D H E C

PROMOTE PROTECT PROSPER

C. Earl Hunter, Commissioner

Promoting and protecting the health of the public and the environment

MAY 17 2007

CASE Diverture

JERRY GREEN
GREENS OIL CO
2457 BREEN CIRCLE
ROCK HILL SC 29732

Re: Greens Oil Co., 2849 Cherry Rd, Rock Hill, SC
UST Permit #09344
Release Reported July 18, 1989
Corrective Action Status Evaluation Report received May 11, 2007
York County

Dear Mr. Green:

The Underground Storage Tank (UST) Program has reviewed the report submitted by ECS documenting the groundwater-sampling event. The next Corrective Action Status Evaluation Report should be submitted no later than August 15, 2007

On all correspondence concerning this site, please reference UST Permit #09344. If there are any questions concerning this project, please contact me at (803) 896-6397, via fax at (803) 896-6245, or by e-mail at thomadl@dhec.sc.gov.

Sincerely,

Debra L Thoma

Debra L. Thoma, Hydrogeologist
Northeastern SC Corrective Action Section
Assessment & Corrective Action Division
Underground Storage Tank Program
Bureau of Land & Waste Management

Cc: Brian Demme, ECS, 13504 South Point Blvd., Unit F, Charlotte, NC, 28273
Technical File

UST PROGRAM
DOCKETING # 1

GROUNDWATER MONITORING REPORT
GREEN'S OIL COMPANY
2849 CHERRY RD.
ROCK HILL, YORK COUNTY
UST PERMIT NO. 09344
SITE RISK CLASSIFICATION: HIGH
LAND USE CLASSIFICATION: COMMERCIAL
ECS PROJECT NO. 14-811030

Prepared For:

Federated Insurance Company
c/o Jerry Green
2457 Breen Circle
Rock Hill, SC 29732

Prepared By:

Environmental Compliance Services, Inc.
13504 South Point Blvd., Unit F
Charlotte, NC 28273
(704) 583-2711

September 14, 2007

James D. Rudder, Jr., P.G.
Branch Manager

ROBERT R. THOMPSON III
REGISTERED
NO.
2328
SOUTH CAROLINA
PROFESSIONAL GEOLOGIST

Robert R. Thompson, III
Senior Project Manager
SC Registration No. 2328

TABLE OF CONTENTS

1.0 INTRODUCTION

This report presents the results of groundwater monitoring activities, conducted on June 25, 2007, at the Green's Oil Company site in Rock Hill, South Carolina. The site previously operated as a gas station located in a commercial/industrial area of York County. Public or private water supply wells were not reported within 1,000 feet of the site. Two abandoned water supply wells were located down gradient of the site. Surface water bodies were not identified within 500 feet of the source area. The Catawba River, located approximately 3,000 feet north of the site in the downgradient direction, was the only known potential receptor identified during the receptor survey.

A previously prepared Corrective Action Plan (CAP) that proposed remediation of petroleum impacted soil and groundwater beneath the site using excavation, de-watering, backfilling with microbial augmented soil, and subsequent microbial injections, was submitted to the SCDHEC by CBM Environmental Services, Inc. (CBM) on January 23, 2004. The SCDHEC approved the CAP in correspondence dated March 29, 2004. However, subsequent telephone conversations between CBM and the responsible party's insurance company (Federated Insurance) indicated that Federated Insurance would only approve soil excavation, de-watering, and backfilling with microbial augmented soil. Microbial injections, if needed, would be implemented after two to three quarters of groundwater monitoring. The initial remedial activities consisting of soil excavation, backfilling with microbial augmented soil, and compaction were completed in December 2004.

2.0 FACILITY INFORMATION

- **Facility Name**: Green's Oil Company
- **Location:** 2849 Cherry Road
  Rock Hill, York County (**Figure 1**)
- **UST Permit No.** 09344
- **Risk Classification:** High
- **Land Use Classification:** Commercial
- **UST Operator:** Green's Oil Company
  2849 Cherry Road
  Rock Hill, South Carolina
- **UST Owner:** Green's Oil Company
  2849 Cherry Road
  Rock Hill, South Carolina
- **Consultant:** Environmental Compliance Services, Inc
  13504 South Point Boulevard
  Charlotte, North Carolina 28273
  (704) 583-2711
- **Release Information:**
  - **Date Discovered:** Unknown
  - **Estimated Quantity of Release:** Unknown
  - **Cause of Release:** Unknown
  - **Source of Release:** Leaking UST System
  - **UST System Size/Contents:** Four gasoline USTs
  - **Latitude / Longitude:** 34°58'42" North/ 80°58'54" West

3.0 SAMPLING ACTIVITIES

3.1 Site Hydrogeology

The depths to groundwater in the Shallow (water table) monitoring wells measured on June 25, 2007 ranged from 7.03 feet (MW-5) to 10.40 feet (MW-4). Groundwater elevations relative to a temporary benchmark with an assumed datum of 100.00 feet, ranged from 86.51 feet (MW-4) to 90.23 feet (MW-7). Based on the June 2007 data, the horizontal groundwater flow was controlled by a groundwater divide trending east-west beneath the site. Groundwater north of monitoring wells MW-1R and MW-7 appeared to flow toward the north, and groundwater in the vicinity of well MW-5 appeared to flow toward the south. The apparent horizontal hydraulic gradient to the north was approximately 0.04 feet per foot, and toward the south approximately 0.06 feet per foot. Groundwater elevation data obtained on June 25, 2007 data is presented in **Table 1**. A summary of historical groundwater elevation data is presented in **Table 2**. A groundwater Elevation Map, based on the June 25, 2007 data, is included as **Figure 3**.

3.2 Groundwater Sampling

On June 25, 2007, six Shallow monitoring wells (MW-1R, MW-2, MW-4, MW-5, MW-6 and MW-7) and one Telescoping monitoring well (PW-8) were purged and sampled. Monitoring well MW-3 was dry and was therefore not sampled during the site visit. Laboratory analyses were performed on groundwater samples collected from the monitoring wells for BTEX (benzene, toluene, ethylbenzene, and total xylenes), MTBE (methyl-tert-butyl ether) and naphthalene by EPA Method 8260B.

4.0 GROUNDWATER QUALITY

Concentrations of benzene and MTBE that exceeded the May 2001 risk based screening level (RBSL) were reported in the groundwater samples collected from monitoring wells MW-1R and MW-2. A detectable concentration of benzene below the RBSL was reported in the groundwater sample collected from monitoring well MW-4. A detectable concentration of toluene below the RBSL was reported in the groundwater sample collected from monitoring well MW-2. Detectable concentrations of ethylbenzene below the RBSL were reported in the groundwater samples collected from monitoring wells MW-1R and MW-2. A detectable concentration of total xylenes below the RBSL was reported in monitoring well MW-1R. Detectable concentrations of MTBE below the RBSL were reported in the groundwater samples collected from monitoring wells MW-4, MW-7 and PW-8. Detectable concentrations of naphthalene below the RBSL were reported in the groundwater samples collected from monitoring wells MW-1R, MW-2, MW-4, and MW-5. Detectable concentrations of requested method constituents were not reported in the groundwater sample collected from monitoring well MW-6.

A summary of laboratory analyses of groundwater samples collected from the monitoring wells on June 25, 2007 is presented in **Table 3**. A summary of historical groundwater quality data is presented in **Table 4**. A Groundwater Quality Map showing individual BTEX constituents, MTBE and naphthalene concentrations in the groundwater samples collected from the monitoring wells during the June 25, 2007 sampling event is included as **Figure 4**. Groundwater sampling field data sheets from the June 25, 2007 sampling event have been included as **Appendix A.** A complete report of laboratory analyses of groundwater samples collected during the June 25, 2007 sampling event has been included as **Appendix B**. Graphs showing variations in BTEX, MTBE, and naphthalene concentrations versus time since completion of the December 2004 remedial activities have been included as **Appendix C**. Graphs showing total VOC concentrations versus depths to groundwater have been included as **Appendix D** Refer to previous Groundwater Monitoring Reports for graphical representations of BTEX, MTBE, and naphthalene concentrations prior to the December 2004 remedial activities. A disposal manifest was not available at this time and will be forwarded upon receipt.

5.0 CONCLUSIONS AND RECOMMENDATIONS

The following comparisons are between the February 27, 2007 and June 25, 2007 groundwater sampling events:

- Concentrations of benzene decreased in MW-1R and MW-4 from February 27 to June 25, 2007.
- Concentrations of toluene and ethylbenzene decreased in MW-1R and increased in MW-2.
- Concentrations of total xylenes decreased in MW-1R and MW-2.
- Concentrations of MTBE decreased in MW-1R, MW-4, and MW-5, and increased in MW-2, and PW-8.
- Concentrations of naphthalene decreased in MW-1R and MW-4, and increased in MW-2 and MW-5.
- The total VOC concentrations have increased slightly in monitoring wells MW-2, MW-5, and PW-8 compared to the February 27, 2007 sampling event. The total VOC concentrations have decreased in monitoring wells MW-1R and MW-4 compared to the February 27, 2007 sampling event. Total VOC concentrations in monitoring well MW-6 remain below laboratory reporting limits.

Environmental Compliance Services Inc. (ECS) recommends quarterly groundwater sampling to monitor trends in the concentrations of chemicals of concern (COC). Site closure would be pursued following two to three consecutive quarterly sampling events with concentrations of COC below their respective RBSL.

6.0 LIMITATIONS

This report has been prepared for the exclusive use of Mr. Jerry Green for specific application to the referenced site in York County, South Carolina. The assessment was conducted based on the scope of work and level of effort desired by the client and with resources adequate only for that scope of work.

Certain data contained in this report was not obtained under the supervision of ECS. Although the accuracy of this data cannot be verified, for the purpose of this report ECS assumes it is correct. Our findings have been developed in accordance with generally accepted standards of geology and hydrogeology practices in the State of South Carolina, available information, and our professional judgment. No other warranty is expressed or implied.

The data presented in this report are indicative of conditions that existed at the precise locations sampled and at the time the samples were collected. In addition, the data obtained from samples would be interpreted as being meaningful with respect to parameters indicated in the laboratory report. No additional information can be logically inferred from this data.

TABLES

TABLE 1
SUMMARY OF GROUNDWATER ELEVATION DATA[1]
GREEN'S OIL COMPANY
June 25, 2007

Well ID	Top of Casing Elevation	Depth to Groundwater	Groundwater Elevation	Well Depth[2]	Dissolved Oxygen[3]
MW-1R[4]	98.30	8.08	90.22	9.85	3.04
MW-2	97.86	8.56	89.30	14.23	1.51
MW-3	97.08	DRY	DRY	7.75	DRY
MW-4	96.91	10.40	86.51	13.60	2.80
MW-5	97.04	7.93	89.11	10.30	4.75
MW-6	98.59	8.76	89.83	9.95	4.78
MW-7	98.40	8.17	90.23	13.55	2.57
PW[5]-8	96.98	7.84	89.14	30.90	1.50

Notes:

1. Top of Casing Elevations for monitoring wells MW-2 through MW-7 and PW-8 were reproduced from the previous consultant's reports. Additional well construction details are unavailable; data reported in feet.
2. Well depths for monitoring wells MW-2 through MW-7 and PW-8 measured during June 12, 2003 sampling event and remeasured during the February 27, 2007 sampling event. Well depths shown above are from February 27, 2007 measurements.
3. Dissolved oxygen (DO) levels were measured in the field using a DO meter; results reported in mg/L.
4. Monitoring well MW-1R was installed as a replacement for monitoring well MW-1 on January 26, 2005.
5. Telescoping monitoring well.

TABLE 2
HISTORICAL SUMMARY OF GROUNDWATER ELEVATION DATA[1]
GREEN'S OIL COMPANY

Well ID	Date Measured	Top of Casing Elevation (feet)	Depth to Groundwater (feet)	Groundwater Elevation (feet)	Well Depth[2] (feet)	Screened Interval (feet)
MW-1	05/24/00	98.15	7.16	90.99	12.33	NA[3]
	10/09/00		7.78	90.37		
	01/02/01		9.58	88.57		
	12/16/02		5.11	93.04		
	06/12/03		2.59	95.56		
	11/22/04		9.36	88.79		
MW-1R[4]	01/31/05	98.30	8.66	89.64	9.85	NA
	04/27/05		4.48	93.82		
	08/17/05		7.39	90.91		
	11/28/05		9.75	88.55		
	03/14/06		7.31	90.99		
	02/27/07		4.82	93.48		
	06/25/07		8.08	90.22		
MW-2	05/24/00	97.86	7.03	90.83	14.23	NA
	10/09/00		7.71	90.15		
	01/02/01		9.43	88.43		
	12/16/02		4.91	92.95		
	06/12/03		2.47	95.39		
	11/22/04		9.26	88.60		
	01/31/05		8.36	89.50		
	04/27/05		4.65	93.21		
	08/17/05		7.59	90.27		
	11/28/05		9.92	87.94		
	03/14/06		7.47	90.39		
	02/27/07		4.50	93.36		
	06/25/07		8.56	89.30		
MW-3	12/16/02	97.08	5.83	91.25	7.75	NA
	06/12/03		3.01	94.07		
	11/22/04		Dry	Dry		
	01/31/05		Dry	Dry		
	04/27/05		5.00	92.08		
	08/17/05		Dry	Dry		
	11/28/05		Dry	Dry		
	03/14/06		Dry	Dry		
	02/27/07		5.29	91.79		
	06/25/07		Dry	Dry		
MW-4	12/16/02	96.91	6.66	90.25	13.60	NA
	06/12/03		3.52	93.39		
	11/22/04		NM[5]	NM		
	01/31/05		NM	NM		
	04/27/05		5.75	91.16		
	08/17/05		9.65	87.26		
	11/28/05		12.32	84.59		
	03/14/06		NM	NM		
	02/27/07		5.86	91.05		
	06/25/07		10.40	86.51		

TABLE 2 (continued)
HISTORICAL SUMMARY OF GROUNDWATER ELEVATION DATA
GREEN'S OIL COMPANY

Well ID	Date Measured	Top of Casing Elevation (feet)	Depth to Groundwater (feet)	Groundwater Elevation (feet)	Well Depth[2] (feet)	Screened Interval (feet)
MW-5	05/24/00	97.04	6.56	90.48	10.30	NA
	10/09/00		7.15	89.89		
	01/02/01		8.90	88.14		
	12/16/02		4.67	92.37		
	06/12/03		2.20	94.84		
	11/22/04		8.67	88.37		
	01/31/05		7.84	89.20		
	04/27/05		4.26	92.78		
	08/17/05		6.99	90.05		
	11/28/05		9.28	87.76		
	03/14/06		6.95	90.09		
	02/27/07		4.24	92.80		
	06/25/07		7.93	89.11		
MW-6	05/24/00	98.59	8.10	90.49	9.95	NA
	10/09/00		7.92	90.67		
	01/02/01		9.52	89.07		
	12/16/02		5.25	93.34		
	06/12/03		2.89	95.70		
	11/22/04		9.44	89.15		
	01/31/05		8.59	90.00		
	04/27/05		4.98	93.61		
	08/17/05		7.80	90.79		
	11/28/05		9.58	89.01		
	03/14/06		7.67	90.92		
	02/27/07		4.83	93.76		
	06/25/07		8.76	89.83		
MW-7	12/16/02	98.40	4.81	93.59	13.55	NA
	06/12/03		3.29	95.11		
	11/22/04		NF[6]	NF		
	01/31/05		NF	NF		
	04/27/05		4.40	94.00		
	08/17/05		6.22	92.18		
	11/28/05		9.64	88.76		
	03/14/06		7.20	91.20		
	02/27/07		NF	NF		
	06/25/07		8.17	90.23		

TABLE 2 (continued)
HISTORICAL SUMMARY OF GROUNDWATER ELEVATION DATA
GREEN'S OIL COMPANY

Well ID	Date Measured	Top of Casing Elevation (feet)	Depth to Groundwater (feet)	Groundwater Elevation (feet)	Well Depth[2] (feet)	Screened Interval (feet)
PW[7]-8	05/24/00	96.98	6.45	90.53	30.90	NA
	10/09/00		7.12	89.86		
	01/02/01		8.69	88.29		
	12/16/02		4.46	92.52		
	06/12/03		2.60	94.38		
	11/22/04		5.34	91.64		
	01/31/05		7.45	89.53		
	04/27/05		4.65	92.33		
	08/17/05		6.22	90.76		
	11/28/05		9.23	87.75		
	03/14/06		6.88	90.10		
	02/27/07		4.22	92.76		
	06/25/07		7.84	89.14		

Notes:

1. Top of Casing Elevations for monitoring wells MW-2 through MW-7 and PW-8 were reproduced from the previous consultant's reports. Additional well construction details are unavailable; data reported in feet.
2. Well depths for monitoring wells MW-2 through MW-7 and PW-8 measured during June 12, 2003 sampling event and remeasured during February 27, 2007 sampling event. Well depths shown above are from February 27, 2007 measurements.
3. Data not available.
4. Monitoring well MW-1R was installed as a replacement for monitoring well MW-1 on January 26, 2005.
5. Not measured. Well did not yield enough water for field measurements or was not accessible due to site obstruction.
6. Not found.
7. Telescoping monitoring well.

TABLE 3
SUMMARY OF GROUNDWATER ANALYTICAL DATA[1]
GREEN'S OIL COMPANY
JUNE 25, 2007

Well ID	Benzene (µg/L)	Toluene (µg/L)	Ethylbenzene (µg/L)	Total Xylenes (µg/L)	MTBE (µg/L)	Naphthalene (µg/L)
MW-1R[2]	**10.3** [3]	<1.00 [4]	14.7	21.5	**52.3**	18.0
MW-2	**26.8**	3.08	15.0	<3.00	**90.1**	**6.60**
MW-3	Dry	Dry	Dry	Dry	Dry	Dry
MW-4	0.710 J[5]	<1.00	<1.00	<3.00	35.7	13.0
MW-5	<1.00	<1.00	<1.00	<3.00	<1.00	4.00
MW-6	<1.00	<1.00	<1.00	<3.00	<1.00	<1.00
MW-7	<1.00	<1.00	<1.00	<3.00	1.96	<1.00
PW-8	<1.00	<1.00	<1.00	<3.00	12.9	<1.00
RBSL[6]	5	1,000	700	10,000	40	25

Notes:

1. Analyses for BTEX constiuents, MTBE and Naphthalene by EPA Method 8260B.
2. Monitoring well MW-1R was installed as a replacement for monitoring well MW-1.
3. Concentrations in bold face type exceeded the May 2001 Risk Based Screening Level.
4. Less than the reporting limit specified in the laboratory report.
5. J-The analyte was postively identified but the value is estimated below the reporting limit.
6. May 2001 Risk Based Screening Level.

TABLE 4

HISTORICAL SUMMARY OF GROUNDWATER ANALYTICAL DATA[1]

GREEN'S OIL COMPANY

Well ID	Date Sampled	Benzene (µg/L)	Toluene (µg/L)	Ethylbenzene (µg/L)	Total Xylenes (µg/L)	MTBE (µg/L)	Naphthalene (µg/L)	Lead (µg/L)
MW-1	10/24/96	**3,040**[2]	164	325	950	**2,310**	**365**	NR[3]
	05/09/00	**1,790**	255	302	611	**1,300**	**117**	12.0
	10/09/00	**1,600**	180	220	400	**850**	**350**	<3.0[4]
	01/02/01	**500**	9.0	38	68	**460**	**55**	<3.0
	12/16/02	**3,000**	**12,000**	**3,700**	**14,000**	**920**	**1,700**	14
	06/12/03	**2,280**	**9,520**	**1,980**	**17,400**	**801**	**991**	NR
	11/22/04	**2,560**	**3,820**	**2,240**	**14,200**	**790**	**2,880**	NR
MW-1R[5]	01/31/05	**1,510**	234	268	3,790	**864**	**310**	NR
	04/27/05	**2,760**	115	376	2,550	**916**	**297**	NR
	08/17/05	**2,880**	26.6	525	1,710	**1,200**	**498**	NR
	11/28/05	**47**	3.1	39	190	**120 E** [6]	**34**	NR
	03/14/06	**24**	<1.0	4.1	2.9J[7]	**98**	**5.0**	NR
	02/27/07	**95.8**	5.61	28.2	31.2	**160**	**89.2**	NR
	06/25/07	**10.3**	<1.00	14.7	21.5	**52.3**	18.0	NR
MW-2	10/24/96	<10.0	<10.0	<10.0	<3.0	**24,700**	<5.0	NR
	05/09/00	**5.2**	ND[8]	ND	ND	**19,900**	ND	ND
	10/09/00	**31**	5.7	<5.0	12	**11,000**	**15**	<3.0
	01/02/01	**7.2**	<5.0	<5.0	<5.0	**7,700**	<5.0	<3.0
	12/16/02	<5.0	<5.0	<5.0	7.2	**170**	12	<3.0
	06/12/03	4.0	<1.0	<1.0	<1.0	**157**	<5.00	NR
	11/22/04[9]	<1.0	<1.0	<1.0	<1.0	**54.9**	<5.00	NR
	01/31/05	<1.0	<1.0	<1.0	<1.0	**68.8**	<5.00	NR
	04/27/05	1.5	<1.0	<1.0	<1.0	**168**	<5.00	NR
	08/17/05	**12.3**	1.66	1.25	<2.0	**104**	<5.00	NR
	11/28/05	**7.5**	2.80	1.20	<3.0	**92**	<1.0	NR
	03/14/06	3.3	0.69 J	<1.0	0.79J	**92**	<1.0	NR
	02/27/07	2.22	1.21	<1.00	0.650 J	**89.7**	5.12	NR
	06/25/07	**26.8**	3.08	15.0	<3.00	**90.1**	6.60	NR
MW-3	10/24/96	NF[11]	NF	NF	NF	NF	NF	NF
	05/09/00	NF	NF	NF	NF	NF	NF	NF
	10/09/00	NF	NF	NF	NF	NF	NF	NF
	01/02/01	NF	NF	NF	NF	NF	NF	NF
	12/12/02	**150**	**5,800**	**2,400**	**14,000**	<25	**920**	**21**
	06/12/03	4.2	135	150	1,920	2.9	**260**	NR
	11/22/04	Dry	Dry	Dry	Dry	Dry	Dry	NR
	01/31/05	Dry	Dry	Dry	Dry	Dry	Dry	NR
	04/27/05	<1.0	<1.0	<1.0	3.7	<1.0	<5.00	NR
	08/17/05	Dry	Dry	Dry	Dry	Dry	Dry	Dry
	11/28/05	Dry	Dry	Dry	Dry	Dry	Dry	Dry
	03/14/06	Dry	Dry	Dry	Dry	Dry	Dry	Dry
	02/27/07	<1.00	<1.00	<1.00	<3.00	<1.00	<1.00	NR
	06/25/07	Dry	Dry	Dry	Dry	Dry	Dry	NR
	RBSL[10]	5	1,000	700	10,000	40	25	15

TABLE 4 (continued)
HISTORICAL SUMMARY OF GROUNDWATER ANALYTICAL DATA
GREEN'S OIL COMPANY

Well ID	Date Sampled	Benzene (µg/L)	Toluene (µg/L)	Ethylbenzene (µg/L)	Total Xylenes (µg/L)	MTBE (µg/L)	Naphthalene (µg/L)	Lead (µg/L)
MW-4	10/24/96	<1.0	<1.0	<1.0	<3.0	**70.4**	<5.0	NR
	05/09/00	NF	NF	NF	NF	NF	NF	NF
	10/09/00	NF	NF	NF	NF	NF	NF	NF
	01/02/01	NF	NF	NF	NF	NF	NF	NF
	12/16/02	<5.0	<5.0	<5.0	<5.0	**160**	8.5	5.8
	06/12/03	<1.0	<1.0	<1.0	<1.0	**198**	<5.00	NR
	11/22/04	NS[12]	NS	NS	NS	NS	NS	NS
	01/31/05	NS	NS	NS	NS	NS	NS	NS
	04/27/05	1.4	<1.0	<1.0	8.8	**160**	**152**	NR
	08/17/05	<1.00	<1.00	<1.00	5	**139**	**102**	NR
	11/28/05	<1.0	<1.0	<1.0	<3.0	**170**	**71**	NR
	03/14/06	NS	NS	NS	NS	NS	NS	NS
	02/27/07	1.03	<1.00	<1.00	<3.00	**96.5**	**47.8**	NR
	06/25/07	0.710 J	<1.00	<1.00	<3.00	35.7	13.0	NR
MW-5	10/24/96	<1.0	<1.0	<1.0	<3.0	**1,720**	<5.0	NR
	05/09/00	ND	ND	ND	ND	**14,000**	ND	ND
	10/09/00	<5.0	<5.0	<5.0	<5.0	**9,100**	<5.0	<3.0
	01/02/01	<5.0	<5.0	<5.0	<5.0	**1,400**	<5.0	<3.0
	12/12/02	<5.0	<5.0	<5.0	<5.0	14	<5.0	14
	06/12/03	<1.0	<1.0	<1.0	<1.0	3.1	<5.00	NR
	11/22/04[13]	<1.0	<1.0	<1.0	<1.0	1.4	<5.00	NR
	01/31/05	<1.0	<1.0	<1.0	<1.0	<1.0	<5.00	NR
	04/27/05	<1.0	<1.0	<1.0	<1.0	<1.0	<5.00	NR
	08/17/05	<1.00	<1.00	<1.00	<2.00	1.23	<5.00	NR
	11/28/05	<1.0	<1.0	<1.0	<3.0	<1.0	<1.0	NR
	03/14/06	<1.0	<1.0	<1.0	<3.0	<1.0	<1.0	NR
	02/27/07	<1.00	<1.00	<1.00	<3.00	0.590 J	<1.00	NR
	06/25/07	<1.00	<1.00	<1.00	<3.00	<1.00	4.00	NR
MW-6	10/24/96	NS	NS	NS	NS	NS	NS	NS
	05/09/00	ND	ND	ND	ND	ND	ND	**52.0**
	10/09/00	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	**26.0**
	01/02/01	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	NS
	12/12/02	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	**48**
	06/12/03	<1.0	<1.0	<1.0	<1.0	<1.0	<5.00	NR
	11/22/04	<1.0	<1.0	<1.0	<1.0	<1.0	<5.00	NR
	01/31/05	<1.0	<1.0	<1.0	<1.0	<1.0	<5.00	NR
	04/27/05	<1.0	<1.0	<1.0	<1.0	<1.0	<5.00	NR
	08/17/05	<1.00	<1.00	<1.00	<2.00	<1.00	<5.00	NR
	11/28/05	<1.0	<1.0	<1.0	<3.0	<1.0	<1.0	NR
	03/14/06	<1.0	<1.0	<1.0	<3.0	<1.0	<1.0	NR
	02/27/07	<1.00	<1.00	<1.00	<3.00	<1.00	<1.00	NR
	06/25/07	<1.00	<1.00	<1.00	<3.00	<1.00	<1.00	NR
	RBSL	5	1,000	700	10,000	40	25	15

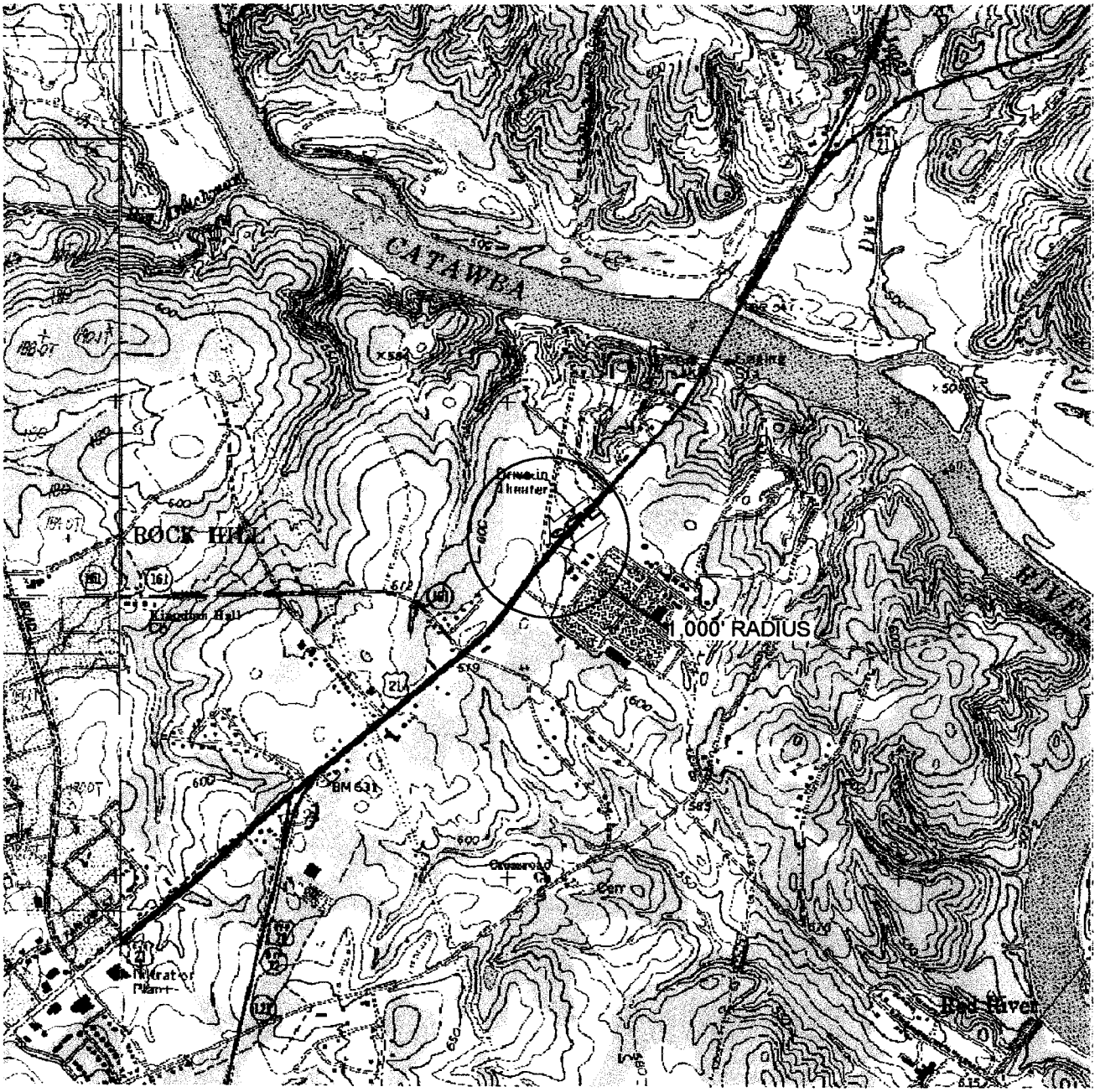
TABLE 4 (continued)
HISTORICAL SUMMARY OF GROUNDWATER ANALYTICAL DATA
GREEN'S OIL COMPANY

Well ID	Date Sampled	Benzene (µg/L)	Toluene (µg/L)	Ethylbenzene (µg/L)	Total Xylenes (µg/L)	MTBE (µg/L)	Naphthalene (µg/L)	Lead (µg/L)
MW-7	10/24/96	NF	NF	NF	NF	NF	NF	NF
	05/09/00	NF	NF	NF	NF	NF	NF	NF
	10/09/00	NF	NF	NF	NF	NF	NF	NF
	01/02/01	NF	NF	NF	NF	NF	NF	NF
	12/12/02	<5.0	<5.0	<5.0	<5.0	**160**	<5.0	**58**
	06/12/03	<1.0	<1.0	<1.0	<1.0	**294**	<5.00	NR
	11/22/04	NF	NF	NF	NF	NF	NF	NF
	01/31/05	NF	NF	NF	NF	NF	NF	NF
	04/27/05	<1.0	<1.0	<1.0	<1.0	1.3	<5.00	NR
	08/17/05	<1.00	<1.00	<1.00	<2.00	22.7	<5.00	NR
	11/28/05	<1.0	<1.0	<1.0	<3.0	**65**	<1.0	NR
	03/14/06	<1.0	<1.0	<1.0	<3.0	1.5	<1.0	NR
	02/27/07	NF	NF	NF	NF	NF	NF	NF
	06/25/07	<1.00	<1.00	<1.00	<3.00	1.96	<1.00	NR
PW-8	10/24/96	<1.0	<1.0	<1.0	<3.0	**547**	<5.0	NR
	05/09/00	ND	ND	ND	ND	**790**	ND	ND
	10/09/00	<5.0	<5.0	<5.0	6.1	**180**	<5.0	<3.0
	01/02/01	<5.0	<5.0	<5.0	<5.0	**160**	<5.0	<3.0
	12/12/02	<5.0	<5.0	<5.0	<5.0	**44**	<5.0	<3.0
	06/12/03	<1.0	<1.0	<1.0	<1.0	**84.6**	<5.00	NR
	11/22/04[14]	<1.0	<1.0	<1.0	<1.0	9.7	<5.00	NR
	01/31/05	<1.0	<1.0	<1.0	<1.0	1.3	<5.00	NR
	04/27/05	<1.0	<1.0	<1.0	<1.0	6.3	<5.00	NR
	08/17/05	<1.00	<1.00	<1.00	<2.00	23.4	<5.00	NR
	11/28/05	<1.0	<1.0	<1.0	<3.0	15.0	<1.0	NR
	03/14/06	<1.0	<1.0	<1.0	<3.0	5.9	<1.0	NR
	02/27/07	<1.00	<1.00	<1.00	<3.00	4.09	<1.00	NR
	06/25/07	<1.00	<1.00	<1.00	<3.00	12.9	<1.00	NR
	RBSL	5	1,000	700	10,000	40	25	15

Notes:

1. Analyses for BTEX constituents, MTBE and Naphthalene by EPA Method 8260B; groundwater quality data prior to June 12, 2003 reproduced from previous consultant's reports. The data is assumed to be correct.
2. Concentrations in bold face type exceeded the January 1998 Risk Based Screening Level for samples collected before May 2001 and exceeded the May 2001 Risk Based Screening Level for samples collected after May 2001.
3. Analysis not requested.
4. Less than the reporting limit specified in the laboratory report.
5. Monitoring well MW-1R was installed as a replacement for monitoring well MW-1.
6. Estimated concentration, calibration range exceeded.
7. Estimated concentration below the laboratory reporting limit.
8. Not Detected.
9. Other compound detected (IPE: 294 µg/L).
10. May 2001 Risk Based Screening Level.
11. Well not found.
12. Not sampled due to insufficient volume of water in the well or well was not accessible.
13. Other compound detected (IPE: 21.8 µg/L)
14. Other compound detected (IPE: 13.4 µg/L)

FIGURES

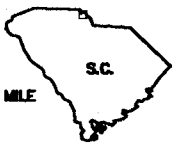


SCALE 1:24,000

1 0 1 MILE

1000 0 1000 2000 3000 4000 5000 6000 7000 FEET

CONTOUR INTERVAL 10 FEET



QUADRANGLE LOCATION

ROCK HILL EAST, SC QUADRANGLE

ecs
13904 South Point Blvd, Suite F
Charlotte, NC 28273
Phone 704-665-8711 Fax 704-665-8744

LATITUDE:	34° 58' 42" N
LONGITUDE:	80° 58' 54" W
DRAWN BY:	KB
CHECKED BY:	JR
DATE:	7/25/07

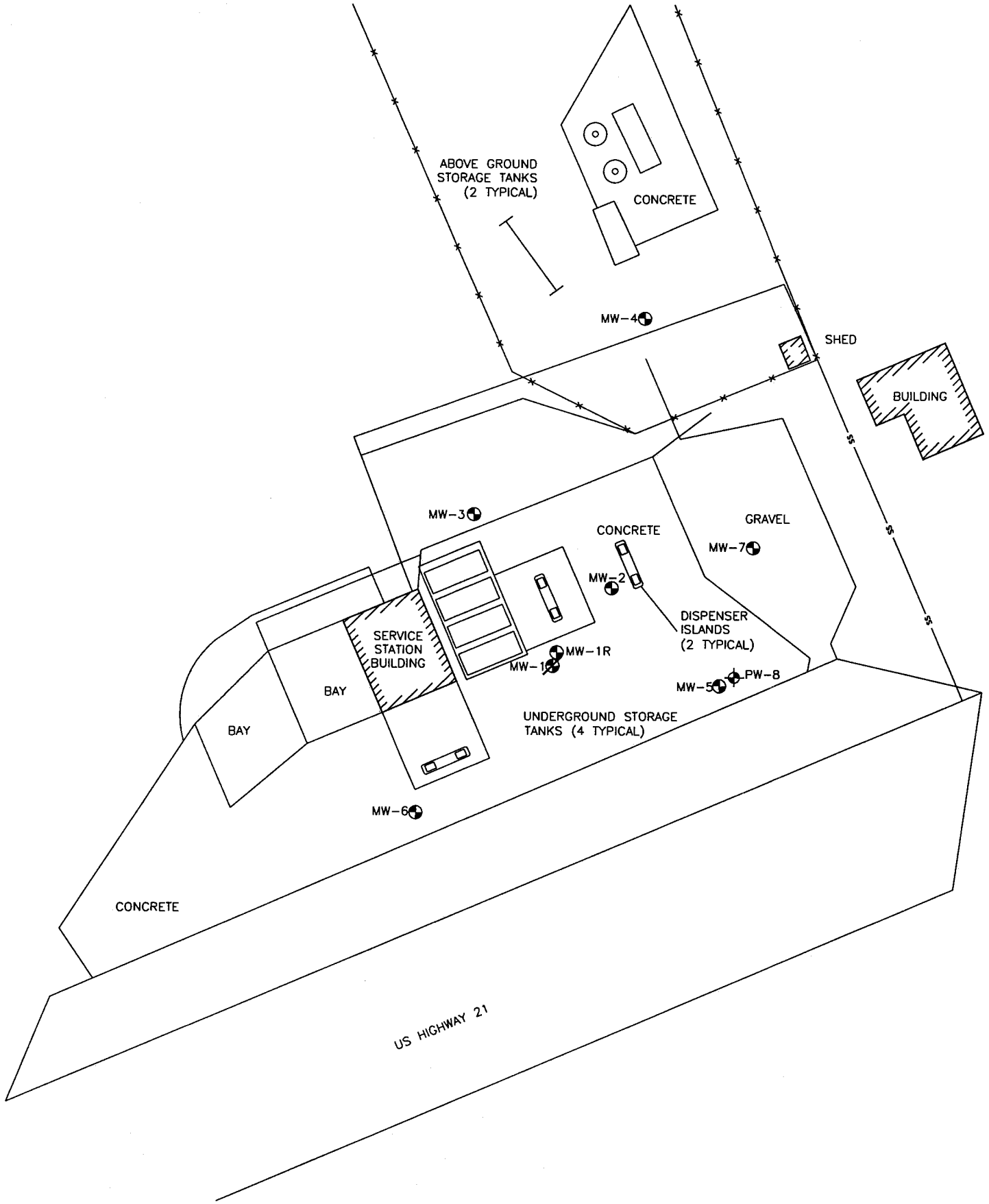
GREEN'S OIL CO.
2849 CHERRY RD.
ROCK HILL, SC

SITE I.D. NO. 09344

FIGURE 1

USGS TOPOGRAPHIC MAP

PROJECT NO. 14-811030



NOTE: FIGURE BASED ON SITE MAP BY PREVIOUS CONSULTANT.

Legend

- SS — Sanitary Sewer Line
- x — Fence
- Shallow (Water Table) Monitoring Well
- Shallow Monitoring Well (Abandoned)
- Telescoping Monitoring Well

General Notes:

All locations, dimensions, and property lines depicted on this plan are approximate. This plan should not be used for construction or land conveyance purposes.

ecs
13504 South Point Blvd, Suite F • Charlotte, NC 28273
Phone: (704)583-2711 Fax: (704)583-2744

PROJECT:
Green's Oil Company
2849 Cherry Road
Rock Hill, South Carolina

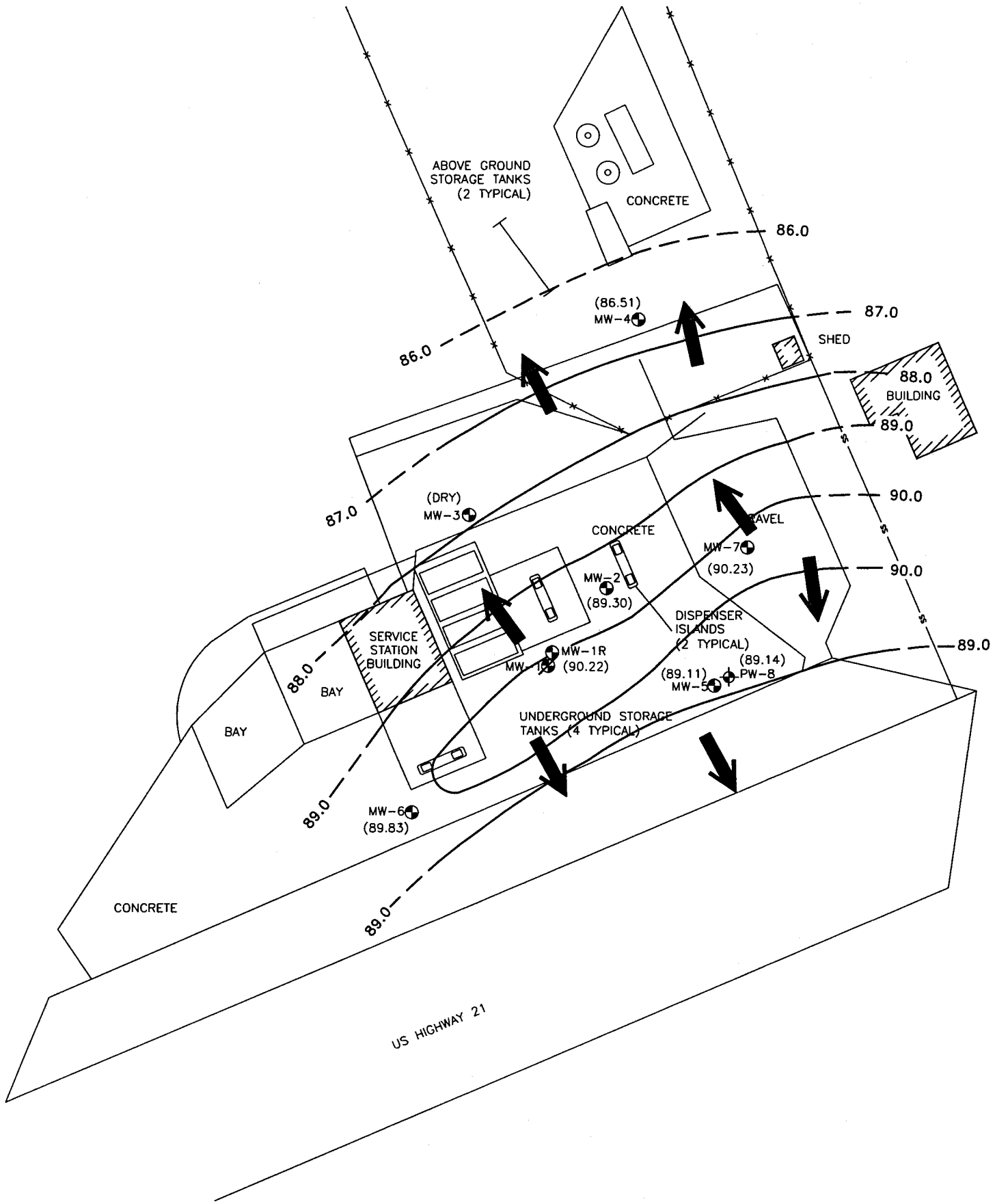
TITLE:
SITE MAP

CLIENT:
Federated Insurance

GRAPHIC SCALE: 40 20 0 20 40

COMPUTER CADFILE: C:\MyDocuments\Charlotte\811030 Green's Oil Company

DRAWN BY:	DESIGNED BY:	CHECKED BY:	APPROVED BY:
KB	KB	JR	JR
SCALE:	DATE:	JOB NO.:	FIGURE NO.:
1"=40'	7/25/07	14-811030	2



NOTE: FIGURE BASED ON SITE MAP BY PREVIOUS CONSULTANT.

Legend

- ss — Sanitary Sewer Line
- x — Fence
- Shallow (Water Table) Monitoring Well
- Shallow Monitoring Well (Abandoned)
- Telescoping Monitoring Well
- (90.23) Groundwater Elevation
- 90.00 — Water Table Contour (Dashed where inferred)
- (NF) Not Found
- Flow Direction Indicator

General Notes:

All locations, dimensions, and property lines depicted on this plan are approximate. This plan should not be used for construction or land conveyance purposes.

Horizontal, and vertical locations of wells, and selected site features determined through measurements made by representatives of ECS.

Groundwater elevations are based on a benchmark with an assumed datum of 100.00 feet.

Water table elevations are based on measurements made on June 25, 2007.

Water table contours, and flow directions assume homogenous, isotropic aquifer conditions, and horizontal flow.

Fluctuations in the level of the water table may occur due to factors not accounted for at the time of measurement.

Water table contours are interpolated between data points, and inferred in other areas.

Telescoping Monitoring Well not used in contouring.

ecs
13504 South Point Blvd, Suite F • Charlotte, NC 28273
Phone: (704)583-2711 Fax: (704)583-2744

PROJECT:
Green's Oil Company
2849 Cherry Road
Rock Hill, South Carolina

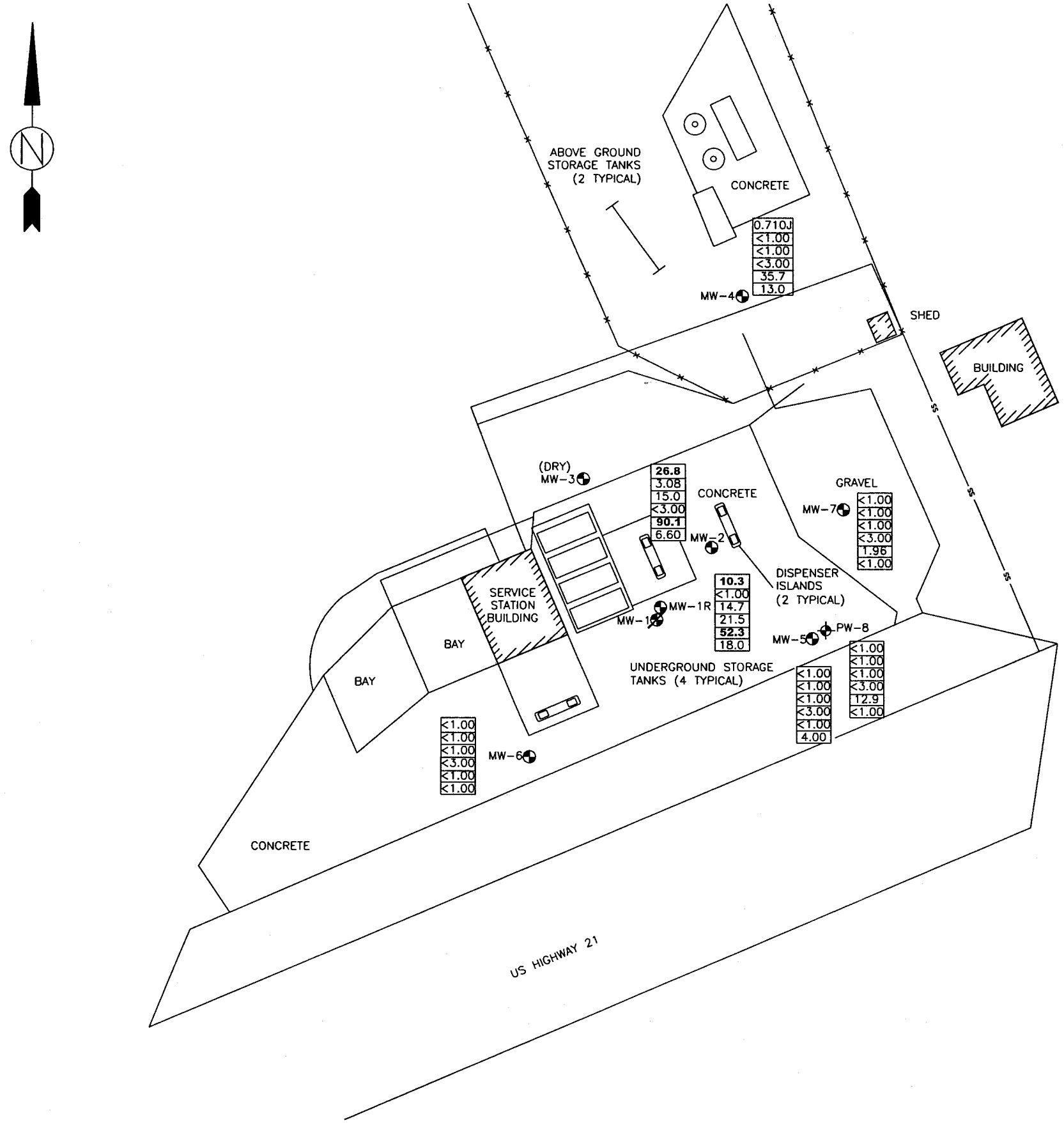
TITLE:
GROUNDWATER ELEVATION MAP 6/25/07

CLIENT:
Federated Insurance

GRAPHIC SCALE: 40 20 0 20 40

COMPUTER CADFILE: C:\MyDocuments\Charlotte\811030 Green's Oil Company

DRAWN BY:	DESIGNED BY:	CHECKED BY:	APPROVED BY:
KB	KB	JR	JR
SCALE:	DATE:	JOB NO.:	FIGURE NO.:
1"=40'	7/25/07	14-811030	3



NOTE: FIGURE BASED ON SITE MAP BY PREVIOUS CONSULTANT.

Legend

- SS — Sanitary Sewer Line
- x — Fence
- Shallow (Water Table) Manitoring Well
- Shallow Monitoring Well (Abondoned)
- Telescoping Monitoring Well

5	Benzene
1,000	Toluene
700	Ethylbenzene
10,000	Total Xylenes
40	MTBE
25	Naphthalene

All concentrations are measured in micrograms per liter (ug/L).

Above concentrations represent May 2001 Risk-Based Screening Levels; Concentrations in bold face type exceeded the RBSL.

J – Estimated Value between the method detection limit and the reporting limit.

<1.0 Less than the reporting limit specified in the laboratory report.

General Notes:

All locations, dimensions, and property lines depicted on this plan are approximate. This plan should not be used for construction or land conveyance purposes.

ecs
13504 South Point Blvd, Suite F • Charlotte, NC 28273
Phone: (704)583-2711 Fax: (704)583-2744

PROJECT:
Green's Oil Company
2849 Cherry Road
Rock Hill, South Carolina

TITLE:
GROUNDWATER QUALITY MAP 6/25/07

CLIENT:
Federated Insurance

GRAPHIC SCALE: 40 20 0 20 40

COMPUTER CADFILE :C:\MyDocuments\Charlotte\811030 Green's Oil Company

DRAWN BY:	DESIGNED BY:	CHECKED BY:	APPROVED BY:
KB	KB	JR	JR
SCALE:	**DATE:**	**JOB NO.:**	**FIGURE NO.:**
1"=40'	7/25/07	14-811030	4

APPENDIX A
GROUNDWATER SAMPLING FIELD DATA SHEETS

GAUGE REPORT

Environmental Compliance Services, Inc.
13504 South Point Boulevard, Unit F
Charlotte, NC 28273

Project Name:	Greens Oil	Location:	Rock Hill, SC
Project No.:	14-811030	Date:	6/25/2007
Measured By:	S Bryant	Weather:	Hot, Humid, 95

Well No.	Depth to Product (feet)	Depth to Water (feet)	Product Thickness (feet)	Product Recovered (gallons)	Well Depth (feet)	Volume Purged (gallons)
MW-1R	---	8.08	---	---	9.85	1.15
MW-2	---	8.56	---	---	14.23	11.10
MW-3	---	dry	---	---	7.75	0.00
MW-4	---	10.40	---	---	13.60	1.04
MW-5	---	7.93	---	---	10.30	1.16
MW-6	---	8.76	---	---	9.95	0.00
MW-7	---	8.17	---	---	13.55	1.76
PW-8	---	7.84	---	---	30.90	11.28

Remarks

South Carolina Department of Health and Environmental Control
Bureau of Underground Storage Tank Management

Field Data Information Sheet for Ground Water Sampling

Date	6/25/2007		
Field Personnel	S Bryant		
General Weather Conditions	Hot, Humid		
Ambient Air Temperature	95		
Facility Name:	Greens Oil	Site ID #	

Quality Assurance:

pH Meter:	YSI-556	Conductivity Meter	
serial no.	06H2174 AG	serial no.	06H2174 AG
pH =4.0	4	Standard	1420
pH =7.0	7	Standard	
pH =10.0	10	Standard	

Chain of Custody

S Bryant	6/27/07 @ 9:25	Prism Labs 6/27/07 @ 9:25	
Relinquished by	Date/Time	Received By	Date/Time

Well #	MW-1R		
Well Diameter (D)	4 inch or	0.33	feet
conversion factor ©: 3.143*(D/2)^2			
for a 2 inch well C=	0.163		
for a 4 inch well C=	0.652		
Total Well Depth (TWD)	9.85 feet		
Depth to GW (DGW)	8.08 feet		
Length of Water Column (LWC= TWD-DGW)		1.77	feet
1 Csg. Volume (LWC*C)=	1.15		
3 Csg. Volume=3 X 1 Csg. Vol=	3.45		
Total Volume of Water Purged Before Sampling		1.15	gallons

	Initial	1st vol.	2nd vol.	3rd vol.	4th vol.	5th vol.	Post	Sampling
Volume Purged (gallons)	-	1.15	1.15	1.15	-	-	-	-
Time (military)	13:10	13:23						17:19
pH (s.u.)	6.8	6.6						7.23
Specific Cond. (umhos/cm)	510	333						334
Water Temp (^{O}C)	24.1	24.5						22.6
Turbidity (*)	1	1						1
Dissolved Oxygen (mg/L)	2.52	3.22						3.04

* subjective (1) None (2) Faint (3) Moderate (4) Strong

Remarks: Well went dry after 1st volume purged

South Carolina Department of Health and Environmental Control
Bureau of Underground Storage Tank Management

Field Data Information Sheet for Ground Water Sampling

Date	6/25/2007	Well #	MW-2
Field Personnel	S Bryant		
General Weather Conditions	Hot, Humid	Well Diameter (D)	4 inch or 0.33 feet
Ambient Air Temperature	95	conversion factor ©: 3.143*(D/2)^2	
		for a 2 inch well C=	0.163
Facility Name:	Greens Oil	for a 4 inch well C=	0.652
Site ID #		Total Well Depth (TWD)	14.23 feet
		Depth to GW (DGW)	8.56 feet
Quality Assurance:			
pH Meter:	YSI-556	Conductivity Meter	
serial no.	06H2174 AG	serial no. 06H2174 AG	Length of Water Column (LWC= TWD-DGW) 5.67 feet
pH =4.0	4	Standard 1420	
pH =7.0	7	Standard	1 Csg. Volume (LWC*C)= 3.70
pH =10.0	10	Standard	
Chain of Custody			3 Csg. Volume=3 X 1 Csg. Vol= 11.10
S Bryant	6/25/07 @ 9:25	Prism Labs 06/27/2007@ 9:25	Total Volume of Water Purged Before Sampling 11.10 gallons
Relinquished by	Date/Time	Received By Date/Time	

	Initial	1st vol.	2nd vol.	3rd vol.	4th vol.	5th vol.	Post	Sampling
Volume Purged (gallons)	-	3.70	3.70	3.70				-
Time (military)	14:29	14:35	14:43	14:53				14:58
pH (s.u.)	6.4	6.4	6.4	6.4				6.4
Specific Cond. (umhos/cm)	566	591	590	592				591
Water Temp (^{O}C)	20.7	20.8	20.4	20.4				20.8
Turbidity (*)	1	1	1	1				1
Dissolved Oxygen (mg/L)	0.72	1.29	1.18	1.26				1.51

* subjective (1) None (2) Faint (3) Moderate (4) Strong

Remarks: Petroleum odor

South Carolina Department of Health and Environmental Control
Bureau of Underground Storage Tank Management

Field Data Information Sheet for Ground Water Sampling

Date	6/25/2007	Well #	MW-3
Field Personnel	S Bryant		
General Weather Conditions	Hot, Humid	Well Diameter (D)	2 inch or 0.17 feet
Ambient Air Temperature	95	conversion factor ©: 3.143*(D/2)^2	
		for a 2 inch well C=	0.163
Facility Name:	Greens Oil	for a 4 inch well C=	0.652
Site ID #		Total Well Depth (TWD)	7.75 feet
		Depth to GW (DGW)	dry feet
Quality Assurance:			
pH Meter:	YSI-556	Conductivity Meter	
serial no.	06H2174 AG	serial no.	06H2174 AG
pH =4.0	4	Standard	1420
pH =7.0	7	Standard	
pH =10.0	10	Standard	
	Chain of Custody	Length of Water Column (LWC= TWD-DGW)	0 feet
		1 Csg. Volume (LWC*C)=	0.00
		3 Csg. Volume=3 X 1 Csg. Vol=	0.00
S Bryant	6/25/07 @ 9:25	Prism Labs 06/27/2007@ 9:25	
Relinquished by	Date/Time	Received By Date/Time	Total Volume of Water Purged Before Sampling 0.00 gallons

	Initial	1st vol.	2nd vol.	3rd vol.	4th vol.	5th vol.	Post	Sampling
Volume Purged (gallons)								-
Time (military)								
pH (s.u.)								
Specific Cond. (umhos/cm)								
Water Temp (^{O}C)								
Turbidity (*)								
Dissolved Oxygen (mg/L)								

* subjective (1) None (2) Faint (3) Moderate (4) Strong

Remarks: Well had no water in it.

South Carolina Department of Health and Environmental Control
Bureau of Underground Storage Tank Management

Field Data Information Sheet for Ground Water Sampling

Date	6/25/2007	Well #	MW-4
Field Personnel	S Bryant		
General Weather Conditions	Hot, Humid	Well Diameter (D)	2 inch or 0.17 feet
Ambient Air Temperature	95	conversion factor ©: 3.143*(D/2)^2	
		for a 2 inch well C=	0.163
Facility Name:	Greens Oil	for a 4 inch well C=	0.652
Site ID #		Total Well Depth (TWD)	13.60 feet
		Depth to GW (DGW)	10.40 feet

Quality Assurance:

pH Meter:	YSI-556	Conductivity Meter	
serial no.	06H2174 AG	serial no.	06H2174 AG
pH =4.0	4	Standard	1420
pH =7.0	7	Standard	
pH =10.0	10	Standard	

Chain of Custody

S Bryant	06/27/07 @ 9:25	Prism Labs 06/27/2007@ 9:25	
Relinquished by	Date/Time	Received By	Date/Time

Length of Water Column (LWC= TWD-DGW)	3.2 feet		
1 Csg. Volume (LWC*C)=	0.52		
3 Csg. Volume=3 X 1 Csg. Vol=	1.56		
Total Volume of Water Purged Before Sampling	1.04 gallons		

	Initial	1st vol.	2nd vol.	3rd vol.	4th vol.	5th vol.	Post	Sampling
Volume Purged (gallons)	-	0.52	0.52	0.52				-
Time (military)	17:00	17:04	17:08					17:18
pH (s.u.)	7.2	6.8	6.7					6.9
Specific Cond. (umhos/cm)	555	565	568					568
Water Temp (^{O}C)	22.3	21.5	21.1					20.2
Turbidity (*)	1	1	2					2
Dissolved Oxygen (mg/L)	1.21	0.81	1.00					2.80

* subjective (1) None (2) Faint (3) Moderate (4) Strong

Remarks: Very strong petroleum odor. Went dry after 2nd volume purged.

South Carolina Department of Health and Environmental Control
Bureau of Underground Storage Tank Management

Field Data Information Sheet for Ground Water Sampling

Date	6/25/2007	Well #	MW-5
Field Personnel	S Bryant		
General Weather Conditions	Hot, Humid	Well Diameter (D)	2 inch or 0.17 feet
Ambient Air Temperature	95	conversion factor ©: 3.143*(D/2)^2	
		for a 2 inch well C=	0.163
Facility Name:	Greens Oil	for a 4 inch well C=	0.652
Site ID #		Total Well Depth (TWD)	10.30 feet
		Depth to GW (DGW)	7.93 feet
Quality Assurance:			
pH Meter:	YSI-556	Conductivity Meter	
serial no.	06H2174 AG	serial no. 06H2174 AG	
pH =4.0	4	Standard 1420	
pH =7.0	7	Standard	
pH =10.0	10	Standard	
Chain of Custody			
S Bryant 06/27/07 @		Prism Labs 06/27/2007@ 9:25	
Relinquished by	Date/Time	Received By Date/Time	
		Length of Water Column (LWC= TWD-DGW)	2.37 feet
		1 Csg. Volume (LWC*C)=	0.39
		3 Csg. Volume=3 X 1 Csg. Vol=	1.16
		Total Volume of Water Purged Before Sampling	1.16 gallons

	Initial	1st vol.	2nd vol.	3rd vol.	4th vol.	5th vol.	Post	Sampling
Volume Purged (gallons)	-	0.39	0.39	0.39				-
Time (military)	15:34	15:36	15:39	15:42				15:46
pH (s.u.)	7.5	7.3	7.2	7.2				7.2
Specific Cond. (umhos/cm)	383	381	377	375				379
Water Temp (^{O}C)	23.8	23.2	23.1	23.1				22.4
Turbidity (*)	1	2	2	2				2
Dissolved Oxygen (mg/L)	5.00	4.15	3.63	3.86				4.75

* subjective (1) None (2) Faint (3) Moderate (4) Strong

Remarks: _____

South Carolina Department of Health and Environmental Control
Bureau of Underground Storage Tank Management

Field Data Information Sheet for Ground Water Sampling

Date	6/25/2007	Well #	MW-6
Field Personnel	S Bryant		
General Weather Conditions	Hot, Humid	Well Diameter (D)	2 inch or 0.17 feet
Ambient Air Temperature	95	conversion factor ©: 3.143*(D/2)^2	
		for a 2 inch well C=	0.163
Facility Name:	Greens Oil	for a 4 inch well C=	0.652
Site ID #		Total Well Depth (TWD)	9.95 feet
		Depth to GW (DGW)	8.76 feet
Quality Assurance:			
pH Meter: YSI-556	Conductivity Meter		
serial no. 06H2174 AG	serial no. 06H2174 AG	Length of Water Column (LWC= TWD-DGW)	1.19 feet
pH =4.0 4	Standard 1420		
pH =7.0 7	Standard	1 Csg. Volume (LWC*C)=	0.19
pH =10.0 10	Standard		
Chain of Custody		3 Csg. Volume=3 X 1 Csg. Vol=	0.58
S Bryant 06/27/07 @ 9:25	Prism Labs 06/27/2007@ 9:25	Total Volume of Water Purged Before Sampling	0.00 gallons
Relinquished by Date/Time	Received By Date/Time		

	Initial	1st vol.	2nd vol.	3rd vol.	4th vol.	5th vol.	Post	Sampling
Volume Purged (gallons)	-	0.19	0.19	0.19				-
Time (military)								18:31
pH (s.u.)								7.0
Specific Cond. (umhos/cm)								645
Water Temp (^{O}C)								23.1
Turbidity (*)								2
Dissolved Oxygen (mg/L)								4.78

* subjective (1) None (2) Faint (3) Moderate (4) Strong

Remarks: Did not purge b/c was raining and the volume of water to be purged totalled .58

South Carolina Department of Health and Environmental Control
Bureau of Underground Storage Tank Management

Field Data Information Sheet for Ground Water Sampling

Date	6/25/2007	Well #	MW-7
Field Personnel	S Bryant		
General Weather Conditions	Hot, Humid	Well Diameter (D)	2 inch or 0.17 feet
Ambient Air Temperature	95	conversion factor ©: 3.143*(D/2)^2	
		for a 2 inch well C=	0.163
Facility Name:	Greens Oil	for a 4 inch well C=	0.652
Site ID #		Total Well Depth (TWD)	13.55 feet
		Depth to GW (DGW)	8.17 feet
Quality Assurance:			
pH Meter: YSI-556	Conductivity Meter	Length of Water Column (LWC= TWD-DGW)	5.38 feet
serial no. 06H2174 AG	serial no. 06H2174 AG		
pH =4.0 4	Standard 1420		
pH =7.0 7	Standard	1 Csg. Volume (LWC*C)=	0.88
pH =10.0 10	Standard		
Chain of Custody		3 Csg. Volume=3 X 1 Csg. Vol=	2.63
S Bryant 06/27/07 @ 9:25	Prism Labs 06/27/2007@ 9:25	Total Volume of Water Purged Before Sampling	1.76 gallons
Relinquished by Date/Time	Received By Date/Time		

	Initial	1st vol.	2nd vol.	3rd vol.	4th vol.	5th vol.	Post	Sampling
Volume Purged (gallons)	-	0.88	0.88	0.88				-
Time (military)	14:03	14:09	14:11					17:30
pH (s.u.)	6.8	6.6	6.7					8.1
Specific Cond. (umhos/cm)	435	436	432					467
Water Temp (^{O}C)	22.6	22.4	22.2					22.1
Turbidity (*)	1	2	2					2
Dissolved Oxygen (mg/L)	2.12	3.25	2.68					2.57

* subjective (1) None (2) Faint (3) Moderate (4) Strong

Remarks: Went dry after 2nd volume purged.

South Carolina Department of Health and Environmental Control
Bureau of Underground Storage Tank Management

Field Data Information Sheet for Ground Water Sampling

Date 6/25/2007
Field Personnel S Bryant
General Weather Conditions Hot, Humid
Ambient Air Temperature 95

Facility Name: Greens Oil Site ID #

Quality Assurance:

pH Meter: YSI-556 Conductivity Meter
serial no. 06H2174 AG serial no. 06H2174 AG
pH =4.0 4 Standard 1420
pH =7.0 7 Standard
pH =10.0 10 Standard

Chain of Custody

S Bryant 06/27/07 @ 9:25 Prism Labs 06/27/2007@ 9:25
Relinquished by Date/Time Received By Date/Time

Well # PW-8

Well Diameter (D) 2 inch or 0.17 feet
conversion factor ©: 3.143*(D/2)^2
for a 2 inch well C= 0.163
for a 4 inch well C= 0.652
Total Well Depth (TWD) 30.90 feet
Depth to GW (DGW) 7.84 feet

Length of Water Column (LWC= TWD-DGW) 23.06 feet

1 Csg. Volume (LWC*C)= 3.76

3 Csg. Volume=3 X 1 Csg. Vol= 11.28

Total Volume of Water Purged Before Sampling 11.28 gallons

	Initial	1st vol.	2nd vol.	3rd vol.	4th vol.	5th vol.	Post	Sampling
Volume Purged (gallons)	-	3.76	3.76	3.76				-
Time (military)	15:58	16:05	16:15	16:35				16:44
pH (s.u.)	7.7	7.0	6.8	6.8				6.8
Specific Cond. (umhos/cm)	212	290	322	332				335
Water Temp (^{O}C)	22.3	21.3	21.5	21.7				21.1
Turbidity (*)	1	1	1	1				1
Dissolved Oxygen (mg/L)	2.70	1.88	2.38	1.66				1.50

* subjective (1) None (2) Faint (3) Moderate (4) Strong

Remarks:

APPENDIX B

LABORATORY REPORT – GROUNDWATER SAMPLES

PRISM
LABORATORIES, INC.

Case Narrative

Date:	07/10/07	**Client Project ID:**	Greens Oil
Company:	Environmental Compliance Services, Inc.	**Prism COC Group No:**	G0607750
Contact:	Jim Rudder	**Collection Date(s):**	06/25/07
Address:	13504 Southpoint Blvd Suite F Charlotte, NC 28273	**Lab Submittal Date(s):**	06/27/07
		Client Project Name Or No:	Rock Hill, SC 14-811030

This data package contains the analytical results for the project identified above and includes a Case Narrative, Laboratory Report and Quality Control Data totaling 11 pages. A chain-of-custody is also attached for the samples submitted to Prism for this project.

Data qualifiers are flagged individually on each sample. A key reference for the data qualifiers appears at the end of this case narrative. Quality control statements and/or sample specific remarks are included in the sample comments section of the laboratory report for each sample affected.

Semi Volatile Analysis

N/A

Volatile Analysis

No Anomalies Reported

Metals Analysis

N/A

Wet Lab and Micro Analysis

N/A

Please call if you have any questions relating to this analytical report.

Date Reviewed by:	Robbi A. Jones	**Project Manager:**	Robbi A. Jones
Signature:	Robbi A. Jones	**Signature:**	Robbi A. Jones
Review Date:	07/10/07	**Approval Date:**	07/10/07

Data Qualifiers Key Reference:

B: Compound also detected in the method blank.
#: Result outside of the QC limits.
DO: Compound diluted out.
E: Estimated concentration, calibration range exceeded.
J: The analyte was positively identified but the value is estimated below the reporting limit.
H: Estimated concentration with a high bias.
L: Estimated concentration with a low bias.
M: A matrix effect is present.

449 Springbrook Road, P.O. Box 240543, Charlotte NC 28224-0403
Phone: 704/529-6364 Toll Free: 800/529-6364 Fax: 704/525-0409

Full Service Analytical & Environmental Solutions

NC Certification No. 402
SC Certification No. 99012
NC Drinking Water Cert. No. 37735

Laboratory Report

07/10/07

Environmental Compliance Services, Inc.
Attn: Jim Rudder
13504 Southpoint Blvd
Suite F
Charlotte, NC 28273

Project Name: Rock Hill, SC
Project ID: Greens Oil
Project No.: 14-811030
Sample Matrix: Water

Client Sample ID: MW-1R
Prism Sample ID: 185706
COC Group: G0607750
Time Collected: 06/25/07 17:19
Time Submitted: 06/27/07 9:25

Parameter	Result	Units	Report Limit	MDL	Dilution Factor	Method	Analysis Date/Time	Analyst	Batch ID
Volatile Organic Compounds by GC/MS									
Benzene	10.3	µg/L	1.00	0.0900	1	8260B	06/29/07 1:24	lwitry	Q24623
Ethylbenzene	14.7	µg/L	1.00	0.0790	1	8260B	06/29/07 1:24	lwitry	Q24623
Methyl t-butyl ether (MTBE)	52.3	µg/L	1.00	0.0780	1	8260B	06/29/07 1:24	lwitry	Q24623
Naphthalene	18.0	µg/L	1.00	0.113	1	8260B	06/29/07 1:24	lwitry	Q24623
Toluene	BRL	µg/L	1.00	0.0720	1	8260B	06/29/07 1:24	lwitry	Q24623
Total xylenes	21.5	µg/L	3.00	0.283	1	8260B	06/29/07 1:24	lwitry	Q24623

Surrogate	% Recovery	Control Limits
Toluene-d8	99	75 - 121
Dibromofluoromethane	94	74 - 133
Bromofluorobenzene	98	69 - 139

Sample Comment(s):

BRL = Below Reporting Limit

J- Estimated value between the Reporting Limit and the MDL

The results in this report relate only to the samples submitted for analysis and meet state certification requirements other than NELAC certification except for those instances indicated in the case narrative and/or test comments.

All results are reported on a wet-weight basis

Angela D. Overcash, V.P. Laboratory Services

449 Springbrook Road - P.O. Box 240543 - Charlotte, NC 28224-0543

Phone: 704/529-6364 - Toll Free Number: 1-800/529-6364 - Fax: 704/525-0409

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NC Drinking Water Cert. No. 37735

Laboratory Report

07/10/07

Environmental Compliance Services, Inc.
Attn: Jim Rudder
13504 Southpoint Blvd
Suite F
Charlotte, NC 28273

Project Name: Rock Hill, SC
Project ID: Greens Oil
Project No.: 14-811030
Sample Matrix: Water

Client Sample ID: MW-2
Prism Sample ID: 185707
COC Group: G0607750
Time Collected: 06/25/07 14:58
Time Submitted: 06/27/07 9:25

Parameter	Result	Units	Report Limit	MDL	Dilution Factor	Method	Analysis Date/Time	Analyst	Batch ID
Volatile Organic Compounds by GC/MS									
Benzene	**26.8**	µg/L	1.00	0.0900	1	8260B	06/28/07 22:17	lwitry	Q24623
Ethylbenzene	**15.0**	µg/L	1.00	0.0790	1	8260B	06/28/07 22:17	lwitry	Q24623
Methyl t-butyl ether (MTBE)	**90.1**	µg/L	1.00	0.0780	1	8260B	06/28/07 22:17	lwitry	Q24623
Naphthalene	**6.60**	µg/L	1.00	0.113	1	8260B	06/28/07 22:17	lwitry	Q24623
Toluene	**3.08**	µg/L	1.00	0.0720	1	8260B	06/28/07 22:17	lwitry	Q24623
Total xylenes	**BRL**	µg/L	3.00	0.283	1	8260B	06/28/07 22:17	lwitry	Q24623

Surrogate	% Recovery	Control Limits
Toluene-d8	96	75 - 121
Dibromofluoromethane	93	74 - 133
Bromofluorobenzene	96	69 - 139

Sample Comment(s):

BRL = Below Reporting Limit

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Laboratory Report

07/10/07

Environmental Compliance Services, Inc.
Attn: Jim Rudder
13504 Southpoint Blvd
Suite F
Charlotte, NC 28273

Project Name: Rock Hill, SC
Project ID: Greens Oil
Project No.: 14-811030
Sample Matrix: Water

Client Sample ID: MW-4
Prism Sample ID: 185708
COC Group: G0607750
Time Collected: 06/25/07 17:18
Time Submitted: 06/27/07 9:25

Parameter	Result	Units	Report Limit	MDL	Dilution Factor	Method	Analysis Date/Time	Analyst	Batch ID
Volatile Organic Compounds by GC/MS									
Benzene	**0.710 J**	µg/L	1.00	0.0900	1	8260B	06/28/07 22:44	lwitry	Q24623
Ethylbenzene	**BRL**	µg/L	1.00	0.0790	1	8260B	06/28/07 22:44	lwitry	Q24623
Methyl t-butyl ether (MTBE)	**35.7**	µg/L	1.00	0.0780	1	8260B	06/28/07 22:44	lwitry	Q24623
Naphthalene	**13.0**	µg/L	1.00	0.113	1	8260B	06/28/07 22:44	lwitry	Q24623
Toluene	**BRL**	µg/L	1.00	0.0720	1	8260B	06/28/07 22:44	lwitry	Q24623
Total xylenes	**BRL**	µg/L	3.00	0.283	1	8260B	06/28/07 22:44	lwitry	Q24623

Surrogate	% Recovery	Control Limits
Toluene-d8	97	75 - 121
Dibromofluoromethane	94	74 - 133
Bromofluorobenzene	96	69 - 139

Sample Comment(s):

BRL = Below Reporting Limit

J- Estimated value between the Reporting Limit and the MDL

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Laboratory Report

07/10/07

Environmental Compliance Services, Inc.
Attn: Jim Rudder
13504 Southpoint Blvd
Suite F
Charlotte, NC 28273

Project Name: Rock Hill, SC
Project ID: Greens Oil
Project No.: 14-811030
Sample Matrix: Water

Client Sample ID: MW-5
Prism Sample ID: 185709
COC Group: G0607750
Time Collected: 06/25/07 15:46
Time Submitted: 06/27/07 9:25

Parameter	Result	Units	Report Limit	MDL	Dilution Factor	Method	Analysis Date/Time	Analyst	Batch ID
Volatile Organic Compounds by GC/MS									
Benzene	**BRL**	µg/L	1.00	0.0900	1	8260B	06/28/07 23:11	lwitry	Q24623
Ethylbenzene	**BRL**	µg/L	1.00	0.0790	1	8260B	06/28/07 23:11	lwitry	Q24623
Methyl t-butyl ether (MTBE)	**BRL**	µg/L	1.00	0.0780	1	8260B	06/28/07 23:11	lwitry	Q24623
Naphthalene	**4.00**	µg/L	1.00	0.113	1	8260B	06/28/07 23:11	lwitry	Q24623
Toluene	**BRL**	µg/L	1.00	0.0720	1	8260B	06/28/07 23:11	lwitry	Q24623
Total xylenes	**BRL**	µg/L	3.00	0.283	1	8260B	06/28/07 23:11	lwitry	Q24623

Surrogate	% Recovery	Control Limits
Toluene-d8	98	75 - 121
Dibromofluoromethane	96	74 - 133
Bromofluorobenzene	95	69 - 139

Sample Comment(s):

BRL = Below Reporting Limit

J- Estimated value between the Reporting Limit and the MDL

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Laboratory Report

07/10/07

Environmental Compliance Services, Inc.
Attn: Jim Rudder
13504 Southpoint Blvd
Suite F
Charlotte, NC 28273

Project Name: Rock Hill, SC
Project ID: Greens Oil
Project No.: 14-811030
Sample Matrix: Water

Client Sample ID: MW-6
Prism Sample ID: 185710
COC Group: G0607750
Time Collected: 06/25/07 18:31
Time Submitted: 06/27/07 9:25

Parameter	Result	Units	Report Limit	MDL	Dilution Factor	Method	Analysis Date/Time	Analyst	Batch ID
Volatile Organic Compounds by GC/MS									
Benzene	**BRL**	µg/L	1.00	0.0900	1	8260B	06/28/07 23:37	lwitry	Q24623
Ethylbenzene	**BRL**	µg/L	1.00	0.0790	1	8260B	06/28/07 23:37	lwitry	Q24623
Methyl t-butyl ether (MTBE)	**BRL**	µg/L	1.00	0.0780	1	8260B	06/28/07 23:37	lwitry	Q24623
Naphthalene	**BRL**	µg/L	1.00	0.113	1	8260B	06/28/07 23:37	lwitry	Q24623
Toluene	**BRL**	µg/L	1.00	0.0720	1	8260B	06/28/07 23:37	lwitry	Q24623
Total xylenes	**BRL**	µg/L	3.00	0.283	1	8260B	06/28/07 23:37	lwitry	Q24623

Surrogate	% Recovery	Control Limits
Toluene-d8	99	75 - 121
Dibromofluoromethane	95	74 - 133
Bromofluorobenzene	98	69 - 139

Sample Comment(s):

BRL = Below Reporting Limit

J- Estimated value between the Reporting Limit and the MDL

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Laboratory Report

07/10/07

Environmental Compliance Services, Inc.
Attn: Jim Rudder
13504 Southpoint Blvd
Suite F
Charlotte, NC 28273

Project Name: Rock Hill, SC
Project ID: Greens Oil
Project No.: 14-811030
Sample Matrix: Water

Client Sample ID: MW-7
Prism Sample ID: 185711
COC Group: G0607750
Time Collected: 06/25/07 17:30
Time Submitted: 06/27/07 9:25

Parameter	Result	Units	Report Limit	MDL	Dilution Factor	Method	Analysis Date/Time	Analyst	Batch ID
Volatile Organic Compounds by GC/MS									
Benzene	**BRL**	µg/L	1.00	0.0900	1	8260B	06/29/07 0:04	lwitry	Q24623
Ethylbenzene	**BRL**	µg/L	1.00	0.0790	1	8260B	06/29/07 0:04	lwitry	Q24623
Methyl t-butyl ether (MTBE)	**1.96**	µg/L	1.00	0.0780	1	8260B	06/29/07 0:04	lwitry	Q24623
Naphthalene	**BRL**	µg/L	1.00	0.113	1	8260B	06/29/07 0:04	lwitry	Q24623
Toluene	**BRL**	µg/L	1.00	0.0720	1	8260B	06/29/07 0:04	lwitry	Q24623
Total xylenes	**BRL**	µg/L	3.00	0.283	1	8260B	06/29/07 0:04	lwitry	Q24623

Surrogate	% Recovery	Control Limits
Toluene-d8	98	75 - 121
Dibromofluoromethane	95	74 - 133
Bromofluorobenzene	97	69 - 139

Sample Comment(s):

BRL = Below Reporting Limit

J- Estimated value between the Reporting Limit and the MDL

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Angela D. Overcash, V.P. Laboratory Services

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Laboratory Report

07/10/07

Environmental Compliance Services, Inc.
Attn: Jim Rudder
13504 Southpoint Blvd
Suite F
Charlotte, NC 28273

Project Name: Rock Hill, SC
Project ID: Greens Oil
Project No.: 14-811030
Sample Matrix: Water

Client Sample ID: PW-8
Prism Sample ID: 185712
COC Group: G0607750
Time Collected: 06/25/07 16:44
Time Submitted: 06/27/07 9:25

Parameter	Result	Units	Report Limit	MDL	Dilution Factor	Method	Analysis Date/Time	Analyst	Batch ID
Volatile Organic Compounds by GC/MS									
Benzene	BRL	µg/L	1.00	0.0900	1	8260B	06/29/07 0:31	lwitry	Q24623
Ethylbenzene	BRL	µg/L	1.00	0.0790	1	8260B	06/29/07 0:31	lwitry	Q24623
Methyl t-butyl ether (MTBE)	12.9	µg/L	1.00	0.0780	1	8260B	06/29/07 0:31	lwitry	Q24623
Naphthalene	BRL	µg/L	1.00	0.113	1	8260B	06/29/07 0:31	lwitry	Q24623
Toluene	BRL	µg/L	1.00	0.0720	1	8260B	06/29/07 0:31	lwitry	Q24623
Total xylenes	BRL	µg/L	3.00	0.283	1	8260B	06/29/07 0:31	lwitry	Q24623

Surrogate	% Recovery	Control Limits
Toluene-d8	105	75 - 121
Dibromofluoromethane	100	74 - 133
Bromofluorobenzene	103	69 - 139

Sample Comment(s):

BRL = Below Reporting Limit

J- Estimated value between the Reporting Limit and the MDL

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Angela D. Overcash, V.P. Laboratory Services

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Laboratory Report

07/10/07

Environmental Compliance Services, Inc.
Attn: Jim Rudder
13504 Southpoint Blvd
Suite F
Charlotte, NC 28273

Project Name: Rock Hill, SC
Project ID: Greens Oil
Project No.: 14-811030
Sample Matrix: Water

Client Sample ID: TRIP BLANK
Prism Sample ID: 185713
COC Group: G0607750
Time Collected: 06/25/07
Time Submitted: 06/27/07 9:25

Parameter	Result	Units	Report Limit	MDL	Dilution Factor	Method	Analysis Date/Time	Analyst	Batch ID
Volatile Organic Compounds by GC/MS									
Benzene	BRL	µg/L	1.00	0.0900	1	8260B	06/28/07 16:28	lwitry	Q24623
Ethylbenzene	BRL	µg/L	1.00	0.0790	1	8260B	06/28/07 16:28	lwitry	Q24623
Methyl t-butyl ether (MTBE)	BRL	µg/L	1.00	0.0780	1	8260B	06/28/07 16:28	lwitry	Q24623
Naphthalene	BRL	µg/L	1.00	0.113	1	8260B	06/28/07 16:28	lwitry	Q24623
Toluene	BRL	µg/L	1.00	0.0720	1	8260B	06/28/07 16:28	lwitry	Q24623
Total xylenes	BRL	µg/L	3.00	0.283	1	8260B	06/28/07 16:28	lwitry	Q24623

Surrogate	% Recovery	Control Limits
Toluene-d8	98	75 - 121
Dibromofluoromethane	95	74 - 133
Bromofluorobenzene	98	69 - 139

Sample Comment(s):

BRL = Below Reporting Limit

J- Estimated value between the Reporting Limit and the MDL

The results in this report relate only to the samples submitted for analysis and meet state certification requirements other than NELAC certification except for those instances indicated in the case narrative and/or test comments.

All results are reported on a wet-weight basis

Angela D. Overcash, V.P. Laboratory Services

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Level II QC Report

7/10/07

Environmental Compliance Services, Inc.
Attn: Jim Rudder
13504 Southpoint Blvd
Suite F
Charlotte, NC 28273

Project Name: Rock Hill, SC
Project ID: Greens Oil
Project No.: 14-811030

COC Group Number: G0607750
Date/Time Submitted: 6/27/07 9:25

Volatile Organic Compounds by GC/MS, method 8260B

Method Blank

	Result	RL	Control Limit	Units	QC Batch ID
Benzene	ND	1	<0.5	µg/L	Q24623
Ethylbenzene	ND	1	<0.5	µg/L	Q24623
m,p-Xylenes	ND	2	<1	µg/L	Q24623
Methyl t-butyl ether (MTBE)	ND	1	<0.5	µg/L	Q24623
Naphthalene	ND	1	<0.5	µg/L	Q24623
o-Xylene	ND	1	<0.5	µg/L	Q24623
Toluene	ND	1	<0.5	µg/L	Q24623

Laboratory Control Sample

	Result	Spike Amount	Units	Recovery %	Recovery Ranges %	QC Batch ID
Benzene	48.47	50	µg/L	97	70-141	Q24623
Ethylbenzene	49.1	50	µg/L	98	80-139	Q24623
m,p-Xylenes	102.15	100	µg/L	102	82-136	Q24623
Methyl t-butyl ether (MTBE)	44.06	50	µg/L	88	70-130	Q24623
Naphthalene	45.36	50	µg/L	91	40-136	Q24623
o-Xylene	47.59	50	µg/L	95	73-134	Q24623
Toluene	44.39	50	µg/L	89	78-130	Q24623

Matrix Spike

Sample ID:	Result	Spike Amount	Units	Recovery %	Recovery Ranges %	QC Batch ID
185806 Benzene	210.4	200	µg/L	105	62-129	Q24623
Ethylbenzene	214.68	200	µg/L	107	58-133	Q24623
m,p-Xylenes	445.28	400	µg/L	111	59-137	Q24623
Methyl t-butyl ether (MTBE)	185.16	200	µg/L	93	70-130	Q24623
Naphthalene	193.28	200	µg/L	97	54-127	Q24623
o-Xylene	201.56	200	µg/L	101	65-129	Q24623
Toluene	191.36	200	µg/L	96	60-131	Q24623

Matrix Spike Duplicate

Sample ID:	Result	Spike Amount	Units	Recovery %	Recovery Ranges %	RPD %	RPD Range %	QC Batch ID
185806 Benzene	177	200	µg/L	89	62-129	17	0 - 19	Q24623
Ethylbenzene	179.16	200	µg/L	90	58-133	18	0 - 22	Q24623
m,p-Xylenes	373.68	400	µg/L	93	59-137	17	0 - 20	Q24623
Methyl t-butyl ether (MTBE)	162.16	200	µg/L	81	70-130	13	0 - 20	Q24623
Naphthalene	170.64	200	µg/L	85	54-127	12	0 - 24	Q24623
o-Xylene	167.6	200	µg/L	84	65-129	18	0 - 21	Q24623
Toluene	162.96	200	µg/L	81	60-131	16	0 - 21	Q24623

Full Service Analytical & Environmental Solutions

NC Certification No. 402
SC Certification No. 99012
NC Drinking Water Cert. No. 37735

Level II QC Report

7/10/07

Environmental Compliance Services, Inc.
Attn: Jim Rudder
13504 Southpoint Blvd
Suite F
Charlotte, NC 28273

#-See Case Narrative

Project Name: Rock Hill, SC
Project ID: Greens Oil
Project No.: 14-811030

COC Group Number: G0607750
Date/Time Submitted: 6/27/07 9:25

CHAIN OF CUSTODY RECORD

PRISM LABORATORIES, INC.

Full Service Analytical & Environmental Solutions

449 Springbrook Road • P.O. Box 240543 • Charlotte, NC 28224-0543
Phone: 704/529-6364 • Fax: 704/525-0409

PAGE 1 OF 1 QUOTE # TO ENSURE PROPER BILLING: _____

Project Name: Green's Oil

Short Hold Analysis: (Yes) (No) UST Project: (Yes) (No)

*Please ATTACH any project specific reporting (QC LEVEL I II III IV) provisions and/or QC Requirements

Invoice To: ECS

Address: Agawam, MA

Client Company Name: ECS

Report To/Contact Name: Jim Rudder

Reporting Address: Charlotte, NC

Phone: 704-583-2711 Fax (Yes) (No) _____

Email (Yes) (No) Email Address jrudder@ecsconsult.com

EDD Type: PDF ✓ Excel ___ Other _____

Site Location Name: Green's Oil

Site Location Physical Address: Rock Hill, SC

Purchase Order No./Billing Reference 14-811030

Requested Due Date ☐ 1 Day ☐ 2 Days ☐ 3 Days ☐ 4 Days ☐ 5 Days

"Working Days" ☐ 6-9 Days ☒ Standard 10 days ☐ Rush Work Must Be Pre-Approved

Samples received after 15:00 will be processed next business day.

Turnaround time is based on business days, excluding weekends and holidays.

(SEE REVERSE FOR TERMS & CONDITIONS REGARDING SERVICES RENDERED BY PRISM LABORATORIES, INC. TO CLIENT)

LAB USE ONLY

	YES	NO	N/A
Samples INTACT upon arrival?	✓		
Received ON WET ICE? Temp 5.6°	✓		
PROPER PRESERVATIVES indicated?	✓		
Received WITHIN HOLDING TIMES?	✓		
CUSTODY SEALS INTACT?			✓
VOLATILES rec'd W/OUT HEADSPACE?	✓		
PROPER CONTAINERS used?	✓		

TO BE FILLED IN BY CLIENT/SAMPLING PERSONNEL

Certification: NELAC ___ USACE ___ FL ___ NC ___ SC ✓ OTHER ___ N/A ___

Water Chlorinated: YES ___ NO ✓

Sample Iced Upon Collection: YES ✓ NO ___

CLIENT SAMPLE DESCRIPTION	DATE COLLECTED	TIME COLLECTED MILITARY HOURS	MATRIX (SOIL, WATER OR SLUDGE)	SAMPLE CONTAINER *TYPE SEE BELOW	NO.	SIZE	PRESERVATIVES	ANALYSES REQUESTED: 8260 BTEX, MTBE, Naph	REMARKS	PRISM LAB ID NO.
MW-1R	6-25	17:19	GW	VOA	3	40ml	HCl	✓		185706
MW-2		14:58							some gas odor	185707
MW-4		17:18							very strong gas odor	185708
MW-5		15:46								185709
MW-6		18:31								185710
MW-7		17:30								185711
PW-8		16:44								185712
Trip Blank										185713

Sampler's Signature Shelley Bryant Sampled By (Print Name) Shelley Bryant Affiliation ECS

PRESS DOWN FIRMLY - 3 COPIES

Upon relinquishing, this Chain of Custody is your authorization for Prism to proceed with the analyses as requested above. Any changes must be submitted in writing to the Prism Project Manager. There will be charges for any changes after analyses have been initialized.

Relinquished By: (Signature) Shelley Bryant	Received By: (Signature)	Date 6/27/07	Military/Hours 09:25
Relinquished By: (Signature)	Received By: (Signature)	Date	
Relinquished By: (Signature)	Received For Prism Laboratories By: J. Rachael Lim	Date 6/27/07	09:25

Method of Shipment: NOTE: ALL SAMPLE COOLERS SHOULD BE TAPED SHUT WITH CUSTODY SEALS FOR TRANSPORTATION TO THE LABORATORY. SAMPLES ARE NOT ACCEPTED AND VERIFIED AGAINST COC UNTIL RECEIVED AT THE LABORATORY.

☐ Fed Ex ☐ UPS ☐ Hand-delivered ☐ Prism Field Service ☐ Other _____

COC Group No. G0657750

Additional Comments:

PRISM USE ONLY

Site Arrival Time:	
Site Departure Time:	
Field Tech Fee:	
Mileage:	

NPDES:	UST:	GROUNDWATER:	DRINKING WATER:	SOLID WASTE:	RCRA:	CERCLA	LANDFILL	OTHER:
☐ NC ☐ SC	☐ NC ☐ SC	☐ NC ☐ SC	☐ NC ☐ SC	☐ NC ☐ SC	☐ NC ☐ SC	☐ NC ☐ SC	☐ NC ☐ SC	☐ NC ☐ SC
☐ _____	☐ _____	☐ _____	☐ _____	☐ _____	☐ _____	☐ _____	☐ _____	☐ _____

*CONTAINER TYPE CODES: A = Amber C = Clear G = Glass P = Plastic; TL = Teflon-Lined Cap VOA = Volatile Organics Analysis (Zero Head Space)

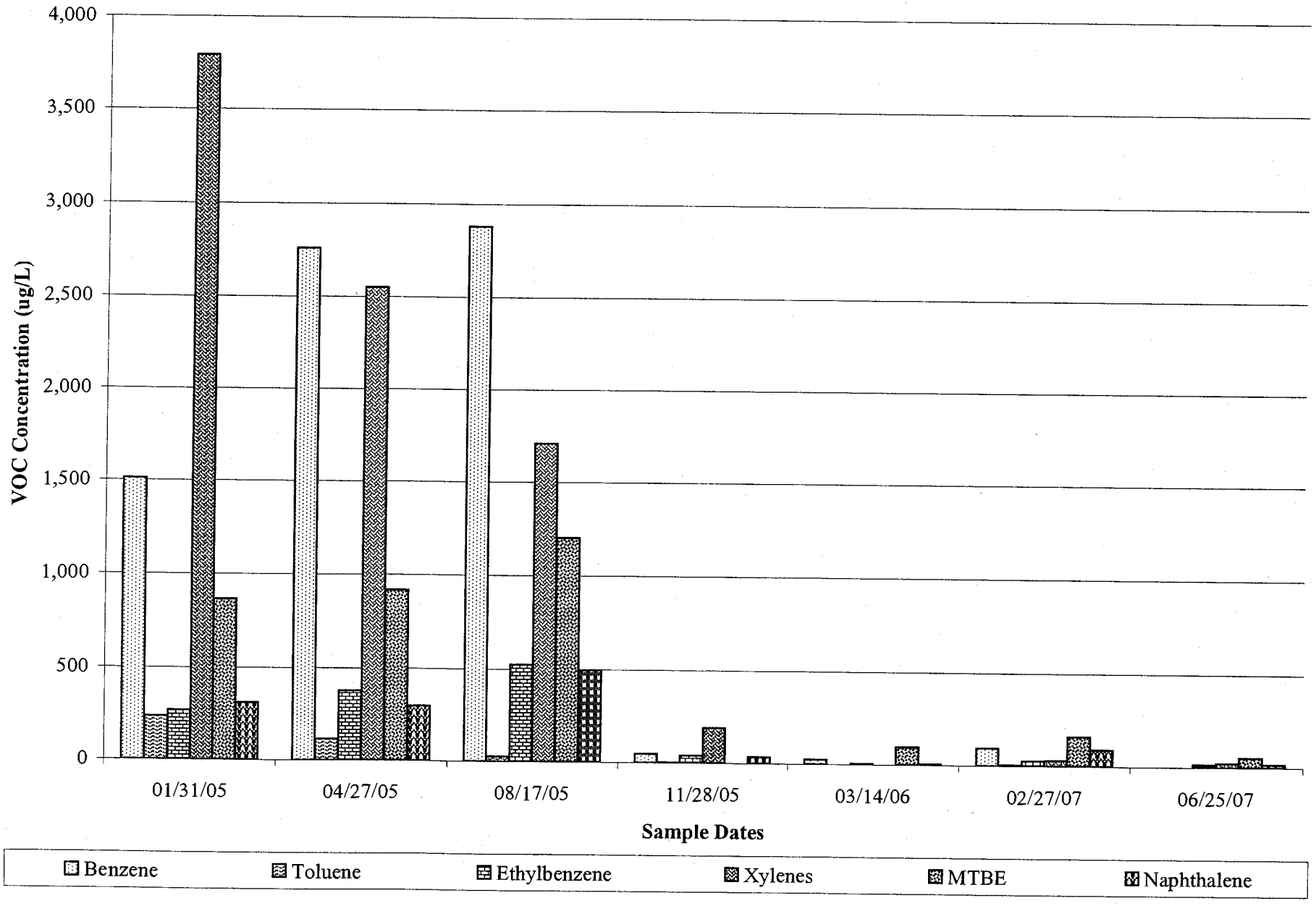
SEE REVERSE FOR TERMS & CONDITIONS

ORIGINAL

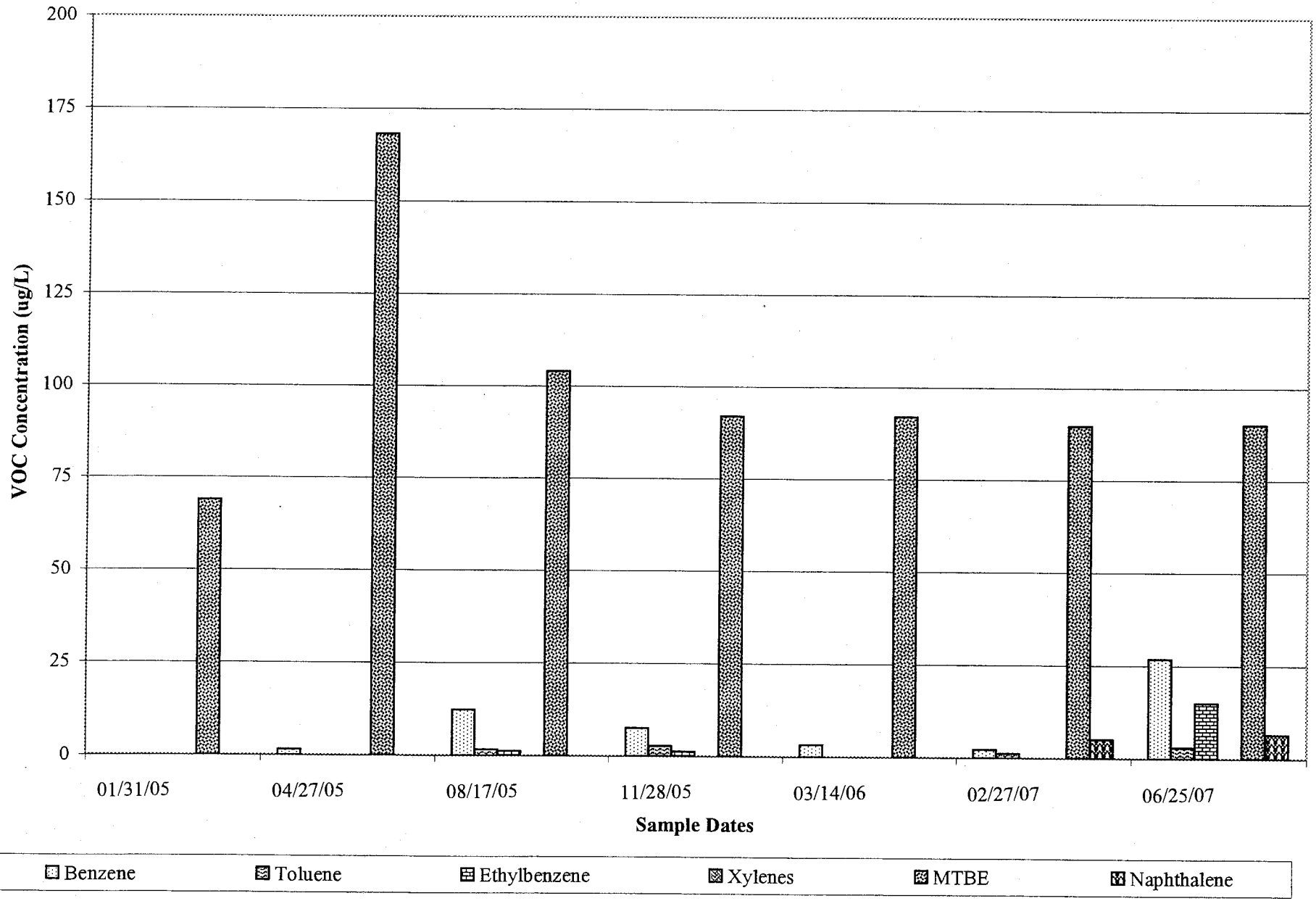
APPENDIX C

GRAPHS OF INDIVIDUAL VOC CONCENTRATIONS VS. TIME

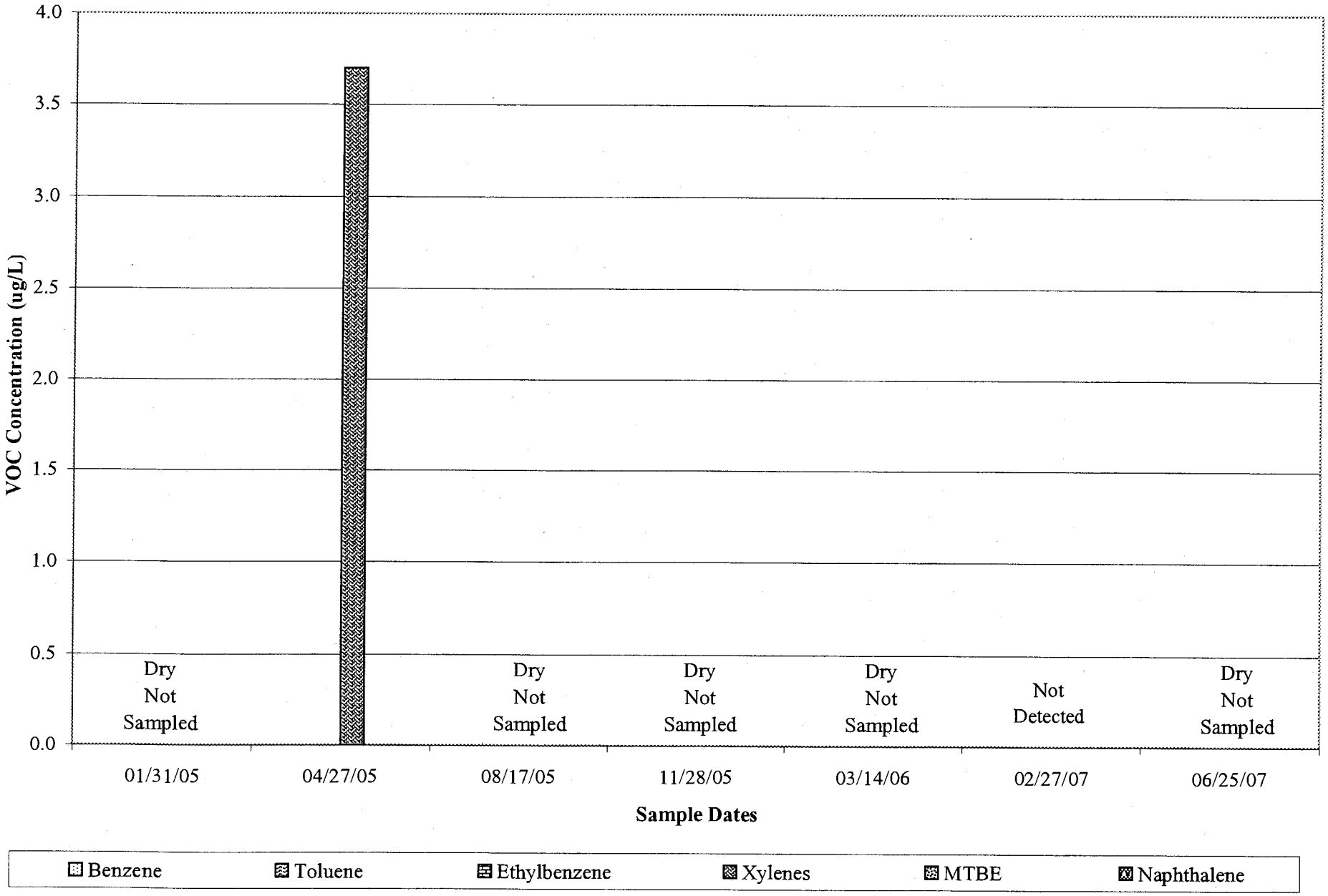
GROUNDWATER QUALITY CHART
GREENS OIL - MW-1/MW-1R



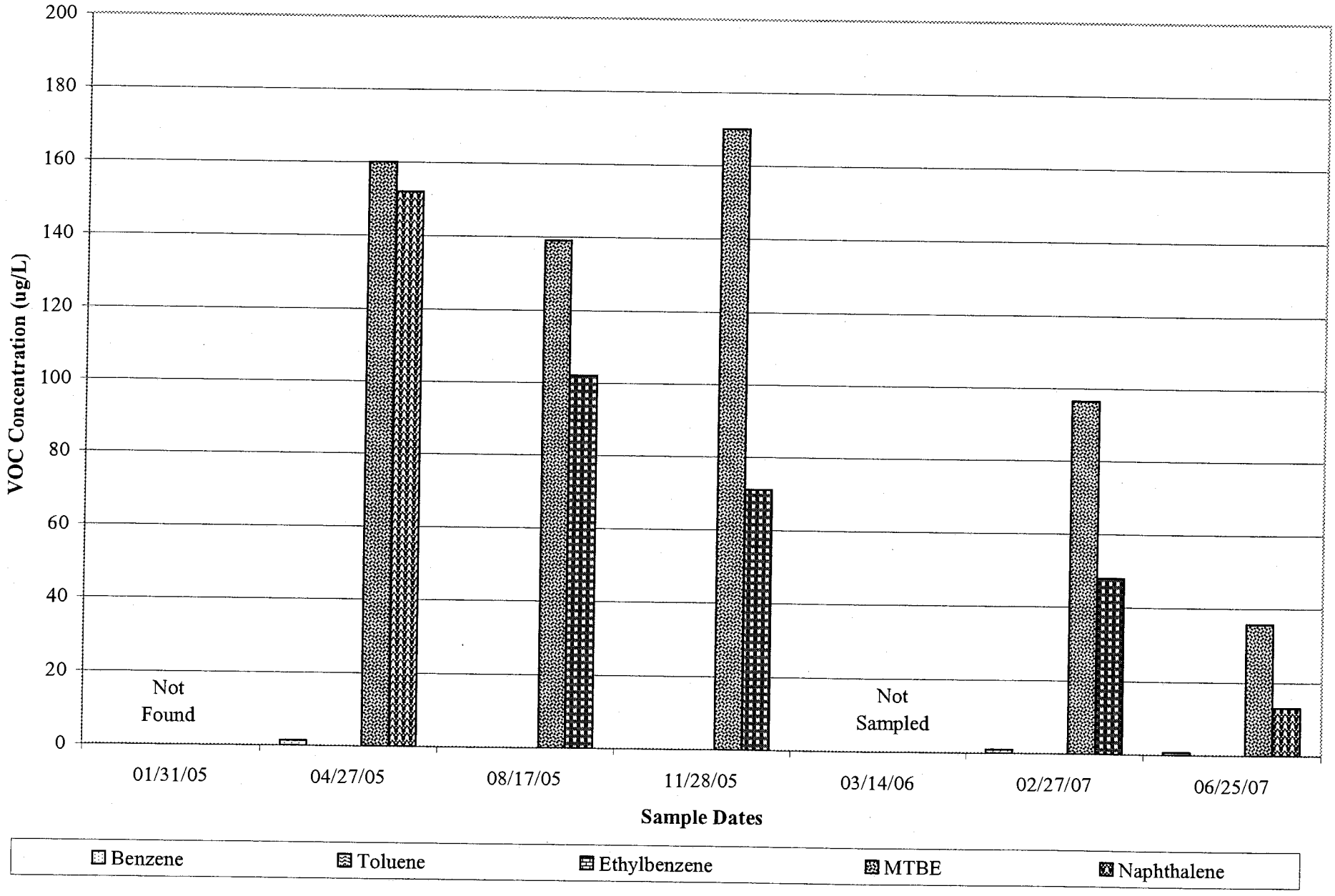
GROUNDWATER QUALITY CHART
GREENS OIL - MW-2



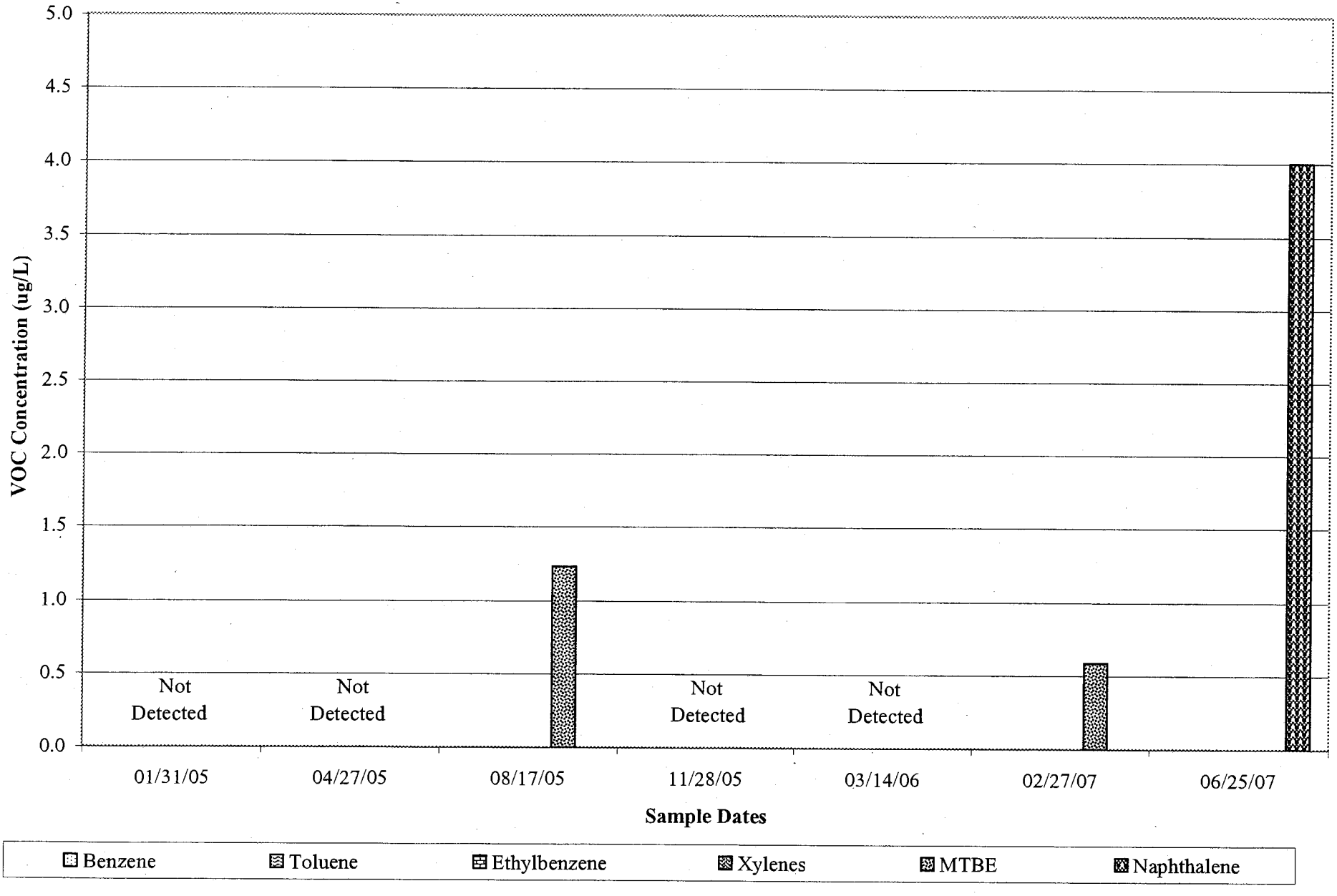
GROUNDWATER QUALITY CHART
GREENS OIL - MW-3



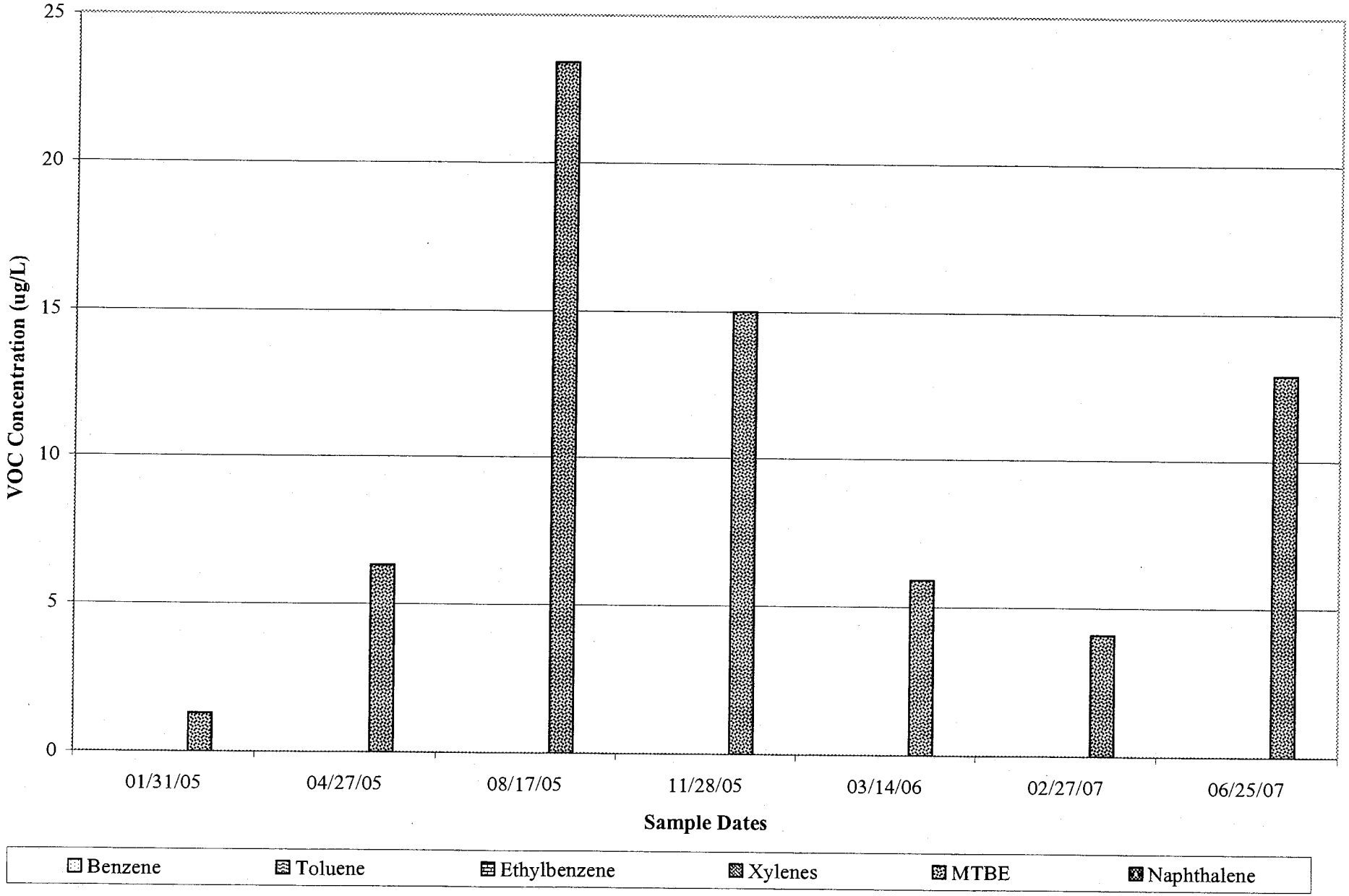
GROUNDWATER QUALITY CHART
GREENS OIL - MW-4



GROUNDWATER QUALITY CHART
GREENS OIL - MW-5



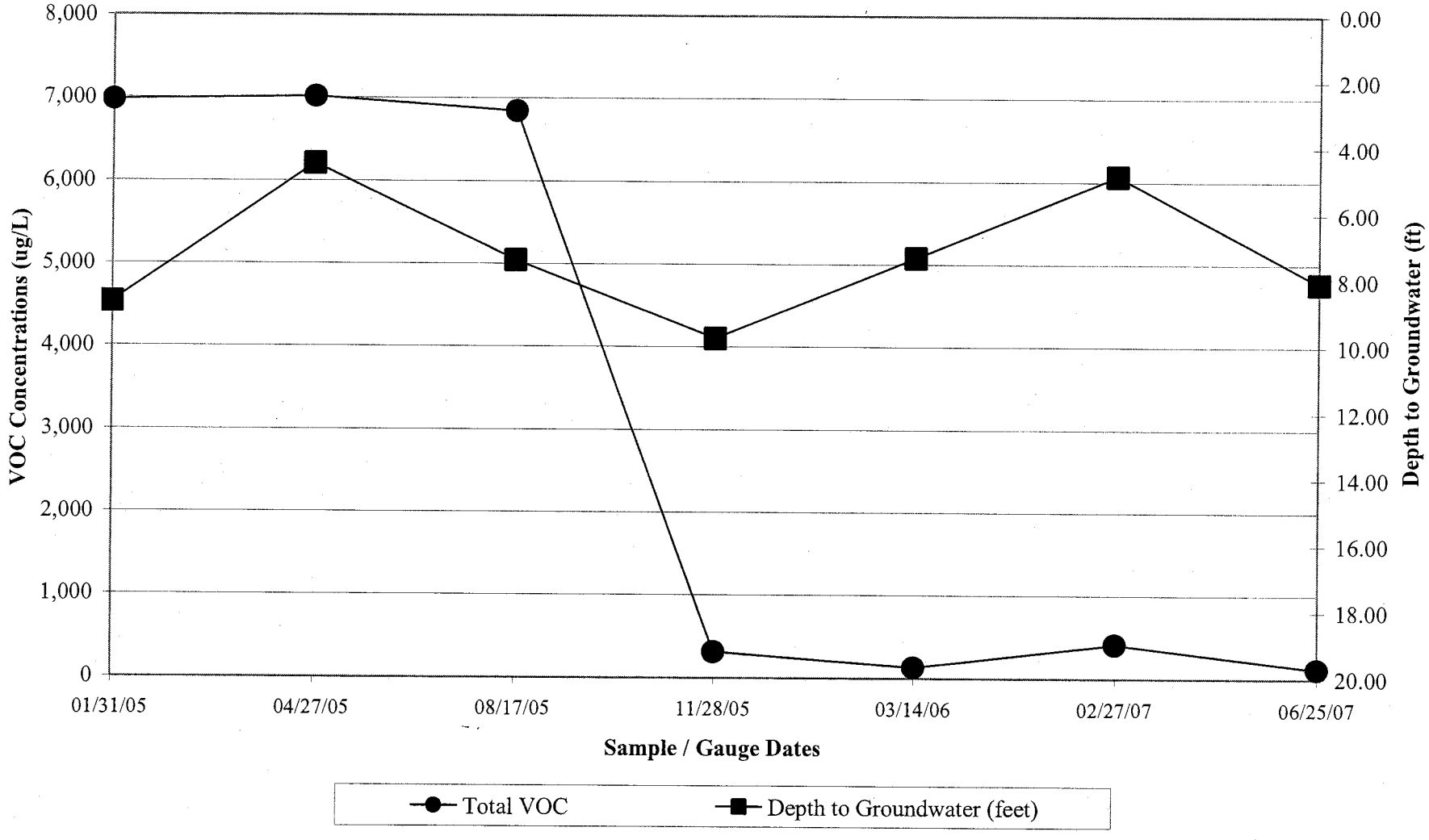
GROUNDWATER QUALITY CHART
GREENS OIL - PW-8



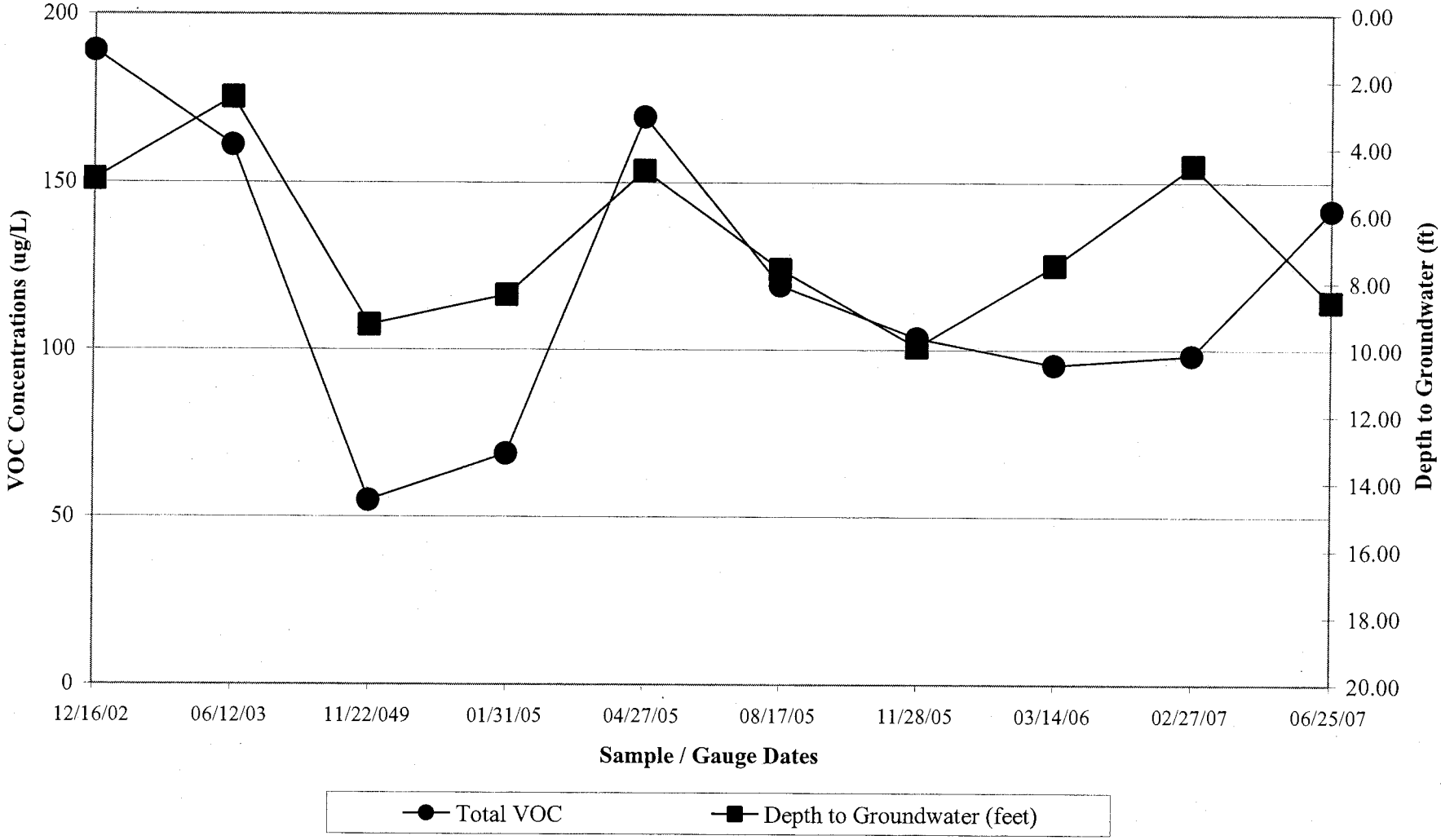
APPENDIX D

GRAPHS OF TOTAL VOC CONCENTRATIONS VS. DEPTH TO GROUNDWATER

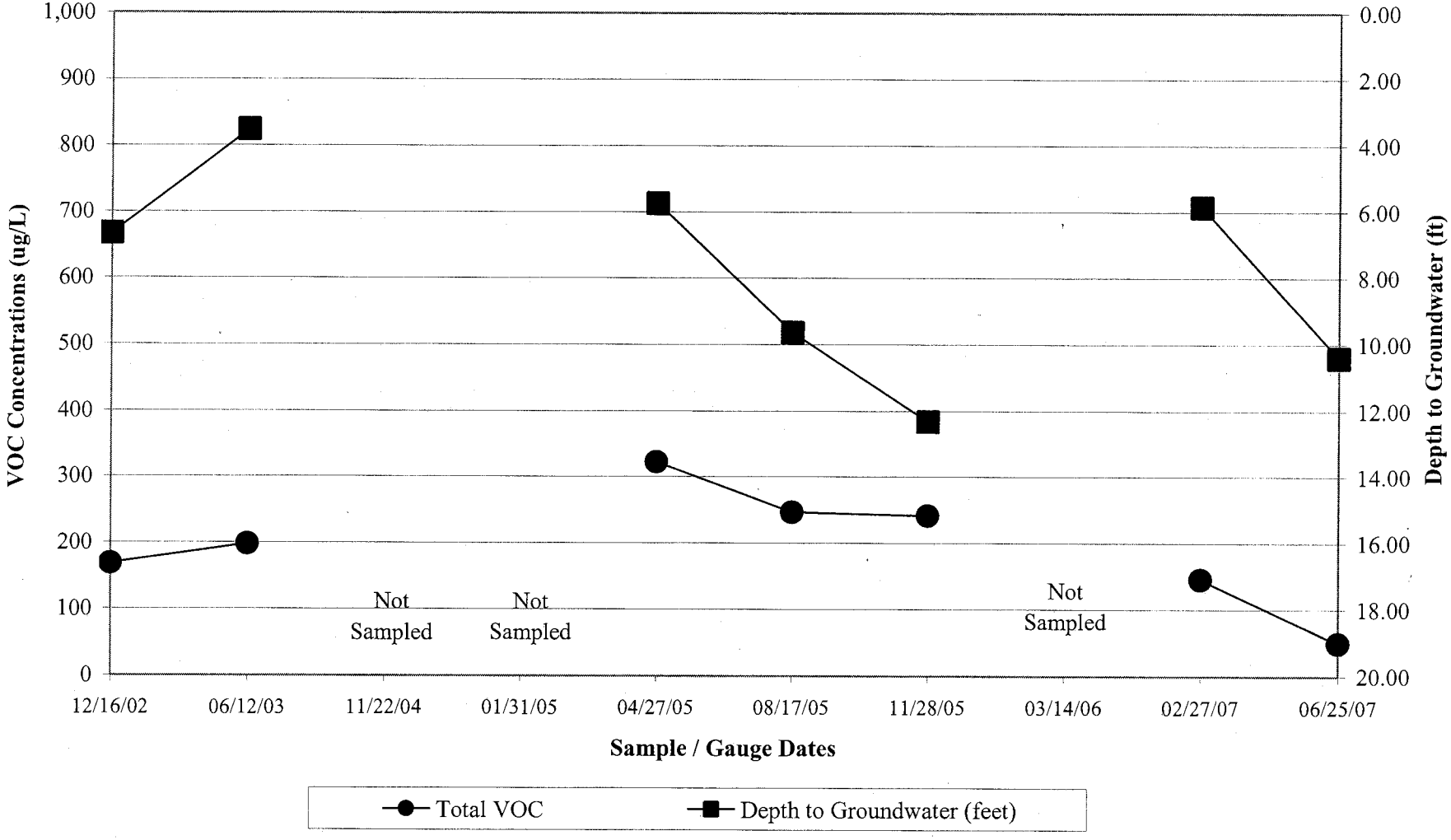
TOTAL VOC CONCENTRATION VS. DEPTH TO GROUNDWATER
GREENS OIL - MW-1R



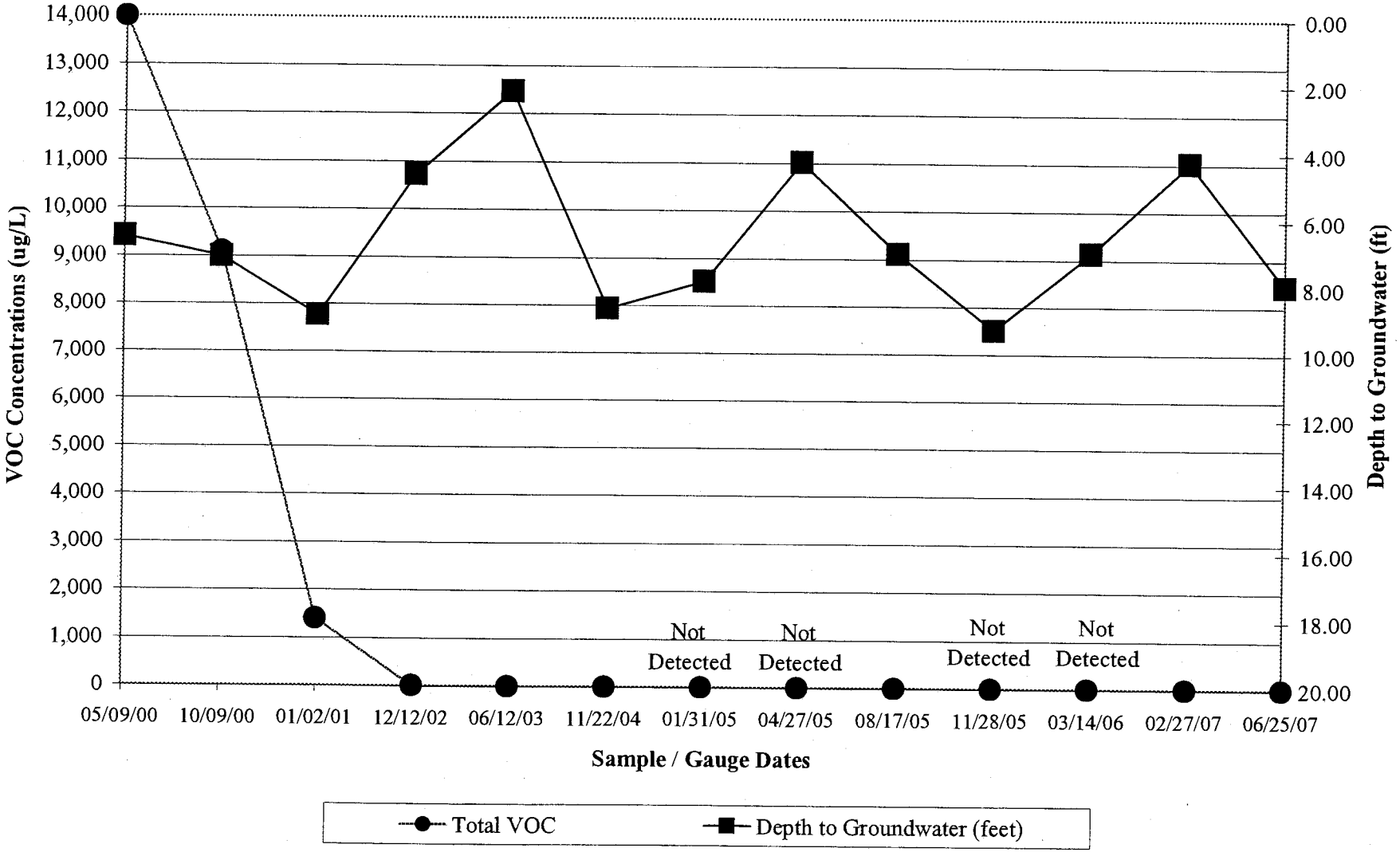
TOTAL VOC CONCENTRATION VS. DEPTH TO GROUNDWATER
GREENS OIL - MW-2



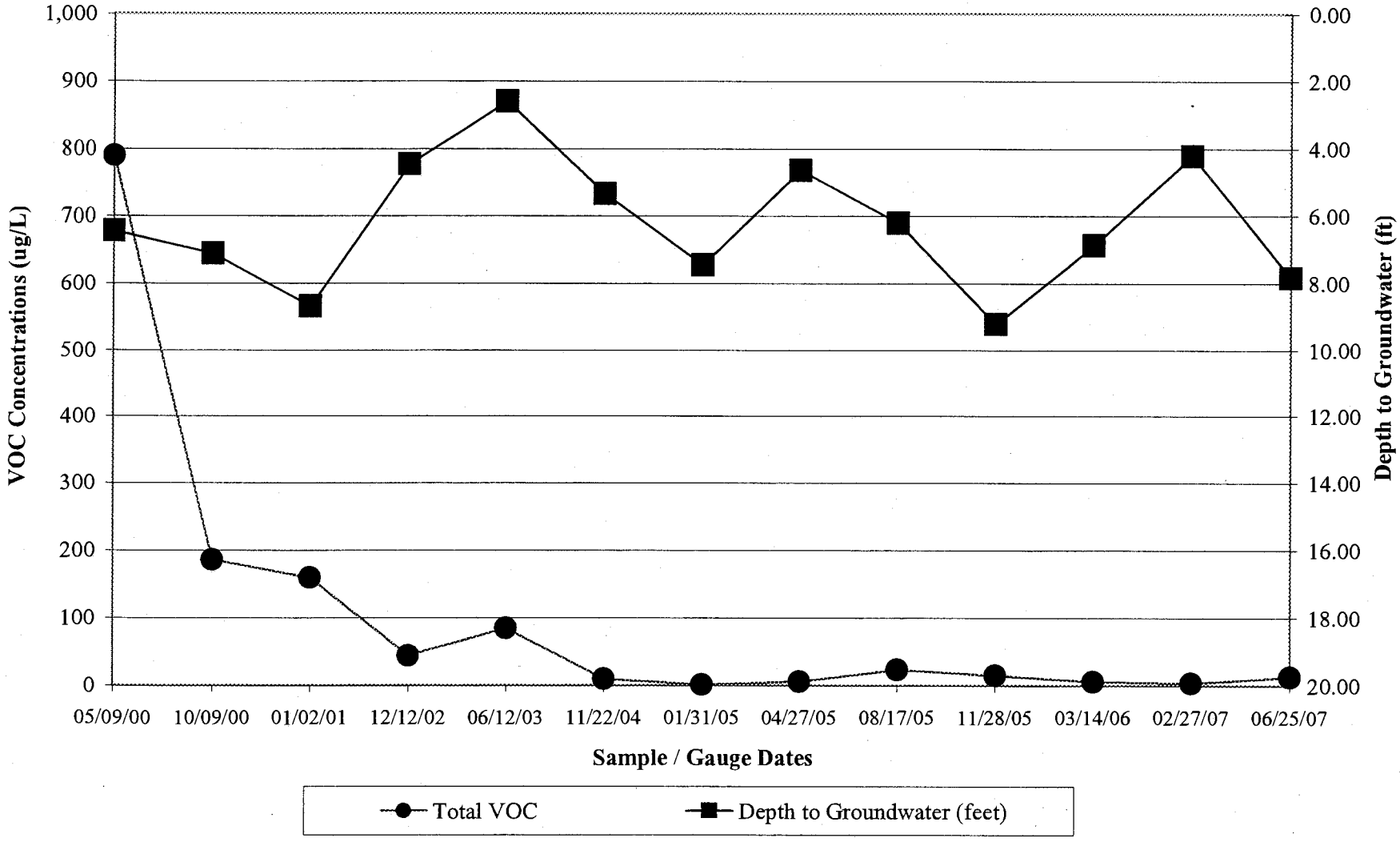
TOTAL VOC CONCENTRATION VS. DEPTH TO GROUNDWATER
GREENS OIL - MW-4



TOTAL VOC CONCENTRATION VS. DEPTH TO GROUNDWATER
GREENS OIL - MW-5



TOTAL VOC CONCENTRATION VS. DEPTH TO GROUNDWATER
GREENS OIL - PW-8



D H E C

PROMOTE PROTECT PROSPER

C. Earl Hunter, Commissioner

Promoting and protecting the health of the public and the environment.

SEP 19 2007

JERRY GREEN
GREENS OIL CO
2457 BREEN CIRCLE
ROCK HILL SC 29732

Re: **Groundwater Monitoring Report Review**
Greens Oil Co., 2849 Cherry Rd, Rock Hill, SC
UST Permit #09344
Release Reported July 18, 1989
Groundwater Monitoring Report received September 17, 2007
York County

Dear Mr. Green:

The Underground Storage Tank (UST) Program has reviewed the report submitted by ECS documenting the groundwater-sampling event. The next report should be submitted no later than December 17, 2007.

On all correspondence concerning this site, please reference UST Permit #09344. If there are any questions concerning this project, please contact me at (803) 896-6397, via fax at (803) 896-6245, or by e-mail at thomadl@dhec.sc.gov.

Sincerely,

Debra L Thoma

Debra L. Thoma, Hydrogeologist
Northeastern SC Corrective Action Section
Assessment & Corrective Action Division
Underground Storage Tank Program
Bureau of Land & Waste Management

Cc: Robert Thompson, ECS, 13504 South Point Blvd., Unit F, Charlotte, NC, 28273
Technical File

UST PROGRAM
DOCKETING # 3

GROUNDWATER MONITORING REPORT
GREEN'S OIL COMPANY
2849 CHERRY RD.
ROCK HILL, YORK COUNTY
UST PERMIT NO. 09344
SITE RISK CLASSIFICATION: HIGH
LAND USE CLASSIFICATION: COMMERCIAL
ECS PROJECT NO. 14-811030

Prepared For:

Federated Insurance Company
c/o Jerry Green
2457 Breen Circle
Rock Hill, SC 29732

Prepared By:

Environmental Compliance Services, Inc.
13504 South Point Blvd., Unit F
Charlotte, NC 28273
(704) 583-2711

April 9, 2008

James D. Rudder, Jr., P.G.
Branch Manager

SOUTH CAROLINA LICENSED PROFESSIONAL ENGINEER No. 6190 JOE CULBRETH

Joe Culbreth, P.E.
Licensed Professional
SC Registration No. 6190

TABLE OF CONTENTS

1.0 INTRODUCTION

This report presents the results of groundwater monitoring activities conducted on March 31, 2008, at the Green's Oil Company site in Rock Hill, South Carolina. The site previously operated as a gas station located in a commercial/industrial area of York County. Public or private water supply wells were not reported within 1,000 feet of the site. Two abandoned water supply wells were located down gradient of the site. Surface water bodies were not identified within 500 feet of the source area. The Catawba River, located approximately 3,000 feet north of the site in the downgradient direction, was the only potential receptor identified during the receptor survey.

A previously prepared Corrective Action Plan (CAP) that proposed remediation of petroleum impacted soil and groundwater beneath the site using excavation, de-watering, backfilling with microbial augmented soil, and subsequent microbial injections, was submitted to the SCDHEC by CBM Environmental Services, Inc. (CBM) on January 23, 2004. The SCDHEC approved the CAP in correspondence dated March 29, 2004. However, subsequent telephone conversations between CBM and the responsible party's insurance company (Federated Insurance) indicated that Federated Insurance would only approve soil excavation, de-watering, and backfilling with microbial augmented soil. Microbial injections, if needed, would be implemented after two to three quarters of groundwater monitoring. The initial remedial activities consisting of soil excavation, backfilling with microbial augmented soil, and compaction were completed in December 2004.

2.0 FACILITY INFORMATION

- **Facility Name**: Green's Oil Company
- **Location:** 2849 Cherry Road
  Rock Hill, York County (**Figure 1**)
- **UST Permit No.** 09344
- **Risk Classification:** High
- **Land Use Classification:** Commercial
- **UST Operator:** Green's Oil Company
  2849 Cherry Road
  Rock Hill, South Carolina
- **UST Owner:** Green's Oil Company
  2849 Cherry Road
  Rock Hill, South Carolina
- **Consultant:** Environmental Compliance Services, Inc
  13504 South Point Boulevard
  Charlotte, North Carolina 28273
  (704) 583-2711
- **Release Information:**
  - **Date Discovered:** Unknown
  - **Estimated Quantity of Release:** Unknown
  - **Cause of Release:** Unknown
  - **Source of Release:** Leaking UST System
  - **UST System Size/Contents:** Four gasoline USTs
  - **Latitude / Longitude:** 34°58'42" North/ 80°58'54" West

3.0 SAMPLING ACTIVITIES

3.1 Site Hydrogeology

The depths to groundwater in the seven shallow (water table) monitoring wells (MW-1R and MW-2 through MW-7) and one telescoping well (PW-8) were measured on March 31, 2008. The depths to groundwater in the shallow wells ranged from 5.11 feet (MW-5) to 7.47 feet (MW-4), and the depth to groundwater in the telescoping well was 5.18 feet. Groundwater elevations, relative to a temporary benchmark with an assumed datum of 100.00 feet, ranged from 89.44 feet (MW-4) to 92.94 feet (MW-1R) in the shallow wells, and was measured at 91.80 feet in well PW-8. Based on the March 2008 data, the horizontal groundwater flow was controlled by a groundwater divide trending east-west beneath the site. Groundwater north of monitoring wells MW-1R and MW-7 appeared to flow toward the north, and groundwater in the vicinity of well MW-5 appeared to flow toward the south. The apparent horizontal hydraulic gradient to the north was approximately 0.02 feet per foot, and toward the south was also approximately 0.02 feet per foot. Groundwater elevation data obtained on March 31, 2008 data is presented in **Table 1**. A groundwater Elevation Map, based on the March 31, 2008 data, is included as **Figure 3**.

3.2 Groundwater Sampling

On March 31, 2008, the seven shallow monitoring wells (MW-1R, MW-2 through MW-7) and one telescoping monitoring well (PW-8) were purged and sampled. Laboratory analyses were performed on groundwater samples collected from the monitoring wells for BTEX (benzene, toluene, ethylbenzene, and total xylenes), MTBE (methyl-tert-butyl ether) and naphthalene by EPA Method 8260B.

4.0 GROUNDWATER QUALITY

Concentrations of benzene, MTBE, and naphthalene that exceeded the May 2001 risk based screening level (RBSL) were reported in the groundwater sample collected from monitoring wells MW-1R. The groundwater samples collected from wells MW-3 and MW-4 were reported to contain MTBE concentrations in excess of the RBSL.

Concentrations of toluene, ethylbenzene, and total xylenes below their respective RBSLs were reported in the groundwater sample collected from monitoring well MW-1R. A detectable concentration of MTBE below the RBSL was reported in the groundwater sample collected from monitoring well MW-2.

Detectable concentrations of requested method constituents were not reported in the groundwater samples collected from monitoring wells MW-5, MW-6, MW-7, and PW-8.

A summary of groundwater quality data is presented in **Table 2**. A Groundwater Quality Map showing individual BTEX constituents, MTBE and naphthalene concentrations in the groundwater samples collected from the monitoring wells during the March 31, 2008 sampling event is included as **Figure 4**. Groundwater sampling field data sheets from the March 31, 2008 sampling event have been included as **Appendix A.** A complete report of laboratory analyses of groundwater samples collected during the March 31, 2008 sampling event has been included as **Appendix B.** A disposal manifest was not available at this time and will be forwarded upon receipt.

5.0 CONCLUSIONS AND RECOMMENDATIONS

The following comparisons are between the June 25, 2007 and March 31, 2008 groundwater sampling events:

- Concentrations of BTEX, MTBE, and naphthalene increased in MW-1R from June 25, 2007.
- Concentrations of benzene, toluene, ethylbenzene, MTBE, and naphthalene decreased in MW-2.
- Concentrations of benzene and naphthalene decreased in MW-4, but MTBE increased.
- Concentrations of naphthalene decreased in MW-5.
- Concentrations of MTBE decreased in MW-7.
- Concentrations of MTBE decreased in PW-8.
- The total VOC concentrations have increased significantly in monitoring well MW-1R when compared to the June 25, 2007 sampling event. The total VOC concentrations have decreased in monitoring wells MW-2, MW-5, and PW-8 compared to the June 25, 2007 sampling event. Total VOC concentrations in monitoring well MW-6 remain below laboratory reporting limits.

Environmental Compliance Services Inc. (ECS) recommends quarterly groundwater sampling to monitor trends in the concentrations of chemicals of concern (COC). Site closure would be pursued following two to three consecutive quarterly sampling events with concentrations of COC below their respective RBSL.

6.0 LIMITATIONS

This report has been prepared for the exclusive use of Mr. Jerry Green for specific application to the referenced site in York County, South Carolina. The assessment was conducted based on the scope of work and level of effort desired by the client and with resources adequate only for that scope of work.

Certain data contained in this report was not obtained under the supervision of ECS. Although the accuracy of this data cannot be verified, for the purpose of this report ECS assumes it is correct. Our findings have been developed in accordance with generally accepted standards of geology and hydrogeology practices in the State of South Carolina, available information, and our professional judgment. No other warranty is expressed or implied.

The data presented in this report are indicative of conditions that existed at the precise locations sampled and at the time the samples were collected. In addition, the data obtained from samples would be interpreted as being meaningful with respect to parameters indicated in the laboratory report. No additional information can be logically inferred from this data.

TABLES

TABLE 1
GROUNDWATER ELEVATION DATA[1]
GREEN'S OIL COMPANY

Well ID	Date Measured	Top of Casing Elevation (feet)	Depth to Groundwater (feet)	Groundwater Elevation (feet)	Well Depth[2] (feet)	Screened Interval (feet)
MW-1	05/24/00	98.15	7.16	90.99	12.33	NA[3]
	10/09/00		7.78	90.37		
	01/02/01		9.58	88.57		
	12/16/02		5.11	93.04		
	06/12/03		2.59	95.56		
	11/22/04		9.36	88.79		
	03/31/08	Abandoned				
MW-1R[4]	01/31/05	98.30	8.66	89.64	9.85	NA
	04/27/05		4.48	93.82		
	08/17/05		7.39	90.91		
	11/28/05		9.75	88.55		
	03/14/06		7.31	90.99		
	02/27/07		4.82	93.48		
	06/25/07		8.08	90.22		
	03/31/08		5.36	92.94	9.90	
MW-2	05/24/00	97.86	7.03	90.83	14.23	NA
	10/09/00		7.71	90.15		
	01/02/01		9.43	88.43		
	12/16/02		4.91	92.95		
	06/12/03		2.47	95.39		
	11/22/04		9.26	88.60		
	01/31/05		8.36	89.50		
	04/27/05		4.65	93.21		
	08/17/05		7.59	90.27		
	11/28/05		9.92	87.94		
	03/14/06		7.47	90.39		
	02/27/07		4.50	93.36		
	06/25/07		8.56	89.30		
	03/31/08		5.57	92.29	14.22	
MW-3	12/16/02	97.08	5.83	91.25	7.75	NA
	06/12/03		3.01	94.07		
	11/22/04		Dry	Dry		
	01/31/05		Dry	Dry		
	04/27/05		5.00	92.08		
	08/17/05		Dry	Dry		
	11/28/05		Dry	Dry		
	03/14/06		Dry	Dry		
	02/27/07		5.29	91.79		
	06/25/07		Dry	Dry		
	03/31/08		5.97	91.11	7.88	

TABLE 1 (continued)
GROUNDWATER ELEVATION DATA
GREEN'S OIL COMPANY

Well ID	Date Measured	Top of Casing Elevation (feet)	Depth to Groundwater (feet)	Groundwater Elevation (feet)	Well Depth[2] (feet)	Screened Interval (feet)
MW-4	12/16/02	96.91	6.66	90.25	13.60	NA
	06/12/03		3.52	93.39		
	11/22/04		NM[5]	NM		
	01/31/05		NM	NM		
	04/27/05		5.75	91.16		
	08/17/05		9.65	87.26		
	11/28/05		12.32	84.59		
	03/14/06		NM	NM		
	02/27/07		5.86	91.05		
	06/25/07		10.40	86.51		
	03/31/08		7.47	89.44	13.66	
MW-5	05/24/00	97.04	6.56	90.48	10.30	NA
	10/09/00		7.15	89.89		
	01/02/01		8.90	88.14		
	12/16/02		4.67	92.37		
	06/12/03		2.20	94.84		
	11/22/04		8.67	88.37		
	01/31/05		7.84	89.20		
	04/27/05		4.26	92.78		
	08/17/05		6.99	90.05		
	11/28/05		9.28	87.76		
	03/14/06		6.95	90.09		
	02/27/07		4.24	92.80		
	06/25/07		7.93	89.11		
	03/31/08		5.11	91.93	10.26	
MW-6	05/24/00	98.59	8.10	90.49	9.95	NA
	10/09/00		7.92	90.67		
	01/02/01		9.52	89.07		
	12/16/02		5.25	93.34		
	06/12/03		2.89	95.70		
	11/22/04		9.44	89.15		
	01/31/05		8.59	90.00		
	04/27/05		4.98	93.61		
	08/17/05		7.80	90.79		
	11/28/05		9.58	89.01		
	03/14/06		7.67	90.92		
	02/27/07		4.83	93.76		
	06/25/07		8.76	89.83		
	03/31/08		5.69	92.90	9.86	

TABLE 1 (continued)
GROUNDWATER ELEVATION DATA
GREEN'S OIL COMPANY

Well ID	Date Measured	Top of Casing Elevation (feet)	Depth to Groundwater (feet)	Groundwater Elevation (feet)	Well Depth[2] (feet)	Screened Interval (feet)
MW-7	12/16/02	98.40	4.81	93.59	13.55	NA
	06/12/03		3.29	95.11		
	11/22/04		NF[6]	NF		
	01/31/05		NF	NF		
	04/27/05		4.40	94.00		
	08/17/05		6.22	92.18		
	11/28/05		9.64	88.76		
	03/14/06		7.20	91.20		
	02/27/07		NF	NF		
	06/25/07		8.17	90.23		
	03/31/08		5.58	92.82	13.70	
PW[7]-8	05/24/00	96.98	6.45	90.53	30.90	NA
	10/09/00		7.12	89.86		
	01/02/01		8.69	88.29		
	12/16/02		4.46	92.52		
	06/12/03		2.60	94.38		
	11/22/04		5.34	91.64		
	01/31/05		7.45	89.53		
	04/27/05		4.65	92.33		
	08/17/05		6.22	90.76		
	11/28/05		9.23	87.75		
	03/14/06		6.88	90.10		
	02/27/07		4.22	92.76		
	06/25/07		7.84	89.14		
	3/31//08		5.18	91.80	30.25	

Notes:

1. Top of Casing Elevations for monitoring wells MW-2 through MW-7 and PW-8 were reproduced from the previous consultant's reports. Additional well construction details are unavailable; data reported in feet.
2. Well depths for monitoring wells MW-2 through MW-7 and PW-8 measured during June 12, 2003 sampling event and remeasured during February 27, 2007 sampling event. Well depths shown above are from February 27, 2007 measurements.
3. Data not available.
4. Monitoring well MW-1R was installed as a replacement for monitoring well MW-1 on January 26, 2005.
5. Not measured. Well did not yield enough water for field measurements or was not accessible due to site obstruction.
6. Not found.
7. Telescoping monitoring well.

TABLE 2
SUMMARY OF GROUNDWATER ANALYTICAL DATA[1]
GREEN'S OIL COMPANY

Well ID	Date Sampled	Benzene (µg/L)	Toluene (µg/L)	Ethylbenzene (µg/L)	Total Xylenes (µg/L)	MTBE (µg/L)	Naphthalene (µg/L)	Lead (µg/L)
MW-1	10/24/96	**3,040**[2]	164	325	950	**2,310**	**365**	NR[3]
	05/09/00	**1,790**	255	302	611	**1,300**	**117**	12.0
	10/09/00	**1,600**	180	220	400	**850**	**350**	<3.0[4]
	01/02/01	**500**	9.0	38	68	**460**	**55**	<3.0
	12/16/02	**3,000**	**12,000**	**3,700**	**14,000**	**920**	**1,700**	14
	06/12/03	**2,280**	**9,520**	**1,980**	**17,400**	**801**	**991**	NR
	11/22/04	**2,560**	**3,820**	**2,240**	**14,200**	**790**	**2,880**	NR
MW-1R[5]	01/31/05	**1,510**	234	268	3,790	**864**	**310**	NR
	04/27/05	**2,760**	115	376	2,550	**916**	**297**	NR
	08/17/05	**2,880**	26.6	525	1,710	**1,200**	**498**	NR
	11/28/05	**47**	3.1	39	190	**120 E**[6]	**34**	NR
	03/14/06	**24**	<1.0	4.1	2.9J[7]	**98**	**5.0**	NR
	02/27/07	**95.8**	5.61	28.2	31.2	**160**	**89.2**	NR
	06/25/07	**10.3**	<1.00	14.7	21.5	**52.3**	18.0	NR
	03/31/08	**359**	110	184	338	**173**	**183**	NR
MW-2	10/24/96	<10.0	<10.0	<10.0	<3.0	**24,700**	<5.0	NR
	05/09/00	**5.2**	ND[8]	ND	ND	**19,900**	ND	ND
	10/09/00	**31**	5.7	<5.0	12	**11,000**	**15**	<3.0
	01/02/01	**7.2**	<5.0	<5.0	<5.0	**7,700**	<5.0	<3.0
	12/16/02	<5.0	<5.0	<5.0	7.2	**170**	12	<3.0
	06/12/03	4.0	<1.0	<1.0	<1.0	**157**	<5.00	NR
	11/22/04[9]	<1.0	<1.0	<1.0	<1.0	**54.9**	<5.00	NR
	01/31/05	<1.0	<1.0	<1.0	<1.0	**68.8**	<5.00	NR
	04/27/05	1.5	<1.0	<1.0	<1.0	**168**	<5.00	NR
	08/17/05	**12.3**	1.66	1.25	<2.0	**104**	<5.00	NR
	11/28/05	**7.5**	2.80	1.20	<3.0	**92**	<1.0	NR
	03/14/06	3.3	0.69 J	<1.0	0.79J	**92**	<1.0	NR
	02/27/07	2.22	1.21	<1.00	0.650 J	**89.7**	5.12	NR
	06/25/07	**26.8**	3.08	15.0	<3.00	**90.1**	6.60	NR
	03/31/08	<1.0	<1.0	<1.0	<3.00	33.9	<1.0	NR
MW-3	10/24/96	NF[11]	NF	NF	NF	NF	NF	NF
	05/09/00	NF	NF	NF	NF	NF	NF	NF
	10/09/00	NF	NF	NF	NF	NF	NF	NF
	01/02/01	NF	NF	NF	NF	NF	NF	NF
	12/12/02	**150**	**5,800**	**2,400**	**14,000**	<25	**920**	**21**
	06/12/03	4.2	135	150	1,920	2.9	**260**	NR
	11/22/04	Dry	Dry	Dry	Dry	Dry	Dry	NR
	01/31/05	Dry	Dry	Dry	Dry	Dry	Dry	NR
	04/27/05	<1.0	<1.0	<1.0	3.7	<1.0	<5.00	NR
	08/17/05	Dry	Dry	Dry	Dry	Dry	Dry	Dry
	11/28/05	Dry	Dry	Dry	Dry	Dry	Dry	Dry
	03/14/06	Dry	Dry	Dry	Dry	Dry	Dry	Dry
	02/27/07	<1.00	<1.00	<1.00	<3.00	<1.00	<1.00	NR
	06/25/07	Dry	Dry	Dry	Dry	Dry	Dry	NR
	03/31/08	<1.0	<1.0	<1.0	<3.00	**63.0**	<1.0	NR
	RBSL[10]	5	1,000	700	10,000	40	25	15

TABLE 2 (continued)
SUMMARY OF GROUNDWATER ANALYTICAL DATA
GREEN'S OIL COMPANY

Well ID	Date Sampled	Benzene (µg/L)	Toluene (µg/L)	Ethylbenzene (µg/L)	Total Xylenes (µg/L)	MTBE (µg/L)	Naphthalene (µg/L)	Lead (µg/L)
MW-4	10/24/96	<1.0	<1.0	<1.0	<3.0	**70.4**	<5.0	NR
	05/09/00	NF	NF	NF	NF	NF	NF	NF
	10/09/00	NF	NF	NF	NF	NF	NF	NF
	01/02/01	NF	NF	NF	NF	NF	NF	NF
	12/16/02	<5.0	<5.0	<5.0	<5.0	**160**	8.5	5.8
	06/12/03	<1.0	<1.0	<1.0	<1.0	**198**	<5.00	NR
	11/22/04	NS[12]	NS	NS	NS	NS	NS	NS
	01/31/05	NS	NS	NS	NS	NS	NS	NS
	04/27/05	1.4	<1.0	<1.0	8.8	**160**	**152**	NR
	08/17/05	<1.00	<1.00	<1.00	5	**139**	**102**	NR
	11/28/05	<1.0	<1.0	<1.0	<3.0	**170**	**71**	NR
	03/14/06	NS	NS	NS	NS	NS	NS	NS
	02/27/07	1.03	<1.00	<1.00	<3.00	**96.5**	**47.8**	NR
	06/25/07	0.710 J	<1.00	<1.00	<3.00	35.7	13.0	NR
	03/31/08	<1.0	<1.0	<1.0	<3.0	**71.5**	<1.0	NR
MW-5	10/24/96	<1.0	<1.0	<1.0	<3.0	**1,720**	<5.0	NR
	05/09/00	ND	ND	ND	ND	**14,000**	ND	ND
	10/09/00	<5.0	<5.0	<5.0	<5.0	**9,100**	<5.0	<3.0
	01/02/01	<5.0	<5.0	<5.0	<5.0	**1,400**	<5.0	<3.0
	12/12/02	<5.0	<5.0	<5.0	<5.0	14	<5.0	14
	06/12/03	<1.0	<1.0	<1.0	<1.0	3.1	<5.00	NR
	11/22/04[13]	<1.0	<1.0	<1.0	<1.0	1.4	<5.00	NR
	01/31/05	<1.0	<1.0	<1.0	<1.0	<1.0	<5.00	NR
	04/27/05	<1.0	<1.0	<1.0	<1.0	<1.0	<5.00	NR
	08/17/05	<1.00	<1.00	<1.00	<2.00	1.23	<5.00	NR
	11/28/05	<1.0	<1.0	<1.0	<3.0	<1.0	<1.0	NR
	03/14/06	<1.0	<1.0	<1.0	<3.0	<1.0	<1.0	NR
	02/27/07	<1.00	<1.00	<1.00	<3.00	0.590 J	<1.00	NR
	06/25/07	<1.00	<1.00	<1.00	<3.00	<1.00	4.00	NR
	03/31/08	<1.0	<1.0	<1.0	<3.0	<1.0	<1.0	NR
MW-6	10/24/96	NS	NS	NS	NS	NS	NS	NS
	05/09/00	ND	ND	ND	ND	ND	ND	**52.0**
	10/09/00	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	**26.0**
	01/02/01	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	NS
	12/12/02	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	**48**
	06/12/03	<1.0	<1.0	<1.0	<1.0	<1.0	<5.00	NR
	11/22/04	<1.0	<1.0	<1.0	<1.0	<1.0	<5.00	NR
	01/31/05	<1.0	<1.0	<1.0	<1.0	<1.0	<5.00	NR
	04/27/05	<1.0	<1.0	<1.0	<1.0	<1.0	<5.00	NR
	08/17/05	<1.00	<1.00	<1.00	<2.00	<1.00	<5.00	NR
	11/28/05	<1.0	<1.0	<1.0	<3.0	<1.0	<1.0	NR
	03/14/06	<1.0	<1.0	<1.0	<3.0	<1.0	<1.0	NR
	02/27/07	<1.00	<1.00	<1.00	<3.00	<1.00	<1.00	NR
	06/25/07	<1.00	<1.00	<1.00	<3.00	<1.00	<1.00	NR
	03/31/08	<1.0	<1.0	<1.0	<3.0	<1.0	<1.0	NR
	RBSL	5	1,000	700	10,000	40	25	15

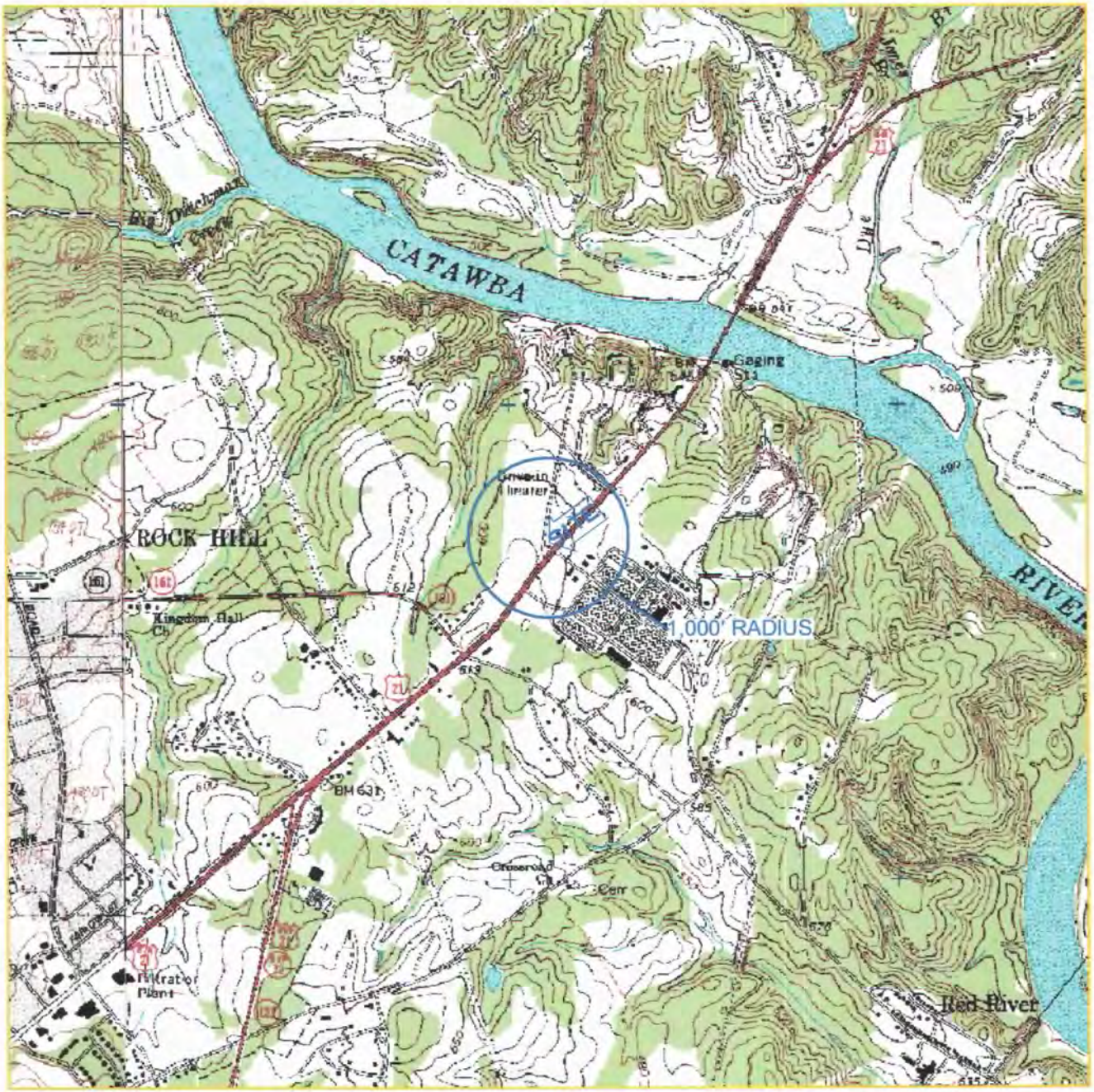
TABLE 2 (continued)
SUMMARY OF GROUNDWATER ANALYTICAL DATA
GREEN'S OIL COMPANY

Well ID	Date Sampled	Benzene (µg/L)	Toluene (µg/L)	Ethylbenzene (µg/L)	Total Xylenes (µg/L)	MTBE (µg/L)	Naphthalene (µg/L)	Lead (µg/L)
MW-7	10/24/96	NF	NF	NF	NF	NF	NF	NF
	05/09/00	NF	NF	NF	NF	NF	NF	NF
	10/09/00	NF	NF	NF	NF	NF	NF	NF
	01/02/01	NF	NF	NF	NF	NF	NF	NF
	12/12/02	<5.0	<5.0	<5.0	<5.0	**160**	<5.0	**58**
	06/12/03	<1.0	<1.0	<1.0	<1.0	**294**	<5.00	NR
	11/22/04	NF	NF	NF	NF	NF	NF	NF
	01/31/05	NF	NF	NF	NF	NF	NF	NF
	04/27/05	<1.0	<1.0	<1.0	<1.0	1.3	<5.00	NR
	08/17/05	<1.00	<1.00	<1.00	<2.00	22.7	<5.00	NR
	11/28/05	<1.0	<1.0	<1.0	<3.0	**65**	<1.0	NR
	03/14/06	<1.0	<1.0	<1.0	<3.0	1.5	<1.0	NR
	02/27/07	NF	NF	NF	NF	NF	NF	NF
	06/25/07	<1.00	<1.00	<1.00	<3.00	1.96	<1.00	NR
	03/31/08	<1.0	<1.0	<1.0	<3.0	<1.0	<1.0	NR
PW-8	10/24/96	<1.0	<1.0	<1.0	<3.0	**547**	<5.0	NR
	05/09/00	ND	ND	ND	ND	**790**	ND	ND
	10/09/00	<5.0	<5.0	<5.0	6.1	**180**	<5.0	<3.0
	01/02/01	<5.0	<5.0	<5.0	<5.0	**160**	<5.0	<3.0
	12/12/02	<5.0	<5.0	<5.0	<5.0	**44**	<5.0	<3.0
	06/12/03	<1.0	<1.0	<1.0	<1.0	**84.6**	<5.00	NR
	11/22/04[14]	<1.0	<1.0	<1.0	<1.0	9.7	<5.00	NR
	01/31/05	<1.0	<1.0	<1.0	<1.0	1.3	<5.00	NR
	04/27/05	<1.0	<1.0	<1.0	<1.0	6.3	<5.00	NR
	08/17/05	<1.00	<1.00	<1.00	<2.00	23.4	<5.00	NR
	11/28/05	<1.0	<1.0	<1.0	<3.0	15.0	<1.0	NR
	03/14/06	<1.0	<1.0	<1.0	<3.0	5.9	<1.0	NR
	02/27/07	<1.00	<1.00	<1.00	<3.00	4.09	<1.00	NR
	06/25/07	<1.00	<1.00	<1.00	<3.00	12.9	<1.00	NR
	03/31/08	<1.0	<1.0	<1.0	<3.0	<1.0	<1.0	NR
	RBSL	5	1,000	700	10,000	40	25	15

Notes:

1. Analyses for BTEX constituents, MTBE and Naphthalene by EPA Method 8260B; groundwater quality data prior to June 12, 2003 reproduced from previous consultant's reports. The data is assumed to be correct.
2. Concentrations in bold face type exceeded the January 1998 Risk Based Screening Level for samples collected before May 2001 and exceeded the May 2001 Risk Based Screening Level for samples collected after May 2001.
3. Analysis not requested.
4. Less than the reporting limit specified in the laboratory report.
5. Monitoring well MW-1R was installed as a replacement for monitoring well MW-1.
6. Estimated concentration, calibration range exceeded.
7. Estimated concentration below the laboratory reporting limit.
8. Not Detected.
9. Other compound detected (IPE: 294 µg/L).
10. May 2001 Risk Based Screening Level.
11. Well not found.
12. Not sampled due to insufficient volume of water in the well or well was not accessible.
13. Other compound detected (IPE: 21.8 µg/L)
14. Other compound detected (IPE: 13.4 µg/L)

FIGURES



SCALE 1:24,000

1 0 1 MILE

1000 0 1000 2000 3000 4000 5000 6000 7000 FEET

QUADRANGLE LOCATION

CONTOUR INTERVAL 10 FEET

ROCK HILL EAST, SC QUADRANGLE

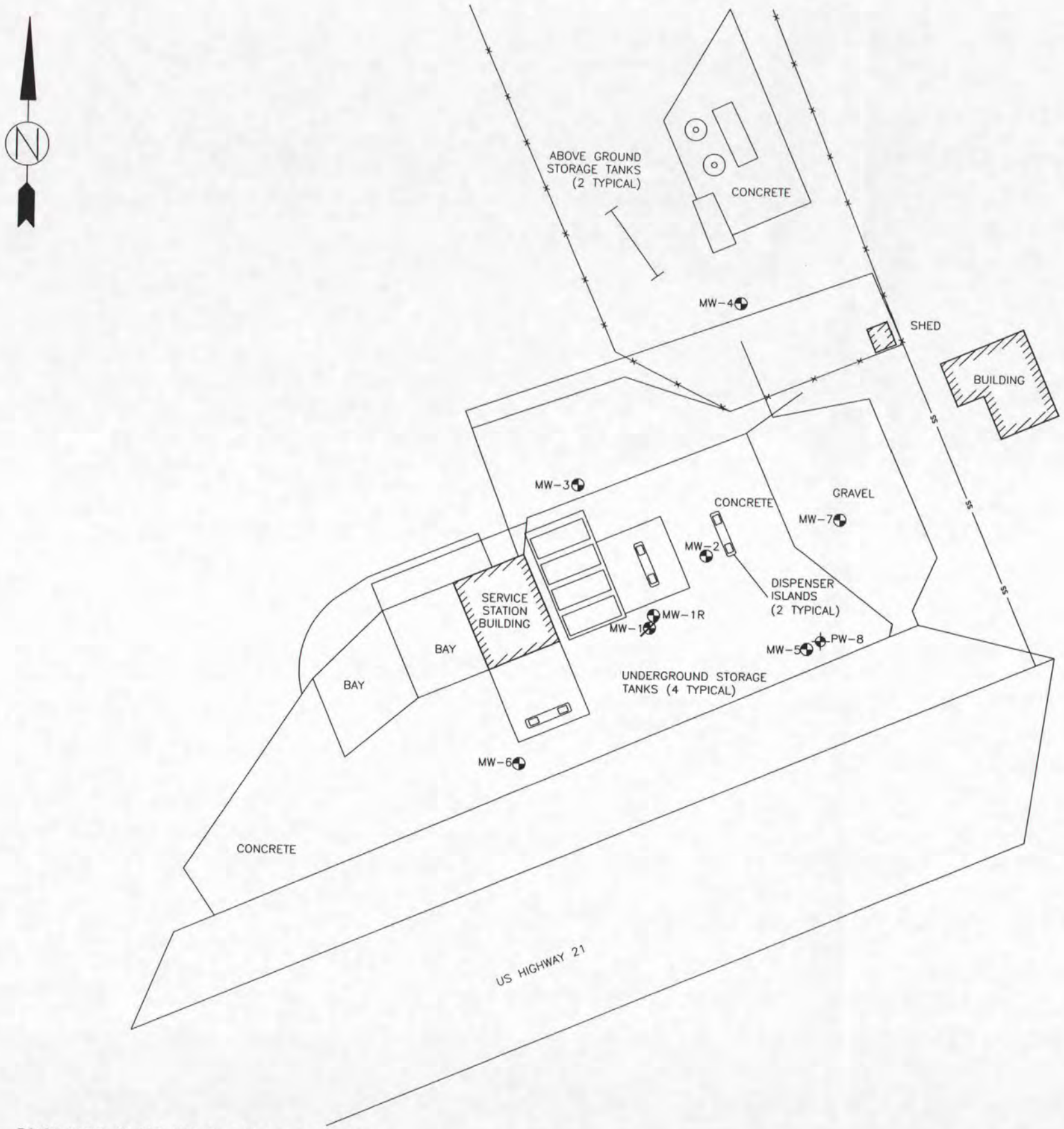
ecs
15704 South Point Blvd, Suite F
Charlotte, NC 28278
Phone: 704-588-0711 Fax: 704-588-0744

LATITUDE: 34° 58' 42" N	GREEN'S OIL CO.
LONGITUDE: 80° 58' 54" W	2849 CHERRY RD.
DRAWN BY: KB	ROCK HILL, SC
CHECKED BY: BD	SITE I.D. NO. 09344
DATE: 3/21/07	

FIGURE 1

USGS TOPOGRAPHIC MAP

PROJECT NO. 14-811030



NOTE: FIGURE BASED ON SITE MAP BY PREVIOUS CONSULTANT.

Legend

- SS — Sanitary Sewer Line
- x — Fence
- Shallow (Water Table) Monitoring Well
- Shallow Monitoring Well (Abandoned)
- Telescoping Monitoring Well

General Notes:

All locations, dimensions, and property lines depicted on this plan are approximate. This plan should not be used for construction or land conveyance purposes.

ecs
13504 South Point Blvd, Suite F • Charlotte, NC 28273
Phone: (704)583-2711 Fax: (704)583-2744

PROJECT:
Green's Oil Company
2849 Cherry Road
Rock Hill, South Carolina

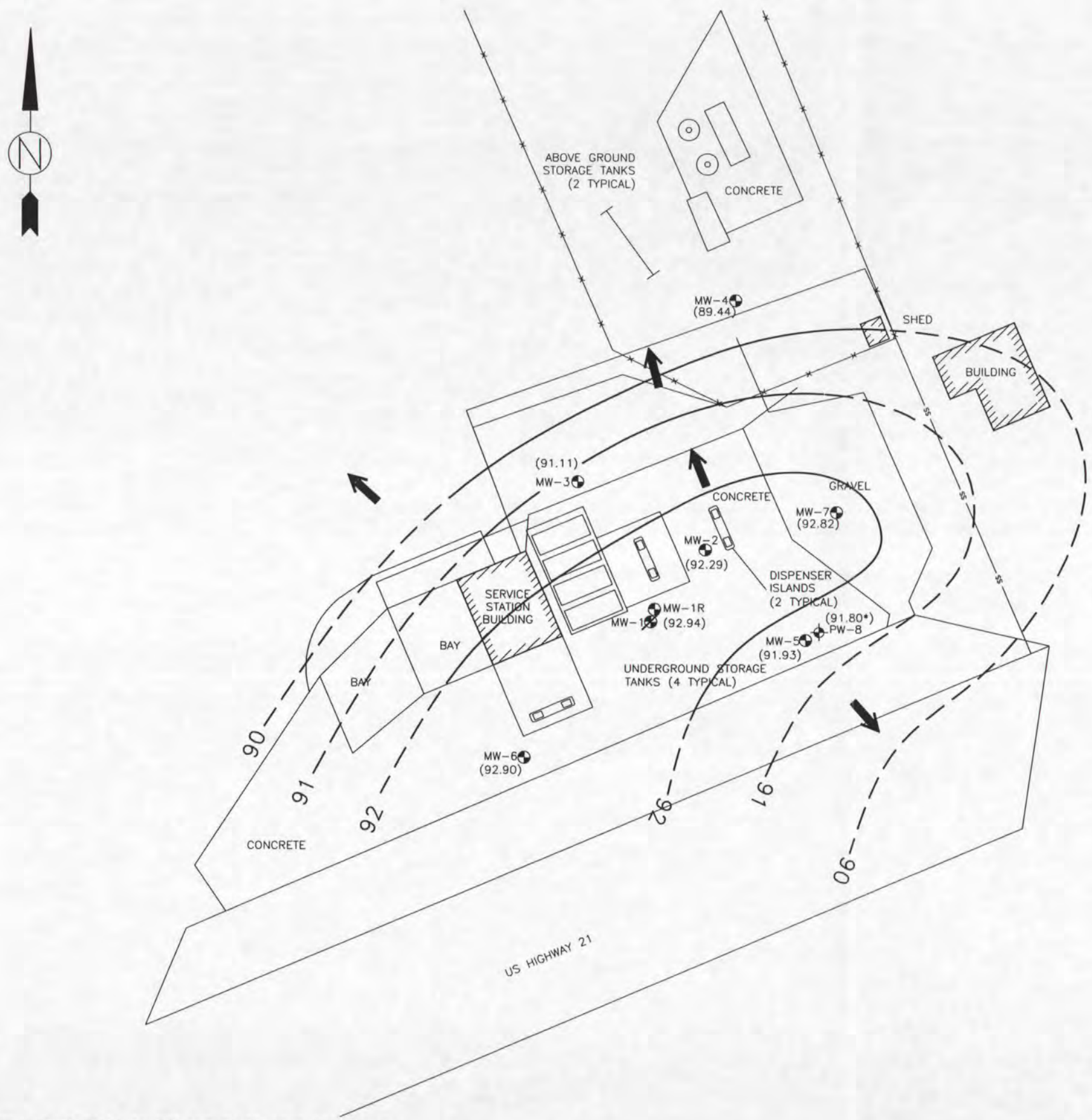
TITLE:
SITE MAP

CLIENT:
Federated Insurance

GRAPHIC SCALE: 40 20 0 20 40

COMPUTER CADFILE: C:\MyDocuments\Charlotte\811030 Green's Oil Company

DRAWN BY:	DESIGNED BY:	CHECKED BY:	APPROVED BY:
KB	KB	JR	JR
SCALE:	DATE:	JOB NO.:	FIGURE NO.:
1"=40'	4/10/08	14-811030	2



NOTE: FIGURE BASED ON SITE MAP BY PREVIOUS CONSULTANT.

Legend

- SS — Sanitary Sewer Line
- x — Fence
- Shallow (Water Table) Monitoring Well
- Shallow Monitoring Well (Abandoned)
- Telescoping Monitoring Well
- (90.23) Groundwater Elevation
- 90.00 Water Table Contour (Dashed where inferred)
- (NF) Not Found
- Flow Direction Indicator

General Notes:

All locations, dimensions, and property lines depicted on this plan are approximate. This plan should not be used for construction or land conveyance purposes.

Horizontal, and vertical locations of wells, and selected site features determined through measurements made by representatives of ECS.

Groundwater elevations are based on a benchmark with an assumed datum of 100.00 feet.

Water table elevations are based on measurements made on March 31, 2008.

Water table contours, and flow directions assume homogenous, isotropic aquifer conditions, and horizontal flow.

Fluctuations in the level of the water table may occur due to factors not accounted for at the time of measurement.

Water table contours are interpolated between data points, and inferred in other areas.

Telescoping Monitoring Well not used in contouring.

*PW-8 elevation not used in developing isoelevation contours.

ecs
13504 South Point Blvd, Suite F * Charlotte, NC 28273
Phone: (704)583-2711 Fax: (704)583-2744

PROJECT:
Green's Oil Company
2849 Cherry Road
Rock Hill, South Carolina

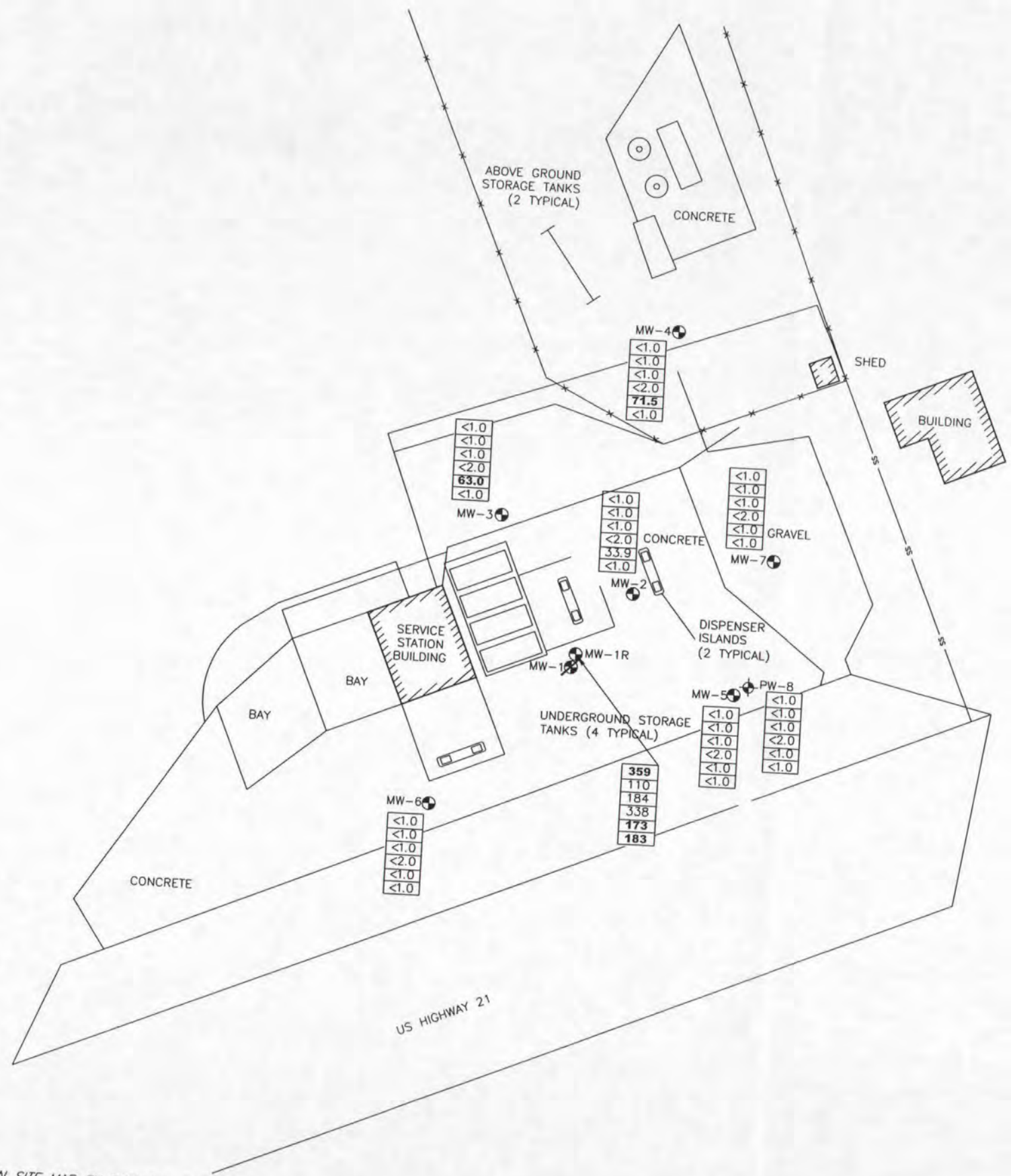
TITLE:
GROUNDWATER ELEVATION MAP 3/31/08

CLIENT:
Federated Insurance

GRAPHIC SCALE: 40 20 0 20 40

COMPUTER CADFILE: C:\My Documents\Charlotte\811030 Green's Oil Company

DRAWN BY:	DESIGNED BY:	CHECKED BY:	APPROVED BY:
KB	KB	JR	JR
SCALE:	DATE:	JOB NO.:	FIGURE NO.:
1"=40'	4/10/08	14-811030	3



NOTE: FIGURE BASED ON SITE MAP BY PREVIOUS CONSULTANT.

Legend

- SS — Sanitary Sewer Line
- x — Fence
- Shallow (Water Table) Monitoring Well
- Shallow Monitoring Well (Abandoned)
- Telescoping Monitoring Well

5	Benzene
1,000	Toluene
700	Ethylbenzene
10,000	Total Xylenes
40	MTBE
25	Naphthalene

All concentrations are measured in micrograms per liter (ug/L).

Above concentrations represent May 2001 Risk-Based Screening Levels; Concentrations in bold face type exceeded the RBSL.

J - Estimated Value between the method detection limit and the reporting limit.

<1.0 Less than the reporting limit specified in the laboratory report.

General Notes:

All locations, dimensions, and property lines depicted on this plan are approximate. This plan should not be used for construction or land conveyance purposes.

ecs
13504 South Point Blvd, Suite F • Charlotte, NC 28273
Phone: (704)583-2711 Fax: (704)583-2744

PROJECT:
Green's Oil Company
2849 Cherry Road
Rock Hill, South Carolina

TITLE:
GROUNDWATER QUALITY MAP 3/31/08

CLIENT:
Federated Insurance

GRAPHIC SCALE: 40 20 0 20 40

COMPUTER CADFILE: C:\MyDocuments\Charlotte\811030 Green's Oil Company

DRAWN BY:	DESIGNED BY:	CHECKED BY:	APPROVED BY:
KB	KB	JR	JR
SCALE:	DATE:	JOB NO.:	FIGURE NO.:
1"=40'	4/10/08	14-811030	4

APPENDIX A

GROUNDWATER SAMPLING FIELD DATA SHEETS

GAUGE REPORT

Environmental Compliance Services, Inc.
13504 South Point Blvd. Unit #F
Charlotte, NC 28273

Project Name:	Greens Oil	Location:	Rock Hill, SC
Project No.:	14-811030	Date:	3/31/2008
Measured By:	S. Bryant	Weather:	Raining, overcast, 40's

Well No.	Depth to Product (feet)	Depth to Water (feet)	Product Thickness (feet)	Product Recovered (gallons)	Well Depth (feet)	Volume Purged (gallons)
MW-1R	---	5.36	---	---	9.90	3.00
MW-2	---	5.57	---	---	14.22	12.14
MW-3	---	5.97	---	---	7.88	0.25
MW-4	---	7.47	---	---	13.66	2.75
MW-5	---	5.11	---	---	10.26	2.43
MW-6	---	5.69	---	---	9.86	1.18
MW-7	---	5.58	---	---	13.70	3.97
PW-8	---	5.18	---	---	30.25	12.25

Remarks

South Carolina Department of Health and Environmental Control
Bureau of Underground Storage Tank Management

Field Data Information Sheet for Ground Water Sampling

Date(mm/dd/yy) 03/31/08
Field Personnel Shelley Bryant
General Weather Conditions Raining, Overcast
Ambient Air Temperature 45 F

Facility Name Green's Oil Site ID# 09344

Quality Assurance:

pH Meter YSI 556 MPS
serial no. 07F101211
pH = 4.0 _____
pH = 7.0 _____
pH = 10.0 _____

Conductivity Meter YSI 556 MPS
serial no. _____
Standard _____
Standard _____
Standard _____

Chain of Custody

S. Bryant	3/31/08 4:35	Pace	4/1/08 11:35
Relinquished by	Date/Time	Received by	Date/Time

Well # **MW-1R**

Well Diameter (D) 4.5 inch _____ or feet
conversion factor(C): 3.143*(D/2)^2
for a 2 inch well C= 0.163
for a 4 inch well C= 0.652
Total Well Depth (TWD) 9.90 ft.
Depth to GW(DGW) 5.36 ft.

Length of Water Column (LWC=TWD-DGW) 4.54 ft.

1Csg. Vol. (LWC*C)= 4.54 X 0.826 = 3.75 gal.
3Csg. Volume = 3x 3.75 = 11.25 gals.(Std. Purge Vol)
Total Vol. of Water Purged Before Sampling 3.0 gal.

	Initial	1st vol.	2nd vol.	3rd vol.	4th vol.	5th vol.	Post	Sampling
Volume Purged (gallons)		3.00						
Time (military)	11:26							11:35
pH (s.u.)	6.78							6.87
O.R.P. (mV)	-40.0							-75.0
Temperature (°C)	15.80							15.86
Specific Cond. (umhos/cm)	540							547
Dissolved Oxygen (mg/L)	2.27							1.82
Turbidity	1							1

*Subjective (1) None (2) Faint (3) Moderate (4) Strong

Remarks Measured a 4.5 inch casing, using a conversion factor of .826 to get purge volume.
Purged 3 gallons during 1st water volume before well was dry. Petroleum odor in water.

South Carolina Department of Health and Environmental Control
Bureau of Underground Storage Tank Management

Field Data Information Sheet for Ground Water Sampling

Date(mm/dd/yy) 03/31/08
Field Personnel Shelley Bryant
General Weather Conditions Raining, Overcast
Ambient Air Temperature 45 F

Facility Name Green's Oil Site ID# 09344

Quality Assurance:

pH Meter YSI 556 MPS
serial no. 07F101211
pH = 4.0 _____
pH = 7.0 _____
pH = 10.0 _____

Conductivity Meter YSI 556 MPS
serial no. _____
Standard _____
Standard _____
Standard _____

Chain of Custody

S. Bryant	3/31/08 4:35	Pace	4/1/08 11:35
Relinquished by	Date/Time	Received by	Date/Time

Well # **MW-2**

Well Diameter (D) 4.5 inch _____ or feet
conversion factor(C): 3.143*(D/2)^2
for a 2 inch well C= 0.163
for a 4 inch well C= 0.652
Total Well Depth (TWD) 14.22 ft.
Depth to GW(DGW) 5.57 ft.

Length of Water Column (LWC=TWD-DGW) 8.65 ft.

1Csg. Vol. (LWC*C)= 8.65 X 0.826 = 7.14 gal.
3Csg. Volume = 3x 7.14 = 21.43 gals.(Std. Purge Vol)
Total Vol. of Water Purged Before Sampling 12.14 gal.

	Initial	1st vol.	2nd vol.	3rd vol.	4th vol.	5th vol.	Post	Sampling
Volume Purged (gallons)		7.14	5.00					
Time (military)	11:50	11:55						12:05
pH (s.u.)	7.08	6.96						6.95
O.R.P. (mV)	-31.2	-30						-35.0
Temperature (°C)	15.56	16.25						15.93
Specific Cond. (umhos/cm)	587	615						632
Dissolved Oxygen (mg/L)	1.56	1.61						1.72
Turbidity	1	1						1

*Subjective (1) None (2) Faint (3) Moderate (4) Strong

Remarks Measured a 4.5 inch casing, using a conversion factor of .826 to get purge volume.
Purged 5 gallons during 2nd water volume before well was dry. Petroleum odor in water.

South Carolina Department of Health and Environmental Control
Bureau of Underground Storage Tank Management

Field Data Information Sheet for Ground Water Sampling

Date(mm/dd/yy) 03/31/08
Field Personnel Shelley Bryant
General Weather Conditions Raining, Overcast
Ambient Air Temperature 45 F

Facility Name Green's Oil Site ID# 09344

Quality Assurance:

pH Meter YSI 556 MPS
serial no. 07F101211
pH = 4.0
pH = 7.0
pH = 10.0

Conductivity Meter YSI 556 MPS
serial no.
Standard
Standard
Standard

Chain of Custody

S. Bryant	3/31/08 4:35	Pace	4/1/08 11:35
Relinquished by	Date/Time	Received by	Date/Time

Well # **MW-3**

Well Diameter (D) 2.0 inch _____ or feet
conversion factor(C): 3.143*(D/2)^2
for a 2 inch well C= 0.163
for a 4 inch well C= 0.652
Total Well Depth (TWD) 7.88 ft.
Depth to GW(DGW) 5.97 ft.

Length of Water Column (LWC=TWD-DGW) 1.91 ft.

1Csg. Vol. (LWC*C)= 1.91 X 0.163 = 0.31 gal.
3Csg. Volume = 3x 0.31 = 0.93 gals.(Std. Purge Vol)
Total Vol. of Water Purged Before Sampling 0.25 gal.

	Initial	1st vol.	2nd vol.	3rd vol.	4th vol.	5th vol.	Post	Sampling
Volume Purged (gallons)		0.25						
Time (military)	12:20							12:25
pH (s.u.)	7.35							7.44
O.R.P. (mV)	-31.0							-30.0
Temperature (°C)	14.62							14.69
Specific Cond. (umhos/cm)	507							518
Dissolved Oxygen (mg/L)	2.83							2.44
Turbidity	2							3

*Subjective (1) None (2) Faint (3) Moderate (4) Strong

Remarks Purged 1/2 a bailer during 1st water volume before well was dry.

South Carolina Department of Health and Environmental Control
Bureau of Underground Storage Tank Management

Field Data Information Sheet for Ground Water Sampling

Date(mm/dd/yy) 03/31/08
Field Personnel Shelley Bryant
General Weather Conditions Raining, Overcast
Ambient Air Temperature 45 F

Facility Name Green's Oil Site ID# 09344

Quality Assurance:

pH Meter YSI 556 MPS
serial no. 07F101211
pH = 4.0 _____
pH = 7.0 _____
pH = 10.0 _____

Conductivity Meter YSI 556 MPS
serial no. _____
Standard _____
Standard _____
Standard _____

Chain of Custody

S. Bryant	3/31/08 4:35	Pace	4/1/08 11:35
Relinquished by	Date/Time	Received by	Date/Time

Well # **MW-4**

Well Diameter (D) 2.0 inch _____ or feet
conversion factor(C): 3.143*(D/2)^2
for a 2 inch well C= 0.163
for a 4 inch well C= 0.652
Total Well Depth (TWD) 13.66 ft.
Depth to GW(DGW) 7.47 ft.

Length of Water Column (LWC=TWD-DGW) 6.19 ft.

1Csg. Vol. (LWC*C)= 6.19 X 0.163 = 1.01 gal.
3Csg. Volume = 3x 1.01 = 3.03 gals.(Std. Purge Vol)
Total Vol. of Water Purged Before Sampling 2.75 gal.

	Initial	1st vol.	2nd vol.	3rd vol.	4th vol.	5th vol.	Post	Sampling
Volume Purged (gallons)		1.00	1.00	0.75				
Time (military)	15:00	15:05	15:08					15:10
pH (s.u.)	7.15	7.16	7.14					7.11
O.R.P. (mV)	-80.0	-101.0	-105.0					-97.0
Temperature (°C)	17.17	17.32	17.18					17.36
Specific Cond. (umhos/cm)	994	1020	1020					1009
Dissolved Oxygen (mg/L)	1.64	1.37	1.23					1.67
Turbidity	1	1	1					1

*Subjective (1) None (2) Faint (3) Moderate (4) Strong

Remarks Purged .75 gallons during 3rd water volume before well was dry.
Strong petroleum odor with sheen on top of water.

South Carolina Department of Health and Environmental Control
Bureau of Underground Storage Tank Management

Field Data Information Sheet for Ground Water Sampling

Date(mm/dd/yy) 03/31/08
Field Personnel Shelley Bryant
General Weather Conditions Raining, Overcast
Ambient Air Temperature 45 F

Facility Name Green's Oil Site ID# 09344

Quality Assurance:

pH Meter YSI 556 MPS
serial no. 07F101211
pH = 4.0
pH = 7.0
pH = 10.0

Conductivity Meter YSI 556 MPS
serial no.
Standard
Standard
Standard

Chain of Custody

S. Bryant	3/31/08 4:35	Pace	4/1/08 11:35
Relinquished by	Date/Time	Received by	Date/Time

Well # **MW-5**

Well Diameter (D) 2.0 inch _____ or feet
conversion factor(C): 3.143*(D/2)^2
for a 2 inch well C= 0.163
for a 4 inch well C= 0.652
Total Well Depth (TWD) 10.26 ft.
Depth to GW(DGW) 5.11 ft.

Length of Water Column (LWC=TWD-DGW) 5.15 ft.

1Csg. Vol. (LWC*C)= 5.15 X 0.163 = 0.84 gal.
3Csg. Volume = 3x 0.84 = 2.52 gals.(Std. Purge Vol)
Total Vol. of Water Purged Before Sampling 2.43 gal.

	Initial	1st vol.	2nd vol.	3rd vol.	4th vol.	5th vol.	Post	Sampling
Volume Purged (gallons)		0.84	0.84	0.75				
Time (military)	14:00	14:02	14:05					14:10
pH (s.u.)	7.44	7.54	7.56					7.60
O.R.P. (mV)	46.0	33.0	27.2					26.2
Temperature (°C)	16.50	16.31						15.58
Specific Cond. (umhos/cm)	329	344	346					346
Dissolved Oxygen (mg/L)	5.50	5.07	4.92					5.27
Turbidity	1	1	2					2

*Subjective (1) None (2) Faint (3) Moderate (4) Strong

Remarks Purged .75 gallons during 3rd water volume before well was dry.
No temperature was recorded for 2nd water volume.

South Carolina Department of Health and Environmental Control
Bureau of Underground Storage Tank Management

Field Data Information Sheet for Ground Water Sampling

Date(mm/dd/yy) 03/31/08
Field Personnel Shelley Bryant
General Weather Conditions Raining, Overcast
Ambient Air Temperature 45 F

Facility Name Green's Oil Site ID# 09344

Quality Assurance:

pH Meter YSI 556 MPS
serial no. 07F101211
pH = 4.0 _____
pH = 7.0 _____
pH = 10.0 _____

Conductivity Meter YSI 556 MPS
serial no. _____
Standard _____
Standard _____
Standard _____

Chain of Custody

S. Bryant	3/31/08 4:35	Pace	4/1/08 11:35
Relinquished by	Date/Time	Received by	Date/Time

Well # **MW-6**

Well Diameter (D) 2.0 inch _____ or feet
conversion factor(C): 3.143*(D/2)^2
for a 2 inch well C= 0.163
for a 4 inch well C= 0.652
Total Well Depth (TWD) 9.86 ft.
Depth to GW(DGW) 5.69 ft.

Length of Water Column (LWC=TWD-DGW) 4.17 ft.

1Csg. Vol. (LWC*C)= 4.17 X 0.163 = 0.68 gal.
3Csg. Volume = 3x 0.68 = 2.04 gals.(Std. Purge Vol)
Total Vol. of Water Purged Before Sampling 1.18 gal.

	Initial	1st vol.	2nd vol.	3rd vol.	4th vol.	5th vol.	Post	Sampling
Volume Purged (gallons)		0.68	0.50					
Time (military)	12:40	12:43						12:45
pH (s.u.)	7.29	7.27						7.41
O.R.P. (mV)	-8.0	-9.0						25.0
Temperature (°C)	16.52	17.03						15.38
Specific Cond. (umhos/cm)	742	769						764
Dissolved Oxygen (mg/L)	3.92	3.91						4.70
Turbidity	1	1						1

*Subjective (1) None (2) Faint (3) Moderate (4) Strong

Remarks Purged .50 gallons during 2nd water volume before well was dry.

South Carolina Department of Health and Environmental Control
Bureau of Underground Storage Tank Management

Field Data Information Sheet for Ground Water Sampling

Date(mm/dd/yy) 03/31/08
Field Personnel Shelley Bryant
General Weather Conditions Raining, Overcast
Ambient Air Temperature 45 F

Facility Name Green's Oil Site ID# 09344

Quality Assurance:

pH Meter YSI 556 MPS
serial no. 07F101211
pH = 4.0
pH = 7.0
pH = 10.0

Conductivity Meter YSI 556 MPS
serial no.
Standard
Standard
Standard

Chain of Custody

Relinquished by	Date/Time	Received by	Date/Time
S. Bryant	3/31/08 4:35	Pace	4/1/08 11:35

Well # **MW-7**

Well Diameter (D) 2.0 inch _____ or feet
conversion factor(C): 3.143*(D/2)^2
for a 2 inch well C= 0.163
for a 4 inch well C= 0.652
Total Well Depth (TWD) 13.70 ft.
Depth to GW(DGW) 5.58 ft.

Length of Water Column (LWC=TWD-DGW) 8.12 ft.

1Csg. Vol. (LWC*C)= 8.12 X 0.163 = 1.32 gal.
3Csg. Volume = 3x 1.32 = 3.97 gals.(Std. Purge Vol)
Total Vol. of Water Purged Before Sampling 3.97 gal.

	Initial	1st vol.	2nd vol.	3rd vol.	4th vol.	5th vol.	Post	Sampling
Volume Purged (gallons)		1.32	1.32	1.32				
Time (military)	14:30	14:33	14:37	14:40				14:45
pH (s.u.)	7.51	7.39	7.33	7.27				7.27
O.R.P. (mV)	53.4	48.0	44.6	43.0				41.7
Temperature (°C)	16.43	16.31	16.24	17.20				16.52
Specific Cond. (umhos/cm)	433	423	438	440				437
Dissolved Oxygen (mg/L)	4.56	5.01	4.80	3.90				4.01
Turbidity	1	1	1	1				1

*Subjective (1) None (2) Faint (3) Moderate (4) Strong

Remarks Took sample with polyethylene bailer.

South Carolina Department of Health and Environmental Control
Bureau of Underground Storage Tank Management

Field Data Information Sheet for Ground Water Sampling

Date(mm/dd/yy) 03/31/08
Field Personnel Shelley Bryant
General Weather Conditions Raining, Overcast
Ambient Air Temperature 45 F

Facility Name Green's Oil Site ID# 09344

Quality Assurance:

pH Meter YSI 556 MPS
serial no. 07F101211
pH = 4.0 _____
pH = 7.0 _____
pH = 10.0 _____

Conductivity Meter YSI 556 MPS
serial no. _____
Standard _____
Standard _____
Standard _____

Chain of Custody

S. Bryant	3/31/08 4:35	Pace	4/1/08 11:35
Relinquished by	Date/Time	Received by	Date/Time

Well # **PW-8**

Well Diameter (D) 2.0 inch _____ or feet
conversion factor(C): 3.143*(D/2)^2
for a 2 inch well C= 0.163
for a 4 inch well C= 0.652
Total Well Depth (TWD) 30.25 ft.
Depth to GW(DGW) 5.18 ft.

Length of Water Column (LWC=TWD-DGW) 25.07 ft.

1Csg. Vol. (LWC*C)= 25.07 X 0.163 = 4.09 gal.
3Csg. Volume = 3x 4.09 = 12.26 gals.(Std. Purge Vol)
Total Vol. of Water Purged Before Sampling 12.25 gal.

	Initial	1st vol.	2nd vol.	3rd vol.	4th vol.	5th vol.	Post	Sampling
Volume Purged (gallons)		4.09	4.09	4.09				
Time (military)	13:15	13:23	13:30	13:40				13:45
pH (s.u.)	7.69	7.42	7.30	7.27				7.25
O.R.P. (mV)	5.8	15.5	17.4	19.3				24.0
Temperature (°C)	15.90	16.07	17.16	16.89				17.76
Specific Cond. (umhos/cm)	130	216	287	300				300
Dissolved Oxygen (mg/L)	4.47	3.72	2.94	3.61				2.06
Turbidity	1	1	1	1				1

*Subjective (1) None (2) Faint (3) Moderate (4) Strong

Remarks Took sample with polyethylene bailer.

APPENDIX B

LABORATORY REPORT – GROUNDWATER SAMPLES – MARCH 2008

Pace Analytical®
www.pacelabs.com

Pace Analytical Services, Inc.
2225 Riverside Dr.
Asheville, NC 28804
(828)254-7176

Pace Analytical Services, Inc.
9800 Kincey Ave. Suite 100
Huntersville, NC 28078
(704)875-9092

April 08, 2008

Mr. Jim Rudder
Environmental Compliance Servi
13504 South Point Blvd
Charlotte, NC 28217

RE: Project: GREEN'S OIL 14-811030
Pace Project No.: 9216450

Dear Mr. Rudder:
Enclosed are the analytical results for sample(s) received by the laboratory on April 01, 2008. The results relate only to the samples included in this report. Results reported herein conform to the most current NELAC standards, where applicable, unless otherwise narrated in the body of the report.

Inorganic Wet Chemistry and Metals analyses were performed at our Pace Asheville laboratory and Organic testing was performed at our Pace Huntersville laboratory unless otherwise footnoted. All Microbiological analyses were performed at the laboratory where the samples were received.

If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Kevin Herring

kevin.herring@pacelabs.com
Project Manager

Enclosures

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www.pacelabs.com

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CERTIFICATIONS

Project: GREEN'S OIL 14-811030
Pace Project No.: 9216450

Charlotte Certification IDs
Florida/NELAP Certification Number: E87627
Kansas Certification Number: E-10364
Louisiana/LELAP Certification Number: 04034
North Carolina Drinking Water Certification Number: 37706
North Carolina Wastewater Certification Number: 12
North Carolina Field Services Certification Number: 5342
South Carolina Certification Number: 990060001
South Carolina Bioassay Certification Number: 990060003
Tennessee Certification Number: 04010
Virginia Certification Number: 00213

Asheville Certification IDs
Florida/NELAP Certification Number: E87648
Louisiana/LELAP Certification Number: 03095
New Jersey Certification Number: NC011
North Carolina Drinking Water Certification Number: 37712
North Carolina Wastewater Certification Number: 40
North Carolina Bioassay Certification Number: 9
Pennsylvania Certification Number: 68-03578
South Carolina Certification Number: 99030001
South Carolina Bioassay Certification Number: 99030002
Tennessee Certification Number: 2980
Virginia Certification Number: 00072

Eden Certification IDs
North Carolina Drinking Water Certification Number: 37738
Virginia Drinking Water Certification Number: 00424
North Carolina Wastewater Certification Number: 633

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SAMPLE ANALYTE COUNT

Project: GREEN'S OIL 14-811030
Pace Project No.: 9216450

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
9216450001	**MW-1R**	EPA 8260	MCK	12	PASI-C
9216450002	**MW-2**	EPA 8260	MCK	12	PASI-C
9216450003	**MW-3**	EPA 8260	MCK	12	PASI-C
9216450004	**MW-4**	EPA 8260	MCK	12	PASI-C
9216450005	**MW-5**	EPA 8260	MCK	12	PASI-C
9216450006	**MW-6**	EPA 8260	MCK	12	PASI-C
9216450007	**MW-7**	EPA 8260	MCK	12	PASI-C
9216450008	**PW-8**	EPA 8260	MCK	12	PASI-C

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ANALYTICAL RESULTS

Project: GREEN'S OIL 14-811030
Pace Project No.: 9216450

Sample: MW-1R **Lab ID: 9216450001** Collected: 03/31/08 11:35 Received: 04/01/08 13:32 Matrix: Water

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
8260 MSV Low Level	Analytical Method: EPA 8260							
Benzene	**359**	ug/L	20.0	20		04/04/08 23:34	71-43-2	
Ethylbenzene	**184**	ug/L	20.0	20		04/04/08 23:34	100-41-4	
Methyl-tert-butyl ether	**173**	ug/L	20.0	20		04/04/08 23:34	1634-04-4	
Naphthalene	**183**	ug/L	20.0	20		04/04/08 23:34	91-20-3	
Toluene	**110**	ug/L	20.0	20		04/04/08 23:34	108-88-3	
Xylene (Total)	**338**	ug/L	40.0	20		04/04/08 23:34	1330-20-7	
m&p-Xylene	**220**	ug/L	40.0	20		04/04/08 23:34	1330-20-7	
o-Xylene	**118**	ug/L	20.0	20		04/04/08 23:34	95-47-6	
4-Bromofluorobenzene (S)	100	%	87-109	20		04/04/08 23:34	460-00-4	
Dibromofluoromethane (S)	97	%	85-115	20		04/04/08 23:34	1868-53-7	
1,2-Dichloroethane-d4 (S)	97	%	79-120	20		04/04/08 23:34	17060-07-0	
Toluene-d8 (S)	99	%	70-120	20		04/04/08 23:34	2037-26-5	

Sample: MW-2 **Lab ID: 9216450002** Collected: 03/31/08 12:05 Received: 04/01/08 13:32 Matrix: Water

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
8260 MSV Low Level	Analytical Method: EPA 8260							
Benzene	ND	ug/L	1.0	1		04/07/08 17:03	71-43-2	
Ethylbenzene	ND	ug/L	1.0	1		04/07/08 17:03	100-41-4	
Methyl-tert-butyl ether	**33.9**	ug/L	1.0	1		04/07/08 17:03	1634-04-4	
Naphthalene	ND	ug/L	1.0	1		04/07/08 17:03	91-20-3	
Toluene	ND	ug/L	1.0	1		04/07/08 17:03	108-88-3	
Xylene (Total)	ND	ug/L	2.0	1		04/07/08 17:03	1330-20-7	
m&p-Xylene	ND	ug/L	2.0	1		04/07/08 17:03	1330-20-7	
o-Xylene	ND	ug/L	1.0	1		04/07/08 17:03	95-47-6	
4-Bromofluorobenzene (S)	100	%	87-109	1		04/07/08 17:03	460-00-4	
Dibromofluoromethane (S)	99	%	85-115	1		04/07/08 17:03	1868-53-7	
1,2-Dichloroethane-d4 (S)	100	%	79-120	1		04/07/08 17:03	17060-07-0	
Toluene-d8 (S)	100	%	70-120	1		04/07/08 17:03	2037-26-5	

Sample: MW-3 **Lab ID: 9216450003** Collected: 03/31/08 12:25 Received: 04/01/08 13:32 Matrix: Water

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
8260 MSV Low Level	Analytical Method: EPA 8260							
Benzene	ND	ug/L	1.0	1		04/03/08 21:32	71-43-2	
Ethylbenzene	ND	ug/L	1.0	1		04/03/08 21:32	100-41-4	
Methyl-tert-butyl ether	**63.0**	ug/L	1.0	1		04/03/08 21:32	1634-04-4	
Naphthalene	ND	ug/L	1.0	1		04/03/08 21:32	91-20-3	
Toluene	ND	ug/L	1.0	1		04/03/08 21:32	108-88-3	
Xylene (Total)	ND	ug/L	2.0	1		04/03/08 21:32	1330-20-7	
m&p-Xylene	ND	ug/L	2.0	1		04/03/08 21:32	1330-20-7	
o-Xylene	ND	ug/L	1.0	1		04/03/08 21:32	95-47-6	

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ANALYTICAL RESULTS

Project: GREEN'S OIL 14-811030
Pace Project No.: 9216450

Sample: MW-3 **Lab ID: 9216450003** Collected: 03/31/08 12:25 Received: 04/01/08 13:32 Matrix: Water

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
8260 MSV Low Level	Analytical Method: EPA 8260							
4-Bromofluorobenzene (S)	98	%	87-109	1		04/03/08 21:32	460-00-4	
Dibromofluoromethane (S)	96	%	85-115	1		04/03/08 21:32	1868-53-7	
1,2-Dichloroethane-d4 (S)	97	%	79-120	1		04/03/08 21:32	17060-07-0	
Toluene-d8 (S)	99	%	70-120	1		04/03/08 21:32	2037-26-5	

Sample: MW-4 **Lab ID: 9216450004** Collected: 03/31/08 15:10 Received: 04/01/08 13:32 Matrix: Water

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
8260 MSV Low Level	Analytical Method: EPA 8260							
Benzene	ND	ug/L	1.0	1		04/07/08 17:26	71-43-2	
Ethylbenzene	ND	ug/L	1.0	1		04/07/08 17:26	100-41-4	
Methyl-tert-butyl ether	**71.5**	ug/L	1.0	1		04/07/08 17:26	1634-04-4	
Naphthalene	ND	ug/L	1.0	1		04/07/08 17:26	91-20-3	
Toluene	ND	ug/L	1.0	1		04/07/08 17:26	108-88-3	
Xylene (Total)	ND	ug/L	2.0	1		04/07/08 17:26	1330-20-7	
m&p-Xylene	ND	ug/L	2.0	1		04/07/08 17:26	1330-20-7	
o-Xylene	ND	ug/L	1.0	1		04/07/08 17:26	95-47-6	
4-Bromofluorobenzene (S)	101	%	87-109	1		04/07/08 17:26	460-00-4	
Dibromofluoromethane (S)	97	%	85-115	1		04/07/08 17:26	1868-53-7	
1,2-Dichloroethane-d4 (S)	99	%	79-120	1		04/07/08 17:26	17060-07-0	
Toluene-d8 (S)	99	%	70-120	1		04/07/08 17:26	2037-26-5	

Sample: MW-5 **Lab ID: 9216450005** Collected: 03/31/08 14:10 Received: 04/01/08 13:32 Matrix: Water

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
8260 MSV Low Level	Analytical Method: EPA 8260							
Benzene	ND	ug/L	1.0	1		04/03/08 21:56	71-43-2	
Ethylbenzene	ND	ug/L	1.0	1		04/03/08 21:56	100-41-4	
Methyl-tert-butyl ether	ND	ug/L	1.0	1		04/03/08 21:56	1634-04-4	
Naphthalene	ND	ug/L	1.0	1		04/03/08 21:56	91-20-3	
Toluene	ND	ug/L	1.0	1		04/03/08 21:56	108-88-3	
Xylene (Total)	ND	ug/L	2.0	1		04/03/08 21:56	1330-20-7	
m&p-Xylene	ND	ug/L	2.0	1		04/03/08 21:56	1330-20-7	
o-Xylene	ND	ug/L	1.0	1		04/03/08 21:56	95-47-6	
4-Bromofluorobenzene (S)	99	%	87-109	1		04/03/08 21:56	460-00-4	
Dibromofluoromethane (S)	98	%	85-115	1		04/03/08 21:56	1868-53-7	
1,2-Dichloroethane-d4 (S)	100	%	79-120	1		04/03/08 21:56	17060-07-0	
Toluene-d8 (S)	99	%	70-120	1		04/03/08 21:56	2037-26-5	

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ANALYTICAL RESULTS

Project: GREEN'S OIL 14-811030
Pace Project No.: 9216450

Sample: MW-6 **Lab ID: 9216450006** Collected: 03/31/08 12:45 Received: 04/01/08 13:32 Matrix: Water

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
8260 MSV Low Level	Analytical Method: EPA 8260							
Benzene	ND	ug/L	1.0	1		04/03/08 22:20	71-43-2	
Ethylbenzene	ND	ug/L	1.0	1		04/03/08 22:20	100-41-4	
Methyl-tert-butyl ether	ND	ug/L	1.0	1		04/03/08 22:20	1634-04-4	
Naphthalene	ND	ug/L	1.0	1		04/03/08 22:20	91-20-3	
Toluene	ND	ug/L	1.0	1		04/03/08 22:20	108-88-3	
Xylene (Total)	ND	ug/L	2.0	1		04/03/08 22:20	1330-20-7	
m&p-Xylene	ND	ug/L	2.0	1		04/03/08 22:20	1330-20-7	
o-Xylene	ND	ug/L	1.0	1		04/03/08 22:20	95-47-6	
4-Bromofluorobenzene (S)	99	%	87-109	1		04/03/08 22:20	460-00-4	
Dibromofluoromethane (S)	99	%	85-115	1		04/03/08 22:20	1868-53-7	
1,2-Dichloroethane-d4 (S)	101	%	79-120	1		04/03/08 22:20	17060-07-0	
Toluene-d8 (S)	98	%	70-120	1		04/03/08 22:20	2037-26-5	

Sample: MW-7 **Lab ID: 9216450007** Collected: 03/31/08 14:45 Received: 04/01/08 13:32 Matrix: Water

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
8260 MSV Low Level	Analytical Method: EPA 8260							
Benzene	ND	ug/L	1.0	1		04/03/08 22:44	71-43-2	
Ethylbenzene	ND	ug/L	1.0	1		04/03/08 22:44	100-41-4	
Methyl-tert-butyl ether	ND	ug/L	1.0	1		04/03/08 22:44	1634-04-4	
Naphthalene	ND	ug/L	1.0	1		04/03/08 22:44	91-20-3	
Toluene	ND	ug/L	1.0	1		04/03/08 22:44	108-88-3	
Xylene (Total)	ND	ug/L	2.0	1		04/03/08 22:44	1330-20-7	
m&p-Xylene	ND	ug/L	2.0	1		04/03/08 22:44	1330-20-7	
o-Xylene	ND	ug/L	1.0	1		04/03/08 22:44	95-47-6	
4-Bromofluorobenzene (S)	101	%	87-109	1		04/03/08 22:44	460-00-4	
Dibromofluoromethane (S)	98	%	85-115	1		04/03/08 22:44	1868-53-7	
1,2-Dichloroethane-d4 (S)	100	%	79-120	1		04/03/08 22:44	17060-07-0	
Toluene-d8 (S)	99	%	70-120	1		04/03/08 22:44	2037-26-5	

Sample: PW-8 **Lab ID: 9216450008** Collected: 03/31/08 13:45 Received: 04/01/08 13:32 Matrix: Water

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
8260 MSV Low Level	Analytical Method: EPA 8260							
Benzene	ND	ug/L	1.0	1		04/03/08 23:07	71-43-2	
Ethylbenzene	ND	ug/L	1.0	1		04/03/08 23:07	100-41-4	
Methyl-tert-butyl ether	ND	ug/L	1.0	1		04/03/08 23:07	1634-04-4	
Naphthalene	ND	ug/L	1.0	1		04/03/08 23:07	91-20-3	
Toluene	ND	ug/L	1.0	1		04/03/08 23:07	108-88-3	
Xylene (Total)	ND	ug/L	2.0	1		04/03/08 23:07	1330-20-7	
m&p-Xylene	ND	ug/L	2.0	1		04/03/08 23:07	1330-20-7	
o-Xylene	ND	ug/L	1.0	1		04/03/08 23:07	95-47-6	

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ANALYTICAL RESULTS

Project: GREEN'S OIL 14-811030
Pace Project No.: 9216450

Sample: PW-8 **Lab ID: 9216450008** Collected: 03/31/08 13:45 Received: 04/01/08 13:32 Matrix: Water

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
8260 MSV Low Level	Analytical Method: EPA 8260							
4-Bromofluorobenzene (S)	100	%	87-109	1		04/03/08 23:07	460-00-4	
Dibromofluoromethane (S)	99	%	85-115	1		04/03/08 23:07	1868-53-7	
1,2-Dichloroethane-d4 (S)	100	%	79-120	1		04/03/08 23:07	17060-07-0	
Toluene-d8 (S)	99	%	70-120	1		04/03/08 23:07	2037-26-5	

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QUALITY CONTROL DATA

Project: GREEN'S OIL 14-811030
Pace Project No.: 9216450

QC Batch: MSV/3020 Analysis Method: EPA 8260
QC Batch Method: EPA 8260 Analysis Description: 8260 MSV Low Level
Associated Lab Samples: 9216450003, 9216450005, 9216450006, 9216450007, 9216450008

METHOD BLANK: 97166
Associated Lab Samples: 9216450003, 9216450005, 9216450006, 9216450007, 9216450008

Parameter	Units	Blank Result	Reporting Limit	Qualifiers
Benzene	ug/L	ND	1.0	
Ethylbenzene	ug/L	ND	1.0	
m&p-Xylene	ug/L	ND	2.0	
Methyl-tert-butyl ether	ug/L	ND	1.0	
Naphthalene	ug/L	ND	1.0	
o-Xylene	ug/L	ND	1.0	
Toluene	ug/L	ND	1.0	
Xylene (Total)	ug/L	ND	2.0	
1,2-Dichloroethane-d4 (S)	%	98	79-120	
4-Bromofluorobenzene (S)	%	100	87-109	
Dibromofluoromethane (S)	%	95	85-115	
Toluene-d8 (S)	%	99	70-120	

LABORATORY CONTROL SAMPLE: 97167

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Benzene	ug/L	50	58.8	118	78-128	
Ethylbenzene	ug/L	50	60.0	120	80-127	
m&p-Xylene	ug/L	100	119	119	82-127	
Methyl-tert-butyl ether	ug/L	50	60.6	121	71-130	
Naphthalene	ug/L	50	62.6	125	52-136	
o-Xylene	ug/L	50	59.3	119	83-124	
Toluene	ug/L	50	57.6	115	76-126	
Xylene (Total)	ug/L	150	178	119	83-125	
1,2-Dichloroethane-d4 (S)	%			99	79-120	
4-Bromofluorobenzene (S)	%			100	87-109	
Dibromofluoromethane (S)	%			102	85-115	
Toluene-d8 (S)	%			100	70-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 97168 97169

Parameter	Units	9216395005 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Qual
Benzene	ug/L	ND	50	50	60.1	60.2	120	120	74-136	.2	
Toluene	ug/L	ND	50	50	56.9	56.4	113	112	73-131	.7	
1,2-Dichloroethane-d4 (S)	%						100	100	79-120		
4-Bromofluorobenzene (S)	%						100	100	87-109		
Dibromofluoromethane (S)	%						98	97	85-115		
Toluene-d8 (S)	%						100	99	70-120		

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QUALITY CONTROL DATA

Project: GREEN'S OIL 14-811030
Pace Project No.: 9216450

QC Batch: MSV/3026
QC Batch Method: EPA 8260
Analysis Method: EPA 8260
Analysis Description: 8260 MSV Low Level
Associated Lab Samples: 9216450001, 9216450002

METHOD BLANK: 97435
Associated Lab Samples: 9216450001, 9216450002

Parameter	Units	Blank Result	Reporting Limit	Qualifiers
Benzene	ug/L	ND	1.0	
Ethylbenzene	ug/L	ND	1.0	
m&p-Xylene	ug/L	ND	2.0	
Methyl-tert-butyl ether	ug/L	ND	1.0	
Naphthalene	ug/L	ND	1.0	
o-Xylene	ug/L	ND	1.0	
Toluene	ug/L	ND	1.0	
Xylene (Total)	ug/L	ND	2.0	
1,2-Dichloroethane-d4 (S)	%	100	79-120	
4-Bromofluorobenzene (S)	%	99	87-109	
Dibromofluoromethane (S)	%	97	85-115	
Toluene-d8 (S)	%	98	70-120	

LABORATORY CONTROL SAMPLE: 97436

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Benzene	ug/L	50	56.9	114	78-128	
Ethylbenzene	ug/L	50	58.0	116	80-127	
m&p-Xylene	ug/L	100	115	115	82-127	
Methyl-tert-butyl ether	ug/L	50	58.4	117	71-130	
Naphthalene	ug/L	50	62.2	124	52-136	
o-Xylene	ug/L	50	56.9	114	83-124	
Toluene	ug/L	50	56.3	113	76-126	
Xylene (Total)	ug/L	150	172	115	83-125	
1,2-Dichloroethane-d4 (S)	%			98	79-120	
4-Bromofluorobenzene (S)	%			100	87-109	
Dibromofluoromethane (S)	%			102	85-115	
Toluene-d8 (S)	%			101	70-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 97437 97438

Parameter	Units	9216589002 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Qual
Benzene	ug/L	21.5	50	50	83.4	81.9	124	121	74-136	2	
Toluene	ug/L	1.0	50	50	59.4	58.4	117	115	73-131	2	
1,2-Dichloroethane-d4 (S)	%						101	99	79-120		
4-Bromofluorobenzene (S)	%						99	100	87-109		
Dibromofluoromethane (S)	%						98	98	85-115		
Toluene-d8 (S)	%						99	100	70-120		

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QUALITY CONTROL DATA

Project: GREEN'S OIL 14-811030
Pace Project No.: 9216450

QC Batch: MSV/3035
QC Batch Method: EPA 8260
Associated Lab Samples: 9216450004

Analysis Method: EPA 8260
Analysis Description: 8260 MSV Low Level

METHOD BLANK: 97782
Associated Lab Samples: 9216450004

Parameter	Units	Blank Result	Reporting Limit	Qualifiers
Benzene	ug/L	ND	1.0	
Ethylbenzene	ug/L	ND	1.0	
m&p-Xylene	ug/L	ND	2.0	
Methyl-tert-butyl ether	ug/L	ND	1.0	
Naphthalene	ug/L	ND	1.0	
o-Xylene	ug/L	ND	1.0	
Toluene	ug/L	ND	1.0	
Xylene (Total)	ug/L	ND	2.0	
1,2-Dichloroethane-d4 (S)	%	99	79-120	
4-Bromofluorobenzene (S)	%	102	87-109	
Dibromofluoromethane (S)	%	97	85-115	
Toluene-d8 (S)	%	99	70-120	

LABORATORY CONTROL SAMPLE: 97783

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Benzene	ug/L	50	55.0	110	78-128	
Ethylbenzene	ug/L	50	55.5	111	80-127	
m&p-Xylene	ug/L	100	110	110	82-127	
Methyl-tert-butyl ether	ug/L	50	56.4	113	71-130	
Naphthalene	ug/L	50	64.1	128	52-136	
o-Xylene	ug/L	50	54.7	109	83-124	
Toluene	ug/L	50	54.5	109	76-126	
Xylene (Total)	ug/L	150	165	110	83-125	
1,2-Dichloroethane-d4 (S)	%			102	79-120	
4-Bromofluorobenzene (S)	%			102	87-109	
Dibromofluoromethane (S)	%			102	85-115	
Toluene-d8 (S)	%			101	70-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 97786 97787

Parameter	Units	9216790003 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Qual
Benzene	ug/L	ND	50	50	60.8	59.8	122	120	74-136	2	
Toluene	ug/L	ND	50	50	57.6	56.8	115	113	73-131	1	
1,2-Dichloroethane-d4 (S)	%						99	99	79-120		
4-Bromofluorobenzene (S)	%						102	102	87-109		
Dibromofluoromethane (S)	%						97	98	85-115		
Toluene-d8 (S)	%						99	100	70-120		

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QUALIFIERS

Project: GREEN'S OIL 14-811030
Pace Project No.: 9216450

DEFINITIONS

DF - Dilution Factor, if reported, represents the factor applied to the reported data due to changes in sample preparation, dilution of the sample aliquot, or moisture content.

ND - Not Detected at or above adjusted reporting limit.

J - Estimated concentration above the adjusted method detection limit and below the adjusted reporting limit.

MDL - Adjusted Method Detection Limit.

S - Surrogate

1,2-Diphenylhydrazine (8270 listed analyte) decomposes to Azobenzene.

Consistent with EPA guidelines, unrounded data are displayed and have been used to calculate % recovery and RPD values.

LCS(D) - Laboratory Control Sample (Duplicate)

MS(D) - Matrix Spike (Duplicate)

DUP - Sample Duplicate

RPD - Relative Percent Difference

NC - Not Calculable.

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QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: GREEN'S OIL 14-811030
Pace Project No.: 9216450

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
9216450003	**MW-3**	EPA 8260	MSV/3020		
9216450005	**MW-5**	EPA 8260	MSV/3020		
9216450006	**MW-6**	EPA 8260	MSV/3020		
9216450007	**MW-7**	EPA 8260	MSV/3020		
9216450008	**PW-8**	EPA 8260	MSV/3020		
9216450001	**MW-1R**	EPA 8260	MSV/3026		
9216450002	**MW-2**	EPA 8260	MSV/3026		
9216450004	**MW-4**	EPA 8260	MSV/3035		

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CHAIN-OF-CUSTODY / Analytical Request Document

The Chain-of-Custody is a LEGAL DOCUMENT. All relevant fields must be completed accurately.

Page: 1 of 1

1163639

Section A Required Client Information:

Company: ECS
Address: 13504 S. Point Blvd - Charlotte, NC
Email To: jrudder@ecsconsulting.com
Phone: 704-583-2714 Fax:
Requested Due Date/TAT: 10-day default

Section B Required Project Information:

Report To: Jim Rudder
Copy To: Jim Rudder
Purchase Order No.: 14-811030
Project Name: Green's Oil
Project Number: 14-811030

Section C Invoice Information:

Attention: Sue Streeter
Company Name: ECS
Address: Agawam, MA
Pace Quote Reference:
Pace Project Manager: Kevin Herring
Pace Profile #: 2290-2

REGULATORY AGENCY

☐ NPDES ☐ GROUND WATER ☐ DRINKING WATER
☒ UST ☐ RCRA ☐ OTHER

Site Location STATE: SC

Section D Required Client Information

SAMPLE ID (A-Z, 0-9 / ,-) Sample IDs MUST BE UNIQUE

Matrix Codes (MATRIX / CODE): Drinking Water DW; Water WT; Waste Water WW; Product P; Soil/Solid SL; Oil OL; Wipe WP; Air AR; Tissue TS; Other OT

ITEM #	SAMPLE ID	MATRIX CODE (see valid codes to left)	SAMPLE TYPE (G=GRAB C=COMP)	COLLECTED: COMPOSITE START DATE	COMPOSITE START TIME	COMPOSITE END/GRAB DATE	COMPOSITE END/GRAB TIME	SAMPLE TEMP AT COLLECTION	# OF CONTAINERS	Preservatives: Unpreserved	H_2SO_4	HNO_3	HCl	NaOH	$Na_2S_2O_3$	Methanol	Other	Analysis Test Y/N	Analysis Test: 8260 BTEX, MTBE + naph	Residual Chlorine (Y/N)	Pace Project No./ Lab I.D.
1	MW-1R	WT	G			3-31-08	11:35						X						X		9216450001
2	MW-2						12:05														002
3	MW-3						12:25														003
4	MW-4						15:10														004
5	MW-5						14:10														005
6	MW-6						12:45														006
7	MW-7						14:45														007
8	PW-8						13:45														008
9																					
10																					
11																					
12																					

ADDITIONAL COMMENTS	RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME	SAMPLE CONDITIONS: Temp in °C	Received on Ice (Y/N)	Custody Sealed Cooler (Y/N)	Samples Intact (Y/N)
MW-1R - Petrol odor				JMoore	4/1	1533	2.6	Y	N	Y
MW-2 - " "										
MW-4 Strong petrol odor w/ sheen	Shelley Bryant	3-31-08	14:35	pce	4-1-08	11:35				

ORIGINAL 13:32

SAMPLER NAME AND SIGNATURE
PRINT Name of SAMPLER: Shelley Bryant
SIGNATURE of SAMPLER: Shelley Bryant
DATE Signed (MM/DD/YY): 3/31/08

*Important Note: By signing this form you are accepting Pace's NET 30 day payment terms and agreeing to late charges of 1.5% per month for any invoices not paid within 30 days.

F-ALL-Q-020rev.07, 15-May-2007

Sample Condition Upon Receipt

Pace Analytical

Client Name: ECS Project # 9216450

Courier: ☐ Fed Ex ☐ UPS ☐ USPS ☐ Client ☐ Commercial ☑ Pace Other ____

Custody Seal on Cooler/Box Present: ☐ yes ☑ no Seals intact: ☐ yes ☑ no

Optional	
Proj. Due Date:	N/A
Proj. Name:	N/A

Packing Material: ☐ Bubble Wrap ☑ Bubble Bags ☐ None ☐ Other ____

Thermometer Used T060 Type of Ice: Wet Blue None ☑ Samples on ice, cooling process has begun

Cooler Temperature 2.6 Biological Tissue is Frozen: Yes No N/A

Date and Initials of person examining contents: MM 4/1

Temp should be above freezing to 6°C

		Comments:
Chain of Custody Present:	☑Yes ☐No ☐N/A	1.
Chain of Custody Filled Out:	☑Yes ☐No ☐N/A	2.
Chain of Custody Relinquished:	☑Yes ☐No ☐N/A	3.
Sampler Name & Signature on COC:	☑Yes ☐No ☐N/A	4.
Samples Arrived within Hold Time:	☑Yes ☐No ☐N/A	5.
Short Hold Time Analysis (<72hr):	☐Yes ☑No ☐N/A	6.
Rush Turn Around Time Requested:	☐Yes ☑No ☐N/A	7.
Sufficient Volume:	☑Yes ☐No ☐N/A	8.
Correct Containers Used:	☑Yes ☐No ☐N/A	9.
-Pace Containers Used:	☑Yes ☐No ☐N/A	
Containers Intact:	☑Yes ☐No ☐N/A	10.
Filtered volume received for Dissolved tests	☐Yes ☐No ☑N/A	11.
Sample Labels match COC:	☑Yes ☐No ☐N/A	12.
-Includes date/time/ID/Analysis Matrix: ____		
All containers needing preservation have been checked.	☑Yes ☐No ☐N/A	13.
All containers needing preservation are found to be in compliance with EPA recommendation.	☑Yes ☐No ☐N/A	
exceptions: VOA, coliform, TOC, O&G, WI-DRO (water)	☐Yes ☐No	Initial when completed
Samples checked for dechlorination:	☐Yes ☐No ☑N/A	14.
Headspace in VOA Vials (>6mm):	☐Yes ☑No ☐N/A	15.
Trip Blank Present:	☐Yes ☐No ☑N/A	16.
Trip Blank Custody Seals Present	☐Yes ☐No ☐N/A	
Pace Trip Blank Lot # (if purchased): N/A		

Client Notification/ Resolution: Field Data Required? Y / N / N/A

Person Contacted: ____ Date/Time: ____

Comments/ Resolution: ____

Project Manager Review: [signature] Date: 4/1/08

Note: Whenever there is a discrepancy affecting North Carolina compliance samples, a copy of this form will be sent to the North Carolina DEHNR Certification Office (i.e out of hold, incorrect preservative, out of temp, incorrect containers)

APPENDIX C

DRUM DISPOSAL MANIFEST

D H E C

PROMOTE PROTECT PROSPER

C. Earl Hunter, Commissioner

Promoting and protecting the health of the public and the environment.

JERRY GREEN
GREENS OIL CO
2457 BREEN CIRCLE
ROCK HILL SC 29732

APR 24 2008

Re: **Groundwater Monitoring Report Review**
Greens Oil Co., 2849 Cherry Rd, Rock Hill, SC
UST Permit #09344
Release Reported July 18, 1989
Groundwater Monitoring Report received April 16, 2008
York County

Dear Mr. Green:

The Underground Storage Tank (UST) Program has reviewed the report submitted by ECS documenting the groundwater-sampling event. The report was to be submitted no later than December 17, 2007, but was not received until April. The next report should be submitted no later than August 15, 2008.

On all correspondence concerning this site, please reference UST Permit #09344. If there are any questions concerning this project, please contact me at (803) 896-6397, via fax at (803) 896-6245, or by e-mail at thomadl@dhec.sc.gov.

Sincerely,

Debra L. Thoma

Debra L. Thoma, Hydrogeologist
Northeastern SC Corrective Action Section
Assessment & Corrective Action Division
Underground Storage Tank Program
Bureau of Land & Waste Management

Cc: Robert Thompson, ECS, 13504 South Point Blvd., Unit F, Charlotte, NC, 28273
Technical File

UST DOCKET

5tech

ecs
WHERE BUSINESS AND THE ENVIRONMENT CONVERGE

13504 South Point Boulevard, Unit F, Charlotte, NC 28273 tel 704.583.2711 fax 704.583.2744 www.ecsconsult.com

GROUNDWATER MONITORING REPORT
GREEN'S OIL COMPANY
2849 CHERRY RD.
ROCK HILL, YORK COUNTY
UST PERMIT NO. 09344
SITE RISK CLASSIFICATION: HIGH
LAND USE CLASSIFICATION: COMMERCIAL
ECS PROJECT NO. 14-811030

Prepared For:

Federated Insurance Company
c/o Jerry Green
2457 Breen Circle
Rock Hill, SC 29732

Prepared By:

Environmental Compliance Services, Inc.
13504 South Point Blvd., Unit F
Charlotte, NC 28273
(704) 583-2711

September 29, 2008

James D. Rudder, Jr., P.G.
SC License No. 1067

Daniel Sparks
Project Geologist

TABLE OF CONTENTS

1.0 INTRODUCTION

This report presents the results of groundwater monitoring activities conducted on September 16, 2008, at the Green's Oil Company site in Rock Hill, South Carolina. The groundwater sampling activities were conducted in accordance to the Corrective Action Status Evaluation Report (CASE) as requested by the South Carolina Department of Health and Environment Control (SCDHEC) dated January 2007. The site previously operated as a gas station located in a commercial/industrial area of York County. Public or private water supply wells were not reported within 1,000 feet of the site. Two abandoned water supply wells were located down gradient of the site. Surface water bodies were not identified within 500 feet of the source area. The Catawba River, located approximately 3,000 feet north of the site in the downgradient direction, was the only potential receptor identified during the receptor survey.

A previously prepared Corrective Action Plan (CAP) that proposed remediation of petroleum impacted soil and groundwater beneath the site using excavation, de-watering, backfilling with microbial augmented soil, and subsequent microbial injections, was submitted to the SCDHEC by CBM Environmental Services, Inc. (CBM) on January 23, 2004. The SCDHEC approved the CAP in correspondence dated March 29, 2004. However, subsequent telephone conversations between CBM and the responsible party's insurance company (Federated Insurance) indicated that Federated Insurance would only approve soil excavation, de-watering, and backfilling with microbial augmented soil. Microbial injections, if needed, would be implemented after two to three quarters of groundwater monitoring. The initial remedial activities consisting of soil excavation, backfilling with microbial augmented soil, and compaction were completed in December 2004.

2.0 FACILITY INFORMATION

- **Facility Name**: Green's Oil Company
- **Location:** 2849 Cherry Road
  Rock Hill, York County (**Figure 1**)
- **UST Permit No.** 09344
- **Risk Classification:** High
- **Land Use Classification:** Commercial
- **UST Operator:** Green's Oil Company
  2849 Cherry Road
  Rock Hill, South Carolina
- **UST Owner:** Green's Oil Company
  2849 Cherry Road
  Rock Hill, South Carolina
- **Consultant:** Environmental Compliance Services, Inc
  13504 South Point Boulevard
  Charlotte, North Carolina 28273
  (704) 583-2711
- **Release Information:**
  - **Date Discovered:** Unknown
  - **Estimated Quantity of Release:** Unknown
  - **Cause of Release:** Unknown
  - **Source of Release:** Leaking UST System
  - **UST System Size/Contents:** Four gasoline USTs
  - **Latitude / Longitude:** 34°58'42" North/ 80°58'54" West

3.0 SAMPLING ACTIVITIES

3.1 Site Hydrogeology

The depths to groundwater in the six shallow (water table) monitoring wells (MW-1R, MW-2, and MW-4 through MW-7) and one telescoping well (PW-8) were measured on September 16, 2008. The depths to groundwater in the shallow wells ranged from 8.05 feet (MW-5) to 10.54 feet (MW-4), and the depth to groundwater in the telescoping well PW-8 was 8.05 feet. Monitoring well MW-3 was dry. Groundwater elevations, relative to a temporary benchmark with an assumed datum of 100.00 feet, ranged from 86.37 feet (MW-4) to 90.13 feet (MW-7) in the shallow wells, and was measured at 88.93 feet in well PW-8. Based on the September 2008 data, the horizontal groundwater flow was controlled by a groundwater divide trending east-west beneath the site. Groundwater north of monitoring wells MW-1R and MW-7 appeared to flow toward the north to northwest, and groundwater in the vicinity of well MW-5 appeared to flow toward the south. The apparent horizontal hydraulic gradient to the north was approximately 0.05 feet per foot (from MW-7 to MW-4), and toward the south approximately 0.02 feet per foot (from MW-7 to MW-4). Groundwater elevation data obtained on September 16, 2008 data is presented in Table 1. A groundwater Elevation Map, based on the September 16, 2008 data, is included as Figure 3.

3.2 Groundwater Sampling

On September 16, 2008, six shallow monitoring wells (MW-1R, MW-2, MW-4 through MW-7) and one telescoping monitoring well (PW-8) were purged and sampled. Laboratory analyses were performed on groundwater samples collected from the monitoring wells for BTEX (benzene, toluene, ethylbenzene, and total xylenes), MTBE (methyl-tert-butyl ether) and naphthalene by EPA Method 8260B.

4.0 GROUNDWATER QUALITY

Concentrations of benzene and naphthalene that exceeded the May 2001 risk based screening levels (RBSL) were reported in the groundwater sample collected from monitoring well MW-1R. The groundwater samples collected from other site wells were not reported to contain compound concentrations in excess of the RBSLs.

Concentrations of toluene, ethylbenzene, and total xylenes below their respective RBSLs were reported in the groundwater sample collected from monitoring well MW-1R. Detectable concentrations of MTBE below the RBSL were reported in the groundwater samples collected from monitoring wells MW-2, MW-4, and PW-8.

Detectable concentrations of requested method constituents were not reported in the groundwater samples collected from monitoring wells MW-5, MW-6, and MW-7.

A summary of groundwater quality data is presented in **Table 2**. A Groundwater Quality Map showing individual BTEX constituents, MTBE and naphthalene concentrations in the groundwater samples collected from the monitoring wells during the September 16, 2008 sampling event is included as **Figure 4**. Groundwater sampling field data sheets from the September 16, 2008 sampling event have been included as **Appendix A.** A complete report of laboratory analyses of groundwater samples collected during the September 16, 2008 sampling event has been included as **Appendix B.** A disposal manifest was not available at this time and will be forwarded upon receipt.

5.0 CONCLUSIONS AND RECOMMENDATIONS

Well MW-1R contained benzene and naphthalene concentrations slightly in excess of the RBSLs for these compounds. Concentrations detected in other site wells were below RBSLs. Three of the site wells did not contain compound concentrations above the laboratory method reporting limits. Compound concentrations historically reported in groundwater samples collected from monitoring wells MW-1R and MW-2 have been greatly reduced from the historical sampling data generated in October 1996. ECS recommends the site monitoring wells be abandoned and the site closed.

LIMITATIONS

This report has been prepared for the exclusive use of Mr. Jerry Green for specific application to the referenced site in York County, South Carolina. The assessment was conducted based on the scope of work and level of effort desired by the client and with resources adequate only for that scope of work.

Certain data contained in this report was not obtained under the supervision of ECS. Although the accuracy of this data cannot be verified, for the purpose of this report ECS assumes it is correct. Our findings have been developed in accordance with generally accepted standards of geology and hydrogeology practices in the State of South Carolina, available information, and our professional judgment. No other warranty is expressed or implied.

The data presented in this report are indicative of conditions that existed at the precise locations sampled and at the time the samples were collected. In addition, the data obtained from samples would be interpreted as being meaningful with respect to parameters indicated in the laboratory report. No additional information can be logically inferred from this data.

ECS appreciates the opportunity to offer this report of groundwater monitoring activities at the Green's Oil site. If you have questions or comments regarding this please contact Mr. Dan Sparks (dsparks@ecsconsult.com) or Mr. Jim Rudder (jrudder@ecsconsult.com) at (704)583-2711.

Regards,

ENVIRONMENTAL COMPLIANCE SERVICES, INC.

Daniel Sparks
Geologist

James D. Rudder, Jr., P.G.
SC License No. 1067

TABLES

TABLE 1
SUMMARY OF GROUNDWATER ELEVATION DATA[1]
GREEN'S OIL COMPANY

Well ID	Date Measured	Top of Casing Elevation (feet)	Depth to Groundwater (feet)	Groundwater Elevation (feet)	Well Depth[2] (feet)	Screened Interval (feet)
MW-1	05/24/00	98.15	7.16	90.99	12.33	NA[3]
	10/09/00		7.78	90.37		
	01/02/01		9.58	88.57		
	12/16/02		5.11	93.04		
	06/12/03		2.59	95.56		
	11/22/04		9.36	88.79		
	03/31/08	Abandoned				
MW-1R[4]	01/31/05	98.30	8.66	89.64	9.85	NA
	04/27/05		4.48	93.82		
	08/17/05		7.39	90.91		
	11/28/05		9.75	88.55		
	03/14/06		7.31	90.99		
	02/27/07		4.82	93.48		
	06/25/07		8.08	90.22		
	03/31/08		5.36	92.94	9.90	
	09/16/08		8.22	90.08	9.90[5]	
MW-2	05/24/00	97.86	7.03	90.83	14.23	NA
	10/09/00		7.71	90.15		
	01/02/01		9.43	88.43		
	12/16/02		4.91	92.95		
	06/12/03		2.47	95.39		
	11/22/04		9.26	88.60		
	01/31/05		8.36	89.50		
	04/27/05		4.65	93.21		
	08/17/05		7.59	90.27		
	11/28/05		9.92	87.94		
	03/14/06		7.47	90.39		
	02/27/07		4.50	93.36		
	06/25/07		8.56	89.30		
	03/31/08		5.57	92.29	14.22	
	09/16/08		8.60	89.26	14.23	

TABLE 1 (continued)
SUMMARY OF GROUNDWATER ELEVATION DATA
GREEN'S OIL COMPANY

Well ID	Date Measured	Top of Casing Elevation (feet)	Depth to Groundwater (feet)	Groundwater Elevation (feet)	Well Depth[2] (feet)	Screened Interval (feet)
MW-3	12/16/02	97.08	5.83	91.25	7.75	NA
	06/12/03		3.01	94.07		
	11/22/04		Dry	Dry		
	01/31/05		Dry	Dry		
	04/27/05		5.00	92.08		
	08/17/05		Dry	Dry		
	11/28/05		Dry	Dry		
	03/14/06		Dry	Dry		
	02/27/07		5.29	91.79		
	06/25/07		Dry	Dry		
	03/31/08		5.97	91.11	7.88	
	09/16/08		Dry	Dry	7.89	
MW-4	12/16/02	96.91	6.66	90.25	13.60	NA
	06/12/03		3.52	93.39		
	11/22/04		NM[5]	NM		
	01/31/05		NM	NM		
	04/27/05		5.75	91.16		
	08/17/05		9.65	87.26		
	11/28/05		12.32	84.59		
	03/14/06		NM	NM		
	02/27/07		5.86	91.05		
	06/25/07		10.40	86.51		
	03/31/08		7.47	89.44	13.66	
	09/16/08		10.54	86.37	13.81	
MW-5	05/24/00	97.04	6.56	90.48	10.30	NA
	10/09/00		7.15	89.89		
	01/02/01		8.90	88.14		
	12/16/02		4.67	92.37		
	06/12/03		2.20	94.84		
	11/22/04		8.67	88.37		
	01/31/05		7.84	89.20		
	04/27/05		4.26	92.78		
	08/17/05		6.99	90.05		
	11/28/05		9.28	87.76		
	03/14/06		6.95	90.09		
	02/27/07		4.24	92.80		
	06/25/07		7.93	89.11		
	03/31/08		5.11	91.93	10.26	
	09/16/08		8.05	88.99	10.27	

TABLE 1 (continued)
SUMMARY OF GROUNDWATER ELEVATION DATA
GREEN'S OIL COMPANY

Well ID	Date	Top of Casing	Depth to	Groundwater	Well Depth[2]	Screened
MW-6	05/24/00	98.59	8.10	90.49	9.95	NA
	10/09/00		7.92	90.67		
	01/02/01		9.52	89.07		
	12/16/02		5.25	93.34		
	06/12/03		2.89	95.70		
	11/22/04		9.44	89.15		
	01/31/05		8.59	90.00		
	04/27/05		4.98	93.61		
	08/17/05		7.80	90.79		
	11/28/05		9.58	89.01		
	03/14/06		7.67	90.92		
	02/27/07		4.83	93.76		
	06/25/07		8.76	89.83		
	03/31/08		5.69	92.90	9.86	
	09/16/08		8.80	89.79	9.87	
MW-7	12/16/02	98.40	4.81	93.59	13.55	NA
	06/12/03		3.29	95.11		
	11/22/04		NF[6]	NF		
	01/31/05		NF	NF		
	04/27/05		4.40	94.00		
	08/17/05		6.22	92.18		
	11/28/05		9.64	88.76		
	03/14/06		7.20	91.20		
	02/27/07		NF	NF		
	06/25/07		8.17	90.23		
	03/31/08		5.58	92.82	13.70	
	09/16/08		8.27	90.13	13.70	
PW[7]-8	05/24/00	96.98	6.45	90.53	30.90	NA
	10/09/00		7.12	89.86		
	01/02/01		8.69	88.29		
	12/16/02		4.46	92.52		
	06/12/03		2.60	94.38		
	11/22/04		5.34	91.64		
	01/31/05		7.45	89.53		
	04/27/05		4.65	92.33		
	08/17/05		6.22	90.76		
	11/28/05		9.23	87.75		
	03/14/06		6.88	90.10		
	02/27/07		4.22	92.76		
	06/25/07		7.84	89.14		
	3/31//08		5.18	91.80	30.25	
	09/16/08		8.05	88.93	30.30	

TABLE 1 (continued)
SUMMARY OF GROUNDWATER ELEVATION DATA
GREEN'S OIL COMPANY

Notes:

1. Top of Casing Elevations for monitoring wells MW-2 through MW-7 and PW-8 were reproduced from the previous consultant's reports. Additional well construction details are unavailable; data reported in feet.
2. Well depths for monitoring wells MW-2 through MW-7 and PW-8 measured during June 12, 2003 sampling event and remeasured during February 27, 2007 sampling event. Well depths shown above are from February 27, 2007 measurements.
3. Data not available.
4. Monitoring well MW-1R was installed as a replacement for monitoring well MW-1 on January 26, 2005.
5. Total well depths measured by ECS on 9/16/08
6. Not measured. Well did not yield enough water for field measurements or was not accessible due to site obstruction.
7. Not found.
8. Telescoping monitoring well.

TABLE 2
SUMMARY OF GROUNDWATER ANALYTICAL DATA[1]
GREEN'S OIL COMPANY

Well ID	Date Sampled	Benzene (µg/L)	Toluene (µg/L)	Ethylbenzene (µg/L)	Total Xylenes (µg/L)	MTBE (µg/L)	Naphthalene (µg/L)	Lead (µg/L)
MW-1	10/24/96	**3,040**[2]	164	325	950	**2,310**	**365**	NR[3]
	05/09/00	**1,790**	255	302	611	**1,300**	**117**	12.0
	10/09/00	**1,600**	180	220	400	**850**	**350**	<3.0[4]
	01/02/01	**500**	9.0	38	68	**460**	**55**	<3.0
	12/16/02	**3,000**	**12,000**	**3,700**	**14,000**	**920**	**1,700**	14
	06/12/03	**2,280**	**9,520**	**1,980**	**17,400**	**801**	**991**	NR
	11/22/04	**2,560**	**3,820**	**2,240**	**14,200**	**790**	**2,880**	NR
MW-1R[5]	01/31/05	**1,510**	234	268	3,790	**864**	**310**	NR
	04/27/05	**2,760**	115	376	2,550	**916**	**297**	NR
	08/17/05	**2,880**	26.6	525	1,710	**1,200**	**498**	NR
	11/28/05	**47**	3.1	39	190	**120 E** [6]	**34**	NR
	03/14/06	**24**	<1.0	4.1	2.9J[7]	**98**	**5.0**	NR
	02/27/07	**95.8**	5.61	28.2	31.2	**160**	**89.2**	NR
	06/25/07	**10.3**	<1.00	14.7	21.5	**52.3**	18.0	NR
	03/31/08	**359**	110	184	338	**173**	**183**	NR
	09/16/08	**11.0**	3.7	30.6	18.2	**15**	**26**	NR
MW-2	10/24/96	<10.0	<10.0	<10.0	<3.0	**24,700**	<5.0	NR
	05/09/00	**5.2**	ND[8]	ND	ND	**19,900**	ND	ND
	10/09/00	**31**	5.7	<5.0	12	**11,000**	**15**	<3.0
	01/02/01	**7.2**	<5.0	<5.0	<5.0	**7,700**	<5.0	<3.0
	12/16/02	<5.0	<5.0	<5.0	7.2	**170**	12	<3.0
	06/12/03	4.0	<1.0	<1.0	<1.0	**157**	<5.00	NR
	11/22/04[9]	<1.0	<1.0	<1.0	<1.0	**54.9**	<5.00	NR
	01/31/05	<1.0	<1.0	<1.0	<1.0	**68.8**	<5.00	NR
	04/27/05	1.5	<1.0	<1.0	<1.0	**168**	<5.00	NR
	08/17/05	**12.3**	1.66	1.25	<2.0	**104**	<5.00	NR
	11/28/05	**7.5**	2.80	1.20	<3.0	**92**	<1.0	NR
	03/14/06	3.3	0.69 J	<1.0	0.79J	**92**	<1.0	NR
	02/27/07	2.22	1.21	<1.00	0.650 J	**89.7**	5.12	NR
	06/25/07	**26.8**	3.08	15.0	<3.00	**90.1**	6.60	NR
	03/31/08	<1.0	<1.0	<1.0	<3.00	33.9	<1.0	NR
	09/16/08	<1.0	<1.0	<1.0	<2.0	26.4	<1.0	NR
	RBSL[10]	5	1,000	700	10,000	40	25	15

TABLE 2 (continued)
SUMMARY OF GROUNDWATER ANALYTICAL DATA
GREEN'S OIL COMPANY

Well ID	Date Sampled	Benzene (µg/L)	Toluene (µg/L)	Ethylbenzene (µg/L)	Total Xylenes (µg/L)	MTBE (µg/L)	Naphthalene (µg/L)	Lead (µg/L)
MW-3	10/24/96	NF[11]	NF	NF	NF	NF	NF	NF
	05/09/00	NF	NF	NF	NF	NF	NF	NF
	10/09/00	NF	NF	NF	NF	NF	NF	NF
	01/02/01	NF	NF	NF	NF	NF	NF	NF
	12/12/02	**150**	**5,800**	**2,400**	**14,000**	<25	**920**	**21**
	06/12/03	4.2	135	150	1,920	2.9	**260**	NR
	11/22/04	Dry	Dry	Dry	Dry	Dry	Dry	NR
	01/31/05	Dry	Dry	Dry	Dry	Dry	Dry	NR
	04/27/05	<1.0	<1.0	<1.0	3.7	<1.0	<5.00	NR
	08/17/05	Dry	Dry	Dry	Dry	Dry	Dry	Dry
	11/28/05	Dry	Dry	Dry	Dry	Dry	Dry	Dry
	03/14/06	Dry	Dry	Dry	Dry	Dry	Dry	Dry
	02/27/07	<1.00	<1.00	<1.00	<3.00	<1.00	<1.00	NR
	06/25/07	Dry	Dry	Dry	Dry	Dry	Dry	NR
	03/31/08	<1.0	<1.0	<1.0	<3.00	**63.0**	<1.0	NR
	09/16/08	Dry	Dry	Dry	Dry	Dry	Dry	Dry
MW-4	10/24/96	<1.0	<1.0	<1.0	<3.0	**70.4**	<5.0	NR
	05/09/00	NF	NF	NF	NF	NF	NF	NF
	10/09/00	NF	NF	NF	NF	NF	NF	NF
	01/02/01	NF	NF	NF	NF	NF	NF	NF
	12/16/02	<5.0	<5.0	<5.0	<5.0	**160**	8.5	5.8
	06/12/03	<1.0	<1.0	<1.0	<1.0	**198**	<5.00	NR
	11/22/04	NS[12]	NS	NS	NS	NS	NS	NS
	01/31/05	NS	NS	NS	NS	NS	NS	NS
	04/27/05	1.4	<1.0	<1.0	8.8	**160**	**152**	NR
	08/17/05	<1.00	<1.00	<1.00	5	**139**	**102**	NR
	11/28/05	<1.0	<1.0	<1.0	<3.0	**170**	**71**	NR
	03/14/06	NS	NS	NS	NS	NS	NS	NS
	02/27/07	1.03	<1.00	<1.00	<3.00	**96.5**	**47.8**	NR
	06/25/07	0.710 J	<1.00	<1.00	<3.00	35.7	13.0	NR
	03/31/08	<1.0	<1.0	<1.0	<3.0	**71.5**	<1.0	NR
	09/16/08	<1.0	<1.0	<1.0	<2.0	**7.1**	<1.0	NR
	RBSL[10]	5	1,000	700	10,000	40	25	15

TABLE 2 (continued)
SUMMARY OF GROUNDWATER ANALYTICAL DATA
GREEN'S OIL COMPANY

Well ID	Date Sampled	Benzene (µg/L)	Toluene (µg/L)	Ethylbenzene (µg/L)	Total Xylenes (µg/L)	MTBE (µg/L)	Naphthalene (µg/L)	Lead (µg/L)
MW-5	10/24/96	<1.0	<1.0	<1.0	<3.0	**1,720**	<5.0	NR
	05/09/00	ND	ND	ND	ND	**14,000**	ND	ND
	10/09/00	<5.0	<5.0	<5.0	<5.0	**9,100**	<5.0	<3.0
	01/02/01	<5.0	<5.0	<5.0	<5.0	**1,400**	<5.0	<3.0
	12/12/02	<5.0	<5.0	<5.0	<5.0	14	<5.0	14
	06/12/03	<1.0	<1.0	<1.0	<1.0	3.1	<5.00	NR
	11/22/04[13]	<1.0	<1.0	<1.0	<1.0	1.4	<5.00	NR
	01/31/05	<1.0	<1.0	<1.0	<1.0	<1.0	<5.00	NR
	04/27/05	<1.0	<1.0	<1.0	<1.0	<1.0	<5.00	NR
	08/17/05	<1.00	<1.00	<1.00	<2.00	1.23	<5.00	NR
	11/28/05	<1.0	<1.0	<1.0	<3.0	<1.0	<1.0	NR
	03/14/06	<1.0	<1.0	<1.0	<3.0	<1.0	<1.0	NR
	02/27/07	<1.00	<1.00	<1.00	<3.00	0.590 J	<1.00	NR
	06/25/07	<1.00	<1.00	<1.00	<3.00	<1.00	4.00	NR
	03/31/08	<1.0	<1.0	<1.0	<3.0	<1.0	<1.0	NR
	09/16/08	<1.0	<1.0	<1.0	<2.0	<1.0	<1.0	NR
MW-6	10/24/96	NS	NS	NS	NS	NS	NS	NS
	05/09/00	ND	ND	ND	ND	ND	ND	**52.0**
	10/09/00	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	**26.0**
	01/02/01	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	NS
	12/12/02	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	**48**
	06/12/03	<1.0	<1.0	<1.0	<1.0	<1.0	<5.00	NR
	11/22/04	<1.0	<1.0	<1.0	<1.0	<1.0	<5.00	NR
	01/31/05	<1.0	<1.0	<1.0	<1.0	<1.0	<5.00	NR
	04/27/05	<1.0	<1.0	<1.0	<1.0	<1.0	<5.00	NR
	08/17/05	<1.00	<1.00	<1.00	<2.00	<1.00	<5.00	NR
	11/28/05	<1.0	<1.0	<1.0	<3.0	<1.0	<1.0	NR
	03/14/06	<1.0	<1.0	<1.0	<3.0	<1.0	<1.0	NR
	02/27/07	<1.00	<1.00	<1.00	<3.00	<1.00	<1.00	NR
	06/25/07	<1.00	<1.00	<1.00	<3.00	<1.00	<1.00	NR
	03/31/08	<1.0	<1.0	<1.0	<3.0	<1.0	<1.0	NR
	09/16/08	<1.0	<1.0	<1.0	<2.0	<1.0	<1.0	NR
	RBSL	5	1,000	700	10,000	40	25	15

TABLE 2 (continued)
SUMMARY OF GROUNDWATER ANALYTICAL DATA
GREEN'S OIL COMPANY

Well ID	Date Sampled	Benzene (µg/L)	Toluene (µg/L)	Ethylbenzene (µg/L)	Total Xylenes (µg/L)	MTBE (µg/L)	Naphthalene (µg/L)	Lead (µg/L)
MW-7	10/24/96	NF	NF	NF	NF	NF	NF	NF
	05/09/00	NF	NF	NF	NF	NF	NF	NF
	10/09/00	NF	NF	NF	NF	NF	NF	NF
	01/02/01	NF	NF	NF	NF	NF	NF	NF
	12/12/02	<5.0	<5.0	<5.0	<5.0	**160**	<5.0	**58**
	06/12/03	<1.0	<1.0	<1.0	<1.0	**294**	<5.00	NR
	11/22/04	NF	NF	NF	NF	NF	NF	NF
	01/31/05	NF	NF	NF	NF	NF	NF	NF
	04/27/05	<1.0	<1.0	<1.0	<1.0	1.3	<5.00	NR
	08/17/05	<1.00	<1.00	<1.00	<2.00	22.7	<5.00	NR
	11/28/05	<1.0	<1.0	<1.0	<3.0	**65**	<1.0	NR
	03/14/06	<1.0	<1.0	<1.0	<3.0	1.5	<1.0	NR
	02/27/07	NF	NF	NF	NF	NF	NF	NF
	06/25/07	<1.00	<1.00	<1.00	<3.00	1.96	<1.00	NR
	03/31/08	<1.0	<1.0	<1.0	<3.0	<1.0	<1.0	NR
	09/16/08	<1.0	<1.0	<1.0	<2.0	<1.0	<1.0	NR
PW-8	10/24/96	<1.0	<1.0	<1.0	<3.0	**547**	<5.0	NR
	05/09/00	ND	ND	ND	ND	**790**	ND	ND
	10/09/00	<5.0	<5.0	<5.0	6.1	**180**	<5.0	<3.0
	01/02/01	<5.0	<5.0	<5.0	<5.0	**160**	<5.0	<3.0
	12/12/02	<5.0	<5.0	<5.0	<5.0	**44**	<5.0	<3.0
	06/12/03	<1.0	<1.0	<1.0	<1.0	**84.6**	<5.00	NR
	11/22/04[14]	<1.0	<1.0	<1.0	<1.0	9.7	<5.00	NR
	01/31/05	<1.0	<1.0	<1.0	<1.0	1.3	<5.00	NR
	04/27/05	<1.0	<1.0	<1.0	<1.0	6.3	<5.00	NR
	08/17/05	<1.00	<1.00	<1.00	<2.00	23.4	<5.00	NR
	11/28/05	<1.0	<1.0	<1.0	<3.0	15.0	<1.0	NR
	03/14/06	<1.0	<1.0	<1.0	<3.0	5.9	<1.0	NR
	02/27/07	<1.00	<1.00	<1.00	<3.00	4.09	<1.00	NR
	06/25/07	<1.00	<1.00	<1.00	<3.00	12.9	<1.00	NR
	03/31/08	<1.0	<1.0	<1.0	<3.0	<1.0	<1.0	NR
	09/16/08	<1.0	<1.0	<1.0	<2.0	1.4	<1.0	NR
	RBSL	5	1,000	700	10,000	40	25	15

TABLE 2 (continued)
SUMMARY OF GROUNDWATER ANALYTICAL DATA
GREEN'S OIL COMPANY

Notes:

1. Analyses for BTEX constituents, MTBE and Naphthalene by EPA Method 8260B; groundwater qu prior to June 12, 2003 reproduced from previous consultant's reports. The data is assumed to be cor
2. Concentrations in bold face type exceeded the January 1998 Risk Based Screening Level for sampl before May 2001 and exceeded the May 2001 Risk Based Screening Level for samples collected af
3. Analysis not requested.
4. Less than the reporting limit specified in the laboratory report.
5. Monitoring well MW-1R was installed as a replacement for monitoring well MW-1.
6. Estimated concentration, calibration range exceeded.
7. Estimated concentration below the laboratory reporting limit.
8. Not Detected.
9. Other compound detected (IPE: 294 µg/L).
10. May 2001 Risk Based Screening Level.
11. Well not found.
12. Not sampled due to insufficient volume of water in the well or well was not accessible.
13. Other compound detected (IPE: 21.8 µg/L)
14. Other compound detected (IPE: 13.4 µg/L)

FIGURES

SCALE 1:24,000

1 0 1 MILE

1000 0 1000 2000 3000 4000 5000 6000 7000 FEET

QUADRANGLE LOCATION

CONTOUR INTERVAL 10 FEET

ROCK HILL EAST, SC QUADRANGLE

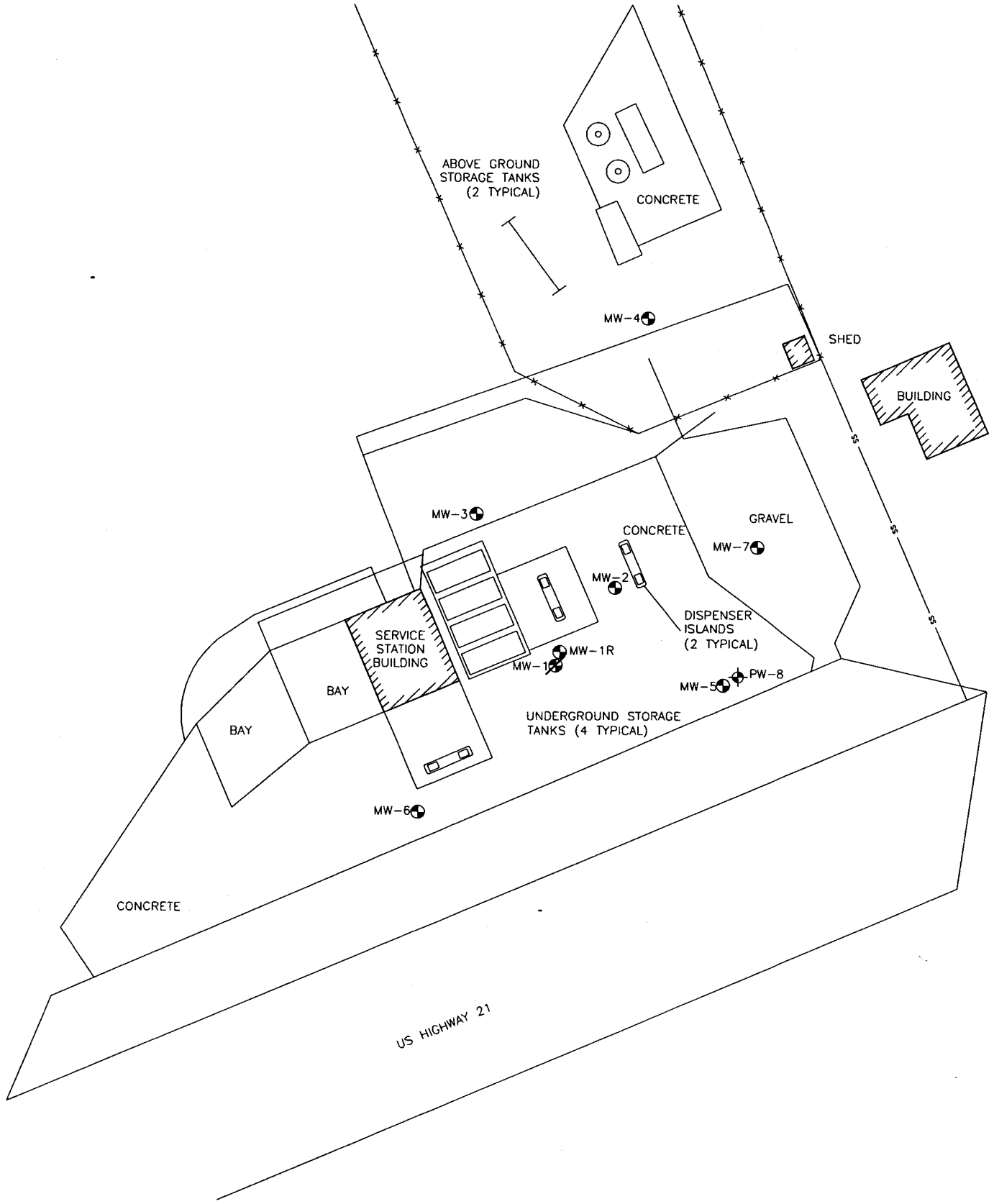
ecs
15704 South Point Blvd, Suite F
Charlotte, NC 28273
Phone: 704-588-0711 Fax: 704-588-0744

LATITUDE: 34° 58' 42" N	GREEN'S OIL CO.
LONGITUDE: 80° 58' 54" W	2849 CHERRY RD.
DRAWN BY: KB	ROCK HILL, SC
CHECKED BY: BD	SITE I.D. NO. 09344
DATE: 3/21/07	

FIGURE 1

USGS TOPOGRAPHIC MAP

PROJECT NO. 14-811030



NOTE: FIGURE BASED ON SITE MAP BY PREVIOUS CONSULTANT.

Legend

- SS — Sanitary Sewer Line
- x — Fence
- Shallow (Water Table) Monitoring Well
- Shallow Monitoring Well (Abandoned)
- Telescoping Monitoring Well

General Notes:

All locations, dimensions, and property lines depicted on this plan are approximate. This plan should not be used for construction or land conveyance purposes.

ecs
13504 South Point Blvd, Suite F • Charlotte, NC 28273
Phone: (704)583-2711 Fax: (704)583-2744

PROJECT:
Green's Oil Company
2849 Cherry Road
Rock Hill, South Carolina

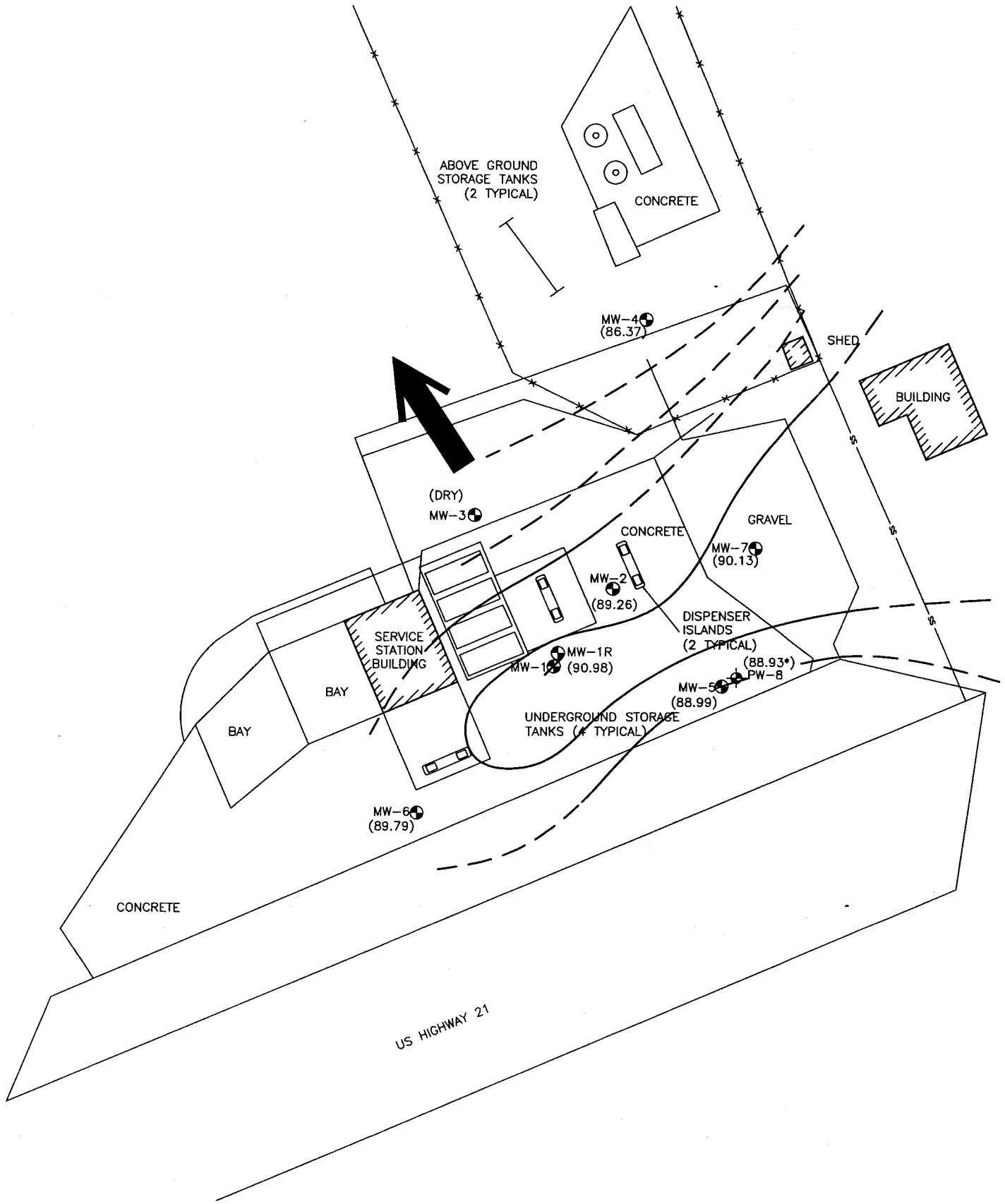
TITLE:
SITE MAP

CLIENT:
Federated Insurance

GRAPHIC SCALE: 40 20 0 20 40

COMPUTER CADFILE 'C:\MyDocuments\Charlotte\811030 Green's Oil Company

DRAWN BY:	DESIGNED BY:	CHECKED BY:	APPROVED BY:
KB	KB	JR	JR
SCALE:	DATE:	JOB NO.:	FIGURE NO.:
1"=40'	9/25/08	14-811030	2



NOTE: FIGURE BASED ON SITE MAP BY PREVIOUS CONSULTANT.

Legend

- SS — Sanitary Sewer Line
- x — Fence
- Shallow (Water Table) Monitoring Well
- Shallow Monitoring Well (Abandoned)
- Telescoping Monitoring Well
- (90.23) Groundwater Elevation
- 90.00 Water Table Contour (Dashed where inferred)
- (NF) Not Found
- Flow Direction Indicator

General Notes:

All locations, dimensions, and property lines depicted on this plan are approximate. This plan should not be used for construction or land conveyance purposes.

Horizontal, and vertical locations of wells, and selected site features determined through measurements made by representatives of ECS.

Groundwater elevations are based on a benchmark with an assumed datum of 100.00 feet.

Water table elevations are based on measurements made on September 16, 2008.

Water table contours, and flow directions assume homogenous, isotropic aquifer conditions, and horizontal flow.

Fluctuations in the level of the water table may occur due to factors not accounted for at the time of measurement.

Water table contours are interpolated between data points, and inferred in other areas.

Telescoping Monitoring Well not used in contouring.

*PW-8 elevation not used in developing isoelevation contours.

ecs
13504 South Point Blvd, Suite F * Charlotte, NC 28273
Phone: (704)583-2711 Fax: (704)583-2744

PROJECT:
Green's Oil Company
2849 Cherry Road
Rock Hill, South Carolina

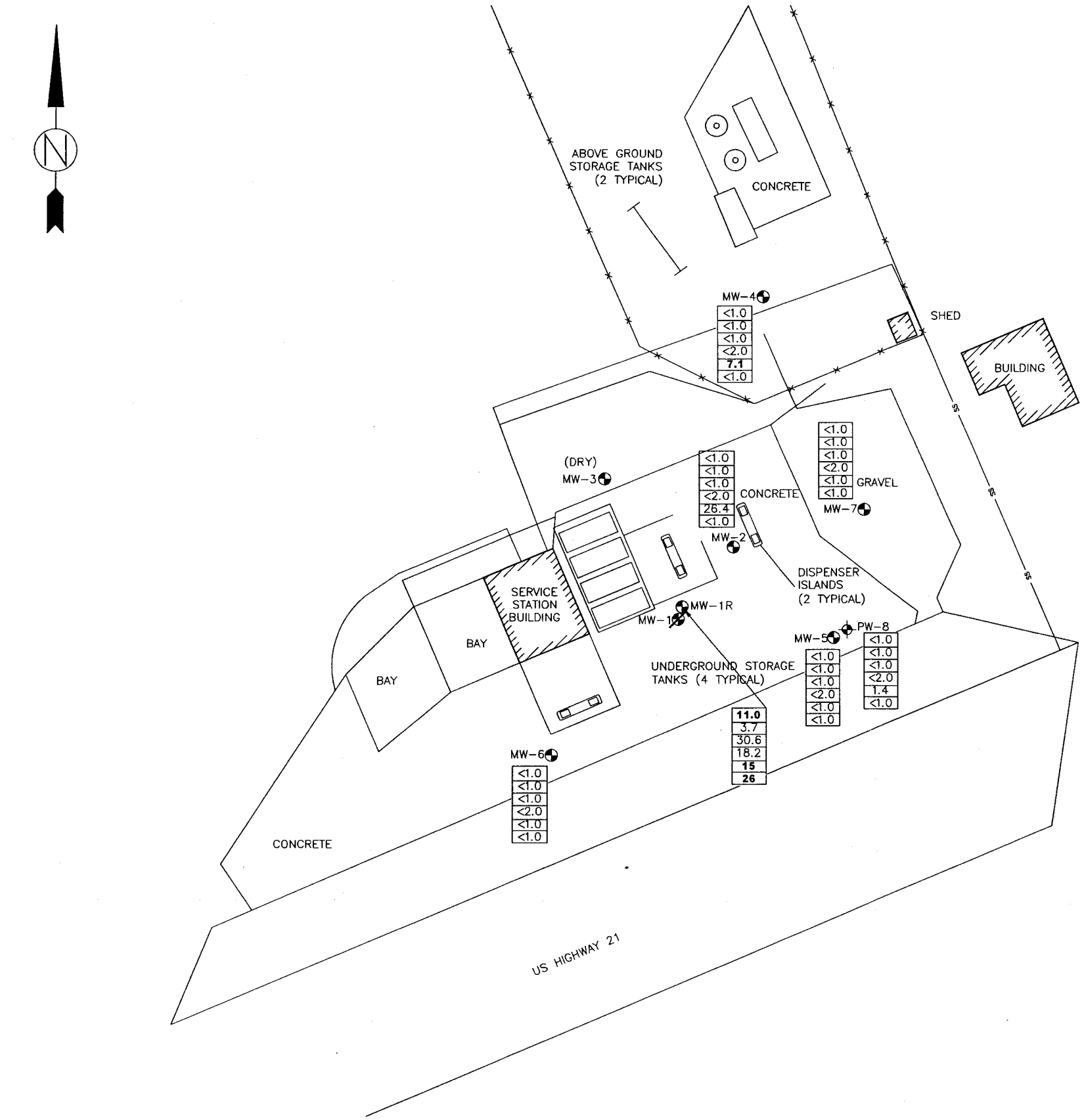
TITLE:
GROUNDWATER ELEVATION MAP 9/16/08

CLIENT:
Federated Insurance

GRAPHIC SCALE: 40 20 0 20 40

COMPUTER CADFILE: C:\MyDocuments\Charlotte\811030 Green's Oil Company

DRAWN BY:	DESIGNED BY:	CHECKED BY:	APPROVED BY:
KB	KB	JR	JR
SCALE:	DATE:	JOB NO.:	FIGURE NO.:
1"=40'	9/25/08	14-811030	3



NOTE: FIGURE BASED ON SITE MAP BY PREVIOUS CONSULTANT.

Legend

- Sanitary Sewer Line
- Fence
- Shallow (Water Table) Monitoring Well
- Shallow Monitoring Well (Abandoned)
- Telescoping Monitoring Well

5	Benzene
1,000	Toluene
700	Ethylbenzene
10,000	Total Xylenes
40	MTBE
25	Naphthalene

All concentrations are measured in micrograms per liter (ug/L).

Above concentrations represent May 2001 Risk-Based Screening Levels; Concentrations in bold face type exceeded the RBSL.

J – Estimated Volue between the method detection limit and the reporting limit.

<1.0 Less than the reporting limit specified in the laboratory report.

General Notes:

All locations, dimensions, and property lines depicted on this plan are approximate. This plan should not be used for construction or land conveyance purposes.

ecs
13504 South Point Blvd, Suite F • Charlotte, NC 28273
Phone: (704)583-2711 Fax: (704)583-2744

PROJECT:
Green's Oil Company
2849 Cherry Road
Rock Hill, South Carolina

TITLE:
GROUNDWATER QUALITY MAP 9/25/08

CLIENT:
Federated Insurance

GRAPHIC SCALE: 40 20 0 20 40

COMPUTER CADFILE 'C:\MyDocuments\Charlotte\811030 Green's Oil Company

DRAWN BY:	DESIGNED BY:	CHECKED BY:	APPROVED BY:
KB	KB	JR	JR
SCALE:	DATE:	JOB NO.:	FIGURE NO.:
1"=40'	9/25/08	14-811030	4

APPENDIX A

GROUNDWATER SAMPLING FIELD DATA SHEETS

Activity **Groundwater Sampling**

Environmental Compliance Services, Incorporated

FIELD ACTIVITY REPORT

Project Name: **Green's Oil**

Location: **Rock Hill, SC**

Project Number: **14-811030**

Date: **09/16/08** Field Staff: **S. Bryant**

Description of Activities: **Gauged, purged and sampled MW-1R, MW-2 thru MW-7 and PW-8. Placed all purge water in drum and staged on site.**

Soil Borings:

Monitoring Wells:

Sampling: **8 wells for 8260 BTEX, MTBE and naphthalene.**

Aquifer Tests:

Drums on Site:	Soil:	**0**	Groundwater:	**1**
Attachments	Field Notes:	**x**	Tax Maps:	
	Site map:	**x**	Sampling Forms:	**x**
	Boring Logs:		Chain of Custody:	**x**
	Well Logs:		Gauge Report:	**x**
	Other:	**WO**		

Reviewed by:

GAUGE REPORT

Environmental Compliance Services, Inc.
13504 South Point Blvd. Unit #F
Charlotte, NC 28273

Project Name:	Greens Oil	Location:	Rock Hill, SC
Project No.:	14-811030	Date:	9/16/2008
Measured By:	Shelley Bryant	Weather:	Showers, mid-80's

Well No.	Depth to Product (feet)	Depth to Water (feet)	Product Thickness (feet)	Product Recovered (gallons)	Well Depth (feet)	Volume Purged (gallons)
MW-1R	---	8.22	---	---	9.90	1.00
MW-2	---	8.60	---	---	14.23	3.60
MW-3	---		---	---	7.89	---
MW-4	---	10.54	---	---	13.81	0.50
MW-5	---	8.05	---	---	10.27	0.75
MW-6	---	8.80	---	---	9.87	---
MW-7	---	8.27	---	---	13.70	2.65
PW-8	---	8.05	---	---	30.30	10.80

Remarks

South Carolina Department of Health and Environmental Control
Bureau of Underground Storage Tank Management

Field Data Information Sheet for Ground Water Sampling

Date(mm/dd/yy) 09/16/08
Field Personnel Shelley Bryant
General Weather Conditions Showers
Ambient Air Temperature 85 F

Facility Name Green's Oil Site ID# 09344

Quality Assurance:

pH Meter YSI 556 MPS Conductivity Meter YSI 556 MPS
serial no. 07F101211 serial no.
pH = 4.0 Standard
pH = 7.0 Standard
pH = 10.0 Standard

Chain of Custody

Shelley Bryant	9/16/08 17:20	Pace	9/17/08 14:05
Relinquished by	Date/Time	Received by	Date/Time

Well # **MW-1R**

Well Diameter (D) 4.0 inch _____ or feet
conversion factor(C): 3.143*(D/2)^2
for a 2 inch well C= 0.163
for a 4 inch well C= 0.652
Total Well Depth (TWD) 9.90 ft.
Depth to GW(DGW) 8.22 ft.

Length of Water Column (LWC=TWD-DGW) 1.68 ft.

1Csg. Vol. (LWC*C)= 1.68 X 0.652 = 1.10 gal.
3Csg. Volume = 3x 1.10 = 3.29 gals.(Std. Purge Vol)
Total Vol. of Water Purged Before Sampling 1.0 gal.

	Initial	1st vol.	2nd vol.	3rd vol.	4th vol.	5th vol.	Post	Sampling
Volume Purged (gallons)		1.00						
Time (military)	10:30							15:55
pH (s.u.)	7.23							8.19
O.R.P. (mV)	-104.3							-67.5
Temperature (°C)	23.23							22.51
Specific Cond. (umhos/cm)	260							326
Dissolved Oxygen (mg/L)	5.80							2.73
Turbidity	1							1

*Subjective (1) None (2) Faint (3) Moderate (4) Strong

Remarks Purged until dry. Let recharge, then collected sample with a new disposable polyethylene bailer.

South Carolina Department of Health and Environmental Control
Bureau of Underground Storage Tank Management

Field Data Information Sheet for Ground Water Sampling

Date(mm/dd/yy) 09/16/08
Field Personnel Shelley Bryant
General Weather Conditions Showers
Ambient Air Temperature 85 F

Facility Name Green's Oil Site ID# 09344

Quality Assurance:

pH Meter YSI 556 MPS Conductivity Meter YSI 556 MPS
serial no. 07F101211 serial no.
pH = 4.0 Standard
pH = 7.0 Standard
pH = 10.0 Standard

Chain of Custody

Shelley Bryant	9/16/08 17:20	Pace	9/17/08 14:05
Relinquished by	Date/Time	Received by	Date/Time

Well # **MW-2**

Well Diameter (D) 4.0 inch _____ or feet
conversion factor(C): 3.143*(D/2)^2
for a 2 inch well C= 0.163
for a 4 inch well C= 0.652
Total Well Depth (TWD) 14.23 ft.
Depth to GW(DGW) 8.60 ft.

Length of Water Column (LWC=TWD-DGW) 5.63 ft.

1Csg. Vol. (LWC*C)= 5.63 X 0.652 = 3.67 gal.
3Csg. Volume = 3x 3.67 = 11.01 gals.(Std. Purge Vol)
Total Vol. of Water Purged Before Sampling 3.60 gal.

	Initial	1st vol.	2nd vol.	3rd vol.	4th vol.	5th vol.	Post	Sampling
Volume Purged (gallons)		3.60						
Time (military)	10:57	11:08						11:15
pH (s.u.)	7.21	7.38						7.56
O.R.P. (mV)	-82.4	-95.6						-92.2
Temperature (°C)	21.78	21.58						21.54
Specific Cond. (umhos/cm)	563	588						584
Dissolved Oxygen (mg/L)	1.81	1.51						1.97
Turbidity	1	1						1

*Subjective (1) None (2) Faint (3) Moderate (4) Strong

Remarks Purged until dry. Let recharge, then collected sample with a new disposable polyethylene bailer.

South Carolina Department of Health and Environmental Control
Bureau of Underground Storage Tank Management

Field Data Information Sheet for Ground Water Sampling

Date(mm/dd/yy) 09/16/08
Field Personnel Shelley Bryant
General Weather Conditions Showers
Ambient Air Temperature 85 F

Facility Name Green's Oil Site ID# 09344

Quality Assurance:

pH Meter YSI 556 MPS
serial no. 07F101211
pH = 4.0 _____
pH = 7.0 _____
pH = 10.0 _____

Conductivity Meter YSI 556 MPS
serial no. _____
Standard _____
Standard _____
Standard _____

Chain of Custody

Shelley Bryant	9/16/08 17:20	Pace	9/17/08 14:05
Relinquished by	Date/Time	Received by	Date/Time

Well # **MW-3**

Well Diameter (D) 2.0 inch _____ or feet
conversion factor(C): 3.143*(D/2)^2
for a 2 inch well C= 0.163
for a 4 inch well C= 0.652
Total Well Depth (TWD) 7.89 ft.
Depth to GW(DGW) dry ft.

Length of Water Column (LWC=TWD-DGW) _____ ft.

1Csg. Vol. (LWC*C)= _____ X 0.163 = 0.00 gal.
3Csg. Volume = 3x 0.00 = 0.00 gals.(Std. Purge Vol)
Total Vol. of Water Purged Before Sampling --- gal.

	Initial	1st vol.	2nd vol.	3rd vol.	4th vol.	5th vol.	Post	Sampling
Volume Purged (gallons)								
Time (military)								
pH (s.u.)								
O.R.P. (mV)								
Temperature (°C)								
Specific Cond. (umhos/cm)								
Dissolved Oxygen (mg/L)								
Turbidity								

*Subjective (1) None (2) Faint (3) Moderate (4) Strong

Remarks Dry well.

South Carolina Department of Health and Environmental Control
Bureau of Underground Storage Tank Management

Field Data Information Sheet for Ground Water Sampling

Date(mm/dd/yy) 09/16/08
Field Personnel Shelley Bryant
General Weather Conditions Showers
Ambient Air Temperature 85 F

Facility Name Green's Oil Site ID# 09344

Quality Assurance:

pH Meter YSI 556 MPS
serial no. 07F101211
pH = 4.0
pH = 7.0
pH = 10.0

Conductivity Meter YSI 556 MPS
serial no.
Standard
Standard
Standard

Chain of Custody

Relinquished by	Date/Time	Received by	Date/Time
Shelley Bryant	9/16/08 17:20	Pace	9/17/08 14:05

Well # **MW-4**

Well Diameter (D) 2.0 inch _____ or feet
conversion factor(C): 3.143*(D/2)^2
for a 2 inch well C= 0.163
for a 4 inch well C= 0.652
Total Well Depth (TWD) 13.81 ft.
Depth to GW(DGW) 10.54 ft.

Length of Water Column (LWC=TWD-DGW) 3.27 ft.

1Csg. Vol. (LWC*C)= 3.27 X 0.163 = 0.53 gal.
3Csg. Volume = 3x 0.53 = 1.60 gals.(Std. Purge Vol)
Total Vol. of Water Purged Before Sampling 0.50 gal.

	Initial	1st vol.	2nd vol.	3rd vol.	4th vol.	5th vol.	Post	Sampling
Volume Purged (gallons)		0.50						
Time (military)	15:23	15:26						15:30
pH (s.u.)	8.21	8.15						8.06
O.R.P. (mV)	-137.0	-133.1						-118.8
Temperature (°C)	22.06	22.48						22.44
Specific Cond. (umhos/cm)	525	534						543
Dissolved Oxygen (mg/L)	1.43	1.22						1.35
Turbidity	1	1						1

*Subjective (1) None (2) Faint (3) Moderate (4) Strong

Remarks Purged until dry. Let recharge, then collected sample with a new disposable polyethylene bailer.

South Carolina Department of Health and Environmental Control
Bureau of Underground Storage Tank Management

Field Data Information Sheet for Ground Water Sampling

Date(mm/dd/yy) 09/16/08
Field Personnel Shelley Bryant
General Weather Conditions Showers
Ambient Air Temperature 85 F

Facility Name Green's Oil Site ID# 09344

Quality Assurance:

pH Meter YSI 556 MPS
serial no. 07F101211
pH = 4.0
pH = 7.0
pH = 10.0

Conductivity Meter YSI 556 MPS
serial no.
Standard
Standard
Standard

Chain of Custody

Shelley Bryant	9/16/08 17:20	Pace	9/17/08 14:05
Relinquished by	Date/Time	Received by	Date/Time

Well # **MW-5**

Well Diameter (D) 2.0 inch _____ or feet
conversion factor(C): 3.143*(D/2)^2
for a 2 inch well C= 0.163
for a 4 inch well C= 0.652
Total Well Depth (TWD) 10.27 ft.
Depth to GW(DGW) 8.05 ft.

Length of Water Column (LWC=TWD-DGW) 2.22 ft.

1Csg. Vol. (LWC*C)= 2.22 X 0.163 = 0.36 gal.
3Csg. Volume = 3x 0.36 = 1.09 gals.(Std. Purge Vol)
Total Vol. of Water Purged Before Sampling 0.70 gal.

	Initial	1st vol.	2nd vol.	3rd vol.	4th vol.	5th vol.	Post	Sampling
Volume Purged (gallons)		0.35	0.35					
Time (military)	14:30	14:32	14:35					16:05
pH (s.u.)	8.75	8.53	8.54					8.70
O.R.P. (mV)	-71.8	-59.8	-70.7					-81.8
Temperature (°C)	23.93	24.78	24.43					23.33
Specific Cond. (umhos/cm)	359	310	305					295
Dissolved Oxygen (mg/L)	4.38	3.99	3.98					4.71
Turbidity	1	1	1					1

*Subjective (1) None (2) Faint (3) Moderate (4) Strong

Remarks Purged until dry. Let recharge, then collected sample with a new disposable polyethylene bailer.

South Carolina Department of Health and Environmental Control
Bureau of Underground Storage Tank Management

Field Data Information Sheet for Ground Water Sampling

Date(mm/dd/yy) 09/16/08
Field Personnel Shelley Bryant
General Weather Conditions Showers
Ambient Air Temperature 85 F

Facility Name Green's Oil Site ID# 09344

Quality Assurance:

pH Meter YSI 556 MPS
serial no. 07F101211
pH = 4.0
pH = 7.0
pH = 10.0

Conductivity Meter YSI 556 MPS
serial no.
Standard
Standard
Standard

Chain of Custody

Shelley Bryant	9/16/08 17:20	Pace	9/17/08 14:05
Relinquished by	Date/Time	Received by	Date/Time

Well # **MW-6**

Well Diameter (D) 2.0 inch _____ or feet
conversion factor(C): 3.143*(D/2)^2
for a 2 inch well C= 0.163
for a 4 inch well C= 0.652
Total Well Depth (TWD) 9.87 ft.
Depth to GW(DGW) 8.80 ft.

Length of Water Column (LWC=TWD-DGW) 1.07 ft.

1Csg. Vol. (LWC*C)= 1.07 X 0.163 = 0.17 gal.
3Csg. Volume = 3x 0.17 = 0.52 gals.(Std. Purge Vol)
Total Vol. of Water Purged Before Sampling --- gal.

	Initial	1st vol.	2nd vol.	3rd vol.	4th vol.	5th vol.	Post	Sampling
Volume Purged (gallons)								
Time (military)								15:45
pH (s.u.)								8.40
O.R.P. (mV)								-62.2
Temperature (°C)								22.79
Specific Cond. (umhos/cm)								686
Dissolved Oxygen (mg/L)								3.76
Turbidity								1

*Subjective (1) None (2) Faint (3) Moderate (4) Strong

Remarks Well had just enough water to collect a sample.

South Carolina Department of Health and Environmental Control
Bureau of Underground Storage Tank Management

Field Data Information Sheet for Ground Water Sampling

Date(mm/dd/yy) 09/16/08
Field Personnel Shelley Bryant
General Weather Conditions Showers
Ambient Air Temperature 85 F

Facility Name Green's Oil Site ID# 09344

Quality Assurance:

pH Meter YSI 556 MPS Conductivity Meter YSI 556 MPS
serial no. 07F101211 serial no. _____
pH = 4.0 _____ Standard _____
pH = 7.0 _____ Standard _____
pH = 10.0 _____ Standard _____

Chain of Custody

Shelley Bryant	9/16/08 17:20	Pace	9/17/08 14:05
Relinquished by	Date/Time	Received by	Date/Time

Well # **MW-7**

Well Diameter (D) 2.0 inch _____ or feet
conversion factor(C): 3.143*(D/2)^2
for a 2 inch well C= 0.163
for a 4 inch well C= 0.652
Total Well Depth (TWD) 13.70 ft.
Depth to GW(DGW) 8.27 ft.

Length of Water Column (LWC=TWD-DGW) 5.43 ft.

1Csg. Vol. (LWC*C)= 5.43 X 0.163 = 0.89 gal.
3Csg. Volume = 3x 0.89 = 2.66 gals.(Std. Purge Vol)
Total Vol. of Water Purged Before Sampling 2.65 gal.

	Initial	1st vol.	2nd vol.	3rd vol.	4th vol.	5th vol.	Post	Sampling
Volume Purged (gallons)		0.88	0.88	0.88				
Time (military)	11:30	11:32	11:37	11:42				11:45
pH (s.u.)	8.09	8.05	8.07	8.14				8.16
O.R.P. (mV)	-50.7	-57.8	-72.4	-82.2				-88.3
Temperature (°C)	22.77	23.66	22.88	22.44				22.74
Specific Cond. (umhos/cm)	377	426	421	428				427
Dissolved Oxygen (mg/L)	3.54	3.70	3.47	3.18				3.10
Turbidity	1	1	1	2				2

*Subjective (1) None (2) Faint (3) Moderate (4) Strong

Remarks Purged well and collected sample with a new polyethylene bailer.

South Carolina Department of Health and Environmental Control
Bureau of Underground Storage Tank Management

Field Data Information Sheet for Ground Water Sampling

Date(mm/dd/yy) 09/16/08
Field Personnel Shelley Bryant
General Weather Conditions Showers
Ambient Air Temperature 85 F

Facility Name Green's Oil Site ID# 09344

Quality Assurance:

pH Meter YSI 556 MPS Conductivity Meter YSI 556 MPS
serial no. 07F101211 serial no. _____
pH = 4.0 _____ Standard _____
pH = 7.0 _____ Standard _____
pH = 10.0 _____ Standard _____

Chain of Custody

Shelley Bryant	9/16/08 17:20	Pace	9/17/08 14:05
Relinquished by	Date/Time	Received by	Date/Time

Well # **PW-8**

Well Diameter (D) 2.0 inch _____ or feet
conversion factor(C): 3.143*(D/2)^2
for a 2 inch well C= 0.163
for a 4 inch well C= 0.652
Total Well Depth (TWD) 30.30 ft.
Depth to GW(DGW) 8.05 ft.

Length of Water Column (LWC=TWD-DGW) 22.25 ft.

1Csg. Vol. (LWC*C)= 22.25 X 0.163 = 3.63 gal.
3Csg. Volume = 3x 3.63 = 10.88 gals.(Std. Purge Vol)
Total Vol. of Water Purged Before Sampling 10.80 gal.

	Initial	1st vol.	2nd vol.	3rd vol.	4th vol.	5th vol.	Post	Sampling
Volume Purged (gallons)		3.60	3.60	3.60				
Time (military)	14:47	14:53	15:00	15:10				15:15
pH (s.u.)	8.40	8.40	8.41	8.44				8.35
O.R.P. (mV)	-97.2	-93.6	-103.2	-101.4				-104.6
Temperature (°C)	21.40	20.99	20.48	20.41				20.96
Specific Cond. (umhos/cm)	210	223	262	281				286
Dissolved Oxygen (mg/L)	2.38	2.47	2.29	2.61				2.23
Turbidity	1	1	1	1				1

*Subjective (1) None (2) Faint (3) Moderate (4) Strong

Remarks Took sample with polyethylene bailer.

APPENDIX B

LABORATORY REPORT – GROUNDWATER SAMPLES – MARCH 2008

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September 23, 2008

Mr. Daniel Sparks
Environmental Compliance Servi
13504 South Point Blvd.
Unit F
Charlotte, NC 28273

RE: Project: GREEN'S OIL 14-811030.01
Pace Project No.: 9228094

Dear Mr. Sparks:
Enclosed are the analytical results for sample(s) received by the laboratory on September 17, 2008. The results relate only to the samples included in this report. Results reported herein conform to the most current NELAC standards, where applicable, unless otherwise narrated in the body of the report.

Inorganic Wet Chemistry and Metals analyses were performed at our Pace Asheville laboratory and Organic testing was performed at our Pace Huntersville laboratory unless otherwise footnoted. All Microbiological analyses were performed at the laboratory where the samples were received.

If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Kevin Herring

kevin.herring@pacelabs.com
Project Manager

Enclosures

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CERTIFICATIONS

Project: GREEN'S OIL 14-811030.01
Pace Project No.: 9228094

Charlotte Certification IDs
Connecticut Certification Number: PH-0104
Pennsylvania Certification Number: 68-00784
West Virginia Certification Number: 357
Virginia Certification Number: 00213
Tennessee Certification Number: 04010
South Carolina Drinking Water Cert. Number: 990060003
South Carolina Certification Number: 990060001
North Carolina Field Services Certification Number: 5342
North Carolina Wastewater Certification Number: 12
North Carolina Drinking Water Certification Number: 37706
Louisiana/LELAP Certification Number: 04034
Kentucky UST Certification Number: 84
New Jersey Certification Number: NC012
Florida/NELAP Certification Number: E87627

Asheville Certification IDs
Connecticut Certification Number: PH-0106
Massachusetts Certification Number: M-NC030
West Virginia Certification Number: 356
Virginia Certification Number: 00072
Tennessee Certification Number: 2980
South Carolina Bioassay Certification Number: 99030002
South Carolina Certification Number: 99030001
Pennsylvania Certification Number: 68-03578
North Carolina Bioassay Certification Number: 9
North Carolina Wastewater Certification Number: 40
North Carolina Drinking Water Certification Number: 37712
New Jersey Certification Number: NC011
Louisiana/LELAP Certification Number: 03095
Florida/NELAP Certification Number: E87648

Eden Certification IDs
Virginia Drinking Water Certification Number: 00424
North Carolina Wastewater Certification Number: 633
North Carolina Drinking Water Certification Number: 37738

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SAMPLE ANALYTE COUNT

Project: GREEN'S OIL 14-811030.01
Pace Project No.: 9228094

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
9228094001	**MW-1R**	EPA 8260	AW	12	PASI-C
9228094002	**MW-2**	EPA 8260	AW	12	PASI-C
9228094003	**MW-4**	EPA 8260	AW	12	PASI-C
9228094004	**MW-5**	EPA 8260	AW	12	PASI-C
9228094005	**MW-6**	EPA 8260	AW	12	PASI-C
9228094006	**MW-7**	EPA 8260	AW	12	PASI-C
9228094007	**MW-8**	EPA 8260	AW	12	PASI-C

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ANALYTICAL RESULTS

Project: GREEN'S OIL 14-811030.01
Pace Project No.: 9228094

Sample: MW-1R **Lab ID: 9228094001** Collected: 09/16/08 15:55 Received: 09/17/08 16:30 Matrix: Water

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
8260 MSV Low Level	Analytical Method: EPA 8260							
Benzene	**11.0**	ug/L	1.0	1		09/21/08 16:40	71-43-2	
Ethylbenzene	**30.6**	ug/L	1.0	1		09/21/08 16:40	100-41-4	
Methyl-tert-butyl ether	**15.2**	ug/L	1.0	1		09/21/08 16:40	1634-04-4	
Naphthalene	**26.1**	ug/L	1.0	1		09/21/08 16:40	91-20-3	
Toluene	**3.7**	ug/L	1.0	1		09/21/08 16:40	108-88-3	
Xylene (Total)	**18.2**	ug/L	3.0	1		09/21/08 16:40	1330-20-7	
m&p-Xylene	**16.1**	ug/L	2.0	1		09/21/08 16:40	1330-20-7	
o-Xylene	**2.2**	ug/L	1.0	1		09/21/08 16:40	95-47-6	
4-Bromofluorobenzene (S)	98	%	87-109	1		09/21/08 16:40	460-00-4	
Dibromofluoromethane (S)	98	%	85-115	1		09/21/08 16:40	1868-53-7	
1,2-Dichloroethane-d4 (S)	103	%	79-120	1		09/21/08 16:40	17060-07-0	
Toluene-d8 (S)	100	%	70-120	1		09/21/08 16:40	2037-26-5	

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ANALYTICAL RESULTS

Project: GREEN'S OIL 14-811030.01
Pace Project No.: 9228094

Sample: MW-2 **Lab ID: 9228094002** Collected: 09/16/08 11:15 Received: 09/17/08 16:30 Matrix: Water

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
8260 MSV Low Level	Analytical Method: EPA 8260							
Benzene	ND	ug/L	1.0	1		09/19/08 07:24	71-43-2	
Ethylbenzene	ND	ug/L	1.0	1		09/19/08 07:24	100-41-4	
Methyl-tert-butyl ether	**26.4**	ug/L	1.0	1		09/19/08 07:24	1634-04-4	
Naphthalene	ND	ug/L	1.0	1		09/19/08 07:24	91-20-3	
Toluene	ND	ug/L	1.0	1		09/19/08 07:24	108-88-3	
Xylene (Total)	ND	ug/L	3.0	1		09/19/08 07:24	1330-20-7	
m&p-Xylene	ND	ug/L	2.0	1		09/19/08 07:24	1330-20-7	
o-Xylene	ND	ug/L	1.0	1		09/19/08 07:24	95-47-6	
4-Bromofluorobenzene (S)	98	%	87-109	1		09/19/08 07:24	460-00-4	
Dibromofluoromethane (S)	102	%	85-115	1		09/19/08 07:24	1868-53-7	
1,2-Dichloroethane-d4 (S)	108	%	79-120	1		09/19/08 07:24	17060-07-0	
Toluene-d8 (S)	102	%	70-120	1		09/19/08 07:24	2037-26-5	

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ANALYTICAL RESULTS

Project: GREEN'S OIL 14-811030.01
Pace Project No.: 9228094

Sample: MW-4 **Lab ID: 9228094003** Collected: 09/16/08 15:30 Received: 09/17/08 16:30 Matrix: Water

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
8260 MSV Low Level	Analytical Method: EPA 8260							
Benzene	ND	ug/L	1.0	1		09/19/08 07:48	71-43-2	
Ethylbenzene	ND	ug/L	1.0	1		09/19/08 07:48	100-41-4	
Methyl-tert-butyl ether	**7.1**	ug/L	1.0	1		09/19/08 07:48	1634-04-4	
Naphthalene	ND	ug/L	1.0	1		09/19/08 07:48	91-20-3	
Toluene	ND	ug/L	1.0	1		09/19/08 07:48	108-88-3	
Xylene (Total)	ND	ug/L	3.0	1		09/19/08 07:48	1330-20-7	
m&p-Xylene	ND	ug/L	2.0	1		09/19/08 07:48	1330-20-7	
o-Xylene	ND	ug/L	1.0	1		09/19/08 07:48	95-47-6	
4-Bromofluorobenzene (S)	99	%	87-109	1		09/19/08 07:48	460-00-4	
Dibromofluoromethane (S)	101	%	85-115	1		09/19/08 07:48	1868-53-7	
1,2-Dichloroethane-d4 (S)	107	%	79-120	1		09/19/08 07:48	17060-07-0	
Toluene-d8 (S)	101	%	70-120	1		09/19/08 07:48	2037-26-5	

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ANALYTICAL RESULTS

Project: GREEN'S OIL 14-811030.01
Pace Project No.: 9228094

Sample: MW-5 **Lab ID: 9228094004** Collected: 09/16/08 16:05 Received: 09/17/08 16:30 Matrix: Water

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
8260 MSV Low Level	Analytical Method: EPA 8260							
Benzene	ND	ug/L	1.0	1		09/19/08 02:16	71-43-2	
Ethylbenzene	ND	ug/L	1.0	1		09/19/08 02:16	100-41-4	
Methyl-tert-butyl ether	ND	ug/L	1.0	1		09/19/08 02:16	1634-04-4	
Naphthalene	ND	ug/L	1.0	1		09/19/08 02:16	91-20-3	
Toluene	ND	ug/L	1.0	1		09/19/08 02:16	108-88-3	
Xylene (Total)	ND	ug/L	3.0	1		09/19/08 02:16	1330-20-7	
m&p-Xylene	ND	ug/L	2.0	1		09/19/08 02:16	1330-20-7	
o-Xylene	ND	ug/L	1.0	1		09/19/08 02:16	95-47-6	
4-Bromofluorobenzene (S)	98	%	87-109	1		09/19/08 02:16	460-00-4	
Dibromofluoromethane (S)	100	%	85-115	1		09/19/08 02:16	1868-53-7	
1,2-Dichloroethane-d4 (S)	105	%	79-120	1		09/19/08 02:16	17060-07-0	
Toluene-d8 (S)	101	%	70-120	1		09/19/08 02:16	2037-26-5	

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ANALYTICAL RESULTS

Project: GREEN'S OIL 14-811030.01
Pace Project No.: 9228094

Sample: MW-6 **Lab ID: 9228094005** Collected: 09/16/08 15:45 Received: 09/17/08 16:30 Matrix: Water

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
8260 MSV Low Level	Analytical Method: EPA 8260							
Benzene	ND	ug/L	1.0	1		09/19/08 02:40	71-43-2	
Ethylbenzene	ND	ug/L	1.0	1		09/19/08 02:40	100-41-4	
Methyl-tert-butyl ether	ND	ug/L	1.0	1		09/19/08 02:40	1634-04-4	
Naphthalene	ND	ug/L	1.0	1		09/19/08 02:40	91-20-3	
Toluene	ND	ug/L	1.0	1		09/19/08 02:40	108-88-3	
Xylene (Total)	ND	ug/L	3.0	1		09/19/08 02:40	1330-20-7	
m&p-Xylene	ND	ug/L	2.0	1		09/19/08 02:40	1330-20-7	
o-Xylene	ND	ug/L	1.0	1		09/19/08 02:40	95-47-6	
4-Bromofluorobenzene (S)	99	%	87-109	1		09/19/08 02:40	460-00-4	
Dibromofluoromethane (S)	100	%	85-115	1		09/19/08 02:40	1868-53-7	
1,2-Dichloroethane-d4 (S)	105	%	79-120	1		09/19/08 02:40	17060-07-0	
Toluene-d8 (S)	100	%	70-120	1		09/19/08 02:40	2037-26-5	

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ANALYTICAL RESULTS

Project: GREEN'S OIL 14-811030.01
Pace Project No.: 9228094

Sample: MW-7 **Lab ID: 9228094006** Collected: 09/16/08 11:45 Received: 09/17/08 16:30 Matrix: Water

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
8260 MSV Low Level	Analytical Method: EPA 8260							
Benzene	ND	ug/L	1.0	1		09/19/08 03:04	71-43-2	
Ethylbenzene	ND	ug/L	1.0	1		09/19/08 03:04	100-41-4	
Methyl-tert-butyl ether	ND	ug/L	1.0	1		09/19/08 03:04	1634-04-4	
Naphthalene	ND	ug/L	1.0	1		09/19/08 03:04	91-20-3	
Toluene	ND	ug/L	1.0	1		09/19/08 03:04	108-88-3	
Xylene (Total)	ND	ug/L	3.0	1		09/19/08 03:04	1330-20-7	
m&p-Xylene	ND	ug/L	2.0	1		09/19/08 03:04	1330-20-7	
o-Xylene	ND	ug/L	1.0	1		09/19/08 03:04	95-47-6	
4-Bromofluorobenzene (S)	98	%	87-109	1		09/19/08 03:04	460-00-4	
Dibromofluoromethane (S)	101	%	85-115	1		09/19/08 03:04	1868-53-7	
1,2-Dichloroethane-d4 (S)	105	%	79-120	1		09/19/08 03:04	17060-07-0	
Toluene-d8 (S)	100	%	70-120	1		09/19/08 03:04	2037-26-5	

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ANALYTICAL RESULTS

Project: GREEN'S OIL 14-811030.01
Pace Project No.: 9228094

Sample: MW-8 **Lab ID: 9228094007** Collected: 09/16/08 15:15 Received: 09/17/08 16:30 Matrix: Water

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
8260 MSV Low Level	Analytical Method: EPA 8260							
Benzene	ND	ug/L	1.0	1		09/19/08 03:27	71-43-2	
Ethylbenzene	ND	ug/L	1.0	1		09/19/08 03:27	100-41-4	
Methyl-tert-butyl ether	**1.4**	ug/L	1.0	1		09/19/08 03:27	1634-04-4	
Naphthalene	ND	ug/L	1.0	1		09/19/08 03:27	91-20-3	
Toluene	ND	ug/L	1.0	1		09/19/08 03:27	108-88-3	
Xylene (Total)	ND	ug/L	3.0	1		09/19/08 03:27	1330-20-7	
m&p-Xylene	ND	ug/L	2.0	1		09/19/08 03:27	1330-20-7	
o-Xylene	ND	ug/L	1.0	1		09/19/08 03:27	95-47-6	
4-Bromofluorobenzene (S)	99	%	87-109	1		09/19/08 03:27	460-00-4	
Dibromofluoromethane (S)	102	%	85-115	1		09/19/08 03:27	1868-53-7	
1,2-Dichloroethane-d4 (S)	105	%	79-120	1		09/19/08 03:27	17060-07-0	
Toluene-d8 (S)	101	%	70-120	1		09/19/08 03:27	2037-26-5	

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(828)254-7176

Pace Analytical Services, Inc.
9800 Kincey Ave. Suite 100
Huntersville, NC 28078
(704)875-9092

QUALITY CONTROL DATA

Project: GREEN'S OIL 14-811030.01
Pace Project No.: 9228094

QC Batch: MSV/4648 Analysis Method: EPA 8260
QC Batch Method: EPA 8260 Analysis Description: 8260 MSV Low Level
Associated Lab Samples: 9228094001, 9228094002, 9228094003, 9228094004, 9228094005, 9228094006, 9228094007

METHOD BLANK: 169686 Matrix: Water
Associated Lab Samples: 9228094001, 9228094002, 9228094003, 9228094004, 9228094005, 9228094006, 9228094007

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Benzene	ug/L	ND	1.0	09/19/08 01:53	
Ethylbenzene	ug/L	ND	1.0	09/19/08 01:53	
m&p-Xylene	ug/L	ND	2.0	09/19/08 01:53	
Methyl-tert-butyl ether	ug/L	ND	1.0	09/19/08 01:53	
Naphthalene	ug/L	ND	1.0	09/19/08 01:53	
o-Xylene	ug/L	ND	1.0	09/19/08 01:53	
Toluene	ug/L	ND	1.0	09/19/08 01:53	
Xylene (Total)	ug/L	ND	2.0	09/19/08 01:53	
1,2-Dichloroethane-d4 (S)	%	105	79-120	09/19/08 01:53	
4-Bromofluorobenzene (S)	%	99	87-109	09/19/08 01:53	
Dibromofluoromethane (S)	%	100	85-115	09/19/08 01:53	
Toluene-d8 (S)	%	101	70-120	09/19/08 01:53	

LABORATORY CONTROL SAMPLE: 169687

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Benzene	ug/L	50	50.2	100	78-128	
Ethylbenzene	ug/L	50	50.9	102	80-127	
m&p-Xylene	ug/L	100	98.5	99	82-127	
Methyl-tert-butyl ether	ug/L	50	48.8	98	71-130	
Naphthalene	ug/L	50	49.3	99	52-136	
o-Xylene	ug/L	50	49.3	99	83-124	
Toluene	ug/L	50	49.1	98	76-126	
Xylene (Total)	ug/L	150	148	99	83-125	
1,2-Dichloroethane-d4 (S)	%			104	79-120	
4-Bromofluorobenzene (S)	%			101	87-109	
Dibromofluoromethane (S)	%			102	85-115	
Toluene-d8 (S)	%			100	70-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 169798 169799

Parameter	Units	9228094004 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Qual
Benzene	ug/L	ND	50	50	55.5	53.8	111	108	74-136	3	
Toluene	ug/L	ND	50	50	54.7	52.9	109	106	73-131	3	
1,2-Dichloroethane-d4 (S)	%						103	103	79-120		
4-Bromofluorobenzene (S)	%						98	98	87-109		
Dibromofluoromethane (S)	%						98	97	85-115		
Toluene-d8 (S)	%						100	100	70-120		

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QUALIFIERS

Project: GREEN'S OIL 14-811030.01
Pace Project No.: 9228094

DEFINITIONS

DF - Dilution Factor, if reported, represents the factor applied to the reported data due to changes in sample preparation, dilution of the sample aliquot, or moisture content.

