December 14, 1999

Mr. Timothy Dieffenbach New York State Department of Environmental Conservation 270 Michigan Avenue Buffalo, New York 14203-2999

Re: Submittal of SFI Completion Report

Dear Mr. Dieffenbach:

On behalf on ExxonMobil Corporation (ExxonMobil), Roux Associates, Inc. (Roux Associates) is pleased to submit the attached nine copies of the Site Facility Investigation (SFI) Completion Report for the Mobil Buffalo Terminal in Buffalo, New York. This report is being submitted for your review in accordance with the SFI Continuation Work Plan dated June 3, 1999 and subsequent letter correspondence dated June 24, 1999 and July 1, 1999. Laboratory analytical data packages are currently undergoing reproduction and will be forwarded to you under separate cover when available.

If you have any questions, please do not hesitate to contact Noelle Clarke or Drew Baris at 631-232-2600.

Sincerely,

ROUX ASSOCIATES, INC.

Noelle M. Clarke, P.E. Senior Engineer/ Project Manager

Andrew J. Baris Principal Hydrogeologist

cc: J. Abel, ExxonMobil R. Ciccotelli, ExxonMobil C. Zink, GES M. Falzone, GB3 W. Palomino, USEPA

SITE FACILITY INVESTIGATION COMPLETION REPORT

Mobil Buffalo Terminal Location No. 31-010 Buffalo, New York

December 14, 1999

Prepared for:

Mobil Oil Corporation Inwood, New York

Prepared by:

ROUX ASSOCIATES, INC. 1377 Motor Parkway Islandia, New York 11788



CONTENTS

1.0 INTRODUCTION	1
2.0. STUDY AREA BACKGROUND AND SCOPE OF WORK	2
2.0 STODI TREADREROROOND AND SCOTE OF WORK	2
2.1.1 Soil Boring and Sampling	3
2.2. Buffalo Terminal Disposal Site	4
2.2 Soil Boring and Sampling	5
2.2.2 Monitoring Well Installation	6
2.2.3 Water-Level and Free-Product Thickness Measurements	7
2.2.4 Groundwater Sampling	7
2.2.5 Slug Testing	7
2.2.6 Piezometer Abandonment	8
2.3 Former Lube Building	8
2.3.1 Soil Boring and Sampling	9
2.3.2 Monitoring Well Installation	10
2.3.3 Water-Level and Free-Product Thickness Measurements	11
2.3.4 Groundwater Sampling	11
2.4 Site-Wide Monitoring Well Gauging	12
2.5 Groundwater Resampling	12
2.6 Validation of Analytical Data	12
3.0 SITE FACILITY INVESTIGATION CONTINUATION RESULTS	14
3.1 Elk Street Lot.	14
3.1.1 Soil Sampling Results	15
3.2 Buffalo Terminal Disposal Site	15
3.2.1 Soll Sampling Results	10
3.2.2 Free-Product Defineation	10
2.2.4 Slug Testing Desults	10
3.2.4 Slug results Results	1/
3.2.5 Containmant Loading Evaluation	10
3.2.5.2 Identification of COCs in Groundwater	10
and Calculation of Mass Flux	10
3 2 5 3 Estimation of Potential Maximum Concentrations	1)
of COCs in Surface Water	20
3 2 5 4 Discussion of the Results	21
3 3 Former Lube Building	21
3 3 1 Soil Sampling Results	21
3 3 2 Free-Product Delineation	22
3.3.3 Babcock Street Sewer	
3.4 Site-Wide Groundwater Flow and Quality	23

CONTENTS (Continued)

4.0 SUMMARY OF FINDINGS AND CONCLUSIONS	
4.1 Elk Street Lot	
4.2 Buffalo Terminal Disposal Site	
4.3 Former Lube Building	27
5.0 REFERENCES	

TABLES

- 1. Summary of Well Construction Details, Mobil Buffalo Terminal, Buffalo, New York
- 2. Groundwater and Free-Product Measurements, Mobil Buffalo Terminal, Buffalo, New York
- 3. Summary of Semivolatile Organic Compounds Detected in Soil Samples, Mobil Buffalo Terminal, Buffalo, New York
- 4. Summary of Metals Detected in Soil Samples, Mobil Buffalo Terminal, Buffalo, New York
- 5. Summary of Volatile Organic Compounds Detected in Soil Samples, Mobil Buffalo Terminal, Buffalo, New York
- 6. Summary of Volatile Organic Compounds Detected in Groundwater Samples, Mobil Buffalo Terminal, Buffalo, New York
- 7. Summary of Semivolatile Organic Compounds Detected in Groundwater Samples, Mobil Buffalo Terminal, Buffalo, New York
- 8. Summary of Metals Detected in Groundwater Samples, Mobil Buffalo Terminal, Buffalo, New York
- 9. Summary of Free-Product Data in the Vicinity of the Babcock Street Sewer, Mobil Buffalo Terminal, Buffalo, New York

FIGURES

- 1. Site Location Map
- 2. Study Area Location Map
- 3. Elk Street Lot Sample Location Map
- 4. Buffalo Terminal Disposal Site Sample Location Map
- 5. Former Lube Building Sample Location Map
- 6. Concentrations of SVOCs Detected in Soil at Elk Street Lot
- 7. Concentrations of Metals Detected in Soil at Elk Street Lot
- 8. Concentrations of VOCs Detected in Soil at the Former Lube Building Area Shallow Interval
- 9. Concentrations of VOCs Detected in Soil at the Former Lube Building Area Deep Interval

FIGURES (Continued)

- 10. Concentrations of SVOCs Detected in Soil at the Former Lube Building Area -Shallow Interval
- 11. Concentrations of SVOCs Detected in Soil at the Former Lube Building Area Deep Interval
- 12. Concentrations of Metals Detected in Soil at the Former Lube Building Area -Shallow Interval
- 13. Concentrations of Metals Detected in Soil at the Former Lube Building Area Deep Interval

APPENDICES

- A. Geologic Logs
- B. Well Development Notes
- C. Aquifer Test Procedures and Analytical Results
- D. Data Validation Report
- E. Contaminant Loading Evaluation Results

PLATES

- 1. Groundwater Potentiometric Map October 7, 1999
- 2. Concentrations of VOCs in Groundwater
- 3. Concentrations of SVOCs in Groundwater
- 4. Concentrations of Metals in Groundwater

1.0 INTRODUCTION

On behalf of Mobil Oil Corporation (Mobil), Roux Associates, Inc. (Roux Associates) has prepared this Site Facility Investigation (SFI) Completion Report to document the additional environmental investigation activities at the Mobil Oil Corporation petroleum distribution terminal (Site), located at 625 Elk Street, Buffalo, New York (Figure 1). This work was performed in accordance with the SFI Continuation Work Plan (Work Plan) dated June 3, 1999 and subsequent letter correspondence to the New York State Department of Environmental Conservation (NYSDEC) dated June 3, 1999, June 24, 1999 and July 1, 1999 (Roux Associates, 1999a, 1999b, 1999c and 1999d). The results of the initial phase of the SFI were presented in the SFI Report dated November 25, 1998 (Roux Associates, 1998).

The SFI Continuation field program was performed between July 19, 1999 to October 19, 1999 by Groundwater & Environmental Services, Inc. (GES). The focus of the Work Plan was to perform additional subsurface investigation activities in three areas of the Site which were prioritized based on the results of the initial SFI work; and to address written and verbal comments provided by the NYSDEC regarding the initial SFI Report. The areas investigated include the Elk Street Lot, the Former Lube Building and the Buffalo Terminal Disposal Site (Figure 2). Soil and groundwater samples were collected from the three study areas as part of the field program. In addition, the field program included monitoring well installation, gauging of monitoring wells, groundwater sampling and slug testing. The specific investigation scopes of work for each area and the ancillary tasks are outlined in Section 2.0. The results of the work are presented in Section 3.0. A summary of findings and conclusions is presented in Section 4.0.

2.0 STUDY AREA BACKGROUND AND SCOPE OF WORK

The following sections briefly describe the setting, history and SFI results for the three SFI Continuation study areas. A more detailed discussion of the Site history and environmental conditions within each study area can be found in the SFI Report (Roux Associates, 1998). Following the background information for each study area is a description of the scope of work completed as part of the SFI Continuation field program. All SFI field tasks described below were conducted by GES. All evaluation and reporting of investigation results presented in Sections 3.0 and 4.0 were performed by Roux Associates.

2.1 Elk Street Lot

The historical usage of the Elk Street Lot was residential. On March 12, 1976, Tank 60 within the Northern Tank Yard (Figure 2) overheated and ruptured, releasing heavy-end petroleum associated with asphalt. Several homes and other buildings on the north side of Elk Street were affected by the release. Some of the structures were subsequently purchased by Mobil and demolished.

During the SFI, soil samples were collected at 12 sample locations (ESL-1 through ESL-12) in the Elk Street Lot. Sample results indicated no volatile organic compounds (VOCs) exceeded the NYSDEC Recommended Soil Cleanup Objectives (RSCOs) (NYSDEC, 1994) or Toxicity Characteristic Leaching Procedure (TCLP) Alternative Guidance Value Criteria (NYSDEC, 1992). The applicable RSCO criteria for semivolatile organic compounds (SVOCs) was exceeded in surface soils (0.0-0.5 feet below land surface [ft bls]) by at least one compound at each of the sampling locations. No SVOCs were detected in the deeper sample (8-10 ft bls) collected at ESL-8. The northern edge of the study area was the only area identified as having SVOCs at concentrations exceeding Site Background criteria that were developed as part of the SFI Work Plan (Woodward-Clyde, 1998). Concentrations of numerous metals exceeded the RSCO criteria and/or Site Background criteria at multiple sample locations. No pattern to the metal exceedances of RSCO or Site Background criteria was observed at the Elk Street Lot.

Based upon the SFI results described above, the objective of the additional work at the Elk Street Lot was to more precisely define the areal and vertical extent of SVOCs exceeding the Site Background in the northern portion of the Elk Street Lot and to evaluate soil quality conditions at two residential properties immediately to the north of the Elk Street Lot. A soil boring and sampling program was performed to obtain the data necessary to meet these objectives. A description of the work performed as part of the additional investigation is provided below.

2.1.1 Soil Boring and Sampling

A Geoprobe[™] direct-push drilling rig was utilized to complete four borings (ESL-13, ESL-14, ESL-15 and ESL-18) on the Elk Street Lot and four borings (ESL-16, ESL-17, ESL-19 and ESL-20) on the properties to the north of the Elk Street Lot. The locations of the borings are shown in Figure 3. The soil borings were performed by Zebra Environmental Corporation (Zebra) under the direction of an on-site GES geologist. Prior to initiating investigative activities on the properties north of the Elk Street Lot, GES obtained access permission from the property owners. All soil borings were advanced using a Macrocore[™] sampler. At each boring location, samples were collected continuously from land surface to a total depth of 3 ft bls. All soil samples were inspected and logged by the field geologist, and screened with a photoionization detector (PID) to determine the potential presence of VOCs. The geologic logs for each boring, provided in Appendix A, describe the lithologic characteristics, any visual or olfactory evidence of hydrocarbon impact, percent recovery, moisture content, and PID screening results.

Three soil samples were retained for laboratory analysis from each boring: surface (0 to 0.5 ft bls), intermediate (1 to 2 ft bls) and deep (2 to 3 ft bls). At locations overlain by surface material consisting of sod, asphalt, broken concrete and brick fragments resulting from the historical demolition activities, the surface material of up to 1 ft in depth was removed prior to collection of the first soil sample. Description and thickness of the surface material at each location are provided on the geologic logs included in Appendix A.

Each sample was collected for analysis of NYSDEC Spill Technology and Remediation Series (STARS) Memo #1 list of SVOCs and reduced target analyte list (TAL) metals via United States Environmental Protection Agency (USEPA) Methods 8270 and 6010B, respectively. Trip blank and field rinsate blank samples were also collected at a frequency of one per day of sampling activities.

All samples were submitted under chain of custody to Lancaster Laboratories, Inc. (Lancaster Laboratories) of Lancaster, Pennsylvania, which is a NYSDEC Analytical Services Protocol (ASP) certified laboratory.

2.2 Buffalo Terminal Disposal Site

The Buffalo Terminal Disposal Site (Terminal Disposal Site) comprises approximately 12 acres located in the southeast portion of the facility (Figure 2). The land comprising the Terminal Disposal Site was created when the Buffalo River channel was re-aligned for navigation in the late 1910s to early 1920s. The historical channel was aligned roughly parallel to the railroad right-of-way and generally bisected the Terminal Disposal Site in a northeast-southwest direction as shown in Figure 4.

The Terminal Disposal Site was used by the City of Buffalo for disposal of municipal waste from 1921 to 1951. Mobil purchased the Terminal Disposal Site in 1951 and, in 1953, erected two above-ground storage tanks with 3,150,000 (No. 175) and 3,360,000 (No. 176) gallon capacities (CDM, 1988). Four above-ground propane gas tanks (29,400 gallon capacity) were also constructed. Mobil also used the area for waste disposal from 1951 to 1976. A detailed description of the history of the Terminal Disposal Site and pre-SFI investigations was provided in the SFI Report.

The results of the SFI indicated the presence of free product in the south-central portion of the Terminal Disposal Site (Monitoring Wells P-15, LF-1S and MW-3URS in Figure 4). Accordingly, the primary objective of the SFI Continuation field program was to further delineate the free product. In addition, as specified by the NYSDEC, the field program included collection of additional hydrogeologic and water quality data to facilitate evaluation of potential contaminant loading from the Terminal Disposal Site to the Buffalo River. In order to achieve these objectives the following tasks were performed:

- soil boring and sampling;
- monitoring well installation;
- water-level and free-product thickness measurements;

- groundwater sampling;
- slug testing; and
- abandonment of any previously installed piezometers and/or wells deemed no longer useful.

The scope of work performed for each task is described below.

2.2.1 Soil Boring and Sampling

A hollow-stem auger drilling rig was utilized to complete six borings (LF-3 through LF-8 in Figure 4) in the Terminal Disposal Site. Soil boring drilling was performed by SJB Services, Inc. (SJB) under the direction of an on-site GES geologist. Three of the borings (LF-6, LF-7, and LF-8) were drilled to document the depth to the top of the clay unit underlying the Site.

At each boring location, samples were collected at 5-ft intervals from 5 ft bls to approximately 5 feet above the anticipated water-table depth, then continuously to a total depth of approximately 37 ft bls, with the exception of LF-8. Samples were collected continuously at LF-8 to document lithologic conditions within the historical Buffalo River channel. The absence of utilities at all boring locations was documented by using an air knife to a depth of 5 ft bls prior to the use of drilling equipment. All soil samples were inspected and logged by the GES field geologist and screened with a PID to determine the potential presence of VOCs. The geologic logs for each boring, provided in Appendix A, describe the lithologic characteristics, any visual or olfactory evidence of hydrocarbon impact, percent recovery, moisture content, and PID screening results.

Since the main objective was to delineate free product, only a limited number of soil samples were collected for laboratory analysis. One soil sample from immediately above the water table was retained from soil borings LF-5 and LF-7, both of which did not display visual or olfactory evidence of free product. The goal of the laboratory analysis was to demonstrate that the samples were beyond the areal extent of any smear zone potentially associated with the free product plume.

Each sample was collected for analysis of NYSDEC STARS Memo #1 list of VOCs and SVOCs via USEPA Methods 8021 and 8270 and reduced TAL metals via USEPA Method 6010B. Field rinsate blank, field duplicate and matrix spike/matrix spike duplicate (MS/MSD) samples were generally collected at a frequency of one per day of sampling activities or one per twenty samples. Due to an oversight, the reduced TAL metals were not analyzed in the soil sample collected from boring LF-5.

All samples were submitted under chain of custody to Lancaster Laboratories.

2.2.2 Monitoring Well Installation

In order to evaluate the occurrence and verify the delineation of free product in the Terminal Disposal Site, six monitoring wells were installed at locations LF-3 through LF-8. Monitoring well drilling was performed by SJB under the direction of an on-site GES geologist. The locations of the monitoring wells are shown in Figure 4. Final locations for the wells were based on the findings of the soil boring task. As stated in Roux Associates' letter to the NYSDEC dated June 24, 1999, one of the monitoring wells (LF-8) was installed within the historical Buffalo River channel.

The monitoring wells were installed within the shallow overburden to a total depth of approximately 37 ft bls. Each well was constructed of 4-inch diameter Schedule 40 polyvinyl chloride (PVC) casing and screen. Each well was constructed such that the screened interval straddles the water table, allowing for fluctuation in static water levels and detection of free product (if present). Well construction logs are provided in Appendix A. A summary of well construction details is presented in Table 1.

Following installation, each well was developed by surging and pumping to remove drillingrelated fluids and sediment from the well bore and filter pack, and to allow for the collection of representative groundwater samples. All fluid pumped from the wells was transported to the onsite treatment system and off-loaded for treatment. Field notes describing well development activities are provided in Appendix B. Each well was subsequently surveyed for horizontal coordinates and land surface elevations accurate to ± 0.1 foot and measuring point (top of casing) elevations accurate to ± 0.01 foot by C.T. Male Associates, P.C. of North Syracuse, New York. In addition to the new wells, all existing wells were also surveyed. This new survey data identified several erroneous monitoring well measuring point elevations. The new survey data for all wells was used throughout this report.

2.2.3 Water-Level and Free-Product Thickness Measurements

Following development, the newly installed monitoring wells were incorporated into the waterlevel and free-product monitoring program. Each well was assessed for the presence of free product using an oil-water interface probe. A summary of the well gauging data is included in Table 2.

2.2.4 Groundwater Sampling

The objective of the groundwater sampling program was to provide additional groundwater quality data for the Terminal Disposal Site and support the evaluation of contaminant loading to the Buffalo River.

Monitoring Wells LF-3 through LF-8 were purged and sampled by GES on August 23 and 25, 1999. All purge water was transported to the on-site treatment system and off-loaded for treatment. Each groundwater sample was collected for analysis of the NYSDEC STARS Memo #1 list of VOCs and SVOCs via USEPA Methods 8021 and 8270, and reduced TAL metals via USEPA Method 6010B. Field rinsate blank, field duplicate and MS/MSD samples were generally collected at a frequency of one per day of sampling activities or one per twenty samples. Trip blank samples were generally collected at a frequency of one per day of sampling activities of one per sample shipment. (Note: Only benzene, toluene, ethyl benzene and xylenes (BTEX) parameters were requested on the chain of custody. As a result, the wells were resampled for VOC analysis on September 28, 1999.)

All samples were submitted under chain of custody to Lancaster Laboratories.

2.2.5 Slug Testing

Slug tests were performed in monitoring wells LF-5, LF-7 and LF-8, none of which contained free product. The rising head tests were performed by GES following the standard operating

ROUX ASSOCIATES, INC.

procedure provided in the Work Plan. The results of the slug tests are provided in Appendix C. This data was then used in conjunction with other chemical and hydrological data to evaluate contaminant loading from the Terminal Disposal Site to the Buffalo River. The results of the contaminant loading evaluation are presented in Section 3.2.5.

2.2.6 Piezometer Abandonment

Abandonment of existing piezometers P-1 through P-14 and P-16 through P-25 was performed by Zebra, under the direction of the on-site GES geologist. Piezometer abandonment was performed in accordance with the NYSDEC groundwater monitoring well decommissioning procedures (NYSDEC, 1996). Prior to abandonment, water-level, free-product thickness, and depth to bottom measurements were obtained from each piezometer. The piezometer casings were first pulled and then the open boreholes resounded to confirm that significant collapse of the borehole had not occurred. The open boreholes were then grouted with cement grout placed using the tremie method. As needed, well pads and/or well stick-up protectors were also removed.

2.3 Former Lube Building

The Former Lube Building was built in 1920 to serve as a lubrication oil processing/packaging facility. A garage and storage sheds were added to the building in the 1940s. Lubrication oil processing and packaging operations ceased approximately 20 years ago. The Former Lube Building and surrounding property was sold to Pinto Construction in 1994. A detailed description of the Former Lube Building history and previous investigations was provided in the SFI Report.

The main objectives of the SFI Continuation field program were to delineate free product at the Former Lube Building and to complete characterization of subsurface soils in the vicinity of previous boring SB-7. The tasks performed to obtain the data necessary to achieve these objectives included soil boring and sampling, monitoring well installation, water-level and free-product thickness measurements and groundwater sampling. A description of the work performed as part of the additional investigation is provided below.

2.3.1 Soil Boring and Sampling

A hollow-stem auger drilling rig was utilized to complete 21 borings (SB-11 through SB-31) in the vicinity of the Former Lube Building, with the exception of SB-12 which was drilled using the Geoprobe[™] method due to access constraints for larger drilling equipment. Soil boring drilling was performed by SJB and Zebra (SB-12) under the direction of an on-site GES geologist. The initial borings proposed (SB-11 through SB-20) were installed at the approximate locations shown in the Work Plan. Additional borings were installed for free-product delineation per the letter dated June 24, 1999 (Roux Associates, 1999c). Locations of all soil borings are shown in Figure 5. The need for additional borings was determined in the field based on the evidence of free product in the soil samples collected from the initial set of borings. If an initial boring exhibited visual evidence of free product, one or more additional borings were installed approximately 30 to 50 feet from the original boring, in the direction(s) that the extent of free product had not already been delineated. This process continued until the extent of free product was defined by borings with no visual evidence of free product. The delineation to the north of boring location SB-28, which exhibited indications of free product during drilling, could not be completed due to access limitations caused by active operations on the adjacent property currently leased to Custom Topsoil. The soil borings that were not completed as monitoring wells were backfilled with soil cuttings upon completion.

At each boring location, samples were collected continuously from 5 ft bls to a total depth ranging from 13 ft bls to 24 ft bls. The absence of utilities at all boring locations was documented using an air knife to a depth of 5 ft bls prior to the use of drilling equipment. All soil samples were inspected and logged by the field geologist, and screened with a PID to determine the potential presence of VOCs. The geologic logs for each boring, provided in Appendix A, describe the lithologic characteristics, any visual or olfactory evidence of hydrocarbon impact, percent recovery, moisture content, and PID screening results.

At soil boring locations SB-17, SB-18, SB-20, adjacent to previous well SB-7, and final perimeter delineation borings (SB-24, SB-27, SB-28 and SB-30), the soil samples were retained from two depths and sent for laboratory analysis. At each location, one sample was retained from the 0 to 0.5 foot interval and a second at the zone where the greatest PID reading was detected, with the exception of SB-20. At SB-20, the shallow interval sample was collected from

3 to 3.5 ft bls due to the presence of asphalt and large pieces of fill material to 3 ft bls. If no PID readings were noted, the second sample was collected from immediately above the water table.

At originally proposed soil boring locations SB-11, SB-13, SB-14, SB-15, SB-16, and SB-19, only the sample exhibiting the highest PID reading was submitted for laboratory analysis in order to evaluate the extent of any smear zone potentially associated with the free product plume. Soil samples were not collected for laboratory analysis from intermediate free-product delineation soil borings SB-21, SB-22, SB-23, SB-25, SB-26, SB-29 and SB-31, or from SB-12 which was specifically installed for monitoring the effectiveness of the western leg of the Well Point System (WPS).

Each sample was collected for analysis of NYSDEC STARS Memo #1 list of VOCs and SVOCs via USEPA Methods 8021 and 8270, and reduced TAL metals via USEPA Method 6010B. Field rinsate blank, field duplicate and MS/MSD samples were generally collected at a frequency of one per day of sampling activities or one per twenty samples. (Note: Due to insufficient sample volume from boring interval 16-18 ft bls at SB-11, only metals analyses were performed. Soil from the 18-20 ft bls interval was analyzed for VOCs and SVOCs.)

All samples were submitted under chain of custody to Lancaster Laboratories.

2.3.2 Monitoring Well Installation

In order to evaluate the occurrence of free product in the vicinity of the Former Lube Building, 11 monitoring wells were installed (SB-11 through SB-17, SB-19, SB-20, SB-28 and SB-31). The locations of the monitoring wells are shown in Figure 5. Monitoring well drilling was performed by SJB and Zebra (SB-12) under the direction of an on-site GES geologist.

The monitoring wells were installed within the shallow overburden to total depths ranging from 13 ft bls to 24 ft bls. Each well was constructed of 4-inch diameter Schedule 40 PVC casing and screen with the exception of SB-12, which was constructed of 2-inch diameter PVC due to access constraints for larger drilling equipment capable of installing larger wells. Each well was constructed such that the screened interval straddles the water table, allowing for fluctuation in

static water levels and detection of free product (if present). Well construction logs are provided in Appendix A. A summary of well construction details is presented in Table 1.

Following installation, each well was developed by surging and pumping to remove drillingrelated fluids and sediment from the well bore and filter pack, and to allow for the collection of representative groundwater samples. All fluid pumped from the wells was transported to the onsite treatment system, and off-loaded for treatment. Field notes describing well development activities are provided in Appendix B. Each well was subsequently surveyed for horizontal coordinates and land surface elevations accurate to ± 0.1 foot and measuring point (top of casing) elevations accurate to ± 0.01 foot by C.T. Male Associates, P.C. of North Syracuse, New York.

2.3.3 Water-Level and Free-Product Thickness Measurements

Following development, the newly installed monitoring wells were incorporated into the waterlevel and free-product monitoring program. Each well was assessed for the presence of free product using an oil-water interface probe. A summary of the well gauging data is included in Table 2.

2.3.4 Groundwater Sampling

Newly installed wells that did not contain free product were purged and sampled by GES on August 23, 1999. Groundwater samples were collected from wells SB-11, SB-12, SB-14 and SB-16. All purge water was transported to the on-site treatment system for treatment. Each groundwater sample was collected for analysis of the NYSDEC STARS Memo #1 list of VOCs and SVOCs via USEPA Methods 8021 and 8270, and reduced TAL metals via USEPA Method 6010B. Field rinsate blank, field duplicate and MS/MSD samples were generally collected at a frequency of one per day of sampling activities. Trip blank samples were generally collected at a frequency of one per sample shipment.

As previously mentioned, an incorrect list of VOC parameters was requested during the August 23, 1999 sampling. As a result, the wells were resampled for VOC analysis on September 28, 1999. However, wells SB-12 and SB-16 were not resampled due to insufficient water and the presence of free product, respectively. In addition, wells SB-19 and SB-28, which

were inadvertently omitted from the initial sampling list, were sampled for the above list of parameters on September 29, 1999 only. Finally, SB-28, which was inadvertently omitted from the initial sampling list, could not be sampled on September 29, 1999 due to insufficient sample volume. The drawdown observed in this well is due to the operation of the western leg of the Well Point System.

All samples were submitted under chain of custody to Lancaster Laboratories.

2.4 Site-Wide Monitoring Well Gauging

A synoptic round of water-level and free-product thickness measurements were collected from all new and previously installed monitoring wells on October 7, 1999. The water-level elevation of the Buffalo River was also measured in conjunction with the gauging event. Gauging results are summarized in Table 2.

2.5 Groundwater Resampling

As presented in the Work Plan, several previously sampled monitoring wells were resampled to provide additional groundwater quality data. The following wells were resampled:

- temporary monitoring wells BTC-4 and BTC-5 for analysis of total lead and tetra ethyl lead (TEL);
- temporary monitoring well NTY-T60 for analysis of total lead and hexavalent chromium; and
- monitoring well MW-1URS for analysis of total lead and TEL.

All samples were submitted under chain of custody to Lozier Analytical Group (Lozier Analytical) of Middlesex, New York and Rochester, New York.

2.6 Validation of Analytical Data

Analytical data from Lancaster Laboratories and Lozier Analytical were validated by Data Validation Services of North Creek, New York, whose function was to provide an independent review of the data packages. The data validation was performed to determine conformance with the analytical method used for analysis. The protocols established in the SFI Work Plan

(Woodward-Clyde, 1998) and in the following USEPA documents were used as guidance during the validation process:

- evaluation of Metals Data for the Contract Laboratory Program (CLP). SOP No. HW-2. Prepared by USEPA Region II; and
- CLP Organics Data Review and Preliminary Review. SOP No. HW-6. Prepared by USEPA Region II.

The data review and validation were structured to ensure that:

- calibration data were scientifically sound, appropriate to the method, and completely documented;
- quality control (QC) samples were within established guidelines;
- qualitative identification of sample components was correct;
- quantitative results were correct;
- transcription errors were not present;
- documentation was complete and correct (all anomalies in the preparation and analysis have been documented); holding times were documented;
- the data were ready for incorporation into the final report; and
- the data package was complete and ready for data archival.

Upon completion of the validation/review effort, a final report covering the overall assessment of the data quality was submitted to Roux Associates. The report includes:

- a general assessment of the data package as it pertains to completeness and compliance;
- descriptions of any and all deviations from the required protocol;
- an assessment of outliers and effect of the outliers on the overall usability of the data; and
- identification of applicable data qualifiers, including, if necessary, rejection of noncompliant data.

The data validation report is included in Appendix D.

3.0 SITE FACILITY INVESTIGATION CONTINUATION RESULTS

The following sections present the results of the SFI Continuation field program for the three study areas. Tables 3 through 8 summarize analytical results for soil and groundwater by SFI study area and type of analyses (e.g., VOC, SVOC, etc.). These tables only contain data for the target analytes that were detected in at least one sample.

As specified in the SFI Continuation Work Plan and Roux Associates' correspondence to the NYSDEC dated June 24, 1999 RSCOs, Toxicity Characteristic Leaching Procedure (TCLP) Alternative Guidance Values and Site Background concentrations were used to evaluate the soil quality at the Site. Evaluation of the data relative to the RSCOs and TCLP Alternative Guidance Values guidelines enables identification of areas that would pose a potential risk under a residential land use scenario as well as those areas that have potential to impact groundwater at concentrations exceeding drinking water standards. Given the current industrial land use at the Site, the background soil concentrations existing throughout the area surrounding the site and Mobil's intention to continue operation of the Site as a petroleum distribution terminal, remediation of soil to achieve residential guidelines is not appropriate. Therefore, the data were compared to the Site Background concentrations developed during preparation of the SFI Work Plan for evaluating the need for soil remediation, where appropriate.

Summary maps were prepared for the Elk Street Lot and Former Lube Building using the analytical database and MapInfo[™] Geographic Information System (GIS) Software to show soil sample concentration data in relation to the criteria. Locations where contaminant concentrations exceed the RSCOs, TCLP Alternative Guidance Values or the Site Background concentrations are shown in Figures 6 through 13.

3.1 Elk Street Lot

As described in Section 2.1, soil samples were collected at eight sample locations (ESL-13 through ESL-20) in the Elk Street Lot area during the SFI Continuation field program. In addition, sample locations ESL-1 through ESL-12 were sampled during the initial SFI. The results of the soil investigation are described below.

3.1.1 Soil Sampling Results

SVOCs were detected in surface soils (0.0-0.5 ft bls) at all eight new sampling locations. The applicable RSCO criteria was exceeded by at least one compound at each of the sampling locations (Figure 6). In addition, RSCO criteria were exceeded at locations ESL-16, ESL-17, and ESL-20 in the 1-2 ft interval and ESL-17 in the 2-3 ft interval. SVOCs were detected at concentrations exceeding Site Background at locations ESL-13, ESL-14 and ESL-15 in both the 0-0.5 ft interval and the 1 to 2 ft interval. Boring ESL-12, installed during the initial SFI field program also exhibited concentrations of SVOCs exceeding Site Background. A summary of the SVOC concentrations detected in soil is provided in Table 3.

These data indicate that the areal extent of SVOCs exceeding Site Background concentrations is limited to the northeast corner of the Elk Street Lot and that the impacts exceeding Site Background do not extend offsite. The data also indicate that the vertical extent of impact extends from land surface to a maximum depth of 2 feet below the broken concrete and brick fragments which are present in this area. No SVOCs were detected above Site Background concentrations in the deeper samples (2-3 ft bls) collected.

As shown in Figure 7, cadmium, chromium, mercury, nickel, selenium, thallium, and vanadium were detected at concentrations exceeding RSCOs and Site Background concentrations at multiple locations. However, no pattern to the exceedances of RSCOs or Site Background concentrations was observed. Moreover, no correlation between SVOC and metals concentrations was observed. A summary of metals concentrations detected in soil is provided in Table 4.

3.2 Buffalo Terminal Disposal Site

As described in Section 2.2, the SFI Continuation scope of work for the Terminal Disposal Site consisted of soil boring and sampling and monitoring well installation and gauging to delineate free product. In addition, slug testing and groundwater sampling were conducted to support the performance of a contaminant loading evaluation for the Buffalo River. The results of the additional investigative tasks are presented in the following sections.

3.2.1 Soil Sampling Results

Soil samples were collected at two locations (LF-5 and LF-7) in the Terminal Disposal Site during the SFI Continuation field program. Analytical results for VOCs, SVOCs and metals are summarized in Tables 5, 3 and 4, respectively. These results indicate:

- No VOCs were detected;
- SVOCs were detected in the sample collected from LF-7; however, none of the concentrations exceeded RSCO criteria; and
- chromium and nickel were detected above RSCO criteria in the sample collected from LF-7; however, the concentrations were less than Site Background.

LF-5 and LF-7 were designed to be perimeter borings to delineate the horizontal limits of the free-product plume. The absence of VOCs and the low concentrations of SVOCs in the soil samples collected immediately above the water table confirm that the borings are outside of the limits of the free-product plume and any associated smear zone.

3.2.2 Free-Product Delineation

Evidence of the presence of free product was not encountered during the drilling of the six newly installed wells (LF-3 through LF-8). Measurable free product was not identified in any of the wells during subsequent gauging. As indicated in Plate 1, free product occurrence is limited to the immediate vicinity of previously installed wells LF-1S, MW-3URS, and piezometer P-15.

3.2.3 Groundwater Sampling Results

Groundwater samples were collected from the six newly installed wells (LF-3 through LF-8) in the Terminal Disposal Site. Summaries of VOCs, SVOCs and metals detected in groundwater are provided in Tables 6 through 8, respectively. The groundwater sampling results were used to update the groundwater quality maps presented in the initial SFI Report. The updated maps for VOCs, SVOCs and metals are provided in Plates 2, 3 and 4, respectively. These data indicate that relatively low concentrations of dissolved phase hydrocarbon compounds are present in groundwater at the Terminal Disposal Site. VOCs were detected at five of the six new sampling locations with concentrations of total VOCs ranging from 1.1 micrograms per liter (μ g/L) (LF-7) to 113.8 μ g/L in LF-3, based on the September 28, 1999 sampling. Benzene was the VOC detected at the highest concentrations, ranging from 50 μ g/L (LF-3) to 80 μ g/L (LF-6), based on the September 28, 1999 sampling. A summary of VOCs detected in groundwater is provided in Table 6.

SVOCs were only detected at locations LF-3 and LF-6. Total SVOC concentrations at the two locations were 24 μ g/L to 16 μ g/L, respectively. Due to a laboratory error, the sample collected from LF-5 was not analyzed for SVOCs.

Neither VOCs nor SVOCs were detected in groundwater in well LF-8, which is located within the historical Buffalo River channel.

Metals were detected in all new wells in the Terminal Disposal Site with the exception of LF-7. The highest concentrations for the reduced list of TAL metals were detected in LF-4. As the groundwater samples were not filtered and metals occur naturally as suspended sediment and dissolved components in groundwater, detected concentrations may not necessarily be related to Site activities. A summary of metals detected in groundwater is provided in Table 8.

3.2.4 Slug Testing Results

Slug testing was performed at newly installed monitoring wells LF-5, LF-7 and LF-8. The hydraulic conductivity (K) values obtained for the three overburden wells tested (i.e., LF-5, LF-7 and LF-8) range from 32 to 190 feet per day (ft/d). These values of K are all within the range of hydraulic conductivities characteristic of soil types similar to those identified throughout the Terminal Disposal Area (i.e., clean sand with silt and gravel). The highest K value was determined for well LF-8, which was installed within the location of historical Buffalo River channel and screens a slightly coarser portion of the formation than wells LF-5 and LF-7. The lowest K value was determined for well LF-7. The geologic log for LF-7 indicates the presence of a relatively thin layer of tight fine silty sand (beneath the water table) described in the geologic log as "dry." The average K value obtained from the three wells was approximately

100 ft/d. A more detailed description of the field methods and data interpretation performed is presented in Appendix C.

3.2.5 Contaminant Loading Evaluation

The contaminant loading evaluation included the following work elements:

- estimation of the groundwater flux to the Buffalo River;
- identification of constituents of concern (COCs) in groundwater;
- estimation of the concentrations of COCs in groundwater discharging to the Buffalo River;
- calculation of the mass loading of COCs to the Buffalo River based upon the groundwater flux and the concentrations of COCs;
- estimation of the potential concentrations of COCs in surface water; and
- comparison of the concentrations of COCs in surface water to relevant criteria to evaluate the potential for impact to aquatic life.

A discussion of each of these work elements and the corresponding results are provided below. Additional details and calculation sheets regarding the contaminant loading evaluation are provided in Appendix E.

3.2.5.1 Groundwater Flux to the Buffalo River

The groundwater flux to the Buffalo River was estimated using the following two methods:

- 1) analytical calculations according to Darcy's law; and
- 2) use of the MODFLOW groundwater model (McDonald and Harbaugh, 1988) developed for the Site during the SFI (Roux Associates, 1998).

The analytical calculations according to Darcy's law were performed using data obtained during SFI and SFI Continuation field work. These data include:

• the average hydraulic conductivity of 53.5 ft/day across the zone of groundwater discharge within the Terminal Disposal Area determined from the slug tests conducted in monitoring wells LF-5 and LF-7;

- the length of the reach of river (350 ft) comprising the zone of groundwater discharge, which was determined from evaluation of groundwater flow directions, the extent of impacted groundwater and hydraulic influence of the Well Point System;
- the average hydraulic gradient of 0.026 feet per foot (ft/ft) determined from analysis of October 7, 1999 groundwater flow across the zone of groundwater discharge within the Terminal Disposal Area (Plate 1); and
- the average saturated thickness (11.86 ft) of the sand formation based upon geologic data from boreholes for monitoring wells LF-5, LF-7, and LF-8.

Based upon the above data, the groundwater flux was calculated to be 5,774 cubic feet per day (ft³/day).

The MODFLOW groundwater model developed during the SFI was updated with the October 7, 1999 pumping conditions to simulate groundwater flow. Groundwater elevation contours from the simulation agreed relatively well with those developed based upon the field measured condition (Plate 1). The USGS software utility known as Zone Budget was used with the MODFLOW model to estimate the groundwater flux into the Buffalo River. The results of the Zone Budget analysis indicated a flux of 2,519 ft³/day across the groundwater discharge zone.

The groundwater flux determined using analytical calculations $(5,774 \text{ ft}^3/\text{day})$ is approximately two times the flux determined using the MODFLOW model (2,519 ft³/day). The results of the two methods are in good agreement considering that small changes in hydraulic parameters could account for the difference. For example, performing the calculations using a hydraulic conductivity value of 32 ft/day (as was measured at LF-7) rather than the average value of 53.5 ft/day, and a hydraulic gradient of 0.02 rather than 0.026, results in a difference of only five percent from the MODFLOW estimate. The groundwater flux estimate (5,774 ft³/day) was used in subsequent steps of the contaminant loading evaluation to be conservative.

3.2.5.2 Identification of COCs in Groundwater and Calculation of Mass Flux

Table E-1 (Appendix E) provides a comparison of the maximum concentrations of all compounds detected in groundwater during the SFI and SFI Continuation field work to their respective Ambient Water Quality Standards and Guidance Values for Class C surface waters (NYSDEC, 1998). The Class C water quality criteria were used since the segment of the Buffalo

River adjacent to the Terminal has been designated by NYSDEC as Class C (6 NYCRR, Part 837.4). The best usage of Class C water bodies is fishing.

The results of the comparison indicate maximum concentrations of benzene, phenanthrene, acenaphthene and fluorene in groundwater exceed their respective Class C standards or guidance values. Therefore, these compounds were retained for further evaluation in the contaminant loading evaluation. All of the other compounds could not pose a potential impact to the Buffalo River since the maximum concentrations are less than the relevant surface-water criteria.

The mass flux of each constituent of concern into the Buffalo River was calculated by multiplying the maximum concentrations of each compound by the groundwater flux estimate of $5,774 \text{ ft}^3/\text{day}$. This is a conservative estimate of mass flux since it utilizes the maximum groundwater flux estimate, the maximum concentrations observed in groundwater and assumes that there will be no attenuation or degradation of the compounds during migration to the River. The River is approximately 100 to 150 feet downgradient from where the maximum concentrations were detected. The calculated mass flux of each constituent of concern into the Buffalo River is shown in Table E-2 (Appendix E).

3.2.5.3 Estimation of Potential Maximum Concentrations of COCs in Surface Water

Potential maximum concentrations of COCs in surface water were estimated by considering the mixing of the groundwater discharge with various percentages of the estimated surface-water discharge of the Buffalo River adjacent to the Site. Based upon review of published information and discussions with the United States Geologic Survey (USGS), there are no surface-water gauging stations along the Buffalo River. Therefore, the discharge of the Buffalo River was approximated as the cumulative flow of its tributaries: Cazenovia Creek, Cayuga Creek and Buffalo Creek. Published gauging data exist for all three of streams for the period May 1, 1974 to September 30, 1998 (USGS, 1999). During this period of record, the average long-term discharge of the Buffalo River was 511 cubic feet per second (ft³/sec) or 4.4×10^7 ft³/day.

Table E-2 summarizes the maximum concentrations of COCs that could occur following mixing of 5,774 ft^3 /day of groundwater with 100, 50, 1, 0.1 and 0.05 percent of the surface-water flow in the Buffalo River. As shown, only at the 0.1 and 0.05 percent mixing levels is there any potential for exceedances of the Class C water quality criteria.

3.2.5.4 Discussion of the Results

The results of the contaminant loading evaluation indicate that the potential for impacts to aquatic life in the Buffalo River is negligible. The maximum concentrations of COCs in groundwater are very low and only slightly exceed their respective water quality criteria. Even conservatively assuming that the maximum concentrations in groundwater discharge to surface water, and using the more conservative estimate of groundwater flux to the River, the resulting surface-water concentrations would be in compliance with the water quality criteria almost immediately upon discharge. Based upon the attenuation characteristics of the COCs, the actual concentrations reaching the River, and corresponding potential for impact to the River, would be even further reduced.

3.3 Former Lube Building

As described in Section 2.3, the SFI Continuation scope of work for the Former Lube Building Area consisted of soil borings and monitoring well installation to delineate free product and to provide additional soil and groundwater quality data. The results of the additional investigative tasks are presented in the following sections.

3.3.1 Soil Sampling Results

As discussed in Section 2.3.1, soil samples were collected and sent for laboratory analysis from 13 locations in the Former Lube Building Area during the SFI Continuation and at four locations during the initial SFI.

As shown in Figures 8 and 9, the BTEX compounds, and 1,2,4-trimethylbenzene were each detected in at least one location above RSCO criteria or TCLP Alternative Guidance Values. In general, higher concentrations were observed in the deeper samples, with no apparent pattern to the areal extent of elevated concentrations in either the shallow or deep intervals. A summary of the VOCs detected in soil is provided in Table 5.

ROUX ASSOCIATES, INC.

As shown in Figures 10 and 11, SVOCs were detected at concentrations exceeding RSCOs and Site Background concentrations at multiple sample locations. There was no pattern of higher and lower concentrations relative to depth. However, all of the exceedances of Site Background concentrations were confined to the portion of the property east of Babcock Street. In addition, the exceedances of Site Background concentrations in the deeper sampling interval were limited to those sample locations in the vicinity of the former truck loading rack. A summary of the SVOCs detected in soil is provided in Table 3.

As shown in Figures 12 and 13, metals concentrations exceeded RSCOs at multiple locations and in both the shallow and deeper intervals. Nickel and chromium were the metals most frequently detected at concentrations exceeding RSCOs. Site Background concentrations were exceeded for mercury, nickel and selenium in both the shallow and deeper intervals. Nickel and selenium were the metals most frequently detected at concentrations exceeding Site Background concentrations. There is no discernible pattern to the horizontal or vertical distribution of the metals exceedances in either interval. A summary of the metals detected in soil is provided in Table 4.

3.3.2 Free-Product Delineation

Of the 2 wells installed during the initial SFI and the 11 wells installed during the SFI Continuation field work in the Former Lube Building Area, only wells SB-17, SB-16 and SB-20 contained measurable free product during the October 7, 1999 site-wide gauging round. Measured thickness ranged from 0.01 ft to 0.87 ft. As indicated on Plate 1, the distribution of the wells exhibiting measurable free-product indicate that the free product plume extends north and west of the Former Truck Rack, and to the south through the central portion of the Former Lube Building. Wells SB-13 and SB-12 are also shown within the free-product plume based on August 10, 1999 gauging data which indicated free-product thicknesses in the two wells to be 0.1 ft and 0.02 ft, respectively. Based upon field observations during the drilling program, soil borings SB-21, SB-22, SB-24, SB-26 and SB-29 on the west side of Babcock Street indicated the presence of free product in soil samples collected from the vicinity of the water table. The next boring to the west, SB-30, did not show any evidence of free product. Therefore, the free-product plume was shown to extend beyond Babcock Street to the west even though no wells

were installed between SB-17 and SB-30 to define free-product thickness in this area. The installation and subsequent gauging of Monitoring Well SB-31 confirmed that delineation had been achieved in this area. In addition, boring SB-28 showed evidence of free product; however, access limitations prevented further delineation to the north. Therefore, it is possible that the free-product plume may extend beyond SB-28 to the north.

3.3.3 Babcock Street Sewer

The potential for impacts to the Babcock Street Sewer was evaluated by comparing groundwater and free-product elevations to the sewer invert and sewer bedding elevations. The elevation data for the sewer was obtained from Buffalo Sewer Authority installation drawings. The analysis included measurements from both before and after startup of the western leg of the Well Point System on August 23, 1999. The groundwater, free product and sewer elevation data are summarized on Table 9.

