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Nightingale Geologic Consultants, P.C.
Charlotte, North Carolina, U.S.A.

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January 19, 1998

Ms. Cindy Rintoul
NCDENR-DWM
Winston-Salem Regional Office
585 Waughtown Street, Suite 100
Winston-Salem, North Carolina 27107-2241

Subject: **Groundwater Monitoring Report, Fourth Quarter 1998**
Exxon RAS # 4-3998
4701 W. Market Street
Greensboro, North Carolina
Groundwater Incident #10001, Site Ranking: Intermediate

Dear Ms. Rintoul:

Nightingale Geologic Consultants, P.C. (NGC) and Griffith Enterprises, Inc., on behalf of Exxon Company, U.S.A., are submitting this report for the referenced site.

A soil vapor extraction and aquifer air sparge system are currently operational at the site.

NAPL was discovered in two groundwater monitoring wells: MW-2 and MW-3. NAPL had not been found in these wells previously.

Please contact Alan Griffith at (336) 712-0290 or Elliot J. Nightingale at (704) 643-9700 if you have questions or comments regarding this site. Frank Medlin, of Exxon, can be reached at (704) 529-4263.

Sincerely,

***Nightingale Geologic Consultants, P.C.***

Elliot J. Nightingale, L.G.
North Carolina Licensed Geologist No. 1165

***Griffith Enterprises, Inc.***

FOR

M. Alan Griffith
Project Manager

enclosure

c: Frank Medlin, Exxon Company, U.S.A.
Alan Griffith, Griffith Enterprises, Inc.

Nightingale Geologic Consultants, P.C.
4736 Sharon Rd., Suite W-124 Charlotte, North Carolina 28210
phone: 704-643-9700 facsimile: 704-643-9701 email: elliotj@infoave.net

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Winston-Salem
Regional Office

# GROUNDWATER MONITORING REPORT
# FOURTH QUARTER 1998

EXXON RAS #4-3998
4701 WEST MARKET STREET
GREENSBORO, NORTH CAROLINA 27407

GROUNDWATER INCIDENT #10001
NCDENR SITE RANKING: ***INTERMEDIATE***

*Prepared For*
Exxon Company, U.S.A.
P.O. Box 30451
Charlotte, North Carolina 28230

*For Submittal To*
Department of Environment and Natural Resources
Division of Waste Management, UST Section
Winston-Salem Regional Office

*Prepared By*

Nightingale Geologic Consultants, P.C.
4736 Sharon Rd., Suite W-124
Charlotte, NC 28210

**and**

GRIFFITH ENTERPRISES
Griffith Enterprises, Inc.
353 Jonestown Rd., Suite 312
Winston-Salem, NC 27104

Prepared: January 15, 1998

## *Report Certification*

The geological and hydrogeological evaluations contained within this groundwater monitoring report were prepared in accordance with generally accepted scientific practices, and are based on our understanding of the site and data provided to us by others.

Elliot J. Nightingale 1/15/99

Elliot J. Nightingale, L.G.
N.C. Licensed Geologist No. 1165
Nightingale Geologic Consultants, P.C.

NORTH CAROLINA
LICENSED
SEAL
1165
GEOLOGIST
ELLIOT J. NIGHTINGALE
1/15/99

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Laboratory Data Sheets

## *Introduction*

The following is the groundwater monitoring report for Exxon RAS #4-3998, located at 4701 West Market Street., in Greensboro, North Carolina (Figure 1). The responsible party for this site is:

Exxon Company, U.S.A.
P.O. Box 30451
Charlotte, NC 28230

This report was prepared in accordance with the following document: The Groundwater Section Guidelines for the Investigation and Remediation of Soil and Groundwater published by the State of North Carolina Department of Environment and Natural Resources, Division of Water Quality, Groundwater Section, January 2, 1998. This report was prepared by Nightingale Geologic Consultants, P.C. (NGC), a licensed geological corporation, and Griffith Enterprises, Inc.

Groundwater monitoring wells were gauged and sampled during the third calendar quarter of 1998. The SVE/AAS remediation system off-gas was last sampled on 4/6/98. The SVE system was in operation throughout the fourth quarter. Remediation system operation and maintenance is performed monthly.

## *Discussion of Sampling Results*

The groundwater monitoring wells associated with this site have been sampled (Table 1, Table 2) and gauged (Table 3, Table 4) periodically since wells were first installed in 1992. Select monitoring wells were most recently sampled in December 1998. Free product (NAPL) had not been present in the past, but was detected in wells MW-2 and MW-3 this quarter.

Product thickness was as follows: MW-2: 0.5 inches, MW-3: 0.25 inches. The NAPL was recovered via bailer, and stored in a steel 55-gallon drum at the site. The drum is vented and labeled. Exxon initiated an inventory investigation at the retail site, and reviewed UST tightness testing records. No discrepancies were noted.

An aquifer air sparge/soil vapor extraction (AAS/SVE) system was installed and operated from the second quarter 1996 through the present. A table of SVE off-gas analytical results is presented as part of Table 5.

A site location map is presented in Figure 1. A site configuration map is presented as Figure 2. A map illustrating the direction of groundwater flow for water table conditions is presented as Figure 3. The dissolved phase

hydrocarbon plume is presented as Figure 4. Cross sections from the CSA report are presented in Figures 5 and 6.

Groundwater monitoring wells MW-5 and MW-6 were located off-site at the McDonald's restaurant. Both wells were buried during re-landscaping and re-paving activities by McDonald's. Efforts to locate the wells proved unsuccessful. The last sampling event including these two wells indicated BTEX levels to be 2 ppb in MW-5 and ND in MW-6 (9/18/95 data).

No potential receptors within 1,000 ft. were identified in the CSA developed by ERM-Southeast in February 1996. Private water supply and irrigation wells were found within 1,500 ft., as noted in the CSA Report. The wells were noted not to be potential receptors based on use and / or location. The Winston-Salem Regional Office made Exxon aware of an ongoing investigation to identify wells in the area in 1998. No further information was received. A potential receptor map is attached is Figure 7.

The CAP was presented to the NCDENR in July 1994 and has been implemented.

## *Conclusions and Recommendations*

Future remediation activities at this site include the operation of the remediation system to reduce dissolved hydrocarbon levels in the groundwater to the GCL (gross contaminant level).

# TABLES

**TABLE 1**
**SUMMARY OF MOST RECENT CHEMICAL ANALYSIS**
**EXXON RAS #4-3998**
**4701 WEST MARKET STREET**
**GREENSBORO, NORTH CAROLINA**

**DECEMBER 22, 1998**

| Well Designation | Benzene | Toluene | Ethyl-benzene | Total Xylenes | Total BTEX | MTBE | IPE | EDB | Lead |
|---|---|---|---|---|---|---|---|---|---|
| MW-1 | 414 | 327 | 382 | 836 | 1959 | ND | 311 | 0.29 | |
| MW-2 | **NAPL in well, not sampled** | | | | | | | | |
| MW-3 | **NAPL in well, not sampled** | | | | | | | | |
| MW-4 | 31.2 | ND | 2.2 | 137 | 170.4 | 2.4 | 4 | ND | |
| MW-7 | 23.3 | 26.1 | 4.5 | 25.6 | 79.5 | 24.5 | 2 | ND | |
| MW-9 | 4.8 | ND | 5.1 | 114 | 123.9 | ND | 15 | ND | |
| OP-1 | 334 | 10.5 | 47.4 | 133 | 524.9 | 83.1 | 8 | ND | |
| DW-8 | ND | ND | ND | ND | ND | ND | ND | ND | |
| NC 2L | *1* | *1000* | *29* | *530* | *NA* | *200* | *70*** | *0.0004* | *15* |
| "GCL" | *5000* | *257500* | *29000* | *87500* | *NA* | *200000* | *70000* | *0.4* | *15,000* |

*** INTERIM STANDARD*

*BOLD INDICATES GREATER THAN DENR "GCL" STANDARD, PER PAGE 60, SOIL AND GROUNDWATER GUIDELINES, 1/1998*

# TABLE 2
## EPA METHOD 602 AND LEAD GROUND WATER ANALYTICAL RESULTS
## EXXON RETAIL LOCATION 4-3998
## 4701 WEST MARKET STREET
## GREENSBORO, NORTH CAROLINA



| MONITOR WELL ID | DATE | EXPANDED EPA METHOD 602 | | | | | | | METHOD 504.1 | METHOD 3030C |
|---|---|---|---|---|---|---|---|---|---|---|
| | | TOTAL BTEX | BENZENE | TOLUENE | ETHYL-BENZENE | XYLENES | MTBE | IPE | EDB | LEAD |
| MW-1 | 8/20/92 | 65,900 | 5000 | 35000 | 3900 | 22000 | <500 | -- | -- | -- |
| | 3/25/93 | 44,600 | 3500 | 21000 | 3100 | 17000 | <250 | -- | -- | -- |
| | 6/22/93 | 44,600 | 4200 | 18000 | 3400 | 19000 | <500 | -- | -- | -- |
| | 6/9/94 | 62,450 | 6150 | 22500 | 5000 | 28800 | 96 | 900 | <10 | 5 |
| | 6/14/95 | <1 | <1 | <1 | <1 | <1 | <10 | 465 | -- | -- |
| | 9/18/95 | 50,500 | 4,000 | 24,000 | 3,000 | 19,500 | <5,000 | <5,000 | -- | -- |
| | 12/6/95 | 47,700 | 4,500 | 18,000 | 3,600 | 21,600 | <225 | 1,230 | -- | -- |
| | 3/27/96 | 15,350 | 2,340 | 3,420 | 1,350 | 8,240 | <450 | 945 | <0.503 | <3.0 |
| | 6/26/96 | 32,280 | 3,420 | 7,980 | 2,640 | 18,240 | <200 | 1,030 | <20 | <3.0 |
| | 6/17/97 | 25,730 | 3,000 | 4,800 | 2,430 | 15500 | ND | 950 | ND | ND |
| | 12/16/97 | 4,250 | 1,110 | 560 | 780 | 1800 | 90 | 130 | 0.07 | ND |
| | 9/30/98 | 9,125 | 1,750 | 715 | 1,810 | 4850 | 15 | 765 | 0.34 | ND |
| | **12/22/98** | **1,959** | **414** | **327** | **382** | **836** | **ND** | **311** | **0.29** | |
| MW-2 | 8/20/92 | 13,900 | 1400 | 4900 | 1600 | 6000 | <250 | -- | -- | -- |
| | 3/25/93 | 16,400 | 2000 | 7300 | 1200 | 5900 | <250 | -- | -- | -- |
| | 6/22/93 | 76,800 | 8100 | 40000 | 4700 | 24000 | <2500 | -- | -- | -- |
| | 6/9/94 | 70,520 | 7160 | 33500 | 4560 | 25300 | 390 | 280 | <10 | 3 |
| | 6/14/95 | 234,900 | 14,000 | 112,000 | 17,100 | 91,800 | <225 | 1,710 | -- | -- |
| | 9/18/95 | 56,000 | 4,500 | 25,000 | 4,000 | 22,500 | <1,000 | 1,600 | -- | -- |
| | 12/6/95 | 5,553 | 788 | 2,900 | 315 | 1,550 | <225 | 292 | -- | -- |
| | 3/27/96 | 136,800 | 22,000 | 72,000 | 7,200 | 35,600 | <900 | 10,800 | 0.70 | <3.0 |
| | 6/26/96 | 103,000 | 16,000 | 60,000 | 4,500 | 22,500 | <10000 | <10000 | <1000 | <3.0 |
| | 6/17/97 | 86,800 | 13,100 | 46,000 | 4,100 | 23,600 | ND | 6,000 | ND | ND |
| | 12/16/97 | 90,550 | 14,000 | 49,500 | 4,050 | 23,000 | 1,350 | 4,050 | 0.22 | ND |
| | 9/30/98 | 116,130 | 17,400 | 74,300 | 7,130 | 17,300 | ND | 8,750 | 1.26 | ND |
| | **12/22/98** | **NS** | | | | | | | | |
| MW-3 | 8/20/92 | 84,800 | 11000 | 41000 | 4800 | 26000 | <500 | -- | -- | -- |
| | 3/25/93 | 67,300 | 9700 | 35000 | 3600 | 19000 | <1000 | -- | -- | -- |
| | 6/22/93 | 88,900 | 13000 | 50000 | 3900 | 22000 | <2500 | -- | -- | -- |
| | 6/9/94 | 114,700 | 12600 | 65400 | 4500 | 32200 | <1000 | 2580 | <50 | 678 |
| | 6/14/95 | 308,200 | 25,200 | 157,000 | 18,000 | 108,000 | <225 | 2,740 | -- | 390 |
| | 9/18/95 | 125,000 | 15,000 | 73,000 | 6,000 | 31,000 | <5,000 | <5,000 | -- | 372 |
| | 12/6/95 | 156,600 | 19,800 | 94,500 | 6,300 | 36,000 | <4500 | 7,650 | -- | 147 |
| | 3/27/96 | 158,400 | 23,400 | 80,100 | 8,100 | 46,800 | <900 | 11,200 | 59 | 1,400 |
| | 6/26/96 | 106,750 | 14,300 | 49,000 | 5,650 | 37,800 | <5000 | 7,300 | <500 | 1,010 |
| | 6/17/97 | 39,381 | 3,550 | 19,100 | 2,181 | 14,550 | ND | 1,140 | ND | 376 |
| | 12/16/97 | 97,200 | 16,400 | 49,300 | 4,500 | 27,000 | 450 | 4,720 | 35 | 956 |
| | 9/30/98 | 59,530 | 8,320 | 37,800 | 3,560 | 9,850 | ND | 2,240 | 69 | 516 |
| | **12/22/98** | **NS** | | | | | | | | |