ND - Not Detected at or above adjusted reporting limit.

J - Estimated concentration above the adjusted method detection limit and below the adjusted reporting limit.

MDL - Adjusted Method Detection Limit.

S - Surrogate

1,2-Diphenylhydrazine (8270 listed analyte) decomposes to Azobenzene.

Consistent with EPA guidelines, unrounded data are displayed and have been used to calculate % recovery and RPD values.

LCS(D) - Laboratory Control Sample (Duplicate)

MS(D) - Matrix Spike (Duplicate)

DUP - Sample Duplicate

RPD - Relative Percent Difference

NC - Not Calculable.

Pace Analytical is NELAP accredited. Contact your Pace PM for the current list of accredited analytes.

LABORATORIES

PASI-C Pace Analytical Services - Charlotte

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2225 Riverside Dr.
Asheville, NC 28804
(828)254-7176

Pace Analytical Services, Inc.
9800 Kincey Ave. Suite 100
Huntersville, NC 28078
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QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: GREEN'S OIL 14-811030.01
Pace Project No.: 9228094

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
9228094001	**MW-1R**	EPA 8260	MSV/4648		
9228094002	**MW-2**	EPA 8260	MSV/4648		
9228094003	**MW-4**	EPA 8260	MSV/4648		
9228094004	**MW-5**	EPA 8260	MSV/4648		
9228094005	**MW-6**	EPA 8260	MSV/4648		
9228094006	**MW-7**	EPA 8260	MSV/4648		
9228094007	**MW-8**	EPA 8260	MSV/4648		

D H E C
PROMOTE PROTECT PROSPER

C. Earl Hunter, Commissioner
Promoting and protecting the health of the public and the environment.

JERRY GREEN
GREENS OIL CO
2457 BREEN CIRCLE
ROCK HILL SC 29732

OCT 16 2008

Re: **Groundwater Monitoring Report Review**
Greens Oil Co., 2849 Cherry Rd, Rock Hill, SC
UST Permit #09344
Release Reported July 18, 1989
Groundwater Monitoring Report received October 7, 2008
York County

Dear Mr. Green:

As the owner of the underground storage tanks at the time the release was reported in 1989 and in accordance with of the Underground Storage Tank Control Regulations, you are required to conduct corrective action to reduce the levels of petroleum in the subsurface to acceptable levels. As such, you will continue to receive correspondence regarding the 1989 release for which you are the responsible party until such time that a no further action decision is issued by the Department.

The Underground Storage Tank (UST) Program has reviewed the report submitted by ECS documenting the groundwater-sampling event. While the sampling that took place in September 2008 indicates that all concentrations are currently below the site-target levels (SSTLs), additional sampling must be conducted in order to verify that the concentrations will remain below the SSTLs. The next report should be submitted no later than January 15, 2009.

On all correspondence concerning this site, please reference UST Permit #09344. If there are any questions concerning this project, please contact me at (803) 896-6397, via fax at (803) 896-6245, or by e-mail at thomadl@dhec.sc.gov.

Sincerely,

Debra L. Thoma

Debra L. Thoma, Hydrogeologist
Northeastern SC Corrective Action Section
Assessment & Corrective Action Division
Underground Storage Tank Program
Bureau of Land & Waste Management

Cc: James Rudder, ECS, 13504 South Point Blvd., Unit F, Charlotte, NC, 28273
Technical File

UST DOCKET 7

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WHERE BUSINESS AND THE ENVIRONMENT CONVERGE

13504 South Point Boulevard, Unit F, Charlotte, NC 28273 tel 704.583.2711 fax 704.583.2744 www.ecsconsult.com

GROUNDWATER MONITORING REPORT
GREEN'S OIL COMPANY
2849 CHERRY RD.
ROCK HILL, YORK COUNTY
UST PERMIT NO. 09344
SITE RISK CLASSIFICATION: HIGH
LAND USE CLASSIFICATION: COMMERCIAL
ECS PROJECT NO. 14-811030

Prepared For:

Federated Insurance Company
c/o Jerry Green
2457 Breen Circle
Rock Hill, SC 29732

Prepared By:

Environmental Compliance Services, Inc.
13504 South Point Blvd., Unit F
Charlotte, NC 28273
(704) 583-2711

January 26, 2009

James D. Rudder, Jr., P.G.
SC License No. 1067

JAMES D. RUDDER JR. REGISTERED No. 1067 SOUTH CAROLINA PROFESSIONAL GEOLOGIST

Daniel Sparks
Project Manager

UST DOCKET

TABLE OF CONTENTS

1.0 INTRODUCTION

This report presents the results of groundwater monitoring activities conducted on January 8, 2009 at the Green's Oil Company site in Rock Hill, South Carolina. The groundwater sampling activities were conducted in accordance to the Corrective Action Status Evaluation Report (CASE) as requested by the South Carolina Department of Health and Environment Control (SCDHEC) dated January 2007. The site previously operated as a gas station located in a commercial/industrial area of York County. Public or private water supply wells were not reported within 1,000 feet of the site. Two abandoned water supply wells were located down gradient of the site. Surface water bodies were not identified within 500 feet of the source area. The Catawba River, located approximately 3,000 feet north of the site in the downgradient direction, was the single potential receptor identified during the receptor survey.

A previously prepared Corrective Action Plan (CAP) that proposed remediation of petroleum impacted soil and groundwater beneath the site using excavation, de-watering, backfilling with microbial augmented soil, and subsequent microbial injections, was submitted to the SCDHEC by CBM Environmental Services, Inc. (CBM) on January 23, 2004. The SCDHEC approved the CAP in correspondence dated March 29, 2004. However, subsequent telephone conversations between CBM and the responsible party's insurance company (Federated Insurance) indicated that Federated Insurance would only approve soil excavation, de-watering, and backfilling with microbial augmented soil. Microbial injections, if needed, would be implemented after two to three quarters of groundwater monitoring. The initial remedial activities consisting of soil excavation, backfilling with microbial augmented soil, and compaction were completed in December 2004.

2.0 FACILITY INFORMATION

- **Facility Name**: Green's Oil Company
- **Location:** 2849 Cherry Road
  Rock Hill, York County (**Figure 1**)
- **UST Permit No.** 09344
- **Risk Classification:** High
- **Land Use Classification:** Commercial
- **UST Operator:** Green's Oil Company
  2849 Cherry Road
  Rock Hill, South Carolina
- **UST Owner:** Green's Oil Company
  2849 Cherry Road
  Rock Hill, South Carolina
- **Consultant:** Environmental Compliance Services, Inc
  13504 South Point Boulevard
  Charlotte, North Carolina 28273
  (704) 583-2711
- **Release Information:**
  - **Date Discovered:** Unknown
  - **Estimated Quantity of Release:** Unknown
  - **Cause of Release:** Unknown
  - **Source of Release:** Leaking UST System
  - **UST System Size/Contents:** Four gasoline USTs
  - **Latitude / Longitude:** 34°58'42" North/ 80°58'54" West

3.0 SAMPLING ACTIVITIES

3.1 Site Hydrogeology

The depths to groundwater in the seven shallow (water table) monitoring wells (MW-1R, and MW-2 through MW-7) and one telescoping well (PW-8) were measured on January 8, 2009. The depths to groundwater in the shallow wells ranged from 4.86 feet (MW-5) to 7.51 feet (MW-4), and the depth to groundwater in the deep monitoring well PW-8 was 4.64 feet. Groundwater elevations in the shallow monitoring wells, relative to a temporary benchmark with an assumed datum of 100.00 feet, ranged from 89.40 feet (MW-4) to 93.42 feet (MW-7). The groundwater elevation in deep monitoring well PW-8, relative to a temporary benchmark with an assumed datum of 100.00 feet, was 92.34 feet. Based on the January 2009 data, groundwater flow beneath the site was generally towards the north and northwest with an average horizontal hydraulic gradient of 0.05 feet per foot (from MW-7 to MW-4). Groundwater elevation data obtained on January 8, 2009 data is presented in Table 1. A groundwater Elevation Map, based on the January 8, 2009 data, is included as Figure 3.

3.2 Groundwater Sampling

On January 8, 2009 seven shallow monitoring wells (MW-1R, and MW-2 through MW-7) and one deep monitoring well (PW-8) were purged and sampled. Laboratory analyses were performed on groundwater samples collected from the monitoring wells for BTEX (benzene, toluene, ethylbenzene, and total xylenes), MTBE (methyl-tert-butyl ether) and naphthalene by EPA Method 8260B.

4.0 GROUNDWATER QUALITY

A concentration of benzene that exceeded the May 2001 risk based screening levels (RBSL) was reported in the groundwater sample collected from monitoring well MW-1R. The groundwater samples collected from other site wells were not reported to contain compound concentrations in excess of the RBSLs.

A detectable concentration of ethylbenzene, total xylenes, and naphthalene below the RBSL was reported in the groundwater sample collected from monitoring well MW-1R. Detectable concentrations of MTBE below the RBSL were reported in the groundwater samples collected from monitoring wells MW-1R, MW-2, MW-3, and MW-4.

Detectable concentrations of requested method constituents were not reported in the groundwater samples collected from monitoring wells MW-5, MW-6, MW-7, and PW-8.

A summary of groundwater quality data is presented in **Table 2**. A Groundwater Quality Map showing individual BTEX constituents, MTBE and naphthalene concentrations in the groundwater samples collected from the monitoring wells during the January 8, 2009 sampling event is included as **Figure 4**. Groundwater sampling field data sheets from the January 8, 2009 sampling event have been included as **Appendix A.** A complete report of laboratory analyses of groundwater samples collected during the January 8, 2009 sampling event has been included as **Appendix B.** A disposal manifest was not available at this time and will be forwarded upon receipt.

5.0 CONCLUSIONS AND RECOMMENDATIONS

Monitoring well MW-1R contained a benzene concentration slightly in excess of the RBSLs for this compound. Concentrations detected in other site wells were below RBSLs. Four of the site wells did not contain compound concentrations above the laboratory method reporting limits. Compound concentrations historically reported in groundwater samples collected from monitoring wells MW-1R and MW-2 have been greatly reduced from the historical sampling data generated in October 1996. ECS recommends site monitoring wells be abandoned and the site closed.

6.0 LIMITATIONS

This report has been prepared for the exclusive use of Mr. Jerry Green for specific application to the referenced site in York County, South Carolina. The assessment was conducted based on the scope of work and level of effort desired by the client and with resources adequate only for that scope of work.

Certain data contained in this report was not obtained under the supervision of ECS. Although the accuracy of this data cannot be verified, for the purpose of this report ECS assumes it is correct. Our findings have been developed in accordance with generally accepted standards of geology and hydrogeology practices in the State of South Carolina, available information, and our professional judgment. No other warranty is expressed or implied.

The data presented in this report are indicative of conditions that existed at the precise locations sampled and at the time the samples were collected. In addition, the data obtained from samples would be interpreted as being meaningful with respect to parameters indicated in the laboratory report. No additional information can be logically inferred from this data.

ECS appreciates the opportunity to offer this report of groundwater monitoring activities at the Green's Oil site. If you have questions or comments regarding this please contact Daniel Sparks (dsparks@ecsconsult.com) or James Rudder (jrudder@ecsconsult.com) at (704)583-2711.

TABLES

TABLE 1
SUMMARY OF GROUNDWATER ELEVATION DATA[1]
GREEN'S OIL COMPANY

Well ID	Date Measured	Top of Casing Elevation (feet)	Depth to Groundwater (feet)	Groundwater Elevation (feet)	Well Depth[2] (feet)	Screened Interval (feet)
MW-1	05/24/00	98.15	7.16	90.99	12.33	NA[3]
	10/09/00		7.78	90.37		
	01/02/01		9.58	88.57		
	12/16/02		5.11	93.04		
	06/12/03		2.59	95.56		
	11/22/04		9.36	88.79		
	03/31/08	Abandoned				
MW-1R[4]	01/31/05	98.30	8.66	89.64	9.85	NA
	04/27/05		4.48	93.82		
	08/17/05		7.39	90.91		
	11/28/05		9.75	88.55		
	03/14/06		7.31	90.99		
	02/27/07		4.82	93.48		
	06/25/07		8.08	90.22		
	03/31/08		5.36	92.94	9.90	
	09/16/08		8.22	90.08	9.90[5]	
	01/08/09		6.20	92.10		
MW-2	05/24/00	97.86	7.03	90.83	14.23	NA
	10/09/00		7.71	90.15		
	01/02/01		9.43	88.43		
	12/16/02		4.91	92.95		
	06/12/03		2.47	95.39		
	11/22/04		9.26	88.60		
	01/31/05		8.36	89.50		
	04/27/05		4.65	93.21		
	08/17/05		7.59	90.27		
	11/28/05		9.92	87.94		
	03/14/06		7.47	90.39		
	02/27/07		4.50	93.36		
	06/25/07		8.56	89.30		
	03/31/08		5.57	92.29	14.22	
	09/16/08		8.60	89.26	14.23	
	01/08/09		5.22	92.64		

TABLE 1 (Continued)
SUMMARY OF GROUNDWATER ELEVATION DATA[1]
GREEN'S OIL COMPANY

Well ID	Date Measured	Top of Casing Elevation (feet)	Depth to Groundwater (feet)	Groundwater Elevation (feet)	Well Depth[2] (feet)	Screened Interval (feet)
MW-3	12/16/02	97.08	5.83	91.25	7.75	NA
	06/12/03		3.01	94.07		
	11/22/04		Dry	Dry		
	01/31/05		Dry	Dry		
	04/27/05		5.00	92.08		
	08/17/05		Dry	Dry		
	11/28/05		Dry	Dry		
	03/14/06		Dry	Dry		
	02/27/07		5.29	91.79		
	06/25/07		Dry	Dry		
	03/31/08		5.97	91.11	7.88	
	09/16/08		Dry	Dry	7.89	
	01/08/09		6.01	91.07		
MW-4	12/16/02	96.91	6.66	90.25	13.60	NA
	06/12/03		3.52	93.39		
	11/22/04		NM[6]	NM		
	01/31/05		NM	NM		
	04/27/05		5.75	91.16		
	08/17/05		9.65	87.26		
	11/28/05		12.32	84.59		
	03/14/06		NM	NM		
	02/27/07		5.86	91.05		
	06/25/07		10.40	86.51		
	03/31/08		7.47	89.44	13.66	
	09/16/08		10.54	86.37	13.81	
	01/08/09		7.51	89.40		
MW-5	05/24/00	97.04	6.56	90.48	10.30	NA
	10/09/00		7.15	89.89		
	01/02/01		8.90	88.14		
	12/16/02		4.67	92.37		
	06/12/03		2.20	94.84		
	11/22/04		8.67	88.37		
	01/31/05		7.84	89.20		
	04/27/05		4.26	92.78		
	08/17/05		6.99	90.05		
	11/28/05		9.28	87.76		
	03/14/06		6.95	90.09		
	02/27/07		4.24	92.80		
	06/25/07		7.93	89.11		
	03/31/08		5.11	91.93	10.26	
	09/16/08		8.05	88.99	10.27	
	01/08/09		4.86	92.18		

TABLE 1 (Continued)
SUMMARY OF GROUNDWATER ELEVATION DATA[1]
GREEN'S OIL COMPANY

Well ID	Date Measured	Top of Casing Elevation (feet)	Depth to Groundwater (feet)	Groundwater Elevation (feet)	Well Depth[2] (feet)	Screened Interval (feet)
MW-6	05/24/00	98.59	8.10	90.49	9.95	NA
	10/09/00		7.92	90.67		
	01/02/01		9.52	89.07		
	12/16/02		5.25	93.34		
	06/12/03		2.89	95.70		
	11/22/04		9.44	89.15		
	01/31/05		8.59	90.00		
	04/27/05		4.98	93.61		
	08/17/05		7.80	90.79		
	11/28/05		9.58	89.01		
	03/14/06		7.67	90.92		
	02/27/07		4.83	93.76		
	06/25/07		8.76	89.83		
	03/31/08		5.69	92.90	9.86	
	09/16/08		8.80	89.79	9.87	
	01/08/09		5.52	93.07		
MW-7	12/16/02	98.40	4.81	93.59	13.55	NA
	06/12/03		3.29	95.11		
	11/22/04		NF[7]	NF		
	01/31/05		NF	NF		
	04/27/05		4.40	94.00		
	08/17/05		6.22	92.18		
	11/28/05		9.64	88.76		
	03/14/06		7.20	91.20		
	02/27/07		NF	NF		
	06/25/07		8.17	90.23		
	03/31/08		5.58	92.82	13.70	
	09/16/08		8.27	90.13	13.70	
	01/08/09		4.98	93.42		

TABLE 1 (Continued)
SUMMARY OF GROUNDWATER ELEVATION DATA[1]
GREEN'S OIL COMPANY

Well ID	Date Measured	Top of Casing Elevation (feet)	Depth to Groundwater (feet)	Groundwater Elevation (feet)	Well Depth[2] (feet)	Screened Interval (feet)
PW[8]-8	05/24/00	96.98	6.45	90.53	30.90	NA
	10/09/00		7.12	89.86		
	01/02/01		8.69	88.29		
	12/16/02		4.46	92.52		
	06/12/03		2.60	94.38		
	11/22/04		5.34	91.64		
	01/31/05		7.45	89.53		
	04/27/05		4.65	92.33		
	08/17/05		6.22	90.76		
	11/28/05		9.23	87.75		
	03/14/06		6.88	90.10		
	02/27/07		4.22	92.76		
	06/25/07		7.84	89.14		
	3/31//08		5.18	91.80	30.25	
	09/16/08		8.05	88.93	30.30	
	01/08/09		4.64	92.34		

Notes:

1. Top of Casing Elevations for monitoring wells MW-2 through MW-7 and PW-8 were reproduced from the previous consultant's reports. Additional well construction details are unavailable; data reported in feet.
2. Well depths for monitoring wells MW-2 through MW-7 and PW-8 measured during June 12, 2003 sampling event and remeasured during February 27, 2007 sampling event. Well depths shown above are from February 27, 2007 measurements.
3. Data not available.
4. Monitoring well MW-1R was installed as a replacement for monitoring well MW-1 on January 26, 2005.
5. Total well depths measured by ECS on 9/16/08
6. Not measured. Well did not yield enough water for field measurements or was not accessible due to site obstruction.
7. Not found.
8. Telescoping monitoring well.

TABLE 2
SUMMARY OF GROUNDWATER ANALYTICAL DATA[1]
CHEMICALS OF CONCERN
GREEN'S OIL

Well ID	Date Sampled	Benzene (µg/L)	Toluene (µg/L)	Ethyl-benzene (µg/L)	Total Xylenes (µg/L)	MTBE (µg/L)	Naph-thalene (µg/L)	Lead (µg/L)
MW-1	10/24/96	**3,040**[2]	164	325	950	**2,310**	**365**	NR[3]
	05/09/00	**1,790**	255	302	611	**1,300**	**117**	12.0
	10/09/00	**1,600**	180	220	400	**850**	**350**	<3.0[4]
	01/02/01	**500**	9.0	38	68	**460**	**55**	<3.0
	12/16/02	**3,000**	**12,000**	**3,700**	**14,000**	**920**	**1,700**	14
	06/12/03	**2,280**	**9,520**	**1,980**	**17,400**	**801**	**991**	NR
	11/22/04	**2,560**	**3,820**	**2,240**	**14,200**	**790**	**2,880**	NR
MW-1R[5]	01/31/05	**1,510**	234	268	3,790	**864**	**310**	NR
	04/27/05	**2,760**	115	376	2,550	**916**	**297**	NR
	08/17/05	**2,880**	26.6	525	1,710	**1,200**	**498**	NR
	11/28/05	**47**	3.1	39	190	**120 E**[6]	**34**	NR
	03/14/06	**24**	<1.0	4.1	2.9J[7]	**98**	5.0	NR
	02/27/07	**95.8**	5.61	28.2	31.2	**160**	**89.2**	NR
	06/25/07	**10.3**	<1.00	14.7	21.5	**52.3**	18.0	NR
	03/31/08	**359**	110	184	338	**173**	**183**	NR
	09/16/08	**11.0**	3.7	30.6	18.2	15.2	**26**	NR
	01/08/09	**14.0**	<5.0	13.4	22.4	14.6	10.2	NR
	RBSL[10]	5	1,000	700	10,000	40	25	15

TABLE 2 (Continued)
SUMMARY OF GROUNDWATER ANALYTICAL DATA[1]
CHEMICALS OF CONCERN
GREEN'S OIL

Well ID	Date Sampled	Benzene (µg/L)	Toluene (µg/L)	Ethylbenzene (µg/L)	Total Xylenes (µg/L)	MTBE (µg/L)	Naph-thalene (µg/L)	Lead (µg/L)
MW-2	10/24/96	<10.0	<10.0	<10.0	<3.0	**24,700**	<5.0	NR
	05/09/00	**5.2**	ND[8]	ND	ND	**19,900**	ND	ND
	10/09/00	**31**	5.7	<5.0	12	**11,000**	**15**	<3.0
	01/02/01	**7.2**	<5.0	<5.0	<5.0	**7,700**	<5.0	<3.0
	12/16/02	<5.0	<5.0	<5.0	7.2	**170**	12	<3.0
	06/12/03	4.0	<1.0	<1.0	<1.0	**157**	<5.00	NR
	11/22/04[9]	<1.0	<1.0	<1.0	<1.0	**54.9**	<5.00	NR
	01/31/05	<1.0	<1.0	<1.0	<1.0	**68.8**	<5.00	NR
	04/27/05	1.5	<1.0	<1.0	<1.0	**168**	<5.00	NR
	08/17/05	**12.3**	1.66	1.25	<2.0	**104**	<5.00	NR
	11/28/05	**7.5**	2.80	1.20	<3.0	**92**	<1.0	NR
	03/14/06	3.3	0.69 J	<1.0	0.79J	**92**	<1.0	NR
	02/27/07	2.22	1.21	<1.00	0.650 J	**89.7**	5.12	NR
	06/25/07	**26.8**	3.08	15.0	<3.00	**90.1**	6.60	NR
	03/31/08	<1.0	<1.0	<1.0	<3.00	33.9	<1.0	NR
	09/16/08	<1.0	<1.0	<1.0	<2.0	26.4	<1.0	NR
	01/08/09	<5.0	<5.0	<5.0	<15.0	23.7	<5.0	NR
MW-3	10/24/96	NF[11]	NF	NF	NF	NF	NF	NF
	05/09/00	NF	NF	NF	NF	NF	NF	NF
	10/09/00	NF	NF	NF	NF	NF	NF	NF
	01/02/01	NF	NF	NF	NF	NF	NF	NF
	12/12/02	**150**	**5,800**	**2,400**	**14,000**	<25	**920**	**21**
	06/12/03	4.2	135	150	1,920	2.9	**260**	NR
	11/22/04	Dry	Dry	Dry	Dry	Dry	Dry	NR
	01/31/05	Dry	Dry	Dry	Dry	Dry	Dry	NR
	04/27/05	<1.0	<1.0	<1.0	3.7	<1.0	<5.00	NR
	08/17/05	Dry	Dry	Dry	Dry	Dry	Dry	Dry
	11/28/05	Dry	Dry	Dry	Dry	Dry	Dry	Dry
	03/14/06	Dry	Dry	Dry	Dry	Dry	Dry	Dry
	02/27/07	<1.00	<1.00	<1.00	<3.00	<1.00	<1.00	NR
	06/25/07	Dry	Dry	Dry	Dry	Dry	Dry	NR
	03/31/08	<1.0	<1.0	<1.0	<3.00	**63.0**	<1.0	NR
	09/16/08	Dry	Dry	Dry	Dry	Dry	Dry	Dry
	01/08/09	<5.0	<5.0	<5.0	<15.0	29.3	<5.0	NR
	RBSL[10]	5	1,000	700	10,000	40	25	15

TABLE 2 (Continued)
SUMMARY OF GROUNDWATER ANALYTICAL DATA[1]
CHEMICALS OF CONCERN
GREEN'S OIL

Well ID	Date Sampled	Benzene (µg/L)	Toluene (µg/L)	Ethylbenzene (µg/L)	Total Xylenes (µg/L)	MTBE (µg/L)	Naph-thalene (µg/L)	Lead (µg/L)
MW-4	10/24/96	<1.0	<1.0	<1.0	<3.0	**70.4**	<5.0	NR
	05/09/00	NF	NF	NF	NF	NF	NF	NF
	10/09/00	NF	NF	NF	NF	NF	NF	NF
	01/02/01	NF	NF	NF	NF	NF	NF	NF
	12/16/02	<5.0	<5.0	<5.0	<5.0	**160**	8.5	5.8
	06/12/03	<1.0	<1.0	<1.0	<1.0	**198**	<5.00	NR
	11/22/04	NS[12]	NS	NS	NS	NS	NS	NS
	01/31/05	NS	NS	NS	NS	NS	NS	NS
	04/27/05	1.4	<1.0	<1.0	8.8	**160**	**152**	NR
	08/17/05	<1.00	<1.00	<1.00	5	**139**	**102**	NR
	11/28/05	<1.0	<1.0	<1.0	<3.0	**170**	**71**	NR
	03/14/06	NS	NS	NS	NS	NS	NS	NS
	02/27/07	1.03	<1.00	<1.00	<3.00	**96.5**	**47.8**	NR
	06/25/07	0.710 J	<1.00	<1.00	<3.00	35.7	13.0	NR
	03/31/08	<1.0	<1.0	<1.0	<3.0	**71.5**	<1.0	NR
	09/16/08	<1.0	<1.0	<1.0	<2.0	7.1	<1.0	NR
	01/08/09	<5.0	<5.0	<5.0	<15.0	12.1	<5.0	NR
MW-5	10/24/96	<1.0	<1.0	<1.0	<3.0	**1,720**	<5.0	NR
	05/09/00	ND	ND	ND	ND	**14,000**	ND	ND
	10/09/00	<5.0	<5.0	<5.0	<5.0	**9,100**	<5.0	<3.0
	01/02/01	<5.0	<5.0	<5.0	<5.0	**1,400**	<5.0	<3.0
	12/12/02	<5.0	<5.0	<5.0	<5.0	14	<5.0	14
	06/12/03	<1.0	<1.0	<1.0	<1.0	3.1	<5.00	NR
	11/22/04[13]	<1.0	<1.0	<1.0	<1.0	1.4	<5.00	NR
	01/31/05	<1.0	<1.0	<1.0	<1.0	<1.0	<5.00	NR
	04/27/05	<1.0	<1.0	<1.0	<1.0	<1.0	<5.00	NR
	08/17/05	<1.00	<1.00	<1.00	<2.00	1.23	<5.00	NR
	11/28/05	<1.0	<1.0	<1.0	<3.0	<1.0	<1.0	NR
	03/14/06	<1.0	<1.0	<1.0	<3.0	<1.0	<1.0	NR
	02/27/07	<1.00	<1.00	<1.00	<3.00	0.590 J	<1.00	NR
	06/25/07	<1.00	<1.00	<1.00	<3.00	<1.00	4.00	NR
	03/31/08	<1.0	<1.0	<1.0	<3.0	<1.0	<1.0	NR
	09/16/08	<1.0	<1.0	<1.0	<2.0	<1.0	<1.0	NR
	01/08/09	<5.0	<5.0	<5.0	<15.0	<5.0	<5.0	NR
	RBSL	5	1,000	700	10,000	40	25	15

TABLE 2 (Continued)
SUMMARY OF GROUNDWATER ANALYTICAL DATA[1]
CHEMICALS OF CONCERN
GREEN'S OIL

Well ID	Date Sampled	Benzene (µg/L)	Toluene (µg/L)	Ethylbenzene (µg/L)	Total Xylenes (µg/L)	MTBE (µg/L)	Naph-thalene (µg/L)	Lead (µg/L)
MW-6	10/24/96	NS	NS	NS	NS	NS	NS	NS
	05/09/00	ND	ND	ND	ND	ND	ND	**52.0**
	10/09/00	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	**26.0**
	01/02/01	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	NS
	12/12/02	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	**48**
	06/12/03	<1.0	<1.0	<1.0	<1.0	<1.0	<5.00	NR
	11/22/04	<1.0	<1.0	<1.0	<1.0	<1.0	<5.00	NR
	01/31/05	<1.0	<1.0	<1.0	<1.0	<1.0	<5.00	NR
	04/27/05	<1.0	<1.0	<1.0	<1.0	<1.0	<5.00	NR
	08/17/05	<1.00	<1.00	<1.00	<2.00	<1.00	<5.00	NR
	11/28/05	<1.0	<1.0	<1.0	<3.0	<1.0	<1.0	NR
	03/14/06	<1.0	<1.0	<1.0	<3.0	<1.0	<1.0	NR
	02/27/07	<1.00	<1.00	<1.00	<3.00	<1.00	<1.00	NR
	06/25/07	<1.00	<1.00	<1.00	<3.00	<1.00	<1.00	NR
	03/31/08	<1.0	<1.0	<1.0	<3.0	<1.0	<1.0	NR
	09/16/08	<1.0	<1.0	<1.0	<2.0	<1.0	<1.0	NR
	01/08/09	<5.0	<5.0	<5.0	<15.0	<5.0	<5.0	NR
MW-7	10/24/96	NF	NF	NF	NF	NF	NF	NF
	05/09/00	NF	NF	NF	NF	NF	NF	NF
	10/09/00	NF	NF	NF	NF	NF	NF	NF
	01/02/01	NF	NF	NF	NF	NF	NF	NF
	12/12/02	<5.0	<5.0	<5.0	<5.0	**160**	<5.0	**58**
	06/12/03	<1.0	<1.0	<1.0	<1.0	**294**	<5.00	NR
	11/22/04	NF	NF	NF	NF	NF	NF	NF
	01/31/05	NF	NF	NF	NF	NF	NF	NF
	04/27/05	<1.0	<1.0	<1.0	<1.0	1.3	<5.00	NR
	08/17/05	<1.00	<1.00	<1.00	<2.00	22.7	<5.00	NR
	11/28/05	<1.0	<1.0	<1.0	<3.0	**65**	<1.0	NR
	03/14/06	<1.0	<1.0	<1.0	<3.0	1.5	<1.0	NR
	02/27/07	NF	NF	NF	NF	NF	NF	NF
	06/25/07	<1.00	<1.00	<1.00	<3.00	1.96	<1.00	NR
	03/31/08	<1.0	<1.0	<1.0	<3.0	<1.0	<1.0	NR
	09/16/08	<1.0	<1.0	<1.0	<2.0	<1.0	<1.0	NR
	01/08/09	<5.0	<5.0	<5.0	<15.0	<5.0	<5.0	NR
	RBSL	5	1,000	700	10,000	40	25	15

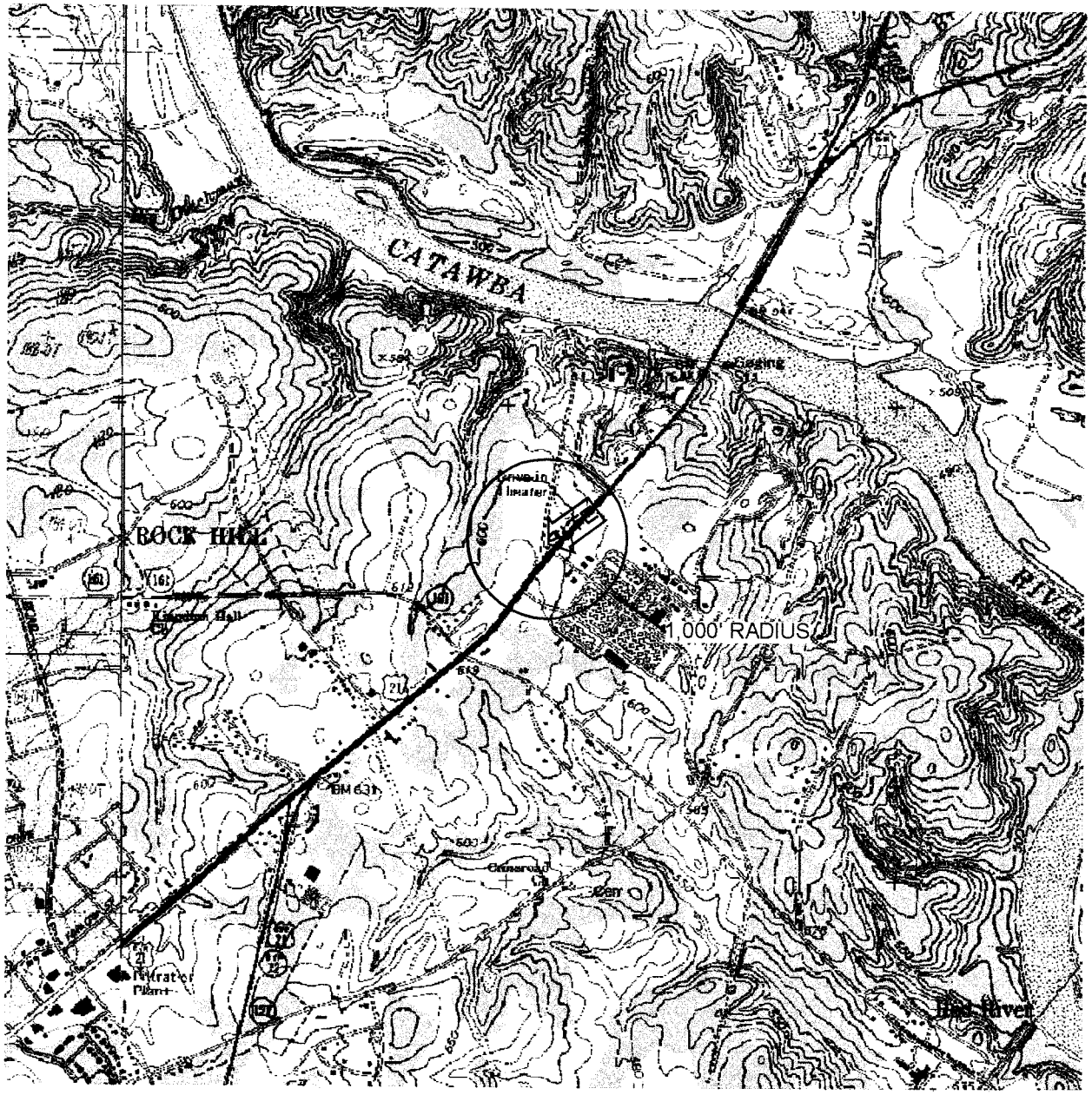
TABLE 2 (Continued)
SUMMARY OF GROUNDWATER ANALYTICAL DATA[1]
CHEMICALS OF CONCERN
GREEN'S OIL

Well ID	Date Sampled	Benzene (µg/L)	Toluene (µg/L)	Ethylbenzene (µg/L)	Total Xylenes (µg/L)	MTBE (µg/L)	Naph-thalene (µg/L)	Lead (µg/L)
PW-8	10/24/96	<1.0	<1.0	<1.0	<3.0	**547**	<5.0	NR
	05/09/00	ND	ND	ND	ND	**790**	ND	ND
	10/09/00	<5.0	<5.0	<5.0	6.1	**180**	<5.0	<3.0
	01/02/01	<5.0	<5.0	<5.0	<5.0	**160**	<5.0	<3.0
	12/12/02	<5.0	<5.0	<5.0	<5.0	**44**	<5.0	<3.0
	06/12/03	<1.0	<1.0	<1.0	<1.0	**84.6**	<5.00	NR
	11/22/04 [14]	<1.0	<1.0	<1.0	<1.0	9.7	<5.00	NR
	01/31/05	<1.0	<1.0	<1.0	<1.0	1.3	<5.00	NR
	04/27/05	<1.0	<1.0	<1.0	<1.0	6.3	<5.00	NR
	08/17/05	<1.00	<1.00	<1.00	<2.00	23.4	<5.00	NR
	11/28/05	<1.0	<1.0	<1.0	<3.0	15.0	<1.0	NR
	03/14/06	<1.0	<1.0	<1.0	<3.0	5.9	<1.0	NR
	02/27/07	<1.00	<1.00	<1.00	<3.00	4.09	<1.00	NR
	06/25/07	<1.00	<1.00	<1.00	<3.00	12.9	<1.00	NR
	03/31/08	<1.0	<1.0	<1.0	<3.0	<1.0	<1.0	NR
	09/16/08	<1.0	<1.0	<1.0	<2.0	1.4	<1.0	NR
	01/08/09	<5.0	<5.0	<5.0	<15.0	<5.0	<5.0	NR
	RBSL	5	1,000	700	10,000	40	25	15

Notes:

1. Analyses for BTEX constituents, MTBE and Naphthalene by EPA Method 8260B; groundwater qu prior to June 12, 2003 reproduced from previous consultant's reports. The data is assumed to be cor
2. Concentrations in bold face type exceeded the January 1998 Risk Based Screening Level for sample before May 2001 and exceeded the May 2001 Risk Based Screening Level for samples collected aft
3. Analysis not requested.
4. Less than the reporting limit specified in the laboratory report.
5. Monitoring well MW-1R was installed as a replacement for monitoring well MW-1.
6. Estimated concentration, calibration range exceeded.
7. Estimated concentration below the laboratory reporting limit.
8. Not Detected.
9. Other compound detected (IPE: 294 µg/L).
10. May 2001 Risk Based Screening Level.
11. Well not found.
12. Not sampled due to insufficient volume of water in the well or well was not accessible.
13. Other compound detected (IPE: 21.8 µg/L)
14. Other compound detected (IPE: 13.4 µg/L)

FIGURES



SCALE 1:24,000

1 0 1 MILE

1000 0 1000 2000 3000 4000 5000 6000 7000 FEET

QUADRANGLE LOCATION

CONTOUR INTERVAL 10 FEET

ROCK HILL EAST, SC QUADRANGLE

ecs
15004 South Point Blvd, Suite F
Charlotte, NC 28273
Phone: 704-588-6711 Fax: 704-588-6744

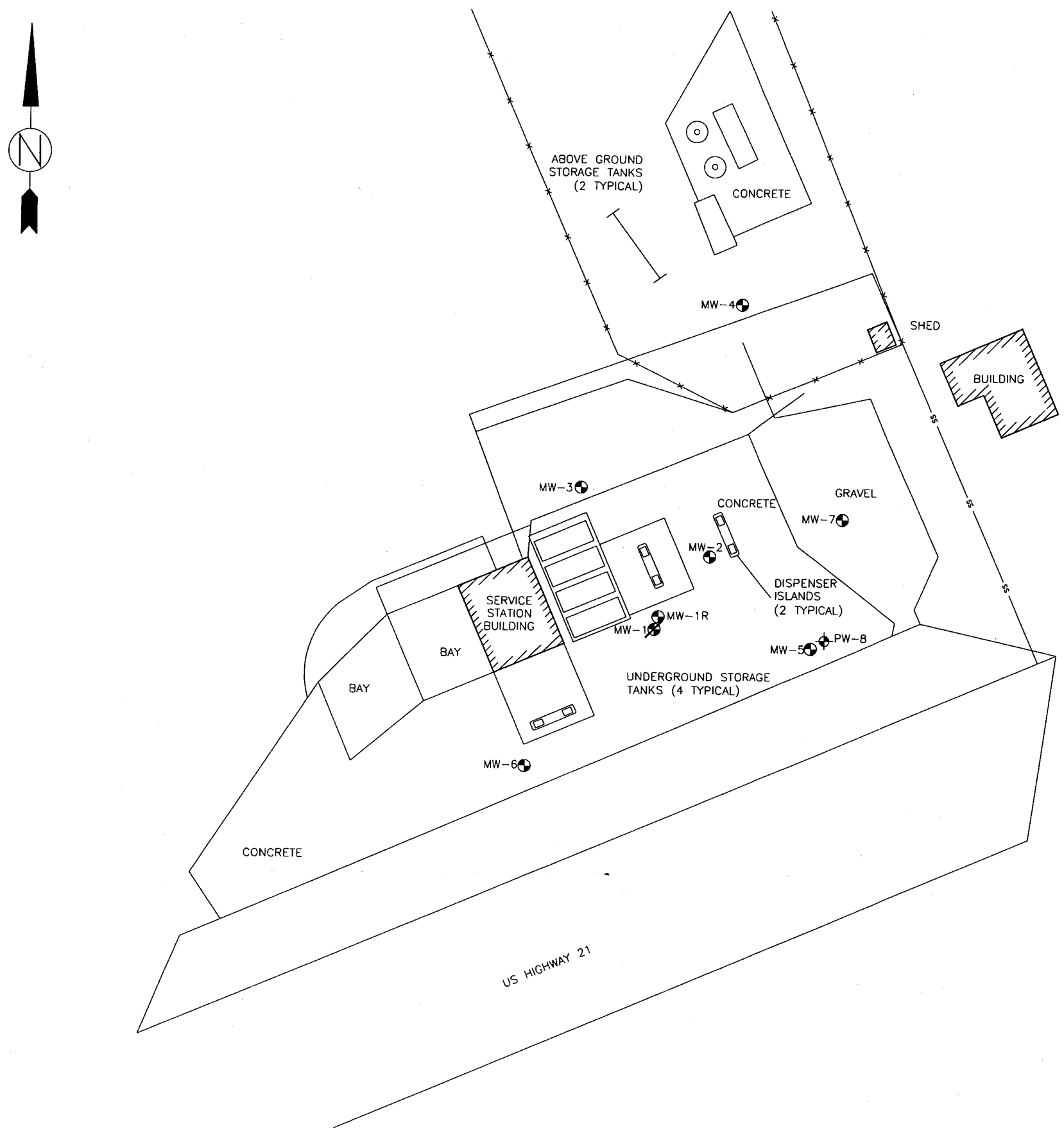
LATITUDE:	34° 58' 42" N
LONGITUDE:	80° 58' 54" W
DRAWN BY:	KB
CHECKED BY:	BD
DATE:	3/21/07

GREEN'S OIL CO.
2849 CHERRY RD.
ROCK HILL, SC

SITE I.D. NO. 09344

FIGURE 1
USGS TOPOGRAPHIC MAP

PROJECT NO. 14-811030



NOTE: FIGURE BASED ON SITE MAP BY PREVIOUS CONSULTANT.

Legend

- SS — Sanitory Sewer Line
- x — Fence
- Shallow (Water Table) Monitoring Well
- Shallow Monitoring Well (Abandoned)
- Telescoping Monitoring Well

General Notes:

All locations, dimensions, and property lines depicted on this plan are approximote. This plan should not be used for construction or land conveyance purposes.

ecs
13504 South Point Blvd, Suite F • Charlotte, NC 28273
Phone: (704)583-2711 Fax: (704)583-2744

PROJECT:
Green's Oil Company
2849 Cherry Road
Rock Hill, South Carolina

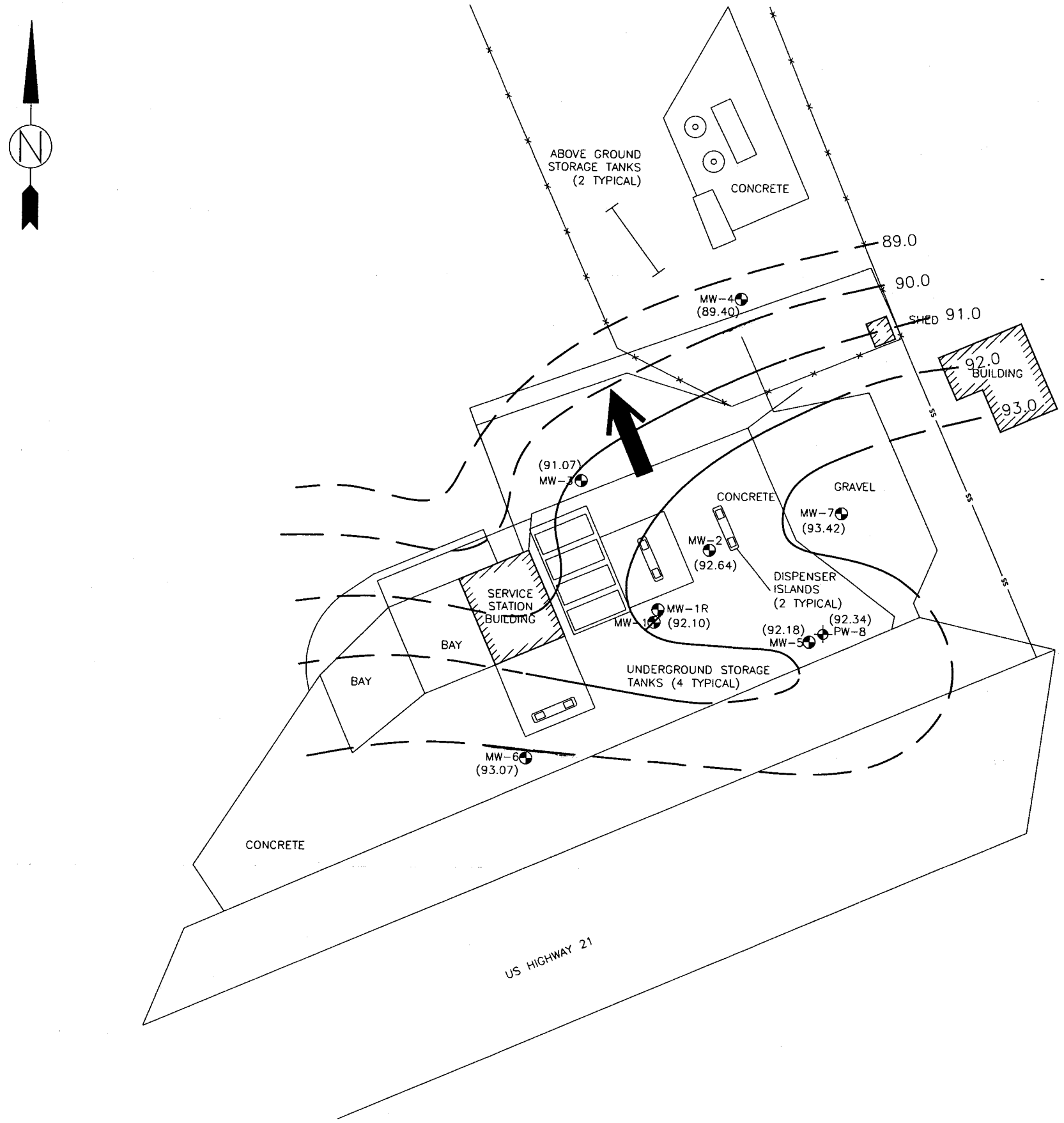
TITLE:
SITE MAP

CLIENT:
Federated Insurance

GRAPHIC SCALE: 40 20 0 20 40

COMPUTER CADFILE: C:\MyDocuments\Charlotte\811030 Green's Oil Company

DRAWN BY:	DESIGNED BY:	CHECKED BY:	APPROVED BY:
KB	KB	DS	JR
SCALE:	DATE:	JOB NO.:	FIGURE NO.:
1"=40'	1/19/09	14-811030	2



NOTE: FIGURE BASED ON SITE MAP BY PREVIOUS CONSULTANT.

Legend

- SS — Sanitary Sewer Line
- x — Fence
- Shallow (Water Toble) Monitoring Well
- Shallow Monitoring Well (Abandoned)
- Telescoping Monitoring Well
- (90.23) Groundwater Elevation
- 90.00 — Water Toble Contour (Doshed where inferred)
- (NF) Not Found
- Flow Direction Indicotor

General Notes:

All locotions, dimensions, ond property lines depicted on this plon ore opproximote. This plan should not be used for construction or land conveyonce purposes.

Horizontal, and verticol locations of wells, and selected site features determined through measurements made by representotives of ECS.

Groundwoter elevations are based on o benchmark with an assumed datum of 100.00 feet.

Water table elevations are based on measurements made on Jonuory 8, 2009.

Water toble contours, and flow directions assume homogenous, isotropic aquifer conditions, and horizontal flow.

Fluctuotions in the level of the water toble may occur due to foctors not accounted for at the time of measurement.

Water table contours are interpolated between data points, and inferred in other oreas.

Telescoping Monitoring Well not used in contouring.

*PW-8 elevation not used in developing isoelevation contours.

ecs
13504 South Point Blvd, Suite F * Charlotte, NC 28273
Phone: (704)583-2711 Fax: (704)583-2744

PROJECT:
Green's Oil Company
2849 Cherry Road
Rock Hill, South Carolina

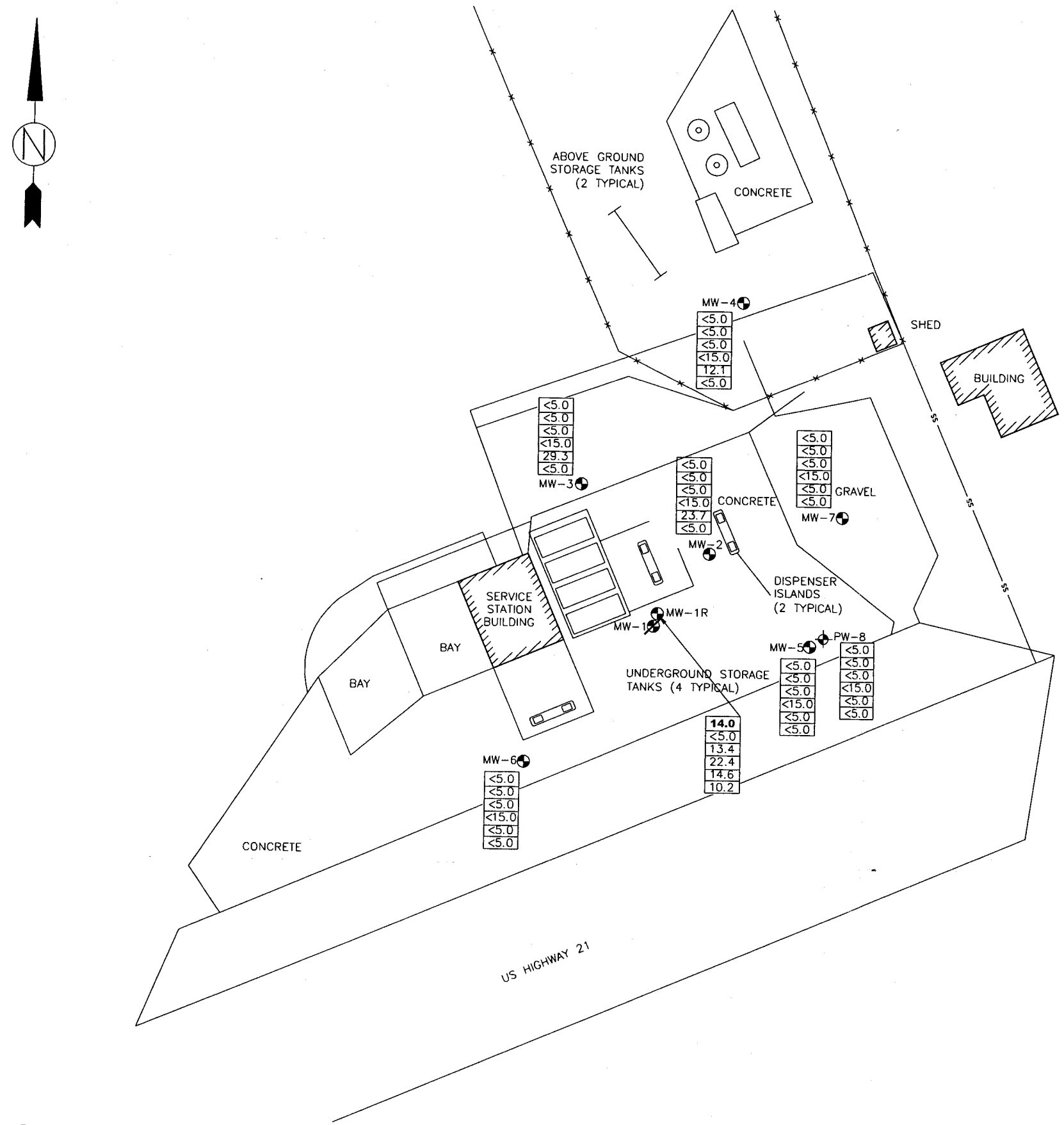
TITLE:
GROUNDWATER ELEVATION MAP 1/8/09

CLIENT:
Federated Insurance

GRAPHIC SCALE: 40 20 0 20 40

COMPUTER CADFILE :C:\MyDocuments\Charlotte\811030 Green's Oil Company

DRAWN BY:	DESIGNED BY:	CHECKED BY:	APPROVED BY:
KB	KB	DS	JR
SCALE:	DATE:	JOB NO.:	FIGURE NO.:
1"=40'	1/19/09	14-811030	3



NOTE: FIGURE BASED ON SITE MAP BY PREVIOUS CONSULTANT.

Legend

- SS — Sanitary Sewer Line
- x — Fence
- Shallow (Water Table) Monitoring Well
- Shallow Monitoring Well (Abandoned)
- Telescoping Monitoring Well

5	Benzene
1,000	Toluene
700	Ethylbenzene
10,000	Total Xylenes
40	MTBE
25	Naphthalene

All concentrations are measured in micrograms per liter (ug/L).

Above concentrations represent May 2001 Risk-Based Screening Levels; Concentrations in bold face type exceeded the RBSL.

J – Estimated Value between the method detection limit and the reporting limit.

<1.0 Less than the reporting limit specified in the laboratory report.

General Notes:

All locations, dimensions, and property lines depicted on this plan are approximate. This plan should not be used for construction ar land conveyance purposes.

ecs
13504 South Point Blvd, Suite F * Charlotte, NC 28273
Phone: (704)583-2711 Fax: (704)583-2744

PROJECT:
Green's Oil Company
2849 Cherry Road
Rock Hill, South Carolina

TITLE:
GROUNDWATER QUALITY MAP 1/8/09

CLIENT:
Federated Insurance

GRAPHIC SCALE: 40 20 0 20 40

COMPUTER CADFILE 'C:\MyDocuments\Charlotte\811030 Green's Oil Company

DRAWN BY:	DESIGNED BY:	CHECKED BY:	APPROVED BY:
KB	KB	DS	JR
SCALE:	DATE:	JOB NO.:	FIGURE NO.:
1"=40'	1/19/08	14-811030	4

APPENDIX A

GROUNDWATER SAMPLING FIELD DATA SHEETS

Activity **GW Sampling**

Environmental Compliance Services, Incorporated

FIELD ACTIVITY REPORT

Project Name: **Green's Oil**

Location: **Rock Hill, SC**

Project Number: **14-811030.01**

Date: **01/08/09** Field Staff: **B. McNeill**

Description of Activities: **Gauged all wells.**

Purged and sampled wells MW-1R, MW-2, MW-3, MW-4, MW-5, MW-6, MW-7, and PW-8

Soil Borings:

Monitoring Wells:

Sampling: **8 wells for BTEX, MTBE, and Naph.**

Aquifer Tests:

Drums on Site: **1**

Attachments	Soil:		Groundwater:	1
	Field Notes:	X	Tax Maps:	
	Site map:	X	Sampling Forms:	X
	Boring Logs:		Chain of Custody:	X
	Well Logs:		Gauge Report:	X
	Other:	WO		
	Reviewed by:			

GAUGE REPORT

Environmental Compliance Services, Inc.
13504 South Point Blvd., Unit F
Charlotte, North Carolina 28273

Project Name: Green's Oil
Project No.: 14-811030.01
Measured By: B. McNeill

Location: Rock Hill, SC
Date: 01/08/09
Weather: Partly Cloudy, 50's

Well ID	Depth to Product (feet)	Depth to Water (feet)	Product Thickness (feet)	Product Recovered (gallons)	Well Depth (feet)	Volume Purged (gallons)
MW-1R	-----	6.20	-----	-----	9.92	3.65
MW-2	-----	5.22	-----	-----	14.24	17.67
MW-3	-----	6.01	-----	-----	7.89	0.92
MW-4	-----	7.51	-----	-----	13.66	3.00
MW-5	-----	4.86	-----	-----	9.97	2.50
MW-6	-----	5.52	-----	-----	9.78	2.08
MW-7	-----	4.98	-----	-----	13.62	4.22
PW-8	-----	4.64	-----	-----	30.12	12.45

Remarks: MW-1R and MW-2 have 4-inch diameter well casings

South Carolina Department of Health and Environmental Control
Bureau of Underground Storage Tank Management

Field Data Information Sheet for Ground Water Sampling

Date(mm/dd/yy) 01/08/09
Field Personnel B. McNeill
General Weather Conditions Partly Cloudy
Ambient Air Temperature 50 F

Facility Name Green's Oil Site ID# 09344

Quality Assurance:

pH Meter	YSI 556 MPS	Conductivity Meter	YSI 556 MPS
serial no.	06H2174 AG	serial no.	
pH = 4.0		Standard	
pH = 7.0		Standard	
pH = 10.0		Standard	

Chain of Custody

B. McNeill	1/8/09 16:40	Pace	1/9/09 16:02
Relinquished by	Date/Time	Received by	Date/Time

Well # **MW-1R**

Well Diameter (D) 4.0 inch _____ or feet
conversion factor(C): 3.143*(D/2)^2
for a 2 inch well C= 0.163
for a 4 inch well C= 0.652
Total Well Depth (TWD) 9.92 ft.
Depth to GW(DGW) 6.20 ft.

Length of Water Column (LWC=TWD-DGW) 3.72 ft.

1Csg. Vol. (LWC*C)= 3.72 X 0.653 = 2.43 gal.
3Csg. Volume = 3x 2.43 = 7.29 gals.(Std. Purge Vol)

Total Vol. of Water Purged Before Sampling 3.65 gal.

	Initial	1st vol.	2nd vol.	3rd vol.	4th vol.	5th vol.	Post	Sampling
Volume Purged (gallons)	0.00	2.43						0.00
Time (military)	10:35	10:39						10:50
pH (s.u.)	7.31	6.39						6.40
O.R.P. (mV)	169.7	62.8						6.7
Temperature (°C)	15.22	17.04						16.57
Specific Cond. (umhos/cm)	252	216						217
Dissolved Oxygen (mg/L)	3.16	2.78						4.40
Turbidity	1	1						2

*Subjective (1) None (2) Faint (3) Moderate (4) Strong

Remarks Purged dry after 1.5 well volumes.
4" diameter well casing.

South Carolina Department of Health and Environmental Control
Bureau of Underground Storage Tank Management

Field Data Information Sheet for Ground Water Sampling

Date(mm/dd/yy) 01/08/09
Field Personnel B. McNeill
General Weather Conditions Partly Cloudy
Ambient Air Temperature 50 F

Facility Name Green's Oil Site ID# 09344

Quality Assurance:

pH Meter	YSI 556 MPS	Conductivity Meter	YSI 556 MPS
serial no.	06H2174 AG	serial no.	
pH = 4.0		Standard	
pH = 7.0		Standard	
pH = 10.0		Standard	

Chain of Custody

B. McNeill	1/8/09 16:40	Pace	1/9/09 16:02
Relinquished by	Date/Time	Received by	Date/Time

Well # **MW-2**

Well Diameter (D) 4.0 inch _____ or feet
conversion factor(C): 3.143*(D/2)^2
for a 2 inch well C= 0.163
for a 4 inch well C= 0.652
Total Well Depth (TWD) 14.24 ft.
Depth to GW(DGW) 5.22 ft.

Length of Water Column (LWC=TWD-DGW) 9.02 ft.

1Csg. Vol. (LWC*C)= 9.02 X 0.653 = 5.89 gal.
3Csg. Volume = 3x 5.89 = 17.67 gals.(Std. Purge Vol)

Total Vol. of Water Purged Before Sampling 17.67 gal.

	Initial	1st vol.	2nd vol.	3rd vol.	4th vol.	5th vol.	Post	Sampling
Volume Purged (gallons)	0.00	5.89	5.89	5.89				0.00
Time (military)	13:04	13:10	13:20	13:30				13:35
pH (s.u.)	6.58	6.49	6.49	6.50				6.52
O.R.P. (mV)	89.2	-0.6	29.2	-26.1				-20.4
Temperature (°C)	20.25	19.81	20.14	20.05				19.94
Specific Cond. (umhos/cm)	529	531	569	568				560
Dissolved Oxygen (mg/L)	0.68	1.67	2.25	2.34				2.47
Turbidity	1	1	1	1				1

*Subjective (1) None (2) Faint (3) Moderate (4) Strong

Remarks 4" diameter well casing.

South Carolina Department of Health and Environmental Control
Bureau of Underground Storage Tank Management

Field Data Information Sheet for Ground Water Sampling

Date(mm/dd/yy) 01/08/09
Field Personnel B. McNeill
General Weather Conditions Partly Cloudy
Ambient Air Temperature 50 F

Facility Name Green's Oil Site ID# 09344

Quality Assurance:

pH Meter YSI 556 MPS
serial no. 06H2174 AG
pH = 4.0
pH = 7.0
pH = 10.0

Conductivity Meter YSI 556 MPS
serial no.
Standard
Standard
Standard

Chain of Custody

B. McNeill	1/8/09 16:40	Pace	1/9/09 16:02
Relinquished by	Date/Time	Received by	Date/Time

Well # **MW-3**

Well Diameter (D) 2.0 inch _____ or feet
conversion factor(C): 3.143*(D/2)^2
for a 2 inch well C= 0.163
for a 4 inch well C= 0.652
Total Well Depth (TWD) 7.89 ft.
Depth to GW(DGW) 6.01 ft.

Length of Water Column (LWC=TWD-DGW) 1.88 ft.

1Csg. Vol. (LWC*C)= 1.88 X 0.163 = 0.31 gal.
3Csg. Volume = 3x 0.31 = 0.92 gals.(Std. Purge Vol)

Total Vol. of Water Purged Before Sampling 0.92 gal.

	Initial	1st vol.	2nd vol.	3rd vol.	4th vol.	5th vol.	Post	Sampling
Volume Purged (gallons)	0.00	0.31	0.31	0.31				0.00
Time (military)	14:31	14:34	14:36	14:38				14:45
pH (s.u.)	7.49	7.28	7.25	7.21				7.24
O.R.P. (mV)	98.2	123.3	121.7	120.2				125.9
Temperature (°C)	14.68	14.40	15.96	15.85				14.90
Specific Cond. (umhos/cm)	351	346	355	356				347
Dissolved Oxygen (mg/L)	7.48	7.50	6.59	7.11				7.75
Turbidity	2	2	3	3				3

*Subjective (1) None (2) Faint (3) Moderate (4) Strong

Remarks

South Carolina Department of Health and Environmental Control
Bureau of Underground Storage Tank Management

Field Data Information Sheet for Ground Water Sampling

Date(mm/dd/yy) 01/08/09
Field Personnel B. McNeill
General Weather Conditions Partly Cloudy
Ambient Air Temperature 50 F

Facility Name Green's Oil Site ID# 09344

Quality Assurance:

pH Meter YSI 556 MPS
serial no. 06H2174 AG
pH = 4.0
pH = 7.0
pH = 10.0

Conductivity Meter YSI 556 MPS
serial no.
Standard
Standard
Standard

Chain of Custody

B. McNeill	1/8/09 16:40	Pace	1/9/09 16:02
Relinquished by	Date/Time	Received by	Date/Time

Well # **MW-4**

Well Diameter (D) 2.0 inch ____ or feet
conversion factor(C): 3.143*(D/2)^2
for a 2 inch well C= 0.163
for a 4 inch well C= 0.652
Total Well Depth (TWD) 13.66 ft.
Depth to GW(DGW) 7.51 ft.

Length of Water Column (LWC=TWD-DGW) 6.15 ft.

1Csg. Vol. (LWC*C)= 6.15 X 0.163 = 1.00 gal.
3Csg. Volume = 3x 1.00 = 3.01 gals.(Std. Purge Vol)

Total Vol. of Water Purged Before Sampling 3.00 gal.

	Initial	1st vol.	2nd vol.	3rd vol.	4th vol.	5th vol.	Post	Sampling
Volume Purged (gallons)	0.00	1.00	1.00	1.00				0.00
Time (military)	14:05	14:08	14:10	14:13				14:15
pH (s.u.)	6.62	6.71	6.70	6.70				6.70
O.R.P. (mV)	-88.9	-96.3	-91.9	-84.8				-83.4
Temperature (°C)	18.55	18.63	18.89	19.38				18.74
Specific Cond. (umhos/cm)	568	574	582	588				582
Dissolved Oxygen (mg/L)	2.58	1.66	1.47	1.69				2.12
Turbidity	1	1	1	1				1

*Subjective (1) None (2) Faint (3) Moderate (4) Strong

Remarks

South Carolina Department of Health and Environmental Control
Bureau of Underground Storage Tank Management

Field Data Information Sheet for Ground Water Sampling

Date(mm/dd/yy) 01/08/09
Field Personnel B. McNeill
General Weather Conditions Partly Cloudy
Ambient Air Temperature 50 F

Facility Name Green's Oil Site ID# 09344

Quality Assurance:

pH Meter	YSI 556 MPS	Conductivity Meter	YSI 556 MPS
serial no.	06H2174 AG	serial no.	
pH = 4.0		Standard	
pH = 7.0		Standard	
pH = 10.0		Standard	

Chain of Custody

B. McNeill	1/8/09 16:40	Pace	1/9/09 16:02
Relinquished by	Date/Time	Received by	Date/Time

Well # **MW-5**

Well Diameter (D) 2.0 inch _____ or feet
conversion factor(C): 3.143*(D/2)^2
for a 2 inch well C= 0.163
for a 4 inch well C= 0.652
Total Well Depth (TWD) 9.97 ft.
Depth to GW(DGW) 4.86 ft.

Length of Water Column (LWC=TWD-DGW) 5.11 ft.

1Csg. Vol. (LWC*C)= 5.11 X 0.163 = 0.83 gal.
3Csg. Volume = 3x 0.83 = 2.50 gals.(Std. Purge Vol)

Total Vol. of Water Purged Before Sampling 2.50 gal.

	Initial	1st vol.	2nd vol.	3rd vol.	4th vol.	5th vol.	Post	Sampling
Volume Purged (gallons)	0.00	0.83	0.83	0.83				0.00
Time (military)	11:42	11:46	11:48	11:51				11:55
pH (s.u.)	7.53	7.54	7.52	7.57				7.57
O.R.P. (mV)	127.6	109.5	102.4	103.4				112.9
Temperature (°C)	18.03	19.12	19.44	19.57				19.21
Specific Cond. (umhos/cm)	255	261	260	264				260
Dissolved Oxygen (mg/L)	7.17	6.61	6.19	6.55				6.24
Turbidity	1	1	1	1				1

*Subjective (1) None (2) Faint (3) Moderate (4) Strong

Remarks

South Carolina Department of Health and Environmental Control
Bureau of Underground Storage Tank Management

Field Data Information Sheet for Ground Water Sampling

Date(mm/dd/yy) 01/08/09
Field Personnel B. McNeill
General Weather Conditions Partly Cloudy
Ambient Air Temperature 50 F

Facility Name Green's Oil Site ID# 09344

Quality Assurance:

pH Meter YSI 556 MPS
serial no. 06H2174 AG
pH = 4.0
pH = 7.0
pH = 10.0

Conductivity Meter YSI 556 MPS
serial no.
Standard
Standard
Standard

Chain of Custody

B. McNeill	1/8/09 16:40	Pace	1/9/09 16:02
Relinquished by	Date/Time	Received by	Date/Time

Well # **MW-6**

Well Diameter (D) 2.0 inch _____ or feet
conversion factor(C): 3.143*(D/2)^2
for a 2 inch well C= 0.163
for a 4 inch well C= 0.652
Total Well Depth (TWD) 9.78 ft.
Depth to GW(DGW) 5.52 ft.

Length of Water Column (LWC=TWD-DGW) 4.26 ft.

1Csg. Vol. (LWC*C)= 4.26 X 0.163 = 0.69 gal.
3Csg. Volume = 3x 0.69 = 2.08 gals.(Std. Purge Vol)

Total Vol. of Water Purged Before Sampling 2.08 gal.

	Initial	1st vol.	2nd vol.	3rd vol.	4th vol.	5th vol.	Post	Sampling
Volume Purged (gallons)	0.00	0.69	0.69	0.69				0.00
Time (military)	11:06	11:09	11:13	11:19				11:25
pH (s.u.)	6.79	6.93	6.89	6.88				6.93
O.R.P. (mV)	25.8	59.3	88.0	113.1				124.2
Temperature (°C)	18.84	18.90	19.20	18.74				17.80
Specific Cond. (umhos/cm)	680	684	697	684				661
Dissolved Oxygen (mg/L)	5.71	6.32	5.50	4.88				4.93
Turbidity	1	1	1	1				2

*Subjective (1) None (2) Faint (3) Moderate (4) Strong

Remarks

South Carolina Department of Health and Environmental Control
Bureau of Underground Storage Tank Management

Field Data Information Sheet for Ground Water Sampling

Date(mm/dd/yy) 01/08/09
Field Personnel B. McNeill
General Weather Conditions Partly Cloudy
Ambient Air Temperature 50 F

Facility Name Green's Oil Site ID# 09344

Quality Assurance:

pH Meter	YSI 556 MPS	Conductivity Meter	YSI 556 MPS
serial no.	06H2174 AG	serial no.	
pH = 4.0		Standard	
pH = 7.0		Standard	
pH = 10.0		Standard	

Chain of Custody

B. McNeill	1/8/09 16:40	Pace	1/9/09 16:02
Relinquished by	Date/Time	Received by	Date/Time

Well # **MW-7**

Well Diameter (D) 2.0 inch _____ or feet
conversion factor(C): 3.143*(D/2)^2
for a 2 inch well C= 0.163
for a 4 inch well C= 0.652
Total Well Depth (TWD) 13.62 ft.
Depth to GW(DGW) 4.98 ft.

Length of Water Column (LWC=TWD-DGW) 8.64 ft.

1Csg. Vol. (LWC*C)= 8.64 X 0.163 = 1.41 gal.
3Csg. Volume = 3x 1.41 = 4.22 gals.(Std. Purge Vol)

Total Vol. of Water Purged Before Sampling 4.22 gal.

	Initial	1st vol.	2nd vol.	3rd vol.	4th vol.	5th vol.	Post	Sampling
Volume Purged (gallons)	0.00	1.41	1.41	1.41				0.00
Time (military)	13:43	13:47	13:51	13:54				13:55
pH (s.u.)	6.82	6.83	6.82	6.81				6.83
O.R.P. (mV)	12.1	65.8	88.5	101.2				109.7
Temperature (°C)	19.65	18.80	18.97	19.12				18.74
Specific Cond. (umhos/cm)	359	340	343	362				358
Dissolved Oxygen (mg/L)	3.49	4.80	4.65	3.94				4.16
Turbidity	1	1	2	2				2

*Subjective (1) None (2) Faint (3) Moderate (4) Strong

Remarks

South Carolina Department of Health and Environmental Control
Bureau of Underground Storage Tank Management

Field Data Information Sheet for Ground Water Sampling

Date(mm/dd/yy) 01/08/09
Field Personnel B. McNeill
General Weather Conditions Partly Cloudy
Ambient Air Temperature 50 F

Facility Name Green's Oil Site ID# 09344

Quality Assurance:

pH Meter YSI 556 MPS
serial no. 06H2174 AG
pH = 4.0
pH = 7.0
pH = 10.0

Conductivity Meter YSI 556 MPS
serial no.
Standard
Standard
Standard

Chain of Custody

B. McNeill	1/8/09 16:40	Pace	1/9/09 16:02
Relinquished by	Date/Time	Received by	Date/Time

Well # **PW-8**

Well Diameter (D) 2.0 inch _____ or feet
conversion factor(C): 3.143*(D/2)^2
for a 2 inch well C= 0.163
for a 4 inch well C= 0.652
Total Well Depth (TWD) 30.12 ft.
Depth to GW(DGW) 4.64 ft.

Length of Water Column (LWC=TWD-DGW) 25.48 ft.

1Csg. Vol. (LWC*C)= 25.48 X 0.163 = 4.15 gal.
3Csg. Volume = 3x 4.15 = 12.46 gals.(Std. Purge Vol)

Total Vol. of Water Purged Before Sampling 12.45 gal.

	Initial	1st vol.	2nd vol.	3rd vol.	4th vol.	5th vol.	Post	Sampling
Volume Purged (gallons)	0.00	4.15	4.15	4.15				0.00
Time (military)	12:04	12:13	12:22	12:30				12:35
pH (s.u.)	7.32	7.04	6.89	6.92				6.88
O.R.P. (mV)	97.0	72.1	91.2	98.0				100.3
Temperature (°C)	19.98	19.96	20.49	20.61				20.18
Specific Cond. (umhos/cm)	165	226	270	278				274
Dissolved Oxygen (mg/L)	5.66	4.92	1.99	3.00				2.02
Turbidity	1	1	1	1				1

*Subjective (1) None (2) Faint (3) Moderate (4) Strong

Remarks

APPENDIX B

LABORATORY REPORT – GROUNDWATER SAMPLES – January 2009

Pace Analytical®
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Pace Analytical Services, Inc.
2225 Riverside Dr.
Asheville, NC 28804
(828)254-7176

Pace Analytical Services, Inc.
9800 Kincey Ave. Suite 100
Huntersville, NC 28078
(704)875-9092

January 15, 2009

Randal Hutchins
Environmental Compliance Services
13504 South Point Blvd
Charlotte, NC 28217

RE: Project: GREEN'S OIL
Pace Project No.: 9235806

Dear Randal Hutchins:
Enclosed are the analytical results for sample(s) received by the laboratory on January 09, 2009. The results relate only to the samples included in this report. Results reported herein conform to the most current NELAC standards, where applicable, unless otherwise narrated in the body of the report.

Inorganic Wet Chemistry and Metals analyses were performed at our Pace Asheville laboratory and Organic testing was performed at our Pace Huntersville laboratory unless otherwise footnoted. All Microbiological analyses were performed at the laboratory where the samples were received.

If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Kevin Herring

kevin.herring@pacelabs.com
Project Manager

Enclosures

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CERTIFICATIONS

Project: GREEN'S OIL
Pace Project No.: 9235806

Charlotte Certification IDs
West Virginia Certification #: 357
Virginia Certification #: 00213
Tennessee Certification #: 04010
South Carolina Drinking Water Cert. #: 990060003
South Carolina Certification #: 990060001
Pennsylvania Certification #: 68-00784
North Carolina Wastewater Certification #: 12
North Carolina Field Services Certification #: 5342
North Carolina Drinking Water Certification #: 37706
New Jersey Certification #: NC012
Louisiana/LELAP Certification #: 04034
Kentucky UST Certification #: 84
Florida/NELAP Certification #: E87627
Connecticut Certification #: PH-0104

Asheville Certification IDs
West Virginia Certification #: 356
Virginia Certification #: 00072
Tennessee Certification #: 2980
South Carolina Certification #: 99030001
South Carolina Bioassay Certification #: 99030002
Pennsylvania Certification #: 68-03578
North Carolina Wastewater Certification #: 40
North Carolina Drinking Water Certification #: 37712
North Carolina Bioassay Certification #: 9
New Jersey Certification #: NC011
Massachusetts Certification #: M-NC030
Louisiana/LELAP Certification #: 03095
Florida/NELAP Certification #: E87648
Connecticut Certification #: PH-0106

Eden Certification IDs
Virginia Drinking Water Certification #: 00424
North Carolina Wastewater Certification #: 633
North Carolina Drinking Water Certification #: 37738

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SAMPLE ANALYTE COUNT

Project: GREEN'S OIL
Pace Project No.: 9235806

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
9235806001	MW-1R	EPA 8260	MCK	11	PASI-C
9235806002	MW-2	EPA 8260	MCK	11	PASI-C
9235806003	MW-3	EPA 8260	MCK	11	PASI-C
9235806004	MW-4	EPA 8260	MCK	11	PASI-C
9235806005	MW-5	EPA 8260	MCK	11	PASI-C
9235806006	MW-6	EPA 8260	MCK	11	PASI-C
9235806007	MW-7	EPA 8260	MCK	11	PASI-C
9235806008	PW-8	EPA 8260	MCK	11	PASI-C

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ANALYTICAL RESULTS

Project: GREEN'S OIL
Pace Project No.: 9235806

Sample: MW-1R **Lab ID: 9235806001** Collected: 01/08/09 10:50 Received: 01/09/09 16:25 Matrix: Water

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
8260 MSV	Analytical Method: EPA 8260							
Benzene	**14.0**	ug/L	5.0	1		01/12/09 18:02	71-43-2	
Ethylbenzene	**13.4**	ug/L	5.0	1		01/12/09 18:02	100-41-4	
Methyl-tert-butyl ether	**14.6**	ug/L	5.0	1		01/12/09 18:02	1634-04-4	
Naphthalene	**10.2**	ug/L	5.0	1		01/12/09 18:02	91-20-3	
Toluene	ND	ug/L	5.0	1		01/12/09 18:02	108-88-3	
m&p-Xylene	**16.1**	ug/L	10.0	1		01/12/09 18:02	1330-20-7	
o-Xylene	**6.3**	ug/L	5.0	1		01/12/09 18:02	95-47-6	
4-Bromofluorobenzene (S)	101	%	87-109	1		01/12/09 18:02	460-00-4	
Dibromofluoromethane (S)	103	%	85-115	1		01/12/09 18:02	1868-53-7	
1,2-Dichloroethane-d4 (S)	100	%	79-120	1		01/12/09 18:02	17060-07-0	
Toluene-d8 (S)	99	%	70-120	1		01/12/09 18:02	2037-26-5	

Sample: MW-2 **Lab ID: 9235806002** Collected: 01/08/09 13:55 Received: 01/09/09 16:25 Matrix: Water

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
8260 MSV	Analytical Method: EPA 8260							
Benzene	ND	ug/L	5.0	1		01/12/09 18:19	71-43-2	
Ethylbenzene	ND	ug/L	5.0	1		01/12/09 18:19	100-41-4	
Methyl-tert-butyl ether	**23.7**	ug/L	5.0	1		01/12/09 18:19	1634-04-4	
Naphthalene	ND	ug/L	5.0	1		01/12/09 18:19	91-20-3	
Toluene	ND	ug/L	5.0	1		01/12/09 18:19	108-88-3	
m&p-Xylene	ND	ug/L	10.0	1		01/12/09 18:19	1330-20-7	
o-Xylene	ND	ug/L	5.0	1		01/12/09 18:19	95-47-6	
4-Bromofluorobenzene (S)	103	%	87-109	1		01/12/09 18:19	460-00-4	
Dibromofluoromethane (S)	105	%	85-115	1		01/12/09 18:19	1868-53-7	
1,2-Dichloroethane-d4 (S)	103	%	79-120	1		01/12/09 18:19	17060-07-0	
Toluene-d8 (S)	100	%	70-120	1		01/12/09 18:19	2037-26-5	

Sample: MW-3 **Lab ID: 9235806003** Collected: 01/08/09 14:25 Received: 01/09/09 16:25 Matrix: Water

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
8260 MSV	Analytical Method: EPA 8260							
Benzene	ND	ug/L	5.0	1		01/12/09 18:36	71-43-2	
Ethylbenzene	ND	ug/L	5.0	1		01/12/09 18:36	100-41-4	
Methyl-tert-butyl ether	**29.3**	ug/L	5.0	1		01/12/09 18:36	1634-04-4	
Naphthalene	ND	ug/L	5.0	1		01/12/09 18:36	91-20-3	
Toluene	ND	ug/L	5.0	1		01/12/09 18:36	108-88-3	
m&p-Xylene	ND	ug/L	10.0	1		01/12/09 18:36	1330-20-7	
o-Xylene	ND	ug/L	5.0	1		01/12/09 18:36	95-47-6	
4-Bromofluorobenzene (S)	102	%	87-109	1		01/12/09 18:36	460-00-4	
Dibromofluoromethane (S)	105	%	85-115	1		01/12/09 18:36	1868-53-7	
1,2-Dichloroethane-d4 (S)	103	%	79-120	1		01/12/09 18:36	17060-07-0	

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Huntersville, NC 28078
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ANALYTICAL RESULTS

Project: GREEN'S OIL
Pace Project No.: 9235806

Sample: MW-3 **Lab ID: 9235806003** Collected: 01/08/09 14:25 Received: 01/09/09 16:25 Matrix: Water

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
8260 MSV	Analytical Method: EPA 8260							
Toluene-d8 (S)	99	%	70-120	1		01/12/09 18:36	2037-26-5	

Sample: MW-4 **Lab ID: 9235806004** Collected: 01/08/09 14:15 Received: 01/09/09 16:25 Matrix: Water

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
8260 MSV	Analytical Method: EPA 8260							
Benzene	ND	ug/L	5.0	1		01/12/09 18:54	71-43-2	
Ethylbenzene	ND	ug/L	5.0	1		01/12/09 18:54	100-41-4	
Methyl-tert-butyl ether	**12.1**	ug/L	5.0	1		01/12/09 18:54	1634-04-4	
Naphthalene	ND	ug/L	5.0	1		01/12/09 18:54	91-20-3	
Toluene	ND	ug/L	5.0	1		01/12/09 18:54	108-88-3	
m&p-Xylene	ND	ug/L	10.0	1		01/12/09 18:54	1330-20-7	
o-Xylene	ND	ug/L	5.0	1		01/12/09 18:54	95-47-6	
4-Bromofluorobenzene (S)	103	%	87-109	1		01/12/09 18:54	460-00-4	
Dibromofluoromethane (S)	102	%	85-115	1		01/12/09 18:54	1868-53-7	
1,2-Dichloroethane-d4 (S)	100	%	79-120	1		01/12/09 18:54	17060-07-0	
Toluene-d8 (S)	99	%	70-120	1		01/12/09 18:54	2037-26-5	

Sample: MW-5 **Lab ID: 9235806005** Collected: 01/08/09 11:55 Received: 01/09/09 16:25 Matrix: Water

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
8260 MSV	Analytical Method: EPA 8260							
Benzene	ND	ug/L	5.0	1		01/12/09 19:11	71-43-2	
Ethylbenzene	ND	ug/L	5.0	1		01/12/09 19:11	100-41-4	
Methyl-tert-butyl ether	ND	ug/L	5.0	1		01/12/09 19:11	1634-04-4	
Naphthalene	ND	ug/L	5.0	1		01/12/09 19:11	91-20-3	
Toluene	ND	ug/L	5.0	1		01/12/09 19:11	108-88-3	
m&p-Xylene	ND	ug/L	10.0	1		01/12/09 19:11	1330-20-7	
o-Xylene	ND	ug/L	5.0	1		01/12/09 19:11	95-47-6	
4-Bromofluorobenzene (S)	102	%	87-109	1		01/12/09 19:11	460-00-4	
Dibromofluoromethane (S)	103	%	85-115	1		01/12/09 19:11	1868-53-7	
1,2-Dichloroethane-d4 (S)	106	%	79-120	1		01/12/09 19:11	17060-07-0	
Toluene-d8 (S)	99	%	70-120	1		01/12/09 19:11	2037-26-5	

Sample: MW-6 **Lab ID: 9235806006** Collected: 01/08/09 11:25 Received: 01/09/09 16:25 Matrix: Water

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
8260 MSV	Analytical Method: EPA 8260							
Benzene	ND	ug/L	5.0	1		01/12/09 19:28	71-43-2	
Ethylbenzene	ND	ug/L	5.0	1		01/12/09 19:28	100-41-4	

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(704)875-9092

ANALYTICAL RESULTS

Project: GREEN'S OIL
Pace Project No.: 9235806

Sample: MW-6 **Lab ID: 9235806006** Collected: 01/08/09 11:25 Received: 01/09/09 16:25 Matrix: Water

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
8260 MSV	Analytical Method: EPA 8260							
Methyl-tert-butyl ether	ND	ug/L	5.0	1		01/12/09 19:28	1634-04-4	
Naphthalene	ND	ug/L	5.0	1		01/12/09 19:28	91-20-3	
Toluene	ND	ug/L	5.0	1		01/12/09 19:28	108-88-3	
m&p-Xylene	ND	ug/L	10.0	1		01/12/09 19:28	1330-20-7	
o-Xylene	ND	ug/L	5.0	1		01/12/09 19:28	95-47-6	
4-Bromofluorobenzene (S)	102	%	87-109	1		01/12/09 19:28	460-00-4	
Dibromofluoromethane (S)	104	%	85-115	1		01/12/09 19:28	1868-53-7	
1,2-Dichloroethane-d4 (S)	102	%	79-120	1		01/12/09 19:28	17060-07-0	
Toluene-d8 (S)	100	%	70-120	1		01/12/09 19:28	2037-26-5	

Sample: MW-7 **Lab ID: 9235806007** Collected: 01/08/09 13:55 Received: 01/09/09 16:25 Matrix: Water

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
8260 MSV	Analytical Method: EPA 8260							
Benzene	ND	ug/L	5.0	1		01/12/09 19:45	71-43-2	
Ethylbenzene	ND	ug/L	5.0	1		01/12/09 19:45	100-41-4	
Methyl-tert-butyl ether	ND	ug/L	5.0	1		01/12/09 19:45	1634-04-4	
Naphthalene	ND	ug/L	5.0	1		01/12/09 19:45	91-20-3	
Toluene	ND	ug/L	5.0	1		01/12/09 19:45	108-88-3	
m&p-Xylene	ND	ug/L	10.0	1		01/12/09 19:45	1330-20-7	
o-Xylene	ND	ug/L	5.0	1		01/12/09 19:45	95-47-6	
4-Bromofluorobenzene (S)	102	%	87-109	1		01/12/09 19:45	460-00-4	
Dibromofluoromethane (S)	104	%	85-115	1		01/12/09 19:45	1868-53-7	
1,2-Dichloroethane-d4 (S)	105	%	79-120	1		01/12/09 19:45	17060-07-0	
Toluene-d8 (S)	100	%	70-120	1		01/12/09 19:45	2037-26-5	

Sample: PW-8 **Lab ID: 9235806008** Collected: 01/08/09 12:35 Received: 01/09/09 16:25 Matrix: Water

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
8260 MSV	Analytical Method: EPA 8260							
Benzene	ND	ug/L	5.0	1		01/12/09 20:03	71-43-2	
Ethylbenzene	ND	ug/L	5.0	1		01/12/09 20:03	100-41-4	
Methyl-tert-butyl ether	ND	ug/L	5.0	1		01/12/09 20:03	1634-04-4	
Naphthalene	ND	ug/L	5.0	1		01/12/09 20:03	91-20-3	
Toluene	ND	ug/L	5.0	1		01/12/09 20:03	108-88-3	
m&p-Xylene	ND	ug/L	10.0	1		01/12/09 20:03	1330-20-7	
o-Xylene	ND	ug/L	5.0	1		01/12/09 20:03	95-47-6	
4-Bromofluorobenzene (S)	102	%	87-109	1		01/12/09 20:03	460-00-4	
Dibromofluoromethane (S)	106	%	85-115	1		01/12/09 20:03	1868-53-7	
1,2-Dichloroethane-d4 (S)	104	%	79-120	1		01/12/09 20:03	17060-07-0	
Toluene-d8 (S)	100	%	70-120	1		01/12/09 20:03	2037-26-5	

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QUALITY CONTROL DATA

Project: GREEN'S OIL
Pace Project No.: 9235806

QC Batch: MSV/5836 Analysis Method: EPA 8260
QC Batch Method: EPA 8260 Analysis Description: 8260 MSV
Associated Lab Samples: 9235806001, 9235806002, 9235806003, 9235806004, 9235806005, 9235806006, 9235806007, 9235806008

METHOD BLANK: 221901 Matrix: Water
Associated Lab Samples: 9235806001, 9235806002, 9235806003, 9235806004, 9235806005, 9235806006, 9235806007, 9235806008

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Benzene	ug/L	ND	5.0	01/12/09 11:02	
Ethylbenzene	ug/L	ND	5.0	01/12/09 11:02	
m&p-Xylene	ug/L	ND	10.0	01/12/09 11:02	
Methyl-tert-butyl ether	ug/L	ND	5.0	01/12/09 11:02	
Naphthalene	ug/L	ND	5.0	01/12/09 11:02	
o-Xylene	ug/L	ND	5.0	01/12/09 11:02	
Toluene	ug/L	ND	5.0	01/12/09 11:02	
1,2-Dichloroethane-d4 (S)	%	98	79-120	01/12/09 11:02	
4-Bromofluorobenzene (S)	%	98	87-109	01/12/09 11:02	
Dibromofluoromethane (S)	%	102	85-115	01/12/09 11:02	
Toluene-d8 (S)	%	99	70-120	01/12/09 11:02	

LABORATORY CONTROL SAMPLE: 221902

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Benzene	ug/L	50	49.7	99	78-128	
Ethylbenzene	ug/L	50	48.8	98	80-127	
m&p-Xylene	ug/L	100	98.5	99	82-127	
Methyl-tert-butyl ether	ug/L	50	47.7	95	71-130	
Naphthalene	ug/L	50	63.5	127	52-136	
o-Xylene	ug/L	50	48.7	97	83-124	
Toluene	ug/L	50	48.5	97	76-126	
1,2-Dichloroethane-d4 (S)	%			98	79-120	
4-Bromofluorobenzene (S)	%			102	87-109	
Dibromofluoromethane (S)	%			98	85-115	
Toluene-d8 (S)	%			100	70-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 221903 221904

Parameter	Units	9235806008 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Qual
Benzene	ug/L	ND	50	50	43.2	56.3	86	113	74-136	26	
Toluene	ug/L	ND	50	50	42.5	55.7	85	111	73-131	27	
1,2-Dichloroethane-d4 (S)	%						99	107	79-120		
4-Bromofluorobenzene (S)	%						101	101	87-109		
Dibromofluoromethane (S)	%						103	106	85-115		
Toluene-d8 (S)	%						100	99	70-120		

REPORT OF LABORATORY ANALYSIS

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QUALIFIERS

Project: GREEN'S OIL
Pace Project No.: 9235806

DEFINITIONS

DF - Dilution Factor, if reported, represents the factor applied to the reported data due to changes in sample preparation, dilution of the sample aliquot, or moisture content.

ND - Not Detected at or above adjusted reporting limit.

J - Estimated concentration above the adjusted method detection limit and below the adjusted reporting limit.

MDL - Adjusted Method Detection Limit.

S - Surrogate

1,2-Diphenylhydrazine (8270 listed analyte) decomposes to Azobenzene.

Consistent with EPA guidelines, unrounded data are displayed and have been used to calculate % recovery and RPD values.

LCS(D) - Laboratory Control Sample (Duplicate)

MS(D) - Matrix Spike (Duplicate)

DUP - Sample Duplicate

RPD - Relative Percent Difference

NC - Not Calculable.

Pace Analytical is NELAP accredited. Contact your Pace PM for the current list of accredited analytes.

U - Indicates the compound was analyzed for, but not detected.

LABORATORIES

PASI-C Pace Analytical Services - Charlotte

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QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: GREEN'S OIL
Pace Project No.: 9235806

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
9235806001	**MW-1R**	EPA 8260	MSV/5836		
9235806002	**MW-2**	EPA 8260	MSV/5836		
9235806003	**MW-3**	EPA 8260	MSV/5836		
9235806004	**MW-4**	EPA 8260	MSV/5836		
9235806005	**MW-5**	EPA 8260	MSV/5836		
9235806006	**MW-6**	EPA 8260	MSV/5836		
9235806007	**MW-7**	EPA 8260	MSV/5836		
9235806008	**PW-8**	EPA 8260	MSV/5836		

Sample Condition Upon Receipt

Pace Analytical

Client Name: Env. Com. Project # 9235806

Courier: ☐ Fed Ex ☐ UPS ☐ USPS ☐ Client ☐ Commercial ☑ Pace Other________

Custody Seal on Cooler/Box Present: ☐ yes ☑ no Seals intact: ☐ yes ☑ no

Optional	
Proj. Due Date:	N/A
Proj. Name:	N/A

Packing Material: ☐ Bubble Wrap ☐ Bubble Bags ☐ None ☐ Other________

Thermometer Used T060 Type of Ice: (Wet) Blue None ☐ Samples on ice, cooling process has begun

Cooler Temperature 4.6 Biological Tissue is Frozen: Yes No N/A

Temp should be above freezing to 6°C

Date and Initials of person examining contents: MM 1/9

		Comments:
Chain of Custody Present:	☐Yes ☐No ☑N/A	1.
Chain of Custody Filled Out:	☐Yes ☑No ☐N/A	2.
Chain of Custody Relinquished:	☐Yes ☑No ☐N/A	3.
Sampler Name & Signature on COC:	☐Yes ☑No ☐N/A	4.
Samples Arrived within Hold Time:	☑Yes ☐No ☐N/A	5.
Short Hold Time Analysis (<72hr):	☐Yes ☑No ☐N/A	6.
Rush Turn Around Time Requested:	☐Yes ☑No ☐N/A	7.
Sufficient Volume:	☑Yes ☐No ☐N/A	8.
Correct Containers Used:	☑Yes ☐No ☐N/A	9.
-Pace Containers Used:	☑Yes ☐No ☐N/A	
Containers Intact:	☑Yes ☐No ☐N/A	10.
Filtered volume received for Dissolved tests	☐Yes ☐No ☑N/A	11.
Sample Labels match COC:	☐Yes ☑No ☐N/A	12. NO COC →
-Includes date/time/ID/Analysis Matrix: WT		
All containers needing preservation have been checked.	☑Yes ☐No ☐N/A	13.
All containers needing preservation are found to be in compliance with EPA recommendation.	☑Yes ☐No ☐N/A	
exceptions: VOA, coliform, TOC, O&G, WI-DRO (water)	☐Yes ☐No	Initial when completed
Samples checked for dechlorination:	☐Yes ☑No ☐N/A	14.
Headspace in VOA Vials (>6mm):	☐Yes ☑No ☐N/A	15.
Trip Blank Present:	☐Yes ☐No ☑N/A	16.
Trip Blank Custody Seals Present	☐Yes ☐No ☑N/A	
Pace Trip Blank Lot # (if purchased): N/A		

Client Notification/ Resolution:

Field Data Required? Y / N / N/A

Person Contacted: ____________________ Date/Time: ____________

Comments/ Resolution: ____________________

Project Manager Review: KAH 1/12/09 Date: Moore 1/9 1025

Note: Whenever there is a discrepancy affecting North Carolina compliance samples, a copy of this form will be sent to the North Carolina DEHNR Certification Office (i.e out of hold, incorrect preservative, out of temp, incorrect containers)

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CHAIN-OF-CUSTODY / Analytical Request Document

The Chain-of-Custody is a LEGAL DOCUMENT. All relevant fields must be completed accurately.

Page: 1 of

1168859

Section A Required Client Information:

Company: ECS
Address: 13504 S. Point Blvd. Charlotte, NC
Email To: dSparks@ecsconsult.com
Phone: 704-583-2711 Fax:
Requested Due Date/TAT: Standard

Section B Required Project Information:

Report To: Daniel Sparks
Copy To:
Purchase Order No.: 14-811030.01
Project Name: Green's Oil
Project Number: 14-811030.01

Section C Invoice Information:

Attention: Christina White
Company Name: ECS
Address: Agawam, Ma
Pace Quote Reference:
Pace Project Manager: Kevin Herring
Pace Profile #:

REGULATORY AGENCY

☐ NPDES ☐ GROUND WATER ☐ DRINKING WATER
☑ UST ☐ RCRA ☐ OTHER

Site Location STATE: SC

Requested Analysis Filtered (Y/N)

9235806

Section D Required Client Information

SAMPLE ID
(A-Z, 0-9 / ,-)
Sample IDs MUST BE UNIQUE

Matrix Codes (MATRIX / CODE)

Drinking Water	DW
Water	WT
Waste Water	WW
Product	P
Soil/Solid	SL
Oil	OL
Wipe	WP
Air	AR
Tissue	TS
Other	OT

ITEM #	SAMPLE ID	MATRIX CODE (see valid codes to left)	SAMPLE TYPE (G=GRAB C=COMP)	COLLECTED COMPOSITE START DATE	COLLECTED COMPOSITE START TIME	COLLECTED COMPOSITE END/GRAB DATE	COLLECTED COMPOSITE END/GRAB TIME	SAMPLE TEMP AT COLLECTION	# OF CONTAINERS	Preservatives: Unpreserved	H_2SO_4	HNO_3	HCl	NaOH	$Na_2S_2O_3$	Methanol	Other	Analysis Test Y/N	8260 BTEX MTBE	Residual Chlorine (Y/N)	Pace Project No./ Lab I.D.
1	MW-1R	WT	G			1/8	10:50		3				X					X	X		92358060 01
2	MW-2						13:35														002
3	MW-3						14:45														003
4	MW-4						14:15														004
5	MW-5						11:55														005
6	MW-6						11:25														006
7	MW-7						13:55														007
8	PW-8						12:35														008
9																					
10																					
11																					
12																					

ADDITIONAL COMMENTS	RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE		SAMPLE CONDITIONS
	Brittany Mallo / ECS	1/8	16:40	George Moody-Pace	1-9-09 16:02	16:02	

SAMPLER NAME AND SIGNATURE

Temp in °C | Received on Ice (Y/N) | Custody Cooler (Y/N) | Samples Intact (Y/N)

ORIGINAL

D H E C

PROMOTE PROTECT PROSPER

C. Earl Hunter, Commissioner

Promoting and protecting the health of the public and the environment.

JERRY GREEN
GREENS OIL CO
2457 BREEN CIRCLE
ROCK HILL SC 29732

FEB 12 2009

Re: **Conditional No Further Action**
Greens Oil Co., 2849 Cherry Rd, Rock Hill, SC
UST Permit #09344
Release Reported July 18, 1989
Groundwater Monitoring Report received February 4, 2009
York County

Dear Mr. Green:

As the owner of the underground storage tanks at the time the release was reported in 1989 and in accordance with the Underground Storage Tank Control Regulations, corrective action was completed to reduce the levels of petroleum in the subsurface to acceptable levels.

The Underground Storage Tank (UST) Program has reviewed the report submitted by ECS documenting the groundwater-sampling event. Based on data obtained from the risk-based assessment and verification monitoring, the above referenced UST release does not present a significant threat to human health or the environment. Therefore, no further action regarding this release will be required at this time. This decision is based on the following assumptions and conditions:

Assumptions and Conditions:

1) The property on which the UST release occurred and properties adjacent to the site are currently commercial/residential and are reasonably anticipated to remain commercial/residential in the future based on existing zoning ordinances.

2) Groundwater is not currently being used and is reasonably anticipated not to be used in the future within the actual or predicted area of petroleum impact. The groundwater should not be used as a source of drinking water or for irrigation within the area of petroleum impact.

3) All petroleum chemicals of concern (CoCs) associated with the referenced UST release are below the Site-Specific Target Levels (SSTL) in soil and ground water, and groundwater monitoring has verified that natural attenuation is occurring. Based on these site-specific conditions, the CoCs will not exceed Risk Based Screening Levels (RBSL) at any potential receptors and/or exposure points.

4) Land use should not change (e.g., from commercial to residential) without notifying the Bureau of the proposed use. Any site excavation activities may encounter petroleum-impacted soil that must be disposed of in a method approved by the Department.

5) If CoCs from the referenced release are detected at levels that present a risk to human health or the environment, this office, under authority established in the South Carolina UST Control Regulations (SCUSTCR) R.61-92 Part 280, may require additional site rehabilitation.

6) This correspondence does not exempt the UST system from any additional requirements (e.g., notification, operation, release detection, and closure) of the SCUSTCR, the SUPERB Act or any other non-UST activities where there may be Department involvement.

7) The Bureau will be notified within 30 days of any changes to any of the above assumptions and conditions until all petroleum constituents are at or below RBSL. If site conditions are changed without Department approval, the owner or operator will be in violation of a Department order enforceable pursuant to the 1976 Code Section 44-2-140.

The referenced release has been placed on a registry of releases in the SCDHEC Freedom of Information office. The release will remain on this registry until all petroleum CoC have attenuated by natural and biological means to the RBSL. If you choose to remove the release from the registry in the future, laboratory analysis must document that each CoC is at or below the RBSL. Samples may be collected from temporary or the existing permanent monitoring wells; however, these sampling and laboratory analytical costs will not be compensated from the SUPERB Account.

The Department intends to report this closure to the United States Environmental Protection Agency. If for any reason you disagree with this decision not to require any further environmental rehabilitation activities, please contact me in writing within thirty (30) days of the date of this letter. After this 30-day period, any significant increase in levels of petroleum chemicals of concern will be attributed to current UST operations and will be considered a new release.

The following options are offered:

Option 1: You may choose to abandon all of the monitoring wells at this time.

Option 2: You may choose to keep some or all of the wells for future monitoring in order to verify that the intrinsic remediation process has been successful in reducing all CoC concentrations below RBSL.

Please complete the attached option form and return it to my attention within 30 days from the date of this letter. Should you choose to abandon any monitoring wells, a report of abandonment is due within 60 days from the date of this letter. On all correspondence related to this facility, please reference the UST Permit #09344. Should you have any questions, please feel free to contact me at (803) 896-6397 or thomadl@dhec.sc.gov via email.

Sincerely,

Debra L. Thoma

Debra L. Thoma, Hydrogeologist
Corrective Action Section
Assessment and Corrective Action Division
Underground Storage Tank Program
Bureau of Land and Waste Management

enc: Option Form

Cc: James Rudder, ECS, 13504 South Point Blvd., Unit F, Charlotte, NC, 28273 (w/ enc.)
Technical File

ecs
WHERE BUSINESS AND THE ENVIRONMENT CONVERGE

13504 South Point Boulevard, Unit F, Charlotte, NC 28273 tel 704.583.2711 fax 704.583.2744 www.ecsconsult.com

March 2, 2009
ECS Project No. 14-811030
UST Permit No. 09344

Ms. Debra Thoma
South Carolina Department of Health
and Environmental Control
2600 Bull Street
Columbia, South Carolina 29201-1708

Re: Conditional No Further Action
Greens Oil Co.
2849 Cherry Road
Rock Hill, South Carolina 29732
York County

Dear Ms. Thoma:

Please find enclosed the Monitoring Well Option Form from the Conditional No Further Action directive dated February 12, 2009.

If you have any questions or require additional information, please contact the undersigned at (704) 583-2711, or at dsparks@ecsconsult.com.

Sincerely,
ENVIRONMENTAL COMPLIANCE SERVICES, INC.

Daniel Sparks
Project Manager

Attachment

cc: Jerry Green – Greens Oil Co., 2457 Breen Circle, Rock Hill, SC 29732

F:\Projects\11030 Greens Oil Co\2009 GW Sampling\Well Abandonment-Site Closure_Letter.doc.

Monitoring Well Option Form

UST Permit # 09344
Facility Name: Green's Oil Co.
Facility Address: 2849 Cherry Rd., Rock Hill, SC
County: York

No additional cleanup efforts are required for the July 18, 1989 UST release at the above referenced facility. Public notice is required as there are residual levels of Chemicals of Concern (CoC). Therefore, its existence is being highlighted on a registry of releases in the SCDHEC Freedom of Information office. The release will remain on this registry until all petroleum CoC have attenuated by natural and biological means to the Risk-Based Screening Level (RBSL). The following options are offered:

Option 1:
You may choose to abandon all the monitoring wells at this time.

Option 2:
You may choose to keep some or all of the wells for future monitoring in order to verify that the intrinsic remediation process has been successful in reducing all CoC concentrations below RBSL.

At this time I choose (Please mark one): ✓ Option One.

_____ Option Two. Keep Monitoring Wells

_____

(Please list wells you wish to keep by number.)

Mr. Jerry Green — 2/17/2009
Name (Please Print) — Date

[signature] — 803 366-4617
Signature — Telephone Number

Please return this form to: SCDHEC
Underground Storage Tank Program
Attention: Debra Thoma
2600 Bull Street, Columbia, SC 29201

ecs WHERE BUSINESS AND THE ENVIRONMENT CONVERGE

13504 South Point Boulevard, Unit F, Charlotte, NC 28273 tel 704.583.2711 fax 704.583.2744 www.ecsconsult.com

March 2, 2009
ECS Project No. 14-811030
UST Permit No. 09344

Ms. Debra Thoma
South Carolina Department of Health
and Environmental Control
2600 Bull Street
Columbia, South Carolina 29201-1708

Re: Disposal Manifest
Greens Oil Co.
2849 Cherry Road
Rock Hill, South Carolina 29732
York County

Dear Ms. Thoma:

Please find enclosed a copy of the Non-Hazardous Waste Disposal Manifest from the January 2009 groundwater sampling activities. We apologize for the delay in providing the manifest.

If you have any questions or require additional information, please contact the undersigned at (704) 583-2711, or at dsparks@ecsconsult.com.

Sincerely,
ENVIRONMENTAL COMPLIANCE SERVICES, INC.

Daniel Sparks
Project Manager

Attachment

cc: Jerry Green – Greens Oil Co., 2457 Breen Circle, Rock Hill, SC 29732

F:\Projects\11030Greens Oil Co\2009 GW Sampling\Disposal Manifest Letter.doc.

ease print or type. (Form designed for use on elite (12-pitch) typewriter.)

NON-HAZARDOUS WASTE MANIFEST	1. Generator ID Number: CESQG	2. Page 1 of: 11	3. Emergency Response Phone	4. Waste Tracking Number: TGT1242

Generator's Site Address (if different than mailing address)

5. Generator's Name and Mailing Address
Green's Oil Co
2849 Cherry Road
Rock Hill SC 29730
Generator's Phone: 843-549-5975

U.S. EPA ID Number: SCR000075515

6. Transporter 1 Company Name: TransGlobal Trucking

U.S. EPA ID Number:

7. Transporter 2 Company Name

U.S. EPA ID Number: SCR000075515

8. Designated Facility Name and Site Address
Global Environmental Assurance, Inc
320 Wilmington Rd
St George, SC 29477
Facility's Phone: 843-563-8916-16

9a. HM	9b. U.S. DOT Description (Including Proper Shipping Name, Hazard Class, ID Number, and Packing Group (if any))	10. Containers No.	10. Containers Type	11. Total Quantity	12. Unit Wt./Vol.	
	1. Waste Water Nonhazardous PAL1901LF	1	DM	55	G	
	2.					
	3.					
	4.					

13. Special Handling Instructions and Additional Information
9(1)Waste Water PAL1901LF 1270186865palm

14. GENERATOR'S CERTIFICATION: I certify the materials described above on this manifest are not subject to federal regulations for reporting proper disposal of Hazardous Waste.
Generator's/Offeror's Printed/Typed Name: JIM ROBERTS AGENT
Signature: Jim Roberts
Month 12 Day 18 Year 09

INTL
15. International Shipments ☐ Import to U.S. ☐ Export from U.S. Port of entry/exit:
Transporter signature (for exports only): Date leaving U.S.:

TRANSPORTER
16. Transporter Acknowledgment of Receipt of Materials
Transporter 1 Printed/Typed Name: Andy Sims
Signature
Month 12 Day 18 Year 09
Transporter 2 Printed/Typed Name
Signature
Month Day Year

DESIGNATED FACILITY
17. Discrepancy
17a. Discrepancy Indication Space ☐ Quantity ☐ Type ☐ Residue ☐ Partial Rejection ☐ Full Rejection
Manifest Reference Number:
U.S. EPA ID Number
17b. Alternate Facility (or Generator)
Facility's Phone:
Month Day Year
17c. Signature of Alternate Facility (or Generator)

Pending QC

18. Designated Facility Owner or Operator: Certification of receipt of hazardous materials covered by the manifest except as noted in Item 17a
Printed/Typed Name: Jimmy Belvin
Signature
Month 12 Day 20 Year 09

6-NHM-C-C-11

1-DESIGNATED FACILITY TO DESTINATION

ecs WHERE BUSINESS AND THE ENVIRONMENT CONVERGE

13504 South Point Boulevard, Unit F, Charlotte, NC 28273 tel 704.583.2711 fax 704.583.2744 www.ecsconsult.com

April 30, 2009
ECS Project No. 14-811030
UST Permit # 09344

Ms. Debra Thoma
South Carolina Department of Health
and Environmental Control
2600 Bull Street
Columbia, South Carolina 29201-1708

Re: Abandonment of Monitoring Wells
Green's Oil Company
2849 Cherry Road
Rock Hill, South Carolina 29732
York County

Dear Ms. Thoma:

As requested in correspondence dated February 12, 2009, this letter has been prepared to document the abandonment of the monitoring wells previously identified as MW-1R, MW-2, MW-3, MW-4, MW-5, MW-6, MW-7, PW-8 located at the above referenced site. These monitoring wells were abandoned on April 2, 2009 by Geologic Exploration. The Well Abandonment Records are attached.

If you have any questions or require additional information, please contact the undersigned at (800) 627-0493, or at dsparks@ecsconsult.com.

Sincerely,
ENVIRONMENTAL COMPLIANCE SERVICES, INC.

Daniel Sparks
Project Manager

Enclosure

cc: Jerry Green – Green's Oil Company, 2457 Breen Circle, Rock Hill, South Carolina, 29732

F:\Projects\11030 Green's Oil\2009 Site Closure\Well Abd Ltr 4-30-09.doc

D H E C
PROMOTE PROTECT PROSPER

Water Well Record
Bureau of Water
2600 Bull Street, Columbia, SC 29201-1708; (803) 898-4300

1. WELL OWNER INFORMATION:
Name: FEDERATED INSURANCE / GREENS OIL (last) (first)
Address: 2457 BRENAN CIRCLE
City: ROCK HILL State: SC Zip: 29732
Telephone: Work: Home:

2. LOCATION OF WELL: SC **COUNTY:** YORK
Name: GREENS OIL COMPANY
Street Address: 2849 CHERRY ROAD
City: ROCK HILL Zip: 29730
Latitude: Longitude:

3. PUBLIC SYSTEM NAME: **PUBLIC SYSTEM NUMBER:**

4. ABANDONMENT: ☑ Yes ☐ No
Grouted Depth: from 0.0 ft. to 11.0 ft.

Formation Description	*Thickness of Stratum	Depth to Bottom of Stratum
WELL ABANDONED BY		
GEOLOGIC EXPLORATION, INC.		
ON 04/01/09 VIA TREMIE PIPE		
WITH PORTLAND BENTONITE		
SLURRY.		
*Indicate Water Bearing Zones (Use a 2nd sheet if needed)		

5. REMARKS:
MW-1R
8.25 GALLONS PORTLAND
BENTONITE SLURRY

6. TYPE: ☐ Mud Rotary ☐ Jetted ☐ Bored ☐ Dug ☐ Air Rotary ☐ Driven ☐ Cable tool ☐ Other

7. PERMIT NUMBER:

8. USE:
☐ Residential ☐ Public Supply ☐ Process ☐ Irrigation ☐ Air Conditioning ☐ Emergency ☐ Test Well ☑ Monitor Well ☐ Replacement

9. WELL DEPTH (completed) Date Started: 04/01/09
11.0 ft. Date Completed: 04/01/09

10. CASING: ☑ Threaded ☐ Welded
Diam.: 4 INCH
Type: ☑ PVC ☐ Galvanized ☐ Steel ☐ Other
_____ in. to _____ ft. depth
_____ in. to _____ ft. depth
Height: Above ☐ Below ☐
Surface _____ ft.
Weight _____ lb./ft.
Drive Shoe? ☐ Yes ☐ No

11. SCREEN:
Type: _____ Diam.: _____
Slot/Gauge: _____ Length: _____
Set Between: _____ ft. and _____ ft.
_____ ft. and _____ ft.
NOTE: MULTIPLE SCREENS USE SECOND SHEET
Sieve Analysis ☐ Yes (please enclose) ☐ No

12. STATIC WATER LEVEL _____ ft. below land surface after 24 hours

13. PUMPING LEVEL Below Land Surface.
_____ ft. after _____ hrs. Pumping _____ G.P.M.
Pumping Test: ☐ Yes (please enclose) ☐ No
Yield: _____

14. WATER QUALITY
Chemical Analysis ☐ Yes ☐ No Bacterial Analysis ☐ Yes ☐ No
Please enclose lab results.

15. ARTIFICIAL FILTER (filter pack) ☐ Yes ☐ No
Installed from _____ ft. to _____ ft.
Effective size _____ Uniformity Coefficient _____

16. WELL GROUTED? ☐ Yes ☐ No
☐ Neat Cement ☐ Bentonite ☐ Bentonite/Cement ☐ Other _____
Depth: From _____ ft. to _____ ft.

17. NEAREST SOURCE OF POSSIBLE CONTAMINATION: ____ ft. ____ direction
Type _____
Well Disinfected ☐ Yes ☐ No Type: _____ Amount: _____

18. PUMP: Date installed: _____ Not installed ☐
Mfr. Name: _____ Model No.: _____
H.P._____ Volts_____ Length of drop pipe ___ ft. Capacity ____ gpm
TYPE: ☐ Submersible ☐ Jet (shallow) ☐ Turbine ☐ Jet (deep) ☐ Reciprocating ☐ Centrifugal

19. WELL DRILLER: VINCE FEDERLE CERT. NO.: 01930
Address: (Print) 176 COMMERCE BLVD
STATESVILLE, NC 28625
Level: A ☐ B ☐ C ☐ D ☑ (circle one)
Telephone No.: 704-872-7686 Fax No.: 704-872-0248

20. WATER WELL DRILLER'S CERTIFICATION: This well was drilled under my direction and this report is true to the best of my knowledge and belief.

Signed: Vincent R. Federle Date: 04/02/09
Well Driller

If D Level Driller, provide supervising driller's name:
MARK GETTYS

DHEC 1903 (07/2003)

COPY 1 MAIL TO: S.C. DEPARTMENT OF HEALTH AND ENVIRONMENTAL CONTROL (ADDRESS ABOVE)

D H E C
PROMOTE PROTECT PROSPER

Water Well Record
Bureau of Water
2600 Bull Street, Columbia, SC 29201-1708; (803) 898-4300

1. WELL OWNER INFORMATION:
Name: FEDERATED INSURANCE / GREENS OIL (last) (first)
Address: 2457 BRENAN CIRCLE
City: ROCK HILL State: SC Zip: 29732
Telephone: Work: Home:

2. LOCATION OF WELL: SC COUNTY: YORK
Name: GREENS OIL COMPANY
Street Address: 2849 CHERRY ROAD
City: ROCK HILL Zip: 29730
Latitude: Longitude:

3. PUBLIC SYSTEM NAME: **PUBLIC SYSTEM NUMBER:**

4. ABANDONMENT: ☑ Yes ☐ No
Grouted Depth: from 0.0 ft. to 14.0 ft.

Formation Description	*Thickness of Stratum	Depth to Bottom of Stratum
WELL ABANDONED BY		
GEOLOGIC EXPLORATION, INC.		
ON 04/01/09 VIA TREMIE PIPE		
WITH PORTLAND BENTONITE		
SLURRY.		
*Indicate Water Bearing Zones (Use a 2nd sheet if needed)		
5. REMARKS: MW-2 10.5 GALLONS PORTLAND BENTONITE SLURRY		

6. TYPE: ☐ Mud Rotary ☐ Jetted ☐ Bored ☐ Dug ☐ Air Rotary ☐ Driven ☐ Cable tool ☐ Other

7. PERMIT NUMBER:

8. USE: ☐ Residential ☐ Public Supply ☐ Process ☐ Irrigation ☐ Air Conditioning ☐ Emergency ☐ Test Well ☑ Monitor Well ☐ Replacement

9. WELL DEPTH (completed) 14.0 ft. Date Started: 04/01/09 Date Completed: 04/01/09

10. CASING: ☑ Threaded ☐ Welded
Diam.: 4 INCH
Type: ☑ PVC ☐ Galvanized ☐ Steel ☐ Other
_____ in. to _____ ft. depth
_____ in. to _____ ft. depth
Height: Above ☐ Below ☐
Surface _____ ft.
Weight _____ lb./ft.
Drive Shoe? ☐ Yes ☐ No

11. SCREEN:
Type: _____ Diam.: _____
Slot/Gauge: _____ Length: _____
Set Between: _____ ft. and _____ ft.
_____ ft. and _____ ft.
NOTE: MULTIPLE SCREENS USE SECOND SHEET
Sieve Analysis ☐ Yes (please enclose) ☐ No

12. STATIC WATER LEVEL _____ ft. below land surface after 24 hours

13. PUMPING LEVEL Below Land Surface.
_____ ft. after _____ hrs. Pumping _____ G.P.M.
Pumping Test: ☐ Yes (please enclose) ☐ No
Yield: _____

14. WATER QUALITY
Chemical Analysis ☐ Yes ☐ No Bacterial Analysis ☐ Yes ☐ No
Please enclose lab results.

15. ARTIFICIAL FILTER (filter pack) ☐ Yes ☐ No
Installed from _____ ft. to _____ ft.
Effective size _____ Uniformity Coefficient _____

16. WELL GROUTED? ☐ Yes ☐ No
☐ Neat Cement ☐ Bentonite ☐ Bentonite/Cement ☐ Other _____
Depth: From _____ ft. to _____ ft.

17. NEAREST SOURCE OF POSSIBLE CONTAMINATION: _____ ft. _____ direction
Type _____
Well Disinfected ☐ Yes ☐ No Type: _____ Amount: _____

18. PUMP: Date installed: _____ Not installed ☐
Mfr. Name: _____ Model No.: _____
H.P._____ Volts_____ Length of drop pipe ___ ft. Capacity ____ gpm
TYPE: ☐ Submersible ☐ Jet (shallow) ☐ Turbine ☐ Jet (deep) ☐ Reciprocating ☐ Centrifugal

19. WELL DRILLER: VINCE FEDERLE CERT. NO.: 01930
Address: (Print) 176 COMMERCE BLVD
STATESVILLE, NC 28625
Level: A ☐ B ☐ C ☐ D ☑ (circle one)
Telephone No.: 704-872-7686 Fax No.: 704-872-0248

20. WATER WELL DRILLER'S CERTIFICATION: This well was drilled under my direction and this report is true to the best of my knowledge and belief.

Signed: Vincent R. Federle Well Driller Date: 04/02/09

If D Level Driller, provide supervising driller's name:
MARK GETTYS

DHEC 1903 (07/2003)

COPY 1 MAIL TO: S.C. DEPARTMENT OF HEALTH AND ENVIRONMENTAL CONTROL (ADDRESS ABOVE)

D H E C
PROMOTE PROTECT PROSPER

Water Well Record
Bureau of Water
2600 Bull Street, Columbia, SC 29201-1708; (803) 898-4300

1. WELL OWNER INFORMATION:
Name: FEDERATED INSURANCE / GREENS OIL (last) (first)
Address: 2457 BRENAN CIRCLE
City: ROCK HILL State: SC Zip: 29732
Telephone: Work: Home:

2. LOCATION OF WELL: SC **COUNTY:** YORK
Name: GREENS OIL COMPANY
Street Address: 2849 CHERRY ROAD
City: ROCK HILL Zip: 29730
Latitude: Longitude:

3. PUBLIC SYSTEM NAME: **PUBLIC SYSTEM NUMBER:**

4. ABANDONMENT: ☑ Yes ☐ No
Grouted Depth: from 0.0 ft. to 8.0 ft.

Formation Description	*Thickness of Stratum	Depth to Bottom of Stratum
WELL ABANDONED BY		
GEOLOGIC EXPLORATION, INC.		
ON 04/01/09 VIA TREMIE PIPE		
WITH PORTLAND BENTONITE		
SLURRY.		
*Indicate Water Bearing Zones (Use a 2nd sheet if needed)		

5. REMARKS:
MW-3
1.25 GALLONS PORTLAND
BENTONITE SLURRY

6. TYPE: ☐ Mud Rotary ☐ Jetted ☐ Bored ☐ Dug ☐ Air Rotary ☐ Driven ☐ Cable tool ☐ Other

7. PERMIT NUMBER:

8. USE: ☐ Residential ☐ Public Supply ☐ Process ☐ Irrigation ☐ Air Conditioning ☐ Emergency ☐ Test Well ☑ Monitor Well ☐ Replacement

9. WELL DEPTH (completed) Date Started: 04/01/09
8.0 ft. Date Completed: 04/01/09

10. CASING: ☑ Threaded ☐ Welded
Diam.: 2 INCH
Type: ☑ PVC ☐ Galvanized ☐ Steel ☐ Other
_____ in. to _____ ft. depth
_____ in. to _____ ft. depth
Height: Above ☐ Below ☐
Surface _____ ft.
Weight _____ lb./ft.
Drive Shoe? ☐ Yes ☐ No

11. SCREEN:
Type: _____ Diam.: _____
Slot/Gauge: _____ Length: _____
Set Between: _____ ft. and _____ ft.
_____ ft. and _____ ft.
NOTE: MULTIPLE SCREENS USE SECOND SHEET
Sieve Analysis ☐ Yes (please enclose) ☐ No

12. STATIC WATER LEVEL _____ ft. below land surface after 24 hours

13. PUMPING LEVEL Below Land Surface.
_____ ft. after _____ hrs. Pumping _____ G.P.M.
Pumping Test: ☐ Yes (please enclose) ☐ No
Yield: _____

14. WATER QUALITY
Chemical Analysis ☐ Yes ☐ No Bacterial Analysis ☐ Yes ☐ No
Please enclose lab results.

15. ARTIFICIAL FILTER (filter pack) ☐ Yes ☐ No
Installed from _____ ft. to _____ ft.
Effective size _____ Uniformity Coefficient _____

16. WELL GROUTED? ☐ Yes ☐ No
☐ Neat Cement ☐ Bentonite ☐ Bentonite/Cement ☐ Other _____
Depth: From _____ ft. to _____ ft.

17. NEAREST SOURCE OF POSSIBLE CONTAMINATION: _____ ft. _____ direction
Type _____
Well Disinfected ☐ Yes ☐ No Type: _____ Amount: _____

18. PUMP: Date installed: _____ Not installed ☐
Mfr. Name: _____ Model No.: _____
H.P._____ Volts_____ Length of drop pipe ___ ft. Capacity ___ gpm
TYPE: ☐ Submersible ☐ Jet (shallow) ☐ Turbine ☐ Jet (deep) ☐ Reciprocating ☐ Centrifugal

19. WELL DRILLER: VINCE FEDERLE **CERT. NO.:** 01930
Address: (Print) 176 COMMERCE BLVD
STATESVILLE, NC 28625
Level: A ☐ B ☐ C ☐ D ☑ (circle one)
Telephone No.: 704-872-7686 Fax No.: 704-872-0248

20. WATER WELL DRILLER'S CERTIFICATION: This well was drilled under my direction and this report is true to the best of my knowledge and belief.

Signed: Vincent R. Federle Well Driller Date: 04/02/09

If D Level Driller, provide supervising driller's name:
MARK GETTYS

DHEC 1903 (07/2003)

COPY 1 MAIL TO: S.C. DEPARTMENT OF HEALTH AND ENVIRONMENTAL CONTROL (ADDRESS ABOVE)

Water Well Record
Bureau of Water
2600 Bull Street, Columbia, SC 29201-1708; (803) 898-4300

DHEC — PROMOTE PROTECT PROSPER

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Name: FEDERATED INSURANCE / GREENS OIL (last) (first)
Address: 2457 BRENAN CIRCLE
City: ROCK HILL State: SC Zip: 29732
Telephone: Work: Home:

2. LOCATION OF WELL: SC **COUNTY:** YORK
Name: GREENS OIL COMPANY
Street Address: 2849 CHERRY ROAD
City: ROCK HILL Zip: 29730
Latitude: Longitude:

3. PUBLIC SYSTEM NAME: **PUBLIC SYSTEM NUMBER:**

4. ABANDONMENT: ☑ Yes ☐ No
Grouted Depth: from 0.0 ft. to 14.0 ft.

Formation Description	*Thickness of Stratum	Depth to Bottom of Stratum
WELL ABANDONED BY		
GEOLOGIC EXPLORATION, INC.		
ON 04/01/09 VIA TREMIE PIPE		
WITH PORTLAND BENTONITE		
SLURRY.		
*Indicate Water Bearing Zones (Use a 2nd sheet if needed)		

5. REMARKS:
MW-4
2.5 GALLONS PORTLAND
BENTONITE SLURRY

6. TYPE: ☐ Mud Rotary ☐ Jetted ☐ Bored ☐ Dug ☐ Air Rotary ☐ Driven ☐ Cable tool ☐ Other

7. PERMIT NUMBER:

8. USE: ☐ Residential ☐ Public Supply ☐ Process ☐ Irrigation ☐ Air Conditioning ☐ Emergency ☐ Test Well ☑ Monitor Well ☐ Replacement

9. WELL DEPTH (completed) 14.0 ft. Date Started: 04/01/09 Date Completed: 04/01/09

10. CASING: ☑ Threaded ☐ Welded
Diam.: 2 INCH
Type: ☑ PVC ☐ Galvanized ☐ Steel ☐ Other
_____ in. to _____ ft. depth
_____ in. to _____ ft. depth
Height: Above ☐ Below ☐
Surface _____ ft.
Weight _____ lb./ft.
Drive Shoe? ☐ Yes ☐ No

11. SCREEN:
Type: _____ Diam.: _____
Slot/Gauge: _____ Length: _____
Set Between: _____ ft. and _____ ft.
_____ ft. and _____ ft.
NOTE: MULTIPLE SCREENS USE SECOND SHEET
Sieve Analysis ☐ Yes (please enclose) ☐ No

12. STATIC WATER LEVEL _____ ft. below land surface after 24 hours

13. PUMPING LEVEL Below Land Surface.
_____ ft. after _____ hrs. Pumping _____ G.P.M.
Pumping Test: ☐ Yes (please enclose) ☐ No
Yield: _____

14. WATER QUALITY
Chemical Analysis ☐ Yes ☐ No Bacterial Analysis ☐ Yes ☐ No
Please enclose lab results.

15. ARTIFICIAL FILTER (filter pack) ☐ Yes ☐ No
Installed from _____ ft. to _____ ft.
Effective size _____ Uniformity Coefficient _____

16. WELL GROUTED? ☐ Yes ☐ No
☐ Neat Cement ☐ Bentonite ☐ Bentonite/Cement ☐ Other _____
Depth: From _____ ft. to _____ ft.

17. NEAREST SOURCE OF POSSIBLE CONTAMINATION: _____ ft. _____ direction
Type _____
Well Disinfected ☐ Yes ☐ No Type: _____ Amount: _____

18. PUMP: Date installed: _____ Not installed ☐
Mfr. Name: _____ Model No.: _____
H.P._____ Volts_____ Length of drop pipe ___ ft. Capacity ___ gpm
TYPE: ☐ Submersible ☐ Jet (shallow) ☐ Turbine ☐ Jet (deep) ☐ Reciprocating ☐ Centrifugal

19. WELL DRILLER: VINCE FEDERLE CERT. NO.: 01930
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Telephone No.: 704-872-7686 Fax No.: 704-872-0248

20. WATER WELL DRILLER'S CERTIFICATION: This well was drilled under my direction and this report is true to the best of my knowledge and belief.

Signed: Vincent R. Federle Well Driller Date: 04/02/09

If D Level Driller, provide supervising driller's name:
MARK GETTYS

DHEC 1903 (07/2003)

COPY 1 MAIL TO: S.C. DEPARTMENT OF HEALTH AND ENVIRONMENTAL CONTROL (ADDRESS ABOVE)

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Telephone: Work: Home:

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Name: GREENS OIL COMPANY
Street Address: 2849 CHERRY ROAD
City: ROCK HILL Zip: 29730
Latitude: Longitude:

3. PUBLIC SYSTEM NAME: **PUBLIC SYSTEM NUMBER:**

4. ABANDONMENT: ☑ Yes ☐ No
Grouted Depth: from 0.0 ft. to 11.0 ft.

Formation Description	*Thickness of Stratum	Depth to Bottom of Stratum
WELL ABANDONED BY		
GEOLOGIC EXPLORATION, INC.		
ON 04/01/09 VIA TREMIE PIPE		
WITH PORTLAND BENTONITE		
SLURRY.		
*Indicate Water Bearing Zones (Use a 2nd sheet if needed)		

5. REMARKS:
MW-5
2.0 GALLONS PORTLAND
BENTONITE SLURRY

6. TYPE: ☐ Mud Rotary ☐ Jetted ☐ Bored ☐ Dug ☐ Air Rotary ☐ Driven ☐ Cable tool ☐ Other

7. PERMIT NUMBER:

8. USE: ☐ Residential ☐ Public Supply ☐ Process ☐ Irrigation ☐ Air Conditioning ☐ Emergency ☐ Test Well ☑ Monitor Well ☐ Replacement

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Type: ☑ PVC ☐ Galvanized ☐ Steel ☐ Other
_____ in. to _____ ft. depth
_____ in. to _____ ft. depth
Height: Above ☐ Below ☐
Surface _____ ft.
Weight _____ lb./ft.
Drive Shoe? ☐ Yes ☐ No

11. SCREEN:
Type: _____ Diam.: _____
Slot/Gauge: _____ Length: _____
Set Between: _____ ft. and _____ ft.
_____ ft. and _____ ft.
NOTE: MULTIPLE SCREENS USE SECOND SHEET
Sieve Analysis ☐ Yes (please enclose) ☐ No

12. STATIC WATER LEVEL _____ ft. below land surface after 24 hours

13. PUMPING LEVEL Below Land Surface.
_____ ft. after _____ hrs. Pumping _____ G.P.M.
Pumping Test: ☐ Yes (please enclose) ☐ No
Yield: _____

14. WATER QUALITY
Chemical Analysis ☐ Yes ☐ No Bacterial Analysis ☐ Yes ☐ No
Please enclose lab results.

15. ARTIFICIAL FILTER (filter pack) ☐ Yes ☐ No
Installed from _____ ft. to _____ ft.
Effective size _____ Uniformly Coefficient _____

16. WELL GROUTED? ☐ Yes ☐ No
☐ Neat Cement ☐ Bentonite ☐ Bentonite/Cement ☐ Other _____
Depth: From _____ ft. to _____ ft.

17. NEAREST SOURCE OF POSSIBLE CONTAMINATION: _____ ft. _____ direction
Type _____
Well Disinfected ☐ Yes ☐ No Type: _____ Amount: _____

18. PUMP: Date installed: _____ Not installed ☐
Mfr. Name: _____ Model No.: _____
H.P._____ Volts_____ Length of drop pipe ___ ft. Capacity ____ gpm
TYPE: ☐ Submersible ☐ Jet (shallow) ☐ Turbine ☐ Jet (deep) ☐ Reciprocating ☐ Centrifugal

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Signed: Vincent R. Federle Well Driller Date: 04/02/09

If D Level Driller, provide supervising driller's name:
MARK GETTYS

DHEC 1903 (07/2003)

COPY 1 MAIL TO: S.C. DEPARTMENT OF HEALTH AND ENVIRONMENTAL CONTROL (ADDRESS ABOVE)

D H E C
PROMOTE PROTECT PROSPER

Water Well Record
Bureau of Water
2600 Bull Street, Columbia, SC 29201-1708; (803) 898-4300

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Name: FEDERATED INSURANCE / GREENS OIL (last) (first)
Address: 2457 BRENAN CIRCLE
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Telephone: Work: Home:

2. LOCATION OF WELL: SC **COUNTY:** YORK
Name: GREENS OIL COMPANY
Street Address: 2849 CHERRY ROAD
City: ROCK HILL Zip: 29730
Latitude: Longitude:

3. PUBLIC SYSTEM NAME: **PUBLIC SYSTEM NUMBER:**

4. ABANDONMENT: ☑ Yes ☐ No
Grouted Depth: from 0.0 ft. to 11.0 ft.

Formation Description	*Thickness of Stratum	Depth to Bottom of Stratum
WELL ABANDONED BY		
GEOLOGIC EXPLORATION, INC.		
ON 04/01/09 VIA TREMIE PIPE		
WITH PORTLAND BENTONITE		
SLURRY.		
*Indicate Water Bearing Zones (Use a 2nd sheet if needed)		

5. REMARKS:
MW-6
2.0 GALLONS PORTLAND
BENTONITE SLURRY

6. TYPE: ☐ Mud Rotary ☐ Jetted ☐ Bored ☐ Dug ☐ Air Rotary ☐ Driven ☐ Cable tool ☐ Other

7. PERMIT NUMBER:

8. USE:
☐ Residential ☐ Public Supply ☐ Process
☐ Irrigation ☐ Air Conditioning ☐ Emergency
☐ Test Well ☑ Monitor Well ☐ Replacement

9. WELL DEPTH (completed) Date Started: 04/01/09
11.0 ft. Date Completed: 04/01/09

10. CASING: ☑ Threaded ☐ Welded
Diam.: 2 INCH
Type: ☑ PVC ☐ Galvanized ☐ Steel ☐ Other
_____ in. to _____ ft. depth
_____ in. to _____ ft. depth
Height: Above ☐ Below ☐
Surface _____ ft.
Weight _____ lb./ft.
Drive Shoe? ☐ Yes ☐ No

11. SCREEN:
Type: _____ Diam.: _____
Slot/Gauge: _____ Length: _____
Set Between: _____ ft. and _____ ft.
_____ ft. and _____ ft.
NOTE: MULTIPLE SCREENS USE SECOND SHEET
Sieve Analysis ☐ Yes (please enclose) ☐ No

12. STATIC WATER LEVEL _____ ft. below land surface after 24 hours

13. PUMPING LEVEL Below Land Surface.
_____ ft. after _____ hrs. Pumping _____ G.P.M.
Pumping Test: ☐ Yes (please enclose) ☐ No
Yield: _____

14. WATER QUALITY
Chemical Analysis ☐ Yes ☐ No Bacterial Analysis ☐ Yes ☐ No
Please enclose lab results.

15. ARTIFICIAL FILTER (filter pack) ☐ Yes ☐ No
Installed from _____ ft. to _____ ft.
Effective size _____ Uniformity Coefficient _____

16. WELL GROUTED? ☐ Yes ☐ No
☐ Neat Cement ☐ Bentonite ☐ Bentonite/Cement ☐ Other _____
Depth: From _____ ft. to _____ ft.

17. NEAREST SOURCE OF POSSIBLE CONTAMINATION: ____ ft. ____ direction
Type _____
Well Disinfected ☐ Yes ☐ No Type: _____ Amount: _____

18. PUMP: Date installed: _____ Not installed ☐
Mfr. Name: _____ Model No.: _____
H.P. _____ Volts _____ Length of drop pipe ___ ft. Capacity ____ gpm
TYPE: ☐ Submersible ☐ Jet (shallow) ☐ Turbine ☐ Jet (deep) ☐ Reciprocating ☐ Centrifugal

19. WELL DRILLER: VINCE FEDERLE CERT. NO.: 01930
Address: (Print) 176 COMMERCE BLVD
STATESVILLE, NC 28625
Level: A ☐ B ☐ C ☐ D ☑ (circle one)
Telephone No.: 704-872-7686 Fax No.: 704-872-0248

20. WATER WELL DRILLER'S CERTIFICATION: This well was drilled under my direction and this report is true to the best of my knowledge and belief.

Signed: Vincent R. Federle Date: 04/02/09
Well Driller

If D Level Driller, provide supervising driller's name:
MARK GETTYS

DHEC 1903 (07/2003)

COPY 1 MAIL TO: S.C. DEPARTMENT OF HEALTH AND ENVIRONMENTAL CONTROL (ADDRESS ABOVE)

D H E C
PROMOTE PROTECT PROSPER

Water Well Record
Bureau of Water
2600 Bull Street, Columbia, SC 29201-1708; (803) 898-4300

1. WELL OWNER INFORMATION:
Name: FEDERATED INSURANCE / GREENS OIL (last) (first)
Address: 2457 BRENAN CIRCLE
City: ROCK HILL State: SC Zip: 29732
Telephone: Work: Home:

2. LOCATION OF WELL: SC COUNTY: YORK
Name: GREENS OIL COMPANY
Street Address: 2849 CHERRY ROAD
City: ROCK HILL Zip: 29730
Latitude: Longitude:

3. PUBLIC SYSTEM NAME: PUBLIC SYSTEM NUMBER:

4. ABANDONMENT: ☑ Yes ☐ No
Grouted Depth: from 0.0 ft. to 14.0 ft.

Formation Description	*Thickness of Stratum	Depth to Bottom of Stratum
WELL ABANDONED BY		
GEOLOGIC EXPLORATION, INC.		
ON 04/01/09 VIA TREMIE PIPE		
WITH PORTLAND BENTONITE		
SLURRY.		
*Indicate Water Bearing Zones (Use a 2nd sheet if needed)		

5. REMARKS:
MW-7
2.5 GALLONS PORTLAND BENTONITE SLURRY

6. TYPE: ☐ Mud Rotary ☐ Jetted ☐ Bored ☐ Dug ☐ Air Rotary ☐ Driven ☐ Cable tool ☐ Other

7. PERMIT NUMBER:

8. USE: ☐ Residential ☐ Public Supply ☐ Process ☐ Irrigation ☐ Air Conditioning ☐ Emergency ☐ Test Well ☑ Monitor Well ☐ Replacement

9. WELL DEPTH (completed) 14.0 ft. Date Started: 04/01/09 Date Completed: 04/01/09

10. CASING: ☑ Threaded ☐ Welded
Diam.: 2 INCH
Type: ☑ PVC ☐ Galvanized ☐ Steel ☐ Other
_____ in. to _____ ft. depth
_____ in. to _____ ft. depth
Height: Above ☐ Below ☐
Surface _____ ft.
Weight _____ lb./ft.
Drive Shoe? ☐ Yes ☐ No

11. SCREEN:
Type: _____ Diam.: _____
Slot/Gauge: _____ Length: _____
Set Between: _____ ft. and _____ ft.
_____ ft. and _____ ft.
NOTE: MULTIPLE SCREENS USE SECOND SHEET
Sieve Analysis ☐ Yes (please enclose) ☐ No

12. STATIC WATER LEVEL _____ ft. below land surface after 24 hours

13. PUMPING LEVEL Below Land Surface.
_____ ft. after _____ hrs. Pumping _____ G.P.M.
Pumping Test: ☐ Yes (please enclose) ☐ No
Yield: _____

14. WATER QUALITY
Chemical Analysis ☐ Yes ☐ No Bacterial Analysis ☐ Yes ☐ No
Please enclose lab results.

15. ARTIFICIAL FILTER (filter pack) ☐ Yes ☐ No
Installed from _____ ft. to _____ ft.
Effective size _____ Uniformity Coefficient _____

16. WELL GROUTED? ☐ Yes ☐ No
☐ Neat Cement ☐ Bentonite ☐ Bentonite/Cement ☐ Other _____
Depth: From _____ ft. to _____ ft.

17. NEAREST SOURCE OF POSSIBLE CONTAMINATION: _____ ft. _____ direction
Type _____
Well Disinfected ☐ Yes ☐ No Type: _____ Amount: _____

18. PUMP: Date installed: _____ Not installed ☐
Mfr. Name: _____ Model No.: _____
H.P._____ Volts_____ Length of drop pipe ___ ft. Capacity ____ gpm
TYPE: ☐ Submersible ☐ Jet (shallow) ☐ Turbine ☐ Jet (deep) ☐ Reciprocating ☐ Centrifugal

19. WELL DRILLER: VINCE FEDERLE CERT. NO.: 01930
Address: (Print) 176 COMMERCE BLVD
STATESVILLE, NC 28625
Level: A ☐ B ☐ C ☐ D ☑ (circle one)
Telephone No.: 704-872-7686 Fax No.: 704-872-0248

20. WATER WELL DRILLER'S CERTIFICATION: This well was drilled under my direction and this report is true to the best of my knowledge and belief.

Signed: Vincent R. Federle Well Driller Date: 04/02/09

If D Level Driller, provide supervising driller's name:
MARK GETTYS

DHEC 1903 (07/2003)

COPY 1 MAIL TO: S.C. DEPARTMENT OF HEALTH AND ENVIRONMENTAL CONTROL (ADDRESS ABOVE)

D H E C
PROMOTE PROTECT PROSPER

Water Well Record
Bureau of Water
2600 Bull Street, Columbia, SC 29201-1708; (803) 898-4300

1. WELL OWNER INFORMATION:
Name: FEDERATED INSURANCE / GREENS OIL (last) (first)
Address: 2457 BRENAN CIRCLE
City: ROCK HILL State: SC Zip: 29732
Telephone: Work: Home:

2. LOCATION OF WELL: SC COUNTY: YORK
Name: GREENS OIL COMPANY
Street Address: 2849 CHERRY ROAD
City: ROCK HILL Zip: 29730
Latitude: Longitude:

3. PUBLIC SYSTEM NAME: PUBLIC SYSTEM NUMBER:

4. ABANDONMENT: ☑ Yes ☐ No
Grouted Depth: from 0.0 ft. to 30.0 ft.

Formation Description	*Thickness of Stratum	Depth to Bottom of Stratum
WELL ABANDONED BY		
GEOLOGIC EXPLORATION, INC.		
ON 04/01/09 VIA TREMIE PIPE		
WITH PORTLAND BENTONITE		
SLURRY.		
*Indicate Water Bearing Zones (Use a 2nd sheet if needed)		

5. REMARKS:
PW-8
5.0 GALLONS PORTLAND
BENTONITE SLURRY

6. TYPE: ☐ Mud Rotary ☐ Jetted ☐ Bored ☐ Dug ☐ Air Rotary ☐ Driven ☐ Cable tool ☐ Other

7. PERMIT NUMBER:

8. USE: ☐ Residential ☐ Public Supply ☐ Process ☐ Irrigation ☐ Air Conditioning ☐ Emergency ☐ Test Well ☑ Monitor Well ☐ Replacement

9. WELL DEPTH (completed) 30.0 ft. Date Started: 04/01/09 Date Completed: 04/01/09

10. CASING: ☑ Threaded ☐ Welded
Diam.: 2 INCH
Type: ☑ PVC ☐ Galvanized ☐ Steel ☐ Other
_____ in. to _____ ft. depth
_____ in. to _____ ft. depth
Height: Above ☐ Below ☐
Surface _____ ft.
Weight _____ lb./ft.
Drive Shoe? ☐ Yes ☐ No

11. SCREEN:
Type: _____ Diam.: _____
Slot/Gauge: _____ Length: _____
Set Between: _____ ft. and _____ ft.
_____ ft. and _____ ft.
NOTE: MULTIPLE SCREENS USE SECOND SHEET
Sieve Analysis ☐ Yes (please enclose) ☐ No

12. STATIC WATER LEVEL _____ ft. below land surface after 24 hours

13. PUMPING LEVEL Below Land Surface.
_____ ft. after _____ hrs. Pumping _____ G.P.M.
Pumping Test: ☐ Yes (please enclose) ☐ No
Yield: _____

14. WATER QUALITY
Chemical Analysis ☐ Yes ☐ No Bacterial Analysis ☐ Yes ☐ No
Please enclose lab results.

15. ARTIFICIAL FILTER (filter pack) ☐ Yes ☐ No
Installed from _____ ft. to _____ ft.
Effective size _____ Uniformity Coefficient _____

16. WELL GROUTED? ☐ Yes ☐ No
☐ Neat Cement ☐ Bentonite ☐ Bentonite/Cement ☐ Other _____
Depth: From _____ ft. to _____ ft.

17. NEAREST SOURCE OF POSSIBLE CONTAMINATION: _____ ft. _____ direction
Type _____
Well Disinfected ☐ Yes ☐ No Type: _____ Amount: _____

18. PUMP: Date installed: _____ Not installed ☐
Mfr. Name: _____ Model No.: _____
H.P. _____ Volts _____ Length of drop pipe ___ ft. Capacity ___ gpm
TYPE: ☐ Submersible ☐ Jet (shallow) ☐ Turbine ☐ Jet (deep) ☐ Reciprocating ☐ Centrifugal

19. WELL DRILLER: VINCE FEDERLE CERT. NO.: 01930
Address: (Print) 176 COMMERCE BLVD
STATESVILLE, NC 28625
Level: A ☐ B ☐ C ☐ D ☑ (circle one)
Telephone No.: 704-872-7686 Fax No.: 704-872-0248

20. WATER WELL DRILLER'S CERTIFICATION: This well was drilled under my direction and this report is true to the best of my knowledge and belief.

Signed: Vincent R. Federle Date: 04/02/09
Well Driller

If D Level Driller, provide supervising driller's name:
MARK GETTYS

DHEC 1903 (07/2003)

COPY 1 MAIL TO: S.C. DEPARTMENT OF HEALTH AND ENVIRONMENTAL CONTROL (ADDRESS ABOVE)

D H E C

PROMOTE PROTECT PROSPER

C. Earl Hunter, Commissioner

Promoting and protecting the health of the public and the environment.

UST 12 DOCKETING

APR 04 2006

COUNTYSOUTH REALTY & BUSINESS BROKERAGE
ATTN: BILLY WINKIE
1300 MATTHEWS-MINT HILL ROAD
MATTHEWS, NC 28105

Re: Community Mart 6, 2849 Cherry Rd., Rock Hill, SC
UST Permit #09344
York County

Dear Mr. Winkie:

You requested that this office provide you with an update on the environmental conditions at the above referenced facility.

We received a report on July 18, 1989 documenting contamination in the subsurface in the vicinity of the underground storage tanks. Our records reveal that twelve underground storage tanks (USTs) are registered with the Department. Eight of the USTs were removed in July 1989 and owned by Greens Oil Co. The remaining four USTs, owned by Ray Thomas Petroleum, are still in place but have been emptied as required by State Regulations. In response to the initial report of contamination, we directed Greens Oil Co, as the party responsible for performing this activity under state and federal law, to assess the extent and severity of the contamination. In December 2004, CBM Environmental initiated corrective action measures to reduce the concentrations of petroleum chemicals to acceptable levels. Enclosed is a site map showing the locations of the monitoring wells and a table indicating the concentrations of petroleum chemicals in the wells. Based on the groundwater data, it appears that the dominant direction of groundwater flow is toward the East and the petroleum appears to be confined to the site.

This release of petroleum products from the USTs is qualified to receive funding under the conditions of the State Underground Petroleum Environmental Response Bank (SUPERB) Act after the existing environmental insurance policy has been exhausted. This means that reasonable costs up to $1,000,000 can be paid by the SUPERB account for site rehabilitation actions associated with this release. Should cleanup costs exceed $1,000,000, Greens Oil Co., under state and federal law, retains responsibility for any additional actions and associated costs.

In 1997, the General Assembly amended Section 80 (B) of the SUPERB Act to clarify that persons who hold "indicia of ownership" primarily to protect a security interest in property impacted by a release from a UST are exempt from the requirements to conduct site rehabilitation activities other than necessary abatement actions to eliminate any imminent threat to human health or the environment. The "indicia of ownership" exemption includes those persons who acquire title to property through foreclosure or other means necessary to protect their security interest, provided that person does not participate in the management of the UST and is not otherwise engaged in petroleum production, marketing, or refining. This applies equally to subsequent lenders who acquire the USTs and property through foreclosure in the future.

The Program is not aware of any laws or regulations that prohibit the use or development of properties where a petroleum release has occurred. Any future work required by the Department should not cause any damage to the building, disrupt deliveries, prevent access to customers, or block main access routes. To further assure you, any required activities associated with the petroleum release would be performed by a SC Certified Site Rehabilitation Contractor who maintains specific levels of insurance coverage for General and Professional Liability and Pollution/Property Damage. Such coverage is required by Section IV of the SUPERB Site Rehabilitation and Fund Access Regulations R. 61-98.

If you have any questions, please do not hesitate to contact me at (803) 896-6397, via e-mail at thomadl@dhec.sc.gov, or via fax at (803) 896-6245.

Sincerely,

Debra L. Thoma

Debra L. Thoma, Hydrogeologist
Northeastern SC Corrective Action Section
Assessment & Corrective Action Division
Underground Storage Tank Program
Bureau of Land & Waste Management

Cc: Stan Lamb, Community South Bank, 2012 W Hwy 180, Ste 15, Fort Mill, SC, 29708
Technical File

D H E C

PROMOTE PROTECT PROSPER

C. Earl Hunter, Commissioner

Promoting and protecting the health of the public and the environment.

JAN 26 2006

JERRY GREEN
GREENS OIL CO
2457 BREEN CIRCLE
ROCK HILL SC 29732

Re: Greens Oil Co., 2849 Cherry Rd, Rock Hill, SC
UST Permit #09344
Release Reported July 18, 1989
Corrective Action Status Evaluation Report received January 20, 2006
York County

Dear Mr. Green:

The Underground Storage Tank (UST) Program has reviewed the report submitted by CBM Environmental documenting the groundwater-sampling event. The next Corrective Action Status Evaluation Report should be submitted no later than April 30, 2006.

On all correspondence concerning this site, please reference UST Permit #09344. If there are any questions concerning this project, please contact me at (803) 896-6397, via fax at (803) 896-6245, or by e-mail at thomadl@dhec.sc.gov.

Sincerely,

Debra L Thoma

Debra L. Thoma, Hydrogeologist
Northeastern SC Corrective Action Section
Assessment & Corrective Action Division
Underground Storage Tank Program
Bureau of Land & Waste Management

Cc: Brian Deme, CBM Environmental, 3440 Lakemont Blvd., Fort Mill, SC, 29708
Technical File

D H E C

PROMOTE PROTECT PROSPER

C. Earl Hunter, Commissioner

Promoting and protecting the health of the public and the environment.

SEP 20 2005

JERRY GREEN
GREENS OIL CO
2457 BREEN CIRCLE
ROCK HILL SC 29732

Re: Greens Oil Co., 2849 Cherry Rd, Rock Hill, SC
UST Permit #09344
Release Reported July 18, 1989
Corrective Action Status Evaluation Report received September 16, 2005
York County

Dear Mr. Green:

The Underground Storage Tank (UST) Program has reviewed the report submitted by CBM Environmental documenting the groundwater-sampling event. The next Corrective Action Status Evaluation Report should be submitted no later than December 15, 2005.

On all correspondence concerning this site, please reference UST Permit #09344. If there are any questions concerning this project, please contact me at (803) 896-6397, via fax at (803) 896-6245, or by e-mail at thomadl@dhec.sc.gov.

Sincerely,

Debra L. Thoma

Debra L. Thoma, Hydrogeologist
Northeastern SC Corrective Action Section
Assessment & Corrective Action Division
Underground Storage Tank Program
Bureau of Land & Waste Management

Cc: Samanth Dawson, CBM Environmental, 3440 Lakemont Blvd., Fort Mill, SC, 29708
Technical File

D H E C

PROMOTE PROTECT PROSPER

C. Earl Hunter, Commissioner

Promoting and protecting the health of the public and the environment.

JUN 08 2005

JERRY GREEN
GREENS OIL CO
2457 BREEN CIRCLE
ROCK HILL SC 29732

Re: Greens Oil Co., 2849 Cherry Rd, Rock Hill, SC
UST Permit #09344
Release Reported July 18, 1989
Corrective Action Status Evaluation Report received June 1, 2005
York County

Dear Mr. Green:

The Underground Storage Tank (UST) Program has reviewed the report submitted by CBM Environmental documenting the groundwater-sampling event. The next Corrective Action Status Evaluation Report should be submitted no later than September 15, 2005.

On all correspondence concerning this site, please reference UST Permit #09344. If there are any questions concerning this project, please contact me at (803) 896-6397, (800) 826-5435 (within South Carolina only), or by e-mail at thomadl@dhec.sc.gov.

Sincerely,

Debra L. Thoma

Debra L. Thoma, Hydrogeologist
Northeastern SC Corrective Action Section
Assessment & Corrective Action Division
Underground Storage Tank Program
Bureau of Land & Waste Management

Cc: Samanth Dawson, CBM Environmental, 3440 Lakemont Blvd., Fort Mill, SC, 29708
Technical File

D H E C

PROMOTE PROTECT PROSPER

C. Earl Hunter, Commissioner

Promoting and protecting the health of the public and the environment.

MAR 0 3 2005

JERRY GREEN
GREENS OIL CO
2457 BREEN CIRCLE
ROCK HILL SC 29732

Re: Greens Oil Co., 2849 Cherry Rd, Rock Hill, SC
UST Permit #09344
Release Reported July 18, 1989
Corrective Action Status Evaluation Report received February 23, 2005
York County

Dear Mr. Green:

The Underground Storage Tank (UST) Program has reviewed the report submitted by CBM Environmental documenting the groundwater-sampling event. As indicated in the report, MW-7 could not be located. If this well still cannot be located before the next sampling event, please contact this department so that the required monitoring well installation permit may be issued. The next Corrective Action Status Evaluation Report should be submitted no later than June 15, 2005.

On all correspondence concerning this site, please reference UST Permit #09344. If there are any questions concerning this project, please contact me at (803) 896-6397, (800) 826-5435 (within South Carolina only), or by e-mail at thomadl@dhec.sc.gov.

Sincerely,

Debra L Thoma

Debra L. Thoma, Hydrogeologist
Northeastern SC Corrective Action Section
Assessment & Corrective Action Division
Underground Storage Tank Program
Bureau of Land & Waste Management

Cc: Samanth Dawson, CBM Environmental, 3440 Lakemont Blvd., Fort Mill, SC, 29708
Technical File

D H E C

PROMOTE PROTECT PROSPER

C. Earl Hunter, Commissioner

Promoting and protecting the health of the public and the environment.

FEB 25 2005

MR GEORGE ADAMS
WPC ENGINEERING
10907 DOWNS RD
CHARLOTTE NC 28134

Re: Community Mart 6, 2849 Cherry Rd., Rock Hill, SC
UST Permit #09344
Correspondence received February 18, 2005
York County

Dear Mr. Adams:

In response to your request for information about environmental conditions and liability associated with the referenced facility and adjacent property, the following is provided.

Our records indicate that twelve Underground Storage Tanks (USTs) were registered with the Department. Eight of the registered USTs were registered by Greens Oil Company and were removed in July 1989. The remaining four USTS are registered to Ray Thomas Petroleum Co., Inc. and are currently in operation. An assessment report received in July 1989 documented a release of petroleum products in the vicinity of the UST. Our records indicate that Greens Oil Co. complied with the regulatory requirements and stopped the leak from the tanks. Additionally, corrective action activities are being conducted to reduce the levels of petroleum constituents to acceptable levels.

This release of petroleum products from the USTs is qualified to receive funding under the conditions of the State Underground Petroleum Environmental Response Bank (SUPERB) Act after the environmental insurance policy is exhausted. This means that reasonable costs up to $1,000,000 can be paid by the SUPERB account for site rehabilitation actions associated with this release. Should cleanup costs exceed $1,000,000, Greens Oil Co., under state and federal law, retains responsibility for any additional actions and associated costs.

Monitoring well MW-4 was installed as part of the assessment investigation. The sample collected in June 2003 was analyzed for dissolved petroleum constituents such as BTEX (Benzene, Toluene, Ethylbenzene, Xylene). The laboratory analysis detected the following constituents as listed below in parts per billion:

Chemical of Concern	Results	Maximum Contaminant Level
Benzene	**<1**	**5**
Toluene	**<1**	**1,000**
Ethylbenzene	**<1**	**700**
Xylenes	**<1**	**10,000**
MTBE	**198**	**40**
Naphthalene	**<5**	**25**

The level of MtBE exceeds the drinking water advisory level established by the Environmental Protection Agency (EPA). No other petroleum compounds were detected at levels above established drinking water standards. MW-4 was installed as a monitoring well and is not a source of drinking water.

The Department is not aware of any laws or regulations that prohibit the use or development of adjacent properties and properties where a petroleum release has occurred. However, the Department advises against installing a water supply well for drinking, cooking, or bathing purposes until active corrective action is completed. If you should choose to install a water supply well for these purposes at this time, it is at your discretion. As previously indicated, corrective action has been initiated by CBM Environmental Services, Inc. to reduce the levels of petroleum constituents to acceptable levels.

If you have any questions, please do not hesitate to contact me at (803) 896-6397, via fax at (803) 896-6245, or via e-mail at thomadl@dhec.sc.gov.

Sincerely,

Debra L. Thoma

Debra L. Thoma, Hydrogeologist
Northeastern SC Corrective Action Section
Assessment & Corrective Action Division
Underground Storage Tank Program
Bureau of Land & Waste Management

cc: Technical File

D H E C

PROMOTE PROTECT PROSPER

C. Earl Hunter, Commissioner

Promoting and protecting the health of the public and the environment.

JAN 07 2005

SAMANTH DAWSON
CBM ENVIRONMENTAL
3440 LAKEMONT BLVD
FORT MILL SC 29708

Re: Greens Oil Co., 2849 Cherry Rd, Rock Hill, SC
UST Permit #09344
Release Reported July 18, 1989
Monitoring Well Installation Permit Request received January 5, 2005
York County

Dear Ms. Dawson:

At your request, please find enclosed the monitoring well installation permit for the replacement of MW-1, which was abandoned due to soil excavation activities. A report documenting the installation of the well should be submitted within 60 days from the date of this letter. Please note that all applicable South Carolina certification requirements regarding laboratory analyses, well installation, and report preparation must be met.

The Bureau grants pre-approval for transportation of drums of virgin petroleum contaminated soil and/or drums of groundwater from the referenced site to a permitted treatment facility. The contaminated soil and/or groundwater must be properly stored in labeled 55-gallon drums or equivalent containers. The contaminated soil and/or groundwater must be accepted by the approved treatment facility. There can be no spillage or leakage in transport. A copy of the disposal manifest from the receiving facility that clearly designates the quantity received must be included in the report.

On all correspondence concerning this site, please reference UST Permit #09344. If there are any questions concerning this project, please contact me at (803) 896-6397, (800) 826-5435 (within South Carolina only), or by e-mail at thomadl@dhec.sc.gov.

Sincerely,

Debra L. Thoma

Debra L. Thoma, Hydrogeologist
Northeastern SC Corrective Action Section
Assessment & Corrective Action Division
Underground Storage Tank Program
Bureau of Land & Waste Management

Enc: Monitoring Well Installation Approval

Cc: Jerry Green, Greens Oil Co., 2457 Breen Cir., Rock Hill, SC, 29732
Technical File

D H E C

PROMOTE PROTECT PROSPER

C. Earl Hunter, Commissioner

Promoting and protecting the health of the public and the environment.

Monitoring Well Installation Approval Form

Original Date of Issue: January 5, 2005 Approval No.: UMW-18922

Approval is hereby granted to: CBM Environmental Services
On behalf of: Jerry Green, Green's Oil C o
Facility: Community Mart 6, 2849 Cherry Rd., Rock Hill, SC
UST Permit #09344
County: York

This approval is for the construction of one (1) permanent monitoring well(s) in accordance with the construction plans and technical specifications outlined in the SC Well Standards and Regulations. The well(s) are to be constructed within the surficial aquifer for the intended purpose of monitoring ground-water quality and/or water level(s) at the referenced facility. Approval is provided with the following conditions:

1. The latitude and longitude, surveyed elevations, boring and/or geologist logs and actual (as built) construction details for each well be submitted to my attention as part of the Monitoring Well Installation Report.

2. Each well shall be labeled with an identification plate constructed of a durable material affixed to the casing or surface pad where it is readily visible. The plate shall provide monitoring well I.D.#, date of construction, static water level, and driller name and state certification #.

3. Temporary wells must be properly abandoned within 30 days from the date of installation.

4. Well construction and sampling derived waste including, but not necessarily limited to, drill cuttings, drilling fluids, development and purge water should be managed properly and in compliance with applicable requirements. If containerized, each vessel should be clearly labeled with regard to contents, source, and date of activity.

5. A minimum of forty-eight (48) hours prior to initiation of drilling activities, please provide notice to Debra L. Thoma at (803) 896-6397 or via e-mail at thomadl@dhec.sc.gov and Al Williams at (803) 285-7461 or via e-mail at Williaal@dhec.sc.gov.

6. Please provide ground-water quality analytical data (chemical analysis and/or water level(s)) associated measurements (i.e., in-situ field measurements) to my attention with the Assessment Report.

7. Monitoring wells shall be installed by a permanently licensed well driller certified by the State of South Carolina.

This approval is pursuant to the provisions of Section 44-55-40 of the 1976 South Carolina Code of Laws and the Department of Health and Environmental Control Regulations R.61-71. **Please remember to have a copy of this approval on the site during well installation.**

Approved by:

Debra L. Thoma

Debra L. Thoma, Hydrogeologist
Northeastern South Carolina Corrective Action Section
Assessment & Corrective Action Division
Underground Storage Tank Program
Bureau of Land & Waste Management

cc: Technical File

D H E C

PROMOTE PROTECT PROSPER

C. Earl Hunter, Commissioner

Promoting and protecting the health of the public and the environment.

JAN 0 6 2005

JERRY GREEN
GREENS OIL CO
2457 BREEN CIRCLE
ROCK HILL SC 29732

Re: Greens Oil Co., 2849 Cherry Rd, Rock Hill, SC
UST Permit #09344
Release Reported July 18, 1989
Corrective Action Status Evaluation Report received December 28, 2004
York County

Dear Mr. Green:

The Underground Storage Tank (UST) Program has reviewed the report submitted by CBM Environmental documenting the soil excavation and bio augmentation activities. The UST Program concurs with the recommendation to conduct two quarters of groundwater sampling to determine whether additional microbial injections will be required. The next Corrective Action Status Evaluation Report should be submitted no later than March 15, 2005.

On all correspondence concerning this site, please reference UST Permit #09344. If there are any questions concerning this project, please contact me at (803) 896-6397, (800) 826-5435 (within South Carolina only), or by e-mail at thomadl@dhec.sc.gov.

Sincerely,

Debra L. Thoma

Debra L. Thoma, Hydrogeologist
Northeastern SC Corrective Action Section
Assessment & Corrective Action Division
Underground Storage Tank Program
Bureau of Land & Waste Management

Cc: Samanth Dawson, CBM Environmental, 3440 Lakemont Blvd., Fort Mill, SC, 29708
Technical File

CBM
ENVIRONMENTAL SERVICES, INC.

October 19, 2004

CERTIFIED MAIL – RETURN RECEIPT REQUESTED

Debra L. Thoma
South Carolina Department of Health and Environmental Control
Bureau of Land and Waste Management
2600 Bull Street
Columbia, SC- 29201

Re: CAP Implementation
Greens Oil Company
Rock Hill, South Carolina
UST No. 09344
CBM Project No. 11030

Dear Ms. Thoma:

This correspondence is in regard to the referenced site and our telephone conversation on October 18, 2004. As I explained, the implementation of the proposed Corrective Action Plan (CAP) was scheduled for the week of August 9-13, 2004. However, due to technical differences between the insurance company (Federated Insurance) of the responsible party (Mr. Jerry Green) and CBM Environmental Services Inc., (CBM), the proposed implementation of the CAP had to be postponed indefinitely.

CBM Environmental Services has been in constant contact with the technical advisory team of Federated Insurance in order to move forward with the implementation of this project. After prolonged negotiations, Federated Insurance has proposed that soil excavation combined with de-watering and microbial augmented backfill would be sufficient to address the soil and groundwater contamination. In addition, they have proposed that after two to three quarters of monitoring, a decision be made regarding the necessity of microbial injections for groundwater remediation based on groundwater quality data at that time. In order to move forward with the implementation, CBM agrees to this modification of the implementation strategy. Please note that SDHEC would be notified in advance of activities scheduled to occur on-site. In addition, baseline samples will be collected and a report submitted documenting the baseline sampling results as well as the excavation and de-watering activities conducted on-site. Your prompt attention to this correspondence would be greatly appreciated. Should you have any questions or comments, please do not hesitate to contact the undersigned at (803) 548-5989.

P.O. Box 411387
Charlotte, NC 28241
1-800-743-1226

3440 Lakemont Blvd.
Fort Mill, SC 29708
803-548-5989

1411 B. South Evans St.
Greenville, NC 27834
252-752-0200

5680-K West Cypress St.
Tampa, FL 33607
813-287-1828

1916 Cypress Green Dr. Ste. 11
Jacksonville, FL 32256
904-739-6606

Sincerely,

Samanth Dawson

Samanth Emmanuel Dawson
Project Manager

Ken Czoer, P.G.
President

enclosures

cc: Mr. Jerry Green, Greens Oil Company
file
/SED

D H E C

PROMOTE PROTECT PROSPER

C. Earl Hunter, Commissioner

Promoting and protecting the health of the public and the environment.

OCT 12 2004

JERRY GREEN
GREENS OIL CO
2457 BREEN CIRCLE
ROCK HILL SC 29732

Re: **Notice of Violation**
Greens Oil Co., 2849 Cherry Rd, Rock Hill, SC
UST Permit #09344
Release Reported July 18, 1989
York County

Dear Mr. Green:

The Underground Storage Tank (UST) Program of the South Carolina Department of Health and Environmental Control directed you to submit a Corrective Action Status Evaluation Report on or before September 30, 2004. To date the required report has not been received. In accordance with Section 280.65 of the South Carolina Underground Storage Tank Regulations, the corrective action must be conducted as chemicals of concern are above the risk-based-screening levels.

Implementation of this scope of work should proceed upon receipt of this correspondence. **The report must be submitted within 30 days from the date of this letter. If the report is not received on or before November 30, 2004 enforcement procedures will be initiated.**

On all correspondence concerning this site, please reference UST Permit #09344. If there are any questions concerning this project, please contact me at (803) 896-6397, (800) 826-5435 (within South Carolina only), or by e-mail at thomadl@dhec.sc.gov.

Sincerely,

Debra L. Thoma

Debra L. Thoma, Hydrogeologist
Northeastern SC Corrective Action Section
Assessment & Corrective Action Division
Underground Storage Tank Program
Bureau of Land & Waste Management

Cc: CBM Environmental, 3440 Lakemont Blvd., Fort Mill, SC, 29708
Technical File

#09344

CBM

ENVIRONMENTAL SERVICES, INC.

RECEIVED

MAY 07 2004

UNDERGROUND STORAGE TANK PROGRAM

May 4, 2004

Ray Thomas
Thomas Petroleum
P.O. Box 338
Shelby, NC 28151

RE: Right to Enter Agreement
Green's Oil Company
2849 Cherry Road
Rock Hill, York County
CBM Project #: 11030

Dear Property Owner:

CBM Environmental Services, Inc. (CBM), on behalf of Green's Oil Company, is currently conducting environmental remediation activities at the above referenced site located in York County, South Carolina. The remediation activities are being conducted at the direction of the South Carolina Department of Health and Environmental Control (SCDHEC). It is our understanding that you are the current owner/operator of the property. In order to complete the remediation, SCDHEC has determined that it is necessary to remove contaminated soil and/or install remediation wells on your property. The proposed area to be excavated and well locations have been marked on the enclosed figures. CBM, in conjunction with SCDHEC, will supervise the excavation, well installation and restoration of the site to its original condition.

A Right to Enter Agreement for conducting remediation has been enclosed for your review. Please sign and return it in the envelope that has been provided within five days of receipt. CBM will notify you prior to the start of the remediation activities, and will attempt to minimize any inconvenience that the activities may cause.

Your cooperation in this matter is greatly appreciated. Please do not hesitate to contact the undersigned at (803) 548-5989 or Ms. Debra Thoma of the SCDHEC at (803) 896-6397 if you have any questions or require additional information.

Sincerely,

Holly Freisen

Holly Freisen, E.I.T.
Project Manager

cc: Jerry Green – 2457 Breen Circle, Rock Hill, SC
Debra Thoma - SCDHEC
file

/HF

RIGHT TO ENTER AGREEMENT
FOR CONDUCTING REMEDIATION AND MONITORING

STATE OF SOUTH CAROLINA
COUNTY OF YORK

We, the undersigned, being all of the fee simple owners of certain tracts or parcels in York County, recognizing the benefits to said property by reason of conducting subsurface remediation, hereby grant to Green's Oil Company and its agents the right to enter said property in accordance with the requirements of the state of South Carolina. Green's Oil Company's agents may include CBM Environmental Services, Inc.

The undersigned hereby covenant and warrant that they are the sole owners of said property; that they solely have the right to grant this right to enter for conducting subsurface remediation against the lawful claims of all persons whomsoever.

It is agreed that Green's Oil Company and its agents shall have the right of future entry for the purpose of maintaining any permanent remediation points for the duration of the remediation period, as required by the State of South Carolina Department of Health and Environmental Control (SCDHEC).

It is further agreed that Green's Oil Company shall be responsible for restoring any damage done to the ground of said property by its employees or its agents during the subsurface remediation and monitoring period and that Green's Oil Company shall abandon monitoring and remediation wells on said property in accordance with the SCDHEC requirements at the conclusion of the monitoring period. The proposed scope of work includes soil excavation, remediation well installation and microbial injections.

It is agreed that Green's Oil Company shall hold harmless the owner of the aforementioned property for any personal injury that might be sustained during the course of conducting, and proximately resulting from the conduct of, subsurface investigations.

Thomas Petroleum Company – 2849 Cherry Road, Rock Hill, SC
Property Identification

☐ Right to Enter denied.

☐ Right to Enter granted.

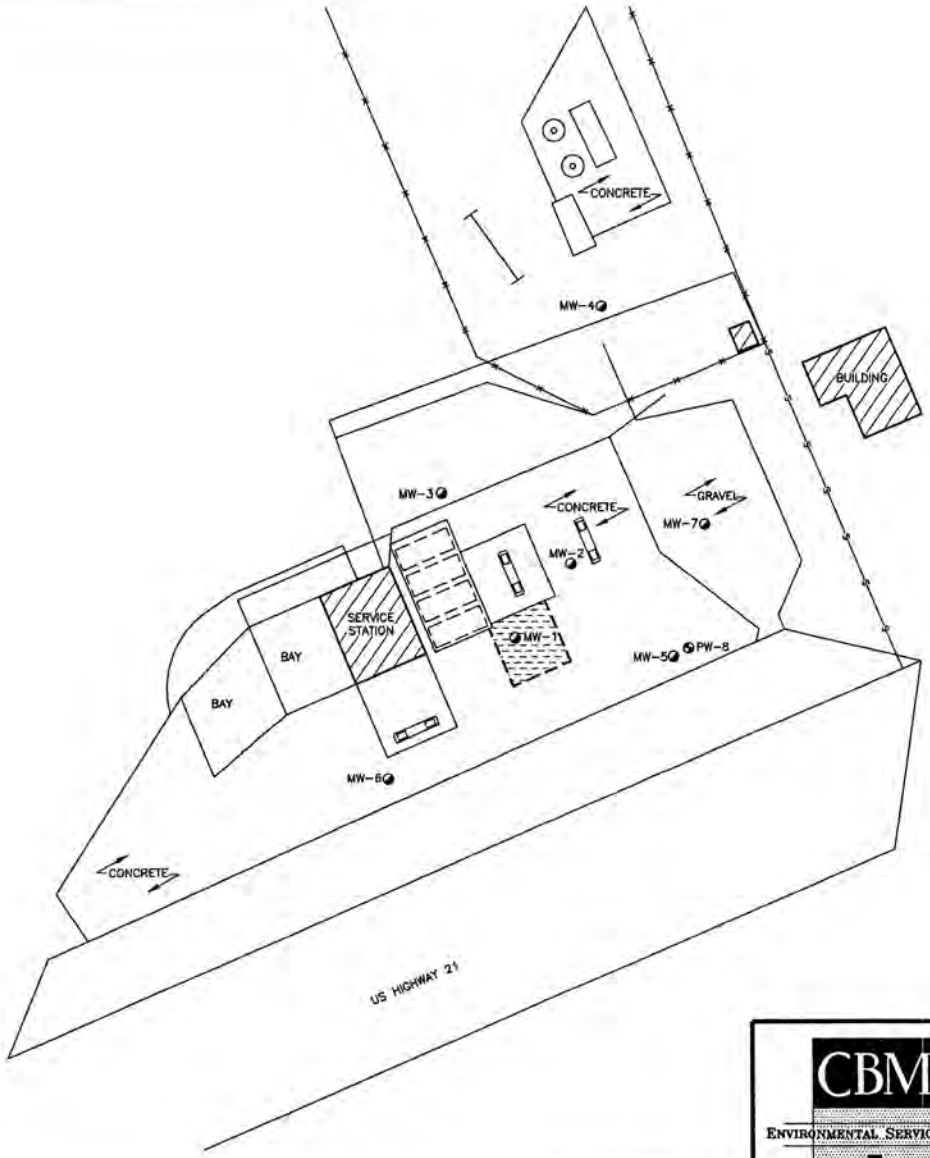
_____
Telephone Number

_____
Signature
Property Owner or Agent

_____
Signature
Green's Oil Company

_____
Date

Green's Oil
CBM Job # 11030



LEGEND

- TYPE II MONITORING WELL
- TYPE III MONITORING WELL
- FENCE
- S SEWER LINE
- PROPOSED SOIL EXCAVATION AREA

SCALE

0 10 20 30 40

FEET

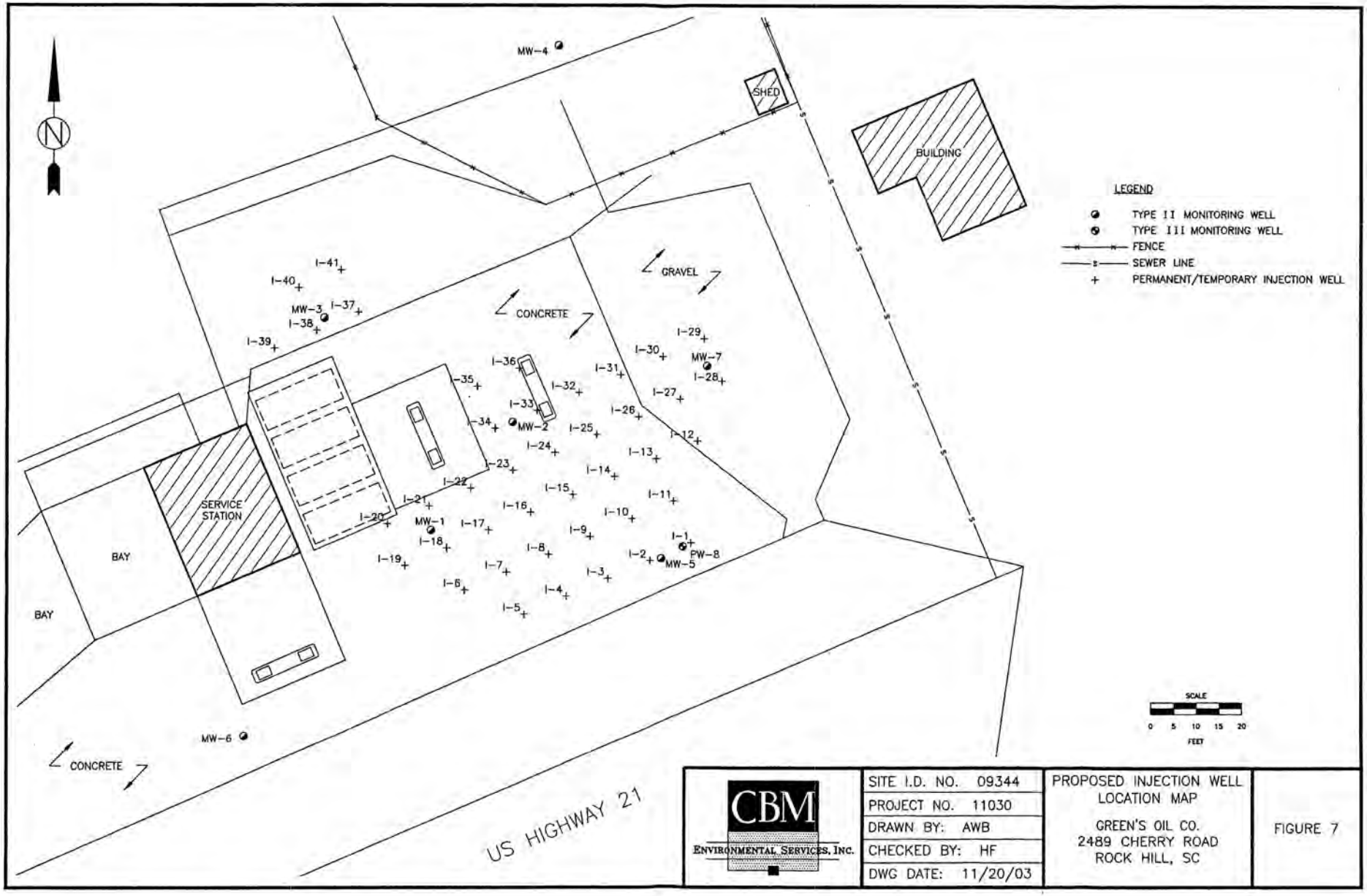
CBM ENVIRONMENTAL SERVICES, INC.

SITE I.D. NO.	09344
PROJECT NO.	11030
DRAWN BY:	BLS/AWB
CHECKED BY:	HF
DWG DATE:	11/20/03

PROPOSED SOIL EXCAVATION LOCATION

GREEN'S OIL CO.
2489 CHERRY ROAD
ROCK HILL, SC

FIGURE 6



CBM ENVIRONMENTAL SERVICES, INC.	SITE I.D. NO. 09344 PROJECT NO. 11030 DRAWN BY: AWB CHECKED BY: HF DWG DATE: 11/20/03	PROPOSED INJECTION WELL LOCATION MAP GREEN'S OIL CO. 2489 CHERRY ROAD ROCK HILL, SC	FIGURE 7

DHEC

PROMOTE PROTECT PROSPER

Communication Slip

Date: _____

To: Bureau of Land & Waste Mgmt.
Attn: Read Mines → OLT

- ☐ Approval
- ☐ Necessary Action
- ☐ Prepare Reply
- ☐ Comment
- ☐ As Requested
- ☐ Note and Return
- ☐ Note and File
- ☐ Other

Remarks:

From: Bow-Adams

DHEC 3001 (2/1997)

D H E C

PROMOTE PROTECT PROSPER

#09344

C. Earl Hunter, Commissioner

Promoting and protecting the health of the public and the environment.

March 24, 2004

Mr. Jerry Green
Green's Oil Company
2457 Breen Circle
Rock Hill, SC 29732

Re: Underground Injection Control Permit #161M
Green's Oil Company
York County

Dear Mr. Green:

Enclosed is a Permit to Construct for forty-one (41) Class VA-I injection wells at the Green's Oil Company, York County, SC as requested in the permit application received March 3, 2004.

Affected parties may appeal this permit decision in accordance with State Regulation R.61-72. To contest a case, a request for a hearing must be made to the Clerk of the DHEC Board within 15 days of the date of this letter. All requests must include the following information:

1) name of the party requesting the hearing,
2) issue(s) for which the hearing is requested,
3) caption or other information sufficient to identify the decision, order, action or inaction which is the subject of the hearing,
4) relief requested.

Note further that Administrative Law Judge (ALJ) Division rules require that persons requesting a contested case hearing must file a copy of the request and pay a filing fee in the amount of $250 dollars (US) with the ALJ Division at the following address:

Clerk, ALJ Division
1205 Pendleton Street, Suite 224
P.O. Box 12467
Columbia, SC 24111

An inspection of the UIC System must be conducted prior to issuance of Approval to Operate. After completion of the inspection, Approval to Operate #161M will be issued. Please call my office to schedule a time and date for the system inspection.

If you have any question, please call Todd Adams at (803) 898-3549.

Sincerely,

Todd Adams, Hydrologist
GroundWater Management Section
Bureau of Water

RECEIVED

MAR 25 2004

UNDERGROUND STORAGE
TANK PROGRAM

cc: Read Miner, BLWM-USTP
Rohit Shetty, CBM Environmental Services

D H E C

PROMOTE PROTECT PROSPER

Promoting and protecting the health of the public and the environment.

WATER MONITORING ASSESSMENT & PROTECTION DIVISION

Injection Well Construction Permit
for
Class II, III, and V.A. Injection Well(s)

Permit #161M

Date Issued: March 24, 2004
Date Expired: March 24, 2005

For (Operator): CBM Environmental Services

In accordance with provisions of Title 48, Chapter 1, South Carolina Code of Laws, 1976, as amended, permission is granted for construction of forty-one (41) Class V.A.-I injection wells with a true diameter of one inch, a total depth of approximately 20-30 feet located at the Green's Oil Company, York County, SC with the following provisions:

1) The operator shall submit completed SCDHEC well record forms to the Department's Water Monitoring, Assessment & Protection Division after completion of the injection wells.

2) Upon completion of construction, injection activities shall not commence prior to receiving approval from the Department to operate the injection wells.

3) When the injection wells are no longer in use, or upon request by the Department, within sixty (60) days all injection wells must be permanently abandoned in accordance with the South Carolina Well Standards and Regulations (R.61-71).

Todd Adams, Hydrologist
GroundWater Management Section
Bureau of Water

March 24, 2004
Date

DHEC 2104 (6/88)

STATEMENT OF BASIS - UIC DRAFT PERMIT #241M

In accordance with the South Carolina Underground Injection Control Regulations, Section R61-87.12,J., this Statement of Basis has been prepared for Service Oil Company Underground Injection Control permit application received March 3, 2004.

Ownership of the proposed injection wells is Green's Oil Company, 2457 Breen Circle, Rock Hill, SC 29732. The permit (UIC #161M) is for the construction of forty-one (41) injection wells for a corrective action system at the Green's Oil Company, York County. The intent of the injection wells is to facilitate enhanced remediation by injection of microbes, nutrients, and an oxygen source into the subsurface. The draft permit for the underground injection proposal has been prepared based on staff review and the application of the Pollution Control Act of South Carolina and the Underground Injection Control Regulations of South Carolina.

Conditions of the permit issuance include the submittal of well records for all injection wells installed and the inspection of well construction by the Department prior to injection.

D H E C

PROMOTE PROTECT PROSPER

C. Earl Hunter, Commissioner

Promoting and protecting the health of the public and the environment.

MAR 29 2004

JERRY GREEN
GREENS OIL CO
2457 BREEN CIRCLE
ROCK HILL SC 29732

Re: Former Greens Oil Co., 2849 Cherry Rd, Rock Hill, SC
UST Permit # 09344
Corrective Action Plan received January 28, 2004
UIC Permit Application received February 9, 2004
York County

Dear Mr. Green:

The Underground Storage Tank Program has reviewed the referenced documents. As required by Section 280.67 of the South Carolina Underground Storage Tank Regulations R.61-92, the Bureau has provided a public notice period including notice of the pending corrective actions to the surrounding landowners. No objections to the proposed actions were expressed; therefore, the Corrective Action Plan (CAP) is approved. All work must be completed in accordance with the referenced bid specifications. The Department recognizes that modifications to the CAP are usually necessary as site conditions change during implementation. If changes to the CAP are later deemed necessary to achieve the Site-Specific Target Levels in a timely manner, please notify the Department.

The Corrective Action Plan is to be implemented within 30 days from receipt of this letter. Monitoring reports are to be submitted on a quarterly basis. The first Corrective Action Status (CASE) Report will be due 3 months from the date of UIC Permit to Operate. The details of the system installation, including well logs, should be documented in the first CASE Report unless a separate System Installation Report will be submitted.

The Bureau grants pre-approval for transportation of drums of virgin petroleum contaminated soil and/or drums of groundwater from the referenced site to a permitted treatment facility. The contaminated soil and/or groundwater must be properly stored in labeled 55-gallon drums or equivalent containers. The contaminated soil and/or groundwater must be accepted by the approved treatment facility. There can be no spillage or leakage in transport. A copy of the disposal manifest from the receiving facility that clearly designates the quantity received must be included in the monitoring reports.

As a liability insurance policy was in effect at the time the release occurred, Section 44-2-130A of the SUPERB Act requires that no SUPERB Funds be made available until the funds provided by the insurance policy have been exhausted. Therefore, the associated cost should be submitted to your insurance carrier for payment.

Please note that Sections 44-2-110(4) and 44-2-130 of the SUPERB Statute state that no costs will be allowed unless prior approval from the Program is obtained. If the total cost approaches the policy limits, you must contact the Department for financial pre-approval for any costs exceeding the policy limits. Please note, a notarized statement from the insurance company will be required indicating that your Insurance Company has processed payment up to the policy limit.

On all correspondence regarding this site, please reference the UST Permit Number. If you have questions concerning this correspondence, feel free to contact me at (803) 896-6397, (800) 826-5435 (within SC only), or thomadl@dhec.sc.gov.

Sincerely,

Debra L. Thoma

Debra L. Thoma, Hydrogeologist
Northeastern SC Corrective Action Section
Assessment & Corrective Action Division
Underground Storage Tank Program
Bureau of Land & Waste Management

Cc: Kurt Blevins, CBM Environmental, 377 Carowinds Blvd., Ste 118, Fort Mill, SC, 29715
Technical File

D H E C
PROMOTE PROTECT PROSPER
C. Earl Hunter, Commissioner
Promoting and protecting the health of the public and the environment.

NOTICE

Public Notice #: *09344-01* **Date: March 11, 2004**

NOTICE OF PROPOSED CORRECTIVE ACTION

Section 280.67 of the S.C. Underground Storage Tank Control Regulations (R.61-92) requires that any Corrective Action Plan prepared to meet the requirements of 280.66 must be placed on notice for public comment. The following applicant has submitted a Corrective Action Plan for the rehabilitation of ground water contaminated by petroleum constituents released from underground storage tanks.

Applicant: Jerry Green, Greens Oil Co., 2457 Breen Circle, Rock Hill SC 29732. Community Mart operates underground storage tanks used for retail sales and is located 2849 Cherry Road in Rock Hill, South Carolina.

Corrective action will consist of the excavation of soil followed by the injection of microbes, nutrients, and oxygen to enhance bioremediation and natural attenuation.

A copy of the Corrective Action Plan is available for review at the Freedom of Information Office (803-898-3880) SCDHEC 2600 Bull Street in Columbia, SC.

Persons wishing to comment upon or object to Corrective Action approval are invited to submit same in writing within fifteen (15) days of the date of this notice to South Carolina Department of Health and Environmental Control, Underground Storage Tank Program, 2600 Bull Street, Columbia, S.C. 29201 or call Read Miner at (800) 826-5435. The public notice # should be placed at the top of the first page of comments. Where there is a significant degree of public interest, the SCDHEC will hold a public hearing.

Please bring the foregoing to the attention of persons who you know will be interested in this matter.

D H E C

PROMOTE PROTECT PROSPER

C. Earl Hunter, Commissioner

Promoting and protecting the health of the public and the environment.

MAR 09 2004

CREDIT SUISSE LEASING 92A LP
PO BOX 105842
ATLANTA GA 30348

Re: Greens Oil Co., 2849 Cherry Rd, Rock Hill, SC
UST Permit # 09344
Corrective Action Plan received January 28, 2004
UIC Permit Application received February 9, 2004
York County

Dear Sir or Madam:

As you are aware, CBM Environmental Services, Inc. has submitted a Corrective Action Plan to clean up the impacted soil and groundwater at the referenced facility through the excavation of contaminated soil followed by the addition of microbes, nutrients, and oxygen to enhance bioremediation and natural attenuation. A fact sheet is enclosed for your information.

Section 280.67 of the South Carolina Underground Storage Tank Regulations requires the Underground Storage Tank Program to provide notice to those members of the public that may be affected by the planned corrective action. Excavation of soil and the installation of injection wells are necessary as part of the corrective action measures; however, the work will be completed in a manner as to minimize any inconvenience to you. Your continued cooperation is appreciated.

A copy of the Corrective Action Plan is enclosed. If you have any questions or comments regarding the proposed corrective actions, please contact me at (803) 896-6584, (800) 826-5435 (within South Carolina only) or by e-mail at Minerrs@dhec.sc.gov. All comments should be submitted on or before March 26, 2004.

Sincerely,

Read S. Miner, P.G., Hydrogeologist
State Lead and Field Services Section
Assessment & Corrective Action Division
Underground Storage Tank Program
Bureau of Land and Waste Management

enc: Public Notice
Fact sheet
Corrective Action Plan
cc: Technical file (without enclosures)

D H E C
PROMOTE PROTECT PROSPER

C. Earl Hunter, Commissioner
Promoting and protecting the health of the public and the environment.

MAR 09 2004

DAVID CLARY
RAY THOMAS PETROLEUM CO
PO BOX 338
SHELBY NC 28151

Re: Greens Oil Co., 2849 Cherry Rd, Rock Hill, SC
UST Permit # 09344
Corrective Action Plan received January 28, 2004
UIC Permit Application received February 9, 2004
York County

Dear Mr. Clary:

As you are aware, CBM Environmental Services, Inc. has submitted a Corrective Action Plan to clean up the impacted soil and groundwater at the referenced facility through the excavation of contaminated soil followed by the addition of microbes, nutrients, and oxygen to enhance bioremediation and natural attenuation. A fact sheet is enclosed for your information.

Section 280.67 of the South Carolina Underground Storage Tank Regulations requires the Underground Storage Tank Program to provide notice to those members of the public that may be affected by the planned corrective action. Excavation of soil and the installation of injection wells are necessary as part of the corrective action measures; however, the work will be completed in a manner as to minimize any inconvenience to you. Your continued cooperation is appreciated.

If you have any questions or comments regarding the proposed corrective actions, please contact me at (803) 896-6584, (800) 826-5435 (within South Carolina only) or by e-mail at Minerrs@dhec.sc.gov. All comments should be submitted on or before March 26, 2004.

Sincerely,

Read S. Miner, P.G., Hydrogeologist
State Lead and Field Services Section
Assessment & Corrective Action Division
Underground Storage Tank Program
Bureau of Land and Waste Management

enc: Public Notice
Fact sheet
Corrective Action Plan
cc: Technical file (without enclosures)

D H E C

PROMOTE PROTECT PROSPER

C. Earl Hunter, Commissioner

Promoting and protecting the health of the public and the environment

MAR 09 2004

CELANESE ACETATE LLC
2300 ARCHDALE DR
CHARLOTTE NC 28210

Re: Greens Oil Co., 2849 Cherry Rd, Rock Hill, SC
UST Permit # 09344
Corrective Action Plan received January 28, 2004
UIC Permit Application received February 9, 2004
York County

Dear Sir or Madam:

As you may be aware, CBM Environmental Services, Inc. has submitted a Corrective Action Plan to clean up the impacted soil and groundwater at the referenced facility through the excavation of contaminated soil followed by the addition of microbes, nutrients, and oxygen to enhance bioremediation and natural attenuation. A fact sheet is enclosed for your information.

Section 280.67 of the South Carolina Underground Storage Tank Regulations requires the Underground Storage Tank Program to provide notice to the public of the planned corrective action. The petroleum has not impacted your property and clean-up actions will not be required on your property. This notice is provided as a courtesy to advise you of proposed actions to take place across Cherry Road from your property. Your understanding is appreciated.

A copy of the Corrective Action Plan may be obtained from the SCDHEC Freedom of Information office at (803) 898-3880. If you have any questions or comments regarding the proposed corrective actions, please contact me at (803) 896-6584, (800) 826-5435 (within South Carolina only) or by e-mail at Minerrs@dhec.sc.gov. All comments should be submitted on or before March 26, 2004.

Sincerely,

Read S. Miner, P.G., Hydrogeologist
State Lead and Field Services Section
Assessment & Corrective Action Division
Underground Storage Tank Program
Bureau of Land and Waste Management

enc: Public Notice
Fact sheet
cc: Technical file (without enclosures)

D H E C
PROMOTE PROTECT PROSPER
C. Earl Hunter, Commissioner
Promoting and protecting the health of the public and the environment.

MAR 0 9 2004

PLAINFIELD PLAZA CO
19601 N 27TH AVE
PHOENIX AZ 85027

Re: Greens Oil Co., 2849 Cherry Rd, Rock Hill, SC
UST Permit # 09344
Corrective Action Plan received January 28, 2004
UIC Permit Application received February 9, 2004
York County

Dear Sir or Madam:

As you may be aware, CBM Environmental Services, Inc. has submitted a Corrective Action Plan to clean up the impacted soil and groundwater at the referenced facility through the excavation of contaminated soil followed by the addition of microbes, nutrients, and oxygen to enhance bioremediation and natural attenuation. A fact sheet is enclosed for your information.

Section 280.67 of the South Carolina Underground Storage Tank Regulations requires the Underground Storage Tank Program to provide notice to the public of the planned corrective action. The petroleum has not impacted your property and clean-up actions will not be required on your property. This notice is provided as a courtesy to advise you of proposed actions to take place on the adjacent property. Your understanding is appreciated.

A copy of the Corrective Action Plan may be obtained from the SCDHEC Freedom of Information office at (803) 898-3880. If you have any questions or comments regarding the proposed corrective actions, please contact me at (803) 896-6584, (800) 826-5435 (within South Carolina only) or by e-mail at Minerrs@dhec.sc.gov. All comments should be submitted on or before March 26, 2004.

Sincerely,

Read S. Miner, P.G., Hydrogeologist
State Lead and Field Services Section
Assessment & Corrective Action Division
Underground Storage Tank Program
Bureau of Land and Waste Management

enc: Public Notice
Fact sheet
cc: Technical file (without enclosures)

D H E C

PROMOTE PROTECT PROSPER

C. Earl Hunter, Commissioner

Promoting and protecting the health of the public and the environment.

MAR 0 9 2004

JERRY P MCGUIRE
382 N SUTTON RD
FORT MILL SC 29715

Re: Greens Oil Co., 2849 Cherry Rd, Rock Hill, SC
UST Permit # 09344
Corrective Action Plan received January 28, 2004
UIC Permit Application received February 9, 2004
York County

Dear Mr. McGuire:

As you may be aware, CBM Environmental Services, Inc. has submitted a Corrective Action Plan to clean up the impacted soil and groundwater at the referenced facility through the excavation of contaminated soil followed by the addition of microbes, nutrients, and oxygen to enhance bioremediation and natural attenuation. A fact sheet is enclosed for your information.

Section 280.67 of the South Carolina Underground Storage Tank Regulations requires the Underground Storage Tank Program to provide notice to the public of the planned corrective action. The petroleum has not impacted your property and clean-up actions will not be required on your property. This notice is provided as a courtesy to advise you of proposed actions to take place on the adjacent property. Your understanding is appreciated.

A copy of the Corrective Action Plan may be obtained from the SCDHEC Freedom of Information office at (803) 898-3880. If you have any questions or comments regarding the proposed corrective actions, please contact me at (803) 896-6584, (800) 826-5435 (within South Carolina only) or by e-mail at Minerrs@dhec.sc.gov. All comments should be submitted on or before March 26, 2004.

Sincerely,

Read S Miner

Read S. Miner, P.G., Hydrogeologist
State Lead and Field Services Section
Assessment & Corrective Action Division
Underground Storage Tank Program
Bureau of Land and Waste Management

enc: Public Notice
Fact sheet
cc: Technical file (without enclosures)

D H E C

PROMOTE PROTECT PROSPER

C. Earl Hunter, Commissioner

Promoting and protecting the health of the public and the environment.

MAR 09 2004

JERRY GREEN
GREENS OIL CO
2457 BREEN CIRCLE
ROCK HILL SC 29732

Re: Greens Oil Co., 2849 Cherry Rd, Rock Hill, SC
UST Permit # 09344
Corrective Action Plan received January 28, 2004
UIC Permit Application received February 9, 2004
York County

Dear Mr. Green:

As you are aware, CBM Environmental Services, Inc. has submitted a Corrective Action Plan to clean up the impacted soil and groundwater at the referenced facility through the excavation of contaminated soil followed by the addition of microbes, nutrients, and oxygen to enhance bioremediation and natural attenuation. A fact sheet is enclosed for your information.

Section 280.67 of the South Carolina Underground Storage Tank Regulations requires the Underground Storage Tank Program to provide notice to those members of the public that may be affected by the planned corrective action. Excavation of soil and the installation of injection wells are necessary as part of the corrective action measures; however, the work will be completed in a manner as to minimize any inconvenience to you. Your continued cooperation is appreciated.

If you have any questions or comments regarding the proposed corrective actions, please contact me at (803) 896-6584, (800) 826-5435 (within South Carolina only) or by e-mail at Minerrs@dhec.sc.gov. All comments should be submitted on or before March 26, 2004.

Sincerely,

Read S Miner

Read S. Miner, P.G., Hydrogeologist
State Lead and Field Services Section
Assessment & Corrective Action Division
Underground Storage Tank Program
Bureau of Land and Waste Management

enc: Public Notice
Fact sheet
cc: Technical file (without enclosures)

D H E C
PROMOTE PROTECT PROSPER
South Carolina Department of Health
and Environmental Control

UNDERGROUND STORAGE TANK PROGRAM
BUREAU OF LAND AND WASTE MANAGEMENT
2600 Bull Street, Columbia, SC 29201
Telephone (803) 896-6240, Fax (803) 896-6245

MEMORANDUM

Date: February 25, 2004

To: Todd Adams
Underground Injection Control

From: Read S. Miner, P.G., Hydrogeologist
State Lead and Field Services Section

Subject: Green's Oil Co., 2849 Cherry Rd., Rock Hill SC
UST Permit #09344
York County

Please find enclosed the Underground Injection Control Permit Application for the referenced facility. If you have any questions, please call me at 896-6584.

Enc: UIC Permit Application

cc: Technical file

D H E C
PROMOTE PROTECT PROSPER

C. Earl Hunter, Commissioner
Promoting and protecting the health of the public and the environment.

JAN 0 6 2004

JERRY GREEN
GREENS OIL CO
2457 BREEN CIRCLE
ROCK HILL SC 29732

Re: Greens Oil Co., 2849 Cherry Rd, Rock Hill, SC
UST Permit # 09344
NOTICE OF VIOLATION
York County

Dear Mr. Green:

Per October 2003 correspondence, you were directed to submit a Corrective Action Plan (CAP) for the referenced facility on or before November 30, 2003. It has not been received. Failure to submit the CAP on or before January 30, 2004 will result in a referral to the Enforcement Section.

On all correspondence regarding this site, please reference the UST Permit # 09344. If you have questions concerning this correspondence, or would like to submit additional information, please contact me at (803) 896-6584 or (800) 826-5435 (within South Carolina only).

Sincerely,

Read S. Miner, P.G., Hydrogeologist
State Lead and Field Services Section
Assessment and Corrective Action Division
Underground Storage Tank Program
Bureau of Land and Waste Management

cc: Technical File
Rohit Shetty, CBM Environmental, 377 Carowinds Blvd., Ste. 118, Fort Mill, SC 29708

D H E C
PROMOTE PROTECT PROSPER
2600 Bull Street
Columbia, SC 29201-1708

UNDERGROUND STORAGE TANK PROGRAM
BUREAU OF LAND AND WASTE MANAGEMENT

Phone (800) 826-5435 Fax (803) 896-6245

OCT 0 6 2003

JERRY GREEN
GREENS OIL CO
2457 BREEN CIRCLE
ROCK HILL SC 29732

Re: Greens Oil Co., 2849 Cherry Rd, Rock Hill, SC
UST Permit # 09344
Computer modeling report received September 24, 2003
York County

Dear Mr. Green:

Thank you for submitting the referenced report. As the concentrations of petroleum at the site exceed the Site-Specific Target Levels calculated by CBM Environmental, corrective action is necessary. A Corrective Action Plan, any necessary permit applications, a copy of the relevant portion of the tax map, and names and addresses of all property owners adjoining the impacted property should be submitted on or before November 30, 2003.

On all correspondence regarding this site, please reference the UST Permit Number. Please feel free to contact me at (803) 896-6584 or (800) 826-5435 (within SC only) if you have questions or need additional information.

Sincerely,

Read S. Miner, P.G., Hydrogeologist
State Lead and Field Services Section
Assessment and Corrective Action Division

cc: Technical File
David Clary, Ray Thomas Petroleum Co., PO Box 338, Shelby, NC 28151
Rohit Shetty, CBM Environmental, 377 Carowinds Blvd., Ste. 118, Fort Mill, SC 29708

D H E C
PROMOTE PROTECT PROSPER
2600 Bull Street
Columbia, SC 29201-1708

UNDERGROUND STORAGE TANK PROGRAM
BUREAU OF LAND AND WASTE MANAGEMENT

Phone (800) 826-5435 Fax (803) 896-6245

AUG 13 2003

JERRY GREEN
GREENS OIL CO
2457 BREEN CIRCLE
ROCK HILL SC 29732

Re: Greens Oil Co., 2849 Cherry Rd, Rock Hill, SC
UST Permit # 09344
Report received August 11, 2003
York County

Dear Mr. Green:

A review of the referenced report revealed that computer modeling results were not included to justify the Site-Specific Target Levels. Based on an August 11, 2003 telephone conversation with Holly Freisen of CBM Environmental, I was informed that the Site-Specific Target Levels presented by CBM in the referenced report were extracted from the report submitted by TET Environmental Services, Inc. in February 1997. A review of the modeling results originally submitted by TET reveals that they used the Domenico mathematical model and assumed that biodegradation was not taking place. However, site-specific data reveals that biodegradation is taking place. The Department requests that the model be calibrated with site-specific data and revised SSTLs submitted on or before September 12, 2003.

On all correspondence regarding this site, please reference the UST Permit Number. Please feel free to contact me at (803) 896-6584 or (800) 826-5435 (within SC only) if you have questions or need additional information.

Sincerely,

Read S Miner

Read S. Miner, P.G., Hydrogeologist
State Lead and Field Services Section
Assessment and Corrective Action Division

cc: Technical File
David Clary, Ray Thomas Petroleum Co., PO Box 338, Shelby, NC 28151
Rohit Shetty, CBM Environmental, 377 Carowinds Blvd., Ste. 118, Fort Mill, SC 29708

D H E C
PROMOTE PROTECT PROSPER
2600 Bull Street
Columbia, SC 29201-1708

UNDERGROUND STORAGE [illegible]K PROGRAM
BUREAU OF LAND AND WASTE MANAGEMENT

Phone (800) 826-5435 Fax (803) 896-6245

JUL 17 2003

JERRY GREEN
GREENS OIL CO
2457 BREEN CIRCLE
ROCK HILL SC 29732

Re: Greens Oil Co., 2849 Cherry Rd, Rock Hill, SC
UST Permit # 09344
Monitoring Report received July 10, 2003
York County

Dear Mr. Green:

Thank you for submitting the referenced monitoring report. Please be aware that the requested Site-Specific Target Levels and Intrinsic Corrective Action Plan (ICAP) were not included. The ICAP and SSTLs should be submitted on or before August 10, 2003.

On all correspondence regarding this site, please reference the UST Permit Number. Please feel free to contact me at (803) 896-6584 or (800) 826-5435 (within SC only) if you have questions or need additional information.

Sincerely,

Read S Miner

Read S. Miner, P.G., Hydrogeologist
State Lead and Field Services Section
Assessment and Corrective Action Division

cc: Technical File
~~David Clary,~~ Ray Thomas Petroleum Co., PO Box 338, Shelby, NC 28151

D H E C
PROMOTE PROTECT PROSPER
2600 Bull Street
Columbia, SC 29201-1708

UNDERGROUND STORAGE TANK PROGRAM
BUREAU OF LAND AND WASTE MANAGEMENT

Phone (803) 896-6240 Fax (803) 896-6245

APR 21 2003

JERRY GREEN
GREENS OIL CO
2457 BREEN CIRCLE
ROCK HILL SC 29732

Re: Green's Oil Company, 2849 Cherry Road, Rock Hill, SC
UST Permit #09344
Notice of Violation
York County

Dear Mr. Green:

Per February 11, 2003 correspondence, you were directed to submit an Intrinsic Corrective Action Plan and monitoring report on or before April 12, 2003. They have not been received. Failure to submit the report on or before May 25, 2003 will result in a referral to the Enforcement Section.

On all correspondence regarding this site, please reference the UST Permit # 09344. If you have questions concerning this correspondence, or would like to submit additional information, please contact me at (803) 896-6584.

Sincerely,

Read S. Miner, P.G., Hydrogeologist
State Lead and Field Services Section
Assessment and Corrective Action Division

cc: Technical File
David Clary, Ray Thomas Petroleum Co., PO Box 338, Shelby, NC 28151

D H E C
PROMOTE PROTECT PROSPER
2600 Bull Street
Columbia, SC 29201-1708

UNDERGROUND STORAGE TANK PROGRAM
BUREAU OF LAND AND WASTE MANAGEMENT

Phone (800) 826-5435 Fax (803) 896-6245

FEB 11 2003

JERRY GREEN
GREENS OIL CO
2457 BREEN CIRCLE
ROCK HILL SC 29732

Re: Greens Oil Co., 2849 Cherry Rd, Rock Hill, SC
UST Permit # 09344
Monitoring Report received January 21, 2003
York County

Dear Mr. Green:

Thank you for submitting the referenced report. The historical data suggests that the release is a candidate for monitored natural attenuation. Site-Specific Target Levels should be calculated and incorporated into an Intrinsic Corrective Action Plan (ICAP). The ICAP should be submitted with the next quarterly monitoring report on or before April 12, 2003.

As you may be aware, the referenced report was completed by NESCO Environmental. Since that time, NESCO has been de-certified. Please let me know as soon as possible which certified site rehabilitation contractor you have selected for the required work.

On all correspondence regarding this site, please reference the UST Permit Number. Please feel free to contact me at (803) 896-6584 or (800) 826-5435 (within SC only) if you have questions or need additional information.

Sincerely,

Read S. Miner, P.G., Hydrogeologist
State Lead and Field Services Section
Assessment and Corrective Action Division

cc: Technical File
~~David~~ Clary, Ray Thomas Petroleum Co., PO Box 338, Shelby, NC 28151

D H E C
PROMOTE PROTECT PROSPER
2600 Bull Street
Columbia, SC 29201-1708

UNDERGROUND STORAGE TANK PROGRAM
BUREAU OF LAND AND WASTE MANAGEMENT

Phone (800) 826-5435 Fax (803) 896-6245

NOV 12 2002

JERRY GREEN
GREENS OIL CO
2457 BREEN CIRCLE
ROCK HILL SC 29732

Re: Greens Oil Co., 2849 Cherry Rd, Rock Hill, SC
UST Permit # 09344
York County

Dear Mr. Green:

Per correspondence dated June 15, 2000, you were directed to initiate a quarterly sampling program for the referenced facility with the first report due on or before October 12, 2000. The first quarterly report was submitted October 30, 2000 and the second on January 25, 2001. The third quarterly report is now more than 19 months overdue. The next quarterly monitoring report shall be submitted on or before January 12, 2003.

On all correspondence regarding this site, please reference the UST Permit Number. Please feel free to contact me at (803) 896-6584 or (800) 826-5435 (within SC only) if you have questions or need additional information.

Sincerely,

Read S. Miner, P.G., Hydrogeologist
State Lead and Field Services Section
Assessment and Corrective Action Division

cc: Technical File
David Clary, Ray Thomas Petroleum Co., PO Box 338, Shelby, NC 28151

D H E C

PROMOTE PROTECT PROSPER

South Carolina Department of Health and Environmental Control

Report On Records Destroyed
Records and Forms Management Unit
(UST Program ONLY)

1. Return this form to:
DHEC Forms Manager-Heritage Building
1777 St. Julian Place
Columbia, SC 29204

The records listed below have been disposed of in accordance with provisions of the Public Records Act, Code of Laws of South Carolina, 1976, Sections 30-1-10 through 30-1-140, as amended, and approved Records Retention Schedules.

2. Signature: 3. Date:

Records Officer signature:

4. Record Series Titles	5. Record Series #	6. Inclusive Dates	7. Volume (cubic footage)	8. Date of Destruction
Monitoring Report	13300	6/00	.01	11-7-02
MR	13300	10/00	.01	11-7-02
MR	13300	3/94	.01	11-7-02
*Documents put in recycle box on date of destruction.			9) .03	Total cubic Feet destroyed

SITE ID # 09344 FACILITY NAME: Greens 01

REVIEWED BY Reed Miner

Ingenuity At Work

NESCO

NESCO, Inc.
521 Clemson Road
Columbia, South Carolina 29229
Telephone 803-699-1976

Telefax 803-699-9863
Toll Free 1-800-379-3688

www.nesco-usa.com

January 23, 2001

Ms. Charles J. Williams, III
Bureau of UST Management
SCDHEC
2600 Bull Street
Columbia, SC 29201

RE: Green's Oil Company
Site ID # 09344
Quarterly Groundwater Monitoring Report
NESCO Report No. 21-1082c

Dear Mr. Williams:

Please find enclosed a copy of the 2nd Quarterly Groundwater Monitoring Report for the above referenced site.

Please feel free to call me at (803) 699-1976 if you have any questions about this report.

Sincerely,
National Environmental Service Company

Sheliaand D. Washington

Sheliaand D. Washington
Environmental Scientist

Enclosure:

Monitoring Report

Ingenuity At Work

NESCO

NESCO, Inc.
521 Clemson Road
Columbia, South Carolina 29229
Telephone 803-699-1976

Telefax 803-699-9863
Toll Free 1-800-379-3688

www.nesco-usa.com

October 27, 2000

Mr. Charles J. Williams, III
Bureau of UST Management
SCDHEC
2600 Bull Street
Columbia, SC 29201

RE: Groundwater Sampling Report
Green's Oil Company
UST Permit # 09344
Rock Hill, South Carolina
York County

Dear Mr. Williams:

Please find enclosed a copy of the Groundwater Monitoring Report for the above referenced site.

Please feel free to call me at (803) 699-1976 if you have any questions about this report.

Sincerely,
National Environmental Service Company

Sheliaand D. Washington

Sheliaand D. Washington
Environmental Scientist

Enclosure:

Groundwater Monitoring Report

D H E C
PROMOTE PROTECT PROSPER
2600 Bull Street
Columbia, SC 29201-1708

BUREAU OF
UNDERGROUND STORAGE TANK MANAGEMENT

Phone (803) 898-4350 Fax (803) 898-4330

JUN 15 2000

Greens Oil Company
Mr. Jerry C. Green
2457 Breen Circle
Rock Hill, SC 29732

Re: Greens Oil Co.
UST Permit #09344, Release #1
Monitoring Report received June 12, 2000
York County

Dear Mr. Green:

The Bureau of Underground Storage Tank Management of the South Carolina Department of Health and Environmental Control has reviewed the referenced report. The Bureau is requesting that quarterly sampling events begin for all chemicals of concern on all monitoring wells with the first sampling event occurring in September 2000 with a report of findings due on or before October 12, 2000.

On all correspondence regarding this site and scope of work, please reference UST Permit #09344. If you have any questions concerning this correspondence, please contact me at (803) 898-4339 or 1-800-826-5435.

Sincerely,

Charles J. Williams, III, Hydrogeologist
State Lead and Field Services Section
Assessment and Corrective Action Division
Bureau of Underground Storage Tank Management

cc: NESCO, 521 Clemson Rd., Columbia, SC 29229
Technical File
Read File

NESCO, Inc.

For Practical Solutions

June 9, 2000

Mr. Charles J. Williams
Division of Underground Storage Tank Management
South Carolina Department of Health and Environmental Control (SCDHEC)
2600 Bull St.
Columbia, SC 29201

Re: Green's Oil Company
Site ID #09344
Groundwater Monitoring Report
NESCO Report No. 21-823c

Dear Mr. Williams:

Please find enclosed a copy of the Groundwater Monitoring Report for the above referenced site.

Please feel free to call me at (803) 699-1976 if you have any questions about this report.

Sincerely,
National Environmental Service Company

Sheliaand D. Washington

Sheliaand D. Washington
Environmental Scientist

Enclosure:

Groundwater Monitoring Report

521 Clemson Rd. • Columbia, SC 29229-4307 • 803-699-1976 • Fax 803-699-9863

D H E C
PROMOTE PROTECT PROSPER
2600 Bull Street
Columbia, SC 29201-1708

BUREAU OF
UNDERGROUND STORAGE TANK MANAGEMENT

Phone (803) 898-4350 Fax (803) 898-4330

MAR 22 2000

CERTIFIED MAIL
Z 326 700 961

Greens Oil Company
Attn: Mr. Jerry C. Green
2849 Cherry Road
Rock Hill, SC 29730

Re: Greens Oil Company
UST Permit #09344, Release #1
York County
Notice of Violation

Dear Mr. Jerry C. Green:

The Bureau of Underground Storage Tank (UST) Management of the South Carolina Department of Health and Environmental Control directed you to complete an Monitoringevent in August 1999 with the report due in October 1999. To date the required report has not been received. In accordance with Section 280.65 of the South Carolina Underground Storage Tank Regulations the assessment must be conducted as documented chemicals of concern are above the risk-based-screening levels.

Implementation of this scope of work should proceed upon receipt of this correspondence. **The Monitoring Report must be submitted within 60 days from the date of this letter. If the report is not received in accordance with this schedule, enforcement procedures will be initiated.**

On all correspondence regarding this site, please reference UST Permit #09344. If you have any questions concerning this correspondence, please call me at (803) 898-4339 or 1-800-826-5435 (within South Carolina only).

Sincerely,

Charles J. Williams, III, Hydrogeologist
State Lead and Field Services Section
Assessment and Corrective Action Division
Bureau of Underground Storage Tank Management

cc: Technical File
Read File

SCDHEC/UST/SLFSS/novra/3.21.00

D H E C
PROMOTE PROTECT PROSPER
2600 Bull Street
Columbia, SC 29201-1708

DIVISION OF
UNDERGROUND STORAGE TANK MANAGEMENT

Phone (803) 898-4339 Fax (803) 898-4330

AUG 09 1999

Greens Oil Company
Mr. Jerry C. Green
2849 Cherry Road
Rock Hill, SC 29730

Re: Greens Oil Co.
UST Permit #09344, Release #1
York County

Dear Mr. Green:

The Division of Underground Storage Tank Management of the South Carolina Department of Health and Environmental Control has reviewed the referenced file. The Division is requesting that a comprehensive sampling event of all chemicals of concern be performed on all monitoring wells for the UST release and that a monitoring report be submitted within 60 days from the date of this letter.

On all correspondence regarding this site and scope of work, please reference UST Permit #09344. If you have any questions concerning this correspondence, please contact Chuck Williams at (803) 898-4339 or 1-800-826-5435.

Sincerely,
State Lead and Field Services Section
Assessment and Corrective Action Branch
Division of Underground Storage Tank Management

Charles J. Williams, III, Hydrogeologist

Christopher S. Doll, P.G., Manager

cc: Technical File
Read File

D H E C

PROMOTE PROTECT PROSPER

South Carolina Department of Health and Environmental Control

Report On Records Destroyed
Records and Forms Management Unit
[UST Program ONLY]

1. Return this form to:
Records and Forms Management Unit
2600 Bull Street
Columbia, SC 29201

The records listed below have been disposed of in accordance with provisions of the Public Records Act, Code of Laws of South Carolina, 1976, Sections 30-1-10 through 30-1-140, as amended, and approved Records Retention Schedules.

2. Signature: Catharine Kuchinsky

3. Title: Program Coordinator Date: 1/6/99

Agency Records Officer signature:

4. Record Series Titles	5. Record Series #	6. Inclusive Dates	7. Volume (cubic footage)	8. Date of Destruction*
Assessment Plan	09344	6-12-92	.01	1-7-99
*Documents put in recycle box on date of destruction			9) .01	Total Cubic Feet destroyed

SITE ID #: 09344 FACILITY NAME: Country Market #2

REVIEWED BY NAME: READ S MINER

South Carolina
DHEC
Department of Health and Environmental Control
2600 Bull Street, Columbia, SC 29201-1708

January 9, 1997
Expiration Date: April 28, 1997

Mr. Jerry Green
Green's Oil Company
2849 Cherry Road
Rock Hill, South Carolina 29730

Re: Green's Texaco
Site ID #: 09344
Wastewater Disposal Request received January 7, 1997
York County

Dear Mr. Green:

The Underground Storage Tank (UST) Program hereby grants approval to TET Environmental Services, Inc. to treat and dispose of approximately 55 gallons (1 drum), of purge water from the referenced underground storage tank facility to the Water Recovery Systems in Charleston, South Carolina. Disposal of the water may proceed with the following restrictions:

1. Transportation and treatment must comply with all South Carolina rules and conditions.

2. Prior approval must be obtained from the appropriate treatment/disposal facility officials.

3. The waste must be compatible with the treatment/disposal facility and not adversely affect the safe and efficient operation of the unit.

4. There can be no spillage or leakage during transport.

5. All State and Federal Air Quality Regulations must be strictly complied with.

6. This approval will be for one time only and is invalid after April 28, 1997.

7. Reimbursement from the State Underground Petroleum Environmental Response Bank (SUPERB) Account for disposal of contaminated ground water is not approved. The report must document the quantity and date of ground water disposal.

Sincerely,

Charles J. Williams III, Hydrogeologist
State Lead and Field Services Section
Assessment and Corrective Action Division
Bureau of Underground Storage Tank Management

cc: Mr. William Schaeffer, TET Environmental Services, Inc.
Catawba District, EQC
Technical File

SOUTHEASTERN SOIL RECOVERY, INC.

PLEASE DELIVER TO THE FOLLOWING PERSON:

NAME: CHUCK WILLIAMS

LOCATION: UST

FROM: CHRIS LOCK

(If you do not receive all pages, please call (803) 566-7065 or 566-7067 as soon as possible.)

TOTAL NUMBER OF PAGES INCLUDING COVER: 2

TIME: 8:20AM **DATE:** 1-9-97

COMMENTS:

RECEIVED
JAN 09 1997
Bureau of Underground
Storage Tank Management

Specializing in Remediating Petroleum Contaminated Soil

P.O. Box 70253 • Charleston, SC 29415 • (803) 566-7065 FAX (803) 566-7066

WATER RECOVERY SYSTEMS LLC

PO Box 70971 • Charleston, SC 29415
(803) 566-7067 • FAX: (803) 566-7066

January 8, 1996

SCDHEC
Attn: Chuck Williams
Bureau of UST Management
2600 Bull Street
Columbia, SC 29201

RE: Green's Texaco-Rock Hill, SC GWPD #09344

Dear Mr. Williams:

Water Recovery Systems, LLC, can properly treat and dispose of 1 drum of purge water from the above referenced location.

Please call the office if you have any questions.

Sincerely,

WATER RECOVERY SYSTEMS, LLC

Christopher M. Lock
Director of Compliance

cc: Ted Schaeffer

TET Environmental Services, Inc.

January 2, 1997

Mr. Chuck Williams
Technical Section
Bureau of UST Management
SCDHEC
2600 Bull Street
Columbia, SC 29201

Re: Green's Texaco GWPD# 09344

Dear Mr. Williams,

TET would like to request permission to dispose of one drum of water which was generated during the Rapid Assessment activities at the above mentioned site. TET would like to dispose of this material at Southeastern Soil Recovery, Inc. in Charleston, SC.

If you have any questions, please feel free to contact me about this matter at (803) 699-1976.

Sincerely,

William Schaeffer
Project Geologist

1/7/97 TALKED TO CHRIS LOCK - WILL ACCEPT WATER - SOUTHEASTERN SOIL RECOVERY - SENDING LETTER

South Carolina
DHEC
Department of Health and Environmental Control
2600 Bull Street, Columbia, SC 29201-1708

September 10, 1996

Mr. Jerry Green
Green's Oil Company
2849 Cherry Road
Rock Hill, SC 29730

Re: Monitoring Report received 8/13/96
Green's Texaco
SITE ID# 09344
York County

Dear Mr. Green:

The Bureau of Underground Storage Tank Management of the South Carolina Department of Health and Environmental Control (SCDHEC) has reviewed the above referenced report. The Bureau requests that a Risk-Based Corrective Action Tier II Evaluation be performed. This evaluation should establish exposure, compliance points, and Site-Specific Target levels for the Chemicals of Concern per the Risk-Based Corrective Action guidelines. Based on the Tier II evaluation a recommendation for the type of corrective action (active or intrinsic) necessary should be made. The Tier Evaluation Report should be submitted to this office on or before **November 8, 1996.**

If you have any question, please call me at (803) 734-5455.

Sincerely,

Todd Adams, Hydrogeologist
Assessment and Corrective Action Division
Bureau of Underground Storage Tank Management

cc: William Wimberly, TET Environmental Services
Mike Kirchhoff, Federated Insurance Company, 121 East Park Square, PO Box 328, Owatonna, MN 55060

South Carolina
DHEC
Department of Health and Environmental Control
2600 Bull Street, Columbia, SC 29201-1708

July 23, 1996

CERTIFIED MAIL

Mr. Jerry Green
Green's Oil Company
2849 Cherry Road
Rock Hill, SC 29730

Re: Monitoring Report requested 3/20/96
Green's Texaco
SITE ID# 09344
York County

Dear Mr. Green:

The Bureau of Underground Storage Tank Management of the South Carolina Department of Health and Environmental Control (SCDHEC) requested the above referenced report in the March 20, 1996 correspondence. The Monitoring Report has not been received by this office as of this date. The ground-water quality has to be monitored at this site to evaluate the potential threat the contamination presents to human health and the environment and the necessary corrective action that will be required for this release. Ground-water samples should be collected from all monitoring wells and analyzed for the chemical of concern per the March 20, 1996 correspondence. Please submit the Monitoring Report to this office on or before **September 30, 1996.**

Failure to comply with this request will result in initiation of enforcement procedures. If you have any question, please call me at (803) 734-5455.

Sincerely,

Todd Adams, Hydrogeologist
Federal Section
Bureau of Underground Storage Tank Management

cc: William Wimberly, TET Environmental Services
Mike Kirchhoff, Federated Insurance Company, 121 East Park Square, PO Box 328, Owatonna, MN 55060

South Carolina
DHEC
Department of Health and Environmental Control
2600 Bull Street, Columbia, SC 29201-1708

F
3/20/96

March 20, 1996

Mr. Jerry Green
Green's Oil Company
2849 Cherry Road
Rock Hill, SC 29730

Re: Monitoring Report received 3/04/96
Green's Texaco
SITE ID# 09344
York County

Dear Mr. Green:

The Bureau of Underground Storage Tank Management of the South Carolina Department of Health and Environmental Control (SCDHEC) has reviewed the above referenced submittal and all available file data. The data indicates that the extent of the Benzene, Toluene, Ethyl-benzene, and Xylenes (BTEX) contaminant plume has been delineated but not the high concentrations of Methyl Tert-Butyl Ether (MTBE). The receptor survey indicates that a drinking water supply well is being utilized on the Jim's Satellite and T&S Auto Sales properties. To insure the quality of the drinking water supplied by that well, the Department requests that the following be performed:

- A sample be collected from the drinking water supply well on the Jim's Satellite and T&S Auto Sales Properties and analyzed for BTEX and MTBE.
- A monitoring well be installed between MW-5 and the drinking water supply well to act as a compliance point. This monitoring well should be installed down-gradient of MW-5 and sufficiently up-gradient of the drinking water supply well as to give adequate time (1 to 2 years) to take corrective action measures if the compliance well should become impacted.
- A Corrective Action Plan (four copies) should be prepared and submitted.

A monitoring well approval form has been sent to your environmental consultant and a copy enclosed for your records. Please install the additional monitoring well and sample both it and the drinking water supply well at Jim's Satellite and T&S Auto Sales Properties. The analytical results and the monitoring well constructions details should be submitted in a concise report to this office on or before **May 10, 1996.** The Corrective Action Plan (four copies) should be prepared and submitted to this office on or before **June 28, 1996.**

On all future correspondence please reference the **Site ID number 09344.** If more time is needed to perform the requested work or you have any questions, please call me at (803) 734-5455.

Sincerely,

Todd Adams, Hydrologist
Federal Section
Bureau of Underground Storage Tank Management

cc: Alex Amos, Catawba EQC
William Wimberly, TET Environmental Services
Mike Kirchhoff, Federated Insurance Company, 121 East Park Square, PO Box 328, Owatonna, MN 55060

South Carolina
DHEC
Department of Health and Environmental Control
2600 Bull Street, Columbia, SC 29201-1708

Monitoring Well Installation Approval Form

Date of Issue: March 20, 1996 Approval No.:6932

Approval is hereby granted to: TET Environmental Services
(on behalf of): Green's Oil Company

Site ID#: 09344
County: York

This approval is for the construction of one monitoring well in accordance with the SC Well Standards and Regulations. The well is to be constructed for the intended purpose of monitoring groundwater at the referenced facility. Approval is provided with the following conditions:

1. The latitude and longitude, surveyed elevations, boring and/or geologist logs and actual (as built) construction details for each well be submitted to Todd Adams.

2. Each well shall be labeled with an identification plate constructed of a durable material affixed to the casing or surface pad where it is readily visible. The plate shall provide monitoring well I.D.#, date of construction, static water level, and driller name and state certification #.

3. Well construction and sampling derived waste including, but not necessarily limited to, drill cuttings, drilling fluids, development and purge water should be managed properly and in compliance with applicable requirements. If containerized, each vessel should be clearly labeled with regard to contents, source, and date of activity.

4. A minimum of forty-eight (48) hours prior to initiation of drilling activities, please provide notice to Alex Amos, Catawba EQC District Office (803-285-7461).

5. Monitoring wells shall be installed by a well driller certified by the State of South Carolina.

This approval is pursuant to the provisions of Section 4-5540 of the 1976 South Carolina Code of Laws and the Department of Health and Environmental Control Regulations R.61-71.

Approved by: Todd Adams

Todd Adams, Hydrologist
Federal Section
Bureau UST Management

cc: Mr. Green, Green's Oil Company
Alex Amos, Catawba EQC District Office

South Carolina
DHEC
Department of Health and Environmental Control
2600 Bull Street, Columbia, SC 29201

March 16, 1994

Mr. Jerry Green
2849 Cherry Road
Rock Hill, SC 29730

Re: Greens Texaco, GWPD #09344
UIC Application received March 9, 1994
York County

Dear Mr. Green:

Enclosed is a Permit to Construct for one (1) Class VA-G (Experimental Technology) injection wells at the referenced site as per your request dated March 9, 1994. Please note this permit is for the construction of the system.

If you have any questions, please feel free to call me at (803) 734-4672.

Sincerely,

Robert Devlin, Hydrogeologist
Assessment and Development Section
Ground Water Protection Division
Bureau of Drinking Water Protection

CC: Sriram Madabhushi, SCDHEC
Will Lyons, TET Environmental

South Carolina
DHEC
Department of Health and Environmental Control
2600 Bull Street, Columbia, SC 29201

GROUND-WATER PROTECTION DIVISION

Injection Well Construction Permit
for

Class II, III, and V.A. Injection Well(s)

Permit # 160

Date Issued: March 18, 1994
Expiration Date: March 18, 1995

For (Operator): Jerry Green
2849 Cherry Road
Rock Hill, SC 29730

In accordance with provisions of Title 48, Chapter 1, South Carolina Code of Laws, 1976, as amended, permission is granted for construction of one (1) Class V.A.-G injection well at the Greens Texaco Station, 2849 Cherry Road, York, South Carolina, with the following provisions:

1) The operator shall submit completed SCDHEC well record forms to the Department's Ground-Water Protection Division after the completion of the injection wells.

2) Upon completion of construction, injection activities **shall not** commence prior to receiving approval to operate these injection wells from the Department.

3) When the injection well(s) is no longer in use, or upon request by the Department, within 60 days all injection wells must be permanently abandoned in accordance with the South Carolina Well Standards and Regulations (R.61-71.10).

Robert Devlin
Assessment & Development Section
Ground-Water Protection Division
Bureau of Drinking Water Protection

March 18, 1994
Date

DHEC 2104 (6/88)

STATEMENT OF BASIS - UIC DRAFT PERMIT #160

In accordance with the South Carolina Underground Injection Control Regulations, Section R61-87.12,J., this "Statement of Basis" has been prepared for Greens Texaco Underground Injection Control permit received March 9, 1994.

Ownership and operator of the proposed injection wells is Jerry Green. The permit (UIC #160) is for the construction of 1 (1) injection well for use in an air sparging pilot test at Greens Texaco, Highway 21, Rock Hill, South Carolina. The intent of the injection wells are to facilitate insitu air stripping and enhance biodegradation by the injection of ambient atmospheric air into the subsurface. A permit for the underground injection proposal has been prepared based on staff review the application of the Pollution Control Act of South Carolina and the Underground Injection Control Regulations of South Carolina.

Conditions of the permit issuance include the submittal of well records for all injection wells installed and the inspection of well construction by the Department prior to injection.

South Carolina
DHEC
Department of Health and Environmental Control
2600 Bull Street, Columbia, SC 29201

Date: OCT 0 1 1993

GREEN'S OIL CO
2849 CHERRY ROAD
ROCK HILL, SC 29731

GWPD Site # N-46-NO-09344 GREEN'S OIL CO
Underground Storage Tank Release
Priority Ranking

Dear Underground Storage Tank Owner:

All releases from regulated underground storage tanks that have been reported to this Department have been prioritized using a ranking system that evaluates environmental and health related factors. The ranking system identifies those sites that represent the most serious threats where the Department should be allocating available SUPERB monies.

Currently, the referenced site ranks higher than many other sites (i.e., represents a significant environmental or health threat). Please note that no site rehabilitation activities have been initiated to date. SCDHEC will notify you when direct billing is an available option for this site. At that time, directives on initiating site rehabilitation actions (investigation and possibly cleanup) via direct billing will be provided.

However, pursuant to R.61-92, § 280.65, the SCDHEC will provide expedited reviews of technical work plans should you wish to proceed with site rehabilitation activities and seek reimbursement upon completion. Please note that reimbursement typically takes a much longer period of time to process and that SUPERB monies are dispersed for reimbursement only so long as funds are available. Reimbursement requests are processed by SCDHEC in chronological order of receipt.

If you have any further questions, please contact Mr. David Baize or Mr. Chris Doll at 734-5331.

Sincerely,

Stanley L. Clark, P.G., Director
Ground-Water Protection Division
Bureau of Drinking Water Protection

slc/odj

cc: TET
CATAWBA DISTRICT EQC

South Carolina
DHEC
Department of Health and Environmental Control
2600 Bull Street, Columbia, SC 29201

July 8, 1993

Mr. Jerry Green
c/o Green's Oil Company
2849 Cherry Road
Rock Hill, SC 29730

Re: Green's Texaco
GWPD Site ID #09344
Phase II Hydrogeologic Assessment Report
received November 18, 1991
York County

Dear Mr. Green:

The Ground-Water Protection Division of the South Carolina Department of Health and Environmental Control (SCDHEC) is in receipt of the above referenced submittal prepared by Tank & Environmental Testing, Inc. (TET). Given the time lapse since the last sampling event (October 3, 1991), data contained within the above-referenced report might be suspect given the changing nature of site conditions over time. This office is requesting that additional groundwater samples (BTEX & MTBE) be taken from the eight existing monitoring wells. Based upon these results, additional wells may be proposed if it is determined that the horizontal and vertical extent of contamination can no longer be ascertained from the existing wells. Please submit the analytical results to this office on or before August 6, 1993.

On all correspondence concerning this site, please reference GWPD Site ID #09344. If there are any questions concerning this project, please call me at (803) 734-5602.

Sincerely,

Jim White, Hydrogeologist
UST Corrective Action Section
Ground-Water Protection Division
Bureau of Drinking Water Protection

GREENTEX.693

cc: Paul Bristol, Central Midlands District EQC
Jan Reynolds, TET, Inc.
Barbara Munkel, Federated Insurance Company
P.O. Box 31716
Tampa, FL. 33631-0155

Tank & Environmental Testing, Inc.

November 11, 1991

Mr. Randy Chapman
SCDHEC
2600 Bull Street
Columbia, S. C.

Re: Phase II Assessment Report
Green's Texaco (PCAS 7123)
Rock Hill, S. C.

Mr. Chapman;

Enclosed you will find the Phase II Hydrogeologic Assessment Report at the referenced site.

If you have any questions or comments regarding the proposal, please give us a call at 754-3688.

Sincerely,

Chris Prince

Christopher M. Prince, Ph.D.
Project Hydrogeologist

cc: Mr. Barbara Munkel
Federated Insurance Company

Mr. Jerry Green
Green's Texaco

1700 Alta Vista Drive, Suite 110 • Columbia, S.C. 29223 • (803) 754-3688, FAX (803) 754-7836

Dear Randy,

As I was going through the worst case results, I noticed this wierd compound (Bis (2-Ethylhexyl.....). No one at the office had ever heard of the stuff, so I put in a bunch of phone calls to the labs we use. As I was waiting for a return call from one of the labs, I decided to write-up the paragraph anyway. The following is from a fertile, but under-utilized mind. We all got a kick ~~of~~ out of this, hope you do too.

Chris Prince

The worst case well analysis of MW-2 revealed a Ph of 6.6 S.U., a biochemical oxygen demand of 140 mg/l, and a lead level of 0.010 mg/l. The only semi-volatile organic contaminant found in concentrations above the detection limit was Bis(2-Ethylhexyl) Phthalate, an organic compound commonly used by junkies to clean their outfits before injection also as an additive to dry cleaning solutions. Traces of this compound have also been detected in confiscated samples of crack cocaine from downtown, and in the Shroud of Turin (Estaba, 1991).

Aquifer Tests

The site is underlain by highly argillaceous saprolites, therefore it is not surprising that aquifer testing at the site revealed very low conductivities and transmissivities. The hydraulic conductivity ranged from 0.01914 to 0.1416 ft/day (Appendix V). Transmissivities range from 0.00743 to 0.0171 to 3.604 ft^2/day. Using the greatest hydraulic gradient of 0.019 ft/ft and an assumed effective porosity of 45%, the measured hydraulic conductivities suggest a maximum ground water velocity ranging between 0.0008 and 0.006 ft/day.

File

South Carolina
DHEC
Department of Health and Environmental Control
2600 Bull Street, Columbia, SC 29201

August 28, 1991

Mr. Jerry C. Green
Green's Oil Company
2849 Cherry Road
Rock Hill, SC 29730

RE: Green's Texaco
GWPD Site ID: #09344
Assessment Plan received April 15, 1991
York County

Dear Mr. Green:

The Ground-Water Protection Division (GWPD) of the South Carolina Department of Health and Environmental Control (SCDHEC) has reviewed the above referenced submittal. The analytical results from the sampled monitoring wells indicate the contaminants may be confined to the immediate area of the underground storage tank (UST) basin. However, as proposed in the referenced report\plan, additional monitoring well may be necessary. Therefore, installation of three (3) water table monitoring wells designated MW-5, MW-6, and MW-7, and one (1) deep monitoring well designated PW-8 (pit cased) is approved with the following conditions:

- The water table monitoring well designated MW-5 is moved to the east and installed as close to Highway 21 as possible (power lines);
- the one (1) deep (PW-8) monitoring well is paired with MW-5, as identified in the referenced submittal;
- the water table well designated MW-7 is installed northeast of existing MW-2 (in the vicinity of B-3);
- groundwater is sampled from **all** on-site monitoring wells and analyzed with EPA method 8020 (BTEX), and for MTBE;
- any and all borings which are not converted to monitoring wells are to be properly abandoned according to SC Well Standards and Regulations.

This information, as well as all pertinent site data, should be included in an Assessment Report (AR) and submitted to this office on or before **October 15, 1991.** A copy of the monitoring well approval issued to Tank and Environmental Testing is enclosed.

As indicated above, an additional water table monitoring well, MW-7, is approved. This office requests the installation of this well in addition to the proposed water table wells. The additional well will allow a better understanding of site conditions and the extent of contamination.

Regarding the deep monitoring well, the top of the screen in PW-8 should be a least fifteen (15) feet below the bottom of the screen in MW-5. The screen in PW-8 should also be no more than five (5) feet in length.

The referenced plan indicates groundwater will be analyzed for Total Petroleum Hydrocarbons (TPH). This office neither requires this analysis nor recommends the use of this analysis at this time.

The SCDHEC is recently created a new database which allows the GWPD to "track" all sites throughout the history of the project. All sites will be "tracked" by the **GWPD Site ID**. This number is the last five digits of the underground storage tank (UST) notification/registration number. Please refer to this number for all future correspondence.

If you have any questions, please call me at (803) 734-5334.

Sincerely,

Randy Chapman, Hydrogeologist
UST State Corrective Action Section
Ground-Water Protection Division
Bureau of Drinking Water Protection

rc/7123b.asp

enc: Monitoring Well Approval

cc: Mark Holmes, TET
Paul Bristol, Catawba District EQC

South Carolina
DHEC
Department of Health and Environmental Control
2600 Bull Street, Columbia, SC 29201

Monitoring Well Approval

Approval is hereby granted to: Tank & Environmental Testing
1700 Alta Vista Dr., Suite 110
Columbia, SC 29223

RE: Green's Texaco
Rock Hill, South Carolina

for the construction of three (3) water table monitoring wells designated MW-5, MW-6, and MW-7, and one (1) deep monitoring well designated PW-8 (pit cased), in accordance with the specifications submitted to the SCDHEC on April 15, 1991, and the correspondence submitted from this office to Green's Oil Company on August 28, 1991.

The three (3) water table monitoring wells will be installed to the approximate depth of X feet below the surface and screened to bracket the water table. The one (1) deep monitoring well will be to assess the vertical extent of contamination. All wells will be for the purpose of ongoing groundwater assessment and remediation.

Conditions: The latitude and longitude and actual construction details for the well shall be submitted to this office. Paul Bristol of the Central Midlands District EQC (935-7015) should be notified at least 72 hours prior to well installation.

This approval is pursuant to the provisions of Section 44-55-40 of the 1976 South Carolina Code of Laws and the SC Well Standards and Regulations.

Date of Issue: August 28, 1991

Signed For

James R. Hess, P.G., Manager
UST State Corrective Action Section
Ground-Water Protection Division
Bureau of Drinking Water Protection

rc/#09344
0828912529

cc: Paul Bristol, Central Midlands District EQC

FEDERATED INSURANCE
PO BOX 31716
TAMPA FL 33631-3716
Ph:(813)287-0155
TOLL FREE (800)282-9158 FL/(800)237-8292 SE STATES

7 3 MB

March 8, 1991

ATTN: MR JAMES R HESS SECTION MANAGER
GROUNDWATER PROTECTION DIVISION
BUREAU OF DRINKING WATER PROTECTION
SOUTH CAROLINA DEPT OF HEALTH & ENVIRONMENTAL CONTROL
2600 BULL STREET
COLUMBIA SC 29201

OUR CLAIM NO.:	63Z-571
OUR INSURED:	GREEN'S TEXACO STATION
LOSS LOCATION:	2849 CHERRY ROAD ROCK HILL, SC

This will confirm your recent meeting with Joe Matrai of Federated Mutual. Mr. Green has turned in a claim to us on the above listed location. We are providing coverage for this claim according to the terms of our insurance contract. This policy has a $25,000.00 deductible. While we have begun making payment on this claim, this took place only after Mr. Green satisfied us that $25,000.00 of allowable expenses have been paid by our insured, or in this case, the South Carolina SUPERB Program. Mr. Green's policy also has a $500,000.00 per incident limit, and once we expend that amount, we will be unable to make any further payment on this claim. We would also like to point out that any future payment made on Mr. Green's claim will be in accordance with the insurance contract, and it is possible that Mr. Green will incur remediation expenses in the future which we will be unable to provide coverage for. These matters will have to be addressed as they arise.

We hope that by this letter you will no longer pursue a reimbursement of the $25,000.00 payment that the SUPERB Program made to Mr. Green. Mr. Green's policy with Federated can provide no payments for that initial $25,000.00.

If you have any questions or need additional information, please don't hesitate to contact us. We appreciate your cooperation on this matter.

Curtis Silvey
Curtis Silvey
Claims Examiner
tmb

cc: Mr. Jerry Green

File

South Carolina
DHEC
Department of Health and Environmental Control
2600 Bull Street, Columbia, SC 29201

February 13, 1991

Mr. Jerry C. Green
Green's Oil Company
2849 Cherry Road
Rock Hill, SC 29730

Re: Green's Texaco (PCAS 7123)
Correspondence received February 8, 1991
York County

Dear Mr. Green:

The Ground-Water Protection Division of the South Carolina Department of Health and Environmental Control (SCDHEC) has reviewed the reference correspondence from Tank and Environmental Testing (TET). The correspondence was generated in response to comments from the SCDHEC concerning the November 12, 1990 assessment plan. In response to the request by TET, the project has been reviewed by SCDHEC a second time. The following comments are provided:

1) The April 25, 1990 assessment report submitted by TET recommended that no further monitoring wells be installed. However, the report also states that ground water remediation will be required, which would appear to be a contradiction. A ground water recovery and treatment system cannot be properly designed, nor the effectiveness property monitored without completely defining the extent of the dissolved plume, both vertically and horizontally. The horizontal extent of dissolved contamination cannot be defined in all directions from a single well. TET, in a report received April 26, 1990, documented (with a potentiometric surface map) the existence of a complex ground water flow pattern at this site. The complex ground water flow pattern further stresses the need for addition monitoring wells to adequately define the horizontal extent of the contamination.

2) TET previously installed three soil borings at this site. No soil or water samples were collected for laboratory analysis, thus no analytical data concerning the extent of contamination in the soil or ground water was generated. While the use of organic vapor levels is appropriate to locate ground-water monitoring wells, this data is unreliable and cannot be used as a substitute for

laboratory analysis, Therefore, the proposed 2 to 4 additional soil borings would produce little additional information concerning the quality of the ground water at this site.

3) TET has stated in all three submittals that ground water in the surficial aquifer is hydraulically connected to, and is a recharge zone for, the bedrock aquifer. The well log for monitor well MW-3 shows that the well is installed to the saprolite/bedrock interface. Analytical results from this well indicate that high concentrations of dissolved contaminants are present at the top of bedrock. Since the surficial aquifer is impacted and is hydraulically connected to the bedrock aquifer acting as a recharge zone, there is a strong possibility that the bedrock aquifer has also been impacted.

The installation of an additional monitoring wells into the bedrock and downgradient to further define the dissolved plume should proceed. Proper drilling techniques and well construction will eliminate the possibility of downward migration of the contaminants within the borehole. Standard practice is to case off the saprolite prior to proceeding into the fractured system below. A revised assessment plan is due April 14, 1991.

The referenced correspondence states that Federated Insurance is now the responsible financial party for the site. The Ground-Water Protection Division of the South Carolina Department of Health and Environmental Control (SCDHEC) will need to be reimbursed for all funds paid from the State Underground Petroleum Environmental Response Bank (SUPERB) for work done at Green's Texaco. A summary of those expenses is listed below:

Reimbursement

o Invoice # 0052	$6360.00
o Invoice 07/20/89	$ 660.00
o Invoice 07/20-09/12	$5670.00
o Invoice # 2003	$1470.00
sub total	$14160.00

Direct Billing

o Invoice # 904-138	$11418.34
sub total	$11418.34
Total	$25578.34

If you have any questions, please contact me at (803) 734-5335.

Sincerely,

James R. Hess

James R. Hess, P. G., Manager
Trust Section
Ground Water Protection Division
Bureau of Drinking Water Protection

cc: Tommy Hyde, Appalachia II District EQC
Catawba District EQC
TET, Inc.

Tank & Environmental Testing, Inc.

February 6, 1991

Ms. Barbara Blackledge
SCDHEC
Ground-water Protection Division
2600 Bull Street
Columbia, South Carolina 29201

Re: Correspondence received February 4, 1991
Green's Texaco (PCAS 7123)
Rock Hill, South Carolina

Ms. Blackledge:

On February 4, 1991, Tank & Environmental Testing, Inc. (TET) received a copy of a correspondence from Mr. Robert Devlin of the Assessment and Development Section addressed to Mr. Jerry C. Green of Green's Oil Company. The letter is in reference to the Phase II Hydrogeologic Assessment Proposal submitted to the Department on November 12, 1990. Mr. Devlin indicated that the proposal, as submitted, was not approvable. He addressed six specific points that contributed to his reaching that decision. I would like to respond to each of the six points and attempt to clear up any misunderstandings and questions. Please refer to the referenced letter for the comments by Mr. Devlin and to the submitted Phase II assessment proposal from TET.

1. In a letter dated July 10, 1990 from Mr. Stan Clark, further assessment was requested to fully define the contaminant plume, both horizontally and vertically. As stated in the Phase I Assessment Report, TET felt that no further monitor well installation was required. However, in response to the SCDHEC's request for further assessment, TET submitted the Phase II Assessment Proposal on November 12, 1990. In an attempt to fulfill SCDHEC's requests, as well as hold down the costs to our client, TET recommended the installation of <u>one</u> additional permanent ground-water quality monitor well along with 2 - 4 additional borings. TET felt that these additional data acquisition points, when combined with the four monitor wells and three borings already installed at this site, would allow the full definition of the areal extent of the contamination to be determined. This number of data points is far from the one monitor well with which Mr. Devlin claims that we are trying to use to define the contamination. The location of the proposed monitor well would give permanent data acquisition points in all quadrants of the area of contamination. The 2 - 4

additional borings would allow complete encircling of the area of contamination, thus defining the areal extent of the plume. TET does not feel that further, permanent monitor wells will contribute any additional information that cannot be obtained from the borings. It is apparent from the work already conducted that the primary extent of the problem is confined to the immediate tank basin. We recognize that the ground water is impacted and feel that sufficient recovery and data points already exist.

2. TET has, on more than one occasion, recommended against drilling a deep well <u>into</u> the bedrock beneath the site. If the purpose of a deep well is to determine if hydrocarbons have migrated into the fracture aquifer network, the chances of drilling into one of the fractures is, at best, remote. Without performing costly fracture network surveys or geophysical data acquisition at the site, it seems that the chances of creating a preferential pathway for hydrocarbon migration into the fracture aquifer system would outweigh the data acquired from the deep well. This would only increase the time and costs of a ground-water clean-up at the site and in fact, may limit the amount of recoverable contaminated ground water for remediation if the hydrocarbons become trapped in the fracture aquifer network. It should be kept in mind that we are dealing with floating petroleum products and that instances of a significant downward flow component in the surficial aquifer are rare. The primary concern at this site is expeditious recovery initiation in the area of the old tank basin. Time and money can best be spent pursuing this goal instead of further study yielding questionable benefits at extreme costs. TET has no problem with drilling <u>to</u> the auger refusal point, which we consider the confining layer. The majority of the wells already drilled at this location have indeed been drilled to refusal, thus, we believe, satisfying this requirement.

3. I think that this comment is addressed in response #1. I find the reasoning for Mr. Devlin's comment questionable. Either more plume definition is requested or it's not. This comment from Mr. Devlin seems to contradict his comment #1.

4. I see the misunderstanding in this comment. TET originally proposed only EPA Method 624 and 625 analyses. However, we generally have MTBE, lead, pH and BOD_5 analyzed as well. I think this may be a semantics problem.

5. TET agrees with this comment. In the past, we have only proposed to conduct aquifer testing, in general, and after consultation with our system design engineer, have determined the optimum number and locations of aquifer tests that would yield the most precise and useful information. Therefore, we will test two wells.

6. In the Phase II proposal, TET indicated that we would initially explore the POTW discharge option as that method of discharge is most acceptable. However, we indicated, obviously not clearly enough, that upon review of the POTW permit options, we would also pursue the NPDES option, if necessary.

Let me further state that after conversations with Federated Insurance Company, it is our understanding that SUPERB funds are no longer being allocated to this site and that Federated is now the responsible financial party at this site. Therefore, any reference to not issuing SUPERB funds pending submittal of specific information or for proposed methods of assessment is an irrelevant point.

Barbara, let me say that I realize that this review of the proposal and the subsequent letter in question probably lacked your personal input and knowledge of the history and current status of the site. However, we feel that this letter was unjustly forwarded to our client and eventually to TET. It appears that Mr. Devlin had little prior knowledge of the project and its overall status. We appreciate SCDHEC's efforts to "speed up" the review process, it works to our benefit for this to occur, however, if it results in reviews and responses that we feel are grossly illogical and unjustified, it only slows down the process and causes undue delays in getting those sites cleaned-up. The end result of the Department and TET's work is, hopefully, to clean these sites up in the most economical and expeditious means possible. We are, after all, working for the same results.

I hope the responses that are included with this letter are sufficient to warrant a closer review of the Phase II Hydrogeologic Assessment Proposal as it was submitted in its present form. If however, following another review of the proposal and with the responses to the comments, you feel that Mr. Devlin's letter was justified, TET will, of course, resubmit a revised proposal after conferring with Mr. Green and Federated.

Sincerely,

William J. Wimberly

William Wimberly
Senior Hydrogeologist

Mark Holmes

Mark Holmes
Project Hydrogeologist

cc: Mr. Jerry C. Green
Green's Oil Company

Mr. Curtis Silvey
Federated Insurance Company

South Carolina
DHEC
Department of Health and Environmental Control
2600 Bull Street, Columbia, SC 29201

February 1, 1991

Mr. Jerry C. Green
Green's Oil Company
2849 Cherry Road
Rock Hill, SC 29730

Re: Assessment plan received November 14, 1990
Green's Texaco (PCAS 7123)
York County

Dear Mr. Green:

The Ground-Water Protection Division of the South Carolina Department of Health and Environmental Control (SCDHEC) has reviewed the referenced assessment plan. The plan cannot be approved as submitted. The remediation guidance document enclosed in the July 10, 1990 correspondence from Stan Clark to you should be reviewed before a revised assessment plan is submitted. The following comments concerning the plan are provided:

1) The horizontal extent of the dissolved contaminants cannot be defined in all directions with the installation of one monitoring well.

2) Because of the close proximity of the bedrock to the surface, a deep well, installed to assess the vertical extent of the contamination, is necessary. The well should installed in a manner which prevents contamination from being carried downward during drilling (i.e. telescoping well, drilling through a grout plug, etc.).

3) The referenced site has confirmed ground-water contamination and will require remediation. Therefore, the installation of soil borings appear excessive and may not be reimbursable under SUPERB. Before the installation of the borings, proper justification outlining the information to be gained should be submitted to SCDHEC.

4) The worst case well analysis should include EPA method 624 and 625, methyl-tert-butyl-ether, lead, ph, and BOD_5.

5) The aquifer test should be performed on two or more wells. Please indicate the number of tests to be conducted and the wells to be used.

6) It would be advantageous to pursue the National Pollution Discharge Elimination System (NPDES) permit at the same time as the Publicly Owned Treatment Works (PTOW) option.

A revised plan should be submitted to Barbara Blackledge of the Ground-Water Protection Division on or before April 14, 1991.

Review of the SCDHEC file has revealed that the Federated Insurance Policy submitted to this office February 6, 1990 became effective after the date the release was discovered. Therefore, this office must be provided with a copy of the insurance policy which was in effect at the time the release was dicovered. No further SUPERB funds will be paid until that information is received. Failure to provide the insurance information may result in the initiation of enforcement action.

If you have any questions, please feel free to call me at (803) 734-4672.

Sincerely,

Robert Devlin

Robert Devlin, Hydrogeologist
Assessment and Development Section
Ground Water Protection Division
Bureau of Drinking Water Protection

cc: Paul Bristol, Central Midlands District EQC
Lenore Watts, Catawba District EQC

Tank & Environmental Testing

Enclosure: Remediation Guidance

RD/pcas7123

South lina Department of Health and Environmen ntrol

MATERIALS RECEIPT REPORT

Quantity	Description of Items	Name of Vendor	Date Received
	Contract Services rendered	Tank & Environmental Testing, Inc.	8/3/90
	Invoice #904-138	1700 Alta Vista Drive, suite 110	
	Amount $11,418.34	Columbia, SC 29223	
	(PCAS-7123, Green's Texaco, York County,		
	SUPERB Site)		
	Complete		

Purchase Order No. L7022

Requisition No. 39007

Signed Stan L Clark

Receiving Unit Ground-Water Protection Division

DHEC-102 (Rev. 3/77)

File

South Carolina
DHEC
Department of Health and Environmental Control
2600 Bull Street, Columbia, SC 29201

August 3, 1990

Mr. William Wimberly
Tank & Environmental Testing, Inc.
1700 Alta Vista Drive, Suite 110
Columbia, SC 29223

RE: Green's Texaco (PCAS 7123)
SUPERB Invoice received April 26, 1990
York County

Dear Mr. Wimberly:

The Ground-Water Protection Division of the SC Department of Health and Environmental Control has reviewed and approved the above referenced invoice for payment in the amount of $11,418.34. This amount reflects the following changes from the amount billed:

- The borings cost was revised to reflect the amount shown on the approved cost estimate ($15.00/foot) and the addition of 12.5 feet of boring (as shown in the assessment report) for a total cost of $600.00.

- The two inch monitoring well cost was revised to reflect the amount shown on the approved cost estimate ($50.73/foot) and the actual depths of the wells (12 feet and 13.5 feet) for a total of $1,293.62.

- The four inch monitoring well cost was revised to reflect the amount shown on the approved cost estimate ($78.48/foot) and the actual depths of the wells (12.5 feet and 14 feet) for a total of $2,079.72.

Purchase Order # L7022 will now be closed, as all the work described in the phase have been completed. A check will be sent to you from our finance department in approximately three to four weeks.

If you have any question, please call.

Sincerely,

Barbara Blackledge

Barbara Blackledge, Hydrogeologist
Trust Section
Ground-Water Protection Division
Bureau of Drinking Water Protection

bb/greens.83

cc: Jerry Green, Green's Texaco
Robertha Dorsey, GWPD

South Carolina
DHEC
Department of Health and Environmental Control

File

July 10, 1990

Mr. Jerry C. Green
Green's Oil Company
2849 Cherry Road
Rock Hill, SC 29730

RE: Green's Texaco (PCAS 7123)
Assessment report received April 26, 1990
SUPERB reimbursement request received March 30, 1990
York County

Dear Mr. Green:

The Ground-Water Protection Division of the SC Department of Health and Environmental Control has reviewed the above referenced submittal. Based on the data included therein, further assessment is warranted to fully define the plume horizontally in all directions, and vertically. Please submit an assessment proposal to this office on or before August 24, 1990.

Available data indicates that ground-water remediation will be required. Please refer to the attached remediation guidance document to prepare for site rehabilitation. The Corrective Action Plan, worst-case well analysis, and other appropriate submittals will be required after the assessment work approved above has been completed.

Your March 30, 1990 SUPERB reimbursement request has been reviewed, as follows:

- The 8/11/89 Cagle Construction Company invoice is payable to you in the full amount of $6,360.00;
- The 9-12-89 and July 20, 1989 Cody's Inc., invoices are payable to you in the full amount of $5,670.00 and $660.00, respectively; and
- The October 4, 1989 York County Solid Waste Department invoice is payable to you in the full amount of $1,470.00.

A check in the amount of $14,160.00 will be sent to you from our Finance Department in approximately three to four weeks.

If you have any questions, please call me or Barbara Blackledge at (803) 734-5331.

Sincerely,

Stan Clark, P.G., Manager
Trust Section
Ground-Water Protection Division
Bureau of Drinking Water Protection

SC/bb/greens.627

Enclosures: Remediation Guidance
IAWD Guidance
UIC Permit Application and Instructions
UIC Regulations

cc: Steve Spigner, Catawba District EQC
Paul Bristol, Central Midlands EQC
William Wimberly, TET, Inc.
Robertha Dorsey, GWPD

File

MEMORANDUM

TO: Harold Seabrook
Waste Assessment Section
Division of Waste Assessment

FROM: Barbara Blackledge, Hydrogeologist
Trust Section BB
Ground-Water Protection Division

RE: Green's Texaco (PCAS 7123)
York County

DATE: July 5, 1990

The Ground-Water Protection Division file on the above referenced facility contains a copy of an approval letter from your section for disposal of 125 cubic yard of soil from the facility at the York County Landfill. Please be advised that current records in our file document that 1,218 cubic yards of soil were actually disposed of at the landfill.

If you have any questions, please call me at 4-4664.

cc: Steve Spigner, Catawaba District EQC
Paul Bristol, Central Midlands EQC

Tank & Environmental Testing, Inc.

April 25, 1990

Ms. Barbara Blackledge
Ground-Water Protection Division
SCDHEC
2600 Bull Street
Columbia, S.C. 29201

Re: Green's Texaco (PCAS 7123)
Rock Hill, S.C.

Dear Ms. Blackledge:

Enclosed please find two copies of the hydrogeologic impact assessment report for the above referenced facility.

If you have any questions concerning this report or any of the methods used to conduct the assessment, please call me at 754-3688.

Sincerely,

Mark Holmes
Project Hydrogeologist

William T. Wimberly
William Wimberly
Senior Hydrogeologist

cc: Mr. Jerry C. Green
Ms. Barbara B. Munkel

1700 Alta Vista Drive, Suite 110 • Columbia, S.C. 29223 • (803) 754-3688, FAX (803) 754-7836

South Carolina Department of Health and Environmental Control

2600 Bull Street
Columbia, S.C. 29201

Commissioner
Michael D. Jarrett

March 8, 1990

Mr. Jerry C. Green
Green's Oil Company
2849 Cherry Road
Rock Hill, SC 29730

RE: Green's Texaco (PCAS 7123)
Cost estimate received 2-16-90 and 3-5-90
SUPERB reimbursement request received 2-20-90
York County

Dear Mr. Green:

The Ground-Water Protection Division of the SC Department of Health and Environmental Control has determined that the above referenced site is eligible to receive SUPERB funds for all necessary, reasonable and eligible work associated with site rehabilitation. The cost estimate and its addendum, received February 16, 1990 and March 5, 1990, respectively, are approvable. A purchase order will be established in the amount of $17,228.50 (which includes the cost for a rock rig, if necessary). The purchase order number will be made available to you in the near future. All invoices should properly reference that number.

The invoices submitted for reimbursement (received February 20, 1990) require further information before payment can be made, as follows:

1) All of the invoices require a summary of the timesheets for the individuals performing the work. The sheets should include the specific names of personnel, hourly rates, number of hours worked, and tasks performed.

2) The Tank & Environmental Testing (TET) invoices should include a clarification of what samples were obtained on 7-25-89.

3) Although the TET invoice is for $5,418.00, the enclosed checks to TET total only $2,000.00. Proof of payment for the full amount must be provided.

4) The Cagle Construction Company Invoice dated 2/3/90 should have the costs associated with tank removal broken out and removed. Costs for tank removal are not eligible for reimbursement under the SUPERB program.

5) The Cagle Construction Company cancelled check predates the invoice by approximately five months. This should be clarified.

6) The York County Landfill Invoice dated October 4, 1989 shows that 42 trailers of soil were received at the landfill. This office requires clarification as to how many cubic yards each trailer holds.

Once the requested information is received, the invoices can be further reviewed.

If you have any questions, please call me at (803) 734-4664.

Sincerely,

Barbara Blackledge

Barbara Blackledge, Hydrogeologist
Trust Section
Ground-Water Protection Division
Bureau of Drinking Water Protection

bb/greens.35

cc: Steve Spigner, Catawba District EQC
Paul Bristol, Catawba District EQC
William Wimberly, TET, Inc.
Robertha Dorsey, GWPD

BATCH MAIL

DATE 2-5-90

TO BARBARA BLACKLEDGE
TRUST SECT.- GROUNDWATER
PROT. - BUREAU DRINKING WATER

FROM
STEVE SPIGNER
CATAWBA DISTRICT

DHEC

Smith Parrish
P.O. Box 21097 Columbi C 29221
Phone: (803) 794-9140

Mr. Green Askes me to send you a copy of his Pollution Policy.

Thanks!

Smith P.

South Carolina Department of Health and Environmental Control

2600 Bull Street
Columbia, S.C. 29201

Commissioner
Michael D. Jarrett

Catawba District
Environmental Quality Control
P. O. Drawer 100
Fort Lawn, S.C. 29714
(803) 285-7461

February 2, 1990

MEMORANDUM

TO: Barbara Blackledge
Trust Section
Groundwater Protection Division
Bureau of Drinking Water Protection

FROM: Steve Spigner
Catawba District EQC

In reference to your request of January 29, I checked the inventory records on February 1, at Green's Texaco in Rock Hill for the period of July 1988 through July 1989. I determined that the records were complete for that period.

If I can be of further assistance please let me know.

SDS/da

cc: Al Williams, Catawba District Director

PRODUCER COPY

Account No. 057-615-7

THIS ENDORSEMENT CHANGES THE POLICY. PLEASE READ IT CAREFULLY

COMMERCIAL PACKAGE POLICY CHANGE ENDORSEMENT

NAME OF INSURED:
GREENS TEXACO STATION &
GREENS OIL CO
JERRY GREEN DBA
2849 CHERRY RD
ROCK HILL SC 29730

FEDERATED MUTUAL INSURANCE COMPANY
HOME OFFICE : OWATONNA
MINNESOTA 55060

FEDERATED INSURANCE

IN CONSIDERATION OF $ 5,900.00 RETURN PREMIUM

EFFECTIVE **11/09/89** POLICY **047404** IS CHANGED AS FOLLOWS:

COVERAGE PARTS AFFECTED: **CHANGED** **Pollution Liability**

POLLUTION LIABILITY CHANGES:

AMENDED SUPPLEMENTAL SCHEDULE FOR THE DECLARATIONS

DELETED SITES:

Site No.	Address of Site	Description of Site	Petroleum Products Locations Underground Tanks	
			# of Tanks	Const (See Key)
1	2849 CHERRY RD ROCK HILL SC YORK	SERVICE STATION	6	1
2	2849 CHERRY RD ROCK HILL SC YORK	BULK PLANT 38,000 GALLONS	2	1

RECEIVED
FEB 06 1990
GROUND-WATER
PROTECTION DIVISION

SECRETARY

PRESIDENT

PRODUCER COPY

Account No. 057-615-7

THIS ENDORSEMENT CHANGES THE POLICY. PLEASE READ IT CAREFULLY

COMMERCIAL PACKAGE POLICY CHANGE ENDORSEMENT

NAME OF INSURED:
GREENS TEXACO STATION &
GREENS OIL CO
JERRY GREEN DBA
2849 CHERRY RD
ROCK HILL SC 29730

FEDERATED MUTUAL INSURANCE COMPANY
HOME OFFICE : OWATONNA MINNESOTA 55060

FEDERATED INSURANCE

IN CONSIDERATION OF $ 4,900.00 RETURN PREMIUM

EFFECTIVE **08/27/89** POLICY **047404** IS CHANGED AS FOLLOWS:

COVERAGE PARTS AFFECTED: **CHANGED** **Pollution Liability**

POLLUTION LIABILITY CHANGES:

MISCELLANEOUS POLLUTION CHANGES:

ADDED CODE 90131 WITH 4 U.G. TANKS.

REVISED RATES AND PREMIUMS FOR CODE 90132 AND REVISED U.G. TANKS TO 4.

SECRETARY

PRESIDENT

MARKETING COPY

COMMERCIAL PACKAGE POLICY

MUTUAL COMPANY
PARTICIPATING
NONASSESSABLE POLICY

FEDERATED MUTUAL INSURANCE COMPANY
HOME OFFICE : OWATONNA
MINNESOTA 55060

FEDERATED INSURANCE

Policy No. **047404**
Account No. **057-615-7**

NAMED INSURED AND MAILING ADDRESS
GREENS TEXACO STATION &
GREENS OIL CO
JERRY GREEN DBA
2849 CHERRY RD
ROCK HILL SC 29730

Issued by
Eastern - Southern Division
5883 Glenridge Drive, N. E.
P.O. Box 28477
Atlanta, GA 30358
(404) 257 - 1511

YORK COUNTY

FILE ADDRESS (if different than above) :
POLICY PERIOD: from **08/27/89** to **02/27/90** 12:01 A.M. Standard time at the designated business premises.

BUSINESS OPERATIONS:
OPERATES AS: **AN INDIVIDUAL**

IN RETURN FOR THE PAYMENT OF THE PREMIUM, AND SUBJECT TO ALL TERMS OF THE POLICY, WE AGREE WITH YOU TO PROVIDE THE INSURANCE AS STATED IN THE POLICY.

THIS POLICY CONSISTS OF ONLY THOSE COVERAGE PARTS SHOWN BELOW. THE PREMIUM MAY BE SUBJECT TO ADJUSTMENT.

POLLUTION LIABILITY COVERAGE PART

TOTAL PROVISIONAL PREMIUM : $ 16,050.00

FORMS APPLICABLE TO ALL COVERAGE PARTS:

IL 00 17(11-85)
IL 00 21(11-85)
IL 02 49(08-86)

MUTUALS - PARTICIPATION CLAUSE WITHOUT CONTINGENT LIABILITY: No Contingent Liability: This policy is nonassessable. The policyholder is a member of the Company and shall participate, to the extent and upon conditions fixed and determined by the Board of Directors in accordance with the provisions of law, in the distribution of dividends so fixed and determined.

MUTUALS - MEMBERSHIP AND VOTING NOTICE: The insured is notified that by virtue of this policy, he or she is a member of the Federated Mutual Insurance Company of Owatonna, Minnesota, and is entitled to vote either in person or by proxy at any and all meetings of said Company. The Annual Meetings are held in its Home Office in Owatonna, Minnesota, on the third Tuesday of April in each year at ten o'clock A.M.

In Witness Whereof, the Company has caused this policy to be executed and attested, and, if required by state law, this policy shall not be valid unless countersigned by a duly authorized representative of the Company.

SECRETARY

PRESIDENT

Authorized Representative

This Policy consists of: (1) this Declarations; (2) the Declarations and coverage form for each Coverage Part indicated above as being part of this Policy; and (3) all forms and endorsements listed on any of those Declarations.

Countersigned Date 06/28/89

IL-F-1 ED. 1-86

COMMON POLICY DECLARATIONS

MARKETING COPY

FEDERATED
INSURANCE

06/28/89

GREENS TEXACO STATION &
GREENS OIL CO
JERRY GREEN DBA
2849 CHERRY RD
ROCK HILL SC 29730

AN IMPORTANT NOTICE OF PREMIUM AND COVERAGE CHANGES

FEDERATED MOVES TO STRENGTHEN THE FUTURE OF POLLUTION INSURANCE

We are pleased to present you with the renewal of your Pollution Liability Policy. This letter will outline important changes in this coverage. Please review this letter and your policy to understand what these changes will mean to you.

Federated Insurance is a major insurer of petroleum marketers in the United States. The Company currently insures about 8000 marketers, and a substantial number have pollution insurance with Federated.

Affordability and availability of pollution insurance is a major concern for the petroleum marketer. The petroleum industry has noted an escalation in the number and size of pollution losses. EPA regulations have intensified the interest in pollution insurance, and the absence of many other major insurers of petroleum marketer's pollution exposures has added to the availability problem.

PRICING AND COVERAGE CHANGES

In order to respond more rapidly to the changing conditions affecting the pollution insurance marketplace, your pollution liability policy will now be issued with a 6-month policy period.

The limits of your policy are now $500,000 for each pollution incident with a $1,000,000 aggregate limit.

If you have autos insured with Federated, your automobile liability policy will no longer respond to pollution incidents arising out of the loading or unloading of a covered auto. Coverage for incidents in which a fire and/or explosion occurs during the loading-unloading process will still remain on the auto policy, however, as will pollution incidents arising out of the collision or overturn of a covered auto.

The pollution policy will now extend coverage to incidents arising out of the loading or unloading of an owned, operated, rented or borrowed auto (except incidents in which fire and explosion occurs) at a site covered under the policy, provided that the spill, overflow or accumulation of spills or overflows from a specific incident occurs after the retroactive date and is reported to us within 120 hours of the incident. Spills and overflows from other sources should also be reported to us within 120 hours of a specific incident.

Many states have implemented or are considering the implementation of governmental funding programs to address the clean up and/or the third party liability costs of pollution losses from petroleum storage tank systems.

PRICING AND COVERAGE CHANGES (Continued)

A new endorsement is being attached to your pollution policy which requires you to register and pay all applicable fees, taxes or premiums to obtain available funds from any governmental funding program so that benefits from your policy and the funding program are properly coordinated. Failure to secure funds from any such program shall void coverage to the extent that such funds would have applied to any loss covered under the policy. Also, any sum payable by a governmental funding program shall reduce the limits of insurance by a corresponding amount if the payment would otherwise have been made under the policy.

IMPORTANT NOTICE: Pro rata cancellation of your policy will be granted should the implementation of a governmental funding program eliminate the need to continue your pollution insurance policy.

Please review your policies to understand what these changes will mean to you.

Please remember that the continued availability of your coverage remains contingent upon your sound daily inventory and reconciliation practices.

THE FUTURE

Many of the leading insurance underwriters have abandoned attempts to insure the environmental liability risk. Federated is the nation's #1 insurer of petroleum marketers. We are optimistic that with the cooperation of our policyholders in loss prevention practices that we can continue to provide a 'viable, stable and affordable market for their pollution liability insurance needs.

MARKETING COPY

Policy No. 047404

DECLARATIONS

POLLUTION LIABILITY COVERAGE PART

LIMITS OF INSURANCE	Limit
AGGREGATE Limit	$ 1,000,000
EACH POLLUTION INCIDENT Limit	$ 500,000

RETROACTIVE DATE

This insurance does not apply to "bodily injury," "property damage" or "environmental damage" caused by a "pollution incident" that commences prior to the Retroactive Date, if any, shown below.

Retroactive Date: 08/27/86

DEDUCTIBLE AMOUNT: $ 25,000

This reduces the Limit of Insurance shown as applicable to each "pollution incident."

ADDRESS OF INSURED SITE(S):

SEE SUPPLEMENTAL SCHEDULE

EPA Identification Number (if applicable): _____

Advance Premium $ _____

ENDORSEMENTS APPLICABLE:

CG 00 39(11-85)
CG-F-25(01-87)
CG-F-38(11-88)
CG-F-35(06-88)
CG-F-36(07-88)
CG-F-27(08-88)
CG-F-9(11-88)
CG-F-34(06-88)
CG-F-37(07-88)

This policy does not fulfill the financial responsibility requirements of the Environmental Protection Agency under 40 CFR Parts 280 and 281.

MARKETING COPY

SUPPLEMENTAL SCHEDULE FOR THE DECLARATIONS

Pollution Liability Coverage Part

Site No.	Address of Site	Description of Site	Petroleum Products Locations Underground Tanks	
			# of Tanks	Const (See Key)
1	2849 CHERRY RD ROCK HILL SC (YORK)	SERVICE STATION	6	1
2	2849 CHERRY RD ROCK HILL SC (YORK)	BULK PLANT (38,000 GALLONS)	2	1

CONSTRUCTION KEY: 1 = Unprotected Steel; 2 = Steel Lined; 3 = Fiberglass; 4 = STI-P3; 5 = Double Walled Steel; 6 = Tanks in Vault

South C olina Department of ealth and Environmental Control

File

2600 Bull Street
Columbia, S.C. 29201

Commissioner
Michael D. Jarrett

January 30, 1990

Mr. Jerry C. Green
Green's Oil Company
2849 Cherry Road
Rock Hill, SC 29730

RE: Green's Texaco (PCAS 7123)
Assessment proposal and cost estimate received 1-19-90
York County

Dear Mr. Green:

The Ground-Water Protection Division of the SC Department of Health and Environmental Control (SCDHEC) has reviewed the above referenced submittals.

The assessment proposal is approvable. Attached is a copy of the monitoring well approval form which has been sent to your consultant. The assessment report should include a description of sampling methodology. Please submit the assessment report on or before April 2, 1990.

Direct billing cannot be established until the site is determined eligible to receive SUPERB funds. This office requires the following before a final determination can be made:

1) The SUPERB fees for the eight tanks listed under Permit # N-46-NO-09344 ($800.00) and the four tanks listed under Permit # P-46-NO 11940 ($400.00) should be paid for the fiscal year 1990, if they have not already been so;

2) Inventory records for the period of July, 1988 through July, 1989 must be reviewed at the site by SCDHEC personnel. A SCDHEC representative will be visiting the site in the near future to accomplish this task.

This office also requires a copy of any insurance policy held for underground storage tank leaks the site, or written verification that no such policy exists.

The SCDHEC files indicate that only six tanks were removed in July, 1989. Please provide this office with information on the status of the two 10,000 gallon tanks listed on Permit # N-46-NO-09344.

If the site is determined eligible to receive SUPERB funds, reasonable expenditures prior to approval can only be reimbursed. Be advised that, assuming the site will qualify, invoices will need to be more meticulously detailed. Specifically, the cost estimate will need clarfication in the following areas:

1) The estimated costs for the installation of each monitoring well do not equal the sum of the appropriate items listed in section I (C) of the estimate;

2) The additional cost of $1800.00 for the mobilization and use of the rock coring drill rig would need to be broken down (fee for mobilization, fee for use per hour, etc.);

3) The surveying costs fee would need to be broken down (i.e. what is the cost for?);

4) The cost for supplies and shipping costs (under Section III (C) will need to be broken down (description of supplies); and

5) Bulk contingency fees should not be included.

This office expects the assessment work to proceed on schedule and not wait for SUPERB qualification. Any costs incurred before an qualification is made may be reimbursed to you, if you so choose. However, if the items above can be clarified and qualification established in a timely manner, direct billing may be established.

If you have any questions, please call me at (803) 734-4664.

Sincerely,

Barbara Blackledge

Barbara Blackledge, Hydrogeologist
Trust Section
Ground-Water Protection Division
Bureau of Drinking Water Protection

BB/Greens.129

cc: Steve Spigner, Catawba District EQC

Paul Bristol, Catawba District EQC

William Wimberly, TET

South C olina Department of ealth and Environmental Control

2600 Bull Street
Columbia, S.C. 29201

Commissioner
Michael D. Jarrett

Monitoring Well Approval

Approval is hereby granted to: Tank & Environmental Testing
1700 Alta Vista Dr., Suite 110
Columbia, SC 29223

RE: Green's Texaco
York County

for the construction of monitoring wells designated MW-1 through MW-4 in accordance with the construction plans and specifications submitted on January 19, 1990.

These wells will be constructed to the approximate depth of X feet below the surface and screened in the surficial aquifer for the purpose of groundwater assessment and monitoring.

Conditions: The latitude and longitude and actual construction details for each well shall be submitted with the next assessment report. Steve Spigner of the Catawba District EQC (285-7461) should be notified at least 72 hours prior to well installation.

This approval is pursuant to the provisions of Section 44-55-40 of the 1976 South Carolina Code of Laws and the Department of Health and Environmental Control Regulations R.61-71.

Date of Issue: January 29, 1990

Stan Clark, P.G., Manager
Trust Fund Section
Ground-Water Protection Division
Bureau of Drinking Water Protection

BB/Greensmw.129
0129901287/BB

cc: Steve Spigner, Catawba District EQC

Paul Bristol, Catawba District EQC

Jerry Green, Green's Oil Company

South Carolina Department of Health and Environmental Control

2600 Bull Street
Columbia, S.C. 29201

Commissioner
Michael D. Jarrett

REQUEST FOR ~~HYDROGEOLOGICAL~~ SERVICES

DATE: 1-29-90

TO: Steve Spigner, Catawba District EQC

FROM: Barbara Blackledge, 734-4664
TRUST SECTION
GROUND-WATER PROTECTION DIVISION
BUREAU OF DRINKING WATER PROTECTION

RE: FACILITY OR PROJECT Green's Texaco - Highway 21, Rock Hill, SC
PCAS CODE 7123
COUNTY York
PLAN/REPORT __ATTACHED

TYPE OF ACTIVITY

__PLAN REVIEW

__REPORT REVIEW

__MONITORING WELL REVIEW

__DATA REVIEW

__SITE WORK SUPERVISION (DATES_____)

__SITE RECONNAISSANCE

__SAMPLE COLLECTION

__COMPLAINT INVESTIGATION

__MEETING: TIME:_____ DATE:_____ PLACE:_____

✓OTHER: Could you please have someone review inventory records at the site for the period of 7-88 thru 7-89?

INSTRUCTIONS AND/OR EXPLANATION: The review is necessary for their SUPERB elisbility determination. Please respond in writing. Thanks!

PRIORITY: __HIGH (1-7 DAYS) ✓MEDIUM (7-30 DAYS) __ LOW (>30 DAYS)

Thanks

Tank & Environmental Testing, Inc.

BB

January 19, 1990

Mr. Mark Berenbrok
Ground Water Protection Division
SCDHEC
2600 Bull Street
Columbia, S.C.

Dear Mark:

Enclosed is a Hydrogeologic Assessment Proposal submitted on behalf of Mr. Jerry Green for Green's Texaco in Rock Hill, S.C. In addition to this proposal, a cost estimate to perform this work is included. Per my recent conversation with Stan Clark, this estimate is sent so as to set up direct billing to the SUPERB fund for this work. In earlier correspondences with the Department (July and October, 1989), requests for SUPERB eligibility and approval were made. We would once again like to request SUPERB funding and thus the estimate is included to further hasten the approval process.

Upon reviewing this information, please call at 754-3688 if you have any questions. Your review of this material is appreciated.

Sincerely,

Dee O'Brinton

William Wimberly

cc: Jerry Green
Green Oil Company

1700 Alta Vista Drive, Suite 110 • Columbia, S.C. 29223 • (803) 754-3688, (803) 754-3781

File
PAK

South rolina Department o lealth and Environmental Control

2600 Bull Street
Columbia, S.C. 29201

Commissioner
Michael D. Jarrett

December 7, 1989

Mr. Jerry C. Green
Green's Oil Company
2849 Cherry Road
Rock Hill, SC 29730

RE: Underground storage tanks
Green's Oil Company
Registration No. N-46-NO-09344

Dear Mr. Green:

The Ground-Water Protection Division (GWPD) of the S.C. Department of Health and Environmental Control has reviewed TET's October 3, 1989 submittal for the referenced facility. This submittal is considered to be the site check described in the Federal Underground Storage Tank Regulations 40 CFR Section 280.52(b). The analytical results indicate the presence of regulated substances in the ground water at the referenced facility. As a result, corrective action in accordance with 40 CFR Section 280.60 must be initiated.

The Department has been informed that the underground storage tanks listed under registration N-46-NO-09344 have been removed from the ground.

Based on the concentrations of petroleum hydrocarbon constituents noted in the groundwater (4700 ug/l benzene), in accordance with 40 CFR Section 280.65 SCDHEC requires that further investigation be conducted at the referenced facility. A Phase 1 assessment plan (2 copies) must be prepared by qualified personnel with experience in ground-water investigations and submitted by January 18, 1990.

The assessment plan shall include, but not be limited to, the following (items listed below which will have already been addressed in reports required above may be deleted):

- Vicinity maps which show topography, surrounding land use, nearby water supply wells, etc.;

- Information regarding any identified wells;

- Scaled site map displaying proposed monitoring well locations (three at a minimum), underground utilities, location of underground storage tanks and associated piping, etc.;

- Well construction details;

- Sampling analytical protocol;

- Overview of the local hydrogeology;

- List of items that will be included in the assessment report (e.g., well construction details, potentiometric surface map, etc.); and

- An implementation schedule.

Ground-water remediation will be required at this site. At this time Green Oil Company should consider the wastewater treatment discharge options (e.g., NPDES [surface water], public or private wastewater treatment facility, infiltration gallery).

Please submit the reports and assessment plan requested above to my attention at the Ground-Water Protection Division. If you have any questions or comments, feel free to call at (803) 734-4550.

Sincerely,

Mark Berenbrok

Mark Berenbrok, Hydrogeologist
Underground Storage Tank Section
Ground-Water Protection Division
Bureau of Drinking Water Protection

MKB/mb
GREEN.TXT

cc: Catawba District EQC
Stan Clark, GWPD
Nancy Weatherup, Industrial Waste Water

RO

Tank & Environmental Testing, Inc.

October 3, 1989

Mr. Stan Clark, Manager
Trust Section
Ground Water Protection Division
SCDHEC
2600 Bull Street
Columbia, SC 29201

Dear Stan:

This letter is sent in order to provide additional information on the report I sent to DHEC on this date. The report is sent concerning work done to date at Green's Texaco in Rock Hill, S.C. and was submitted on behalf of Mr. Jerry Green. A copy of analysis results on ground water from the excavation is included. In a previous letter to Raymond Knox on July 13, TET requested SUPERB eligibility for Green's Texaco. As of yet we have received no word as to the status of this request. This report is being submitted to provide you with all available information on the site.

Upon reviewing this information, please call at 754-3688 if you have any questions. Mr. Green has advised me that Al Williams of the Catawba District would be interested in seeing this report. You may wish to talk with him about this if you so desire. If we can provide any assistance, please advise. Thanks.

Sincerely,

William

William Wimberly

cc: Jerry Green
Green's Texaco

1700 Alta Vista Drive, • Columbia, S.C. 29223 • (803) 754-3688, (803) 754-3781

Tank & Environmental Testing, Inc.

REPORT ON WORK RELATED TO
UNDERGROUND STORAGE TANK REMOVAL AND
REPLACEMENT AT GREEN'S TEXACO-ROCK HILL, S.C.

INTRODUCTION

Tank and Environmental Testing (TET), Inc. was contacted in early July of 1989 with regard to assisting Mr. Jerry Green of Green Oil Company in environmental matters associated with the underground tank removal and replacement project which was taking place at Green's Texaco on U.S. Highway 21 in Rock Hill. During the excavation at the site, contamination of soils surrounding the tanks was found and thus a need developed to properly coordinate soil disposal with the South Department of Health and Environmental Control (SCDHEC) and to assess the multiple (6) tank basin after completion of the extractions. The following delineates the work performed to date and the results of sample analyses from stockpiled soils and ground water in the excavation.

SCOPE OF WORK

On July 7, 1989, TET arrived on site and found that four tanks had been removed from a large basin and two tanks remained in-place to be removed. A considerable amount of soil was stockpiled on plastic on the side of the property. The tanks which had been removed were of approximately forty years of age and showed corrosion around the seams and some pitting.

1700 Alta Vista Drive, • Columbia, S.C. 29223 • (803) 754-3688, (803) 754-3781

Contamination in the excavation, as evidenced by odor, was noted.

TET contacted Mr. Al Williams of SCDHEC's Catawba District EQC to inquire into soil disposal alternatives. He advised that it would be necessary to go through the Bureau of Solid and Hazardous Waste Management in Columbia to gain approval for disposal in the York County Landfill. Upon contacting this Bureau, it was learned that a sample from the stockpile for benzene, toluene, ethyl benzene, and xylenes (BTEX) and total petroleum hydrocarbons (TPH) would be required for submittal prior to permission being granted. At the time of TET's departure on this date, a consideration was being made to move the soil to another site to wait for the analysis results if approved by Mr. Williams, however this option was subsequently abandoned. Prior to leaving on this date, James Waste Oil Company of Charlotte was contacted to have a vacuum truck come to the site to evacuate water from the hole so that the construction work could resume and new backfill and tanks could be implaced.

On July 10, 1989, TET returned to the site to continue work. James Waste Oil was called at 7:30 A.M. prior to departure from Columbia to insure that they would be present to dewater the excavation. Upon arriving at the site, it was found that the remaining tanks had been removed and after dewatering the hole, construction would continue. The ground water had come up to within approximately twelve feet below grade over the previous weekend. Once James Waste Oil's trucks arrived, around 11,500

8000 previously ?

gallons of waste water was pumped from the excavation and hauled to Charlotte, N.C. for disposal at their facility.

Subsequent to the pumping, a water sample was taken from the water entering the excavation. Proper storage, transport, and sampling methods were followed during this work. The water sample was submitted for analysis for benzene, toluene, ethylbenzene, and xylenes (BTEX) and total petroleum hydrocarbons (TPH). At this time, soils from the excavation were checked for organic vapor concentration. Soil was obtained from each side wall of the hole and composite samples scanned with a Thermo Environmental Instruments 580 A Photoionizer. Typical readings showed vapor levels to be above 100 parts per million throughout the excavation with readings reaching 200 ppm present in the east side of the hole. The base of the hole contained several inches of water and thus samples were not taken from this area. No further soils were removed from the excavation due to limited space available at the site for soil stockpiling and the fact that the excavation was already of considerable size.

In view of the need to dispose of the stockpiled soils, samples were taken from this soil, on July 10, for submittal to a laboratory for analysis. A composite was taken from soil from a variety of spots in the pile and was subsequently analyzed for BTEX and TPH.

At the time of departure on July 10, construction regarding

installation of the new tanks resumed. Installation of the new tanks followed. James Waste Oil later returned to Green's Texaco and pumped another 700 gallons of accumulated water from the hole so that backfill could be properly laid down beneath the new tanks.

On July 13, 1989, a letter requesting eligibility of the site for SUPERB funds was prepared by TET and sent to Mr. Raymond Knox of SCDHEC (copy enclosed). This letter briefly elaborated on the work at the site to date. As of the time of this report, no reply to the letter has been received from the Department.

RESULTS OF THE ANALYSES

The results of the water samples taken from the excavation after pumping 11,500 gallons of water revealed that total hydrocarbons were present at 32 parts per million (ppm). Benzene was present at 4.7 ppm., toluene at 12.9 ppm., ethylbenzene at 2.6 ppm., and total xylenes at 7.3 ppm. These results indicate that the ground water remains impacted.

The results of the analyses on the stockpiled soil samples revealed that the contamination in the soils exceeded allowable limits established by the Bureau of Solid and Hazardous Waste for landfill disposal (copy of results included as addendum). Therefore after the soils were spread out further at the site and

allowed to aerate for approximately three weeks, two other composite samples were obtained. The results of each of these samples show total hydrocarbons to be present in one at 357 ppm. (pile nearest to the street) and the other at less than the detection limit (pile at rear of property). BTEX concentrations from both samples were below 1 ppm. for all parameters. Therefore a letter to Mr. Harold Seabrook of the Bureau of Solid and Hazardous Waste was prepared requesting permission for disposal of these soils at the York County landfill. A response to this letter is pending.

CONCLUSIONS

It is apparent from the results of the water sampling from the excavation that ground water remains affected by petroleum products in the area beneath the old tanks despite the pumping of 12,200 gallons of water from the excavation. The lateral extent of this impact is not discernible at this time. TET is presently awaiting word from SCDHEC on the eligibility of the site for SUPERB funds and on permission to dispose of the contaminated soils. Once responses concerning these matters are received, work will begin disposing of the soils and further work concerning addressal of remaining contamination at the site will take place as necessary.

James H. Carr & Associates, Inc.
Office & Laboratories
P.O. Box 90209
Columbia, SC 29290

07/28/89

Mr. William Wimberly
Tank & Environmental Test
1700 Alta Vista Dr
Columbia, SC 29233

Dear Mr. Wimberly:

The following are the results of the parameters you requested we check on your GREER'S samples listed below.

Parameter	Analyst	Analysis Date	Analysis Time	Results	Lowest Detectable Level	Method #
07/13/89 In House # 07-5380-89	Source G. TEX 1	Location				
Hydrocarbon Scan (FID) - solid	CCS	07/20/89	09:00	8240.000 mg/kg	10.000 mg/kg	
Benzene - solid	CCS	07/20/89	09:00	< 5.000 ug/kg	5.000 ug/kg	624
Toluene - solid	CCS	07/20/89	09:00	< 5.000 ug/kg	5.000 ug/kg	624
Ethylbenzene - solid	CCS	07/20/89	09:00	18800.000 ug/kg	5.000 ug/kg	624
Xylene - solid	CCS	07/20/89	09:00	11750.000 ug/kg	5.000 ug/kg	624.
Comments:						
Hydrocarbon present is diesel fuel.						
07/13/89 In House # 07-5381-89	Source G. TEX 1	Location				
FID Hydrocarbon Scan - liquid	CCS	07/20/89	09:00	32.000 mg/l	1.000 mg/l	000.
Benzene - liquid	CCS	07/20/89	09:00	4700.000 ug/l	5.000 ug/l	624
Toluene - liquid	CCS	07/20/89	09:00	12900.000 ug/l	5.000 ug/l	624
Ethylbenzene - liquid	CCS	07/20/89	09:00	2600.000 ug/l	5.000 ug/l	624
Xylene - liquid	CCS	07/20/89	09:00	7300.000 ug/l	10.000 ug/l	624
Comments:						
Hydrocarbon present is gasoline.						

Laboratory ID # 40111
Very truly yours,

James H. Carr, Jr.
Chemist

South C olina Department of ealth and Environmental Control

2600 Bull Street
Columbia, S.C. 29201

Commissioner
Michael D. Jarrett

August 29, 1989
Expiration Date: November 28,1989

Mr. William J. Wimberley
Tank and Environmental Testing Inc.
1700 Alta Vista Drive,Suite 280
Columbia, S.C. 29223

RE: Disposal of Soil from Green's Texico (8/18/89)
York County Landfill DWP-103
York County

Dear Mr. Wimberley:

This office has determined that the Green's Texico waste is suitable for disposal at the sanitary landfill. The materials for disposal are as outlined: approximately 125 cubic yards of soil contaminated from leaking underground storage tanks at Green's Texico. This material is to be disposed at the York County Landfill. All disposals are subject to the following conditions:

1. Violation of any of the conditions in this approval will result in immediate termination of this approval by the District Solid Waste Consultant or other appropriate EQC personnel.
2. All disposals must have prior approval from the appropriate landfill official.
3. The District Solid Waste consultant must be notified prior to actual disposal at a landfill.
4. Disposals must not have any adverse effect upon the landfill proper, nor upon the safe and efficient operation of the landfill.
5. Precautions must be taken to prevent spillage or leakage during transport.
6. No appreciable amount of free liquids will be landfilled.
7. All containers deemed empty and landfilled will conform to the Departments definition of empty.
8. This soil is to be used for cover on the working portion of the landfill.
9. Weekend or holiday disposals are prohibited without prior notification of the landfill official and District consultant.
10. This approval is for one time only.

If you have any questions concerning this matter, please let us know.

Sincerely,

Gerald Shealy
Waste Assessment Section
Bureau of Solid and Hazardous
Waste Management

GDS/rwk

cc: Cindy Mason
William G. Tillotson

Tank & Environmental Testing, Inc.

N-46-NO-09344

RECEIVED
JUL 18 1989
GROUND-WATER PROTECTION DIVISION

July 13, 1989

Mr. Raymond Knox
Ground Water Protection Division
South Carolina Department of Health
and Environmental Control
2600 Bull Street
Columbia, South Carolina

Dear Raymond,

This letter is sent in regards to a request for SUPERB eligibility for Green's Texaco in Rock Hill, S.C. The following is a brief narrative of the events pertaining to the station and its underground tanks to date.

Mr. Green , prior to burying new underground tanks at his site on Highway 21 in Rock Hill, had four 3,000 gallon tanks of approximate age of 40 years removed. The soil beneath and around these tanks was impacted by petroleum products (OVA readings averaging from 100-250 parts per million) and thus has been stockpiled on-site on plastic pending approval from Solid and Hazardous Waste to remove them to the York County Landfill. The tanks were corroded particularly around the seams, and appeared to have leaked. Samples from the stockpiled soil and from ground water from the excavation are currently being analyzed for BTEX and TPH. In an effort to get Mr. Green's new tanks back into the excavation and not hold up the construction crew, we have supervised the removal of soils which were feasible to be taken out at the site. Additionally, approximately 8,000 gallons of contaminated ground water has been pumped from the hole and disposed of by James Waste Oil Service of Charlotte,N.C. so that the hole could be dewatered without unregulated pumping, and also to help remedy the problem of petroleum constituents being present in the ground water.

Although we have not yet received the results of the ground water samples, since there has been an impact at the site, we would like to request that MR. Green's site be made eligible for SUPERB funds. In addition, if direct billing is possible, Mr. Green is interested in having this set up. Mr. Green is gathering his inventory records together and will forward them to the Department once we receive your reply. He has paid his registration fees as well. I have advised him to keep a record of his costs and to keep receipts associated with the work. Mr. Green does have Federated Insurance at his site and has informed them of the work being done. We wanted to submit this information so as to start the process with regard to SUPERB. We have been in contact with Mr. Al Williams of the Catawba District regarding this work as well as Mr. Phil Morris of BSHWM. TET will continue to stay in contact with the Department throughout

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this work.

If you have any questions, please call at 754-3688 or 754-3781. Thanks for your consideration of this matter.

Sincerely,

William T. Wimberly

William Wimberly

WW/bh

a message

TO: Kim

FROM: Al Williams

PHONE: 285-7461

DATE: 7/6 TIME: 3:14 pm

Informed Al

- ✓ PLEASE CALL
- ____ WILL CALL LATER
- ____ CALLED
- ____ RETURNED YOUR CALL

MESSAGE: Texaco - US 21, Rock Hill (owner - Jerry Greene)
- need to remove as much contam. soil as possible (preferably to 10 ppm in field if gas) + take samples for lab. analy
- get approval for disposal thru dist.
- once lab samples taken, instal. compressed

BY: DW

SOUTH CAROLINA DEPARTMENT OF HEALTH
AND ENVIRONMENTAL CONTROL
J. MARION SIMS BUILDING • COLUMBIA, SOUTH CAROLINA 29201
PHONE 803-734-5000

To: File
From: Mark Berenbrok

Green's Oil Company
2849 Cherry Rd, Rock Hill
C-46-NO-11940

MEMO

DATE: 7-12-89

A site visit was made at the above referenced facility on 7-11-89. Present was Jerry Green (owner), Rob Devlin, + the writer (DHEC). 4 stip-3 tanks were on site. Two tanks that had been removed were on site. Mr Green stated that gasoline odors had been encountered during the tank removal and pointed out a weep area on the end of one of the tanks. The excavated soils had been stored on tarps on-site. Cagle Construction is installing the new tank system.

cc: Kim Caulk, Trust

FILE COPY

#09344 4/26/1990

HYDROGEOLOGIC IMPACT ASSESSMENT REPORT
FOR GREEN'S TEXACO
ROCK HILL, S. C.

Tank & Environmental Testing, Inc.
1700 Alta Vista Dr., Suite 110 • Columbia, S.C. 29223
(803) 754-3688 • FAX (803) 754-7836

Tank & Environmental Testing, Inc.

HYDROGEOLOGIC ASSESSMENT REPORT FOR GREEN'S TEXACO ROCK HILL, S.C.

April 25, 1990

Received 4-26-90 GWPD (see page 2)

Prepared by:
Tank & Environmental Testing, Inc.

Mark Holmes
Project Hydrogeologist

William Wimberly
Senior Hydrogeologist

TABLE OF CONTENTS

Tank & Environmental Testing, Inc.

HYDROGEOLOGIC ASSESSMENT REPORT FOR GREEN'S TEXACO ROCK HILL, S. C.

INTRODUCTION

This report is submitted by Tank and Environmental Testing, Inc. (TET) for the purpose of documenting the results of a ground water assessment investigation at Green's Texaco located on U. S. Highway 21 in Rock Hill, South Carolina (Fig. 1). The assessment was conducted on behalf of Mr. Jerry C. Green of Green's Oil Company. The purpose of the assessment was to characterize the hydrogeologic conditions at the site, determine the presence or absence of ground-water quality alteration and to gather information concerning conditions at and adjacent to the site.

SITE DESCRIPTION

In accordance with 40 CFR 280.63 and 280.65, the following information was determined by TET concerning the site.

Green's Texaco is located east of Rock Hill, S. C. on U. S. Highway 21 (Cherry Road) and is approximately 1/4 mile west of the

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Catawba River which is the nearest likely ground water discharge location. The facility consists of a gasoline station/repair shop with four underground storage tanks (UST's) present which deliver product by means of submersible pumps to three dispenser islands (Fig. 2).

Green's Texaco is situated in a commercial/heavy industrial area and is served by the municipal water supply. The Celanese Fibers Plant, a large heavy industrial complex, is located directly across U. S. Highway 21 from Green's. The site is relatively flat, however the ground water flow direction in the shallow aquifer is expected to follow the apparent topography of the local area which slopes to the east-southeast. Adjacent to and behind the site is a bulk storage facility containing four above ground tanks for Green Oil Company. These tanks are as follows:

1 - 25,000 gallon horizontal tank containing diesel fuel
1 - 15,000 gallon vertical tank containing kerosene
1 - 8,000 gallon vertical tank containing kerosene
1 - 270 gallon horizontal tank containing tank bottom water

There have been underground tanks removed in this vicinity in the past.

Green's Texaco is bordered on the north, along Highway 21, by the Celriver Credit Union and on the south by the Cloverbrook

Mobile Home Sales. A used auto dealership is present, to the north, beside the credit union. A variety of utility lines are present in the area. Water lines run along the back of the property which reportedly supplies process water to industries and/or businesses further toward Rock Hill. A 20-inch water line is reportedly present along U. S. 21, as well as a sanitary sewer line and a 10-12 inch natural gas line. The sewer line is approximately 12 feet below grade and the gas line approximately 3 feet deep. The service line to Green's runs parallel to the concrete pad (southeast-northwest) from U. S. 21 and then turns at roughly 90 degrees toward the rear of the building.

A well survey of the area did not reveal any water supply wells present within approximately 1/4 mile of Green's. Two wells were formerly located near the site, one at the credit union next door and one on the property to the south, but these wells were properly abandoned by filling with grout prior to installation of the new tanks.

PROJECT HISTORY

During the removal of four 3,000 gallon underground storage tanks in July 1989, signs of corrosion were visually evident, particularly around seams, in the UST's. Soils within the excavation were initially suspected to be contaminated based on the presence of strong gasoline odors found in the soils around and beneath the UST's. Further evidence of hydrocarbon impact was gathered by analyzing soils from within the tank basin using a photoionizing organic vapor analyzer (OVA). These OVA readings averaged 100-250 parts per million as indicated by head space analysis of collected samples. In addition, 12,200 gallons of contaminated ground water from within the tank basin excavation was pumped out and disposed of by James Waste Oil Services of Charlotte, North Carolina. This operation was performed to dewater the hole for the new tank installation and also to remedy the ground water impact as much as possible while the excavation was open. Samples of the ground water and stockpiled soils from the excavation were analyzed for BTEX (benzene, toluene, ethylbenzene and xylene) and TPH (Total Petroleum Hydrocarbons).

The stockpiled soil at the site was disposed of in the York County Landfill after prior approval was obtained from the Departments' Bureau of Solid and Hazardous Waste after receipt of analytical results confirming impact. Ground water contamination

was also confirmed upon receipt of the analyses and a report concerning this and the work performed was subsequently prepared and submitted to the Department on October 3, 1989. This submittal included the steps taken in response to 40 CFR 280.62 regarding initial abatement measures and site checks. In response to the report, the SCDHEC required the preparation of an assessment plan to determine the extent and severity of contamination. TET sent such a plan to the Department in January, 1990 and the study, as delineated herein, was approved on January 30, 1990. The study proposed the installation of four ground water quality monitoring wells to monitor the area surrounding the underground storage tank basin as well as the bulk storage facility on the site (Fig. 2). The following report documents the findings of the study.

GEOLOGIC SETTING AND REGIONAL HYDROGEOLOGY

The site is located in the Piedmont physiographic province of South Carolina. The Piedmont region is underlain by igneous, and metamorphosed igneous bedrock. The majority of the rocks in York County belong to the diorite-granite complex or are believed associated with it. The rocks are massive and generally lacking in regional structural trends with the exception being in the eastern portion of the county where there is a thin belt of slatey rocks (the Carolina Slate Belt) that are jointed and possess a

gentler dip than other rock units in the Rock Hill area (LeGrand, 1952). These rocks are overlain in turn by the regolith, a granular layer of saprolite and thin, discontinuous, alluvial deposits. Hydraulically, the regolith functions as a ground-water reservoir, recharging the bedrock aquifer. Ground water occurs within the rock fracture network in the bedrock aquifer system. Ground water typically occurs under unconfined (water table) conditions in the shallow aquifer.

METHODOLOGY

Well Installations

Two 2-inch and two 4-inch diameter ground-water quality monitoring wells were installed at Green's Texaco on March 13, 1990 (Fig. 3). All wells were installed per South Carolina Well Standards (R. 61-71) and were constructed by a licensed driller. The borings were advanced using a 7 1/2 inch and a 10 inch O. D. hollow stem auger for the two and four inch wells, respectively. Cuttings from the advancements were continuously logged by a TET hydrogeologist on-site (Appendix II). Upon completion of each boring, the augers were steam cleaned to prevent cross contamination.

Two or four inch diameter, flush threaded, schedule 40 PVC casing and 0.010 inch slotted screens were installed through the hollow stem auger. The wells were constructed such that the ten feet of screen was set to bracket the water table. The four inch wells, MW-1 and MW-2 were constructed in an area where strong hydrocarbon odors were encountered. It was anticipated that these wells, installed apparently downgradient of the tank basin, would serve as recovery wells in the future. Clean, washed filter sand was placed around and above the screens. Bentonite seals were placed above the sand. The wells were grouted from the bentonite seal to the surface. Flush mounted steel protective covers and locking well head caps were also installed. In addition to the monitoring wells, subsurface borings were also installed in areas believed to be on the plume's fringe in order to better define the contaminants. These were installed to the water table and were advanced using the same methodology outlined above. Further details on the monitoring wells and borings are included with the logs described in this report (Appendix II).

Water Level Information

Upon completing the well construction, the tops of the casings were surveyed to an established reference point (a nail in the base of a power pole on the site assumed to be 100 feet). From this

information, fluid levels in the wells could be referenced to a common point. Water levels were measured using a water level interface probe accurate to 0.01 feet. Water level data for the four wells is included in Table 1.