The gauging data collected prior to startup of the western leg of the WPS indicated that the groundwater and free-product elevations were generally above the sewer invert elevation; and in all instances above the approximate elevation of the sewer bedding material. Following startup of the western leg of the WPS, the data indicated groundwater and free product elevations declined to below the sewer invert and bedding material, with the exception of groundwater at Monitoring Well SB-16.

Based upon these data, the startup of the western leg of the WPS has reduced the potential for any impacts to the Babcock Street Sewer.

3.4 Site-Wide Groundwater Flow and Quality

As shown in Plate 1, groundwater flows towards the south in the region between the northern Site boundary and the dual-phase recovery systems (RW-1 through RW-5). This is the natural direction of groundwater flow in the absence of pumping (i.e., toward discharge at the Buffalo River). In the area between the dual-phase recovery systems and the Well Point System, a groundwater flow divide is created between the cones of influence of the two pumping systems. In the area between the Well Point System and the River, pumping of the Well Point System depresses the water table sufficiently to induce recharge from the Buffalo River into the aquifer and prevent the discharge of contaminants from the aquifer to the River. This effect of the Well Point System is documented by the 5.4 feet of head difference between well MW-21 and the Buffalo River; and approximately 5.5 feet of head difference between well SB-12 and the Buffalo River (Plate 1).

The groundwater flow directions depicted in Plate 1 are very similar to those observed during prior monitoring rounds at the Site and that were shown in the initial SFI Report. One notable difference is that the activation of the western leg of the WPS has resulted in hydraulic capture of groundwater beneath and to the west of Babcock Street. In addition, the survey of all new and existing wells performed by the licensed surveyor as part of the SFI Continuation field work identified several erroneous monitoring well measuring point elevations. While this new information did not change the overall interpretation of groundwater flow directions presented in the SFI, it did clarify some anomalies identified during past gauging events. For example, groundwater elevations in the Terminal Disposal Area previously could not be contoured. However, based on the new surveyed elevations of several existing wells in this area, flow is clearly shown to be toward the Buffalo River.

Plates 2, 3 and 4 the summarize the site-wide groundwater quality data that was collected during the initial SFI and the SFI Continuation field work. As described in the SFI Report, the groundwater sampling results generally indicate low or nondetectable concentrations of VOCs and SVOCs at the upgradient northern edge of the Site and higher concentrations towards the center and southern areas. This is consistent with the historical Site operations, as well as groundwater flow direction, and presence of free product within the southern portion of the Site. A site-wide pattern of metals occurrence or concentrations in groundwater was not observed.

The data collected during the SFI Continuation program (summarized in Tables 6 through 8, and included on Plates 2 through 4) are consistent with the results of the initial SFI and do not affect the general understanding of groundwater quality at the Site.

As described above, the dual-phase recovery wells and Well Point System provide hydraulic capture of groundwater at the Site. As a result of the recent activation of the western leg of the

Well Point System, hydraulic capture of impacted groundwater is provided across the whole Site with the exception of the groundwater in the vicinity of the free-product plume at the Terminal Disposal Site. The contaminant loading evaluation described in Section 3.2.5 indicates that there is little to no potential for groundwater in this area to impact the Buffalo River.

As requested by NYSDEC and as discussed in Section 2.5, monitoring wells BTC-4 and BTC-5 in the Biotreatment Cell Area and MW-1URS in the Terminal Disposal Area were resampled for lead and TEL, and monitoring well NTY-T60 in the Northern Tank Yard/Former Refinery Area was resampled for hexavalent chromium and lead. Groundwater samples collected from all four locations contained lead at concentrations ranging from 0.007 mg/L in NTY-T60 to 0.167 mg/L in BTC-5. There were no detections of TEL or hexavalent chromium. A summary of metals detected in groundwater is provided in Table 8.

4.0 SUMMARY OF FINDINGS AND CONCLUSIONS

A summary of the key findings and conclusions of the initial SFI and SFI Continuation field program with respect to the Elk Street Lot, Terminal Disposal Site and Former Lube Building Area is provided in the following sections.

4.1 Elk Street Lot

The results of the initial SFI and SFI Continuation field program indicate that the concentrations of SVOCs and metals in soil exceed RSCOs across the entire Elk Street Lot and on the properties immediately north of the Elk Street Lot. However, the areal extent of the SVOCs exceeding Site Background is limited to the northeast corner of the Elk Street Lot; and, the vertical extent is from land surface to a depth of two feet below the layer of surficial material (e.g., concrete and brick fragments) present in this area. The groundwater quality data from the initial SFI indicate no impacts to groundwater quality beneath the Elk Street Lot.

Based upon the information summarized above, remedial alternatives will be developed and evaluated to address the northeast corner of the Elk Street Lot where SVOCs are present at concentrations exceeding Site Background. Remediation to achieve Site Background concentrations will eliminate all impacts potentially associated with Mobil's historical Site operations, including the historical discharge from Tank 60.

4.2 Buffalo Terminal Disposal Site

The results of the initial SFI and SFI Continuation field program indicate that the extent of free product has been delineated to the immediate vicinity of Monitoring Wells P-15, LF-1S and MW-3URS. During the SFI Continuation field program free product was not present in MW-3URS, however, this well is still shown to be within the area impacted by free product pending the results of future monitoring.

The three monitoring wells that contain or have contained free product, as well as the new wells not containing free product, will be incorporated into a routine interim free-product recovery program. The interim program will include use of appropriate methods (e.g., bailing and gauging, passive bailers, skimmers, etc.) to recover free product and collect additional data regarding temporal fluctuations in free-product occurrence and thickness, and sustainable freeproduct recovery rates. The frequency of the interim recovery efforts will be based upon the ability of the well to sustain free-product recovery. Results will be included in Quarterly Monitoring reports that are submitted to document ongoing remedial activities at the Site.

The results of the Contaminant Loading Evaluation indicate that the potential for the groundwater beneath the Terminal Disposal Site to impact aquatic life in the Buffalo River is negligible. Quarterly groundwater monitoring of the wells installed as part of the SFI and SFI Continuation field program will be performed to determine whether there are any temporal fluctuations or trends in groundwater quality and, in turn, to verify the conclusions of the Contaminant Loading Evaluation.

4.3 Former Lube Building

The results of the initial SFI and SFI Continuation field program indicate that free product extends from the western leg of the Well Point System on the south side of the Former Lube Building to north of the former truck loading rack on the north side of the Former Lube Building. East of the Former Lube Building, the free product extends onto the current terminal property and is co-mingled with other free product. West of the Former Lube Building, the data from Monitoring Well SB-13 and SB-17 indicate that the free product extends beneath Babcock Street. Monitoring wells installed on the west side of Babcock Street did not show evidence of free product.

Comparison of the Babcock Street sewer elevation with the free-product elevation in monitoring wells indicates that the free product layer was at or above the sewer invert elevation prior to activation of western leg of the Well Point System. Following activation of the western leg, groundwater and free-product elevations were lowered below the sewer invert and bedding material, with the exception of well SB-16.

A feasibility study of remedial alternatives to improve the recovery of free product beneath the Former Lube Building will be performed during the year 2000. During the performance of the feasibility study, interim free-product recovery efforts will be performed as previously described for the Terminal Disposal Site. In addition, as part of the feasibility study, it is anticipated that various types of recovery equipment will be tested; thereby, improving free-product recovery.

Soil quality in the area of the Former Lube Building and the truck loading rack has been impacted by historical activities. Concentrations of VOCs and SVOCs exceed the RSCOs as well as Site Background. The SFI Continuation Work Plan specified that an exposure assessment would be conducted to develop Site-specific criteria for soil at the Former Lube Building Area. Based upon the results of the investigation and the future remedial activities planned for the Former Lube Building Area, it is not appropriate to develop Site-specific criteria for soil at this time. Specifically, the feasibility study of free-product recovery alternatives and anticipated future pipe removal activities in this area will result in the collection of additional soil and groundwater characterization data that will be pertinent to the exposure assessment. Therefore, the conduct of the exposure assessment to develop Site-specific cleanup levels for soil and groundwater will be deferred until these data are collected and remedial alternatives for free-product recovery have been implemented.

Respectfully submitted,

ROUX ASSOCIATES, INC.

Noelle Clarke, P.E. Senior Engineer/ Project Manager

Andrew Baris Principal Hydrogeologist/ Project Principal

5.0 REFERENCES

- CDM, 1988. Draft RCRA Facility Assessment Report, CDM Federal Programs Corporation, November 30, 1988.
- McDonald, M.G. and Harbaugh, A.W., 1988. A modular three-dimensional finite-difference groundwater flow model. Techniques of Water-Resources Investigations of the United States Geological Survey. Book 6, Chapter A1.
- New York State Department of Environmental Conservation, 1992. Spill Technology and Remediation Series (STARS) Memo # 1, Petroleum-Contaminated Soil Guidance Policy, August 1992.
- New York State Department of Environmental Conservation, 1994. Division of Hazardous Waste Remediation. Division Technical and Administrative Guidance Memorandum: Determination of Soil Cleanup Objectives and Cleaning Levels, January 24, 1994.
- New York State Department of Environmental Conservation, 1996. Groundwater Monitoring Well Decommissioning Procedures, October 1996.
- New York State Department of Environmental Conservation, 1998. Division of Technical and Operational Guidance Series (1.1.1) Ambient Water Quality Standards and Guidance Values and Groundwater Effluent Limitations, June 1998.
- Roux Associates, Inc., 1998. Site Facility Investigation Report, Mobil Buffalo Terminal, November 25, 1998.
- Roux Associates, Inc., 1999a. June 3, 1999 letter to Mr. Tim Dieffenbach at the NYSDEC regarding the response to NYSDEC comments regarding SFI report.
- Roux Associates, Inc., 1999b. Work Plan for the Continuation of Site Facility Investigation, Mobil Buffalo Terminal, June 3, 1999.
- Roux Associates, Inc., 1999c. June 24, 1999 letter to Mr. Tim Dieffenbach at the NYSDEC regarding addendum to the response to NYSDEC comments regarding SFI report.
- Roux Associates, Inc., 1999d. July 1, 1999 letter to Mr. Tim Dieffenbach at the NYSDEC regarding acknowledgement and acceptance of NYSDEC clarifications regarding June 24, 1999 addendum to response for Mobil's Buffalo Terminal.
- Title 6, New York Code of Rules and Regulations (6NYCRR), Part 837.4.
- United States Geological Survey, 1999. Stream gauging data from Stations 04124500, 04215000 and 04125500 from the USGS web site "http://ny-usgs.gov/rt-cgi/gen_stn_pg."
- Woodward-Clyde, 1998. Site Facility Investigation Work Plan, Mobil Oil Corporation Buffalo Terminal. Revised February 2, 1998.

Table 1. Summary of Well Construction Details, Mobil Buffalo Terminal, Buffalo, New York.

Well			Measuring Point	Land Surface	Depth of	Depth of	Screen Interval	Screen Length	
Designation	Date Installed	Installer	Elevation (ft amsl)	Elevation (ft amsl)	Boring (ft bls)	Well (ft bls)	(ft bls)	(feet)	
LF-3	8/3/99	GES	596.17	594.1	36	36	16-36	20	
LF-4	8/5/99	GES	594.87	595.6	37	36	16-36	20	
LF-5	8/6/99	GES	597.62	595	37	37	17-37	20	
LF-6	8/13/99	GES	598.14	595.8	37	36	16-36	20	
LF-7	8/16/99	GES	598.28	596.1	38	38	18-38	20	
LF-8	8/17/99	GES	596.99	594.8	37	37	17-37	20	
SB-11/LB-1	7/2/99	GES	584.24	582.1	24	24	7-24	17	
SB-12	7/9/99	GES	582.74	583	21.5	18	3-18	15	
SB-13	7/27/99	GES	583.44	583.9	15	15	5-15	10	
SB-14	7/27/99	GES	584.79	582.8	23	23	5-23	18	
SB-15	7/27/99	GES	583.35	583.35	15	15	5-15	10	
SB-16	7/28/99	GES	583.81	584	17	17	5-17	12	
SB-17	7/28/99	GES	583.53	583.8	20	20	5-20	15	
SB-19	7/29/99	GES	583.13	583.8	20	20	5-20	15	
SB-20	7/29/99	GES	583.46	583.8	15	15	5-15	10	
SB-28	8/2/99	GES	588.13	585.3	15	15	5-15	10	
SB-31	8/5/99	GES	581.92	582.6	15	15	5-15	10	

Notes:

ft amsl = feet above mean sea level

ft bls = feet below land surface
		Measuring						
		Point	Depth to	Depth to	Product	Specific	Corrected	
Designation	Date	Elevation	Product (ft)	Water (ft)	Thickness (ft)	Gravity	Elevation	Comments
B-1MW	10/7/99	590.31		5.76			584.55	
B-2MW	10/7/99	588.45		6			582.45	sheen
B-3MW	10/7/99	586.82		4.78			582.04	
B-4MW	10/7/99	587.05		8.77			578.28	
B-5MW	10/7/99	587.82		4.6			583.22	
B-6MW	10/7/99	596.35		25.48			570.87	
ESI-1	10/7/99	586.69	20.06	21.44	1.38	0.8236	566.39	
ESI-2	10/7/99	586.5	17.78	19.75	1.97	0.8338	568.39	
ESI-3	10/7/99	588.32	22.11	22.12	0.01	0.8	566.21	
ESI-4	10/7/99	583.49		16.96			566.53	
ESI-5	10/7/99	586.97	13.15	13.51	0.36	0.856	573.77	
LF-1S	10/7/99	596.27	25.92	26.01	0.09	0.8	570.33	
LF-2D	10/7/99	581.83	20.72	12.79	0.07	0.0	569.04	
LF-2S	10/7/99	581.77		13.93			567.84	
LF-3	10/7/99	596.17		25.37			570.80	
LF-4	10/7/99	594.87		22.88			571.99	
LF-5	10/7/99	597.62		26.77			570.85	
LF-6	10/7/99	598.14		27.33			570.81	
LI-0 I F-7	10/7/99	598.28		27.35			570.88	
LT - 7 L F-8	10/7/00	596.20		27.4			570.82	
MW_1	10/7/00	582.13		15 75			566.38	
101 $W - 1$	10/7/00	594 79	12/11	16.7	4 20	0 7076	571.50	
MW-10	10/7/00	595.22	12.41	10.7	4.29	0.7970	560.80	
MW 12	10/7/00	596.69	13.43	13.43	0.02	0.828	5(7.2)	
MW-12	10/7/99	584.27	19.28	20.49	1.21	0.8811	507.20	
MW-13	10/7/99	584.57	10.72	0.74	2.59	0.0120	585.05	
MW-14	10/7/99	580.91	18.72	21.5	2.58	0.8128	567.71	
MW-15	10/7/99	580.65	17.8	18./3	0.93	0.8265	568.69	
MW-16	10/7/99	589.66		5.01			584.65	
MW-17	10/7/99	588.39	1(22	4.55	1.46	0.0010	583.84	
MW-18	10/7/99	582.88	16.33	17.79	1.46	0.8212	566.29	
MW-19	10/7/99	585.37	16.7	19.61	2.91	0.8294	568.17	
MW-IURS	10/7/99	594.82		14.62			580.20	
MW-2	10/7/99	583.09	1.5.00	16.26			566.83	
MW-20	10/7/99	585.97	17.88	18.99	1.11	0.8702	567.95	
MW-21	10/7/99	582.69		17.64			565.05	
MW-2URS	10/7/99	581.83		14.17			567.66	
MW-3	10/7/99	581.72		16.71			565.01	
MW-3URS	10/7/99	598.63		27.76		0.8822	570.87	
MW-4	10/7/99	586.01	9.29	11.77	2.48	0.8504	576.35	
MW-4URS	10/7/99	594.59		23.79			570.80	
MW-5	10/7/99	585.77	10.72	11.26	0.54	0.8922	574.99	
MW-5URS	10/7/99	595.36		14.84			580.52	
MW-6	10/7/99	585.99		16.86			569.13	film
MW-7	10/7/99	586.36	19.23			0.9593	NA	
MW-8	10/7/99	587.45	13.82	18.34	4.52	0.8017	572.73	
MW-9	10/7/99	588.5		4.94			583.56	
P-15	10/7/99	597.04	26.12	26.6	0.48	0.88	570.86	
RIVER	10/7/99	583.75		13.3			570.45	
RW-1	10/7/99	581.8	18.04	19.9	1.86	0.8	563.39	
RW-2	10/7/99	581.61	16.2	16.4	0.2	0.8	565.37	
RW-3	10/7/99	583.21	18.65	18.7	0.05	0.8	564.55	
RW-4	10/7/99	581.91	19.05	19.25	0.2	0.8433	562.83	

Table 2. Groundwater and Free-Product Measurements, Mobil Buffalo Terminal, Buffalo, New York.

		Measuring						
		Point	Depth to	Depth to	Product	Specific	Corrected	
Designation	Date	Elevation	Product (ft)	Water (ft)	Thickness (ft)	Gravity	Elevation	Comments
RW-5	10/7/99	581.98	17	17.1	0.1	0.8529	564.97	
RW-6	10/7/99	581.99		3.48			578.51	sheen
SB-10	10/7/99	582.13		10.35			571.78	
SB-11	10/7/99	584.24		19.49			564.75	
SB-12	10/7/99	582.74		17.76			564.98	
SB-13	10/7/99	583.44		14.02			569.42	
SB-14	10/7/99	584.79		21.83			562.96	
SB-15	10/7/99	583.35		13.44			569.91	film, I" of product on water in road box
SB-16	10/7/99	583.81	13.98	14.16	0.18	0.8	569.79	
SB-17	10/7/99	583.53	17.6	18.47	0.87	0.8	565.76	
SB-19	10/7/99	583.13		8.05			575.08	
SB-20	10/7/99	583.46	13.74	13.75	0.01	0.8	569.72	
SB-31	10/7/99	581.92		14.72			567.20	
SB-7	10/7/99	583.37	4.57	4.58	0.01	0.8	578.80	
W-1	10/7/99	595.98		18.31			577.67	

NA - Not applicable

Area:	Elk Street I	Lot							
Sample Designation:	ESL-1	ESL-2	ESL-3	ESL-4	ESL-5	ESL-6	ESL-7	ESL-8/ESL-W1	ESL-8/ESL-W1
Sample Date:	6/17/98	9/2/99	6/17/98	6/17/98	6/17/98	6/17/98	6/17/98	6/17/98	6/22/98
Sample Depth (ft bls):	0-0.5	0-0.5	0-0.5	0-0.5	0-0.5	0-0.5	0-0.5	0-0.5	8-10
Parameter									
(Concentrations in µg/kg)									
Acenaphthene	42J	36U	34 U	64.J	36J	37U	130J	38U	42 U
Acenaphthylene	58J	51J	68J	120J	190	160J	250	38U	42U
Anthracene	120J	96J	110J	320	230	180J	470	38U	42U
Benzo[a]anthracene	770	380	480	1300	780	410	1700	93J	42U
Benzo[a]pyrene	860	410	440	1200	800	400	1700	90J	42U
Benzo[b]fluoranthene	1200	530J	640	1600	980	570	2100	140J	42U
Benzo[g,h,i]perylene	720	350	330	800	550	280	970	77J	42U
Benzo[k]fluoranthene	420	210J	230	570	370	180J	760	45J	42U
Chrysene	850	430	450	1300	840	470	1800	110J	42U
Dibenzo[a,h]anthracene	170J	120J	99J	280	170J	82J	300	38U	42U
Fluoranthene	1700	740	790	2500	1300	680	3500	120J	42U
Fluorene	38J	36U	34U	100J	59J	45J	150J	38U	42U
Indeno[1,2,3-cd]pyrene	780	340	400	900	610	300	1100	77J	42U
Naphthalene	38U	36U	34U	100J	35U	110J	84J	160J	42U
Phenanthrene	970	400	240	1400	530	430	2000	140J	42U
Pyrene	1400	610	650	1900	1200	610	2800	130J	42U
TOTAL SVOCS	10098	4667	4927	14454	8645	4907	19814	1182	0

µg/kg - Micrograms per kilogram

U - The analyte was analyzed for, but not detected above the reported quantitation limit.

J - The analyte was positively identified: the associated numerical value is the approximate concentration of the analyte in the sample.

UJ - The analyte was not detected above the reported quantitation limit. However the reported quantitation limit may be biased.

NA - Not analyzed

Area:	Elk Street I	Lot								
Sample Designation:	ESL-9	ESL-10	ESL-11	ESL-12	ESL-13	ESL-13	ESL-13	ESL-14	ESL-14	ESL-14
Sample Date:	6/17/98	6/17/98	6/17/98	6/17/98	9/2/99	9/2/99	9/2/99	9/2/99	9/2/99	9/2/99
Sample Depth (ft bls):	0-0.5	0-0.5	0-0.5	0-0.5	0-0.5	1-2	2-3	0-0.5	1-2	2-3
Parameter										
(Concentrations in µg/kg)										
Acenanhthene	101 1	621	641	5300	1700 I	2100	350	7601	1600	61 I
A compatible and a compa	400 74 I	02J 78 I	110T	2500	1700J 0/01	1100	220	700J 400U	1000	4211
Anthracene	/4J 110 T	70J 270	220	2300	5500	5500	1100	2200 I	5100	420 1701
Benzo[a]anthracene	4301	930	760	69000	16000	16000	2500	6800	7700	510
Benzo[a]nvrene	450J 450 I	930 870	700	57000	13000	14000	2300	7000	6900	570
Benzo[h]fluoranthene	430J 59N I	1000	940	63000	15000	17000	2900	7600	8900	570 740
Benzo[g h i]pervlene	390J	550	520	30000	6500	5200	1000	4500	2400	440
Benzo[k]fluoranthene	200.1	410	310	26000	6300	5700	1200	3500	3800	260
Chrysene	2000 550.I	850	800	20000 59000	16000	16000	2600	6900	7800	200 560
Dibenzo[a h]anthracene	120J	170.I	150J	9200.1	2400	1700	340	1400	990.1	130.1
Fluoranthene	760.I	1700	1600	140000	29000	35000	4700	12000	16000	940
Fluorene	40U	70J	79.J	5600	2100	3100	540	830.1	3300	120J
Indeno[1 2 3-cd]nyrene	360.1	610	520	35000	8200	10000	1300	5100	3300	470
Nanhthalene	40 U	74J	520 76J	1200	720J	2300	330	400U	1200J	47.J
Phenanthrene	410.1	890	1000	69000	18000	26000	3800	7300	12000	530
Pyrene	670J	1400	1300	120000	28000	29000	4500	12000	13000	820
	0.00	1.00	1000	120000	20000	_> 300		12000	10000	
TOTAL SVOCS	5114	9934	9159	712800	169360	189700	29680	77890	100470	6338

µg/kg - Micrograms per kilogram

U - The analyte was analyzed for, but not detected above the reported quantitation limit.

J - The analyte was positively identified: the associated numerical value is the approximate concentration of the analyte in the sample.

UJ - The analyte was not detected above the reported quantitation limit. However the reported quantitation limit may be biased.

NA - Not analyzed

Area:	Elk Street	Lot									
Sample Designation:	ESL-15	ESL-15	ESL-15	ESL-16	ESL-16	ESL-16	ESL-17	ESL-17	ESL-17	ESL-18	ESL-18
Sample Date:	9/2/99	9/2/99	9/2/99	9/2/99	9/2/99	9/2/99	9/2/99	9/2/99	9/2/99	9/2/99	9/2/99
Sample Depth (ft bls):	0-0.5	1-2	2-3	0-0.5	1-2	2-3	0-0.5	1-2	2-3	0-0.5	1-2
Parameter											
(Concentrations in µg/kg)											
Acenaphthene	3400	950	170J	49J	36U	37U	110J	150J	37U	36U	38U
Acenaphthylene	410	500J	110J	110J	53J	37U	160J	300	37U	36U	38U
Anthracene	7400	2600	580	190	110J	37U	340	510	66J	44J	38U
Benzo[a]anthracene	18000	6700	2200	710	310	37U	1100	2000	150J	180	110J
Benzo[a]pyrene	13000	5500	1800	750	320	53J	1100	1800	130J	250	130J
Benzo[b]fluoranthene	14000J	7200	2200	1000	400	64J	1400J	2200J	130J	230J	120J
Benzo[g,h,i]perylene	4200	3200	910	600	290	49J	810	1100	73J	250	96J
Benzo[k]fluoranthene	13000J	3700	940	330	140J	37UJ	610J	970J	50J	74J	55J
Chrysene	20000	7200	2300	910	390	45J	1300	2200	180J	200	120J
Dibenzo[a,h]anthracene	2500	1000	330	180	96J	37U	250	380	37U	74J	38U
Fluoranthene	30000	15000	3900	1400	670	65J	2200	3200	260	280	150J
Fluorene	3400	1400	180J	74J	52J	37U	110J	170J	37U	36U	38U
Indeno[1,2,3-cd]pyrene	5200	3600	1100	630	290	43J	940	1300	69J	160J	84J
Naphthalene	1700	600J	90J	100J	58J	37U	52J	78J	37U	36U	38U
Phenanthrene	25000	11000	1600	790	510	43J	1400	1800	350	160J	45J
Pyrene	33000	13000	3500	1300	610	60J	1900	2900	340	270	140J
TOTAL SVOCS	194210	83150	21910	9123	4299	422	13782	21058	1798	2172	1050

 $\mu g/kg$ - Micrograms per kilogram

U - The analyte was analyzed for, but not detected above the reported quantitation limit.

J - The analyte was positively identified: the associated numerical value is the approximate concentration of the analyte in the sample.

UJ - The analyte was not detected above the reported quantitation limit. However the reported quantitation limit may be biased.

NA - Not analyzed

Area:	Elk Street	Lot						Terminal Disp	osal Site
Sample Designation:	ESL-18	ESL-19	ESL-19	ESL-19	ESL-20	ESL-20	ESL-20	LF-5	LF-7
Sample Date:	9/2/99	9/2/99	9/2/99	9/2/99	9/2/99	9/2/99	9/2/99	8/6/99	8/16/99
Sample Depth (ft bls):	2-3	0-0.5	1-2	2-3	0-0.5	1-2	2-3	21-23	21-23
Parameter									
(Concentrations in µg/kg)									
A 1.1	2011		2011	2011	4177	4011	4011	4011	4211
Acenaphthene	38U 2011	33J 120 I	390	390	410	420	400	420	430
Acenaphthylene	380	130J	390	390	53J	420	400	NA	430
Anthracene	380	300	390	390	110J	420	400	420	430
Benzo[a]anthracene	38U	1400	390	390	490	120J	40U	42UJ	44J
Benzo[a]pyrene	38U	1300	39U	39U	420	170J	40U	42U	43U
Benzo[b]fluoranthene	38U	1500J	39 U	39U	560J	130J	50J	42U	53J
Benzo[g,h,i]perylene	38U	1000	39U	39U	400	150J	40U	42U	43U
Benzo[k]fluoranthene	38U	1200J	39U	39U	410J	100J	40UJ	42U	43U
Chrysene	38U	1800	39 U	39U	630	170J	40U	42UJ	46J
Dibenzo[a,h]anthracene	38U	530	39U	39U	190J	42J	40U	42U	43U
Fluoranthene	38U	2100	40J	39U	650	110J	40U	42U	91J
Fluorene	38U	100J	39U	39U	41U	42U	40U	42U	43U
Indeno[1,2,3-cd]pyrene	38U	910	39U	39U	350	93J	40U	42U	43U
Naphthalene	38U	42J	39U	39U	41U	42U	40U	42U	43U
Phenanthrene	38U	1400	39U	39U	450	79J	40U	42U	66J
Pyrene	38U	2500	42J	39 U	1000	200J	45J	42UJ	74J
TOTAL SVOCS	0	16267	82	0	5713	1364	95	0	374

 $\mu g/kg$ - Micrograms per kilogram

U - The analyte was analyzed for, but not detected above the reported quantitation limit.

J - The analyte was positively identified: the associated numerical value is the approximate concentration of the analyte in the sample.

UJ - The analyte was not detected above the reported quantitation limit. However the reported quantitation limit may be biased.

NA - Not analyzed

Area: F	Former Lube	Building							
Sample Designation:	SB-7	SB-7	SB-8	SB-8	SB-9	SB-9	SB-10	SB-10	SB-11/LB-1
Sample Date:	6/26/98	6/26/98	6/26/98	6/26/98	6/26/98	6/26/98	6/26/98	6/26/98	7/1/99
Sample Depth (ft bls):	0-2	8-10	0-2	10-12	0-2	10-12	0-2	8-10	18-20
Parameter									
(Concentrations in µg/kg)									
Acenaphthene	5300	24000	35U	90.J	190.J	44 U	2100U	2000	130J
Acenaphthylene	710U	4300	35U	45U	39 U	44U	2100U	580	38UJ
Anthracene	10000	46000	47J	230	300	44U	3200J	750	100J
Benzofalanthracene	12000	45000	180J	160J	890	44U	13000	920	100J
Benzo[a]pyrene	10000	41000	220	66J	1300	44U	20000	1100	38UJ
Benzo[b]fluoranthene	12000	42000	310J	45U	1200	44U	13000	560	38UJ
Benzo[g,h,i]perylene	4400	18000	93J	45U	1700	44U	2100U	680	38UJ
Benzo[k]fluoranthene	4000	17000	93J	45U	360	44U	3600J	95J	38UJ
Chrysene	11000	41000	300	270	1100	44U	17000	1400	120J
Dibenzo[a,h]anthracene	1500J	5000	35UJ	45U	550	44U	2100U	240	38UJ
Fluoranthene	25000	130000	350	100J	1800	44U	14000	810	180J
Fluorene	7400	39000	35U	140J	130J	44U	2900J	2500	370J
Indeno[1,2,3-cd]pyrene	5100	21000	60J	45U	1000	44U	6600J	320	38UJ
Naphthalene	3100J	37000	35 U	45U	170J	44U	2100U	770	38UJ
Phenanthrene	27000	180000	280	130J	1700	44U	13000	7500	190J
Pyrene	22000	110000	410	600	1800	44U	36000	2800	310J
TOTAL SVOCS	159800	800300	2343	1786	14190	0	142300	23025	1500

 $\mu g/kg$ - Micrograms per kilogram

- U The analyte was analyzed for, but not detected above the reported quantitation limit.
- J The analyte was positively identified: the associated numerical value is the approximate concentration of the analyte in the sample.
- UJ The analyte was not detected above the reported quantitation limit. However the reported quantitation limit may be biased.

NA - Not analyzed

Area: I	Former Lub	e Building								
Sample Designation:	SB-13	SB-14	SB-15	SB-16	SB-17	SB-17	SB-18	SB-18	SB-19	SB-20
Sample Date:	7/27/99	7/26/99	7/27/99	7/28/99	7/28/99	7/28/99	7/29/99	7/29/99	7/29/99	7/29/99
Sample Depth (ft bls):	11-13	13-15	11-13	11-13	0-0.5	11-13	0-0.5	11-13	7-9	3-4
Parameter										
(Concentrations in µg/kg)										
Acenaphthene	3000	290	1600	1700	61J	1500	5200	850	8100	450
Acenaphthylene	210U	NA	510J	1500J	NA	410UJ	1800J	240J	2400J	100J
Anthracene	16000	250	1200	1500	180	1400	2200	640	6200	94J
Benzo[a]anthracene	1200	170U	500	880	510	560	1800	260U	4400	140U
Benzo[a]pyrene	470U	140U	220U	370U	510	270	1700	140U	3800	160U
Benzo[b]fluoranthene	310U	170U	190U	270U	490U	170U	1700	89U	3400	180U
Benzo[g,h,i]perylene	290U	130U	140U	260U	440	170U	430U	40U	430U	35U
Benzo[k]fluoranthene	210U	68U	120U	260U	190U	43U	530	40U	1000	52U
Chrysene	1700J	220U	720J	1200J	490U	900J	2400	440	6500	170U
Dibenzo[a,h]anthracene	210U	48 J	120U	260U	150	93J	430U	40U	910	35U
Fluoranthene	210U	360U	740U	780U	700U	680U	3900	290U	8800	280U
Fluorene	5300	480U	2700	2800	210U	2300	6800	1200	17000	650U
Indeno[1,2,3-cd]pyrene	210U	140U	120U	260U	340U	110U	1100	40U	2100	87U
Naphthalene	3500	72J	1700	990	310	1500	4700	340	1800	140J
Phenanthrene	210U	990U	9000	10000	580U	8000	16000	4500	27000	1600
Pyrene	3100J	380U	1500J	2600J	940U	1900J	5600	1100	16000	700U
TOTAL SVOCS	33800	660	19430	23170	2161	18423	55430	9310	109410	2384

 $\mu g/kg$ - Micrograms per kilogram

U - The analyte was analyzed for, but not detected above the reported quantitation limit.

J - The analyte was positively identified: the associated numerical value is the approximate concentration of the analyte in the sample.

UJ - The analyte was not detected above the reported quantitation limit. However the reported quantitation limit may be biased.

NA - Not analyzed

Area: F	ormer Lube	Building							
Sample Designation:	SB-20	SB-24	SB-24	SB-27	SB-27	SB-28	SB-28	SB-30	SB-30
Sample Date:	7/29/99	8/4/99	8/2/99	8/4/99	8/3/99	8/4/99	8/3/99	8/6/99	8/5/99
Sample Depth (ft bls):	9-11	0-0.5	13-15	0-0.5	11-13	0-0.5	11-13	0-0.5	9-11
Parameter									
(Concentrations in µg/kg)									
Acenaphthene	10000	90J	44U	99J	280	3000	42U	43U	42U
Acenaphthylene	2400J	NA	NA	NA	NA	NA	NA	NA	NA
Anthracene	4000	230	44U	350	570	5000	62J	43U	42U
Benzo[a]anthracene	2700	670	44U	1100	560U	9900	42U	43U	42U
Benzo[a]pyrene	1700	860	44U	1100	280U	10000	42U	43U	42U
Benzo[b]fluoranthene	920	1300	44U	1600	190U	13000	42U	43U	42U
Benzo[g,h,i]perylene	1000	670	44U	840	180U	5600	42U	43U	42U
Benzo[k]fluoranthene	540U	420	44U	660	41U	5200	42U	43U	42U
Chrysene	5300	810	47U	1400	550U	12000	55U	43U	42U
Dibenzo[a,h]anthracene	540U	290	44U	260	99J	1700	42U	43U	42U
Fluoranthene	2400	770J	44U	2400	480U	19000	57U	43U	42U
Fluorene	13000	140J	44U	130J	470U	4400	50U	43U	42U
Indeno[1,2,3-cd]pyrene	540 U	530	44U	910	82U	6500	42U	43U	42U
Naphthalene	22000	300	44U	180	41U	3800	42U	43U	42U
Phenanthrene	41000	830J	64U	1600	660U	20000	200U	55U	42U
Pyrene	9300	1700	190U	2400	1700	20000	140U	50U	42U
TOTAL SVOCS	115720	9610	0	14899	2649	139100	62	0	0

µg/kg - Micrograms per kilogram

- U The analyte was analyzed for, but not detected above the reported quantitation limit.
- J The analyte was positively identified: the associated numerical value is the approximate concentration of the analyte in the sample.
- UJ The analyte was not detected above the reported quantitation limit. However the reported quantitation limit may be biased.

NA - Not analyzed

	Area:	Elk Street L	ot								
	Sample Designation:	ESL-1	ESL-2	ESL-3	ESL-4	ESL-5	ESL-6	ESL-7	ESL-8/ESL-W1	ESL-8/ESL-W1	ESL-9
	Sample Date:	6/17/98	6/17/98	6/17/98	6/17/98	6/17/98	6/17/98	6/17/98	6/17/98	6/22/98	6/17/98
	Sample Depth (ft bls):	0-0.5	0-0.5	0-0.5	0-0.5	0-0.5	0-0.5	0-0.5	0-0.5	8-10	0-0.5
Parameters											
(Concentratio	ons in mg/kg)										
Cadmium		1.81	1.04	0.36	0.96	0.92	1.31	2.7	1.76	3.8J	1.36
Chromium		838	15.9	73.7	15.3	35.5	24.8	32.6	26.6	19.4J	14.9
Lead		85.6	129	25.7	333	130	232	723	324	11.9EJ	169
Mercury		0.0755	0.33	0.0381	0.38	0.18	0.0257	1.38	0.0658	0.0202	0.31
Nickel		12	20.1	7.8	13.1	16.9	12.4	27	15.7	35.6	16.6
Selenium		1.4	0.41	0.37U	1.2	0.39U	1.02	1.8	1.7	0.46UJ	1.2
Thallium		12.9	1.39	1.94	1.1	1.43	1.97	1.77	1.54	2.01	0.92
Vanadium		300	15.3	27.7	15.5	22.7	18.9	28.4	27.6	21.7	18.2

Notes:

mg/kg - Milligrams per kilogram

- J The analyte was positively identified: the associated numerical value is the approximate concentration of the analyte in the sample.
- UJ The analyte was not detected above the reported quantitation limit. However the reported quantitation limit may be biased.
- NA Not analyzed
- Bold Analyte detected

	Area:	Elk Street I	Lot										
	Sample Designation:	ESL-10	ESL-11	ESL-12	ESL-13	ESL-13	ESL-13	ESL-14	ESL-14	ESL-14	ESL-15	ESL-15	ESL-15
	Sample Date:	6/17/98	6/17/98	6/17/98	9/2/99	9/2/99	9/2/99	9/2/99	9/2/99	9/2/99	9/2/99	9/2/99	9/2/99
	Sample Depth (ft bls):	0-0.5	0-0.5	0-0.5	0-0.5	1-2	2-3	0-0.5	1-2	2-3	0-0.5	1-2	2-3
Parameters													
(Concentratio	ons in mg/kg)												
Cadmium		1.49	9.7	2.6	0.056U	0.06U	0.057U	0.061U	0.065U	0.52	2.64	0.06U	0.058U
Chromium		22.6	32.7	21.1	31.2	22.8	30.1	28.1	24.4	14.7	27.1	24.7	14.9
Lead		214	625	164	1410	533	44.2	652	1620	491	704	514	324
Mercury		0.57	2.04	0.6	2.54	0.41	0.0998	1.56	0.83	0.0983	1.59	1.09	0.13
Nickel		22.8	31.8	29.6	23.6	18.2	35	24.3	23.3	13	18	20.5	16.5
Selenium		0.47	2.1	0.6	5.2	2.8	0.46U	1.4	3.6	0.5 U	0.47	2.9	0.47U
Thallium		2.6	2.3	4.2	0.75U	2.4	2.3	0.81U	3.6	0.83U	0.75U	1.96	1.37
Vanadium		37.8	26.4	18.3	32	29.4	34	58.6	35.5	17.9	41.6	29.3	25.5

Notes:

mg/kg - Milligrams per kilogram

- J The analyte was positively identified: the associated numerical value is the approximate concentration of the analyte in the sample.
- UJ The analyte was not detected above the reported quantitation limit. However the reported quantitation limit may be biased.
- NA Not analyzed
- Bold Analyte detected

	Area:	Elk Street	Lot										
	Sample Designation:	ESL-16	ESL-16	ESL-16	ESL-17	ESL-17	ESL-17	ESL-18	ESL-18	ESL-18	ESL-19	ESL-19	ESL-19
	Sample Date:	9/2/99	9/2/99	9/2/99	9/2/99	9/2/99	9/2/99	9/2/99	9/2/99	9/2/99	9/2/99	9/2/99	9/2/99
	Sample Depth (ft bls):	0-0.5	1-2	2-3	0-0.5	1-2	2-3	0-0.5	1-2	2-3	0-0.5	1-2	2-3
Parameters													
(Concentratio	ons in mg/kg)												
Cadmium		4.94	0.056U	0.054U	0.28U	0.058U	0.055U	2.3	0.058U	0.057U	6.89	0.058U	0.059U
Chromium		26.7	16.1	18.2	87.3	32.8	14.7	14.5	19.4	20.1	119	24.6	25.4
Lead		449	261	30.3	552	294	16.5	112	33.5	31.1	1610	27.1	34
Mercury		0.71	0.92	0.0676	0.82	0.45	0.025	0.12	0.0589	0.0339	1.41	0.0778	0.0391
Nickel		30.4	16.3	27.8	41	31.5	23.4	17.2	22.8	33.6	24.2	27.2	35.1
Selenium		1.5	1.2	0.44U	10.2	4.4	0.44U	0.5	1.12	0.46U	2	0.47U	0.47U
Thallium		0.74U	1.08	1.6	36	4.8	1.02	0.73U	1.51	0.76U	0.8U	0.96	1.5
Vanadium		32.9	20.3	24.5	88	30.6	18.7	19.1	27.2	24.4	47.1	26.6	27.9

Notes:

mg/kg - Milligrams per kilogram

- J The analyte was positively identified: the associated numerical value is the approximate concentration of the analyte in the sample.
- UJ The analyte was not detected above the reported quantitation limit. However the reported quantitation limit may be biased.
- NA Not analyzed
- Bold Analyte detected

	Area:	Elk Street	Lot		Terminal Disposal Site	Former Lu	be Building				
	Sample Designation:	ESL-20	ESL-20	ESL-20	LF-7	SB-7	SB-7	SB-8	SB-8	SB-9	SB-9
	Sample Date:	9/2/99	9/2/99	9/2/99	8/16/99	6/26/98	6/26/98	6/26/98	6/26/98	6/26/98	6/26/98
	Sample Depth (ft bls):	0-0.5	1-2	2-3	21-23	0-2	8-10	0-2	10-12	0-2	10-12
Parameters											
(Concentratio	ons in mg/kg)										
Cadmium		0.62U	0.64	0.062U	0.066U	0.91	0.38	0.24	0.35	0.44	0.36
Chromium		985	197	57.2	15J	14.3J	11.1J	10.4J	15.1J	13.9J	16.2J
Lead		676	134	48.1	18.1	48.9	12.1	70.6	12.1	73.7	12
Mercury		0.91	0.27	0.0356	0.0384	0.17	0.0381U	0.0365U	0.053U	0.0897	0.0304U
Nickel		28.7	21.4	35.8	22.6	11.5U	16.6U	12.9U	29.3U	24.6U	29.4U
Selenium		5U	1.3	0.5U	0.53UJ	0.39U	0.45U	0.38U	0.49U	0.44U	0.49U
Thallium		13.5	3	2.04	4.1	0.79U	0.9U	0.77U	1U	0.94	1U
Vanadium		266	72.1	38.7	23.2	11.7	17.3	18	19	28.8	21.1

Notes:

mg/kg - Milligrams per kilogram

U - The analyte was analyzed for, but not detected above the reported quantitation limit.

J - The analyte was positively identified: the associated numerical value is the approximate concentration of the analyte in the sample.

UJ - The analyte was not detected above the reported quantitation limit. However the reported quantitation limit may be biased.

