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COMPREHENSIVE SITE ASSESSMENT
FORMER UNOCAL STATION # 9787-214
1342 TROLLINGWOOD ROAD
MEBANE, NORTH CAROLINA

Prepared By:

Joe Best
Project Geologist

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for Rick Holshouser
Project Engineer

S&ME, Inc.
135-C Montlieu Avenue
Greensboro, NC 27419

February 19, 1993

S&ME

February 19, 1993

Unocal Corporation
13 Corporate Square, N.E.
P.O. Box 4147
Atlanta, Georgia 30302

Attention: Mr. Wayne Holt

Reference: Comprehensive Site Assessment
Former Unocal Station 9787-214
1342 Trollingwood Road
Mebane, North Carolina 27302
S&ME Job No. 1584-92-080

Dear Mr. Holt:

S&ME, Inc. is pleased to present this letter of recommendations for the subject site. We have completed the initial phase of the Comprehensive Site Assessment. Four Type II groundwater monitoring wells were installed and sampled. Three of the four groundwater samples collected from the newly installed monitoring wells (MW-2, MW-3 and MW-4) contained benzene concentrations in excess of North Carolina Department of Environment, Health and Natural Resources maximum allowable concentrations found in Administrative Code T15A:021.0202. Monitoring well MW-1 did not contain detectable concentrations of petroleum hydrocarbons. We recommend that three additional shallow groundwater monitoring wells be installed to aid in the horizontal delineation of petroleum hydrocarbons in groundwater.

In addition, we recommend that one deep monitoring well be installed to aid in the vertical delineation of petroleum hydrocarbons.

S&ME, Inc. 135-C Montlieu Avenue, Greensboro, North Carolina 27419, (919) 855-7547, Fax (919) 855-8017
Mailing address: P.O. Box 18169, Greensboro, North Carolina 27419

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S&ME appreciates the opportunity to provide environmental services for Unocal and looks forward to working with Unocal at other facilities. If you have any questions or need additional information, please do not hesitate to contact us.

Very truly yours,

S&ME, Inc.

Joseph P. Best
Project Geologist

Sharon G. Drescher
Project Manager/Chemist

for Rick Holshouser, Jr.
Senior Marketing/
Project Manager

JPB/SGD/RH/vr

Enclosure(s)

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1.0 EXECUTIVE SUMMARY

S&ME, Inc. has performed the initial phase of a comprehensive Site Assessment at the Red Horse Truck Stop/Former Unocal Station 9787-214. The site is located at 1342 Trollingwood-Hawfield Road in Mebane, North Carolina.

Four Type II groundwater monitoring wells were installed and sampled at the subject site to confirm the absence or presence of petroleum hydrocarbons in groundwater. The wells were installed at the following locations: the former location of (4) 10,000 gallon diesel underground storage tanks (USTs), the former location of a diesel fuel pump island, the former location of (4) 4,000 gallon gasoline USTs and the former location of the gasoline pump island. Results of laboratory analyses indicated that groundwater at three of the four well locations contained detectable concentrations of petroleum hydrocarbons.

2.0 INTRODUCTION

S&ME, Inc. was contracted by UNOCAL Corporation to perform a Comprehensive Site Assessment at the Red Horse Truck Stop located at 1342 Trollingwood-Hawfield Road in Mebane, North Carolina (Figure 080-1).

3.0 BACKGROUND

Eleven underground storage tanks (USTs) were removed from the site in June of 1992 by James Contracting Company of Marietta, Georgia. The USTs were contained in 5 tank basins. Approximately 3,314 tons of petroleum hydrocarbon containing soil was excavated and transported off-site for thermal treatment at the Cherokee Sanford Group located in Sanford, North Carolina.

ENSCI Corporation of High Point, North Carolina was contracted by UNOCAL to perform environmental soil sampling and to prepare the

report of UST Closure (ENSCI UST Closure and Site Investigation Report, dated August 10, 1992).

A preliminary environmental evaluation was performed by Ecological Services, Inc. of Charlotte, North Carolina. Twelve soil borings were performed to aid in the lateral delineation of petroleum hydrocarbons in soil at the site.

Fifteen geoprobe samples were collected to determine the absence or presence of petroleum hydrocarbons in groundwater at the site. Based on the results of the evaluation by Ecological Services, Inc. they recommended the installation of 3 groundwater monitoring wells.

4.0 FACILITY DESCRIPTION AND HISTORY

The site is located at 1342 Trollingwood Road in Mebane, North Carolina (Figure 080-1). The site is currently used as a restaurant/truck stop. The site contains a restaurant building. The remainder of the site is covered by asphalt and crushed stone paving.

The site was developed as a gasoline service station in 1966. In May of 1966, 4 - 4,000 gallon gasoline USTs were installed. In May of 1969, 4 - 10,000 gallon diesel USTs were installed. In March of 1972, Red Horse Enterprises became the manager of operations at the site. In 1983 UNOCAL sold the property to Mr. Raymond Jernigan. In 1992, eleven USTs were removed from the site. The USTs included: 4 - 4,000 gallon gasoline USTs, 1 - 560 gallon kerosene UST, 4 - 10,000 gallon diesel USTs, 1 - 270 gallon kerosene UST, and 1 - 270 gallon used oil UST. Laboratory analyses of soil samples collected at the time of the removal of the USTs detected petroleum hydrocarbon concentrations in excess of North Carolina Department of Environment, Health and Natural Resources, Division of Environmental Management (NCDEM) guidelines.

5.0 LOCAL LAND USE AND ADJOINING PROPERTIES

The land usage of the area surrounding the subject site is primarily residential and agricultural (Figure 080-3). Adjacent properties include: a private residence to the south, wooded land to the east, Interstate 40/85 to the north and pasture land to the west. Two truck stops with motor fuel sales are located across Interstate 40/85. No evidence of environmental problems were observed at these two sites. S&ME reviewed files at the North Carolina Department of Environment, Health and Natural Resources, Division of Environmental Management, Winston-Salem Regional Office. No files existed for the two truck stops. The only file located referred to a spill at GKN Automotive Components, Inc. located approximately 7,500 feet northwest of the subject site. On September 8, 1987 an estimated loss of 500 gallons of a hydraulic oil/cutting oil mixture was discovered. The spill was cleaned up. A groundwater assessment performed in January 1988 indicated that groundwater at the GKN site had not been affected by the spill.

There are two water supply wells in the vicinity. One well is on the subject site but is no longer in use. The other well is located on the abutting property to the south of the subject site. Locations are identified on Figure 080-3.

6.0 REGIONAL GEOLOGY

The site is located in the Carolina Slate Belt of the Piedmont Physiographic Province, an area underlain by mafic and felsic metavolcanic rocks. The soils present in the area were formed by physical and chemical weathering of the preexisting rock. The typical residual soil profile consists of more extensively weathered clays and silts near the ground surface transitioning to sandy silts and sands with depth. Partially weathered subsurface materials are generally referred to as saprolite. Saprolite

thicknesses vary in depth from a few feet near bedrock outcrops to over 100 feet (Heath, 1980).

7.0 REGIONAL HYDROGEOLOGY

The groundwater system in the Piedmont is recharged by precipitation in the interstream areas. A part of the precipitation infiltrates through the unsaturated zone to the water table, which normally occurs in saprolite. Groundwater is primarily stored in void spaces in the saprolite with secondary storage in fractures within the bedrock. Most fractures are nonwater bearing below a depth of 300 to 400 feet. Groundwater moves laterally and downward through the saprolite to streams in the adjacent valleys.

8.0 SOIL BORINGS

S&ME drilled four soil borings at the approximate locations shown on Figure 080-2. These locations were based on data collected during previous site assessments performed by Ensci and ESI. Each boring was drilled to an approximate depth of 25.5 feet below the ground surface using truck-mounted drilling equipment. A Test Boring Record was completed for each boring and is contained in Appendix I. To prevent cross contamination, all downhole drilling equipment was steam cleaned prior to drilling at each location.

Soil samples were collected at 5 foot intervals. Penetration testing and soil sampling were performed in general accordance with ASTM D 1586. A portion of each soil sample was placed into a clean ziplock bag and placed in a warm location for approximately ten minutes. The bag samples were then screened with a Century Model 128 GC Organic Vapor Analyzer (OVA) in order to record head space organic vapor concentrations. The OVA detected organic vapors in

the samples at concentrations ranging from 1 part per million (ppm) to greater than 1,000 ppm. The results of the OVA screening are presented in Table 1. The auger cuttings were stockpiled behind the restaurant building. The cuttings were placed on 3 layers of 10 ml plastic and covered with plastic. The cuttings are to be transported to the Cherokee Sanford Group for thermal treatment upon completion of drilling activities at the site.

9.0 SOIL SAMPLING

Four soil samples (one from each boring) were selected for laboratory analysis. Sample selection was based on OVA screening results. Each sample was collected at a depth of approximately 15 feet below the ground surface.

Immediately after collection, each soil sample selected for laboratory analysis was removed from the sampling device by hand using new, disposable, vinyl gloves. A representative portion of each sample was packed into a laboratory-prepared glass container equipped with a teflon-lined screw cap. The sample containers were packed tightly with sample to minimize available headspace.

Each sample container was labeled with the job name and number, the time and date of sample collection, the analyses to be performed, and the presence or absence of preservative. The filled sample containers were placed into a cooler and chilled to approximately 4 degrees Celsius. The Chain-of-Custody was initiated. The soil samples were shipped to ENSECO Laboratories to be analyzed for volatile TPH (SW-846 5030), and purgeable aromatic hydrocarbons (SW-846 8020). Two of the samples (MW-1 and MW-2) were also analyzed for semi-volatile TPH (SW-846 3550).

10.0 MONITORING WELL INSTALLATION

After completion of the soil borings, the borings were converted to Type II groundwater monitoring wells each with a total depth of 23.5 feet below the ground surface. These depths were selected based on consideration of the depth to groundwater as indicated by soil moisture conditions, auger cuttings, and observations of water within the boreholes.

Each well was constructed with 4-inch I.D. Schedule 40 PVC casing and screen. The PVC screen and casing were lowered through the annulus of the augers to the appropriate depth.

A 15-foot slotted well screen with machined 0.01-inch slot widths were installed at the bottom of each well. The bottom of the slotted interval was sealed with a threaded plug. The screened section was positioned to intersect the elevation of the water table. A solid section of PVC riser pipe was placed above the screened interval. The annular space around each well was filled with washed and graded sand from the bottom of the boring to two feet above the top of the screen. After placement of the sand, bentonite pellets were placed immediately above the sand pack. The bentonite pellets were hydrated by adding approximately 10 gallons of tap water.

After hydrating the bentonite pellets, a bentonite/neat cement mixture containing approximately four percent bentonite was pumped down the hole to fill the annulus of the boring from the bentonite cap to the ground surface. The wells were fitted with flush-mounted covers equipped with lockable, water-tight well caps. The general construction details for each well are shown on the Boring Logs and Well Installation Diagrams which can be found in Appendix II.

The wells were developed by evacuating at least five well volumes using a decontaminated inertial pump. The wells were developed to achieve two objectives: 1) to remove sand, silt and other fine sediments which may have entered the well during its construction, and 2) to develop the sandpack surrounding the wells' screened intervals.

11.0 GROUNDWATER SAMPLING

The wells were purged by removing at least 5 well volumes. Purging was accomplished using an inertial pump. After the purging of a well was completed, a groundwater sample was then collected.

Immediately after collection, the groundwater samples were transferred from the laboratory decontaminated teflon bailer into three (6) 40-milliliter (ml), and (1) one-liter amber laboratory prepared, glass containers (equipped with teflon-lined screw caps). New disposable vinyl gloves were utilized in the sample transfer. The sample containers were completely filled with sample to eliminate headspace.

After being filled, each sample container was labeled with the job name and number, the time and date of sample collection, the analyses to be performed, and the presence or absence of preservative. The sample containers were then placed into a cooler containing ice and cooled to approximately four degrees celsius. The chain-of-custody was initiated. The cooler containing the sample was shipped to ENSECO Laboratories located in Cambridge, Massachusetts for analysis.

12.0 GROUNDWATER FLOW DIRECTION

After installation of the wells was completed, the relative elevation of the top of each well's casing was measured to the nearest 0.01 feet by a surveyor licensed in the State of North Carolina. The elevations were measured relative to temporary benchmark which was assigned an arbitrary reference elevation of 100 feet. The distances between each well were also measured.

Groundwater elevations were measured in the monitoring wells on January 20, 1993 and are included in Table 2. Based on the measured groundwater elevations, groundwater flow is toward the northwest as shown in Figure 080-2.

13.0 HYDRAULIC CONDUCTIVITY

Rising head permeability (hydraulic conductivity) tests were performed on monitoring wells MW-2 and MW-4. The resultant values were found to be as follows:

Well No.	Hydraulic Conductivity (ft/day)
MW-2	0.212
MW-4	1.8

Assuming Darcy's Law is valid for the conditions at the site, the average linear velocity (V) may be estimated from the equation:

$$V = ki/n$$

where k = hydraulic conductivity (ft/day)

i = hydraulic gradient (ft/ft)

n - soil porosity

Based on an average hydraulic conductivity of 1.006 ft/day, a hydraulic gradient of 0.039 ft/ft, and a soil porosity of 0.3, the average linear groundwater flow velocity is estimated to be 0.131 ft/day, or approximately 47.74 ft/yr.

14.0 SITE SENSITIVITY EVALUATION

A Site Sensitivity Evaluation (SSE) was performed for the site utilizing guidelines established by the North Carolina Department of Environment, Health and Natural Resources (DEHNR). The purpose of the SSE is to evaluate the sensitivity of groundwater to contamination by the release of petroleum related substances in the vadose zone. The cleanup level is based on the SSE score, i.e., a higher SSE score requires a lower soil TPH clean up level. The SSE score for the site was 80 requiring a soil clean up volatile TPH level of 120 ppm and a semi-volatile TPH soil clean up level of 480 ppm. Cleanup levels must be approved by DEHNR.

15.0 RESULTS OF LABORATORY ANALYSES

15.1 Soil Samples

The soil samples were analyzed for volatile TPH (SW-846 5030) and purgable aromatic hydrocarbons (SW-846 8020). The soil samples collected from borings MW-1 and MW-2 were also analyzed for semi-volatile TPH (SW-846 3550). The laboratory analytical results are summarized in Table 3, and the laboratory data sheets are contained in Appendix III. Each of the samples contained detectable concentrations of benzene, toluene, ethylbenzene and xylenes (BTEX). Volatile TPH concentrations ranged from 1,200,000 parts per billion ([ppb] MW-2) to non detected (MW-1). Semivolatile TPH was detected at concentration of 16 and 510 ppb in the samples collected from MW-1 and MW-2 respectively. The method reporting limits varied due to the presence of target analytes.

15.2 Groundwater Samples

The groundwater samples were analyzed for purgeable halocarbons (SW-846 8010), purgeable aromatics (SW-846 8020) and semi-volatile organics (SW-846 8270). Laboratory analyses of the groundwater sample collected from monitoring well MW-1 did not detect concentrations of any target analytes. The groundwater samples collected from monitoring wells MW-2, MW-3 and MW-4 each contained detectable concentrations of benzene, toluene, ethylbenzene and xylenes (BTEX). Total BTEX concentrations Ranged from not detected (MW-1) to 98,000 ppb (MW-4).

Laboratory results are summarized in Table 4 and the laboratory data sheets are contained in Appendix III.