TABLE 1

SUMMARY OF LIQUID LEVELS
GREEN'S TEXACO - ROCK HILL, S. C.

Monitor Well	TOC Elevation	TOC to WL	WL Elevation
MW-1	98.15	1.98	96.17
MW-2	97.86	2.93	94.93
MW-3	98.98	2.56	96.42
MW-4	99.06	3.18	95.88

TOC = top of casing
WL = water level

All measurements are in feet

Static water levels measured by TET on March 22, 1990.

All elevations referenced to a nail in the base of a power pole at the site (assumed to be 100 feet). Well elevations surveyed by Bailey Land Surveyors of Florence, S. C. on April 2, 1990.

WATER QUALITY SAMPLING AND ANALYSIS

Ground water quality samples were collected from the four monitoring wells on March 22, 1990. Samples were analyzed for benzene, toluene, ethylbenzene and xylene (BTEX - EPA Method 602) the primary aromatic constituents of gasoline and for Total Petroleum Hydrocarbons (TPH). All samples were obtained after each well was checked for free product and at least three well volumes of water were evacuated. The ground-water samples were collected using Voss disposable polyethylene bailers dedicated for each well. Care was taken throughout the procedure to avoid cross contamination as evidenced by the use of the dedicated bailers and gloves. During the sampling, steps were taken to limit the agitation of the ground-water samples and to prevent aeration. All sample containers were precleaned and provided by the analytical laboratory. Samples were kept at approximately four degrees centigrade throughout the operation and during transport to the lab. Chain of custody was maintained and documented during the shipping and handling process to insure sample integrity. The organic analyses were performed by Normandeau Associates, Inc. of Aiken, S. C. A copy of the analytical laboratory results is included with this report (Appendix III).

RESULTS

Site Hydrology

The shallow subsurface at the site is composed of brown to red, fine grained sands and clays. Ground water occurs at the site under water table (unconfined) conditions in the surficial aquifer. The water table at the site is variable with depth but is generally within 2 - 5 feet of the surface, significantly higher then found during the work in the previous summer. As previously mentioned, water level measurements were combined with well elevations to determine ground-water elevations in each monitoring well. Well MW-3 displayed the highest ground-water elevation at 96.42 feet, while MW-2 had the lowest elevation at 94.93 feet. A potentiometric surface map (Fig. 4) of the surficial aquifer was constructed based upon the ground-water elevations.

Interpretation of the potentiometric surface map indicates shallow ground-water movement in the area of the monitor wells is in an easterly direction and is fairly consistent with the site slope which is to the east-southeast. Based upon visual inspection of the sediments which comprise the surficial aquifer and observed monitor well recoveries after bailing, shallow ground-water horizontal flow velocities are expected to be moderate due to the

permeabilities of the sediments containing the shallow aquifer and the moderate horizontal hydraulic gradient of 0.0276 ft./ft.

Ground-water Quality

Free floating product was not encountered in any of the monitor wells at the site. The following table lists the concentrations of the contaminants identified in each of the wells.

TABLE 2
LABORATORY ANALYSES RESULTS

(BTEX measured in parts per billion
TPH measured in parts per million)

Monitor Well	BTEX	TPH
MW-1	2,910.0-benzene 1,400.0-toluene 367.0-ethylbenzene 3,560.0-xylene	4.75
MW-2	122.0-benzene 15.0-toluene <1.0-ethylbenzene 13.0-xylene	0.135
MW-3	157.0-benzene 37.0-toluene 8.0-ethylbenzene 258.0-xylene	0.211
MW-4	<1.0-benzene <1.0-toluene <1.0-ethylbenzene <1.0-xylene	<0.100 gas <0.500 diesel

As indicated above, three of the monitoring wells exhibited the presence of contaminants. MW-1 was the most adversely affected well while MW-4, located in the area of the bulk storage facility, showed no impact. The concentrations of contaminants were fairly high in MW-1 with benzene significantly exceeding the established Maximum Contaminant Level (MCL) of 5.0 parts per billion. The other parameters, however, were below the Recommended Maximum Contaminant Levels (RMCL's) of 2.0 parts per million for toluene, 700 parts per billion for ethylbenzene and 10 parts per million for total xylenes. Total Petroleum Hydrocarbons (TPH) were present at significant levels. The concentrations of benzene in MW-2 and MW-3 were above the MCL as well, however at markedly lower values than in MW-1. No other aromatic constituents of gasoline approached RMCL levels.

CONCLUSIONS AND RECOMMENDATIONS

The results of the laboratory analyses indicate that the area of the underground storage tank basin remains a concern based on the high levels of benzene found in the ground-water samples taken from monitor wells MW-1, MW-2 AND MW-3. This conclusion is confirmed by the presence of measured amounts of TPH as gasoline in the same wells. Based on correlation of the laboratory analyses with each monitor well location, it appears that the affected area is primarily in the area of the UST basin. In view of the computed ground-water flow direction, it appears that the plume of contamination is in a general easterly direction from the area of the tank basin. MW-1, the most downgradient well, is the most severely affected. MW-2 and MW-3 appear to be near the fringe of the plume of contamination as evidenced by their low to moderate impact by hydrocarbon constituents. Borings B-2 and B-3, which were placed outside of the well locations and further away from the tank basin, did not intercept any hydrocarbon odors as confirmed by the OVM analyses. Boring B-1, in the bulk storage area, likewise did not encounter petroleum impact.

The pumping of the excavation at the time of new construction and removal of the old tanks appears to have significantly aided in cleansing the ground water. Despite the presence of contaminates in the wells around the basin, impact levels were less

than anticipated based on observations made during the work phase in July, 1989 and the result of water samples obtained at that time.

Based on the above stated evidence, no further monitoring well installation is recommended. It is advised that subsequent sampling of the wells should be performed in order to confirm the results and to monitor on-going concentration levels. In view of the violation of ground-water standards, it appears that remediation of the surficial aquifer is needed. A ground-water recovery and treatment system should be implemented to remedy the impact in the tank basin area. MW-1 and MW-2, both 4-inch diameter wells, can be utilized for recovery purposes.

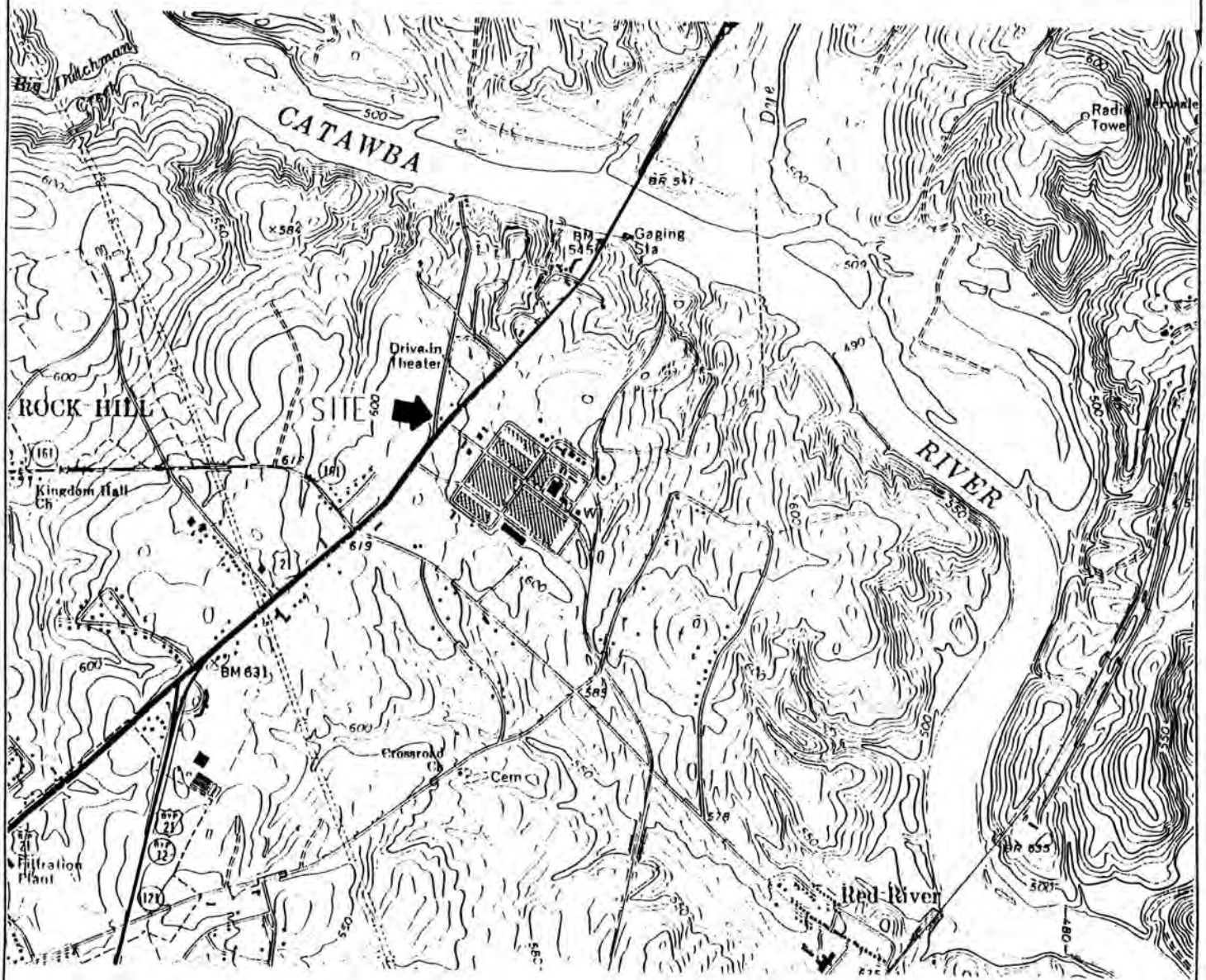
Upon review of this report and confirmation by the Department, worse case well analysis and permit pursuance will be initiated.

REFERENCES

LeGrand, H. E., and Mundorff, M. J. 1952. Geology and Ground Water in the Charlotte Area, North Carolina. N. C. Department of Conservation and Development, Division of Mineral Resources Bulletin 63.

APPENDIX I
FIGURES

GREEN'S TEXACO SITE LOCATION MAP
ROCK HILL, S. C



ROCK HILL EAST QUADRANGLE
7.5 MINUTE SERIES (TOPOGRAPHIC)

Figure 1

GREEN'S TEXACO - SITE MAP
ROCK HILL, S.C.

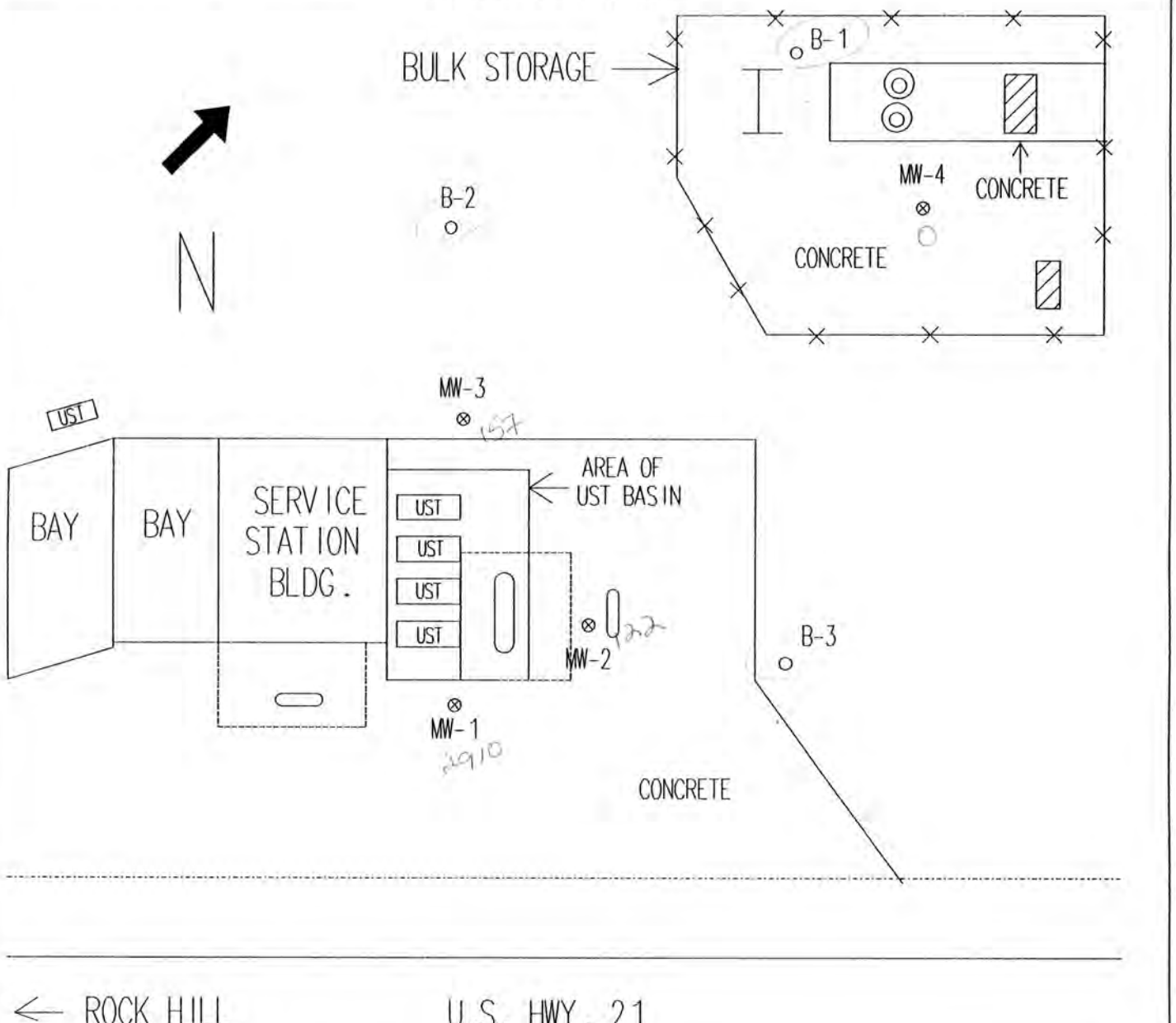


Figure 2. Site Map

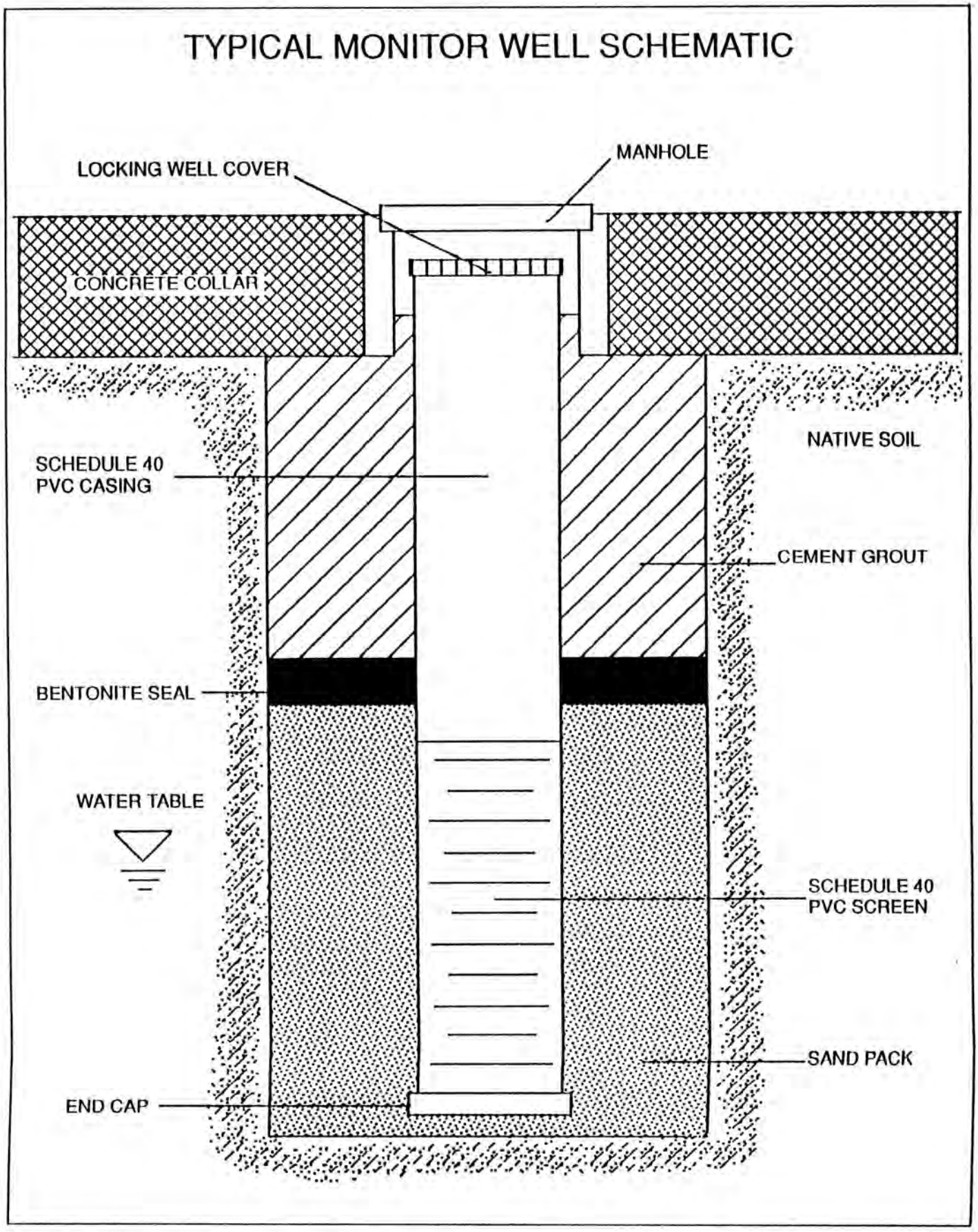


Figure 3. Schematic diagram showing monitor well construction details.

GREEN'S TEXACO - SITE MAP
ROCK HILL, S.C.

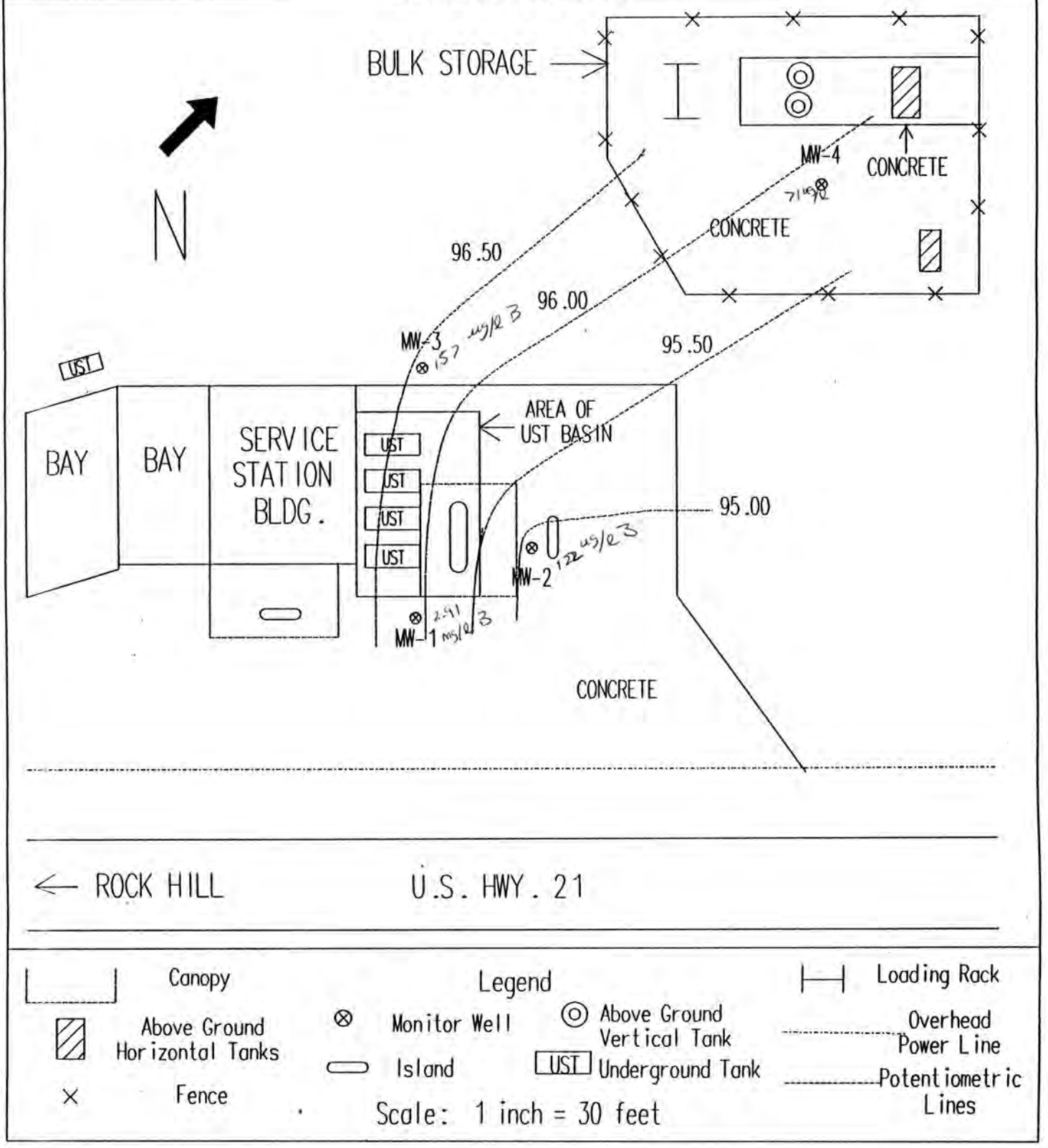


Figure 4. Potentiometric Surface Map of Surficial Aquifer (measured in feet)

APPENDIX II
BORING LOGS

GEOLOGIST LOG

TET

JOB NO.	NAME / LOCATION: GREEN'S TEXACO, ROCK HILL, SOUTH CAROLINA		WELL NO. B-1
CITY / TOWN	COUNTY / STATE: YORK / S. C.	DATE: 3-13-90	CASING HEIGHT
LAT. / ONG.	DRILLED BY: MID ATLANTIC	LIC. NO.: 650	STATIC WATER LEVEL: N/A
RID COORD.	LOGGED BY: W. WIMBERLY / TET		SAMPLING METHOD
ESTS	DRILLING METHOD: HOLLOW STEM AUGER		DEVELOP METHOD
GROUT	SEAL		GRAVEL PACK
CASING TYPE	DIA.	DEPTH	HOLE DIA. 7.5 in.
SCREEN TYPE	SLOT SIZE / DIA.	DEPTH	TOTAL DEPTH 14 ft.

LITHOLOGY/REMARKS: No competent sediments encountered unlike MW-4. Little moisture. Little or no hydrocarbon odors throughout boring.

OVA BAG (PPM)	OVA SPLIT SPOON (PPM)	WATER TABLE	DEPTH	SAMPLE	RECOVERY	ELEVATION	LITHOLOGY	WELL COMPLETION / hydrocarbon odors
			0				gravel-rich red to brown sand	none
			1				increasing clay	none
							brown micaceous, sandy clay	none
1.6			2					
			3					
2.0			4				brown clay	none
			5				tight brown clay	none
0.0			6				tight brown clay	none
			7					
0.0			8				brown silty clay	none
			9					
0.0			10				brown silty clay	none
			11					
0.0			12				brown silty clay	none
			13					
0.0			14				T. D.	
			15					
			16					
			17					
			18					
			19					
			20					

GEOLOGIST LOG

TET

JOB NO.	NAME / LOCATION: GREEN'S TEXACO, ROCK HILL, SOUTH CAROLINA		WELL NO. B-2
CITY / TOWN	COUNTY: YORK; STATE: S. C.	DATE: 3-13-90	CASING HEIGHT
LAT. / ORG.	DRILLED BY: MID ATLANTIC; LIC. NO.: 650		STATIC WATER LEVEL: approx. 2.5 ft.
GRID COORD.	LOGGED BY: W. WIMBERLY, TET		SAMPLING METHOD
ESTS	DRILLING METHOD: HOLLOW STEM AUGER		DEVELOP METHOD
GROUT	SEAL		GRAVEL PACK
CASING TYPE	DIA.	DEPTH	HOLE DIA. 7.5 in.
SCREEN TYPE	SLOT SIZE / DIA.	DEPTH	TOTAL DEPTH 14 ft.

OVA BAG (PPM)	OVA SPLIT SPOON (PPM)	WATER TABLE	DEPTH	SAMPLE	RECOVERY	LITHOLOGY / REMARKS	WELL COMPLETION hydrocarbon odors
			0			gravel	
			1			brownish gray silty sand	none
0.0			2			orange-brown sandy clay	none
			3				
0.0			4			grayish brown silty clay	none
			5			grayish brown clayey silt	none
0.0			6			gray clayey silt	none
			7				
0.0			8			light gray to brown sandy, silty clay	none
			9				
0.0			10			light gray to brown sandy clay	none
			11				
0.0			12			light gray to brown sandy clay	none
			13				
0.0			14			T. D.	
			15				
			16				
			17				
			18				
			19				
			20				

ELEVATION

GEOLOGIST LOG

TET

JOB NO.	NAME / LOCATION: GREEN'S TEXACO, ROCK HILL, SOUTH CAROLINA		WELL NO. B-3
CITY / TOWN	COUNTY: YORK; STATE: S. C.	DATE: 3-14-90	CASING HEIGHT
LAT. / DNG.	DRILLED BY: MID ATLANTIC; LIC. NO.: 650		STATIC WATER LEVEL
RID COORD.	LOGGED BY: JAN BROWN / TET		SAMPLING METHOD
ESTS	DRILLING METHOD: HOLLOW STEM AUGER		DEVELOP METHOD
GROUT	SEAL		GRAVEL PACK
CASING TYPE	DIA.	DEPTH	HOLE DIA.
SCREEN TYPE	SLOT SIZE / DIA.	DEPTH	TOTAL DEPTH

OVA BAG (PPM)	OVA SPLIT SPOON (PPM)	WATER TABLE	DEPTH	SAMPLE RECOVERY	LITHOLOGY / REMARKS	WELL COMPLETION hydrocarbon odors
					sample taken in dirt area at edge of pavement	
			0		ELEVATION	
					orange brown silty clay	none
			1			
			2			
0.0			3		light orange silty clay	none
			4		light brown silty clay	none
			5			
0.0			6		dark gray sandy clay	none
			7			
			8			
0.0			9		dark gray silty clay (hard confining layer)	none
			0		rock	none
			1			
			2		T. D.	
			3			
			4			
			5			
			6			
			7			
			8			
			9			
			0			

GEOLOGIST LOG

TET

J NO.	NAME GREEN'S TEXACO LOCATION ROCK HILL, SOUTH CAROLINA	WELL NO. MW-1
C Y T WN	COUNTY YORK STATE S. C. — DATE 3-13-90	CASING HEIGHT
LAT. L NG.	DRILLED BY MID ATLANTIC LIC. NO. 650	STATIC WATER LEVEL approx. 2.5 ft.
G D C ND.	LOGGED BY W. WIMBERLY TET	SAMPLING METHOD
TESTS	DRILLING METHOD HOLLOW STEM AUGER	DEVELOP METHOD
G OUT	SEAL	GRAVEL PACK
C SING T E PVC	DIA. 4.0 in. DEPTH 0-2 ft.	HOLE DIA. 10.25 in.
SCREEN T E PVC	SLOT SIZE 0.010 in. DIA. 4.0 in. DEPTH 2-12 ft.	TOTAL DEPTH 12.5 ft.

OVA BAG (PPM)	OVA SPLIT SPOON (PPM)	WATER TABLE	DEPTH	SAMPLE RECOVERY	LITHOLOGY/REMARKS	WELL COMPLETION: hydrocarbon odors
					auger refusal at 12.5 ft. strong hydrocarbon odor throughout boring	
					ELEVATION	
			0		concrete	strong
			1		brown sandy clay	strong
301			2		increasing sand	strong
			3			
309			4		brown clayey sand	strong
			5		tan clayey, sandy silt	strong
440			6			
			7		dark gray-brown clayey, sandy silt w/rock fragments	strong
536			8			
			9		gold-brown clayey, silty sand w/rock fragment	strong
473			10		tan brown sandy, silty clay w/rock fragments drilling difficult	strong
			11			
304			12		rock fragments increasing (granite material) T. D. auger refusal	
			13			
			14			
			15			
			16			
			17			
			18			
			19			
			20			

GEOLOGIST LOG

TET

J NO.	NAME GREEN'S TEXACO LOCATION ROCK HILL, SOUTH CAROLINA	WELL NO. MW-2
C Y T N	COUNTY YORK STATE S. C.	DATE 3-14-90
LAT. LONG.	DRILLED BY MID ATLANTIC LIC. NO. 650	CASING HEIGHT STATIC WATER LEVEL 2.5 ft.
GI) CO RD.	LOGGED BY JAN BROWN TET	SAMPLING METHOD
TESTS	DRILLING METHOD HOLLOW STEM AUGER	DEVELOP METHOD
G UT	SEAL	GRAVEL PACK

C ING T E PVC — DIA. 4.0 in. DEPTH 0-2 ft. — HOLE DIA. 10.25 in.

SCREEN T E PVC — SLOT SIZE 0.010 in. DIA. 4.0 in. DEPTH 2-13 ft. — TOTAL DEPTH 14 ft.

OVA BAG (PPM)	OVA SPLIT SPOON (PPM)	WATER TABLE	DEPTH	SAMPLE RECOVERY	LITHOLOGY/REMARKS	WELL COMPLETIO
			ELEVATION			hydrocarbon odors
			0		concrete	
			1		orange-red silty clay	none
			2			
5.2			3		light brown silty clay	slight
			4		tan silty clay	moderate
			5		moist silty clay	moderate
106			6		moist silty clay	moderate
			7			
			8			
48			9		moist silty clay	moderate
			0			
			1			
2.0			2		saturated light tan silty clay	
			3			
			4		T. D.	
			5			
			6			
			7			
			8			
			9			
			0			

GEOLOGIST LOG

TET

JOB NO.	NAME LOCATION: GREEN'S TEXACO, ROCK HILL, SOUTH CAROLINA		WELL NO. MW-3
CITY TOWN	COUNTY: YORK; STATE: S. C.	DATE: 3-13-90	CASING HEIGHT
LAT. LONG.	DRILLED BY: MID ATLANTIC; LIC. NO.: 650		STATIC WATER LEVEL: approx. 2.5 ft.
GRID COORD.	LOGGED BY: W. WIMBERLY; TET		SAMPLING METHOD
TESTS	DRILLING METHOD: HOLLOW STEM AUGER		DEVELOP METHOD
GROUT	SEAL		GRAVEL PACK
CASING TYPE: PVC	DIA.: 2in.	DEPTH: 0-2 ft.	HOLE DIA.: 7.5 in.
SCREEN TYPE: PVC	SLOT SIZE: 0.010 in.	DIA.: 2 in. DEPTH: 2-12 ft.	TOTAL DEPTH: 12 ft.

OVA BAG (PPM)	OVA SPLIT SPOON (PPM)	WATER TABLE	DEPTH	SAMPLE RECOVERY	ELEVATION	LITHOLOGY/REMARKS	WELL COMPLETION hydrocarbon odors
						sandy sediments believed to be from new UST backfill	
			0			sandy gravel	none
			1			red silty clay w/numerous gravel fragments	none
1.6			2			brown silty clay w/gravel fragments	slight
			3				
15			4			moist, tan silty sand (coarse grained)	moderate
			5				
60			6			moist silty sand	strong
			7				
431			8			grayish brown silty sand (medium grained)	strong
			9				
491			0			grayish brown silty sand (medium grained)	strong
			1				
390			2			sand auger distress due to rock at T. D. sand persist	
			3				
			4				
			5				
			6				
			7				
			8				
			9				
			0				

GEOLOGIST LOG

TET

	NAME / LOCATION: GREEN'S TEXACO, ROCK HILL, SOUTH CAROLINA		WELL NO.: MW-4
	COUNTY / STATE: YORK, S. C.	DATE: 3-13-90	CASING HEIGHT:
	DRILLED BY / LIC. NO.: MID ATLANTIC, 650		STATIC WATER LEVEL: approx. 2.5 ft.
	LOGGED BY: W. WIMBERLY, TET		SAMPLING METHOD:
	DRILLING METHOD: HOLLOW STEM AUGER		DEVELOP METHOD:
	SEAL:		GRAVEL PACK:

CASING TYPE: PVC — DIA.: 2 in. — DEPTH: 0-2 ft. — HOLE DIA.: 7.5 in.

SCREEN TYPE: PVC — SLOT SIZE: 0.010 — DIA.: 2 in. — DEPTH: 2-12 ft. — TOTAL DEPTH: 13.5 ft.

OVA BAG (PPM)	OVA SPLIT SPOON (PPM)	WATER TABLE	DEPTH	SAMPLE RECOVERY	LITHOLOGY/REMARKS / ELEVATION	WELL COMPLETION hydrocarbon odors
			0		gravel	none
					red sandy silt w/abundant gravel	none
			1			
2.6			2		red silty clay	slight
					red-brown sandy silty clay, moist	slight
			3			
4.5			4		red-brown sandy silty clay, dry	slight
			5			
9.9			6		brown sandy clay, dry	slight
			7			
15			8		brown sandy clay (increasing clay content)	moderate
			9		gray brown silty clay	moderate
5.5			10		gray brown silty clay w/rock fragments	decreasing to slight
			11		brown sandy silty clay w/numerous rock fragments (fragments friable)	
5.0			12			
			13		T. D. auger refusal	
			14			
			15			
			16			
			17			
			18			
			19			
			20			

Tank & Environmental Testing, Inc.

PHASE II HYDROGEOLOGIC ASSESSMENT REPORT FOR GREEN'S TEXACO (GWPD #09344) ROCK HILL, SOUTH CAROLINA

November 6, 1991

Prepared by:
Tank & Environmental Testing, Inc.

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TABLE OF CONTENTS

PHASE II HYDROGEOLOGIC ASSESSMENT FOR GREEN'S TEXACO (GWPD #09344) ROCK HILL, SOUTH CAROLINA

INTRODUCTION

This report is submitted by Tank and Environmental Testing, Inc. (TET) for the purpose of documenting the results of a Phase II Hydrogeologic Assessment at Green's Texaco located on U. S. Highway 21 in Rock Hill, South Carolina (Fig. 1). The assessment was conducted on behalf of Mr. Jerry C. Green of Green's Oil Company. The purpose of the assessment was to further define the areal and vertical limits of hydrocarbon impact to the ground water at the site.

SITE DESCRIPTION

Green's Texaco is located east of Rock Hill, S. C. on U. S. Highway 21 (Cherry Road) and is approximately 1/4 mile west of the Catawba River which is the nearest likely ground water discharge location. The facility consists of a gasoline station/repair shop with four underground storage tanks (UST's) present which deliver product by means of submersible pumps to three dispenser islands

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(Fig. 2).

Green's Texaco is situated in a commercial/heavy industrial area and is served by the municipal water supply. The Celanese Fibers Plant, a large heavy industrial complex, is located directly across U. S. Highway 21 from Green's. The site is relatively flat, however the ground water flow direction in the shallow aquifer is expected to follow the apparent topography of the local area which slopes to the east-southeast. Adjacent to and behind the site is a bulk storage facility containing four above ground tanks for Green Oil Company. These tanks are as follows:

1 - 25,000 gallon horizontal tank containing diesel fuel
1 - 15,000 gallon vertical tank containing kerosene
1 - 8,000 gallon vertical tank containing kerosene
1 - 270 gallon horizontal tank containing tank bottom water

There have been underground tanks removed in this vicinity in the past.

Green's Texaco is bordered on the north, along Highway 21, by the Celriver Credit Union and on the south by Cloverbrook Mobile Home Sales. A used auto dealership is present, to the north, beside the credit union. A variety of utility lines are present in the area. Water lines run along the back of the property which reportedly supplies process water to industries and/or businesses further toward Rock Hill. A 20-inch water line is reportedly present along U. S. 21, as well as a sanitary sewer line and a 10-

12 inch natural gas line. The gas and sewer lines are approximately 3 and 12 feet below surface grade, respectively. The service line to Green's runs parallel to the concrete pad (southeast-northwest) from U. S. 21 and then turns at roughly 90 degrees toward the rear of the building.

A well survey of the area did not reveal any water supply wells present within approximately 1/4 mile of Green's. Two wells were formerly located near the site, one at the credit union next door and one on the property to the south, but these wells were properly abandoned by filling with grout prior to installation of the new tanks.

PROJECT HISTORY

During the removal of four 3,000 gallon underground storage tanks in July 1989, signs of corrosion were visually evident, particularly around seams, in the UST's. Soils within the excavation were initially suspected to be contaminated based on the presence of strong gasoline odors found in the soils around and beneath the UST's. Further evidence of hydrocarbon impact was gathered by analyzing soils from within the tank basin using a photoionizing organic vapor analyzer (OVA). These OVA readings averaged 100-250 parts per million as indicated by head space analysis of collected samples. In addition, 12,200 gallons of

contaminated ground water from within the tank basin excavation was pumped out and disposed of by James Waste Oil Services of Charlotte, North Carolina. This operation was performed to dewater the hole for the new tank installation and also to remedy the ground water impact as much as possible while the excavation was open. Samples of the ground water and stockpiled soils from the excavation were analyzed for BTEX (benzene, toluene, ethylbenzene and xylene) and TPH (Total Petroleum Hydrocarbons).

The stockpiled soil at the site was disposed of in the York County Landfill after prior approval was obtained from the Department's Bureau of Solid and Hazardous Waste after receipt of analytical results confirming impact. Ground-water contamination was also confirmed upon receipt of the analyses and a report concerning this and the work performed was subsequently prepared and submitted to the Department on October 3, 1989. This submittal included the steps taken in response to 40 CFR 280.62 regarding initial abatement measures and site checks. In response to the report, the SCDHEC required the preparation of an assessment plan to determine the extent and severity of contamination. TET sent such a plan to the Department in January, 1990 and the study was approved on January 30, 1990. The study involved the installation of four ground water quality monitoring wells to monitor the area surrounding the underground storage tank basin as well as the bulk storage facility on the site (Fig. 2).

A Phase I hydrogeologic assessment was conducted in the spring of 1990 and the results forwarded to the SCDHEC on April 26, 1990. The results indicated that the ground water at the site had been adversely affected by petroleum hydrocarbons, with the greatest impact in well MW-1 immediately east of the tank basin (Appendix I, Figure 2).

In response to a letter dated July 10, 1990 from SCDHEC, a plan was developed to further delineate the areal and vertical extent of hydrocarbon impact and submitted to SCDHEC on October 10, 1990. The initial plan was not approved and a revised plan was submitted to SCDHEC on April 12, 1991. A letter of approval was received on August 28, 1991. The following details the implementation and results of this of this phase of assessment.

GEOLOGIC SETTING AND REGIONAL HYDROGEOLOGY

The site is located in the Piedmont physiographic province of South Carolina. The Piedmont region is underlain by igneous, and metamorphosed igneous bedrock. The majority of the rocks in York County belong to the diorite-granite complex or are believed associated with it. The rocks are massive and generally lacking in regional structural trends with the exception being in the eastern portion of the county where there is a thin belt of slatey rocks (the Carolina Slate Belt) that are jointed and possess a gentler

dip than other rock units in the Rock Hill area (LeGrand, 1952). These rocks are overlain in turn by the regolith, a granular layer of saprolite and thin, discontinuous, alluvial deposits. Hydraulically, the regolith functions as a ground-water reservoir, recharging the bedrock aquifer. Ground water occurs within the rock fracture network in the bedrock aquifer system. Ground water typically occurs under unconfined (water table) conditions in the shallow aquifer.

METHODOLOGY

Monitor Well Installation

On September 10, 1991 three shallow ground water monitoring wells, designated MW-5, MW-6, and MW-7 were installed at the site. All three were drilled to the depth of auger refusal and a 10 foot section of 0.010-inch slotted screen was emplaced to bracket the water table. The only exception was in well MW-6 where auger refusal was encountered at a depth of ten feet, and a 9-foot section of screen was used. All wells were installed per South Carolina Well Standards (R. 61-71) and were constructed by a well driller licensed in the state of South Carolina. Cuttings from the advancements were continuously logged by a TET Hydrogeologist on-site. Soil samples were collected at three foot intervals

throughout the drilling and were analyzed for the presence of organic vapors by means of a photoionizing organic vapor analyzer (OVA). The results of the OVA analyses are shown in the boring logs (Appendix II). A schematic of a typical shallow monitor well installation is shown in Figure 3, Appendix I.

To test for the possible vertical migration of contamination, a deep monitor well, PW-8, was installed at the site, paired with MW-5. Continuous split-spoon samples were taken down to bedrock. These were described by the TET Hydrogeologist on-site and were analyzed with the OVA. A bentonite seal was placed at the base of the boring and the upper casing was emplaced and grouted into position. On the following day, September 11, 1991, mud rotary methods were used to advance the lower section of the well through rock to the total depth of 30 feet. A five-foot section of 0.010" slotted screen was emplaced at a depth of 25-30 feet, such that the top of the screened interval was 15 feet below the base of the screen in MW-5, the adjacent shallow well. The results of OVA analysis are contained in the boring logs (Appendix II). A schematic of a typical telescoping or "pit-cased" well is included with this report (Figure 4, Appendix I).

Water Level Information

Upon completing the well construction, the tops of the casings were surveyed to an established reference point (a nail in the base of a power pole on the site assumed to be 100 feet). From this information, fluid levels in the wells could be referenced to a common point. Water levels were measured on September 26, 1991 using a water level interface probe accurate to 0.01 feet. Water level data is included in Table 1, Appendix III.

Water Quality Sampling

Ground water quality samples were collected from all the monitoring wells on September 26, 1991. Samples were analyzed for benzene, toluene, ethylbenzene and total xylenes (BTEX - EPA Method 602 plus xylenes), the primary aromatic constituents of gasoline, and for Methyl-Tert-Butyl-Ether, a gasoline additive used to enhance octane levels in unleaded gas. At the direction of the SCDHEC, well MW-2 was designated a "worst-case" well and was sampled for an expanded list of parameters including pH, BOD_5, EPA method 625 - base/neutral and acid extractables, and total Lead.

All samples were obtained after each well was checked for free product and at least three well volumes of water were evacuated.

The ground-water samples were collected using Voss disposable polyethylene bailers dedicated for each well. During the sampling, steps were taken to limit the agitation of the ground-water samples and to prevent aeration. All sample containers were precleaned and provided by the analytical laboratory. Samples were kept at approximately four degrees centigrade throughout the operation and during transport to the lab. Chain of custody was maintained to insure sample integrity. The organic analyses were performed by EMS Heritage Laboratories of Charlotte, N.C. A copy of the analytical laboratory results is included with this report (Appendix III).

Aquifer Tests

A rising and falling head test was conducted on monitor well MW-5, and a rising head test on monitor well MW-7 on October 12, 1991 using the method of Bouwer and Rice (1976). These tests were performed to determine the hydraulic conductivity and transmissivity at the site.

A falling head test was performed by lowering a pneumatic slug into the well along with the transducer. The slug was filled with air to induce a rise in head. After the completion of the falling head test and water level stabilization, the air was released from the slug to induce a drop in head for the rising head test. Data

was recorded using a data logger with an initial logging rate of one second. A complete falling and rising head cycle was completed for MW-5 and a rising head cycle for MW-7 (raw data is available upon request). Plots of the data are included in Appendix IV.

RESULTS

Site Hydrology

The shallow subsurface at the site is composed of brown, red, and green clays and sandy clays. These sediments grade to crystalline rock consisting with gabbroic characteristics (green, partially degraded augite crystals) at depths ranging from 9 to 15 feet below land surface. Ground water occurs at the site under water table (unconfined) conditions in the surficial aquifer. The water table at the site is variable with depth but is generally within 6 - 9 feet of the surface. Water levels were measured in all the wells on September 26, 1991. Well MW-6 displayed the highest ground-water elevation at 91.42 feet, while MW-4 had the lowest elevation at 90.15 feet. A map of the water table elevation in the surficial aquifer is included with this report (Figure 5, Appendix I). The water level measurement from well PW-8 was not used to construct the map as the screened interval does not bracket

the water table. The map indicates that ground water movement is to the north, northeast, and east with a hydraulic gradient ranging from 0.012 ft/ft (north) to 0.019 ft/ft (east).

Ground-water Quality

Ground water quality samples were collected from all the wells on September 26, 1991. Free floating product was not encountered in any of the wells. The results of the ground-water quality analyses for the occurrence of BTEX and MTBE are shown in Table 2 (Appendix I). Well MW-1 showed the highest concentrations of benzene with a concentration of 800 µg/l. Wells MW-3 and MW-2 also contained benzene with concentrations of 84 and 50 µg/l, respectively. An isoconcentration map of benzene is included with this report (Figure 6, Appendix I).

The most prevalent contaminant was MTBE, found in seven of the eight wells. Concentrations ranged from a maximum of 4300 µg/l in well MW-2 to a low of 47 µg/l in well MW-3. The only well that did not show any contamination was MW-6, the upgradient well. An isoconcentration map of MTBE is included with this report (Figure 7, Appendix I). While a maximum contaminant level has yet to be defined for MTBE, the latest information available indicates that a Recommended Maximum Contaminant Level (RMCL) of 40 µg/l is being considered by the US EPA.

The results for benzene and for MTBE both indicate a significant impact to the ground water by petroleum hydrocarbons. MTBE is more volatile and mobile than benzene and therefore is more widespread than the benzene, marking the leading edge of the contaminant plume. That the maximum contaminant concentration for MTBE is found in MW-2, in comparison with MW-1 for benzene, suggests that the contaminant plume is migrating downgradient. MTBE was also found in PW-8, the deep well, at a level of 535 µg/l.

The worst case well analysis of MW-2 revealed a pH of 6.6 S.U., a biochemical oxygen demand of 140 mg/l, and a lead level of 0.01 mg/l, which is below the maximum level of 0.05 mg/l. The only semi-volatile organic contaminant found in concentrations above the detection limit was Bis(2-Ethylhexyl) Phthalate, an organic compound commonly found in residues from plastics. As the site does not engage in the manufacture of plastics, there appears to be no on-site source for this chemical and its presence is possibly associated with laboratory procedures.

Aquifer Tests

The method used for analysis of the data was the Bouwer and Rice method (Bouwer and Rice, 1976). This method was chosen because it was developed specifically for water table conditions

with partially penetrating wells. It thus fits the conditions of the test wells at the site. It is a modification of the Theim technique for aquifer property determination. Bouwer and Rice developed parameters to apply the technique to partially penetrating wells by electrical modelling methods. Rigorous analytical modelling by Dagan (1978) has shown that errors involved with this technique will not exceed 37%. The major sources of error will be: 1) the heterogeneity of the soils (all methods assume homogeneity), and 2) the definition of the base of the soil. In the latter case, there are two contributing factors. The first is the unknown depth and shape of the soil/rock boundary, which is an input in the analysis of partially penetrating wells. The second factor is the nature of the boundary. In some cases the boundary is considered to be much more permeable than either rock or soil (Harned and Daniel, 1989). In all cases, these errors will be present in any analysis including aquifer tests involving pumping and observation wells.

The interpretation procedure is outlined below.
The well construction parameters are denoted:

H - the depth of the well

L - the length of the screened interval

R_w - the radius of the sand pack

R_c - the radius of the riser pipe

P - the porosity of the sand pack

The static water level is measured and a change in head is induced by an air-filled slug lowered into the well. The water level is monitored for a period of time that is dependent upon the response of the aquifer. The heads are changed to Y values where:

$$Y = (\text{water level}) - (\text{static water level})$$

ln(Y) is plotted over time. The initial portion of the curve will be linear. The Y intercept (where time (t)=0) is denoted Y_0 and the value of any point on the curve (Y_t) is determined by the function $1/t*\ln(Y_0/Y_t)$. The parameters A and B are determined from the type curves in Bouwer and Rice (1976). The values are determined by L/R_w. The value of $\ln((D-H)/R_w)$ is also determined. If the value is greater than 6, the value of 6 is used for $\ln((D-H)/R_w)$ in the computations of aquifer parameters. If the value is less than 6, the calculated value of $\ln((D-H)/R_w)$ is used.

Calculation of Aquifer Parameters

The value of $\ln(R_e/R_w)$ is calculated by formula 8 from Bouwer and Rice (1976), permeability is determined by formula 5, and transmissivity is determined from formula 6.

The site is underlain by highly argillaceous saprolites, therefore it is not surprising that aquifer testing at the site

revealed very low conductivities and transmissivities. The hydraulic conductivity ranged from 0.01914 to 0.1416 ft/day (See below). Transmissivities range from 0.00743 to 0.0171 to 3.604 ft^2/day. Using the greatest hydraulic gradient of 0.019 ft/ft and an assumed effective porosity of 45%, the measured hydraulic conductivities suggest a maximum ground water velocity ranging between 0.0008 and 0.006 ft/day.

SUMMARY OF HYDRAULIC CONDUCTIVITY
GREEN'S TEXACO - ROCK HILL, S.C.

WELL #	HYDRAULIC CONDUCTIVITY K in cm/sec	AVERAGE K	K in ft./day
MW-5 falling rising	3.87×10^{-5} 6.12×10^{-5}	5.00×10^{-5}	0.14
MW-7(H) rising	6.75×10^{-6}	6.75×10^{-6}	0.019

CONCLUSIONS AND RECOMMENDATIONS

The results of the laboratory analyses indicate that the area of the underground storage tank basin remains a concern based on the levels of benzene and MTBE found in the ground-water samples, particularly monitor wells MW-1, MW-2 AND MW-3. The highest levels of MTBE were found in MW-2 and correlate with the downgradient migration of the plume. The relatively low concentrations of the aromatic fraction in all wells except MW-1 suggests that the pumping of the excavation at the time of new construction and removal of the old tanks appears to have significantly aided in cleansing the ground water and served to aid in the elimination of the source for ground water contamination.

The plume is well delineated at this time and thus no further monitoring well installation is recommended. The current wells should serve to adequately monitor changes in chemical concentrations throughout the site. It is advised that subsequent sampling of the wells should be performed in order to confirm the results and to monitor on-going concentration levels. In view of the violation of ground-water standards, it appears that remediation of the surficial aquifer is needed. This effort should be concentrated in the tank basin area and should be implemented as quickly as possible before further migration occurs.

It is advised that the NPDES permit application process should be initiated in the near future. Permission for discharge of any treated water to the local POTW should also be sought. In order to progress toward remedial action, a Corrective Action Plan (CAP) and Preliminary Engineering Report (PER) will be needed. Upon receiving SCDHEC's review and confirmation of these conclusions, this work will be initiated.

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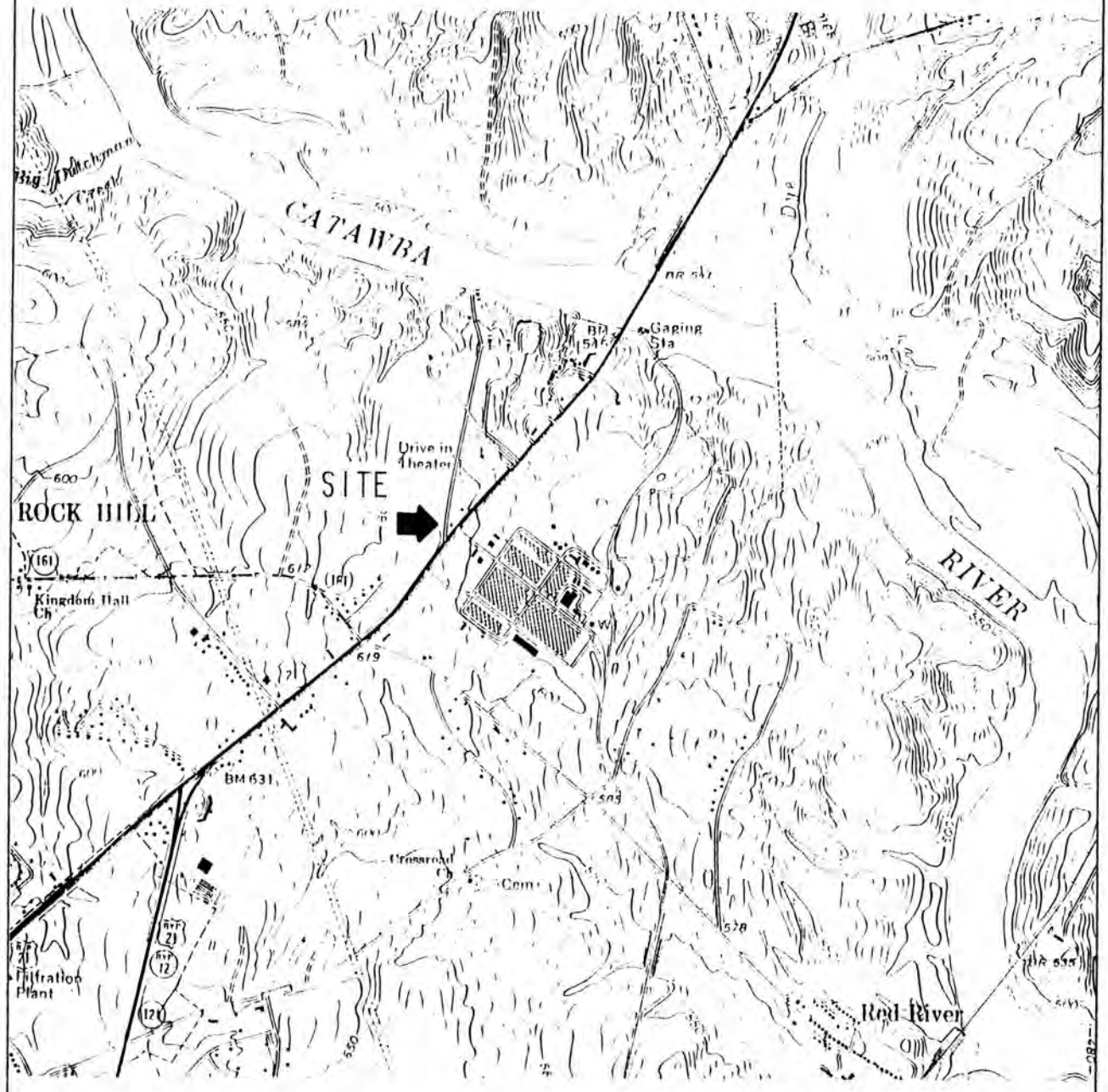
GREEN'S TEXACO
ROCK HILL, S.C.



ROCK HILL EAST QUADRANGLE
7.5 MINUTE SERIES (TOPOGRAPHIC)

Figure 1. Site Location Map

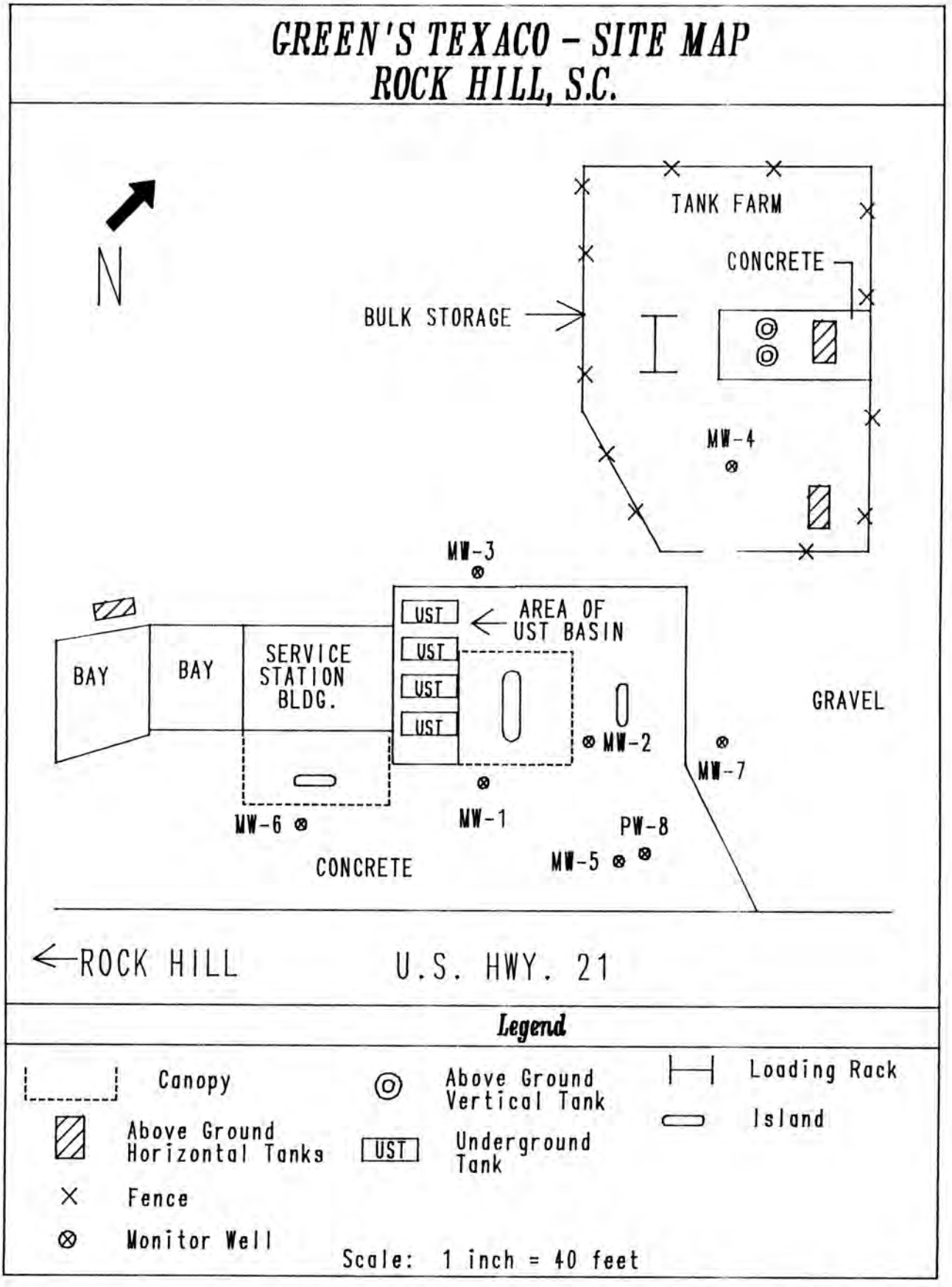


Figure 2. Site Map

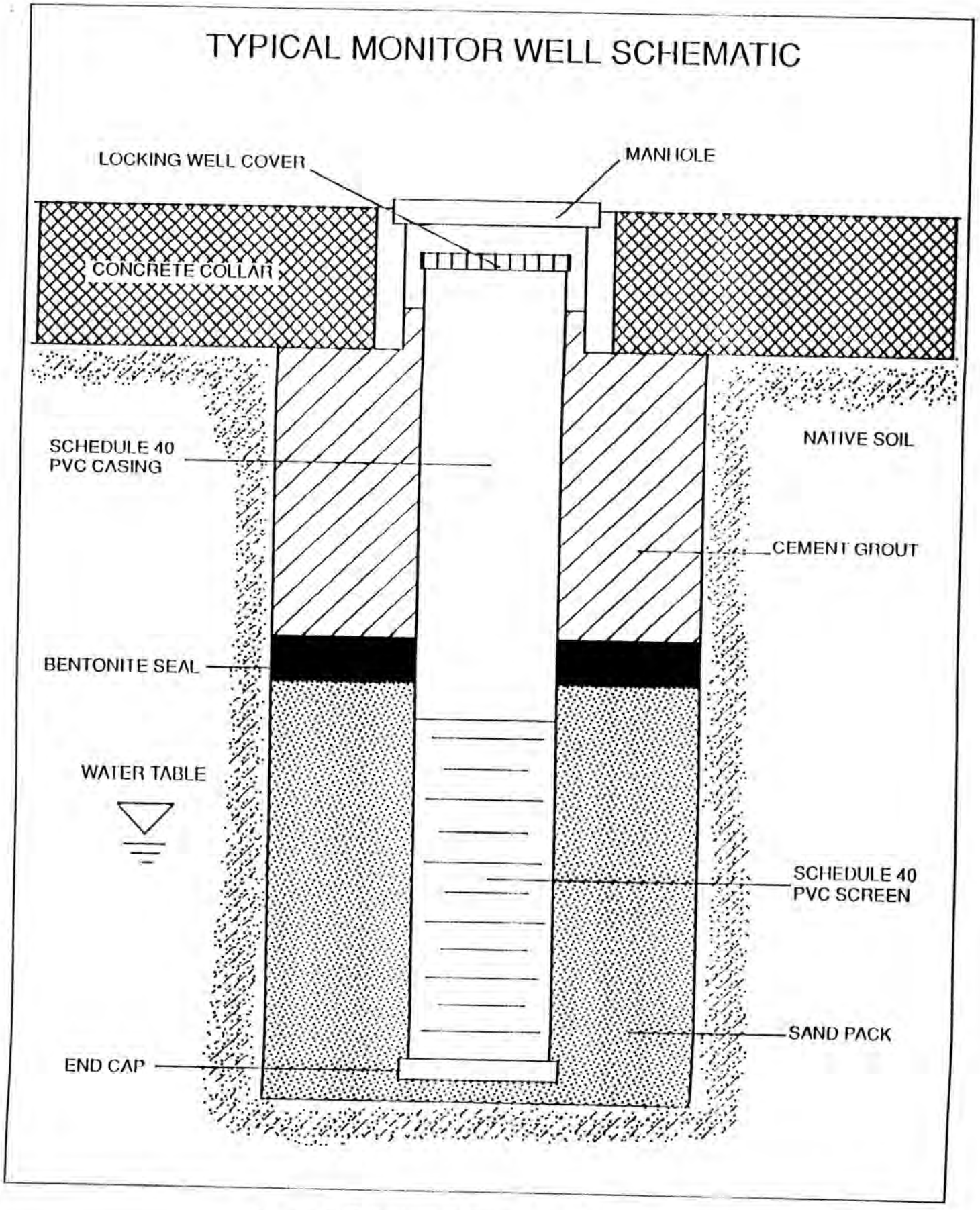


Figure 3. Schematic diagram showing monitor well construction details.

DEEP WELL SCHEMATIC

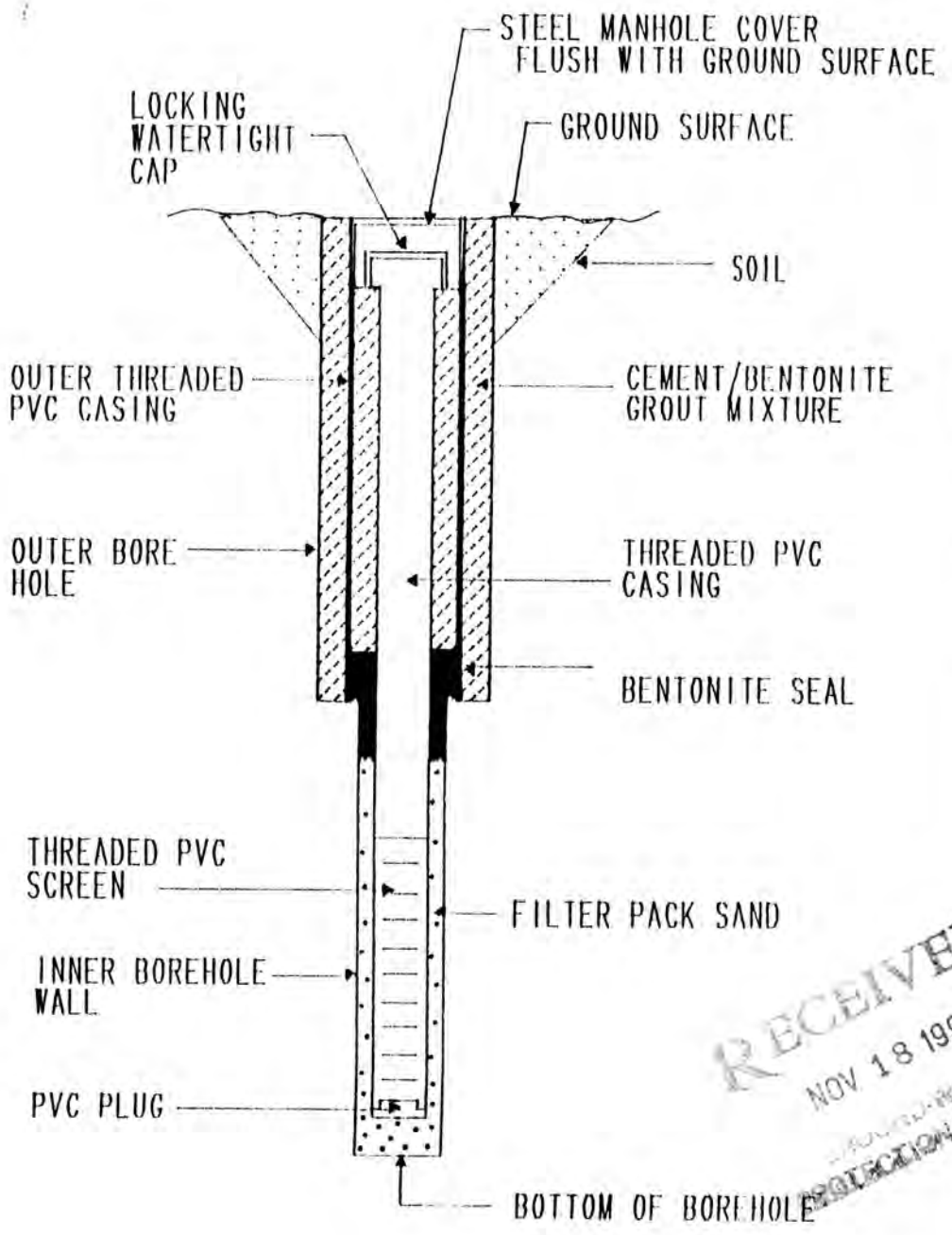
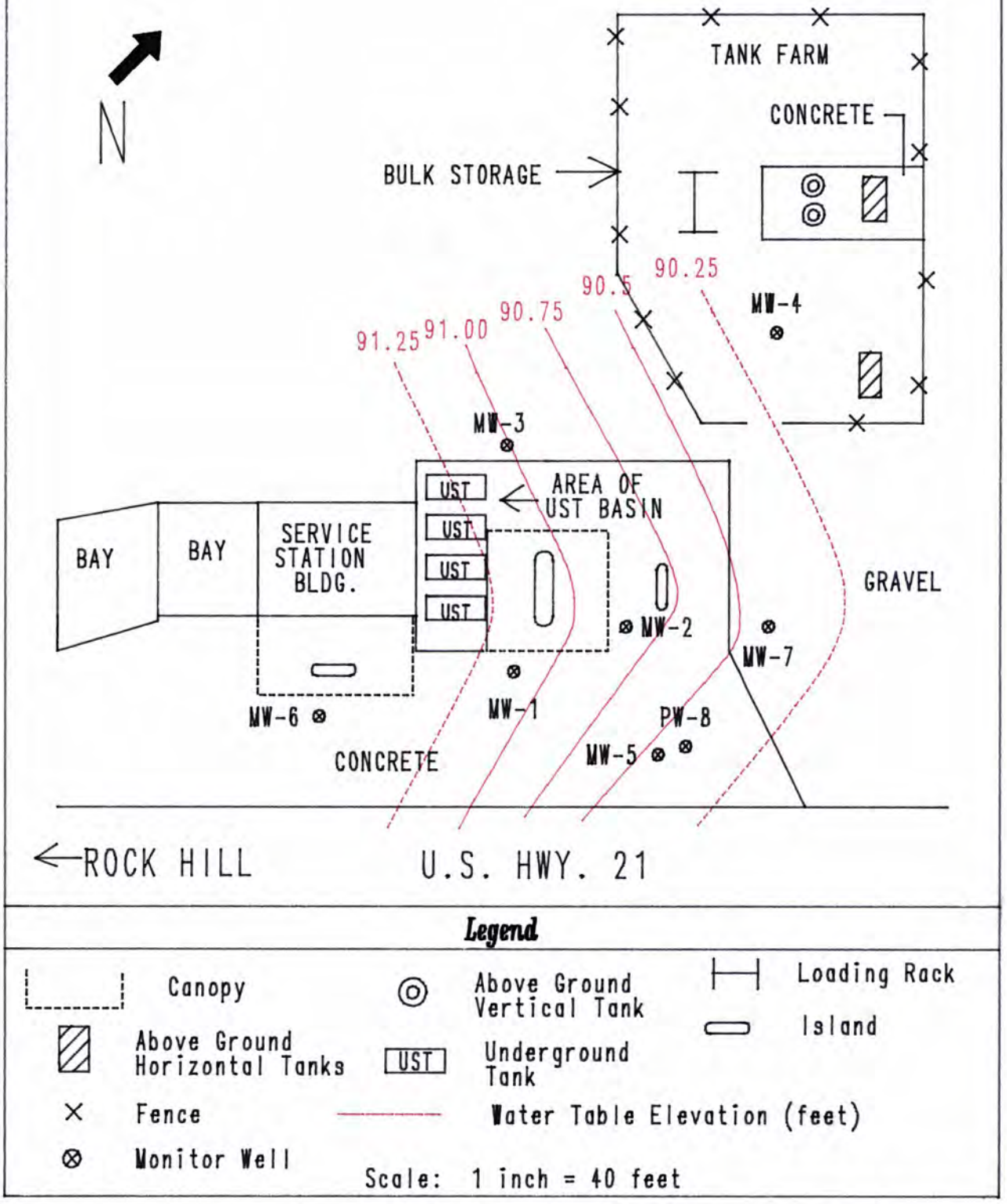


Figure 4. Schematic Diagram Showing
Telescoping Deep Well

GREEN'S TEXACO - SITE MAP
ROCK HILL, S.C.



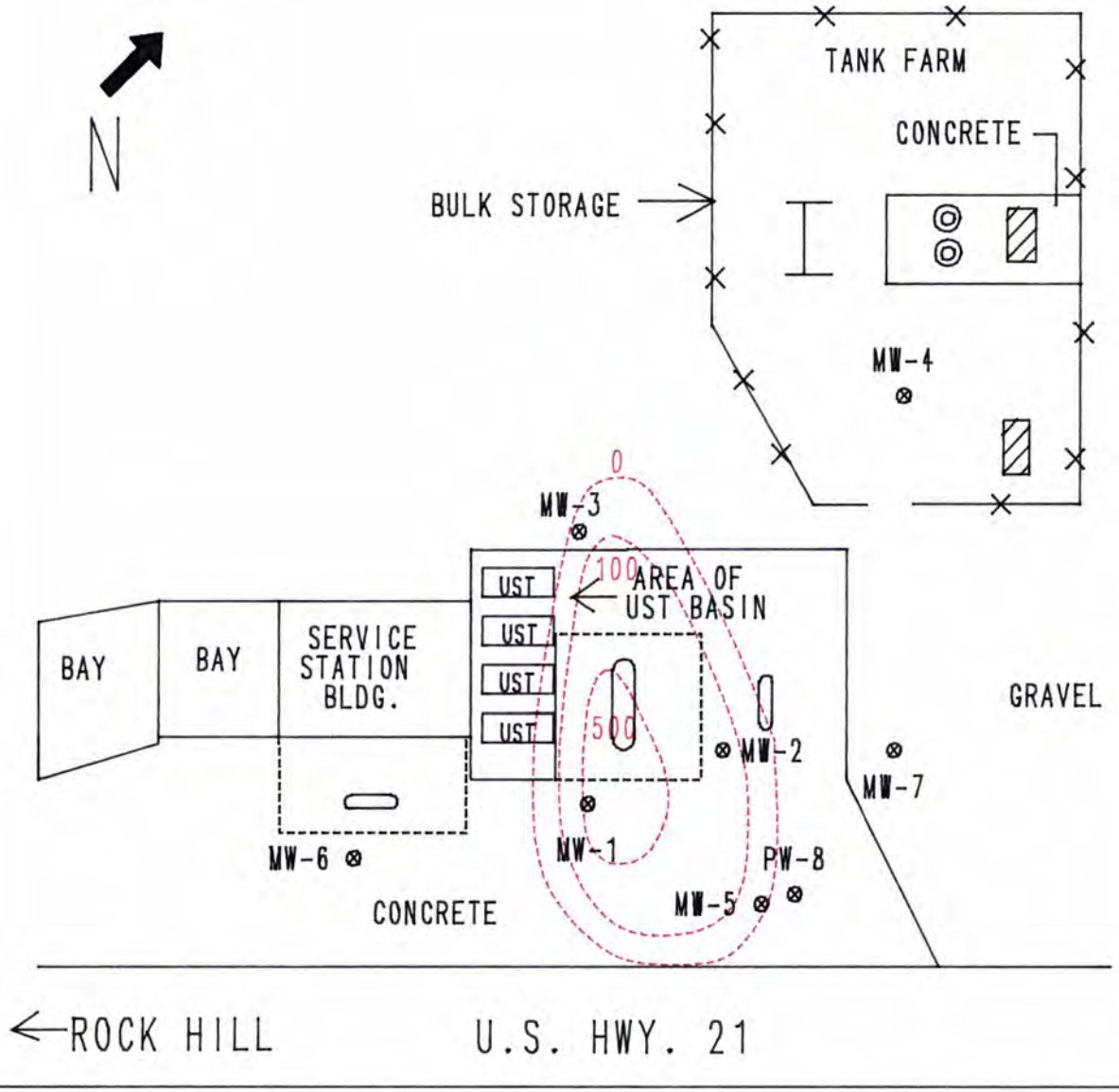
Legend

- Canopy
- Above Ground Vertical Tank
- Loading Rack
- Island
- Above Ground Horizontal Tanks
- UST — Underground Tank
- Fence
- Water Table Elevation (feet)
- Monitor Well

Scale: 1 inch = 40 feet

Figure 5. Water Table Elevation
September 26, 1991

GREEN'S TEXACO - SITE MAP
ROCK HILL, S.C.



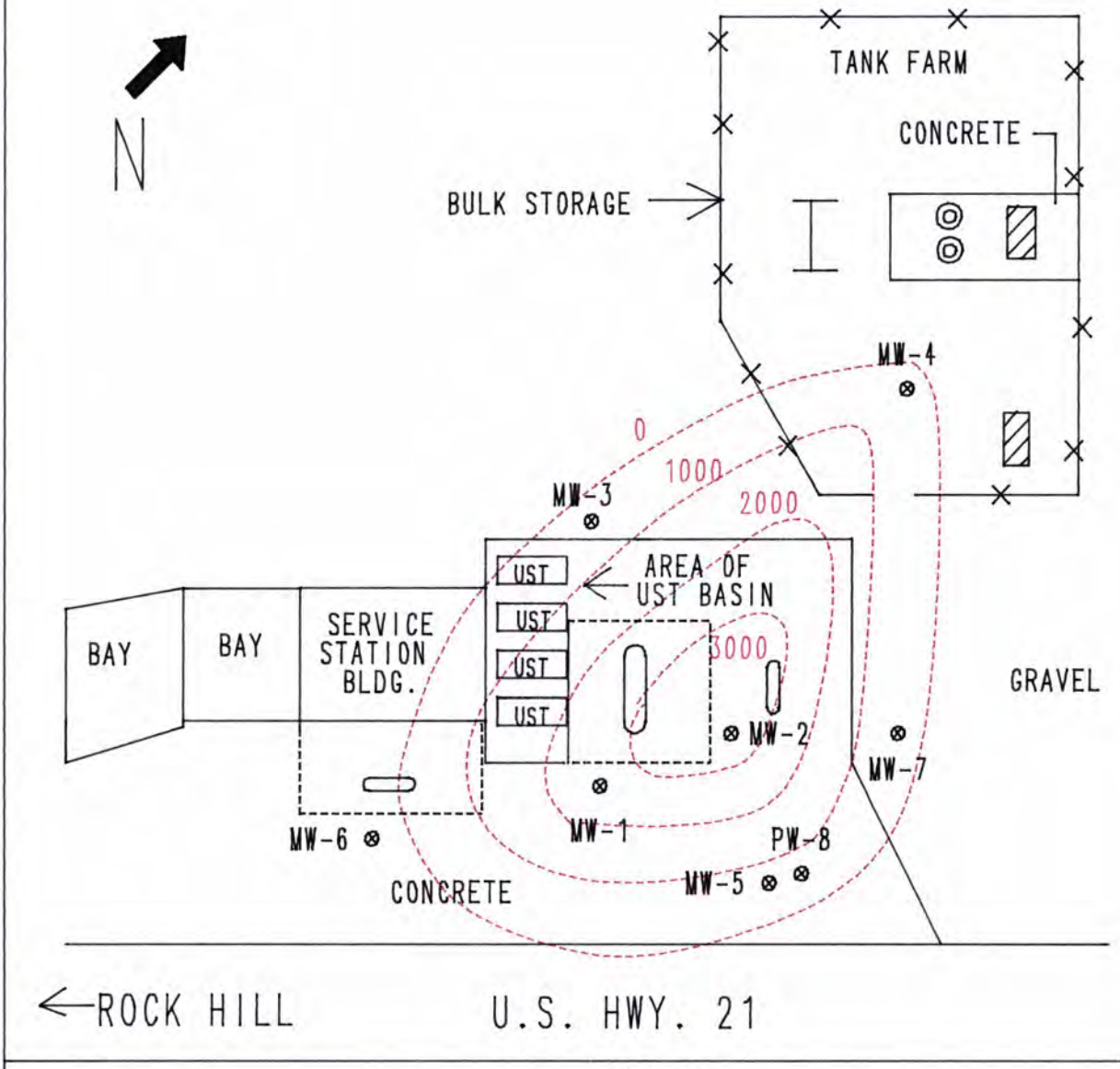
Legend

- Canopy
- Above Ground Vertical Tank
- Loading Rack
- Above Ground Horizontal Tanks
- UST — Underground Tank
- Island
- Fence
- Isoconcentration (µg/l)
- Monitor Well

Scale: 1 inch = 40 feet

Figure 6. Benzene Isoconcentration Map
September 26, 1991

GREEN'S TEXACO - SITE MAP
ROCK HILL, S.C.



Legend

- Canopy
- Above Ground Horizontal Tanks
- Fence
- Monitor Well
- Above Ground Vertical Tank
- UST — Underground Tank
- Isoconcentration (µg/l)
- Loading Rack
- Island

Scale: 1 inch = 40 feet

Figure 7. MTBE Isoconcentration Map
(9/26/91)

GEOLOGIST LOG - TANK AND ENVIRONMENTAL TESTING, INC.

NAME: GREEN'S TEXACO LOCATION: ROCK HILL, SOUTH CAROLINA		WELL NO.: MW-5
TOPOGRAPHIC QUADRANGLE: ROCK HILL EAST 7.5 MINUTE USGS	COUNTY: YORK STATE: S. C.	LOGGED BY: CHRIS PRINCE
LAT.: 80°58'54" LONG.: 34°58'42"	DRILLED BY: MID ATLTANTIC ENVIR. LIC. NO.:	DATE: SEPTEMBER 11, 1991
STATIC WATER LEVEL: APPROX. 8 FEET	SAMPLING METHOD: SOIL GRAB	
DRILLING METHOD: HOLLOW STEM AUGER	DEVELOP METHOD:	
GROUT: CEMENT	SEAL: BENTONITE	GRAVEL PACK: SAND
CASING TYPE: PVC DIA.: 2" DEPTH: 0 - 0.5'		HOLE DIA.: 7 1/2"
SCREEN TYPE: PVC SLOT: 0.010" DIA.: 2" DEPTH: 0.5 - 10'		TOTAL DEPTH: 10'

OVA head-space (ppm)	DEPTH in feet	REMARKS:	WELL COMPLETION	ODORS PRESENT
	0	CONCRETE		
	1	MEDIUM GREENISH BROWN SANDY CLAY		
	2			
3.5	3	MEDIUM GREENISH BROWN SANDY CLAY		NONE
	4	" " " " " WITH SMALL PEBBLES		
	5	" " " " " LARGER GABBROIC PEBBLES		
1.4	6			NONE
	7	INTERMITTANT PEBBLE LAYERS		
	8			
5.6	9			NONE
	10			
	11	AUGER REFUSAL		
	12			
	13			
	14			
	15			
	16			
	17			
	18			
	19			
	20			

GEOLOGIST LOG - TANK AND ENVIRONMENTAL TESTING, INC.

NAME: GREEN'S TEXACO LOCATION: ROCK HILL, SOUTH CAROLINA			WELL NO.: MW-6
TOPOGRAPHIC QUADRANGLE: ROCK HILL EAST 7.5 MINUTE USGS	COUNTY: YORK STATE: S. C.		LOGGED BY: CHRIS PRINCE
LAT.: 80°58'54" LONG.: 34°58'42"	DRILLED BY: MID ATLTANTIC ENVIR. LIC. NO.:		DATE: SEPTEMBER 10, 1991
STATIC WATER LEVEL: APPROX. 7 FEET	SAMPLING METHOD: SOIL GRAB		
DRILLING METHOD: HOLLOW STEM AUGER	DEVELOP METHOD:		
GROUT: CEMENT	SEAL: BENTONITE	GRAVEL PACK: SAND	
CASING TYPE: PVC DIA.: 2" DEPTH: 0 - 0.5'			HOLE DIA.: 7 1/2"
SCREEN TYPE: PVC SLOT: 0.010" DIA.: 2" DEPTH: 0.5 - 10'			TOTAL DEPTH: 10'

OVA head-space (ppm)	DEPTH in feet	REMARKS:	WELL COMPLETION	ODORS PRESENT
	0	ASPHALT		
	1	MEDIUM BROWN CLAYEY SILT RED TIGHT CLAY		
	2			
	3	MUSTARD BROWN SILTY CLAY WITH ROCK FRAGMENTS (GABBROIC)		
5.6				V. SLIGHT
	4	MUSTARD BROWN CLAYEY SILT		
	5	" INCREASING SAND MUSTARD BROWN SANDY SILT		
13.0	6			SLIGHT
	7			
	8			
	9	LARGE ROCK FRAGMENTS - GABBROIC VERY ROCKY		
6.8				SLIGHT
	10	AUGER REFUSAL		
	11			
	12			
	13			
	14			
	15			
	16			
	17			
	18			
	19			
	20			

GEOLOGIST LOG - TANK AND ENVIRONMENTAL TESTING, INC.

NAME: GREEN'S TEXACO LOCATION: ROCK HILL, SOUTH CAROLINA			WELL NO.: MW-7
TOPOGRAPHIC QUADRANGLE: ROCK HILL EAST 7.5 MINUTE USGS	COUNTY: YORK STATE: S. C.		LOGGED BY: CHRIS PRINCE
LAT.: 80°58'54" LONG.: 34°58'42"	DRILLED BY: MID ATLTANTIC ENVIR. LIC. NO.:		DATE: SEPTEMBER 10, 1991
STATIC WATER LEVEL: APPROX. 7 FEET	SAMPLING METHOD: SOIL GRAB		
DRILLING METHOD: HOLLOW STEM AUGER	DEVELOP METHOD:		
GROUT: CEMENT	SEAL: BENTONITE	GRAVEL PACK: SAND	
CASING TYPE: PVC DIA.: 2" DEPTH: 0 - 4.5'			HOLE DIA.: 7 1/2"
SCREEN TYPE: PVC SLOT: 0.010" DIA.: 2" DEPTH: 4.5 - 14.5'			TOTAL DEPTH: 14.5'

OVA head-space (ppm)	DEPTH in feet	REMARKS:	WELL COMPLETION	ODORS PRESENT
	0	GRAVEL		
	1	MEDIUM BROWN SILTY SAND MEDIUM BROWN SILTY CLAY		
	2			
3.1	3	MEDIUM BROWN SILTY CLAY WITH ROCK FRAGMENTS (GABBROIC)		NONE
	4	MEDIUM BROWN SILTY CLAY WITH PEBBLES (GABBROIC)		
	5			
1.9	6			NONE
	7	MEDIUM BROWN CLAYEY SILT		
	8			
4.8	9	MEDIUM BROWN TIGHT CLAY - MOIST		NONE
	10	MEDIUM BROWN SLIGHTLY SILTY CLAY WITH ROUNDED PEBBLES		
	11	LIGHT BROWN SLIGHTLY SILTY CLAY WITH PEBBLES		
0.0	12	LIGHT BROWN SILTY CLAY WITH SMALL PEBBLES		NONE
	13			
	14			
0.0	15			NONE
	16			
	17			
	18			
	19			
	20			

GEOLOGIST LOG - TANK AND ENVIRONMENTAL TESTING, INC.

NAME: GREEN'S TEXACO LOCATION: ROCK HILL, SOUTH CAROLINA		WELL NO.: PW-8
TOPOGRAPHIC QUADRANGLE: ROCK HILL EAST 7.5 MINUTE USGS	COUNTY: YORK STATE: S. C.	LOGGED BY: CHRIS PRINCE
LAT.: 80°58'54" LONG.: 34°58'42"	DRILLED BY: MID ATLTANTIC ENVIR. LIC. NO.:	DATE: SEPTEMBER 10, 1991
STATIC WATER LEVEL: APPROX. 7 FEET	SAMPLING METHOD: SPLIT SPOON	
DRILLING METHOD: HOLLOW STEM AUGER	DEVELOP METHOD:	
GROUT: CEMENT	SEAL: BENTONITE	GRAVEL PACK: SAND
CASING TYPE: PVC DIA.: 2" DEPTH: 0 - 25'		HOLE DIA.: 7 1/2"
SCREEN TYPE: PVC SLOT: 0.010" DIA.: 2" DEPTH: 25 - 30'		TOTAL DEPTH: 14.5'

REMARKS: TELESCOPING WELL PAIRED WITH MW-5
SPLIT SPOON UNTIL BEDROCK

OVA headspace (ppm)	DEPTH in feet		WELL COMPLETION	ODORS PRESENT
	0	CONCRETE		
		GREENISH BROWN TIGHT CLAY		
0.2	1			
		GREENISH BROWN SANDY/SILTY CLAY		NONE
	2			
0.0	3	DECOMPOSED GABBROIC MATERIAL		
				NONE
	4	GREEN CLAY WITH DECOMPOSED GABBROIC MATERIAL		
0.6	5	RED-BROWN TIGHT CLAY		
		MOTTLED RED/PINK/BLACK SANDY CLAY (SAPROLITE)		NONE
	6	MEDIUM BROWN CLAYEY SILT		
2.3	7			
				NONE
	8			
6.0	9	SAPROLITE WITH DECOMPOSED DIORITE FRAGMENTS		
				NONE
	10			
8.4	11			
				NONE
	12	YELLOW-GREEN SAPROLITE WITH DECOMPOSED DIORITE FRAGMENTS SATURATED YELLOW-GREEN CLAYEY SAND		
3.9	13			
				NONE
	14			
		TIGHT GREENISH CLAY WITH ROCK FRAGMENTS		
	15	BEDROCK		
	16			
	17			
	18			
	19			
	20			

TABLE 1

SUMMARY OF WATER LEVELS
(sampled 9/26/1991 - measured in feet)

Monitor Well	TOC Elevation	TOC to WL	WL Elevation
MW-1	98.15	7.04	91.11
MW-2	97.86	6.92	90.94
MW-3	98.96	7.96	91.00
MW-4	99.06	8.91	90.15
MW-5	97.04	6.71	90.33
MW-6	98.59	7.17	91.42
MW-7	97.23	6.80	90.43
PW-8	96.98	5.54	91.44

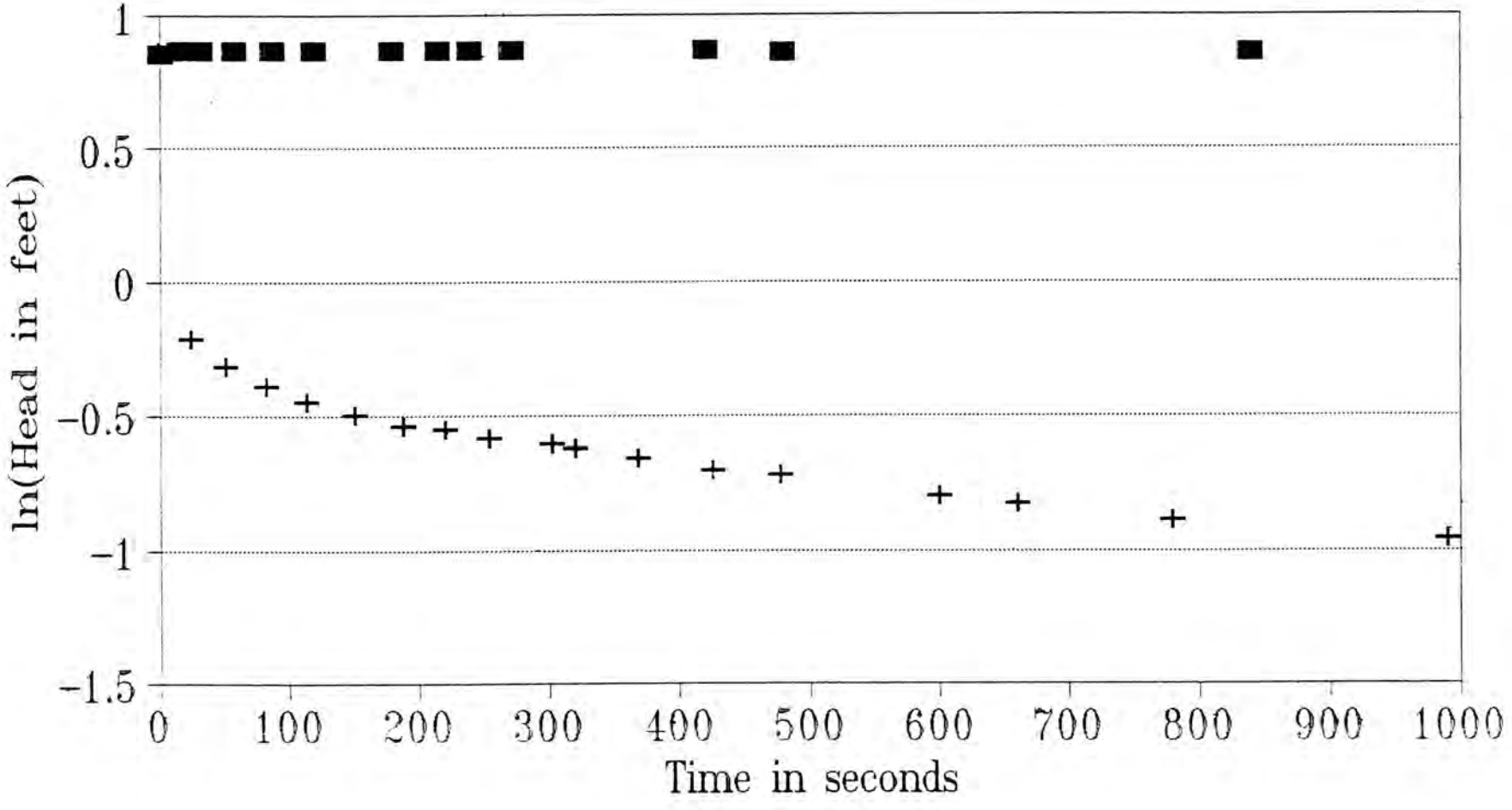
TABLE 2
SUMMARY OF GROUND-WATER QUALITY DATA
Sampled 9/26/1991 - All results in µg/l

Monitor Well	Benzene	Toluene	Ethyl Benzene	Total Xylenes	MTBE
MW-1	800	1100	600	3650	2300*
MW-2	50*	4.8	BDL	BDL	4300
MW-3	84	BDL	BDL	BDL	47*
MW-4	BDL	BDL	BDL	BDL	200
MW-5	BDL	BDL	BDL	32	800
MW-6	BDL	BDL	BDL	BDL	BDL
MW-7	BDL	BDL	BDL	10.1	110
PW-8	BDL	BDL	BDL	BDL	535

* = Estimated Value
BDL = Below Detection Limit

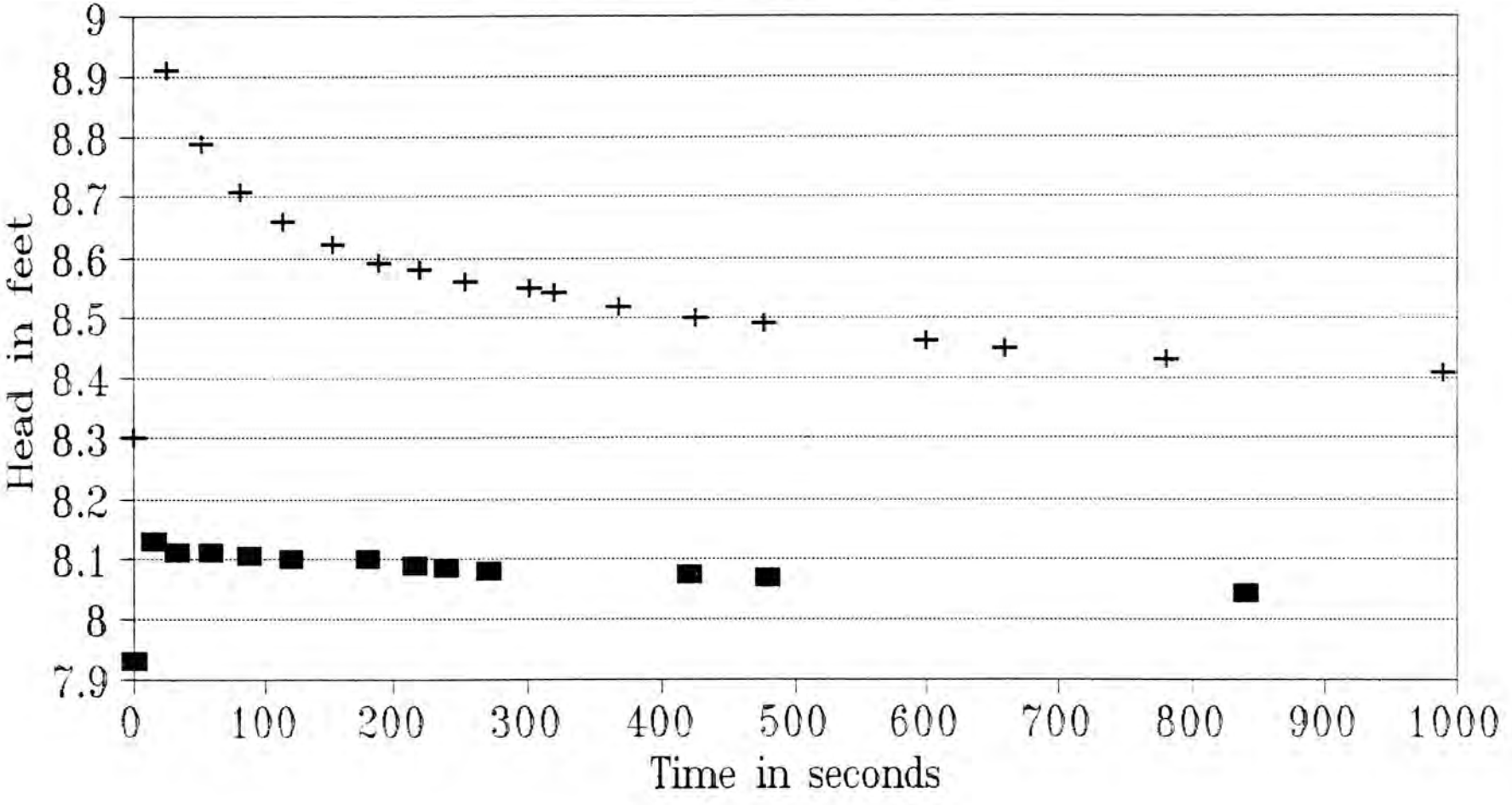
Aquifer testing Green's Oil

Rising Head (by hand)



Aquifer testing Green's Oil

Rising Head (by hand)



SLUG TEST CALCULATIONS

SITE:	Greens Oil
WELL:	MW-5
TEST:	Falling Head By data logge

WELL PARAMETERS

Depth to bedrock	4.27	D	meters
Depth of well	3.05	H	meters
Screened interval	3.05	L	meters
Radius of casing	0.0254	Rc	meters
Radius of annular space	0.0953	Rw	meters

MEASURED VALUES

Falling Head ln(Yo/Yt)/t	1.58E-03	1/sec

FORMULA PARAMETERS

Effective Rc	0.0254	meters
L/Rw	32	ratio
A coeffficient	2.6	dimension
B coeffficient	0.42	dimension
ln(d-h)/Rw (calculated)	2.55	1/meters
ln(d-h)/Rw (used)	2.549445	1/meters
ln(Re/Rw)	2.31	dimension

RESULTS (M.K.S)

FALLING HEAD

Hydraulic conductivity	3.87E-07	K	meters/se
Transmissivity	1.65E-06	T	meters ^ 2

SLUG TEST CALCULATIONS

SITE:	Greens Oil
WELL:	MW-5
TEST:	Rising Head Test By Hand.

WELL PARAMETERS

Depth to bedrock	4.27	D	meters
Depth of well	3.05	H	meters
Screened interval	3.05	L	meters
Radius of casing	0.0254	Rc	meters
Radius of annular space	0.0953	Rw	meters

MEASURED VALUES

Rising Head ln(Yo/Yt)/t	2.50E-03	1/sec

FORMULA PARAMETERS

Effective Rc	0.0254	meters
L/Rw	32	ratio
A coeffficient	2.6	dimension
B coeffficient	0.42	dimension
ln(d-h)/Rw (calculated)	2.55	1/meters
ln(d-h)/Rw (used)	2.549445	1/meters
ln(Re/Rw)	2.31	dimension

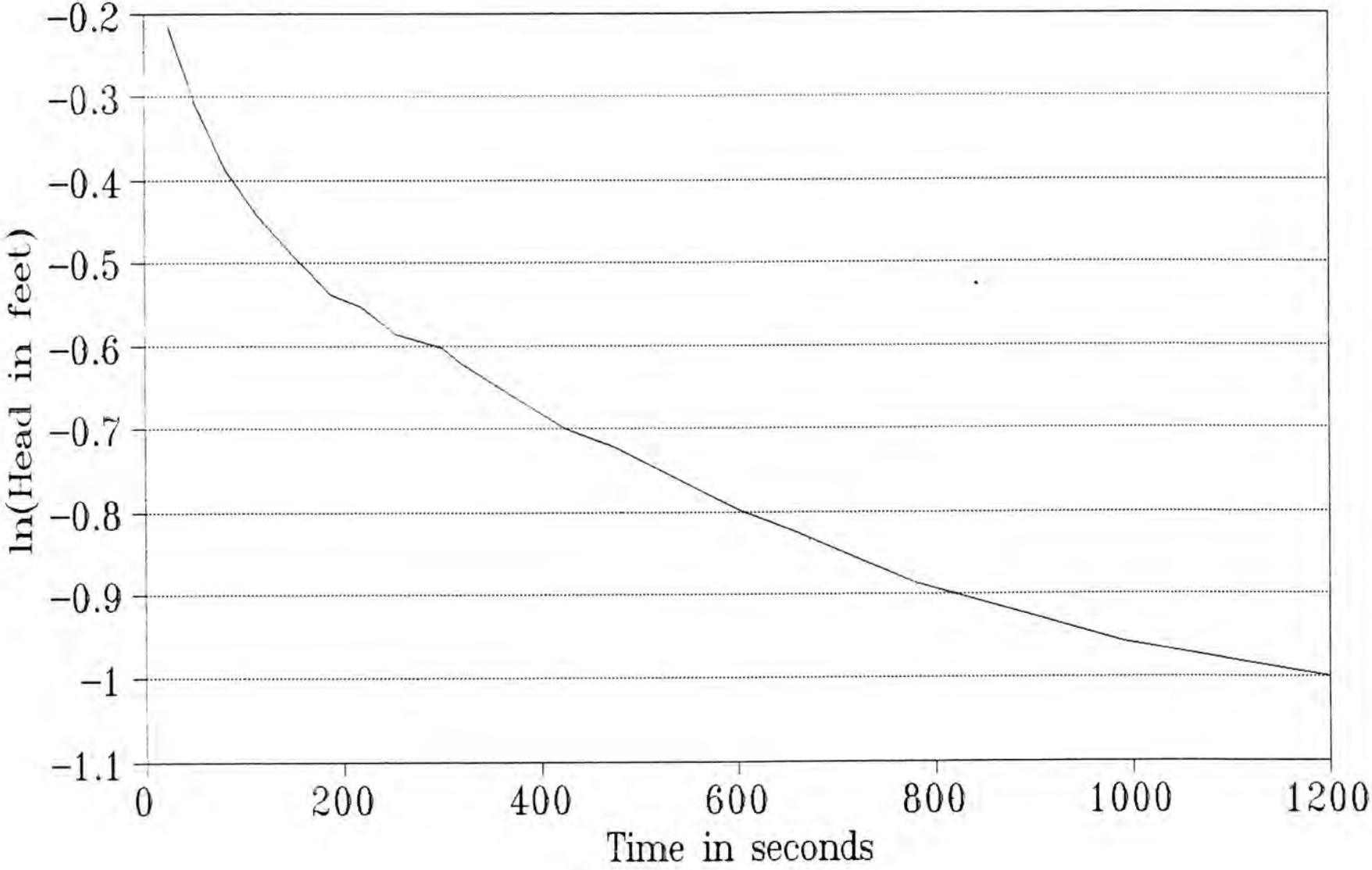
RESULTS (M.K.S)

RISING HEAD

Hydraulic conductivity	6.12E-07	K	meters/se
Transmissivity	2.61E-06	T	meters ^ 2

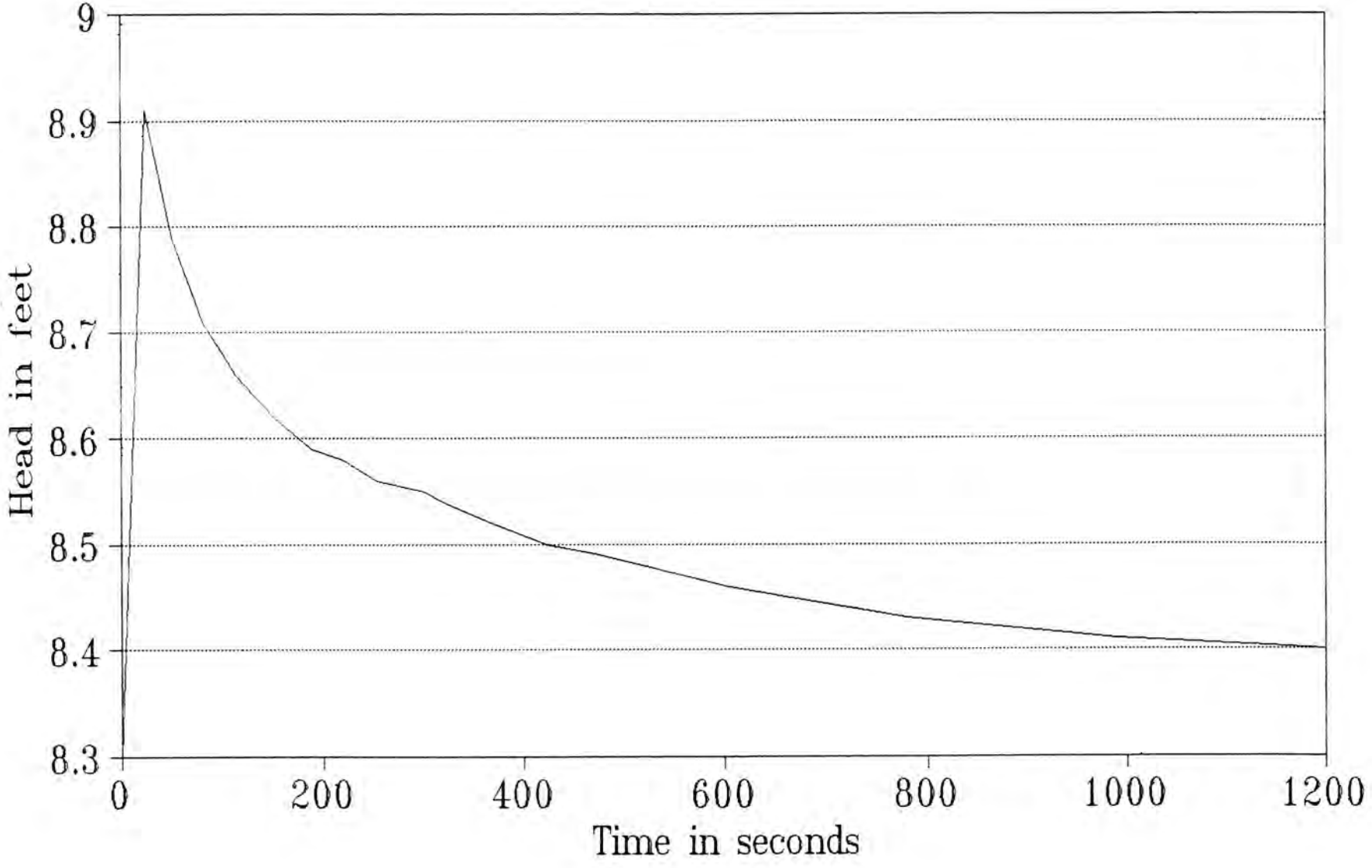
Aquifer testing Green's Oil

MW #5 Rising Head (by hand)



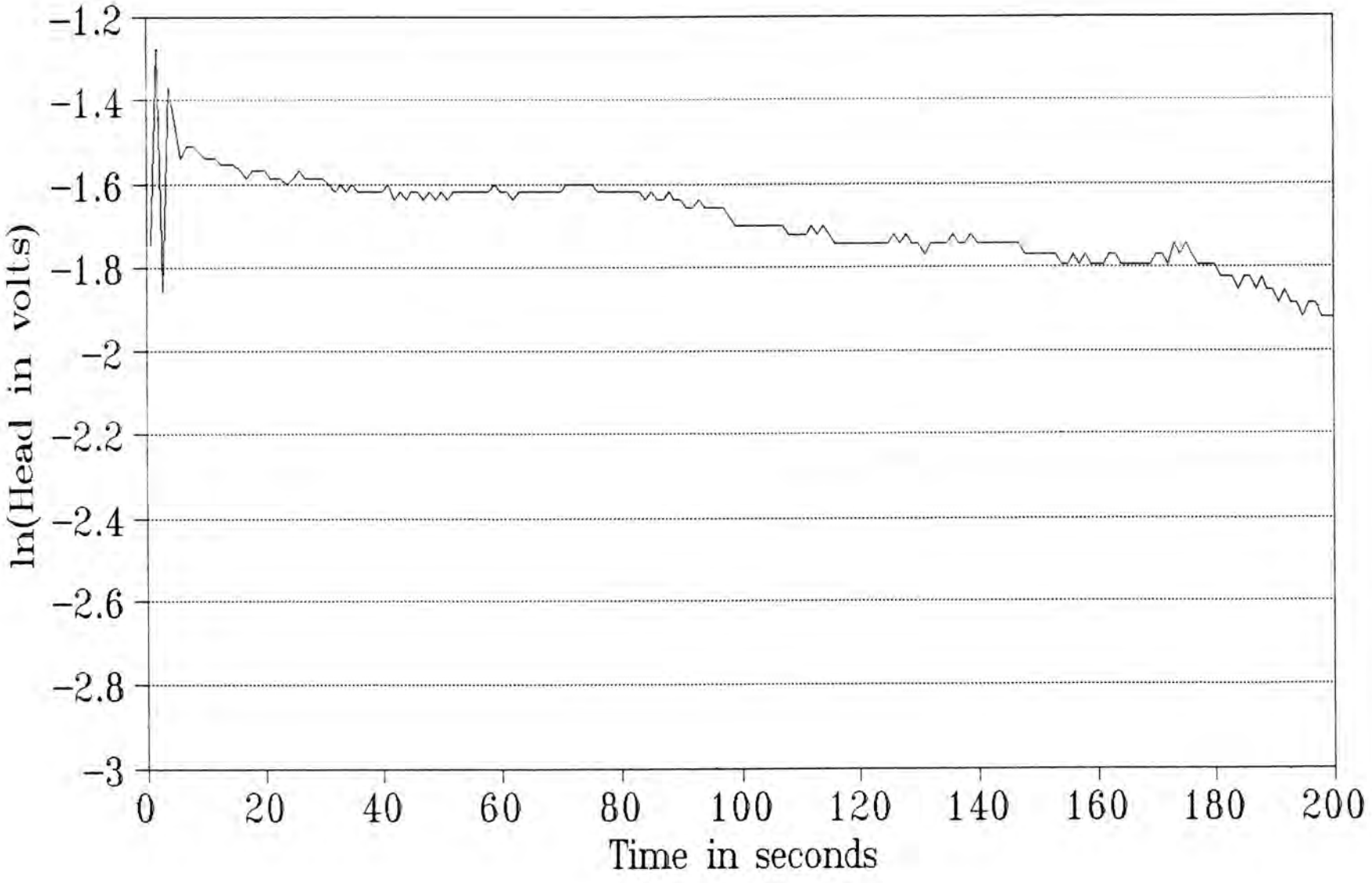
Aquifer testing Green's Oil

MW #5 Rising Head (by hand)



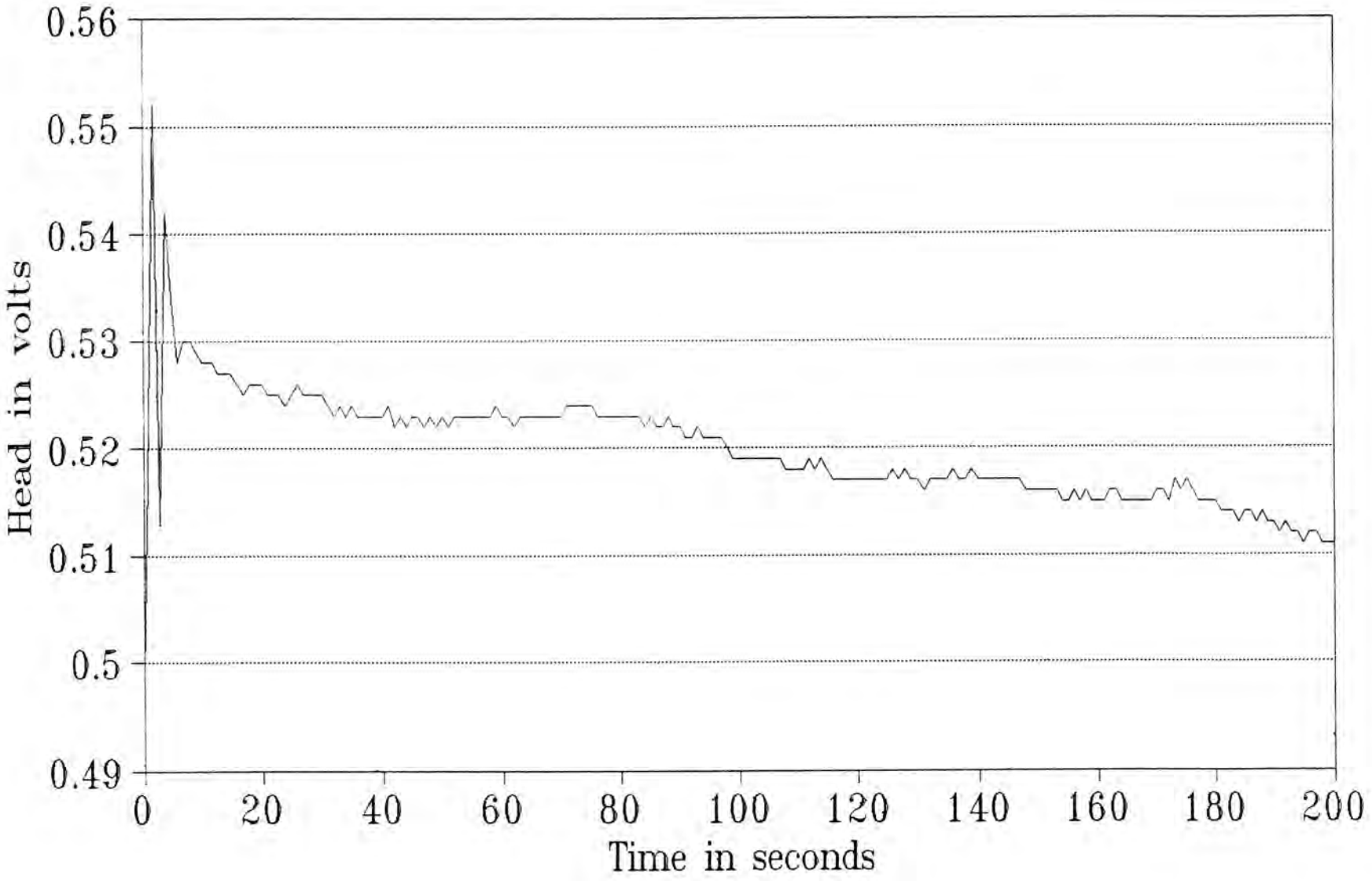
Aquifer testing Green's Oil

Falling Head (data logger) MW #5



Aquifer testing Green's Oil

Falling Head (data logger) MW #5



SLUG TEST CALCULATIONS

SITE:	Greens Oil
WELL:	MW-7
TEST:	Rising Head Test By Hand.

WELL PARAMETERS

Depth to bedrock	13.72	D	meters
Depth of well	4.42	H	meters
Screened interval	3.05	L	meters
Radius of casing	0.0254	Rc	meters
Radius of annular space	0.0953	Rw	meters

MEASURED VALUES

Rising Head ln(Yo/Yt)/t	2.73E-04	1/sec

FORMULA PARAMETERS

Effective Rc	0.0254	meters
L/Rw	32	ratio
A coeffficient	2.6	dimension
B coeffficient	0.42	dimension
ln(d-h)/Rw (calculated)	4.58	1/meters
ln(d-h)/Rw (used)	4.580877	1/meters
ln(Re/Rw)	2.34	dimension

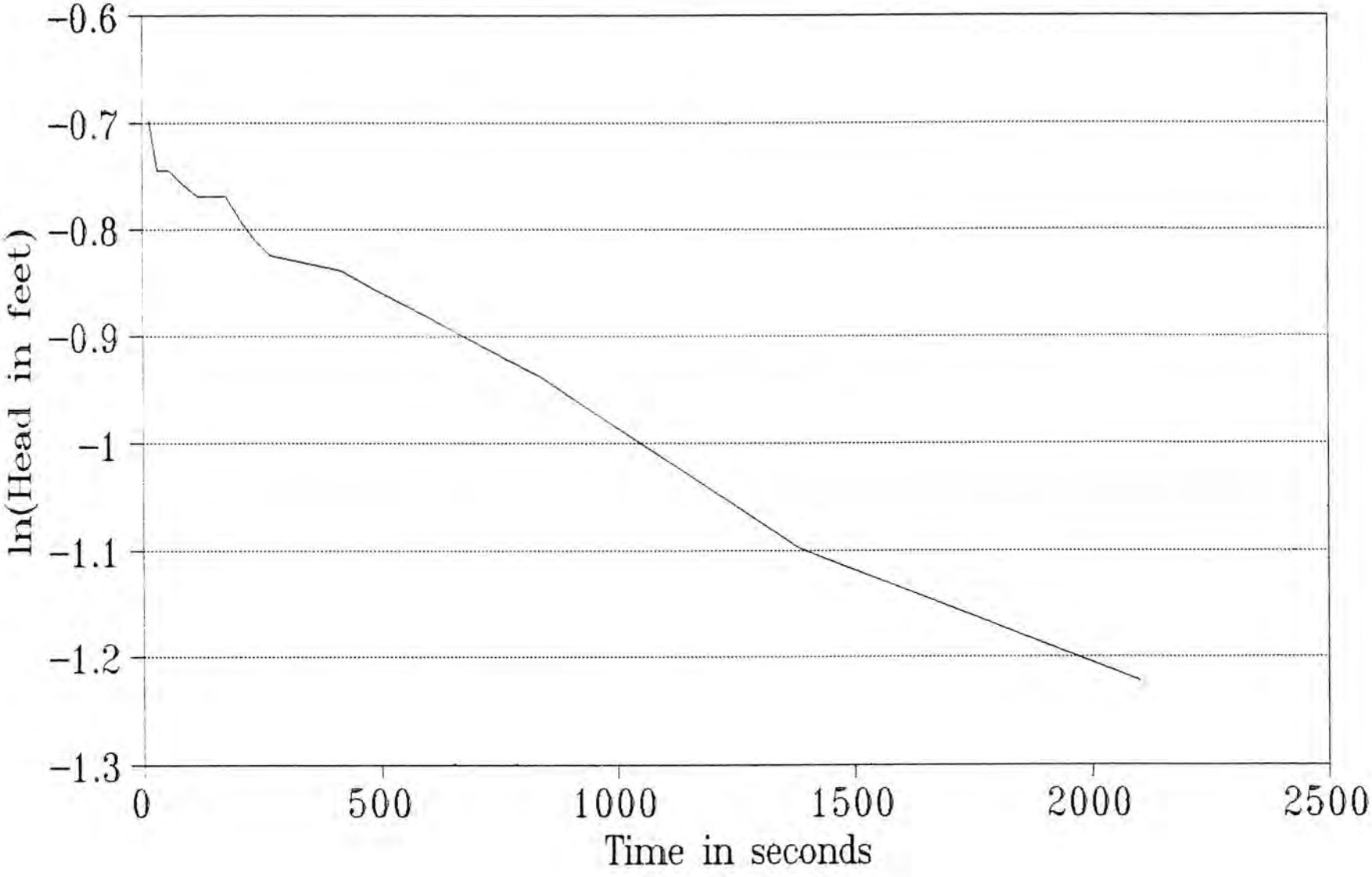
RESULTS (M.K.S)

RISING HEAD

Hydraulic conductivity	6.75E-08	K	meters/se
Transmissivity	9.26E-07	T	meters ^ 2

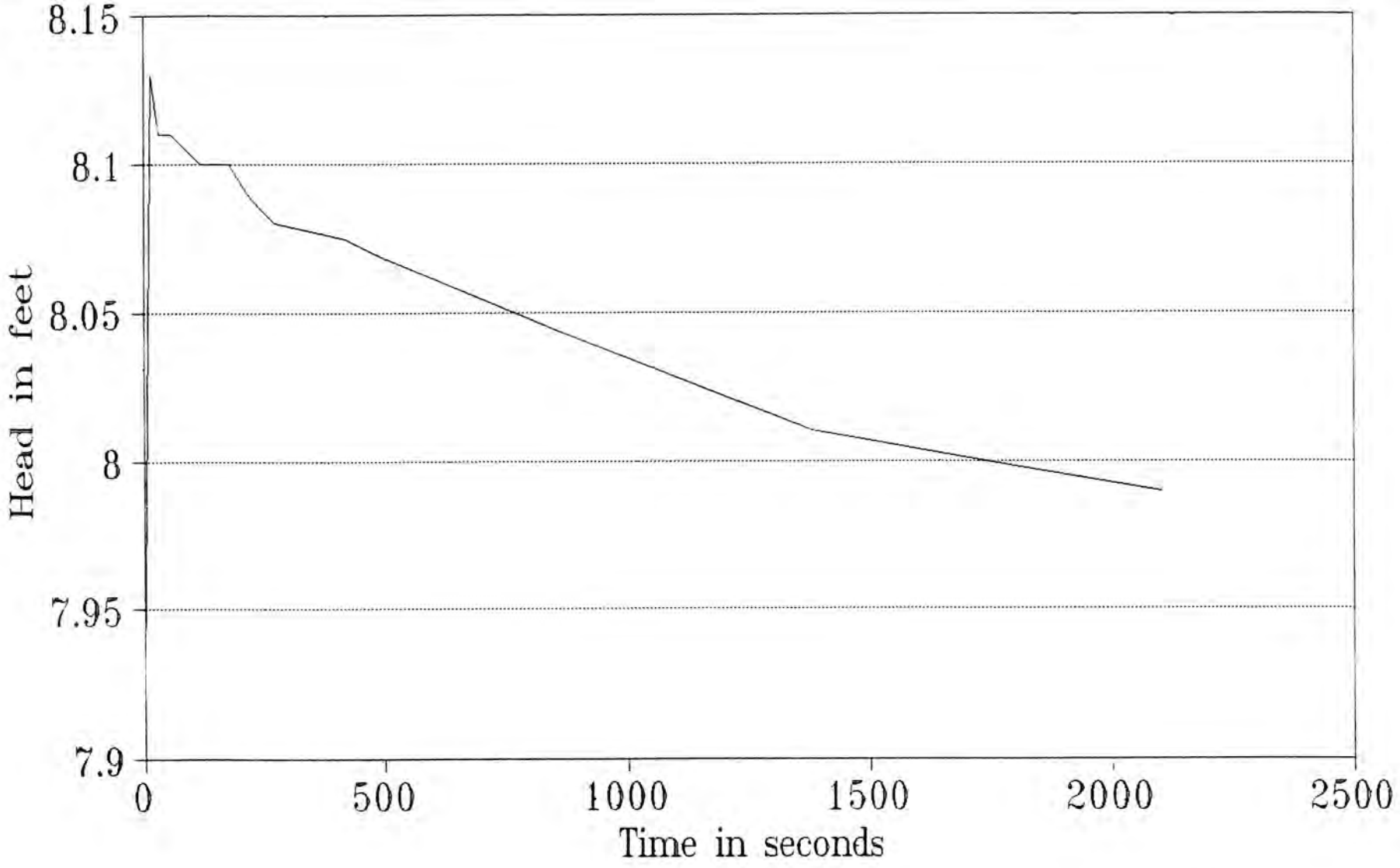
Aquifer testing Green's Oil

MW #7 Rising Head (by hand)



Aquifer testing Green's Oil

MW #7 Rising Head (by hand)



TET

TET Environmental Services, Inc.

August 29, 1994

Mr. Sriram Madabhushi
South Carolina Department of
Health and Environmental Control
Ground-Water Protection Division
UST Federal Corrective Section
2600 Bull St.
Columbia, South Carolina 29201

Regarding: Green's Texaco
Rock Hill, South Carolina
GWPD Site #09344

Dear Mr. Madabhushi:

Enclosed please find two copies of a Pilot Air Sparging Test Report for the above referenced site. The report details pilot air sparging tests and ground-water sampling conducted in April 1994.

Pilot air sparging tests indicate a radius of sparge influence of up to 115 feet based on increases in ground-water dissolved oxygen concentrations, observation well head pressures, and well head organic vapor concentrations.

Results of April 1994 ground-water sampling indicate that the areal extent of the soluble phase hydrocarbon plume is limited to the vicinity of the former tank basin. Highest BTEX concentrations were again detected in well MW-1 (6,508 ppb).

Based on the results detailed in the referenced report, air sparging is being considered as a remedial action. Further information regarding this project will be forthcoming after review of the results by Federated Insurance Company and Mr. Jerry C. Green.

If you have any questions regarding this report, please contact our office.

Very truly yours,

Thomas R. Spinek

Thomas R. Spinek, P.G.
S.C. Reg. #1104

Enclosures: Pilot Air Sparging Test Report (2 copies)
cc: Ms. Barbara Munkel, Federated Insurance Company
Mr. Jerry C. Green, Green's Oil Company

521 Clemson Road • Columbia, S.C. 29223 • (803) 699-1976, FAX (803) 699-9863

TET Environmental Services, Inc.

PILOT AIR SPARGING TEST REPORT
GREEN'S TEXACO
ROCK HILL, SOUTH CAROLINA
GWPD ID #09344

August 29, 1994

Prepared by:
TET Environmental Services, Inc.

Thomas R. Spinek

Thomas R. Spinek, P.G.
Remedial Services Manager
S.C. Reg. #1104

William Wimberly

William Wimberly, P.G.
Senior Hydrogeologist
S.C. Reg. #906

TABLE OF CONTENTS

INTRODUCTION / SITE HISTORY

The following report is submitted by TET Environmental Services, Inc. (TET) on behalf of Mr. Jerry C. Green of Green's Oil Company. The report details results of pilot air sparging tests conducted on April 5, 1994 and ground-water sampling conducted on April 20, 1994 at Green's Texaco in Rock Hill, South Carolina. A site map showing the locations of site features including monitor wells is presented in Figure 1 (Appendix I).

Four underground storage tanks (USTs) were removed from the site in July 1989. Approximately 250 cubic yards of hydrocarbon-impacted soil was removed from the tank basin excavation and temporarily stockpiled at the site. After approval was obtained from the South Carolina Department of Health and Environmental Control's (SCDHEC) Bureau of Solid and Hazardous Waste, the soil was disposed of in the York County Landfill. In addition, 12,200 gallons of hydrocarbon-impacted ground water was pumped out of the tank basin excavation and was disposed of by James Waste Oil Services of Charlotte, North Carolina.

At the request of the SCDHEC, TET completed a Phase I hydrogeologic assessment in the Spring of 1990 and the results were forwarded to the SCDHEC on April 26, 1990. This investigation involved installation and sampling of four ground-water monitor wells. Ground-water sampling results indicated that ground water at the site had been impacted by petroleum hydrocarbons, with the greatest impact in well MW-1, directly east of the tank basin.

At the request of the SCDHEC, TET completed a Phase II hydrogeologic assessment in the Fall of 1991, and results of this investigation were submitted in a TET report dated November 6, 1991. The Phase II investigation involved installation and sampling of one deep ground-water monitor well and three shallow monitor wells, and hydraulic conductivity (slug) testing of two shallow monitor wells. Ground-water sampling results from September 1991 confirmed the initial sampling results and indicated greatest ground-water impact in the vicinity of well MW-1 near the former tank basin.

Ground-water sampling conducted by TET on July 27, 1993 and April 20, 1994 confirmed that the dissolved phase hydrocarbon plume had remained relatively confined to the vicinity of the UST basin.

WATER LEVEL INFORMATION

Ground-water occurs at the site under unconfined conditions in the surficial aquifer. Depth to ground-water is variable, but generally 3 to 5 feet below grade. Water levels were measured from the top of each well casing on April 20, 1994 and water table elevations were calculated relative to an arbitrary datum of 100 feet. Water table elevation data are presented in Table 1 (Appendix II). Monitor wells MW-6 and MW-3 displayed the highest water table elevation (94.44 feet), while MW-5 had the lowest water table elevation (93.25) feet. A potentiometric surface map based on gauging data is included as Figure 2 (Appendix I). The water level measurement from pit-cased deep well PW-8 was not used in the construction of this map

because the screened interval does not bracket the water table. The potentiometric surface map indicates that the water table slopes gently east with an average hydraulic gradient of 0.014 feet/foot.

Due to the high water table and the lack of well screen above the water table in site monitor wells, soil vapor extraction testing could not be performed. The pilot vapor extraction test would not have been possible due to ground-water upwelling associated with vapor extraction. This upwelling reduces the amount of well screen available for air flow to the vapor extraction test well and nearby monitor wells.

GROUND-WATER QUALITY

Ground-water quality samples were collected from all site wells on April 20, 1994. Free floating product was not encountered in any of the wells. The results of the ground-water quality sampling and analysis for the April 20, 1994 sampling event are summarized in Table 2 (Appendix II) and the laboratory report and chain of custody are presented in Appendix III. The highest BTEX (benzene, toluene, ethylbenzene, xylenes) concentration was detected in well MW-1 (6,508 parts per billion (ppb)). BTEX concentrations in wells MW-2 and MW-3 were 18.4 ppb and 536 ppb, respectively. BTEX concentrations in all other site wells were below laboratory detection limits.

Historical ground-water sampling results for the July 27, 1993 and September 26, 1991 sampling events are also presented in Table 2 (Appendix II). These results indicate that the most significant impact to ground water at the site is in the vicinity of well MW-1 and the former tankfield.

AIR SPARGING TEST SETUP

A pilot air sparging test was conducted at the site on April 5, 1994. Pit-cased well (PW-8) was used as the air injection point for the air sparging test. This well has a total depth of 30 feet and is screened from 25 to 30 feet below the top of the well casing. Well PW-8 was fitted with a sanitary well seal equipped with fittings for a vacuum gauge and the air injection line. A two and one-half horsepower, oilless air compressor with a maximum displacement of 9.4 cubic feet per minute (cfm) was used to inject atmospheric air into the formation via the pilot sparging well. Air was supplied to the pilot injection well via a 1/4" diameter rubber air line and injection pressure was controlled with a regulator at the injection well head.

Monitor wells MW-1, MW-2, MW-4, MW-5, MW-6 were used as observation points during the air sparging test. In addition, two temporary monitor wells, TW-1 and TW-2 were installed for monitoring the effect of the air sparging pilot testing. Construction details for all site wells and depth to ground water data collected on April 20, 1994 are presented in Table 3 (Appendix II). All monitor wells were sealed with plumbing fittings equipped with an expandable rubber well seal and ball valve/hose barb fitting. A short rubber hose (3/16 inch diameter) was

connected from each hose barb fitting to a differential pressure gauge at each monitor well.

Temporary monitor wells TW-1 and TW-2 were installed in boreholes advanced using 3.5-inch diameter hand augers. The wells were completed to a depth of 4 feet below grade and consisted of 1 foot of 2-inch diameter Schedule 40 PVC casing threaded atop 3 feet of 2-inch diameter Schedule 40 PVC screen (0.01 inch slot size). The base of each temporary well was fitted with a conical slip cap. The wells were installed into their respective boreholes and sand packed with Foster Dixiana FX-50 medium sand from total depth to approximately one-half foot above the top of each well screen. Powdered bentonite was placed atop the well sand to the ground surface at each temporary well and was hydrated to provide an air-tight seal.

Well headspace organic vapor concentration data were collected from select wells using a photoionization detector device (PID) prior to, during, and after air sparge testing on April 5, 1994. The PID measures aromatic hydrocarbons accurately, but is not an accurate measurement device for total hydrocarbons. Organic vapors were collected from the well headspace by attaching the instrument probe to the rubber hose and opening the ball valve.

Prior to conducting the pilot air sparging test, dissolved oxygen (DO) and temperature (T) data were collected from all locatable ground-water monitor wells using a YSI Model 51B dissolved oxygen/temperature meter. This meter measures DO to better than +/- 0.2 milligrams/liter (mg/l) and T to +/- 0.7 °C (centigrade).

AIR SPARGING PROCEDURE

Pilot air sparge testing on April 5, 1994 consisted of a five step test, with injection pressures of 5, 10, 13, 18, and 19 pounds per square inch (psi), respectively. Well headspace organic vapor concentration and well head pressure data were collected from select wells before and during the test. Ground-water dissolved oxygen concentration and temperature data were also collected from wells before and after air sparge testing.

AIR SPARGING FIELD RESULTS

Pre- and post-air sparging ground-water dissolved oxygen, temperature, and well headspace organic vapor concentration data are presented in Table 4 (Appendix II). Pre-air sparging ground-water dissolved oxygen concentrations were 0.7 mg/l, 0.7 mg/l, 0.6 mg/l, 0.7 mg/l, 0.6 mg/l, and 1.3 mg/l for wells MW-1, MW-2, MW-4, MW-5, MW-6, and PW-8, respectively. Pre-air sparging ground-water temperatures were 16.0 °C, 17.0 °C, 16.0 °C, 17.0 °C, 17.0 °C, and 18.0 °C for wells MW-1, MW-2, MW-4, MW-5, MW-6, and PW-8, respectively. Pre-air sparging well headspace PID measurements were 201 parts per million (ppm), 534 ppm, 332 ppm, 64 ppm, 285 ppm, 36 ppm, and 31 ppm for wells MW-1, MW-2, MW-4, MW-5, MW-6, TW-1, and TW-2, respectively.

Results of field data from pilot air sparge testing conducted on April 5, 1994 are presented in Table 5 (Appendix II). The first step of the test was conducted for 65 minutes at an injection

well pressure of 5 psi. No induced pressure changes (as noted on magnehelic pressure gauges) were observed during this step of the test. Well headspace organic vapor concentrations were >1,000 ppm, 636 ppm, >1,000 ppm, 226 ppm, >1,000 ppm, 61 ppm, and 33 ppm for wells MW-1, MW-2, MW-4, MW-5, MW-6, TW-1, and TW-2, respectively.

The second step of the test was conducted for 30 minutes at an injection pressure of 10 psi. Pressure readings of 0.23, 0, 0.20, 0.03, 0, 0, and 0 inches of water were detected in sparge observation wells MW-1, MW-2, MW-4, MW-5, MW-6, TW-1, and TW-2 respectively. Well headspace organic vapor concentrations were 879 ppm, 628 ppm, 749 ppm, 116 ppm, >1,000 ppm, 52 ppm, and 36 ppm for wells MW-1, MW-2, MW-4, MW-5, MW-6, TW-1, and TW-2 respectively.

The third step of the test was conducted for 35 minutes at an injection pressure of 13 psi. Pressure readings of 0.20, 0.05, 0, 2.41, 0, 0, and 0.03 inches of water were detected in sparge observation wells MW-1, MW-2, MW-4, MW-5, MW-6, TW-1, and TW-2 respectively. Well headspace organic vapor concentrations were 875 ppm, 652 ppm, 560 ppm, 49 ppm, >1,000 ppm, 40 ppm, and 39 ppm for wells MW-1, MW-2, MW-4, MW-5, MW-6, TW-1, and TW-2 respectively.

The fourth step of the test was conducted for 45 minutes at an injection pressure of 18 psi. Pressure readings of 2.20, 0, 0, 44, 0, and 0 inches of water were detected in sparge observation wells MW-1, MW-2, MW-4, MW-5, TW-1, and TW-2 respectively. Well headspace organic

vapor concentrations were 501 ppm, 656 ppm, 594 ppm, 52 ppm, and 37 ppm for wells MW-1, MW-2, MW-4, TW-1, and TW-2 respectively.

After an elapsed test time of 175 minutes, the sparge well injection pressure was increased to 23 psi. This pressure decreased to 19 psi after approximately 20 minutes, the duration of the fifth step of the air sparging test. Pressure readings of 4.00, 0, 0, 68, 0.5, and 0.85 inches of water were detected in sparge observation wells MW-1, MW-2, MW-4, MW-5, TW-1, and TW-2 respectively. Well headspace organic vapor concentrations were 638 ppm, 708 ppm, 610 ppm, 55 ppm, 67 ppm, and 41 ppm for wells MW-1, MW-2, MW-4, MW-5, TW-1, and TW-2 respectively.

The test was stopped after a total elapsed time of 195 minutes. Post-air sparge test measurements of ground-water dissolved oxygen and temperature and well headspace organic vapor concentrations were collected from monitor wells and are summarized in Table 4 (Appendix III).

As indicated in Table 4, the ground-water dissolved oxygen concentration in well MW-5, located 8 feet from the test air sparging injection well, increased from 0.7 mg/l before air sparging to 1.4 mg/l after air sparging. In addition, pre- to post-test dissolved oxygen concentration increases were noted in the air injection well PW-8 (1.3 mg/l to 2.9 mg/l) and in well MW-4 located 115 feet from the injection well (0.6 mg/l to 0.8 mg/l). Ground-water dissolved oxygen concentrations in wells MW-2 and MW-6 were the same before and after testing. The dissolved

oxygen concentration in well MW-1 decreased from 0.7 mg/l before testing to 0.5 mg/l after testing. Ground-water dissolved oxygen isoconcentration maps for pre- and post-air sparge testing are presented in Figures 3 and 4 (Appendix I) respectively.

As indicated in Table 4, ground-water temperatures were the same before and after testing in wells MW-2, MW-4, and MW-5. Ground-water temperatures displayed pre- to post-testing increases in wells MW-1 (16.0 °C to 16.5 °C), MW-6 (17.0 °C to 18.0 °C), and PW-8 (18.0 °C to 20.0 °C).

As indicated in Table 4, pre- to post-test well headspace organic vapor concentrations increased in wells MW-1 (201 ppm to 638 ppm), MW-2 (534 ppm to 708 ppm), MW-4 (332 ppm to 610 ppm), TW-1 (36 ppm to 67 ppm), and TW-2 (31 ppm to 41 ppm). Pre- to post-test well headspace organic vapor concentrations decreased from 64 ppm to 55 ppm in well MW-5.

INTERPRETATION OF AIR SPARGING RESULTS

Radius of Influence

Maximum radius of influence results for the air sparging test are presented in Table 6 (Appendix II). An increase in well headspace pressure is the result of injected air displacing the water column, and is an indicator of air sparging radius of influence. Based on the pressure responses recorded in nearby wells during the maximum injection well pressure step of 19 psi, a maximum

radius of influence of 50 feet (the distance from the injection well to well MW-1) was determined.

Following air sparge pilot testing, dissolved oxygen concentration increases were noted in wells MW-5 and MW-4 at distances of 8 and 115 feet, respectively, from the air sparge injection well. These increases in ground-water dissolved oxygen concentrations are also indicators of air sparging radius of influence. Therefore, pilot air sparge test results indicate that an injection well pressure of at least 19 psi will produce a sparge radius of influence of up to 115 feet, as measured in the direction of MW-5. Since ground-water dissolved oxygen increases were not noted in other site wells, the air sparging radius of influence, as measured by increases in dissolved oxygen concentrations, varies considerably with direction across the site.

Increases in well headspace vapor concentrations are an indication that sparged air was effectively volatilizing hydrocarbons from ground water. As noted above, increases in well headspace vapor concentrations were noted in wells MW-1, MW-2, MW-4, TW-1, and TW-2. A measurable increase in well headspace organic vapor concentration was detected in well MW-4 at distance of 115 feet from the injection well. Therefore, a radius of influence of at least 115 feet in the direction of well MW-4 was determined from well headspace vapor concentration data.

CONCLUSIONS/RECOMMENDATIONS

Pilot air sparge testing indicates a radius of influence of up to 115 feet based on increases in ground-water dissolved oxygen concentrations, observation well head pressures, and observation well organic vapor concentrations. Radius of influence varies considerably with direction from the air injection well, however.

Based on air sparge test results, this technique may be effective in increasing dissolved oxygen concentrations in ground water. Recent literature indicates that air sparging may reduce ground-water hydrocarbon concentrations by both volatilization and by the stimulation of naturally occurring hydrocarbon-degrading microbial populations. Concurrent installation of a shallow soil vapor extraction system would be recommended to prevent vapor accumulations in buildings or other possible vapor receptors.

Based on recent ground-water sampling results, the areal extent of the soluble phase hydrocarbon plume is limited to the area in the vicinity of wells MW-1, MW-2, and MW-3. An air sparging system with concurrent vapor extraction is recommended in the area of these wells, particularly in the vicinity of well MW-1 and the former underground storage tank basin which was located just upgradient of this well.

APPENDIX I

FIGURES

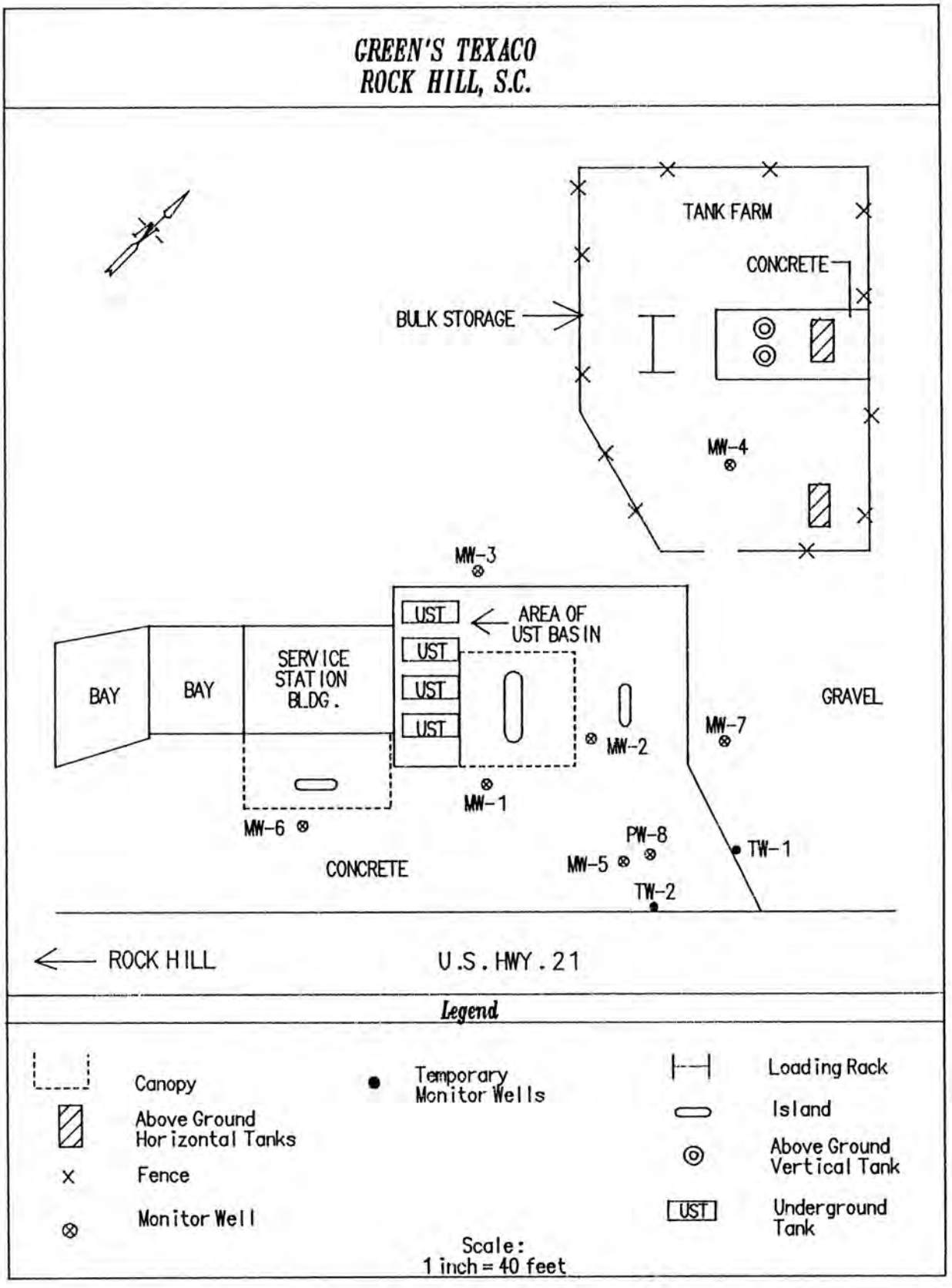


Figure 1. Site Map

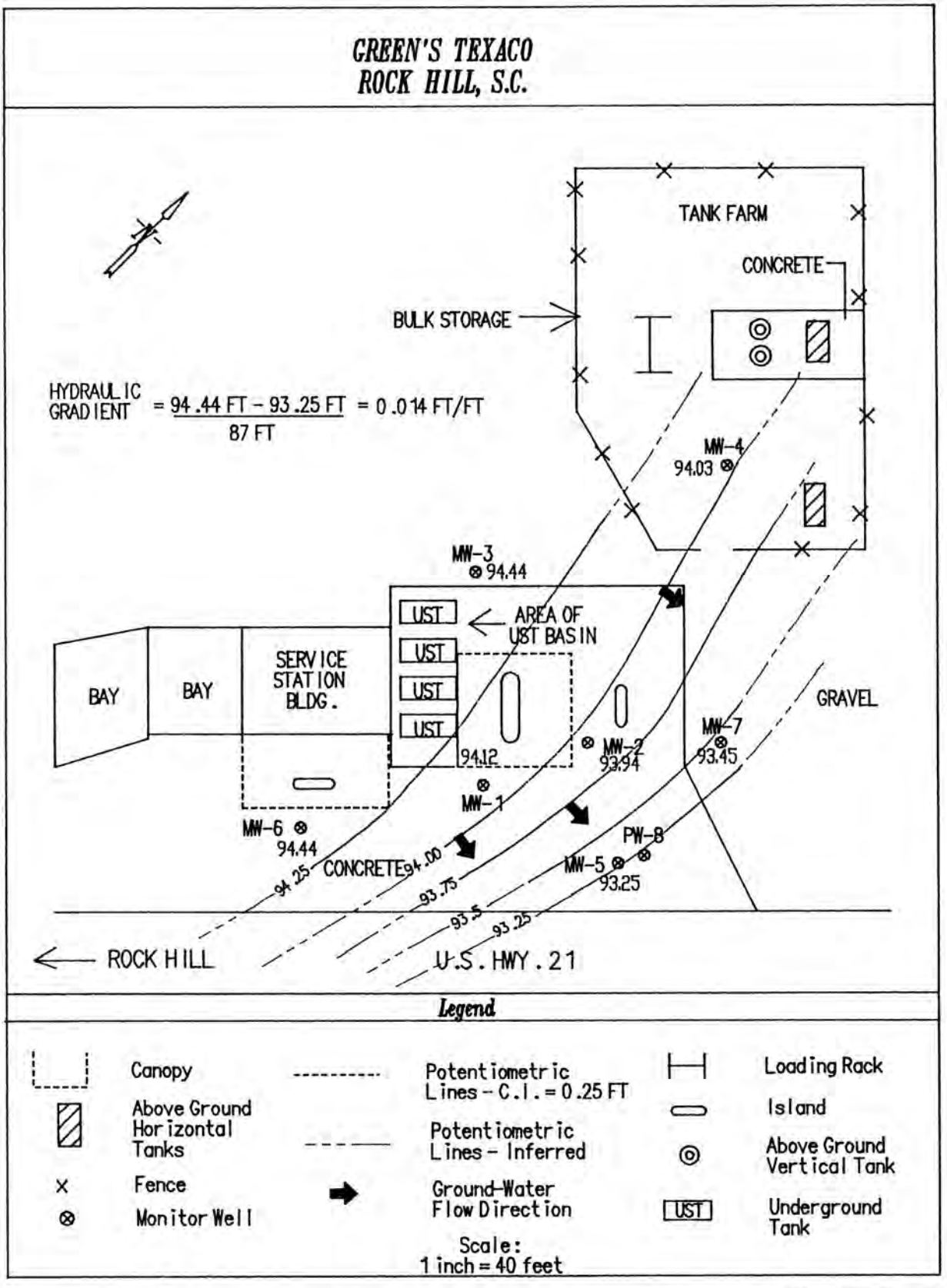


Figure 2. Potentiometric Surface Map (04/20/94)

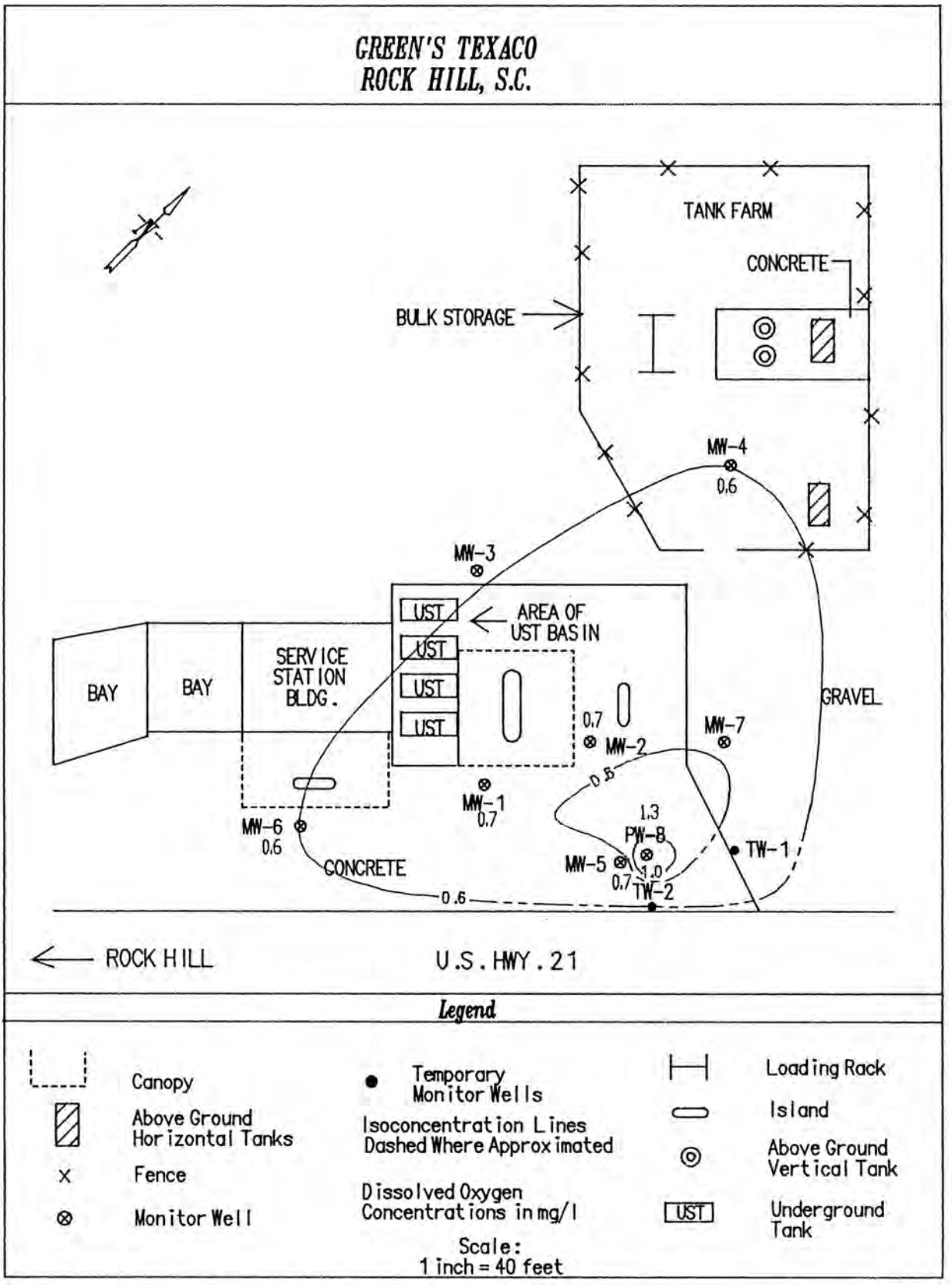


Figure 3. Dissolved Oxygen Isoconcentration Map Pre-Air Sparge Testing (04/05/94)

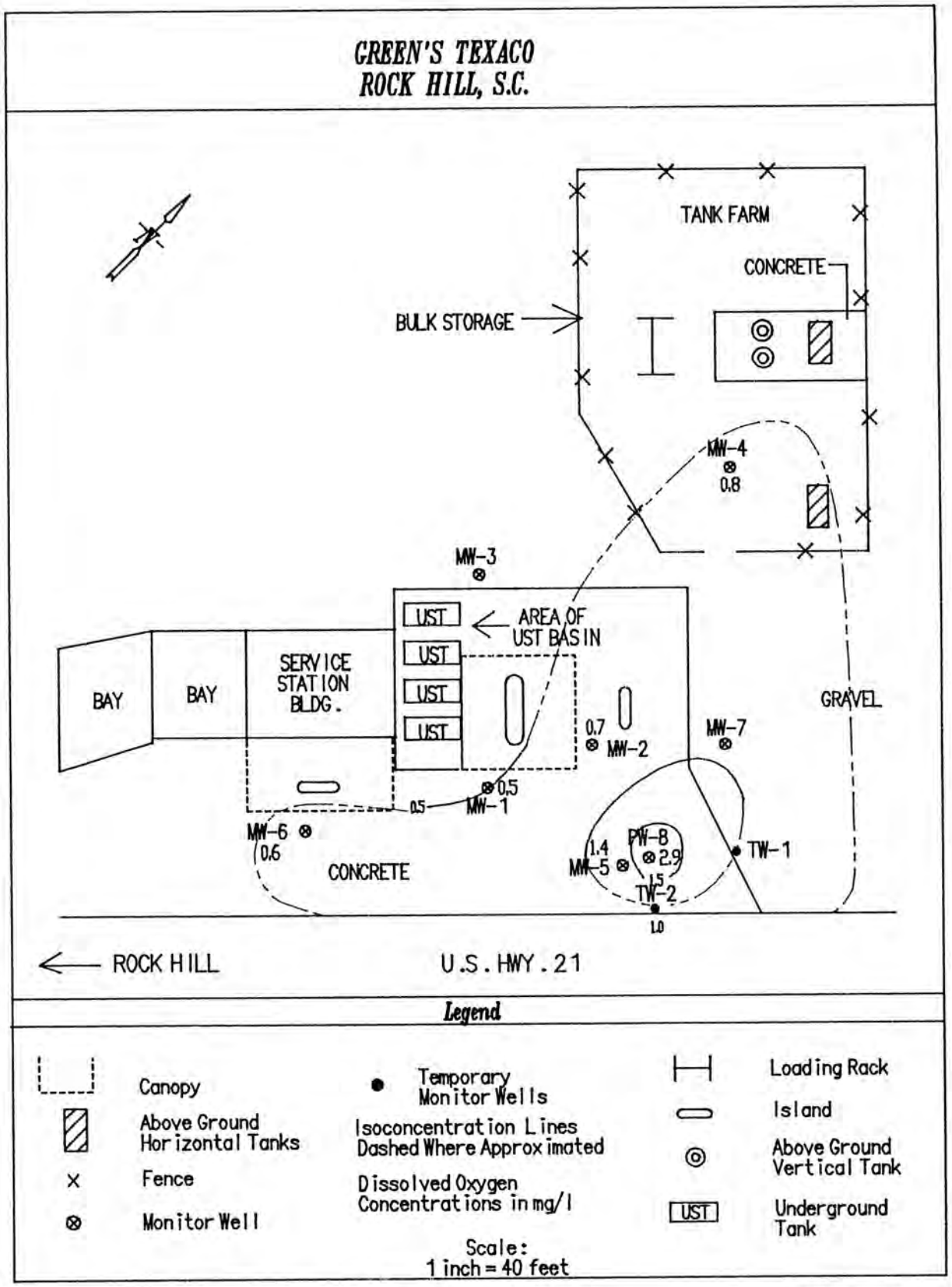


Figure 4. Dissolved Oxygen Isoconcentration Map Post-Air Sparge Testing (04/05/94)

APPENDIX II

TABLES

TABLE 1
GREEN'S TEXACO - ROCK HILL, SC
SUMMARY OF GROUND-WATER LEVELS (UNITS IN FEET)

WELL NO.	DATE MEASURED	TOC ELEVATION	TOC TO WL	WL ELEVATION
MW-1	04/20/94	98.15	4.03	94.12
MW-2	04/20/94	97.86	3.92	93.94
MW-3	04/20/94	98.96	4.52	94.44
MW-4	04/20/94	99.06	5.03	94.03
MW-5	04/20/94	97.04	3.79	93.25
MW-6	04/20/94	98.59	4.15	94.44
MW-7	04/20/94	97.23	3.78	93.45
PW-8	04/20/94	96.98	3.59	93.39

TABLE 2
GREEN'S TEXACO - ROCK HILL, SC
SUMMARY OF GROUND-WATER QUALITY ANALYSES

(09/26/91, 07/27/93, 04/20/94)

WELL NO.	DATE MEASURED	BENZENE UG/L	TOLUENE UG/L	ETHYL-BENZENE UG/L	XYLENES UG/L	TOTAL BTEX UG/L	MTBE UG/L
MW-1	09/26/91	800	1,100	600	3,650	4,250	2,300*
	07/27/93	5,720	384	354	1,850	8,308	1,060
	04/20/94	3,460	559	249	2,240	6,508	NM
MW-2	09/26/91	50*	4.8	<1	<1	54.8*	4,300
	07/27/93	69.7	6.61	<2.5	21.8	98.1	136
	04/20/94	14.6	3.79	<2.5	<7.5	18.4	NM
MW-3	09/26/91	84	<10	<10	<10	84	47*
	07/27/93	NM	NM	NM	NM	NM	NM
	04/20/94	472	18.9	13.4	31.5	536	NM
MW-4	09/26/91	<20	<20	<20	<40	<100	200
	07/27/93	<2.5	<2.5	<2.5	<7.5	<15.0	<50
	04/20/94	<2.5	<2.5	<2.5	<7.5	<15.0	NM
MW-5	09/26/91	<1	<1	<1	32	32	800
	07/27/93	<2.5	<2.5	<2.5	<7.5	<15.0	<50
	04/20/94	<2.5	<2.5	<2.5	<7.5	<15.0	NM

NM = Not Measured
* = Estimated Value

TABLE 2 (continued)
GREEN'S TEXACO - ROCK HILL, SC
SUMMARY OF GROUND-WATER QUALITY ANALYSES

(09/26/91, 07/27/93, 04/20/94)

WELL NO.	DATE MEASURED	BENZENE UG/L	TOLUENE UG/L	ETHYL-BENZENE UG/L	XYLENES UG/L	TOTAL BTEX UG/L	MTBE UG/L
MW-6	09/26/91	<1	<1	<1	<2	<5	<5
	07/27/93	<2.5	<2.5	<2.5	<7.5	<15.0	<50
	04/20/94	<2.5	<2.5	<2.5	<7.5	<15.0	NM
MW-7	09/26/91	<1	<1	<1	10.1	10.1	110
	07/27/93	<2.5	<2.5	<2.5	<7.5	<15.0	<50
	04/20/94	<2.5	<2.5	<2.5	10.1	10.1	NM
PW-8	09/26/91	<5	<5	<5	<10	<25	535
	07/27/93	<2.5	<2.5	<2.5	<7.5	<15.0	<50
	04/20/94	<2.5	<2.5	<2.5	<7.5	<15.0	NM

NM = Not Measured
* = Estimated Value

Table 3

Monitor Well Construction Details
and
Depth to Ground Water Levels (04/20/94)

Green's Texaco
Rock Hill, South Carolina

Well No.	Distance from Pilot Air Sparging Well (feet)	Total Depth (feet)	Cased Interval (feet)	Screened Interval (feet)	Depth to Static GW (feet) from TOC 04/20/94
MW-1	50	12.5	0-0.5	2-12	4.03
MW-2	35	14	0-2	2-13	3.92
MW-3	92	12	0-2	2-12	4.52
MW-4	115	13.5	0-2	2-12	5.03
MW-5	8	10	0-0.5	0.5-10	3.79
MW-6	98	10	0-0.5	0.5-10	4.15
MW-7	40	14.5	0-4.5	4.5-14.5	3.78
TW-1	24	4	0-1	1-3	NM
TW-2	14	4	0-1	1-3	NM
PW-8	0	30	0-25	25-30	3.59

NM = Not Measured.

Table 4

Ground-Water Dissolved Oxygen and Temperature
and
Well Headspace Organic Vapor Concentration Data

Green's Texaco
Rock Hill, South Carolina

Date: April 5, 1994

Well No.	Pre-Air Sparge Conditions			Post-Air Sparge Conditions		
	Dissolved Oxygen (mg/l)	Temp. (°C)	Headspace OVA (ppm)	Dissolved Oxygen (mg/l)	Temp. (°C)	Headspace OVA (ppm)
MW-1	0.7	16.0	201	0.5	16.5	638
MW-2	0.7	17.0	534	0.7	17.0	708
MW-4	0.6	16.0	332	0.8	16.0	610
MW-5	0.7	17.0	64	1.4	17.0	55
MW-6	0.6	17.0	285	0.6	18.0	NM
PW-8	1.3	18.0	NM	2.9	20.0	NM
TW-1	NM	NM	36	NM	NM	67
TW-2	NM	NM	31	NM	NM	41

NM = Not Measured.

Table 5

Pilot Air Sparging Test Data
Green's Texaco
Rock Hill, SC

Sparging Well: PW-8 April 5, 1994

Distance from Sparge Well (ft):			50		35		115		8		98	
Time	Elapsed Time (min.)	Sparge Well PSI	MW-1 ("H_2O)	MW-1 (PID)	MW-2 ("H_2O)	MW-2 (PID)	MW-4 ("H_2O)	MW-4 (PID)	MW-5 ("H_2O)	MW-5 (PID)	MW-6 ("H_2O)	MW-6 (PID)
1135	START	5	0	201	0	534	0	332	0	64	0	285
1235	60	5	0	>1,000	0	636	0	>1,000	0	226	0	>1,000
1240	65	10										
1305	90	10	0.23	879	0	628	0.20	749	0.03	116	0	>1,000
1310	95	13										
1340	125	13	0.20	875	0.05	652	0	560	2.41	49	0	>1,000
1345	130	18										
1355	140	18	2.20	501	0	656	0	594	44	NM	NM	NM
1430	175	23										
1450	195	19	4.00	638	0	708	0	610	68	55	NM	NM

NM = Not Measured.

Table 5 (continued)

Pilot Air Sparging Test Data
Green's Texaco
Rock Hill, SC

Sparging Well: PW-8 April 5, 1994

Distance from Sparge Well (ft):			24		14	
Time	Elapsed Time (min.)	Sparge Well PSI	TW-1 ("H_2O)	TW-1 (PID)	TW-2 ("H_2O)	TW-2 (PID)
1135	START	5	0	36	0	31
1235	60	5	0	61	0	33
1240	65	10				
1305	90	10	0	52	0	36
1310	95	13				
1340	125	13	0	40	0.03	39
1345	130	18				
1355	140	18	0	52	0	37
1430	175	23				
1450	195	19	0.5	67	0.85	41

NM = Not Measured.

Table 6

Air Sparging Radius of Influence

Green's Texaco
Rock Hill, SC

Date: April 5, 1994
Maximum Injection Pressure: 19 psi

Parameter	Maximum Radius of Influence (Feet)
Pressure Response	50
Dissolved Oxygen	115
Increase in Volatile Organic Compounds (VOCs)	115

APPENDIX III

ANALYTICAL RESULTS

RECEIVED APR 2 8 1994

HYDROLOGIC COLUMBIA
Sample Data Report
NC Certification No. 400
SC Certification No. 40101

Date : 4/25/94
Project : Rock Hill, SC Green's Texaco
Client : TET Environmental Services, Inc.
Date Collected : 4/20/94
Date Received : 4/20/94
Date Analyzed : 4/22-23/94
Date Reported : 4/25/94

Sample ID	Client ID	Benzene	Toluene	Ethyl Benzene	Xylenes	Total BTEX
94-1933	MW-1	3460	559	249	2240	6508
94-1934	MW-2	14.6	3.79	<2.5	<7.5	18.4
94-1935	MW-3	472	18.9	13.4	31.5	536
94-1936	MW-4	<2.5	<2.5	<2.5	<7.5	<15.0
94-1937	MW-5	<2.5	<2.5	<2.5	<7.5	<15.0
94-1938	MW-6	<2.5	<2.5	<2.5	<7.5	<15.0
94-1939	MW-7	<2.5	<2.5	<2.5	<7.5	<15.0
94-1940	PW-8	<2.5	<2.5	<2.5	<7.5	<15.0
94-1941	Trip Blank	<2.5	<2.5	<2.5	<7.5	<15.0

BTEX Units = ug/L (parts per billion) Water by M602

Data Approved for Release:

Robert D. Downing
Laboratory Manager

REPORT TO: TET

Columbia, S.C.

CHAIN OF CUSTODY

PO #

HydroLogic, Inc.

Method of Shipment

Page 1 of 1

100 Ashland Park Lane
Columbia, SC 29210
803-750-0913 800-243-0913

FOR SAMPLE MATRIX: W=WATER OR LIQUID S=SOIL OR SOLID

FOR SAMPLE TYPE: G = GRAB C = COMPOSITE

* PROGRAM IDENTIFICATION UST UNLESS OTHERWISE STATED

CLIENT: Green's Texaco

PHONE: Rock Hill, S.C.

PROJ #: Will Lyons

SAMPLER: J. Harley

ENTER PRESERVATION CODE A-NONE B-HCl C-NaOH D-H2SO4 E-HNO3 F-OTHER(SPECIFY)

PROJECT ID #:

REPORT DUE:

VERBAL FAX COPY HARD COPY

FIELD ID	SAMPLE MATRIX	COLLECTION TIME	DATE	SAMPLE TYPE	BTEX M602/8020	TPH VOLATILES 5030	TPH SEMI/VOLATILES 3550	MTBE	NAPHTHALENE	PAH'S	SEMI\VOL. GC/MS (BNA)	VOLATILES GC/MS	OIL AND GREASE	LEAD ONLY	8 RCRA METALS	OTHER SPECIFY IN REMARKS				NUMBER OF CONTAINERS	PROGRAM IDENTIFICATION *	REMARKS	LABORATORY'S SAMPLE ID#
					B															17			
MW-1	W S	12:10	4/20/94		X															2			94-1933
MW-2	W S	12:05			X															2			94-1934
MW-3	W S	12:38			X															2			94-1935
MW-4	W S	1:00			X															2			94-1936
MW-5	W S	11:38			X															2			94-1937
MW-6	W S	12:28			X															2			94-1938
MW-7	W S	11:51			X															2			94-1939
PW-8	W S	11:26			X															2			94-1940
Trip	W S	—			X															1			94-1941

RELINQUISHED BY: J. Harley	DATE: 4-20-94	TIME: 2:45 P.M.	RECEIVED BY:
RELINQUISHED BY:	DATE:	TIME:	RECEIVED BY:
LAB RECEIPT BY: Robert D. Looney	DATE: 4/20/94	TIME: 4 PM	REMARKS: Received on wet ice - 4°C

TET Environmental Services, Inc.

PILOT SOIL VAPOR EXTRACTION TEST REPORT GREEN'S TEXACO ROCK HILL, SOUTH CAROLINA GWPD ID #09344

November 29, 1994

Prepared by:
TET Environmental Services, Inc.

Thomas R. Spinek

Thomas R. Spinek, P.G.
Remedial Services Manager
S.C. Reg. #1104

Dee O'Brien, P.G.
Senior Hydrogeologist
S.C. Reg. #873

TABLE OF CONTENTS

INTRODUCTION

The following report is submitted by TET Environmental Services, Inc. (TET) on behalf of Mr. Jerry C. Green of Green's Oil Company. The report details results of pilot soil vapor extraction testing conducted on November 10, 1994 at Green's Texaco in Rock Hill, South Carolina.

Four underground storage tanks (USTs) were removed from the site in July 1989. Approximately 250 cubic yards of hydrocarbon-impacted soil were removed from the tank basin excavation and temporarily stockpiled at the site. After approval was obtained from the South Carolina Department of Health and Environmental Control's (SCDHEC) Bureau of Solid and Hazardous Waste, the soil was disposed of in the York County Landfill. In addition, 12,200 gallons of hydrocarbon-impacted ground water were pumped out of the tank basin excavation and disposed of by James Waste Oil Services of Charlotte, North Carolina.

At the request of the SCDHEC, TET completed a Phase I hydrogeologic assessment in the Spring of 1990 and the results were forwarded to the SCDHEC on April 26, 1990. This investigation involved installation and sampling of four ground-water monitor wells. Ground-water sampling results indicated that ground water at the site had been impacted by petroleum hydrocarbons, with the greatest impact in well MW-1, directly east of the tank basin. Locations of site features and monitor wells are presented in Figure 1 (Appendix I).

At the request of the SCDHEC, TET completed a Phase II hydrogeologic assessment in the Fall of 1991, and results of this investigation were submitted in a TET report dated November 6, 1991. The Phase II investigation involved installation and sampling of one deep ground-water monitor well and three shallow monitor wells, and hydraulic conductivity (slug) testing of two shallow monitor wells. Ground-water sampling results from September 1991 confirmed the initial sampling results and indicated greatest ground-water impact in the vicinity of well MW-1 near the former tank basin. Ground-water sampling conducted by TET on July 27, 1993 and April 20, 1994 confirmed that the dissolved phase hydrocarbon plume had remained relatively confined to the vicinity of the UST basin.

TET performed a pilot air sparging test at the site on April 5, 1994. Due to the high water table and the lack of well screen above the water table in site monitor wells, soil vapor extraction testing could not be performed. A report documenting results of the pilot air sparging test was submitted to the SCDHEC on August 29, 1994.

WATER LEVEL INFORMATION

Ground water at the site occurs under unconfined conditions in the surficial aquifer. Depth to ground water is variable, but is generally from 3 to 12 feet based on historical well gauging data. Water levels were measured from the top of each well casing on November 10, 1994 and water table elevations were calculated relative to an arbitrary datum of 100 feet. Water table elevation data are presented in Table 1 (Appendix II). Monitor well MW-6 displayed the highest

water table elevation (89.03 feet), while monitor well MW-4 had the lowest elevation (87.21 feet). A potentiometric surface map based on gauging data is included as Figure 2 (Appendix I). The water level measurement from pit-cased deep well PW-8 was not used in construction of this map because the screened interval does not bracket the water table. The potentiometric surface map indicates that the water table slopes gently east with an average hydraulic gradient of 0.014 feet/foot. This is consistent with previously determined ground-water flow directions and hydraulic gradients.

SOIL VAPOR EXTRACTION TEST SETUP

The pilot soil vapor extraction test was conducted utilizing a four-inch diameter well (MW-1) as the test vapor extraction well. Prior to the test, well MW-1 was gauged for depth to ground water in order to confirm sufficient well screen above the static water level, a requirement of vapor extraction testing. Well construction details and depth to static ground water for site wells on November 10, 1994 are presented in Table 2 (Appendix II). Depth to the static water level in well MW-1 prior to the start of the test was 10.00 feet below the top of well casing. Thus, approximately 8 feet of well screen was present above the water table to allow air flow to the well during water upwelling associated with vapor extraction. The extraction well was then sealed with a standard sanitary well seal equipped with a ball valve/hose barb fitting for measurement of applied vacuum and a two-inch diameter opening for vapor extraction piping.

Monitor wells MW-2, MW-4, MW-5, MW-6, and a four-inch diameter tankfield monitor well (herein named T-2) were used as vacuum monitor points during the test. Wells MW-3 and MW-7 could not be located and are probably covered by gravel. Well construction details for tankfield monitor well T-2 are unknown. The vacuum monitor points were chosen because of their proximity and radial location to the extraction test well. As indicated in Table 2, at least several feet of well screen was present above the static water table at each vacuum monitor point to allow air flow (and induced vacuum) at the monitor points during the pilot test. Deep well PW-8 was not monitored during the test since it is cased across the water table.

Vacuum monitor points were sealed with plumbing fittings equipped with an expandable rubber well seal and ball valve/hose barb fitting. A short rubber hose (3/16 inch inside diameter) was connected from each hose barb fitting to a differential pressure gauge at each vacuum monitor well. All wells were checked for structural integrity in order to prevent any avoidable loss of applied vacuum. In addition, one differential pressure gauge sensitive in the range 0 to 0.25 inches of water was left unattached to any monitor well in order to monitor atmospheric pressure changes during the pilot test.

An EG&G Rotron 5-horsepower regenerative blower was used to apply a vacuum on the unsaturated zone through the pilot vapor extraction well. The blower is capable of a maximum vacuum of 85 inches of water and a maximum air flow of 225 standard cubic feet per minute. The pilot SVE system consists of two-inch diameter flexible hoses and standard PVC Schedule

40 piping, an air dilution valve, particulate filter, moisture separator, differential pressure gauges, air velocity measuring devices, and a sample port.

Air flow from the pilot vapor extraction well was measured using an averaging pitot tube connected to appropriate scale differential pressure/air velocity gauges. Total air flow (extraction well flow plus dilution air flow) was also measured using a pitot tube connected to a differential pressure/air velocity gauge.

Field measurements of the vapor extraction air influent were made using a combustible gas indicator (CGI) and a photoionization detector (PID). The CGI measures all volatile hydrocarbons but only provides a measurement of the percentage of the lower explosive limit of the calibration compound (pentane). The photoionization detector measures aromatic hydrocarbons accurately, but is not useful for measurement of total hydrocarbons. Field measurements with the CGI and PID were made only to semi-quantitatively characterize the air stream, compare vapor concentrations at different steps of the test, and confirm laboratory air analyses.

SVE PROCEDURE

The pilot test was conducted at three different extraction well vacuum levels (38, 60, and 84 inches of water, respectively). Measured vacuum and soil vapor concentration data are more easily interpreted through the analysis of a measured variable response to changes in vapor

extraction rate (i.e., a step test). Vacuum data, flow data, and field vapor concentration data were collected upon stabilization of conditions at the end of each step. Vacuum data were collected at the extraction well and individual vacuum monitor wells using differential pressure gauges of appropriate scale. Flow measurements were determined from measurements in the two-inch diameter PVC piping using averaging pitot tube devices connected to dual scale air velocity/differential pressure gauges. Field vapor concentration data were collected from the sampling port using a CGI indicator calibrated to pentane and a photoionization detector calibrated to isobutylene.

At the end of the test, a soil vapor sample was collected from the sampling port in a Tedlar® air bag. A duplicate sample was also collected in case of damage or accidental air loss. The sample (and duplicate) were accompanied by chain of custody documentation and were shipped via overnight mail to Enthalpy Analytical, Inc. laboratory in Raleigh, North Carolina for analysis for BTEX (benzene, toluene, ethylbenzene, xylenes) and total petroleum hydrocarbons (TPH) expressed as methane and isooctane.

SVE FIELD RESULTS

Results of pilot soil vapor extraction testing are presented in Table 3 (Appendix II). The first step of the test was conducted for 70 minutes at a blower vacuum of 50 inches of water and a resulting extraction well vacuum of 38 inches of water. This produced a flow rate of 950 feet per minute (fpm) (20.7 cubic feet per minute (cfm)) in the two-inch diameter piping from the

extraction well. The total air flow (including dilution air) at this step was 5,000 fpm (109 cfm). The air flow from the extraction well was approximately 19% of the total flow due to the partially-closed dilution valve.

After 30 minutes of blower operation, measured vacuums at vacuum monitor wells T-2, MW-2, MW-4, MW-5, and MW-6 were 0.045, 0.08, 0, 0.06, and 0 inches of water, respectively. The LEL reading at this step was 2% and the soil vapor concentration as measured with the PID was 286 parts per million (ppm). After 60 minutes of testing, measured vacuums at vacuum monitor wells T-2, MW-2, MW-4, MW-5, and MW-6 were 0.05, 0.08, 0, 0.075 and 0 inches of water, respectively. The LEL reading was 2% and the soil vapor concentration was 301 ppm.

The second step of the test was conducted for 60 minutes at a blower vacuum of 65 inches of water and a resulting extraction well vacuum of 60 inches of water. This produced an air flow rate of 1,100 fpm (24 cfm) in the two-inch diameter piping from the extraction well. The total air flow (including dilution air) at this step was 3,000 fpm (65.4 cfm). The air flow rate from the extraction well was approximately 37% of the total air flow rate.

After 30 minutes at an extraction well vacuum of 60 inches of water, measured vacuums at vacuum monitor wells T-2, MW-2, MW-4, MW-5, and MW-6 were 0.06, 0.13, 0, 0.10, and 0 inches of water, respectively. The LEL reading at this step was 4% and the soil vapor concentration was 347 ppm. After 60 minutes at this extraction well vacuum level, measured vacuums at wells T-2, MW-2, MW-4, MW-5, and MW-6 were 0.05, 0.12, 0, 0.095, and 0

inches of water, respectively. The LEL reading was 3% and the soil vapor concentration was 358 ppm.

The third step of the test was conducted for 60 minutes at a blower vacuum of 85 inches of water and a resulting extraction well vacuum of 84 inches of water. This produced an air flow rate of 1,250 fpm (26.2 cfm) in the two-inch diameter piping from the extraction well. The total air flow (including dilution air) at this step was 1,800 fpm (39.2 cfm). The air flow rate from the extraction well was approximately 69% of the total air flow rate.

After 30 minutes at an extraction well vacuum of 84 inches of water, measured vacuums at wells T-2, MW-2, MW-4, MW-5, and MW-6 were 0.06, 0.22, 0.02, 0.22, and 0.11 inches of water, respectively. The LEL reading at this step was 12% and the soil vapor concentration was 638 ppm. After 60 minutes at this extraction well vacuum level, measured vacuums at wells T-2, MW-2, MW-4, MW-5, and MW-6 were 0.06, 0.15, 0, 0.18, and 0.07 inches of water, respectively. The LEL reading was 13% and the soil vapor concentration was 681 ppm.

Following collection of an air sample (and duplicate), the test was stopped after a total elapsed time of 200 minutes. No change was noted in the ambient pressure gauge during the test.

SVE ANALYTICAL RESULTS

Laboratory analytical results of an air sample collected at the maximum extraction well vacuum level are presented in Table 4 (Appendix II). These results indicate a benzene concentration of 232 ppm, a toluene concentration of 16.3 ppm, an ethylbenzene concentration of 5.38 ppm, and a xylene concentration of 1.04 ppm. A total petroleum hydrocarbon concentration (TPH, expressed as methane) of 8,407 ppm was determined from the air sample. Complete laboratory analytical results are presented in Appendix III.

The air sample was collected with the dilution valve partially open due to the minimum air flow requirements of the regenerative blower at maximum vacuum. Thus, approximately 69% of the total air flow was from the extraction well and the remaining 31% was through the dilution valve.

INTERPRETATION OF SVE RESULTS

Induced vacuum is an indirect measurement of air flow, the mechanism by which volatile hydrocarbons are removed from the subsurface. Air flow also supplies oxygen to the subsurface for aerobic biodegradation. In general, the rate of air flow (and associated vacuum) induced by an extraction well decreases radially away from the well. Subsurface induced vacuum varies approximately exponentially with distance from the extraction well and linearly with applied vacuum.

Vacuum (negative pressure) measurements at the vacuum monitor wells are indicators of variation in unsaturated zone permeability. This variation may be the result of several factors including soil stratigraphic changes and man-made surface and subsurface features (e.g. permeability differences due to fill materials associated with underground storage tank fields, subsurface utilities, and open versus impermeable surface seals). Thus, the induced vacuum at a given distance from the vapor extraction well will most likely vary with direction.

Effective Radius of Influence

An effective radius of influence (Chevron, 1991, p. E-7) is defined as "an extraction well spacing sufficiently close to optimize air flow rates in order to accelerate site remediation, while avoiding overdesigning the system and incurring unnecessary capital and operation and maintenance costs". The percentage of operating vacuum selected to determine vapor extraction well spacing is based on air flow modelling conducted by the Chevron Research and Technology Corporation (Chevron, 1991). Based on modelling and a nation-wide performance study of 128 operating vapor extraction systems, Chevron concluded that a value of 1% of the projected operating vacuum is an appropriate value to establish extraction well spacing.

Vacuum measurements collected at vapor monitor points during each of the three steps of the test failed to reach the recommended 1% of applied vacuum. The maximum vacuum measurements in the nearest monitor well with known construction details, MW-2 (32 feet from

the extraction well) was approximately 0.26 % of the applied vacuum. Therefore, although an effective radius of influence was not determined, it can be concluded that it is less than 32 feet.

Estimated Contaminant Removal Rates

The air emission rate (ER), in pounds per day of total petroleum hydrocarbon volatiles is determined by the following equation (modified from U.S. EPA, 1989):

$$ER = Q \times C \times MW \times 1.581\ E^{-7} \times 24$$

where: ER = initial emission rate in lb/day

Q = air flow rate (cfm)

C = soil vapor concentration (total petroleum hydrocarbons in ppm-v)

MW = molecular weight of contaminant by vapor (lb/lb-mole) using assumed average molecular weight of 86.18 lb/lb-mole (API, 1985)

$1.581\ E^{-7} \times 24$ = conversion coefficient

Using the maximum pilot test extraction well air flow rate of 27.3 cfm and an assumed constant C (total petroleum hydrocarbon concentration from air sample):

$$ER = 27.3 \times 8{,}407 \times 86.18 \times 1.581\ E^{-7} \times 24$$

$$ER = 75.1 \text{ lb/day}$$

Using a product density of 5.51 lb/gal (API, 1985), this equates to a removal rate of approximately 13.6 gallons per day.

It should be noted that vapor extraction effluent concentrations commonly follow an exponentially declining mass removal rate. However, a full-scale vapor extraction system may be capable of creating a higher air flow rate, thus increasing the calculated emission rate and exceeding the State of South Carolina attainment zone limit of 1,000 lbs/month of volatile organic compounds (VOCs). In addition, if soil vapor extraction is coupled with air sparging (introduction of air below the water table), unsaturated zone vapor concentrations may increase due to upward migration of saturated zone VOCs. In order to maximize any potential remedial efforts, it would be necessary to determine whether dilution of vapor extraction influent can allow remediation within an acceptable time frame, or whether off-gas treatment of influent vapors is a more cost-effective option.

CONCLUSIONS/RECOMMENDATIONS

Pilot vapor extraction testing indicates low air permeability in the vicinity of soil vapor extraction test well MW-1. Pilot test vacuum measurements suggest an effective radius of influence (at the maximum applied pilot test vacuum) of less than 32 feet. The proximity of the pilot extraction well to the tank field may have resulted in "short-circuiting" of air flow from the more permeable tank field, resulting in decreased vacuum measurements in surrounding vapor extraction monitor wells. However, the pilot test may simulate realistic conditions for

vapor extraction since the area of maximum hydrocarbon impact *is* present in the vicinity of the tank field and well MW-1. Air flow rates and air sample laboratory results indicate initial hydrocarbon removal rates of approximately 13.6 gallons/day. Concurrent operation of an air sparging system (supplying air below the water table in the area of hydrocarbon impact) would increase volatiles available for removal via soil vapor extraction.

Pilot air sparge (AS) testing conducted in April 1994 indicated a radius of influence of up to 115 feet based on increases in ground-water dissolved oxygen concentrations, observation well head pressures, and observation well organic vapor concentrations. Recent literature indicates that air sparging may reduce ground-water hydrocarbon concentrations by both volatilization and by the stimulation of naturally occurring hydrocarbon-degrading microbial populations.

Based on historical ground-water sampling results including the most recent sampling event (April 1994), the areal extent of the soluble phase hydrocarbon plume is limited to the area in the vicinity of wells MW-1, MW-2, and MW-3. An air sparging system with concurrent vapor extraction is recommended in the area of these wells, particularly in the vicinity of well MW-1 and the former underground storage tank basin which was located just upgradient of this well.

Concurrent installation of a soil vapor extraction system would be recommended to prevent vapor accumulations in buildings or other possible vapor receptors. Soil vapor extraction is also necessary to address unsaturated zone hydrocarbon impact. Horizontal SVE wells should be considered due to the shallow water table at the site and limited radius of influence for vertical

SVE wells. Horizontal vapor extraction wells could be installed in shallow trenches across the areas of concern, would mimimize ground-water upwelling, and would allow effective coverage of a greater area than vertical wells.

REFERENCES

API (American Petroleum Institute), 1985, Subsurface Venting of Hydrocarbon Vapors from an Underground Aquifer, API Publication No. 4410

Chevron Research and Technology Company, Environmental Group, Site Assessment and Remediation Unit, 1991, Chevron USA Inc. Marketing Department Vapor Extraction System Performance Study

U.S. Environmental Protection Agency, Office of Underground Storage Tanks, 1989, Estimating Air Emissions from Petroleum UST Cleanups

APPENDIX I

FIGURES

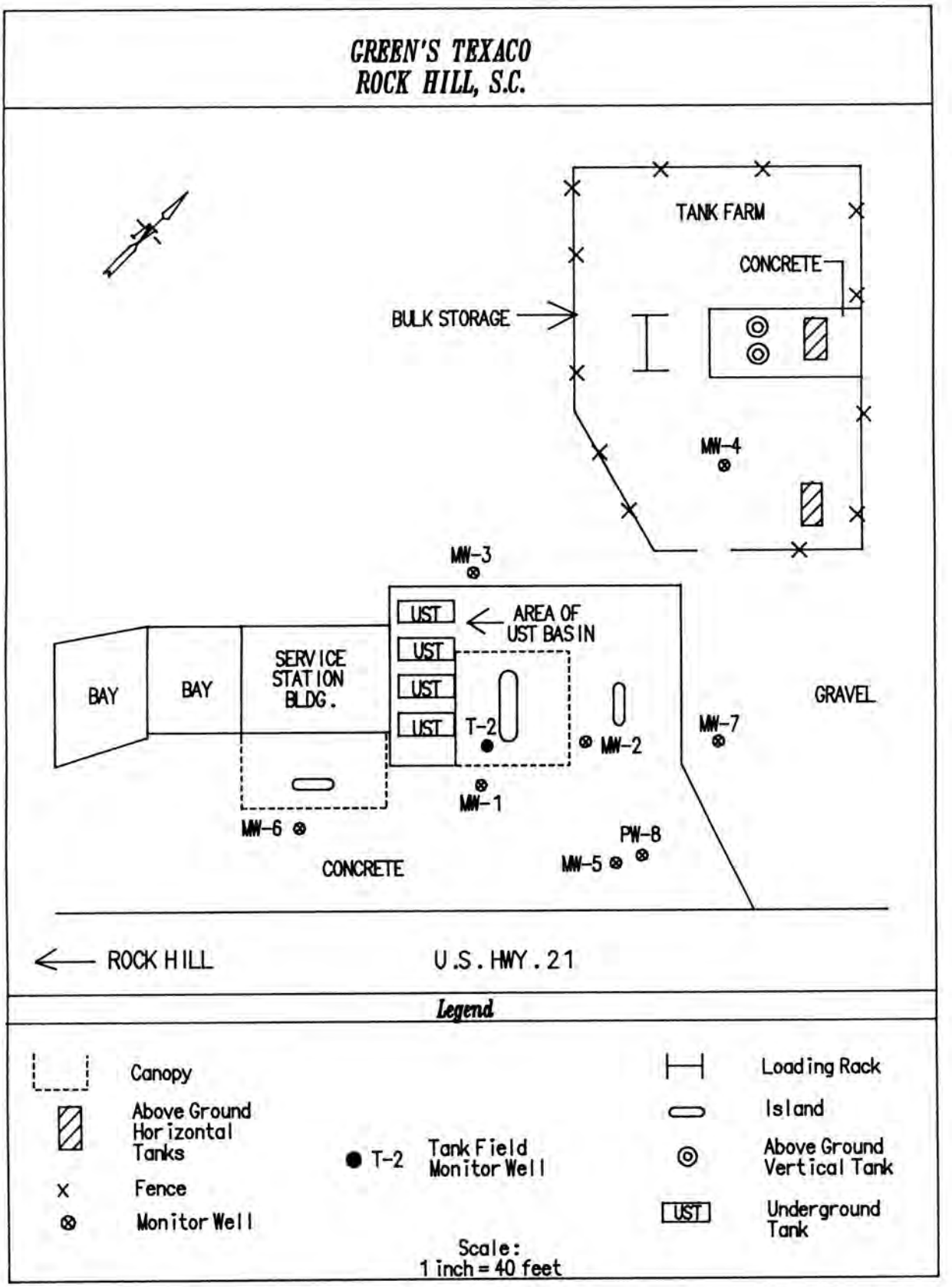


Figure 1. Site Map

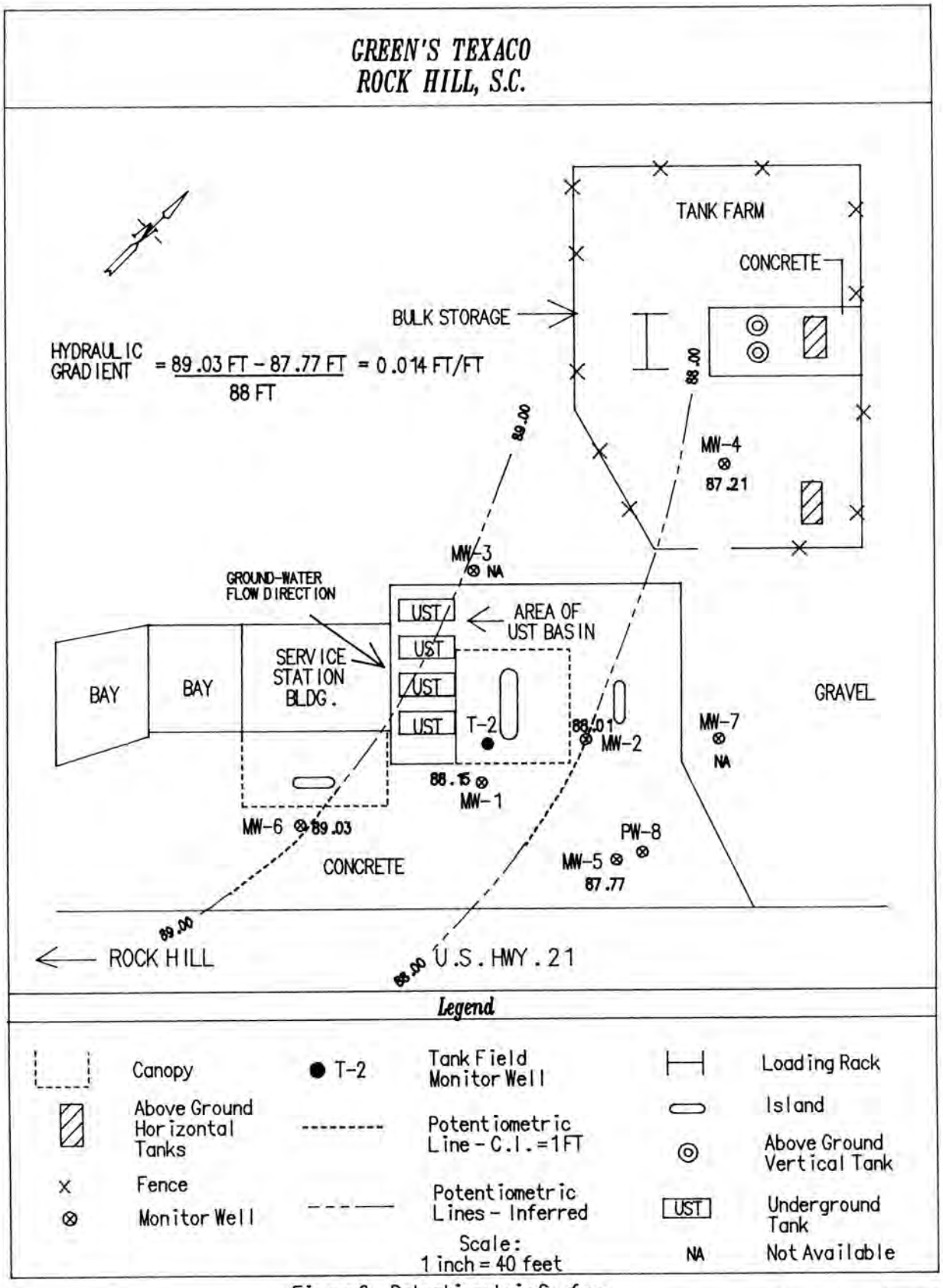


Figure 2. Potentiometric Surface Map (11/10/94)

APPENDIX II

TABLES

Table 1

Summary of Ground-Water Levels (11/10/94)
(units in feet)

Green's Texaco
Rock Hill, South Carolina

Well No.	Date Measured	TOC Elevation	TOC to WL	WL Elevation
MW-1	11/10/94	98.15	10.00	88.15
MW-2	11/10/94	97.86	9.85	88.01
MW-3	11/10/94	98.96	NA	NA
MW-4	11/10/94	99.06	11.85	87.21
MW-5	11/10/94	97.04	9.27	87.77
MW-6	11/10/94	98.59	9.56	89.03
MW-7	11/10/94	97.23	NA	NA
PW-8	11/10/94	96.98	7.80	89.18

TOC = top of well casing
WL = water level
NA = not available

Table 2

Monitor Well Construction Details and Depth to Ground Water (11/10/94)

Green's Texaco
Rock Hill, South Carolina

Well No.	Distance from Pilot Vapor Extraction Well (feet)**	Total Depth (feet)	Cased Interval (feet)	Screened Interval (feet)	Depth to Static GW from TOC on 11/10/94
MW-1	0	12.5	0-2	2-12	10.00
MW-2	32	14	0-2	2-13	9.85
MW-3*	58	12	0-2	2-12	NA
MW-4	108	13.5	0-2	2-12	11.85
MW-5	51	10	0-0.5	0.5-10	9.27
MW-6	58	10	0-0.5	0.5-10	9.56
MW-7*	65	14.5	0-4.5	4.5-14.5	NA
PW-8	55	30	0-25	25-30	7.80
T-2	11	14	NA	NA	NM

* = well could not be located
** = distances measured in field
NA = not available
NM = not measured

Table 3

Pilot Vapor Extraction Test Data

Site Name: Green's Texaco, Rock Hill, SC **Date: November 10, 1994**
Extraction Well: MW-1

					Distance to extraction well (ft):				32	108	51	58	11
Time	Elapsed Time (min.)	Blower Vacuum ("H_2O)	Total Flow (fpm)	Well Flow (fpm) in 2" pipe	XP (% LEL)	PID (ppm)	Sample	Ext. Well Vacuum ("H_2O)	MW-2 ("H_2O)	MW-4 ("H_2O)	MW-5 ("H_2O)	MW-6 ("H_2O)	T-2 ("H_2O)
1050	START	50											
1120	30	50	5,000	950	2	286		38	0.08	0	0.06	0	0.045
1150	60	50	5,000	950	2	301		38	0.08	0	0.075	0	0.05
1200	70	65											
1230	100	65	3,000	1,100	4	347		60	0.13	0	0.10	0	0.06
1300	130	65	3,000	1,100	3	358		60	0.12	0	0.095	0	0.05
1300	130	85											
1330	160	85	1,800	1,250	12	638		84	0.22	0.02	0.22	0.11	0.06
1400	190	85	1,800	1,250	13	681	SVE-1	84	0.15	0	0.18	0.07	0.06
1410	STOP	85											

Ambient pressure gauge remained at initial setting (0.10" H_20) for duration of test.

Table 4

Pilot Vapor Extraction Test
Air Sample Laboratory Analytical Summary
Sample Collected: 11/10/94

Green's Texaco
Rock Hill, South Carolina

Compound	Concentration (ppm-V)
Benzene	232
Toluene	16.3
Ethylbenzene	5.38
Xylenes	1.04
TOTAL BTEX	254.72
TPH (as methane)	8,407

APPENDIX III

ANALYTICAL RESULTS

Analytical Report

Enthalpy Analytical, Inc.
3211 Bramer Drive
Raleigh, NC 27604
919/850-4392

Summary of Results

ENTHALPY analytical, inc.

Company:	TET Environmental Services	Enthalpy #:	1194-04
Analyst:	BGP	Sampled:	11/10/94
Parameters:	BTEX, TPH	Received:	11/11/94
# Samples:	1 (Green's Texaco; Rock Hill)	Analyzed:	11/11/94

Compound	Concentration (PPMV)
	SVE-1
Benzene	232
Toulene	16.3
Ethylbenzene	5.38
Xylene	1.04
TPH (as isooctane)	1,051
TPH (as methane)	8,407

Results

MDL:	1.0	ppm
LOQ:	5.0	ppm

Company:	TET Environmental Services	Client #:	NA
Analyst:	BGP	Enthalpy #:	1194-04
Parameters:	BTEX, TPH	PO #:	Verbal
# Samples:	1 (Green's Texaco; Rock Hill)	Date:	11/15/94

Reviewed: JE
Date: 11/19/94

Sample Id.	Retention Time (min.)		Percent	Concentration		% Difference	Ave. Conc.	Cal.	Dilution	Conc.
	Inj. # 1	Inj. # 2	Difference	Inj. # 1	Inj. # 2	of Mean		Curve	Ratio	PPMV
BENZENE										
SVE-1	5.995	5.943	0.87	232.13	231.39	0.16	231.76	1	1.0	232
TOLUENE										
SVE-1	7.468	7.349	1.59	9.90	22.62	39.10	16.26	1	1.0	16.3
ETHYL BENZENE										
SVE-1	8.826	8.775	0.58	5.63	5.12	4.76	5.38	1	1.0	5.38
XYLENE										
SVE-1	9.204	9.152	0.56	1.21	0.86	16.88	1.04	1	1.0	1.04
TPH (as isooctane)				Area			Ave. Area			
SVE-1	NA	NA	NA	12,522,200	10,673,300	7.97	11,597,750	2	1.0	1,051

Narrative Summary

ENTHALPY analytical, inc.

Enthalpy Analytical Narrative Summary

Company:	TET Environmental Services
Contact:	Tom Spinek
Phone:	800-476-0913
Fax:	803-750-9505
Analyst:	BGP

Client #:	
Enthalpy #:	1194-04
PO #:	Verbal
Parameters:	BTEX, TPH
# Samples:	1 (bag)

Custody

Samples were delivered by Federal Express on 11/4/94 and were received by Todd Grosshandler. Samples were personally attended during transport, then kept under lock with access only to authorized personnel of Enthalpy Analytical, Inc.

Separation

All samples were separated using a Restek 60 M x 0.53 mm RTX-Volatiles capillary column. The analysis of the sample was done in the gaseous phase using a six port valve. The calibration standards were also analyzed in the gaseous phase for BTEX and methane (for TPH). All components of interest were easily identified and reproducible. The samples were analyzed using a 5890 Series II Hewlett Packard Gas Chromatograph with a flame ionization detector

Labeling

OK

Reproducibility

All standards were within 10% of their tag value.

Quality of Data

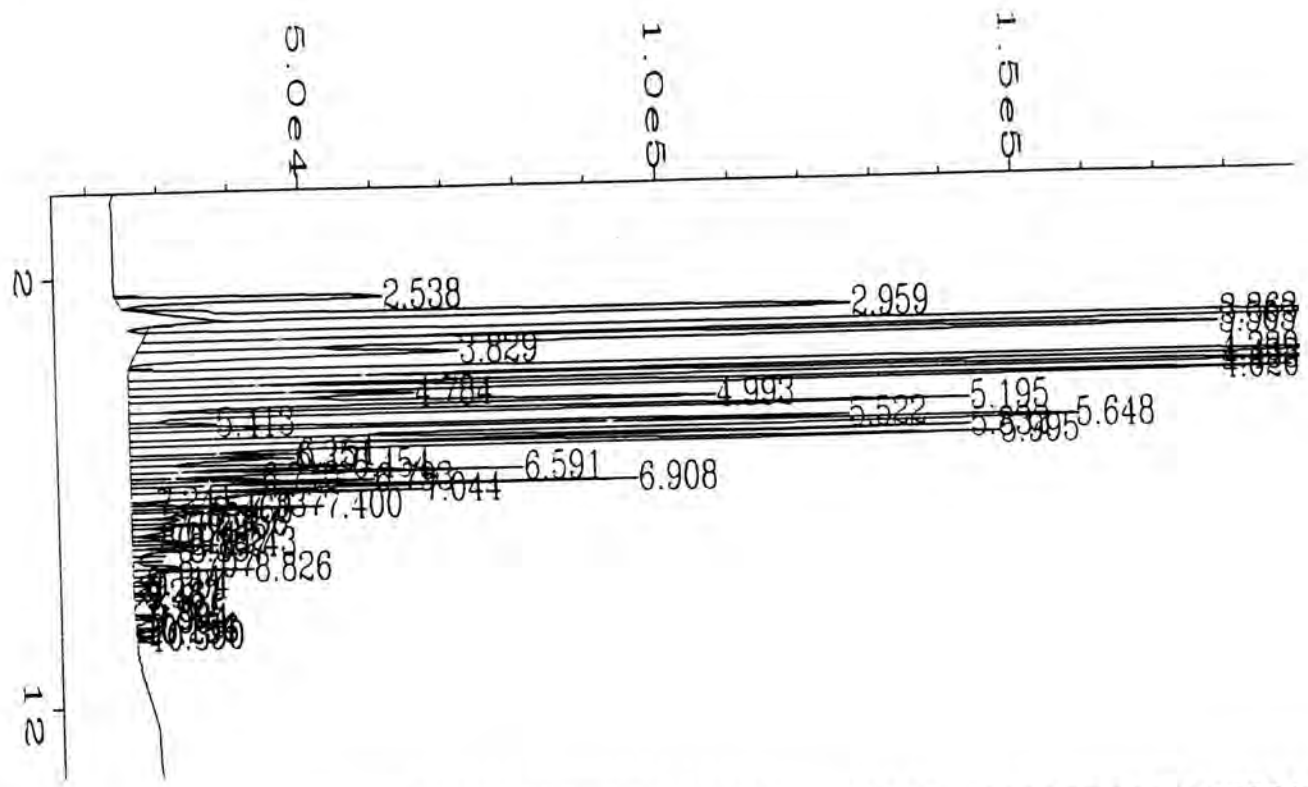
Toluene was the only compound of interest that was not reproducible. The sample was not reanalyzed because all other compounds of interest were within 5% of the mean and the concetration for toluene was near the Limit of Quantification.

Sample Custody

ENTHALPY analytical, inc.

Chromatograms

ENTHALPY analytical, inc.



External Standard Report

Data File Name : C:\HPCHEM\1\DATA\TET11-04\NV-F0113.D
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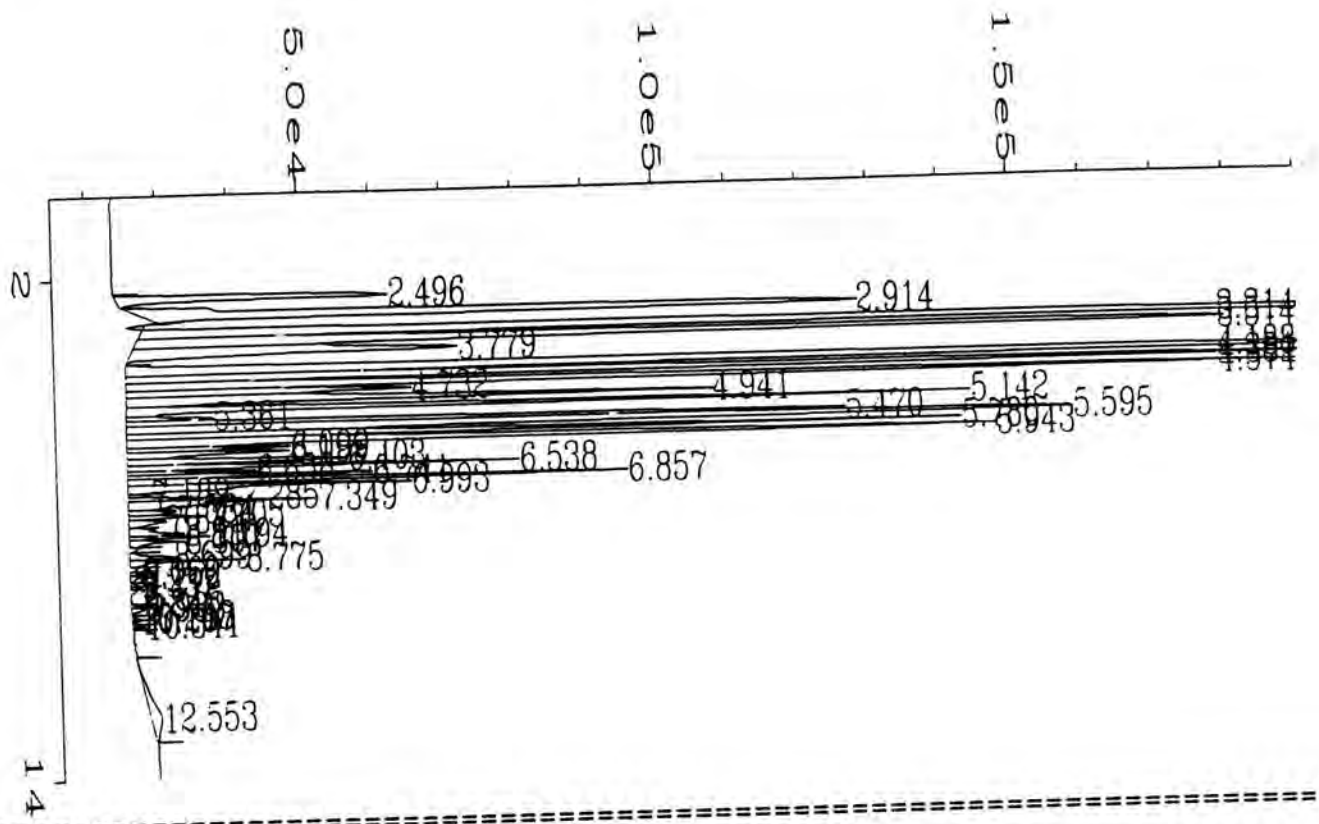
Instrument : FID
Sample Name : Green'sTex SVE-1
Run Time Bar Code:
Acquired on : 11 Nov 94 03:54 PM
Report Created on: 11 Nov 94 04:33 PM
Last Recalib on : 11 NOV 94 03:47 PM
Multiplier : 1

Page Number : 1
Vial Number :
Injection Number :
Sequence Line :
Instrument Method: BTEX-GEN.MTH
Analysis Method : BTEX-GEN.MTH
Sample Amount : 0
ISTD Amount :

Sig. 1 in C:\HPCHEM\1\DATA\TET11-04\NV-F0113.D

Ret Time	Area	Type	Width	Ref#	ng/ul	Name
5.995	743601	VV	0.086	1	232.128	Benzene
7.468	65434	VV	0.093	1	9.904	Toluene
8.826	57130	VV	0.048	1	5.632	Ethyl benzene
9.204	12234	VV	0.066	1	1.212	Xylene



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External Standard Report

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Report Created on: 11 Nov 94 04:34 PM
Last Recalib on : 11 NOV 94 03:47 PM
Multiplier : 1

Page Number : 1
Vial Number :
Injection Number :
Sequence Line :
Instrument Method: BTEX-GEN.MTH
Analysis Method : BTEX-GEN.MTH
Sample Amount : 0
ISTD Amount :

Sig. 1 in C:\HPCHEM\1\DATA\TET11-04\NV-F0114.D

Ret Time	Area	Type	Width	Ref#	ng/ul	Name
5.943	741284	VV	0.086	1	231.392	Benzene
7.349	149432	VV	0.091	1	22.619	Toluene
8.775	51943	VV	0.046	1	5.120	Ethyl benzene
9.152	8703	VV	0.072	1	0.862	Xylene

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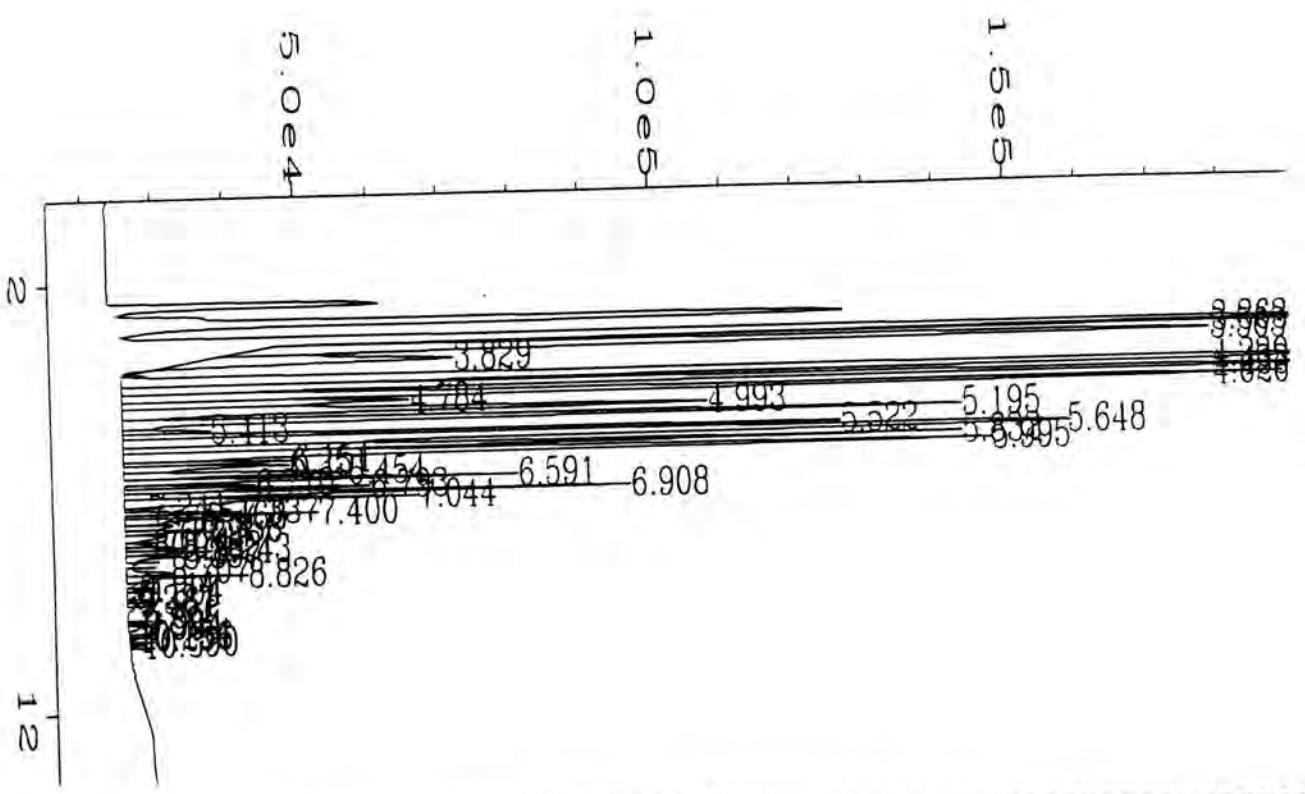

Area Percent Report

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Instrument : FID
Sample Name : Green'sTex SVE-1
Run Time Bar Code:
Acquired on : 11 Nov 94 03:54 PM
Report Created on: 18 Nov 94 06:03 AM

Page Number : 1
Vial Number :
Injection Number :
Sequence Line :
Instrument Method: BTEX-GEN.MTH
Analysis Method : BTEX-GEN.MTH

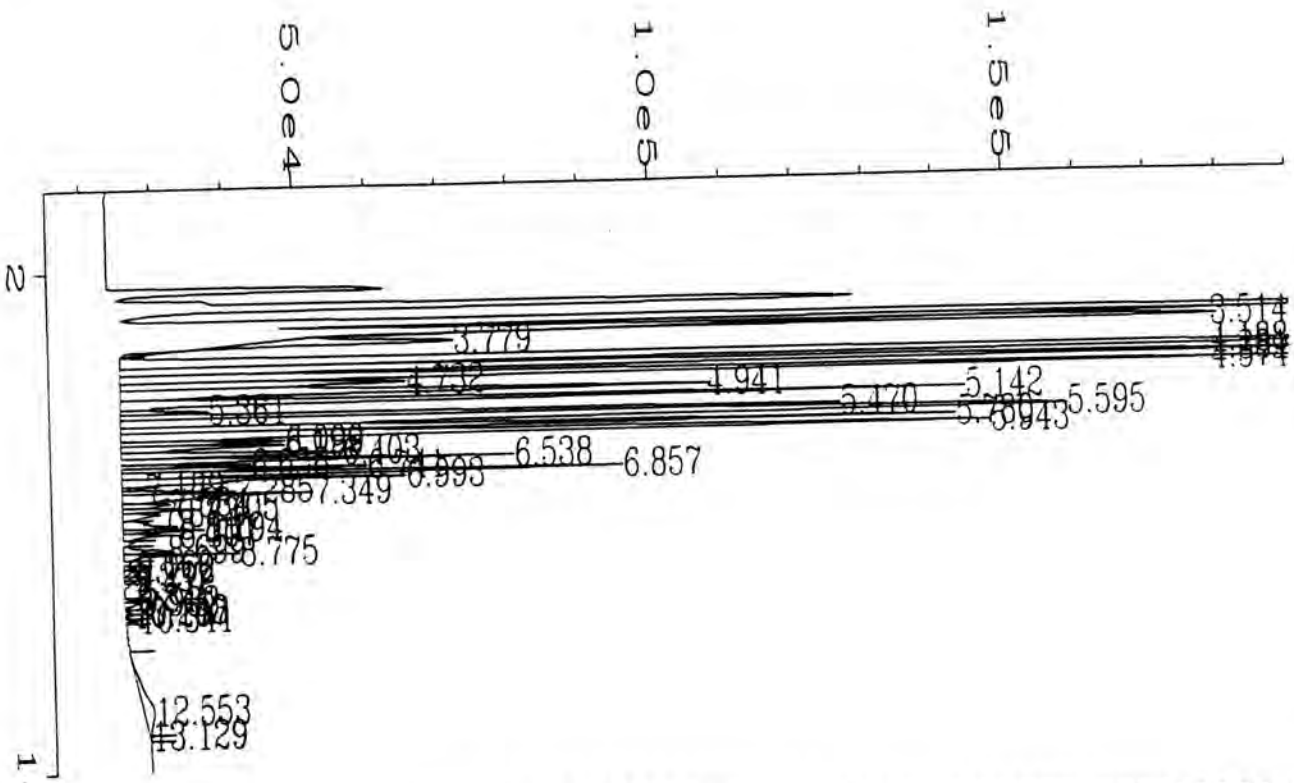
Sig. 1 in C:\HPCHEM\1\DATA\TET11-04\NV-F0113.D

Pk#	Ret Time	Area	Height	Type	Width	Area %
1	3.363	770914	140177	BV	0.092	6.1564
2	3.563	987588	134994	PV	0.121	7.8867
3	3.829	347791	37841	VV	0.140	2.7774
4	4.239	1995310	308742	PV	0.105	15.9342
5	4.433	1128661	184929	VV	0.098	9.0133
6	4.626	969746	163903	VV	0.094	7.7442
7	4.784	284965	40333	VV	0.103	2.2757
8	4.993	583874	83597	VV	0.105	4.6627
9	5.195	588479	119892	VV	0.078	4.6995
10	5.413	60187	12445	VV	0.071	0.4806
11	5.522	428359	101773	VV	0.065	3.4208
12	5.648	1053229	134342	VV	0.123	8.4109
13	5.832	582408	120883	VV	0.073	4.6510
14	5.995	743601	124615	VV	0.086	5.9383

15	6.151	106177	24069	VV	0.066	0.8479
16	6.251	128848	23506	VV	0.080	1.0290
17	6.454	186204	31402	VV	0.097	1.4870
18	6.591	239191	56391	VV	0.065	1.9101
19	6.710	68592	18764	VV	0.055	0.5478
20	6.793	138525	35628	VV	0.060	1.1062
21	6.908	305650	72185	VV	0.064	2.4409
22	7.044	215767	42147	VV	0.073	1.7231
23	7.241	12512	3545	VV	0.053	0.0999
24	7.337	54940	16576	VV	0.050	0.4387
25	7.400	89558	27525	VV	0.049	0.7152
26	7.468	65434	11766	VV	0.093	0.5225
27	7.634	37307	6946	VV	0.081	0.2979
28	7.756	40031	11342	VV	0.053	0.3197
29	7.872	34283	5756	VV	0.081	0.2738
30	8.074	16826	3932	VV	0.071	0.1344
31	8.162	33542	8136	VV	0.062	0.2679
32	8.243	38662	12481	VV	0.052	0.3087
33	8.357	35213	8146	VV	0.083	0.2812
34	8.707	37717	6336	VV	0.085	0.3012
35	8.826	57130	17507	VV	0.048	0.4562
36	9.111	6121	1761	VV	0.053	0.0489
37	9.204	12234	2568	VV	0.066	0.0977
38	9.387	4394	1277	VV	0.051	0.0351
39	9.461	6353	1733	VV	0.055	0.0507
40	9.895	4937	2029	PV	0.039	0.0394
41	9.984	10688	2366	VV	0.064	0.0854
42	10.194	2425	909	VV	0.044	0.0194
43	10.256	2901	1125	VV	0.043	0.0232
44	10.390	4885	2047	PV	0.040	0.0390

Total area = 1.25222E+007

==========



Area Percent Report

Data File Name : C:\HPCHEM\1\DATA\TET11-04\NV-F0114.D
Operator : BGP
Instrument : FID
Sample Name : Green'sTex SVE-1
Run Time Bar Code:
Acquired on : 11 Nov 94 04:18 PM
Report Created on: 18 Nov 94 06:04 AM

Page Number : 1
Vial Number :
Injection Number :
Sequence Line :
Instrument Method: BTEX-GEN.MTH
Analysis Method : BTEX-GEN.MTH

Sig. 1 in C:\HPCHEM\1\DATA\TET11-04\NV-F0114.D

Pk#	Ret Time	Area	Height	Type	Width	Area %
1	3.514	5385	67088	BV	0.036	0.0505
2	3.779	203767	30033	PV	0.112	1.9091
3	4.188	2004395	311230	PV	0.104	18.7795
4	4.381	1132109	186092	VV	0.098	10.6069
5	4.574	970917	164943	VV	0.094	9.0967
6	4.732	283853	40292	VV	0.103	2.6595
7	4.941	583105	84158	VV	0.104	5.4632
8	5.142	587468	120560	VV	0.078	5.5041
9	5.361	60435	12353	VV	0.072	0.5662
10	5.470	429042	102257	VV	0.065	4.0198
11	5.595	1063394	133908	VV	0.125	9.9631
12	5.780	571678	121041	VV	0.072	5.3561
13	5.943	741284	124160	VV	0.086	6.9452
14	6.099	103194	23579	VV	0.066	0.9668

15	6.199	125572	23163	VV	0.079	1.1765
16	6.403	184086	31170	VV	0.084	1.7247
17	6.538	237578	56503	VV	0.065	2.2259
18	6.658	67811	18631	VV	0.055	0.6353
19	6.741	137732	35524	VV	0.059	1.2904
20	6.857	304929	71853	VV	0.064	2.8569
21	6.993	212836	41726	VV	0.073	1.9941
22	7.189	11628	3343	VV	0.052	0.1089
23	7.285	55724	16422	VV	0.052	0.5221
24	7.349	149432	27488	VV	0.091	1.4001
25	7.584	35763	6884	VV	0.079	0.3351
26	7.705	38792	11172	VV	0.053	0.3634
27	7.823	32753	5498	VV	0.086	0.3069
28	8.111	49272	7909	VV	0.087	0.4616
29	8.194	37249	12111	VV	0.051	0.3490
30	8.307	34026	7988	VV	0.061	0.3188
31	8.699	34816	6397	VV	0.086	0.3262
32	8.775	51943	16878	VV	0.046	0.4867
33	9.060	5930	1716	VV	0.053	0.0556
34	9.152	8703	2011	VV	0.072	0.0815
35	9.337	3746	1129	VV	0.050	0.0351
36	9.412	5845	1636	VV	0.054	0.0548
37	9.845	4809	1926	PV	0.042	0.0451
38	9.933	10039	2332	VV	0.062	0.0941
39	10.143	2768	954	VV	0.048	0.0259
40	10.207	2851	1076	VV	0.044	0.0267
41	10.341	4558	1912	PV	0.062	0.0427
42	12.553	81212	1483	PV	0.669	0.7609
43	13.129	893	189	VB	0.068	0.0084

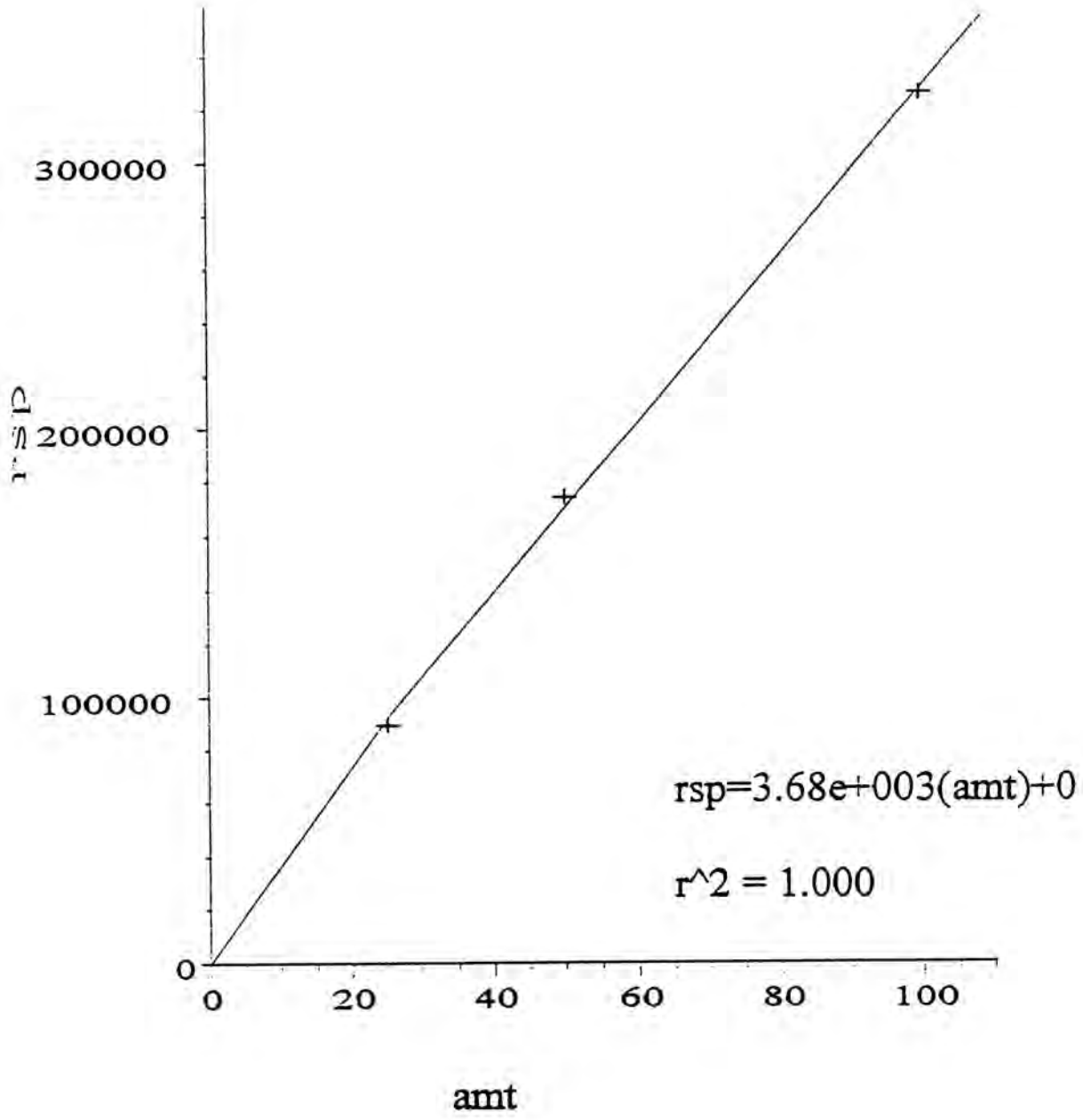
Total area = 1.06733E+007

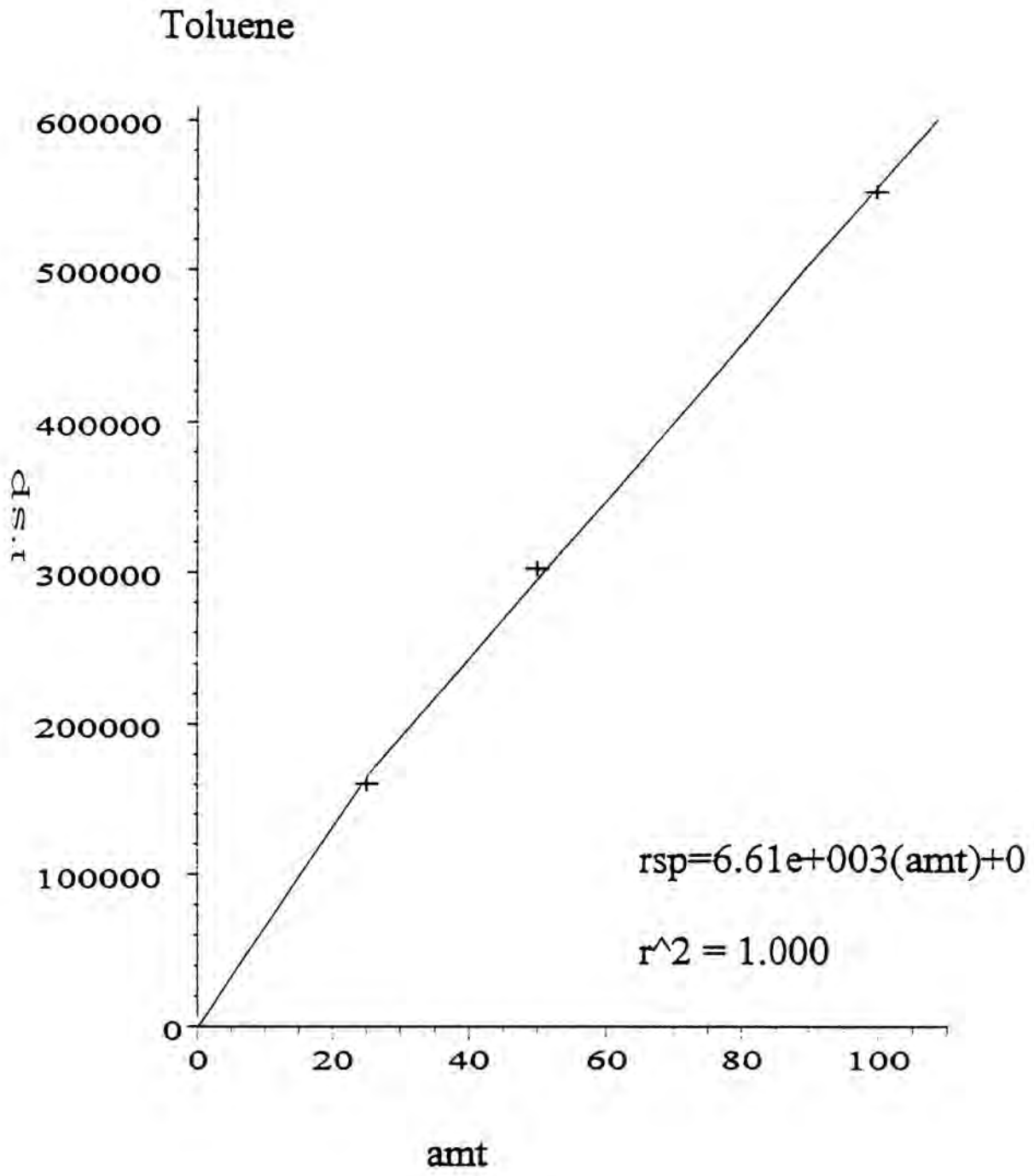
==========

Curve # 1

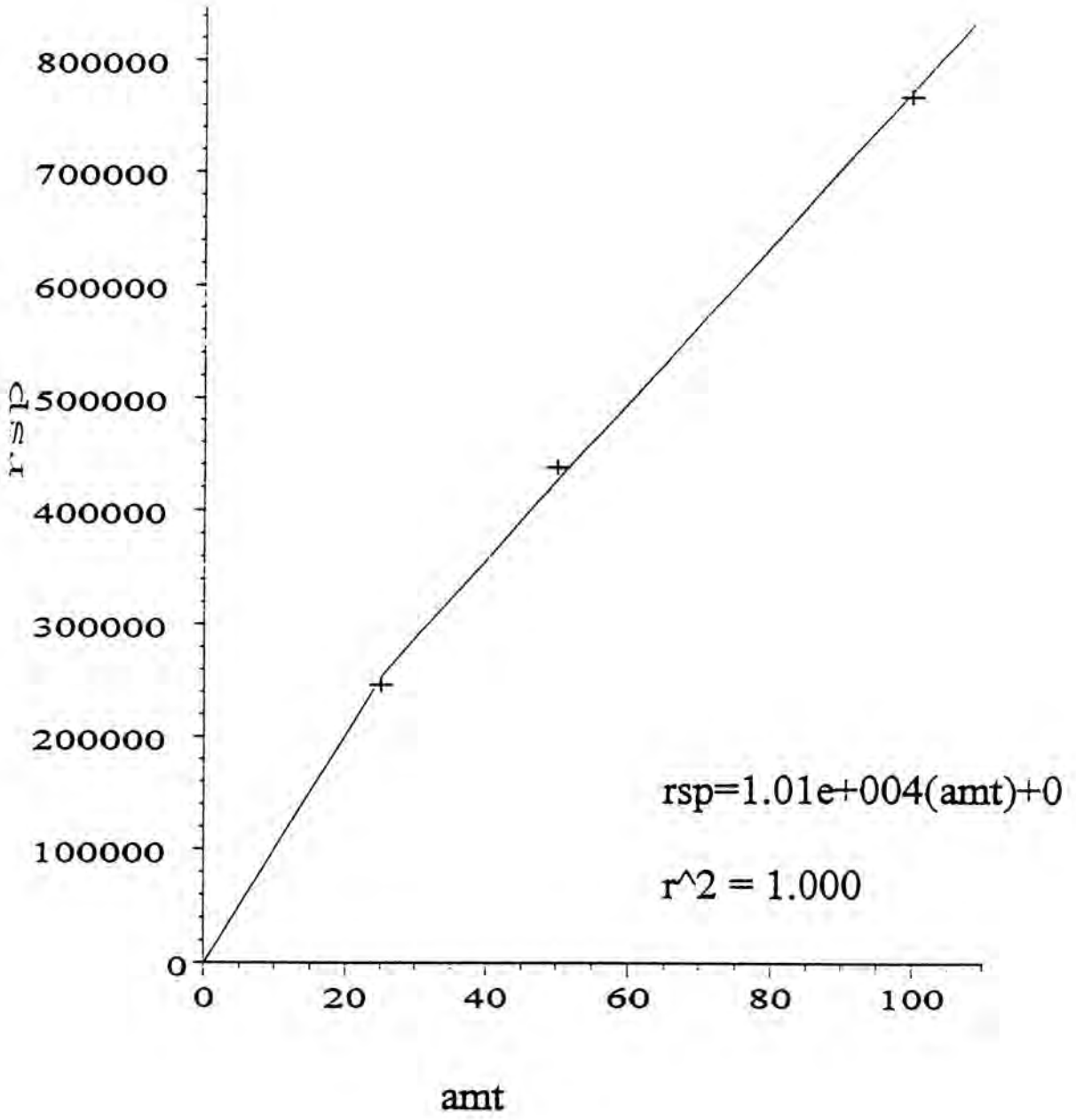
ENTHALPY analytical, inc.

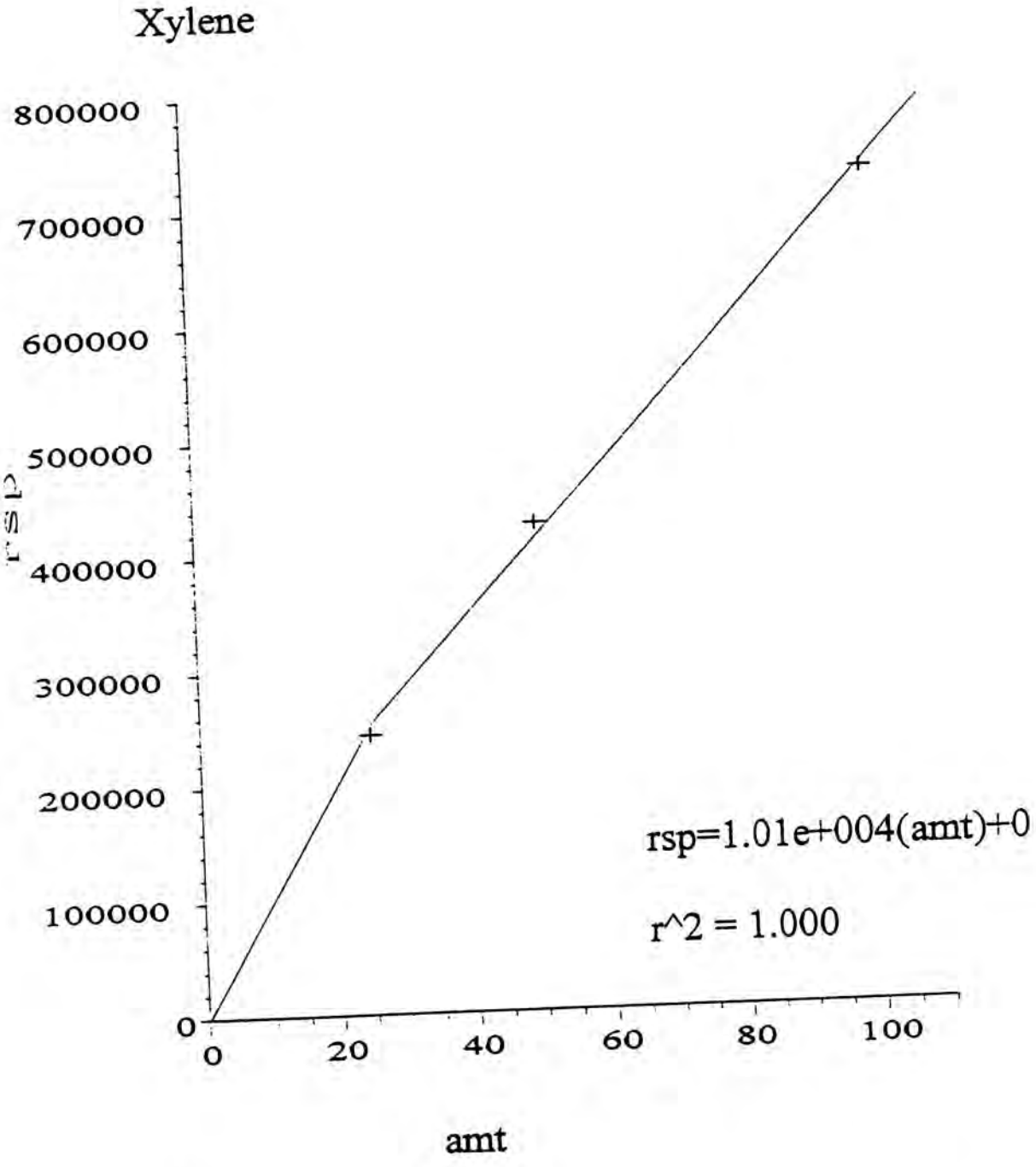
Benzene

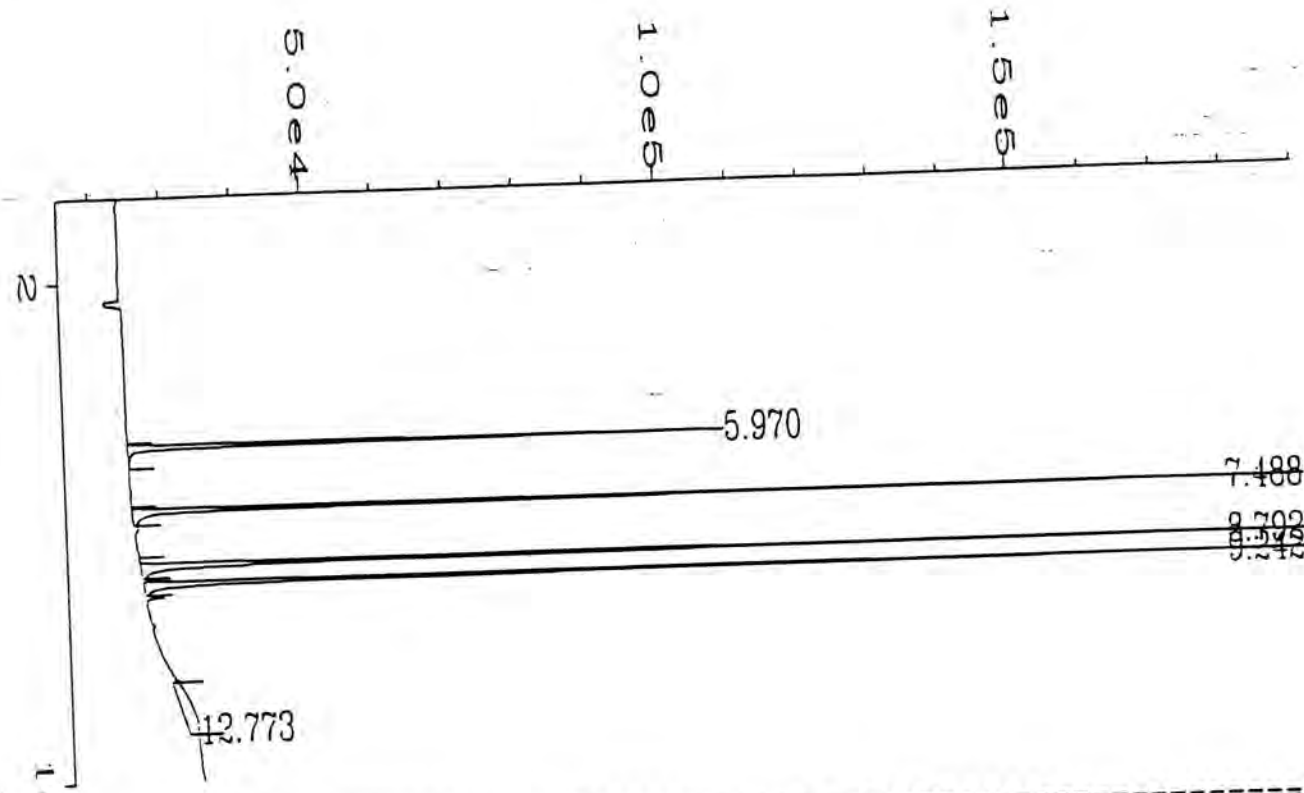

300000
200000
100000
0
0
20
40
60
80
100
rsp
amt
rsp=3.68e+003(amt)+0
r^2 = 1.000


Toluene
600000
500000
400000
300000
200000
100000
0
rsp
0
20
40
60
80
100
amt
rsp=6.61e+003(amt)+0
r^2 = 1.000

Ethyl benzene




Xylene
800000
700000
600000
500000
400000
300000
200000
100000
0
rsp
0
20
40
60
80
100
amt
rsp=1.01e+004(amt)+0
r^2 = 1.000



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External Standard Report

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Data File Name : C:\HPCHEM\1\DATA\tet11-04\NV-F0104.D
Operator : BGP
Instrument : FID
Sample Name : 100ppm BTEX STD
Run Time Bar Code:
Acquired on : 11 Nov 94 11:58 AM
Report Created on: 11 Nov 94 03:56 PM
Last Recalib on : 11 NOV 94 03:47 PM
Multiplier : 1

Page Number : 1
Vial Number :
Injection Number :
Sequence Line :
Instrument Method: BTEX-GEN.MTH
Analysis Method : BTEX-GEN.MTH
Sample Amount : 0
ISTD Amount :

Sig. 1 in C:\HPCHEM\1\DATA\tet11-04\NV-F0104.D

Ret Time	Area	Type	Width	Ref#	ng/ul	Name
5.970	322169	BB	0.060	1	98.143	Benzene
7.488	546369	BV	0.117	1	98.287	Toluene
8.792	771425	PV	0.083	1	99.587	Ethyl benzene
9.242	737244	VV	0.039	1	100.734	Xylene

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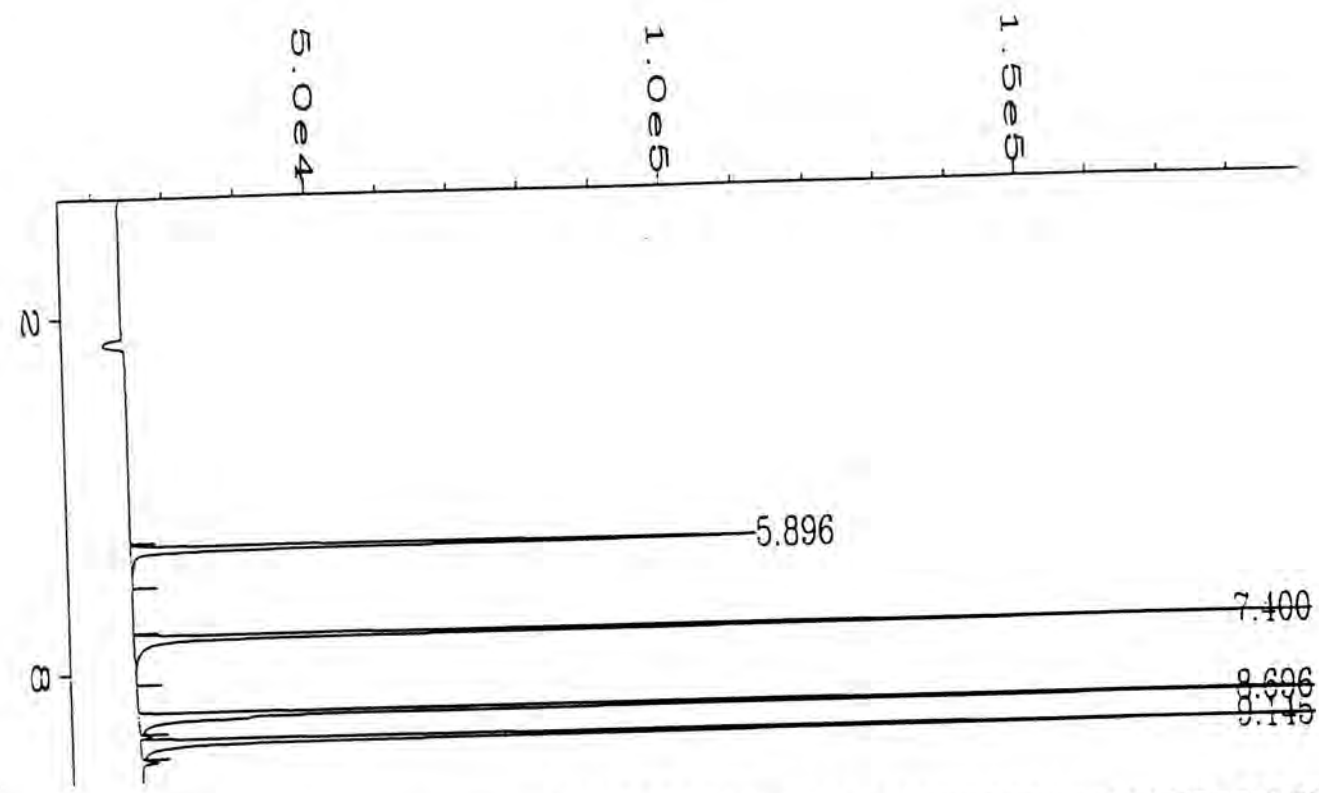
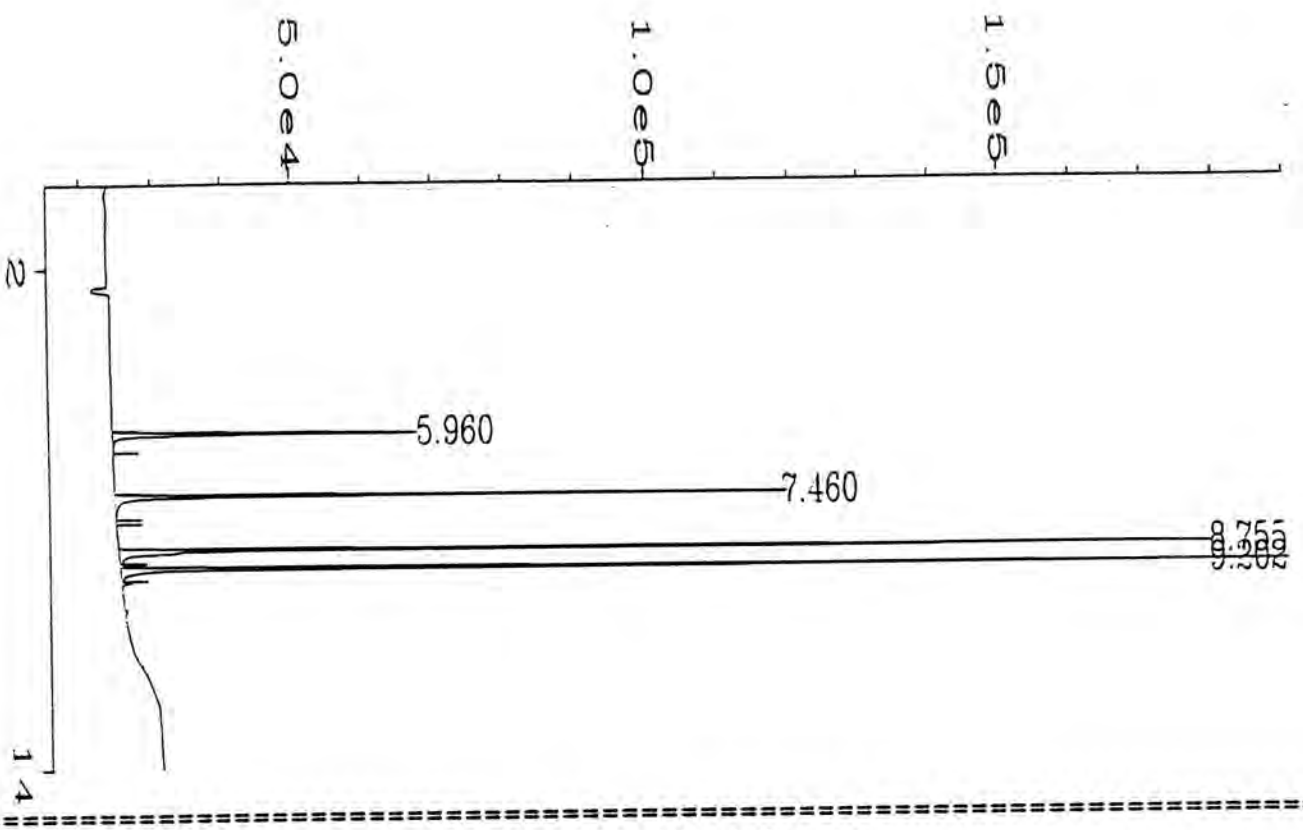


External Standard Report

Data File Name	: C:\HPCHEM\1\DATA\tet11-04\NV-F0112.D	Page Number	: 1
Operator	: BGP	Vial Number	:
Instrument	: FID	Injection Number	:
Sample Name	: 100ppm BTEX STD	Sequence Line	:
Run Time Bar Code:		Instrument Method	: BTEX-GEN.MTH
Acquired on	: 11 Nov 94 03:36 PM	Analysis Method	: BTEX-GEN.MTH
Report Created on	: 11 Nov 94 03:59 PM	Sample Amount	: 0
Last Recalib on	: 11 NOV 94 03:47 PM	ISTD Amount	:
Multiplier	: 1		

Sig. 1 in C:\HPCHEM\1\DATA\tet11-04\NV-F0112.D

Ret Time	Area	Type	Width	Ref#	ng/ul	Name
5.896	331115	BB	0.059	1	100.987	Benzene
7.400	559363	BV	0.043	1	100.785	Toluene
8.696	769718	PV	0.081	1	99.341	Ethyl benzene
9.145	719423	VV	0.037	1	97.951	Xylene



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External Standard Report

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Data File Name	: C:\HPCHEM\1\DATA\tet11-04\NV-F0105.D		
Operator	: BGP	Page Number	: 1
Instrument	: FID	Vial Number	:
Sample Name	: 50ppm BTEX STD	Injection Number	:
Run Time Bar Code:		Sequence Line	:
Acquired on	: 11 Nov 94 12:21 PM	Instrument Method	: BTEX-GEN.MTH
Report Created on	: 11 Nov 94 03:56 PM	Analysis Method	: BTEX-GEN.MTH
Last Recalib on	: 11 NOV 94 03:47 PM	Sample Amount	: 0
Multiplier	: 1	ISTD Amount	:

Sig. 1 in C:\HPCHEM\1\DATA\tet11-04\NV-F0105.D

Ret Time	Area	Type	Width	Ref#	ng/ul	Name
5.960	161746	BB	0.059	1	47.140	Benzene
7.460	281630	BB	0.046	1	47.391	Toluene
8.755	411459	BV	0.054	1	47.737	Ethyl benzene
9.202	402151	VV	0.039	1	48.400	Xylene

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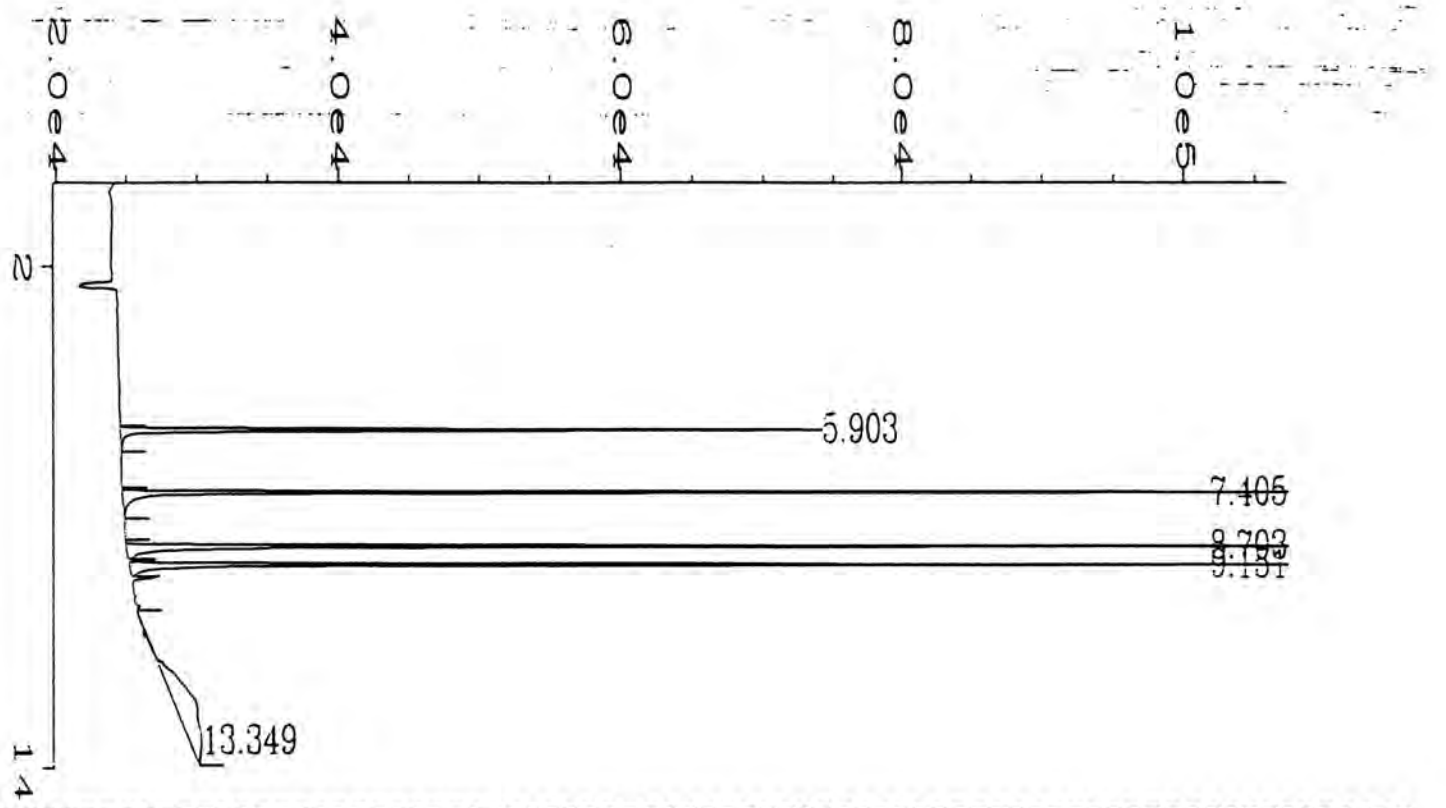
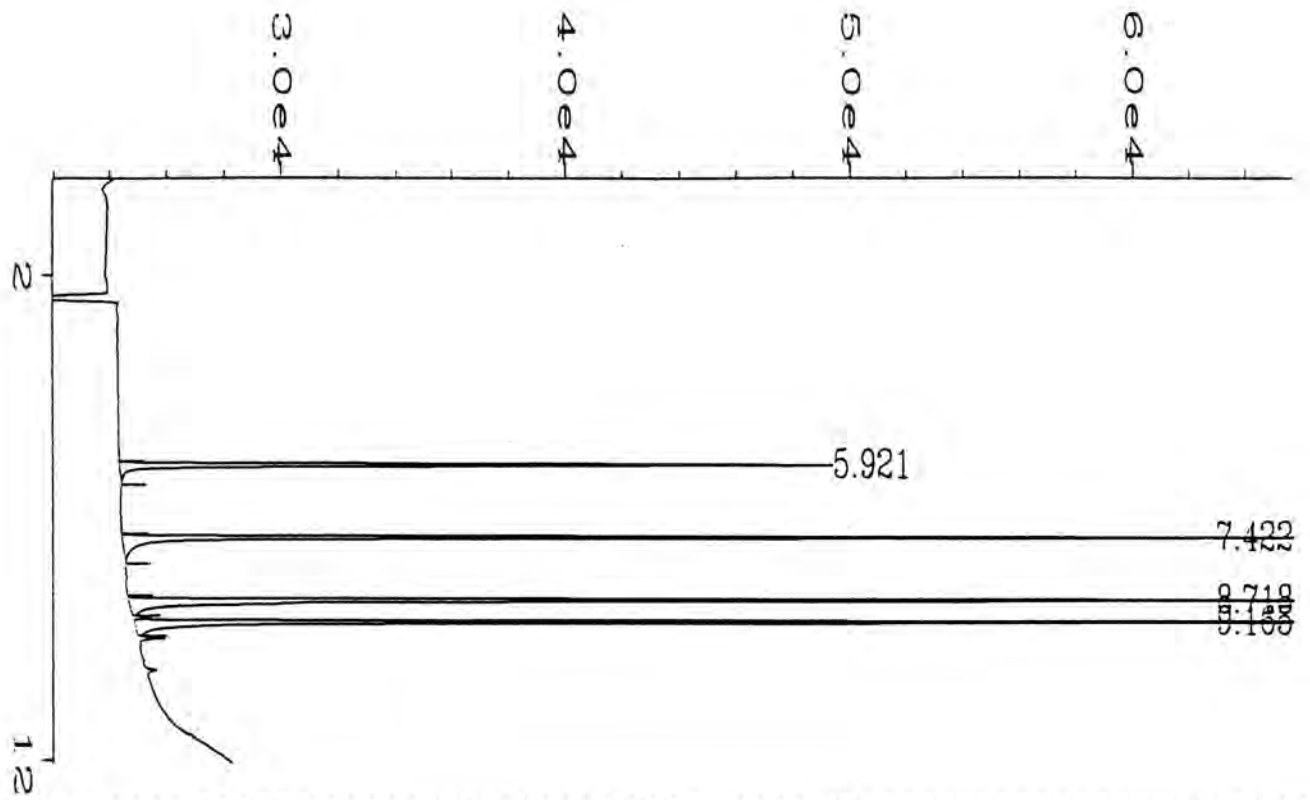


External Standard Report

Data File Name	: C:\HPCHEM\1\DATA\tet11-04\NV-F0106.D		
Operator	: BGP	Page Number	: 1
Instrument	: FID	Vial Number	:
Sample Name	: 50ppm BTEX STD	Injection Number	:
Run Time Bar Code:		Sequence Line	:
Acquired on	: 11 Nov 94 01:32 PM	Instrument Method	: BTEX-GEN.MTH
Report Created on	: 11 Nov 94 03:57 PM	Analysis Method	: BTEX-GEN.MTH
Last Recalib on	: 11 NOV 94 03:47 PM	Sample Amount	: 0
Multiplier	: 1	ISTD Amount	:

Sig. 1 in C:\HPCHEM\1\DATA\tet11-04\NV-F0106.D

Ret Time	Area	Type	Width	Ref#	ng/ul	Name
5.903	187941	BB	0.060	1	55.468	Benzene
7.405	323252	BB	0.046	1	55.392	Toluene
8.703	465203	BV	0.054	1	55.478	Ethyl benzene
9.151	447906	VV	0.039	1	55.546	Xylene



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External Standard Report

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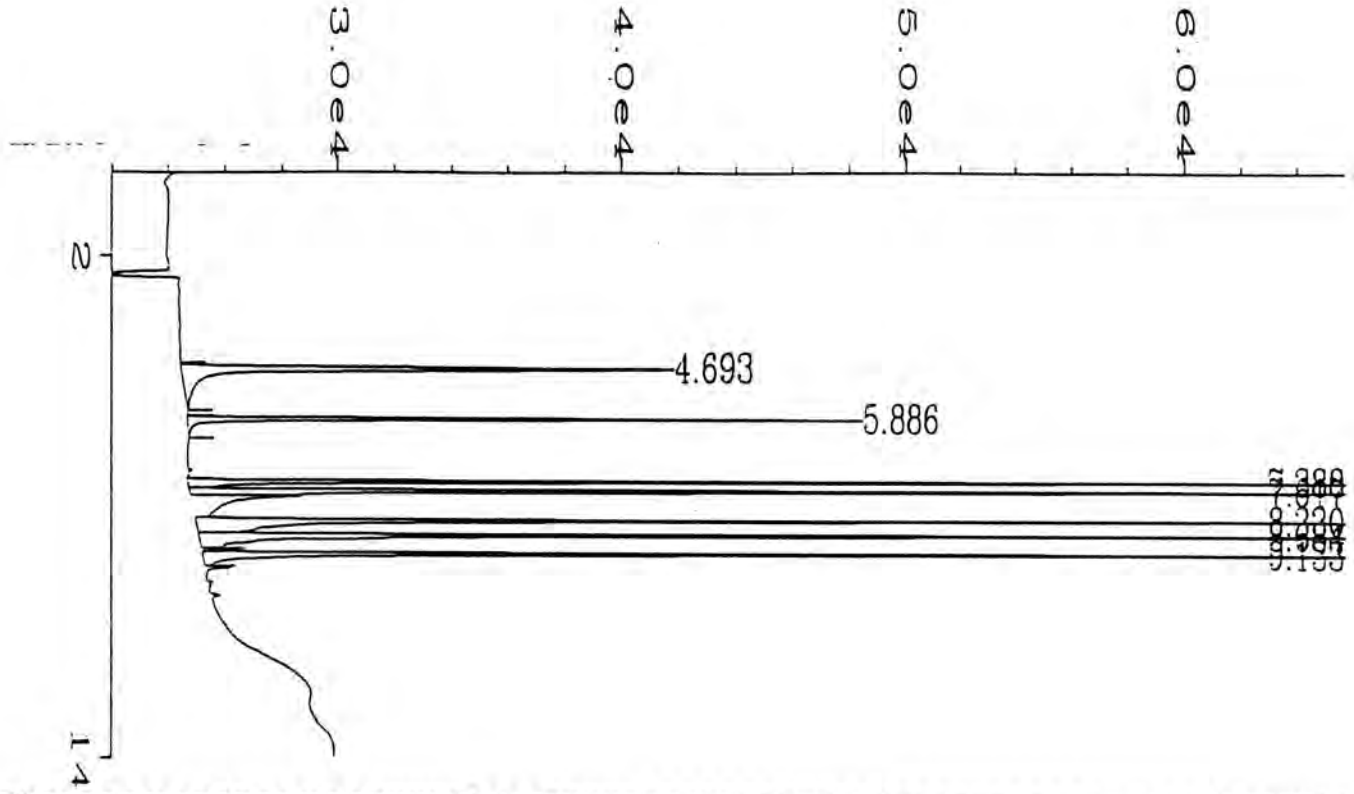
Data File Name	: C:\HPCHEM\1\DATA\tet11-04\NV-F0107.D		
Operator	: BGP	Page Number	: 1
Instrument	: FID	Vial Number	:
Sample Name	: 25ppm BTEX STD	Injection Number	:
Run Time Bar Code:		Sequence Line	:
Acquired on	: 11 Nov 94 01:55 PM	Instrument Method	: BTEX-GEN.MTH
Report Created on	: 11 Nov 94 03:57 PM	Analysis Method	: BTEX-GEN.MTH
Last Recalib on	: 11 NOV 94 03:47 PM	Sample Amount	: 0
Multiplier	: 1	ISTD Amount	:

Sig. 1 in C:\HPCHEM\1\DATA\tet11-04\NV-F0107.D

Ret Time	Area	Type	Width	Ref#	ng/ul	Name
5.921	93312	BB	0.059	1	25.383	Benzene
7.422	168069	BB	0.099	1	25.558	Toluene
8.718	259060	BV	0.054	1	25.784	Ethyl benzene
9.165	259730	VV	0.040	1	26.157	Xylene

==========



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External Standard Report

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Data File Name	: C:\HPCHEM\1\DATA\tet11-04\NV-F0109.D		
Operator	: BGP	Page Number	: 1
Instrument	: FID	Vial Number	:
Sample Name	: 25ppm BTEX STD	Injection Number	:
Run Time Bar Code:		Sequence Line	:
Acquired on	: 11 Nov 94 02:48 PM	Instrument Method	: BTEX-GEN.MTH
Report Created on	: 11 Nov 94 03:58 PM	Analysis Method	: BTEX-GEN.MTH
Last Recalib on	: 11 NOV 94 03:47 PM	Sample Amount	: 0
Multiplier	: 1	ISTD Amount	:

Sig. 1 in C:\HPCHEM\1\DATA\tet11-04\NV-F0109.D

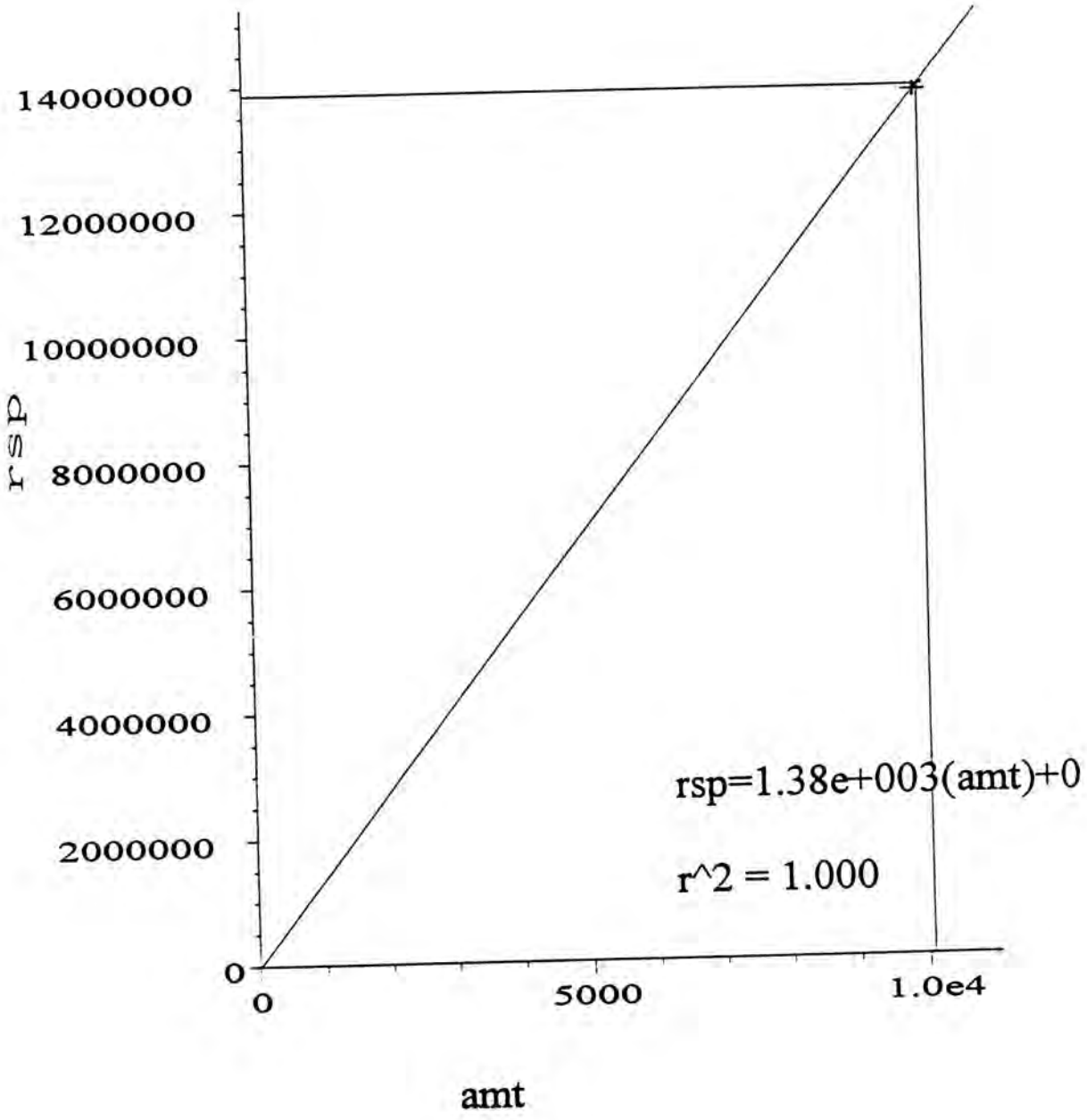
Ret Time	Area	Type	Width	Ref#	ng/ul	Name
5.886	91266	BB	0.059	1	24.772	Benzene
7.388	159571	PV	0.043	1	24.153	Toluene
8.684	268415	VV	0.045	1	27.132	Ethyl benzene
9.133	250241	VV	0.038	1	24.794	Xylene

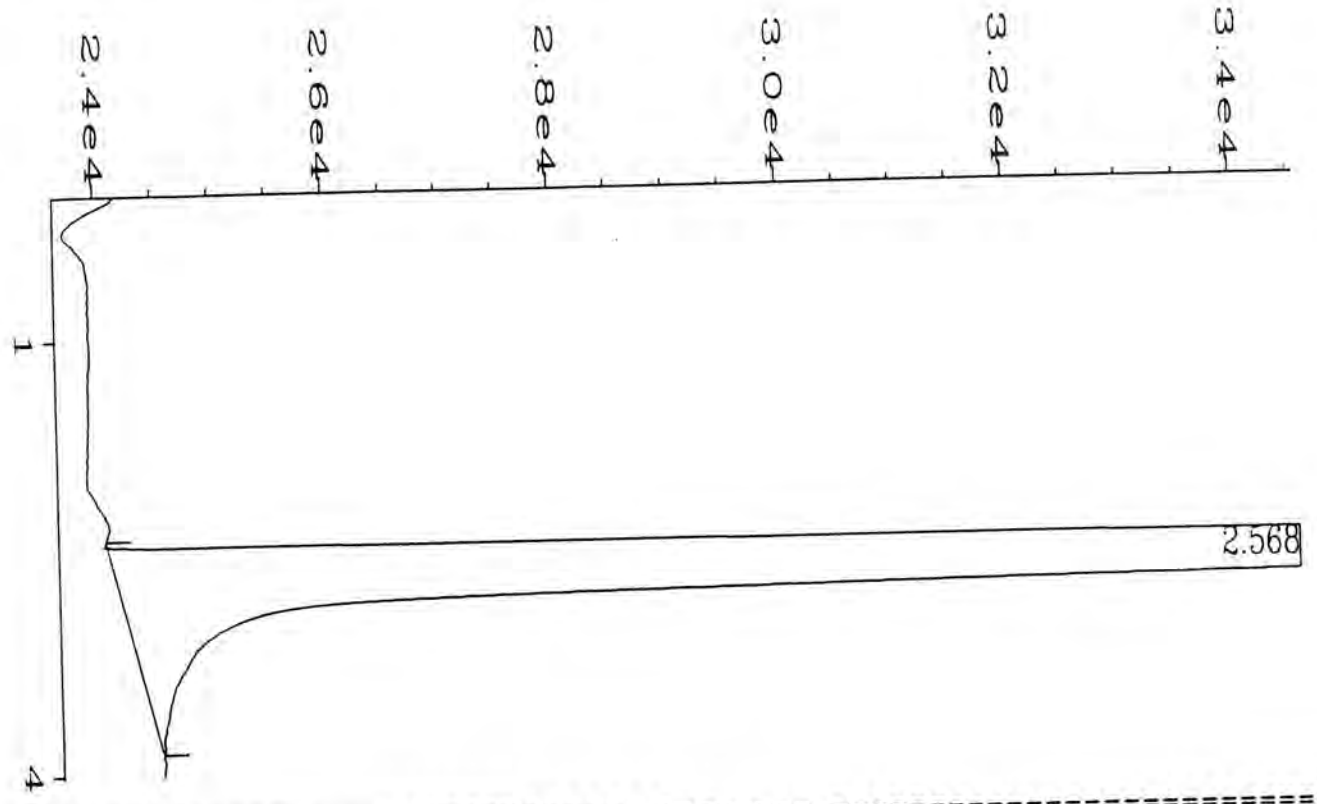
==========

Curve # 2

ENTHALPY analytical, inc.

Methane


14000000
12000000
10000000
8000000
6000000
4000000
2000000
0
rsp
0
5000
1.0e4
amt
rsp=1.38e+003(amt)+0
r^2 = 1.000



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External Standard Report

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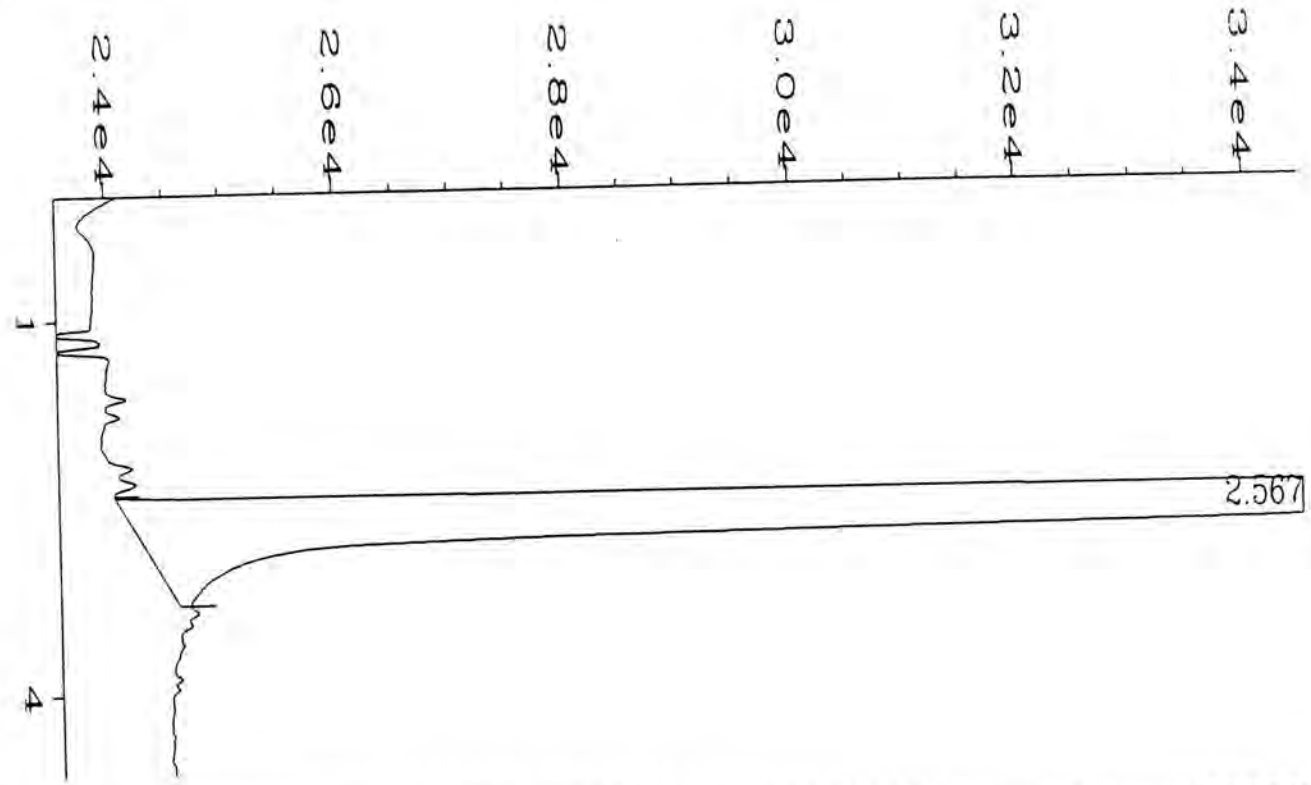
Data File Name : C:\HPCHEM\1\DATA\TET11-04\NV-F0102.D
Operator : BGP
Instrument : FID
Sample Name : 10000ppm Methane
Run Time Bar Code:
Acquired on : 11 Nov 94 11:27 AM
Report Created on: 18 Nov 94 06:00 AM
Last Recalib on : 18 Nov 94 05:59 AM
Multiplier : 1

Page Number : 1
Vial Number :
Injection Number :
Sequence Line :
Instrument Method: BTEX-GEN.MTH
Analysis Method : BTEX-GEN.MTH
Sample Amount : 0
ISTD Amount :

Sig. 1 in C:\HPCHEM\1\DATA\TET11-04\NV-F0102.D

Ret Time	Area	Type	Width	Ref#	ng/ul	Name
2.568	1.38847E+007	BV	0.137	1	10064.49	Methane

==========



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External Standard Report

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Data File Name : C:\HPCHEM\1\DATA\TET11-04\NV-F0101.D
Operator : BGP
Instrument : FID
Sample Name : 10000ppm Methane
Run Time Bar Code:
Acquired on : 11 Nov 94 11:20 AM
Report Created on: 18 Nov 94 06:00 AM
Last Recalib on : 18 Nov 94 05:59 AM
Multiplier : 1

Page Number : 1
Vial Number :
Injection Number :
Sequence Line :
Instrument Method: BTEX-GEN.MTH
Analysis Method : BTEX-GEN.MTH
Sample Amount : 0
ISTD Amount :

Sig. 1 in C:\HPCHEM\1\DATA\TET11-04\NV-F0101.D

Ret Time	Area	Type	Width	Ref#	ng/ul	Name
2.567	1.37068E+007	PV	0.137	1	9935.507	Methane

==========

HydroLogic Inc.
800-476-0913
803-750-0913
FAX 803-750-9505
0 Ashland Park Lane, Suite E • Columbia, SC 29210

HydroLogic - Columbia, South Carolina

CHAIN OF CUSTODY RECORD

SAMPLE ANALYSIS REQUIRED

LIENT:
Green's Texaco
Rock Hill, SC

MPLER(S) SIGNATURE:
Tom Spinek

PRESERVATION (CODE)

CODE: A - NONE
B - H2SO4
C - NaOH
D - HNO3
E - _____

LAB USE ONLY

SAMPLE ID (LOCATION)	DATE	TIME	WELL	SOLID	COMP	GRAB	# OF CONTAINERS	INORGANIC - SPECIFY	NUTRIENT - SPECIFY	METALS - SPECIFY	VOC-602	VOC - BTEX	VOC-601	TPH - SPECIFY	B/N - EXTRACTABLES	ACIDS - EXTRACTABLES	PESTICIDES	HERBICIDES	PCB'S	TOTAL PHENOL	COLIFORM - SPECIFY	TOXICITY - SPECIFY	CYANIDE	PROGRAM SC	REMARKS	LAB I.D.
Green's Texaco																										
SVE-1	11/10/94	1400										X		X											BTEX + TPH (as Methane)	

RELINQUISHED BY: (Sig.)	DATE/TIME	RECEIVED BY: (Sig)	RELINQUISHED BY: (Sig)	DATE/TIME	RECEIVED BY: (Sig.)
Tom Spinek	11/10/94	[signature] 11/11/94			
RELINQUISHED BY: (Sig.)	DATE/TIME	RECEIVED BY: (Sig)	RELINQUISHED BY: (Sig)	DATE/TIME	RECEIVED BY: (Sig)
LAB RECEIPT BY: (Sig.)	DATE/TIME	REMARKS:			

TET Environmental Services, Inc.

UST 17 Tech DOCKETING

February 28, 1996

Mr. Todd Adams, Hydrologist
Federal Section
Underground Storage Tank Program
Ground Water Protection Division
SCDHEC
2600 Bull Street
Columbia, S.C. 29201

Re: Green's Texaco
Rock Hill, S.C.
GWPD # 09344

Dear Mr. Adams:

Enclosed is a Receptor Survey and Monitoring Report for the above referenced site. We apologize for the delay in submitting this by your requested date. As detailed in the report, we had to make a trip to the site in February to locate wells which had been covered during work on-site. We appreciate your patience in this regard.

Upon reviewing the information please call at 699-1976 if you have any questions. Thank you.

Sincerely,

William Wimberly, P.G. #906

cc: Jerry Green
Mike Kirchhoff, Federated Insurance

9/91 data-analytical summarized here
7/93
4/94
12/95

RECEIVED
MAR 0 4 1996
Bureau of Underground Storage Tank Management

521 Clemson Road • Columbia, S.C. 29223 • (803) 699-1976, FAX (803) 699-9863

TET Environmental Services, Inc.

RECEPTOR SURVEY & MONITORING REPORT GREEN'S TEXACO - ROCK HILL, SC GWPD ID # 09344

February 29, 1996

William Wimberly, P.G.
S.C. # 906

521 Clemson Road • Columbia, S.C. 29223 • (803) 699-1976, FAX (803) 699-9863

TABLE OF CONTENTS

RECEPTOR SURVEY & MONITORING REPORT
GREEN'S TEXACO - ROCK HILL, SC
GWPD ID# 09344

INTRODUCTION

The following report is submitted by TET Environmental Services, Inc. (TET) on behalf of Mr. Jerry Green of Green's Oil Company. The purpose of the report is to document the results of data collected at the Green's Texaco site located in Rock Hill, S.C. In a letter dated November 27, 1995 Mr. Todd Adams of the South Carolina Department of Health and Environmental Control (SCDHEC) requested that ground-water samples be collected from all monitoring wells and analyzed for Benzene, Toluene, Ethyl-benzene, Xylenes, and Polynuclear Aromatic Hydrocarbon constituents along with a survey of sensitive receptors in the area of the site. This report is intended to satisfy this request.

The data was collected during December 11, 1995 and February 8, 1996 sampling episodes. During the December sampling event, monitor wells MW-3 and MW-4 could not be located, thus requiring a second site visit in February. During this second visit a metal detector was used to find MW-3 and MW-4. While MW-4 was measured and sampled, it was determined that MW-3 has been permanently destroyed. In addition to monitor well sampling and water level measurements, a receptor survey was conducted to identify any possible exposure pathways in the area surrounding the site. This report details the collection of water levels, ground water quality analyses, and the receptor survey.

DATA COLLECTION

Water Level Information

Water levels were measured in the monitoring wells on December 11, 1995. Figure 1, (Appendix I), is a potentiometric map of the surficial aquifer based on data collected during the December sampling event. The water levels for this event are summarized in Table 1, Appendix II.

The top of casing of each monitor well was previously surveyed to a referenced benchmark to determine the top of casing elevation. The top of casing elevations are combined with the water level measurements to determine water table elevations and ground-water flow direction. The deep well (PW-8) water level measurements were not used in the construction of the potentiometric maps as the well is screened in a different interval than the shallow wells. The hydraulic gradient in the surficial aquifer beneath the Green's Texaco site remained fairly constant as reported in previous reports. It was calculated to be 0.002 ft/ft in October, 1995 and .013 ft/ft in December. Ground-water flow continues to be toward the east-southeast.

Ground-Water Analysis

During December, 1995 and February, 1996 ground-water quality samples were collected from 7 of the 8 monitor wells on-site and analyzed for Benzene, Toluene, Ethyl-benzene, Xylene, and Polynuclear Aromatic Hydrocarbons. A ground-water sample was not

collected from MW-3 due to recent damage to the well which has rendered it inoperable. Figure 2, Appendix I is a total BTEX concentration map constructed based on the ground-water results for the December and February sampling events. Figure 3 is a MTBE concentration map from the same dates. The analytical results are summarized in Table 2, Appendix II. In addition to the concentrations of chemicals shown on these figures and Table 2, Naphthalene was also present in MW-1 at 460 ppb. A copy of the laboratory report and chain of custody is included in Appendix III.

RECEPTOR SURVEY

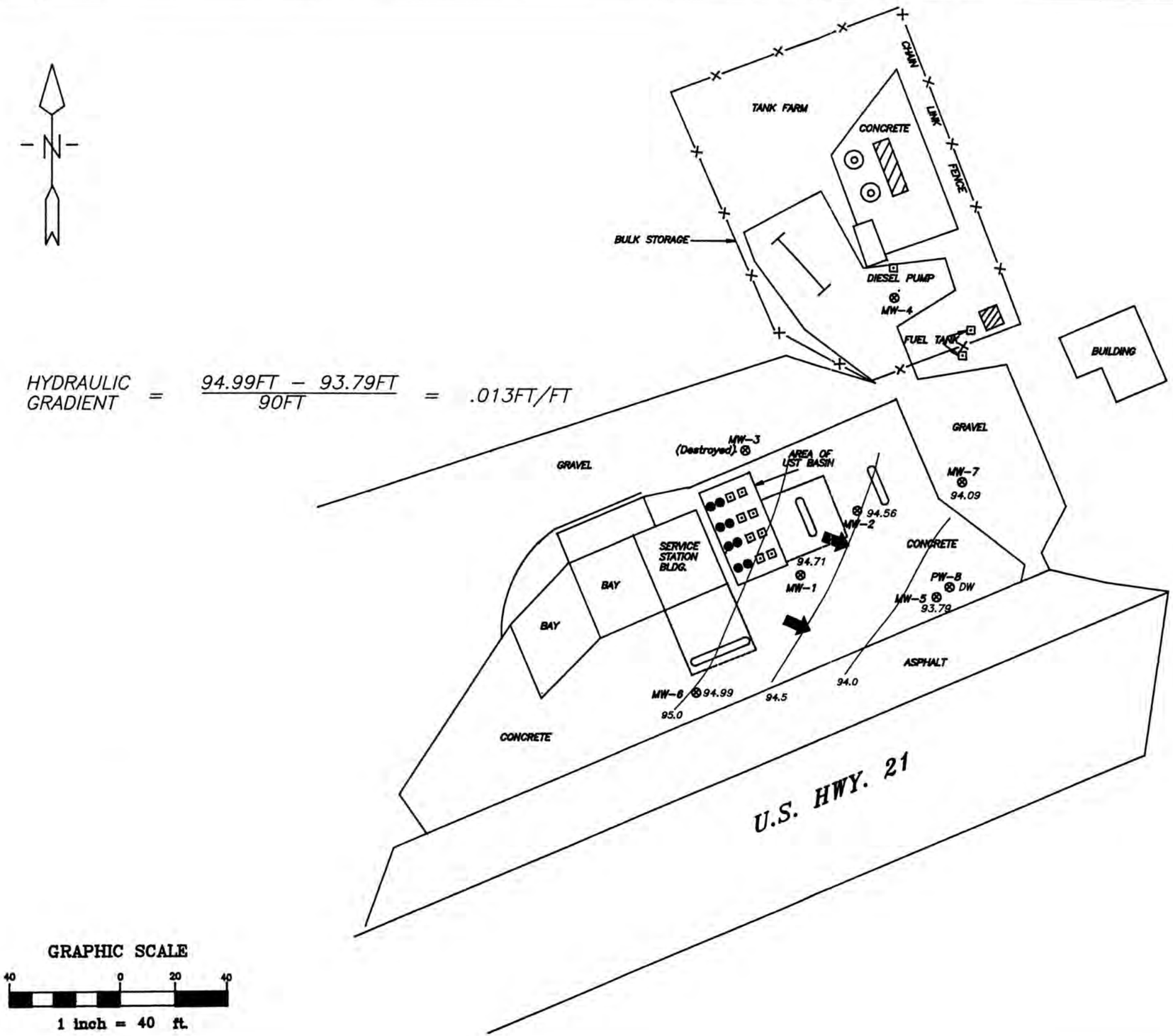
A receptor survey was conducted to identify any possible exposure pathways in the area surrounding the site. Findings of the receptor survey indicate that a private well serving two businesses is located approximately 400 feet (east) downgradient from the site. Persons at Jim's Satellite and T&S Auto Sales when interviewed advised that the well was being used for drinking water. The depth of the well was not known. In addition, a well that is not being used is located on the Green's Texaco property. It reportedly has been filled. A completed Tier 1 form detailing additional findings of the receptor survey is contained in Appendix II of this report.

CONCLUSIONS AND RECOMMENDATIONS

The results of this monitoring event indicate that BTEX constituents and Naphthalene are primarily concentrated in the area of MW-1. These concentrations remain similar to those recorded over the last three to four years. The major factor observed from data

gathered in December and February was the increase and significant MTBE concentrations in wells MW-1, MW-2, MW-5, MW-7, and PW-8. As previously mentioned, MW-3 has been damaged beyond repair and thus water quality in the area north of the tank basin could not be determined at this time. Figure 3 shows the MTBE concentrations to be high in wells MW-1, MW-2, and MW-5, with well MW-7, the most easterly well, showing 240 ppb MTBE. A concentration exceeding 2000 ppb MTBE in MW-5 suggests that this contaminant is likely approaching off-site areas. MTBE is commonly an indicator of the leading edge of a hydrocarbon plume and thus concentrations of BTEX compounds may increase in the wells in the future.

It is recommended that work necessary to design and implement a corrective action system should begin as soon as possible. A drinking water well exists immediately downgradient of wells on the site with concentrations of MTBE above the Risk-Based Screening Levels (RBSL's) issued by the Department. The leading edge of the plume is likely to migrate off-site in the near future and may already have done so. Installation of additional monitor well(s) should also be considered to monitor impact outside of the Green's property.



$$\text{HYDRAULIC GRADIENT} = \frac{94.99\text{FT} - 93.79\text{FT}}{90\text{FT}} = .013\text{FT/FT}$$

LEGEND

- ⊗ Monitor Well
- × Fence
- Island
- Canopy
- Above Ground Horizontal Tank
- Above Ground Vertical Tank
- Loading Rack
- DW Deep Well
- Potentiometric Line C.I. = .5ft
- Ground Water Flow Direction

GRAPHIC SCALE

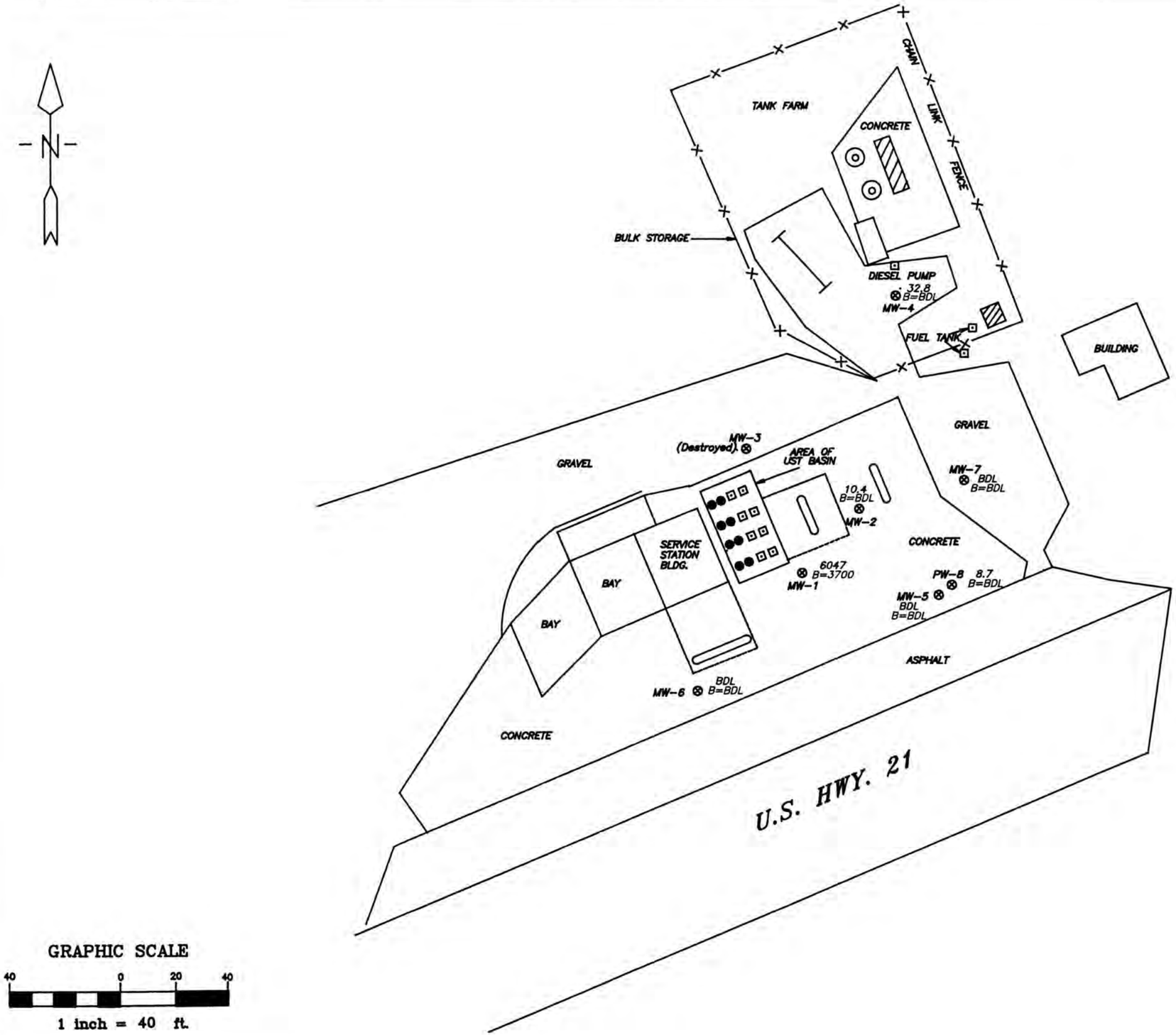
40 0 20 40

1 inch = 40 ft.

GREEN'S TEXACO
ROCK HILL, S.C.

Figure 1.

Potentiometric Map based on data collected on 12/11/95



LEGEND

⊗	Monitor Well
×	Fence
⬭	Island
□	Canopy
▨	Above Ground Horizontal Tank
⊙	Above Ground Vertical Tank
⊢⊣	Loading Rack
BDL	Below Detection Limit
B	Benzene
10.4	Total BTEX Concentration in ppb

GRAPHIC SCALE

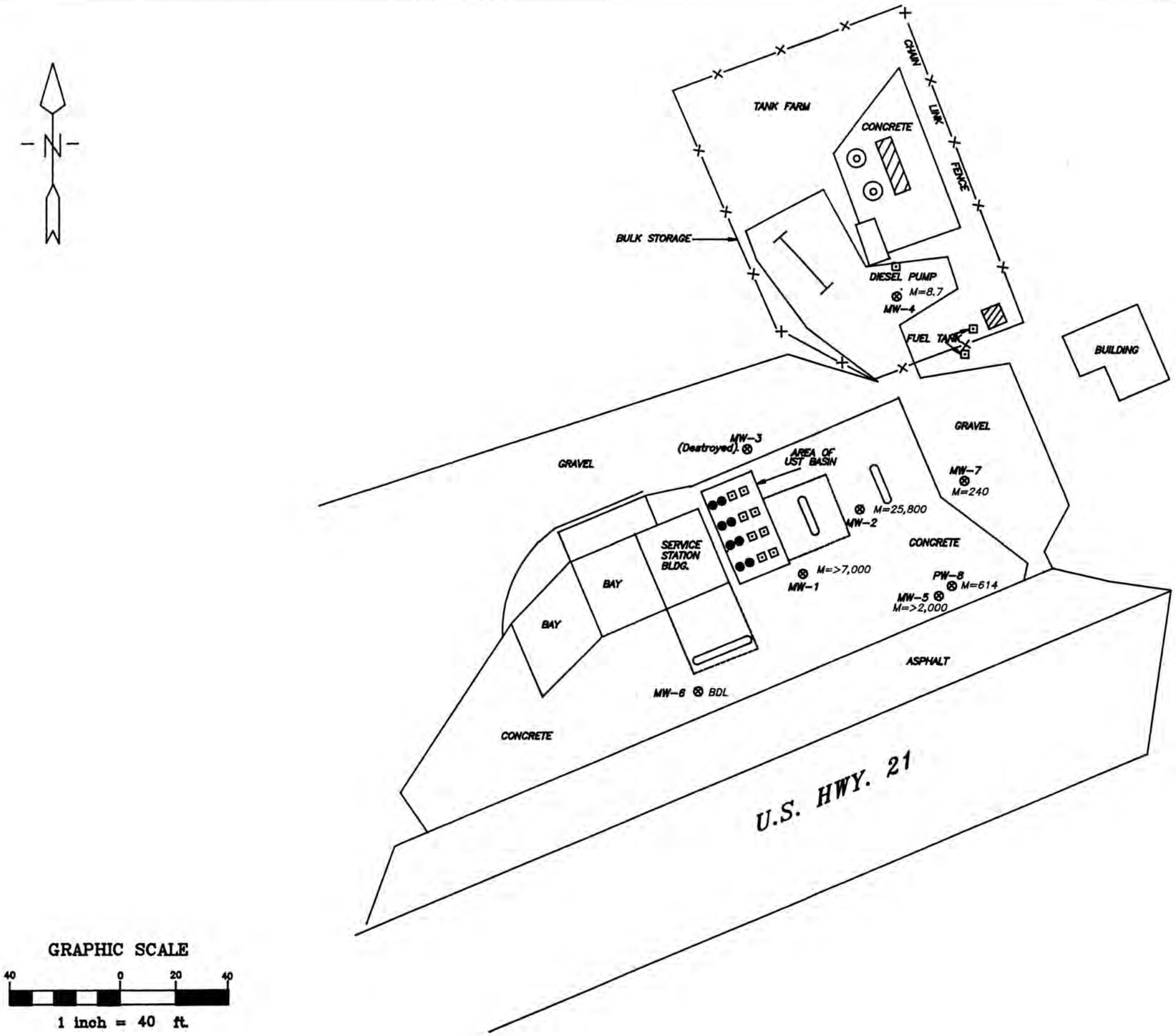
40 0 20 40

1 inch = 40 ft.

GREEN'S TEXACO
ROCK HILL, S.C.

Figure 2.

Total BTEX Concentrations based on data collected on 12/11/95 and 02/08/96



LEGEND

⊗	Monitor Well
×	Fence
⬭	Island
□	Canopy
▮	Above Ground Horizontal Tank
◎	Above Ground Vertical Tank
⊢⊣	Loading Rack
BDL	Below Detection Limit
M	Methyl-tert-butyl Ether in ppb

GRAPHIC SCALE

40 0 20 40

1 inch = 40 ft.

GREEN'S TEXACO
ROCK HILL, S.C.

Figure 3.

Total MTBE Concentrations based on data collected on 12/11/95 and 2/8/96

TABLE 1
GREEN'S TEXACO - ROCK HILL, SC
SUMMARY OF GROUND-WATER LEVELS (UNITS IN FEET)

WELL NO.	DATE MEASURED	TOC ELEVATION	TOC TO WL	WL ELEVATION
MW-1	09/26/91	98.15	7.04	91.11
	07/27/93	98.15	9.43	88.72
	04/20/94	98.15	4.03	94.12
	11/10/94	98.15	10.00	88.15
	12/11/95	98.15	3.44	94.71
MW-2	09/26/91	97.86	6.92	90.94
	07/27/93	97.86	9.27	88.59
	04/20/94	97.86	4.03	93.83
	11/10/94	97.86	9.85	88.01
	12/11/95	97.86	3.30	94.56
MW-3	09/26/91	98.96	7.96	91.00
	07/27/93	98.96	DRY	DRY
	04/20/94	98.96	4.52	94.44
	11/10/94	98.96	NL	NL
	12/11/95	98.96	*NL	*NL
MW-4	09/26/91	99.06	8.91	90.15
	07/27/93	99.06	11.27	87.79
	04/20/94	99.06	5.03	94.03
	11/10/94	99.06	11.85	87.21
	12/11/95	99.06	NM	NM
MW-5	09/26/91	97.04	6.71	90.33
	07/27/93	97.04	8.65	88.39
	04/20/94	97.04	3.79	93.25
	11/10/94	97.04	9.27	87.77
	12/11/95	97.04	3.25	93.79

TABLE 1
GREEN'S TEXACO - ROCK HILL, SC
SUMMARY OF GROUND-WATER LEVELS (UNITS IN FEET)

WELL NO.	DATE MEASURED	TOC ELEVATION	TOC TO WL	WL ELEVATION
MW-6	09/26/91	98.59	7.17	91.42
	07/27/93	98.59	9.36	89.23
	04/20/94	98.59	4.15	94.44
	11/10/94	98.59	9.56	89.03
	12/11/95	98.59	3.60	94.99
MW-7	09/26/91	97.23	6.80	90.43
	07/27/93	97.23	8.94	88.29
	04/20/94	97.23	3.78	93.45
	11/10/94	97.23	NL	NL
	12/11/95	97.23	3.14	94.09
PW-8	09/26/91	96.98	5.54	91.44
	07/27/93	96.98	6.32	90.66
	04/20/94	96.98	3.59	93.39
	11/10/94	96.98	7.80	89.18
	12/11/95	96.98	2.97	94.01

NL = Not Located
* = MW-3 permanently damaged as of 12/11/95

TABLE 2
GREEN'S TEXACO - ROCK HILL, SC
SUMMARY OF GROUND-WATER QUALITY ANALYSES

WELL NO.	DATE MEASURED	BENZENE UG/L	TOLUENE UG/L	ETHYL-BENZENE UG/L	XYLENES UG/L	TOTAL BTEX UG/L	MTBE UG/L
MW-1	09/26/91	800	1,100	600	3,650	4,250	2,300*
	07/27/93	5,720	384	354	1,850	8,308	1,060
	04/20/94	3,460	559	249	2,240	6,508	NA
	12/11/95	3,700	417	430	1,500	6,047	>7,000
MW-2	09/26/91	50*	4.8	<1	<1	54.8*	4,300
	07/27/93	69.7	6.61	<2.5	21.8	98.1	136
	04/20/94	14.6	3.79	<2.5	<7.5	18.4	NA
	12/11/95	BDL	BDL	6.1	4.3	10.4	25,800
MW-3	09/26/91	84	<10	<10	<10	84	47*
	07/27/93	NA	NA	NA	NA	NA	NA
	04/20/94	472	18.9	13.4	31.5	536	NA
	12/11/95	NA	NA	NA	NA	NA	NA

NA = Not Analyzed

* = Estimated Value

TABLE 2 (continued)
GREEN'S TEXACO - ROCK HILL, SC
SUMMARY OF GROUND-WATER QUALITY ANALYSES

WELL NO.	DATE MEASURED	BENZENE UG/L	TOLUENE UG/L	ETHYL-BENZENE UG/L	XYLENES UG/L	TOTAL BTEX UG/L	MTBE UG/L
MW-4	09/26/91	<20	<20	<20	<40	<100	200
	07/27/93	<2.5	<2.5	<2.5	<7.5	<15.0	<50
	04/20/94	<2.5	<2.5	<2.5	<7.5	<15.0	NA
	2/8/96	BDL	1.9	4.7	26.2	32.8	8.7
MW-5	09/26/91	<1	<1	<1	32	32	800
	07/27/93	<2.5	<2.5	<2.5	<7.5	<15.0	<50
	04/20/94	<2.5	<2.5	<2.5	<7.5	<15.0	NA
	12/11/95	BDL	BDL	BDL	BDL	BDL	>2,000
MW-6	09/26/91	<1	<1	<1	<2	<5	<5
	07/27/93	<2.5	<2.5	<2.5	<7.5	<15.0	<50
	04/20/94	<2.5	<2.5	<2.5	<7.5	<15.0	NA
	12/11/95	BDL	BDL	BDL	BDL	BDL	BDL

NA = Not Analyzed

* = Estimated Value

TABLE 2
GREEN'S TEXACO - ROCK HILL, SC
SUMMARY OF GROUND-WATER QUALITY ANALYSES

WELL NO.	DATE MEASURED	BENZENE UG/L	TOLUENE UG/L	ETHYL-BENZENE UG/L	XYLENES UG/L	TOTAL BTEX UG/L	MTBE UG/L
MW-7	09/26/91	<1	<1	<1	10.1	10.1	110
	07/27/93	<2.5	<2.5	<2.5	<7.5	<15.0	<50
	04/20/94	<2.5	<2.5	<2.5	10.1	10.1	NA
	12/11/95	BDL	BDL	BDL	BDL	BDL	240
PW-8	09/26/91	<5	<5	<5	<10	<25	535
	07/27/93	<2.5	<2.5	<2.5	<7.5	<15.0	<50
	04/20/94	<2.5	<2.5	<2.5	<7.5	<15.0	NA
	12/11/95	BDL	1.5	1.7	5.5	8.7	614

NA = Not Analyzed

* = Estimated Value

TIER 1 EVALUATION GREEN'S TEXACO - ROCK HILL, SC			
Potentially Exposed Population	**Exposure Route, Medium and exposure point**	**Pathway Selected for Evaluation**	**Reason for Selection or Non-Selection**
Off-site resident	Ingestion of ground water from impacted well	Yes	Private well located 400' downgradient from site
	Direct Contact with surface soil	??	No off-site soil samples collected
	Inhalation while showering	Yes	Private Well
	Dermal Contact While Showering	Yes	Unknown
	Inhalation of volatiles	Yes	Unknown
On-site resident	Ingestion of ground water from impacted well	No	No residents on site commercial establishment
	Direct Contact with surface soil	No	N/A
	Inhalation while showering	No	N/A
	Dermal Contact While Showering	No	N/A
	Inhalation of volatiles	No	N/A
Worker	Ingestion of ground water from impacted well	No	No water well located on-site
	Direct Contact with surface soil	Yes	On-site soil impacted
	Inhalation while showering	No	N/A
	Dermal Contact While Showering	No	N/A
	Inhalation of volatiles	Yes	Volatile emissions possible
Visitor	Ingestion of ground water from impacted well	No	No water well located on-site
	Direct Contact with surface soil	Yes	On-site soil impacted
	Inhalation while showering	No	N/A
	Dermal Contact While Showering	No	N/A
	Inhalation of volatiles	Yes	Volatile emissions possible

TET

TET Environmental Services, Inc.

February 20, 1997

Raw analytical data removed

Mr. Chuck Williams
Bureau of UST Management
SCDHEC
Columbia, SC 29201

Re: Green's Texaco, Site ID# 09344
Rock Hill, South Carolina

Dear Mr. Williams,

TET Environmental Services, Inc. has implemented the scope of work outlined in the SCDHEC letter dated September 10, 1996, for the referenced site. The results of the work completed are presented in the narrative below and the accompanying figures and tables. Previous work at the site includes a Hydrogeologic Assessment Report dated November 6, 1991 by TET Environmental Services.

RECEPTOR SURVEY

The Receptor Survey was completed on November 6, 1996. This survey did not reveal any public or private water supply wells within 1000 ft of the Green's Texaco site. Two previously reported downgradient water supply wells have been properly abandoned. The Catawba River is the only known potential receptor identified during this survey. The river is located approximately 3000 feet downgradient of the site. No free standing water was observed at the site.

INSTALLATION OF BORINGS

TET installed seven borings at the Green's Texaco site on November 6, 1996, in order to obtain

soil analytical data needed for the soil leachability model. The locations of the soil borings are presented in the site map shown in Figure 2. All soil borings were field screened for the presence of organic vapors using a Photo Ionization Detector (PID). Placement of the soil borings was determined in order to detect the presence of soil contamination around the tank basin and dispenser islands. Placement of the boring was also determined by the locations of the product lines and buried utilities. Soil borings SB-5 and SB-7 were placed in areas that had been reported to have high levels of groundwater contamination. Soil boring SB-2 and SB-3 were placed to detect contamination within the tank farm and around the kerosene dispenser. Borings SB-4 and SB-6 were placed to detect contamination around the outermost dispenser islands. Boring SB-1 was installed outside of the suspected source area and was analyzed for Total Organic Carbon (TOC). Soil samples collected from each of the soils boring were analyzed for BTEX and naphthalene using method 8020 and Total Petroleum Hydrocarbons (TPH) using method 3550. The results of the soil analyses are presented in Table 1. The soil analytical data indicate boring SB-5 to display concentrations of benzene (99.8 ug/kg) and naphthalene (1880 ug/kg) which are above the Risk-Based Screening Levels (RBSLs) for sandy soils. The remaining soil samples did not display detectable levels of contamination.

GROUNDWATER SAMPLE COLLECTION

TET conducted watertable measurements and collected groundwater samples in 6 monitoring wells. These wells were selected based upon their proximity to the source of contamination and groundwater flow direction. The watertable measurements are presented in Table 2. Based upon the watertable data, a potentiometric map was constructed and is shown in Figure 3. Groundwater samples collected from monitoring wells at the site were analyzed for concentrations of BTEX, naphthalene, MTBE, and PAHs. The analytical results are presented in Table 3 and Figure 4. These results indicate elevated levels of benzene (3040 ug/l), naphthalene (365 ug/l), and MTBE (2310 ug/l) in monitoring well MW-1 which exceed the RBSL for groundwater. Elevated MTBE concentrations were also found in MW-2 (24700 ug/l), MW-4 (70.4 ug/l), MW-5 (1720 ug/l), and PW-8 (547 ug/l). Monitoring wells MW-3 and MW-7 were found to have been destroyed and therefore were not sampled. Monitoring well MW-6 did not produce a sufficient amount of water for sampling.

SOIL LEACHABILITY MODEL

Soil boring data from boring SB-5 were used to calculate the soil leachability model. The bulk density, wetting front suction, soil hydraulic conductivity, porosity, and residual water content were determined based on the grain size analysis using Figures 1 through 5 of the SCDHEC Risk-Based Corrective Action for Petroleum Releases guidelines (RBCA). Since insufficient data exist at present, the average annual recharge was set at 25 cm. The results of the soil leachability model are shown in Appendix V. The results of the soil leachability model indicate that soil concentrations of BTEX and naphthalene will impact the groundwater quality at SB-5. Based on these results, Site-Specific Target Levels were calculated and are presented in Table 4.