NA - Not analyzed

	Area:	Former Lu	be Building									
	Sample Designation:	SB-10	SB-10	SB-11/LB-1	SB-13	SB-14	SB-15	SB-16	SB-17	SB-17	SB-18	SB-18
	Sample Date:	6/26/98	6/26/98	7/1/99	7/27/99	7/26/99	7/27/99	7/28/99	7/28/99	7/28/99	7/29/99	7/29/99
	Sample Depth (ft bls):	0-2	8-10	16-18	11-13	13-15	11-13	11-13	0-0.5	11-13	0-0.5	11-13
Parameters												
(Concentratio	ons in mg/kg)											
Cadmium		1.01	0.34	0.65	0.062U	0.13	0.058U	0.6	0.26	0.061U	0.065U	0.06U
Chromium		12.4J	13.1J	6.3J	11.7	11.8	14.3	21.4	14.9	18.1	18.3	16.5
Lead		2380	34.9	10.2	20.2	16	10.3	584	77.2	10.5	57.5	9.1
Mercury		0.46	0.0417U	0.0089	0.0113	0.0156	0.0233	3.33	0.18	0.03	0.0343	0.0112
Nickel		14.8U	22.1U	11.2	14.3	19	17.7	20.6	22.1	22.6	31.2	19.5
Selenium		0.46U	0.47U	0.48U	0.5U	0.53U	0.47U	16.9	0.76	0.49U	1.03	0.49U
Thallium		0.91U	0.94U	0.79U	0.82U	0.88U	0.77U	1U	0.79U	0.82U	0.87U	0.81U
Vanadium		14.6	20.6	8.5	17.4	16.1	17.2	36.8	24.5	24.8	35.3	22.7

mg/kg - Milligrams per kilogram

- J The analyte was positively identified: the associated numerical value is the approximate concentration of the analyte in the sample.
- UJ The analyte was not detected above the reported quantitation limit. However the reported quantitation limit may be biased.
- NA Not analyzed
- Bold Analyte detected

	Area:	Former Lul	be Building									
	Sample Designation:	SB-19	SB-20	SB-20	SB-24	SB-24	SB-27	SB-27	SB-28	SB-28	SB-30	SB-30
	Sample Date:	7/29/99	7/29/99	7/29/99	8/2/99	8/4/99	8/3/99	8/4/99	8/3/99	8/4/99	8/5/99	8/6/99
	Sample Depth (ft bls):	7-9	3-4	9-11	13-15	0-0.5	11-13	0-0.5	11-13	0-0.5	9-11	0-0.5
Parameters												
(Concentratio	ons in mg/kg)											
Cadmium		0.066U	0.053U	0.081U	1.05	0.063U	0.062U	0.66	0.064U	0.062U	0.064U	0.58
Chromium		14.1	7.7	15.8	14.6	28	10.8	34.7	23.6	114	15.8	23.4
Lead		46.1	20.1	5800	12.5	188	34.1	377	14.8	299	15.6	38.1
Mercury		0.0909	0.0313	0.17	0.0062U	3.9	0.0607	0.8	0.0226	0.32	0.0879	0.64
Nickel		26.8	9.3	30	39.1	21.8	42.6	16.3	35.1	30.2	29.3	39.5
Selenium		1.3	0.43U	1.36	0.53U	6.5	0.5U	2.8U	0.54	2.9	0.51U	3
Thallium		0.88U	0.71U	1.1U	0.88U	1.86	0.83U	4.6U	0.85U	1.26	0.85U	1.31
Vanadium		27.5	13.8	27.1	19.4	47.8	16.7	46	30.4	47.5	21.3	35

Notes:

mg/kg - Milligrams per kilogram

- J The analyte was positively identified: the associated numerical value is the approximate concentration of the analyte in the sample.
- UJ The analyte was not detected above the reported quantitation limit. However the reported quantitation limit may be biased.
- NA Not analyzed
- Bold Analyte detected

Area:	Elk Street	Lot			Terminal Disp	osal Site	Former Lube Bu	uilding
Sample Designation:	ESL-4	ESL-8/ESL-W1	ESL-8/ESL-W1	ESL-12	LF-5	LF-7	SB-7	SB-7
Sample Date:	6/22/98	6/22/98	6/22/98	6/22/98	8/6/99	8/16/99	6/26/98	6/26/98
Sample Depth (ft bls):	1.5-2	1.5-2	8-10	1.5-2	21-23	21-23	0-2	8-10
Parameter								
(Concentration in µg/kg)								
Benzene	5.5U	5U	5U	5.2U	5U	5.2U	110U	240
Toluene	18J	9.1J	5U	5.2U	5U	5.2U	110U	46
Ethylbenzene	7.2J	8.5J	5U	5.2U	5U	5.2U	110U	97
Xylenes (total)	35J	24	10U	10U	10U	10U	1700	160
TOTAL BTEX	60.2	41.6	0	0	0	0	1700	543
1,2,4-Trimethylbenzene	29J	27	5U	5.2U	5U	5.2U	5200	220
1,3,5-Trimethylbenzene	7.9J	6.3J	5U	5.2U	5U	5.2U	2200	93
Cumene	7.5J	5U	5U	5.2U	5U	5.2U	430U	500
MTBE	5.5U	5U	5U	5.2U	5U	5.2U	110U	5U
n-Butylbenzene	8.2J	12J	5U	5.2U	5U	5.2U	8600	700
n-Propylbenzene	8J	7.1J	5U	5.2U	5U	5.2U	3000	400
Naphthalene	51UJ	42	5U	12U	5U	5.2U	2100U	1300
o-Xylene	30J	12J	5U	5.2U	5U	5.2U	450	140
p-Isopropyltoluene	5.5U	6.9J	5U	5.2U	5U	5.2U	11000U	550
sec-Butylbenzene	5.6J	5U	5U	5.2U	5U	5.2U	7800	570
tert-Butylbenzene	5.5U	5U	5U	5.2U	5U	5.2U	7300	330
Total VOCS	156.4	154.9	0	0	0	0	36250	5346

 $\mu g/kg$ - Micrograms per kilogram

U - The analyte was analyzed for, but not detected above the reported quantitation limit.

J - The analyte was positively identified: the associated numerical value is the approximate concentration of the analyte in the sample.

UJ - The analyte was not detected above the reported quantitation limit. However the reported quantitation limit may be biased.

NA - Not analyzed

Area: H	Former Lube	Building								
Sample Designation:	SB-8	SB-8	SB-9	SB-9	SB-10	SB-10	SB-11/LB-1	SB-13	SB-14	SB-15
Sample Date:	6/26/98	6/26/98	6/26/98	6/26/98	6/26/98	6/26/98	7/1/99	7/27/99	7/26/99	7/27/99
Sample Depth (ft bls):	0-2	10-12	0-2	10-12	0-2	8-10	18-20	11-13	13-15	11-13
Parameter										
(Concentration in µg/kg)										
Benzene	4 211	23.I	4 7U	13U	34	750	120	2500	780	2300
Toluene	7.5J	13U	14	27.J	40	300	180	2500	220	680
Ethylbenzene	4.2U	76	4.7U	170	24	740	610	8200	1400	5100
Xylenes (total)	11U	120	16U	480	170	2200	830	22000	730	3500
TOTAL BTEX	7.5	219	14	677	268	3990	1740	35200	3130	11580
1,2,4-Trimethylbenzene	8.7J	580	16	1100	150	3100	2400	18000	1100	11000
1,3,5-Trimethylbenzene	5.1J	300	4.9J	680	100	4900	1500	9100	980	8600
Cumene	5.3J	520	4.7U	1700	78	12000	2800	20000	1900	11000
MTBE	4.2U	13U	4.7U	13U	5U	25U	23U	120U	130U	1500
n-Butylbenzene	10J	850	6.5J	2700	130	7800	3400	24000	3100	18000
n-Propylbenzene	4.2U	220	5J	13U	29	4100	1300	15000	2400	12000
Naphthalene	28	2000	20	4600	180	9600	2600	33000	1300	23000
o-Xylene	5.3J	47	11J	210	39	500	300	7200	360	1900
p-Isopropyltoluene	4.2U	130U	4.9J	1800	62	13000	2300U	20000	1300U	13000
sec-Butylbenzene	4.8J	670	5.9J	520U	75	7600	2500J	12000	1500	7400
tert-Butylbenzene	4.2U	550	4.7U	1700	45	7000	2400	11000	1300	7100
Total VOCS	74.7	5956	88.2	15167	1156	73590	20940	204500	17070	126080

µg/kg - Micrograms per kilogram

- U The analyte was analyzed for, but not detected above the reported quantitation limit.
- J The analyte was positively identified: the associated numerical value is the approximate concentration of the analyte in the sample.
- UJ The analyte was not detected above the reported quantitation limit. However the reported quantitation limit may be biased.
- NA Not analyzed
- Bold Analyte detected

Area:	Former Lub	e Building								
Sample Designation:	SB-16	SB-17	SB-17	SB-18	SB-18	SB-19	SB-20	SB-20	SB-24	SB-24
Sample Date:	7/28/99	7/28/99	7/28/99	7/29/99	7/29/99	7/29/99	7/29/99	7/29/99	8/2/99	8/4/99
Sample Depth (ft bls):	11-13	0-0.5	11-13	0-0.5	11-13	7-9	3-4	9-11	13-15	0-0.5
Parameter										
(Concentration in µg/kg)										
Benzene	3000	170	1200	2000	520	26U	91	12000	5 3U	8.7
Toluene	430	28	220	520	130	79	24	7500	5 3U	23
Ethylbenzene	1600	43	1200	3200	820	200	73	14000	5.3U	13
Xylenes (total)	1800	170	2300	3400	1700	1600	250	60000	11U	40
TOTAL BTEX	6830	411	4920	9120	3170	1879	438	93500	0	84.7
1,2,4-Trimethylbenzene	2500	350	6300	4100	8400	1600	340	95000	5.3U	100
1,3,5-Trimethylbenzene	1300	210	2600	5200	2800	1400	180	37000	5.3U	97
Cumene	5500	53	5200	12000	3800	4100	360	12000	5.3U	79
MTBE	30U	4.7U	24U	51U	48U	26U	4.2U	320U	12	5U
n-Butylbenzene	13000	290	6700	14000	6400	4900	400	49000	5.3U	180
n-Propylbenzene	17000	41	4700	7400	3600	1300	220	39000	5.3U	63
Naphthalene	20000	240	8800	26000U	7800	12000	530	31000	5.3U	310
o-Xylene	960	84	980J	1200	1300	360	91	20000	5.3U	73
p-Isopropyltoluene	3000U	120U	6100U	26000U	5100	2600U	210U	11000	5.3U	88
sec-Butylbenzene	8200	55	3500	8100	2700	5500	190	16000	5.3U	76
tert-Butylbenzene	4000	66	3500							
Total VOCS	79290	1800	47200	61120	45070	33039	2749	403500	12	1150.7

 $\mu g/kg$ - Micrograms per kilogram

U - The analyte was analyzed for, but not detected above the reported quantitation limit.

J - The analyte was positively identified: the associated numerical value is the approximate concentration of the analyte in the sample.

UJ - The analyte was not detected above The reported quantition limit. However The reported quantitation limit may be biased.

NA - Not analyzed

Area: F	Former Lube	e Building				
Sample Designation:	SB-27	SB-27	SB-28	SB-28	SB-30	SB-30
Sample Date:	8/3/99	8/4/99	8/3/99	8/4/99	8/5/99	8/6/99
Sample Depth (ft bls):	11-13	0-0.5	11-13	0-0.5	9-11	0-0.5
Parameter						
(Concentration in µg/kg)						
Benzene	4 9 11	5 4U	511	2511	5 111	5 211
Toluene	6.2	7.8	5U	57	5.1U	5.20 5.2U
Ethylbenzene	27	5.8	5U	390	5.1U	5.2U
Xylenes (total)	97	35	10U	4200	10U	10U
TOTAL BTEX	130.2	48.6	0	4647	0	0
1,2,4-Trimethylbenzene	180	38U	5U	12000	5.1U	6.5U
1,3,5-Trimethylbenzene	110	15	5U	4900	5.1U	5.2U
Cumene	350	7.5	5U	2100	5.1U	5.2U
MTBE	4.9U	5.4U	5U	25U	5.1U	5.2U
n-Butylbenzene	300	16U	5U	7100	5.1U	5.2U
n-Propylbenzene	92	9.3U	5U	770	5.1U	5.2U
Naphthalene	660	47U	25U	7300	5.1U	8.6U
o-Xylene	27	9.2	5U	330	5.1U	5.2U
p-Isopropyltoluene	270	9.7	5U	1800	5.1U	5.2U
sec-Butylbenzene	290	7.1	5U	1200	5.1U	5.2U
tert-Butylbenzene						
Total VOCS	2409.2	97.1	0	42147	0	0

µg/kg - Micrograms per kilogram

- U The analyte was analyzed for, but not detected above the reported quantitation limit.
- J The analyte was positively identified: the associated numerical value is the approximate concentration of the analyte in the sample.
- UJ The analyte was not detected above The reported quantitation limit. However The reported quantitation limit may be biased.
- NA Not analyzed
- Bold Analyte detected

Area:	Terminal D	isposal Site							
Sample Designation: Sample Date:	LF-3 8/23/99	LF-3 9/28/99	LF-3 DUP 9/28/99	LF-4 8/23/99	LF-4 9/28/99	LF-5 8/25/99	LF-5 9/28/99	LF-6 8/25/99	LF-6 9/28/99
Parameter									
(Concentrations in µg/L)									
Benzene	45	50J	56	0.2U	0.2U	0.2U	0.2U	83	80
Toluene	0.7	0.6J	0.7	0.2U	0.2U	0.2U	0.2U	2	2.3
Ethylbenzene	0.2U	0.2UJ	0.2U	0.2U	0.2U	0.3	0.2U	1U	0.2U
Xylenes (total)	2U	0.5J	0.4U	0.6U	0.4U	0.6U	0.4U	3U	0.5
TOTAL BTEX	45.7	51.1	56.7	0	0	0.3	0	85	82.8
1,2,4-Trimethylbenzene	NA	0.2J	0.3	NA	0.2U	NA	0.2U	NA	0.3
1,3,5-Trimethylbenzene	NA	0.2J	0.2	NA	0.2U	NA	0.2U	NA	0.2U
Cumene	NA	7.7J	7	NA	0.2U	NA	0.2U	NA	1.8
MTBE	NA	26J	24	NA	4.7	NA	5.5	NA	4.6
n-Butylbenzene	NA	11J	9.3	NA	0.2U	NA	0.2U	NA	2.3
n-Propylbenzene	NA	10J	9.6	NA	0.2U	NA	0.2U	NA	2.7
Naphthalene	NA	5UJ	1.9	NA	0.2U	NA	0.2U	NA	0.5
o-Xylene	NA	0.4J	0.4	NA	0.2U	NA	0.2U	NA	0.2U
p-Isopropyltoluene	NA	1UJ	0.2U	NA	0.2U	NA	0.2U	NA	0.2U
sec-Butylbenzene	NA	7.2J	6.5	NA	0.2U	NA	0.2U	NA	1.7
Total VOCS	45.7	113.8	57.3	0	4.7	0.3	5.5	85	96.7

µg/L - Micrograms per liter

- U The analyte was analyzed for, but not detected above the reported quantitation limit.
- J The analyte was positively identified: the associated numerical value is the approximate concentration of the analyte in the sample.
- UJ The analyte was not detected above the reported quantitation limit. However the reported quantitation limit may be biased.
- NA Not analyzed
- Bold Analyte detected

	Area:	Ferminal Dis	sposal Site			Former Lube Bu	ilding			
Sample	Designation:	LF-7	LF-7	LF-8	LF-8	SB-11/LB-1	SB-11/LB-1	SB-12	SB-14	SB-14
S	Sample Date:	8/25/99	9/28/99	8/25/99	9/28/99	8/23/99	09/28/99	8/23/99	8/23/99	9/28/99
Parameter										
(Concentrations in µg/L)										
Benzene		0.2U	0.2U	0.2U	0.2U	46	8	6	10	14
Toluene		0.2U	0.2U	0.2U	0.2U	17	2U	1U	3	1.2
Ethylbenzene		0.2U	0.2U	0.2U	0.2U	15	5.6	1	6	1.3
Xylenes (total)		0.6U	0.4U	0.6U	0.4U	50U	4U	3U	5	2.6
TOTAL BTEX		0	0	0	0	78	13.6	7	24	19.1
1,2,4-Trimethylbenzene		NA	0.2U	NA	0.2U	NA	2U	NA	NA	1.4
1,3,5-Trimethylbenzene		NA	0.2U	NA	0.2U	NA	2U	NA	NA	1.9
Cumene		NA	0.2U	NA	0.2U	NA	5	NA	NA	2.8
MTBE		NA	1.1	NA	0.2U	NA	2U	NA	NA	8.4
n-Butylbenzene		NA	0.2U	NA	0.2U	NA	14	NA	NA	4.8
n-Propylbenzene		NA	0.2U	NA	0.2U	NA	16	NA	NA	6.5
Naphthalene		NA	0.2U	NA	0.2U	NA	3.3	NA	NA	1.7
o-Xylene		NA	0.2U	NA	0.2U	NA	2U	NA	NA	0.6
p-Isopropyltoluene		NA	0.2U	NA	0.2U	NA	2U	NA	NA	0.4U
sec-Butylbenzene		NA	0.2U	NA	0.2U	NA	9.9	NA	NA	3.9
Total VOCS		0	1.1	0	0	78	61.8	7	24	51.1

µg/L - Micrograms per kilogram

U - The analyte was analyzed for, but not detected above the reported quantitation limit.

J - The analyte was positively identified: the associated numerical value is the approximate concentration of the analyte in the sample.

UJ - The analyte was not detected above the reported quantitation limit. However the reported quantitation limit may be biased.

NA - Not analyzed

	Area: Forme	r Lube Buildi	ing	
Sample Design	nation: SB-	l6 SB-19	9 SB-28	SB-28 DUP
Sample	e Date: 8/23/	/99 9/29/9	9/29/99	9/29/99
Parameter				
(Concentrations in µg/L)				
Benzene	610) 0.7	2.4	2.4
Toluene	17	0.4	1.3	1.3
Ethylbenzene	7	1.6	10	11
Xylenes (total)	30	5.6	15	16
TOTAL BTEX	664	8.3	28.7	30.7
1,2,4-Trimethylbenzene	NA	. 14	42J	43
1,3,5-Trimethylbenzene	NA	8.1	21	21
Cumene	NA	6.9	3.7	11
MTBE	NA	. 1	0.2U	0.2U
n-Butylbenzene	NA	5.2	16	16
n-Propylbenzene	NA	1.7	7.2	7.4
Naphthalene	NA	6.5	7.1	7.2
o-Xylene	NA	3.8	4.5	4.7
p-Isopropyltoluene	NA	0.5	2.2	2.2
sec-Butylbenzene	NA	4.1	3	3.1
Total VOCS	664	60.1	135.4	115.6

µg/L - Micrograms per kilogram

- U The analyte was analyzed for, but not detected above the reported quantitation limit.
- J The analyte was positively identified: the associated numerical value is the approximate concentration of the analyte in the sample.
- UJ The analyte was not detected above the reported quantitation limit. However the reported quantitation limit may be biased.
- NA Not analyzed
- Bold Analyted detected

Area:	Terminal Dispo	osal Site				Former Lube	Building		
Sample Designation:	LF-3	LF-4	LF-6	LF-7	LF-8	SB-11/LB-1	SB-11/LB-1 DUI	SB-12	SB-14
Sample Date:	8/23/1999	8/23/1999	8/25/1999	8/25/1999	8/25/1999	8/23/1999	8/23/1999	8/23/1999	8/23/1999
Parameters									
(Concentrations in µg/L)									
Acenaphthene	9	1U	4J	1U	1U	6	7	3J	3J
Acenaphthylene	NA	NA	NA	NA	NA	3NJ	3NJ	1U	1U
Anthracene	1U	1U	1U	1U	1U	2J	3J	3	1
Benzo[a]anthracene	1U	1U	1U	1U	1U	2J	2J	4	1U
Benzo[a]pyrene	1U	1U	1U	1U	1U	1J	1J	2	1U
Benzo[b]fluoranthene	1U	1U	1U	1U	1U	1J	1J	2	1U
Benzo[g,h,i]perylene	1U	1U	1U	1U	1U	1U	1U	1U	1U
Benzo[k]fluoranthene	1U	1U	1U	1U	1U	1U	1U	1U	1U
Chrysene	1U	1U	1U	1U	1U	3J	3J	6	1U
Dibenzo[a,h]anthracene	1U	1U	1U	1U	1U	1U	1U	1U	1U
Fluoranthene	1U	1U	1U	1U	1U	4J	5	7	1
Fluorene	7	1U	3	1U	1U	10	1U	5	5
Indeno[1,2,3-cd]pyrene	1U	1U	1U	1U	1U	1U	1U	1U	1U
Naphthalene	1U	1U	1U	1U	1U	6NJ	7NJ	1U	2
Phenanthrene	8	1U	9	1U	1U	10	12	6	2
Pyrene	1U	1U	1U	1U	1U	9	10	11	3
TOTAL SVOCS	24	0	16	0	0	57	54	49	17

Notes:

 $\mu g/L$ - Micrograms per liter

U - The analyte was analyzed for, but not detected above the reported quantitation limit.

J - The analyte was positively identified: the associated numerical value is the approximate concentration of the analyte in the sample.

UJ - The analyte was not detected above the reported quantitation limit. However the reported quantitation limit may be biased.

N - Detections considered tentative due to poor spectral quality.

NA - Not analyzed

A	rea:		
Sample Designat	ion: SB-16	SB-19	SB-28
Sample D	ate: 8/23/1999	9/29/1999	9/29/1999
Parameters			
(Concentrations in µg/L)			
Acenaphthene	5	3	1U
Acenaphthylene	1	0.9U	1U
Anthracene	3	2	1U
Benzo[a]anthracene	3	1	1U
Benzo[a]pyrene	1	0.9U	1U
Benzo[b]fluoranthene	1U	0.9U	1U
Benzo[g,h,i]perylene	1U	0.9U	1U
Benzo[k]fluoranthene	1U	0.9U	1U
Chrysene	4	2	1U
Dibenzo[a,h]anthracene	1U	0.9U	1U
Fluoranthene	2	3	1U
Fluorene	1U	4	1U
Indeno[1,2,3-cd]pyrene	1U	0.9U	1U
Naphthalene	3	4	1U
Phenanthrene	21	7	1U
Pyrene	7	3	1U
TOTAL SVOCS	50	29	2

Notes:

- µg/L Micrograms per liter
 - U The analyte was analyzed for, but not detected above the reported quantitation limit.
 - J The analyte was positively identified: the associated numerical value is the approximate concentration of the analyte in the sample.
 - UJ The analyte was not detected above the reported quantitation limit. However the reported quantitation limit may be biased.
 - N Detections considered tentative due to poor spectral quality.
- NA Not analyzed
- Bold Analyte detected

Area: Terminal Disposal Site					Former Lube Building					
Sample Designation	LF-3	LF-4	LF-5	LF-6	LF-7	LF-8	SB-11/LB-1	SB-11/LB-1 DUP	SB-12	SB-14
Sample Date:	8/23/99	8/23/99	8/25/99	8/25/99	8/25/99	8/25/99	8/23/99	8/23/99	8/23/99	8/23/99
Parameter										
(Concentrations in mg/L)										
Cadmium	0.0017U	0.0043	0.0017U	0.0017U	0.0017U	0.0042	0.0019	0.0035	0.0017U	0.0043
Chromium	0.0103	0.0955	0.0389	0.0197	0.0017U	0.0017U	0.022	0.213	0.037	0.0062
Hexavalent Chromium	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Lead	0.0137	0.16	0.051	0.04	0.0019U	0.044	0.18	0.19	0.069	0.02
Mercury	0.000042U	0.000152	0.000045	0.00006	0.000042U	0.000042U	0.000052	0.0001	0.0001	0.000121
Nickel	0.016	0.186	0.07	0.0398	0.0054U	0.0054U	0.051	0.051	0.0344	0.0242
Selenium	0.0016U	0.0022	0.0016U	0.0016U	0.0016U	0.0016U	0.0035	0.0044	0.0047	0.0016U
Tetra Ethyl Lead	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Thallium	0.0097U	0.0113	0.0097U	0.0097U	0.0097U	0.0097U	0.0118	0.0097U	0.0097U	0.049
Vanadium	0.0082	0.123	0.043	0.024	0.0028U	0.0028U	0.036	0.034	0.028	0.026

mg/L - Milligrams per liter

U - The analyte was analyzed for, but not detected above the reported quantitation limit.

J - The analyte was positively identified: the associated numerical value is the approximate concentration of the analyte in the sample.

UJ - The analyte was not detected above the reported quantitation limit. However the reported quantitation limit may be biased.

NA - Not analyzed

Area	: Former Lub	e Building		Resampling	z Locations				
Sample Designation	n: SB-16	SB-19	SB-28	BTC-4	BTC-5	MW-1URS	MW-1URS DUP	NTY-T60	
Sample Date	: 8/23/99	9/29/99	9/29/99	8/24/99	8/24/99	8/24/99	8/24/99	8/24/99	
Parameter									
(Concentrations in mg/L)									
Cadmium	0.0017U	0.0017U	0.0017U	NA	NA	NA	NA	NA	
Chromium	0.0123	0.0059	0.0131	NA	NA	NA	NA	NA	
Hexavalent Chromium	NA	NA	NA	NA	NA	NA	NA	0.02U	
Lead	0.51	0.0263	0.0115	0.013	0.167	0.019	0.018	0.007	
Mercury	0.00381	0.000047	0.000042U	NA	NA	NA	NA	NA	
Nickel	0.0172	0.0136	0.0232	NA	NA	NA	NA	NA	
Selenium	0.0056	0.0016UJ	0.0024J	NA	NA	NA	NA	NA	
Tetra Ethyl Lead	NA	NA	NA	0.001U	0.001U	0.001U	0.001U	NA	
Thallium	0.0097U	0.0097U	0.0097U	NA	NA	NA	NA	NA	
Vanadium	0.02	0.0074	0.021	NA	NA	NA	NA	NA	

mg/L - Milligrams per liter

U - The analyte was analyzed for, but not detected above the reported quantitation limit.

J - The analyte was positively identified: the associated numerical value is the approximate concentration of the analyte in the sample.

UJ - The analyte was not detected above the reported quantitation limit. However the reported quantitation limit may be biased.

NA - Not analyzed

Table 9. Summary of Free-Product Data in the Vicinity of the Babcock Street Sewer, Mobil Buffalo Terminal, Buffalo, New York

Free-Product Data

	Be	fore Western Leg	Startup	After Western Leg Startup			
Well Location	Adjusted	Apparent	Elevation of	Adjusted	Apparent	Elevation of	
	Elevation to Water	Free-Product	Top of Free Product	Elevation to Water	Free-Product	Top of Free Product	
	(ft amsl)	Thickness (ft)	(ft amsl)	(ft amsl)	Thickness (ft)	(ft amsl)	
SB-11	570.9	0.0	NA	564.8	0.0	564.8	
SB-13	571.7	0.0	NA	569.4	0.0	569.4	
SB-16	571.6	0.0	NA	569.8	0.2	570.0	
SB-17	570.2	6.2	576.4	565.8	0.9	566.6	
SB-31	571.4	0.0	NA	NA	NA	NA	

Sewer Construction Data

Babcock Street Sewer Manhole Location	Manhole Rim Elevation (ft amsl)	Sewer Invert Elevation (ft amsl)	Approx. Elevation of Sewer Bedding Material (ft amsl)
Manhole west of SB-13 Manhole at intersection of former Prenatt St and Babcock	584.1 583.5	570.0 570.2	568.0 568.2
Manhole approximately 300 ft south of Elk St.	583.6	570.7	568.7

Notes: ft amsl - feet above mean sea level NA - Not applicable













<u>LEGEND</u>

Φ	EXISTING MONITORING WELL
-	EXISTING RECOVERY WELL
\oplus	EXISTING PIEZOMETER
· · · ·	EXISTING WELL POINT SYSTEM
	STUDY AREA BOUNDARY
۲	SFI SOIL BORING LOCATION
•	SFI CONTINUATION SOIL BORING LOCATION
\oplus	SFI CONTINUATION MONITORING WELL LOCATION
	INOPERABLE PORTION OF WESTERN LEG OF WELL POINT SYSTEM












BENZO(a)ANTHRACENE





MAP OF SAMPLING LOCATIONS



EXISTING SFI LOCATION

• SFI CONTINUATION LOCATION

DIBENZO(a,h)ANTHRACENE

FORMER LUBE BUILDING AREA

-

BENZO(a)PYRENE





LEGEND FOR COLOR CODING OF CONCENTRATIONS FOR INDIVIDUAL SVOCs		NYSDEC RSCO STANDARDS (ug/kg)	SITE BACKGROUND VALUES (ug/kg)	LEGEND FOR COLOR CODING OF OF TOTAL SVOC
 10 Times Greater than Site Background Greater than Site Background Greater than NYSDEC RSCO, Less than Site Background Less than NYSDEC RSCO ANALYTE NOT DETECTED 	BENZO(a)ANTHRACENE BENZO(b)FLUORANTHENE CHRYSENE DIBENZO(a,h)ANTHRACENE BENZO(a)PYRENE BENZO(k)FLUORANTHENE	224 1,100 400 14 61 1,100	5,587 5,568 6,470 584 5,238 5,142	Greater than 1,000,000 ug/kg Greater than 100,000 ug/kg, Less the Greater than 10,000 ug/kg, Less that Less than 10,000 ug/kg ANALYTE NOT DETECTED
NOTE: Naphthalene Detections Are Not Shown. Concentrations For Naphthalene By Method 8021 Are Shown On Figure 9.				







APPENDIX A

Geologic Logs

ROUX ASSOCIATES, INC.

Jero con con con con

Ť^{10,000} k = 100

a na na la salata siyang arawa na salahang katang arawa katang katang katang katang katang katang katang katang

MC17252Y02.111/A-C

tere e en contractor e a conserve e



LOG	
SB-11/LB-1	

Date: 02-Jul-99

Project Name: Mobil Terminal Location: Former Lube Oil Building Well Number: SB-1/LB-1 Casing Elevation: 584.24 Screen Diameter: 4 Inches Casing Diameter: 4 Inches

Log By: M.Falzone **Driller:** Maxxim Technologies Drilling Method: Hollow Stem Auger Slot Size: 20 Type: PVC Sample Method: 3 inch Split Spoon

Construction Details Water Level (Init): NC Cement/Grout Interval: 3 - grade = Cement/Grout Borehole Diameter: 10 inches **Backfill Interval:** NA = Backfill Total Well Depth: 24 Feet Bentonite Interval: 5-3 Feet = Bentonite Sand Pack Interval: 24-5 Feet = Sand Screen Interval: 24-7 Feet Sand Pack Type: Morrie #2 Completion Details: Pro casing Lithology: Burmister Classification System Sample Blow Percent PID Count Recovery Depth (ft) (ft) (ppm) 0 Air knifed. FILL. 1 2 3 4 5 0 6-8 3,4,4,5 70 FILL : Brown/orange fine Sand and Silt with some Clay with brick 6 fragments, little medium sand, moist. 7 8 8-10 1 3,2,3,5 100 FILL : Brown/orange fine Sand and Silt with little Clay, brick fragments and Gravel, 8-9' grading to gray fine Sand with Silt, little Clay, moist, slight odor. 9 10-12 2,2,3,2 10 1 65 FILL: Brown petroleum stained fine Sand and Clay grading to fine to medium Sand with some Clay, little Silt and rock fragments, 11 moist, slight odor. 12 12-14 5 5,4,5,7 80 FILL : Brown petroleum stained fine Sand and Clay with some brick/rock fragments and Ash, wet at 14', significant odor at 14', slight odor at 12-13.8'. 13 14-16 8 2,3,4,5 60 14 FILL : Petroleum stained fine to medium Sand with Ash and rock/brick fragments, saturated, odor. 15 16 16-18 4 4,5,4,6 80 FILL: Black stained Ash and Gravel and coarse Sand, saturated, odor, sheen. 17 18-20 18 25 9,8,8,7 60 FILL: Fine to medium Sand with Ash and little Gravel, brown with petroleum staining, saturated. Note: hit wood shear. 19 20 20-22 0 5,4,6,6 50 FILL: Gray coarse SAND and ASH with little Gravel and fine Sand, saturated. 21 22

Bottom of boring (a) 24 feet.



						LOG
Pro Wa Casin Screen Casin	oject Name: Location: ell Number: g Elevation: n Diameter: g Diameter:	Mobil Ten Former Lu SB-12 582.74 2 Inches 2 Inches	minal ıbe Oil Buil	lding	Log By: M.Falzone Driller: Zebra Drilling Method: Geoprobe Slot Size: 10 Type: PVC Sample Method: 2 inch Macrocore Soil Sampler	Date: 09-Jul-99
Water Borehol Total Scre Sand	Level (Init): e Diameter: Well Depth: en Interval: Pack Type:	NC 3 inches 18 feet 18-3 Feet Morrie #2		Con	struction Details Cement/Grout Interval: .5-grade Backfill Interval: NA Bentonite Interval: 25 Feet Sand Pack Interval: 18-2 Feet Completion Details: Flush mount road box	= Cement/Grou = Backfill = Bentonite = Sand
(B)	Sample	PID	Blow Count	Percent Recovery	Lithology: Burmister Classification System	
(ft) 0 1 2	Depth (ft)	(ppm)	Air knifed.		FILL: Coarse Sand with brick and concrete.	
3 4						
5 6	5-6 6-9	0 6	NA	50 100	FILL: Brown coarse Sand with brick, concrete and rock, dry, no odor. FILL: Brown and black stained, coarse to medium Sand with Ash, Stone and little Silt moist netroleum odor.	
7 8						
9 10	9-10 10-13	1.4 3	NA NA	25 25	FILL: Black stained coarse Sand with some medium Sand and Silt, saturated, petroleum odor, staining, product. Black stained coarse Sand first with intermittent intervals with	
11 12					brown/gray Silt/Clay to 13', saturated, product.	
13 14	13-17	7.2	NA	100	FILL: Reworked Green gray Clay/Silt 13-15', overlying black Ash, saturated, significant petroleum odor.	
15 16						
17 18	17-19	11.2	NA	50	FILL: Gray reworked Silt 17-18' overlying gray stained medium Sand, saturated, petroleum odor.	
19	19-20	8.5	NA	100	FILL: Black Ash overlying black medium Sand with wood, saturated, petroleum odor.	
20	20-21.5	52	NA	100	FILL: Black Ash overlying black medium Sand with wood at bottom, saturated, significant petroleum odor.	
21						

Bottom of boring @ 21.5 feet.



LOG	
SB-13	

Date: 27-Jul-99

Project Name: Mobil Terminal Location: Former Lube Oil Building Well Number: SB-13 Casing Elevation: 583.44 Screen Diameter: 4 Inches Casing Diameter: 4 Inches

Log By: D. D'Amico Driller: SJB Drilling Method: Hollow Stem Auger Slot Size: 20 Type: PVC Sample Method: 3 inch Split Spoon

Construction Details Cement/Grout Interval: 2 - grade Backfill Interval: NA Bentonite Interval: 4-2 feet Sand Pack Interval: 15-4 feet



nd	Pack Type:	Morrie #2			Completion Details: Flush mount road box	
	Sample	PID	Blow	Percent	Lithology: Burmister Classification System	
	Depth (ft)	(ppm)	Count	Recovery		
	0-1		Air Knifed.		Concrete/Asphalt.	
	1-2				FILL: Brown and gray medium Sand and Silt and w/ bricks, cinders, gravel, dry	
	2-5	3.0			FILL: Brown and gray medium Sand and Silt with bricks, cinders, gravel, dry.	
			•			
-	5-7	100	4,1,1,3	50	FILL: Gray Clay (5-6'), some medium Sand, some Silt, trace cinders, moist. Gray Cinders/Fill material (6-7'), some Clay, little medium Sand, little Silt, trace Cobbles.	
	7-9	90	3,2,3,2	30	FILL: Black medium Sand and Silt and Cinders fill, little Gravel, trace Clay, moist, stained, sheen.	
	9-11	125	1,2,4,2	50	Gray medium SAND and SILT, some fine Gravel, some Clay, moist, stained, sheen, product.	
	11-13	110	3,3,4,3	75	Gray medium SAND and SILT, some fine Gravel, some Clay, saturated, stained, sheen, product.	
	13-15	115	1,3,3,3	50	Black medium to coarse SAND and SILT, some fine Gravel, trace Clay, odor, staining, sheen, saturated, product droplets.	

Bottom of boring @ 15 feet.

Water Level (Init): NC Borehole Diameter: 10 inches Total Well Depth: 15 Feet Screen Interval: 15-5 Feet San

(ft) 0

1

2

3

4

5

6

7

8

9

10

11

12

13

14

15

16

17

18



Project Name: Mobil Terminal Location: Former Lube Oil Building Well Number: SB-14
Casing Elevation: 584.79
Screen Diameter: 4 Inches
Casing Diameter: 4 Inches Log By: M.Falzone Driller: SJB Drilling Method: Hollow Stem Auger Slot Size: 20 Type: PVC Sample Method: 3 inch Split Spoon

Construction Details = Cement/Grout Water Level (Init): NC Cement/Grout Interval: 2- grade = Backfill Borehole Diameter: 10 inches Backfill Interval: NA Bentonite Interval: 4-2 Feet = Bentonite Total Well Depth: 23 Feet Screen Interval: 23-5 Feet Sand Pack Interval: 23-4 Feet = Sand Sand Pack Type: Morrie #2 **Completion Details:** Pro Casing Lithology: Burmister Classification System Sample Blow Percent PID Count Recovery (ft) Depth (ft) (ppm) Air knifed. 0 1 2 3 4 NC 1,2,2,2 5 5-7 50 FILL. Brown coarse Sand with brick plus rock intervals of reworked Silt and Clay, stained, moist, petroleum odor. 6 7 7-9 11.1 50 2,2,2,2 FILL: Coarse Sand and Brick overlying gray/green Silty Sand and little Clay and Ash, moist, stained, petroleum odor. 8 9-11 0 9 NA 2.2.4.1 no recovery 10 11-13 24 2,2,3,3 10 11 FILL:Stones and Brick fragments with Ash, black stained, petroleum odor. 12 13 13-15 45.3 1,1,2,2 75 FILL. Olive-gray fine Sand and Clay grading to fine to medium Sand with some Silt, trace Clay, saturated, petroleum odor, stained. 14 15 15-17 35 1,3,7,2 75 FILL. Olive gray medium to fine Sand with some Silt, trace Clay, saturated, petroleum odor. 16 Olive gray fine SAND with Silt grading to fine to medium Sand 17-19 24.3 1,3,9,7 17 80 with little coarse Sand and Gravel at 19', saturated, petro odor. 18 19-21 30.3 7,9,9,10 19 80 Stained medium to coarse SAND with little fine Gravel, saturated, petroleum odor. 20 21-23 18.5 4.6.6.7 80 Brown medium to coarse SAND with little fine Gravel, saturated, 21 petroleum odor. 22 23 Bottom of boring @ 23 feet.

Date: 27-Jul-99



LOG	
SB-15	

Date: 27-Jul-99

Project Name: Mobil Terminal Location: Former Lube Oil Building Well Number: SB-15
Casing Elevation: 583.35
Screen Diameter: 4 Inches
Casing Diameter: 4 Inches Log By: D. D'Amico Driller: SJB Drilling Method: Hollow Stem Auger Slot Size: 20 Type: PVC Sample Method: 3 inch Split Spoon

Water oreho Total Scre Sand	Level (Init): le Diameter: Well Depth: een Interval: Pack Type:	NC 10 inches 15 Feet 15-5 Feet Morrie #2		Con	Instruction Details = Cement/Grout Cement/Grout Interval: 2 - grade = Backfill Backfill Interval: NA = Backfill Bentonite Interval: 4-2 Feet = Bentonite Sand Pack Interval: 15-4 Feet = Sand Completion Details: Flush mount road box = Sand
	Sample	PID	Blow	Percent	Lithology: Burmister Classification System
(ft)	Depth (ft)	(ppm)	Count	Recovery	
0	05	6	Air Knifed.		FILL: Black tar like substance, petroleum odor, brown, medium to
1					coarse Sand and Silt, trace Clay, trace Gravel, moist. .5-5' Brown medium to coarse SAND and SILT, some Gravel/Cobbles, trace Clay, slight odor, moist.
2					
3					
4			↓		
5	5-7	75	W.O.H.	50	Red brown CLAY with some brown and gray coarse Sand and fine
6			1,1,1		Gravel, moist, odor.
7	7-9	12.5	1,2,3,5	100	Red brown CLAY with some brown and gray coarse Sand and fine
8					
9	9-11	110	5,5,6,7	100	Brown medium SAND and SILT, trace medium Gravel, moist,
10					
11	11-13	100	2,3,2,3	75	Brown medium SAND and SILT, trace medium Gravel,
12					
13	13-15	80	3,3,4,3	90	Brown medium SAND and SILT, trace medium Gravel, trace
14					Clay, moist, petro. odor, product.
15					
16					
17					
18					



Pr	oject Name:	Mobil Ter	minal		Log By:	A.Kearns
	Location:	Former Lu	ube Oil Build	ding	Driller:	SJB
W	ell Number:	SB-16		0	Drilling Method:	Hollow Stem Auger
Casin	g Elevation:	583.81			Slot Size:	20
Screen	Diameter:	4 Inches			Type:	PVC
Casin	g Diameter:	4 Inches			Sample Method:	3 inch Split Spoon
	0				-	
				Co	nstruction Details	
Water	Level (Init):	NC			Cement/Grout Interval:	2 to grade
Borehol	e Diameter:	10 inches			Backfill Interval:	NA
Total '	Well Depth:	17 Feet			Bentonite Interval:	4-2 Feet
Scre	en Interval:	17-5 Feet			Sand Pack Interval:	17-4 Feet
Sand	Pack Type:	Morrie #2			Completion Details:	Flush mount road bo
	Sample	DIA	Blow	Percent	Lithology: Burm	ister Classification Syste
(ft)	Depth (ft)	(ppm)	Count	Recover		
0			Air knifed.	у	3" Asphalt. Fill to 5 feet.	
					-	
1						
2						
3						
4			\downarrow			
			<u> </u>			
5	5-7	50	2,3,4,4	40	FILL. Black gray Ash, dry.	

. . .

.

SB	-16	

LOG

Date: 28-Jul-99

Water	Level (Init):	NC			Cement/Grout Interval: 2 to grade	=	= Cement/Grout
Borehol	e Diameter:	10 inches			Backfill Interval: NA	-	= Backfill
Total	Well Depth:	17 Feet			Bentonite Interval: 4-2 Feet	=	= Bentonite
Scre	en Interval:	17-5 Feet			Sand Pack Interval: 17-4 Feet	=	= Sand
Sand	Pack Type:	Morrie #2			Completion Details: Flush mount road box		
	Sample	PID	Blow	Percent	Lithology: Burmister Classification System		
(ft)	Depth (ft)	(ppm)	Count	Recover			
0			Air knifed.	у	3" Asphalt. Fill to 5 feet.		
			1				
1							
2							
,							
3							
4							
-			★				
5	5-7	50	2,3,4,4	40	FILL. Black gray Ash, dry.		
						::::E	
6						E	
						::::E	
7	7-9	140	1,2,1,2	25	FILL. Black gray Ash, some Silt, dry, petro.odor.		
						E	
8						::::E	
0	0.11	120	2222	50			
9	9-11	120	2,2,2,2	50	FILL. Product in sample. Stained brown coarse Sand, some Silt,		
10					indie Asii, inoisi, peuto odor.	::::E	
10							
11	11-13	150	2.2.2.2	50	FILL: Stained Brown coarse Sand, some Silt, little Ash, wet.		
			, , , ,		Product, saturated, trace wood, petro odor.	::::E	
12							
						::::E	
13	13-15	130	1,2,6,12	30	FILL. Stained fine Sand and Silt, some fine to medium Gravel, trace		
14					wood, saturated.		
14						::::E	
15	15-17	110	10.9.8.5	40	FILL, Stained fine Sand and Silt and fine to medium Gravel.		
			,-,-,-		product, some Ash, saturated.		
16						::::E	
						E	
17							
18							
10					D-4		
19					Bottom of boring (a) 17 feet.		

T



LOG	
SB-17	

Date: 28-Jul-99

Project Name: Mobil Terminal Location: Former Lube Oil Building Well Number: SB-17 Casing Elevation: 583.53 Screen Diameter: 4 inches Casing Diameter: 4 inches

Log By: A.Kearns Driller: SJB Drilling Method: Hollow Stem Auger Slot Size: 20 Type: PVC Sample Method: 3 inch Split Spoon

Water 2 Borehold Total 2 Scre Sand	Level (Init): e Diameter: Well Depth: en Interval: Pack Type:	NC 10 inches 20 Feet 20 -5 Feet Morrie #2		Con	struction Details Cement/Grout Interval: 2.5- grade Backfill Interval: NC Bentonite Interval: 4-2.5 Feet Sand Pack Interval: 20-4 Feet Completion Details: Flush mount road box		Cement/Grout Backfill Bentonite Sand
(ft)	Sample Depth (ft)	PID (ppm)	Blow Count	Percent Recovery	Lithology: Burmister Classification System		
0	Deptil (11)	(ppiii)	Air Knifed.		Asphalt/Concrete to 2.5'. Fill to 5'.		
1 2	2.5-3	2.5					
3							
4			\downarrow				
5	5-7	75	2,2,2,1	20	FILL. Black stained fine Sand, some Ash and fine to medium		
6					Gravel, product.		
7	7-9	60	2,2,1,2	40	TILL. Reworked.Black stained Silty Clay with little fine Gravel, product saturated		
8							
9	9-11	125	1,2,2,2	70	TILL. Reworked. Brown Clayey Silt, some fine to coarse Gravel, product,saturated.		
10							
11	11-13	150	3,3,5,5	80	TILL. Brown Clay and Silt, some fine Gravel, product, saturated.		
12							
13					Spooned to 13'/Augered to 20'.		
14							
15							
16							
17							
18							
19							
20					Bottom of boring @ 20 feet.	-	



LOG	
 SB-18	

Date: 29-Jul-99

Project Name: Mobil Terminal Location: Former Lube Oil Building Well Number: NA Casing Elevation: NA Screen Diameter: NA Casing Diameter: NA

Log By:	A.Kearns
Driller:	SJB
Drilling Method:	Hollow Stem Auger
Slot Size:	NA
Туре:	NA
Sample Method:	3 inch Split Spoon

	Construction Details						
Water	Water Level (Init): NA Cement/Grout Interval: NA						
Borehole Diameter: 10 inches					Backfill Interval: NA		
Total '	Well Depth:	NA			Bentonite Interval: NA		
Scre	en Interval:	NA			Sand Pack Interval: NA		
Sand	Pack Type:	NA			Completion Details: NA		
	Sample	PID	Blow	Percent	Lithology: Burmister Classification System		
(ft)	Depth (ft)	(ppm)	Count	Recovery			
0			Air knifed.		3" Asphalt. Fill to 5 feet.		
			1				
1							
2							
2	254	05					
3	3.3-4	95			Cloury SILT and fine to seems CDAVEL black law viscous meduat		
А					Clayey SILT and line to coarse GRAVEL, black low viscous product.		
7			♥				
5	5-7	150	W.O.H.	60	FILL Clayev Silt some fine to coarse Sand little fine Gravel trace coarse		
Ĵ			1.2.1		Gravel, saturated.		
6			7-7-				
7	7-9	12.5	4,6,4,3	90	TILL. Clayey Silt, some fine to coarse Sand, little Gravel, saturated.		
8	-						
0	0.11	110	2256	70			
9	9-11	110	2,3,5,6	70	Fine to coarse SAND, some fine to coarse Gravel and Clay, product,		
10					saturated.		
10							
11	11-13	105	6644	50	Fine to coarse SAND, some fine to coarse Gravel and Clay, product, saturated		
	11 15	105	0,0,1,1	50			
12	ł						
13							
14							
15							
14							
10							
17	1						
1/							
18							
	[
19					Bottom of boring @ 13 feet.		



