified above 2L Standards in monitoring wells MW-2 through MW-5; however, GCLs were not exceeded.
- Free product was not encountered during the LSA field activities.
- Four Onslow County production wells were identified within 1,000 feet of the subject facility to the north/northwest and in an apparent cross/up-gradient location. These wells obtain potable water from the Castle Hayne aquifer. The Castle Hayne confining unit separates the Castle Hayne aquifer from the surficial aquifer in the area.
- Potable water supply wells were not identified within 500 feet of the subject facility. The subject facility and vicinity are connected to a municipal water supply system.
- Water supply wells, used for purposes other than drinking, were not identified within 250 feet of the subject facility.
- Surface water was not identified within 500 feet of the source area.

7.2 Recommendations

Delta has arranged for the performance of a UST system tightness test to confirm that the gasoline system is operating within established guidelines. These results will be forwarded to NCDENR upon receipt.

Groundwater modeling may reveal the fate and transport of the petroleum constituents with respect to the production and private wells. Delta recommends the collection of necessary data to perform this modeling.

8.0 REMARKS

The recommendations contained in this report represent our professional opinions. These opinions were arrived at in accordance with currently accepted hydrogeologic practices and relevant regulatory guidelines at this time and location. Other than this, no warranty is implied or intended.

This report was prepared by:

DELTA ENVIRONMENTAL CONSULTANTS, INC.



Maureen Jones
Staff Geologist

This report was reviewed by:



Michael H. Haseltine, P.G.
Project Geologist
North Carolina Licensed Geologist No. 1574

TABLE 1
PROPERTIES WITHIN 1,000-FOOT RADIUS OF SUBJECT SITE
SCOTCHMAN #139
HUBERT, NORTH CAROLINA
DELTA PROJECT NO. X0NC-170

PARCEL NUMBER	PROPERTY OWNER NAME AND ADDRESS	PUBLIC WATER	WATER SUPPLY WELL	USE OF WATER SUPPLY WELL	COMMENTS*	APPROX. DISTANCE FROM SITE (ft.)
1301-111	David and Susan Taphous P.O. Box 501 Hubert, NC 28539	YES	YES	Non-operational	Depth unknown.	1,700
1301-7	Samuel Muscari c/o John Hrko P.O. Box 769 Pineville, West Virginia	NO	YES	Operational Drinking, bathrooms	Depth unknown.	1,450
1302-1.4	Michael and Debra Williams 175 Starling Road Hubert, NC 28539	YES	YES	Operational Irrigation	Depth unknown.	550
1306-63	Mark and Patricia Bennett 432 Hubert Boulevard Hubert, NC 28539	YES	YES	Non-operational	Depth unknown.	1,250
1302-7	Clifton and Mary Foreman P.O. Box 74 Hubert, NC 28539	YES	YES	Non-operational	Depth unknown.	1,150
1302-6	Clifton and Mary Foreman P.O. Box 74 Hubert, NC 28539	YES	YES	Non-operational	Depth unknown.	1,050
1302-8	Clifton and Mary Foreman P.O. Box 74 Hubert, NC 28539	YES	YES	Non-operational	Depth unknown.	1,250
1302-18	Elizabeth and Charles Redeker, Jr. 124 Leslie Drive Hubert, NC 28539	YES	YES	Operational Irrigation	Supply well at present is being repaired from hurricane.	375
1307-23	John and Louise Horne P.O. Box 42 Hubert, NC 28539	YES	YES	Operational Irrigation	Depth 125 feet.	1,000
1302-4	Joseph and Carol Kowalski 143 Highway 172 Hubert, NC 28539	YES	YES	Operational Irrigation	Depth unknown.	800
1307-23.1	Dennie and Mary Horne 231 Starling Road Hubert, NC 28539	YES	YES	Operational Irrigation	Depth 95 feet.	1,125
1307-23.4	Dennie and Mary Horne 231 Starling Road Hubert, NC 28539	YES	YES	Operational Irrigation	Depth 95 feet.	1,075
1302-19.2	Onslow County 521 Mill Avenue Jacksonville, NC 28540	NO	YES	Operational Onslow County Production Well	Depth 176 feet.	1,150
1302-1.8	Onslow County 521 Mill Avenue Jacksonville, NC 28540	NO	YES	Operational Onslow County Production Well	Depth 240 feet.	700
1302-1.6	Onslow County 521 Mill Avenue Jacksonville, NC 28540	NO	YES	Operational Onslow County Production Well	Depth 240 feet.	800
1302-1.1	Onslow County 521 Mill Avenue Jacksonville, NC 28540	NO	YES	Operational Onslow County Production Well	Depth 240 feet.	750
1306-56	Nancy and J. Harvey Lilley 475 Hubert Boulevard Hubert, NC 28539	YES	YES	Operational Irrigation	Depth 90 feet.	1,250

* Comments are based on information provided by the property owners during the supply well survey. The comments are not substantiated by verified documentation/well construction records.

TABLE 2
WELL CONSTRUCTION DETAILS AND GROUNDWATER ELEVATION DATA
SCOTCHMAN #139
HUBERT, NORTH CAROLINA
DELTA PROJECT NO. X0NC-170

WELL ID	INSTALLATION DATE	WELL DEPTHS ¹ (ft.)	WELL SCREEN INTERVAL (ft.)	TOC ² ELEVATION (ft.)	APRIL 25, 2000		JUNE 12, 2000	
					DEPTH TO WATER ³ (ft.)	WATER TABLE ELEVATION ⁴ (ft.)	DEPTH TO WATER ³ (ft.)	WATER TABLE ELEVATION ⁴
MW-1	4/1/98	15.0	5-15	100.00	11.75	88.25	13.16	86.84
MW-2	4/19/00	17.0	5-17	99.84	13.61	86.23	14.61	85.23
MW-3	6/7/00	17.0	5-17	100.15	NI	NI	14.35	85.80
MW-4	6/6/00	17.0	5-17	99.98	NI	NI	15.05	84.93
MW-5	6/6/00	18.0	5-18	99.79	NI	NI	15.00	84.79
DW-1	6/6/00	39.0	34-39	99.91	NI	NI	15.27	84.64

NOTES:

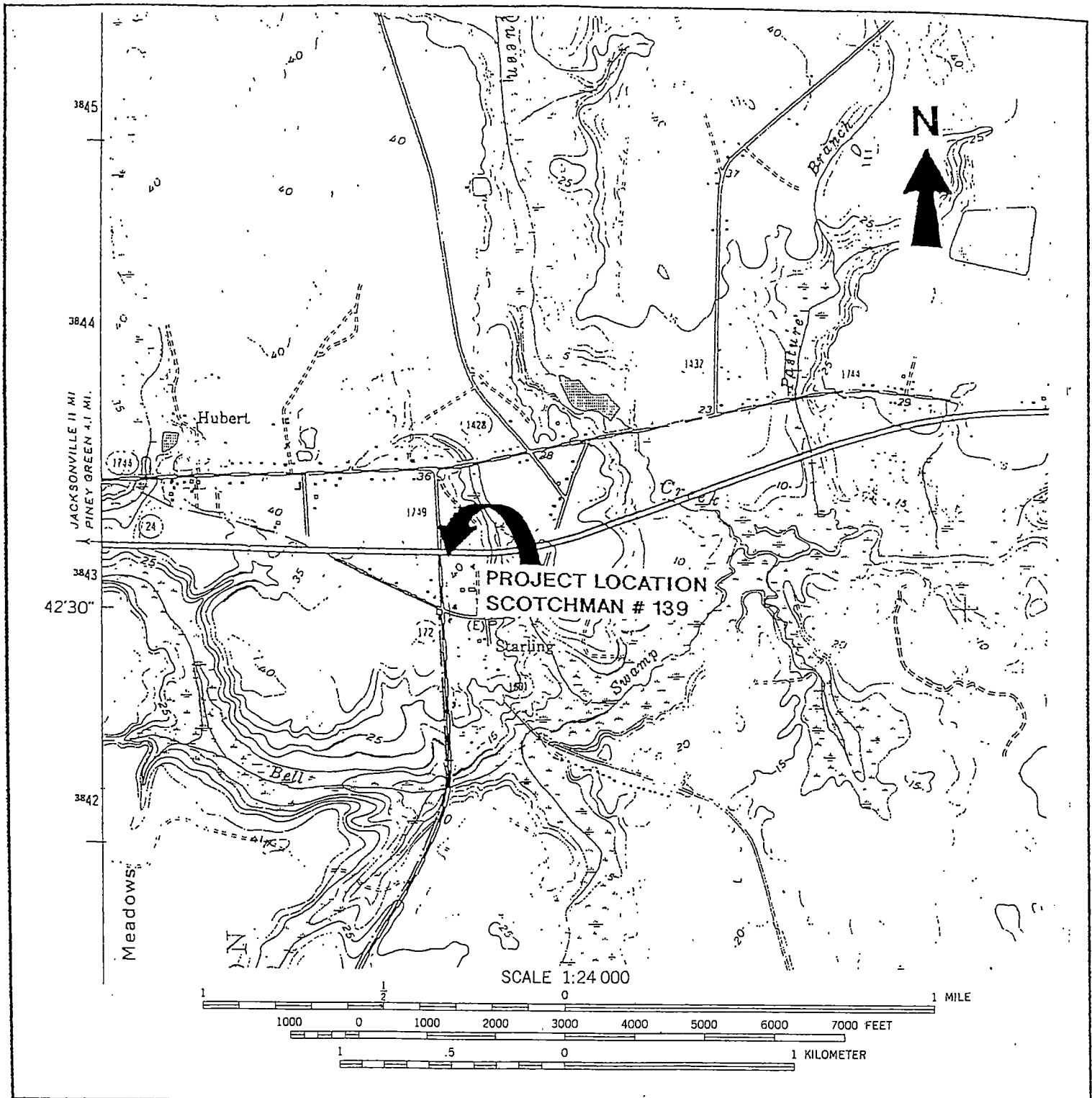
- 1) Well depths per well construction records - measuring point from top-of-casing.
- 2) TOC denotes top-of-casing elevation. The TOC elevations are based on an arbitrary benchmark elevation of 100 feet above mean sea level.
- 3) The depth to water was measured from top-of-casing.
- 4) The water table elevations are based on the respective top-of-casing measurements minus the depth to water measurements.
- 5) NI denotes no information available. Wells were not constructed at this time.

TABLE 3
ANALYTICAL SUMMARY FOR GROUNDWATER
SCOTCHMAN #139
HUBERT, NORTH CAROLINA
DELTA PROJECT NO. X0NC-170

Sample ID	MW-1	MW-2	MW-3	MW-4	MW-5	DW-1	GROSS CONTAMINANT LEVELS	2L STANDARDS
Sample Date	4/30/98	4/25/00	6/12/00	6/12/00	6/12/00	6/12/00		
Analyses	EPA Methods 602 and 625 plus 10	EPA Methods 602, 625 plus 10, and MADEP-VPH	EPA Methods 601/602; 504.1; 3030C; MADEP- VPH; MADEP-EPH	EPA Methods 601/602; 504.1; 3030C; MADEP- VPH; MADEP-EPH	EPA Methods 601/602; 504.1; 3030C; MADEP- VPH; MADEP-EPH	EPA Methods 601/602; 504.1; 3030C; MADEP- VPH; MADEP-EPH	ppb	ppb
	Detected Compounds	Concentrations (ppb)	Concentrations (ppb)	Concentrations (ppb)	Concentrations (ppb)	Concentrations (ppb)		
Benzene	BQL	97	835	3.6	646	BQL	5,000	1
Ethylbenzene	BQL	BQL	1,040	BQL	1,020	BQL	29,000	29
Toluene	BQL	BQL	3,970	BQL	12,100	BQL	257,500	1,000
Total Xylenes	BQL	BQL	6,060	BQL	5,870	BQL	87,500	530
IPE	BQL	180	BQL	12	BQL	BQL	70,000	70
MTBE	BQL	250	BQL	68	BQL	BQL	200,000	200
Lead	BQL	BQL	8	5	12	BQL	15,000	15
Naphthalene	BQL	BQL	BQL	BQL	113	BQL	15,500	21
Creosols	NI	NI	NI	NI	102	NI	NS	NS
Benzene, propyl	NI	NI	NI	NI	55	NI	NS	NS
Benzene, 1-ethyl-2-methyl	NI	NI	NI	NI	345	NI	NS	NS
Benzene, 1-ethyl-4-methyl	NI	NI	381	NI	NI	NI	NS	NS
Benzene, 1-ethyl-3-methyl	NI	NI	187	NI	NI	NI	NS	NS
Benzenemethanol, 2-methyl	NI	NI	87	NI	NI	NI	NS	NS
Benzene, 1-methyl-3-propyl	NI	NI	80	NI	NI	NI	NS	NS
Benzene, 4-ethyl-1,2-dimethyl	NI	NI	71	NI	NI	NI	NS	NS
Benzene, 2-ethenyl-1,4-dimethyl	NI	NI	65	NI	NI	NI	NS	NS
Benzene, 1,2,4,5-tetramethyl	NI	NI	39	NI	NI	NI	NS	NS
Benzene, 1,2,4-trimethyl	NI	NI	195	NI	136	NI	28,500	350
Benzene, 1,3,5-trimethyl	NI	NI	NI	NI	504	NI	25,000	350
Benzene, 1,2,3-trimethyl	NI	NI	504	NI	151	NI	NS	NS
Indane	NI	NI	148	NI	94	NI	NS	NS
Trimethylbenzene, Isomer of	NI	7.9	NI	NI	NI	NI	NS	NS
Dimethylbenzene, Isomer of	NI	6.5	NI	NI	NI	NI	NS	NS
C5-C8 Aliphatics (VPH)	NA	930	9,840	BQL	19,100	BQL	NS	420
C9-C18 Aliphatics (EPH + VPH)	NA	120 (VPH only)	16,820	345 (EPH only)	16,300	BQL	NS	4,200
C19-C36 Aliphatics (EPH)	NA	NA	231	120	197	BQL	NS	42,000
C9-C22 Aromatics (VPH + EPH)	NA	44 (VPH only)	5,390	505 (EPH only)	3,490	BQL	NS	210

NOTES:

- 1) NA denotes not analyzed.
- 2) BQL denotes below quantitation limit.
- 3) Analytical results exceeding 2L Standards are in bold type.
- 4) Analytical results presented in parts per billion (ug/L).
- 5) NI denotes compounds not detected in library search.
- 6) NS denotes no narrative standard has been established.



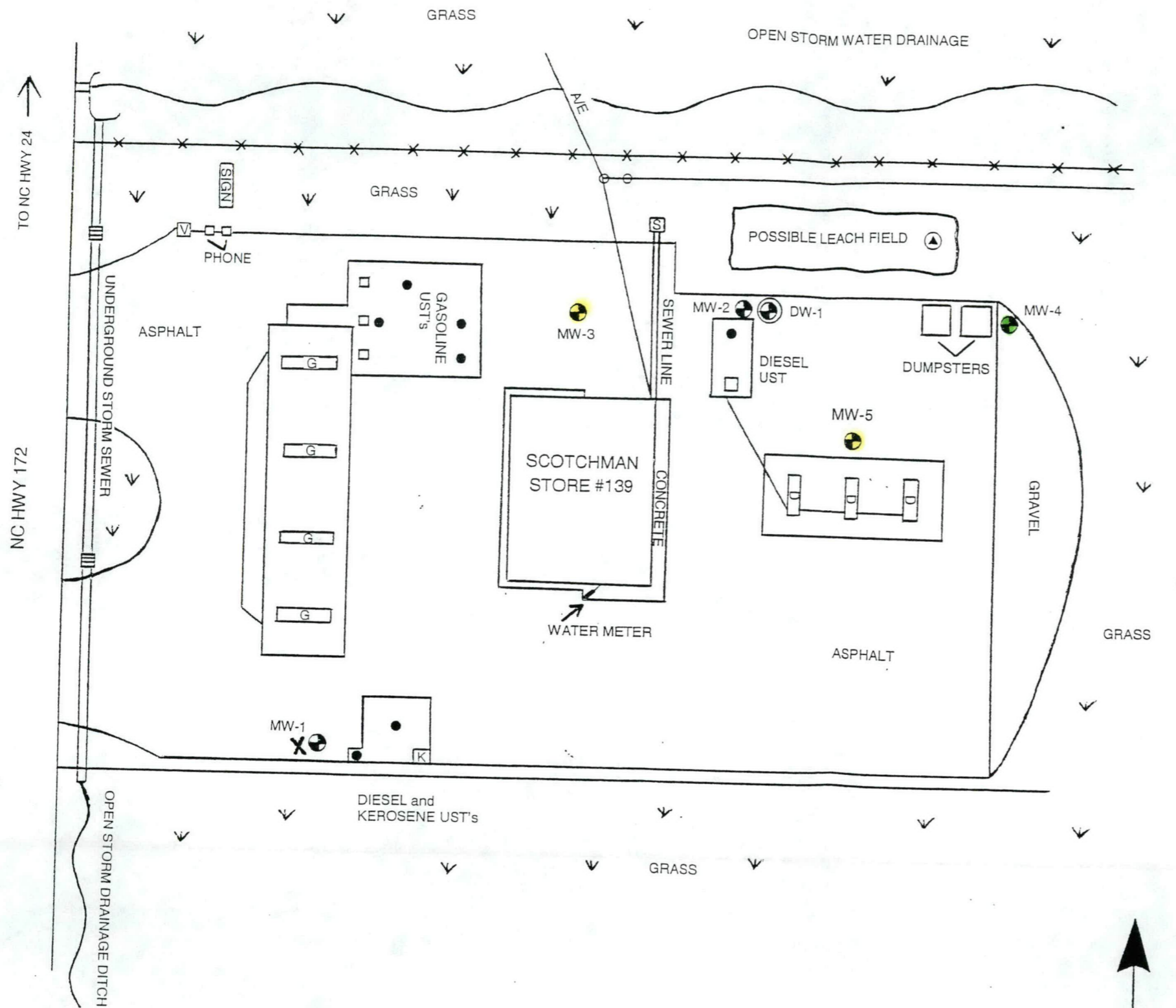
CONTOUR INTERVAL 5 FEET
 NATIONAL GEODETIC VERTICAL DATUM OF 1929

HUBERT QUADRANGLE
 NORTH CAROLINA—ONSLOW CO.
 7.5 MINUTE SERIES (TOPOGRAPHIC)




Delta
 Environmental Consultants, Inc.
 1201 South 16th Street
 Wilmington, North Carolina 28401

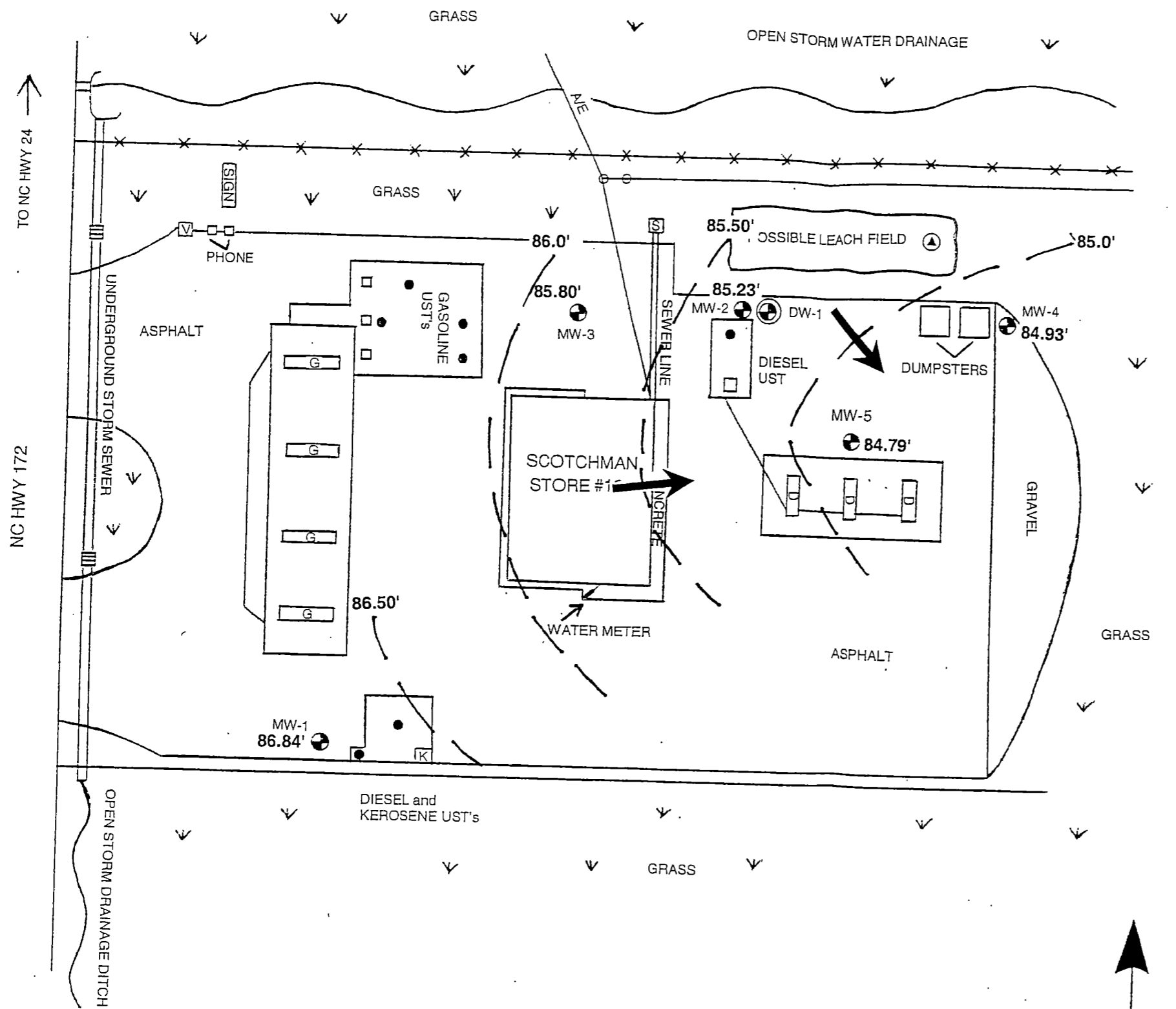
PROJECT NO. XONC170	FIGURE NO. 1	CLIENT/LOCATION Worsley Companies, Inc. Wilmington, NC	
PROJECT MANAGER A. LORD		SITE VICINITY MAP Scotchman #139 Hubert, NC	
DESIGNED BY	DRAWING DESCRIPTION		
DRAWN BY SML	REVIEWED BY	DATE 12/27/99	SCALE 1 in. = 2,000 ft.
			CAD NO.