# TABLE 2
## EPA METHOD 602 AND LEAD GROUND WATER ANALYTICAL RESULTS
## EXXON RETAIL LOCATION 4-3998
## 4701 WEST MARKET STREET
## GREENSBORO, NORTH CAROLINA



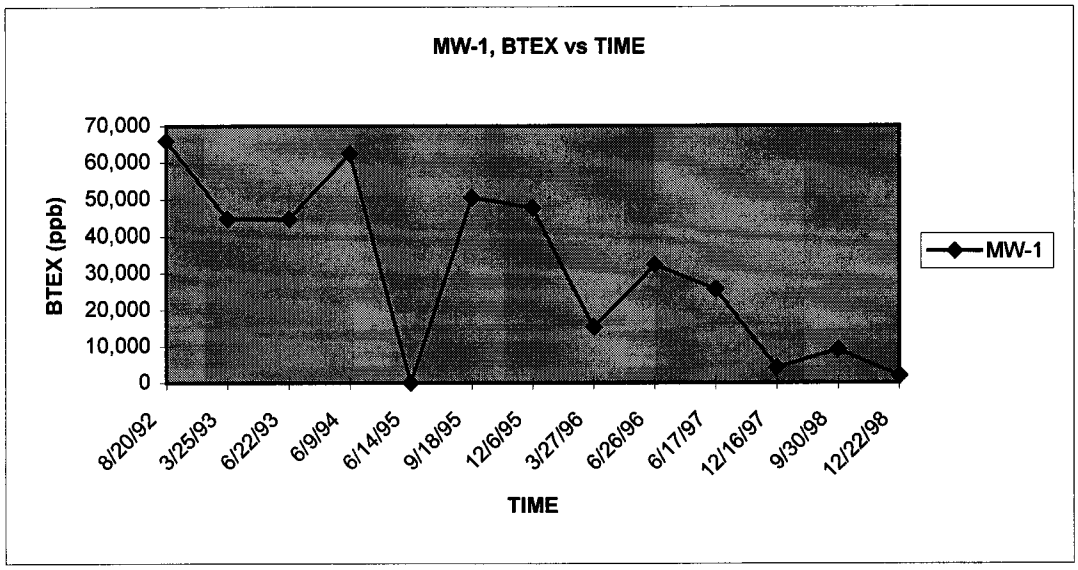
| MONITOR WELL ID | DATE | EXPANDED EPA METHOD 602 | | | | | | | METHOD 504.1 | METHOD 3030C |
|---|---|---|---|---|---|---|---|---|---|---|
| | | TOTAL BTEX | BENZENE | TOLUENE | ETHYL-BENZENE | XYLENES | MTBE | IPE | EDB | LEAD |
| MW-4 | 8/20/92 | 4 | <2.0 | <2.0 | <2.0 | 4 | <10 | -- | -- | -- |
| | 3/25/93 | 17.6 | 1.9 | 4.7 | <1.0 | 11 | <10 | -- | -- | -- |
| | 6/22/93 | 17.5 | 1.5 | <1.0 | <1.0 | 16 | <10 | -- | -- | -- |
| | 6/9/94 | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 | <10 | <10 | <1.0 | 4 |
| | 6/14/95 | 71 | 6 | 9 | 3 | 53 | <10 | <10 | -- | -- |
| | 9/18/95 | 33 | 4 | <1.0 | <1.0 | 29 | <10 | 33 | -- | -- |
| | 6/17/97 | 112.2 | 11.4 | ND | 15.8 | 85.0 | ND | ND | -- | -- |
| | 12/16/97 | 175.0 | 22.0 | 2.0 | 14.0 | 137.0 | ND | 2 | ND | ND |
| | 9/30/98 | 65.9 | 8.8 | 1.2 | 2.4 | 53.5 | ND | 1 | ND | ND |
| | **12/22/98** | **170.4** | **31.2** | **ND** | **2.2** | **137.0** | **2** | **4** | **ND** | |
| MW-5 | 3/25/93 | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 | <10 | -- | -- | -- |
| | 6/22/93 | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 | <10 | -- | -- | -- |
| | 6/9/94 | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 | <10 | <10 | <1.0 | 13 |
| | 6/14/95 | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 | <10 | <10 | -- | -- |
| | 9/18/95 | 2 | <1.0 | 1 | <1.0 | 1 | <10 | 27 | -- | -- |
| MW-6 | 3/25/93 | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 | <10 | -- | -- | -- |
| | 6/22/93 | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 | <10 | -- | -- | -- |
| | 6/9/94 | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 | <10 | <10 | <1.0 | 13 |
| | 6/14/95 | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 | <10 | <10 | -- | -- |
| | 9/18/95 | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 | <10 | 14 | -- | -- |
| MW-7 | 3/25/93 | 9.1 | 1.9 | 1.9 | 1.9 | 3.4 | 36.0 | -- | -- | -- |
| | 6/22/93 | <5.0 | <5.0 | <5.0 | <5.0 | <5.0 | <50 | -- | -- | -- |
| | 6/9/94 | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 | <10 | <10 | <1.0 | 20 |
| | 6/14/95 | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 | <10 | <10 | -- | 26 |
| | 9/18/95 | 2 | <1.0 | 1 | <1.0 | 1 | 10 | 16 | -- | 15 |
| | 12/16/97 | 11 | 7 | 4 | <1.0 | <1.0 | <1.0 | <1.0 | <0.02 | 7 |
| | **12/22/98** | **79.5** | **23.3** | **26.1** | **4.5** | **25.6** | **24.5** | **2.0** | **ND** | |
| DW-8 | 3/25/93 | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 | <10 | -- | -- | -- |
| | 6/22/93 | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 | <10 | -- | -- | -- |
| | 6/9/94 | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 | <10 | <10 | <1.0 | 4 |
| | 6/14/95 | 2 | <1 | 1 | <1 | 1 | <10 | <10 | -- | -- |
| | 9/18/95 | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 | <10 | <10 | -- | -- |
| | 12/16/97 | 14 | 2 | 6 | <1.0 | 6 | <1.0 | <1.0 | <0.02 | 5 |
| | 9/30/98 | ND | ND | ND | ND | ND | ND | ND | ND | ND |
| | **12/22/98** | **ND** | **ND** | **ND** | **ND** | **ND** | **ND** | **ND** | **ND** | **ND** |

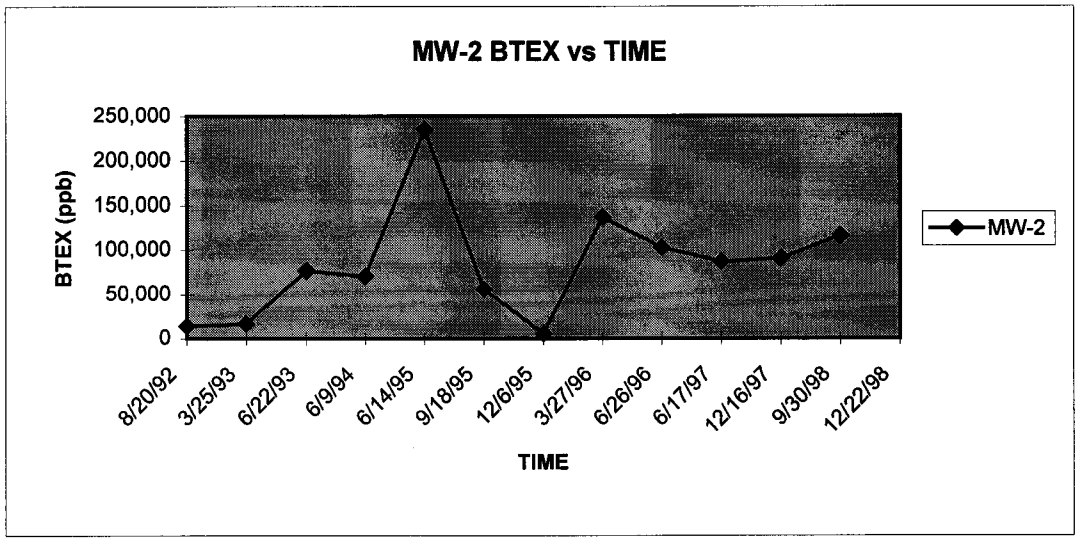
# TABLE 2
## EPA METHOD 602 AND LEAD GROUND WATER ANALYTICAL RESULTS
## EXXON RETAIL LOCATION 4-3998
## 4701 WEST MARKET STREET
## GREENSBORO, NORTH CAROLINA

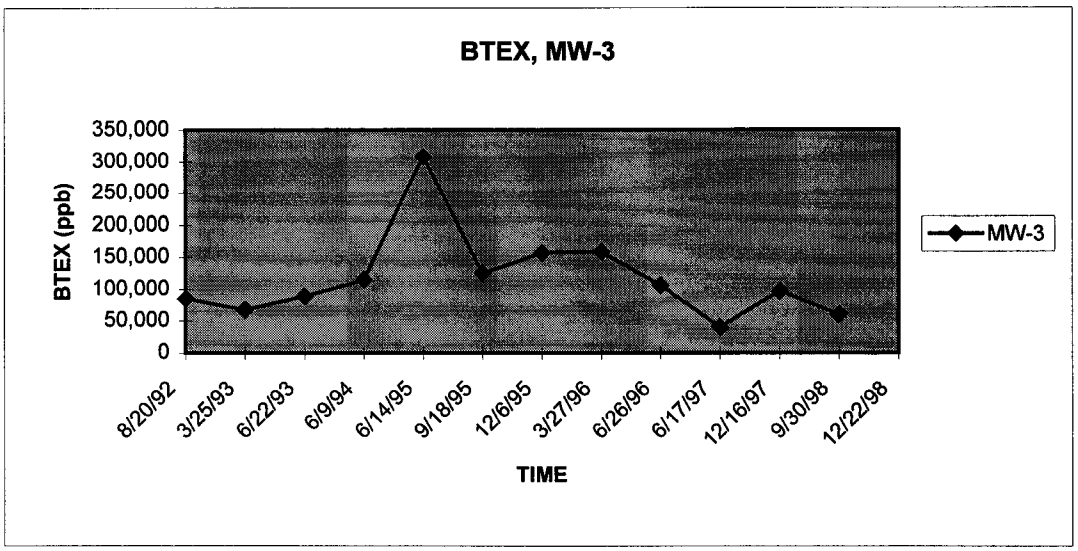


| MONITOR WELL ID | DATE | EXPANDED EPA METHOD 602 | | | | | | | METHOD 504.1 EDB | METHOD 3030C LEAD |
|---|---|---|---|---|---|---|---|---|---|---|
| | | TOTAL BTEX | BENZENE | TOLUENE | ETHYL-BENZENE | XYLENES | MTBE | IPE | | |
| MW-9 | 12/6/95 | 823 | 36 | 7 | 110 | 670 | <10 | 38 | -- | -- |
| | 12/16/97 | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 | <0.02 | 5 |
| | 9/30/98 | <1.0 | 8 | 70 | 45 | 307 | ND | 8 | ND | ND |
| | **12/22/98** | **124** | **5** | **ND** | **5** | **114** | **ND** | **15** | **ND** | |
| | | | | | | | | | | |
| OP-1 | 12/16/97 | 561 | 320 | 10 | 57 | 174 | 45 | 10 | <0.02 | <3 |
| | **12/22/98** | **525** | **334** | **11** | **47** | **133** | **83** | **8** | **ND** | |
| | | | | | | | | | | |
| MW-1A* | 11/20/92 | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 | -- | -- | -- | -- |
| (MW-Moore | 11/13/95 | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 | -- | -- | -- | -- |
| | | | | | | | | | | |
| **T15A NCAC 2L STANDARD** | | | **1** | **1,000** | **29** | **530** | **200** | **NS** | **0.0004** | **15** |

BTEX / Gross Levels Graphs



BTEX / Gross Levels Graphs

GCL Groundwater Levels (ppb)
From 1998 Guidelines (p.60)

| Benzene | Toluene | E-Benz | Xylenes | MTBE | IPE | EDB | Lead |
|---|---|---|---|---|---|---|---|
| 5000 | 257500 | 29000 | 87500 | 200000 | 70000 | 50 | 15 |