LOG SB-19

Date: 29-Jul-99

Project Name:	Mobil Terminal
Location:	Former Lube Oil Building
Well Number:	SB-19
Casing Elevation:	583.13
Screen Diameter:	4 Inches
Casing Diameter:	4 Inches

Log By: A.Kearns Driller: SJB Drilling Method: Hollow Stem Auger Slot Size: 20 Type: PVC Sample Method: 3 inch Split Spoon

•

Water Level (Init): NA Borehole Diameter: 10 inches Total Well Depth: 20 Feet Screen Interval: 20-5 Feet Sand Pack Type: Morrie #2			و چې و چې و چې و	Construction Details = Cement Cement/Grout Interval: 2.5 - grade = Backfill Backfill Interval: NA = Backfill Bentonite Interval: 4-2.5 Feet = Benton Sand Pack Interval: 20-4 Feet = Sand Completion Details: Flush mount road box = Sand				
(ft)	Sample	PID	Blow Count	Percent Recovery	Lithology: Burmister Classification System			
0	Depui (It)	<u>(ppin)</u>	Air knifed.		4" Asphalt. Fill.			
1								
2								
3								
4			♦					
5	5-7	75	1,1,1,2	70	TILL, Clayey Silt, some fine Gravel, little medium to coarse Gravel, product, very moist.			
6								
7	7-9	70	4,3,3,4	70	TILL. Clayey Silt and fine to coarse Gravel, little coarse Sand, product, saturated.			
8					A			
9	9-11	40	2,2,4,2	30	SILT and fine GRAVEL, some coarse Sand and medium Gravel, product, saturated.			
10								
11	11-13	30	6,2,2,2	5	SILT and fine GRAVEL, some coarse Sand and medium Gravel, product, saturated.			
12								
13								
14								
15								
16								
17								
18								
19					Augered to 20'.			
20					Bottom of boring @ 20 feet.			



							LOG SB-20
Pro	oject Name: Location:	Mobil Ter Former Lu	minal 1be Oil Build	ling	Log By: A.Keams Driller: SJB	Date:	29-Jul-99
We Casin	ell Number: g Elevation:	SB-20 583.46			Slot Size: 20		
Screen	Diameter:	4 Inches			Type: PVC		
Casin	g Diameter:	4 Inches			Sample Method: 3 Inch Spin Spoon		
				Con	struction Details		
Water . Borehol	Level (Init): e Diameter:	NC 10 inches			Backfill Interval: 2- grade		= Cement/Grout = Backfill
Total '	Well Depth:	15 Feet			Bentonite Interval: 4-2 Feet		= Bentonite
Scre	en Interval:	15-5 Feet			Sand Pack Interval: 15-4 Feet		= Sand
Sand	Sample	Morrie #2	Blow	Percent	Lithology: Burmister Classification System		
(ft)	Depth (ft)	PID (ppm)	Count	Recovery			
0			Air Knifed.		FILL. Fine Sand and Ash, trace fine to coarse Gravel.		
1							
2							
3	3-3.5	23					
4							
5	5-7	60	▼ 7,6,5,5	3	FILL. Fine Sand, some fine to coarse Gravel, product at end of the		
6					spoon (at 7), saturated.		
7	7-9	70	2,2,2,3	5	FILL. Fine Sand and Ash, some fine to coarse Gravel, product,		
. 8					saturated.		
9	9-11	100	1,1,1,2	50	FILL. Fine to coarse Gravel, some fine to coarse Sand and Ash, product, saturated.		
10					r ,		
11	11-13	70	2,2,8,7	40	FILL: Fine to coarse Gravel, some fine to coarse Sand, product, saturated.		
12							
13	13-15	65	8,8,6,6	50	FILL. Fine to coarse Gravel, some fine to coarse Sand, product, saturated.		
14							
15							
16							
17							
18							

Bottom of boring @ 15 feet.



							LOG
							SB-21
Pr	oject Name:	Mobil ler	minal		Log By: A.Kearns	D .	30 1 1 00
W 7	Location:	Former Lu	ibe Oil Build	ling	Driller: SJB Drilling Method: Hollow Stem Auger	Date:	30 - Jul-99
Casin	a Flevation:	NΔ			Slot Size: NA		
Screet	Diameter:	NA			Type: NA		
Casin	g Diameter:	NA			Sample Method: 3 inch Split Spoon		
		110		<u>Con</u>	struction Details		
Water .	Level (Init):	NC 10 inchas			Cement/Grout Interval: NA		
Total V	Well Denth	NA			Bentonite Interval: NA		
Scre	en Interval:	NA			Sand Pack Interval: NA		
Sand	Pack Type:	NA			Completion Details: NA		
	Sample	PID	Blow	Percent	Lithology: Burmister Classification System		
(ft)	Depth (ft)	(ppm)	Count	Recovery			
0			Air knifed.		3" Asphalt. Fill.		
1				:			
1							
2							
3							
4							
			—				
5	5-7	15	3,4,5,6	40	FILL. Brown fine Sand and Silt, little fine to medium Gravel, dry, pe	etro. odo	r.
6							
0							
7	7-9	13	4,6,8,7	40	TILL. Brown fine Sand and Silt, some Clay, little fine Gravel, dry, p	etro.	
0					odor.		
8							
9	9-11	75	1,2,2,3	70	TILL.Brown Silty Clay, trace fine to medium Gravel, residual produ	ct,	
					moist.		
10							
11	11-12	120	4444	100	TILL Grav Silt and fine Sand some Clav residual product moist		
11	11-13	120	7,7,7,7	100	The oray one and the band, some oray, residual product, III0181.		
12							
12	12.15	100	1124	70			
15	13-15	100	1,1,3,4	70	Uray line SAND and SIL1, product, saturated.		
14							
15	15-17	115	2,4,5,3	50	Gray tine SAND and SILT, product, saturated.		
16							
17	17-19	100	1,1,2,3	100	Gray fine SAND and SILT, heavy sheen, saturated, .		
19							
10							
19					Bottom of boring @ 19 feet.		

and a second strand data and the second strands and the second strangs and the second strangs and the second st

T



		LOG SB-22
Log By: A.Kearns Driller: SJB Drilling Method: Hollow Stem Auger Slot Size: NA Type: NA Sample Method: 3 inch Split Spoon	Date:	30-Jul-99
tion Details		
ment/Grout Interval: NA		
Backfill Interval: NA	· . · ·	
Bentonite Interval: NA		
Sand Pack Interval: NA		
Completion Details: NA		A
Lithology: Burmister Classification System		
sphalt. Fill.		

Project Name: Mobil Terminal Location: Former Lube Oil Building Well Number: NA **Casing Elevation:** NA Screen Diameter: NA **Casing Diameter: NA**

Construc Water Level (Init): NC Ce Borehole Diameter: 10 inches Total Well Depth: NA Screen Interval: NA Sand Pack Type: NA Blow Sample Percent PID Count Recovery (ft) Depth (ft) (ppm) 3" A 0 Air knifed. 1 2 3 4 6.5 5 5-7 3,4,5,6 70 FILL. Clayey Silt, some fine Gravel, dry. 6 6,7,8,7 7 7-9 5 50 FILL. Fine to coarse Sand and Silt, some fine to medium Gravel, little Ash and Clay, dry. 8 2.5 9 9-11 2,2,3,3 80 TILL.Clayey Silt, some fine to coarse Sand, little fine Gravel, moist. 10 11-13 123 3,4,3,5 80 TILL. Clayey Silt, some fine Gravel. Then fine to coarse Sand and Gravel, trace 11 Silt and Clay, trace product, saturated. 12 13-15 95 4,5,6,5 13 50 Fine to coarse SAND and GRAVEL, little Silt and Clay, product globules, saturated. 14 15 16 17 18 19 Bottom of boring @ 15 feet.



I	LOG	
S	B-2 3	

Project Name: Mobil Terminal Location: Former Lube Oil Building Well Number: NA Casing Elevation: NA Screen Diameter: NA Casing Diameter: NA Log By: A.Kearns Driller: SJB Drilling Method: Hollow Stem Auger Slot Size: NA Type: NA Sample Method: 3 inch Split Spoon

Date: 30-Jul-99

Water] Borehold Total V Scre Sand	Level (Init): e Diameter: Well Depth: en Interval: Pack Type:	NC 10 inches NA NA NA		Cons	struction Details Cement/Grout Interval: NA Backfill Interval: NA Bentonite Interval: NA Sand Pack Interval: NA Completion Details: NA
	Sample	PID	Blow	Percent	Lithology: Burmister Classification System
(ft)	Depth (ft)	(ppm)	Air Knifed	Recovery	3" Apphalt Fill
1					
2					
3					
4			•		
5	5-7	7	1,2,2,3	70	FILL. Brown Clayey Silt, some fine to medium Gravel, dry.
6					
7 8	7-9	120	4,4,5,5	50	FILL. 7-8' Brown Clayey Silt, some fine to medium Gravel, trace brick. 8- 9' Black stained fine to coarse Sand and Gravel, some Silt, product.
9	9-11	95	5,1,3,3	50	Black stained fine to coarse SAND and GRAVEL, some Silt and Clay, product, saturated.
10 11	11-13	80	3,3,5,5	50	Fine to medium SAND and SILT, some Clay and fine to medium Gravel, trace
12					coarse Gravel, product, saturated.
13					
14					
15					
16					
17					
18					
19					Bottom of boring @ 13 feet.

Log By: D.D'Amico



T

LOG	
SB-24	

W	Location: 'ell Number:	Former Lu NA	ibe Oil Build	ling	Driller: SJB Drilling Method: Hollow Stem Auger	Date:	0 2- Aug-99
Casin	g Elevation:	NA			Slot Size: NA		
Scree	n Diameter:	NA			Type: NA		
Casin	g Diameter:	NA			Sample Method: 3 inch Split Spoon		
				Con	struction Details		
Water	Level (Init):	NC			Cement/Grout Interval: NA		
Boreho	le Diameter:	10 inches			Backfill Interval: NA		
Total	Well Depth:	NA			Bentonite Interval: NA		
Scre	en Interval:	NA			Sand Pack Interval: NA		
Sand	Pack Type:	NA			Completion Details: NA		
	Sample	PID	Blow	Percent	Lithology: Burmister Classification System		
(ft)	Depth (ft)	(ppm)	Count	Recovery			
0	0-5		Air		FILL material (bricks, rocks) and brown/gray medium to coarse		
1			Knifed.		Sand and Silt.		
2							
3							
4			•				
5	5-7	2	1,2,1,2	75	Brown and gray medium to coarse SAND, some fine Silt, trace petro	oleum tar	like
6					globules, moist.		
7	7-9	1	1,2,2,4	100	Brown and gray medium to coarse SAND, some fine Silt, trace Clay	<i>'</i> ,	
8					moist.		
9	9-11	.8	1,2,2,3	100	Brown fine SAND and SILT, little Clay, moist.		
10							
11	11-13	.3	3,3,4,3	100	Brown fine to medium to coarse SAND and SILT, little Clay, satura	ted.	
12							
13	13-15	.2	2,3,3,4	100	Brown fine to medium to coarse SAND and SILT, little Clay, satura	ted.	
14							
15	15-17	.3	1,1,2,2	100	Brown fine to medium to coarse SAND and SILT, little Clay,		
16					saturated.		
17	17-19	.2	2,2,2,3	100	Brown fine to medium to coarse SAND and SILT, little Clay.		
18					saturated.		
19				×	Bottom of boring @ 19 feet.		

Project Name: Mobil Terminal



	-
LOG	
SB-25	

Project Name: Mobil Terminal Location: Former Lube Oil Building Well Number: NA Casing Elevation: NA Screen Diameter: NA Casing Diameter: NA

Log By:	D.D'Amico
Driller:	SJB
Drilling Method:	Hollow Stem Auger
Slot Size:	NA
Туре:	NA
Sample Method:	3 inch Split Spoon

Date: 02-Aug-99

Water Level (Init): NC Borehole Diameter: 10 inches Total Well Depth: NA Screen Interval: NA Sand Pack Type: NA			<u>Construction Details</u> Cement/Grout Interval: NA Backfill Interval: NA Bentonite Interval: NA Sand Pack Interval: NA Completion Details: NA				
	Sample	PID	Blow	Percent	Lithology: Burmister Classification System		
(ft) 0	Depth (ft)	(ppm)	Air	Recovery			
1			Knifed.				
2							
3							
4			+				
5	5-7	96	1,3,4,3	50	Brown/black, petroleum stained medium to coarse SAND, some Silt. some medium Gravel, moist sediment, product.		
- 6							
7	7-9	48	1,2,1,2	100	Gray petroleum stained fine SAND and SILT, some Clay, trace medium Gravel, moist, slight petroleum sheen.		
8							
9	9-11	19.8	4,9,12,15	100	Red brown CLAY, some fine Sand, trace petroleum staining (~2" section on top- gray petroleum stained fine Sand and Silt, some Clay, trace medium Gravel, moist,		
10					slight petroleum sheen), moist.		
11	11-13	42	11,12,12,15	100	Red brown CLAY, some fine Sand, trace petroleum staining, moist.		
12							
13	13-15	3	10,7,6,5	100	Red brown CLAY, some fine Sand, trace petroleum staining, saturated.		
14							
15							
16							
17							
18							
19					Bottom of boring @ 15 feet.		



LOG	
SB-26	

Project Name: Mobil Terminal Log By: D.D'Amico Location: Former Oil Lube Building Driller: SJB Date: 02-Aug-99 Well Number: NA Drilling Method: Hollow Stem Auger Casing Elevation: NA Slot Size: NA Screen Diameter: NA Type: NA Casing Diameter: NA Sample Method: 3 inch Split Spoon **Construction Details** Water Level (Init): NC **Cement/Grout Interval: NA** Borehole Diameter: 10 inches Backfill Interval: NA Total Well Depth: NA Bentonite Interval: NA Screen Interval: NA Sand Pack Interval: NA Sand Pack Type: NA **Completion Details: NA** Sample Blow Percent Lithology: Burmister Classification System PID Count Recovery (ft) Depth (ft) (ppm) 0 Air Knifed FILL Brown/gray medium to coarse Sand and Silt w/Cinders, Cobbles and boulders, some Clay at lower depths, dry, no petroleum staining, slight 1 odor. 2 3 4 5-7 8,4,4,4 10 5 slight FILL:Brown/gray fine Sand and Silt, some Clay, trace Cinders, moist, no deflection petroleum odor or sheen. 6 7 7-9 ND 4,4,5,5 25 FILL:Reddish brown Clay, trace fine Sand, trace Silt (little wood preventing full recovery), moist, no odor or staining. 8 9 9-11 17.0 Brown/gray CLAY, little medium Gravel, trace Sand, trace Silt, product 2,2.2,3 50 saturated. 10 11-13 11 78 5,6,8,4 75 Brown/gray medium SAND and SILT and medium GRAVEL, some Clay, product. 12 13-15 80.0 100 Brown/gray medium SAND and SILT and medium GRAVEL, some Clay, 13 2,2,2,2 product. 14 15 16 17 18

Bottom of boring @ 15 feet.



-		
	LOG	
	SB-27	

Date: 03-Aug-99

Project Name: Mobil Terminal Location: Former Oil Lube Building Well Number: NA Casing Elevation: NA Screen Diameter: NA Casing Diameter: NA

Log By:	D.D'Amico
Driller:	SJB
Drilling Method:	Hollow Stem Auger
Slot Size:	NA
Туре:	NA
Sample Method:	3 inch Split Spoon

				<u>Con</u>	struction Details		
Water	Level (Init):	NC			Cement/Grout Interval: NA		
Borehol	le Diameter:	10 inches			Backfill Interval: NA		
Total `	Well Depth:	NA			Bentonite Interval: NA		
Scre	en Interval:	NA	Sand Pack Interval: NA				
Sand	Pack Type:	NA			Completion Details: NA		
	Sample	PID	Blow	Percent	Lithology: Burmister Classification System		
(ft)	Depth (ft)	(ppm)	Count	Recovery			
0			Air		FILL: Brown/gray coarse Sand and Silt and Gravel/Cobbles.		
			Knifed.				
ì							
2							
3							
4							
			<u> </u>				
5	5-7	1.4	1,2,2,2	50	FILL: Brown/gray coarse Cinders/Wood and medium Sand and Silt, moist,		
6					no petroleum odor or sheen.		
0							
7	7-9	1.0	3,2,3,2	50	FILL: Brown/gray coarse Cinders/Wood and medium Sand and Silt, moist,		
					no petroleum odor or sheen.		
8							
9	9-11	6.2	4,7,10,14	75	FILL:Brown/gray medium to coarse Sand and Silt, some fine Gravel, little		
					Clay, trace wood/fill, moist, slight petroleum odor, slight staining.		
10							
		20.2	10.15.10.17	00			
11	11-13	20.2	10,15,19,17	90	Brown/gray medium to coarse SAND and SIL1 and line GRAVEL, trace Clay,		
12					saturated, singht petroleum odor, singht stammig.		
12							
13	13-15	7.8	5554	30	Brown/gray medium to coarse SAND and SILT and fine GRAVEL, trace Clay		
	10 10	7.0	5,5,5,7		saturated, slight petroleum odor, slight staining.		
14							
15							
14							
10							
17							
.,							
18							
19					Bottom of boring @ 15 feet.		

Cement/Grout Interval: 2- grade

Backfill Interval: NA

Bentonite Interval: 4-2 Feet **Sand Pack Interval:** 15-4 Feet

Construction Details



LOG	
SB-28	

Date: 02-Aug-99

Project Name: Mobil Terminal Location: Former Oil Lube Building Well Number: SB-28
Casing Elevation: 588.13
Screen Diameter: 4 Inches
Casing Diameter: 4 Inches Log By: D.D'Amico Driller: SJB Drilling Method: Hollow Stem Auger Slot Size: 20 Type: PVC Sample Method: 3 inch Split Spoon

= Cement/Grout
= Backfill
= Bentonite
= Sand

Water Level (Init): NC Borehole Diameter: 10 inches Total Well Depth: 15 Feet Screen Interval: 15-5 Feet

Sand	Pack Type:	Morrie #2			Completion Details: Pro Casing	
	Sample	PID	Blow	Percent	Lithology: Burmister Classification System	
(ft)	Depth (ft)	(ppm)	Count	Recovery		
0			Air		Black medium to coarse SAND and SILT, trace Clay, saturated,	
			Knifed.		distinct petroleum odor/sheen.	
1						
2						
3						
4			▼			
5	5-7	12.2	1,4,9,9	60	Gray/black CLAY, some fine to medium Sand, some Silt, some fine	e
6					Gravel, petroleum odor, petroleum staining, saturated.	
0						
7	7-9	13.8	10,15,18,16	100	Black medium SAND and medium GRAVEL (7-7.5'), saturated,	
					petroleum odor/staining/slight sheen. Brown CLAY, little fine	
8					Sand (7.5-9'), saturated, slight petroleum staining.	
9	9-11	2.0	9 12 14 18	100	Brown fine SAND and SILT and CLAY, saturated, some slough	
,	7 11	2.0	2,12,14,10	100	slight petroleum odor.	
10						
11	11-13	3.0	11,9,11,9	100	Brown fine SAND and SILT and CLAY, saturated, slight	
12					ipenoleum odor. 🗝 section medium Oraver.	
12						
13	13-15	.8	9,6,6,5	100	Brown fine SAND and SILT and CLAY, little Sand and Silt,	
					saturated, slight petroleum odor.	
14						
15						
						terret and the second
16						
17						
1/						
18						
19				L	Bottom of boring (a) 15 feet.	



LOG	
SB-29	

Date: 03-Aug-99

Project Name: Mobil Terminal Location: Former Oil Lube Building Well Number: NA Casing Elevation: NA Screen Diameter: NA Casing Diameter: NA

19

Log By: D.D'Amico Driller: SJB Drilling Method: Hollow Stem Auger Slot Size: NA Type: NA Sample Method: 3 inch Split Spoon

	Construction Details								
Water	Level (Init):	NC		Cement/Grout Interval: NA					
Borehole Diameter: 10 inches				Backfill Interval: NA					
Total Well Depth: NA				Bentonite Interval: NA					
Scre	en Interval:	NA		Sand Pack Interval: NA					
Sand	Pack Type:	NA		Completion Details: NA					
	Sample	PID	Blow	Percent	Lithology: Burmister Classification System				
(ft)	Depth (ft)	(ppm)	Count	Recovery					
0			Air		Brown/black medium to coarse SAND and SILT and GRAVEL/Cobbles.				
			Knifed.						
1									
2									
-									
3									
4									
			<u> </u>						
5	5-7	.4	1,2,2,2	100	Brown CLAY, some coarse SAND and SILT, some fine Gravel, moist.				
6									
0									
7	7-9	19.8	4,4,5,15	100	Brown CLAY and coarse SAND and SILT, some fine Gravel, moist, slight petro				
					odor (large rock at 9'-refusal-15 blow count).				
8									
9	9-11	82	2,2,3,4	90	Brown CLAY and coarse SAND and SILT, some fine Gravel, moist, product.				
10									
.,	11.12	(0)	1617	100					
11	11-13	60	4,6,4,7	100	Brown CLAY and coarse SAND and SIL1, some time Gravel, moist, some				
12					product.				
12									
13	13-15	48	2323	75	Brown CLAY and coarse SAND and SILT some fine Gravel moist sheen some				
1.5	15 15	10	2,3,2,5	15	product.				
14									
15									
16									
10									
17									
18									

Bottom of boring @ 15 feet.



LOG	1
SB-3 0	

Pr	oject Name:	Mobil Ter	minal	Log By: D.D'Amico				
Location: For		Former Of	il Lube Build	ling	Driller: SJB Date: 05	-Aug-99		
Well Number: NA		NA			Drilling Method: Hollow Stem Auger			
Casin	g Elevation:	NA			Slot Size: NA			
Screer	Diameter:	NA			Type: NA			
Casin	g Diameter:	NA			Sample Method: 3 inch Split Spoon			
				0	a dama di sa Dada ila			
***	[] ([NO		Con	nstruction Details			
water.	Diamatari	NC 10 inchos			Cement/Grout Interval: NA Backfill Interval: NA			
Dorenoi	Wall Danth	NIA			Bontonito Interval: NA			
1 otal	on Interval:	NA NA			Sand Pack Interval: NA			
Sand	Pack Type	NA			Completion Details: NA			
Sand	Sample		Blow	Percent	Lithology: Burmister Classification System			
(11)	Denth (ft)	(ppm)	Count	Recovery				
0		(ppm)	Air Knifed.					
č								
1								
2								
2		1						
3								
4								
•			<u> </u>					
5	5-7	3.0	1,2,2,2	75	Brown/gray coarse SAND and CLAY, fine to medium Gravel. moist, some			
6		[i	black staining, slight odor.			
0								
7	7-9	1.0	1,2,3,4	100	Brown/gray coarse SAND and CLAY, fine Gravel (7-8.75'), moist, some black			
					staining, slight odor. Gray fine to medium SAND and SILT (8.75-9'), moist, no			
8					odor, no staining/sheen.			
9	9-11	2.0	2,5,9,8	100	Gray fine to medium SAND and SILT (9-10.5'), moist, no odor, no			
					staining/sheen. Gray line SAND and SIL1, some Clay(10.3-11), saturated, no			
10					ouor, stam or sheen.			
11	11-13	2.0	5555	100	Grav fine SAND and SILT trace Clay trace wood saturated no odor stain or			
11	11-15	2.0	5,5,5,5	100	sheen.			
12								
		1						
13	13-15	1.0	1,2,3,2	100	Gray/black fine SAND and SILT, some Organic staining and debris (leaves,			
					woody stems, etc.), moist, no odor or sheen.			
14								
1.5								
15		l						
16								
17								
10								
18								
10					Bottom of horing @ 15 feet			
17		L		L	Lottom of Johns (4/15 100.			



J	LOG	
S	B-31	

Date: 05-Aug-99

Project Name: Mobil Terminal Location: Former Oil Lube Building Well Number: SB-31 Casing Elevation: 581.92 Screen Diameter: 4 Inches Casing Diameter: 4 Inches

Log By: D.D'Amico Driller: SJB Drilling Method: Hollow Stem Auger Slot Size: 20 Type: PVC Sample Method: 3 inch Split Spoon

Construction Details Cement/Grout Interval: 2- grade Backfill Interval: NA Bentonite Interval: 4-2 Feet Sand Pack Interval: 15-4 Feet

= Cement/Grout
= Backfill
= Bentonite
= Sand

Sand	Pack Type:	Morrie #2			Completion Details: Flush mount road box	L	
	Sample	PID	Blow	Percent	Lithology: Burmister Classification System		
(ft)	Depth (ft)	(ppm)	Count	Recovery			
0			Air Knifed.		All hand clear cuttings hauled away on 4-Aug-1999-unable to		
1					denote lithology.		
2							
3							
4							
5	5-7	3.0	1,2,3,5	75	Reddish brown CLAY, some fine Sand, some Silt, some fine to		
6					coarse Gravel/Cobbles, no odor, staining or sheen, moist.		
- 7	7-9	3.0	4,3,3,4	100	Reddish brown CLAY, some fine Sand, some Silt, some fine to coarse Gravel/Cobbles, no odor, staining or sheen, saturated		
8							
N	0.11	(0)	21244	75	Reddish brown CLAY (9-10'), some fine Sand, some Silt, some		
9	9-11	60	5,12,4,4	73	sheen, saturated. Gray medium to coarse SAND and SILT and		
10					medium to coarse GRAVEL (10-11'), saturated, petroleum odor and sheen and staining.		
11	11-13	73	4,4,5,4	75	Gray medium to coarse SAND and SILT and medium to coarse		
					Gravel, trace Clay saturated, petroleum odor, sheen and staining.		
12							
13	13-15	32	2,2,2,3	100	Gray medium to coarse SAND and SILT and medium to coarse		
14				:	staining. Black fine SAND and SILT (13.5-15'), saturated,	1	
15					petroleum odor, sheen, and staining.		
15							
10							
17							
18							
10							
19					Bottom of boring (a) 15 feet.		

Water Level (Init): NC Borehole Diameter: 10 inches Total Well Depth: 15 Feet Screen Interval: 15-5 Feet



LOG	
ESL-13	

T

Project Name: Mobil Terminal Log By: D.D'Amico Date: 02-Sep-99 Location: Elk Street Lot Driller: Zebra Drilling Method: Geoprobe Well Number: NA Casing Elevation: NA Slot Size: NA Screen Diameter: NA Type: NA Sample Method: 2 inch Macro Core Soil Sampler **Casing Diameter: NA Construction Details** Water Level (Init): NA **Cement/Grout Interval: NA** Backfill Interval: NA Borehole Diameter: 3 inches Total Well Depth: NA Bentonite Interval: NA Sand Pack Interval: NA Screen Interval: NA Sand Pack Type: NA **Completion Details: NA** Sample Blow Percent Lithology: Burmister Classification System PID Count Recovery Depth (ft) (ft) (ppm) 0-1 Surface Material. sod, crushed coarse Gravel.* 0 1-1.5 0.2 NA NA FILL: Red brown fine Sand and Silt and Brick, some medium to 1 coarse Gravel, trace Organics, dry, no odor. 2 2-3 0.2 NA NA FILL: Brown to dark brown fine Sand and Silt, brick, some medium to coarse Gravel, dry, no odor. 3 3-4 ND NA NA FILL: Olive gray and dark brown fine Sand and Silt, some medium Gravel, trace Brick, trace Clay, dry, no odor. 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19

*Indicates material removed prior to sampling.

20

NOTE: As per NYSDEC request, soil was collected within the zone below the "surface material". The samples sent for laboratory analysis were noted as 0-.5, 1-2, and 2-3 as per the SFI workplan, though the actual depth of sample is dependent on thickness of surface material.

Bottom of boring @ 4 feet.



LOG

T

						E	ESL-14
Pr	Landing Elle Ct. Lat				Log By: D.D'Amico	Dete	02.6.00
***	LOCATION: LIK SI. LOI Wall Number: NA				Driller: Lebra	Date:	02-Sep-99
w	ell Number:	NA			Drilling Method: Geoprobe		
Screet	g Elevation:	NA NA		Slot Size: NA			
Casin	o Diameter	NA			Sample Method: 2 inch Macro Core Soil Sampler		
Cubin					1		
**/ - 4	I	NTA		Cons	truction Details		
Borehol	Level (Init):	NA 3 inches			Cement/Grout Interval: NA Backfill Interval: NA		
Total	Well Denth	NA			Bentonite Interval: NA		
Scre	en Interval:	NA			Sand Pack Interval: NA		
Sand	Pack Type:	NA			Completion Details: NA		
	Sample	PID	Blow	Percent	Lithology: Burmister Classification System		
(ft)	Depth (ft)	(ppm)	Count	Recovery			
0	0-1				Surface Material: Asphalt/Gravel.*		
1	1-1.5	0.2	NA	NA	FILL: Dark gray medium Sand and Silt and Cinders and Brick, som	e medium	n Gravel, dry,
2	2-3	0.2	NA	NA	FILL: Dark gray medium Sand and Silt and Cinders and Brick, som petroleum odor, trace Organic, trace Concrete, thick tar like petroleu	e medium ım substar	n Gravel, dry, nce.
3	3-4	0.4	NA	NA	FILL: 6" Black fine Sand and Silt, some Brick, some medium grave odor.	l, dry, slig	<u>zht</u>
4							
5							
6							
7							
8							
9 10							
11							
12							
13							
14							
15							
16							
17							
18			1				
19							
20					Bottom of boring @ A feet		

*Indicates material removed prior to sampling.

NOTE: As per NYSDEC request, soil was collected within the zone below the "surface material". The samples sent for laboratory analysis were noted as 0-.5, 1-2, and 2-3 as per the SFI workplan, though the actual depth of sample is dependent on thickness of surface material.

Cement/Grout Interval: NA

Backfill Interval: NA

Bentonite Interval: NA

Construction Details

Log By: D.D'Amico

Sample Method: 2 inch Macro Core Sampler

Driller: Zebra

Type: NA

Drilling Method: Geoprobe Slot Size: NA



LOG	_
ESL-15	

Date: 26-Aug-99

1

Project Name: Mobil Terminal Location: Elk St. Lot Well Number: NA Casing Elevation: NA Screen Diameter: NA Casing Diameter: NA

Water Level (Init): NA Borehole Diameter: 3 inches Total Well Depth: NA Screen Interval: NA

Screen Interval: NA Sand Pack Type: NA					Sand Pack Interval: NA Completion Details: NA
(ft)	Sample Depth (ft)	PID (ppm)	Blow Count	Percent Recovery	Lithology: Burmister Classification System
0	0-1				Surface Material: Asphalt/Gravel/Weeds.*
1	1-1.5	3.0	NA	NA	FILL: Red brown and brown fine Sand and Silt and Brick, some medium gravel, trace Organic, dry, no odor.
2	2-3	65	NA	NA	FILL: Black fine Sand and Silt and Brick, medium to coarse Gravel, trace Slate and Coal, trace Organic, dry, distinct odor.
3	3-4	108	NA	NA	Olive gray fine Sand and Silt, trace Clay. ~4" Black fine Sand and Silt overlain material, dry, distinct petroleum odor.
4					
5					
6					
7					
8					
9 [·]					
10					
11					
12					
13			e.		
14					
15					
16					
17					
18					
19					
20					Bottom of boring @ 4 feet.

*Indicates material removed prior to sampling.

NOTE: As per NYSDEC request, soil was collected within the zone below the "surface material". The samples sent for laboratory analysis were noted as 0-.5, 1-2, and 2-3 as per the SFI workplan, though the actual depth of sample is dependent on thickness of surface material.



							LOG
Dr	aiact Nama:	Mobil Te	rminal		Log Bu D. D'Amico	E	SL-16
rr	Location	Elk St L	ot		Lug Dy: D.DAIIICO Driller: Zebra	Date [.]	02-Sen-99
W	ell Number:	NA	51		Drilling Method: Geoprobe	Dute.	02-0 c p-99
Casin	g Elevation:	NA			Slot Size: NA		
Screen	Diameter:	NA			Type: NA		
Casin	g Diameter:	NA			Sample Method: 2 inch Macro Core Sampler		·
				Con	struction Details		
Water]	Level (Init):	NA			Cement/Grout Interval: NA		
orehol	e Diameter:	3 inches			Backfill Interval: NA		
Total V	Well Depth:	NA			Bentonite Interval: NA		
Scre	Pack Type:	NA			Completion Details: NA		
	Sample	PID	Blow	Percent	Lithology: Burmister Classification System]
(ft)	Depth (ft)	(ppm)	Count	Recovery			
0	0-0.5				Surface Material: Sod.*		
1	0.5-1	ND	NA	NA	Brown (topsoil) fine SAND and SILT, some fine to medium Grave	, trace	
1	1.5-2.5	ND	NA	NA	Brown and orange brown (topsoil) fine SAND and SILT, some fine	to	
2				[medium Gravel, trace Clay, trace Organics, dry, no odor.		1
2	2.5-3.5	ND	NA	NA	Brown and light gray fine SAND and SILT, some Clay, trace Orga	nic,	
3					dry, no odor.		
4							
5							
6							
7							
δ							1
9							
10							
							1
11				, ,			
12							
13							
14							
15							
16							
10							
17							
18							
10							
19					Bottom of boring @ 3.5 feet.		

*Indicates material removed prior to sampling.

NOTE: As per NYSDEC request, soil was collected within the zone below the "surface material".

The samples sent for laboratory analysis were noted as 0-.5, 1-2, and 2-3 as per the SFI workplan, though the actual depth of sample is dependent on thickness of surface material.

-

T

Constant de la const



Г

						LOG
Du	ia d Nama.	Mahil Tor	minal		Log Pru D D'Amino	<u>ESL-17</u>
Pro	Location: Elk St. Lot				Data: 02-Sen-00	
We	Location:	EIK SL LO NA	l		Drilling Method: Geoprobe	Date. 02-Sep-33
Casino	Elevation	NA			Slot Size: NA	
Screen	Diameter:	NA			Type: NA	
Casing	g Diameter:	NA			Sample Method: 2 inch Macro Core Soil Sampler	
				Con	struction Details	
Water I	Level (Init):	NA			Cement/Grout Interval: NA	
Borehole	e Diameter:	3 inches			Backfill Interval: NA	
Total V	Vell Depth:	NA			Bentonite Interval: NA	
Scree	Pack Type	ΝΔ			Completion Details: NA	
Junu	Sample	DID	Blow	Percent	Lithology: Burmister Classification System	
(#)	Denth (ft)	PID (nrm)	Count	Recovery	,,, ,, ,, ,, ,, _, ,, ,, ,, ,, ,, ,, , ,, ,, ,, ,, ,, ,, ,, , ,, ,, ,, ,, ,, ,, , ,, ,, ,, ,, ,, , ,, ,, ,, ,, , ,, ,, ,, ,, , ,, ,, , ,, , ,, ,, , ,, ,, , ,, , , ,	
<u>(II)</u>	0-1	(phu)		·	Surface Material: Sod *	
0	0-1					
1	1-1.5	ND	NA	NA	Brown fine SAND and SILT, some light gray Clay, trace iron	
					staining, trace Organic, dry, no odor, trace fine Gravel.	
	2-3	2.8	NA	NA	Brown fine SAND and SILT, some light gray Clay, trace iron stain	ing,
2					trace Organic, dry, no odor, trace line Gravel.	
	3_1	24	NA	NΔ	Dark brown fine SAND and SILT, some light grav Clay, trace iron	staining trace
3	5-4	2.4	INA	1471	Organic, dry, no odor, trace fine Gravel.	Saming, uuse
5						
4						
-						
5						
6						
7						
8						
Q						
7						
10						
11						
12						
13					Bottom of boring @ 4 feet.	

*Indicates material removed prior to sampling.

NOTE: As per NYSDEC request, soil was collected within the zone below the "surface material".

The samples sent for laboratory analysis were noted as 0-.5, 1-2, and 2-3 as per the SFI workplan, though the actual depth of sample is dependent on thickness of surface material.



Г

						LOG	
						ESL-18	
Pr	oject Name:	Mobil Ter	minal		Log By: D.D'Amico		
Location: Elk St. Lot			t	Driller: Zebra Date: 02-Set			
Well Number: NA		Drilling Method: Geoprobe					
Casin	g Elevation:	NA			Slot Size: NA		
Screer	n Diameter:	NA			Type: NA		
Casin	g Diameter:	NA			Sample Method: 2 inch Macro Core Soil Sampler		
				Con	struction Details		
Water	Level (Init):	NA		0.011			
Boreho	le Diameter:	3 inches		Backfill Interval: NA			
Total '	Well Depth:	NA		Bentonite Interval: NA			
Scre	en Interval:	NA			Sand Pack Interval: NA		
Sand	Pack Type:	NA	Play	Paraant	Lithology: Burnister Classification System		
	Darath (A)	PID	Count	Recoverv	Liutotogy. Durinister Classification System		
(#)	Depth (ft)	(ppm)			Surface Material: Sod *		
U	0-1				Surface Material, Sou.		
1	1-1.5	ND	NA	NA	Brown (topsoil) fine SAND and SILT, trace fine Gravel, trace Gravel	, trace Clay, trace Iron,	
					trace Organic, occasional large gravel, dry, no odor.		
2	2-3	ND	NA	NA	Y ellowish brown and brown (topsoil) fine SAND and SILT, trace fine	e Gravel, trace Gravel,	
3	3-4	ND	NA	NA	Yellowish brown and brown (tonsoil) fine SAND and SILT trace fine	e Gravel, trace Gravel	
5	5.	TID.			trace light gray Clay, trace Iron, trace Organic, occasional large grave	el, dry, no odor.	
4							
5							
6							
0							
7							
			1				
8							
9							
10							
11				1			
12							
13				ł			
15							
14							
				1			
15				1			
16				1			
17				1			
10							
18							
19				l			
20				1	Bottom of boring @ 4 feet.		

*Indicates material removed prior to sampling.

NOTE: As per NYSDEC request, soil was collected within the zone below the "surface material". The samples sent for laboratory analysis were noted as 0-.5, 1-2, and 2-3 as per the SFI workplan, though the actual depth of sample is dependent on thickness of surface material.



Date: 02-Sep-99

Project Name: Mobil Terminal Log By: D.D'Amico Location: Elk St. Lot Driller: Zebra Well Number: NA Drilling Method: Geoprobe Slot Size: NA **Casing Elevation: NA** Screen Diameter: NA Type: NA **Casing Diameter: NA** Sample Method: 2 inch Macro Core Soil Sampler **Construction Details Cement/Grout Interval: NA** Water Level (Init): NA Borehole Diameter: 3 inches **Backfill Interval: NA** Bentonite Interval: NA Total Well Depth: NA Screen Interval: NA Sand Pack Interval: NA Sand Pack Type: NA **Completion Details: NA** Sample Blow Percent Lithology: Burmister Classification System PID Count Recovery Depth (ft) (ft) (ppm) 0-1 Surface Material: .5' Sod, .5' Asphalt/Concrete/Gravel mix.* 0 ND 1 1-1.5 NA NA FILL: Trace Brick, Cinders, Coal. Dark brown and orange brown marble color, fine Sand and Silt, trace red brown Clay, trace fine to medium Gravel, dry, no odor. 2 2-3 ND NA NA Brown and orange brown fine SAND and SILT, some light gray Clay, trace fine to medium gravel, dry, no odor. 3 3-4 ND NA Brown and orange brown fine SAND and SILT, some light gray NA Clay, trace fine to medium gravel, dry, no odor. 4 5 6 7 8 9 10 11 12 13 14

*Indicates material removed prior to sampling.

15

16 17

18

19

20

NOTE: As per NYSDEC request, soil was collected within the zone below the "surface material".

The samples sent for laboratory analysis were noted as 0-.5, 1-2, and 2-3 as per the SFI workplan, though the actual depth of sample is dependent on thickness of surface material.

Bottom of boring @ 4 feet.

Log By: D.D'Amico

Driller: Zebra



Date: 02-Sep-99

Drilling Method: Geoprobe Well Number: NA Slot Size: NA **Casing Elevation: NA** Screen Diameter: NA Type: NA Sample Method: 2 inch Macrocore Soil Sampler Casing Diameter: NA **Construction Details** Cement/Grout Interval: NA Water Level (Init): NA Borehole Diameter: 3 inches Backfill Interval: NA Bentonite Interval: NA Total Well Depth: NA Sand Pack Interval: NA Screen Interval: NA Sand Pack Type: NA **Completion Details: NA** Sample Blow Percent Lithology: Burmister Classification System PID Recovery Count Depth (ft) (ppm) (ft) Surface Material: Asphalt/Gravel.* 0 0-1 FILL: Dark brown fine Sand and Silt, fine to medium Gravel. 0.4 NA NA 1 1-1.5 trace Wood, Slag and Cinders, dry, no odor. 6" FILL: Red brown and dark brown fine Sand and Silt, fine to medium Gravel, trace NA 2 2-3 0.4 NA Wood, Slag and Cinders, dry, no odor. 6" Brown and orange brown fine SAND and SILT, moist, no odor. Dark brown fine SAND and SILT and fine GRAVEL. 10" brown fine 3 NA 3-4 0.2 NA SAND and SILT, some light gray Clay (moist), no odor. 4 5 6 7 8 9 10 11 12 13 14 15 16 Bottom of boring @ 4 feet.

*Indicates material removed prior to sampling.

Project Name: Mobil Terminal

Location: Elk St. Lot

NOTE: As per NYSDEC request, soil was collected within the zone below the "surface material".

The samples sent for laboratory analysis were noted as 0-.5, 1-2, and 2-3 as per the SFI workplan, though the actual depth of sample is dependent on thickness of surface material.

Construction Details



LOG LF-3

Date: 03-Aug-99

and 04-Aug-99

Project Name: Mobil Terminal Location: Upper Tank Farm (Disposal Area) Well Number: LF-3 Casing Elevation: 596.17 Screen Diameter: 4 Inches Casing Diameter: 4 Inches

Log By: D.D'Amico Driller: SJB Drilling Method: Hollow Stem Auger Slot Size: 20 Type: PVC Sample Method: 3 inch Split Spoon

Cement/Grout Interval: 13.4 - grade

Bentonite Interval: 15-13.4 Feet

Completion Details: Pro casing installed.

Sand Pack Interval: 36-15 Feet

Backfill Interval: NA

= Cement/Grout = Backfill = Bentonite = Sand

Water Level (Init):	NC
Borehole Diameter:	10 inches
Total Well Depth:	36 Feet
Screen Interval:	36-16 Feet
Sand Pack Type:	Morrie #2

	Sample	PID	Blow	Percent	Lithology: Burmister Classification System
(ft)	Depth (ft)	(ppm)	Count	Recovery	
0	0-5		Air Knifed.		Hand cleared.
1					
2					
3					
4			•		
5	5-7	NC	W.O.H. for 12".1.1	10	FILL: Reddish brown coarse Sand and Silt and fine to n Gravel (cinders, cobbles) (5-7'), dry, no odor, staining o
6			,-		
7					
8					
9					
10	10-12	NC	W.O.H. for 12",1,3	30	FILL:Reddish brown coarse Sand and Silt and fine to m

1,2,1

19

d Silt and fine to medium no odor, staining or sheen.

10	10-12	NC	W.O.H. for 12",1,3	30	FILL:Reddish brown coarse Sand and Silt and fine to medium Gravel (cinders, cobbles), moist, no odor, staining or sheen.	
12						
13						
14						
15				3		
16						
17						
18	18-20	20.0	W.O.H.	75	Gray black fine SAND and SILT, some Clay, moist, saturated at	

19.5', petroleum odor, slight staining, no sheen.

Construction Details



LOG LF-3

Date: 03-Aug-99

and 04-Aug-99

Project Name: Mobil Terminal Location: Upper Tank Farm (Disposal Area) Well Number: LF-3 Casing Elevation: 596.17 Screen Diameter: 4 Inches Casing Diameter: 4 Inches

Water Level (Init): NC

Borehole Diameter: 10 inches

Log By: D.D'Amico Driller: SJB Drilling Method: Hollow Stem Auger Slot Size: 20 Type: PVC Sample Method: 3 inch Split Spoon

Cement/Grout Interval: 13.4 - grade

Backfill Interval: NA

	_
	= Cement/Grout
	= Backfill
<i>\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\</i>	= Bentonite
	- Sand

Total Well Depth: 36 Feet Screen Interval: 36-16 Feet Sand Pack Type: Morrie #2			t	Bentonite Interval:15-13.4 Feet= BentoniteSand Pack Interval:36-15 Feet= SandCompletion Details:Pro casing		
	Sample	PID	Blow	Percent	Lithology: Burmister Classification System	
(ft)	Depth (ft)	(ppm)	Count	Recovery		
20	20-22	42.0	1,1,1,2	50	Gray black medium SAND and SILT, trace Clay, saturated,	
21					petroleum odor, nue stamme.	
22	22-24	38	2,3,2,2	100	Gray black medium SAND and SILT, trace Clay, saturated, petroleum odor. little staining.	
23					r	
24	24-26	64.0	1,1,1	50	Gray black medium SAND and SILT, trace Clay, saturated, petroleum odor, little staining, slight sheen.	
25						
26	26-28	58.0	2,3,5,6	25	Black, medium SAND and SILT, saturated, petroleum odor, slight sheen.	
27						
28	28-30	10.0	5,4,6,8	25	Black, coarse SAND and SILT and fine GRAVEL, saturated, petroleum odor, no sheen.	
29						
30	30-32	4.2	4,3,3,3	25	Black coarse SAND and SILT and medium GRAVEL, some Clay, saturated, slight petroleum odor, no sheen.	
31						
32	32-34	5.6	3,2,4,4	25	Black coarse SAND and SILT and medium GRAVEL, some Clay, saturated, slight petroleum odor, no sheen.	
33						
34	34-36	0.8	2,3,6,9	50	Black coarse SAND and SILT and medium to coarse GRAVEL/COBBLES, some Clay, saturated, no petroleum odor,	
35					no sheen.	
36						
37						
38						
39					Bottom of boring @ 36 feet.	