LEGEND:

- ⊙ MONITORING WELL
- ⊕ TELESCOPING WELL
- ⊗ FENCE
- ∇ GRASS
- UST FILL PORT
- V VACUUM
- K KEROSENE DISPENSER
- G GASOLINE DISPENSER
- D DIESEL DISPENSER
- ⊙ ATTEMPTED MONITORING WELL LOCATION
- S SEPTIC TANK
- X SOIL SAMPLE LOCATION

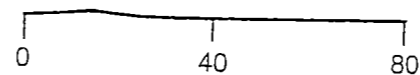
 Delta Environmental Consultants, Inc. 1201 South 16th Street Wilmington, North Carolina 28401		PROJECT NO. XONC-170	CLIENT/LOCATION WORSLEY COMPANIES, INC. SCOTCHMAN #139 HUBERT, NORTH CAROLINA
		FIGURE NO. 2	
PROJECT MANAGER A.LORD	DRAWING DESCRIPTION SITE MAP		
DESIGNED BY	DATE 6/21/00	SCALE 1" = 40 FEET	CAD NO.
DRAWN BY			
REVIEWED BY			



LEGEND:

- ⊕ MONITORING WELL
- ⊕ TELESCOPING WELL
- ⊗ FENCE
- ∇ GRASS
- UST FILL PORT
- V VACUUM
- K KEROSENE DISPENSER
- G GASOLINE DISPENSER
- D DIESEL DISPENSER
- ⊕ ATTEMPTED MONITORING WELL LOCATION
- S SEPTIC TANK

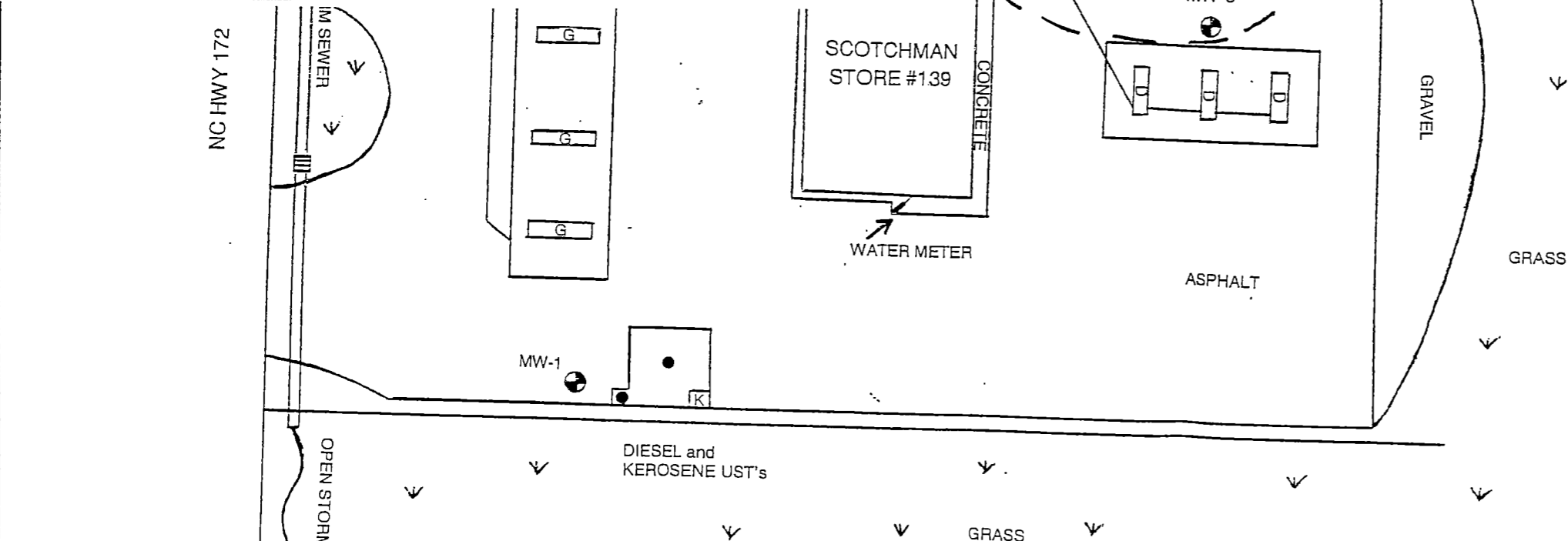
- 86.84' GROUNDWATER ELEVATION (ft.)
- 85.0' GROUNDWATER ELEVATION CONTOUR (ft.)
- ➔ APPARENT DIRECTION OF GROUNDWATER FLOW



		Delta Environmental Consultants, Inc. 1201 South 16th Street Wilmington, North Carolina 28401	
		PROJECT NO. XONC-170	FIGURE NO. 4
PROJECT MANAGER A.LORD		DRAWING DESCRIPTION GROUNDWATER ELEVATION CONTOUR MAP	
DESIGNED BY	DATE 6/21/00	SCALE 1" = 40 FEET	CAD NO.

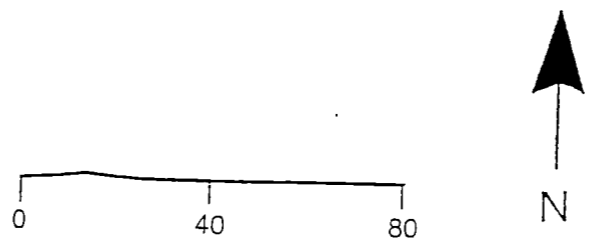
Sample ID	MW-1	MW-2	MW-3	MW-4	MW-5	DW-1	GROSS CONTAMINANT LEVELS	2L STANDARDS
Sample Date	4/30/98	4/25/00	6/12/00	6/12/00	6/12/00	6/12/00		
Analyses	EPA Methods: 602, 825 plus 10	EPA Methods: 602, 825 plus 10, MADEP, VPH, MADEP, EPH	EPA Methods: 601/602, 504, 1, 3030C, 625 plus 10, MADEP, VPH, MADEP, EPH	EPA Methods: 601/602, 504, 1, 3030C, 625 plus 10, MADEP, VPH, MADEP, EPH	EPA Methods: 601/602, 504, 1, 3030C, 625 plus 10, MADEP, VPH, MADEP, EPH	EPA Methods: 601/602, 504, 1, 3030C, 625 plus 10, MADEP, VPH, MADEP, EPH		
Detected Compounds	Compound Concentrations ppb	Compound Concentrations ppb	Compound Concentrations ppb	Compound Concentrations ppb	Compound Concentrations ppb	Compound Concentrations ppb	ppb	ppb
Benzene	BQL	97	835	3,6	646	BQL	5,000	1
Ethylbenzene	BQL	BQL	1,040	BQL	1,020	BQL	29,000	29
Toluene	BQL	BQL	3,970	BQL	12,100	BQL	257,500	1,000
Total Xylenes	BQL	BQL	6,060	BQL	5,870	BQL	87,500	530
IPE	BQL	BQL	BQL	12	BQL	BQL	70,000	70
MTBE	BQL	260	BQL	68	BQL	BQL	200,000	200
Lead	BQL	BQL	8	5	BQL	BQL	15,000	15
Naphthalene	BQL	BQL	BQL	BQL	113	BQL	15,500	21
Creosols	NI	NI	NI	NI	102	NI	NS	NS
Benzene, propyl	NI	NI	NI	NI	55	NI	NS	NS
Benzene, 1-ethyl-2-methyl	NI	NI	NI	NI	345	NI	NS	NS
Benzene, 1-ethyl-4-methyl	NI	NI	381	NI	NI	NI	NS	NS
Benzene, 1-ethyl-3-methyl	NI	NI	187	NI	NI	NI	NS	NS
Benzenemethanol, 2-methyl	NI	NI	87	NI	NI	NI	NS	NS
Benzene, 1-methyl-3-propyl	NI	NI	80	NI	NI	NI	NS	NS
Benzene, 4-ethyl-1,2-dimethyl	NI	NI	71	NI	NI	NI	NS	NS
Benzene, 2-ethyl-1,4-dimethyl	NI	NI	65	NI	NI	NI	NS	NS
Benzene, 1,2,4,5-tetramethyl	NI	NI	39	NI	NI	NI	NS	NS
Benzene, 1,2,4-trimethyl	NI	NI	195	NI	136	NI	NS	NS
Benzene, 1,3,5-trimethyl	NI	NI	NI	NI	504	NI	26,500	350
Benzene, 1,2,3-trimethyl	NI	NI	504	NI	151	NI	25,000	350
Indane	NI	NI	148	NI	NI	NI	NS	NS
Trimethylbenzene, isomer of	NI	7.9	NI	NI	94	NI	NS	NS
Dimethylbenzene, isomer of	NI	6.5	NI	NI	NI	NI	NS	NS
C5-C8 Aliphatics (VPH)	NA	930	9,840	BQL	19,100	BQL	NS	NS
C9-C18 Aliphatics (VPH + EPH)	NA	120 (VPH only)	16,820	345 (EPH only)	16,300	BQL	NS	4,200
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- NOTES:
- 1) NA denotes not analyzed.
 - 2) BQL denotes below quantitation limit.
 - 3) Analytical results exceeding 2L standards are in bold type.
 - 4) Analytical results presented in parts per billion (ug/L).
 - 5) NI denotes compounds not detected in library search.
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LEGEND:

- MONITORING WELL
- TELESCOPING WELL
- FENCE
- GRASS
- UST FILL PORT
- V VACUUM
- K KEROSENE DISPENSER
- G GASOLINE DISPENSER
- D DIESEL DISPENSER
- S ATTEMPTED MONITORING WELL LOCATION
- S SEPTIC TANK
- ESTIMATED AREA OF DISSOLVED PETROLEUM HYDROCARBONS ABOVE 2L STANDARDS



		Delta Environmental Consultants, Inc. 1201 South 16th Street Wilmington, North Carolina 28401	
PROJECT NO. XONC-170	FIGURE NO. 5	CLIENT/LOCATION WORSLEY COMPANIES, INC. SCOTCHMAN #139 HUBERT, NORTH CAROLINA	
PROJECT MANAGER A.LORD	DRAWING DESCRIPTION ESTIMATED AREA OF DISSOLVED PETROLEUM HYDROCARBONS ABOVE 2L STANDARDS		
DESIGNED BY	DATE 6/21/00	SCALE 1" = 40 FEET	CAD NO.

State of North Carolina
Department of Environment
and Natural Resources
Wilmington Regional Office
Division of Water Quality
Groundwater Section

James B. Hunt, Jr., Governor
Wayne McDevitt, Secretary



December 19, 1997

CERTIFIED MAIL Z 312 648 469
RETURN RECEIPT REQUESTED

Mr. Cecil Worsley
Worsley Companies, Inc.
10 Cardinal Drive
Wilmington, NC 28403

SUBJECT: NOTICE OF REGULATORY REQUIREMENTS of 15A NCAC 2N
Scotchman # 139
101 Hwy. 172 & Hwy. 24
Hubert, Onslow County

Dear Mr. Worsley:

Our records indicate that you are the owner and/or operator of the underground storage tanks at the above referenced site. This letter is a standard notice explaining the actions you must take as a result of the confirmation of a suspected release from underground storage tanks at this site in accordance with North Carolina laws. The Groundwater Section of the Division of Water Quality (DWQ), administers the State's rules for underground storage tanks and the required response for suspected releases from underground storage tanks. Those rules are located in Title 15A, Subchapter 2N of the North Carolina Administrative Code (NCAC).

Results of the underfill portion of the USTest 2000 P/U precision tank tightness tests conducted pursuant to 15A NCAC 2N .0603, by Petro Tech, Inc., on November 26, 1996, were received by this office on January 22, 1997. This test indicates a release of product may have occurred from the 2000 gallon Diesel #2, and from the 4000 gallon Diesel #2 underground storage tanks at the subject site. According to USTest representatives, the leak rate is computed using the best fit line through data points plotting change in product level versus time. The formula for computing the leak rate is expressed by; $\text{leak rate} = (\text{slope})(\text{differential volume})$. Using the data from the November 26, 1996, test of the 2000 gallon Diesel #2 tank, $\text{leak rate} = (.00422 \text{ in/hr})(77.77 \text{ gal/in}) = 0.328 \text{ gal/hr}$. The leak rate for the 4000 gallon Diesel #2 tank = $(.00458 \text{ in/hr})(101.81 \text{ gal/in}) = 0.466 \text{ gal/hr}$. These leak rates exceed the rate at which both tanks are declared leaking by the third party certification of the USTest 2000 P/U (.05 gal/hr).

In accordance with NCAC 2N .0603 you are required to repair, replace, or upgrade these underground storage tanks, and begin corrective action. Listed below are general descriptions of actions you must take to comply with State rules (2N .0702-.0705 are attached). For a detailed description of your requirements please refer to the enclosed rules.

1) If you have not already done so, you must take immediate action to prevent any further release of the regulated substance into the environment and identify and mitigate any fire, explosion, and vapor hazards (Title 15A NCAC 2N .0702). To comply with this requirement, please immediately remove as much of the regulated substance from the subject underground storage tanks as is necessary to prevent further release to the environment. Note: Because the USTest 2000 P/U is incapable of determining the exact location of the leak, please empty the subject underground storage tanks completely. (Title 15A NCAC 2N .0703)

2) Undertake initial abatement measures, perform a site check, and if free product is discovered, begin recovery within 14 days thereafter. A report of the measures you have taken to comply with this rule must be received by the Wilmington Regional Office at the letterhead address no later than 20 days from the receipt of this letter. While conducting the site check please be aware that you are required to measure for the presence of a release where contamination is most likely to be present at the site. To comply with this requirement please collect soil samples immediately adjacent to, and directly below the bottom of the subject underground storage tanks, product lines, and dispensers. If groundwater is encountered, please collect a groundwater sample. The samples should be sent to a certified laboratory for appropriate analyses (Please refer to the North Carolina Groundwater Section publication, "Groundwater Section Guidelines for the Investigation and Remediation of Soil and Groundwater" for additional guidance). (Title 15A NCAC 2N .0703)

3) Assemble information about the nature and quantity of the release and about the site and the surrounding area. Please include the locations of all supply wells located within 1500 feet of the facility, and the results of the analyses of the samples collected during the initial site check (#2 above). A report of this information must be received by the Wilmington Regional Office by no later than 45 days from the receipt of this letter. (Title 15A NCAC 2N .0704)

4) If free product is discovered during the initial site check (#2 above), a report describing the free product removal measures being undertaken must be received by the Wilmington Regional Office by no later than 45 days from the receipt of this letter. (Title 15A NCAC 2N .0705)

If requested, the Wilmington Regional Office may allow an alternate compliance schedule for the release response rules and may allow certain reports to be combined. In order for such an alternate compliance schedule to be considered, you must contact the Wilmington Regional Office immediately and follow-up in writing with a proposed schedule. An alternate compliance schedule cannot be granted for the 20 day initial abatement report (#2 above).

Your prompt attention to the items described herein is required. Failure to comply with the State's rules may result in the assessment of civil penalties and/or the use of other enforcement mechanisms available to the State. Each day that a violation continues

Worsley Companies, Inc.
Page 3

If you believe you are not the responsible party notify the Groundwater Section within 15 days of receipt of this letter. If you have any questions regarding the actions that must be taken or the rules mentioned in this letter, please contact Charles F. Stehman, Ph.D., P.G., of the Wilmington Regional Office, at the letterhead address and/or telephone number. If you have any questions regarding trust fund eligibility or reimbursement, please contact the Groundwater Section at (919) 733-8486.

Sincerely,

RICK SHIVER

Rick Shiver, P.G.
Regional Supervisor

RSS/CFS/PC/JH/gjg

Enclosures

cc: Arthur Mouberry
WIRO

gws\john\nov\139-1126.wpd

Entered in DB

State of North Carolina
Department of Environment
and Natural Resources
Wilmington Regional Office
Division of Waste Management
UST Section



James B. Hunt, Jr., Governor
Bill Holman, Secretary

October 26, 1999

Mr. Don Quinn
Worsley Companies, Inc.
P. O. Box 3227
Wilmington, NC 28406

Subject: Review of Report Entitled "Subsurface
Petroleum Detection Summary Report"
Scotchman #139
Incident No. NA
Hubert
Onslow County

Dear Mr. Quinn:

The Division has reviewed the subject report that was received on June 25, 1998. All of the appropriate test methods were not performed on the soil samples obtained for analysis. Only EPA Method 8260 (volatiles) was performed on the samples. Therefore, please have your consultant obtain and analyze soil samples for the remainder of the required tests for diesel fuel. A copy of the test methods are attached for your reference. Please submit a copy of the results shortly after receipt.

Thank you for your attention to this matter. If you have any questions concerning this letter, please call me at (910) 395-3900.

Sincerely,

Bruce Reed
Hydrogeologist II

BR

cc: Alison Lord (Delta Env.)
WiRO-UST

Table 5
Approved Methods for Soil Analyses

(Laboratories must be certified by the North Carolina DWQ to perform the following methods)

Contaminant Testing For:	Method (See Notes)	Reportable Concentrations
1. Low Boiling Point Fuels: gasoline, aviation gasoline, gasohol, etc.	1) EPA 8260 with IPE & MTBE AND 2) MADEP VPH: Alkanes/Aromatics*	Any Amount Above the MDL
2. Medium/High Boiling Point Fuels: jet fuels, kerosene, diesel, tarsol, mineral spirits, naphtha, fuel oil #2, etc.	1) EPA 8260 AND 2) MADEP VPH: Alkanes/Aromatic* AND 3) EPA 8270 AND 4) MADEP EPH: Alkanes/Aromatics*	Any Amount Above the MDL
3. Heavy Fuels: #4, #5, #6 fuel oils; motor oil; hydraulic fluid; etc.	1) EPA 8270 AND 2) MADEP EPH: Alkanes/Aromatics*	Any Amount Above the MDL
4. Used / Waste Oil	1) EPA 8260 AND 2) MADEP VPH: Alkanes/Aromatic* AND 3) EPA 8270 & EPA 8080 (pesticides/PCBs)** AND 4) MADEP EPH: Alkanes/Aromatics* AND 5) EPA 3050 or 3051 Preparation: Total Metals*** (Chromium and Lead)	Any Amount Above the MDL

* The MADEP VPH and EPH methods should be used only after the laboratories receive DWQ approval for their use. The laboratories will be notified when DWQ approval is issued.

** EPA 8080 has been replaced by a combination of EPA 8081 and EPA 8082 in the SW 846 test methods. Continue to analyze for EPA 8080 until laboratories are certified for EPA 8082. (Laboratory certification is already available for EPA 8081.)

** If the total metal concentration for Chromium or Lead exceeds the corresponding TCLP limits using one of the following equations, then contact the DWM – Hazardous Waste Section at (919) 733-2178 for a regulatory status determination. The TCLP regulatory limits are provided in Figure 12 in Appendix B1.

$$M = C/20 \quad \text{where:}$$

M = maximum theoretical leachate concentration (mg/L);

C = concentration of analyte in the solid (mg/kg) (total metal concentration); and

mg/L = ppm = mg/kg.

Abbreviations

EPA = Environmental Protection Agency

EPH = Extractable petroleum hydrocarbons

IPE = Isopropyl ether

MADEP = Massachusetts Department of Environmental Protection

MDL = Method Detection Limit

MTBE = Methyl tertiary butyl ether

VPH = Volatile petroleum hydrocarbons

NOTE: 1) Other EPA approved comparable methods which have similar costs, same constituents, and equivalent or lower detection limits may be used if analyses are conducted by a NC certified laboratory. 2) Report all results on a "dry weight" basis.

Entered in DB

State of North Carolina
Department of Environment
and Natural Resources
Wilmington Regional Office
Division of Waste Management
UST Section



James B. Hunt, Jr., Governor
Bill Holman, Secretary

February 11, 2000

Mr. Don Quinn
Worsley Companies, Inc.
P. O. Box 3227
Wilmington, NC 28406

Subject: Review of Report Entitled "Subsurface
Petroleum Detection Summary Report
Addendum"
Scotchman #139
Hubert, Onslow County

Dear Mr. Quinn:

The Division has reviewed the subject report that was received on December 29, 1999. Review of this report and the previous report received on June 25, 1998, indicates that contaminated environmental media was not encountered during the investigations around the diesel tank located on the southern-end of the subject site. Therefore, this specific tank site is not considered a petroleum incident by the Division, and no further action is required at this time in regard to the Division's December 19, 1997-letter. However, while reviewing the file on this date, it was discovered that the Notice of Regulatory Requirements letter referenced two diesel tanks. Therefore, Worsley Companies must investigate the other diesel tank which is located on the other side of the site. A copy of the December 19, 1997-letter is enclosed for your reference. Please submit a copy of the results of the investigation by May 15, 2000.

Thank you for your attention to this matter. If you have any questions concerning this letter, please call Bruce Reed or myself at (910) 395-3900.

Sincerely,

Patricia C. Coughlan
UST Section Regional Supervisor

Attachment
BR

cc: Alison Lord (Delta Env.)
WiRO-UST
s:\bruce\s#139.feb

SCOTCHMAN 139, 97214 MW-1

WELL CONSTRUCTION RECORD

FOR OFFICE USE ONLY

Quad. No. _____ Serial No. _____
 Lat. _____ Long. _____ Pc _____
 Minor Basin _____
 Basin Code _____
 Header Ent. _____ GW-1 Ent. _____

DRILLING CONTRACTOR CES
 DRILLER REGISTRATION NUMBER 1300

STATE WELL CONSTRUCTION
 PERMIT NUMBER: NA

1 WELL LOCATION: (Show sketch of the location below)

Nearest Town: Hubert, NC
Highway 24 & Highway 172
 (Road, Community, or Subdivision and Lot No.)