TABLE 1
OVA SCREENING RESULTS
FORMER UNOCAL STATION 9787-214
MEBANE, NORTH CAROLINA
S&ME JOB NO. 1584-92-080

Sample Location	Depth Interval	OVA Reading (ppm)
MW-1	4-5.5	1.5
	9-10.5	5
	14-15.5	1
	19-20.5	0.5
	24-25.5	0.5
MW-2	4-5.5	160
	9-10.5	525
	14-15.5	>1000
	19-20.5	>1000
	24-25.5	290
MW-3	4-5.5	15
	9-10.5	100
	14-15.5	>1000
	19-20.5	>1000
	24-25.5	400
MW-4	4-5.5	350
	9-10.5	>1000
	14-15.5	>1000
	19-20.5	>1000
	24-25.5	500

ppm - parts per million

TABLE 2
GROUNDWATER ELEVATIONS
RED HORSE TRUCK STOP
UNOCAL SITE # 9787-214
MEBANE, NORTH CAROLINA
S&ME JOB NO. 1584-92-080

Location	Reference Elevation*	Depth to Groundwater	Groundwater Elevation
MW-1	98.56	11.63	86.93
MW-2	99.33	14.62	84.71
MW-3	99.51	15.42	84.09
MW-4	98.75	16.50	82.25

TABLE 3
RESULTS OF LABORATORY ANALYSES - TPH AND DETECTED 8020 COMPOUNDS - SOIL SAMPLES
FORMER UNOCAL STATION 9787-214
MEBANE, NORTH CAROLINA
S&ME JOB NO. 1584-92-080

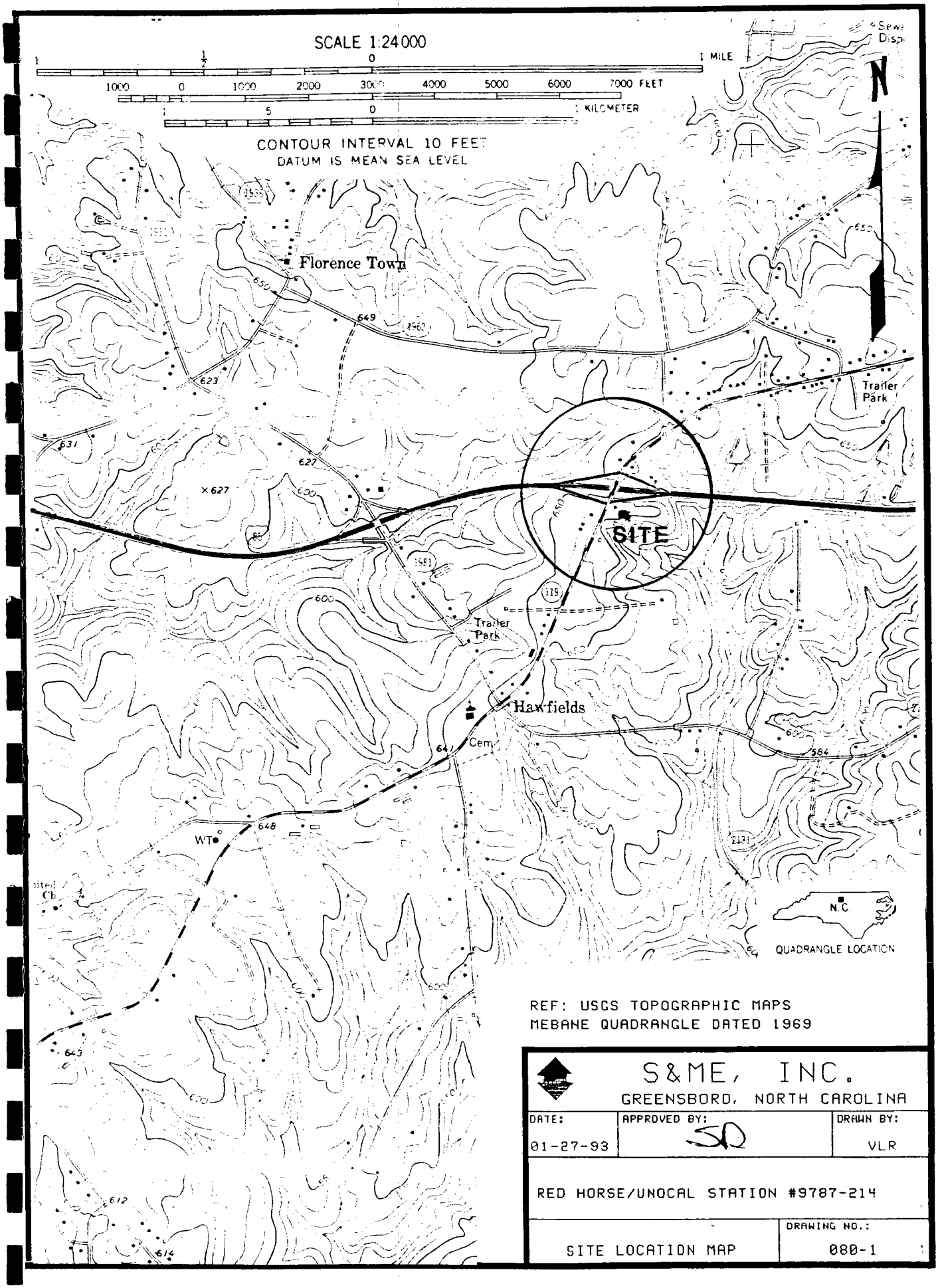
Sample Location	Depth of Sample (ft)	TPH Volatile (ppb)	TPH Semi-Volatile (ppb)	Benzene (ppb)	Toluene (ppb)	Xylenes (ppb)	Ethyl-benzene (ppb)	Chloro-benzene (ppb)
MW-1	15	ND	16	ND	120	120	ND	ND
MW-2	15	1,200,000	510	810	20,000	95,000	17,000	ND
MW-3	15	99,000	NA	ND	1,300	13,000	2,100	ND
MW-4	15	95,000	NA	ND	1,700	31,000	4,900	ND

ft = feet
ppb = parts per billion
ND - not detected
NA - not analyzed

TABLE 4
RESULTS OF LABORATORY ANALYSES
BTEX - GROUNDWATER SAMPLES
FORMER UNOCAL STATION 9787-214
MEBANE, NORTH CAROLINA
S&ME JOB NO. 1584-92-080

Location	Benzene (ppb)	Toluene (ppb)	Ethylbenzene (ppb)	Xylenes (ppb)
MW-1	ND	ND	ND	ND
MW-2	120	65	4.2	160
MW-3	84	82	5.1	590
MW-4	26,800	42,000	5,200	24,000

ND - not detected
ppb - parts per billion



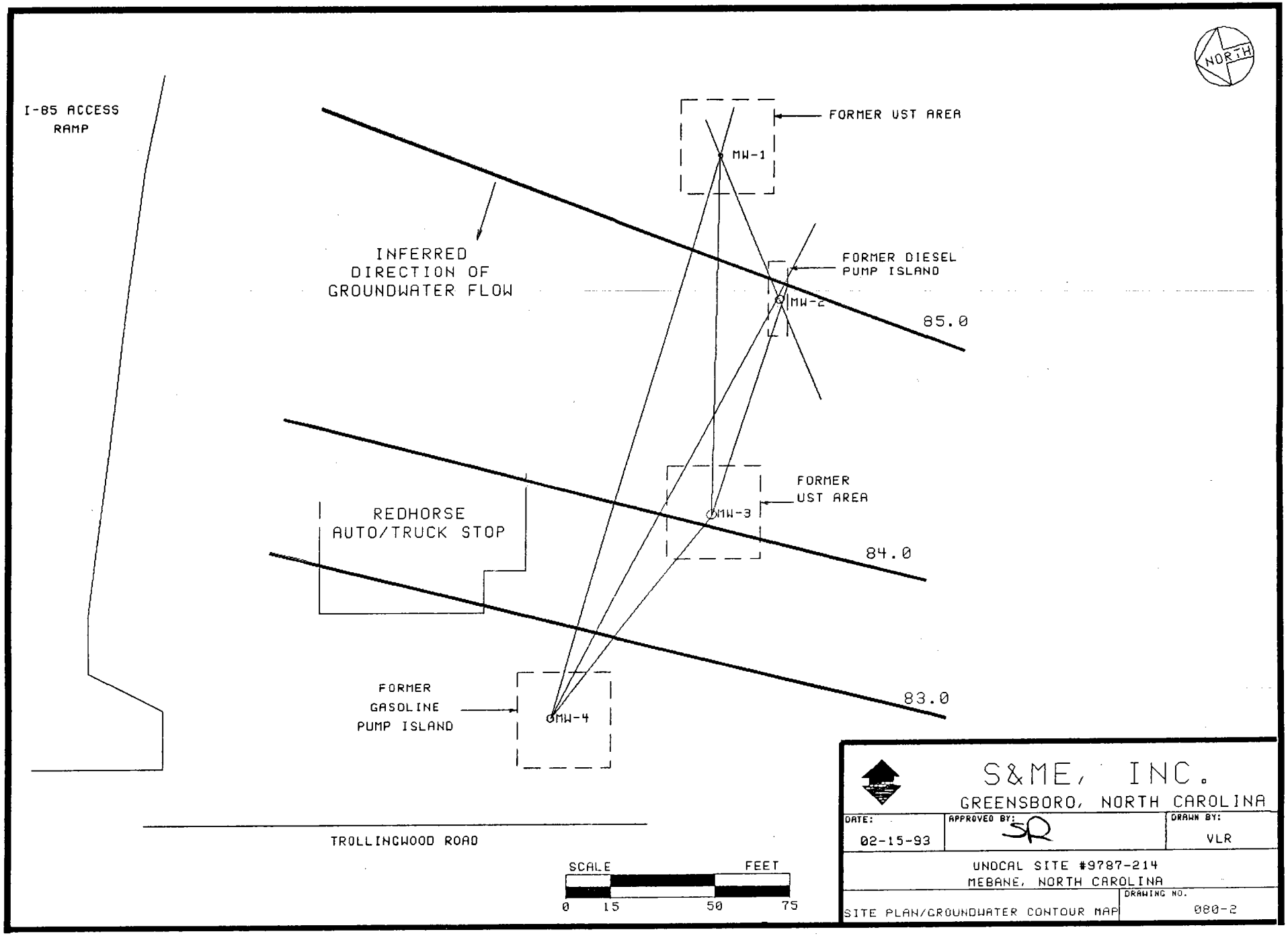
REF: USGS TOPOGRAPHIC MAPS
MEBANE QUADRANGLE DATED 1969

S&ME, INC.
GREENSBORO, NORTH CAROLINA

DATE:	APPROVED BY:	DRAWN BY:
01-27-93	SD	VLR

RED HORSE/UNOCAL STATION #9787-214

SITE LOCATION MAP	DRAWING NO.: 080-1



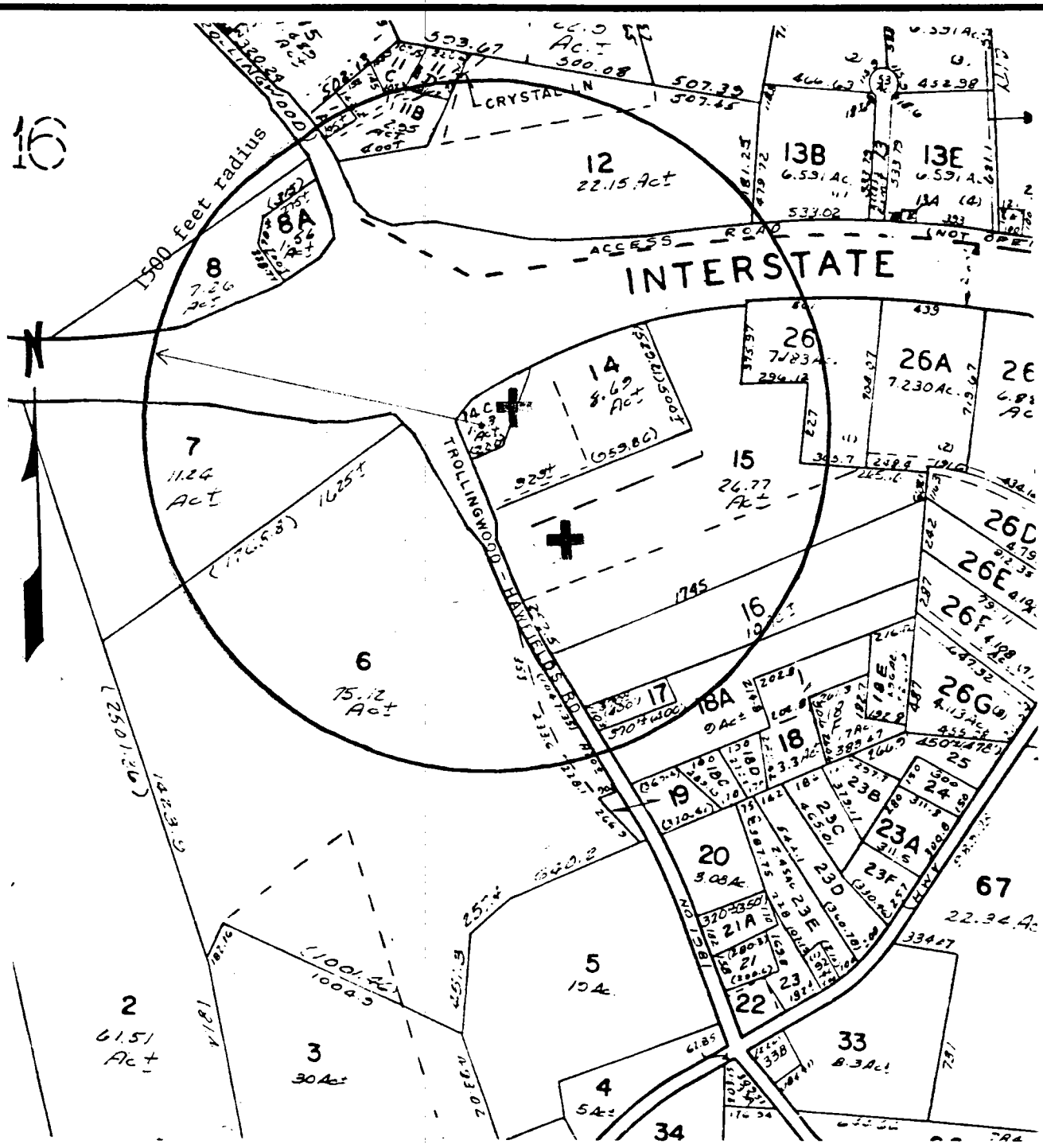
S&ME, INC.
GREENSBORO, NORTH CAROLINA

DATE:	APPROVED BY:	DRAWN BY:
02-15-93	SR	VLR

UNOCAL SITE #9787-214
MEBANE, NORTH CAROLINA

SITE PLAN/GROUNDWATER CONTOUR MAP

DRAWING NO. 080-2



Scale: 1" = 660'

+ – WATER SUPPLY WELL LOCATIONS

PROPERTY OWNERS

LOT NUMBER	PROPERTY OWNER
6	ROBERT W. GIBSON, JR.
14	RAYMOND A. JERNIGAN
14C	RAYMOND A. JERNIGAN
15	JOHN A. WILLIAMS
26	RUTH KIMREY

S&ME, INC.
GREENSBORO, NORTH CAROLINA

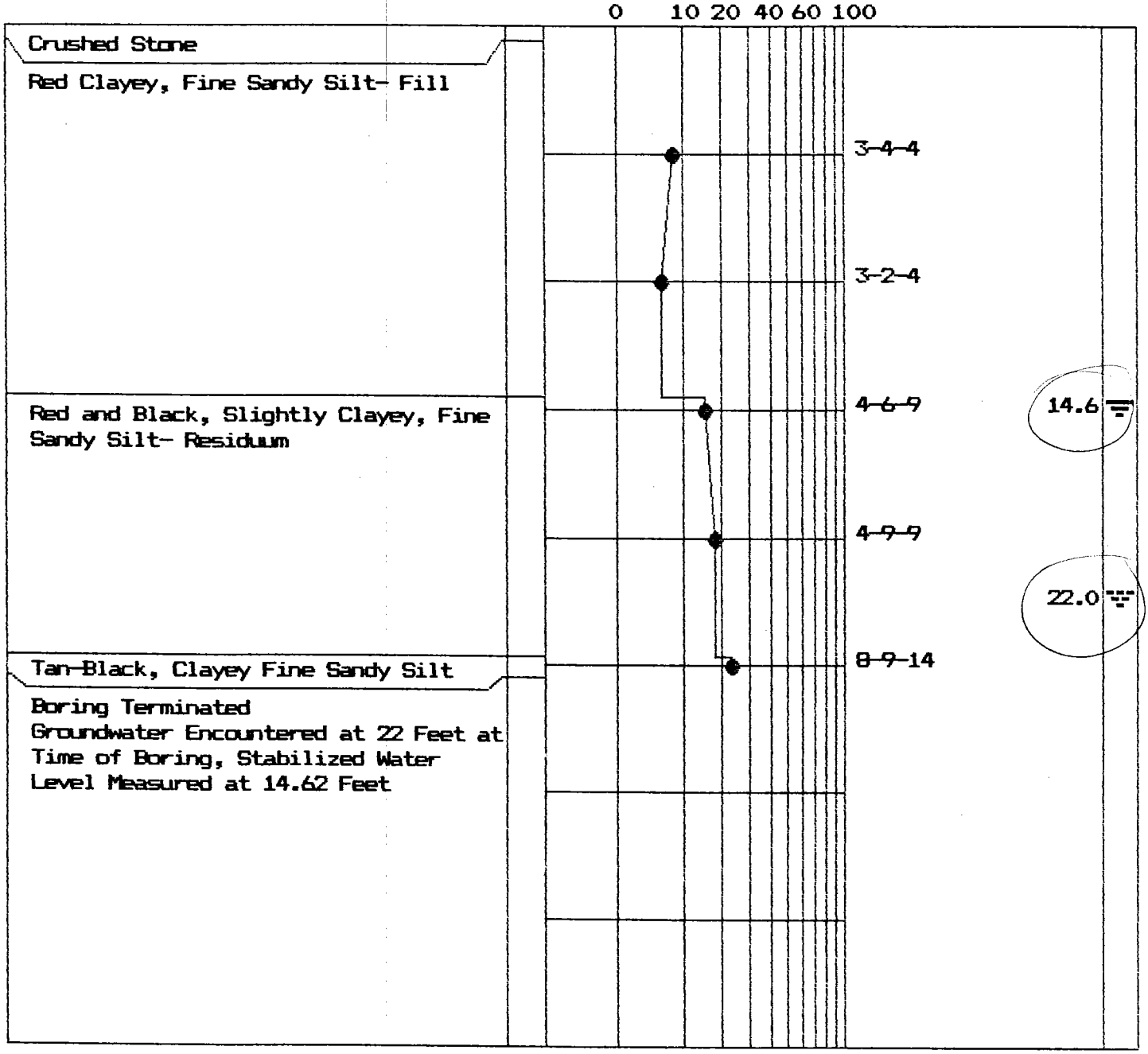
DATE:	APPROVED BY:	DRAWN BY:
01-27-93	SD	VLR