FATE/TRANSPORT MODEL

Groundwater data from monitoring wells at the Green's Texaco site were used to estimate the movement of groundwater contamination. The AT123D Fate and Transport module within the APIDSS computer modeling program was used to estimate the movement of the worst case well concentrations. Based on the analysis of the groundwater data, monitoring well MW-1 was considered to be the worst case well. Groundwater samples collected from this well displayed elevated levels of benzene (3040 ug/l), naphthalene (365 ug/l) and MTBE (2310 mg/kg) which exceed the RBSLs for groundwater. Evaluation of the potentiometric data indicate the direction of groundwater movement is to the northeast. Results of the receptor survey indicate that a river located approximately 3000 ft (914.4 m) of MW-1 is the only downgradient receptor. The site is located in an area zoned for urban development with no restrictions precluding the future installation of a water supply well. Based on this information, Fate and Transport modeling was conducted to an exposure point established approximately 100 ft. (30.48 m) from MW-1 on the downgradient property boundary of this site. Input parameters used in the Fate and Transport modeling were determined using data collected during this and previous studies. These parameters are presented in Table 5A. Since the model was conducted assuming a constant release rate, the input levels of COC were calculated using a total tank volume of 4.5E4 L (12,000 gal) and an effective porosity of 0.50. Results of the Fate and Transport modeling are presented in Appendix VI and in Table 5B. Evaluation of the calculated results predict that maximum concentrations of benzene (0.189 ug/l) will impact the exposure point in 50 years at levels below the RBSL for benzene. Maximum concentrations of MTBE (8.86E-5 ug/l) will impact the exposure point in 40 years at levels below the RBSL for MTBE. Maximum concentrations of naphthalene will not impact the exposure point during the maximum modeling interval of 100 years.

In order to gain a better understanding of the potential impact of the groundwater naphthalene concentrations, the Domenico's equation was used. Since Domenico's equation does not take into consideration the natural degradation of COC over time, the impact concentrations will be elevated above the actual concentrations. Input data and the calculated results of the Domenico's equation modeling are presented in Table 6. Based on the results of the Domenico's equations it is predicted that the maximum concentrations of naphthalene (324.2 ug/l) will impact the exposure point in 518 years at levels above the RBSL for groundwater. Based on this result, the SSTL was calculated and is shown in Table 6. The calculated SSTL is based on the concentration level of naphthalene necessary at the source well (MW-1) to prevent naphthalene levels at the exposure point from exceeding the RBSL.

TIER 2 EVALUATION

A Tier 2 evaluation was conducted by TET on the Green's Texaco site using data collected during this and previous studies. Evaluation of the available data indicate that the results of the groundwater analysis displayed elevated levels of benzene, naphthalene, and MTBE above the RBSL in samples collected from monitoring well MW-1. Elevated levels of MTBE were also observed in MW-2, MW-4, MW-5, and PW-8. Fate and Transport modeling predict that the groundwater benzene and MTBE concentrations will not exceed the RBSL for groundwater at the

modeled exposure point. Fate and Transport modeling using Domenico's equations predicts that groudnwater naphthalene concentrations will impact the exposure point at levels which exceed the RBSL for groundwater. Evaluation of the soil data indicate elevated levels of BTEX, and naphthalene in soil boring SB-5. Results of the Soil Leachability model using data collected from SB-5 predict that the current BTEX and naphthalene levels in SB-5 will impact the groundwater above the RBSL for sandy soils. Based on this result the SSTLs for BTEX, and naphthalene were calculated for soils at boring SB-5.

Based on the results of this investigation, it is recommended that a corrective action plan be established to reduce the soil concentrations of BTEX and naphthalene near SB-5 to the calculated SSTL and to reduce the naphthalene concentrations in the groundwater. It is also recommended that monitoring of the groundwater at this site be continued to monitor the impact of contaminated soils on groundwater quality and to insure the continued decrease of benzene, naphthalene, and MTBE concentrations within the groundwater at the site. In addition, MTBE impact to groundwater quality has not been completely defined, it is therefore recommended that a Rapid Assessment be conducted at the site to determine the extent of groundwater quality alteration.

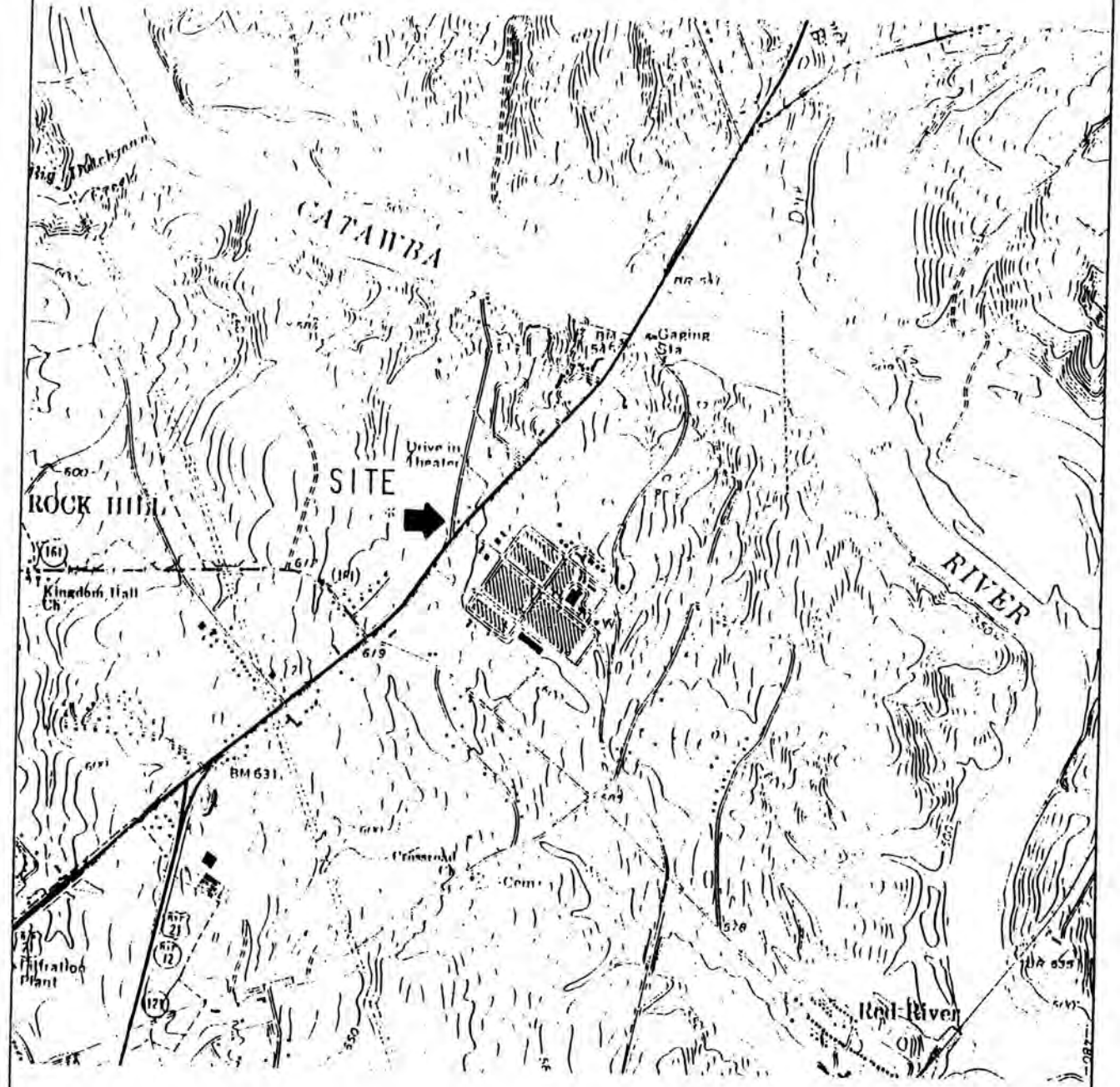
Sincerely,

William Schaeffer
Project Geologist

Dee O'Brien, P.G.
Senior Geologist

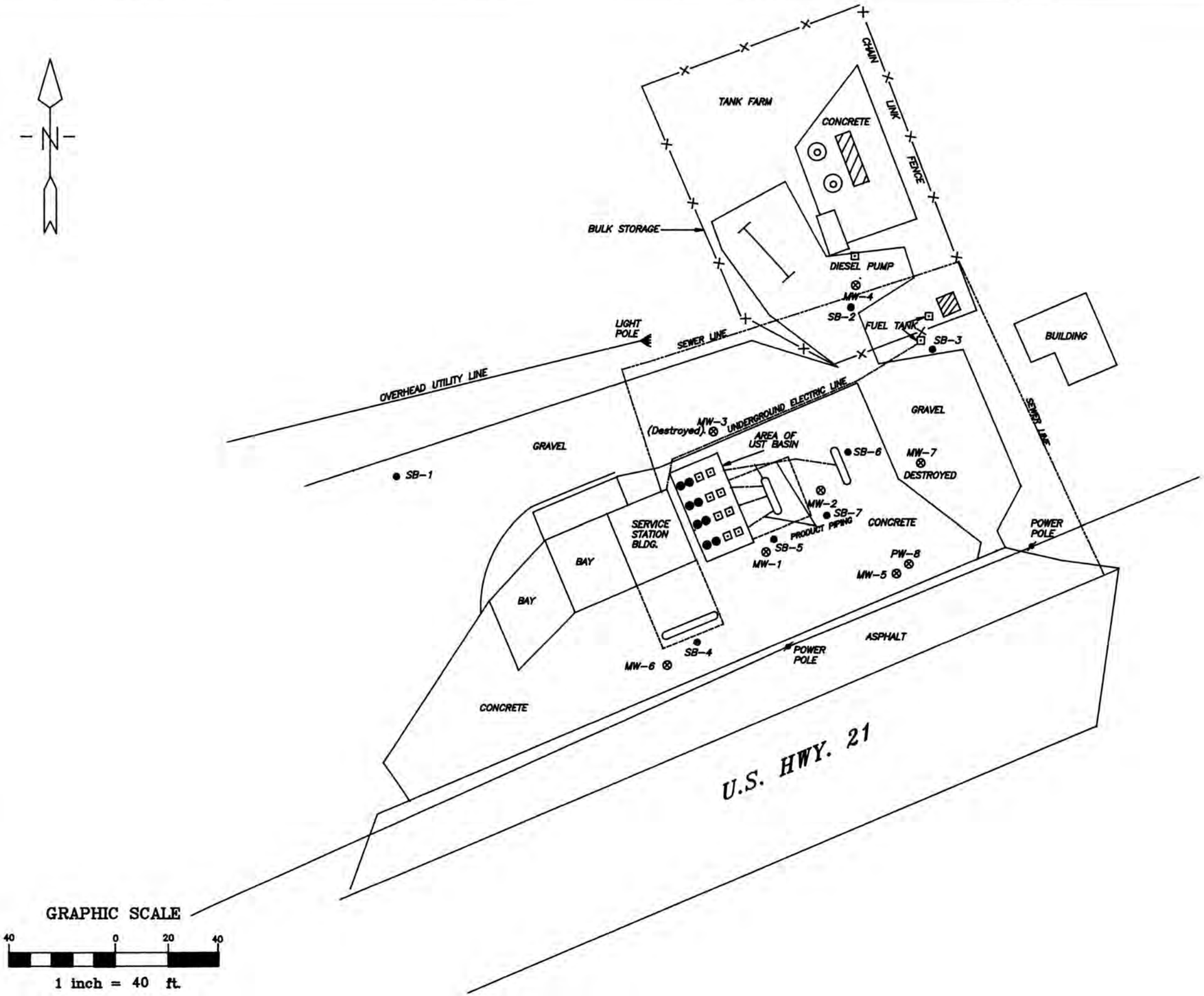
cc: Mr. Mike Kirchoff, Federated Insurance Company, 121 East Park Square, PO Box 328, Owatonna, MN 55060
Mr. Jerry Green, Green's Oil Company, 2849 Cherry Road, Rock Hill, SC 29730

GREEN'S TEXACO
ROCK HILL, S.C.



ROCK HILL EAST QUADRANGLE
7.5 MINUTE SERIES (TOPOGRAPHIC)

Figure 1. Site Location Map



LEGEND

- Monitor Well
- Fence
- Island
- Canopy
- Above Ground Horizontal Tank
- Above Ground Vertical Tank
- Loading Rack
- Soil Boring Location

GRAPHIC SCALE

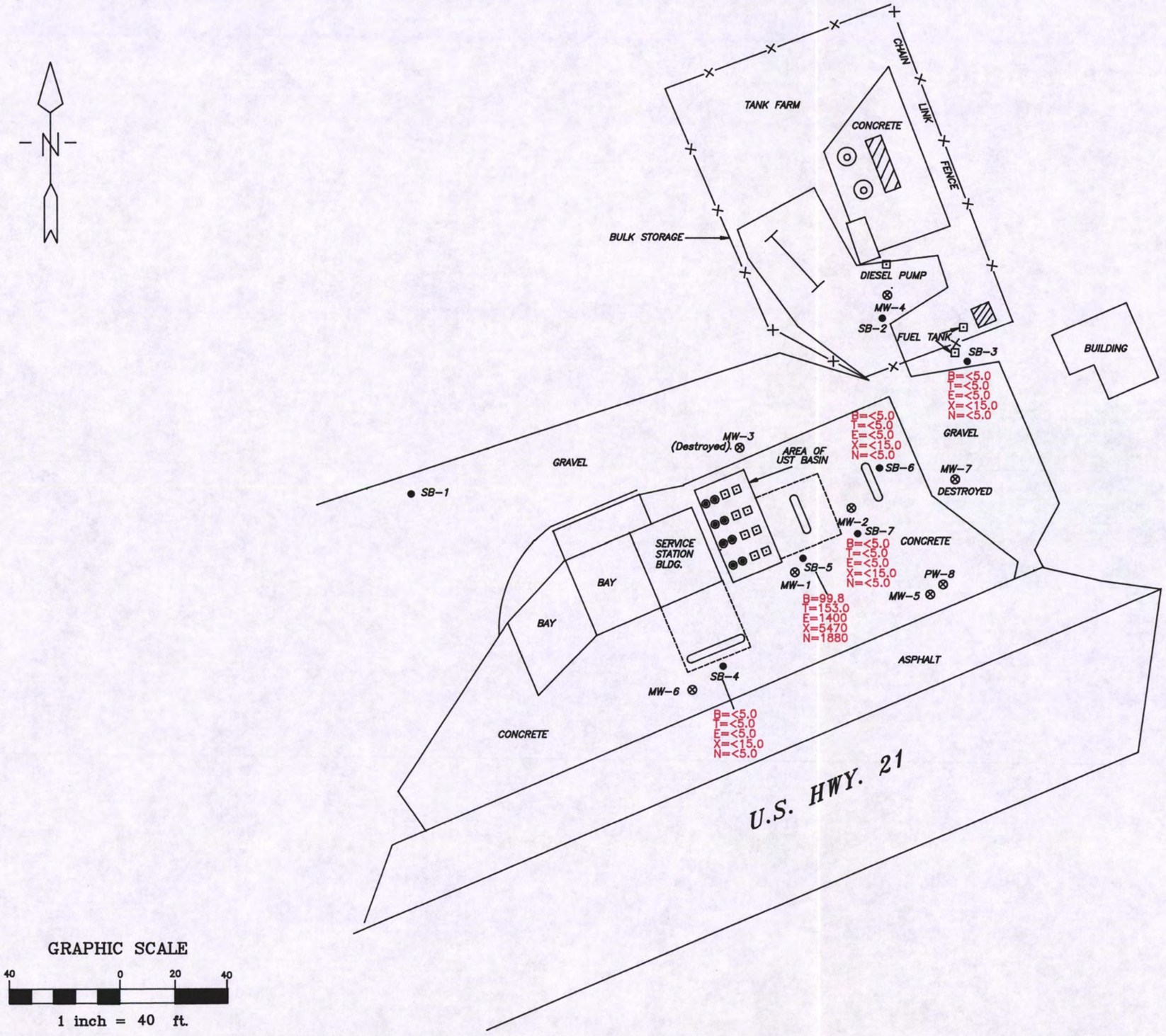
40 0 20 40

1 inch = 40 ft.

GREEN'S TEXACO
ROCK HILL, S.C.

Figure 2.

Site Map Showing Utilities, Monitor Wells and Soil Boring locations



LEGEND

⊗	Monitor Well
×	Fence
⬭	Island
▭	Canopy
▮	Above Ground Horizontal Tank
◎	Above Ground Vertical Tank
⊢⊣	Loading Rack
●	Soil Boring Location
B	Benzene (ppb)
T	Toluene (ppb)
E	Ethylbenzene (ppb)
X	Total Xylene (ppb)
N	Naphthalene (ppb)
TOC	Total Organic Carbons (ppm)

GRAPHIC SCALE

40 0 20 40

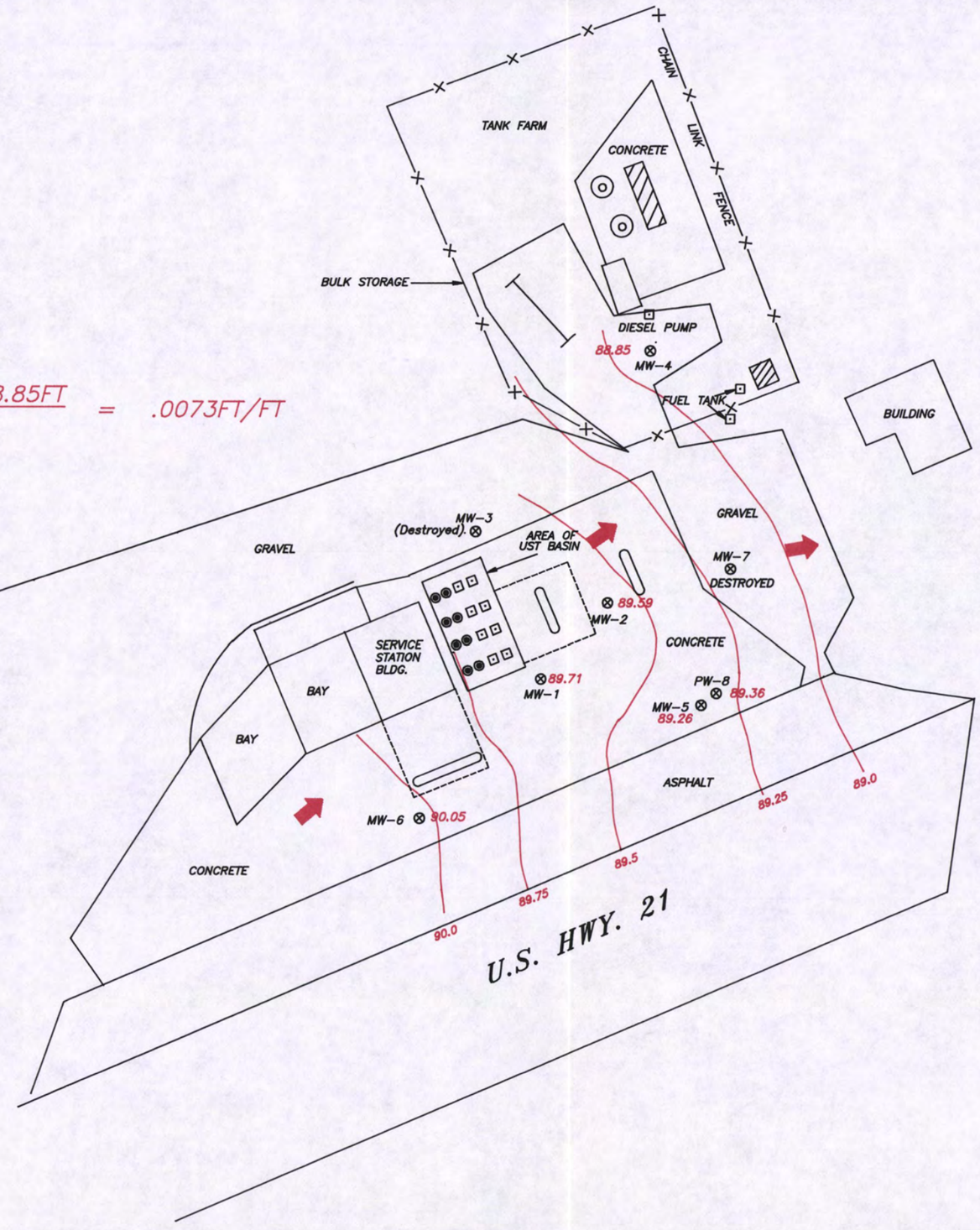
1 inch = 40 ft.

GREEN'S TEXACO
ROCK HILL, S.C.

Figure 3.

Soil Concentration Based on Data from 11/6/96

$$\text{HYDRAULIC GRADIENT} = \frac{90.05\text{FT} - 88.85\text{FT}}{164\text{FT}} = .0073\text{FT/FT}$$



LEGEND

- Monitor Well
- Fence
- Island
- Canopy
- Above Ground Horizontal Tank
- Above Ground Vertical Tank
- Loading Rack
- Potentiometric Line C.I. = .25ft
- Ground Water Flow Direction

GRAPHIC SCALE

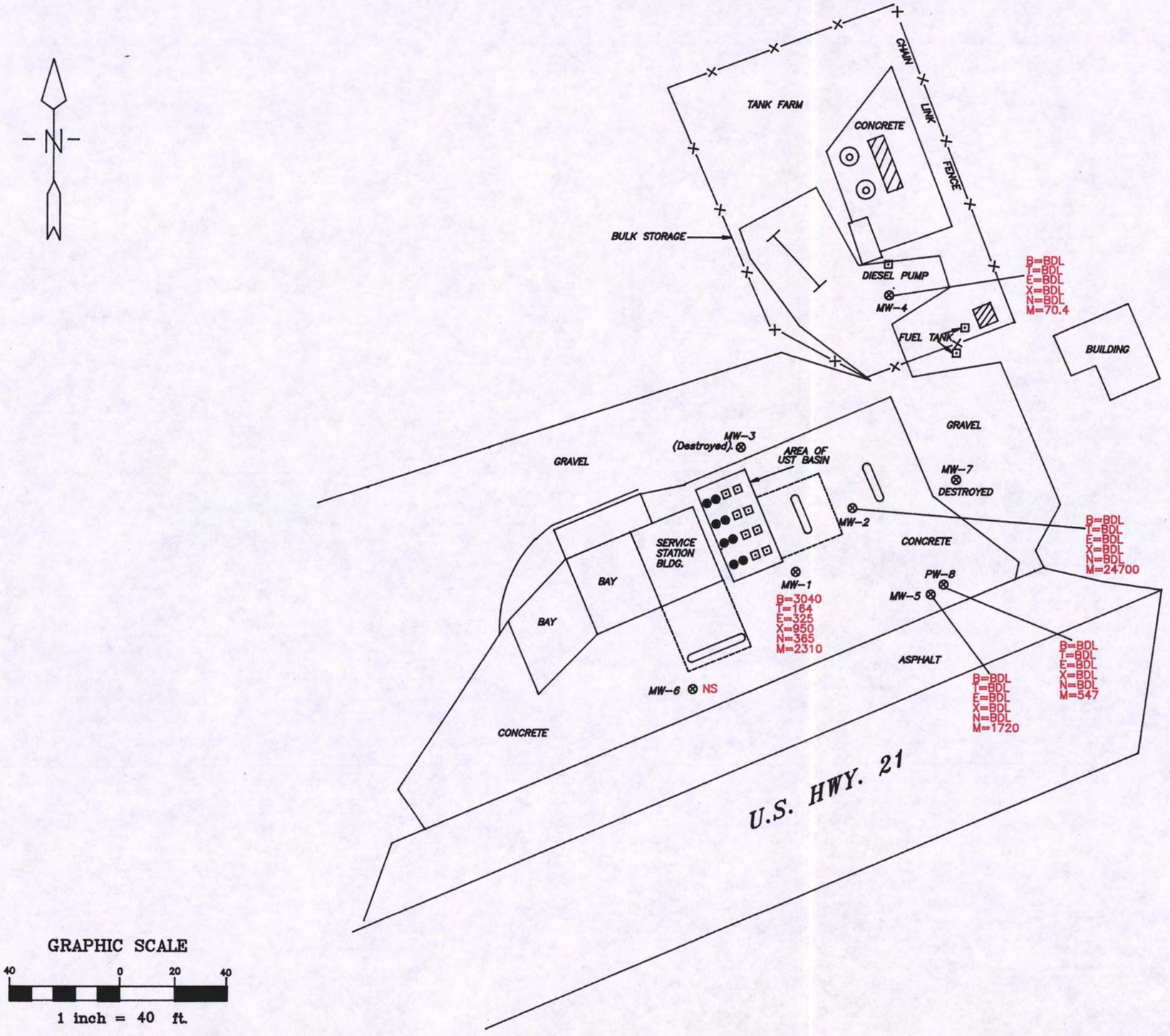
40 0 20 40

1 inch = 40 ft.

GREEN'S TEXACO
ROCK HILL, S.C.

Figure 4.

Potentiometric Map based on data collected on 10/24/96



LEGEND

⊗	Monitor Well
×	Fence
⬭	Island
☐	Canopy
▯	Above Ground Horizontal Tank
◎	Above Ground Vertical Tank
⊢⊣	Loading Rack
BDL	Below Detection Limit
NS	Not Sampled
B	Benzene (ppb)
T	Toluene (ppb)
E	Ethylbenzene (ppb)
X	Total Xylene (ppb)
N	Naphthalene (ppb)
M	MTBE (ppb)

GRAPHIC SCALE

40 0 20 40

1 inch = 40 ft.

GREEN'S TEXACO
ROCK HILL, S.C.

Figure 5.

Groundwater Concentrations of BTEX, Naphthalene, and MTBE Based on Data from 11/6/96

TABLE 1
GREEN'S TEXACO - ROCK HILL, SC
SUMMARY OF SOIL QUALITY ANALYSES

SOIL ID	DEPTH (FT)	DATE	BENZENE UG/KG	TOLUENE UG/KG	ETHYL-BENZENE UG/KG	TOTAL XYLENES UG/KG	NAPH-THALENE UG/KG	TPH 3550 MG/KG	TOC MG/KG
SB-1	5-7	11/05/96	-	-	-	-	-	-	101
SB-3	5-6	11/05/96	<5.0	<5.0	<5.0	<15.0	<5.0	-	N/A
SB-4	4-5	11/05/96	<5.0	<5.0	<5.0	<15.0	<5.0	-	N/A
SB-5	4-5	11/05/96	99.8	153.0	1400	5470	1880	<50.0	N/A
SB-6	4-5	11/05/96	<5.0	<5.0	<5.0	<15.0	<5.0	-	N/A
SB-7	4-5	11/05/96	<5.0	<5.0	<5.0	<15.0	<5.0	-	N/A
RBSL			7.0	1700	1500	44000	200	N/A	N/A

BDL = Below Detection Limit
Shaded blocks exceed Risk-Based Screening Levels (RBSLs)

TABLE 2
GREEN'S TEXACO - ROCK HILL, SC
SUMMARY OF GROUND-WATER SAMPLE ANALYSES

WELL NO.	DATE SAMPLED	BENZENE UG/L	TOLUENE UG/L	ETHYL-BENZENE UG/L	TOTAL XYLENES UG/L	TOTAL BTEX UG/L	NAPHTHA-LENE UG/L	MTBE UG/L
MW-1	10/24/96	**3040**	164	325	950	4479	**365**	**2310**
MW-2	10/24/96	<10.0	<10.0	<10.0	<30.0	N/A	<5.0	**24700**
MW-4	10/24/96	<1.0	<1.0	<1.0	<3.0	N/A	<5.0	**70.4**
MW-5	10/24/96	<1.0	<1.0	<1.0	<3.0	N/A	<5.0	**1720**
PW-8	10/24/96	<1.0	<1.0	<1.0	<3.0	N/A	<5.0	**547**
RBSL		5.0	1000.0	700.0	10,000	N/A	25.0	40.0

BDL = Below Detection Limit
Shaded blocks exceed Risk-Based Screening Levels (RBSLs)

TABLE 4
SITE-SPECIFIC TARGET LEVELS (SSTL) FOR SOIL
GREEN'S TEXACO, ROCK HILL, SOUTH CAROLINA
SOIL BORING SB-5

	SSTL	
BENZENE	4.2E-4 mg/kg	0.00042
TOLUENE	1.4E-1 mg/kg	0.14
ETHYLBENZENE	1.3E-1 mg/kg	0.13
XYLENES	6.67 mg/kg	6.67

TABLE 5A
INPUT PARAMETERS USED IN THE AT123D MODEL
GREEN'S TEXACO, ROCK HILL, SOUTH CAROLINA
Worst Case Well: MW-1

MODEL CONTROL PARAMETERS	
Assume aquifer to be infinite in the transverse (y) direction?	Yes
Assume aquifer to be infinite in depth?	No
Type of source?	Constant Release
Simulation Time:	100 years

MEDIA SPECIFIC PARAMETERS	
Effective Porosity	0.50
Hydraulic Conductivity	15.8 m/yr
Hydraulic Gradient	0.0073 m/m
Longitudinal Dispersivity	3.048 m
Transverse Dispersivity	1.016 m
Vertical Dispersivity	0.1524 m
Dry Weight Soil Bulk Density	1.40 g/cm3
Fractional Organic Carbon Content	1.01E-4 g/g
Thickness of Aquifer	12.19 m

RECEPTOR WELL GEOMETRY	
X-coordinate of well	30.48 m
Y-coordinate of well	0 m
Z-coordinate of well (Top of screen)	0 m
Z-coordinate of well (Bottom of screen)	5.0 m

SOURCE WELL GEOMETRY	
Length of source in the X-direction	5.5 m
Length of source in the Y-direction	7.0 m
Thickness of source	1.63 m

CHEMICAL PARAMETERS	**RELEASE RATE**	**DEGRADATION RATE**
Benzene	24.97 kg/yr	9.63E-4 1/day
MTBE	18.98 kg/yr	1.93E-3 1/day
Naphthalene	2.99 kg/yr	2.69E-3 1/day

TABLE 5B
GROUNDWATER FATE AND TRANSPORT MODELING RESULTS
GREEN'S TEXACO, ROCK HILL, SOUTH CAROLINA

Exposure Point

	Max. Conc (mg/l)	Time	RBSL (mg/l)
Benzene	1.89E-4	50 yrs.	5.0E-3
MTBE	8.86E-5	40 yrs.	2.5E-2
Naphthalene *	**3.242E-1**	**518 yrs.**	**4.0E-2**

* Values for this constituent are from calculations made using Domenico's equations

Bold items indicate values above RBSL

Domenico's Model — Table 6

Site: Green's Texaco
Location: Rock Hill, SC
Source Well: MW-1
Receptor Point: Exposure Point

Input Parameters			
Concentration of COC at the Source (mg/L):	Co=========>		
Width of source perpendicular to GW flow (m):	Y=	7	
Vertical thickness of Source (m):	Z=	1.63	
Distance from Source to receptor (m):	x=	30.48	
y-coordinate of Receptor relative to Source (m):	y=	0	
z-coordinate of Receptor relative to Source (m):	z=	0	
Longitudinal dispersivity (m):	ax=	3.05	
Transverse dispersivity (m):	ay=	1.02	
Vertical dispersivity (m):	az=	0.15	
Seepage Velocity (m/s): Vs=(K/effective porosity)(dH/dL)	Vs=	7.31E-09	
Time during which decrease in COC is predicted (sec):	Tt=		<====== t=x/Vs

Co (mg/L)		RBSL (mg/L)
0	Benzene	0.005
0	Toluene	1
0	Ethylbenzen	0.7
0	Xylene	10
2.31	Naphthalene	0.025
0	MTBE	0.04

Equation One				Concentrations Over Time (ppm)					
Solution 1	TIME (YRS)	400.0	500.0	510.0	515.0	517.0	518.0	520.0	550.0
Benzene	mg/L	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Toluene	mg/L	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Ethylbenzene	mg/L	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Xylene	mg/L	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Naphthalene	mg/L	3.230E-01	3.240E-01	3.240E-01	3.240E-01	3.240E-01	3.242E-01	3.242E-01	3.242E-01
MTBE	mg/L	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00

Site-Specific Target Levels (SSTL) (PPM)		
		SSTL
Benzene	mg/L	3.563E-02
Toluene	mg/L	7.126E+00
Ethylbenzene	mg/L	4.988E+00
Xylene	mg/L	7.126E+01
Naphthalene	mg/L	1.781E-01
MTBE	mg/L	2.850E-01

GEOLOGIST LOG - TET ENVIRONMENTAL SERVICES, INC.

Site Name	**Greens Texaco**	Location	**2849 Cherry Road**			Well No.	**SB-1**
City	**Rock Hill**	County	**York**	State	**S.C.**	Logged By	**W. Schaeffer**
Latitude	80° 58' 54"	Drilled By	**N/A**			Date	
Longitude	34° 58' 42"	State License No.					**11/5/96**
Static Water Level		**N/A**			Sampling Method		**Split-spoon**
Drilling Method		**N/A**			Develop Method		**N/A**
Grout	**Cement Abandonment**	Seal	**N/A**			Gravel Pack	**N/A**
Casing Type	**N/A**		Diameter	Depth		Hole Diameter	
Screen Type	**N/A**	Slot Size	Diameter	Depth		Total Depth	**7.0'**

OVA Headspace (ppm)	Depth (ft)	Remarks	Well Completion	Odors
	0 - 1 - 2 - 3 - 4 - 5	Gravel		
0.0	6	SS 13/20/23/28 Greenish brown sandy clay with medium sized pebbles		None
	7 - 8 - 9 - 10 - 11 - 12 - 13 - 14 - 15 - 16 - 17 - 18 - 19 - 20 -	T.D.		

GEOLOGIST LOG - TET ENVIRONMENTAL SERVICES, INC.

Site Name	**Greens Texaco**	Location	**2849 Cherry Road**			Well No.	**SB-2**
City	**Rock Hill**	County	**York**	State	**S.C.**	Logged By	**W. Schaeffer**
Latitude	80° 58' 54"	Drilled By	**N/A**			Date	
Longitude	34° 58' 42"	State License No.					**11/5/96**
Static Water Level	**N/A**					Sampling Method	**Split-spoon**
Drilling Method	**N/A**					Develop Method	**N/A**
Grout	**Cement Abandonment**	Seal	**N/A**			Gravel Pack	**N/A**
Casing Type	**N/A**		Diameter	Depth		Hole Diameter	
Screen Type	**N/A**	Slot Size	Diameter	Depth		Total Depth	**5.0'**

OVA Headspace (ppm)	Depth (ft)	Remarks	Well Completion	Odors
	0	Grass Dark brown, humate rich clayey sand		
	1			
	2			
	3			
	4			
0.0	5	T.D. SS 50/refusal Greenish brown sandy clay		None
	6			
	7			
	8			
	9			
	10			
	11			
	12			
	13			
	14			
	15			
	16			
	17			
	18			
	19			
	20			

GEOLOGIST LOG - TET ENVIRONMENTAL SERVICES, INC.

Site Name	Greens Texaco	Location	2849 Cherry Road			Well No.	SB-3
City	Rock Hill	County	York	State	S.C.	Logged By	W. Schaeffer
Latitude	80° 58' 54"	Drilled By	N/A			Date	
Longitude	34° 58' 42"	State License No.					11/5/96
Static Water Level	N/A					Sampling Method	Split-spoon
Drilling Method	N/A					Develop Method	N/A
Grout	Cement Abandonment	Seal	N/A			Gravel Pack	N/A
Casing Type	N/A		Diameter	Depth		Hole Diameter	
Screen Type	N/A	Slot Size	Diameter	Depth		Total Depth	6.0'

OVA Headspace (ppm)	Depth (ft)	Remarks	Well Completion	Odors
	0 - 1 - 2 - 3 - 4 - 5 -	Grass		
0.0	6 - 7 - 8 - 9 - 10 - 11 - 12 - 13 - 14 - 15 - 16 - 17 - 18 - 19 - 20 -	T.D. SS 52/56/refusal Greensih brown sandy clay		None

GEOLOGIST LOG - TET ENVIRONMENTAL SERVICES, INC.

Site Name	**Greens Texaco**	Location	**2849 Cherry Road**			Well No.	**SB-4**
City	**Rock Hill**	County	**York**	State	**S.C.**	Logged By	**W. Schaeffer**
Latitude	**80° 58' 54"**	Drilled By	**N/A**			Date	
Longitude	**34° 58' 42"**	State License No.					**11/5/96**
Static Water Level		**N/A**			Sampling Method		**Split-spoon**
Drilling Method		**N/A**			Develop Method		**N/A**
Grout	**Cement Abandonment**	Seal	**N/A**			Gravel Pack	**N/A**
Casing Type	**N/A**		Diameter	Depth		Hole Diameter	
Screen Type	**N/A**	Slot Size	Diameter	Depth		Total Depth	**5.0'**

OVA Headspace (ppm)	Depth (ft)	Remarks	Well Completion	Odors
	0	Concrete		
	1			
	2			
	3			
	4			
10.0	5	T.D. SS 32/50/refusal Yellowish brown silty clay		None
	6			
	7			
	8			
	9			
	10			
	11			
	12			
	13			
	14			
	15			
	16			
	17			
	18			
	19			
	20			

GEOLOGIST LOG - TET ENVIRONMENTAL SERVICES, INC.

Site Name	**Greens Texaco**	Location	**2849 Cherry Road**			Well No.	**SB-5**
City	**Rock Hill**	County	**York**	State	**S.C.**	Logged By	**W. Schaeffer**
Latitude	80° 58' 54"	Drilled By	**N/A**			Date	
Longitude	34° 58' 42"	State License No.					**11/5/96**
Static Water Level		**N/A**			Sampling Method		**Split-spoon**
Drilling Method		**N/A**			Develop Method		**N/A**
Grout	**Cement Abandonment**	Seal	**N/A**			Gravel Pack	**N/A**
Casing Type	**N/A**		Diameter	Depth		Hole Diameter	
Screen Type	**N/A**	Slot Size	Diameter	Depth		Total Depth	**7.0'**

OVA Headspace (ppm)	Depth (ft)	Remarks	Well Completion	Odors
	0	Concrete		
	1			
	2			
	3			
	4			
94.0	5	SS 20/28/46/47		
	6	Yellowish brown silty clay with greenish brown sandy clay		Slight
	7	T.D.		
	8			
	9			
	10			
	11			
	12			
	13			
	14			
	15			
	16			
	17			
	18			
	19			
	20			

GEOLOGIST LOG - TET ENVIRONMENTAL SERVICES, INC.

Site Name	**Greens Texaco**	Location	**2849 Cherry Road**			Well No.	**SB-6**
City	**Rock Hill**	County	**York**	State	**S.C.**	Logged By	**W. Schaeffer**
Latitude	80° 58' 54"	Drilled By	**N/A**			Date	
Longitude	34° 58' 42"	State License No.					**11/5/96**
Static Water Level	**N/A**					Sampling Method	**Split-spoon**
Drilling Method	**N/A**					Develop Method	**N/A**
Grout	**Cement Abandonment**	Seal	**N/A**			Gravel Pack	**N/A**
Casing Type	**N/A**		Diameter	Depth		Hole Diameter	
Screen Type	**N/A**	Slot Size	Diameter	Depth		Total Depth	**7.0'**

OVA Headspace (ppm)	Depth (ft)	Remarks	Well Completion	Odors
	0	Concrete		
	1			
	2			
	3			
	4			
0.0	5	SS 12/12/24/30 Light brown silty clay		None
	6			
	7	T.D.		
	8			
	9			
	10			
	11			
	12			
	13			
	14			
	15			
	16			
	17			
	18			
	19			
	20			

GEOLOGIST LOG - TET ENVIRONMENTAL SERVICES, INC.

Site Name	**Greens Texaco**	Location	**2849 Cherry Road**			Well No.	**SB-7**
City	**Rock Hill**	County	**York**	State	**S.C.**	Logged By	**W. Schaeffer**
Latitude	**80° 58' 54"**	Drilled By	**N/A**			Date	
Longitude	**34° 58' 42"**	State License No.					**11/5/96**
Static Water Level		**N/A**			Sampling Method		**Split-spoon**
Drilling Method		**N/A**			Develop Method		**N/A**
Grout	**Cement Abandonment**	Seal	**N/A**			Gravel Pack	**N/A**
Casing Type	**N/A**		Diameter	Depth		Hole Diameter	
Screen Type	**N/A**	Slot Size	Diameter	Depth		Total Depth	**7.0'**

OVA Headspace (ppm)	Depth (ft)	Remarks	Well Completion	Odors
	0	Concrete		
	1			
	2			
	3			
	4			
0.0	5	SS 32/50/refusal Greenish brown sandy clay		None
	6			
	7	T.D.		
	8			
	9			
	10			
	11			
	12			
	13			
	14			
	15			
	16			
	17			
	18			
	19			
	20			

CTS1

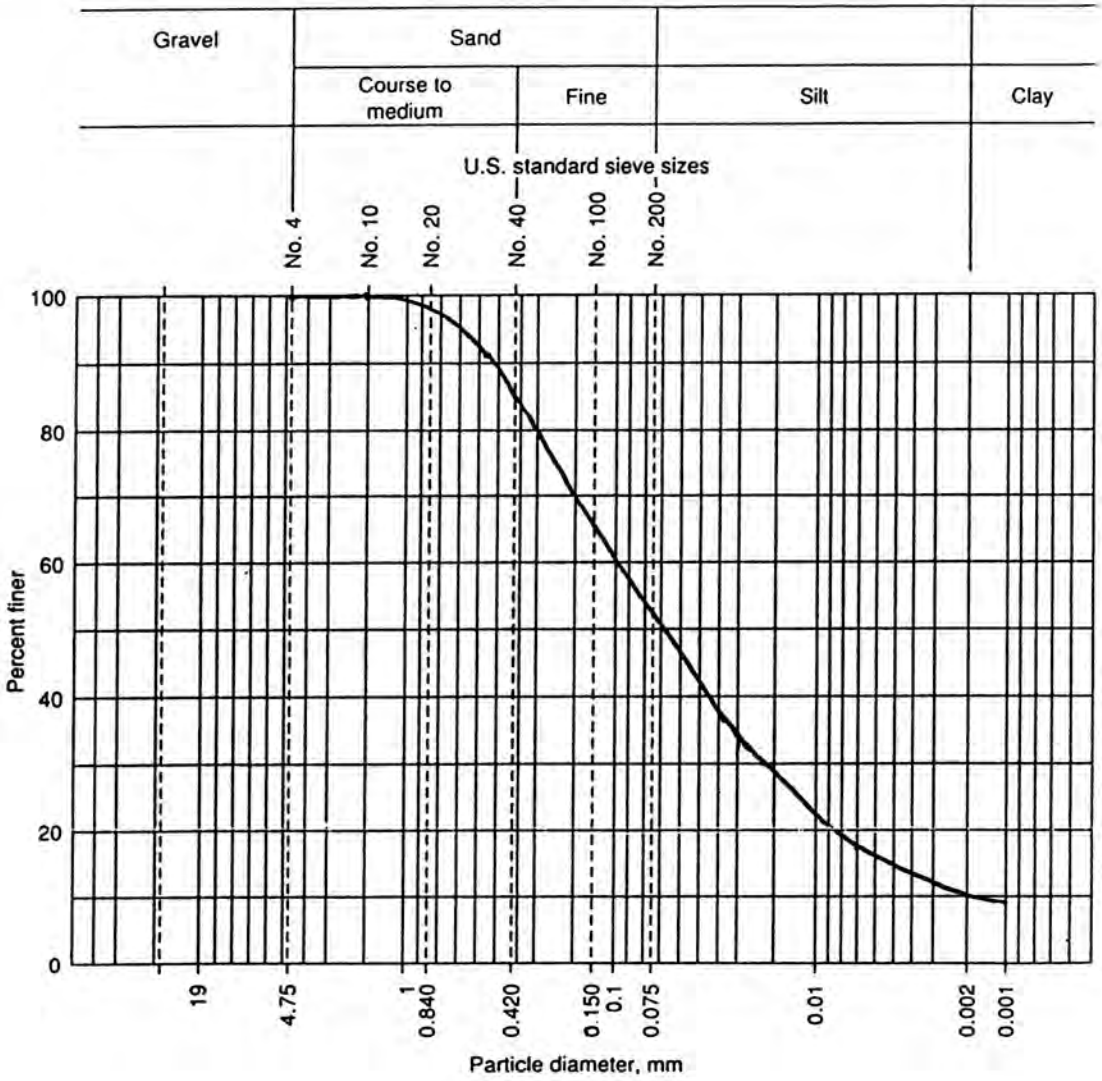
Carolina Technical Services, Inc.
2858 Sunset Boulevard
Post Office Box 5692
West Columbia, South Carolina 29171

Phone 803/926-9268
Fax 803/739-0022

Grain Size Distribution Test Report

Lab No. **A-187**

Project **Green's Texaco** Project No. **96-1136**



Visual Soil Description **Light green and brown, slightly clayey, silty fine to medium SAND**

Soil Classification

Remarks **Sample collected from SB-7**

Signed

IN-SITU SOIL RISK EVALUATION

SOUTH CAROLINA

Department of Health and Environmental Control (DHEC)
Ground Water Protection Division (GWPD)
State Underground Petroleum Environmental Response Bank (SUPERB) Account

Site Data

GWPD SITE ID # 9344 COUNTY YORK

FACILITY NAME GREEN'S TEXACO

STREET ADDRESS 2849 CHERRY ROAD, ROCK HILL, SC

Soil Risk Evaluation Data

				Figure
TPH 3550		50	mg/kg	
Soil % SAND		48	%	USE 50%
Soil % CLAY		10	%	USE 10%
Worst Case (SB-5)	Benzene	0.0998	mg/kg	C s
Soil Analyses	Toluene	0.153	mg/kg	C s
	Ethylbenzene	1.4	mg/kg	C s
	Xylenes	5.47	mg/kg	C s
	Naphthalene	1.8	mg/kg	C s
Natural Organic Carbon Content		101	mg/kg	f oc
Average Annual Recharge		25	cm	H w
Distance from highest Soil Contamination to water table		30.48	cm	L
Bulk Density of Soil		1.4	g/cc	B d
Wetting Front Suction		-15	cm	H f
Soil Hydraulic Conductivity		0.00028	cm/sec	K u
Porosity		0.5	decimal %	ø
Residual Water Content		0.05	decimal %	W r

List possible human exposure pathways from surface soils.

IN-SITU SOIL RISK EVALUATION

Equation Set I

Step 1

F cs = (F oc + TPH/1.724)*(.000001)

F cs = 0.00013

Step 2

C w = C s[((Wr*1g/cc)+Bd)/((Bd*Koc*Fcs)+Wr+(0−Wr)*H')]

	K oc *	H' *	Cw
Benzene	81	0.226	0.869
Toluene	133	0.301	1.058
Ethylbenzene	176	0.28	9.758
Xylenes	639	0.278	27.219
Naphthalene	1543	0.002	7.868

* from Table 2 of docs

Equation Set II

Step 1

f = ø − W r

f = 0.45

Step 2

t = [f / K f] [L − {H w − H f}{ln (*H w + L − H f / H w − H f)}]

t = 1.3E+04

Step 3

V w = (L/30.48)/(t/31500000)

V w = 2505.75

Equation Set III

Step 1

K d = K oc x (f oc)(.000001)

Step 2

V c = V w/(1+((B d * K d)/ø)) ø 0.45

Equation Set IV

Step 1

T c = 365 * L/30.48/V c

	K oc *	K d	V c	T c
Benzene	81	0.0082	2443.55	0.15
Toluene	133	0.0134	2405.23	0.15
Ethylbenzene	176	0.0178	2374.43	0.15
Xylenes	639	0.0645	2086.75	0.17
Naphthalene	1543	0.1558	1687.55	0.22

* from Table 2 of docs

Equation Set IV (continued)

Step 2 $\log [C\ w] = \log [C\ rbsl] + \{(T\ c/2.3) \times (0.693/t\ ½)\}$

	Crbsl **	t1/2 ***	log [C p]	C p
Benzene	0.005	16	-2.30	0.005
Toluene	1	22	0.00	1.005
Ethylbenzene	0.7	10	-0.15	0.708
Xylenes	10	28	1.00	10.043
Naphthalene	0.025	48	-1.60	0.025

** Risk-based screening level (enter)

*** from Table 1 of docs

	Cw	Cp
Benzene	0.869	0.005
Toluene	1.058	1.005
Ethylbenzene	9.758	0.708
Xylenes	27.219	10.043
Naphthalene	7.868	0.025

NOTE:

If Cp is greater than Cw it is not necessary to proceed to equation set V.

Equation Set V

Step 1 C sstl = DAF x C w x K oc X f cs

DAF - 2 (Clay) or 8 (Sandy) ?? 8

	C sstl	
Benzene	0.00042	mg/kg
Toluene	0.13899	mg/kg
Ethylbenzene	0.1295	mg/kg
Xylenes	6.67458	mg/kg
Naphthalene	0.0402	mg/kg

Ingenuity At Work

NESCO

NESCO, Inc.
521 Clemson Road
Columbia, South Carolina 29229
Telephone 803-699-1976

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Toll Free 1-800-379-3688

www.nesco-usa.com

January 23, 2001

Mr. Charles J. Williams, III
Bureau of UST Management
SCDHEC
2600 Bull Street
Columbia, SC 29201

RE: Quarterly Groundwater Monitoring Report
Green's Oil Company
UST Permit # 09344
Rock Hill, South Carolina
York County

Dear Mr. Williams:

This report presents the results of the groundwater sampling at Green's Oil Company (GWPD Site No. 09344) in York County, South Carolina. A site map showing monitoring wells and previous soil boring locations are displayed in Figure 1.

FIELD ACTIVITIES

On January 2, 2001 NESCO field personnel measured water level elevations and collected groundwater samples from five monitoring wells at Green's Oil Co. Free-phase product was not detected in any of the wells petroleum like odor was detected in monitoring wells MW-2 and MW-1. Monitoring well MW-4 could not be found due to a thick layer of crush and run in the area of the well. Attempts to locate this well during previous sampling events, May 2000 and October 2000, were unsuccessful.

Prior to sample collection a minimum of three well volumes of water was purged from the monitoring wells and pH, conductivity, temperature and dissolved oxygen were measured. Monitoring well MW-6 purged dry and did not recharge sufficient water to obtain these measurements.

The groundwater samples were collected from the monitoring wells using dedicated disposable polyethylene bailers. All samples were placed on ice upon collection and transported to Shealy Environmental Services in Columbia, South Carolina to be analyzed for concentrations of benzene, toluene, ethylbenzene, xylenes (BTEX), naphthalene, methyl-tertiary butyl ether (MTBE) by EPA Method 8260 and lead by EPA Method 6010.

RESULTS

Based upon the derived water level measurements (Table 1) a potentiometric surface map was created and is displayed as Figure 2. Groundwater flow is towards the east. Field measurements are displayed in Table 2.

The analytical results are summarized in Table 3 and copies of the analytical reports can be found in Appendix I. A Chemical of Concern (CoC) map is included as Figure 3.

Groundwater Risk-Based Screening Levels (RBSL) for benzene, naphthalene and MTBE were exceeded in the sample taken from monitoring well MW-1. The RBSLs for benzene and MTBE were exceeded in the sample taken from MW-2 and exceeded for MTBE in monitoring wells MW-5 and PW-8. Due to a very limited amount of water in monitoring well MW-6 a sample could not be taken for lead. An additional visit proved unsuccessful in attempting to get a sample for testing. CoCs in the remaining wells were either not detected or below their respective RBSLs.

Sincerely,
NESCO, Inc.

Sheliaand D. Washington
Environmental Scientist

William D. Wood, Jr., P.G.
S.C. Reg. #2116

Cc: Green's Oil Company
Mr. Jerry C. Green,
2849 Cherry Road
Rock Hill, SC 29730

Federated Insurance Company
Attn: John Fenske
121 East Park Square
P.O. Box 328
Owatonna, MN 55060

GREEN'S OIL COMPANY
ROCK HILL, SOUTH CAROLINA

TABLE 1
SUMMARY OF GROUNDWATER LEVELS

MONITOR WELL	DATE	TOC ELEVATION	TOC to WL	WL ELEVATION
MW-1	5/24/00	98.15	7.16	90.99
	10/9/00	98.15	7.78	90.37
	1/2/01	98.15	9.58	88.57
MW-2	5/24/00	97.86	7.03	90.83
	10/9/00	97.86	7.71	90.15
	1/2/01	97.86	9.43	88.43
MW-5	5/24/00	97.04	6.56	90.48
	10/9/00	97.04	7.15	89.89
	1/2/01	97.04	8.90	88.14
MW-6	5/24/00	98.59	8.10	90.49
	10/9/00	98.59	7.92	90.67
	1/2/01	98.59	9.52	89.07
PW-8	5/24/00	96.98	6.45	90.53
	10/9/00	96.98	7.12	89.86
	1/2/01	96.98	8.69	88.29

TOC = Top of casing
WL = Water Level
Units in **feet**

GREEN'S OIL CO.
ROCK HILL, SOUTH CAROLINA

TABLE 2
FIELD MEASUREMENTS

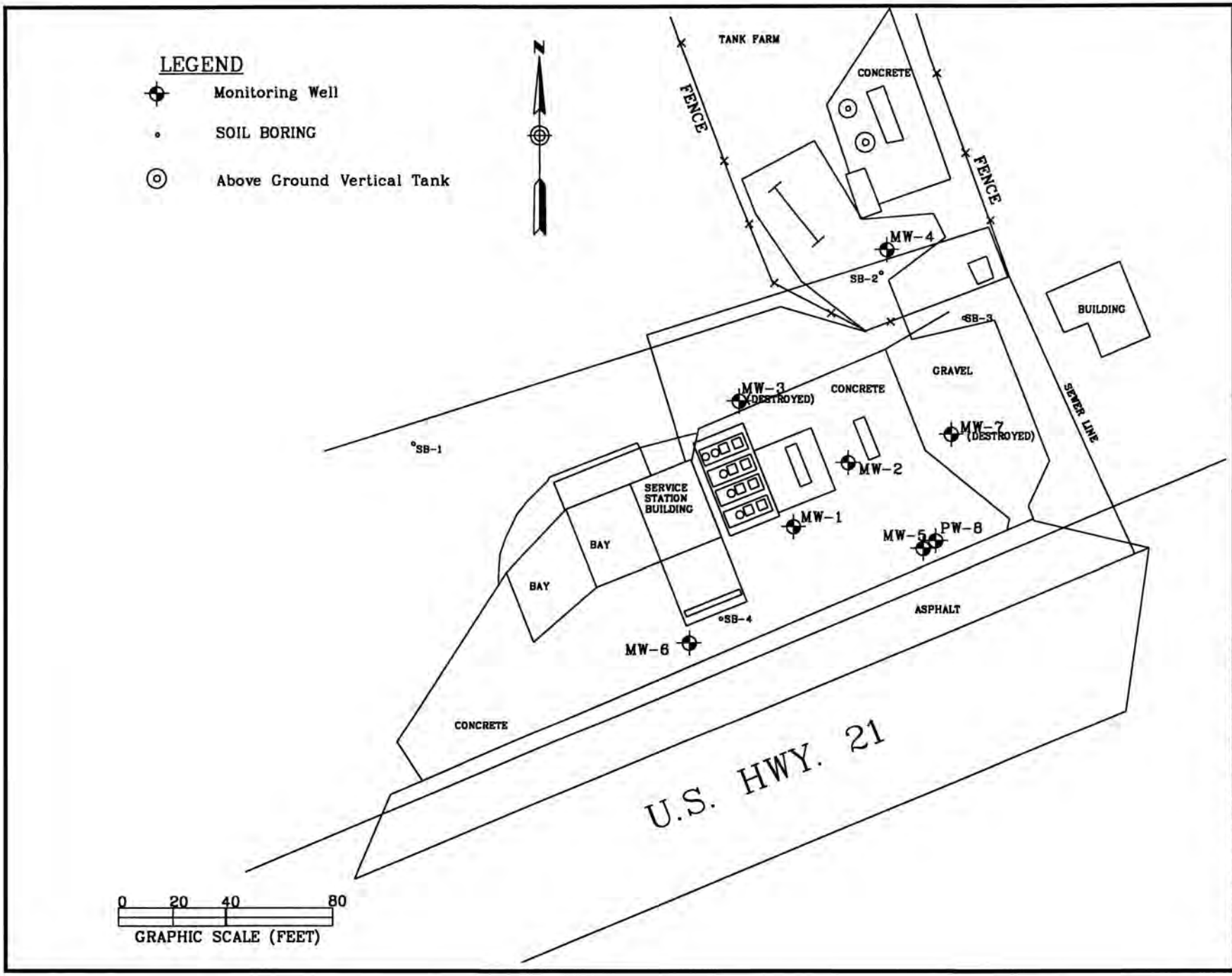
MONITOR WELL	DATE	pH Standard	Conductivity mS/cm	Temperature celsius	DO mg/L
MW-1	5/24/00	5.81	0.758	24.2	1.3
	10/9/00	5.94	0.688	22.2	2.3
	1/2/01	7.90	0.561	16.8	1.4
MW-2	5/24/00	5.82	0.637	23.0	1.9
	10/9/00	5.93	0.641	22.4	2.4
	1/2/01	7.57	0.639	13.2	0.0
MW-5	5/24/00	6.29	0.584	22.9	2.4
	10/9/00	6.19	0.547	22.5	3.0
	1/2/01	7.77	0.412	17.8	1.6
MW-6	5/24/00	6.13	0.848	23.1	3.8
	10/9/00	6.02	0.754	23.6	4.9
	1/2/01	*NM*	*NM*	*NM*	*NM*
PW-8	5/24/00	6.53	0.329	22.3	3.9
	10/9/00	5.90	0.292	20.7	2.5
	1/2/01	7.14	0.183	18.3	2.1

NM = Not Measured

TABLE 3
CHEMICALS OF CONCERN
GREEN'S OIL COMPANY
ROCK HILL, SOUTH CAROLINA

Chemical of Concern	RBSL	Date	MW-1	MW-2	MW-5	MW-6	PW-8
Benzene	5	5/9/00	**1790**	**5.2**	ND	ND	ND
		10/9/00	**1600**	**31**	<5.0	<5.0	<5.0
		1/2/01	**500**	**7.2**	<5.0	<5.0	<5.0
Toluene	1000	5/9/00	255	ND	ND	ND	ND
		10/9/00	180	5.7	<5.0	<5.0	<5.0
		1/2/01	9.0	<5.0	<5.0	<5.0	<5.0
Ethylbenzene	700	5/9/00	302	ND	ND	ND	ND
		10/9/00	220	<5.0	<5.0	<5.0	<5.0
		1/2/01	38	<5.0	<5.0	<5.0	<5.0
Xylenes (TOTAL)	10,000	5/9/00	611	ND	ND	ND	ND
		10/9/00	400	12	5.0	<5.0	6.1
		1/2/01	68	<5.0	<5.0	<5.0	<5.0
Naphthalene	25	5/9/00	**117**	ND	ND	ND	ND
		10/9/00	**350**	15	5.0	<5.0	<5.0
		1/2/01	**55**	<5.0	<5.0	<5.0	<5.0
MTBE	40	5/9/00	**1300**	**19900**	**14000**	ND	**790**
		10/9/00	**850**	**11000**	**9100**	<5.0	**180**
		1/2/01	**460**	**7700**	**1400**	<5.0	**160**
Lead (ug/l)	15	5/9/00	12.0	ND	ND	**52.0**	ND
		10/9/00	<3.0	<3.0	<3.0	**26.0**	<3.0
		1/10/01	<3.0	<3.0	<3.0	NA	<3.0

Unit of measurements are ug/l except where noted.
NA = Not Analyzed
Shaded areas exceed the RBSLs.



NESCO
Ingenuity At Work
NATIONAL ENVIRONMENTAL SERVICE CO.
521 CLEMSON ROAD
COLUMBIA, SOUTH CAROLINA 29229, USA
PHONE: 803.699.1576 FAX: 803.699.2663

FIGURE 1

SITE MAP

2 January 2001

GREEN'S OIL COMPANY

ROCK HILL, SC
YORK COUNTY

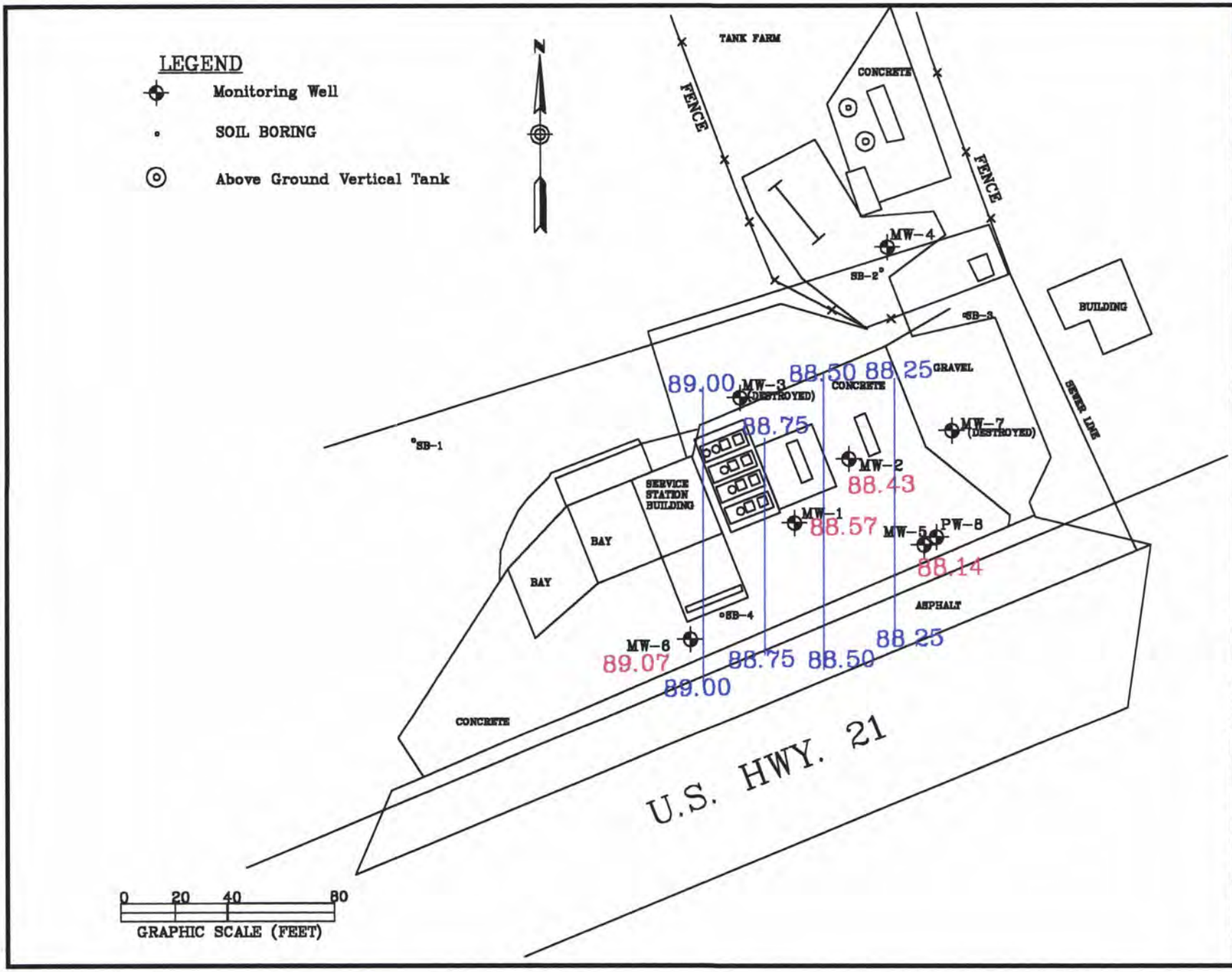
GWPD SITE #03344

REFERENCES

1. MAP REFERENCE FROM TET SITE MAP,

NOTES

NESCO 21-1082c



NESCO
Ingenuity At Work

NATIONAL ENVIRONMENTAL SERVICE CO.
521 CLEMSON ROAD
COLUMBIA, SOUTH CAROLINA 29229, USA
PHONE: 803.699.1679 FAX: 803.699.0369

FIGURE 2

POTENTIOMETRIC MAP

2 January 2001

GREEN'S OIL COMPANY

ROCK HILL, SC
YORK COUNTY

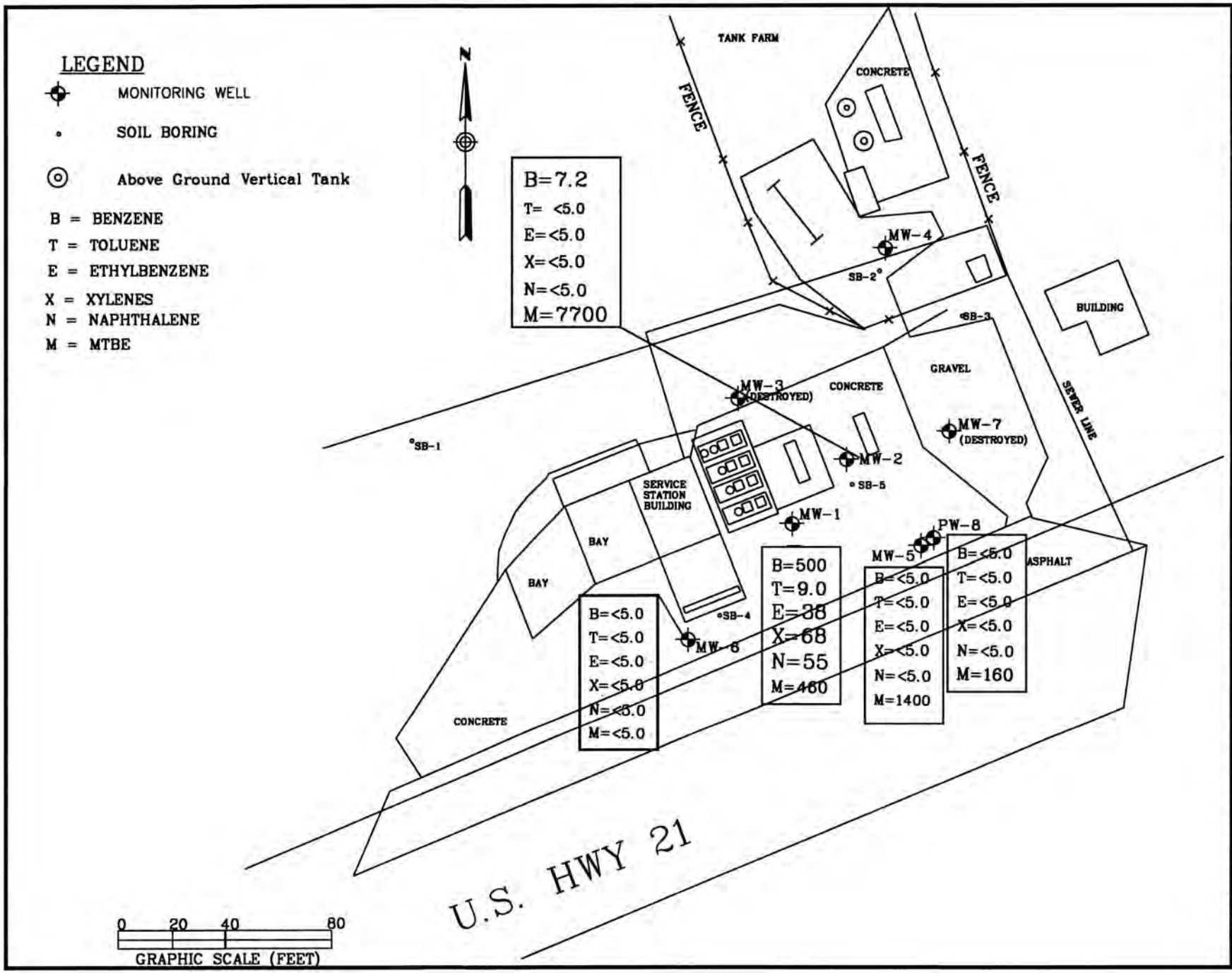
GWPD SITE #08344

REFERENCES

1. MAP REFERENCE FROM TET SITE MAP,

NOTES

NESCO 21-1082c



NESCO
Ingenuity At Work
NATIONAL ENVIRONMENTAL SERVICE CO.
821 CLEMSON ROAD
COLUMBIA, SOUTH CAROLINA 29229, USA
PHONE: 803.699.1979 FAX: 803.699.8969

FIGURE 3

CHEMICALS OF CONCERN (CoC)

2 January 2001

GREEN'S OIL COMPANY

ROCK HILL, SC
YORK COUNTY

GWPD SITE #09344

REFERENCES

1. MAP REFERENCE FROM TET SITE MAP,

NOTES

NESCO 21-1082c

Report of Analysis

Nesco
521 Clemson Road
Columbia, SC 29229
Attention : S. Washington

Project Name : **Greens Oil Co**

Project Number : **21-823**

Lot Number : **CA05018**

Date Completed : **01/11/2001**

Jennifer L. Orr
Project Manager

Total number of pages in report : **6**

The following non-paginated documents are considered part of this report: Chain Of Custody Record and Sample Receipt Checklist.

SHEALY ENVIRONMENTAL SERVICES, INC.

Report of Analysis

SC,DHEC No. 32010 NC DEHNR No. 329

Client : **NESCO**
521 Clemson Road
Columbia, SC 29229

Attention : **S. Washington**
Project Name : **Greens Oil Co** Project Number : **21-823**

Description : **MW 1** Date Sampled : 01/02/2001 1400
Lot Number : CA05018-001 Matrix : Aqueous

Date Received : 01/04/2001

Parameter	Prep Method	Analytical Method	Result	Q	PQL	Units	Prep Date	Analysis Date	Analyst
Volatile Organic Compounds by GC/MS									
Benzene	5030B	8260B	**500**		25	ug/L		01/08/2001 2137	SZY
Ethylbenzene	5030B	8260B	**38**		5.0	ug/L		01/09/2001 0013	SZY
Methyl tertiary butyl ether (MTBE)	5030B	8260B	**460**		25	ug/L		01/08/2001 2137	SZY
Naphthalene	5030B	8260B	**55**		5.0	ug/L		01/09/2001 0013	SZY
Toluene	5030B	8260B	**9.0**		5.0	ug/L		01/09/2001 0013	SZY
Xylenes (total)	5030B	8260B	**68**		5.0	ug/L		01/09/2001 0013	SZY
Surrogates									
1,2-Dichloroethane-d4	5030B	8260B	88		70-130	%		01/09/2001 0013	SZY
Toluene-d8	5030B	8260B	96		70-130	%		01/09/2001 0013	SZY
Bromofluorobenzene	5030B	8260B	94		70-130	%		01/09/2001 0013	SZY

PQL = Practical quantitation limit
ND = Not detected at or above the PQL
B = Detected in the method blank
J = Estimated result less than the PQL
E = Quantitation of compound exceeded the calibration range
Soils reported on a dry weight basis unless flagged with a "W"

Description : **MW 2**
Lot Number : CA05018-002
Client : **NESCO**
Date Received : 01/04/2001

Date Sampled : 01/02/2001 1425
Matrix : Aqueous

Parameter	Prep Method	Analytical Method	Result	Q	PQL	Units	Prep Date	Analysis Date	Analyst
Volatile Organic Compounds by GC/MS									
Benzene	5030B	8260B	**7.2**		5.0	ug/L		01/08/2001 2342	SZY
Ethylbenzene	5030B	8260B	ND		5.0	ug/L		01/08/2001 2342	SZY
Methyl tertiary butyl ether (MTBE)	5030B	8260B	**7700**		250	ug/L		01/09/2001 2100	SZY
Naphthalene	5030B	8260B	ND		5.0	ug/L		01/08/2001 2342	SZY
Toluene	5030B	8260B	ND		5.0	ug/L		01/08/2001 2342	SZY
Xylenes (total)	5030B	8260B	ND		5.0	ug/L		01/08/2001 2342	SZY
Surrogates									
1,2-Dichloroethane-d4	5030B	8260B	76		70-130	%		01/08/2001 2342	SZY
Toluene-d8	5030B	8260B	88		70-130	%		01/08/2001 2342	SZY
Bromofluorobenzene	5030B	8260B	82		70-130	%		01/08/2001 2342	SZY

PQL = Practical quantitation limit
ND = Not detected at or above the PQL
B = Detected in the method blank
J = Estimated result less than the PQL
E = Quantitation of compound exceeded the calibration range
Soils reported on a dry weight basis unless flagged with a "W"

Description : **MW 5**
Lot Number : CA05018-003
Client : **NESCO**
Date Received : 01/04/2001

Date Sampled : 01/02/2001 1340
Matrix : Aqueous

Parameter	Prep Method	Analytical Method	Result	Q	PQL	Units	Prep Date	Analysis Date	Analyst
Volatile Organic Compounds by GC/MS									
Benzene	5030B	8260B	ND		5.0	ug/L		01/08/2001 2311	SZY
Ethylbenzene	5030B	8260B	ND		5.0	ug/L		01/08/2001 2311	SZY
Methyl tertiary butyl ether (MTBE)	5030B	8260B	**1400**		50	ug/L		01/08/2001 2208	SZY
Naphthalene	5030B	8260B	ND		5.0	ug/L		01/08/2001 2311	SZY
Toluene	5030B	8260B	ND		5.0	ug/L		01/08/2001 2311	SZY
Xylenes (total)	5030B	8260B	ND		5.0	ug/L		01/08/2001 2311	SZY
Surrogates									
1,2-Dichloroethane-d4	5030B	8260B	87		70-130	%		01/08/2001 2311	SZY
Toluene-d8	5030B	8260B	99		70-130	%		01/08/2001 2311	SZY
Bromofluorobenzene	5030B	8260B	89		70-130	%		01/08/2001 2311	SZY

PQL = Practical quantitation limit
ND = Not detected at or above the PQL
B = Detected in the method blank
J = Estimated result less than the PQL
E = Quantitation of compound exceeded the calibration range
Soils reported on a dry weight basis unless flagged with a "W"

Description	: **MW 6**	Date Sampled	:	01/02/2001	1310
Lot Number	: CA05018-004	Matrix	:	Aqueous	
Client	: **NESCO**				
Date Received	: 01/04/2001				

Parameter	Prep Method	Analytical Method	Result	Q	PQL	Units	Prep Date	Analysis Date	Analyst
Volatile Organic Compounds by GC/MS									
Benzene	5030B	8260B	ND		5.0	ug/L		01/08/2001 1931	SZY
Ethylbenzene	5030B	8260B	ND		5.0	ug/L		01/08/2001 1931	SZY
Methyl tertiary butyl ether (MTBE)	5030B	8260B	ND		5.0	ug/L		01/08/2001 1931	SZY
Naphthalene	5030B	8260B	ND		5.0	ug/L		01/08/2001 1931	SZY
Toluene	5030B	8260B	ND		5.0	ug/L		01/08/2001 1931	SZY
Xylenes (total)	5030B	8260B	ND		5.0	ug/L		01/08/2001 1931	SZY
Surrogates									
1,2-Dichloroethane-d4	5030B	8260B	91		70-130	%		01/08/2001 1931	SZY
Toluene-d8	5030B	8260B	99		70-130	%		01/08/2001 1931	SZY
Bromofluorobenzene	5030B	8260B	91		70-130	%		01/08/2001 1931	SZY

PQL = Practical quantitation limit
ND = Not detected at or above the PQL
B = Detected in the method blank
J = Estimated result less than the PQL
E = Quantitation of compound exceeded the calibration range
Soils reported on a dry weight basis unless flagged with a "W"

Description	: **PW 8**	Date Sampled	:	01/02/2001	1330
Lot Number	: CA05018-005	Matrix	:	Aqueous	
Client	: **NESCO**				
Date Received	: 01/04/2001				

Parameter	Prep Method	Analytical Method	Result	Q	PQL	Units	Prep Date	Analysis Date	Analyst
Volatile Organic Compounds by GC/MS									
Benzene	5030B	8260B	ND		5.0	ug/L		01/08/2001 1900	SZY
Ethylbenzene	5030B	8260B	ND		5.0	ug/L		01/08/2001 1900	SZY
Methyl tertiary butyl ether (MTBE)	5030B	8260B	**160**		5.0	ug/L		01/08/2001 1900	SZY
Naphthalene	5030B	8260B	ND		5.0	ug/L		01/08/2001 1900	SZY
Toluene	5030B	8260B	ND		5.0	ug/L		01/08/2001 1900	SZY
Xylenes (total)	5030B	8260B	ND		5.0	ug/L		01/08/2001 1900	SZY
Surrogates									
1,2-Dichloroethane-d4	5030B	8260B	87		70-130	%		01/08/2001 1900	SZY
Toluene-d8	5030B	8260B	101		70-130	%		01/08/2001 1900	SZY
Bromofluorobenzene	5030B	8260B	96		70-130	%		01/08/2001 1900	SZY

PQL = Practical quantitation limit
ND = Not detected at or above the PQL
B = Detected in the method blank
J = Estimated result less than the PQL
E = Quantitation of compound exceeded the calibration range
Soils reported on a dry weight basis unless flagged with a "W"

USE BALL POINT PEN ONLY, PRESS HARD

SHEALY ENVIRONMENTAL SERVICES, INC.

106 Vantage Pointe Drive
Cayce, South Carolina 29033
Telephone No. (803) 791-9700 Fax No. (803) 791-9111

Page 1 of 1

CHAIN OF CUSTODY RECORD

SAMPLE ANALYSIS REQUIRED

CHAIN OF CUSTODY # GREENS OIL CO. 21823

Client Name NESCO

Reporting Address 321 Clemson Rd. Columbia SC 29229

Attention S. Washington

Telephone No. 6991976 P.O. No. _____

NPDES # _____

County _____

Receiving Stream _____

Outfall No. _____

←PRESERVATION (CODE)

CODE: A = None
B = HNO3
C = H2SO4
D = NaOH
E = ICE
F = HCL

LAB USE ONLY

Program Area (Circle)
DW CWA/NPDES
RCRA SP/SOL
SP/LIQ Other:_____

Sample ID (Location)	Yr. 01 DATE	TIME	WELL	SOLID	COMP	GRAB	# of containers	pH, Conductivity	BOD	Nutrients - Specify	METALS - Specify	TOC/TOX - Specify	BTEX	VOC - Specify Method required	Pesticides/PCBs - Specify	Herbicides	Total Phenol	Oil & Grease	BNAs	Solids - Specify	Cyanide	Coliform - Specify type	Toxicity - Specify	REMARKS	SESI LAB I.D.
MW 1	Start 1/2 Finish	1400	X			X	3																	BTEX, Naph, MTBE 5 DAY TURN	CA0308-001
MW 2	Start 1/2 Finish	1425	X			X	3																		002
MW 5	Start 1/2 Finish	1340	X			X	3																		003
MW 6	Start 1/2 Finish	1310	X			X	3																		004
PW 8	Start 1/2 Finish	1330	X			X	3																		005
	Start Finish																								
	Start Finish																								
	Start Finish																								

SAMPLER	Date/Time	Received by (Sig.)	Date/Time	Hazards Associated with Sample	Custody Seal Intact (Circle)
Print Name: CARRIE WGILLDICE	1/4/01 1240	[signature] SECURE AREA	1/4/01 0940		YES NO NONE
Signature: [signature]					Receipt TRC _____ mg/l
Relinquished by (Sig.) [signature]	Date/Time 1/4/01 1230	Received by (Sig.)	Date/Time		Receipt pH _____ su
Relinquished by (Sig.)	Date/Time	Lab Receipt by (Sig.) [signature]	Date/Time 1/4/01 1230		Receipt Temp. 4.8 °C
					Received on Ice (Circle) YES NO ICE PACK

AMERICAN SYSTEMS, COLUMBIA, S.C.

C ... ler ... Yell ... : Sh ... Copy: ...

Sample Receipt Checklist

Client: Nesco Cooler received by/date: KMM/1-4 Lot number: CA5019

Means of receipt: ☒ SESI ☐ Client ☐ UPS ☐ FedEx ☐ DirectX ☐ Other			
Cooler temperature upon receipt 4.8 °C Method: ☐ Temperature Blank ☒ Against Bottles Method of coolant: ☒ Wet Ice ☐ Blue Ice ☐ Dry Ice ☐ None			
Yes ☐	No ☐	NA ☒	1. Is the shipper's packing slip attached to this form? (if applicable)
Yes ☒	No ☐	NA ☐	2. Was a chain of custody provided with the samples?
Yes ☒	No ☐	NA ☐	3. Were proper custody procedures followed?
Yes ☒	No ☐	NA ☐	4. Was the client name listed?
Yes ☒	No ☐	NA ☐	5. Were sample IDs listed?
Yes ☒	No ☐	NA ☐	6. Was collection date & time listed?
Yes ☒	No ☐	NA ☐	7. Were the tests to be performed listed on either the C of C or quote?
Yes ☒	No ☐	NA ☐	8. Did all samples arrive in the proper containers for each test?
Yes ☒	No ☐	NA ☐	9. Did all bottle labels agree with custody papers?
Yes ☒	No ☐	NA ☐	10. Did all containers arrive in good condition (unbroken)?
Yes ☒	No ☐	NA ☐	11. Was adequate sample volume available?
Yes ☐	No ☒	NA ☐	12. Were all samples received within ½ the holding time or 48 hours, whichever comes first?
Yes ☐	No ☒	NA ☐	13. Were any samples containers missing?
Yes ☐	No ☒	NA ☐	14. Were there any excess samples not listed on C of C?
Yes ☐	No ☒	NA ☐	15. Were air bubbles >6 mm in any VOA vials (if applicable)?
Yes ☐	No ☐	NA ☒	16. Were all Metals; Oil & Grease; Nutrient samples received at a pH of <2?
Yes ☐	No ☐	NA ☒	17. Were all Cyanide; Sulfide samples received at a pH >12?
Yes ☐	No ☐	NA ☒	18. Were all NH3; TKN; Cyanide; BNA; PEST; PCB; HERB samples free of residual chlorine? (< 0.2 mg/L)
Yes ☐	No ☐	NA ☒	19. For North Carolina samples, were collection temperatures documented on the chain of custody?
Sample Preservation (Must be completed for any sample(s) incorrectly preserved.)			
Sample(s)_____ were received incorrectly preserved and were adjusted accordingly in sample receiving.			
Sample(s)_____ were received incorrectly preserved and were unable to be analyzed.			
Sample(s) were received with bubble >6 mm in diameter			

Corrective Action taken, if necessary:

Was client notified: Yes ☐ No ☐
Did client respond: Yes ☐ No ☐
Date of response: _____
Shealy employee: _____
Client instructions / Comments:

_____
_____
_____
_____
_____

SHEALY ENVIRONMENTAL SERVICES, INC.
Scientists and Consultants

Report of Analysis

Nesco
521 Clemson Road
Columbia, SC 29229
Attention : S Washington

Project Name : **Green's Oil**
Project Number : **21-1082**

Lot Number : **CA11025**
Date Completed : **01/18/2001**

Jennifer L. Orr
Project Manager

Total number of pages in report : **5**

The following non-paginated documents are considered part of this report: Chain Of Custody Record and Sample Receipt Checklist.

SHEALY ENVIRONMENTAL SERVICES, INC.

Report of Analysis

SC DHEC No. 32010 NC DEHNR No. 329

Client : **NESCO**
521 Clemson Road
Columbia, SC 29229

Attention : **S Washington**
Project Name : **Green's Oil** Project Number : **21-1082**

Description : **MW 1** Date Sampled : 01/08/2001 1000
Lot Number : CA11025-001 Matrix : Aqueous

Date Received : 01/11/2001

Parameter	Prep Method	Analytical Method	Result	Q	PQL	Units	Prep Date	Analysis Date	Analyst
ICP-AES									
Lead		6010B	ND		0.0030	mg/L	01/12/2001 1020	01/17/2001 0033	FTS

PQL = Practical quantitation limit
ND = Not detected at or above the PQL
B = Detected in the method blank
J = Estimated result less than the PQL
E = Quantitation of compound exceeded the calibration range
Soils reported on a dry weight basis unless flagged with a "W"

Description	:	**MW 2**	Date Sampled	:	01/08/2001 1015
Lot Number	:	CA11025-002	Matrix	:	Aqueous
Client	:	**NESCO**			
Date Received	:	01/11/2001			

Parameter	Prep Method	Analytical Method	Result	Q	PQL	Units	Prep Date	Analysis Date	Analyst
ICP-AES									
Lead		6010B	ND		0.0030	mg/L	01/12/2001 1020	01/17/2001 0040	FTS

PQL = Practical quantitation limit
ND = Not detected at or above the PQL
B = Detected in the method blank
J = Estimated result less than the PQL
E = Quantitation of compound exceeded the calibration range
Soils reported on a dry weight basis unless flagged with a "W"

Description	: **MW 5**	Date Sampled	:	01/08/2001	1045
Lot Number	: CA11025-003	Matrix	:	Aqueous	
Client	: **NESCO**				
Date Received	: 01/11/2001				

Parameter	Prep Method	Analytical Method	Result	Q	PQL	Units	Prep Date	Analysis Date	Analyst
ICP-AES									
Lead		6010B	ND		0.0030	mg/L	01/12/2001 1020	01/17/2001 0046	FTS

PQL = Practical quantitation limit
ND = Not detected at or above the PQL
B = Detected in the method blank
J = Estimated result less than the PQL
E = Quantitation of compound exceeded the calibration range
Soils reported on a dry weight basis unless flagged with a "W"

Description	: **MW 8**		Date Sampled	:	01/08/2001 1030
Lot Number	: CA11025-004		Matrix	:	Aqueous
Client	: **NESCO**				
Date Received	: 01/11/2001				

Parameter	Prep Method	Analytical Method	Result	Q	PQL	Units	Prep Date	Analysis Date	Analyst
ICP-AES									
Lead		6010B	ND		0.0030	mg/L	01/12/2001 1020	01/17/2001 0052	FTS

PQL = Practical quantitation limit
ND = Not detected at or above the PQL
B = Detected in the method blank
J = Estimated result less than the PQL
E = Quantitation of compound exceeded the calibration range
Soils reported on a dry weight basis unless flagged with a "W"

106 Vantage Pointe Drive
Cayce, South Carolina 29033
Telephone No. (803) 791-9700 Fax No. (803) 791-9111

CHAIN OF CUSTODY RECORD

SAMPLE ANALYSIS REQUIRED

CHAIN OF CUSTODY # Geeris Oil 21-1082

Client Name Nesco

Reporting Address 521 Clemson Columbia SC

Attention S. Washington

Telephone No. 6991976 P.O. No. _____

NPDES # _____

County _____

Receiving Stream _____

Outfall No. _____

Sample ID (Location)	Yr. 01 DATE	TIME	WELL	SOLID	COMP	GRAB	# of containers	pH, Conductivity	BOD	Nutrients - Specify	METALS - Specify	TOC/TOX - Specify	BTEX	VOC - Specify Method required	Pesticides/PCBs - Specify	Herbicides	Total Phenol	Oil & Grease	BNAs	Solids - Specify	Cyanide	Coliform - Specify Type	Toxicity - Specify	←PRESERVATION (CODE)	LAB USE ONLY
																								CODE: A = None B = HNO3 C = H2SO4 D = NaOH E = ICE F = HCL	Program Area (Circle) DW CWA/NPDES RCRA SP/SOL SP/LIQ Other:_____
																								REMARKS	SESI LAB I.D.
MW 1	Start 1/8 Finish	1000	X			X	1																	LEAD	CA1025-001
MW 2	Start Finish	1015																						5Day turn	002
MW 5	Start Finish	1045																							003
MW 8	Start Finish	1030																							004
	Start Finish																								
	Start Finish																								
	Start Finish																								
	Start Finish																								

SAMPLER	Date/Time	Received by (Sig.)	Date/Time	Hazards Associated with Sample	Custody Seal Intact (Circle)
Print Name: Carrie Lowrance	1/11/01 1210	[signature]	1/11/01 1210		YES NO NONE
Signature: [signature]					Receipt TRC _____ mg/l
Relinquished by (Sig.) [signature]	1/11/01 1300	Received by (Sig.)	Date/Time		Receipt pH _____ su
Relinquished by (Sig.)	Date/Time	Lab Receipt by (Sig.) [signature]	1/11/01 1300		Receipt Temp. 6.3 °C
					Received on Ice (Circle) YES NO ICE PACK

AMERICAN SYSTEMS, COLUMBIA, S.C.

White Copy: Sampler Yellow Copy: Shealy Pink Copy: Report

Sample Receipt Checklist

Client: Nesco Cooler received by/date: PBM 1/11/01 Lot number: CA11025

Means of receipt: ☑ SESI ☐ Client ☐ UPS ☐ FedEx ☐ DirectX ☐ Other

Cooler temperature upon receipt 6.3 °C
Method: ☐ Temperature Blank ☑ Against Bottles
Method of coolant: ☑ Wet Ice ☐ Blue Ice ☐ Dry Ice ☐ None

Yes ☐	No ☐	NA ☑	1. Is the shipper's packing slip attached to this form? (if applicable)
Yes ☑	No ☐	NA ☐	2. Was a chain of custody provided with the samples?
Yes ☑	No ☐	NA ☐	3. Were proper custody procedures followed?
Yes ☑	No ☐	NA ☐	4. Was the client name listed?
Yes ☑	No ☐	NA ☐	5. Were sample IDs listed?
Yes ☑	No ☐	NA ☐	6. Was collection date & time listed?
Yes ☑	No ☐	NA ☐	7. Were the tests to be performed listed on either the C of C or quote?
Yes ☑	No ☐	NA ☐	8. Did all samples arrive in the proper containers for each test?
Yes ☑	No ☐	NA ☐	9. Did all bottle labels agree with custody papers?
Yes ☑	No ☐	NA ☐	10. Did all containers arrive in good condition (unbroken)?
Yes ☑	No ☐	NA ☐	11. Was adequate sample volume available?
Yes ☑	No ☐	NA ☐	12. Were all samples received within ½ the holding time or 48 hours, whichever comes first?
Yes ☐	No ☑	NA ☐	13. Were any samples containers missing?
Yes ☐	No ☑	NA ☐	14. Were there any excess samples not listed on C of C?
Yes ☐	No ☐	NA ☑	15. Were air bubbles >6 mm in any VOA vials (if applicable)?
Yes ☑	No ☐	NA ☐	16. Were all Metals; Oil & Grease; Nutrient samples received at a pH of <2?
Yes ☐	No ☐	NA ☑	17. Were all Cyanide; Sulfide samples received at a pH >12?
Yes ☐	No ☐	NA ☑	18. Were all NH3; TKN; Cyanide; BNA; PEST; PCB; HERB samples free of residual chlorine? (< 0.2 mg/L)
Yes ☐	No ☐	NA ☑	19. For North Carolina samples, were collection temperatures documented on the chain of custody?

Sample Preservation (Must be completed for any sample(s) incorrectly preserved.)

Sample(s) _____ were received incorrectly preserved and were adjusted accordingly in sample receiving.

Sample(s) _____ were received incorrectly preserved and were unable to be analyzed.

Sample(s) were received with bubble >6 mm in diameter

Corrective Action taken, if necessary:

Was client notified: Yes ☐ No ☐
Did client respond: Yes ☐ No ☐
Date of response: _____
Shealy employee: _____
Client instructions / Comments:

_____
_____
_____
_____
_____

NESCO

NESCO, Inc.
521 Clemson Road
Columbia, South Carolina 29229
Telephone 803-699-1976

Telefax 803-699-9863
Toll Free 1-800-379-3688

www.nesco-usa.com

January 13, 2003

Mr. Reed Miner
Bureau of UST Management
SCDHEC
2600 Bull Street
Columbia, SC 29201

RE: Quarterly Groundwater Monitoring Report
Green's Oil Company
UST Permit # 09344
Rock Hill, South Carolina
York County

Dear Mr. Miner:

This report presents the results of the groundwater sampling at Green's Oil Company (GWPD Site No. 09344) in York County, South Carolina (Figure 1). Figure 2 is a site map showing monitoring well locations.

FIELD ACTIVITIES

On December 12 and 16, 2002 NESCO collected groundwater samples from eight monitoring wells at the Green's Oil Co site. During the December 12 site visit an electronic metal detector was utilized to locate wells MW-3, MW-4, and MW-7. These wells had previously been reported as destroyed or unable to be located. Additionally, the well pad and flush-mounted well vault at MW-3 were replaced on 16 December. The locking caps on most of the wells were also replaced.

Site-wide water levels were taken on 16 December. Free-phase product was not detected in any of the wells. A weathered petroleum like odor was detected in monitoring wells MW-1, MW-2, and MW-3.

Prior to sample collection a minimum of three well volumes of water was purged from the monitoring wells and pH, conductivity, temperature and dissolved oxygen were measured. Monitoring well MW-6 purged dry and was sampled after sufficient water recharged.

The groundwater samples were collected from the monitoring wells using dedicated disposable polyethylene bailers. All samples were placed on ice upon collection and

transported to Shealy Environmental Services in Columbia, South Carolina to be analyzed for concentrations of benzene, toluene, ethylbenzene, xylenes (BTEX), naphthalene, methyl-tertiary butyl ether (MTBE) by EPA Method 8260 and lead by EPA Method 6010.

RESULTS

Based upon the derived water level measurements (Table 1) a potentiometric surface map was created and is displayed as Figure 3. Groundwater flow is generally towards the east as was the case during previous sampling events. Field measured parameters are displayed in Table 2.

The analytical results are summarized in Table 3 and copies of the analytical reports can be found in the Appendix. A Chemical of Concern (CoC) map is included as Figure 4.

Groundwater Risk-Based Screening Levels (RBSLs) were exceeded in the samples taken from monitoring well MW-1 for BTEX, naphthalene and MTBE. The RBSLs for BTEX and naphthalene were exceeded in the sample from MW-3. The RBSL for MTBE was exceeded in the samples taken from MW-2, MW-4, MW-7, and PW-8. The RBSL for lead was exceeded in the samples collected from MW-6 and MW-7. CoCs in the remaining wells were either not detected or below their respective RBSLs. The exceedance for lead appears to be naturally occurring based on the lack of petroleum constituents other than MTBE in these samples. With the exception of the results from MW-1, COC levels appear to be decreasing across the site.

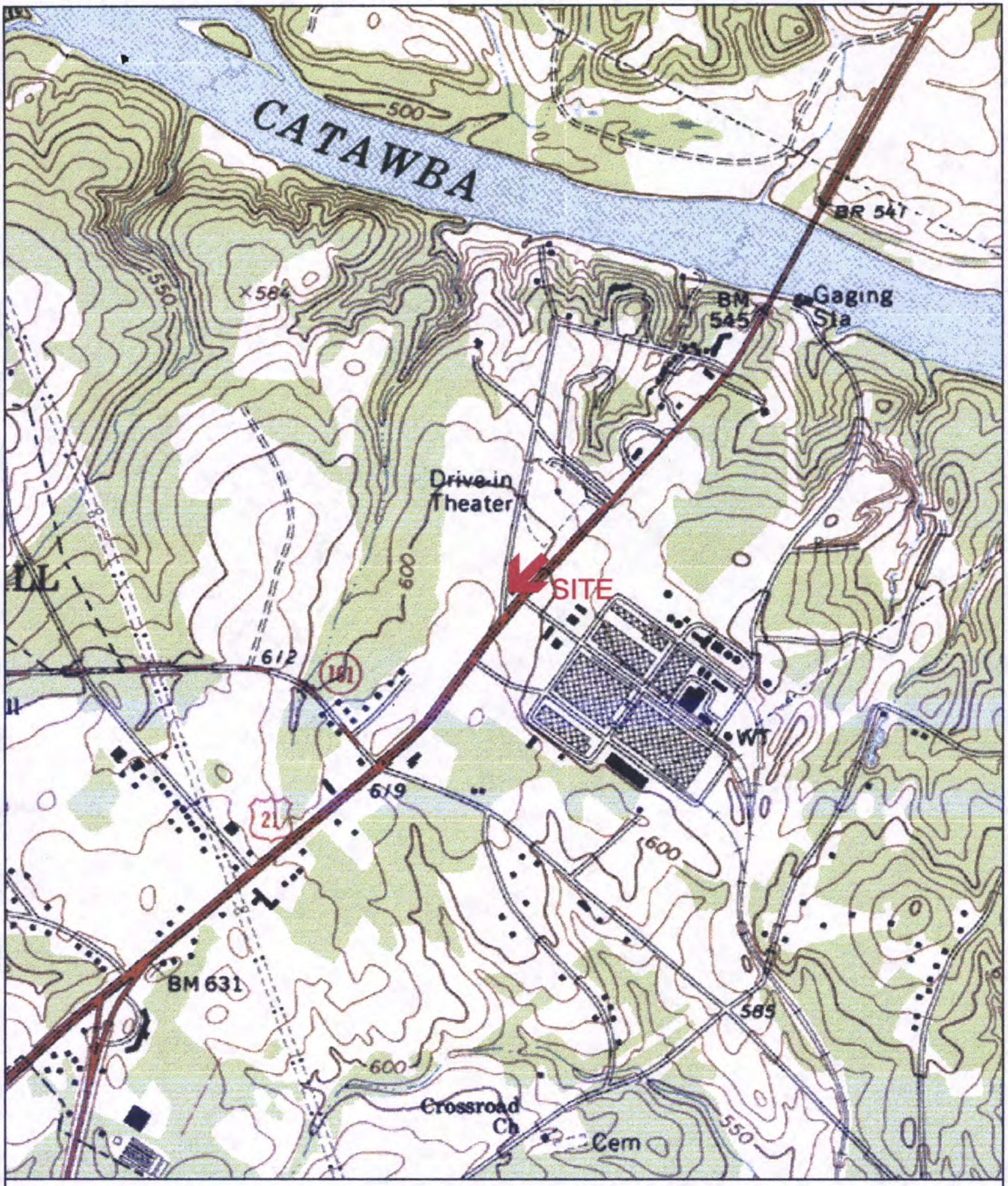
Sincerely,
NESCO, Inc.

William D. Wood, Jr., P.G.
S.C. Reg. #2116

Cc: Green's Oil Company
Mr. Jerry C. Green,
2849 Cherry Road
Rock Hill, SC 29730

Federated Insurance Company
Attn: John Fenske
121 East Park Square
P.O. Box 328
Owatonna, MN 55060

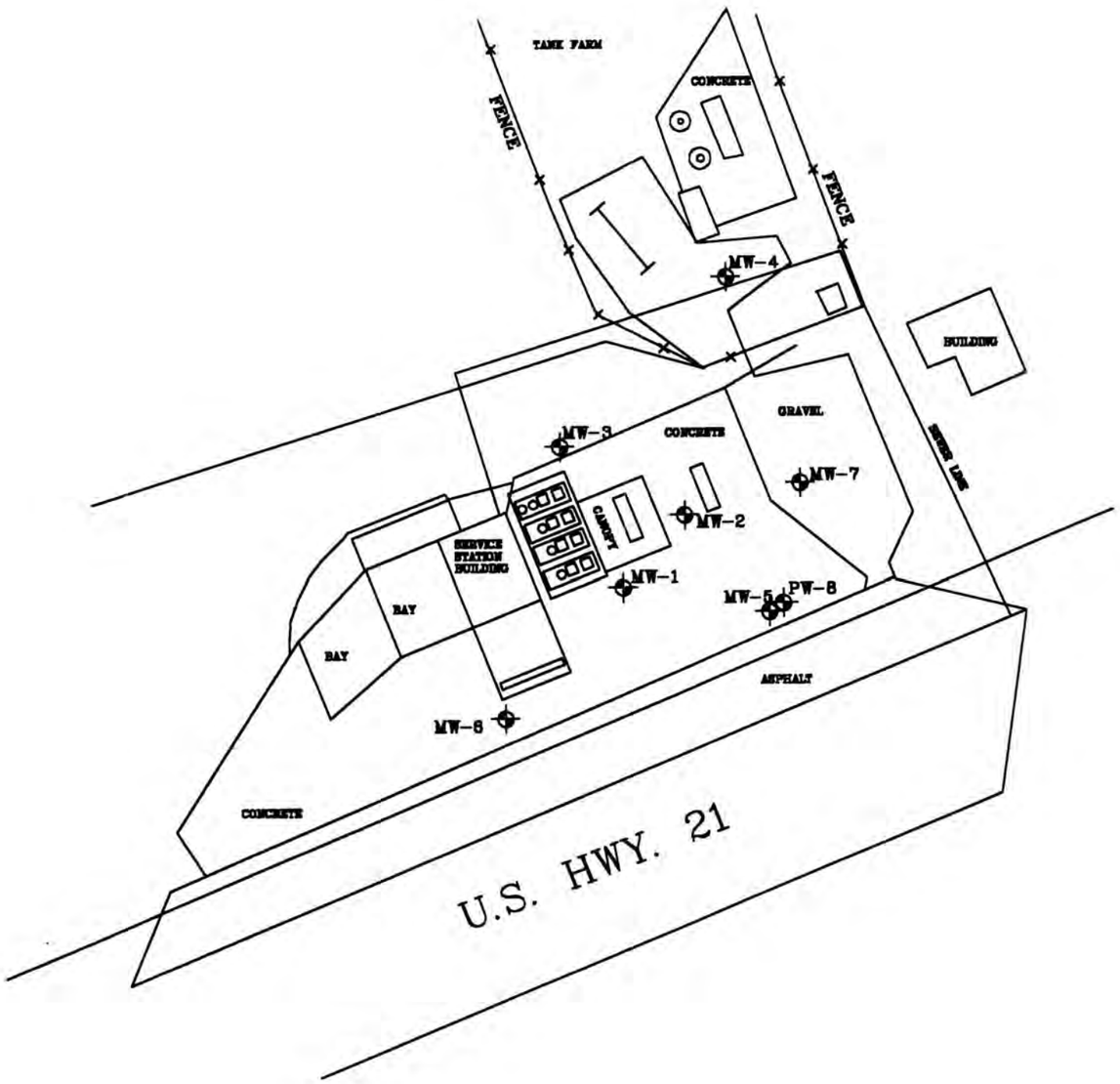
FIGURES



Name: ROCK HILL EAST
Date: 1/13/2003
Scale: 1 inch equals 1000 feet

Location: 034° 58' 42.0" N 080° 58' 55.4" W
Caption: FIGURE 1
SITE LOCATION MAP
GREENS OIL COMPANY

NORTH



GRAPHIC SCALE

40 0 20 40

1 inch = 40 ft.

LEGEND

- Monitoring Well
- Above Ground Vertical Tank

NESCO
Ingenuity At Work

NESCO, Inc.
521 CLEMSON ROAD
COLUMBIA, SOUTH CAROLINA 29229, USA
PHONE: 803.699.1976 FAX: 803.699.9863
EMAIL: COLUMBIA@NESCO-USA.COM

Figure 2
SITE MAP
December 2002

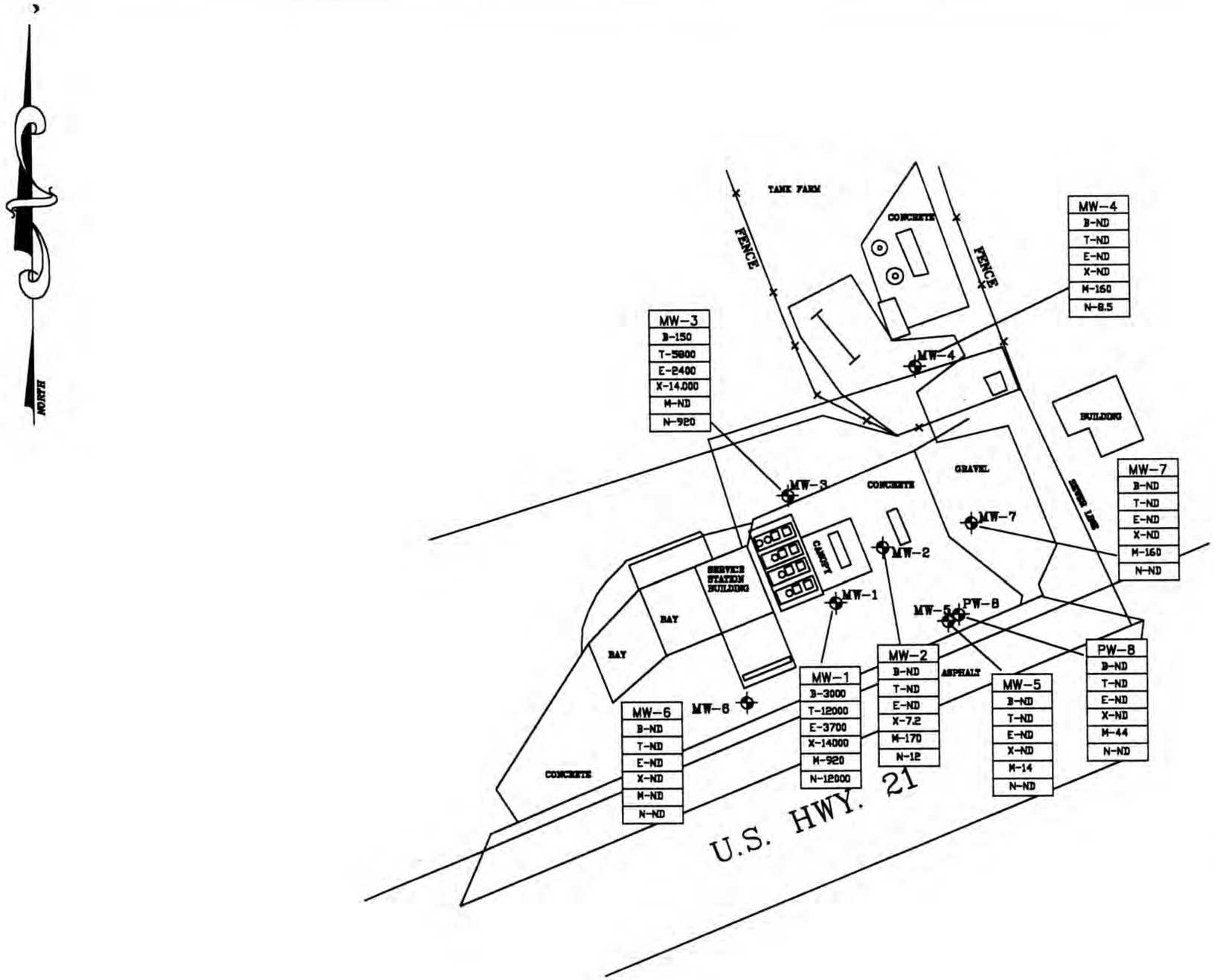
Green's Oil Company
Rock Hill, SC
York County
GWPD Site #09344

REFERENCES

1. MAP REFERENCE FROM TET SITE MAP

NOTES

PROJ. MGR.: Bill Wood
DESIGN BY:
DRAWN BY: TJW
DATE: 01/10/03
PROJECT NO: 21-2224A
DWG NO: Fig2.dwg



GRAPHIC SCALE

40 0 20 40

1 inch = 40 ft.

Note – All concentrations in micrograms/liter(ug/l)

LEGEND

- Monitoring Well
- Above Ground Vertical Tank
- B Benzene
- T Toluene
- E Ethylbenzene
- X Xylenes
- M MTBE
- N Naphthalene
- ND NOT DETECTED

NESCO
Ingenuity At Work

NESCO, Inc.
521 CLEMSON ROAD
COLUMBIA, SOUTH CAROLINA 29229, USA
PHONE: 803.699.1975 FAX: 803.699.9853
EMAIL: COLUMBIA@NESCO-USA.COM

Figure 3
GROUNDWATER COC MAP
December 2002

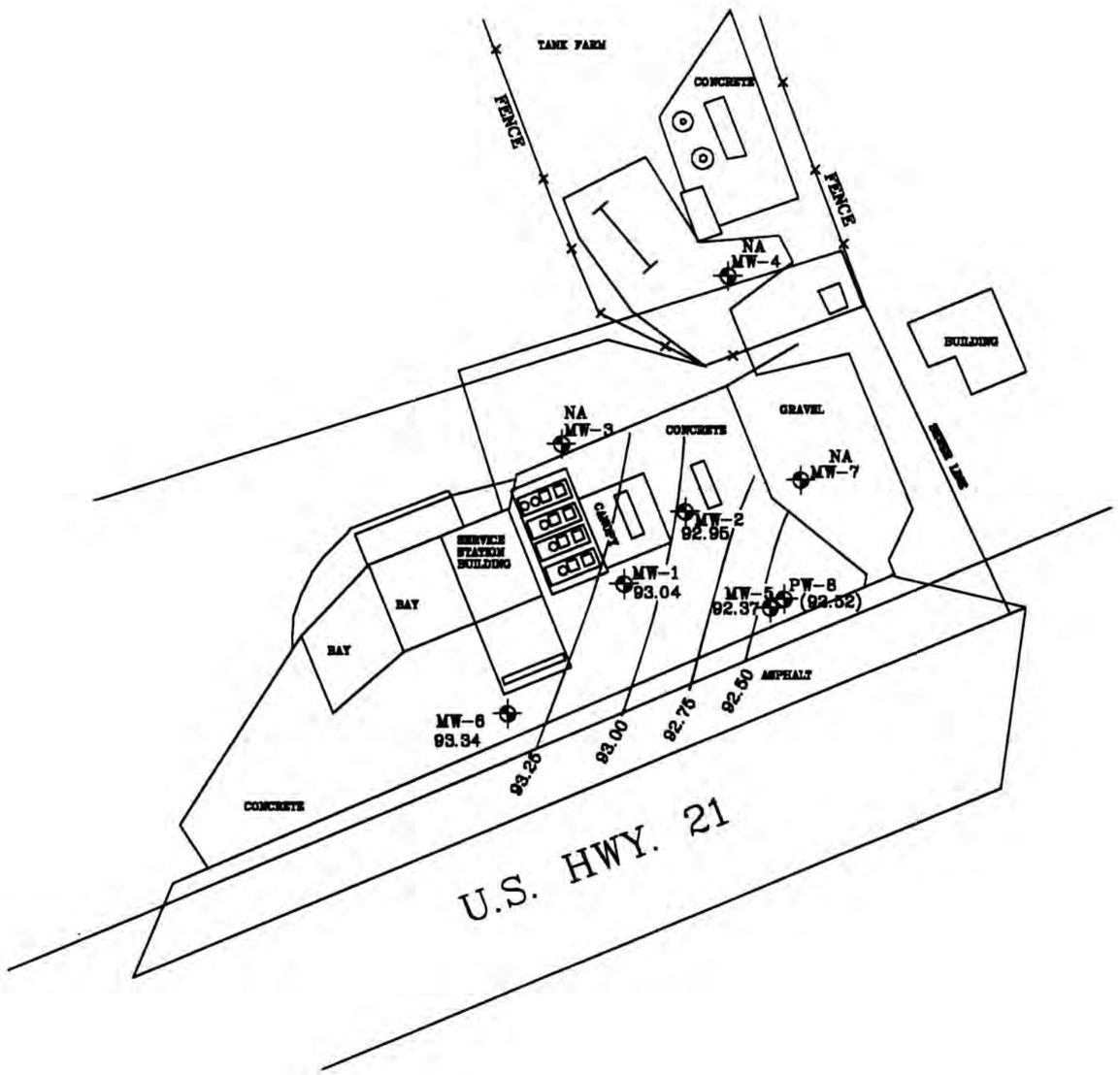
Green's Oil Company
Rock Hill, SC
York County
GWPD Site #09344

REFERENCES

1. MAP REFERENCE FROM TET SITE MAP

NOTES

PROJ. MGR.: Bill Wood
DESIGN BY:
DRAWN BY: TJW
DATE: 01/10/03
PROJECT NO: 21-2224A
DWG NO: Fig3.dwg



GRAPHIC SCALE

40 0 20 40

1 inch = 40 ft.

LEGEND

- Monitoring Well
- Above Ground Vertical Tank

NESCO
Ingenuity At Work

NESCO, Inc.
521 CLEMSON ROAD
COLUMBIA, SOUTH CAROLINA 29229, USA
PHONE: 803.699.1978 FAX: 803.699.9863
EMAIL: COLUMBIA@NESCO-USA.COM

Figure 4
POTENTIOMETRIC MAP
December 16, 2002

Green's Oil Company
Rock Hill, SC
York County
GWPD Site #09344

REFERENCES

1. MAP REFERENCE FROM TET SITE MAP

NOTES

PROJ. MGR.: Bill Wood
DESIGN BY:
DRAWN BY: TJW
DATE: 01/10/03
PROJECT NO: 21-2224A
DWG NO: Fig4.dwg

GREEN'S OIL COMPANY
ROCK HILL, SOUTH CAROLINA

TABLE 1
SUMMARY OF GROUNDWATER LEVELS

MONITOR WELL	DATE	TOC ELEVATION	TOC to WL	WL ELEVATION
MW-1	05/24/2000	98.15	7.16	90.99
	10/09/2000	98.15	7.78	90.37
	01/02/2001	98.15	9.58	88.57
	12/16/2002	98.15	5.11	93.04
MW-2	05/24/2000	97.86	7.03	90.83
	10/09/2000	97.86	7.71	90.15
	01/02/2001	97.86	9.43	88.43
	12/16/2002	97.86	4.91	92.95
MW-3	12/16/2002	NA	5.83	NA
MW-4	12/16/2002	NA	6.66	NA
MW-5	05/24/2000	97.04	6.56	90.48
	10/09/2000	97.04	7.15	89.89
	01/02/2001	97.04	8.90	88.14
	12/16/2002	97.04	4.67	92.37
MW-6	05/24/2000	98.59	8.10	90.49
	10/09/2000	98.59	7.92	90.67
	01/02/2001	98.59	9.52	89.07
	12/16/2002	98.59	5.25	93.34
MW-7	12/16/2002	NA	4.81	NA
PW-8	05/24/2000	96.98	6.45	90.53
	10/09/2000	96.98	7.12	89.86
	01/02/2001	96.98	8.69	88.29
	12/16/2002	96.98	4.46	92.52

TOC = Top of casing
WL = Water Level
Units in **feet**

GREEN'S OIL CO.
ROCK HILL, SOUTH CAROLINA

TABLE 2
FIELD MEASUREMENTS

MONITOR WELL	DATE	pH Standard	Conductivity mS/cm	Temperature celsius	DO mg/L
MW-1	05/24/2000	5.81	0	24.2	1.3
	10/09/2000	5.94	0.688	22.2	2.3
	01/02/2001	7.90	0	16.8	1.4
	12/16/2002	6.35	8.3	21.3	NM
MW-2	05/24/2000	5.82	0	23.0	1.9
	10/09/2000	5.93	0.641	22.4	2.4
	01/02/2001	7.57	0	13.2	0.0
	12/16/2002	6.53	6.47	21.2	2.06
MW-3	12/12/2002	7.01	10.39	16.3	NM
MW-4	12/16/2002	6.36	8.89	20.8	1.45
MW-5	05/24/2000	6.29	0	22.9	2.4
	10/09/2000	6.19	0.547	22.5	3.0
	01/02/2001	7.77	0	17.8	1.6
	12/12/2002	6.61	4.87	19.7	2.27
MW-6	05/24/2000	6.13	0	23.1	3.8
	10/09/2000	6.02	0.754	23.6	4.9
	01/02/2001	*NM*	*NM*	*NM*	*NM*
	12/12/2002	7.59	4.09	18.5	3.68
PW-8	05/24/2000	6.53	0	22.3	3.9
	10/09/2000	5.90	0.292	20.7	2.5
	01/02/2001	7.14	0	18.3	2.1
	12/12/2002	6.86	3.13	19.2	NM

NM = Not Measured

TABLE 3
CHEMICALS OF CONCERN
GREEN'S OIL COMPANY
ROCK HILL, SOUTH CAROLINA

Chemical of Concern	RBSL	Date	MW-1	MW-2	MW-3	MW-4	MW-5	MW-6	MW-7	PW-8
Benzene	5	05/09/2000	**1790**	**5.2**	NA	NA	ND	ND	NA	ND
		10/09/2000	**1600**	**31**	NA	NA	<5.0	<5.0	NA	<5.0
		01/02/2001	**500**	**7.2**	NA	NA	<5.0	<5.0	NA	<5.0
		12/12-16/2002	**3000**	<5.0	**150**	<5.0	<5.0	<5.0	<5.0	<5.0
Toluene	1000	05/09/2000	255	ND	NA	NA	ND	ND	NA	ND
		10/09/2000	180	5.7	NA	NA	<5.0	<5.0	NA	<5.0
		01/02/2001	9.0	<5.0	NA	NA	<5.0	<5.0	NA	<5.0
		12/12-16/2002	**12000**	<5.0	**5800**	<5.0	<5.0	<5.0	<5.0	<5.0
Ethylbenzene	700	05/09/2000	302	ND	NA	NA	ND	ND	NA	ND
		10/09/2000	220	<5.0	NA	NA	<5.0	<5.0	NA	<5.0
		01/02/2001	38	<5.0	NA	NA	<5.0	<5.0	NA	<5.0
		12/12-16/2002	**3700**	<5.0	**2400**	<5.0	<5.0	<5.0	<5.0	<5.0
Xylenes (TOTAL)	10,000	05/09/2000	611	ND	NA	NA	ND	ND	NA	ND
		10/09/2000	400	12	NA	NA	5.0	<5.0	NA	6.1
		01/02/2001	68	<5.0	NA	NA	<5.0	<5.0	NA	<5.0
		12/12-16/2002	**14000**	7.2	**14000**	<5.0	<5.0	<5.0	<5.0	<5.0
Naphthalene	25	05/09/2000	**117**	ND	NA	NA	ND	ND	NA	ND
		10/09/2000	**350**	15	NA	NA	5.0	<5.0	NA	<5.0
		01/02/2001	**55**	<5.0	NA	NA	<5.0	<5.0	NA	<5.0
		12/12-16/2002	**1700**	12	**920**	8.5	<5.0	<5.0	<5.0	<5.0
MTBE	40	05/09/2000	**1300**	**19900**	NA	NA	**14000**	ND	NA	**790**
		10/09/2000	**850**	**11000**	NA	NA	**9100**	<5.0	NA	**180**
		01/02/2001	**460**	**7700**	NA	NA	**1400**	<5.0	NA	**160**
		12/12-16/2002	**920**	**170**	<25	**160**	14	<5.0	**160**	**44**
Lead (ug/l)	15	05/09/2000	12.0	ND	NA	NA	ND	**52.0**	NA	ND
		10/09/2000	<3.0	<3.0	NA	NA	<3.0	**26.0**	NA	<3.0
		01/10/2001	<3.0	<3.0	NA	NA	<3.0	NA	NA	<3.0
		12/12-16/2002	14	<3.0	21	5.8	14	**48**	**58**	<3.0

Unit of measurements are ug/l except where noted.
NA = Not Analyzed
Shaded areas exceed the RBSLs.

Report of Analysis

NESCO
521 Clemson Road
Columbia, SC 29229
Attention: William Wood

Project Name: **Greens**

Project Number: **21-2224A**

Lot Number: **DL13041**

Date Completed: **12/27/2002**

Jennifer Orr
Project Manager

The following non-paginated documents are considered part of this report: Chain of Custody Record and Sample Receipt Checklist.

Case Narrative
NESCO
Lot Number: DL13041

This Report of Analysis contains the analytical result(s) for the sample(s) listed on the Sample Summary following this Case Narrative.

Sample receipt, sample analysis, and data review have been performed in accordance with Shealy's Quality Assurance Management Plan and Standard Operating Procedures. Any data qualifiers associated with sample analysis are footnoted on the analytical results page(s) or are discussed below.

SHEALY ENVIRONMENTAL SERVICES, INC.

Sample Summary
NESCO
Lot Number: DL13041

Sample Number	Sample ID	Matrix	Date Sampled
001	MW-3	Aqueous	12/12/2002 1715
002	MW-5	Aqueous	12/12/2002 1510
003	MW-6	Aqueous	12/12/2002 1745
004	MW-7	Aqueous	12/12/2002 1635
005	PW-8	Aqueous	12/12/2002 1555

(5 samples)

Executive Summary
NESCO
Lot Number: DL13041

Sample	Sample ID	Matrix	Parameter	Method	Result	Q	Units
001	MW-3	Aqueous	Benzene	8260B	150		ug/L
001	MW-3	Aqueous	Ethylbenzene	8260B	2400		ug/L
001	MW-3	Aqueous	Naphthalene	8260B	920		ug/L
001	MW-3	Aqueous	Toluene	8260B	5800		ug/L
001	MW-3	Aqueous	Xylenes (total)	8260B	14000		ug/L
001	MW-3	Aqueous	Lead	6010B	0.021		mg/L
002	MW-5	Aqueous	Methyl tertiary butyl ether	8260B	14		ug/L
002	MW-5	Aqueous	Lead	6010B	0.014		mg/L
003	MW-6	Aqueous	Lead	6010B	0.048		mg/L
004	MW-7	Aqueous	Methyl tertiary butyl ether	8260B	160		ug/L
004	MW-7	Aqueous	Lead	6010B	0.058		mg/L
005	PW-8	Aqueous	Methyl tertiary butyl ether	8260B	44		ug/L

(12 detections)

Volatile Organic Compounds by GC/MS

Client: **NESCO**
Description: **MW-3**
Date Sampled: **12/12/2002 1715**
Date Received: **12/13/2002**

Laboratory ID: **DL13041-001**
Matrix: **Aqueous**

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	5030B	8260B	5	12/26/2002 1925	RED		
2	5030B	8260B	50	12/26/2002 1951	RED		

Parameter	CAS Number	Analytical Method	Result	Q	PQL	Units	Run
Benzene	**71-43-2**	**8260B**	**150**		**25**	**ug/L**	**1**
Ethylbenzene	**100-41-4**	**8260B**	**2400**		**250**	**ug/L**	**2**
Methyl tertiary butyl ether (MTBE)	1634-04-4	8260B	ND		25	ug/L	1
Naphthalene	**91-20-3**	**8260B**	**920**		**25**	**ug/L**	**1**
Toluene	**108-88-3**	**8260B**	**5800**		**250**	**ug/L**	**2**
Xylenes (total)	**1330-20-7**	**8260B**	**14000**		**250**	**ug/L**	**2**

Surrogate	Q	Run 1 % Recovery	Acceptance Limits	Q	Run 2 % Recovery	Acceptance Limits
1,2-Dichloroethane-d4		98	70-130		95	70-130
Bromofluorobenzene		96	70-130		94	70-130
Toluene-d8		109	70-130		105	70-130

PQL = Practical quantitation limit
ND = Not detected at or above the PQL
B = Detected in the method blank
J = Estimated result less than the PQL
E = Quantitation of compound exceeded the calibration range
P = The RPD between two GC columns exceeds 40%
Where applicable, all soil sample analysis are reported on a dry weight basis unless flagged with a "W"

ICP-AES

Client: **NESCO**
Description: **MW-3**
Date Sampled: **12/12/2002 1715**
Date Received: **12/13/2002**

Laboratory ID: **DL13041-001**
Matrix: **Aqueous**

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	3005A	6010B	1	12/18/2002 1445	MAW	12/17/2002 1525	6154

Parameter	CAS Number	Analytical Method	Result	Q	PQL	Units	Run
Lead	**7439-92-1**	**6010B**	**0.021**		**0.0030**	**mg/L**	**1**

PQL = Practical quantitation limit
ND = Not detected at or above the PQL
B = Detected in the method blank
J = Estimated result less than the PQL
E = Quantitation of compound exceeded the calibration range
P = The RPD between two GC columns exceeds 40%
Where applicable, all soil sample analysis are reported on a dry weight basis unless flagged with a "W"

Volatile Organic Compounds by GC/MS

Client: **NESCO**
Description: **MW-5**
Date Sampled: **12/12/2002 1510**
Date Received: **12/13/2002**

Laboratory ID: **DL13041-002**
Matrix: **Aqueous**

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	5030B	8260B	1	12/21/2002 1728	RED		

Parameter	CAS Number	Analytical Method	Result	Q	PQL	Units	Run
Benzene	71-43-2	8260B	ND		5.0	ug/L	1
Ethylbenzene	100-41-4	8260B	ND		5.0	ug/L	1
Methyl tertiary butyl ether (MTBE)	**1634-04-4**	**8260B**	**14**		**5.0**	**ug/L**	**1**
Naphthalene	91-20-3	8260B	ND		5.0	ug/L	1
Toluene	108-88-3	8260B	ND		5.0	ug/L	1
Xylenes (total)	1330-20-7	8260B	ND		5.0	ug/L	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
1,2-Dichloroethane-d4		112	70-130
Bromofluorobenzene		92	70-130
Toluene-d8		106	70-130

PQL = Practical quantitation limit
ND = Not detected at or above the PQL
B = Detected in the method blank
J = Estimated result less than the PQL
E = Quantitation of compound exceeded the calibration range
P = The RPD between two GC columns exceeds 40%
Where applicable, all soil sample analysis are reported on a dry weight basis unless flagged with a "W"

ICP-AES

Client: **NESCO**
Description: **MW-5**
Date Sampled: **12/12/2002 1510**
Date Received: **12/13/2002**

Laboratory ID: **DL13041-002**
Matrix: **Aqueous**

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	3005A	6010B	1	12/18/2002 1450	MAW	12/17/2002 1525	6154

Parameter	CAS Number	Analytical Method	Result	Q	PQL	Units	Run
Lead	**7439-92-1**	**6010B**	**0.014**		**0.0030**	**mg/L**	**1**

PQL = Practical quantitation limit
ND = Not detected at or above the PQL
B = Detected in the method blank
J = Estimated result less than the PQL
E = Quantitation of compound exceeded the calibration range
P = The RPD between two GC columns exceeds 40%
Where applicable, all soil sample analysis are reported on a dry weight basis unless flagged with a "W"

Volatile Organic Compounds by GC/MS

Client: **NESCO**
Description: **MW-6**
Date Sampled: **12/12/2002 1745**
Date Received: **12/13/2002**

Laboratory ID: **DL13041-003**
Matrix: **Aqueous**

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	5030B	8260B	1	12/21/2002 1754	RED		

Parameter	CAS Number	Analytical Method	Result	Q	PQL	Units	Run
Benzene	71-43-2	8260B	ND		5.0	ug/L	1
Ethylbenzene	100-41-4	8260B	ND		5.0	ug/L	1
Methyl tertiary butyl ether (MTBE)	1634-04-4	8260B	ND		5.0	ug/L	1
Naphthalene	91-20-3	8260B	ND		5.0	ug/L	1
Toluene	108-88-3	8260B	ND		5.0	ug/L	1
Xylenes (total)	1330-20-7	8260B	ND		5.0	ug/L	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
1,2-Dichloroethane-d4		112	70-130
Bromofluorobenzene		91	70-130
Toluene-d8		107	70-130

PQL = Practical quantitation limit
ND = Not detected at or above the PQL
B = Detected in the method blank
J = Estimated result less than the PQL
E = Quantitation of compound exceeded the calibration range
P = The RPD between two GC columns exceeds 40%
Where applicable, all soil sample analysis are reported on a dry weight basis unless flagged with a "W"

ICP-AES

Client: **NESCO**
Description: **MW-6**
Date Sampled: **12/12/2002 1745**
Date Received: **12/13/2002**

Laboratory ID: **DL13041-003**
Matrix: **Aqueous**

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	3005A	6010B	1	12/18/2002 1455	MAW	12/17/2002 1525	6154

Parameter	CAS Number	Analytical Method	Result	Q	PQL	Units	Run
Lead	**7439-92-1**	**6010B**	**0.048**		**0.0030**	**mg/L**	**1**

POL = Practical quantitation limit
ND = Not detected at or above the PQL
B = Detected in the method blank
J = Estimated result less than the PQL
E = Quantitation of compound exceeded the calibration range
P = The RPD between two GC columns exceeds 40%
Where applicable, all soil sample analysis are reported on a dry weight basis unless flagged with a "W"

Volatile Organic Compounds by GC/MS

Client: **NESCO**
Description: **MW-7**
Date Sampled: **12/12/2002 1635**
Date Received: **12/13/2002**

Laboratory ID: **DL13041-004**
Matrix: **Aqueous**

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	5030B	8260B	1	12/21/2002 1820	RED		

Parameter	CAS Number	Analytical Method	Result	Q	PQL	Units	Run
Benzene	71-43-2	8260B	ND		5.0	ug/L	1
Ethylbenzene	100-41-4	8260B	ND		5.0	ug/L	1
Methyl tertiary butyl ether (MTBE)	**1634-04-4**	**8260B**	**160**		**5.0**	**ug/L**	**1**
Naphthalene	91-20-3	8260B	ND		5.0	ug/L	1
Toluene	108-88-3	8260B	ND		5.0	ug/L	1
Xylenes (total)	1330-20-7	8260B	ND		5.0	ug/L	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
1,2-Dichloroethane-d4		110	70-130
Bromofluorobenzene		87	70-130
Toluene-d8		103	70-130

PQL = Practical quantitation limit
ND = Not detected at or above the PQL
B = Detected in the method blank
J = Estimated result less than the PQL
E = Quantitation of compound exceeded the calibration range
P = The RPD between two GC columns exceeds 40%
Where applicable, all soil sample analysis are reported on a dry weight basis unless flagged with a "W"

ICP-AES

Client: **NESCO**
Description: **MW-7**
Date Sampled: **12/12/2002 1635**
Date Received: **12/13/2002**

Laboratory ID: **DL13041-004**
Matrix: **Aqueous**

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	3005A	6010B	1	12/18/2002 1500	MAW	12/17/2002 1525	6154

Parameter	CAS Number	Analytical Method	Result	Q	PQL	Units	Run
Lead	**7439-92-1**	**6010B**	**0.058**		**0.0030**	**mg/L**	**1**

PQL = Practical quantitation limit
ND = Not detected at or above the PQL
B = Detected in the method blank
J = Estimated result less than the PQL
E = Quantitation of compound exceeded the calibration range
P = The RPD between two GC columns exceeds 40%
Where applicable, all soil sample analysis are reported on a dry weight basis unless flagged with a "W"

Volatile Organic Compounds by GC/MS

Client: **NESCO**
Description: **PW-8**
Date Sampled: **12/12/2002 1555**
Date Received: **12/13/2002**

Laboratory ID: **DL13041-005**
Matrix: **Aqueous**

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	5030B	8260B	1	12/21/2002 1847	RED		

Parameter	CAS Number	Analytical Method	Result	Q	PQL	Units	Run
Benzene	71-43-2	8260B	ND		5.0	ug/L	1
Ethylbenzene	100-41-4	8260B	ND		5.0	ug/L	1
Methyl tertiary butyl ether (MTBE)	**1634-04-4**	**8260B**	**44**		**5.0**	**ug/L**	**1**
Naphthalene	91-20-3	8260B	ND		5.0	ug/L	1
Toluene	108-88-3	8260B	ND		5.0	ug/L	1
Xylenes (total)	1330-20-7	8260B	ND		5.0	ug/L	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
1,2-Dichloroethane-d4		111	70-130
Bromofluorobenzene		86	70-130
Toluene-d8		104	70-130

PQL = Practical quantitation limit
ND = Not detected at or above the PQL
B = Detected in the method blank
J = Estimated result less than the PQL
E = Quantitation of compound exceeded the calibration range
P = The RPD between two GC columns exceeds 40%
Where applicable, all soil sample analysis are reported on a dry weight basis unless flagged with a "W"

ICP-AES

Client: **NESCO**
Description: **PW-8**
Date Sampled: **12/12/2002 1555**
Date Received: **12/13/2002**

Laboratory ID: **DL13041-005**
Matrix: **Aqueous**

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	3005A	6010B	1	12/18/2002 1505	MAW	12/17/2002 1525	6154

Parameter	CAS Number	Analytical Method	Result	Q	PQL	Units	Run
Lead	7439-92-1	6010B	ND		0.0030	mg/L	1

PQL = Practical quantitation limit
ND = Not detected at or above the PQL
B = Detected in the method blank
J = Estimated result less than the PQL
E = Quantitation of compound exceeded the calibration range
P = The RPD between two GC columns exceeds 40%
Where applicable, all soil sample analysis are reported on a dry weight basis unless flagged with a "W"

SHEALY **Chain of Custody Record**

SHEALY ENVIRONMENTAL SERVICES, INC.
106 Vantage Point Drive
Cayce, South Carolina 29033
Telephone No. (803) 791-9700 Fax No. (803) 791-9111

Number 15572

Client: NESCO	Project Manager: WILLIAM WOOD	Telephone No. / Fax No. / E-mail:	Quote No.
Address: 521 CLEMSON RD	Sampler's Signature: X William Wood	Waybill No.	Page ____ of ____
City: COLUMBIA / State: SC / Zip Code: 29229	Printed Name: WILLIAM WOOD	Analysis (Attach list if more space is needed.)	
Project Name: GREENS			
Project No.: 21-2224A	P.O. No.		Lot No.: OL13041

Sample ID / Description (Containers for each sample may be combined on one line.)	Date	Time	G=Grab C=Composite	Matrix: Aqueous	Matrix: Solid	Matrix: Non-Aqueous	No. of Containers by Preservative Type: Unpres	H2SO4	HNO3	HCl	NaOH	5035 Kit	BTEX NAPH MTBE LEAD	Remarks / Cooler I.D.
MW-3	12/12/02	1715	G	✓					1	3			✓ ✓	
MW-5		1510												
MW-6		1745												
MW-7		1635												
PW-8	↓	1555	↓	↓					↓	↓			↓ ↓	

Possible Hazard Identification
[X] Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison ☐ Unknown

Sample Disposal
☐ Return to Client ☐ Disposal by Lab

Note: All samples are retained for six weeks from receipt unless other arrangements are made.

Turn Around Time Required (Prior lab approval required for expedited TAT.)
[X] Standard ☐ Rush (Specify)

QC Requirements (Specify)

	Date	Time		Date	Time
1. Relinquished by: William Wood	12/13/02	1100	1. Received by: SELLERS FEDEX	12/13/02	1100
2. Relinquished by:	12/13/02	1400	2. Received by:	12/13/02	1400
3. Relinquished by:	12/13/02	1621	3. Laboratory received by:	12/13/02	1621

Comments

LAB USE ONLY
Received on ice (Circle) (Yes) No Ice Pack

Receipt Temp. 3.8 °C

DISTRIBUTION: WHITE & YELLOW-Return to laboratory with Sample(s); PINK-Field/Client Copy

Shealy Form No. 1001

Sample Receipt Checklist

Client: NCSCo Cooler Rec'd by/date: BTF / 12-13-02 Lot #: OL13041

Means of receipt: ☑ SESI ☐ Client ☐ UPS ☐ FedEx ☐ DirectX ☐ Other

Cooler temperature upon receipt 3.8 °C
Method: ☑ Temperature Blank ☐ Against Bottles
Method of coolant: ☑ Wet Ice ☐ Blue Ice ☐ Dry Ice ☐ None

Yes ☐	No ☐	NA ☑	1. Is the shipper's packing slip attached to this form? (if applicable)
Yes ☑	No ☐	NA ☐	2. Was a chain of custody provided with the samples?
Yes ☑	No ☐	NA ☐	3. Were proper custody procedures followed?
Yes ☑	No ☐	NA ☐	4. Was the client name listed?
Yes ☑	No ☐	NA ☐	5. Were sample IDs listed?
Yes ☑	No ☐	NA ☐	6. Was collection date & time listed?
Yes ☑	No ☐	NA ☐	7. Were the tests to be performed listed on either the C of C or quote?
Yes ☑	No ☐	NA ☐	8. Did all samples arrive in the proper containers for each test?
Yes ☑	No ☐	NA ☐	9. Did all bottle labels agree with custody papers?
Yes ☑	No ☐	NA ☐	10. Did all containers arrive in good condition (unbroken)?
Yes ☑	No ☐	NA ☐	11. Was adequate sample volume available?
Yes ☑	No ☐	NA ☐	12. Were all samples received within ½ the holding time or 48 hours, whichever comes first?
Yes ☐	No ☑	NA ☐	13. Were any samples containers missing?
Yes ☐	No ☑	NA ☐	14. Were there any excess samples not listed on C of C?
Yes ☐	No ☑	NA ☐	15. Were air bubbles >6 mm in any VOA vials (if applicable)?
Yes ☑	No ☐	NA ☐	16. Were all Metals; Oil & Grease; Nutrient samples received at a pH of <2?
Yes ☐	No ☐	NA ☑	17. Were all Cyanide; Sulfide samples received at a pH >12?
Yes ☐	No ☐	NA ☑	18. Were all NH3; TKN; Cyanide; BNA; PEST; PCB; HERB; Toxicity samples free of residual chlorine? (< 0.2 mg/L)
Yes ☐	No ☐	NA ☑	19. For North Carolina samples, were collection temperatures documented on the chain of custody?

Sample Preservation (Must be completed for any sample(s) incorrectly preserved.)

Sample(s) _____ were received incorrectly preserved and were adjusted accordingly in sample receiving.

Sample(s) _____ were received incorrectly preserved and were unable to be analyzed.

Sample(s) _____ were received with bubble >6 mm in diameter

Toxicity sample(s) _____ were received with TRC > 0.2 mg/L and were analyzed by method 330.5.

Corrective Action taken, if necessary:

Was client notified: Yes ☐ No ☐
Did client respond: Yes ☐ No ☐
Date of response: _____
SESI employee: _____
Client instructions / Comments:

_____
_____
_____
_____
_____

SHEALY ENVIRONMENTAL SERVICES, INC.

Report of Analysis

NESCO
521 Clemson Road
Columbia, SC 29229
Attention: William Wood

Project Name: **Greens Oil**

Project Number: **21-2224A**

Lot Number: **DL18009**

Date Completed: **12/31/2002**

Jennifer Orr
Project Manager

The following non-paginated documents are considered part of this report: Chain of Custody Record and Sample Receipt Checklist.

Case Narrative
NESCO
Lot Number: DL18009

This Report of Analysis contains the analytical result(s) for the sample(s) listed on the Sample Summary following this Case Narrative.

Sample receipt, sample analysis, and data review have been performed in accordance with Shealy's Quality Assurance Management Plan and Standard Operating Procedures. Any data qualifiers associated with sample analysis are footnoted on the analytical results page(s) or are discussed below.

SHEALY ENVIRONMENTAL SERVICES, INC.

Sample Summary
NESCO
Lot Number: DL18009

Sample Number	Sample ID	Matrix	Date Sampled
001	MW-1	Aqueous	12/16/2002 1540
002	MW-2	Aqueous	12/16/2002 1500
003	MW-4	Aqueous	12/16/2002 1650

(3 samples)

Executive Summary
NESCO
Lot Number: DL18009

Sample	Sample ID	Matrix	Parameter	Method	Result	Q	Units
001	MW-1	Aqueous	Benzene	8260B	3000		ug/L
001	MW-1	Aqueous	Ethylbenzene	8260B	3700		ug/L
001	MW-1	Aqueous	Methyl tertiary butyl ether	8260B	920		ug/L
001	MW-1	Aqueous	Naphthalene	8260B	1700		ug/L
001	MW-1	Aqueous	Toluene	8260B	12000		ug/L
001	MW-1	Aqueous	Xylenes (total)	8260B	14000		ug/L
001	MW-1	Aqueous	Lead	6010B	0.014		mg/L
002	MW-2	Aqueous	Methyl tertiary butyl ether	8260B	170		ug/L
002	MW-2	Aqueous	Naphthalene	8260B	12		ug/L
002	MW-2	Aqueous	Xylenes (total)	8260B	7.2		ug/L
003	MW-4	Aqueous	Methyl tertiary butyl ether	8260B	160		ug/L
003	MW-4	Aqueous	Naphthalene	8260B	8.5		ug/L
003	MW-4	Aqueous	Lead	6010B	0.0058		mg/L

(13 detections)

Volatile Organic Compounds by GC/MS

Client: **NESCO**
Description: **MW-1**
Date Sampled: **12/16/2002 1540**
Date Received: **12/17/2002**

Laboratory ID: **DL18009-001**
Matrix: **Aqueous**

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	5030B	8260B	50	12/28/2002 1923	RED		
2	5030B	8260B	500	12/30/2002 1203	RED		

Parameter	CAS Number	Analytical Method	Result	Q	PQL	Units	Run
Benzene	**71-43-2**	**8260B**	**3000**		**250**	**ug/L**	**1**
Ethylbenzene	**100-41-4**	**8260B**	**3700**		**250**	**ug/L**	**1**
Methyl tertiary butyl ether (MTBE)	**1634-04-4**	**8260B**	**920**		**250**	**ug/L**	**1**
Naphthalene	**91-20-3**	**8260B**	**1700**		**250**	**ug/L**	**1**
Toluene	**108-88-3**	**8260B**	**12000**		**2500**	**ug/L**	**2**
Xylenes (total)	**1330-20-7**	**8260B**	**14000**		**2500**	**ug/L**	**2**

Surrogate	Q	Run 1 % Recovery	Acceptance Limits	Q	Run 2 % Recovery	Acceptance Limits
1,2-Dichloroethane-d4		85	70-130		104	70-130
Bromofluorobenzene		111	70-130		90	70-130
Toluene-d8		121	70-130		98	70-130

PQL = Practical quantitation limit
ND = Not detected at or above the PQL
B = Detected in the method blank
J = Estimated result less than the PQL
E = Quantitation of compound exceeded the calibration range
P = The RPD between two GC columns exceeds 40%
Where applicable, all soil sample analysis are reported on a dry weight basis unless flagged with a "W"

ICP-AES

Client: **NESCO**
Description: **MW-1**
Date Sampled: **12/16/2002 1540**
Date Received: **12/17/2002**

Laboratory ID: **DL18009-001**
Matrix: **Aqueous**

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	3005A	6010B	1	12/24/2002 1443	MNM	12/20/2002 1715	6188

Parameter	CAS Number	Analytical Method	Result	Q	PQL	Units	Run
Lead	**7439-92-1**	**6010B**	**0.014**		**0.0030**	**mg/L**	**1**

PQL = Practical quantitation limit
ND = Not detected at or above the PQL
B = Detected in the method blank
J = Estimated result less than the PQL
E = Quantitation of compound exceeded the calibration range
P = The RPD between two GC columns exceeds 40%
Where applicable, all soil sample analysis are reported on a dry weight basis unless flagged with a "W"

Volatile Organic Compounds by GC/MS

Client: **NESCO**
Description: **MW-2**
Date Sampled: **12/16/2002 1500**
Date Received: **12/17/2002**

Laboratory ID: **DL18009-002**
Matrix: **Aqueous**

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	5030B	8260B	1	12/28/2002 1948	RED		

Parameter	CAS Number	Analytical Method	Result	Q	PQL	Units	Run
Benzene	71-43-2	8260B	ND		5.0	ug/L	1
Ethylbenzene	100-41-4	8260B	ND		5.0	ug/L	1
Methyl tertiary butyl ether (MTBE)	**1634-04-4**	**8260B**	**170**		**5.0**	**ug/L**	**1**
Naphthalene	**91-20-3**	**8260B**	**12**		**5.0**	**ug/L**	**1**
Toluene	108-88-3	8260B	ND		5.0	ug/L	1
Xylenes (total)	**1330-20-7**	**8260B**	**7.2**		**5.0**	**ug/L**	**1**

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
1,2-Dichloroethane-d4		91	70-130
Bromofluorobenzene		107	70-130
Toluene-d8		117	70-130

PQL = Practical quantitation limit
ND = Not detected at or above the PQL
B = Detected in the method blank
J = Estimated result less than the PQL
E = Quantitation of compound exceeded the calibration range
P = The RPD between two GC columns exceeds 40%
Where applicable, all soil sample analysis are reported on a dry weight basis unless flagged with a "W"

ICP-AES

Client: **NESCO**
Description: **MW-2**
Date Sampled: **12/16/2002 1500**
Date Received: **12/17/2002**

Laboratory ID: **DL18009-002**
Matrix: **Aqueous**

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	3005A	6010B	1	12/24/2002 1504	MNM	12/20/2002 1715	6188

Parameter	CAS Number	Analytical Method	Result	Q	PQL	Units	Run
Lead	7439-92-1	6010B	ND		0.0030	mg/L	1

PQL = Practical quantitation limit
ND = Not detected at or above the PQL
B = Detected in the method blank
J = Estimated result less than the PQL
E = Quantitation of compound exceeded the calibration range
P = The RPD between two GC columns exceeds 40%
Where applicable, all soil sample analysis are reported on a dry weight basis unless flagged with a "W"

Volatile Organic Compounds by GC/MS

Client: **NESCO**
Description: **MW-4**
Date Sampled: **12/16/2002 1650**
Date Received: **12/17/2002**

Laboratory ID: **DL18009-003**
Matrix: **Aqueous**

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	5030B	8260B	1	12/28/2002 2013	RED		

Parameter	CAS Number	Analytical Method	Result	Q	PQL	Units	Run
Benzene	71-43-2	8260B	ND		5.0	ug/L	1
Ethylbenzene	100-41-4	8260B	ND		5.0	ug/L	1
Methyl tertiary butyl ether (MTBE)	**1634-04-4**	**8260B**	**160**		**5.0**	**ug/L**	**1**
Naphthalene	**91-20-3**	**8260B**	**8.5**		**5.0**	**ug/L**	**1**
Toluene	108-88-3	8260B	ND		5.0	ug/L	1
Xylenes (total)	1330-20-7	8260B	ND		5.0	ug/L	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
1,2-Dichloroethane-d4		95	70-130
Bromofluorobenzene		114	70-130
Toluene-d8		124	70-130

PQL = Practical quantitation limit
ND = Not detected at or above the PQL
B = Detected in the method blank
J = Estimated result less than the PQL
E = Quantitation of compound exceeded the calibration range
P = The RPD between two GC columns exceeds 40%
Where applicable, all soil sample analysis are reported on a dry weight basis unless flagged with a "W"

ICP-AES

Client: **NESCO**
Description: **MW-4**
Date Sampled: **12/16/2002 1650**
Date Received: **12/17/2002**

Laboratory ID: **DL18009-003**
Matrix: **Aqueous**

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	3005A	6010B	1	12/26/2002 1305	MAW	12/20/2002 1715	6188

Parameter	CAS Number	Analytical Method	Result	Q	PQL	Units	Run
Lead	**7439-92-1**	**6010B**	**0.0058**		**0.0030**	**mg/L**	**1**

PQL = Practical quantitation limit
ND = Not detected at or above the PQL
B = Detected in the method blank
J = Estimated result less than the PQL
E = Quantitation of compound exceeded the calibration range
P = The RPD between two GC columns exceeds 40%
Where applicable, all soil sample analysis are reported on a dry weight basis unless flagged with a "W"

SHEALY ENVIRONMENTAL SERVICES, INC.

SHEALY Chain of Custody Record

106 Vantage Point Drive
Cayce, South Carolina 29033
Telephone No. (803) 791-9700 Fax No. (803) 791-9111

Number 15573

Client: NESCO	Project Manager: WILLIAM WOOD	Telephone No. / Fax No. / E-mail	Quote No.
Address: 521 CLEMSON RD	Sampler's Signature: X William Wood	Waybill No.	Page ____ of ____
City: COLUMBIA State: SC Zip Code: 29501	Printed Name: WILLIAM WOOD	Analysis (Attach list if more space is needed.)	
Project Name: GREENS OIC			
Project No.: 21-2224A	P.O. No.		Lot No.: DL18009

Sample ID / Description (Containers for each sample may be combined on one line.)	Date	Time	G=Grab C=Composite	Matrix: Aqueous	Matrix: Solid	Matrix: Non-Aqueous	No. of Containers by Preservative Type: Unpres.	H2SO4	HNO3	HCl	NaOH	5035 Kit	BTEX, NAPH, MTBE	EDB	Remarks / Cooler I.D.
MW-1	12/14/02	1540	G	✓					1	3			✓	✓	
MW-2	↓	1500	↓	↓					↓	↓			✓	✓	
MW-4	↓	1650	↓	↓					↓	↓			✓	✓	

Possible Hazard Identification
☒ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison ☐ Unknown

Sample Disposal
☐ Return to Client ☒ Disposal by Lab

Note: All samples are retained for six weeks from receipt unless other arrangements are made.

Turn Around Time Required (Prior lab approval required for expedited TAT.)
☒ Standard ☐ Rush (Specify)

QC Requirements (Specify)

	Date	Time		Date	Time
1. Relinquished by: William Wood	12/16/02	1830	1. Received by: SECURE AREA	12/16/02	1830
2. Relinquished by: Secured Area	12-17-02	1520	2. Received by:	12-17-02	1520
3. Relinquished by:	12-17-02	1700	3. Laboratory received by:	12/17/02	1700

Comments

LAB USE ONLY
Received on ice (Circle) (Yes) No Ice Pack

Receipt Temp. 1.9 °C

DISTRIBUTION: WHITE & YELLOW-Return to laboratory with Sample(s); PINK-Field/Client Copy

Shealy Form No. 1001

Sample Receipt Checklist

Client: Nesco Cooler Rec'd by/date: BTF 12/18/00 Lot #: DL18009

Means of receipt: ☒ SESI ☐ Client ☐ UPS ☐ FedEx ☐ DirectX ☐ Other

Cooler temperature upon receipt _____ °C
Method: ☒ Temperature Blank ☐ Against Bottles
Method of coolant: ☒ Wet Ice ☐ Blue Ice ☐ Dry Ice ☐ None

Yes ☐	No ☐	NA ☒	1. Is the shipper's packing slip attached to this form? (if applicable)
Yes ☒	No ☐	NA ☐	2. Was a chain of custody provided with the samples?
Yes ☒	No ☐	NA ☐	3. Were proper custody procedures followed?
Yes ☒	No ☐	NA ☐	4. Was the client name listed?
Yes ☒	No ☐	NA ☐	5. Were sample IDs listed?
Yes ☒	No ☐	NA ☐	6. Was collection date & time listed?
Yes ☒	No ☐	NA ☐	7. Were the tests to be performed listed on either the C of C or quote?
Yes ☒	No ☐	NA ☐	8. Did all samples arrive in the proper containers for each test?
Yes ☒	No ☐	NA ☐	9. Did all bottle labels agree with custody papers?
Yes ☒	No ☐	NA ☐	10. Did all containers arrive in good condition (unbroken)?
Yes ☒	No ☐	NA ☐	11. Was adequate sample volume available?
Yes ☐	No ☒	NA ☐	12. Were all samples received within ½ the holding time or 48 hours, whichever comes first?
Yes ☐	No ☒	NA ☐	13. Were any samples containers missing?
Yes ☐	No ☒	NA ☐	14. Were there any excess samples not listed on C of C?
Yes ☐	No ☒	NA ☐	15. Were air bubbles >6 mm in any VOA vials (if applicable)?
Yes ☒	No ☐	NA ☐	16. Were all Metals; Oil & Grease; Nutrient samples received at a pH of <2?
Yes ☐	No ☐	NA ☒	17. Were all Cyanide; Sulfide samples received at a pH >12?
Yes ☐	No ☐	NA ☒	18. Were all NH3; TKN; Cyanide; BNA; PEST; PCB; HERB; Toxicity samples free of residual chlorine? (< 0.2 mg/L)
Yes ☐	No ☐	NA ☒	19. For North Carolina samples, were collection temperatures documented on the chain of custody?

Sample Preservation (Must be completed for any sample(s) incorrectly preserved.)

Sample(s) _____ were received incorrectly preserved and were adjusted accordingly in sample receiving.

Sample(s) _____ were received incorrectly preserved and were unable to be analyzed.

Sample(s) _____ were received with bubble >6 mm in diameter

Toxicity sample(s) _____ were received with TRC > 0.2 mg/L and were analyzed by method 330.5.

Corrective Action taken, if necessary:

Was client notified: Yes ☐ No ☐
Did client respond: Yes ☐ No ☐
Date of response: _____
SESI employee: _____
Client instructions / Comments:

_____

_____

_____

_____

_____

CBM
ENVIRONMENTAL SERVICES, INC.

July 7, 2003

Mr. Read Miner
South Carolina Department of Health
and Environmental Control
2600 Bull Street
Columbia, South Carolina 29201-1708

Re: Groundwater Monitoring Report
June 2003
Green's Oil Company
Rock Hill, York County
Site ID No. 09344
CBM No. 11030

Dear Mr. Miner:

The purpose of this report is to present the results of groundwater monitoring activities conducted in June 2003 at the above referenced site. The following Figures, Tables and Appendices have been attached:

- Figure 1: USGS Topographic Map
- Figure 2: Site Map
- Figure 3: Water Table Surface Map – June 12, 2003
- Figure 4: Groundwater Quality Map – June 12, 2003
- Table 1: Summary of Historical Groundwater Elevation Data
- Table 2: Summary of Historical Laboratory Analyses – Groundwater Samples
- Table 3: Summary of Natural Attenuation Parameters – June 12, 2003
- Appendix A: Groundwater Sampling Data Sheets – June 12, 2003
- Appendix B: Laboratory Reports – Groundwater Samples – June 12, 2003
- Appendix C: Certificate of Disposal

Depths to groundwater measured on June 12, 2003 in the Type II monitoring wells ranged from 2.20 to 3.52 feet. Groundwater elevations relative to a benchmark provided by the previous consultant ranged from 93.39 to 95.70 feet. Based on the June 2003 data, groundwater flow was generally toward the north. The average hydraulic gradient was approximately 0.02 feet per foot. The locations of the monitoring wells are shown on **Figure 2**. A summary of historical groundwater elevation data is presented in **Table 1**. A Water Table Surface Map based on data obtained in June 2003 has been included as **Figure 3**.

Seven Type II monitoring wells (MW-1 through MW-7) and one Type III monitoring well (PW-8) were developed and sampled on June 12, 2003. Groundwater samples were analyzed for BTEX constituents, MTBE and naphthalene using EPA Method 8260. In addition, groundwater samples were collected for natural attenuation evaluation. Groundwater samples were analyzed for methane by Method 8015, nitrates and sulfates by EPA Method 300.0, ferrous iron by Method 3500D, oxidation-reduction potential, dissolved oxygen, specific conductivity, temperature and pH.

P.O. Box 411387
Charlotte, NC 28241
704-527-4391

377 Carowinds Boulevard, #118
Fort Mill, SC 29708
803-548-5989

1411-B South Evans Street
Greenville, NC 27834
252-752-0200

5680-K West Cypress Street
Tampa, FL 33607
813-287-1828

Concentrations of one or more BTEX constituents, MTBE and/or naphthalene that exceeded the RBSLs were reported in monitoring wells MW-1 through MW-4, MW-7 and PW-8. Since the December 2002 sampling event total VOC concentrations have decreased significantly in two wells and remained relatively constant in the remaining wells. A Groundwater Quality Map showing the concentrations of BTEX constituents, MTBE and naphthalene from groundwater samples collected in June 2003 is included as **Figure 4**. A summary of historical laboratory analyses of groundwater samples is presented in **Table 2.** A summary of natural attenuation parameters is presented in **Table 3**. Groundwater sampling data sheets from the June 2003 sampling event have been included in **Appendix A**. A complete report of laboratory analyses of groundwater samples collected in June 2003 has been included as **Appendix B**. Purge water was stored in a 55-gallon drum and transported to a licensed disposal facility. The certificate of disposal is included as **Appendix C**.

Please do not hesitate to contact the undersigned at (803) 548-5989 if you have any questions or comments concerning this project.

Sincerely,

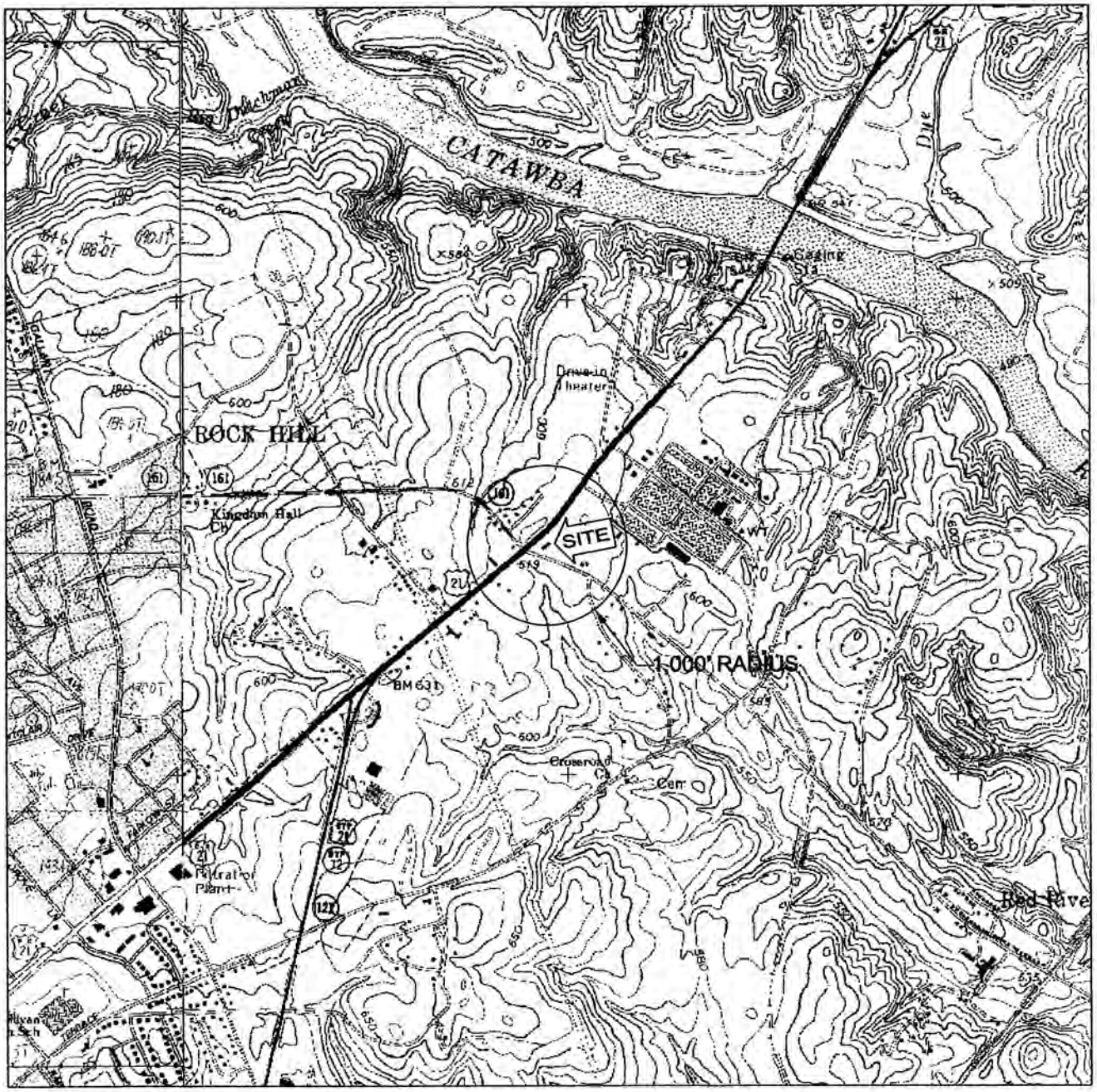
Holly Freiman
Staff Engineer

Rohit Shetty, P.E.
License No. 20533

enclosures

cc: file

/HF



SCALE 1:24,000

1 0 1 MILE

1000 0 1000 2000 3000 4000 5000 6000 7000 FEET

CONTOUR INTERVAL 10 FEET

QUADRANGLE LOCATION

ROCK HILL EAST, SC QUADRANGLE

CBM ENVIRONMENTAL SERVICES, INC.

LATITUDE:	34° 58' 29" N
LONGITUDE:	80° 59' 3" W
DRAWN BY:	AWB
CHECKED BY:	HF
DATE:	7/2/03

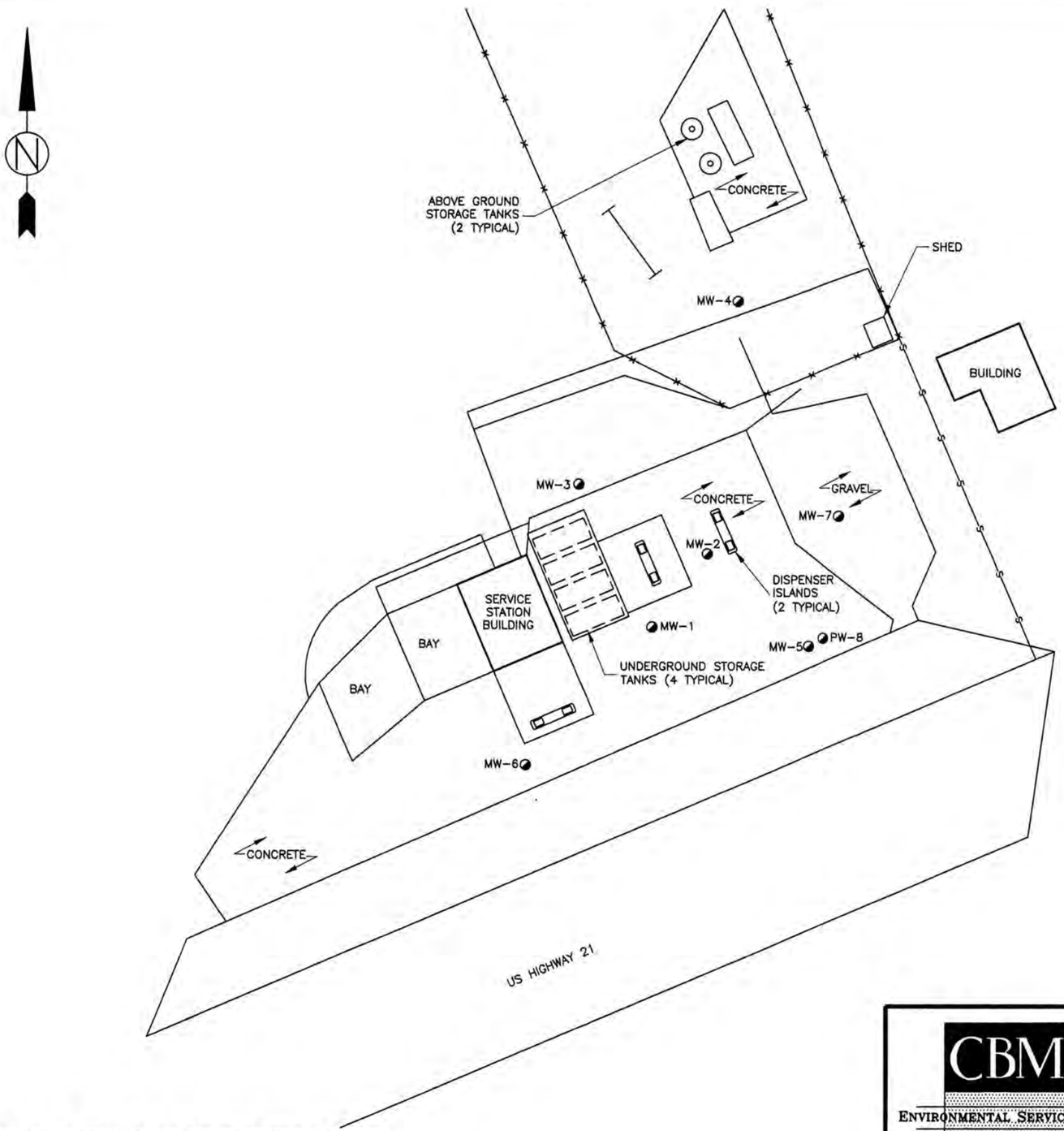
GREEN'S OIL CO.
2849 CHERRY RD.
ROCK HILL, SC

SITE ID NO. 09344

FIGURE 1

USGS TOPOGRAPHIC MAP

CBM PROJECT NO. 11030



LEGEND

- MONITORING WELL
- FENCE
- S — SEWER LINE

SCALE

0 10 20 30 40

FEET

NOTE: FIGURE BASED ON SITE MAP BY PREVIOUS CONSULTANT.

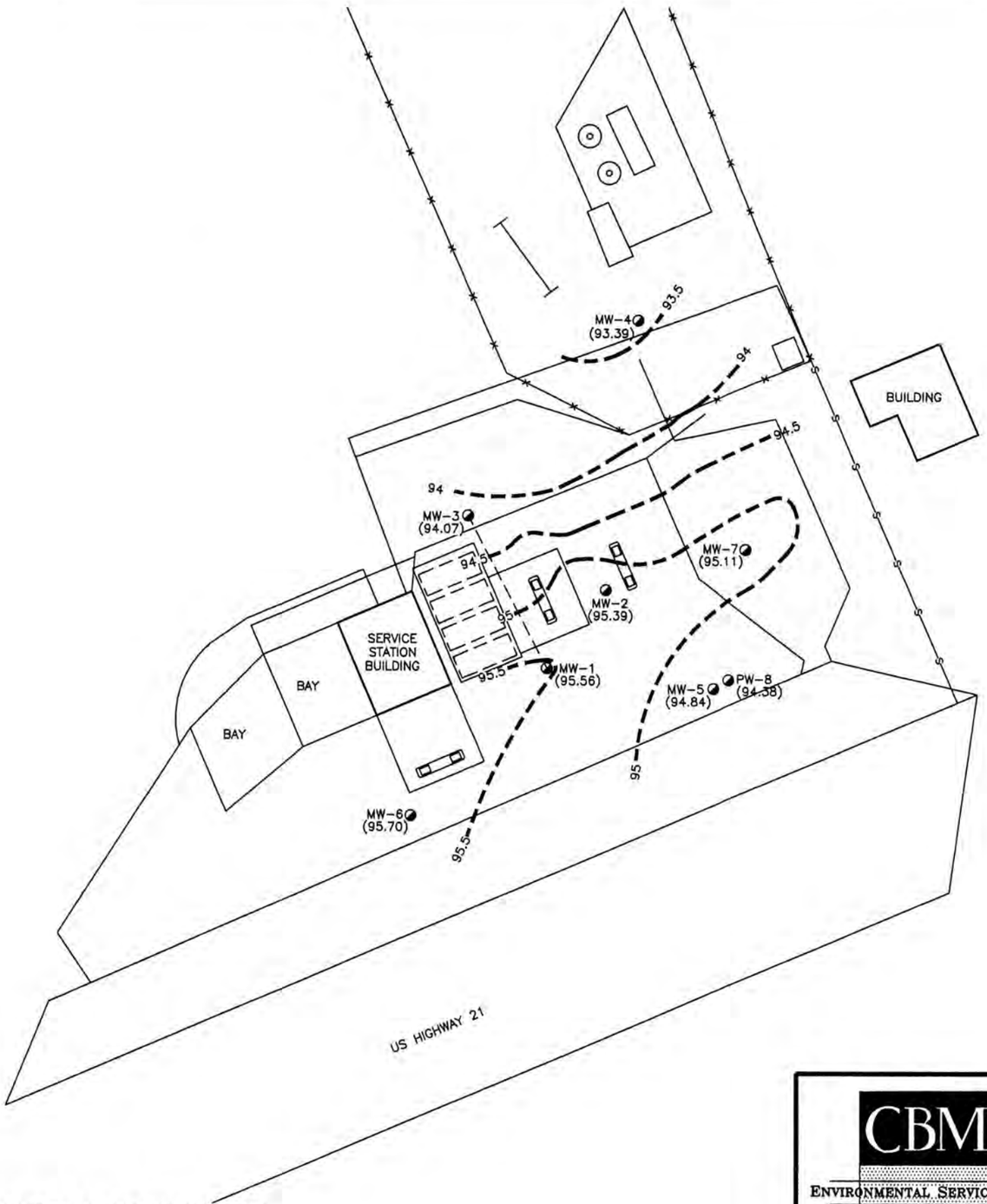
CBM ENVIRONMENTAL SERVICES, INC.

SITE I.D. NO.	09344
PROJECT NO.	11030
DRAWN BY:	BLS/AWB
CHECKED BY:	HF
DWG DATE:	7/3/03

SITE MAP

GREEN'S OIL CO.
2489 CHERRY ROAD
ROCK HILL, SC

FIGURE 2



LEGEND

- MONITORING WELL
- FENCE
- S SEWER LINE
- WATER TABLE SURFACE CONTOUR
- (95.70) WATER TABLE ELEVATION IN FEET

SCALE
0 10 20 30 40
FEET

NOTE: FIGURE BASED ON SITE MAP BY PREVIOUS CONSULTANT.

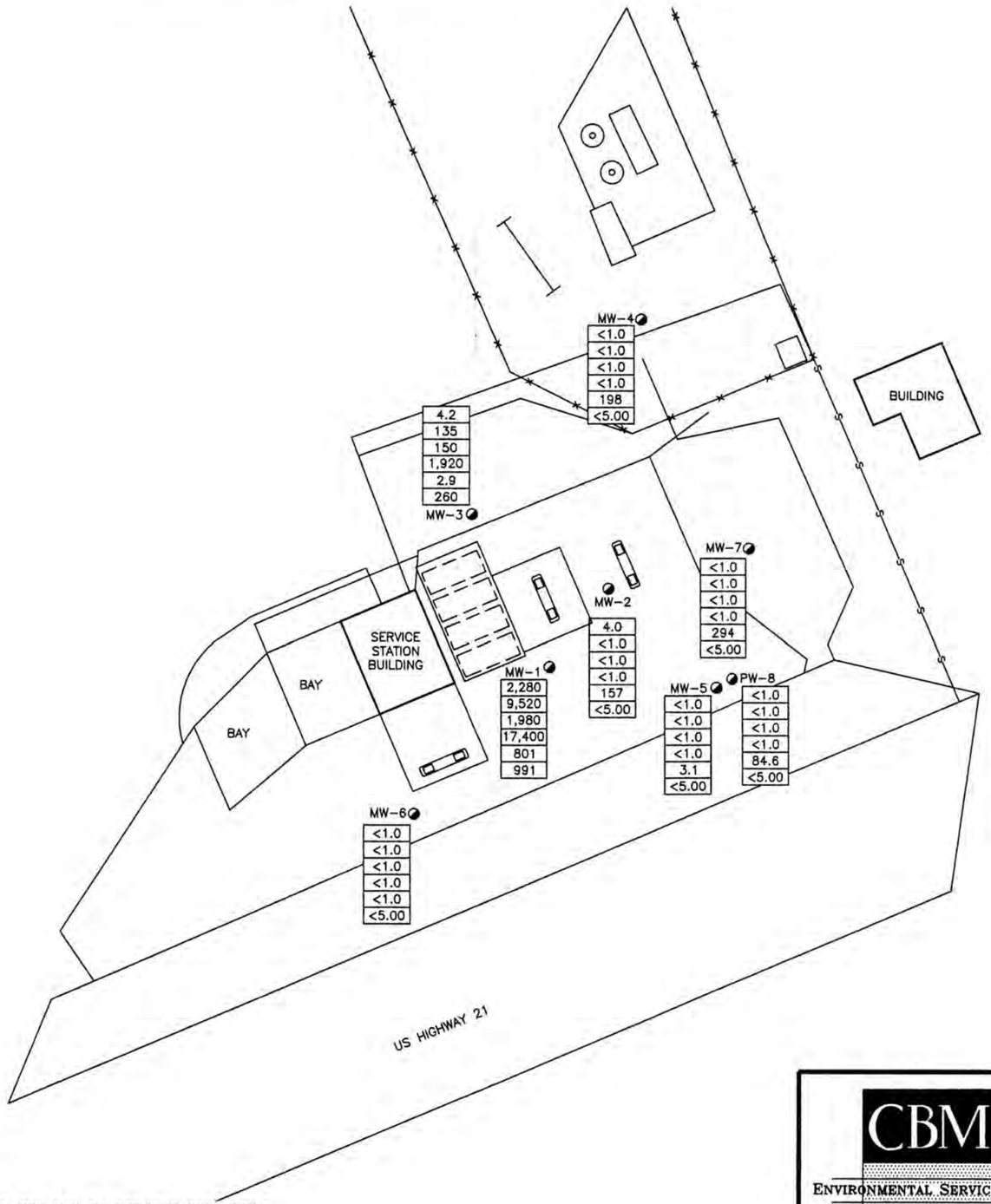
CBM
ENVIRONMENTAL SERVICES, INC.

SITE I.D. NO.	09344
PROJECT NO.	11030
DRAWN BY:	BLS/AWB
CHECKED BY:	HF
DWG DATE:	7/3/03

WATER TABLE SURFACE MAP
JUNE 12, 2003

GREEN'S OIL CO.
2489 CHERRY ROAD
ROCK HILL, SC

FIGURE 3



LEGEND

- MONITORING WELL
- FENCE
- SEWER LINE

2,280	BENZENE
9,520	TOLUENE
1,980	ETHYLBENZENE
17,400	XYLENES
801	MTBE
991	NAPHTHALENE

CONCENTRATIONS IN $\mu g/L$

<1.0 – LESS THAN THE METHOD DETECTION LIMIT SPECIFIED IN THE LABORATORY REPORT

SCALE

0 10 20 30 40

FEET

NOTE: FIGURE BASED ON SITE MAP BY PREVIOUS CONSULTANT.

CBM ENVIRONMENTAL SERVICES, INC.

SITE I.D. NO.	09344
PROJECT NO.	11030
DRAWN BY:	BLS/AWB
CHECKED BY:	HF
DWG DATE:	7/3/03

GROUNDWATER QUALITY MAP
JUNE 12, 2003

GREEN'S OIL CO.
2489 CHERRY ROAD
ROCK HILL, SC

FIGURE 4

TABLE 1
SUMMARY OF HISTORICAL GROUNDWATER ELEVATION DATA[1]
GREEN'S OIL COMPANY

Well No.	Date	Top of Casing Elevation	Depth to Groundwater	Groundwater Elevation	Well Depth[2]	Dissolved Oxygen[3]
MW-1	05/24/00	98.15	7.16	90.99	12.33	1.3
	10/09/00		7.78	90.37		2.3
	01/02/01		9.58	88.57		1.4
	12/16/02		5.11	93.04		NM[4]
	06/12/03		2.59	95.56		0.79
MW-2	05/24/00	97.86	7.03	90.83	14.04	1.9
	10/09/00		7.71	90.15		2.4
	01/02/01		9.43	88.43		0.0
	12/16/02		4.91	92.95		2.06
	06/12/03		2.47	95.39		0.53
MW-3	12/16/02	97.08	5.83	91.25	7.75	NM
	06/12/03		3.01	94.07		1.14
MW-4	12/16/02	96.91	6.66	90.25	13.59	1.45
	06/12/03		3.52	93.39		0.69
MW-5	05/24/00	97.04	6.56	90.48	10.04	2.4
	10/09/00		7.15	89.89		3.0
	01/02/01		8.90	88.14		1.6
	12/16/02		4.67	92.37		2.27
	06/12/03		2.20	94.84		1.51
MW-6	05/24/00	98.59	8.10	90.49	9.60	3.8
	10/09/00		7.92	90.67		4.9
	01/02/01		9.52	89.07		NM
	12/16/02		5.25	93.34		3.68
	06/12/03		2.89	95.70		4.48
MW-7	12/16/02	98.40	4.81	93.59	13.60	NM
	06/12/03		3.29	95.11		0.84
PW-8	05/24/00	96.98	6.45	90.53	30.10	3.9
	10/09/00		7.12	89.86		2.5
	01/02/01		8.69	88.29		2.1
	12/16/02		4.46	92.52		NM
	06/12/03		2.60	94.38		1.23

Notes:

1. Top of casing elevations were reproduced from the previous consultant's reports. Additional well construction details are unavailable; data reported in feet.
2. Well depths measured during June 12, 2003 sampling event.
3. Dissolved oxygen levels were measured using a DO meter; results reported in mg/L.
4. Not measured.

TABLE 2
SUMMARY OF HISTORICAL LABORATORY ANALYSES[1]
GROUNDWATER SAMPLES
GREEN'S OIL COMPANY

Well No.	Date	Benzene	Toluene	Ethylbenzene	Xylenes	MTBE	Naphthalene	Lead
MW-1	10/24/96	**3,040**[2]	164	325	950	**2,310**	**365**	NR[3]
	05/09/00	**1,790**	255	302	611	**1,300**	**117**	12.0
	10/09/00	**1,600**	180	220	400	**850**	**350**	<3.0[4]
	01/02/01	**500**	9.0	38	68	**460**	**55**	<3.0
	12/16/02	**3,000**	**12,000**	**3,700**	**14,000**	**920**	**1,700**	14
	06/12/03	**2,280**	**9,520**	**1,980**	**17,400**	**801**	**991**	NR
MW-2	10/24/96	<10.0	<10.0	<10.0	<3.0	**24,700**	<5.0	NR
	05/09/00	**5.2**	ND[5]	ND	ND	**19,900**	ND	ND
	10/09/00	**31**	5.7	<5.0	12	**11,000**	15	<3.0
	01/02/01	**7.2**	<5.0	<5.0	<5.0	**7,700**	<5.0	<3.0
	12/16/02	<5.0	<5.0	<5.0	7.2	**170**	**12**	<3.0
	06/12/03	4.0	<1.0	<1.0	<1.0	**157**	<5.00	NR
MW-3	10/24/96	NF[6]	NF	NF	NF	NF	NF	NF
	05/09/00	NF	NF	NF	NF	NF	NF	NF
	10/09/00	NF	NF	NF	NF	NF	NF	NF
	01/02/01	NF	NF	NF	NF	NF	NF	NF
	12/12/02	**150**	**5,800**	**2,400**	**14,000**	<25	**920**	**21**
	06/12/03	4.2	135	150	1,920	2.9	**260**	NR
MW-4	10/24/96	<1.0	<1.0	<1.0	<3.0	**70.4**	<5.0	NR
	05/09/00	NF	NF	NF	NF	NF	NF	NF
	10/09/00	NF	NF	NF	NF	NF	NF	NF
	01/02/01	NF	NF	NF	NF	NF	NF	NF
	12/16/02	<5.0	<5.0	<5.0	<5.0	**160**	8.5	5.8
	06/12/03	<1.0	<1.0	<1.0	<1.0	**198**	<5.00	NR
	RBSL[7]	5	1,000	700	10,000	40	10	15

TABLE 2 (cont'd.)
SUMMARY OF HISTORICAL LABORATORY ANALYSES
GROUNDWATER SAMPLES
GREEN'S OIL COMPANY

Well No.	Date	Benzene	Toluene	Ethylbenzene	Xylenes	MTBE	Naphthalene	Lead
MW-5	10/24/96	<1.0	<1.0	<1.0	<3.0	**1,720**	<5.0	NR
	05/09/00	ND	ND	ND	ND	**14,000**	ND	ND
	10/09/00	<5.0	<5.0	<5.0	<5.0	**9,100**	<5.0	<3.0
	01/02/01	<5.0	<5.0	<5.0	<5.0	**1,400**	<5.0	<3.0
	12/12/02	<5.0	<5.0	<5.0	<5.0	14	<5.0	14
	06/12/03	<1.0	<1.0	<1.0	<1.0	3.1	<5.00	NR
MW-6	10/24/96	NS[8]	NS	NS	NS	NS	NS	NS
	05/09/00	ND	ND	ND	ND	ND	ND	**52.0**
	10/09/00	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	**26.0**
	01/02/01	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	NS
	12/12/02	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	**48**
	06/12/03	<1.0	<1.0	<1.0	<1.0	<1.0	<5.00	NR
MW-7	10/24/96	NF	NF	NF	NF	NF	NF	NF
	05/09/00	NF	NF	NF	NF	NF	NF	NF
	10/09/00	NF	NF	NF	NF	NF	NF	NF
	01/02/01	NF	NF	NF	NF	NF	NF	NF
	12/12/02	<5.0	<5.0	<5.0	<5.0	**160**	<5.0	**58**
	06/12/03	<1.0	<1.0	<1.0	<1.0	**294**	<5.00	NR
PW-8	10/24/96	<1.0	<1.0	<1.0	<3.0	**547**	<5.0	NR
	05/09/00	ND	ND	ND	ND	**790**	ND	ND
	10/09/00	<5.0	<5.0	<5.0	6.1	**180**	<5.0	<3.0
	01/02/01	<5.0	<5.0	<5.0	<5.0	**160**	<5.0	<3.0
	12/12/02	<5.0	<5.0	<5.0	<5.0	**44**	<5.0	<3.0
	06/12/03	<1.0	<1.0	<1.0	<1.0	**84.6**	<5.00	NR
	RBSL	5	1,000	700	10,000	40	10	15

TABLE 2 (cont'd.)
SUMMARY OF HISTORICAL LABORATORY ANALYSES
GROUNDWATER SAMPLES
GREEN'S OIL COMPANY

Notes:

1. Analyses for BTEX constituents, MTBE and Naphthalene by EPA Method 8260B; groundwater quality data prior to June 12, 2003 reproduced from previous consultant's reports; results reported in µg/L.
2. Concentrations in bold face type exceeded the January 1998 Risk Based Screening Level.
3. Analysis not requested.
4. Less than the method detection limit specified in the laboratory report.
5. Not detected.
6. Well not found.
7. January 1998 Risk Based Screening Level.
8. Not sampled due to insufficient volume of water in the well.

TABLE 3
SUMMARY OF NATURAL ATTENUATION PARAMETERS[1]
GREEN'S OIL COMPANY
JUNE 12, 2003

Well No.	DO (mg/L)	Temp (°C)	pH	Redox Potential (mV)	Specific Conductance (µS/cm)	Methane (µg/L)	Nitrate (mg/L)	Sulfate (mg/L)	Ferrous Iron (µg/L)
MW-1	0.79	26.1	6.46	-35	922	7,240	<0.10[2]	<1.00	19,600
MW-2	0.53	21.9	6.02	-70	770	255	<0.10	3.23	3,500
MW-3	1.14	22.1	6.41	-60	699	1,100	<0.10	<1.00	23,200
MW-4	0.69	21.1	6.25	-70	1,016	743	<0.100	5.79	18,300
MW-5	1.51	23.9	6.42	115	553	<26	1.20	10.2	<100
MW-6	4.48	23.7	6.29	110	636	<26	0.44	2,170	540
MW-7	0.84	21.9	6.36	65	442	<26	0.870	24.4	1,760
PW-8	1.23	25.5	6.39	110	356	<26	0.39	28.8	111

Notes:
1. Analysis for Methane by Method 8015, Nitrate and Sulfate by EPA Method 300.0 and Ferrous Iron by Method 3500D.
2. Less than the method detection limit specified in the laboratory report.

GAUGE REPORT

CBM Environmental Services, Inc.
377 Carowinds Boulevard, Suite 118
Fort Mill, South Carolina 29708

Project Name: Green Oil Co. Location: Rock Hill, SC

Project Number: 11030 Date: 6/12/03

Measured By: Holly Freisen Weather: hot, sunny, cloudy, rainy

Well Number	Depth to Product (feet)	Depth to Water (feet)	Product Thickness (feet)	Product Recovered (gallons)	Well Depth (feet)	Volume Purged (gallons)
MW-1	—	2.59			12.33	
MW-2	—	2.47			14.04	
MW-3	—	3.01			7.75	
MW-4	—	3.52			13.59	
MW-5	—	2.20			10.04	
MW-6	—	2.89			9.60	
MW-7	—	3.29			13.60	
PW-8	—	2.60			30.10	

Remarks:

South Carolina Department of Health and Environmental Control
Bureau of Underground Storage Tank Management

Field Data Information Sheet for Ground Water Sampling

Date(mm/dd/yy) 06/12/03
Field Personnel Holly Freisen
General Weather Conditions hot, sunny, cloudy, rainy
Ambient Air Temperature 29.5 °C

Facility Name Green Oil Co. Site ID# 00815

Quality Assurance:

pH Meter: serial no. _____
pH=4.0 _____
pH=7.0 _____
pH=10.0 _____

Conductivity Meter serial no. _____
Standard _____
Standard _____
Standard _____

Chain of Custody

Relinquished by	Date / Time	Received by	Date/Time

Well # MW-1

Well Diameter(D) 4 inch or ____ feet
conversion factor(C): 3.143*(D/2)^2
for a 2 inch well C=0.163
4 inch well C=0.652
Total Well Depth(TWD) 12.33 ft.
Depth to GW (DGW) 2.59 ft.

Length of Water Column(LWC=TWD-DGW) 9.74 ft.

1 Csg. Volume(LWC * C) = 9.74 X 0.652 = 6.23 gals.
3 Csg. Volumes = 3 X 6.23 = 18.7 gals. (Std. Purge Volume)

Total Volume of Water Purged Before Sampling 18.75 gals.

	Initial	1st vol.	2nd vol.	3rd vol.	4th vol.	5th vol.	Post	Sampling
Volume Purged (gallons)	0	6.25	12.5	18.75				
Time (military)	1422	1428	1435	1450				
pH (s.u.)	6.46	6.28	6.28	6.19				
Specific Cond. (umhos/cm)	883	930	921	922				
Water Temp (°C)	26.1	22.7	21.1	21.3				
Turbidity (*)	4	4	4	4				
DO Readings	0.79	1.21	1.38	2.18				

* subjective (1) None (2) Faint (3) Moderate (4) Strong

Remarks Sampled after 75 bailers

South Carolina Department of Health and Environmental Control
Bureau of Underground Storage Tank Management

Field Data Information Sheet for Ground Water Sampling

Date(mm/dd/yy) 06/12/03
Field Personnel Holly Freisen
General Weather Conditions hot, sunny, cloudy, rainy
Ambient Air Temperature 29.5 °C

Facility Name Green Oil Co. Site ID# 00815

Quality Assurance:

pH Meter:
serial no.
pH=4.0
pH=7.0
pH=10.0

Conductivity Meter
serial no.
Standard
Standard
Standard

Chain of Custody

Relinquished by	Date / Time	Received by	Date/Time

Well # MW-2

Well Diameter(D) 4 inch or ___ feet
conversion factor(C): 3.143*(D/2)^2
for a 2 inch well C=0.163
4 inch well C=0.652
Total Well Depth(TWD) 2.47 ft.
Depth to GW (DGW) 14.04 ft.

Length of Water Column(LWC=TWD-DGW) 11.57 ft.

1 Csg. Volume(LWC * C) = 11.57 X 0.652 7.40 gals.
3 Csg. Volumes = 3 X 7.40 = 22.2 gals. (Std. Purge Volume)

Total Volume of Water Purged Before Sampling 22.25 gals.

	Initial	1st vol.	2nd vol.	3rd vol.	4th vol.	5th vol.	Post	Sampling
Volume Purged (gallons)	0	7.5	15	22.25				
Time (military)	11:33	11:36	11:45	12:05				
pH (s.u.)	6.05	6.04	6.13	6.02				
Specific Cond. (umhos/cm)	776	785	772	770				
Water Temp (°C)	24.2	22.3	23.5	21.9				
Turbidity (*)	3	3	3	3				
Do Readings	0.53	1.18	1.44	1.22				

* subjective (1) None (2) Faint (3) Moderate (4) Strong

Remarks Sampled after 89 bailers

South Carolina Department of Health and Environmental Control
Bureau of Underground Storage Tank Management

Field Data Information Sheet for Ground Water Sampling

Date(mm/dd/yy) 06/12/03
Field Personnel Holly Freisen
General Weather Conditions hot, sunny, cloudy, rainy
Ambient Air Temperature 29.5 °C

Facility Name Green Oil Co. Site ID# 00815

Quality Assurance:

pH Meter:
serial no.
pH=4.0
pH=7.0
pH=10.0

Conductivity Meter
serial no.
Standard
Standard
Standard

Chain of Custody

Relinquished by	Date / Time	Received by	Date/Time

Well # MW-3

Well Diameter(D) 2 inch or ___ feet
conversion factor(C): 3.143*(D/2)^2
for a 2 inch well C=0.163
4 inch well C=0.652
Total Well Depth(TWD) 3.01 ft.
Depth to GW (DGW) 7.75 ft.

Length of Water Column(LWC=TWD-DGW) 4.74 ft.

1 Csg. Volume(LWC * C) = 4.74 X 0.163 = 0.76 gals.
3 Csg. Volumes = 3 X 0.76 = 2.28 gals. (Std. Purge Volume)

Total Volume of Water Purged Before Sampling 2.25 gals.

	Initial	1st vol.	2nd vol.	3rd vol.	4th vol.	5th vol.	Post	Sampling
Volume Purged (gallons)	0	0.75	1.5	2.25				
Time (military)	1450	1452	1454	1500				
pH (s.u.)	6.94	6.51	6.41	6.41				
Specific Cond. (umhos/cm)	704	694	698	699				
Water Temp (°C)	22.2	22.2	22.1	22.1				
Turbidity (*)	4	4	4	4				
Do Readings	1.14	1.17	0.74	1.44				

* subjective (1) None (2) Faint (3) Moderate (4) Strong

Remarks Sampled after 9 bailers

South Carolina Department of Health and Environmental Control
Bureau of Underground Storage Tank Management

Field Data Information Sheet for Ground Water Sampling

Date(mm/dd/yy) 06/12/03
Field Personnel Holly Freisen
General Weather Conditions hot, sunny, cloudy, rainy
Ambient Air Temperature 29.5 °C

Facility Name Green Oil Co. Site ID# 00815

Quality Assurance:

pH Meter:
serial no.
pH=4.0
pH=7.0
pH=10.0

Conductivity Meter
serial no.
Standard
Standard
Standard

Chain of Custody

Relinquished by	Date / Time	Received by	Date/Time

Well # MW-4

Well Diameter(D) 2 inch or ___ feet
conversion factor(C): 3.143*(D/2)^2
for a 2 inch well C=0.163
4 inch well C=0.652
Total Well Depth(TWD) 13.59 ft.
Depth to GW (DGW) 3.52 ft.

Length of Water Column(LWC=TWD-DGW) 10.07 ft.

1 Csg. Volume(LWC * C) = 10.07 X 0.163 = 1.61 gals.
3 Csg. Volumes = 3 X 1.61 = 4.83 gals. (Std. Purge Volume)

Total Volume of Water Purged Before Sampling 4.75 gals.

	Initial	1st vol.	2nd vol.	3rd vol.	4th vol.	5th vol.	Post	Sampling
Volume Purged (gallons)	0	1.75	3.25	4.75				
Time (military)	1037	1042	1047	1053				
pH (s.u.)	6.16	6.26	6.25	6.25				
Specific Cond. (umhos/cm)	971	965	991	1,016				
Water Temp (°C)	22.4	22.6	21.9	21.1				
Turbidity (*)	2	2	2	2				
DO Readings	0.69	0.99	0.95	0.96				

* subjective (1) None (2) Faint (3) Moderate (4) Strong

Remarks Sampled after 19 bailers

South Carolina Department of Health and Environmental Control
Bureau of Underground Storage Tank Management

Field Data Information Sheet for Ground Water Sampling

Date(mm/dd/yy) 06/12/03
Field Personnel Holly Freisen
General Weather Conditions hot, sunny, cloudy, rainy
Ambient Air Temperature 29.5 °C

Facility Name Green Oil Co. Site ID# 00815

Quality Assurance:

pH Meter:
serial no.
pH=4.0
pH=7.0
pH=10.0

Conductivity Meter
serial no.
Standard
Standard
Standard

Chain of Custody

Relinquished by	Date / Time	Received by	Date/Time

Well # MW-5

Well Diameter(D) 2 inch or ___ feet
conversion factor(C): 3.143*(D/2)^2
for a 2 inch well C=0.163
4 inch well C=0.652
Total Well Depth(TWD) 10.04 ft.
Depth to GW (DGW) 2.20 ft.

Length of Water Column(LWC=TWD-DGW) 7.84 ft.

1 Csg. Volume(LWC * C) = 7.84 X 0.163 = 1.25 gals.
3 Csg. Volumes = 3 X 1.25 = 3.75 gals. (Std. Purge Volume)

Total Volume of Water Purged Before Sampling 3.75 gals.

	Initial	1st vol.	2nd vol.	3rd vol.	4th vol.	5th vol.	Post	Sampling
Volume Purged (gallons)	0	1.25	2.5	3.75				
Time (military)	1357	1359	1402	1409				
pH (s.u.)	6.74	6.45	6.41	6.42				
Specific Cond. (umhos/cm)	560	537	552	553				
Water Temp (°C)	25.3	24.6	23.9	23.9				
Turbidity (*)	1	1	1	1				
Do Readings	1.51	1.40	1.29	1.28				

* subjective (1) None (2) Faint (3) Moderate (4) Strong

Remarks Sampled after 15 bailers

South Carolina Department of Health and Environmental Control
Bureau of Underground Storage Tank Management

Field Data Information Sheet for Ground Water Sampling

Date(mm/dd/yy) 06/12/03
Field Personnel Holly Freisen
General Weather Conditions hot, sunny, cloudy, rainy
Ambient Air Temperature 29.5 °C

Facility Name Green Oil Co. Site ID# 00815

Quality Assurance:

pH Meter:
serial no.
pH=4.0
pH=7.0
pH=10.0

Conductivity Meter
serial no.
Standard
Standard
Standard

Chain of Custody

Relinquished by	Date / Time	Received by	Date/Time

Well # MW-6

Well Diameter(D) 2 inch or ____ feet
conversion factor(C): 3.143*(D/2)^2
for a 2 inch well C=0.163
4 inch well C=0.652
Total Well Depth(TWD) 9.60 ft.
Depth to GW (DGW) 2.89 ft.

Length of Water Column(LWC=TWD-DGW) 6.71 ft.

1 Csg. Volume(LWC * C) = 6.71 X 0.163 = 1.07 gals.
3 Csg. Volumes = 3 X 1.07 = 3.22 gals. (Std. Purge Volume)

Total Volume of Water Purged Before Sampling 3.25 gals.

	Initial	1st vol.	2nd vol.	3rd vol.	4th vol.	5th vol.	Post	Sampling
Volume Purged (gallons)	0	1.25	2.25	3.25				
Time (military)	12:54	12:57	12:59	13:05				
pH (s.u.)	6.29	6.32	6.28	6.29				
Specific Cond. (umhos/cm)	631	644	637	636				
Water Temp (°C)	26.0	25.2	23.7	23.7				
Turbidity (*)	1	1	1	1				
Do Readings	4.48	4.24	3.71	4.19				

* subjective (1) None (2) Faint (3) Moderate (4) Strong

Remarks Sampled after 13 bailers

South Carolina Department of Health and Environmental Control
Bureau of Underground Storage Tank Management

Field Data Information Sheet for Ground Water Sampling

Date(mm/dd/yy) 06/12/03
Field Personnel Holly Freisen
General Weather Conditions hot, sunny, cloudy, rainy
Ambient Air Temperature 29.5 °C

Facility Name Green Oil Co. Site ID# 00815

Quality Assurance:

pH Meter:
serial no.
pH=4.0
pH=7.0
pH=10.0

Conductivity Meter
serial no.
Standard
Standard
Standard

Chain of Custody

Relinquished by	Date / Time	Received by	Date/Time

Well # MW-7

Well Diameter(D) 2 inch or ___ feet
conversion factor(C): 3.143*(D/2)^2
for a 2 inch well C=0.163
4 inch well C=0.652
Total Well Depth(TWD) 13.60 ft.
Depth to GW (DGW) 3.29 ft.

Length of Water Column(LWC=TWD-DGW) 10.31 ft.

1 Csg. Volume(LWC * C) = 10.31 X 0.163 = 1.65 gals.
3 Csg. Volumes = 3 X 1.65 = 4.95 gals. (Std. Purge Volume)

Total Volume of Water Purged Before Sampling 5 gals.

	Initial	1st vol.	2nd vol.	3rd vol.	4th vol.	5th vol.	Post	Sampling
Volume Purged (gallons)	0	1.75	3.5	5				
Time (military)	1107	1110	1113	1123				
pH (s.u.)	6.72	6.49	6.40	6.36				
Specific Cond. (umhos/cm)	449	436	433	442				
Water Temp (°C)	23.0	22.2	21.9	21.9				
Turbidity (*)	2	2	2	2				
Do Readings	0.84	1.24	1.25	1.18				

* subjective (1) None (2) Faint (3) Moderate (4) Strong

Remarks Sampled after 20 bailers

South Carolina Department of Health and Environmental Control
Bureau of Underground Storage Tank Management

Field Data Information Sheet for Ground Water Sampling

Date(mm/dd/yy) 06/12/03
Field Personnel Holly Freisen
General Weather Conditions hot, sunny, cloudy, rainy
Ambient Air Temperature 29.5 °C

Facility Name Green Oil Co. Site ID# 00815

Quality Assurance:

pH Meter:
serial no.
pH=4.0
pH=7.0
pH=10.0

Conductivity Meter
serial no.
Standard
Standard
Standard

Chain of Custody

Relinquished by	Date /Time	Received by	Date/Time

Well # PW-8

Well Diameter(D) 2 inch or ___ feet
conversion factor(C): 3.143*(D/2)^2
for a 2 inch well C=0.163
4 inch well C=0.652
Total Well Depth(TWD) 30.10 ft.
Depth to GW (DGW) 2.60 ft.

Length of Water Column(LWC=TWD-DGW) 27.50 ft.

1 Csg. Volume(LWC * C) = 27.50 X 0.163 = 4.40 gals.
3 Csg. Volumes = 3 X 4.40 = 13.2 gals. (Std. Purge Volume)

Total Volume of Water Purged Before Sampling 13.25 gals.

	Initial	1st vol.	2nd vol.	3rd vol.	4th vol.	5th vol.	Post	Sampling
Volume Purged (gallons)	0	4.5	9	13.25				
Time (military)	1321	1329	1336	1345				
pH (s.u.)	6.51	6.48	6.42	6.39				
Specific Cond. (umhos/cm)	349	328	347	356				
Water Temp (°C)	26.1	23.1	22.6	25.5				
Turbidity (*)	1	1	1	1				
Do Readings	1.23	1.33	1.62	1.70				

* subjective (1) None (2) Faint (3) Moderate (4) Strong

Remarks Sampled after 53 bailers

APPENDIX B
LABORATORY REPORTS – GROUNDWATER SAMPLES
JUNE 12, 2003

TEST AMERICA ANALYTICAL TESTING CORP.-NASHVILLE

RECEIVED
JUN 2 6 2003

COOLER RECEIPT FORM BC#

Client: CBM Environmental

Cooler Received On: 6/14/03 And Opened On: 6/14/03 By: Shawn Gracey

(Signature)

1. Temperature of Cooler when opened 0.4 **Degrees Celsius**
2. Were custody seals on outside of cooler?.....YES...NO....NA
   a. If yes, how many, what kind and where: 1 (Front/Back/Side)
3. Were custody seals on containers and intact?.....NO...YES...NA
4. Were the seals intact, signed, and dated correctly?.....YES...NO...NA
5. Were custody papers inside cooler?.....YES...NO...NA
6. Were custody papers properly filled out (ink,signed,etc)?.....YES...NO...NA
7. Did you sign the custody papers in the appropriate place?.....YES...NO...NA
8. What kind of packing material used? Bubblewrap Peanuts Vermiculite Other None
9. Was sufficient ice used (if appropriate)?.....YES...NO...NA
10. Did all bottles arrive in good condition(unbroken)?.....YES...NO...NA
11. Were all bottle labels complete (#,date,signed,pres,etc)?.....YES...NO...NA
12. Did all bottle labels and tags agree with custody papers?.....YES...NO...NA
13. Were correct bottles used for the analysis requested?.....YES...NO...NA
14. a. Were VOA vials received?.....YES...NO...NA
    b. Was there any observable head space present in any VOA vial?.....NO...YES...NA
15. Was sufficient amount of sample sent in each bottle?.....YES...NO...NA
16. Were correct preservatives used?.....YES...NO...NA
    If not, record standard ID of preservative used here No metals bottle
17. Was residual chlorine present?.....NO...YES...NA 6/26
18. See attached for resolution of non-conformance:

Fed-Ex UPS Velocity Airborne Route Off-street Misc.

cc: HF file

335779

TestAmerica INCORPORATED

RECEIVED JUN 26 2003

To assist us in using the proper analytical methods, is this work being conducted for regulatory purposes?
Compliance Monitoring ____

Client Name: CBM Environmental Client #: 2175
Address: 377 Carowinds Blvd
City/State/Zip Code: Fort Mill, SC
Project Manager: Holly Freisen
Telephone Number: 803-548-5989 Fax: 803-548-5892
Sampler Name: (Print Name) Holly Freisen
Sampler Signature: Holly Freisen
8381665111 83

Project Name: Green Oil Co.
Project #: 11030
Site/Location ID: Rockhill State: SC
Report To: Holly Freisen
Invoice To: CBM
Quote #: ____ PO#: 18923

TAT: ✓ Standard; ___ Rush (surcharges may apply)
Date Needed: 6/20/03
Fax Results: (Y) N

SAMPLE ID	Date Sampled	Time Sampled	G = Grab, C = Composite	Field Filtered	Matrix: SL - Sludge, DW - Drinking Water, GW - Groundwater, S - Soil/Solid, WW - Wastewater, Specify Other	Preservation & # of Containers: HNO_3	HCl	NaOH	H_2SO_4	Methanol	None	Other (Specify)	Analyze For: 8260B BTEX, MBE, Naphthalene only	200.7 Total Iron	300.0 Nitrates & Sulfides	8015 Methane			NO_2+NO_3 *				QC Deliverables / REMARKS
MW-1	6/12	1450	G		GW		3				1		✓	✓	✓	✓			✓				93023
MW-2		1205											✓	✓	✓	✓			✓				4
MW-3		1500											✓	✓	✓	✓			✓				5
MW-4		1053											✓	✓	✓	✓			✓				6
MW-5		1409											✓	✓	✓	✓			✓				7
MW-6		1305											✓	✓	✓	✓			✓				8
MW-7		1123											✓	✓	✓	✓			✓				9
PW-8	↓	1345	↓		↓		↓				↓		✓	✓	✓	✓			✓				93030

QC Deliverables: ___ None; ✓ Level 2 (Batch QC); ___ Level 3; ___ Level 4; Other: ____

Special Instructions: * NO_2+NO_3 (H_2SO_4 pres.) to be run only if not able to meet NO_3 48 Hr. hold time after

	Date	Time		Date	Time
Relinquished By: Holly Freisen	6/12/03	1624	Received By: CBrand	6/13	1430
Relinquished By: CBrand	6/13	1600	Received By:	Date:	Time:
Relinquished By:	Date:	Time:	Received By:	6/14/03	830

LABORATORY COMMENTS:
Init Lab Temp:
Rec Lab Temp: 0.4
Custody Seals: (Y) N N/A
Bottles Supplied by Test America: Y N
Method of Shipment:

SAMPLE NONCONFORMANCE/COC REVISION FORM

RECEIVED
JUN 26 2003

TestAmerica
INCORPORATED
Nashville Division

DATE RECEIVED: 6/14/03 ACCT NO.: 2175

SDG NUMBER: 35779 COMPANY NAME: CBM Env.

Relinquished by:	Date/Time:	Received by:	Date/Time:
SPC	6/14/03 / 1504	GBH	6-17-03 / 1640
Relinquished by:	Date/Time:	Received by:	Date/Time:
GBH	6-18-03 / 0835	SPC	6/18/03 0926
Relinquished by:	Date/Time:	Received by:	Date/Time:

NONCONFORMANCE ISSUE(S):

OIL & GREASE METHOD?	METALS LIST?
TPH METHOD?	TCLP WHAT?
EDB METHOD?	HERB LIST- LONG OR SHORT?
NEED LIST OF COMPOUNDS?	RUN SOILS BY 8260 INSTEAD OF 8021?
TEMPERATURE UPON RECEIPT?	SATURDAY DELIVERY MARKED?
ICE -- OR-- NO ICE??	SAMPLES TO BE SUBCONTRACTED?
NO COC - PLEASE FAX	NO ANALYSIS REQUESTED?
DOCUMENTATION LEVEL?	OUT OF HOLDING TIME -- TEST:

OTHER: -Didn't get metals bottle.

RESOLUTION: Should have requested Ferr Fe instead of total Iron. Please change test on each sample 93023-30
see revised COC by fax > OK to run regardless of holding time now.

PERSON CONTACTED	DATE/TIME	VIA E-MAIL or VOICEMAIL	NOTES AND/OR COMMENTS:
TA-CLT General VM	6-17-03 / 1700	(*)	
Charles Cabaniss	6-18-03 / 0830		

Revised 12/9/02

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Sample NonConformance/COC Revision Form

Initiated by:	Sgracey	**Phone:**		NC Closed	☑
Client Name:	CBM ENVIRONME	**Sample Range:**	93023-30	Date Closed	6/16/2003
Client Contact:	TA-CLT/ CHARLE	**SDG:**	335779		
Client Account:	2175	**Analyst:**	279		
Date Created:	6/14/2003	**Supervisor:**			
NC #:	93030	**NC Type:**	NC Analytical 1		

Process: Out of Holding Time-List Analysis — **Corrected By:** JENNIFER HUCK

Action: Other action taken (Please explain in summary section below). — **Closed:** ☑ Jhuckaba

Comments:

Comment added by: Mbeasley on 6/16/2003 1:33:37 PM
NC closed with out comments

****

Comment added by: Jhuckaba on 6/16/2003 12:29:25 PM
Per Charles, that it OK to run like that.

****

MW-4 AND MW-7 WILL BE GETTING THE COMBO. THEY WERE RECEIVED OUT OF HOLD. ALL OTHERS WILL BE RUN BY IC300

TestAmerica
ANALYTICAL TESTING CORPORATION

2960 Foster Creighton Drive • Nashville, Tennessee 37204
800-765-0980 • 615-726-3404 Fax

6/21/03

CBM ENVIRONMENTAL (FT.MILL) 2175
DANA DILLON
P.O. BOX 411387
CHARLOTTE, NC 28241

This report includes the analytical certificates of analysis for all samples listed below. These samples relate to your project identified below:

Project Name: GREEN OIL CO.
Project Number: 11030.
Laboratory Project Number: 335779.

An executed copy of the chain of custody, the project quality control data, and the sample receipt form are also included as an addendum to this report. If you have any questions relating to this analytical report, please contact your Laboratory Project Manager at 1-800-765-0980.

Sample Identification	Lab Number	Collection Date
MW-1	03-A93023	6/12/03
MW-2	03-A93024	6/12/03
MW-3	03-A93025	6/12/03
MW-4	03-A93026	6/12/03
MW-5	03-A93027	6/12/03
MW-6	03-A93028	6/12/03
MW-7	03-A93029	6/12/03
PW-8	03-A93030	6/12/03

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Sample Identification	Lab Number	Collection Date

These results relate only to the items tested.
This report shall not be reproduced except in full and with permission of the laboratory.

Report Approved By: Roxanne L Connor Report Date: 6/21/03

Laboratory Certification Number: 84009

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ANALYTICAL REPORT

CBM ENVIRONMENTAL (FT.MILL) 2175
DANA DILLON
P.O. BOX 411387
CHARLOTTE, NC 28241

Project: 11030
Project Name: GREEN OIL CO.
Sampler: HOLLY FREISEN

Lab Number: 03-A93023
Sample ID: MW-1
Sample Type: Water
Site ID: ROCK HILL

Date Collected: 6/12/03
Time Collected: 14:50
Date Received: 6/14/03
Time Received: 8:30
Page: 1

Analyte	Result	Units	Report Limit	Dil Factor	Analysis Date	Analysis Time	Analyst	Method	Batch
VOLATILE ORGANICS									
Benzene	2280	ug/L	100.	100.	6/17/03	18:58	C. Wani	8260B	3698
Toluene	9520	ug/L	100.	100.	6/17/03	18:58	C. Wani	8260B	3698
Ethylbenzene	1980	ug/L	100.	100.	6/17/03	18:58	C. Wani	8260B	3698
Xylenes (Total)	17400	ug/L	100.	100.	6/17/03	18:58	C. Wani	8260B	3698
Methyl-t-butyl ether	801.	ug/L	10.0	10.0	6/17/03	6:43	C. Wani	8260B	3695
Naphthalene	991.	ug/L	50.0	10.0	6/17/03	6:43	C. Wani	8260B	3695
MISCELLANEOUS GC PARAMETERS									
Methane	7240	ug/L	130.	5.0	6/16/03	13:03	K. Burritt	8015BM	8958
METALS									
Ferrous Iron	19600	ug/L	1000	10.0	6/18/03	18:26	S. Duncan	3500D	1508
MISCELLANEOUS CHEMISTRY									
Nitrate-N as N	ND	mg/L	0.10	1.0	6/14/03	10:50	S. Overton	300	8449
Sulfate	ND	mg/L	1.00	1.0	6/14/03	10:50	S. Overton	300	8449

Surrogate	% Recovery	Target Range
VOA Surr 1,2-DCA-d4	99.	70. - 133.
VOA Surr Toluene-d8	94.	76. - 123.
VOA Surr, 4-BFB	101.	71. - 132.
VOA Surr, DBFM	107.	74. - 128.

Sample report continued . . .

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ANALYTICAL REPORT

Laboratory Number: 03-A93023
Sample ID: MW-1
Project: 11030

LABORATORY COMMENTS:

ND = Not detected at the report limit.
B = Analyte was detected in the method blank.
J = Estimated Value below Report Limit.
E = Estimated Value above the calibration limit of the instrument.
# = Recovery outside Laboratory historical or method prescribed limits.
M = Method RSK175M/8015BM modified for use with Headspace analyzer.
Sample for Ferrous Iron analysis received outside method
prescribed holding time.
Running Ferrous Iron after 48 hours from sampling.

End of Sample Report.

TestAmerica
ANALYTICAL TESTING CORPORATION

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ANALYTICAL REPORT

CBM ENVIRONMENTAL (FT.MILL) 2175
DANA DILLON
P.O. BOX 411387
CHARLOTTE, NC 28241

Project: 11030
Project Name: GREEN OIL CO.
Sampler: HOLLY FREISEN

Lab Number: 03-A93024
Sample ID: MW-2
Sample Type: Water
Site ID: ROCK HILL

Date Collected: 6/12/03
Time Collected: 12:05
Date Received: 6/14/03
Time Received: 8:30
Page: 1

Analyte	Result	Units	Report Limit	Dil Factor	Analysis Date	Analysis Time	Analyst	Method	Batch
VOLATILE ORGANICS									
Benzene	4.0	ug/L	1.0	1.0	6/17/03	17:58	C. Wani	8260B	3695
Toluene	ND	ug/L	1.0	1.0	6/17/03	17:58	C. Wani	8260B	3695
Ethylbenzene	ND	ug/L	1.0	1.0	6/17/03	17:58	C. Wani	8260B	3695
Xylenes (Total)	ND	ug/L	1.0	1.0	6/17/03	17:58	C. Wani	8260B	3695
Methyl-t-butyl ether	157.	ug/L	1.0	1.0	6/17/03	17:58	C. Wani	8260B	3695
Naphthalene	ND	ug/L	5.00	1.0	6/17/03	17:58	C. Wani	8260B	3695
MISCELLANEOUS GC PARAMETERS									
Methane	255.	ug/L	26.	1.0	6/16/03	12:03	K. Burritt	8015BM	8958
METALS									
Ferrous Iron	3500	ug/L	100.	1.0	6/18/03	18:26	S. Duncan	3500D	1508
MISCELLANEOUS CHEMISTRY									
Nitrate-N as N	ND	mg/L	0.10	1.0	6/14/03	10:50	S. Overton	300	8449
Sulfate	3.23	mg/L	1.00	1.0	6/14/03	10:50	S. Overton	300	8449

Surrogate	% Recovery	Target Range
VOA Surr 1,2-DCA-d4	101.	70. - 133.
VOA Surr Toluene-d8	98.	76. - 123.
VOA Surr, 4-BFB	104.	71. - 132.
VOA Surr, DBFM	114.	74. - 128.

Sample report continued . . .

TestAmerica
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JUN 26 2003

ANALYTICAL REPORT

Laboratory Number: 03-A93024
Sample ID: MW-2
Project: 11030

LABORATORY COMMENTS:

ND = Not detected at the report limit.
B = Analyte was detected in the method blank.
J = Estimated Value below Report Limit.
E = Estimated Value above the calibration limit of the instrument.
# = Recovery outside Laboratory historical or method prescribed limits.
M = Method RSK175M/8015BM modified for use with Headspace analyzer.
Sample for Ferrous Iron analysis received outside method
prescribed holding time.
Running Ferrous Iron after 48 hours from sampling.

End of Sample Report.

TestAmerica
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ANALYTICAL REPORT

CBM ENVIRONMENTAL (FT.MILL) 2175
DANA DILLON
P.O. BOX 411387
CHARLOTTE, NC 28241

Project: 11030
Project Name: GREEN OIL CO.
Sampler: HOLLY FREISEN

Lab Number: 03-A93025
Sample ID: MW-3
Sample Type: Water
Site ID: ROCK HILL

Date Collected: 6/12/03
Time Collected: 15:00
Date Received: 6/14/03
Time Received: 8:30
Page: 1

Analyte	Result	Units	Report Limit	Dil Factor	Analysis Date	Analysis Time	Analyst	Method	Batch
VOLATILE ORGANICS									
Benzene	4.2	ug/L	1.0	1.0	6/17/03	7:42	C. Wani	8260B	3695
Toluene	135.	ug/L	1.0	1.0	6/17/03	7:42	C. Wani	8260B	3695
Ethylbenzene	150.	ug/L	1.0	1.0	6/17/03	7:42	C. Wani	8260B	3695
Xylenes (Total)	1920	ug/L	50.0	50.0	6/17/03	13:40	C. Wani	8260B	3698
Methyl-t-butyl ether	2.9	ug/L	1.0	1.0	6/17/03	7:42	C. Wani	8260B	3695
Naphthalene	260.	ug/L	250.	50.0	6/17/03	13:40	C. Wani	8260B	3698
MISCELLANEOUS GC PARAMETERS									
Methane	1100	ug/L	26.	1.0	6/16/03	12:06	K. Burritt	8015BM	8958
METALS									
Ferrous Iron	23200	ug/L	1000	10.0	6/18/03	18:26	S. Duncan	3500D	1508
MISCELLANEOUS CHEMISTRY									
Nitrate-N as N	ND	mg/L	0.10	1.0	6/14/03	10:50	S. Overton	300	8449
Sulfate	ND	mg/L	1.00	1.0	6/14/03	10:50	S. Overton	300	8449

Surrogate	% Recovery	Target Range
VOA Surr 1,2-DCA-d4	102.	70. - 133.
VOA Surr Toluene-d8	95.	76. - 123.
VOA Surr, 4-BFB	99.	71. - 132.
VOA Surr, DBFM	108.	74. - 128.

Sample report continued . . .

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ANALYTICAL REPORT

Laboratory Number: 03-A93025
Sample ID: MW-3
Project: 11030

LABORATORY COMMENTS:

ND = Not detected at the report limit.
B = Analyte was detected in the method blank.
J = Estimated Value below Report Limit.
E = Estimated Value above the calibration limit of the instrument.
# = Recovery outside Laboratory historical or method prescribed limits.
M = Method RSK175M/8015BM modified for use with Headspace analyzer.
Sample for Ferrous Iron analysis received outside method
prescribed holding time.
Running Ferrous Iron after 48 hours from sampling.

End of Sample Report.

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ANALYTICAL REPORT

CBM ENVIRONMENTAL (FT.MILL) 2175
DANA DILLON
P.O. BOX 411387
CHARLOTTE, NC 28241

Project: 11030
Project Name: GREEN OIL CO.
Sampler: HOLLY FREISEN

Lab Number: 03-A93026
Sample ID: MW-4
Sample Type: Water
Site ID: ROCK HILL

Date Collected: 6/12/03
Time Collected: 10:53
Date Received: 6/14/03
Time Received: 8:30
Page: 1

Analyte	Result	Units	Report Limit	Dil Factor	Analysis Date	Analysis Time	Analyst	Method	Batch
VOLATILE ORGANICS									
Benzene	ND	ug/L	1.0	1.0	6/17/03	16:58	C. Wani	8260B	3695
Toluene	ND	ug/L	1.0	1.0	6/17/03	16:58	C. Wani	8260B	3695
Ethylbenzene	ND	ug/L	1.0	1.0	6/17/03	16:58	C. Wani	8260B	3695
Xylenes (Total)	ND	ug/L	1.0	1.0	6/17/03	16:58	C. Wani	8260B	3695
Methyl-t-butyl ether	198.	ug/L	1.0	1.0	6/17/03	16:58	C. Wani	8260B	3695
Naphthalene	ND	ug/L	5.00	1.0	6/17/03	16:58	C. Wani	8260B	3695
MISCELLANEOUS GC PARAMETERS									
Methane	743.	ug/L	26.	1.0	6/16/03	12:10	K. Burritt	8015BM	8958
METALS									
Ferrous Iron	18300	ug/L	1000	10.0	6/18/03	18:26	S. Duncan	3500D	1508
MISCELLANEOUS CHEMISTRY									
Nitrate/Nitrite-N as N	ND	mg/L	0.100	1.0	6/14/03	21:09	W. Choate	353.2	8500
Sulfate	5.79	mg/L	1.00	1.0	6/14/03	10:50	S. Overton	300	8449

Surrogate	% Recovery	Target Range
VOA Surr 1,2-DCA-d4	99.	70. - 133.
VOA Surr Toluene-d8	96.	76. - 123.
VOA Surr, 4-BFB	102.	71. - 132.
VOA Surr, DBFM	110.	74. - 128.

Sample report continued . . .

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ANALYTICAL REPORT

Laboratory Number: 03-A93026
Sample ID: MW-4
Project: 11030

LABORATORY COMMENTS:

ND = Not detected at the report limit.
B = Analyte was detected in the method blank.
J = Estimated Value below Report Limit.
E = Estimated Value above the calibration limit of the instrument.
# = Recovery outside Laboratory historical or method prescribed limits.
M = Method RSK175M/8015BM modified for use with Headspace analyzer.
Sample for Ferrous Iron analysis received outside method prescribed holding time.
Running NO2/NO3 combo. Received sample greater than 48 hours from sampling.

End of Sample Report.

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ANALYTICAL REPORT

CBM ENVIRONMENTAL (FT.MILL) 2175
DANA DILLON
P.O. BOX 411387
CHARLOTTE, NC 28241

Project: 11030
Project Name: GREEN OIL CO.
Sampler: HOLLY FREISEN

Lab Number: 03-A93027
Sample ID: MW-5
Sample Type: Water
Site ID: ROCK HILL

Date Collected: 6/12/03
Time Collected: 14:09
Date Received: 6/14/03
Time Received: 8:30
Page: 1

Analyte	Result	Units	Report Limit	Dil Factor	Analysis Date	Analysis Time	Analyst	Method	Batch
VOLATILE ORGANICS									
Benzene	ND	ug/L	1.0	1.0	6/17/03	8:42	C. Wani	8260B	3695
Toluene	ND	ug/L	1.0	1.0	6/17/03	8:42	C. Wani	8260B	3695
Ethylbenzene	ND	ug/L	1.0	1.0	6/17/03	8:42	C. Wani	8260B	3695
Xylenes (Total)	ND	ug/L	1.0	1.0	6/17/03	8:42	C. Wani	8260B	3695
Methyl-t-butyl ether	3.1	ug/L	1.0	1.0	6/17/03	8:42	C. Wani	8260B	3695
Naphthalene	ND	ug/L	5.00	1.0	6/17/03	8:42	C. Wani	8260B	3695
MISCELLANEOUS GC PARAMETERS									
Methane	ND	ug/L	26.	1.0	6/16/03	12:23	K. Burritt	8015BM	8954
METALS									
Ferrous Iron	ND	ug/L	100.	1.0	6/18/03	18:26	S. Duncan	3500D	1508
MISCELLANEOUS CHEMISTRY									
Nitrate-N as N	1.20	mg/L	0.10	1.0	6/14/03	10:50	S. Overton	300	8449
Sulfate	10.2	mg/L	1.00	1.0	6/14/03	10:50	S. Overton	300	8449

Surrogate	% Recovery	Target Range
VOA Surr 1,2-DCA-d4	98.	70. - 133.
VOA Surr Toluene-d8	96.	76. - 123.
VOA Surr, 4-BFB	103.	71. - 132.
VOA Surr, DBFM	106.	74. - 128.

Sample report continued . . .

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ANALYTICAL REPORT

Laboratory Number: 03-A93027
Sample ID: MW-5
Project: 11030

LABORATORY COMMENTS:

ND = Not detected at the report limit.
B = Analyte was detected in the method blank.
J = Estimated Value below Report Limit.
E = Estimated Value above the calibration limit of the instrument.
# = Recovery outside Laboratory historical or method prescribed limits.
M = Method RSK175M/8015BM modified for use with Headspace analyzer.
Sample for Ferrous Iron analysis received outside method
prescribed holding time.
Running Ferrous Iron after 48 hours from sampling.

End of Sample Report.

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ANALYTICAL REPORT

CBM ENVIRONMENTAL (FT.MILL) 2175
DANA DILLON
P.O. BOX 411387
CHARLOTTE, NC 28241

Project: 11030
Project Name: GREEN OIL CO.
Sampler: HOLLY FREISEN

Lab Number: 03-A93028
Sample ID: MW-6
Sample Type: Water
Site ID: ROCK HILL

Date Collected: 6/12/03
Time Collected: 13:05
Date Received: 6/14/03
Time Received: 8:30
Page: 1

Analyte	Result	Units	Report Limit	Dil Factor	Analysis Date	Analysis Time	Analyst	Method	Batch
VOLATILE ORGANICS									
Benzene	ND	ug/L	1.0	1.0	6/17/03	9:12	C. Wani	8260B	3695
Toluene	ND	ug/L	1.0	1.0	6/17/03	9:12	C. Wani	8260B	3695
Ethylbenzene	ND	ug/L	1.0	1.0	6/17/03	9:12	C. Wani	8260B	3695
Xylenes (Total)	ND	ug/L	1.0	1.0	6/17/03	9:12	C. Wani	8260B	3695
Methyl-t-butyl ether	ND	ug/L	1.0	1.0	6/17/03	9:12	C. Wani	8260B	3695
Naphthalene	ND	ug/L	5.00	1.0	6/17/03	9:12	C. Wani	8260B	3695
MISCELLANEOUS GC PARAMETERS									
Methane	ND	ug/L	26.	1.0	6/16/03	12:30	K. Burritt	8015BM	8958
METALS									
Ferrous Iron	540.	ug/L	100.	1.0	6/18/03	18:26	S. Duncan	3500D	1508
MISCELLANEOUS CHEMISTRY									
Nitrate-N as N	0.44	mg/L	0.10	1.0	6/14/03	10:50	S. Overton	300	8449
Sulfate	2170	mg/L	140.	140.	6/14/03	10:50	S. Overton	300	8449

Surrogate	% Recovery	Target Range
VOA Surr 1,2-DCA-d4	102.	70. - 133.
VOA Surr Toluene-d8	95.	76. - 123.
VOA Surr, 4-BFB	101.	71. - 132.
VOA Surr, DBFM	111.	74. - 128.

Sample report continued . . .

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ANALYTICAL REPORT

Laboratory Number: 03-A93028
Sample ID: MW-6
Project: 11030

LABORATORY COMMENTS:

ND = Not detected at the report limit.
B = Analyte was detected in the method blank.
J = Estimated Value below Report Limit.
E = Estimated Value above the calibration limit of the instrument.
# = Recovery outside Laboratory historical or method prescribed limits.
M = Method RSK175M/8015BM modified for use with Headspace analyzer.
Sample for Ferrous Iron analysis received outside method
prescribed holding time.
Running Ferrous Iron after 48 hours from sampling.

End of Sample Report.

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CBM ENVIRONMENTAL (FT.MILL) 2175
DANA DILLON
P.O. BOX 411387
CHARLOTTE, NC 28241

Project: 11030
Project Name: GREEN OIL CO.
Sampler: HOLLY FREISEN

Lab Number: 03-A93029
Sample ID: MW-7
Sample Type: Water
Site ID: ROCK HILL

Date Collected: 6/12/03
Time Collected: 11:23
Date Received: 6/14/03
Time Received: 8:30
Page: 1

Analyte	Result	Units	Report Limit	Dil Factor	Analysis Date	Analysis Time	Analyst	Method	Batch
VOLATILE ORGANICS									
Benzene	ND	ug/L	1.0	1.0	6/17/03	9:41	C. Wani	8260B	3695
Toluene	ND	ug/L	1.0	1.0	6/17/03	9:41	C. Wani	8260B	3695
Ethylbenzene	ND	ug/L	1.0	1.0	6/17/03	9:41	C. Wani	8260B	3695
Xylenes (Total)	ND	ug/L	1.0	1.0	6/17/03	9:41	C. Wani	8260B	3695
Methyl-t-butyl ether	294.	ug/L	5.0	5.0	6/17/03	19:27	C. Wani	8260B	3698
Naphthalene	ND	ug/L	5.00	1.0	6/17/03	9:41	C. Wani	8260B	3695
MISCELLANEOUS GC PARAMETERS									
Methane	ND	ug/L	26.	1.0	6/16/03	12:43	K. Burritt	8015BM	8958
METALS									
Ferrous Iron	1760	ug/L	100.	1.0	6/18/03	18:26	S. Duncan	3500D	1508
MISCELLANEOUS CHEMISTRY									
Nitrate/Nitrite-N as N	0.870	mg/L	0.100	1.0	6/14/03	21:10	W. Choate	353.2	8500
Sulfate	24.4	mg/L	1.00	1.0	6/14/03	10:50	S. Overton	300	8449

Surrogate	% Recovery	Target Range
VOA Surr 1,2-DCA-d4	100.	70. - 133.
VOA Surr Toluene-d8	97.	76. - 123.
VOA Surr, 4-BFB	98.	71. - 132.
VOA Surr, DBFM	108.	74. - 128.

Sample report continued . . .

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ANALYTICAL REPORT

Laboratory Number: 03-A93029
Sample ID: MW-7
Project: 11030

LABORATORY COMMENTS:

ND = Not detected at the report limit.
B = Analyte was detected in the method blank.
J = Estimated Value below Report Limit.
E = Estimated Value above the calibration limit of the instrument.
# = Recovery outside Laboratory historical or method prescribed limits.
M = Method RSK175M/8015BM modified for use with Headspace analyzer.
Sample for Ferrous Iron analysis received outside method prescribed holding time.
Running NO2/NO3 combo. Received sample greater than 48 hours from sampling.

End of Sample Report

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ANALYTICAL REPORT

CBM ENVIRONMENTAL (FT.MILL) 2175
DANA DILLON
P.O. BOX 411387
CHARLOTTE, NC 28241

Project: 11030
Project Name: GREEN OIL CO.
Sampler: HOLLY FREISEN

Lab Number: 03-A93030
Sample ID: PW-8
Sample Type: Water
Site ID: ROCK HILL

Date Collected: 6/12/03
Time Collected: 13:45
Date Received: 6/14/03
Time Received: 8:30
Page: 1

Analyte	Result	Units	Report Limit	Dil Factor	Analysis Date	Analysis Time	Analyst	Method	Batch
VOLATILE ORGANICS									
Benzene	ND	ug/L	1.0	1.0	6/17/03	10:11	C. Wani	8260B	3695
Toluene	ND	ug/L	1.0	1.0	6/17/03	10:11	C. Wani	8260B	3695
Ethylbenzene	ND	ug/L	1.0	1.0	6/17/03	10:11	C. Wani	8260B	3695
Xylenes (Total)	ND	ug/L	1.0	1.0	6/17/03	10:11	C. Wani	8260B	3695
Methyl-t-butyl ether	84.6	ug/L	1.0	1.0	6/17/03	10:11	C. Wani	8260B	3695
Naphthalene	ND	ug/L	5.00	1.0	6/17/03	10:11	C. Wani	8260B	3695
MISCELLANEOUS GC PARAMETERS									
Methane	ND	ug/L	26.	1.0	6/16/03	12:47	K. Burritt	8015BM	8958
METALS									
Ferrous Iron	111.	ug/L	100.	1.0	6/18/03	18:26	S. Duncan	3500D	1508
MISCELLANEOUS CHEMISTRY									
Nitrate-N as N	0.39	mg/L	0.10	1.0	6/14/03	10:50	S. Overton	300	8449
Sulfate	28.8	mg/L	1.00	1.0	6/14/03	10:50	S. Overton	300	8449

Surrogate	% Recovery	Target Range
VOA Surr 1,2-DCA-d4	101.	70. - 133.
VOA Surr Toluene-d8	97.	76. - 123.
VOA Surr, 4-BFB	99.	71. - 132.
VOA Surr, DBFM	110.	74. - 128.

Sample report continued . . .

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ANALYTICAL REPORT

Laboratory Number: 03-A93030
Sample ID: PW-8
Project: 11030

LABORATORY COMMENTS:

ND = Not detected at the report limit.
B = Analyte was detected in the method blank.
J = Estimated Value below Report Limit.
E = Estimated Value above the calibration limit of the instrument.
# = Recovery outside Laboratory historical or method prescribed limits.
M = Method RSK175M/8015BM modified for use with Headspace analyzer.
Sample for Ferrous Iron analysis received outside method
prescribed holding time.
Running Ferrous Iron after 48 hours from sampling.

End of Sample Report.

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PROJECT QUALITY CONTROL DATA
Project Number: 11030
Project Name: GREEN OIL CO.
Page: 1
Laboratory Receipt Date: 6/14/03

Matrix Spike Recovery

Note: If Blank is referenced as the sample spiked, insufficient volume was received for the defined analytical batch for MS/MSD analysis on an true sample matrix. Laboratory reagent water was used for QC purposes.

Analyte	units	Orig. Val.	MS Val	Spike Conc	Recovery	Target Range	Q.C. Batch	Spike Sample
VOA PARAMETERS								
Benzene	mg/l	< 0.0005	0.0512	0.0500	102	68. - 136.	3695	blank
Toluene	mg/l	< 0.0006	0.0496	0.0500	99	73. - 133.	3695	blank
VOA Surr 1,2-DCA-d4	% Rec				101	70. - 133.	3695	
VOA Surr Toluene-d8	% Rec				84	76. - 123.	3695	
VOA Surr, 4-BFB	% Rec				94	71. - 132.	3695	
VOA Surr, DBFM	% Rec				114	74. - 128.	3695	

Matrix Spike Recovery

Note: If Blank is referenced as the sample spiked, insufficient volume was received for the defined analytical batch for MS/MSD analysis on an true sample matrix. Laboratory reagent water was used for QC purposes.

Analyte	units	Orig. Val.	MS Val	Spike Conc	Recovery	Target Range	Q.C. Batch	Spike Sample
MISC PARAMETERS								
Nitrate-N as N	mg/l	< 0.10	3.18	3.00	106	80 - 120	8449	03-A93023
Sulfate	mg/l	< 1.00	17.8	15.0	119	80 - 120	8449	03-A93023

Matrix Spike Recovery

Note: If Blank is referenced as the sample spiked, insufficient volume was received for the defined analytical batch for MS/MSD analysis on an true sample matrix. Laboratory reagent water was used for QC purposes.

Analyte	units	Orig. Val.	MS Val	Spike Conc	Recovery	Target Range	Q.C. Batch	Spike Sample
MISC PARAMETERS								
Methane	mg/L	< 0.026	1.39	1.33	105	40 - 140	8958	03-A91256

Project QC continued . . .

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PROJECT QUALITY CONTROL DATA
Project Number: 11030
Project Name: GREEN OIL CO.

Laboratory Receipt Date: 6/14/03

Matrix Spike Duplicate

Analyte	units	Orig. Val.	Duplicate	RPD	Limit	Q.C. Batch
VOA PARAMETERS						
Benzene	mg/l	0.0512	0.0507	0.98	22.	3695
Toluene	mg/l	0.0496	0.0449	9.95	22.	3695
VOA Surr 1,2-DCA-d4	% Rec		100.			3695
VOA Surr Toluene-d8	% Rec		84.			3695
VOA Surr, 4-BFB	% Rec		97.			3695
VOA Surr, DBFM	% Rec		112.			3695

Matrix Spike Duplicate

Analyte	units	Orig. Val.	Duplicate	RPD	Limit	Q.C. Batch
MISC PARAMETERS						
Methane	mg/L	1.39	1.61	14.67	50	8958

Matrix Spike Duplicate

Analyte	units	Orig. Val.	Duplicate	RPD	Limit	Q.C. Batch
MISC PARAMETERS						
Nitrate-N as N	mg/l	3.18	3.17	0.31	20	8449
Nitrate/Nitrite-N as N	mg/l	6.55	6.50	0.77	20	8500
Sulfate	mg/l	17.8	17.6	1.13	20	8449

Project QC continued . . .

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PROJECT QUALITY CONTROL DATA
Project Number: 11030
Project Name: GREEN OIL CO.

Laboratory Receipt Date: 6/14/03

Laboratory Control Data

Analyte	units	Known Val.	Analyzed Val	% Recovery	Target Range	Q.C. Batch
VOA PARAMETERS						
Benzene	mg/l	0.0500	0.0515	103	78 - 125	3695
Benzene	mg/l	0.0500	0.0519	104	78 - 125	3695
Benzene	mg/l	0.0500	0.0519	104	78 - 125	3698
Ethylbenzene	mg/l	0.0500	0.0475	95	79 - 125	3695
Ethylbenzene	mg/l	0.0500	0.0489	98	79 - 125	3695
Ethylbenzene	mg/l	0.0500	0.0489	98	79 - 125	3698
Naphthalene	mg/l	0.0500	0.0469	94	62 - 142	3695
Naphthalene	mg/l	0.0500	0.0493	99	62 - 142	3695
Naphthalene	mg/l	0.0500	0.0493	99	62 - 142	3698
Toluene	mg/l	0.0500	0.0450	90	79 - 125	3695
Toluene	mg/l	0.0500	0.0515	103	79 - 125	3695
Toluene	mg/l	0.0500	0.0515	103	79 - 125	3698
Xylenes (Total)	mg/l	0.150	0.152	101	78 - 127	3695
Xylenes (Total)	mg/l	0.150	0.155	103	78 - 127	3695
Xylenes (Total)	mg/l	0.150	0.155	103	78 - 127	3698
Methyl-t-butyl ether	mg/l	0.0500	0.0509	102	71 - 135	3695
Methyl-t-butyl ether	mg/l	0.0500	0.0536	107	71 - 135	3695
Methyl-t-butyl ether	mg/l	0.0500	0.0536	107	71 - 135	3698
Methane	mg/L	1.33	1.26	95	79 - 121	8958
VOA Surr 1,2-DCA-d4	% Rec			99	70 - 133	3695
VOA Surr 1,2-DCA-d4	% Rec			100	70 - 133	3695
VOA Surr 1,2-DCA-d4	% Rec			100	70 - 133	3698
VOA Surr Toluene-d8	% Rec			86	76 - 123	3695
VOA Surr Toluene-d8	% Rec			92	76 - 123	3695
VOA Surr Toluene-d8	% Rec			92	76 - 123	3698
VOA Surr, 4-BFB	% Rec			98	71 - 132	3695
VOA Surr, 4-BFB	% Rec			94	71 - 132	3695
VOA Surr, 4-BFB	% Rec			94	71 - 132	3698
VOA Surr, DBFM	% Rec			116	74 - 128	3695

Project QC continued . . .

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JUN 26 2003

PROJECT QUALITY CONTROL DATA
Project Number: 11030
Project Name: GREEN OIL CO.
Page: 4
Laboratory Receipt Date: 6/14/03

Laboratory Control Data

Analyte	units	Known Val.	Analyzed Val	% Recovery	Target Range	Q.C. Batch
VOA Surr, DBFM	% Rec			115	74 - 128	3695
VOA Surr, DBFM	% Rec			115	74 - 128	3698

Laboratory Control Data

Analyte	units	Known Val.	Analyzed Val	% Recovery	Target Range	Q.C. Batch
MISC PARAMETERS						
Methane	mg/L	1.33	1.26	95	79 - 121	8958

Laboratory Control Data

Analyte	units	Known Val.	Analyzed Val	% Recovery	Target Range	Q.C. Batch
MISC PARAMETERS						
Nitrate-N as N	mg/l	3.00	3.00	100	90 - 110	8449
Sulfate	mg/l	15.0	16.0	107	90 - 110	8449

Duplicates

Analyte	units	Orig. Val.	Duplicate	RPD	Limit	Q.C. Batch	Sample Dup'd
Nitrate-N as N	mg/l	0.39	0.37	5.26	15.	8449	03-A93030
Sulfate	mg/l	28.8	28.6	0.70	15.	8449	03-A93030

Project QC continued . . .

TestAmerica
ANALYTICAL TESTING CORPORATION
2960 Foster Creighton Drive • Nashville, Tennessee 37204
800-765-0980 • 615-726-3404 Fax

PROJECT QUALITY CONTROL DATA
Project Number: 11030
Project Name: GREEN OIL CO.
Page: 5
Laboratory Receipt Date: 6/14/03

Blank Data

Analyte	Blank Value	Units	Q.C. Batch	Analysis Date	Analysis Time

Blank Data

Analyte	Blank Value	Units	Q.C. Batch	Date Analyzed	Time Analyzed
VOA PARAMETERS					
Benzene	< 0.0005	mg/l	3695	6/17/03	6:13
Benzene	< 0.0005	mg/l	3695	6/17/03	16:28
Benzene	< 0.0005	mg/l	3698	6/17/03	16:28
Ethylbenzene	< 0.0003	mg/l	3695	6/17/03	6:13
Ethylbenzene	< 0.0003	mg/l	3695	6/17/03	16:28
Ethylbenzene	< 0.0003	mg/l	3698	6/17/03	16:28
Naphthalene	< 0.00120	mg/l	3695	6/17/03	6:13
Naphthalene	< 0.00120	mg/l	3695	6/17/03	16:28
Naphthalene	< 0.00120	mg/l	3698	6/17/03	16:28
Toluene	< 0.0006	mg/l	3695	6/17/03	6:13
Toluene	< 0.0006	mg/l	3695	6/17/03	16:28
Toluene	< 0.0006	mg/l	3698	6/17/03	16:28
Xylenes (Total)	< 0.0009	mg/l	3695	6/17/03	6:13
Xylenes (Total)	< 0.0009	mg/l	3695	6/17/03	16:28
Xylenes (Total)	< 0.0009	mg/l	3698	6/17/03	16:28
Methyl-t-butyl ether	< 0.0005	mg/l	3695	6/17/03	6:13
Methyl-t-butyl ether	< 0.0005	mg/l	3695	6/17/03	16:28
Methyl-t-butyl ether	< 0.0005	mg/l	3698	6/17/03	16:28
VOA Surr 1,2-DCA-d4	101.	% Rec	3695	6/17/03	6:13
VOA Surr 1,2-DCA-d4	101.	% Rec	3695	6/17/03	16:28
VOA Surr 1,2-DCA-d4	101.	% Rec	3698	6/17/03	16:28
VOA Surr Toluene-d8	86.	% Rec	3695	6/17/03	6:13
VOA Surr Toluene-d8	86.	% Rec	3695	6/17/03	16:28
VOA Surr Toluene-d8	86.	% Rec	3698	6/17/03	16:28

Project QC continued . . .

TestAmerica
ANALYTICAL TESTING CORPORATION
2960 Foster Creighton Drive • Nashville, Tennessee 37204
800-765-0980 • 615-726-3404 Fax

PROJECT QUALITY CONTROL DATA
Project Number: 11030
Project Name: GREEN OIL CO.
Page: 6
Laboratory Receipt Date: 6/14/03

Blank Data

Analyte	Blank Value	Units	Q.C. Batch	Analysis Date	Analysis Time
VOA Surr, 4-BFB	101.	% Rec	3695	6/17/03	6:13
VOA Surr, 4-BFB	97.	% Rec	3695	6/17/03	16:28
VOA Surr, 4-BFB	97.	% Rec	3698	6/17/03	16:28
VOA Surr, DBFM	115.	% Rec	3695	6/17/03	6:13
VOA Surr, DBFM	115.	% Rec	3695	6/17/03	16:28
VOA Surr, DBFM	115.	% Rec	3698	6/17/03	16:28

Blank Data

Analyte	Blank Value	Units	Q.C. Batch	Date Analyzed	Time Analyzed
MISC PARAMETERS					
Nitrate-N as N	< 0.10	mg/l	8449	6/14/03	10:50
Nitrate/Nitrite-N as N	< 0.100	mg/l	8500	6/14/03	21:07
Sulfate	< 1.00	mg/l	8449	6/14/03	10:50

Blank Data

Analyte	Blank Value	Units	Q.C. Batch	Date Analyzed	Time Analyzed
MISC PARAMETERS					
Methane	< 0.026	mg/L	8958	6/16/03	9:47

= Value outside Laboratory historical or method prescribed QC limits.

End of Report for Project 335779

GARCO, Inc.

Environmental, Industrial & Recycling Services

RECEIVED
JUL 2 2003
11030

Certificate of Disposal

GENERATOR:

Green Oil Co.
2849 Cherry Road
Rock Hill, SC

MATERIAL ACCEPTED:

1 drum of non-hazardous Water

DISPOSAL METHOD:

Waste Water Treatment

GARCO, Inc. accepted the above listed materials on 6/26/03. This material has been assigned the following GARCO identification number(s).

GARCO ID No.(s) AQ-5271

GARCO, Inc. has accepted custody of the above referenced non-hazardous material. This material has been determined to be non-hazardous by a material profile, generator knowledge, and/or analytical data provided to GARCO, Inc.

Greg Russell
President

CC: HF Dr. file

Post Office Box 1907 / Asheboro, NC 27204-1907 / 336-683-0911 / Fax 336-683-0811

NON-HAZARDOUS WASTE MANIFEST

Please print or type (Form designed for use on elite (12 pitch) typewriter)

NON-HAZARDOUS WASTE MANIFEST

1. Generator's US EPA ID No.: NA

Manifest Document No.: 03001

2. Page 1 of

3. Generator's Name and Mailing Address:
Green Oil Co
2849 Cherry Rd
Rock Hill SC 29732

4. Generator's Phone ( )

5. Transporter 1 Company Name: GARCO, Inc.

6. US EPA ID Number: NCR000135384

A. State Transporter's ID

B. Transporter 1 Phone: 336-683-0911

7. Transporter 2 Company Name

8. US EPA ID Number

C. State Transporter's ID

D. Transporter 2 Phone

9. Designated Facility Name and Site Address:
GARCO, Inc.
2503 N. Fayetteville St.
Asheboro, NC 27203

10. US EPA ID Number: NA

E. State Facility's ID

F. Facility's Phone: 336-683-0911

11. WASTE DESCRIPTION	12. Containers No.	12. Containers Type	13. Total Quantity	14. Unit Wt./Vol.
a. Non-hazardous Material CLIENT	1	DM	300	P
b.				
c.				
d.				

G. Additional Descriptions for Materials Listed Above

11a). Water

AQ-5271

H. Handling Codes for Wastes Listed Above

None

15. Special Handling Instructions and Additional Information

24 Hour ER# 800-814-1204

16. GENERATOR'S CERTIFICATION: I hereby certify that the contents of this shipment are fully and accurately described and are in all respects in proper condition for transport. The materials described on this manifest are not subject to federal hazardous waste regulations.

Printed/Typed Name	Signature	Date (Month Day Year)

17. Transporter 1 Acknowledgement of Receipt of Materials

Printed/Typed Name	Signature	Date (Month Day Year)
Philip Cauthen	Philip Cauthen	6 26 03

18. Transporter 2 Acknowledgement of Receipt of Materials

Printed/Typed Name	Signature	Date (Month Day Year)

19. Discrepancy Indication Space

20. Facility Owner or Operator; Certification of receipt of the waste materials covered by this manifest, except as noted in item 19.

Printed/Typed Name	Signature	Date (Month Day Year)
Dollie Hilliard	Dollie Hilliard	6 26 03

NON-HAZARDOUS WASTE — GENERATOR — TRANSPORTER — FACILITY

RM

UST DOCKETING

RECEIVED

AUG 11 2003

UNDERGROUND STORAGE TANK PROGRAM

INTRINSIC CORRECTIVE ACTION PLAN
GREEN'S OIL COMPANY
2849 CHERRY RD.
ROCK HILL, YORK COUNTY
UST PERMIT NO. 09344
SITE RISK CLASSIFICATION: HIGH
LAND USE CLASSIFICATION: COMMERCIAL
CBM PROJECT NO. 11030

Prepared For:

Federated Insurance Company
c/o Jerry Green
2457 Breen Circle
Rock Hill, SC 29732

Prepared By:

CBM Environmental Services, Inc.
377 Carowinds Blvd, Suite 118
Fort Mill, SC 29708
(803) 548-5989

August 8, 2003

Holly Freisen, E.I.T.
Level II Engineer

SOUTH CAROLINA REGISTERED PROFESSIONAL ENGINEER
ROHIT SHETTY

Rohit Shetty, P.E.
License No 20533

TABLE OF CONTENTS

FIGURES

TABLES

APPENDICES

EXECUTIVE SUMMARY

Source Information

- Source Type: Gasoline
- Source of Release: Leaking underground storage tank (UST)
- Amount of Release: Unknown

Initial Abatement/Emergency Response

- Tank Closure: The USTs on site are currently in use. No other information regarding tank removal or closure was provided in the previous consultants' reports.
- Soil Removal: No information regarding soil removal was provided in the previous consultants' reports.
- Free Product: To date, no measurable amounts of free product have been observed at the site.
- Alternative water supply: Based on information provided by the previous consultant, no public or private water supply wells were observed within 1,000 feet of the site.

Sampling/Investigative Results

- Nature and Extent of Contamination: Gasoline
- Recent Maximum Contaminant Concentrations:

Soil – Benzene: 99.8 µg/kg (SB-5, November 5, 1996)
Toluene: 153 µg/kg (SB-5, November 5, 1996)
Ethylbenzene: 1,400 µg/kg (SB-5, November 5, 1996)
Xylenes: 5,470 µg/kg (SB-5, November 5, 1996)
Naphthalene: 1,880 µg/kg (SB-5, November 5, 1996)

Groundwater – Benzene: 2,280 µg/L (MW-1, June 12, 2003)
Toluene: 9,520 µg/L (MW-1, June 12, 2003)
Ethylbenzene: 1,980 µg/L (MW-1, June 12, 2003)
Xylenes: 17,400 µg/L (MW-1, June 12, 2003)
MTBE: 801 µg/L (MW-1, June 12, 2003)
Naphthalene: 991 µg/L (MW-1, June 12, 2003)

Proposed Remedy for Soil and Groundwater Contamination:

- Selected Remedy: It is proposed to remediate contaminated soil and groundwater beneath the site by excavation with de-watering (as needed) followed by natural attenuation.

1.0 INTRODUCTION

The Green's Oil Company site is located at 2849 Cherry Road in Rock Hill, York County, South Carolina. The latitude and longitude of the site are 34°58'29" North and 80°59'3" West, respectively. A Site Location Map based on the USGS Rock Hill East, South Carolina 7.5-minute quadrangle is presented as **Figure 1**. The property and UST system are owned by Green's Oil Company. The site is located in a commercial area of York County. A Site Map showing the location of the UST system is presented as **Figure 2**. The site currently serves as a gasoline and convenience retail location.

1.1 Purpose of the CAP

The purpose of this Intrinsic Corrective Action Plan (ICAP) is to outline a remedial action plan for the restoration of groundwater and soil affected by petroleum hydrocarbons, and groundwater monitoring to track the fate and transport of the dissolved-phase hydrocarbon plume. The ICAP has been prepared in response to the requirements outlined in the South Carolina Department of Health and Environmental Control (DHEC) correspondence dated February 11, 2003. The ICAP has been prepared in accordance with guidelines contained in the SCDHEC guidance document entitled, "*Corrective Action Guidelines for Petroleum Releases,*" dated June 20, 1997. The ICAP is based on data collected during assessment activities conducted by TET Environmental Services, Inc. (TET) and monitoring activities conducted by Nesco, Inc. (Nesco) and CBM Environmental Services, Inc. (CBM), between November 1991 and the present.

1.2 Site Information

Based on information collected from assessment activities, the contaminant source was the UST system that consists of four gasoline USTs. The location of the UST system is shown on **Figure 2**.

Based on the results of laboratory analyses of soil samples collected in the vicinity of the UST basin, product lines, dispenser islands and areas of groundwater with high hydrocarbon impact, detectable concentrations of benzene and naphthalene that exceeded the risk based screening levels (RBSL) were reported in soil sample SB-5 collected from the vicinity of monitoring well MW-1.

To date, free product has not been observed in any monitoring wells on site. Based on the results of laboratory analyses of groundwater samples collected in June 2003, concentrations of one or more BTEX constituents, MTBE and/or naphthalene that exceeded the RBSLs were reported in monitoring wells MW-1 through MW-4, MW-7 and PW-8.

1.3 Initial Remedial Actions

- Tank Closure: Based on information provided by the previous consultant, no tanks have been closed at the site.
- Soil Removed: Based on information provided by the previous consultant, no soil has been removed from the site.
- Amount of Release: Unknown.
- Free Product: Free product has not historically been observed at the site.
- Corrective Actions To-Date: Based on information provided by the previous consultant, there have been no corrective actions to date.

1.4 Previous Activities and Reports

Previous activities conducted at the site between November 1991 and July 2003 include: hydrogeologic assessment, rapid assessment and monitoring activities. The results of hydrogeologic assessment activities, conducted by TET, were documented in a Hydrogeologic Assessment Report dated November 6, 1991. The results of rapid assessment activities, conducted by TET, were documented in a Rapid Assessment Report (RAR) dated February 20, 1997. Monitoring activities conducted by Nesco were documented in Groundwater Monitoring Reports dated October 27, 2000, January 23, 2001 and January 13, 2003. Monitoring activities conducted by CBM were documented in a monitoring report dated July 7, 2003.

1.5 Receptor Information

During rapid assessment activities conducted by TET on November 6, 1996, no public or private water supply wells were reported within 1,000 feet of the site. Two previously reported water supply wells downgradient of the site have been properly abandoned.

No surface water bodies were observed within 500 feet of the source area. The Catawba River is the only known potential receptor identified during the survey. The river is approximately 3,000 feet downgradient of the site. Please refer to the RAR for additional receptor survey information.

2.0 EXPOSURE ASSESSMENT

The following paragraphs provide a summary of the findings of the previous assessment activities conducted on-site and provide information regarding the nature of the contaminants, as well as the potential contaminant

pathways for human exposure.

2.1 Soils Investigation

A total of seven soil samples were collected during Rapid Assessment activities. Assessment activities conducted for the RAR included the collection of seven soil samples (SB-1 through SB-7) in November 1996. Please refer to the RAR for additional information.

2.2. Regional Geology

The site is located in the Charlotte Geologic Belt of the South Carolina Piedmont Geographic Belt. The bedrock in this area is composed primarily of Augite, Seyenite and Gabbro of Permian Age. This rock is coarse grained and gray in color. Bold outcrops are often found in this area. Aquifers found in the Piedmont are composed of clays, disintegrating rock materials, or fractured bedrock. This aquifer does not normally produce high yields of groundwater, but some high yield areas have been found near lakes and streams. The source of recharge in the Piedmont is the precipitation that saturates the saprolite that overlies unweathered rock. (Cederstrom, 1979).

2.3 Site Geology

Based on observations made during the collection of soil samples in November 1996, soils at the site consist of mostly greenish brown sandy clay and some yellowish brown silty clay to a depth of seven feet, the terminal depth of the soil borings.

2.4 Soil Analytical Results

Based on the results of laboratory analyses of soil samples collected by TET during assessment activities, detectable concentrations of benzene and naphthalene that exceeded the RBSL were reported in SB-5 collected from the vicinity of monitoring well MW-1.

A Soil Quality Map showing individual BTEX constituent, MTBE and naphthalene concentrations in soil samples collected in November 1996 has been included as **Figure 3**. A summary of the results of analyses of soil samples collected during rapid assessment activities is presented in **Table 1**. Please refer to previous assessment reports for complete laboratory analytical results.

2.5 Groundwater Investigation

To determine the horizontal and vertical extent of groundwater contamination, seven Type II monitoring wells

(MW-1 through MW-7) and one Type III monitoring well (PW-8) have been installed to date at the site during the assessment activities. All monitoring wells were installed under the supervision of the previous consultants. Please refer to the previous assessment reports for well construction records. The locations of the monitoring wells are shown on **Figure 2.**

On June 12, 2003, seven Type II monitoring wells (MW-1 through MW-7) and one Type III monitoring well (PW-8) were gauged, developed and sampled.

2.6 Aquifer Characteristics

Depths to groundwater in the Type II monitoring wells measured on June 12, 2003 ranged from 2.20 to 3.52 feet. Groundwater elevations relative to a benchmark provided by the previous consultant ranged from 93.39 to 95.70 feet. Based on the June 2003 data, groundwater flow was generally toward the north. The average hydraulic gradient was approximately 0.02 feet per foot. A Water Table Surface Map based on data obtained from the Type II monitoring wells on June 12, 2003 is included as **Figure 4**. A summary of historical groundwater elevation data is presented in **Table 2**.

During RAR activities, a hydraulic conductivity of 15.8 m/yr (0.142 feet per day) was estimated. Based on a review of available assessment reports, it does not appear that any slug tests were performed on monitoring wells. The seepage velocity, calculated using the equation $V = K (dh/dl)/n_e$ was 2.07×10^{-3} feet per day (0.76 feet per year). Please refer to the RAR for additional information regarding the estimated hydraulic conductivity.

2.7 Groundwater Analytical Results

Based on the June 12, 2003 sampling results, the concentrations of one or more BTEX constituents, MTBE and/or naphthalene that exceeded the RBSLs were reported in monitoring wells MW-1 through MW-4, MW-7 and PW-8. A Groundwater Quality Map showing individual BTEX constituent, MTBE, IPE and naphthalene concentrations in the monitoring wells from the June 2003 sampling event has been included as **Figure 5.** A summary of historical laboratory analyses of groundwater samples collected from the monitoring wells is presented in **Table 3**.

2.8 Natural Attenuation

In order to evaluate natural attenuation conditions at the site, on June 12, 2003, groundwater samples collected from monitoring wells MW-1 through MW-7 and PW-8 were analyzed for methane, nitrates, sulfates, ferrous

iron, oxidation-reduction potential, dissolved oxygen, specific conductivity, temperature and pH.

Oxygen is the electron acceptor for aerobic metabolism, whereas nitrate, ferrous iron, sulfate and carbon dioxide can serve as electron acceptors for alternative anaerobic pathways. This transfer of electrons releases energy which is utilized for microbial cell maintenance and growth. The biochemical energy associated with alternative degradation pathways can be represented by the redox potential of the alternative electron acceptors: the more positive the redox potential, the more energetically favorable the reaction. Based solely on thermodynamic considerations, the most energetically preferred reaction (oxygen depletion) would proceed in the plume until all of the required electron acceptor is depleted. At this point, the next most preferred reaction (nitrates depletion) would proceed, leading to a pattern where preferred electron acceptors are consumed one at a time, in sequence. In general, most natural attenuation programs yield data that indicate a general pattern of electron acceptor depletion, but not complete depletion. These general patterns of geochemical changes within the plume can provide strong evidence that multiple mechanisms of biodegradation can and are occurring at the site.

Microorganisms require moisture, oxygen, nutrients and a suitable set of environmental factors to grow. The environmental factors include pH, temperature and absence of toxic conditions. Based on published literature, critical conditions for bioremediation are a 25-85% water holding capacity, greater than 0.2 mg/L of dissolved oxygen, air filled pore space to be greater than 10% by volume, a redox potential (ORP) greater than 50 millivolts for aerobes and facultative anaerobes, sufficient nutrients (suggested C:N:P molar ratio of 120:10:1), pH ranging between 5.5 to 8.5 (for most bacteria) and temperature ranging between 15 to 45°C.

An evaluation of natural attenuation parameters indicated that conditions that facilitate natural attenuation (i.e. alternate electron acceptor concentrations (DO, nitrates, sulfates and ferrous iron) and ORP) exist at the site. Based on past experience and from published literature on the subject, the source area wells (including MW-1) with typically higher hydrocarbon concentrations would be expected to have lower dissolved oxygen levels and possibly detectable levels of iron (indicator of anaerobic pathways). A summary of natural attenuation measurements collected in June 2003 is presented in **Table 4**. Please refer to the July 2003 Groundwater Monitoring Report for a complete report of laboratory analyses of groundwater samples collected in June 2003.

2.9 Free Product Recovery

To date, free product has not been observed in any monitoring wells at the site.

3.0 EVALUATION OF REMEDIATION ALTERNATIVES

3.1 Soil Remediation Alternatives

Based on the soil quality data obtained to-date, hydrocarbon impacted soil appears to be concentrated in the vicinity of the monitoring well MW-1. Since groundwater has been affected by the release, it is apparent that the contaminated soil extends to the water table. Several soil remediation alternatives were considered and the options pertinent to this site are discussed in the following paragraphs. An overview of additional soil remediation options is presented in **Appendix A**.

Excavation With Off-Site Disposal of Impacted Soil

Excavation with off-site landfill disposal involves removing calculated volumes of soil with high concentrations of contaminants. Contaminated soil is excavated and transported to a landfill for disposal. Since groundwater has been affected by the release, it is expected that soil contamination extends to the water table to a depth of approximately two to four feet below grade in the vicinity of monitoring well MW-1.

A limitation of this method is that it simply moves contaminants to a landfill without treating or destroying them. The technique is also subject to extensive land disposal restrictions, which can vary between states and counties. It is also subject to constraints in landfill capacity. In addition, excavating large quantities of soil is expensive. In addition, if soil contamination exists beneath the building, this technique would be incapable of adequately addressing the contamination, without affecting the building.

An advantage of this method is that it is relatively easy to execute and does not involve a major capital expenditure. In addition, it effectively removes the mass of contaminants from the soil and thereby reduces the risk of soil acting as a secondary source of contamination. When the amount of contaminated soil is relatively small and no structures are at risk, or disruption of on-going business is negligible, soil excavation is very feasible a remediation method. Based on an evaluation of existing site conditions and the extent and depth of saturated and unsaturated soil contamination, soil excavation in the vicinity of monitoring well MW-1 appears to be a feasible method of soil (and groundwater) remediation for the site. Due to the shallow depth to groundwater, it is recommended that the excavated area should be de-watered (as needed) as excavation progresses to help keep the excavated area accessible and to remove any contaminated water that seeps into the pit.

Natural Attenuation

Natural attenuation is an approach for removing biodegradable contaminants from soil. This method of

remediation relies on naturally occurring microorganisms to break down petroleum products in the soil to water and carbon dioxide. It does not necessarily require the addition of oxygen or nutrients to facilitate the process.

A limitation of this method is that it is extremely slow. It is most appropriate when expedient remediation is not needed and nearby receptors will not be affected by the contaminated soil. The technique offers low cost and minimal disruption to operations. In addition, this method generates no waste streams. The method, however, is inherently slow and biodegradation of contaminants is dependent on the presence of sufficient nutrients, moisture and an active indigenous microbial population. In addition, throughout the process contaminated soil can continue to act as a secondary source of groundwater contamination.

There are a number of methods of enhancing and expediting the attenuation process. These involve the addition of oxygen, nutrients and/or selective microbes in design combinations. The right combination of microbes, nutrients and oxygen source can expedite the destruction of hydrocarbon contaminants in the subsurface. Based on an evaluation of natural attenuation parameters, conditions that facilitate natural attenuation (i.e. alternate electron acceptor concentrations (nitrates, sulfates and ferrous iron), ORP, DO, pH and production of methane) exist at the site. Attenuation, natural or engineered, is a feasible option for this site and is often used in conjunction with soil excavation.

In-Situ Soil Vapor Extraction (SVE)

In-situ soil vapor extraction is a technique for removing contaminants from unsaturated soils. The technique involves drawing fresh air into the ground with a vacuum pump. The air brings the volatile contaminants to the surface where they can be treated and safely discharged. Although recovery of volatiles is the primary function of SVE, the fact that oxygen (air) is drawn into the subsurface, some biodegradation of semi-volatile and non-volatile contaminants takes place. In-situ soil vapor extraction is most effective in coarse-grained soils such as sand and gravel. It typically requires a minimum five-foot thick unsaturated zone of soil. This technique can be used in conjunction with air sparging, groundwater pumping or bioremediation systems. This technique is able to treat large volumes of soil effectively and with minimal disruption to business operations. It can also remove contamination from near or under fixed structures.

A major disadvantage of soil vapor extraction is that it involves equipment cost, extensive operation and maintenance costs and problems associated with rotating equipment and noise. Based on contaminant concentrations in soil, it does not appear that SVE would be a very cost effective method of remediation at the site. In addition, the relatively shallow depth to groundwater would cause the SVE system to extract more

water than vapor, defeating the very purpose of the system. Therefore, soil vapor extraction is not a feasible option of soil remediation at this site.

3.2 Groundwater Remediation Alternatives

The results of the site assessment activities indicated that groundwater at the site has been impacted by petroleum hydrocarbons in concentrations exceeding the RBSLs. Several groundwater remediation alternatives were considered and the options pertinent to the site are discussed in the following paragraphs. An overview of additional groundwater remediation options is included in **Appendix A**.

In-Situ Air Sparging (With Soil Vapor Extraction)

The use of supplemental air injected into the subsurface has been used to enhance the remediation of both groundwater and soil contamination. When air is injected below the groundwater surface, it is known as air sparging (AS). The air strips out dissolved volatile petroleum hydrocarbons from the groundwater (and the adsorbed contaminants from the soil) by volatilization, carrying it up into the unsaturated soil where it can be captured by the soil vapor extraction system. From the injection point, the air moves upward and outward because in the subsurface horizontal permeability is generally higher than the vertical permeability. Thus, a single air injection point can influence a significant area of contamination. Although some biodegradation of the hydrocarbons takes place, volatilization is the primary process and purpose of air sparging. Thus, semi-volatile and non-volatile contaminants stay behind in the soil or groundwater. A limitation of air sparging is that it is difficult to control the air distribution in the groundwater. In addition, it can promote vapor and plume migration. Its effectiveness is limited in low permeability or heterogeneous media. However, by carefully locating the air injection wells, providing a cap (paving) on the site and using SVE, the general flow direction can be controlled to maximize flow through the plume to the extraction well points.

With the exception of the contaminant concentrations in monitoring well MW-1, minimal groundwater impact is present at the site. Based on this data it does not appear that groundwater beneath the site has been significantly impacted by the petroleum hydrocarbon release to warrant an AS system. Based on an evaluation of site conditions and low groundwater impact, air sparging is not considered a feasible and cost effective method of remediation.

Natural Attenuation and Biodegradation

This remediation method allows naturally occurring processes to degrade the petroleum hydrocarbon plume. Research has shown that groundwater impacted by compounds associated with petroleum motor fuels,

particularly benzene, toluene, ethylbenzene and xylenes can be remediated through naturally occurring processes. Although physical mechanisms such as advection, dispersion, volatilization and adsorption are important in the fate and transport of these compounds in subsurface environments, biological processes such as aerobic and anaerobic degradation have been shown to contribute significantly to the natural attenuation process. Field studies have demonstrated that aerobic biodegradation is the most significant biodegradation mechanism for petroleum constituents such as BTEX. Therefore, sufficient dissolved oxygen must be available for degradation via aerobic microorganisms to occur. Typically, this alternative is selected when the site conditions are suitable, contaminant concentrations are relatively low, the aerial extent of contamination is limited and migration of the plume will not adversely impact groundwater receptors.

There are a number of methods of enhancing and expediting the attenuation process. These involve the addition of oxygen, nutrients and/or selective microbes in design combinations. The right combination of microbes, nutrients and oxygen source can expedite the destruction of hydrocarbon contaminants in the subsurface. Attenuation, natural or engineered, is a feasible option for this site. A mixture of oxygen source, nutrients and/or selective microbes could be injected into the subsurface using temporary or permanent injection wells and the destruction of hydrocarbon contaminants would proceed without any need for supervision. The injection of nutrients and/or selective microbes may be pursued if the SCDHEC requires a more expeditious approach to remediate groundwater contamination at the site in addition to monitored natural attenuation.

Groundwater Pump and Treat

This technology involves the recovery of contaminated groundwater through the use of extraction wells followed by physical treatment of groundwater using one or a combination of three processes: granular activated carbon, air stripping, or bioremediation. Continuous recovery of groundwater serves to control migration of the contaminant plume and lessen the contaminant concentrations in the aquifer over time. This technique is most effective in permeable aquifers. It can also be used in conjunction with soil vapor extraction to enhance removal of volatile contaminants from the zone of water table fluctuation.

A limitation of pump and treat is that it can take a long time to achieve complete remediation. In addition, this method is subject to fluctuations of the water table that can smear contaminants and complicate clean-ups. Off-site discharge permits might also be required. The capital costs associated with the installation of remediation equipment, operation and maintenance can be significantly high. Groundwater pump and treat is not a feasible option for the site and is not considered a cost effective option.

3.3 Recommended Remedial Option

Based on current available information concerning the various treatment options, existence and concentrations of contamination, remediation of soil and groundwater beneath the Green's Oil Company site may best be achieved soil excavation with de-watering, as needed, followed by natural attenuation. Please note that, if a more expeditious approach is required by the SCDHEC, injections of nutrients and/or selective microbes may be considered to expedite the remediation effort. Reasons for selecting this technology include:

- Soil excavation in the vicinity of monitoring well MW-1 with de-watering (as needed) of the excavated area prior to backfilling is relatively easy to implement and does not involve a major capital expenditure.
- Soil excavation would be effective in removing all or a significant mass of contamination from the source area which would eliminate the secondary source.
- Bioremediation destroys the contaminants instead of just transferring them to another phase or environment.
- Does not involve major capital expenditure.
- The system is easy to maintain, no noise, odor concerns.
- Low to medium cost of implementation.

The other remedial options evaluated for the site were not selected for the following reasons:

- Air sparging was not considered feasible due to the high equipment, operation and maintenance costs and overall cost-ineffectiveness for low hydrocarbon impacted groundwater. In addition, air sparging may result in the lateral migration of contaminants within the subsurface.
- Soil vapor extraction was eliminated because of the shallow depth to groundwater. Typically, when the seasonal high water table is as shallow as is the case with the referenced site, the system would extract more water than vapor, defeating the very purpose of the system.
- Groundwater pump and treat was not a feasible remediation alternative due to long remediation time and significantly high capital expenses.

4.0 PROPOSED CORRECTIVE ACTION PLAN

4.1 System Overview

It is proposed to reduce the concentrations of petroleum hydrocarbons in soil and groundwater beneath the Green's Oil Company site by soil excavation combined with de-watering of the excavated area followed by

natural attenuation. If a more aggressive approach is required by the SCDHEC to remediate soil and groundwater contamination beneath the site, the injection of nutrients and/or microbes will used to expedite the remediation process. Natural attenuation parameters will continue to be monitored in addition to regular monitoring of volatile and semi-volatile organics. By excavating and removing a majority of the contaminated soils, a possible secondary source of contamination will be eliminated and the total amount of time to remediate soil and groundwater will be greatly reduced. The contaminated soil will be transported off-site for disposal and treatment.

It is proposed to excavate the soil in the vicinity of monitoring well MW-1 to a depth of approximately eight feet. Any monitoring wells destroyed during the excavation will be replaced after completion of excavation, backfilling and compaction of the clean backfill. After excavation activities are completed, soil and groundwater monitoring may proceed, to monitor contaminant reductions as a result of the excavation and natural attenuation. Sampling and monitoring of the site will continue until the contaminant concentrations are at or below RBSLs and until the SCDHEC advises closure for the site. The proposed area of soil excavation is shown on **Figure 6**. Estimated first year costs for the proposed remediation are included in **Appendix B**. A cost comparison of alternate remediation technologies considered for the Green's Oil Company site has also been included in **Appendix B**. An approximate estimate of the time required for the remediation of soil and groundwater has been included as **Appendix C**. A Corrective Action Plan for natural attenuation form has been included as **Appendix D**.

4.2 Basis for Proposed System Recommendation

- Excavating the soil, de-watering the excavated area (as needed) and replacing excavated soil with clean fill is the most expeditious method of eliminating the source. De-watering the excavated area simultaneously with the excavation would not only help reduce the problem of groundwater seepage into the excavated area from hindering excavation, but would also remove any contaminated water in the vicinity. Groundwater extracted from the excavation would be collected in groundwater disposal trucks and disposed at a licensed facility.
- The process is minimally intrusive and easy to implement. There is no possible problem of odor or noise.
- After the soil excavation and backfilling is completed, no equipment other than that used for sampling and monitoring is required.

4.3 Equipment Components

After the soil excavation, de-watering and backfilling is completed, no equipment other than that used for sampling and monitoring is required.

4.4 Sampling and Reporting

Groundwater samples will be analyzed for BTEX constituents, MTBE and naphthalene using EPA Method 8260. In addition, groundwater samples will be analyzed for methane by Method 8015, nitrates and sulfates by EPA Method 300.0 and ferrous iron by Method 3500D. In addition, field measurements of dissolved oxygen (DO), carbon dioxide (CO_2), pH, temperature and oxidation/reduction potential (ORP) will also be obtained. Soil samples (if required) will be analyzed for volatile and semi-volatile organics using SW846 Methods 8260B and 8270C, respectively. Soil samples will be screened with an organic vapor analyzer (OVA) to determine the presence of VOCs. Reporting will be on a quarterly basis for the remediation period unless otherwise indicated by the SCDHEC. A summary of the sampling and reporting schedule is presented in **Table 5**.

4.5 Monitoring and Evaluation

Performance monitoring to evaluate the effectiveness of the process is a critical element of natural attenuation. Performance monitoring is of great importance for natural attenuation due to the potentially longer remediation time period and potential for ongoing contaminant migration. As the laboratory results are received, the progression of remediation by natural attenuation will be tracked, monitored and evaluated.

- CO_2 levels in the groundwater will be monitored. These indicate biological activity and should be done early at start-up and then quarterly thereafter.
- Dissolved oxygen (DO) levels in the groundwater will be monitored on a quarterly basis in conjunction with monitoring well sampling events.
- VOC concentrations in groundwater will indicate what is being removed and areas being affected by the biodegradation process. This monitoring will be done on a quarterly basis.
- Depth to water measurements will be collected on a quarterly basis during each groundwater sampling event.
- Evaluation of the data to verify that the size and movement (if any) of the plume will be evaluated quarterly.

The proposed implementation schedule is presented in **Table 6**.

4.6 System Security and Safety Measures

During work performed on site, all OSHA Safety Regulations will be observed (i.e. barriers, warning signs, etc.).

5.0 PERMITS REQUIRED

- No air emissions or NPDES permit will be necessary because there will be no emissions or discharge of effluent.
- An Underground Injection Control (UIC) permit will be required if microbial injections are considered.

6.0 ABANDONMENT

Following written confirmation from the SCDHEC that the soil and groundwater have been restored to acceptable standards (at or below SSTLs), the site will be returned to its original condition (i.e., landscaping, repair/replacement of fences, if any, etc.). All monitoring wells will be abandoned in accordance with established guidelines.

7.0 LIMITATIONS

This report has been prepared for the exclusive use of Mr. Jerry Green for specific application to the referenced site in York County, South Carolina. The assessment was conducted based on the scope of work and level of effort desired by the client and with resources adequate only for that scope of work. Our findings have been developed in accordance with generally accepted standards of geology and hydrogeology practices in the State of South Carolina, available information, and our professional judgment. No other warranty is expressed or implied.

The data that are presented in this report are indicative of conditions that existed at the precise locations sampled and at the time the samples were collected. In addition, the data obtained from samples would be interpreted as being meaningful with respect to parameters indicated in the laboratory report. No additional information can logically be inferred from these data.

Please note that certain information contained in this report was not obtained under the supervision of CBM. Therefore, CBM cannot verify the accuracy of this information. However, for the purpose of this report, CBM

assumes that this information is correct.

8.0 REFERENCES

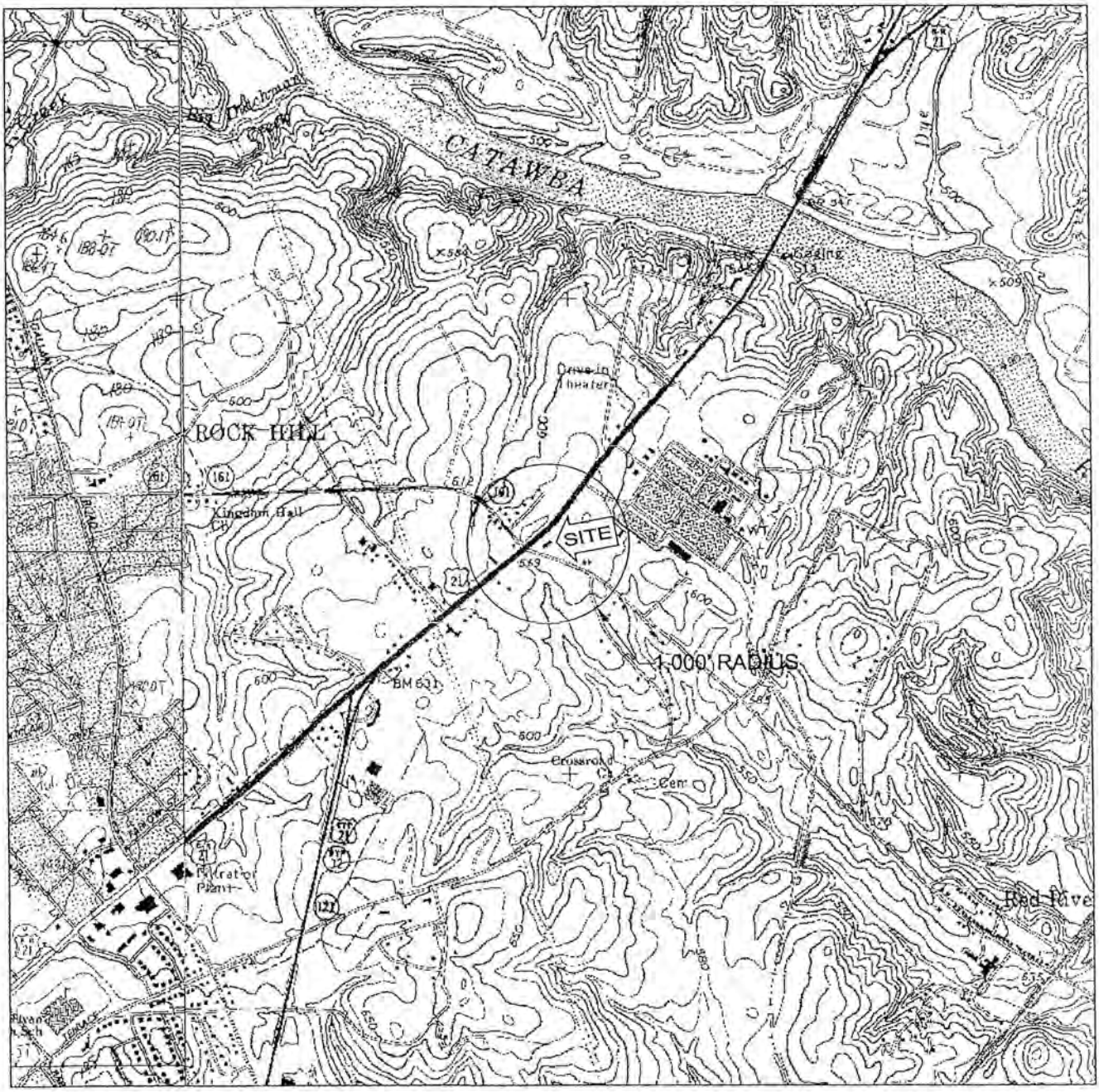
Cederstrom, D.J., Boswell, E.H. Tarver, G.R., 1979, Geological Survey Professional Paper 813-0: "Summary Appraisals of the Nations Groundwater Resources – South Atlantic – Gulf Region".

EPA PUBLICATION: EPA 510-F-92-029; "An Overview of Underground Storage Tank Remediation Options."

Kuo, Jeff, Lewis Publishers, 1998. "Practical Design Calculations for Groundwater and Soil Remediation.

Lewis, Sr., Richard J. "Hazardous Chemicals Desk Reference," 2nd Edition.

FIGURES



SCALE 1:24,000

1 0 1 MILE

1000 0 1000 2000 3000 4000 5000 6000 7000 FEET

CONTOUR INTERVAL 10 FEET

QUADRANGLE LOCATION

ROCK HILL EAST, SC QUADRANGLE

CBM ENVIRONMENTAL SERVICES, INC.

LATITUDE: 34° 58' 29" N	
LONGITUDE: 80° 59' 3" W	
DRAWN BY: AWB	
CHECKED BY: HF	
DATE: 7/2/03	

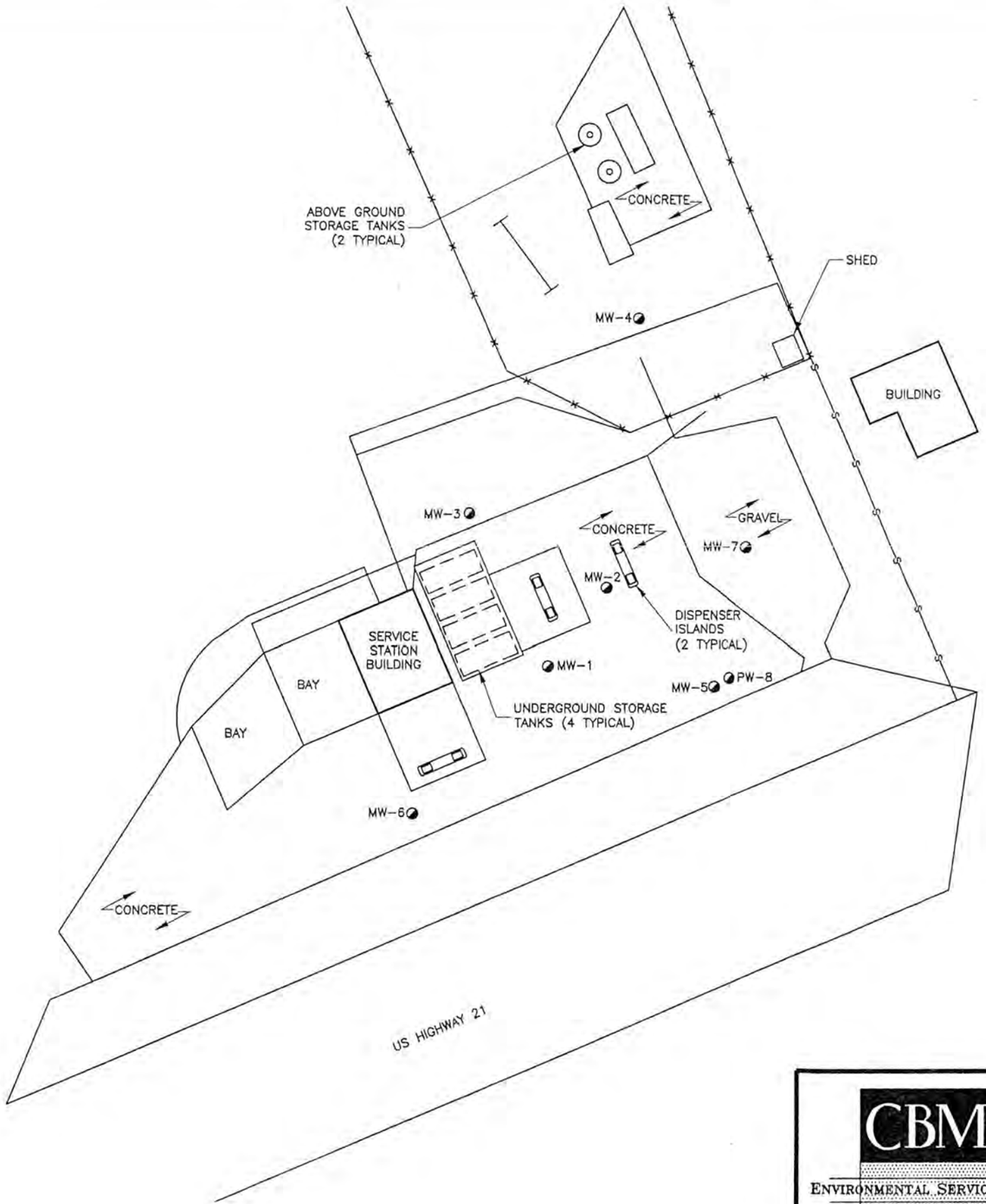
GREEN'S OIL CO.
2849 CHERRY RD.
ROCK HILL, SC

SITE ID NO. 09344

FIGURE 1

USGS TOPOGRAPHIC MAP

CBM PROJECT NO. 11030



LEGEND

- MONITORING WELL
- FENCE
- SEWER LINE

SCALE

0 10 20 30 40

FEET

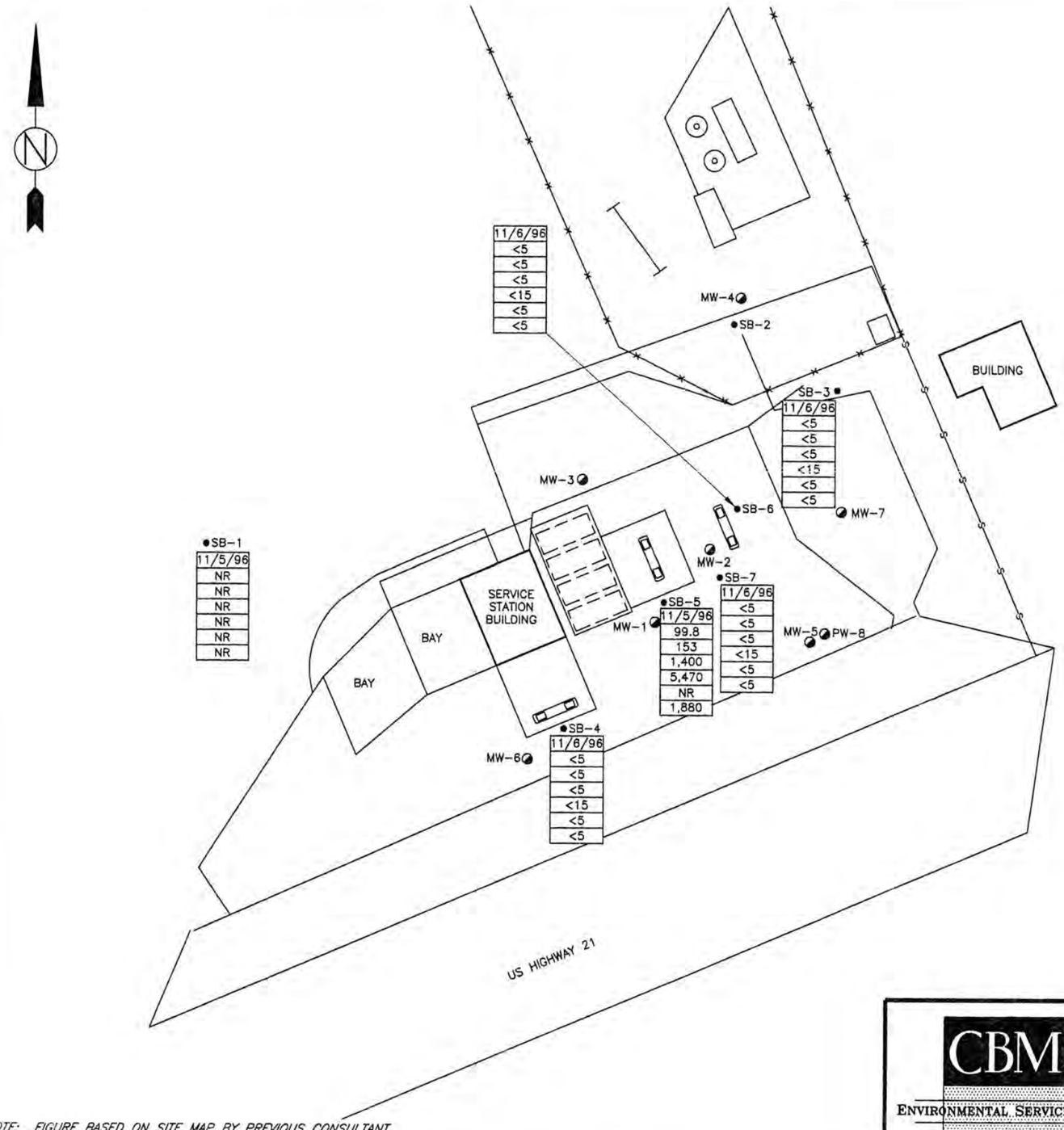
CBM ENVIRONMENTAL SERVICES, INC.

SITE I.D. NO.	09344
PROJECT NO.	11030
DRAWN BY:	BLS/AWB
CHECKED BY:	HF
DWG DATE:	7/3/03

SITE MAP

GREEN'S OIL CO.
2489 CHERRY ROAD
ROCK HILL, SC

FIGURE 2



LEGEND

- SOIL SAMPLE
- MONITORING WELL
- FENCE
- SEWER LINE

11/5/96	SAMPLE DATE
99.8	BENZENE
153	TOLUENE
1,400	ETHYLBENZENE
5,470	XYLENES
NR	MTBE
1,880	NAPHTHALENE

CONCENTRATIONS IN µg/kg

<5 – LESS THAN THE METHOD DETECTION LIMIT SPECIFIED IN THE LABORATORY REPORT

NR – ANALYSIS NOT REQUESTED

NOTE: REFER TO TABLE 1 FOR OTHER DETECTABLE CONTAMINANT CONCENTRATIONS

SCALE

0 10 20 30 40

FEET

NOTE: FIGURE BASED ON SITE MAP BY PREVIOUS CONSULTANT.

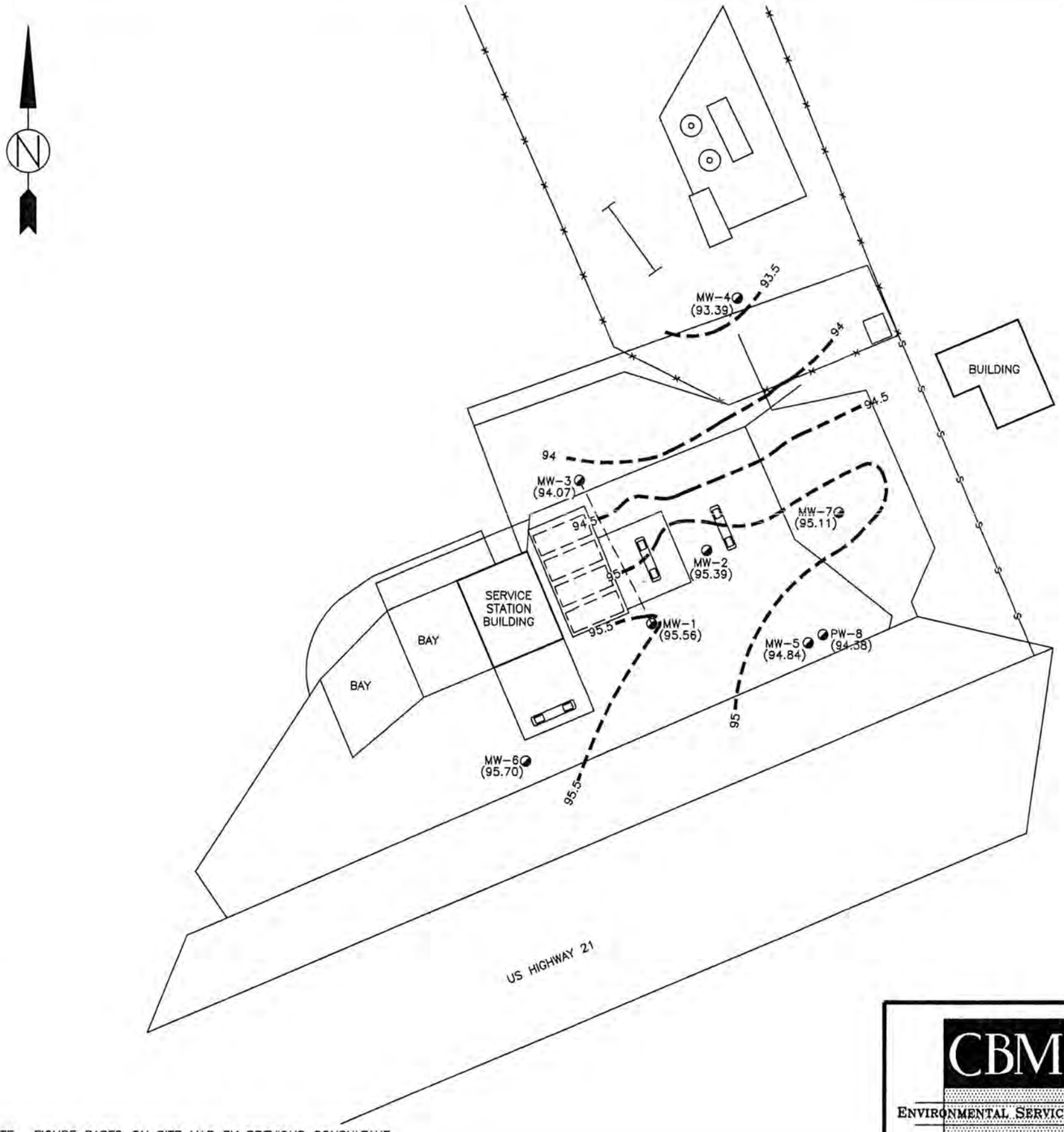
CBM
ENVIRONMENTAL SERVICES, INC.

SITE I.D. NO.	09344
PROJECT NO.	11030
DRAWN BY:	BLS/AWB
CHECKED BY:	HF
DWG DATE:	7/14/03

SOIL QUALITY MAP

GREEN'S OIL CO.
2489 CHERRY ROAD
ROCK HILL, SC

FIGURE 3



LEGEND

- MONITORING WELL
- FENCE
- SEWER LINE
- WATER TABLE SURFACE CONTOUR
- (95.70) WATER TABLE ELEVATION IN FEET

SCALE

0 10 20 30 40

FEET

NOTE: FIGURE BASED ON SITE MAP BY PREVIOUS CONSULTANT.

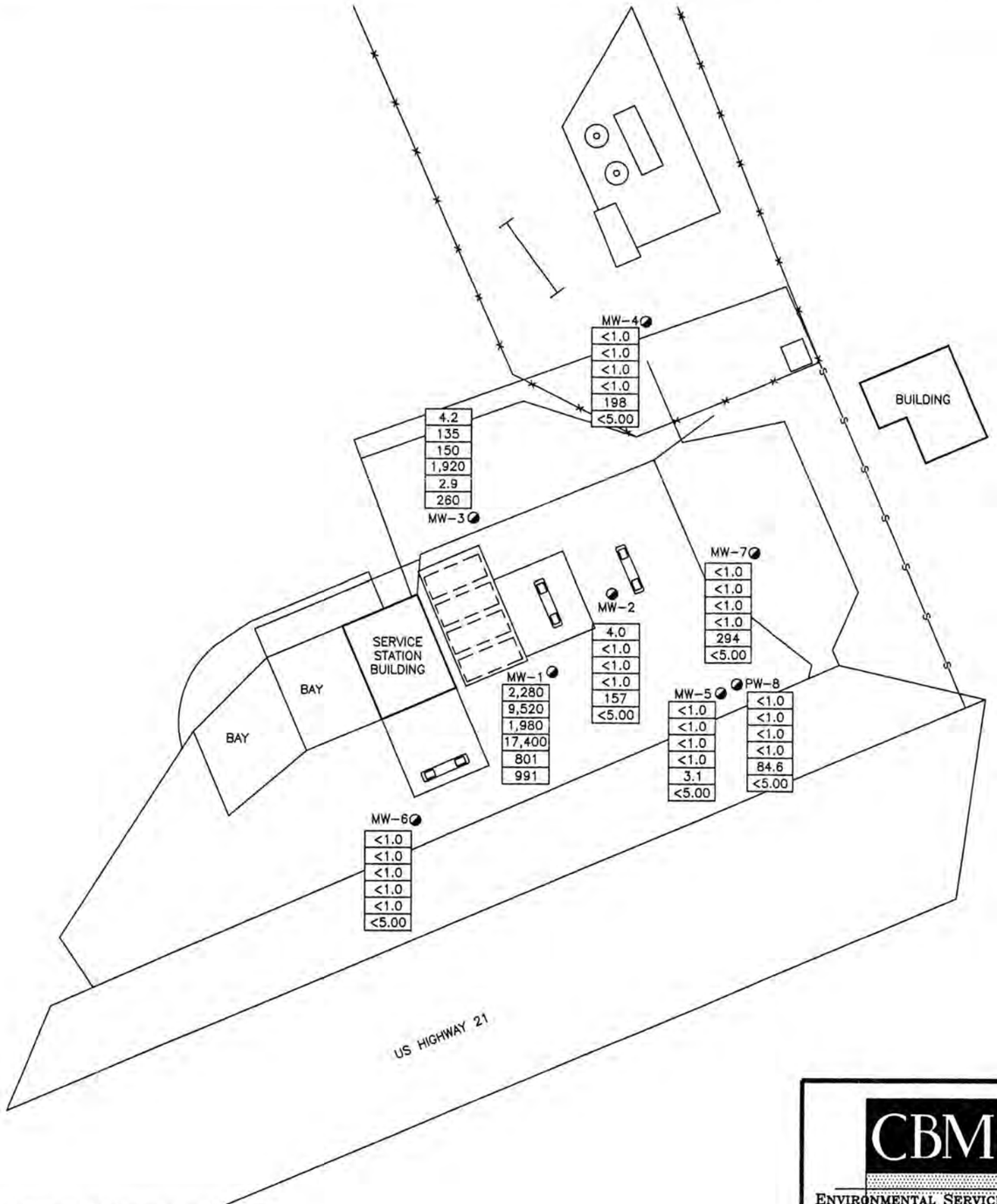
CBM
ENVIRONMENTAL SERVICES, INC.

SITE I.D. NO.	09344
PROJECT NO.	11030
DRAWN BY:	BLS/AWB
CHECKED BY:	HF
DWG DATE:	7/3/03

WATER TABLE SURFACE MAP
JUNE 12, 2003

GREEN'S OIL CO.
2489 CHERRY ROAD
ROCK HILL, SC

FIGURE 4



LEGEND

- MONITORING WELL
- FENCE
- SEWER LINE

2,280	BENZENE
9,520	TOLUENE
1,980	ETHYLBENZENE
17,400	XYLENES
801	MTBE
991	NAPHTHALENE

CONCENTRATIONS IN $\mu g/L$

<1.0 – LESS THAN THE METHOD DETECTION LIMIT SPECIFIED IN THE LABORATORY REPORT

SCALE

0 10 20 30 40

FEET

NOTE: FIGURE BASED ON SITE MAP BY PREVIOUS CONSULTANT.

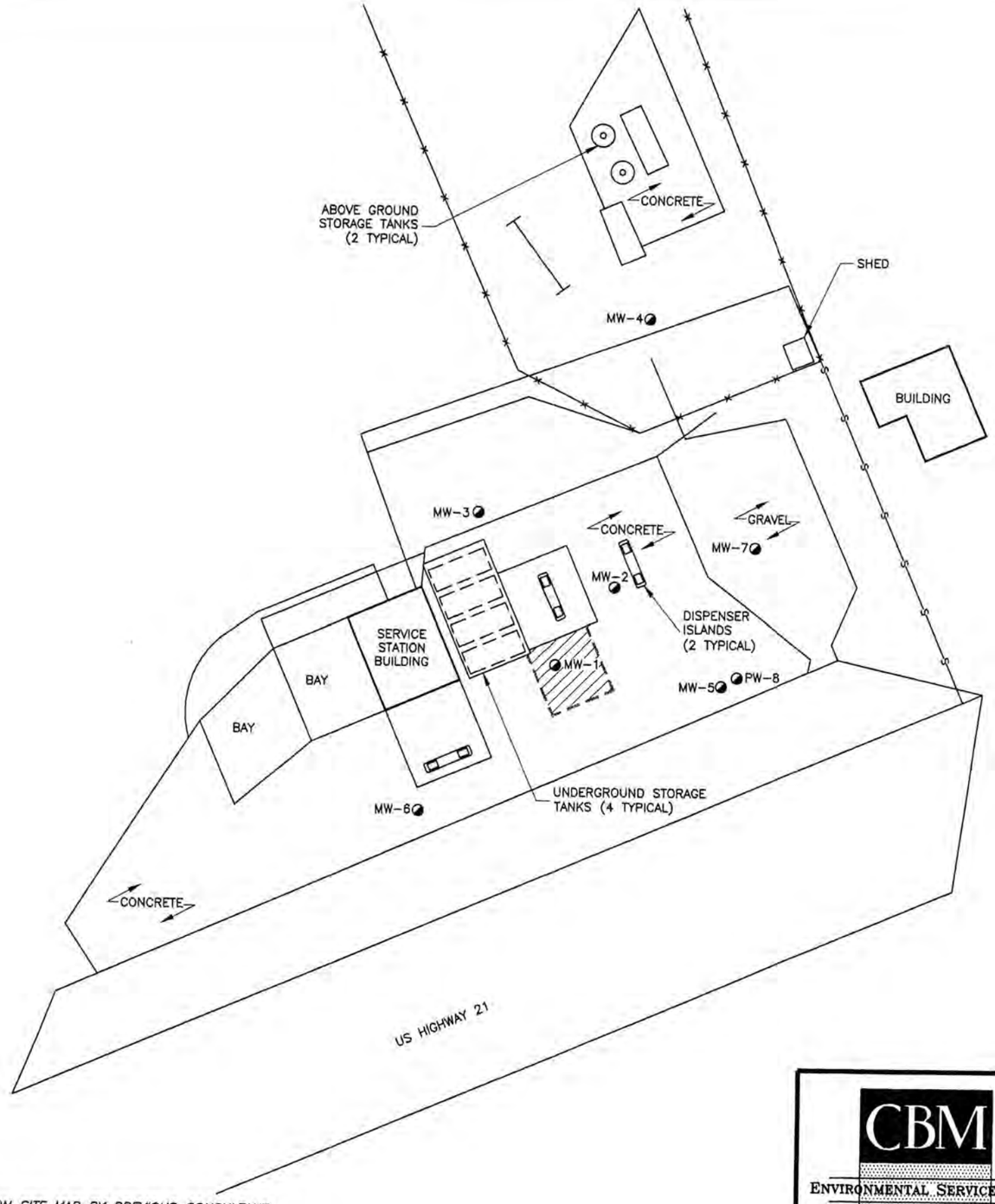
CBM ENVIRONMENTAL SERVICES, INC.

SITE I.D. NO.	09344
PROJECT NO.	11030
DRAWN BY:	BLS/AWB
CHECKED BY:	HF
DWG DATE:	7/3/03

GROUNDWATER QUALITY MAP
JUNE 12, 2003

GREEN'S OIL CO.
2489 CHERRY ROAD
ROCK HILL, SC

FIGURE 5



LEGEND

- MONITORING WELL
- FENCE
- SEWER LINE
- PROPOSED SOIL EXCAVATION AREA

SCALE

0 10 20 30 40

FEET

NOTE: FIGURE BASED ON SITE MAP BY PREVIOUS CONSULTANT.

CBM ENVIRONMENTAL SERVICES, INC.

SITE I.D. NO.	09344
PROJECT NO.	11030
DRAWN BY:	BLS/AWB
CHECKED BY:	HF
DWG DATE:	7/15/03

PROPOSED SOIL EXCAVATION LOCATION

GREEN'S OIL CO.
2489 CHERRY ROAD
ROCK HILL, SC

FIGURE 6

TABLES

TABLE 1
SUMMARY OF LABORATORY ANALYSES[1]
RAPID ASSESSMENT SOIL SAMPLES
GREEN'S OIL COMPANY

Sample ID	Sample Depth (feet)	Sample Date	Benzene	Toluene	Ethylbenzene	Xylenes	MTBE	Naphthalene	TPH 3550 (mg/kg)	TOC (mg/kg)
SB-1	5-7	11/05/96	NR[2]	NR	NR	NR	NR	NR	NR	101
SB-3	5-6	11/06/96	<5[3]	<5	<5	<15	<5	<5	NR	NR
SB-4	4-5	11/06/96	<5	<5	<5	<15	<5	<5	NR	NR
SB-5	4-5	11/05/96	**99.8**[4]	153	1,400	5,470	NR	**1,880**	<50.0	NR
SB-6	4-5	11/06/96	<5	<5	<5	<15	<5	<5	NR	NR
SB-7	4-5	11/06/96	<5	<5	<5	<15	<5	<5	NR	NR
		RBSL[5]	7	1,700	1,500	44,000	NA[6]	200	NA	NA

Notes:

1. Analyses for BTEX, MTBE and naphthalene by EPA Method 8260, TPH semi-volatiles by Method 3550 and TOC by Method 9060M; results reported in µg/kg unless otherwise specified.
2. Analysis not requested.
3. Less than the method detection limit specified in the laboratory report.
4. Concentrations in bold face type exceeded the Risk Based Screening Level.
5. Risk Based Screening Level.
6. Not available.

TABLE 2
SUMMARY OF HISTORICAL GROUNDWATER ELEVATION DATA[1]
GREEN'S OIL COMPANY

Well No.	Date	Top of Casing Elevation	Depth to Groundwater	Groundwater Elevation	Well Depth[2]	Dissolved Oxygen[3]
MW-1	05/24/00	98.15	7.16	90.99	12.33	1.3
	10/09/00		7.78	90.37		2.3
	01/02/01		9.58	88.57		1.4
	12/16/02		5.11	93.04		NM[4]
	06/12/03		2.59	95.56		2.18
MW-2	05/24/00	97.86	7.03	90.83	14.04	1.9
	10/09/00		7.71	90.15		2.4
	01/02/01		9.43	88.43		0.0
	12/16/02		4.91	92.95		2.06
	06/12/03		2.47	95.39		1.22
MW-3	12/16/02	97.08	5.83	91.25	7.75	NM
	06/12/03		3.01	94.07		1.44
MW-4	12/16/02	96.91	6.66	90.25	13.59	1.45
	06/12/03		3.52	93.39		0.96
MW-5	05/24/00	97.04	6.56	90.48	10.04	2.4
	10/09/00		7.15	89.89		3.0
	01/02/01		8.90	88.14		1.6
	12/16/02		4.67	92.37		2.27
	06/12/03		2.20	94.84		1.28
MW-6	05/24/00	98.59	8.10	90.49	9.60	3.8
	10/09/00		7.92	90.67		4.9
	01/02/01		9.52	89.07		NM
	12/16/02		5.25	93.34		3.68
	06/12/03		2.89	95.70		4.19
MW-7	12/16/02	98.40	4.81	93.59	13.60	NM
	06/12/03		3.29	95.11		1.18
PW-8	05/24/00	96.98	6.45	90.53	30.10	3.9
	10/09/00		7.12	89.86		2.5
	01/02/01		8.69	88.29		2.1
	12/16/02		4.46	92.52		NM
	06/12/03		2.60	94.38		1.70

Notes:

1. Top of Casing Elevations were reproduced from the previous consultant's reports. Additional well construction details are unavailable; data reported in feet.
2. Well depths measured during June 12, 2003 sampling event.
3. Dissolved oxygen levels were measured using a DO meter; results reported in mg/L.
4. Not measured.

TABLE 3
SUMMARY OF HISTORICAL LABORATORY ANALYSES[1]
GROUNDWATER SAMPLES
GREEN'S OIL COMPANY

Well No.	Date	Benzene	Toluene	Ethylbenzene	Xylenes	MTBE	Naphthalene	Lead
MW-1	10/24/96	**3,040**[2]	164	325	950	**2,310**	**365**	NR[3]
	05/09/00	**1,790**	255	302	611	**1,300**	**117**	12.0
	10/09/00	**1,600**	180	220	400	**850**	**350**	<3.0[4]
	01/02/01	**500**	9.0	38	68	**460**	**55**	<3.0
	12/16/02	**3,000**	**12,000**	**3,700**	**14,000**	**920**	**1,700**	**14**
	06/12/03	**2,280**	**9,520**	**1,980**	**17,400**	**801**	**991**	NR
MW-2	10/24/96	<10.0	<10.0	<10.0	<3.0	**24,700**	<5.0	NR
	05/09/00	**5.2**	ND[5]	ND	ND	**19,900**	ND	ND
	10/09/00	**31**	5.7	<5.0	12	**11,000**	15	<3.0
	01/02/01	**7.2**	<5.0	<5.0	<5.0	**7,700**	<5.0	<3.0
	12/16/02	<5.0	<5.0	<5.0	7.2	**170**	**12**	<3.0
	06/12/03	4.0	<1.0	<1.0	<1.0	**157**	<5.00	NR
MW-3	10/24/96	NF[6]	NF	NF	NF	NF	NF	NF
	05/09/00	NF	NF	NF	NF	NF	NF	NF
	10/09/00	NF	NF	NF	NF	NF	NF	NF
	01/02/01	NF	NF	NF	NF	NF	NF	NF
	12/12/02	**150**	**5,800**	**2,400**	**14,000**	<25	**920**	**21**
	06/12/03	4.2	135	150	1,920	2.9	**260**	NR
MW-4	10/24/96	<1.0	<1.0	<1.0	<3.0	**70.4**	<5.0	NR
	05/09/00	NF	NF	NF	NF	NF	NF	NF
	10/09/00	NF	NF	NF	NF	NF	NF	NF
	01/02/01	NF	NF	NF	NF	NF	NF	NF
	12/16/02	<5.0	<5.0	<5.0	<5.0	**160**	8.5	5.8
	06/12/03	<1.0	<1.0	<1.0	<1.0	**198**	<5.00	NR
	RBSL[7]	5	1,000	700	10,000	40	10	15

TABLE 3 (cont'd.)
SUMMARY OF HISTORICAL LABORATORY ANALYSES
GROUNDWATER SAMPLES
GREEN'S OIL COMPANY

Well No.	Date	Benzene	Toluene	Ethylbenzene	Xylenes	MTBE	Naphthalene	Lead
MW-5	10/24/96	<1.0	<1.0	<1.0	<3.0	**1,720**	<5.0	NR
	05/09/00	ND	ND	ND	ND	**14,000**	ND	ND
	10/09/00	<5.0	<5.0	<5.0	<5.0	**9,100**	<5.0	<3.0
	01/02/01	<5.0	<5.0	<5.0	<5.0	**1,400**	<5.0	<3.0
	12/12/02	<5.0	<5.0	<5.0	<5.0	14	<5.0	**14**
	06/12/03	<1.0	<1.0	<1.0	<1.0	3.1	<5.00	NR
MW-6	10/24/96	NS[8]	NS	NS	NS	NS	NS	NS
	05/09/00	ND	ND	ND	ND	ND	ND	**52.0**
	10/09/00	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	**26.0**
	01/02/01	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	NS
	12/12/02	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	**48**
	06/12/03	<1.0	<1.0	<1.0	<1.0	<1.0	<5.00	NR
MW-7	10/24/96	NF	NF	NF	NF	NF	NF	NF
	05/09/00	NF	NF	NF	NF	NF	NF	NF
	10/09/00	NF	NF	NF	NF	NF	NF	NF
	01/02/01	NF	NF	NF	NF	NF	NF	NF
	12/12/02	<5.0	<5.0	<5.0	<5.0	**160**	<5.0	**58**
	06/12/03	<1.0	<1.0	<1.0	<1.0	**294**	<5.00	NR
PW-8	10/24/96	<1.0	<1.0	<1.0	<3.0	**547**	<5.0	NR
	05/09/00	ND	ND	ND	ND	**790**	ND	ND
	10/09/00	<5.0	<5.0	<5.0	6.1	**180**	<5.0	<3.0
	01/02/01	<5.0	<5.0	<5.0	<5.0	**160**	<5.0	<3.0
	12/12/02	<5.0	<5.0	<5.0	<5.0	**44**	<5.0	<3.0
	06/12/03	<1.0	<1.0	<1.0	<1.0	**84.6**	<5.00	NR
	RBSL	5	1,000	700	10,000	40	25	15

TABLE 3 (cont'd.)
SUMMARY OF HISTORICAL LABORATORY ANALYSES
GROUNDWATER SAMPLES
GREEN'S OIL COMPANY

Notes:

1. Analyses for BTEX constituents, MTBE and naphthalene by EPA Method 8260B; results reported in µg/L.
2. Concentrations in bold face type exceeded the January 1998 Risk Based Screening Level.
3. Analysis not requested.
4. Less than the method detection limit specified in the laboratory report.
5. Not detected.
6. Well not found.
7. January 1998 Risk Based Screening Level.
8. Not sampled due to insufficient volume of water in the well.