County: Onslow

2. OWNER WCI
 ADDRESS PO Box 3227
Wilmington NC 28406
 (Street or Route No.)

Depth		DRILLING LOG
From	To	Formation Description
		see attached

3. DATE DRILLED 4-1-98 USE OF WELL Monitoring

4. TOTAL DEPTH 15 CUTTINGS COLLECTED Yes No

5. DOES WELL REPLACE EXISTING WELL? Yes No

6. STATIC WATER LEVEL: 10 FT. above TOP OF CASING.
 below
 TOP OF CASING IS 0 FT. ABOVE LAND SURFACE.

7. YIELD (gpm): NA METHOD OF TEST NA

8. WATER ZONES (depth): surficial aquifer

9. CHLORINATION: Type NA Amount NA

10. CASING:

Depth	Diameter	Wall Thickness or Weight/Ft.	Material
From <u>0</u> To <u>5</u> Ft.	<u>2"</u>	<u>.010</u>	<u>PVC</u>
From _____ To _____ Ft.	_____	_____	_____
From _____ To _____ Ft.	_____	_____	_____

If additional space is needed use back of form.
LOCATION SKETCH
 (Show direction and distance from at least two State Roads, or other map reference points)

11. GROUT:

Depth	Material	Method
From <u>0</u> To <u>1.5</u> Ft.	<u>concrete</u>	<u>hand pour</u>
From _____ To _____ Ft.	_____	_____

see attached

12. SCREEN:

Depth	Diameter	Slot Size	Material
From <u>5</u> To <u>15</u> Ft.	<u>2</u> in.	<u>.010</u> in.	<u>PVC</u>
From _____ To _____ Ft.	_____ in.	_____ in.	_____
From _____ To _____ Ft.	_____ in.	_____ in.	_____

13. GRAVEL PACK:

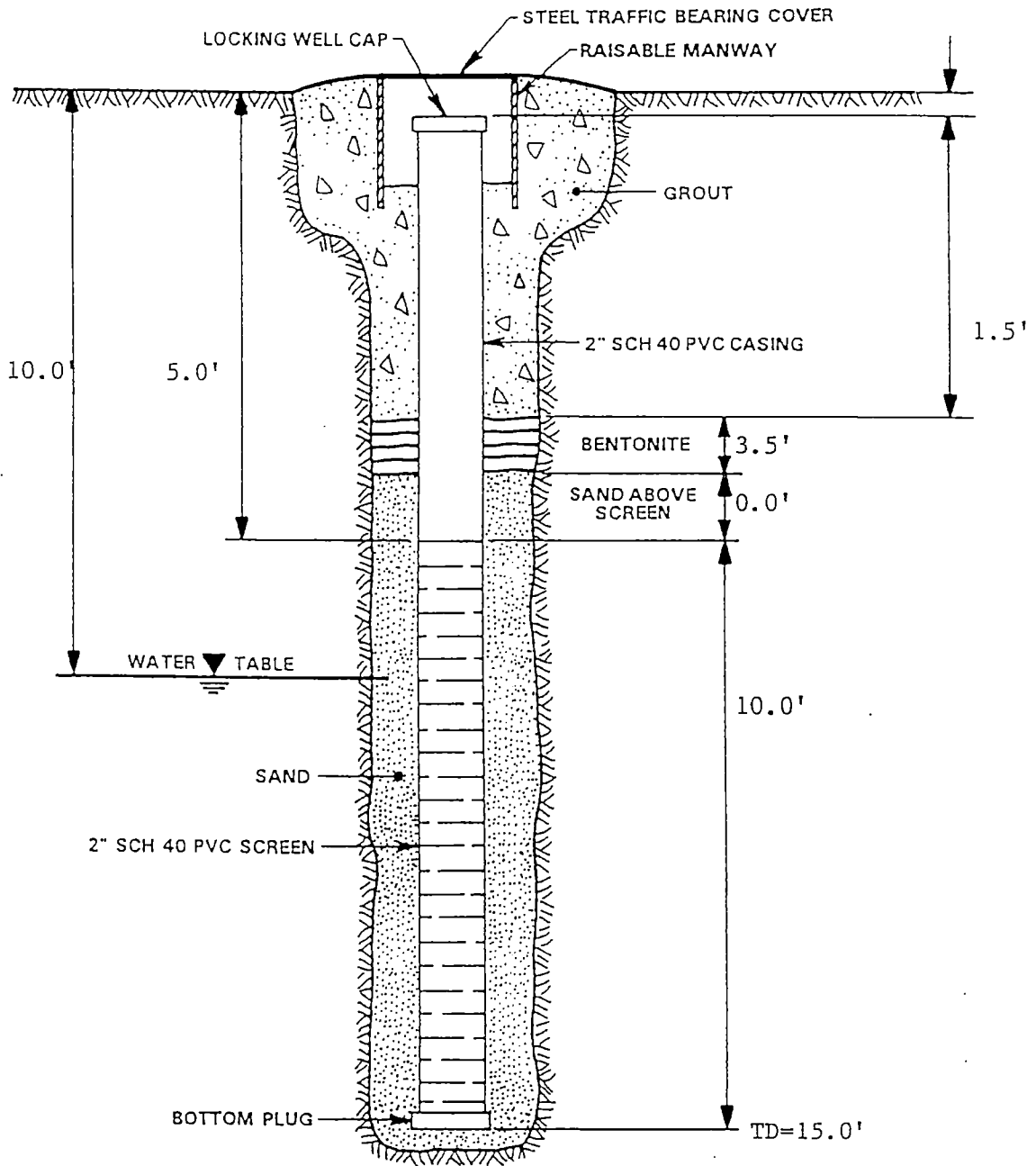
Depth	Size	Material
From <u>5</u> To <u>15</u> Ft.	<u>coarse</u>	<u>sand</u>
From _____ To _____ Ft.	_____	_____

14. REMARKS: _____

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

John M. Shadron PG/CES 6/25/98
 SIGNATURE OF CONTRACTOR

SCOTCHMAN #139
CES#97214
MW-1



AS-BUILT MONITORING WELL DETAIL

NOT TO SCALE

Environmental Management - Groundwater Section
P.O. Box 29533 - Raleigh, N.C. 27626-9535
Phone (919) 733-3221

WELL CONSTRUCTION RECORD

DRILLING CONTRACTOR: Geologic Exploration, Inc.

FOR OFFICE USE ONLY			
QUAD NO	SERIAL NO		
Lat	Long	RD	
Minor Basin			
Basin Code			
Header Ent	GW-1 Ent		

STATE WELL CONSTRUCTION
DRILLER REGISTRATION NUMBER: 1175 PERMIT NUMBER: _____

1. WELL LOCATION: (Show sketch of the location below)

Nearest Town: HUBERT

101 HWY 172/HWY 24

(Road, Community, or Subdivision and Lot No.)

2. OWNER WORSLEY OIL CO.

ADDRESS 12 CARDINAL DR.
(Street or Route No.)

WILMINGTON NC 28046
City or Town State Zip Code

3. DATE DRILLED 4-19-00 USE OF WELL MONITOR

4. TOTAL DEPTH 17.0 FEET

5. CUTTINGS COLLECTED YES NO

6. DOES WELL REPLACE EXISTING WELL? YES NO

7. STATIC WATER LEVEL Below Top of Casing: _____ FT
(Use "+" if Above Top of Casing)

8. TOP OF CASING IS 0.0 FT Above Land Surface*
*Casing Terminated at/or below land surface is illegal unless a variance

is issued in accordance with 15A NCAC 2C .0118

9. YIELD (gpm): N/A METHOD OF TEST N/A

10. WATER ZONES (depth): N/A

11. CHLORINATION: Type N/A Amount N/A

2. CASING:

Depth	Diameter	Wall Thickness or Weight/ft.	Material
From <u>0.0</u> To <u>7.0</u> Ft.	<u>2 INCH</u>	<u>SCH 40</u>	<u>PVC</u>
From _____ To _____ Ft.	_____	_____	_____
From _____ To _____ Ft.	_____	_____	_____

3. GROUT:

Depth	Material	Method
From <u>0.0</u> To <u>2.0</u> Ft.	<u>PORTLAND BENTONITE</u>	<u>SLURRY</u>
From _____ To _____ Ft.	_____	_____

4. SCREEN:

Depth	Diameter	Slot Size	Material
From <u>7.0</u> To <u>17.0</u> Ft.	<u>2.0 in.</u>	<u>.010 in.</u>	<u>PVC</u>
From _____ To _____ Ft.	_____ in.	_____ in.	_____

5. SAND/GRAVEL PACK:

Depth	Size	Material
From <u>5.0</u> To <u>17.0</u> Ft.	<u>20-40</u>	<u>FINE SILICA SAND</u>
From _____ To _____ Ft.	_____	_____

6. REMARKS: MW-2 BENTONITE SEAL FROM 2.0 TO 5.0 FEET

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.

SIGNATURE OF CONTRACTOR OR AGENT

DATE 6-1-00

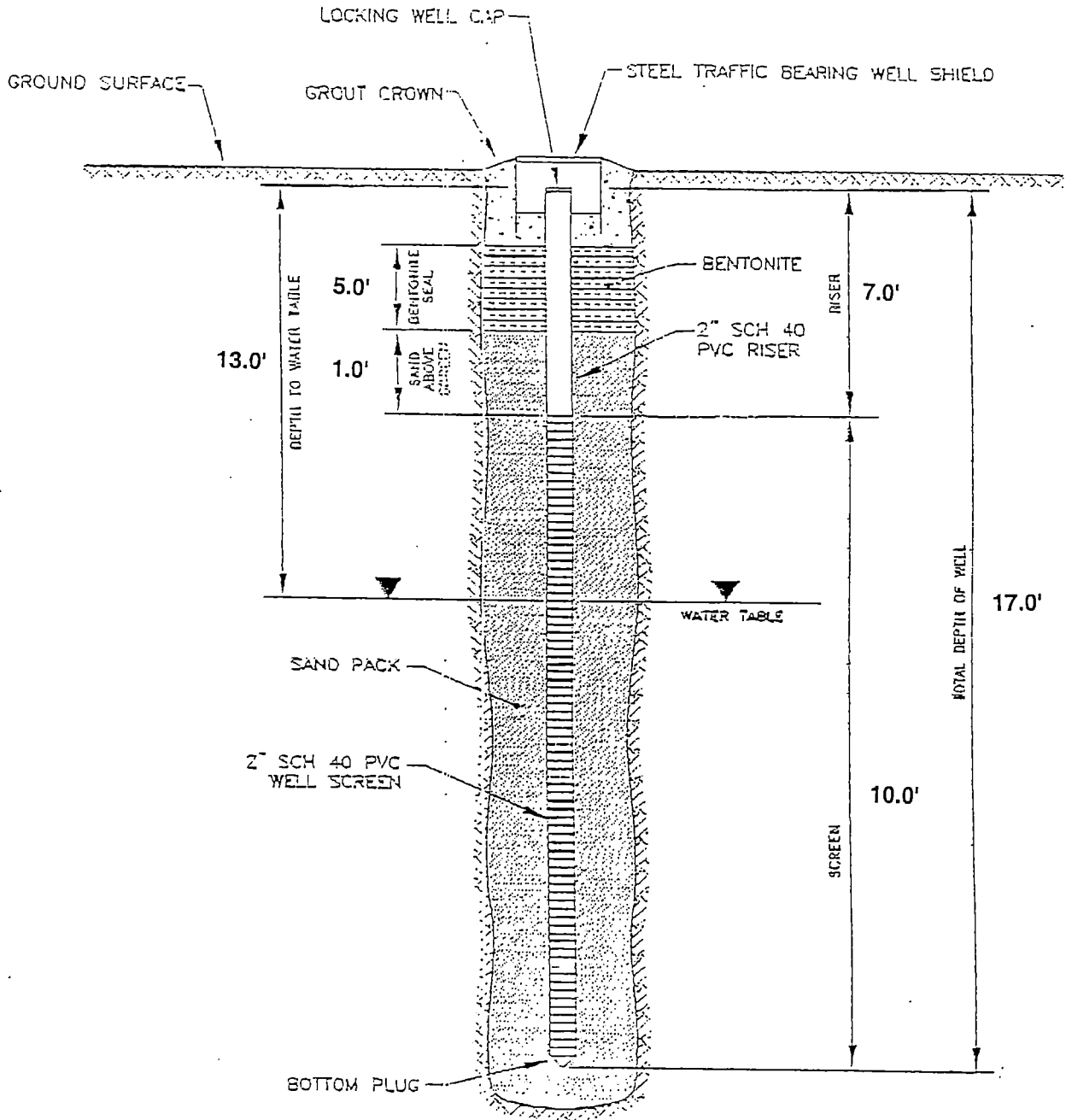
LOCATION OF SKETCH
(Show direction and distance from at least two State Roads, or other map reference points.)


HWY 24

Site

HWY 172

MW-2



 Delta Environmental Consultants, Inc. 1201 South 16th Street Wilmington, North Carolina 28401	
PROJECT NUMBER X0NC-170	CLIENT/LOCATION SL
DESIGNED BY AS	DRAWING DESCRIPTION AS-BUILT MONITORING WELL DETAIL

WELL CONSTRUCTION RECORD

DRILLING CONTRACTOR: Geologic Exploration, Inc.

FOR OFFICE USE ONLY	
QUAD NO. _____	SERIAL NO. _____
Lat _____	Long _____ RO _____
Minor Basin _____	Basin Code _____
Header Ent _____	GW-1 Ent _____

STATE WELL CONSTRUCTION

DRILLER REGISTRATION NUMBER: 1175 PERMIT NUMBER: _____

1. WELL LOCATION: (Show sketch of the location below)

Nearest Town: HUBERT

County: ONSLOW

NC HWY 24E & NC HWY 172

DEPTH

DRILLING LOG

(Road, Community, or Subdivision and Lot No.)

From To Formation Description

2. OWNER WORSLEY OIL CO.

0.0' 3.0' GRAVEL

ADDRESS P.O. BOX 3227

3.0' 14.0' TAN/GREY SILTY CLAY

(Street or Route No.)

14.0' 17.0' WHITE/GOLD SAND

WILMINGTON NC 28406

City or Town State Zip Code

3. DATE DRILLED 6-7-00 USE OF WELL MONITOR

4. TOTAL DEPTH 17.0 FEET

5. CUTTINGS COLLECTED YES NO

6. DOES WELL REPLACE EXISTING WELL? YES NO

7. STATIC WATER LEVEL Below Top of Casing: _____ FT

(Use "+" if Above Top of Casing)

8. TOP OF CASING IS 0.0 FT Above Land Surface*

*Casing Terminated at/or below land surface is illegal unless a variance

is issued in accordance with 15A NCAC 2C .0118

9. YIELD (gpm): N/A METHOD OF TEST N/A

10. WATER ZONES (depth): N/A

11. CHLORINATION: Type N/A Amount N/A

12. CASING:

If additional space is needed use back of form

LOCATION OF SKETCH

Depth	Diameter	Wall Thickness or Weight/Ft.	Material
From <u>0.0</u> To <u>2.0</u> Ft.	<u>2 INCH</u>	<u>SCH 40</u>	<u>PVC</u>
From _____ To _____ Ft.	_____	_____	_____
From _____ To _____ Ft.	_____	_____	_____

(Show direction and distance from at least two State Roads, or other map reference points.)

13. GROUT:

Depth	Material	Method
From <u>0.0</u> To <u>0.5</u> Ft.	<u>PORTLAND BENTONITE</u>	<u>SLURRY</u>
From _____ To _____ Ft.	_____	_____

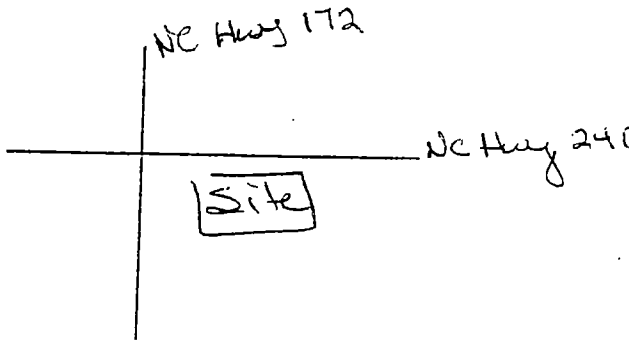
14. SCREEN:

Depth	Diameter	Slot Size	Material
From <u>2.0</u> To <u>17.0</u> Ft.	<u>2.0 in.</u>	<u>.010 in.</u>	<u>PVC</u>
From _____ To _____ Ft.	_____ in.	_____ in.	_____
From _____ To _____ Ft.	_____ in.	_____ in.	_____

15. SAND/GRAVEL PACK:

Depth	Size	Material
From <u>1.0</u> To <u>17.0</u> Ft.	<u>20-40</u>	<u>FINE SILICA SAND</u>
From _____ To _____ Ft.	_____	_____

16. REMARKS: MW-3 BENTONITE SEAL FROM 0.5 TO 1.0 FEET



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.

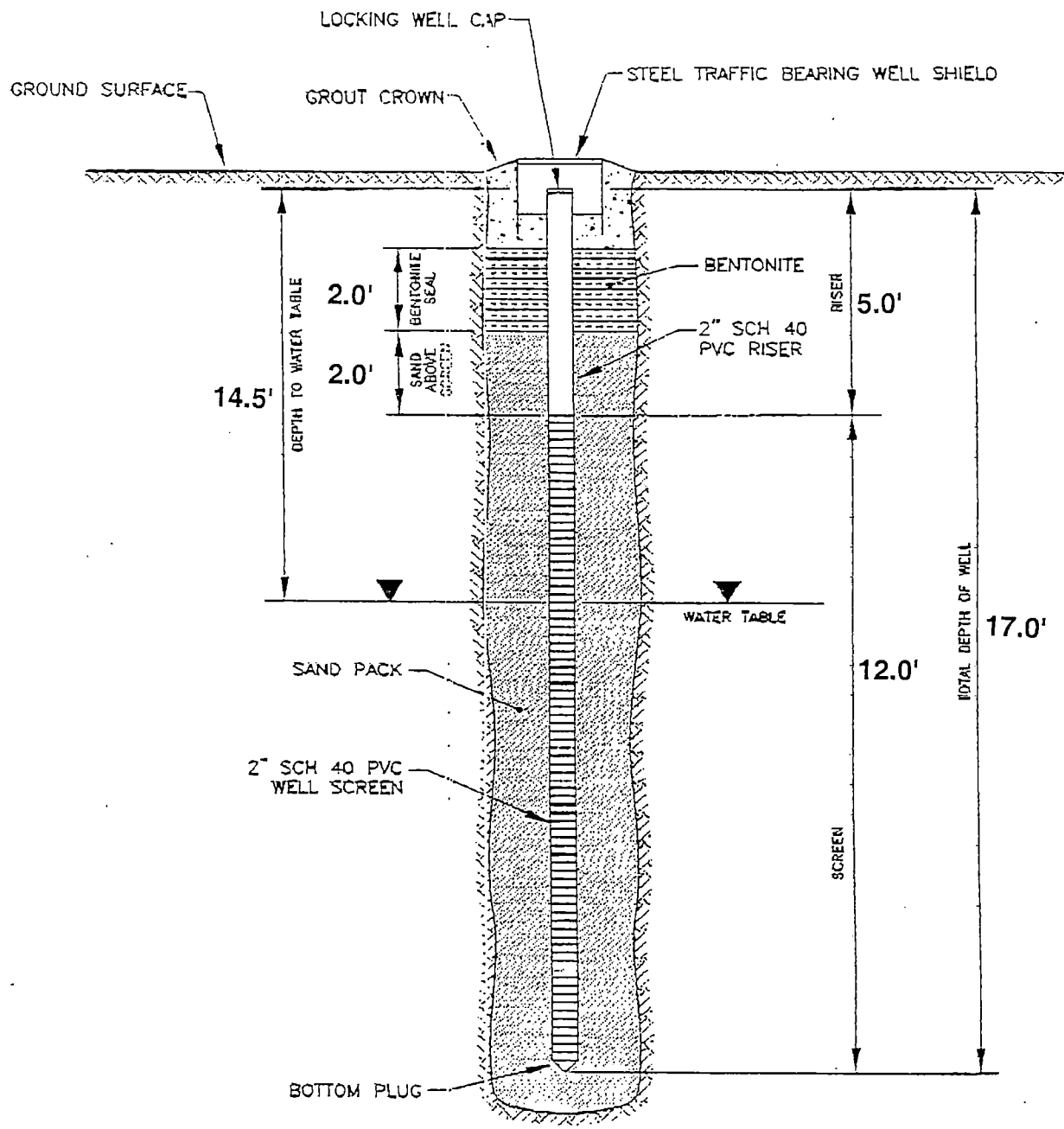
SIGNATURE OF CONTRACTOR OR AGENT


DATE

GW-1 REV. 9/91

Submit original to Division of Environmental Management and copy to well owner.

MW-3



 <p>Delta Environmental Consultants, Inc. 1201 South 16th Street Wilmington, North Carolina 28401</p>		CLIENT/LOCATION	
		The Worsley Companies, Inc. Scotchman #139 Hubert, NC	
PROJECT NO. X0NC-170	FIGURE NO.	DRAWING DESCRIPTION	
PROJECT MANAGER SL		AS-BUILT MONITORING WELL DETAIL	
DESIGNED BY	DATE	SCALE	CAD NO.
DRAWN BY DD	6/23/00	NONE	blank

WELL CONSTRUCTION RECORD

DRILLING CONTRACTOR: Geologic Exploration, Inc.

FOR OFFICE USE ONLY			
QUAD NO	SERIAL NO		
Lat	Long	RO	
Minor Basin			
Basin Code			
Header Ent		GW-1 Ent	

STATE WELL CONSTRUCTION
 DRILLER REGISTRATION NUMBER: 1175 PERMIT NUMBER: _____

1. WELL LOCATION: (Show sketch of the location below)

Nearest Town: HUBERT
 County: ONslow
NC HWY 24E & NC HWY 172
 (Road, Community, or Subdivision and Lot No.)