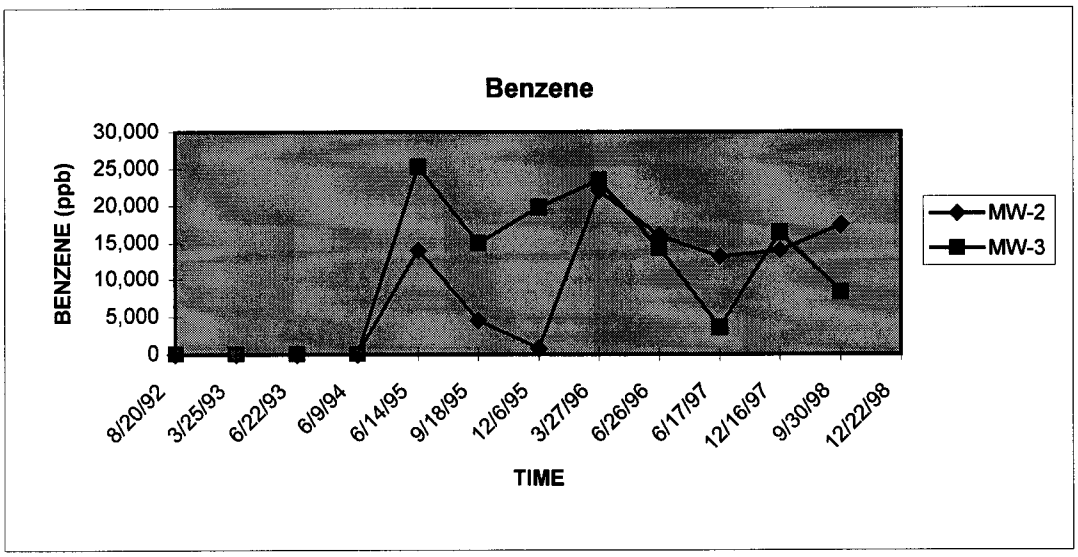


**TABLE 3**
**SUMMARY OF MOST RECENT GAUGING AND WELL CONSTRUCTION DATA**
**EXXON RAS #4-3998**
**4701 WEST MARKET STREET**
**GREENSBORO, NORTH CAROLINA**

| MONITORING WELL | DATE GAUGED | DATE DRILLED | CASING ELEV. (ft.) | DEPTH TO WATER (ft.) | GROUNDWATER ELEV. (ft.) | SCREENED INTERVAL (ft.) |
|---|---|---|---|---|---|---|
| MW-1 | 12/22/98 | 8/13/92 | 96.50 | 23.60 | 72.90 | 15-30 |
| MW-2 | 12/22/98 | 8/13/92 | 96.56 | 0.5" NAPL | NA | 15-35 |
| MW-3 | 12/22/98 | 8/14/92 | 96.92 | 0.25" NAPL | NA | 15-30 |
| MW-4 | 12/22/98 | 8/14/92 | 97.92 | 24.38 | 73.54 | 15-30 |
| MW-5 | 9/30/98 | 3/29/93 | 97.24 | PAVED OVR | PAVED OVR | 17-32 |
| MW-6 | 9/30/98 | 3/29/93 | 96.15 | PAVED OVR | PAVED OVR | 17-32 |
| MW-7 | 12/22/98 | 3/29/93 | 98.64 | 27.18 | 71.46 | 17-32 |
| MW-9 | 12/22/98 | 12/6/95 | 94.56 | 21.03 | 73.53 | 15-30 |
| DW-8 | 12/22/98 | NA | 98.00 | 22.87 | 75.13 | 55-60 |
| OP-1 | 12/22/98 | 3/9/94 | 96.79 | 25.55 | 71.24 | 8-25 |

NA not applicable or not available

# TABLE 4
## GROUND WATER ELEVATION DATA
## EXXON RETAIL LOCATION 4-3998
## 4701 WEST MARKET STREET
## GREENSBORO, NORTH CAROLINA

| | MW-1 | | MW-2 | | MW-3 | | MW-4 | |
|---|---|---|---|---|---|---|---|---|
| | 96.50 | | 96.56 | | 96.92 | | 97.92 | |
| DATE | DEPTH TO GROUND WATER | GROUND WATER ELEVATIO | DEPTH TO GROUND WATER | GROUND WATER ELEVATIO | DEPTH TO GROUND WATER | GROUND WATER ELEVATIO | DEPTH TO GROUND WATER | GROUND WATER ELEVATION |
| 8/20/92 | 23.45 | 73.05 | 22.99 | 73.57 | 24.49 | 72.43 | 24.50 | 73.42 |
| 3/25/93 | 18.77 | 77.73 | 18.90 | 77.66 | 20.91 | 76.01 | 22.62 | 75.30 |
| 6/11/93 | 19.23 | 77.27 | 18.85 | 77.71 | 20.74 | 76.18 | 21.36 | 76.56 |
| 4/13/94 | 19.79 | 76.71 | 19.06 | 77.50 | 21.60 | 75.32 | 22.74 | 75.18 |
| 6/9/94 | 21.97 | 74.53 | 21.40 | 75.16 | 23.24 | 73.68 | 23.26 | 74.66 |
| 6/14/95 | 22.65 | 73.85 | 22.70* | 73.86 | 23.96* | 72.96 | 24.28 | 73.64 |
| 9/18/95 | 23.73 | 72.77 | 24.06* | 72.50 | 25.22* | 71.70 | 24.82 | 73.10 |
| 12/6/95 | 22.20 | 74.30 | 21.70 | 74.86 | 23.60 | 73.32 | 24.26 | 73.66 |
| 12/14/95 | 22.10 | 74.40 | 21.62 | 74.94 | 23.44* | 96.92 | 24.22 | 73.70 |
| 3/27/96 | 19.56 | 76.94 | 19.25 | 77.31 | 21.16 | 75.76 | n/a | n/a |
| 6/26/96 | 20.39 | 76.11 | 20.15 | 76.41 | 21.70 | 75.22 | n/a | n/a |
| 6/17/97 | 18.28 | 78.22 | 18.08 | 78.48 | 19.7 | 77.22 | 20.26 | 77.66 |
| 12/16/97 | 21.84 | 74.66 | 21.05 | 75.51 | 23.02 | 73.90 | 22.92 | 75.00 |
| 9/30/98 | 22.65 | 73.85 | 22.43 | 74.13 | 23.41 | 73.51 | 22.61 | 75.31 |
| 12/22/98 | 23.6 | 72.90 | 0.5" NAPL | NAPL | 0.25" NAPL | NAPL | 24.38 | 73.54 |

| | MW-5 | | MW-6 | | MW-7 | | DW-8 | |
|---|---|---|---|---|---|---|---|---|
| | 97.24 | | 96.15 | | 98.64 | | 98.00 | |
| DATE | DEPTH TO GROUND WATER | GROUND WATER ELEVATIO | DEPTH TO GROUND WATER | GROUND WATER ELEVATIO | DEPTH TO GROUND WATER | GROUND WATER ELEVATIO | DEPTH TO GROUND WATER | GROUND WATER ELEVATION |
| 3/25/93 | 22.05 | 75.19 | 21.10 | 75.05 | 26.60 | 72.04 | 9.50 | 88.50 |
| 6/11/93 | 21.88 | 75.36 | 20.71 | 75.44 | 25.61 | 73.03 | 22.41 | 75.59 |
| 4/13/94 | 22.74 | 74.50 | 21.62 | 74.53 | -- | -- | -- | -- |
| 6/9/94 | 24.19 | 73.05 | 23.08 | 73.07 | 27.30 | 71.34 | 25.31 | 72.69 |
| 6/14/95 | 25.02 | 72.22 | 23.90 | 72.25 | 27.78 | 70.86 | 25.40 | 72.60 |
| 9/18/95 | 25.82 | 71.42 | 24.86 | 71.29 | 27.35 | 71.29 | 25.57 | 72.43 |
| 12/6/95 | 24.77 | 72.47 | 23.73 | 72.42 | 27.60 | 71.04 | 25.18 | 72.82 |
| 12/14/95 | 24.68 | 72.56 | 23.66 | 72.49 | 27.47 | 71.17 | 25.11 | 72.89 |
| 3/27/96 | n/a | n/a | n/a | n/a | n/a | n/a | n/a | n/a |
| 6/26/96 | n/a | n/a | n/a | n/a | n/a | n/a | n/a | n/a |
| 12/16/97 | n/a | n/a | n/a | n/a | n/a | n/a | 24.25 | 73.75 |
| 9/30/98 | n/a | n/a | n/a | n/a | n/a | n/a | 22.87 | 75.13 |
| 12/22/98 | n/a | n/a | n/a | n/a | 27.18 | 71.46 | 22.87 | 75.13 |

| | MW-9 | | MW -Moore | | 0P-1 | | | |
|---|---|---|---|---|---|---|---|---|
| | 94.56 | | 98.10 | | 96.79 | | | |
| DATE | DEPTH TO GROUND WATER | GROUND WATER ELEVATIO | DEPTH TO GROUND WATER | GROUND WATER ELEVATIO | DEPTH TO GROUND WATER | GROUND WATER ELEVATION | | |
| 4/13/94 | -- | -- | -- | -- | 21.06 | 75.73 | | |
| 6/9/94 | -- | -- | -- | -- | 23.04 | 73.75 | | |
| 6/14/95 | -- | -- | -- | -- | 23.94 | 72.85 | | |
| 11/13/95 | -- | -- | 23.90 | 74.20 | -- | -- | | |
| 12/6/95 | **20.64 | 73.92 | 23.12 | 74.98 | -- | -- | | |
| 12/14/95 | 19.19 | 75.37 | -- | -- | -- | -- | | |
| 3/27/96 | n/a | n/a | -- | -- | -- | -- | | |
| 6/26/96 | n/a | n/a | -- | -- | -- | -- | | |
| 12/16/97 | 18.45 | 76.11 | -- | -- | 24.22 | 72.57 | | |
| 9/30/98 | 21.08 | 73.48 | -- | -- | n/a | n/a | | |
| 12/22/98 | 21.03 | 73.53 | -- | -- | 25.55 | 71.24 | | |

# TABLE 4
# GROUND WATER ELEVATION DATA
# EXXON RETAIL LOCATION 4-3998
# 4701 WEST MARKET STREET
# GREENSBORO, NORTH CAROLINA

| | AS-1 96.38 | | EP-1 96.31 | | | | | |
|---|---|---|---|---|---|---|---|---|
| DATE | DEPTH TO GROUND WATER | GROUND WATER ELEVATIO | DEPTH TO GROUND WATER | GROUND WATER ELEVATION | | | | |
| 4/13/94 | 20.90 | 75.48 | 20.77 | 75.54 | | | | |
| 6/9/94 | 22.65 | 73.73 | 22.56 | 73.75 | | | | |
| 6/14/95 | 23.54 | 72.84 | DRY | -- | | | | |

Notes:
Depth to ground water measured in feet below top of casing.
Elevations are relative to an on-site reference point which has been assigned an elevation of 100.00 feet.
"--" = Gauging data not available
* = Free product film detected in monitor well (<0.01 feet thick)
** = Ground water not at static level
n/a = well not gauged

# TABLE 5
## SVE OFF-GAS ANALYTICAL RESULTS

**SVES SAMPLING**

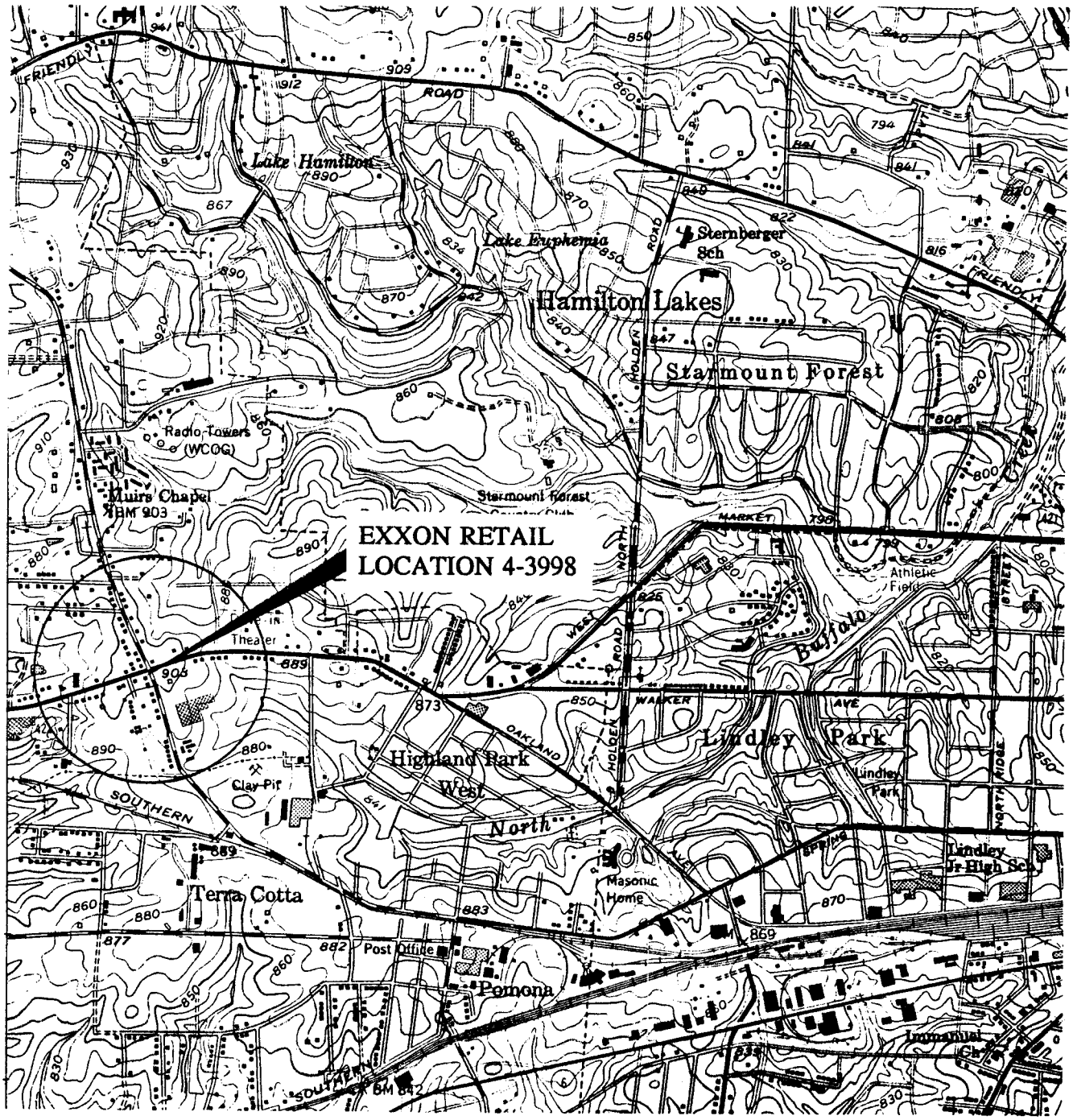
| Date | Benzene (ppm) | Toluene (ppm) | Ethyl-benz (ppm) | Tot-Xylenes (ppm) | Total VOCs (TPH, ppm) | Air Velocity (fps) | Benzene (lbs/day) | VOCs (lbs/day) |
|---|---|---|---|---|---|---|---|---|
| *6/12/96* | *2.91* | *2.50* | *<0.5* | *1.07* | *44.50* | *38.26* | *0.03* | *0.52* |
| *12/16/97* | *--* | *--* | *--* | *--* | ***3.60*** | *--* | *--* | *--* |
| ***4/6/98*** | ***<15*** | ***0.52*** | ***0.82*** | ***2.15*** | ***8.26*** | ***166.00*** | ***ND*** | ***0.42*** |