TABLE 4
SUMMARY OF NATURAL ATTENUATION PARAMETERS[1]
GREEN'S OIL COMPANY
JUNE 12, 2003

Well No.	DO (mg/L)	Temp (°C)	pH	Redox Potential (mV)	Specific Conductance (µS/cm)	Methane (µg/L)	Nitrate (mg/L)	Sulfate (mg/L)	Ferrous Iron (µg/L)
MW-1	2.18	26.1	6.46	-35	922	7,240	<0.10[2]	<1.00	19,600
MW-2	1.22	21.9	6.02	-70	770	255	<0.10	3.23	3,500
MW-3	1.44	22.1	6.41	-60	699	1,100	<0.10	<1.00	23,200
MW-4	0.96	21.1	6.25	-70	1,016	743	<0.100	5.79	18,300
MW-5	1.28	23.9	6.42	115	553	<26	1.20	10.2	<100
MW-6	4.19	23.7	6.29	110	636	<26	0.44	2,170	540
MW-7	1.18	21.9	6.36	65	442	<26	0.870	24.4	1,760
PW-8	1.70	25.5	6.39	110	356	<26	0.39	28.8	111

Notes:
1. Analysis for Methane by Method 8015, Nitrate and Sulfate by EPA Method 300.0 and Ferrous Iron by Method 3500D.
2. Less than the method detection limit specified in the laboratory report.

TABLE 5
SAMPLING AND REPORTING SCHEDULE
GREEN'S OIL COMPANY

Medium	Parameter/Method	Frequency
Groundwater	Static water levels	Weekly – First two weeks Quarterly thereafter
	Dissolved Oxygen, pH, Temp and ORP	Weekly – First two weeks Quarterly thereafter
	Volatile organics using EPA Method 8260B, methane by Method 8015, nitrate and sulfate by EPA Method 300.0 and ferrous iron by EPA Method 3500D.	Sample monitoring wells MW-1 through MW-7 and PW-8 quarterly.
Soil	Volatile and semi-volatile organics by SW846 Methods 8260B and 8270C, respectively.	Quarterly for the first year (if required). From test borings before requesting site closure.

Note:
Reporting will be on a quarterly basis during the first year of operation and semi-annually thereafter.

TABLE 6
IMPLEMENTATION SCHEDULE
GREEN'S OIL COMPANY

Item	Completion Point
Submittal of request for bids for excavation and de-watering.	Within one week from receipt of CAP approval.
Receipt of soil excavation bids.	One to two weeks after submittal of bid requests.
Excavation and de-watering (as needed) of proposed area of soil.	Eight to ten weeks after receipt of approval to proceed from SCDHEC.
Monitoring and Reporting Schedule.	Please refer to **Table 5**.

APPENDICES

APPENDIX A
OVERVIEW OF SOIL AND GROUNDWATER REMEDIATION OPTIONS

Environmental Protection Agency 5403W

EPA

An Overview of Underground Storage Tank Remediation Options

EPA

An Overview Of Underground Storage Tank Remediation Options

Contents

Groundwater Remediation

EPA

Groundwater Remediation For UST Sites

In Situ Air Sparging With Soil Vapor Extraction

In situ air sparging with soil vapor extraction (SVE) is a technique for removing dissolved volatile contaminants from groundwater. The technique injects air into the saturated zone. The air forms bubbles that rise into the unsaturated zone, carrying trapped and dissolved contaminants. Extraction wells in the unsaturated zone capture sparged air. If necessary, the air can then be treated using a variety of vapor treatment options.

This technique is most effective in homogenous, permeable aquifers. Performance data for this technique are limited.

In situ air sparging with soil vapor extraction is a rapid remediation technique that can reduce contamination levels in six months. It is also able to quickly remove volatile organic compounds (VOCs) from below the groundwater table.

Petroleum Types And Constituents

- Gasoline and diesel
- Volatile organic compounds (VOCs) such as benzene, toluene, ethylbenzene, and xylene (BTEX)

EPA

Groundwater Remediation For UST Sites

In Situ Bioremediation

In situ bioremediation is a technique for removing biodegradable contaminants from groundwater. The technique relies on microorganisms and supplemental oxygen and nutrients to break down petroleum products in the groundwater.

In situ bioremediation offers the advantage of being able to treat contamination in place, without the need for pumping or the subsequent treatment of pumped groundwater. The technique is most effective in permeable aquifers.

Petroleum Types And Constituents

- Fresh or weathered gasoline, diesel, jet fuel, kerosene, motor oil, heavy fuel oil, lubricating oils, and crude oils
- Volatile organic compounds (VOCs) such as benzene, toluene, ethylbenzene, and xylene (BTEX); residual semivolatile organic compounds (SVOCs) such as polynuclear aromatic hydrocarbons; and nonvolatile constituents

EPA

Groundwater Remediation For UST Sites

In Situ Bioventing Combined With Low Flow Air Sparging (Biosparging)

In situ bioventing combined with low flow air sparging (biosparging) stimulates the aerobic biodegradation of organic contaminants in groundwater by delivering oxygen to the saturated and unsaturated zones. The oxygen is delivered at a slow rate to encourage biodegradation rather than volatilization.

Biosparging degrades volatile organic compounds (VOCs) in place, reducing the need for subsequent vapor treatment and the costs of remediation. This technique is most effective in permeable aquifers.

Petroleum Types And Constituents

- Fresh or weathered gasoline, diesel, jet fuel, kerosene, motor oil, fuel oil, lubricating oils, and crude oils
- Volatile organic compounds (VOCs) such as benzene, toluene, ethylbenzene, and xylene (BTEX); and residual semivolatile organic compounds (SVOCs) such as polynuclear aromatic hydrocarbons

EPA

Groundwater Remediation For UST Sites

Vacuum Enhanced Pump And Treat

Vacuum enhanced pump and treat is a technique that uses a surface-mounted vacuum pump to remove contaminated soil vapors and groundwater simultaneously. This method increases the rate of pumping, reducing remediation time. The pumped water and soil vapors can then be treated with a number of techniques.

Vacuum enhanced pump and treat is most effective when used in aquifers with medium to low permeability (silts and clays).

This method offers pumping rates that are 3 to 10 times greater than conventional pump and treat rates. Increased pumping rates result in decreased remediation time.

Petroleum Types And Constituents

- Dissolved gasoline and diesel, jet fuel, and kerosene
- Dissolved constituents such as benzene, toluene, ethylbenzene, and xylene (BTEX)

EPA

Groundwater Remediation For UST Sites

Pump And Treat

Pump and treat is a technique that brings contaminated groundwater above the ground through the use of extraction wells. The water is then treated, normally using one of three processes: granulated activated carbon, air stripping, or bioremediation.

This technique is most effective in permeable aquifers. It also can be used with in situ vapor extraction (SVE) to enhance removal of volatile contaminants from the zone of water table fluctuation.

A limitation of pump and treat is that it can take a long time to achieve complete remediation, sometimes as long as seven years even for an ideal site. In addition, this method is subject to fluctuations of the water table that can smear contaminants and complicate cleanups.

Petroleum Types And Constituents

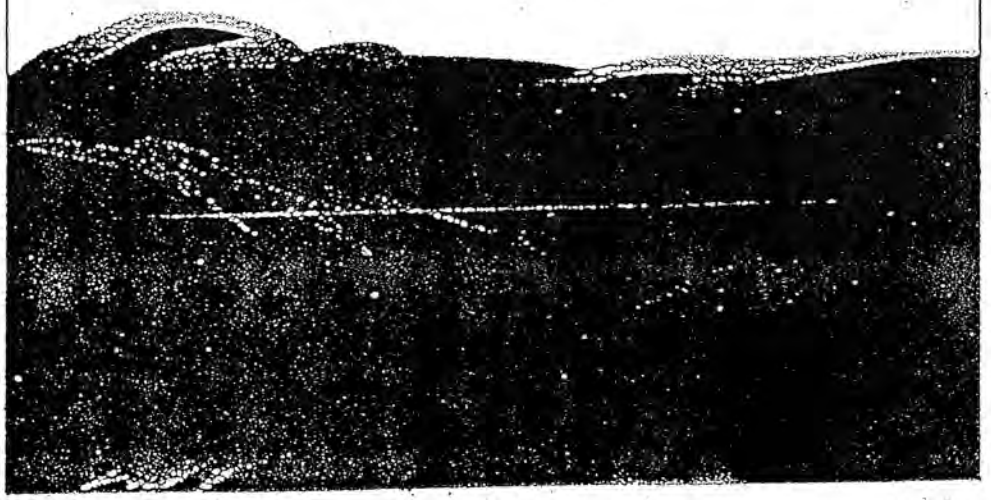
- Dissolved gasoline and diesel, jet fuel, and kerosene
- Dissolved constituents such as benzene, toluene, ethylbenzene, and xylene (BTEX)

EPA

An Overview Of Underground Storage Tank Remediation Options

Contents

Soil Remediation



Environmental Protection Agency | Emergency Response 5403W | October 1993

EPA

Soil Remediation For UST Sites

In Situ Soil Vapor Extraction

In situ soil vapor extraction (SVE) is a technique for removing contaminants from unsaturated soils. The technique draws fresh air into the ground with a vacuum pump. The air brings the contaminants to the surface, where they can be treated and safely discharged.

In situ soil vapor extraction is most effective in coarse-grained soils such as sand and gravel. It requires a minimum 5-foot-thick unsaturated zone of soil. This technique can be used in conjunction with air sparging, groundwater pumping, or bioremediation systems.

This technique is able to treat large volumes of soil effectively and with minimal disruption to business operations. It also can remove contamination from near or under fixed structures.

Petroleum Types And Constituents

- Fresh and weathered gasoline and diesel
- Volatile organic compounds (VOCs) such as benzene, toluene, ethylbenzene, and xylene (BTEX); and semivolatile organic compounds (SVOCs)

United States Environmental Protection Agency | Solid Waste and Emergency Response 5403W | EPA 510-F-93-022 October 1993

EPA

Soil Remediation For UST Sites

In Situ Bioremediation: Bioventing

In situ bioremediation—bioventing—is a technique for removing biodegradable contaminants from unsaturated soils. The technique injects oxygen into contaminated soil. The oxygen stimulates the aerobic biodegradation of the organic contaminants in the soil. Oxygen is delivered at a low rate to encourage biodegradation rather than volatilization.

Bioventing is most effective in coarse-grained soils such as sand and gravel. It requires a minimum 5-foot-thick unsaturated zone. This technique can be used in conjunction with air sparging or groundwater pumping systems.

This technique is able to treat large volumes of soil effectively and with minimal disruption to business operations. It also can remove contamination from near or under fixed structures. Bioventing also reduces the need for aboveground treatment because it works to degrade contaminants in place.

Petroleum Types And Constituents

- Fresh or weathered gasoline, diesel, jet fuel, kerosene, motor oil, heavy fuel oil, lubricating oils, and crude oils
- Volatile organic compounds (VOCs) such as benzene, toluene, ethylbenzene, and xylene (BTEX); residual semivolatile organic compounds (SVOCs), such as polynuclear aromatic hydrocarbons; and nonvolatile constituents

United States
Environmental Protection
Agency

Solid Waste and
Emergency Response
5403W

EPA 510-F-93-023
October 1993

EPA

Soil Remediation For UST Sites

Ex Situ Bioremediation: Biomounding

Ex situ bioremediation—biomounding—is a technique for removing biodegradable contaminants from excavated mounds of soil. Nutrients are added to the soil mounds, which are often several feet high, to facilitate bioremediation. Aeration conduits and irrigation systems are constructed in the mound.

Biomounding is most appropriate for shallow contamination sites that cover a large horizontal area. This is a low-maintenance technique that requires a relatively short treatment time. Biomounding also provides better control over aeration, moisture, nutrient levels, and soil texture than other methods.

Petroleum Types And Constituents

- Fresh or weathered gasoline, diesel, jet fuel, kerosene, motor oil, heavy fuel oil, lubricating oils, and crude oils
- Volatile organic compounds (VOCs) such as benzene, toluene, ethylbenzene, and xylene (BTEX); residual semivolatile organic compounds (SVOCs) such as polynuclear aromatic hydrocarbons; and nonvolatile constituents

United States Environmental Protection Agency
Solid Waste and Emergency Response 5403W
EPA 510-F-93-026 October 1993

EPA

Soil Remediation For UST Sites

In Situ Passive Biodegradation (Natural Attenuation)

In situ passive biodegradation (natural attenuation) is an approach for removing biodegradable contaminants from soil. This method of remediation relies on microorganisms to break down petroleum products in the soil. It does not require the addition of oxygen or nutrients to facilitate the process.

In situ passive biodegradation is extremely slow. It is most appropriate when expedient remediation is not needed and nearby receptors will not be affected by contaminated soil. To date, few sites have been fully remediated using this approach.

This technique offers low cost and minimal disruption to business operations. In addition, this method generates no wastestreams.

Petroleum Types And Constituents

- Fresh or weathered gasoline, diesel, jet fuel, kerosene
- Volatile organic compounds (VOCs) such as benzene, toluene, ethylbenzene, and xylene (BTEX); residual semivolatile organic compounds (SVOCs) such as polynuclear aromatic hydrocarbons; and nonvolatile constituents

United States Environmental Protection Agency
Solid Waste and Emergency Response 5403W
EPA 510-F-93-024
October 1993

EPA

Soil Remediation For UST Sites

On-Site Low Temperature Thermal Desorption

Low temperature thermal desorption *is a technique for removing contaminants from large volumes (greater than 1,000 cubic yards) of soil. The technique heats contaminated soil to relatively low temperatures (200-1,000°F). The heat causes contaminants to vaporize so that they can be treated with air emissions treatment systems.*

On-site thermal treatment is most effective on soil that contains high levels of hydrocarbons. It requires less time than bioremediation or soil vapor extraction (SVE). On-site thermal treatment can be implemented rapidly and works quickly—within six to eight weeks—at a relatively low cost.

Petroleum Types And Constituents

- All types of petroleum products

United States
Environmental Protection
Agency

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Emergency Response
5403W

EPA 510-F-93-025
October 1993

EPA

Soil Remediation For UST Sites

Ex Situ Bioremediation: Land Farming

Ex situ bioremediation—land farming (or land treatment)—is a technique for removing biodegradable contaminants from excavated soil. The excavated soil and added nutrients are spread over a lined treatment area. The area is periodically tilled to facilitate the natural release of volatile organic compounds (VOCs) and the biodegradation of contaminants.

Land farming is effective on many soil types and a variety of contaminants. It is also easy and inexpensive to design, operate, and maintain.

Petroleum Types And Constituents

- Fresh or weathered gasoline, diesel, jet fuel, kerosene, motor oil, heavy fuel oil, lubricating oils, and crude oils
- Volatile organic compounds (VOCs) such as benzene, toluene, ethylbenzene, and xylene (BTEX); residual semivolatile organic compounds (SVOCs) such as polynuclear aromatic hydrocarbons; and nonvolatile constituents

United States Environmental Protection Agency
Solid Waste and Emergency Response 5403W
EPA 510-F-93-027
October 1993

EPA

Soil Remediation For UST Sites

Excavation And Off-Site Treatment

Excavation and off-site treatment is a method for removing contaminants from small volumes (less than 1,000 cubic yards) of soil that cannot be treated effectively on site. Contaminated soil is excavated and then treated. Typical treatment facilities include:

- *Low temperature thermal desorption facilities*
- *Asphalt plants*
- *Incinerators*

This technique can be used with many different kinds of soils and contaminants. It offers the benefit of actually destroying contaminants rather than simply moving them from one location to another.

Petroleum Types And Constituents

- All types of petroleum products

APPENDIX B
ESTIMATED PROJECT COST AND COST COMPARISON

APPENDIX B
REMEDIAL METHOD COMPARISON – SOIL
GREEN'S OIL COMPANY

Method	Soil Excavation	Natural Attenuation of Soil Hydrocarbons	Soil Vapor Extraction (SVE)
Feasibility (For This Site)	High	High (Long-Term)	Low
Advantage	Removes contaminated soil, a secondary source of contamination, quickly.	Low cost (no equipment required)	Rapidly removes vadose zone adsorbed and saturated zone stripped VOCs
Disadvantage(s)	Can be high cost; have disposal restrictions; be disruptive to business; may affect structural integrity of building.	Removes only biodegradables; extremely slow process; contaminated soil continues to act as secondary source; dependent upon presence of sufficient nutrients and microbes.	Relatively shallow depth to groundwater; system will extract more water than vapor.
Estimated Cost	~$25,000 plus cost of annual monitoring and lab analyses (inclusive of pump out/de-watering and disposal, if necessary)	See cost summary.	~$100,000 (equipment and installation) Does not include monitoring, O&M, etc. (see cost summary for example of breakdown of sampling and reporting)

APPENDIX B
REMEDIAL METHOD COMPARISON – GROUNDWATER
GREEN'S OIL COMPANY

Method	Air Sparging (AS)	Natural Attenuation of Dissolved Groundwater Hydrocarbons	Pump and Treat
Feasibility (For This Site)	Low	High	Low
Advantage	Enhances removal of volatiles from soil and groundwater; provides oxygen to naturally occurring microbes to promote biodegradation.	Low cost (no equipment required)	Controls plume migration, water treated on surface.
Disadvantage(s)	Effectiveness limited in low permeability or heterogeneous media or if site has free product.	Removes only biodegradables; extremely slow process; no control on plume migration; dependent upon presence of sufficient nutrients and microbes.	Takes long time to achieve complete remediation; can smear contaminants and complicate clean-up; extensive discharge permitting requirements; high capital costs for two independent systems; must meet NPDES requirements.
Estimated Cost	~$60,000 (equipment and installation), plus added O & M, reporting and sampling costs (annually ~ $63,000).	See cost summary.	~$100,000 (equipment and installation), plus added O & M, reporting and sampling costs (annually ~ $63,000).

APPENDIX B
ESTIMATED PROJECT COST
GREEN'S OIL COMPANY

Task No.	Description	Total Cost ($)
1	Impacted soil excavation and backfill with clean soil (~120 tons)	3,480
2	Soil disposal and treatment	3,600
3	Excavation de-watering (if necessary)	8,000
4	Drill one replacement monitoring well after excavation	1,800
5	Engineering, Supervision	4,000
6	Sampling, monitoring	4,200
7	Laboratory analyses	8,640
8	Monitoring reports	8,400
First Year	Total First Year Costs (sample, monitoring, reporting)	42,120

Note:
Costs after the first year would include items 6 through 8, adjusted for inflation and price modifications. First year costs are based on a quarterly sampling schedule. Costs after the first year will be based on sampling schedule.

APPENDIX C
TIME ESTIMATE FOR REMEDIATION OF SOIL AND GROUNDWATER

APPENDIX C
TIME ESTIMATE FOR REMEDIATION OF SOIL AND GROUNDWATER
GREEN'S OIL COMPANY

Calculate the oxygen required and time to closure:

The hydrocarbons in the saturated zone will be dissolved in the groundwater or adsorbed onto the surface of the aquifer soils. An estimate of the amount of hydrocarbons adsorbed onto the soil will be made by using partition equations. Since heating oil is a mixture of compounds and the exact physiochemical data for it is not available, data for total BTEX, MTBE and naphthalene will be used.

Basis: 1 cubic meter

Average contaminant (sum of concentrations of total BTEX, MTBE and naphthalene measured in monitoring well MW-1)

MW-1 32,972 µg/L (June 2003 data)
32,972 = 32.97 mg/L

From RAR:

Hydraulic Conductivity	0.142 ft/day
Seepage Velocity	0.00207 ft/day

Aquifer Characteristics (assumed values):

Porosity	0.25
Organic Content (F_{OC})	0.000101
Subsurface Temperature	20^0C
Bulk Density of Aquifer Material	1.40 g/cm^3
DO Concentration in the Aquifer (1/2 Saturation)	4.0 mg/L

Use xylenes characteristics for gasoline

Log K_{OC} = 3.0 (Position coefficient between organic phase and water)
K_{OC} = 0.63 K_{OW} (general equation)
K_{OC} = $(0.63)(10^3)$ = 630
K_P = $F_{OC}K_{OC}$ = (0.000101)(630) = 0.06363 L/kg
= Soil/water partition coefficient

Contaminant Adsorbed Onto Soil:

X = K_pC = (0.06363)(32.97)= 2.10 mg/kg

Mass of the aquifer matrix (1 m^3)(1,400 kg/m^3) = 1,400 kg = M_S

Mass of the contaminant adsorbed on the solid surface = (X)(M_S) = (2.10 mg/kg)(1,400 kg)
= 2,940 mg
= 2.94 g

APPENDIX C (cont'd.)
TIME ESTIMATE FOR REMEDIATION OF SOIL AND GROUNDWATER
GREEN'S OIL COMPANY

Void space in aquifer = (1 m^3)(0.25) = 0.25 m^3 = 250 L
Mass of the contaminant dissolved in the groundwater = (C) (V_1)
= (32.97)(250)
= 8,242.5 mg
= 8.24 g
Total mass of the contaminants in the aquifer = 2.94 + 8.24 = 11.18 g
Amount of oxygen present in the groundwater = (V_1)(DO) = (250 L)(4.0 mg/L) = 1000mg = 1 g
3.08 ratio of grams of oxygen are required to degrade 1 gram of hydrocarbon
therefore, amount of oxygen required = (3.08)(11.18) = 34.43 grams oxygen /m^3

Fresh water at 4 mg/L oxygen concentration passes through the 1 meter distance at a velocity of 0.00207 ft/day.
= 3.28 ft/m/0.00207 ft/day = 1,585 day/meter distance
Every 1,585 days, 1.0 g oxygen is fed to the cubic meter of subsurface
= (34.43 g/m^3)/1.0 = 34.43 (1,585 day periods)
= 34.43 x 1,585 = 54,572 days
= 149.5 years

Natural attenuation alone will not work.

Please note the estimate is based on the assumption that there is perfect contact between the dissolved oxygen and the dissolved contaminants. Once baseline samples are collected after the excavation is completed, a more realistic estimate can be made.

APPENDIX D
CORRECTIVE ACTION PLAN FOR NATURAL ATTENUATION FORM

CORRECTIVE ACTION PLAN FOR NATURAL ATTENUATION

UST Permit Name: Green's Oil Company
UST Permit #: 09344
Date Release Reported: _____
Project Manager: Holly Freisen
Priority Class: _____

CoC Concentrations (ug/L)

Benzene:	2,280
Toluene:	9,520
Ethylbenzene:	1,980
Xylenes:	17,400
MTBE:	801
Naphthalene:	991

SSTL Concentration (ug/L)

Benzene:	35.63
Toluene:	7,126
Ethylbenzene:	4,988
Xylenes:	71,260
MTBE:	178.1
Naphthalene:	285

Date of Last Sampling: 6/12/03
Contractor: CBM Environmental
Assessment Activities Completed: Groundwater monitoring
# of Sampling Events Completed: 1
Groundwater Velocity (ft/yr): 0.76
Groundwater Flow Direction: North
Depth to Groundwater: 2.82 ft.
Soil Lithology: sandy clay
Distance to the Nearest Receptor? 3,000 feet
Type of Receptor? surface water
Is the CoC Plume Defined (Yes/No)? yes
Is the CoC Plume Stable (Yes/No)? yes

Additional Comments:

Proposal to sample 8 wells in 3 months to verify natural attenuation

Project Manager: Holly Freisen
Date: 7/15/03

September 22, 2003

CBM
ENGINEERING, INCORPORATED

CERTIFIED MAIL – RETURN RECEIPT REQUESTED

Mr. Read S. Miner, P.G.
South Carolina Department of Health and Environmental Control
Assessment and Corrective Action Division
2600 Bull Street
Columbia, South Carolina 29201-1708

Re: Intrinsic Corrective Action Plan – Comments/Fate and Transport Modeling
Greens Oil Company
Rock Hill, York County
UST Permit No. 09344
CBM No. 11030

Dear Mr. Miner:

The purpose of this report is to address the comments in your correspondence dated August 13, 2003 to Mr. Jerry Green of Greens Oil Company and your telephone conversation with Ms. Holly Freisen of CBM Environmental Services, Inc. (CBM) on August 11, 2003 regarding the above referenced facility. (**Figures 1 and 2**). As discussed in the referenced telephone conversation, site-specific target levels (SSTLs) used in the Intrinsic Corrective Action Plan (ICAP) dated August 8, 2003, were based on the assessment report submitted by TET Environmental Services, Inc. in February 1997.

The ICAP was developed based on groundwater quality data obtained in June 2003. A comparison of groundwater quality data between June 2003 and October 1996 indicated that COC concentrations in the source area have increased significantly and, based on these data, it was proposed that contaminated soil and groundwater beneath the site be remediated by excavation with de-watering (as needed) followed by natural attenuation. We concur with your evaluation that current groundwater quality data indicates that conditions that facilitate natural attenuation (i.e. nutrient concentrations, dissolved oxygen levels and production of methane) exist. However, based on our estimate (in **Appendix C** of the ICAP) it would take approximately 150 years to remediate soil and groundwater with natural attenuation alone. Therefore, it was proposed to expedite the remediation effort by soil excavation.

In accordance with your request, a fate and transport simulation was completed and SSTLs were re-calculated based on current groundwater quality data. In addition, a fate and transport simulation was

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performed to determine the feasibility of site remediation by natural attenuation using BIOSCREEN. The results are discussed in the following sections.

FATE AND TRANSPORT MODEL

A fate and transport model based on the Domenico equations was run to determine the risk posed by the release to potential receptors. For modeling purposes, Receptor 1 is the exposure point (as calculated by the previous consultant) located approximately 100 feet down-gradient from the center of the source area and Receptor 2 is the down-gradient limit of the 1,000-foot receptor search radius. The model was performed for each COC that exceeded the RBSL. A summary of the model input parameters and assumptions are presented in **Table 1**.

The results indicate that the concentrations of benzene and naphthalene would exceed the RBSLs for groundwater at each of the modeled receptors. The concentrations of toluene and MTBE would exceed the RBSLs for groundwater at Receptor 1. The concentrations of ethylbenzene and xylenes would not exceed the RBSLs at any of the modeled receptors during the simulation period of 1,000 years. A summary of the results of the model is presented in **Table 2.** The results of the fate and transport model have been included as **Appendix A**.

SITE SPECIFIC TARGET LEVELS (SSTLs) FOR GROUNDWATER

Based on the results of the model, SSTLs for groundwater for each COC that exceeded the RBSLs for the closest down-gradient receptor (the exposure point located 100 feet north of the site) were calculated. The calculations indicated that the concentrations of benzene, toluene, MTBE and naphthalene in the source area exceeded the SSTLs necessary to maintain the concentrations below the RBSLs at the exposure point. However, it is important to note that the model does not account for any reduction in source concentrations by natural attenuation during the simulation period. It is probable that natural attenuation would play an important role in reduction of source concentrations if the plume has stabilized. A summary of the SSTLs for groundwater is presented in **Table 3.** The results of the SSTL calculations have been included as **Appendix B.** A Corrective Action Plan for Natural Attenuation Form based on the revised SSTLs is included as **Appendix C**.

FATE AND TRANSPORT MODEL (NATURAL ATTENUATION)

A fate and transport simulation was performed to determine the feasibility of site remediation by natural attenuation. The reduction of the contaminants of concern in the saturated zone by natural attenuation was estimated using BIOSCREEN, which simulates remediation through natural attenuation of dissolved

hydrocarbons. The software is based on the Domenico analytical solute transport model and has the ability to simulate advection, dispersion, adsorption, and aerobic decay as well as anaerobic reactions that have been shown to be the dominant biodegradation processes at many petroleum release sites. BIOSCREEN includes three different model types:

1) Solute transport without decay,
2) Solute transport with biodegradation modeled as a first-order decay process (simple, lumped-parameter approach),
3) Solute transport with biodegradation modeled as an "instantaneous" biodegradation reaction (approach used by BIOPLUME models).

The model is designed to simulate biodegradation by both aerobic and anaerobic reactions. It was developed through a collaboration between the U.S. EPA and the U.S. Air Force.

In addition to the assumptions built into the Domenico Model, several other site-specific assumptions were incorporated based upon field data collected during assessment and monitoring activities. The site-specific assumptions are as follows:

- The groundwater flow regime is generally toward the north/northeast based on the June 2003 data.
- The groundwater flow velocity is approximately 3.65 feet per year. (2.1 feet per year used in model after calibration.)
- The source area is centered on the UST basin and dispenser islands and is extended to include monitoring wells MW-1, MW-2 and MW-3 (wells with highest hydrocarbon concentrations in groundwater).
- For comparison of field data with modeled data for the source area, the source area concentration was based on the total BTEX concentration for monitoring well MW-1 (32.9 mg/L).
- Monitoring well MW-4, located approximately 120 feet down-gradient from the source area was used as a compliance point to compare the simulated data with actual data.
- Soil TOC and TPH values were based on data obtained in November 1996 by the previous consultant from samples collected from soil borings SB-1 and SB-5, respectively.
- For gasoline spills, BTEX is usually assumed to comprise the bulk of dissolvable organics in the source zone. To simulate a declining source, the soluble mass of BTEX in soil was calculated based on analytical results of soil samples collected by the previous consultant in November 1996. Average BTEX concentrations were obtained from soil sample SB-5. The volume of contaminated soil was estimated by multiplying the estimated area of impacted soil with the depth of soil contamination. The volume was converted to kilograms (kg) of contaminated soil and

multiplied by the average soil concentration to get the soluble mass in the source zone. This quantity was used to estimate the rate at which the source zone concentration declines. Please note that the model probably underpredicts the removal rate.

- The objective was to predict the trend of contaminant reduction in the source area from the estimated time of the release (1991) in the absence of a secondary source area. Please note however that current contaminant concentrations (MW-1 from June 2003) in the source area have increased significantly when compared with concentrations from October 1996 and it appears that the plume has not reached steady state. Therefore, the current modeling effort focused only on the reduction in contaminant concentrations from the original release and does not account for any contribution from any secondary source. The modeling effort was directed towards obtaining a match point for down-gradient monitoring wells that may not have experienced the effects of the secondary source contribution to the source area.

The input parameters for the natural attenuation model are presented in **Table 4**.

BIOSCREEN MODELING SUMMARY

- BIOSCREEN was used in an attempt to reproduce the movement of the plume from 1991 (the best estimate of the release date) to 2003.
- The soluble mass in soil was estimated by integrating soil BTEX concentrations from soil boring SB-5 collected by the previous consultant in November 1996. Based on laboratory analysis of soil samples, 27 kg of BTEX was estimated to be present at the site. This value represents a minimum source half-life of 6 years with the instantaneous reaction model. Based on the relatively long source half-life, the 27 kg of BTEX measured in 1996 was assumed to be representative of 1991 conditions
- The instantaneous reaction model was used in an attempt to approximate the current plume length (~80 feet).
- Because a decaying source was used, the source concentrations on the input screen (representing concentrations 12 years ago) were adjusted so the source concentrations on the centerline output screen (representing current conditions) were equal to 32.9 mg/L of total BTEX. Because the source decay term is different for the first order decay and instantaneous reaction models, this simulation focused on matching the instantaneous reaction model. The source concentration that best represented the contaminant concentrations in the source in 1991 was 80 mg/L. The final result was a concentration of 31.379 mg/l in the source area and 0.0 mg/L at a point located approximately 120 feet from the center of the source area. This matched well with the reported

concentration of total BTEX in MW-1 (32.9 mg/L) in the source area and MW-4 (<0.004 mg/L) located approximately 120 feet down-gradient from the source area.

- The initial run of the instantaneous reaction model indicated that the plume was too long. This indicates that there is more mixing of hydrocarbons and electron acceptors at the site than is predicted by the model. Therefore the longitudinal, transverse and vertical dispersivity values were adjusted to compensate for the mixing until BIOSCREEN matched the observed plume length.
- As confirmation, the first-order decay model was used with the BIOSCREEN default value of two years. This run greatly overestimated the plume length. Therefore, the amount of biodegradation was increased by decreasing the solute half-life. A reasonably accurate match of the plume was reached with a solute half-life of 0.65 years. This is within the observed ranges reported in literature (0.2 to 2 years).
- Both the first order decay and instantaneous models reproduce the actual plume length relatively well and provided a reasonable match for conditions in MW-4.
- As shown in the plume output, the current plume is estimated to contain 12.9 kg of BTEX. BIOSCREEN indicates that the plume under a no-degradation scenario would contain 20.5 kg of BTEX (i.e. 37% of the BTEX mass that has left the source since 1991 has biodegraded).
- Approximately 24% of the source mass estimated at the site in 1991 was still present as of June 2003 (27 kg vs. 6.5 kg, or 24 %)
- The current plume contains 0.7 acre-feet of contaminated groundwater, with 0.03 acre-feet/year of water being contaminated as it flows through the source. The plume has not yet reached steady state since the amount of water being contaminated each year is not equal to the amount being remediated by in-situ biodegradation and other attenuation processes.

The results of the fate and transport simulation using BIOSCREEN have been included as **Appendix D**.

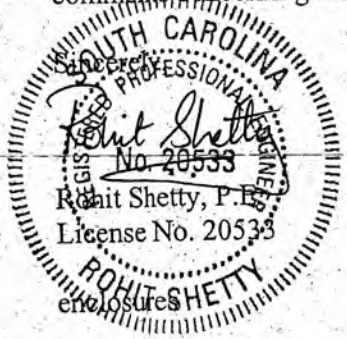
CONCLUSIONS AND RECOMMENDATIONS

- The results of the model indicate that the concentration of benzene and naphthalene would exceed the RBSL for groundwater at each of the modeled receptors. The concentrations of toluene and MTBE would exceed the RBSLs for groundwater at the closest modeled down-gradient receptor. The concentrations of benzene, toluene, MTBE and naphthalene in the source area exceeded the SSTLs required to maintain the concentrations below the RBSLs at the closest modeled down-gradient receptor. Based on this, it appears that the most appropriate course of action would be to reduce the groundwater contaminant levels in the source area to the SSTLs necessary to maintain contaminant concentrations beneath this property below the RBSLs.

- The results of the natural attenuation fate and transport simulation indicate that the contaminant plume has not reached steady state. In addition, the model indicates that approximately 24% of the source mass in 1991 (when the release was discovered) is still present in the source area.
- Based on a comparison of groundwater sampling results between October 1996 and June 2003, it appears that hydrocarbon concentrations in the source area have increased substantially and the plume is continuing to spread laterally.
- Microorganisms require moisture, oxygen, nutrients and a suitable set of environmental factors to grow. The environmental factors include pH, temperature and absence of toxic conditions. Based on published literature, critical conditions for bioremediation are a 25-85% water holding capacity, greater than 0.2 mg/L of dissolved oxygen, air filled pore space to be greater than 10% by volume, a redox potential (ORP) greater than 50 millivolts for aerobes and facultative anaerobes, sufficient nutrients (suggested C:N:P molar ratio of 120:10:1), pH ranging between 5.5 to 8.5 (for most bacteria), and temperature ranging between 15 to 45°C. An evaluation of natural attenuation parameters indicates that conditions that facilitate natural attenuation (i.e. nutrient concentrations, dissolved oxygen levels and production of methane) exist at the site. However, based on a comparison of groundwater quality data between December 2002 and June 2003, it appears that although reduction in contaminant concentrations in groundwater is occurring, the reduction is not as significant compared to the significant increase in contaminant concentrations since October 1996. Based on this, remediation by natural attenuation alone is not determined to be a viable option for this site. A remediation strategy based on a limited excavation and de-watering (as needed) in the source area to eliminate the secondary source followed by natural attenuation would expedite the remediation effort and would be more cost-effective in the long term.

Please do not hesitate to contact the undersigned at (803) 548-5989 if you have any questions or comments concerning this project.

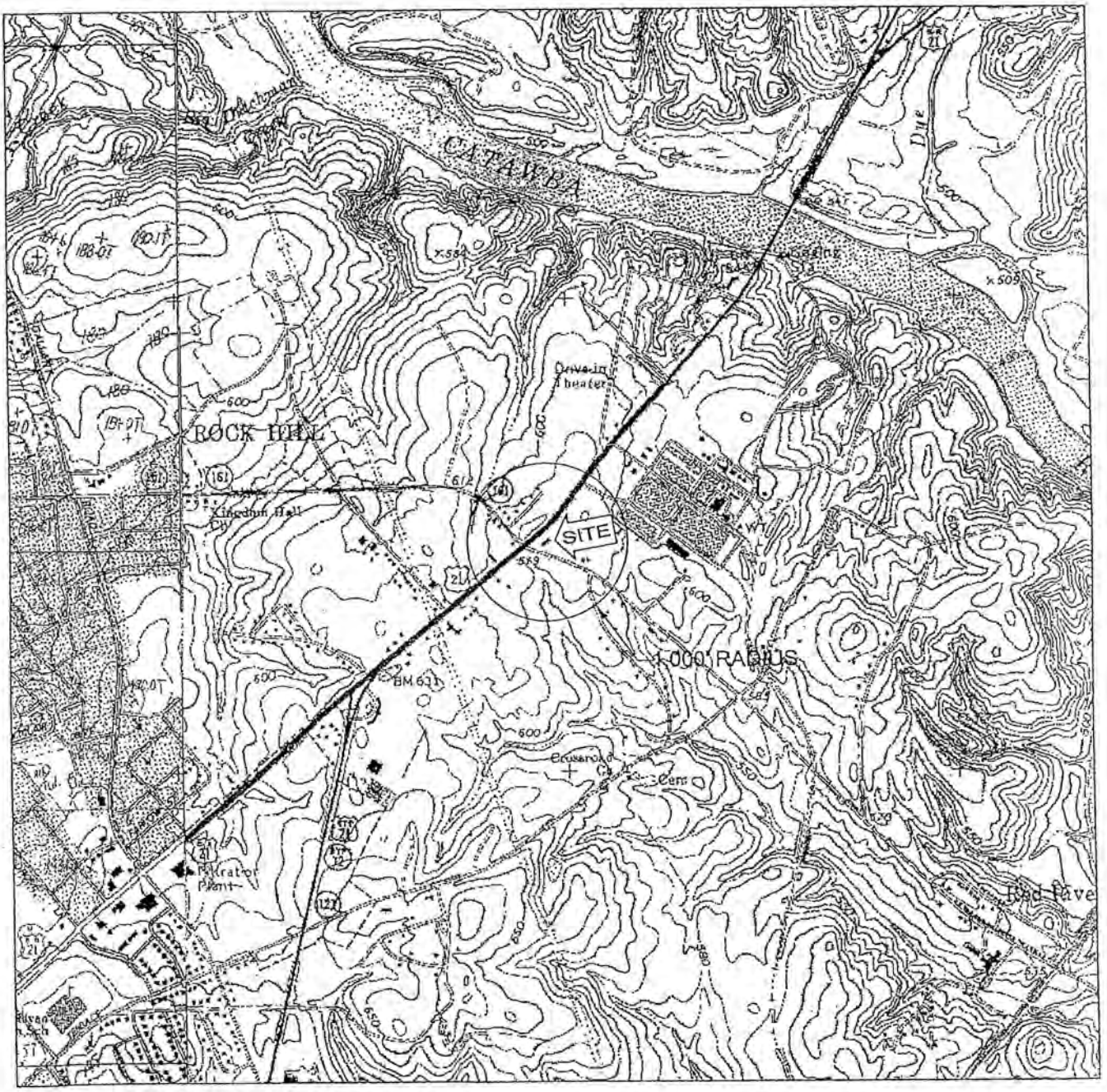
Sincerely,



Rohit Shetty, P.E.
License No. 20533

enclosures

cc: Jerry Green, Green Oil Company
John Fenske, Federated Insurance Company
file



SCALE 1:24,000

1 0 1 MILE

1000 0 1000 2000 3000 4000 5000 6000 7000 FEET

CONTOUR INTERVAL 10 FEET

QUADRANGLE LOCATION

ROCK HILL EAST, SC QUADRANGLE

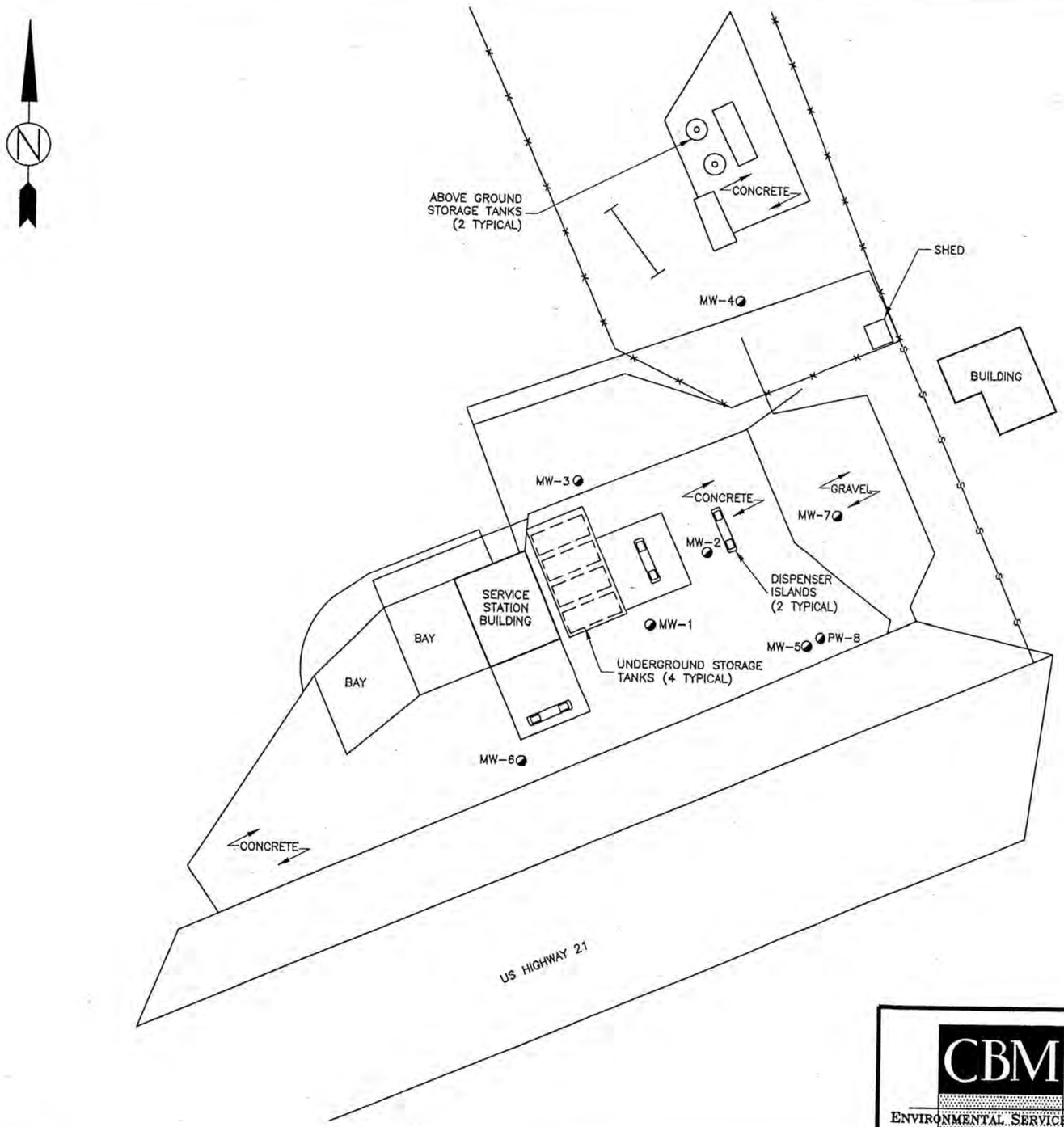
CBM ENVIRONMENTAL SERVICES, INC.

LATITUDE: 34° 58' 29" N	GREEN'S OIL CO.
LONGITUDE: 80° 59' 3" W	2849 CHERRY RD.
DRAWN BY: AWB	ROCK HILL, SC
CHECKED BY: HF	SITE ID NO. 09344
DATE: 7/2/03	

FIGURE 1

USGS TOPOGRAPHIC MAP

CBM PROJECT NO. 11030



CBM
ENVIRONMENTAL SERVICES, INC.

SITE I.D. NO.	09344
PROJECT NO.	11030
DRAWN BY:	BLS/AWB
CHECKED BY:	HF
DWG DATE:	7/3/03

SITE MAP

GREEN'S OIL CO.
2489 CHERRY ROAD
ROCK HILL, SC

FIGURE 2

TABLE 2
SUMMARY OF RESULTS
FATE AND TRANSPORT MODEL
GREEN'S OIL COMPANY

COC	RBSL (µg/L)	Time[1] Receptor 1	Time Receptor 2
Benzene	5	Between 2 and 3	Between 169 and 170
Toluene	1,000	Between 42 and 43	Greater than 1,000
Ethylbenzene	700	Greater than 1,000	Greater than 1,000
Xylenes	10,000	Greater than 1,000	Greater than 1,000
MTBE	40	Between 12 and 13	Greater than 1,000
Naphthalene	10	Between 9 and 10	Between 627 and 628

Note:
1. Time in years for COC concentration at receptor to exceed the RBSL.

TABLE 1
FATE AND TRANSPORT MODEL INPUT PARAMETERS
DOWN-GRADIENT RECEPTORS
GREEN'S OIL COMPANY

GENERAL INPUT PARAMETERS	
Source Width (ft)[1]	60
Vertical Thickness of Source (ft)[2]	27.5
Distance of Assumed Receptors (ft)[3]	100 and 1,000
Groundwater Flow Velocity (ft/yr)[4]	3.65 (0.01 ft/day)
Time of Simulation (yrs)	1,000
Longitudinal Dispersivity (ft)	100.00
Transverse Dispersivity (ft)	33.33
Vertical Dispersivity (ft)	5.00
Total Organic Carbon (mg/kg)[5]	101
TPH 3550 (mg/kg)[6]	49.5
Effective Porosity (%)[7]	25
Bulk Density (g/cc)	1.6

CONTAMINANT SPECIFIC INPUT PARAMETERS						
Parameter	Benzene	Toluene	Ethylbenzene	Xylenes	MTBE	Naphthalene
Source Area Concentration (µg/L)[8]	**2,280**	**9,520**	**3,700**	**17,400**	**801**	**991**
K_{oc} (ml/g)	81	133	176	639	11	1,543

Notes:

1. Based on the width of the hydrocarbon plume in the site vicinity, extended to include the UST area, dispenser islands and monitoring wells MW-1, MW-2 and MW-3. The on-site monitoring wells with the overall highest hydrocarbon impact are incorporated into the source area.
2. Based on the approximate height of the water column in the Type III monitoring well.
3. Receptor 1 is an assumed exposure point located approximately 100 feet down-gradient from the center of the source area and Receptor 2 is the down-gradient edge of the 1,000-foot receptor search radius.
4. Based on the seepage velocity calculated using slug test data for MW-2 obtained in January 2001.
5. Based on the results of analyses of a soil sample collected by the previous consultant from SB-1 in November 1996.
6. Based on the results of analyses of a soil sample collected by the previous consultant from SB-5 in November 1996.
7. Referenced in Scott, 1969
8. Source concentrations for benzene, toluene, ethylbenzene, xylenes, MTBE and naphthalene are based on the results of analyses of a groundwater sample collected from MW-1 in June 2003. Please note that the fate and transport simulation was performed only for those COC with source concentrations that exceeded the RBSLs.

TABLE 3
SSTLs FOR GROUNDWATER (CLOSEST DOWN-GRADIENT RECEPTOR)
GREEN'S OIL COMPANY

COC	Source Area Concentration[1]	RBSL	Minimum SSTL at the source	Comments
Benzene	2,280	5	28.34	SSTL exceeded
Toluene	9,520	1,000	5,667.25	SSTL exceeded
Ethylbenzene	3,700	700	3,967.13	SSTL not exceeded
Xylenes	17,400	10,000	56,698.20	SSTL not exceeded
MTBE	801	40	226.68	SSTL exceeded
Naphthalene	991	10	56.91	SSTL exceeded

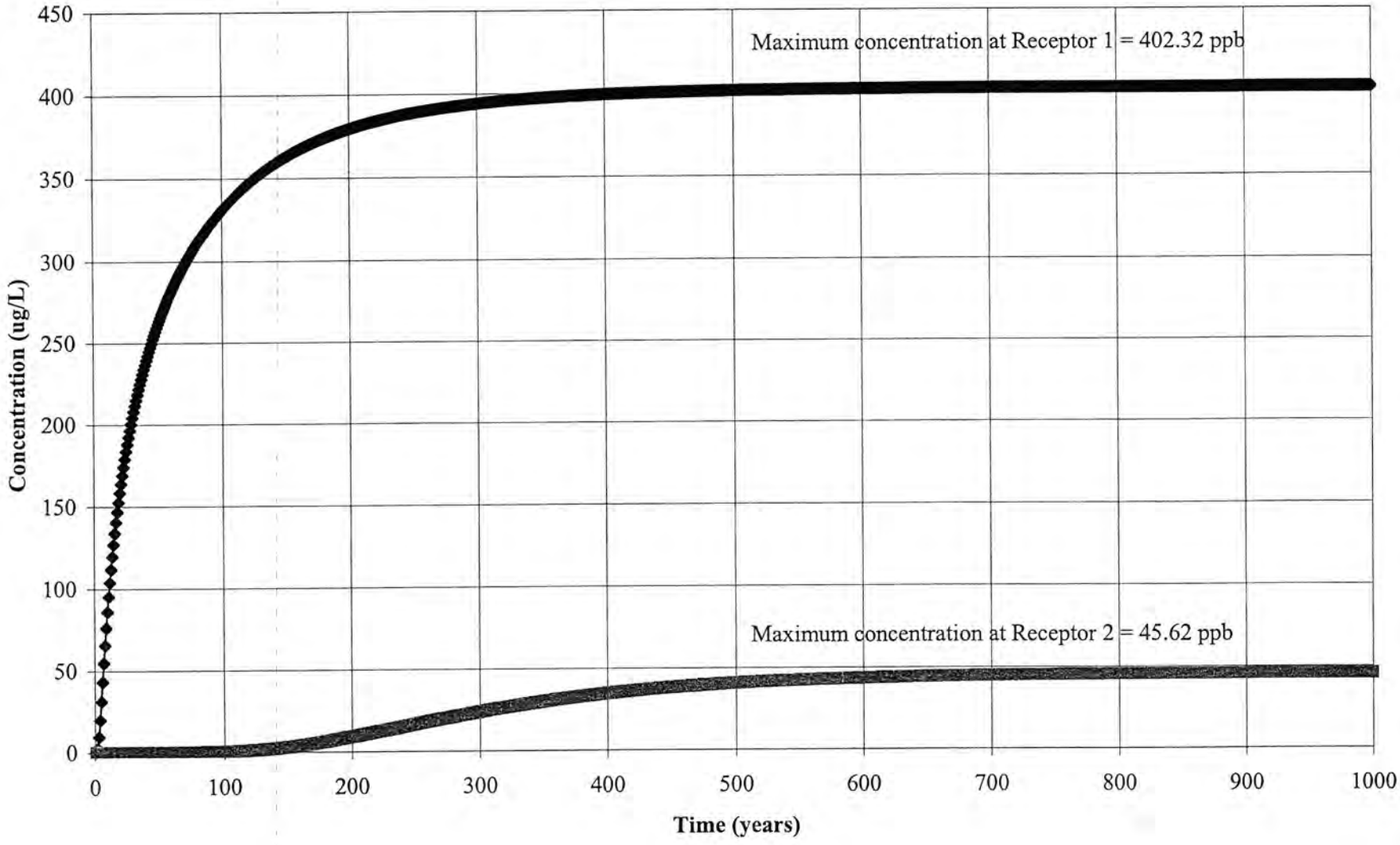
Notes:

1. Source concentrations for benzene, toluene, ethylbenzene, xylenes, MTBE and naphthalene are based on the results of analyses of a groundwater sample collected from MW-1 in June 2003; results reported in µg/L. Please note that the fate and transport simulation was performed only for those COC with source concentrations that exceeded the RBSLs.

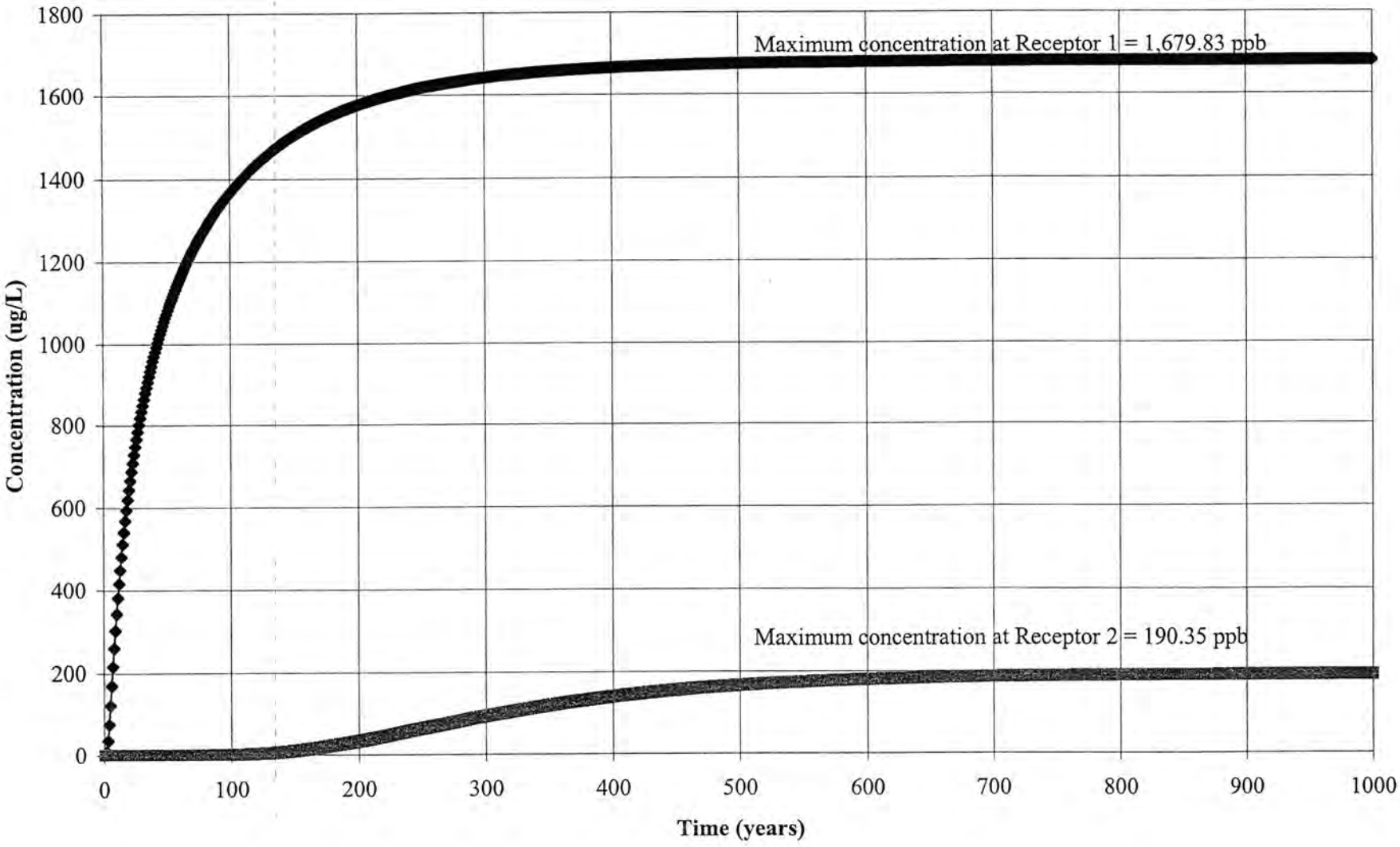
TABLE 4
SUMMARY OF BIOSCREEN INPUT PARAMETERS
GREEN'S OIL COMPANY

Data Type	Parameter	Value	Source of Data
Hydrogeology	• Hydraulic Conductivity • Hydraulic Gradient • Effective Porosity	5.0×10^{-5} (cm/sec) 0.02 (ft/ft) 0.25	• Estimated • Static water level measurements • Estimated
Dispersion	Original • Longitudinal Dispersivity • Transverse Dispersivity • Vertical Dispersivity After Calibration • Longitudinal Dispersivity • Transverse Dispersivity • Vertical Dispersivity	 8.0 (ft) 0.8 (ft) 0.0 (ft) 25.0 (ft) 1.0 (ft) 0.1 (ft)	• Based on estimated plume length of 80 ft and Xu/Eckstein relationship. • Based on calibration to plume length and current plume concentrations.
Adsorption	• Retardation Factor • Soil Bulk Density • foc • Koc	1.1 1.6 (kg/l) 0.000013 Benzene : 81	• Calculated from R = 1+Koc x foc x rho/n • Estimated • Calculated from foc= (TOC +TPH/1.724)x10^{-6} • Literature – use Koc =81
Biodegradation	Electron Acceptor Background Conc. (mg/l) Minimum Conc. (mg/l) Change in Conc. (mg/l) Electron Acceptor Max. Conc. (mg/l) Avg. Conc. (mg/l)	O_2 NO_3 SO_4 3.00 0.82 5.10 - 0.53 - 0.10 - 1.00 2.47 0.72 4.10 Fe CH_4 23.20 7.24 15.43 2.87	• Based on June 2003 groundwater sampling event. Note: Boxed values are BIOSCREEN input screen.
General	• Modeled Area Length • Modeled Area Width • Simulation Time	200 (ft) 250 (ft) 12 (yrs)	• Based on area of affected groundwater plume • Steady-state flow
Source Data	• Source Thickness • Source Concentration	25 (ft) Total BTEX = 32.9 mg/l	• Based on PW-8. • Based on monitoring data from MW-1.
Actual Data	Distance From Source (ft) Total BTEX Conc. (mg/l)	~120 <0.004	• Based on observed concentrations at site (in MW-4).
OUTPUT	Centerline Concentration	See Centerline Output (Appendix D)	
	Array Concentration	See Plume Output (Appendix D)	

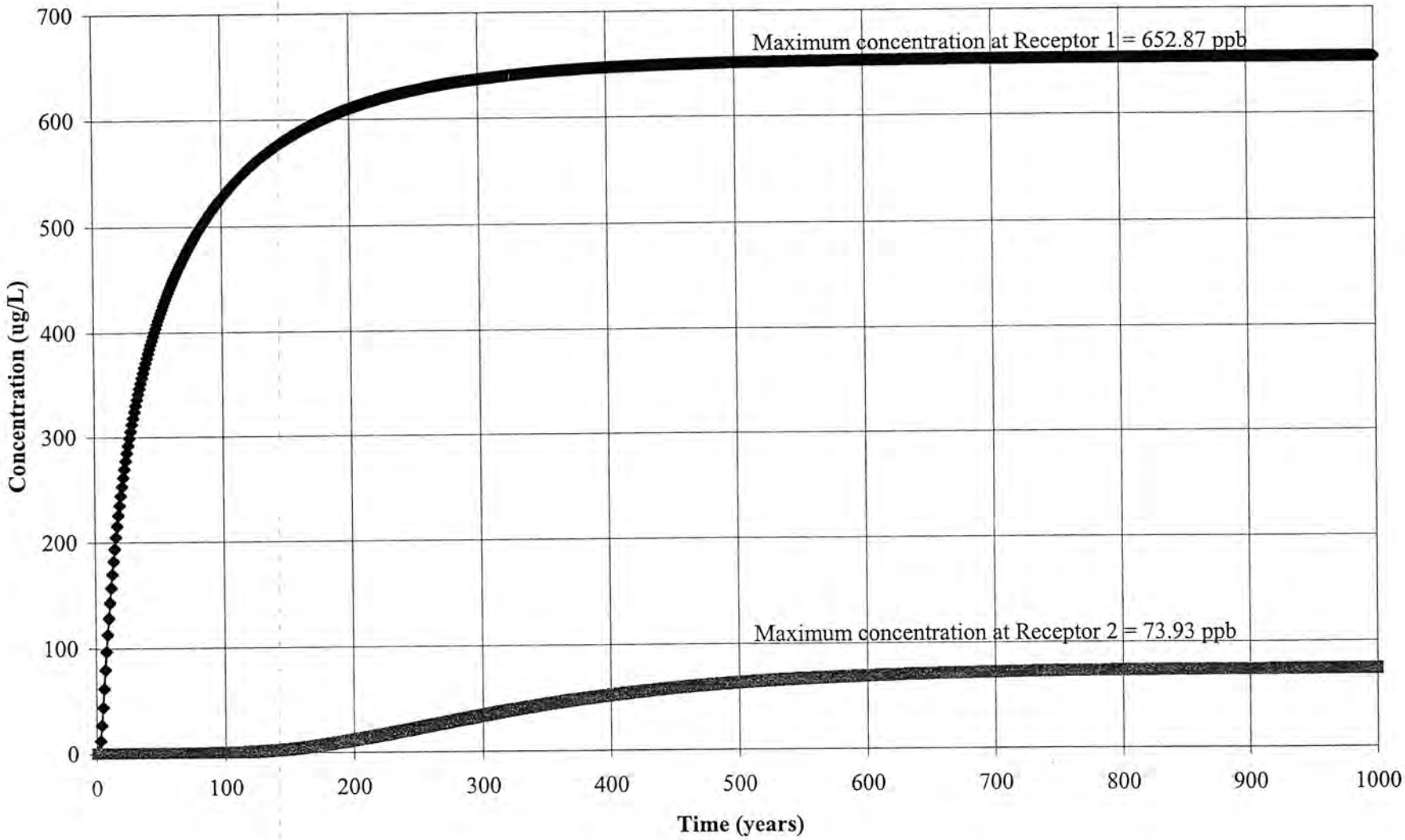
Change in Receptor Concentration - Benzene



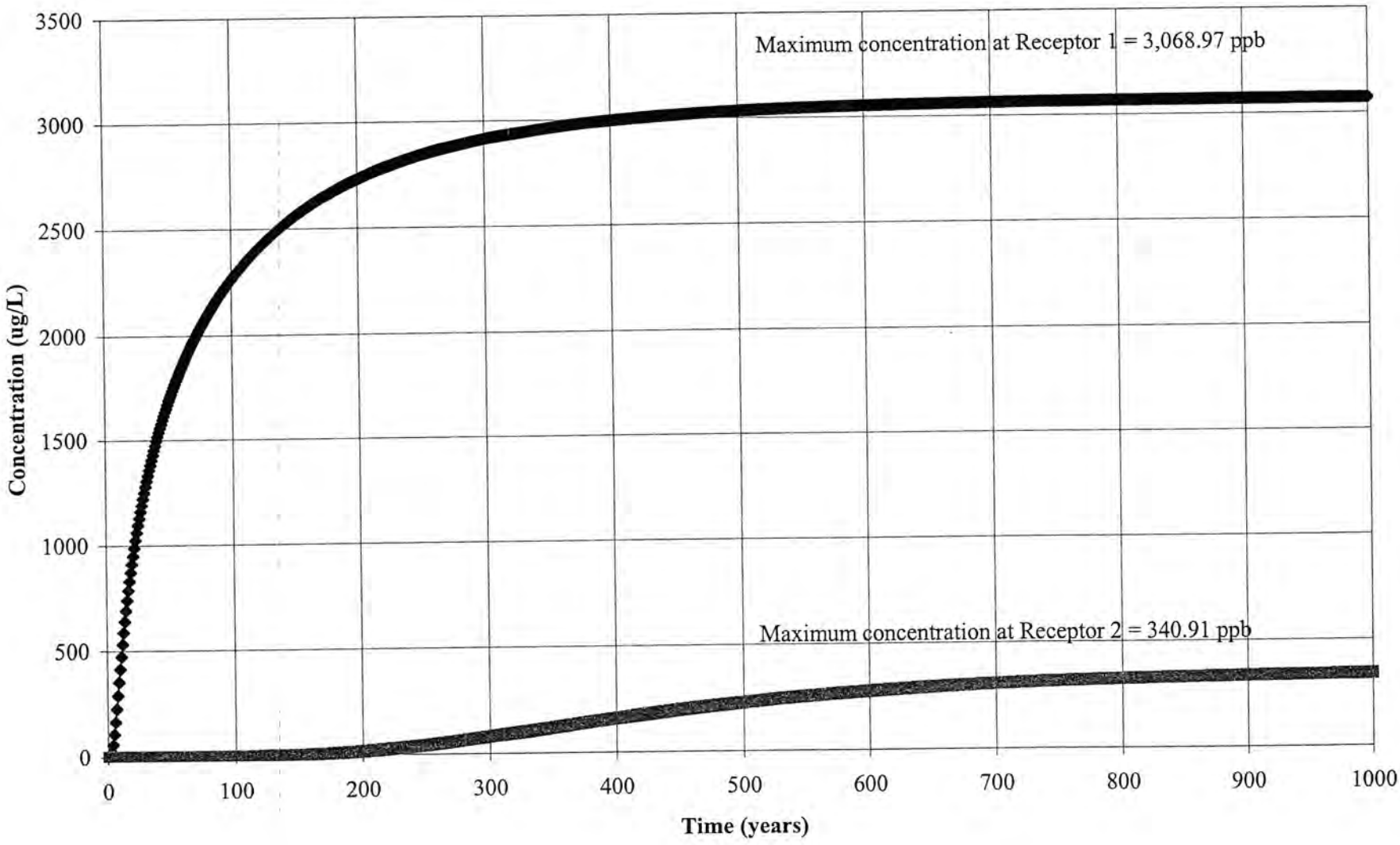
Change in Receptor Concentration - Toluene



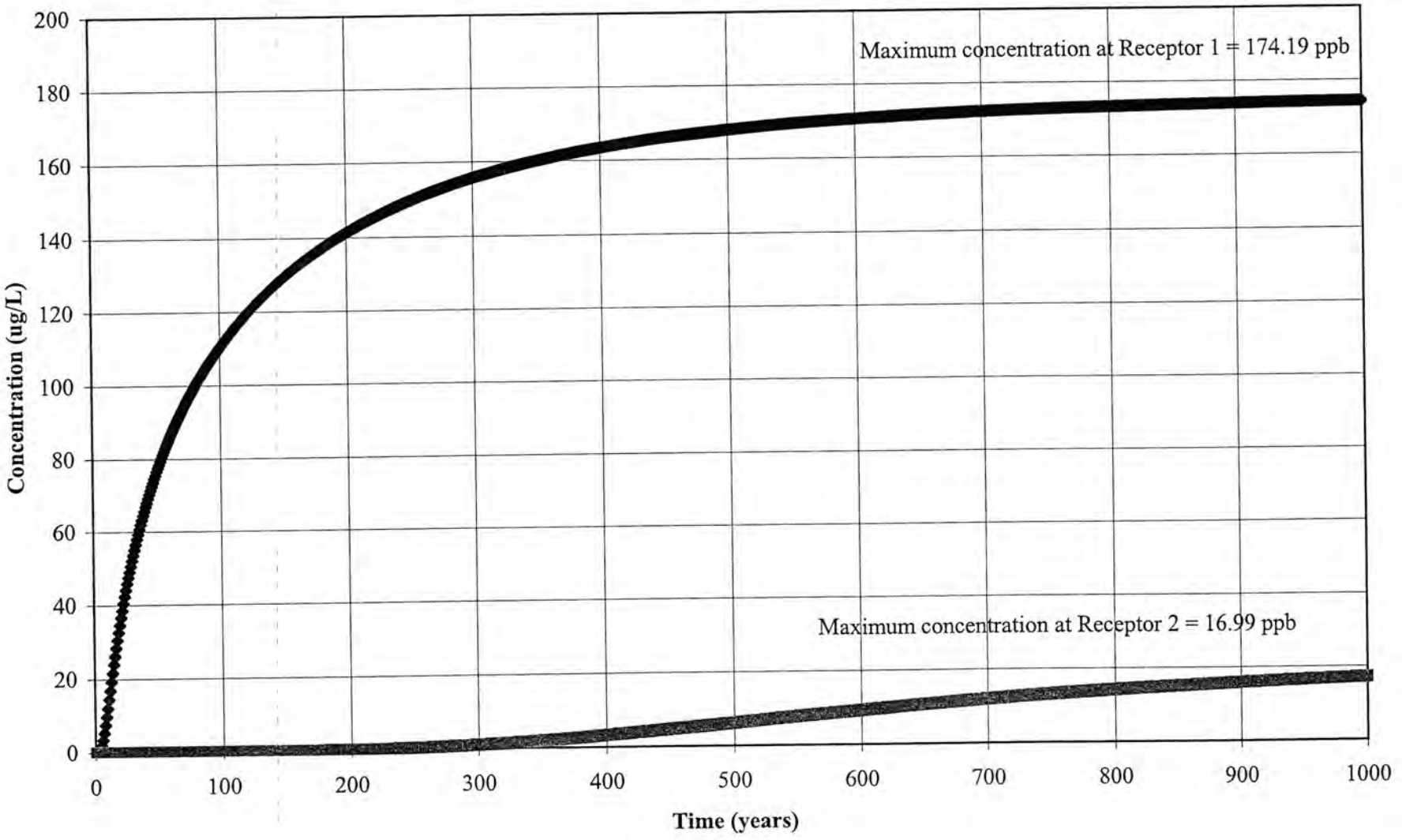
Change in Receptor Concentration - Ethylbenzene



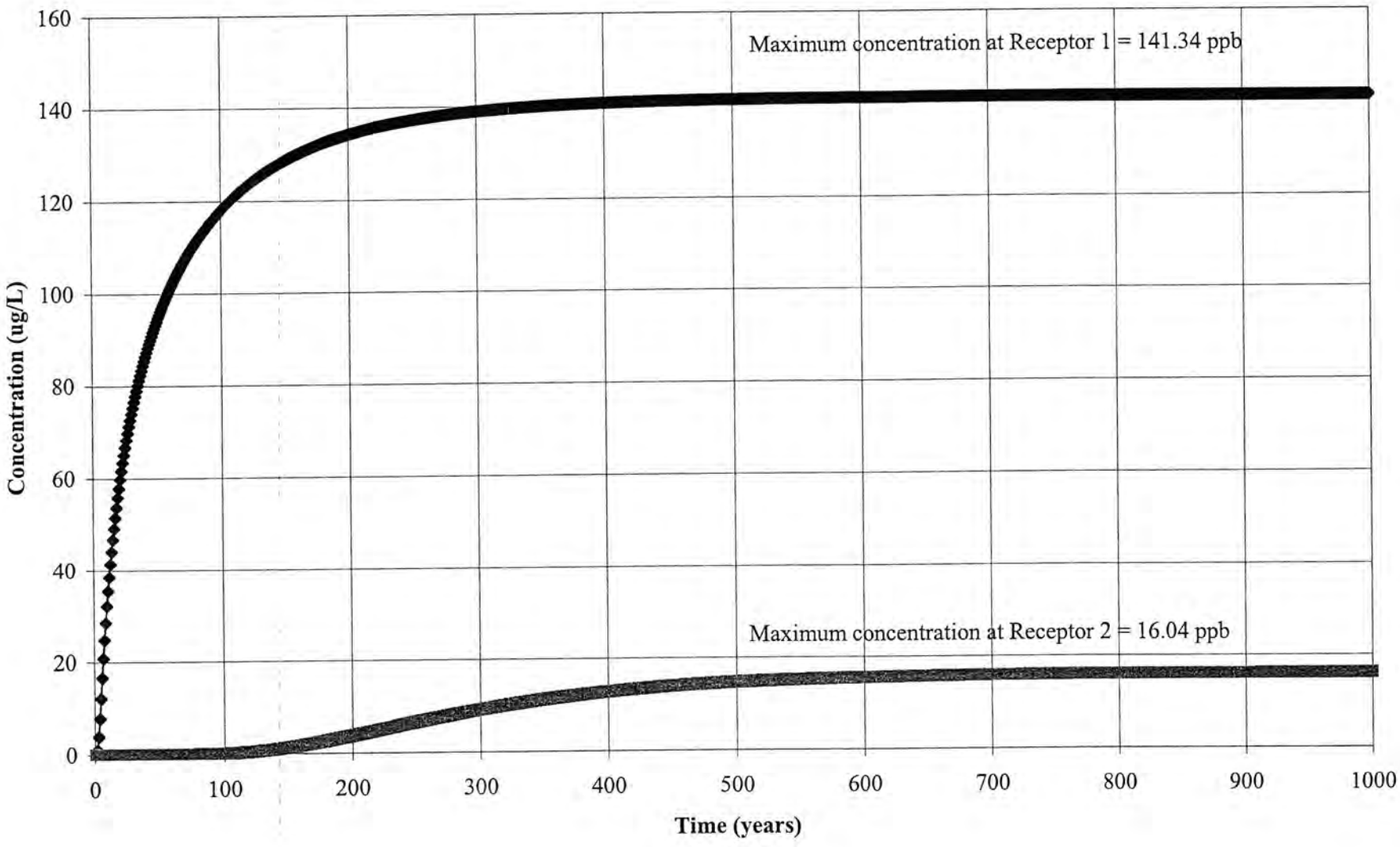
Change in Receptor Concentration - Xylenes



Change in Receptor Concentration - Naphthalene



Change in Receptor Concentration - MTBE



TITLE : GREENS OIL COMPANY
CBM JOB # : 11030
SC ID # : 09344

Contaminant of Concern is BENZENE

C(x,0,0,t)=(C0/2)erfc[(x-vt)/2(Ax*vt)1/2]
erf[Y/4(Ay*x)1/2]erf[Z/2(alphz*x)1/2]

INPUT PARAMETERS :
Concentration of Source (ppb) = 2280.00
Source Width (ft) = 60.00
Vertical Thickness of Source (ft) = 27.50
Distance of Recipient (ft) =1000.00
Groundwater Flow Velocity (ft/yr) = 3.65
Time of Simulation (years) = 1000.00
Longitudinal Dispersivity (ft) = 100.000000
Transverse Dispersivity (ft) = 33.333332
Vertical Dispersivity (ft) = 5.000000
Total Organic Carbon, TOC (mg/kg) = 101.00
Total Petroleum Hydrocarbons,TPH(mg/kg) = 49.50
Soil/Water Part. Coefficient,Koc(ml/g) = 81.00
Organic Carbon Fraction, foc (%) = 0.0001297
Porosity = .250
Bulk Density (g/cc) = 1.600
Retardation Factor, Rf = 1.06724
Contaminant Velocity (ft/yr) = 3.42003

CONCENTRATION COMPUTED FOR :
100.000 ft. 1000.000 ft

TIME (yrs)	CONC. (ppb)	CONC. (ppb)
1.00000	0.446664E-01	0.000000
2.00000	2.36916	0.000000
3.00000	9.57265	0.000000
4.00000	19.8934	0.000000
5.00000	31.4464	0.000000
6.00000	43.1967	0.000000
7.00000	54.6528	0.000000
8.00000	65.6026	0.000000
9.00000	75.9712	0.000000
10.0000	85.7497	0.000000
11.0000	94.9602	0.000000
12.0000	103.638	0.000000
13.0000	111.822	0.000000
14.0000	119.553	0.000000
15.0000	126.869	0.000000
16.0000	133.803	0.000000
17.0000	140.389	0.000000
18.0000	146.654	0.000000
19.0000	152.624	0.000000
20.0000	158.323	0.000000
21.0000	163.771	0.000000
22.0000	168.988	0.000000
23.0000	173.989	0.000000
24.0000	178.790	0.000000
25.0000	183.405	0.000000
26.0000	187.846	0.000000
27.0000	192.124	0.000000
28.0000	196.249	0.000000
29.0000	200.232	0.000000
30.0000	204.079	0.000000
31.0000	207.800	0.000000
32.0000	211.401	0.000000
33.0000	214.888	0.000000
34.0000	218.268	0.000000
35.0000	221.547	0.000000
36.0000	224.729	0.000000

37.0000	227.820	0.000000
38.0000	230.823	0.000000
39.0000	233.742	0.000000
40.0000	236.583	0.000000
41.0000	239.348	0.000000
42.0000	242.040	0.000000
43.0000	244.663	0.000000
44.0000	247.220	0.000000
45.0000	249.713	0.000000
46.0000	252.144	0.000000
47.0000	254.518	0.000000
48.0000	256.834	0.000000
49.0000	259.097	0.000000
50.0000	261.307	0.000000
51.0000	263.468	0.000000
52.0000	265.579	0.000000
53.0000	267.644	0.000000
54.0000	269.664	0.509498E-03
55.0000	271.640	0.653276E-03
56.0000	273.574	0.830301E-03
57.0000	275.468	0.104654E-02
58.0000	277.322	0.130867E-02
59.0000	279.138	0.162419E-02
60.0000	280.917	0.200139E-02
61.0000	282.660	0.244941E-02
62.0000	284.368	0.297829E-02
63.0000	286.043	0.359898E-02
64.0000	287.685	0.432336E-02
65.0000	289.296	0.516426E-02
66.0000	290.876	0.613550E-02
67.0000	292.426	0.725186E-02
68.0000	293.947	0.852909E-02
69.0000	295.439	0.998396E-02
70.0000	296.904	0.116342E-01
71.0000	298.343	0.134984E-01
72.0000	299.755	0.155962E-01
73.0000	301.142	0.179481E-01
74.0000	302.505	0.205757E-01
75.0000	303.843	0.235012E-01
76.0000	305.158	0.267477E-01
77.0000	306.450	0.303392E-01
78.0000	307.720	0.343004E-01
79.0000	308.968	0.386567E-01
80.0000	310.195	0.434341E-01
81.0000	311.401	0.486594E-01
82.0000	312.587	0.543598E-01
83.0000	313.754	0.605631E-01
84.0000	314.901	0.672976E-01
85.0000	316.029	0.745919E-01
86.0000	317.139	0.824750E-01
87.0000	318.231	0.909763E-01
88.0000	319.305	0.100125
89.0000	320.362	0.109952
90.0000	321.402	0.120485
91.0000	322.426	0.131756
92.0000	323.434	0.143794
93.0000	324.426	0.156629
94.0000	325.403	0.170291
95.0000	326.364	0.184810
96.0000	327.311	0.200214
97.0000	328.244	0.216534
98.0000	329.162	0.233798
99.0000	330.066	0.252035
100.000	330.957	0.271272
101.000	331.834	0.291539
102.000	332.698	0.312861
103.000	333.550	0.335267
104.000	334.389	0.358781
105.000	335.215	0.383430

106.000	336.030	0.409240
107.000	336.832	0.436233
108.000	337.623	0.464434
109.000	338.403	0.493867
110.000	339.171	0.524553
111.000	339.929	0.556514
112.000	340.676	0.589770
113.000	341.412	0.624343
114.000	342.137	0.660250
115.000	342.853	0.697511
116.000	343.558	0.736142
117.000	344.254	0.776162
118.000	344.940	0.817584
119.000	345.616	0.860426
120.000	346.283	0.904700
121.000	346.941	0.950420
122.000	347.590	0.997598
123.000	348.230	1.04625
124.000	348.862	1.09637
125.000	349.484	1.14799
126.000	350.099	1.20111
127.000	350.705	1.25574
128.000	351.303	1.31187
129.000	351.893	1.36953
130.000	352.475	1.42872
131.000	353.049	1.48944
132.000	353.616	1.55169
133.000	354.175	1.61547
134.000	354.727	1.68080
135.000	355.272	1.74767
136.000	355.810	1.81608
137.000	356.340	1.88603
138.000	356.864	1.95752
139.000	357.381	2.03055
140.000	357.891	2.10511
141.000	358.394	2.18121
142.000	358.892	2.25883
143.000	359.382	2.33798
144.000	359.867	2.41865
145.000	360.345	2.50083
146.000	360.817	2.58452
147.000	361.283	2.66970
148.000	361.744	2.75638
149.000	362.198	2.84453
150.000	362.647	2.93417
151.000	363.090	3.02526
152.000	363.528	3.11781
153.000	363.960	3.21180
154.000	364.386	3.30723
155.000	364.808	3.40407
156.000	365.224	3.50232
157.000	365.635	3.60197
158.000	366.041	3.70300
159.000	366.442	3.80540
160.000	366.838	3.90915
161.000	367.229	4.01425
162.000	367.615	4.12067
163.000	367.997	4.22840
164.000	368.374	4.33743
165.000	368.746	4.44773
166.000	369.114	4.55931
167.000	369.477	4.67213
168.000	369.836	4.78618
169.000	370.191	4.90144
170.000	370.541	5.01791
171.000	370.887	5.13555
172.000	371.229	5.25436
173.000	371.567	5.37431
174.000	371.901	5.49539

175.000	372.231	5.61758
176.000	372.557	5.74086
177.000	372.879	5.86521
178.000	373.197	5.99061
179.000	373.512	6.11705
180.000	373.822	6.24451
181.000	374.129	6.37296
182.000	374.433	6.50239
183.000	374.733	6.63278
184.000	375.029	6.76411
185.000	375.322	6.89637
186.000	375.611	7.02952
187.000	375.898	7.16356
188.000	376.180	7.29846
189.000	376.460	7.43420
190.000	376.736	7.57077
191.000	377.009	7.70814
192.000	377.279	7.84630
193.000	377.545	7.98522
194.000	377.809	8.12490
195.000	378.070	8.26529
196.000	378.327	8.40640
197.000	378.582	8.54820
198.000	378.833	8.69067
199.000	379.082	8.83378
200.000	379.328	8.97753
201.000	379.571	9.12190
202.000	379.812	9.26685
203.000	380.049	9.41239
204.000	380.284	9.55848
205.000	380.516	9.70510
206.000	380.746	9.85225
207.000	380.973	9.99990
208.000	381.197	10.1480
209.000	381.419	10.2966
210.000	381.639	10.4457
211.000	381.856	10.5951
212.000	382.070	10.7450
213.000	382.282	10.8953
214.000	382.492	11.0459
215.000	382.699	11.1970
216.000	382.904	11.3483
217.000	383.107	11.5000
218.000	383.307	11.6520
219.000	383.505	11.8042
220.000	383.701	11.9568
221.000	383.895	12.1096
222.000	384.087	12.2626
223.000	384.276	12.4159
224.000	384.464	12.5694
225.000	384.649	12.7231
226.000	384.832	12.8769
227.000	385.013	13.0309
228.000	385.193	13.1851
229.000	385.370	13.3394
230.000	385.545	13.4938
231.000	385.718	13.6483
232.000	385.890	13.8029
233.000	386.060	13.9576
234.000	386.227	14.1123
235.000	386.393	14.2671
236.000	386.557	14.4219
237.000	386.719	14.5767
238.000	386.880	14.7315
239.000	387.039	14.8864
240.000	387.196	15.0412
241.000	387.351	15.1959
242.000	387.505	15.3506
243.000	387.656	15.5053

244.000	387.807	15.6599
245.000	387.955	15.8143
246.000	388.102	15.9687
247.000	388.248	16.1230
248.000	388.392	16.2772
249.000	388.534	16.4312
250.000	388.675	16.5851
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252.000	388.952	16.8924
253.000	389.088	17.0458
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256.000	389.488	17.5048
257.000	389.619	17.6573
258.000	389.748	17.8097
259.000	389.875	17.9618
260.000	390.002	18.1136
261.000	390.127	18.2652
262.000	390.251	18.4166
263.000	390.373	18.5676
264.000	390.494	18.7184
265.000	390.614	18.8689
266.000	390.732	19.0191
267.000	390.849	19.1689
268.000	390.965	19.3185
269.000	391.080	19.4677
270.000	391.194	19.6166
271.000	391.306	19.7652
272.000	391.417	19.9134
273.000	391.527	20.0612
274.000	391.636	20.2087
275.000	391.743	20.3558
276.000	391.850	20.5025
277.000	391.955	20.6488
278.000	392.059	20.7948
279.000	392.163	20.9403
280.000	392.265	21.0855
281.000	392.366	21.2302
282.000	392.466	21.3745
283.000	392.565	21.5184
284.000	392.662	21.6619
285.000	392.759	21.8049
286.000	392.855	21.9475
287.000	392.950	22.0897
288.000	393.044	22.2314
289.000	393.137	22.3726
290.000	393.228	22.5134
291.000	393.319	22.6537
292.000	393.409	22.7935
293.000	393.498	22.9329
294.000	393.586	23.0718
295.000	393.673	23.2102
296.000	393.760	23.3481
297.000	393.845	23.4855
298.000	393.930	23.6224
299.000	394.013	23.7589
300.000	394.096	23.8948
301.000	394.178	24.0302
302.000	394.259	24.1651
303.000	394.339	24.2995
304.000	394.418	24.4334
305.000	394.497	24.5667
306.000	394.575	24.6996
307.000	394.651	24.8319
308.000	394.728	24.9636
309.000	394.803	25.0949
310.000	394.877	25.2256
311.000	394.951	25.3558
312.000	395.024	25.4854

313.000	395.097	25.6145
314.000	395.168	25.7430
315.000	395.239	25.8710
316.000	395.309	25.9984
317.000	395.378	26.1253
318.000	395.447	26.2517
319.000	395.515	26.3775
320.000	395.582	26.5027
321.000	395.649	26.6274
322.000	395.715	26.7515
323.000	395.780	26.8750
324.000	395.844	26.9980
325.000	395.908	27.1204
326.000	395.971	27.2423
327.000	396.034	27.3636
328.000	396.096	27.4843
329.000	396.157	27.6045
330.000	396.218	27.7241
331.000	396.278	27.8431
332.000	396.337	27.9615
333.000	396.396	28.0794
334.000	396.454	28.1967
335.000	396.512	28.3134
336.000	396.569	28.4296
337.000	396.625	28.5452
338.000	396.681	28.6602
339.000	396.737	28.7746
340.000	396.791	28.8885
341.000	396.846	29.0018
342.000	396.899	29.1145
343.000	396.953	29.2266
344.000	397.005	29.3382
345.000	397.057	29.4492
346.000	397.109	29.5596
347.000	397.160	29.6695
348.000	397.210	29.7787
349.000	397.260	29.8874
350.000	397.310	29.9956
351.000	397.359	30.1031
352.000	397.407	30.2101
353.000	397.455	30.3165
354.000	397.503	30.4223
355.000	397.550	30.5276
356.000	397.596	30.6323
357.000	397.642	30.7364
358.000	397.688	30.8400
359.000	397.733	30.9430
360.000	397.778	31.0454
361.000	397.822	31.1472
362.000	397.866	31.2485
363.000	397.909	31.3492
364.000	397.952	31.4494
365.000	397.995	31.5490
366.000	398.037	31.6480
367.000	398.079	31.7465
368.000	398.120	31.8444
369.000	398.161	31.9418
370.000	398.201	32.0386
371.000	398.241	32.1348
372.000	398.281	32.2305
373.000	398.320	32.3257
374.000	398.359	32.4203
375.000	398.397	32.5143
376.000	398.435	32.6078
377.000	398.473	32.7007
378.000	398.510	32.7931
379.000	398.547	32.8850
380.000	398.584	32.9763
381.000	398.620	33.0671

382.000	398.656	33.1573
383.000	398.691	33.2470
384.000	398.727	33.3361
385.000	398.761	33.4248
386.000	398.796	33.5128
387.000	398.830	33.6004
388.000	398.864	33.6874
389.000	398.897	33.7739
390.000	398.930	33.8599
391.000	398.963	33.9453
392.000	398.995	34.0302
393.000	399.028	34.1146
394.000	399.059	34.1985
395.000	399.091	34.2819
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404.000	399.361	35.0091
405.000	399.389	35.0874
406.000	399.417	35.1652
407.000	399.445	35.2425
408.000	399.473	35.3193
409.000	399.500	35.3956
410.000	399.528	35.4715
411.000	399.555	35.5468
412.000	399.581	35.6217
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422.000	399.833	36.3440
423.000	399.857	36.4137
424.000	399.881	36.4829
425.000	399.904	36.5516
426.000	399.927	36.6199
427.000	399.950	36.6878
428.000	399.973	36.7551
429.000	399.996	36.8221
430.000	400.018	36.8886
431.000	400.040	36.9546
432.000	400.062	37.0202
433.000	400.083	37.0854
434.000	400.105	37.1501
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436.000	400.147	37.2783
437.000	400.168	37.3417
438.000	400.188	37.4047
439.000	400.209	37.4673
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441.000	400.249	37.5912
442.000	400.269	37.6525
443.000	400.288	37.7134
444.000	400.308	37.7739
445.000	400.327	37.8339
446.000	400.346	37.8936
447.000	400.365	37.9528
448.000	400.384	38.0117
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456.000	400.527	38.4679
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466.000	400.691	39.0035
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472.000	400.782	39.3072
473.000	400.796	39.3565
474.000	400.811	39.4055
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503.000	401.176	40.6829
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511.000	401.260	40.9901
512.000	401.270	41.0272
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523.000	401.374	41.4178
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525.000	401.392	41.4855
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527.000	401.410	41.5521
528.000	401.418	41.5850
529.000	401.427	41.6177
530.000	401.435	41.6501
531.000	401.444	41.6823
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534.000	401.468	41.7774
535.000	401.476	41.8087
536.000	401.484	41.8397
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539.000	401.508	41.9313
540.000	401.516	41.9613
541.000	401.523	41.9912
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544.000	401.546	42.0793
545.000	401.553	42.1083
546.000	401.560	42.1370
547.000	401.567	42.1655
548.000	401.574	42.1938
549.000	401.582	42.2218
550.000	401.589	42.2497
551.000	401.595	42.2773
552.000	401.602	42.3048
553.000	401.609	42.3320
554.000	401.616	42.3590
555.000	401.623	42.3858
556.000	401.629	42.4124
557.000	401.636	42.4388
558.000	401.642	42.4650
559.000	401.649	42.4910
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561.000	401.661	42.5424
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565.000	401.686	42.6428
566.000	401.692	42.6674
567.000	401.698	42.6918
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570.000	401.715	42.7640
571.000	401.721	42.7877
572.000	401.727	42.8112
573.000	401.732	42.8345
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576.000	401.749	42.9034
577.000	401.754	42.9260
578.000	401.760	42.9484
579.000	401.765	42.9706
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581.000	401.775	43.0146
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583.000	401.786	43.0579
584.000	401.791	43.0793
585.000	401.796	43.1006
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587.000	401.806	43.1425
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591.000	401.825	43.2245
592.000	401.829	43.2446
593.000	401.834	43.2645
594.000	401.839	43.2843
595.000	401.843	43.3040
596.000	401.848	43.3234
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599.000	401.861	43.3809
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603.000	401.878	43.4555
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605.000	401.887	43.4919
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611.000	401.911	43.5978
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616.000	401.930	43.6822
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621.000	401.948	43.7634
622.000	401.951	43.7792
623.000	401.955	43.7949
624.000	401.958	43.8105
625.000	401.962	43.8260
626.000	401.965	43.8414
627.000	401.969	43.8566
628.000	401.972	43.8717
629.000	401.975	43.8867
630.000	401.979	43.9015
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635.000	401.994	43.9741
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643.000	402.018	44.0843
644.000	402.021	44.0976
645.000	402.024	44.1108
646.000	402.027	44.1238
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648.000	402.033	44.1497
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650.000	402.038	44.1751
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652.000	402.043	44.2001
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654.000	402.049	44.2247
655.000	402.051	44.2369
656.000	402.054	44.2489
657.000	402.056	44.2609

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661.000	402.066	44.3078
662.000	402.069	44.3192
663.000	402.071	44.3306
664.000	402.074	44.3419
665.000	402.076	44.3532
666.000	402.078	44.3643
667.000	402.081	44.3753
668.000	402.083	44.3862
669.000	402.085	44.3971
670.000	402.087	44.4079
671.000	402.090	44.4185
672.000	402.092	44.4291
673.000	402.094	44.4396
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676.000	402.100	44.4707
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681.000	402.111	44.5207
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683.000	402.115	44.5401
684.000	402.117	44.5497
685.000	402.119	44.5593
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687.000	402.123	44.5781
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690.000	402.128	44.6058
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716.000	402.171	44.8191
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726.000	402.185	44.8898

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761.000	402.225	45.0958
762.000	402.226	45.1008
763.000	402.227	45.1059
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780.000	402.242	45.1850
781.000	402.243	45.1893
782.000	402.243	45.1935
783.000	402.244	45.1978
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785.000	402.246	45.2062
786.000	402.247	45.2103
787.000	402.247	45.2144
788.000	402.248	45.2185
789.000	402.249	45.2225
790.000	402.250	45.2265
791.000	402.250	45.2305
792.000	402.251	45.2344
793.000	402.252	45.2383
794.000	402.252	45.2422
795.000	402.253	45.2460

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803.000	402.259	45.2756
804.000	402.259	45.2792
805.000	402.260	45.2827
806.000	402.261	45.2862
807.000	402.261	45.2897
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820.000	402.269	45.3322
821.000	402.269	45.3353
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823.000	402.271	45.3414
824.000	402.271	45.3444
825.000	402.272	45.3474
826.000	402.272	45.3504
827.000	402.273	45.3533
828.000	402.273	45.3562
829.000	402.274	45.3591
830.000	402.274	45.3620
831.000	402.275	45.3648
832.000	402.275	45.3676
833.000	402.276	45.3704
834.000	402.276	45.3732
835.000	402.277	45.3759
836.000	402.277	45.3786
837.000	402.278	45.3813
838.000	402.278	45.3840
839.000	402.279	45.3867
840.000	402.279	45.3893
841.000	402.280	45.3919
842.000	402.280	45.3945
843.000	402.280	45.3970
844.000	402.281	45.3996
845.000	402.281	45.4021
846.000	402.282	45.4046
847.000	402.282	45.4071
848.000	402.283	45.4096
849.000	402.283	45.4120
850.000	402.284	45.4144
851.000	402.284	45.4168
852.000	402.284	45.4192
853.000	402.285	45.4215
854.000	402.285	45.4239
855.000	402.286	45.4262
856.000	402.286	45.4285
857.000	402.286	45.4308
858.000	402.287	45.4330
859.000	402.287	45.4353
860.000	402.288	45.4375
861.000	402.288	45.4397
862.000	402.288	45.4419
863.000	402.289	45.4441
864.000	402.289	45.4462

865.000	402.290	45.4483
866.000	402.290	45.4505
867.000	402.290	45.4526
868.000	402.291	45.4546
869.000	402.291	45.4567
870.000	402.291	45.4587
871.000	402.292	45.4608
872.000	402.292	45.4628
873.000	402.292	45.4648
874.000	402.293	45.4667
875.000	402.293	45.4687
876.000	402.293	45.4706
877.000	402.294	45.4726
878.000	402.294	45.4745
879.000	402.294	45.4764
880.000	402.295	45.4782
881.000	402.295	45.4801
882.000	402.295	45.4819
883.000	402.296	45.4838
884.000	402.296	45.4856
885.000	402.296	45.4874
886.000	402.297	45.4892
887.000	402.297	45.4909
888.000	402.297	45.4927
889.000	402.297	45.4944
890.000	402.298	45.4962
891.000	402.298	45.4979
892.000	402.298	45.4996
893.000	402.299	45.5013
894.000	402.299	45.5029
895.000	402.299	45.5046
896.000	402.299	45.5062
897.000	402.300	45.5078
898.000	402.300	45.5094
899.000	402.300	45.5110
900.000	402.301	45.5126
901.000	402.301	45.5142
902.000	402.301	45.5158
903.000	402.301	45.5173
904.000	402.302	45.5188
905.000	402.302	45.5204
906.000	402.302	45.5219
907.000	402.302	45.5234
908.000	402.303	45.5248
909.000	402.303	45.5263
910.000	402.303	45.5278
911.000	402.303	45.5292
912.000	402.304	45.5306
913.000	402.304	45.5321
914.000	402.304	45.5335
915.000	402.304	45.5349
916.000	402.305	45.5362
917.000	402.305	45.5376
918.000	402.305	45.5390
919.000	402.305	45.5403
920.000	402.306	45.5417
921.000	402.306	45.5430
922.000	402.306	45.5443
923.000	402.306	45.5456
924.000	402.306	45.5469
925.000	402.307	45.5482
926.000	402.307	45.5495
927.000	402.307	45.5507
928.000	402.307	45.5520
929.000	402.307	45.5532
930.000	402.308	45.5544
931.000	402.308	45.5556
932.000	402.308	45.5569
933.000	402.308	45.5581

934.000	402.308	45.5592
935.000	402.309	45.5604
936.000	402.309	45.5616
937.000	402.309	45.5627
938.000	402.309	45.5639
939.000	402.309	45.5650
940.000	402.310	45.5662
941.000	402.310	45.5673
942.000	402.310	45.5684
943.000	402.310	45.5695
944.000	402.310	45.5706
945.000	402.311	45.5717
946.000	402.311	45.5727
947.000	402.311	45.5738
948.000	402.311	45.5748
949.000	402.311	45.5759
950.000	402.311	45.5769
951.000	402.312	45.5780
952.000	402.312	45.5790
953.000	402.312	45.5800
954.000	402.312	45.5810
955.000	402.312	45.5820
956.000	402.312	45.5830
957.000	402.313	45.5839
958.000	402.313	45.5849
959.000	402.313	45.5859
960.000	402.313	45.5868
961.000	402.313	45.5878
962.000	402.313	45.5887
963.000	402.313	45.5896
964.000	402.314	45.5905
965.000	402.314	45.5915
966.000	402.314	45.5924
967.000	402.314	45.5933
968.000	402.314	45.5942
969.000	402.314	45.5950
970.000	402.315	45.5959
971.000	402.315	45.5968
972.000	402.315	45.5976
973.000	402.315	45.5985
974.000	402.315	45.5993
975.000	402.315	45.6002
976.000	402.315	45.6010
977.000	402.315	45.6018
978.000	402.316	45.6026
979.000	402.316	45.6034
980.000	402.316	45.6042
981.000	402.316	45.6050
982.000	402.316	45.6058
983.000	402.316	45.6066
984.000	402.316	45.6074
985.000	402.316	45.6082
986.000	402.317	45.6089
987.000	402.317	45.6097
988.000	402.317	45.6104
989.000	402.317	45.6112
990.000	402.317	45.6119
991.000	402.317	45.6126
992.000	402.317	45.6134
993.000	402.317	45.6141
994.000	402.318	45.6148
995.000	402.318	45.6155
996.000	402.318	45.6162
997.000	402.318	45.6169
998.000	402.318	45.6176
999.000	402.318	45.6183
1000.00	402.318	45.6189

TITLE : GREENS OIL COMPANY
CBM JOB # : 11030
SC ID # : 09344

Contaminant of Concern is TOLUENE

C(x,0,0,t)=(C0/2)erfc[(x-vt)/2(Ax*vt)1/2]
erf[Y/4(Ay*x)1/2]erf[Z/2(alphz*x)1/2]

INPUT PARAMETERS :
Concentration of Source (ppb) = 9520.00
Source Width (ft) = 60.00
Vertical Thickness of Source (ft) = 27.50
Distance of Recipient (ft) =1000.00
Groundwater Flow Velocity (ft/yr) = 3.65
Time of Simulation (years) = 1000.00
Longitudinal Dispersivity (ft) = 100.000000
Transverse Dispersivity (ft) = 33.333332
Vertical Dispersivity (ft) = 5.000000
Total Organic Carbon, TOC (mg/kg) = 101.00
Total Petroleum Hydrocarbons,TPH(mg/kg) = 49.50
Soil/Water Part. Coefficient,Koc(ml/g) = 133.00
Organic Carbon Fraction, foc (%) = 0.0001297
Porosity = .250
Bulk Density (g/cc) = 1.600
Retardation Factor, Rf = 1.11041
Contaminant Velocity (ft/yr) = 3.28707

CONCENTRATION COMPUTED FOR :
100.000 ft. 1000.000 ft

TIME (yrs)	CONC. (ppb)	CONC. (ppb)
1.00000	0.136274	0.000000
2.00000	8.38273	0.000000
3.00000	35.6034	0.000000
4.00000	75.8712	0.000000
5.00000	121.767	0.000000
6.00000	168.980	0.000000
7.00000	215.368	0.000000
8.00000	259.953	0.000000
9.00000	302.347	0.000000
10.0000	342.458	0.000000
11.0000	380.336	0.000000
12.0000	416.097	0.000000
13.0000	449.883	0.000000
14.0000	481.844	0.000000
15.0000	512.123	0.000000
16.0000	540.857	0.000000
17.0000	568.169	0.000000
18.0000	594.174	0.000000
19.0000	618.974	0.000000
20.0000	642.662	0.000000
21.0000	665.321	0.000000
22.0000	687.028	0.000000
23.0000	707.850	0.000000
24.0000	727.848	0.000000
25.0000	747.079	0.000000
26.0000	765.592	0.000000
27.0000	783.434	0.000000
28.0000	800.646	0.000000
29.0000	817.266	0.000000
30.0000	833.330	0.000000
31.0000	848.868	0.000000
32.0000	863.911	0.000000
33.0000	878.486	0.000000
34.0000	892.616	0.000000
35.0000	906.326	0.000000
36.0000	919.636	0.000000

37.0000	932.566	0.000000
38.0000	945.134	0.000000
39.0000	957.358	0.000000
40.0000	969.252	0.000000
41.0000	980.833	0.000000
42.0000	992.113	0.000000
43.0000	1003.11	0.000000
44.0000	1013.82	0.000000
45.0000	1024.28	0.000000
46.0000	1034.48	0.000000
47.0000	1044.43	0.000000
48.0000	1054.16	0.000000
49.0000	1063.65	0.000000
50.0000	1072.93	0.000000
51.0000	1082.01	0.000000
52.0000	1090.88	0.000000
53.0000	1099.55	0.000000
54.0000	1108.04	0.000000
55.0000	1116.35	0.000000
56.0000	1124.49	0.000000
57.0000	1132.45	0.258713E-02
58.0000	1140.25	0.326403E-02
59.0000	1147.89	0.408602E-02
60.0000	1155.38	0.507716E-02
61.0000	1162.72	0.626424E-02
62.0000	1169.92	0.767694E-02
63.0000	1176.98	0.934791E-02
64.0000	1183.90	0.113129E-01
65.0000	1190.69	0.136110E-01
66.0000	1197.35	0.162843E-01
67.0000	1203.89	0.193786E-01
68.0000	1210.30	0.229430E-01
69.0000	1216.60	0.270299E-01
70.0000	1222.79	0.316955E-01
71.0000	1228.86	0.369991E-01
72.0000	1234.83	0.430040E-01
73.0000	1240.69	0.497763E-01
74.0000	1246.44	0.573861E-01
75.0000	1252.10	0.659066E-01
76.0000	1257.66	0.754142E-01
77.0000	1263.13	0.859886E-01
78.0000	1268.50	0.977125E-01
79.0000	1273.78	0.110672
80.0000	1278.97	0.124955
81.0000	1284.08	0.140654
82.0000	1289.11	0.157861
83.0000	1294.05	0.176674
84.0000	1298.91	0.197191
85.0000	1303.69	0.219513
86.0000	1308.40	0.243741
87.0000	1313.03	0.269980
88.0000	1317.58	0.298336
89.0000	1322.07	0.328916
90.0000	1326.49	0.361829
91.0000	1330.84	0.397182
92.0000	1335.12	0.435087
93.0000	1339.33	0.475653
94.0000	1343.48	0.518992
95.0000	1347.57	0.565214
96.0000	1351.60	0.614430
97.0000	1355.56	0.666752
98.0000	1359.47	0.722289
99.0000	1363.32	0.781152
100.000	1367.11	0.843449
101.000	1370.84	0.909289
102.000	1374.53	0.978779
103.000	1378.15	1.05202
104.000	1381.73	1.12913
105.000	1385.25	1.21020

106.000	1388.73	1.29534
107.000	1392.15	1.38463
108.000	1395.53	1.47820
109.000	1398.86	1.57611
110.000	1402.14	1.67848
111.000	1405.37	1.78540
112.000	1408.56	1.89694
113.000	1411.71	2.01320
114.000	1414.81	2.13426
115.000	1417.87	2.26020
116.000	1420.89	2.39110
117.000	1423.86	2.52704
118.000	1426.80	2.66809
119.000	1429.69	2.81432
120.000	1432.55	2.96579
121.000	1435.37	3.12257
122.000	1438.15	3.28473
123.000	1440.89	3.45231
124.000	1443.60	3.62538
125.000	1446.27	3.80398
126.000	1448.91	3.98816
127.000	1451.51	4.17798
128.000	1454.08	4.37346
129.000	1456.61	4.57466
130.000	1459.11	4.78160
131.000	1461.58	4.99433
132.000	1464.02	5.21286
133.000	1466.42	5.43724
134.000	1468.79	5.66747
135.000	1471.14	5.90359
136.000	1473.45	6.14560
137.000	1475.73	6.39353
138.000	1477.99	6.64739
139.000	1480.22	6.90718
140.000	1482.41	7.17291
141.000	1484.58	7.44459
142.000	1486.73	7.72221
143.000	1488.84	8.00577
144.000	1490.93	8.29527
145.000	1493.00	8.59070
146.000	1495.04	8.89205
147.000	1497.05	9.19930
148.000	1499.04	9.51245
149.000	1501.00	9.83147
150.000	1502.94	10.1563
151.000	1504.86	10.4870
152.000	1506.75	10.8235
153.000	1508.62	11.1658
154.000	1510.46	11.5139
155.000	1512.29	11.8676
156.000	1514.09	12.2271
157.000	1515.87	12.5921
158.000	1517.63	12.9628
159.000	1519.37	13.3391
160.000	1521.08	13.7209
161.000	1522.78	14.1082
162.000	1524.45	14.5009
163.000	1526.11	14.8990
164.000	1527.75	15.3025
165.000	1529.36	15.7113
166.000	1530.96	16.1253
167.000	1532.54	16.5445
168.000	1534.10	16.9689
169.000	1535.64	17.3983
170.000	1537.17	17.8328
171.000	1538.67	18.2723
172.000	1540.16	18.7167
173.000	1541.63	19.1659
174.000	1543.08	19.6199

175.000	1544.52	20.0787
176.000	1545.94	20.5421
177.000	1547.34	21.0101
178.000	1548.73	21.4827
179.000	1550.10	21.9598
180.000	1551.46	22.4413
181.000	1552.80	22.9271
182.000	1554.12	23.4172
183.000	1555.43	23.9115
184.000	1556.73	24.4100
185.000	1558.01	24.9125
186.000	1559.27	25.4191
187.000	1560.52	25.9296
188.000	1561.76	26.4439
189.000	1562.98	26.9621
190.000	1564.19	27.4839
191.000	1565.39	28.0094
192.000	1566.57	28.5386
193.000	1567.74	29.0712
194.000	1568.89	29.6072
195.000	1570.03	30.1467
196.000	1571.16	30.6894
197.000	1572.28	31.2354
198.000	1573.38	31.7845
199.000	1574.48	32.3367
200.000	1575.56	32.8919
201.000	1576.62	33.4500
202.000	1577.68	34.0110
203.000	1578.72	34.5748
204.000	1579.76	35.1414
205.000	1580.78	35.7105
206.000	1581.79	36.2823
207.000	1582.79	36.8566
208.000	1583.77	37.4333
209.000	1584.75	38.0124
210.000	1585.72	38.5938
211.000	1586.67	39.1774
212.000	1587.62	39.7632
213.000	1588.55	40.3511
214.000	1589.48	40.9410
215.000	1590.39	41.5328
216.000	1591.30	42.1266
217.000	1592.19	42.7221
218.000	1593.08	43.3194
219.000	1593.95	43.9184
220.000	1594.82	44.5191
221.000	1595.67	45.1212
222.000	1596.52	45.7249
223.000	1597.36	46.3300
224.000	1598.19	46.9365
225.000	1599.01	47.5442
226.000	1599.82	48.1532
227.000	1600.62	48.7634
228.000	1601.41	49.3746
229.000	1602.20	49.9869
230.000	1602.98	50.6003
231.000	1603.75	51.2145
232.000	1604.51	51.8296
233.000	1605.26	52.4455
234.000	1606.00	53.0621
235.000	1606.74	53.6795
236.000	1607.47	54.2975
237.000	1608.19	54.9160
238.000	1608.90	55.5351
239.000	1609.61	56.1546
240.000	1610.31	56.7746
241.000	1611.00	57.3949
242.000	1611.68	58.0155
243.000	1612.36	58.6364

244.000	1613.03	59.2574
245.000	1613.69	59.8786
246.000	1614.34	60.4999
247.000	1614.99	61.1212
248.000	1615.63	61.7426
249.000	1616.27	62.3639
250.000	1616.89	62.9850
251.000	1617.52	63.6060
252.000	1618.13	64.2269
253.000	1618.74	64.8474
254.000	1619.34	65.4677
255.000	1619.94	66.0877
256.000	1620.53	66.7073
257.000	1621.11	67.3264
258.000	1621.69	67.9451
259.000	1622.26	68.5632
260.000	1622.82	69.1808
261.000	1623.38	69.7979
262.000	1623.94	70.4142
263.000	1624.49	71.0299
264.000	1625.03	71.6449
265.000	1625.57	72.2592
266.000	1626.10	72.8726
267.000	1626.62	73.4852
268.000	1627.14	74.0970
269.000	1627.66	74.7078
270.000	1628.17	75.3177
271.000	1628.67	75.9266
272.000	1629.17	76.5346
273.000	1629.67	77.1414
274.000	1630.15	77.7472
275.000	1630.64	78.3519
276.000	1631.12	78.9555
277.000	1631.59	79.5579
278.000	1632.06	80.1590
279.000	1632.53	80.7590
280.000	1632.99	81.3577
281.000	1633.44	81.9550
282.000	1633.89	82.5511
283.000	1634.34	83.1458
284.000	1634.78	83.7391
285.000	1635.21	84.3311
286.000	1635.65	84.9216
287.000	1636.08	85.5106
288.000	1636.50	86.0982
289.000	1636.92	86.6842
290.000	1637.33	87.2688
291.000	1637.74	87.8517
292.000	1638.15	88.4331
293.000	1638.55	89.0129
294.000	1638.95	89.5911
295.000	1639.35	90.1676
296.000	1639.74	90.7424
297.000	1640.12	91.3156
298.000	1640.51	91.8871
299.000	1640.89	92.4568
300.000	1641.26	93.0248
301.000	1641.63	93.5910
302.000	1642.00	94.1554
303.000	1642.36	94.7181
304.000	1642.72	95.2789
305.000	1643.08	95.8379
306.000	1643.43	96.3950
307.000	1643.78	96.9503
308.000	1644.13	97.5036
309.000	1644.47	98.0551
310.000	1644.81	98.6047
311.000	1645.15	99.1523
312.000	1645.48	99.6980

313.000	1645.81	100.242
314.000	1646.13	100.784
315.000	1646.46	101.323
316.000	1646.78	101.861
317.000	1647.09	102.397
318.000	1647.40	102.931
319.000	1647.71	103.462
320.000	1648.02	103.992
321.000	1648.32	104.520
322.000	1648.63	105.045
323.000	1648.92	105.569
324.000	1649.22	106.090
325.000	1649.51	106.610
326.000	1649.80	107.127
327.000	1650.09	107.642
328.000	1650.37	108.155
329.000	1650.65	108.666
330.000	1650.93	109.175
331.000	1651.20	109.682
332.000	1651.47	110.186
333.000	1651.74	110.689
334.000	1652.01	111.189
335.000	1652.28	111.687
336.000	1652.54	112.183
337.000	1652.80	112.677
338.000	1653.05	113.168
339.000	1653.31	113.658
340.000	1653.56	114.145
341.000	1653.81	114.630
342.000	1654.05	115.113
343.000	1654.30	115.593
344.000	1654.54	116.072
345.000	1654.78	116.548
346.000	1655.02	117.022
347.000	1655.25	117.494
348.000	1655.48	117.964
349.000	1655.71	118.431
350.000	1655.94	118.896
351.000	1656.17	119.359
352.000	1656.39	119.820
353.000	1656.61	120.279
354.000	1656.83	120.735
355.000	1657.05	121.189
356.000	1657.26	121.641
357.000	1657.48	122.091
358.000	1657.69	122.538
359.000	1657.90	122.983
360.000	1658.10	123.427
361.000	1658.31	123.867
362.000	1658.51	124.306
363.000	1658.71	124.742
364.000	1658.91	125.177
365.000	1659.11	125.609
366.000	1659.30	126.038
367.000	1659.50	126.466
368.000	1659.69	126.891
369.000	1659.88	127.315
370.000	1660.06	127.736
371.000	1660.25	128.154
372.000	1660.43	128.571
373.000	1660.62	128.985
374.000	1660.80	129.398
375.000	1660.98	129.808
376.000	1661.15	130.215
377.000	1661.33	130.621
378.000	1661.50	131.025
379.000	1661.67	131.426
380.000	1661.84	131.825
381.000	1662.01	132.222

382.000	1662.18	132.617
383.000	1662.34	133.010
384.000	1662.51	133.400
385.000	1662.67	133.788
386.000	1662.83	134.175
387.000	1662.99	134.559
388.000	1663.15	134.941
389.000	1663.30	135.321
390.000	1663.46	135.698
391.000	1663.61	136.074
392.000	1663.76	136.447
393.000	1663.91	136.819
394.000	1664.06	137.188
395.000	1664.21	137.555
396.000	1664.35	137.920
397.000	1664.50	138.283
398.000	1664.64	138.644
399.000	1664.78	139.003
400.000	1664.92	139.360
401.000	1665.06	139.714
402.000	1665.20	140.067
403.000	1665.34	140.418
404.000	1665.47	140.766
405.000	1665.61	141.113
406.000	1665.74	141.457
407.000	1665.87	141.800
408.000	1666.00	142.140
409.000	1666.13	142.479
410.000	1666.26	142.815
411.000	1666.38	143.150
412.000	1666.51	143.482
413.000	1666.63	143.812
414.000	1666.75	144.141
415.000	1666.88	144.467
416.000	1667.00	144.792
417.000	1667.12	145.115
418.000	1667.23	145.435
419.000	1667.35	145.754
420.000	1667.47	146.071
421.000	1667.58	146.386
422.000	1667.70	146.699
423.000	1667.81	147.010
424.000	1667.92	147.319
425.000	1668.03	147.626
426.000	1668.14	147.932
427.000	1668.25	148.235
428.000	1668.36	148.537
429.000	1668.46	148.836
430.000	1668.57	149.134
431.000	1668.67	149.430
432.000	1668.78	149.724
433.000	1668.88	150.017
434.000	1668.98	150.307
435.000	1669.08	150.596
436.000	1669.18	150.883
437.000	1669.28	151.168
438.000	1669.38	151.451
439.000	1669.47	151.733
440.000	1669.57	152.012
441.000	1669.66	152.290
442.000	1669.76	152.567
443.000	1669.85	152.841
444.000	1669.94	153.114
445.000	1670.03	153.385
446.000	1670.13	153.654
447.000	1670.21	153.921
448.000	1670.30	154.187
449.000	1670.39	154.451
450.000	1670.48	154.714

451.000	1670.57	154.974
452.000	1670.65	155.233
453.000	1670.74	155.491
454.000	1670.82	155.746
455.000	1670.90	156.000
456.000	1670.99	156.253
457.000	1671.07	156.503
458.000	1671.15	156.752
459.000	1671.23	157.000
460.000	1671.31	157.246
461.000	1671.39	157.490
462.000	1671.46	157.732
463.000	1671.54	157.973
464.000	1671.62	158.213
465.000	1671.69	158.451
466.000	1671.77	158.687
467.000	1671.84	158.922
468.000	1671.92	159.155
469.000	1671.99	159.386
470.000	1672.06	159.616
471.000	1672.13	159.845
472.000	1672.20	160.072
473.000	1672.27	160.297
474.000	1672.34	160.521
475.000	1672.41	160.744
476.000	1672.48	160.965
477.000	1672.55	161.184
478.000	1672.62	161.402
479.000	1672.68	161.619
480.000	1672.75	161.834
481.000	1672.81	162.048
482.000	1672.88	162.260
483.000	1672.94	162.471
484.000	1673.01	162.680
485.000	1673.07	162.888
486.000	1673.13	163.095
487.000	1673.19	163.300
488.000	1673.25	163.504
489.000	1673.31	163.706
490.000	1673.37	163.907
491.000	1673.43	164.106
492.000	1673.49	164.305
493.000	1673.55	164.502
494.000	1673.61	164.697
495.000	1673.67	164.891
496.000	1673.72	165.084
497.000	1673.78	165.276
498.000	1673.83	165.466
499.000	1673.89	165.655
500.000	1673.94	165.842
501.000	1674.00	166.029
502.000	1674.05	166.214
503.000	1674.10	166.397
504.000	1674.16	166.580
505.000	1674.21	166.761
506.000	1674.26	166.941
507.000	1674.31	167.120
508.000	1674.36	167.297
509.000	1674.41	167.473
510.000	1674.46	167.648
511.000	1674.51	167.822
512.000	1674.56	167.994
513.000	1674.61	168.166
514.000	1674.66	168.336
515.000	1674.71	168.505
516.000	1674.75	168.673
517.000	1674.80	168.839
518.000	1674.85	169.005
519.000	1674.89	169.169

520.000	1674.94	169.332
521.000	1674.98	169.494
522.000	1675.03	169.655
523.000	1675.07	169.814
524.000	1675.11	169.973
525.000	1675.16	170.130
526.000	1675.20	170.286
527.000	1675.24	170.442
528.000	1675.28	170.596
529.000	1675.33	170.749
530.000	1675.37	170.900
531.000	1675.41	171.051
532.000	1675.45	171.201
533.000	1675.49	171.350
534.000	1675.53	171.497
535.000	1675.57	171.644
536.000	1675.61	171.789
537.000	1675.65	171.934
538.000	1675.69	172.077
539.000	1675.72	172.220
540.000	1675.76	172.361
541.000	1675.80	172.501
542.000	1675.84	172.641
543.000	1675.87	172.779
544.000	1675.91	172.916
545.000	1675.94	173.053
546.000	1675.98	173.188
547.000	1676.02	173.323
548.000	1676.05	173.456
549.000	1676.08	173.589
550.000	1676.12	173.720
551.000	1676.15	173.851
552.000	1676.19	173.980
553.000	1676.22	174.109
554.000	1676.25	174.237
555.000	1676.29	174.364
556.000	1676.32	174.489
557.000	1676.35	174.614
558.000	1676.38	174.739
559.000	1676.42	174.862
560.000	1676.45	174.984
561.000	1676.48	175.105
562.000	1676.51	175.226
563.000	1676.54	175.346
564.000	1676.57	175.464
565.000	1676.60	175.582
566.000	1676.63	175.699
567.000	1676.66	175.815
568.000	1676.69	175.931
569.000	1676.72	176.045
570.000	1676.74	176.159
571.000	1676.77	176.272
572.000	1676.80	176.384
573.000	1676.83	176.495
574.000	1676.86	176.605
575.000	1676.88	176.715
576.000	1676.91	176.823
577.000	1676.94	176.931
578.000	1676.96	177.038
579.000	1676.99	177.145
580.000	1677.02	177.250
581.000	1677.04	177.355
582.000	1677.07	177.459
583.000	1677.09	177.562
584.000	1677.12	177.665
585.000	1677.14	177.766
586.000	1677.17	177.867
587.000	1677.19	177.967
588.000	1677.22	178.067

589.000	1677.24	178.166
590.000	1677.27	178.263
591.000	1677.29	178.361
592.000	1677.31	178.457
593.000	1677.34	178.553
594.000	1677.36	178.648
595.000	1677.38	178.743
596.000	1677.40	178.836
597.000	1677.43	178.929
598.000	1677.45	179.022
599.000	1677.47	179.113
600.000	1677.49	179.204
601.000	1677.51	179.294
602.000	1677.54	179.384
603.000	1677.56	179.473
604.000	1677.58	179.561
605.000	1677.60	179.649
606.000	1677.62	179.735
607.000	1677.64	179.822
608.000	1677.66	179.907
609.000	1677.68	179.992
610.000	1677.70	180.077
611.000	1677.72	180.160
612.000	1677.74	180.243
613.000	1677.76	180.326
614.000	1677.78	180.408
615.000	1677.80	180.489
616.000	1677.82	180.570
617.000	1677.83	180.650
618.000	1677.85	180.729
619.000	1677.87	180.808
620.000	1677.89	180.886
621.000	1677.91	180.964
622.000	1677.92	181.041
623.000	1677.94	181.117
624.000	1677.96	181.193
625.000	1677.98	181.268
626.000	1677.99	181.343
627.000	1678.01	181.417
628.000	1678.03	181.491
629.000	1678.04	181.564
630.000	1678.06	181.636
631.000	1678.08	181.708
632.000	1678.09	181.779
633.000	1678.11	181.850
634.000	1678.13	181.921
635.000	1678.14	181.990
636.000	1678.16	182.060
637.000	1678.17	182.128
638.000	1678.19	182.197
639.000	1678.20	182.264
640.000	1678.22	182.331
641.000	1678.23	182.398
642.000	1678.25	182.464
643.000	1678.26	182.530
644.000	1678.28	182.595
645.000	1678.29	182.660
646.000	1678.31	182.724
647.000	1678.32	182.787
648.000	1678.34	182.851
649.000	1678.35	182.913
650.000	1678.36	182.975
651.000	1678.38	183.037
652.000	1678.39	183.098
653.000	1678.40	183.159
654.000	1678.42	183.220
655.000	1678.43	183.279
656.000	1678.44	183.339
657.000	1678.46	183.398

658.000	1678.47	183.456
659.000	1678.48	183.514
660.000	1678.49	183.572
661.000	1678.51	183.629
662.000	1678.52	183.686
663.000	1678.53	183.742
664.000	1678.54	183.798
665.000	1678.56	183.853
666.000	1678.57	183.908
667.000	1678.58	183.963
668.000	1678.59	184.017
669.000	1678.60	184.071
670.000	1678.61	184.124
671.000	1678.63	184.177
672.000	1678.64	184.230
673.000	1678.65	184.282
674.000	1678.66	184.333
675.000	1678.67	184.385
676.000	1678.68	184.436
677.000	1678.69	184.486
678.000	1678.70	184.536
679.000	1678.71	184.586
680.000	1678.72	184.635
681.000	1678.74	184.684
682.000	1678.75	184.733
683.000	1678.76	184.781
684.000	1678.77	184.829
685.000	1678.78	184.876
686.000	1678.79	184.923
687.000	1678.80	184.970
688.000	1678.81	185.017
689.000	1678.82	185.063
690.000	1678.83	185.108
691.000	1678.83	185.153
692.000	1678.84	185.198
693.000	1678.85	185.243
694.000	1678.86	185.287
695.000	1678.87	185.331
696.000	1678.88	185.375
697.000	1678.89	185.418
698.000	1678.90	185.461
699.000	1678.91	185.503
700.000	1678.92	185.546
701.000	1678.93	185.588
702.000	1678.93	185.629
703.000	1678.94	185.670
704.000	1678.95	185.711
705.000	1678.96	185.752
706.000	1678.97	185.792
707.000	1678.98	185.832
708.000	1678.98	185.872
709.000	1678.99	185.911
710.000	1679.00	185.950
711.000	1679.01	185.989
712.000	1679.02	186.028
713.000	1679.02	186.066
714.000	1679.03	186.104
715.000	1679.04	186.141
716.000	1679.05	186.178
717.000	1679.06	186.215
718.000	1679.06	186.252
719.000	1679.07	186.288
720.000	1679.08	186.324
721.000	1679.08	186.360
722.000	1679.09	186.396
723.000	1679.10	186.431
724.000	1679.11	186.466
725.000	1679.11	186.501
726.000	1679.12	186.535

727.000	1679.13	186.569
728.000	1679.13	186.603
729.000	1679.14	186.637
730.000	1679.15	186.670
731.000	1679.15	186.703
732.000	1679.16	186.736
733.000	1679.17	186.769
734.000	1679.17	186.801
735.000	1679.18	186.833
736.000	1679.19	186.865
737.000	1679.19	186.897
738.000	1679.20	186.928
739.000	1679.21	186.959
740.000	1679.21	186.990
741.000	1679.22	187.021
742.000	1679.22	187.051
743.000	1679.23	187.081
744.000	1679.24	187.111
745.000	1679.24	187.141
746.000	1679.25	187.170
747.000	1679.25	187.199
748.000	1679.26	187.228
749.000	1679.26	187.257
750.000	1679.27	187.285
751.000	1679.28	187.314
752.000	1679.28	187.342
753.000	1679.29	187.370
754.000	1679.29	187.397
755.000	1679.30	187.425
756.000	1679.30	187.452
757.000	1679.31	187.479
758.000	1679.31	187.505
759.000	1679.32	187.532
760.000	1679.32	187.558
761.000	1679.33	187.584
762.000	1679.33	187.610
763.000	1679.34	187.636
764.000	1679.34	187.662
765.000	1679.35	187.687
766.000	1679.35	187.712
767.000	1679.36	187.737
768.000	1679.36	187.762
769.000	1679.37	187.786
770.000	1679.37	187.810
771.000	1679.38	187.834
772.000	1679.38	187.858
773.000	1679.39	187.882
774.000	1679.39	187.906
775.000	1679.40	187.929
776.000	1679.40	187.952
777.000	1679.41	187.975
778.000	1679.41	187.998
779.000	1679.41	188.021
780.000	1679.42	188.043
781.000	1679.42	188.065
782.000	1679.43	188.088
783.000	1679.43	188.109
784.000	1679.43	188.131
785.000	1679.44	188.153
786.000	1679.44	188.174
787.000	1679.45	188.195
788.000	1679.45	188.217
789.000	1679.46	188.237
790.000	1679.46	188.258
791.000	1679.46	188.279
792.000	1679.47	188.299
793.000	1679.47	188.319
794.000	1679.47	188.339
795.000	1679.48	188.359

796.000	1679.48	188.379
797.000	1679.49	188.399
798.000	1679.49	188.418
799.000	1679.49	188.438
800.000	1679.50	188.457
801.000	1679.50	188.476
802.000	1679.50	188.494
803.000	1679.51	188.513
804.000	1679.51	188.532
805.000	1679.51	188.550
806.000	1679.52	188.568
807.000	1679.52	188.586
808.000	1679.52	188.604
809.000	1679.53	188.622
810.000	1679.53	188.640
811.000	1679.53	188.657
812.000	1679.54	188.675
813.000	1679.54	188.692
814.000	1679.54	188.709
815.000	1679.55	188.726
816.000	1679.55	188.743
817.000	1679.55	188.760
818.000	1679.56	188.776
819.000	1679.56	188.793
820.000	1679.56	188.809
821.000	1679.57	188.825
822.000	1679.57	188.841
823.000	1679.57	188.857
824.000	1679.57	188.873
825.000	1679.58	188.889
826.000	1679.58	188.904
827.000	1679.58	188.920
828.000	1679.59	188.935
829.000	1679.59	188.950
830.000	1679.59	188.965
831.000	1679.59	188.980
832.000	1679.60	188.995
833.000	1679.60	189.010
834.000	1679.60	189.024
835.000	1679.60	189.039
836.000	1679.61	189.053
837.000	1679.61	189.067
838.000	1679.61	189.081
839.000	1679.62	189.095
840.000	1679.62	189.109
841.000	1679.62	189.123
842.000	1679.62	189.137
843.000	1679.63	189.150
844.000	1679.63	189.164
845.000	1679.63	189.177
846.000	1679.63	189.190
847.000	1679.63	189.203
848.000	1679.64	189.216
849.000	1679.64	189.229
850.000	1679.64	189.242
851.000	1679.64	189.255
852.000	1679.65	189.267
853.000	1679.65	189.280
854.000	1679.65	189.292
855.000	1679.65	189.305
856.000	1679.66	189.317
857.000	1679.66	189.329
858.000	1679.66	189.341
859.000	1679.66	189.353
860.000	1679.66	189.365
861.000	1679.67	189.376
862.000	1679.67	189.388
863.000	1679.67	189.399
864.000	1679.67	189.411

865.000	1679.67	189.422
866.000	1679.68	189.434
867.000	1679.68	189.445
868.000	1679.68	189.456
869.000	1679.68	189.467
870.000	1679.68	189.478
871.000	1679.69	189.488
872.000	1679.69	189.499
873.000	1679.69	189.510
874.000	1679.69	189.520
875.000	1679.69	189.531
876.000	1679.70	189.541
877.000	1679.70	189.552
878.000	1679.70	189.562
879.000	1679.70	189.572
880.000	1679.70	189.582
881.000	1679.70	189.592
882.000	1679.71	189.602
883.000	1679.71	189.612
884.000	1679.71	189.621
885.000	1679.71	189.631
886.000	1679.71	189.641
887.000	1679.71	189.650
888.000	1679.72	189.660
889.000	1679.72	189.669
890.000	1679.72	189.678
891.000	1679.72	189.687
892.000	1679.72	189.696
893.000	1679.72	189.706
894.000	1679.73	189.715
895.000	1679.73	189.723
896.000	1679.73	189.732
897.000	1679.73	189.741
898.000	1679.73	189.750
899.000	1679.73	189.758
900.000	1679.74	189.767
901.000	1679.74	189.775
902.000	1679.74	189.784
903.000	1679.74	189.792
904.000	1679.74	189.800
905.000	1679.74	189.809
906.000	1679.74	189.817
907.000	1679.75	189.825
908.000	1679.75	189.833
909.000	1679.75	189.841
910.000	1679.75	189.849
911.000	1679.75	189.856
912.000	1679.75	189.864
913.000	1679.75	189.872
914.000	1679.75	189.880
915.000	1679.76	189.887
916.000	1679.76	189.895
917.000	1679.76	189.902
918.000	1679.76	189.909
919.000	1679.76	189.917
920.000	1679.76	189.924
921.000	1679.76	189.931
922.000	1679.76	189.938
923.000	1679.77	189.946
924.000	1679.77	189.953
925.000	1679.77	189.960
926.000	1679.77	189.966
927.000	1679.77	189.973
928.000	1679.77	189.980
929.000	1679.77	189.987
930.000	1679.77	189.994
931.000	1679.78	190.000
932.000	1679.78	190.007
933.000	1679.78	190.013

934.000	1679.78	190.020
935.000	1679.78	190.026
936.000	1679.78	190.033
937.000	1679.78	190.039
938.000	1679.78	190.045
939.000	1679.78	190.051
940.000	1679.79	190.058
941.000	1679.79	190.064
942.000	1679.79	190.070
943.000	1679.79	190.076
944.000	1679.79	190.082
945.000	1679.79	190.088
946.000	1679.79	190.094
947.000	1679.79	190.100
948.000	1679.79	190.105
949.000	1679.79	190.111
950.000	1679.80	190.117
951.000	1679.80	190.122
952.000	1679.80	190.128
953.000	1679.80	190.134
954.000	1679.80	190.139
955.000	1679.80	190.144
956.000	1679.80	190.150
957.000	1679.80	190.155
958.000	1679.80	190.161
959.000	1679.80	190.166
960.000	1679.80	190.171
961.000	1679.81	190.176
962.000	1679.81	190.182
963.000	1679.81	190.187
964.000	1679.81	190.192
965.000	1679.81	190.197
966.000	1679.81	190.202
967.000	1679.81	190.207
968.000	1679.81	190.212
969.000	1679.81	190.216
970.000	1679.81	190.221
971.000	1679.81	190.226
972.000	1679.81	190.231
973.000	1679.82	190.236
974.000	1679.82	190.240
975.000	1679.82	190.245
976.000	1679.82	190.250
977.000	1679.82	190.254
978.000	1679.82	190.259
979.000	1679.82	190.263
980.000	1679.82	190.268
981.000	1679.82	190.272
982.000	1679.82	190.276
983.000	1679.82	190.281
984.000	1679.82	190.285
985.000	1679.82	190.289
986.000	1679.82	190.294
987.000	1679.83	190.298
988.000	1679.83	190.302
989.000	1679.83	190.306
990.000	1679.83	190.310
991.000	1679.83	190.314
992.000	1679.83	190.318
993.000	1679.83	190.322
994.000	1679.83	190.326
995.000	1679.83	190.330
996.000	1679.83	190.334
997.000	1679.83	190.338
998.000	1679.83	190.342
999.000	1679.83	190.346
1000.00	1679.83	190.349

TITLE : GREENS OIL COMPANY
CBM JOB # : 11030
SC ID # : 09344

Contaminant of Concern is ETHYLBENZENE

C(x,0,0,t)=(C0/2)erfc[(x-vt)/2(Ax*vt)1/2]
erf[Y/4(Ay*x)1/2]erf[Z/2(alphz*x)1/2]

INPUT PARAMETERS :
Concentration of Source (ppb) = 3700.00
Source Width (ft) = 60.00
Vertical Thickness of Source (ft) = 27.50
Distance of Recipient (ft) =1000.00
Groundwater Flow Velocity (ft/yr) = 3.65
Time of Simulation (years) = 1000.00
Longitudinal Dispersivity (ft) = 100.000000
Transverse Dispersivity (ft) = 33.333332
Vertical Dispersivity (ft) = 5.000000
Total Organic Carbon, TOC (mg/kg) = 101.00
Total Petroleum Hydrocarbons,TPH(mg/kg) = 49.50
Soil/Water Part. Coefficient,Koc(ml/g) = 176.00
Organic Carbon Fraction, foc (%) = 0.0001297
Porosity = .250
Bulk Density (g/cc) = 1.600
Retardation Factor, Rf = 1.14611
Contaminant Velocity (ft/yr) = 3.18469

CONCENTRATION COMPUTED FOR :
100.000 ft. 1000.000 ft

TIME (yrs)	CONC. (ppb)	CONC. (ppb)
1.00000	0.408838E-01	0.000000
2.00000	2.84244	0.000000
3.00000	12.5807	0.000000
4.00000	27.3719	0.000000
5.00000	44.4839	0.000000
6.00000	62.2533	0.000000
7.00000	79.8245	0.000000
8.00000	96.7908	0.000000
9.00000	112.980	0.000000
10.0000	128.338	0.000000
11.0000	142.871	0.000000
12.0000	156.617	0.000000
13.0000	169.622	0.000000
14.0000	181.939	0.000000
15.0000	193.619	0.000000
16.0000	204.714	0.000000
17.0000	215.268	0.000000
18.0000	225.323	0.000000
19.0000	234.918	0.000000
20.0000	244.088	0.000000
21.0000	252.864	0.000000
22.0000	261.275	0.000000
23.0000	269.346	0.000000
24.0000	277.101	0.000000
25.0000	284.562	0.000000
26.0000	291.746	0.000000
27.0000	298.671	0.000000
28.0000	305.355	0.000000
29.0000	311.810	0.000000
30.0000	318.051	0.000000
31.0000	324.090	0.000000
32.0000	329.937	0.000000
33.0000	335.604	0.000000
34.0000	341.099	0.000000
35.0000	346.432	0.000000
36.0000	351.611	0.000000

37.0000	356.643	0.000000
38.0000	361.535	0.000000
39.0000	366.294	0.000000
40.0000	370.926	0.000000
41.0000	375.437	0.000000
42.0000	379.832	0.000000
43.0000	384.115	0.000000
44.0000	388.293	0.000000
45.0000	392.368	0.000000
46.0000	396.345	0.000000
47.0000	400.228	0.000000
48.0000	404.020	0.000000
49.0000	407.726	0.000000
50.0000	411.348	0.000000
51.0000	414.889	0.000000
52.0000	418.352	0.000000
53.0000	421.740	0.000000
54.0000	425.056	0.000000
55.0000	428.302	0.000000
56.0000	431.480	0.000000
57.0000	434.592	0.000000
58.0000	437.642	0.828692E-03
59.0000	440.630	0.104475E-02
60.0000	443.558	0.130710E-02
61.0000	446.429	0.162348E-02
62.0000	449.245	0.200250E-02
63.0000	452.006	0.245371E-02
64.0000	454.714	0.298766E-02
65.0000	457.372	0.361590E-02
66.0000	459.980	0.435108E-02
67.0000	462.540	0.520692E-02
68.0000	465.054	0.619830E-02
69.0000	467.521	0.734121E-02
70.0000	469.945	0.865286E-02
71.0000	472.325	0.101516E-01
72.0000	474.664	0.118570E-01
73.0000	476.962	0.137898E-01
74.0000	479.220	0.159720E-01
75.0000	481.439	0.184266E-01
76.0000	483.620	0.211781E-01
77.0000	485.765	0.242518E-01
78.0000	487.874	0.276745E-01
79.0000	489.947	0.314736E-01
80.0000	491.987	0.356782E-01
81.0000	493.993	0.403179E-01
82.0000	495.966	0.454236E-01
83.0000	497.908	0.510269E-01
84.0000	499.818	0.571607E-01
85.0000	501.698	0.638585E-01
86.0000	503.549	0.711545E-01
87.0000	505.370	0.790837E-01
88.0000	507.163	0.876822E-01
89.0000	508.928	0.969860E-01
90.0000	510.666	0.107032
91.0000	512.377	0.117859
92.0000	514.063	0.129503
93.0000	515.723	0.142003
94.0000	517.357	0.155398
95.0000	518.968	0.169726
96.0000	520.554	0.185028
97.0000	522.117	0.201341
98.0000	523.658	0.218705
99.0000	525.175	0.237159
100.000	526.671	0.256743
101.000	528.145	0.277496
102.000	529.597	0.299456
103.000	531.029	0.322661
104.000	532.441	0.347152
105.000	533.832	0.372964

106.000	535.204	0.400136
107.000	536.557	0.428706
108.000	537.891	0.458708
109.000	539.206	0.490181
110.000	540.503	0.523158
111.000	541.782	0.557675
112.000	543.043	0.593766
113.000	544.288	0.631464
114.000	545.515	0.670802
115.000	546.726	0.711812
116.000	547.920	0.754525
117.000	549.099	0.798970
118.000	550.261	0.845178
119.000	551.409	0.893176
120.000	552.540	0.942992
121.000	553.657	0.994652
122.000	554.760	1.04818
123.000	555.847	1.10361
124.000	556.921	1.16095
125.000	557.980	1.22023
126.000	559.026	1.28148
127.000	560.059	1.34470
128.000	561.078	1.40993
129.000	562.083	1.47718
130.000	563.076	1.54646
131.000	564.057	1.61780
132.000	565.025	1.69120
133.000	565.980	1.76669
134.000	566.924	1.84427
135.000	567.855	1.92396
136.000	568.775	2.00577
137.000	569.684	2.08970
138.000	570.581	2.17577
139.000	571.467	2.26399
140.000	572.342	2.35435
141.000	573.206	2.44687
142.000	574.059	2.54155
143.000	574.902	2.63840
144.000	575.735	2.73741
145.000	576.558	2.83859
146.000	577.370	2.94193
147.000	578.173	3.04745
148.000	578.965	3.15513
149.000	579.749	3.26498
150.000	580.523	3.37699
151.000	581.287	3.49116
152.000	582.042	3.60748
153.000	582.789	3.72595
154.000	583.526	3.84656
155.000	584.255	3.96931
156.000	584.975	4.09418
157.000	585.686	4.22116
158.000	586.389	4.35026
159.000	587.084	4.48144
160.000	587.770	4.61472
161.000	588.449	4.75007
162.000	589.120	4.88748
163.000	589.782	5.02693
164.000	590.437	5.16842
165.000	591.085	5.31193
166.000	591.725	5.45744
167.000	592.357	5.60495
168.000	592.982	5.75442
169.000	593.600	5.90585
170.000	594.211	6.05922
171.000	594.815	6.21451
172.000	595.412	6.37170
173.000	596.002	6.53077
174.000	596.585	6.69171

175.000	597.162	6.85450
176.000	597.732	7.01910
177.000	598.296	7.18551
178.000	598.853	7.35371
179.000	599.404	7.52366
180.000	599.949	7.69536
181.000	600.487	7.86878
182.000	601.020	8.04389
183.000	601.547	8.22067
184.000	602.067	8.39911
185.000	602.582	8.57917
186.000	603.091	8.76084
187.000	603.595	8.94409
188.000	604.093	9.12889
189.000	604.585	9.31523
190.000	605.072	9.50308
191.000	605.554	9.69241
192.000	606.030	9.88320
193.000	606.501	10.0754
194.000	606.966	10.2691
195.000	607.427	10.4641
196.000	607.883	10.6605
197.000	608.333	10.8582
198.000	608.779	11.0572
199.000	609.220	11.2576
200.000	609.656	11.4591
201.000	610.087	11.6620
202.000	610.514	11.8660
203.000	610.936	12.0712
204.000	611.353	12.2776
205.000	611.766	12.4851
206.000	612.174	12.6937
207.000	612.578	12.9034
208.000	612.978	13.1141
209.000	613.373	13.3259
210.000	613.764	13.5387
211.000	614.151	13.7525
212.000	614.534	13.9672
213.000	614.913	14.1829
214.000	615.287	14.3994
215.000	615.658	14.6169
216.000	616.025	14.8352
217.000	616.387	15.0543
218.000	616.746	15.2743
219.000	617.101	15.4950
220.000	617.453	15.7165
221.000	617.800	15.9387
222.000	618.144	16.1617
223.000	618.485	16.3853
224.000	618.821	16.6096
225.000	619.155	16.8345
226.000	619.484	17.0600
227.000	619.811	17.2862
228.000	620.133	17.5129
229.000	620.453	17.7401
230.000	620.769	17.9679
231.000	621.082	18.1962
232.000	621.391	18.4249
233.000	621.697	18.6541
234.000	622.000	18.8838
235.000	622.300	19.1138
236.000	622.597	19.3442
237.000	622.891	19.5751
238.000	623.182	19.8062
239.000	623.469	20.0377
240.000	623.754	20.2695
241.000	624.036	20.5015
242.000	624.315	20.7339
243.000	624.591	20.9664

244.000	624.864	21.1992
245.000	625.134	21.4322
246.000	625.402	21.6654
247.000	625.666	21.8987
248.000	625.928	22.1322
249.000	626.188	22.3658
250.000	626.445	22.5995
251.000	626.699	22.8333
252.000	626.950	23.0672
253.000	627.199	23.3011
254.000	627.445	23.5351
255.000	627.689	23.7690
256.000	627.931	24.0030
257.000	628.170	24.2370
258.000	628.406	24.4709
259.000	628.640	24.7047
260.000	628.872	24.9385
261.000	629.102	25.1722
262.000	629.329	25.4058
263.000	629.553	25.6392
264.000	629.776	25.8726
265.000	629.996	26.1057
266.000	630.214	26.3387
267.000	630.430	26.5716
268.000	630.644	26.8042
269.000	630.855	27.0366
270.000	631.065	27.2688
271.000	631.272	27.5008
272.000	631.477	27.7325
273.000	631.680	27.9639
274.000	631.881	28.1951
275.000	632.081	28.4259
276.000	632.278	28.6564
277.000	632.473	28.8867
278.000	632.666	29.1166
279.000	632.857	29.3461
280.000	633.047	29.5753
281.000	633.234	29.8041
282.000	633.420	30.0325
283.000	633.603	30.2605
284.000	633.785	30.4882
285.000	633.966	30.7154
286.000	634.144	30.9422
287.000	634.320	31.1685
288.000	634.495	31.3944
289.000	634.668	31.6198
290.000	634.840	31.8448
291.000	635.010	32.0692
292.000	635.178	32.2932
293.000	635.344	32.5167
294.000	635.509	32.7397
295.000	635.672	32.9621
296.000	635.833	33.1840
297.000	635.993	33.4054
298.000	636.152	33.6262
299.000	636.308	33.8465
300.000	636.464	34.0662
301.000	636.617	34.2854
302.000	636.770	34.5039
303.000	636.920	34.7219
304.000	637.070	34.9392
305.000	637.217	35.1560
306.000	637.364	35.3722
307.000	637.509	35.5877
308.000	637.652	35.8026
309.000	637.794	36.0169
310.000	637.935	36.2305
311.000	638.074	36.4435
312.000	638.212	36.6558

313.000	638.349	36.8675
314.000	638.484	37.0785
315.000	638.618	37.2889
316.000	638.751	37.4985
317.000	638.882	37.7075
318.000	639.012	37.9158
319.000	639.141	38.1234
320.000	639.269	38.3303
321.000	639.395	38.5365
322.000	639.521	38.7420
323.000	639.645	38.9468
324.000	639.767	39.1509
325.000	639.889	39.3542
326.000	640.009	39.5568
327.000	640.128	39.7587
328.000	640.247	39.9598
329.000	640.364	40.1603
330.000	640.479	40.3599
331.000	640.594	40.5588
332.000	640.708	40.7570
333.000	640.820	40.9544
334.000	640.932	41.1511
335.000	641.042	41.3470
336.000	641.151	41.5421
337.000	641.260	41.7365
338.000	641.367	41.9301
339.000	641.473	42.1229
340.000	641.578	42.3150
341.000	641.682	42.5062
342.000	641.786	42.6967
343.000	641.888	42.8865
344.000	641.989	43.0754
345.000	642.089	43.2635
346.000	642.189	43.4509
347.000	642.287	43.6375
348.000	642.384	43.8232
349.000	642.481	44.0082
350.000	642.576	44.1924
351.000	642.671	44.3758
352.000	642.765	44.5584
353.000	642.858	44.7402
354.000	642.950	44.9212
355.000	643.041	45.1014
356.000	643.131	45.2808
357.000	643.220	45.4594
358.000	643.309	45.6371
359.000	643.397	45.8141
360.000	643.484	45.9903
361.000	643.570	46.1657
362.000	643.655	46.3402
363.000	643.739	46.5140
364.000	643.823	46.6869
365.000	643.906	46.8591
366.000	643.988	47.0304
367.000	644.069	47.2009
368.000	644.150	47.3706
369.000	644.229	47.5395
370.000	644.308	47.7076
371.000	644.387	47.8749
372.000	644.464	48.0414
373.000	644.541	48.2070
374.000	644.617	48.3719
375.000	644.692	48.5360
376.000	644.767	48.6992
377.000	644.841	48.8617
378.000	644.914	49.0233
379.000	644.987	49.1841
380.000	645.059	49.3442
381.000	645.130	49.5034

382.000	645.200	49.6618
383.000	645.270	49.8194
384.000	645.339	49.9763
385.000	645.408	50.1323
386.000	645.476	50.2875
387.000	645.543	50.4419
388.000	645.610	50.5956
389.000	645.676	50.7484
390.000	645.741	50.9004
391.000	645.806	51.0517
392.000	645.870	51.2021
393.000	645.934	51.3518
394.000	645.997	51.5007
395.000	646.060	51.6488
396.000	646.121	51.7961
397.000	646.183	51.9426
398.000	646.243	52.0883
399.000	646.304	52.2333
400.000	646.363	52.3775
401.000	646.422	52.5209
402.000	646.481	52.6635
403.000	646.539	52.8054
404.000	646.596	52.9465
405.000	646.653	53.0868
406.000	646.709	53.2263
407.000	646.765	53.3651
408.000	646.820	53.5031
409.000	646.875	53.6404
410.000	646.929	53.7768
411.000	646.983	53.9126
412.000	647.036	54.0476
413.000	647.089	54.1818
414.000	647.141	54.3153
415.000	647.193	54.4480
416.000	647.245	54.5800
417.000	647.295	54.7112
418.000	647.346	54.8417
419.000	647.396	54.9714
420.000	647.445	55.1004
421.000	647.494	55.2287
422.000	647.543	55.3562
423.000	647.591	55.4831
424.000	647.639	55.6091
425.000	647.686	55.7345
426.000	647.733	55.8591
427.000	647.779	55.9830
428.000	647.825	56.1062
429.000	647.870	56.2287
430.000	647.915	56.3505
431.000	647.960	56.4715
432.000	648.004	56.5918
433.000	648.048	56.7115
434.000	648.092	56.8304
435.000	648.135	56.9486
436.000	648.177	57.0662
437.000	648.220	57.1830
438.000	648.261	57.2991
439.000	648.303	57.4146
440.000	648.344	57.5293
441.000	648.385	57.6434
442.000	648.425	57.7568
443.000	648.465	57.8695
444.000	648.505	57.9815
445.000	648.544	58.0929
446.000	648.583	58.2036
447.000	648.622	58.3136
448.000	648.660	58.4230
449.000	648.698	58.5317
450.000	648.735	58.6397

451.000	648.772	58.7471
452.000	648.809	58.8538
453.000	648.846	58.9598
454.000	648.882	59.0653
455.000	648.917	59.1700
456.000	648.953	59.2742
457.000	648.988	59.3776
458.000	649.023	59.4805
459.000	649.057	59.5827
460.000	649.092	59.6843
461.000	649.126	59.7852
462.000	649.159	59.8855
463.000	649.193	59.9852
464.000	649.226	60.0843
465.000	649.258	60.1828
466.000	649.291	60.2806
467.000	649.323	60.3778
468.000	649.354	60.4744
469.000	649.386	60.5704
470.000	649.417	60.6658
471.000	649.448	60.7606
472.000	649.479	60.8549
473.000	649.509	60.9485
474.000	649.539	61.0415
475.000	649.569	61.1339
476.000	649.599	61.2257
477.000	649.628	61.3170
478.000	649.657	61.4077
479.000	649.686	61.4978
480.000	649.714	61.5873
481.000	649.743	61.6762
482.000	649.771	61.7646
483.000	649.798	61.8524
484.000	649.826	61.9397
485.000	649.853	62.0263
486.000	649.880	62.1125
487.000	649.907	62.1980
488.000	649.933	62.2830
489.000	649.960	62.3675
490.000	649.986	62.4514
491.000	650.011	62.5348
492.000	650.037	62.6176
493.000	650.062	62.6999
494.000	650.087	62.7817
495.000	650.112	62.8629
496.000	650.137	62.9436
497.000	650.161	63.0238
498.000	650.186	63.1034
499.000	650.210	63.1825
500.000	650.233	63.2611
501.000	650.257	63.3392
502.000	650.280	63.4168
503.000	650.303	63.4938
504.000	650.326	63.5704
505.000	650.349	63.6464
506.000	650.372	63.7220
507.000	650.394	63.7970
508.000	650.416	63.8716
509.000	650.438	63.9456
510.000	650.460	64.0192
511.000	650.481	64.0922
512.000	650.503	64.1648
513.000	650.524	64.2369
514.000	650.545	64.3085
515.000	650.565	64.3797
516.000	650.586	64.4503
517.000	650.606	64.5205
518.000	650.627	64.5902
519.000	650.647	64.6595

520.000	650.666	64.7283
521.000	650.686	64.7966
522.000	650.706	64.8645
523.000	650.725	64.9319
524.000	650.744	64.9988
525.000	650.763	65.0653
526.000	650.782	65.1314
527.000	650.800	65.1970
528.000	650.819	65.2622
529.000	650.837	65.3269
530.000	650.855	65.3912
531.000	650.873	65.4550
532.000	650.891	65.5184
533.000	650.909	65.5814
534.000	650.926	65.6440
535.000	650.944	65.7061
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537.000	650.978	65.8291
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539.000	651.012	65.9504
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541.000	651.045	66.0700
542.000	651.061	66.1292
543.000	651.077	66.1880
544.000	651.093	66.2464
545.000	651.109	66.3044
546.000	651.125	66.3620
547.000	651.140	66.4192
548.000	651.156	66.4761
549.000	651.171	66.5325
550.000	651.186	66.5885
551.000	651.201	66.6441
552.000	651.216	66.6994
553.000	651.231	66.7543
554.000	651.245	66.8087
555.000	651.260	66.8629
556.000	651.274	66.9166
557.000	651.289	66.9700
558.000	651.303	67.0230
559.000	651.317	67.0756
560.000	651.331	67.1278
561.000	651.344	67.1797
562.000	651.358	67.2313
563.000	651.371	67.2824
564.000	651.385	67.3333
565.000	651.398	67.3837
566.000	651.411	67.4338
567.000	651.424	67.4836
568.000	651.437	67.5330
569.000	651.450	67.5820
570.000	651.463	67.6308
571.000	651.475	67.6791
572.000	651.488	67.7272
573.000	651.500	67.7749
574.000	651.512	67.8222
575.000	651.524	67.8693
576.000	651.536	67.9160
577.000	651.548	67.9623
578.000	651.560	68.0084
579.000	651.572	68.0541
580.000	651.583	68.0995
581.000	651.595	68.1445
582.000	651.606	68.1893
583.000	651.618	68.2337
584.000	651.629	68.2779
585.000	651.640	68.3217
586.000	651.651	68.3652
587.000	651.662	68.4083
588.000	651.673	68.4512

589.000	651.683	68.4938
590.000	651.694	68.5361
591.000	651.704	68.5781
592.000	651.715	68.6197
593.000	651.725	68.6611
594.000	651.735	68.7022
595.000	651.746	68.7430
596.000	651.756	68.7835
597.000	651.766	68.8237
598.000	651.776	68.8636
599.000	651.785	68.9032
600.000	651.795	68.9426
601.000	651.805	68.9817
602.000	651.814	69.0205
603.000	651.824	69.0590
604.000	651.833	69.0972
605.000	651.842	69.1352
606.000	651.852	69.1728
607.000	651.861	69.2103
608.000	651.870	69.2474
609.000	651.879	69.2843
610.000	651.888	69.3209
611.000	651.896	69.3573
612.000	651.905	69.3933
613.000	651.914	69.4292
614.000	651.922	69.4647
615.000	651.931	69.5001
616.000	651.939	69.5351
617.000	651.948	69.5699
618.000	651.956	69.6045
619.000	651.964	69.6388
620.000	651.972	69.6728
621.000	651.980	69.7067
622.000	651.989	69.7402
623.000	651.996	69.7735
624.000	652.004	69.8066
625.000	652.012	69.8395
626.000	652.020	69.8721
627.000	652.027	69.9044
628.000	652.035	69.9366
629.000	652.043	69.9684
630.000	652.050	70.0001
631.000	652.057	70.0315
632.000	652.065	70.0627
633.000	652.072	70.0937
634.000	652.079	70.1245
635.000	652.086	70.1550
636.000	652.093	70.1853
637.000	652.100	70.2154
638.000	652.107	70.2453
639.000	652.114	70.2749
640.000	652.121	70.3043
641.000	652.128	70.3335
642.000	652.135	70.3625
643.000	652.141	70.3913
644.000	652.148	70.4199
645.000	652.154	70.4483
646.000	652.161	70.4764
647.000	652.167	70.5044
648.000	652.174	70.5321
649.000	652.180	70.5597
650.000	652.186	70.5870
651.000	652.192	70.6141
652.000	652.198	70.6411
653.000	652.205	70.6678
654.000	652.211	70.6944
655.000	652.217	70.7207
656.000	652.223	70.7469
657.000	652.228	70.7728

658.000	652.234	70.7986
659.000	652.240	70.8242
660.000	652.246	70.8496
661.000	652.251	70.8748
662.000	652.257	70.8998
663.000	652.263	70.9247
664.000	652.268	70.9493
665.000	652.274	70.9738
666.000	652.279	70.9981
667.000	652.284	71.0222
668.000	652.290	71.0461
669.000	652.295	71.0699
670.000	652.300	71.0934
671.000	652.306	71.1168
672.000	652.311	71.1401
673.000	652.316	71.1631
674.000	652.321	71.1860
675.000	652.326	71.2087
676.000	652.331	71.2313
677.000	652.336	71.2537
678.000	652.341	71.2759
679.000	652.346	71.2979
680.000	652.350	71.3198
681.000	652.355	71.3415
682.000	652.360	71.3631
683.000	652.365	71.3845
684.000	652.369	71.4057
685.000	652.374	71.4268
686.000	652.378	71.4477
687.000	652.383	71.4685
688.000	652.387	71.4891
689.000	652.392	71.5096
690.000	652.396	71.5299
691.000	652.401	71.5500
692.000	652.405	71.5701
693.000	652.409	71.5899
694.000	652.413	71.6096
695.000	652.418	71.6292
696.000	652.422	71.6486
697.000	652.426	71.6679
698.000	652.430	71.6870
699.000	652.434	71.7060
700.000	652.438	71.7248
701.000	652.442	71.7435
702.000	652.446	71.7621
703.000	652.450	71.7805
704.000	652.454	71.7988
705.000	652.458	71.8169
706.000	652.462	71.8349
707.000	652.465	71.8528
708.000	652.469	71.8706
709.000	652.473	71.8882
710.000	652.477	71.9056
711.000	652.480	71.9230
712.000	652.484	71.9402
713.000	652.488	71.9573
714.000	652.491	71.9742
715.000	652.495	71.9911
716.000	652.498	72.0078
717.000	652.502	72.0243
718.000	652.505	72.0408
719.000	652.508	72.0571
720.000	652.512	72.0733
721.000	652.515	72.0894
722.000	652.519	72.1054
723.000	652.522	72.1212
724.000	652.525	72.1369
725.000	652.528	72.1525
726.000	652.532	72.1680

727.000	652.535	72.1834
728.000	652.538	72.1986
729.000	652.541	72.2138
730.000	652.544	72.2288
731.000	652.547	72.2437
732.000	652.550	72.2585
733.000	652.553	72.2732
734.000	652.556	72.2878
735.000	652.559	72.3022
736.000	652.562	72.3166
737.000	652.565	72.3308
738.000	652.568	72.3449
739.000	652.571	72.3590
740.000	652.574	72.3729
741.000	652.577	72.3867
742.000	652.579	72.4004
743.000	652.582	72.4140
744.000	652.585	72.4275
745.000	652.588	72.4409
746.000	652.590	72.4542
747.000	652.593	72.4675
748.000	652.596	72.4806
749.000	652.598	72.4936
750.000	652.601	72.5065
751.000	652.604	72.5193
752.000	652.606	72.5320
753.000	652.609	72.5446
754.000	652.611	72.5571
755.000	652.614	72.5695
756.000	652.616	72.5818
757.000	652.619	72.5941
758.000	652.621	72.6062
759.000	652.624	72.6182
760.000	652.626	72.6302
761.000	652.628	72.6421
762.000	652.631	72.6538
763.000	652.633	72.6655
764.000	652.635	72.6771
765.000	652.638	72.6886
766.000	652.640	72.7000
767.000	652.642	72.7114
768.000	652.644	72.7226
769.000	652.647	72.7338
770.000	652.649	72.7449
771.000	652.651	72.7558
772.000	652.653	72.7667
773.000	652.655	72.7776
774.000	652.657	72.7883
775.000	652.659	72.7990
776.000	652.662	72.8095
777.000	652.664	72.8200
778.000	652.666	72.8304
779.000	652.668	72.8408
780.000	652.670	72.8510
781.000	652.672	72.8612
782.000	652.674	72.8713
783.000	652.676	72.8813
784.000	652.678	72.8913
785.000	652.680	72.9011
786.000	652.682	72.9109
787.000	652.683	72.9207
788.000	652.685	72.9303
789.000	652.687	72.9399
790.000	652.689	72.9494
791.000	652.691	72.9588
792.000	652.693	72.9681
793.000	652.694	72.9774
794.000	652.696	72.9866
795.000	652.698	72.9958

796.000	652.700	73.0048
797.000	652.701	73.0138
798.000	652.703	73.0228
799.000	652.705	73.0316
800.000	652.707	73.0404
801.000	652.708	73.0491
802.000	652.710	73.0578
803.000	652.712	73.0664
804.000	652.713	73.0749
805.000	652.715	73.0834
806.000	652.716	73.0918
807.000	652.718	73.1001
808.000	652.720	73.1084
809.000	652.721	73.1166
810.000	652.723	73.1247
811.000	652.724	73.1328
812.000	652.726	73.1408
813.000	652.727	73.1488
814.000	652.729	73.1566
815.000	652.730	73.1645
816.000	652.732	73.1722
817.000	652.733	73.1800
818.000	652.735	73.1876
819.000	652.736	73.1952
820.000	652.738	73.2027
821.000	652.739	73.2102
822.000	652.740	73.2176
823.000	652.742	73.2250
824.000	652.743	73.2323
825.000	652.745	73.2395
826.000	652.746	73.2467
827.000	652.747	73.2539
828.000	652.749	73.2610
829.000	652.750	73.2680
830.000	652.751	73.2750
831.000	652.753	73.2819
832.000	652.754	73.2887
833.000	652.755	73.2955
834.000	652.756	73.3023
835.000	652.758	73.3090
836.000	652.759	73.3157
837.000	652.760	73.3223
838.000	652.761	73.3288
839.000	652.763	73.3353
840.000	652.764	73.3418
841.000	652.765	73.3482
842.000	652.766	73.3545
843.000	652.767	73.3608
844.000	652.768	73.3671
845.000	652.770	73.3733
846.000	652.771	73.3794
847.000	652.772	73.3856
848.000	652.773	73.3916
849.000	652.774	73.3976
850.000	652.775	73.4036
851.000	652.776	73.4095
852.000	652.777	73.4154
853.000	652.778	73.4212
854.000	652.780	73.4270
855.000	652.781	73.4328
856.000	652.782	73.4385
857.000	652.783	73.4441
858.000	652.784	73.4497
859.000	652.785	73.4553
860.000	652.786	73.4608
861.000	652.787	73.4663
862.000	652.788	73.4717
863.000	652.789	73.4771
864.000	652.790	73.4825

865.000	652.791	73.4878
866.000	652.792	73.4930
867.000	652.793	73.4983
868.000	652.794	73.5035
869.000	652.794	73.5086
870.000	652.795	73.5137
871.000	652.796	73.5188
872.000	652.797	73.5238
873.000	652.798	73.5288
874.000	652.799	73.5338
875.000	652.800	73.5387
876.000	652.801	73.5435
877.000	652.802	73.5484
878.000	652.803	73.5532
879.000	652.803	73.5579
880.000	652.804	73.5627
881.000	652.805	73.5673
882.000	652.806	73.5720
883.000	652.807	73.5766
884.000	652.808	73.5812
885.000	652.808	73.5857
886.000	652.809	73.5902
887.000	652.810	73.5947
888.000	652.811	73.5992
889.000	652.812	73.6036
890.000	652.812	73.6079
891.000	652.813	73.6123
892.000	652.814	73.6166
893.000	652.815	73.6208
894.000	652.815	73.6251
895.000	652.816	73.6293
896.000	652.817	73.6334
897.000	652.818	73.6376
898.000	652.818	73.6417
899.000	652.819	73.6457
900.000	652.820	73.6498
901.000	652.821	73.6538
902.000	652.821	73.6578
903.000	652.822	73.6617
904.000	652.823	73.6656
905.000	652.823	73.6695
906.000	652.824	73.6734
907.000	652.825	73.6772
908.000	652.825	73.6810
909.000	652.826	73.6847
910.000	652.827	73.6885
911.000	652.827	73.6922
912.000	652.828	73.6959
913.000	652.829	73.6995
914.000	652.829	73.7031
915.000	652.830	73.7067
916.000	652.831	73.7103
917.000	652.831	73.7138
918.000	652.832	73.7173
919.000	652.832	73.7208
920.000	652.833	73.7243
921.000	652.834	73.7277
922.000	652.834	73.7311
923.000	652.835	73.7345
924.000	652.835	73.7378
925.000	652.836	73.7411
926.000	652.837	73.7444
927.000	652.837	73.7477
928.000	652.838	73.7509
929.000	652.838	73.7542
930.000	652.839	73.7573
931.000	652.839	73.7605
932.000	652.840	73.7636
933.000	652.841	73.7668

934.000	652.841	73.7699
935.000	652.842	73.7729
936.000	652.842	73.7760
937.000	652.843	73.7790
938.000	652.843	73.7820
939.000	652.844	73.7850
940.000	652.844	73.7879
941.000	652.845	73.7908
942.000	652.845	73.7937
943.000	652.846	73.7966
944.000	652.846	73.7995
945.000	652.847	73.8023
946.000	652.847	73.8051
947.000	652.848	73.8079
948.000	652.848	73.8107
949.000	652.849	73.8134
950.000	652.849	73.8162
951.000	652.849	73.8189
952.000	652.850	73.8216
953.000	652.850	73.8242
954.000	652.851	73.8269
955.000	652.851	73.8295
956.000	652.852	73.8321
957.000	652.852	73.8347
958.000	652.853	73.8372
959.000	652.853	73.8398
960.000	652.854	73.8423
961.000	652.854	73.8448
962.000	652.854	73.8473
963.000	652.855	73.8497
964.000	652.855	73.8522
965.000	652.856	73.8546
966.000	652.856	73.8570
967.000	652.856	73.8594
968.000	652.857	73.8618
969.000	652.857	73.8641
970.000	652.858	73.8664
971.000	652.858	73.8688
972.000	652.858	73.8710
973.000	652.859	73.8733
974.000	652.859	73.8756
975.000	652.860	73.8778
976.000	652.860	73.8800
977.000	652.860	73.8822
978.000	652.861	73.8844
979.000	652.861	73.8866
980.000	652.861	73.8887
981.000	652.862	73.8909
982.000	652.862	73.8930
983.000	652.862	73.8951
984.000	652.863	73.8972
985.000	652.863	73.8993
986.000	652.864	73.9013
987.000	652.864	73.9033
988.000	652.864	73.9054
989.000	652.865	73.9074
990.000	652.865	73.9094
991.000	652.865	73.9113
992.000	652.866	73.9133
993.000	652.866	73.9152
994.000	652.866	73.9172
995.000	652.867	73.9191
996.000	652.867	73.9210
997.000	652.867	73.9228
998.000	652.867	73.9247
999.000	652.868	73.9266
1000.00	652.868	73.9284

TITLE : GREENS OIL COMPANY
CBM JOB # : 11030
SC ID # : 09344

Contaminant of Concern is XYLENES

C(x,0,0,t)=(C0/2)erfc[(x-vt)/2(Ax*vt)1/2]
erf[Y/4(Ay*x)1/2]erf[Z/2(alphz*x)1/2]

INPUT PARAMETERS :
Concentration of Source (ppb) = 17400.00
Source Width (ft) = 60.00
Vertical Thickness of Source (ft) = 27.50
Distance of Recipient (ft) =1000.00
Groundwater Flow Velocity (ft/yr) = 3.65
Time of Simulation (years) = 1000.00
Longitudinal Dispersivity (ft) = 100.000000
Transverse Dispersivity (ft) = 33.333332
Vertical Dispersivity (ft) = 5.000000
Total Organic Carbon, TOC (mg/kg) = 101.00
Total Petroleum Hydrocarbons,TPH(mg/kg) = 49.50
Soil/Water Part. Coefficient,Koc(ml/g) = 639.00
Organic Carbon Fraction, foc (%) = 0.0001297
Porosity = .250
Bulk Density (g/cc) = 1.600
Retardation Factor, Rf = 1.53047
Contaminant Velocity (ft/yr) = 2.38489

CONCENTRATION COMPUTED FOR :
100.000 ft. 1000.000 ft

TIME (yrs)	CONC. (ppb)	CONC. (ppb)
1.00000	0.000000	0.000000
2.00000	3.14305	0.000000
3.00000	21.6629	0.000000
4.00000	58.8892	0.000000
5.00000	109.470	0.000000
6.00000	167.643	0.000000
7.00000	229.336	0.000000
8.00000	291.997	0.000000
9.00000	354.106	0.000000
10.0000	414.798	0.000000
11.0000	473.603	0.000000
12.0000	530.294	0.000000
13.0000	584.788	0.000000
14.0000	637.092	0.000000
15.0000	687.259	0.000000
16.0000	735.374	0.000000
17.0000	781.533	0.000000
18.0000	825.841	0.000000
19.0000	868.400	0.000000
20.0000	909.313	0.000000
21.0000	948.677	0.000000
22.0000	986.583	0.000000
23.0000	1023.12	0.000000
24.0000	1058.36	0.000000
25.0000	1092.39	0.000000
26.0000	1125.27	0.000000
27.0000	1157.07	0.000000
28.0000	1187.85	0.000000
29.0000	1217.67	0.000000
30.0000	1246.57	0.000000
31.0000	1274.61	0.000000
32.0000	1301.82	0.000000
33.0000	1328.25	0.000000
34.0000	1353.95	0.000000
35.0000	1378.93	0.000000
36.0000	1403.25	0.000000

37.0000	1426.92	0.000000
38.0000	1449.99	0.000000
39.0000	1472.46	0.000000
40.0000	1494.38	0.000000
41.0000	1515.77	0.000000
42.0000	1536.64	0.000000
43.0000	1557.02	0.000000
44.0000	1576.93	0.000000
45.0000	1596.38	0.000000
46.0000	1615.40	0.000000
47.0000	1634.01	0.000000
48.0000	1652.21	0.000000
49.0000	1670.02	0.000000
50.0000	1687.46	0.000000
51.0000	1704.53	0.000000
52.0000	1721.26	0.000000
53.0000	1737.66	0.000000
54.0000	1753.73	0.000000
55.0000	1769.48	0.000000
56.0000	1784.93	0.000000
57.0000	1800.09	0.000000
58.0000	1814.96	0.000000
59.0000	1829.56	0.000000
60.0000	1843.89	0.000000
61.0000	1857.96	0.000000
62.0000	1871.78	0.000000
63.0000	1885.36	0.000000
64.0000	1898.70	0.000000
65.0000	1911.81	0.000000
66.0000	1924.70	0.000000
67.0000	1937.36	0.000000
68.0000	1949.82	0.000000
69.0000	1962.07	0.000000
70.0000	1974.12	0.000000
71.0000	1985.98	0.000000
72.0000	1997.64	0.000000
73.0000	2009.12	0.000000
74.0000	2020.42	0.000000
75.0000	2031.55	0.000000
76.0000	2042.50	0.000000
77.0000	2053.29	0.000000
78.0000	2063.91	0.429052E-02
79.0000	2074.37	0.509488E-02
80.0000	2084.68	0.602438E-02
81.0000	2094.83	0.709431E-02
82.0000	2104.84	0.832129E-02
83.0000	2114.70	0.972330E-02
84.0000	2124.42	0.113197E-01
85.0000	2133.99	0.131315E-01
86.0000	2143.44	0.151810E-01
87.0000	2152.75	0.174921E-01
88.0000	2161.93	0.200903E-01
89.0000	2170.98	0.230029E-01
90.0000	2179.91	0.262587E-01
91.0000	2188.72	0.298883E-01
92.0000	2197.41	0.339237E-01
93.0000	2205.98	0.383992E-01
94.0000	2214.43	0.433504E-01
95.0000	2222.78	0.488146E-01
96.0000	2231.01	0.548314E-01
97.0000	2239.13	0.614416E-01
98.0000	2247.15	0.686881E-01
99.0000	2255.07	0.766155E-01
100.000	2262.88	0.852700E-01
101.000	2270.60	0.946996E-01
102.000	2278.21	0.104954
103.000	2285.73	0.116085
104.000	2293.16	0.128146
105.000	2300.49	0.141190

106.000	2307.73	0.155275
107.000	2314.88	0.170459
108.000	2321.95	0.186800
109.000	2328.93	0.204360
110.000	2335.82	0.223201
111.000	2342.63	0.243386
112.000	2349.36	0.264981
113.000	2356.01	0.288051
114.000	2362.57	0.312665
115.000	2369.07	0.338890
116.000	2375.48	0.366797
117.000	2381.82	0.396455
118.000	2388.09	0.427937
119.000	2394.28	0.461315
120.000	2400.40	0.496662
121.000	2406.45	0.534053
122.000	2412.43	0.573561
123.000	2418.35	0.615262
124.000	2424.19	0.659232
125.000	2429.97	0.705548
126.000	2435.69	0.754285
127.000	2441.34	0.805520
128.000	2446.93	0.859333
129.000	2452.46	0.915798
130.000	2457.92	0.974994
131.000	2463.33	1.03700
132.000	2468.68	1.10189
133.000	2473.96	1.16974
134.000	2479.19	1.24064
135.000	2484.37	1.31465
136.000	2489.49	1.39185
137.000	2494.55	1.47233
138.000	2499.56	1.55615
139.000	2504.51	1.64339
140.000	2509.42	1.73413
141.000	2514.27	1.82844
142.000	2519.07	1.92640
143.000	2523.82	2.02807
144.000	2528.52	2.13353
145.000	2533.17	2.24285
146.000	2537.77	2.35610
147.000	2542.32	2.47335
148.000	2546.83	2.59466
149.000	2551.29	2.72012
150.000	2555.71	2.84977
151.000	2560.08	2.98370
152.000	2564.40	3.12195
153.000	2568.68	3.26460
154.000	2572.92	3.41171
155.000	2577.11	3.56333
156.000	2581.27	3.71953
157.000	2585.38	3.88036
158.000	2589.45	4.04588
159.000	2593.48	4.21615
160.000	2597.47	4.39121
161.000	2601.42	4.57113
162.000	2605.33	4.75595
163.000	2609.20	4.94573
164.000	2613.03	5.14050
165.000	2616.83	5.34032
166.000	2620.59	5.54523
167.000	2624.31	5.75527
168.000	2628.00	5.97050
169.000	2631.65	6.19093
170.000	2635.26	6.41663
171.000	2638.84	6.64762
172.000	2642.39	6.88393
173.000	2645.90	7.12561
174.000	2649.38	7.37269

175.000	2652.82	7.62519
176.000	2656.23	7.88315
177.000	2659.61	8.14660
178.000	2662.96	8.41555
179.000	2666.28	8.69004
180.000	2669.56	8.97008
181.000	2672.81	9.25570
182.000	2676.04	9.54692
183.000	2679.23	9.84376
184.000	2682.39	10.1462
185.000	2685.52	10.4544
186.000	2688.63	10.7682
187.000	2691.70	11.0876
188.000	2694.75	11.4128
189.000	2697.77	11.7436
190.000	2700.76	12.0802
191.000	2703.72	12.4224
192.000	2706.66	12.7704
193.000	2709.57	13.1241
194.000	2712.45	13.4835
195.000	2715.30	13.8486
196.000	2718.13	14.2194
197.000	2720.94	14.5960
198.000	2723.72	14.9783
199.000	2726.47	15.3663
200.000	2729.20	15.7599
201.000	2731.90	16.1593
202.000	2734.58	16.5644
203.000	2737.24	16.9751
204.000	2739.87	17.3915
205.000	2742.48	17.8136
206.000	2745.06	18.2413
207.000	2747.62	18.6746
208.000	2750.16	19.1135
209.000	2752.68	19.5580
210.000	2755.17	20.0081
211.000	2757.64	20.4637
212.000	2760.09	20.9248
213.000	2762.52	21.3915
214.000	2764.93	21.8636
215.000	2767.32	22.3412
216.000	2769.68	22.8242
217.000	2772.02	23.3127
218.000	2774.35	23.8065
219.000	2776.65	24.3057
220.000	2778.93	24.8102
221.000	2781.20	25.3200
222.000	2783.44	25.8351
223.000	2785.67	26.3554
224.000	2787.87	26.8809
225.000	2790.06	27.4115
226.000	2792.22	27.9473
227.000	2794.37	28.4882
228.000	2796.50	29.0342
229.000	2798.61	29.5852
230.000	2800.71	30.1412
231.000	2802.78	30.7022
232.000	2804.84	31.2680
233.000	2806.88	31.8388
234.000	2808.90	32.4143
235.000	2810.91	32.9947
236.000	2812.90	33.5799
237.000	2814.87	34.1697
238.000	2816.82	34.7642
239.000	2818.76	35.3634
240.000	2820.68	35.9672
241.000	2822.59	36.5755
242.000	2824.48	37.1883
243.000	2826.35	37.8055

244.000	2828.21	38.4272
245.000	2830.05	39.0533
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247.000	2833.69	40.3183
248.000	2835.48	40.9572
249.000	2837.27	41.6003
250.000	2839.03	42.2475
251.000	2840.78	42.8988
252.000	2842.52	43.5542
253.000	2844.24	44.2135
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256.000	2849.33	46.2151
257.000	2850.99	46.8899
258.000	2852.65	47.5686
259.000	2854.28	48.2509
260.000	2855.91	48.9369
261.000	2857.52	49.6265
262.000	2859.12	50.3196
263.000	2860.71	51.0163
264.000	2862.28	51.7164
265.000	2863.84	52.4200
266.000	2865.38	53.1269
267.000	2866.92	53.8371
268.000	2868.44	54.5506
269.000	2869.95	55.2673
270.000	2871.45	55.9871
271.000	2872.93	56.7101
272.000	2874.40	57.4361
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274.000	2877.31	58.8971
275.000	2878.75	59.6320
276.000	2880.18	60.3697
277.000	2881.59	61.1103
278.000	2882.99	61.8536
279.000	2884.39	62.5997
280.000	2885.77	63.3484
281.000	2887.14	64.0997
282.000	2888.49	64.8536
283.000	2889.84	65.6100
284.000	2891.18	66.3688
285.000	2892.50	67.1301
286.000	2893.82	67.8937
287.000	2895.12	68.6596
288.000	2896.42	69.4278
289.000	2897.70	70.1983
290.000	2898.97	70.9709
291.000	2900.24	71.7456
292.000	2901.49	72.5223
293.000	2902.73	73.3011
294.000	2903.97	74.0819
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296.000	2906.41	75.6492
297.000	2907.61	76.4356
298.000	2908.80	77.2238
299.000	2909.99	78.0138
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301.000	2912.33	79.5987
302.000	2913.49	80.3935
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305.000	2916.91	82.7873
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307.000	2919.14	84.3903
308.000	2920.25	85.1938
309.000	2921.34	85.9986
310.000	2922.43	86.8046
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314.000	2926.69	90.0402
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316.000	2928.77	91.6643
317.000	2929.80	92.4777
318.000	2930.82	93.2921
319.000	2931.84	94.1073
320.000	2932.84	94.9233
321.000	2933.84	95.7401
322.000	2934.83	96.5575
323.000	2935.81	97.3757
324.000	2936.79	98.1946
325.000	2937.75	99.0140
326.000	2938.71	99.8340
327.000	2939.66	100.655
328.000	2940.61	101.476
329.000	2941.55	102.297
330.000	2942.48	103.119
331.000	2943.40	103.941
332.000	2944.31	104.764
333.000	2945.22	105.587
334.000	2946.13	106.410
335.000	2947.02	107.233
336.000	2947.91	108.057
337.000	2948.79	108.880
338.000	2949.66	109.704
339.000	2950.53	110.528
340.000	2951.39	111.352
341.000	2952.25	112.176
342.000	2953.10	113.000
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344.000	2954.77	114.648
345.000	2955.60	115.471
346.000	2956.42	116.295
347.000	2957.24	117.118
348.000	2958.05	117.941
349.000	2958.85	118.764
350.000	2959.65	119.586
351.000	2960.44	120.409
352.000	2961.23	121.230
353.000	2962.01	122.052
354.000	2962.78	122.873
355.000	2963.55	123.694
356.000	2964.31	124.514
357.000	2965.07	125.333
358.000	2965.82	126.152
359.000	2966.57	126.971
360.000	2967.31	127.789
361.000	2968.04	128.606
362.000	2968.77	129.423
363.000	2969.49	130.239
364.000	2970.21	131.054
365.000	2970.92	131.869
366.000	2971.63	132.683
367.000	2972.33	133.496
368.000	2973.03	134.308
369.000	2973.72	135.119
370.000	2974.40	135.930
371.000	2975.08	136.739
372.000	2975.76	137.548
373.000	2976.43	138.356
374.000	2977.09	139.163
375.000	2977.76	139.969
376.000	2978.41	140.774
377.000	2979.06	141.577
378.000	2979.71	142.380
379.000	2980.35	143.182
380.000	2980.99	143.982
381.000	2981.62	144.782

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383.000	2982.87	146.377
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385.000	2984.10	147.968
386.000	2984.71	148.762
387.000	2985.31	149.554
388.000	2985.91	150.345
389.000	2986.50	151.135
390.000	2987.09	151.923
391.000	2987.68	152.711
392.000	2988.26	153.496
393.000	2988.84	154.281
394.000	2989.41	155.064
395.000	2989.98	155.846
396.000	2990.55	156.626
397.000	2991.11	157.405
398.000	2991.67	158.182
399.000	2992.22	158.958
400.000	2992.77	159.732
401.000	2993.31	160.505
402.000	2993.85	161.277
403.000	2994.39	162.046
404.000	2994.92	162.815
405.000	2995.45	163.581
406.000	2995.97	164.347
407.000	2996.50	165.110
408.000	2997.01	165.872
409.000	2997.53	166.632
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411.000	2998.54	168.148
412.000	2999.04	168.904
413.000	2999.54	169.657
414.000	3000.04	170.409
415.000	3000.53	171.160
416.000	3001.02	171.908
417.000	3001.50	172.655
418.000	3001.98	173.400
419.000	3002.46	174.143
420.000	3002.93	174.885
421.000	3003.40	175.625
422.000	3003.87	176.363
423.000	3004.33	177.099
424.000	3004.79	177.834
425.000	3005.25	178.566
426.000	3005.70	179.297
427.000	3006.15	180.026
428.000	3006.60	180.753
429.000	3007.04	181.478
430.000	3007.48	182.201
431.000	3007.92	182.923
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433.000	3008.78	184.360
434.000	3009.21	185.076
435.000	3009.63	185.790
436.000	3010.06	186.502
437.000	3010.47	187.212
438.000	3010.89	187.920
439.000	3011.30	188.626
440.000	3011.71	189.330
441.000	3012.12	190.032
442.000	3012.52	190.732
443.000	3012.92	191.431
444.000	3013.32	192.127
445.000	3013.71	192.821
446.000	3014.11	193.513
447.000	3014.50	194.204
448.000	3014.88	194.892
449.000	3015.27	195.578
450.000	3015.65	196.262

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456.000	3017.88	200.325
457.000	3018.24	200.995
458.000	3018.60	201.662
459.000	3018.95	202.328
460.000	3019.31	202.992
461.000	3019.66	203.653
462.000	3020.01	204.313
463.000	3020.36	204.970
464.000	3020.70	205.626
465.000	3021.04	206.279
466.000	3021.38	206.930
467.000	3021.72	207.579
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469.000	3022.39	208.871
470.000	3022.72	209.514
471.000	3023.04	210.155
472.000	3023.37	210.793
473.000	3023.69	211.430
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475.000	3024.33	212.696
476.000	3024.65	213.326
477.000	3024.96	213.954
478.000	3025.27	214.580
479.000	3025.58	215.204
480.000	3025.89	215.826
481.000	3026.19	216.445
482.000	3026.50	217.062
483.000	3026.80	217.678
484.000	3027.10	218.291
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487.000	3027.98	220.117
488.000	3028.27	220.722
489.000	3028.56	221.324
490.000	3028.84	221.925
491.000	3029.13	222.523
492.000	3029.41	223.119
493.000	3029.69	223.713
494.000	3029.97	224.305
495.000	3030.24	224.894
496.000	3030.52	225.482
497.000	3030.79	226.067
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500.000	3031.59	227.811
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502.000	3032.12	228.962
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505.000	3032.90	230.674
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514.000	3035.13	235.694
515.000	3035.37	236.241
516.000	3035.61	236.786
517.000	3035.85	237.329
518.000	3036.08	237.870
519.000	3036.32	238.409

520.000	3036.55	238.946
521.000	3036.78	239.481
522.000	3037.01	240.013
523.000	3037.23	240.544
524.000	3037.46	241.072
525.000	3037.68	241.598
526.000	3037.90	242.123
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528.000	3038.34	243.165
529.000	3038.56	243.683
530.000	3038.78	244.199
531.000	3038.99	244.713
532.000	3039.20	245.224
533.000	3039.41	245.734
534.000	3039.62	246.242
535.000	3039.83	246.748
536.000	3040.04	247.251
537.000	3040.24	247.753
538.000	3040.45	248.252
539.000	3040.65	248.750
540.000	3040.85	249.245
541.000	3041.05	249.739
542.000	3041.25	250.230
543.000	3041.45	250.720
544.000	3041.64	251.207
545.000	3041.84	251.692
546.000	3042.03	252.176
547.000	3042.22	252.657
548.000	3042.41	253.136
549.000	3042.60	253.614
550.000	3042.79	254.089
551.000	3042.97	254.562
552.000	3043.16	255.034
553.000	3043.34	255.503
554.000	3043.53	255.971
555.000	3043.71	256.436
556.000	3043.89	256.900
557.000	3044.07	257.361
558.000	3044.24	257.821
559.000	3044.42	258.278
560.000	3044.59	258.734
561.000	3044.77	259.188
562.000	3044.94	259.639
563.000	3045.11	260.089
564.000	3045.28	260.537
565.000	3045.45	260.983
566.000	3045.62	261.427
567.000	3045.79	261.869
568.000	3045.95	262.310
569.000	3046.12	262.748
570.000	3046.28	263.184
571.000	3046.44	263.619
572.000	3046.60	264.051
573.000	3046.76	264.482
574.000	3046.92	264.911
575.000	3047.08	265.338
576.000	3047.24	265.763
577.000	3047.39	266.186
578.000	3047.55	266.608
579.000	3047.70	267.027
580.000	3047.85	267.445
581.000	3048.00	267.861
582.000	3048.15	268.275
583.000	3048.30	268.687
584.000	3048.45	269.097
585.000	3048.60	269.506
586.000	3048.74	269.912
587.000	3048.89	270.317
588.000	3049.03	270.720

589.000	3049.18	271.122
590.000	3049.32	271.521
591.000	3049.46	271.919
592.000	3049.60	272.315
593.000	3049.74	272.709
594.000	3049.88	273.101
595.000	3050.01	273.492
596.000	3050.15	273.880
597.000	3050.29	274.267
598.000	3050.42	274.652
599.000	3050.55	275.036
600.000	3050.69	275.418
601.000	3050.82	275.798
602.000	3050.95	276.176
603.000	3051.08	276.553
604.000	3051.21	276.927
605.000	3051.34	277.300
606.000	3051.47	277.672
607.000	3051.59	278.042
608.000	3051.72	278.409
609.000	3051.84	278.776
610.000	3051.97	279.140
611.000	3052.09	279.503
612.000	3052.21	279.864
613.000	3052.33	280.224
614.000	3052.45	280.582
615.000	3052.57	280.938
616.000	3052.69	281.293
617.000	3052.81	281.646
618.000	3052.93	281.997
619.000	3053.04	282.346
620.000	3053.16	282.694
621.000	3053.27	283.041
622.000	3053.39	283.386
623.000	3053.50	283.729
624.000	3053.61	284.070
625.000	3053.73	284.410
626.000	3053.84	284.748
627.000	3053.95	285.085
628.000	3054.06	285.420
629.000	3054.17	285.754
630.000	3054.27	286.086
631.000	3054.38	286.416
632.000	3054.49	286.745
633.000	3054.59	287.072
634.000	3054.70	287.398
635.000	3054.80	287.722
636.000	3054.91	288.045
637.000	3055.01	288.366
638.000	3055.11	288.685
639.000	3055.21	289.003
640.000	3055.32	289.320
641.000	3055.42	289.635
642.000	3055.52	289.948
643.000	3055.61	290.260
644.000	3055.71	290.570
645.000	3055.81	290.879
646.000	3055.91	291.187
647.000	3056.00	291.493
648.000	3056.10	291.797
649.000	3056.19	292.100
650.000	3056.29	292.402
651.000	3056.38	292.702
652.000	3056.47	293.001
653.000	3056.57	293.298
654.000	3056.66	293.594
655.000	3056.75	293.888
656.000	3056.84	294.181
657.000	3056.93	294.472

658.000	3057.02	294.762
659.000	3057.11	295.051
660.000	3057.20	295.338
661.000	3057.28	295.624
662.000	3057.37	295.909
663.000	3057.46	296.192
664.000	3057.54	296.473
665.000	3057.63	296.753
666.000	3057.71	297.032
667.000	3057.80	297.310
668.000	3057.88	297.586
669.000	3057.96	297.861
670.000	3058.05	298.134
671.000	3058.13	298.406
672.000	3058.21	298.677
673.000	3058.29	298.946
674.000	3058.37	299.214
675.000	3058.45	299.481
676.000	3058.53	299.746
677.000	3058.61	300.011
678.000	3058.68	300.273
679.000	3058.76	300.535
680.000	3058.84	300.795
681.000	3058.92	301.054
682.000	3058.99	301.311
683.000	3059.07	301.568
684.000	3059.14	301.823
685.000	3059.22	302.077
686.000	3059.29	302.329
687.000	3059.36	302.580
688.000	3059.44	302.830
689.000	3059.51	303.079
690.000	3059.58	303.326
691.000	3059.65	303.573
692.000	3059.72	303.818
693.000	3059.79	304.061
694.000	3059.86	304.304
695.000	3059.93	304.545
696.000	3060.00	304.785
697.000	3060.07	305.024
698.000	3060.14	305.262
699.000	3060.21	305.498
700.000	3060.27	305.733
701.000	3060.34	305.968
702.000	3060.41	306.200
703.000	3060.47	306.432
704.000	3060.54	306.663
705.000	3060.60	306.892
706.000	3060.67	307.120
707.000	3060.73	307.347
708.000	3060.80	307.573
709.000	3060.86	307.798
710.000	3060.92	308.022
711.000	3060.98	308.244
712.000	3061.05	308.465
713.000	3061.11	308.686
714.000	3061.17	308.905
715.000	3061.23	309.122
716.000	3061.29	309.339
717.000	3061.35	309.555
718.000	3061.41	309.770
719.000	3061.47	309.983
720.000	3061.53	310.196
721.000	3061.59	310.407
722.000	3061.64	310.617
723.000	3061.70	310.826
724.000	3061.76	311.034
725.000	3061.82	311.241
726.000	3061.87	311.447

727.000	3061.93	311.652
728.000	3061.98	311.856
729.000	3062.04	312.059
730.000	3062.09	312.261
731.000	3062.15	312.461
732.000	3062.20	312.661
733.000	3062.26	312.860
734.000	3062.31	313.057
735.000	3062.36	313.254
736.000	3062.42	313.449
737.000	3062.47	313.644
738.000	3062.52	313.837
739.000	3062.57	314.030
740.000	3062.62	314.221
741.000	3062.68	314.412
742.000	3062.73	314.602
743.000	3062.78	314.790
744.000	3062.83	314.978
745.000	3062.88	315.164
746.000	3062.93	315.350
747.000	3062.97	315.535
748.000	3063.02	315.718
749.000	3063.07	315.901
750.000	3063.12	316.083
751.000	3063.17	316.264
752.000	3063.21	316.443
753.000	3063.26	316.622
754.000	3063.31	316.800
755.000	3063.36	316.977
756.000	3063.40	317.154
757.000	3063.45	317.329
758.000	3063.49	317.503
759.000	3063.54	317.676
760.000	3063.58	317.849
761.000	3063.63	318.020
762.000	3063.67	318.191
763.000	3063.72	318.361
764.000	3063.76	318.530
765.000	3063.80	318.698
766.000	3063.85	318.865
767.000	3063.89	319.031
768.000	3063.93	319.196
769.000	3063.97	319.361
770.000	3064.02	319.524
771.000	3064.06	319.687
772.000	3064.10	319.849
773.000	3064.14	320.010
774.000	3064.18	320.170
775.000	3064.22	320.329
776.000	3064.26	320.488
777.000	3064.30	320.645
778.000	3064.34	320.802
779.000	3064.38	320.958
780.000	3064.42	321.113
781.000	3064.46	321.268
782.000	3064.50	321.421
783.000	3064.54	321.574
784.000	3064.58	321.726
785.000	3064.62	321.877
786.000	3064.65	322.027
787.000	3064.69	322.176
788.000	3064.73	322.325
789.000	3064.76	322.473
790.000	3064.80	322.620
791.000	3064.84	322.766
792.000	3064.87	322.911
793.000	3064.91	323.056
794.000	3064.95	323.200
795.000	3064.98	323.343

796.000	3065.02	323.486
797.000	3065.05	323.627
798.000	3065.09	323.768
799.000	3065.12	323.908
800.000	3065.16	324.048
801.000	3065.19	324.186
802.000	3065.23	324.324
803.000	3065.26	324.461
804.000	3065.29	324.598
805.000	3065.33	324.733
806.000	3065.36	324.868
807.000	3065.39	325.003
808.000	3065.42	325.136
809.000	3065.46	325.269
810.000	3065.49	325.401
811.000	3065.52	325.532
812.000	3065.55	325.663
813.000	3065.58	325.793
814.000	3065.62	325.922
815.000	3065.65	326.051
816.000	3065.68	326.178
817.000	3065.71	326.306
818.000	3065.74	326.432
819.000	3065.77	326.558
820.000	3065.80	326.683
821.000	3065.83	326.807
822.000	3065.86	326.931
823.000	3065.89	327.054
824.000	3065.92	327.177
825.000	3065.95	327.298
826.000	3065.98	327.419
827.000	3066.01	327.540
828.000	3066.03	327.660
829.000	3066.06	327.779
830.000	3066.09	327.897
831.000	3066.12	328.015
832.000	3066.15	328.132
833.000	3066.18	328.249
834.000	3066.20	328.365
835.000	3066.23	328.480
836.000	3066.26	328.595
837.000	3066.28	328.709
838.000	3066.31	328.822
839.000	3066.34	328.935
840.000	3066.36	329.047
841.000	3066.39	329.159
842.000	3066.42	329.270
843.000	3066.44	329.380
844.000	3066.47	329.490
845.000	3066.49	329.599
846.000	3066.52	329.707
847.000	3066.54	329.815
848.000	3066.57	329.923
849.000	3066.59	330.030
850.000	3066.62	330.136
851.000	3066.64	330.241
852.000	3066.67	330.346
853.000	3066.69	330.451
854.000	3066.72	330.555
855.000	3066.74	330.658
856.000	3066.76	330.761
857.000	3066.79	330.863
858.000	3066.81	330.965
859.000	3066.83	331.066
860.000	3066.86	331.166
861.000	3066.88	331.266
862.000	3066.90	331.366
863.000	3066.93	331.465
864.000	3066.95	331.563

865.000	3066.97	331.661
866.000	3066.99	331.758
867.000	3067.02	331.855
868.000	3067.04	331.951
869.000	3067.06	332.047
870.000	3067.08	332.142
871.000	3067.10	332.236
872.000	3067.12	332.330
873.000	3067.15	332.424
874.000	3067.17	332.517
875.000	3067.19	332.610
876.000	3067.21	332.702
877.000	3067.23	332.793
878.000	3067.25	332.884
879.000	3067.27	332.975
880.000	3067.29	333.065
881.000	3067.31	333.154
882.000	3067.33	333.243
883.000	3067.35	333.332
884.000	3067.37	333.420
885.000	3067.39	333.507
886.000	3067.41	333.594
887.000	3067.43	333.681
888.000	3067.45	333.767
889.000	3067.47	333.853
890.000	3067.49	333.938
891.000	3067.51	334.023
892.000	3067.52	334.107
893.000	3067.54	334.190
894.000	3067.56	334.274
895.000	3067.58	334.357
896.000	3067.60	334.439
897.000	3067.62	334.521
898.000	3067.63	334.602
899.000	3067.65	334.683
900.000	3067.67	334.764
901.000	3067.69	334.844
902.000	3067.71	334.924
903.000	3067.72	335.003
904.000	3067.74	335.082
905.000	3067.76	335.160
906.000	3067.77	335.238
907.000	3067.79	335.315
908.000	3067.81	335.392
909.000	3067.83	335.469
910.000	3067.84	335.545
911.000	3067.86	335.621
912.000	3067.88	335.696
913.000	3067.89	335.771
914.000	3067.91	335.845
915.000	3067.92	335.919
916.000	3067.94	335.993
917.000	3067.96	336.066
918.000	3067.97	336.139
919.000	3067.99	336.212
920.000	3068.00	336.284
921.000	3068.02	336.355
922.000	3068.03	336.426
923.000	3068.05	336.497
924.000	3068.06	336.568
925.000	3068.08	336.638
926.000	3068.09	336.707
927.000	3068.11	336.777
928.000	3068.12	336.845
929.000	3068.14	336.914
930.000	3068.15	336.982
931.000	3068.17	337.050
932.000	3068.18	337.117
933.000	3068.20	337.184

934.000	3068.21	337.251
935.000	3068.23	337.317
936.000	3068.24	337.383
937.000	3068.25	337.448
938.000	3068.27	337.513
939.000	3068.28	337.578
940.000	3068.30	337.642
941.000	3068.31	337.706
942.000	3068.32	337.770
943.000	3068.34	337.833
944.000	3068.35	337.896
945.000	3068.36	337.959
946.000	3068.38	338.021
947.000	3068.39	338.083
948.000	3068.40	338.144
949.000	3068.42	338.205
950.000	3068.43	338.266
951.000	3068.44	338.327
952.000	3068.45	338.387
953.000	3068.47	338.447
954.000	3068.48	338.506
955.000	3068.49	338.565
956.000	3068.50	338.624
957.000	3068.52	338.682
958.000	3068.53	338.741
959.000	3068.54	338.798
960.000	3068.55	338.856
961.000	3068.56	338.913
962.000	3068.58	338.970
963.000	3068.59	339.026
964.000	3068.60	339.083
965.000	3068.61	339.139
966.000	3068.62	339.194
967.000	3068.63	339.249
968.000	3068.65	339.304
969.000	3068.66	339.359
970.000	3068.67	339.413
971.000	3068.68	339.467
972.000	3068.69	339.521
973.000	3068.70	339.574
974.000	3068.71	339.627
975.000	3068.72	339.680
976.000	3068.73	339.733
977.000	3068.75	339.785
978.000	3068.76	339.837
979.000	3068.77	339.888
980.000	3068.78	339.940
981.000	3068.79	339.991
982.000	3068.80	340.042
983.000	3068.81	340.092
984.000	3068.82	340.142
985.000	3068.83	340.192
986.000	3068.84	340.242
987.000	3068.85	340.291
988.000	3068.86	340.340
989.000	3068.87	340.389
990.000	3068.88	340.437
991.000	3068.89	340.485
992.000	3068.90	340.533
993.000	3068.91	340.581
994.000	3068.92	340.628
995.000	3068.93	340.675
996.000	3068.94	340.722
997.000	3068.95	340.769
998.000	3068.96	340.815
999.000	3068.97	340.861
1000.00	3068.97	340.907

TITLE : GREENS OIL COMPANY
CBM JOB # : 11030
SC ID # : 09344

Contaminant of Concern is NAPHTHALENE

C(x,0,0,t)=(C0/2)erfc[(x-vt)/2(Ax*vt)1/2]
erf[Y/4(Ay*x)1/2]erf[Z/2(alphz*x)1/2]

INPUT PARAMETERS :
Concentration of Source (ppb) = 991.00
Source Width (ft) = 60.00
Vertical Thickness of Source (ft) = 27.50
Distance of Recipient (ft) =1000.00
Groundwater Flow Velocity (ft/yr) = 3.65
Time of Simulation (years) = 1000.00
Longitudinal Dispersivity (ft) = 100.000000
Transverse Dispersivity (ft) = 33.333332
Vertical Dispersivity (ft) = 5.000000
Total Organic Carbon, TOC (mg/kg) = 101.00
Total Petroleum Hydrocarbons,TPH(mg/kg) = 49.50
Soil/Water Part. Coefficient,Koc(ml/g) = 1543.00
Organic Carbon Fraction, foc (%) = 0.0001297
Porosity = .250
Bulk Density (g/cc) = 1.600
Retardation Factor, Rf = 2.28093
Contaminant Velocity (ft/yr) = 1.60022

CONCENTRATION COMPUTED FOR :
100.000 ft. 1000.00 ft.

TIME (yrs)	CONC. (ppb)	CONC. (ppb)
1.00000	0.000000	0.000000
2.00000	0.114070E-01	0.000000
3.00000	0.185698	0.000000
4.00000	0.777884	0.000000
5.00000	1.87628	0.000000
6.00000	3.42058	0.000000
7.00000	5.30253	0.000000
8.00000	7.41780	0.000000
9.00000	9.68192	0.000000
10.0000	12.0313	0.000000
11.0000	14.4199	0.000000
12.0000	16.8150	0.000000
13.0000	19.1937	0.000000
14.0000	21.5405	0.000000
15.0000	23.8448	0.000000
16.0000	26.0999	0.000000
17.0000	28.3018	0.000000
18.0000	30.4481	0.000000
19.0000	32.5379	0.000000
20.0000	34.5713	0.000000
21.0000	36.5490	0.000000
22.0000	38.4720	0.000000
23.0000	40.3418	0.000000
24.0000	42.1600	0.000000
25.0000	43.9283	0.000000
26.0000	45.6486	0.000000
27.0000	47.3225	0.000000
28.0000	48.9520	0.000000
29.0000	50.5387	0.000000
30.0000	52.0843	0.000000
31.0000	53.5905	0.000000
32.0000	55.0589	0.000000
33.0000	56.4910	0.000000
34.0000	57.8882	0.000000
35.0000	59.2520	0.000000

36.0000	60.5836	0.000000
37.0000	61.8844	0.000000
38.0000	63.1554	0.000000
39.0000	64.3980	0.000000
40.0000	65.6131	0.000000
41.0000	66.8018	0.000000
42.0000	67.9650	0.000000
43.0000	69.1037	0.000000
44.0000	70.2189	0.000000
45.0000	71.3112	0.000000
46.0000	72.3816	0.000000
47.0000	73.4308	0.000000
48.0000	74.4595	0.000000
49.0000	75.4684	0.000000
50.0000	76.4582	0.000000
51.0000	77.4295	0.000000
52.0000	78.3829	0.000000
53.0000	79.3189	0.000000
54.0000	80.2382	0.000000
55.0000	81.1413	0.000000
56.0000	82.0286	0.000000
57.0000	82.9006	0.000000
58.0000	83.7578	0.000000
59.0000	84.6006	0.000000
60.0000	85.4294	0.000000
61.0000	86.2447	0.000000
62.0000	87.0468	0.000000
63.0000	87.8361	0.000000
64.0000	88.6130	0.000000
65.0000	89.3777	0.000000
66.0000	90.1307	0.000000
67.0000	90.8721	0.000000
68.0000	91.6024	0.000000
69.0000	92.3218	0.000000
70.0000	93.0306	0.000000
71.0000	93.7291	0.000000
72.0000	94.4174	0.000000
73.0000	95.0960	0.000000
74.0000	95.7650	0.000000
75.0000	96.4246	0.000000
76.0000	97.0750	0.000000
77.0000	97.7166	0.000000
78.0000	98.3494	0.000000
79.0000	98.9737	0.000000
80.0000	99.5897	0.000000
81.0000	100.198	0.000000
82.0000	100.797	0.000000
83.0000	101.390	0.000000
84.0000	101.974	0.000000
85.0000	102.551	0.000000
86.0000	103.121	0.000000
87.0000	103.684	0.000000
88.0000	104.239	0.000000
89.0000	104.788	0.000000
90.0000	105.330	0.000000
91.0000	105.866	0.000000
92.0000	106.395	0.000000
93.0000	106.918	0.000000
94.0000	107.434	0.000000
95.0000	107.945	0.000000
96.0000	108.450	0.000000
97.0000	108.948	0.000000
98.0000	109.442	0.000000
99.0000	109.929	0.000000
100.000	110.411	0.000000
101.000	110.888	0.000000
102.000	111.359	0.000000
103.000	111.825	0.000000
104.000	112.286	0.000000

105.000	112.742	0.000000
106.000	113.193	0.000000
107.000	113.639	0.000000
108.000	114.080	0.000000
109.000	114.517	0.000000
110.000	114.949	0.000000
111.000	115.376	0.000000
112.000	115.799	0.000000
113.000	116.218	0.000000
114.000	116.632	0.000000
115.000	117.042	0.000000
116.000	117.448	0.237398E-03
117.000	117.850	0.266665E-03
118.000	118.248	0.298958E-03
119.000	118.642	0.334525E-03
120.000	119.031	0.373628E-03
121.000	119.417	0.416548E-03
122.000	119.800	0.463578E-03
123.000	120.178	0.515028E-03
124.000	120.553	0.571223E-03
125.000	120.924	0.632508E-03
126.000	121.292	0.699241E-03
127.000	121.656	0.771801E-03
128.000	122.016	0.850582E-03
129.000	122.374	0.935999E-03
130.000	122.728	0.102848E-02
131.000	123.078	0.112848E-02
132.000	123.425	0.123647E-02
133.000	123.769	0.135293E-02
134.000	124.110	0.147837E-02
135.000	124.448	0.161333E-02
136.000	124.783	0.175834E-02
137.000	125.114	0.191397E-02
138.000	125.443	0.208082E-02
139.000	125.768	0.225949E-02
140.000	126.091	0.245061E-02
141.000	126.411	0.265482E-02
142.000	126.728	0.287279E-02
143.000	127.042	0.310522E-02
144.000	127.353	0.335281E-02
145.000	127.662	0.361630E-02
146.000	127.968	0.389643E-02
147.000	128.271	0.419397E-02
148.000	128.572	0.450971E-02
149.000	128.870	0.484447E-02
150.000	129.165	0.519907E-02
151.000	129.458	0.557438E-02
152.000	129.749	0.597125E-02
153.000	130.037	0.639057E-02
154.000	130.322	0.683325E-02
155.000	130.606	0.730024E-02
156.000	130.886	0.779245E-02
157.000	131.165	0.831087E-02
158.000	131.441	0.885648E-02
159.000	131.715	0.943027E-02
160.000	131.986	0.100333E-01
161.000	132.256	0.106665E-01
162.000	132.523	0.113310E-01
163.000	132.788	0.120279E-01
164.000	133.050	0.127583E-01
165.000	133.311	0.135231E-01
166.000	133.570	0.143237E-01
167.000	133.826	0.151610E-01
168.000	134.080	0.160362E-01
169.000	134.333	0.169506E-01
170.000	134.583	0.179052E-01
171.000	134.831	0.189012E-01
172.000	135.078	0.199399E-01
173.000	135.322	0.210224E-01

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175.000	135.805	0.233239E-01
176.000	136.044	0.245454E-01
177.000	136.281	0.258156E-01
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179.000	136.749	0.285074E-01
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182.000	137.438	0.329429E-01
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184.000	137.889	0.361801E-01
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189.000	138.985	0.453299E-01
190.000	139.200	0.473516E-01
191.000	139.412	0.494404E-01
192.000	139.624	0.515975E-01
193.000	139.833	0.538243E-01
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195.000	140.248	0.584922E-01
196.000	140.453	0.609361E-01
197.000	140.657	0.634549E-01
198.000	140.859	0.660501E-01
199.000	141.059	0.687230E-01
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201.000	141.456	0.743070E-01
202.000	141.652	0.772209E-01
203.000	141.847	0.802177E-01
204.000	142.040	0.832987E-01
205.000	142.232	0.864653E-01
206.000	142.423	0.897188E-01
207.000	142.612	0.930605E-01
208.000	142.800	0.964916E-01
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213.000	143.720	0.115033
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217.000	144.433	0.131605
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222.000	145.296	0.154620
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225.000	145.800	0.169713
226.000	145.965	0.174964
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228.000	146.293	0.185804
229.000	146.455	0.191394
230.000	146.616	0.197101
231.000	146.776	0.202923
232.000	146.935	0.208863
233.000	147.093	0.214921
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235.000	147.406	0.227396
236.000	147.561	0.233815
237.000	147.714	0.240356
238.000	147.867	0.247020
239.000	148.019	0.253808
240.000	148.169	0.260721
241.000	148.319	0.267760
242.000	148.468	0.274925

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244.000	148.762	0.289639
245.000	148.908	0.297189
246.000	149.052	0.304869
247.000	149.196	0.312680
248.000	149.339	0.320622
249.000	149.481	0.328696
250.000	149.622	0.336903
251.000	149.762	0.345243
252.000	149.901	0.353718
253.000	150.039	0.362328
254.000	150.177	0.371073
255.000	150.313	0.379954
256.000	150.449	0.388972
257.000	150.583	0.398127
258.000	150.717	0.407420
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260.000	150.982	0.426423
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262.000	151.244	0.445983
263.000	151.374	0.455973
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265.000	151.630	0.476378
266.000	151.758	0.486792
267.000	151.884	0.497349
268.000	152.009	0.508049
269.000	152.134	0.518891
270.000	152.258	0.529877
271.000	152.381	0.541006
272.000	152.504	0.552279
273.000	152.625	0.563697
274.000	152.746	0.575259
275.000	152.866	0.586966
276.000	152.985	0.598818
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278.000	153.222	0.622958
279.000	153.339	0.635247
280.000	153.455	0.647681
281.000	153.571	0.660262
282.000	153.686	0.672988
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284.000	153.914	0.698880
285.000	154.027	0.712046
286.000	154.139	0.725358
287.000	154.250	0.738817
288.000	154.361	0.752422
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290.000	154.580	0.780073
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292.000	154.797	0.808310
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311.000	156.730	1.10567

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378.000	162.053	2.54199
379.000	162.118	2.56741
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387.000	162.625	2.77427
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395.000	163.111	2.98709
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647.000	171.390	10.5460
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653.000	171.486	10.7089
654.000	171.502	10.7359
655.000	171.517	10.7629
656.000	171.533	10.7897

657.000	171.548	10.8166
658.000	171.564	10.8434
659.000	171.579	10.8701
660.000	171.595	10.8968
661.000	171.610	10.9234
662.000	171.625	10.9500
663.000	171.640	10.9765
664.000	171.655	11.0030
665.000	171.670	11.0294
666.000	171.685	11.0558
667.000	171.700	11.0821
668.000	171.714	11.1084
669.000	171.729	11.1346
670.000	171.744	11.1608
671.000	171.758	11.1869
672.000	171.773	11.2129
673.000	171.787	11.2390
674.000	171.801	11.2649
675.000	171.816	11.2908
676.000	171.830	11.3167
677.000	171.844	11.3425
678.000	171.858	11.3682
679.000	171.872	11.3939
680.000	171.886	11.4196
681.000	171.900	11.4452
682.000	171.913	11.4707
683.000	171.927	11.4962
684.000	171.941	11.5216
685.000	171.954	11.5470
686.000	171.968	11.5723
687.000	171.981	11.5976
688.000	171.994	11.6228
689.000	172.008	11.6480
690.000	172.021	11.6731
691.000	172.034	11.6982
692.000	172.047	11.7232
693.000	172.060	11.7481
694.000	172.073	11.7730
695.000	172.086	11.7979
696.000	172.099	11.8227
697.000	172.112	11.8474
698.000	172.125	11.8721
699.000	172.137	11.8967
700.000	172.150	11.9213
701.000	172.163	11.9458
702.000	172.175	11.9703
703.000	172.188	11.9947
704.000	172.200	12.0191
705.000	172.212	12.0434
706.000	172.224	12.0676
707.000	172.237	12.0918
708.000	172.249	12.1160
709.000	172.261	12.1400
710.000	172.273	12.1641
711.000	172.285	12.1881
712.000	172.297	12.2120
713.000	172.309	12.2359
714.000	172.320	12.2597
715.000	172.332	12.2834
716.000	172.344	12.3071
717.000	172.356	12.3308
718.000	172.367	12.3544
719.000	172.379	12.3779
720.000	172.390	12.4014
721.000	172.402	12.4249
722.000	172.413	12.4482
723.000	172.424	12.4716
724.000	172.435	12.4948
725.000	172.447	12.5180

726.000	172.458	12.5412
727.000	172.469	12.5643
728.000	172.480	12.5874
729.000	172.491	12.6104
730.000	172.502	12.6333
731.000	172.513	12.6562
732.000	172.524	12.6790
733.000	172.534	12.7018
734.000	172.545	12.7245
735.000	172.556	12.7472
736.000	172.566	12.7698
737.000	172.577	12.7924
738.000	172.587	12.8149
739.000	172.598	12.8373
740.000	172.608	12.8597
741.000	172.619	12.8821
742.000	172.629	12.9044
743.000	172.639	12.9266
744.000	172.650	12.9488
745.000	172.660	12.9709
746.000	172.670	12.9930
747.000	172.680	13.0150
748.000	172.690	13.0369
749.000	172.700	13.0588
750.000	172.710	13.0807
751.000	172.720	13.1025
752.000	172.730	13.1242
753.000	172.739	13.1459
754.000	172.749	13.1676
755.000	172.759	13.1891
756.000	172.769	13.2107
757.000	172.778	13.2321
758.000	172.788	13.2535
759.000	172.797	13.2749
760.000	172.807	13.2962
761.000	172.816	13.3175
762.000	172.826	13.3387
763.000	172.835	13.3598
764.000	172.844	13.3809
765.000	172.854	13.4019
766.000	172.863	13.4229
767.000	172.872	13.4438
768.000	172.881	13.4647
769.000	172.890	13.4855
770.000	172.899	13.5063
771.000	172.908	13.5270
772.000	172.917	13.5477
773.000	172.926	13.5683
774.000	172.935	13.5888
775.000	172.944	13.6093
776.000	172.953	13.6298
777.000	172.961	13.6502
778.000	172.970	13.6705
779.000	172.979	13.6908
780.000	172.987	13.7110
781.000	172.996	13.7312
782.000	173.004	13.7513
783.000	173.013	13.7714
784.000	173.021	13.7914
785.000	173.030	13.8114
786.000	173.038	13.8313
787.000	173.047	13.8511
788.000	173.055	13.8709
789.000	173.063	13.8907
790.000	173.071	13.9104
791.000	173.080	13.9300
792.000	173.088	13.9496
793.000	173.096	13.9692
794.000	173.104	13.9886

795.000	173.112	14.0081
796.000	173.120	14.0275
797.000	173.128	14.0468
798.000	173.136	14.0661
799.000	173.144	14.0853
800.000	173.152	14.1045
801.000	173.159	14.1236
802.000	173.167	14.1426
803.000	173.175	14.1617
804.000	173.183	14.1806
805.000	173.190	14.1995
806.000	173.198	14.2184
807.000	173.206	14.2372
808.000	173.213	14.2559
809.000	173.221	14.2747
810.000	173.228	14.2933
811.000	173.236	14.3119
812.000	173.243	14.3305
813.000	173.250	14.3489
814.000	173.258	14.3674
815.000	173.265	14.3858
816.000	173.272	14.4041
817.000	173.280	14.4224
818.000	173.287	14.4407
819.000	173.294	14.4588
820.000	173.301	14.4770
821.000	173.308	14.4951
822.000	173.315	14.5131
823.000	173.322	14.5311
824.000	173.329	14.5490
825.000	173.336	14.5669
826.000	173.343	14.5847
827.000	173.350	14.6025
828.000	173.357	14.6203
829.000	173.364	14.6379
830.000	173.371	14.6556
831.000	173.378	14.6731
832.000	173.384	14.6907
833.000	173.391	14.7082
834.000	173.398	14.7256
835.000	173.405	14.7430
836.000	173.411	14.7603
837.000	173.418	14.7776
838.000	173.424	14.7948
839.000	173.431	14.8120
840.000	173.437	14.8291
841.000	173.444	14.8462
842.000	173.450	14.8632
843.000	173.457	14.8802
844.000	173.463	14.8972
845.000	173.470	14.9141
846.000	173.476	14.9309
847.000	173.482	14.9477
848.000	173.488	14.9644
849.000	173.495	14.9811
850.000	173.501	14.9977
851.000	173.507	15.0143
852.000	173.513	15.0309
853.000	173.519	15.0474
854.000	173.526	15.0638
855.000	173.532	15.0802
856.000	173.538	15.0966
857.000	173.544	15.1129
858.000	173.550	15.1291
859.000	173.556	15.1453
860.000	173.562	15.1615
861.000	173.567	15.1776
862.000	173.573	15.1937
863.000	173.579	15.2097

864.000	173.585	15.2257
865.000	173.591	15.2416
866.000	173.597	15.2575
867.000	173.602	15.2733
868.000	173.608	15.2891
869.000	173.614	15.3048
870.000	173.619	15.3205
871.000	173.625	15.3361
872.000	173.631	15.3517
873.000	173.636	15.3673
874.000	173.642	15.3828
875.000	173.647	15.3982
876.000	173.653	15.4136
877.000	173.658	15.4290
878.000	173.664	15.4443
879.000	173.669	15.4596
880.000	173.675	15.4748
881.000	173.680	15.4900
882.000	173.685	15.5051
883.000	173.691	15.5202
884.000	173.696	15.5352
885.000	173.701	15.5502
886.000	173.707	15.5652
887.000	173.712	15.5801
888.000	173.717	15.5949
889.000	173.722	15.6097
890.000	173.727	15.6245
891.000	173.733	15.6392
892.000	173.738	15.6539
893.000	173.743	15.6685
894.000	173.748	15.6831
895.000	173.753	15.6977
896.000	173.758	15.7121
897.000	173.763	15.7266
898.000	173.768	15.7410
899.000	173.773	15.7554
900.000	173.778	15.7697
901.000	173.783	15.7840
902.000	173.788	15.7982
903.000	173.792	15.8124
904.000	173.797	15.8265
905.000	173.802	15.8406
906.000	173.807	15.8547
907.000	173.812	15.8687
908.000	173.816	15.8827
909.000	173.821	15.8966
910.000	173.826	15.9105
911.000	173.831	15.9243
912.000	173.835	15.9381
913.000	173.840	15.9519
914.000	173.845	15.9656
915.000	173.849	15.9793
916.000	173.854	15.9929
917.000	173.858	16.0065
918.000	173.863	16.0200
919.000	173.867	16.0335
920.000	173.872	16.0470
921.000	173.876	16.0604
922.000	173.881	16.0738
923.000	173.885	16.0871
924.000	173.890	16.1004
925.000	173.894	16.1136
926.000	173.898	16.1268
927.000	173.903	16.1400
928.000	173.907	16.1531
929.000	173.911	16.1662
930.000	173.916	16.1792
931.000	173.920	16.1922
932.000	173.924	16.2052

933.000	173.929	16.2181
934.000	173.933	16.2310
935.000	173.937	16.2438
936.000	173.941	16.2566
937.000	173.945	16.2694
938.000	173.949	16.2821
939.000	173.954	16.2948
940.000	173.958	16.3074
941.000	173.962	16.3200
942.000	173.966	16.3325
943.000	173.970	16.3450
944.000	173.974	16.3575
945.000	173.978	16.3699
946.000	173.982	16.3823
947.000	173.986	16.3947
948.000	173.990	16.4070
949.000	173.994	16.4193
950.000	173.998	16.4315
951.000	174.002	16.4437
952.000	174.005	16.4559
953.000	174.009	16.4680
954.000	174.013	16.4801
955.000	174.017	16.4921
956.000	174.021	16.5041
957.000	174.025	16.5161
958.000	174.028	16.5280
959.000	174.032	16.5399
960.000	174.036	16.5517
961.000	174.040	16.5635
962.000	174.043	16.5753
963.000	174.047	16.5870
964.000	174.051	16.5987
965.000	174.054	16.6104
966.000	174.058	16.6220
967.000	174.062	16.6336
968.000	174.065	16.6451
969.000	174.069	16.6566
970.000	174.072	16.6681
971.000	174.076	16.6795
972.000	174.080	16.6909
973.000	174.083	16.7023
974.000	174.087	16.7136
975.000	174.090	16.7249
976.000	174.094	16.7361
977.000	174.097	16.7473
978.000	174.101	16.7585
979.000	174.104	16.7696
980.000	174.107	16.7807
981.000	174.111	16.7918
982.000	174.114	16.8028
983.000	174.118	16.8138
984.000	174.121	16.8248
985.000	174.124	16.8357
986.000	174.128	16.8466
987.000	174.131	16.8574
988.000	174.134	16.8682
989.000	174.137	16.8790
990.000	174.141	16.8897
991.000	174.144	16.9004
992.000	174.147	16.9111
993.000	174.150	16.9217
994.000	174.154	16.9323
995.000	174.157	16.9429
996.000	174.160	16.9534
997.000	174.163	16.9639
998.000	174.166	16.9744
999.000	174.169	16.9848
1000.00	174.173	16.9952

TITLE : GREENS OIL COMPANY
CBM JOB # : 11030
SC ID # : 09344

Contaminant of Concern is MTBE

C(x,0,0,t)=(C0/2)erfc[(x-vt)/2(Ax*vt)1/2]
erf[Y/4(Ay*x)1/2]erf[Z/2(alphz*x)1/2]

INPUT PARAMETERS :
Concentration of Source (ppb) = 801.00
Source Width (ft) = 60.00
Vertical Thickness of Source (ft) = 27.50
Distance of Recipient (ft) =1000.00
Groundwater Flow Velocity (ft/yr) = 3.65
Time of Simulation (years) = 1000.00
Longitudinal Dispersivity (ft) = 100.000000
Transverse Dispersivity (ft) = 33.333332
Vertical Dispersivity (ft) = 5.000000
Total Organic Carbon, TOC (mg/kg) = 101.00
Total Petroleum Hydrocarbons,TPH(mg/kg) = 49.50
Soil/Water Part. Coefficient,Koc(ml/g) = 11.00
Organic Carbon Fraction, foc (%) = 0.0001297
Porosity = .250
Bulk Density (g/cc) = 1.600
Retardation Factor, Rf = 1.00913
Contaminant Velocity (ft/yr) = 3.61697

CONCENTRATION COMPUTED FOR :
100.000 ft. 1000.000 ft

TIME (yrs)	CONC. (ppb)	CONC. (ppb)
1.00000	0.239710E-01	0.000000
2.00000	1.04126	0.000000
3.00000	3.93374	0.000000
4.00000	7.90278	0.000000
5.00000	12.2393	0.000000
6.00000	16.5831	0.000000
7.00000	20.7746	0.000000
8.00000	24.7512	0.000000
9.00000	28.4959	0.000000
10.0000	32.0122	0.000000
11.0000	35.3130	0.000000
12.0000	38.4142	0.000000
13.0000	41.3325	0.000000
14.0000	44.0838	0.000000
15.0000	46.6828	0.000000
16.0000	49.1430	0.000000
17.0000	51.4765	0.000000
18.0000	53.6940	0.000000
19.0000	55.8052	0.000000
20.0000	57.8186	0.000000
21.0000	59.7419	0.000000
22.0000	61.5819	0.000000
23.0000	63.3448	0.000000
24.0000	65.0360	0.000000
25.0000	66.6607	0.000000
26.0000	68.2232	0.000000
27.0000	69.7277	0.000000
28.0000	71.1777	0.000000
29.0000	72.5767	0.000000
30.0000	73.9277	0.000000
31.0000	75.2336	0.000000
32.0000	76.4967	0.000000
33.0000	77.7197	0.000000
34.0000	78.9045	0.000000
35.0000	80.0532	0.000000
36.0000	81.1675	0.000000

37.0000	82.2494	0.000000
38.0000	83.3002	0.000000
39.0000	84.3215	0.000000
40.0000	85.3146	0.000000
41.0000	86.2809	0.000000
42.0000	87.2214	0.000000
43.0000	88.1374	0.000000
44.0000	89.0298	0.000000
45.0000	89.8997	0.000000
46.0000	90.7479	0.000000
47.0000	91.5754	0.000000
48.0000	92.3829	0.000000
49.0000	93.1711	0.000000
50.0000	93.9409	0.000000
51.0000	94.6928	0.000000
52.0000	95.4277	0.229194E-03
53.0000	96.1459	0.295291E-03
54.0000	96.8482	0.376926E-03
55.0000	97.5351	0.476909E-03
56.0000	98.2070	0.598393E-03
57.0000	98.8646	0.744895E-03
58.0000	99.5082	0.920307E-03
59.0000	100.138	0.112892E-02
60.0000	100.755	0.137542E-02
61.0000	101.360	0.166491E-02
62.0000	101.952	0.200294E-02
63.0000	102.532	0.239545E-02
64.0000	103.101	0.284882E-02
65.0000	103.659	0.336989E-02
66.0000	104.205	0.396589E-02
67.0000	104.741	0.464449E-02
68.0000	105.267	0.541378E-02
69.0000	105.783	0.628225E-02
70.0000	106.289	0.725879E-02
71.0000	106.786	0.835267E-02
72.0000	107.274	0.957352E-02
73.0000	107.752	0.109313E-01
74.0000	108.222	0.124364E-01
75.0000	108.684	0.140994E-01
76.0000	109.137	0.159312E-01
77.0000	109.582	0.179430E-01
78.0000	110.019	0.201462E-01
79.0000	110.449	0.225525E-01
80.0000	110.871	0.251736E-01
81.0000	111.286	0.280217E-01
82.0000	111.693	0.311087E-01
83.0000	112.094	0.344470E-01
84.0000	112.488	0.380489E-01
85.0000	112.876	0.419268E-01
86.0000	113.256	0.460932E-01
87.0000	113.631	0.505605E-01
88.0000	113.999	0.553411E-01
89.0000	114.362	0.604473E-01
90.0000	114.718	0.658916E-01
91.0000	115.069	0.716861E-01
92.0000	115.414	0.778431E-01
93.0000	115.753	0.843744E-01
94.0000	116.087	0.912919E-01
95.0000	116.416	0.986072E-01
96.0000	116.739	0.106332
97.0000	117.058	0.114477
98.0000	117.371	0.123054
99.0000	117.680	0.132073
100.000	117.984	0.141545
101.000	118.283	0.151480
102.000	118.578	0.161888
103.000	118.868	0.172779
104.000	119.153	0.184161
105.000	119.435	0.196045

106.000	119.712	0.208438
107.000	119.985	0.221348
108.000	120.254	0.234785
109.000	120.519	0.248755
110.000	120.780	0.263265
111.000	121.037	0.278323
112.000	121.290	0.293934
113.000	121.540	0.310106
114.000	121.786	0.326843
115.000	122.028	0.344151
116.000	122.267	0.362035
117.000	122.503	0.380500
118.000	122.735	0.399549
119.000	122.964	0.419186
120.000	123.189	0.439415
121.000	123.412	0.460239
122.000	123.631	0.481660
123.000	123.847	0.503681
124.000	124.060	0.526304
125.000	124.270	0.549530
126.000	124.477	0.573359
127.000	124.682	0.597794
128.000	124.883	0.622835
129.000	125.082	0.648481
130.000	125.278	0.674732
131.000	125.471	0.701589
132.000	125.661	0.729049
133.000	125.850	0.757112
134.000	126.035	0.785776
135.000	126.218	0.815040
136.000	126.398	0.844900
137.000	126.576	0.875355
138.000	126.752	0.906403
139.000	126.925	0.938040
140.000	127.096	0.970262
141.000	127.265	1.00307
142.000	127.431	1.03645
143.000	127.595	1.07041
144.000	127.758	1.10493
145.000	127.917	1.14003
146.000	128.075	1.17568
147.000	128.231	1.21189
148.000	128.385	1.24866
149.000	128.536	1.28596
150.000	128.686	1.32381
151.000	128.834	1.36219
152.000	128.979	1.40110
153.000	129.123	1.44054
154.000	129.265	1.48049
155.000	129.406	1.52095
156.000	129.544	1.56191
157.000	129.681	1.60337
158.000	129.816	1.64532
159.000	129.949	1.68775
160.000	130.080	1.73066
161.000	130.210	1.77404
162.000	130.338	1.81788
163.000	130.465	1.86217
164.000	130.590	1.90692
165.000	130.713	1.95210
166.000	130.835	1.99771
167.000	130.955	2.04375
168.000	131.074	2.09021
169.000	131.191	2.13707
170.000	131.307	2.18434
171.000	131.421	2.23200
172.000	131.534	2.28004
173.000	131.646	2.32847
174.000	131.756	2.37726

175.000	131.864	2.42641
176.000	131.972	2.47592
177.000	132.078	2.52577
178.000	132.183	2.57597
179.000	132.286	2.62649
180.000	132.388	2.67733
181.000	132.489	2.72849
182.000	132.589	2.77995
183.000	132.688	2.83171
184.000	132.785	2.88376
185.000	132.881	2.93609
186.000	132.976	2.98869
187.000	133.070	3.04156
188.000	133.162	3.09468
189.000	133.254	3.14806
190.000	133.344	3.20168
191.000	133.434	3.25553
192.000	133.522	3.30961
193.000	133.609	3.36390
194.000	133.695	3.41841
195.000	133.780	3.47312
196.000	133.865	3.52802
197.000	133.948	3.58312
198.000	134.030	3.63839
199.000	134.111	3.69384
200.000	134.191	3.74945
201.000	134.270	3.80522
202.000	134.348	3.86114
203.000	134.426	3.91720
204.000	134.502	3.97340
205.000	134.578	4.02973
206.000	134.652	4.08618
207.000	134.726	4.14274
208.000	134.799	4.19941
209.000	134.871	4.25619
210.000	134.942	4.31306
211.000	135.012	4.37002
212.000	135.082	4.42705
213.000	135.150	4.48417
214.000	135.218	4.54135
215.000	135.285	4.59859
216.000	135.352	4.65589
217.000	135.417	4.71324
218.000	135.482	4.77063
219.000	135.546	4.82806
220.000	135.609	4.88551
221.000	135.672	4.94300
222.000	135.733	5.00050
223.000	135.795	5.05802
224.000	135.855	5.11554
225.000	135.915	5.17307
226.000	135.974	5.23059
227.000	136.032	5.28810
228.000	136.090	5.34560
229.000	136.146	5.40308
230.000	136.203	5.46053
231.000	136.258	5.51796
232.000	136.314	5.57535
233.000	136.368	5.63270
234.000	136.422	5.69000
235.000	136.475	5.74725
236.000	136.527	5.80445
237.000	136.579	5.86159
238.000	136.631	5.91867
239.000	136.681	5.97568
240.000	136.732	6.03261
241.000	136.781	6.08947
242.000	136.830	6.14625
243.000	136.879	6.20294

244.000	136.927	6.25954
245.000	136.974	6.31604
246.000	137.021	6.37245
247.000	137.067	6.42876
248.000	137.113	6.48496
249.000	137.159	6.54106
250.000	137.203	6.59704
251.000	137.248	6.65290
252.000	137.291	6.70864
253.000	137.335	6.76426
254.000	137.378	6.81976
255.000	137.420	6.87512
256.000	137.462	6.93035
257.000	137.503	6.98544
258.000	137.544	7.04039
259.000	137.585	7.09520
260.000	137.625	7.14987
261.000	137.664	7.20438
262.000	137.703	7.25875
263.000	137.742	7.31296
264.000	137.780	7.36701
265.000	137.818	7.42090
266.000	137.855	7.47464
267.000	137.892	7.52820
268.000	137.929	7.58160
269.000	137.965	7.63483
270.000	138.001	7.68789
271.000	138.036	7.74077
272.000	138.071	7.79348
273.000	138.106	7.84601
274.000	138.140	7.89836
275.000	138.174	7.95052
276.000	138.208	8.00250
277.000	138.241	8.05430
278.000	138.273	8.10590
279.000	138.306	8.15732
280.000	138.338	8.20855
281.000	138.369	8.25958
282.000	138.401	8.31041
283.000	138.432	8.36105
284.000	138.462	8.41149
285.000	138.493	8.46173
286.000	138.523	8.51177
287.000	138.552	8.56161
288.000	138.582	8.61124
289.000	138.611	8.66067
290.000	138.639	8.70989
291.000	138.668	8.75890
292.000	138.696	8.80771
293.000	138.723	8.85630
294.000	138.751	8.90468
295.000	138.778	8.95285
296.000	138.805	9.00081
297.000	138.831	9.04855
298.000	138.858	9.09608
299.000	138.884	9.14340
300.000	138.909	9.19049
301.000	138.935	9.23737
302.000	138.960	9.28403
303.000	138.985	9.33047
304.000	139.009	9.37669
305.000	139.034	9.42270
306.000	139.058	9.46848
307.000	139.082	9.51404
308.000	139.105	9.55937
309.000	139.128	9.60449
310.000	139.151	9.64938
311.000	139.174	9.69405
312.000	139.197	9.73850

313.000	139.219	9.78272
314.000	139.241	9.82672
315.000	139.263	9.87049
316.000	139.285	9.91404
317.000	139.306	9.95736
318.000	139.327	10.0005
319.000	139.348	10.0433
320.000	139.369	10.0860
321.000	139.389	10.1284
322.000	139.409	10.1706
323.000	139.430	10.2126
324.000	139.449	10.2543
325.000	139.469	10.2958
326.000	139.488	10.3371
327.000	139.507	10.3782
328.000	139.526	10.4190
329.000	139.545	10.4597
330.000	139.564	10.5000
331.000	139.582	10.5402
332.000	139.600	10.5802
333.000	139.618	10.6199
334.000	139.636	10.6594
335.000	139.654	10.6986
336.000	139.671	10.7377
337.000	139.688	10.7765
338.000	139.705	10.8151
339.000	139.722	10.8535
340.000	139.739	10.8916
341.000	139.756	10.9295
342.000	139.772	10.9672
343.000	139.788	11.0047
344.000	139.804	11.0420
345.000	139.820	11.0790
346.000	139.836	11.1158
347.000	139.851	11.1524
348.000	139.866	11.1888
349.000	139.882	11.2250
350.000	139.897	11.2609
351.000	139.911	11.2966
352.000	139.926	11.3321
353.000	139.941	11.3674
354.000	139.955	11.4025
355.000	139.969	11.4374
356.000	139.983	11.4720
357.000	139.997	11.5064
358.000	140.011	11.5406
359.000	140.025	11.5746
360.000	140.038	11.6084
361.000	140.051	11.6420
362.000	140.065	11.6753
363.000	140.078	11.7085
364.000	140.091	11.7414
365.000	140.103	11.7742
366.000	140.116	11.8067
367.000	140.129	11.8390
368.000	140.141	11.8711
369.000	140.153	11.9030
370.000	140.166	11.9347
371.000	140.178	11.9662
372.000	140.189	11.9975
373.000	140.201	12.0285
374.000	140.213	12.0594
375.000	140.224	12.0901
376.000	140.236	12.1206
377.000	140.247	12.1508
378.000	140.258	12.1809
379.000	140.269	12.2108
380.000	140.280	12.2404
381.000	140.291	12.2699

382.000	140.302	12.2992
383.000	140.312	12.3283
384.000	140.323	12.3572
385.000	140.333	12.3859
386.000	140.343	12.4144
387.000	140.354	12.4427
388.000	140.364	12.4708
389.000	140.374	12.4987
390.000	140.383	12.5264
391.000	140.393	12.5540
392.000	140.403	12.5813
393.000	140.412	12.6085
394.000	140.422	12.6355
395.000	140.431	12.6623
396.000	140.440	12.6889
397.000	140.450	12.7153
398.000	140.459	12.7416
399.000	140.468	12.7676
400.000	140.476	12.7935
401.000	140.485	12.8192
402.000	140.494	12.8448
403.000	140.502	12.8701
404.000	140.511	12.8953
405.000	140.519	12.9203
406.000	140.528	12.9451
407.000	140.536	12.9697
408.000	140.544	12.9942
409.000	140.552	13.0185
410.000	140.560	13.0426
411.000	140.568	13.0665
412.000	140.576	13.0903
413.000	140.584	13.1139
414.000	140.591	13.1373
415.000	140.599	13.1606
416.000	140.606	13.1837
417.000	140.614	13.2067
418.000	140.621	13.2294
419.000	140.629	13.2520
420.000	140.636	13.2745
421.000	140.643	13.2968
422.000	140.650	13.3189
423.000	140.657	13.3409
424.000	140.664	13.3627
425.000	140.671	13.3843
426.000	140.677	13.4058
427.000	140.684	13.4271
428.000	140.691	13.4483
429.000	140.697	13.4693
430.000	140.704	13.4902
431.000	140.710	13.5109
432.000	140.717	13.5314
433.000	140.723	13.5518
434.000	140.729	13.5721
435.000	140.735	13.5922
436.000	140.742	13.6121
437.000	140.748	13.6320
438.000	140.754	13.6516
439.000	140.759	13.6711
440.000	140.765	13.6905
441.000	140.771	13.7097
442.000	140.777	13.7288
443.000	140.783	13.7477
444.000	140.788	13.7665
445.000	140.794	13.7852
446.000	140.799	13.8037
447.000	140.805	13.8221
448.000	140.810	13.8403
449.000	140.815	13.8584
450.000	140.821	13.8764

451.000	140.826	13.8942
452.000	140.831	13.9119
453.000	140.836	13.9295
454.000	140.841	13.9469
455.000	140.846	13.9642
456.000	140.851	13.9813
457.000	140.856	13.9984
458.000	140.861	14.0153
459.000	140.866	14.0321
460.000	140.871	14.0487
461.000	140.876	14.0652
462.000	140.880	14.0816
463.000	140.885	14.0979
464.000	140.889	14.1140
465.000	140.894	14.1300
466.000	140.898	14.1459
467.000	140.903	14.1617
468.000	140.907	14.1773
469.000	140.912	14.1929
470.000	140.916	14.2083
471.000	140.920	14.2236
472.000	140.924	14.2387
473.000	140.929	14.2538
474.000	140.933	14.2687
475.000	140.937	14.2835
476.000	140.941	14.2983
477.000	140.945	14.3128
478.000	140.949	14.3273
479.000	140.953	14.3417
480.000	140.957	14.3559
481.000	140.961	14.3701
482.000	140.964	14.3841
483.000	140.968	14.3980
484.000	140.972	14.4118
485.000	140.976	14.4255
486.000	140.979	14.4391
487.000	140.983	14.4526
488.000	140.987	14.4660
489.000	140.990	14.4793
490.000	140.994	14.4925
491.000	140.997	14.5055
492.000	141.001	14.5185
493.000	141.004	14.5313
494.000	141.007	14.5441
495.000	141.011	14.5568
496.000	141.014	14.5693
497.000	141.017	14.5818
498.000	141.021	14.5941
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507.000	141.048	14.7011
508.000	141.051	14.7125
509.000	141.054	14.7238
510.000	141.057	14.7350
511.000	141.060	14.7462
512.000	141.063	14.7572
513.000	141.066	14.7682
514.000	141.068	14.7790
515.000	141.071	14.7898
516.000	141.074	14.8005
517.000	141.076	14.8111
518.000	141.079	14.8216
519.000	141.082	14.8321

520.000	141.084	14.8424
521.000	141.087	14.8527
522.000	141.089	14.8629
523.000	141.092	14.8730
524.000	141.094	14.8830
525.000	141.097	14.8930
526.000	141.099	14.9028
527.000	141.102	14.9126
528.000	141.104	14.9223
529.000	141.107	14.9319
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531.000	141.111	14.9510
532.000	141.113	14.9604
533.000	141.116	14.9697
534.000	141.118	14.9789
535.000	141.120	14.9881
536.000	141.122	14.9972
537.000	141.125	15.0062
538.000	141.127	15.0151
539.000	141.129	15.0240
540.000	141.131	15.0328
541.000	141.133	15.0415
542.000	141.135	15.0502
543.000	141.137	15.0587
544.000	141.139	15.0672
545.000	141.141	15.0757
546.000	141.143	15.0841
547.000	141.145	15.0924
548.000	141.147	15.1006
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551.000	141.153	15.1249
552.000	141.155	15.1329
553.000	141.157	15.1408
554.000	141.159	15.1486
555.000	141.161	15.1564
556.000	141.162	15.1641
557.000	141.164	15.1717
558.000	141.166	15.1793
559.000	141.168	15.1868
560.000	141.169	15.1943
561.000	141.171	15.2016
562.000	141.173	15.2090
563.000	141.175	15.2162
564.000	141.176	15.2235
565.000	141.178	15.2306
566.000	141.180	15.2377
567.000	141.181	15.2447
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569.000	141.184	15.2586
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571.000	141.187	15.2723
572.000	141.189	15.2790
573.000	141.191	15.2857
574.000	141.192	15.2923
575.000	141.194	15.2989
576.000	141.195	15.3054
577.000	141.196	15.3119
578.000	141.198	15.3183
579.000	141.199	15.3247
580.000	141.201	15.3310
581.000	141.202	15.3372
582.000	141.204	15.3434
583.000	141.205	15.3496
584.000	141.206	15.3557
585.000	141.208	15.3617
586.000	141.209	15.3677
587.000	141.210	15.3737
588.000	141.212	15.3796

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590.000	141.214	15.3912
591.000	141.216	15.3969
592.000	141.217	15.4026
593.000	141.218	15.4083
594.000	141.219	15.4139
595.000	141.221	15.4195
596.000	141.222	15.4250
597.000	141.223	15.4304
598.000	141.224	15.4358
599.000	141.225	15.4412
600.000	141.227	15.4465
601.000	141.228	15.4518
602.000	141.229	15.4571
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607.000	141.234	15.4826
608.000	141.235	15.4876
609.000	141.237	15.4925
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612.000	141.240	15.5070
613.000	141.241	15.5118
614.000	141.242	15.5165
615.000	141.243	15.5212
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620.000	141.248	15.5441
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623.000	141.250	15.5573
624.000	141.251	15.5617
625.000	141.252	15.5660
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656.000	141.276	15.6826
657.000	141.277	15.6859

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661.000	141.280	15.6987
662.000	141.280	15.7018
663.000	141.281	15.7049
664.000	141.282	15.7080
665.000	141.282	15.7110
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667.000	141.283	15.7170
668.000	141.284	15.7200
669.000	141.285	15.7230
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691.000	141.296	15.7817
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693.000	141.297	15.7865
694.000	141.298	15.7888
695.000	141.298	15.7912
696.000	141.299	15.7935
697.000	141.299	15.7958
698.000	141.299	15.7981
699.000	141.300	15.8004
700.000	141.300	15.8026
701.000	141.301	15.8049
702.000	141.301	15.8071
703.000	141.302	15.8093
704.000	141.302	15.8114
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707.000	141.303	15.8178
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709.000	141.304	15.8220
710.000	141.304	15.8241
711.000	141.305	15.8261
712.000	141.305	15.8281
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717.000	141.307	15.8380
718.000	141.307	15.8399
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722.000	141.309	15.8474
723.000	141.309	15.8492
724.000	141.310	15.8511
725.000	141.310	15.8529
726.000	141.310	15.8547

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728.000	141.311	15.8582
729.000	141.311	15.8599
730.000	141.312	15.8617
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732.000	141.312	15.8651
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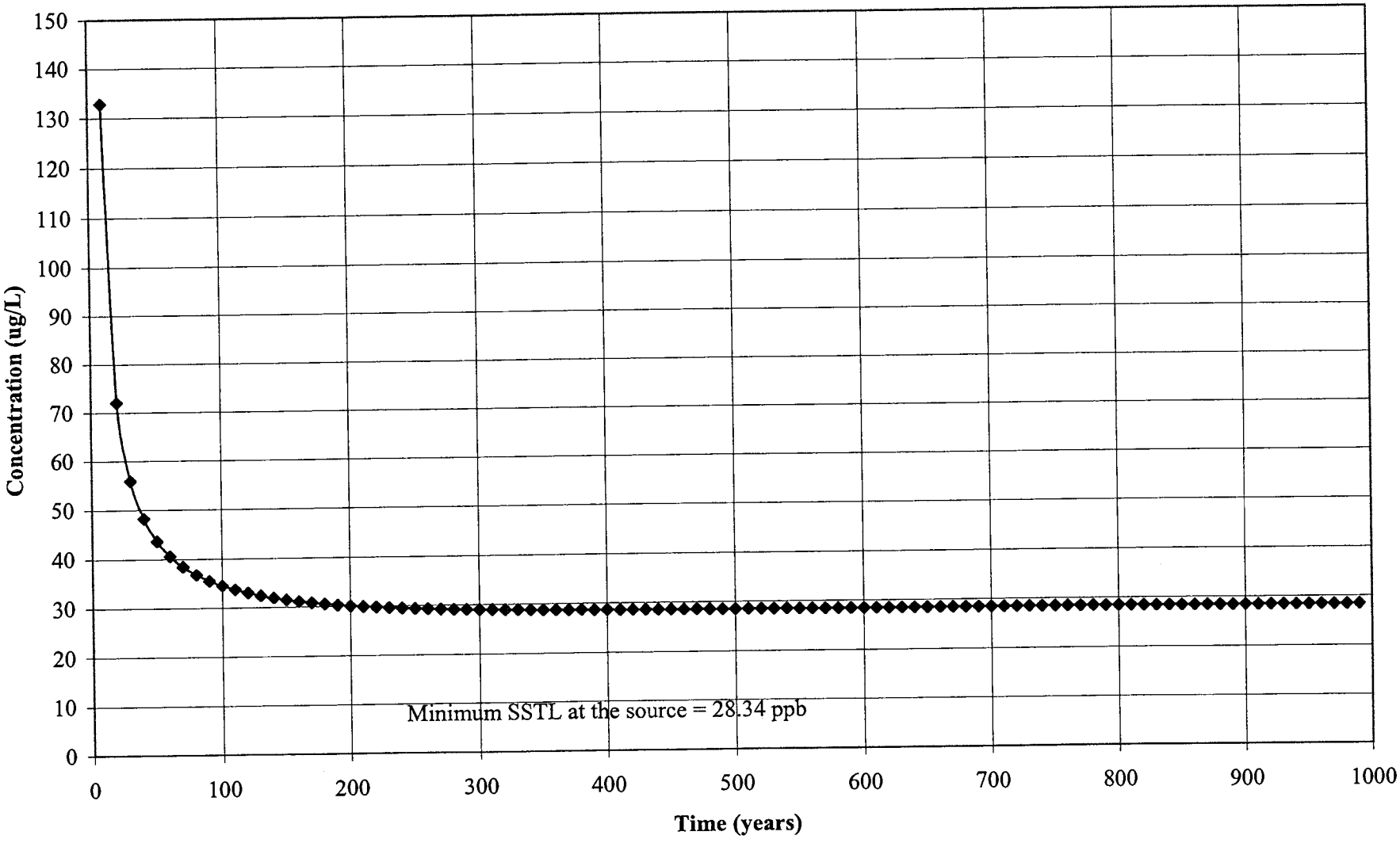
735.000	141.313	15.8701
736.000	141.313	15.8717
737.000	141.314	15.8733
738.000	141.314	15.8749
739.000	141.314	15.8765
740.000	141.315	15.8781
741.000	141.315	15.8797
742.000	141.315	15.8812
743.000	141.316	15.8828
744.000	141.316	15.8843
745.000	141.316	15.8858
746.000	141.316	15.8873
747.000	141.317	15.8888
748.000	141.317	15.8903
749.000	141.317	15.8917
750.000	141.317	15.8932
751.000	141.318	15.8946
752.000	141.318	15.8961
753.000	141.318	15.8975
754.000	141.318	15.8989
755.000	141.319	15.9002
756.000	141.319	15.9016
757.000	141.319	15.9030
758.000	141.319	15.9043
759.000	141.320	15.9057
760.000	141.320	15.9070
761.000	141.320	15.9083
762.000	141.320	15.9096
763.000	141.321	15.9109
764.000	141.321	15.9122
765.000	141.321	15.9134
766.000	141.321	15.9147
767.000	141.322	15.9159
768.000	141.322	15.9172
769.000	141.322	15.9184
770.000	141.322	15.9196
771.000	141.322	15.9208
772.000	141.323	15.9220
773.000	141.323	15.9232
774.000	141.323	15.9244
775.000	141.323	15.9255
776.000	141.324	15.9267
777.000	141.324	15.9278
778.000	141.324	15.9289
779.000	141.324	15.9301
780.000	141.324	15.9312
781.000	141.325	15.9323
782.000	141.325	15.9334
783.000	141.325	15.9344
784.000	141.325	15.9355
785.000	141.325	15.9366
786.000	141.326	15.9376
787.000	141.326	15.9387
788.000	141.326	15.9397
789.000	141.326	15.9407
790.000	141.326	15.9417
791.000	141.326	15.9428
792.000	141.327	15.9437
793.000	141.327	15.9447
794.000	141.327	15.9457
795.000	141.327	15.9467

796.000	141.327	15.9477
797.000	141.327	15.9486
798.000	141.328	15.9496
799.000	141.328	15.9505
800.000	141.328	15.9514
801.000	141.328	15.9523
802.000	141.328	15.9533
803.000	141.328	15.9542
804.000	141.329	15.9551
805.000	141.329	15.9559
806.000	141.329	15.9568
807.000	141.329	15.9577
808.000	141.329	15.9586
809.000	141.329	15.9594
810.000	141.330	15.9603
811.000	141.330	15.9611
812.000	141.330	15.9619
813.000	141.330	15.9628
814.000	141.330	15.9636
815.000	141.330	15.9644
816.000	141.330	15.9652
817.000	141.331	15.9660
818.000	141.331	15.9668
819.000	141.331	15.9676
820.000	141.331	15.9684
821.000	141.331	15.9691
822.000	141.331	15.9699
823.000	141.331	15.9707
824.000	141.331	15.9714
825.000	141.332	15.9721
826.000	141.332	15.9729
827.000	141.332	15.9736
828.000	141.332	15.9743
829.000	141.332	15.9751
830.000	141.332	15.9758
831.000	141.332	15.9765
832.000	141.332	15.9772
833.000	141.333	15.9779
834.000	141.333	15.9785
835.000	141.333	15.9792
836.000	141.333	15.9799
837.000	141.333	15.9806
838.000	141.333	15.9812
839.000	141.333	15.9819
840.000	141.333	15.9825
841.000	141.334	15.9832
842.000	141.334	15.9838
843.000	141.334	15.9844
844.000	141.334	15.9851
845.000	141.334	15.9857
846.000	141.334	15.9863
847.000	141.334	15.9869
848.000	141.334	15.9875
849.000	141.334	15.9881
850.000	141.334	15.9887
851.000	141.335	15.9893
852.000	141.335	15.9899
853.000	141.335	15.9905
854.000	141.335	15.9910
855.000	141.335	15.9916
856.000	141.335	15.9922
857.000	141.335	15.9927
858.000	141.335	15.9933
859.000	141.335	15.9938
860.000	141.335	15.9944
861.000	141.335	15.9949
862.000	141.336	15.9955
863.000	141.336	15.9960
864.000	141.336	15.9965

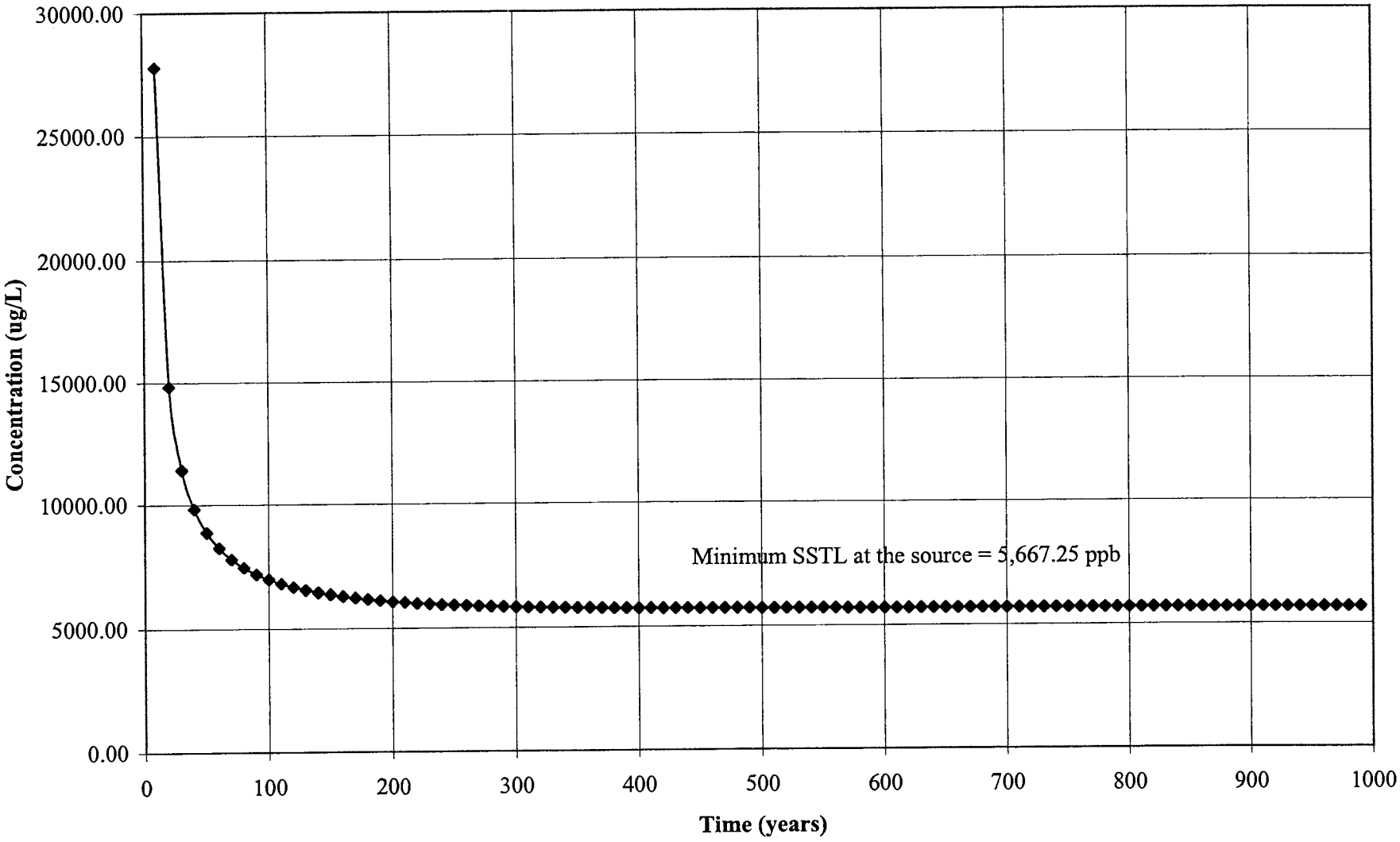
865.000	141.336	15.9970
866.000	141.336	15.9975
867.000	141.336	15.9980
868.000	141.336	15.9986
869.000	141.336	15.9991
870.000	141.336	15.9996
871.000	141.336	16.0000
872.000	141.336	16.0005
873.000	141.337	16.0010
874.000	141.337	16.0015
875.000	141.337	16.0020
876.000	141.337	16.0024
877.000	141.337	16.0029
878.000	141.337	16.0034
879.000	141.337	16.0038
880.000	141.337	16.0043
881.000	141.337	16.0047
882.000	141.337	16.0052
883.000	141.337	16.0056
884.000	141.337	16.0061
885.000	141.337	16.0065
886.000	141.338	16.0069
887.000	141.338	16.0073
888.000	141.338	16.0078
889.000	141.338	16.0082
890.000	141.338	16.0086
891.000	141.338	16.0090
892.000	141.338	16.0094
893.000	141.338	16.0098
894.000	141.338	16.0102
895.000	141.338	16.0106
896.000	141.338	16.0110
897.000	141.338	16.0114
898.000	141.338	16.0118
899.000	141.338	16.0122
900.000	141.338	16.0126
901.000	141.339	16.0129
902.000	141.339	16.0133
903.000	141.339	16.0137
904.000	141.339	16.0140
905.000	141.339	16.0144
906.000	141.339	16.0148
907.000	141.339	16.0151
908.000	141.339	16.0155
909.000	141.339	16.0158
910.000	141.339	16.0162
911.000	141.339	16.0165
912.000	141.339	16.0168
913.000	141.339	16.0172
914.000	141.339	16.0175
915.000	141.339	16.0178
916.000	141.339	16.0182
917.000	141.339	16.0185
918.000	141.339	16.0188
919.000	141.340	16.0191
920.000	141.340	16.0195
921.000	141.340	16.0198
922.000	141.340	16.0201
923.000	141.340	16.0204
924.000	141.340	16.0207
925.000	141.340	16.0210
926.000	141.340	16.0213
927.000	141.340	16.0216
928.000	141.340	16.0219
929.000	141.340	16.0222
930.000	141.340	16.0225
931.000	141.340	16.0228
932.000	141.340	16.0230
933.000	141.340	16.0233

934.000	141.340	16.0236
935.000	141.340	16.0239
936.000	141.340	16.0242
937.000	141.340	16.0244
938.000	141.340	16.0247
939.000	141.340	16.0250
940.000	141.341	16.0252
941.000	141.341	16.0255
942.000	141.341	16.0258
943.000	141.341	16.0260
944.000	141.341	16.0263
945.000	141.341	16.0265
946.000	141.341	16.0268
947.000	141.341	16.0270
948.000	141.341	16.0273
949.000	141.341	16.0275
950.000	141.341	16.0277
951.000	141.341	16.0280
952.000	141.341	16.0282
953.000	141.341	16.0285
954.000	141.341	16.0287
955.000	141.341	16.0289
956.000	141.341	16.0292
957.000	141.341	16.0294
958.000	141.341	16.0296
959.000	141.341	16.0298
960.000	141.341	16.0300
961.000	141.341	16.0303
962.000	141.341	16.0305
963.000	141.341	16.0307
964.000	141.341	16.0309
965.000	141.341	16.0311
966.000	141.342	16.0313
967.000	141.342	16.0315
968.000	141.342	16.0317
969.000	141.342	16.0319
970.000	141.342	16.0321
971.000	141.342	16.0323
972.000	141.342	16.0325
973.000	141.342	16.0327
974.000	141.342	16.0329
975.000	141.342	16.0331
976.000	141.342	16.0333
977.000	141.342	16.0335
978.000	141.342	16.0337
979.000	141.342	16.0339
980.000	141.342	16.0341
981.000	141.342	16.0342
982.000	141.342	16.0344
983.000	141.342	16.0346
984.000	141.342	16.0348
985.000	141.342	16.0350
986.000	141.342	16.0351
987.000	141.342	16.0353
988.000	141.342	16.0355
989.000	141.342	16.0356
990.000	141.342	16.0358
991.000	141.342	16.0360
992.000	141.342	16.0361
993.000	141.342	16.0363
994.000	141.342	16.0365
995.000	141.342	16.0366
996.000	141.342	16.0368
997.000	141.342	16.0369
998.000	141.342	16.0371
999.000	141.342	16.0373
1000.00	141.342	16.0374

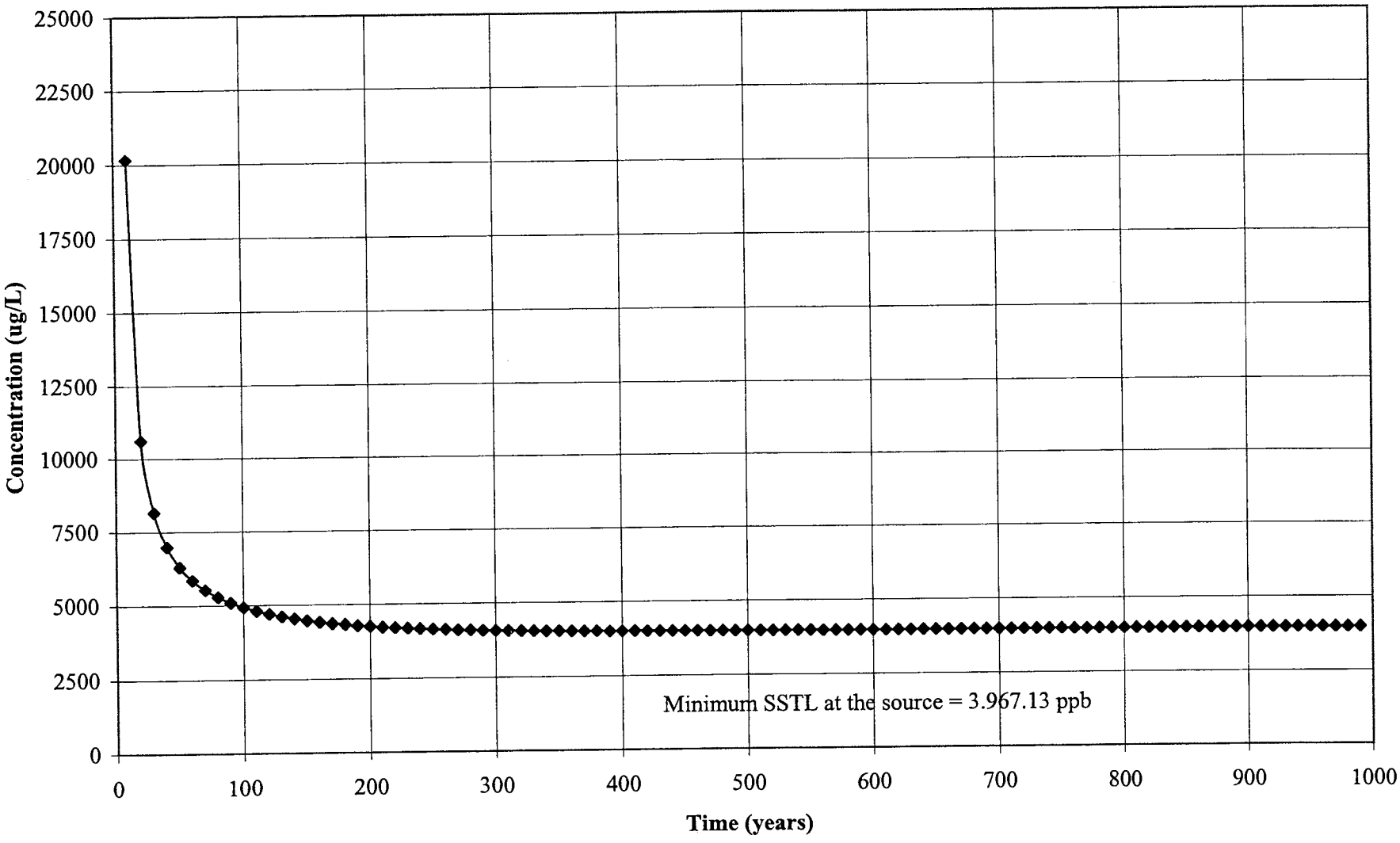
Source Concentrations - Benzene



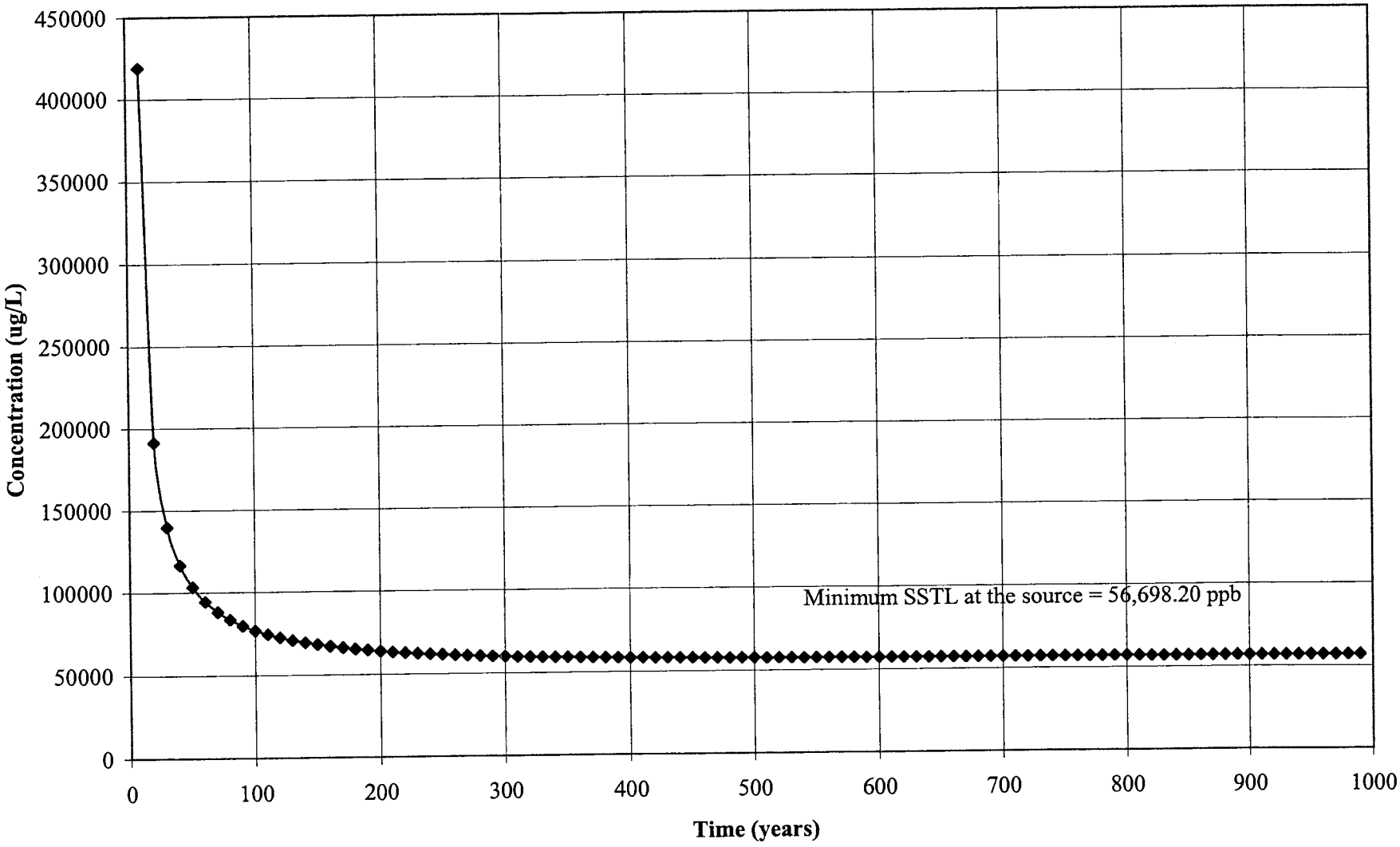
Source Concentration - Toluene



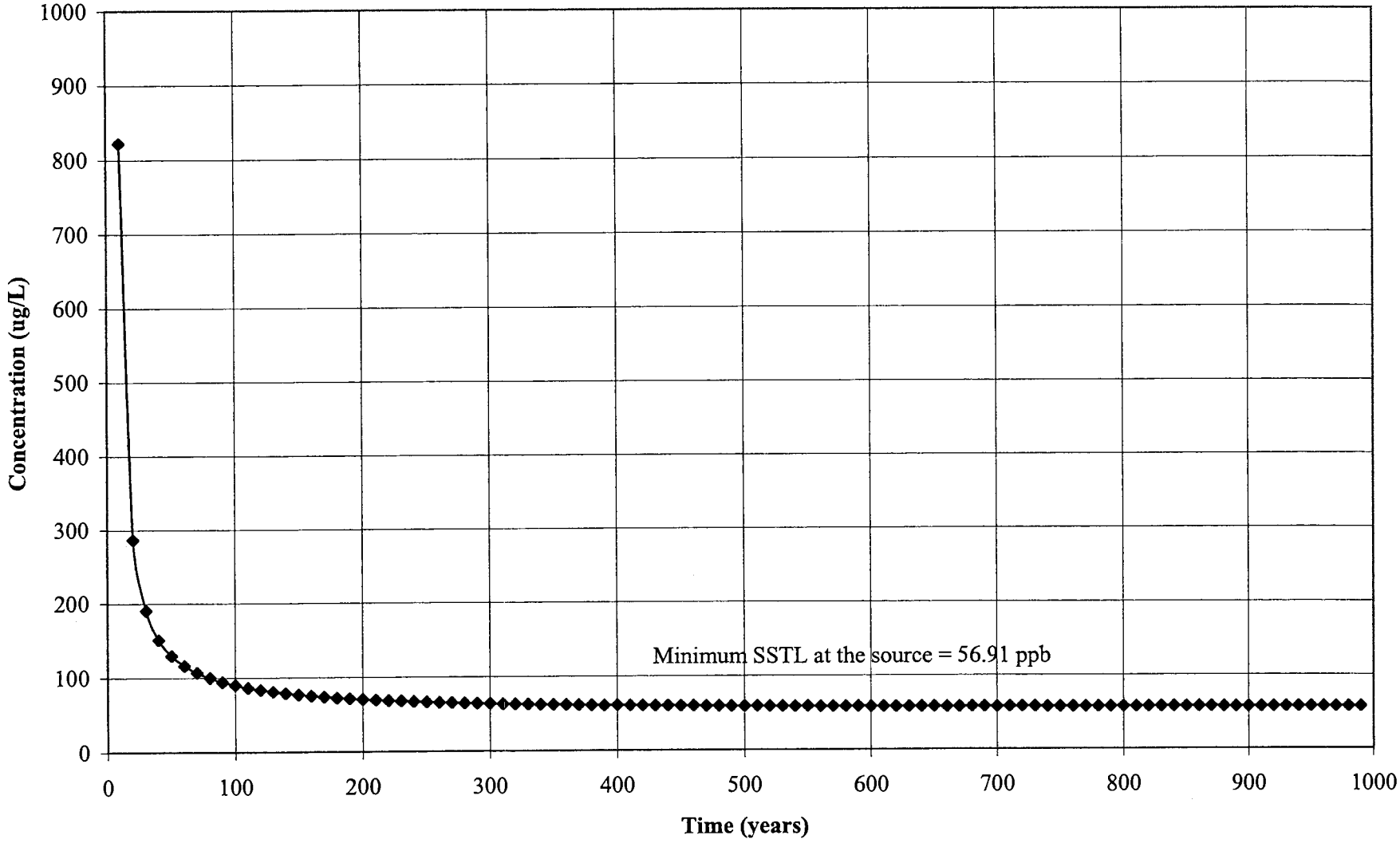
Source Concentration - Ethylbenzene



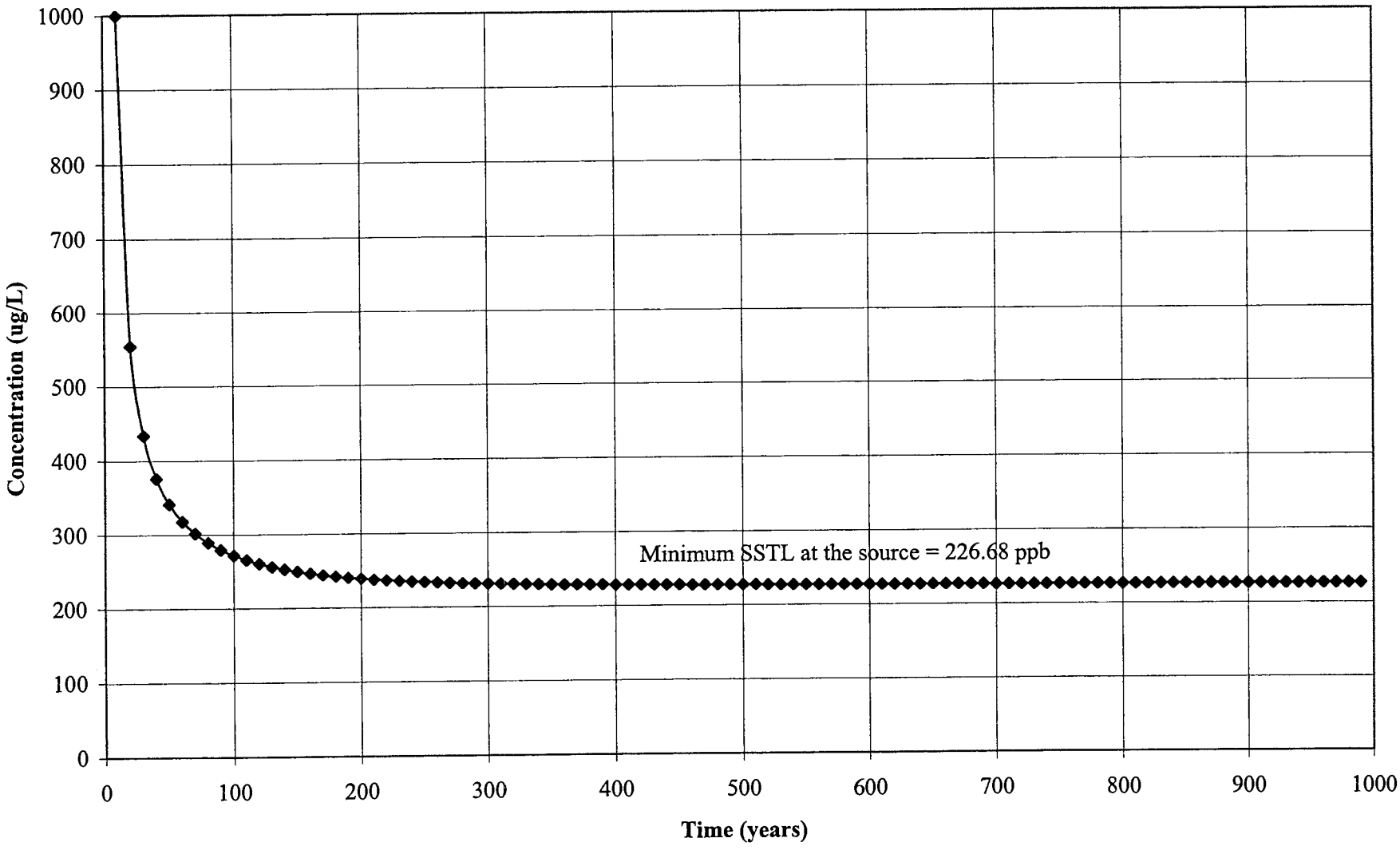
Source Concentration - Xylenes



Source Concentration - Naphthalene



Source Concentration - MTBE



TITLE : GREENS OIL COMPANY
CBM JOB # : 11030
SC ID # : 09344

Contaminant of Concern is BENZENE

C(x,0,0,t)=(C0/2)erfc[(x-vt)/2(Ax*vt)1/2]
erf[Y/4(Ay*x)1/2]erf[Z/2(alphz*x)1/2]

INPUT PARAMETERS :

Concentration of Source (ppb) = 2280.00
Source Width (ft) = 60.00
Vertical Thickness of Source (ft) = 27.50
Distance of Recipient (ft) =100.00
Groundwater Flow Velocity (ft/yr) = 3.65
RBSL concentration for COC(ppb) = 5.00
Longitudinal Dispersivity (ft) = 100.000000
Transverse Dispersivity (ft) = 33.333332
Vertical Dispersivity (ft) = 5.000000
Total Organic Carbon, TOC (mg/kg) = 101.00
Total Petroleum Hydrocarbons,TPH(mg/kg) = 49.50
Soil/Water Part. Coefficient,Koc(ml/g) = 81.00
Organic Carbon Fraction, foc (%) = 0.0001297
Porosity = .250
Bulk Density (g/cc) = 1.600
Retardation Factor, Rf = 1.06724
Contaminant Velocity (ft/yr) = 3.42003

SSTL CONCENTRATION COMPUTED FOR :
100.000 ft.

TIME (yrs)	SSTL FOR RECEPTOR 1 (ppb)
0.100000E-01	Plume will not reach receptor in given time
10.0100	132.798
20.0100	71.9793
30.0100	55.8503
40.0100	48.1803
50.0100	43.6231
60.0100	40.5789
70.0100	38.3943
80.0100	36.7496
90.0100	35.4684
100.010	34.4447
110.010	33.6106
120.010	32.9204
130.010	32.3422
140.010	31.8528
150.010	31.4352
160.010	31.0761
170.010	30.7655
180.010	30.4955
190.010	30.2597
200.010	30.0529
210.010	29.8710
220.010	29.7105
230.010	29.5684
240.010	29.4424
250.010	29.3303
260.010	29.2305
270.010	29.1415
280.010	29.0619
290.010	28.9907
300.010	28.9269
310.010	28.8697
320.010	28.8182
330.010	28.7720
340.010	28.7304

350.010	28.6930
360.010	28.6592
370.010	28.6287
380.010	28.6012
390.010	28.5764
400.010	28.5540
410.010	28.5337
420.010	28.5153
430.010	28.4987
440.010	28.4837
450.010	28.4701
460.010	28.4577
470.010	28.4465
480.010	28.4364
490.010	28.4272
500.010	28.4188
510.010	28.4112
520.010	28.4043
530.010	28.3981
540.010	28.3924
550.010	28.3873
560.010	28.3826
570.010	28.3783
580.010	28.3744
590.010	28.3709
600.010	28.3677
610.010	28.3648
620.010	28.3621
630.010	28.3597
640.010	28.3575
650.010	28.3555
660.010	28.3537
670.010	28.3520
680.010	28.3505
690.010	28.3492
700.010	28.3479
710.010	28.3468
720.010	28.3457
730.010	28.3448
740.010	28.3439
750.010	28.3431
760.010	28.3424
770.010	28.3418
780.010	28.3412
790.010	28.3406
800.010	28.3401
810.010	28.3397
820.010	28.3393
830.010	28.3389
840.010	28.3385
850.010	28.3382
860.010	28.3379
870.010	28.3377
880.010	28.3374
890.010	28.3372
900.010	28.3370
910.010	28.3368
920.010	28.3367
930.010	28.3365
940.010	28.3364
950.010	28.3363
960.010	28.3361
970.010	28.3360
980.010	28.3359
990.010	28.3359

Based on a travel time of 29.2395 years
For the receptor to be at 5.00000 ppb
The SSTL should be (in ppb): 56.6699

TITLE : GREENS OIL COMPANY
CBM JOB # : 11030
SC ID # : 09344

Contaminant of Concern is TOLUENE

C(x,0,0,t)=(C0/2)erfc[(x-vt)/2(Ax*vt)1/2]
erf[Y/4(Ay*x)1/2]erf[Z/2(alphz*x)1/2]

INPUT PARAMETERS :

Concentration of Source (ppb) = 9520.00
Source Width (ft) = 60.00
Vertical Thickness of Source (ft) = 27.50
Distance of Recipient (ft) =100.00
Groundwater Flow Velocity (ft/yr) = 3.65
RBSL concentration for COC(ppb) = 1000.00
Longitudinal Dispersivity (ft) = 100.000000
Transverse Dispersivity (ft) = 33.333332
Vertical Dispersivity (ft) = 5.000000
Total Organic Carbon, TOC (mg/kg) = 101.00
Total Petroleum Hydrocarbons,TPH(mg/kg) = 49.50
Soil/Water Part. Coefficient,Koc(ml/g) = 133.00
Organic Carbon Fraction, foc (%) = 0.0001297
Porosity = .250
Bulk Density (g/cc) = 1.600
Retardation Factor, Rf = 1.11041
Contaminant Velocity (ft/yr) = 3.28707

SSTL CONCENTRATION COMPUTED FOR :
100.000 ft.

TIME (yrs)	SSTL FOR RECEPTOR 1 (ppb)
0.100000E-01	Plume will not reach receptor in given time
10.0100	27767.4
20.0100	14808.1
30.0100	11421.9
40.0100	9820.81
50.0100	8872.11
60.0100	8239.16
70.0100	7785.10
80.0100	7443.17
90.0100	7176.61
100.010	6963.41
110.010	6789.48
120.010	6645.35
130.010	6524.41
140.010	6421.87
150.010	6334.17
160.010	6258.63
170.010	6193.16
180.010	6136.11
190.010	6086.16
200.010	6042.27
210.010	6003.56
220.010	5969.31
230.010	5938.92
240.010	5911.90
250.010	5887.81
260.010	5866.29
270.010	5847.05
280.010	5829.80
290.010	5814.32
300.010	5800.41
310.010	5787.89
320.010	5776.61
330.010	5766.45
340.010	5757.27

350.010	5748.98
360.010	5741.49
370.010	5734.71
380.010	5728.57
390.010	5723.01
400.010	5717.97
410.010	5713.40
420.010	5709.26
430.010	5705.49
440.010	5702.07
450.010	5698.96
460.010	5696.14
470.010	5693.57
480.010	5691.23
490.010	5689.10
500.010	5687.17
510.010	5685.40
520.010	5683.80
530.010	5682.33
540.010	5681.00
550.010	5679.79
560.010	5678.68
570.010	5677.67
580.010	5676.74
590.010	5675.90
600.010	5675.14
610.010	5674.44
620.010	5673.80
630.010	5673.21
640.010	5672.68
650.010	5672.19
660.010	5671.75
670.010	5671.34
680.010	5670.97
690.010	5670.63
700.010	5670.32
710.010	5670.04
720.010	5669.78
730.010	5669.54
740.010	5669.33
750.010	5669.13
760.010	5668.95
770.010	5668.78
780.010	5668.63
790.010	5668.49
800.010	5668.36
810.010	5668.25
820.010	5668.14
830.010	5668.05
840.010	5667.96
850.010	5667.88
860.010	5667.80
870.010	5667.73
880.010	5667.67
890.010	5667.61
900.010	5667.56
910.010	5667.51
920.010	5667.47
930.010	5667.43
940.010	5667.39
950.010	5667.36
960.010	5667.33
970.010	5667.30
980.010	5667.27
990.010	5667.25

Based on a travel time of 30.4222 years
For the receptor to be at 1000.00 ppb
The SSTL should be (in ppb): 11334.0

TITLE : GREENS OIL COMPANY
CBM JOB # : 11030
SC ID # : 09344

Contaminant of Concern is ETHYLBENZENE

C(x,0,0,t)=(C0/2)erfc[(x-vt)/2(Ax*vt)1/2]
erf[Y/4(Ay*x)1/2]erf[Z/2(alphz*x)1/2]

INPUT PARAMETERS :

Concentration of Source (ppb) = 3700.00
Source Width (ft) = 60.00
Vertical Thickness of Source (ft) = 27.50
Distance of Recipient (ft) =100.00
Groundwater Flow Velocity (ft/yr) = 3.65
RBSL concentration for COC(ppb) = 700.00
Longitudinal Dispersivity (ft) = 100.000000
Transverse Dispersivity (ft) = 33.333332
Vertical Dispersivity (ft) = 5.000000
Total Organic Carbon, TOC (mg/kg) = 101.00
Total Petroleum Hydrocarbons,TPH(mg/kg) = 49.50
Soil/Water Part. Coefficient,Koc(ml/g) = 176.00
Organic Carbon Fraction, foc (%) = 0.0001297
Porosity = .250
Bulk Density (g/cc) = 1.600
Retardation Factor, Rf = 1.14611
Contaminant Velocity (ft/yr) = 3.18469

SSTL CONCENTRATION COMPUTED FOR :
100.000 ft.

TIME (yrs)	SSTL FOR RECEPTOR 1 (ppb)
0.100000E-01	Plume will not reach receptor in given time
10.0100	20157.7
20.0100	10607.0
30.0100	8141.77
40.0100	6981.66
50.0100	6295.83
60.0100	5838.76
70.0100	5511.00
80.0100	5264.15
90.0100	5071.64
100.010	4917.54
110.010	4791.72
120.010	4687.34
130.010	4599.65
140.010	4525.20
150.010	4461.44
160.010	4406.43
170.010	4358.68
180.010	4317.00
190.010	4280.45
200.010	4248.27
210.010	4219.83
220.010	4194.63
230.010	4172.22
240.010	4152.26
250.010	4134.43
260.010	4118.47
270.010	4104.16
280.010	4091.31
290.010	4079.76
300.010	4069.35
310.010	4059.97
320.010	4051.49
330.010	4043.84
340.010	4036.91

350.010	4030.64
360.010	4024.96
370.010	4019.81
380.010	4015.13
390.010	4010.89
400.010	4007.03
410.010	4003.53
420.010	4000.34
430.010	3997.43
440.010	3994.79
450.010	3992.38
460.010	3990.19
470.010	3988.19
480.010	3986.37
490.010	3984.70
500.010	3983.18
510.010	3981.80
520.010	3980.53
530.010	3979.38
540.010	3978.32
550.010	3977.36
560.010	3976.48
570.010	3975.67
580.010	3974.93
590.010	3974.26
600.010	3973.64
610.010	3973.08
620.010	3972.56
630.010	3972.09
640.010	3971.65
650.010	3971.26
660.010	3970.90
670.010	3970.56
680.010	3970.26
690.010	3969.98
700.010	3969.72
710.010	3969.49
720.010	3969.28
730.010	3969.08
740.010	3968.90
750.010	3968.73
760.010	3968.58
770.010	3968.44
780.010	3968.32
790.010	3968.20
800.010	3968.09
810.010	3967.99
820.010	3967.90
830.010	3967.82
840.010	3967.74
850.010	3967.68
860.010	3967.61
870.010	3967.55
880.010	3967.50
890.010	3967.45
900.010	3967.40
910.010	3967.36
920.010	3967.32
930.010	3967.29
940.010	3967.26
950.010	3967.23
960.010	3967.20
970.010	3967.17
980.010	3967.15
990.010	3967.13

Based on a travel time of 31.4002 years
For the receptor to be at 700.000 ppb
The SSTL should be (in ppb): 7933.78

TITLE : GREENS OIL COMPANY
CBM JOB # : 11030
SC ID # : 09344

Contaminant of Concern is XYLENES

C(x,0,0,t)=(C0/2)erfc[(x-vt)/2(Ax*vt)1/2]
erf[Y/4(Ay*x)1/2]erf[Z/2(alphz*x)1/2]

INPUT PARAMETERS :

Concentration of Source (ppb) = 17400.00
Source Width (ft) = 60.00
Vertical Thickness of Source (ft) = 27.50
Distance of Recipient (ft) =100.00
Groundwater Flow Velocity (ft/yr) = 3.65
RBSL concentration for COC(ppb) = 10000.00
Longitudinal Dispersivity (ft) = 100.000000
Transverse Dispersivity (ft) = 33.333332
Vertical Dispersivity (ft) = 5.000000
Total Organic Carbon, TOC (mg/kg) = 101.00
Total Petroleum Hydrocarbons,TPH(mg/kg) = 49.50
Soil/Water Part. Coefficient,Koc(ml/g) = 639.00
Organic Carbon Fraction, foc (%) = 0.0001297
Porosity = .250
Bulk Density (g/cc) = 1.600
Retardation Factor, Rf = 1.53047
Contaminant Velocity (ft/yr) = 2.38489

SSTL CONCENTRATION COMPUTED FOR :
100.000 ft.

TIME (yrs)	SSTL FOR RECEPTOR 1 (ppb)
0.100000E-01	Plume will not reach receptor in given time
10.0100	418877.
20.0100	191269.
30.0100	139551.
40.0100	116419.
50.0100	103103.
60.0100	94358.3
70.0100	88135.1
80.0100	83462.1
90.0100	79816.5
100.010	76890.4
110.010	74489.9
120.010	72486.1
130.010	70789.9
140.010	69337.5
150.010	68081.8
160.010	66987.3
170.010	66026.7
180.010	65178.5
190.010	64425.6
200.010	63754.3
210.010	63153.4
220.010	62613.4
230.010	62126.7
240.010	61686.8
250.010	61288.1
260.010	60926.0
270.010	60596.3
280.010	60295.7
290.010	60021.0
300.010	59769.6
310.010	59539.3
320.010	59327.9
330.010	59133.7
340.010	58955.0

350.010	58790.5
360.010	58638.9
370.010	58499.0
380.010	58369.8
390.010	58250.5
400.010	58140.1
410.010	58037.9
420.010	57943.3
430.010	57855.7
440.010	57774.4
450.010	57699.0
460.010	57629.0
470.010	57564.1
480.010	57503.7
490.010	57447.6
500.010	57395.5
510.010	57347.0
520.010	57301.9
530.010	57259.9
540.010	57220.8
550.010	57184.4
560.010	57150.4
570.010	57118.8
580.010	57089.4
590.010	57061.9
600.010	57036.3
610.010	57012.4
620.010	56990.1
630.010	56969.3
640.010	56949.9
650.010	56931.8
660.010	56914.9
670.010	56899.1
680.010	56884.3
690.010	56870.5
700.010	56857.6
710.010	56845.6
720.010	56834.4
730.010	56823.8
740.010	56814.0
750.010	56804.8
760.010	56796.2
770.010	56788.2
780.010	56780.7
790.010	56773.6
800.010	56767.1
810.010	56760.9
820.010	56755.2
830.010	56749.8
840.010	56744.7
850.010	56740.0
860.010	56735.6
870.010	56731.5
880.010	56727.6
890.010	56724.0
900.010	56720.6
910.010	56717.4
920.010	56714.4
930.010	56711.6
940.010	56709.0
950.010	56706.6
960.010	56704.3
970.010	56702.1
980.010	56700.1
990.010	56698.2

Based on a travel time of 41.9307 years
For the receptor to be at 10000.0 ppb
The SSTL should be (in ppb): 113340.

TITLE : GREENS OIL COMPANY
CBM JOB # : 11030
SC ID # : 09344

Contaminant of Concern is NAPHTHALENE

C(x,0,0,t)=(C0/2)erfc[(x-vt)/2(Ax*vt)1/2]
erf[Y/4(Ay*x)1/2]erf[Z/2(alphz*x)1/2]

INPUT PARAMETERS :

Concentration of Source (ppb) = 991.00
Source Width (ft) = 60.00
Vertical Thickness of Source (ft) = 27.50
Distance of Recipient (ft) =100.00
Groundwater Flow Velocity (ft/yr) = 3.65
RBSL concentration for COC(ppb) = 10.00
Longitudinal Dispersivity (ft) = 100.000000
Transverse Dispersivity (ft) = 33.333332
Vertical Dispersivity (ft) = 5.000000
Total Organic Carbon, TOC (mg/kg) = 101.00
Total Petroleum Hydrocarbons,TPH(mg/kg) = 49.50
Soil/Water Part. Coefficient,Koc(ml/g) = 1543.00
Organic Carbon Fraction, foc (%) = 0.0001297
Porosity = .250
Bulk Density (g/cc) = 1.600
Retardation Factor, Rf = 2.28093
Contaminant Velocity (ft/yr) = 1.60022

SSTL CONCENTRATION COMPUTED FOR :
100.000 ft.

TIME (yrs)	SSTL FOR RECEPTOR 1 (ppb)
0.100000E-01	Plume will not reach receptor in given time
10.0100	822.059
20.0100	286.488
30.0100	190.213
40.0100	151.009
50.0100	129.597
60.0100	115.991
70.0100	106.516
80.0100	99.5022
90.0100	94.0802
100.010	89.7516
110.010	86.2092
120.010	83.2526
130.010	80.7456
140.010	78.5920
150.010	76.7215
160.010	75.0820
170.010	73.6334
180.010	72.3448
190.010	71.1916
200.010	70.1542
210.010	69.2166
220.010	68.3657
230.010	67.5906
240.010	66.8823
250.010	66.2330
260.010	65.6362
270.010	65.0864
280.010	64.5786
290.010	64.1086
300.010	63.6730
310.010	63.2683
320.010	62.8919
330.010	62.5411
340.010	62.2139

350.010	61.9083
360.010	61.6224
370.010	61.3547
380.010	61.1038
390.010	60.8684
400.010	60.6473
410.010	60.4395
420.010	60.2441
430.010	60.0601
440.010	59.8868
450.010	59.7234
460.010	59.5692
470.010	59.4238
480.010	59.2864
490.010	59.1565
500.010	59.0338
510.010	58.9177
520.010	58.8078
530.010	58.7038
540.010	58.6053
550.010	58.5120
560.010	58.4235
570.010	58.3396
580.010	58.2600
590.010	58.1845
600.010	58.1129
610.010	58.0448
620.010	57.9802
630.010	57.9188
640.010	57.8605
650.010	57.8051
660.010	57.7523
670.010	57.7022
680.010	57.6545
690.010	57.6092
700.010	57.5660
710.010	57.5250
720.010	57.4859
730.010	57.4486
740.010	57.4132
750.010	57.3794
760.010	57.3472
770.010	57.3166
780.010	57.2874
790.010	57.2596
800.010	57.2330
810.010	57.2078
820.010	57.1836
830.010	57.1607
840.010	57.1387
850.010	57.1178
860.010	57.0979
870.010	57.0788
880.010	57.0607
890.010	57.0434
900.010	57.0268
910.010	57.0110
920.010	56.9960
930.010	56.9816
940.010	56.9679
950.010	56.9548
960.010	56.9423
970.010	56.9303
980.010	56.9189
990.010	56.9080

Based on a travel time of 62.4914 years
For the receptor to be at 10.0000 ppb
The SSTL should be (in ppb): 113.340

TITLE : GREENS OIL COMPANY
CBM JOB # : 11030
SC ID # : 09344

Contaminant of Concern is MTBE

C(x,0,0,t)=(C0/2)erfc[(x-vt)/2(Ax*vt)1/2]
erf[Y/4(Ay*x)1/2]erf[Z/2(alphz*x)1/2]

INPUT PARAMETERS :

Concentration of Source (ppb) = 801.00
Source Width (ft) = 60.00
Vertical Thickness of Source (ft) = 27.50
Distance of Recipient (ft) =100.00
Groundwater Flow Velocity (ft/yr) = 3.65
RBSL concentration for COC(ppb) = 40.00
Longitudinal Dispersivity (ft) = 100.000000
Transverse Dispersivity (ft) = 33.333332
Vertical Dispersivity (ft) = 5.000000
Total Organic Carbon, TOC (mg/kg) = 101.00
Total Petroleum Hydrocarbons,TPH(mg/kg) = 49.50
Soil/Water Part. Coefficient,Koc(ml/g) = 11.00
Organic Carbon Fraction, foc (%) = 0.0001297
Porosity = .250
Bulk Density (g/cc) = 1.600
Retardation Factor, Rf = 1.00913
Contaminant Velocity (ft/yr) = 3.61697

SSTL CONCENTRATION COMPUTED FOR :
100.000 ft.

TIME (yrs)	SSTL FOR RECEPTOR 1 (ppb)
0.100000E-01	Plume will not reach receptor in given time
10.0100	999.805
20.0100	553.959
30.0100	433.318
40.0100	375.508
50.0100	341.038
60.0100	317.978
70.0100	301.427
80.0100	288.974
90.0100	279.285
100.010	271.556
110.010	265.271
120.010	260.083
130.010	255.748
140.010	252.089
150.010	248.975
160.010	246.307
170.010	244.007
180.010	242.013
190.010	240.278
200.010	238.763
210.010	237.434
220.010	236.266
230.010	235.236
240.010	234.327
250.010	233.521
260.010	232.807
270.010	232.172
280.010	231.607
290.010	231.103
300.010	230.654
310.010	230.252
320.010	229.893
330.010	229.572
340.010	229.284

350.010	229.026
360.010	228.795
370.010	228.587
380.010	228.400
390.010	228.232
400.010	228.081
410.010	227.945
420.010	227.822
430.010	227.712
440.010	227.613
450.010	227.523
460.010	227.442
470.010	227.369
480.010	227.304
490.010	227.244
500.010	227.191
510.010	227.142
520.010	227.098
530.010	227.059
540.010	227.023
550.010	226.991
560.010	226.961
570.010	226.935
580.010	226.911
590.010	226.889
600.010	226.870
610.010	226.852
620.010	226.836
630.010	226.821
640.010	226.808
650.010	226.796
660.010	226.785
670.010	226.775
680.010	226.766
690.010	226.758
700.010	226.751
710.010	226.744
720.010	226.738
730.010	226.733
740.010	226.728
750.010	226.724
760.010	226.720
770.010	226.716
780.010	226.712
790.010	226.709
800.010	226.707
810.010	226.704
820.010	226.702
830.010	226.700
840.010	226.698
850.010	226.696
860.010	226.695
870.010	226.693
880.010	226.692
890.010	226.691
900.010	226.690
910.010	226.689
920.010	226.688
930.010	226.687
940.010	226.687
950.010	226.686
960.010	226.685
970.010	226.685
980.010	226.684
990.010	226.684

Based on a travel time of 27.6474 years
For the receptor to be at 40.0000 ppb
The SSTL should be (in ppb): 453.359

CORRECTIVE ACTION PLAN FOR NATURAL ATTENUATION

UST Permit Name: Greens Oil Company
UST Permit #: 09344
Date Release Reported: 1991
Project Manager: Holly Freisen
Priority Class: _____

CoC Concentrations (ug/L)

Benzene:	2,280
Toluene:	9,520
Ethylbenzene:	3,700
Xylenes:	17,400
MTBE:	801
Naphthalene:	991

SSTL Concentration (ug/L)

Benzene:	28.34
Toluene:	5,667.25
Ethylbenzene:	3,967.13
Xylenes:	56,698.20
MTBE:	226.68
Naphthalene:	56.91

Date of Last Sampling: June 12, 2003
Contractor: CBM Environmental Services
Assessment Activities Completed: Groundwater Sampling
# of Sampling Events Completed: one
Groundwater Velocity (ft/yr): 3.65
Groundwater Flow Direction: North
Depth to Groundwater: 2.82 ft
Soil Lithology: sandy clay
Distance to the Nearest Receptor? 3,000 feet
Type of Receptor? Surface water
Is the CoC Plume Defined (Yes/No)? yes
Is the CoC Plume Stable (Yes/No)? no

Additional Comments:

Proposal to sample 8 wells in 1 months to verify natural attenuation

Project Manager: Holly Freisen
Date: 9/10/03

BIOSCREEN Natural Attenuation Decision Support System

Air Force Center for Environmental Excellence — *Version 1.3*

Greens Oil Company
Rock Hill, South Carolina
Run Name

Data Input Instructions:

1. Enter value directly... or
2. Calculate by filling in grey cells below. (To restore formulas, hit button below).

- Data used directly in model.
- Value calculated by model. (Don't enter any data).

1. HYDROGEOLOGY

Seepage Velocity*	Vs	2.1	(ft/yr)
or		↑ or	
Hydraulic Conductivity	K	5.0E-05	(cm/sec)
Hydraulic Gradient	I	0.02	(ft/ft)
Porosity	n	0.25	(-)

2. DISPERSION

Longitudinal Dispersivity*	alpha x	25.0	(ft)
Transverse Dispersivity*	alpha y	1.0	(ft)
Vertical Dispersivity*	alpha z	0.1	(ft)
or		↑ or	
Estimated Plume Length	Lp	80	(ft)

3. ADSORPTION

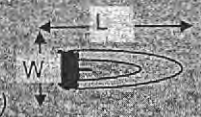
Retardation Factor*	R	1.1	(-)
or		↑ or	
Soil Bulk Density	rho	1.6	(kg/l)
Partition Coefficient	Koc	81	(L/kg)
FractionOrganicCarbon	foc	1.30E-04	(-)

4. BIODEGRADATION

1st Order Decay Coeff*	lambda	1.1E+0	(per yr)
or		↑ or	
Solute Half-Life	t-half	0.65	(year)
or Instantaneous Reaction Model			
Delta Oxygen*	DO	2.47	(mg/L)
Delta Nitrate*	NO3	0.72	(mg/L)
Observed Ferrous Iron*	Fe2+	15.43	(mg/L)
Delta Sulfate*	SO4	4.1	(mg/L)
Observed Methane*	CH4	2.87	(mg/L)

5. GENERAL

Modeled Area Length*	200	(ft)
Modeled Area Width*	250	(ft)
Simulation Time*	12	(yr)



115 ↑ or 0.02

Variable* 20

6. SOURCE DATA

Source Thickness in Sat.Zone* 25 (ft)

Source Zones:

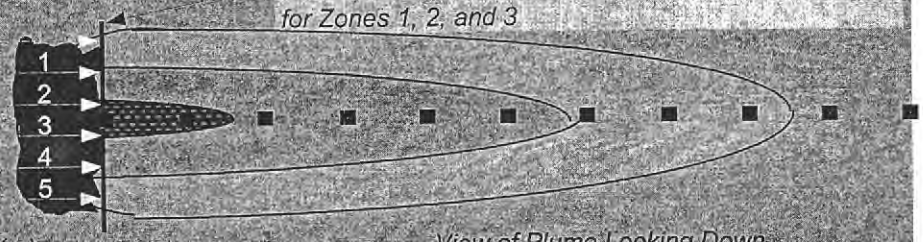
Width* (ft)	Conc. (mg/L)*
100	80
0	0
0	0

Source Decay (see Help):

SourceHalflife* 6 (yr)

Soluble Mass ↑ or In NAPL Soil 27 (Kg)

Vertical Plane Source: Look at Plume Cross-Section and Input Concentrations & Widths for Zones 1, 2, and 3



View of Plume Looking Down

Observed Centerline Concentrations at Monitoring Wells If No Data Leave Blank or Enter "0"

7. FIELD DATA FOR COMPARISON

Concentration (mg/L)	.0	32.9	.0							.0	
Dist. from Source (ft)	0	100	200	220	240	260	280	300	320	340	360

8. CHOOSE TYPE OF OUTPUT TO SEE:

RUN CENTERLINE — **View Output**

RUN ARRAY — **View Output**

Help

Recalculate This Sheet

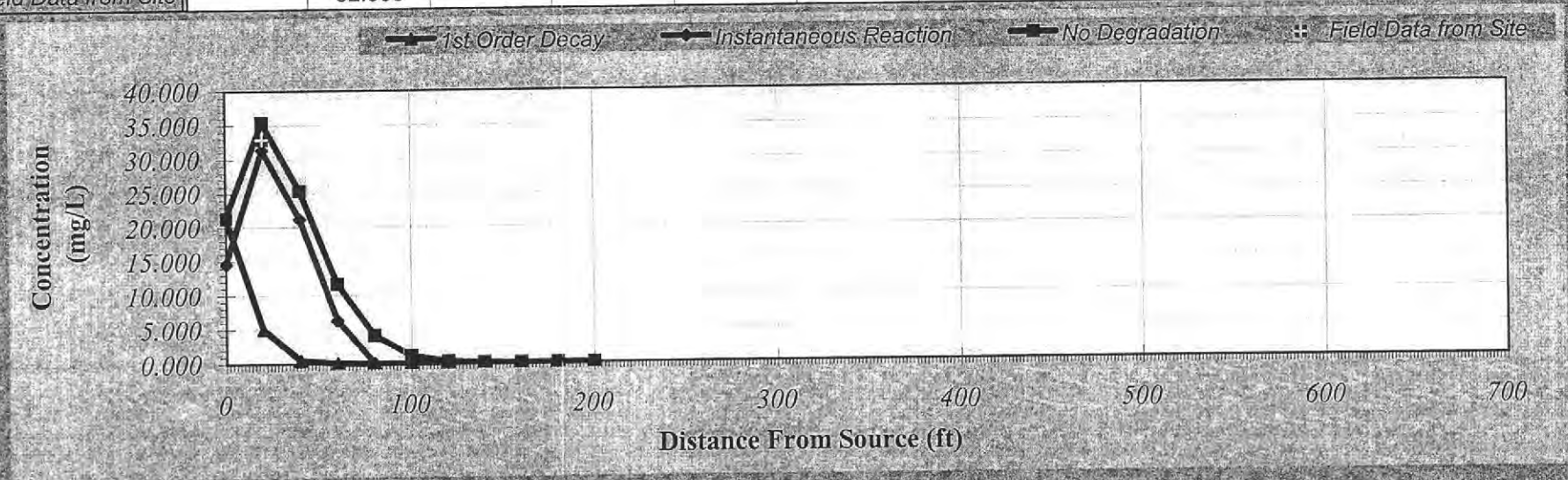
Paste Example Dataset

Restore Formulas for Vs, Dispersivities, R, lambda, other

BIOSCREEN Input Screen. Green's Oil Company, Rock Hill, South Carolina.

DISSOLVED HYDROCARBON CONCENTRATION ALONG PLUME CENTERLINE (mg/L at Z=0)

	Distance from Source (ft)										
TYPE OF MODEL	0	20	40	60	80	100	120	140	160	180	200
No Degradation	21.357	35.422	25.332	11.577	4.022	1.042	0.199	0.028	0.003	0.000	0.000
1st Order Decay	21.357	4.995	0.467	0.036	0.003	0.000	0.000	0.000	0.000	0.000	0.000
Inst. Reaction	14.581	31.379	21.100	6.280	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Field Data from Site		32.900									



Calculate Animation

Time: 12 Years

Return to Input

Recalculate This Sheet

Centerline Output. Green's Oil Company, Rock Hill, South Carolina.