DEPTH		DRILLING LOG
From	To	Formation Description
0.0'	2.0'	GRAVEL
2.0'	13.0'	TAN SILTY CLAY
13.0'	17.0'	GOLD/WHITE SAND

2. OWNER WORSLEY OIL CO.
 ADDRESS P.O. BOX 3227
 (Street or Route No.)
WILMINGTON NC 28406
 City or Town State Zip Code

3. DATE DRILLED 6-6-00 USE OF WELL MONITOR
 4. TOTAL DEPTH 17.0 FEET
 5. CUTTINGS COLLECTED YES NO
 6. DOES WELL REPLACE EXISTING WELL? YES NO
 7. STATIC WATER LEVEL Below Top of Casing: _____ FT
 (Use "+" if Above Top of Casing)
 8. TOP OF CASING IS 0.0 FT Above Land Surface*
 *Casing Terminated at/or below land surface is illegal unless a variance is issued in accordance with 15A NCAC 2C .0118

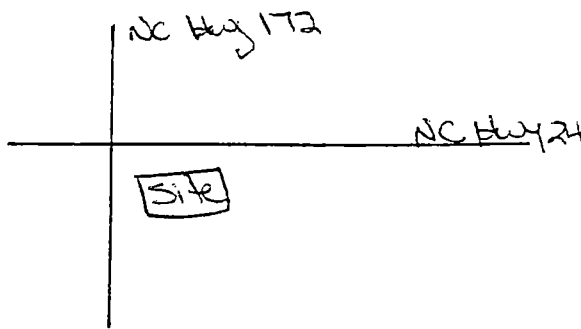
9. YIELD (gpm): N/A METHOD OF TEST N/A
 10. WATER ZONES (depth): N/A
 11. CHLORINATION: Type N/A Amount N/A
 12. CASING:

If additional space is needed use back of form

Depth	Diameter	Wall Thickness or Weight/Ft.	Material
From <u>0.0</u> To <u>2.0</u> Ft.	<u>2 INCH</u>	<u>SCH 40</u>	<u>PVC</u>
From _____ To _____ Ft.	_____	_____	_____
From _____ To _____ Ft.	_____	_____	_____

LOCATION OF SKETCH

(Show direction and distance from at least two State Roads, or other map reference points.)



13. GROUT:
 From 0.0 To 0.5 Ft. Material PORTLAND BENTONITE Method SLURRY

14. SCREEN:
 From 2.0 To 17.0 Ft. Diameter 2.0 in. Slot Size .010 in. Material PVC

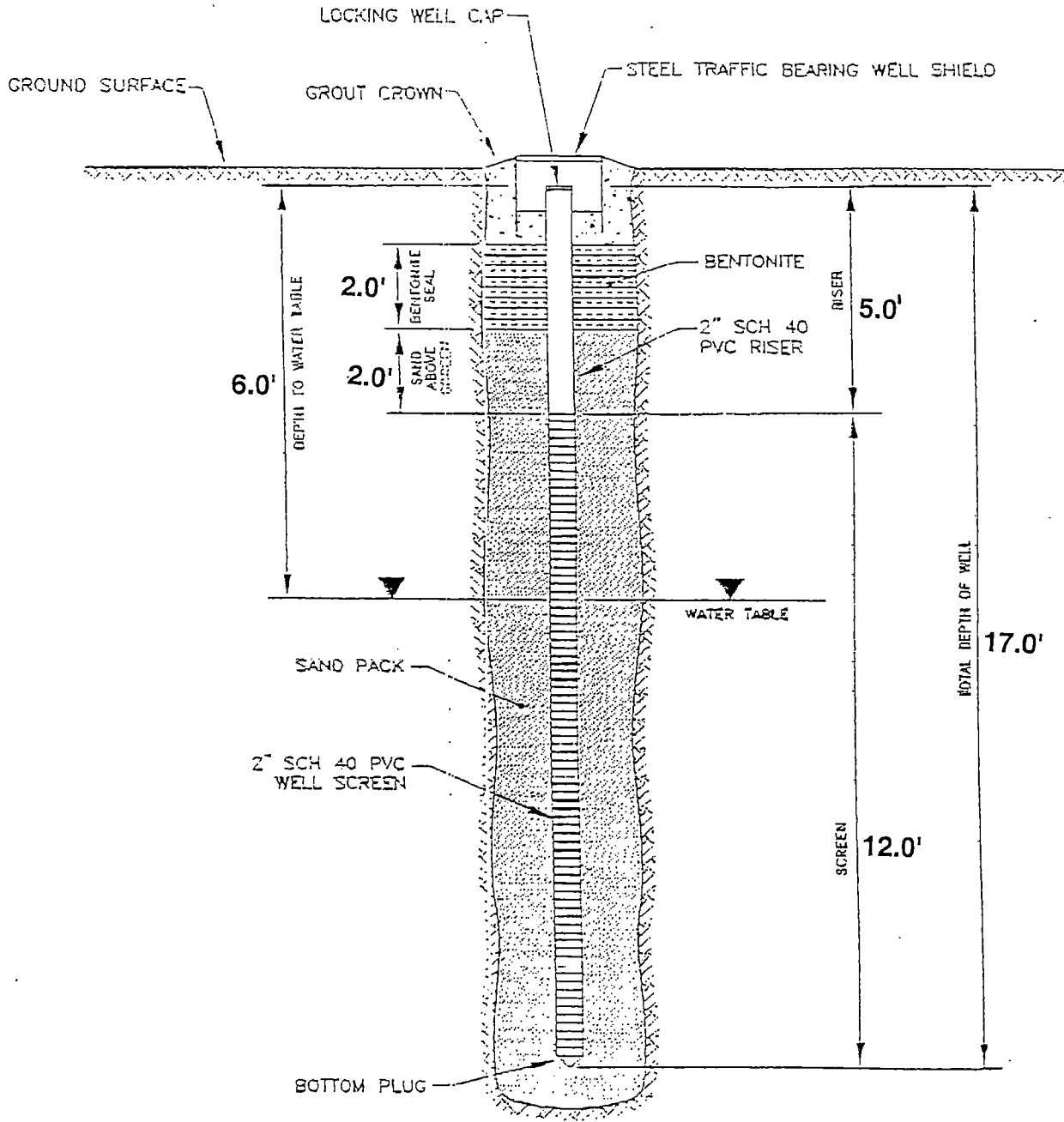
15. SAND/GRAVEL PACK:
 From 1.0 To 17.0 Ft. Size 20-40 Material FINE SILICA SAND


16. REMARKS: MW-4 BENTONITE SEAL FROM 0.5 TO 1.0 FEET

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.

[Signature] SIGNATURE OF CONTRACTOR OR AGENT 7/13/00 DATE

MW - 4



 Delta Environmental Consultants, Inc. 1201 South 16th Street Wilmington, North Carolina 28401		PROJECT NO.	CLIENT/LOCATION
		X0NC-170	The Worsley Companies, Inc. Scotchman #139 Hubert, NC
PROJECT MANAGER	DESIGNED BY	DRAWING DESCRIPTION	
SL		AS-BUILT MONITORING WELL DETAIL	
DRAWN BY			

WELL CONSTRUCTION RECORD

DRILLING CONTRACTOR: Geologic Exploration, Inc.

FOR OFFICE USE ONLY			
QUAD NO.	SERIAL NO.		
Lat	Long	RO	
Minor Basin			
Basin Code			
Header Ent		GW-1 Ent	

STATE WELL CONSTRUCTION

DRILLER REGISTRATION NUMBER: 1175 PERMIT NUMBER: _____

1. WELL LOCATION: (Show sketch of the location below)

Nearest Town: HUBERT

County: ONSLOW

NC HWY 24E & NC HWY 172

(Road, Community, or Subdivision and Lot No.)

2. OWNER WORSLEY OIL CO.

ADDRESS P.O. BOX 3227

(Street or Route No.)

WILMINGTON NC 28406

City or Town State Zip Code

3. DATE DRILLED 6-6-00 USE OF WELL MONITOR

4. TOTAL DEPTH 17.0 FEET

5. CUTTINGS COLLECTED YES NO

6. DOES WELL REPLACE EXISTING WELL? YES NO

7. STATIC WATER LEVEL Below Top of Casing: _____ FT

(Use "+" if Above Top of Casing)

8. TOP OF CASING IS 0.0 FT Above Land Surface*

*Casing Terminated at/or below land surface is illegal unless a variance

is issued in accordance with 15A NCAC 2C .0118

9. YIELD (gpm): N/A METHOD OF TEST N/A

10. WATER ZONES (depth): N/A

11. CHLORINATION: Type N/A Amount N/A

12. CASING:

Depth	Diameter	Wall Thickness or Weight/Ft.	Material
From <u>0.0</u> To <u>2.0</u> Ft.	<u>2 INCH</u>	<u>SCH 40</u>	<u>PVC</u>
From _____ To _____ Ft.	_____	_____	_____
From _____ To _____ Ft.	_____	_____	_____

13. GROUT:

Depth	Material	Method
From <u>0.0</u> To <u>0.5</u> Ft.	<u>PORTLAND BENTONITE</u>	<u>SLURRY</u>
From _____ To _____ Ft.	_____	_____

14. SCREEN:

Depth	Diameter	Slot Size	Material
From <u>2.0</u> To <u>17.0</u> Ft.	<u>2.0 in.</u>	<u>.010 in.</u>	<u>PVC</u>
From _____ To _____ Ft.	_____ in.	_____ in.	_____
From _____ To _____ Ft.	_____ in.	_____ in.	_____

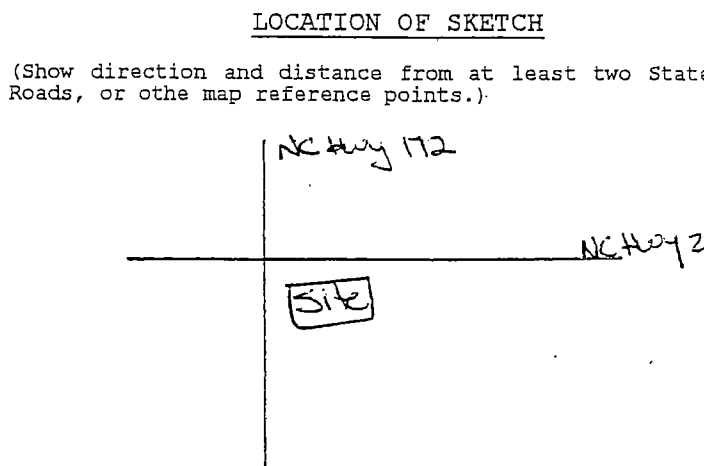
15. SAND/GRAVEL PACK:

Depth	Size	Material
From <u>1.0</u> To <u>17.0</u> Ft.	<u>20-40</u>	<u>FINE SILICA SAND</u>
From _____ To _____ Ft.	_____	_____

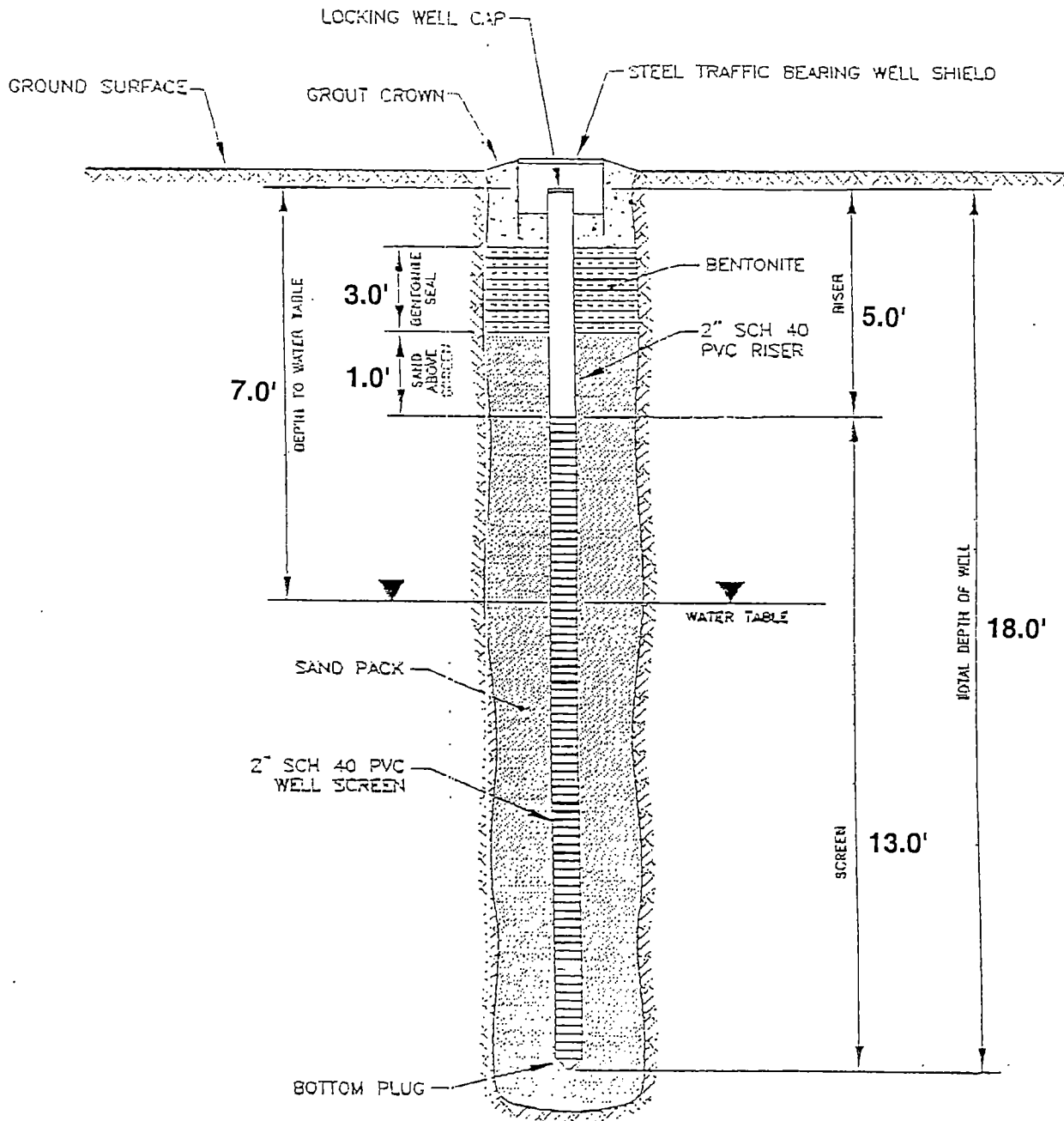
16. REMARKS: MW-5 BENTONITE SEAL FROM 0.5 TO 1.0 FEET


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.

SIGNATURE OF CONTRACTOR OR AGENT [Signature] DATE 7/13/00



MW-5



 Delta Environmental Consultants, Inc. 1201 South 16th Street Wilmington, North Carolina 28401	
PROJECT NO. XONC-170	CLIENT/LOCATION The Worsley Companies, Inc. Scotchman #139 Hubert, NC
PROJECT MANAGER SL	
DESIGNED BY	DRAWING DESCRIPTION AS-BUILT MONITORING WELL DETAIL
DRAWN BY	

North Carolina -Department of Environment and Natural Resources - Division of Water Quality - Groundwater Section
1636 Mail Service Center - Raleigh, N.C. 27699-1636 - Phone (919) 733-3221

WELL CONSTRUCTION RECORD

WELL CONTRACTOR: Brian Thomas
WELL CONTRACTOR CERTIFICATION #: 2581
STATE WELL CONSTRUCTION PERMIT #:

1. WELL USE (Check Applicable Box): Residential Municipal Industrial Agricultural Monitoring
Recovery Heat Pump Water Injection Other If Other, List Use:

2. WELL LOCATION: (Show sketch of the location below)
Nearest Town: Hubert County: Onslow
NC HWY 24E & NC HWY 172
(Road name and Numbers, Community, or Subdivision and Lot No.)

3. OWNER Worsley Oil Company
Address P.O. Box 3227
Wilmington NC 28406
City or Town State Zip Code

4. DATE DRILLED 6-7-00
5. TOTAL DEPTH 39.0 Ft.
6. CUTTINGS COLLECTED YES NO
7. DOES WELL REPLACE EXISTING WELL? YES NO
8. STATIC WATER LEVEL Below top of Casing: FT.
9. TOP OF CASIING IS 0.0 FT. Above Land Surface
10. YIELD (gmp): n/a METHOD OF TEST n/a
11. WATER ZONES (depth): n/a

DRILLING LOG		DEPTH
From	To	Formation Description
0.0'	3.0'	Gravel
3.0'	13.0'	Tan Gray Silty clay
13.0'	18.0'	Gold White Sand
18.0'	27.0'	Gold Sand
27.0'	39.0'	Gray Clay with rock fragments

12. CHLORINATION: Type n/a Amount n/a
13. CASING

From	To	Depth	Diameter	Wall Thickness Or Weight/Ft.	Material
0.0'	34.0'	Ft.	2 inch	sch.40	pvc
0.0'	20.0'	Ft.	6 inch	sch.40	pvc

14. GROUT:
From 0.0' To 27.0' Ft. portland/bentonite slurry
From 0.0' To 20.0' Ft. portland/bentonite slurry

15. SCREEN:
From 34.0' To 39.0' Ft. 2.0 in. .010 in. pvc
From To Ft. in. in.
From To Ft. in. in.

16. SAND/GRAVEL PACK:
From 32.0' To 39.0' Ft. 20-40 fine silica sand
From To Ft.

17. REMARKS: DW-1 Bentonite seal from 27.0 to 32.0 feet.

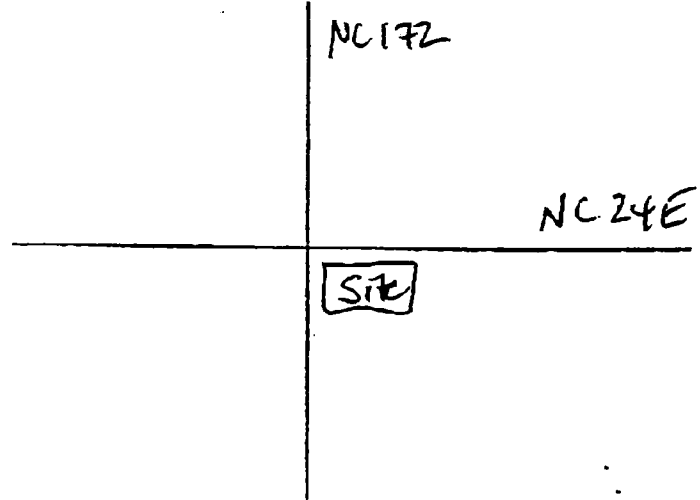
I DO HEREBY CERTIFY THAT THIS WELL WAS CONSTRUCTED IN ACCORDANCE WITH 15A NCAC 2C. WELL CONSTRUCTIONS STANDARDS, AND THAT A COPY OF THIS RECORD HAS BEEN PROVIDED TO THE WELL OWNER.

FOR OFFICE USE ONLY
Quad No:
Serial No.