Results in micrograms per liter (ug/l).
MTBE = Methy tert-butyl ether
IPE = Isopropyl ether
EDB = Ethylene dibromide
"--" = not analyzed
* - Source: Groundwater Investigation - Bath and Kitchen Menagerie, Greensboro, North Carolina, 11-27-92, Pyramid Environmental,Inc.

# TABLE 6
# SYSTEM OPERATING SCHEDULE
# EXXON RETAIL LOCATION 4-3998
# 4701 WEST MARKET STREET
# GREENSBORO, NORTH CAROLINA

| Line | Date | Operation | SVE air vel. (f/m) | AAS press. psi | SVE vac. in H2O |
|---|---|---|---|---|---|
| 1 | 4/29/96 | system start-up | 6059 | 9 | 30 |
| 2 | 5/25/96 | shut system down; maint. on carbon drums | | | |
| 3 | 6/14/96 | system check | 6090 | 5.5 | 25 |
| 4 | 6/20/96 | installed carbon drums in parallel, relocated vacuum relief valve | | | |
| 5 | | flow into carbon drums about 100 cfm each | | | |
| 6 | 8/5/96 | system check, hour meter 2135.11 | 10000+ | 7 | 25 |
| 7 | 8/26/96 | system down, high level switch failed. Switch backordered | | | |
| 8 | 10/29/96 | system still down, awaiting delivery of high level switch | | | |
| 9 | 11/7/96 | installed new high-level switch. | | | |
| 10 | 11/19/96 | wired new high level switch moisture knock out tank. | | | |
| 11 | | system still off. | | | |
| 12 | 12/2/96 | system test. Hour meter 2279.87. Lubricated blower impellers. | 10000+ | 7 | 25 |
| 13 | 1/7/96 | system re-start. Note to get new vac. rel valve set for 10 in-Hg. | | 9.5 | 20 |
| 14 | | Current valve set for 14 in-Hg. | | | |
| 15 | 1/27/97 | hour meter 2755.44 | 7904 | 7 | 22 |
| 16 | 2/31/97 | hour meter 3549.23. Turned AS compressor off due to dirty filter | 10000+ | 7.5 | 23 |
| 17 | 3/31/97 | hour meter 4406.29 | 10000+ | 7.5 | 23 |
| 18 | 4/25/97 | hour meter 4804.34 | 10000+ | off | 27 |
| 19 | | compressor off, filter needs to be replaced. | | | |
| 20 | 5/16/97 | hour meter 5293.04 | 10000+ | off | 24 |
| 21 | | compressor off, waiting on filter | | | |
| 22 | 6/21/97 | hour meter 6155.59 | 10000+ | off | 26 |
| 23 | | replaced compressor filter, compressor inoperable | | | |
| 24 | | rebuilding kit for compressor ordered | | | |
| 25 | 7/1/97 | system restarted | | | |
| 26 | 7/31/97 | system check. Hour meter 7096.29 | 10000+ | 7 | 23 |
| 27 | 8/25/97 | system check. Hour meter 7697.47 | 10000+ | 7 | 23 |
| 28 | 9/25/97 | system check. Hour meter 8603.90 | 10000+ | 7 | 25 |
| 29 | | air filter on SVE needs to be replaced. Will order this week. | | | |
| 30 | | Assembly model: CSL-850-200, element #850 | | | |
| 31 | 10/17/97 | system check. Hour meter 8940.50 | 10000+ | 7 | 25 |
| 32 | | replaced SVE filter; system serviced | | | |
| 33 | | one drum on site contains dirt and concrete debris from bollard instl. | | | |
| 34 | | six unlabeled drums (empty) ...not Griffith's | | | |
| 35 | 11/30/97 | system check. Hour meter 10,087.31 | 10000+ | 7 | 25 |
| 36 | | checked SVE filter-OK; system serviced | | | |
| 37 | | compressor filter needs to be replaced, Gast #3080 P-121-T338 | | | |
| 38 | 12/18/97 | system check. Hour meter 10,421.38 | | | 25 |
| 39 | | shut down system due to faulty compressor impeller | | | |
| 40 | 1/20/98 | replaced cooling impeller on compressor. | | | 25 |
| 41 | | SVE system running. Hour meter 111579.0 | | | |
| 42 | 2/25/98 | system check. SVE operating, AAS still down. Awaiting filter for AAS | | 4 | 25 |
| 43 | | compressor. | | | |
| 44 | | System serviced: oil change in blower motor and unit greased. | | | |
| 45 | | Pressure relief valve on compressor failed critical device test. | | | |
| 46 | 4/6/98 | system check and air sample on SVE. | 10000+ | | |
| 47 | | Hour meter: 11895.78 | | | |
| 48 | 6/26/98 | system check. SVE operating. Replaced Kunkle valve on AAS a | 10000+ | 7 | 22 |
| 49 | | restarted system. Replaced SVE filter. Oil change in compressor and | | | |
| 50 | | compressor greased. Hour meter 11895.92 | | | |
| 51 | 7/8/98 | system check. Hour meter 12,184.55 | 10000+ | 7 | 22 |
| 52 | | checked SVE filter-OK; system serviced | | | |
| 53 | | greased blower and changed oil | | | |
| 54 | 8/14/98 | system check. SVE selenoid valve on moisture knock-out faulty. | 10000+ | 6.5 | 24 |
| 55 | | SVE down until replacement can be installed | | | |
| 56 | 10/13/98 | system check. SVE restarted. Hour meter 13,070.98 | 10000+ | 6.5 | 24 |
| 57 | | replaced selenoid valve w/elec. ball valve; installed new relay | | | |
| 58 | 11/27/98 | system check. SVE/AS operating OK. Hour meter 14,290.86 | 10000+ | 4 | 27 |
| 59 | | Belt tension adjusted, exhauster lube changed, system greased. | | | |

# FIGURES




SOURCE: GREENSBORO, NC 7.5 MINUTE U.S.G.S. TOPOGRAPHIC QUADRANGLE, 1951 (PHOTOREVISED 1968)

N

SCALE IN FEET

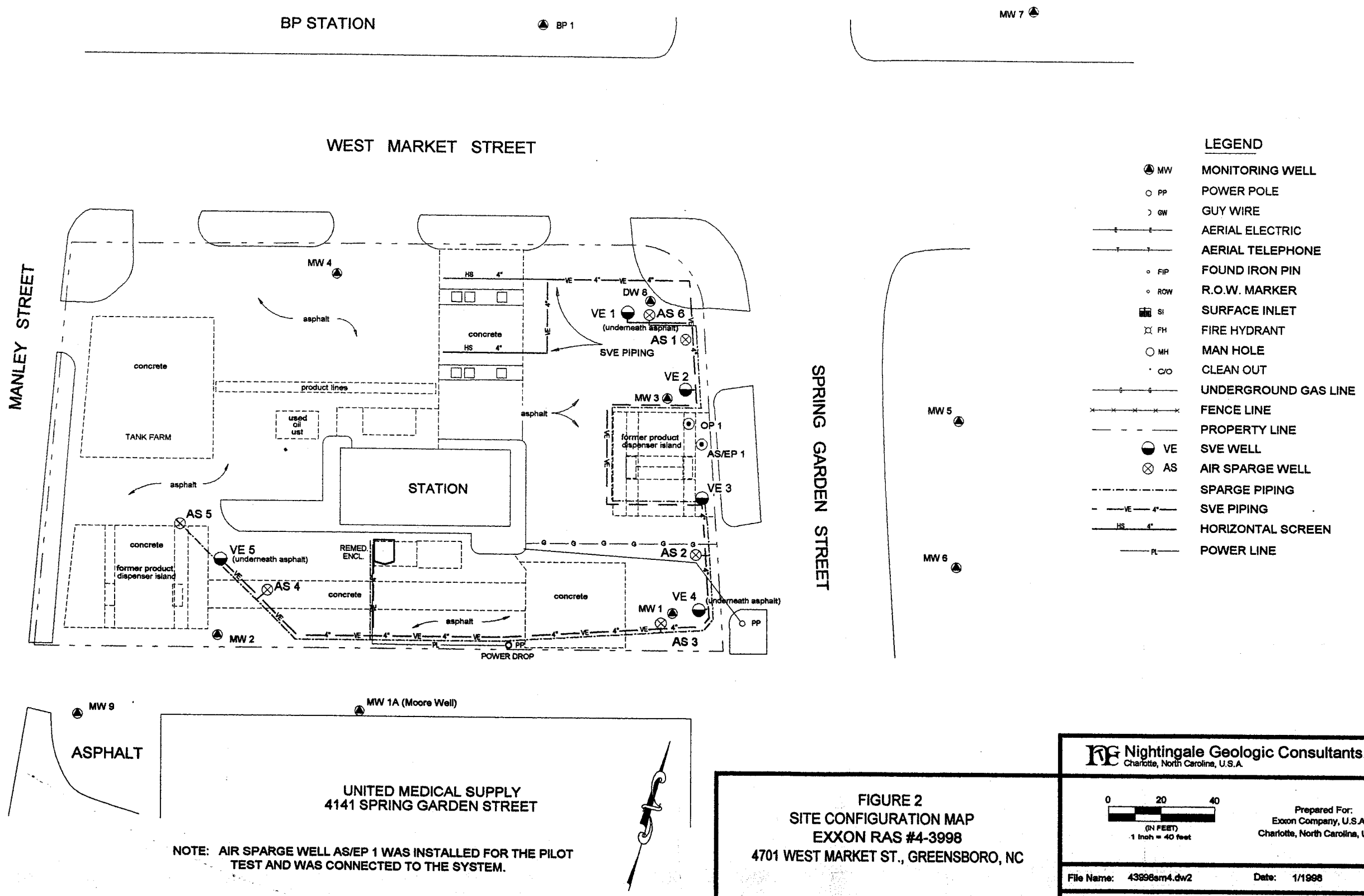
0 2000

ERM-Southeast, Inc.
CHARLOTTE, NORTH CAROLINA

ERM

SITE LOCATION MAP
EXXON COMPANY, U.S.A.
RETAIL LOCATION 4-3998
GREENSBORO, NORTH CAROLINA

FIGURE
1




NOTE: AIR SPARGE WELL AS/EP 1 WAS INSTALLED FOR THE PILOT TEST AND WAS CONNECTED TO THE SYSTEM.