T

Pre W Casin Screen Casin	oject Name: Location: ell Number: g Elevation: n Diameter: g Diameter:	Mobil Ter Upper Tar LF-4 594.87 4 Inches 4 Inches	minal ık Farm (Dis	sposal Area)	Log By: D.D'Amico Driller: SJB Drilling Method: Hollow Stem Auger Slot Size: 20 Type: PVC Sample Method: 3 inch Split Spoon	LOG LF-4 Date: 05-Aug-99 and 06-Aug-99
Water Borehol Total Scre Sand	Level (Init): e Diameter: Well Depth: en Interval: Pack Type:	NC 10 inches 36 Feet 36-16 Fee Morrie #2	t	Cons	truction Details Cement/Grout Interval: 13 - grade Backfill Interval: NA Bentonite Interval: 15-13 Feet Sand Pack Interval: 36-15 Feet Completion Details: Flush mount road box	= Cement/Grout = Backfill = Bentonite = Sand
	Sample	PID	Blow Count	Percent Recovery	Lithology: Burmister Classification System	
(ft)	Depth (ft)	(ppm)	Air Knifed		Hand cleared: Brown coarse SAND and SILT and	
1	0-5				GRAVEL/FILL, dry, no odor.	
2						
3 4						
5 6	5-7	1.8	<u>,1,1,2,1</u>	25	FILL:Brown medium Sand and Silt, some medium Gravel/cobbles, trace Cinders/fill material, moist, no odor, no sheen.	
7 8 9						
10	10-12	1.4	1,2,4,4	30	10-12' Brown, coarse SAND and SILT, trace fine to medium Cobbles, moist, no odor, no sheen.	
11						
12						
13						
14						
15	15-17	1.6	W.O.H. 1,1,1	75	Gray fine SAND and SILT, trace Clay, moist, black staining, no odor.	
16						
17	17-19	1.8	1,2,2,2	50	Gray fine SAND and SILT, trace Clay, moist, black staining, no odor.	
18						
19						

Cement/Grout Interval: 13 - grade

Construction Details



LOG LF-4

Date: 05-Aug-99

and 06-Aug-99

Project Name: Mobil Terminal Location: Upper Tank Field (Disposal Area) Well Number: LF-4 Casing Elevation: 594.87 Screen Diameter: 4 Inches Casing Diameter: 4 Inches

Water Level (Init): NC

Log By: D.D'Amico Driller: SJB Drilling Method: Hollow Stem Auger Slot Size: 20 Type: PVC Sample Method: 3 inch Split Spoon

> = Cement/Grout = Backfill

Borehol	e Diameter:	10 inches			Backfill Interval: NA	= Backfill
Total Well Depth: 36 Feet				Bentonite Interval: 15-13 Feet		
Screen Interval: 36-16 Feet			t		Sand Pack Interval: 36-15 Feet	= Sand
Sand	Pack Type:	Morrie #2			Completion Details: Flush mount road box	
,	Sample	PID	Blow	Percent	Lithology: Burmister Classification System	
(ft)	Depth (ft)	(ppm)	Count	Recovery		
20	19-21	1.6	W.O.H. for 12",2,2	50	Gray fine to medium SAND and some Silt, moist, black staining, no odor.	
21	21-23	1.2	2,2,4,3	50	Gray fine to medium SAND with trace Silt, moist, black staining, no odor.	
22						
23	23-25	1.4	W.O.H. 1,1,1	40	Gray fine to medium SAND with trace Silt, saturated, black staining, no odor.	
24						
25	25-27	1.5	W.O.H. for 12",1,4	30	Gray fine to medium SAND with trace Silt, saturated, black staining, no odor.	
26	27.20	16	2734	75	27.28 Gray fine to medium SAND with trace Silt saturated	
27	21-29	1.0	3,2,3,4	15	black, non-petroleum staining, no odor. 28-29' Black medium to coarse SAND and SILT and fine to medium	
29	29-31	2.6	1,7,6,7	75	GRAVEL/COBBLES, saturated, no odor, no sheen. Gray coarse SAND and SILT, fine GRAVEL, saturated, no odor,	
30					no sheen.	
31	31-33	2.0	5,8,10,10	40	Gray coarse SAND and SILT, fine GRAVEL, saturated, no odor, no sheen.	
32						
33	33-35	ND	1,3,3,3	40	Gray coarse SAND and SILT (33-34'), tine GRAVEL, saturated, no odor. no sheen. Gray CLAY(34-35'), some fine Sand, trace	
34	35.37	ND	5434	30	Silt, saturated, no odor, no staining, no sneen.	
35	33-37	ND	,,,,,,,	50	coarse GRAVEL, some SAND, trace Silt, saturated, no odor, no staining, no sheen.	
37						
38						
39	· ۱			ľ	Bottom of boring @ 37 feet.	



						LOG
						LF-5
Pre	oiect Name:	Mobil Ter	minal		Log By: D. D'Amico	
	Location:	Upper Tar	nk Farm (Di	sposal Area)	Driller: SJB	Date: 06-Aug-99
W	ell Number	IF-5		sposarrada,	Drilling Method: Hollow Stem Auger	C,
Casin	a Elevation.	597.62			Slot Size: 20	
Screen	Diameter:	4 Inches			Type: PVC	
Casin	g Diameter:	4 Inches			Sample Method: 3 inch Split Spoon	
Cushi	5 2 100000000000000000000000000000000000	1 11101100				
				Const	ruction Details	
Water]	Level (Init):	NC			Cement/Grout Interval: 14-grade	= Cement/Grout
Borehol	e Diameter:	10 inches			Backfill Interval: NA	= Backfill
Total `	Well Depth:	37 Feet			Bentonite Interval: 16-14 Feet	= Bentonite
Scre	en Interval:	37-17 Fee	t		Sand Pack Interval: 37-16 Feet	Sand
Sand	Pack Type:	Morrie #2			Completion Details: Pro Casing	
	Sample	PID	Blow	Percent	Lithology: Burmister Classification System	
(ft)	Depth (ft)	(ppm)	Count	Recovery		
0	0-5		Air Knifed.		Hand cleared: Dark brown, coarse SAND and SILT, fine to	
					medium to coarse Gravel/Cobbles, dry, cinders.	
1						
2						•····
3						
1						
4			★			
5	5-7	0.4	1 for	10	FILL:Brown coarse Sand and Silt (5-7), some fine to medium	
5	57	0.1	12".1.1		Gravel/Cobbles, trace glass, cinders, moist, no odor, no sheen.	
6						
7						
8						
9						
10	10-12	ND	1446	30		
10	10-12	ПD	1,4,4,0	50	FILL Brown gray Clay and fine Sand (10-12) some Silt, some	
11					medium Cobbles, cinders, moist, no odor, no sheen, no staining.	
12						
13						
14						
				•	THE COLLECTION AND A CITY AND A SHALE AT	
15	15-17	0.4	1,2,3,2	20	FILL: Gray black line Sand and Sill, trace Clay, trace Shale, trace	
14					rill (ceramic, leather), trace line Gravel, moist, slight odor.	
10						
17	17-19	0.4	2.3.3.3	75	Gray fine SAND and SILT, trace Clay, trace fine Cobbles, trace	
£ /	., 17		_,_,_,_,_		black staining, moist, no odor, no sheen.	
18						
		[
19	[

T

Cement/Grout Interval: 14-grade

Construction Details



LOG	
LF-5	

Date: 06-Aug-99

Project Name: Mobil Terminal Location: Upper Tank Field (Disposal Area) Well Number: LF-5 Casing Elevation: 597.62 Screen Diameter: 4 Inches Casing Diameter: 4 Inches

Water Level (Init): NC

Log By: D. D'Amico Driller: SJB Drilling Method: Hollow Stem Auger Slot Size: 20 Type: PVC Sample Method: 3 inch Split Spoon

= Cement/Grout

Borehole Diameter: 10 inches					Backfill Interval: NA	= Backfill
Total Well Depth: 37 Feet					Bentonite Interval: 16-14 Feet	= Bentonite
Scre	en Interval:	37-17 Fee	t		Sand Pack Interval: 37-16 Feet	= Sand
Sand	Pack Type:	Morrie #2			Completion Details: Pro Casing	
	Sample	PID	Blow	Percent	Lithology: Burmister Classification System	
(ft)	Depth (ft)	(ppm)	Count	Recovery		
20	19-21	0.4	W.O.H. for	75	Gray fine SAND and SILT, trace Clay, trace fine Cobbles, trace	
[12",1,2		black staining, moist, no odor, no sheen.	
21	21-23	0.4	2,2,2,2	100		
		l I			Gray fine to medium SAND and SILT, trace Clay, trace fine	
22					Cobbles, trace black staining, moist, no odor, no sheen.	
			WOUG			
23	23-25	0.2	W.O.H. for	75	Gray, medium SAND and SIL1, saturated, black staining, no odor,	
2.1			12",2,1		sneen.	
24	ĺ					
25	25-27	0.2	WOH 1	50	Grav medium SAND and SILT, saturated, black staining, no odor.	
23	23 27	0.2	1.1		sheen.	
26			-,-			
27	27-29	0.2	2,2,4,4	100	Gray, medium SAND and SILT, saturated, black staining, no odor,	
					sheen.	
28						
29	29-31	0.2	2,4,7,8	50	Gray, medium to coarse SAND and SILT, saturated, black	
					staining, no odor, no sheen.	
- 30						
21	31.33	0.2	6770	100	Grav medium to coarse SAND and SILT saturated some fine to	
.,1	51-55	0.2	0,7,7,2	100	medium Gravel, black staining, no odor, no sheen.	
32	1					
	ł					
33	33-35	ND	5,3,6,5			
					Gray, medium to coarse SAND and SILT, saturated, some fine to	
34					medium Gravel, black staining, no odor, no sheen.	
1	1					
35	35-37	slight	2,3,7,5	25	35-36' Gray, medium to coarse SAND and SIL1, saturated, some	
		deflection			tine to medium Gravel, black staining, no odor, no sheen. 36-37	
24					odor no sheen	
50	l					
37	ł					
38	[}	
39	{	(Bottom of boring (a) 37 feet.	



		LOG
		LF-6
l Area)	Log By: D. D'Amico Driller: SJB Drilling Method: Hollow Stem Auger Slot Size: 20 Type: PVC	Date: 13-Aug-99
	Sample Method: 3 inch Split Spoon	
Const	ruction Details Cement/Grout Interval: 13-grade Backfill Interval: NA Bentonite Interval: 15-13 Feet Sand Pack Interval: 37-15 Feet Completion Details: Pro casing	= Cement/Grout = Backfill = Bentonite = Sand
ercent	Lithology: Burmister Classification System	
10	Hand cleared. 5' Deep and 9" Diameter. FILL: Brown medium to coarse Sand and Silt. Cinders, Brick, trace medium Cobbles, dry, no odor or staining.	
25	FILL:Reddish brown medium to coarse Sand and Silt (10-12'), some medium Gravel, dry, no petroleum odor or staining.	

Project Name: Mobil Terminal Location: Upper Tank Farm (Disposal Well Number: LF-6 Casing Elevation: 598.14 Screen Diameter: 4 Inches Casing Diameter: 4 Inches

Water Level (Init): NC

Sample

Depth (ft)

0-5

5-7

10-12

15-17

17-19

ND

ND

0.2

0.2

1.2.W.O.H.

4,4,5,3

1,1,4,5

3,3,3,4

20

for 12"

(ft) 0

1

2

3

4

5

ΰ

7

8

9

10

11

12

13

14

15

16

17

18

19

Borehole Diameter: 10 inches Total Well Depth: 36 Feet Screen Interval: 36-16 Feet Sand Pack Type: Morrie #2 Pe Blow PID Rec Count (ppm) Air Knifed.

> Reddish brown medium to coarse SAND and SILT, some medium Gravel, dry, no petroleum odor or staining.

Reddish brown medium to coarse SAND and SILT (17-18'), some 25 medium Gravel, dry, no staining. Black fine Sand and Siltand Fill (18-19') (Wood. Brick, Cinders), moist, no petroleum odor.

T



LOG	
 LF-6	

.

Date: 13-Aug-99

Project Name: Mobil Terminal Location: Upper Tank Farm (Disposal Area) Well Number: LF-6 Casing Elevation: 598.14 Screen Diameter: 4 Inches Casing Diameter: 4 Inches Log By: D. D'Amico Driller: SJB Drilling Method: Hollow Stem Auger Slot Size: 20 Type: PVC Sample Method: 3 inch Split Spoon

				Cons	struction Details	
Water	Level (Init):	NC			Cement/Grout Interval: 13-grade	= Cement/Grout
Borehol	e Diameter:	10 inches			Backfill Interval: NA	= Backfill
Total '	Well Depth:	36 Feet			Bentonite Interval: 15-13 Feet	= Bentonite
Scre	en Interval:	36-16 Fee	t		Sand Pack Interval: 37-15 Feet	= Sand
Sand	Pack Type:	Morrie #2			Completion Details: Pro casing	
	Sample	PID	Blow	Percent	Lithology: Burmister Classification System	
(ft)	Depth (ft)	(ppm)	Count	Recovery		
20	19-21	30.0	2.2.3.4	75	Gray black fine SAND and SILT trace Clay moist slight	
			-,-,-,		petroleum odor, no sheen.	
21	21-23	58	4,5,5,6	100		
					21-22' Gray black fine SAND and SILT, trace Clay, moist, slight	
22					petroleum odor, no sheen, 22-23' Grav fine to medium SAND.	
					some Silt, moist, petroleum odor, slight sheen.	
23	23-25	92.0	5,4,4,5	20	Gray fine to medium Sand, some Silt, saturated, petroleum odor,	
					slight sheen.	
24						
25	25-27	88.0	W.O.H.,1,	75	Gray coarse SAND and SILT, saturated, petroleum odor, sheen.	
			3,3			
26						
27	27-29	19.6	W.O.H. for	50	Gray coarse SAND and SILT, saturated, slight petroleum odor, no	
			12",1,1		sheen.	
28						
29	29-31	6.0	2,2,3,3	25	Gray coarse SAND and SILT, some coarse to medium Gravel,	
					saturated, slight petroleum odor, no sheen.	
30						
21	21.22	6.0	1267	50		
51	31-33	5.8	1,3,3,7	50	Gray coarse SAND and SIL1, some coarse to medium Gravel,	
37					saturated, slight petroleum odor, no sneen.	
32						
33	33-35	ND	WOH	50	Red grav fine to medium SAND saturated	
5.57	55 55		for 24"	50	Nod gray fille to modium of 11(D, saturator.	
34			10.21			
35	35-37	ND	1,1,3,5	50	Dark brown coarse SAND grading to dark brown fine Sand with	
]					coarse Gravel in shoe at 37 feet, no odor, saturated.	
36					· · · · · · · · · · · · · · · · · · ·	
37					CLAY at bottom of boring within bit.	
38						
39					Bottom of boring @ 37 feet.	

Construction Details



<u> </u>	LOG	
	LF-7	

Date: 16-Aug-99

Project Name: Mobil Terminal Location: Upper Tank Farm (Disposal Area)
Well Number: LF-7
Casing Elevation: 598.28
Screen Diameter: 4 Inches
Casing Diameter: 4 Inches Log By: M.Falzone Driller: SJB Drilling Method: Hollow Stem Auger Slot Size: 20 Type: PVC Sample Method: 3 inch Split Spoon

Cement/Grout Interval: 0-15 Feet

Backfill Interval: NA

= Cement/Grout = Backfill = Bentonite ::::: = Sand

Total Scre Sand	Well Depth: en Interval: Pack Type:	38 Feet 18-38 Fee Morrie #2	t		Bentonite Interval: 15-16.5 Feet Sand Pack Interval: 16.5-38 Feet Completion Details: Pro-Casing		= Bentonite = Sand
	Sample	PID	Blow	Percent	Lithology: Burmister Classification System		
(ft)	Depth (ft)	(ppm)	Count	Recovery			
0			Air Knifed.				
1							
2							
3							
4			↓				
5	5-7	3.0	1,3,5,3	50	FILL: Brown fine to coarse Sand with glass, concrete and white ash, dry, no petroleum odor.		
6							
7							
8							
9							
10	10-12	1.0	1,1,1,1	15	FILL: Black gray coarse Sand and Ash, some fine Gravel, dry, no		
11					petroleum odor.		
12							
13							
14							
15	15-17	1.0	1,1,2,3	25	FILL: Black gray Ash with some coarse Sand and Glass grading t	°	
16							
17	17-19	ND	3,9,10,10	75	FILL: Red brown Clay and Silt, fragments of Glass throughout grading to black coarse Sand, moist no odor		
18					Branne to black coarse saile, moist, no buor.		
19							

Water Level (Init): NC Borehole Diameter: 10 inches Total Well Depth: 38 Feet



		LOG	
		LF-7	
Auger	Date:	16-Aug-99	

Project Name: Mobil Terminal Location: Upper Tank Farm (Disposal Area)
Well Number: LF-7
Casing Elevation: 598.28
Screen Diameter: 4 Inches
Casing Diameter: 4 Inches Log By: M.Falzone Driller: SJB Drilling Method: Hollow Stem Auger Slot Size: 20 Type: PVC Sample Method: 3 inch Split Spoon

	Construction Details						
Water	Level (Init):	NC			Cement/Grout Interval: 0-15 Feet = Cement/Grout		
Borehole Diameter: 10 inches			Backfill Interval: NA = Backfill				
Total `	Well Depth:	38 Feet			Bentonite Interval: 15-16.5 Feet = Bentonite		
Scre	en Interval:	18-38 Feet	t		Sand Pack Interval: 16.5-38 Feet		
Sand	Pack Type:	Morrie #2			Completion Details: Pro-Casing		
	Sample	PID	Blow	Percent	Lithology: Burmister Classification System		
(ft)	Depth (ft)	(ppm)	Count	Recovery			
20	19-21	ND	2,2,4,4	75	FILL: Black, orange, gray, fine to coarse Sand and Ash with little wood and brick. At 19.5' Olive gray Clay with Silt, moist, no odor.		
21	21-23	ND	2,2,3,5	100	FILL: Olive gray Clay with some Silt grading to olive gray fine Sand with some Silt, saturated, slight petroleum odor.		
22							
23	23-25	ND	-,1,1,3	100	Olive gray fine SAND, trace Silt, saturated, slight petroleum odor.		
24							
25	25-27	1.0	-,1,1,2	50	Olive gray fine SAND, trace Silt, areas of dark staining and trace		
26							
20							
27	27-29	3.0	1,1,1,2	75	Olive gray fine SAND with trace Silt, saturated, grading to a Silty Sand, dry, slight odor.		
28							
29	29-31	1.0	W.O.H.12", 1.1	75	Dark gray, medium to coarse SAND and fine GRAVEL, saturated		
30			-,-				
31	31-33	3.0	3,5,5,6	50	Dark gray, medium to coarse SAND and fine GRAVEL, saturated		
22					no odor, sheen.		
52							
33	33-35	1.0	3,3,3,5	50	Olive gray coarse SAND and fine to medium GRAVEL, some Silt,		
34							
35	35-37	ND	3,5,5,4	50	Olive gray coarse SAND and fine to medium GRAVEL, some Silt		
36					Red brown CLAY, some fine Sand and Silt, saturated, no odor or sheen.		
37							
38							
39					Bottom of boring @ 38 feet.		



							LOG LF-8
P V Casi Scree Casi	roject Name: Location: Vell Number: ing Elevation: en Diameter: ing Diameter:	Mobil Ter Upper Tar LF-8 596.99 4 Inches 4 Inches	minal ık Farm (Disj	posal Area)	Log By: D. D'Amico Driller: SJB Drilling Method: Hollow Stem Auger Slot Size: 20 Type: PVC Sample Method: 3 inch Split Spoon	Date:	17-Aug-99
Wate Boreh Tota Sci San	r Level (Init): ole Diameter: I Well Depth: reen Interval: d Pack Type:	NC 10 inches 37 Feet 37-17 Fee Morrie #2	t	Const	truction Details Cement/Grout Interval: 14-grade Backfill Interval: NA Bentonite Interval: 16-14 Feet Sand Pack Interval: 37-16 Feet Completion Details: Pro-Casing		= Cement/Grou = Backfill = Bentonite = Sand
	Sample	PID	Blow Count	Percent Recoverv	Lithology: Burmister Classification System		
(ft) 0 1 2 3	Depth (ft)	(ppm)	Air Knifed.				
5 6	5-7	2.0	20,8,12,18	100	FILL: Brick ~6 inches, tarlike black coarse Sand, fine cobbles. moist, petroleum odor.		
7	7-9	0.6	9,10,12,12	50	FILL: Brick ~6 inches, tarlike black coarse Sand, fine cobbles, moist, petroleum odor, trace concrete.		
9 10	9-11	0.1	1,1,4,3	20	Coarse FILL: Brick, cinders, coarse Sand, fine rounded gravel, moist.		
11 12	11-13	0.2	2,1,1,2	10	Coarse FILL: Brick, cinders, coarse Sand, fine rounded gravel, moist.		
13 14	13-15	0.1	2,1,2,2	20	Red brown, medium to coarse SAND and FILL and fine GRAVEL, moist, no odor or staining.		
15 16	15-17	0.3	1,3,5,10	50	FILL: Red brown medium to coarse Sand, trace Clay and fine Gravel, moist, no odor.		
17 18	17-19	0.2	10,10,12,11	50	FILL: Brown medium to coarse Sand and fine to medium Gravel, trace Organics, moist, no odor or staining.		
10							

Cement/Grout Interval: 14-grade

Backfill Interval: NA

Bentonite Interval: 16-14 Feet Sand Pack Interval: 37-16 Feet

Construction Details



LOG	
 <u>LF-8</u>	

Project Name: Mobil Terminal Location: Upper Tank Farm (Disposal Area) Well Number: LF-8 Casing Elevation: 596.99 Screen Diameter: 4 Inches Casing Diameter: 4 Inches

Log By: D. D'Amico Driller: SJB Drilling Method: Hollow Stem Auger Slot Size: 20 Type: PVC Sample Method: 3 inch Split Spoon

Date: 17-Aug-99

= Cement/Grout = Backfill = Bentonite = Sand

Water Level (Init):	NC
Borehole Diameter:	10 inches
Total Well Depth:	37 Feet
Screen Interval:	37-17 Feet

N · 110 ידר בי

Sand	Sand Pack Type: Morrie #2				Completion Details: Pro-Casing				
	Sample	PID	Blow	Percent	Lithology: Burmister Classification System				
(ft)	Depth (ft)	(ppm)	Count	Recovery					
20	19-21	0.1	1,3,5,4	40	FILL: Dark brown, medium to coarse Sand and fine to coarse Gravel, trace Silt, wet, slight organic odor.				
21	21-23	0.1	3,5,6,4	40	Brown fine to medium SAND and 3" SILT and fine to coarse GRAVEL trace 3" cobbles black staining saturated slight				
22					petroleum odor.				
23	23-25	0.1	3,2,3,3	100	Brown fine to medium SAND and 3" SILT and fine to coarse GRAVEL, trace 3" cobbles, black staining, saturated, slight				
24					petroleum odor.				
25	25-27	ND	1,3,2,2	50	Dark gray medium to coarse SAND and fine to medium				
26					odor.				
27	27-29	4.0	3,6,9,12	90	Dark gray medium to coarse SAND and fine to medium GRAVEL some red brown Clay, trace cobbles, saturated, slight				
28					petroleum odor.				
29	29-31	3.0	6,8,8,9	50	4 " Dark gray fine to medium SAND and SILT and fine GRAVEL,				
30					gray medium SAND and SILT and medium to coarse GRAVEL, solution of the second s				
31	31-33	1.8	2,3,5,6	30	4" Dark gray fine to medium SAND, some fine Gravel, trace Silt, 4" Olive gray medium SAND and fine to medium GRAVEL				
32					saturated, slight petroleum odor.				
33	33-35	3.6	12,18,25,22	100	16" Olive gray medium to coarse SAND, trace Silt, trace fine Gravel 8" Olive coarse SAND and medium to coarse GRAVEL				
34					saturated, slight odor or staining.				
35	35-37	1.0	4,4,5,4	100	12" Olive gray medium SAND and fine GRAVEL, saturated, no				
36									
37									
38									
39					Bottom of boring (a) 37 feet.				

APPENDIX B

.

.

Well Development Notes

ROUX ASSOCIATES, INC.

1++ ·

and a programmer of the second se

MC17252Y02.111/A-C

∳4 44 4 4

nana yanga u dhalaa a yayaa da ahaa ah

Well	Development	Date		Development	Volume of Water	Relative Water	
Designation	Method	Developed	Developer	Time (minutes)	Removed (gallons)	Clarity	Notes
LF-3	Surge and Pump	8/11/99	GES	40	40	Clear	Water clear after 25 gallons purged
LF-4	Surge and Pump	8/11/99	GES	40	50	Clear	Water clear after 25 gallons purged
LF-5	Surge and Pump	8/11/99	GES	40	35	Clear	Purged 35 gallons, dry, grey fines in water
LF-6	Surge and Pump	8/18/99	GES	45	50	Clear	Water clear after 20 gallons purged
LF-7	Surge and Pump	8/18/99	GES	45	20	Clear	Purged 20 gallons, dry, grey fines in water
LF-8	Surge and Pump	8/18/99	GES	40	45	Clear	Water clear after 35 gallons purged
SB-11	Surge and Pump	7/26/99	GES	60	22	Turbid	Petro, odor, grey fines in water
SB-12	Surge and Pump	8/6/99	GES	20	5	Turbid	One inch bailer used to surge well
SB-13	Surge and Pump	7/27/99	GES	20	6	Clear	Product 0.03 inches in thickness
SB-14	Surge and Pump	7/28/99	GES	30	30	Turbid	Good recovery; grey fines
SB-15	Surge and Pump	8/18/99	GES	30	5	Turbid	Fine sediment
SB-16	Surge and Pump	8/18/99	GES	30	12	Turbid	Product; fine sediment
SB-17	Surge and Pump	8/2/99	GES	40	30	Clear	Thick product noted; Slow recovery
SB-19	Surge and Pump	8/2/99	GES	60	45	Clear	Sheen noted; Very good recovery
SB-20	Surge and Pump	8/18/99	GES	30	4	Turbid	Black product; fine sediment
SB-28	Surge and Pump	8/18/99	GES	45	26	Turbid	Slight petro odor
SB-31	Surge and Pump	8/18/99	GES	30	8	Turbid	Sewer like odor

Table B-1. Summary of Monitoring Well Development for Wells Installed During SFI Continuation, Mobil Buffalo Terminal, Buffalo, New York

į

-

Ŧ

ł

+

ŧ

•

ŧ

frankprint Deter

5B-19 9:57 connenced development DTP DTW T-6/ depth N/A 7.42 20.20 Intervals 7.42 + 12' 9:57 + 10:17 17' to 16' 10:18 to 10:3 16 10 20.20' 10:39 to 10:5 Hoo quality: water char slight - sheen, petro odor sediment quality/descrip ! black, f. sand & silt, petro adar, petro sheen (sel.) Ho quality w/ sospension : black gray, visible sheen, petro 0.do-.

SB-11 Cont 112,0 1/26 St. E/m 15 interval = 3 from 23.9 to 20.9 interval = 2' from 20.9 18.9 interval = 2' from 18.7 Interval = 2' from 18.9 2rd 16.9 4th 14.9 5m whereal = 200 from 14.9 12.88 + each @ 13 min = 5 intervals . * Duration = 60 min total for _well_(1h-) Ē1 following Development Ġ. DTP DIW Total depth Time નન -110990 9.00 - 24.00 -12.90 11:35 ASST 1 sediment on probe de gray f. Sand & silt (sat.) Sheen water checked with bailer: OM gray in color w/ a lot of suspension petroleum odor Building sheen proclominant E VA(Truck (Mobil) removed all Har Jeoudojorog jog Dh & suspension (0 11:55. Ellowing vac 13. do Hao quality River Drw 1 c same

38-11 Development Data 7/26 Mobil Terminal Pinto Property 9:15 an 2-bra Discontined EIK SA. Babrort harmer inck procedures a and location 1- determined that laye there thought to have be 7-26-99 On site @ 7:45 w/ MF & 5H concrete was asphalt. W.C. Zebra & SJB arrived between 8:00 Saw cut instead. Moved beatron de banna jack P 8:15 Observen de banne jack obler area 2 with visible NF Discussed scope of work, Concrete Converced @ 9:45 conducted HASP meeting (all parties signed plan) potential Containinents Well Development (550) SB P DT W Toke Devek (4705-14) of concern. SJB set up decon station, Zen - 12-88 (0:00) 23-58) produces breight of HoO column = 10.7 Poke determined tasks for each crew 2' intervals = 12 min / interval) (i.e ait Kniking, well pulling & Probe had potro odor & Sheen following topol (ev. Interval Start Stop Nodes 23.9-20.9 10:07 Am 10:19 an STB rig compressed 20.9-18.7 10:20 an 10:37 an Sedimont to a jack hammering) 55B & Zebra moved all equipment to specific location of intended 18.9-16.9 10:33 pm 10:45. to stal dep (4 14.9-14.9 10:44 pm 10:58. 23.9 = -32 site work. set up @ 9:00 AM 17.9-12.88 10:59 AM 11:11: AN OF Ser prom Zebra commenced jart hammaning @ 9:10 AM on Pinto Property 1-in-well sort set - up tig on well @ 11.00 FHO rolumn 9:10 AM on Ainto Property 1 = 5.51 intervals set @ 15+ 00 7'

						Grou	Field Observation Log Groundwater Sampling Record						
Sit	e Name	MB7	-			<u></u>		m.,	Falzono	5/A	Keuns		
Pr	oject # ill #	<u>05-0007</u>			Date Weather/Temperature Time of Arrival/Departure		7/28						
	Bample Beq. Well No.	Well Depth	Well Diameter	DTP	Product Thickness	Depth to Groundwater	Sampling Depth*	D .O.	Purge Method	Purge Amount	Sample Time	Öbservations Color/Sheen	
	SBIY	25.5	Ч"	NP	-	13.72	SUDUE DEPTH, 20-25		SURGE BLULK		gonin		
							SURGE 0x014 20'-15'		SAA		gomin		
						25.5'				30541		grossilts Final in water	
			1			23'					11:13:05		
						ୖ ୶୰ୖ					11:13:30	L. L	
				l. I	. 1	18'				÷.	11:17:00		
			•	1		16.00				1	11:17:05		
	······		1									V. scool rocover	
	1				· ·						:		
			1	÷.,						2 - 4 - 4			
			1									and a second sec	
•	Depth at time of	sample collection	on.							<u>.</u>		ð". 	
Ce	mments:	<u></u>											
												•	

4

w. Dovelopment area

Field Observation Log Groundwater Sampling Record

Site Name	p	BT					Technician(s)	D.	D'An	nico/M	Falzaso
Project #	C	59-000	507					4	1		3i -
Spill #					Date Weather/Temperature Time of Arrival/Departure		<u> </u>				
Sample Seq. Well No.	Well Depth	Well Diameter	DTP	Product Thickness	Depth to Groundwater	Sampling Depth*	D.O.	Purge Method	Purg e Amount	Sample Time	Observations Color/Sheen
SB-19	20.20	4"	NP	HEAVY SHEEN	7.42			Sulle BLUCF 7.42-12		20 mm	
								Sque Biart 12-16'		gomin	
								Supled BLOCK		2000	
											hator cloor -1 slight shoon
											pitro odar black(sta)
									· .		Scanner in Suspension
			-		11.00'			11.00	ļ	9.25	to Remove, All LIQUID
		e de la composition de la comp	÷		10.00					9:92:12	~ 20+30 th
		1			9.00'					a : 2 s . 25	U.Scool
Ŧ										:	recovers
								÷	1 I		
* Depth at time o	f sample collectio	n.								:	8
Comments:											· · · · · · · · · · · · · · · · · · ·
											۲

ł

....

					Grou	Field Observa Indwater Sam	ition Log pling Record	đ	\cup , ρ e	ue l'épriet	Dater
Site Name		MBT					Technician(s)	·p	,Ealzon	10	
Project #	G	1-000	507						1		j:
Spill #				1		Weather Time of Arr	Date r/Temperature tval/Departure	<u> </u>	791 <u> </u>		
Sample Beq. Well No.	Well Depth	Well Diameter	DTP	Product Thickness	Depth to Groundwater	Sempling Depth*	D.O.	Purge Method	Purge Amount	Sample Time	Observations Color/Sheen
SS-17	"Dob	<i>५″</i>	12.16	4.44	16.60			SURGE BLOCK 16	-20'	うしょう	THICK PRODUCT
								Sulle BLOCK	. 1	acmin	
:										4.	TO REMOVE SEDMONT
•	·				16,00				•	a:46:36	und total lizuids ~20-305clini
• 1					15.00'					2:48:05	1
			ļ		14.00					નેઃ ડે ઇઃ ડેગ	
-					13.001					りここう	RUZDOR
······	1	1	A. S.		·						
						-					
2	1	-								4	
			· ·							4 	
,		-						÷			
* Depth at time of	sample collect	ion.									
Comments:											

W. Douclopmant Pata 8-18 Mobil Terminal (Pinto Property) 58-16 8-18-99 DTP TOTAL DEPTH DTW H.0 115AVY SHEEN 12.23 13.83 1.6 ARRIVED @ 8:00, CONDUCTED HASP MAGETING PRODUCT THICKNESS (Et) : < . 1 W/ SJB - SIGNED ITASP. OBTAINED HOT WORK MINTERVALS DURATION (MIN) ft /min PERMIT - DISCUSSED SCOPE W/ MF 30 min 41.6 (30 min SET-UP FQUIP PINTO PROPERTY TO SURGE BLOCK INTERVALS (Ft) START WELL DEVELOPMENT @ SB-15 . INSTALLED PADS 13.83 - 12.23 9:55A 10115 @ LF- 7 & LF-8 . DECON AUGERS. 58-15 DTP DTW TOTAL DEPTH HOD COLUMN HEIGHT COMPLETED SETIG DEVELOPMENT @ 10:30 3.59 10.71 12.13 14.30 PRODUCT THICKNESS (Ft) : 1.47 58-20 DTP DTW TOTAL DEPTY HEIGHT 30 ~1.8/15min 11.44 13.87 14.55 a a interaction and the state and the PRODUCT THICKNESS (CF) \$ 2.43 INTERVALS (24) START FINISH * INTERVALS DURATION (MW) ft Imin 14.30 - 17.50 (1.8') 8:55 A 9:10 A 30 min 15-1-12 12.50 - 10.71 (1.79') 9:11 A 9:26 A INTERVALS (Ft) START EINISH __COMPLETED 58-15 DEVELOPMENT @ 9:30 AM 14.55 - 13.05 11:30 1145 COMPLETED SB-20 DEVELOPMENT @ 12:15 LUNCH: 17:20 - 12:50

8-18			a Daclopment Pater
_58-28(PRo_case) ~ 3' AB	VE GRADE)	WELL T	SEVELOPMENT - PINTO PROPERTY
DTP DTW TOTAL_DEPTH	HO COLUMN NEIGHT		8-18-99
N/A 5.98 19.20	13.22		
PRODUCT THICKNESS (CA) & NA		WATER	A SEDMENT QUALITY
NITERVALS DURATION (MIN)	ft/min	(Follow	UNG DEFELSENGNT
3 45	4.5 / 15min		Beleloment J
INTERVALS (CH) START		WELL IDENTIFICATIO	N WATER SEDIMENT
19.20 - 14:70	FINISH IM · U C		
		58715	PRODUCT PRESENT
_10, + _ J. 18 11.00		RECOURAY RATE :	
COMPLETED SB-28 DEVELOPME	r_@11:30	.58-16	HEAVY SREEN - BLACK
		•	- TAR-LIKE SUBSERVICE
<u>_58-31</u>		RECOVERY RATE :	
DEF DEW TOTAL DEPTH	- HO COLUMN HEIGHT	58-20	PRODULT PRESENT
N/A 10.55 14.70	4.15		
-PRODUCT THICKNESS (CH) : N/A	· · · · · · · · · · · · · · · · · · ·	RECOVERY RAFE :	
WERKALS DURATION (MIN)	ft/min	58-28	CLEAR
2 30 min	~2/min		
		RECOVERY PARE :	
INTERVALS (Ft) START		Ka	
14.7 + 12.7	EINISH	10- 31	
		RECOVERY RATE:	
· · · · · · · · · · · · · · · · · · ·			
(OMPLETE) SB-31 DEVELOPMEN	@1:30	SEDIMENT QUALITIES	X RECOVERY RATES WILL BE
		. DETERMINED DURING	JET PUMPING / VAC

8-18			a Daclopment Pater
_58-28(PRo_case) ~ 3' AB	VE GRADE)	WELL T	SEVELOPMENT - PINTO PROPERTY
DTP DTW TOTAL_DEPTH	HO COLUMN NEIGHT		8-18-99
N/A 5.98 19.20	13.22		
PRODUCT THICKNESS (CA) & NA		WATER	A SEDMENT QUALITY
NITERVALS DURATION (MIN)	ft/min	(Follow	UNG DEFELSENGNT
3 45	4.5 / 15min		Beleloment
INTERVALS (CH) START		WELL IDENTIFICATIO	N WATER SEDIMENT
19.20 - 14:70	FINISH IM · U C		
		58715	PRODUCT PRESENT
_10, + _ J. 18 11.00		RECOURAY RATE :	
COMPLETED SB-28 DEVELOPME	r_@11:30	.58-16	HEAVY SREEN - BLACK
		•	- TAR-LIKE SUBSERVICE
<u>_58-31</u>		RECOVERY RATE :	
DEF DEW TOTAL DEPTH	- HO COLUMN HEIGHT	58-20	PRODULT PRESENT
N/A 10.55 14.70	4.15		
-PRODUCT THICKNESS (CH) : N/A	· · · · · · · · · · · · · · · · · · ·	RECOVERY RAFE :	
WERKALS DURATION (MIN)	ft/min	58-28	CLEAR
2 30 min	~2/min		
		RECOVERY PARE :	
INTERVALS (Ft) START		Ka	
14.7 + 12.7	EINISH	10- 31	
		RECOVERY RATE:	
· · · · · · · · · · · · · · · · · · ·			
(OMPLETE) SB-31 DEVELOPMEN	@1:30	SEDIMENT QUALITIES	X RECOVERY RATES WILL BE
		. DETERMINED DURING	JET PUMPING / VAC

8-18	W. Desclepmet Dat
MOBIL TERMINAL - UPPER TANK FARM	LF-7
(DISADSAL _AREA)	DTP DTW TOTAL DEPTH HO COLUMN NELO
8-17-77	N/A 27.0 41.85
	PRODUCT THICENESS : N/A
UP DATED HOT WARK PERMIT @1:00	* INTERVALS DURATION (MIN) FE/min
WELL DEVELOPMENT (surge block)	3 45 5 15 min
LF-6	INTERVALS (Ft) . START EINISH
DTP DIW TOTAL DEPTH HOO COLUMN HEIGHT	41.85 - 36-85 2:50 3:05
ND 56.75 43.00 16.25	36.85 - 31.85 3:05 8:20
- FRODUCT THICENESS : N/A	31.85 7 27.0 3:20 3:65
H WERVALS DURATION (MIN) Ft/min	
	COMPLETED LF-7 DEVELOPMENT Q 3:40
INTERVALS LET START FINISH	
	WATER QUALITY : CLEAR
35 0 + 31 0	SEDIMENT QUALITY: Gray, F. Sanda Silt. (5+1) to SHEEN SLUGAT
31.0 7 16 75	RATE OF RECARDE :
COMPLETED DEVELORMENT @ LE-1 @ 2:40	
WATER QUALITY CLEAP	
SEDIMENT ANALY & C C - C - C - C	
RATE OF RETHARGE: Strand & Sill (SAT) NO SHEAN	

8-18	6 Development Dur
LF-8 DTP DTW TOTAL DEPTH HO COLUMN HEIGHT	
ND 25.78 40.38 14.6	
-PRODUCT THICKNESS : N/A - INTERVALS DURATION (MIN) Lt / mits	
40 - 3.5/10 min	
INTERVALS (FY) START FINISH	
$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	
33.38 - 29.88 4:10 4:10 29.88 - 25.78 4:10 4:20	
COMPLETED LE-8 DEVELOPMENT @ 41 70	
WATER QUALITY: CLEAR NO SHEEN - SLIGHT ODOR SEDIMENT QUALITY: ND	
RATE OF RECHAROE:	
DELON OPS COMMENCED @' 4:30	

					đ	Pull	SE DAT.	AFTER W DOUGLE			
ite Name	MOBil	310	010				Technician(o)	KEEK	JE		
roject #	09-0	0000	7·		_	-			1		3
pill #	, Ř. 11	•		i	• •	Weather Time of Arr	Date r/Temperature tval/Departure	8/2 RAIN	0/89 - RAin 1	- RAi	
Sample Beq. Well No.	Weil Depth	Weil Diameter	DTP	Product Thickness	Depth to Groundwater	Sampling Depth*	D.O.	Purge Method	Furge	Sample Time	Observations Color/Sheen
LF-3	37.50	4"			24.93			SUB JET	40 GAL		DARK GREY WATER OLEALING AFFER 25 GALI
					35,18					11:35	
					25.12					11:42	
					25.09					11:47	i i
•					25.05					11:52	
					25.02			(b) - 01	Į.	12:04	
		1 - L	•••1 • • • •	1							
		·		· · · · · · · · · · · · · · · · · · ·						·	
											1
									: v		
•											
Depth at time of	sample collection	n.				L <u>an at 2011</u> 2013	lone constan				
, (AT UNICITUI)			, Î								
			÷ :					•			

1

					Grou	Field Observa Indwater Sam	ition Log	t.∧ d	11-1- 1-11-1	12 Well Belozosmely	
Site Name	MOBI	L 31	1010				Technician(s)	KEEN	IE-		ļ.
Project #	89-0	0007	7 .								N
Spili #			; ! .	i	•	Weather Time of Arr	Date r/Temperature tval/Departure	RAI	199 N 1		
Sample Beq. Well No.	Well Depth	Well Diameter	DTP	Product Thickness	Depth to Groundwater	Sampling Depth*	D.O.	Purge Method	Purge	Sample Time	Observations Calor/Sheen
LF-4	34.70	4"	22.52		22.53			SUB JET	50 Gol		DARK GREY WATER. CLEARING AFTER 35
					24.63				12:14		GALLONS
					22.55				12:18		
					32.54				12:22		Ì
•					22.53				12:29		
					ι.	į		r a s a	ļ		
		1									
		н									
,							-				
• Depth at time of	sample collection	A second a s A second a se		Latination are point.							
Contraction;	<u></u>		.ī. '					<u></u>	• •		· · · · ·
		1	Ŧ						•		

			the design of the	we contraction the second s							
te Name	MOBIC	- 31	010				Technician()	KEE	NE		· · ·
oject #	09-0	0007	•				· · _		1		•
	1 H. H		11.	1		Weathe Time of Arr	Date r/Temperature ival/Departure	8/20 R	199, Ain 1		
Sample Beq. Well No.	Well Depth	Well Diameter	DTP	Product Thickness	Depth to Groundwater	Sampling Depth*	D.O.	Purge Method	Purge Amount	Sample Time	Observations Color/Sheen
LF5	.37.90	4"			26.36			ЅЦІЗ ЈЕТ	35 GAL DRY		HEAVY GREY WATER. DID NOT CLEAR U
					27.76					12:55	ATTEMP TO BAIL
					26.60					1:00	DUE TO RAPID
•					26.52					1:05	RECHARGE
					26.51					1:15	
						!		5 4 5 4	l.		
		5									
·		۰.								÷	
									di s		
Depth at time of	i sample collectio	n				, agos 2, an ann a sugar ann an s			•		
			ι.								
			: :	•							

	Field Observation Log Groundwater Sampling Record													
ilte Name	MOBIL	310	10				Technician(s)	KEED	NE		· · ·			
'roject #	09-	0000	7				· • .		1		; ;;			
ipill #	· · · · ·			i .		Weather Time of Arr	Date r/Temperature tval/Departure	8/20 	199 i N 1	• • •				
Sample Beq. Well No.	Well Depth	Well Diameter	DTP	Product Thickness	Depth to Groundwater	Sampling Depth ^a	D.O .	Furge Method	Purge Amount	Sample Time	Observations Color/Sheen			
1F6	39.90	4"	5	(27.06			SUB JET	50GAL		HEAVY GREY WATER CLEARED AFTER 20 GAL			
					27.12					1:28				
					27.09					1:34				
	·				27.05					1:45	ŕ			
•				•						•				
				11 1 11		1	E . P	· • •	l.					
		11												
·		· .												
											3			
Depth at time of	sample collectio	m.							<u>Andrean and and</u>					
Conwnenti:			1 ¹⁰	· · · · · · · · · · · · · · · · · · ·										
		1	: :		:	: :								

•

•					Gro	Field Observs undwater Sam	ntion Log Apling Recor	ક્રાટ્ટ(d	26 (11)713	AFTCQ C	Nell Develedment
Site Name	MOBI	L 31	010				Technician(s)	KEE	NE		
Project #	09-00	0007	•						- 1		i i
Spill #	· · · ·		11.	i .		Weathe Time of Arr	Date r/Temperature ival/Departure	816 Rain	1		
Sample Seq. Well No.	Well Depth	Well Diameter	DTP	Product Thickness	Depth to Groundwater	Sampling Depth*	D.O.	Purge Method	Purge	Sample Time	Observations Color/Sheen
LF 7	41.60	4''	<u>مــــــــــــــــــــــــــــــــــــ</u>	&	27.16			Suß JET	DRY 20 Gol		HEAVY GREY WATER D'D NOT CLEAR UP
					32,27					1:55	AFTER 20 GAL.
					27.41					2:04	
					27.02					2:10	i
•					27.00					2:15	
					с 3	1		t kj∞			
							· · .				
•		1	:							-	
		·								·	
÷											
Depth at time of Comments:	sample collectio	n.							•		
			dr '								
		;	ŧ.		:	· : 1		5 - 		,	

.