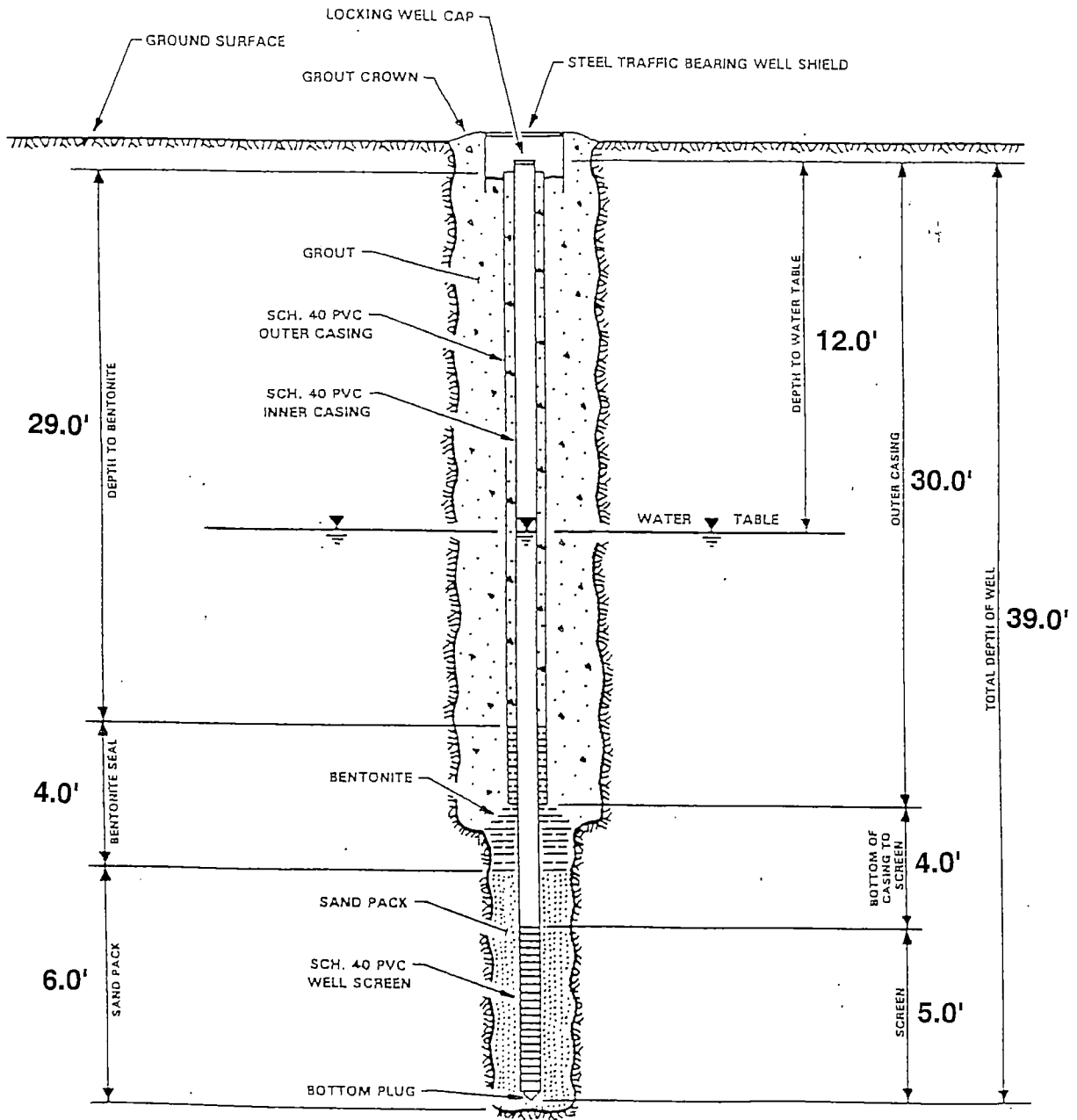
Brian Thomas
SIGNATURE OF PERSON CONSTRUCTING THE WELL
Submit original to Division of Water Quality, Groundwater Section within 30 days


7/13/00
DATE

LOCATION SKETCH
(Show direction and distance from at least two State Roads, or other map reference points)



DW-1



		Delta Environmental Consultants, Inc. 1201 South 16th Street Wilmington, North Carolina 28401	
		PROJECT NO. X0NC-170	FIGURE NO.
PROJECT MANAGER SL		DESIGNED BY	
DRAWN BY		DRAWING DESCRIPTION AS-BUILT TELESCOPING WELL DETAIL	

CLARK ENVIRONMENTAL SERVICES, INC. BORING LOG

PROJECT NAME: Scotchman # 139
 LOCATION: Hubert, NC
 CES PROJECT #: 97214
 LOGGED BY: KD

BORING/WELL #: MW-1
 DATE: 04/01/98
 GROUND ELEV.: NA

DEPTH		DESCRIPTION	BLOW COUNT	VAPOR SURVEY	
FROM	TO			ODOR	HNU (ppm)
0	0.3	Asphalt	-	NO	-
0.3	0.5	Sand, silt and gravel	-	NO	-
0.5	3	Orange, medium brown, clayey, silty very fine grained sand	-	NO	0.75
3	6.5	Medium brown, orange, silty, clay	-	NO	0
6.5	8	Light brown, tan, silty sand	-	NO	0
8	9	Light brown, silty sand	-	NO	0
9	15	Tan, silty, very fine grained sand, wet at 10 feet	-	NO	0

REMARKS:

Boring Log

Site Name: Scotchman #139
 Location: 101 Highway 172 and Highway 24
Hubert, Onslow County
North Carolina
 Project No.: X0NC-170
 Client: Worsley Companies, Inc.
10 Cardinal Drive
Wilmington, North Carolina

Soil Boring ID: MW-2
 Construction Date: 04/19/00
 Drilling Contractor: Geologic Exploration
 Drill Rig Type: Not Applicable
 Drilling Method: Hand Auger (0.0' - 2.5')
Hollow-stem Auger (2.5'-17')
 Logged By: BP
 Top-of-Casing Elev.: Not Applicable

Comments	Depth bgs (ft.)	Groundwater Level @ Time-of-Boring	Screened Interval (ft.)	Organic Vapor Reading (ppm)	Blow Count n value	Sample Interval/Type	Soil Description & Classification (USCS)
						[Hand Auger Symbol]	Asphalt and stone.
Sample collected for lab analysis from 1.0' - 3.0' bgs.	2.0			1.4		[Submitted for laboratory analysis Symbol]	Tan and gray silty Clay (CL).
	4.0					[Cuttings Symbol]	Gray silty Clay (CL).
Sample collected for lab analysis from 5.0' - 7.0' bgs.	6.0			1.2		[Direct Push Symbol]	Gray and tan silty Clay (CL).
	8.0		[Screened Interval Symbol]			[Cuttings Symbol]	Yellowish-orange silty Clay (CL).
Sample collected for lab analysis from 10.0' - 12.0' bgs.	10			0.7		[Direct Push Symbol]	Yellowish-orange silty fine Sand (SM).
	12	[Groundwater Level @ Time-of-Boring Symbol]				[Cuttings Symbol]	Light gray silty fine Sand (SM), moist to wet.
Wet @ 13.0 feet bgs.	14					[Cuttings Symbol]	Light gray silty fine Sand (SM), wet.
	16					[Cuttings Symbol]	Light gray silty fine Sand (SM), wet.
EOB @ 17 feet bgs.							

Symbols

- ▼ - Groundwater Level @ Time-of-Boring
- [Screened Interval Symbol] - Screened Interval
- [Hand Auger Symbol] - Hand Auger
- [Direct Push Symbol] - Direct Push
- [SPT Symbol] - Std. Penetration Test (SPT)
- [Cuttings Symbol] - Cuttings
- [Submitted for laboratory analysis Symbol] - Submitted for laboratory analysis

Notes:
 Organic Vapor Readings by a PID - photoionization detector
 bgs - below ground surface
 ppm - parts per million
 EOB - end of boring

Delta Environmental Consultants, Inc.
 1201 South 16th Street, Suite B
 Wilmington, NC 28401

Boring Log

Site Name: Scotchman #139
 Location: 101 Highway 172 and Highway 24
Hubert, Onslow County
North Carolina
 Project No.: XONC-170
 Client: Worsley Companies, Inc.
10 Cardinal Drive
Wilmington, North Carolina

Soil Boring ID: MW-3
 Construction Date: 06/06/00
 Drilling Contractor: Geologic Exploration
 Drill Rig Type: Not Applicable
 Drilling Method: Hand Auger (0.0' - 2.5')
Hollow-stem Auger (2.5'-17')
 Logged By: BP
 Top-of-Casing Elev.: Not Applicable

Comments	Depth bgs (ft.)	Groundwater Level @ Time-of-Boring	Screened Interval (ft.)	Organic Vapor Reading (ppm)	Blow Count n value	Sample Interval/Type	Soil Description & Classification (USCS)
							Asphalt and stone.
							Tan silty sandy Clay (CL).
							Yellowish-orange silty sandy Clay (CL).
	2.0			0.0			Brown silty fine Sand (SM).
							Tan silty clayey fine Sand (SM/SC).
	4.0						
				0.0			Yellowish-orange silty sandy Clay (CL).
	6.0						
							Dark gray silty sandy Clay (CL), moist.
	8.0						
							Light gray silty fine Sand (SM).
	10						
							Tan silty fine Sand (SM).
Wet @ 14.5 feet bgs.	12						
	14	▼					
							Light gray silty fine Sand (SM).
	16						
EOB @ 17 feet bgs.							

Symbols

- ▼ - Groundwater Level @ Time-of-Boring
- ▨ - Hand Auger
- ▤ - Direct Push
- ▤ (with horizontal lines) - Screened Interval
- - Std. Penetration Test (SPT)
- ▤ (with dots) - Cuttings
- ▤ (with small squares) - Submitted for laboratory analysis

Notes:
 Organic Vapor Readings by a PID - photoionization detector
 bgs - below ground surface
 ppm - parts per million
 EOB - end of boring

Delta Environmental Consultants, Inc.
 1201 South 16th Street, Suite B
 Wilmington, NC 28401

Boring Log

Site Name: Scotchman #139
 Location: 101 Highway 172 and Highway 24
Hubert, Onslow County
North Carolina
 Project No.: X0NC-170
 Client: Worsley Companies, Inc.
10 Cardinal Drive
Wilmington, North Carolina

Soil Boring ID: MW-4
 Construction Date: 06/06/00
 Drilling Contractor: Geologic Exploration
 Drill Rig Type: Not Applicable
 Drilling Method: Hand Auger (0.0' - 4.0')
Hollow-stem Auger (4.0'-17.0')
 Logged By: BP
 Top-of-Casing Elev.: Not Applicable

Comments	Depth bgs (ft.)	Groundwater Level @ Time-of-Boring	Screened Interval (ft.)	Organic Vapor Reading (ppm)	Blow Count n value	Sample Interval/Type	Soil Description & Classification (USCS)
							Gravel.
	2.0						Brown clayey sandy Silt (SM).
	4.0			0			Tan clayey sandy Silt (SC).
	6.0	▼					Yellowish-orange and gray silty sandy Clay (CL), moist.
Wet @ 6.0 feet bgs.	8.0						Yellowish-orange and gray silty sandy Clay (CL), wet at approximately 6 feet.
	10.0						Olive gray silty Clay (CL).
	12.0						Light gray silty Clay (CL).
	14.0						Gray silty clayey fine Sand (SC).
EOB @ 17 feet bgs.	16.0						

Symbols

- ▼ - Groundwater Level @ Time-of-Boring
- ▨ - Screened Interval
- ▧ - Hand Auger
- ▣ - Direct Push
- - Std. Penetration Test (SPT)
- ▩ - Submitted for laboratory analysis
- ▤ - Cuttings

Notes:
 Organic Vapor Readings by a PID - photoionization detector
 bgs - below ground surface
 ppm - parts per million
 EOB - end of boring

Delta Environmental Consultants, Inc.
 1201 South 16th Street, Suite B
 Wilmington, NC 28401

Boring Log

Site Name: Scotchman #139
 Location: 101 Highway 172 and Highway 24
Hubert, Onslow County
North Carolina
 Project No.: X0NC-170
 Client: Worsley Companies, Inc.
10 Cardinal Drive
Wilmington, North Carolina

Soil Boring ID: MW-5
 Construction Date: 06/06/00
 Drilling Contractor: Geologic Exploration
 Drill Rig Type: Not Applicable
 Drilling Method: Hand Auger (0.0' - 4.0')
Hollow-stem Auger (4.0'-18.0')
 Logged By: BP
 Top-of-Casing Elev.: Not Applicable

Comments	Depth bgs (ft.)	Groundwater Level @ Time-of-Boring	Screened Interval (ft.)	Organic Vapor Reading (ppm)	Blow Count n value	Sample Interval/Type	Soil Description & Classification (USCS)
							Asphalt and Stone.
	2.0			0.3			Yellowish-orange silty sandy Clay (ML/CL).
	4.0			0.3			Olive gray clayey Silt (SM/SC).
	6.0			0			Brownish gray clayey Silt (SM/SC), moist.
Wet @ 7.0 feet bgs.	8.0	▼					Brownish gray clayey Silt (SM/SC), wet at approximately 7-8 feet.
	10						Light gray silty Clay (CL).
	12						Yellowish-orange clayey Silt (SM/SC).
	14						Olive gray clayey Silt (SM/SC).
EOB @ 18 feet bgs.	16						Light gray sandy Clay (CL).

Symbols

- ▼ - Groundwater Level @ Time-of-Boring
- ▤ - Screened Interval
- ▨ - Hand Auger
- - Std. Penetration Test (SPT)
- ▩ - Submitted for laboratory analysis
- ▧ - Direct Push
- ▩ - Cuttings

Notes:
 Organic Vapor Readings by a PID - photoionization detector
 bgs - below ground surface
 ppm - parts per million
 EOB - end of boring

Delta Environmental Consultants, Inc.
 1201 South 16th Street, Suite B
 Wilmington, NC 28401

Boring Log

Site Name: Scotchman #139
 Location: 101 Highway 172 and Highway 24
Hubert, Onslow County
North Carolina
 Project No.: X0NC-170
 Client: Worsley Companies, Inc.
10 Cardinal Drive
Wilmington, North Carolina

Soil Boring ID: DW-1
 Construction Date: 6/6 and 6/7/2000
 Drilling Contractor: Geologic Exploration
 Drill Rig Type: Not Applicable
 Drilling Method: Hand Auger (0.0' - 2.5'),
Hollow Stem (2.5'-30.0')
Mud Rotary (30.0'-40.0')
 Logged By: BP
 Top-of-Casing Elev.: Not Applicable

Comments	Depth bgs (ft.)	Groundwater Level @ Time-of-Boring	Screened Interval (ft.)	Organic Vapor Reading (ppm)	Blow Count n value	Sample Interval/Type	Soil Description & Classification (USCS)
						[Hand Auger Symbol]	Asphalt and stone.
						[Cuttings Symbol]	Tan silty sandy Clay (CL).
	5.0					[Cuttings Symbol]	Gray silty sandy Clay (CL).
						[Cuttings Symbol]	Tan silty sandy Clay (CL).
	10	▼				[Cuttings Symbol]	Gray clayey Silt (SC), moist.
Wet at approximately 12-13 feet bgs.						[Cuttings Symbol]	Yellowish-orange sandy Silt (SM), moist.
						[Cuttings Symbol]	Tan fine Sand (SP), wet.
	15					[Cuttings Symbol]	Gray fine Sand (SP).
	20					[Cuttings Symbol]	
	25					[Cuttings Symbol]	Tan silty fine Sand (SP).
	30					[Cuttings Symbol]	
	35		[Screened Interval Symbol]			[Cuttings Symbol]	Light gray silty fine Sand (SM).
			[Screened Interval Symbol]			[Cuttings Symbol]	Tan silty fine Sand (SM).
	40		[Screened Interval Symbol]			[Cuttings Symbol]	Brown silty fine sandy Clay (SM/SC).
EOB @ 40 feet bgs.							

Symbols

- ▼ - Groundwater Level @ Time-of-Boring
- [Screened Interval Symbol] - Screened Interval
- [Hand Auger Symbol] - Hand Auger
- [SPT Symbol] - Std. Penetration Test (SPT)
- [Direct Push Symbol] - Direct Push
- [Cuttings Symbol] - Cuttings
- [Lab Analysis Symbol] - Submitted for laboratory analysis

Notes:
 Organic Vapor Readings by a PID - photoionization detector
 bgs - below ground surface
 ppm - parts per million
 EOB - end of boring

Delta Environmental Consultants, Inc.
 1201 South 16th Street, Suite B
 Wilmington, NC 28401

June 20, 2000

Gary and Sally Morton
127 Sand Ridge Road
Hubert, NC 28539

Subject: Supply Well Survey, Onslow County, Hubert, North Carolina
Parcel ID 1307-28.2
Delta Project No. X0NC-170

Dear Mr. and Mrs. Morton:

Delta Environmental Consultants, Inc. (Delta) is conducting a supply well survey in your area as part of an environmental investigation requested by the North Carolina Department of Environment and Natural Resources (NCDENR). Delta respectfully requests information pertaining to the water supply usage for your property located in Hubert, Onslow County, North Carolina.

A survey form listing the information needed is enclosed. Following your review, please complete the form and return to Delta within 30 (thirty) days. A self-addressed stamped envelope is included for your convenience. If you have any questions regarding this matter, please contact me at (910) 772-9329.

Sincerely,

DELTA ENVIRONMENTAL CONSULTANTS, INC.

Maureen Jones
Staff Geologist

Enclosures

Gary and Sally Morton
127 Sand Ridge Road
Hubert, NC 28539

Subject: Parcel ID 1307-28.2
Delta Project No. X0NC-170

Please circle the appropriate response:

Is your site connected to a public water supply? YES NO

Does your site have a water supply well? YES NO

If you answered yes to your site having a water supply well, please answer some additional questions.

Is the water supply well operational? YES NO

Is the water supply well used as a source of drinking water? YES NO

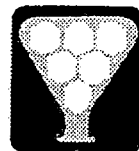
If you answered no to using the water supply well as a source of drinking water, please briefly explain the use of the water supply well.

To the best of your knowledge, please fill in the appropriate response:

the depth of the water supply well _____

the screened interval for the water supply well _____

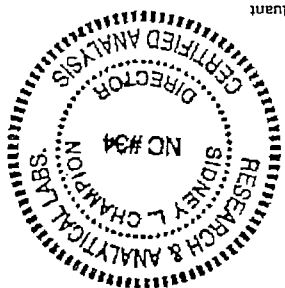
Thank you for your time and cooperation.



RESEARCH & ANALYTICAL LABORATORIES, INC.

Analytical/Process Consultations

Chemical Analysis for Selected Parameters and Soil Samples identified as Scotchman #139 (A Delta Environmental Project#XONC170, 19 April 2000)



Parameter	Quant	Limit	Parameter	Quant	Limit
EPA Method 8260	(mg/kg)	MW-2	III, MADEP 98-1	(mg/kg)	MW-2
1. Volatile Organics			IV. Semivolatile Organics		
Chloroform	0.005	BQL	EPA Method 8270 BNA		
Carbon Tetrachloride	0.010	BQL	4-Chloro-3-methylphenol	0.33	BQL
1,2-Dichloropropane	0.005	BQL	2-Chlorophenol	0.33	BQL
Dibromochloromethane	0.005	BQL	1,1,2-Trichloroethane	0.005	BQL
1,1,2-Trichloroethane	0.005	BQL	1,1,2,2-Tetrachloroethane	0.005	BQL
Toluene	0.005	BQL	Ethyl Benzene	0.010	BQL
Chloromethane	0.010	BQL	Benzaldehyde	0.33	BQL
Bromomethane	0.010	BQL	Benzofuran	0.33	BQL
Vinyl Chloride	0.010	BQL	Benzofuran	0.33	BQL
Chloroethane	0.010	BQL	Benzofuran	0.33	BQL
Acetone	0.100	BQL	Benzofuran	0.33	BQL
Carbon Disulfide	0.100	BQL	Benzofuran	0.33	BQL
Vinyl Acetate	0.050	BQL	Benzofuran	0.33	BQL
2-Butanone	0.100	BQL	Benzofuran	0.33	BQL
4-Methyl-2-Pentanone	0.100	BQL	Benzofuran	0.33	BQL
2-Hexanone	0.050	BQL	Benzofuran	0.33	BQL
Styrene	0.010	BQL	Benzofuran	0.33	BQL
Total Xylenes	0.005	BQL	Benzofuran	0.33	BQL
Acrylonitrile	0.200	BQL	Benzofuran	0.33	BQL
1,2-Dichlorobenzene	0.005	BQL	Benzofuran	0.33	BQL
1,4-Dichlorobenzene	0.005	BQL	Benzofuran	0.33	BQL
Trans-1,4-Dichloro-2-butene	0.100	BQL	Benzofuran	0.33	BQL
Cis-1,2-Dichloroethene	0.005	BQL	Benzofuran	0.33	BQL
Methyl Iodide	0.010	BQL	Benzofuran	0.33	BQL
Bromochloromethane	0.005	BQL	Benzofuran	0.33	BQL
Dibromomethane	0.010	BQL	Benzofuran	0.33	BQL
1,1,1,2-Tetrachloroethane	0.005	BQL	Benzofuran	0.33	BQL
1,2,3-Trichloropropane	0.015	BQL	Benzofuran	0.33	BQL
1,2-Dibromo-3-chloropropane(DBCP)	0.025	BQL	Benzofuran	0.33	BQL
1,2-Dibromoethane (EDB)	0.005	BQL	Benzofuran	0.33	BQL
p-Isopropyltoluene	0.005	BQL	Benzofuran	0.33	BQL
N-Butylbenzene	0.005	BQL	Benzofuran	0.33	BQL
1,3,5-Trimethylbenzene	0.005	BQL	Benzofuran	0.33	BQL
1,2,4-Trimethylbenzene	0.005	BQL	Benzofuran	0.33	BQL
2-Chlorotoluene	0.005	BQL	Benzofuran	0.33	BQL
4-Chlorotoluene	0.005	BQL	Benzofuran	0.33	BQL
Tert-Butylbenzene	0.005	BQL	Benzofuran	0.33	BQL
Sec-Butylbenzene	0.005	BQL	Benzofuran	0.33	BQL
1-Propylbenzene	0.005	BQL	Benzofuran	0.33	BQL
N-Propylbenzene	0.005	BQL	Benzofuran	0.33	BQL
Dilution Factor	1		Benzofuran	0.33	BQL
II. MADEP 98-1			Benzofuran	0.33	BQL
VPH			Benzofuran	0.33	BQL
Parameter			Benzofuran	0.33	BQL
C5-C8 Aliphatics	10.0	BQL	Benzofuran	0.33	BQL
C9-C12 Aliphatics	10.0	BQL	Benzofuran	0.33	BQL
C9-C10 Aromatics	10.0	BQL	Benzofuran	0.33	BQL
Dilution Factor	1		Benzofuran	0.33	BQL
Sample Number	38828		Benzofuran	0.33	BQL
Sample Date	04/19/00		Benzofuran	0.33	BQL
Sample Time	1419		Benzofuran	0.33	BQL
Sample Number	38828		Benzofuran	0.33	BQL
Sample Date	04/19/00		Benzofuran	0.33	BQL
Sample Time	1419		Benzofuran	0.33	BQL

MADPE VPH 98-1 = Volatile Petroleum Hydrocarbons via the Massachusetts Department of Environmental Protection Method
BQLEPH 98-1 = Extractable Petroleum Hydrocarbons via the Massachusetts Department of Environmental Protection Method
mg/kg = milligrams per kilogram = parts per million
BQL = below quantitation limits

Attachment 2
VPH Laboratory Reporting Form

Calibration and QA/QC Information

Initial Calibration Date 04/12/00
 Calibration Ranges and Limits mg/kg

Range	MDL	ML	RL
C5 - C8 Aliphatics	2.84	9.03	10.0
C9 - C12 Aliphatics	0.90	2.86	10.0
C9 - C10 Aromatics	0.66	2.10	10.0

NOTE: Please include units as appropriate

Method of Quantitation (check one): Curve or Average Response Factor
 Calibration Concentration Levels mg/kg

Range	Levels	% RSD or CCC
C5 - C8 Aliphatics	7.50	9.88 % RSD ccc = 0.998
	75.0	
	150	
	225	
	300	
C9 - C12 Aliphatics	5.50	10.8 % RSD ccc = 0.999
	55.0	
	110	
	165	
	220	
C9 - C10 Aromatics	5.0	12.1 % RSD ccc = 0.998
	13.0	
	20.0	
	30.0	
	40.0	

NOTE: Please indicate units as appropriate.