FIGURE 2
SITE CONFIGURATION MAP
EXXON RAS #4-3998
4701 WEST MARKET ST., GREENSBORO, NC

Reference map by EA Engineering, Science, and Technology

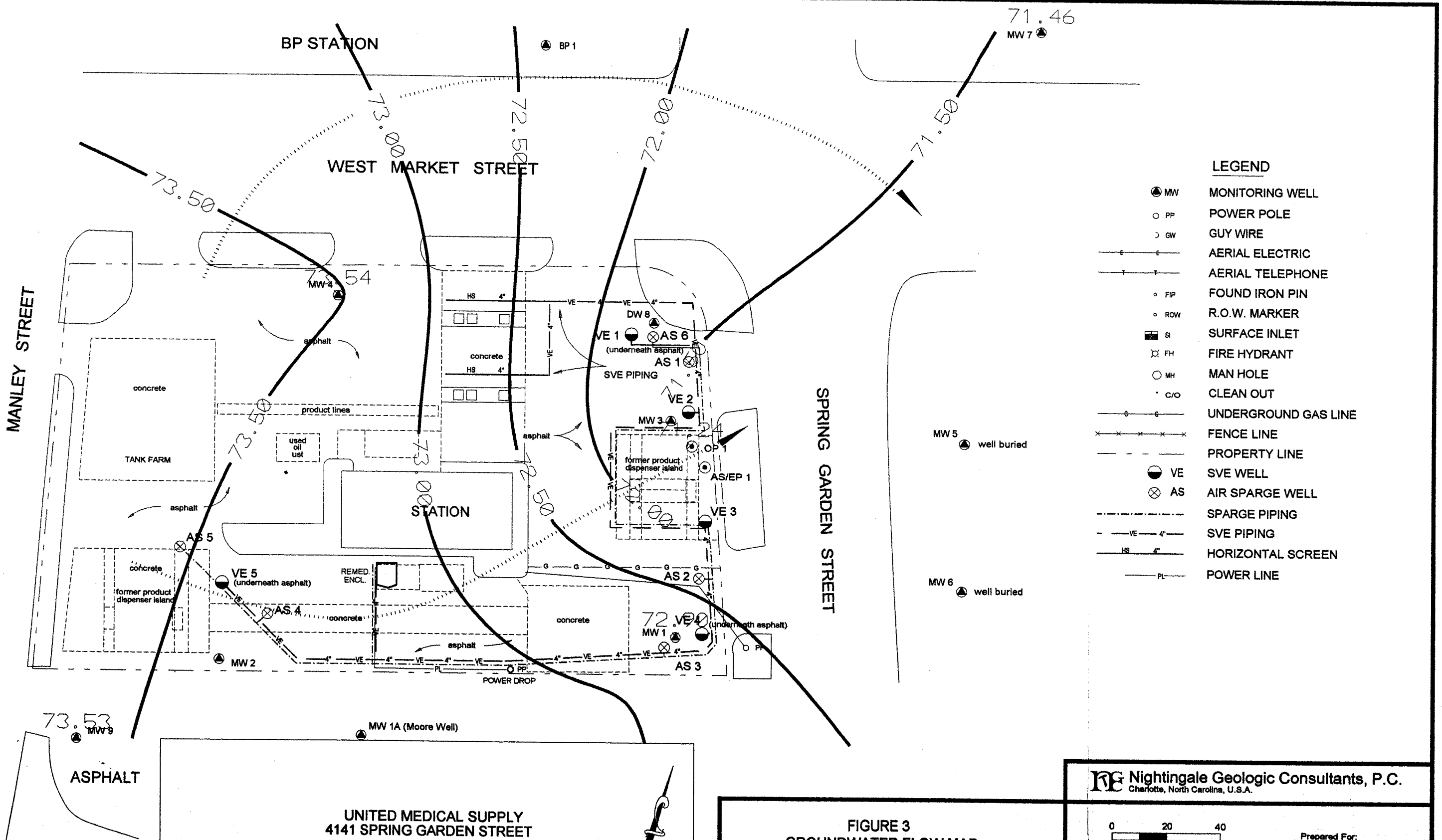
Nightingale Geologic Consultants, P.C.
Charlotte, North Carolina, U.S.A.

0 20 40
(IN FEET)
1 inch = 40 feet

Prepared For:
Exxon Company, U.S.A.
Charlotte, North Carolina, U.S.A.

File Name: 43998sm4.dw2 Date: 1/1998

Approved: Scale: 1 in. = 40 ft.




NOTE: AIR SPARGE WELL AS/EP 1 WAS INSTALLED FOR THE PILOT TEST AND WAS CONNECTED TO THE SYSTEM.

FIGURE 3
GROUNDWATER FLOW MAP
EXXON RAS #4-3998
4701 WEST MARKET ST., GREENSBORO, NC

Reference map by EA Engineering, Science, and Technology

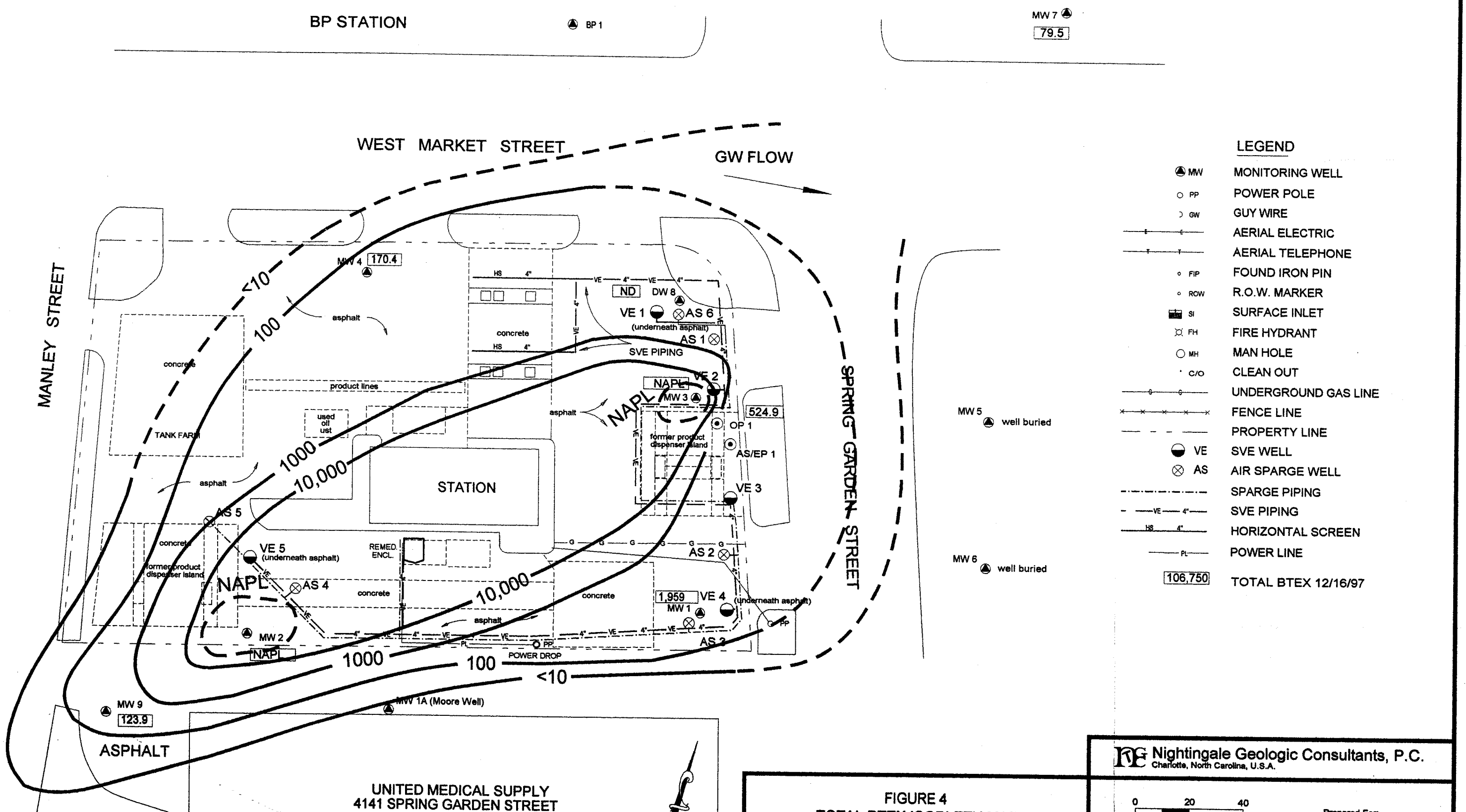
Nightingale Geologic Consultants, P.C.
Charlotte, North Carolina, U.S.A.

0 20 40
(IN FEET)
1 inch = 40 feet

Prepared For:
Exxon Company, U.S.A.
Charlotte, North Carolina, U.S.A.

File Name: 43998sm4.dw2 Date: 12/1998

Approved: Scale: 1 in. = 40 ft.




NOTE: AIR SPARGE WELL AS/EP 1 WAS INSTALLED FOR THE PILOT TEST AND WAS CONNECTED TO THE SYSTEM.

FIGURE 4
TOTAL BTEX ISOPLETH MAP
EXXON RAS #4-3998
4701 WEST MARKET ST., GREENSBORO, NC

Reference map by EA Engineering, Science, and Technology

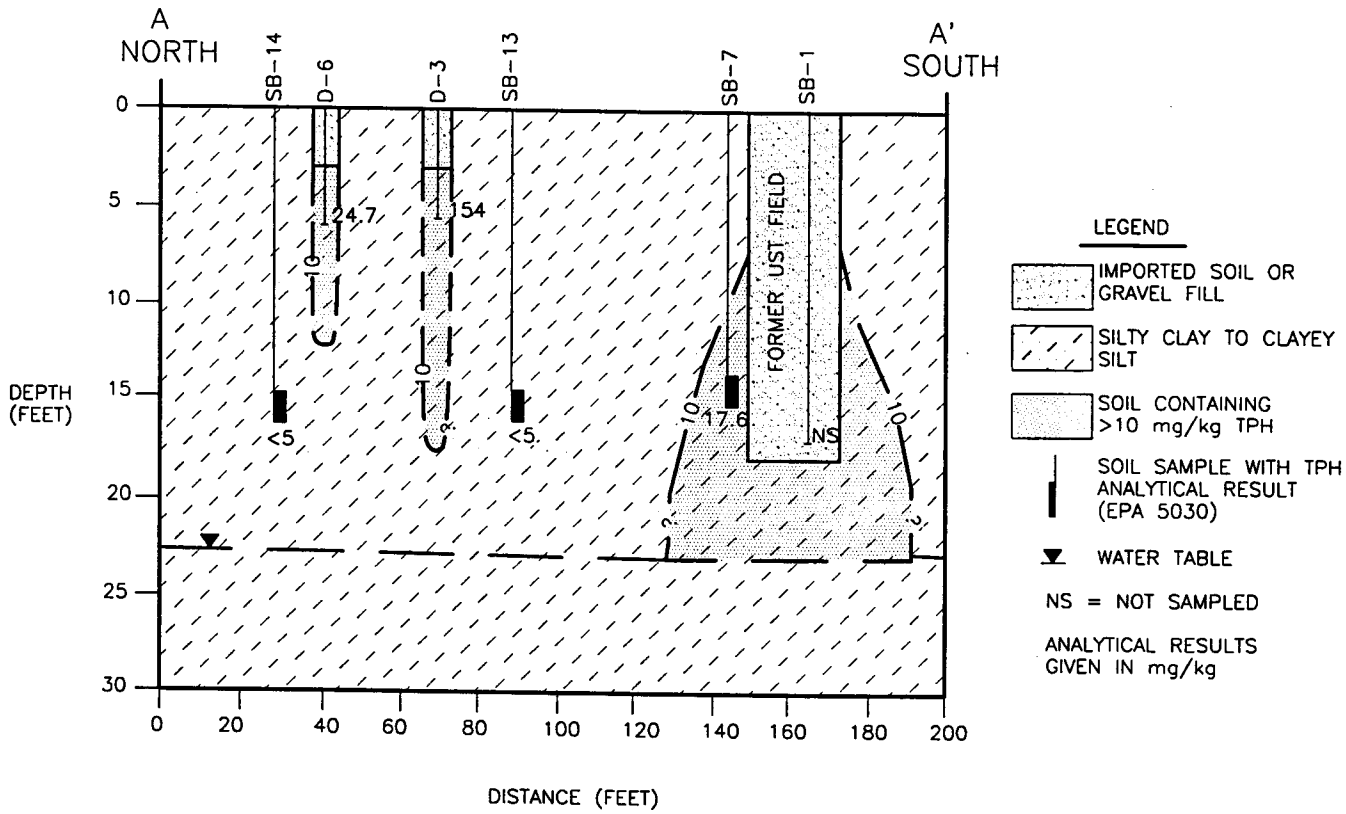
Nightingale Geologic Consultants, P.C.
Charlotte, North Carolina, U.S.A.