ł

ŧ

Site Name	MOBIC	- 310	10			•	Technician()	KEE	NE			
Project #	09-00	0001	•									
Spill #	· · · ·			i		Weather Time of Arr	Date r/Temperaturo Ival/Departuro	8/2019 RAIN	<i>7 9</i> 1	· · ·		1
Bample Beq. Well No.	Well Depth	Well Diameter	DTP	Product Thickness	Depth to Groundwater	Sampling Depth*	D.O.	Purge Method	Furge Amount	Sample Time	Observations Color/Sheen	
LF 8	40.05	4 ¹¹			25.22	-		SUB JET	45 Gal		HEAVY GREYWATED CLEARED AFTER	2
					25,91					2:30	35 Gallons,	
				•	25.85					2:40		1 1 1
					25.85					2:50		i
		-	•									
		tes - t			i .	1		ę star	1		And the second s	NY DI
		11					· · · ·					
		۰.								:		
										•		. !
r												1
١												
* Depth at time Comments:	of sample collectio	n							·			
			9 T.									

1

		,			l Grou	Field Observa Indwater Sam	tion Log pling Recor	் அட் b	ese on	TA OF	ice as process
Site Name	MBT	PIN	TO T	roper	274		Technician(s)	51	EVIS	JAR	<u>ris</u>
Project #	09-0	20007	· .	02/03	3				1		j.
Spin #~	SB	15	 •	•		Weather Time of Arr	Date /Temperature val/Departure	80°5	19-99 WW7 CSC SF	<u>a</u>	11 15 -12 00-
Sample Seq. Well No.	Well Depth	Well Diameter	DTP	Product Thickness	Depth to Groundwater	Sampling Depth*	D.O.	Purge Method	Purge Amount	Sample Time	Observations Color/Sheen
SBIS	14.26	4"	10,70	THIN	10.73			JET SUB	54AL	115	GIVOUND WATER
ARE	COVE	RY	12.60		17.51					1130	DID NOT FILL HOSE.
			12.02		12.24					1145	FINE SECTIMENT
			11,50		11,80					1200	LAIDEN - WELL
											Bottom Has
				, i		:					TSLACK, ANCLIFUR
											CNYSTAL LIKG
											501 Lances
											PIECES)
* Depth at time of Comments:	sample collectio	n.									

					Gro	Field Observa undwater Sam	tion Log pling Recor	đ	PURCH	10-77A	AFTER LA Decelept.
Site Name	Mī	37/	PINTO	PROF	FETY	-	Technician(s)	\leq	- TEVEN	HARR	-1S
Project #	69	- 00	0.7		,	-	-				;i
Spill #	į ė. s	SB	- 28	1 ····		Weather Time of Arr	Data r/Temperaturo tval/Departuro	8- 80 3	19-99 50N 2013	49	
Sample Seq. Well No.	Well Depth	Well Diameter	DTP	Product Thickness	Depth to Groundwater	Sampling Depth*	D.O.	Purge Method	Purge Amount	Sample Time	Observations Color/Sheen
SB-28	19,50	4"	Trace	\$	5.60			50B JET	ZHGNL	321	RISER J'AGOVE
					17,50					339	Grade
					17.30					341	
					01.11					343	LIGHT ODOR,
•			÷.		16.90					3 <u>44</u>	HZO MUDDY
					16.70	:		- 1	l.	3.45	
		5			16.50					347	
·		۲.			16.30					3.49	
		·			16:10					351	
* Depth at time of	sample collection	n.									v t
			<i>.</i>						······		
		:	: •						•		

;

	Field Observation Log HURGE (DATID PARTIE) C. Devectories Groundwater Sampling Record												
ite Name	ME	37/7	PINTO	PROP	BRTY		Technician(s)	\leq	TEVEN	HA	TIZIS		
roject#	09	- 000	07	02/0	3		·						
pill #	5	B-2	ð	1		Weather Time of Arri	Date Temperaturo val/Departuro	- 8 60 1 3	19-99 • SUN • 1 7	03			
Sample Beq. Well No.	Well Depth	Well Diameter	DTP	Product Thickness	Depth to Groundwater	Sampling Depth*	D.O.	Purge Method	Purge Amount	Sample Time	Observations Color/Sheen		
5B-20	14.31	4*	11.40	CRUDE	13.46			sub Jet	4GAL	130	PRODUCT TOLACK,		
			12.90		13.23					150	THICK, HZO		
			12,23		12,33					153	SECTIMENT LAIDEN		
			12.00		12.22					15]	W/FINES (BLACK)		
•			11.91		12.21					Z.3	COLOR H, O		
						1		- b - F			CLOUDY		
		\$ 1											
		4 .											
											1		
			·										
· · ·													
Depth at time of	sample collectio	n.									2		
omments:			ŵ						·····				
		:	: ;										

;

					Grou	Field Observa indwater Sam	tion Log pling Recor	ď	PURC	 	D AFTORCOULD NELEZY
Sile Name	_Mī	37/1	PINTO	Prof	ERTY		Technician(s)	5	EVEN	Hor	rs in
Project #	09-	- 000	<u>27</u>	02/0	53 '				1		
Spili #	· · · · ·	<u>58 -</u>	16	1		Weather Time of Arri	Date Temperature/ val/Departure/	<u> </u>	<u>۲۹- ۹۹</u> لر <u>ن ک</u> ۲ <u>۹ - ۹۶</u>	3 0 4	
Sample Beq. Well No.	Well Depth	Well Diameter	DTP	Product Thickness	Depth to Groundwater	Sampling Depth*	D.O.	Purge Method	Purge Amount	Sample Thme	Observations Color/Sheen
SBIE	14.80	4 ^{(t}	12.21	CRUDE	12.22			5013 JE7	12GAL	230	
					13.47					239	
					12.92					241	
									3		Stop RECOVERY
											TEST DUE TO
						1		ke a	Į.		MACFUNCTIONIN
									1		MIST GUAGES
		۰.			13.25					3.02	
					TZEC	-13,00				了萼。	PRODUCT DANK
					15.80					3	STRONG ODOR
					12.40					3 09	HOO MUDDY
											SSDIMINT LAIDEN
• Depth at time of a Comments:	numple collection								•		(Fines)
·.			,ē ¹								· · · · · · · · · · · · · · · · · · ·
		:	: :		:						

Ŧ

ŧ

ł

1

ł

+

		THE RECENTERS									
te Name	M	37/	PINTO	Prop	ERTY_		Technician(s)	57	WEN	Har	rris i
oject #	, 6	9-00	2007		/		·				71
138 #	2 H. 12	5B-3	31	i	· .	Weathe Time of Arr	Date r/Temperature tval/Departure		19-99 500	4 30	
iample Seq. Well No.	Well Depth	Well Diameter	DTP	Product Thickness	Depth to Groundwater	Sampling Depth*	D .O.	Furge Method	Furge Amount	Sample Time	Observations Color/Sheen
B-31	14.72	4"	Ð	Q	10,50			SUB JET		400	HZO HEAVY
					Peits	-				AR	SEWAR ODOR
					12,15					419	(GREY WATER?)
					11.70					4 =	i
•			1		11,50					43	
					11.30	1		- 6 - 14	l.	4:22	
					11.00					4	
		۰.			10.65					430	•
									ан н. 1		
,											
epth at time of	sample collection	1.				L	L		L		
mnents:	<u> </u>		,ti						•		
			: ;		-	:		· ·			

•

F

1

1

;

ŧ

•

8 2 2

	MBT/PINTO PRODERTY					Field Observa Indwater Sam	tion Log pling Recor	đ	Puzza	0,27,2 1	AFTER CELL OFFICE
Site Name	MB	J/F	NTO	PROFFIC	2TY		Technician(s)	Sn	NEN	JAR	25
Project #	00	2-000	2007	02/	03		· • •		1		
Spill #	19. 1	5B -	19			Weather Time of Arr	Date r/Temperature ival/Departure	8- 80 121	19-99 SUN 15-1-18	2;40	
Sample Beq. Well No.	Well Depth	Well Diameter	DTP	Product Thickness	Depth to Groundwater	Sampling Depth*	D.O.	Purge Method	Furg e Amount	Sample Time	Observations Color/Sheen
SB-19	19.15	4"	Þ		7,84			১ ৩৪ ১ ভ T	45Gal	12 15	CONT. RECOVERY
REC	OVER	<u> </u>	θ		14.32					1230	H20 Full OFFINES
	/				12,50					1235	GREY PASTE AT
					10.50					1238	well isottom
	ļ				9,50					12 40	HO CLEAR
				1, 1,	8.50	1		k a	ļ	1242	
		· · ·									
									1 - A	-	
•											
• Depth at time of Comments:	sample collection	n.							•		
			,÷						i		
			: '					•			

.

.

Ŧ

l

-

ł

4

APPENDIX C

Aquifer Test Procedures and Analytical Results

and a second second second

and compared to the statement of

......

ա ապահում է ույս անհեն հր վերաստիներին մութուն է մաջիների։

en en en en angeler e real dete
AQUIFER TEST PROCEDURES AND ANALYTICAL RESULTS

1.0 INTRODUCTION

Slug tests were performed by GES October 14 and 15, 1999 at Mobil Oil Corporation's Buffalo Terminal (Site) in Buffalo, New York. Three monitoring wells were tested to characterize the hydraulic conductivities of the overburden aquifer beneath the Site. The slug tests were performed in accordance with GES' Field Standard Operating Procedure, Slug Tests (GES, 1992), as provided in the Work Plan for Continuation of the SFI (Roux Associates, Inc., 1999).

2.0 EQUIPMENT

The principal equipment used to conduct the slug tests included:

- a one-gallon capacity bailer (i.e., slug) used to displace a volume of water within the well being tested (the slug size was chosen based on well diameter, water column height, and the amount of displacement or drawdown required to adequately stress the aquifer);
- transducers that continuously measured the total hydraulic head above them when lowered below the water table (i.e., the height of the column of water above the transducer tip); and
- an In-Situ, Inc. Hermit[®] 1000C Data Logger, which records and stores the hydraulic head data from the transducers.

3.0 SLUG TEST PROCEDURES

Prior to initiating each slug test, the total well depth and depth to water within the well were determined. The transducer was lowered into the well and secured at a depth that would not interfere with insertion and removal of the bailer.

Background data was measured using an oil/water interface probe to verify that static conditions existed within the well. Once the static level had been determined, the slug test was performed. A rising head test slug test was initiated by rapidly removing one gallon of water from the well, causing a decline in the water level within the well. The data logger then recorded the rise in water level over time. In addition, depth to water measurements were taken with an oil/water

at some at the second second

-1-

interface probe and manually recorded as a backup to the data logger. Once the water level had returned to near static conditions (i.e., at least 90 percent of the initial displacement had recovered), the test was ended.

4.0 DATA ANALYSIS

Slug test data were analyzed by the Bouwer and Rice (1976) Method using the software package AQTESOLVTM (Glenn M. Duffield, 1998), which allows an interactive graphical method of curve matching to the water-level recovery data. Once the best-fit line through the portion of the data determined to be representative of the aquifer is obtained, the hydraulic conductivity (K) value is automatically calculated. The graphs showing the best-fit lines and calculated K values are provided at the end of this Appendix. All three slug tests were performed on unconsolidated (i.e., overburden) wells. The effective base of ground-water flow for these wells is the clay layer present at 36 feet below grade.

Unconfined conditions occur in all three wells, and the screen zone of each well straddles the water table. Since drawdown occurred within the screen zone of each well tested, the radius of each of these wells (LF-5, LF-7 and LF-8) is affected by its gravel pack. AQTESOLV[™] automatically corrects for the contribution of the gravel pack, where appropriate. One rising test was performed and analyzed for each well. Input values for each well are summarized in Table C-1.

5.0 SUMMARY OF RESULTS

Table C-2 contains a summary of the K values obtained from the slug tests. As listed on the AQTESOLVTM graphs, the K values are presented in feet per day (ft/d).

The hydraulic conductivity (K) values obtained for the three overburden wells tested (i.e., LF-5, LF-7 and LF-8) range from 32 to 190 feet per day (ft/d). These values of K are all within the range of hydraulic conductivities characteristic of soil types similar to those identified throughout the Terminal Disposal Area (i.e., clean sand with silt and gravel). The highest K value was determined for well LF-8, which was installed within the location of historical Buffalo River channel and screens a slightly coarser portion of the formation than wells LF-5 and LF-7.

-2-

The lowest K value was determined for well LF-7. The geologic log for LF-7 indicates the presence of a relatively thin layer of tight fine silty sand (beneath the water table) described in the geologic log as "dry." The average K value obtained from the three wells was approximately 100 ft/d. The K values obtained from the slug tests and the associated geology are summarized in Table C-2.

6.0 REFERENCES

- Bouwer, H., 1989. The Bouwer and Rice Slug Test An Update. Ground Water. vol 27. no 3. pp 304-309.
- Bouwer, H. and R.C. Rice, 1976. A Slug Test for Determining Hydraulic Conductivity of Unconfined Aquifers With Completely of Partially Penetrating Wells. Ground Water. vol 12. no 3. pp 423-428.
- Duffield, Glenn M., 1998. AQTESOLV[™] for Windows. ARCADIS Geraghty & Miller, Inc.
- GES, 1992. Field Standard Operating Procedure, Slug Tests. SOP No. 0018, Revision No. 1a. July 10, 1992.
- Roux Associates, Inc., 1999. Work Plan for Continuation of the SFI, Mobil Oil Corporation, Buffalo Terminal, June 3, 1999.

T....

. . .

_			
Well Designation:	LF-5	<u>LF-7</u>	LF-8
Formation	Overburden	Overburden	Overburden
Falling or Rising Head Test	Rising	Rising	Rising
Initial displacement	3.606	4.341	2.977
Casing radius (r)	0.167 *	0.167 *	0.167 *
Borehole radius (r _w)	0.52	0.52	0.52
Saturated thickness (b)	12.76	10.55	12.28
Screen length (L)	20.00	20.00	20.00
Depth of screen bottom	36.00	36.00	36.00
Depth to Water	23.24	25.45	23.72
Static water column height (h)	12.76	10.55	12.28
Computer file name	LF5-GES	LF7-GES	LF8-GES

Table C-1. Summary of Slug Test Data Used to Prepare AQTESOLV™ Input Files
Mobil Oil Corporation, Buffalo Terminal, Buffalo, New York

NOTES:

All Measurements in feet. Depths are relative to land surface. * - Casing radius corrected within AQTESOLVTM; screen zone straddles water table

-

....

Well Designation	<u>Slug Test Type</u>	Hydraulic Conductivity (feet/day)	Major Component(s) in Screen Zone
LF-5	Rising	75	Medium SAND and Silt
LF-7	Rising	32	Fine SAND grading to SAND and Silt, overlying SAND and Gravel
LF-8	Rising	<u>190</u>	Poorly sorted SAND and Gravel, some Clay, some Silt
	AVERAGE	99	

Table C-2. Summary of Hydraulic Conductivities Calculated from Slug Testing, Mobil Oil Corporation, Buffalo Terminal, Buffalo, New York

ŧ

ł

÷

÷

÷

ŧ.

1

ŧ

İ

į

ŧ

Ì







LF-8 RISING	HEAD TEST			
Data Set: C:\myfiles\MOBIL\17252Y02\Report\LF8-GES.aqt				
Date: <u>11/18/99</u>	Time: <u>14:25:50</u>			
PROJECT IN	FORMATION			
Company: Roux Associates, Inc.				
Client: Mobil				
Project: 1/252YU2 Test Location: Buffalo, New York				
Test Well: 1 F-8				
Test Date: October 14, 1999				
AQUIFE	R DATA			
Saturated Thickness: <u>12.28</u> ft	Anisotropy Ratio (Kz/Kr): 1.			
WELL DA	NTA (LF-8)			
Initial Displacement: 2.977 ft	Water Column Height: 12.28 ft			
Casing Radius: 0.167 ft	Wellbore Radius: 0.52 ft			
Screen Length: 20. ft	Gravel Pack Porosity: 0.3			
SOLUTION				
Aquifer Model: Unconfined	Solution Method: Bouwer-Rice			
K = <u>190.</u> ft/day	y0 = 1.5 ft			

APPENDIX D

Data Validation Report

ROUX ASSOCIATES, INC.

wara a concernante

MC17252Y02.111/A-C

tere and the second
-

Data Validation Services

120 Cobble Creek Road P. O. Box 208 North Creek, N. Y. 12853 Phone 518-251-4429 Facsimile 518-251-4428

December 7, 1999

Noelle Clarke Roux Associates 1377 Motor Parkway Islandia, NY 11788

RE: Validation of the Mobil --Elk St. Site Data Packages Lancaster Lab SDG Nos. ELK01 through ELK06 Lozier/Express Lab SDG No. 082499

Dear Ms. Clarke:

Review has been completed for the data packages generated by Lancaster Laboratories and Lozier/Express Laboratories, pertaining to samples collected at the Mobil Elk St. Site. Soil and aqueous samples collected 7/7/99 through 9/29/99 were processed for combinations of STARS volatiles, PAHs, and eight site-specific metals. Five aqueous samples collected 8/24/99 were processed for total lead by Lozier/Express Labs. Four of them were analysed for Tetra Ethyl Lead (TEL), and one of them was also processed for hexavalent chromium. Field and trip blanks, and matrix spikes/duplicates were also processed. Methodologies utilized are those of the USEPA SW846.

Data validation was performed with guidance from the most current editions of the USEPA CLP National Functional Guidelines for Organic and Inorganic Data Review and the USEPA SOPs HW-2 and HW-6. The following items were reviewed:

- * Data Completeness
- * Custody Documentation
- * Holding Times
- * Surrogate and Internal Standard Recoveries
- * Matrix Spike Recoveries/Duplicate Correlations
- * Preparation/Calibration Blanks
- * Control Spike/Laboratory Control Samples
- * Instrumental Tunes
- * Calibration Standards
- * Instrument IDLs
- * Method Compliance
- * Sample Result Verification

Those items showing deficiencies are discussed in the following sections of this report. All others were found to be acceptable as outlined in the above-mentioned validation procedures, and as applicable for the methodology. Unless noted specifically in the following text, reported results are substantiated by the raw data, and generated in compliance with protocol requirements.

In summary, sample processing was primarily conducted with compliance to protocol requirements and with adherance to quality criteria, and most analyte results are usable as reported, or with minor qualification as estimated ("J" validation qualifier). The exceptions are the edits of some of the low level PAH detections due to possible contamination.

Roux data tables representing the Lancaster results were edited with red-ink to include the validation data qualifiers. These are attached to, and referenced within, this report. No qualification to the Lozier/Express Lab data was indicated. Copies of laboratory case narratives are attached, and should be reviewed in conjunction with this narrative.

Data Completeness/General

There were significant delays between sample collection and shipment to the laboratory, with time intervals of up to 9 days. Technical holding times were met, and results are therefore not qualified, but it is recommended that the status of the samples during the interim (i.e. temperature and custody) be documented by the sampler with a memorandum to the file.

The custodies pertaining to samples collected 7/29/99 through 8/6/99 (received by the laboratory on 8/7/99) do not show shipment dates and times.

Data packages were to have been generated in accordance with the NYSDEC ASP Category B deliverables. They were not, but sufficient information was provided to validate the results. Lancaster analysis report forms include information (i.e. associated blank and spike results) other than the details of the specific sample. Only the sample results were reviewed on these forms.

Data package ELK03 includes four samples, including two samples collected more than a month prior to other two. A single package was generated to provide efficient review. Adequate QC was processed.

No resubmissions were required of Lancaster; raw data for the hexavalent chromium analysis were requested, and provided by Lozier. A copy is attached to this narrative.

STARS Volatile and BTEX Analyses by EPA 8021

Samples which were received at elevated cooler temperatures on 8/23/99 and 8/25/99 in SDG ELK01 were recollected, analysed, and reported in SDG ELK06. The original samples were reported for BTEX, but, with the exception of the data for SB-12 and SB-14, the data were not validated. Results for those four analytes were comparable for the two sample collection events.

Although this analysis was performed on a rather specific detector system (PID), the identifications of the detected analytes has not been confirmed on a second system. Therefore interferences can exist to contribute to false positives. Confirmation analyses are not required if project history provides confidence in the analyte identifications.

The method holding time of 14 days from sample collection was used for this project.

Results for selected analytes in many samples were reported at elevated reporting limits due to interferences which prohibited evaluation at lower limits.

Due to elevated surrogate recovery (124%), detected values of STARS volatile analytes in LF-3 are considered estimated, with a possible slight high bias.

In cases where an initial analyte result exceeds the calibration range, dilution results are used for that analyte.

Matrix spikes/duplicates were performed on aqueous samples SB-28, SB-11, and LF-3, and soil samples SB-17(11-13) and LF-7/21-23. They showed acceptable values, or outlying values not affecting sample results, with the following exceptions:

- a. The detected result for o-xylene in SB-17(11-13) is qualified as estimated ("J") due to outlying matrix spike recoveries (-6% and 214%). Sample nonhomogeneity is suspected.
- b. 1,2,4-trimethylbenzene in SB-28 is estimated due to outlying matrix spike recoveries (120% and 69%).

Aqueous field duplicates of SB-11, LF-3, and SB-28 showed good correlation, although the naphthalene values of LF-3 and LF-3 DUP are qualified estimated due to values above, and below, the MDL.

The field blank collected with the soil samples in SDG ELK02 (collected 7/26/99 through 8/6/99) showed low level contamination. The following sample detections are also possible contamination, and results are edited to reflect nondetection ("U") at the originally reported values:

1,2,4-trimethylbenzene and naphthalene in SB-30/0.5(0-0.5)

1,2,4-trimethylbenzene, n-propylbenzene, n-butylbenzene, and naphthalene in SB-27/0-0.5

Naphthalene was detected in several blanks (method and equipment) in the project, and associated sample results have been reviewed for consideration as contamination. No additional edits were indicated.

Trip blanks were not included with each shipment. Therefore contamination contribution is not thoroughly evaluated.

Due to elevated daily standard responses, the results for sec-butylbenzene (23%D) in LB-1(18-20) are considered estimated

STARS PAH Analyses by EPA 8270

Although not consistent with the NYSDEC ASP reporting requirements, the sample data were reported using Method Detection Limit (MDL) values for reporting limits, rather than method CRDL values (which are about ten times higher). The data package Forms 1 show correct CRDL limits, and values between the MDL and CRDL are correctly flagged with the "J" qualifier. However, the summary analysis reports, and the client tables are not. The attached tables have been edited to include qualification as estimated ("J") for values below the linear range (which is five times the reported MDLs).

In cases where an initial analyte result exceeds the calibration range, dilution results are used for that analyte.

It is noted that acenaphthylene was not reported as a target analyte for some of the project samples. Review of the associated standard and sample data shows that valid results for that analyte should be available from the laboratory by reprocessing the existing sample analysis data files. This should be requested, if of concern for the project.

Due to low surrogate recoveries (21-23%), the results for LB-1(18-20) are considered estimated, possibly biased low. The initial analysis results should be used preferentially over the reanalysis.

Sample SB-17(11-13) exhibited three outlying internal standard recoveries in the initial analysis, but acceptable responses in the dilution analysis. The attached table values have been edited to reflect the most accurate values from the two analyses, and include qualification of the result of associated nondetected analyte acenaphthylene as estimated.

The results for the three analytes in LF-5/21-23 which are associated with internal standard d12chrysene are considered estimated due to its low recovery (42%).

Some of the soil samples produced one low surrogate recovery, and were reextracted. The initial analysis results can be used without qualification. However, it is noted that the reextraction results of SB-16(11-13) showed concentrations about twice those originally determined. The sample results should be used with that consideration.

The field blank collected with the soil samples in SDG ELK02 (collected 7/26/99 through 8/6/99) showed low level contamination of eleven analytes. The samples in that delivery group were evaluated for responses below five times the blank levels, and qualified as nondetection ("U"), accordingly. Numerous low level detections were affected.

Resolution was not possible between benzo(b)fluoranthene and benzo(k)fluoranthene in some samples (see case narratives). The results for these two analytes in affected samples (SDG ELK05) are qualified as estimated, although the reported value is usable as a combined result.

Due to poor spectral quality (nonsubtractive interferences), the detections of naphthalene and acenaphthylene in SB-11 and SB-11-DUP are considered tentative ("N" flag).

Due to poor spectral quality (nonsubtractive interferences), the detection of acenaphthene in SB-19 is also considered tentative ("N" flag). In other cases of observed interferences in the spectra, the relative responses of the secondary and tertiary ions were evaluated.

Standard responses were acceptable, with the exception of those for chrysene and pyrene on 8-6-99 and 8-9-99 (26%D to 29%D; elevated responses). The pyrene and chrysene results for SB-11(11-13), SB-15(11-13), SB-16(11-13), and SB-17(11-13) are considered estimated.

Matrix spikes/duplicates were performed on aqueous samples SB-28 and SB-11, and on soil samples SB-17(11-13), LF-7(21-23), ESL-14(0-0.5), and ESL-15(0-0.5). They showed acceptable values, or outlying values not affecting sample results, with the following exceptions:

- a. Anthracene in ESL-15(0-0.5) is estimated due to elevated matrix spike recoveries (168% and 200%).
- b. Those for ESL-14(0-0.5) do not provide for adequate evaluation due to the analysis dilution performed.

Aqueous field duplicates of SB-11, LF-3, and SB-28 showed good correlation.

The field blank provided with samples in SDG ELK03 (collected 8/16/99) was not processed for PAHs. Contamination is therefore not thoroughly evaluated.

Samples received in SDG ELK01 at elevated cooler temperatures (10 to 13 degrees C) are not recommended for qualification due to the persistance of the PAH target analytes under those conditions.

Metals Analyses

Matrix spikes/duplicates were performed on aqueous samples SB-28, SB-11, on soil samples SB-17(11-13), LF-7(21-23), ESL-14(0-0.5), and ESL-15(0-0.5), and on batch QC for some of the elements run by graphite furnace, . They showed acceptable values, or outlying values not requiring qualification of associated sample results, with the following exceptions:

- a. The chromium results in samples LF-7(21-23) and LB-1(16-18) are estimated due to elevated matrix spike recovery (129%).
- b. Selenium in SB-28 and SB-19 is estimated due to low recovery in the matrix spike duplicate (67%).

ICP serial dilution values for in samples SB-11, SB-28, SB-17(11-13), LF-7(21-23), ESL-14(0-0.5), ESL-15(0-0.5) were acceptable.

Thallium in the field blank of SDG ELK02 is estimated due to low associated CRI standard recoveries (62% to 73%). Selenium in LF-7(21-23) is similarly estimated (63% to 79%).

Some of the metals results are reported at elevated reporting limits due to matrix effect.

pg. 6/6

The field blank provided with samples in SDG ELK03 (collected 8/16/99) was not processed for metals. Contamination is therefore not thoroughly evaluated.

The receive date on the Form 1-IN for LB1-(16-18) should be 7/9/99.

Aqueous digestion logs should show the sample pHs (required by ASP).

Occasional errors were observed on QC summary form entries. These do not affect sample results, and are not detailed herein.

Total Lead/Hexavalent Chromium Analyses by Lozier/Express

Accuracy and precision evaluations, and the field duplicate correlation, which were all performed on MW-1URS, were acceptable.

The ICP serial dilution results were also acceptable.

Reported sample results are substantiated by the raw data.

Tetraethyl Lead Analyses by 8270 by Lozier/Express

No qualifications to the sample results are indicated, but overall instrument/column performance was poor, as indicated by the following parameters:

Calibration standards and sample data showing significant tailing.

- The instrument was not tuned properly, as indicated by the lack of detection of the required m/z 441 ion. Many of the standard and sample responses required manual integration.
- The surrogate standard d5-nitrobenzene produced significant area counts on integration, but showed little overall GC response. Its retention time in the standards varied.
- Internal standard areas in the samples and field blank were about twice those of the associated calibration standards. The sample results, which are nondetection, are not affected by elevated responses.

Although the instrument performance was poor and not incompliance with protocol requirements, the response identified as tetraethyllead was acceptable in the standards, and the reported nondetection in the samples is supported by the raw data.

Accuracy and precision determinations, and field duplicate correlations, of MW-1URS were within laboratory range.

Please do not hesitate to contact me if questions or comments arise during your review of this report.

Very truly yours,

Judy Harry

Lancaster Laboratories A Thermo Analytical Laboratory Where quality is a science.

.

. .

Sample Reference List for SDG Number ELK01 with a Data Package Type of I

09593 - Mobil Oil Corporation

MOBIL: NY

Lab Sample	Lab Sample	
Number	Code	Client Sample Description
3219182	SB11U	SB-11 Unspiked Grab Water Sample LOC# WBS#
3219183	11SBU	SB-11 Duplicate Grab Water Sample LOC# WBS#
3219184	SB11U	SB-11 Matrix Spike Grab Water Sample LOC# WBS#
3219185	SB11U	SB-11 Matrix Spike Dup. Grab Water Sample LOC# WBS#
3219186	B11FB	SB-11 Field Blank Grab Water Sample LOC# WBS#
3219187	LUBTB	Trip Blank (Lube Oil #1) Water Sample LOC# WBS#
3219459	MNB12	SB-12 Grab Water Sample LOC# WBS#
3219460	MNB14	SB-14 Grab Water Sample LOC# WBS#
3219461	MNB16	SB-16 Grab Water Sample LOC# WBS#
3219462	MNTBK	Trip Blank (Lube Oil #2) Water Sample LOC# WBS#
3220988	LF3	LF-3 Grab Water Sample LOC # WBS #
3220989	LF4	LF-4 Grab Water Sample LOC # WBS #
3220990	LF5	LF-5 Grab Water Sample LOC # WBS #
3220991	LF6	LF-6 Grab Water Sample LOC # WBS #
3220992	LF7	LF-7 Grab Water Sample LOC # WBS #
3220993	LF8	LF-8 Grab Water Sample LOC # WBS #
3220994	ТВ	Trip Blank Water Sample LOC # WBS #

A Thermo Analytical Laboratory Where quality is a science.

> Sample Reference List for SDG Number ELK02 with a Data Package Type of NYSDEC

> > 09593 - Mobil Oil Corporation MOBIL: 625 Elk St. - Buffalo, NY

Lab Sample	Lab Sample	
Number	Code	Client Sample Description
3204225	SB14-	SB14/13'-15' Grab Soil Sample LOC# 31010 PRCA# 951061 PHC# 5L
3204226	SB15-	SB15/11'-13' Grab Soil Sample LOC# 31010 PRCA# 951061 PHC# 5L
3204227	SB175	SB17/.5' Grab Soil Sample LOC# 31010 PRCA# 951061 PHC# 5L
3204228	B1711	SB17/11'-13' Unspiked Grab Soil Sample LOC# 31010 PRCA# 951061 PHC# 5L
3204229	B1711	SB17/11'-13' Matrix Spike Grab Soil Sample LOC# 31010 PRCA# 951061 PHC# 5L
3204230	B1711	SB17/11'-13' Matrix Spike Dup. Grab Soil Sample LOC# 31010 PRCA# 951061 PHC# 5L
3204231	B1711	SB17/11'-13' Duplicate Grab Soil Sample LOC# 31010 PRCA# 951061 PHC# 5L
3204232	B17FB	SB17/Field Blank Grab Water Sample LOC# 31010 PRCA# 951061 PHC# 5L
3204233	B17TB	SB17/Trip Blank Water Sample LOC# 31010 PRCA# 951061 PHC# 5L
3204234	B1611	SB16/11'-13' Grab Soil Sample LOC# 31010 PRCA# 951061 PHC# 5L
3204235	B1311	SB13/11'-13' Grab Soil Sample LOC# 31010 PRCA# 951061 PHC# 5L
3208444	BSB18	SB-18 / .5 (0-0.5) Grab Soil Sample LOC# 31010 PRCA# 951061 PHC# 20-6
3208445	B1811	SB-18 / 11'-13' Grab Soil Sample LOC# 31010 PRCA# 951061 PHC# 20-6
3208446	B19-7	SB-19 / 7'-9' Grab Soil Sample LOC# 31010 PRCA# 951061 PHC# 20-6
3208447	B20-3	SB-20 / .5' (3.0'-3.5') Grab Soil Sample LOC# 31010 PRCA# 951061 PHC# 20-6
3208448	B20-9	SB-20 / 9'-11' Grab Soil Sample LOC# 31010 PRCA# 951061 PHC# 20-6
3208449	B24-0	SB-24 / 0-0.5' Grab Soil Sample LOC# 31010 PRCA# 951061 PHC# 20-6
3208450	B2413	SB-24 / 13'-15' Grab Soil Sample LOC# 31010 PRCA# 951061 PHC# 20-6
3208451	B27-0	SB-27 / 0'-0.5' Grab Soil Sample LOC# 31010 PRCA# 951061 PHC# 20-6
3208452	B2711	SB-27 / 11'-13' Grab Soil Sample LOC# 31010 PRCA# 951061 PHC# 20-6
3208453	B28	SB-28 / .5' (0-0.5') Grab Soil Sample LOC# 31010 PRCA# 951061 PHC# 20-6
3?:08454	B2811	SB-28 / 11'-13' Grab Soil Sample LOC# 31010 PRCA# 951061 PHC# 20-6
3208455	B30	SB-30 / .5' (0-0.5') Grab Soil Sample LOC# 31010 PRCA# 951061 PHC# 20-6
3208456	B30-9	SB-30 / 9'-11' Grab Soil Sample LOC# 31010 PRCA# 951061 PHC# 20-6



Sample Reference List for SDG Number ELK03 with a Data Package Type of NYSDEC

> **09593 - Mobil Oil Corporation** MOBIL: 625 Elk Street - Buffalo, NY

Lab Sample Number	Lab Sample Code	Client Sample Description
3188734	LB118	LB1 (18-20) Grab Soil Sample LOC# 31010 PRCA# 951061 PHC# 2L
3188735	LB116	LB1 (16-18) Soil Sample LOC# 31010 PRCA# 951061 PHC# 2L
3188736	TRPBL	Trip Blank Water Sample LOC# 31010 PRCA# 951061 PHC# 2L
3213143	LF-5-	LF-5/21'-23' Composite Soil Sample LOC# 31-010 WBS# 26
3217224	LF-7-	LF-7/21'-23' Unspiked Grab Soil Sample LOC# PRCA# PHC# 8
3217225	LF-7-	LF-7/21'-23' Matrix Spike Grab Soil Sample LOC# PRCA# PHC# 8
3217226	LF-7-	LF-7/21'-23' Matrix Spike Dup/Dup Grab Soil Sample LOC# PRCA# PHC# 8
3217227	LF-FB	LF-7/21'-23' Field Blank Water Sample LOC# PRCA# PHC#
3217228	LF-TB	LF-7/21'-23' Trip Blank Water Sample LOC# PRCA# PHC#

A Thermo Analytical Laboratory Where quality is a science.

Sample Reference List for SDG Number ELK04 with a Data Package Type of NYSDEC

09593 - Mobil Oil Corporation

MOBIL: Elk St., Buffalo, NY

Lab Sample Number	Lab Sample Code	Client Sample Description
3228185	13005	ESL-13/0-0.5' Grab Soil Sample LOC# WBS#
3228186	131	ESL-13/1'-2' Grab Soil Sample LOC# WBS#
3228187	132	ESL-13/2'-3' Grab Soil Sample LOC# WBS#
3228188	14005	ESL-14/0-0.5 Unspiked Grab Soil Sample LOC# WBS#
3228189	14005	ESL-14/0-0.5' Matrix Spike Grab Soil Sample LOC# WBS#
3228190	14005	ESL-14/0-0.5'Matrix Spike Dup/Dup Grab Soil Sample LOC# W
3228191	141	ESL-14/1'-2' Grab Soil Sample LOC# WBS#
3228192	142	ESL-14/2'-3' Grab Soil Sample LOC# WBS#
3228196	151	ESL-15/1'-2' Grab Soil Sample LOC# WBS#
3228197	152	ESL-15/2'-3' Grab Soil Sample LOC# WBS#
3228198	16005	ESL-16/0-0.5' Grab Soil Sample LOC# WBS#
3228199	161	ESL-16/1'-2' Grab Soil Sample LOC# WBS#

Lancaster Laboratories A Thermo Analytical Laboratory Where quality is a science.

Sample Reference List for SDG Number ELK05 with a Data Package Type of NYSDEC

09593 - Mobil Oil Corporation

MOBIL: Elk St., Buffalo, NY

Lab Sample	Lab Sample			
Number	Code	Client Sample Description		
3228193	15005	ESL-15/0-0.5' Unspiked Grab Soil Sample	LOC#	WBS#
3228194	15005	ESL-15/0-0.5' Matrix Spike Grab Soil Samp	ble LOC#	WBS#
3228195	15005	ESL-15/0-0.5' Matrix Spike Dup/Dup Grab	Soil LOC#	WBS#
3228200	162	ESL-16/2'-3' Grab Soil Sample LOC#	WBS#	
3228201	17005	ESL-17/0-0.5' Grab Soil Sample LOC#	WBS#	
3228202	171	ESL-17/1'-2' Grab Soil Sample LOC#	WBS#	
3228203	172	ESL-17/2'-3' Grab Soil Sample LOC#	WBS#	
3228204	18005	ESL-18/0-0.5' Grab Soil Sample LOC#	WBS#	
3228205	18FB-	ESL-18/0-0.5' Field Blank Grab Water Sam	ple LOC#	WBS#
3228206	181	ESL-18/1'-2' Grab Soil Sample LOC#	WBS#	
3228207	182	ESL-18/2'-3' Grab Soil Sample LOC#	WBS#	
3228209	19005	ESL-19/0-0.5' Grab Soil Sample LOC#	WBS#	
3228210	191	ESL-19/1'-2' Grab Soil Sample LOC#	WBS#	
3228211	192	ESL-19/2'-3' Grab Soil Sample LOC#	WBS#	
3228212	20005	ESL-20/0-0.5' Grab Soil Sample LOC#	WBS#	
3228213	201	ESL-20/1'-2' Grab Soil Sample LOC#	WBS#	
3228214	202	ESL-20/2'-3' Grab Soil Sample LOC#	WBS#	

Lancaster Laboratories • 2425 New Holland Pike, PO Box 12425, Lancaster, PA 17605-2425 • 717-656-2300 Fax: 717-656-2681 A subsidiary of Thermo TerraTech Inc., a Thermo Electron company Lancaster Laboratories <u>A Thermo Analytical Laboratory</u> Where quality is a science.

Sample Reference List for SDG Number ELK06 with a Data Package Type of NYSDEC

09593 - Mobil Oil Corporation MOBIL: 635 Elk St., Buffalo, NY

Lab Sample Number	Lab Sample Code	Client Sample Description
3239768	LF3BK	LF-3 Unspiked Grab Water Sample LOC# 31010 WBS# 26
3239769	LF3BK	LF-3 Duplicate Grab Water Sample LOC# 31010 WBS# 26
3239770	LF3BK	LF-3 Matrix Spike Grab Water Sample LOC# 31010 WBS# 26
3?39771	LF3BK	LF-3 Matrix Spike Duplicate Grab Water Sample LOC# 31010 WBS# 26
3239772	LF3FB	LF-3 Field Blank Grab Water Sample LOC# 31010 WBS# 26
3239773	DISTB	Disposal/Pinto Trip Blank Water Sample LOC# 31010 WBS# 26
3239774	LF-4-	LF-4 Grab Water Sample LOC# 31010 WBS# 26
3239775	LF-5-	LF-5 Grab Water Sample LOC# 31010 WBS# 26
3239776	LF-6-	LF-6 Grab Water Sample LOC# 31010 WBS# 26
3239777	LF-7-	LF-7 Grab Water Sample LOC# 31010 WBS# 26
3239778	LF-8-	LF-8 Grab Water Sample LOC# 31010 WBS# 26
3239779	SB-11	SB-11 Grab Water Sample LOC# 31010 WBS# 26
3239780	SB-14	SB-14 Grab Water Sample LOC# 31010 WBS# 26



Sample Reference List for SDG Number ELK07 with a Data Package Type of NYSDEC

09593 - Mobil Oil Corporation

MOBIL: 635 Elk St., Buffalo, NY

Lab Sample Number	Lab Sample Code	Client Sample Description
3241775	SB28-	SB-28 Unspiked Grab Water Sample LOC# 31010 WBS# 26
3241776	SB28-	SB-28 Matrix Spike Grab Water Sample LOC# 31010 WBS# 26
3241777	SB28-	SB-28 Matrix Spike Dup/Dup Grab Water Sample LOC# 31010 WBS# 26
3241778	SB28D	SB-28-Duplicate Grab Water Sample LOC# 31010 WBS# 26
3241779	SB28F	SB-28-Field_Blank Grab Water Sample LOC# 31010 WBS# 26
3241780	PINTO	Pinto Trip Blank Water Sample LOC# 31010 WBS# 26
3241781	SB19-	SB-19 Grab Water Sample LOC# 31010 WBS# 26



CASE NARRATIVE

Client: Mobil Oil Corporation SDG #: ELK01

LANCASTER LABORATORIES SEMIVOLATILES BY GC/MS

SAMPLE NUMBER(S) :

		matrix	
LL #'s	Sample Code	Soil Water	Comments
3219182	SB11U	X	Unspiked
3219183	11SBU	Х	
3219184	SB11UMS	Х	Matrix Spike
3219185	SB11UMSD	X	Matrix Spike Dup
3219186	B11FB	X	Client Blank
3219459	MNB12	Х	
3219460	MNB14	Х	
3219461	MNB16	Х	
3220988	LF3	Х	
3220989	LF4	Х	
3220991	LF6	X	• •
3220992	LF7	X	
3220993	LF8	X	
LABORATORY	SUBMITTED QC:		
SBLKWD239	SBLKWD2398	Х	Method Blank
SBLKWC242	SBLKWC2423	Х	Method Blank
239WDLCS	239WDLCS8	X	Lab Control Sample
242WCLCS	242WCLCS3	Х	Lab Control Sample
242WCLCSD	242WCLCSD3	Х	Lab Control Sample Dup

SAMPLE PREPARATION:

Due to insufficient sample, only 921 mls were used in the extraction of LF--3 and 971 mls in the extraction of LF--4.

No other problems were encountered during the extraction of these samples.

Lancaster Laboratories • 2425 New Holland Pike, PO Box 12425, Lancaster, PA 17605-2425 • 717-656-2300 Fax: 717-656-2681 A subsidiary of Thermo TerraTech Inc., a Thermo Electron company



Case Narrative SDG #: ELK01 continued

ANALYSIS:

The method used for analysis was SW-846 Method 8270C.

All samples were analyzed for the semivolatile polynuclear aromatic hydrocarbon compounds.

No problems were encountered during the analysis of these samples.

QUALITY CONTROL AND NONCONFORMANCE SUMMARY:

All QC was within specifications.

DATA INTERPRETATION:

Only non-conformances for client requested compounds are addressed in this case narrative.

No further interpretation is necessary for the data submitted.

Case Narrative Reviewed and Approved by:

all malling

Charles J. Neslund Group Leader, GC/MS Semivolatiles

Date: 10/1/17



Case Narrative SDG# ELK01

Client : Mobil Oil Corporation Project: MOBIL: NY Petroleum Analysis - Water

SAMPLE ANALYSES

\mathbf{LL}	Sample	Matrix	
Sample #	Designation	Soil Water	Comments
3219459	MNB12	x	DF 5
3219461	MNB16	Х	DF 5
QUALITY CONT	ROL ANALYSES		
BLK1655		х	Method Blank
BLK1657		Х	Method Blank
3219183		х	DF 5
3219184MS		Х	DF 20 Matrix Spike
3219185MSD		х	DF 20 Matrix Spike Dup
LCS1655		х	Lab Control Sample
LDS1655		X	Lab Control Dup

SAMPLE PREPARATION

Dilutions were necessary for some samples as noted in the comments sectica above.

ANALYSIS

The integration system reviews the chromatogram retention times, comparing them to the retention times in the ID Window column. A peak in the sample chromatogram with a retention time within the ID window is identified as a "hit."

The method used for analysis was EPA Method SW-846 8021B. A J&W DB-MTBE, 60m, 0.45mm column was used for the analysis of all samples.

No problems were encountered during analysis.

QUALITY CONTROL AND NONCONFORMANCE SUMMARY

There was no client submitted QC, so Lancaster Laboratories batch QC was referenced.

All QC was within specifications.

DATA INTERPRETATION

No explanation is necessary for the data submitted.

Due to the limitations of the data package generating software, the NYSDEC ASP forms could not be included for the GC Volatiles data. Sample results are summarized on the analysis reports, and QC and calibration information is included on summary forms in this section of the data package.



Case Narrative SDG# ELK01

Client : Mobil Oil Corporation Project: MOBIL: NY Petroleum Analysis - Water

٠

Narrative reviewed and approved by:

10/6/99 Date

ı.

Thomas C. Lehman, Group Leader



CASE NARRATIVE FOR INORGANICS

Laboratory Name: Lancaster Laboratories

SDG Number: ELK01

Date Received: 08/28/99

Analysis:

Refer to the analysis run logs for samples requiring dilutions.

The following samples required analysis by Method of Standard Additions (MSA) because the post digestion spike on the background sample of the digestion batch recovered less than 85% or greater than 115%:

Sample	Element
*38541	Pb
*38541D	Pb
*38541M	Pb
*38541S	Pb
B11FB	Pb
LF3	Pb
LF7	Pb
MNB12	Pb
MNB14	Pb
B11FB	Se
MNB12	Se
MNB14	Se
MNB16	Se
SB11U	Se
SB11UD	Se
SB11UM	Se
SB11US	Se

Preparation:

Sample LF--3 was digested a second time for chromium in batch 99279-1848-005 because of a preparation error.

Quality Control:

The matrix spike (*38541S) and matrix spike duplicate (*38541M) were not within the control limits for lead. This indicates that the sample matrix may be affecting the digestion and/or measurement methodology for that analyte; however, the data are considered to be valid because the laboratory control sample is within the control limits.