Calibration Check Date 04/26/00
 Calibration Check mg/kg

Range	Level	RPD
C5 - C8 Aliphatics	150	22 %
C9 - C12 Aliphatics	110	22 %
C9 - C10 Aromatics	20	19 %

MDL = Method Detection Limit
 ML = Minimum Limit
 RL = Reportable Limit

RPD = Relative Percent Difference
 %RSD = Percent Relative Standard Deviation
 CCC = Correlation Coefficient of Curve

VPH (Aliphatics/Aromatics) Laboratory Reporting Form Continued

Client Name DELTA - Scotchman #139 Laboratory Name RESEARCH & ANALYTICAL LABORATORIES, INC.
 Project Name Project #XONC170 NC Certification # (Lab) 34
 Site Location RAL#'s 388828

INCLUDE APPROPRIATE UNITS: PPM (Parts Per Million) (i.e., for Water: mg/L | for Soil: mg/kg)

Sample Information and Analytical Results							
Sample Identification	MW-2	Blank					
Sample Matrix	soil	Methanol					
Collection Option (for soil)*	1	N/A					
Date Collected	04/19/00	04/19/00					
Date Received	04/21/00	04/21/00					
Date Extracted	N/A	N/A					
Date Analyzed	04/26/00	04/26/00					
Dry Weight	83.2	N/A					
Dilution Factor	1	1					
C5 - C8 Aliphatics **	BRL	BRL					
C9 - C12 Aliphatics **	BRL	BRL					
C9 - C10 Aromatics **	BRL	BRL					
Surrogate % Recovery - PID	97	96					
Surrogate % Recovery - FID	101	100					

* Option 1 = Established fill line on vial Option 2 = Sampling Device (indicate brand, e.g. EnCore) Option 3 = Field weight of soil

** Unadjusted value. Should exclude the concentration of any surrogate(s), internal standards, and/or concentrations of other ranges that elute within the specified range.

	C5 - C8 Aliphatic	C9 - C12 Aliphatic	C9 - C10 Aromatic
Percent Recovery - Fortified Blank (Spike) - PID	-	-	84
Relative Percent Difference - PID Duplicate	-	-	7.5
Percent Recovery - Fortified Blank (Spike) - FID	86	79	-
Relative Percent Difference - FID Duplicate	4.2	0.8	-

Attachment 3
EPH Laboratory Reporting Form

Calibration and QA/QC Information

Initial Calibration Date 11/11/99
 Calibration Ranges and Limits mg/kg

Range	MDL	ML	RL
C9 - C18 Aliphatics	5.3	16.8	10.0
C19 - C36 Aliphatics	2.4	7.63	10.0
C11 - C22 Aromatics	4.3	13.7	10.0

NOTE: Please include units as appropriate

Method of Quantitation (check one): Curve or Average Response Factor
 Calibration Concentration Levels mg/kg

Range	Levels	% RSD or CCC
C9 - C18 Aliphatics	15	3.79 % RSD ccc = 0.996
	30	
	60	
	150	
	300	
C19 - C36 Aliphatics	20	12.1 % RSD ccc = 0.979
	40	
	80	
	200	
	400	
C11 - C22 Aromatics	42.5	8.17 % RSD ccc = 0.998
	85	
	170	
	425	
	850	

NOTE: Please indicate units as appropriate.

Calibration Check Date 04/21/00
 Calibration Check mg/kg

Range	Level	RPD
C9 - C18 Aliphatics	150	7 %
C19 - C36 Aliphatics	200	8 %
C11 - C22 Aromatics	425	17 %

MDL = Method Detection Limit
 ML = Minimum Limit
 RL = Reportable Limit

RPD = Relative Percent Difference
 %RSD = Percent Relative Standard Deviation
 CCC = Correlation Coefficient of Curve

EPH (Aliphatics/Aromatics) Laboratory Reporting Form Continued

Client Name DELTA - Scotchman #139 Laboratory Name RESEARCH & ANALYTICAL LABORATORIES, INC.
 Project Name Project #XONC170 NC Certification # (Lab) 34
 Site Location RAL#'s 388828

INCLUDE APPROPRIATE UNITS: PPM (Parts Per Million) (i.e., for Water: mg/L | for Soil: mg/kg)

Sample Information and Analytical Results							
Sample Identification	MW-2						
Sample Matrix	soil						
Date Collected	04/19/00						
Date Received	04/21/00						
Date Extracted	04/21/00						
Date Analyzed	04/21/00						
Dry Weight	83.2						
Dilution Factor	1						
C9 - C18 Aliphatics *	BRL						
C19 - C36 Aliphatics *	BRL						
C11 - C22 Aromatics *	BRL						
Surrogate % Recovery - Aliph.	60						
Surrogate % Recovery - Arom.	73						
Fractionation Surrogate % Recovery	not fract.						
Fractionation Surrogate % Recovery	not fract.						

* Unadjusted value. Should exclude the concentration of any surrogate(s), internal standards, and/or concentrations of other ranges that elute within the specified range.

	C9 - C18 Aliphatic	C19 - C36 Aliphatic	C11 - C22 Aromatic
Percent Recovery - Fortified Blank (Spike)	96	93	85
Relative Percent Difference - Sample Duplicates	0.0	0.0	0.0



RESEARCH & ANALYTICAL LABORATORIES, INC.

Analytical / Process Consultations
Phone (336) 996-2841

CHAIN OF CUSTODY RECORD

COMPANY									JOB NO.		WATER / WASTEWATER														MISC.																
Delta Environmental									XONC170		2L G (BNA, Herb. / Pest.) 2 40ml Vials (VOA) HCL 250ml G (TOX) 250ml P (TOX) 1L P.G (TOC) H ₂ SO ₄ 1L G (BOD, TSS, Unpreserved, etc.) 1L P.G (Phenol, Oil & Grease) H ₂ SO ₄ 1L P.G (COD, N.P) H ₂ SO ₄ 1L P.G (Metals, Hardness) HNO ₃ Sterile P.G (CYANIDE) NaOH Sterile P.G (Coliform)																														
STREET ADDRESS									PROJECT																	REQUESTED ANALYSIS															
1201 S. 16 th Street									Scotchman 139																	VPH EPH 8260 w/MTBE+IPE 8270															
CITY, STATE, ZIP									SAMPLER NAME (PLEASE PRINT)		NO. OF CONTAINERS																														
Wilmington, NC, 28401									Brad Pierce																																
CONTACT									SAMPLER SIGNATURE																																
Alison Lord 910-772-9971									Brad Pierce																																
SAMPLE NUMBER (LAB USE ONLY)	DATE	TIME	COMP	GRAB	TEMP °C	RES CI	CHLORINE REMOVED (Y or N)	SAMPLE MATRIX (S or W)	SAMPLE LOCATION / I.D.																																
388828	4/19/00	14:19		X				S	Mw-2(5'-7')																																
↓	↓	↓		↓				↓	↓																																
829									mech Blank																																
RELINQUISHED BY									DATE/TIME			RECEIVED BY			REMARKS:																										
Brad Pierce									4/20/00 11:00																																
RELINQUISHED BY									DATE/TIME			RECEIVED BY																													
* UPS *									4/21/2000			AK			onice SAMPLE TEMPERATURE AT RECEIPT 3.1 °C																										

PARADIGM ANALYTICAL LABORATORIES, INC.
 Results for Volatiles
 by GC 602

Client Sample ID: MW-2
 Client Project ID: SM 139 XONC-170
 Lab Sample ID: 86356
 Lab Project ID: G129-214

Analyzed By: EKR
 Date Collected: 4/25/00
 Date Received: 4/25/00
 Matrix: Water

Compound	Date Analyzed	Dilution	Quantitation Limit (ug/L)	Result (ug/L)
Benzene	5/4/00	10	10	97
Diisopropyl ether (DIPE)	5/4/00	10	10	180
Ethylbenzene	5/4/00	10	10	BQL
Methyl-tert-butyl ether (MTBE)	5/4/00	10	20	250
Toluene	5/4/00	10	10	BQL
m/p-Xylene	5/4/00	10	20	BQL
o-Xylene	5/4/00	10	20	BQL

Surrogate Spike Recoveries	Spike Added	Spike Result	Percent Recovered
Trifluorotoluene	40	41	101

Comments:

All values corrected for dilution.

Flags:

BQL = Below quantitation limit

Reviewed By: Mr

PARADIGM ANALYTICAL LABORATORIES, INC.

Results for Semivolatiles
by GCMS 625

Client Sample ID: MW-2
Client Project ID: SM 139 XONC-170
Lab Sample ID: 86356
Lab Project ID: G129-214
Matrix: Water

Date Collected: 4/25/00
Date Received: 4/25/00
Date Analyzed: 5/4/00
Analyzed By: MRC
Dilution: 1

Compound	Quantitation Limit (ug/L)	Result (ug/L)
Acenaphthene	10	BQL
Acenaphthylene	10	BQL
Anthracene	10	BQL
Benzo[a]anthracene	10	BQL
Benzo[a]pyrene	10	BQL
Benzo[b]fluoranthene	10	BQL
Benzo[g,h,i]perylene	10	BQL
Benzo[k]fluoranthene	10	BQL
Bis(2-chloroethoxy)methane	10	BQL
Bis(2-chloroethyl)ether	10	BQL
Bis(2-chloroisopropyl)ether	10	BQL
Bis(2-ethylhexyl)phthalate	10	BQL
4-bromophenyl phenyl ether	10	BQL
Butylbenzylphthalate	10	BQL
4-Chloro-3-methylphenol	10	BQL
2-Chloronaphthalene	10	BQL
2-Chlorophenol	10	BQL
4-Chlorophenyl phenyl ether	10	BQL
Chrysene	10	BQL
Di-n-Butylphthalate	10	BQL
Di-n-octylphthalate	10	BQL
Dibenzo[a,h]anthracene	10	BQL
1,2-Dichlorobenzene	10	BQL
1,3-Dichlorobenzene	10	BQL
1,4-Dichlorobenzene	10	BQL
3,3'-Dichlorobenzidine	20	BQL
2,4-Dichlorophenol	10	BQL
Diethylphthalate	10	BQL
2,4-Dimethylphenol	10	BQL
Dimethylphthalate	10	BQL
4,6-Dinitro-2-methylphenol	50	BQL
2,4-Dinitrophenol	50	BQL
2,4-Dinitrotoluene	10	BQL
2,6-Dinitrotoluene	10	BQL
Fluoranthene	10	BQL
Fluorene	10	BQL
Hexachlorobenzene	10	BQL
Hexachlorobutadiene	10	BQL
Hexachlorocyclopentadiene	20	BQL
Hexachloroethane	10	BQL

PARADIGM ANALYTICAL LABORATORIES, INC.

Results for Semivolatiles
by GCMS 625

Client Sample ID: MW-2
Client Project ID: SM 139 XONC-170
Lab Sample ID: 86356
Lab Project ID: G129-214
Matrix: Water

Date Collected: 4/25/00
Date Received: 4/25/00
Date Analyzed: 5/4/00
Analyzed By: MRC
Dilution: 1

Compound	Quantitation Limit (ug/L)	Result (ug/L)
Indeno(1,2,3-c,d)pyrene	10	BQL
Isophorone	10	BQL
N-Nitrosodi-n-propylamine	10	BQL
N-Nitrosodiphenylamine	10	BQL
Naphthalene	10	BQL
Nitrobenzene	10	BQL
2-Nitrophenol	10	BQL
4-Nitrophenol	50	BQL
Pentachlorophenol	50	BQL
Phenanthrene	10	BQL
Phenol	10	BQL
Pyrene	10	BQL
1,2,4-Trichlorobenzene	10	BQL
2,4,6-Trichlorophenol	10	BQL

Surrogate Spike Recoveries	Spike Added	Spike Result	Percent Recovered
2-Fluorobiphenyl	10	7.6	76
2-Fluorophenol	10	4.7	47
Nitrobenzene-d5	10	6.9	69
Phenol-d6	10	6.2	62
2,4,6-Tribromophenol	10	10	100
4-Terphenyl-d14	10	8.9	89

Comments:

Results are corrected for %solids and dilution where applicable.

Flags:

BQL = Below Quantitation Limit.

Reviewed By: Wm

PARADIGM ANALYTICAL LABORATORIES, INC.

Results of Library Search for Semivolatile Compounds

by GCMS

Client Sample ID: MW-2
Client Project ID: SM 139 XONC-170
Lab Sample ID: 86356
Lab Project ID: G129-214
Matrix: Water

Date Collected: 4/25/00
Date Received: 4/25/00
Date Analyzed: 5/4/00
Analyzed By: MRC
Dilution: 1

Num.	Compound	CAS#	Match Probability	Result (ug/L)
1	Unknown			18
2	Unknown			11
3	Trimethylbenzene, Isomer of			7.9
4	Unknown			7
5	Dimethylbenzene, Isomer of			6.5
6	Unknown			5.2
7	Unknown			4.9
8				
9				
10				

Comment:

Tentatively Identified Compound (TIC) refers to substances which are not present in the list of target compounds. Therefore, not all TICs are identified and quantitated using individual standards. TIC listings are prepared utilizing a computerized library search of electron impact mass spectral data and evaluation of the relevant data by a mass spectral data specialist.

Quantitation is accomplished by relative peak height of the compound compared to that of the nearest internal standard from the total ion chromatogram. TICs are identified and quantitated only if the peak height is equal to or greater than 10% of that of the nearest internal standard. Quantitation provided is an estimate.

Reviewed by: MRC

PARADIGM ANALYTICAL LABORATORIES, INC.

VPH (Aliphatics/Aromatics) Laboratory Reporting Form

Client Name: Delta Environmental Consultants

Project Name: SM 139 XONC-170

Sample Information and Analytical Results	
Sample Identification	MW-2
Sample Matrix	Water
Collection Option (for Soil)*	
Date Collected	04/25/00
Date Received	04/25/00
Date Extracted	04/26/00
Date Analyzed	04/26/00
Dry Weight	
Dilution Factor	1
C ₅ -C ₈ Aliphatics**	930 (µg/L)
C ₉ -C ₁₂ Aliphatics**	120 (µg/L)
C ₉ -C ₁₀ Aromatics**	44 (µg/L)
Surrogate % Recovery - PID	67
Surrogate % Recovery - FID	81

* = Option 1 = Established fill line on vial, Option 2 = Sampling Device/Brand, or Option 3 = Field weight of soil.
 ** = Excludes any surrogates or internal standards.

PARADIGM ANALYTICAL LABORATORIES, INC.

VPH (Aliphatics/Aromatics) Laboratory Reporting Form

Client Name: Delta Environmental Consultants

Project Name: SM 139 XONC-170

Sample Information and Analytical Results	
Sample Identification	Trip Blank
Sample Matrix	Water
Collection Option (for Soil)*	
Date Collected	04/25/00
Date Received	04/25/00
Date Extracted	04/27/00
Date Analyzed	04/27/00
Dry Weight	
Dilution Factor	1
C ₅ -C ₈ Aliphatics**	< 10 (µg/L)
C ₉ -C ₁₂ Aliphatics**	< 10 (µg/L)
C ₉ -C ₁₀ Aromatics**	< 10 (µg/L)
Surrogate % Recovery - PID	72
Surrogate % Recovery - FID	88

* = Option 1 = Established fill line on vial, Option 2 = Sampling Device/Brand, or Option 3 = Field weight of soil.
 ** = Excludes any surrogates or internal standards.

Lab Info: G129-214-86357

Reviewed By: Man

PARADIGM ANALYTICAL LABORATORIES, INC.

Attachment 2

VPH Laboratory Reporting Form

Calibration and QA/QC Information

FID Initial Calibration Date: 04/10/00 PID Initial Calibration Date: 04/10/00

Calibration Ranges and Limits

Range	MDL		ML		RL	
	(µg/L)	(µg/Kg)	(µg/L)	(µg/Kg)	(µg/L)	(µg/Kg)
C ₅ -C ₈ Aliphatics	2.4	120	7.5	380	10	500
C ₉ -C ₁₂ Aliphatics	1.3	65	4.0	210	10	500
C ₉ -C ₁₀ Aromatics	0.5	25	1.6	80	10	500

Calibration Concentration Levels

Range	Levels		%RSD or CCC	Method of Quantitation
	(µg/L)	(µg/Kg)		
C ₅ -C ₈ Aliphatics	40	2000	20.7	Calibration Factor
	160	8000		
	400	20000		
	1600	80000		
	4000	200000		
C ₉ -C ₁₂ Aliphatics	30	1500	18.5	Calibration Factor
	120	6000		
	300	15000		
	1200	60000		
	3000	150000		
C ₉ -C ₁₀ Aromatics	65	3250	10.7	Calibration Factor
	260	13000		
	650	32500		
	2600	130000		
	6500	325000		

Calibration Check Date: 04/26/00

Calibration Check

Range	Levels		RPD
	(µg/L)	(µg/Kg)	
C ₅ -C ₈ Aliphatics	400	20000	-8.5
C ₉ -C ₁₂ Aliphatics	300	15000	0.4
C ₉ -C ₁₀ Aromatics	650	32500	21.8

MDL = Method Detection Limit

ML = Minimum Limit

RL = Reportable Limit

RPD = Relative Percent Difference

%RSD = Percent Relative Standard Deviation

CCC = Correlation Coefficient of Curve

PARADIGM ANALYTICAL LABORATORIES, INC.

Attachment 2

VPH Laboratory Reporting Form

Calibration and QA/QC Information

FID Initial Calibration Date: 04/10/00 PID Initial Calibration Date: 04/10/00

Calibration Ranges and Limits

Range	MDL		ML		RL	
	(µg/L)	(µg/Kg)	(µg/L)	(µg/Kg)	(µg/L)	(µg/Kg)
C ₅ -C ₈ Aliphatics	2.4	120	7.5	380	10	500
C ₉ -C ₁₂ Aliphatics	1.3	65	4.0	210	10	500
C ₉ -C ₁₀ Aromatics	0.5	25	1.6	80	10	500

Calibration Concentration Levels

Range	Levels		%RSD or CCC	Method of Quantitation
	(µg/L)	(µg/Kg)		
C ₅ -C ₈ Aliphatics	40	2000	20.7	Calibration Factor
	160	8000		
	400	20000		
	1600	80000		
	4000	200000		
C ₉ -C ₁₂ Aliphatics	30	1500	18.5	Calibration Factor
	120	6000		
	300	15000		
	1200	60000		
	3000	150000		
C ₉ -C ₁₀ Aromatics	65	3250	10.7	Calibration Factor
	260	13000		
	650	32500		
	2600	130000		
	6500	325000		

Calibration Check Date: 04/27/00

Calibration Check

Range	Levels		RPD
	(µg/L)	(µg/Kg)	
C ₅ -C ₈ Aliphatics	400	20000	-3.6
C ₉ -C ₁₂ Aliphatics	300	15000	0.7
C ₉ -C ₁₀ Aromatics	650	32500	24.0

MDL = Method Detection Limit
ML = Minimum Limit
RL = Reportable Limit

RPD = Relative Percent Difference
%RSD = Percent Relative Standard Deviation
CCC = Correlation Coefficient of Curve

PARADIGM ANALYTICAL LABORATORIES, INC.

EPH (Aliphatics/Aromatics) Results

by MDEP-EPH

Client Name: Delta Environmental Consultants

Project Name: SM 139 XONC-170

Sample Information and Analytical Results	
Sample Identification	MW-2
Sample Matrix	Water
Date Collected	04/25/00
Date Received	04/25/00
Date Extracted	05/02/00
Date Analyzed	05/08/00
Dry Weight	
Dilution Factor	1
C ₉ -C ₁₈ Aliphatics*	< 1 (µg/mL)
C ₁₉ -C ₃₆ Aliphatics*	< 1 (µg/mL)
C ₁₁ -C ₂₂ Aromatics*	< 1 (µg/mL)
Aliphatic Surrogate % Recovery	18
Aromatic Surrogate % Recovery	18

Comments:

- * = Excludes any surrogates or internal standards.
- Sample did not require fractionation.
- Low surrogate confirmed by duplicate analysis.

PARADIGM ANALYTICAL LABORATORIES, INC.
Attachment 3

EPH Laboratory Reporting Form

Calibration and QA/QC Information

Initial Calibration Date: 02/22/00

Calibration Ranges and Limits

Range	MDL		ML		RL	
	(µg/mL)	(mg/Kg)	(µg/mL)	(mg/Kg)	(µg/mL)	(mg/Kg)
C ₉ -C ₁₈ Aliphatics	0.1	2	0.3	6.5	1	10
C ₁₉ -C ₃₆ Aliphatics	0.1	1	0.3	3.1	1	10
C ₁₁ -C ₂₂ Aromatics	0.2	2.5	0.6	8	1	10

Calibration Concentration Levels

Range	Levels		%RSD or CCC	Method of Quantitation
	(µg/mL)	(mg/Kg)		
C ₉ -C ₁₈ Aliphatics	0.6	10	3.10	Calibration Factor
	1.5	25		
	3	50		
	6	100		
	12	200		
C ₁₉ -C ₃₆ Aliphatics	0.8	13.3	2.8	Calibration Factor
	2	33.3		
	4	66.7		
	8	133		
	16	267		
C ₁₁ -C ₂₂ Aromatics	1.2	20	4.3	Calibration Factor
	3	50		
	6	100		
	12	200		
	24	400		

Calibration Check Date: 05/08/00

Calibration Check

Range	Levels		RPD
	(µg/mL)	(mg/Kg)	
C ₉ -C ₁₈ Aliphatics	6	100	4.0
C ₁₉ -C ₃₆ Aliphatics	8	133	-0.9
C ₁₁ -C ₂₂ Aromatics	12	200	5.5

MDL = Method Detection Limit
ML = Minimum Limit
RL = Reportable Limit

RPD = Relative Percent Difference
%RSD = Percent Relative Standard Deviation
CCC = Correlation Coefficient of Curve

Delta Environmental Project ID: XONC-170 Date: April 25, 2000 Report To: Alison Lord
 Address: 1201 S. 116th St. Contact: Maurzen Jones Turnaround: STD
Suite B Phone: 910-772-9329 Job Number: XONC-170
Wilmington, NC 28401 Fax: 910- P.O. Number: _____ Invoice To: Delta Environmental

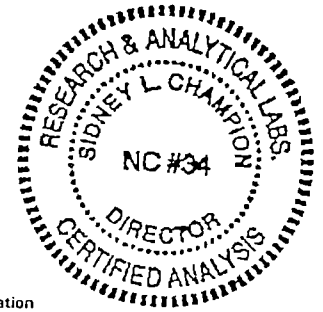
Sample ID	Date	Time	Matrix	Preservatives				Analyses				Comments: Please specify any special reporting requirements	
								1025 + 10	1002 w/xylenes	VPH	EPH		
2-2	4/25/00	1145	W					1	2	2	1		G129-214 analyze 1025 + 10 largest peaks analyze 1002 with xylenes.
Black	4/25/00	1145	W	lab. _____									
Black	4/25/00	1145	W	lab. _____									
Relinquished By				Date	Time	Received By				Date	Time	Temperature	State Certification Requested
Maurzen Jones				4/25/00	1330	Emily Ralva				4/25/00	1:40p.	ON ICE walk in	NC _____ SC _____ Other _____

SEE REVERSE FOR TERMS AND CONDITIONS



RESEARCH & ANALYTICAL LABORATORIES, INC.