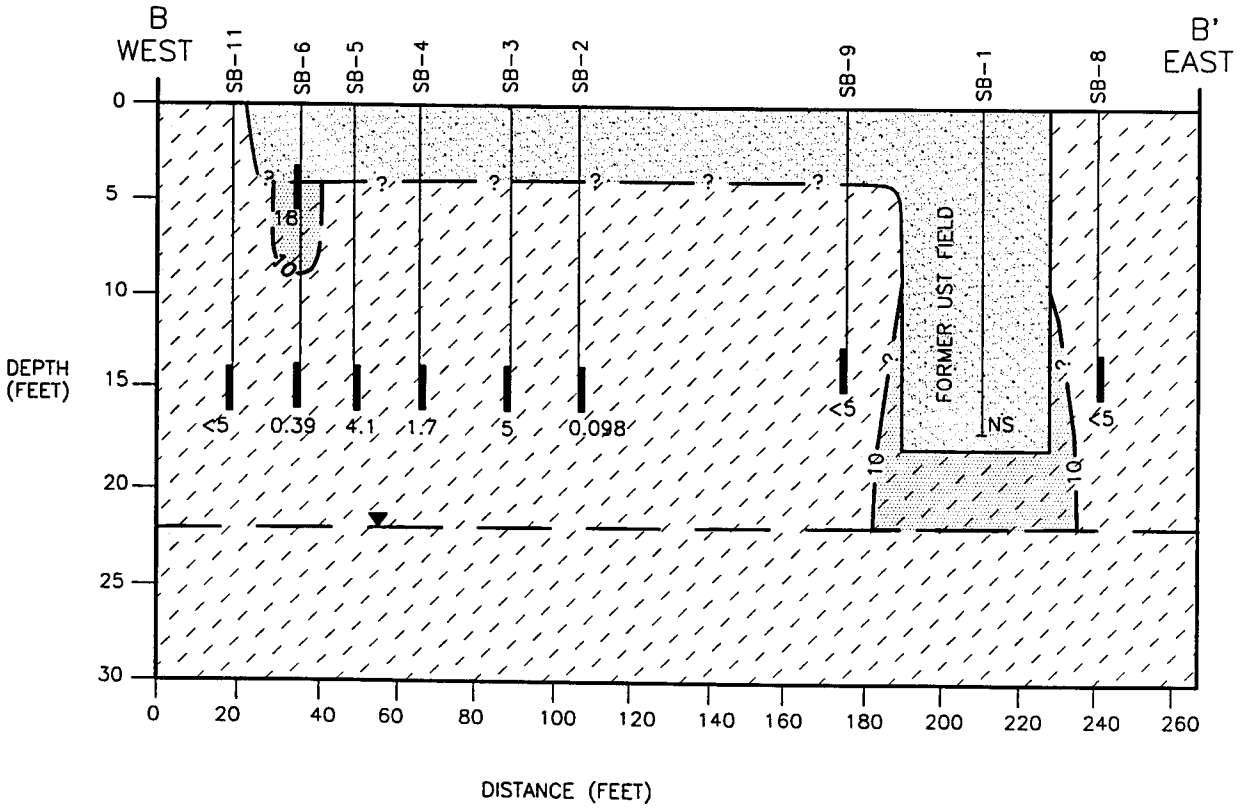
0 20 40
(IN FEET)
1 inch = 40 feet

Prepared For:
Exxon Company, U.S.A.
Charlotte, North Carolina, U.S.A.

File Name: 43998sm4.dw2 Date: 12/1998

Approved: Scale: 1 in. = 40 ft.




4106CRS2.DWG 1-29-96 AM 1=1 KH/JP

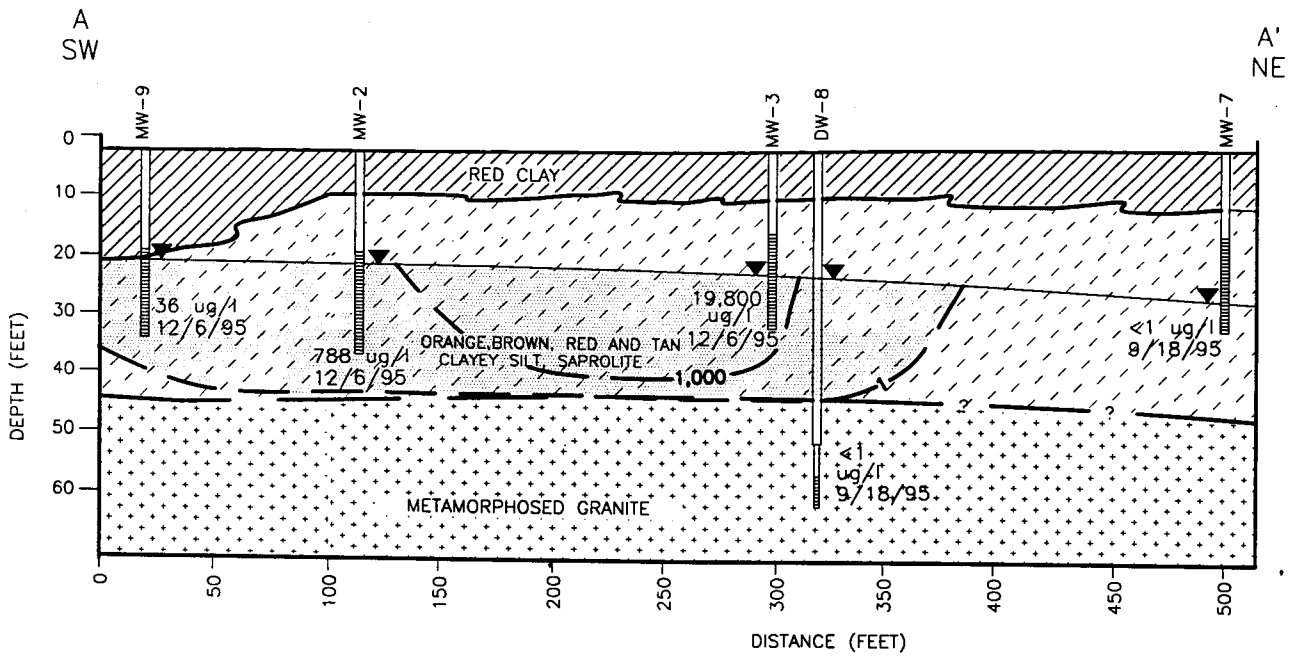
ERM-Southeast, Inc.
CHARLOTTE, NORTH CAROLINA

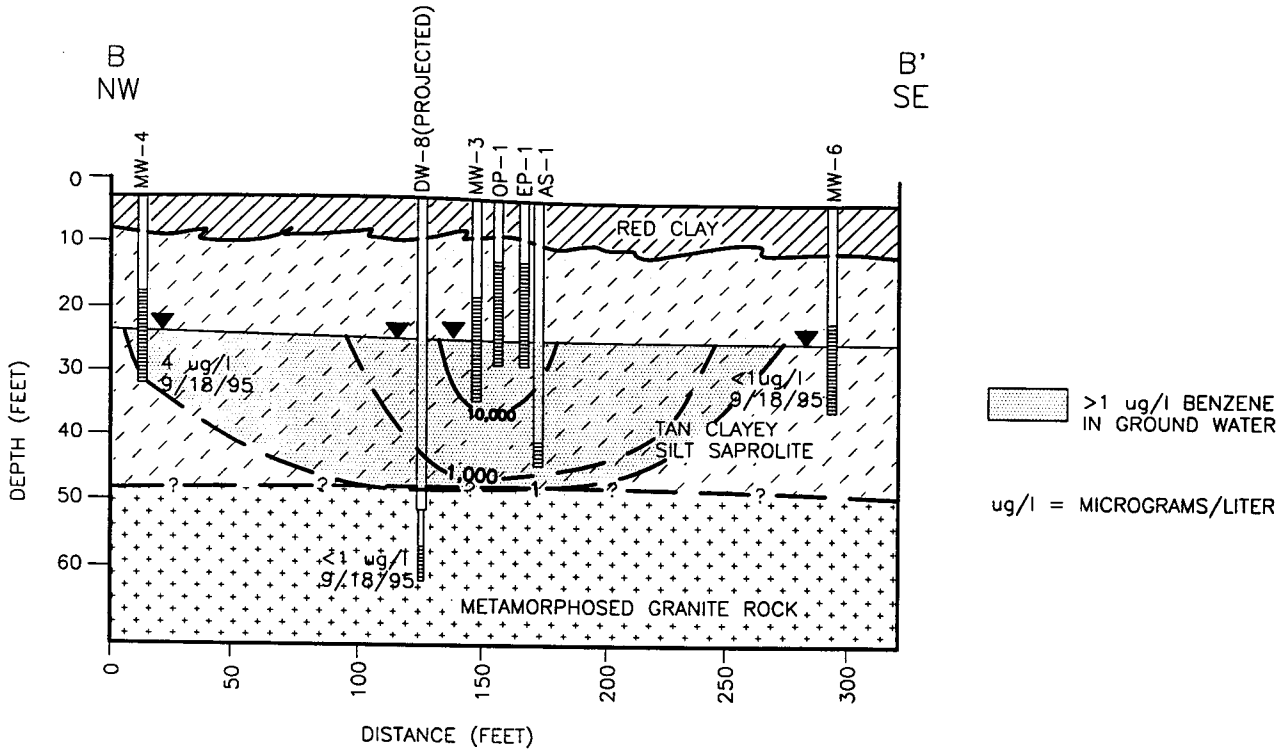
ERM

**GEOLOGIC GROSS-SECTIONS WITH LOW BOILING POINT TPH ANALYTICAL RESULTS**

EXXON RETAIL LOCATIONN 4-3998
GREENSBORO, NORTH CAROLINA

FIGURE
5




LEGEND

WATER TABLE

BENZENE ISOCONCENTRATION CONTOUR LINE (MICROGRAMS/LITER)

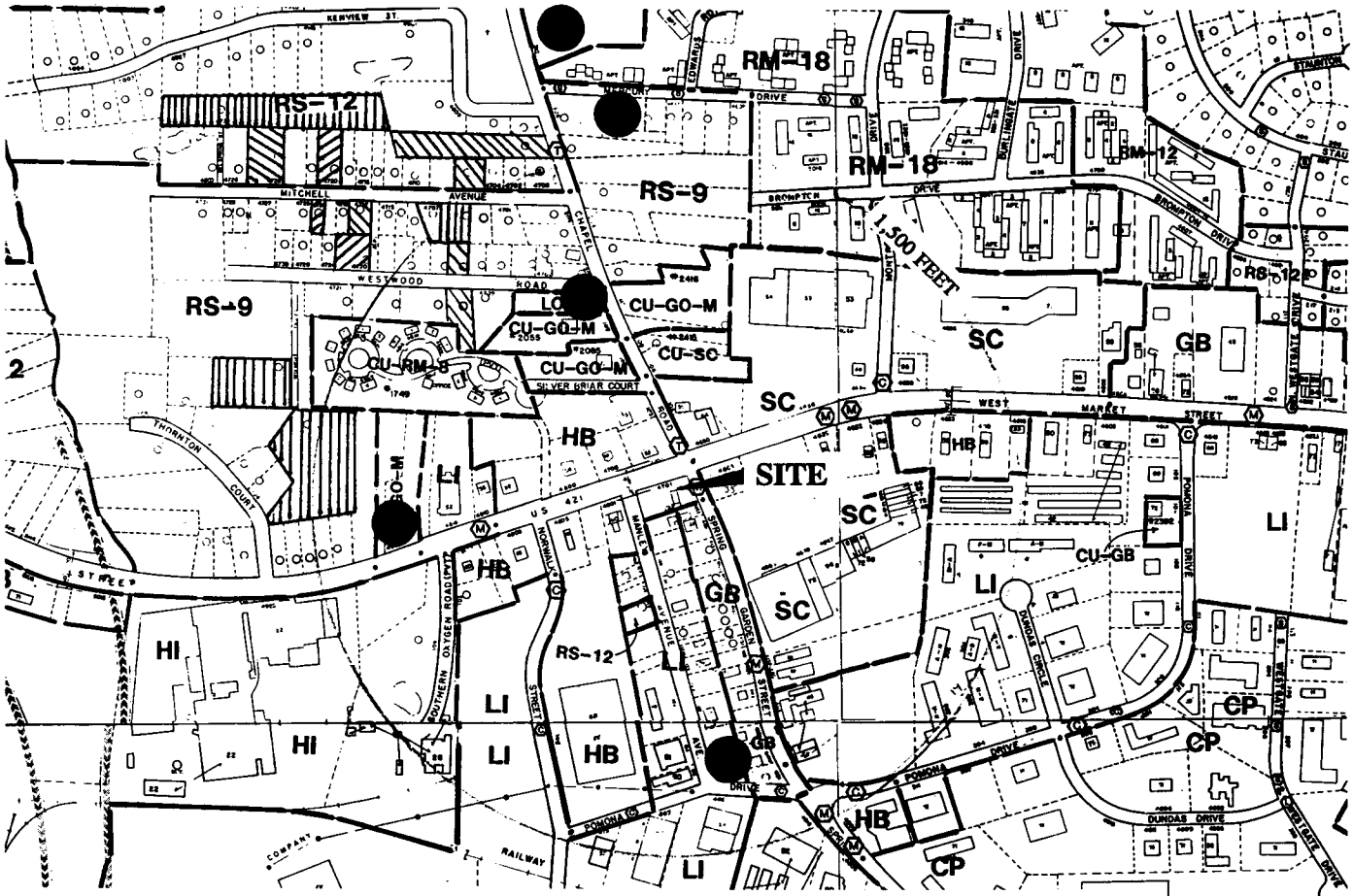
ERM-Southeast, Inc.
CHARLOTTE, NORTH CAROLINA

ERM

**GROUNDWATER BENZENE ISOCONCENTRATION CONTOUR CROSS SECTIONS**
EXXON, U.S.A. LOCATION # 4-3998
GREENSBORO, NORTH CAROLINA

FIGURE
6

4106ISOC.DWG 6-15-94 AM 1=1 KH/AN




## ZONING DESCRIPTIONS

| | |
|---|---|
| CU | Corporate park district (office, warehouse, assembly, research and development uses) |
| GB | General business district (retail, service, office uses) |
| GO | Geral Office district (M indicates moderate density) |
| HB | Highway business district (reatil, service, and distrubution purposes) |
| HI | Heavy industrial district |
| LI | Light industrial district |
| LO | Limited Office District |
| RM | Multifamily residential dwellings |
| RS | Single family detached residential dwellings |
| SC | Shopping center district |

## LEGEND

- Residential water supply well
- Residential irrigation well
- Out-of-service water supply well
- Child day care center, church, or school