DISSOLVED HYDROCARBON CONCENTRATIONS IN PLUME (mg/L at Z=0)

Transverse Distance (ft) \ Distance from Source (ft)	0	20	40	60	80	100	120	140	160	180	200
125	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
63	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
0	14.581	31.379	21.100	6.280	0.000	0.000	0.000	0.000	0.000	0.000	0.000
-63	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
-125	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

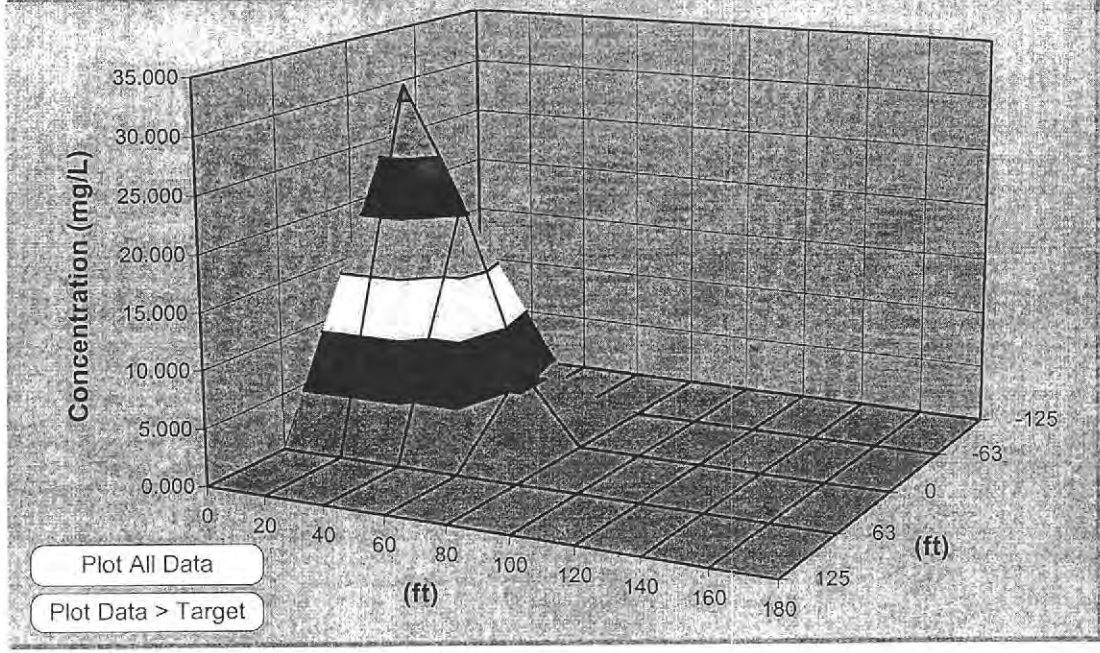
Model to Display:

- No Degradation Model
- 1st Order Decay Model
- Instantaneous Reaction Model

Time: 12 Years

Target Level: 0.005 mg/L

Displayed Model: Inst. Reaction



Plot All Data

Plot Data > Target

Plume and Source Masses (Order-of-Magnitude Accuracy)

Plume Mass if No Biodegradation	20.5	(Kg)
- Actual Plume Mass	12.9	(Kg)
= Plume Mass Removed by Biodeg	7.6	(Kg) (37 %)

Change in Electron Acceptor/Byproduct Masses:

Oxygen	Nitrate	Iron II	Sulfate	Methane	
-3.0	-0.9	+18.9	-5.0	+3.5	(Kg)

Original Mass In Source (Time = 0 Years)	27.0	(Kg)
Mass in Source Now (Time = 12Years)	6.5	(Kg)
Current Volume of Groundwater in Plume	0.7	(ac-ft)
Flowrate of Water Through Source Zone	0.030	(ac-ft/yr)

Mass HELP

Recalculate

Plume Output. Green's Oil Company, Rock Hill, South Carolina.

DISSOLVED HYDROCARBON CONCENTRATIONS IN PLUME (mg/L at Z=0)

Transverse Distance (ft)	Distance from Source (ft) 0	20	40	60	80	100	120	140	160	180	200
125	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
63	0.000	0.120	0.038	0.005	0.000	0.000	0.000	0.000	0.000	0.000	0.000
0	21.357	4.995	0.467	0.036	0.003	0.000	0.000	0.000	0.000	0.000	0.000
-63	0.000	0.120	0.038	0.005	0.000	0.000	0.000	0.000	0.000	0.000	0.000
-125	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

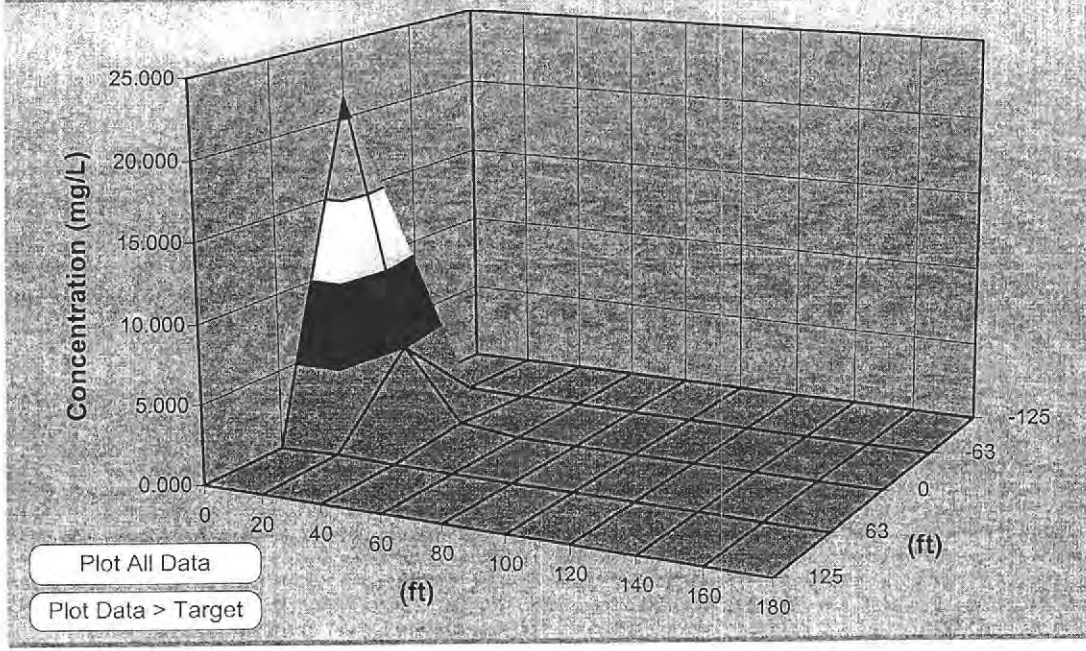
Model to Display:

- No Degradation Model
- 1st Order Decay Model
- Instantaneous Reaction Model

Time: **12 Years**

Target Level: **0.005** mg/L

Displayed Model: **1st Order Decay**



Plot All Data

Plot Data > Target

Plume and Source Masses (Order-of-Magnitude Accuracy)

Plume Mass if No Biodegradation	19.8	(Kg)
- Actual Plume Mass	3.1	(Kg)
= Plume Mass Removed by Biodeg	**16.7**	(Kg) (84 %)

Change in Electron Acceptor/Byproduct Masses

Oxygen	Nitrate	Iron II	Sulfate	Methane	
na	na	na	na	na	(Kg)

Original Mass In Source (Time = 0 Years)	27.0	(Kg)
Mass in Source Now (Time = 12Years)	7.2	(Kg)
Current Volume of Groundwater in Plume	1.4	(ac-ft)
Flowrate of Water Through Source Zone	0.030	(ac-ft/yr)

Mass HELP

Recalculate

Plume Output. Green's Oil Company, Rock Hill, South Carolina.

DISSOLVED HYDROCARBON CONCENTRATIONS IN PLUME (mg/L at Z=0)

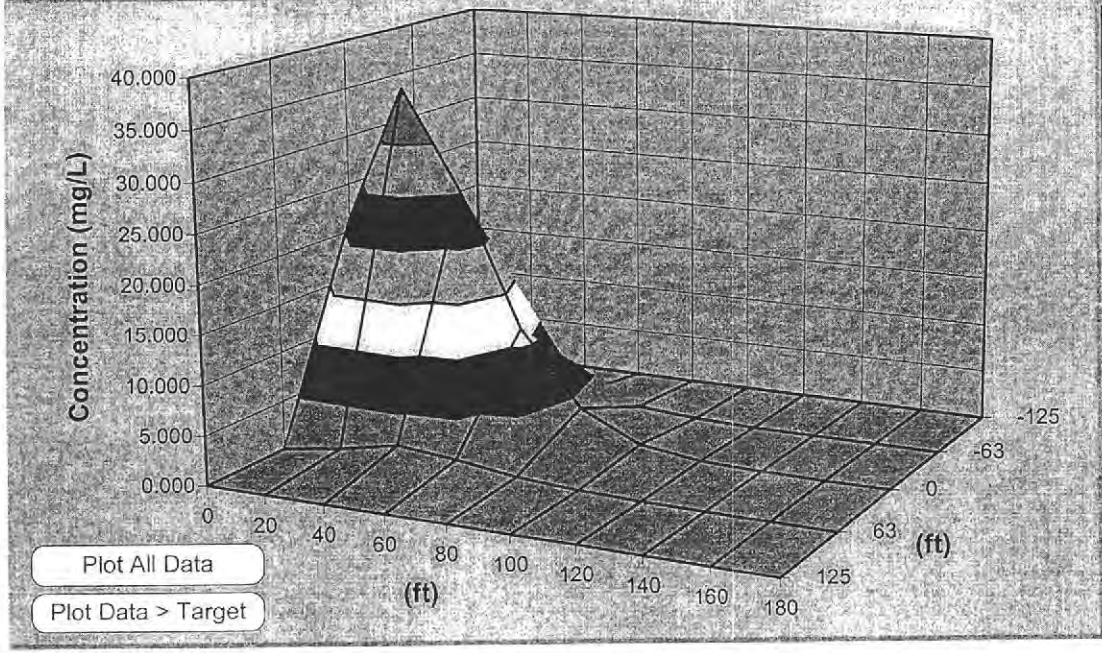
Transverse Distance (ft)	Distance from Source (ft)										
	0	20	40	60	80	100	120	140	160	180	200
125	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
63	0.000	0.852	2.055	1.469	0.650	0.196	0.042	0.006	0.001	0.000	0.000
0	21.357	35.422	25.332	11.577	4.022	1.042	0.199	0.028	0.003	0.000	0.000
-63	0.000	0.852	2.055	1.469	0.650	0.196	0.042	0.006	0.001	0.000	0.000
-125	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

Model to Display:
- No Degradation Model
- 1st Order Decay Model
- Instantaneous Reaction Model

Time: 12 Years

Target Level: 0.005 mg/L

Displayed Model: No Degradation



Plot All Data

Plot Data > Target

Plume and Source Masses (Order-of-Magnitude Accuracy)

Plume Mass if No Biodegradation	19.8	(Kg)
- Actual Plume Mass	19.8	(Kg)
= Plume Mass Removed by Biodeg	0.0	(Kg)
	0 %	

Change in Electron Acceptor/Byproduct Masses:

Oxygen	Nitrate	Iron II	Sulfate	Methane	
na	na	na	na	na	(Kg)

Original Mass In Source (Time = 0 Years)	27.0	(Kg)
Mass in Source Now (Time = 12Years)	7.2	(Kg)
Current Volume of Groundwater in Plume	3.9	(ac-ft)
Flowrate of Water Through Source Zone	0.030	(ac-ft/yr)

Mass HELP

Recalculate

Plume Output. Green's Oil Company, Rock Hill, South Carolina.

CORRECTIVE ACTION PLAN
GREEN'S OIL COMPANY
2849 CHERRY RD.
ROCK HILL, YORK COUNTY
UST PERMIT NO. 09344
SITE RISK CLASSIFICATION: HIGH
LAND USE CLASSIFICATION: COMMERCIAL
CBM PROJECT NO. 11030

Prepared For:

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January 23, 2004

Holly Freisen ISD

Holly Freisen, E.I.T.
Project Manager

Rohit Shetty, P.E.
License No 20533

TABLE OF CONTENTS

FIGURES

TABLES

APPENDICES

EXECUTIVE SUMMARY

Source Information

- Source Type: Gasoline
- Source of Release: Leaking underground storage tank (UST)
- Amount of Release: Unknown

Initial Abatement/Emergency Response

- Tank Closure: The USTs on site are currently in use. No other information regarding tank removal or closure was provided in the previous consultants' reports.
- Soil Removal: No information regarding soil removal was provided in the previous consultants' reports.
- Free Product: To date, no measurable amounts of free product have been observed at the site.
- Alternative water supply: Based on information provided by the previous consultant, no public or private water supply wells were observed within 1,000 feet of the site.

Sampling/Investigative Results

- Nature and Extent of Contamination: Gasoline
- Recent Maximum Contaminant Concentrations:

Soil – Benzene: 99.8 µg/kg (SB-5, November 5, 1996)
Toluene: 153 µg/kg (SB-5, November 5, 1996)
Ethylbenzene: 1,400 µg/kg (SB-5, November 5, 1996)
Xylenes: 5,470 µg/kg (SB-5, November 5, 1996)
Naphthalene: 1,880 µg/kg (SB-5, November 5, 1996)

Groundwater – Benzene: 2,280 µg/L (MW-1, June 12, 2003)
Toluene: 9,520 µg/L (MW-1, June 12, 2003)
Ethylbenzene: 1,980 µg/L (MW-1, June 12, 2003)
Xylenes: 17,400 µg/L (MW-1, June 12, 2003)
MTBE: 801 µg/L (MW-1, June 12, 2003)
Naphthalene: 991 µg/L (MW-1, June 12, 2003)

Proposed Remedy for Soil and Groundwater Contamination:

- Selected Remedy: It is proposed to remediate contaminated soil and groundwater beneath the site by excavation with de-watering (as needed) followed by microbial injections and natural attenuation.

1.0 INTRODUCTION

The Green's Oil Company site is located at 2849 Cherry Road in Rock Hill, York County, South Carolina. The latitude and longitude of the site are 34°58'29" North and 80°59'3" West, respectively. A Site Location Map based on the USGS Rock Hill East, South Carolina 7.5-minute quadrangle is presented as **Figure 1**. The property and UST system are owned by Green's Oil Company. The site is located in a commercial area of York County. A Site Map showing the location of the UST system is presented as **Figure 2**. The site currently serves as a gasoline and convenience retail location.

1.1 Purpose of the CAP

The purpose of this Corrective Action Plan (CAP) is to outline a remedial action plan for the restoration of groundwater and soil affected by petroleum hydrocarbons, and groundwater monitoring to track the fate and transport of the dissolved-phase hydrocarbon plume. The CAP has been prepared in response to the requirements outlined in the South Carolina Department of Health and Environmental Control (DHEC) correspondence dated October 6, 2003. The CAP has been prepared in accordance with guidelines contained in the SCDHEC guidance document entitled, "*Corrective Action Guidelines for Petroleum Releases,*" dated June 20, 1997. The CAP is based on data collected during assessment activities conducted by TET Environmental Services, Inc. (TET) and monitoring activities conducted by Nesco, Inc. (Nesco) and CBM Environmental Services, Inc. (CBM), between November 1991 and the present.

1.2 Site Information

Based on information collected from assessment activities, the contaminant source was the UST system that consists of four gasoline USTs. The location of the UST system is shown on **Figure 2**.

Based on the results of laboratory analyses of soil samples collected in the vicinity of the UST basin, product lines, dispenser islands and areas of groundwater with high hydrocarbon impact, detectable concentrations of benzene and naphthalene that exceeded the risk based screening levels (RBSL) were reported in soil sample SB-5 collected from the vicinity of monitoring well MW-1.

To date, free product has not been observed in any monitoring wells on site. Based on the results of laboratory analyses of groundwater samples collected in June 2003, concentrations of one or more BTEX constituents, MTBE and/or naphthalene that exceeded the RBSLs were reported in monitoring wells MW-1 through MW-4, MW-7 and PW-8.

1.3 Initial Remedial Actions

- Tank Closure: Based on information provided by the previous consultant, no tanks have been closed at the site.
- Soil Removed: Based on information provided by the previous consultant, no soil has been removed from the site.
- Amount of Release: Unknown.
- Free Product: Free product has not historically been observed at the site.
- Corrective Actions To-Date: Based on information provided by the previous consultant, there have been no corrective actions to date.

1.4 Previous Activities and Reports

Previous activities conducted at the site between November 1991 and July 2003 include: hydrogeologic assessment, rapid assessment, monitoring activities and fate and transport modeling. The results of hydrogeologic assessment activities, conducted by TET, were documented in a Hydrogeologic Assessment Report dated November 6, 1991. The results of rapid assessment activities, conducted by TET, were documented in a Rapid Assessment Report (RAR) dated February 20, 1997. Monitoring activities conducted by Nesco were documented in Groundwater Monitoring Reports dated October 27, 2000, January 23, 2001 and January 13, 2003. Monitoring activities conducted by CBM were documented in a monitoring report dated July 7, 2003. An Intrinsic Corrective Action Plan was prepared and submitted to the SCDHEC on August 8, 2003. The results of the fate and transport modeling were submitted to the SCDHEC on September 22, 2003.

1.5 Receptor Information

During rapid assessment activities conducted by TET on November 6, 1996, no public or private water supply wells were reported within 1,000 feet of the site. Two previously reported water supply wells downgradient of the site have been properly abandoned.

No surface water bodies were observed within 500 feet of the source area. The Catawba River is the only known potential receptor identified during the survey. The river is approximately 3,000 feet downgradient of the site. A table listing the names and addresses of adjacent property owners is included as **Appendix A**. Please refer to the RAR for additional receptor survey information.

2.0 EXPOSURE ASSESSMENT

The following paragraphs provide a summary of the findings of the previous assessment activities conducted on-site and provide information regarding the nature of the contaminants, as well as the potential contaminant pathways for human exposure.

2.1 Soils Investigation

A total of seven soil samples were collected during Rapid Assessment activities. Assessment activities conducted for the RAR included the collection of seven soil samples (SB-1 through SB-7) in November 1996. Please refer to the RAR for additional information.

2.2. Regional Geology

The site is located in the Charlotte Geologic Belt of the South Carolina Piedmont Geographic Belt. The bedrock in this area is composed primarily of Augite, Seyenite and Gabbro of Permian Age. This rock is coarse grained and gray in color. Bold outcrops are often found in this area. Aquifers found in the Piedmont are composed of clays, disintegrating rock materials, or fractured bedrock. This aquifer does not normally produce high yields of groundwater, but some high yield areas have been found near lakes and streams. The source of recharge in the Piedmont is the precipitation that saturates the saprolite that overlies unweathered rock. (Cederstrom, 1979).

2.3 Site Geology

Based on observations made during the collection of soil samples in November 1996, soils at the site consist of mostly greenish brown sandy clay and some yellowish brown silty clay to a depth of seven feet, the terminal depth of the soil borings.

2.4 Soil Analytical Results

Based on the results of laboratory analyses of soil samples collected by TET during assessment activities, detectable concentrations of benzene and naphthalene that exceeded the RBSL were reported in SB-5 collected from the vicinity of monitoring well MW-1.

A Soil Quality Map showing individual BTEX constituents, MTBE and naphthalene concentrations in soil samples collected in November 1996 has been included as **Figure 3**. A summary of the results of analyses of soil samples collected during rapid assessment activities is presented in **Table 1**. Please refer to previous assessment reports for complete laboratory analytical results.

2.5 Groundwater Investigation

To determine the horizontal and vertical extent of groundwater contamination, seven Type II monitoring wells (MW-1 through MW-7) and one Type III monitoring well (PW-8) have been installed to date at the site during the assessment activities. All monitoring wells were installed under the supervision of the previous consultants. Please refer to the previous assessment reports for well construction records. The locations of the monitoring wells are shown on **Figure 2**.

On June 12, 2003, seven Type II monitoring wells (MW-1 through MW-7) and one Type III monitoring well (PW-8) were gauged, developed and sampled.

2.6 Aquifer Characteristics

Depths to groundwater in the Type II monitoring wells measured on June 12, 2003 ranged from 2.20 to 3.52 feet. Groundwater elevations relative to a benchmark provided by the previous consultant ranged from 93.39 to 95.70 feet. Based on the June 2003 data, groundwater flow was generally toward the north. The average hydraulic gradient was approximately 0.02 feet per foot. A Water Table Surface Map based on data obtained from the Type II monitoring wells on June 12, 2003 is included as **Figure 4**. A summary of historical groundwater elevation data is presented in **Table 2**.

During RAR activities, a hydraulic conductivity of 15.8 m/yr (0.142 feet per day) was estimated. Based on a review of available assessment reports, it does not appear that any slug tests were performed on monitoring wells. The seepage velocity, calculated using the equation $V = K (dh/dl)/n_e$ was 2.07×10^{-3} feet per day (0.76 feet per year). Please refer to the RAR for additional information regarding the estimated hydraulic conductivity.

2.7 Groundwater Analytical Results

Based on the June 12, 2003 sampling results, the concentrations of one or more BTEX constituents, MTBE and/or naphthalene that exceeded the RBSLs were reported in monitoring wells MW-1 through MW-4, MW-7 and PW-8. A Groundwater Quality Map showing individual BTEX constituent, MTBE, IPE and naphthalene concentrations in the monitoring wells from the June 2003 sampling event has been included as **Figure 5.** A summary of historical laboratory analyses of groundwater samples collected from the monitoring wells is presented in **Table 3**. Please refer to previous monitoring reports for complete laboratory analytical results.

2.8 Fate and Transport Model

A fate and transport model based on Domenico equations was run to determine the risk posed by the release to potential receptors. For modeling purposes, Receptor 1 is the exposure point (as calculated by the previous consultant) located approximately 100 feet down-gradient from the center of the source area and Receptor 2 is the down-gradient limit of the 1,000-foot receptor search radius. The model was performed for each contaminant of concern (COC) that exceeded the Risk Based Screening Level (RBSL).

The results indicated that the concentrations of benzene and naphthalene would exceed the RBSLs for groundwater at each of the modeled receptors. The concentrations of toluene and MTBE would exceed the RBSLs for groundwater at Receptor 1. The concentrations of ethylbenzene and xylenes would not exceed the RBSLs at any of the modeled receptors during the simulation period. Please refer to the modeling summary report for additional information.

Based on the results of the model, site specific target levels (SSTLs) for groundwater for each COC that exceeded the RBSLs for the closest down-gradient receptor (the exposure point located 100 feet north of the site) were calculated. The calculations indicated that the concentrations of benzene, toluene, MTBE and naphthalene in the source area exceeded the SSTLs necessary to maintain the concentrations below the RBSLs at the exposure point. A summary of the SSTLs for groundwater is presented in **Table 4**. Please refer to the modeling summary report for additional information.

2.9 Natural Attenuation

In order to evaluate natural attenuation conditions at the site, on June 12, 2003, groundwater samples collected from monitoring wells MW-1 through MW-7 and PW-8 were analyzed for methane, nitrates, sulfates, ferrous iron, oxidation-reduction potential, dissolved oxygen, specific conductivity, temperature and pH.

Oxygen is the electron acceptor for aerobic metabolism, whereas nitrate, ferrous iron, sulfate and carbon dioxide can serve as electron acceptors for alternative anaerobic pathways. This transfer of electrons releases energy which is utilized for microbial cell maintenance and growth. The biochemical energy associated with alternative degradation pathways can be represented by the redox potential of the alternative electron acceptors: the more positive the redox potential, the more energetically favorable the reaction. Based solely on thermodynamic considerations, the most energetically preferred reaction (oxygen depletion) would proceed in the plume until all of the required electron acceptor is depleted. At this point, the next most preferred reaction (nitrates depletion) would proceed, leading to a pattern where preferred electron acceptors are consumed one at

a time, in sequence. In general, most natural attenuation programs yield data that indicate a general pattern of electron acceptor depletion, but not complete depletion. These general patterns of geochemical changes within the plume can provide strong evidence that multiple mechanisms of biodegradation can and are occurring at the site.

Microorganisms require moisture, oxygen, nutrients and a suitable set of environmental factors to grow. The environmental factors include pH, temperature and absence of toxic conditions. Based on published literature, critical conditions for bioremediation are a 25-85% water holding capacity, greater than 0.2 mg/L of dissolved oxygen, air filled pore space to be greater than 10% by volume, a redox potential (ORP) greater than 50 millivolts for aerobes and facultative anaerobes, sufficient nutrients (suggested C:N:P molar ratio of 120:10:1), pH ranging between 5.5 to 8.5 (for most bacteria) and temperature ranging between 15 to 45°C.

An evaluation of natural attenuation parameters indicated that conditions that facilitate natural attenuation (i.e. alternate electron acceptor concentrations (DO, nitrates, sulfates and ferrous iron) and ORP) exist at the site. Based on past experience and from published literature on the subject, the source area wells (including MW-1) with typically higher hydrocarbon concentrations would be expected to have lower dissolved oxygen levels and possibly detectable levels of iron (indicator of anaerobic pathways). A summary of natural attenuation measurements collected in June 2003 is presented in **Table 5**. Please refer to the July 2003 Groundwater Monitoring Report for a complete report of laboratory analyses of groundwater samples collected in June 2003.

A fate and transport simulation was performed to determine the feasibility of site remediation by natural attenuation. The reduction of the contaminants of concern in the saturated zone by natural attenuation was estimated using BIOSCREEN, which simulates remediation through natural attenuation of dissolved hydrocarbons. The results of the natural attenuation fate and transport simulation indicated that the contaminant plume had not reached steady state. In addition, the model indicated that approximately 24% of the source mass in 1991 (when the release was discovered) was still present in the source area. Based on a comparison of groundwater quality data between December 2002 and June 2003, it appears that although reduction in contaminant concentrations in groundwater is occurring, the reduction is not significant compared to the significant increase in contaminant concentrations since October 1996. Based on this, remediation by natural attenuation alone is not determined to be a viable option for this site. A remediation strategy based on the elimination of the secondary source followed by natural attenuation would expedite the remediation effort and would be more cost effective in the long term. Please refer to the modeling summary report for additional information.

2.10 Free Product Recovery

To date, free product has not been observed in any monitoring wells at the site.

3.0 EVALUATION OF REMEDIATION ALTERNATIVES

3.1 Soil Remediation Alternatives

Based on the soil quality data obtained to-date, hydrocarbon impacted soil appears to be concentrated in the vicinity of the monitoring well MW-1. Since groundwater has been affected by the release, it is apparent that the contaminated soil extends to the water table. Several soil remediation alternatives were considered and the options pertinent to this site are discussed in the following paragraphs. An overview of additional soil remediation options is presented in **Appendix B**.

Excavation with Off-Site Disposal of Impacted Soil

Excavation with off-site landfill disposal involves removing calculated volumes of soil with high concentrations of contaminants. Contaminated soil is excavated and transported to a landfill for disposal. Since groundwater has been affected by the release, it is expected that soil contamination extends to the water table to a depth of approximately two to four feet below grade in the vicinity of monitoring well MW-1.

A limitation of this method is that it simply moves contaminants to a landfill without treating or destroying them. The technique is also subject to extensive land disposal restrictions, which can vary between states and counties. It is also subject to constraints in landfill capacity. In addition, excavating large quantities of soil is expensive. In addition, if soil contamination exists beneath the building, this technique would be incapable of adequately addressing the contamination, without affecting the building.

An advantage of this method is that it is relatively easy to execute and does not involve a major capital expenditure. In addition, it effectively removes the mass of contaminants from the soil and thereby reduces the risk of soil acting as a secondary source of contamination. When the amount of contaminated soil is relatively small and no structures are at risk, or disruption of on-going business is negligible, soil excavation is very feasible as a remediation method. Based on an evaluation of existing site conditions and the extent and depth of saturated and unsaturated soil contamination, soil excavation in the vicinity of monitoring well MW-1 appears to be a feasible method of soil (and groundwater) remediation for the site. Due to the shallow depth to groundwater, it is recommended that the excavated area should be de-watered (as needed) as excavation progresses to help keep the excavated area accessible and to remove any contaminated water that seeps into the

pit.

Natural Attenuation

Natural attenuation is an approach for removing biodegradable contaminants from soil. This method of remediation relies on naturally occurring microorganisms to break down petroleum products in the soil to water and carbon dioxide. It does not necessarily require the addition of oxygen or nutrients to facilitate the process.

A limitation of this method is that it is extremely slow. It is most appropriate when expedient remediation is not needed and nearby receptors will not be affected by the contaminated soil. The technique offers low cost and minimal disruption to operations. In addition, this method generates no waste streams. The method, however, is inherently slow and biodegradation of contaminants is dependent on the presence of sufficient nutrients, moisture and an active indigenous microbial population. In addition, throughout the process contaminated soil can continue to act as a secondary source of groundwater contamination.

There are a number of methods of enhancing and expediting the attenuation process. These involve the addition of oxygen, nutrients and/or selective microbes in design combinations. The right combination of microbes, nutrients and oxygen source can expedite the destruction of hydrocarbon contaminants in the subsurface. Based on an evaluation of natural attenuation parameters, conditions that facilitate natural attenuation (i.e. alternate electron acceptor concentrations (nitrates, sulfates and ferrous iron), ORP, DO, pH and production of methane) exist at the site. Attenuation, natural or engineered, is a feasible option for this site and is often used in conjunction with soil excavation.

In-Situ Soil Vapor Extraction (SVE)

In-situ soil vapor extraction is a technique for removing contaminants from unsaturated soils. The technique involves drawing fresh air into the ground with a vacuum pump. The air brings the volatile contaminants to the surface where they can be treated and safely discharged. Although recovery of volatiles is the primary function of SVE, the fact that oxygen (air) is drawn into the subsurface, some biodegradation of semi-volatile and non-volatile contaminants takes place. In-situ soil vapor extraction is most effective in coarse-grained soils such as sand and gravel. It typically requires a minimum five-foot thick unsaturated zone of soil. This technique can be used in conjunction with air sparging, groundwater pumping or bioremediation systems. This technique is able to treat large volumes of soil effectively and with minimal disruption to business operations. It can also remove contamination from near or under fixed structures.

A major disadvantage of soil vapor extraction is that it involves equipment cost, extensive operation and maintenance costs and problems associated with rotating equipment and noise. Based on contaminant concentrations in soil, it does not appear that SVE would be a very cost effective method of remediation at the site. In addition, the relatively shallow depth to groundwater would cause the SVE system to extract more water than vapor, defeating the very purpose of the system. Therefore, soil vapor extraction is not a feasible option of soil remediation at this site.

3.2 Groundwater Remediation Alternatives

The results of the site assessment activities indicated that groundwater at the site has been impacted by petroleum hydrocarbons in concentrations exceeding the RBSLs. Several groundwater remediation alternatives were considered and the options pertinent to the site are discussed in the following paragraphs. An overview of additional groundwater remediation options is included in **Appendix B**.

In-Situ Air Sparging (With Soil Vapor Extraction)

The use of supplemental air injected into the subsurface has been used to enhance the remediation of both groundwater and soil contamination. When air is injected below the groundwater surface, it is known as air sparging (AS). The air strips out dissolved volatile petroleum hydrocarbons from the groundwater (and the adsorbed contaminants from the soil) by volatilization, carrying it up into the unsaturated soil where it can be captured by the soil vapor extraction system. From the injection point, the air moves upward and outward because in the subsurface horizontal permeability is generally higher than the vertical permeability. Thus, a single air injection point can influence a significant area of contamination. Although some biodegradation of the hydrocarbons takes place, volatilization is the primary process and purpose of air sparging. Thus, semi-volatile and non-volatile contaminants stay behind in the soil or groundwater. A limitation of air sparging is that it is difficult to control the air distribution in the groundwater. In addition, it can promote vapor and plume migration. Its effectiveness is limited in low permeability or heterogeneous media. However, by carefully locating the air injection wells, providing a cap (paving) on the site and using SVE, the general flow direction can be controlled to maximize flow through the plume to the extraction well points.

With the exception of the contaminant concentrations in monitoring well MW-1, minimal groundwater impact is present at the site. Based on this data it does not appear that groundwater beneath the site has been significantly impacted by the petroleum hydrocarbon release to warrant an AS system. Based on an evaluation of site conditions and low groundwater impact, air sparging is not considered a feasible and cost effective method of remediation.

Natural Attenuation and Biodegradation

This remediation method allows naturally occurring processes to degrade the petroleum hydrocarbon plume. Research has shown that groundwater impacted by compounds associated with petroleum motor fuels, particularly benzene, toluene, ethylbenzene and xylenes can be remediated through naturally occurring processes. Although physical mechanisms such as advection, dispersion, volatilization and adsorption are important in the fate and transport of these compounds in subsurface environments, biological processes such as aerobic and anaerobic degradation have been shown to contribute significantly to the natural attenuation process. Field studies have demonstrated that aerobic biodegradation is the most significant biodegradation mechanism for petroleum constituents such as BTEX. Therefore, sufficient dissolved oxygen must be available for degradation via aerobic microorganisms to occur. Typically, this alternative is selected when the site conditions are suitable, contaminant concentrations are relatively low, the aerial extent of contamination is limited and migration of the plume will not adversely impact groundwater receptors.

There are a number of methods of enhancing and expediting the attenuation process. These involve the addition of oxygen, nutrients and/or selective microbes in design combinations. The right combination of microbes, nutrients and oxygen source can expedite the destruction of hydrocarbon contaminants in the subsurface. Attenuation, natural or engineered, is a feasible option for this site. A mixture of oxygen source, nutrients and/or selective microbes could be injected into the subsurface using temporary or permanent injection wells and the destruction of hydrocarbon contaminants would proceed without any need for supervision. The injection of nutrients and/or selective microbes is a feasible option for this site to remediate groundwater contamination.

Groundwater Pump and Treat

This technology involves the recovery of contaminated groundwater through the use of extraction wells followed by physical treatment of groundwater using one or a combination of three processes: granular activated carbon, air stripping, or bioremediation. Continuous recovery of groundwater serves to control migration of the contaminant plume and lessen the contaminant concentrations in the aquifer over time. This technique is most effective in permeable aquifers. It can also be used in conjunction with soil vapor extraction to enhance removal of volatile contaminants from the zone of water table fluctuation.

A limitation of pump and treat is that it can take a long time to achieve complete remediation. In addition, this method is subject to fluctuations of the water table that can smear contaminants and complicate clean-ups.

Off-site discharge permits might also be required. The capital costs associated with the installation of remediation equipment, operation and maintenance can be significantly high. Groundwater pump and treat is not a feasible option for the site and is not considered a cost effective option.

3.3 Recommended Remedial Option

Based on current available information concerning the various treatment options, existence and concentrations of contamination, remediation of soil and groundwater beneath the Green's Oil Company site may best be achieved soil excavation with de-watering, as needed, followed by microbial injections and natural attenuation. Reasons for selecting this technology include:

- Soil excavation in the vicinity of monitoring well MW-1 with de-watering (as needed) of the excavated area prior to backfilling is relatively easy to implement and does not involve a major capital expenditure.
- Soil excavation would be effective in removing all or a significant mass of contamination from the source area which would eliminate the secondary source.
- Bioremediation destroys the contaminants instead of just transferring them to another phase or environment.
- The injection of a blend of microbes, nutrients and oxygen to the subsurface would expedite the degradation of groundwater contamination remaining after the soil excavation and de-watering.
- Does not involve major capital expenditure.
- The system is easy to maintain, no noise, odor concerns.
- Low to medium cost of implementation.

The other remedial options evaluated for the site were not selected for the following reasons:

- Air sparging was not considered feasible due to the high equipment, operation and maintenance costs and overall cost-ineffectiveness for low hydrocarbon impacted groundwater. In addition, air sparging may result in the lateral migration of contaminants within the subsurface.
- Soil vapor extraction was eliminated because of the shallow depth to groundwater. Typically, when the seasonal high water table is as shallow as is the case with the referenced site, the system would extract more water than vapor, defeating the very purpose of the system.
- Groundwater pump and treat was not a feasible remediation alternative due to long remediation time and significantly high capital expenses.

4.0 PROPOSED CORRECTIVE ACTION PLAN

4.1 System Overview

It is proposed to reduce the concentrations of petroleum hydrocarbons in soil and groundwater beneath the Green's Oil Company site by soil excavation combined with de-watering of the excavated area followed by microbial injections and natural attenuation. Natural attenuation parameters will continue to be monitored in addition to regular monitoring of volatile and semi-volatile organics. By excavating and removing a majority of the contaminated soils, a possible secondary source of contamination will be eliminated and the total amount of time to remediate soil and groundwater will be greatly reduced. The contaminated soil will be transported off-site for disposal and treatment.

It is proposed to excavate the soil in the vicinity of monitoring well MW-1 to a depth of approximately eight feet. Any monitoring wells destroyed during the excavation will be replaced after completion of excavation, backfilling and compaction of the clean backfill. After excavation activities are completed, a network of both permanent and temporary injection wells will be installed throughout the body of the hydrocarbon plume to deliver a blend of microbes, nutrients and oxygen to the subsurface. The injection wells will be located in the vicinity of monitoring wells MW-1, MW-2, MW-5 and MW-7. After the microbial injections, groundwater monitoring may proceed, to monitor contaminant reductions as a result of the excavation, injections and natural attenuation. Microbial injections and monitoring will continue until the contaminant concentrations are at or below SSTLs and until the SCDHEC advises closure for the site.

The proposed area of soil excavation is shown on **Figure 6**. The proposed locations of the permanent and temporary injection wells are shown on **Figure 7**. Estimated first year costs for the proposed remediation are included in **Appendix C**. A cost comparison of alternate remediation technologies considered for the Green's Oil Company site has also been included in **Appendix C**. An approximate estimate of the time required for the remediation of soil and groundwater has been included as **Appendix D**.

4.2 Basis for Proposed System Recommendation

- Excavating the soil, de-watering the excavated area (as needed) and replacing excavated soil with clean fill is the most expeditious method of eliminating the source. De-watering the excavated area simultaneously with the excavation would not only help reduce the problem of groundwater seepage into the excavated area from hindering excavation, but would also remove any contaminated water in the vicinity. Groundwater extracted from the excavation would be collected in groundwater disposal trucks and disposed at a licensed facility.

- The injection of a blend of microbes, nutrients and oxygen to the soil and groundwater will increase the rate of biodegradation of COCs at the site.
- The process is minimally intrusive and easy to implement. There is no possible problem of odor or noise.
- After the soil excavation, backfilling and injection well installation are completed, no equipment other than that used for injections, sampling and monitoring is required.

4.3 Microbial Injection Methodology

It is anticipated that a total of 41 permanent or temporary injection wells will be located on-site in the areas of high hydrocarbon impact. The configuration of the injection wells is based upon a radius of influence of five feet. The injection wells are proposed to be installed to depths of 10 to 30 feet below grade. The injection wells will be constructed of one-inch diameter Schedule 40 PVC casing, each with a section of 0.010-inch slot screen ranging from 8 to 28-foot in length, depending on well depth. Typical injection well details are shown on **Figure 8.** The temporary wells will be abandoned after the injection is completed in accordance with the established SCDHEC guidelines.

4.4 Equipment and Components

After the completion of excavation, de-watering, backfilling and injection well installation, only equipment for microbial injections, sampling and monitoring will be needed. Material Safety Data Sheets (MSDS) for the microbial product proposed to be used on-site are included as **Appendix E**.

4.5 Sampling and Reporting

Groundwater samples will be analyzed for BTEX constituents, MTBE and naphthalene using EPA Method 8260. In addition, groundwater samples will be analyzed for methane by Method 8015, nitrates and sulfates by EPA Method 300.0 and ferrous iron by Method 3500D. In addition, field measurements of dissolved oxygen (DO), carbon dioxide (CO_2), pH, temperature and oxidation/reduction potential (ORP) will also be obtained. Soil samples (if required) will be analyzed for volatile and semi-volatile organics using SW846 Methods 8260B and 8270C, respectively. Soil samples will be screened with an organic vapor analyzer (OVA) to determine the presence of VOCs. Reporting will be on a quarterly basis for the remediation period unless otherwise indicated by the SCDHEC. A summary of the sampling and reporting schedule is presented in **Table 6.**

4.6 Monitoring and Evaluation

Performance monitoring to evaluate the effectiveness of the process is a critical element of natural attenuation. Performance monitoring is of great importance for natural attenuation due to the potentially longer remediation time period and potential for ongoing contaminant migration. As the laboratory results are received, the progression of remediation by natural attenuation will be tracked, monitored and evaluated.

- CO_2 levels in the groundwater will be monitored. These indicate biological activity and should be done early at start-up and then quarterly thereafter.
- Dissolved oxygen (DO) levels in the groundwater will be monitored on a quarterly basis in conjunction with monitoring well sampling events.
- VOC concentrations in groundwater will indicate what is being removed and areas being affected by the biodegradation process. This monitoring will be done on a quarterly basis.
- Depth to water measurements will be collected on a quarterly basis during each groundwater sampling event.
- Evaluation of the data to verify that the size and movement (if any) of the plume will be evaluated quarterly.

The proposed implementation schedule is presented in **Table 7**.

4.7 System Security and Safety Measures

During work performed on site, all OSHA Safety Regulations will be observed (i.e. barriers, warning signs, etc.).

5.0 PERMITS REQUIRED

- No air emissions or NPDES permit will be necessary because there will be no emissions or discharge of effluent.
- An Underground Injection Control (UIC) permit will be required for microbial injections.

6.0 ABANDONMENT

Following written confirmation from the SCDHEC that the soil and groundwater have been restored to acceptable standards (at or below SSTLs), the site will be returned to its original condition (i.e., landscaping, repair/replacement of fences, if any, etc.). All monitoring wells will be abandoned in accordance with established guidelines.

7.0 LIMITATIONS

This report has been prepared for the exclusive use of Mr. Jerry Green for specific application to the referenced site in York County, South Carolina. The assessment was conducted based on the scope of work and level of effort desired by the client and with resources adequate only for that scope of work. Our findings have been developed in accordance with generally accepted standards of geology and hydrogeology practices in the State of South Carolina, available information, and our professional judgment. No other warranty is expressed or implied.

The data that are presented in this report are indicative of conditions that existed at the precise locations sampled and at the time the samples were collected. In addition, the data obtained from samples would be interpreted as being meaningful with respect to parameters indicated in the laboratory report. No additional information can logically be inferred from these data.

Please note that certain information contained in this report was not obtained under the supervision of CBM. Therefore, CBM cannot verify the accuracy of this information. However, for the purpose of this report, CBM assumes that this information is correct.

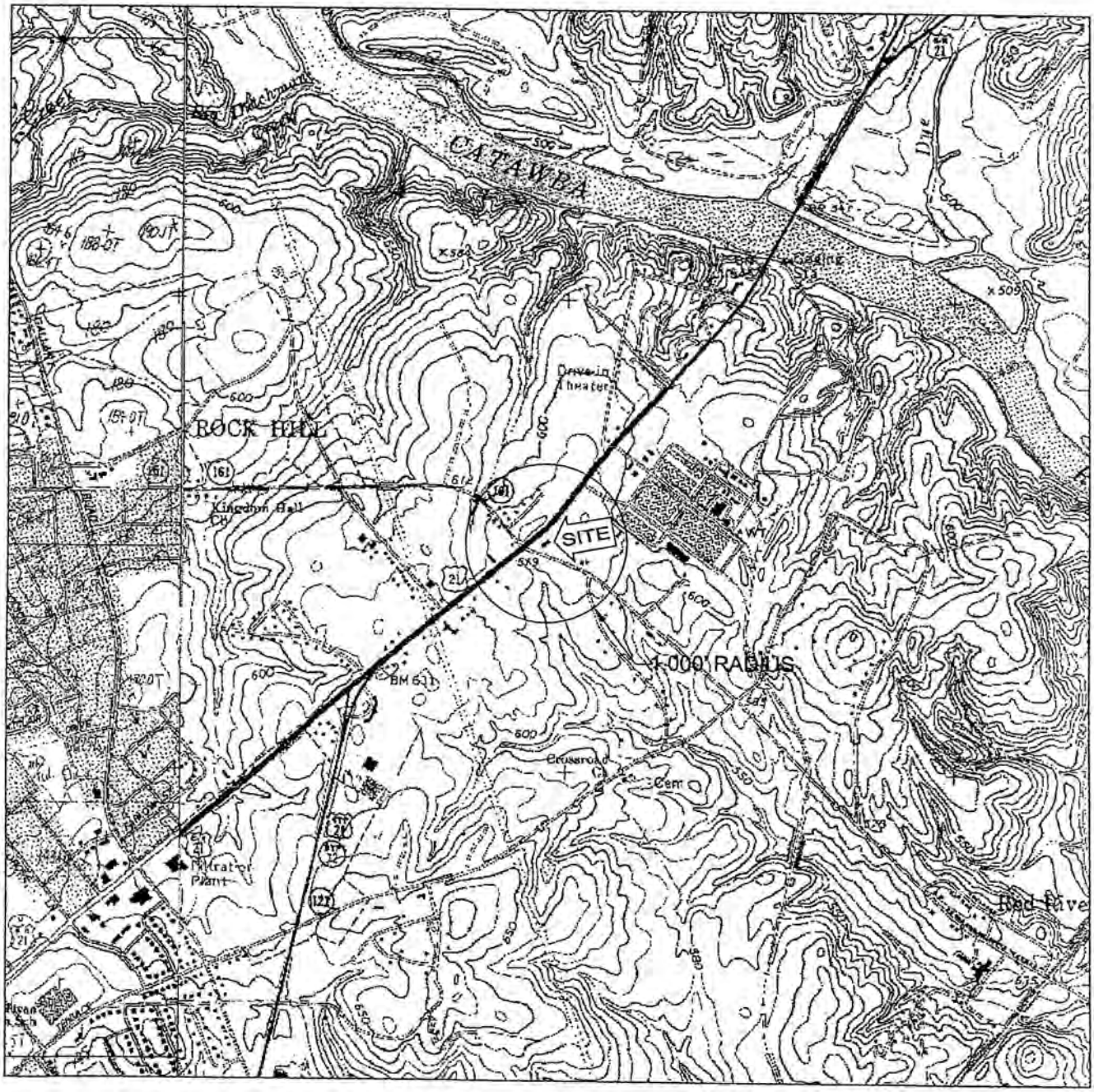
8.0 REFERENCES

Cederstrom, D.J., Boswell, E.H. Tarver, G.R., 1979, Geological Survey Professional Paper 813-0: "Summary Appraisals of the Nations Groundwater Resources – South Atlantic – Gulf Region".

EPA PUBLICATION: EPA 510-F-92-029; "An Overview of Underground Storage Tank Remediation Options."

Kuo, Jeff, Lewis Publishers, 1998. "Practical Design Calculations for Groundwater and Soil Remediation.

Lewis, Sr., Richard J. "Hazardous Chemicals Desk Reference," 2nd Edition.



SCALE 1:24,000

1 0 1 MILE

1000 0 1000 2000 3000 4000 5000 6000 7000 FEET

CONTOUR INTERVAL 10 FEET

QUADRANGLE LOCATION

ROCK HILL EAST, SC QUADRANGLE

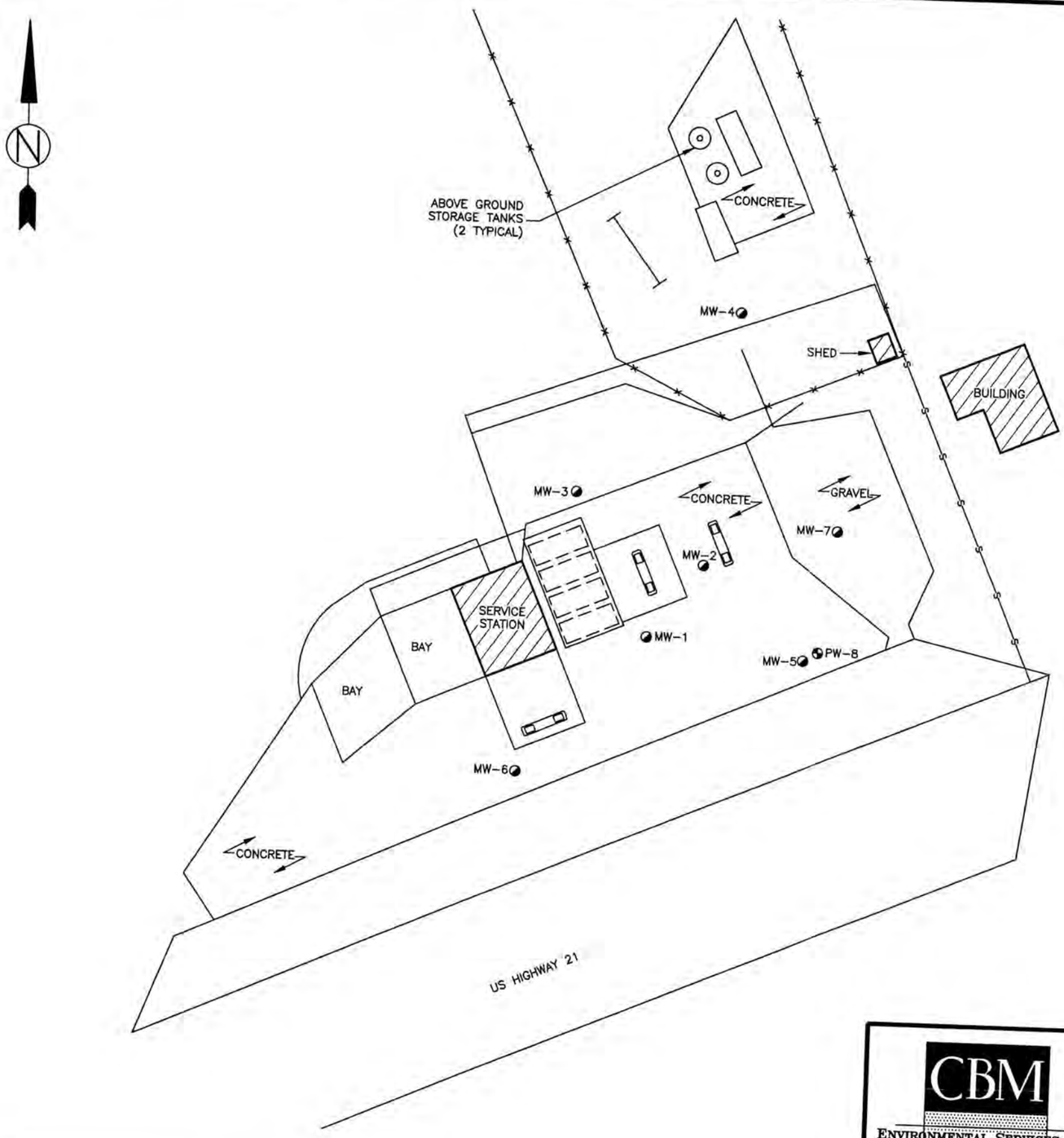
CBM ENVIRONMENTAL SERVICES, INC.

LATITUDE:	34° 58' 29" N
LONGITUDE:	80° 59' 3" W
DRAWN BY:	AWB
CHECKED BY:	HF
DATE:	7/2/03

GREEN'S OIL CO.
2849 CHERRY RD.
ROCK HILL, SC

FIGURE 1

USGS TOPOGRAPHIC MAP



LEGEND

- TYPE II MONITORING WELL
- TYPE III MONITORING WELL
- FENCE
- S — SEWER LINE

SCALE

0 10 20 30 40

FEET

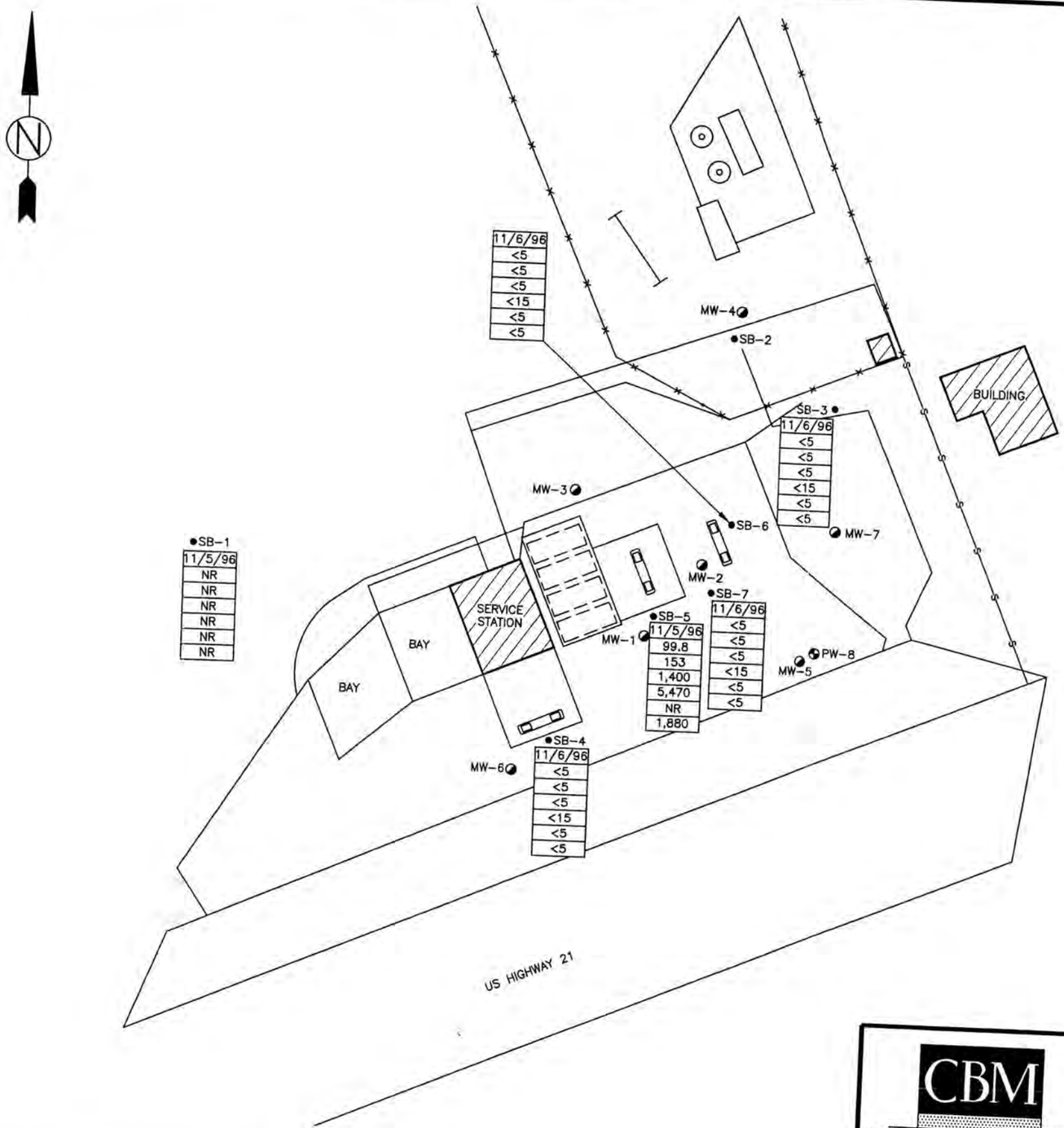
CBM ENVIRONMENTAL SERVICES, INC.

SITE I.D. NO.	09344
PROJECT NO.	11030
DRAWN BY:	BLS/AWB
CHECKED BY:	HF
DWG DATE:	11/20/03

SITE MAP

GREEN'S OIL CO.
2489 CHERRY ROAD
ROCK HILL, SC

FIGURE 2



LEGEND

- SOIL SAMPLE
- TYPE II MONITORING WELL
- TYPE III MONITORING WELL
- FENCE
- S — SEWER LINE

11/5/96	SAMPLE DATE
99.8	BENZENE
153	TOLUENE
1,400	ETHYLBENZENE
5,470	XYLENES
NR	MTBE
1,880	NAPHTHALENE

CONCENTRATIONS IN $\mu g/kg$

<5 – LESS THAN THE METHOD DETECTION LIMIT SPECIFIED IN THE LABORATORY REPORT

NR – ANALYSIS NOT REQUESTED

NOTE: REFER TO TABLE 1 FOR OTHER DETECTABLE CONTAMINANT CONCENTRATIONS

SCALE

0 10 20 30 40

FEET

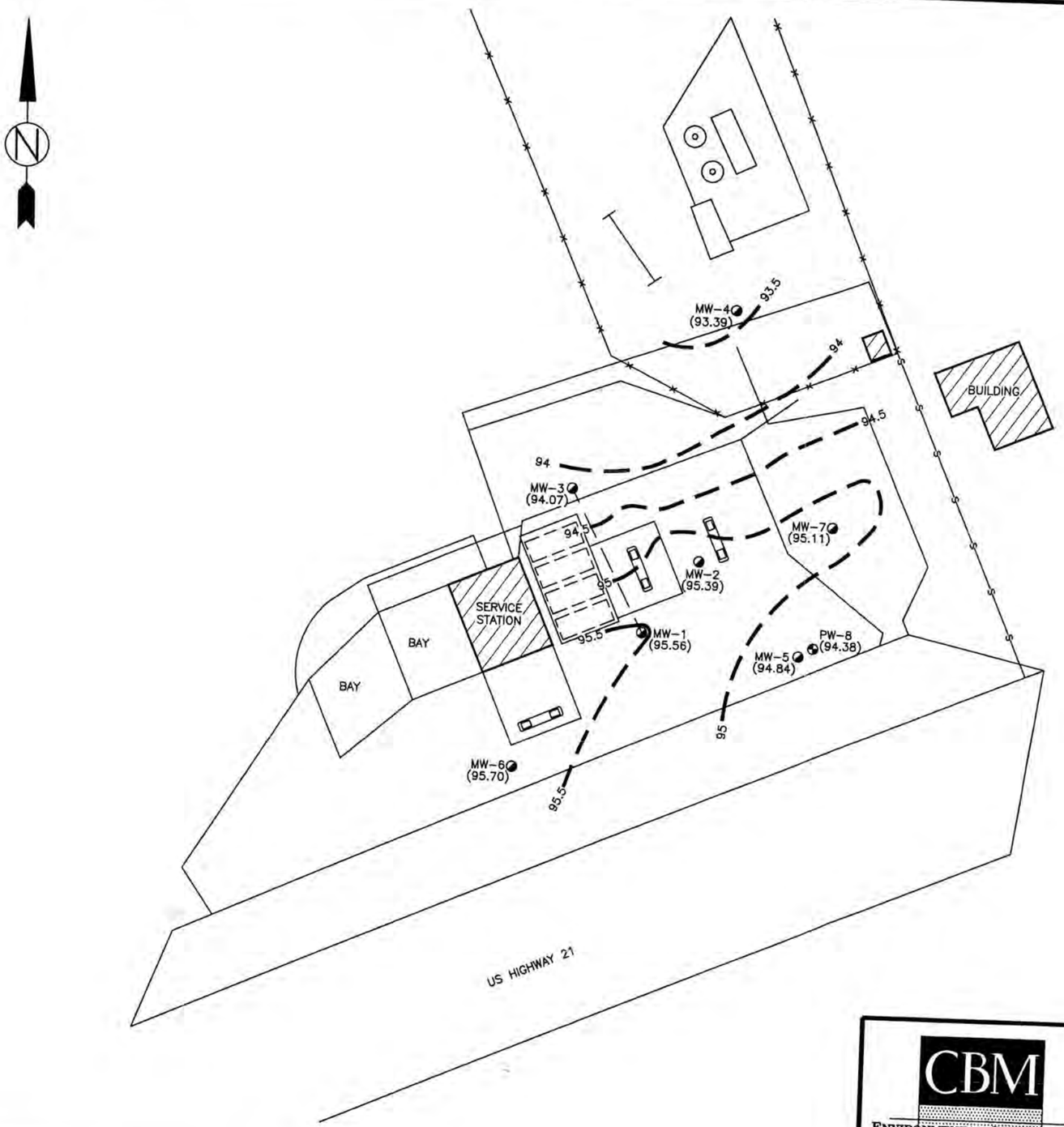
CBM ENVIRONMENTAL SERVICES, INC.

SITE I.D. NO.	09344
PROJECT NO.	11030
DRAWN BY:	BLS/AWB
CHECKED BY:	HF
DWG DATE:	11/20/03

SOIL QUALITY MAP

GREEN'S OIL CO.
2489 CHERRY ROAD
ROCK HILL, SC

FIGURE 3



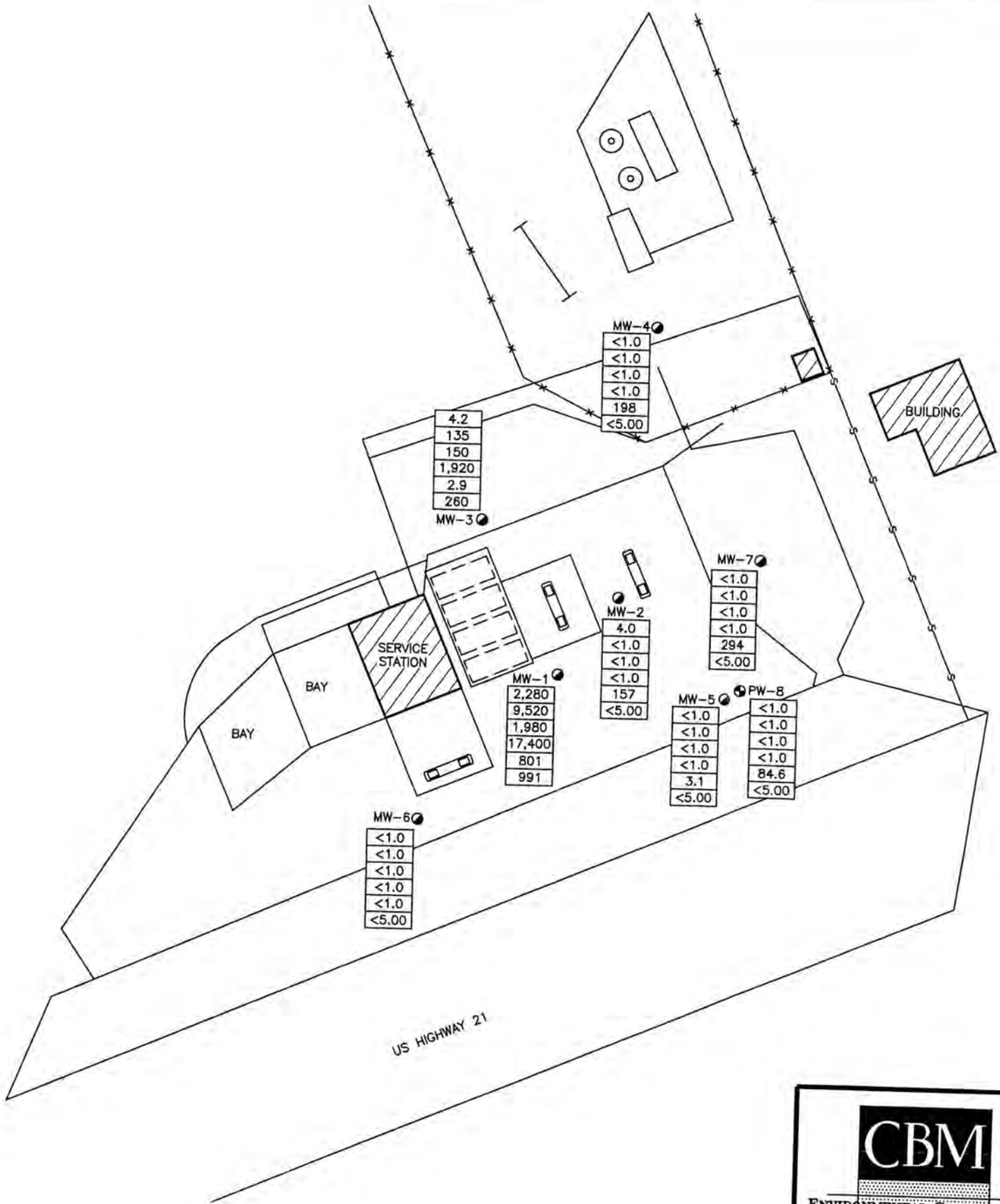
CBM
ENVIRONMENTAL SERVICES, INC.

SITE I.D. NO.	09344
PROJECT NO.	11030
DRAWN BY:	BLS/AWB
CHECKED BY:	HF
DWG DATE:	11/20/03

WATER TABLE SURFACE MAP
JUNE 12, 2003

GREEN'S OIL CO.
2489 CHERRY ROAD
ROCK HILL, SC

FIGURE 4



LEGEND

- TYPE II MONITORING WELL
- TYPE III MONITORING WELL
- FENCE
- S SEWER LINE

2,280	BENZENE
9,520	TOLUENE
1,980	ETHYLBENZENE
17,400	XYLENES
801	MTBE
991	NAPHTHALENE

CONCENTRATIONS IN $\mu g/L$

<1.0 – LESS THAN THE METHOD DETECTION LIMIT SPECIFIED IN THE LABORATORY REPORT

SCALE

0 10 20 30 40

FEET

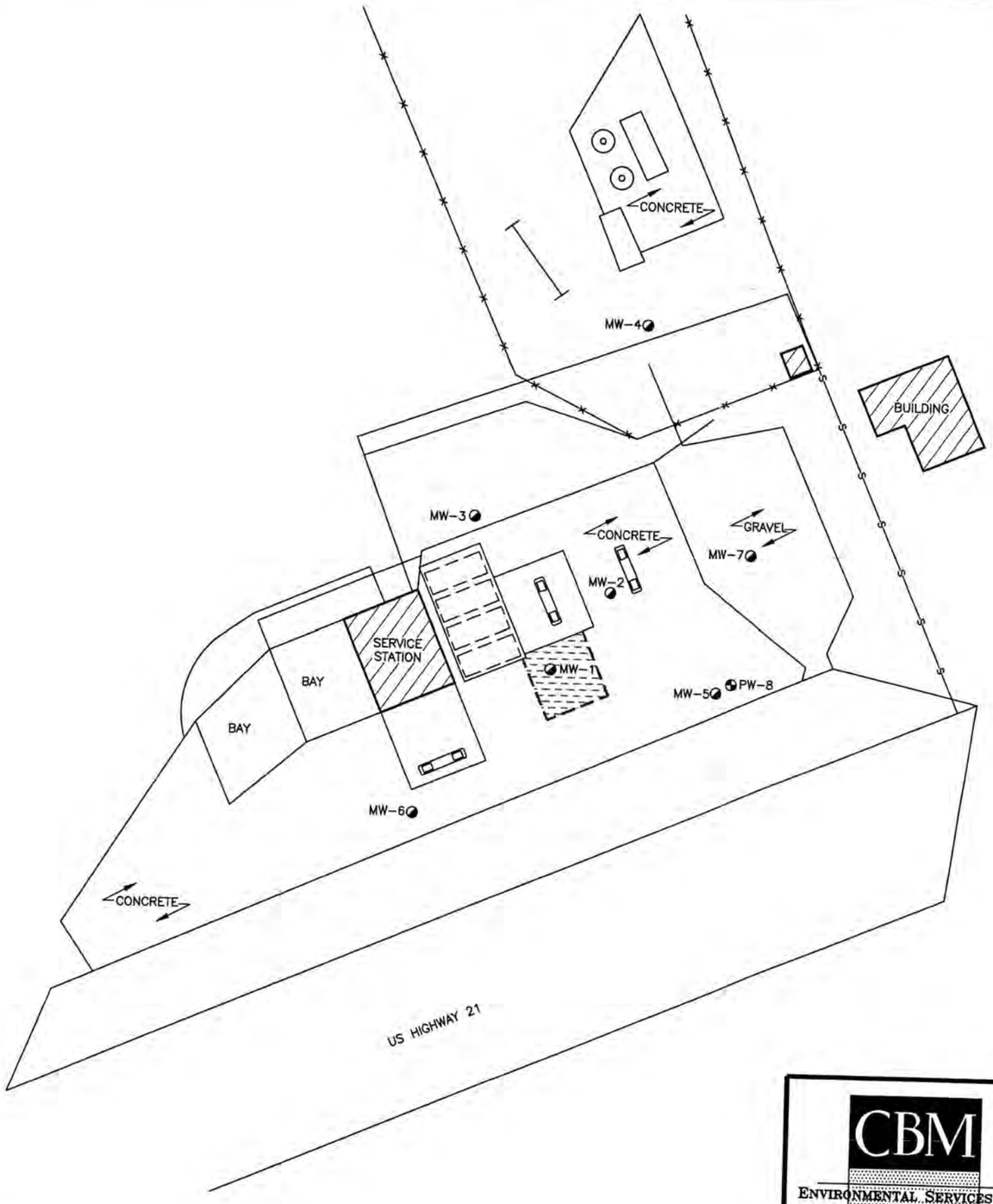
CBM ENVIRONMENTAL SERVICES, INC.

SITE I.D. NO.	09344
PROJECT NO.	11030
DRAWN BY:	BLS/AWB
CHECKED BY:	HF
DWG DATE:	11/20/03

GROUNDWATER QUALITY MAP
JUNE 12, 2003

GREEN'S OIL CO.
2489 CHERRY ROAD
ROCK HILL, SC

FIGURE 5



LEGEND

- TYPE II MONITORING WELL
- TYPE III MONITORING WELL
- FENCE
- S — SEWER LINE
- PROPOSED SOIL EXCAVATION AREA

SCALE

0 10 20 30 40

FEET

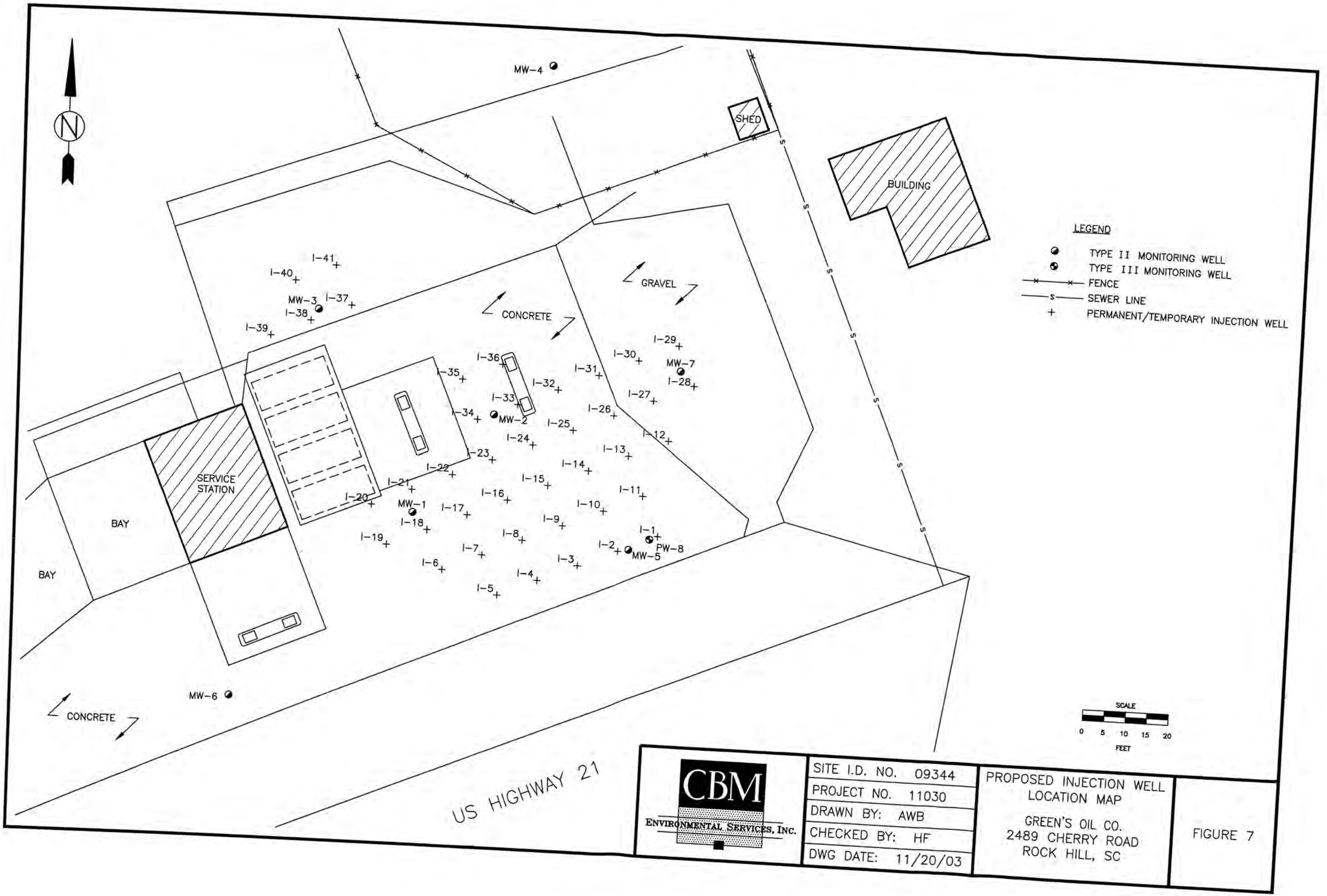
CBM ENVIRONMENTAL SERVICES, INC.

SITE I.D. NO.	09344
PROJECT NO.	11030
DRAWN BY:	BLS/AWB
CHECKED BY:	HF
DWG DATE:	11/20/03

PROPOSED SOIL EXCAVATION LOCATION

GREEN'S OIL CO.
2489 CHERRY ROAD
ROCK HILL, SC

FIGURE 6



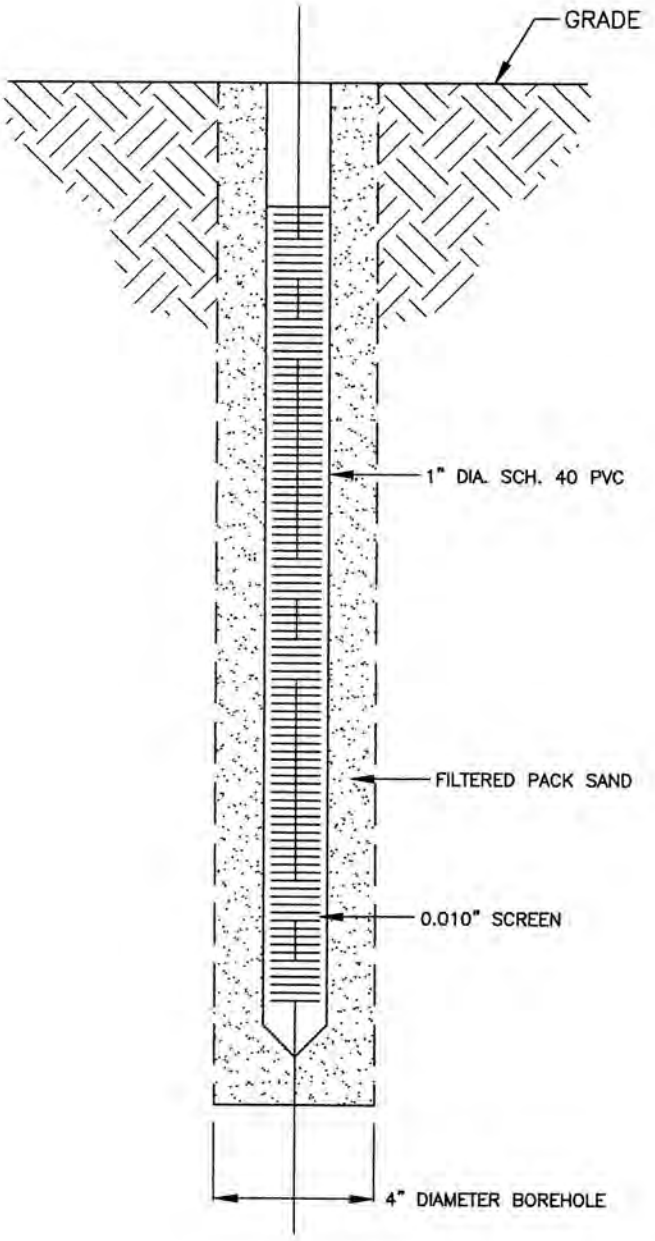
CBM
ENVIRONMENTAL SERVICES, INC.

SITE I.D. NO.	09344
PROJECT NO.	11030
DRAWN BY:	AWB
CHECKED BY:	HF
DWG DATE:	11/20/03

PROPOSED INJECTION WELL LOCATION MAP

GREEN'S OIL CO.
2489 CHERRY ROAD
ROCK HILL, SC

FIGURE 7



NOT TO SCALE

CBM ENVIRONMENTAL SERVICES, INC.

SITE ID NO.	09344
PROJECT NO.	11030
DRAWN BY:	AWB
CHECKED BY:	HF
DWG DATE:	11/20/03

INJECTION WELL DIAGRAM

GREEN'S OIL CO.
2489 CHERRY RD.
ROCK HILL, SC

FIGURE 8

TABLE 1
SUMMARY OF LABORATORY ANALYSES[1]
RAPID ASSESSMENT SOIL SAMPLES
GREEN'S OIL COMPANY

Sample ID	Sample Depth (feet)	Sample Date	Benzene	Toluene	Ethylbenzene	Xylenes	MTBE	Naphthalene	TPH 3550 (mg/kg)	TOC (mg/kg)
SB-1	5-7	11/05/96	NR[2]	NR	NR	NR	NR	NR	NR	101
SB-3	5-6	11/06/96	<5[3]	<5	<5	<15	<5	<5	NR	NR
SB-4	4-5	11/06/96	<5	<5	<5	<15	<5	<5	NR	NR
SB-5	4-5	11/05/96	**99.8**[4]	153	1,400	5,470	NR	**1,880**	<50.0	NR
SB-6	4-5	11/06/96	<5	<5	<5	<15	<5	<5	NR	NR
SB-7	4-5	11/06/96	<5	<5	<5	<15	<5	<5	NR	NR
		RBSL[5]	7	1,700	1,500	44,000	NA[6]	200	NA	NA

Notes:

1. Analyses for BTEX, MTBE and naphthalene by EPA Method 8260, TPH semi-volatiles by Method 3550 and TOC by Method 9060M; results reported in µg/kg unless otherwise specified.
2. Analysis not requested.
3. Less than the method detection limit specified in the laboratory report.
4. Concentrations in bold face type exceeded the Risk Based Screening Level.
5. Risk Based Screening Level.
6. Not available.

TABLE 2
SUMMARY OF HISTORICAL GROUNDWATER ELEVATION DATA[1]
GREEN'S OIL COMPANY

Well No.	Date	Top of Casing Elevation	Depth to Groundwater	Groundwater Elevation	Well Depth[2]	Dissolved Oxygen[3]
MW-1	05/24/00	98.15	7.16	90.99	12.33	1.3
	10/09/00		7.78	90.37		2.3
	01/02/01		9.58	88.57		1.4
	12/16/02		5.11	93.04		NM[4]
	06/12/03		2.59	95.56		2.18
MW-2	05/24/00	97.86	7.03	90.83	14.04	1.9
	10/09/00		7.71	90.15		2.4
	01/02/01		9.43	88.43		0.0
	12/16/02		4.91	92.95		2.06
	06/12/03		2.47	95.39		1.22
MW-3	12/16/02	97.08	5.83	91.25	7.75	NM
	06/12/03		3.01	94.07		1.44
MW-4	12/16/02	96.91	6.66	90.25	13.59	1.45
	06/12/03		3.52	93.39		0.96
MW-5	05/24/00	97.04	6.56	90.48	10.04	2.4
	10/09/00		7.15	89.89		3.0
	01/02/01		8.90	88.14		1.6
	12/16/02		4.67	92.37		2.27
	06/12/03		2.20	94.84		1.28
MW-6	05/24/00	98.59	8.10	90.49	9.60	3.8
	10/09/00		7.92	90.67		4.9
	01/02/01		9.52	89.07		NM
	12/16/02		5.25	93.34		3.68
	06/12/03		2.89	95.70		4.19
MW-7	12/16/02	98.40	4.81	93.59	13.60	NM
	06/12/03		3.29	95.11		1.18
PW-8	05/24/00	96.98	6.45	90.53	30.10	3.9
	10/09/00		7.12	89.86		2.5
	01/02/01		8.69	88.29		2.1
	12/16/02		4.46	92.52		NM
	06/12/03		2.60	94.38		1.70

Notes:

1. Top of Casing Elevations were reproduced from the previous consultant's reports. Additional well construction details are unavailable; data reported in feet.
2. Well depths measured during June 12, 2003 sampling event.
3. Dissolved oxygen levels were measured using a DO meter; results reported in mg/L.
4. Not measured.

TABLE 3
SUMMARY OF HISTORICAL LABORATORY ANALYSES[1]
GROUNDWATER SAMPLES
GREEN'S OIL COMPANY

Well No.	Date	Benzene	Toluene	Ethylbenzene	Xylenes	MTBE	Naphthalene	Lead
MW-1	10/24/96	**3,040**[2]	164	325	950	**2,310**	**365**	NR[3]
	05/09/00	**1,790**	255	302	611	**1,300**	**117**	12.0
	10/09/00	**1,600**	180	220	400	**850**	**350**	<3.0[4]
	01/02/01	**500**	9.0	38	68	**460**	**55**	<3.0
	12/16/02	**3,000**	**12,000**	**3,700**	**14,000**	**920**	**1,700**	**14**
	06/12/03	**2,280**	**9,520**	**1,980**	**17,400**	**801**	**991**	NR
MW-2	10/24/96	<10.0	<10.0	<10.0	<3.0	**24,700**	<5.0	NR
	05/09/00	**5.2**	ND[5]	ND	ND	**19,900**	ND	ND
	10/09/00	**31**	5.7	<5.0	12	**11,000**	15	<3.0
	01/02/01	**7.2**	<5.0	<5.0	<5.0	**7,700**	<5.0	<3.0
	12/16/02	<5.0	<5.0	<5.0	7.2	**170**	**12**	<3.0
	06/12/03	4.0	<1.0	<1.0	<1.0	**157**	<5.00	NR
MW-3	10/24/96	NF[6]	NF	NF	NF	NF	NF	NF
	05/09/00	NF	NF	NF	NF	NF	NF	NF
	10/09/00	NF	NF	NF	NF	NF	NF	NF
	01/02/01	NF	NF	NF	NF	NF	NF	NF
	12/12/02	**150**	**5,800**	**2,400**	**14,000**	<25	**920**	**21**
	06/12/03	4.2	135	150	1,920	2.9	**260**	NR
MW-4	10/24/96	<1.0	<1.0	<1.0	<3.0	**70.4**	<5.0	NR
	05/09/00	NF	NF	NF	NF	NF	NF	NF
	10/09/00	NF	NF	NF	NF	NF	NF	NF
	01/02/01	NF	NF	NF	NF	NF	NF	NF
	12/16/02	<5.0	<5.0	<5.0	<5.0	**160**	8.5	5.8
	06/12/03	<1.0	<1.0	<1.0	<1.0	**198**	<5.00	NR
	RBSL[7]	5	1,000	700	10,000	40	10	15
	SSTL[8]	28.34	5,667.25	3,967.13	56,698.20	226.68	56.91	NA[9]

TABLE 3 (cont'd.)
SUMMARY OF HISTORICAL LABORATORY ANALYSES
GROUNDWATER SAMPLES
GREEN'S OIL COMPANY

Well No.	Date	Benzene	Toluene	Ethylbenzene	Xylenes	MTBE	Naphthalene	Lead
MW-5	10/24/96	<1.0	<1.0	<1.0	<3.0	**1,720**	<5.0	NR
	05/09/00	ND	ND	ND	ND	**14,000**	ND	ND
	10/09/00	<5.0	<5.0	<5.0	<5.0	**9,100**	<5.0	<3.0
	01/02/01	<5.0	<5.0	<5.0	<5.0	**1,400**	<5.0	<3.0
	12/12/02	<5.0	<5.0	<5.0	<5.0	14	<5.0	**14**
	06/12/03	<1.0	<1.0	<1.0	<1.0	3.1	<5.00	NR
MW-6	10/24/96	NS[10]	NS	NS	NS	NS	NS	NS
	05/09/00	ND	ND	ND	ND	ND	ND	**52.0**
	10/09/00	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	**26.0**
	01/02/01	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	NS
	12/12/02	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	**48**
	06/12/03	<1.0	<1.0	<1.0	<1.0	<1.0	<5.00	NR
MW-7	10/24/96	NF	NF	NF	NF	NF	NF	NF
	05/09/00	NF	NF	NF	NF	NF	NF	NF
	10/09/00	NF	NF	NF	NF	NF	NF	NF
	01/02/01	NF	NF	NF	NF	NF	NF	NF
	12/12/02	<5.0	<5.0	<5.0	<5.0	**160**	<5.0	**58**
	06/12/03	<1.0	<1.0	<1.0	<1.0	**294**	<5.00	NR
PW-8	10/24/96	<1.0	<1.0	<1.0	<3.0	**547**	<5.0	NR
	05/09/00	ND	ND	ND	ND	**790**	ND	ND
	10/09/00	<5.0	<5.0	<5.0	6.1	**180**	<5.0	<3.0
	01/02/01	<5.0	<5.0	<5.0	<5.0	**160**	<5.0	<3.0
	12/12/02	<5.0	<5.0	<5.0	<5.0	**44**	<5.0	<3.0
	06/12/03	<1.0	<1.0	<1.0	<1.0	**84.6**	<5.00	NR
	RBSL	5	1,000	700	10,000	40	25	15
	SSTL	28.34	5,667.25	3,967.13	56,698.20	226.68	56.91	NA

TABLE 3 (cont'd.)
SUMMARY OF HISTORICAL LABORATORY ANALYSES
GROUNDWATER SAMPLES
GREEN'S OIL COMPANY

Notes:

1. Analyses for BTEX constituents, MTBE and naphthalene by EPA Method 8260B; results reported in µg/L.
2. Concentrations in bold face type exceeded the January 1998 Risk Based Screening Level.
3. Analysis not requested.
4. Less than the method detection limit specified in the laboratory report.
5. Not detected.
6. Well not found.
7. January 1998 Risk Based Screening Level.
8. Site Specific Target levels.
9. Not applicable.
10. Not sampled due to insufficient volume of water in the well.

TABLE 4
SUMMARY OF SSTLs FOR GROUNDWATER (CLOSEST DOWN-GRADIENT RECEPTOR)
GREEN'S OIL COMPANY

COC	Source Area Concentration[1]	RBSL	Minimum SSTL at the Source
Benzene	2,280	5	28.34
Toluene	9,520	1,000	5,667.25
Ethylbenzene	3,700	700	3,967.13
Xylenes	17,400	10,000	56,698.20
MTBE	801	40	226.68
Naphthalene	991	10	56.91

Notes:

1. Source concentrations for benzene, toluene, ethylbenzene, xylenes, MTBE and naphthalene are based on the results of analyses of a groundwater sample collected from MW-1 in June 2003; results reported in µg/L. Please note that the fate and transport simulation was performed only for those COC with source concentrations that exceeded the RBSLs.

TABLE 5
SUMMARY OF NATURAL ATTENUATION PARAMETERS[1]
GREEN'S OIL COMPANY
JUNE 12, 2003

Well No.	DO (mg/L)	Temp (°C)	pH	Redox Potential (mV)	Specific Conductance (µS/cm)	Methane (µg/L)	Nitrate (mg/L)	Sulfate (mg/L)	Ferrous Iron (µg/L)
MW-1	2.18	26.1	6.46	-35	922	7,240	<0.10[2]	<1.00	19,600
MW-2	1.22	21.9	6.02	-70	770	255	<0.10	3.23	3,500
MW-3	1.44	22.1	6.41	-60	699	1,100	<0.10	<1.00	23,200
MW-4	0.96	21.1	6.25	-70	1,016	743	<0.100	5.79	18,300
MW-5	1.28	23.9	6.42	115	553	<26	1.20	10.2	<100
MW-6	4.19	23.7	6.29	110	636	<26	0.44	2,170	540
MW-7	1.18	21.9	6.36	65	442	<26	0.870	24.4	1,760
PW-8	1.70	25.5	6.39	110	356	<26	0.39	28.8	111

Notes:

1. Analysis for Methane by Method 8015, Nitrate and Sulfate by EPA Method 300.0 and Ferrous Iron by Method 3500D.
2. Less than the method detection limit specified in the laboratory report.

TABLE 6
SAMPLING AND REPORTING SCHEDULE
GREEN'S OIL COMPANY

Medium	Parameter/Method	Frequency
Groundwater	Static water levels	Weekly – First two weeks Quarterly thereafter
	Dissolved Oxygen, pH, Temp and ORP	Weekly – First two weeks Quarterly thereafter
	Volatile organics using EPA Method 8260B, methane by Method 8015, nitrate and sulfate by EPA Method 300.0 and ferrous iron by EPA Method 3500D.	Sample monitoring wells MW-1 through MW-7 and PW-8 quarterly.
Soil	Volatile and semi-volatile organics by SW846 Methods 8260B and 8270C, respectively.	Quarterly for the first year (if required). From test borings before requesting site closure.

Note:
Reporting will be on a quarterly basis during the first year of operation and semi-annually thereafter.

TABLE 7
IMPLEMENTATION SCHEDULE
GREEN'S OIL COMPANY

Item	Completion Point
Submittal of request for bids for excavation and de-watering.	Within one week from receipt of CAP approval.
Receipt of soil excavation bids.	One to two weeks after submittal of bid requests.
Excavation and de-watering (as needed) of proposed area of soil.	Eight to ten weeks after receipt of approval to proceed from SCDHEC.
Installation of permanent/temporary injection wells.	One to two weeks after completion of excavation/de-watering.
Microbial Injections	One to two weeks after installation of injection wells.
Monitoring and Reporting Schedule.	Please refer to **Table 6**.

APPENDIX A
ADJACENT PROPERTY OWNER INFORMATION
GREEN'S OIL COMPANY

Parcel No.	Property Owner	Address
6600000004	Betty F McGuire Life Estate	1099 Grier McGuire Drive Rock Hill, South Carolina 29732
6600000005	The Thomas McGuire Family LTD	2975 Pump Station Road Rock Hill, South Carolina 29732
6600000007	Betty McGuire Trustee	1099 Grier McGuire Road Rock Hill, South Carolina 29730
6600000008	Betty McGuire Trustee	1099 McGuire Road Rock Hill, South Carolina 29732
6600000009	Perry D. McGuire	PO Box 11 Catawba, South Carolina 29704
6620000001	Jerry P McGuire	382 North Sutton Road Fort Mill, South Carolina 29715
6620701050	Credit Suisse Leasing 92A LP	PO Box 105842 Atlanta, Georgia 30348
6620701051	Zaxby's Holding LLC	1040 Founders Boulevard Athens, Georgia 30606
6620701057	Celriver Federal Credit Union	PO Box 2893 Rock Hill, South Carolina 29732
6620701058	William Enterprises LLC	595 Kallam Mill Road Madison, North Carolina 27025
6620701059	Tricor NC Properties LLC	7421 Carmel Executive Park Suite 250 Charlotte, North Carolina 28226
6620701060	Plainfield Plaza Company	19601 North 27th Avenue Phoenix, AZ 85027
6620701068	Faith Assembly	PO Box 4442 Rock Hill, South Carolina 29732
6630000001	Celanese Acetate LLC	2300 Archdale Drive Charlotte, North Carolina 28210

Environmental Protection Agency | Emergency Response 5403W | October 1993

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An Overview Of Underground Storage Tank Remediation Options

Contents

Groundwater Remediation

EPA

Groundwater Remediation For UST Sites

In Situ Air Sparging With Soil Vapor Extraction

In situ air sparging with soil vapor extraction (SVE) is a technique for removing dissolved volatile contaminants from groundwater. The technique injects air into the saturated zone. The air forms bubbles that rise into the unsaturated zone, carrying trapped and dissolved contaminants. Extraction wells in the unsaturated zone capture sparged air. If necessary, the air can then be treated using a variety of vapor treatment options.

This technique is most effective in homogenous, permeable aquifers. Performance data for this technique are limited.

In situ air sparging with soil vapor extraction is a rapid remediation technique that can reduce contamination levels in six months. It is also able to quickly remove volatile organic compounds (VOCs) from below the groundwater table.

Petroleum Types And Constituents

- Gasoline and diesel
- Volatile organic compounds (VOCs) such as benzene, toluene, ethylbenzene, and xylene (BTEX)

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Groundwater Remediation For UST Sites

In Situ Bioremediation

In situ bioremediation is a technique for removing biodegradable contaminants from groundwater. The technique relies on microorganisms and supplemental oxygen and nutrients to break down petroleum products in the groundwater.

In situ bioremediation offers the advantage of being able to treat contamination in place, without the need for pumping or the subsequent treatment of pumped groundwater. The technique is most effective in permeable aquifers.

Petroleum Types And Constituents

- Fresh or weathered gasoline, diesel, jet fuel, kerosene, motor oil, heavy fuel oil, lubricating oils, and crude oils
- Volatile organic compounds (VOCs) such as benzene, toluene, ethylbenzene, and xylene (BTEX); residual semivolatile organic compounds (SVOCs) such as polynuclear aromatic hydrocarbons; and nonvolatile constituents

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Groundwater Remediation For UST Sites

In Situ Bioventing Combined With Low Flow Air Sparging (Biosparging)

In situ bioventing combined with low flow air sparging (biosparging) stimulates the aerobic biodegradation of organic contaminants in groundwater by delivering oxygen to the saturated and unsaturated zones. The oxygen is delivered at a slow rate to encourage biodegradation rather than volatilization.

Biosparging degrades volatile organic compounds (VOCs) in place, reducing the need for subsequent vapor treatment and the costs of remediation. This technique is most effective in permeable aquifers.

Petroleum Types And Constituents

- Fresh or weathered gasoline, diesel, jet fuel, kerosene, motor oil, fuel oil, lubricating oils, and crude oils
- Volatile organic compounds (VOCs) such as benzene, toluene, ethylbenzene, and xylene (BTEX); and residual semivolatile organic compounds (SVOCs) such as polynuclear aromatic hydrocarbons

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Groundwater Remediation For UST Sites

Vacuum Enhanced Pump And Treat

Vacuum enhanced pump and treat is a technique that uses a surface-mounted vacuum pump to remove contaminated soil vapors and groundwater simultaneously. This method increases the rate of pumping, reducing remediation time. The pumped water and soil vapors can then be treated with a number of techniques.

Vacuum enhanced pump and treat is most effective when used in aquifers with medium to low permeability (silts and clays).

This method offers pumping rates that are 3 to 10 times greater than conventional pump and treat rates. Increased pumping rates result in decreased remediation time.

Petroleum Types And Constituents

- Dissolved gasoline and diesel, jet fuel, and kerosene
- Dissolved constituents such as benzene, toluene, ethylbenzene, and xylene (BTEX)

EPA

Groundwater Remediation For UST Sites

Pump And Treat

Pump and treat is a technique that brings contaminated groundwater above the ground through the use of extraction wells. The water is then treated, normally using one of three processes: granulated activated carbon, air stripping, or bioremediation.

This technique is most effective in permeable aquifers. It also can be used with in situ vapor extraction (SVE) to enhance removal of volatile contaminants from the zone of water table fluctuation.

A limitation of pump and treat is that it can take a long time to achieve complete remediation, sometimes as long as seven years even for an ideal site. In addition, this method is subject to fluctuations of the water table that can smear contaminants and complicate cleanups.

Petroleum Types And Constituents

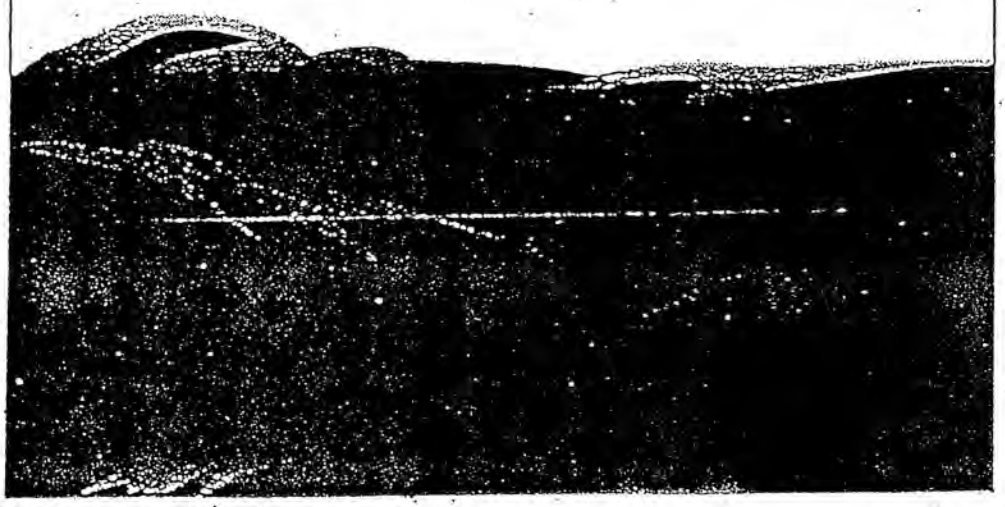
- Dissolved gasoline and diesel, jet fuel, and kerosene
- Dissolved constituents such as benzene, toluene, ethylbenzene, and xylene (BTEX)

EPA

An Overview Of Underground Storage Tank Remediation Options

Contents

Soil Remediation



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Soil Remediation For UST Sites

In Situ Soil Vapor Extraction

In situ soil vapor extraction (SVE) is a technique for removing contaminants from unsaturated soils. The technique draws fresh air into the ground with a vacuum pump. The air brings the contaminants to the surface, where they can be treated and safely discharged.

In situ soil vapor extraction is most effective in coarse-grained soils such as sand and gravel. It requires a minimum 5-foot-thick unsaturated zone of soil. This technique can be used in conjunction with air sparging, groundwater pumping, or bioremediation systems.

This technique is able to treat large volumes of soil effectively and with minimal disruption to business operations. It also can remove contamination from near or under fixed structures.

Petroleum Types And Constituents

- Fresh and weathered gasoline and diesel
- Volatile organic compounds (VOCs) such as benzene, toluene, ethylbenzene, and xylene (BTEX), and semivolatile organic compounds (SVOCs)

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Soil Remediation For UST Sites

In Situ Bioremediation: Bioventing

In situ bioremediation—bioventing—is a technique for removing biodegradable contaminants from unsaturated soils. The technique injects oxygen into contaminated soil. The oxygen stimulates the aerobic biodegradation of the organic contaminants in the soil. Oxygen is delivered at a low rate to encourage biodegradation rather than volatilization.

Bioventing is most effective in coarse-grained soils such as sand and gravel. It requires a minimum 5-foot-thick unsaturated zone. This technique can be used in conjunction with air sparging or groundwater pumping systems.

This technique is able to treat large volumes of soil effectively and with minimal disruption to business operations. It also can remove contamination from near or under fixed structures. Bioventing also reduces the need for aboveground treatment because it works to degrade contaminants in place.

Petroleum Types And Constituents

- Fresh or weathered gasoline, diesel, jet fuel, kerosene, motor oil, heavy fuel oil, lubricating oils, and crude oils
- Volatile organic compounds (VOCs) such as benzene, toluene, ethylbenzene, and xylene (BTEX); residual semivolatile organic compounds (SVOCs) such as polynuclear aromatic hydrocarbons; and nonvolatile constituents

United States Environmental Protection Agency
Solid Waste and Emergency Response 5403W
EPA 510-F-93-023 October 1993

EPA

Soil Remediation For UST Sites

Ex Situ Bioremediation: Biomounding

Ex situ bioremediation—biomounding—is a technique for removing biodegradable contaminants from excavated mounds of soil. Nutrients are added to the soil mounds, which are often several feet high, to facilitate bioremediation. Aeration conduits and irrigation systems are constructed in the mound.

Biomounding is most appropriate for shallow contamination sites that cover a large horizontal area. This is a low-maintenance technique that requires a relatively short treatment time. Biomounding also provides better control over aeration, moisture, nutrient levels, and soil texture than other methods.

Petroleum Types And Constituents

- Fresh or weathered gasoline, diesel, jet fuel, kerosene, motor oil, heavy fuel oil, lubricating oils, and crude oils
- Volatile organic compounds (VOCs) such as benzene, toluene, ethylbenzene, and xylene (BTEX); residual semivolatile organic compounds (SVOCs) such as polynuclear aromatic hydrocarbons; and nonvolatile constituents

United States Environmental Protection Agency
Solid Waste and Emergency Response 5403W
EPA 510-F-93-026 October 1993

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Soil Remediation For UST Sites

In Situ Passive Biodegradation (Natural Attenuation)

In situ passive biodegradation (natural attenuation) is an approach for removing biodegradable contaminants from soil. This method of remediation relies on microorganisms to break down petroleum products in the soil. It does not require the addition of oxygen or nutrients to facilitate the process.

In situ passive biodegradation is extremely slow. It is most appropriate when expedient remediation is not needed and nearby receptors will not be affected by contaminated soil. To date, few sites have been fully remediated using this approach.

This technique offers low cost and minimal disruption to business operations. In addition, this method generates no wastestreams.

Petroleum Types And Constituents

- Fresh or weathered gasoline, diesel, jet fuel, kerosene
- Volatile organic compounds (VOCs) such as benzene, toluene, ethylbenzene, and xylene (BTEX); residual semivolatile organic compounds (SVOCs) such as polynuclear aromatic hydrocarbons; and nonvolatile constituents

United States Environmental Protection Agency | Solid Waste and Emergency Response 5403W | EPA 510-F-93-024 October 1993

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Soil Remediation For UST Sites

On-Site Low Temperature Thermal Desorption

Low temperature thermal desorption *is a technique for removing contaminants from large volumes (greater than 1,000 cubic yards) of soil. The technique heats contaminated soil to relatively low temperatures (200-1,000°F). The heat causes contaminants to vaporize so that they can be treated with air emissions treatment systems.*

On-site thermal treatment is most effective on soil that contains high levels of hydrocarbons. It requires less time than bioremediation or soil vapor extraction (SVE). On-site thermal treatment can be implemented rapidly and works quickly—within six to eight weeks—at a relatively low cost.

Petroleum Types And Constituents

- All types of petroleum products

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5403W

EPA 510-F-93-025
October 1993

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Soil Remediation For UST Sites

Ex Situ Bioremediation: Land Farming

Ex situ bioremediation—land farming (or land treatment)—is a technique for removing biodegradable contaminants from excavated soil. The excavated soil and added nutrients are spread over a lined treatment area. The area is periodically tilled to facilitate the natural release of volatile organic compounds (VOCs) and the biodegradation of contaminants.

Land farming is effective on many soil types and a variety of contaminants. It is also easy and inexpensive to design, operate, and maintain.

Petroleum Types And Constituents

- Fresh or weathered gasoline, diesel, jet fuel, kerosene, motor oil, heavy fuel oil, lubricating oils, and crude oils
- Volatile organic compounds (VOCs) such as benzene, toluene, ethylbenzene, and xylene (BTEX); residual semivolatile organic compounds (SVOCs) such as polynuclear aromatic hydrocarbons; and nonvolatile constituents

United States Environmental Protection Agency
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EPA 510-F-93-027 October 1993

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Soil Remediation For UST Sites

Excavation And Off-Site Treatment

Excavation and off-site treatment is a method for removing contaminants from small volumes (less than 1,000 cubic yards) of soil that cannot be treated effectively on site. Contaminated soil is excavated and then treated. Typical treatment facilities include:

- *Low temperature thermal desorption facilities*
- *Asphalt plants*
- *Incinerators*

This technique can be used with many different kinds of soils and contaminants. It offers the benefit of actually destroying contaminants rather than simply moving them from one location to another.

Petroleum Types And Constituents

- All types of petroleum products

APPENDIX C
REMEDIAL METHOD COMPARISON – SOIL
GREEN'S OIL COMPANY

Method	Soil Excavation	Natural Attenuation of Soil Hydrocarbons	Soil Vapor Extraction (SVE)
Feasibility (For This Site)	High	High (Long-Term)	Low
Advantage	Removes contaminated soil, a secondary source of contamination, quickly.	Low cost (no equipment required)	Rapidly removes vadose zone adsorbed and saturated zone stripped VOCs
Disadvantage(s)	Can be high cost; have disposal restrictions; be disruptive to business; may affect structural integrity of building.	Removes only biodegradables; extremely slow process; contaminated soil continues to act as secondary source; dependent upon presence of sufficient nutrients and microbes.	Relatively shallow depth to groundwater; system will extract more water than vapor.
Estimated Cost	~$25,000 plus cost of annual monitoring and lab analyses (inclusive of pump out/de-watering and disposal, if necessary)	See cost summary.	~$100,000 (equipment and installation) Does not include monitoring, O&M, etc. (see cost summary for example of breakdown of sampling and reporting)

APPENDIX C
REMEDIAL METHOD COMPARISON – GROUNDWATER
GREEN'S OIL COMPANY

Method	Air Sparging (AS)	Natural Attenuation of Dissolved Groundwater Hydrocarbons	Pump and Treat
Feasibility (For This Site)	Low	High	Low
Advantage	Enhances removal of volatiles from soil and groundwater; provides oxygen to naturally occurring microbes to promote biodegradation.	Low cost (no equipment required)	Controls plume migration, water treated on surface.
Disadvantage(s)	Effectiveness limited in low permeability or heterogeneous media or if site has free product.	Removes only biodegradables; extremely slow process; no control on plume migration; dependent upon presence of sufficient nutrients and microbes.	Takes long time to achieve complete remediation; can smear contaminants and complicate clean-up; extensive discharge permitting requirements; high capital costs for two independent systems; must meet NPDES requirements.
Estimated Cost	~$60,000 (equipment and installation), plus added O & M, reporting and sampling costs (annually ~ $63,000).	See cost summary.	~$100,000 (equipment and installation), plus added O & M, reporting and sampling costs (annually ~ $63,000).

APPENDIX C
ESTIMATED PROJECT COST
GREEN'S OIL COMPANY

Task No.	Description	Total Cost ($)
1	Impacted soil excavation and backfill with clean soil (~180 tons)	5,220
2	Soil disposal and treatment	5,400
3	Excavation de-watering (if necessary)	8,000
4	Drill one replacement monitoring well after excavation	1,800
5	Drill temporary and permanent injection wells	12,000
6	Engineering, Supervision	6,000
7	Cost for microbes, nutrients and oxygen source	12,000
6	Sampling, monitoring	4,200
7	Laboratory analyses	8,640
8	Monitoring reports	8,400
First Year	Total First Year Costs (sample, monitoring, reporting)	71,660

Note:
Costs after the first year would include items 6 through 8, adjusted for inflation and price modifications. First year costs are based on a quarterly sampling schedule. Costs after the first year will be based on sampling schedule.

APPENDIX D
TIME ESTIMATE FOR REMEDIATION OF SOIL AND GROUNDWATER
GREEN'S OIL COMPANY

Calculate the oxygen required and time to closure:

The hydrocarbons in the saturated zone will be dissolved in the groundwater or adsorbed onto the surface of the aquifer soils. An estimate of the amount of hydrocarbons adsorbed onto the soil will be made by using partition equations. Since gasoline is a mixture of compounds and the exact physiochemical data for it is not available, data for total BTEX, MTBE and naphthalene will be used.

Basis: 1 cubic meter

Average contaminant (sum of concentrations of total BTEX, MTBE and naphthalene measured in monitoring well MW-1)

MW-1 32,972 μg/L (June 2003 data)
32,972 = 32.97 mg/L

From RAR:

Hydraulic Conductivity	0.142 ft/day
Seepage Velocity	0.00207 ft/day

Aquifer Characteristics (assumed values):

Porosity	0.25
Organic Content (F_{OC})	0.000101
Subsurface Temperature	20^0C
Bulk Density of Aquifer Material	1.40 g/cm^3
DO Concentration in the Aquifer (1/2 Saturation)	4.0 mg/L

Use xylenes characteristics for gasoline

Log K_{OC} = 3.0 (Position coefficient between organic phase and water)
K_{OC} = 0.63 K_{OW} (general equation)
K_{OC} = $(0.63)(10^3)$ = 630
K_P = $F_{OC}K_{OC}$ = (0.000101)(630) = 0.06363 L/kg
= Soil/water partition coefficient

Contaminant Adsorbed Onto Soil:

X = K_pC = (0.06363)(32.97)= 2.10 mg/kg

Mass of the aquifer matrix (1 m^3)(1,400 kg/m^3) = 1,400 kg = M_S

Mass of the contaminant adsorbed on the solid surface = (X)(M_S) = (2.10 mg/kg)(1,400 kg)
= 2,940 mg
= 2.94 g

APPENDIX D (cont'd.)
TIME ESTIMATE FOR REMEDIATION OF SOIL AND GROUNDWATER
GREEN'S OIL COMPANY

Void space in aquifer = (1 m^3)(0.25) = 0.25 m^3 = 250 L
Mass of the contaminant dissolved in the groundwater = (C) (V_1)
= (32.97)(250)
= 8,242.5 mg
= 8.24 g
Total mass of the contaminants in the aquifer = 2.94 + 8.24 = 11.18 g
Amount of oxygen present in the groundwater = (V_1)(DO) = (250 L)(4.0 mg/L) = 1000mg = 1 g
3.08 ratio of grams of oxygen are required to degrade 1 gram of hydrocarbon
therefore, amount of oxygen required = (3.08)(11.18) = 34.43 grams oxygen /m^3

Fresh water at 4 mg/L oxygen concentration passes through the 1 meter distance at a velocity of 0.00207 ft/day.

= 3.28 ft/m/0.00207 ft/day = 1,585 day/meter distance

Every 1,585 days, 1.0 g oxygen is fed to the cubic meter of subsurface
= (34.43 g/m^3)/1.0 = 34.43 (1,585 day periods)
= 34.43 x 1,585 = 54,572 days
= 149.5 years

Natural attenuation alone will not work.

Please note the estimate is based on the assumption that there is perfect contact between the dissolved oxygen and the dissolved contaminants. Once baseline samples are collected after the excavation is completed, a more realistic estimate can be made.

MATERIAL SAFETY DATA SHEET

Catalina BioSolutions'
Carbon Biocritters

SECTION I - COMPANY IDENTITY

Catalina BioSolutions
6890 E. Sunrise Drive #120-110
Tucson, Arizona 85750
Emergency Phone: 520-299-9808

SECTION II - HAZARDOUS INGREDIENTS/IDENTITY INFORMATION

Chemical Name & Synonyms:	Activated carbon
Trade Name & Synonyms:	Catalina BioSolutions' Tri-Based Carbon Pellets; Catalina BioSolutions' Carbon Biocritters
Formula:	Carbon atom in a crystallite structure has an infinite molecular weight
Chemical Family:	Amorphous carbon with three bases containing an enzymatic mixture of active hydrocarbon oxidizing natural single-celled organisms. The mixture has no chemical impact.
CAS No.:	68647-86-9
Hazardous Ingredients:	None
Hazardous Mixtures of Other Liquids [%TLV (Units)]:	Activated carbons that have adsorbed other carbon or non-carbon liquids or gasses may lower or raise the ignition point and must be laboratory checked for ignition point when expended

SECTION III - PHYSICAL DATA

Boiling Point (°F):	4200°F
Vapor Pressure (mm/Hg):	N/A
Vapor Density (Air=1):	N/A
Solubility in Water:	Insoluble
Specific Gravity (H20=1):	1.8–2.1
Percent Volatile by Volume:	None

Evaporation Rate:	None
Ignition Temperature:	600°C
Appearance & Odor:	Odorless, black cylindrical solid

SECTION IV - FIRE & EXPLOSION HAZARD DATA

Flash Point (Method):	None
Flammable Limits	
Lower Explosive Limit:	N/A
Upper Explosive Limit:	N/A
Extinguishing Media:	Use media for Class A fires: foam, multipurpose dry chemical and water type extinguishers
Special Firefighting Procedures:	None
Unusual Fire & Explosion Hazards:	Provide for the handling of dry flowing solids in grounded equipment to prevent buildup of static electric charge, especially when explosive dust or vapor mixtures may exist in confined areas. Also provide for pressure relief devices following the principles set forth in the National Fire Protection Association Explosion Preventing Guide NFPS68-1854.

SECTION V - HEALTH HAZARD DATA

Threshold Limit Value:	Avoid exposure to dust levels above 15 mg per cubic meter
Effects of Overexposure:	Temporary dryness to mucous membranes causing coughing and minor nose and throat irritation
Emergency First Aid Procedures:	Wash mouth with water — no other treatment required. Use protective respiratory equipment to avoid inhaling carbon dust.

SECTION VI - REACTIVITY DATA

Stability:	Inert
Conditions to Avoid:	Activated carbon is chemically inert
Incompatibility (Materials to Avoid):	None
Hazardous Decomposition Products:	None
Hazardous Polymerization:	Will not occur

SECTION VII - SPILL OR LEAK PROCEDURES

Steps To Be Taken in Case Material is Released or Spilled:	Spills can create nuisance dust and housekeeping problems. Vacuuming is best clean-up method.
Waste Disposal Method:	Wet or dry activated carbon is best disposed of by landfill

SECTION VIII - SPECIAL PROTECTION INFORMATION

Respiratory Protection (Specify Type):	Respiratory Classification Table G-2, Part 1910.93 (OSHA) Rules and Regulations
Ventilation Local Exhaust:	Vacuum to control dust
Protective Gloves:	None required
Eye Protection:	For airborne dust
Other Protective Equipment:	Protective clothing should be worn during handling to protect against airborne dust

SECTION IX - SPECIAL PRECAUTIONS

Precautions To Be Taken In Handling & Storing:	Packaged activated carbon is not resistant to weather or outside storage and requires indoor Type I and Type II storage facilities
Other Precautions:	Check oxygen content of atmosphere of any vessel containing activated carbon before allowing entry of personnel

SECTION X - TRANSPORTATION DATA

Proper Shipping (Article) Name:	Catalina BioSolutions' Tri-Based Carbon Pellets/Non-Regulated; Catalina BioSolutions' Carbon Biocritters/Non-Regulated
DOT Classification:	NMFC 40560
IDOT Marking:	N/A
IDOT Placard:	N/A
Emergency Accident Precautions & Procedures:	Contact: Catalina BioSolutions Phone: 520-299-9808
Precautions to be Taken in Transportation:	N/A

The information contained herein is based on data considered accurate in light of current information. However, No warranty is expressed or implied regarding the accuracy of this data or the results to be obtained from the use thereof. This material safety sheet was prepared to comply with 24 CFR 1910.1200.

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Tucson, Arizona 85750
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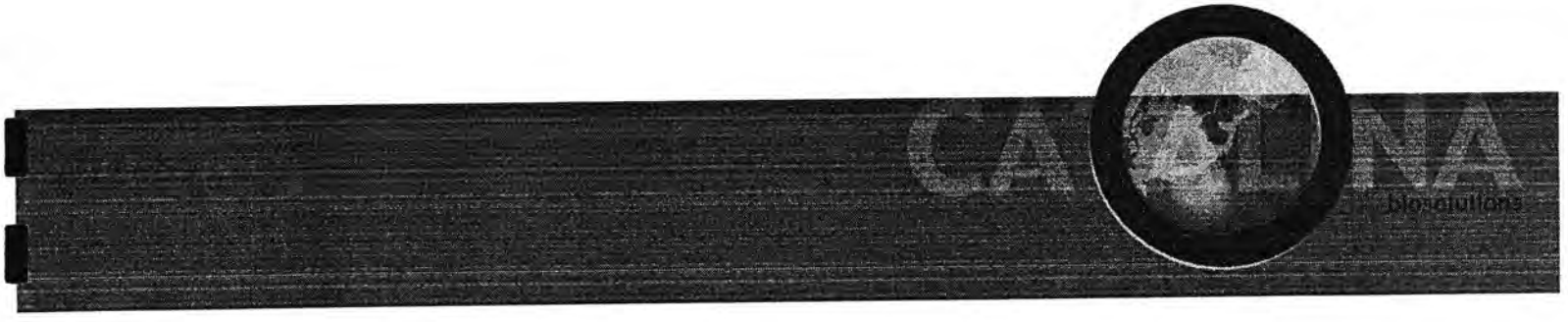
Fax: 520-577-1926
www.catalinabiosolutions.com



MATERIAL SAFETY DATA SHEET

Catalina BioSolutions'
Bio Booster

SECTION I - COMPANY IDENTITY

Catalina BioSolutions
6890 E. Sunrise Drive #120-110
Tucson, Arizona 85750
Emergency Phone: 520-299-9808

SECTION II - HAZARDOUS INGREDIENTS/IDENTITY INFORMATION

Chemical Name & Synonyms:	Confidential chemical blend
Trade Name & Synonyms:	Catalina BioSolutions' Bio Booster; Catalina BioSolutions' Super Duper Bacterial Booster
Product Uses:	Bacterial food additive
Means of Classification:	In-house
Molecular Weight:	148.01
WHIMS Classification:	Not classified
PIN/UN No.:	N/A
CAS/PIN No.:	N/A
Test Related Info.:	N/A
Hazardous Ingredients:	None
Hazard Ratings (0=Least, 1=Slight, 2=Moderate, 3=High, 4=Extreme):	
Health	0
Fire & Explosion	0
Reactivity	0

SECTION III - PHYSICAL DATA

Boiling Point (°F):	N/A
Vapor Pressure (mm/Hg):	N/A

Vapor Density (Air=1):	N/A
Solubility in Water:	22g/100g @ 0°C 38g/100g @ 20°C
Percent Soluble (@ 20°C):	N/A
Specific Gravity (H20=1):	1:8
Melting Point (°C):	180°C
Evaporation Rate:	N/A
Coef. Water/Oil:	N/A
Freezing Temp. (°F):	
Percent Volatile by Volume:	N/A
pH:	6.1 (1% solution @ 20°C)
Appearance & Odor:	Solid, white anhydrous crystals, odorless

SECTION IV - FIRE & EXPLOSION HAZARD DATA

Flash Point:	N/A
Flammable Limits	
	Lower Flammable Limit: N/A Upper Flammable Limit: N/A
Extinguishing Media:	Water, fog, CO_2, foam or dry chemical may be used
Special Firefighting Procedures: or exposed to combustion products	Wear NIOSH approved SCUBA when in a confined area
Unusual Fire & Explosion Hazards:	None known
Hazardous Combustion Products:	Ammonia, phosphorous and nitrogen oxides are released when heated. NOx may be released in a fire.
Explosion	
Sensitivity to Impact:	N/A
Sensitivity to Static Discharge:	N/A

SECTION V - HEALTH HAZARD DATA

Carcinogenicity	
By NIP:	N/A
By IARC:	N/A
OSHA Regulated:	N/A
Effects of Overexposure	
Acute Ingestion:	May cause diarrhea, nausea, vomiting, cramps and burns to the mouth and throat if large amounts are ingested
Inhalation:	Dust and mist may be irritating to the nose and throat, causing coughing and choking
Chronic:	Dermatitis may develop from repeated or prolonged skin contact
Exposure Limits	
TWA:	N/A
STEL:	N/A
C:	N/A
OSHA PEL:	N/A
ACGIH TLV:	N/A
Others:	N/A
Routes of Entry:	Ingestion
Emergency First Aid Procedures	
Eyes:	Flush thoroughly with water for 15 minutes while keeping upper and lower eyelids apart. Get medical attention.
Skin:	Remove contaminated clothing. Wash exposed areas with soap and water and rinse thoroughly for at least 15 minutes. Wash clothing before reuse. Get medical attention if irritation develops.
Ingestion:	Drink a glass of water or milk. DO NOT induce vomiting. Consult a physician immediately.
Inhalation:	Move victim to fresh air. Assist breathing, if necessary. Give oxygen or administer artificial respiration if required.
Special Note:	Never give fluids or induce vomiting to any unconscious victim. Place individual in stable position.
Irritants	

Eyes:	May cause mild irritation
Skin:	May be irritating from prolonged skin contact. No effects if promptly rinsed off.
Sensitization:	N/A
Terategenicity:	N/A
Reproduction Toxicity:	N/A
Mutagenicity:	N/A
Synergistic Products:	N/A

Lethality Tests:	Value	Related Information
LD50 Oral	N/A	Tested on rats
LD50 Dermal	N/A	Tested on rabbits
LD50 Inhalation	N/A	Tested on rats

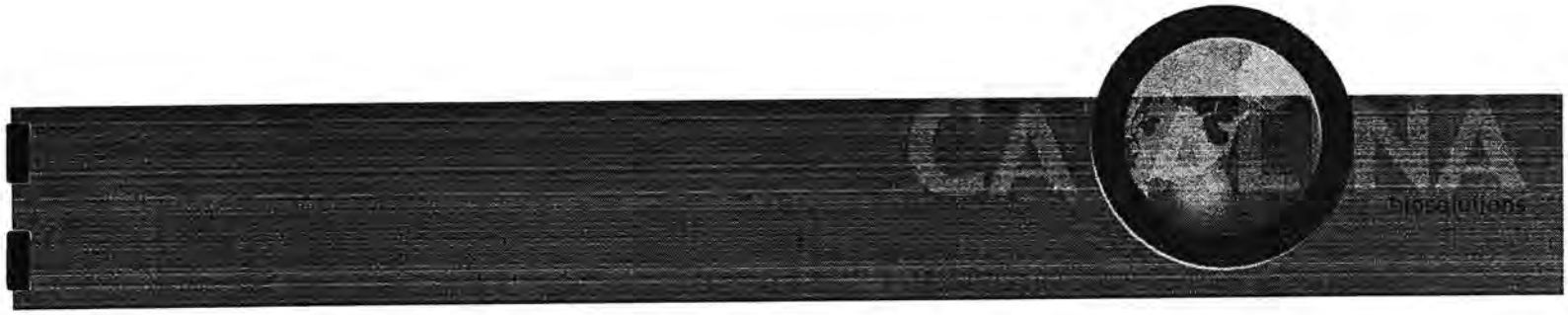
NOT FOR HUMAN CONSUMPTION

SECTION VI - REACTIVITY DATA

Stability:	Stable under normal conditions
Conditions to Avoid:	Avoid excessive heat
Incompatibility (Materials to Avoid):	Avoid contact with strong oxidizing agents and strong bases
Other Reactivity Concerns:	Strong bases will release ammonia gas Strong oxidizing agents can cause decomposition to occur

SECTION VII - SPILL OR LEAK PROCEDURES

Steps To Be Taken in Case Material is Released or Spilled:	Wear necessary protective clothing and equipment. Sweep up while avoiding dust regeneration. Place in a properly labeled container for later disposal. Larger spills may require a vacuum.
Waste Disposal Method:	May be deposited in a chemical dump. Disposal shall be in accordance to all applicable Federal and State waste regulations.



SECTION VIII - SPECIAL PROTECTION INFORMATION

Respiratory Protection (Specify Type):	Wear NIOSH/MSHA approved chemical cartage filter designed to remove dust particles during product application or if occupational exposure limits (TLV)
Ventilation Local Exhaust:	General mechanical ventilation system is adequate
Protective Gloves:	Rubber or plastic gloves
Eye Protection:	Chemical goggles
Special:	Remove and wash contaminated clothing before reuse. Wash thoroughly after handling.
Other Protective Equipment:	None

SECTION IX - SPECIAL PRECAUTIONS

Precautions To Be Taken In Handling & Storing:	Do not handle unless the safety precautions have been read and understood. Avoid eye and skin contact. Avoid inhalation of dust or vapors. Do not puncture, drag, or slide containers. Do not smoke in any chemical handling or storage area. Wash hands before eating.
Storage Requirements:	Store in a cool, dry and well-ventilated location. Avoid dust generation. Keep containers tightly closed. Store away from incompatible materials.

SECTION X - TRANSPORTATION DATA

Proper Shipping (Article) Name:	Catalina BioSolutions' BioBooster; Catalina BioSolutions' Super Duper Bacterial Booster
Special Shipping Information:	49 CFR REGULATION (under HM-181 rule) Not regulated for transport in the U.S.
Emergency Accident Precautions & Procedures:	Contact: Catalina BioSolutions Phone: 520-299-9808

The information contained herein is based on data considered accurate in light of current information. However, No warranty is expressed or implied regarding the accuracy of this data or the results to be obtained from the use thereof. This material safety sheet was prepared to comply with 24 CFR 1910.1200.

Catalina BioSolutions
6890 E. Sunrise Drive #120-110
Tucson, Arizona 85750
Phone: 520-299-9808
Fax: 520-577-1926
www.catalinabiosolutions.com

CBM

ENVIRONMENTAL SERVICES, INC.

February 5, 2004

CERTIFIED MAIL – RETURN RECEIPT REQUESTED

Mr. Read Miner
South Carolina Department of Health
and Environmental Control
2600 Bull Street
Columbia, South Carolina 29201

Re: Site Vicinity Map/UIC Permit Application
Green's Oil Company
Rock Hill, York County
Site ID No. 09344
CBM Project No. 11030

Dear Mr. Miner:

This correspondence is in reference to the Corrective Action Plan (CAP) submitted to SCDHEC on January 23, 2004 and our telephone conversation on January 30, 2004. Based on this conversation, a Site Vicinity Map including adjacent property parcel numbers within a 1,000-foot radius of the site is presented as **Figure 3**. The Site Vicinity Map was prepared using the York County GIS online. The properties are keyed to **Table 1**. In addition, the UIC permit application for the microbial injection wells has been included as **Appendix A**.

As outlined in the CAP, it is proposed to inject a blend of microbes, nutrients and oxygen source beneath the site using a combination of temporary and permanent injection wells. The temporary wells will be abandoned after the injection is completed in accordance with the established SCDHEC guidelines.

The proposed plan for microbial injection consists of a minimum of three treatments spaced three months apart. After the first quarter of microbial treatment, based on an evaluation of groundwater quality data, additional microbial product may be delivered to the subsurface using the network of permanent wells. The blend of microbes, nutrients and oxygen source will be delivered to the subsurface in the form of a slurry through 1-inch diameter temporary and permanent wells, installed using a direct-push sampling device. An addendum to the UIC permit will be submitted if it is determined that additional temporary injection wells need to be installed. In addition to the microbial injections, microbial product will be mixed with the soil used to backfill the excavated area in order to expedite the remediation process. Groundwater monitoring will be conducted on a quarterly basis until the remediation goals for the site have been achieved. The initial phase of microbial treatment is proposed to be completed by mid April.

original forwarded to VIC. Program 2-25-04

P.O. Box 411387
Charlotte, NC 28241
704-527-4391

377 Carowinds Boulevard, #118
Fort Mill, SC 29708
803-548-5989

1411-B South Evans Street
Greenville, NC 27834
252-752-0200

561 ... Cypress Street
Tampa, FL 33607
813-287-1828

Should you have any questions or comments regarding this project please do not hesitate to contact the undersigned at (803) 548-5989.

Sincerely,

Holly Freisen
Project Manager

Rohit Shetty, P.E.
Engineering Director

enclosures

cc: file

/HF

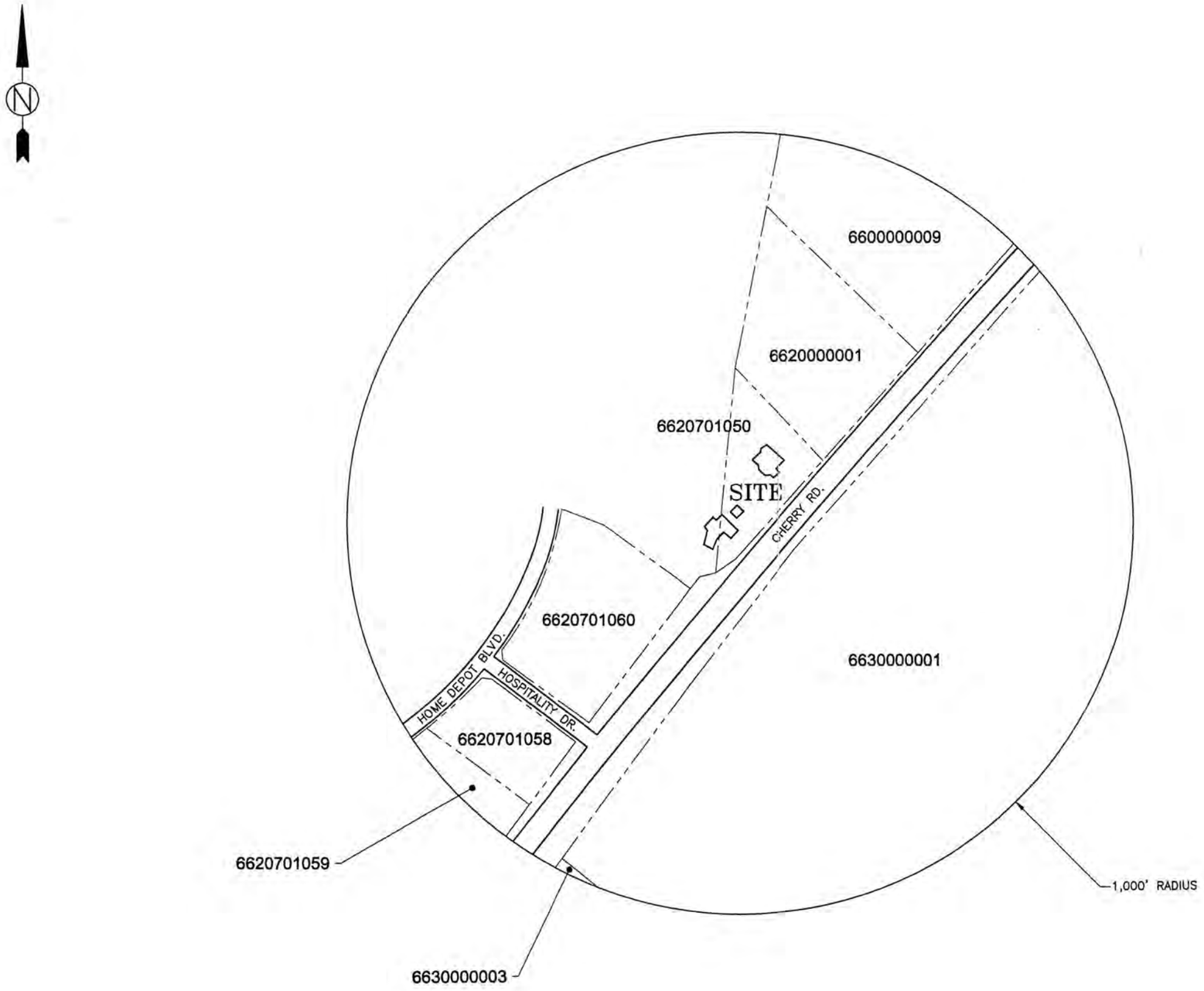
TABLE 1
ADJACENT PROPERTY OWNER INFORMATION
GREEN'S OIL COMPANY

Parcel No.	Property Owner	Address
6600000009	Perry D. McGuire	PO Box 11 Catawba, South Carolina 29704
6620000001	Jerry P McGuire	382 North Sutton Road Fort Mill, South Carolina 29715
6620701050	Credit Suisse Leasing 92A LP	PO Box 105842 Atlanta, Georgia 30348
6620701058	William Enterprises LLC	595 Kallam Mill Road Madison, North Carolina 27025
6620701059	Tricor NC Properties LLC	7421 Carmel Executive Park Suite 250 Charlotte, North Carolina 28226
6620701060	Plainfield Plaza Company	19601 North 27th Avenue Phoenix, AZ 85027
6630000001	Celanese Acetate LLC	2300 Archdale Drive Charlotte, North Carolina 28210
6630000003	Inchem Corp.	800 Celriver Road Rock Hill, SC 29730

LEGEND

6620701050 TAX MAP PARCEL I.D. NUMBER

PROPERTY LINE



SCALE

0 300

FEET

FIGURE 3

SITE VICINITY MAP

GREEN'S OIL CO.
2849 CHERRY RD.
ROCK HILL, SC

SITE I.D. NO. 09344

CBM PROJECT NO. 11030

DRAWN BY: AWB

CHECKED BY: HF

DWG DATE: 2/4/04

CBM ENVIRONMENTAL SERVICES, INC.

Form I UIC	D H E C Underground Injection Control Permit Application Ground-Water Protection Division (Collected under the Authority of Title 48 Chapter I of the 1976 South Carolina Code of Laws)	I. EPA ID NUMBER	T/A	C
		U		

Read attached instructions before starting.
For OfficialUse Only

Application Approved month day year	Date Received month day year	Permit Well Number

Comments

II. Facility Name and Address	III. Owner/Operator and Address
Facility Name: Green's Oil Company	Owner/OperatorName: Jerry Green
Street Address: 2849 Cherry Rd.	Street Address: 2457 Breen Circle
City: Rock Hill; State: SC; Zip Code: 29730	City: Rock Hill; State: SC; Zip Code: 29732

IV. Ownership Status (Select One)

☐ A. Federal ☐ B. State ☑ C. Private
☐ D. Public ☐ E. Other (Explain)

V. SIC Codes

VI. Well Status (Select A, B or C)

☐ A. Operating | Date Started *(MM/DD/YYYY)* | ☐ B. Modification/Conversion ☑ C. Proposed

VII. Type of Permit Requested - Class and Type of Well (see reverse)

A. Class(es) enter code(s)	B. Type(s) enter code(s)	C. If class is "other" or type is code 'Y', explain	D. Number of Wells per type
V.A	I		41

VIII. Location of Wells or Approximate Center of field or Project

C	A. Latitude				B. Longitude			
I		Deg 34	Min 58	Sec 42		Deg 80	Min 58	Sec 54

IX. Attachments

Complete the following questions on a separate sheet(s) and number accordingly; see instructions for Classes 11, 111, and V, complete and submit on a separate sheet(s) attachments A-U as appropriate. Attach maps where required. List attachments by letter which are applicable and include with your application.

X. Certification

I certify under penalty of law that I have personally examined and am familiar with the information submitted in this document and all attachments and that, based on my inquiry of those individuals immediately responsible for obtaining the information, I believe that the information is true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of a fine and imprisonment.

A. Name (Type or Print)	Title	B. Phone No.
Holly Freisen	Project Manager	803-548-5989
C. Signature: Holly Freisen		D. Date Signed (MM/DD/YYYY): 2/5/04

DHEC2502(08/1997)

ATTACHMENT A

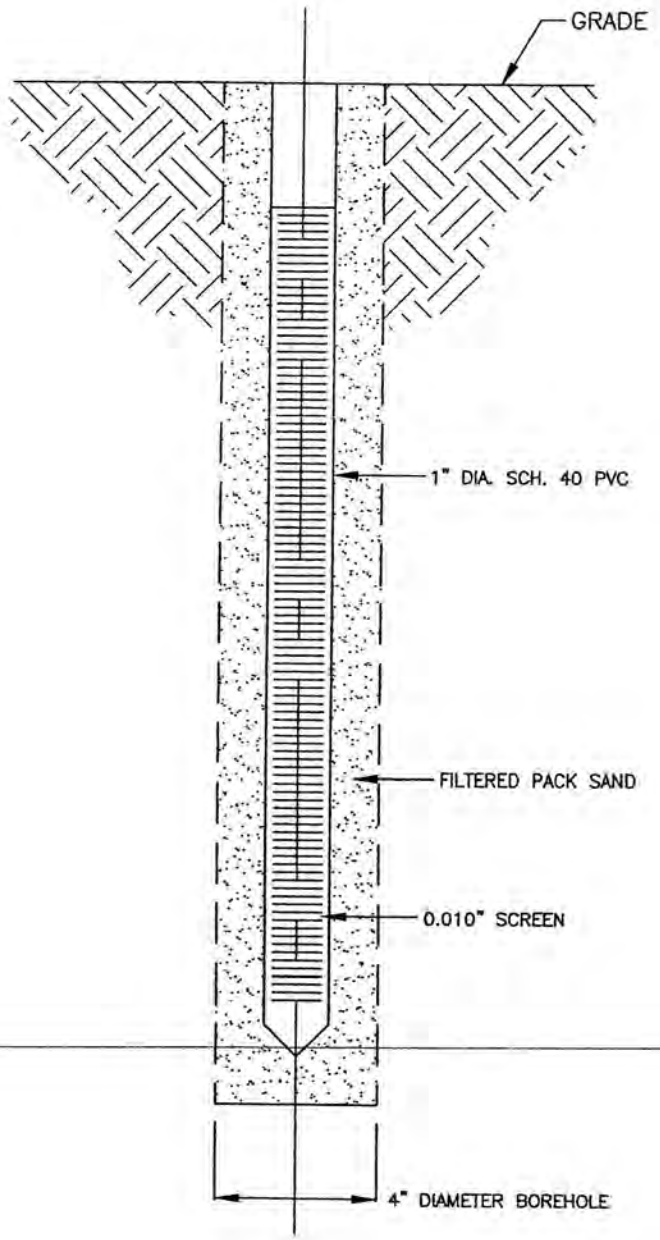
ACTIVITY FOR REVIEW

It is proposed to expedite the reduction in concentrations of petroleum hydrocarbons in groundwater beneath the Green's Oil Company site by injection of a blend of microbes, nutrients and oxygen source. The microbial product will be delivered to the subsurface using a series of 41 temporary and permanent injection wells. The depths of the temporary and permanent injection wells will range from 10 to 30 feet, with two of the permanent injection wells being installed to a depth of 30 feet and the remaining permanent injection wells to a depth of 20 feet. The proposed plan for microbial treatment involves an initial injection of the microbial product at the locations shown on **Figure** 7. After the first quarter of injection, based on an evaluation of groundwater quality data, additional microbial product may be delivered to the subsurface using the permanent wells. The blend of microbes, nutrients and oxygen source will be delivered to the subsurface in the form of a slurry through 1-inch diameter temporary and permanent wells, installed using a direct push sampling device. If additional temporary wells are required after the first quarter of injections, a UIC permit addendum will be submitted detailing the number and locations of the additional wells. Groundwater monitoring will be conducted on a quarterly basis until the remediation goals for the site have been achieved.

ATTACHMENT B

WELL CONSTRUCTION DETAILS

Figure 8: Injection Well Diagram



NOT TO SCALE

CBM ENVIRONMENTAL SERVICES, INC.

SITE ID NO.	09344
PROJECT NO.	11030
DRAWN BY:	AWB
CHECKED BY:	HF
DWG DATE:	11/20/03

INJECTION WELL DIAGRAM

GREEN'S OIL CO.
2489 CHERRY RD.
ROCK HILL, SC

FIGURE 8

ATTACHMENT C

OPERATING DATA

- Excavation and removal of impacted soil in the source area will be conducted prior to the initial microbial treatment. Microbial product will be added to the soil backfilled into the excavation pit. After the initial treatment is completed, the requirement for any additional treatments will be based on an evaluation of groundwater quality data after the first quarter of treatment. Additional treatments, if any, will be spaced three months apart.
- The injected microbial product does not contain any chemicals of concern. Product descriptions and Material Safety Data Sheets for the microbes (BioCritters®), nutrient (BioBooster®) and oxygen source (Critter Oxygen Source®) are included in this attachment. A copy of the Safety Evaluation by the State Toxicologist has been included for your reference.
- The remediation period is expected to last for approximately one to two years including the verification period (if any). It is expected that a two-year permit would be required to ensure sufficient time to complete the project.

THE CRITTER COMPANY
Bioremediation

Corporate Office. The Critter Company, Inc. 6890 E. Sunrise Drive, #120-110, Tucson, Arizona 85750 (520) 229-9803
Eastern Office. The Critter Company of Ohio, Inc. P.O. Box 276. Westerville, Ohio 43086 (614) 794-9775

PRODUCT DESCRIPTIONS

1. **BioCritters™ *(Microbial product)*:**
BioCritters is The Critter Company's primary microbial product for the degradation of hydrocarbon contamination. BioCritters is used to degrade gasoline, diesel fuel, various oils and greases, heavy lubes, restaurant grease, and many other organic contaminants. Each batch of BioCritters is cultivated with different strains of microbes, depending on the contaminant to be degraded. A combination of aerobic (Microbes needing oxygen), anaerobic (Microbes not needing oxygen), and facultative anaerobic microorganisms (Microbes adjusting with or without oxygen) are included in every batch of BioCritters. The by-products of BioCritters are carbon dioxide, water, and trace elements of fatty acid. All microbes grown by The Critter Company are USDA approved, pathogen free, naturally occuring and pose very little risk to human health or the environment; however, we recommend that you review our material safety data sheets before using our products. All microbes come preserved on cylinder shaped carbon pellets, approximately 1/8" x 3/8" in size, wheat bran flakes, or a ground zeolite powder. An activated liquid BioCritters product is also available.

2. **BioBooster *(Nutrient)*:**
Bio Booster is a special, proprietary nutrient source used to promote rapid growth of the microbial colonies. As the microbial population increases, the time that it takes for the microbes to digest the contaminant is greatly reduced. Bio Booster is used in both soil and water applications. It is a non-toxic, white and brown crystalline substance that easily dissolves in water.

3. **CritterClean/Oil-X *(Degreasing agent)*:**
CritterClean is a nontoxic, nonflammable, water-soluble solution that can be used as a degreasing agent on most surfaces. It can also be used as a surfactant to flush out free standing petroleum products in the soil and/or groundwater from leaking underground storage tanks. Moreover, CritterClean can be used in restaurant grease traps, oil and lube facilities and airport runways. It contains no petroleum products, solvents, or acids. When mixed with BioCritters, CritterClean completes the cleaning process by degrading any run off from the contamination.

MATERIAL SAFETY DATA SHEET

MSDS - T34.DOC

SECTION I - IDENTITY

The Critter Company, Inc.
6890 E. Sunrise Drive, #120-110
Tucson, Arizona 85750

Date 01/15/99
Emergency Telephone (520) 299-9808

SECTION II - HAZARDOUS INGREDIENTS/IDENTITY INFORMATION

NAME: BioCritters Dry Formula
D.O.T.: Class not regulated
FORMULA: Proprietary
CHEMICAL FAMILY: A microbial mixture of active hydrocarbon oxidizing natural single celled organisms. The microbial cells are in an inert preparation of carbon pellets. The mixture has no chemical impact. The mixture should be handled with normal precautions.

In enclosed areas - protective mask and eye covering is recommended. The mixture has been tested by human contact for a ten year period with no direct or indirect impact.

SECTION III - PHYSICAL/CHEMICAL CHARACTERISTICS

Boiling Point:	N/A	Specific Gravity $H_2O = 1$:	Density of approx. 0.5
Vapor Pressure mm/Hg:	N/A	Melting Point:	N/A
Vapor Density Air = 1:	N/A	Evaporation Rate:	N/A
Appearance:	Black carbon pellets	Solubility in Water:	Insoluble; may be water wet
Odor:	Faint odor		

SECTION IV - FIRE AND EXPLOSION HAZARD DATA

Flash Point:	N/A	Flammable Limits:	N/A
Extinguisher Media:	N/A	Special Fire Fighting Procedure:	N/A
Unusual Fire Hazards:	N/A		

SECTION V - REACTIVITY DATA

Stability: Stable
Incompatibility: None Known
Conditions to Avoid: Direct consumption or inhalation
Hazardous Polymerization will not occur

SECTION VI - HEALTH HAZARD DATA

Health Hazards (Acute & Chronic): None
Carcinogenicity: None
Conditions Aggravated by Exposure: None
Signs and symptoms of Exposure: None
Route(s) of Entry: Inhalation
NOT FOR HUMAN CONSUMPTION

SECTION VII - PRECAUTIONS FOR SAFE HANDLING AND USE

Precautions to be taken in handling: None
Precautions in case of spill: None
Disposal Method: Storm drains, septic systems, and sewage systems. Follow all federal, state, and local regulations for non-hazardous waste disposal
Storage requirements: Dry, clean, normal room temperature
Precautions for handling and storage: Normal precautions for grain handling
Other precautions: None

SECTION VIII - CONTROL MEASURES

Respiratory Protection:	In areas of concentration, mask and eye protection		
Ventilation Required:	None	Mechanical:	None
Local Exhaust:	Standard dust precautions	Special:	None
Other:	None	Protective Gloves:	No
Eye Protection:	In concentration areas	Other:	Dusk mask in concentration area

THE INFORMATION ON THIS MATERIAL SAFETY DATA SHEET (MSDS) REFLECTS THE LATEST INFORMATION AND DATA THAT WE HAVE ON HAZARDS, PROPERTIES, AND HANDLING OF THIS PRODUCT UNDER THE RECOMMENDED CONDITIONS OF USE. THIS MSDS WAS PREPARED TO COMPLY WITH 24CFR 1910.1200.

MATERIAL SAFETY DATA SHEET

MSDS - Bio-Booster

SECTION I - COMPANY IDENTITY

The Critter Company, Inc.
6890 E. Sunrise Drive, #120-110
Tucson, Arizona 85750

Date 08/01/98
Emergency Telephone (520) 299-9803

SECTION II - HAZARDOUS INGREDIENTS/IDENTITY INFORMATION

NAME:	Bacterial Bio Booster
D.O.T.:	Class not regulated
FORMULA	Proprietary
CHEMICAL FAMILY:	Confidential Chemical Blend
PRODUCT USES:	Bacterial Food Additive

SECTION III - PHYSICAL/CHEMICAL CHARACTERISTICS

Appearance:	White & Brown anhydrous crystals	Odor:	Odorless
Physical State:	Solid	Freezing Point:	NA
Melting Point:	180 ©	Boiling Point:	NA
Odor Threshold:	NA	Vapor Pressure:	NA
Vapor Density:	NA	Percent Volatile:	NA
Evaporation Rate:	NA	pH:	6.1
Specific Gravity:	1.8	solubility:	22 g/100 g @ 0 ©
Percent Soluble (@ 20 C):	NA		

SECTION IV - FIRE AND EXPLOSION HAZARD DATA

Special Fire Fighting Procedures: Wear NIOSH approved SCUBA when in a confined area or exposed to combustion products.

Unusual Fire and Explosion Hazards:	None Known	Flash Point and Method:	NA
Flammability:	NA	Extinguishing Media:	Water fog, CO2, foam, or dry chemical may be used.
Upper Flammable Limits (% Vol):	NA	Lower Flammable Limit:	NA
Auto-ignition Temp (C):	NA	Ammonia, phosphorus, and nitrogen released when heated.	
Explosion - Sensitivity:	NA	Sensitivity to Static Discharge:	NA

SECTION V - REACTIVITY DATA

Chemical Stability:	Yes, Stable under normal conditions. Avoid excessive heat.
Incompatibility with other substances:	Yes, Avoid contact with strong oxidizing agents and strong bases.
Other Reactivity Concerns:	Yes, STRONG BASES will release ammonia gas. STRONG OXIDIZING AGENTS can cause decomposition to occur.

SECTION VI - TOXICOLOGICAL EFFECTS

Routes of entry: Skin Contact, NO; Inhalation, NO; Skin Absorption, NO; Ingestion, YES; Eye Contact, NO

Acute Exposure: INGESTION. May cause diarrhea, nausea, vomiting, cramps, and burns to the mouth and throat if large amounts are ingested. INHALATION; Dust and mist may be irrigating to the nose and throat, causing coughing and choking.

Chronic Exposure: Dermatitis may develop from repeated or prolong skin contact.

Exposure Limits: TWA, NA; STEL, NA; C, NA; OSHA PEL, NA; ACGIH, NA; Others, NA

Carcinogen by NIP:	NA	Carcinogen by IARC:	NA
Irritants:	EYES, May cause mild irritation.	SKIN: May be irritating from prolong skin contact. No effects if promptly rinsed off.	
Sensitization:	NA	Carcinogenicity:	NA
Teratogenicity:	NA	Reproduction Toxicity:	NA
Mutagenicity:	NA	Synergistic Products:	NA

Lethality Tests:

TEST	VALUE	Related Information
LD50 Oral	NA	Tested on rats
LD50 Dermal	NA	Tested on rabbits
LD50 Inhalation	NA	Tested on rats

SECTION VII - PREVENTATIVE MEASURES

Personal Protective Equipment

Gloves:	Wear rubber or plastic gloves.
Respirator:	Wear NIOSH/MSHA approved chemical cartage filter designed to remove dust particles during product application or if occupational exposure limits (TLV)
Eye:	Wear Chemical goggles.
Footwear:	None required.
Clothing:	No special requirement.
Other:	Remove and wash contaminated clothing before reuse. Wash thoroughly after handling

Engineering Controls:	General mechanical ventilation system is adequate.
Leak and spill Procedure:	Wear necessary protective clothing and equipment. Sweep up while avoiding dust regeneration. Place in a properly labeled container for later disposal. Larger spills may require a vacuum.
Waste Disposal:	May be deposited in a chemical dump. Disposal shall be in accordance to all applicable federal, state, and local waste regulations.
Handling Procedures & Equipment:	Do not handle unless the safety precautions have been read and understood. Avoid eye and skin contact. Avoid inhalation of dust or vapors. Do not puncture, drag, or slide containers. Do not smoke in any chemical handling or storage area. Wash hands well before eating
Storage Requirements:	Store in a cool, dry, and well ventilated location. Avoid dust generation. Keep containers tightly closed. Store away from incompatible materials.
Special Shipping info:	49 CFR REGULATION (under HM-181rule) Not regulated for transport in US.

SECTION VIII - FIRST AID MEASURES

First Aid Measure:	EYE CONTACT:	Flush eyes with flowing water for at least 15 minutes while keeping the upper and lower eyelids apart.
	SKIN CONTACT:	Remove contaminated clothing. Wash affected skin area with soap and water and rinse thoroughly with flowing water for at least 15 minutes. Consult a physician if irritation persists.
	INGESTION:	Give water or milk. DO NOT induce vomiting. Consult a physician immediately.
	INHALATION:	Move victim to fresh air. Assist breathing if necessary. Give oxygen or administer artificial respiration if required
	**SPECIAL NOTE:	NEVER GIVE FLUIDS OR INDUCE VOMITING TO ANY UNCONSCIOUS VICTIM.

THE INFORMATION ON THIS MATERIAL SAFETY DATA SHEET (MSDS) REFLECTS THE LATEST INFORMATION AND DATA THAT WE HAVE ON HAZARDS, PROPERTIES, AND HANDLING OF THIS PRODUCT UNDER THE RECOMMENDED CONDITIONS OF USE. THIS MSDS WAS PREPARED TO COMPLY WITH 24CFR 1510.1200.

MATERIAL SAFETY DATA SHEET

MSDS - Critter Orygen Source.DOC

SECTION I - COMPANY IDENTITY

The Critter Company, Inc.
6890 E. Sunrise Drive, #120-110
Tucson, Arizona 85750

Date 11/27/00
Emergency Telephone (520) 299-9803

SECTION II - HAZARDOUS INGREDIENTS/IDENTITY INFORMATION

NAME: Critter Oxygen Source
D.O.T.: Class not regulated
FORMULA: A blend of several classes of enzymes in formulation designed for organic waste treatment.

Materials or Components	CAS No.	% Hazard Data
Enzymes	0	90-98 PEL N/A TLV-TWA N/A
Other Ingredients:		
Fe (iron)	7782-63-0	0.12% as Ferrous Sulphate
Zn (zinc)	7646-85-7	0.06% as Zinc Chloride

Notes: All constituent organic enzymatic protein catalysts are not considered hazardous referenced by the Federal Hazard Communications Standard (29 CFR 1910.1200)

* OSHA PEL,
** ACGIH, 1986-1989, TWA for 8 hour workday, 40 hour work week.
*** CEL or maximum exposure concentration not to be exceeded under any circumstances .

HAZARD RATINGS: (ratings: 0=Least, 1=Slight, 2=Moderate, 3=High, 4=Extreme)

Health:	1 (due to pH)
Fire & Explosion:	0
Reactivity:	0

SECTION III - PHYSICAL/CHEMICAL CHARACTERISTICS

The precise composition of this oxygen source is a proprietary blend of organic enzymatic proteins. There are no hazardous components to this product.

Boiling Point:	212° F	Specific Gravity:	1.00 +/- .01
Vapor Pressure mm/Hg:	N/A	Melting Point:	N/A
Vapor Density Air = 1:	N/A	Evaporation Rate:	N/A
Appearance:	Light amber liquid	Solubility in Water:	Complete
Odor:	None	Percent Volatile by Vol:	N/A
Reactivity with Water:	No	Auto-Ignite Temp:	N/A
Freeze Temp:	32° F	pH:	2.0 (acidic)

SECTION IV - FIRE AND EXPLOSION HAZARD DATA

Flash Point:	N/A	Flammable Limits:	N/A
Extinguisher Media:	N/A	Special Fire Fighting Procedure:	N/A
Unusual Fire Hazards:	N/A		

SECTION V - PHYSICAL HAZARDS

Stability:	Stable	Conditions to Avoid:	Direct consumption
Incompatibility:	None Known	Hazardous Polymerization will not occur	
Conditions to Avoid:	Avoid exposure to oxidizing agents.		

SECTION VI - HEALTH HAZARD DATA

Threshold Limit Values: NA

Signs and Symptoms of Over Exposure -

Acute: Moderate eye irritation. Skin: Causes redness, edema, drying of skin.

Chronic: No known chronic hazards.

Medical conditions aggravated by Exposure: Unknown

Carcinogen: No

Emergency First Aid Procedures -

Eyes: Flush thoroughly with water for 15 minutes. Get medical attention.

Skin: Remove contaminated clothing. Wash exposed areas with soap and water. Wash clothing before reuse. Get medical attention if irritation develops.

Ingestion: Drink a glass of water or milk, ingestion may cause diarrhea.

Inhalation: Wear dust mask type respirator to prevent splash inhalation

*Seek medical assistance for further treatment, observation and support necessary.

SECTION VII - SPECIAL PROTECTION INFORMATION

Respiratory Protection: Not Necessary

Protective Gloves: Rubber-type gloves

Eye Protection: Wear safety glasses

Ventilation Required: Normal

Local Exhaust: No

Hygienic Work Practices: Wash hands thoroughly before eating, routine washing of clothing.

SECTION VIII - SPECIAL PRECAUTIONS AND SPILL/LEAK PROCEDURES

Precautions to be taken in Handling and Storage: Use good, normal hygiene.

Precautions to be taken in case of Spill or Leak -

Small spills, in an undiluted form, contain. Soak up with absorbent materials.

Large spills, in an undiluted form, flush with water into sewer system or drain, dilute with water. .

Waste Disposal Procedures-

Dispose in an approved disposal area or in a manner which complies with all local, state, and federal regulations.

Other Precautions and/or Special Hazards-

Avoid exposure to temperature, catalytic enzymatic activity may be lost if temperatures exceed 130°F Or if pH exposure is above 10.0+.

THE INFORMATION ON THIS MATERIAL SAFETY DATA SHEET (MSDS) REFLECTS THE LATEST INFORMATION AND DATA THAT WE HAVE ON HAZARDS, PROPERTIES, AND HANDLING OF THIS PRODUCT UNDER THE RECOMMENDED CONDITIONS OF USE. THIS MSDS WAS PREPARED TO COMPLY WITH 24CFR 1910.1200.

D H E C
PROMOTE PROTECT PROSPER
Mills/Jarrett Complex
Box 101106
Columbia, SC 29211-0106

MEMORANDUM

DATE: March 3, 1998

TO: Art Shrader
Director
Assessment and Corrective Action Division
Bureau of Underground Storage Tank Management

FROM: John F. Brown, DVM, PhD
State Toxicologist
Health Hazard Evaluation Division

RE: Safety Evaluation of T-34 M3 Dry Formula Bioremediation Product produced by the Critter Company, Tucson, Arizona for Vendor Marketing

1. I have reviewed the responses to DHEC Guidelines for Health Hazard Evaluation of Bioremediation Procedures for Contaminated Soil which were submitted by Jeremy W. Coon, President of the Critter Company.

2. If the material listed is utilized in an approved application procedure, I find no significant threat to the public health and environmental integrity and have no objection to this procedure being carried out at an approved, designated site.

3. The review does not address the effectiveness of the bioremediation process which can be evaluated by others.

ATTACHMENT D

MONITORING PROGRAM

One month after the initial treatment is completed, groundwater samples collected from the monitoring wells MW-1 through MW-7 and PW-8 will be analyzed for BTEX constituents, MTBE and naphthalene using EPA Method 8260. Thereafter, the monitoring wells will be sampled quarterly until the remediation goals for the site have been achieved.

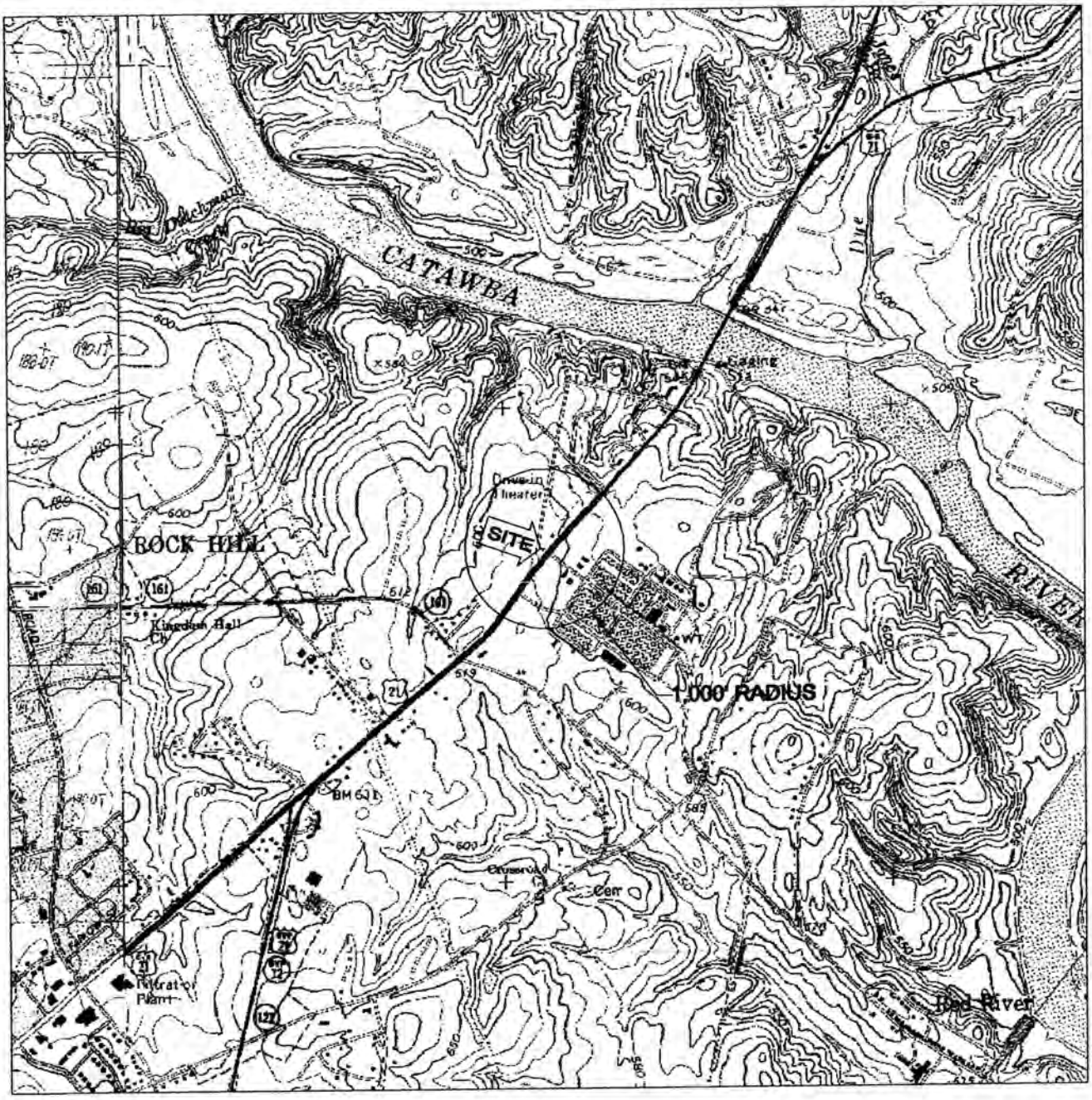
As the laboratory results are received, the effectiveness of the treatment will be tracked and compared with the expected performance. Based on the laboratory results, additional treatments will be conducted on a quarterly basis as needed until remediation goals are met.

VOC concentrations in groundwater will indicate what is being removed and areas being affected by the treatments. Dissolved oxygen (DO) levels in the groundwater will also be monitored. This indicates biological activity and will assist in future dosage of oxygen. Low levels of oxygen indicate that aerobic biodegradation is taking place. The frequency of this measurement will be quarterly.

ATTACHMENT E

MAPS OF WELLS AND AREA OF REVIEW

Figure 1:	USGS Topographic Map
Figure 2:	Site Map
Figure 4:	Water Table Surface Map – June 12, 2003
Figure 7:	Proposed Injection Well Location Map



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1 0 1 MILE

1000 0 1000 2000 3000 4000 5000 6000 7000 FEET

CONTOUR INTERVAL 10 FEET

QUADRANGLE LOCATION

ROCK HILL EAST, SC QUADRANGLE

CBM ENVIRONMENTAL SERVICES, INC.

LATITUDE: 34° 58' 42" N	
LONGITUDE: 80° 58' 54" W	
DRAWN BY: AWB	
CHECKED BY: HF	
DATE: 2/4/04	

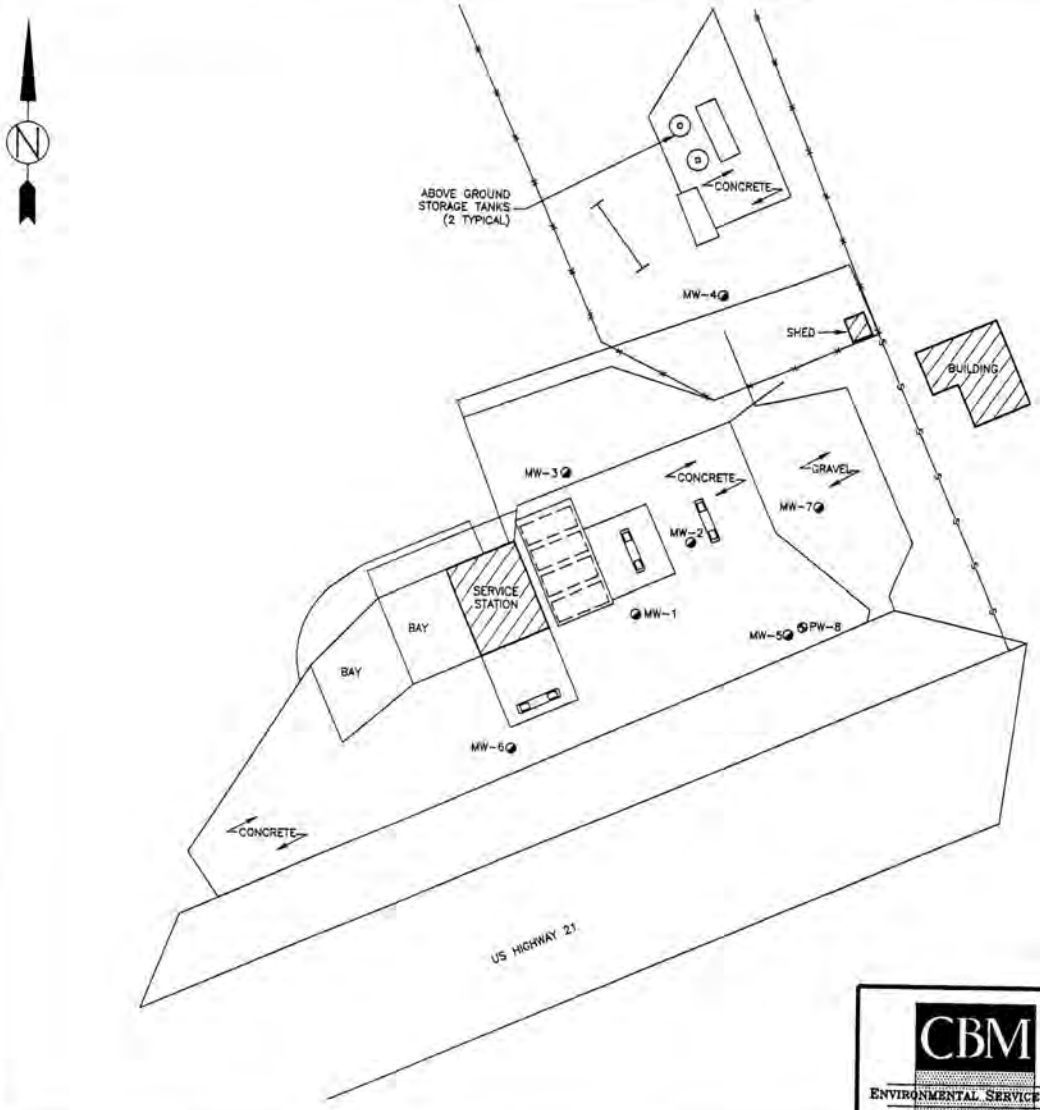
GREEN'S OIL CO.
2849 CHERRY RD.
ROCK HILL, SC

SITE ID NO. 09344

FIGURE 1

USGS TOPOGRAPHIC MAP

CBM PROJECT NO. 11030



LEGEND

- TYPE II MONITORING WELL
- TYPE III MONITORING WELL
- FENCE
- S SEWER LINE

SCALE

0 10 20 30 40

FEET

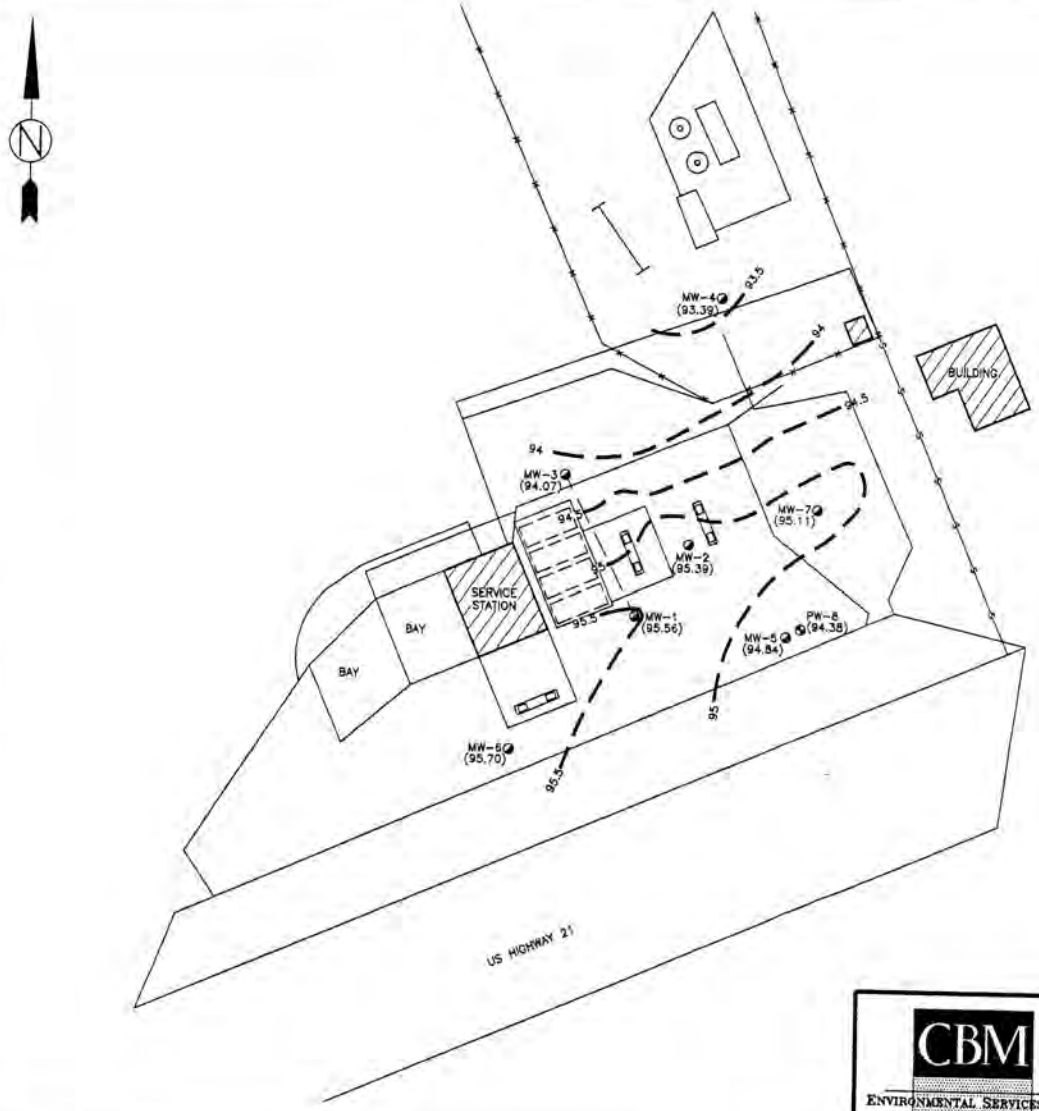
CBM ENVIRONMENTAL SERVICES, INC.

SITE I.D. NO.	09344
PROJECT NO.	11030
DRAWN BY:	BLS/AWB
CHECKED BY:	HF
DWG DATE:	11/20/03

SITE MAP

GREEN'S OIL CO.
2489 CHERRY ROAD
ROCK HILL, SC

FIGURE 2



LEGEND

- TYPE II MONITORING WELL
- TYPE III MONITORING WELL
- FENCE
- S SEWER LINE
- WATER TABLE SURFACE CONTOUR
- (95.70) WATER TABLE ELEVATION IN FEET

SCALE

0 10 20 30 40

FEET

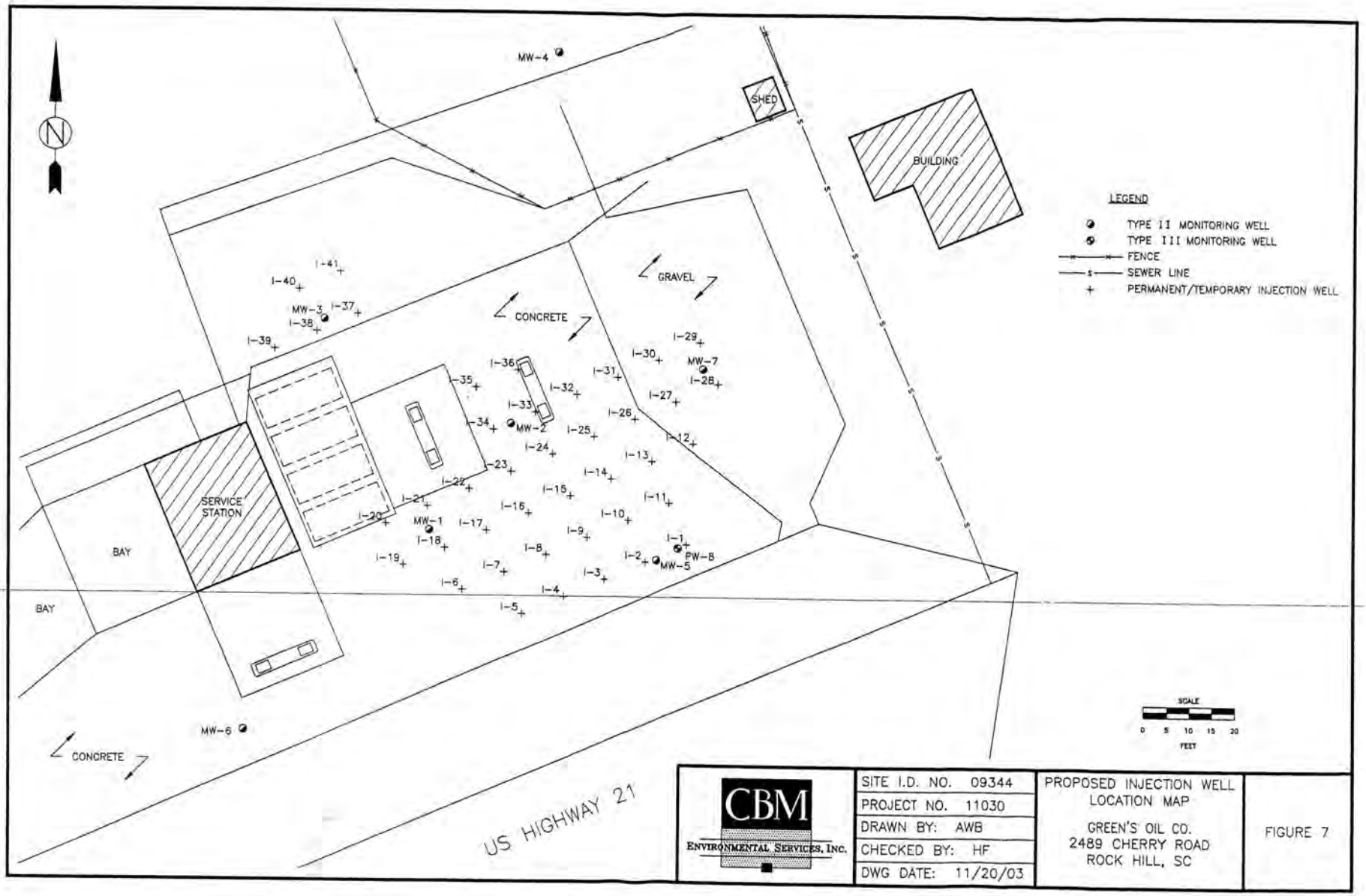
CBM ENVIRONMENTAL SERVICES, INC.

SITE I.D. NO.	09344
PROJECT N	11030
DRAWN BY:	BLS/AWB
CHECKED BY	HF
DWG DATE:	11/20/03

WATER TABLE SURFACE MAP
JUNE 12, 2003

GREEN'S OIL CO.
2489 CHERRY ROAD
ROCK HILL, SC

FIGURE 4



CBM
ENVIRONMENTAL SERVICES, INC.

SITE I.D. NO.	09344
PROJECT NO.	11030
DRAWN BY:	AWB
CHECKED BY:	HF
DWG DATE:	11/20/03

PROPOSED INJECTION WELL LOCATION MAP

GREEN'S OIL CO.
2489 CHERRY ROAD
ROCK HILL, SC

FIGURE 7

D H E C

PROMOTE PROTECT PROSPER

March 16, 2004

UST 25 Todd DOCKETING

Mr. Jerry Green
Green's Oil Company
2457 Breen Circle
Rock Hill, SC 29732

Re: Underground Injection Control Permit #161M
Green's Oil Company
York County

09344

Dear Mr. Green:

Enclosed is a Permit to Construct for sixteen (16) Class VA-I injection wells at the Green's Oil Company, York County, SC as requested in the permit application received March 3, 2004.

Affected parties may appeal this permit decision in accordance with State Regulation R.61-72. To contest a case, a request for a hearing must be made to the Clerk of the DHEC Board within 15 days of the date of this letter. All requests must include the following information:

1) name of the party requesting the hearing,
2) issue(s) for which the hearing is requested,
3) caption or other information sufficient to identify the decision, order, action or inaction which is the subject of the hearing,
4) relief requested.

Note further that Administrative Law Judge (ALJ) Division rules require that persons requesting a contested case hearing must file a copy of the request and pay a filing fee in the amount of $250 dollars (US) with the ALJ Division at the following address:

Clerk, ALJ Division
1205 Pendleton Street, Suite 224
P.O. Box 11667
Columbia, SC 16111

An inspection of the UIC System must be conducted prior to issuance of Approval to Operate. After completion of the inspection, Approval to Operate #161M will be issued. Please call my office to schedule a time and date for the system inspection.

If you have any question, please call Todd Adams at (803) 898-3549.

Sincerely,

Todd Adams, Hydrologist
GroundWater Management Section
Bureau of Water

RECEIVED
MAR 17 2004
UNDERGROUND STORAGE TANK PROGRAM

cc: Read Miner, BLWM-USTP
Rohit Shetty, CBM Environmental Services

D H E C

PROMOTE PROTECT PROSPER

Promoting and protecting the health of the public and the environment.

WATER MONITORING ASSESSMENT & PROTECTION DIVISION

Injection Well Construction Permit
for
Class II, III, and V.A. Injection Well(s)

Permit #161M

Date Issued: March 16, 2004
Date Expired: March 16, 2005

For (Operator): CBM Environmental Services

In accordance with provisions of Title 48, Chapter 1, South Carolina Code of Laws, 1976, as amended, permission is granted for construction of sixteen (16) Class V.A.-I injection wells with a true diameter of one inch, a total depth of approximately 20-30 feet located at the Green's Oil Company, York County, SC with the following provisions:

1) The operator shall submit completed SCDHEC well record forms to the Department's Water Monitoring, Assessment & Protection Division after completion of the injection wells.

2) Upon completion of construction, injection activities shall not commence prior to receiving approval from the Department to operate the injection wells.

3) When the injection wells are no longer in use, or upon request by the Department, within sixty (60) days all injection wells must be permanently abandoned in accordance with the South Carolina Well Standards and Regulations (R.61-71).

Todd Adams, Hydrologist
GroundWater Management Section
Bureau of Water

March 16, 2004
Date

DHEC 2104 (6/88)

STATEMENT OF BASIS - UIC DRAFT PERMIT #161M

In accordance with the South Carolina Underground Injection Control Regulations, Section R61-87.12,J., this Statement of Basis has been prepared for Service Oil Company Underground Injection Control permit application received March 3, 2004.

Ownership of the proposed injection wells is Green's Oil Company, 2457 Breen Circle, Rock Hill, SC 29732. The permit (UIC #161M) is for the construction of sixteen (16) injection wells for a corrective action system at the Green's Oil Company, York County. The intent of the injection wells is to facilitate enhanced remediation by injection of microbes, nutrients, and an oxygen source into the subsurface. The draft permit for the underground injection proposal has been prepared based on staff review and the application of the Pollution Control Act of South Carolina and the Underground Injection Control Regulations of South Carolina.

Conditions of the permit issuance include the submittal of well records for all injection wells installed and the inspection of well construction by the Department prior to injection.

SOIL EXCAVATION AND GROUNDWATER MONITORING REPORT
GREEN'S OIL COMPANY
2849 CHERRY RD.
ROCK HILL, YORK COUNTY
UST PERMIT NO. 09344
SITE RISK CLASSIFICATION: HIGH
LAND USE CLASSIFICATION: COMMERCIAL
CBM PROJECT NO. 11030

Prepared For:

Federated Insurance Company
c/o Jerry Green
2457 Breen Circle
Rock Hill, SC 29732

Prepared By:

CBM Environmental Services, Inc.
3440 Lakemont Blvd.
Fort Mill, SC 29708
(803) 548-5989

December 23, 2004

Samanth Dawson

Samanth Emmanuel Dawson
Project Manager

Ken Czoer, P.G.
License No. 1025

TABLE OF CONTENTS

FIGURES

TABLES

APPENDICES

Appendix A: Non-Hazardous Waste Disposal Manifests and Weight Tickets
Appendix B: Groundwater Sampling Data Sheets
Appendix C: Laboratory Report – Groundwater Samples – November 22, 2004
Appendix D: Graph of Individual VOC Concentrations Vs. Time
Appendix E: Graph of Total VOC Concentrations Vs. Depth to Groundwater

1.0 INTRODUCTION

This report presents the results of groundwater monitoring and soil excavation activities conducted in November and December 2004 at the Greens Oil Company site. The work was conducted in accordance with the cost agreement dated November 11, 2004. The site served as a gas station although it is presently not in use. The site is located in a commercial area of York County. No public or private water supply wells were reported within 1,000 feet of the site. Two water supply wells downgradient of the site have been abandoned. No surface water bodies were observed within 500 feet of the source area. The Catawba River is the only known potential receptor identified during the receptor survey conducted. It is approximately 3,000 feet downgradient of the site.

A Corrective Action Plan (CAP) that proposed the remediation of petroleum impacted soil and groundwater beneath the site by excavating, backfilling with microbial augmented soil and dewatering followed by microbial injections was submitted to the SCDHEC on January 23, 2004. SCDHEC approved the CAP in correspondence dated March 29, 2004. However, in subsequent telephone conferences with the responsible party's insurance company (Federated Insurance), it was decided that only the soil excavation and microbial augmented backfill combined with de-watering would be implemented initially with the possibility of microbial injections being conducted after two to three quarters of groundwater monitoring.

2.0 FACILITY INFORMATION

- **Facility Name**: Greens Oil Company
- **Location:** 2849 Cherry Road
  Rock Hill, York County (**Figure 1**)
- **UST Permit No.** 09344
- **Risk Classification:** High
- **Land Use Classification:** Commercial
- **UST Operator:** Greens Oil Company
  2849 Cherry Road
  Rock Hill, South Carolina
- **UST Owner:** Greens Oil Company
  2849 Cherry Road
  Rock Hill, South Carolina

- **Consultant:** CBM Environmental Services, Inc.
  3440 Lakemont Blvd
  Fort Mill, South Carolina 29708
  (803) 548-5989
- **Release Information:**
- **Date Discovered:** Unknown
- **Estimated Quantity of Release:** Unknown
- **Cause of Release:** Unknown
- **Source of Release:** Leaking UST System
- **UST System Size/Contents:** Four gasoline USTs
- **Latitude / Longitude:** 34°58'42" North/ 80°58'54" West

3.0 SOIL EXCAVATION ACTIVITIES

3.1 Soil Excavation and Backfill

In accordance with the CAP approved by the SCDHEC on March 29, 2004, excavation of petroleum impacted soil was conducted between December 1 and 3, 2004. During the sampling event conducted in November 2004, depths to groundwater were recorded at an average of 9 feet across the site. Thus, de-watering was not necessary during excavation. A figure showing the site and surrounding vicinity is presented in **Figure 2**. Soil excavation activities were performed under the supervision of CBM Environmental Services, Inc. of Fort Mill, SC. Petroleum impacted soil was removed from the source area using a backhoe and trackhoe and loaded directly onto trucks for hauling and disposal. Due to the presence of the UST basin, the horizontal extent of the excavation was limited. The vertical extent of the excavation was stopped between seven and eight feet due to the presence of fractured bedrock in the excavation basin.

On December 2 and 3, 2004 approximately 206 tons of excavated soil were taken to Soil Technologies Inc., of Shelby, North Carolina for treatment and disposal. Additional tonnage was incurred due to the presence of rock intermixed with the soil from a depth of 3 feet down. Fractured bedrock was encountered between 7 and 8 feet and the excavation was terminated. Copies of the weight tickets and the associated Non-Hazardous Waste Disposal Manifest for excavated soil have been included as **Appendix A**.

The pit was backfilled with fill dirt in 1 foot lifts. Each lift was inoculated with approximately 10 gallons of microbial solution which had been prepared and aerated 48 hours prior to application per the manufacturer's specification. A total of 80 gallons was gravity fed into the backfill material. After each

application of the microbial product, the back fill was compacted using a Ramex vibratory compactor. After all backfill and compaction activities were completed the excavated area was "capped" with concrete. A map showing the location of the area of excavation has been included as **Figure 3**.

4.0 SAMPLING ACTIVITIES

4.1 Monitoring Well Abandonment

On November 24, 2004, one, four-inch Type II monitoring well (MW-1) was abandoned prior to soil excavation activities. Monitoring well MW-1 will be replaced before the next groundwater sampling event is scheduled to be conducted in January 2005.

4.2 Site Hydrology

Depths to groundwater in the Type II monitoring wells measured on November 22, 2004 ranged from 8.67 to 9.44 feet. Groundwater elevations relative to a temporary benchmark with an assumed datum of 100.00 feet ranged from 88.37 to 89.15 feet. Based on the November 2004 data, groundwater flow was generally toward the east. The hydraulic gradient beneath the site was less than 0.01 feet per foot. The mean groundwater elevation has decreased approximately 6.65 feet since June 2003. A Water Table Surface Map based on the November 2004 data is included as **Figure 4**. A summary of groundwater elevation data obtained in November 2004 is presented in **Table 1**. A summary of historical groundwater elevation data obtained is presented in **Table 2**. Please note that monitoring well MW-3 was dry and monitoring well MW-4 was not accessible as the enclosure in which this well is located was locked. Monitoring well MW-7 was not found.

4.3 Groundwater Sampling

On November 22, 2004, four Type II monitoring wells (MW-1, MW-2, MW-5 and MW-6) and one Type III monitoring well (PW-8) were developed and sampled. Laboratory analyses were performed on groundwater samples collected from monitoring wells MW-1, MW-2, MW-5, MW-6 and PW-8 for BTEX constituents, MTBE and naphthalene by EPA Method 8260B. In addition, groundwater samples collected from monitoring wells MW-1, MW-2, MW-5 and PW-8 were analyzed for Methane by Method RSK175M, Nitrate and Sulfate by EPA Method 300.0 and Total Iron by Method 200.7, respectively. Field measurements of DO, pH, conductivity and temperature were collected from the monitoring wells sampled. Monitoring well MW-6 did not yield sufficient amount of water for analyses of natural attenuation parameters or for field measurements.

5.0 GROUNDWATER QUALITY

Detectable concentrations of BTEX constituents, naphthalene and /or MTBE that exceeded the risk based screening levels (RBSLs) were reported in groundwater samples collected from monitoring wells MW-1 and MW-2. Detectable concentrations of MTBE that did not exceed the RBSLs were also reported in groundwater samples colleted from monitoring wells MW-5 and PW-8. No detectable concentrations of requested method constituents were reported in groundwater samples collected from monitoring well MW-6.

A Groundwater Quality Map showing individual BTEX constituents, MTBE and naphthalene concentrations in the monitoring wells from the November 2004 sampling event is included as **Figure 5**. A summary of laboratory analyses of groundwater samples collected from the monitoring wells in November 2004 is presented in **Table 3**. A summary of historical groundwater quality data is presented in **Table 4**. A summary of natural attenuation parameters is presented in **Table 5.** Groundwater sampling data sheets from the November 2004 sampling event have been included as **Appendix B.** A complete report of laboratory analyses of groundwater samples collected during the November 2004 sampling event has been included as **Appendix C**. Graphs showing variations in BTEX constituents, MTBE and naphthalene concentrations versus time and total VOC concentrations versus depths to groundwater have been included as **Appendices D** and **E**, respectively. A certificate of disposal for purge water stored in a 55-gallon drum will be forwarded upon receipt.

6.0 CONCLUSIONS AND RECOMMENDATIONS

- Detectable concentrations of BTEX constituents, naphthalene and/or MTBE that exceeded the RBSLs were reported in groundwater samples collected from monitoring wells MW-1 and MW-2. The concentrations of one or more requested method constituents in the remaining monitoring wells were below the RBSLs.
- The total VOC concentrations have decreased significantly in monitoring well MW-1 and marginally in monitoring wells MW-2, MW-5 and PW-8 since the last reporting period. Monitoring well MW-1 was abandoned on November 24, 2004, prior to soil excavation activities
- Approximately 206 tons of petroleum contaminated soil was excavated from the vicinity of the UST basin. Microbial augmented backfill was compacted into the excavated pit in 1 foot lifts for dispersion. The surface of the excavation area was "capped" with concrete after completion of backfill and compaction activities.

dispersion. The surface of the excavation area was "capped" with concrete after completion of backfill and compaction activities.

- A replacement monitoring well (MW-1R) will be installed prior to the groundwater sampling event scheduled to be conducted in January 2005. Well permits will be obtained before installation of this well.
- It is recommended that groundwater sampling be conducted on a quarterly basis for the first year. After two quarters of groundwater sampling and monitoring, the possibility of utilizing microbial injections for aggressive groundwater remediation should be explored.
- The next groundwater sampling event will be conducted in January 2005 and the report will be submitted no later than February 28, 2005.

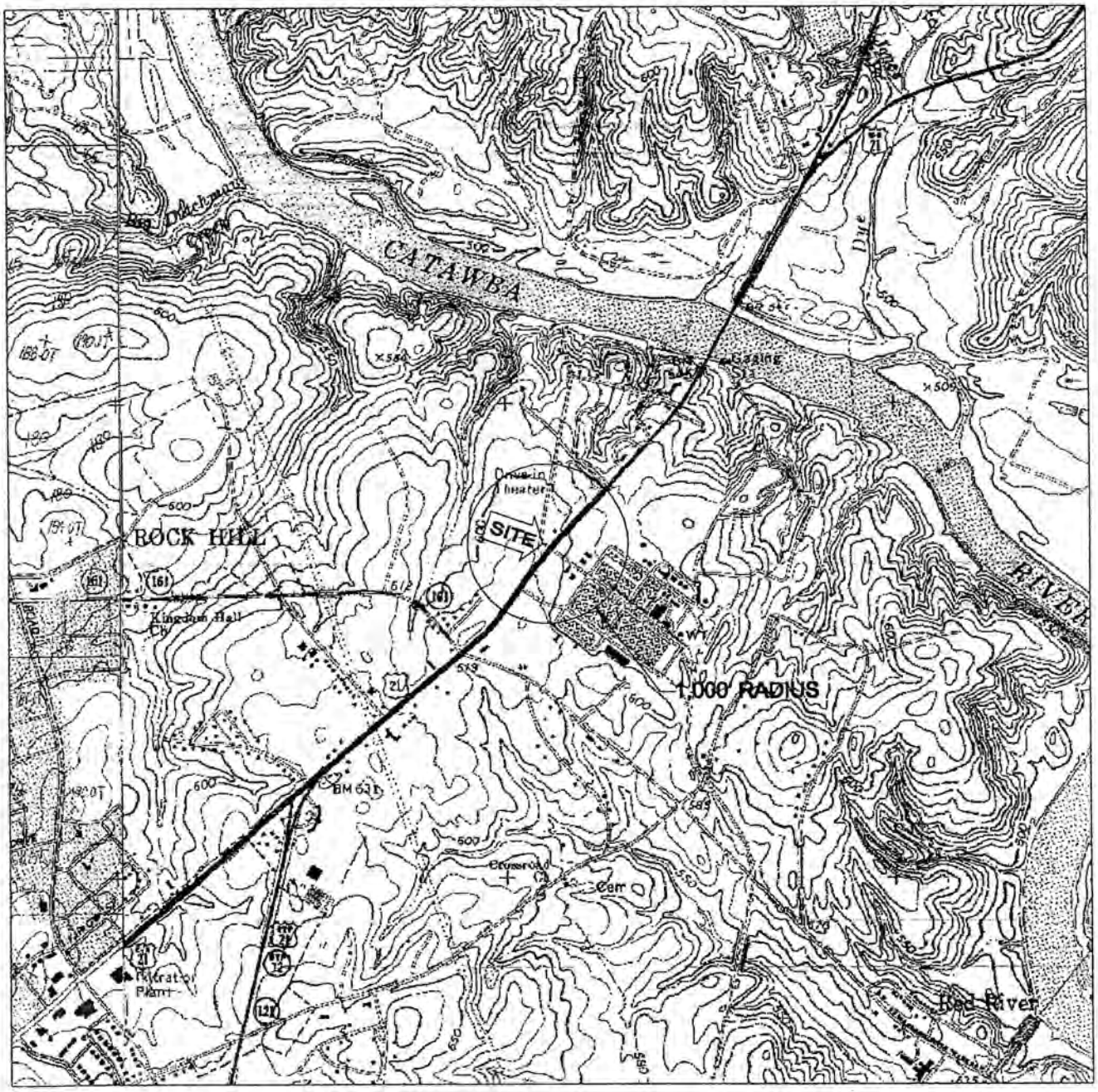
7.0 LIMITATIONS

This report has been prepared for the exclusive use of Mr. Jerry Green for specific application to the referenced site in York County, South Carolina. The assessment was conducted based on the scope of work and level of effort desired by the client and with resources adequate only for that scope of work.

Certain data contained in this report was not obtained under the supervision of CBM. Although the accuracy of this data cannot be verified, for the purpose of this report CBM assumes it is correct. Our findings have been developed in accordance with generally accepted standards of geology and hydrogeology practices in the State of South Carolina, available information, and our professional judgment. No other warranty is expressed or implied.

The data that is presented in this report are indicative of conditions that existed at the precise locations sampled and at the time the samples were collected. In addition, the data obtained from samples would be interpreted as being meaningful with respect to parameters indicated in the laboratory report. No additional information can be logically be inferred from this data.

FIGURES



SCALE 1:24,000

1 0 1 MILE

1000 0 1000 2000 3000 4000 5000 6000 7000 FEET

CONTOUR INTERVAL 10 FEET

QUADRANGLE LOCATION

ROCK HILL EAST, SC QUADRANGLE

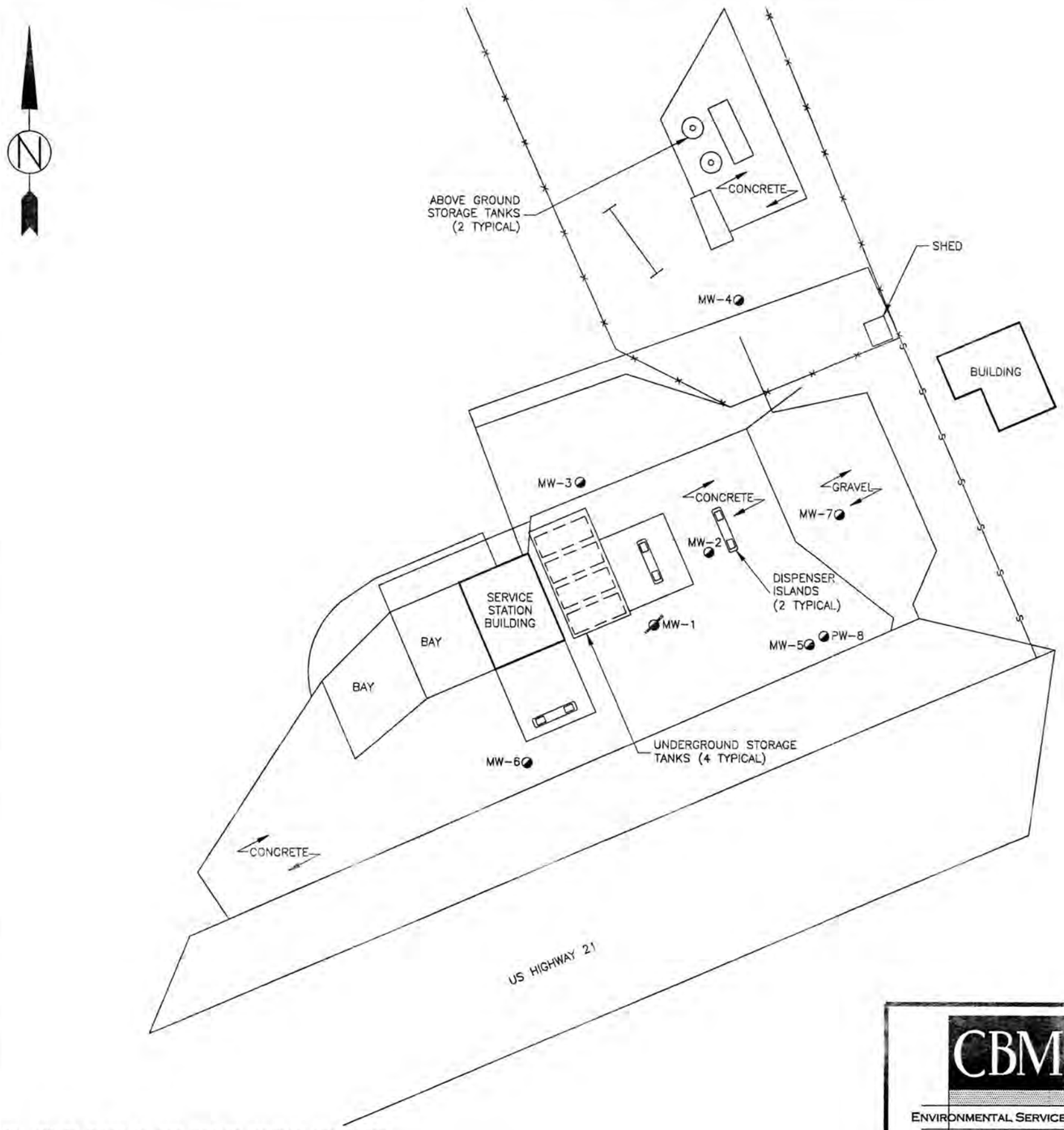
CBM
ENVIRONMENTAL SERVICES, INC.

LATITUDE: 34° 58' 42" N	
LONGITUDE: 80° 58' 54" W	GREEN'S OIL CO. 2849 CHERRY RD. ROCK HILL, SC
DRAWN BY: AWB	
CHECKED BY: HF	SITE ID NO. 09344
DATE: 2/4/04	

FIGURE 1

USGS TOPOGRAPHIC MAP

CBM PROJECT NO. 11030



NOTE: FIGURE BASED ON SITE MAP BY PREVIOUS CONSULTANT.

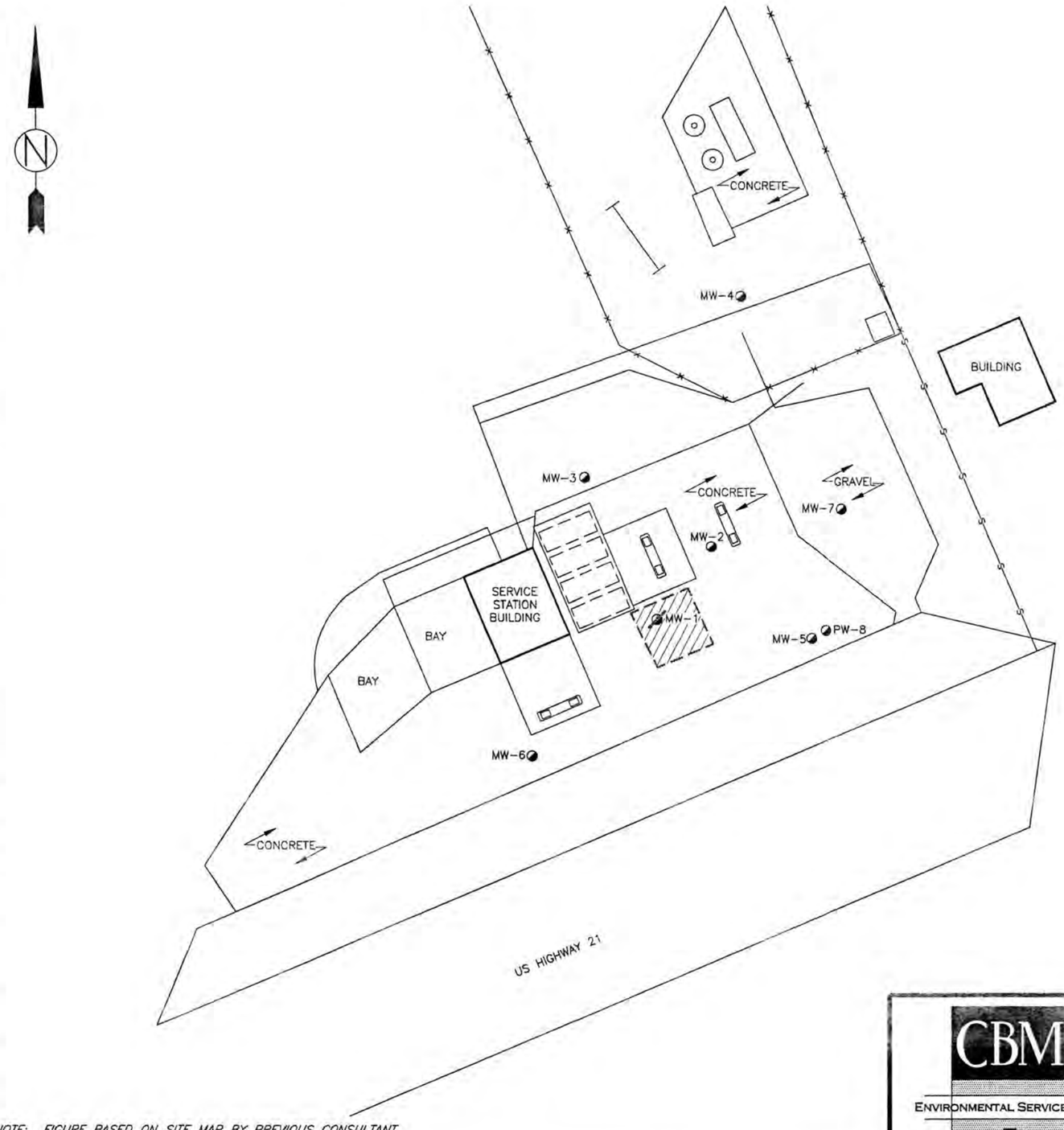
CBM
ENVIRONMENTAL SERVICES, INC.

SITE I.D. NO.	09344
PROJECT NO.	11030
DRAWN BY:	BLS/AWB
CHECKED BY:	SD
DWG DATE:	12/23/04

SITE MAP
NOVEMBER 24, 2004

GREEN'S OIL CO.
2489 CHERRY ROAD
ROCK HILL, SC

FIGURE 2



NOTE: FIGURE BASED ON SITE MAP BY PREVIOUS CONSULTANT.

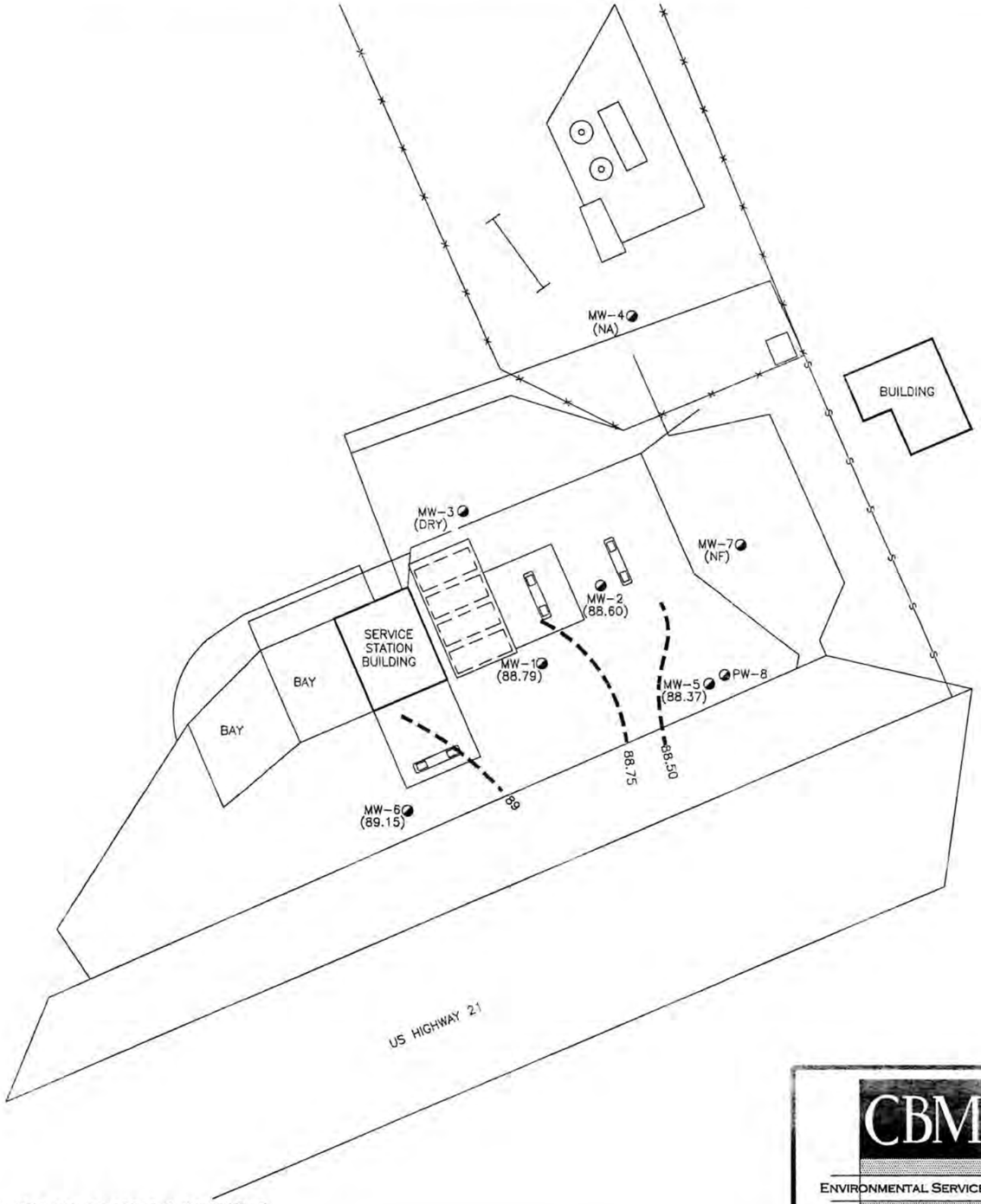
CBM
ENVIRONMENTAL SERVICES, INC.

SITE I.D. NO.	09344
PROJECT NO.	11030
DRAWN BY:	BLS/AWB
CHECKED BY:	SD
DWG DATE:	12/23/04

SOIL EXCAVATION
LOCATION MAP
DECEMBER 1-3, 2004

GREEN'S OIL CO.
2489 CHERRY ROAD
ROCK HILL, SC

FIGURE 3



LEGEND

◕	MONITORING WELL
-x-x-	FENCE
——S——	SEWER LINE
- - - -	WATER TABLE SURFACE CONTOUR
(89.15)	WATER TABLE ELEVATION IN FEET
(NA)	NOT ACCESSIBLE
(NF)	NOT FOUND

SCALE

0 10 20 30 40

FEET

NOTE: FIGURE BASED ON SITE MAP BY PREVIOUS CONSULTANT.

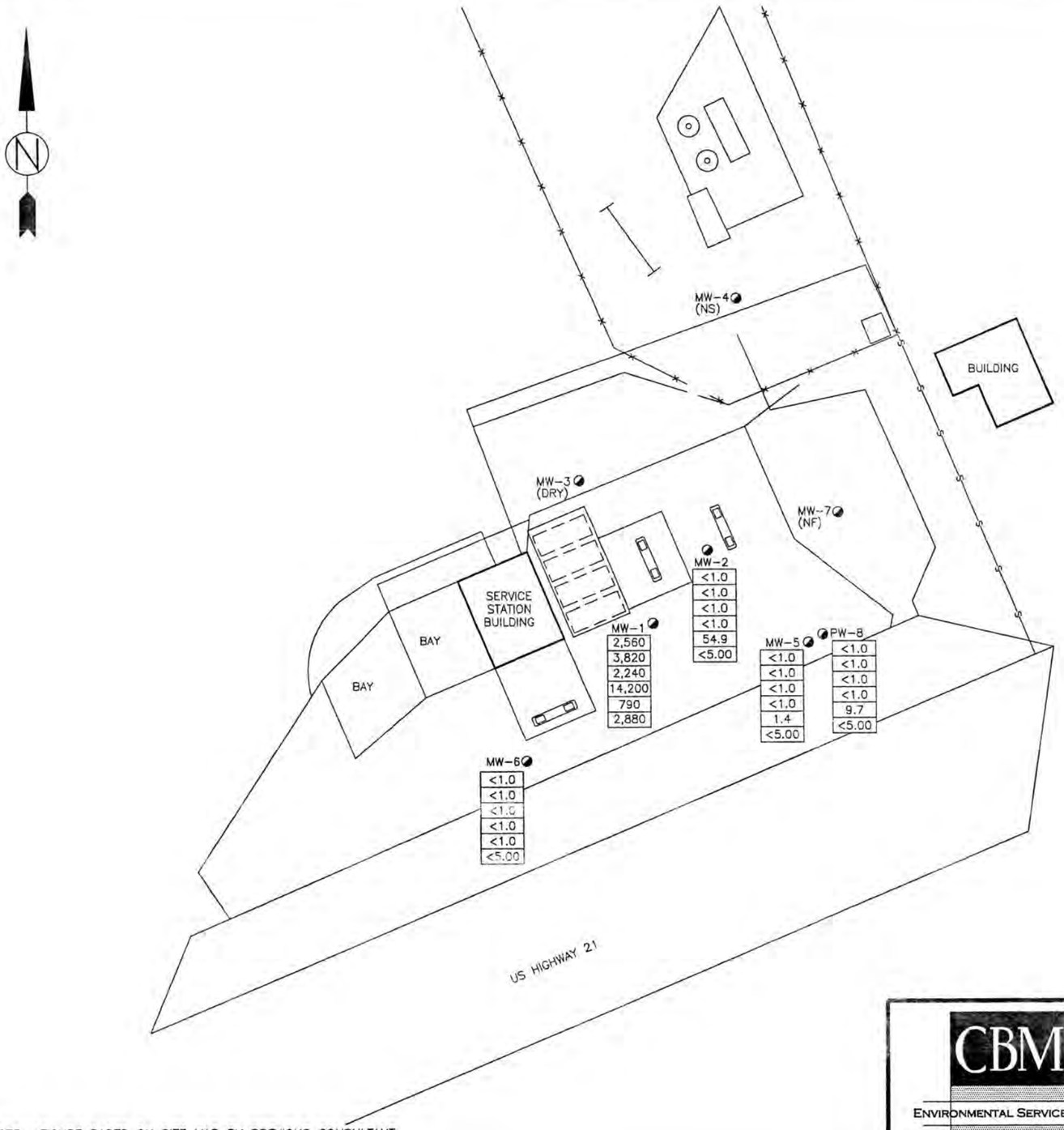
CBM
ENVIRONMENTAL SERVICES, INC.

SITE I.D. NO.	09344
PROJECT NO.	11030
DRAWN BY:	BLS/AWB
CHECKED BY:	SD
DWG DATE:	12/23/04

WATER TABLE SURFACE MAP
NOVEMBER 22, 2004

GREEN'S OIL CO.
2489 CHERRY ROAD
ROCK HILL, SC

FIGURE 4



LEGEND

- MONITORING WELL
- FENCE
- SEWER LINE

2,560	BENZENE
3,820	TOLUENE
2,240	ETHYLBENZENE
14,200	XYLENES
790	MTBE
2,880	NAPHTHALENE

CONCENTRATIONS IN µg/L

<1.0 – LESS THAN THE METHOD DETECTION LIMIT SPECIFIED IN THE LABORATORY REPORT

(NF) – NOT FOUND

(NS) – NOT SAMPLED

SCALE

0 10 20 30 40

FEET

NOTE: FIGURE BASED ON SITE MAP BY PREVIOUS CONSULTANT.

CBM
ENVIRONMENTAL SERVICES, INC.

SITE I.D. NO.	09344
PROJECT NO.	11030
DRAWN BY:	BLS/AWB
CHECKED BY:	SD
DWG DATE:	12/23/04

GROUNDWATER QUALITY MAP
NOVEMBER 22, 2004

GREEN'S OIL CO.
2489 CHERRY ROAD
ROCK HILL, SC

FIGURE 5

TABLES

TABLE 1
SUMMARY OF GROUNDWATER ELEVATION DATA[1]
GREEN'S OIL COMPANY
NOVEMBER 22, 2004

Well No.	Top of Casing Elevation	Depth to Groundwater	Groundwater Elevation	Well Depth[2]	Dissolved Oxygen[3]
MW-1	98.15	9.36	88.79	12.33	0.93
MW-2	97.86	9.26	88.60	14.04	1.39
MW-3	97.08	Dry	Dry	7.75	Dry
MW-4	96.91	NM[4]	NM	13.59	NM
MW-5	97.04	8.67	88.37	10.04	1.41
MW-6	98.59	9.44	89.15	9.60	NM
MW-7	98.40	NF[5]	NF	13.60	NF
PW-8	96.98	5.34	91.64	30.10	2.01

Notes:

1. Top of Casing Elevations were reproduced from the previous consultant's reports. Additional well construction details are unavailable; data reported in feet.
2. Well depths measured during June 12, 2003 sampling event.
3. Dissolved oxygen levels were measured using a DO meter; results reported in mg/L.
4. Not measured. Well did not yield enough water for field measurements or was not accessible.
5. Not found.

TABLE 2

SUMMARY OF HISTORICAL GROUNDWATER ELEVATION DATA[1]

GREEN'S OIL COMPANY

Well No.	Date	Top of Casing Elevation	Depth to Groundwater	Groundwater Elevation	Well Depth[2]	Dissolved Oxygen[3]
MW-1	05/24/00	98.15	7.16	90.99	12.33	1.3
	10/09/00		7.78	90.37		2.3
	01/02/01		9.58	88.57		1.4
	12/16/02		5.11	93.04		NM[4]
	06/12/03		2.59	95.56		0.79
	11/22/04		9.36	88.79		0.93
MW-2	05/24/00	97.86	7.03	90.83	14.04	1.9
	10/09/00		7.71	90.15		2.4
	01/02/01		9.43	88.43		0.0
	12/16/02		4.91	92.95		2.06
	06/12/03		2.47	95.39		0.53
	11/22/04		9.26	88.60		1.39
MW-3	12/16/02	97.08	5.83	91.25	7.75	NM
	06/12/03		3.01	94.07		1.14
	11/22/04		Dry	Dry		Dry
MW-4	12/16/02	96.91	6.66	90.25	13.59	1.45
	06/12/03		3.52	93.39		0.69
	11/22/04		NM	NM		NM
MW-5	05/24/00	97.04	6.56	90.48	10.04	2.4
	10/09/00		7.15	89.89		3.0
	01/02/01		8.90	88.14		1.6
	12/16/02		4.67	92.37		2.27
	06/12/03		2.20	94.84		1.51
	11/22/04		8.67	88.37		1.41
MW-6	05/24/00	98.59	8.10	90.49	9.60	3.8
	10/09/00		7.92	90.67		4.9
	01/02/01		9.52	89.07		NM
	12/16/02		5.25	93.34		3.68
	06/12/03		2.89	95.70		4.48
	11/22/04		9.44	89.15		NM
MW-7	12/16/02	98.40	4.81	93.59	13.60	NM
	06/12/03		3.29	95.11		0.84
	11/22/04		NF[5]	NF		NF

TABLE 2 (cont'd.)
SUMMARY OF HISTORICAL GROUNDWATER ELEVATION DATA
GREEN'S OIL COMPANY

Well No.	Date	Top of Casing Elevation	Depth to Groundwater	Groundwater Elevation	Well Depth	Dissolved Oxygen
PW-8	05/24/00	96.98	6.45	90.53	30.10	3.9
	10/09/00		7.12	89.86		2.5
	01/02/01		8.69	88.29		2.1
	12/16/02		4.46	92.52		NM
	06/12/03		2.60	94.38		1.23
	11/22/04		5.34	91.64		2.01

Notes:

1. Top of casing elevations were reproduced from the previous consultant's reports. Additional well construction details are unavailable; data reported in feet.
2. Well depths measured during June 12, 2003 sampling event.
3. Dissolved oxygen levels were measured using a DO meter; results reported in mg/L.
4. Not measured. Well was not accessible or did not yield enough water for measurements.
5. Not found.

TABLE 3
SUMMARY OF LABORATORY ANALYSES[1]
GROUNDWATER SAMPLES
GREEN'S OIL COMPANY
NOVEMBER 22, 2004

Well No.	Benzene	Toluene	Ethylbenzene	Xylenes	MTBE	Naphthalene
MW-1	**2,560**[2]	**3,820**	**2,240**	**14,200**	**790**	**2,880**
MW-2[3]	<1.0[4]	<1.0	<1.0	<1.0	**54.9**	<5.00
MW-3	Dry	Dry	Dry	Dry	Dry	Dry
MW-4	NS[5]	NS	NS	NS	NS	NS
MW-5[6]	<1.0	<1.0	<1.0	<1.0	1.4	<5.00
MW-6	<1.0	<1.0	<1.0	<1.0	<1.0	<5.00
MW-7	NF[7]	NF	NF	NF	NF	NF
PW-8[8]	<1.0	<1.0	<1.0	<1.0	9.7	<5.00
RBSL[9]	5	1,000	700	10,000	40	10

Notes:

1. Analyses for BTEX constituents, MTBE and Naphthalene by EPA Method 8260B; results reproted in µg/L.
2. Concentrations in bold face type exceeded the January 1998 Risk Based Screening Level.
3. Other compound detected (IPE: 294 µg/L).
4. Less than the method detection limit specified in the laboratory report.
5. Not sampled. Well was not accessible.
6. Other compound detected (IPE: 21.8 µg/L)
7. Well not found.
8. Other compound detected (IPE: 13.4 µg/L)
9. January 1998 Risk Based Screening Level.

TABLE 4
SUMMARY OF HISTORICAL LABORATORY ANALYSES[1]
GROUNDWATER SAMPLES
GREEN'S OIL COMPANY

Well No.	Date	Benzene	Toluene	Ethylbenzene	Xylenes	MTBE	Naphthalene	Lead
MW-1	10/24/96	**3,040**[2]	164	325	950	**2,310**	**365**	NR[3]
	05/09/00	**1,790**	255	302	611	**1,300**	**117**	12.0
	10/09/00	**1,600**	180	220	400	**850**	**350**	<3.0[4]
	01/02/01	**500**	9.0	38	68	**460**	**55**	<3.0
	12/16/02	**3,000**	**12,000**	**3,700**	**14,000**	**920**	**1,700**	14
	06/12/03	**2,280**	**9,520**	**1,980**	**17,400**	**801**	**991**	NR
	11/22/04	**2,560**	**3,820**	**2,240**	**14,200**	**790**	**2,880**	NR
MW-2	10/24/96	<10.0	<10.0	<10.0	<3.0	**24,700**	<5.0	NR
	05/09/00	**5.2**	ND[5]	ND	ND	**19,900**	ND	ND
	10/09/00	**31**	5.7	<5.0	12	**11,000**	15	<3.0
	01/02/01	**7.2**	<5.0	<5.0	<5.0	**7,700**	<5.0	<3.0
	12/16/02	<5.0	<5.0	<5.0	7.2	**170**	**12**	<3.0
	06/12/03	4.0	<1.0	<1.0	<1.0	**157**	<5.00	NR
	11/22/04[6]	<1.0	<1.0	<1.0	<1.0	**54.9**	<5.00	NR
MW-3	10/24/96	NF[7]	NF	NF	NF	NF	NF	NF
	05/09/00	NF	NF	NF	NF	NF	NF	NF
	10/09/00	NF	NF	NF	NF	NF	NF	NF
	01/02/01	NF	NF	NF	NF	NF	NF	NF
	12/12/02	**150**	**5,800**	**2,400**	**14,000**	<25	**920**	**21**
	06/12/03	4.2	135	150	1,920	2.9	**260**	NR
	11/22/04	Dry	Dry	Dry	Dry	Dry	Dry	NR
MW-4	10/24/96	<1.0	<1.0	<1.0	<3.0	**70.4**	<5.0	NR
	05/09/00	NF	NF	NF	NF	NF	NF	NF
	10/09/00	NF	NF	NF	NF	NF	NF	NF
	01/02/01	NF	NF	NF	NF	NF	NF	NF
	12/16/02	<5.0	<5.0	<5.0	<5.0	**160**	8.5	5.8
	06/12/03	<1.0	<1.0	<1.0	<1.0	**198**	<5.00	NR
	11/22/04	NS[8]	NS	NS	NS	NS	NS	NR
	RBSL[9]	5	1,000	700	10,000	40	10	15

TABLE 4 (cont'd.)
SUMMARY OF HISTORICAL LABORATORY ANALYSES
GROUNDWATER SAMPLES
GREEN'S OIL COMPANY

Well No.	Date	Benzene	Toluene	Ethylbenzene	Xylenes	MTBE	Naphthalene	Lead
MW-5	10/24/96	<1.0	<1.0	<1.0	<3.0	**1,720**	<5.0	NR
	05/09/00	ND	ND	ND	ND	**14,000**	ND	ND
	10/09/00	<5.0	<5.0	<5.0	<5.0	**9,100**	<5.0	<3.0
	01/02/01	<5.0	<5.0	<5.0	<5.0	**1,400**	<5.0	<3.0
	12/12/02	<5.0	<5.0	<5.0	<5.0	14	<5.0	14
	06/12/03	<1.0	<1.0	<1.0	<1.0	3.1	<5.00	NR
	11/22/04[10]	<1.0	<1.0	<1.0	<1.0	1.4	<5.00	NR
MW-6	10/24/96	NS	NS	NS	NS	NS	NS	NS
	05/09/00	ND	ND	ND	ND	ND	ND	**52.0**
	10/09/00	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	**26.0**
	01/02/01	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	NS
	12/12/02	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	**48**
	06/12/03	<1.0	<1.0	<1.0	<1.0	<1.0	<5.00	NR
	11/22/04	<1.0	<1.0	<1.0	<1.0	<1.0	<5.00	NR
MW-7	10/24/96	NF	NF	NF	NF	NF	NF	NF
	05/09/00	NF	NF	NF	NF	NF	NF	NF
	10/09/00	NF	NF	NF	NF	NF	NF	NF
	01/02/01	NF	NF	NF	NF	NF	NF	NF
	12/12/02	<5.0	<5.0	<5.0	<5.0	**160**	<5.0	**58**
	06/12/03	<1.0	<1.0	<1.0	<1.0	**294**	<5.00	NR
	11/22/04	NF	NF	NF	NF	NF	NF	NF
PW-8	10/24/96	<1.0	<1.0	<1.0	<3.0	**547**	<5.0	NR
	05/09/00	ND	ND	ND	ND	**790**	ND	ND
	10/09/00	<5.0	<5.0	<5.0	6.1	**180**	<5.0	<3.0
	01/02/01	<5.0	<5.0	<5.0	<5.0	**160**	<5.0	<3.0
	12/12/02	<5.0	<5.0	<5.0	<5.0	**44**	<5.0	<3.0
	06/12/03	<1.0	<1.0	<1.0	<1.0	**84.6**	<5.00	NR
	11/22/04[11]	<1.0	<1.0	<1.0	<1.0	9.7	<5.00	NR
	RBSL	5	1,000	700	10,000	40	10	15

TABLE 4 (cont'd.)
SUMMARY OF HISTORICAL LABORATORY ANALYSES
GROUNDWATER SAMPLES
GREEN'S OIL COMPANY

Notes:

1. Analyses for BTEX constituents, MTBE and Naphthalene by EPA Method 8260B; groundwater quality data prior to June 12, 2003 reproduced from previous consultant's reports; results reported in µg/L.
2. Concentrations in bold face type exceeded the January 1998 Risk Based Screening Level.
3. Analysis not requested.
4. Less than the method detection limit specified in the laboratory report.
5. Not detected.
6. Other compound detected (IPE: 294 µg/L).
7. Well not found.
8. Not sampled due to insufficient volume of water in the well or well was not accessible.
9. January 1998 Risk Based Screening Level.
10. Other compound detected (IPE: 21.8 µg/L)
11. Other compound detected (IPE: 13.4 µg/L)

TABLE 5
SUMMARY OF NATURAL ATTENUATION PARAMETERS[1]
GREEN'S OIL COMPANY
NOVEMBER 22, 2004

Well No.	DO (mg/L)	Temp (°C)	pH	Specific Conductance (mS)	Methane (µg/L)	Nitrate (mg/L)	Sulfate (mg/L)	Total Iron (µg/L)
MW-1	0.93	22.5	6.1	0.67	6,710	<0.100[2]	<1.00	17,300
MW-2	1.39	23.4	6.18	0.76	29	<0.100	5.94	3,150
MW-3	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry
MW-4	NM[3]	NM	NM	NM	NM	NM	NM	NM
MW-5	1.41	23.9	6.56	0.54	<26	1.56	17.8	21,400
MW-6	NM	NM	NM	NM	NM	NM	NM	NM
MW-7	NF[4]	NF	NF	NF	NF	NF	NF	NF
PW-8	2.01	21.9	6.58	0.37	<26	0.310	27.6	5,140

Notes:

1. Analysis for Methane by Method RSK175M, Nitrate and Sulfate by EPA Method 300.0 and Ferrous Iron by Method 200.7.
2. Less than the method detection limit specified in the laboratory report.
3. Not measured due to insufficient volume of water in the well or well was not accessible.
4. Not found.

APPENDICES

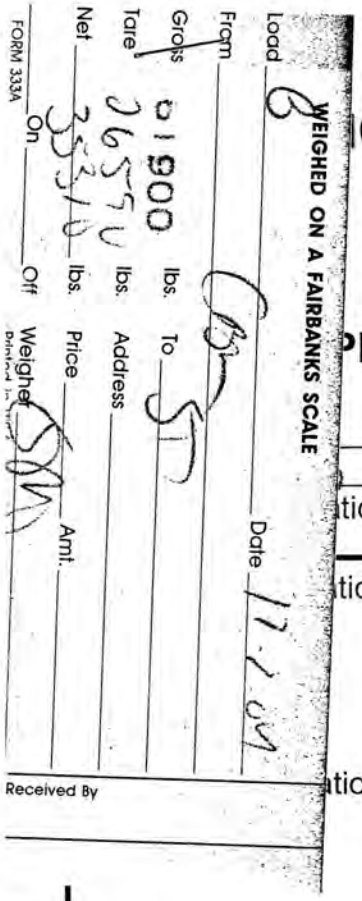
APPENDIX A

NON-HAZARDOUS WASTE DISPOSAL MANIFESTS AND WEIGHT TICKETS

Site Address: 947 Crowder Road
Shelby, North Carolina 28150
Mailing Address: Post Office Box 62
Lattimore, North Carolina
28089-0062
Phone (704) 477-2315 Office / Fax (704) 434-5884

OLOGIES, INC.

NON-HAZARDOUS CONTAMINATED SOIL / PETROLEUM CONTAMINATED SOIL MANIFEST



tion_____ Cause of Release_____

tion:
Telephone No._____

tion:
Telephone No._____

Transporter Information:
Telephone No._____

READ REVERSE BEFORE SIGNING!!

Driver's Signature_____ Truck No._____
***Driver's signature acknowledges that driver has read the terms and conditions on the reverse side of this page and that the driver fully understands and agrees to be bound by them.*

Date,Time Weighed:_____
Weigh Master Signature:_____

Gross Weight_____ Tare Weight_____
Net Weight_____ Equiv.Tons_____

Inspected & Accepted By: **SOIL TECHNOLOGIES, INC.**

By:_____ Date:_____ Time:_____

NOTICE TO TRUCKER:

TRUCKS WILL NOT BE PERMITTED TO ENTER FACILITY WITHOUT A MANIFEST

White and Yellow copies of this form must be left at SOIL TECHNOLOGIES, INC.

White-Billing Green-Generator Canary-Trucker

WEIGHED ON A FAIRBANKS SCALE

Load 5 Date 12-7-04

From CBM

To 5

Gross 63140 lbs. Address

Tare 28446 lbs.

Net 34694 lbs. Price Amt.

On Off Weigher

FORM 333A Printed in USA

Received By

...OLOGIES, INC.

Site Address: 947 Crowder Road
Shelby, North Carolina 28150
Mailing Address: Post Office Box 62
Lattimore, North Carolina
28089-0062
Phone (704) 477-2315 Office / Fax (704) 434-5884

NON-HAZARDOUS CONTAMINATED SOIL / ...ETROLEUM CONTAMINATED SOIL MANIFEST

...on ________ Cause of Release ________

...on: CBM Environmental

Fort Mill S.C.

Telephone No. ________

...on: Green Oil Company

2489 Cherry Rd

Rock Hill S.C.

Telephone No. ________

Transporter Information: TNT

Fort Mill S.C.

Telephone No. ________

READ REVERSE BEFORE SIGNING!!

Driver's Signature [signature] Truck No. ________

Driver's signature acknowledges that driver has read the terms and conditions on the reverse side of this page and that the driver fully understands and agrees to be bound by them.

Date,Time Weighed: 12-7-04 1102

Weigh Master Signature: [signature]

Gross Weight 63140 Tare Weight 28446

Net Weight 34694 Equiv.Tons 17.37

Inspected & Accepted By: **SOIL TECHNOLOGIES, INC.**

By: [signature] Date: 12-7-04 Time: 1102

NOTICE TO TRUCKER:

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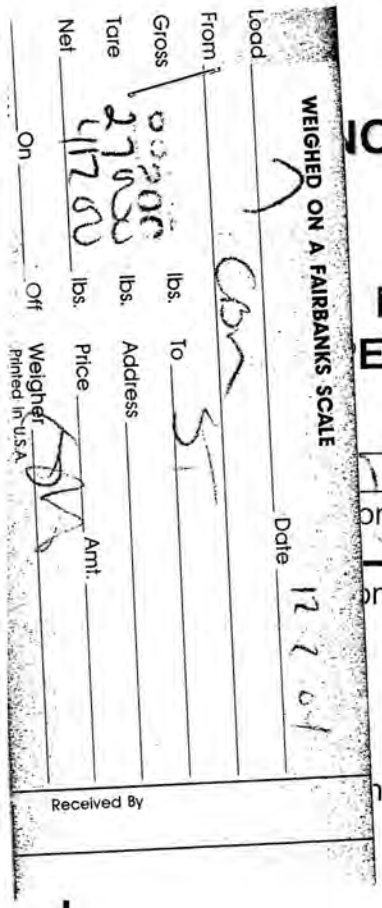
White-Billing Green-Generator Canary-Trucker



NOLOGIES, INC.

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Shelby, North Carolina 28150
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Lattimore, North Carolina
28089-0062
Phone (704) 477-2315 Office / Fax (704) 434-5884

NON-HAZARDOUS CONTAMINATED SOIL / ETROLEUM CONTAMINATED SOIL MANIFEST

on_____ Cause of Release_____

on: CBM-ENVIRONMENTAL
Fort Mill S.C.
Telephone No._____

n: GREENE OIL COMPANY
2489 CHURCH RD.
Rock Hill S.C.
Telephone No._____

Transporter Information: TNT
Fort Mill S.C.
Telephone No._____

READ REVERSE BEFORE SIGNING!!

Driver's Signature_____ Truck No._____
Driver's signature acknowledges that driver has read the terms and conditions on the reverse side of this page and that the driver fully understands and agrees to be bound by them.

Date,Time Weighed: 12.7.09 9:15
Weigh Master Signature:_____

Gross Weight 68760 Tare Weight 27000
Net Weight 41760 Equiv.Tons 20.8

Inspected & Accepted By: **SOIL TECHNOLOGIES, INC.**

By:_____ Date: 12/7/09 Time:_____

NOTICE TO TRUCKER:

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SOIL TECHNOLOGIES, INC.

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NON-HAZARDOUS CONTAMINATED SOIL / PETROLEUM CONTAMINATED SOIL MANIFEST

S.T.I. Job No. 2
Manifest No. _____
Type of Contamination _____ Cause of Release _____

Contractor Information: CBM Environmental
Fort Mill S.C.
Telephone No. _____

Generator Information: Green Oil Company
2939 Cherry Rd.
Rock Hill S.C.
Telephone No. _____

Transporter Information: TNT
Fort Mill
Telephone No. _____

READ REVERSE BEFORE SIGNING!!

Driver's Signature [signature] Truck No. TNT 2

***Driver's signature acknowledges that driver has read the terms and conditions on the reverse side of this page and that the driver fully understands and agrees to be bound by them.**

Date,Time Weighed: 12-2-04 11:20
Weigh Master Signature: [signature]

Gross Weight 60360 Tare Weight 27600
Net Weight 32760 Equiv.Tons 16.38

Inspected & Accepted By: **SOIL TECHNOLOGIES, INC.**

By: [signature] Date: 12-2-04 Time: 1125

NOTICE TO TRUCKER:

TRUCKS WILL NOT BE PERMITTED TO ENTER FACILITY WITHOUT A MANIFEST

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White-Billing Green-Generator Canary-Trucker

SOIL TECHNOLOGIES, INC.

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Shelby, North Carolina 28150
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NON-HAZARDOUS CONTAMINATED SOIL / PETROLEUM CONTAMINATED SOIL MANIFEST

S.T.I. Job No. 3
Manifest No. _____
Type of Contamination _____ Cause of Release _____

Contractor Information: CBM ENVIRONMENTAL
FORT MILL SC.
Telephone No. _____

Generator Information: GREEN OIL COMPANY
7429 CHERRY RD
ROCK HILL SC
Telephone No. _____

Transporter Information: TNT
FORT MILL S.C.
Telephone No. _____

READ REVERSE BEFORE SIGNING!!

Driver's Signature _____ Truck No. _____
***Driver's signature acknowledges that driver has read the terms and conditions on the reverse side of this page and that the driver fully understands and agrees to be bound by them.**

Date,Time Weighed: 12-2-04 11:25
Weigh Master Signature: _____

Gross Weight 56540 Tare Weight 27000
Net Weight 29540 Equiv.Tons 14.77

Inspected & Accepted By: **SOIL TECHNOLOGIES, INC.**

By: _____ Date: 12-2-04 Time: 11:30

NOTICE TO TRUCKER:

TRUCKS WILL NOT BE PERMITTED TO ENTER FACILITY WITHOUT A MANIFEST

White and Yellow copies of this form must be left at SOIL TECHNOLOGIES, INC.

White-Billing Green-Generator Canary-Trucker

SOIL TECHNOLOGIES, INC.

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Shelby, North Carolina 28150
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NON-HAZARDOUS CONTAMINATED SOIL / PETROLEUM CONTAMINATED SOIL MANIFEST

S.T.I. Job No. 1
Manifest No. _____
Type of Contamination _____ Cause of Release _____

Contractor Information: C B & J Enterprise
Fort Mill SC.
Telephone No. _____

Generator Information: Green Oil Company
7489 Cherry pl.
Rock Hill SC.
Telephone No. _____

Transporter Information: TNT
Fort Mill
Telephone No. _____

READ REVERSE BEFORE SIGNING!!

Driver's Signature _____ Truck No. 40

***Driver's signature acknowledges that driver has read the terms and conditions on the reverse side of this page and that the driver fully understands and agrees to be bound by them.*

Date,Time Weighed: 12-2-04 1115
Weigh Master Signature: _____

Gross Weight 55920 Tare Weight 28400
Net Weight 27520 Equiv.Tons 13.76

Inspected & Accepted By: **SOIL TECHNOLOGIES, INC.**

By: _____ Date: 12-2-04 Time: 1120

NOTICE TO TRUCKER:

TRUCKS WILL NOT BE PERMITTED TO ENTER FACILITY WITHOUT A MANIFEST

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White-Billing Green-Generator Canary-Trucker

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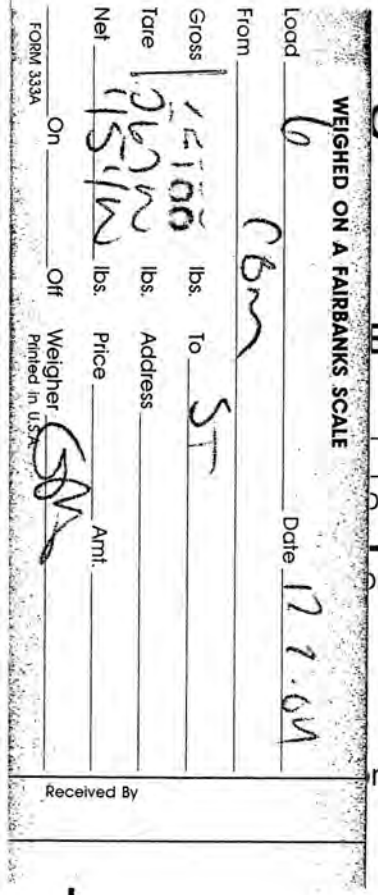
Shelby, North Carolina 28150
Mailing Address: Post Office Box 62
Lattimore, North Carolina
28089-0062
Phone (704) 477-2315 Office / Fax (704) 434-5884

OLOGIES, INC.

NON-HAZARDOUS CONTAMINATED SOIL / ETROLEUM CONTAMINATED SOIL MANIFEST



_____

_____

on _____ Cause of Release _____

on: CGM ENVIRONMENTAL
FORT MILL SC
Telephone No. _____

n: GREEN OIL COMPANY
2989 CHERRY RD.
ROCK HILL S.C.
Telephone No. _____

Transporter Information: INT
FORT MILL S.C.
Telephone No. _____

READ REVERSE BEFORE SIGNING!!

Driver's Signature Don Baird Truck No. INT 12

Driver's signature acknowledges that driver has read the terms and conditions on the reverse side of this page and that the driver fully understands and agrees to be bound by them.

Date,Time Weighed: 12/1/09 1:12
Weigh Master Signature: _____

Gross Weight 72.16 Tare Weight 26.76
Net Weight 45.40 Equiv.Tons 22.7

Inspected & Accepted By: **SOIL TECHNOLOGIES, INC.**

By: _____ Date: 12/1/09 Time: 1:15

NOTICE TO TRUCKER:

TRUCKS WILL NOT BE PERMITTED TO ENTER FACILITY WITHOUT A MANIFEST

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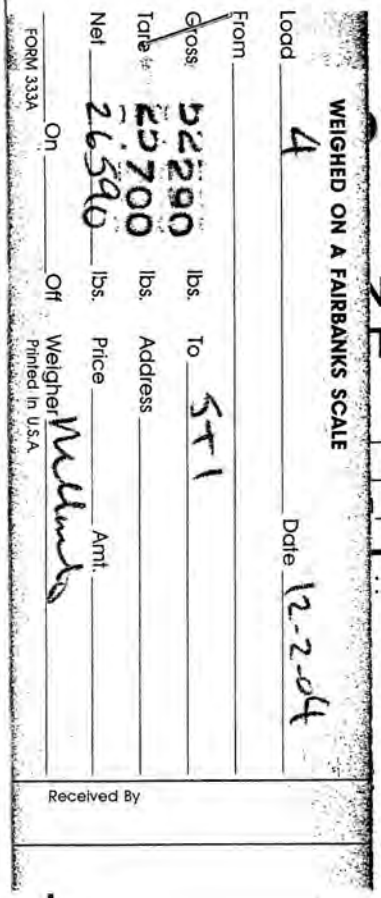
White-Billing Green-Generator Canary-Trucker



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LOGIES, INC.

NON-HAZARDOUS CONTAMINATED SOIL / TROLEUM CONTAMINATED SOIL MANIFEST

Cause of Release

CBM Environmental
Fort Mill S.C.
Telephone No.

Green Oil Company
2189 Cherry Rd.
Rock Hill S.C
Telephone No.

Transporter Information: TNT
Fort Mill S.C.
Telephone No.

READ REVERSE BEFORE SIGNING!!

Driver's Signature Truck No. TNT 160

***Driver's signature acknowledges that driver has read the terms and conditions on the reverse side of this page and that the driver fully understands and agrees to be bound by them.*

Date,Time Weighed: 12-2-04 1130
Weigh Master Signature:

Gross Weight 52290 Tare Weight 25700
Net Weight 26590 Equiv.Tons 13.29

Inspected & Accepted By: **SOIL TECHNOLOGIES, INC.**

By: Date: 12.2.04 Time: 1135

NOTICE TO TRUCKER:

TRUCKS WILL NOT BE PERMITTED TO ENTER FACILITY WITHOUT A MANIFEST

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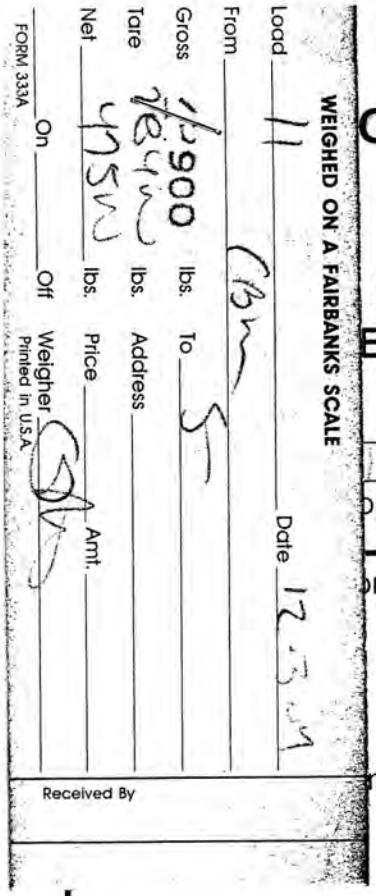
NON-HAZARDOUS CONTAMINATED SOIL / ETROLEUM CONTAMINATED SOIL MANIFEST



_____
_____
on_____Cause of Release_____

on:
_____
_____
_____
Telephone No._____

n:
_____
_____
_____
Telephone No._____

Transporter Information:
_____
_____
_____
Telephone No._____

READ REVERSE BEFORE SIGNING!!

Driver's Signature_____ Truck No._____
Driver's signature acknowledges that driver has read the terms and conditions on the reverse side of this page and that the driver fully understands and agrees to be bound by them.

Date,Time Weighed:_____
Weigh Master Signature:_____

Gross Weight_____ Tare Weight_____
Net Weight_____ Equiv.Tons_____

Inspected & Accepted By: **SOIL TECHNOLOGIES, INC.**

By:_____ Date:_____Time:_____

NOTICE TO TRUCKER:

TRUCKS WILL NOT BE PERMITTED TO ENTER FACILITY WITHOUT A MANIFEST

White and Yellow copies of this form must be left at SOIL TECHNOLOGIES, INC.

White-Billing Green-Generator Canary-Trucker

WEIGHED ON A FAIRBANKS SCALE

Load ____ Date ____

From ____ To ____

Gross ____ lbs.

Tare ____ lbs. Address ____

Net ____ lbs. Price ____ Amt. ____

On ____ Off ____ Weigher ____

Received By ____

FORM 333A Printed in U.S.A.

Site Address: 947 Crowder Road
Shelby, North Carolina 28150
Mailing Address: Post Office Box 62
Lattimore, North Carolina
28089-0062
Phone (704) 477-2315 Office / Fax (704) 434-5884

…IOLOGIES, INC.

NON-HAZARDOUS CONTAMINATED SOIL / …PETROLEUM CONTAMINATED SOIL MANIFEST

…ion ____________________ Cause of Release ____________________

…on: ____________________

Telephone No. ____________________

…on: ____________________

Telephone No. ____________________

Transporter Information: ____________________

Telephone No. ____________________

READ REVERSE BEFORE SIGNING!!

Driver's Signature ____________________ Truck No. ____________________

Driver's signature acknowledges that driver has read the terms and conditions on the reverse side of this page and that the driver fully understands and agrees to be bound by them.

Date,Time Weighed: ____________________

Weigh Master Signature: ____________________

Gross Weight ____________________ Tare Weight ____________________

Net Weight ____________________ Equiv.Tons ____________________

Inspected & Accepted By: **SOIL TECHNOLOGIES, INC.**

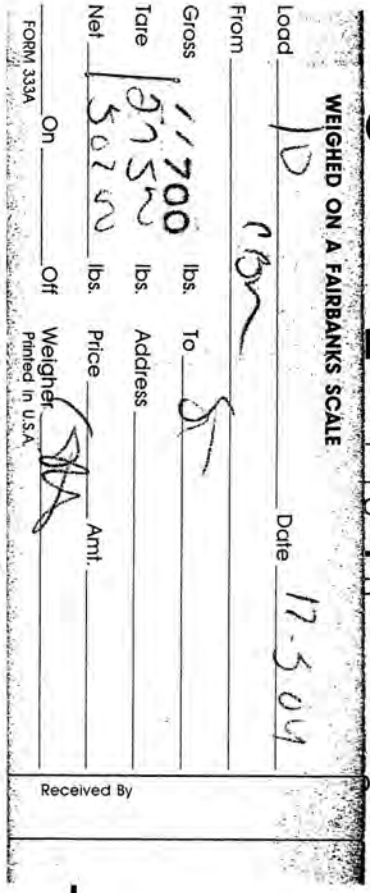
By: ____________________ Date: ____________ Time: ____________

NOTICE TO TRUCKER:

TRUCKS WILL NOT BE PERMITTED TO ENTER FACILITY WITHOUT A MANIFEST

White and Yellow copies of this form must be left at SOIL TECHNOLOGIES, INC.

White-Billing Green-Generator Canary-Trucker



OLOGIES, INC.

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Shelby, North Carolina 28150
Mailing Address: Post Office Box 62
Lattimore, North Carolina
28089-0062
Phone (704) 477-2315 Office / Fax (704) 434-5884

NON-HAZARDOUS CONTAMINATED SOIL / ETROLEUM CONTAMINATED SOIL MANIFEST

on_____ Cause of Release_____

on:

Telephone No._____

on:

Telephone No._____

Transporter Information:

Telephone No._____

READ REVERSE BEFORE SIGNING!!

Driver's Signature_____ Truck No._____

***Driver's signature acknowledges that driver has read the terms and conditions on the reverse side of this page and that the driver fully understands and agrees to be bound by them.**

Date,Time Weighed:_____

Weigh Master Signature:_____

Gross Weight_____ Tare Weight_____

Net Weight_____ Equiv.Tons_____

Inspected & Accepted By: **SOIL TECHNOLOGIES, INC.**

By:_____ Date:_____ Time:_____

NOTICE TO TRUCKER:

TRUCKS WILL NOT BE PERMITTED TO ENTER FACILITY WITHOUT A MANIFEST

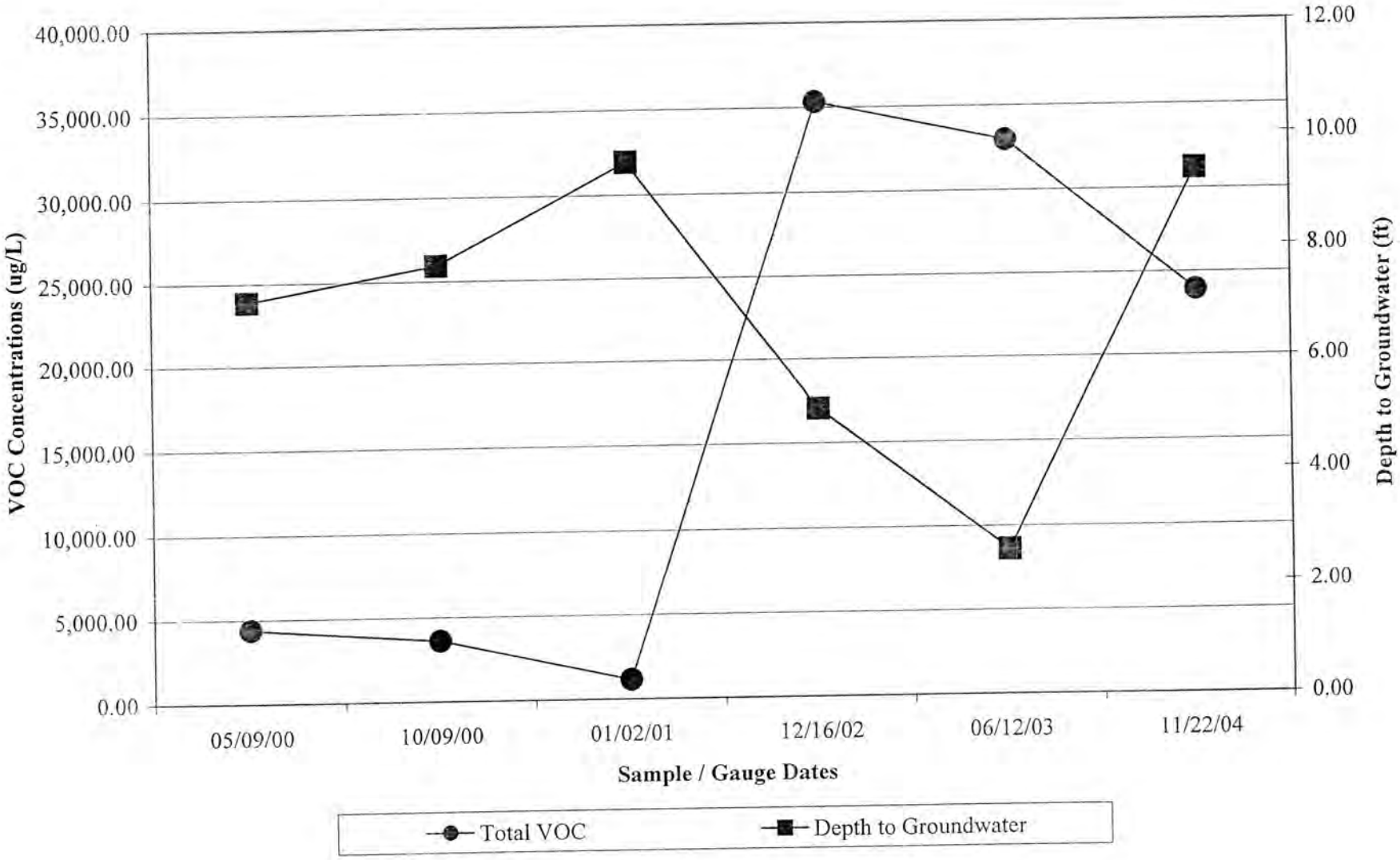
White and Yellow copies of this form must be left at SOIL TECHNOLOGIES, INC.

White-Billing Green-Generator Canary-Trucker

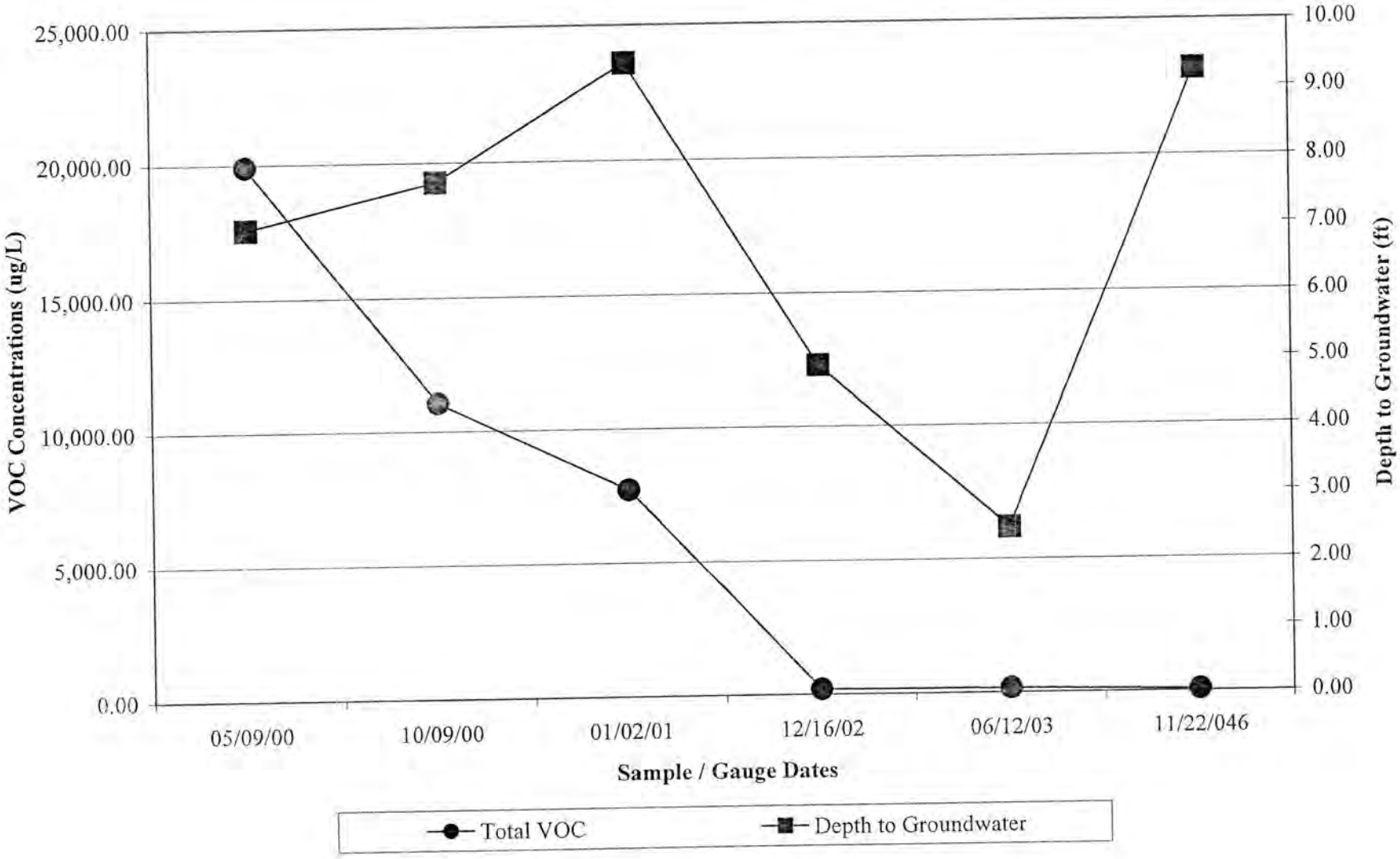
APPENDIX D

GRAPHS OF INDIVIDUAL VOC CONCENTRATIONS VS. TIME

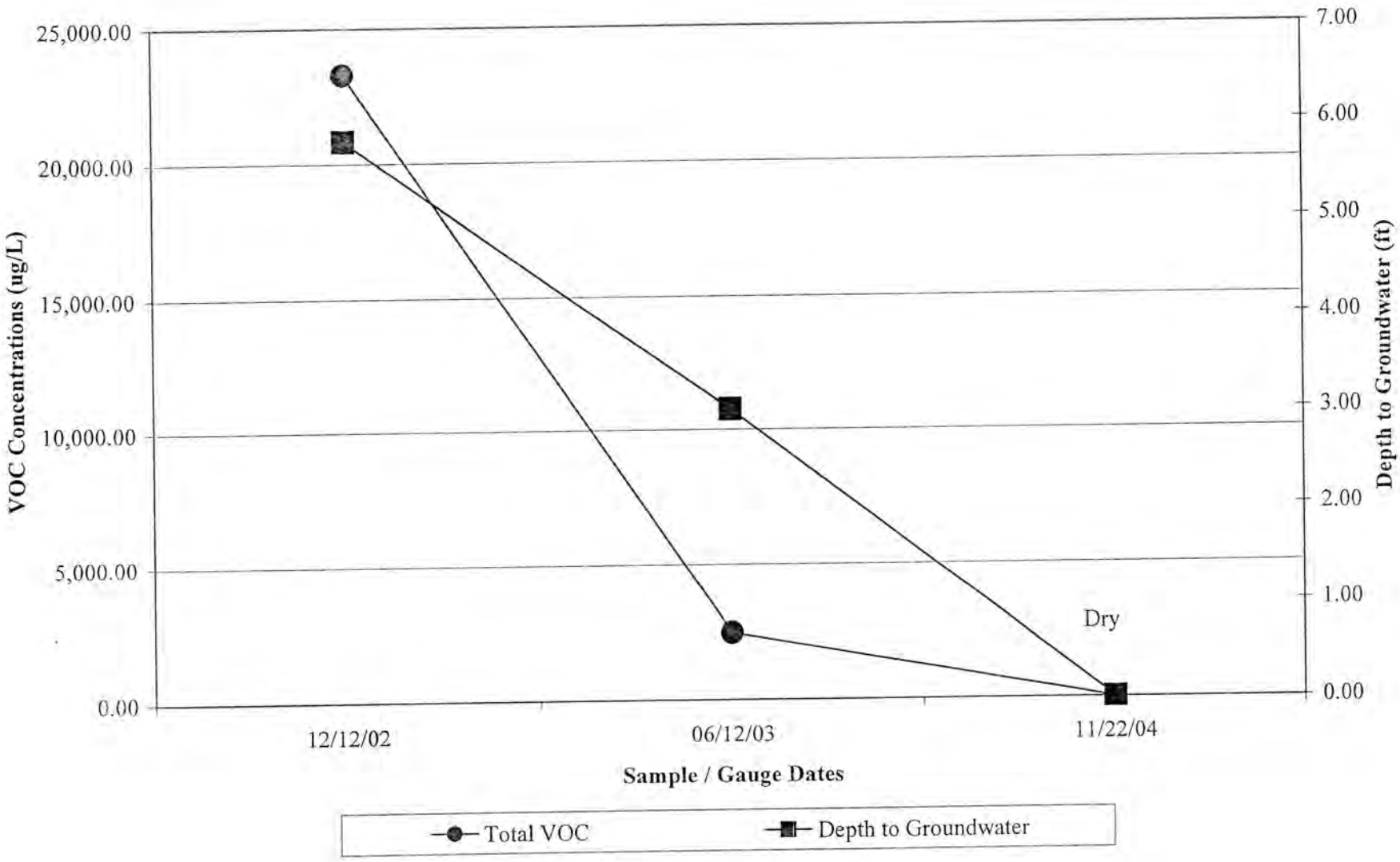
TOTAL VOC CONCENTRATION VS. DEPTH TO GROUNDWATER
GREENS OIL - MW-1



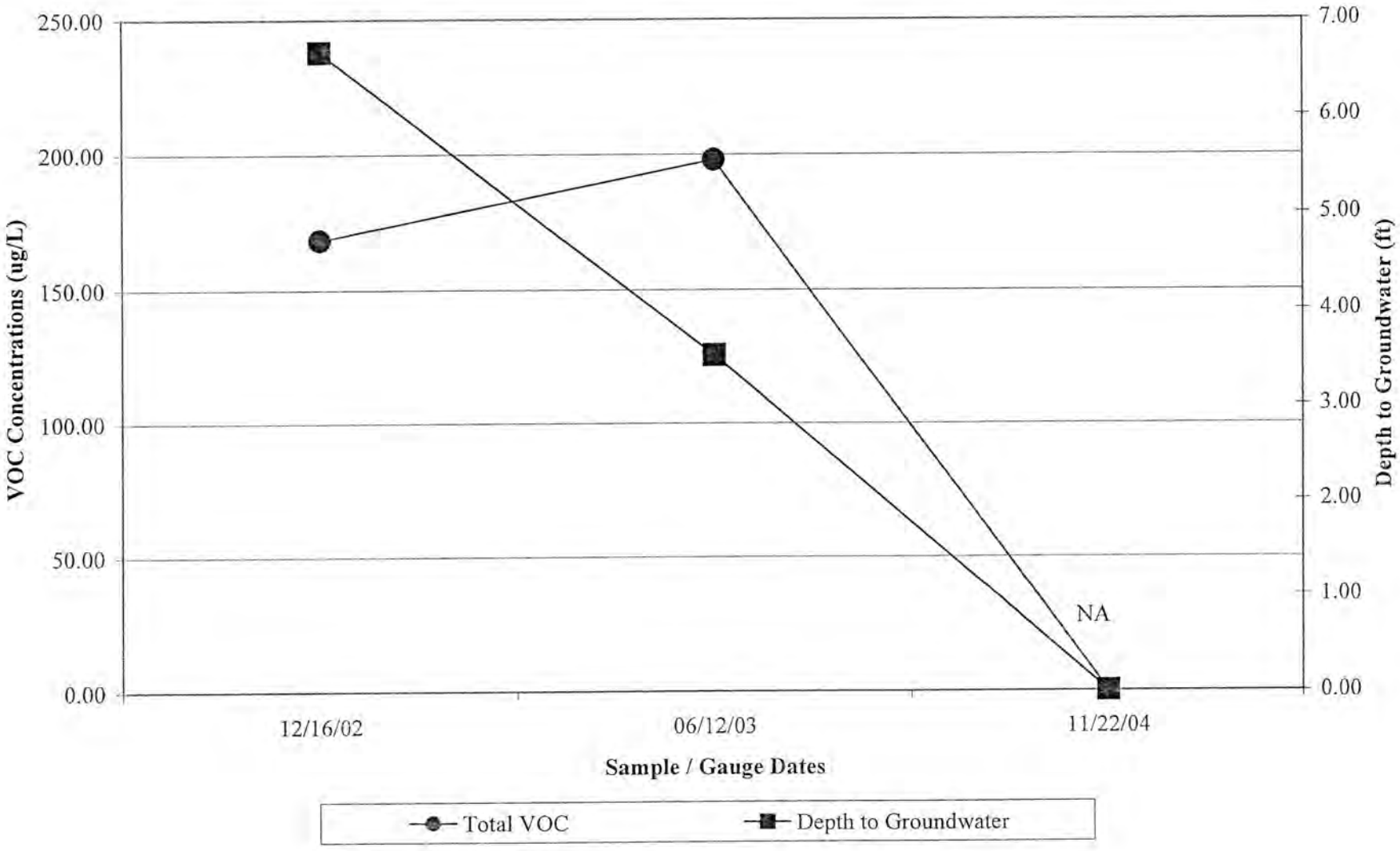
TOTAL VOC CONCENTRATION VS. DEPTH TO GROUNDWATER
GREENS OIL - MW-2



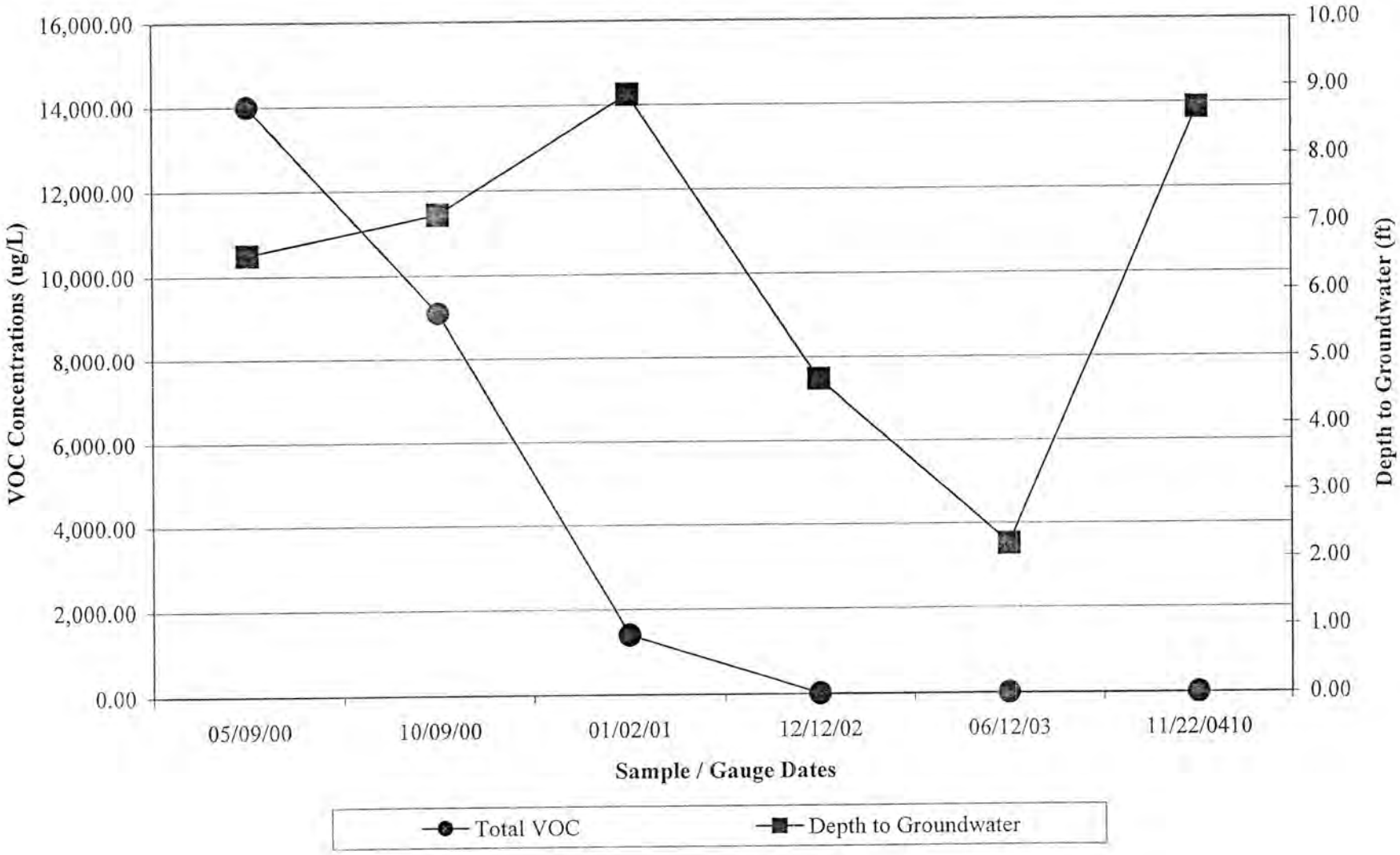
TOTAL VOC CONCENTRATION VS. DEPTH TO GROUNDWATER
GREENS OIL - MW-3



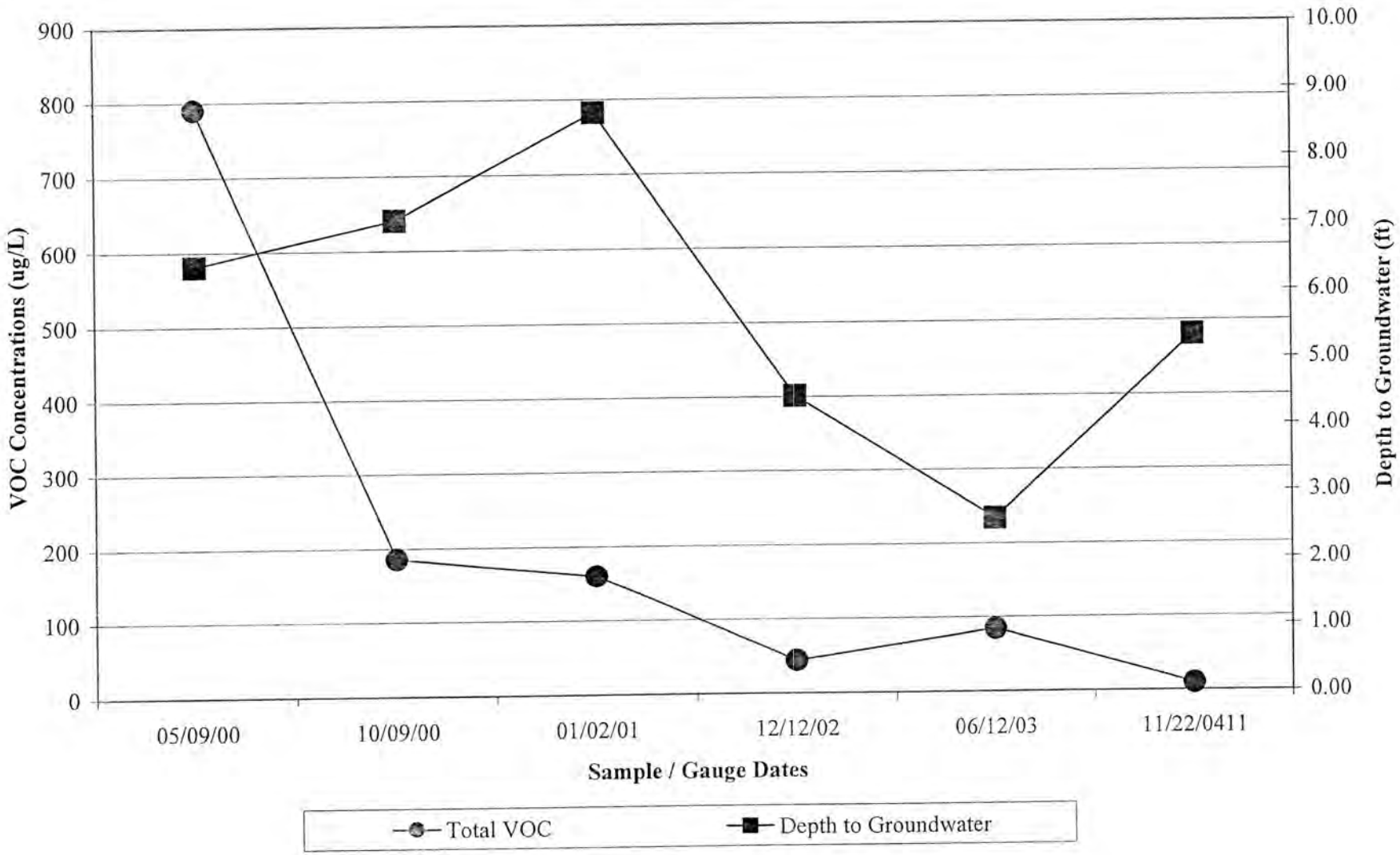
TOTAL VOC CONCENTRATION VS. DEPTH TO GROUNDWATER
GREENS OIL - MW-4



TOTAL VOC CONCENTRATION VS. DEPTH TO GROUNDWATER
GREENS OIL - MW-5



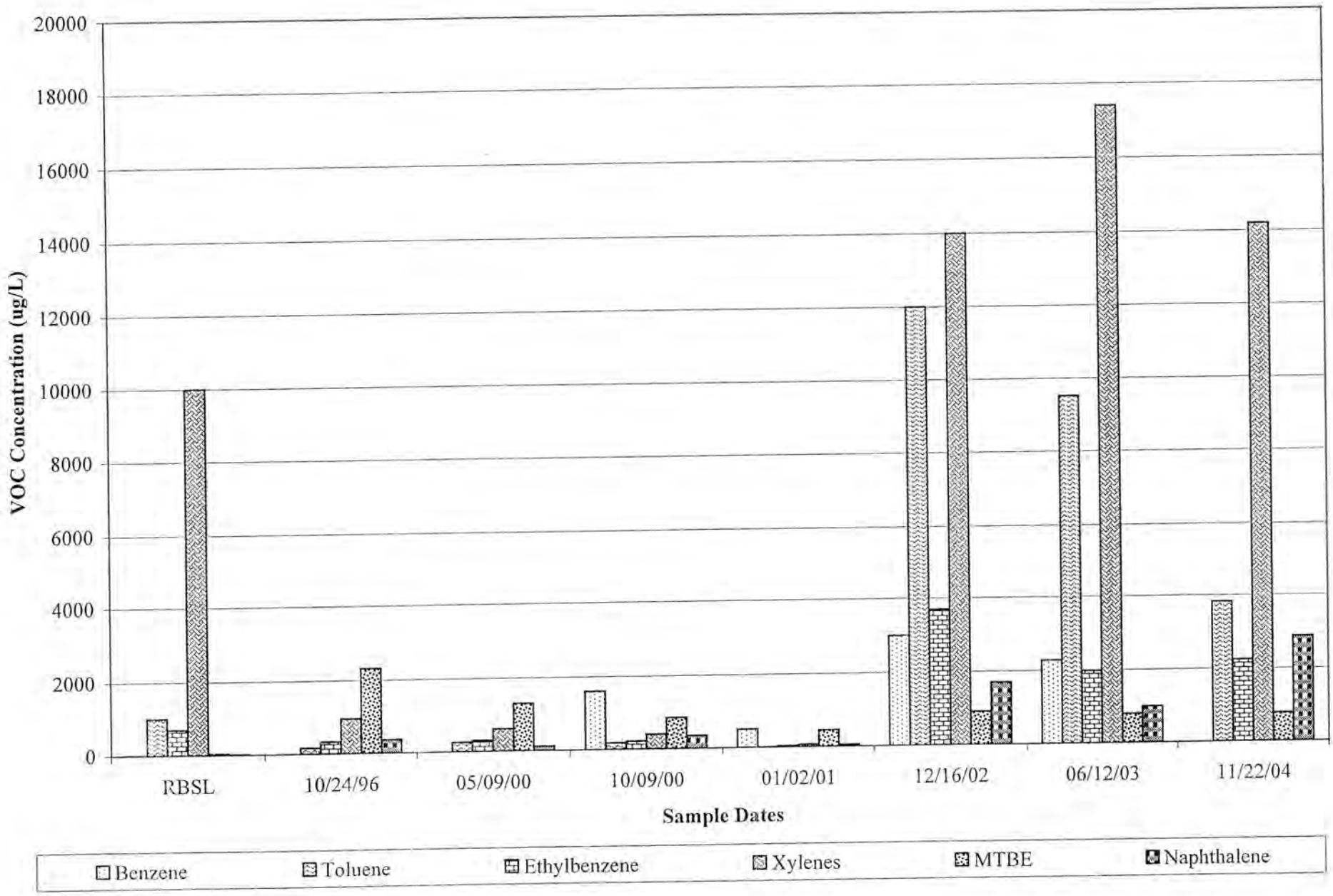
TOTAL VOC CONCENTRATION VS. DEPTH TO GROUNDWATER
GREENS OIL - PW-8



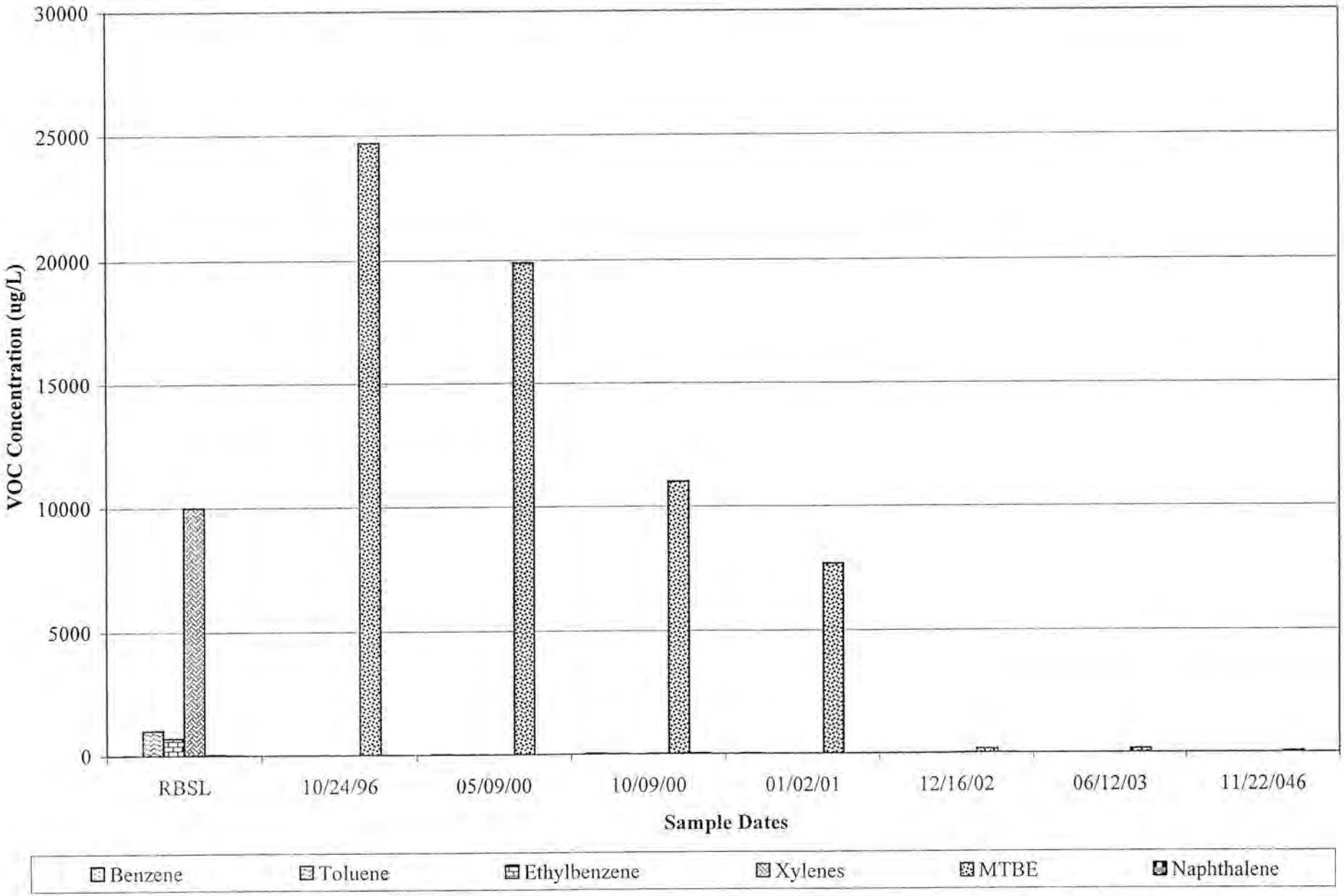
APPENDIX E

GRAPHS OF TOTAL VOC CONCENTRATIONS VS. DEPTH TO GROUNDWATER

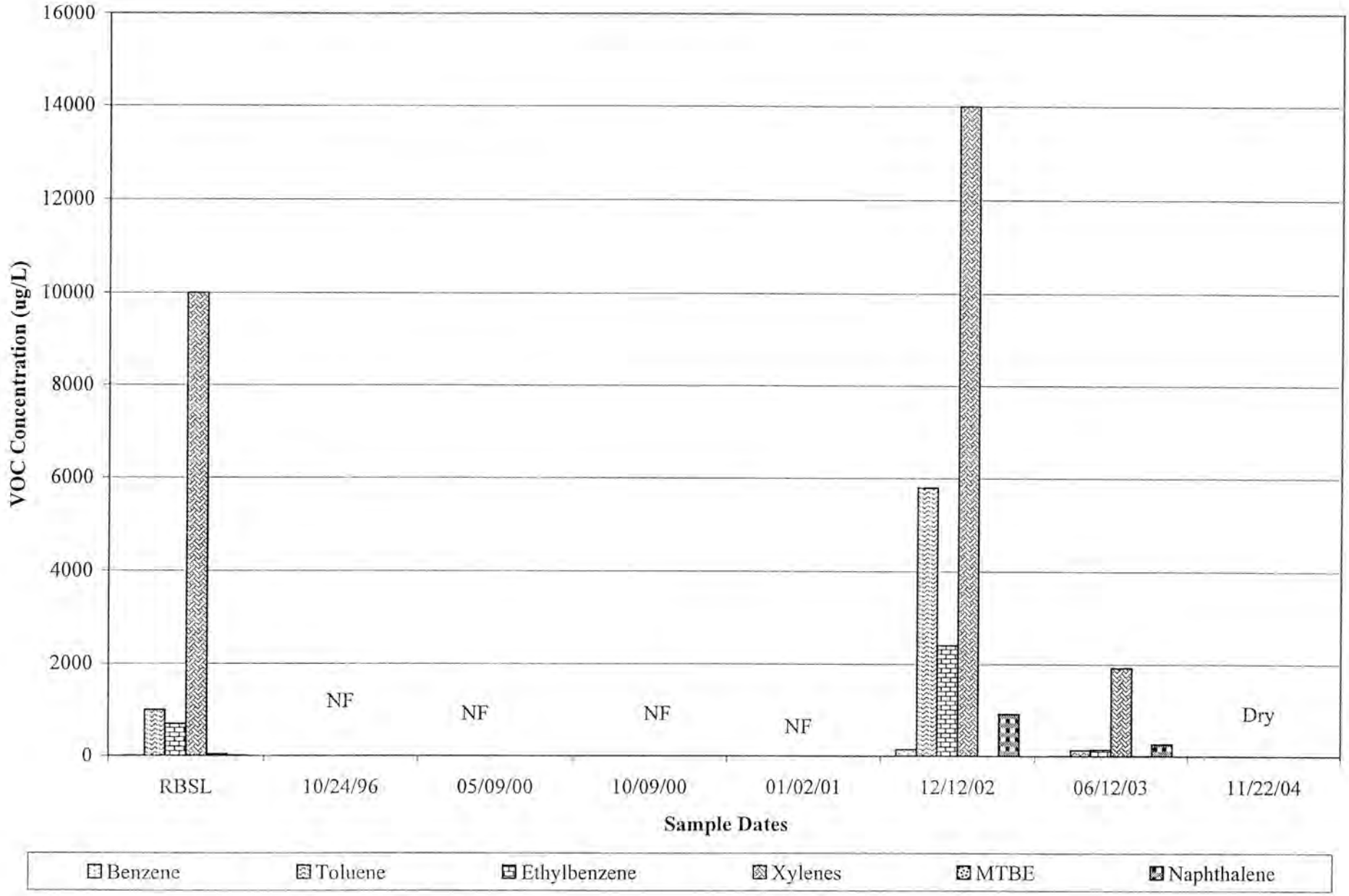
GROUNDWATER QUALITY CHART
GREENS OIL - MW-1



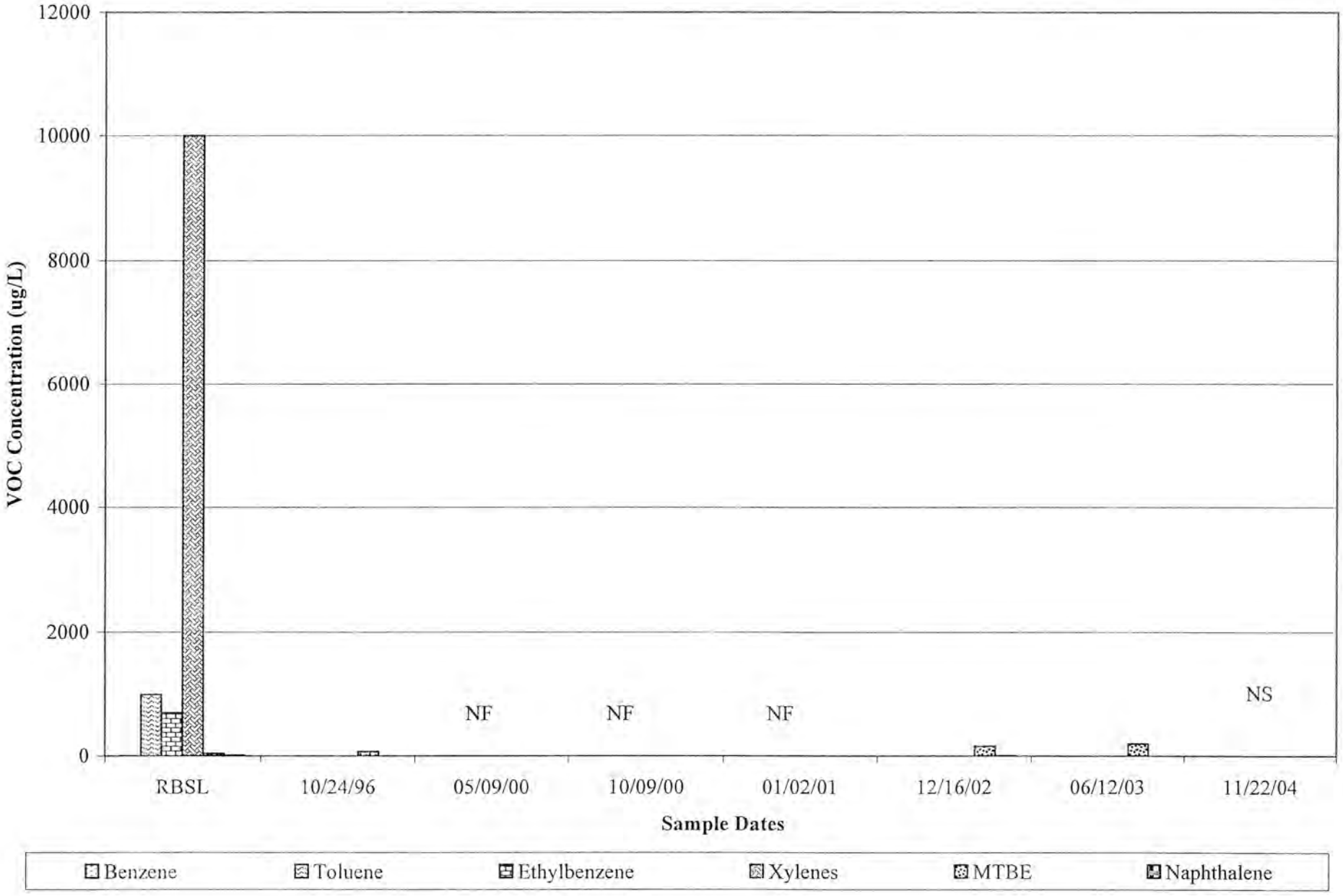
GROUNDWATER QUALITY CHART
GREENS OIL - MW-2



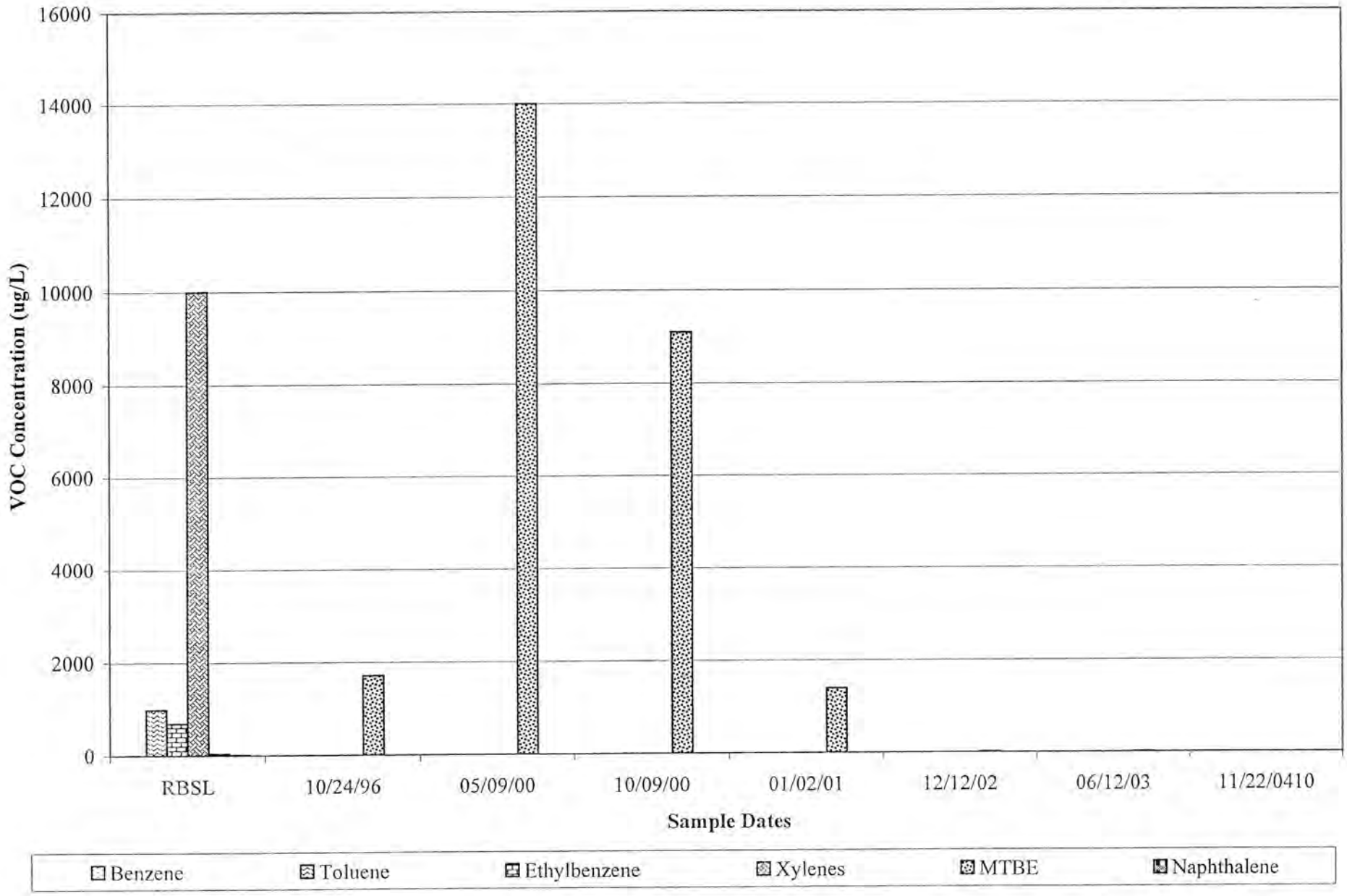
GROUNDWATER QUALITY CHART
GREENS OIL - MW-3



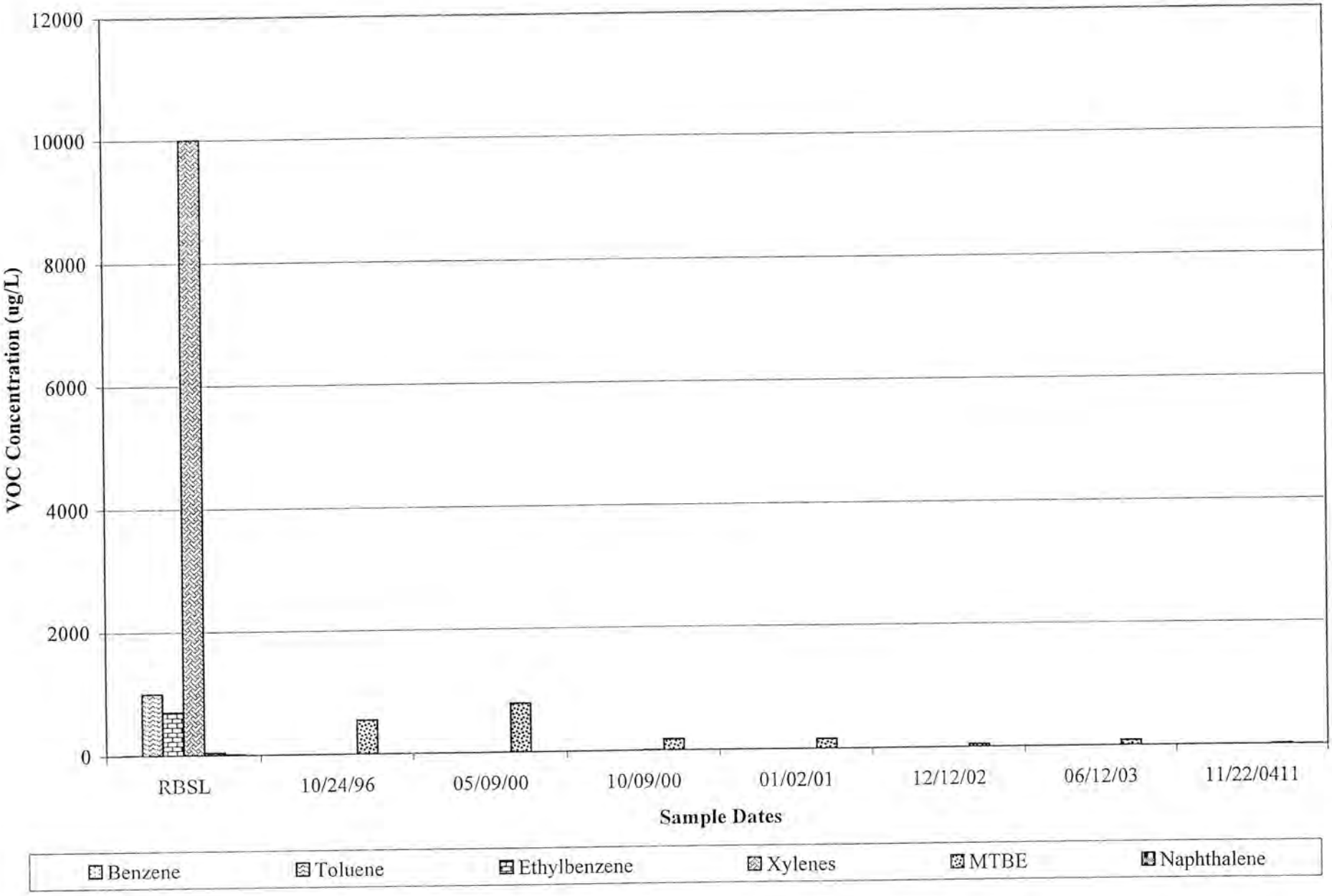
GROUNDWATER QUALITY CHART
GREENS OIL - MW-4



GROUNDWATER QUALITY CHART
GREENS OIL - MW-5



GROUNDWATER QUALITY CHART
GREENS OIL - PW-8



CBM

ENVIRONMENTAL SERVICES, INC.

January 3, 2004

UST 2 LOA Tech DOCKETING

Ms. Debra Thoma
Bureau of Water
South Carolina Department of Health and Environmental Control
2600 Bull Street
Columbia, South Carolina- 29201-1708

RE: Request for Monitoring Well Installation Permit
Greens Oil Company
Rock Hill, York County
UST Permit No. 09344
CBM Project No. 11030

Dear Ms. Thoma:

Please find attached a monitoring well application for one well (MW-1R) proposed to be installed to monitor the effects of the soil excavation and microbial augmented backfill conducted at the site. In addition, please find attached a map indicating the approximate location of the proposed monitoring well.

If you require additional information or have any questions concerning this project, please contact the undersigned at (803) 548-5989.

Sincerely,

Samanth Dawson

Samanth Emmanuel Dawson
Project Manager

RECEIVED
JAN 0 5 2005
UNDERGROUND STORAGE TANK PROGRAM

enclosures

cc: file
/SED

P.O. Box 411387
Charlotte, NC 28241
1-800-743-1226

3440 Lakemont Blvd.
Fort Mill, SC 29708
803-548-5989

1411 B. South Evans St.
Greenville, NC 27834
252-752-0200

5680-K West Cypress St.
Tampa, FL 33607
813-287-1828

1916 Cypress Green Dr. Ste. 11
Jacksonville, FL 32256
904-739-6606

D H E C

PROMOTE PROTECT PROSPER

SCDHEC Monitoring Well Application

1. Proposed location of monitoring wells(s)

Greens Oil Company

Street Address:
2849 Cherry Road

City:
Rock Hill

County:
York

Please attach scaled map or plat.

2. Well Owner's Name:

Green (last) Jerry (first)

Address:
2457 Breen Circle, Rock Hill-29732

Telephone No.:
803-366-4617

3. Property owner's name (if different from well owner):

Thomas (last) Ray (first)

Address:
Thomas Petroleum, P.O. Box 338, Shelby, NC-28151

Telephone No.:

4. Proposed Drilling Date:

January 20, 2005

5. Intended purpose of monitoring well(s):

Pre-Purchase ☐

Investigation ☑

6. Proposed number of monitoring wells:

One

7. Proposed parameters to be analyzed (check as many that apply):

BTEX	☑
MTBE	☑
Naphthalene	☑
PAHs	☐
Metals	☐
Nitrates	☑
Base, Neutral & Acid Ex.	☐
Pesticides/Herbicides	☐
Phenols	☐
Radionuclides	☐
PCBs	☐
Other	☐

8. Proposed construction details (complete and attach proposed monitoring well schematics):

Please see attached.

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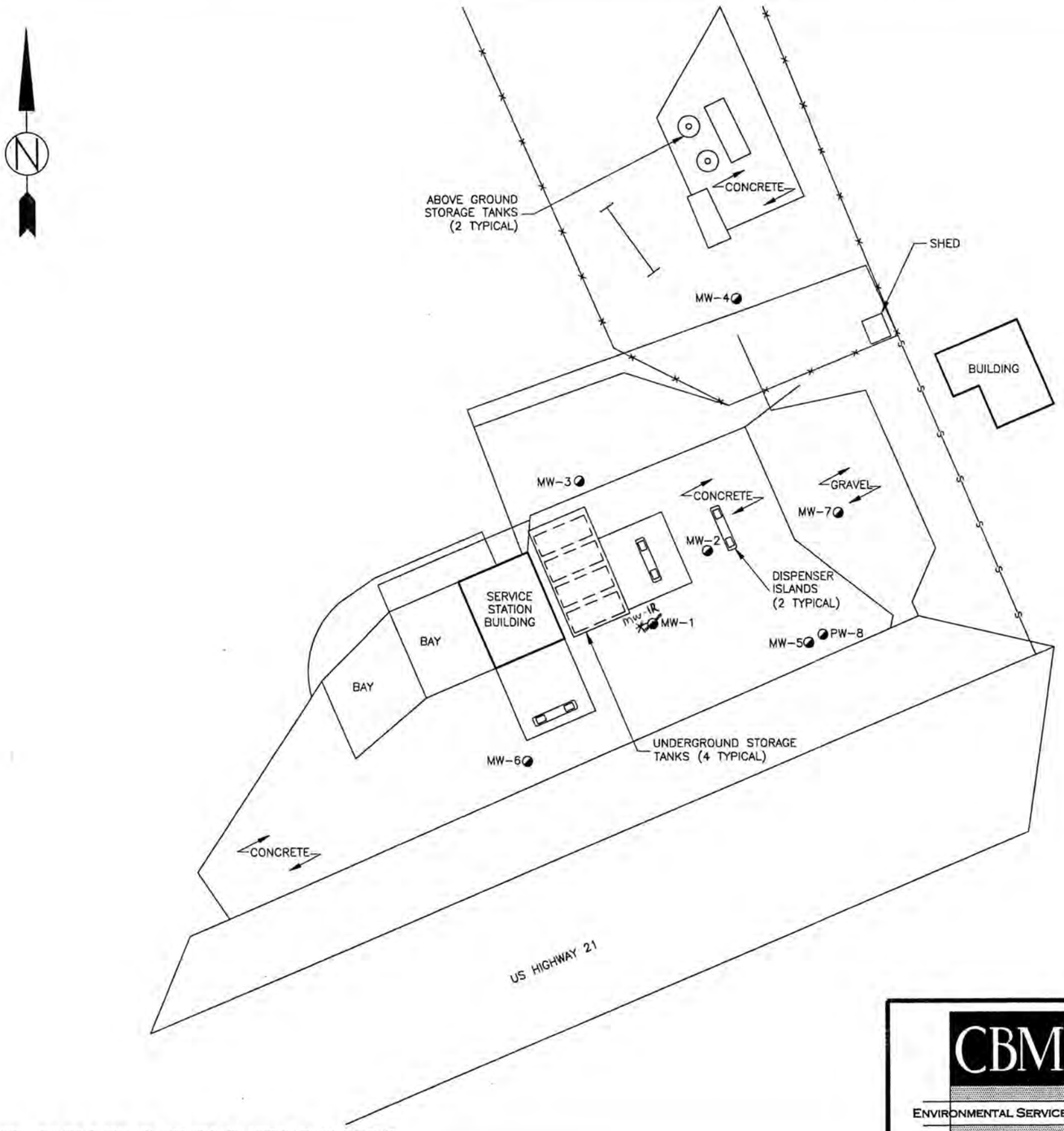
JAN 0 5 2005

UNDERGROUND STORAGE TANK PROGRAM

Construction Details for Monitoring Well 1R.

Well ID	Diameter (inches)	Depth (feet)	Screen Interval (feet)	Filter Pack (feet)	Seal (feet)	Grout (feet)
MW-1R	4	13	3-13	2.5-13	2-2.5	1-2



LEGEND

- MONITORING WELL
- MONITORING WELL (ABANDONED)
- FENCE
- SEWER LINE

SCALE

0 10 20 30 40

FEET

NOTE: FIGURE BASED ON SITE MAP BY PREVIOUS CONSULTANT.

CBM ENVIRONMENTAL SERVICES, INC.

SITE I.D. NO.	09344
PROJECT NO.	11030
DRAWN BY:	BLS/AWB
CHECKED BY:	SD
DWG DATE:	12/23/04

SITE MAP
NOVEMBER 24, 2004

GREEN'S OIL CO.
2489 CHERRY ROAD
ROCK HILL, SC

FIGURE 2

WPC

ENGINEERING, ENVIRONMENTAL
& CONSTRUCTION SERVICES

February 18, 2005

UST Program, Bureau of Land & Waste Management
SC DHEC
2600 Bull Street
Columbia, South Carolina 29201

Attention: Debra Thoma

Re: Letter of Concern, Community Mart 6 # 9344 (Green Oil Company)

Dear Ms. Thoma:

During a due diligence study of an area in Rock Hill, South Carolina, **WPC** discovered a Leaking Underground Storage Tank (LUST) site, Community Mart 6 (Facility No. 09344) at 2849 Cherry Road. A subsequent review of the facility file at the Freedom of Information Office in Columbia on February 17, 2005 by **WPC** did not reveal that petroleum release was confined to the property.

On behalf of the Tuttle Company, **WPC** is submitting this request for a Letter of Concern regarding Community Mart 6 (Facility No. 09344). **WPC** understands that a Letter of Concern may indicate if a responsible party has been identified and the likelihood of environmental liability from regulatory agencies of potential and current adjacent property owners. In addition, **WPC** seeks an opinion about the horizontal delineation of dissolved petroleum constituents and the possibility for petroleum contamination to exist on adjacent properties as a result of the aforementioned release.

WPC greatly appreciates your assistance in evaluating environmental reports during our file review on February 17, 2005. If you need any additional information or have questions regarding our request, please call us at (704) 927-4000.

Very Truly Yours,
WPC

George D. Adams
Staff Professional

10907 Downs Rd. Charlotte NC 28134 **tel** 704 927 4000 **fax** 704 927 4001 www.wpceng.com

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FEB 23 2005

UNDERGROUND STORAGE TANK PROGRAM

GROUNDWATER MONITORING REPORT
GREEN'S OIL COMPANY
2849 CHERRY RD.
ROCK HILL, YORK COUNTY
UST PERMIT NO. 09344
SITE RISK CLASSIFICATION: HIGH
LAND USE CLASSIFICATION: COMMERCIAL
CBM PROJECT NO. 11030

Prepared For:

Federated Insurance Company
c/o Jerry Green
2457 Breen Circle
Rock Hill, SC 29732

Prepared By:

CBM Environmental Services, Inc.
3440 Lakemont Blvd.
Fort Mill, SC 29708
(803) 548-5989

February 21, 2005

Samanth Dawson

Samanth Emmanuel Dawson
Project Manager

SOUTH CAROLINA CBM ENVIRONMENTAL SERVICES, INC. No. C01230 CERTIFICATE OF AUTHORIZATION

SOUTH CAROLINA LICENSED PROFESSIONAL ENGINEER 2/21/2005 No. 22353 ANDREW K. KENNEDY

Andrew K. Kennedy, P.E
License No. 22353

TABLE OF CONTENTS

FIGURES

TABLES

APPENDICES

1.0 INTRODUCTION

This report presents the results of groundwater monitoring activities, conducted in January 2005, at the Greens Oil Company site. The work was conducted in accordance with the cost agreement dated November 11, 2004. The site served as a gas station although it is presently not in use. The site is located in a commercial area of York County. No public or private water supply wells were reported within 1,000 feet of the site. Two water supply wells downgradient of the site have been abandoned. No surface water bodies were observed within 500 feet of the source area. The Catawba River is the only known potential receptor identified during the receptor survey conducted located approximately 3,000 feet downgradient of the site.

A Corrective Action Plan (CAP) that proposed the remediation of petroleum impacted soil and groundwater beneath the site; by excavating, backfilling with microbial augmented soil and de-watering, followed by microbial injections, was submitted to the SCDHEC on January 23, 2004. SCDHEC approved the CAP in a correspondence dated March 29, 2004. However, in subsequent telephone conferences with the responsible party's insurance company (Federated Insurance), it was decided that only the soil excavation and microbial augmented backfill combined with de-watering would be implemented initially. Microbial injections, if needed, would be conducted after two to three quarters of groundwater monitoring. Soil excavation followed by microbial augmented backfill and compaction was completed in December 2004.

2.0 FACILITY INFORMATION

- **Facility Name**: Greens Oil Company
- **Location:** 2849 Cherry Road
  Rock Hill, York County (**Figure 1**)
- **UST Permit No.** 09344
- **Risk Classification:** High
- **Land Use Classification:** Commercial
- **UST Operator:** Greens Oil Company
  2849 Cherry Road
  Rock Hill, South Carolina
- **UST Owner:** Greens Oil Company
  2849 Cherry Road
  Rock Hill, South Carolina

- **Consultant:** CBM Environmental Services, Inc.
  3440 Lakemont Blvd
  Fort Mill, South Carolina 29708
  (803) 548-5989
- **Release Information:**
  - **Date Discovered:** Unknown
  - **Estimated Quantity of Release:** Unknown
  - **Cause of Release:** Unknown
  - **Source of Release:** Leaking UST System
  - **UST System Size/Contents:** Four gasoline USTs
  - **Latitude / Longitude:** 34°58'42" North/ 80°58'54" West

3.0 SAMPLING ACTIVITIES

3.1 Site Hydrology

One Type II monitoring well (MW-1R) was installed as a replacement for monitoring well MW-1, which was abandoned before soil excavation activities were conducted in December 2004. Depths to groundwater in the Type II monitoring wells measured on January 31, 2005 ranged from 7.84 to 8.66 feet. Groundwater elevations relative to a temporary benchmark with an assumed datum of 100.00 feet ranged from 89.20 to 90.00 feet. Based on the January 2005 data, groundwater flow was generally toward the east/southeast. The hydraulic gradient beneath the site was less than 0.01 feet per foot. The mean groundwater elevation has decreased approximately 0.85 feet since November 2004. A Water Table Surface Map based on the January 2005 data is included as **Figure 3**. A summary of groundwater elevation data obtained in January 2005 is presented in **Table 1**. A summary of historical groundwater elevation data obtained is presented in **Table 2**. Monitoring well MW-3 was dry and monitoring well MW-4 was not accessible as the enclosure in which this well is located was locked. Monitoring well MW-7 was not found. Well construction details for monitoring well MW-1R have been included in **Appendix A**.

3.2 Groundwater Sampling

On January 31, 2005, four Type II monitoring wells (MW-1R, MW-2, MW-5 and MW-6) and one Type III monitoring well (PW-8) were developed and sampled. Laboratory analyses were performed on groundwater samples collected from the monitoring wells for BTEX constituents, MTBE and naphthalene by EPA Method 8260B. In addition, the groundwater samples were analyzed for Methane by Method

RSK175M, Nitrate and Sulfate by EPA Method 300.0 and Total Iron by Method 200.7, respectively. Field measurements of DO, pH, conductivity and temperature were collected from the monitoring wells sampled. Monitoring well MW-6 did not yield sufficient amount of water for analyses of natural attenuation parameters or for field measurements.

4.0 GROUNDWATER QUALITY

Detectable concentrations of BTEX constituents and /or MTBE and naphthalene that exceeded the risk based screening levels (RBSLs) were reported in groundwater samples collected from monitoring wells MW-1R and MW-2. Detectable concentrations of MTBE that did not exceed the RBSLs were also reported in the groundwater sample collected from monitoring well PW-8. No detectable concentrations of requested method constituents were reported in groundwater samples collected from monitoring wells MW-5 and MW-6.

A Groundwater Quality Map showing individual BTEX constituents, MTBE and naphthalene concentrations in the monitoring wells from the January 2005 sampling event is included as **Figure 4**. A summary of laboratory analyses of groundwater samples collected from the monitoring wells in January 2005 is presented in **Table 3**. A summary of historical groundwater quality data is presented in **Table 4**. A summary of natural attenuation parameters is presented in **Table 5.** Groundwater sampling data sheets from the January 2005 sampling event have been included as **Appendix B.** A complete report of laboratory analyses of groundwater samples collected during the January 2005 sampling event has been included as **Appendix C.** Graphs showing variations in BTEX constituents, MTBE and naphthalene concentrations versus time and total VOC concentrations versus depths to groundwater have been included as **Appendices D** and **E**, respectively. A certificate of disposal for purge water stored in a 55-gallon drum as well as drill cuttings from monitoring well installation will be forwarded upon receipt.

5.0 CONCLUSIONS AND RECOMMENDATIONS

- Detectable concentrations of BTEX constituents and/or MTBE and naphthalene that exceeded the RBSLs were reported in groundwater samples collected from monitoring wells MW-1R and MW-2. The concentrations of one or more requested method constituents in the remaining monitoring wells were below the RBSLs.
- The total VOC concentrations have decreased significantly in the replacement monitoring well MW-1R compared to monitoring well MW-1 in November 2004, and marginally in monitoring wells MW-5 and PW-8 since the last reporting period.