UNOCAL SITE #9787-214
MEBANE, NORTH CAROLINA

ALAMANCE COUNTY TAX MAP

DRAWING NO.: 080-3

TEST BORING RECORD



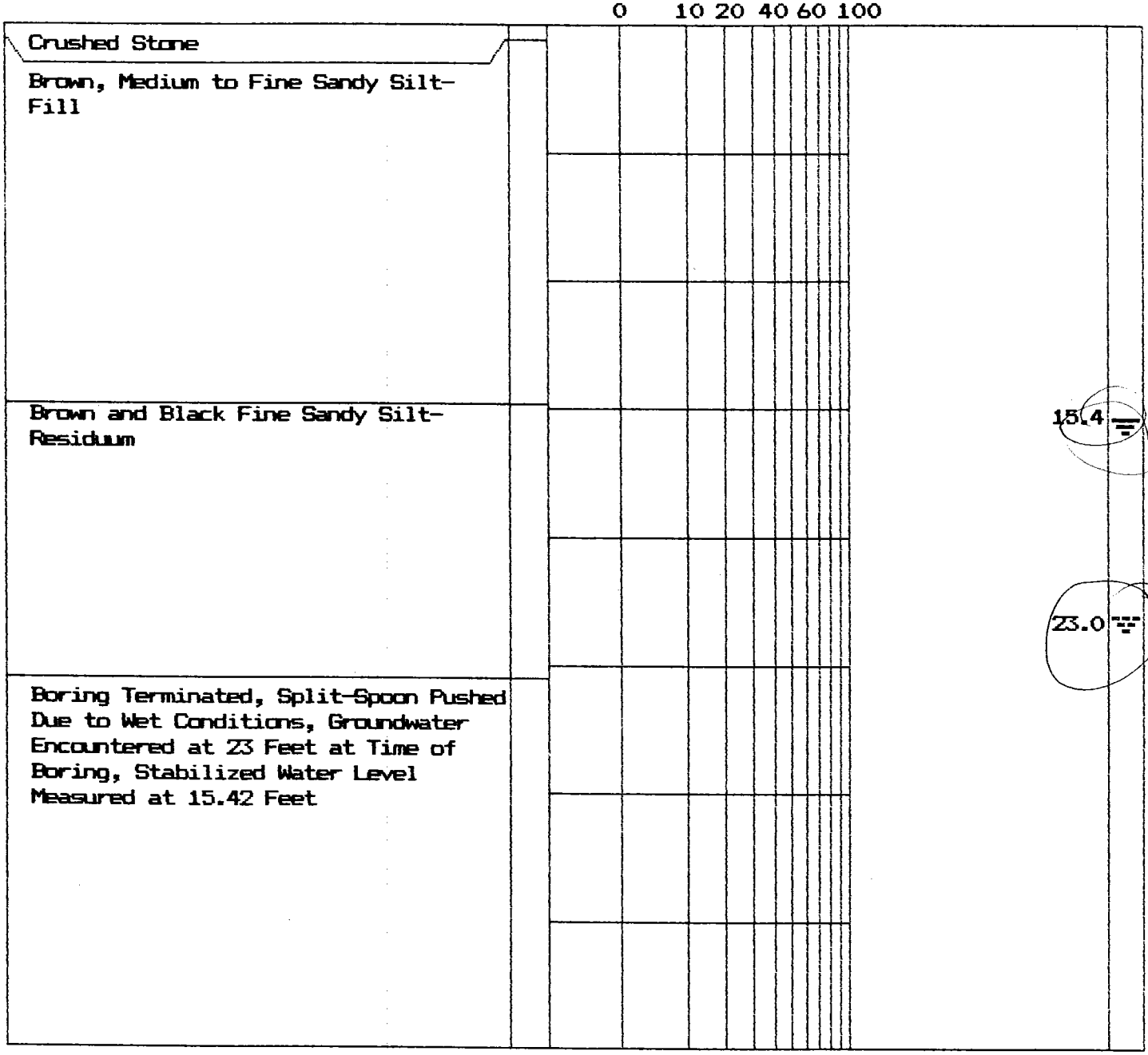
REFER TO ATTACHED SHEET FOR EXPLANATIONS AND SYMBOLS

JOB NUMBER 1584-92-080
BORING NUMBER MW-2
DATE 01/07/93

S&ME

TEST BORING RECORD

DEPTH (FT.)	DESCRIPTION	ELEVATION (FT.)	PENETRATION (BLOWS/FT.) 0 10 20 40 60 100	BLOWS PER SIX IN.
0.0	Crushed Stone			
0.6	Brown, Medium to Fine Sandy Silt- Fill			
14.9	Brown and Black Fine Sandy Silt- Residuum			15.4 ▽
				23.0 ▽
25.5	Boring Terminated, Split-Spoon Pushed Due to Wet Conditions, Groundwater Encountered at 23 Feet at Time of Boring, Stabilized Water Level Measured at 15.42 Feet			



REFER TO ATTACHED SHEET FOR EXPLANATIONS AND SYMBOLS

JOB NUMBER 1584-92-080
BORING NUMBER MW-3
DATE 01/11/93

S&ME

TEST BORING RECORD

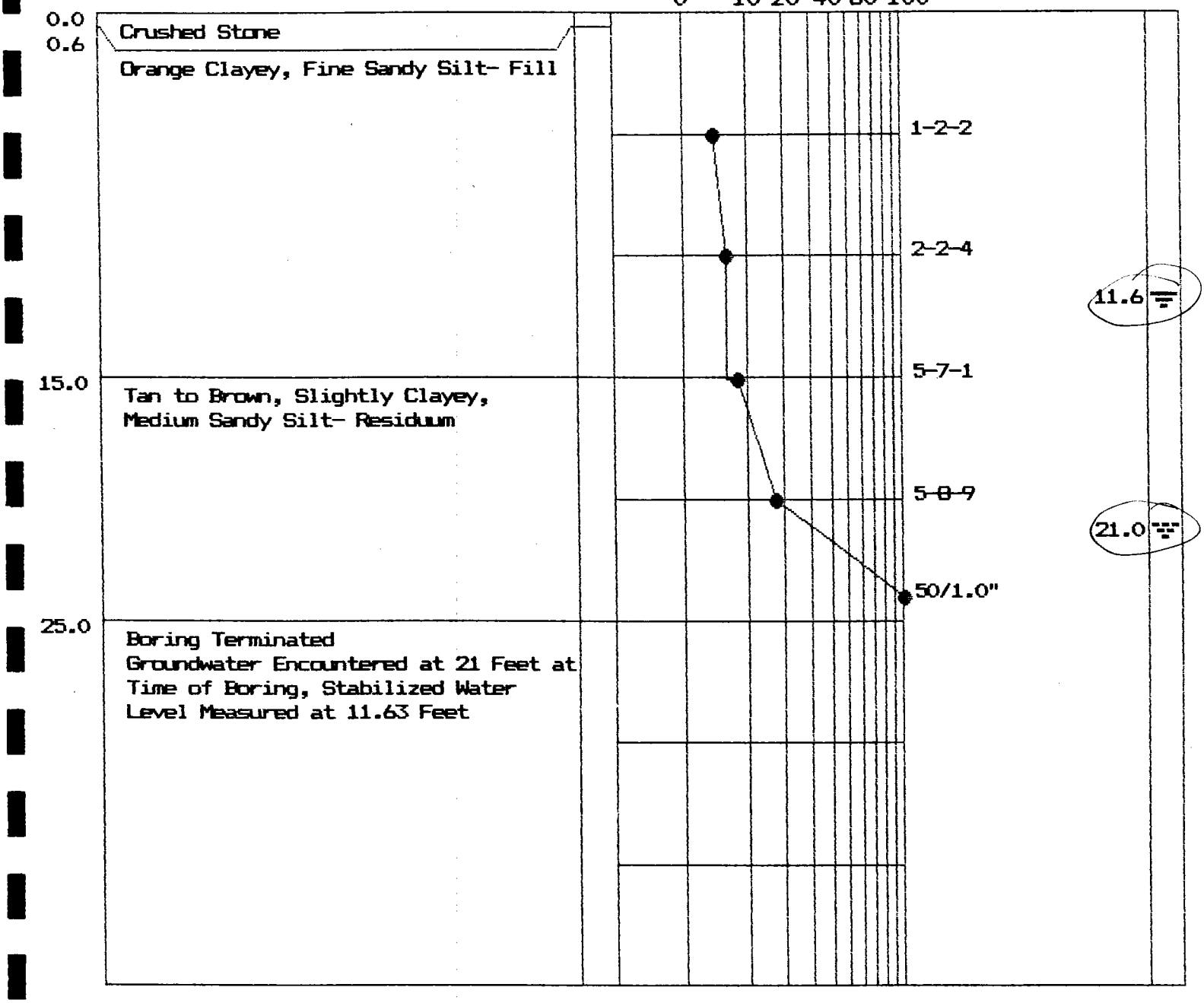
DEPTH (FT.)	DESCRIPTION	ELEVATION (FT.)	PENETRATION (BLOWS/FT.) 0 10 20 40 60 100	BLOWS PER SIX IN.
0.0	Crushed Stone			
0.6	Brown, Medium to Fine Sandy Silt- Fill			
9.0	Orange to Tan, Fine Sandy Silt- Residuum			
				16.5 ▽
				23.0 ▽
25.5	Boring Terminated, Split-Spoon Pushed Due to Wet Conditions, Groundwater Encountered at 23 Feet at Time of Boring, Stabilized Water Level Measured at 16.50 Feet			

REFER TO ATTACHED SHEET FOR EXPLANATIONS AND SYMBOLS

JOB NUMBER 1584-92-080
BORING NUMBER MW-4
DATE 01/11/93

S&ME

TEST BORING RECORD



REFER TO ATTACHED SHEET FOR EXPLANATIONS AND SYMBOLS

JOB NUMBER 1584-92-080
BORING NUMBER MW-1
DATE 01/07/93

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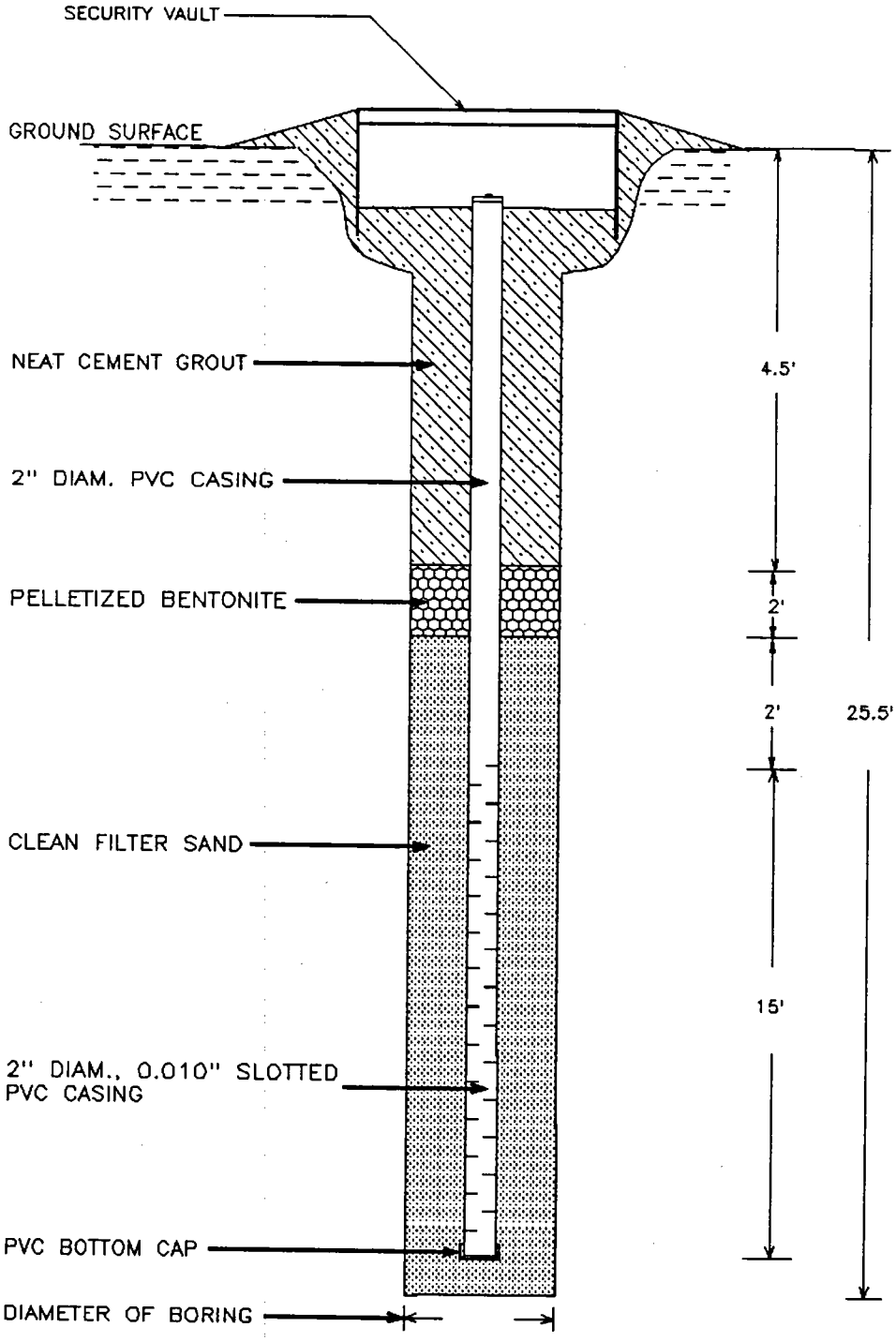
PAGE 1 OF 1



WELL NO. MW-4

SCREEN SLOT SIZE: 0.01

INSTALLATION DATE: 01/11/93

GROUNDWATER LEVEL: 16.5

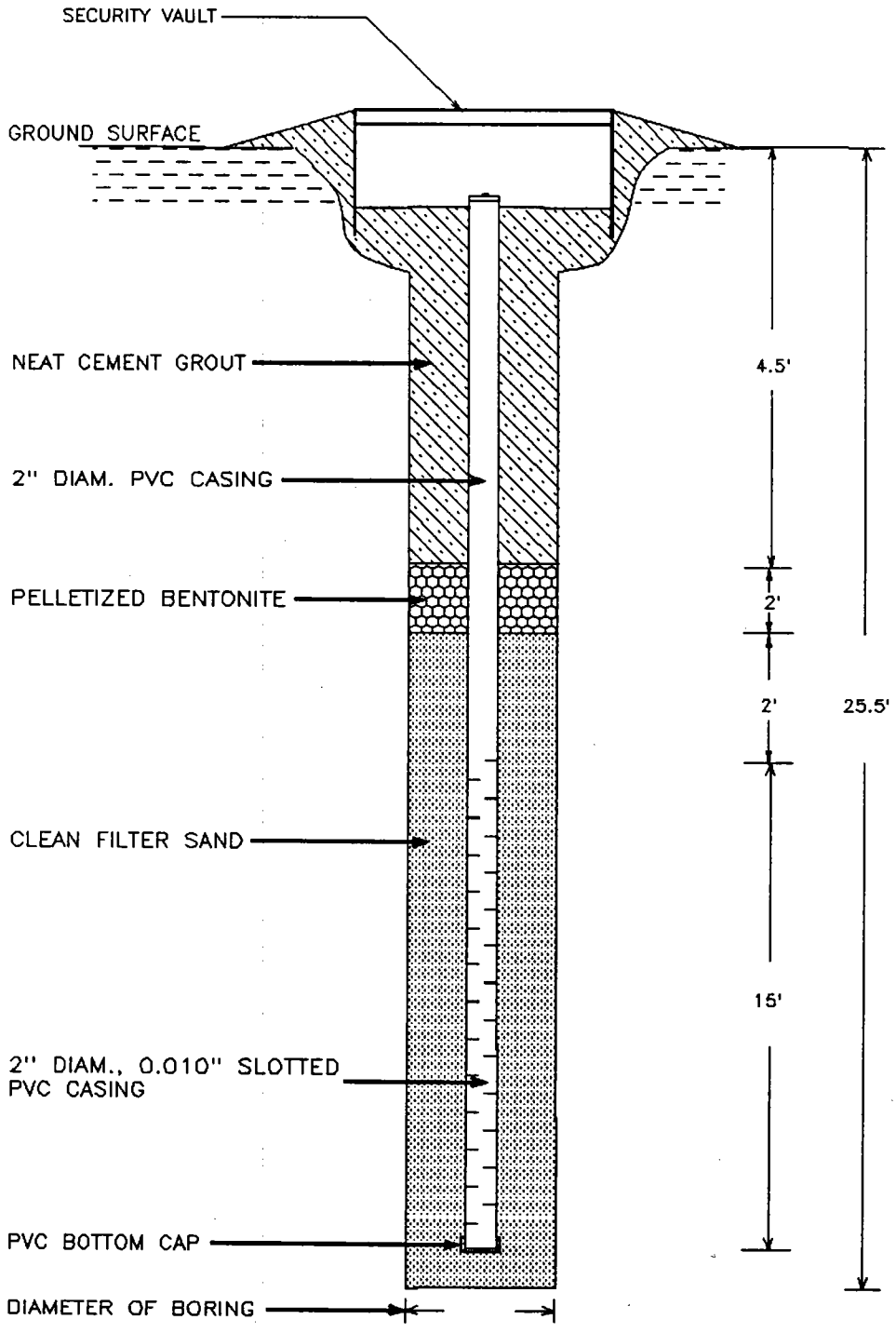
(DEPTH BELOW GROUND SURFACE)

S&ME, INC.