SOURCE: GREENSBORO ZONING MAP, AUGUST 1995

N

SCALE IN FEET
0 800

ERM-Southeast, Inc.
CHARLOTTE, NORTH CAROLINA
ERM

LAND USE AND WATER SUPPLY WELL LOCATION MAP
EXXON COMPANY, U.S.A.
RETAIL LOCATION 4-3998
GREENSBORO, NORTH CAROLINA

FIGURE
7

85X11VER.DWG MM-DD-YY AM 1=1 TIWK

# APPENDIX

**SPECIALIZED ASSAYS, INC.**

2960 Foster Creighton Dr.
P.O. Box 40566
Nashville, TN 37204-0566
Phone 1-615-726-0177

# ANALYTICAL REPORT

GRIFFITH ENTERPRISES 5930
ELLIOT NIGHTINGALE
4736 SHARON RD, STE W124
CHARLOTTE, NC 28210

Lab Number: 98-A164411
Sample ID: MW-1
Sample Type: Water
Site ID:

Date Collected: 12/22/98
Time Collected: 9:00
Date Received: 12/26/98
Time Received: 9:00

Project: 4-3998
Project Name: EXXON 4-3998
Sampler: R BARKO

| Analyte | Result | Units | Report Limit | Quan Limit | Dil Factor | Date | Time | Analyst | Method | Batch |
|---|---|---|---|---|---|---|---|---|---|---|
| *ORGANIC PARAMETERS* | | | | | | | | | | |
| Benzene | 414. | ug/l | 10.0 | 1.0 | 10 | 12/29/98 | 9:20 | D.Raney | 602 | 2777 |
| Toluene | 327. | ug/l | 10.0 | 1.0 | 10 | 12/29/98 | 9:20 | D.Raney | 602 | 2777 |
| Ethylbenzene | 382. | ug/l | 10.0 | 1.0 | 10 | 12/29/98 | 9:20 | D.Raney | 602 | 2777 |
| Xylenes, total | 836. | ug/l | 10.0 | 1.0 | 10 | 12/29/98 | 9:20 | D.Raney | 602 | 2777 |
| Methyl-t-butylether | ND | ug/l | 10.0 | 1.0 | 10 | 12/29/98 | 9:20 | D.Raney | 602 | 2777 |
| Isopropyl ether | 311. | ug/l | 10.0 | 1.0 | 10 | 12/29/98 | 9:20 | D.Raney | 602 | 2777 |
| Ethylene Dibromide | 0.29 | ug/l | 0.02 | 0.02 | 1 | 1/ 4/99 | 9:29 | Carmichael | 504.1 | 4138 |

ND = Not detected at the report limit.

| Surrogate | % Recovery | Target Range |
|---|---|---|
| BTEX/GRO Surr., a,a,a-trifluorotoluene | 109. | 50. - 150. |

Report Approved By: Michael H. Dunn  Report Date: 1/ 4/99

Theodore J. Duello, Ph.D., Lab Director
Michael H. Dunn, M.S., Technical Director
Johnny A. Mitchell, Dir. Technical Services
Eric Smith, Assistant Technical Director

Laboratory Certification Number: 387

COPY 1

**SPECIALIZED ASSAYS, INC.**

2960 Foster Creighton Dr.
P.O. Box 40566
Nashville, TN 37204-0566
Phone 1-615-726-0177

# ANALYTICAL REPORT

GRIFFITH ENTERPRISES 5930
ELLIOT NIGHTINGALE
4736 SHARON RD, STE W124
CHARLOTTE, NC 28210

Lab Number: 98-A164412
Sample ID: MW-4
Sample Type: Water
Site ID:

Date Collected: 12/22/98
Time Collected: 10:30
Date Received: 12/26/98
Time Received: 9:00

Project: 4-3998
Project Name: EXXON 4-3998
Sampler: R BARKO

| Analyte | Result | Units | Report Limit | Quan Limit | Dil Factor | Date | Time | Analyst | Method | Batch |
|---|---|---|---|---|---|---|---|---|---|---|
| *ORGANIC PARAMETERS* | | | | | | | | | | |
| Benzene | 31.2 | ug/l | 1.0 | 1.0 | 1 | 12/29/98 | 9:47 | B.Ramey | 602 | 2777 |
| Toluene | ND | ug/l | 1.0 | 1.0 | 1 | 12/29/98 | 9:47 | B.Ramey | 602 | 2777 |
| Ethylbenzene | 2.2 | ug/l | 1.0 | 1.0 | 1 | 12/29/98 | 9:47 | B.Ramey | 602 | 2777 |
| Xylenes, total | 137. | ug/l | 1.0 | 1.0 | 1 | 12/29/98 | 9:47 | B.Ramey | 602 | 2777 |
| Methyl-t-butylether | 2.4 | ug/l | 1.0 | 1.0 | 1 | 12/29/98 | 9:47 | B.Ramey | 602 | 2777 |
| Isopropyl ether | 4.0 | ug/l | 1.0 | 1.0 | 1 | 12/29/98 | 9:47 | B.Ramey | 602 | 2777 |
| Ethylene Dibromide | ND | ug/l | 0.02 | 0.02 | 1 | 1/ 4/99 | 9:29 | Carmichael | 504.1 | 4138 |

ND = Not detected at the report limit.

| Surrogate | % Recovery | Target Range |
|---|---|---|
| BTEX/GRO Surr., a,a,a-trifluorotoluene | 87. | 50. - 150. |

Report Approved By: Michael H. Dunn  Report Date: 1/ 4/99

Theodore J. Duello, Ph.D., Lab Director
Michael H. Dunn, M.S., Technical Director
Johnny A. Mitchell, Dir. Technical Services
Eric Smith, Assistant Technical Director

Laboratory Certification Number: 387

COPY 1

**SPECIALIZED ASSAYS, INC.**

2960 Foster Creighton Dr.
P.O. Box 40566
Nashville, TN 37204-0566
Phone 1-615-726-0177

# ANALYTICAL REPORT

GRIFFITH ENTERPRISES 5930
ELLIOT NIGHTINGALE
4736 SHARON RD, STE W124
CHARLOTTE, NC 28210

Lab Number: 98-A164413
Sample ID: MW-7
Sample Type: Water
Site ID:

Date Collected: 12/22/98
Time Collected: 11:00
Date Received: 12/26/98
Time Received: 9:00

Project: 4-3998
Project Name: EXXON 4-3998
Sampler: R BARKO

| Analyte | Result | Units | Report Limit | Mean Limit | Dil Factor | Date | Time | Analyst | Method | Batch |
|---|---|---|---|---|---|---|---|---|---|---|
| *ORGANIC PARAMETERS* | | | | | | | | | | |
| Benzene | 23.3 | ug/l | 1.0 | 1.0 | 1 | 12/28/98 | 23:35 | D.Raney | 602 | 2286 |
| Toluene | 26.1 | ug/l | 1.0 | 1.0 | 1 | 12/28/98 | 23:35 | D.Raney | 602 | 2286 |
| Ethylbenzene | 4.5 | ug/l | 1.0 | 1.0 | 1 | 12/28/98 | 23:35 | D.Raney | 602 | 2286 |
| Xylenes, total | 25.6 | ug/l | 1.0 | 1.0 | 1 | 12/28/98 | 23:35 | D.Raney | 602 | 2286 |
| Methyl-t-butylether | 24.5 | ug/l | 1.0 | 1.0 | 1 | 12/28/98 | 23:35 | D.Raney | 602 | 2286 |
| Isopropyl ether | 2.0 | ug/l | 1.0 | 1.0 | 1 | 12/28/98 | 23:35 | D.Raney | 602 | 2286 |
| Ethylene Dibromide | ND | ug/l | 0.02 | 0.02 | 1 | 1/ 4/99 | 9:29 | Carmichael | 504.1 | 4138 |

ND = Not detected at the report limit.

| Surrogate | % Recovery | Target Range |
|---|---|---|
| BTEX/GRO Surr., a,a,a-trifluorotoluene | 87. | 50. - 150. |

Report Approved By: Michael H. Dunn  Report Date: 1/ 4/99

Theodore J. Duello, Ph.D., Lab Director
Michael H. Dunn, M.S., Technical Director
Johnny A. Mitchell, Dir. Technical Services
Eric Smith, Assistant Technical Director

Laboratory Certification Number: 387

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**SPECIALIZED ASSAYS, INC.**

2960 Foster Creighton Dr.
P.O. Box 40566
Nashville, TN 37204-0566
Phone 1-615-726-0177

# ANALYTICAL REPORT

GRIFFITH ENTERPRISES 5930
ELLIOT NIGHTINGALE
4736 SHARON RD, STE W124
CHARLOTTE, NC 28210

Project: 4-3998
Project Name: EXXON 4-3998
Sampler: R BARKO

Lab Number: 98-A164414
Sample ID: DW-8
Sample Type: Water
Site ID:

Date Collected: 12/22/98
Time Collected: 11:30
Date Received: 12/26/98
Time Received: 9:00

| Analyte | Result | Units | Report Limit | Mean Limit | Dil Factor | Date | Time | Analyst | Method | Batch |
|---|---|---|---|---|---|---|---|---|---|---|
| *ORGANIC PARAMETERS* | | | | | | | | | | |
| Benzene | ND | ug/l | 1.0 | 1.0 | 1 | 12/29/98 | 8:03 | D.Ramey | 602 | 2286 |
| Toluene | ND | ug/l | 1.0 | 1.0 | 1 | 12/29/98 | 8:03 | D.Ramey | 602 | 2286 |
| Ethylbenzene | ND | ug/l | 1.0 | 1.0 | 1 | 12/29/98 | 8:03 | D.Ramey | 602 | 2286 |
| Xylenes, total | ND | ug/l | 1.0 | 1.0 | 1 | 12/29/98 | 8:03 | D.Ramey | 602 | 2286 |
| Methyl-t-butylether | ND | ug/l | 1.0 | 1.0 | 1 | 12/29/98 | 8:03 | D.Ramey | 602 | 2286 |
| Isopropyl ether | ND | ug/l | 1.0 | 1.0 | 1 | 12/29/98 | 8:03 | D.Ramey | 602 | 2286 |
| Ethylene Dibromide | ND | ug/l | 0.02 | 0.02 | 1 | 1/ 4/99 | 9:29 | Carmichael | 504.1 | 4138 |

ND = Not detected at the report limit.

| Surrogate | % Recovery | Target Range |
|---|---|---|
| BTEX/GRO Surr., a,a,a-trifluorotoluene | 103. | 50. - 150. |

Report Approved By: Michael H. Dunn  Report Date: 1/ 4/99

Theodore J. Duello, Ph.D., Lab Director
Michael H. Dunn, M.S., Technical Director
Johnny A. Mitchell, Dir. Technical Services
Eric Smith, Assistant Technical Director

Laboratory Certification Number: 387

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# ANALYTICAL REPORT

GRIFFITH ENTERPRISES 5930
ELLIOT NIGHTINGALE
4736 SHARON RD, STE W124
CHARLOTTE, NC 28210

Lab Number: 98-A164415
Sample ID: MW-9
Sample Type: Water
Site ID:

Date Collected: 12/22/98
Time Collected: 12:00
Date Received: 12/26/98
Time Received: 9:00

Project: 4-3998
Project Name: EXXON 4-3998
Sampler: R BARKO

| Analyte | Result | Units | Report Limit | Quan Limit | Dil Factor | Date | Time | Analyst | Method | Batch |
|---|---|---|---|---|---|---|---|---|---|---|
| *ORGANIC PARAMETERS* | | | | | | | | | | |
| Benzene | 4.8 | ug/l | 1.0 | 1.0 | 1 | 12/29/98 | 2:24 | B.Ramey | 602 | 2286 |
| Toluene | ND | ug/l | 1.0 | 1.0 | 1 | 12/29/98 | 2:24 | B.Ramey | 602 | 2286 |
| Ethylbenzene | 5.1 | ug/l | 1.0 | 1.0 | 1 | 12/29/98 | 2:24 | B.Ramey | 602 | 2286 |
| Xylenes, total | 114. | ug/l | 1.0 | 1.0 | 1 | 12/29/98 | 2:24 | B.Ramey | 602 | 2286 |
| Methyl-t-butylether | ND | ug/l | 1.0 | 1.0 | 1 | 12/29/98 | 2:24 | B.Ramey | 602 | 2286 |
| Isopropyl ether | 15.0 | ug/l | 1.0 | 1.0 | 1 | 12/29/98 | 2:24 | B.Ramey | 602 | 2286 |
| Ethylene Dibromide | ND | ug/l | 0.02 | 0.02 | 1 | 1/ 4/99 | 9:29 | Carmichael | 504.1 | 4138 |

ND = Not detected at the report limit.

| Surrogate | % Recovery | Target Range |
|---|---|---|
| BTEX/GRO Surr., a,a,a-trifluorotoluene | 104. | 50. - 150. |

Report Approved By: Michael H. Dunn  Report Date: 1/ 4/99

Theodore J. Duello, Ph.D., Lab Director
Michael H. Dunn, M.S., Technical Director
Johnny A. Mitchell, Dir. Technical Services
Eric Smith, Assistant Technical Director