Chemical Analysis for Selected Parameters and Sampling Locations Identified as SM#139
(A Bona Environmental Consultants Project# XONC-170, 12 June 2000)



I. Volatile Organics EPA Methods 601/602 Parameter	Quant.	MW-3	DW-1
	Limits (mg/L)	(mg/L)	(mg/L)
Bromodichloromethane	0.0005	BQL	BQL
Bromoform	0.0005	BQL	BQL
Bromomethane	0.0005	BQL	BQL
Carbon Tetrachloride	0.0005	BQL	BQL
Chloroethane	0.0005	BQL	BQL
Chloroform	0.0005	BQL	BQL
Chloromethane	0.0005	BQL	BQL
2-Chloroethyl vinyl ether	0.0005	BQL	BQL
Cis-1,3-Dichloropropene	0.0005	BQL	BQL
Dibromochloromethane	0.0005	BQL	BQL
Dichlorodifluoromethane	0.0005	BQL	BQL
1,1-Dichloroethane	0.0005	BQL	BQL
1,2-Dichloroethane	0.0005	BQL	BQL
1,1-Dichloroethene	0.0005	BQL	BQL
1,2-Dichloropropane	0.0005	BQL	BQL
Methylene Chloride	0.0005	BQL	BQL
1,1,2,2-Tetrachloroethane	0.0005	BQL	BQL
Tetrachloroethene	0.0005	BQL	BQL
Trans-1,2-Dichloroethene	0.0005	BQL	BQL
Trans-1,3-Dichloropropene	0.0005	BQL	BQL
1,1,1-Trichloroethane	0.0005	BQL	BQL
1,1,2-Trichloroethane	0.0005	BQL	BQL
Trichloroethene	0.0005	BQL	BQL
Trichlorofluoromethane	0.0005	BQL	BQL
Vinyl Chloride	0.0005	BQL	BQL
Benzene	0.0005	0.835	BQL
Chlorobenzene	0.0005	BQL	BQL
1,3-Dichlorobenzene	0.0005	BQL	BQL
1,4-Dichlorobenzene	0.0005	BQL	BQL
1,2-Dichlorobenzene	0.0005	BQL	BQL
Ethylbenzene	0.0005	1.04	BQL
Toluene	0.0005	3.97	BQL
Total Xylenes	0.0005	6.06	BQL
Methyl-Tert-Butyl ether (MTBE)	0.010	BQL	BQL
Isopropyl ether (IPE)	0.010	BQL	BQL
Dilution Factor		100	1

II. Method 504.1 Parameter			
EDB	0.000020	BQL	BQL
Dilution Factor		1	1

III Method 3030-C Parameter			
Lead	0.005	0.008	BQL

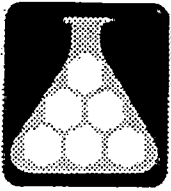
IV. EPA Method 625 (Library Search) Tentatively Identified Compounds	Est. Conc.	Est. Conc.
Benzene, 1-ethyl-4-methyl	0.381	NOPI
Benzene, 1-ethyl-3-methyl	0.187	
Benzenemethanol, 2-methyl	0.087	
Benzene, 1-methyl-3-propyl	0.080	
Benzene, 4-ethyl-1,2-dimethyl	0.071	
Benzene, 2-ethenyl-1,4-dimethyl	0.065	
Benzene, 1,2,4,5-tetramethyl	0.039	
Benzene, 1,2,4-trimethyl	0.195	
Benzene, 1,2,3-trimethyl	0.504	
Indane	0.148	

V. Semi-Volatile Organics EPA Method 625 BNA Parameter	Quantitation Limit (mg/l)	MW-3 (mg/l)	DW-1 (mg/l)
4-Chloro-3-methylphenol	0.010	BQL	BQL
2-Chlorophenol	0.010	BQL	BQL
2,4-Dichlorophenol	0.010	BQL	BQL
2,4-Dimethylphenol	0.010	BQL	BQL
2,4-Dinitrophenol	0.050	BQL	BQL
2-Methyl-4,6-dinitrophenol	0.050	BQL	BQL
2-Nitrophenol	0.010	BQL	BQL
4-Nitrophenol	0.050	BQL	BQL
Pentachlorophenol	0.050	BQL	BQL
Phenol	0.010	BQL	BQL
2,4,6-Trichlorophenol	0.010	BQL	BQL
Acenaphthene	0.010	BQL	BQL
Acenaphthylene	0.010	BQL	BQL
Anthracene	0.010	BQL	BQL
Benzidine	0.050	BQL	BQL
Benzo(a)anthracene	0.010	BQL	BQL
Benzo(a)pyrene	0.010	BQL	BQL
Benzo(b)fluoranthene	0.010	BQL	BQL
Benzo(ghi)perylene	0.010	BQL	BQL
Benzo(k)fluoranthene	0.010	BQL	BQL
Benzyl butyl phthalate	0.010	BQL	BQL
Bis(2-chloroethoxy)methane	0.010	BQL	BQL
Bis(2-chloroethyl)ether	0.010	BQL	BQL
Bis(2-chloroisopropyl)ether	0.010	BQL	BQL
Bis(2-ethyl-hexyl)phthalate	0.010	BQL	BQL
4-Bromophenyl phenyl ether	0.010	BQL	BQL
2-Chloronaphthalene	0.010	BQL	BQL
4-Chlorophenyl phenyl ether	0.010	BQL	BQL
Chrysene	0.010	BQL	BQL
Dibenzo(a,h)anthracene	0.010	BQL	BQL
1,2-Dichlorobenzene	0.010	BQL	BQL
1,3-Dichlorobenzene	0.010	BQL	BQL
1,4-Dichlorobenzene	0.010	BQL	BQL
3,3-Dichlorobenzidine	0.020	BQL	BQL
Diethyl phthalate	0.010	BQL	BQL
Dimethyl phthalate	0.010	BQL	BQL
Di-N-Butyl phthalate	0.010	BQL	BQL
2,4-Dinitrotoluene	0.010	BQL	BQL
2,6-Dinitrotoluene	0.010	BQL	BQL
Di-N-Octyl phthalate	0.010	BQL	BQL
1,2-Diphenylhydrazine	0.050	BQL	BQL
Fluoranthene	0.010	BQL	BQL
Fluorene	0.010	BQL	BQL
Hexachlorobenzene	0.010	BQL	BQL
Hexachlorobutadiene	0.010	BQL	BQL
Hexachlorocyclopentadiene	0.010	BQL	BQL
Hexachloroethane	0.010	BQL	BQL
Indeno(1,2,3-cd) pyrene	0.010	BQL	BQL
Isophorone	0.010	BQL	BQL
Naphthalene	0.010	BQL	BQL
Nitrobenzene	0.010	BQL	BQL
N-Nitrosodimethylamine	0.010	BQL	BQL
N-nitrosodi-n-propylamine	0.010	BQL	BQL
N-Nitrosodiphenylamine	0.010	BQL	BQL
Phenanthrene	0.010	BQL	BQL
Pyrene	0.010	BQL	BQL
1,2,4-Trichlorobenzene	0.010	BQL	BQL
Dilution Factor		4	1

VI. Method MADEP 98-1 VPH Parameter			
C5-C8 Aliphatics	0.100	9.84	BQL
C9-C12 Aliphatics	0.100	14.7	BQL
C9-C10 Aromatics	0.100	4.34	BQL
Dilution Factor		25	1

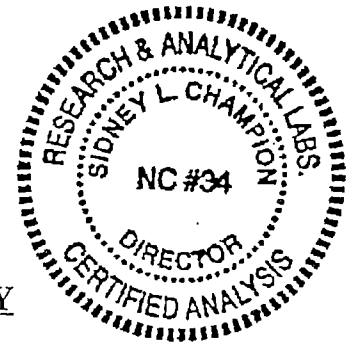
Method MADEP 98-1 EPH Parameter			
C9-C18 Aliphatics	0.100	2.12	BQL
C-19-C-36 Aliphatics	0.100	0.231	BQL
C11-C22 Aromatics	0.100	1.05	BQL
Dilution Factor		1	1

BQL = Below Quantitation Limits
---- = not requested



RESEARCH & ANALYTICAL LABORATORIES, INC.

Analytical/Process Consultations



QUALITY CONTROL DATA SUMMARY

<u>601/602 + MTBE + IPE</u> <u>Parameter</u>	<u>RAL</u> <u>Sample #</u>	<u>Date</u> <u>Collected</u>	<u>Date</u> <u>Analyzed</u>	<u>Method</u> <u>Blank</u>	<u>Quality</u> <u>Control</u> <u>Standard</u> <u>Results</u> <u>(% Recovery)</u>	<u>Analyst</u>
Bromodichloromethane	392806/07	06/12/00	06/22-24/00	ND	99.5	MB
Bromoform	392806/07	06/12/00	06/22-24/00	ND	98.0	MB
Bromomethane	392806/07	06/12/00	06/22-24/00	ND	73.2	MB
Carbon Tetrachloride	392806/07	06/12/00	06/22-24/00	ND	83.0	MB
Chloroethane	392806/07	06/12/00	06/22-24/00	ND	80.8	MB
Chloroform	392806/07	06/12/00	06/22-24/00	ND	88.4	MB
Chloromethane	392806/07	06/12/00	06/22-24/00	ND	73.2	MB
2-Chloroethyl vinyl ether	392806/07	06/12/00	06/22-24/00	ND	73.4	MB
Cis-1,3-Dichloropropene	392806/07	06/12/00	06/22-24/00	ND	82.4	MB
Dibromochloromethane	392806/07	06/12/00	06/22-24/00	ND	89.8	MB
Dichlorodifluoromethane	392806/07	06/12/00	06/22-24/00	ND	286	MB
1,1-Dichloroethane	392806/07	06/12/00	06/22-24/00	ND	101	MB
1,2-Dichloroethane	392806/07	06/12/00	06/22-24/00	ND	82.8	MB
1,1-Dichloroethene	392806/07	06/12/00	06/22-24/00	ND	90.7	MB
1,2-Dichloropropane	392806/07	06/12/00	06/22-24/00	ND	84.6	MB
Methylene Chloride	392806/07	06/12/00	06/22-24/00	ND	96.2	MB
1,1,2,2-Tetrachloroethane	392806/07	06/12/00	06/22-24/00	ND	82.5	MB
Tetrachloroethene	392806/07	06/12/00	06/22-24/00	ND	76.5	MB
Trans-1,2-Dichloroethene	392806/07	06/12/00	06/22-24/00	ND	89.2	MB
Trans-1,3-Dichloropropene	392806/07	06/12/00	06/22-24/00	ND	85.0	MB
1,1,1-Trichloroethane	392806/07	06/12/00	06/22-24/00	ND	91.5	MB
1,1,2-Trichloroethane	392806/07	06/12/00	06/22-24/00	ND	83.7	MB
Trichloroethene	392806/07	06/12/00	06/22-24/00	ND	82.6	MB
Trichlorofluoromethane	392806/07	06/12/00	06/22-24/00	ND	95.1	MB
Vinyl Chloride	392806/07	06/12/00	06/22-24/00	ND	104	MB
Benzene	392806/07	06/12/00	06/22-24/00	ND	78.9	MB
Chlorobenzene	392806/07	06/12/00	06/22-24/00	ND	83.4	MB
1,3-Dichlorobenzene	392806/07	06/12/00	06/22-24/00	ND	79.5	MB
1,4-Dichlorobenzene	392806/07	06/12/00	06/22-24/00	ND	80.4	MB
1,2-Dichlorobenzene	392806/07	06/12/00	06/22-24/00	ND	80.5	MB
Ethylbenzene	392806/07	06/12/00	06/22-24/00	ND	79.6	MB
Toluene	392806/07	06/12/00	06/22-24/00	ND	78.9	MB
Total Xylenes	392806/07	06/12/00	06/22-24/00	ND	75.1	MB
MTBE	392806/07	06/12/00	06/22-24/00	ND	120	MB
IPE	392806/07	06/12/00	06/22-24/00	ND	78.7	MB
Lead	392806/07	06/12/00	06/16/00	ND	90.2	IB
<u>504.1</u> EDB	392806/07	06/12/00	06/15/00	ND	108	SEC

Delta Project# XONC-170 (SM#139)

ND = Not Detected

--- = Data Not Available

Attachment 2
VPH Laboratory Reporting Form

Calibration and QA/QC Information

Initial Calibration Date 06/02/2000
 Calibration Ranges and Limits $\mu\text{g/l}$

Range	MDL	ML	RL
C5 - C8 Aliphatics	52	165	100
C9 - C12 Aliphatics	18	57	100
C9 - C10 Aromatics	9.0	29	100

NOTE: Please include units as appropriate

Method of Quantitation (check one): Curve or Average Response Factor
 Calibration Concentration Levels $\mu\text{g/l}$

Range	Levels	% RSD or CCC
C5 - C8 Aliphatics	75	7.69 % RSD ccc = 0.997
	750	
	1500	
	2250	
	3000	
C9 - C12 Aliphatics	55	5.13 % RSD ccc = 0.998
	550	
	1100	
	1650	
	2200	
C9 - C10 Aromatics	50	3.55 % RSD ccc = 0.998
	100	
	200	
	300	
	400	

NOTE: Please indicate units as appropriate.

Calibration Check Date 06/14/2000
 Calibration Check $\mu\text{g/l}$

Range	Level	RPD
C5 - C8 Aliphatics	1500	5 %
C9 - C12 Aliphatics	1100	5 %
C9 - C10 Aromatics	200	2 %

MDL = Method Detection Limit
 ML = Minimum Limit
 RL = Reportable Limit

RPD = Relative Percent Difference
 %RSD = Percent Relative Standard Deviation
 CCC = Correlation Coefficient of Curve

VPH (Aliphatics/Aromatics) Laboratory Reporting Form Continued

Client Name DELTA # XONC170
 Project Name SM#139
 Site Location RAL#'s 392806/07

Laboratory Name RESEARCH & ANALYTICAL LABORATORIES, INC.
 NC Certification # (Lab) 34

INCLUDE APPROPRIATE UNITS: PPM (Parts Per Million) (i.e., for Water: mg/L | for Soil: mg/kg)

Sample Information and Analytical Results									
Sample Identification	MW-3	DW-1							
Sample Matrix	Water	Water							
Collection Option (for soil)*	N/A	N/A							
Date Collected	06/12/00	06/12/00							
Date Received	06/13/00	06/13/00							
Date Extracted	N/A	N/A							
Date Analyzed	06/14/00	06/14/00							
Dry Weight	N/A	N/A							
Dilution Factor	25	1							
C5 - C8 Aliphatics **	9.84	BRL							
C9 - C12 Aliphatics **	14.7	BRL							
C9 - C10 Aromatics **	4.34	BRL							
Surrogate % Recovery - PID	109	86							
Surrogate % Recovery - FID	106	93							

* Option 1 = Established fill line on vial Option 2 = Sampling Device (indicate brand, e.g. EnCore) Option 3 = Field weight of soil

** Unadjusted value. Should exclude the concentration of any surrogate(s), internal standards, and/or concentrations of other ranges that elute within the specified range.

	C5 - C8 Aliphatic	C9 - C12 Aliphatic	C9 - C10 Aromatic
Percent Recovery - Fortified Blank (Spike) - PID	-	-	108
Relative Percent Difference - PID Duplicate	-	-	3.4
Percent Recovery - Fortified Blank (Spike) - FID	114	112	-
Relative Percent Difference - FID Duplicate	5.6	2.7	-

Attachment 3
EPH Laboratory Reporting Form

Calibration and QA/QC Information

Initial Calibration Date 05/23/00
 Calibration Ranges and Limits $\mu\text{g/l}$

Range	MDL	ML	RL
C9 - C18 Aliphatics	63	200	100
C19 - C36 Aliphatics	31	99	100
C11 - C22 Aromatics	9.0	29	100

NOTE: Please include units as appropriate

Method of Quantitation (check one): Curve or Average Response Factor
 Calibration Concentration Levels $\mu\text{g/l}$

Range	Levels	% RSD or CCC
C9 - C18 Aliphatics	60	3.60 % RSD ccc = 0.999
	120	
	300	
	600	
	800	
C19 - C36 Aliphatics	80	3.41 % RSD ccc = 0.999
	160	
	400	
	800	
	1200	
C11 - C22 Aromatics	85	5.68 % RSD ccc = 0.998
	170	
	340	
	850	
	1700	

NOTE: Please indicate units as appropriate.

Calibration Check Date 06/16/00
 Calibration Check $\mu\text{g/l}$

Range	Level	RPD %
C9 - C18 Aliphatics	300	11 %
C19 - C36 Aliphatics	400	11 %
C11 - C22 Aromatics	850	9 %

MDL = Method Detection Limit
 ML = Minimum Limit
 RL = Reportable Limit

RPD = Relative Percent Difference
 RSD = Percent Relative Standard Deviation
 CCC = Correlation Coefficient of Curve

EPH (Aliphatics/Aromatics) Laboratory Reporting Form Continued

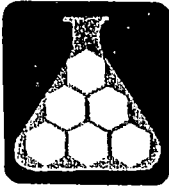
Client Name DELTA # XONC-170 Laboratory Name RESEARCH & ANALYTICAL LABORATORIES, INC.
 Project Name SM#139 NC Certification # (Lab) 34
 Site Location RAL#'s 392306/07

INCLUDE APPROPRIATE UNITS: PPM (Parts Per Million) (i.e., for Water: mg/L | for Soil: mg/kg)

Sample Information and Analytical Results									
Sample Identification	MW-3	DW-1							
Sample Matrix	Water	Water							
Date Collected	06/12/00	06/12/00							
Date Received	06/13/00	06/13/00							
Date Extracted	06/15/00	06/15/00							
Date Analyzed	06/16/00	06/16/00							
Dry Weight	N/A	N/A							
Dilution Factor	1	1							
C9 - C18 Aliphatics *	2.12	BRL							
C19 - C36 Aliphatics *	0.231	BRL							
C11 - C22 Aromatics *	1.05	BRL							
Surrogate % Recovery - Aliph.	55	50							
Surrogate % Recovery - Aroma.	65	68							
Fractionation Surrogate % Recovery	82	not fract.							
Fractionation Surrogate % Recovery	59	not fract.							

* Unadjusted value. Should exclude the concentration of any surrogate(s), internal standards, and/or concentrations of other ranges that elute within the specified range.

	C9 - C18 Aliphatic	C19 - C36 Aliphatic	C11 - C22 Aromatic
Percent Recovery - Fortified Blank (Spike)	97	81	82
Relative Percent Difference - Sample Duplicates	0.0	0.0	0.0



RESEARCH & ANALYTICAL LABORATORIES, INC.

Analytical / Process Consultations
Phone (336) 996-2841

CHAIN OF CUSTODY RECORD

COMPANY <i>DELTA</i>				JOB NO.			
STREET ADDRESS <i>1201 S. 11th Street</i>				PROJECT <i>XDNR170 C</i>			
CITY, STATE, ZIP <i>Wilmington NC 28401</i>				SAMPLER NAME (PLEASE PRINT) <i>VICTORIA WISE</i>			
CONTACT <i>ALDRD</i>		PHONE <i>(910) 772-9971</i>		SAMPLER SIGNATURE <i>[Signature]</i>			

SAMPLE NUMBER (LAB USE ONLY)	DATE	TIME	COMP	GRAB	TEMP °C	RES Cl	CHLORINE REMOVED (Y or N)	SAMPLE MATRIX (S or W)	SAMPLE LOCATION / I.D.	NO. OF CONTAINERS	WATER / WASTEWATER ?											MISC.	REQUESTED ANALYSIS					
											1	2	3	4	5	6	7	8	9	10	11			12	13	14	15	16
<i>392806</i>	<i>6/12</i>	<i>12:30</i>		<i>X</i>				<i>W</i>	<i>MW-3</i>	<i>11</i>																		
<i>807</i>	<i>6/12</i>	<i>1350</i>		<i>X</i>				<i>W</i>	<i>DLDH</i>	<i>11</i>																		
<i>808</i>									<i>TB</i>																			

2L G (BNA, Herb. / Pest.)
 2 40ml Vials (VOA) HCL
 250ml G (TOX)
 250ml P (TOX)
 1L P.G (TOC) H₂O
 1L G (BOD, TSS, Unpreserved, etc)
 1L P.G (Phenol, Oil & Grease) H₂O
 1L P.G (COD, N, P) H₂O
 1L P.G (Metals: Hardness) H₂O
 1L P.G (Metals: As, Cd, Cr, Ni, Pb, Se, V)
 1L P.G (Metals: Al, Ag, Ba, Bi, Br, Ca, Cu, Fe, K, Mg, Mn, Mo, Na, Ni, Se, Si, Zn)
 1L P.G (Metals: Al, Ag, Ba, Bi, Br, Ca, Cu, Fe, K, Mg, Mn, Mo, Na, Ni, Se, Si, Zn)
 1L P.G (Metals: Al, Ag, Ba, Bi, Br, Ca, Cu, Fe, K, Mg, Mn, Mo, Na, Ni, Se, Si, Zn)
 1L P.G (Metals: Al, Ag, Ba, Bi, Br, Ca, Cu, Fe, K, Mg, Mn, Mo, Na, Ni, Se, Si, Zn)
 1L P.G (Metals: Al, Ag, Ba, Bi, Br, Ca, Cu, Fe, K, Mg, Mn, Mo, Na, Ni, Se, Si, Zn)

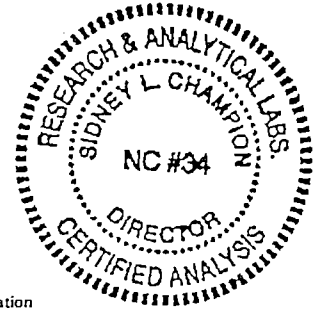
RELINQUISHED BY <i>[Signature]</i>	DATE/TIME <i>6/12/23</i>	RECEIVED BY <i>UPS</i>
RELINQUISHED BY <i>*UPS*</i>	DATE/TIME <i>10:30</i>	RECEIVED BY <i>01312000 A Carlyle</i>

REMARKS:
DNice
SAMPLE TEMPERATURE AT RECEIPT *3* °C



RESEARCH & ANALYTICAL LABORATORIES, INC.