GREENSBORO, NORTH CAROLINA

DATE:	APPROVED BY:	DRAWN BY:
		VLR

DRAWING NO.



WELL NO. MW-1

SCREEN SLOT SIZE: 0.01

INSTALLATION DATE: 01/07/93

GROUNDWATER LEVEL: 11.63

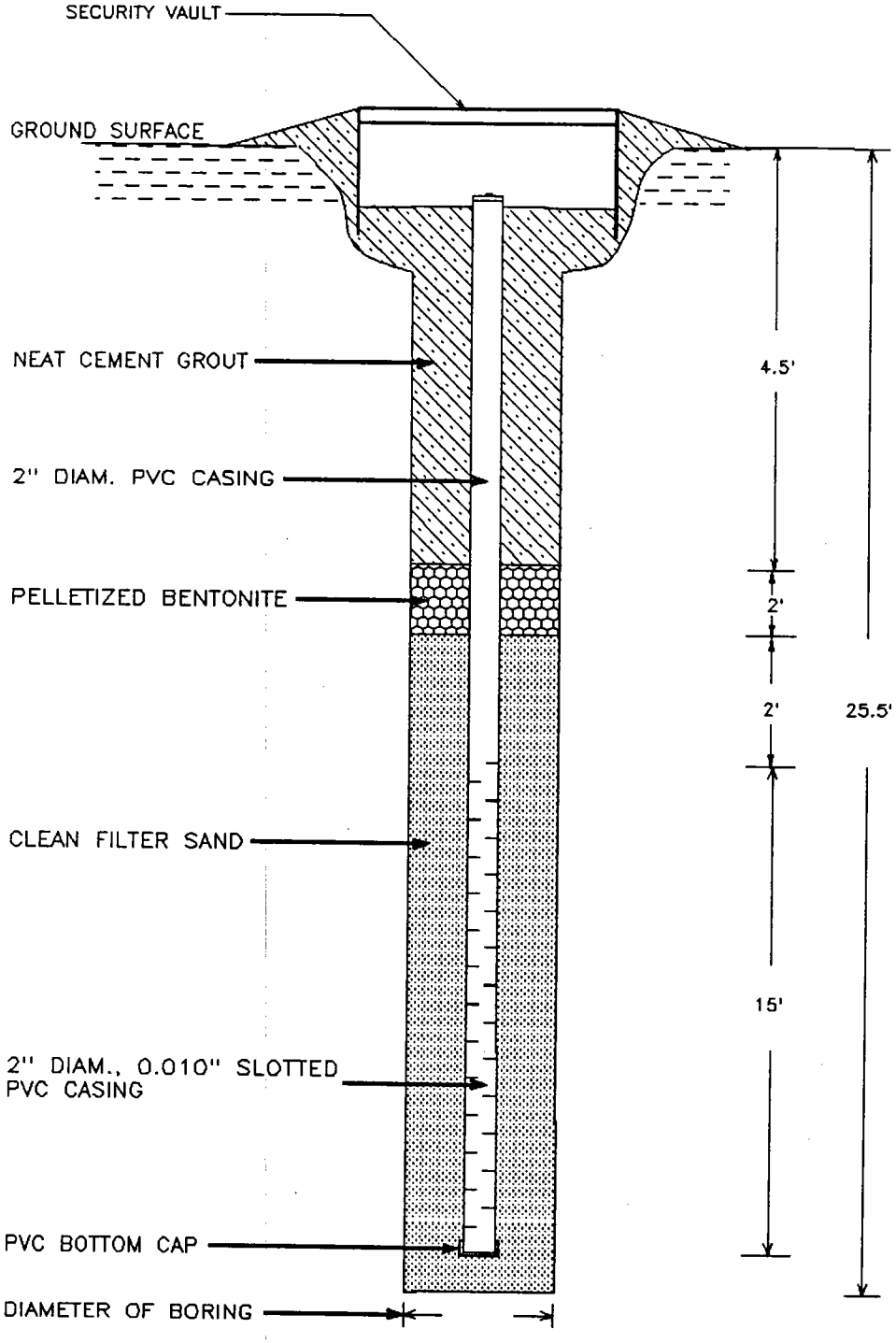
(DEPTH BELOW GROUND SURFACE)

S&ME, INC.

GREENSBORO, NORTH CAROLINA

DATE:	APPROVED BY:	DRAWN BY:
		VLR

DRAWING NO.



WELL NO. MW-2

SCREEN SLOT SIZE: 0.01

INSTALLATION DATE: 01/07/93

GROUNDWATER LEVEL: 14.62

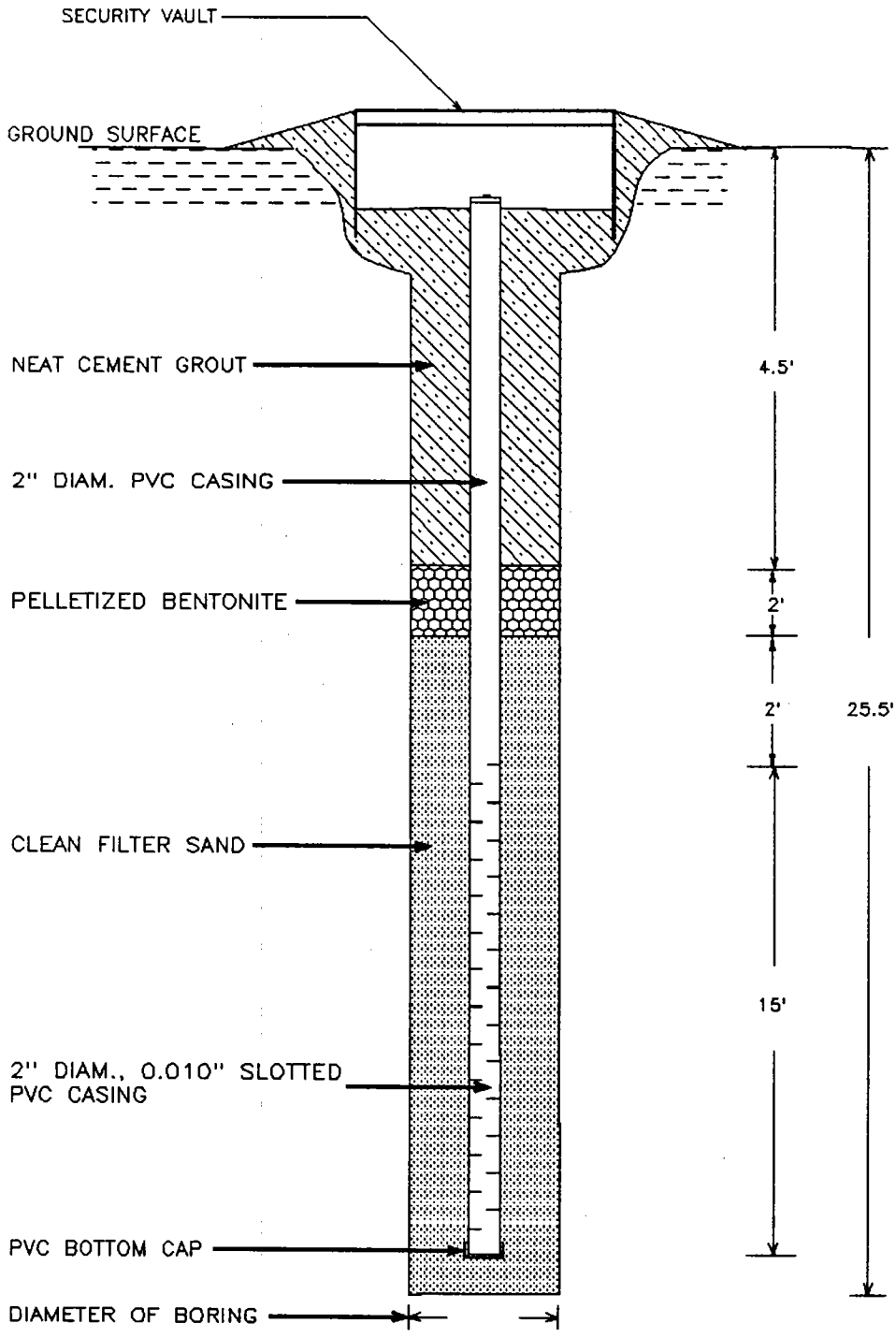
(DEPTH BELOW GROUND SURFACE)

S&ME, INC.

GREENSBORO, NORTH CAROLINA

DATE:	APPROVED BY:	DRAWN BY:
		VLR

DRAWING NO.



WELL NO. MW-3

SCREEN SLOT SIZE: 0.01

INSTALLATION DATE: 01/11/93

GROUNDWATER LEVEL: 15.42

(DEPTH BELOW GROUND SURFACE)

S&ME, INC.

GREENSBORO, NORTH CAROLINA

DATE:	APPROVED BY:	DRAWN BY:
		VLR

DRAWING NO.

NORTH CAROLINA DEPARTMENT OF NATURAL RESOURCES AND COMMUNITY DEVELOPMENT
DIVISION OF ENVIRONMENTAL MANAGEMENT - GROUNDWATER SECTION
P.O. BOX 27687 - RALEIGH,N.C. 27611, PHONE (919) 733-5083

FOR OFFICE USE ONLY
Quad. No. _____ Serial No. _____
Lat. _____ Long. _____ Pc ____
Minor Basin _____
Basin Code _____
Header Ent. _____ GW-1 Ent. _____

WELL CONSTRUCTION RECORD

DRILLING CONTRACTOR S&ME, Inc.

DRILLER REGISTRATION NUMBER 412

STATE WELL CONSTRUCTION PERMIT NUMBER: 00-0361-WM-0130

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

Nearest Town: Mebane

Trollingwood-Hawfield Road
(Road, Community, or Subdivision and Lot No.)

County: Alamance

OWNER Raymond Jernigan

ADDRESS 1342 Trollingwood-Hawfield Road
(Street or Route No.)

Mebane NC
City or Town State Zip Code

3. DATE DRILLED 1/7/93 USE OF WELL Monitoring

TOTAL DEPTH 25.5 CUTTINGS COLLECTED ☒ Yes ☐ No

5. DOES WELL REPLACE EXISTING WELL? ☐ Yes ☒ No

STATIC WATER LEVEL: 12.2 FT. ☐ above ☐ below TOP OF CASING,

TOP OF CASING IS 0.3 FT. ABOVE LAND SURFACE.

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

WATER ZONES (depth): _____

9. CHLORINATION: Type _____ Amount _____

10. CASING:

	Depth		Diameter	Wall Thickness or Weight/Ft.	Material
From	23.5	To 0 Ft.	4"	Sched.40	PVC
From		To Ft.			
From		To Ft.			

11. GROUT:

	Depth		Material	Method
From	5	To 3 Ft.	Neat Cement	Pump
From		To Ft.		

12. SCREEN:

	Depth		Diameter	Slot Size	Material
From	23.5	To 9 Ft.	4" in.	.010 in.	PVC
From		To Ft.	in.	in.	
From		To Ft.	in.	in.	

13. GRAVEL PACK:

	Depth		Size	Material
From	23.5	To 7 Ft.	Fine Filter	Sand
From		To Ft.		

14. REMARKS: _____

Depth From	Depth To	DRILLING LOG Formation Description
		See Attached Log

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)

See Attached Map

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.

SIGNATURE OF CONTRACTOR OR AGENT DATE

GW-1 Revised 11/84

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

NORTH CAROLINA DEPARTMENT OF NATURAL RESOURCES AND COMMUNITY DEVELOPMENT
DIVISION OF ENVIRONMENTAL MANAGEMENT - GROUNDWATER SECTION
P.O. BOX 27687 - RALEIGH,N.C. 27611, PHONE (919) 733-5083

FOR OFFICE USE ONLY
Quad. No. _____ Serial No. _____
Lat. _____ Long. _____ Pc ____
Minor Basin _____
Basin Code _____
Header Ent. _____ GW-1 Ent. _____

WELL CONSTRUCTION RECORD

DRILLING CONTRACTOR S&ME, Inc.
DRILLER REGISTRATION NUMBER 412
STATE WELL CONSTRUCTION PERMIT NUMBER: 00-0361-WM-0130

1. WELL LOCATION: (Show sketch of the location below) MW-4
Nearest Town: Mebane
Trollingwood-Hawfield Road
(Road, Community, or Subdivision and Lot No.)
County: Alamance
2. OWNER Ray Jernigan
ADDRESS 1342 Trollingwood-Hawfield Road (Street or Route No.)
Mebane NC
City or Town State Zip Code
3. DATE DRILLED 01/11/93 USE OF WELL Monitoring
4. TOTAL DEPTH 25.5 CUTTINGS COLLECTED ☒ Yes ☐ No
5. DOES WELL REPLACE EXISTING WELL? ☐ Yes ☒ No
6. STATIC WATER LEVEL: _____ FT. ☐ above ☐ below TOP OF CASING,
TOP OF CASING IS 0.3 FT. ABOVE LAND SURFACE.
7. YIELD (gpm): N/A METHOD OF TEST _____
8. WATER ZONES (depth): _____
_____
9. CHLORINATION: Type _____ Amount _____
10. CASING:

	Depth From	To	Ft.	Diameter	Wall Thickness or Weight/Ft.	Material
	23.5	0		4"	Sched.40	PVC

11. GROUT:

	Depth From	To	Ft.	Material	Method
	5	3		Neat Cement	Pump

12. SCREEN:

	Depth From	To	Ft.	Diameter	In.	Slot Size	In.	Material
	23.5	9		4"		.010		PVC

13. GRAVEL PACK:

	Depth From	To	Ft.	Size	Material
	23.5	7		Fine Filter	Sand

14. REMARKS: _____

DRILLING LOG

Depth From	To	Formation Description
		See Attached Log

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)
See Attached Map

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.

SIGNATURE OF CONTRACTOR OR AGENT DATE

GW-1 Revised 11/84
Submit original to Division of Environmental Management and copy to well owner.

NORTH CAROLINA DEPARTMENT OF NATURAL RESOURCES AND COMMUNITY DEVELOPMENT
DIVISION OF ENVIRONMENTAL MANAGEMENT - GROUNDWATER SECTION
P.O. BOX 27687 - RALEIGH,N.C. 27611, PHONE (919) 733-5083

FOR OFFICE USE ONLY
Quad. No. _____ Serial No. _____
Lat. _____ Long. _____ Pc ____
Minor Basin _____
Basin Code _____
Header Ent. _____ GW-1 Ent. _____

WELL CONSTRUCTION RECORD

DRILLING CONTRACTOR S&ME, Inc.

DRILLER REGISTRATION NUMBER 412

STATE WELL CONSTRUCTION PERMIT NUMBER: 00-0361-WM-0130

1. WELL LOCATION: (Show sketch of the location below) MW-3

Nearest Town: MeBane
Trollingwood-Hawfield Road
(Road, Community, or Subdivision and Lot No.)

County: Alamance

OWNER Raymond Jernigan

ADDRESS 1342 Trollingwood-Hawfield Road
(Street or Route No.)
Mebane NC
City or Town State Zip Code

3. DATE DRILLED 01/11/93 USE OF WELL Monitoring

TOTAL DEPTH 25.5 CUTTINGS COLLECTED ☒ Yes ☐ No

5. DOES WELL REPLACE EXISTING WELL? ☐ Yes ☒ No

6. STATIC WATER LEVEL: 16.2 FT. ☐ above ☒ below TOP OF CASING,
TOP OF CASING IS 0.3 FT. ABOVE LAND SURFACE.

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

WATER ZONES (depth): _____

9. CHLORINATION: Type _____ Amount _____

10. CASING:

	Depth From	Depth To	Diameter	Wall Thickness or Weight/Ft.	Material
	23.5	0 Ft.	4"	Sched.40	PVC
		Ft.			
		Ft.			

11. GROUT:

	Depth From	Depth To	Material	Method
	5	3 Ft.	Neat Cement	Pump
		Ft.		

12. SCREEN:

	Depth From	Depth To	Diameter	Slot Size	Material
	23.5	9 Ft.	4" in.	.010 in.	PVC
		Ft.	in.	in.	
		Ft.	in.	in.	