Explanatory Notes: The final concentration is obtained using the following calculation:

final = instrument reading x final vol. x dilution factor
conc. initial volume or weight

Calibration Standards: Instrument calibration standards are prepared monthly from stock solutions purchased from Spex Industries Inc., JT Baker, Aldrich Chemical, VWR Scientific, EM Science, High Purity, Ultra Scientific or VHG Laboratories.

Case Narrative reviewed and approved by:

10 Date

Betty L. Umble, Specialist Inorganic Data Packages Where guality is a science.

CASE NARRATIVE

Client: Mobil Oil Corporation SDG #: ELK02

LANCASTER LABORATORIES SEMIVOLATILES BY GC/MS

SAMPLE NUMBER(S) :

ter Constantin and

		Mat	rix	
<u>LL #'s</u>	Sample Code	<u>Soil</u>	<u>Water</u>	<u>Comments</u>
3204225	SB14-	Х		
3204226	SB15-	Х		3X Dilution
3204226RE	SB15-RE	Х		Reextraction
3204227	SB175	Х		
3204228	B1711	Х		Unspiked
3204228DL	B1711DL	Х		2X Dilution
3204229	B1711MS	Х		Matrix Spike
3204230	B1711MSD	Х		Matrix Spike Dup
3204232	B17FB		Х	Client Blank
3204234	B1611	Х		5X Dilution
3204234RE	B1611RE	Х		Reextraction
3204235	B1311	Х		5X Dilution
3204235RE	B1311RE	Х		Reextraction
3208444	BSB18	Х		5X Dilution
3208445	B1811	Х		
3208445RE	B1811RE	Х		Reextraction
3208446	B19-7	Х		5X Dilution
3208447	B20-3	Х		
3208448	B20-9	Х		5X Dilution
3208449	B24-0	Х		
3208450	B2413	Х		
3208451	B27-0	Х		
3208452	B2711	Х		
3208453	B28	Х		
3208454	B2811	Х		
3208455	B30	Х		
3208456	B30-9	Х		
LABORATORY S	UBMITTED QC:			
SBLKLA216	SBLKLA216M	- X		Method Blank
SBLKWC216	SBLKWC2163		Х	Method Blank
SBLKLB222	SBLKLB2228	Х		Method Blank
SBLKLC223	SBLKLC2239	Х		Method Blank
SBLKLD229	SBLKLD229J	Х		Method Blank

Lancaster Laboratories • 2425 New Holland Pike, PO Box 12425, Lancaster, PA 17605-2425 • 717-656-2300 Fax: 717-656-2681

A subsidiary of Thermo TerraTech Inc., a Thermo Electron company

Where quality is a science.

Case Narrative SDG #: ELK02 continued

LABORATORY SUBMITTED QC continued:

Matrix			
Sample Code	<u>Soil</u>	<u>Water</u>	<u>Comments</u>
216LALCSM	Х		Lab Control Sample
216WCLCS3		Х	Lab Control Sample
216WCLCSD3		Х	Lab Control Sample Dup
222LBLCS8	Х		Lab Control Sample
223LCLCS9	Х		Lab Control Sample
229LDLCS	Х		Lab Control Sample
	Sample Code 216LALCSM 216WCLCS3 216WCLCSD3 222LBLCS8 223LCLCS9 229LDLCS	MatSample CodeSoil216LALCSMX216WCLCS3216WCLCSD3222LBLCS8X223LCLCS9X229LDLCSX	MatrixSample CodeSoilWater216LALCSMX216WCLCS3X216WCLCSD3X222LBLCS8X223LCLCS9X229LDLCSX

SAMPLE PREPARATION:

Due to insufficient sample, only 897 mls were used in the extraction of B817FB.

Due to the nature of the sample matrix, the following samples were concentrated to final volumes greater than 1.0 ml.

Sample Code	Final Volume
BSB18	2 mls
B19-7	2 mls
B20-9	2 mls
B28	5 mls

No other problems were encountered during the extraction of these samples.

ANALYSIS:

The method used for analysis was SW-846 Method 8270C.

All samples were analyzed for the semivolatile CLP OLM03.2 target compounds.

SB15- was analyzed at an initial 3X dilution and B1611 and B1311 at initial 5X dilutions due to high concentrations of target compounds.

Lancaster Laboratories • 2425 New Holland Pike, PO Box 12425, Lancaster, PA 17605-2425 • 717-656-2300 Fax: 717-656-2681 A subsidiary of Thermo TerraTech Inc., a Thermo Electron company



Case Narrative SG #: ELK02 continued

BSB18, B19-7, and B20-9 were analyzed at initial 5X dilutions due to high concentrations of non-target compounds.

Due to a concentration of phenanthrene above calibration range, B1711 was analyzed at a further 2X dilution.

Reextractions were required for SB15-, B1611, B1311, B1811 due to unacceptable surrogate recoveries.

No other problems were encountered during the analysis of these samples.

QUALITY CONTROL AND NONCONFORMANCE SUMMARY:

B1711 had internal standard peak areas outside QC limits. B1711MS and B1711MSD were analyzed and internal standard peak areas were again outside QC limits, indicating a significant matrix effect.

B1711 had the surrogate recovery of nitrobenzene-d5 outside QC limits. B1711MS and B1711MSD were analyzed and surrogate recoveries were again outside QC limits, confirming a matrix effect.

SB15-, B1611, and B1311 had surrogate recoveries outside QC limits for both the initial extraction and the reextraction confirming a matrix effect.

Due to surrogate recoveries outside QC limits, B1811 was reextracted. The reextraction was performed outside the method required holding time. The surrogate recoveries in B1811RE did not confirm the original extraction. Both sets of data are included in this data package.

The recovery of fluorene in B1711MS and B1711MSD was outside QC limits. All recoveries were within specifications in 216LALCSM.

All other QC was within specifications.



Case Narrative SDG #: ELK02 continued

DATA INTERPRETATION:

Only non-conformances for client requested compounds are addressed in this case narrative.

No further interpretation is necessary for the data submitted.

Case Narrative Reviewed and Approved by:

1. 1 Mala

Charles J. Neslund Group Leader, GC/MS Semivolatiles

_____ Date: 10/1/4;



Case Narrative SDG# ELK02

Client : Mobil Oil Corporation Project: MOBIL: 325 Elk St. Buffalo, NY Volatiles by GC - Soil/Water

SAMPLE ANALYSES

LL	Sample	Matrix	
Sample #	Designation	Soil Water	Comments
2204225	CD14	v	
3204225	5014- CD15	A V	
3204226	SBID-	X	
3204227	SBI/S	X	DF 20 DF 100 Unanikod
3204228		A V	DF 100 Unspiked
3204229MS		× v	DE 100 Matrix Spike Dup
2204230M5D		A V	Dr 100 Macrix Spike Dup
3204232	B177B	x X	
2204222	D1611	v	DF 100
2204234	D1211	x v	DF 500
3204233	BIJII BCB18	x X	DF 200
3208444	B1811	X X	DF 200
3208445	B19-7	X	DF 100
3208447	B20-3	x	DF 20
3208448	B20-9	x	DF 1000
3208449	B20 9	x	DF 20
3208450	B2413	x	
3208451	B27-0	x	DF 20
3208452	B2711	x	
3208453	B28	x	DF 100
3208454	B2811	x	DF 20
200454	B30	x	DF 20
3208456	B30-9	x	DF 20
5200450	000	Λ	51 20
OUALITY CONTR	OL ANALYSES		
x			
BLK0835		X	DF 20 Method Blank
BLK0837		X	DF 20 Method Blank
BLK0838		X	DF 20 Method Blank
BLK1801		х	Method Blank

BLK1801	Х	Method Blank
BLK1803	Х	Method Blank
BLK0839	Х	DF 20 Method Blank
BLK0840	Х	DF 20 Method Blank
BLK0947	Х	DF 20 Method Blank
LCS0809	X	Lab Control Sample
LCS1801	Х	Lab Control Sample

SAMPLE PREPARATION

•

Blanks/Standards were prepared by adding 1 mL of methanol to 20 mL of DI water. This mixture was analyzed by purge and trap gas chromatography. This results in a dilution factor of 20.

,



Case Narrative SDG# ELK02

Client : Mobil Oil Corporation Project: MOBIL: 325 Elk St. Buffalo, NY Volatiles by GC - Soil/Water

81

Twenty grams of soil were extracted with 20 mL of methanol. The surrogate standards and spiking solutions are added to the methanol as it is in contact with the soil. The methanol is then diluted into DI water, and injected into a purge and trap concentrator. This diluted extract is then analyzed by gas chromatography.

Dilutions were necessary for some samples as noted in the comments section above.

ANALYSIS

The integration system reviews the chromatogram retention times, comparing them to the retention times in the ID Window column. A peak in the sample chromatogram with a retention time within the ID window is identified as a "hit."

The method used for analysis was EPA Method SW-846 5030B/8021B. A J&W DB-VRX, 75m x 0.45mm column was used for the analysis of all samples.

The initial calibration P08187 met the requirements of SW-846 Method 8000B (section 7.7) since the average of all relative standard deviation values was < 20%. (The average % RSD was calculated using all of the compounds in the standard, though the ICAL summary form in this data package reflects only the client requested compounds.) As stated in method 8000B (section 7.5.1.2.3) the data user should be made aware that the %RSD(s) for methyl tert-butyl ether fell outside of the < 20% criteria.

The calibration verification standard (injection #05 analyzed on 08/04/99 at 03:47) met the requirements of SW-846 Method 8000B (section 7.7) since the average of all percent drift values was < 15%. (The average % drift was calculated using all of the compounds in the standard, though the CCV summary form in this data package only reflects the client requested compounds.) As stated in method 8000B (section 7.5.1.2.3) the data user should be made aware that the %drift for methyl tert-butyl ether fell outside of the +/- 15% criteria.

The calibration verification standard (injection #40 analyzed on 08/10/99 at 07:02) met the requirements of SW-846 Method 8000B (section 7.7) since the average of all percent drift values was < 15%. (The average % drift was calculated using all of the compounds in the standard, though the CCV summary form in this data package only reflects the client requested compounds.) As stated in method 8000B (section 7.5.1.2.3) the data user should be made aware that the %drift for p-isopropyltoluene fell outside of the +/- 15% criteria.

The calibration verification standard (injection #55 analyzed on 08/10/99 at 21:37) met the requirements of SW-846 Method 8000B (section 7.7) since the average of all percent drift values was < 15%. (The average % drift was calculated using all of the compounds in the standard, though the CCV summary form in this data package only reflects the client requested compounds.) As stated in method 8000B (section 7.5.1.2.3) the data user should be made aware that the %drift for methyl tert-butyl ether fell outside of the +/- 15% criteria.

The calibration verification standard (injection #32 analyzed on 08/12/99 at 08:08) met the requirements of SW-846 Method 8000B (section 7.7) since the average of all percent drift values was < 15%. (The average % drift was calculated using all of the compounds in the standard, though the CCV summary form in this data package only reflects the client requested compounds.) As stated in method 8000B (section 7.5.1.2.3) the data user should be made aware that the %drift for methyl tert-butyl ether and naphthalene fell outside of the +/- 15% criteria.



Case Narrative SDG# ELK02

Client : Mobil Oil Corporation Project: MOBIL: 325 Elk St. Buffalo, NY Volatiles by GC - Soil/Water

QUALITY CONTROL AND NONCONFORMANCE SUMMARY

Client submitted batch QC was referenced.

For samples 3204226, 3204234, 3204235, 3208445 and 3208448, the surrogate, 1-bromo-4chlorobenzene, is outside of specifications due to the dilution needed to perform the analysis.

The recovery of multiple compounds in the MS and/or MSD are outside of specifications. However, the corresponding laboratory control sample is acceptable, and shows the system to be in calibration.

DATA INTERPRETATION

Due to the limitations of the data package generating software, the NYSDEC ASP forms could not be included for the GC Volatiles data. Sample results are summarized on the analysis reports, and QC and calibration information is included on summary forms in this section of the data package.

Narrative reviewed and approved by:

e M. Turner, Manager

10.12.99 Date

Where guality is a science.

CASE NARRATIVE FOR INORGANICS

Laboratory Name: Lancaster Laboratories

SDG Number: ELK02S

Date Received: 08/07/99

Analysis:

Refer to the analysis run logs for samples requiring dilutions.

Quality Control:

Poor duplication was observed between the matrix background and matrix duplicate for vanadium. This indicates that the sample matrix may not be homogeneous for that analyte; however, the data are considered to be valid because the laboratory control sample is within the control limits.

Data Package Assembly:

This sample delivery group was separated by matrix into two data packages, ELK02W and ELK02S, due to limitations of the data package generating software.

Explanatory Notes:

The instrument detection limits (IDLs) are used for determining the U flags on the initial and continuing calibration blanks. The method detection limits (MDLs) are used for determining all other U flags.

The final concentration is obtained using the following calculation:

final = instrument reading x final vol. x dilution factor
conc. initial volume or weight

Calibration Standards:

Instrument calibration standards are prepared monthly from stock solutions purchased from Spex Industries Inc., JT Baker, Aldrich Chemical, VWR Scientific, EM Science, High Purity, Ultra Scientific or VHG Laboratories.

Case Narrative reviewed and approved by: Date 10/8/99

1

4.67

Betty L. Umble, Specialist Inorganic Data Packages

A subsidiary of Thermo TerraTech Inc., a Thermo Electron company
Lancaster Laboratories Where quality is a science.

CASE NARRATIVE

Client: Mobil Oil Corporation SDG #: ELK03

LANCASTER LABORATORIES SEMIVOLATILES BY GC/MS

SAMPLE NUMBER(S) :

		watrix	
<u>LL #'s</u>	Sample Code	Soil Water	<u>Comments</u>
3188734	LB118	X	
3188734RE	LB118RE	Х	Reextraction
3213143	LF-5-	Х	
3213143RE	LF-5-RE	X	Reinjection
3217224	LF-7-	Х	Unspiked
3217225	LF-7-MS	Х	Matrix Spike
3217226	LF-7-MSD	X	Matrix Spike Dup
LABORATORY	SUBMITTED QC:		
SBLKLA193	SBLKLA193M	Х	Method Blank
SBLKLB195	SBLKLB195M	Х	Method Blank
SBLKLD229	SBLKLD229J	Х	Method Blank
SBLKLD237	SBLKLD2373	Х	Method Blank
193LALCS	193LALCSM	Х	Lab Control Sample
195LBLCS	195LBLCSM	Х	Lab Control Sample
229LDLCS	229LDLCSJ	Х	Lab Control Sample
237LDLCS	237LDLCS3	Х	Lab Control Sample

SAMPLE PREPARATION:

Due to the nature of the sample matrix, LB118 was concentrated to a final volume of 2 mls.

No other problems were encountered during the extraction of these samples.

ANALYSIS:

The method used for analysis was SW-846 Method 8270C.

Lancaster Laboratories • 2425 New Holland Pike, PO Box 12425, Lancaster, PA 17605-2425 • 717-656-2300 Fax: 717-656-2681 A subsidiary of Thermo TerraTech Inc., a Thermo Electron company

Lancaster Laboratories Where quality is a science.

Case Narrative SDG #: ELK03 continued

All samples were analyzed for the semivolatile CLP OLM03.2 target compounds.

Reextraction was required for LB118 due to unacceptable surrogate recoveries.

No other problems were encountered during the analysis of these samples.

QUALITY CONTROL AND NONCONFORMANCE SUMMARY:

LF-5- had internal standard peak areas outside QC limits for both the initial injection and the reinjection confirming a matrix effect.

LB118 had surrogate recoveries outside QC limits for both the initial extraction and the reextraction confirming a matrix effect.

All other QC was within specifications.

DATA INTERPRETATION:

Only non-conformances for client requested compounds are addressed in this case narrative.

No further interpretation is necessary for the data submitted.

Case Narrative Reviewed and Approved by:

Charles J. Neslund Group Leader, GC/MS Semivolatiles

Date: ___________/6/AG

Lancaster Laboratories • 2425 New Holland Pike, PO Box 12425, Lancaster, PA 17605-2425 • 717-656-2300 Fax: 717-656-2681 A subsidiary of Thermo TerraTech Inc., a Thermo Electron company



Case Narrative SDG# ELK03

Client : Mobil Oil Corporation Project: MOBIL: NY Volatiles by GC - Soil/Water

8

SAMPLE ANALYSES

LL	Sample	Matrix	
Sample #	Designation	Soil Water	Comments
2100724	T D1 1 0	37	DE 100
3188/34	TRT18	X	DF 100
3188736	TRPBL	Х	
3213143	LF-5-	Х	DF 20
3217224	LF-7-	Х	DF 20 Unspiked
3217225MS	LF-7-	Х	DF 20 Matrix Spike
3217226MSD	LF-7-	Х	DF 20 Matrix Spike Dup
3217227	LF-FB	Х	
3217228	LF-TB	Х	
QUALITY CONTRO	DL ANALYSES		

BLK0809	Х	DF 20 Method Blank
BLK1328	Х	Method Blank
BLK1331	Х	Method Blank
BLK0853	x	DF 20 Method Blank
BLK0854	X	DF 20 Method Blank
BLK1516	х	Method Blank
BLK1517	Х	Method Blank
LCS1312	х	Lab Control Sample
LCS0812	x	Lab Control Sample
LCS1507	х	Lab Control Sample
LDS1506	х	Lab Control Sample Duplicate

SAMPLE PREPARATION

Blanks/Standards for soil matrix samples were prepared by adding 1 mL of methanol to 20 mL of DI water. This mixture was analyzed by purge and trap gas chromatography. This results in a dilution factor of 20.

Twenty grams of soil were extracted with 20 mL of methanol. The surrogate standards and spiking solutions are added to the methanol as it is in contact with the soil. The methanol is then diluted into DI water, and injected into a purge and trap concentrator. This diluted extract is then analyzed by gas chromatography.

Dilutions were necessary for some samples as noted in the comments section above.

ANALYSIS

The integration system reviews the chromatogram retention times, comparing them to the retention times in the ID Window column. A peak in the sample chromatogram with a retention time within the ID window is identified as a "hit."

The method used for analysis was EPA Method SW-846 5030B/8021B. A J&W DB-VRX, 75m x 0.45mm² capillary column was used for the analysis of all samples.



Case Narrative SDG# ELK03

Client : Mobil Oil Corporation Project: MOBIL: NY Volatiles by GC - Soil/Water

The initial calibration P08187 met the requirements of SW-846 Method 8000B (section 7.7) since the average of all relative standard deviation values was < 20%. (The average % RSD was calculated using all of the compounds in the standard, though the ICAL summary form in this data package reflects only the client requested compounds.) As stated in method 8000B (section 7.5.1.2.3) the data user should be made aware that the %RSD(s) for methyl tert-butyl ether fell outside of the < 20% criteria.

The calibration verification standard (injection #54 analyzed on 07/14/99 at 21:38) met the requirements of SW-846 Method 8000B (section 7.7) since the average of all percent drift values was < 15%. (The average % drift was calculated using all of the compounds in the standard, though the CCV summary form in this data package only reflects the client requested compounds.) As stated in method 8000B (section 7.5.1.2.3) the data user should be made aware that the %drift for sec-butylbenzene fell outside of the +/- 15% criteria.

The calibration verification standard (injection #02 analyzed on 08/25/99 at 03:02) met the requirements of SW-846 Method 8000B (section 7.7) since the average of all percent drift values was < 15%. (The average % drift was calculated using all of the compounds in the standard, though the CCV summary form in this data package only reflects the client requested compounds.) As stated in method 8000B (section 7.5.1.2.3) the data user should be made aware that the %drift for methyl tert-butyl ether fell outside of the +/- 15% criteria.

QUALITY CONTROL AND NONCONFORMANCE SUMMARY

Client submitted batch QC was referenced.

For sample 3188734, the surrogate, 1-bromo-4-chlorobenzene, is outside of specifications due to the dilution needed to perform the analysis.

DATA INTERPRETATION

Due to the limitations of the data package generating software, the NYSDEC ASP forms could not be included for the GC Volatiles data. Sample results are summarized on the analysis reports, and QC and calibration information is included on summary forms in this section of the data package.

Narrative reviewed and approved by:

hele M. Turner, Manager

Where guality is a science.

CASE NARRATIVE FOR INORGANICS

Laboratory Name: Lancaster Laboratories

SDG Number: ELK03

Date Received: 08/21/99

Analysis:

Refer to the analysis run logs for samples requiring dilutions.

Quality Control:

The matrix spike and matrix spike duplicate were not within the control limits for chromium and vanadium. This indicates that the sample matrix may be affecting the digestion and/or measurement methodology for those analytes; however, the data are considered to be valid because the laboratory control sample is within the control limits.

Explanatory Notes:

The instrument detection limits (IDLs) are used for determining the U flags on the initial and continuing calibration blanks. The method detection limits (MDLs) are used for determining all other U flags. The final concentration is obtained using the following

calculation:

final = instrument reading x final vol. x dilution factor conc. initial volume or weight

Calibration Standards:

Instrument calibration standards are prepared monthly from stock solutions purchased from Spex Industries Inc., JT Baker, Aldrich Chemical, VWR Scientific, EM Science, High Purity, Ultra Scientific or VHG Laboratories.

Case Narrative reviewed and approved by:

_Date 10/12/99

Kathleen A. Risko, Specialist Inorganic Data Packages



CASE NARRATIVE

Client: Mobil Oil Corporation SDG #: ELK04

LANCASTER LABORATORIES SEMIVOLATILES BY GC/MS

SAMPLE NUMBER(S) :

		Matrix	
<u>LL #'s</u>	Sample Code	<u>Soil Water</u>	<u>Comments</u>
3228185	13005	Х	
3228186	131	X	
3228186DL	131DL	Х	10X Dilution
3228187	132	Х	
3228188	14005	Х	Unspiked
3228189	14005MS	Х	Matrix Spike
3228190	14005MSD	Х	Matrix Spike Dup
3228191	141	Х	
3228192	142	Х	
3228196	151	Х	
3228197	152	X	
3228198	16005	Х	
3228199	161	X	
LABORATORY	SUBMITTED QC:		
SBLKLA256	SBLKLA256M	Х	Method Blank
256LALCS	256LALCSM	X	Lab Control Sample

SAMPLE PREPARATION:

Due to the nature of the sample matrix, the following samples were concentrated to final volumes greater than 1.0 ml.

Sample Code	Final Volume
13005	10 mls
14005, 14005MS, 14005MSD	10 mls
141	10 mls
151	10 mis
152	2 mls

Lancaster Laboratories • 2425 New Holland Pike, PO Box 12425, Lancaster, PA 17605-2425 • 717-656-2300 Fax: 717-656-2681 A subsidiary of Thermo TerraTech Inc., a Thermo Electron company

1

30 (2) ver

Lancaster Laboratories

Case Narrative SDG #: ELK04 continued

No other problems were encountered during the extraction of these samples.

ANALYSIS:

The method used for analysis was SW-846 Method 8270C.

All samples were analyzed for the semivolatile CLP OLM03.2 target compounds.

Due to a number of concentrations above calibration range, 131-- was analyzed at a further 10X dilution.

No other problems were encountered during the analysis of these samples.

QUALITY CONTROL AND NONCONFORMANCE SUMMARY:

A number of compounds were not recovered or their recoveries were outside QC limits in 14005MS and 14005MSD. Refer to the matrix spike/matrix spike duplicate form for the specific compounds outside QC limits.

A number of relative percent differences (RPD's) between 14005MS and 14005MSD were greater than 30 percent.

All other QC was within specifications.

DATA INTERPRETATION:

Only non-conformances for client requested compounds are addressed in this case narrative.

No further interpretation is necessary for the data submitted.

Case Narrative Reviewed and Approved by:

Charles J. Neslund Group Leader, GC/MS Semivolatiles

13/6/96 Date:

Lancaster Laboratories • 2425 New Holland Pike, PO Box 12425, Lancaster, PA 17605-2425 • 717-656-2300 Fax: 717-656-2681 A subsidiary of Thermo TerraTech Inc., a Thermo Electron company Lancaster Laboratories

CASE NARRATIVE FOR INORGANICS

Laboratory Name: Lancaster Laboratories

SDG Number: ELK04

Date Received: 09/03/99

Analysis:

Refer to the analysis run logs for samples requiring dilutions.

Quality Control:

The matrix spike was not within the control limits for chromium. This indicates that the sample matrix may be affecting the digestion and/or measurement methodology for that analyte; however, the data are considered to be valid because the laboratory control sample is within the control limits.

Poor duplication was observed between the matrix background and matrix duplicate for chromium and mercury. Poor duplication was observed between the matrix spike and matrix spike duplicate for lead. This indicates that the sample matrix may not be homogeneous for those analytes; however, the data are considered to be valid because the laboratory control sample is within the control limits.

The recovery percentages of the matrix spike and matrix spike duplicate for lead and mercury were not used to validate the data because the sample results were greater than four times the respective amounts of spike added.

Explanatory Notes:

The instrument detection limits (IDLs) are used for determining the U flags on the initial and continuing calibration blanks. The method detection limits (MDLs) are used for determining all other U flags.

The final concentration is obtained using the following calculation:

final = instrument reading x final vol. x dilution factor
conc. initial volume or weight

Calibration Standards:

Instrument calibration standards are prepared monthly from stock solutions purchased from Spex Industries Inc., JT Baker, Aldrich Chemical, VWR Scientific, EM Science, High Purity, Ultra Scientific or VHG Laboratories.

Case Narrative reviewed and approved by:

menes Date 10/29 Betsy S. Menefee, Senior/Specialist Inorganid Analysis



CASE NARRATIVE

Client: Mobil Oil Corporation SDG #: ELK05

LANCASTER LABORATORIES SEMIVOLATILES BY GC/MS

SAMPLE NUMBER(S) :

		Matrix	
<u>LL #'s</u>	Sample Code	<u>Soil Water</u>	<u>Comments</u>
3228193	15005	Х	Unspiked
3228193DL	15005DL	Х	10X Dilution
3228194	15005MS	Х	Matrix Spike
3228195	15005MSD	Х	Matrix Spike Dup
3228200	162	X	
3228201	17005	X	
3228202	171	X	
3228203	172	X	
3228204	18005	Х	
3228205	18FB-	X	Client Blank
3228206	181	X	
3228207	182	X	
3228209	19005	Х	
3228210	191	Х	
3228211	192	Х	
3228212	20005	Х	
3228213	201	Х	
3228214	202	X	
	UBMITTED QC:		
SBLKWB255	SBLKWB2553	Х	Method Blank
SBLKLA256	SBLKLA256M	Х	Method Blank
SBLKLD258	SBLKLD258L	Х	Method Blank
255WBLCS	255WBLCS3	Х	Lab Control Sample
255WBLCSD	255WBLCSD3	Х	Lab Control Sample Dup
256LALCS	256LALCSM	Х	Lab Control Sample
258LDLCS	258LDLCSL	Х	Lab Control Sample



Case Narrative SDG #: ELK05 continued

SAMPLE PREPARATION:

No problems were encountered during the extraction of these samples.

ANALYSIS:

The method used for analysis was SW-846 Method 8270C.

All samples were analyzed for the semivolatile polynuclear aromatic hydrocarbon compounds.

Due to a number of concentrations above calibration range, 15005 was analyzed at a further 10X dilution.

In 202--, benzo(b)fluoranthene and benzo(k)fluoranthene were not resolved under the analysis conditions. The benzo(b)fluoranthene value is a combination of results from both isomers.

No other problems were encountered during the analysis of these samples.

QUALITY CONTROL AND NONCONFORMANCE SUMMARY:

A number of compounds were not recovered or their recoveries were outside QC limits in 15005MS and 15005MSD. Refer to the matrix spike/matrix spike duplicate form for the specific compounds outside QC limits.

All other QC was within specifications.

DATA INTERPRETATION:

Only non-conformances for client requested compounds are addressed in this case narrative.



Case narrative SDG #: ELK05 continued

No further interpretation is necessary for the data submitted.

Case Narrative Reviewed and Approved by:

Charles all'in

_____ Date: 10/6/96

Charles J. Neslund Group Leader, GC/MS Semivolatiles



CASE NARRATIVE FOR INORGANICS

Laboratory Name: Lancaster Laboratories

SDG Number: ELK05S

Date Received: 09/03/99

Preparation:

Samples 191- and 201-- were digested a second time for all ICP analyses in batch 99273-5708-005 because of a problem during preparation.

Analysis:

Refer to the analysis run logs for samples requiring dilutions.

Quality Control:

Poor duplication was observed between the matrix background and matrix duplicate for chromium. This indicates that the sample matrix may not be homogeneous for that analyte; however, the data are considered to be valid because the laboratory control sample is within the control limits.

Explanatory Notes:

The instrument detection limits (IDLs) are used for determining the U flags on the initial and continuing calibration blanks. The method detection limits (MDLs) are used for determining all other U flags.

The final concentration is obtained using the following calculation:

final = instrument reading x final vol. x dilution factor
conc. initial volume or weight

Data Package Assembly:

This sample delivery group was separated by matrix into two data packages, ELK05W and ELK05S due to limitations of the data package generating software.

Calibration Standards:

Instrument calibration standards are prepared monthly from stock solutions purchased from Spex Industries Inc., JT Baker, Aldrich Chemical, VWR Scientific, EM Science, High Purity, Ultra Scientific or VHG Laboratories.

Case Narrative reviewed and approved by:

Betsy S. Menefee, Senior Specialist 702 Inorganic Analysis

Lancaster Laboratories • 2425 New Holland Pike, PO Box 12425, Lancaster, PA 17605-2425 • 717-656-2300 Fax: 717-656-2681

A subsidiary of Thermo TerraTech Inc., a Thermo Electron company



Case Narrative SDG# ELK06

Client : Mobil Oil Corporation Project: MOBIL: 635 Elk St. Buffalo, NY Volatiles by GC - Water

SAMPLE ANALYSES

LL	Sample	Matrix	
Sample #	Designation	Soil Water	Comments
3239768	LF3BK	х	Unspiked
3239769	LF3DU	Х	
3239770MS	LF3MS	Х	Matrix Spike
3239771MSD	LF3MD	Х	Matrix Spike Dup
3239772	LF3FB	Х	
3239773	DISTB	Х	
3239774	LF-4-	Х	
3239775	LF-5-	Х	
3239776	LF-6-	Х	
3239777	LF-7-	Х	
3239778	LF-8-	Х	
3239779	SB-11	Х	DF 10
3239780	SB-14	Х	DF 2

QUALITY CONTROL ANALYSES

BLK1333	Х	Method Blank
BLK1834	Х	Method Blank
BLK1336	Х	Method Blank
BLK2008	Х	Method Blank
LCS1305	Х	Lab Control Sample
LCS2002	Х	Lab Control Sample

SAMPLE PREPARATION

Dilutions were necessary for some samples as noted in the comments section above.

ANALYSIS

The integration system reviews the chromatogram retention times, comparing them to the retention times in the ID Window column. A peak in the sample chromatogram with a retention time within the ID window is identified as a "hit."

The method used for analysis was EPA Method SW-846 5030B/8021B. A J&W DB-VRX, 75m \times 0.45mm capillary column was used for the analysis of all samples.

The calibration verification standard (injection #32 analyzed on 09/30/99 at 07:51) met the requirements of SW-846 Method 8000B (section 7.7) since the average of all percent drift values was < 15%. (The average % drift was calculated using all of the compounds in the standard, though the CCV summary form in this data package only reflects the client requested compounds.) As stated in method 8000B (section 7.5.1.2.3) the data user should be made aware that the % % drift for naphthalene fell outside of the +/- 15% criteria.

.



Case Narrative SDG# ELK06

Client : Mobil Oil Corporation Project: MOBIL: 635 Elk St. Buffalo, NY Volatiles by GC - Water

The calibration verification standard (injection #71 analyzed on 10/01/99 at 00:48) met the requirements of SW-846 Method 8000B (section 7.7) since the average of all percent drift values was < 15%. (The average % drift was calculated using all of the compounds in the standard, though the CCV summary form in this data package only reflects the client requested compounds.) As stated in method 8000B (section 7.5.1.2.3) the data user should be made aware that the %drift for o-xylene fell outside of the +/- 15% criteria.

QUALITY CONTROL AND NONCONFORMANCE SUMMARY

Client submitted batch QC was referenced.

For samples 3239768 and 3239770MS, the surrogate, 1-bromo-4-chlorobenzene, is outside of specifications due to the nature of the sample matrix.

The recovery of naphthalene in the MS and MSD is outside of specifications. However, the corresponding laboratory control sample is acceptable, and shows the system to be in calibration.

DATA INTERPRETATION

Due to the limitations of the data package generating software, the NYSDEC ASP forms could not be included for the GC Volatiles data. Sample results are summarized on the analysis reports, and QC and calibration information is included on summary forms in this section of the data package.

Narrative reviewed and approved by:

Michele M. Turner, Manager

<u>10.14.99</u> Date

-Pr. CA 620-620



CASE NARRATIVE

Client: Mobil Oil Corporation SDG #: ELK07

LANCASTER LABORATORIES SEMIVOLATILES BY GC/MS

SAMPLE NUMBER(S) :

		Malix	
<u>LL #'s</u>	Sample Code	<u>Soil</u> Water	Comments
3241775	SB28-	X	Unspiked
3241776	SB28-MS	Х	Matrix Spike
3241777	SB28-MSD	Х	Matrix Spike Dup
3241778	SB28D	Х	
3241779	SB28F	Х	
3241781	SB19-	X	
LABORATORY	SUBMITTED QC:		
SBLKWC277	SBLKWC2779	Х	Method Blank
277WCLCS	277WCLCS9	X	Lab Control Sample

Motrix

SAMPLE PREPARATION:

Due to insufficient sample, only 975 mls were used in the extraction of SB28D and 968 mls in the extraction of SB28F.

No other problems were encountered during the extraction of these samples.

ANALYSIS:

The method used for analysis was SW-846 Method 8270C.

All samples were analyzed for the semivolatile polynuclear aromatic hydrocarbon compounds.

No problems were encountered during the analysis of these samples.



Case Narrative SDB #: ELK07 continued

QUALITY CONTROL AND NONCONFORMANCE SUMMARY:

All QC was within specifications.

DATA INTERPRETATION:

Only non-conformances for client requested compounds are addressed in this case narrative.

No further interpretation is necessary for the data submitted.

Case Narrative Reviewed and Approved by:

11 1/

Charles J. Neslund Group Leader, GC/MS Semivolatiles

hulling Date: 10/00/19



CASE NARRATIVE FOR INORGANICS

Laboratory Name: Lancaster Laboratories

SDG Number: ELK07

Date Received:

Analysis:

Refer to the analysis run logs for samples requiring dilutions. All of the samples for lead and selenium required analysis by Method of Standard Additions (MSA) because the post digestion spike on the background sample of the digestion batch recovered less than 85%.

Quality Control:

The matrix spike was not within the control limits for lead. The matrix spike duplicate was not within the control limits for selenium. This indicates that the sample matrix may be affecting the digestion and/or measurement methodology for those analytes; however, the data are considered to be valid because the laboratory control sample is within the control limits.

Poor duplication was observed between the matrix spike and matrix spike duplicate for selenium. This indicates that the sample matrix may not be homogeneous for that analyte; however, the data are considered to be valid because the laboratory control sample is within the control limits.

Explanatory Notes:

The instrument detection limits (IDLs) are used for determining the U flags on the initial and continuing calibration blanks and in the calculation of the %R for the Graphite Furnace AA (GFAA) analytical spikes. The method detection limits (MDLs) are used for determining all other U flags. The final concentration is obtained using the following calculation:

final = instrument reading x final vol. x dilution factor
conc. initial volume or weight

Calibration Standards:

Instrument calibration standards are prepared monthly from stock solutions purchased from Spex Industries Inc., JT Baker, Aldrich Chemical, VWR Scientific, EM Science, High Purity, Ultra Scientific or VHG Laboratories.

Case Narrative reviewed and approved by:

Diane L. Lockard, Senior QA Spectalist

Quality Assurance



Case Narrative SDG# ELK07

Client : Mobil Oil Corporation Project: MOBIL: 635 Elk St., Buffalo, NY Volatiles by GC - Water

SAMPLE ANALYSES

LL	Sample	Matrix	
Sample #	Designation	Soil Water	Comments
3241775	SB28-	х	Unspiked
3241776MS	SB28-	Х	Matrix Spike
3241777MSD	SB28-	Х	Matrix Spike Dup
3241778	SB28D	Х	
3241779	SB28F	Х	
3241780	PINTO	Х	
3241781	SB19-	Х	
QUALITY CONTR	OL ANALYSES		
BLK2019		х	Method Blank
BLK2020		х	Method Blank
LCS2004		x	Lab Control Sample

SAMPLE PREPARATION

No sample preparation was necessary.

ANALYSIS

The integration system reviews the chromatogram retention times, comparing them to the retention times in the ID Window column. A peak in the sample chromatogram with a retention time within the ID window is identified as a "hit."

The method used for analysis was EPA Method SW-846 5030B/8021B. A J&W DB-VRX, 75m x 0.45mm capillary column was used for the analysis of all samples.

No problems were encountered during analysis.

QUALITY CONTROL AND NONCONFORMANCE SUMMARY

Client submitted batch QC was referenced.

The recovery of m, p-xylene, o-xylene, n-propylbenzene, 1,3,5-trimethylbenzene, 1,2,4trimethylbenzene, p-isopropyltoluene and naphthalene in the MS and/or MSD is outside of specifications. However, the corresponding laboratory control sample is acceptable, and shows the system to be in calibration.



Case Narrative SDG# ELK07

Client : Mobil Oil Corporation Project: MOBIL: 635 Elk St., Buffalo, NY Volatiles by GC - Water

LATA INTERPRETATION

Due to the limitations of the data package generating software, the NYSDEC ASP forms could not be included for the GC Volatiles data. Sample results are summarized on the analysis reports, and QC and calibration information is included on summary forms in this section of the data package.

Narrative reviewed and approved by:

 $\left| \mathbf{O} \right|$ Michele M. Turner, Manager

10.20.99 Date

LOZIER ANALYTICAL GROUP

CR+6 Analysis Sheet

Date	8/25/00
Date:	6/23/89

Analyst: K.H.

Start Time: 4:30

End Time: 4:35

Detection Limit: 0.02 Wavelenth: 540nm

Concentration Comments Volume (ml) or Final STD Absorbance From Dilution Client jod # Sample Welghi (g) Concentration iD Curve (mg/.) (rng/l) \$0ml 0.014 BLK 0.014 1 0 0 0 02 0.018 0.032 ۱ 50ml 0.032 0.1 0.08 0 093 4 50mi 0.093 0.2 0.154 0.167 • 50ml 0.167 • 0 514 50ml 0.514 0.5 0.503 20 0.407 0.32 C 395 0.407 1 50m 4905-1 0 0014 1 5Cm 0.014 0.014 1 5Crn. 0.014 485-2 C 4805-3 0 014 • \$Cml 0014 0 4805-4 C 0.014 1 50ml 0.014 4805-5 0 0.014 1 50m 0.014 4805-6 6 0 014 1 50m: 0.01+ 0 0014 Sumi 0.014 4805-5 1 30.4 SCITI 4805-10 0 1 0 014 0014 , SOITI 4305-11 0 1.014 4825-8 Q 0.014 1 50m; C.114 0.32 0 407 90 0.395 , C 407 0.014 ULK. ņ 0 1 0.014

QC Checked by: Onc 3/24/99 Data Entered by: Onc 8/24/99

TOTAL 1.02

-

					l	t		
Area:	Elk Street	Lot			Terminal Dis	posal Site	Former Lube O	Building
Sample Designation:	ESL-4	ESL-8/ESL-W1	ESL-8/ESL-W1	ESL-12	LF-5	1.1-7	SB-7	SB-7
Sample Date:	6/22/98	6/22/98	6/22/98	6/22/98	8/6/99	8/16/99	6/26/98	6/26/98
Sample Depth (ft bls):	1.5-2	1.5-2	8-10	1.5-2	21-23	21-23	0-2	8-10
Parameter								
(Concentration in µg/kg)								
Benzene	5.SU	SU	SU	5.20	5U	5.20	1100	240
Tohicae	1 8 J	9.1J	5U	5. 2 U	SU	5.2U	1100	46
Ethylbenzene	7.2J	8.5J	SU	5.2U	SU	5.2U	110U	97
Xylenes (total)	35J	24	100	10U	10U	100	1700	160
TOTAL BTEX	60.2	41.6	0	0	0	0	1790	543
1,2,4-Traniethylbenzene	29. J	27	S U	5.2U	SU	5.2U	5200	226
1,3,5-Trimeshythenzene	7.9J	· 6.3J	SU	5.2U	SU	5.2U	2200	93
Cunterie	7.5J	5U	5U	5.2U	SU	5.2U	430U	500
MTBE	5.5U	5U	SU	5 2U	su	5.2U	11 0 U	5U
n-Butyibenzene	8.2J	12J	5U	5.2U	5U	5.2U	8609	700
n-Propylbenzene	8 J	- 7.1 J	5U	5.2U	5U	5.2U	3000	400
Naphthalene	51WJ	42	50	12U	5U	5.2U	2100U	1300
o-Xylene	30 J	12J	5U	5.2U	5U -	5.2U	450	140
p-isopropykoluene	5.5U	6.9J	5U	5.2U	5U	5.2U	1100 0 U	550
sec-Butylbenzene	5.6J	SU	5U	5.2U	5U	5.2U	7800	570
text-Butylbenzene	5.5U	5 U	50	5. 2 U	5u	5.2 U	7300	330
Total VOCS	156.4	154.9	0	0	0	0	36250	5346

ر مرد ها

µg/kg - Micrograms per kilogram

- U The analyte was analyzed for, but not detected above the reported sample limit.
- I The analyte was positively identified: the associated numerical value is the approximate concentration of the analyte in the sample.
- UI The analyte was not detected above the reported quantitation limit. However the reported quantitation limit may be biased.
- NA Not analyzed
- Beld Analyte detected

ł

ł

					l	t		
Area:	Elk Street	Lot			Terminal Dis	posal Site	Former Lube O	Building
Sample Designation:	ESL-4	ESL-8/ESL-W1	ESL-8/ESL-W1	ESL-12	LF-5	1.1-7	SB-7	SB-7
Sample Date:	6/22/98	6/22/98	6/22/98	6/22/98	8/6/99	8/16/99	6/26/98	6/26/98
Sample Depth (ft bls):	1.5-2	1.5-2	8-10	1.5-2	21-23	21-23	0-2	8-10
Parameter								
(Concentration in µg/kg)								
Benzene	5.SU	SU	SU	5.20	5U	5.20	1100	240
Tohicae	1 8 J	9.1J	5U	5. 2 U	SU	5.2U	1100	46
Ethylbenzene	7.2J	8.5J	SU	5.2U	SU	5.2U	110U	97
Xylenes (total)	35J	24	100	10U	10U	100	1700	160
TOTAL BTEX	60.2	41.6	0	0	0	0	1790	543
1,2,4-Traniethylbenzene	29. J	27	S U	5.2U	SU	5.2U	5200	226
1,3,5-Trimeshythenzene	7.9J	· 6.3J	SU	5.2U	SU	5.2U	2200	93
Cunterie	7.5J	5U	5U	5.2U	SU	5.2U	430U	500
MTBE	5.5U	5U	SU	5 2U	su	5.2U	11 0 U	5U
n-Butyibenzene	8.2J	12J	5U	5.2U	5U	5.2U	8609	700
n-Propylbenzene	8 J	- 7.1 J	5U	5.2U	5U	5.2U	3000	400
Naphthalene	51WJ	42	50	12U	5U	5.2U	2100U	1300
o-Xylene	30 J	12J	5U	5.2U	5U -	5.2U	450	140
p-isopropykoluene	5.5U	6.9J	5U	5.2U	5U	5.2U	1100 0 U	550
sec-Butylbenzene	5.6J	SU	5U	5.2U	5U	5.2U	7888	570
text-Butylbenzene	5.5U	5 U	50	5. 2 U	5u	5.2 U	7300	330
Total VOCS	156.4	154.9	0	0	0	0	36250	5346

ر مرد هر

µg/kg - Micrograms per kilogram

- U The analyte was analyzed for, but not detected above the reported sample limit.
- I The analyte was positively identified: the associated numerical value is the approximate concentration of the analyte in the sample.
- UI The analyte was not detected above the reported quantitation limit. However the reported quantitation limit may be biased.
- NA Not analyzed
- Beld Analyte detected

ł

ł

					l	t		
Area:	Elk Street	Lot			Terminal Dis	posal Site	Former Lube O	Building
Sample Designation:	ESL-4	ESL-8/ESL-W1	ESL-8/ESL-W1	ESL-12	LF-5	1.1-7	SB-7	SB-7
Sample Date:	6/22/98	6/22/98	6/22/98	6/22/98	8/6/99	8/16/99	6/26/98	6/26/98
Sample Depth (ft bls):	1.5-2	1.5-2	8-10	1.5-2	21-23	21-23	0-2	8-10
Parameter								
(Concentration in µg/kg)								
Benzene	5.SU	SU	SU	5.20	5U	5.20	1100	240
Tohicae	1 8 J	9.1J	5U	5. 2 U	SU	5.2U	1100	46
Ethylbenzene	7.2J	8.5J	SU	5.2U	SU	5.2U	110U	97
Xylenes (total)	35J	24	100	10U	10U	100	1700	160
TOTAL BTEX	60.2	41.6	0	0	0	0	1790	543
1,2,4-Traniethylbenzene	29. J	27	S U	5.2U	SU	5.2U	5200	226
1,3,5-Trimeshythenzene	7.9J	· 6.3J	SU	5.2U	SU	5.2U	2200	93
Cunterie	7.5J	5U	5U	5.2U	SU	5.2U	430U	500
MTBE	5.5U	5U	SU	5 2U	su	5.2U	11 0 U	5U
n-Butyibenzene	8.2J	12J	5U	5.2U	5U	5.2U	8609	700
n-Propylbenzene	8 J	- 7.1 J	5U	5.2U	5U	5.2U	3000	400
Naphthalene	51WJ	42	50	12U	5U	5.2U	2100U	1300
o-Xylene	30 J	12J	5U	5.2U	5U -	5.2U	450	140
p-isopropykoluene	5.5U	6.9J	5U	5.2U	5U	5.2U	1100 0 U	550
sec-Butylbenzene	5.6J	SU	5U	5.2U	5U	5.2U	7888	570
text-Butylbenzene	5.5U	5 U	50	5. 2 U	5u	5.2 U	7300	330
Total VOCS	156.4	154.9	0	0	0	0	36250	5346