Chemical Analysis for Selected Parameters and Sampling Locations Identified as SM#139
(A Delta Analytical Process Consultations Consultants Project #ONC-170, 12 June 2000)



I. Volatile Organics	Quant. Limits (mg/L)	MW-5 (mg/L)	MW-4 (mg/L)
EPA Methods 601/602			
<u>Parameter</u>			
Bromodichloromethane	0.0005	BQL	BQL
Bromoform	0.0005	BQL	BQL
Bromomethane	0.0005	BQL	BQL
Carbon Tetrachloride	0.0005	BQL	BQL
Chloroethane	0.0005	BQL	BQL
Chloroform	0.0005	BQL	BQL
Chloromethane	0.0005	BQL	BQL
2-Chloroethyl vinyl ether	0.0005	BQL	BQL
Cis-1,3-Dichloropropene	0.0005	BQL	BQL
Dibromochloromethane	0.0005	BQL	BQL
Dichlorodifluoromethane	0.0005	BQL	BQL
1,1-Dichloroethane	0.0005	BQL	BQL
1,2-Dichloroethane	0.0005	BQL	BQL
1,1-Dichloroethene	0.0005	BQL	BQL
1,2-Dichloropropane	0.0005	BQL	BQL
Methylene Chloride	0.0005	BQL	BQL
1,1,2,2-Tetrachloroethane	0.0005	BQL	BQL
Tetrachloroethene	0.0005	BQL	BQL
Trans-1,2-Dichloroethene	0.0005	BQL	BQL
Trans-1,3-Dichloropropene	0.0005	BQL	BQL
1,1,1-Trichloroethane	0.0005	BQL	BQL
1,1,2-Trichloroethane	0.0005	BQL	BQL
Trichloroethene	0.0005	BQL	BQL
Trichlorofluoromethane	0.0005	BQL	BQL
Vinyl Chloride	0.0005	BQL	BQL
Benzene	0.0005	0.646	0.0036
Chlorobenzene	0.0005	BQL	BQL
1,3-Dichlorobenzene	0.0005	BQL	BQL
1,4-Dichlorobenzene	0.0005	BQL	BQL
1,2-Dichlorobenzene	0.0005	BQL	BQL
Ethylbenzene	0.0005	1.02	BQL
Toluene	0.0005	12.1	BQL
Total Xylenes	0.0005	5.87	BQL
Methyl-Tert-Butyl ether (MTBE)	0.010	BQL	0.068
Isopropyl ether (IPE)	0.010	BQL	0.012
Dilution Factor		400	1

II. Method 504.1	Quant. Limits (mg/L)	MW-5 (mg/L)	MW-4 (mg/L)
<u>Parameter</u>			
EDB	0.000020	BQL	BQL
Dilution Factor		1	1

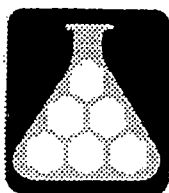
III Method 3030-C	Quant. Limits (mg/L)	MW-5 (mg/L)	MW-4 (mg/L)
<u>Parameter</u>			
Lead	0.005	0.012	0.005

IV. EPA Method 625 (Library Search)	Est. Conc.	Est. Conc.
<u>Tentatively Identified Compounds</u>		
Creosols	0.102	NOPI
Benzene, propyl	0.055	
Benzene, 1-ethyl-2-methyl	0.345	
Benzene, 1,3,5-trimethyl	0.504	
Benzene, 1,2,3-trimethyl	0.151	
Indane	0.094	
1,2,4-Trimethylbenzene	0.136	
Sample Number	392804	392805
Sample Date	06/12/00	06/12/00
Sample Time(hrs)	1153	1200

V. Semi-Volatile Organics	Quantitation Limit (mg/l)	MW-5 (mg/l)	MW-4 (mg/l)
EPA Method 625 BNA			
<u>Parameter</u>			
4-Chloro-3-methylphenol	0.010	BQL	BQL
2-Chlorophenol	0.010	BQL	BQL
2,4-Dichlorophenol	0.010	BQL	BQL
2,4-Dimethylphenol	0.010	BQL	BQL
2,4-Dinitrophenol	0.050	BQL	BQL
2-Methyl-4,6-dinitrophenol	0.050	BQL	BQL
2-Nitrophenol	0.010	BQL	BQL
4-Nitrophenol	0.050	BQL	BQL
Pentachlorophenol	0.050	BQL	BQL
Phenol	0.010	BQL	BQL
2,4,6-Trichlorophenol	0.010	BQL	BQL
Acenaphthene	0.010	BQL	BQL
Acenaphthylene	0.010	BQL	BQL
Anthracene	0.010	BQL	BQL
Benzidine	0.050	BQL	BQL
Benzo(a)anthracene	0.010	BQL	BQL
Benzo(a)pyrene	0.010	BQL	BQL
Benzo(b)fluoranthene	0.010	BQL	BQL
Benzo(ghi)perylene	0.010	BQL	BQL
Benzo(k)fluoranthene	0.010	BQL	BQL
Benzyl butyl phthalate	0.010	BQL	BQL
Bis(2-chloroethoxy)methane	0.010	BQL	BQL
Bis(2-chloroethyl)ether	0.010	BQL	BQL
Bis(2-chloroisopropyl)ether	0.010	BQL	BQL
Bis(2-ethyl-hexyl)phthalate	0.010	BQL	BQL
4-Bromophenyl phenyl ether	0.010	BQL	BQL
2-Chloronaphthalene	0.010	BQL	BQL
4-Chlorophenyl phenyl ether	0.010	BQL	BQL
Chrysene	0.010	BQL	BQL
Dibenzo(a,h)anthracene	0.010	BQL	BQL
1,2-Dichlorobenzene	0.010	BQL	BQL
1,3-Dichlorobenzene	0.010	BQL	BQL
1,4-Dichlorobenzene	0.010	BQL	BQL
3,3-Dichlorobenzidine	0.020	BQL	BQL
Diethyl phthalate	0.010	BQL	BQL
Dimethyl phthalate	0.010	BQL	BQL
Di-N-Butyl phthalate	0.010	BQL	BQL
2,4-Dinitrotoluene	0.010	BQL	BQL
2,6-Dinitrotoluene	0.010	BQL	BQL
Di-N-Octyl phthalate	0.010	BQL	BQL
1,2-Diphenylhydrazine	0.050	BQL	BQL
Fluoranthene	0.010	BQL	BQL
Fluorene	0.010	BQL	BQL
Hexachlorobenzene	0.010	BQL	BQL
Hexachlorobutadiene	0.010	BQL	BQL
Hexachlorocyclopentadiene	0.010	BQL	BQL
Hexachloroethane	0.010	BQL	BQL
Indeno(1,2,3-cd) pyrene	0.010	BQL	BQL
Isophorone	0.010	BQL	BQL
Naphthalene	0.010	0.113	BQL
Nitrobenzene	0.010	BQL	BQL
N-Nitrosodimethylamine	0.010	BQL	BQL
N-nitrosodi-n-propylamine	0.010	BQL	BQL
N-Nitrosodiphenylamine	0.010	BQL	BQL
Phenanthrene	0.010	BQL	BQL
Pyrene	0.010	BQL	BQL
1,2,4-Trichlorobenzene	0.010	BQL	BQL
Dilution Factor		4	1

VI. Method MADEP 98-1 VPH	Quantitation Limit (mg/l)	MW-5 (mg/l)	MW-4 (mg/l)
<u>Parameter</u>			
C5-C8 Aliphatics	0.100	19.1	BQL
C9-C12 Aliphatics	0.100	13.9	BQL
C9-C10 Aromatics	0.100	2.78	BQL
Dilution Factor		10	1
<u>Method MADEP 98-1 EPH</u>			
<u>Parameter</u>			
C9-C18 Aliphatics	0.100	2.40	0.345
C-19-C-36 Aliphatics	0.100	0.197	0.120
C11-C22 Aromatics	0.100	0.708	0.505
Dilution Factor		1	1

BQL = Below Quantitation Limits
 ---- = not requested
 mg/l = milligrams per liter = parts per million (ppm)



RESEARCH & ANALYTICAL LABORATORIES, INC.

Analytical/Process Consultations



QUALITY CONTROL DATA SUMMARY

<u>601/602+MTBE+IPE Parameter</u>	<u>RAL Sample #</u>	<u>Date Collected</u>	<u>Date Analyzed</u>	<u>Method Blank</u>	<u>Quality Control Standard Results (% Recovery)</u>	<u>Analyst</u>
Bromodichloromethane	392804/05	06/12/00	06/22-24/00	ND	99.5	MB
Bromoform	392804/05	06/12/00	06/22-24/00	ND	98.0	MB
Bromomethane	392804/05	06/12/00	06/22-24/00	ND	73.2	MB
Carbon Tetrachloride	392804/05	06/12/00	06/22-24/00	ND	83.0	MB
Chloroethane	392804/05	06/12/00	06/22-24/00	ND	80.8	MB
Chloroform	392804/05	06/12/00	06/22-24/00	ND	88.4	MB
Chloromethane	392804/05	06/12/00	06/22-24/00	ND	73.2	MB
2-Chloroethyl vinyl ether	392804/05	06/12/00	06/22-24/00	ND	73.4	MB
Cis-1,3-Dichloropropene	392804/05	06/12/00	06/22-24/00	ND	82.4	MB
Dibromochloromethane	392804/05	06/12/00	06/22-24/00	ND	89.8	MB
Dichlorodifluoromethane	392804/05	06/12/00	06/22-24/00	ND	286	MB
1,1-Dichloroethane	392804/05	06/12/00	06/22-24/00	ND	101	MB
1,2-Dichloroethane	392804/05	06/12/00	06/22-24/00	ND	82.8	MB
1,1-Dichloroethene	392804/05	06/12/00	06/22-24/00	ND	90.7	MB
1,2-Dichloropropane	392804/05	06/12/00	06/22-24/00	ND	84.6	MB
Methylene Chloride	392804/05	06/12/00	06/22-24/00	ND	96.2	MB
1,1,2,2-Tetrachloroethane	392804/05	06/12/00	06/22-24/00	ND	82.5	MB
Tetrachloroethene	392804/05	06/12/00	06/22-24/00	ND	76.5	MB
Trans-1,2-Dichloroethene	392804/05	06/12/00	06/22-24/00	ND	89.2	MB
Trans-1,3-Dichloropropene	392804/05	06/12/00	06/22-24/00	ND	85.0	MB
1,1,1-Trichloroethane	392804/05	06/12/00	06/22-24/00	ND	91.5	MB
1,1,2-Trichloroethane	392804/05	06/12/00	06/22-24/00	ND	83.7	MB
Trichloroethene	392804/05	06/12/00	06/22-24/00	ND	82.6	MB
Trichlorofluoromethane	392804/05	06/12/00	06/22-24/00	ND	95.1	MB
Vinyl Chloride	392804/05	06/12/00	06/22-24/00	ND	104	MB
Benzene	392804/05	06/12/00	06/22-24/00	ND	78.9	MB
Chlorobenzene	392804/05	06/12/00	06/22-24/00	ND	83.4	MB
1,3-Dichlorobenzene	392804/05	06/12/00	06/22-24/00	ND	79.5	MB
1,4-Dichlorobenzene	392804/05	06/12/00	06/22-24/00	ND	80.4	MB
1,2-Dichlorobenzene	392804/05	06/12/00	06/22-24/00	ND	80.5	MB
Ethylbenzene	392804/05	06/12/00	06/22-24/00	ND	79.6	MB
Toluene	392804/05	06/12/00	06/22-24/00	ND	78.9	MB
Total Xylenes	392804/05	06/12/00	06/22-24/00	ND	75.1	MB
MTBE	392804/05	06/12/00	06/22-24/00	ND	120	MB
IPE	392804/05	06/12/00	06/22-24/00	ND	78.7	MB
Lead	392804/05	06/12/00	06/16/00	ND	90.2	IB
<u>504.1</u>						
EDB	392804/05	06/12/00	06/15/00	ND	108	SEC

Delta Project# XONC-170 (SM#139)

ND = Not Detected

--- = Data Not Available

Attachment 3
EPH Laboratory Reporting Form

Calibration and QA/QC Information

Initial Calibration Date 05/23/00
 Calibration Ranges and Limits $\mu\text{g/l}$

Range	MDL	ML	RL
C9 - C18 Aliphatics	63	200	100
C19 - C36 Aliphatics	31	99	100
C11 - C22 Aromatics	9.0	29	100

NOTE: Please include units as appropriate

Method of Quantitation (check one): Curve or Average Response Factor
 Calibration Concentration Levels $\mu\text{g/l}$

Range	Levels	% RSD or CCC
C9 - C18 Aliphatics	60	3.60 % RSD ccc = 0.999
	120	
	300	
	600	
	800	
C19 - C36 Aliphatics	80	3.41 % RSD ccc = 0.999
	160	
	400	
	800	
	1200	
C11 - C22 Aromatics	85	5.68 % RSD ccc = 0.998
	170	
	340	
	850	
	1700	

NOTE: Please indicate units as appropriate.

Calibration Check Date 06/15/00
 Calibration Check $\mu\text{g/l}$

Range	Level	RPD
C9 - C18 Aliphatics	300	10 %
C19 - C36 Aliphatics	400	3 %
C11 - C22 Aromatics	850	3 %

MDL = Method Detection Limit
 ML = Minimum Limit
 RL = Reportable Limit

RPD = Relative Percent Difference
 %RSD = Percent Relative Standard Deviation
 CCC = Correlation Coefficient of Curve

EPH (Aliphatics/Aromatics) Laboratory Reporting Form Continued

Client Name DELTA # XONC-170
 Project Name SM#139
 Site Location RAL#'s 392304/05

Laboratory Name RESEARCH & ANALYTICAL LABORATORIES, INC.
 NC Certification # (Lab) 34

INCLUDE APPROPRIATE UNITS: PPM (Parts Per Million) (i.e., for Water: mg/L | for Soil: mg/kg)

Sample Information and Analytical Results									
Sample Identification	MW-5	MW-4							
Sample Matrix	Water	Water							
Date Collected	06/12/00	06/12/00							
Date Received	06/13/00	06/13/00							
Date Extracted	06/15/00	06/15/00							
Date Analyzed	06/15/00	06/15/00							
Dry Weight	N/A	N/A							
Dilution Factor	1	1							
C9 - C18 Aliphatics *	2.40	0.345							
C19 - C36 Aliphatics *	0.197	0.120							
C11 - C22 Aromatics *	0.708	0.505							
Surrogate % Recovery - Aliph.	81	67							
Surrogate % Recovery - Aroma.	92	82							
Fractionation Surrogate % Recovery	69	81							
Fractionation Surrogate % Recovery	51	60							

* Unadjusted value. Should exclude the concentration of any surrogate(s), internal standards, and/or concentrations of other ranges that elute within the specified range.

	C9 - C18 Aliphatic	C19 - C36 Aliphatic	C11 - C22 Aromatic
Percent Recovery - Fortified Blank (Spike)	97	81	82
Relative Percent Difference - Sample Duplicates	0.0	0.0	0.0

Attachment 2
VPH Laboratory Reporting Form

Calibration and QA/QC Information

Initial Calibration Date 06/02/2000
 Calibration Ranges and Limits $\mu\text{g/l}$

Range	MDL	ML	RL
C5 - C8 Aliphatics	52	165	100
C9 - C12 Aliphatics	18	57	100
C9 - C10 Aromatics	9.0	29	100

NOTE: Please include units as appropriate

Method of Quantitation (check one): Curve or Average Response Factor
 Calibration Concentration Levels $\mu\text{g/l}$

Range	Levels	% RSD or CCC
C5 - C8 Aliphatics	75	7.69 % RSD ccc = 0.997
	750	
	1500	
	2250	
	3000	
C9 - C12 Aliphatics	55	5.13 % RSD ccc = 0.998
	550	
	1100	
	1650	
	2200	
C9 - C10 Aromatics	50	3.55 % RSD ccc = 0.998
	100	
	200	
	300	
	400	

NOTE: Please indicate units as appropriate.

Calibration Check Date 06/14/2000
 Calibration Check $\mu\text{g/l}$

Range	Level	RPD
C5 - C8 Aliphatics	1500	5 %
C9 - C12 Aliphatics	1100	5 %
C9 - C10 Aromatics	200	2 %

MDL = Method Detection Limit
 ML = Minimum Limit
 RL = Reportable Limit

RPD = Relative Percent Difference
 %RSD = Percent Relative Standard Deviation
 CCC = Correlation Coefficient of Curve

VPH (Aliphatics/Aromatics) Laboratory Reporting Form Continued

Client Name DELTA # XONC170
 Project Name SM#139
 Site Location RAL#'s 392804/05

Laboratory Name RESEARCH & ANALYTICAL LABORATORIES, INC.
 NC Certification # (Lab) 34

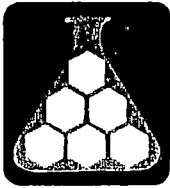
INCLUDE APPROPRIATE UNITS: PPM (Parts Per Million) (i.e., for Water: mg/L | for Soil: mg/kg)

Sample Information and Analytical Results									
Sample Identification	MW-5	MW-4							
Sample Matrix	Water	Water							
Collection Option (for soil)*	N/A	N/A							
Date Collected	06/12/00	06/12/00							
Date Received	06/13/00	06/13/00							
Date Extracted	N/A	N/A							
Date Analyzed	06/14/00	06/14/00							
Dry Weight	N/A	N/A							
Dilution Factor	10	1							
C5 - C8 Aliphatics **	19.1	BRL							
C9 - C12 Aliphatics **	13.9	BRL							
C9 - C10 Aromatics **	2.78	BRL							
Surrogate % Recovery - PID	82	92							
Surrogate % Recovery - FID	84	93							

* Option 1 = Established fill line on vial Option 2 = Sampling Device (indicate brand, e.g. EnCore) Option 3 = Field weight of soil

** Unadjusted value. Should exclude the concentration of any surrogate(s), internal standards, and/or concentrations of other ranges that elute within the specified range.

	C5 - C8 Aliphatic	C9 - C12 Aliphatic	C9 - C10 Aromatic
Percent Recovery - Fortified Blank (Spike) - PID	-	-	108
Relative Percent Difference - PID Duplicate	-	-	3.4
Percent Recovery - Fortified Blank (Spike) - FID	114	112	-
Relative Percent Difference - FID Duplicate	5.6	2.7	-



RESEARCH & ANALYTICAL LABORATORIES, INC.

Analytical / Process Consultations
Phone (336) 996-2841

CHAIN OF CUSTODY RECORD

COMPANY DELTA						JOB NO.						NO. OF CONTAINERS	WATER / WASTEWATER														MISC.		
STREET ADDRESS 1201 S. 16th Street						PROJECT XONC-170C							2L G (BNA, Herb. / Pest.) 2 40ml Vials (NOA) HCL 250ml G (TOX) 250ml P (TOX) 1L P.G (TOC) H ₂ SO ₄ 1L G (BOD, TSS, Unpreserved, etc.) 1L P.G (Phenol, Oil & Grease) H ₂ SO ₄ 1L P.G (COD, N, P) H ₂ SO ₄ 1L P.G (Metals, Hardness) HNO ₃ 500ml P.G (Ammonia) HNO ₃ 10110334 (100ml) 3.02% MADEP EDB MADEP VPA MADEP EPA																
CITY, STATE, ZIP Wilmington NC 28401						SAMPLER NAME (PLEASE PRINT) VICTORIA WISE																							
CONTACT A. LORD						SAMPLER SIGNATURE <i>Victoria Wise</i>																							
PHONE (910) 772-9971						SAMPLE LOCATION / I.D.						REQUESTED ANALYSIS																	
SAMPLE NUMBER (LAB USE ONLY)	DATE	TIME	COMP	GRAB	TEMP °C	RES Cl	CHLORINE REMOVED (Y or N)	SAMPLE MATRIX (S or W)	SAMPLE LOCATION / I.D.		NO. OF CONTAINERS	2L G (BNA, Herb. / Pest.)	2 40ml Vials (NOA) HCL	250ml G (TOX)	250ml P (TOX)	1L P.G (TOC) H ₂ SO ₄	1L G (BOD, TSS, Unpreserved, etc.)	1L P.G (Phenol, Oil & Grease) H ₂ SO ₄	1L P.G (COD, N, P) H ₂ SO ₄	1L P.G (Metals, Hardness) HNO ₃	500ml P.G (Ammonia) HNO ₃	10110334 (100ml) 3.02%	MADEP EDB	MADEP VPA	MADEP EPA				
2A25804	6-12	1153		X				W	mw-5	11																			
805	6-12	1200		X				W	mw-4	11																			
RELINQUISHED BY <i>Victoria Wise</i>						DATE/TIME 6/12/11:20						RECEIVED BY UPS						REMARKS: SAMPLE TEMPERATURE AT RECEIPT <u>3</u> °C											
RELINQUISHED BY						DATE/TIME 6/13/2000						RECEIVED BY Azanyle																	