13. GRAVEL PACK:

	Depth From	Depth To	Size	Material
	23.5	7 Ft.	Fine Filter	Sand
		Ft.		

14. REMARKS: _____

DRILLING LOG

Depth From	Depth To	Formation Description
		See Attached Log.

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)

See Attached Map

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.

SIGNATURE OF CONTRACTOR OR AGENT DATE

GW-1 Revised 11/84

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

NORTH CAROLINA DEPARTMENT OF NATURAL RESOURCES AND COMMUNITY DEVELOPMENT
DIVISION OF ENVIRONMENTAL MANAGEMENT - GROUNDWATER SECTION
P.O. BOX 27687 - RALEIGH,N.C. 27611, PHONE (919) 733-5083

FOR OFFICE USE ONLY
Quad. No. _____ Serial No. _____
Lat. _____ Long. _____ Pc ____
Minor Basin _____
Basin Code _____
Header Ent. _____ GW-1 Ent. _____

WELL CONSTRUCTION RECORD

DRILLING CONTRACTOR S&ME, Inc.
DRILLER REGISTRATION NUMBER 412
STATE WELL CONSTRUCTION PERMIT NUMBER: 00-0361-WM-0130

1. WELL LOCATION: (Show sketch of the location below) MW-2
Nearest Town: Mebane
County: Alamance
~~Trollingwood-Hawfield Road~~
(Road, Community, or Subdivision and Lot No.)
OWNER Raymond Jernigan
ADDRESS 1342 Trollingwood-Hawfield Road
(Street or Route No.)
Mebane NC
City or Town State Zip Code
3. DATE DRILLED 01/07/93 USE OF WELL Monitoring
TOTAL DEPTH 25.5 CUTTINGS COLLECTED ☒ Yes ☐ No
5. DOES WELL REPLACE EXISTING WELL? ☐ Yes ☒ No
STATIC WATER LEVEL: 14.9 FT. ☐ above ☐ below TOP OF CASING,
TOP OF CASING IS 0.3 FT. ABOVE LAND SURFACE.
7. YIELD (gpm): N/A METHOD OF TEST _____
WATER ZONES (depth): _____
_____
9. CHLORINATION: Type _____ Amount _____
10. CASING:

	Depth From	To	Ft.	Diameter	Wall Thickness or Weight/Ft.	Material
	23.5	0		4"	Sched.40	PVC

11. GROUT:

	Depth From	To	Ft.	Material	Method
	5	3		Neat Cement	Pump

12. SCREEN:

	Depth From	To	Ft.	Diameter	Slot Size	Material
	23.5	9		4"	.010 in.	PVC
					in.	
					in.	

13. GRAVEL PACK:

	Depth From	To	Ft.	Size	Material
	23.5	7		Fine Filter	Sand

14. REMARKS: _____

DRILLING LOG

Depth From	To	Formation Description
		See Attached Log

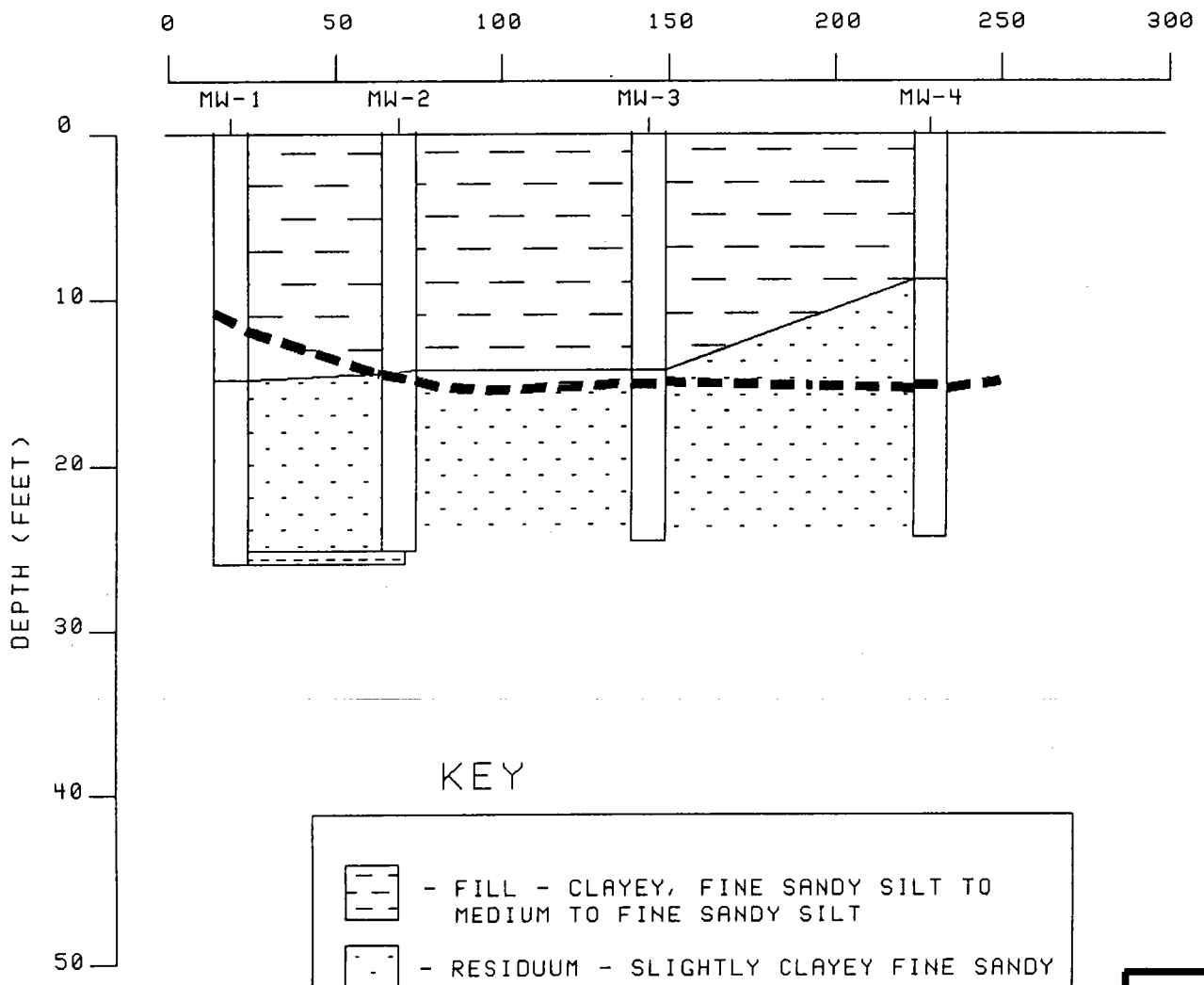
If additional space is needed use back of form.

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

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.

SIGNATURE OF CONTRACTOR OR AGENT DATE

GW-1 Revised 11/84
Submit original to Division of Environmental Management and copy to well owner.



KEY

- FILL - CLAYEY, FINE SANDY SILT TO MEDIUM TO FINE SANDY SILT
- RESIDUUM - SLIGHTLY CLAYEY FINE SANDY SILT TO FINE SANDY SILT
- CLAYEY, FINE SANDY SILT
- GROUNDWATER TABLE

S&ME, INC.
GREENSBORO, NORTH CAROLINA

DATE:	APPROVED BY:	DRAWN BY:
02-04-93		VLR

UNOCAL
MEBANE, NORTH CAROLINA

CROSSECTION

DRAWING NO. 080-4

Enseco
A Corning Company

January 29, 1993

Project Narrative

Client: Soil & Material Engineers
Project Name: Sampled 1/18/93
Erco Project No.: 013441

1. This project consists of the results for samples received at Enseco - Erco Laboratory on January 20, 1993. Please see the sample description information sheet for a list of samples.

2. Temperature of cooler upon receipt was 7.6C.
Bottles were not broken in transit.
Bottles were properly labeled.
Samples agreed with the chain-of-custody, except that Rinsate Blank was not listed on chain-of-custody. Sample was analyzed per client request.
VOA vials were properly preserved.
VOA vials did not contain headspace.

3. In the semivolitile fraction, sample MW-4 (13441-03), was diluted due to high levels of target compounds and unknowns. It was also noted in the preparation laboratory that this sample had a strong "gasoline smell".

Enseco
A Corning Company

SAMPLE DESCRIPTION INFORMATION
for
Soil & Material Engineers

Lab ID	Client ID	Matrix	Sampled Date	Sampled Time	Received Date
013441-0001-SA	MW-1	AQUEOUS	18 JAN 93	14:00	20 JAN 93
013441-0002-SA	MW-2	AQUEOUS	18 JAN 93	15:00	20 JAN 93
013441-0003-SA	MW-4	AQUEOUS	18 JAN 93	16:30	20 JAN 93
013441-0004-SA	FIELD BLANK	AQUEOUS	18 JAN 93	15:00	20 JAN 93
013441-0005-SA	TRIP BLANK	AQUEOUS	18 JAN 93		20 JAN 93
013441-0006-SA	RINSATE BLANK	AQUEOUS	18 JAN 93	14:00	20 JAN 93

Enseco
A Corning Company

ANALYTICAL TEST REQUESTS
for
Soil & Material Engineers

Lab ID: 013441	Group Code	Analysis Description	Custom Test?
0001 - 0004	A	Semivolatile Organics	N
		Target Compound List (TCL)	
		Prep - Semivolatile Organics by GCMS	N
		Volatile Organics	Y
		Aromatic Compounds	Y
		Volatile Organics	N
		Halogenated Compounds	N
0005 - 0006	B	Volatile Organics	Y
		Aromatic Compounds	Y
		Volatile Organics	N
		Halogenated Compounds	N

Enseco
A Corning Company

February 5, 1993

Copied

Mr. Joe Best
Soil & Material Engineers
135-C Montlieu Avenue
Greensboro, NC 27419

Dear Mr. Best:

Enclosed are the results of the analyses for Red Horse Site Assessment (Sampled 1/27/93). This project was received at Enseco - Erco Laboratory on January 27, 1993, and was processed for a 14 day turnaround time.

This report is presented in three sections. The first section consists of the Sample Description Information page, Analytical Test Requests summary, and a Project Narrative which lists any deviations or anomalies associated with sample analyses. The second section contains the analytical results and method references. The third section briefly describes the elements of Enseco's quality assurance/quality control (QA/QC) program and contains the QA/QC results. This letter authorizes the release of the analytical results and should be considered an integral part of this report.

Please refer to this project by the Enseco project number 013472 to expedite any further discussions. I will be happy to address any questions or concerns that you may have.

Sincerely,

Dan Wielandt

Dan Wielandt
Program Administrator

Encl.

Enseco Incorporated
205 Alewife Brook Parkway
Cambridge, MA 02138
617/661-3111 617/354-5258

UNDERGROUND STORAGE TANK PROGRAM
ANALYTICAL REQUEST FORM/CHAIN OF CUSTODY

STATION NO: LOCATION (TOWN)	PROJECT ENGINEER: (BILL TO)	CONSULTANTS PROJECT NO.	SEND RESULTS TO:
Red Horse Mebane, N.C.	Sharon Prosher	1584-92-080	S&ME, Inc 135-C Mountlieu Ave Greensboro, N.C. 27409

SAMPLE NUMBER	DATE	TIME	SAMPLE I.D.	MATRIX (A OR S)	# OF CONTAINERS	BTEX	BTEX & MTBE	TPH (IR) 418.1	602 & MTBE & TPE	601	625	SPECIAL INSTRUCTIONS(*)
	1/26/93	11:00	MW-3						/	/	/	
			Rinse Blanks						/	/		
			Field Blanks						/	/		
			Trip Blanks						/	/		

SAMPLERS NAME: (SIGNATURE)	RELINQUISHED BY: (SIGNATURE)	DATE	TIME	RECEIVED BY: (SIGNATURE)
Sue Best				

RELINQUISHED BY: (SIGNATURE)	DATE	TIME	RECEIVED BY: (SIGNATURE)	COURIER:
Sue Best	1/26/93	16:10		AIRBILL NO:

RECEIVED FOR LABORATORY BY: (SIGN.)	PRINT NAME:	DATE	TIME	CUSTODY SEAL NO.:
				COOLER NO.:

Enseco
A Corning Company

SAMPLE DESCRIPTION INFORMATION
for
Soil & Material Engineers

Lab ID	Client ID	Matrix	Sampled Date	Sampled Time	Received Date
013472-0001-SA	MW-3	AQUEOUS	26 JAN 93	11:00	27 JAN 93
013472-0002-SA	Rinse Blank	AQUEOUS	26 JAN 93		27 JAN 93
013472-0003-SA	Field Blank	AQUEOUS	26 JAN 93		27 JAN 93
013472-0004-SA	Trip Blank	AQUEOUS	26 JAN 93		27 JAN 93

Enseco
A Corning Company

ANALYTICAL TEST REQUESTS
for
Soil & Material Engineers

Lab ID: 013472	Group Code	Analysis Description	Custom Test?
0001	A	Semivolatile Organics	N
		Target Compound List (TCL)	
		Prep - Semivolatile Organics by GCMS	N
		Volatile Organics	Y
		Aromatic Compounds	Y
		Volatile Organics	N
		Halogenated Compounds	N
0002 - 0004	B	Volatile Organics	Y
		Aromatic Compounds	Y
		Volatile Organics	N
		Halogenated Compounds	N

Enseco
A Corning Company

February 5, 1993

Project Narrative

Client: Soil & Material Engineers
Project Name: Sampled 1/27/93
Erco Project No.: 013472

1. This project consists of the results for samples received at Enseco - Erco Laboratory on January 27, 1993. Please see the sample description information sheet for a list of samples.

2. Samples were cold upon receipt.
Bottles were not broken in transit.
Bottles were properly labeled.
Samples agreed with the chain-of-custody.
VOA vials were properly preserved.
VOA vial labeled Trip Blank contained headspace.

- ANALYTICAL RESULTS -

ANALYTICAL RESULTS

The method number provided on each data report sheet refers to a method or procedure from a publication originating from a regulatory or standard-setting organization. In general, the methods employed are those specified by the U.S. Environmental Protection Agency and other state and federal agencies. In cases where an approved regulatory method does not exist, a method developed by Enseco will be employed to meet the specific needs of the client. In all cases, Enseco's specific procedures are documented in proprietary Standard Operating Procedures (SOP). The methods commonly employed by Enseco are based on methods from the following references.

U.S. Environmental Protection Agency. 1983. Methods for Chemical Analysis of Water and Wastes. EPA-600/4-79-020. Cincinnati, OH, March.

U.S. Environmental Protection Agency. 1990. Test Methods for Evaluating Solid Waste, Physical/Chemical Methods (SW-846). Washington, D.C., November.

U.S. Environmental Protection Agency. 1988. Methods for Determination of Organic Compounds in Finished Drinking Water and Raw Source water. EPA-600/4-88/039. Cincinnati, OH, December.

"Guidelines Establishing Test Procedures for the Analysis of Pollutants Under the Clean Water Act," 40 CFR, Part 136; Federal Register, Vol. 49, No. 209.

American Public Health Association, American Water Works Association, Water Pollution Control Federation. 1989. Standard Methods for the Examination of Water and Wastewater, 17th Edition. Washington, D.C., September.

Current EPA Contract Laboratory Program (CLP) protocols for the analysis of organic and inorganic hazardous substances including chlorinated dioxins and furans.