- Monitoring well MW-1 was abandoned on November 24, 2004, prior to soil excavation activities and a replacement monitoring well (MW-1R) was installed on January 26, 2005.
- Since contaminants of concern have decreased significantly in the source area monitoring well (MW-1R) after excavation and microbial augmented backfill, we recommend that the possibility of utilizing microbial injections for aggressive groundwater remediation be explored if a declining trend in contaminant concentrations is evident after the next monitoring period.
- Efforts will be made to find monitoring well MW-7 before the next sampling event. However, if this is unsuccessful, we recommend replacing monitoring well MW-7 to obtain groundwater data east of the site.
- The next groundwater sampling event will be conducted in April 2005 and the report will be submitted no later than May 31, 2005.

6.0 LIMITATIONS

This report has been prepared for the exclusive use of Mr. Jerry Green for specific application to the referenced site in York County, South Carolina. The assessment was conducted based on the scope of work and level of effort desired by the client and with resources adequate only for that scope of work.

Certain data contained in this report was not obtained under the supervision of CBM. Although the accuracy of this data cannot be verified, for the purpose of this report CBM assumes it is correct. Our findings have been developed in accordance with generally accepted standards of geology and hydrogeology practices in the State of South Carolina, available information, and our professional judgment. No other warranty is expressed or implied.

The data presented in this report are indicative of conditions that existed at the precise locations sampled and at the time the samples were collected. In addition, the data obtained from samples would be interpreted as being meaningful with respect to parameters indicated in the laboratory report. No additional information can be logically be inferred from this data.

FIGURES

SCALE 1:24,000

1 0 1 MILE

1000 0 1000 2000 3000 4000 5000 6000 7000 FEET

CONTOUR INTERVAL 10 FEET

QUADRANGLE LOCATION

ROCK HILL EAST, SC QUADRANGLE

CBM ENVIRONMENTAL SERVICES, INC.

LATITUDE: 34° 58' 42" N	
LONGITUDE: 80° 58' 54" W	
DRAWN BY: AWB	
CHECKED BY: HF	
DATE: 2/4/04	

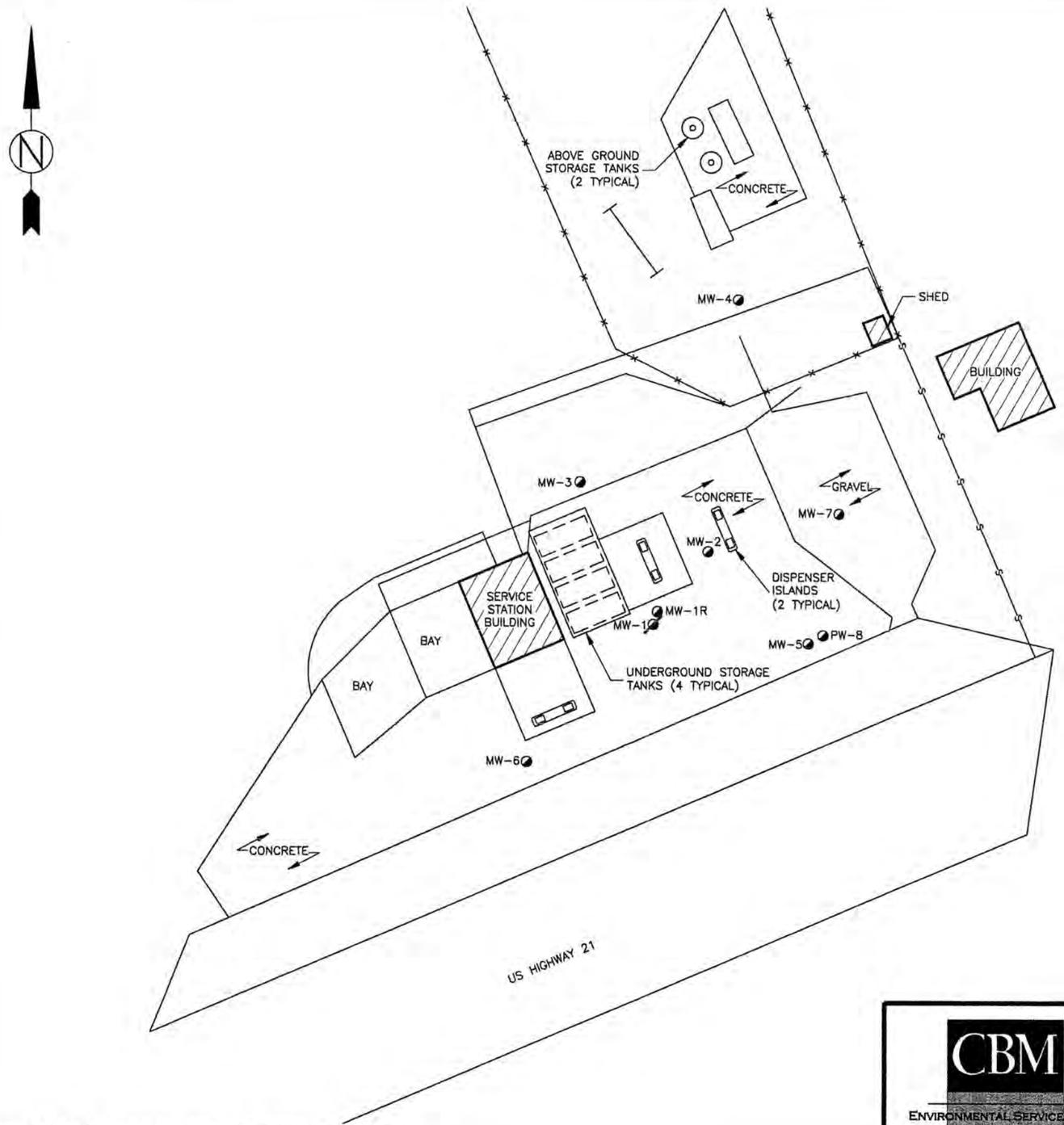
GREEN'S OIL CO.
2849 CHERRY RD.
ROCK HILL, SC

SITE ID NO. 09344

FIGURE 1

USGS TOPOGRAPHIC MAP

CBM PROJECT NO. 11030



NOTE: FIGURE BASED ON SITE MAP BY PREVIOUS CONSULTANT.

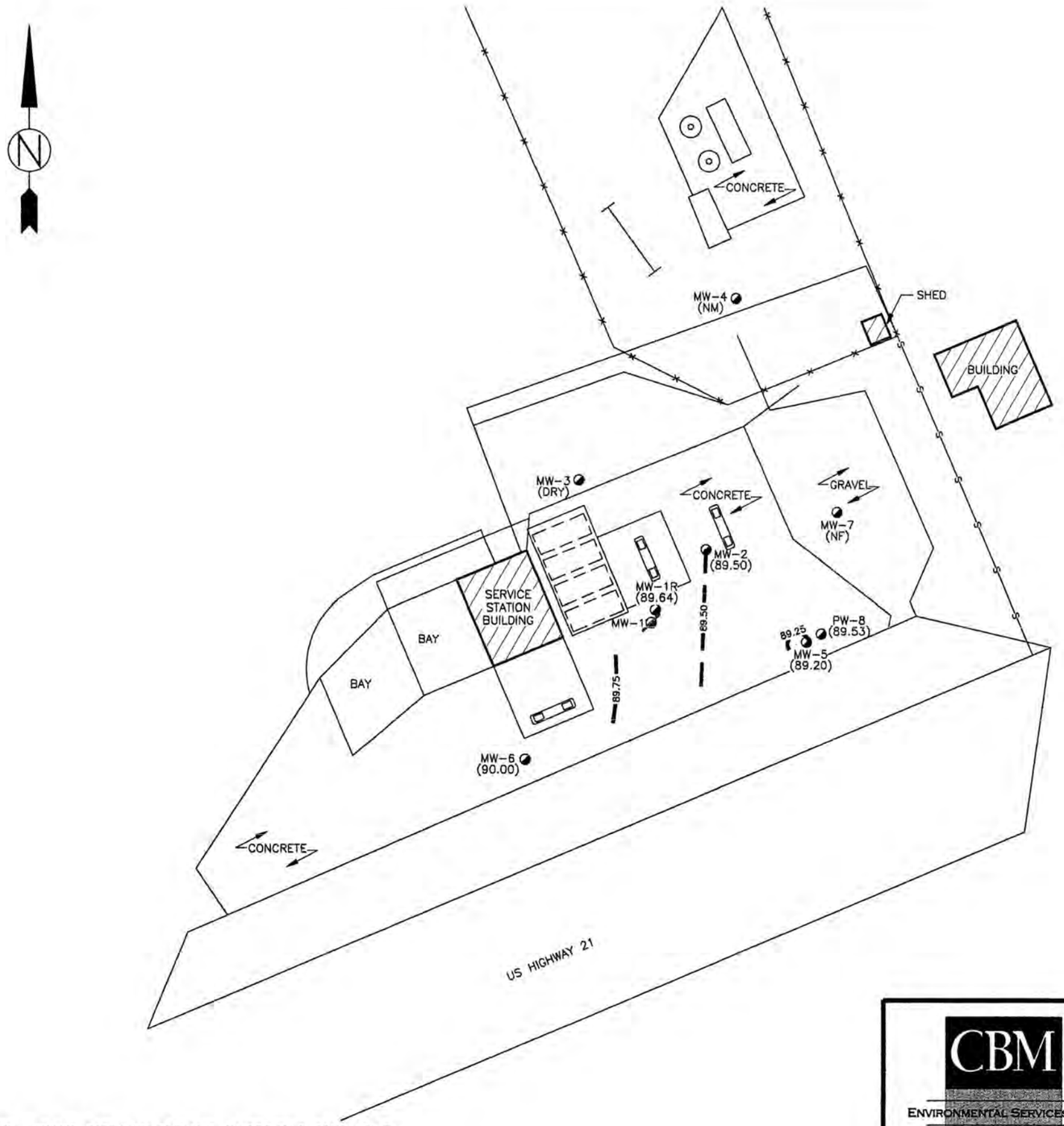
CBM ENVIRONMENTAL SERVICES, INC.

SITE I.D. NO.	09344
PROJECT NO.	11030
DRAWN BY:	AWB
CHECKED BY:	SD
DWG DATE:	2/11/05

SITE MAP

GREEN'S OIL CO.
2489 CHERRY ROAD
ROCK HILL, SC

FIGURE 2



LEGEND

- TYPE II MONITORING WELL
- TYPE II MONITORING WELL (ABANDONED)
- FENCE
- S — SEWER LINE
- WATER TABLE SURFACE CONTOUR w/ELEVATION (ft)
- (89.64) GROUNDWATER ELEVATION (ft)
- (NF) NOT FOUND
- (NM) NOT MEASURED; WELL WAS INACCESSIBLE

SCALE
0 10 20 30 40
FEET

NOTE: FIGURE BASED ON SITE MAP BY PREVIOUS CONSULTANT.

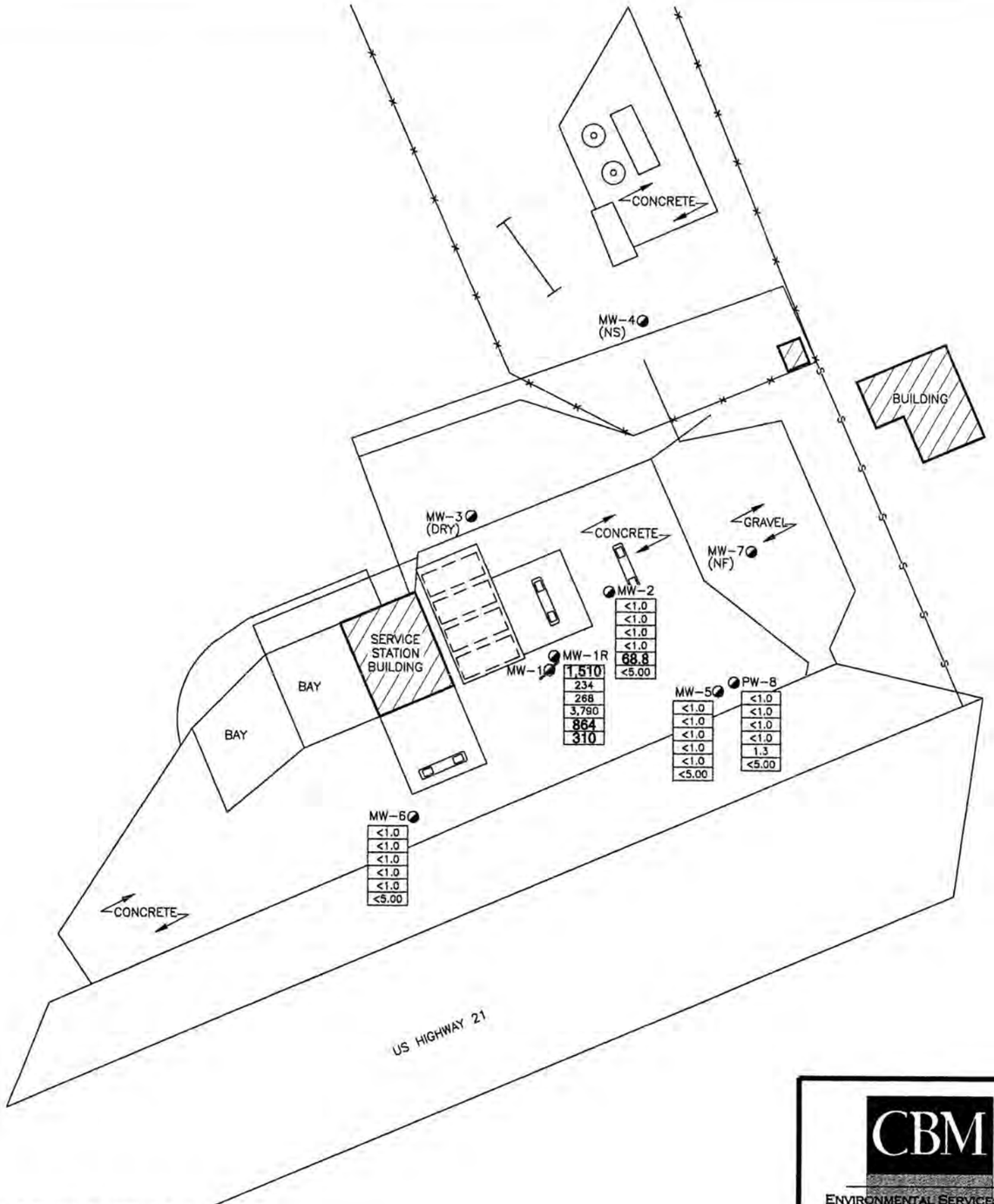
CBM ENVIRONMENTAL SERVICES, INC.

SITE I.D. NO.	09344
PROJECT NO.	11030
DRAWN BY:	AWB
CHECKED BY:	SD
DWG DATE:	2/16/05

WATER TABLE SURFACE MAP
JANUARY 31, 2005

GREEN'S OIL CO.
2489 CHERRY ROAD
ROCK HILL, SC

FIGURE 3



LEGEND

- TYPE II MONITORING WELL
- TYPE II MONITORING WELL (ABANDONED)
- FENCE
- SEWER LINE

5	BENZENE
1,000	TOLUENE
700	ETHYLBENZENE
10,000	XYLENES
40	MTBE
25	NAPHTHALENE

CONCENTRATIONS IN $\mu g/L$

ABOVE CONCENTRATIONS REPRESENT MAY 2001 RISK-BASED SCREENING LEVELS; CONCENTRATIONS IN BOLD FACE TYPE EXCEEDED THE RBSL

<1.0 – LESS THAN THE METHOD DETECTION LIMIT SPECIFIED IN THE LABORATORY REPORT

(NF) – NOT FOUND

(NS) – NOT SAMPLED; WELL INACCESSIBLE

SCALE

0 10 20 30 40

FEET

NOTE: FIGURE BASED ON SITE MAP BY PREVIOUS CONSULTANT.

CBM ENVIRONMENTAL SERVICES, INC.

SITE I.D. NO.	09344
PROJECT NO.	11030
DRAWN BY:	AWB
CHECKED BY:	SD
DWG DATE:	2/14/05

GROUNDWATER QUALITY MAP
JANUARY 31, 2005

GREEN'S OIL CO.
2489 CHERRY ROAD
ROCK HILL, SC

FIGURE 4

TABLES

TABLE 1
SUMMARY OF GROUNDWATER ELEVATION DATA[1]
GREEN'S OIL COMPANY
JANUARY 31, 2005

Well No.	Top of Casing Elevation	Depth to Groundwater	Groundwater Elevation	Well Depth[2]	Dissolved Oxygen[3]
MW-1R[4]	98.30	8.66	89.64	9.50	2.33
MW-2	97.86	8.36	89.50	14.04	1.28
MW-3	97.08	Dry	Dry	7.75	Dry
MW-4	96.91	NM[5]	NM	13.59	NM
MW-5	97.04	7.84	89.20	10.04	3.05
MW-6	98.59	8.59	90.00	9.60	NM
MW-7	98.40	NF[6]	NF	13.60	NF
PW-8	96.98	7.45	89.53	30.10	3.25

Notes:

1. Top of Casing Elevations for monitoring wells MW-2 through MW-7 and PW-8 were reproduced from the previous consultant's reports. Additional well construction details are unavailable; data reported in feet.
2. Well depths for monitoring wells MW-2 through MW-7 and PW-8 measured during June 12, 2003 sampling event.
3. Dissolved oxygen levels were measured using a DO meter; results reported in mg/L.
4. Monitoring well MW-1R was installed as a replacement for monitoring well MW-1 on January 26, 2005.
5. Not measured. Well did not yield enough water for field measurements or was not accessible.
6. Not found.

TABLE 2
SUMMARY OF HISTORICAL GROUNDWATER ELEVATION DATA[1]
GREEN'S OIL COMPANY

Well No.	Date	Top of Casing Elevation	Depth to Groundwater	Groundwater Elevation	Well Depth[2]	Dissolved Oxygen[3]
MW-1	05/24/00	98.15	7.16	90.99	12.33	1.3
	10/09/00		7.78	90.37		2.3
	01/02/01		9.58	88.57		1.4
	12/16/02		5.11	93.04		NM[4]
	06/12/03		2.59	95.56		0.79
	11/22/04		9.36	88.79		0.93
MW-1R[5]	01/31/05	98.30	8.66	89.64		2.33
MW-2	05/24/00	97.86	7.03	90.83	14.04	1.9
	10/09/00		7.71	90.15		2.4
	01/02/01		9.43	88.43		0.0
	12/16/02		4.91	92.95		2.06
	06/12/03		2.47	95.39		0.53
	11/22/04		9.26	88.60		1.39
	01/31/05		8.36	89.50		1.28
MW-3	12/16/02	97.08	5.83	91.25	7.75	NM
	06/12/03		3.01	94.07		1.14
	11/22/04		Dry	Dry		Dry
	01/31/05		Dry	Dry		Dry
MW-4	12/16/02	96.91	6.66	90.25	13.59	1.45
	06/12/03		3.52	93.39		0.69
	11/22/04		NM	NM		NM
	01/31/05		NM	NM		NM
MW-5	05/24/00	97.04	6.56	90.48	10.04	2.4
	10/09/00		7.15	89.89		3.0
	01/02/01		8.90	88.14		1.6
	12/16/02		4.67	92.37		2.27
	06/12/03		2.20	94.84		1.51
	11/22/04		8.67	88.37		1.41
	01/31/05		7.84	89.20		3.05
MW-6	05/24/00	98.59	8.10	90.49	9.60	3.8
	10/09/00		7.92	90.67		4.9
	01/02/01		9.52	89.07		NM
	12/16/02		5.25	93.34		3.68
	06/12/03		2.89	95.70		4.48
	11/22/04		9.44	89.15		NM
	01/31/05		8.59	90.00		NM
MW-7	12/16/02	98.40	4.81	93.59	13.60	NM
	06/12/03		3.29	95.11		0.84
	11/22/04		NF[6]	NF		NF
	01/31/05		NF	NF		NF

TABLE 2 (cont'd.)
SUMMARY OF HISTORICAL GROUNDWATER ELEVATION DATA
GREEN'S OIL COMPANY

Well No.	Date	Top of Casing Elevation	Depth to Groundwater	Groundwater Elevation	Well Depth	Dissolved Oxygen
PW-8	05/24/00	96.98	6.45	90.53	30.10	3.9
	10/09/00		7.12	89.86		2.5
	01/02/01		8.69	88.29		2.1
	12/16/02		4.46	92.52		NM
	06/12/03		2.60	94.38		1.23
	11/22/04		5.34	91.64		2.01
	01/31/05		7.45	89.53		3.25

Notes:

1. Top of Casing Elevations for monitoring wells MW-2 through MW-7 and PW-8 were reproduced from the previous consultant's reports. Additional well construction details are unavailable; data reported in feet.
2. Well depths for monitoring wells MW-2 through MW-7 and PW-8 measured during June 12, 2003 sampling event.
3. Dissolved oxygen levels were measured using a DO meter; results reported in mg/L.
4. Not measured. Well did not yield enough water for field measurements or was not accessible.
5. Monitoring well MW-1R was installed as a replacement for monitoring well MW-1 on January 26, 2005.
6. Not found.

TABLE 3
SUMMARY OF LABORATORY ANALYSES[1]
GROUNDWATER SAMPLES
GREEN'S OIL COMPANY
JANUARY 31, 2005

Well No.	Benzene	Toluene	Ethylbenzene	Xylenes	MTBE	Naphthalene
MW-1R[2]	**1,510[3]**	234	268	3,790	**864**	**310**
MW-2	<1.0[4]	<1.0	<1.0	<1.0	**68.8**	<5.00
MW-3	Dry	Dry	Dry	Dry	Dry	Dry
MW-4	NS[5]	NS	NS	NS	NS	NS
MW-5	<1.0	<1.0	<1.0	<1.0	<1.0	<5.00
MW-6	<1.0	<1.0	<1.0	<1.0	<1.0	<5.00
MW-7	NF[6]	NF	NF	NF	NF	NF
PW-8	<1.0	<1.0	<1.0	<1.0	1.3	<5.00
RBSL[7]	5	1,000	700	10,000	40	25

Notes:

1. Analyses for BTEX constituents, MTBE and Naphthalene by EPA Method 8260B; results reproted in µg/L.
2. Monitoring well MW-1R was installed as a replacement for monitoring well MW-1.
3. Concentrations in bold face type exceeded the May 2001 Risk Based Screening Level.
4. Less than the method detection limit specified in the laboratory report.
5. Not sampled. Well was not accessible.
6. Well not found.
7. May 2001 Risk Based Screening Level.

TABLE 4
SUMMARY OF HISTORICAL LABORATORY ANALYSES[1]
GROUNDWATER SAMPLES
GREEN'S OIL COMPANY

Well No.	Date	Benzene	Toluene	Ethylbenzene	Xylenes	MTBE	Naphthalene	Lead
MW-1	10/24/96	**3,040[2]**	164	325	950	**2,310**	**365**	NR[3]
	05/09/00	**1,790**	255	302	611	**1,300**	**117**	12.0
	10/09/00	**1,600**	180	220	400	**850**	**350**	<3.0[4]
	01/02/01	**500**	9.0	38	68	**460**	**55**	<3.0
	12/16/02	**3,000**	**12,000**	**3,700**	**14,000**	**920**	**1,700**	14
	06/12/03	**2,280**	**9,520**	**1,980**	**17,400**	**801**	**991**	NR
	11/22/04	**2,560**	**3,820**	**2,240**	**14,200**	**790**	**2,880**	NR
MW-1R[5]	01/31/05	**1,510**	234	268	3,790	**864**	**310**	NR
MW-2[7]	10/24/96	<10.0	<10.0	<10.0	<3.0	**24,700**	<5.0	NR
	05/09/00	**5.2**	ND[6]	ND	ND	**19,900**	ND	ND
	10/09/00	**31**	5.7	<5.0	12	**11,000**	**15**	<3.0
	01/02/01	**7.2**	<5.0	<5.0	<5.0	**7,700**	<5.0	<3.0
	12/16/02	<5.0	<5.0	<5.0	7.2	**170**	12	<3.0
	06/12/03	4.0	<1.0	<1.0	<1.0	**157**	<5.00	NR
	11/22/04	<1.0	<1.0	<1.0	<1.0	**54.9**	<5.00	NR
	01/31/05	<1.0	<1.0	<1.0	<1.0	**68.8**	<5.00	NR
MW-3	10/24/96	NF[8]	NF	NF	NF	NF	NF	NF
	05/09/00	NF	NF	NF	NF	NF	NF	NF
	10/09/00	NF	NF	NF	NF	NF	NF	NF
	01/02/01	NF	NF	NF	NF	NF	NF	NF
	12/12/02	**150**	**5,800**	**2,400**	**14,000**	<25	**920**	**21**
	06/12/03	4.2	135	150	1,920	2.9	**260**	NR
	11/22/04	Dry	Dry	Dry	Dry	Dry	Dry	NR
	01/31/05	Dry	Dry	Dry	Dry	Dry	Dry	NR
	RBSL[9]	5	1,000	700	10,000	40	25	15

TABLE 4 (cont'd.)
SUMMARY OF HISTORICAL LABORATORY ANALYSES
GROUNDWATER SAMPLES
GREEN'S OIL COMPANY

Well No.	Date	Benzene	Toluene	Ethylbenzene	Xylenes	MTBE	Naphthalene	Lead
MW-4	10/24/96	<1.0	<1.0	<1.0	<3.0	**70.4**	<5.0	NR
	05/09/00	NF	NF	NF	NF	NF	NF	NF
	10/09/00	NF	NF	NF	NF	NF	NF	NF
	01/02/01	NF	NF	NF	NF	NF	NF	NF
	12/16/02	<5.0	<5.0	<5.0	<5.0	**160**	8.5	5.8
	06/12/03	<1.0	<1.0	<1.0	<1.0	**198**	<5.00	NR
	11/22/04	NS[10]	NS	NS	NS	NS	NS	NS
	01/31/05	NS	NS	NS	NS	NS	NS	NS
MW-5	10/24/96	<1.0	<1.0	<1.0	<3.0	**1,720**	<5.0	NR
	05/09/00	ND	ND	ND	ND	**14,000**	ND	ND
	10/09/00	<5.0	<5.0	<5.0	<5.0	**9,100**	<5.0	<3.0
	01/02/01	<5.0	<5.0	<5.0	<5.0	**1,400**	<5.0	<3.0
	12/12/02	<5.0	<5.0	<5.0	<5.0	14	<5.0	14
	06/12/03	<1.0	<1.0	<1.0	<1.0	3.1	<5.00	NR
	11/22/04[11]	<1.0	<1.0	<1.0	<1.0	1.4	<5.00	NR
	01/31/05	<1.0	<1.0	<1.0	<1.0	<1.0	<5.00	NR
MW-6	10/24/96	NS	NS	NS	NS	NS	NS	NS
	05/09/00	ND	ND	ND	ND	ND	ND	**52.0**
	10/09/00	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	**26.0**
	01/02/01	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	NS
	12/12/02	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	**48**
	06/12/03	<1.0	<1.0	<1.0	<1.0	<1.0	<5.00	NR
	11/22/04	<1.0	<1.0	<1.0	<1.0	<1.0	<5.00	NR
	01/31/05	<1.0	<1.0	<1.0	<1.0	<1.0	<5.00	NR
	RBSL	5	1,000	700	10,000	40	25	15

TABLE 4 (cont'd.)
SUMMARY OF HISTORICAL LABORATORY ANALYSES
GROUNDWATER SAMPLES
GREEN'S OIL COMPANY

Well No.	Date	Benzene	Toluene	Ethylbenzene	Xylenes	MTBE	Naphthalene	Lead
MW-7	10/24/96	NF	NF	NF	NF	NF	NF	NF
	05/09/00	NF	NF	NF	NF	NF	NF	NF
	10/09/00	NF	NF	NF	NF	NF	NF	NF
	01/02/01	NF	NF	NF	NF	NF	NF	NF
	12/12/02	<5.0	<5.0	<5.0	<5.0	**160**	<5.0	**58**
	06/12/03	<1.0	<1.0	<1.0	<1.0	**294**	<5.00	NR
	11/22/04	NF	NF	NF	NF	NF	NF	NF
	01/31/05	NF	NF	NF	NF	NF	NF	NF
PW-8	10/24/96	<1.0	<1.0	<1.0	<3.0	**547**	<5.0	NR
	05/09/00	ND	ND	ND	ND	**790**	ND	ND
	10/09/00	<5.0	<5.0	<5.0	6.1	**180**	<5.0	<3.0
	01/02/01	<5.0	<5.0	<5.0	<5.0	**160**	<5.0	<3.0
	12/12/02	<5.0	<5.0	<5.0	<5.0	**44**	<5.0	<3.0
	06/12/03	<1.0	<1.0	<1.0	<1.0	**84.6**	<5.00	NR
	11/22/04[12]	<1.0	<1.0	<1.0	<1.0	9.7	<5.00	NR
	01/31/05	<1.0	<1.0	<1.0	<1.0	1.3	<5.00	NR
	RBSL	5	1,000	700	10,000	40	25	15

TABLE 4 (cont'd.)
SUMMARY OF HISTORICAL LABORATORY ANALYSES
GROUNDWATER SAMPLES
GREEN'S OIL COMPANY

Notes:

1. Analyses for BTEX constituents, MTBE and Naphthalene by EPA Method 8260B; groundwater quality data prior to June 12, 2003 reproduced from previous consultant's reports; results reported in µg/L.
2. Concentrations in bold face type exceeded the January 1998 Risk Based Screening Level for samples collected before May 2001 and exceeded the May 2001 Risk Based Screening Level for samples collected after May 2001.
3. Analysis not requested.
4. Less than the method detection limit specified in the laboratory report.
5. Monitoring well MW-1R was installed as a replacement for monitoring well MW-1.
6. Not detected.
7. Other compound detected (IPE: 294 µg/L).
8. Well not found.
9. May 2001 Risk Based Screening Level.
10. Not sampled due to insufficient volume of water in the well or well was not accessible.
11. Other compound detected (IPE: 21.8 µg/L)
12. Other compound detected (IPE: 13.4 µg/L)

TABLE 5
SUMMARY OF NATURAL ATTENUATION PARAMETERS[1]
GREEN'S OIL COMPANY
JANUARY 31, 2005

Well No.	DO (mg/L)	Temp (°C)	pH	Specific Conductance (mS)	Methane (µg/L)	Nitrate (mg/L)	Sulfate (mg/L)	Total Iron (µg/L)
MW-1R[2]	2.33	12.9	6.78	0.54	35	<0.100[3]	62.5	185,000
MW-2	1.28	16.3	6.70	0.80	<26	<0.100	7.30	6,220
MW-3	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry
MW-4	NM[4]	NM	NM	NM	NM	NM	NM	NM
MW-5	3.05	17.3	6.72	0.55	<26	1.53	16.1	14,900
MW-6	NM	NM	NM	NM	<26	0.510	182	37,100
MW-7	NF[5]	NF	NF	NF	NF	NF	NF	NF
PW-8	3.25	18.4	6.79	0.35	<26	0.360	30.6	3,990

Notes:

1. Analysis for Methane by Method RSK175M, Nitrate and Sulfate by EPA Method 300.0 and Total Iron by Method 200.7.
2. Monitoring well MW-1R was installed as a replacement for monitoring well MW-1.
3. Less than the method detection limit specified in the laboratory report.
4. Not measured due to insufficient volume of water in the well or well was not accessible.
5. Not found.

APPENDICES

APPENDIX A

WELL CONSTRUCTION RECORD

D H E C

PROMOTE PROTECT PROSPER

Water Well Record
Bureau of Water
2600 Bull Street, Columbia, SC 29201-1708; (803) 734-5300

1. LOCATION OF WELL:

County: York | System Name: Greens Oil

Latitude: 34°58'42"N | Longitude: 80°58'54"W

Distance and Direction from Road Intersections:
~500' East from US Hwy 21 and Celenese Road.

Street Address & City of Well Location:
2489 Cherry Road, Rock Hill, South Carolina

Sketch Map:

See Attached

2. CUTTING SAMPLES: ☐ Yes ☒ No

Geophysical Logs: ☐ Yes (please enclose) ☒ No

Formation Description	*Thickness of Stratum	Depth to Bottom of Stratum
Concrete	0.3'	0.3'
Brown silty fine to medium SAND	9.2'	9.5'
Augur refusal and Boring terminated at 9.5'		
Indicate Water Bearing Zones (Use a 2nd sheet if needed)		

3. REMARKS

MW-1R
Hydrated bentonite seal from 0.5-1.5 feet.

4. OWNER OF WELL: South Carolina DHEC
Address: 2600 Bull Street, Columbia, South Carolina 29201-1708
Telephone No: (803) 734-5331

Engineer: CBM Environmental Services, Inc.
Address: 3440 Lakemont Blvd, Fort Mill, South Carolina 29708
Telephone No: (803) 548-5989

5. WELL DEPTH (completed) 9.5 ft. Date Started: 01/26/2005 Date Completed: 01/26/2005

6. ☐ Mud Rotary ☐ Air Rotary ☐ Jetted ☐ Driven ☒ Bored ☐ Cable tool ☐ Dug ☐ Other

7. USE:
☐ Domestic ☐ Irrigation ☐ Test Well ☐ Public Supply-Permit No. ☒ Air Conditioning ☒ Monitor Well ☐ Industry ☐ Commercial ☐ Recovery

8. CASING: ☒ Threaded ☐ Welded
Diam.: 4"
Type: ☒ PVC ☐ Steel ☐ Galvanized ☐ Other
0 in. to 1.5 ft. depth
in. to ft. depth
Height: Above/Below
Surface ft.
Weight Sch 40 lb./ft.
Drive Shoe? ☐ Yes ☒ No

9. SCREEN
Type: PVC Diam.: 4"
Slot/Gauge: 0.01 Length: 8'
Set Between: 1.5 ft. and 9.5 ft.
ft. and ft.
NOTE: MULTIPLE SCREENS USE SECOND SHEET
Sieve Analysis ☐ Yes (please enclose) ☒ No

10. STATIC WATER LEVEL
NA ft. below land surface after 24 hours

11. PUMPING LEVEL Below Land Surface.
ft. after hrs. Pumping G.P.M.
Pumping Test: ☐ Yes (please enclose) ☒ No
Yield:

12. WATER QUALITY
Chemical Analysis ☐ Yes ☒ No Bacterial Analysis ☐ Yes ☒ No
Please enclose lab results.

13. ARTIFICIAL FILTER (gravel pack) ☒ Yes ☐ No
Installed from 1.5 ft. to 9.5 ft.
Effective size FX 50 Uniformity Coefficient NA

14. WELL GROUTED ? ☒ Yes ☐ No
☒ Neat Cement ☐ Sand Cement ☐ Concrete ☐ Other
Depth: From 0 ft. to 1.5 ft.

15. NEAREST SOURCE OF POSSIBLE CONTAMINATION: 5 ft. N direction
Petroleum
Type well disinfected upon completion ☐ Yes ☒ No Type: Amount:

16. PUMP: Date Installed: Not Installed ☒
Mfr. Name: Model No.:
H.P. Volts Length of drop pipe ft. Capacity gpm
TYPE: ☐ Submersible ☐ Jet (deep) ☐ Jet (shallow) ☐ Reciprocating ☐ Turbine ☐ Centrifugal

17. WATER WELL CONTRACTOR'S CERTIFICATION: This well was drilled under my direction and this report is true to the best of my knowledge and belief.
Registered Business Name: CBM Environmental Services, Inc. Date: 2-14-05
Address: 3440 Lakemont Blvd., Fort Mill, SC 29708
Signed: Todd Hill Cert. No.: 1446
Authorized Representative

APPENDIX B
GROUNDWATER SAMPLING DATA SHEETS

GAUGE REPORT

CBM Environmental Services, Inc.
3440 Lakemont Boulevard
Fort Mill, SC 29708

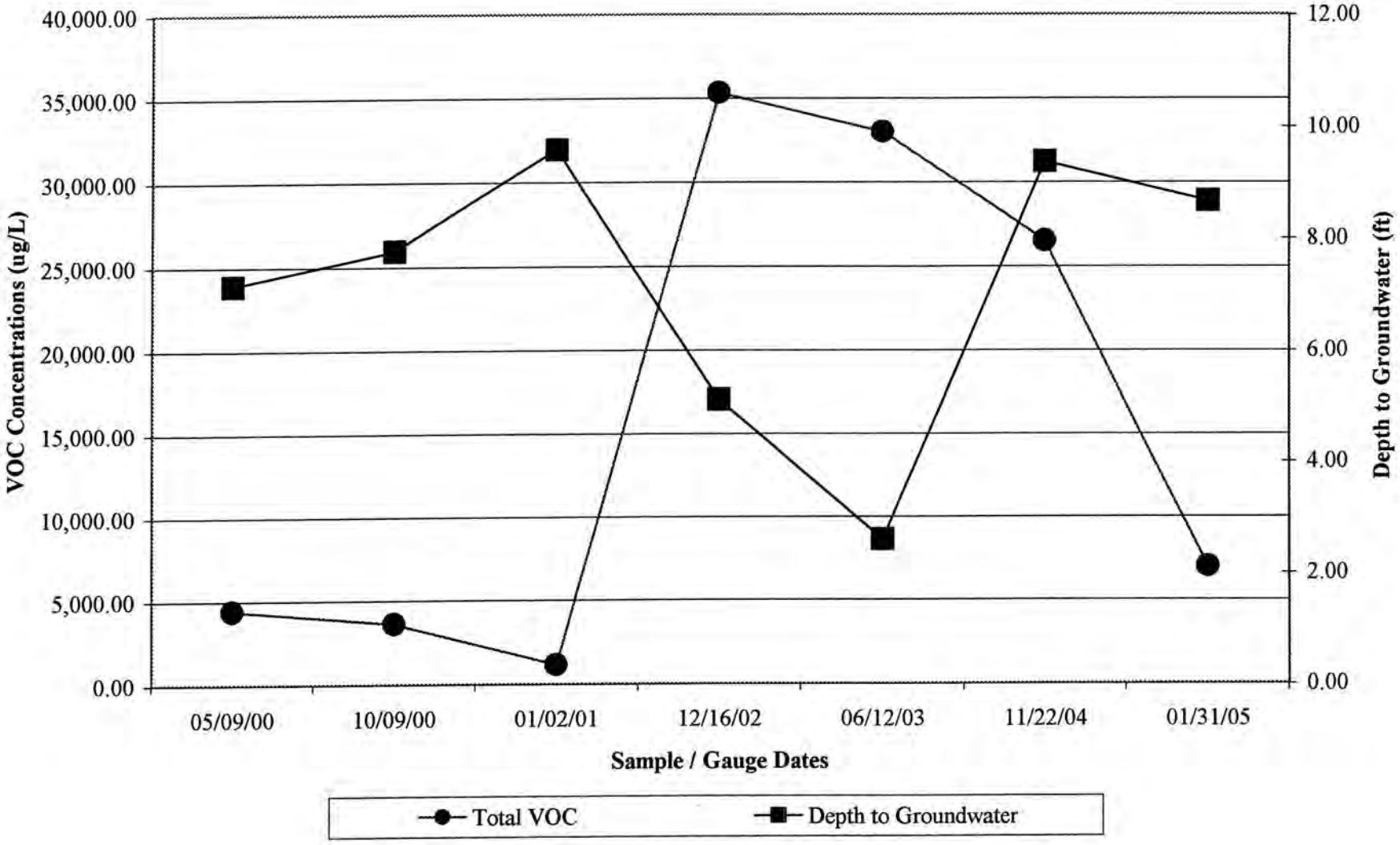
Project Name	Greens Oil	Location	Rock Hill, SC
Project No.	11030	Date	1/31/2005
Measured By	Matt Ferguson	Weather	sunny and cold

Well No.	Depth to Product (feet)	Depth to Water (feet)	Product Thickness (feet)	Product Recovered (gallons)	Well Depth (feet)	Volume Purged (gallons)
MW-1R		8.66			10.00	0.75
MW-2		8.36			14.00	3.75
MW-3		DRY			7.75	---
MW-4		NA			NA	---
MW-5		7.84			10.04	0.75
MW-6		8.59			9.60	0.25
MW-7		NF			NF	---
PW-8		7.45			30.00	11.00

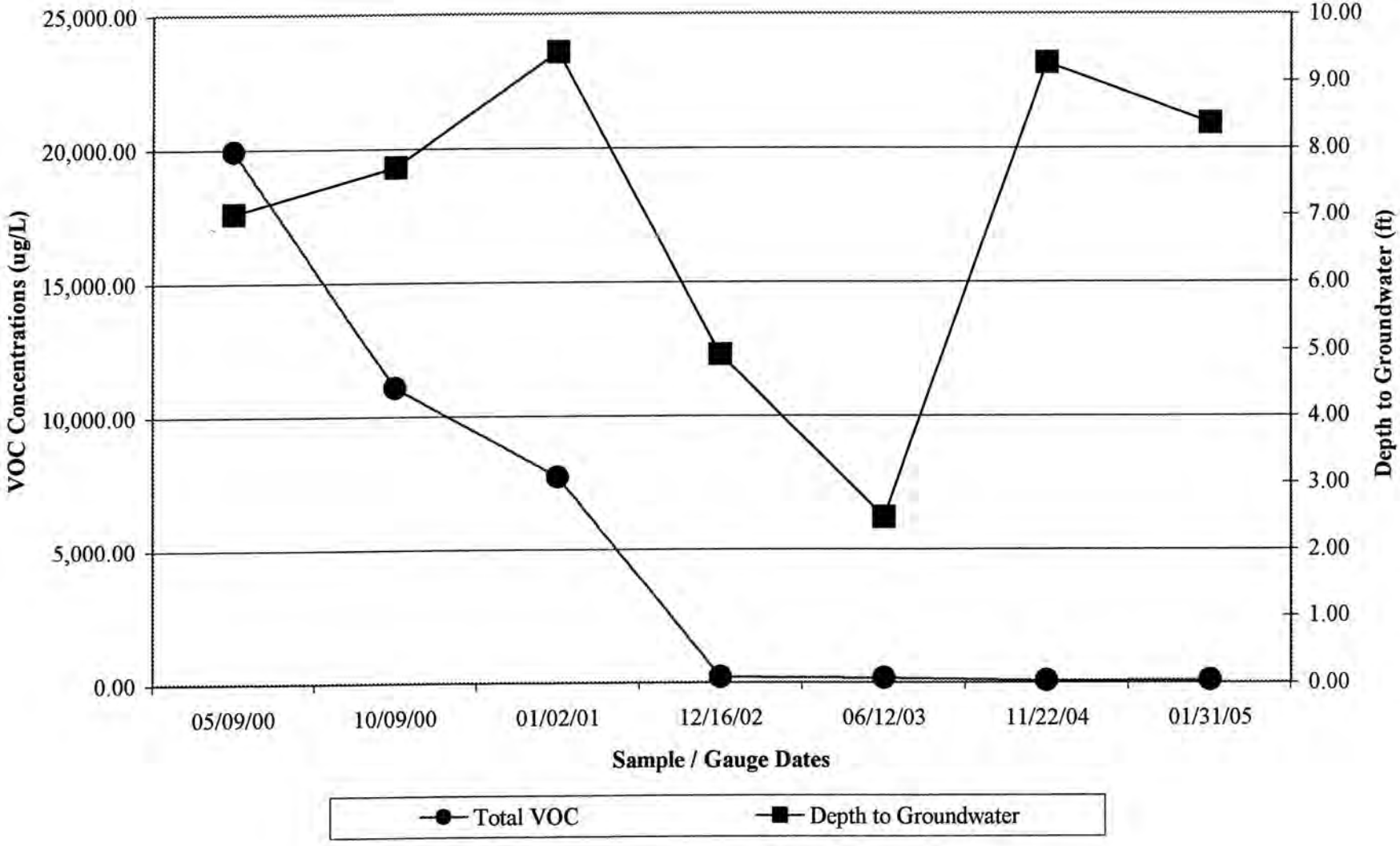
Remarks MW-4 was locked inside an enclosure and MW-7 was not found. MW-3 was dry.

APPENDIX D
GRAPHS OF INDIVIDUAL VOC CONCENTRATIONS VS. TIME

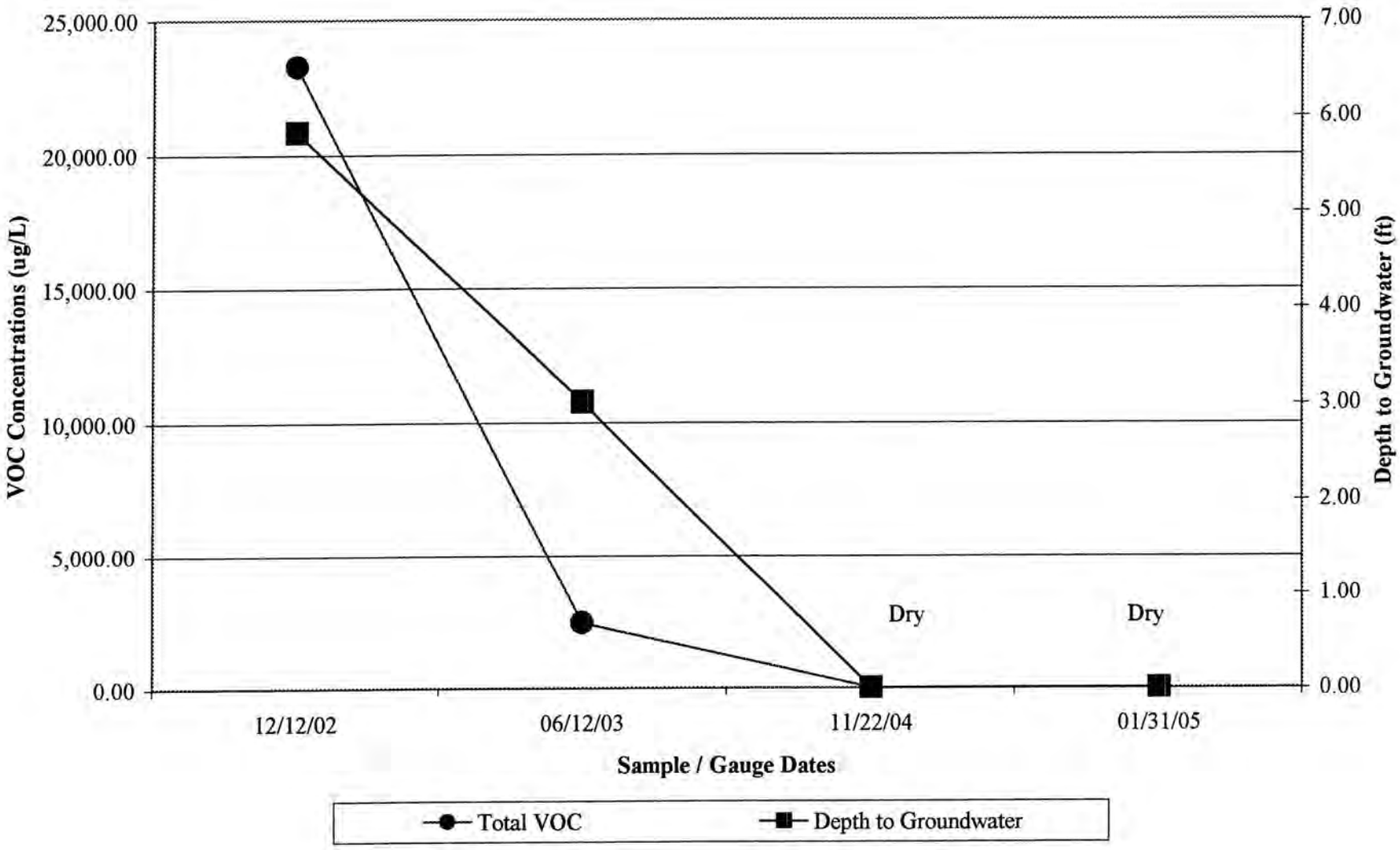
TOTAL VOC CONCENTRATION VS. DEPTH TO GROUNDWATER
GREENS OIL - MW-1/MW-1R



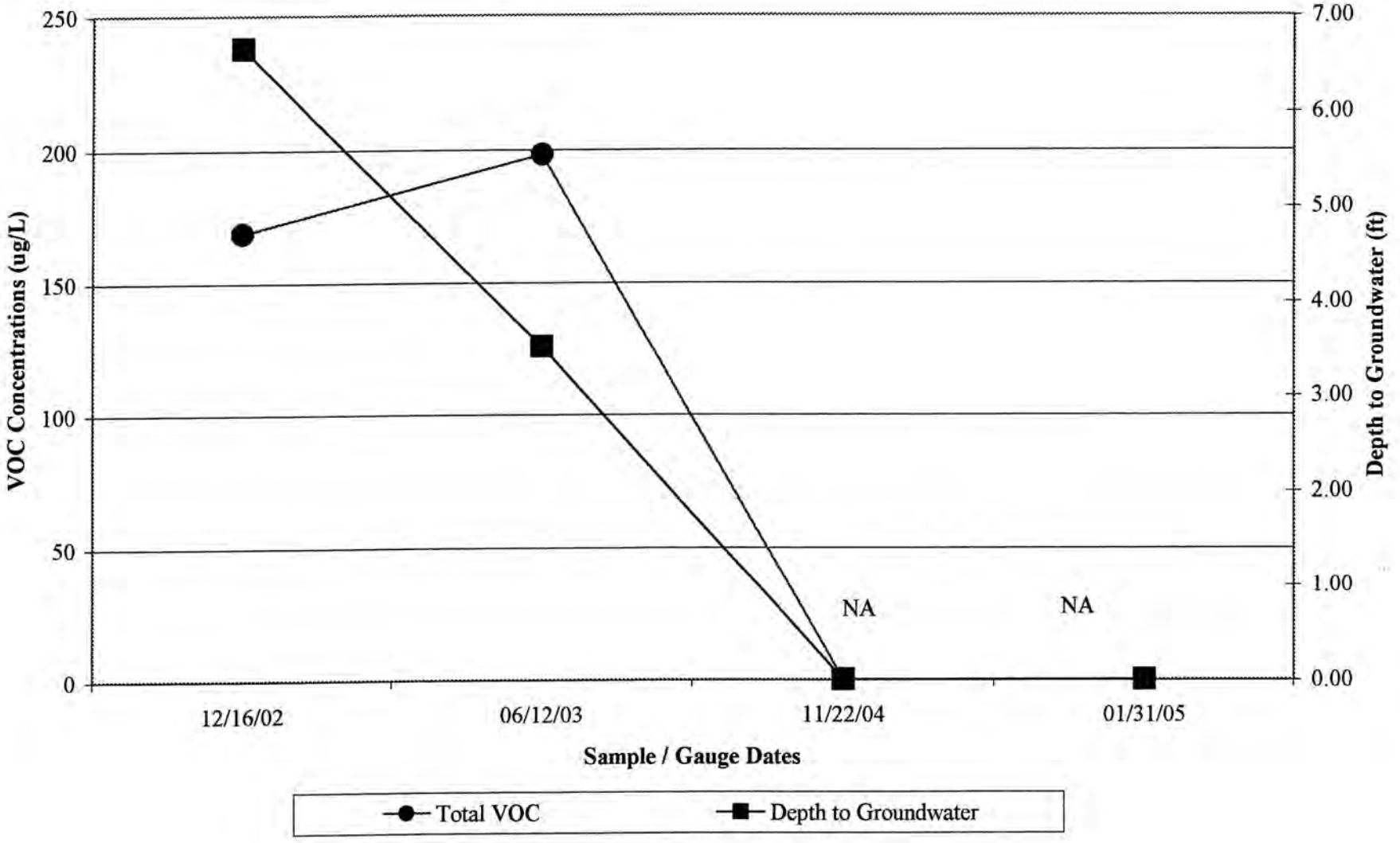
TOTAL VOC CONCENTRATION VS. DEPTH TO GROUNDWATER
GREENS OIL - MW-2



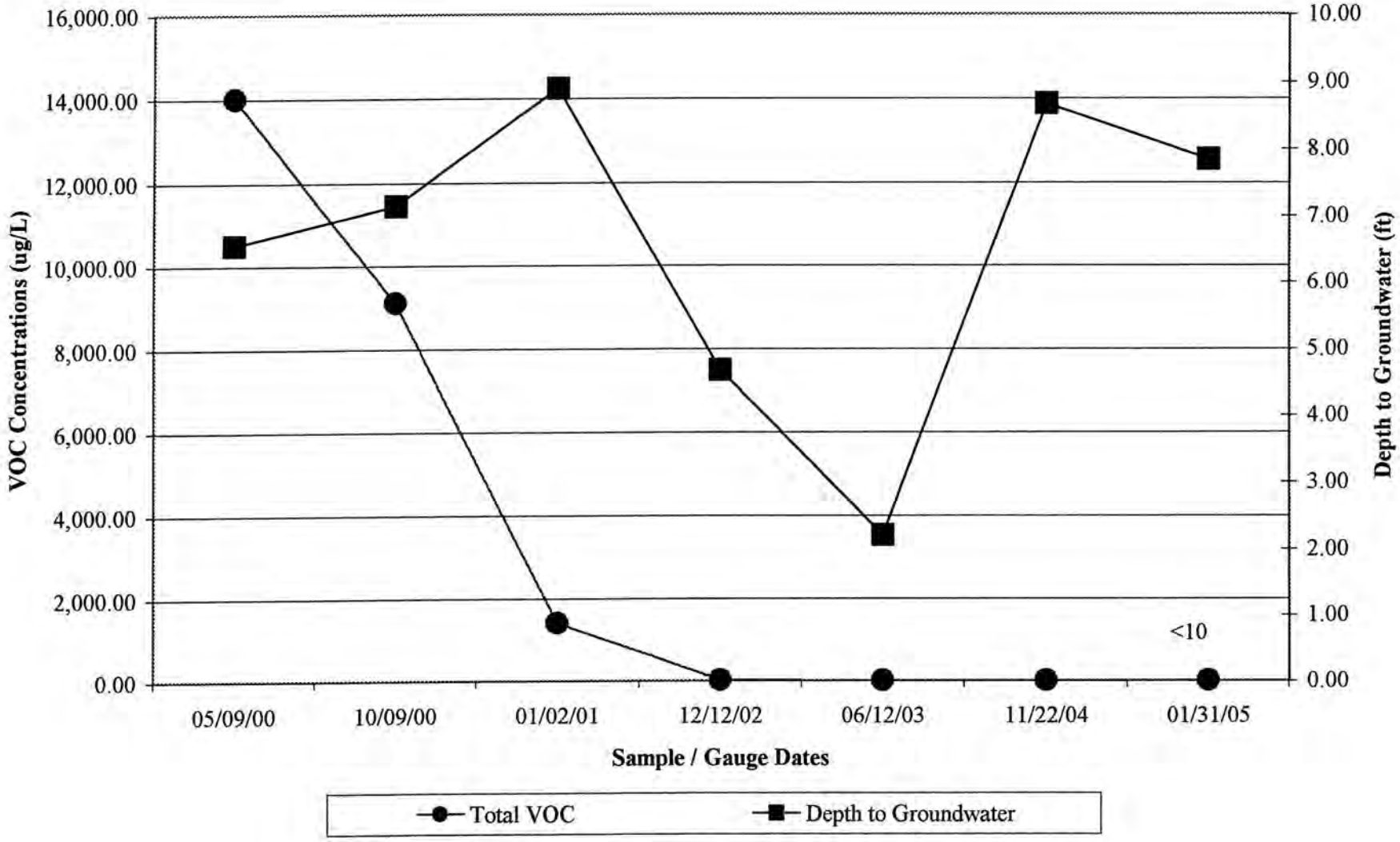
TOTAL VOC CONCENTRATION VS. DEPTH TO GROUNDWATER
GREENS OIL - MW-3



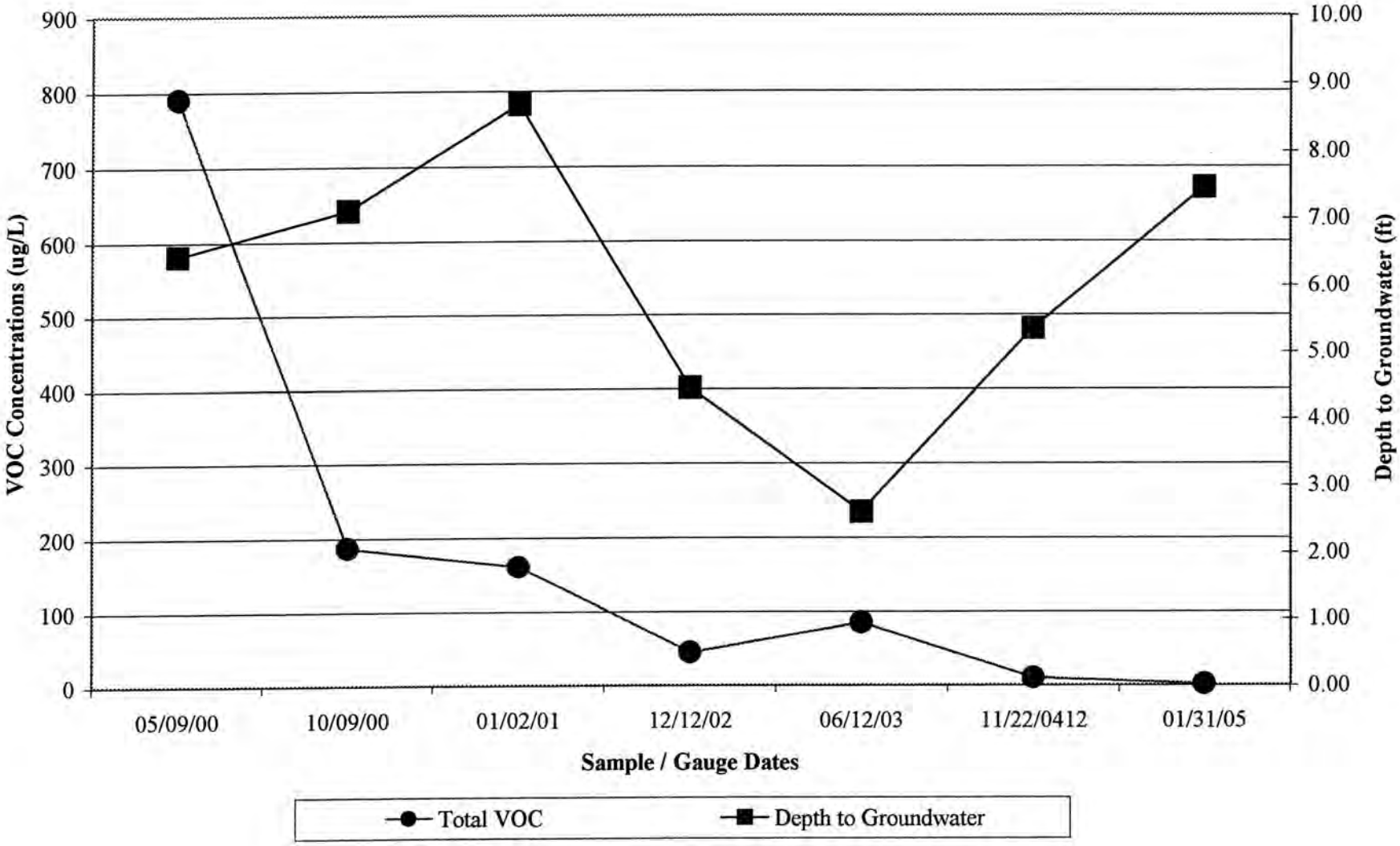
TOTAL VOC CONCENTRATION VS. DEPTH TO GROUNDWATER
GREENS OIL - MW-4



TOTAL VOC CONCENTRATION VS. DEPTH TO GROUNDWATER
GREENS OIL - MW-5



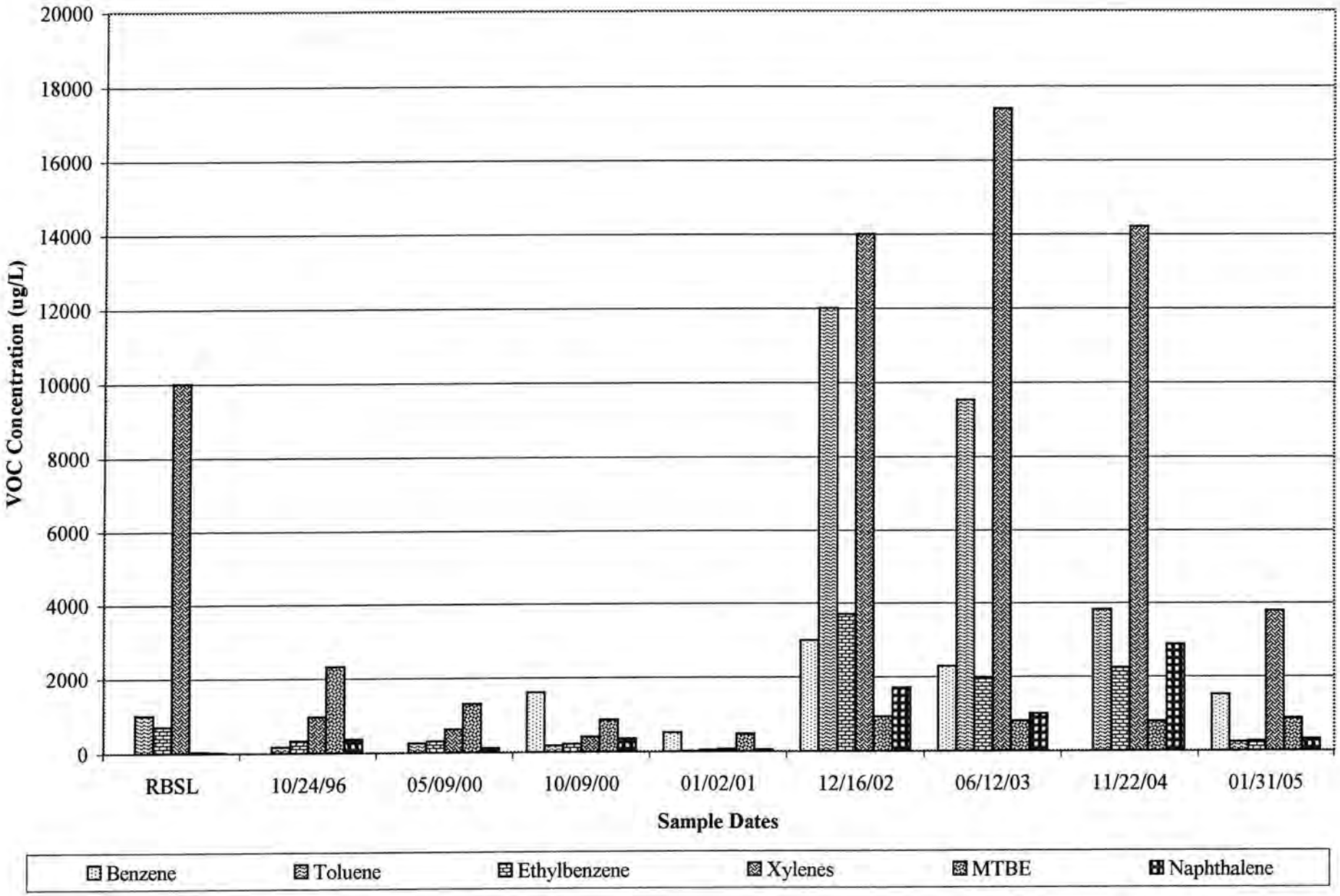
TOTAL VOC CONCENTRATION VS. DEPTH TO GROUNDWATER
GREENS OIL - PW-8



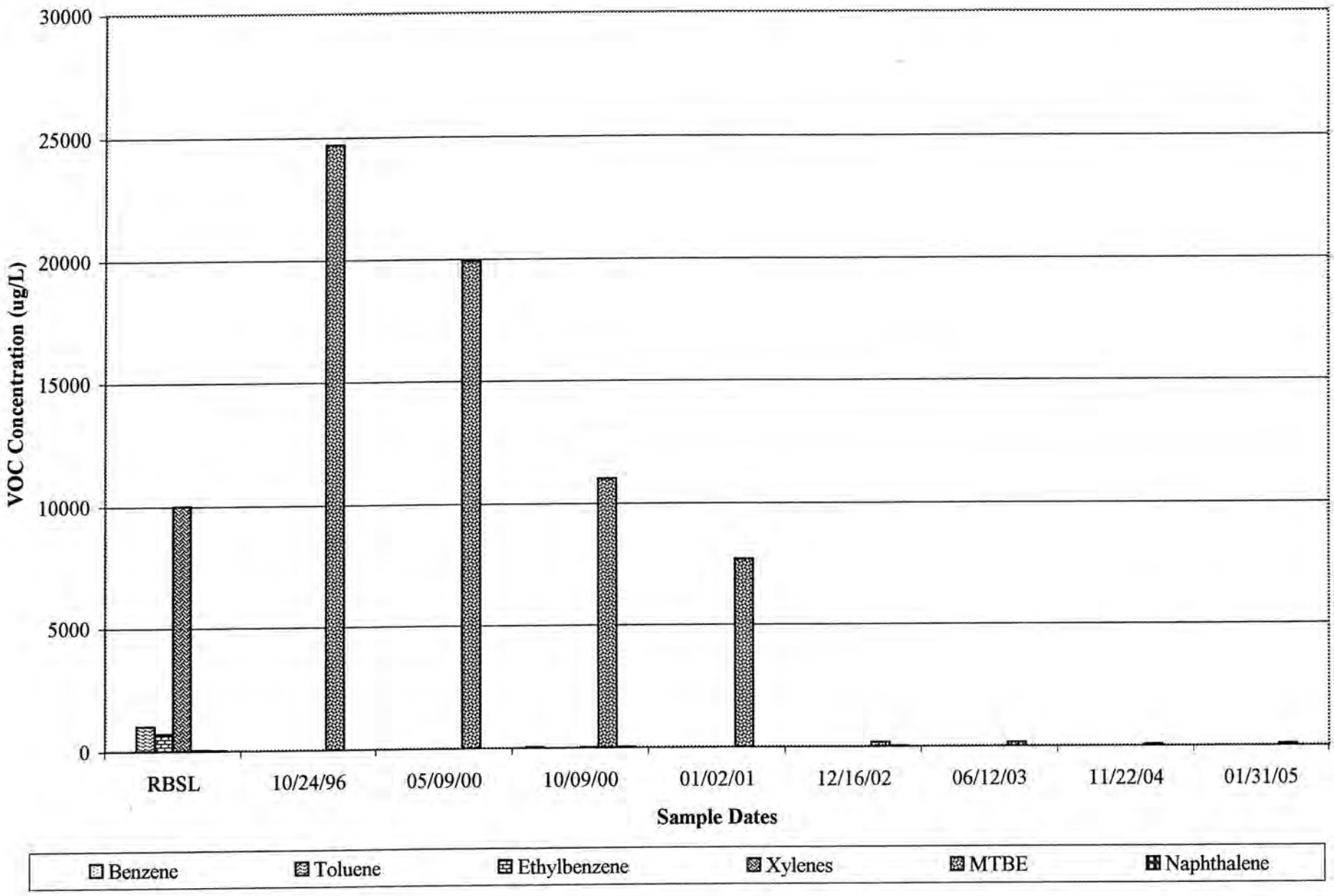
APPENDIX E

GRAPHS OF TOTAL VOC CONCENTRATIONS VS. DEPTH TO GROUNDWATER

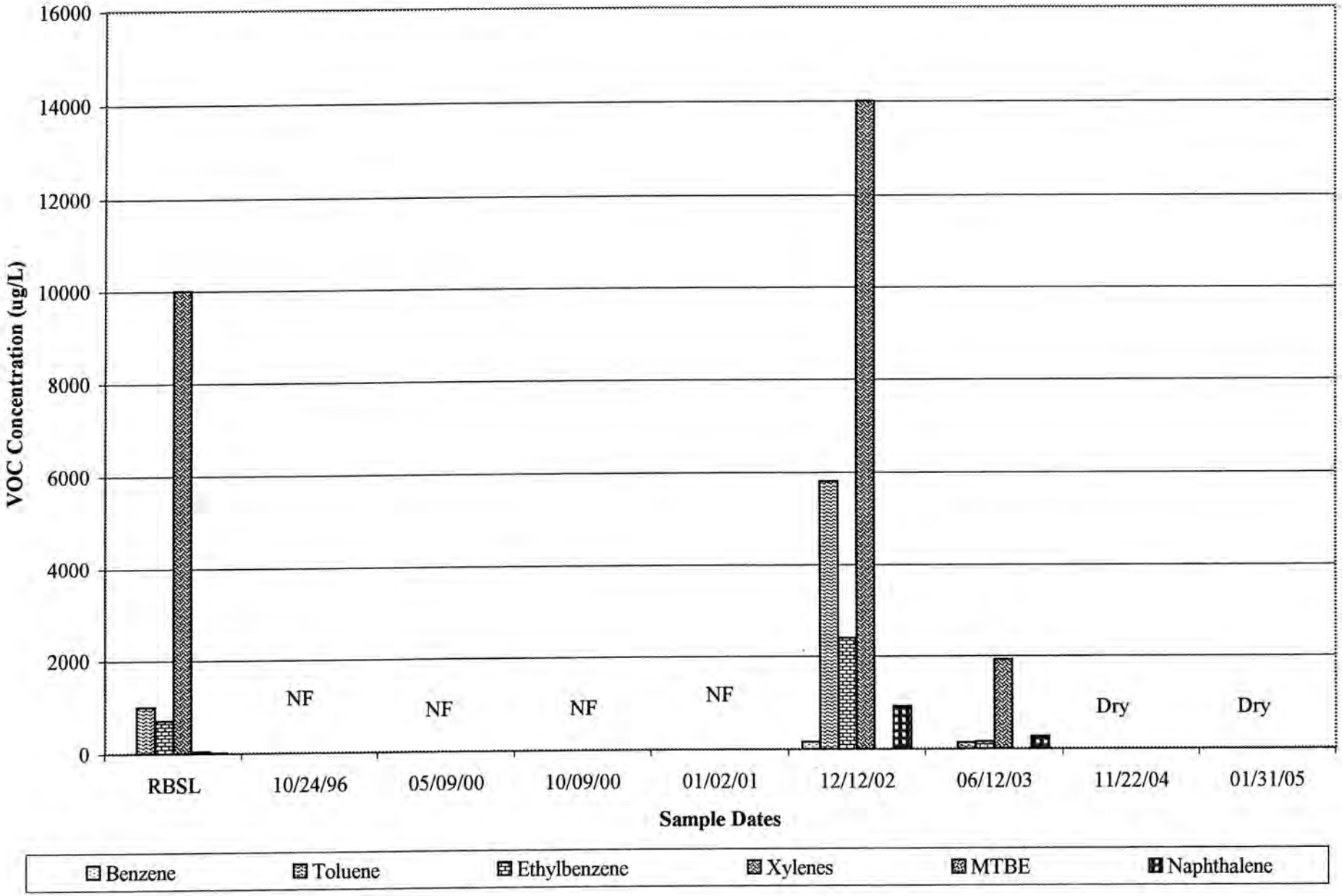
GROUNDWATER QUALITY CHART
GREENS OIL - MW-1/MW-1R



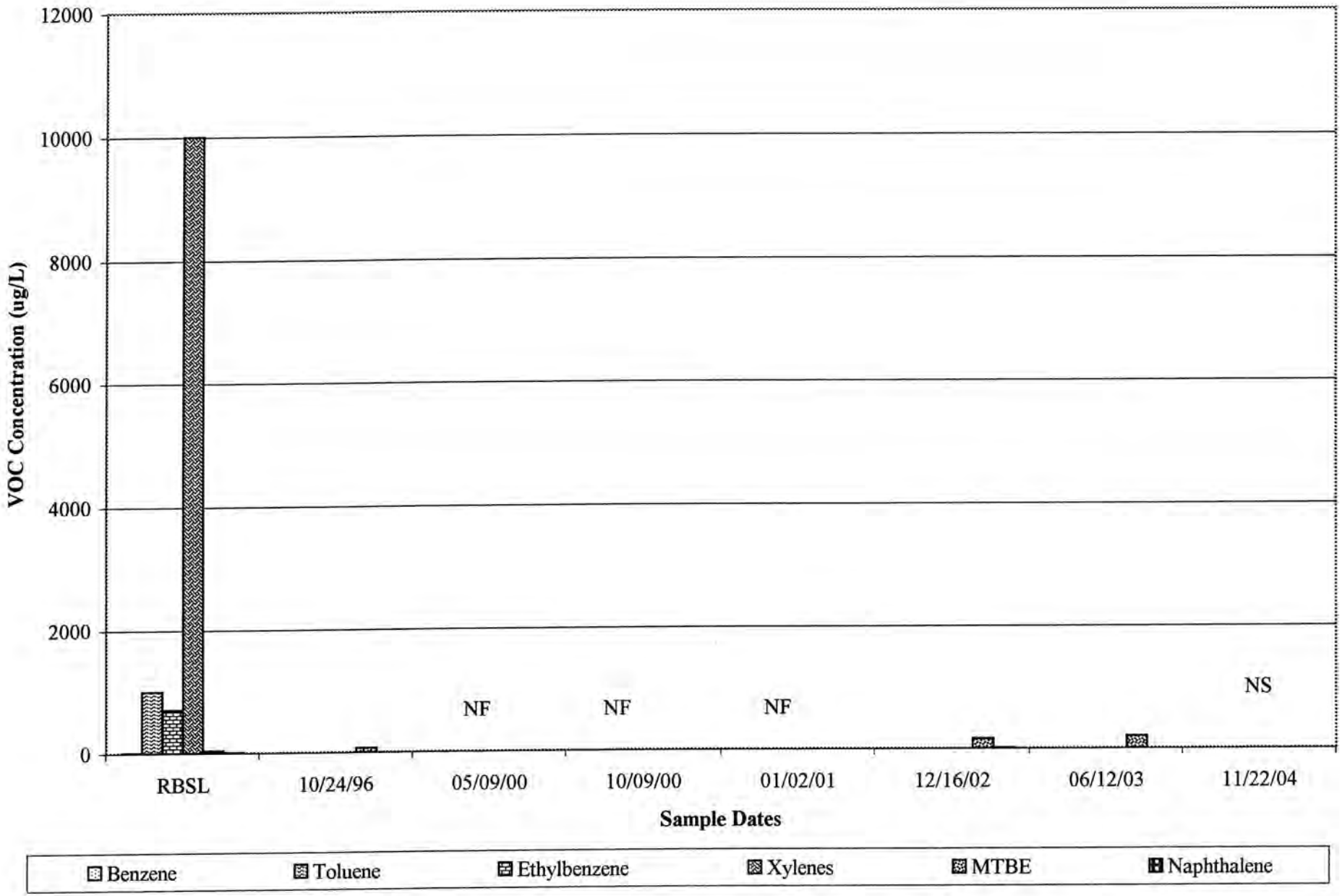
GROUNDWATER QUALITY CHART
GREENS OIL - MW-2



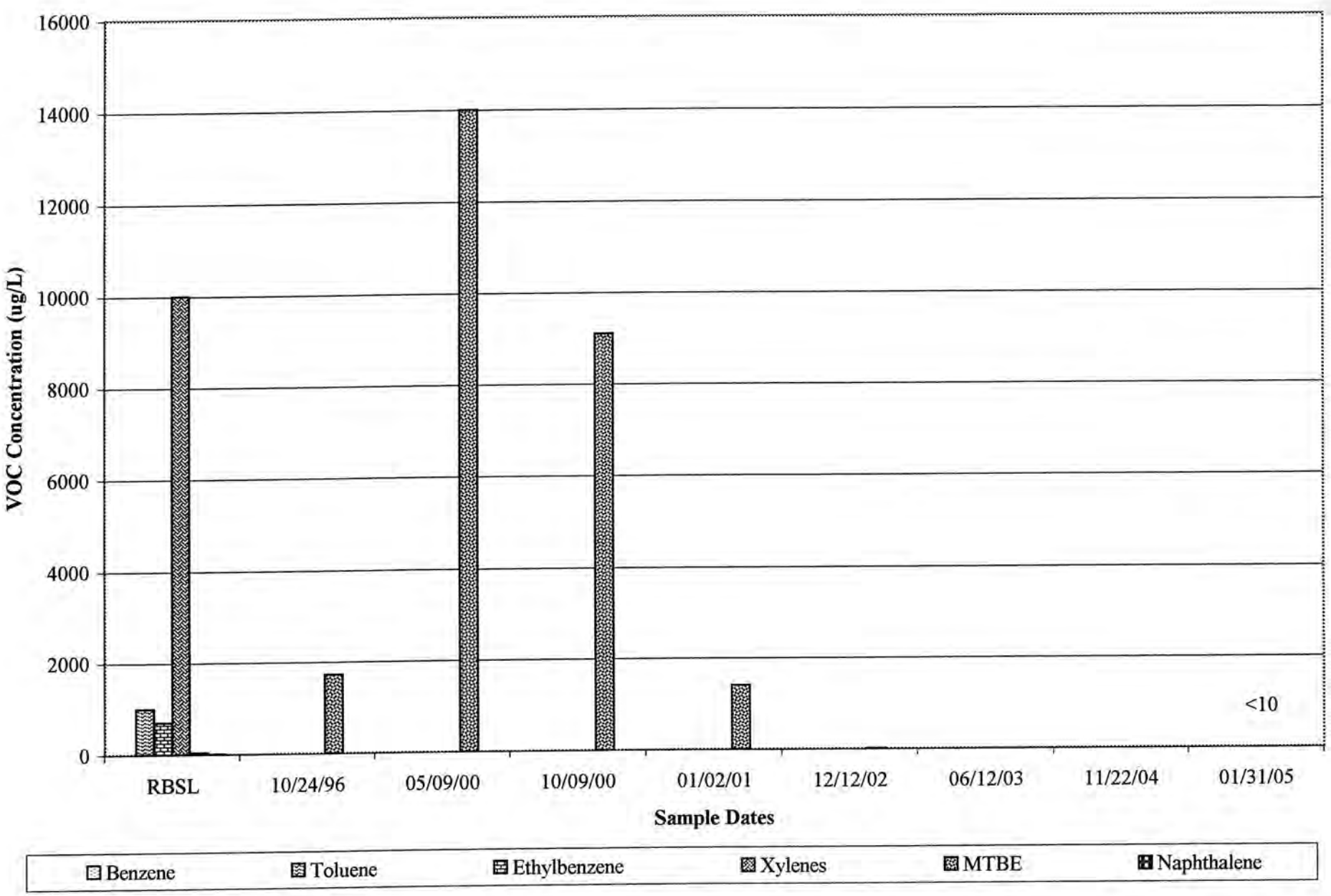
GROUNDWATER QUALITY CHART
GREENS OIL - MW-3



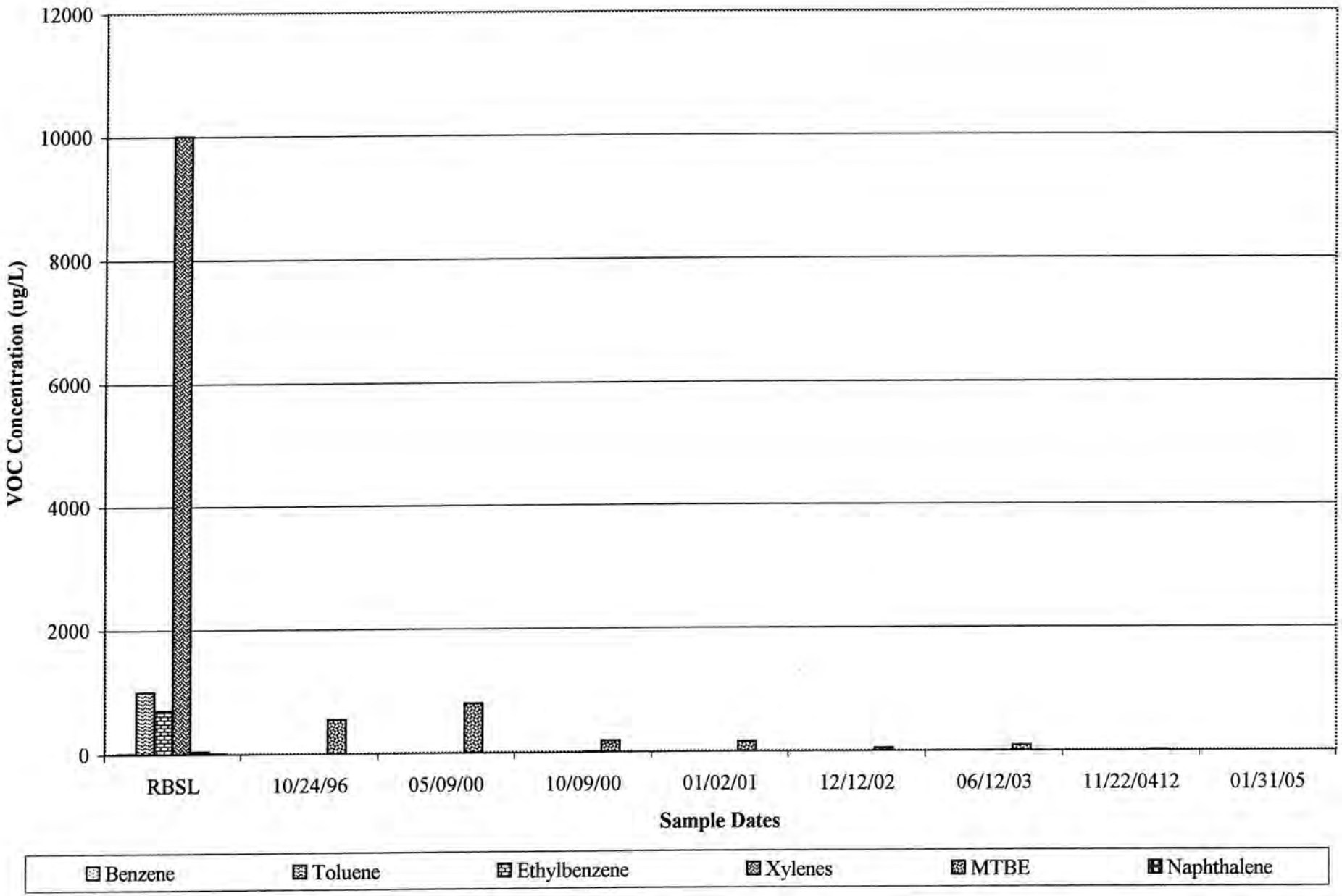
GROUNDWATER QUALITY CHART
GREENS OIL - MW-4



GROUNDWATER QUALITY CHART
GREENS OIL - MW-5



GROUNDWATER QUALITY CHART
GREENS OIL - PW-8



GROUNDWATER SAMPLES
GREEN'S OIL COMPANY

Well No.	Date	Benzene	Toluene	Ethylbenzene	Xylenes	MTBE	Naphthalene	Total VOC
MW-1	10/24/96	**3,040**[2]	164	325	950	**2,310**	**365**	
	05/09/00	**1,790**	255	302	611	**1,300**	**117**	4,375.00
	10/09/00	**1,600**	180	220	400	**850**	**350**	3,600.00
	01/02/01	**500**	9.0	38	68	**460**	**55**	1,130.00
	12/16/02	**3,000**	**12,000**	**3,700**	**14,000**	**920**	**1,700**	35,320.00
	06/12/03	**2,280**	**9,520**	**1,980**	**17,400**	**801**	**991**	32,972.00
	11/22/04	**2,560**	**3,820**	**2,240**	**14,200**	**790**	**2,880**	26,490.00
MW-1R[5]	01/31/05	**1,510**	234	268	3,790	**864**	**310**	6,976.00
MW-2	10/24/96	<10.0	<10.0	<10.0	<3.0	**24,700**	<5.0	
	05/09/00	**5.2**	ND[6]	ND	ND	**19,900**	ND	19,905.20
	10/09/00	**31**	5.7	<5.0	12	**11,000**	15	11,063.70
	01/02/01	**7.2**	<5.0	<5.0	<5.0	**7,700**	<5.0	7,707.20
	12/16/02	<5.0	<5.0	<5.0	7.2	**170**	**12**	189.20
	06/12/03	4.0	<1.0	<1.0	<1.0	**157**	<5.00	161.00
	11/22/04	<1.0	<1.0	<1.0	<1.0	**54.9**	<5.00	54.90
	01/31/05	<1.0	<1.0	<1.0	<1.0	**68.8**	<5.00	68.80
MW-3	10/24/96	NF[8]	NF	NF	NF	NF	NF	NF
	05/09/00	NF	NF	NF	NF	NF	NF	NF
	10/09/00	NF	NF	NF	NF	NF	NF	NF
	01/02/01	NF	NF	NF	NF	NF	NF	NF
	12/12/02	**150**	**5,800**	**2,400**	**14,000**	<25	**920**	23,270.00
	06/12/03	4.2	135	150	1,920	2.9	**260**	2,472.10
	11/22/04	Dry	Dry	Dry	Dry	Dry	Dry	Dry
	01/31/05	Dry	Dry	Dry	Dry	Dry	Dry	Dry
	RBSL[9]	5	1,000	700	10,000	40	10	

GROUNDWATER SAMPLES
GREEN'S OIL COMPANY

Well No.	Date	Benzene	Toluene	Ethylbenzene	Xylenes	MTBE	Naphthalene	Total VOC
MW-4	10/24/96	<1.0	<1.0	<1.0	<3.0	**70.4**	<5.0	
	05/09/00	NF	NF	NF	NF	NF	NF	NF
	10/09/00	NF	NF	NF	NF	NF	NF	NF
	01/02/01	NF	NF	NF	NF	NF	NF	NF
	12/16/02	<5.0	<5.0	<5.0	<5.0	**160**	8.5	168.5
	06/12/03	<1.0	<1.0	<1.0	<1.0	**198**	<5.00	198
	11/22/04	NS[10]	NS	NS	NS	NS	NS	NS
	01/31/05	NS	NS	NS	NS	NS	NS	NS
MW-5	10/24/96	<1.0	<1.0	<1.0	<3.0	**1,720**	<5.0	
	05/09/00	ND	ND	ND	ND	**14,000**	ND	14,000.00
	10/09/00	<5.0	<5.0	<5.0	<5.0	**9,100**	<5.0	9,100.00
	01/02/01	<5.0	<5.0	<5.0	<5.0	**1,400**	<5.0	1,400.00
	12/12/02	<5.0	<5.0	<5.0	<5.0	14	<5.0	14.00
	06/12/03	<1.0	<1.0	<1.0	<1.0	3.1	<5.00	3.10
	11/22/04	<1.0	<1.0	<1.0	<1.0	1.4	<5.00	1.40
	01/31/05	<1.0	<1.0	<1.0	<1.0	<1.0	<5.00	<10
MW-6	10/24/96	NS	NS	NS	NS	NS	NS	
	05/09/00	ND	ND	ND	ND	ND	ND	
	10/09/00	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	
	01/02/01	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	
	12/12/02	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	
	06/12/03	<1.0	<1.0	<1.0	<1.0	<1.0	<5.00	
	11/22/04	<1.0	<1.0	<1.0	<1.0	<1.0	<5.00	
	01/31/05	<1.0	<1.0	<1.0	<1.0	<1.0	<5.00	
	RBSL	5	1,000	700	10,000	40	10	

GROUNDWATER SAMPLES
GREEN'S OIL COMPANY

Well No.	Date	Benzene	Toluene	Ethylbenzene	Xylenes	MTBE	Naphthalene	Total VOC
MW-7	10/24/96	NF	NF	NF	NF	NF	NF	
	05/09/00	NF	NF	NF	NF	NF	NF	
	10/09/00	NF	NF	NF	NF	NF	NF	
	01/02/01	NF	NF	NF	NF	NF	NF	
	12/12/02	<5.0	<5.0	<5.0	<5.0	**160**	<5.0	
	06/12/03	<1.0	<1.0	<1.0	<1.0	**294**	<5.00	
	11/22/04	NF	NF	NF	NF	NF	NF	
	01/31/05	NF	NF	NF	NF	NF	NF	
PW-8	10/24/96	<1.0	<1.0	<1.0	<3.0	**547**	<5.0	85
	05/09/00	ND	ND	ND	ND	**790**	ND	790
	10/09/00	<5.0	<5.0	<5.0	6.1	**180**	<5.0	186.1
	01/02/01	<5.0	<5.0	<5.0	<5.0	**160**	<5.0	160
	12/12/02	<5.0	<5.0	<5.0	<5.0	**44**	<5.0	44
	06/12/03	<1.0	<1.0	<1.0	<1.0	**84.6**	<5.00	84.6
	11/22/04[12]	<1.0	<1.0	<1.0	<1.0	9.7	<5.00	9.7
	01/31/05	<1.0	<1.0	<1.0	<1.0	1.3	<5.00	1.3
	RBSL	5	1,000	700	10,000	40	10	

GROUNDWATER MONITORING REPORT
GREEN'S OIL COMPANY
2849 CHERRY RD.
ROCK HILL, YORK COUNTY
UST PERMIT NO. 09344
SITE RISK CLASSIFICATION: HIGH
LAND USE CLASSIFICATION: COMMERCIAL
CBM PROJECT NO. 11030

Prepared For:

Federated Insurance Company
c/o Jerry Green
2457 Breen Circle
Rock Hill, SC 29732

Prepared By:

CBM Environmental Services, Inc.
3440 Lakemont Blvd.
Fort Mill, SC 29708
(803) 548-5989

May 25, 2005

Samanth Dawson
Samanth Emmanuel Dawson
Project Manager

Andrew K. Kennedy, P.E
License No. 22353

TABLE OF CONTENTS

FIGURES

TABLES

APPENDICES

1.0 INTRODUCTION

This report presents the results of groundwater monitoring activities, conducted in April 2005, at the Greens Oil Company site. The site served as a gas station although it is presently not in use. The site is located in a commercial/industrial area of York County. No public or private water supply wells were reported within 1,000 feet of the site. Two water supply wells downgradient of the site have been abandoned. No surface water bodies were observed within 500 feet of the source area. The Catawba River is the only known potential receptor identified during the receptor survey conducted located approximately 3,000 feet downgradient of the site.

A Corrective Action Plan (CAP) that proposed the remediation of petroleum impacted soil and groundwater beneath the site; by excavating, backfilling with microbial augmented soil and de-watering, followed by microbial injections, was submitted to the SCDHEC on January 23, 2004. SCDHEC approved the CAP in a correspondence dated March 29, 2004. However, in subsequent telephone conferences with the responsible party's insurance company (Federated Insurance), it was decided that only the soil excavation and microbial augmented backfill combined with de-watering would be implemented initially. Microbial injections, if needed, would be conducted after two to three quarters of groundwater monitoring. Soil excavation followed by microbial augmented backfill and compaction was completed in December 2004.

2.0 FACILITY INFORMATION

- **Facility Name**: Greens Oil Company
- **Location:** 2849 Cherry Road
  Rock Hill, York County (**Figure 1**)
- **UST Permit No.** 09344
- **Risk Classification:** High
- **Land Use Classification:** Commercial
- **UST Operator:** Greens Oil Company
  2849 Cherry Road
  Rock Hill, South Carolina
- **UST Owner:** Greens Oil Company
  2849 Cherry Road
  Rock Hill, South Carolina

- **Consultant:** CBM Environmental Services, Inc.
  3440 Lakemont Blvd
  Fort Mill, South Carolina 29708
  (803) 548-5989
- **Release Information:**
  - **Date Discovered:** Unknown
  - **Estimated Quantity of Release:** Unknown
  - **Cause of Release:** Unknown
  - **Source of Release:** Leaking UST System
  - **UST System Size/Contents:** Four gasoline USTs
  - **Latitude / Longitude:** 34°58'42" North/ 80°58'54" West

3.0 SAMPLING ACTIVITIES

3.1 Site Hydrology

Depths to groundwater in the Type II monitoring wells measured on April 27, 2005 ranged from 4.26 to 5.75 feet. Groundwater elevations relative to a temporary benchmark with an assumed datum of 100.00 feet ranged from 91.16 to 94.00 feet. Based on the April 2005 data, groundwater flow was generally toward the north. The hydraulic gradient beneath the site was approximately 0.04 feet per foot. A Water Table Surface Map based on the April 2005 data is included as **Figure 3**. A summary of groundwater elevation data obtained in April 2005 is presented in **Table 1**. A summary of historical groundwater elevation data obtained is presented in **Table 2**.

3.2 Groundwater Sampling

On April 27, 2005, seven Type II monitoring wells (MW-1R through MW-7) and one Type III monitoring well (PW-8) were developed and sampled. Laboratory analyses were performed on groundwater samples collected from the monitoring wells for BTEX constituents, MTBE and naphthalene by EPA Method 8260B. Field measurements of DO, pH, conductivity and temperature were collected from the monitoring wells sampled.

4.0 GROUNDWATER QUALITY

Detectable concentrations of MTBE that exceeded the risk based screening levels (RBSLs) were reported in the groundwater samples collected from monitoring wells MW-1R, MW-2 and MW-4. In addition, the concentration of benzene and/or naphthalene reported from monitoring wells MW-1R and MW-4 exceeded the RBSLs. No detectable concentrations of requested method constituents were reported in groundwater samples collected from monitoring wells MW-5 and MW-6.

A Groundwater Quality Map showing individual BTEX constituents, MTBE and naphthalene concentrations in the monitoring wells from the April 2005 sampling event is included as **Figure 4**. A summary of laboratory analyses of groundwater samples collected from the monitoring wells in April 2005 is presented in **Table 3**. A summary of historical groundwater quality data is presented in **Table 4**. Groundwater sampling data sheets from the April 2005 sampling event have been included as **Appendix A.** A complete report of laboratory analyses of groundwater samples collected during the April 2005 sampling event has been included as **Appendix B**. Graphs showing variations in BTEX constituents, MTBE and naphthalene concentrations versus time and total VOC concentrations versus depths to groundwater have been included as **Appendices C** and **D**, respectively. A certificate of disposal for purge water stored in a 55-gallon drum as well as drill cuttings from monitoring well installation will be forwarded upon receipt.

5.0 CONCLUSIONS AND RECOMMENDATIONS

- Detectable concentrations of BTEX constituents, naphthalene and/or MTBE that exceeded the RBSLs were reported in groundwater samples collected from monitoring wells MW-1R, MW-2 and MW-4. The concentrations of one or more requested method constituents in the remaining monitoring wells were below the RBSLs.
- The total VOC concentrations have increased marginally in monitoring wells MW-1R, MW-2 and PW-8 compared to the last sampling period. Monitoring wells MW-4 and MW-7 not located in the previous sampling event were located and sampled during this event. Monitoring well MW-4 is downgradient from the source area and historically has not exhibited naphthalene concentrations in excess of the RBSLs.
- We recommend that microbial injections for aggressive groundwater remediation be considered, pending results of the next groundwater sampling event as proposed in the original Corrective Action Plan .

- The next groundwater sampling event will be conducted in July 2005 and the report will be submitted no later than August 31, 2005.

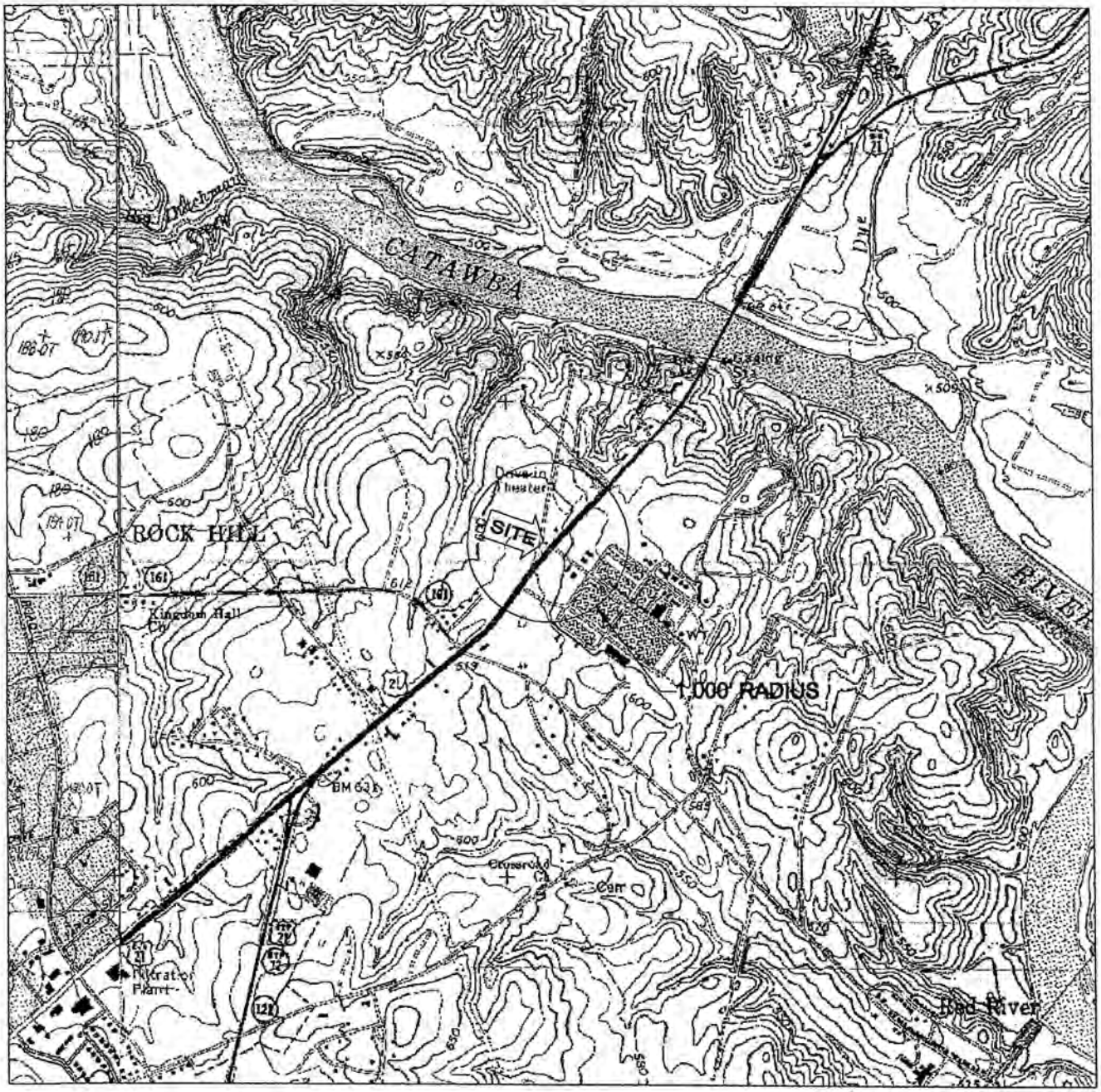
6.0 LIMITATIONS

This report has been prepared for the exclusive use of Mr. Jerry Green for specific application to the referenced site in York County, South Carolina. The assessment was conducted based on the scope of work and level of effort desired by the client and with resources adequate only for that scope of work.

Certain data contained in this report was not obtained under the supervision of CBM Environmental Services Inc.,. Although the accuracy of this data cannot be verified, for the purpose of this report CBM Environmental Services assumes it is correct. Our findings have been developed in accordance with generally accepted standards of geology and hydrogeology practices in the State of South Carolina, available information, and our professional judgment. No other warranty is expressed or implied.

The data presented in this report are indicative of conditions that existed at the precise locations sampled and at the time the samples were collected. In addition, the data obtained from samples would be interpreted as being meaningful with respect to parameters indicated in the laboratory report. No additional information can be logically be inferred from this data.

FIGURES



SCALE 1:24,000

1 0 1 MILE

1000 0 1000 2000 3000 4000 5000 6000 7000 FEET

CONTOUR INTERVAL 10 FEET

QUADRANGLE LOCATION

ROCK HILL EAST, SC QUADRANGLE

CBM ENVIRONMENTAL SERVICES, INC.

LATITUDE: 34° 58' 42" N	
LONGITUDE: 80° 58' 54" W	
DRAWN BY: AWB	
CHECKED BY: HF	
DATE: 2/4/04	

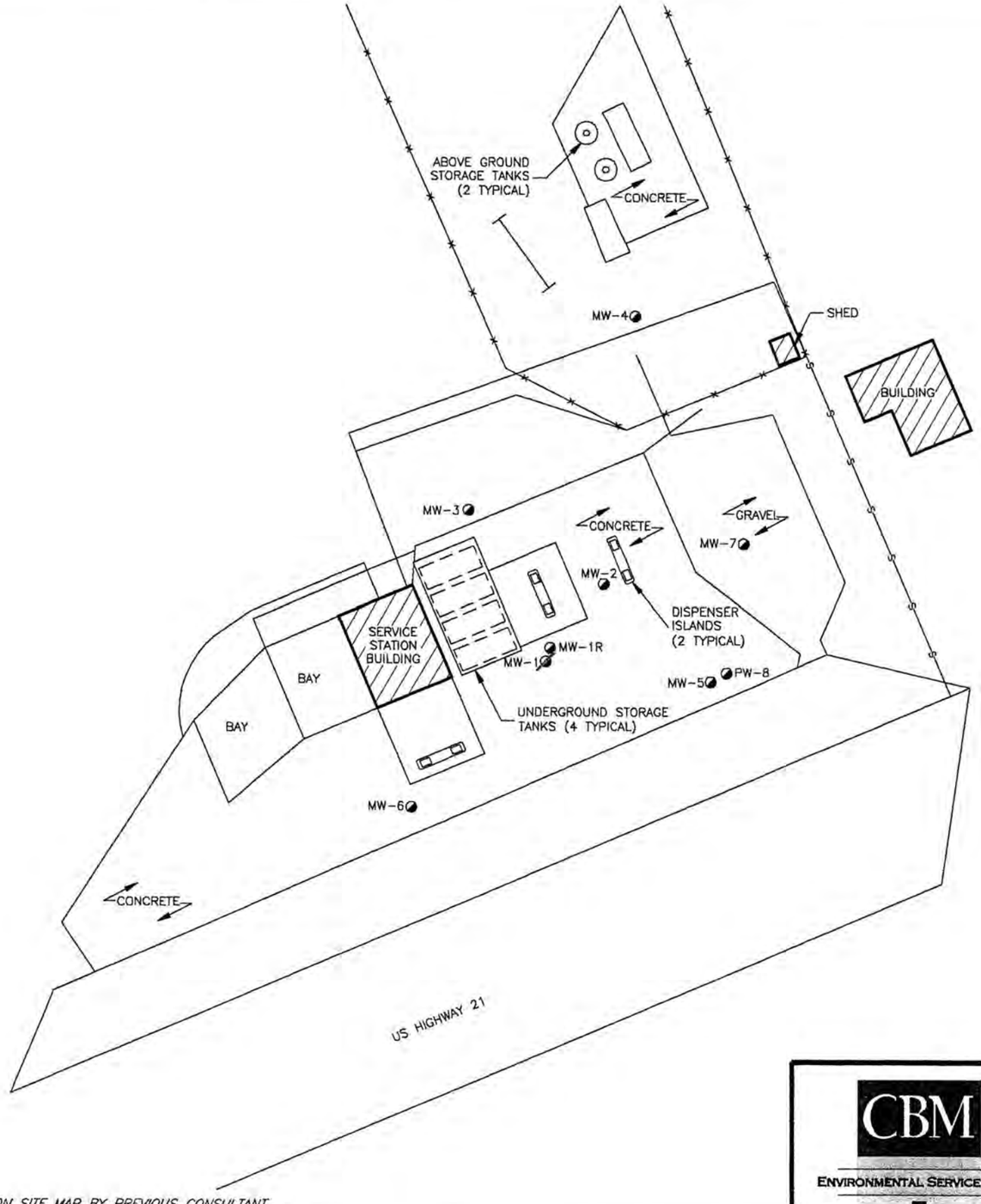
GREEN'S OIL CO.
2849 CHERRY RD.
ROCK HILL, SC

SITE ID NO. 09344

FIGURE 1

USGS TOPOGRAPHIC MAP

CBM PROJECT NO. 11030



NOTE: FIGURE BASED ON SITE MAP BY PREVIOUS CONSULTANT.

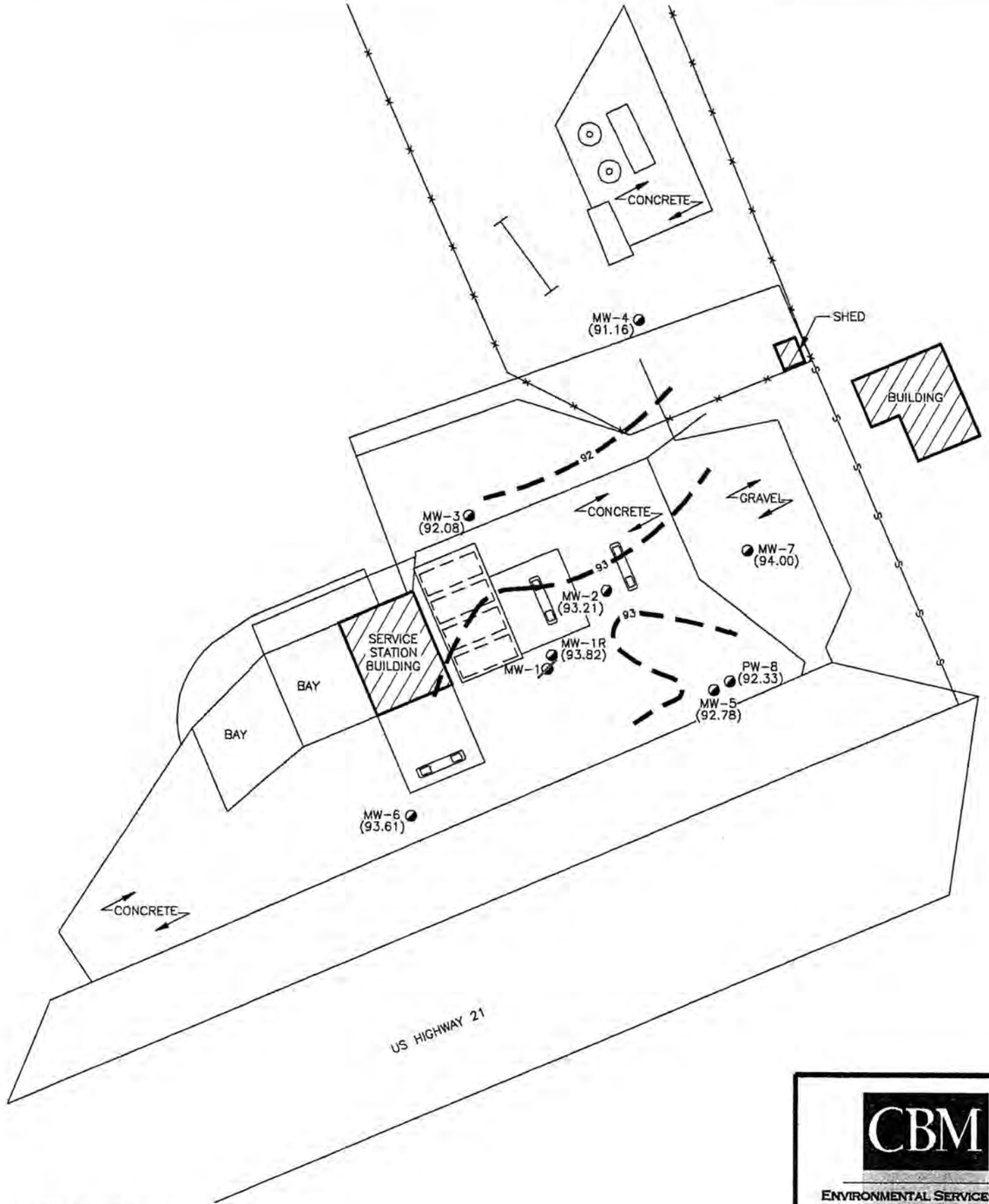
CBM ENVIRONMENTAL SERVICES, INC.

SITE I.D. NO.	09344
PROJECT NO.	11030
DRAWN BY:	AWB
CHECKED BY:	SD
DWG DATE:	2/11/05

SITE MAP

GREEN'S OIL CO.
2489 CHERRY ROAD
ROCK HILL, SC

FIGURE 2



LEGEND

- TYPE II MONITORING WELL
- TYPE II MONITORING WELL (ABANDONED)
- FENCE
- SEWER LINE
- WATER TABLE SURFACE CONTOUR w/ELEVATION (ft)
- (93.82) GROUNDWATER ELEVATION (ft)

SCALE

0 10 20 30 40

FEET

NOTE: FIGURE BASED ON SITE MAP BY PREVIOUS CONSULTANT.

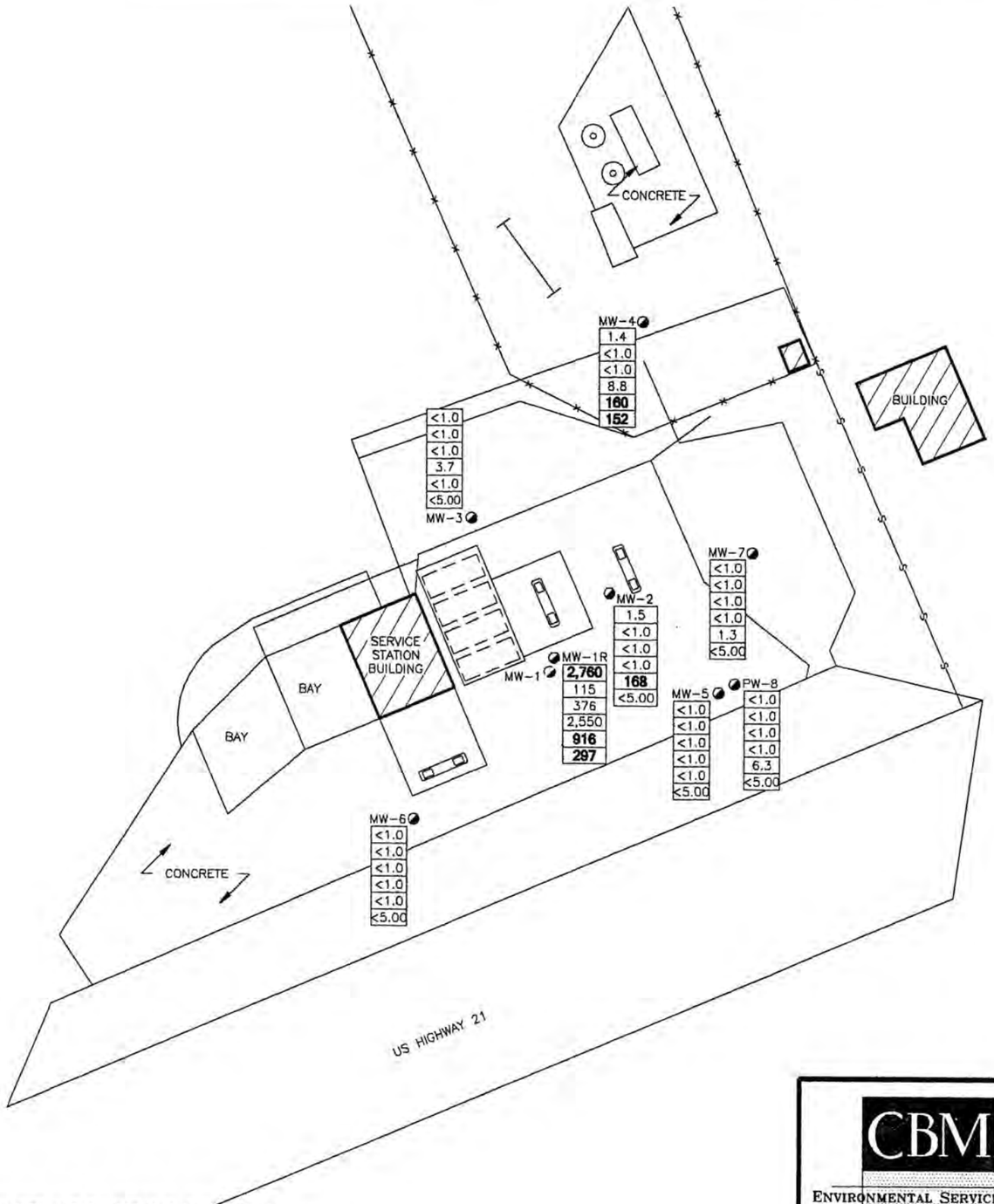
CBM ENVIRONMENTAL SERVICES, INC.

SITE I.D. NO.	09344
PROJECT NO.	11030
DRAWN BY:	AWB
CHECKED BY:	SD
DWG DATE:	5/23/05

WATER TABLE SURFACE MAP
APRIL 27, 2005

GREEN'S OIL CO.
2489 CHERRY ROAD
ROCK HILL, SC

FIGURE 3



LEGEND

- MONITORING WELL
- TYPE II MONITORING WELL (ABANDONED)
- FENCE
- SEWER LINE

5	BENZENE
1,000	TOLUENE
700	ETHYLBENZENE
10,000	XYLENES
40	MTBE
25	NAPHTHALENE

CONCENTRATIONS IN $\mu g/L$

ABOVE CONCENTRATIONS REPRESENT MAY 2001 RISK-BASED SCREENING LEVELS; CONCENTRATIONS IN BOLD FACE TYPE EXCEEDED THE RBSL

<1.0 – LESS THAN THE REPORTING LIMIT SPECIFIED IN THE LABORATORY REPORT

SCALE

0 10 20 30 40

FEET

NOTE: FIGURE BASED ON SITE MAP BY PREVIOUS CONSULTANT.

CBM ENVIRONMENTAL SERVICES, INC.

SITE I.D. NO.	09344
PROJECT NO.	11030
DRAWN BY:	BLS/AWB
CHECKED BY:	SD
DWG DATE:	5/23/05

GROUNDWATER QUALITY MAP
APRIL 27, 2005

GREEN'S OIL CO.
2489 CHERRY ROAD
ROCK HILL, SC

FIGURE 4

TABLES

TABLE 1
SUMMARY OF GROUNDWATER ELEVATION DATA[1]
GREEN'S OIL COMPANY
APRIL 27, 2005

Well No.	Top of Casing Elevation	Depth to Groundwater	Groundwater Elevation	Well Depth[2]	Dissolved Oxygen[3]
MW-1R[4]	98.30	4.48	93.82	9.50	1.03
MW-2	97.86	4.65	93.21	14.04	0.85
MW-3	97.08	5.00	92.08	7.75	1.73
MW-4	96.91	5.75	91.16	13.59	1.30
MW-5	97.04	4.26	92.78	10.04	3.15
MW-6	98.59	4.98	93.61	9.60	5.81
MW-7	98.40	4.40	94.00	13.60	2.33
PW-8	96.98	4.65	92.33	30.10	2.25

Notes:

1. Top of Casing Elevations for monitoring wells MW-2 through MW-7 and PW-8 were reproduced from the previous consultant's reports. Additional well construction details are unavailable; data reported in feet.
2. Well depths for monitoring wells MW-2 through MW-7 and PW-8 measured during June 12, 2003 sampling event.
3. Dissolved oxygen levels were measured using a DO meter; results reported in mg/L.
4. Monitoring well MW-1R was installed as a replacement for monitoring well MW-1 on January 26, 2005.

TABLE 2
SUMMARY OF HISTORICAL GROUNDWATER ELEVATION DATA[1]
GREEN'S OIL COMPANY

Well No.	Date	Top of Casing Elevation	Depth to Groundwater	Groundwater Elevation	Well Depth[2]	Dissolved Oxygen[3]
MW-1	05/24/00	98.15	7.16	90.99	12.33	1.3
	10/09/00		7.78	90.37		2.3
	01/02/01		9.58	88.57		1.4
	12/16/02		5.11	93.04		NM[4]
	06/12/03		2.59	95.56		0.79
	11/22/04		9.36	88.79		0.93
MW-1R[5]	01/31/05	98.30	8.66	89.64	9.50	2.33
	04/27/05		4.48	93.82		1.03
MW-2	05/24/00	97.86	7.03	90.83	14.04	1.9
	10/09/00		7.71	90.15		2.4
	01/02/01		9.43	88.43		0.0
	12/16/02		4.91	92.95		2.06
	06/12/03		2.47	95.39		0.53
	11/22/04		9.26	88.60		1.39
	01/31/05		8.36	89.50		1.28
	04/27/05		4.65	93.21		0.85
MW-3	12/16/02	97.08	5.83	91.25	7.75	NM
	06/12/03		3.01	94.07		1.14
	11/22/04		Dry	Dry		Dry
	01/31/05		Dry	Dry		Dry
	04/27/05		5.00	92.08		1.73
MW-4	12/16/02	96.91	6.66	90.25	13.59	1.45
	06/12/03		3.52	93.39		0.69
	11/22/04		NM	NM		NM
	01/31/05		NM	NM		NM
	04/27/05		5.75	91.16		1.30
MW-5	05/24/00	97.04	6.56	90.48	10.04	2.4
	10/09/00		7.15	89.89		3.0
	01/02/01		8.90	88.14		1.6
	12/16/02		4.67	92.37		2.27
	06/12/03		2.20	94.84		1.51
	11/22/04		8.67	88.37		1.41
	01/31/05		7.84	89.20		3.05
	04/27/05		4.26	92.78		3.15

TABLE 2 (cont'd.)
SUMMARY OF HISTORICAL GROUNDWATER ELEVATION DATA
GREEN'S OIL COMPANY

Well No.	Date	Top of Casing Elevation	Depth to Groundwater	Groundwater Elevation	Well Depth	Dissolved Oxygen
MW-6	05/24/00	98.59	8.10	90.49	9.60	3.8
	10/09/00		7.92	90.67		4.9
	01/02/01		9.52	89.07		NM
	12/16/02		5.25	93.34		3.68
	06/12/03		2.89	95.70		4.48
	11/22/04		9.44	89.15		NM
	01/31/05		8.59	90.00		NM
	04/27/05		4.98	93.61		5.81
MW-7	12/16/02	98.40	4.81	93.59	13.60	NM
	06/12/03		3.29	95.11		0.84
	11/22/04		NF[6]	NF		NF
	01/31/05		NF	NF		NF
	04/27/05		4.40	94.00		2.33
PW-8	05/24/00	96.98	6.45	90.53	30.10	3.9
	10/09/00		7.12	89.86		2.5
	01/02/01		8.69	88.29		2.1
	12/16/02		4.46	92.52		NM
	06/12/03		2.60	94.38		1.23
	11/22/04		5.34	91.64		2.01
	01/31/05		7.45	89.53		3.25
	04/27/05		4.65	92.33		2.25

Notes:

1. Top of Casing Elevations for monitoring wells MW-2 through MW-7 and PW-8 were reproduced from the previous consultant's reports. Additional well construction details are unavailable; data reported in feet.
2. Well depths for monitoring wells MW-2 through MW-7 and PW-8 measured during June 12, 2003 sampling event.
3. Dissolved oxygen levels were measured using a DO meter; results reported in mg/L.
4. Not measured. Well did not yield enough water for field measurements or was not accessible.
5. Monitoring well MW-1R was installed as a replacement for monitoring well MW-1 on January 26, 2005.
6. Not found.

TABLE 3
SUMMARY OF LABORATORY ANALYSES[1]
GROUNDWATER SAMPLES
GREEN'S OIL COMPANY
APRIL 27, 2005

Well No.	Benzene	Toluene	Ethylbenzene	Xylenes	MTBE	Naphthalene
MW-1R[2]	**2,760**[3]	115	376	2,550	**916**	**297**
MW-2	1.5	<1.0[4]	<1.0	<1.0	**168**	<5.00
MW-3	<1.0	<1.0	<1.0	3.7	<1.0	<5.00
MW-4	1.4	<1.0	<1.0	8.8	**160**	**152**
MW-5	<1.0	<1.0	<1.0	<1.0	<1.0	<5.00
MW-6	<1.0	<1.0	<1.0	<1.0	<1.0	<5.00
MW-7	<1.0	<1.0	<1.0	<1.0	1.3	<5.00
PW-8	<1.0	<1.0	<1.0	<1.0	6.3	<5.00
RBSL[5]	5	1,000	700	10,000	40	25

Notes:

1. Analyses for BTEX constituents, MTBE and Naphthalene by EPA Method 8260B; results reproted inµg/L.
2. Monitoring well MW-1R was installed as a replacement for monitoring well MW-1.
3. Concentrations in bold face type exceeded the May 2001 Risk Based Screening Level.
4. Less than the method detection limit specified in the laboratory report.
5. May 2001 Risk Based Screening Level.

TABLE 4
SUMMARY OF HISTORICAL LABORATORY ANALYSES[1]
GROUNDWATER SAMPLES
GREEN'S OIL COMPANY

Well No.	Date	Benzene	Toluene	Ethylbenzene	Xylenes	MTBE	Naphthalene	Lead
MW-1	10/24/96	**3,040**[2]	164	325	950	**2,310**	**365**	NR[3]
	05/09/00	**1,790**	255	302	611	**1,300**	**117**	12.0
	10/09/00	**1,600**	180	220	400	**850**	**350**	<3.0[4]
	01/02/01	**500**	9.0	38	68	**460**	**55**	<3.0
	12/16/02	**3,000**	**12,000**	**3,700**	**14,000**	**920**	**1,700**	14
	06/12/03	**2,280**	**9,520**	**1,980**	**17,400**	**801**	**991**	NR
	11/22/04	**2,560**	**3,820**	**2,240**	**14,200**	**790**	**2,880**	NR
MW-1R[5]	01/31/05	**1,510**	234	268	3,790	**864**	**310**	NR
	04/27/05	**2,760**	115	376	2,550	**916**	**297**	NR
MW-2[7]	10/24/96	<10.0	<10.0	<10.0	<3.0	**24,700**	<5.0	NR
	05/09/00	**5.2**	ND[6]	ND	ND	**19,900**	ND	ND
	10/09/00	**31**	5.7	<5.0	12	**11,000**	**15**	<3.0
	01/02/01	**7.2**	<5.0	<5.0	<5.0	**7,700**	<5.0	<3.0
	12/16/02	<5.0	<5.0	<5.0	7.2	**170**	12	<3.0
	06/12/03	4.0	<1.0	<1.0	<1.0	**157**	<5.00	NR
	11/22/04	<1.0	<1.0	<1.0	<1.0	**54.9**	<5.00	NR
	01/31/05	<1.0	<1.0	<1.0	<1.0	**68.8**	<5.00	NR
	04/27/05	1.5	<1.0	<1.0	<1.0	**168**	<5.00	NR
MW-3	10/24/96	NF[8]	NF	NF	NF	NF	NF	NF
	05/09/00	NF	NF	NF	NF	NF	NF	NF
	10/09/00	NF	NF	NF	NF	NF	NF	NF
	01/02/01	NF	NF	NF	NF	NF	NF	NF
	12/12/02	**150**	**5,800**	**2,400**	**14,000**	<25	**920**	**21**
	06/12/03	4.2	135	150	1,920	2.9	**260**	NR
	11/22/04	Dry	Dry	Dry	Dry	Dry	Dry	NR
	01/31/05	Dry	Dry	Dry	Dry	Dry	Dry	NR
	04/27/05	<1.0	<1.0	<1.0	3.7	<1.0	<5.00	NR
	RBSL[9]	5	1,000	700	10,000	40	25	15

TABLE 4 (cont'd.)
SUMMARY OF HISTORICAL LABORATORY ANALYSES
GROUNDWATER SAMPLES
GREEN'S OIL COMPANY

Well No.	Date	Benzene	Toluene	Ethylbenzene	Xylenes	MTBE	Naphthalene	Lead
MW-4	10/24/96	<1.0	<1.0	<1.0	<3.0	**70.4**	<5.0	NR
	05/09/00	NF	NF	NF	NF	NF	NF	NF
	10/09/00	NF	NF	NF	NF	NF	NF	NF
	01/02/01	NF	NF	NF	NF	NF	NF	NF
	12/16/02	<5.0	<5.0	<5.0	<5.0	**160**	8.5	5.8
	06/12/03	<1.0	<1.0	<1.0	<1.0	**198**	<5.00	NR
	11/22/04	NS[10]	NS	NS	NS	NS	NS	NS
	01/31/05	NS	NS	NS	NS	NS	NS	NS
	04/27/05	1.4	<1.0	<1.0	8.8	**160**	**152**	NR
MW-5	10/24/96	<1.0	<1.0	<1.0	<3.0	**1,720**	<5.0	NR
	05/09/00	ND	ND	ND	ND	**14,000**	ND	ND
	10/09/00	<5.0	<5.0	<5.0	<5.0	**9,100**	<5.0	<3.0
	01/02/01	<5.0	<5.0	<5.0	<5.0	**1,400**	<5.0	<3.0
	12/12/02	<5.0	<5.0	<5.0	<5.0	14	<5.0	14
	06/12/03	<1.0	<1.0	<1.0	<1.0	3.1	<5.00	NR
	11/22/04[11]	<1.0	<1.0	<1.0	<1.0	1.4	<5.00	NR
	01/31/05	<1.0	<1.0	<1.0	<1.0	<1.0	<5.00	NR
	04/27/05	<1.0	<1.0	<1.0	<1.0	<1.0	<5.00	NR
MW-6	10/24/96	NS	NS	NS	NS	NS	NS	NS
	05/09/00	ND	ND	ND	ND	ND	ND	**52.0**
	10/09/00	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	**26.0**
	01/02/01	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	NS
	12/12/02	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	**48**
	06/12/03	<1.0	<1.0	<1.0	<1.0	<1.0	<5.00	NR
	11/22/04	<1.0	<1.0	<1.0	<1.0	<1.0	<5.00	NR
	01/31/05	<1.0	<1.0	<1.0	<1.0	<1.0	<5.00	NR
	04/27/05	<1.0	<1.0	<1.0	<1.0	<1.0	<5.00	NR
	RBSL	5	1,000	700	10,000	40	25	15

TABLE 4 (cont'd.)
SUMMARY OF HISTORICAL LABORATORY ANALYSES
GROUNDWATER SAMPLES
GREEN'S OIL COMPANY

Well No.	Date	Benzene	Toluene	Ethylbenzene	Xylenes	MTBE	Naphthalene	Lead
MW-7	10/24/96	NF	NF	NF	NF	NF	NF	NF
	05/09/00	NF	NF	NF	NF	NF	NF	NF
	10/09/00	NF	NF	NF	NF	NF	NF	NF
	01/02/01	NF	NF	NF	NF	NF	NF	NF
	12/12/02	<5.0	<5.0	<5.0	<5.0	**160**	<5.0	**58**
	06/12/03	<1.0	<1.0	<1.0	<1.0	**294**	<5.00	NR
	11/22/04	NF	NF	NF	NF	NF	NF	NF
	01/31/05	NF	NF	NF	NF	NF	NF	NF
	04/27/05	<1.0	<1.0	<1.0	<1.0	1.3	<5.00	NR
PW-8	10/24/96	<1.0	<1.0	<1.0	<3.0	**547**	<5.0	NR
	05/09/00	ND	ND	ND	ND	**790**	ND	ND
	10/09/00	<5.0	<5.0	<5.0	6.1	**180**	<5.0	<3.0
	01/02/01	<5.0	<5.0	<5.0	<5.0	**160**	<5.0	<3.0
	12/12/02	<5.0	<5.0	<5.0	<5.0	**44**	<5.0	<3.0
	06/12/03	<1.0	<1.0	<1.0	<1.0	**84.6**	<5.00	NR
	11/22/04[12]	<1.0	<1.0	<1.0	<1.0	9.7	<5.00	NR
	01/31/05	<1.0	<1.0	<1.0	<1.0	1.3	<5.00	NR
	04/27/05	<1.0	<1.0	<1.0	<1.0	6.3	<5.00	NR
	RBSL	5	1,000	700	10,000	40	25	15

TABLE 4 (cont'd.)
SUMMARY OF HISTORICAL LABORATORY ANALYSES
GROUNDWATER SAMPLES
GREEN'S OIL COMPANY

Notes:

1. Analyses for BTEX constituents, MTBE and Naphthalene by EPA Method 8260B; groundwater quality data prior to June 12, 2003 reproduced from previous consultant's reports; results reported inµg/L.
2. Concentrations in bold face type exceeded the January 1998 Risk Based Screening Level for samples collected before May 2001 and exceeded the May 2001 Risk Based Screening Level for samples collected after May 2001.
3. Analysis not requested.
4. Less than the method detection limit specified in the laboratory report.
5. Monitoring well MW-1R was installed as a replacement for monitoring well MW-1.
6. Not detected.
7. Other compound detected (IPE: 294 µg/L).
8. Well not found.
9. May 2001 Risk Based Screening Level.
10. Not sampled due to insufficient volume of water in the well or well was not accessible.
11. Other compound detected (IPE: 21.8 µg/L)
12. Other compound detected (IPE: 13.4 µg/L)

APPENDICES

APPENDIX A
GROUNDWATER SAMPLING DATA SHEETS

GAUGE REPORT

CBM Environmental Services, Inc.
3440 Lakemont Boulevard
Fort Mill, SC 29708

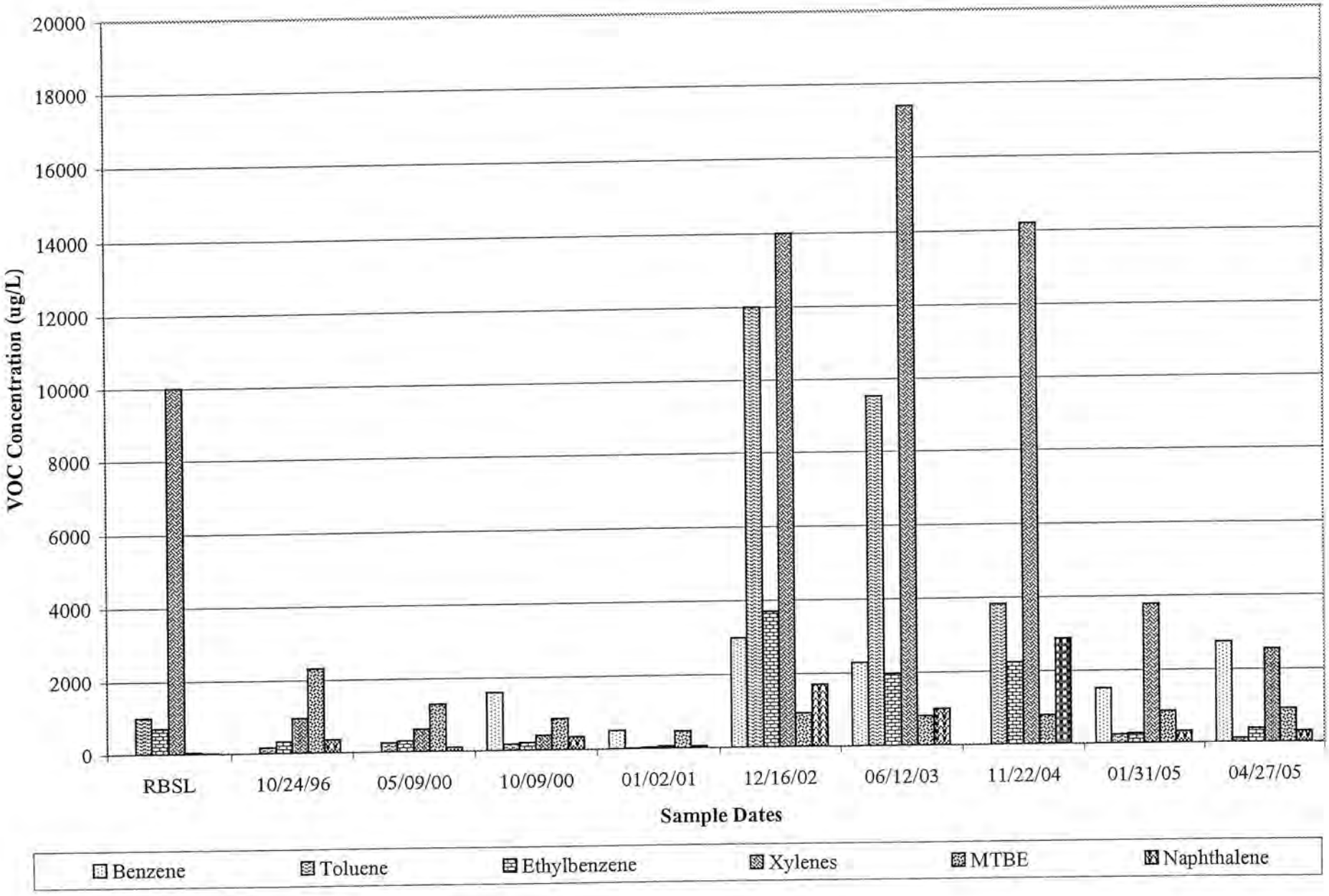
Project Name	Greens Oil	Location	Rock Hill, SC
Project No.	11030	Date	4/27/2005
Measured By	Samanth Dawson	Weather	Windy and Sunny

Well No.	Depth to Product (feet)	Depth to Water (feet)	Product Thickness (feet)	Product Recovered (gallons)	Well Depth (feet)	Volume Purged (gallons)
MW-1R		4.48			10.00	8.25
MW-2		4.65			14.00	18.25
MW-3		5.00			7.75	1.25
MW-4		5.75			13.75	4.00
MW-5		4.26			10.04	2.75
MW-6		4.98			9.60	2.25
MW-7		4.40			13.71	4.50
PW-8		4.65			30.00	12.50

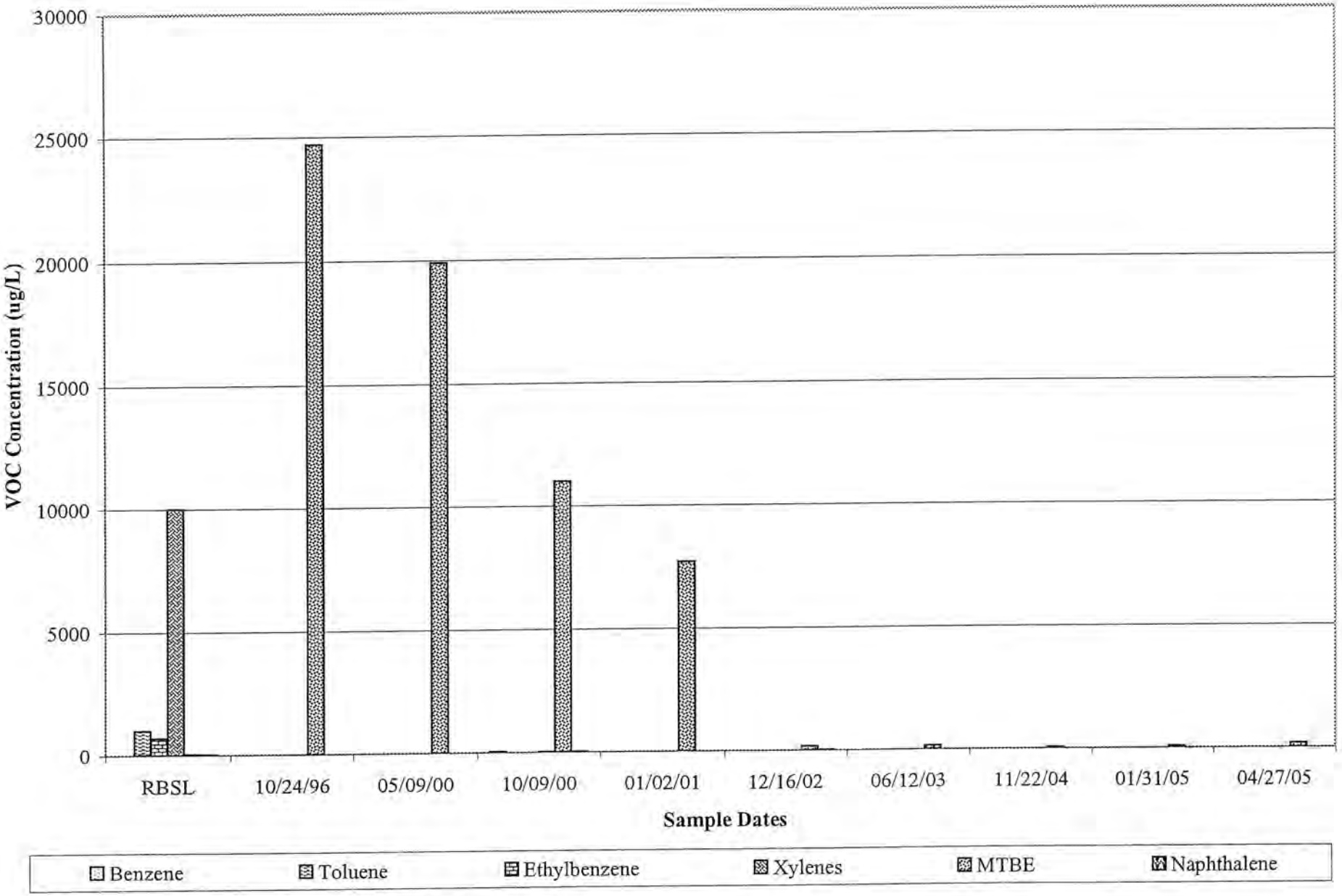
Remarks

APPENDIX C
GRAPHS OF INDIVIDUAL VOC CONCENTRATIONS VS. TIME

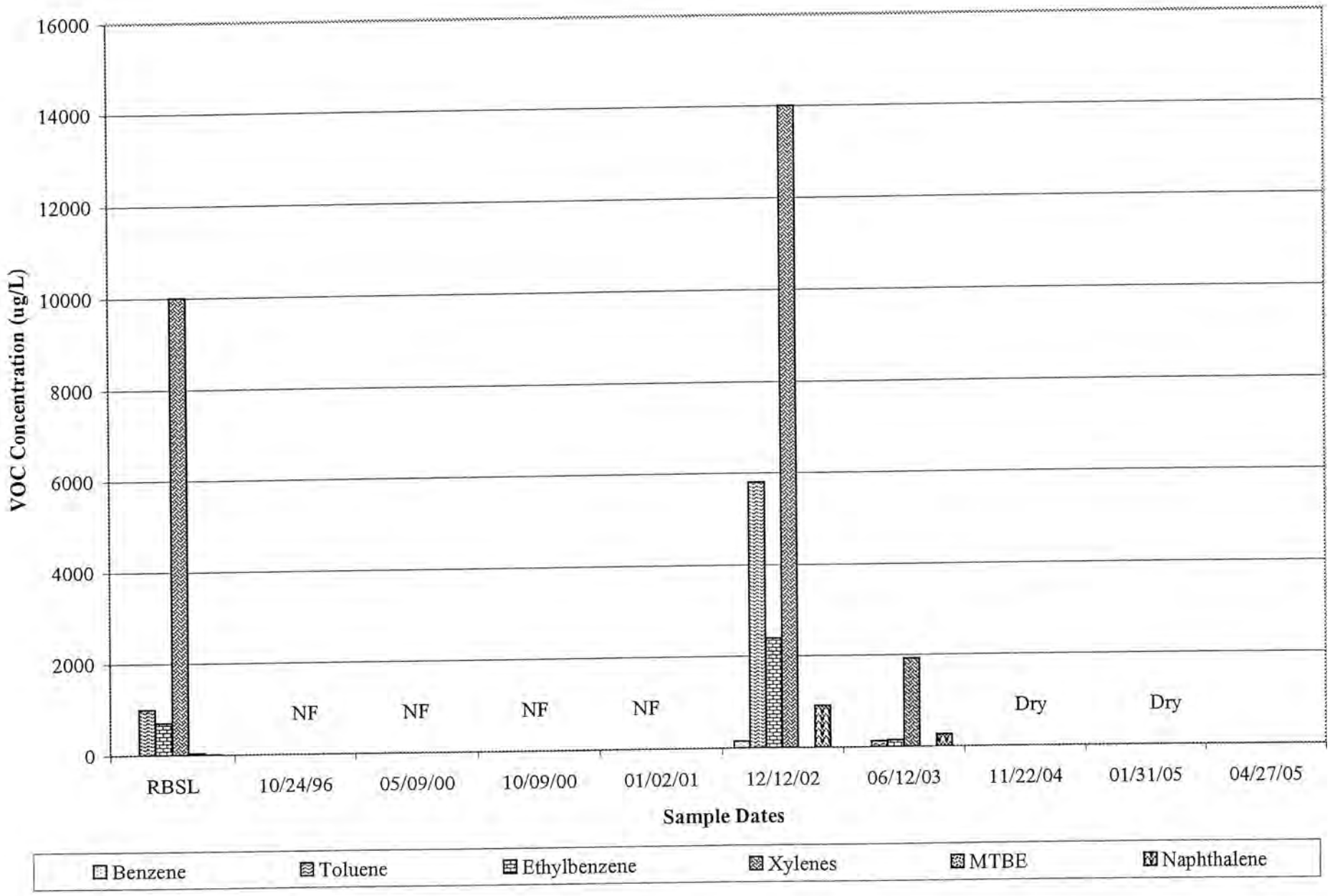
GROUNDWATER QUALITY CHART
GREENS OIL - MW-1/MW-1R



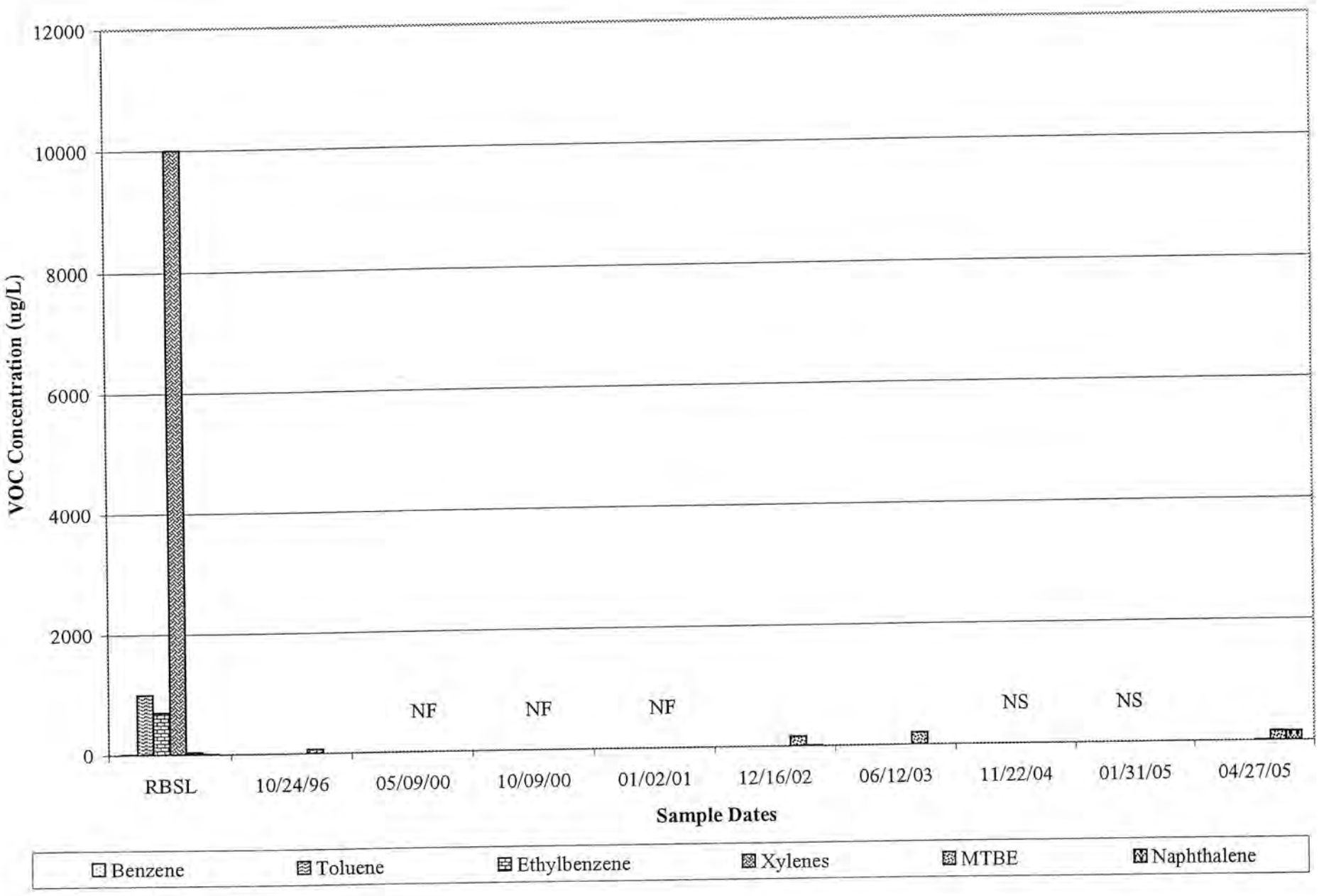
GROUNDWATER QUALITY CHART
GREENS OIL - MW-2



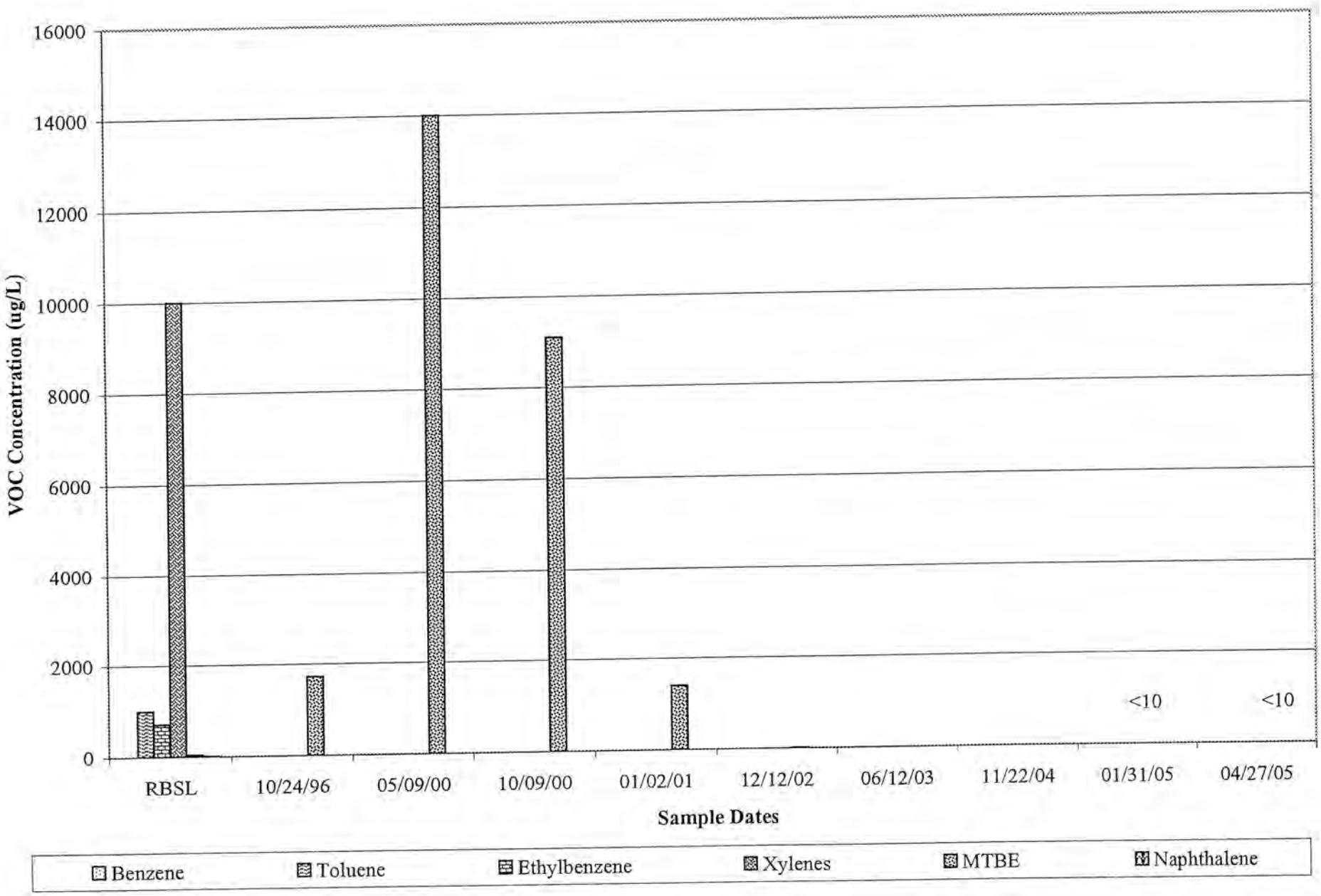
GROUNDWATER QUALITY CHART
GREENS OIL - MW-3



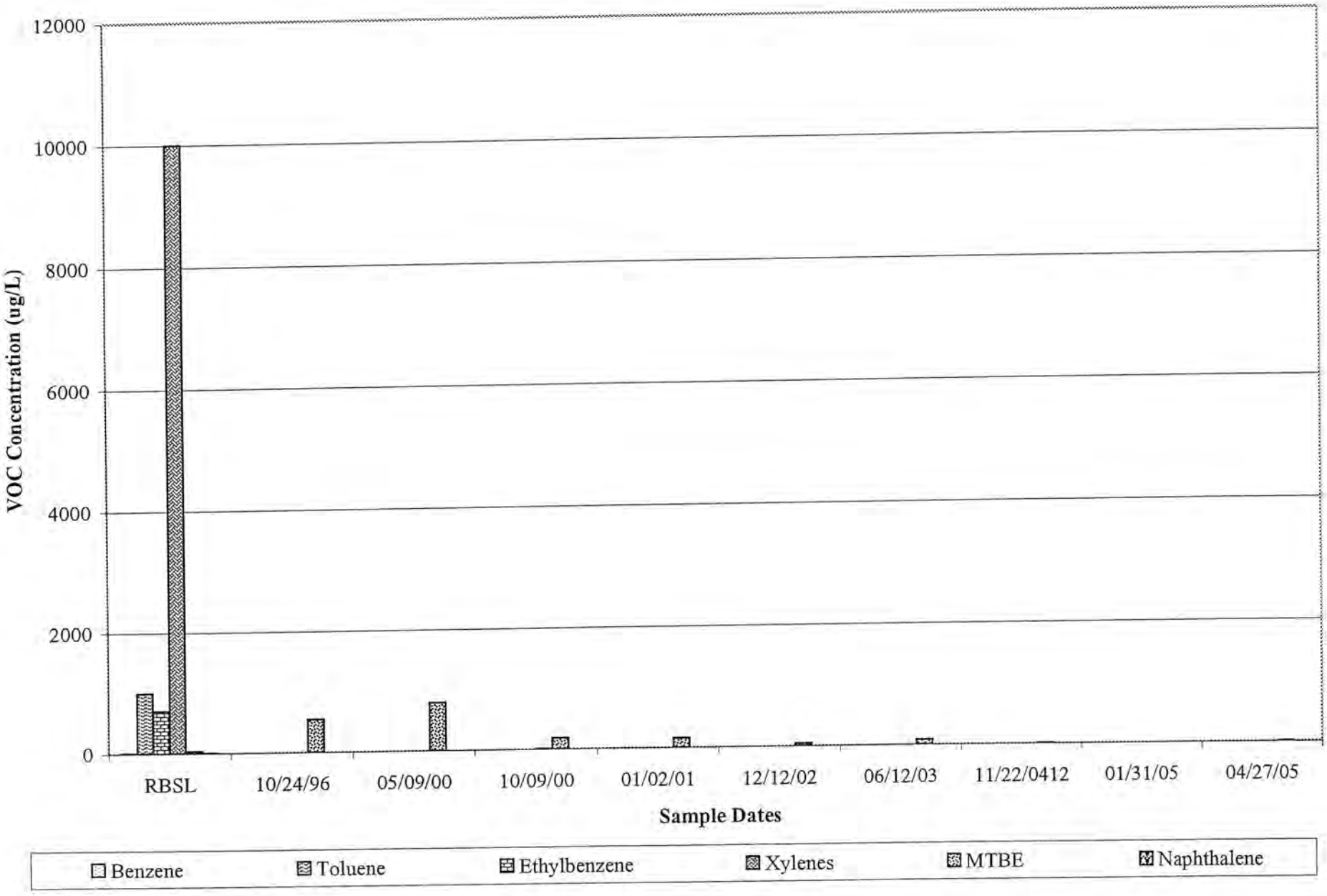
GROUNDWATER QUALITY CHART
GREENS OIL - MW-4



GROUNDWATER QUALITY CHART
GREENS OIL - MW-5



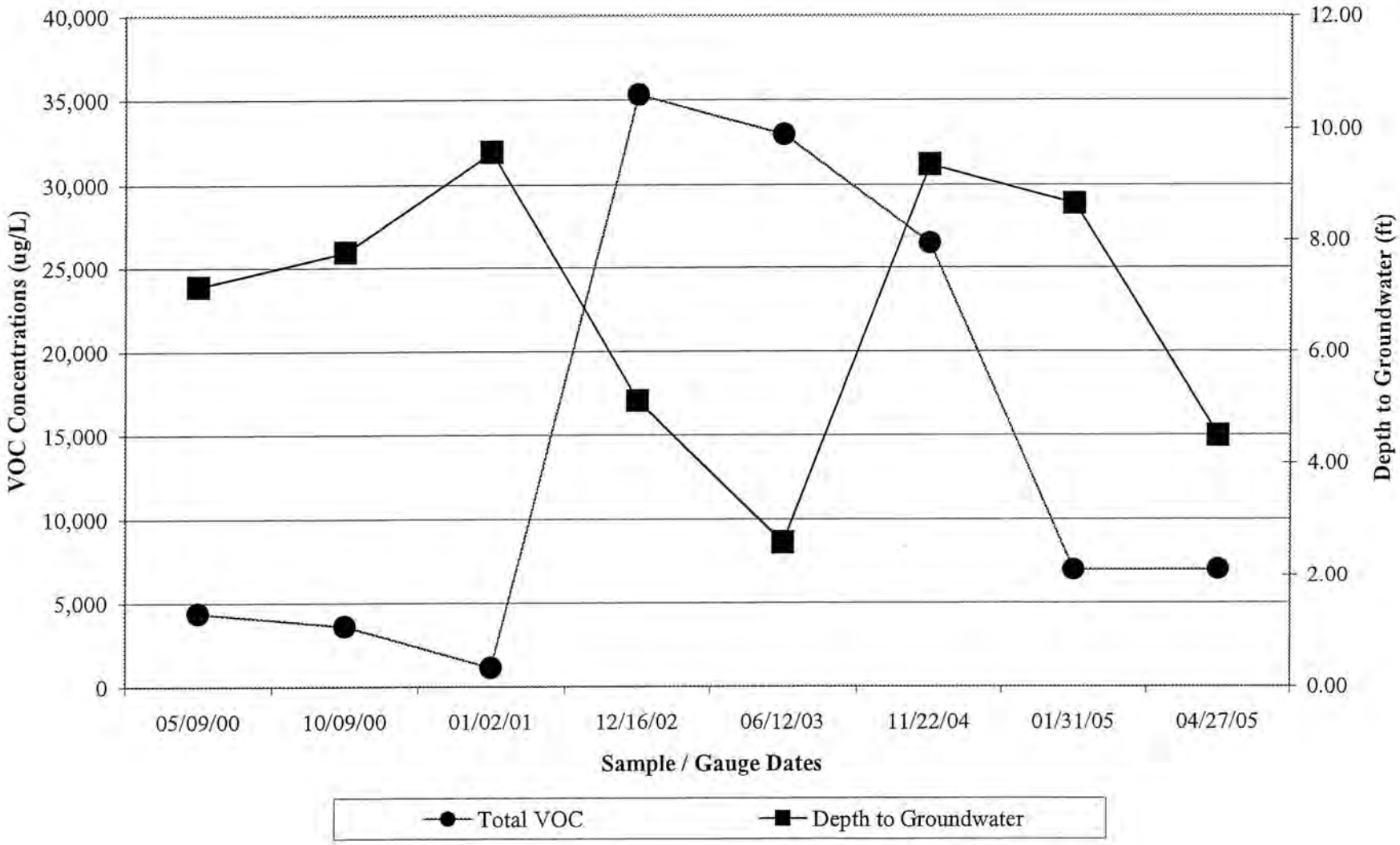
GROUNDWATER QUALITY CHART
GREENS OIL - PW-8



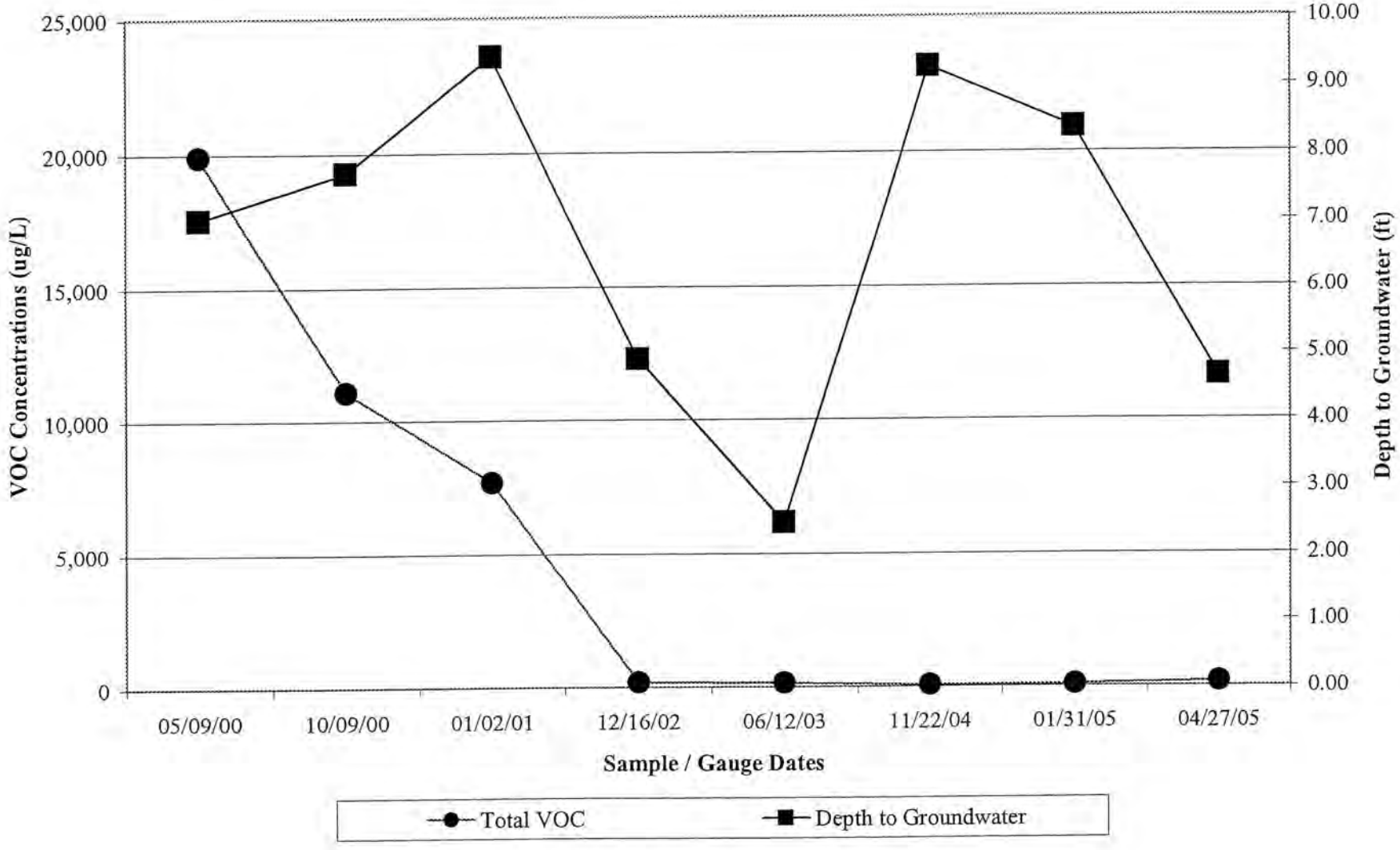
APPENDIX D

GRAPHS OF TOTAL VOC CONCENTRATIONS VS. DEPTH TO GROUNDWATER

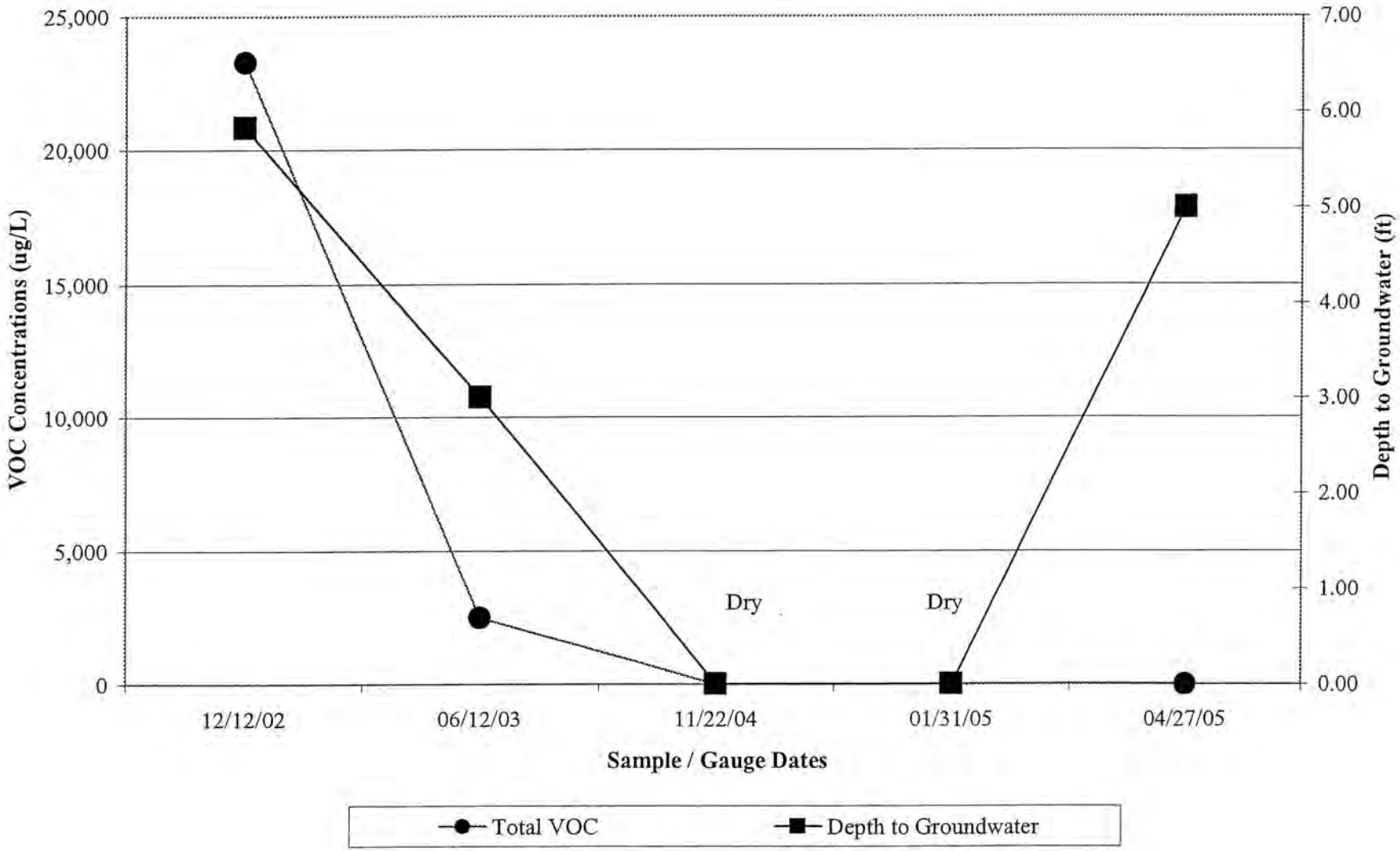
TOTAL VOC CONCENTRATION VS. DEPTH TO GROUNDWATER
GREENS OIL - MW-1/MW-1R



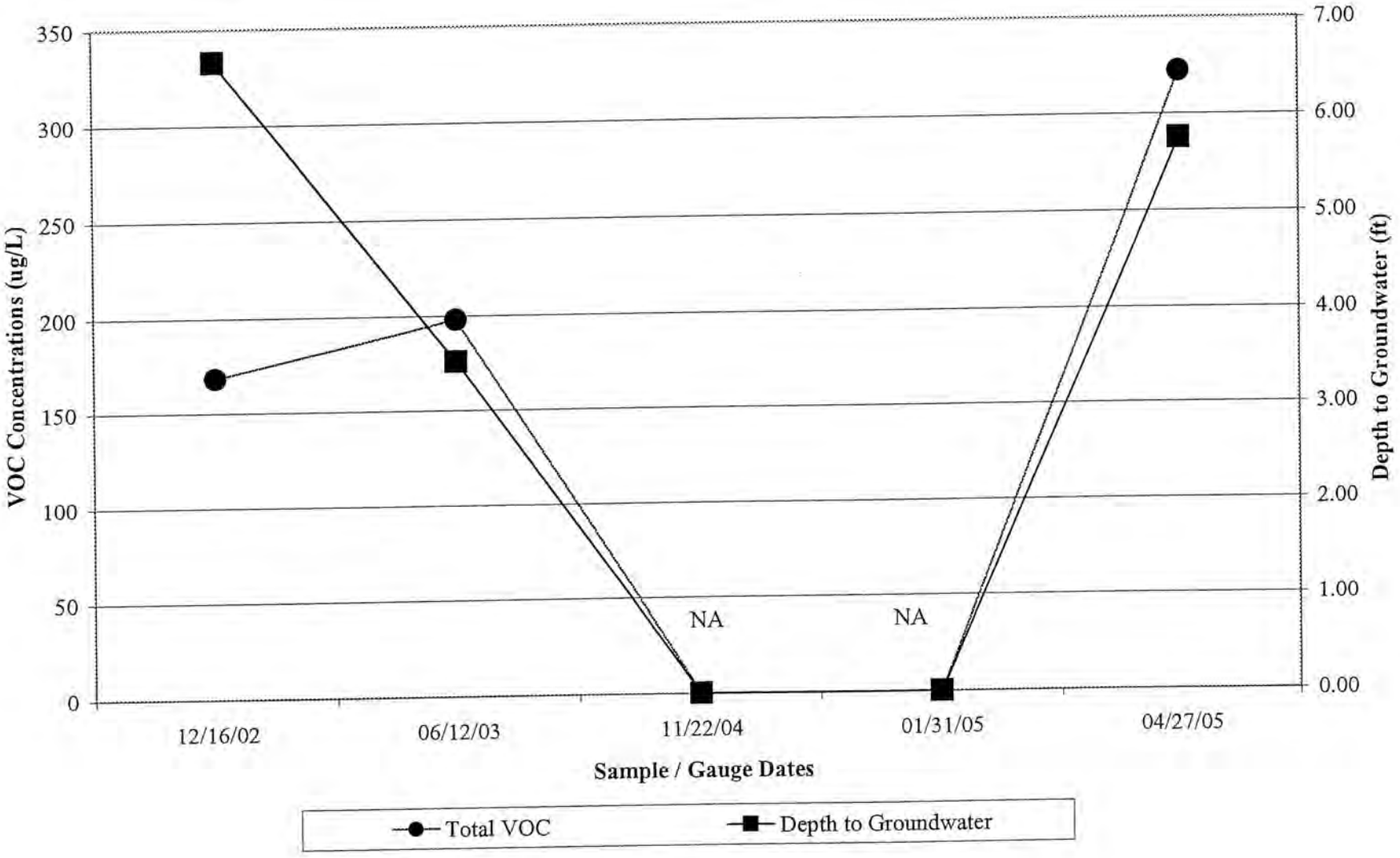
TOTAL VOC CONCENTRATION VS. DEPTH TO GROUNDWATER
GREENS OIL - MW-2



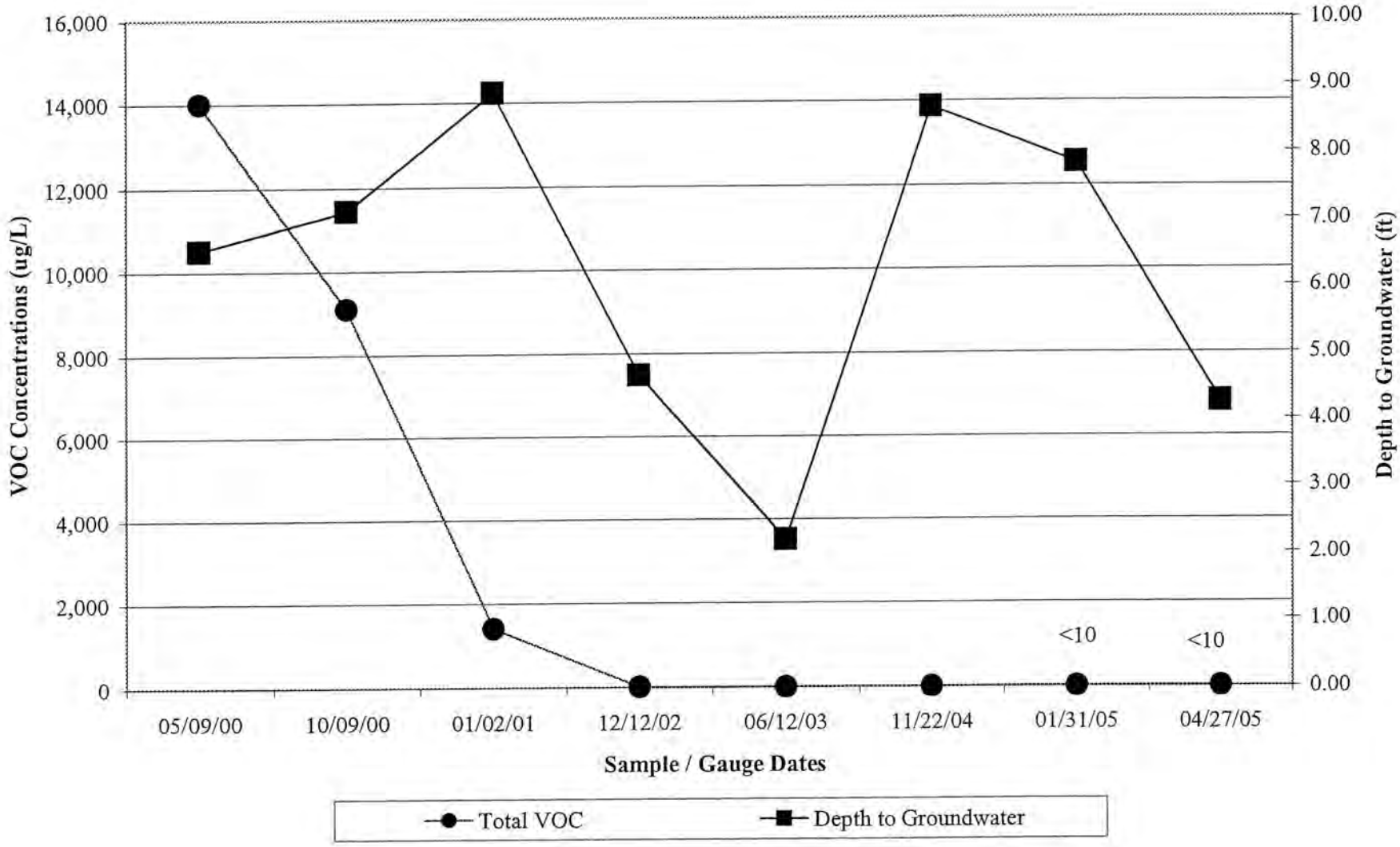
TOTAL VOC CONCENTRATION VS. DEPTH TO GROUNDWATER
GREENS OIL - MW-3



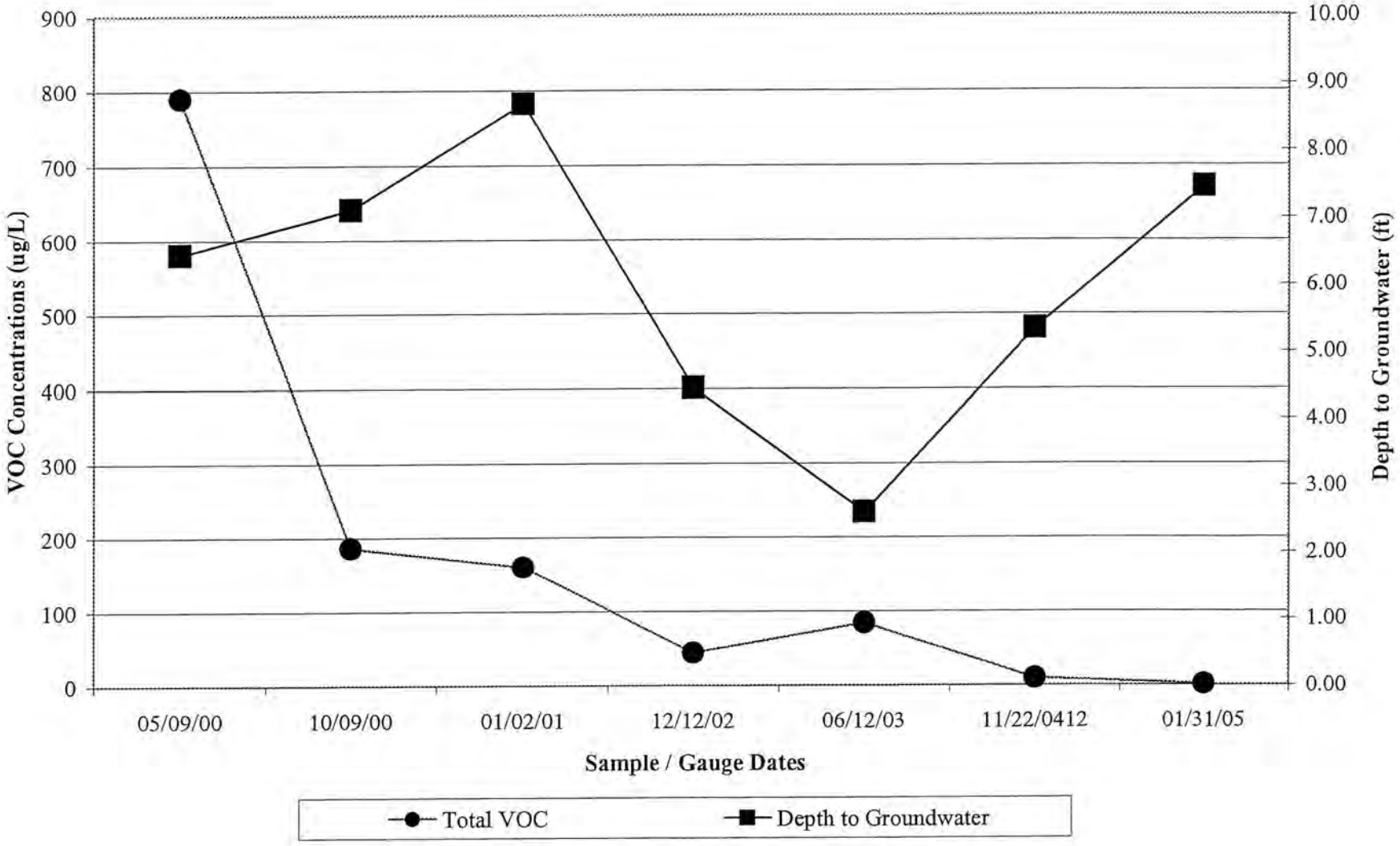
TOTAL VOC CONCENTRATION VS. DEPTH TO GROUNDWATER
GREENS OIL - MW-4



TOTAL VOC CONCENTRATION VS. DEPTH TO GROUNDWATER
GREENS OIL - MW-5



TOTAL VOC CONCENTRATION VS. DEPTH TO GROUNDWATER
GREENS OIL - PW-8



DATA TABLE FOR GRAPHS
GROUNDWATER SAMPLES
GREEN'S OIL COMPANY

Well No.	Date	Benzene	Toluene	Ethylbenzene	Xylenes	MTBE	Naphthalene	Total VOC
MW-1	10/24/96	**3,040**	164	325	950	**2,310**	**365**	4,117.04
	05/09/00	**1,790**	255	302	611	**1,300**	**117**	4,375.00
	10/09/00	**1,600**	180	220	400	**850**	**350**	3,600.00
	01/02/01	**500**	9.0	38	68	**460**	**55**	1,130.00
	12/16/02	**3,000**	**12,000**	**3,700**	**14,000**	**920**	**1,700**	35,320.00
	06/12/03	**2,280**	**9,520**	**1,980**	**17,400**	**801**	**991**	32,972.00
	11/22/04	**2,560**	**3,820**	**2,240**	**14,200**	**790**	**2,880**	26,490.00
MW-1R	01/31/05	**1,510**	234	268	3,790	**864**	**310**	6,976.00
	04/27/05	**2,760**	115	376	2,550	**916**	**297**	7,014.00
MW-2	10/24/96	<10.0	<10.0	<10.0	<3.0	**24,700**	<5.0	24,700.00
	05/09/00	**5.2**	ND	ND	ND	**19,900**	ND	19,905.20
	10/09/00	**31**	5.7	<5.0	12	**11,000**	15	11,063.70
	01/02/01	**7.2**	<5.0	<5.0	<5.0	**7,700**	<5.0	7,707.20
	12/16/02	<5.0	<5.0	<5.0	7.2	**170**	**12**	189.20
	06/12/03	4.0	<1.0	<1.0	<1.0	**157**	<5.00	161.00
	11/22/04	<1.0	<1.0	<1.0	<1.0	**54.9**	<5.00	54.90
	01/31/05	<1.0	<1.0	<1.0	<1.0	**68.8**	<5.00	68.80
	04/27/05	1.5	<1.0	<1.0	<1.0	**168**	<5.00	169.50
MW-3	10/24/96	NF	NF	NF	NF	NF	NF	NF
	05/09/00	NF	NF	NF	NF	NF	NF	NF
	10/09/00	NF	NF	NF	NF	NF	NF	NF
	01/02/01	NF	NF	NF	NF	NF	NF	NF
	12/12/02	**150**	**5,800**	**2,400**	**14,000**	<25	**920**	23,270.00
	06/12/03	4.2	135	150	1,920	2.9	**260**	2,472.10
	11/22/04	Dry	Dry	Dry	Dry	Dry	Dry	Dry
	01/31/05	Dry	Dry	Dry	Dry	Dry	Dry	Dry
	04/27/05	<1.0	<1.0	<1.0	3.7	<1.0	<5.00	3.70
	RBSL	5	1,000	700	10,000	40	10	

DATA TABLE FOR GRAPHS
GROUNDWATER SAMPLES
GREEN'S OIL COMPANY

Well No.	Date	Benzene	Toluene	Ethylbenzene	Xylenes	MTBE	Naphthalene	Total VOC
MW-4	10/24/96	<1.0	<1.0	<1.0	<3.0	**70.4**	<5.0	70.40
	05/09/00	NF	NF	NF	NF	NF	NF	NF
	10/09/00	NF	NF	NF	NF	NF	NF	NF
	01/02/01	NF	NF	NF	NF	NF	NF	NF
	12/16/02	<5.0	<5.0	<5.0	<5.0	**160**	8.5	168.5
	06/12/03	<1.0	<1.0	<1.0	<1.0	**198**	<5.00	198
	11/22/04	NS	NS	NS	NS	NS	NS	NS
	01/31/05	NS	NS	NS	NS	NS	NS	NS
	04/27/05	1.4	<1.0	<1.0	8.8	**160**	**152**	322.20
MW-5	10/24/96	<1.0	<1.0	<1.0	<3.0	**1,720**	<5.0	1,720.00
	05/09/00	ND	ND	ND	ND	**14,000**	ND	14,000.00
	10/09/00	<5.0	<5.0	<5.0	<5.0	**9,100**	<5.0	9,100.00
	01/02/01	<5.0	<5.0	<5.0	<5.0	**1,400**	<5.0	1,400.00
	12/12/02	<5.0	<5.0	<5.0	<5.0	14	<5.0	14.00
	06/12/03	<1.0	<1.0	<1.0	<1.0	3.1	<5.00	3.10
	11/22/04	<1.0	<1.0	<1.0	<1.0	1.4	<5.00	1.40
	01/31/05	<1.0	<1.0	<1.0	<1.0	<1.0	<5.00	<10
	04/27/05	<1.0	<1.0	<1.0	<1.0	<1.0	<5.00	<10
	RBSL	5	1,000	700	10,000	40	10	

DATA TABLE FOR GRAPHS
GROUNDWATER SAMPLES
GREEN'S OIL COMPANY

Well No.	Date	Benzene	Toluene	Ethylbenzene	Xylenes	MTBE	Naphthalene	Total VOC
MW-7	10/24/96	NF	NF	NF	NF	NF	NF	NF
	05/09/00	NF	NF	NF	NF	NF	NF	NF
	10/09/00	NF	NF	NF	NF	NF	NF	NF
	01/02/01	NF	NF	NF	NF	NF	NF	NF
	12/12/02	<5.0	<5.0	<5.0	<5.0	**160**	<5.0	160
	06/12/03	<1.0	<1.0	<1.0	<1.0	**294**	<5.00	294
	11/22/04	NF	NF	NF	NF	NF	NF	NF
	01/31/05	NF	NF	NF	NF	NF	NF	NF
	04/27/05	<1.0	<1.0	<1.0	<1.0	1.3	<5.00	1.3
PW-8	10/24/96	<1.0	<1.0	<1.0	<3.0	**547**	<5.0	85
	05/09/00	ND	ND	ND	ND	**790**	ND	790
	10/09/00	<5.0	<5.0	<5.0	6.1	**180**	<5.0	186.1
	01/02/01	<5.0	<5.0	<5.0	<5.0	**160**	<5.0	160
	12/12/02	<5.0	<5.0	<5.0	<5.0	**44**	<5.0	44
	06/12/03	<1.0	<1.0	<1.0	<1.0	**84.6**	<5.00	84.6
	11/22/04	<1.0	<1.0	<1.0	<1.0	9.7	<5.00	9.7
	01/31/05	<1.0	<1.0	<1.0	<1.0	1.3	<5.00	1.3
	04/27/05	<1.0	<1.0	<1.0	<1.0	6.3	<5.00	6.3
	RBSL	5	1,000	700	10,000	40	10	

Debra

GROUNDWATER MONITORING REPORT
GREEN'S OIL COMPANY
2849 CHERRY RD.
ROCK HILL, YORK COUNTY
UST PERMIT NO. 09344
SITE RISK CLASSIFICATION: HIGH
LAND USE CLASSIFICATION: COMMERCIAL
CBM PROJECT NO. 11030

Prepared For:

Federated Insurance Company
c/o Jerry Green
2457 Breen Circle
Rock Hill, SC 29732

Prepared By:

CBM Environmental Services, Inc.
3440 Lakemont Blvd.
Fort Mill, SC 29708
(803) 548-5989

September 14, 2005

SOUTH CAROLINA LICENSED PROFESSIONAL ENGINEER No. 22353 9/14/2005 ANDREW K. KENNEDY

Andrew K. Kennedy, P.E
Senior Geotechnical Engineer
License No. 22353

SOUTH CAROLINA CBM ENVIRONMENTAL SERVICES, INC. No. C01230 CERTIFICATE OF AUTHORIZATION

Robert R. Thompson, III, P.G.
Project Manager

TABLE OF CONTENTS

FIGURES

TABLES

APPENDICES

1.0 INTRODUCTION

This report presents the results of groundwater monitoring activities, conducted in August 2005, at the Green's Oil Company site, in Rock Hill, South Carolina. The site previously operated as a gas station and is located in a commercial/industrial area of York County. Public or private water supply wells have not been reported within 1,000 feet of the site. Two water supply wells located down gradient of the site have been abandoned. Surface water bodies have not been observed within 500 feet of the source area. The Catawba River is the only known potential receptor identified during the receptor survey and is located approximately 3,000 feet down gradient north by northwest of the site.

A Corrective Action Plan (CAP) that proposed the remediation of petroleum impacted soil and groundwater beneath the site; by excavating, backfilling with microbial augmented soil and de-watering, followed by microbial injections, was submitted to the SCDHEC on January 23, 2004. The SCDHEC approved the CAP in correspondence dated March 29, 2004. However, in subsequent telephone conversations with the responsible party's insurance company (Federated Insurance), it was decided, by Federated Insurance, that only the soil excavation and backfilling with microbial augmented soil, combined with de-watering, would be implemented initially. Microbial injections, if needed, would be conducted after two to three quarters of groundwater monitoring. Soil excavation, followed by backfilling with microbial augmented soil and compaction was completed in December 2004.

2.0 FACILITY INFORMATION

- **Facility Name**: Green's Oil Company
- **Location:** 2849 Cherry Road
  Rock Hill, York County (**Figure 1**)
- **UST Permit No.** 09344
- **Risk Classification:** High
- **Land Use Classification:** Commercial
- **UST Operator:** Green's Oil Company
  2849 Cherry Road
  Rock Hill, South Carolina
- **UST Owner:** Green's Oil Company
  2849 Cherry Road
  Rock Hill, South Carolina

- **Consultant:** CBM Environmental Services, Inc.
  3440 Lakemont Blvd
  Fort Mill, South Carolina 29708
  (803) 548-5989
- **Release Information:**
  - **Date Discovered:** Unknown
  - **Estimated Quantity of Release:** Unknown
  - **Cause of Release:** Unknown
  - **Source of Release:** Leaking UST System
  - **UST System Size/Contents:** Four gasoline USTs
  - **Latitude / Longitude:** 34°58'42" North/ 80°58'54" West

3.0 SAMPLING ACTIVITIES

3.1 Site Hydrogeology

The depths to groundwater in the Type II monitoring wells measured on August 17, 2005 ranged from 6.22 feet (MW-7 and PW-8) to 9.65 feet (MW-4). Groundwater elevations relative to a temporary benchmark with an assumed datum of 100.00 feet, ranged from 87.26 feet (MW-4) to 92.18 feet (MW-7). Based on the August 2005 data, the horizontal groundwater flow direction was generally toward the northwest. The horizontal hydraulic gradient beneath the site was approximately 0.07 feet per foot. A Water Table Surface Map, based on the August 2005 data, is included as **Figure 3**. A summary of groundwater elevation data obtained in August 2005 is presented in **Table 1**. A summary of historical groundwater elevation data is presented in **Table 2**.

3.2 Groundwater Sampling

On August 17, 2005, six Type II monitoring wells (MW-1R, MW-2, MW-4, MW-5, MW-6, and MW-7) and one Type III monitoring well (PW-8) were purged and sampled. Monitoring well MW-3 was dry at the time of our site visit. Laboratory analyses were performed on groundwater samples collected from the monitoring wells for BTEX constituents, MTBE and naphthalene by EPA Method 8260B. Field measurements of dissolved oxygen (DO), pH, conductivity and temperature were collected from the monitoring wells when sampled.

4.0 GROUNDWATER QUALITY

Detectable concentrations of benzene and MTBE that exceeded the May 2001 risk based screening levels (RBSLs) were reported in the groundwater samples collected from monitoring wells MW-1R and MW-2. The concentrations of naphthalene reported in the groundwater samples collected from monitoring wells MW-1R and MW-4 exceeded the RBSL. A concentration of MTBE that exceeded the RBSL was reported in the groundwater sample collected from monitoring well MW-4. Detectable concentrations of requested method constituents were not reported above the RBSLs in the groundwater samples collected from monitoring wells MW-5, MW-6, MW-7, and PW-8.

A Groundwater Quality Map showing individual BTEX constituents, MTBE and naphthalene concentrations in the groundwater samples collected from the monitoring wells during the August 2005 sampling event is included as **Figure 4**. A summary of laboratory analyses of groundwater samples collected from the monitoring wells in August 2005 is presented in **Table 3**. A summary of historical groundwater quality data is presented in **Table 4**. Groundwater sampling data sheets from the August 2005 sampling event have been included as **Appendix A.** A complete report of laboratory analyses of groundwater samples collected during the August 2005 sampling event has been included as **Appendix B**. Graphs showing variations in BTEX constituents, MTBE and naphthalene concentrations versus time and total VOC concentrations versus depths to groundwater have been included as **Appendices C** and **D**, respectively. A certificate of disposal for purge water stored in a 55-gallon drum has been included as **Appendix E**.

5.0 CONCLUSIONS AND RECOMMENDATIONS

- Detectable concentrations of BTEX constituents, naphthalene and/or MTBE that exceeded the RBSLs were reported in groundwater samples collected from monitoring wells MW-1R, MW-2, and MW-4. A concentration of xylenes, below the RBSL was reported in the groundwater sample collected from monitoring well MW-4. Concentrations of MTBE, below the RBSL were reported in the groundwater samples collected from monitoring wells MW-5, MW-7 and PW-8.

- The total VOC concentrations have decreased marginally in monitoring wells MW-1R and MW-4, compared to the last sampling period. The total VOC concentrations have increased slightly in monitoring wells MW-7 and PW-8, however they remain below the RBSLs, compared to the last sampling period. The total VOC concentrations have remained approximately the same in monitoring

wells MW-2 and MW-5, compared to the last sampling period. Monitoring well, MW-6, remains below reporting limits. Monitoring wells MW-3 was dry and therefore not sampled.

- Pending the results from the next groundwater sampling event, microbial injections to accelerate groundwater remediation may be applicable

- The next groundwater sampling event will be conducted in October 2005 and the report will be submitted no later than November 30, 2005.

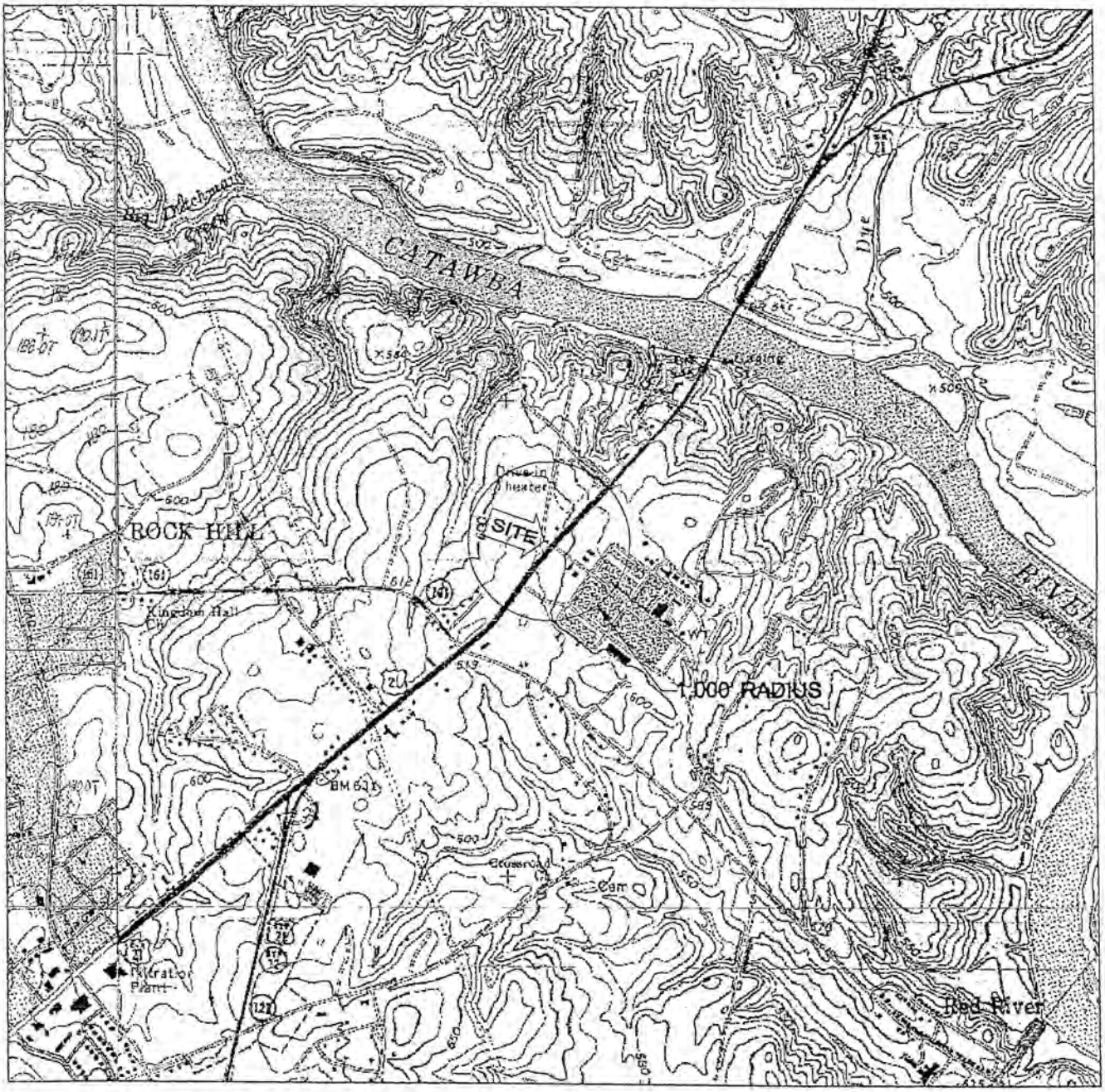
6.0 LIMITATIONS

This report has been prepared for the exclusive use of Mr. Jerry Green for specific application to the referenced site in York County, South Carolina. The assessment was conducted based on the scope of work and level of effort desired by the client and with resources adequate only for that scope of work.

Certain data contained in this report was not obtained under the supervision of CBM Environmental Services Inc. (CBM). Although the accuracy of this data cannot be verified and for the purpose of this report CBM assumes it is correct. Our findings have been developed in accordance with generally accepted standards of geology and hydrogeology practices in the State of South Carolina, available information, and our professional judgment. No other warranty is expressed or implied.

The data presented in this report are indicative of conditions that existed at the precise locations sampled and at the time the samples were collected. In addition, the data obtained from samples would be interpreted as being meaningful with respect to parameters indicated in the laboratory report. No additional information can be logically be inferred from this data.

FIGURES



SCALE 1:24,000

1 0 1 MILE

1000 0 1000 2000 3000 4000 5000 6000 7000 FEET

CONTOUR INTERVAL 10 FEET

QUADRANGLE LOCATION

ROCK HILL EAST, SC QUADRANGLE

CBM ENVIRONMENTAL SERVICES, INC.

LATITUDE:	34° 58' 42" N
LONGITUDE:	80° 58' 54" W
DRAWN BY:	AWB
CHECKED BY:	HF
DATE:	2/4/04

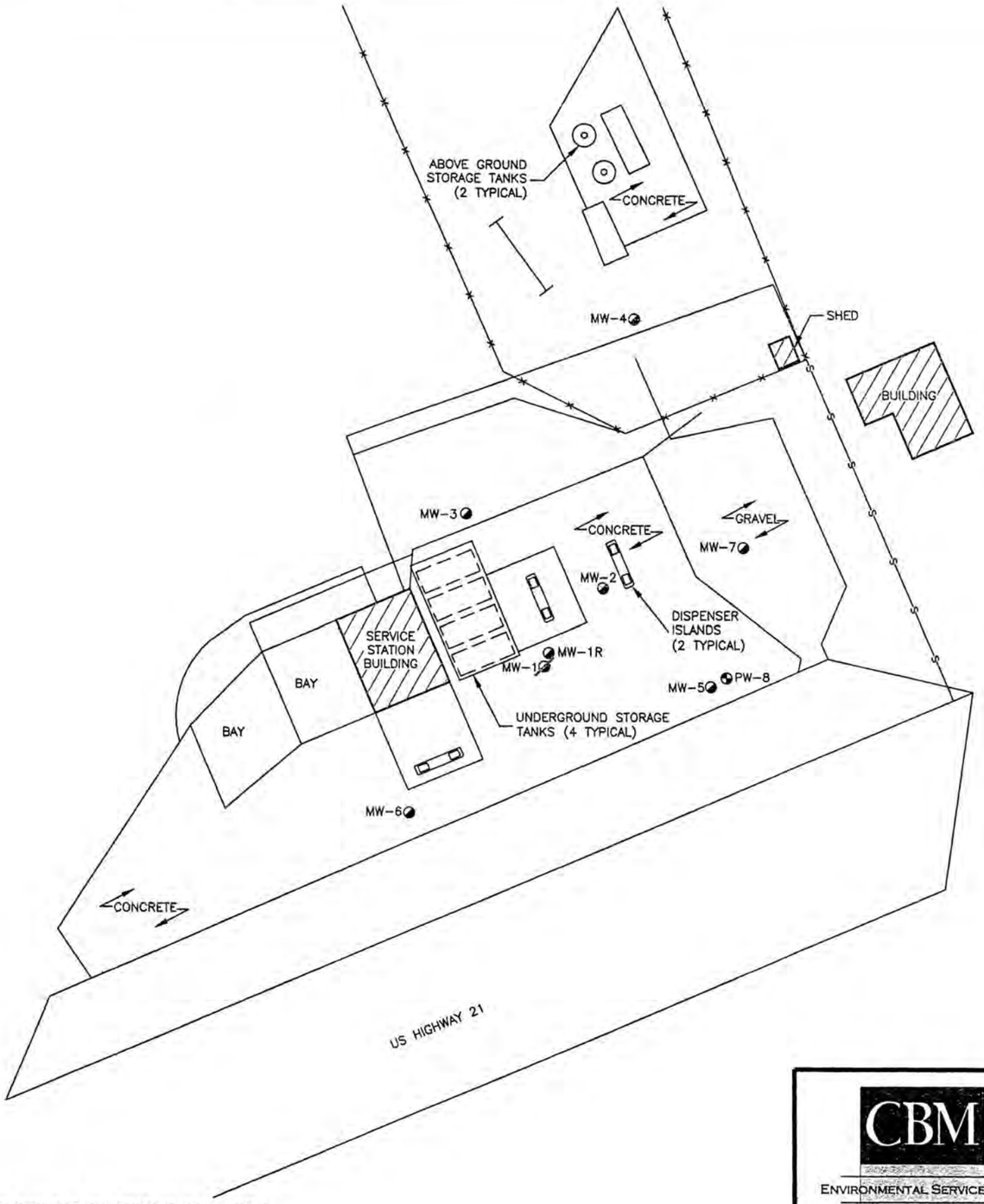
GREEN'S OIL CO.
2849 CHERRY RD.
ROCK HILL, SC

SITE ID NO. 09344

FIGURE 1

USGS TOPOGRAPHIC MAP

CBM PROJECT NO. 11030



LEGEND

- TYPE II MONITORING WELL
- TYPE II MONITORING WELL (ABANDONED)
- TYPE III MONITORING WELL
- FENCE
- SEWER LINE

SCALE:
0 10 20 30 40
FEET

NOTE: FIGURE BASED ON SITE MAP BY PREVIOUS CONSULTANT.

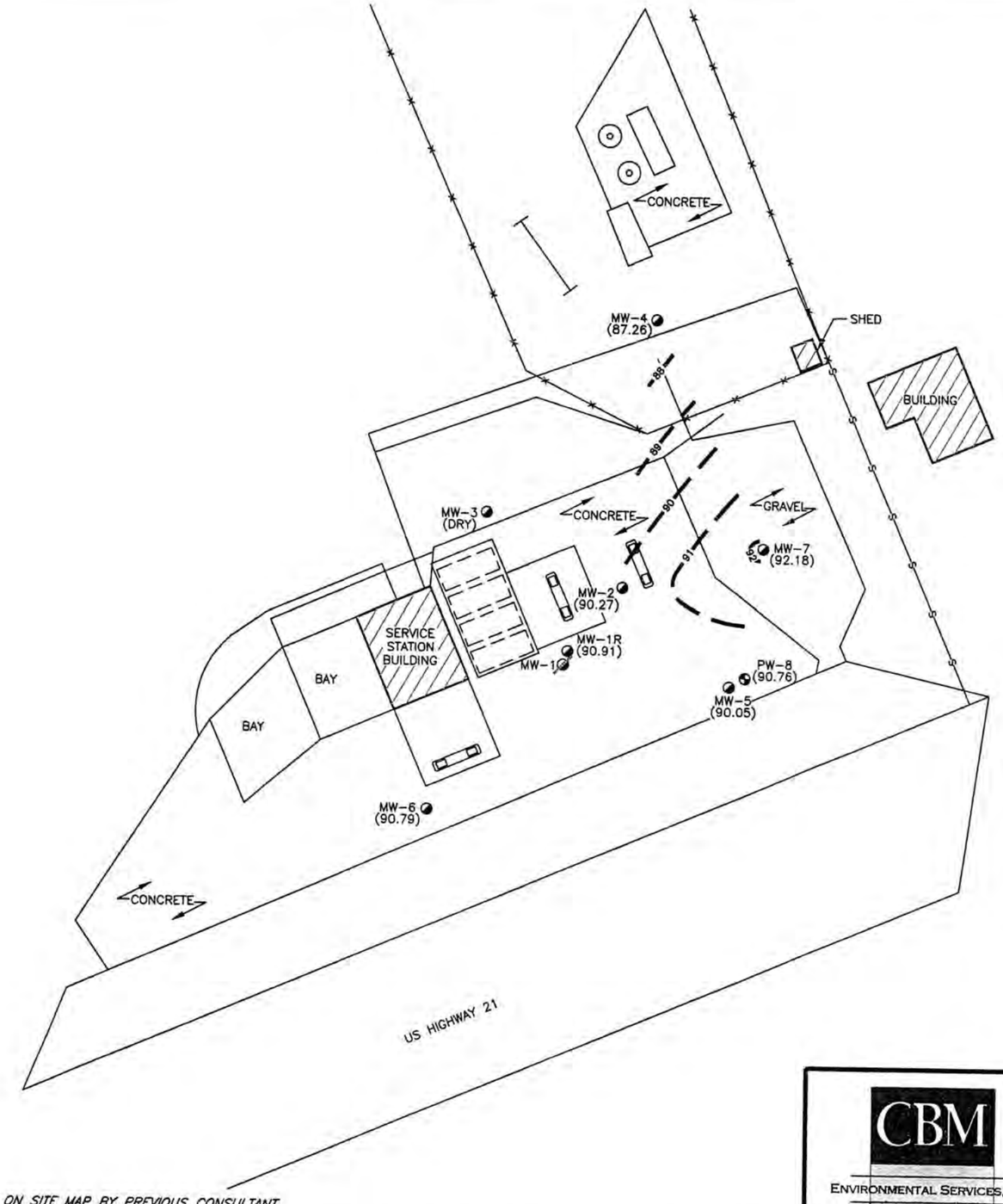
CBM
ENVIRONMENTAL SERVICES, INC.

SITE I.D. NO.	09344
PROJECT NO.	11030
DRAWN BY:	AWB
CHECKED BY:	AKK
DWG DATE:	9/14/05

SITE MAP

GREEN'S OIL CO.
2849 CHERRY ROAD
ROCK HILL, SC

FIGURE 2



LEGEND

- TYPE II MONITORING WELL
- TYPE II MONITORING WELL (ABANDONED)
- TYPE III MONITORING WELL
- FENCE
- S SEWER LINE
- WATER TABLE SURFACE CONTOUR w/ELEVATION (ft)
- (90.91) GROUNDWATER ELEVATION (ft)

SCALE

0 10 20 30 40

FEET

NOTE: FIGURE BASED ON SITE MAP BY PREVIOUS CONSULTANT.

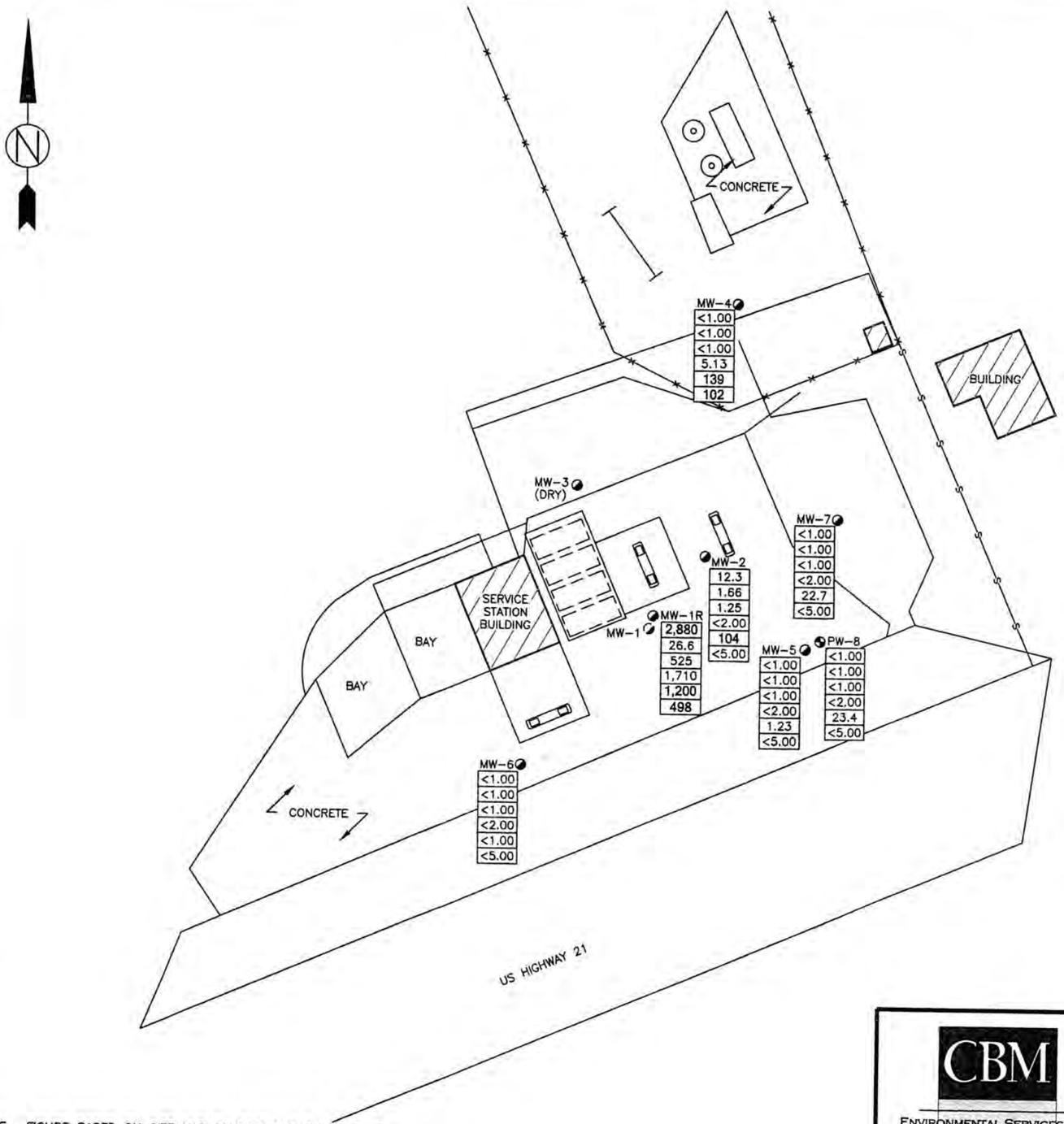
CBM ENVIRONMENTAL SERVICES, INC.

SITE I.D. NO.	09344
PROJECT NO.	11030
DRAWN BY:	AWB
CHECKED BY:	AKK
DWG DATE:	9/14/05

WATER TABLE SURFACE MAP
AUGUST 17, 2005

GREEN'S OIL CO.
2849 CHERRY ROAD
ROCK HILL, SC

FIGURE 3



LEGEND

- TYPE II MONITORING WELL
- TYPE II MONITORING WELL (ABANDONED)
- TYPE III MONITORING WELL
- FENCE
- SEWER LINE

5	BENZENE
1,000	TOLUENE
700	ETHYLBENZENE
10,000	XYLENES
40	MTBE
25	NAPHTHALENE

CONCENTRATIONS IN $\mu g/L$

ABOVE CONCENTRATIONS REPRESENT MAY 2001 RISK-BASED SCREENING LEVELS; CONCENTRATIONS IN BOLD FACE TYPE EXCEEDED THE RBSL

<1.0 – LESS THAN THE REPORTING LIMIT SPECIFIED IN THE LABORATORY REPORT

SCALE

0 10 20 30 40

FEET

NOTE: FIGURE BASED ON SITE MAP BY PREVIOUS CONSULTANT.

CBM
ENVIRONMENTAL SERVICES, INC.

SITE I.D. NO.	09344
PROJECT NO.	11030
DRAWN BY:	AWB
CHECKED BY:	AKK
DWG DATE:	9/14/05

GROUNDWATER QUALITY MAP
AUGUST 17, 2005

GREEN'S OIL CO.
2849 CHERRY ROAD
ROCK HILL, SC

FIGURE 4

TABLES

TABLE 1
SUMMARY OF GROUNDWATER ELEVATION DATA[1]
GREEN'S OIL COMPANY
AUGUST 17, 2005

Well ID	Top of Casing Elevation	Depth to Groundwater	Groundwater Elevation	Well Depth[2]	Dissolved Oxygen[3]
MW-1R[4]	98.30	7.39	90.91	9.50	3.18
MW-2	97.86	7.59	90.27	14.04	3.78
MW-3	97.08	DRY	DRY	7.75	DRY
MW-4	96.91	9.65	87.26	13.59	4.26
MW-5	97.04	6.99	90.05	10.04	4.41
MW-6	98.59	7.80	90.79	9.60	4.70
MW-7	98.40	6.22	92.18	13.60	3.69
PW-8	96.98	6.22	90.76	30.10	2.98

Notes:

1. Top of Casing Elevations for monitoring wells MW-2 through MW-7 and PW-8 were reproduced from the previous consultant's reports. Additional well construction details are unavailable; data reported in feet.
2. Well depths for monitoring wells MW-2 through MW-7 and PW-8 measured during June 12, 2003 sampling event.
3. Dissolved oxygen (DO) levels were measured in the field using a DO meter; results reported in mg/L.
4. Monitoring well MW-1R was installed as a replacement for monitoring well MW-1 on January 26, 2005.

TABLE 2
SUMMARY OF HISTORICAL GROUNDWATER ELEVATION DATA[1]
GREEN'S OIL COMPANY

Well ID	Date Measured	Top of Casing Elevation	Depth to Groundwater	Groundwater Elevation	Well Depth[2]	Dissolved Oxygen[3]
MW-1	05/24/00	98.15	7.16	90.99	12.33	1.3
	10/09/00		7.78	90.37		2.3
	01/02/01		9.58	88.57		1.4
	12/16/02		5.11	93.04		NM[4]
	06/12/03		2.59	95.56		0.79
	11/22/04		9.36	88.79		0.93
MW-1R[5]	01/31/05	98.30	8.66	89.64	9.50	2.33
	04/27/05		4.48	93.82		1.03
	08/17/05		7.39	90.91		3.18
MW-2	05/24/00	97.86	7.03	90.83	14.04	1.9
	10/09/00		7.71	90.15		2.4
	01/02/01		9.43	88.43		0.0
	12/16/02		4.91	92.95		2.06
	06/12/03		2.47	95.39		0.53
	11/22/04		9.26	88.60		1.39
	01/31/05		8.36	89.50		1.28
	04/27/05		4.65	93.21		0.85
	08/17/05		7.59	90.27		3.78
MW-3	12/16/02	97.08	5.83	91.25	7.75	NM
	06/12/03		3.01	94.07		1.14
	11/22/04		Dry	Dry		Dry
	01/31/05		Dry	Dry		Dry
	04/27/05		5.00	92.08		1.73
	08/17/05		Dry	Dry		Dry
MW-4	12/16/02	96.91	6.66	90.25	13.59	1.45
	06/12/03		3.52	93.39		0.69
	11/22/04		NM	NM		NM
	01/31/05		NM	NM		NM
	04/27/05		5.75	91.16		1.30
	08/17/05		9.65	87.26		4.26
MW-5	05/24/00	97.04	6.56	90.48	10.04	2.4
	10/09/00		7.15	89.89		3.0
	01/02/01		8.90	88.14		1.6
	12/16/02		4.67	92.37		2.27
	06/12/03		2.20	94.84		1.51
	11/22/04		8.67	88.37		1.41
	01/31/05		7.84	89.20		3.05
	04/27/05		4.26	92.78		3.15
	08/17/05		6.99	90.05		4.41

TABLE 2 (continued)
SUMMARY OF HISTORICAL GROUNDWATER ELEVATION DATA
GREEN'S OIL COMPANY

Well ID	Date	Top of Casing Elevation	Depth to Groundwater	Groundwater Elevation	Well Depth	Dissolved Oxygen
MW-6	05/24/00	98.59	8.10	90.49	9.60	3.8
	10/09/00		7.92	90.67		4.9
	01/02/01		9.52	89.07		NM
	12/16/02		5.25	93.34		3.68
	06/12/03		2.89	95.70		4.48
	11/22/04		9.44	89.15		NM
	01/31/05		8.59	90.00		NM
	04/27/05		4.98	93.61		5.81
	08/17/05		7.80	90.79		4.70
MW-7	12/16/02	98.40	4.81	93.59	13.60	NM
	06/12/03		3.29	95.11		0.84
	11/22/04		NF[6]	NF		NF
	01/31/05		NF	NF		NF
	04/27/05		4.40	94.00		2.33
	08/17/05		6.22	92.18		3.69
PW-8	05/24/00	96.98	6.45	90.53	30.10	3.9
	10/09/00		7.12	89.86		2.5
	01/02/01		8.69	88.29		2.1
	12/16/02		4.46	92.52		NM
	06/12/03		2.60	94.38		1.23
	11/22/04		5.34	91.64		2.01
	01/31/05		7.45	89.53		3.25
	04/27/05		4.65	92.33		2.25
	08/17/05		6.22	90.76		2.98

Notes:

1. Top of Casing Elevations for monitoring wells MW-2 through MW-7 and PW-8 were reproduced from the previous consultant's reports. Additional well construction details are unavailable; data reported in feet.
2. Well depths for monitoring wells MW-2 through MW-7 and PW-8 measured during June 12, 2003 sampling event.
3. Dissolved oxygen (DO) levels were measured in the field using a DO meter; results reported in mg/L.
4. Not measured. Well did not yield enough water for field measurements or was not accessible.
5. Monitoring well MW-1R was installed as a replacement for monitoring well MW-1 on January 26, 2005.
6. Not found.

TABLE 3
SUMMARY OF LABORATORY ANALYSES[1]
GROUNDWATER SAMPLES
GREEN'S OIL COMPANY
AUGUST 17, 2005

Well ID	Benzene	Toluene	Ethylbenzene	Xylenes	MTBE	Naphthalene
MW-1R[2]	**2,880**[3]	26.6	525	1,710	**1,200**	**498**
MW-2	**12.3**	1.66	1.25	<2.0[4]	**104**	<5.00
MW-3	Dry	Dry	Dry	Dry	Dry	Dry
MW-4	<1.00	<1.00	<1.00	5.13	**139**	**102**
MW-5	<1.00	<1.00	<1.00	<2.00	1.23	<5.00
MW-6	<1.00	<1.00	<1.00	<2.00	<1.00	<5.00
MW-7	<1.00	<1.00	<1.00	<2.00	22.7	<5.00
PW-8	<1.00	<1.00	<1.00	<2.00	23.4	<5.00
RBSL[5]	5	1,000	700	10,000	40	25

Notes:

1. Analyses for BTEX constituents, MTBE and Naphthalene by EPA Method 8260B; results reproted in µg/L.
2. Monitoring well MW-1R was installed as a replacement for monitoring well MW-1.
3. Concentrations in bold face type exceeded the May 2001 Risk Based Screening Level.
4. Less than the reporting limit specified in the laboratory report.
5. May 2001 Risk Based Screening Level.

TABLE 4
SUMMARY OF HISTORICAL LABORATORY ANALYSES[1]
GROUNDWATER SAMPLES
GREEN'S OIL COMPANY

Well ID	Date Sampled	Benzene	Toluene	Ethylbenzene	Xylenes	MTBE	Naphthalene	Lead
MW-1	10/24/96	**3,040[2]**	164	325	950	**2,310**	**365**	NR[3]
	05/09/00	**1,790**	255	302	611	**1,300**	**117**	12.0
	10/09/00	**1,600**	180	220	400	**850**	**350**	<3.0[4]
	01/02/01	**500**	9.0	38	68	**460**	**55**	<3.0
	12/16/02	**3,000**	**12,000**	**3,700**	**14,000**	**920**	**1,700**	14
	06/12/03	**2,280**	**9,520**	**1,980**	**17,400**	**801**	**991**	NR
	11/22/04	**2,560**	**3,820**	**2,240**	**14,200**	**790**	**2,880**	NR
MW-1R[5]	01/31/05	**1,510**	234	268	3,790	**864**	**310**	NR
	04/27/05	**2,760**	115	376	2,550	**916**	**297**	NR
	08/17/05	**2,880**	26.6	525	1,710	**1,200**	**498**	NR
MW-2	10/24/96	<10.0	<10.0	<10.0	<3.0	**24,700**	<5.0	NR
	05/09/00	**5.2**	ND[6]	ND	ND	**19,900**	ND	ND
	10/09/00	**31**	5.7	<5.0	12	**11,000**	**15**	<3.0
	01/02/01	**7.2**	<5.0	<5.0	<5.0	**7,700**	<5.0	<3.0
	12/16/02	<5.0	<5.0	<5.0	7.2	**170**	12	<3.0
	06/12/03	4.0	<1.0	<1.0	<1.0	**157**	<5.00	NR
	11/22/2004[7]	<1.0	<1.0	<1.0	<1.0	**54.9**	<5.00	NR
	01/31/05	<1.0	<1.0	<1.0	<1.0	**68.8**	<5.00	NR
	04/27/05	1.5	<1.0	<1.0	<1.0	**168**	<5.00	NR
	08/17/05	**12.3**	1.66	1.25	<2.0	**104**	<5.00	NR
	RBSL[8]	5	1,000	700	10,000	40	25	15

TABLE 4 (continued)
SUMMARY OF HISTORICAL LABORATORY ANALYSES
GROUNDWATER SAMPLES
GREEN'S OIL COMPANY

Well ID	Date Sampled	Benzene	Toluene	Ethylbenzene	Xylenes	MTBE	Naphthalene	Lead
MW-3	10/24/96	NF[9]	NF	NF	NF	NF	NF	NF
	05/09/00	NF	NF	NF	NF	NF	NF	NF
	10/09/00	NF	NF	NF	NF	NF	NF	NF
	01/02/01	NF	NF	NF	NF	NF	NF	NF
	12/12/02	**150**	**5,800**	**2,400**	**14,000**	<25	**920**	**21**
	06/12/03	4.2	135	150	1,920	2.9	**260**	NR
	11/22/04	Dry	Dry	Dry	Dry	Dry	Dry	NR
	01/31/05	Dry	Dry	Dry	Dry	Dry	Dry	NR
	04/27/05	<1.0	<1.0	<1.0	3.7	<1.0	<5.00	NR
	08/17/05	Dry	Dry	Dry	Dry	Dry	Dry	Dry
MW-4	10/24/96	<1.0	<1.0	<1.0	<3.0	**70.4**	<5.0	NR
	05/09/00	NF	NF	NF	NF	NF	NF	NF
	10/09/00	NF	NF	NF	NF	NF	NF	NF
	01/02/01	NF	NF	NF	NF	NF	NF	NF
	12/16/02	<5.0	<5.0	<5.0	<5.0	**160**	8.5	5.8
	06/12/03	<1.0	<1.0	<1.0	<1.0	**198**	<5.00	NR
	11/22/04	NS[10]	NS	NS	NS	NS	NS	NS
	01/31/05	NS	NS	NS	NS	NS	NS	NS
	04/27/05	1.4	<1.0	<1.0	8.8	**160**	**152**	NR
	08/17/05	<1.00	<1.00	<1.00	5	**139**	**102**	NR
	RBSL	5	1,000	700	10,000	40	25	15

TABLE 4 (continued)
SUMMARY OF HISTORICAL LABORATORY ANALYSES
GROUNDWATER SAMPLES
GREEN'S OIL COMPANY

Well ID	Date Sampled	Benzene	Toluene	Ethylbenzene	Xylenes	MTBE	Naphthalene	Lead
MW-5	10/24/96	<1.0	<1.0	<1.0	<3.0	**1,720**	<5.0	NR
	05/09/00	ND	ND	ND	ND	**14,000**	ND	ND
	10/09/00	<5.0	<5.0	<5.0	<5.0	**9,100**	<5.0	<3.0
	01/02/01	<5.0	<5.0	<5.0	<5.0	**1,400**	<5.0	<3.0
	12/12/02	<5.0	<5.0	<5.0	<5.0	14	<5.0	14
	06/12/03	<1.0	<1.0	<1.0	<1.0	3.1	<5.00	NR
	11/22/04[11]	<1.0	<1.0	<1.0	<1.0	1.4	<5.00	NR
	01/31/05	<1.0	<1.0	<1.0	<1.0	<1.0	<5.00	NR
	04/27/05	<1.0	<1.0	<1.0	<1.0	<1.0	<5.00	NR
	08/17/05	<1.00	<1.00	<1.00	<2.00	1.23	<5.00	NR
MW-6	10/24/96	NS	NS	NS	NS	NS	NS	NS
	05/09/00	ND	ND	ND	ND	ND	ND	**52.0**
	10/09/00	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	**26.0**
	01/02/01	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	NS
	12/12/02	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	**48**
	06/12/03	<1.0	<1.0	<1.0	<1.0	<1.0	<5.00	NR
	11/22/04	<1.0	<1.0	<1.0	<1.0	<1.0	<5.00	NR
	01/31/05	<1.0	<1.0	<1.0	<1.0	<1.0	<5.00	NR
	04/27/05	<1.0	<1.0	<1.0	<1.0	<1.0	<5.00	NR
	08/17/05	<1.00	<1.00	<1.00	<2.00	<1.00	<5.00	NR
	RBSL	5	1,000	700	10,000	40	25	15

TABLE 4 (continued)
SUMMARY OF HISTORICAL LABORATORY ANALYSES
GROUNDWATER SAMPLES
GREEN'S OIL COMPANY

Well ID	Date Sampled	Benzene	Toluene	Ethylbenzene	Xylenes	MTBE	Naphthalene	Lead
MW-7	10/24/96	NF	NF	NF	NF	NF	NF	NF
	05/09/00	NF	NF	NF	NF	NF	NF	NF
	10/09/00	NF	NF	NF	NF	NF	NF	NF
	01/02/01	NF	NF	NF	NF	NF	NF	NF
	12/12/02	<5.0	<5.0	<5.0	<5.0	**160**	<5.0	**58**
	06/12/03	<1.0	<1.0	<1.0	<1.0	**294**	<5.00	NR
	11/22/04	NF	NF	NF	NF	NF	NF	NF
	01/31/05	NF	NF	NF	NF	NF	NF	NF
	04/27/05	<1.0	<1.0	<1.0	<1.0	1.3	<5.00	NR
	08/17/05	<1.00	<1.00	<1.00	<2.00	22.7	<5.00	NR
PW-8	10/24/96	<1.0	<1.0	<1.0	<3.0	**547**	<5.0	NR
	05/09/00	ND	ND	ND	ND	**790**	ND	ND
	10/09/00	<5.0	<5.0	<5.0	6.1	**180**	<5.0	<3.0
	01/02/01	<5.0	<5.0	<5.0	<5.0	**160**	<5.0	<3.0
	12/12/02	<5.0	<5.0	<5.0	<5.0	**44**	<5.0	<3.0
	06/12/03	<1.0	<1.0	<1.0	<1.0	**84.6**	<5.00	NR
	11/22/04[12]	<1.0	<1.0	<1.0	<1.0	9.7	<5.00	NR
	01/31/05	<1.0	<1.0	<1.0	<1.0	1.3	<5.00	NR
	04/27/05	<1.0	<1.0	<1.0	<1.0	6.3	<5.00	NR
	08/17/05	<1.00	<1.00	<1.00	<2.00	23.4	<5.00	NR
	RBSL	5	1,000	700	10,000	40	25	15

TABLE 4 (continued)
SUMMARY OF HISTORICAL LABORATORY ANALYSES
GROUNDWATER SAMPLES
GREEN'S OIL COMPANY

Notes:

1. Analyses for BTEX constituents, MTBE and Naphthalene by EPA Method 8260B; groundwater quality data prior to June 12, 2003 reproduced from previous consultant's reports; results reported in µg/L.
2. Concentrations in bold face type exceeded the January 1998 Risk Based Screening Level for samples collected before May 2001 and exceeded the May 2001 Risk Based Screening Level for samples collected after May 2001.
3. Analysis not requested.
4. Less than the reporting limit specified in the laboratory report.
5. Monitoring well MW-1R was installed as a replacement for monitoring well MW-1.
6. Less than the reporting limit specified in the laboratory report.
7. Other compound detected (IPE: 294 µg/L).
8. May 2001 Risk Based Screening Level.
9. Well not found.
10. Not sampled due to insufficient volume of water in the well or well was not accessible.
11. Other compound detected (IPE: 21.8 µg/L)
12. Other compound detected (IPE: 13.4 µg/L)

APPENDICES

APPENDIX A
GROUNDWATER SAMPLING DATA SHEETS

GAUGE REPORT

CBM Environmental Services, Inc.
377 Carowinds Boulevard, Suite 118
Fort Mill, South Carolina, 29715

Project Name Green Oil Co. Location 2849 Cherry Rd. Rock Hill, SC

Project No. 11030 Date 8/17/05

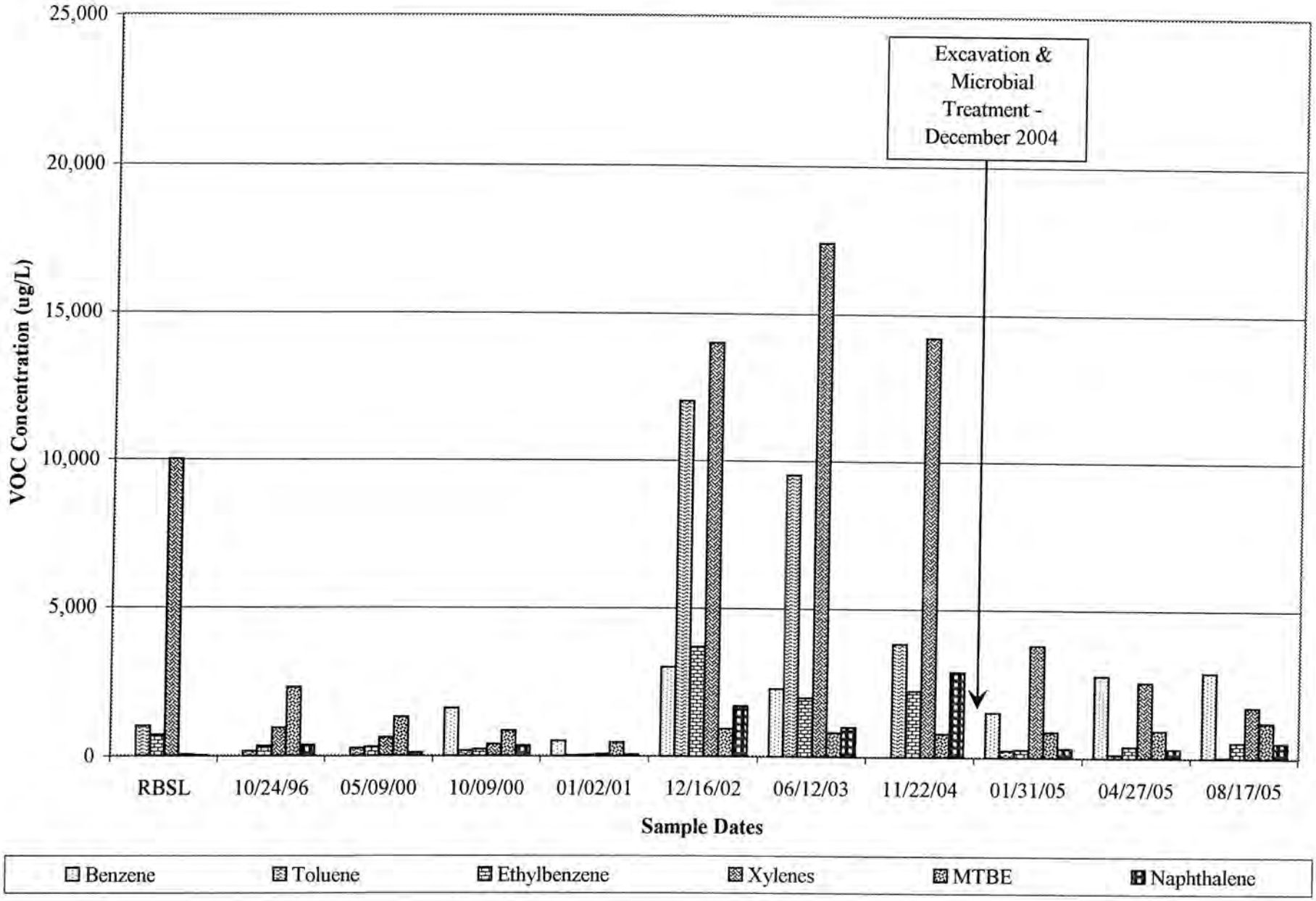
Measured By N. Goodbar Weather Sunny 85°F

Well No.	Depth to Product (feet)	Depth to Water (feet)	Product Thickness (feet)	Product Recovered (gallons)	Well Depth (feet)	Volume Purged (gallons)
MW-1R		7.34			10	
MW-2		7.59			14	
MW-3	———	Dry	———	———	7.75	———
MW-4		9.65			13.75	
MW-5		6.99			10.04	
MW-6		7.80			9.60	
MW-7		6.22			13.71	
PW-8		6.22			30.00	

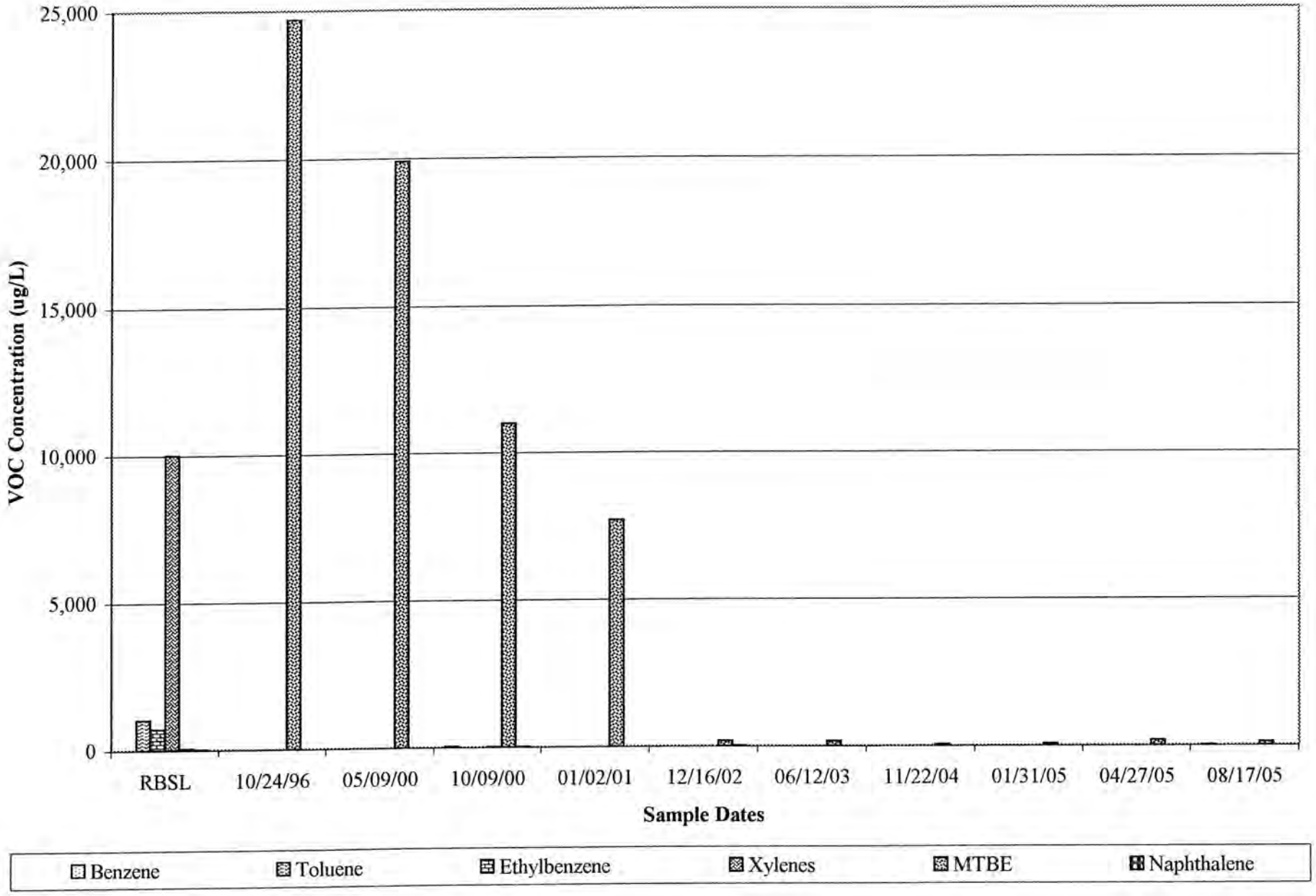
Remarks

APPENDIX C
GRAPHS OF INDIVIDUAL VOC CONCENTRATIONS VS. TIME

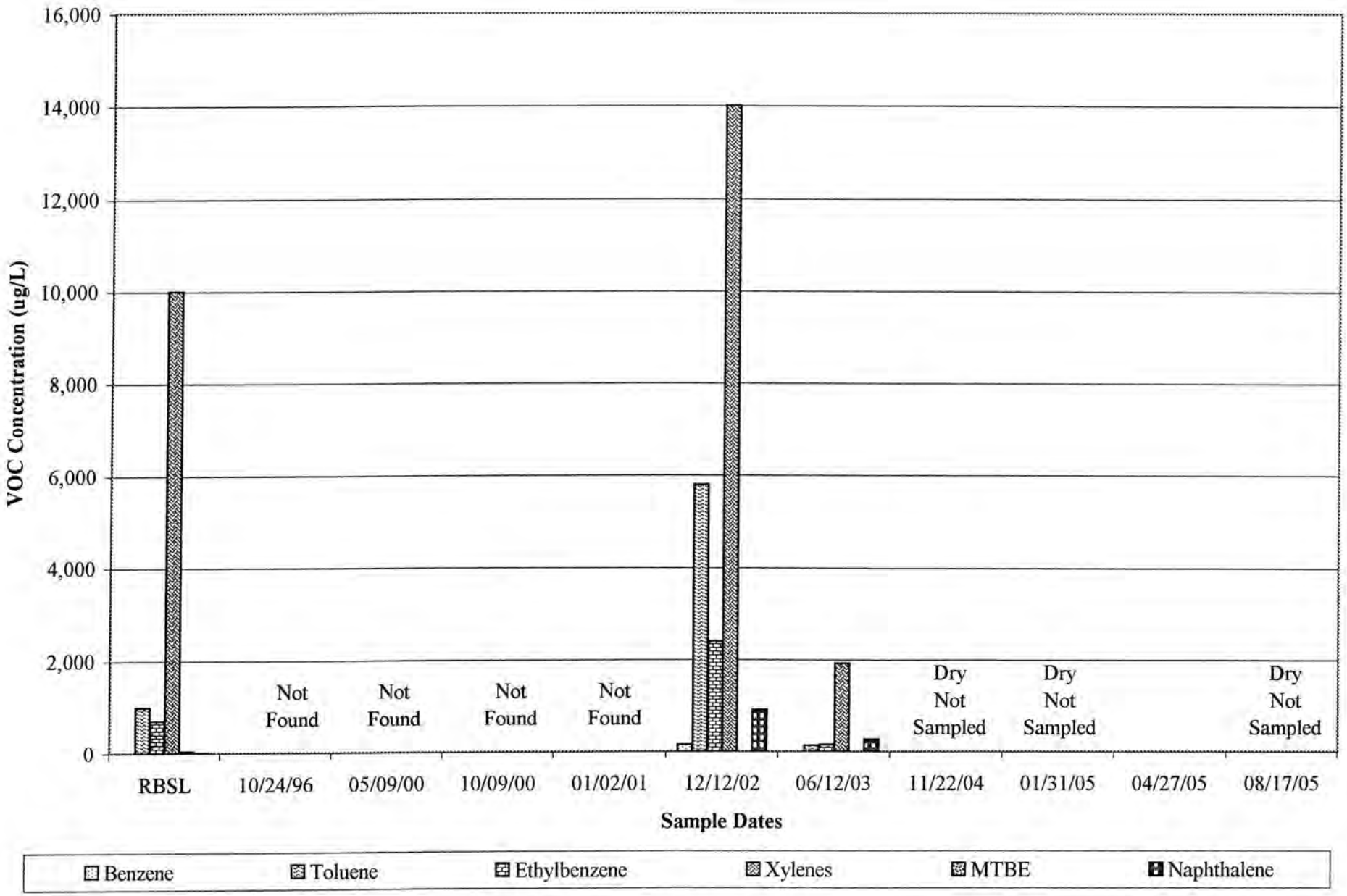
GROUNDWATER QUALITY CHART
GREENS OIL - MW-1/MW-1R



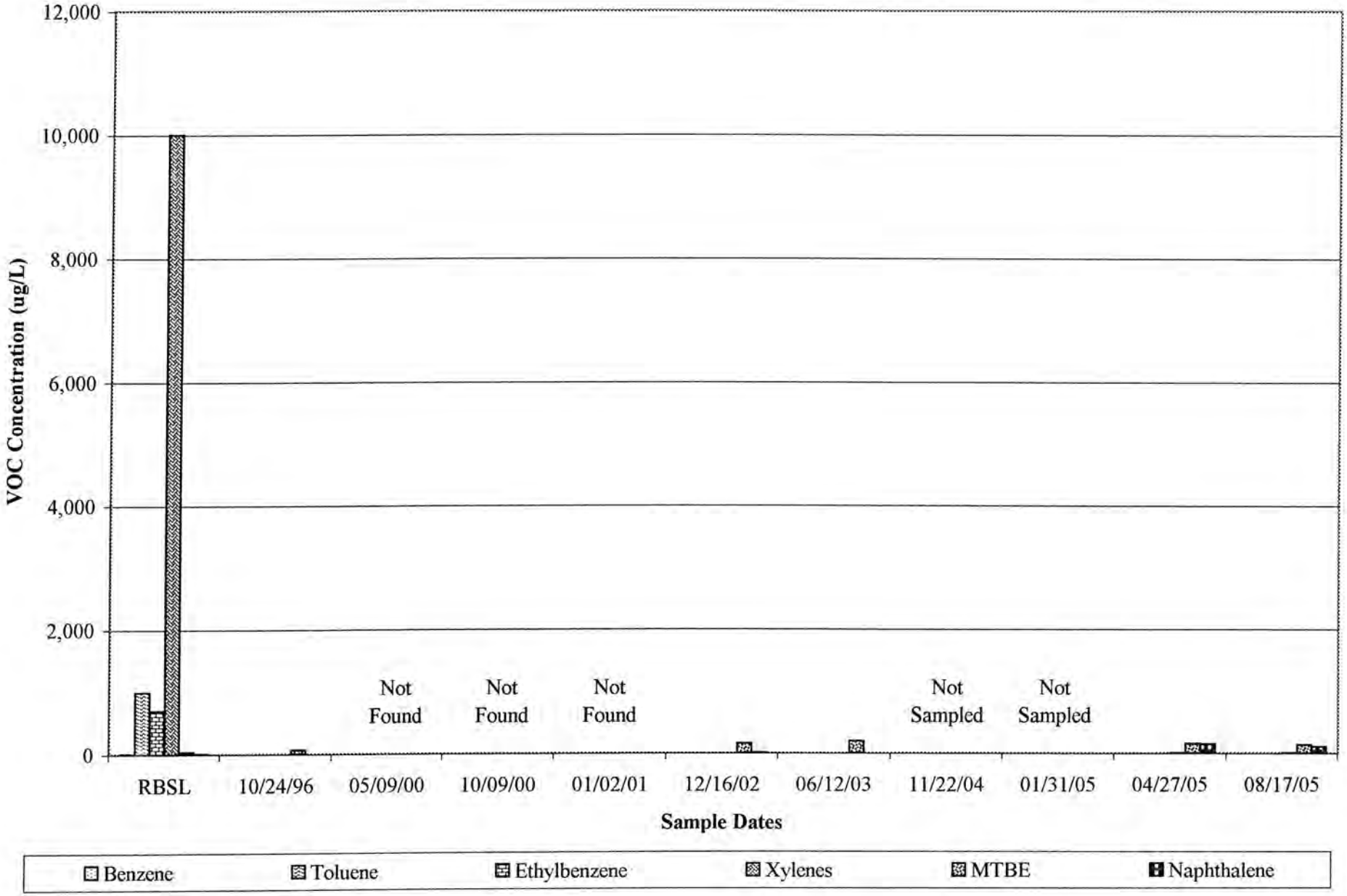
GROUNDWATER QUALITY CHART
GREENS OIL - MW-2



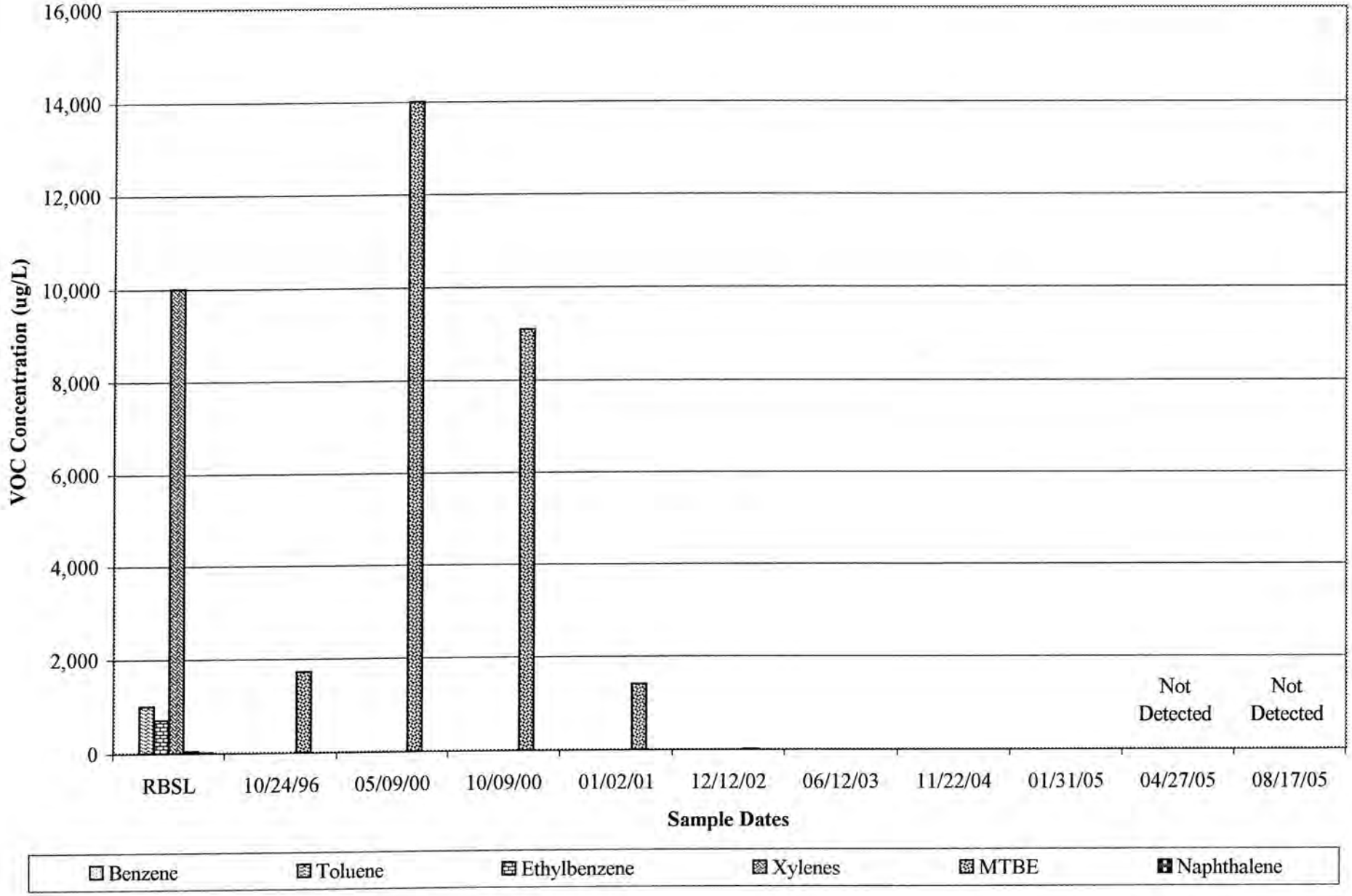
GROUNDWATER QUALITY CHART
GREENS OIL - MW-3



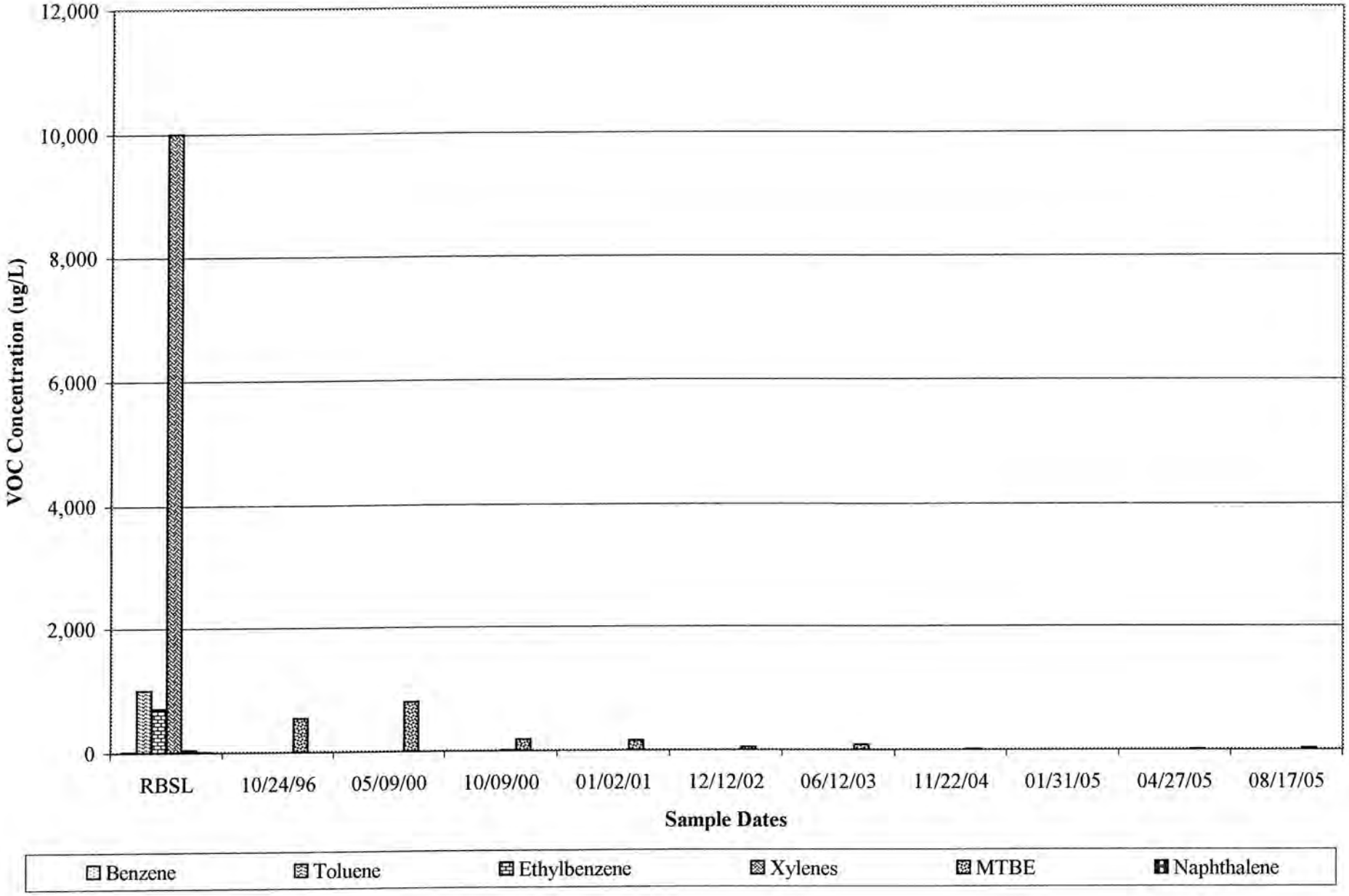
GROUNDWATER QUALITY CHART
GREENS OIL - MW-4



GROUNDWATER QUALITY CHART
GREENS OIL - MW-5



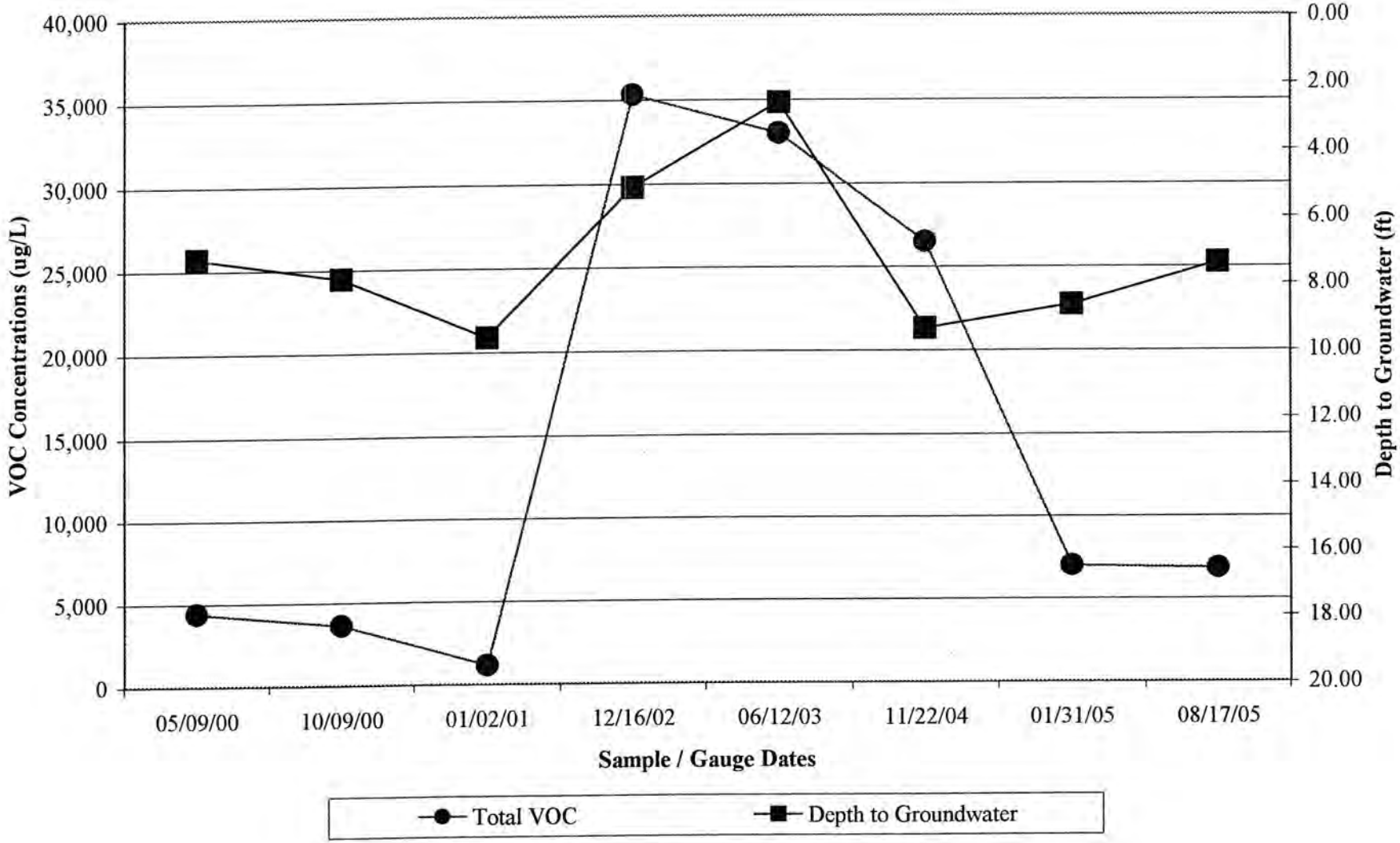
GROUNDWATER QUALITY CHART
GREENS OIL - PW-8



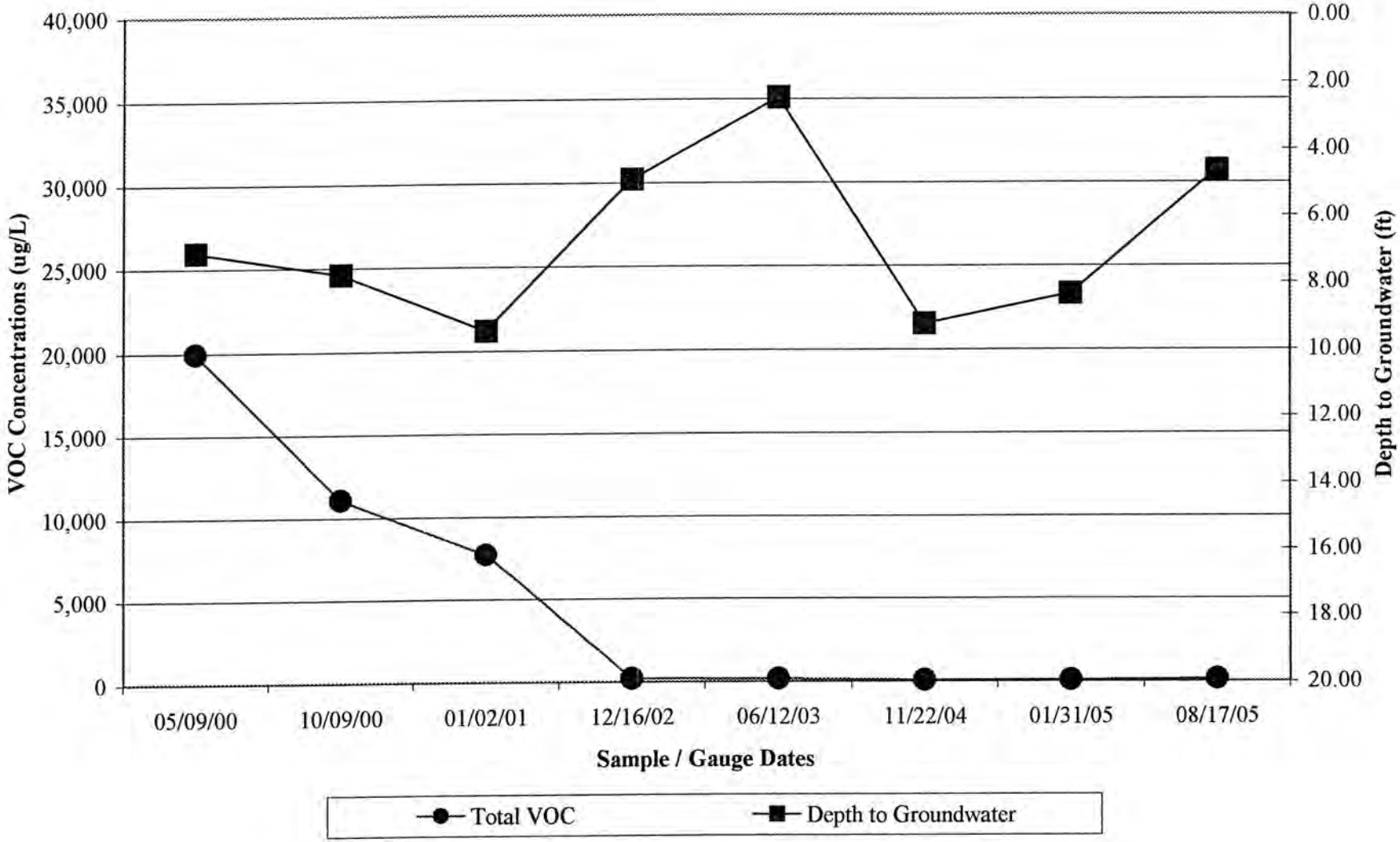
APPENDIX D

GRAPHS OF TOTAL VOC CONCENTRATIONS VS. DEPTH TO GROUNDWATER

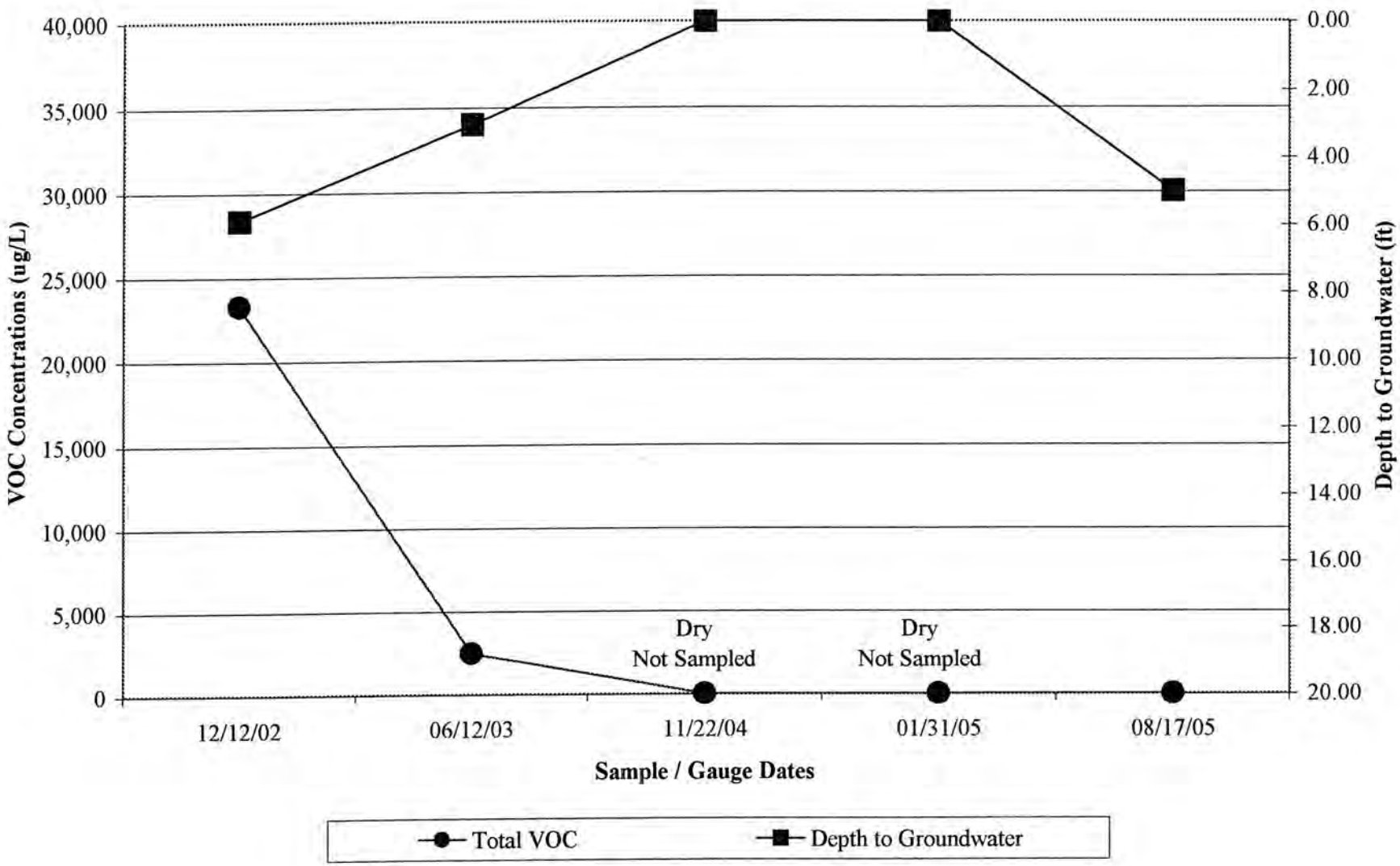
TOTAL VOC CONCENTRATION VS. DEPTH TO GROUNDWATER
GREENS OIL - MW-1/MW-1R



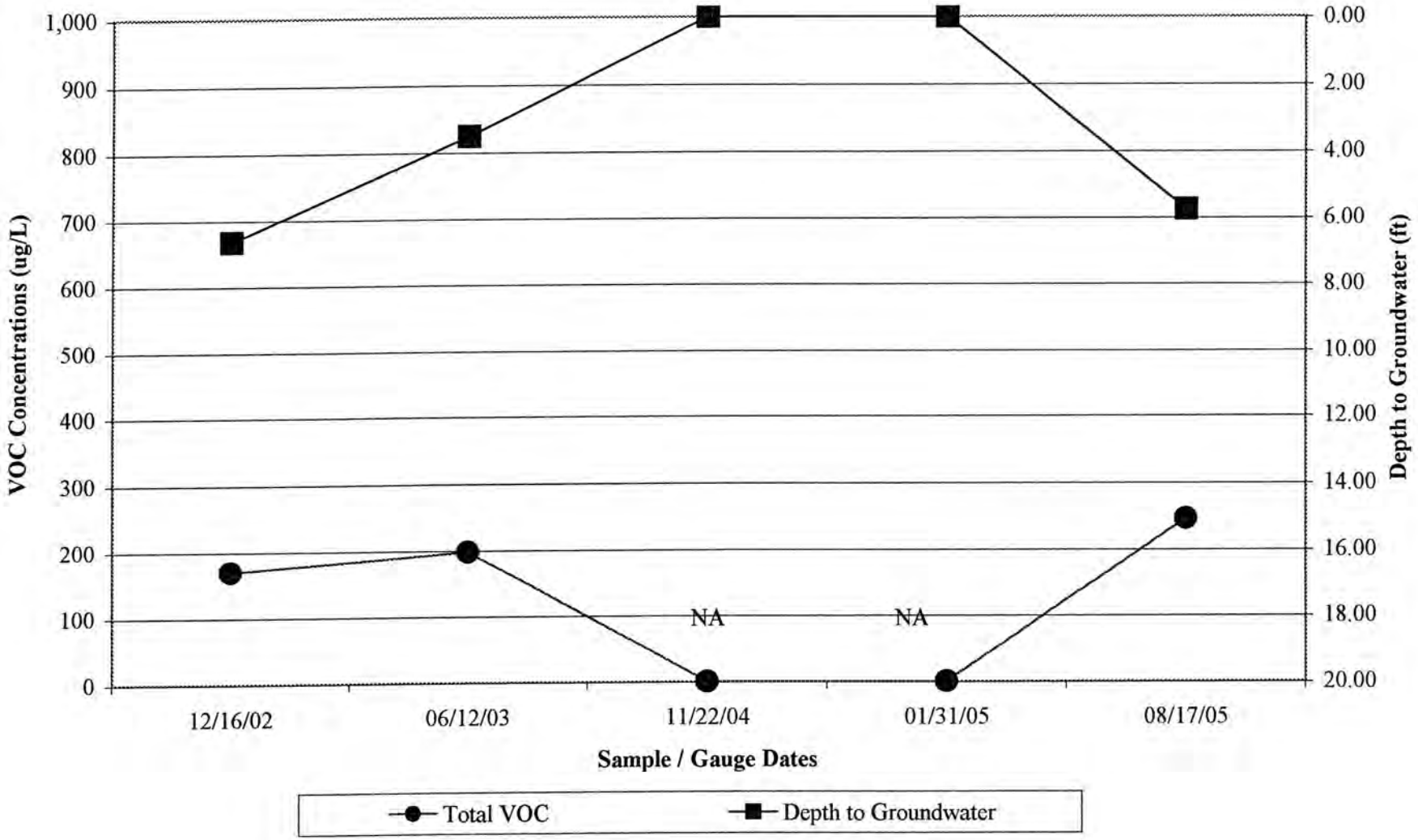
TOTAL VOC CONCENTRATION VS. DEPTH TO GROUNDWATER
GREENS OIL - MW-2



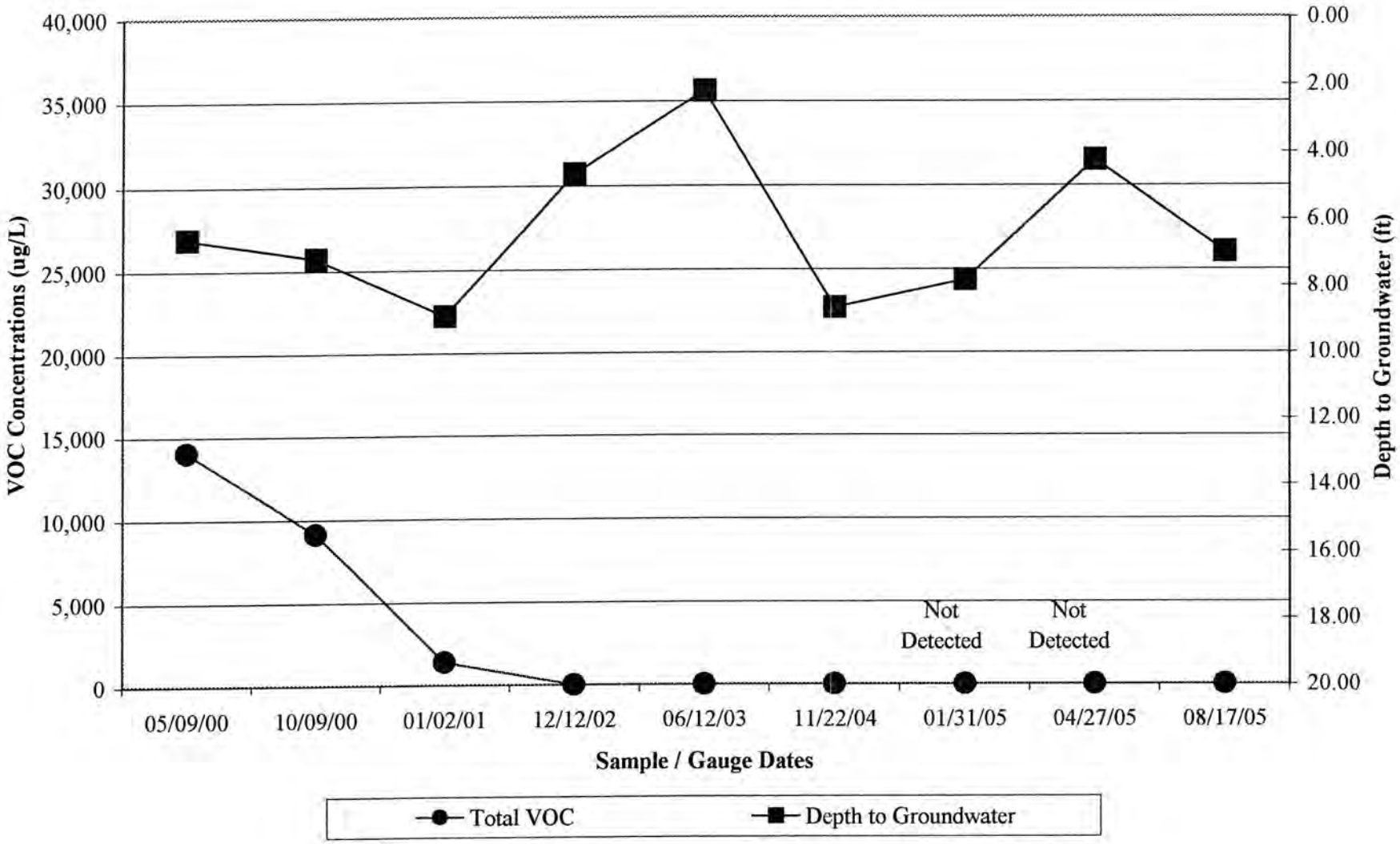
TOTAL VOC CONCENTRATION VS. DEPTH TO GROUNDWATER
GREENS OIL - MW-3



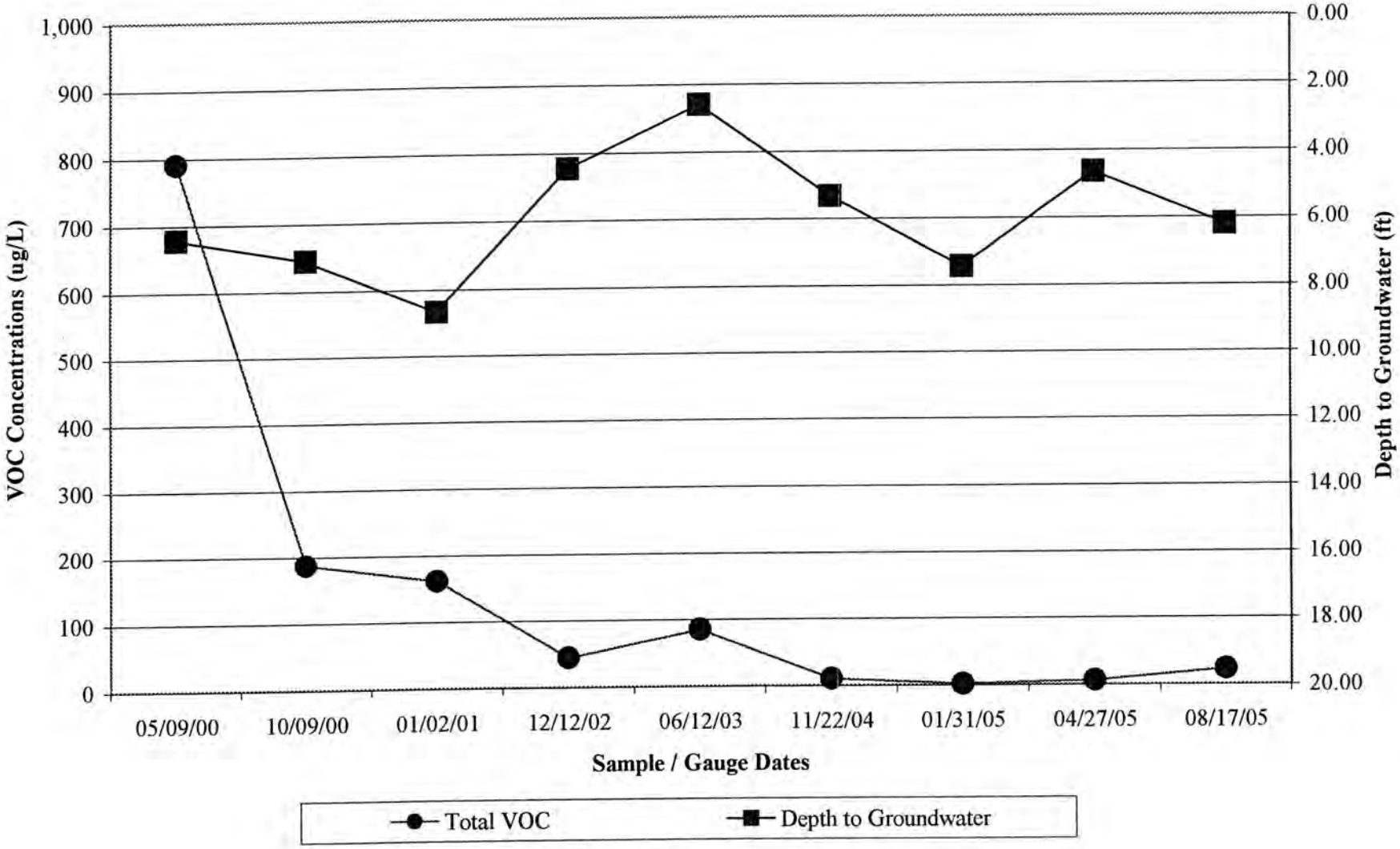
TOTAL VOC CONCENTRATION VS. DEPTH TO GROUNDWATER
GREENS OIL - MW-4



TOTAL VOC CONCENTRATION VS. DEPTH TO GROUNDWATER
GREENS OIL - MW-5



TOTAL VOC CONCENTRATION VS. DEPTH TO GROUNDWATER
GREENS OIL - PW-8



APPENDIX E
DRUM DISPOSAL MANIFEST

NON-HAZARDOUS WASTE MANIFEST

Please print or type (Form designed for use on elite (12 pitch) typewriter)

NON-HAZARDOUS WASTE MANIFEST

1. Generator's US EPA ID No.: C E S Q G

Manifest Document No.: 0 1 5 1 4

2. Page 1 of 1

3. Generator's Name and Mailing Address
Greens Oil
2849 Cherry Road
Rock Hill, SC
4. Generator's Phone (803) 548-5989

5. Transporter 1 Company Name: CBM Environmental

6. US EPA ID Number: N / A

A. State Transporter's ID

B. Transporter 1 Phone

7. Transporter 2 Company Name

8. US EPA ID Number

C. State Transporter's ID

D. Transporter 2 Phone

9. Designated Facility Name and Site Address
Advanced Environmental Options,
867 Wilcox Avenue
Gaffney, SC 29341

10. US EPA ID Number: N / A

E. State Facility's ID

F. Facility's Phone: (864) 435-9111

11. WASTE DESCRIPTION	12. Containers No.	12. Containers Type	13. Total Quantity	14. Unit Wt./Vol.
a. NON DOT/ NON RCRA Regulated Materials (Contains Purge water) (PROF000982-AEO)	2	D M	0 0 6 0 0	P
b.	0			
c.	0			
d.	0			

G. Additional Descriptions for Materials Listed Above
a) N/A

H. Handling Codes for Wastes Listed Above
a) 301

15. Special Handling Instructions and Additional Information
Emergency Phone Number & Contact: PERS - 800-633-8253 - Caller MUST Identify AEO or Advanced Environmental Options as the Registrant.

GENERATOR

16. GENERATOR'S CERTIFICATION: I hereby certify that the contents of this shipment are fully and accurately described and are in all respects in proper condition for transport. The materials described on this manifest are not subject to federal hazardous waste regulations.

Printed/Typed Name: Ted Hite

Signature

Date: Month Day Year

TRANSPORTER

17. Transporter 1 Acknowledgement of Receipt of Materials

Printed/Typed Name: Ted Hite

Signature

Date: Month Day Year

18. Transporter 2 Acknowledgement of Receipt of Materials

Printed/Typed Name

Signature

Date: Month Day Year

FACILITY

19. Discrepancy Indication Space

20. Facility Owner or Operator; Certification of receipt of the waste materials covered by this manifest, except as noted in item 19.

Printed/Typed Name: Cheryl Hitchcock

Signature

Date: Month Day Year: 9/12/05

NON-HAZARDOUS WASTE

AEO

Advanced Environmental Options, Inc.
345 Windslow Avenue
Gaffney, SC 29341
864-488-9111

Waste Stream

Purge Water

Profile No. PROF000982-AEO

Alternate No. Green's Oil

GENERATOR INFORMATION

Generator Name: Greens Oil

Address: 2849 Cherry Road

Rock Hill, SC

County:

EPA ID No: CESQG

Contact: Samantha Dawson

Telephone: (803)548-5989 Ext: Fax:

Billing Address: AEO

867 Wilcox Ave

Gaffney, SC

Billing Contact: Cheryl Hitchens

Telephone: (864)488-9111 Ext:

SHIPPING INFORMATION

Non-Hazardous: [x] DOT Hazardous: [ ] RCRA Regulated: [ ] State Hazardous: [ ]

Shipping Name: NON DOT/ NON RCRA Regulated Materials

DOT Hazard Class: UN/NA #: Packing Group: EPA Hazard Class: ERG #: Guide Year: 2000

EPA Waste Codes NONE

State Waste Codes

Additional Description (Section J) L/-

DOT Shipping Description NON DOT/ NON RCRA Regulated Materials (Contains Purge water) (PROF000982-AEO)

Special Handling (Section 15)

CHARACTERISTICS

Reactivity

- [ ] DOT Explosive
- [ ] Pyrophoric
- [ ] Oxidizer
- [ ] Cyanides
- [ ] Sulfides
- [ ] Shock Sensitive
- [ ] Water Reactive
- [ ] Air Reactive
- [ ] Acid Reactive
- [ ] Alkaline Reactive
- [ ] Polymerizable

Physical State: Liquid

Liquid 100.00 % Solid 0.00 %

Sludge 0.00 % Gas 0.00 %

Phases/Layers: Single

Viscosity: Low

Chlorine Content: 0 %

pH: 4.1 - 10 BTU / Lb: NA

Density: 8.30 lbs/gal Specific Gravity: 0.99

Flash Point (F): >200 Boiling Point (F): >95

Color/Appearance: Varies

Odor: [x] None [ ] Mild [ ] Strong

Describe:

CONSTITUENTS

	Avg %	Min %	Max %
Purge water	100.00	100.00	100.00

OTHER COMPONENTS

PCB's 0 ppm

Cyanides 0.00 ppm Phenolics 0.00 ppm

Sulfides 0.00 ppm Dioxins 0.00 ppm

Pesticides 0.00 ppm Halogens 0.00 %

ANNUAL REPORT CODES

Source Code: Point of Measure:

Form Code: Radioactive Mixed:

Origin Code: System Code:

METALS

[x] None [ ] TOTAL (ppm) [ ] TCLP (mg/L)

	Avg	Min	Max		Avg	Min	Max
Antimony	0.00	0.00	0.00	Lead	0.00	0.00	0.00
Arsenic	0.00	0.00	0.00	Mercury	0.00	0.00	0.00
Barium	0.00	0.00	0.00	Nickel	0.00	0.00	0.00
Beryllium	0.00	0.00	0.00	Selenium	0.00	0.00	0.00
Cadmium	0.00	0.00	0.00	Silver	0.00	0.00	0.00
Chromium	0.00	0.00	0.00	Thallium	0.00	0.00	0.00
Copper	0.00	0.00	0.00	Zinc	0.00	0.00	0.00

REGULATORY INFORMATION

Generating Process: Sampling groundwater

Infectious or Biological Waste? No

NRC Regulated Radioactive? No

Is this waste regulated under Subpart CC (VOC>=500ppm)? No

Spent solvent? No

Is this waste regulated as an ozone depleting substance (40 CFR part 82)? No

Does the waste contain scap metal pieces greater than 2 inches in size? No

Is this waste TSCA Regulated PCB Waste (From source >50 ppm)? No

Is this waste subject to Benzene NESHAP Regulations (D018, U019)? No

Is this waste stored in drums? Yes

Is this waste pumpable? Yes

Generator's Certification:

I hereby certify that the above and attached description is complete and accurate to the best of my knowledge and ability to determine that no deliberate or willful omissions of composition properties exist and that all known or suspected hazards have been disclosed. I certify that the materials tested are representative of all material described by this profile.

Generator Signature: Date:

CONSULTECH ENVIRONMENTAL, INC.

October 12, 2005

Ms. Denise Smith
Director of Operations
Times Oil Corporation
1500 East Main Street
Lincolnton, NC 28092-2198

Re: Replacement of Monitoring Wells
Time Turn Around #10
UST Permit #10381
2488 US Highway 21 Bypass
Fort Mill, SC

Dear Ms. Smith:

Consultech Environmental, Inc. has recently discovered that monitoring wells MW-3T and MW-6T have been destroyed at the Times Turn Around # 10 facility in Fort Mill, South Carolina. SCDHEC requires that UST release sites that are under remediation be sampled every quarter to determine the progress of the clean-up. In the past, Mr. Massey, representing Times Oil, agreed to pay for the replacement of two, other monitoring wells destroyed at the Times Turn Around facility: MW-1 and MW-10T. Therefore, Times Oil Corporation should replace the four destroyed wells: MW-1T, MW-3T, MW-6T, and MW-10T.

Consultech is familiar with and we frequently conduct activities at the site. Therefore, Consultech submits a competitive quotation for drilling services to replaced the destroyed wells at the Times Turn Around facility. We have attached our quotation. If you have any questions, please do not hesitate to contact us at (678) 377-0400.

Sincerely,

CONSULTECH ENVIRONMENTAL, INC.

Kenneth L. Brooke, P.E.
Project Manager

cc: Debra Thoma – SCDHEC
James Wilson, P.G. – Consultech
File C-1122

1800 MacLeod Drive, Suite F * Lawrenceville, GA 30043-5376
678 377-0400 * FAX 678 377-0051

QUOTATION FOR THE INSTALLATION OF MONITORING WELLS

Project Scope:

Install two-inch diameter replacement monitoring wells for MW-1T, MW-3T, MW-6T, and MW-10T. Each monitoring well will be installed to 15 ft. below grade surface with a screen installed from 3 ft. to 15 ft. using a two-inch diameter, 0.010- inch, slotted screen. Each well will have a hydrated, bentonite seal of two feet with bentonite/Portland cement grout from the seal to grade. Each well will be completed flush to grade with a cover assembly and a lockable well cap. The drilling, at the site, will be performed by a certified South Carolina drilling company. The drilling and well instalation activities will be supervised by a Consultech staff member to ensure that the installation meets the well specifications. Monitoring well installation records will be developed for each well and submitted to Times Oil and SCDHEC. The soil and associated project debris will be removed and disposed of at an approved facility for this project. The site plan map showing the locations of the monitoring well locations is attached to this quotation. The total cost for this project as described above is **$3,300.00**.

Proprietary Notice:

 This proposal will remain open for 30 days. We thank you for the opportunity to be of service to you. After we received the signed authorization to proceed, Consultech will schedule and begin work on this project.

Please contact us at (678) 377-0400, extension 218 if you have any questions.

Respectfully submitted,

CONSULTECH ENVIRONMENTAL, INC.

Kenneth L Brooke

Kenneth L. Brooke, P.E.
Project Manager

Client Signature _____ Date _____

Print Name/Title _____

LEGEND

- MONITORING WELL
- PRIVATE WELL
- AIR SPARGE WELL
- DEEP AIR SPARGE WELL
- GRASS
- CONCRETE
- CURRENT AST
- CURRENT UST
- FORMER UST
- CURRENT UST PIT
- FORMER UST PIT
- DISPENSER ISLAND
- STORM DRAIN DROP INLET
- STORM CULVERT
- TELEPHONE POLE
- MANHOLE COVER
- BORDER
- CHAIN-LINK FENCE
- UNDERGROUND PHONE LINE
- OVERHEAD POWER LINE
- GAS LINE
- SANITARY SEWER LINE
- WATER LINE
- STORM SEWER LINE
- PRODUCT LINE
- FIRE HYDRANT
- TREES

PW-9
MW-12S
PW-7
MW-29R Destroyed
MW-3S Destroyed
MW-4S Destroyed
SYSTEM COMPOUND
BAXTER LANE
MW-2S
MW-10S Destroyed
FORMER FORT MILL 66 MYERS STATION
MW-28R
MW-5S
PW-13 No Longer In Use
MW-1SR
MW-1IR
MW-19D
MW-1S
PW-5
MW-27R
MW-13D Destroyed
MW-19S
MW-11S
ON THE GO FOOD MART
VERNON DRIVE
MW-14D Destroyed
MW-7S
MW-6S
PW-4
GARRISON FARM ROAD
PW-12
MW-26R
MW-9S
MW-7SR
MW-20S
MW-18D
MW-18S
MW-30R
TW-3 Destroyed
INTERMITTANT STREAM
MW-23S
MW-16D
MW-16S
MW-22S
MW-2T
MW-7T
PW-3
PW-2
MW-21D
MW-25R
RW-1
MW-17D
MW-31R
MW-6T
MW-5T
MW-8T
MW-11DT
TIMES OIL
MW-4T
MW-9T
MW-10T
MW-15D Destroyed
MW-32R
U.S. HWY 21 BUS.
MW-34R Destroyed
PW-1
U.S. HWY 21
TW-2 Destroyed
PW-11
MW-35R Destroyed
TW-1 Destroyed
MW-33R Destroyed
MW-24R
(COVERED WITH CONSTRUCTION MATERIALS)
PW-10

0 200 400
APPROXIMATE SCALE IN FEET

CAD FILE = C-1122btx.dwg

CONSULTECH ENVIRONMENTAL, INC.
Environmental Consulting and Engineering © 1998
Delivering innovative solutions to today's environmental concerns

DRAWN: SRC	DATE: 10/10/05
REV.: 0	
PROJECT: FORT MILL	
PROJECT No.: C-1122	
LOCATION: FORT MILL, SOUTH CAROLINA	

FIGURE 2
SITE PLAN MAP

Debra Thoma

RECEIVED

JAN 2 0 2006

UNDERGROUND STORAGE TANK PROGRAM

CBM

ENVIRONMENTAL SERVICES, INC.

GROUNDWATER MONITORING REPORT
GREEN'S OIL COMPANY
2849 CHERRY RD.
ROCK HILL, YORK COUNTY
UST PERMIT NO. 09344
SITE RISK CLASSIFICATION: HIGH
LAND USE CLASSIFICATION: COMMERCIAL
CBM PROJECT NO. 11030

UST 32 1 Copy DOCKET

Prepared For:

Federated Insurance Company
c/o Jerry Green
2457 Breen Circle
Rock Hill, SC 29732

Prepared By:

CBM Environmental Services, Inc.
3440 Lakemont Blvd.
Fort Mill, SC 29708
(803) 548-5989

January 13, 2006

Brian M. Demme

Brian Demme
Project Manager

DANA CARLTON DILLON REGISTERED 2391 SOUTH CAROLINA PROFESSIONAL GEOLOGIST

Dana Dillon, P.G.
Senior Project Manager
SC License No. 2391

TABLE OF CONTENTS

FIGURES

TABLES

APPENDICES

1.0 INTRODUCTION

This report presents the results of groundwater monitoring activities, conducted in November 2005, at the Green's Oil Company site, in Rock Hill, South Carolina. The site previously operated as a gas station and is located in a commercial/industrial area of York County. Public or private water supply wells have not been reported within 1,000 feet of the site. Two water supply wells located down gradient of the site have been abandoned. Surface water bodies have not been observed within 500 feet of the source area. The Catawba River is the only known potential receptor identified during the receptor survey and is located approximately 3,000 feet down gradient north by northwest of the site.

A Corrective Action Plan (CAP) that proposed the remediation of petroleum impacted soil and groundwater beneath the site; by excavating, backfilling with microbial augmented soil and de-watering, followed by microbial injections, was submitted to the SCDHEC on January 23, 2004. The SCDHEC approved the CAP in correspondence dated March 29, 2004. However, in subsequent telephone conversations with the responsible party's insurance company (Federated Insurance), it was decided, by Federated Insurance, that only the soil excavation and backfilling with microbial augmented soil, combined with de-watering, would be implemented initially. Microbial injections, if needed, would be conducted after two to three quarters of groundwater monitoring. Soil excavation, followed by backfilling with microbial augmented soil and compaction was completed in December 2004.

2.0 FACILITY INFORMATION

- **Facility Name**: Green's Oil Company
- **Location:** 2849 Cherry Road
  Rock Hill, York County (**Figure 1**)
- **UST Permit No.** 09344
- **Risk Classification:** High
- **Land Use Classification:** Commercial
- **UST Operator:** Green's Oil Company
  2849 Cherry Road
  Rock Hill, South Carolina
- **UST Owner:** Green's Oil Company
  2849 Cherry Road
  Rock Hill, South Carolina

- **Consultant:** CBM Environmental Services, Inc.
  3440 Lakemont Blvd
  Fort Mill, South Carolina 29708
  (803) 548-5989
- **Release Information:**
  - **Date Discovered:** Unknown
  - **Estimated Quantity of Release:** Unknown
  - **Cause of Release:** Unknown
  - **Source of Release:** Leaking UST System
  - **UST System Size/Contents:** Four gasoline USTs
  - **Latitude / Longitude:** 34°58'42" North/ 80°58'54" West

3.0 SAMPLING ACTIVITIES

3.1 Site Hydrogeology

The depths to groundwater in the Type II monitoring wells measured on November 28, 2005 ranged from 9.28 feet (MW-5) to 12.32 feet (MW-4). Groundwater elevations relative to a temporary benchmark with an assumed datum of 100.00 feet, ranged from 84.59 feet (MW-4) to 89.01 feet (MW-6). Based on the November 2005 data, the horizontal groundwater flow direction was generally toward the northwest. The horizontal hydraulic gradient beneath the site was approximately 0.07 feet per foot. A Water Table Surface Map, based on the November 2005 data, is included as **Figure 3**. A summary of groundwater elevation data obtained in November 2005 is presented in **Table 1**. A summary of historical groundwater elevation data is presented in **Table 2**.

3.2 Groundwater Sampling

On November 28, 2005, six Type II monitoring wells (MW-1R, MW-2, MW-4, MW-5, MW-6, and MW-7) and one Type III monitoring well (PW-8) were purged and sampled. Monitoring well MW-3 was gauged and was observed to be dry at the time of the site visit. Laboratory analyses were performed on groundwater samples collected from the monitoring wells for BTEX constituents, MTBE and naphthalene by EPA Method 8260B. Field measurements of dissolved oxygen (DO), pH, conductivity and temperature were collected from the monitoring wells when sampled.

4.0 GROUNDWATER QUALITY

Detectable concentrations of benzene that exceeded the May 2001 risk based screening level (RBSL) were reported in the groundwater samples collected from monitoring wells MW-1R and MW-2. Concentrations of MTBE that exceeded the RBSL were reported in the groundwater samples collected from monitoring wells MW-1R, MW-2, MW-4, and MW-7. The concentrations of naphthalene reported in the groundwater samples collected from monitoring wells MW-1R and MW-4 exceeded the RBSL. Detectable concentrations of requested method constituents were not reported above the RBSLs in the groundwater samples collected from monitoring wells MW-5, and MW-6.

A Groundwater Quality Map showing individual BTEX constituents, MTBE and naphthalene concentrations in the groundwater samples collected from the monitoring wells during the November 2005 sampling event is included as **Figure 4**. A summary of laboratory analyses of groundwater samples collected from the monitoring wells in November 2005 is presented in **Table 3**. A summary of historical groundwater quality data is presented in **Table 4**. Groundwater sampling data sheets from the November 2005 sampling event have been included as **Appendix A.** A complete report of laboratory analyses of groundwater samples collected during the November 2005 sampling event has been included as **Appendix B**. Graphs showing variations in BTEX constituents, MTBE and naphthalene concentrations versus time and total VOC concentrations versus depths to groundwater have been included as **Appendices C** and **D**, respectively. Disposal manifest were not available at this time. They will be forwarded upon receipt.

5.0 CONCLUSIONS AND RECOMMENDATIONS

- Detectable concentrations of BTEX constituents, naphthalene and/or MTBE that exceeded the RBSLs were reported in groundwater samples collected from monitoring wells MW-1R, MW-2, MW-4 and MW-7. Concentrations of total xylenes, ethylbenzene and/or toluene below the RBSL were reported in the groundwater samples collected from monitoring wells MW-1R and MW-2. Concentrations of MTBE, below the RBSL were reported in the groundwater samples collected from monitoring well PW-8.

- The total VOC concentrations have decreased marginally in monitoring wells MW-2, MW-4, MW-5 and PW-8 and decreased substantially in MW-1R compared to the last sampling period. The total VOC concentrations have increased slightly in monitoring well MW-7, compared to the last sampling

period. Monitoring well, MW-6, remains below reporting limits. Monitoring wells MW-3 was dry and therefore not sampled.

- Pending the results from the next groundwater sampling event, microbial injections to accelerate groundwater remediation may be applicable.

- The next groundwater sampling event will be conducted in March 2006 and the report will be submitted no later than April 30, 2006.

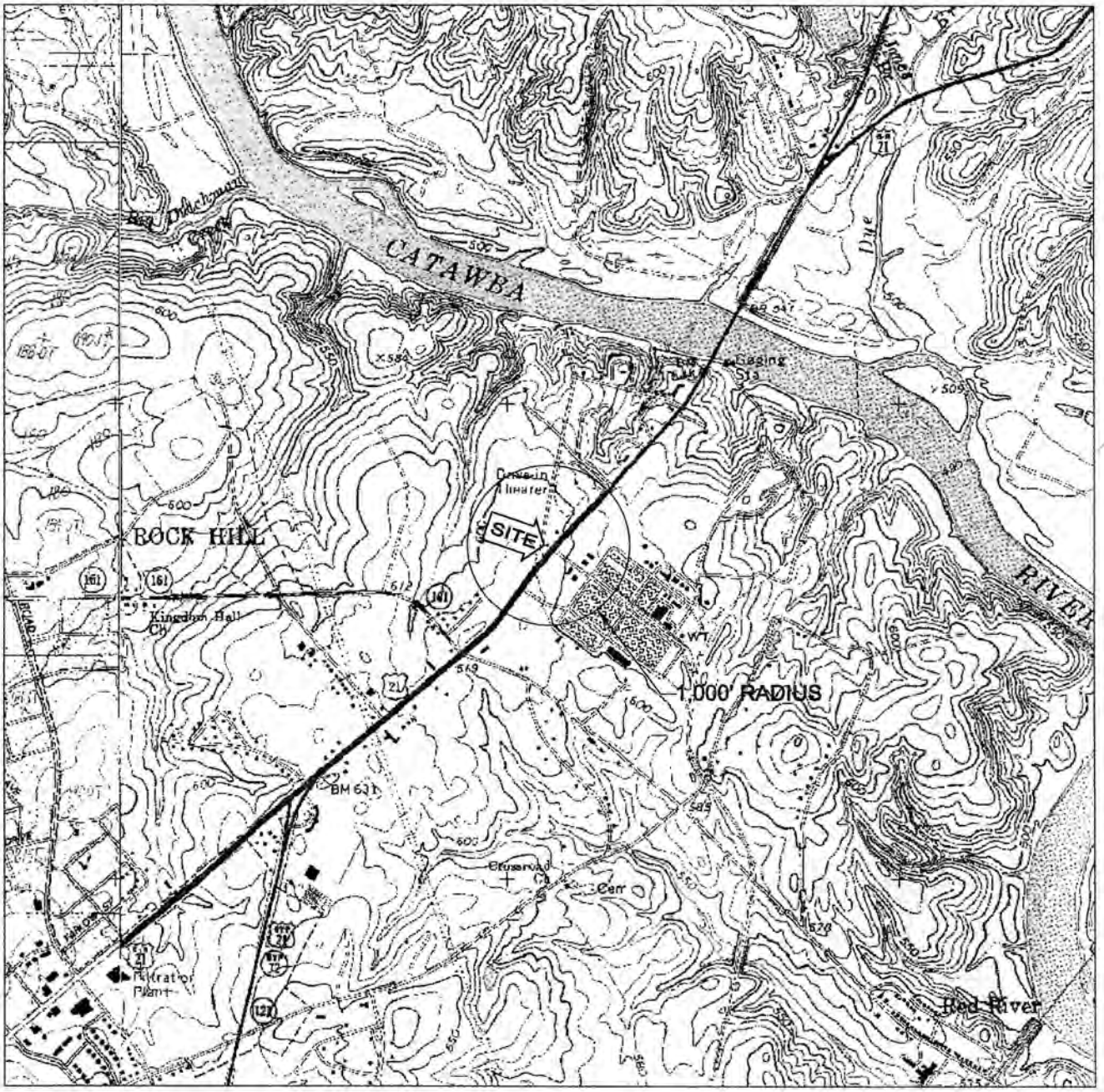
6.0 LIMITATIONS

This report has been prepared for the exclusive use of Mr. Jerry Green for specific application to the referenced site in York County, South Carolina. The assessment was conducted based on the scope of work and level of effort desired by the client and with resources adequate only for that scope of work.

Certain data contained in this report were obtained under the supervision of CBM Environmental Services Inc. (CBM). Although the accuracy of these data cannot be verified, for the purpose of this report, CBM assumes they are correct. Our findings have been developed in accordance with generally accepted standards of geology and hydrogeology practices in the State of South Carolina, available information, and our professional judgment. No other warranty is expressed or implied.

The data presented in this report are indicative of conditions that existed at the precise locations sampled and at the time the samples were collected. In addition, the data obtained from samples would be interpreted as being meaningful with respect to parameters indicated in the laboratory report. No additional information can be logically be inferred from these data.

FIGURES



SCALE 1:24,000

1 0 1 MILE

1000 0 1000 2000 3000 4000 5000 6000 7000 FEET

CONTOUR INTERVAL 10 FEET

QUADRANGLE LOCATION

ROCK HILL EAST, SC QUADRANGLE

CBM ENVIRONMENTAL SERVICES, INC.

LATITUDE:	34° 58' 42" N
LONGITUDE:	80° 58' 54" W
DRAWN BY:	AWB
CHECKED BY:	BD
DATE:	12/16/05

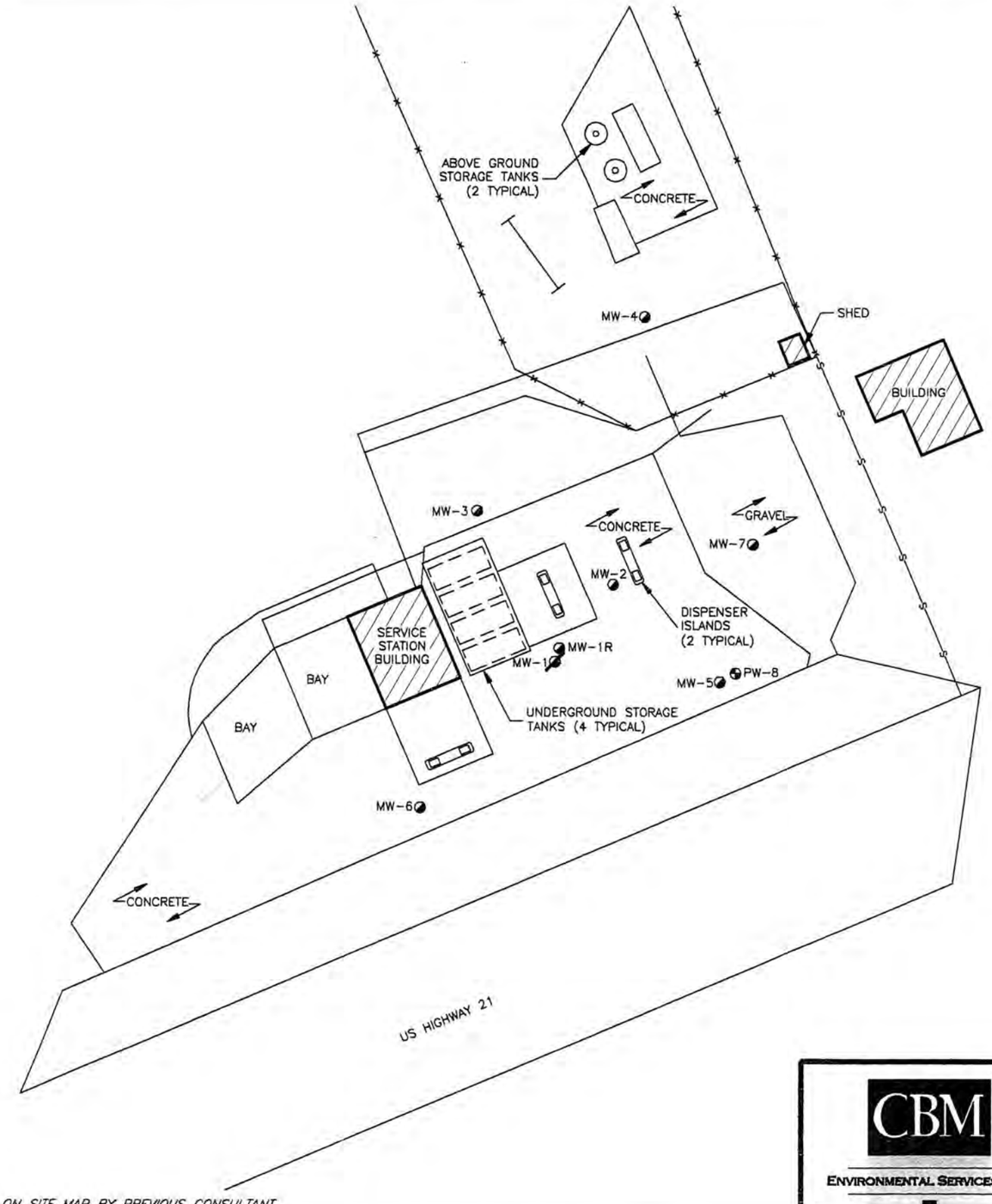
GREEN'S OIL CO.
2849 CHERRY RD.
ROCK HILL, SC

SITE ID NO. 09344

FIGURE 1

USGS TOPOGRAPHIC MAP

CBM PROJECT NO. 11030



NOTE: FIGURE BASED ON SITE MAP BY PREVIOUS CONSULTANT.

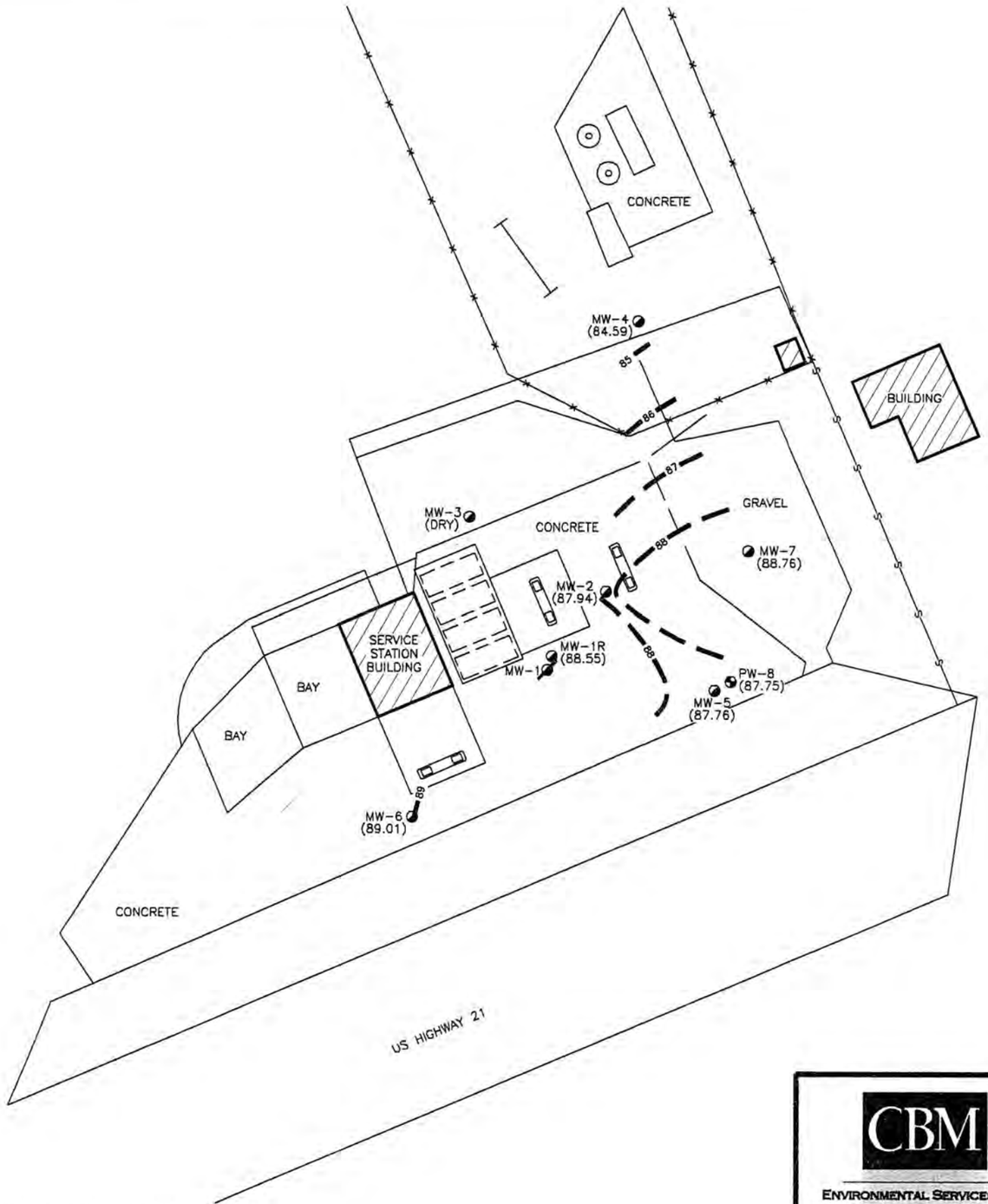
CBM
ENVIRONMENTAL SERVICES, INC.

SITE I.D. NO.	09344
PROJECT NO.	11030
DRAWN BY:	AWB
CHECKED BY:	BD
DWG DATE:	1/12/06

SITE MAP

GREEN'S OIL CO.
2849 CHERRY ROAD
ROCK HILL, SC

FIGURE 2



LEGEND

- SHALLOW MONITORING WELL
- SHALLOW MONITORING WELL (ABANDONED)
- TELESCOPING MONITORING WELL
- FENCE
- S — SEWER LINE
- WATER TABLE SURFACE CONTOUR
- (88.55) GROUNDWATER ELEVATION (ft)

SCALE
0 10 20 30 40
FEET

NOTE: FIGURE BASED ON SITE MAP BY PREVIOUS CONSULTANT.