Laboratory Certification Number: 387

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Phone 1-615-726-0177

# ANALYTICAL REPORT

GRIFFITH ENTERPRISES 5930
ELLIOT NIGHTINGALE
4736 SHARON RD, STE W124
CHARLOTTE, NC 28210

Lab Number: 98-A164416
Sample ID: BP-1
Sample Type: Water
Site ID:

Date Collected: 12/22/98
Time Collected: 13:00
Date Received: 12/26/98
Time Received: 9:00

Project: 4-3998
Project Name: EXXON 4-3998
Sampler: R BARKO

| Analyte | Result | Units | Report Limit | Quan Limit | Dil Factor | Date | Time | Analyst | Method | Batch |
|---|---|---|---|---|---|---|---|---|---|---|
| *ORGANIC PARAMETERS* | | | | | | | | | | |
| Benzene | 334. | ug/l | 5.0 | 1.0 | 5 | 12/29/98 | 18:15 | D.Ramey | 602 | 2777 |
| Toluene | 10.5 | ug/l | 1.0 | 1.0 | 1 | 12/29/98 | 2:53 | D.Ramey | 602 | 2286 |
| Ethylbenzene | 47.4 | ug/l | 1.0 | 1.0 | 1 | 12/29/98 | 2:53 | D.Ramey | 602 | 2286 |
| Xylenes, total | 133. | ug/l | 1.0 | 1.0 | 1 | 12/29/98 | 2:53 | D.Ramey | 602 | 2286 |
| Methyl-t-butylether | 83.1 | ug/l | 1.0 | 1.0 | 1 | 12/29/98 | 2:53 | D.Ramey | 602 | 2286 |
| Isopropyl ether | 8.0 | ug/l | 1.0 | 1.0 | 1 | 12/29/98 | 2:53 | D.Ramey | 602 | 2286 |
| Ethylene Dibromide | ND | ug/l | 0.02 | 0.02 | 1 | 1/ 4/99 | 9:29 | Carmichael | 504.1 | 4138 |

ND = Not detected at the report limit.

| Surrogate | % Recovery | Target Range |
|---|---|---|
| BTEX/GRO Surr., a,a,a-trifluorotoluene | 102. | 50. - 150. |

Report Approved By: Michael H. Dunn  Report Date: 1/ 4/99

Theodore J. Duello, Ph.D., Lab Director
Michael H. Dunn, M.S., Technical Director
Johnny A. Mitchell, Dir. Technical Services
Eric Smith, Assistant Technical Director

Laboratory Certification Number: 387

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P.O. Box 40566
Nashville, TN 37204-0566
Phone 1-615-726-0177

# PROJECT QUALITY CONTROL DATA

## Matrix Spike Recovery

| Analyte | units | Orig. Val. | MS Val | Spike Conc | Recovery | Target Range | Q.C. Batch |
|---|---|---|---|---|---|---|---|
| Benzene | ug/l | < 0.0010 | 0.0174 | 0.0200 | 87.00 | 59. - 138. | 2286 |
| Toluene | ug/l | < 0.0010 | 0.0175 | 0.0200 | 87.50 | 59. - 135. | 2286 |
| Ethylbenzene | ug/l | < 0.0010 | 0.0182 | 0.0200 | 91.00 | 47. - 144. | 2286 |
| Xylenes, total | ug/l | < 0.0010 | 0.0350 | 0.0400 | 87.50 | 58. - 136. | 2286 |
| Methyl-t-butylether | ug/l | < 0.0010 | 0.0188 | 0.0200 | 94.00 | 62. - 133. | 2286 |
| Isopropyl ether | ug/l | < 0.001 | 0.018 | 0.020 | 90.00 | 74. - 132. | 2286 |
| Ethylene Dibromide | ug/l | < 0.00002 | 0.00032 | 0.00029 | 110.34 | 84. - 114. | 4138 |

## Matrix Spike Duplicate

| Analyte | units | Orig. Val. | Duplicate | RPD | Limit | Q.C. Batch |
|---|---|---|---|---|---|---|
| Ethylene Dibromide | ug/l | 0.00032 | 0.00031 | 3.17 | 16. | 4138 |

## Laboratory Control Data

| Analyte | units | Known Val. | Analyzed Val | % Recovery | Target Range | Q.C. Batch |
|---|---|---|---|---|---|---|
| Benzene | ug/l | 0.0200 | 0.0173 | 86. | 70 - 130 | 2286 |
| Toluene | ug/l | 0.0200 | 0.0173 | 86. | 70 - 130 | 2286 |
| Ethylbenzene | ug/l | 0.0200 | 0.0181 | 90. | 70 - 130 | 2286 |
| Xylenes, total | ug/l | 0.0400 | 0.0344 | 86. | 70 - 130 | 2286 |
| Methyl-t-butylether | ug/l | 0.0200 | 0.0171 | 86. | 70 - 130 | 2286 |
| Isopropyl ether | ug/l | 0.020 | 0.018 | 90. | 60 - 140 | 2286 |

## Blank Data

| Analyte | Blank Value | Units | Q.C. Batch |
|---|---|---|---|
| Benzene | < 0.0010 | ug/l | 2286 |
| Toluene | < 0.0010 | ug/l | 2286 |
| Ethylbenzene | < 0.0010 | ug/l | 2286 |
| Xylenes, total | < 0.0010 | ug/l | 2286 |
| Methyl-t-butylether | < 0.0010 | ug/l | 2286 |
| Isopropyl ether | < 0.001 | ug/l | 2286 |
| Ethylene Dibromide | < 0.00002 | ug/l | 4138 |

SPECIALIZED ASSAYS ENVIRONMENTAL
2960 Foster Creighton Dr.
Nashville, Tennessee 37204

1-800-765-0980
615-726-0177
Fax: 615-726-3404

125623

# EXXON COMPANY USA

## CHAIN-OF-CUSTODY RECORD AND ANALYSIS REQUESTED

LWR #:

Name: Griffith Enterprises, Inc. Elliot Nightingal5930
Phone: 704-643-9700
Fax: 704-643-9701

Address: 4722 Sharon Road Suite E-124 Charlotte, NC 28210
Client Project # 4-3998
Name: 4-3998

Project Mgr: Elliot Nightingal
Exxon Env. Work Release: 1966-1704

Exxon Contact: Frank Medlan
[circle one] EE or C&M Phone:

RAS #: 4-3998
Site Address: Market St.
State ID #:

Cooler Seal
Seal Intact yes no Initial

Consultant Receipt
yes no Initial

Laboratory Receipt
yes no Initial

Air Bill # 8082187827 # of coolers
Sample Temperature 4 [*C] upon receipt

Sampled by [please print] R. BARKO
Sampler Signature: R. Barko

Ship Date: 12-23-98

TAT REQUESTED 24hr 48hr 72hr other _____ day
Exxon Std TAT

| FIELD SAMPLE ID | SAE LAB # [for lab use only] | # CONT | Matrix: WATER | SOIL | AIR | SLUDGE | PRODUCT | OTHER | Method Preserved: HCL | HNO3 | H2SO4 | ICE | NON-PRES | OTHER SPECIFY | Sampling: DATE | TIME | BTEX 8020 | MTBE | EDB METHOD 504.1 | PETROLEUM HYDROCARBONS, GC, 8015 GAS DIESEL | TRPH/OIL AND GREASE 418.1 9070 9071 413.1 413.2 | PURGEABLE HALOCARBONS 601 8010 8021 | PURGEABLE AROMATICS 602 8020 8021 | PCB's | VOLATILE ORGANICS 624 8240 TCL 8260 | EXTRACTABLE ORGANICS 625 8270 TCL | PAH's 610 8310 8100 8270 | TCLP METALS VOA's BNA's P/H TOTAL | METALS RCRA PP TAL | LEAD 238.2 200.7 6010 7421 | CORROSIVITY REACTIVITY | FP OPEN CUP CLOSED CUP |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| MW-1 | 164411 | 5 | X | | | | | | X | X | | X | | | 12-22 | 900 | X | X | X | | | | | | | | | | | X | | |
| MW-4 | 412 | 5 | | | | | | | | | | | | | | 1030 | X | X | X | | | | | | | | | | | X | | |
| MW-7 | 413 | 5 | | | | | | | | | | | | | | 1100 | X | X | X | | | | | | | | | | | X | | |
| DW-8 | 414 | 5 | | | | | | | | | | | | | | 1130 | X | X | X | | | | | | | | | | | X | | |
| MW-9 | 415 | 5 | | | | | | | | | | | | | | 1200 | X | X | X | | | | | | | | | | | X | | |
| BP-1 | 164 416 | 5 | | | | | | | | | | | | | | 1300 | X | X | X | | | | | | | | | | | X | | |

SPECIAL DETECTION LIMITS:

REPORTING LIMITS:

CLIENT REMARKS:

STORAGE LOCATION:

| | | DATE | TIME |
|---|---|---|---|
| Relinquished by Sampler: | R. Barko | 12-22-98 | |
| Company / Affiliation: | | | |
| Relinquished by: | | | |
| Company / Affiliation: | | | |

| | | DATE | TIME |
|---|---|---|---|
| Received by: | | 122298 | 900 |
| Received by: | | | |

SPECIALIZED ASSAYS ENVIRONMENTAL
2960 Foster Creighton Dr.
Nashville, Tennessee 37204

1-800-765-0980
615-726-0177
Fax: 615-726-3404

125623

# EXXON COMPANY USA

## CHAIN-OF-CUSTODY RECORD AND ANALYSIS REQUESTED

LWR #: _____

Name: Griffith Enterprises, Inc. Elliot Nightingal5930
Phone: 704-643-9700
Fax: 704-643-9701

Address: 4722 Sharon Road Suite E-124 Charlotte, NC 28210
Client Project #4-3998
Name: 4-3998

Project Mgr: Elliot Nightingal
Exxon Env. Work Release: 1966-1704

Exxon Contact: Frank Medlan
[circle one] EE or C&M Phone:

RAS #: 4-3998
Site Address: Market ST.
State ID #:

Cooler Seal
Seal Intact
Consultant Receipt: yes no Initial
Laboratory Receipt: yes no Initial

Air Bill # 808218782721 # of coolers
Sample Temperature 4 [*C] upon receipt

Sampled by [please print] R. BARKO
Sampler Signature: R. Barko

Ship Date: 12-23-98

TAT REQUESTED 24hr 48hr 72hr other _____ day Exxon Std TAT

ANALYSIS REQUEST | OTHER

| FIELD SAMPLE ID | SAE LAB # [for lab use only] | # CONT | Matrix: WATER | SOIL | AIR | SLUDGE | PRODUCT | OTHER | Method Preserved: HCL | HNO3 | H2SO4 | ICE | NON-PRES | OTHER SPECIFY | Sampling: DATE | TIME | BTEX 602 ☒ 8020 ☐ | MTBE ☒ IPE ☒ | EDB METHOD 504.1 | PETROLEUM HYDROCARBONS, GC, 8015 GAS ☐ DIESEL ☐ | TRPH/OIL AND GREASE 418.1 ☐ 9070 ☐ 9071 ☐ 413.1 ☐ 413.2 ☐ | PURGEABLE HALOCARBONS 601 ☐ 8010 ☐ 8021 ☐ | PURGEABLE AROMATICS 602 ☐ 8020 ☐ 8021 ☐ | PCB's ☐ | VOLATILE ORGANICS 624 ☐ 8240 TCL ☐ 8260 ☐ | EXTRACTABLE ORGANICS 625 ☐ 8270 TCL ☐ | PAH's 610 ☐ 8310 ☐ 8100 ☐ 8270 ☐ | TCLP METALS ☐ VOA's ☐ BNA's ☐ P/H ☐ TOTAL ☐ | METALS RCRA ☐ PP ☐ TAL ☐ | LEAD 238.2 ☐ 200.7 ☐ 6010 ☐ 7421 ☐ 3030c ☒ | CORROSIVITY ☐ REACTIVITY ☐ | FP OPEN CUP ☐ CLOSED CUP ☐ |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| MW-1 | 164411 | 5 | X | | | | | | X | X | | X | | | 12-22 | 900 | X | X | X | | | | | | | | | | | X | | |
| MW-4 | 412 | 5 | | | | | | | | | | | | | | 1030 | X | X | X | | | | | | | | | | | X | | |
| MW-7 | 413 | 5 | | | | | | | | | | | | | | 1100 | X | X | X | | | | | | | | | | | X | | |
| DW-8 | 414 | 5 | | | | | | | | | | | | | | 1130 | X | X | X | | | | | | | | | | | X | | |
| MW-9 | 415 | 5 | | | | | | | | | | | | | | 1200 | X | X | X | | | | | | | | | | | X | | |
| BP-1 | 164416 | 5 | | | | | | | | | | | | | | 1300 | X | X | X | | | | | | | | | | | | | |

3030c samples out of holding time
rec'd 12/26

SPECIAL DETECTION LIMITS:

REPORTING LIMITS:

CLIENT REMARKS: Do Not Run Pb per Elliot @ 1103 12/28

STORAGE LOCATION:

| | | DATE | TIME |
|---|---|---|---|
| Relinquished by Sampler: | R. Barko | 12-22-98 | |
| Company / Affiliation: | Griffith | | |
| Relinquished by: | | | |
| Company / Affiliation: | | | |

| | | DATE | TIME |
|---|---|---|---|
| Received by: | [signature] | 12-26-98 | 946 |
| Received by: | | | |