Enseco
A Corning Company

Volatile Organics
Halogenated Compounds
Method 8010

Client Name: Soil & Material Engineers
Client ID: MW-3
Lab ID: 013472-0001-SA
Matrix: AQUEOUS
Authorized: 27 JAN 93

Sampled: 26 JAN 93
Prepared: NA

Received: 27 JAN 93
Analyzed: 01 FEB 93

Parameter	Result	Units	Reporting Limit
Chloromethane	ND	ug/L	5.0
Bromomethane	ND	ug/L	5.0
Vinyl chloride	ND	ug/L	1.0
Chloroethane	ND	ug/L	5.0
Methylene chloride	ND	ug/L	5.0
1,1-Dichloroethene	ND	ug/L	0.50
1,1-Dichloroethane	ND	ug/L	0.50
1,2-Dichloroethene (total)	ND	ug/L	0.50
Chloroform	ND	ug/L	0.50
1,2-Dichloroethane	8.4	ug/L	1.0
1,1,1-Trichloroethane	ND	ug/L	0.50
Carbon tetrachloride	ND	ug/L	0.50
Bromodichloromethane	ND	ug/L	1.0
1,2-Dichloropropane	ND	ug/L	1.0
trans-1,3-Dichloropropene	ND	ug/L	1.0
Trichloroethene	ND	ug/L	0.50
Dibromochloromethane	ND	ug/L	1.0
cis-1,3-Dichloropropene	ND	ug/L	1.0
1,1,2-Trichloroethane	ND	ug/L	1.0
Bromoform	ND	ug/L	5.0
1,1,2,2-Tetrachloroethane	ND	ug/L	1.0
Tetrachloroethene	ND	ug/L	0.50
Chlorobenzene	ND	ug/L	5.0

Surrogate	Recovery		
Bromochloromethane	84	%	--

ND = Not detected
NA = Not applicable

Reported By: Nancy Duggan

Approved By: Joyce Lombardo

Enseco
A Corning Company

Volatile Organics
Halogenated Compounds
Method 8010

Client Name: Soil & Material Engineers
Client ID: Rinse Blank
Lab ID: 013472-0002-SA
Matrix: AQUEOUS Sampled: 26 JAN 93 Received: 27 JAN 93
Authorized: 27 JAN 93 Prepared: NA Analyzed: 29 JAN 93

Parameter	Result	Units	Reporting Limit
Chloromethane	ND	ug/L	5.0
Bromomethane	ND	ug/L	5.0
Vinyl chloride	ND	ug/L	1.0
Chloroethane	ND	ug/L	5.0
Methylene chloride	ND	ug/L	5.0
1,1-Dichloroethene	ND	ug/L	0.50
1,1-Dichloroethane	ND	ug/L	0.50
1,2-Dichloroethene (total)	ND	ug/L	0.50
Chloroform	ND	ug/L	0.50
1,2-Dichloroethane	ND	ug/L	1.0
1,1,1-Trichloroethane	ND	ug/L	0.50
Carbon tetrachloride	ND	ug/L	0.50
Bromodichloromethane	ND	ug/L	1.0
1,2-Dichloropropane	ND	ug/L	1.0
trans-1,3-Dichloropropene	ND	ug/L	1.0
Trichloroethene	ND	ug/L	0.50
Dibromochloromethane	ND	ug/L	1.0
cis-1,3-Dichloropropene	ND	ug/L	1.0
1,1,2-Trichloroethane	ND	ug/L	1.0
Bromoform	ND	ug/L	5.0
1,1,2,2-Tetrachloroethane	ND	ug/L	1.0
Tetrachloroethene	ND	ug/L	0.50
Chlorobenzene	ND	ug/L	5.0

Surrogate	Recovery		
Bromochloromethane	86	%	--

ND = Not detected
NA = Not applicable

Reported By: Nancy Duggan Approved By: Joyce Lombardo

Enseco
A Corning Company

Volatile Organics
Halogenated Compounds
Method 8010

Client Name: Soil & Material Engineers
Client ID: Field Blank
Lab ID: 013472-0003-SA
Matrix: AQUEOUS
Authorized: 27 JAN 93

Sampled: 26 JAN 93
Prepared: NA

Received: 27 JAN 93
Analyzed: 29 JAN 93

Parameter	Result	Units	Reporting Limit
Chloromethane	ND	ug/L	5.0
Bromomethane	ND	ug/L	5.0
Vinyl chloride	ND	ug/L	1.0
Chloroethane	ND	ug/L	5.0
Methylene chloride	ND	ug/L	5.0
1,1-Dichloroethene	ND	ug/L	0.50
1,1-Dichloroethane	ND	ug/L	0.50
1,2-Dichloroethene (total)	ND	ug/L	0.50
Chloroform	ND	ug/L	0.50
1,2-Dichloroethane	ND	ug/L	1.0
1,1,1-Trichloroethane	ND	ug/L	0.50
Carbon tetrachloride	ND	ug/L	0.50
Bromodichloromethane	ND	ug/L	1.0
1,2-Dichloropropane	ND	ug/L	1.0
trans-1,3-Dichloropropene	ND	ug/L	1.0
Trichloroethene	ND	ug/L	0.50
Dibromochloromethane	ND	ug/L	1.0
cis-1,3-Dichloropropene	ND	ug/L	1.0
1,1,2-Trichloroethane	ND	ug/L	1.0
Bromoform	ND	ug/L	5.0
1,1,2,2-Tetrachloroethane	ND	ug/L	1.0
Tetrachloroethene	ND	ug/L	0.50
Chlorobenzene	ND	ug/L	5.0

Surrogate	Recovery		
Bromochloromethane	94	%	--

ND = Not detected
NA = Not applicable

Reported By: Nancy Duggan

Approved By: Joyce Lombardo

Enseco
A Corning Company

Volatile Organics
Halogenated Compounds
Method 8010

Client Name: Soil & Material Engineers
Client ID: Trip Blank
Lab ID: 013472-0004-SA
Matrix: AQUEOUS Sampled: 26 JAN 93 Received: 27 JAN 93
Authorized: 27 JAN 93 Prepared: NA Analyzed: 28 JAN 93

Parameter	Result	Units	Reporting Limit
Chloromethane	ND	ug/L	5.0
Bromomethane	ND	ug/L	5.0
Vinyl chloride	ND	ug/L	1.0
Chloroethane	ND	ug/L	5.0
Methylene chloride	ND	ug/L	5.0
1,1-Dichloroethene	ND	ug/L	0.50
1,1-Dichloroethane	ND	ug/L	0.50
1,2-Dichloroethene (total)	ND	ug/L	0.50
Chloroform	ND	ug/L	0.50
1,2-Dichloroethane	1.4	ug/L	1.0
1,1,1-Trichloroethane	ND	ug/L	0.50
Carbon tetrachloride	ND	ug/L	0.50
Bromodichloromethane	ND	ug/L	1.0
1,2-Dichloropropane	ND	ug/L	1.0
trans-1,3-Dichloropropene	ND	ug/L	1.0
Trichloroethene	ND	ug/L	0.50
Dibromochloromethane	ND	ug/L	1.0
cis-1,3-Dichloropropene	ND	ug/L	1.0
1,1,2-Trichloroethane	ND	ug/L	1.0
Bromoform	ND	ug/L	5.0
1,1,2,2-Tetrachloroethane	ND	ug/L	1.0
Tetrachloroethene	ND	ug/L	0.50
Chlorobenzene	ND	ug/L	5.0

Surrogate	Recovery		
Bromochloromethane	93	%	--

ND = Not detected
NA = Not applicable

Reported By: Nancy Duggan Approved By: Joyce Lombardo

Enseco
A Corning Company

Volatile Organics
Aromatic Compounds
Method 8020

Client Name: Soil & Material Engineers
Client ID: MW-3
Lab ID: 013472-0001-SA
Matrix: AQUEOUS
Authorized: 27 JAN 93

Sampled: 26 JAN 93
Prepared: NA

Received: 27 JAN 93
Analyzed: 01 FEB 93

Parameter	Result	Units	Reporting Limit
Methyl tert-butyl ether	ND	ug/L	25
Isopropyl ether	ND	ug/L	25
Benzene	84	ug/L	2.5
Toluene	82	ug/L	2.5
Ethylbenzene	5.1	ug/L	2.5
Chlorobenzene	ND	ug/L	2.5
Xylenes (total)	590	ug/L	2.5
1,4-Dichlorobenzene	ND	ug/L	2.5
1,3-Dichlorobenzene	ND	ug/L	2.5
1,2-Dichlorobenzene	ND	ug/L	2.5
Surrogate	**Recovery**		
a,a,a-Trifluorotoluene	101	%	--

ND = Not detected
NA = Not applicable

Reported By: Peter Colonero

Approved By: Joyce Lombardo

Enseco
A Corning Company

Volatile Organics
Aromatic Compounds
Method 8020

Client Name: Soil & Material Engineers
Client ID: Rinse Blank
Lab ID: 013472-0002-SA
Matrix: AQUEOUS
Authorized: 27 JAN 93

Sampled: 26 JAN 93
Prepared: NA

Received: 27 JAN 93
Analyzed: 28 JAN 93

Parameter	Result	Units	Reporting Limit
Methyl tert-butyl ether	ND	ug/L	5.0
Isopropyl ether	ND	ug/L	5.0
Benzene	ND	ug/L	0.50
Toluene	ND	ug/L	0.50
Ethylbenzene	ND	ug/L	0.50
Chlorobenzene	ND	ug/L	0.50
Xylenes (total)	ND	ug/L	0.50
1,4-Dichlorobenzene	ND	ug/L	0.50
1,3-Dichlorobenzene	ND	ug/L	0.50
1,2-Dichlorobenzene	ND	ug/L	0.50
Surrogate	**Recovery**		
a,a,a-Trifluorotoluene	100	%	--

ND = Not detected
NA = Not applicable

Reported By: Peter Colonero

Approved By: Joyce Lombardo

Enseco
A Corning Company

Volatile Organics
Aromatic Compounds
Method 8020

Client Name: Soil & Material Engineers
Client ID: Field Blank
Lab ID: 013472-0003-SA
Matrix: AQUEOUS
Authorized: 27 JAN 93

Sampled: 26 JAN 93
Prepared: NA

Received: 27 JAN 93
Analyzed: 28 JAN 93

Parameter	Result	Units	Reporting Limit
Methyl tert-butyl ether	ND	ug/L	5.0
Isopropyl ether	ND	ug/L	5.0
Benzene	ND	ug/L	0.50
Toluene	0.53	ug/L	0.50
Ethylbenzene	ND	ug/L	0.50
Chlorobenzene	ND	ug/L	0.50
Xylenes (total)	0.62	ug/L	0.50
1,4-Dichlorobenzene	ND	ug/L	0.50
1,3-Dichlorobenzene	ND	ug/L	0.50
1,2-Dichlorobenzene	ND	ug/L	0.50
Surrogate	**Recovery**		
a,a,a-Trifluorotoluene	102	%	--

ND = Not detected
NA = Not applicable

Reported By: Peter Colonero

Approved By: Joyce Lombardo

Enseco
A Corning Company

Volatile Organics
Aromatic Compounds
Method 8020

Client Name: Soil & Material Engineers
Client ID: Trip Blank
Lab ID: 013472-0004-SA
Matrix: AQUEOUS
Authorized: 27 JAN 93

Sampled: 26 JAN 93
Prepared: NA

Received: 27 JAN 93
Analyzed: 28 JAN 93

Parameter	Result	Units	Reporting Limit
Methyl tert-butyl ether	ND	ug/L	5.0
Isopropyl ether	ND	ug/L	5.0
Benzene	ND	ug/L	0.50
Toluene	ND	ug/L	0.50
Ethylbenzene	ND	ug/L	0.50
Chlorobenzene	ND	ug/L	0.50
Xylenes (total)	ND	ug/L	0.50
1,4-Dichlorobenzene	ND	ug/L	0.50
1,3-Dichlorobenzene	ND	ug/L	0.50
1,2-Dichlorobenzene	ND	ug/L	0.50
Surrogate	**Recovery**		
a,a,a-Trifluorotoluene	102	%	--

ND = Not detected
NA = Not applicable

Reported By: Peter Colonero

Approved By: Joyce Lombardo

Enseco
A Corning Company

Semivolatile Organics
Target Compound List (TCL)
Method 625

Client Name: Soil & Material Engineers
Client ID: MW-3
Lab ID: 013472-0001-SA
Matrix: AQUEOUS
Authorized: 27 JAN 93

Sampled: 26 JAN 93
Prepared: 28 JAN 93

Received: 27 JAN 93
Analyzed: 04 FEB 93

Parameter	Result	Units	Reporting Limit
Phenol	ND	ug/L	10
bis(2-Chloroethyl) ether	ND	ug/L	10
2-Chlorophenol	ND	ug/L	10
1,3-Dichlorobenzene	ND	ug/L	10
1,4-Dichlorobenzene	ND	ug/L	10
Benzyl alcohol	ND	ug/L	10
1,2-Dichlorobenzene	ND	ug/L	10
2-Methylphenol	ND	ug/L	10
bis(2-Chloroisopropyl) ether	ND	ug/L	10
4-Methylphenol	ND	ug/L	10
N-Nitroso-di-n-propylamine	ND	ug/L	10
Hexachloroethane	ND	ug/L	10
Nitrobenzene	ND	ug/L	10
Isophorone	ND	ug/L	10
2-Nitrophenol	ND	ug/L	10
2,4-Dimethylphenol	ND	ug/L	10
Benzoic acid	22	ug/L	10
bis(2-Chloroethoxy)-methane	ND	ug/L	50
2,4-Dichlorophenol	ND	ug/L	10
1,2,4-Trichlorobenzene	ND	ug/L	10
Naphthalene	ND	ug/L	10
4-Chloroaniline	ND	ug/L	10
Hexachlorobutadiene	ND	ug/L	10
4-Chloro-3-methylphenol	ND	ug/L	10
2-Methylnaphthalene	ND	ug/L	10
Hexachlorocyclopentadiene	ND	ug/L	10
2,4,6-Trichlorophenol	ND	ug/L	10
2,4,5-Trichlorophenol	ND	ug/L	50
2-Chloronaphthalene	ND	ug/L	10
2-Nitroaniline	ND	ug/L	50
Dimethyl phthalate	ND	ug/L	10
Acenaphthylene	ND	ug/L	10
3-Nitroaniline	ND	ug/L	50
Acenaphthene	ND	ug/L	10
2,4-Dinitrophenol	ND	ug/L	50
4-Nitrophenol	ND	ug/L	50
Dibenzofuran	ND	ug/L	10
2,4-Dinitrotoluene	ND	ug/L	10

(continued on following page)

ND = Not detected
NA = Not applicable

Reported By: Elizabeth Ellis

Approved By: Mark Porta

Enseco
A Corning Company

Semivolatile Organics
Target Compound List (TCL)
Method 625

Client Name: Soil & Material Engineers
Client ID: MW-3
Lab ID: 013472-0001-SA
Matrix: AQUEOUS Sampled: 26 JAN 93 Received: 27 JAN 93
Authorized: 27 JAN 93 Prepared: 28 JAN 93 Analyzed: 04 FEB 93

Parameter	Result	Units	Reporting Limit
2,6-Dinitrotoluene	ND	ug/L	10
Diethyl phthalate	ND	ug/L	10
4-Chlorophenyl phenyl ether	ND	ug/L	10
Fluorene	ND	ug/L	10
4-Nitroaniline	ND	ug/L	50
4,6-Dinitro-2-methylphenol	ND	ug/L	50
N-Nitrosodiphenylamine	ND	ug/L	10
4-Bromophenyl phenyl ether	ND	ug/L	10
Hexachlorobenzene	ND	ug/L	10
Pentachlorophenol	ND	ug/L	50
Phenanthrene	ND	ug/L	10
Anthracene	ND	ug/L	10
Di-n-butyl phthalate	ND	ug/L	10
Fluoranthene	ND	ug/L	10
Pyrene	ND	ug/L	10
Butyl benzyl phthalate	ND	ug/L	10
3,3'-Dichlorobenzidine	ND	ug/L	20
Benzo(a)anthracene	ND	ug/L	10
bis(2-Ethylhexyl) phthalate	ND	ug/L	10
Chrysene	ND	ug/L	10
Di-n-octyl phthalate	ND	ug/L	10
Benzo(b)fluoranthene	ND	ug/L	10
Benzo(k)fluoranthene	ND	ug/L	10
Benzo(a)pyrene	ND	ug/L	10
Indeno(1,2,3-cd)pyrene	ND	ug/L	10
Dibenz(a,h)anthracene	ND	ug/L	10
Benzo(g,h,i)perylene	ND	ug/L	10

Surrogate	Recovery		
Nitrobenzene-d5	83	%	--
2-Fluorobiphenyl	86	%	--
Terphenyl-d14	92	%	--
Phenol-d5	84	%	--
2-Fluorophenol	82	%	--
2,4,6-Tribromophenol	109	%	--

ND = Not detected
NA = Not applicable

Reported By: Elizabeth Ellis Approved By: Mark Porta

- QUALITY ASSURANCE/QUALITY CONTROL -

QUALITY ASSURANCE/QUALITY CONTROL

The results of the internal quality control checks, used to monitor data quality, are included with this report. The following have been provided, where applicable. A comprehensive description of each of these elements can be found in the Enseco Quality Assurance Program Plan for Environmental Chemical Monitoring.

DUPLICATE CONTROL SAMPLES (DCS) are used to monitor the precision and accuracy of the analytical system on an on-going basis. Each DCS consists of a standard, control matrix that is spiked with a group of target compounds representative of the method analytes. A DCS pair is analyzed for every 20 samples processed by the method. DCS are analyzed with environmental samples to provide evidence that the laboratory is performing the method within accepted QC guidelines for accuracy and precision.

SINGLE CONTROL SAMPLES (SCS) are analyzed with every batch of samples. An SCS consists of a control matrix that is spiked with surrogate compounds appropriate to the method being used. In cases where no surrogate is available (e.g., metals or wet chemistry), a single DCS serves as the control sample. Recovery data generated from the SCS are compared to control limits that have been established for each of the compounds being monitored.

METHOD BLANKS, also known as reagent, analytical, or preparation blanks, are analyzed to assess the level of contamination which exists in the analytical system. A method blank is analyzed with every batch of samples processed. A method blank consists of reagents specific to the method which are carried through every aspect of the procedure, including preparation, cleanup, and analysis. The results of the method blank analysis are evaluated, in conjunction with other QC information, to determine the acceptability of the data generated for that batch of samples.