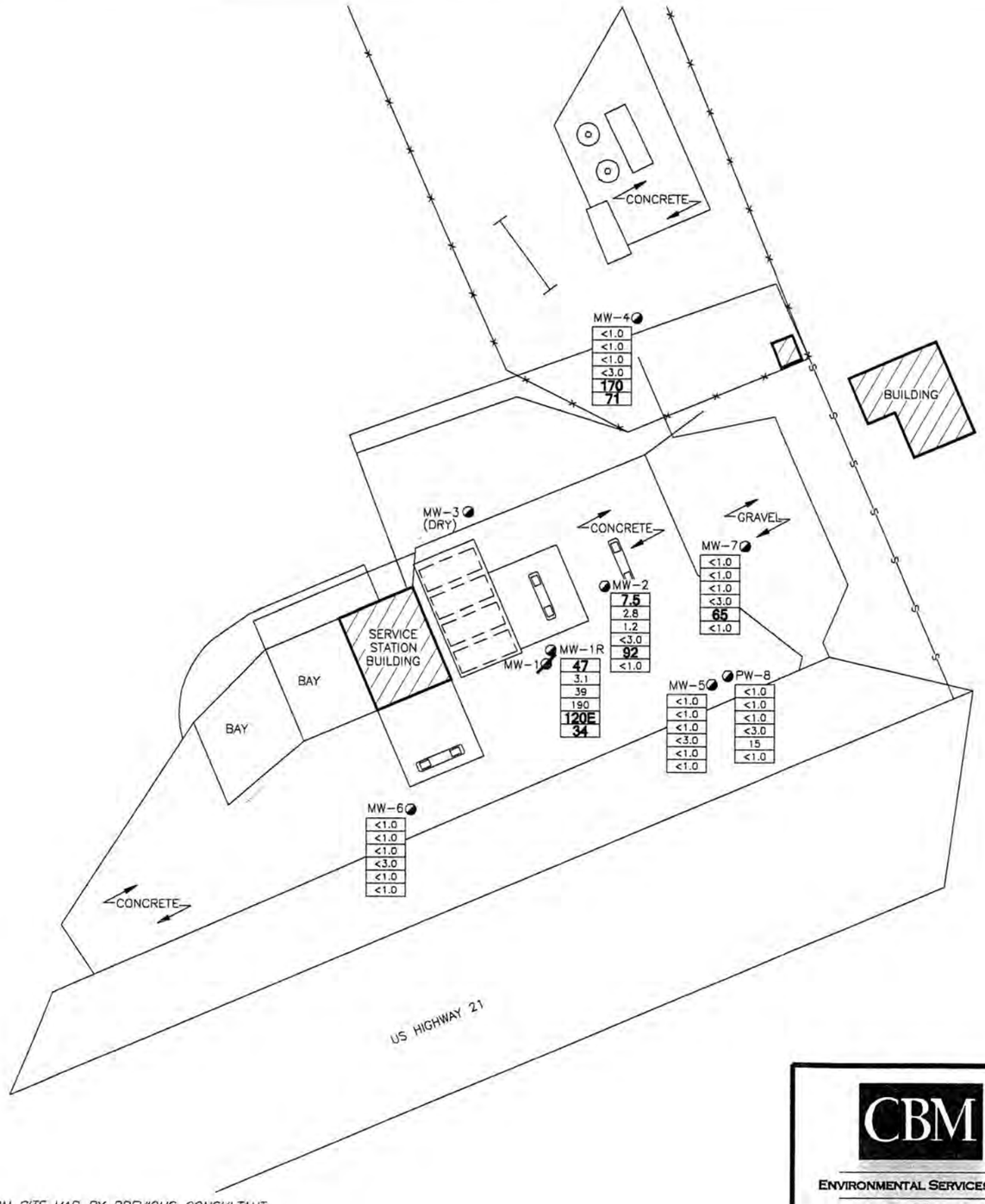
CBM
ENVIRONMENTAL SERVICES, INC.

SITE I.D. NO.	09344
PROJECT NO.	11030
DRAWN BY:	AWB
CHECKED BY:	BD
DWG DATE:	1/12/06

WATER TABLE SURFACE MAP
NOVEMBER 28, 2005

GREEN'S OIL CO.
2849 CHERRY ROAD
ROCK HILL, SC

FIGURE 3



LEGEND

- SHALLOW MONITORING WELL
- SHALLOW MONITORING WELL (ABANDONED)
- FENCE
- SEWER LINE

5	BENZENE
1,000	TOLUENE
700	ETHYLBENZENE
10,000	XYLENES
40	MTBE
25	NAPHTHALENE

CONCENTRATIONS IN $\mu g/L$

ABOVE CONCENTRATIONS REPRESENT MAY 2001 RISK-BASED SCREENING LEVELS; CONCENTRATIONS IN BOLD FACE TYPE EXCEEDED THE RBSL

<1.0 – LESS THAN THE METHOD DETECTION LIMIT SPECIFIED IN THE LABORATORY REPORT

E – ESTIMATED CONCENTRATION; CALIBRATION RANGE EXCEEDED

SCALE

0 10 20 30 40

FEET

NOTE: FIGURE BASED ON SITE MAP BY PREVIOUS CONSULTANT.

CBM
ENVIRONMENTAL SERVICES, INC.

SITE I.D. NO.	09344
PROJECT NO.	11030
DRAWN BY:	AWB
CHECKED BY:	BD
DWG DATE:	1/12/06

GROUNDWATER QUALITY MAP
NOVEMBER 28, 2005

GREEN'S OIL CO.
2489 CHERRY ROAD
ROCK HILL, SC

FIGURE 4

TABLES

TABLE 1
SUMMARY OF GROUNDWATER ELEVATION DATA[1]
GREEN'S OIL COMPANY
NOVEMBER 28, 2005

Well ID	Top of Casing Elevation	Depth to Groundwater	Groundwater Elevation	Well Depth[2]	Dissolved Oxygen[3]
MW-1R[4]	98.30	9.75	88.55	9.50	NM[5]
MW-2	97.86	9.92	87.94	14.04	1.9
MW-3	97.08	DRY	DRY	7.75	DRY
MW-4	96.91	12.32	84.59	13.59	1.78
MW-5	97.04	9.28	87.76	10.04	1.71
MW-6	98.59	9.58	89.01	9.60	NM
MW-7	98.40	9.64	88.76	13.60	1.63
PW-8	96.98	9.23	87.75	30.10	2.18

Notes:

1. Top of Casing Elevations for monitoring wells MW-2 through MW-7 and PW-8 were reproduced from the previous consultant's reports. Additional well construction details are unavailable; data reported in feet.
2. Well depths for monitoring wells MW-2 through MW-7 and PW-8 measured during June 12, 2003 sampling event.
3. Dissolved oxygen (DO) levels were measured in the field using a DO meter; results reported in mg/L.
4. Monitoring well MW-1R was installed as a replacement for monitoring well MW-1 on January 26, 2005.
5. Not measured. Well did not yield enough water for field measurements.

TABLE 2
SUMMARY OF HISTORICAL GROUNDWATER ELEVATION DATA[1]
GREEN'S OIL COMPANY

Well ID	Date Measured	Top of Casing Elevation	Depth to Groundwater	Groundwater Elevation	Well Depth[2]	Dissolved Oxygen[3]
MW-1	05/24/00	98.15	7.16	90.99	12.33	1.3
	10/09/00		7.78	90.37		2.3
	01/02/01		9.58	88.57		1.4
	12/16/02		5.11	93.04		NM[4]
	06/12/03		2.59	95.56		0.79
	11/22/04		9.36	88.79		0.93
MW-1R[5]	01/31/05	98.30	8.66	89.64	9.50	2.33
	04/27/05		4.48	93.82		1.03
	08/17/05		7.39	90.91		3.18
	11/28/05		9.75	88.55		NM[4]
MW-2	05/24/00	97.86	7.03	90.83	14.04	1.9
	10/09/00		7.71	90.15		2.4
	01/02/01		9.43	88.43		0.0
	12/16/02		4.91	92.95		2.06
	06/12/03		2.47	95.39		0.53
	11/22/04		9.26	88.60		1.39
	01/31/05		8.36	89.50		1.28
	04/27/05		4.65	93.21		0.85
	08/17/05		7.59	90.27		3.78
	11/28/05		9.92	87.94		1.9
MW-3	12/16/02	97.08	5.83	91.25	7.75	NM
	06/12/03		3.01	94.07		1.14
	11/22/04		Dry	Dry		Dry
	01/31/05		Dry	Dry		Dry
	04/27/05		5.00	92.08		1.73
	08/17/05		Dry	Dry		Dry
	11/28/05		Dry	Dry		NM[4]
MW-4	12/16/02	96.91	6.66	90.25	13.59	1.45
	06/12/03		3.52	93.39		0.69
	11/22/04		NM	NM		NM
	01/31/05		NM	NM		NM
	04/27/05		5.75	91.16		1.30
	08/17/05		9.65	87.26		4.26
	11/28/05		12.32	84.59		1.78

TABLE 2 (continued)
SUMMARY OF HISTORICAL GROUNDWATER ELEVATION DATA
GREEN'S OIL COMPANY

Well ID	Date Measured	Top of Casing Elevation	Depth to Groundwater	Groundwater Elevation	Well Depth	Dissolved Oxygen
MW-5	05/24/00	97.04	6.56	90.48	10.04	2.4
	10/09/00		7.15	89.89		3.0
	01/02/01		8.90	88.14		1.6
	12/16/02		4.67	92.37		2.27
	06/12/03		2.20	94.84		1.51
	11/22/04		8.67	88.37		1.41
	01/31/05		7.84	89.20		1.71
	04/27/05		4.26	92.78		3.15
	08/17/05		6.99	90.05		4.41
	11/28/05		9.28	87.76		1.71
MW-6	05/24/00	98.59	8.10	90.49	9.60	3.8
	10/09/00		7.92	90.67		4.9
	01/02/01		9.52	89.07		NM
	12/16/02		5.25	93.34		3.68
	06/12/03		2.89	95.70		4.48
	11/22/04		9.44	89.15		NM
	01/31/05		8.59	90.00		NM
	04/27/05		4.98	93.61		5.81
	08/17/05		7.80	90.79		4.70
	11/28/05		9.58	89.01		NM[4]
MW-7	12/16/02	98.40	4.81	93.59	13.60	NM
	06/12/03		3.29	95.11		0.84
	11/22/04		NF[6]	NF		NF
	01/31/05		NF	NF		NF
	04/27/05		4.40	94.00		2.33
	08/17/05		6.22	92.18		3.69
	11/28/05		9.64	88.76		1.63
PW-8	05/24/00	96.98	6.45	90.53	30.10	3.9
	10/09/00		7.12	89.86		2.5
	01/02/01		8.69	88.29		2.1
	12/16/02		4.46	92.52		NM
	06/12/03		2.60	94.38		1.23
	11/22/04		5.34	91.64		2.01
	01/31/05		7.45	89.53		3.25
	04/27/05		4.65	92.33		2.25
	08/17/05		6.22	90.76		2.98
	11/28/05		9.23	87.75		2.18

Notes:

1. Top of Casing Elevations for monitoring wells MW-2 through MW-7 and PW-8 were reproduced from the previous consultant's reports. Additional well construction details are unavailable; data reported in feet.
2. Well depths for monitoring wells MW-2 through MW-7 and PW-8 measured during June 12, 2003 sampling event.
3. Dissolved oxygen (DO) levels were measured in the field using a DO meter; results reported in mg/L.
4. Not measured. Well did not yield enough water for field measurements or was not accessible.
5. Monitoring well MW-1R was installed as a replacement for monitoring well MW-1 on January 26, 2005.
6. Not found.

TABLE 3
SUMMARY OF LABORATORY ANALYSES[1]
GROUNDWATER SAMPLES
GREEN'S OIL COMPANY
NOVEMBER 28, 2005

Well ID	Benzene	Toluene	Ethylbenzene	Xylenes	MTBE	Naphthalene
MW-1R[2]	**47**[3]	3.1	39	190	**120**E[4]	**34**
MW-2	**7.5**	2.8	1.2	<3.0[5]	**92**	<1.0
MW-3	Dry	Dry	Dry	Dry	Dry	Dry
MW-4	<1.0	<1.0	<1.0	<3.0	**170**	**71**
MW-5	<1.0	<1.0	<1.0	<3.0	<1.0	<1.0
MW-6	<1.0	<1.0	<1.0	<3.0	<1.0	<1.0
MW-7	<1.0	<1.0	<1.0	<3.0	**65**	<1.0
PW-8	<1.0	<1.0	<1.0	<3.0	15	<1.0
RBSL[5]	5	1,000	700	10,000	40	25

Notes:

1. Analyses for BTEX constituents, MTBE and Naphthalene by EPA Method 8260B; results reproted in µg/L.
2. Monitoring well MW-1R was installed as a replacement for monitoring well MW-1.
3. Concentrations in bold face type exceeded the May 2001 Risk Based Screening Level.
4. E = Estimated concentration, calibration range exceeded.
5. Less than the reporting limit specified in the laboratory report.
6. May 2001 Risk Based Screening Level.

TABLE 4
SUMMARY OF HISTORICAL LABORATORY ANALYSES[1]
GROUNDWATER SAMPLES
GREEN'S OIL COMPANY

Well ID	Date Sampled	Benzene	Toluene	Ethylbenzene	Xylenes	MTBE	Naphthalene	Lead
MW-1	10/24/96	**3,040**[2]	164	325	950	**2,310**	**365**	NR[3]
	05/09/00	**1,790**	255	302	611	**1,300**	**117**	12.0
	10/09/00	**1,600**	180	220	400	**850**	**350**	<3.0[4]
	01/02/01	**500**	9.0	38	68	**460**	**55**	<3.0
	12/16/02	**3,000**	**12,000**	**3,700**	**14,000**	**920**	**1,700**	14
	06/12/03	**2,280**	**9,520**	**1,980**	**17,400**	**801**	**991**	NR
	11/22/04	**2,560**	**3,820**	**2,240**	**14,200**	**790**	**2,880**	NR
MW-1R[5]	01/31/05	**1,510**	234	268	3,790	**864**	**310**	NR
	04/27/05	**2,760**	115	376	2,550	**916**	**297**	NR
	08/17/05	**2,880**	26.6	525	1,710	**1,200**	**498**	NR
	11/28/05	**47**	3.1	39	190	**120E**[6]	**34**	NR
MW-2	10/24/96	<10.0	<10.0	<10.0	<3.0	**24,700**	<5.0	NR
	05/09/00	**5.2**	ND[7]	ND	ND	**19,900**	ND	ND
	10/09/00	**31**	5.7	<5.0	12	**11,000**	15	<3.0
	01/02/01	**7.2**	<5.0	<5.0	<5.0	**7,700**	<5.0	<3.0
	12/16/02	<5.0	<5.0	<5.0	7.2	**170**	12	<3.0
	06/12/03	4.0	<1.0	<1.0	<1.0	**157**	<5.00	NR
	11/22/04[8]	<1.0	<1.0	<1.0	<1.0	**54.9**	<5.00	NR
	01/31/05	<1.0	<1.0	<1.0	<1.0	**68.8**	<5.00	NR
	04/27/05	1.5	<1.0	<1.0	<1.0	**168**	<5.00	NR
	08/17/05	**12.3**	1.66	1.25	<2.0	**104**	<5.00	NR
	11/28/05	**7.5**	2.8	1.2	<3.0	**92**	<1.0	NR
	RBSL[9]	5	1,000	700	10,000	40	25	15

TABLE 4 (continued)
SUMMARY OF HISTORICAL LABORATORY ANALYSES
GROUNDWATER SAMPLES
GREEN'S OIL COMPANY

Well ID	Date Sampled	Benzene	Toluene	Ethylbenzene	Xylenes	MTBE	Naphthalene	Lead
MW-3	10/24/96	NF[10]	NF	NF	NF	NF	NF	NF
	05/09/00	NF	NF	NF	NF	NF	NF	NF
	10/09/00	NF	NF	NF	NF	NF	NF	NF
	01/02/01	NF	NF	NF	NF	NF	NF	NF
	12/12/02	**150**	**5,800**	**2,400**	**14,000**	<25	**920**	**21**
	06/12/03	4.2	135	150	1,920	2.9	**260**	NR
	11/22/04	Dry	Dry	Dry	Dry	Dry	Dry	NR
	01/31/05	Dry	Dry	Dry	Dry	Dry	Dry	NR
	04/27/05	<1.0	<1.0	<1.0	3.7	<1.0	<5.00	NR
	08/17/05	Dry	Dry	Dry	Dry	Dry	Dry	Dry
	11/28/05	Dry	Dry	Dry	Dry	Dry	Dry	Dry
MW-4	10/24/96	<1.0	<1.0	<1.0	<3.0	**70.4**	<5.0	NR
	05/09/00	NF	NF	NF	NF	NF	NF	NF
	10/09/00	NF	NF	NF	NF	NF	NF	NF
	01/02/01	NF	NF	NF	NF	NF	NF	NF
	12/16/02	<5.0	<5.0	<5.0	<5.0	**160**	8.5	5.8
	06/12/03	<1.0	<1.0	<1.0	<1.0	**198**	<5.00	NR
	11/22/04	NS[11]	NS	NS	NS	NS	NS	NS
	01/31/05	NS	NS	NS	NS	NS	NS	NS
	04/27/05	1.4	<1.0	<1.0	8.8	**160**	**152**	NR
	08/17/05	<1.00	<1.00	<1.00	5	**139**	**102**	NR
	11/28/05	<1.0	<1.0	<1.0	<3.0	**170**	**71**	NR
	RBSL	5	1,000	700	10,000	40	25	15

TABLE 4 (continued)
SUMMARY OF HISTORICAL LABORATORY ANALYSES
GROUNDWATER SAMPLES
GREEN'S OIL COMPANY

Well ID	Date Sampled	Benzene	Toluene	Ethylbenzene	Xylenes	MTBE	Naphthalene	Lead
MW-5	10/24/96	<1.0	<1.0	<1.0	<3.0	**1,720**	<5.0	NR
	05/09/00	ND	ND	ND	ND	**14,000**	ND	ND
	10/09/00	<5.0	<5.0	<5.0	<5.0	**9,100**	<5.0	<3.0
	01/02/01	<5.0	<5.0	<5.0	<5.0	**1,400**	<5.0	<3.0
	12/12/02	<5.0	<5.0	<5.0	<5.0	14	<5.0	14
	06/12/03	<1.0	<1.0	<1.0	<1.0	3.1	<5.00	NR
	11/22/04[12]	<1.0	<1.0	<1.0	<1.0	1.4	<5.00	NR
	01/31/05	<1.0	<1.0	<1.0	<1.0	<1.0	<5.00	NR
	04/27/05	<1.0	<1.0	<1.0	<1.0	<1.0	<5.00	NR
	08/17/05	<1.00	<1.00	<1.00	<2.00	1.23	<5.00	NR
	11/28/05	<1.0	<1.0	<1.0	<3.0	<1.0	<1.0	NR
MW-6	10/24/96	NS	NS	NS	NS	NS	NS	NS
	05/09/00	ND	ND	ND	ND	ND	ND	**52.0**
	10/09/00	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	**26.0**
	01/02/01	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	NS
	12/12/02	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	**48**
	06/12/03	<1.0	<1.0	<1.0	<1.0	<1.0	<5.00	NR
	11/22/04	<1.0	<1.0	<1.0	<1.0	<1.0	<5.00	NR
	01/31/05	<1.0	<1.0	<1.0	<1.0	<1.0	<5.00	NR
	04/27/05	<1.0	<1.0	<1.0	<1.0	<1.0	<5.00	NR
	08/17/05	<1.00	<1.00	<1.00	<2.00	<1.00	<5.00	NR
	11/28/05	<1.0	<1.0	<1.0	<3.0	<1.0	<1.0	NR
	RBSL	5	1,000	700	10,000	40	25	15

TABLE 4 (continued)
SUMMARY OF HISTORICAL LABORATORY ANALYSES
GROUNDWATER SAMPLES
GREEN'S OIL COMPANY

Well ID	Date Sampled	Benzene	Toluene	Ethylbenzene	Xylenes	MTBE	Naphthalene	Lead
MW-7	10/24/96	NF	NF	NF	NF	NF	NF	NF
	05/09/00	NF	NF	NF	NF	NF	NF	NF
	10/09/00	NF	NF	NF	NF	NF	NF	NF
	01/02/01	NF	NF	NF	NF	NF	NF	NF
	12/12/02	<5.0	<5.0	<5.0	<5.0	**160**	<5.0	**58**
	06/12/03	<1.0	<1.0	<1.0	<1.0	**294**	<5.00	NR
	11/22/04	NF	NF	NF	NF	NF	NF	NF
	01/31/05	NF	NF	NF	NF	NF	NF	NF
	04/27/05	<1.0	<1.0	<1.0	<1.0	1.3	<5.00	NR
	08/17/05	<1.00	<1.00	<1.00	<2.00	22.7	<5.00	NR
	11/28/05	<1.0	<1.0	<1.0	<3.0	**65**	<1.0	NR
PW-8	10/24/96	<1.0	<1.0	<1.0	<3.0	**547**	<5.0	NR
	05/09/00	ND	ND	ND	ND	**790**	ND	ND
	10/09/00	<5.0	<5.0	<5.0	6.1	**180**	<5.0	<3.0
	01/02/01	<5.0	<5.0	<5.0	<5.0	**160**	<5.0	<3.0
	12/12/02	<5.0	<5.0	<5.0	<5.0	**44**	<5.0	<3.0
	06/12/03	<1.0	<1.0	<1.0	<1.0	**84.6**	<5.00	NR
	11/22/04[13]	<1.0	<1.0	<1.0	<1.0	9.7	<5.00	NR
	01/31/05	<1.0	<1.0	<1.0	<1.0	1.3	<5.00	NR
	04/27/05	<1.0	<1.0	<1.0	<1.0	6.3	<5.00	NR
	08/17/05	<1.00	<1.00	<1.00	<2.00	23.4	<5.00	NR
	01/28/05	<1.0	<1.0	<1.0	<3.0	15	<1.0	NR
	RBSL	5	1,000	700	10,000	40	25	15

TABLE 4 (continued)
SUMMARY OF HISTORICAL LABORATORY ANALYSES
GROUNDWATER SAMPLES
GREEN'S OIL COMPANY

Notes:

1. Analyses for BTEX constituents, MTBE and Naphthalene by EPA Method 8260B; groundwater quality data prior to June 12, 2003 reproduced from previous consultant's reports; results reported in µg/L.
2. Concentrations in bold face type exceeded the January 1998 Risk Based Screening Level for samples collected before May 2001 and exceeded the May 2001 Risk Based Screening Level for samples collected after May 2001.
3. Analysis not requested.
4. Less than the reporting limit specified in the laboratory report.
5. Monitoring well MW-1R was installed as a replacement for monitoring well MW-1.
6. E = Estimated concentration, calibration range exceeded.
7. Not detected.
8. Other compound detected (IPE: 294 µg/L).
9. May 2001 Risk Based Screening Level.
10. Well not found.
11. Not sampled due to insufficient volume of water in the well or well was not accessible.
12. Other compound detected (IPE: 21.8 µg/L)
13. Other compound detected (IPE: 13.4 µg/L)

APPENDICES

APPENDIX A
GROUNDWATER SAMPLING DATA SHEETS

South Carolina Department of Health and Environmental Control
Bureau of Underground Storage Tank Management

Field Data Information Sheet for Ground Water Sampling

Date (mm/dd/yy) 11/28/05
Field Personnel N. Goodbar
General Weather Conditions Overcast 60 °F
Ambient Air Temperature _____ °C

Facility Name: Green Oil Company Site ID # O9344

Quality Assurance:

pH Meter:
serial no. HI98107
pH =4.0 4
pH =7.0 7
pH =10.0 10

Conductivity Meter
serial no. ECTestr
Standard 1420
Standard
Standard

Chain of Custody

N. Goodbar _____ Prism Labs _____
Relinquished by Date/Time Received By Date/Time

Well # MW-2

Well Diameter (D) 4 inch or 0.33 feet
conversion factor ©: 3.143*(D/2)^2
for a 2 inch well C= 0.163
for a 4 inch well C= 0.652
Total Well Depth (TWD 14.04 feet
Depth to GW (DGW) 9.92 feet

Length of Water Column (LWC= TWD-DGW) 4.12 feet

1 Csg. Volume (LWC*C)= 2.69

3 Csg. Volume=3 X 1 Csg. Vol= 8.06

Total Volume of Water Purged Before Sampling _ 3.50

	Initial	1st vol.	2nd vol.	3rd vol.	4th vol.	5th vol.	Post	Sampling
Volume Purged (gallons)	-	2.75	0.75					-
Time (military)	10:15	10:17	10:20					10:20
pH (s.u.)	8.1	8.1	7.7					7.7
Specific Cond. (umhos/cm)	900	840	880					880
Water Temp (°C)	21.5	21.7	21.8					21.8
Turbidity (*)	1	1	1					1
Dissolved Oxygen (mg/L)	1.44	2.08	1.9					1.9

* subjective (1) None (2) Faint (3) Moderate (4) Strong

Remarks: Went Dry during 2nd purge volume

South Carolina Department of Health and Environmental Control
Bureau of Underground Storage Tank Management

Field Data Information Sheet for Ground Water Sampling

Date (mm/dd/yy) 11/28/05
Field Personnel N. Goodbar
General Weather Conditions Overcast 60 °F
Ambient Air Temperature _____ °C

Facility Name: Green Oil Company Site ID # O9344

Quality Assurance:

pH Meter:
serial no. HI98107
pH =4.0 4
pH =7.0 7
pH =10.0 10

Conductivity Meter
serial no. ECTestr
Standard 1420
Standard
Standard

Chain of Custody

N. Goodbar _____ Prism Labs _____
Relinquished by Date/Time Received By Date/Time

Well # MW-4

Well Diameter (D) 2 inch or 0.17 feet
conversion factor ©: 3.143*(D/2)^2
for a 2 inch well C= 0.163
for a 4 inch well C= 0.652
Total Well Depth (TWD 13.59 feet
Depth to GW (DGW) 12.32 feet

Length of Water Column (LWC= TWD-DGW) 1.27 feet

1 Csg. Volume (LWC*C)= 0.21

3 Csg. Volume=3 X 1 Csg. Vol= 0.62

Total Volume of Water Purged Before Sampling _ 0.25

	Initial	1st vol.	2nd vol.	3rd vol.	4th vol.	5th vol.	Post	Sampling
Volume Purged (gallons)	-	0.25						-
Time (military)	10:26	10:30						10:30
pH (s.u.)	7.4	7.4						7.4
Specific Cond. (umhos/cm)	980	980						980
Water Temp (°C)	20.5	20.5						20.5
Turbidity (*)	2	2						2
Dissolved Oxygen (mg/L)	1.78	1.78						1.78

* subjective (1) None (2) Faint (3) Moderate (4) Strong

Remarks: Went dry after first purge volume

South Carolina Department of Health and Environmental Control
Bureau of Underground Storage Tank Management

Field Data Information Sheet for Ground Water Sampling

Date (mm/dd/yy) 11/28/05
Field Personnel N. Goodbar
General Weather Conditions Overcast 60 °F
Ambient Air Temperature _____ °C

Facility Name: Green Oil Company Site ID # O9344

Quality Assurance:

pH Meter:
serial no. HI98107
pH =4.0 4
pH =7.0 7
pH =10.0 10

Conductivity Meter
serial no. ECTestr
Standard 1420
Standard
Standard

Chain of Custody

N. Goodbar _____ Prism Labs _____
Relinquished by Date/Time Received By Date/Time

Well # MW-5

Well Diameter (D) 2 inch or 0.17 feet
conversion factor ©: 3.143*(D/2)^2
for a 2 inch well C= 0.163
for a 4 inch well C= 0.652
Total Well Depth (TWD 10.00 feet
Depth to GW (DGW) 9.28 feet

Length of Water Column (LWC= TWD-DGW) 0.72 feet

1 Csg. Volume (LWC*C)= 0.12

3 Csg. Volume=3 X 1 Csg. Vol= 0.35

Total Volume of Water Purged Before Sampling _ 0.25

	Initial	1st vol.	2nd vol.	3rd vol.	4th vol.	5th vol.	Post	Sampling
Volume Purged (gallons)	-	0.25						-
Time (military)	10:39	10:40						10:40
pH (s.u.)	8	8						8
Specific Cond. (umhos/cm)	600	600						600
Water Temp (°C)	21.5	21.5						21.5
Turbidity (*)	1	1						1
Dissolved Oxygen (mg/L)	1.71	1.71						1.71

* subjective (1) None (2) Faint (3) Moderate (4) Strong

Remarks: Went dry after first purge volume

South Carolina Department of Health and Environmental Control
Bureau of Underground Storage Tank Management

Field Data Information Sheet for Ground Water Sampling

Date (mm/dd/yy) 11/28/05
Field Personnel N. Goodbar
General Weather Conditions Overcast 60 °F
Ambient Air Temperature _____ °C

Facility Name: Green Oil Company Site ID # O9344

Quality Assurance:

pH Meter:
serial no. HI98107
pH =4.0 4
pH =7.0 7
pH =10.0 10

Conductivity Meter
serial no. ECTestr
Standard 1420
Standard
Standard

Chain of Custody

N. Goodbar _____ Prism Labs _____
Relinquished by Date/Time Received By Date/Time

Well # MW-6

Well Diameter (D) 2 inch or 0.17 feet
conversion factor ©: 3.143*(D/2)^2
for a 2 inch well C= 0.163
for a 4 inch well C= 0.652
Total Well Depth (TWD) 9.60 feet
Depth to GW (DGW) 9.58 feet

Length of Water Column (LWC= TWD-DGW) 0.02 feet

1 Csg. Volume (LWC*C)= 0.00

3 Csg. Volume=3 X 1 Csg. Vol= 0.01

Total Volume of Water Purged Before Sampling _ 0.00

	Initial	1st vol.	2nd vol.	3rd vol.	4th vol.	5th vol.	Post	Sampling
Volume Purged (gallons)	-							-
Time (military)								
pH (s.u.)								
Specific Cond. (umhos/cm)								
Water Temp (°C)								
Turbidity (*)								
Dissolved Oxygen (mg/L)								

* subjective (1) None (2) Faint (3) Moderate (4) Strong

Remarks: Not enough ground water present to measure.

South Carolina Department of Health and Environmental Control
Bureau of Underground Storage Tank Management

Field Data Information Sheet for Ground Water Sampling

Date (mm/dd/yy) 11/28/05
Field Personnel N. Goodbar
General Weather Conditions Overcast 60 °F
Ambient Air Temperature _____ °C

Facility Name: Green Oil Company Site ID # O9344

Quality Assurance:

pH Meter:
serial no. HI98107
pH =4.0 4
pH =7.0 7
pH =10.0 10

Conductivity Meter
serial no. ECTestr
Standard 1420
Standard
Standard

Chain of Custody

N. Goodbar _____ Prism Labs _____
Relinquished by Date/Time Received By Date/Time

Well # MW-7

Well Diameter (D) 2 inch or 0.17 feet
conversion factor ©: 3.143*(D/2)^2
for a 2 inch well C= 0.163
for a 4 inch well C= 0.652
Total Well Depth (TWD) 13.50 feet
Depth to GW (DGW) 9.64 feet

Length of Water Column (LWC= TWD-DGW) 3.86 feet

1 Csg. Volume (LWC*C)= 0.63

3 Csg. Volume=3 X 1 Csg. Vol= 1.89

Total Volume of Water Purged Before Sampling _ 1.00

	Initial	1st vol.	2nd vol.	3rd vol.	4th vol.	5th vol.	Post	Sampling
Volume Purged (gallons)	-	0.75	0.25					-
Time (military)	11:22	11:24	11:25					11:25
pH (s.u.)	8.3	8.1	8.1					8.1
Specific Cond. (umhos/cm)	550	550	550					550
Water Temp (°C)	22	22.1	22.1					22.1
Turbidity (*)	1	3	3					3
Dissolved Oxygen (mg/L)	1.88	1.68	1.63					1.63

* subjective (1) None (2) Faint (3) Moderate (4) Strong

Remarks: Went Dry during 2nd purge volume

South Carolina Department of Health and Environmental Control
Bureau of Underground Storage Tank Management

Field Data Information Sheet for Ground Water Sampling

Date (mm/dd/yy) 11/28/05
Field Personnel N. Goodbar
General Weather Conditions Overcast 60 °F
Ambient Air Temperature _____ °C

Facility Name: Green Oil Company Site ID # O9344

Quality Assurance:

pH Meter:
serial no. HI98107
pH =4.0 4
pH =7.0 7
pH =10.0 10

Conductivity Meter
serial no. ECTestr
Standard 1420
Standard
Standard

Chain of Custody

N. Goodbar _____ Prism Labs _____
Relinquished by Date/Time Received By Date/Time

Well # PW-8

Well Diameter (D) 2 inch or 0.17 feet
conversion factor ©: 3.143*(D/2)^2
for a 2 inch well C= 0.163
for a 4 inch well C= 0.652
Total Well Depth (TWD) 30.00 feet
Depth to GW (DGW) 9.23 feet

Length of Water Column (LWC= TWD-DGW) 20.77 feet

1 Csg. Volume (LWC*C)= 3.39

3 Csg. Volume=3 X 1 Csg. Vol= 10.16

Total Volume of Water Purged Before Sampling _ 10.50

	Initial	1st vol.	2nd vol.	3rd vol.	4th vol.	5th vol.	Post	Sampling
Volume Purged (gallons)	-	3.50	3.50	3.50				-
Time (military)	10:42	10:51	10:55	11:00				11:00
pH (s.u.)	8.2	8.4	8.4	8.4				8.4
Specific Cond. (umhos/cm)	120	400	420	420				420
Water Temp (°C)	21.9	20.4	20.4	20.4				20.4
Turbidity (*)	1	1	1	1				1
Dissolved Oxygen (mg/L)	1.36	2.16	2.18	2.18				2.18

* subjective (1) None (2) Faint (3) Moderate (4) Strong

Remarks: _____

APPENDIX B

LABORATORY REPORT – GROUNDWATER SAMPLES

NOVEMBER 28, 2005

PRISM LABORATORIES, INC.

Full Service Analytical & Environmental Solutions

449 Springbrook Road • P.O. Box 240543 • Charlotte, NC 28224-0543
Phone: 704/529-6364 • Fax: 704/525-0409

CHAIN OF CUSTODY RECORD

PAGE 1 OF 1 QUOTE # TO ENSURE PROPER BILLING: ____

Client Company Name: CBM B Dempo
Report To/Contact Name: ~~Andrew Kennedy~~ mg
Reporting Address: 3140 Lakemont Blvd
Ft Mill, SC 29708
Phone: 803-548-5981 Fax (Yes) (No):
Email (Yes) (No) Email Address akennedy@cbmen.net
EDD Type: ✓ PDF____ Excel____ Other
Site Location Name: Green Oil
Site Location Physical Address: ____

Project Name: Green Oil Company
Short Hold Analysis: (Yes) (No) UST Project: (Yes) (No)
*Please ATTACH any project specific reporting (QC LEVEL I II III IV) provisions and/or QC Requirements
Invoice To: M. Plyler
Address: ____

Purchase Order No./Billing Reference 11210
Requested Due Date ☐ 1 Day ☐ 2 Days ☐ 3 Days ☐ 4 Days ☐ 5 Days
"Working Days" ☐ 6-9 Days ☑ Standard 10 days
Samples received after 15:00 will be processed next business day.
Turnaround time is based on business days, excluding weekends and holidays.
(SEE REVERSE FOR TERMS & CONDITIONS REGARDING SERVICES RENDERED BY PRISM LABORATORIES, INC. TO CLIENT)

LAB USE ONLY

	YES	NO	N/A
Samples INTACT upon arrival?	✓		
Received ON WET ICE? Temp 0.2°	✓		
PROPER PRESERVATIVES indicated?	✓		
Received WITHIN HOLDING TIMES?	✓		
CUSTODY SEALS INTACT?			✓
VOLATILES rec'd W/OUT HEADSPACE?	✓		
PROPER CONTAINERS used?	✓		

TO BE FILLED IN BY CLIENT/SAMPLING PERSONNEL

Certification: NELAC____ USACE____ FL____ NC____
SC ✓ OTHER ____ N/A ____
Water Chlorinated: YES __ NO __
Sample Iced Upon Collection: YES ✓ NO __

CLIENT SAMPLE DESCRIPTION	DATE COLLECTED	TIME COLLECTED MILITARY HOURS	MATRIX (SOIL, WATER OR SLUDGE)	*TYPE SEE BELOW	NO.	SIZE	PRESERVATIVES	ANALYSES REQUESTED: 8260 STD, MTBE, Napth						REMARKS	PRISM LAB ID NO.
MW-1R	11/28/05	10:10	GW	VOA	1	40ml	HCl	✓							135827
MW-2	|	10:20	|	|	3	|	|	✓							135828
MW-4	|	10:30	|	|	3	|	|	✓							135829
MW-5	|	10:40	|	|	3	|	|	✓							135830
MW-6	|	11:10	|	|	1	|	|	✓							135831
MW-7	|	11:25	|	|	3	|	|	✓							135832
PW-8	|	11:00	|	|	3	|	|	✓							135833

Sampler's Signature Neal R Goodson Sampled By (Print Name) Neal Goodson Affiliation CBM

PRESS DOWN FIRMLY - 3 COPIES

Upon relinquishing, this Chain of Custody is your authorization for Prism to proceed with the analyses as requested above. Any changes must be submitted in writing to the Prism Project Manager. There will be charges for any changes after analyses have been initialized.

Relinquished By: (Signature)	Received By: (Signature)	Date	Military/Hours
Neal R Goodson		12/1/05	15:45
Relinquished By: (Signature)	Received By: (Signature)	Date	
Relinquished By: (Signature)	Received For Prism Laboratories By: Jeff Borland	12/1/05	15:45

Method of Shipment: NOTE: ALL SAMPLE COOLERS SHOULD BE TAPED SHUT WITH CUSTODY SEALS FOR TRANSPORTATION TO THE LABORATORY. SAMPLES ARE NOT ACCEPTED AND VERIFIED AGAINST COC UNTIL RECEIVED AT THE LABORATORY.

☐ Fed Ex ☐ UPS ☒ Hand-delivered ☐ Prism Field Service ☐ Other ____

Login Group No. G1205012

Additional Comments:

PRISM USE ONLY

Site Arrival Time:
Site Departure Time:
Field Tech Fee:
Mileage:

NPDES: ☐ NC ☐ SC ☐ | UST: ☐ NC ☐ SC ☐ | GROUNDWATER: ☐ NC ☐ SC ☐ | DRINKING WATER: ☐ NC ☐ SC ☐ | SOLID WASTE: ☐ NC ☐ SC ☐ | RCRA: ☐ NC ☐ SC ☐ | CERCLA ☐ NC ☐ SC ☐ | LANDFILL ☐ NC ☐ SC ☐ | OTHER: ☐ NC ☐ SC ☐

SEE REVERSE FOR TERMS & CONDITIONS

*CONTAINER TYPE CODES: A = Amber C = Clear G = Glass P = Plastic; TL = Teflon-Lined Cap VOA = Volatile Organics Analysis (Zero Head Space)

ORIGINAL

CHAIN OF CUSTODY RECORD

PRISM LABORATORIES, INC.

Full Service Analytical & Environmental Solutions

449 Springbrook Road • P.O. Box 240543 • Charlotte, NC 28224-0543
Phone: 704/529-6364 • Fax: 704/525-0409

PAGE 1 OF 1 QUOTE # TO ENSURE PROPER BILLING: _____

Client Company Name: CBM B Demps
Report To/Contact Name: ~~Andrew Kemp~~ Neal Goodlet
Reporting Address: 340 Element Blvd Ste 140
Ft Mill, SC 29708
Phone: 803 548 5181 Fax (Yes) (No): _____
Email (Yes) (No) Email Address akemp@cbmenv.net
EDD Type: ✓ PDF ___ Excel ___ Other
Site Location Name: Green Oil
Site Location Physical Address: _____

Project Name: Green Oil Company
Short Hold Analysis: (Yes) (No) UST Project: (Yes) (No)
*Please ATTACH any project specific reporting (QC LEVEL I II III IV) provisions and/or QC Requirements
Invoice To: M. Plyler
Address: _____

Purchase Order No./Billing Reference 11210
Requested Due Date ☐ 1 Day ☐ 2 Days ☐ 3 Days ☐ 4 Days ☐ 5 Days
"Working Days" ☐ 6-9 Days ☑ Standard 10 days
Samples received after 15:00 will be processed next business day.
Turnaround time is based on business days, excluding weekends and holidays.
(SEE REVERSE FOR TERMS & CONDITIONS REGARDING SERVICES RENDERED BY PRISM LABORATORIES, INC. TO CLIENT)

LAB USE ONLY

	YES	NO	N/A
Samples INTACT upon arrival?	✓		
Received ON WET ICE? Temp 0.2°	✓		
PROPER PRESERVATIVES indicated?			
Received WITHIN HOLDING TIMES?			✓
CUSTODY SEALS INTACT?			
VOLATILES rec'd W/OUT HEADSPACE?			
PROPER CONTAINERS used?	✓		

TO BE FILLED IN BY CLIENT/SAMPLING PERSONNEL
Certification: NELAC ___ USACE ___ FL ___ NC ___
SC ✓ OTHER ___ N/A ___
Water Chlorinated: YES ___ NO ___
Sample Iced Upon Collection: YES ✓ NO ___

CLIENT SAMPLE DESCRIPTION	DATE COLLECTED	TIME COLLECTED MILITARY HOURS	MATRIX (SOIL, WATER OR SLUDGE)	SAMPLE CONTAINER *TYPE SEE BELOW	NO.	SIZE	PRESERVATIVES	ANALYSES REQUESTED (8260 BTEX, MTBE, Naphthalene)	REMARKS	PRISM LAB ID NO.
MW-1R	11/28/05	10:10	GW	VOA	1	40 mL	HCl	✓		135827
MW-2		10:20			3			✓		135828
MW-4		10:30			3			✓		135829
MW-5		10:40			3			✓		135830
MW-6		11:10			1			✓		135831
MW-M		11:25			3			✓		135832
PW-8		11:00			3			✓		135833

Sampler's Signature Neal R Goodlet Sampled By (Print Name) Neal Goodlet Affiliation CBM

PRESS DOWN FIRMLY - 3 COPIES

Upon relinquishing, this Chain of Custody is your authorization for Prism to proceed with the analyses as requested above. Any changes must be submitted in writing to the Prism Project Manager. There will be charges for any changes after analyses have been initialized.

Relinquished By: (Signature)	Received By: (Signature)	Date	Military/Hours
Neal R Goodlet		12/1/05	15:45
Relinquished By: (Signature)	Received By: (Signature)	Date	
Relinquished By: (Signature)	Received For Prism Laboratories By: Jeff Borland	Date	
		12/1/05	15:45

Method of Shipment: NOTE: ALL SAMPLE COOLERS SHOULD BE TAPED SHUT WITH CUSTODY SEALS FOR TRANSPORTATION TO THE LABORATORY. SAMPLES ARE NOT ACCEPTED AND VERIFIED AGAINST COC UNTIL RECEIVED AT THE LABORATORY.

☐ Fed Ex ☐ UPS ☑ Hand-delivered ☐ Prism Field Service ☐ Other _____

Log-in Group No. G1205012

Additional Comments:

PRISM USE ONLY

Site Arrival Time:
Site Departure Time:
Field Tech Fee:
Mileage:

NPDES:	UST:	GROUNDWATER:	DRINKING WATER:	SOLID WASTE:	RCRA:	CERCLA	LANDFILL	OTHER:
☐ NC ☐ SC ☐	☐ NC ☐ SC ☐	☐ NC ☐ SC ☐	☐ NC ☐ SC ☐	☐ NC ☐ SC ☐	☐ NC ☐ SC ☐	☐ NC ☐ SC ☐	☐ NC ☐ SC ☐	☐ NC ☐ SC ☐

*CONTAINER TYPE CODES: A = Amber C = Clear G = Glass P = Plastic; TL = Teflon-Lined Cap VOA = Volatile Organics Analysis (Zero Head Space)

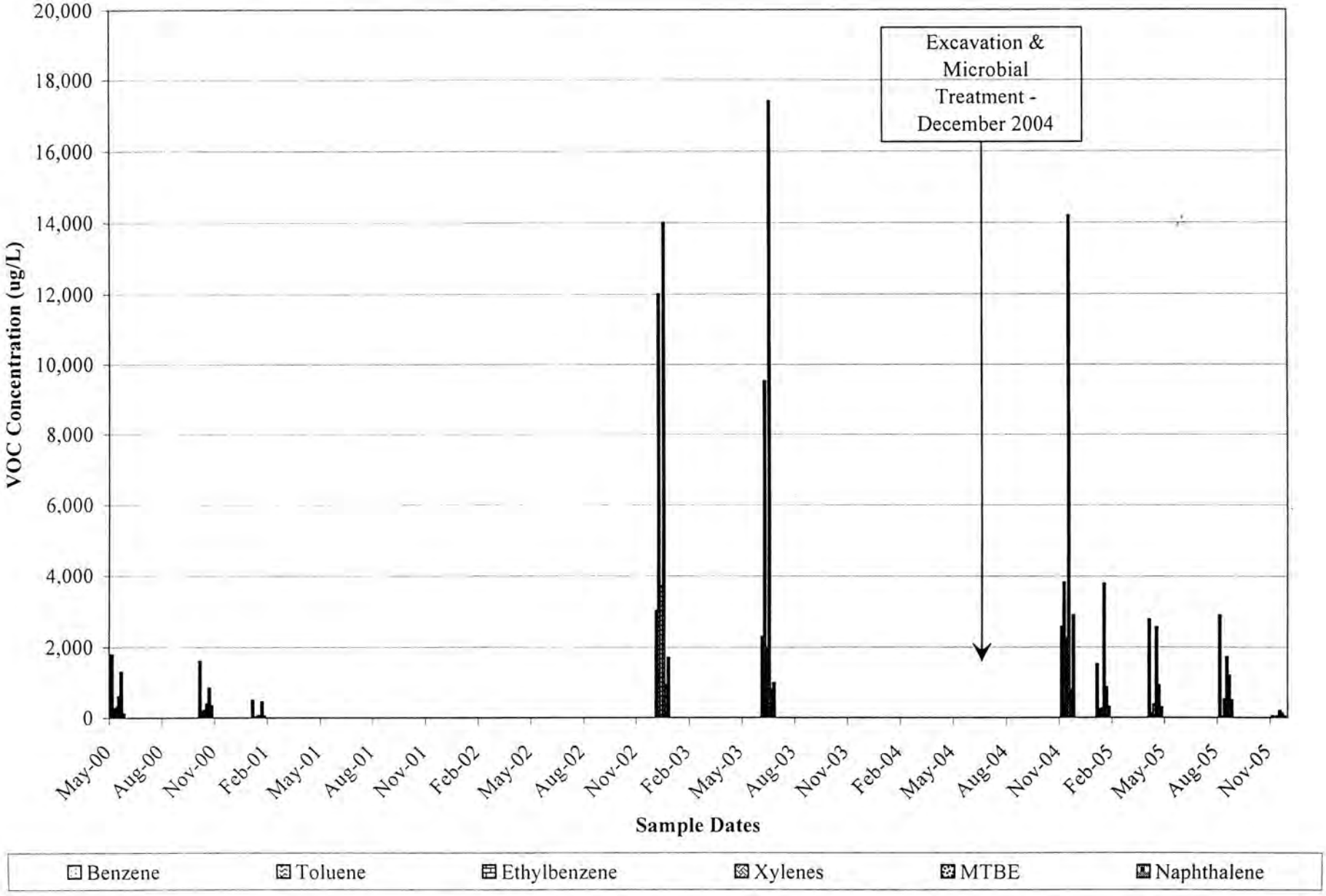
SEE REVERSE FOR TERMS & CONDITIONS

ORIGINAL

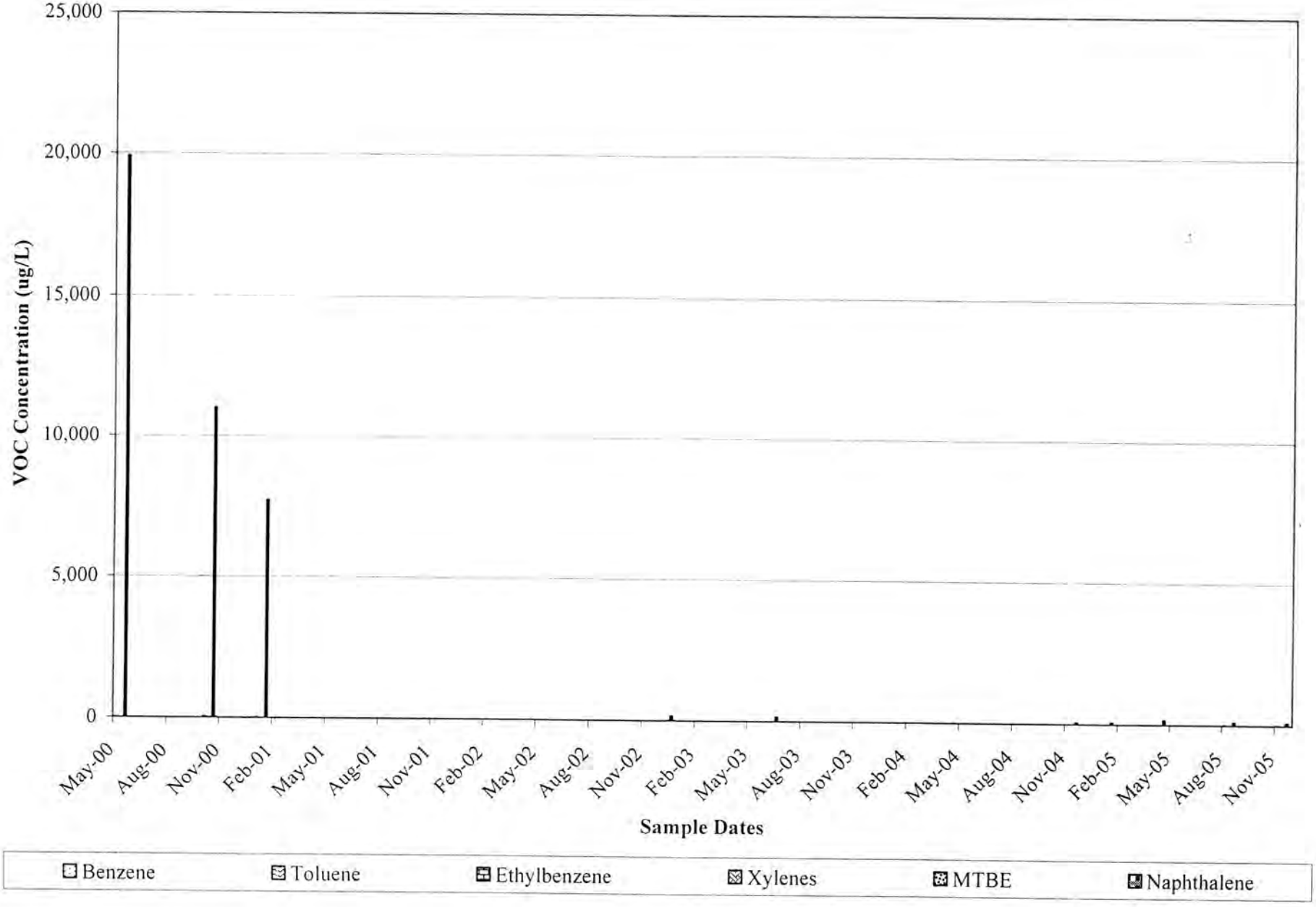
APPENDIX C

GRAPHS OF INDIVIDUAL VOC CONCENTRATIONS VS. TIME

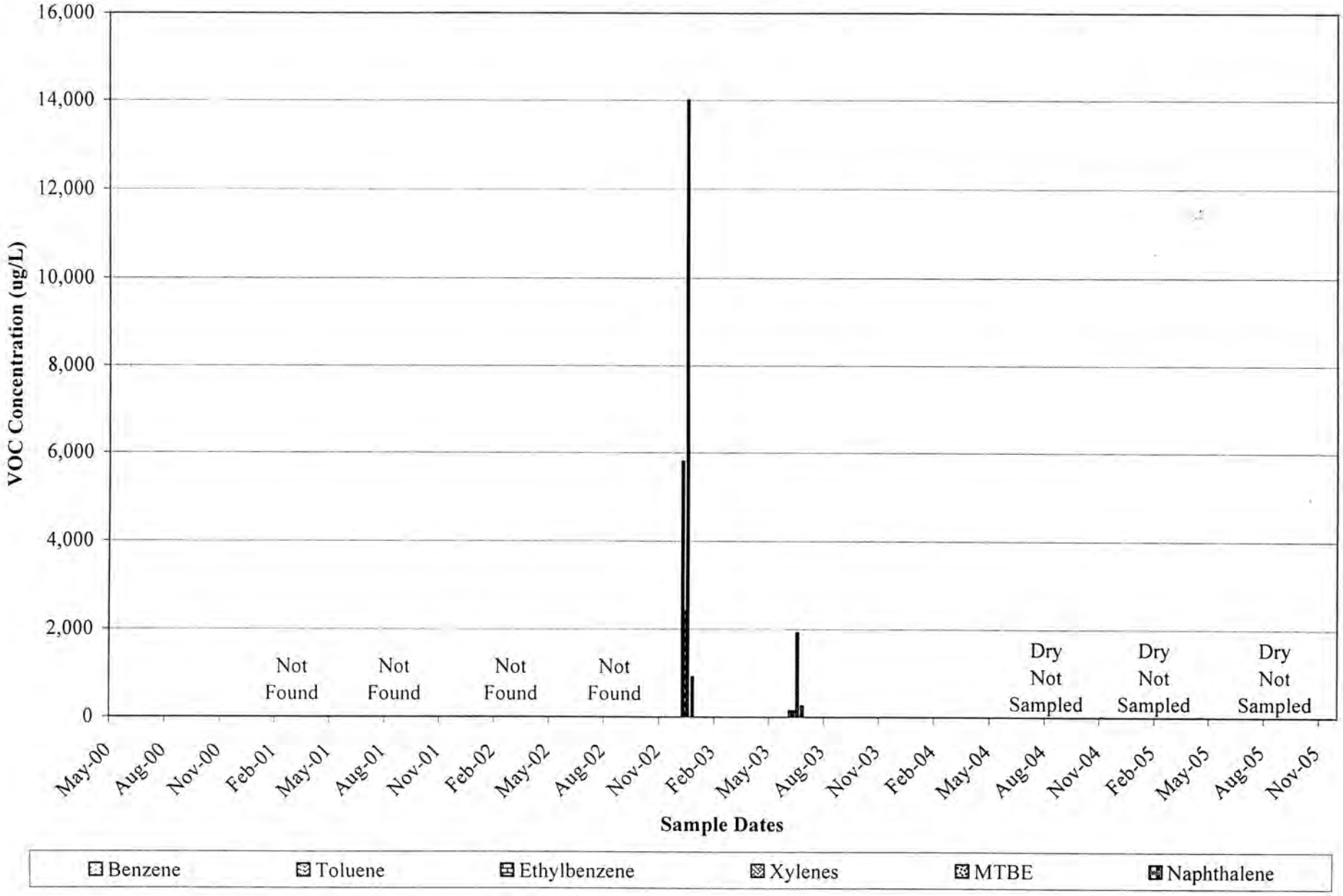
GROUNDWATER QUALITY CHART
GREENS OIL - MW-1/MW-1R



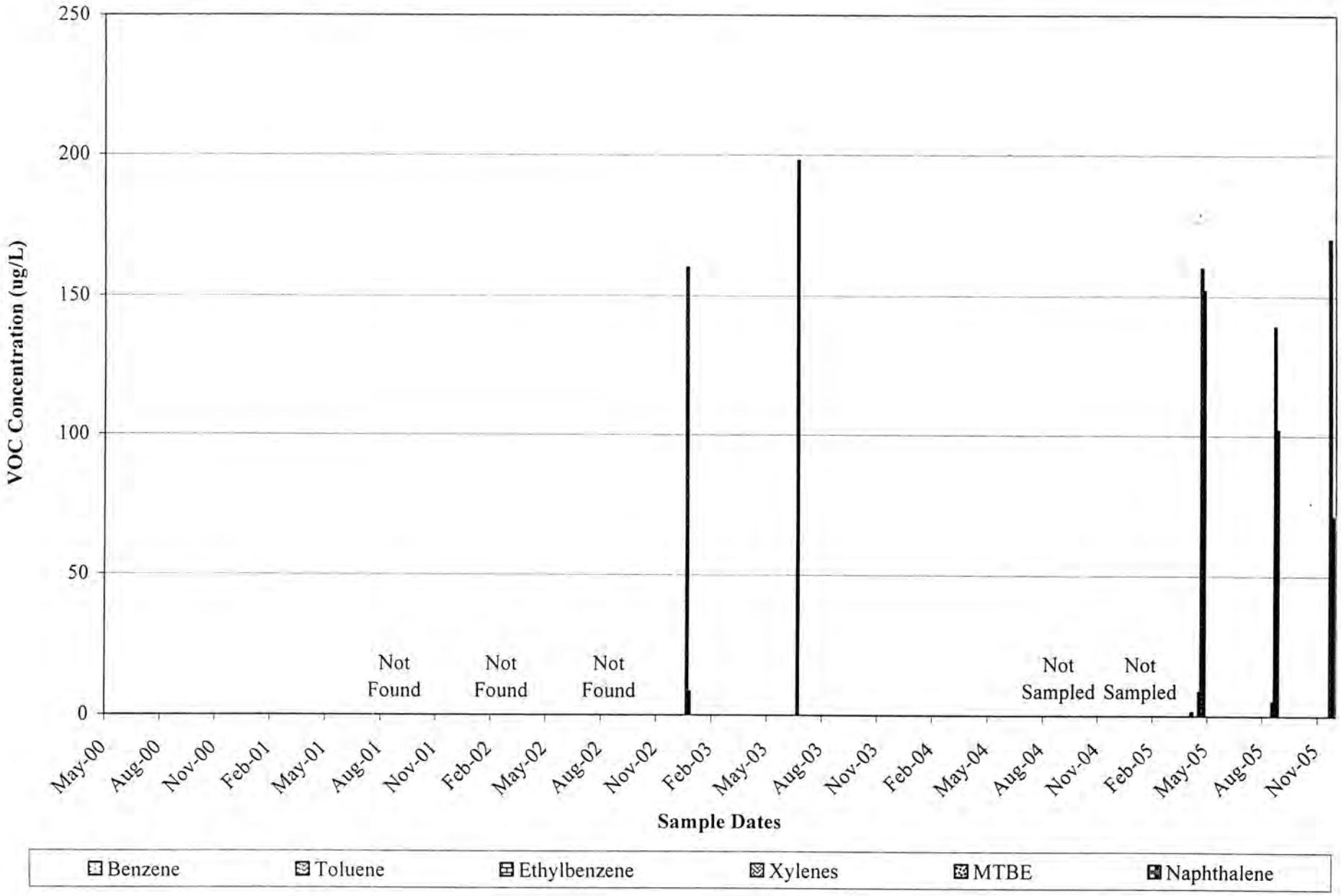
GROUNDWATER QUALITY CHART
GREENS OIL - MW-2



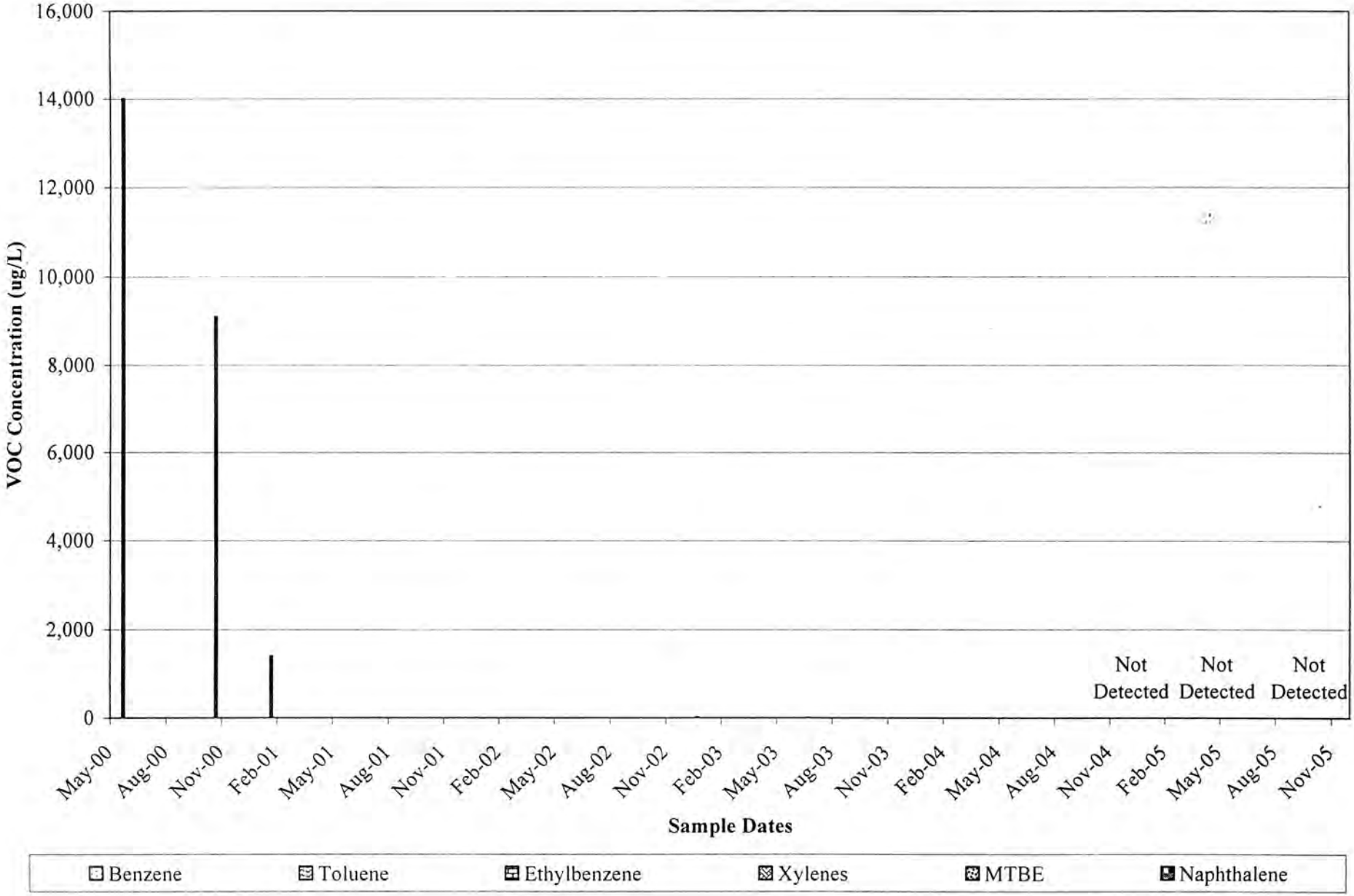
GROUNDWATER QUALITY CHART
GREENS OIL - MW-3



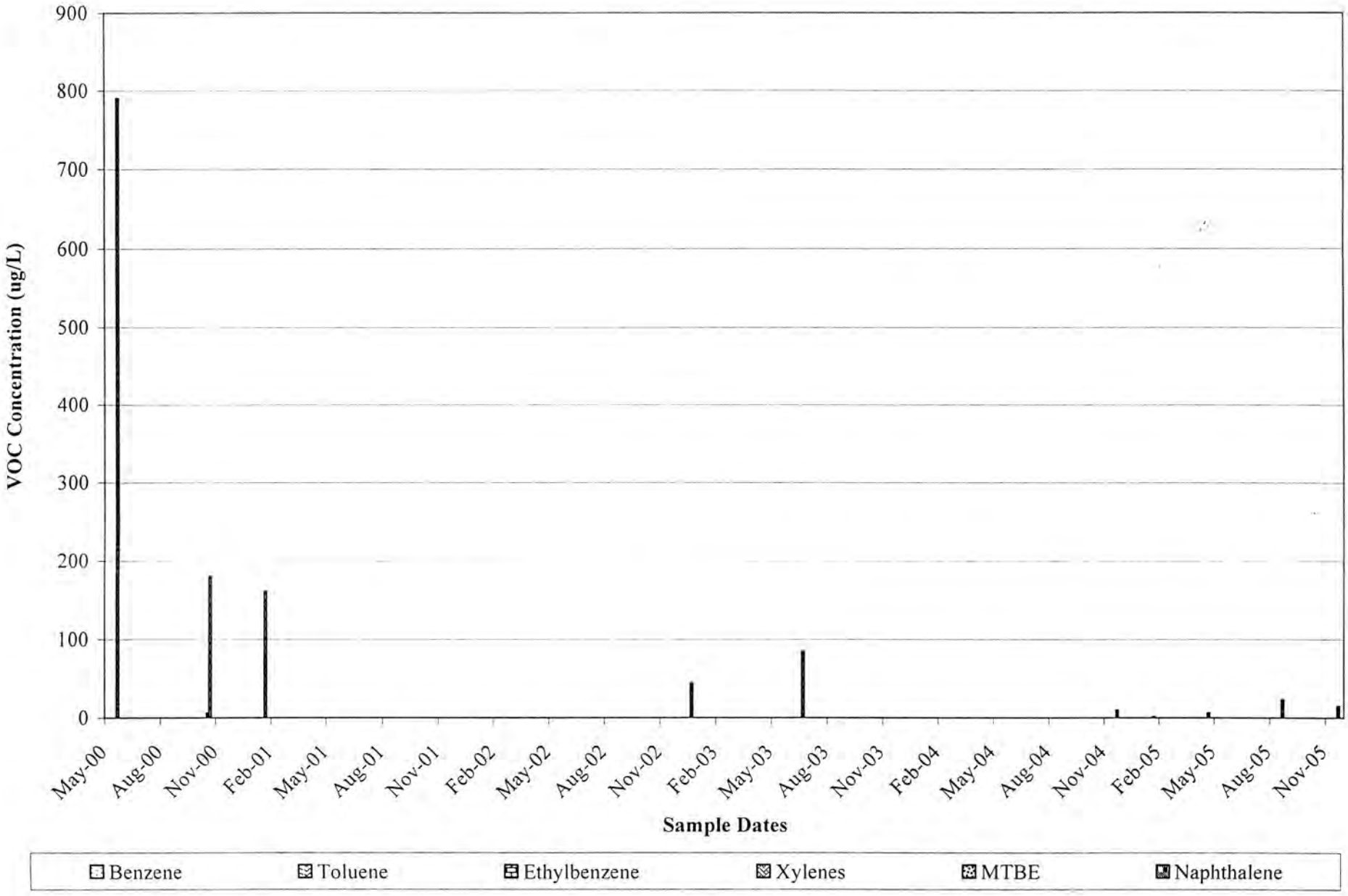
GROUNDWATER QUALITY CHART
GREENS OIL - MW-4



GROUNDWATER QUALITY CHART
GREENS OIL - MW-5



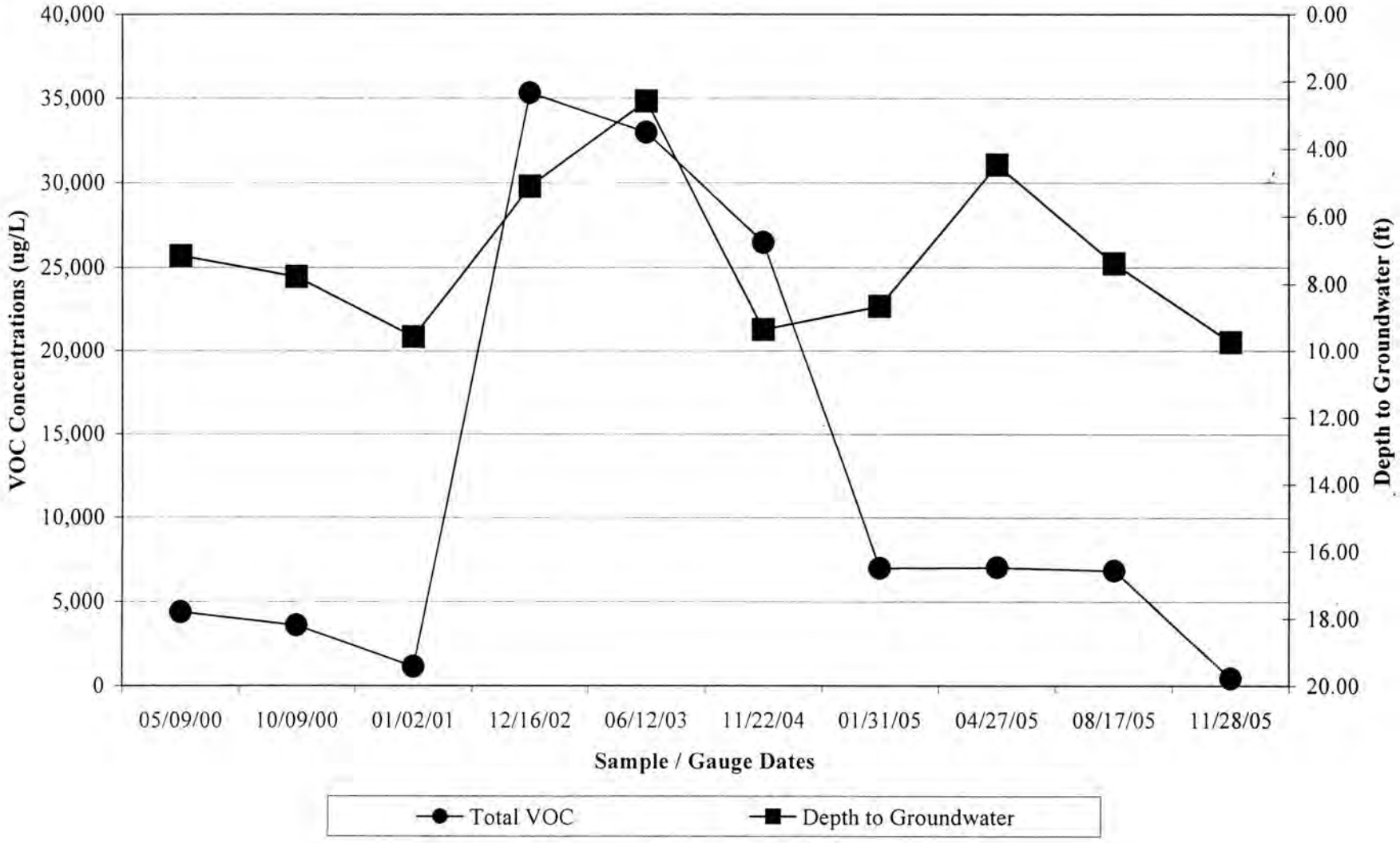
GROUNDWATER QUALITY CHART
GREENS OIL - PW-8



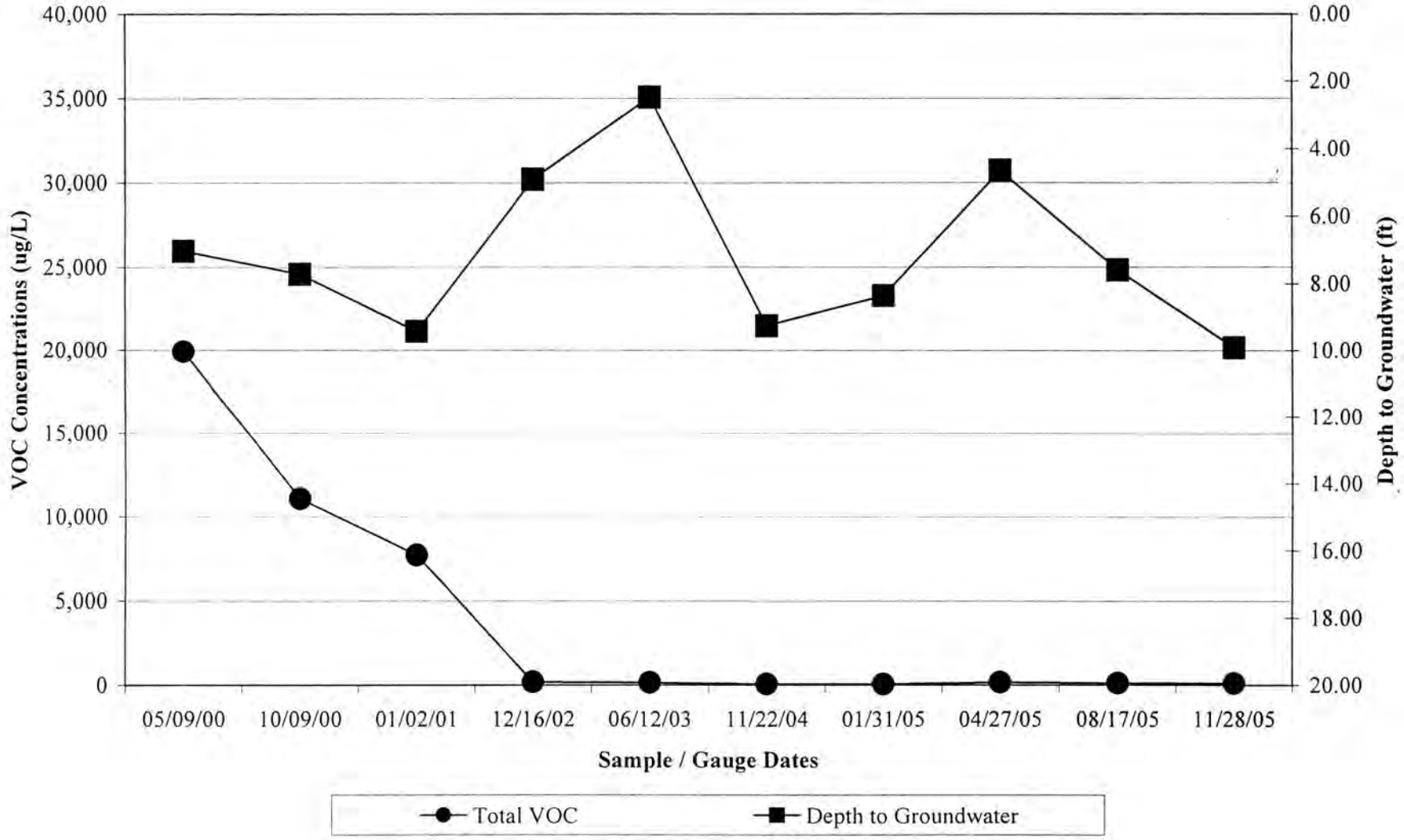
APPENDIX D

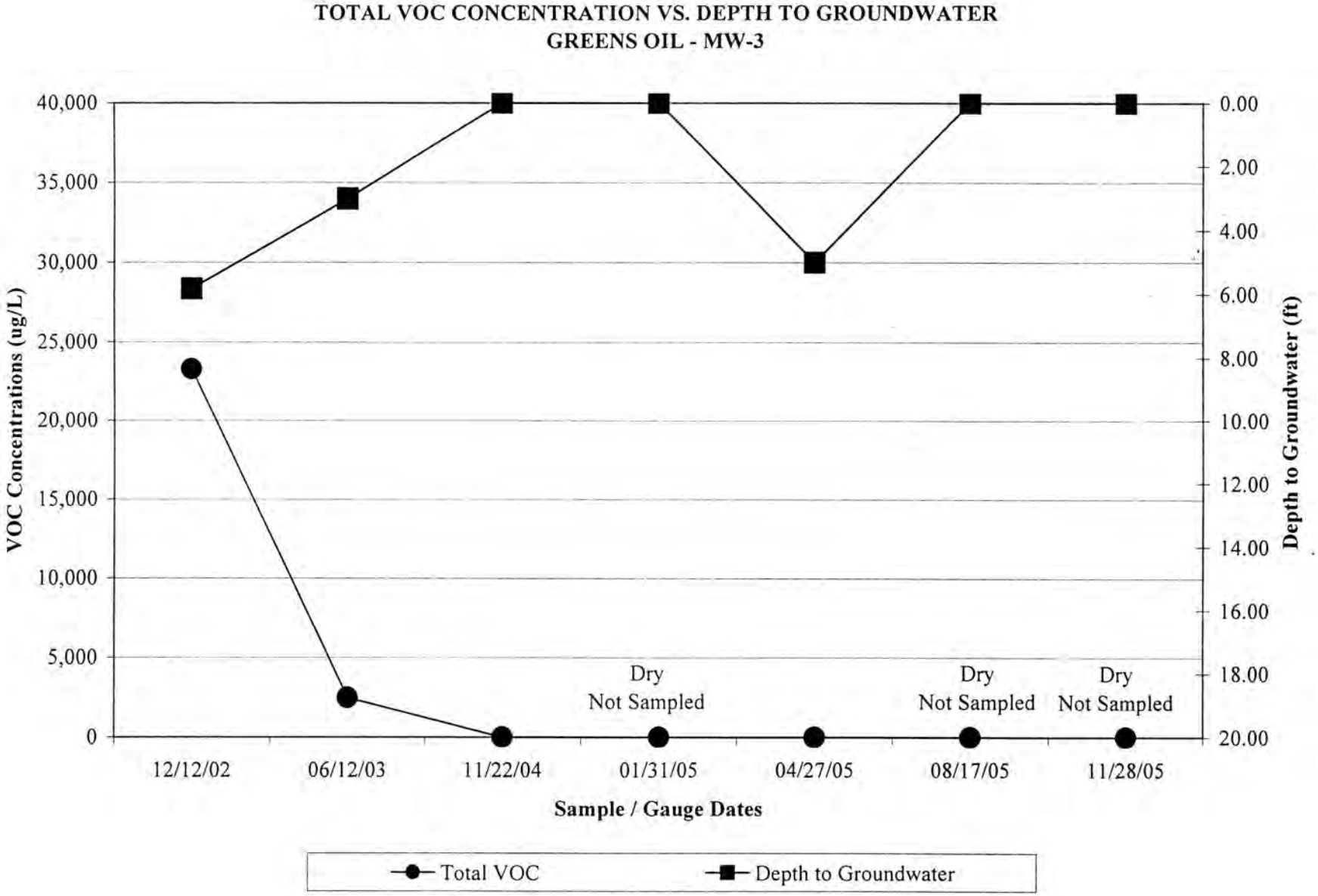
GRAPHS OF TOTAL VOC CONCENTRATIONS VS. DEPTH TO GROUNDWATER

TOTAL VOC CONCENTRATION VS. DEPTH TO GROUNDWATER
GREENS OIL - MW-1/MW-1R

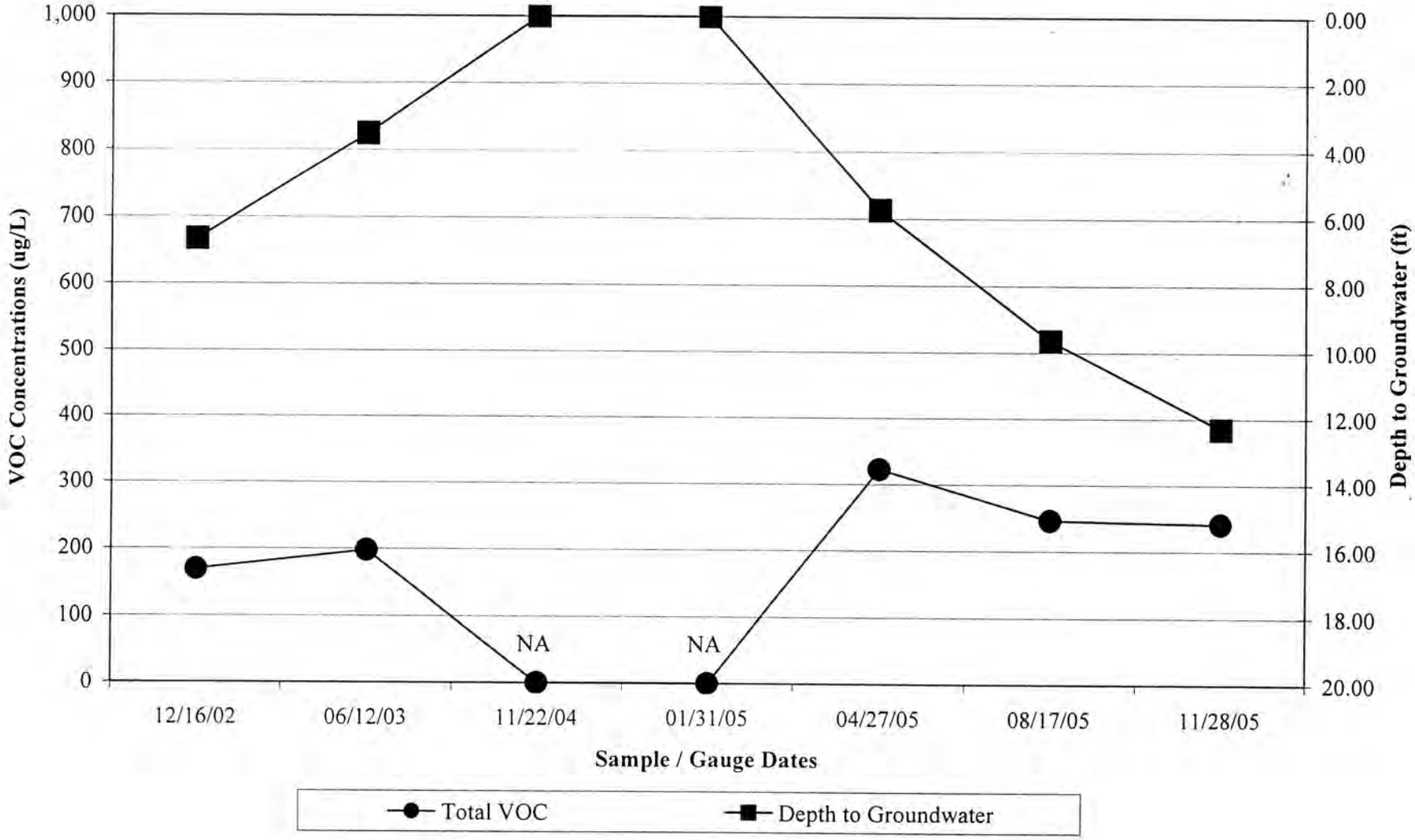


TOTAL VOC CONCENTRATION VS. DEPTH TO GROUNDWATER
GREENS OIL - MW-2

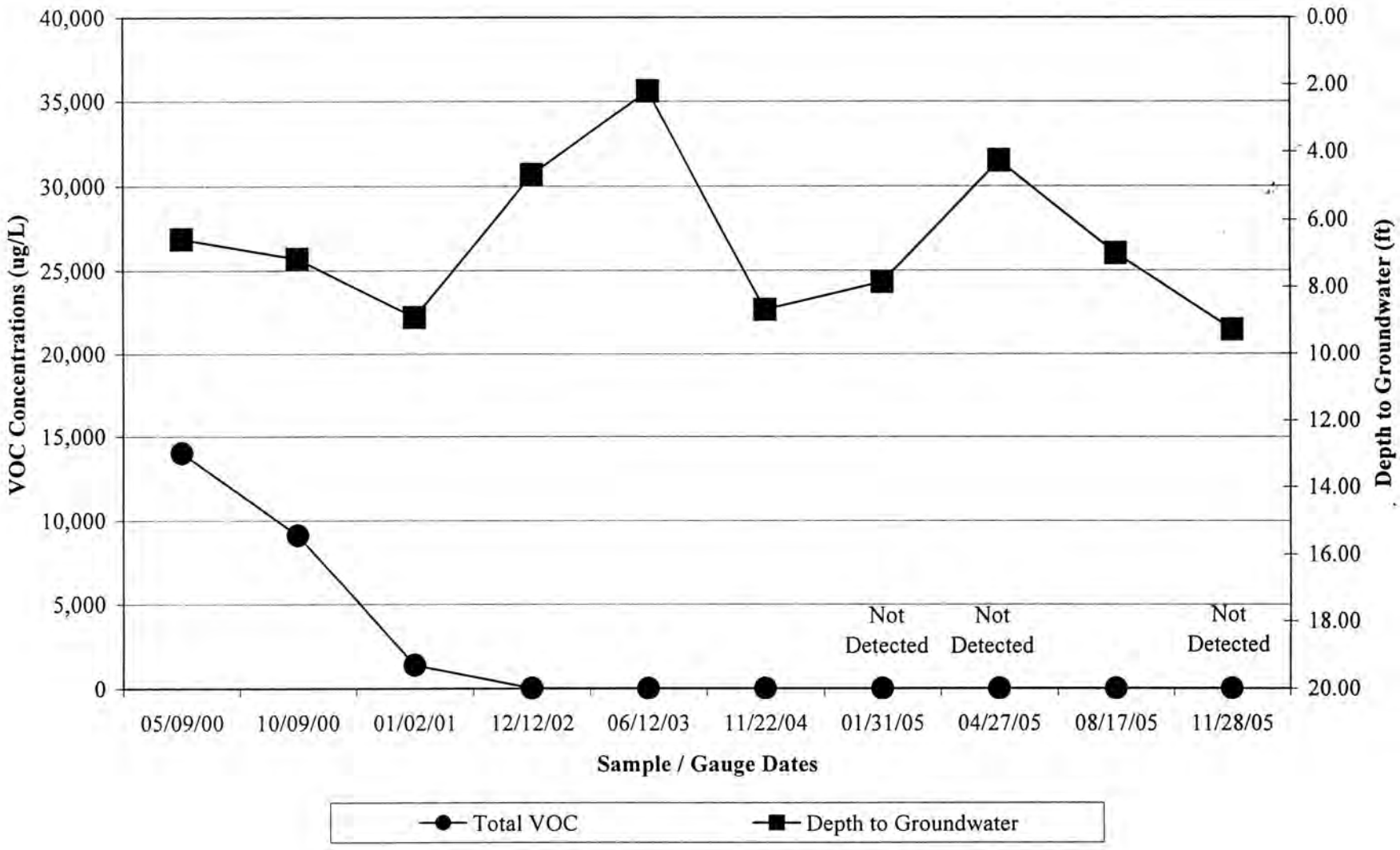



TOTAL VOC CONCENTRATION VS. DEPTH TO GROUNDWATER
GREENS OIL - MW-3
VOC Concentrations (ug/L)
40,000
35,000
30,000
25,000
20,000
15,000
10,000
5,000
0
Depth to Groundwater (ft)
0.00
2.00
4.00
6.00
8.00
10.00
12.00
14.00
16.00
18.00
20.00
Dry
Not Sampled
Dry
Not Sampled
Dry
Not Sampled
12/12/02
06/12/03
11/22/04
01/31/05
04/27/05
08/17/05
11/28/05
Sample / Gauge Dates
Total VOC
Depth to Groundwater

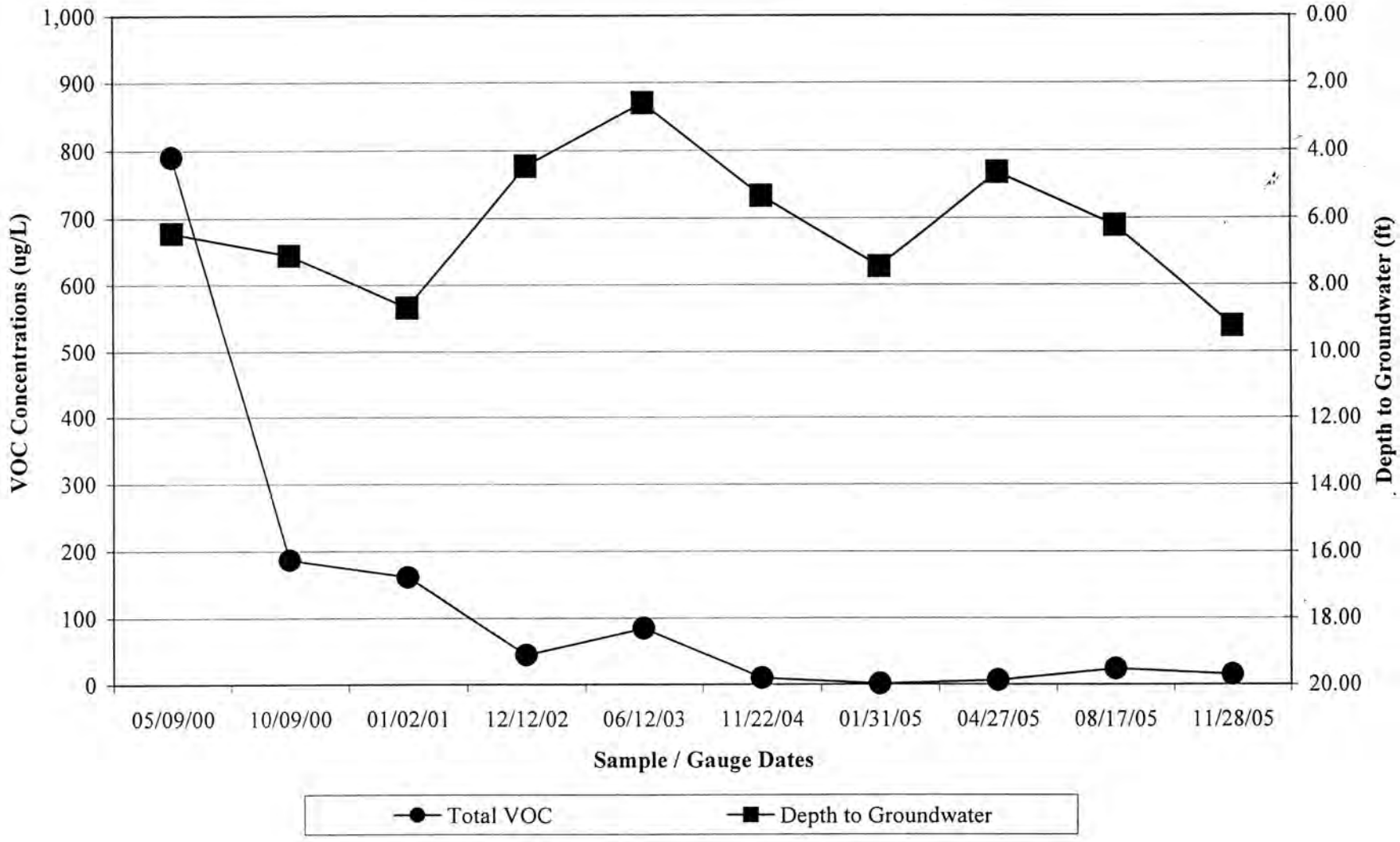
TOTAL VOC CONCENTRATION VS. DEPTH TO GROUNDWATER
GREENS OIL - MW-4



TOTAL VOC CONCENTRATION VS. DEPTH TO GROUNDWATER
GREENS OIL - MW-5



TOTAL VOC CONCENTRATION VS. DEPTH TO GROUNDWATER
GREENS OIL - PW-8



CBM

ENVIRONMENTAL SERVICES, INC.

GROUNDWATER MONITORING REPORT
GREEN'S OIL COMPANY
2849 CHERRY RD.
ROCK HILL, YORK COUNTY
UST PERMIT NO. 09344
SITE RISK CLASSIFICATION: HIGH
LAND USE CLASSIFICATION: COMMERCIAL
CBM PROJECT NO. 11030

Prepared For:

Federated Insurance Company
c/o Jerry Green
2457 Breen Circle
Rock Hill, SC 29732

Prepared By:

CBM Environmental Services, Inc.
3440 Lakemont Blvd.
Fort Mill, SC 29708
(803) 548-5989

April 17, 2006

Brian M. Demme
Project Manager

DANA CARLTON DILLON REGISTERED No. 2391 SOUTH CAROLINA PROFESSIONAL GEOLOGIST

Dana Dillon, P.G.
Senior Project Manager
SC License No. 2391

TABLE OF CONTENTS

FIGURES

TABLES

APPENDICES

1.0 INTRODUCTION

This report presents the results of groundwater monitoring activities, conducted in March 14, 2006, at the Green's Oil Company site, in Rock Hill, South Carolina. The site previously operated as a gas station and is located in a commercial/industrial area of York County. Public or private water supply wells have not been reported within 1,000 feet of the site. Two water supply wells located down gradient of the site have been abandoned. Surface water bodies have not been observed within 500 feet of the source area. The Catawba River is the only known potential receptor identified during the receptor survey and is located approximately 3,000 feet down gradient north by northwest of the site.

A Corrective Action Plan (CAP) that proposed the remediation of petroleum impacted soil and groundwater beneath the site; by excavating, backfilling with microbial augmented soil and de-watering, followed by microbial injections, was submitted to the SCDHEC on January 23, 2004. The SCDHEC approved the CAP in correspondence dated March 29, 2004. However, in subsequent telephone conversations with the responsible party's insurance company (Federated Insurance), it was decided, by Federated Insurance, that only the soil excavation and backfilling with microbial augmented soil, combined with de-watering, would be implemented initially. Microbial injections, if needed, would be conducted after two to three quarters of groundwater monitoring. Soil excavation, followed by backfilling with microbial augmented soil and compaction was completed in December 2004.

2.0 FACILITY INFORMATION

- **Facility Name**: Green's Oil Company
- **Location:** 2849 Cherry Road
  Rock Hill, York County (**Figure 1**)
- **UST Permit No.** 09344
- **Risk Classification:** High
- **Land Use Classification:** Commercial
- **UST Operator:** Green's Oil Company
  2849 Cherry Road
  Rock Hill, South Carolina
- **UST Owner:** Green's Oil Company
  2849 Cherry Road
  Rock Hill, South Carolina

- **Consultant:** CBM Environmental Services, Inc.
  3440 Lakemont Blvd
  Fort Mill, South Carolina 29708
  (803) 548-5989
- **Release Information:**
  - **Date Discovered:** Unknown
  - **Estimated Quantity of Release:** Unknown
  - **Cause of Release:** Unknown
  - **Source of Release:** Leaking UST System
  - **UST System Size/Contents:** Four gasoline USTs
  - **Latitude / Longitude:** 34°58'42" North/ 80°58'54" West

3.0 SAMPLING ACTIVITIES

3.1 Site Hydrogeology

The depths to groundwater in the Type II monitoring wells measured on March 14, 2006 ranged from 6.95 feet (MW-5) to 7.67 feet (MW-6). Groundwater elevations relative to a temporary benchmark with an assumed datum of 100.00 feet, ranged from 90.09 feet (MW-5) to 91.20 feet (MW-7). Based on the March 2006 data, the horizontal groundwater flow direction was generally toward the northwest. The horizontal hydraulic gradient beneath the site was approximately 0.07 feet per foot. A Water Table Surface Map, based on the March 2006 data, is included as **Figure 3**. A summary of groundwater elevation data obtained in March 2006 is presented in **Table 1**. A summary of historical groundwater elevation data is presented in **Table 2**.

3.2 Groundwater Sampling

On March 14, 2006, five Shallow (water table) monitoring wells (MW-1R, MW-2, MW-5, MW-6 and MW-7) and one Telescoping monitoring well (PW-8) were purged and sampled. Monitoring well MW-3 was gauged and was observed to be dry at the time of the site visit. Monitoring well MW-4 was not gauged due to an obstruction. Laboratory analyses were performed on groundwater samples collected from the monitoring wells for BTEX constituents, MTBE and naphthalene by EPA Method 8260B. Field measurements of dissolved oxygen (DO), pH, conductivity and temperature were collected from the monitoring wells when sampled.

4.0 GROUNDWATER QUALITY

A detectable concentration of benzene that exceeded the May 2001 risk based screening level (RBSL) was reported in the groundwater sample collected from monitoring well MW-1R. Concentrations of MTBE that exceeded the RBSL were reported in the groundwater samples collected from monitoring well MW-1R, and MW-2. A detectable concentration of benzene below the RBSL was reported in the groundwater sample collected from monitoring well MW-2. Detectable concentrations of MTBE below the RBSL were reported in the groundwater sample collected from monitoring wells MW-7 and PW-8.

A detectable concentration of ethylbenzene below the RBSL was reported in the groundwater sample collected from monitoring well MW-1R. A detectable concentration of Naphthalene below the RBSL was reported in the groundwater sample collected from monitoring well MW-1R. Detectable concentrations of requested method constituents were not reported above the RBSLs in the groundwater samples collected from monitoring wells MW-5, and MW-6.

A Groundwater Quality Map showing individual BTEX constituents, MTBE and naphthalene concentrations in the groundwater samples collected from the monitoring wells during the March 2006 sampling event is included as **Figure 4**. A summary of laboratory analyses of groundwater samples collected from the monitoring wells in March 2006 is presented in **Table 3**. A summary of historical groundwater quality data is presented in **Table 4**. Groundwater sampling data sheets from the March 2006 sampling event have been included as **Appendix A.** A complete report of laboratory analyses of groundwater samples collected during the March 2006 sampling event has been included as **Appendix B**. Graphs showing variations in BTEX constituents, MTBE and naphthalene concentrations versus time and total VOC concentrations versus depths to groundwater have been included as **Appendices C** and **D**, respectively. Disposal manifest were not available at this time. They will be forwarded upon receipt.

5.0 CONCLUSIONS AND RECOMMENDATIONS

- Detectable concentrations of BTEX constituents, and/or MTBE that exceeded the RBSLs were reported in groundwater samples collected from monitoring wells MW-1R and MW-2. Concentrations of ethylbenzene and naphthalene below the RBSLs were reported in the groundwater samples collected from monitoring well MW-1R. Concentrations of benzene, below the RBSL were reported in the groundwater samples collected from monitoring well MW-2.

- Concentrations of MTBE, below the RBSL were reported in the groundwater samples collected from monitoring well MW-7 and PW-8.
- The total VOC concentrations have decreased marginally in monitoring wells MW-2, and PW-8 and decreased substantially in MW-1R and MW-7 to the last sampling period. Monitoring wells MW-5 and MW-6 remain below reporting limits. Monitoring wells MW-3 was dry and therefore not sampled. Monitoring well MW-4 was not sampled due to an obstruction.
- The next groundwater sampling event will be conducted in July 2006 and the report will be submitted no later than July 30, 2006.

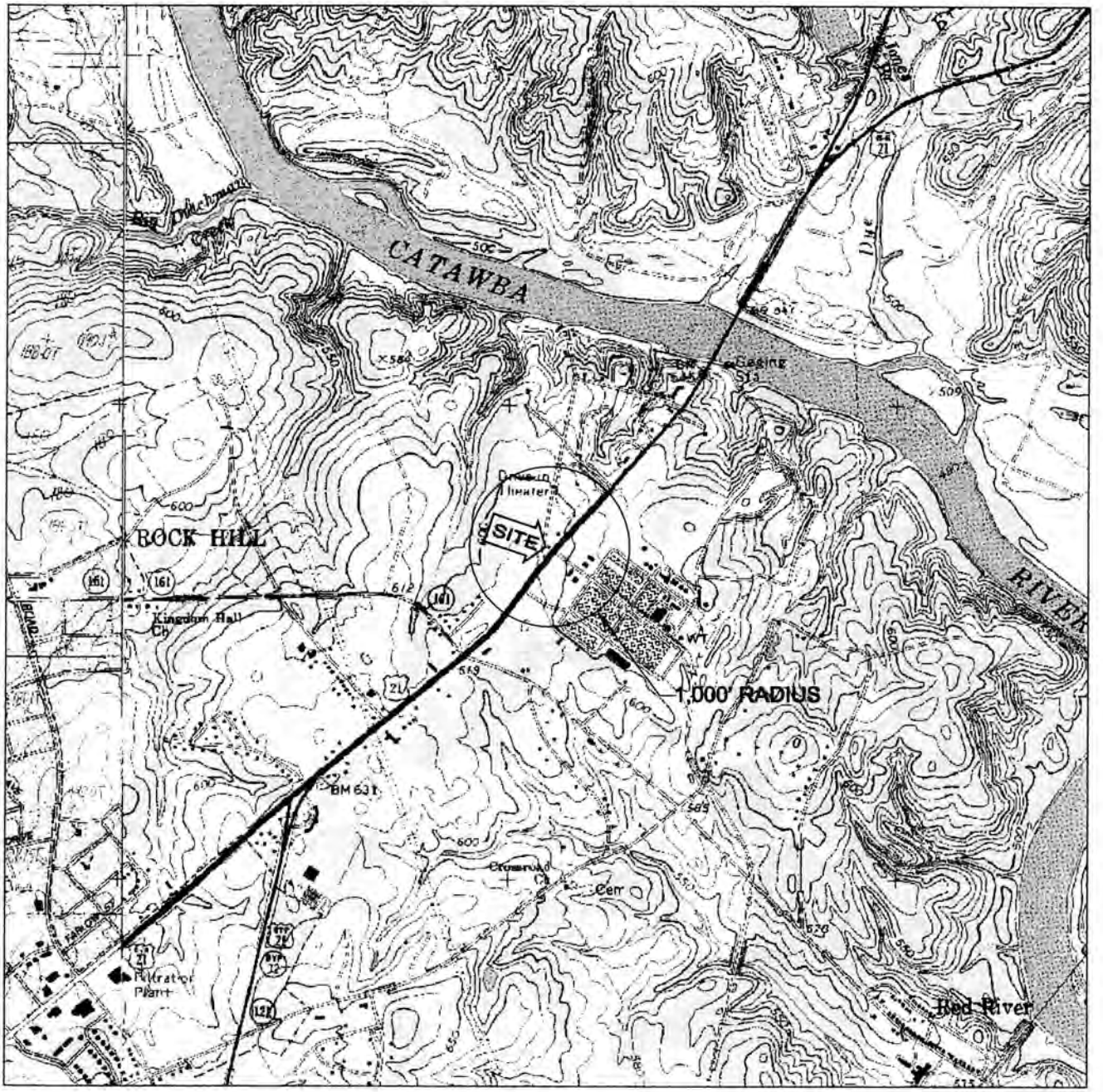
6.0 LIMITATIONS

This report has been prepared for the exclusive use of Mr. Jerry Green for specific application to the referenced site in York County, South Carolina. The assessment was conducted based on the scope of work and level of effort desired by the client and with resources adequate only for that scope of work.

Certain data contained in this report was not obtained under the supervision of CBM Environmental Services Inc. (CBM). Although the accuracy of this data cannot be verified and for the purpose of this report CBM assumes it is correct. Our findings have been developed in accordance with generally accepted standards of geology and hydrogeology practices in the State of South Carolina, available information, and our professional judgment. No other warranty is expressed or implied.

The data presented in this report are indicative of conditions that existed at the precise locations sampled and at the time the samples were collected. In addition, the data obtained from samples would be interpreted as being meaningful with respect to parameters indicated in the laboratory report. No additional information can be logically be inferred from this data.

FIGURES



SCALE 1:24,000

1 MILE

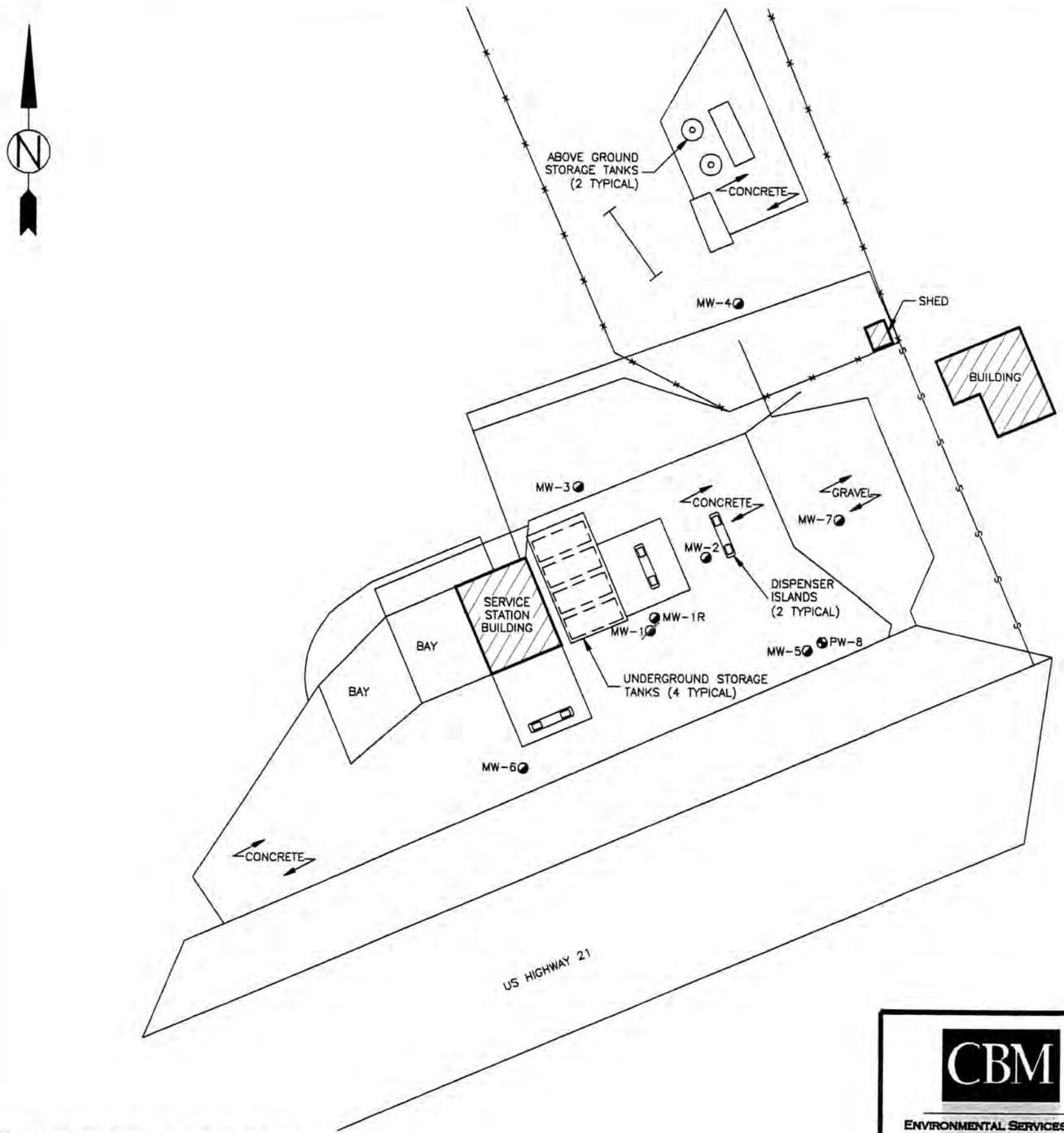
1000 0 1000 2000 3000 4000 5000 6000 7000 FEET

CONTOUR INTERVAL 10 FEET

QUADRANGLE LOCATION

ROCK HILL EAST, SC QUADRANGLE

CBM ENVIRONMENTAL SERVICES, INC.	LATITUDE: 34° 58' 42" N LONGITUDE: 80° 58' 54" W DRAWN BY: AWB CHECKED BY: BD DATE: 12/16/05	GREEN'S OIL CO. 2849 CHERRY RD. ROCK HILL, SC SITE ID NO. 09344	FIGURE 1 USGS TOPOGRAPHIC MAP CBM PROJECT NO. 11030



LEGEND

- SHALLOW MONITORING WELL
- SHALLOW MONITORING WELL (ABANDONED)
- TELESCOPING MONITORING WELL
- FENCE
- SEWER LINE

SCALE

0 10 20 30 40

FEET

NOTE: FIGURE BASED ON SITE MAP BY PREVIOUS CONSULTANT.

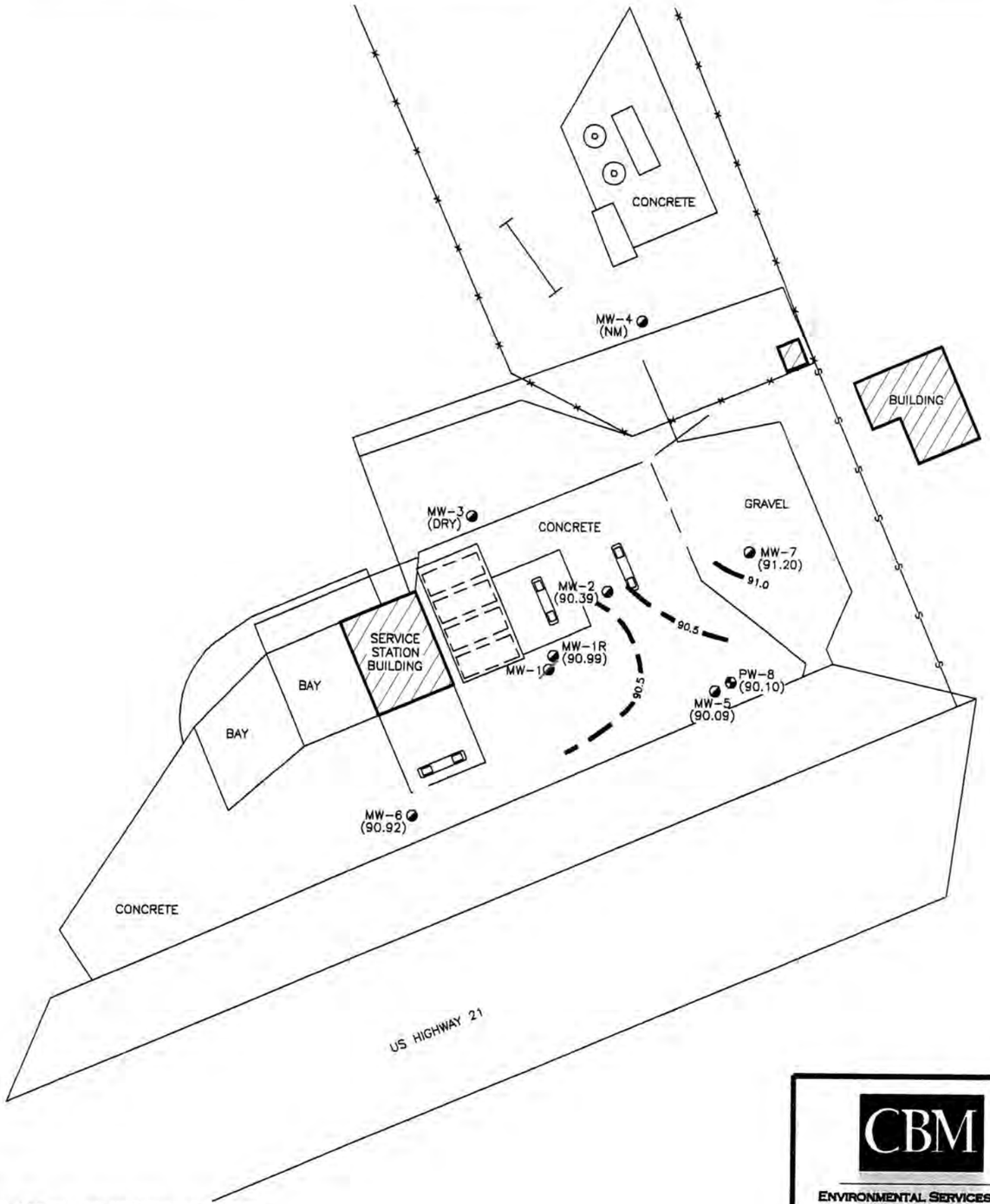
CBM ENVIRONMENTAL SERVICES, INC.

SITE I.D. NO.	09344
PROJECT NO.	11030
DRAWN BY:	AWB
CHECKED BY:	BD
DWG DATE:	1/12/06

SITE MAP

GREEN'S OIL CO.
2849 CHERRY ROAD
ROCK HILL, SC

FIGURE 2



LEGEND

- SHALLOW MONITORING WELL
- SHALLOW MONITORING WELL (ABANDONED)
- TELESCOPING MONITORING WELL
- FENCE
- S — SEWER LINE
- WATER TABLE SURFACE CONTOUR
- (90.99) GROUNDWATER ELEVATION (ft)
- (NM) NOT MEASURED

SCALE

0 10 20 30 40

FEET

NOTE: FIGURE BASED ON SITE MAP BY PREVIOUS CONSULTANT.

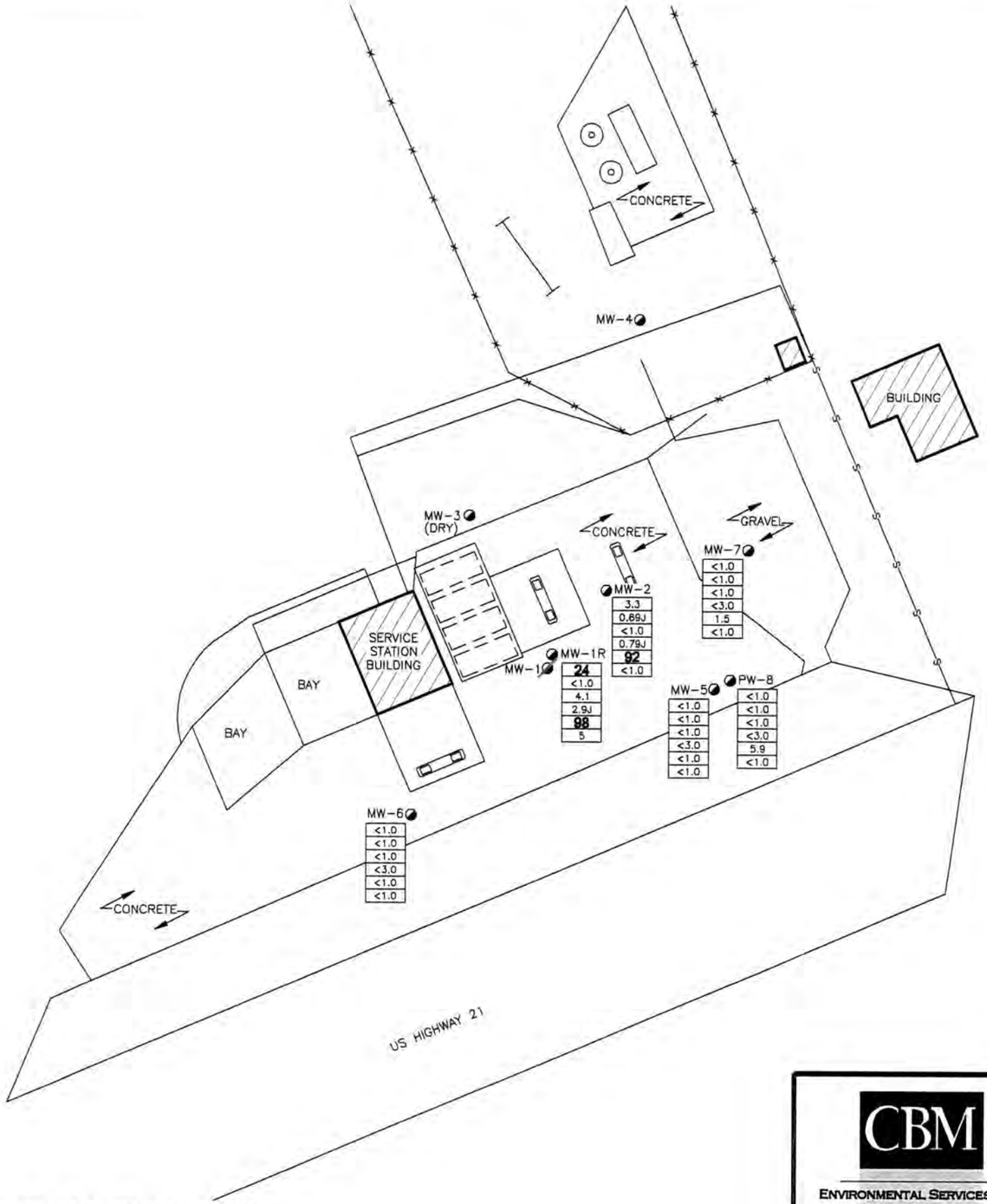
CBM
ENVIRONMENTAL SERVICES, INC.

SITE I.D. NO.	09344
PROJECT NO.	11030
DRAWN BY:	AWB
CHECKED BY:	BD
DWG DATE:	4/4/06

WATER TABLE SURFACE MAP
MARCH 14, 2006

GREEN'S OIL CO.
2849 CHERRY ROAD
ROCK HILL, SC

FIGURE 3



LEGEND

- SHALLOW MONITORING WELL
- SHALLOW MONITORING WELL (ABANDONED)
- FENCE
- S SEWER LINE

5	BENZENE
1,000	TOLUENE
700	ETHYLBENZENE
10,000	XYLENES
40	MTBE
25	NAPHTHALENE

CONCENTRATIONS IN $\mu g/L$

ABOVE CONCENTRATIONS REPRESENT MAY 2001 RISK-BASED SCREENING LEVELS; CONCENTRATIONS IN BOLD FACE TYPE EXCEEDED THE RBSL

<1.0 – LESS THAN THE METHOD DETECTION LIMIT SPECIFIED IN THE LABORATORY REPORT

J – THE ANALYTE WAS POSITIVELY IDENTIFIED BUT THE VALUE IS ESTIMATED BELOW THE REPORTING LIMIT

SCALE

0 10 20 30 40

FEET

NOTE: FIGURE BASED ON SITE MAP BY PREVIOUS CONSULTANT.

CBM ENVIRONMENTAL SERVICES, INC.

SITE I.D. NO.	09344
PROJECT NO.	11030
DRAWN BY:	AWB
CHECKED BY:	BD
DWG DATE:	4/4/06

GROUNDWATER QUALITY MAP
MARCH 14, 2006

GREEN'S OIL CO.
2489 CHERRY ROAD
ROCK HILL, SC

FIGURE 4

TABLES

TABLE 1
SUMMARY OF GROUNDWATER ELEVATION DATA[1]
GREEN'S OIL COMPANY
MARCH 14, 2006

Well ID	Top of Casing Elevation	Depth to Groundwater	Groundwater Elevation	Well Depth[2]	Dissolved Oxygen[3]
MW-1R[4]	98.30	7.31	90.99	10.35	3.64
MW-2	97.86	7.47	90.39	15.20	2.72
MW-3	97.08	Dry	Dry	7.75	NM[5]
MW-4	96.91	NM	NM	NM	NM
MW-5	97.04	6.95	90.09	10.30	5.30
MW-6	98.59	7.67	90.92	9.95	7.03
MW-7	98.40	7.20	91.20	14.10	4.47
PW-8	96.98	6.88	90.10	30.90	3.30

Notes:

1. Top of Casing Elevations for monitoring wells MW-2 through MW-7 and PW-8 were reproduced from the previous consultant's reports. Additional well construction details are unavailable; data reported in feet.
2. Well depths for monitoring wells MW-2 through MW-7 and PW-8 measured during June 12, 2003 sampling event.
3. Dissolved oxygen (DO) levels were measured in the field using a DO meter; results reported in mg/L.
4. Monitoring well MW-1R was installed as a replacement for monitoring well MW-1 on January 26, 2005.
5. Not Measured. Well did not yield enough water for field measurements.

TABLE 2
SUMMARY OF HISTORICAL GROUNDWATER ELEVATION DATA[1]
GREEN'S OIL COMPANY

Well ID	Date Measured	Top of Casing Elevation	Depth to Groundwater	Groundwater Elevation	Well Depth[2]	Dissolved Oxygen[3]
MW-1	05/24/00	98.15	7.16	90.99	12.33	1.3
	10/09/00		7.78	90.37		2.3
	01/02/01		9.58	88.57		1.4
	12/16/02		5.11	93.04		NM[4]
	06/12/03		2.59	95.56		0.79
	11/22/04		9.36	88.79		0.93
MW-1R[5]	01/31/05	98.30	8.66	89.64	9.50	2.33
	04/27/05		4.48	93.82		1.03
	08/17/05		7.39	90.91		3.18
	11/28/05		9.75	88.55		NM
	03/14/06		7.31	90.99		3.64
MW-2	05/24/00	97.86	7.03	90.83	14.04	1.9
	10/09/00		7.71	90.15		2.4
	01/02/01		9.43	88.43		0.0
	12/16/02		4.91	92.95		2.06
	06/12/03		2.47	95.39		0.53
	11/22/04		9.26	88.60		1.39
	01/31/05		8.36	89.50		1.28
	04/27/05		4.65	93.21		0.85
	08/17/05		7.59	90.27		3.78
	11/28/05		9.92	87.94		1.9
	03/14/06		7.47	90.39		2.72
MW-3	12/16/02	97.08	5.83	91.25	7.75	NM
	06/12/03		3.01	94.07		1.14
	11/22/04		Dry	Dry		Dry
	01/31/05		Dry	Dry		Dry
	04/27/05		5.00	92.08		1.73
	08/17/05		Dry	Dry		Dry
	11/28/05		Dry	Dry		NM
	03/14/06		Dry	Dry		NM
MW-4	12/16/02	96.91	6.66	90.25	13.59	1.45
	06/12/03		3.52	93.39		0.69
	11/22/04		NM	NM		NM
	01/31/05		NM	NM		NM
	04/27/05		5.75	91.16		1.30
	08/17/05		9.65	87.26		4.26
	11/28/05		12.32	84.59		1.78
	03/14/06		NM[6]	NM		NM

TABLE 2 (continued)
SUMMARY OF HISTORICAL GROUNDWATER ELEVATION DATA
GREEN'S OIL COMPANY

Well ID	Date	Top of Casing Elevation	Depth to Groundwater	Groundwater Elevation	Well Depth	Dissolved Oxygen
MW-5	05/24/00	97.04	6.56	90.48	10.04	2.4
	10/09/00		7.15	89.89		3.0
	01/02/01		8.90	88.14		1.6
	12/16/02		4.67	92.37		2.27
	06/12/03		2.20	94.84		1.51
	11/22/04		8.67	88.37		1.41
	01/31/05		7.84	89.20		1.71
	04/27/05		4.26	92.78		3.15
	08/17/05		6.99	90.05		4.41
	11/28/05		9.28	87.76		1.71
	03/14/06		6.95	90.09		5.30
MW-6	05/24/00	98.59	8.10	90.49	9.60	3.8
	10/09/00		7.92	90.67		4.9
	01/02/01		9.52	89.07		NM
	12/16/02		5.25	93.34		3.68
	06/12/03		2.89	95.70		4.48
	11/22/04		9.44	89.15		NM
	01/31/05		8.59	90.00		NM
	04/27/05		4.98	93.61		5.81
	08/17/05		7.80	90.79		4.70
	11/28/05		9.58	89.01		NM
	03/14/06		7.67	90.92		7.03
MW-7	12/16/02	98.40	4.81	93.59	13.60	NM
	06/12/03		3.29	95.11		0.84
	11/22/04		NF[7]	NF		NF
	01/31/05		NF	NF		NF
	04/27/05		4.40	94.00		2.33
	08/17/05		6.22	92.18		3.69
	11/28/05		9.64	88.76		1.63
	03/14/06		7.20	91.20		4.47
PW-8	05/24/00	96.98	6.45	90.53	30.10	3.9
	10/09/00		7.12	89.86		2.5
	01/02/01		8.69	88.29		2.1
	12/16/02		4.46	92.52		NM
	06/12/03		2.60	94.38		1.23
	11/22/04		5.34	91.64		2.01
	01/31/05		7.45	89.53		3.25
	04/27/05		4.65	92.33		2.25
	08/17/05		6.22	90.76		2.98
	11/28/05		9.23	87.75		2.18
	03/14/06		6.88	90.10		3.30

TABLE 2 (continued)
SUMMARY OF HISTORICAL GROUNDWATER ELEVATION DATA
GREEN'S OIL COMPANY

Notes:

1. Top of Casing Elevations for monitoring wells MW-2 through MW-7 and PW-8 were reproduced from the previous consultant's reports. Additional well construction details are unavailable; data reported in feet.
2. Well depths for monitoring wells MW-2 through MW-7 and PW-8 measured during June 12, 2003 sampling event.
3. Dissolved oxygen (DO) levels were measured in the field using a DO meter; results reported in mg/L.
4. Not measured. Well did not yield enough water for field measurements or was not accessible.
5. Monitoring well MW-1R was installed as a replacement for monitoring well MW-1 on January 26, 2005.
6. Not measured, due to site obstruction.
7. Not found.

TABLE 3
SUMMARY OF LABORATORY ANALYSES[1]
GROUNDWATER SAMPLES
GREEN'S OIL COMPANY
MARCH 14, 2006

Well ID	Benzene	Toluene	Ethylbenzene	Xylenes	MTBE	Naphthalene
MW-1R[2]	**24**[3]	<1.0[4]	4.1	2.9 J[5]	**98**	5.0
MW-2	3.3	0.69 J	<1.0	0.79 J	**92**	<1.0
MW-3	Dry	Dry	Dry	Dry	Dry	Dry
MW-4	NS[6]	NS	NS	NS	NS	NS
MW-5	<1.0	<1.0	<1.0	<3.0	<1.0	<1.0
MW-6	<1.0	<1.0	<1.0	<3.0	<1.0	<1.0
MW-7	<1.0	<1.0	<1.0	<3.0	1.5	<1.0
PW-8	<1.0	<1.0	<1.0	<3.0	5.9	<1.0
RBSL[7]	5	1,000	700	10,000	40	25

Notes:

1. Analyses for BTEX constituents, MTBE and Naphthalene by EPA Method 8260B; results reported in µg/L.
2. Monitoring well MW-1R was installed as a replacement for monitoring well MW-1.
3. Concentrations in bold face type exceeded the May 2001 Risk Based Screening Level.
4. Less than the reporting limit specified in the laboratory report.
5. J-The analyte was postively identified but the value is estimated below the reporting limit.
6. No sampled due to obstruction.
7. May 2001 Risk Based Screening Level.

TABLE 4
SUMMARY OF HISTORICAL LABORATORY ANALYSES[1]
GROUNDWATER SAMPLES
GREEN'S OIL COMPANY

Well ID	Date Sampled	Benzene	Toluene	Ethylbenzene	Xylenes	MTBE	Naphthalene	Lead
MW-1	10/24/96	**3,040**[2]	164	325	950	**2,310**	**365**	NR[3]
	05/09/00	**1,790**	255	302	611	**1,300**	**117**	12.0
	10/09/00	**1,600**	180	220	400	**850**	**350**	<3.0[4]
	01/02/01	**500**	9.0	38	68	**460**	**55**	<3.0
	12/16/02	**3,000**	**12,000**	**3,700**	**14,000**	**920**	**1,700**	14
	06/12/03	**2,280**	**9,520**	**1,980**	**17,400**	**801**	**991**	NR
	11/22/04	**2,560**	**3,820**	**2,240**	**14,200**	**790**	**2,880**	NR
MW-1R[5]	01/31/05	**1,510**	234	268	3,790	**864**	**310**	NR
	04/27/05	**2,760**	115	376	2,550	**916**	**297**	NR
	08/17/05	**2,880**	26.6	525	1,710	**1,200**	**498**	NR
	11/28/05	**47**	3.1	39	190	**120 E**[6]	**34**	NR
	03/14/06	**24**	<1.0	4.1	2.9J[7]	**98**	**5.0**	NR
MW-2	10/24/96	<10.0	<10.0	<10.0	<3.0	**24,700**	<5.0	NR
	05/09/00	**5.2**	ND[8]	ND	ND	**19,900**	ND	ND
	10/09/00	**31**	5.7	<5.0	12	**11,000**	**15**	<3.0
	01/02/01	**7.2**	<5.0	<5.0	<5.0	**7,700**	<5.0	<3.0
	12/16/02	<5.0	<5.0	<5.0	7.2	**170**	12	<3.0
	06/12/03	4.0	<1.0	<1.0	<1.0	**157**	<5.00	NR
	11/22/04[9]	<1.0	<1.0	<1.0	<1.0	**54.9**	<5.00	NR
	01/31/05	<1.0	<1.0	<1.0	<1.0	**68.8**	<5.00	NR
	04/27/05	1.5	<1.0	<1.0	<1.0	**168**	<5.00	NR
	08/17/05	**12.3**	1.66	1.25	<2.0	**104**	<5.00	NR
	11/28/05	**7.5**	2.80	1.20	<3.0	**92**	<1.0	NR
	03/14/06	3.3	0.69 J	<1.0	0.79J	**92**	<1.0	NR
	RBSL[10]	5	1,000	700	10,000	40	25	15

TABLE 4 (continued)
SUMMARY OF HISTORICAL LABORATORY ANALYSES
GROUNDWATER SAMPLES
GREEN'S OIL COMPANY

Well ID	Date Sampled	Benzene	Toluene	Ethylbenzene	Xylenes	MTBE	Naphthalene	Lead
MW-3	10/24/96	NF[11]	NF	NF	NF	NF	NF	NF
	05/09/00	NF	NF	NF	NF	NF	NF	NF
	10/09/00	NF	NF	NF	NF	NF	NF	NF
	01/02/01	NF	NF	NF	NF	NF	NF	NF
	12/12/02	**150**	**5,800**	**2,400**	**14,000**	<25	**920**	**21**
	06/12/03	4.2	135	150	1,920	2.9	**260**	NR
	11/22/04	Dry	Dry	Dry	Dry	Dry	Dry	NR
	01/31/05	Dry	Dry	Dry	Dry	Dry	Dry	NR
	04/27/05	<1.0	<1.0	<1.0	3.7	<1.0	<5.00	NR
	08/17/05	Dry	Dry	Dry	Dry	Dry	Dry	Dry
	11/28/05	Dry	Dry	Dry	Dry	Dry	Dry	Dry
	03/14/06	Dry	Dry	Dry	Dry	Dry	Dry	Dry
MW-4	10/24/96	<1.0	<1.0	<1.0	<3.0	**70.4**	<5.0	NR
	05/09/00	NF	NF	NF	NF	NF	NF	NF
	10/09/00	NF	NF	NF	NF	NF	NF	NF
	01/02/01	NF	NF	NF	NF	NF	NF	NF
	12/16/02	<5.0	<5.0	<5.0	<5.0	**160**	8.5	5.8
	06/12/03	<1.0	<1.0	<1.0	<1.0	**198**	<5.00	NR
	11/22/04	NS[12]	NS	NS	NS	NS	NS	NS
	01/31/05	NS	NS	NS	NS	NS	NS	NS
	04/27/05	1.4	<1.0	<1.0	8.8	**160**	**152**	NR
	08/17/05	<1.00	<1.00	<1.00	5	**139**	**102**	NR
	11/28/05	<1.0	<1.0	<1.0	<3.0	**170**	**71**	NR
	03/14/06	NS	NS	NS	NS	NS	NS	NS
	RBSL	5	1,000	700	10,000	40	25	15

TABLE 4 (continued)
SUMMARY OF HISTORICAL LABORATORY ANALYSES
GROUNDWATER SAMPLES
GREEN'S OIL COMPANY

Well ID	Date Sampled	Benzene	Toluene	Ethylbenzene	Xylenes	MTBE	Naphthalene	Lead
MW-5	10/24/96	<1.0	<1.0	<1.0	<3.0	**1,720**	<5.0	NR
	05/09/00	ND	ND	ND	ND	**14,000**	ND	ND
	10/09/00	<5.0	<5.0	<5.0	<5.0	**9,100**	<5.0	<3.0
	01/02/01	<5.0	<5.0	<5.0	<5.0	**1,400**	<5.0	<3.0
	12/12/02	<5.0	<5.0	<5.0	<5.0	14	<5.0	14
	06/12/03	<1.0	<1.0	<1.0	<1.0	3.1	<5.00	NR
	11/22/04[13]	<1.0	<1.0	<1.0	<1.0	1.4	<5.00	NR
	01/31/05	<1.0	<1.0	<1.0	<1.0	<1.0	<5.00	NR
	04/27/05	<1.0	<1.0	<1.0	<1.0	<1.0	<5.00	NR
	08/17/05	<1.00	<1.00	<1.00	<2.00	1.23	<5.00	NR
	11/28/05	<1.0	<1.0	<1.0	<3.0	<1.0	<1.0	NR
	03/14/06	<1.0	<1.0	<1.0	<3.0	<1.0	<1.0	NR
MW-6	10/24/96	NS	NS	NS	NS	NS	NS	NS
	05/09/00	ND	ND	ND	ND	ND	ND	**52.0**
	10/09/00	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	**26.0**
	01/02/01	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	NS
	12/12/02	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	**48**
	06/12/03	<1.0	<1.0	<1.0	<1.0	<1.0	<5.00	NR
	11/22/04	<1.0	<1.0	<1.0	<1.0	<1.0	<5.00	NR
	01/31/05	<1.0	<1.0	<1.0	<1.0	<1.0	<5.00	NR
	04/27/05	<1.0	<1.0	<1.0	<1.0	<1.0	<5.00	NR
	08/17/05	<1.00	<1.00	<1.00	<2.00	<1.00	<5.00	NR
	11/28/05	<1.0	<1.0	<1.0	<3.0	<1.0	<1.0	NR
	03/14/06	<1.0	<1.0	<1.0	<3.0	<1.0	<1.0	NR
	RBSL	5	1,000	700	10,000	40	25	15

TABLE 4 (continued)
SUMMARY OF HISTORICAL LABORATORY ANALYSES
GROUNDWATER SAMPLES
GREEN'S OIL COMPANY

Well ID	Date Sampled	Benzene	Toluene	Ethylbenzene	Xylenes	MTBE	Naphthalene	Lead
MW-7	10/24/96	NF	NF	NF	NF	NF	NF	NF
	05/09/00	NF	NF	NF	NF	NF	NF	NF
	10/09/00	NF	NF	NF	NF	NF	NF	NF
	01/02/01	NF	NF	NF	NF	NF	NF	NF
	12/12/02	<5.0	<5.0	<5.0	<5.0	**160**	<5.0	**58**
	06/12/03	<1.0	<1.0	<1.0	<1.0	**294**	<5.00	NR
	11/22/04	NF	NF	NF	NF	NF	NF	NF
	01/31/05	NF	NF	NF	NF	NF	NF	NF
	04/27/05	<1.0	<1.0	<1.0	<1.0	1.3	<5.00	NR
	08/17/05	<1.00	<1.00	<1.00	<2.00	22.7	<5.00	NR
	11/28/05	<1.0	<1.0	<1.0	<3.0	**65**	<1.0	NR
	03/14/06	<1.0	<1.0	<1.0	<3.0	1.5	<1.0	NR
PW-8	10/24/96	<1.0	<1.0	<1.0	<3.0	**547**	<5.0	NR
	05/09/00	ND	ND	ND	ND	**790**	ND	ND
	10/09/00	<5.0	<5.0	<5.0	6.1	**180**	<5.0	<3.0
	01/02/01	<5.0	<5.0	<5.0	<5.0	**160**	<5.0	<3.0
	12/12/02	<5.0	<5.0	<5.0	<5.0	**44**	<5.0	<3.0
	06/12/03	<1.0	<1.0	<1.0	<1.0	**84.6**	<5.00	NR
	11/22/04[14]	<1.0	<1.0	<1.0	<1.0	9.7	<5.00	NR
	01/31/05	<1.0	<1.0	<1.0	<1.0	1.3	<5.00	NR
	04/27/05	<1.0	<1.0	<1.0	<1.0	6.3	<5.00	NR
	08/17/05	<1.00	<1.00	<1.00	<2.00	23.4	<5.00	NR
	11/28/05	<1.0	<1.0	<1.0	<3.0	15.0	<1.0	NR
	03/14/06	<1.0	<1.0	<1.0	<3.0	5.9	<1.0	NR
	RBSL	5	1,000	700	10,000	40	25	15

TABLE 4 (continued)
SUMMARY OF HISTORICAL LABORATORY ANALYSES
GROUNDWATER SAMPLES
GREEN'S OIL COMPANY

Notes:

1. Analyses for BTEX constituents, MTBE and Naphthalene by EPA Method 8260B; groundwater quality data prior to June 12, 2003 reproduced from previous consultant's reports; results reported in µg/L.
2. Concentrations in bold face type exceeded the January 1998 Risk Based Screening Level for samples collected before May 2001 and exceeded the May 2001 Risk Based Screening Level for samples collected after May 2001.
3. Analysis not requested.
4. Less than the reporting limit specified in the laboratory report.
5. Monitoring well MW-1R was installed as a replacement for monitoring well MW-1.
6. Estimated concentration, calibration range exceeded.
7. Estimated concentration below the laboratory reporting limit.
8. Not Detected.
9. Other compound detected (IPE: 294 µg/L).
10. May 2001 Risk Based Screening Level.
11. Well not found.
12. Not sampled due to insufficient volume of water in the well or well was not accessible.
13. Other compound detected (IPE: 21.8 µg/L)
14. Other compound detected (IPE: 13.4 µg/L)

Field Data Information Sheet for Ground Water Sampling

Date (mm/dd/yy) 3/14/2006
Field Personnel Jill Keller
General Weather Conditions Sunny, 75F
Ambient Air Temperature _____ °C

Facility Name: Green Oil Site ID #

Quality Assurance:

pH Meter:
serial no. HI98107
pH =4.0 4
pH =7.0 7
pH =10.0 10

Conductivity Meter
serial no. ECTestr
Standard 1420
Standard
Standard

Chain of Custody

Jill Keller	3/15/2006 15:34 PM	Prism Labs	3/15/2006 15:34 PM
Relinquished by	Date/Time	Received By	Date/Time

Well # MW-1R

Well Diameter (D) 4 inch or 0.33 feet
conversion factor ©: 3.143*(D/2)^2
for a 2 inch well C= 0.163
for a 4 inch well C= 0.652
Total Well Depth (TWD 10.35 feet
Depth to GW (DGW) 7.31 feet

Length of Water Column (LWC= TWD-DGW) 3.04 feet

1 Csg. Volume (LWC*C)= 2.60

3 Csg. Volume=3 X 1 Csg. Vol= 7.80

Total Volume of Water Purged Before Sampling 2.60

	Initial	1st vol.	2nd vol.	3rd vol.	4th vol.	5th vol.	Post	Sampling
Volume Purged (gallons)	-	2.6						-
Time (military)	16:20	16:40						16:40
pH (s.u.)	6.7	6.6						6.6
Specific Cond. (umhos/cm)	390	360						360
Water Temp (°C)	17.2	16.5						16.5
Turbidity (*)	1	2						2
Dissolved Oxygen (mg/L)	3.81	3.64						3.64

* subjective (1) None (2) Faint (3) Moderate (4) Strong

Remarks: DRY during 2nd well volume.

Field Data Information Sheet for Ground Water Sampling

Date (mm/dd/yy) 3/14/2006
Field Personnel Jill Keller
General Weather Conditions Sunny, 75F
Ambient Air Temperature _____ °C

Facility Name: Green Oil Site ID #

Quality Assurance:

pH Meter:
serial no. HI98107
pH =4.0 4
pH =7.0 7
pH =10.0 10

Conductivity Meter
serial no. ECTestr
Standard 1420
Standard
Standard

Chain of Custody

Jill Keller 3/15/2006 15:34 PM
Relinquished by Date/Time

Prism Labs 3/15/2006 15:34 PM
Received By Date/Time

Well # MW-2

Well Diameter (D) 4 inch or 0.33 feet
conversion factor ©: 3.143*(D/2)^2
for a 2 inch well C= 0.163
for a 4 inch well C= 0.652
Total Well Depth (TWD 15.20 feet
Depth to GW (DGW) 7.47 feet

Length of Water Column (LWC= TWD-DGW) 7.73 feet

1 Csg. Volume (LWC*C)= 6.56

3 Csg. Volume=3 X 1 Csg. Vol= 19.70

Total Volume of Water Purged Before Sampling 15.00

	Initial	1st vol.	2nd vol.	3rd vol.	4th vol.	5th vol.	Post	Sampling
Volume Purged (gallons)	-	6.5	13	15				-
Time (military)	15:30	15:40	15:50	16:00				16:00
pH (s.u.)	6.4	6.3	6.3	6.4				6.4
Specific Cond. (umhos/cm)	780	880	900	850				850
Water Temp (°C)	20.3	18.1	18.4	18.1				18.1
Turbidity (*)	1	1	2	2				2
Dissolved Oxygen (mg/L)	1.34	1.87	2.99	2.72				2.72

* subjective (1) None (2) Faint (3) Moderate (4) Strong

Remarks: DRY during 3rd well volume.

Field Data Information Sheet for Ground Water Sampling

Date (mm/dd/yy) 3/14/2006
Field Personnel Jill Keller
General Weather Conditions Sunny, 75F
Ambient Air Temperature _____ °C

Facility Name: Green Oil Site ID #

Quality Assurance:

pH Meter:
serial no. HI98107
pH =4.0 4
pH =7.0 7
pH =10.0 10

Conductivity Meter
serial no. ECTestr
Standard 1420
Standard
Standard

Chain of Custody

Jill Keller 3/15/2006 15:34 PM
Relinquished by Date/Time

Prism Labs 3/15/2006 15:34 PM
Received By Date/Time

Well # MW-5

Well Diameter (D) 2 inch or 0.17 feet
conversion factor ©: 3.143*(D/2)^2
for a 2 inch well C= 0.163
for a 4 inch well C= 0.652
Total Well Depth (TWD 10.30 feet
Depth to GW (DGW) 6.95 feet

Length of Water Column (LWC= TWD-DGW) 3.35 feet

1 Csg. Volume (LWC*C)= 0.55

3 Csg. Volume=3 X 1 Csg. Vol= 1.64

Total Volume of Water Purged Before Sampling _ 2.00

	Initial	1st vol.	2nd vol.	3rd vol.	4th vol.	5th vol.	Post	Sampling
Volume Purged (gallons)	-	0.7	1.4	2.0				-
Time (military)	13:15	13:20	13:35	13:40				13:40
pH (s.u.)	6.9	7.0	7.0	7.0				7.0
Specific Cond. (umhos/cm)	440	440	450	430				430
Water Temp (°C)	19.8	18.1	18.0	18.4				18.4
Turbidity (*)	1	2	2	3				3
Dissolved Oxygen (mg/L)	5.23	5.33	5.36	5.3				5.3

* subjective (1) None (2) Faint (3) Moderate (4) Strong

Remarks: _____

Field Data Information Sheet for Ground Water Sampling

Date (mm/dd/yy) 3/14/2006
Field Personnel Jill Keller
General Weather Conditions Sunny, 75F
Ambient Air Temperature _____ °C

Facility Name: Green Oil Site ID #

Quality Assurance:

pH Meter:
serial no. HI98107
pH =4.0 4
pH =7.0 7
pH =10.0 10

Conductivity Meter
serial no. ECTestr
Standard 1420
Standard
Standard

Chain of Custody

Jill Keller 3/15/2006 15:34 PM
Relinquished by Date/Time

Prism Labs 3/15/2006 15:34 PM
Received By Date/Time

Well # MW-6

Well Diameter (D) 2 inch or 0.17 feet
conversion factor ©: 3.143*(D/2)^2
for a 2 inch well C= 0.163
for a 4 inch well C= 0.652
Total Well Depth (TWD 9.95 feet
Depth to GW (DGW) 7.67 feet

Length of Water Column (LWC= TWD-DGW) 2.28 feet

1 Csg. Volume (LWC*C)= 0.37

3 Csg. Volume=3 X 1 Csg. Vol= 0.80

Total Volume of Water Purged Before Sampling _ -

	Initial	1st vol.	2nd vol.	3rd vol.	4th vol.	5th vol.	Post	Sampling
Volume Purged (gallons)	-	0.4	0.8					-
Time (military)	14:45	14:50	14:55					15:00
pH (s.u.)	7.0	7.0	7.0					7.0
Specific Cond. (umhos/cm)	440	450	420					420
Water Temp (°C)	20.4	18.9	18.5					18.5
Turbidity (*)	1	2	2					2
Dissolved Oxygen (mg/L)	7.94	7.74	7.03					7.03

* subjective (1) None (2) Faint (3) Moderate (4) Strong

Remarks: DRY after 2nd well volume.

Field Data Information Sheet for Ground Water Sampling

Date (mm/dd/yy) 3/14/2006
Field Personnel Jill Keller
General Weather Conditions Sunny, 75F
Ambient Air Temperature _____ °C

Facility Name: Green Oil Site ID #

Quality Assurance:

pH Meter:
serial no. HI98107
pH =4.0 4
pH =7.0 7
pH =10.0 10

Conductivity Meter
serial no. ECTestr
Standard 1420
Standard
Standard

Chain of Custody

Jill Keller 3/15/2006 15:34 PM
Relinquished by Date/Time

Prism Labs 3/15/2006 15:34 PM
Received By Date/Time

Well # MW-7

Well Diameter (D) 2 inch or 0.17 feet
conversion factor ©: 3.143*(D/2)^2
for a 2 inch well C= 0.163
for a 4 inch well C= 0.652
Total Well Depth (TWD 14.10 feet
Depth to GW (DGW) 7.20 feet

Length of Water Column (LWC= TWD-DGW) 6.9 feet

1 Csg. Volume (LWC*C)= 1.12

3 Csg. Volume=3 X 1 Csg. Vol= 3.37

Total Volume of Water Purged Before Sampling 3.40

	Initial	1st vol.	2nd vol.	3rd vol.	4th vol.	5th vol.	Post	Sampling
Volume Purged (gallons)	-	1.1	2.2	3.4				-
Time (military)	12:50	12:55	13:00	13:10				13:10
pH (s.u.)	6.6	6.6	6.6	6.7				6.7
Specific Cond. (umhos/cm)	470	430	460	460				460
Water Temp (°C)	19.8	18.0	18.2	18.7				18.7
Turbidity (*)	1	3	3	3				3
Dissolved Oxygen (mg/L)	5.25	5.42	4.57	4.47				4.47

* subjective (1) None (2) Faint (3) Moderate (4) Strong

Remarks: _____

Field Data Information Sheet for Ground Water Sampling

Date (mm/dd/yy) 3/14/2006
Field Personnel Jill Keller
General Weather Conditions Sunny, 75F
Ambient Air Temperature _____ °C

Facility Name: Green Oil Site ID #

Quality Assurance:

pH Meter:
serial no. HI98107
pH =4.0 4
pH =7.0 7
pH =10.0 10

Conductivity Meter
serial no. ECTestr
Standard 1420
Standard
Standard

Chain of Custody

Jill Keller 3/15/2006 15:34 PM
Relinquished by Date/Time

Prism Labs 3/15/2006 15:34 PM
Received By Date/Time

Well # PW-8

Well Diameter (D) 2 inch or 0.17 feet
conversion factor ©: 3.143*(D/2)^2
for a 2 inch well C= 0.163
for a 4 inch well C= 0.652
Total Well Depth (TWD 30.90 feet
Depth to GW (DGW) 6.88 feet

Length of Water Column (LWC= TWD-DGW) 24.02 feet

1 Csg. Volume (LWC*C)= 3.92

3 Csg. Volume=3 X 1 Csg. Vol= 11.75

Total Volume of Water Purged Before Sampling 12.00

	Initial	1st vol.	2nd vol.	3rd vol.	4th vol.	5th vol.	Post	Sampling
Volume Purged (gallons)	-	4	8	12				-
Time (military)	13:50	14:00	14:10	14:20				14:20
pH (s.u.)	6.9	6.8	6.6	6.8				6.8
Specific Cond. (umhos/cm)	240	320	330	340				340
Water Temp (°C)	20.8	20.9	21.5	21				21
Turbidity (*)	1	2	2	2				2
Dissolved Oxygen (mg/L)	4.71	2.77	2.67	3.3				3.3

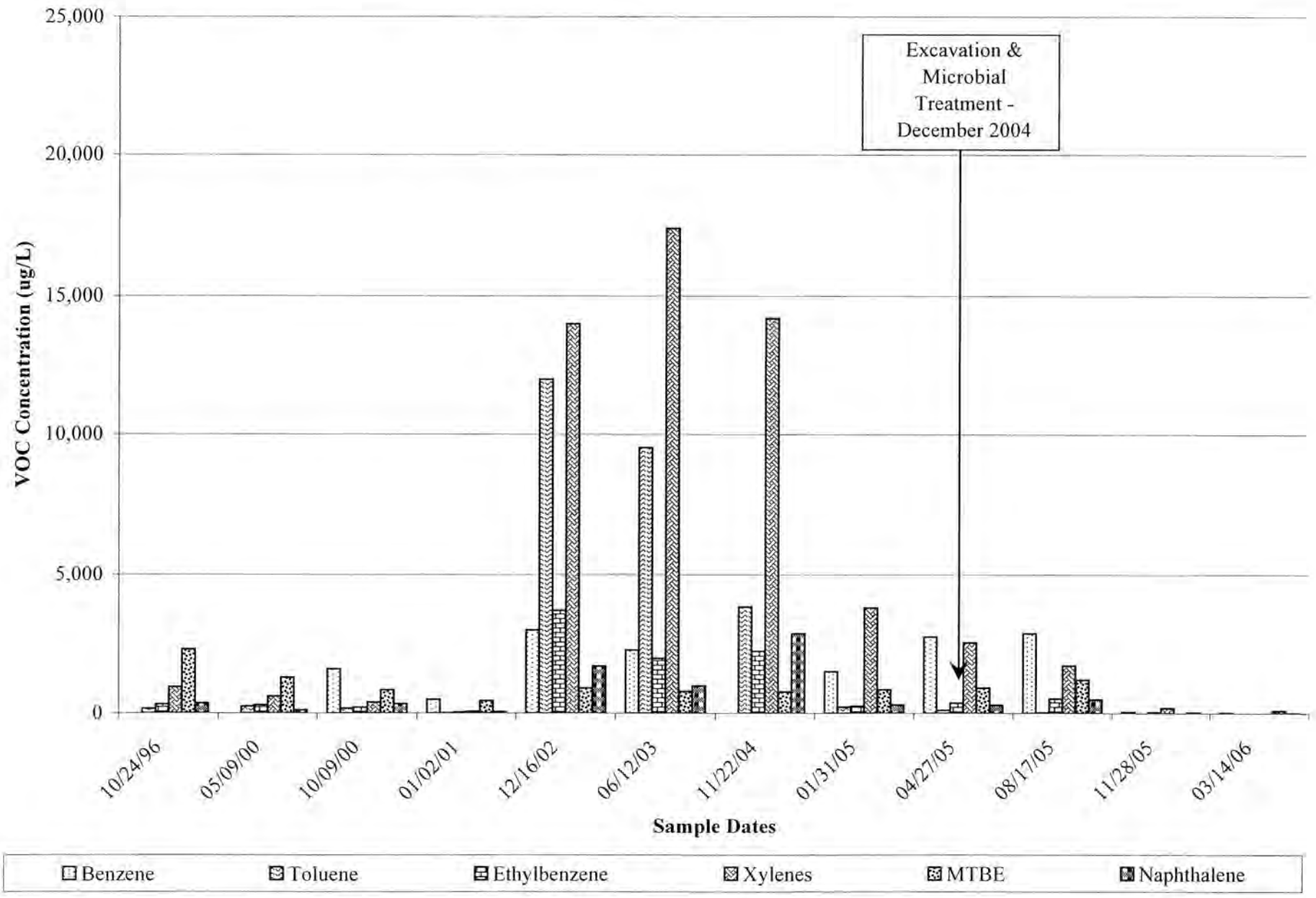
* subjective (1) None (2) Faint (3) Moderate (4) Strong

Remarks: _____

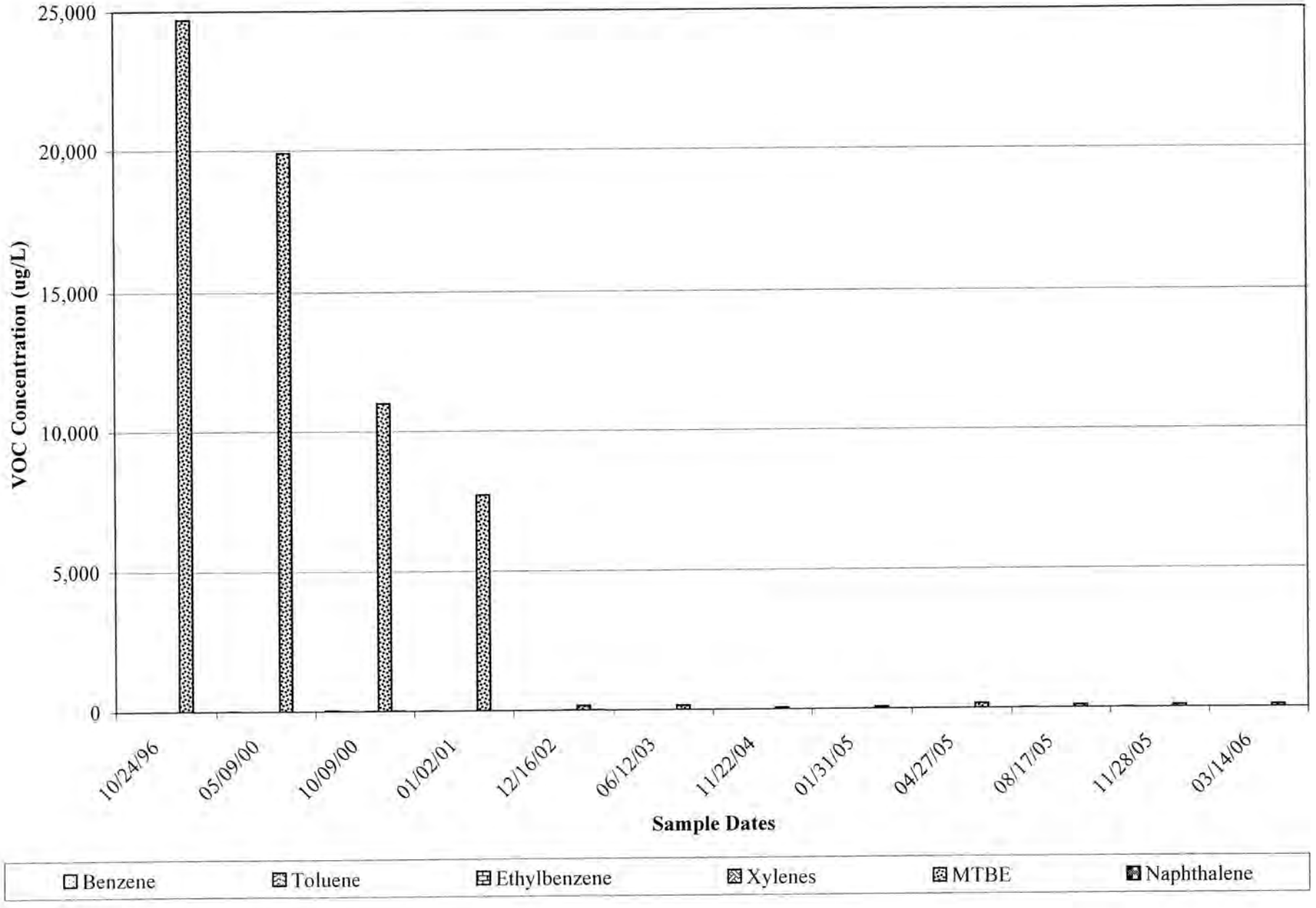
APPENDIX C

GRAPHS OF INDIVIDUAL VOC CONCENTRATIONS VS. TIME

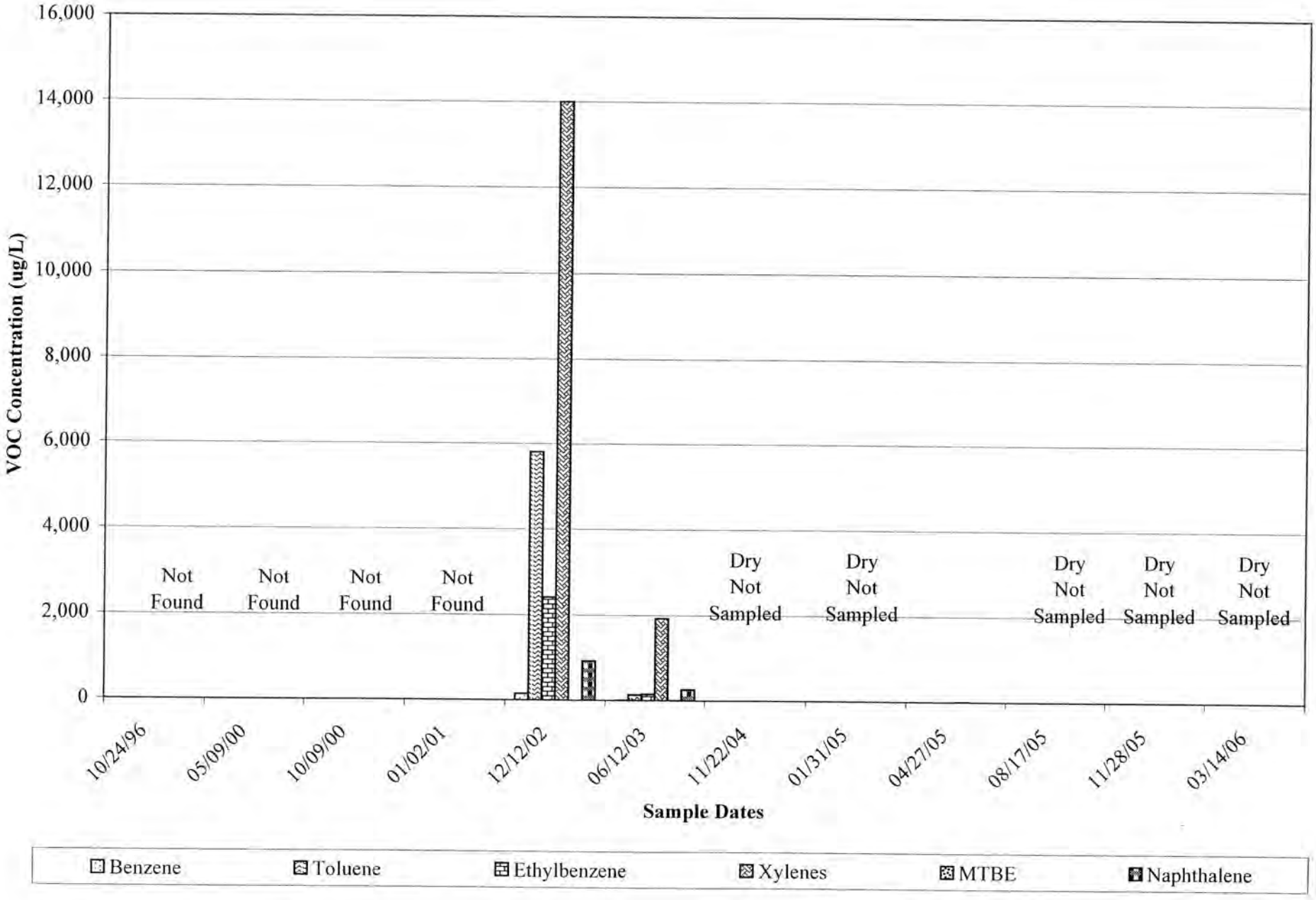
GROUNDWATER QUALITY CHART
GREENS OIL - MW-1/MW-1R



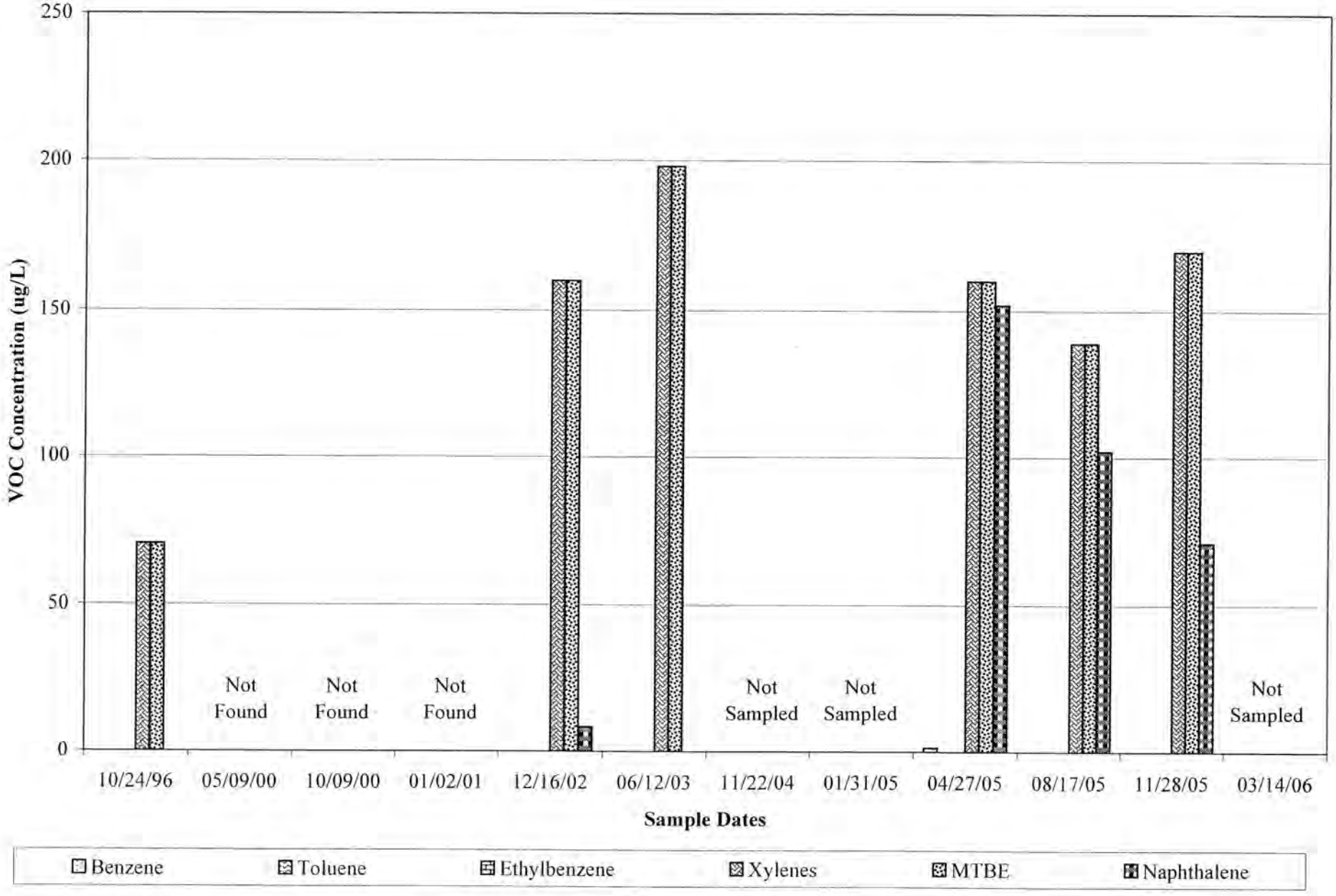
GROUNDWATER QUALITY CHART
GREENS OIL - MW-2



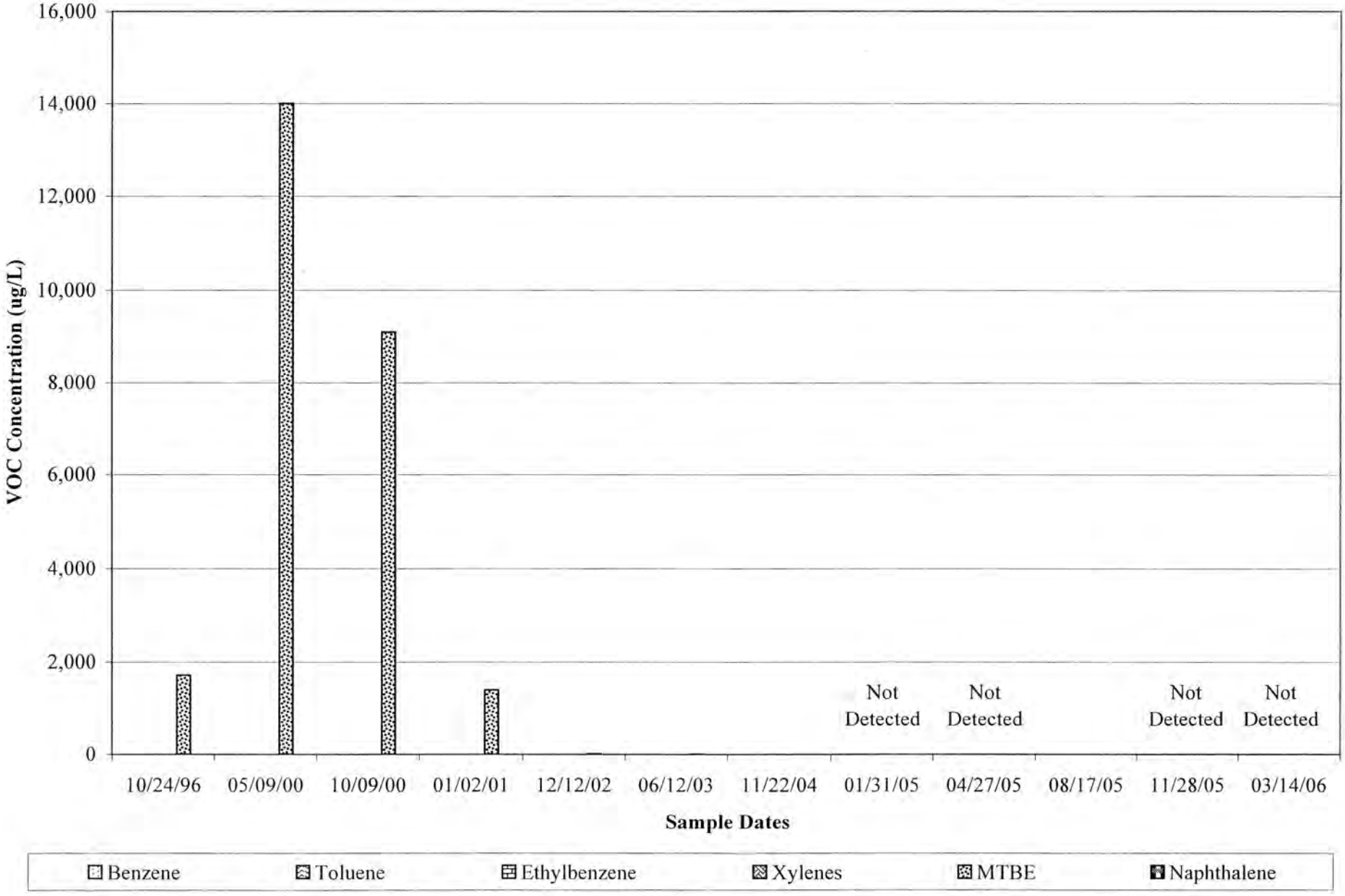
GROUNDWATER QUALITY CHART
GREENS OIL - MW-3



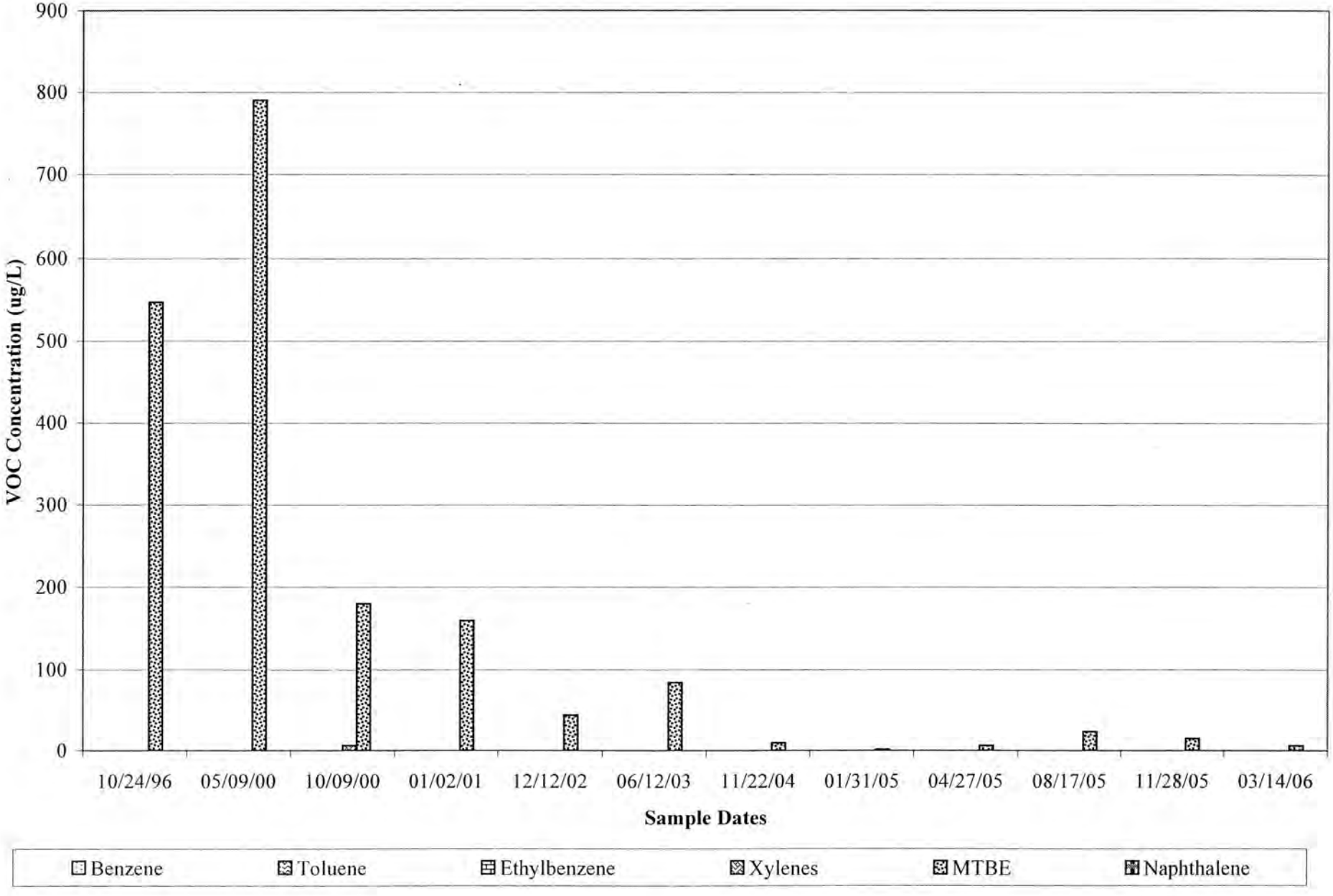
GROUNDWATER QUALITY CHART
GREENS OIL - MW-4



GROUNDWATER QUALITY CHART
GREENS OIL - MW-5

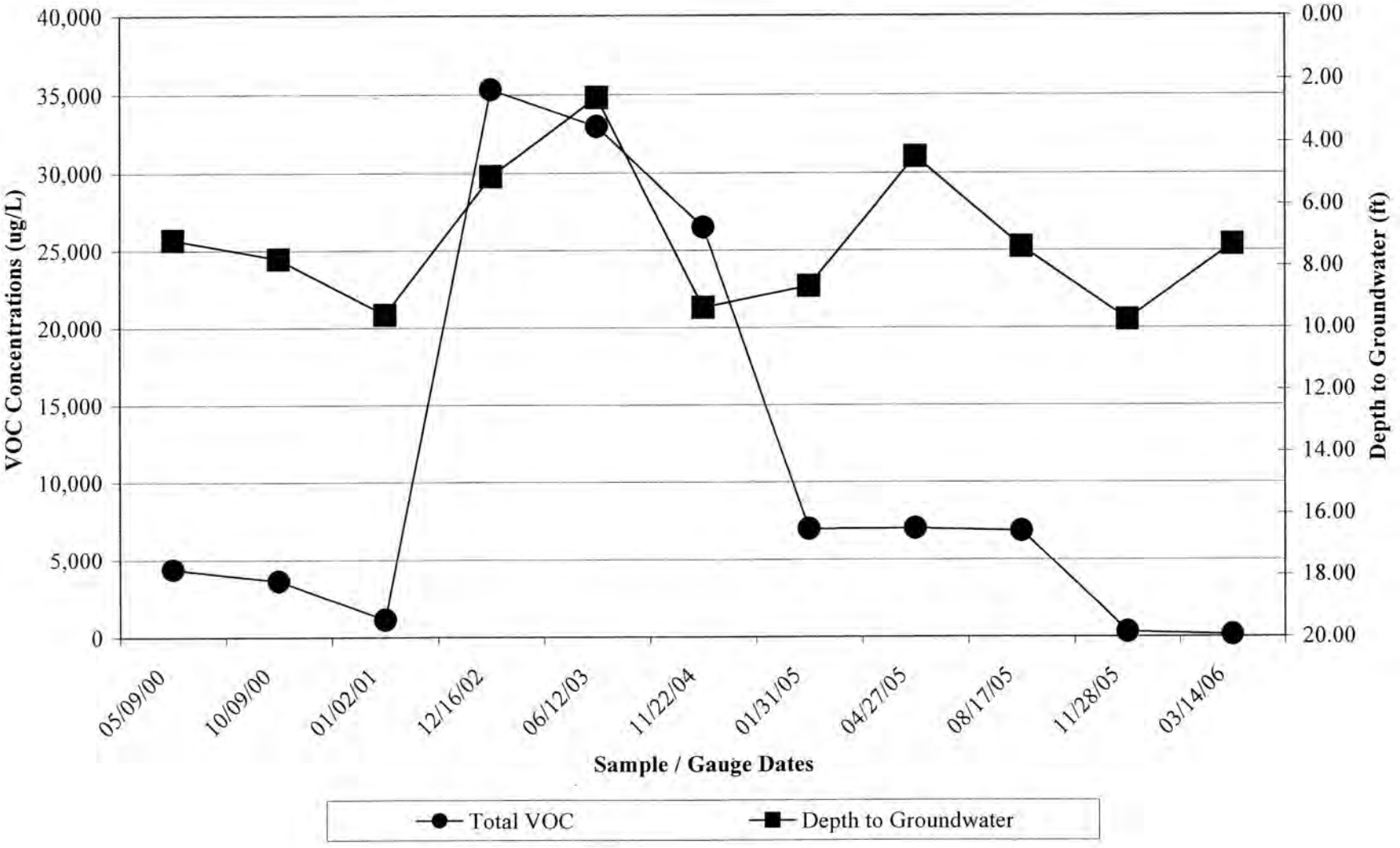


GROUNDWATER QUALITY CHART
GREENS OIL - PW-8

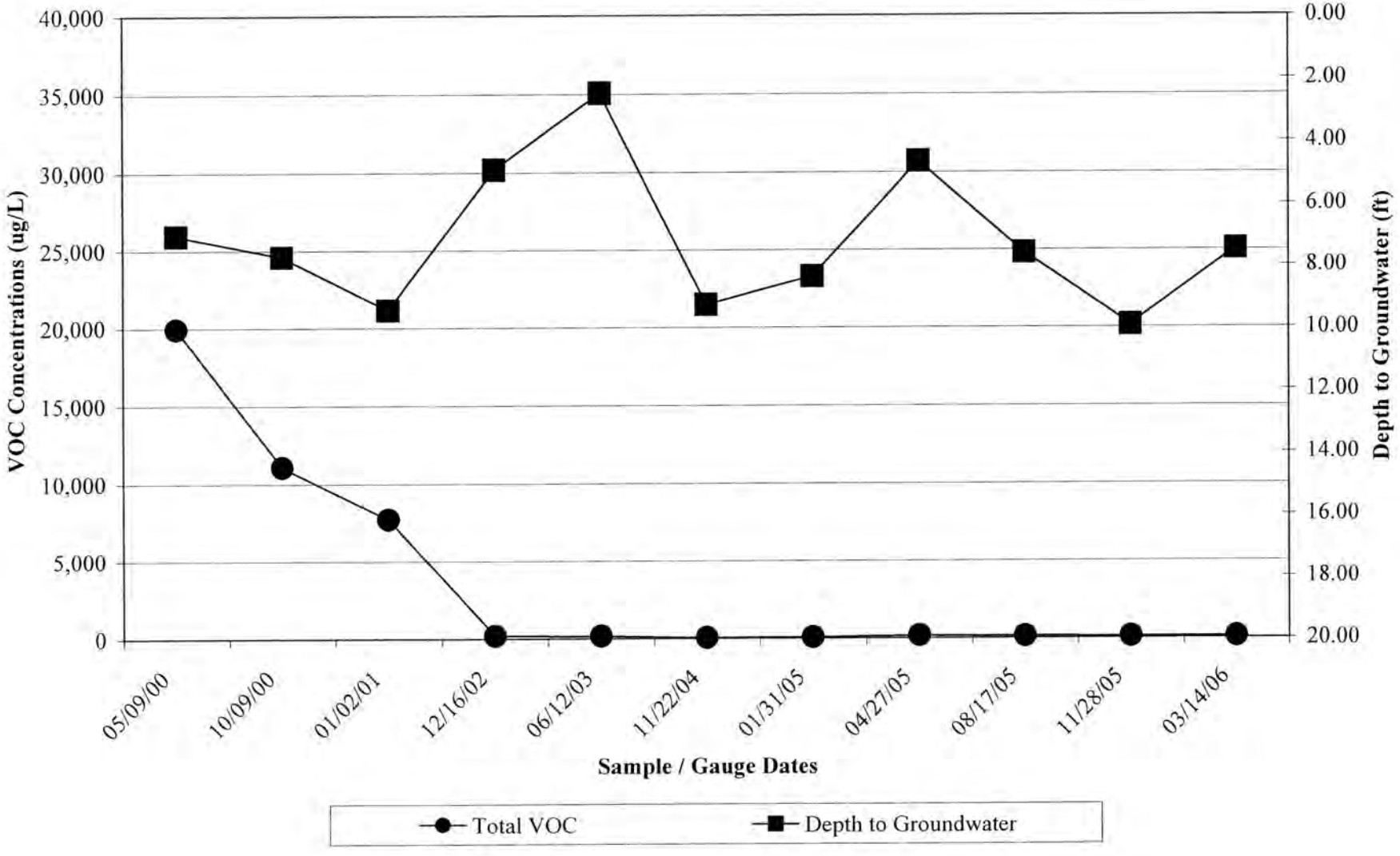


APPENDIX D
GRAPHS OF TOTAL VOC CONCENTRATIONS VS. DEPTH TO GROUNDWATER

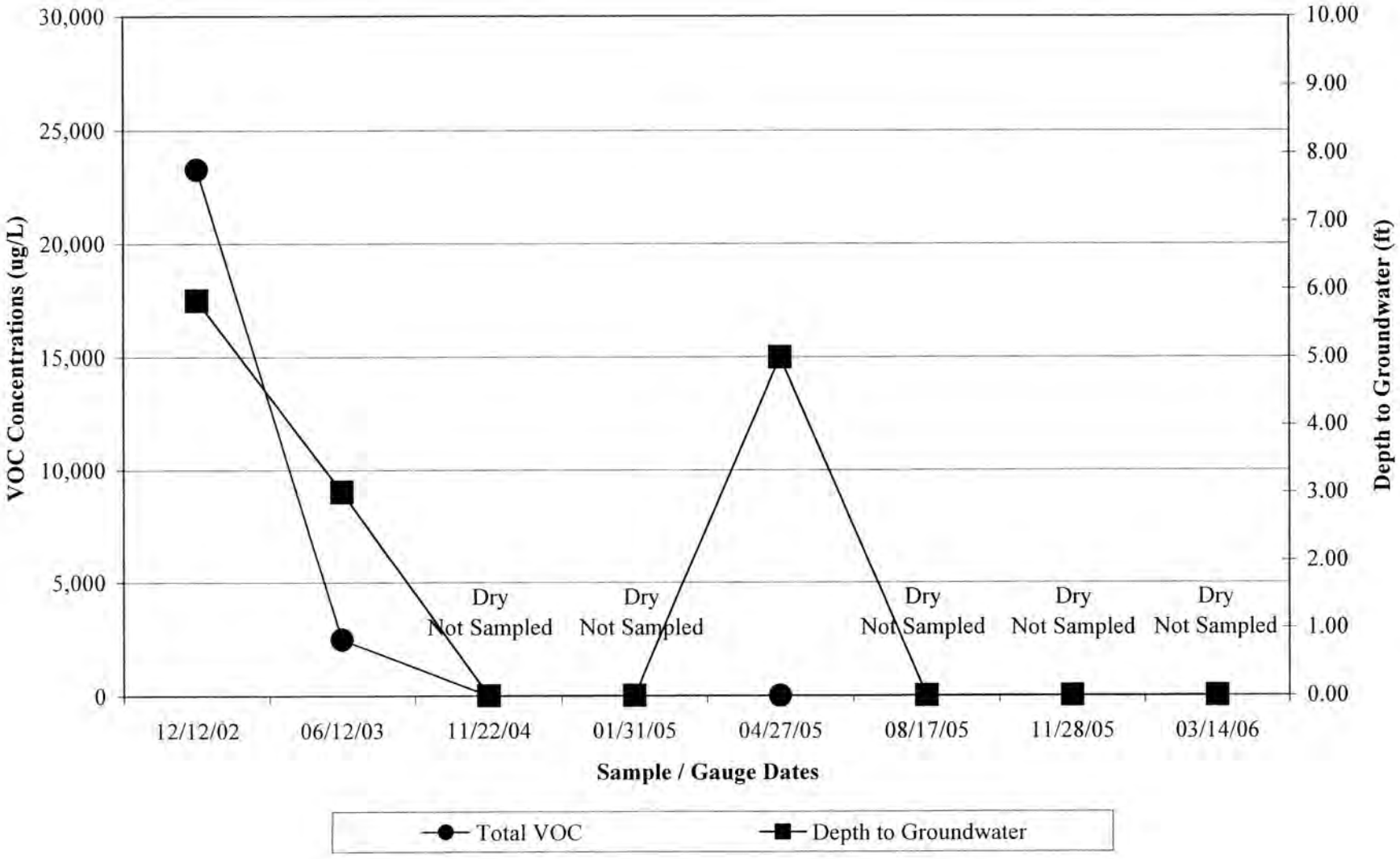
TOTAL VOC CONCENTRATION VS. DEPTH TO GROUNDWATER
GREENS OIL - MW-1/MW-1R



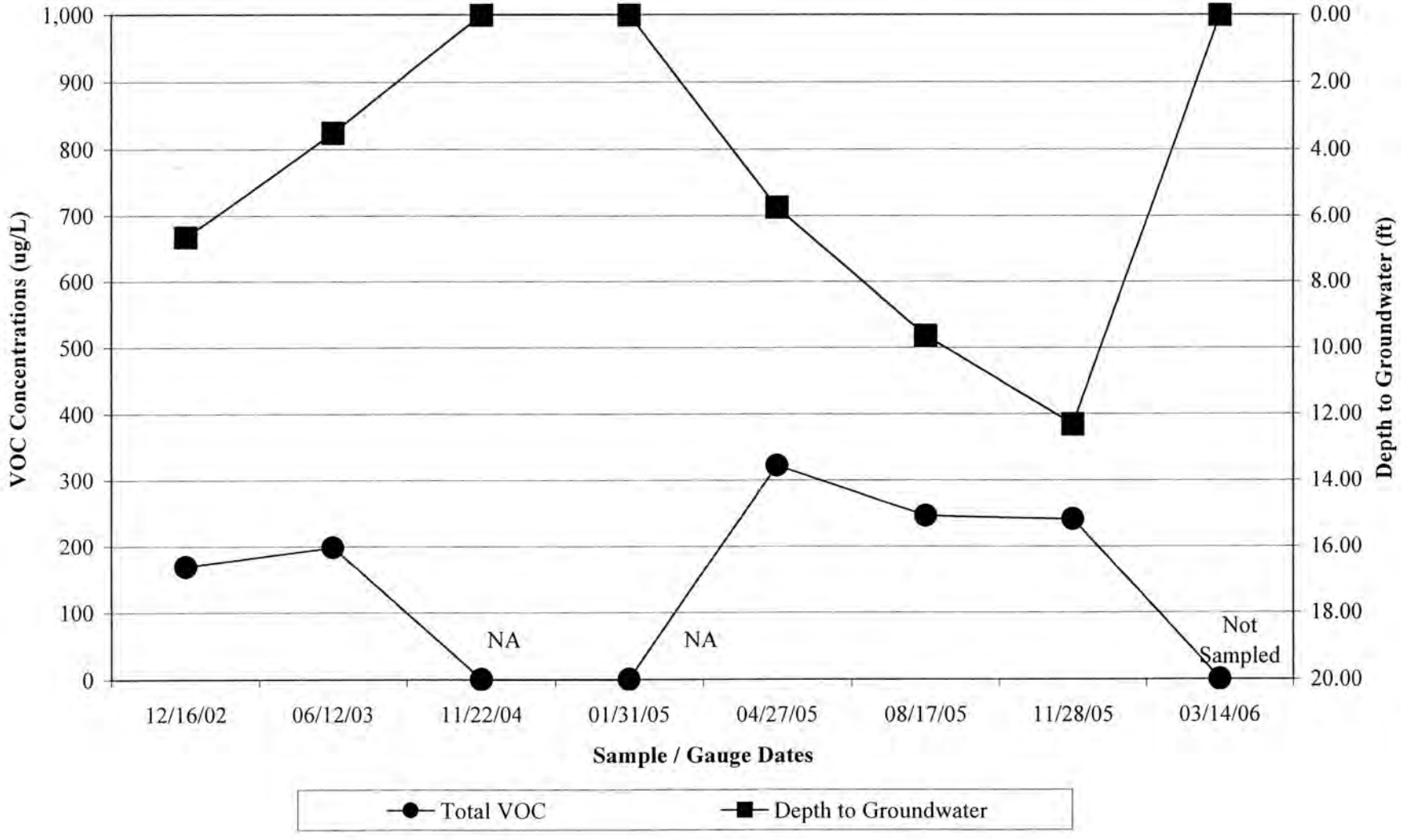
TOTAL VOC CONCENTRATION VS. DEPTH TO GROUNDWATER
GREENS OIL - MW-2



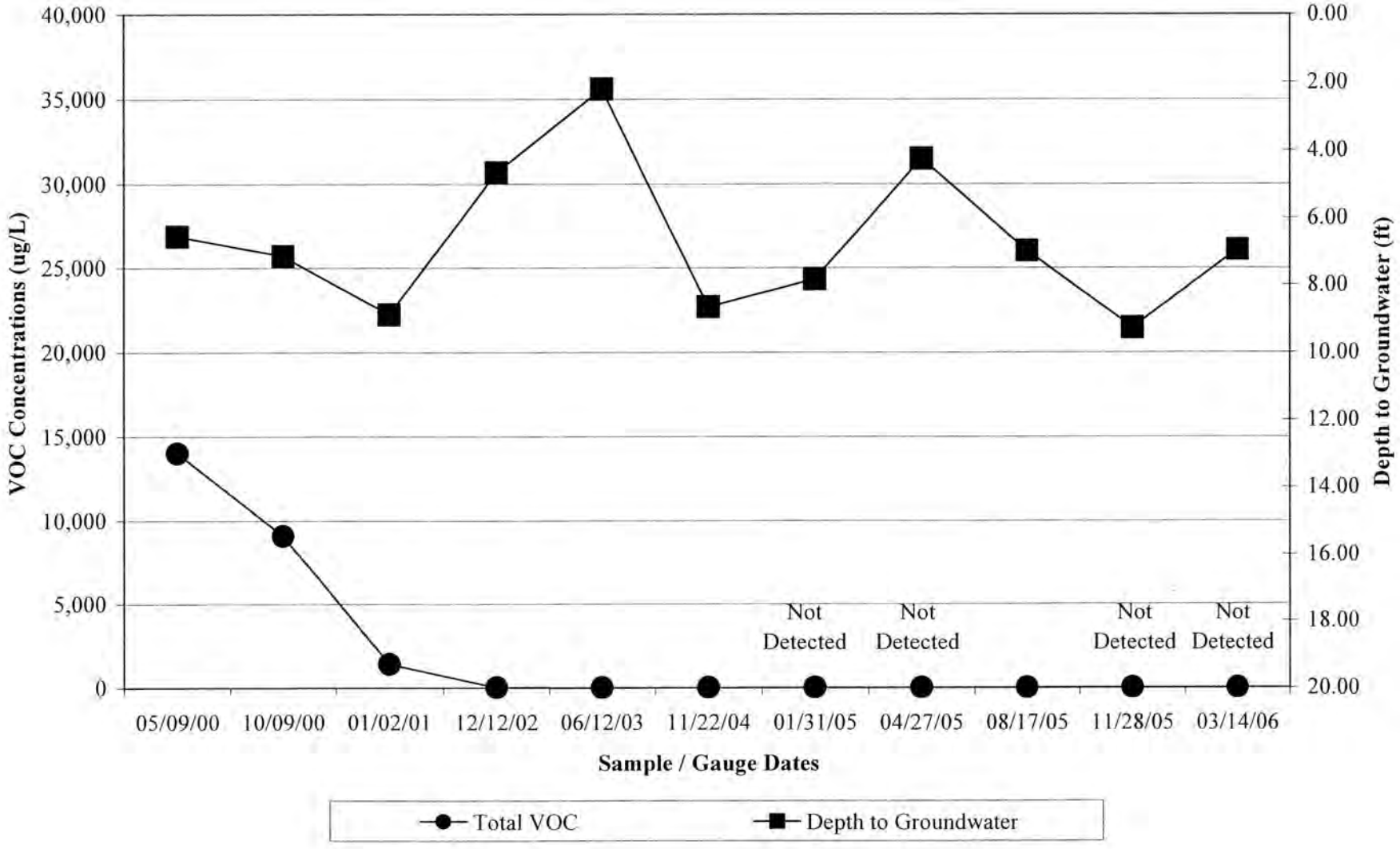
TOTAL VOC CONCENTRATION VS. DEPTH TO GROUNDWATER
GREENS OIL - MW-3



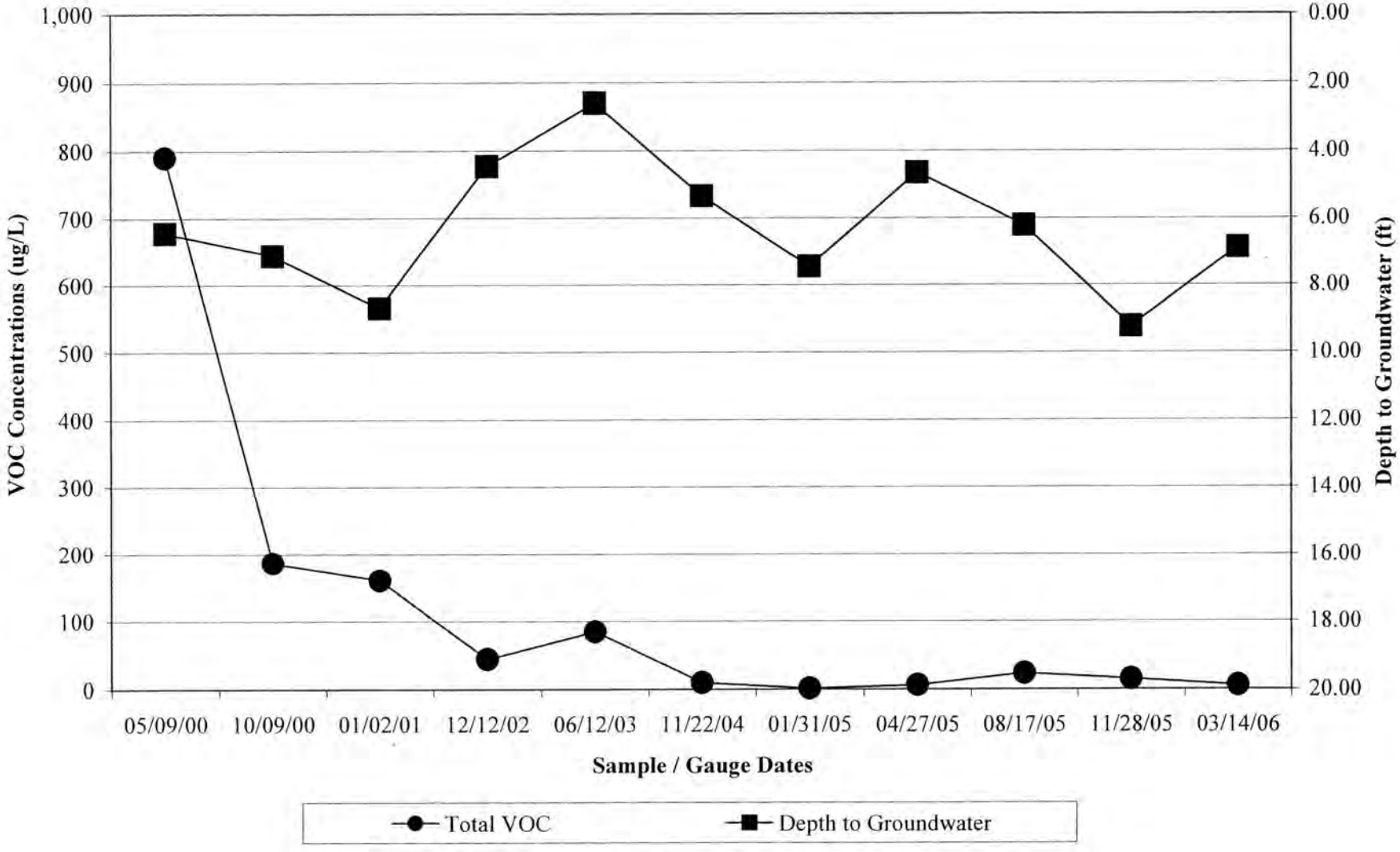
TOTAL VOC CONCENTRATION VS. DEPTH TO GROUNDWATER
GREENS OIL - MW-4



TOTAL VOC CONCENTRATION VS. DEPTH TO GROUNDWATER
GREENS OIL - MW-5



TOTAL VOC CONCENTRATION VS. DEPTH TO GROUNDWATER
GREENS OIL - PW-8



APPENDIX E
DRUM DISPOSAL MANIFEST

Please print or type
(Form designed for use on elite (12-pitch) typewriter.)

09344

NON-HAZARDOUS WASTE MANIFEST

1. Generator's US EPA ID No.: C E S Q G . . . . . | Manifest Doc. No.: 0 5 0 0 1 | 2. Page 1 of 1

GENERATOR

3. Generator's Name and Mailing Address:
(CBM ENVIRONMENTAL) GREEN'S OIL COMPANY
2849 CHERRY ROAD
ROCK HILL, SC

4. Generator's Phone (803 548-5989)

5. Transporter 1 Company Name | 6. US EPA ID Number | A. Transporter's Phone

7. Transporter 2 Company Name | 8. US EPA ID Number | B. Transporter's Phone

9. Designated Facility Name and Site Address
CMEG, INC.
917 INDUSTRIAL ROAD
WALTERBORO, SC 29488

10. US EPA ID Number: S C R 0 0 0 0 3 4 4 2

C. Facility's Phone: (843) 538-2636

11. Waste Shipping Name and Description	12. Containers No.	12. Containers Type	13. Total Quantity	14. Unit Wt/Vol
a. PURGE WATER, #10975 NON HAZARDOUS/NON REGULATED	2	D M	400	P
b.				
c.				
d.				

D. Additional Descriptions for Materials Listed Above
A: 10975
B:
C:
D:

E. Handling Codes for Wastes Listed Above

15. Special Handling Instructions and Additional Information
24 HOUR EMERGENCY CONTACT: BRIAN DEMME 803-548-5989

16. **GENERATOR'S CERTIFICATION:** I certify the materials described above on this manifest are not subject to federal regulations for reporting proper disposal of Hazardous Waste.

Printed/Typed Name	Signature	Month	Day	Year
Philip Pike	Philip Pike	05	03	06

TRANSPORTER

17. Transporter 1 Acknowledgement of Receipt of Materials

Printed/Typed Name	Signature	Month	Day	Year
Philip Pike	Philip Pike	05	03	06

18. Transporter 2 Acknowledgement of Receipt of Materials

Printed/Typed Name	Signature	Month	Day	Year

FACILITY

19. Discrepancy Indication Space

20. Facility Owner or Operator: Certification of receipt of waste materials covered by this manifest except as noted in Item 19.

Printed/Typed Name	Signature	Month	Day	Year
Mark	Mark	5	03	06

Printed by J. J. KELLER & ASSOCIATES, INC.
Neenah, WI 54957-0368

TRANSPORTER #1

12-BLS-C5 Rev. 12/98

GROUNDWATER MONITORING REPORT
GREEN'S OIL COMPANY
2849 CHERRY RD.
ROCK HILL, SC
YORK COUNTY

UST PERMIT NO. 09344
MAY 9, 2007

Prepared For:

Federated Insurance Company
C/O Jerry Green
2457 Breen Circle
Rock Hill, SC 29732

May 2007
Project No: 14-811030.00

Prepared By:

ecs

13504 South Point Blvd., Unit F Charlotte, NC 28273
704-583-2711 Fax: 704-583-2744 www.ecsconsult.com

GROUNDWATER MONITORING REPORT
GREEN'S OIL COMPANY
2849 CHERRY RD.
ROCK HILL, YORK COUNTY
UST PERMIT NO. 09344
SITE RISK CLASSIFICATION: HIGH
LAND USE CLASSIFICATION: COMMERCIAL
ECS PROJECT NO. 14-811030

Prepared For:

Federated Insurance Company
c/o Jerry Green
2457 Breen Circle
Rock Hill, SC 29732

Prepared By:

Environmental Compliance Services, Inc.
13504 South Point Blvd., Unit F
Charlotte, NC 28273
(704) 583-2711

May 9, 2007

Brian M. Demme
Project Manager

ROBERT R. THOMPSON III
REGISTERED
NO. 2328
SOUTH CAROLINA
PROFESSIONAL GEOLOGIST

Robert R. Thompson, III
Senior Project Manager
SC License No. 2328

TABLE OF CONTENTS

TABLES

FIGURES

APPENDICES

1.0 INTRODUCTION

This report presents the results of groundwater monitoring activities, conducted on February 27, 2007, at the Green's Oil Company site in Rock Hill, South Carolina. The site previously operated as a gas station located in a commercial/industrial area of York County. Public or private water supply wells were not reported within 1,000 feet of the site. Two abandoned water supply wells were located down gradient of the site. Surface water bodies were not identified within 500 feet of the source area. The Catawba River, located approximately 3,000 feet north of the site in the downgradient direction, was the only known potential receptor identified during the receptor survey.

A previously prepared Corrective Action Plan (CAP) that proposed remediation of petroleum impacted soil and groundwater beneath the site using excavation, de-watering, backfilling with microbial augmented soil, and subsequent microbial injections, was submitted to the SCDHEC by CBM Environmental Services, Inc January 23, 2004. The SCDHEC approved the CAP in correspondence dated March 29, 2004. However, subsequent telephone conversations between CBM and the responsible party's insurance company (Federated Insurance), indicated that Federated Insurance would only approve soil excavation, de-watering, and backfilling with microbial augmented soil. Microbial injections, if needed, would be implemented after two to three quarters of groundwater monitoring. The initial remedial activities consisting of soil excavation, backfilling with microbial augmented soil, and compaction were completed in December 2004.

2.0 FACILITY INFORMATION

- **Facility Name**: Green's Oil Company
- **Location:** 2849 Cherry Road
  Rock Hill, York County (**Figure 1**)
- **UST Permit No.** 09344
- **Risk Classification:** High
- **Land Use Classification:** Commercial
- **UST Operator:** Green's Oil Company
  2849 Cherry Road
  Rock Hill, South Carolina
- **UST Owner:** Green's Oil Company
  2849 Cherry Road
  Rock Hill, South Carolina
- **Consultant:** Environmental Compliance Services, Inc
  13504 South Point Boulevard
  Charlotte, North Carolina 28273
  (704) 583-2711
- **Release Information:**
  - **Date Discovered:** Unknown
  - **Estimated Quantity of Release:** Unknown
  - **Cause of Release:** Unknown
  - **Source of Release:** Leaking UST System
  - **UST System Size/Contents:** Four gasoline USTs
  - **Latitude / Longitude:** 34°58'42" North/ 80°58'54" West

3.0 SAMPLING ACTIVITIES

3.1 Site Hydrogeology

The depths to groundwater in the Shallow (water table) monitoring wells measured on February 27, 2007 ranged from 4.24 feet (MW-5) to 5.86 feet (MW-4). Groundwater elevations relative to a temporary benchmark with an assumed datum of 100.00 feet, ranged from 91.05 feet (MW-4) to 93.76 feet (MW-6). Based on the February 2007 data, the horizontal groundwater flow direction was generally toward the north. The horizontal hydraulic gradient beneath the site was approximately 0.03 feet per foot (ft/ft). A groundwater Elevation Map, based on the February 27, 2007 data, is included as **Figure 3**. Groundwater elevation data obtained on February 27, 2007 data is presented in **Table 1**. A summary of historical groundwater elevation data is presented in **Table 2**.

3.2 Groundwater Sampling

On February 27, 2007, six Shallow monitoring wells (MW-1R, MW-2, MW-3, MW-4, MW-5, and MW-6) and one Telescoping monitoring well (PW-8) were purged and sampled. Monitoring well MW-7 was not found and therefore was not sampled during the site visit. Laboratory analyses were performed on groundwater samples collected from the monitoring wells for BTEX (benzene, toluene, ethylbenzene, and total xylenes), MTBE (methyl-tert-butyl ether) and naphthalene by EPA Method 8260B. Field measurements of dissolved oxygen (DO), pH, specific conductivity and temperature were collected from the monitoring wells during sampling activities.

4.0 GROUNDWATER QUALITY

A concentration of benzene that exceeded the May 2001 risk based screening level (RBSL) was reported in the groundwater sample collected from monitoring well MW-1R. Concentrations of MTBE that exceeded the RBSL were reported in the groundwater samples collected from monitoring wells MW-1R, MW-2 and MW-4. Concentrations of naphthalene that exceeded the RBSL were reported in the groundwater samples collected from MW-1R and MW-4. Detectable concentrations of benzene below the RBSL were reported in the groundwater samples collected from monitoring wells MW-2 and MW-4. Detectable concentrations of toluene below the RBSL were reported in the groundwater samples collected from monitoring wells MW-1R and MW-2. Detectable concentrations of ethylbenzene and total xylenes below the RBSL were reported in the groundwater sample collected from monitoring well MW-1R and a detectable concentration of total xylenes below the RBSL was reported in monitoring well MW-2. Detectable concentrations of MTBE below the RBSL were reported in the groundwater samples collected from monitoring wells MW-5 and PW-8. A detectable concentration of naphthalene below the RBSL was reported in the groundwater sample collected from monitoring well MW-2. Detectable concentrations of requested method constituents were not reported above the RBSLs in the groundwater samples collected from monitoring wells MW-3, and MW-6.

A Groundwater Quality Map showing individual BTEX constituents, MTBE and naphthalene concentrations in the groundwater samples collected from the monitoring wells during the February 27, 2007 sampling event is included as **Figure 4**. A summary of laboratory analyses of groundwater samples collected from the monitoring wells on February 27, 2007 is presented in **Table 3**. A summary of historical groundwater quality data is presented in **Table 4**. Groundwater sampling field data sheets from the February 27, 2007 sampling event have been included as **Appendix A.** A complete report of laboratory analyses of groundwater samples collected during the February 27, 2007 sampling event has been included as **Appendix B**. Graphs showing variations in BTEX constituents, MTBE and naphthalene concentrations versus time and total VOC concentrations versus depths to groundwater have been included as **Appendices C** and **D**, respectively. A disposal manifest was not available at this time and will be forwarded upon receipt.

5.0 CONCLUSIONS AND RECOMMENDATIONS

- Concentrations of BTEX constituents, and/or MTBE that exceeded the RBSLs were reported in groundwater samples collected from monitoring wells MW-1R, MW-2 and MW-4. Concentrations of naphthalene that exceeded the RBSLs were reported in groundwater samples collected from monitoring wells MW-1R and MW-4.
- The total VOC concentrations have increased slightly in monitoring wells MW-1R and MW-2 compared to the March 14, 2006 sampling event. The total VOC concentrations have decreased in monitoring well MW-4 compared to the November 28, 2005 sampling event. Monitoring well MW-4 was not sampled during the March 2006 event, therefore data was compared to the November 28, 2005 event. Total VOC concentrations in monitoring wells MW-3 and MW-6 remain below reporting limits.
- ECSNC recommends quarterly groundwater sampling to monitor trends in the concentrations of chemicals of concern (COC). Site closure would be pursued following two to three consecutive quarterly sampling events with concentrations of COC below their respective RBSL.

6.0 LIMITATIONS

This report has been prepared for the exclusive use of Mr. Jerry Green for specific application to the referenced site in York County, South Carolina. The assessment was conducted based on the scope of work and level of effort desired by the client and with resources adequate only for that scope of work.

Certain data contained in this report was not obtained under the supervision of Environmental Compliance Services Inc. (ECS). Although the accuracy of this data cannot be verified and for the purpose of this report ECS assumes it is correct. Our findings have been developed in accordance with generally accepted standards of geology and hydrogeology practices in the State of South Carolina, available information, and our professional judgment. No other warranty is expressed or implied.

The data presented in this report are indicative of conditions that existed at the precise locations sampled and at the time the samples were collected. In addition, the data obtained from samples would be interpreted as being meaningful with respect to parameters indicated in the laboratory report. No additional information can be logically be inferred from this data.

TABLES

TABLE 1
SUMMARY OF GROUNDWATER ELEVATION DATA[1]
GREEN'S OIL COMPANY
FEBRUARY 27, 2007

Well ID	Top of Casing Elevation	Depth to Groundwater	Groundwater Elevation	Well Depth[2]	Dissolved Oxygen[3]
MW-1R[4]	98.30	4.82	93.48	10.35	1.89
MW-2	97.86	4.50	93.36	15.20	1.95
MW-3	97.08	5.29	91.79	7.75	4.03
MW-4	96.91	5.86	91.05	13.60	1.03
MW-5	97.04	4.24	92.80	10.30	4.76
MW-6	98.59	4.83	93.76	9.95	3.58
MW-7	98.40	NF[5]	NF	14.10	NM[6]
PW[7]-8	96.98	4.22	92.76	30.90	2.61

Notes:

1. Top of Casing Elevations for monitoring wells MW-2 through MW-7 and PW-8 were reproduced from the previous consultant's reports. Additional well construction details are unavailable; data reported in feet.
2. Well depths for monitoring wells MW-2 through MW-7 and PW-8 measured during June 12, 2003 sampling event and remeasured during the February 27, 2007 sampling event. Well depths shown above are from February 27, 2007 measurements.
3. Dissolved oxygen (DO) levels were measured in the field using a DO meter; results reported in mg/L.
4. Monitoring well MW-1R was installed as a replacement for monitoring well MW-1 on January 26, 2005.
5. Not found.
6. Not measured.
7. Telescoping monitoring well.

TABLE 2

HISTORICAL SUMMARY OF GROUNDWATER ELEVATION DATA[1]

GREEN'S OIL COMPANY

Well ID	Date Measured	Top of Casing Elevation	Depth to Groundwater	Groundwater Elevation	Well Depth[2]	Dissolved Oxygen[3]
MW-1	05/24/00	98.15	7.16	90.99	12.33	1.3
	10/09/00		7.78	90.37		2.3
	01/02/01		9.58	88.57		1.4
	12/16/02		5.11	93.04		NM[4]
	06/12/03		2.59	95.56		0.79
	11/22/04		9.36	88.79		0.93
MW-1R[5]	01/31/05	98.30	8.66	89.64	10.35	2.33
	04/27/05		4.48	93.82		1.03
	08/17/05		7.39	90.91		3.18
	11/28/05		9.75	88.55		NM
	03/14/06		7.31	90.99		3.64
	02/27/07		4.82	93.48		1.89
MW-2	05/24/00	97.86	7.03	90.83	15.2	1.9
	10/09/00		7.71	90.15		2.4
	01/02/01		9.43	88.43		0.0
	12/16/02		4.91	92.95		2.06
	06/12/03		2.47	95.39		0.53
	11/22/04		9.26	88.60		1.39
	01/31/05		8.36	89.50		1.28
	04/27/05		4.65	93.21		0.85
	08/17/05		7.59	90.27		3.78
	11/28/05		9.92	87.94		1.9
	03/14/06		7.47	90.39		2.72
	02/27/07		4.50	93.36		1.95
MW-3	12/16/02	97.08	5.83	91.25	7.75	NM
	06/12/03		3.01	94.07		1.14
	11/22/04		Dry	Dry		Dry
	01/31/05		Dry	Dry		Dry
	04/27/05		5.00	92.08		1.73
	08/17/05		Dry	Dry		Dry
	11/28/05		Dry	Dry		NM
	03/14/06		Dry	Dry		NM
	02/27/07		5.29	91.79		4.03
MW-4	12/16/02	96.91	6.66	90.25	13.60	1.45
	06/12/03		3.52	93.39		0.69
	11/22/04		NM	NM		NM
	01/31/05		NM	NM		NM
	04/27/05		5.75	91.16		1.30
	08/17/05		9.65	87.26		4.26
	11/28/05		12.32	84.59		1.78
	03/14/06		NM[6]	NM		NM
	02/27/07		5.86	91.05		1.03

TABLE 2 (continued)
HISTORICAL SUMMARY OF GROUNDWATER ELEVATION DATA
GREEN'S OIL COMPANY

Well ID	Date	Top of Casing Elevation	Depth to Groundwater	Groundwater Elevation	Well Depth	Dissolved Oxygen
MW-5	05/24/00	97.04	6.56	90.48	10.30	2.4
	10/09/00		7.15	89.89		3.0
	01/02/01		8.90	88.14		1.6
	12/16/02		4.67	92.37		2.27
	06/12/03		2.20	94.84		1.51
	11/22/04		8.67	88.37		1.41
	01/31/05		7.84	89.20		1.71
	04/27/05		4.26	92.78		3.15
	08/17/05		6.99	90.05		4.41
	11/28/05		9.28	87.76		1.71
	03/14/06		6.95	90.09		5.30
	02/27/07		4.24	92.80		4.76
MW-6	05/24/00	98.59	8.10	90.49	9.95	3.8
	10/09/00		7.92	90.67		4.9
	01/02/01		9.52	89.07		NM
	12/16/02		5.25	93.34		3.68
	06/12/03		2.89	95.70		4.48
	11/22/04		9.44	89.15		NM
	01/31/05		8.59	90.00		NM
	04/27/05		4.98	93.61		5.81
	08/17/05		7.80	90.79		4.70
	11/28/05		9.58	89.01		NM
	03/14/06		7.67	90.92		7.03
	02/27/07		4.83	93.76		3.58
MW-7	12/16/02	98.40	4.81	93.59	14.10	NM
	06/12/03		3.29	95.11		0.84
	11/22/04		NF[7]	NF		NF
	01/31/05		NF	NF		NF
	04/27/05		4.40	94.00		2.33
	08/17/05		6.22	92.18		3.69
	11/28/05		9.64	88.76		1.63
	03/14/06		7.20	91.20		4.47
	02/27/07		NF	NF		NM

TABLE 2 (continued)
HISTORICAL SUMMARY OF GROUNDWATER ELEVATION DATA
GREEN'S OIL COMPANY

Well ID	Date	Top of Casing Elevation	Depth to Groundwater	Groundwater Elevation	Well Depth	Dissolved Oxygen
PW[8]-8	05/24/00	96.98	6.45	90.53	30.90	3.9
	10/09/00		7.12	89.86		2.5
	01/02/01		8.69	88.29		2.1
	12/16/02		4.46	92.52		NM
	06/12/03		2.60	94.38		1.23
	11/22/04		5.34	91.64		2.01
	01/31/05		7.45	89.53		3.25
	04/27/05		4.65	92.33		2.25
	08/17/05		6.22	90.76		2.98
	11/28/05		9.23	87.75		2.18
	03/14/06		6.88	90.10		3.30
	02/27/07		4.22	92.76		2.61

Notes:

1. Top of Casing Elevations for monitoring wells MW-2 through MW-7 and PW-8 were reproduced from the previous consultant's reports. Additional well construction details are unavailable; data reported in feet.
2. Well depths for monitoring wells MW-2 through MW-7 and PW-8 measured during June 12, 2003 sampling event and remeasured during the February 27, 2007 sampling event. Well depth shown above are from February 27, 2007 measurements.
3. Dissolved oxygen (DO) levels were measured in the field using a DO meter; results reported in mg/L.
4. Not measured. Well did not yield enough water for field measurements or was not accessible.
5. Monitoring well MW-1R was installed as a replacement for monitoring well MW-1 on January 26, 2005.
6. Not measured, due to site obstruction.
7. Not found.
8. Telescoping monitoring well.

TABLE 3
SUMMARY OF GROUNDWATER ANALYTICAL DATA[1]
GREEN'S OIL COMPANY
FEBRUARY 27, 2007

Well ID	Benzene (µg/L)	Toluene (µg/L)	Ethylbenzene (µg/L)	Total Xylenes (µg/L)	MTBE (µg/L)	Naphthalene (µg/L)
MW-1R[2]	**95.8**[3]	5.61	28.2	31.2	**160**	**89.2**
MW-2	2.22	1.21	<1.00[4]	0.650 J[5]	**89.7**	5.12
MW-3	<1.00	<1.00	<1.00	<3.00	<1.00	<1.00
MW-4	1.03	<1.00	<1.00	<3.00	**96.5**	**47.8**
MW-5	<1.00	<1.00	<1.00	<3.00	0.590 J	<1.00
MW-6	<1.00	<1.00	<1.00	<3.00	<1.00	<1.00
MW-7	NF[6]	NF	NF	NF	NF	NF
PW-8	<1.00	<1.00	<1.00	<3.00	4.09	<1.00
RBSL[7]	5	1,000	700	10,000	40	25

Notes:

1. Analyses for BTEX constituents, MTBE and Naphthalene by EPA Method 8260B; results reported in µg/L.
2. Monitoring well MW-1R was installed as a replacement for monitoring well MW-1.
3. Concentrations in bold face type exceeded the May 2001 Risk Based Screening Level.
4. Less than the reporting limit specified in the laboratory report.
5. J-The analyte was postively identified but the value is estimated below the reporting limit.
6. Not found.
7. May 2001 Risk Based Screening Level.

TABLE 4

HISTORICAL SUMMARY OF GROUNDWATER ANALYTICAL DATA[1]

GREEN'S OIL COMPANY

Well ID	Date Sampled	Benzene (µg/L)	Toluene (µg/L)	Ethylbenzene (µg/L)	Total Xylenes (µg/L)	MTBE (µg/L)	Naphthalene (µg/L)	Lead (µg/L)
MW-1	10/24/96	**3,040**[2]	164	325	950	**2,310**	**365**	NR[3]
	05/09/00	**1,790**	255	302	611	**1,300**	**117**	12.0
	10/09/00	**1,600**	180	220	400	**850**	**350**	<3.0[4]
	01/02/01	**500**	9.0	38	68	**460**	**55**	<3.0
	12/16/02	**3,000**	**12,000**	**3,700**	**14,000**	**920**	**1,700**	14
	06/12/03	**2,280**	**9,520**	**1,980**	**17,400**	**801**	**991**	NR
	11/22/04	**2,560**	**3,820**	**2,240**	**14,200**	**790**	**2,880**	NR
MW-1R[5]	01/31/05	**1,510**	234	268	3,790	**864**	**310**	NR
	04/27/05	**2,760**	115	376	2,550	**916**	**297**	NR
	08/17/05	**2,880**	26.6	525	1,710	**1,200**	**498**	NR
	11/28/05	**47**	3.1	39	190	**120 E**[6]	**34**	NR
	03/14/06	**24**	<1.0	4.1	2.9J[7]	**98**	**5.0**	NR
	02/27/07	**95.8**	5.61	28.2	31.2	**160**	**89.2**	NR
MW-2	10/24/96	<10.0	<10.0	<10.0	<3.0	**24,700**	<5.0	NR
	05/09/00	**5.2**	ND[8]	ND	ND	**19,900**	ND	ND
	10/09/00	**31**	5.7	<5.0	12	**11,000**	**15**	<3.0
	01/02/01	**7.2**	<5.0	<5.0	<5.0	**7,700**	<5.0	<3.0
	12/16/02	<5.0	<5.0	<5.0	7.2	**170**	12	<3.0
	06/12/03	4.0	<1.0	<1.0	<1.0	**157**	<5.00	NR
	11/22/04[9]	<1.0	<1.0	<1.0	<1.0	**54.9**	<5.00	NR
	01/31/05	<1.0	<1.0	<1.0	<1.0	**68.8**	<5.00	NR
	04/27/05	1.5	<1.0	<1.0	<1.0	**168**	<5.00	NR
	08/17/05	**12.3**	1.66	1.25	<2.0	**104**	<5.00	NR
	11/28/05	**7.5**	2.80	1.20	<3.0	**92**	<1.0	NR
	03/14/06	3.3	0.69 J	<1.0	0.79J	**92**	<1.0	NR
	02/27/07	2.22	1.21	<1.00	0.650 J	**89.7**	5.12	NR
	RBSL[10]	5	1,000	700	10,000	40	25	15

TABLE 4 (continued)
HISTORICAL SUMMARY OF GROUNDWATER ANALYTICAL DATA
GREEN'S OIL COMPANY

Well ID	Date Sampled	Benzene (µg/L)	Toluene (µg/L)	Ethylbenzene (µg/L)	Total Xylenes (µg/L)	MTBE (µg/L)	Naphthalene (µg/L)	Lead (µg/L)
MW-3	10/24/96	NF[11]	NF	NF	NF	NF	NF	NF
	05/09/00	NF	NF	NF	NF	NF	NF	NF
	10/09/00	NF	NF	NF	NF	NF	NF	NF
	01/02/01	NF	NF	NF	NF	NF	NF	NF
	12/12/02	**150**	**5,800**	**2,400**	**14,000**	<25	**920**	**21**
	06/12/03	4.2	135	150	1,920	2.9	**260**	NR
	11/22/04	Dry	Dry	Dry	Dry	Dry	Dry	NR
	01/31/05	Dry	Dry	Dry	Dry	Dry	Dry	NR
	04/27/05	<1.0	<1.0	<1.0	3.7	<1.0	<5.00	NR
	08/17/05	Dry	Dry	Dry	Dry	Dry	Dry	Dry
	11/28/05	Dry	Dry	Dry	Dry	Dry	Dry	Dry
	03/14/06	Dry	Dry	Dry	Dry	Dry	Dry	Dry
	02/27/07	<1.00	<1.00	<1.00	<3.00	<1.00	<1.00	NR
MW-4	10/24/96	<1.0	<1.0	<1.0	<3.0	**70.4**	<5.0	NR
	05/09/00	NF	NF	NF	NF	NF	NF	NF
	10/09/00	NF	NF	NF	NF	NF	NF	NF
	01/02/01	NF	NF	NF	NF	NF	NF	NF
	12/16/02	<5.0	<5.0	<5.0	<5.0	**160**	8.5	5.8
	06/12/03	<1.0	<1.0	<1.0	<1.0	**198**	<5.00	NR
	11/22/04	NS[12]	NS	NS	NS	NS	NS	NS
	01/31/05	NS	NS	NS	NS	NS	NS	NS
	04/27/05	1.4	<1.0	<1.0	8.8	**160**	**152**	NR
	08/17/05	<1.00	<1.00	<1.00	5	**139**	**102**	NR
	11/28/05	<1.0	<1.0	<1.0	<3.0	**170**	**71**	NR
	03/14/06	NS	NS	NS	NS	NS	NS	NS
	02/27/07	1.03	<1.00	<1.00	<3.00	**96.5**	**47.8**	NR
	RBSL	5	1,000	700	10,000	40	25	15

TABLE 4 (continued)
HISTORICAL SUMMARY OF GROUNDWATER ANALYTICAL DATA
GREEN'S OIL COMPANY

Well ID	Date Sampled	Benzene (µg/L)	Toluene (µg/L)	Ethylbenzene (µg/L)	Total Xylenes (µg/L)	MTBE (µg/L)	Naphthalene (µg/L)	Lead (µg/L)
MW-5	10/24/96	<1.0	<1.0	<1.0	<3.0	**1,720**	<5.0	NR
	05/09/00	ND	ND	ND	ND	**14,000**	ND	ND
	10/09/00	<5.0	<5.0	<5.0	<5.0	**9,100**	<5.0	<3.0
	01/02/01	<5.0	<5.0	<5.0	<5.0	**1,400**	<5.0	<3.0
	12/12/02	<5.0	<5.0	<5.0	<5.0	14	<5.0	14
	06/12/03	<1.0	<1.0	<1.0	<1.0	3.1	<5.00	NR
	11/22/04[13]	<1.0	<1.0	<1.0	<1.0	1.4	<5.00	NR
	01/31/05	<1.0	<1.0	<1.0	<1.0	<1.0	<5.00	NR
	04/27/05	<1.0	<1.0	<1.0	<1.0	<1.0	<5.00	NR
	08/17/05	<1.00	<1.00	<1.00	<2.00	1.23	<5.00	NR
	11/28/05	<1.0	<1.0	<1.0	<3.0	<1.0	<1.0	NR
	03/14/06	<1.0	<1.0	<1.0	<3.0	<1.0	<1.0	NR
	02/27/07	<1.00	<1.00	<1.00	<3.00	0.590 J	<1.00	NR
MW-6	10/24/96	NS	NS	NS	NS	NS	NS	NS
	05/09/00	ND	ND	ND	ND	ND	ND	**52.0**
	10/09/00	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	**26.0**
	01/02/01	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	NS
	12/12/02	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	**48**
	06/12/03	<1.0	<1.0	<1.0	<1.0	<1.0	<5.00	NR
	11/22/04	<1.0	<1.0	<1.0	<1.0	<1.0	<5.00	NR
	01/31/05	<1.0	<1.0	<1.0	<1.0	<1.0	<5.00	NR
	04/27/05	<1.0	<1.0	<1.0	<1.0	<1.0	<5.00	NR
	08/17/05	<1.00	<1.00	<1.00	<2.00	<1.00	<5.00	NR
	11/28/05	<1.0	<1.0	<1.0	<3.0	<1.0	<1.0	NR
	03/14/06	<1.0	<1.0	<1.0	<3.0	<1.0	<1.0	NR
	02/27/07	<1.00	<1.00	<1.00	<3.00	<1.00	<1.00	NR
	RBSL	5	1,000	700	10,000	40	25	15

TABLE 4 (continued)
HISTORICAL SUMMARY OF GROUNDWATER ANALYTICAL DATA
GREEN'S OIL COMPANY

Well ID	Date Sampled	Benzene (µg/L)	Toluene (µg/L)	Ethylbenzene (µg/L)	Total Xylenes (µg/L)	MTBE (µg/L)	Naphthalene (µg/L)	Lead (µg/L)
MW-7	10/24/96	NF	NF	NF	NF	NF	NF	NF
	05/09/00	NF	NF	NF	NF	NF	NF	NF
	10/09/00	NF	NF	NF	NF	NF	NF	NF
	01/02/01	NF	NF	NF	NF	NF	NF	NF
	12/12/02	<5.0	<5.0	<5.0	<5.0	**160**	<5.0	**58**
	06/12/03	<1.0	<1.0	<1.0	<1.0	**294**	<5.00	NR
	11/22/04	NF	NF	NF	NF	NF	NF	NF
	01/31/05	NF	NF	NF	NF	NF	NF	NF
	04/27/05	<1.0	<1.0	<1.0	<1.0	1.3	<5.00	NR
	08/17/05	<1.00	<1.00	<1.00	<2.00	22.7	<5.00	NR
	11/28/05	<1.0	<1.0	<1.0	<3.0	**65**	<1.0	NR
	03/14/06	<1.0	<1.0	<1.0	<3.0	1.5	<1.0	NR
	02/27/07	NF	NF	NF	NF	NF	NF	NF

TABLE 4 (continued)
HISTORICAL SUMMARY OF GROUNDWATER ANALYTICAL DATA
GREEN'S OIL COMPANY

Well ID	Date Sampled	Benzene (µg/L)	Toluene (µg/L)	Ethylbenzene (µg/L)	Total Xylenes (µg/L)	MTBE (µg/L)	Naphthalene (µg/L)	Lead (µg/L)
PW-8	10/24/96	<1.0	<1.0	<1.0	<3.0	**547**	<5.0	NR
	05/09/00	ND	ND	ND	ND	**790**	ND	ND
	10/09/00	<5.0	<5.0	<5.0	6.1	**180**	<5.0	<3.0
	01/02/01	<5.0	<5.0	<5.0	<5.0	**160**	<5.0	<3.0
	12/12/02	<5.0	<5.0	<5.0	<5.0	**44**	<5.0	<3.0
	06/12/03	<1.0	<1.0	<1.0	<1.0	**84.6**	<5.00	NR
	11/22/04[14]	<1.0	<1.0	<1.0	<1.0	9.7	<5.00	NR
	01/31/05	<1.0	<1.0	<1.0	<1.0	1.3	<5.00	NR
	04/27/05	<1.0	<1.0	<1.0	<1.0	6.3	<5.00	NR
	08/17/05	<1.00	<1.00	<1.00	<2.00	23.4	<5.00	NR
	11/28/05	<1.0	<1.0	<1.0	<3.0	15.0	<1.0	NR
	03/14/06	<1.0	<1.0	<1.0	<3.0	5.9	<1.0	NR
	02/27/07	<1.00	<1.00	<1.00	<3.00	4.09	<1.00	NR
	RBSL	5	1,000	700	10,000	40	25	15

Notes:
1. Analyses for BTEX constituents, MTBE and Naphthalene by EPA Method 8260B; groundwater quality data prior to June 12, 2003 reproduced from previous consultant's reports. The data is assumed to be correct.
2. Concentrations in bold face type exceeded the January 1998 Risk Based Screening Level for samples collected before May 2001 and exceeded the May 2001 Risk Based Screening Level for samples collected after May 2001.
3. Analysis not requested.
4. Less than the reporting limit specified in the laboratory report.
5. Monitoring well MW-1R was installed as a replacement for monitoring well MW-1.
6. Estimated concentration, calibration range exceeded.
7. Estimated concentration below the laboratory reporting limit.
8. Not Detected.
9. Other compound detected (IPE: 294 µg/L).
10. May 2001 Risk Based Screening Level.
11. Well not found.
12. Not sampled due to insufficient volume of water in the well or well was not accessible.
13. Other compound detected (IPE: 21.8 µg/L)
14. Other compound detected (IPE: 13.4 µg/L)

FIGURES

SCALE 1:24,000

1 0 1 MILE

1000 0 1000 2000 3000 4000 5000 6000 7000 FEET

CONTOUR INTERVAL 10 FEET

S.C.

QUADRANGLE LOCATION

ROCK HILL EAST, SC QUADRANGLE

ecs
13904 South Point Blvd, Suite F
Charlotte, NC 28273
Phone: 704-588-5711 Fax: 704-588-5744

LATITUDE:	34° 58' 42" N
LONGITUDE:	80° 58' 54" W
DRAWN BY:	KB
CHECKED BY:	BD
DATE:	3/21/07

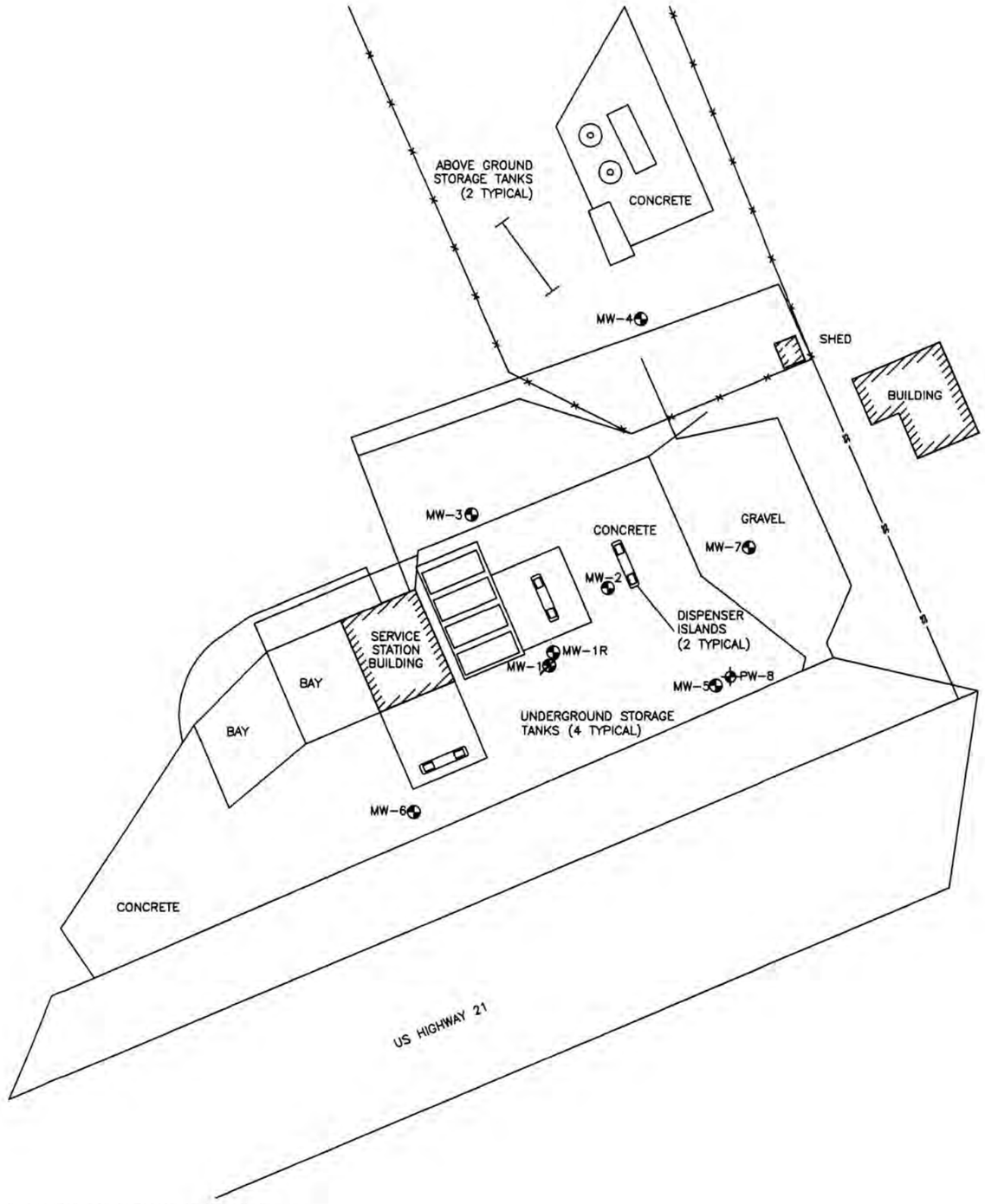
GREEN'S OIL CO.
2849 CHERRY RD.
ROCK HILL, SC

SITE I.D. NO. 09344

FIGURE 1

USGS TOPOGRAPHIC MAP

PROJECT NO. 14-811030



NOTE: FIGURE BASED ON SITE MAP BY PREVIOUS CONSULTANT.

Legend

- Sanitary Sewer Line
- Fence
- Shallow (Water Table) Monitoring Well
- Shallow Monitoring Well (Abandoned)
- Telescoping Monitoring Well

General Notes:

All locations, dimensions, and property lines depicted on this plan are approximate. This plan should not be used for construction or land conveyance purposes.

ecs
13504 South Point Blvd, Suite F • Charlotte, NC 28273
Phone: (704)583-2711 Fax: (704)583-2744

PROJECT:
Green's Oil Company
2849 Cherry Road
Rock Hill, South Carolina

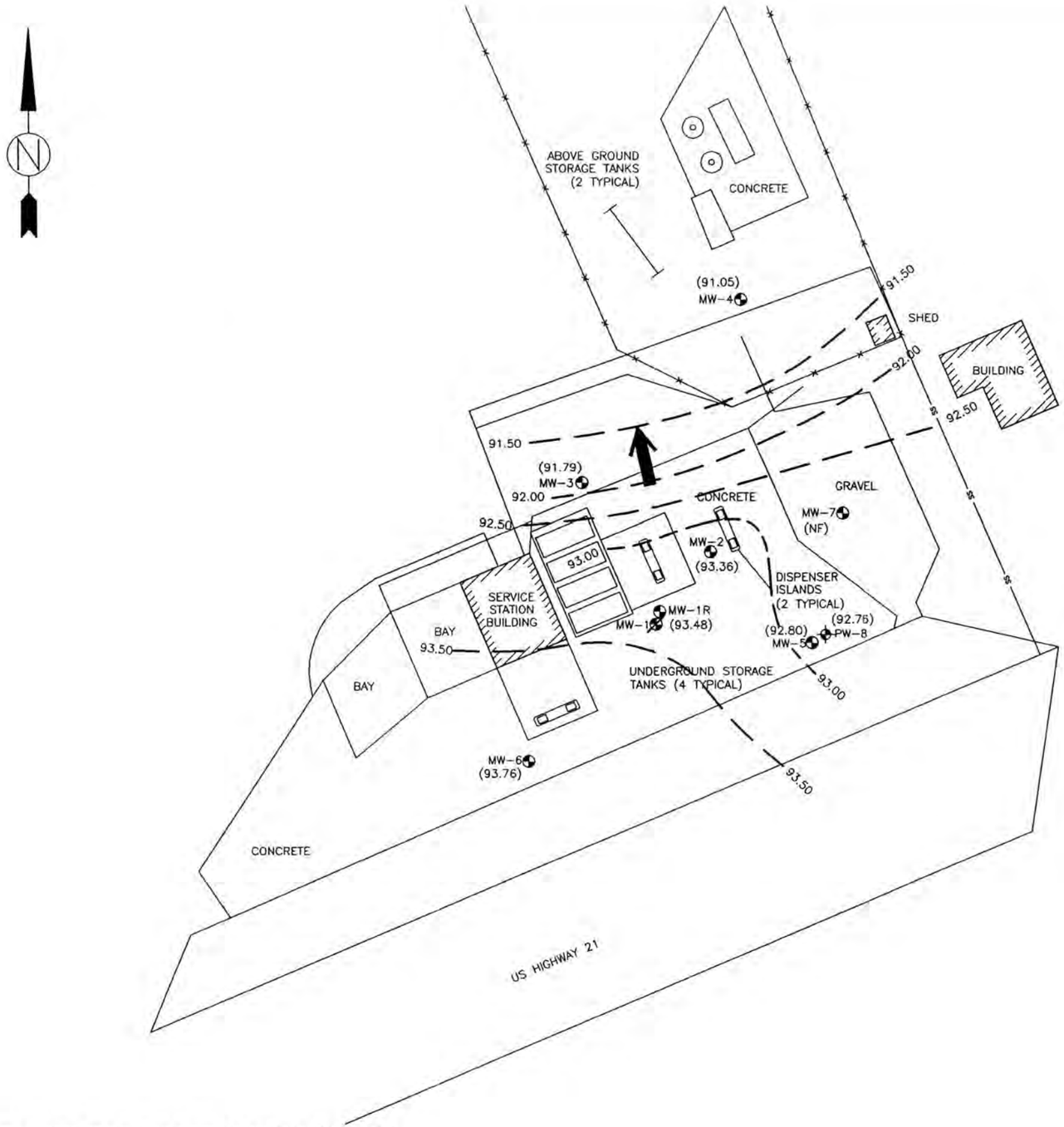
TITLE:
SITE MAP

CLIENT:
Federated Insurance

GRAPHIC SCALE: 40 20 0 20 40

COMPUTER CADFILE: C:\MyDocuments\Charlotte\811030 Green's Oil Company

DRAWN BY:	DESIGNED BY:	CHECKED BY:	APPROVED BY:
KB	KB	BD	BD
SCALE:	DATE:	JOB NO.:	FIGURE NO.:
1"=40'	3/21/07	14-811030	2



NOTE: FIGURE BASED ON SITE MAP BY PREVIOUS CONSULTANT.

Legend

- ss — Sanitary Sewer Line
- x — Fence
- Shallow (Water Table) Monitoring Well
- Shallow Monitoring Well (Abandoned)
- Telescoping Monitoring Well
- (93.48) Groundwater Elevation
- 93.00 — Water Table Contour (Dashed where inferred)
- (NF) Not Found
- Flow Direction Indicator

General Notes:

All locations, dimensions, and property lines depicted on this plan are approximate. This plan should not be used for construction or land conveyance purposes.

Horizontal, and vertical locations of wells, and selected site features determined through measurements made by representatives of ECS.

Groundwater elevations are based on a benchmark with an assumed datum of 100.00 feet.

Water table elevations are based on measurements made on February 27, 2007.

Water table contours, and flow directions assume homogenous, isotropic aquifer conditions, and horizontal flow.

Fluctuations in the level of the water table may occur due to factors not accounted for at the time of measurement.

Water table contours are interpolated between data points, and inferred in other areas.

Telescoping Monitoring Well not used in contouring.

ecs
13504 South Point Blvd, Suite F * Charlotte, NC 28273
Phone: (704)583-2711 Fax: (704)583-2744

PROJECT:
Green's Oil Company
2849 Cherry Road
Rock Hill, South Carolina

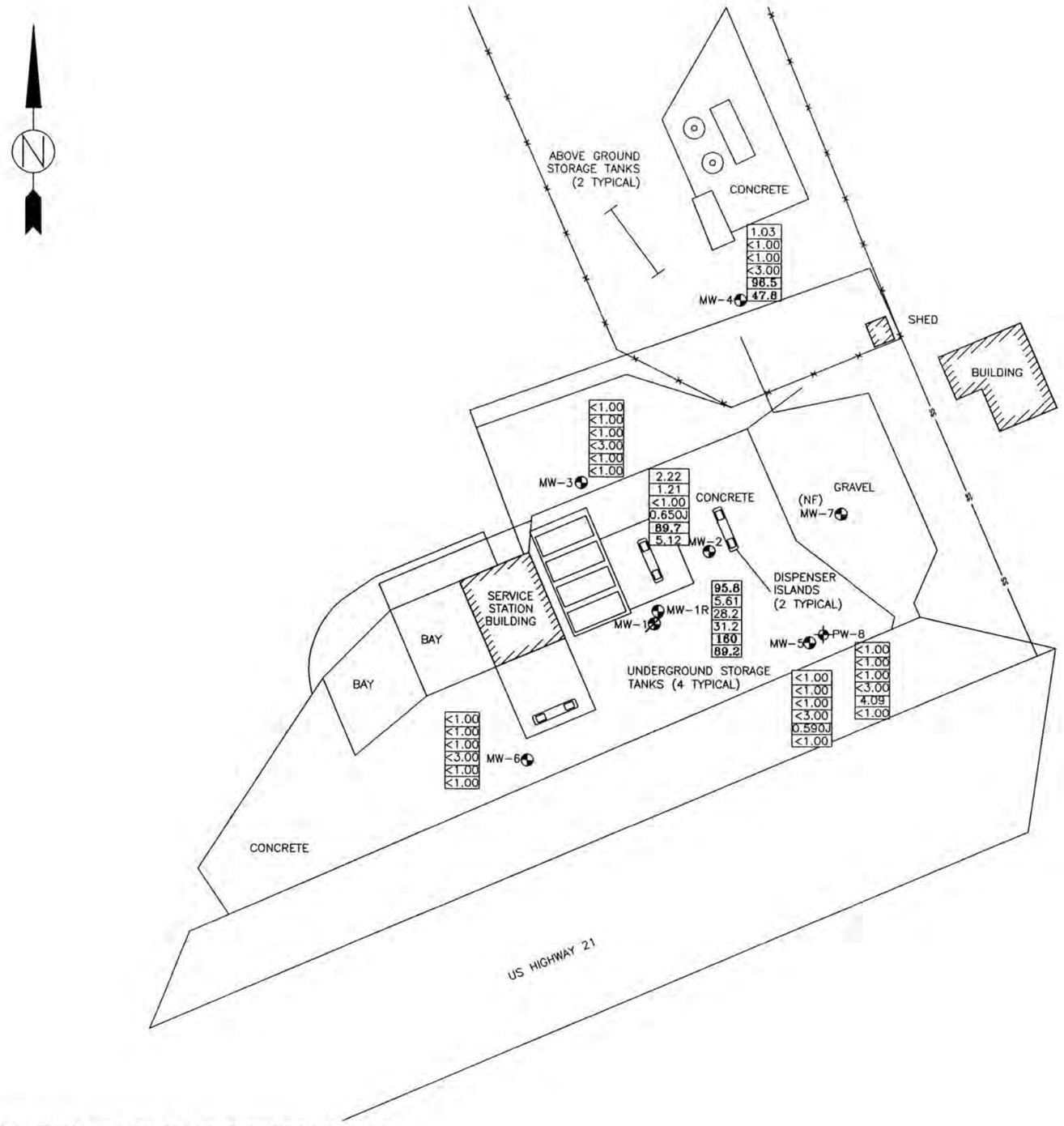
TITLE:
GROUNDWATER ELEVATION MAP 2/27/07

CLIENT:
Federated Insurance

GRAPHIC SCALE: 40 20 0 20 40

COMPUTER CADFILE: C:\MyDocuments\Charlotte\811030 Green's Oil Company

DRAWN BY:	DESIGNED BY:	CHECKED BY:	APPROVED BY:
KB	KB	BD	BD
SCALE:	DATE:	JOB NO.:	FIGURE NO.:
1"=40'	3/21/07	14-811030	3



NOTE: FIGURE BASED ON SITE MAP BY PREVIOUS CONSULTANT.

Legend

- ——ss—— Sanitary Sewer Line
- ——x—— Fence
- Shallow (Water Table) Monitoring Well
- Shallow Monitoring Well (Abandoned)
- Telescoping Monitoring Well

5	Benzene
1,000	Toluene
700	Ethylbenzene
10,000	Xylenes
40	MTBE
25	Naphthalene

All concentrations are measured in micrograms per liter (ug/L).

Above concentrations represent May 2001 Risk-Based Screening Levels; Concentrations in bold face type exceeded the RBSL.

J – Estimated Value between the method detection limit and the reporting limit.

<1.0 Less than the reporting limit specified in the laboratory report.

NF – Not Found

General Notes:

All locations, dimensions, and property lines depicted on this plan are approximate. This plan should not be used for construction or land conveyance purposes.

ecs
13504 South Point Blvd, Suite F • Charlotte, NC 28273
Phone: (704)583-2711 Fax: (704)583-2744

PROJECT:
Green's Oil Company
2849 Cherry Road
Rock Hill, South Carolina

TITLE:
GROUNDWATER QUALITY MAP 2/27/07

CLIENT:
Federated Insurance

GRAPHIC SCALE: 40 20 0 20 40

COMPUTER CADFILE: C:\MyDocuments\Charlotte\811030 Green's Oil Company

DRAWN BY:	DESIGNED BY:	CHECKED BY:	APPROVED BY:
KB	KB	BD	BD
SCALE:	DATE:	JOB NO.:	FIGURE NO.:
1"=40'	3/21/07	14-811030	4

APPENDIX A
GROUNDWATER SAMPLING FIELD DATA SHEETS

GAUGE REPORT

Environmental Compliance Services, Inc.
13504 South Point Blvd
Charlotte, NC 28273

Project Name	Greens Oil	Location	Rock Hill, SC
Project No.	14-811030	Date	2/27/2007
Measured By	Phil P	Weather	Sunny 50

Well No.	Depth to Product (feet)	Depth to Water (feet)	Product Thickness (feet)	Product Recovered (gallons)	Well Depth (feet)	Volume Purged (gallons)
MW-1R	---	4.82	---	---	10.35	10.80
MW-2	---	4.50	---	---	15.20	20.92
MW-3	---	5.29	---	---	7.75	1.20
MW-4	---	5.86	---	---	13.60	3.78
MW-5	---	4.24	---	---	10.30	2.96
MW-6	---	4.83	---	---	9.95	2.50
MW-7	---	NF	---	---	14.10	0.00
PW-8	---	4.22	---	---	30.90	13.05

Remarks

South Carolina Department of Health and Environmental Control
Bureau of Underground Storage Tank Management

Field Data Information Sheet for Ground Water Sampling

Date	2/27/2007		
Field Personnel	Phil Pike		
General Weather Conditions	Sunny		
Ambient Air Temperature	50		
Facility Name:	Greens Oil	Site ID #815	
Quality Assurance:			
pH Meter:		Conductivity Meter	
serial no.	HI98107	serial no.	ECTestr
pH =4.0	4	Standard	1420
pH =7.0	7	Standard	
pH =10.0	10	Standard	
Chain of Custody			
Phil Pike	2/27/2007	Prism Labs 3/1/2007@8:15	
Relinquished by	Date/Time	Received By	Date/Time

Well #	MW-1		
Well Diameter (D)	4 inch or	0.33	feet
conversion factor ©: 3.143*(D/2)^2			
for a 2 inch well C=	0.163		
for a 4 inch well C=	0.652		
Total Well Depth (TWD)	10.35 feet		
Depth to GW (DGW)	4.82 feet		
Length of Water Column (LWC= TWD-DGW)		5.53	feet
1 Csg. Volume (LWC*C)=	3.60		
3 Csg. Volume=3 X 1 Csg. Vol=	10.80		
Total Volume of Water Purged Before Sampling		10.80	gallons

	Initial	1st vol.	2nd vol.	3rd vol.	4th vol.	5th vol.	Post	Sampling
Volume Purged (gallons)	-	3.60	3.60	3.60	-	-	-	-
Time (military)	9:05	9:12	9:19	9:23				12:05
pH (s.u.)	6.8	6.5	6.2	6.2				7.00
Specific Cond. (umhos/cm)	110	120	140	140				180
Water Temp (^{O}C)	12.1	14.6	15.0	14.9				17.1
Turbidity (*)	1	1	1	1				1
Dissolved Oxygen (mg/L)	3.16	5.14	5.10	5.01				1.89

* subjective (1) None (2) Faint (3) Moderate (4) Strong

Remarks: _____

APPENDIX B

LABORATORY REPORT – GROUNDWATER SAMPLES

CHAIN OF CUSTODY RECORD

PRISM LABORATORIES, INC.

Full Service Analytical & Environmental Solutions

449 Springbrook Road • P.O. Box 240543 • Charlotte, NC 28224-0543
Phone: 704/529-6364 • Fax: 704/525-0409

PAGE 1 OF 1 QUOTE # TO ENSURE PROPER BILLING: _____

Project Name: Greens oil

Short Hold Analysis: (Yes) (No) UST Project: (Yes) (No)

*Please ATTACH any project specific reporting (QC LEVEL I II III IV) provisions and/or QC Requirements

Invoice To: ECS

Address: Agawam MA

Client Company Name: ECS

Report To/Contact Name: Brian Demmc

Reporting Address: Charlotte NC

Phone: 704-583-2711 Fax (Yes) (No): _____

Email (Yes) (No) Email Address BDemmc@ecsconsult.com

EDD Type: PDF ✓ Excel ___ Other _____

Site Location Name: Greens oil

Site Location Physical Address: Cherry Rd Rock Hill SC

Purchase Order No./Billing Reference 14-81030

Requested Due Date ☐ 1 Day ☐ 2 Days ☐ 3 Days ☐ 4 Days ☐ 5 Days

"Working Days" ☐ 6-9 Days ☐ Standard 10 days ☐ Rush Work Must Be Pre-Approved

Samples received after 15:00 will be processed next business day.

Turnaround time is based on business days, excluding weekends and holidays.

(SEE REVERSE FOR TERMS & CONDITIONS REGARDING SERVICES RENDERED BY PRISM LABORATORIES, INC. TO CLIENT)

LAB USE ONLY

	YES	NO	N/A
Samples INTACT upon arrival?	✓		
Received ON WET ICE? Temp 4.3	✓		
PROPER PRESERVATIVES indicated?	✓		
Received WITHIN HOLDING TIMES?	✓		
CUSTODY SEALS INTACT?			✓
VOLATILES rec'd W/OUT HEADSPACE?	✓		
PROPER CONTAINERS used?	✓		

TO BE FILLED IN BY CLIENT/SAMPLING PERSONNEL

Certification: NELAC ___ USACE ___ FL ___ NC ___ SC ✓ OTHER ___ N/A ___

Water Chlorinated: YES ___ NO ✓

Sample Iced Upon Collection: YES ✓ NO ___

CLIENT SAMPLE DESCRIPTION	DATE COLLECTED	TIME COLLECTED MILITARY HOURS	MATRIX (SOIL, WATER OR SLUDGE)	SAMPLE CONTAINER *TYPE SEE BELOW	NO.	SIZE	PRESERVATIVES	ANALYSES REQUESTED 8260 BTEX, MTBE Naph.	REMARKS	PRISM LAB ID NO.
MW-1R	2/27/07	12:05	Gw	VOA	3	40ml	HCl	X		174845
MW-2		12:15								174846
MW-3		12:30								174847
MW-4		12:20								174848
MW-5		11:45								174849
MW-6		11:55								174850
~~PW~~ PW-8		11:40								174851

PRESS DOWN FIRMLY - 3 COPIES

Sampler's Signature _____ Sampled By (Print Name) Phil Price Affiliation ECS

Upon relinquishing, this Chain of Custody is your authorization for Prism to proceed with the analyses as requested above. Any changes must be submitted in writing to the Prism Project Manager. There will be charges for any changes after analyses have been initialized. 3-1-07

		Date	Military/Hours
Relinquished By: (Signature)	Received By: (Signature)	3/1/07	815
Relinquished By: (Signature)	Received By: (Signature)	3/1/07	0910
Relinquished By: (Signature)	Received For Prism Laboratories By:	3/1/07	0910

Method of Shipment: NOTE: ALL SAMPLE COOLERS SHOULD BE TAPED SHUT WITH CUSTODY SEALS FOR TRANSPORTATION TO THE LABORATORY. SAMPLES ARE NOT ACCEPTED AND VERIFIED AGAINST COC UNTIL RECEIVED AT THE LABORATORY.

☐ Fed Ex ☐ UPS ☐ Hand-delivered ☒ Prism Field Service ☐ Other _____

COC Group No. 603070104

Additional Comments:

PRISM USE ONLY

Site Arrival Time:	
Site Departure Time:	
Field Tech Fee:	
Mileage:	

NPDES:	UST:	GROUNDWATER:	DRINKING WATER:	SOLID WASTE:	RCRA:	CERCLA	LANDFILL	OTHER:
☐ NC ☐ SC ☐ _____	☐ NC ☐ SC ☐ _____	☐ NC ☐ SC ☐ _____	☐ NC ☐ SC ☐ _____	☐ NC ☐ SC ☐ _____	☐ NC ☐ SC ☐ _____	☐ NC ☐ SC ☐ _____	☐ NC ☐ SC ☐ _____	☐ NC ☐ SC ☐ _____

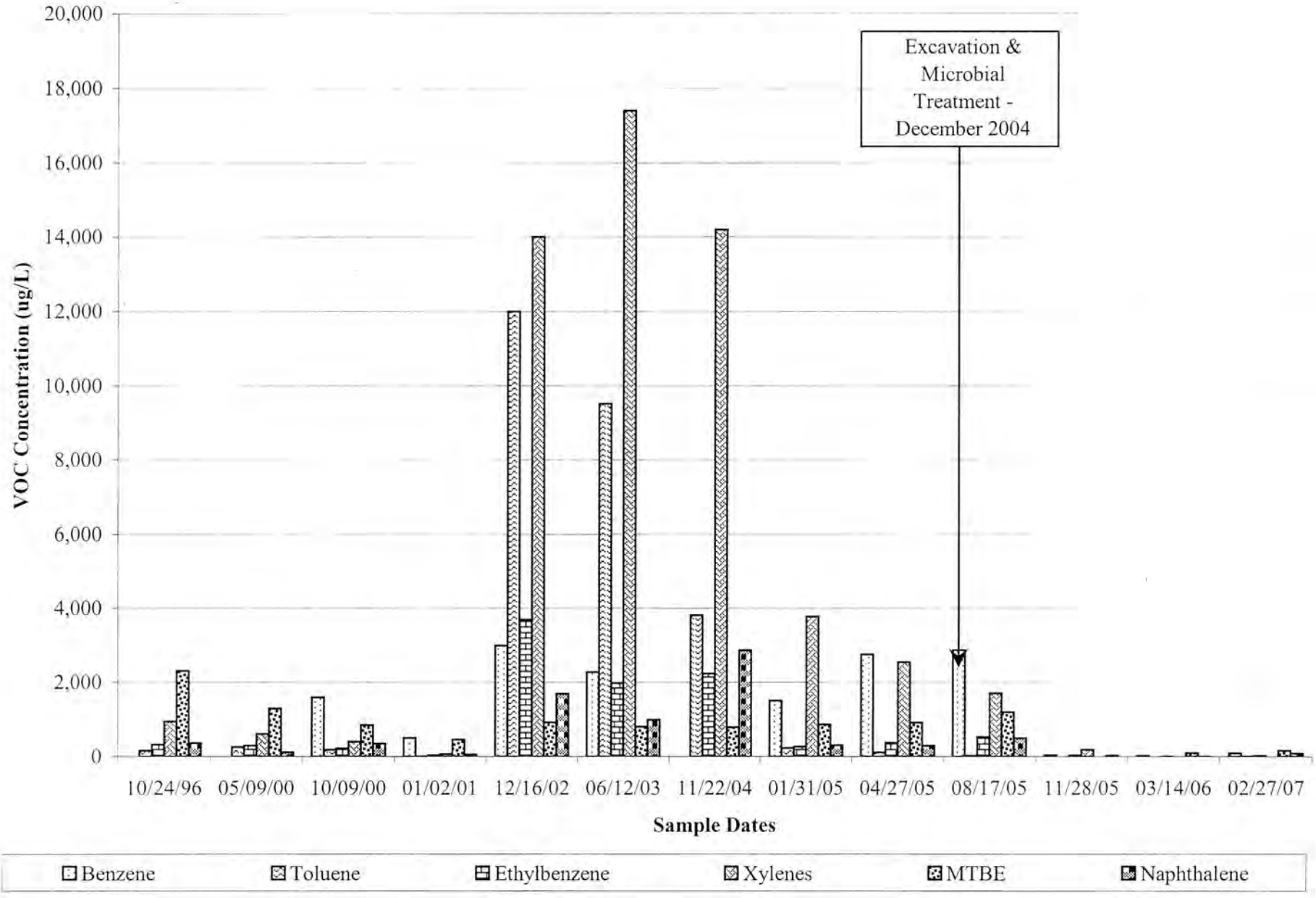
SEE REVERSE FOR TERMS & CONDITIONS

ORIGINAL

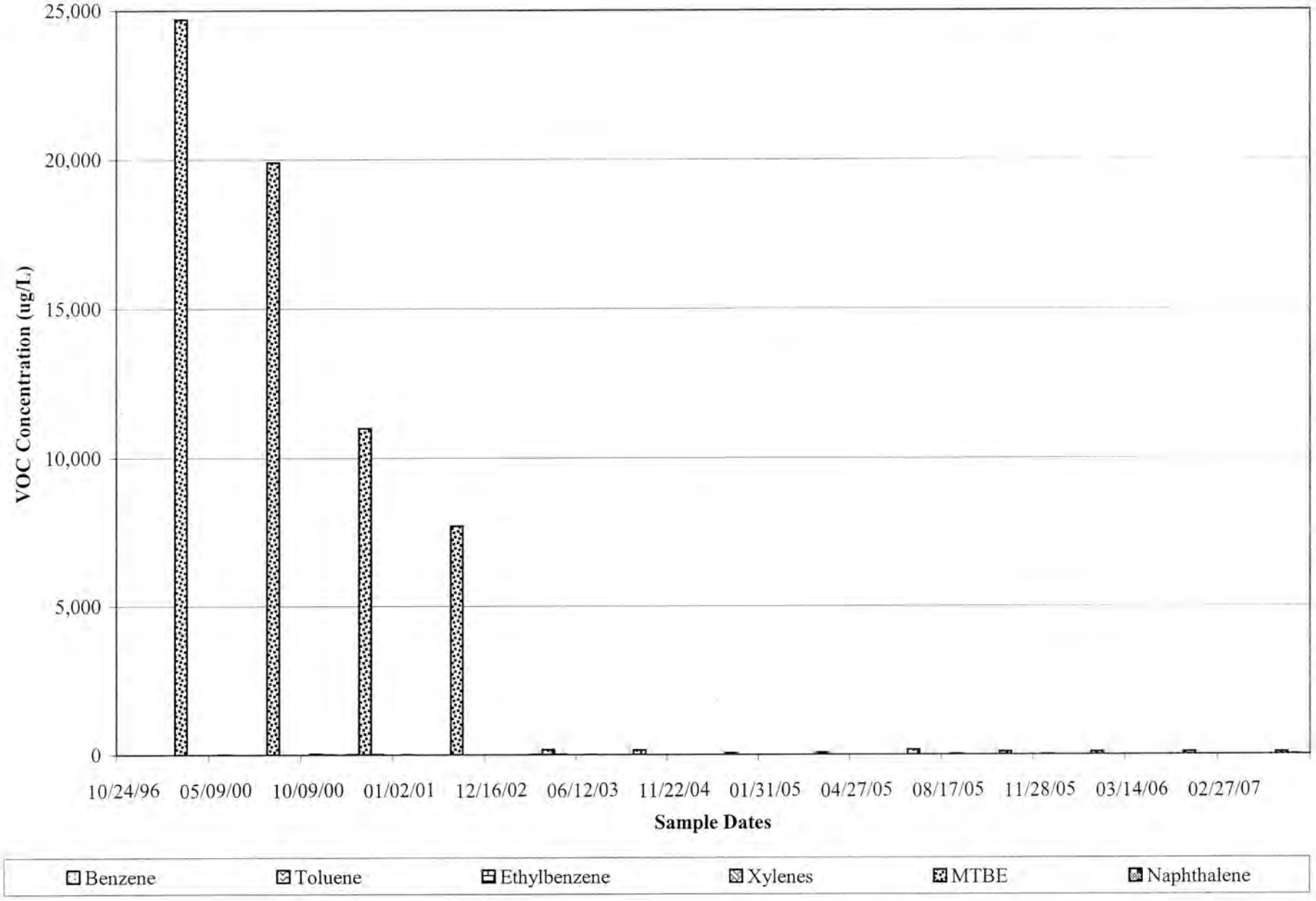
APPENDIX C

GRAPHS OF INDIVIDUAL VOC CONCENTRATIONS VS. TIME

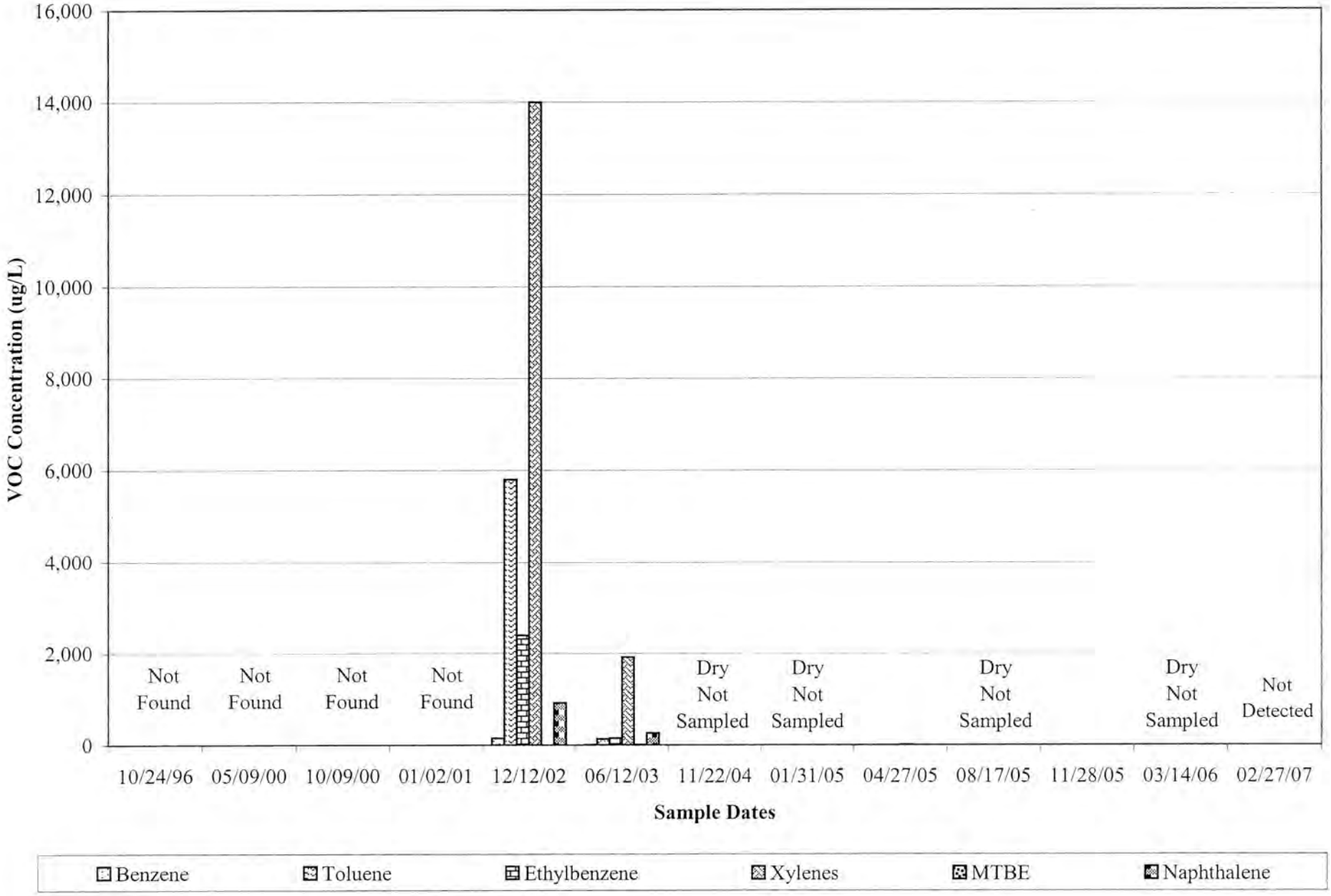
GROUNDWATER QUALITY CHART
GREENS OIL - MW-1/MW-1R



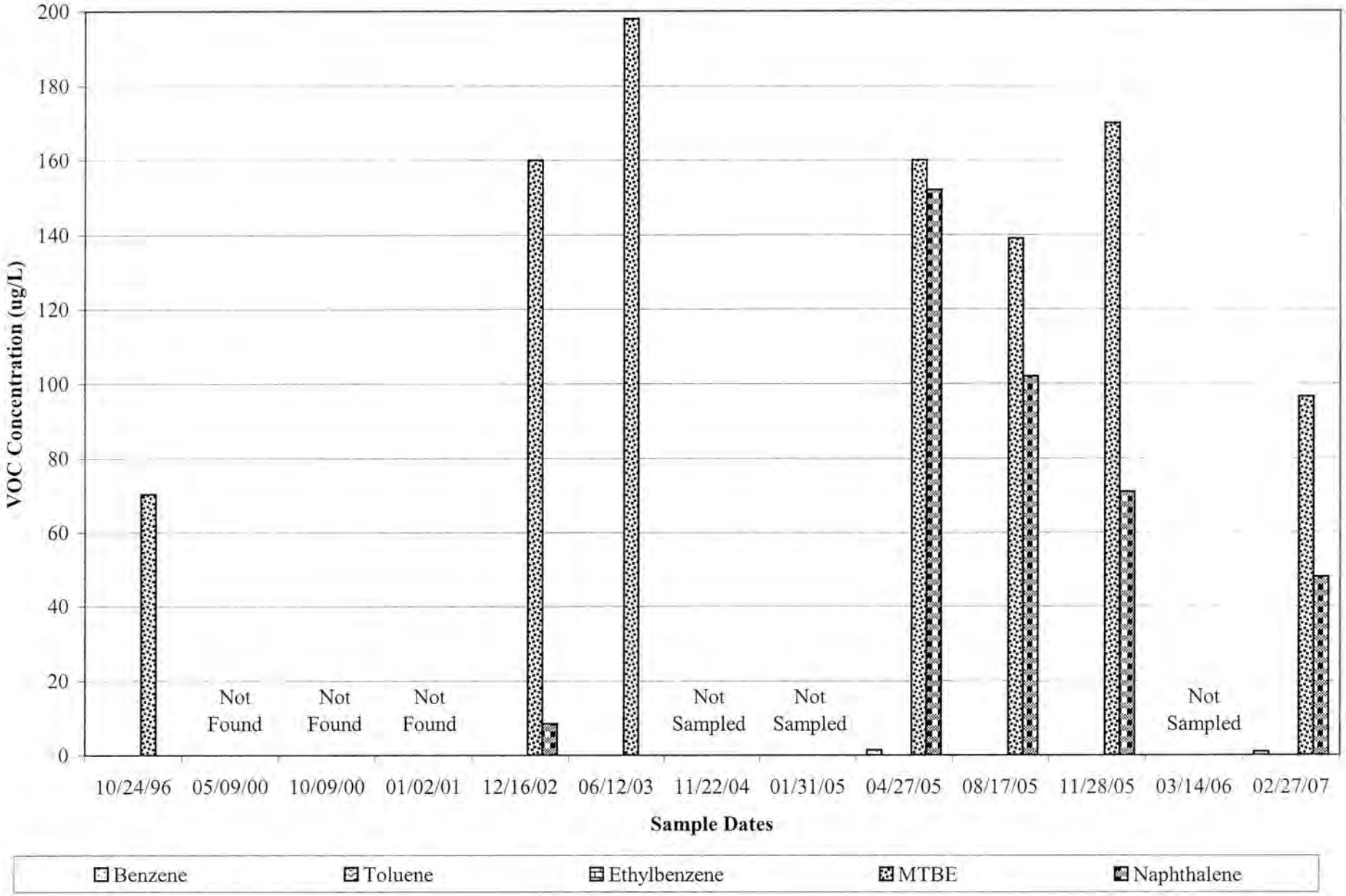
GROUNDWATER QUALITY CHART
GREENS OIL - MW-2



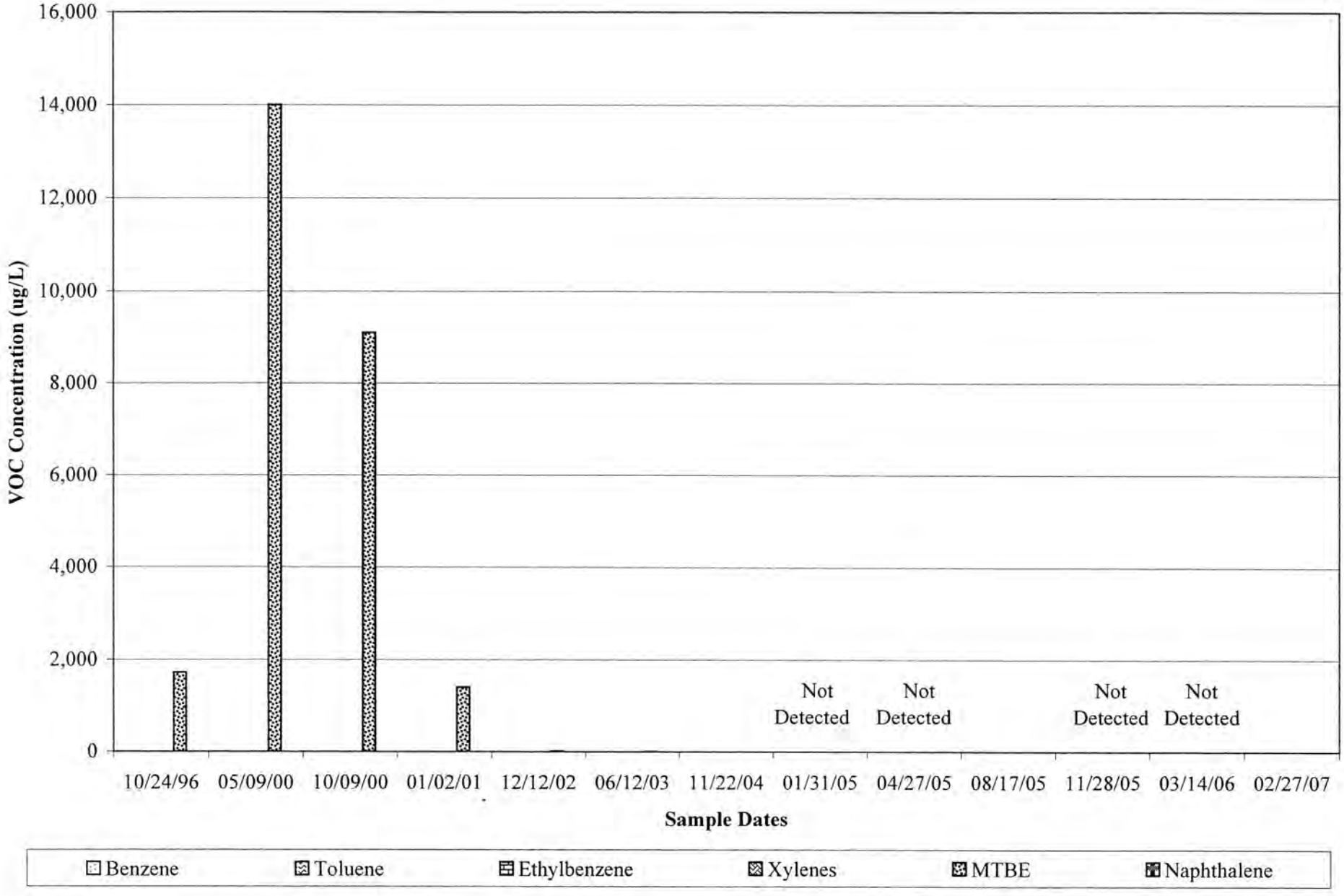
GROUNDWATER QUALITY CHART
GREENS OIL - MW-3



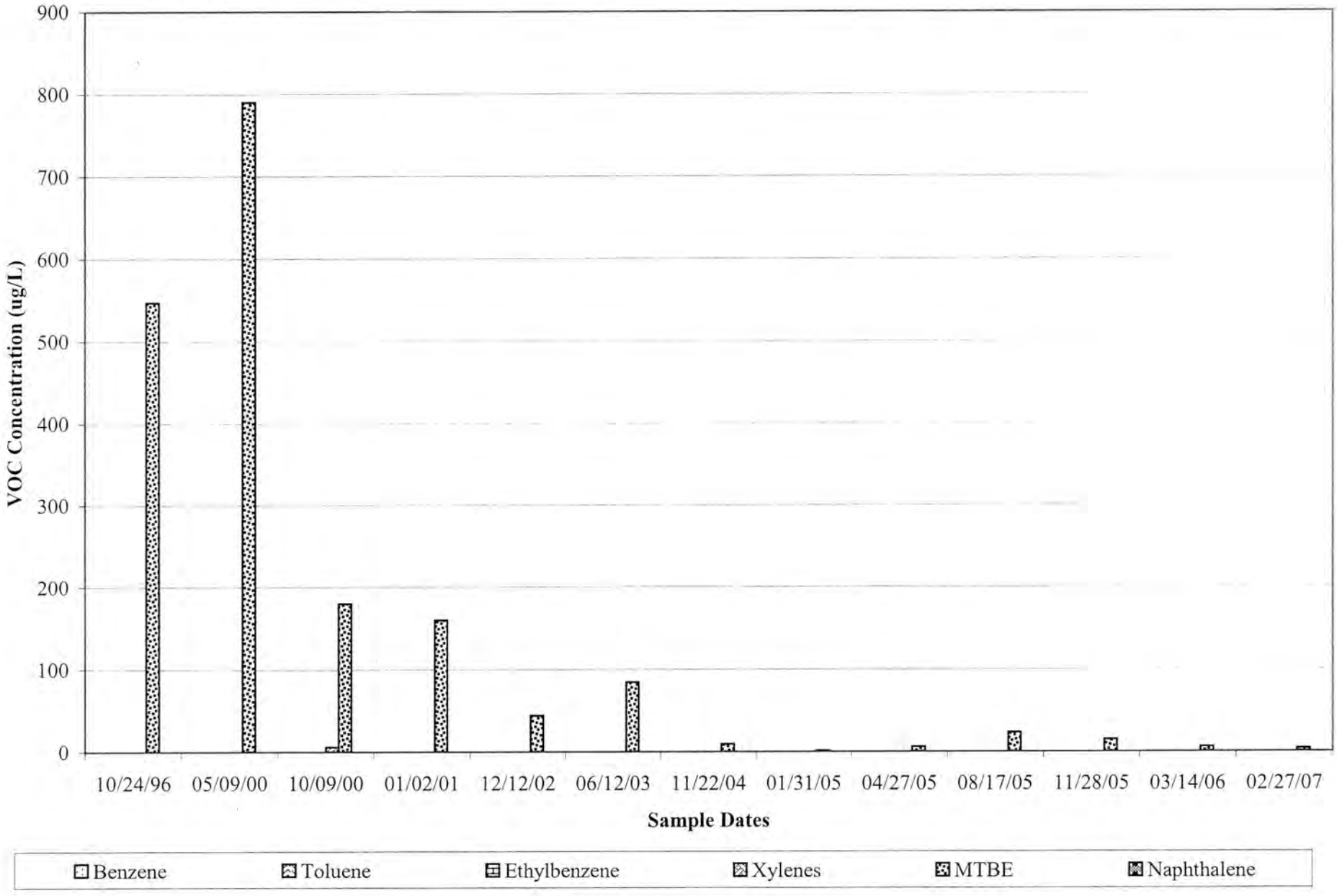
GROUNDWATER QUALITY CHART
GREENS OIL - MW-4



GROUNDWATER QUALITY CHART
GREENS OIL - MW-5



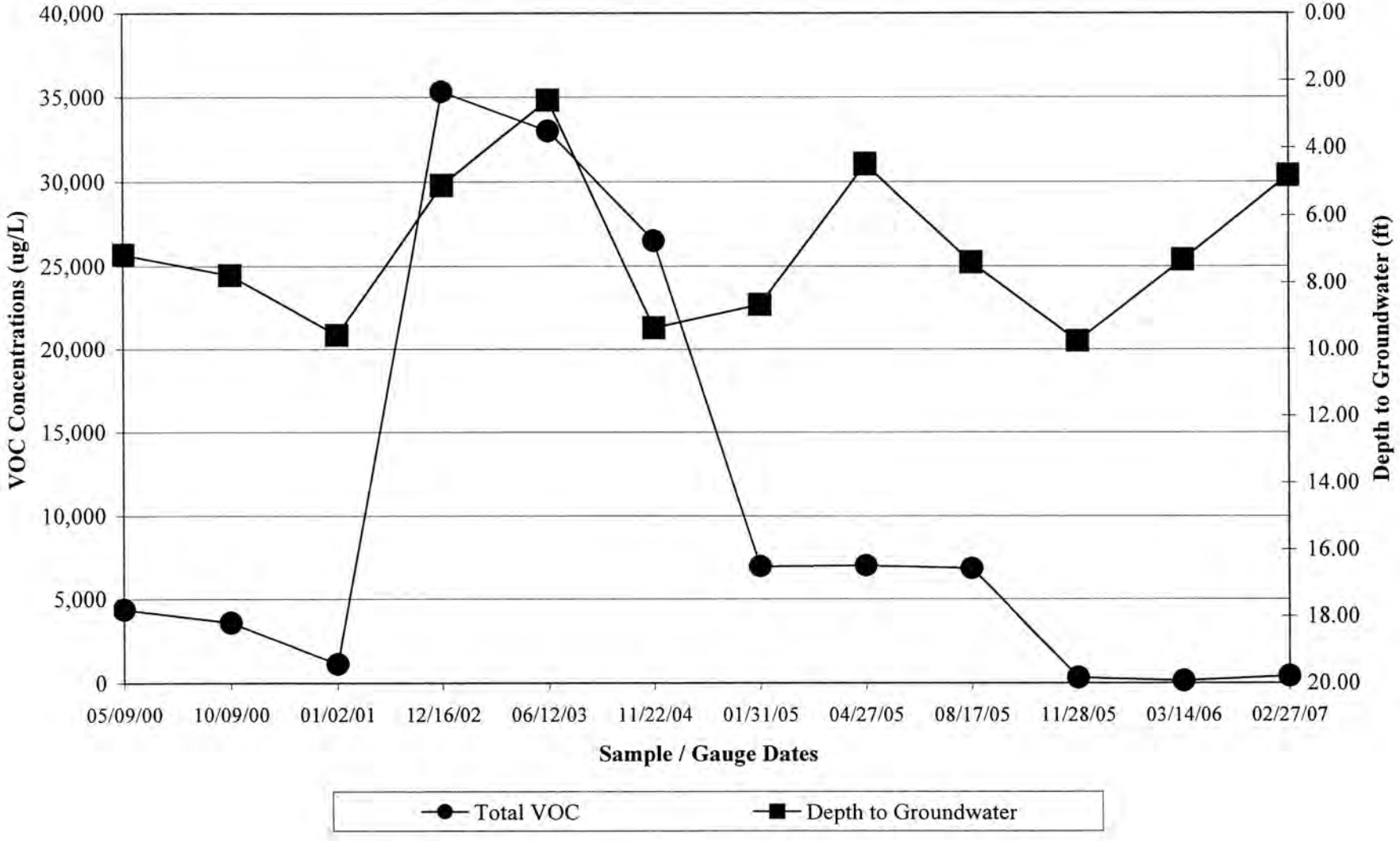
GROUNDWATER QUALITY CHART
GREENS OIL - PW-8



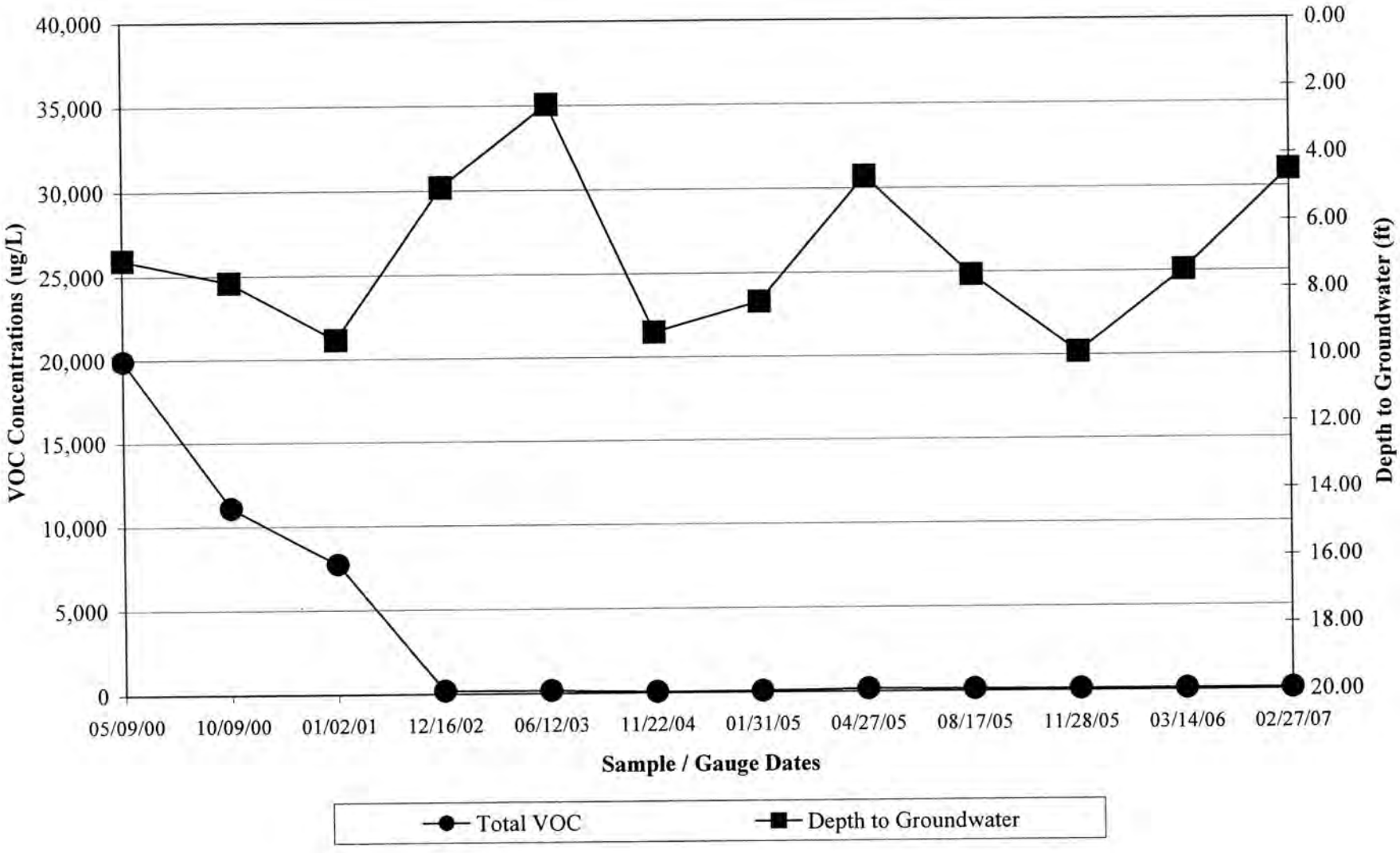
APPENDIX D

GRAPHS OF TOTAL VOC CONCENTRATIONS VS. DEPTH TO GROUNDWATER

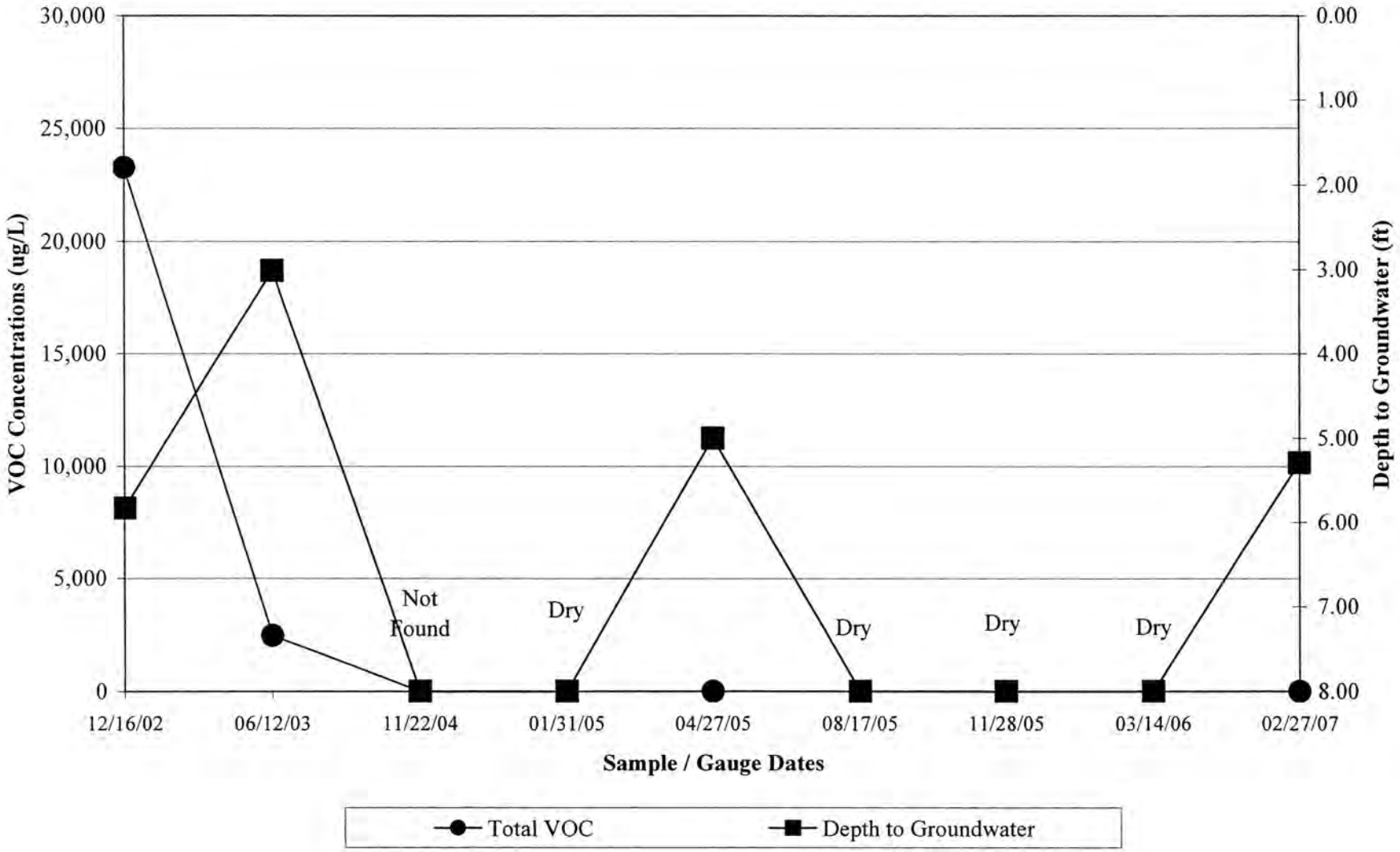
TOTAL VOC CONCENTRATION VS. DEPTH TO GROUNDWATER
GREENS OIL - MW-1/MW-1R



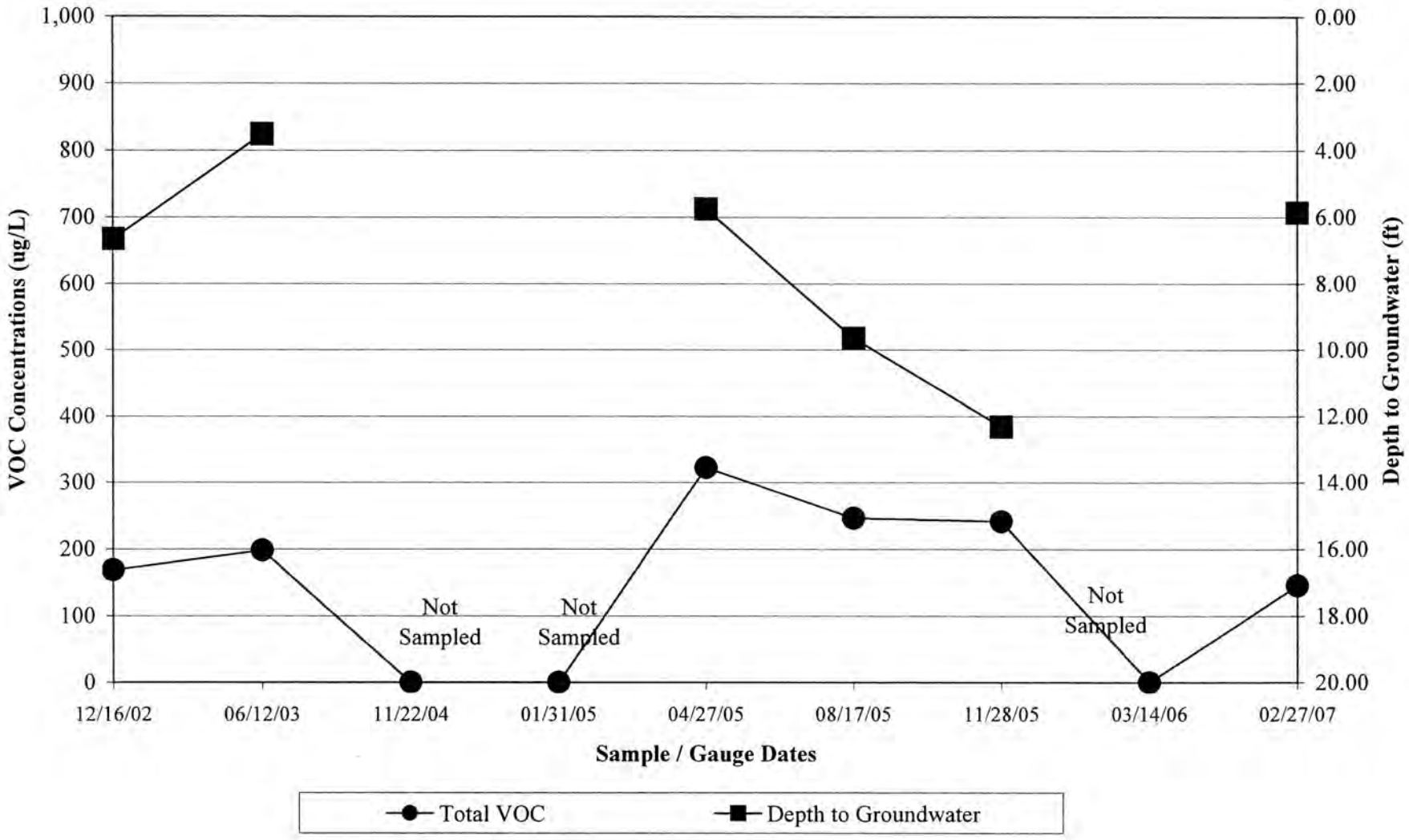
TOTAL VOC CONCENTRATION VS. DEPTH TO GROUNDWATER
GREENS OIL - MW-2



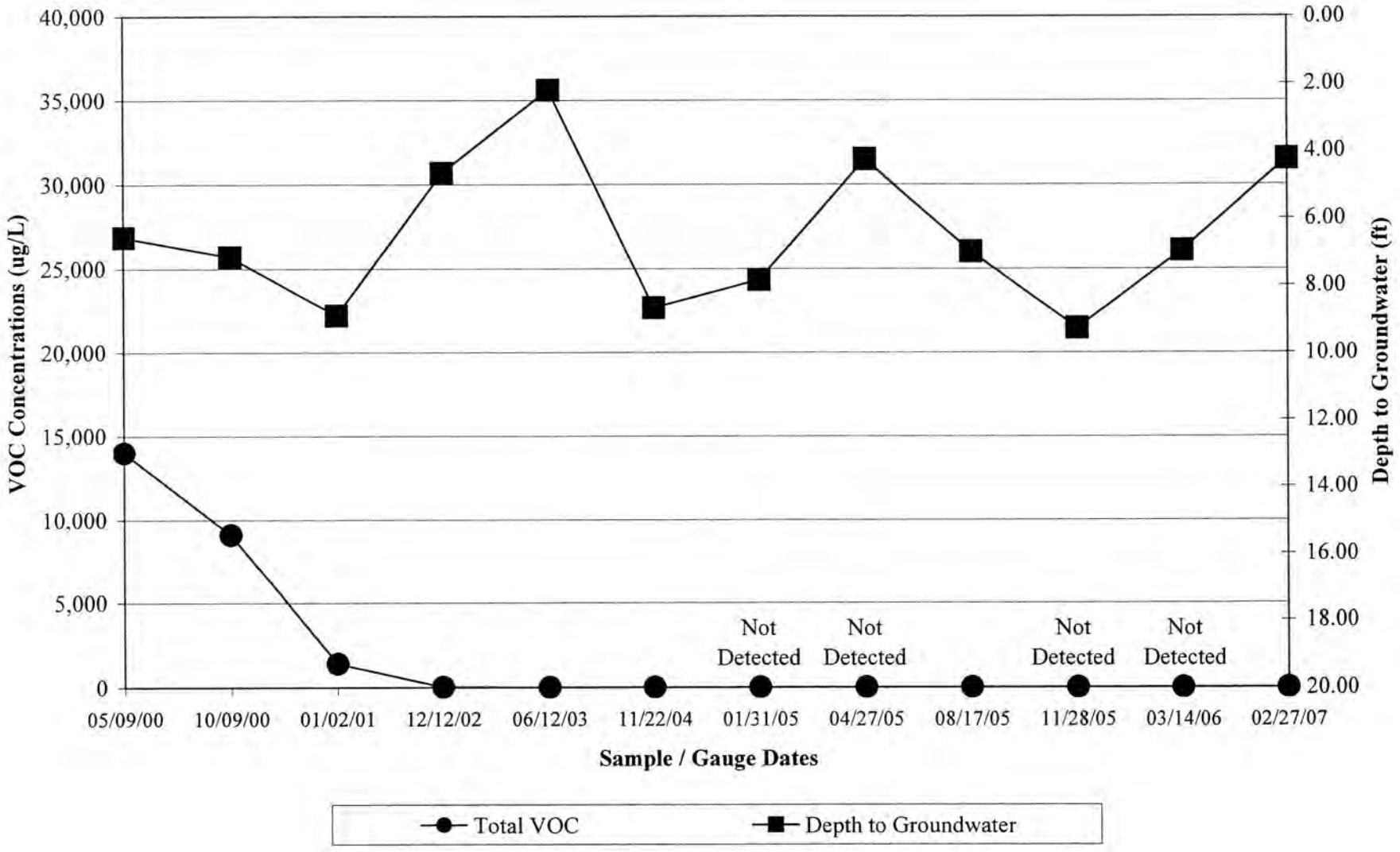
TOTAL VOC CONCENTRATION VS. DEPTH TO GROUNDWATER
GREENS OIL - MW-3



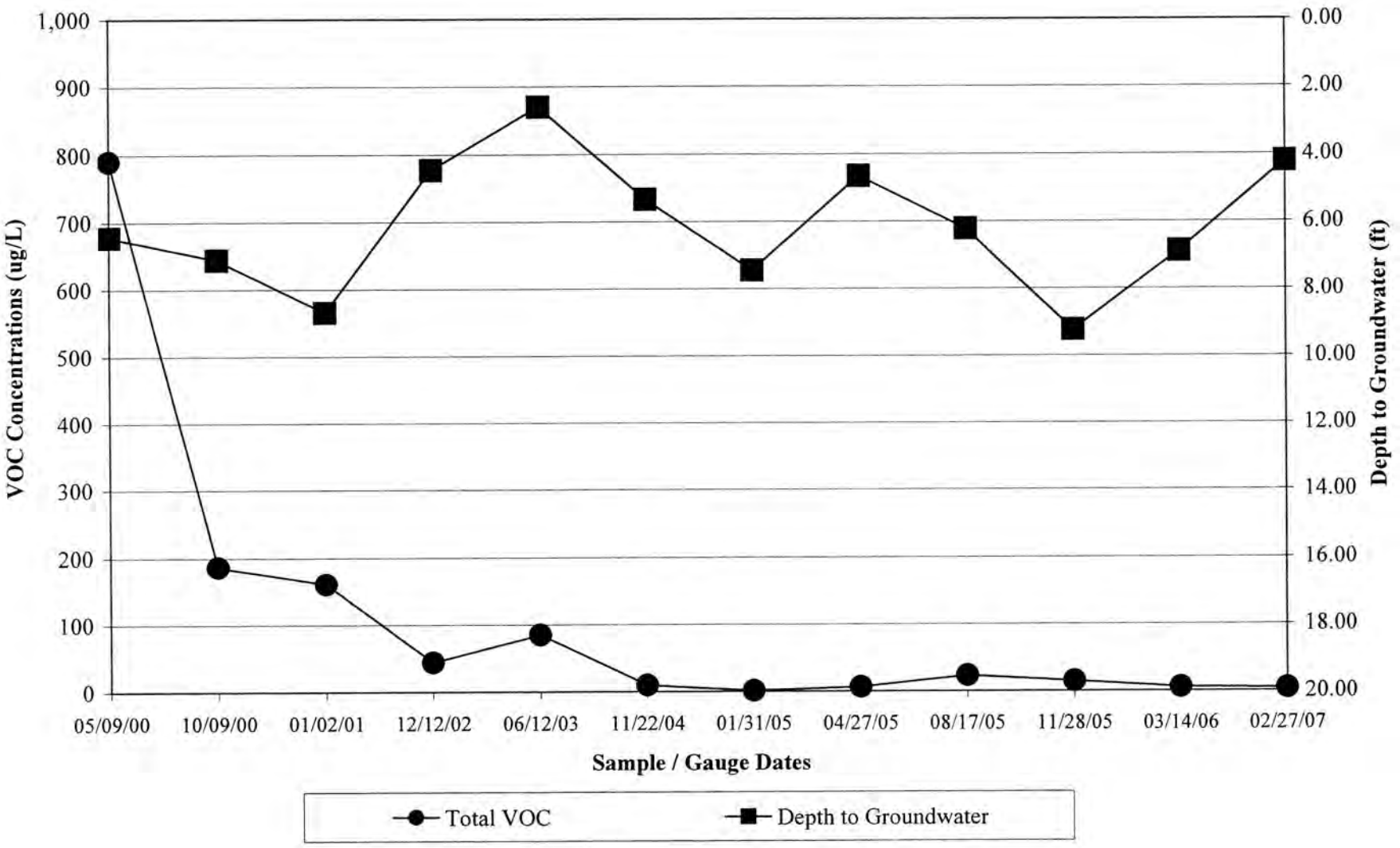
TOTAL VOC CONCENTRATION VS. DEPTH TO GROUNDWATER
GREENS OIL - MW-4



TOTAL VOC CONCENTRATION VS. DEPTH TO GROUNDWATER
GREENS OIL - MW-5



TOTAL VOC CONCENTRATION VS. DEPTH TO GROUNDWATER
GREENS OIL - PW-8



Tank & Environmental Testing, Inc.

February 15, 1990

Ms. Barbara Blackledge
Ground Water Protection Division
SCDHEC
2600 Bull Street
Columbia, S.C. 29201

Dear Barbara:

Enclosed is the hard copy of the previously faxed cost estimate for Green's Texaco in Rock Hill, S.C. It has been amended to incorporate the item requested in your January 30, 1990 letter and in your previous conversation with Jan Reynolds of this office. Please call at 754-3688 if you have any questions.

Sincerely,

William Wimberly

cc: Jerry Green
Green Oil Company

1700 Alta Vista Drive, Suite 110 • Columbia, S.C. 29223 • (803) 754-3688, (803) 754-3781

Tank & Environmental Testing, Inc.

COST ESTIMATE FOR PHASE I
HYDROGEOLOGIC ASSESSMENT STUDY AT
GREEN'S TEXACO - ROCK HILL, S.C.

I. Monitoring Well Drilling and Installation

A. Mobilization.....$550.00

*If rock is encountered, an additional cost of $1800.00 will be charged for mobilization. This cost will cover mileage, per diem and drilling costs for a large rock rig from Georgia.

B. Test borings @ $15/ft to approximately 20 feet, (3 maximum).....$900.00

C. Monitoring well costs listed below. Costs are for two-2 inch and two-4 inch diameter wells to approximately 25 feet, finished at grade with locking caps and covers.

1. Two inch diameter wells will be charged at $50.73/foot for all drilling costs and materials. Estimated costs for each 25' well at $50.73/ft.....$1268.25

Costs for two-2 inch wells.....$2536.50

2. Four inch diameter wells will be charged at $78.48/foot for all drilling costs and materials. Estimated costs for each 25' well at $78.48/ft.....$1962.00

Costs for two-4 inch wells.....$3924.00

Total well construction costs including mobilization $6460.50
If rock is encountered, total well costs....$8260.00

3. Per Diem (drillers) 2 drillers x 2 days at $65.00/day.....$260.00

4. Extra time involved in concrete cutting on standby, 2 hours x $60.....$120.00

Estimated total well and boring (if needed) costs.....$7740.50

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TOTAL COST IF ROCK ENCOUNTERED.....$9540.50

II. PROFESSIONAL FEES

A. Field work associated with drilling and sampling and analyses.

1. Hydrogeologist at $50/hr for 18 hours.....$ 900.00

2. Surveying costs to be contracted out. Costs anticipated to be.....$ 500.00

3. Per Diem at $50/day for two people x 2 days.....$ 200.00

4. Mileage at $.30/mile x 600.....$ 180.00

SUBTOTAL $1780.00

B. Preparation of assessment proposal and study report

1. Professional Input (Sr. Hydrogeologist at $60/hr. Hydrogeologist at $50/hr. Staff Scientist at $40/hr:

Senior 28 hrs.....$1680.00

Hydro. 22 hrs.....$1100.00

Staff Scien. 20 hrs.....$ 800.00

SEE ATTACHMENT RECEIVED 3-590

2. Administrative (Drafting at $25/hr.x 24 hrs).....$ 600.00
Clerical work preparation at 20 hrs at $20/hr).....$ 400.00

SUBTOTAL $4580.00

III. Sample Analyses Costs

A. 4 BTEX at $120.00/each.....$ 480.00

B. 4 TPH at $120.00/each.....$ 480.00

C. Supplies and shipping costs outlined as follows:

1. Gloves.....$7.00
2. Disposable bailers at $8.00/bailer x 8 bailers.....$64.00
3. Cold packs...$6.00
4. String.....$4.00
5. Ziplock bags.$2.50
6. Sample shipping costs.....$25.00

Subtotal C.....$ 108.00

D. Organic vapor meter use for one day.....$ 100.00

III. Subtotal.....$1168.00

TOTAL ESTIMATED COST.....~~$15,269.00~~ $15,428.50
TOTAL ESTIMATED COST IF ROCK WELLS NEEDED.....~~$17,069.00~~ REVISED TOTAL $17,228.50

Tank & Environmental Testing, Inc.

March 1, 1990

Ms. Barbara Blackledge
Ground Water Protection Division
SCDHEC
2600 Bull Street
Columbia, SC 29201

Dear Barbara:

This is to revise our cost estimate for the Hydrogeologic Assessment at Green's Texaco in Rock Hill, S.C. per our conversation of this date. Item II B is revised as follows to delete hours associated with preparation of the assessment proposal.

B. Preparation of assessment proposal and study report.

1. Professional Input
(Sr. Hydrogeologist at $60/hr. Hydrogeologist at $50/hr. Staff scientist at $40/hr.:

Senior 26 hours.....$1560.00

Hydro. 20 hrs.....$1000.00

Staff Scien. 18 hrs.....$ 720.00

2. Administrative
(Drafting at $25/hr x 22 hours)...$ 550.00

Clerical work preparation at 18 hrs at $20/hr).....$ 360.00

SUBTOTAL $4190.00

This revision will thus result in a lessening of the grand total for the work by $390.00. The cost of the assessment proposal will be billed to Mr. Greene for his submittal for reimbursement. Please advise if you have any questions.

Sincerely,

William T. Wimberly

William Wimberly

cc: Jerry Greene

1700 Alta Vista Drive, Suite 110 • Columbia, S.C. 29223 • (803) 754-3688, (803) 754-3781

PURCHASE ORDER

S. C. D TMENT OF HEALTH AND ENVIRONMENTA ITROL
2600 BULL STREET
PURCHASING OFFICE
COLUMBIA, S. C. 29201
(803) 734-4760

PURCHASE ORDE

No. L 7022

SHOW THIS NUMBER ON / INVOICES IN TRIPLICAT

EQC/Ground-Water Protection

REQUISITION NO. 39007/EQC

VENDOR:
Tank & Environmental Testing
1700 Alta Vista Drive
Suite 110
Columbia, SC 29223

SHIP OR DELIVER TO:
SC Dept. of Health & Env. Control
Mail & Supply Room 173
2600 Bull St.
Columbia, SC 29201

F.O.B. DESTINATION:

CONTRACT NUMBER:

VENDOR BID NUMBER:

PROCUREMENT OFFICER: Turner/mn

TO BE SHIPPED:

INVOICE TO:
S.C. DEPARTMENT OF HEALTH & ENVIRONMENTAL CONTRO
2600 BULL STREET
COLUMBIA, S. C. 29201
ATTN: FINANCE DIVISION
PHONE (803) 734-5100

PAYMENT TERMS:

1-3	4 - 6	7 - 11	12 - 17	18 - 22	23 - 27	28 - 31	32 - 36	37 - 41	47 - 54
KF	T CODE	DOCUMENT NO.	DOC. DATE	VENDOR NO.	COST CENTER	FUND	CLASS	ANALYTICAL	AMOUNT
S P O		L 7022	3/15/90		4AE10	R040	52140	AE160	$17,228.5

ITEM NO.	QUANTITY	UNIT OF MEASURE	D.H.E.C. NUMBER	DESCRIPTION	UNIT PRICE (REFERENCE)	TOTAL PRI
1	1			Contractor to perform a ground-water contamination assessment at underground storage tank site – Green's Texaco (PCAS-7123, York County per attached Scope of Work). Contract Period: 03/12/90 – 03/11/91 Direct Billing Per Sec 44-2-130 SUPERB Act of 1988 Tank & Environmental Testing (TET)		$17,228.5

SIGNATURE PROCUREMENT OFF

P.O. NUMBER _____ STATE OF SOUTH CAROLINA – PURCHASING REQUISITION Permit 09344 REQ. NO 39001

DATE of P.O. _____ DISTRICT OR PROGRAM NAME: DATE: March 12, 1990

VENDOR (CSP use only)	CODE

INVOICE TO:	CODE 1119600
S.C. Dept. Health & Env. Control J. Marion Sims Bldg. Columbia, S.C. 29201 Att.: FINANCE DIVISION	

SHIP OR DELIVER TO:	CODE
SC Dept of Health & Env Control Mail room 2600 Bull Street Columbia, SC 29201 Telephone Number:	

TERM ☐ NON-T ☐ SPL ☐ BUYER No. _____

DELIVERY DATE _____

F.O.B. DEST. ☐ OTHER _____

DISCOUNT TERMS _____

TRACT NO. _____

KF	T CODE	DOCUMENT NO.	COST CENTER	FUND	CLASS	ANALYTICAL	AMOUNT
S		39007					$17,228.50
P	DOC. DATE	VENDOR NO.					(estimated)
O							

☐ CONFIRMATION ORDER DATED _____ PREPAY FREIGHT & ADD TO INVOICE ☐

ITEM	QTY.	UNIT OF MEAS.	COMMODITY CODE	DESCRIPTION. (use separate form for each class)	EST. UNIT COST	UNIT PRICE	TOTAL PRICE
1	1			Contractor to perform a ground-water contamination			17,228.50
				assessment at underground storage tank site -			
				Green's Texaco (PCAS-7123, York County, per			
				attached Scope of Work).			
				Contract Period: 03/12/90 - 03/11/91			
				Direct Billing Per Sec 44-2-130 SUPERB Act of 1988			
				Tank & Environmental testing (TET)			

Requested Delivery Date:

Requestor Approval: _____ DATE

Finance Approval: _____ DATE

Business Management Approval: _____ DATE

(MUST BE SIGNED)

Special Delivery Instructions

Installed ☐

The approver certifies that the items indicated hereon are for the exclusive use of the public agency named, that they are exempt from Federal Excise Tax and if the items are used otherwise than stated hereon such facts will be reported by the undersigned to the manufacturer as required by law and that failure to do so will subject the undersigned and all guilty parties to a fine of not more than $10,000 or to imprisonment for not more than five years, or both, together with cost of prosecution.

Form No. MMO R005-3/83

Suggested Vendors And Telephone Numbers:

Tank & Environmental Testing
1700 Alta Vista Drive
Suite 110
Columbia, SC 29223
(803)754-3688

DHEC Form 101 (Rev. 1/89 10M/4/89

US/

136 DOCKETING

SUPERB INFORMATION SHEET

Site Name Green's Oil Company GWPD ID # 09344

Date Release Reported 7-18-89 Date SUPERB Approved 3-8-90

Grace Period _____ $25,000 Deduct _____ $100,000 Deduct _____

Post 06/30/91 Work _____ Insurance Co. _____

Deductible $ _____ Maximum Payable $ _____

Responsible Party Name Green's Oil Company

Address 2849 Cherry Road

City Rock Hill State SC Zip Code 29730

Telephone Number (803) 366-5146

Contractor Name Tank & Environmental Testing

Address 100 Alta Vista Drive, Suite 110

City Columbia State SC Zip Code 29223

Telephone Number (803) 754-3688

Contractor Name _____

Address _____

City _____ State _____ Zip Code _____

Telephone Number (____) _____

Contractor Name _____

Address _____

City _____ State _____ Zip Code _____

Telephone Number (____) _____