MATRIX SPIKES, MATRIX DUPLICATES, AND MATRIX SPIKE DUPLICATES are types of Matrix Specific QC, which is used to assess the effects of a sample matrix or field conditions on the analytical data. A Matrix Spike (MS) is an environmental sample to which known concentrations of analytes have been added. A Matrix Duplicate (MD) is a sample that is divided into two separate aliquots which are analyzed separately. A Matrix Spike Duplicate (MSD) is a sample that is divided into two separate aliquots, each of which is spiked with known concentrations of analytes. This data is provided only where required or requested. The samples that are used are either project-specific or part of the analytical batch, depending on the requirements of the project.

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QC LOT ASSIGNMENT REPORT
Volatile Organics by GC

Laboratory Sample Number	QC Matrix	QC Category	QC Lot Number (DCS)	QC Run Number (SCS/BLANK)
013472-0001-SA	AQUEOUS	602-A	23 JAN 93-G13	01 FEB 93-G13
013472-0001-SA	AQUEOUS	601-A	22 JAN 93-G7	01 FEB 93-G7
013472-0002-SA	AQUEOUS	602-A	23 JAN 93-G13	28 JAN 93-G13
013472-0002-SA	AQUEOUS	601-A	22 JAN 93-G7	29 JAN 93-G7
013472-0003-SA	AQUEOUS	602-A	23 JAN 93-G13	28 JAN 93-G13
013472-0003-SA	AQUEOUS	601-A	22 JAN 93-G7	29 JAN 93-G7
013472-0004-SA	AQUEOUS	602-A	23 JAN 93-G13	28 JAN 93-G13
013472-0004-SA	AQUEOUS	601-A	22 JAN 93-G7	28 JAN 93-G7
013472-0004-SA	AQUEOUS	601-A	22 JAN 93-G7	08 JAN 93-G7

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DUPLICATE CONTROL SAMPLE REPORT
Volatile Organics by GC
Project: 013472

Category: 602-A Aromatic Volatile Organics
Matrix: AQUEOUS
QC Lot: 23 JAN 93-G13
Concentration Units: ug/L

Analyte	Concentration Spiked	Measured DCS1	Measured DCS2	Measured AVG	Accuracy Average(%) DCS	Accuracy Limits	Precision (RPD) DCS	Precision Limit
Benzene	5.00	4.77	4.84	4.80	96	60-140	1.5	30
Toluene	5.00	4.58	4.58	4.58	92	60-140	0.0	30
Ethylbenzene	5.00	4.71	4.70	4.70	94	60-140	0.21	30
Xylenes (total)	5.00	4.92	4.94	4.93	99	60-140	0.41	30
1,3-Dichlorobenzene	5.00	4.78	4.75	4.76	95	60-140	0.63	30

Category: 601-A Halogenated Volatile Organics
Matrix: AQUEOUS
QC Lot: 22 JAN 93-G7
Concentration Units: ug/L

Analyte	Concentration Spiked	Measured DCS1	Measured DCS2	Measured AVG	Accuracy Average(%) DCS	Accuracy Limits	Precision (RPD) DCS	Precision Limit
1,1-Dichloroethane	5.00	4.89	6.06	5.48	110	60-140	21	30
Chloroform	5.00	3.07	3.15	3.11	62	60-140	2.6	30
Bromodichloromethane	10.0	8.66	9.80	9.23	92	60-140	12	30
Trichloroethene	5.00	4.52	4.96	4.74	95	60-140	9.3	30
Chlorobenzene	10.0	4.17	4.26	4.22	42	60-140	2.1	30

Calculations are performed before rounding to avoid round-off errors in calculated results.

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METHOD BLANK REPORT
Volatile Organics by GC
Project: 013472

Test: 8020-TCL-AP Volatile Organics Aromatic Compounds
Matrix: AQUEOUS
QC Lot: 23 JAN 93-G13 QC Run: 01 FEB 93-G13

Analyte	Result	Units	Reporting Limit
Methyl tert-butyl ether	ND	ug/L	5.0
Isopropyl ether	ND	ug/L	5.0
Benzene	ND	ug/L	0.50
Toluene	ND	ug/L	0.50
Ethylbenzene	ND	ug/L	0.50
Chlorobenzene	ND	ug/L	0.50
Xylenes (total)	ND	ug/L	0.50
1,4-Dichlorobenzene	ND	ug/L	0.50
1,3-Dichlorobenzene	ND	ug/L	0.50
1,2-Dichlorobenzene	ND	ug/L	0.50

Test: 8020-TCL-AP Volatile Organics Aromatic Compounds
Matrix: AQUEOUS
QC Lot: 23 JAN 93-G13 QC Run: 28 JAN 93-G13

Analyte	Result	Units	Reporting Limit
Methyl tert-butyl ether	ND	ug/L	5.0
Isopropyl ether	ND	ug/L	5.0
Benzene	ND	ug/L	0.50
Toluene	ND	ug/L	0.50
Ethylbenzene	ND	ug/L	0.50
Chlorobenzene	ND	ug/L	0.50
Xylenes (total)	ND	ug/L	0.50
1,4-Dichlorobenzene	ND	ug/L	0.50
1,3-Dichlorobenzene	ND	ug/L	0.50
1,2-Dichlorobenzene	ND	ug/L	0.50

ND = Not Detected

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SINGLE CONTROL SAMPLE REPORT
Volatile Organics by GC
Project: 013472 (cont.)

Category: 601-A Halogenated Volatile Organics
Matrix: AQUEOUS
QC Lot: 22 JAN 93-G7 QC Run: 08 JAN 93-G7
Concentration Units: ug/L

Analyte	Concentration Spiked	Concentration Measured	Accuracy(%) SCS	Accuracy(%) Limits
Bromochloromethane	30.0	29.2	97	60-140

Calculations are performed before rounding to avoid round-off errors in calculated resul

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METHOD BLANK REPORT
Volatile Organics by GC
Project: 013472 (cont.)

Test: 8010-TCL-A Volatile Organics Halogenated Compounds
Matrix: AQUEOUS
QC Lot: 22 JAN 93-G7 QC Run: 01 FEB 93-G7

Analyte	Result	Units	Reporting Limit
Chloromethane	ND	ug/L	5.0
Bromomethane	ND	ug/L	5.0
Vinyl chloride	ND	ug/L	1.0
Chloroethane	ND	ug/L	5.0
Methylene chloride	ND	ug/L	5.0
1,1-Dichloroethene	ND	ug/L	0.50
1,1-Dichloroethane	ND	ug/L	0.50
1,2-Dichloroethene (total)	ND	ug/L	0.50
Chloroform	ND	ug/L	0.50
1,2-Dichloroethane	ND	ug/L	1.0
1,1,1-Trichloroethane	ND	ug/L	0.50
Carbon tetrachloride	ND	ug/L	0.50
Bromodichloromethane	ND	ug/L	1.0
1,2-Dichloropropane	ND	ug/L	1.0
trans-1,3-Dichloropropene	ND	ug/L	1.0
Trichloroethene	ND	ug/L	0.50
Dibromochloromethane	ND	ug/L	1.0
cis-1,3-Dichloropropene	ND	ug/L	1.0
1,1,2-Trichloroethane	ND	ug/L	1.0
Bromoform	ND	ug/L	5.0
1,1,2,2-Tetrachloroethane	ND	ug/L	1.0
Tetrachloroethene	ND	ug/L	0.50
Chlorobenzene	ND	ug/L	5.0

ND = Not Detected

METHOD BLANK REPORT
Volatile Organics by GC
Project: 013472 (cont.)

Test: 8010-TCL-A Volatile Organics Halogenated Compounds
Matrix: AQUEOUS
QC Lot: 22 JAN 93-G7 QC Run: 29 JAN 93-G7

Analyte	Result	Units	Reporting Limit
Chloromethane	ND	ug/L	5.0
Bromomethane	ND	ug/L	5.0
Vinyl chloride	ND	ug/L	1.0
Chloroethane	ND	ug/L	5.0
Methylene chloride	ND	ug/L	5.0
1,1-Dichloroethene	ND	ug/L	0.50
1,1-Dichloroethane	ND	ug/L	0.50
1,2-Dichloroethene (total)	ND	ug/L	0.50
Chloroform	ND	ug/L	0.50
1,2-Dichloroethane	ND	ug/L	1.0
1,1,1-Trichloroethane	ND	ug/L	0.50
Carbon tetrachloride	ND	ug/L	0.50
Bromodichloromethane	ND	ug/L	1.0
1,2-Dichloropropane	ND	ug/L	1.0
trans-1,3-Dichloropropene	ND	ug/L	1.0
Trichloroethene	ND	ug/L	0.50
Dibromochloromethane	ND	ug/L	1.0
cis-1,3-Dichloropropene	ND	ug/L	1.0
1,1,2-Trichloroethane	ND	ug/L	1.0
Bromoform	ND	ug/L	5.0
1,1,2,2-Tetrachloroethane	ND	ug/L	1.0
Tetrachloroethene	ND	ug/L	0.50
Chlorobenzene	ND	ug/L	5.0

ND = Not Detected

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METHOD BLANK REPORT
Volatile Organics by GC
Project: 013472 (cont.)

Test: 8010-TCL-A Volatile Organics Halogenated Compounds
Matrix: AQUEOUS
QC Lot: 22 JAN 93-G7 QC Run: 28 JAN 93-G7

Analyte	Result	Units	Reporting Limit
Chloromethane	ND	ug/L	5.0
Bromomethane	ND	ug/L	5.0
Vinyl chloride	ND	ug/L	1.0
Chloroethane	ND	ug/L	5.0
Methylene chloride	ND	ug/L	5.0
1,1-Dichloroethene	ND	ug/L	0.50
1,1-Dichloroethane	ND	ug/L	0.50
1,2-Dichloroethene (total)	ND	ug/L	0.50
Chloroform	ND	ug/L	0.50
1,2-Dichloroethane	ND	ug/L	1.0
1,1,1-Trichloroethane	ND	ug/L	0.50
Carbon tetrachloride	ND	ug/L	0.50
Bromodichloromethane	ND	ug/L	1.0
1,2-Dichloropropane	ND	ug/L	1.0
trans-1,3-Dichloropropene	ND	ug/L	1.0
Trichloroethene	ND	ug/L	0.50
Dibromochloromethane	ND	ug/L	1.0
cis-1,3-Dichloropropene	ND	ug/L	1.0
1,1,2-Trichloroethane	ND	ug/L	1.0
Bromoform	ND	ug/L	5.0
1,1,2,2-Tetrachloroethane	ND	ug/L	1.0
Tetrachloroethene	ND	ug/L	0.50
Chlorobenzene	ND	ug/L	5.0

ND = Not Detected

SINGLE CONTROL SAMPLE REPORT
Volatile Organics by GC
Project: 013472

Category: 602-A Aromatic Volatile Organics
Matrix: AQUEOUS
QC Lot: 23 JAN 93-G13 QC Run: 01 FEB 93-G13
Concentration Units: ug/L

Analyte	Concentration Spiked	Measured	Accuracy(%) SCS	Limits
a,a,a-Trifluorotoluene	30.0	32.0	107	60-140

Category: 602-A Aromatic Volatile Organics
Matrix: AQUEOUS
QC Lot: 23 JAN 93-G13 QC Run: 28 JAN 93-G13
Concentration Units: ug/L

Analyte	Concentration Spiked	Measured	Accuracy(%) SCS	Limits
a,a,a-Trifluorotoluene	30.0	30.6	102	60-140

Category: 601-A Halogenated Volatile Organics
Matrix: AQUEOUS
QC Lot: 22 JAN 93-G7 QC Run: 01 FEB 93-G7
Concentration Units: ug/L

Analyte	Concentration Spiked	Measured	Accuracy(%) SCS	Limits
Bromochloromethane	30.0	26.8	89	60-140

Category: 601-A Halogenated Volatile Organics
Matrix: AQUEOUS
QC Lot: 22 JAN 93-G7 QC Run: 29 JAN 93-G7
Concentration Units: ug/L

Analyte	Concentration Spiked	Measured	Accuracy(%) SCS	Limits
Bromochloromethane	30.0	28.6	95	60-140

Calculations are performed before rounding to avoid round-off errors in calculated results.

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QC LOT ASSIGNMENT REPORT
Semivolatile Organics by GC/MS

Laboratory Sample Number	QC Matrix	QC Category	QC Lot Number (DCS)	QC Run Number (SCS/BLANK)
013472-0001-SA	AQUEOUS	625-A	22 JAN 93-LA	28 JAN 93-L11

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DUPLICATE CONTROL SAMPLE REPORT
Semivolatile Organics by GC/MS
Project: 013472

Category: 625-A Semivolatile Organics - GC/MS
Matrix: AQUEOUS
QC Lot: 22 JAN 93-LA
Concentration Units: ug/L

Analyte	Concentration				Accuracy		Precision	
	Spiked	Measured			Average(%)		(RPD)	
		DCS1	DCS2	AVG	DCS	Limits	DCS	Limit
Pentachlorophenol	200	229	231	230	115	9-103	0.91	50
Phenol	200	107	106	106	53	12-89	1.1	42
2-Chlorophenol	200	107	108	108	54	27-123	0.65	40
4-Chloro-3-methylphenol	200	140	136	138	69	23-97	3.0	42
4-Nitrophenol	200	182	186	184	92	10-80	2.4	50
1,2,4-Trichlorobenzene	100	70.3	71.4	70.9	71	39-98	1.5	28
Acenaphthene	100	64.8	62.3	63.6	64	46-118	3.9	31
2,4-Dinitrotoluene	100	88.6	89.8	89.2	89	24-96	1.3	38
Pyrene	100	51.7	51.4	51.5	52	26-127	0.64	31
N-Nitroso-di-n-propylamine	100	69.0	67.4	68.2	68	41-116	2.4	38
1,4-Dichlorobenzene	100	57.9	58.9	58.4	58	36-97	1.7	28

Calculations are performed before rounding to avoid round-off errors in calculated results.

METHOD BLANK REPORT
Semivolatile Organics by GC/MS
Project: 013472

Test: 625-TCL-A Semivolatile Organics Target Compound List (TCL)
Matrix: AQUEOUS
QC Lot: 22 JAN 93-LA QC Run: 28 JAN 93-L11

Analyte	Result	Units	Reporting Limit
Phenol	ND	ug/L	10
bis(2-Chloroethyl) ether	ND	ug/L	10
2-Chlorophenol	ND	ug/L	10
1,3-Dichlorobenzene	ND	ug/L	10
1,4-Dichlorobenzene	ND	ug/L	10
Benzyl alcohol	ND	ug/L	10
1,2-Dichlorobenzene	ND	ug/L	10
2-Methylphenol	ND	ug/L	10
bis(2-Chloroisopropyl)ether	ND	ug/L	10
4-Methylphenol	ND	ug/L	10
N-Nitroso-di-n-propylamine	ND	ug/L	10
Hexachloroethane	ND	ug/L	10
Nitrobenzene	ND	ug/L	10
Isophorone	ND	ug/L	10
2-Nitrophenol	ND	ug/L	10
2,4-Dimethylphenol	ND	ug/L	10
Benzoic acid	ND	ug/L	50
bis(2-Chloroethoxy)-methane	ND	ug/L	10
2,4-Dichlorophenol	ND	ug/L	10
1,2,4-Trichlorobenzene	ND	ug/L	10
Naphthalene	ND	ug/L	10
4-Chloroaniline	ND	ug/L	10
Hexachlorobutadiene	ND	ug/L	10
4-Chloro-3-methylphenol	ND	ug/L	10
2-Methylnaphthalene	ND	ug/L	10
Hexachlorocyclopentadiene	ND	ug/L	10
2,4,6-Trichlorophenol	ND	ug/L	10
2,4,5-Trichlorophenol	ND	ug/L	50
2-Chloronaphthalene	ND	ug/L	10
2-Nitroaniline	ND	ug/L	50
Dimethyl phthalate	ND	ug/L	10
Acenaphthylene	ND	ug/L	10
3-Nitroaniline	ND	ug/L	50
Acenaphthene	ND	ug/L	10
2,4-Dinitrophenol	ND	ug/L	50
4-Nitrophenol	ND	ug/L	50
Dibenzofuran	ND	ug/L	10
2,4-Dinitrotoluene	ND	ug/L	10
2,6-Dinitrotoluene	ND	ug/L	10
Diethyl phthalate	ND	ug/L	10
4-Chlorophenyl phenyl ether	ND	ug/L	10
Fluorene	ND	ug/L	10
4-Nitroaniline	ND	ug/L	50
4,6-Dinitro-2-methylphenol	ND	ug/L	50
N-Nitrosodiphenylamine	ND	ug/L	10

ND = Not Detected

METHOD BLANK REPORT
Semivolatile Organics by GC/MS
Project: 013472 (cont.)

Test: 625-TCL-A Semivolatile Organics Target Compound List (TCL)
Matrix: AQUEOUS
QC Lot: 22 JAN 93-LA QC Run: 28 JAN 93-L11 (cont.)

Analyte	Result	Units	Reporting Limit
4-Bromophenyl phenyl ether	ND	ug/L	10
Hexachlorobenzene	ND	ug/L	10
Pentachlorophenol	ND	ug/L	50
Phenanthrene	ND	ug/L	10
Anthracene	ND	ug/L	10
Di-n-butyl phthalate	ND	ug/L	10
Fluoranthene	ND	ug/L	10
Pyrene	ND	ug/L	10
Butyl benzyl phthalate	ND	ug/L	10
3,3'-Dichlorobenzidine	ND	ug/L	20
Benzo(a)anthracene	ND	ug/L	10
bis(2-Ethylhexyl) phthalate	ND	ug/L	10
Chrysene	ND	ug/L	10
Di-n-octyl phthalate	ND	ug/L	10
Benzo(b)fluoranthene	ND	ug/L	10
Benzo(k)fluoranthene	ND	ug/L	10
Benzo(a)pyrene	ND	ug/L	10
Indeno(1,2,3-cd)pyrene	ND	ug/L	10
Dibenz(a,h)anthracene	ND	ug/L	10
Benzo(g,h,i)perylene	ND	ug/L	10

ND = Not Detected

Enseco
A Corning Company

SINGLE CONTROL SAMPLE REPORT
Semivolatile Organics by GC/MS
Project: 013472

Category: 625-A Semivolatile Organics - GC/MS
Matrix: AQUEOUS
QC Lot: 22 JAN 93-LA QC Run: 28 JAN 93-L11
Concentration Units: ug/L

Analyte	Concentration Spiked	Concentration Measured	Accuracy(%) SCS	Accuracy(%) Limits
Phenol-d5	200	137	68	10-94
2-Fluorophenol	200	143	72	21-100
2,4,6-Tribromophenol	200	173	86	10-123
Nitrobenzene-d5	100	71.4	71	35-114
2-Fluorobiphenyl	100	73.0	73	43-116
Terphenyl-d14	100	91.1	91	33-141

Calculations are performed before rounding to avoid round-off errors in calculated results.

Enseco
A Corning Company

January 29, 1993

Mr. Joe Best
Soil & Material Engineers
135-C Montlieu Avenue
Greensboro, NC 27419

Dear Mr. Best:

Enclosed are the results of the analyses for Red Horse Site Assessment (Sampled 1/18/93). This project was received at Enseco - Erco Laboratory on January 20, 1993, and was processed for a 14 day turnaround time.

This report is presented in three sections. The first section consists of the Sample Description Information page, Analytical Test Requests summary, and a Project Narrative which lists any deviations or anomalies associated with sample analyses. The second section contains the analytical results and method references. The third section briefly describes the elements of Enseco's quality assurance/quality control (QA/QC) program and contains the QA/QC results. This letter authorizes the release of the analytical results and should be considered an integral part of this report.

Please refer to this project by the Enseco project number 013441 to expedite any further discussions. I will be happy to address any questions or concerns that you may have.

Sincerely,

for

Dan Wielandt
Program Administrator

Encl.

Enseco Incorporated
205 Alewife Brook Parkway
Cambridge, MA 02138
617/661-3111 617/354-5258

Enseco
A Corning Company

CHAIN-OF-CUSTODY RECORD ENS-1045-C

PAGE 1 OF 1

SHIP TO: ☐ ENSECO EAST 2300 Cottontail Lane Somerset NJ 08873 (908) 526-2996
☒ ERCO 205 Alexander Street Clackamas, OR 97015 (217) 655-1131

CLIENT NAME: Joe Best / Project Geologist
COMPANY: S&ME, Inc.
ADDRESS: P.O. Box 18169 135-C Montview Ave
Greensboro, NC 27419
PHONE NO: 919-855-7547
PROJECT NAME: Unocal / Redhorse
P.O. NUMBER: 1677
SAMPLER NAME: Kirk Becker
PHONE NUMBER: 919-855-7547
METHOD OF SHIPMENT: Fed. Ex.
AIR BILL NUMBER: 1251-2124-1
COOLER NUMBER:
CUSTODY SEAL NUMBER: 73497 / 73498

ENSECO CONTACT: Greg Russell
ENSECO PROJECT #: 13441

SPECIAL INSTRUCTIONS/COMMENTS:

Analytical TAT Rush ____ Days (Normal) Agreed Days

ANALYSES: 601 | 602* MIBK as BTEX | 625 BNA | TCLP per JOE BEST DW 1/14/93

	SAMPLE ID	MATRIX	SIZE	# CONT.	DATE	TIME	PRESERVATIVE	ENSECO COMMENTS
1	MW-1	aqueous	40 ml	6	1/18/93	2pm	3 yes / 3 NO	
2	MW-2	aqueous	40 ml	6	1/18/93	3pm	3 yes / 3 NO	
3	MW-4	aqueous	40 ml	6	1/18/93	4:30 p	3 yes / 3 NO	
	MW-1	aqueous	1 Liter	3	1/18/93	2p	NO	all Wells DW Becker
	MW-2	aqueous	1 Liter	3	1/18/93	3pm	NO	
	MW-4	aqueous	1 Liter	3	1/18/93	4:30 p	NO	
4	Field Blank	aqueous	1 Liter	1	1/18/93	3pm	NO	✓
7	Field Blank	aqueous	1 Liter	1	1/18/93	4pm	NO	✓
9	Field Blank	aqueous	40 ml	6	1/18/93	2pm	3 yes / 3 NO	
5	Trip Blank	aqueous	40 ml	6	1/18/93		3 yes / 3 NO	Add rinsate blank for 601, 602 per Stanley Dunker DW 1/20/93

RELINQUISHED BY	DATE	SAMPLE RECEIVED BY	TIME	DATE
Kirk W. Becker	1-19-93			
		RECEIVED AT ENSECO Dpetrulandt	945	1/20/93

* see note bar RIGHT - Fm

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A Corning Company

METHOD BLANK REPORT
Hydrocarbon
Project: 013410

Test: DRO-UST-S Diesel Range Organics (DRO)
Matrix: SOIL
QC Lot: 14 JAN 93-NA QC Run: 14 JAN 93-N1

Analyte	Result	Units	Reporting Limit
Diesel Range Organics	ND	ug/g	3.3

ND = Not Detected

Enseco
A Corning Company

SINGLE CONTROL SAMPLE REPORT
Hydrocarbon
Project: 013410

Category: DRO-S Deisel Range Organics (DRO)
Matrix: SOIL
QC Lot: 14 JAN 93-NA QC Run: 14 JAN 93-N1
Concentration Units: ug/g

Analyte	Concentration Spiked	Measured	Accuracy(%) SCS	Limits
o-Terphenyl	1.67	1.80	108	60-120

Calculations are performed before rounding to avoid round-off errors in calculated results.

Enseco
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QC LOT ASSIGNMENT REPORT
Volatile Organics by GC

Laboratory Sample Number	QC Matrix	QC Category	QC Lot Number (DCS)	QC Run Number (SCS/BLANK)
013410-0001-SA	SOIL	GRO-S	15 DEC 92-G10	14 JAN 93-G10
013410-0001-SA	SOIL	8020-S	29 DEC 92-G13	18 JAN 93-G13
013410-0002-SA	SOIL	GRO-S	15 DEC 92-G10	15 JAN 93-G10
013410-0002-SA	SOIL	8020-S	29 DEC 92-G13	18 JAN 93-G13
013410-0003-SA	SOIL	GRO-S	15 DEC 92-G10	14 JAN 93-G10
013410-0003-SA	SOIL	8020-S	29 DEC 92-G13	18 JAN 93-G13
013410-0004-SA	SOIL	GRO-S	15 DEC 92-G10	14 JAN 93-G10
013410-0004-SA	SOIL	8020-S	29 DEC 92-G13	18 JAN 93-G13

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A Corning Company

DUPLICATE CONTROL SAMPLE REPORT
Volatile Organics by GC
Project: 013410

Category: GRO-S Gasoline Range Organics (GRO)
Matrix: SOIL
QC Lot: 15 DEC 92-G10
Concentration Units: ug/kg

Analyte	Concentration Spiked	Measured DCS1	Measured DCS2	Measured AVG	Accuracy Average(%) DCS	Accuracy Limits	Precision (RPD) DCS	Precision Limit
Benzene	5.00	ND	ND	NC	NC	60-140	NC	0
Toluene	5.00	ND	ND	NC	NC	60-140	NC	0
Ethylbenzene	5.00	ND	ND	NC	NC	60-140	NC	0
Xylenes (total)	5.00	ND	ND	NC	NC	60-140	NC	0
Gasoline Range Organics	62500	45000	42600	43800	70	45-100	5.50	30

Category: 8020-S Aromatic Volatile Organics
Matrix: SOIL
QC Lot: 29 DEC 92-G13
Concentration Units: ug/kg

Analyte	Concentration Spiked	Measured DCS1	Measured DCS2	Measured AVG	Accuracy Average(%) DCS	Accuracy Limits	Precision (RPD) DCS	Precision Limit
Benzene	625	740	767	754	121	60-140	3.6	30
Toluene	625	732	750	741	119	60-140	2.4	30
Ethylbenzene	625	679	695	687	110	60-140	2.3	30
Xylenes (total)	625	735	756	746	119	60-140	2.8	30
1,3-Dichlorobenzene	625	655	666	660	106	60-140	1.7	30

NC = Not Calculated, calculation not applicable.
ND = Not Detected

Calculations are performed before rounding to avoid round-off errors in calculated results.

Enseco
A Corning Company

METHOD BLANK REPORT
Volatile Organics by GC
Project: 013410

Test: GRO-UST-S Gasoline Range Organics (GRO)
Matrix: SOIL
QC Lot: 15 DEC 92-G10 QC Run: 14 JAN 93-G10

Analyte	Result	Units	Reporting Limit
Gasoline Range Organics	ND	ug/kg	6200

Test: GRO-UST-S Gasoline Range Organics (GRO)
Matrix: SOIL
QC Lot: 15 DEC 92-G10 QC Run: 15 JAN 93-G10

Analyte	Result	Units	Reporting Limit
Gasoline Range Organics	ND	ug/kg	6200

Test: 8020-TCL-MED-S Volatile Organics Aromatic Compounds
Matrix: SOIL
QC Lot: 29 DEC 92-G13 QC Run: 18 JAN 93-G13

Analyte	Result	Units	Reporting Limit
Benzene	ND	ug/kg	62
Toluene	ND	ug/kg	62
Ethylbenzene	ND	ug/kg	62
Chlorobenzene	ND	ug/kg	62
Xylenes (total)	ND	ug/kg	62
1,4-Dichlorobenzene	ND	ug/kg	62
1,3-Dichlorobenzene	ND	ug/kg	62
1,2-Dichlorobenzene	ND	ug/kg	62

ND = Not Detected

Enseco
A Corning Company

SINGLE CONTROL SAMPLE REPORT
Volatile Organics by GC
Project: 013410

Category: GRO-S Gasoline Range Organics (GRO)
Matrix: SOIL
QC Lot: 15 DEC 92-G10 QC Run: 15 JAN 93-G10
Concentration Units: ug/kg

Analyte	Concentration Spiked	Measured	Accuracy(%) SCS	Limits
a,a,a-Trifluorotoluene	3750	3300	88	60-140

Category: GRO-S Gasoline Range Organics (GRO)
Matrix: SOIL
QC Lot: 15 DEC 92-G10 QC Run: 14 JAN 93-G10
Concentration Units: ug/kg

Analyte	Concentration Spiked	Measured	Accuracy(%) SCS	Limits
a,a,a-Trifluorotoluene	3750	3670	97	60-140

Category: 8020-S Aromatic Volatile Organics
Matrix: SOIL
QC Lot: 29 DEC 92-G13 QC Run: 18 JAN 93-G13
Concentration Units: ug/kg

Analyte	Concentration Spiked	Measured	Accuracy(%) SCS	Limits
a,a,a-Trifluorotoluene	30.0	30.8	103	60-140

Calculations are performed before rounding to avoid round-off errors in calculated results.

State of North Carolina
Department of Environment, Health, and Natural Resources
Winston-Salem Regional Office

James G. Martin, Governor
William W. Cobey, Jr., Secretary

Margaret Plemmons Foster
Regional Manager

DIVISION OF ENVIRONMENTAL MANAGEMENT
GROUNDWATER SECTION

December 14, 1992

Unocal Corporation
13 Corporate Square NE
P O Box 4147
Atlanta, GA 30329

SUBJECT: MONITOR WELL CONSTRUCTION
PERMIT NO. 00-0361-WM-0130
ALAMANCE COUNTY
FILE NAME: Red Horse Truck Stop

Dear Sir:

In accordance with your application received November 13, 1992, we are forwarding herewith Monitor Well Construction Permit No. 00-0361-WM-0130 for the construction of eight monitor wells or more as needed in the Carolina Slate Belt Hydrogeologic Unit.

Henceforth, correspondence and data relating to these wells shall be designated as specified in the subject heading above.

This Permit will be effective from the date of its issuance and shall be subject to the conditions and limitations as specified therein.

Sincerely,

Sherri V. Knight

Sherri V. Knight
Groundwater Supervisor

LDC/SVK/ahl
Enclosure
cc: Groundwater Section - Central Office
Alamance County Health Department
WSRO Files
S&ME
Ray Jernigan

8025 North Point Boulevard, Suite 100, Winston-Salem, N.C. 27106-3203 • Telephone [illegible] (919) 896-7007

NORTH CAROLINA

ENVIRONMENTAL MANAGEMENT COMMISSION

DEPARTMENT OF ENVIRONMENT, HEALTH AND NATURAL RESOURCES

PERMIT FOR THE CONSTRUCTION OF

A MONITOR WELL OR WELL SYSTEM

In accordance with the provisions of Article 7, Chapter 87, North Carolina General Statutes, and other applicable Laws, Rules, and Regulations.

PERMISSION IS HEREBY GRANTED TO

Unocal Corporation

FOR THE CONSTRUCTION OF EIGHT MONITOR WELLS OR MORE AS NEEDED in the Carolina Slate Belt Hydrogeologic unit located at I-85 North Access Road and Trollingwood Road, Mebane, North Carolina in Alamance County in accordance with the application dated November 10, 1992, and in conformity with the specifications and supporting data, all of which are filed with the Department of Environment, Health and Natural Resources and are considered a part of this Permit.

This Permit is for well construction only, and does not waive any provisions or requirements or any other applicable laws or regulations.

Construction of a well under this Permit shall be in compliance with the North Carolina Well Construction Regulations and Standards, and any other laws and regulations pertaining to well construction.

This Permit will be effective from the date of its issuance until the site assessment has been completed, and shall be subject to other specified conditions, limitations or exceptions as follows:

1. Written permission must be obtained from the property owner prior to construction of the wells.

2. A permanent identification plate with the date of construction, depth of well, screen interval, depth of grout, drilling contractor, and his registration number shall be attached to the well head or the outer protective steel casing.

3. The well construction completion form and all water quality data are to be submitted to the Central Office of the Groundwater Section P. O. Box 29535, Raleigh, North Carolina 27611.

4. All laboratory analysis of Groundwater samples collected from the permitted monitor wells are to be submitted to North Carolina Department of Environment, Health, and Natural Resources, Groundwater Section, P. O. Box 29535, Raleigh, N. C. 27611 with a copy to the North Carolina Department of Environment, Health and Natural Resources, Groundwater Section, 8025 North Point Boulevard, Suite 100, Winston-Salem, N. C. 27106 within 60 days of well completion, and quarterly thereafter.

5. All additional investigative findings in relation to the pollution sources being monitored, as indicated under "Additional Information" of form GW-22M ("Item J" of form GW-22B) of permit application, are to be submitted to North Carolina Department of Environment, Health and Natural Resources, Groundwater Section, P. O. Box 29535, Raleigh, N. C. 27611 with a copy to North Carolina Department of Environment, Health, and Natural Resources, Groundwater Section, 8025 North Point Boulevard, Suite 100, Winston-Salem, N. C. 27106 within 60 days of well completion, and quarterly thereafter.

6. The well shall be afforded a means of protection against vandalism, damage, or unauthorized use.

7. When any monitor well is no longer useful for its intended purpose, it shall be abandoned in compliance with North Carolina Administrative Code 15. 2C.0113 and a well abandonment form sent to the North Carolina Department of Environment, Health, and Natural Resources, Groundwater Section, P. O. Box 29535, Raleigh, N. C. 27611 with a copy to North Carolina Department of Environment, Health and Natural Resources, Groundwater Section, 8025 North Point Boulevard, Suite 100, Winston-Salem, N. C. 27106.

8. The monitor well shall be constructed in accordance with the Groundwater Section's recommended construction details as outlined in attachment #1.

9. A county monitor well construction permit shall be required by the county health departments where applicable. In Forsyth County, contact the Forsyth County Health Department, Division of Environmental Health, P.O. Box 686, Winston-Salem, NC 27102-0686.

10. If additional monitor wells, not shown on the location diagram, need to be constructed, a map showing the proposed location shall be submitted to the Winston-Salem Regional Office, 8025 North Point Blvd., Suite 100, Winston-Salem, NC 27106.

Permit issued this the 14th day of December 1992

FOR THE NORTH CAROLINA ENVIRONMENTAL MANAGEMENT COMMISSION

Larry D. Coble

Larry D. Coble, Regional Supervisor
Division of Environmental Management

By Authority of the Environmental Management Commission