ر مرد هر

µg/kg - Micrograms per kilogram

- U The analyte was analyzed for, but not detected above the reported sample limit.
- I The analyte was positively identified: the associated numerical value is the approximate concentration of the analyte in the sample.
- UI The analyte was not detected above the reported quantitation limit. However the reported quantitation limit may be biased.
- NA Not analyzed
- Beld Analyte detected

ł

ł

					l	t		
Area:	Elk Street	Lot			Terminal Dis	posal Site	Former Lube O	Building
Sample Designation:	ESL-4	ESL-8/ESL-W1	ESL-8/ESL-W1	ESL-12	LF-5	1.1-7	SB-7	SB-7
Sample Date:	6/22/98	6/22/98	6/22/98	6/22/98	8/6/99	8/16/99	6/26/98	6/26/98
Sample Depth (ft bls):	1.5-2	1.5-2	8-10	1.5-2	21-23	21-23	0-2	8-10
Parameter								
(Concentration in µg/kg)								
Benzene	5.SU	SU	SU	5.20	5U	5.20	1100	240
Tohicae	1 8 J	9.1J	5U	5. 2 U	SU	5.2U	1100	46
Ethylbenzene	7.2J	8.5J	SU	5.2U	SU	5.2U	110U	97
Xylenes (total)	35J	24	100	10U	10U	100	1700	160
TOTAL BTEX	60.2	41.6	0	0	0	0	1790	543
1,2,4-Traniethylbenzene	29. J	27	S U	5.2U	SU	5.2U	5200	226
1,3,5-Trimeshythenzene	7.9J	· 6.3J	SU	5.2U	SU	5.2U	2200	93
Cunterie	7.5J	5U	5U	5.2U	SU	5.2U	430U	500
MTBE	5.5U	5U	SU	5 2U	su	5.2U	11 0 U	5U
n-Butyibenzene	8.2J	12J	5U	5.2U	5U	5.2U	8609	700
n-Propylbenzene	8 J	- 7.1 J	5U	5.2U	5U	5.2U	3000	400
Naphthalene	51WJ	42	50	12U	5U	5.2U	2100U	1300
o-Xylene	30 J	12J	5U	5.2U	5U -	5.2U	450	140
p-isopropykoluene	5.5U	6.9J	5U	5.2U	5U	5.2U	1100 0 U	550
sec-Butylbenzene	5.6J	SU	5U	5.2U	5U	5.2U	7888	570
text-Butylbenzene	5.5U	5 U	50	5. 2 U	5u	5.2 U	7300	330
Total VOCS	156.4	154.9	0	0	0	0	36250	5346

ر مرد هر

µg/kg - Micrograms per kilogram

- U The analyte was analyzed for, but not detected above the reported sample limit.
- I The analyte was positively identified: the associated numerical value is the approximate concentration of the analyte in the sample.
- UI The analyte was not detected above the reported quantitation limit. However the reported quantitation limit may be biased.
- NA Not analyzed
- Beld Analyte detected

ł

ł

Arca: [[uplc Designation: Sample Date: ble Depth (ft bis):	Former Lube SB-8 6/26/98	Oil Building SB-8	SB 0							
nple Designation: Sample Date: ble Depth (ft bls):	SB-8 6/26/98	SB-8	CR Q							
Sample Date: ble Depth (ft bis):	6/26/98			SB-9	SB-10	SB-10	SB-11/J.B-1	SB-13	SB-14	SB-15
ole Depth (ft bis):		6/26/98	6/26/98	6/26/98	6/26/98	6/26/98	7/1/99	7/27/99	7/26/99	7/27/99
	0-2	10-12	0-2	10-12	0-2	8-10	18-20	11-13	13-15	11-13
			والمراجع والمحافظ والمحاوم والمحاوم والمحاوم والمحافظ والمحافظ والمحافظ والمحافظ والمحافظ والمحافظ والمحافظ وال			·		. <u></u>		
	4.2 U	23J	4.7U	13U	34	750	120	2500	780	2308
	7.5J	130	14	273	40	306	180	2500	220	680
	4.2U	76	4.7U	170	24	740	610	8200	1400	5100
	11 U	1 20	16U	480	178	2200	830	72000	730	3500
	7.5	219	14	677	268	3990	1740	35200	3130	11580
	8.7J	588	16	1100	150	3100	2400	18000	1100	11000
	5.1J ·	300	4.9J	680	180	4900	1500	9100	926	8688
	5.3J	520	4.7U	1700	78	12000	2800	20000	1900	11000
	4.2U	13U	4.7(1	13U	5U	25U	23U	120U	130U	1500
	1 0J	850	6.5J	2709	130	7800	3488	24000	3104	18000
	4.2U	220	5J	13U	29	4100	1300	15006	2488	12000
	28	2090	26	4606	180	9606	2600	33000	1300	23000
	5.3J	47	11 J	210	39	500	390	7288	360	1900
	4.2U	. 13 0U	4.9J	1800	62	13000	2300U	20000	1300U	13000
	4.8J	670	5.9J	520U	75	7680	2500 J	12000	1500	7480
	4.2U	550	4.7U	1708	45	7000	2400	11909	1300	7100
		4.2U 7.5J 4.2U 11U 7.5 8.7J 5.1J 5.3J 4.2U 10J 4.2U 28 5.3J 4.2U 4.8J 4.2U	4.2U 23J 7.5J 13U 4.2U 76 11U 120 7.5 219 8.7J 580 5.1J 300 5.3J 520 4.2U 13U 10J 850 4.2U 220 28 2000 5.3J 47 4.2U 130U 4.8J 670 4.2U 550	$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	4.2U $23J$ $4.7U$ $13U$ 34 750 120 $7.5J$ $13U$ 14 $27J$ 40 300 180 $4.2U$ 76 $4.7U$ 176 24 740 610 $11U$ 120 $16U$ 480 179 2200 830 7.5 219 14 677 268 3990 1740 $8.7J$ 586 16 1100 150 3100 2400 $5.1J$ 306 $4.9J$ 680 100 4900 1500 $5.3J$ 526 $4.7U$ 1700 78 12000 2300 $4.2U$ $13U$ $4.7U$ $13U$ $5U$ $25U$ $23U$ $10J$ 850 $6.5J$ 2700 130 7800 3446 $4.2U$ 220 $5J$ $13U$ 29 4100 1300 28 2090 24 4606 180 9606 2600 $5.3J$ 47 $11J$ 210 39 590 300 $4.2U$ $130U$ $4.9J$ 1800 62 13000 $23000J$ $4.8J$ 670 $5.9J$ $520U$ 75 7660 2500 J $4.2U$ $130U$ $4.9J$ 1800 62 13000 $2300J$ $4.8J$ 670 $5.9J$ $520U$ 75 7660 2500 J $4.2U$ $130U$ $4.9J$ 1800 62 13000 $2300J$ J $4.2U$	$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$	$\begin{array}{c ccccccccccccccccccccccccccccccccccc$

µg/kg - Micrograms per kilogram

88.2

5956

74.7

U - The analyte was analyzed for, but not detected above the reported sample limit.

15167

I - The analyte was positively identified: the associated numerical value is the approximate concentration of the analyte in the sample.

1156

73590

18540

204500

17070

- 113 The analyse was not detected above the reported quantitation limit. However the reported quantitation limit may be biased.
- NA Not analyzed
- Bold Analyte detected

Total VOCS

Ī

P.16

Arca: [[uplc Designation: Sample Date: ble Depth (ft bis):	Former Lube SB-8 6/26/98	Oil Building SB-8	SB 0							
nple Designation: Sample Date: ble Depth (ft bls):	SB-8 6/26/98	SB-8	CR Q							
Sample Date: ble Depth (ft bis):	6/26/98			SB-9	SB-10	SB-10	SB-11/J.B-1	SB-13	SB-14	SB-15
ole Depth (ft bis):		6/26/98	6/26/98	6/26/98	6/26/98	6/26/98	7/1/99	7/27/99	7/26/99	7/27/99
	0-2	10-12	0-2	10-12	0-2	8-10	18-20	11-13	13-15	11-13
			والمراجع والمحافظ والمحاوم والمحاوم والمحاوم والمحافظ والمحافظ والمحافظ والمحافظ والمحافظ والمحافظ والمحافظ وال			·		. <u></u>		
	4.2 U	23J	4.7U	13U	34	750	120	2500	780	2308
	7.5J	130	14	273	40	306	180	2500	220	680
	4.2U	76	4.7U	176	24	740	610	8200	1400	5100
	11 U	1 20	16U	480	178	2200	830	72000	730	3500
	7.5	219	14	677	268	3990	1740	35200	3130	1 1 580
	8.7J	588	16	1100	150	3100	2400	18000	1100	11000
	5.1J ·	300	4.9J	680	180	4900	1500	9100	926	8688
	5.3J	520	4.7U	1700	78	12000	2800	20000	1900	11000
	4.2U	13U	4.70	13U	5U	25U	23U	120U	130U	1500
	1 0J	850	6.5J	2709	130	7800	3488	24000	3104	18000
	4.2U	220	5J	13U	29	4100	1300	15006	2488	12000
	28	2090	26	4606	180	9606	2600	33000	1300	23000
	5.3J	47	11 J	210	39	500	390	7288	360	1900
	4.2U	. 13 0U	4.9J	1800	62	13000	2300U	20000	1300U	13000
	4.8J	670	5.9J	520U	75	7680	2500 J	12000	1500	7488
	4.2U	550	4.7U	1708	45	7888	2400	11909	1300	7100
		4.2U 7.5J 4.2U 11U 7.5 8.7J 5.1J 5.3J 4.2U 10J 4.2U 28 5.3J 4.2U 4.8J 4.2U	4.2U 23J 7.5J 13U 4.2U 76 11U 120 7.5 219 8.7J 580 5.1J 300 5.3J 520 4.2U 13U 10J 850 4.2U 220 28 2000 5.3J 47 4.2U 130U 4.8J 670 4.2U 550	$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	4.2U $23J$ $4.7U$ $13U$ 34 750 120 $7.5J$ $13U$ 14 $27J$ 40 300 180 $4.2U$ 76 $4.7U$ 176 24 740 610 $11U$ 120 $16U$ 480 179 2200 830 7.5 219 14 677 268 3990 1740 $8.7J$ 586 16 1100 150 3100 2400 $5.1J$ 306 $4.9J$ 680 100 4900 1500 $5.3J$ 526 $4.7U$ 1700 78 12000 2300 $4.2U$ $13U$ $4.7U$ $13U$ $5U$ $25U$ $23U$ $10J$ 850 $6.5J$ 2700 130 7800 3446 $4.2U$ 220 $5J$ $13U$ 29 4100 1300 28 2090 24 4606 180 9606 2600 $5.3J$ 47 $11J$ 210 39 590 300 $4.2U$ $130U$ $4.9J$ 1800 62 13000 $23000J$ $4.8J$ 670 $5.9J$ $520U$ 75 7660 2500 J $4.2U$ $130U$ $4.9J$ 1800 62 13000 $2300J$ $4.8J$ 670 $5.9J$ $520U$ 75 7660 2500 J $4.2U$ $130U$ $4.9J$ 1800 62 13000 $2300J$ J $4.2U$	$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$	$\begin{array}{c ccccccccccccccccccccccccccccccccccc$

µg/kg - Micrograms per kilogram

88.2

5956

74.7

U - The analyte was analyzed for, but not detected above the reported sample limit.

15167

I - The analyte was positively identified: the associated numerical value is the approximate concentration of the analyte in the sample.

1156

73590

18540

204500

17070

- 113 The analyse was not detected above the reported quantitation limit. However the reported quantitation limit may be biased.
- NA Not analyzed
- Bold Analyte detected

Total VOCS

Ī

P.16

Arca: [[uplc Designation: Sample Date: ble Depth (ft bis):	Former Lube SB-8 6/26/98	Oil Building SB-8	SB 0							
nple Designation: Sample Date: ble Depth (ft bls):	SB-8 6/26/98	SB-8	CR Q							
Sample Date: ble Depth (ft bis):	6/26/98			SB-9	SB-10	SB-10	SB-11/J.B-1	SB-13	SB-14	SB-15
ole Depth (ft bis):		6/26/98	6/26/98	6/26/98	6/26/98	6/26/98	7/1/99	7/27/99	7/26/99	7/27/99
	0-2	10-12	0-2	10-12	0-2	8-10	18-20	11-13	13-15	11-13
			والمراجع والمحافظ والمحاوم والمحاوم والمحاوم والمحافظ والمحافظ والمحافظ والمحافظ والمحافظ والمحافظ والمحافظ وال			·		. <u></u>		
	4.2 U	23J	4.7U	13U	34	750	120	2500	780	2308
	7.5J	130	14	273	40	306	180	2500	220	680
	4.2U	76	4.7U	170	24	740	610	8200	1400	5100
	11 U	1 20	16U	480	178	2200	830	72000	730	3500
	7.5	219	14	677	268	3990	1740	35200	3130	1 1 580
	8.7J	588	16	1100	150	3100	2400	18000	1100	11000
	5.1J ·	300	4.9J	680	180	4900	1500	9100	926	8688
	5.3J	520	4.7U	1700	78	12000	2800	20000	1900	11000
	4.2U	13U	4.70	13U	5U	25U	23U	120U	130U	1500
	1 0J	850	6.5J	2709	130	7800	3488	24000	3104	18000
	4.2U	220	5J	13U	29	4100	1300	15006	2488	12000
	28	2090	26	4606	180	9606	2600	33000	1300	23000
	5.3J	47	11 J	210	39	500	390	7288	360	1900
	4.2U	. 13 0U	4.9J	1800	62	13000	2300U	20000	1300U	13000
	4.8J	670	5.9J	520U	75	7680	2500 J	12000	1500	7480
	4.2U	550	4.7U	1708	45	7000	2400	11909	1300	7100
		4.2U 7.5J 4.2U 11U 7.5 8.7J 5.1J 5.3J 4.2U 10J 4.2U 28 5.3J 4.2U 4.8J 4.2U	4.2U 23J 7.5J 13U 4.2U 76 11U 120 7.5 219 8.7J 580 5.1J 300 5.3J 520 4.2U 13U 10J 850 4.2U 220 28 2000 5.3J 47 4.2U 130U 4.8J 670 4.2U 550	$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	4.2U $23J$ $4.7U$ $13U$ 34 750 120 $7.5J$ $13U$ 14 $27J$ 40 300 180 $4.2U$ 76 $4.7U$ 176 24 740 610 $11U$ 120 $16U$ 480 179 2200 830 7.5 219 14 677 268 3990 1740 $8.7J$ 586 16 1100 150 3100 2400 $5.1J$ 306 $4.9J$ 680 100 4900 1500 $5.3J$ 526 $4.7U$ 1700 78 12000 2300 $4.2U$ $13U$ $4.7U$ $13U$ $5U$ $25U$ $23U$ $10J$ 850 $6.5J$ 2700 130 7800 3446 $4.2U$ 220 $5J$ $13U$ 29 4100 1300 28 2090 24 4606 180 9606 2600 $5.3J$ 47 $11J$ 210 39 590 300 $4.2U$ $130U$ $4.9J$ 1800 62 13000 $23000J$ $4.8J$ 670 $5.9J$ $520U$ 75 7660 2500 J $4.2U$ $130U$ $4.9J$ 1800 62 13000 $2300J$ $4.8J$ 670 $5.9J$ $520U$ 75 7660 2500 J $4.2U$ $130U$ $4.9J$ 1800 62 13000 $2300J$ J $4.2U$	$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$	$\begin{array}{c ccccccccccccccccccccccccccccccccccc$

µg/kg - Micrograms per kilogram

88.2

5956

74.7

U - The analyte was analyzed for, but not detected above the reported sample limit.

15167

I - The analyte was positively identified: the associated numerical value is the approximate concentration of the analyte in the sample.

1156

73590

18540

204500

17070

- 113 The analyse was not detected above the reported quantitation limit. However the reported quantitation limit may be biased.
- NA Not analyzed
- Bold Analyte detected

Total VOCS

Ī

P.16

										4
Area:	Former Lub	e Oil Buildi	ng							
Sample Designation:	SB-16	SB-17	SB-17	SB-18	SB-18	SB-19	SB-20	SB-20	SB-24	SB-24
Sample Date:	7/28/99	7/28/99	7/28/99	7/7.9/99	7/29/99	7/29/99	7/29/99	7/29/99	8/2/99	8/4/99
Sample Depth (It bis):	11-13	Q-0.5	11-13	0-0.5	11-13	7-9	3-4	9-11	13-15	0-0.5
Parameter	-				1					
(Concentration in µg/kg)				,						
Benzene	3000	170	1200	2000	520	26 U	91	12000	5.3U	8.7
Toluçoc	430	28	228	520	130	79	24	7500	5.3U	23
Ethylbenzene	1600	43	1200	3260	820	200	73	14000	5.3U	13
Xylenes (total)	1 800	170	2300	3400	1700	1600	250	60000	ΠU	40
TOTAL BTEX	6830	411	4920	9120	3170	1879	438	93500	• 0	84.7
1,2,4-Trimethylbenzenc	2500	350	6300	4100	8480	1660	340	95006	5.3U	100
1,3,5-Trimethylbenzene	1300	• 210	2690	52 0 0	2800	1400	180	37000	5.3U	97
Cumene	5500	53	5200	12000	3809	4100	360	12000	5.3U	79
MTBE	30U	4.7U	24U	51U	48U	26U	4.2U	320 U	12	SU
n-Butylbenzene	13000	290	6700	14000	6400	4900	400	49 00 0	5. 3U	180
n-Propylbenzene	17000	41	4700	7480	3600	1300	220	39000	5. 3U	63
Naphthalene	26000	248	280 G	26000U	7888	12080	539	31000	5.3U	316
o-Xylene	960	84	980 J	1200	1380	360	91	20000	5. 3U	73
p-Isopropyltoluene	3000U	1 20 U	610 0 U	26000U	5100	2600U	210U	11000	5.3U	88
sec-Butybenzene	8200	55	3500	8100	2700	5500	190	16000	5.3U	76
tert-Butylbenzene	4800	66	3500							
Total VOCS	79290	1890	47200	61120	45070	33039	2749	403500	12	1150.7

µg/kg - Micrograms per kilogram

- U The analyte was analyzed for, but not detected above the reported sample limit.
- J The analyte was positively identified: the associated numerical value is the approximate concentration of the analyte in the sample.
- UI The analyte was not detected above The reported quantitation limit. However The reported quantitation limit may be biased.

NA - Not analyzed

Beid - Analyte detected

.

					l	t		
Area:	Elk Street	Lot			Terminal Dis	posal Site	Former Lube O	Building
Sample Designation:	ESL-4	ESL-8/ESL-W1	ESL-8/ESL-W1	ESL-12	LF-5	1.1-7	SB-7	SB-7
Sample Date:	6/22/98	6/22/98	6/22/98	6/22/98	8/6/99	8/16/99	6/26/98	6/26/98
Sample Depth (ft bls):	1.5-2	1.5-2	8-10	1.5-2	21-23	21-23	0-2	8-10
Parameter								
(Concentration in µg/kg)								
Benzene	5.SU	SU	SU	5.20	5U	5.20	1100	240
Tohicae	1 8 J	9.1J	5U	5. 2 U	SU	5.2U	1100	46
Ethylbenzene	7.2J	8.5J	SU	5.2U	SU	5.2U	110U	97
Xylenes (total)	35J	24	100	10U	10U	100	1700	160
TOTAL BTEX	60.2	41.6	0	0	0	0	1790	543
1,2,4-Traniethylbenzene	29. J	27	S U	5.2U	SU	5.2U	5200	226
1,3,5-Trimeshythenzene	7.9J	· 6.3J	SU	5.2U	SU	5.2U	2200	93
Cunterie	7.5J	5U	5U	5.2U	SU	5.2U	430U	500
MTBE	5.5U	5U	SU	5 2U	su	5.2U	11 0 U	5U
n-Butyibenzene	8.2J	12J	5U	5.2U	5U	5.2U	8609	700
n-Propylbenzene	8 J	- 7.1 J	5U	5.2U	5U	5.2U	3000	400
Naphthalene	51WJ	42	50	12U	5U	5.2U	2100U	1300
o-Xylene	30 J	12J	5U	5.2U	5U -	5.2U	450	140
p-isopropykoluene	5.5U	6.9J	5U	5.2U	5U	5.2U	1100 0 U	550
sec-Butylbenzene	5.6J	SU	5U	5.2U	5U	5.2U	7800	570
text-Butylbenzene	5.5U	5 U	50	5. 2 U	5u	5.2 U	7300	330
Total VOCS	156.4	154.9	0	0	0	0	36250	5346

ر مرد هر

µg/kg - Micrograms per kilogram

- U The analyte was analyzed for, but not detected above the reported sample limit.
- I The analyte was positively identified: the associated numerical value is the approximate concentration of the analyte in the sample.
- UI The analyte was not detected above the reported quantitation limit. However the reported quantitation limit may be biased.
- NA Not analyzed
- Beld Analyte detected

ł

ł

										4
Area:	Former Lub	e Oil Buildi	ng							
Sample Designation:	SB-16	SB-17	SB-17	SB-18	SB-18	SB-19	SB-20	SB-20	SB-24	SB-24
Sample Date:	7/28/99	7/28/99	7/28/99	7/7.9/99	7/29/99	7/29/99	7/29/99	7/29/99	8/2/99	8/4/99
Sample Depth (It bis):	11-13	Q-0.5	11-13	0-0.5	11-13	7-9	3-4	9-11	13-15	0-0.5
Parameter	-				1					
(Concentration in µg/kg)				,						
Benzene	3000	170	1200	2000	520	26 U	91	12000	5.3U	8.7
Toluçoc	430	28	228	520	130	79	24	7500	5.3U	23
Ethylbenzene	1600	43	1200	3260	820	200	73	14000	5.3U	13
Xylenes (total)	1 800	170	2300	3400	1700	1600	250	60000	ΠU	40
TOTAL BTEX	6830	411	4920	9120	3170	1879	438	93500	• 0	84.7
1,2,4-Trimethylbenzenc	2500	350	6300	4100	8480	1660	340	95006	5.3U	100
1,3,5-Trimethylbenzene	1300	• 210	2690	52 0 0	2800	1400	180	37000	5.3U	97
Cumene	5500	53	5200	12000	3809	4100	360	12000	5.3U	79
MTBE	30U	4.7U	24U	51U	48U	26U	4.2U	320 U	12	SU
n-Butylbenzene	13000	290	6700	14000	6400	4900	400	49 00 0	5. 3U	180
n-Propylbenzene	17000	41	4700	7480	3600	1300	220	39000	5. 3U	63
Naphthalene	26000	248	280 G	26000U	7888	12080	539	31000	5.3U	316
o-Xylene	960	84	980 J	1200	1380	360	91	20000	5. 3U	73
p-Isopropyltoluene	3000U	1 20 U	610 0 U	26000U	5100	2600U	210U	11000	5.3U	88
sec-Butybenzene	8200	55	3500	8100	2700	5500	190	16000	5.3U	76
tert-Butylbenzene	4800	66	3500							
Total VOCS	79290	1890	47200	61120	45070	33039	2749	403500	12	1150.7

µg/kg - Micrograms per kilogram

- U The analyte was analyzed for, but not detected above the reported sample limit.
- J The analyte was positively identified: the associated numerical value is the approximate concentration of the analyte in the sample.
- UI The analyte was not detected above The reported quantitation limit. However The reported quantitation limit may be biased.

NA - Not analyzed

Beid - Analyte detected

.

					l	t		
Area:	Elk Street	Lot			Terminal Dis	posal Site	Former Lube O	Building
Sample Designation:	ESL-4	ESL-8/ESL-W1	ESL-8/ESL-W1	ESL-12	LF-5	1.1-7	SB-7	SB-7
Sample Date:	6/22/98	6/22/98	6/22/98	6/22/98	8/6/99	8/16/99	6/26/98	6/26/98
Sample Depth (ft bls):	1.5-2	1.5-2	8-10	1.5-2	21-23	21-23	0-2	8-10
Parameter								
(Concentration in µg/kg)								
Benzene	5.SU	SU	SU	5.20	5U	5.20	1100	240
Tohicae	1 8 J	9.1J	5U	5. 2 U	SU	5.2U	1100	46
Ethylbenzene	7.2J	8.5J	SU	5.2U	SU	5.2U	110U	97
Xylenes (total)	35J	24	100	10U	10U	100	1700	160
TOTAL BTEX	60.2	41.6	0	0	0	0	1790	543
1,2,4-Traniethylbenzene	29. J	27	S U	5.2U	SU	5.2U	5200	226
1,3,5-Trimeshythenzene	7.9J	· 6.3J	SU	5.2U	SU	5.2U	2200	93
Cunterie	7.5J	5U	5U	5.2U	SU	5.2U	430U	500
MTBE	5.5U	5U	SU	5 2U	su	5.2U	11 0 U	5U
n-Butyibenzene	8.2J	12J	5U	5.2U	5U	5.2U	8609	700
n-Propylbenzene	8 J	- 7.1 J	5U	5.2U	5U	5.2U	3000	400
Naphthalene	51WJ	42	50	12U	5U	5.2U	2100U	1300
o-Xylene	30 J	12J	5U	5.2U	5U -	5.2U	450	140
p-isopropykoluene	5.5U	6.9J	5U	5.2U	5U	5.2U	1100 0 U	550
sec-Butylbenzene	5.6J	SU	5U	5.2U	5U	5.2U	7888	570
text-Butylbenzene	5.5U	5 U	50	5. 2 U	5u	5.2 U	7300	330
Total VOCS	156.4	154.9	0	0	0	0	36250	5346

ر مرد هر

µg/kg - Micrograms per kilogram

- U The analyte was analyzed for, but not detected above the reported sample limit.
- I The analyte was positively identified: the associated numerical value is the approximate concentration of the analyte in the sample.
- UI The analyte was not detected above the reported quantitation limit. However the reported quantitation limit may be biased.
- NA Not analyzed
- Beld Analyte detected

ł

ł

					l	t		
Area:	Elk Street	Lot			Terminal Dis	posal Site	Former Lube O	Building
Sample Designation:	ESL-4	ESL-8/ESL-W1	ESL-8/ESL-W1	ESL-12	LF-5	1.1-7	SB-7	SB-7
Sample Date:	6/22/98	6/22/98	6/22/98	6/22/98	8/6/99	8/16/99	6/26/98	6/26/98
Sample Depth (ft bls):	1.5-2	1.5-2	8-10	1.5-2	21-23	21-23	0-2	8-10
Parameter								
(Concentration in µg/kg)								
Benzene	5.SU	SU	SU	5.20	5U	5.20	1100	240
Tohicae	1 8 J	9.1J	5U	5. 2 U	SU	5.2U	1100	46
Ethylbenzene	7.2J	8.5J	SU	5.2U	SU	5.2U	110U	97
Xylenes (total)	35J	24	100	10U	10U	100	1700	160
TOTAL BTEX	60.2	41.6	0	0	0	0	1790	543
1,2,4-Traniethylbenzene	29. J	27	S U	5.2U	SU	5.2U	5200	226
1,3,5-Trimeshythenzene	7.9J	· 6.3J	SU	5.2U	SU	5.2U	2200	93
Cunterie	7.5J	5U	5U	5.2U	SU	5.2U	430U	500
MTBE	5.5U	5U	SU	5 2U	su	5.2U	11 0 U	5U
n-Butyibenzene	8.2J	12J	5U	5.2U	5U	5.2U	8609	700
n-Propylbenzene	8 J	- 7.1 J	5U	5.2U	5U	5.2U	3000	400
Naphthalene	51WJ	42	50	12U	5U	5.2U	2100U	1300
o-Xylene	30 J	12J	5U	5.2U	5U -	5.2U	450	140
p-isopropykoluene	5.5U	6.9J	5U	5.2U	5U	5.2U	1100 0 U	550
sec-Butylbenzene	5.6J	SU	5U	5.2U	5U	5.2U	7800	570
text-Butylbenzene	5.5U	5 U	50	5. 2 U	5u	5.2 U	7300	330
Total VOCS	156.4	154.9	0	0	0	0	36250	5346

ر مرد هر

µg/kg - Micrograms per kilogram

- U The analyte was analyzed for, but not detected above the reported sample limit.
- I The analyte was positively identified: the associated numerical value is the approximate concentration of the analyte in the sample.
- UI The analyte was not detected above the reported quantitation limit. However the reported quantitation limit may be biased.
- NA Not analyzed
- Beld Analyte detected

ł

ł

Arca: [[uplc Designation: Sample Date: ble Depth (ft bis):	Former Lube SB-8 6/26/98	Oil Building SB-8	SB 0							
nple Designation: Sample Date: ble Depth (ft bls):	SB-8 6/26/98	SB-8	CR Q							
Sample Date: ble Depth (ft bis):	6/26/98			SB-9	SB-10	SB-10	SB-11/J.B-1	SB-13	SB-14	SB-15
ole Depth (ft bis):		6/26/98	6/26/98	6/26/98	6/26/98	6/26/98	7/1/99	7/27/99	7/26/99	7/27/99
	0-2	10-12	0-2	10-12	0-2	8-10	18-20	11-13	13-15	11-13
			والمراجع والمحافظ والمحاوم والمحاوم والمحاوم والمحافظ والمحافظ والمحافظ والمحافظ والمحافظ والمحافظ والمحافظ وال			·		. <u></u>		
	4.2 U	23J	4.7U	13U	34	750	120	2500	780	2308
	7.5J	130	14	273	40	306	180	2500	220	680
	4.2U	76	4.7U	176	24	740	610	8200	1400	5100
	11 U	1 20	16U	480	178	2200	830	72000	730	3500
	7.5	219	14	677	268	3990	1740	35200	3130	1 1 580
	8.7J	588	16	1100	150	3100	2400	18000	1100	11000
	5.1J ·	300	4.9J	680	180	4900	1500	9100	926	8688
	5.3J	520	4.7U	1700	78	12000	2800	20000	1900	11000
	4.2U	13U	4.70	13U	5U	25U	23U	120U	130U	1500
	1 0J	850	6.5J	2709	130	7800	3488	24000	3104	18000
	4.2U	220	5J	13U	29	4100	1300	15006	2488	12000
	28	2090	26	4606	180	9606	2600	33000	1300	23000
	5.3J	47	11 J	210	39	500	390	7288	360	1900
	4.2U	. 13 0U	4.9J	1800	62	13000	2300U	20000	1300U	13000
	4.8J	670	5.9J	520U	75	7680	2500 J	12000	1500	7480
	4.2U	550	4.7U	1708	45	7888	2400	11909	1300	7100
		4.2U 7.5J 4.2U 11U 7.5 8.7J 5.1J 5.3J 4.2U 10J 4.2U 28 5.3J 4.2U 4.8J 4.2U	4.2U 23J 7.5J 13U 4.2U 76 11U 120 7.5 219 8.7J 580 5.1J 300 5.3J 520 4.2U 13U 10J 850 4.2U 220 28 2000 5.3J 47 4.2U 130U 4.8J 670 4.2U 550	$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	4.2U $23J$ $4.7U$ $13U$ 34 750 120 $7.5J$ $13U$ 14 $27J$ 40 300 180 $4.2U$ 76 $4.7U$ 176 24 740 610 $11U$ 120 $16U$ 480 179 2200 830 7.5 219 14 677 268 3990 1740 $8.7J$ 586 16 1100 150 3100 2400 $5.1J$ 306 $4.9J$ 680 100 4900 1500 $5.3J$ 526 $4.7U$ 1700 78 12000 2300 $4.2U$ $13U$ $4.7U$ $13U$ $5U$ $25U$ $23U$ $10J$ 850 $6.5J$ 2700 130 7800 3446 $4.2U$ 220 $5J$ $13U$ 29 4100 1300 28 2090 24 4606 180 9606 2600 $5.3J$ 47 $11J$ 210 39 590 300 $4.2U$ $130U$ $4.9J$ 1800 62 13000 $23000J$ $4.8J$ 670 $5.9J$ $520U$ 75 7660 2500 J $4.2U$ $130U$ $4.9J$ 1800 62 13000 $2300J$ $4.8J$ 670 $5.9J$ $520U$ 75 7660 2500 J $4.2U$ $130U$ $4.9J$ 1800 62 13000 $2300J$ J $4.2U$	$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$	$\begin{array}{c ccccccccccccccccccccccccccccccccccc$

µg/kg - Micrograms per kilogram

88.2

5956

74.7

U - The analyte was analyzed for, but not detected above the reported sample limit.

15167

I - The analyte was positively identified: the associated numerical value is the approximate concentration of the analyte in the sample.

1156

73590

18540

204500

17070

- 113 The analyse was not detected above the reported quantitation limit. However the reported quantitation limit may be biased.
- NA Not analyzed
- Bold Analyte detected

Total VOCS

Ī

P.16

					l	t		
Area:	Elk Street	Lot			Terminal Dis	Former Lube Oil Building		
Sample Designation: ESL-4 E		ESL-8/ESL-W1	ESL-8/ESL-W1	ESL-12	LF-5	1.1-7	SB-7	SB-7
Sample Date:	6/22/98	6/22/98	6/22/98	6/22/98	8/6/99	8/16/99	6/26/98	6/26/98
Sample Depth (ft bls):	1.5-2	1.5-2	8-10	1.5-2	21-23	21-23	0-2	8-10
Parameter								
(Concentration in µg/kg)								
Benzene	5.SU	su	ક્ય	5.20	5U	5.20	1100	240
Tohicae	1 8 J	9.1J	5U	5. 2 U	SU	5.2U	1100	46
Ethylbenzene	7.2J	8.5J	SU	5.2U	SU	5.2U	110U	97
Xylenes (total)	35J	24	100	10U	10U	100	1700	160
TOTAL BTEX	60.2	41.6	0	0	0	0	1790	543
1,2,4-Traniethylbenzene	29. J	27	5 U	5.2U	SU	5.2U	5200	226
1,3,5-Trimeshythenzene	7.9J	· 6.3J	SU	5.2U	SU	5.2U	2200	93
Cunterie	7.5J	5U	5U	5.2U	SU	5.2U	430U	500
MTBE	5.5U	5U	SU	5 2U	su	5.2U	11 0 U	5U
n-Butyibenzene	8.2J	12J	5U	5.2U	5U	5.2U	8609	700
n-Propylbenzene	8 J	- 7.1 J	5U	5.2U	5U	5.2U	3000	400
Naphthalene	51WJ	42	50	12U	5U	5.2U	2100U	1300
o-Xylene	30 J	12J	5U	5.2U	5U -	5.2U	450	140
p-isopropykoluene	5.5U	6.9J	5U	5.2U	5U	5.2U	1100 0 U	550
sec-Butylbenzene	5.6J	SU	5 U	5.2U	5U	5.2U	7800	570
text-Butylbenzene	5.5U	5 U	5 U	5. 2 U	5u	5.2 U	7300	330
Total VOCS	156.4	154.9	0	0	0	0	36250	5346

ر مرد هر

µg/kg - Micrograms per kilogram

- U The analyte was analyzed for, but not detected above the reported sample limit.
- I The analyte was positively identified: the associated numerical value is the approximate concentration of the analyte in the sample.
- UI The analyte was not detected above the reported quantitation limit. However the reported quantitation limit may be biased.
- NA Not analyzed
- Beld Analyte detected

ł

ł

Arca: [[aplc Designation: Sample Date: ple Depth (ft bis):	Former Lube SB-8 6/26/98	Oil Building SB-8	5													
aple Designation: Sample Date: ple Depth (ft bls):	SB-8 6/26/98	SB-8	00.0	Area: Former Lube Oil Building												
Sample Date: ple Depth (ft bis):	6/26/98		313-Y	SB-9	SB-10	SB-10	SB-11/)_B-1	SB-13	SB-14	SB-15						
ole Depth (ft bis):		6/26/98	6/26/98	6/26/98	6/26/98	6/26/98	7/1/99	7/27/99	7/26/99	7/27/99						
	0-2	10-12	0-2	10-12	0-2	8-10	18-20	11-13	13-15	11-13						
						·		. <u></u>								
	4.2U	23J	4.7U	13U	34	750	120	2500	780	2300						
	7.5J	130	14	273	40	306	180	2500	220	680						
	4.2U	76	4.7U	174	24	740	610	8200	1400	5100						
	nv	1 20	16U	480	178	2200	830	72000	730	3500						
	7.5	219	14	677	268	3990	1740	35200	3130	1 1 580						
	8.7J	588	16	1100	150	3100	2460	18000	1100	11000						
	5.1J '	300	4.9J	680	180	4900	1500	9100	926	8666						
	5.3J	520	4.7U	1700	78	12000	2800	20000	1900	11000						
	4.2U	13U	4.70	1 3 U	5U	25U	23U	120U	130U	1500						
	1 0J	859	6.5J	2700	130	7800	3488	24000	3104	18000						
	4.2U	220	5J	13U	29	4100	1300	15006	2488	12000						
	28	2090	28	4606	180	9606	2600	33000	1300	23000						
	5.3J	47	11 J	210	39	500	300	7288	360	1900						
	4.2U	. 130U	4.9J	1800	62	13000	2300U	20000	1300U	13000						
	4.8J	670	5.9J	520U	75	7680	2500 J	12000	1500	7488						
	4.2 U	550	4.7U	1708	45	7888	2400	11909	1300	7100						
		4.2U 7.5J 4.2U 11U 7.5 8.7J 5.1J 5.1J 5.3J 4.2U 10J 4.2U 28 5.3J 4.2U 4.8J 4.2U	4.2U 23J 7.5J 13U 4.2U 76 11U 120 7.5 219 8.7J 560 5.1J 300 5.3J 520 4.2U 13U 10J 850 4.2U 220 28 2000 5.3J 47 4.2U 130U 4.8J 670 4.2U 550	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$	$\begin{array}{c ccccccccccccccccccccccccccccccccccc$						

µg/kg - Micrograms per kilogram

88.2

5956

74.7

U - The analyte was analyzed for, but not detected above the reported sample limit.

15167

I - The analyte was positively identified: the associated numerical value is the approximate concentration of the analyte in the sample.

1156

73590

18540

204500

17070

- 113 The analyse was not detected above the reported quantitation limit. However the reported quantitation limit may be biased.
- NA Not analyzed
- Bold Analyte detected

Total VOCS

Ī

P.16

										4.
Area:	Former Lub	e Oil Buildi	ng						<u></u>	
Sample Designation:	SB-16	SB-17	SB-17	SB-18	SB-18	SB-19	SB-20	SB-20	SB-24	SB-24
Sample Date:	7/28/99	7/28/99	7/28/99	7/7.9/99	7/29/99	7/29/99	7/29/99	7/29/99	8/2/99	8/4/99
Sample Depth (It bis):	11-13	Q-0.5	11-13	0-0.5	11-13	7-9	3-4	9-11	13-15	0-0.5
Parameter	-				1					
(Concentration in µg/kg)				,						•
Benzene	3000	170	1200	2000	520	26 U	91	12000	5.3U	8.7
Toluçoc	430	28	228	520	130	79	24	7500	5.3U	23
Ethylbenzene	1600	43	1200	3260	820	200	73	14000	5.3U	13
Xylenes (total)	1800	170	2300	3400	1700	1600	250	60000	ШU	40
TOTAL BTEX	6830	411	4920	9120	3170	1879	438	93500	• 0	84.7
1,2,4-Trimethylbenzenc	2500	350	6300	4100	8480	1660	340	95006	5.3U	100
1,3,5-Trimethylbenzene	1300	• 210	2690	52 0 0	2800	1400	180	37000	5.3U	97
Cumene	5500	53	5200	12000	3809	4108	360	12000	5.3U	79
MTBE	3011	4.7U	24U	51U	48U	26U	4.2U	320 U	12	5U
n-Butylbenzene	13000	290	6700	14000	6400	4900	400	49000	5. 3U	180
n-Propylbenzene	17000	41	4700	7480	3600	1300	220	39000	5. 3U	63
Naphthalene	26000	248	280 G	26000U	7888	12000	539	31000	5.3U	316
o-Xylene	960	84	980 J	1200	1380	360	91	20000	5. 3U	73
p-Isopropyltoluene	3000U	1 20 U	610 0 U	26000U	5100	2600U	210U	11000	5.3U	88
sec-Butylbenzene	8200	55	3500	8100	2700	5500	190	16000	5.3U	76
tert-Butylbenzene	4880	66	3500							
Total VOCS	79290	1890	47200	61120	45070	33039	2749	403500	. 12	1150.7

µg/kg - Micrograms per kilogram

- U The analyte was analyzed for, but not detected above the reported sample limit.
- J The analyte was positively identified: the associated numerical value is the approximate concentration of the analyte in the sample.
- UI The analyte was not detected above The reported quantitation limit. However The reported quantitation limit may be biased.

NA - Not analyzed

Beid - Analyte detected

.
Arca: [[uplc Designation: Sample Date: ble Depth (ft bis):	Former Lube SB-8 6/26/98	Oil Building SB-8	SB 0							
nple Designation: Sample Date: ble Depth (ft bls):	SB-8 6/26/98	SB-8	CR Q							
Sample Date: ble Depth (ft bis):	6/26/98			SB-9	SB-10	SB-10	SB-11/J.B-1	SB-13	SB-14	SB-15
ole Depth (ft bis):		6/26/98	6/26/98	6/26/98	6/26/98	6/26/98	7/1/99	7/27/99	7/26/99	7/27/99
	0-2	10-12	0-2	10-12	0-2	8-10	18-20	11-13	13-15	11-13
			والمراجع والمحافظ والمحاوم والمحاوم والمحاوم والمحافظ والمحافظ والمحافظ والمحافظ والمحافظ والمحافظ والمحافظ وال			···		. <u></u>		
	4.2 U	23J	4.7U	13U	34	750	120	2500	780	2308
	7.5J	130	14	273	40	306	180	2500	220	680
	4.2U	76	4.7U	176	24	740	610	8200	1400	5100
	11 U	1 20	16U	480	178	2200	830	72000	730	3500
	7.5	219	14	677	268	3990	1740	35200	3130	11580
	8.7J	588	16	1100	150	3100	2400	18000	1100	11000
	5.1J ·	300	4.9J	680	180	4900	1500	9100	926	8688
	5.3J	520	4.7U	1700	78	12000	2800	20000	1900	11000
	4.2U	13U	4.70	13U	5U	25U	23U	120U	130U	1500
	1 0J	850	6.5J	2709	130	7800	3488	24000	3104	18000
	4.2U	220	5J	13U	29	4100	1300	15006	2488	12000
	28	2090	26	4606	180	9606	2600	33000	1300	23000
	5.3J	47	11 J	210	39	500	390	7288	360	1900
	4.2U	. 130U	4.9J	1800	62	13000	2300U	20000	1300U	13000
	4.8J	670	5.9J	520U	75	7680	2500 J	12000	1500	7480
	4.2U	550	4.7U	1708	45	7000	2400	11909	1300	7100
		4.2U 7.5J 4.2U 11U 7.5 8.7J 5.1J 5.3J 4.2U 10J 4.2U 28 5.3J 4.2U 28 5.3J 4.2U 4.8J 4.2U	4.2U 23J 7.5J 13U 4.2U 76 11U 120 7.5 219 8.7J 580 5.1J 300 5.3J 520 4.2U 13U 10J 850 4.2U 220 28 2000 5.3J 47 4.2U 130U 4.8J 670 4.2U 550	$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	4.2U $23J$ $4.7U$ $13U$ 34 750 120 $7.5J$ $13U$ 14 $27J$ 40 300 180 $4.2U$ 76 $4.7U$ 176 24 740 610 $11U$ 120 $16U$ 480 179 2200 830 7.5 219 14 677 268 3990 1740 $8.7J$ 586 16 1100 150 3100 2400 $5.1J$ 306 $4.9J$ 680 100 4900 1500 $5.3J$ 526 $4.7U$ 1700 78 12000 2300 $4.2U$ $13U$ $4.7U$ $13U$ $5U$ $25U$ $23U$ $10J$ 850 $6.5J$ 2700 130 7800 3446 $4.2U$ 220 $5J$ $13U$ 29 4100 1300 28 2090 24 4606 180 9606 2600 $5.3J$ 47 $11J$ 210 39 590 300 $4.2U$ $130U$ $4.9J$ 1800 62 13000 $23000J$ $4.8J$ 670 $5.9J$ $520U$ 75 7660 2500 J $4.2U$ $130U$ $4.9J$ 1800 62 13000 $2300J$ $4.8J$ 670 $5.9J$ $520U$ 75 7660 2500 J $4.2U$ $130U$ $4.9J$ 1800 62 13000 $2300J$ J $4.2U$	$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$	$\begin{array}{c ccccccccccccccccccccccccccccccccccc$

µg/kg - Micrograms per kilogram

88.2

5956

74.7

U - The analyte was analyzed for, but not detected above the reported sample limit.

15167

I - The analyte was positively identified: the associated numerical value is the approximate concentration of the analyte in the sample.

1156

73590

18540

204500

17070

- 113 The analyse was not detected above the reported quantitation limit. However the reported quantitation limit may be biased.
- NA Not analyzed
- Bold Analyte detected

Total VOCS

Ī

P.16

126880

										4
Area:	Former Lub	e Oil Buildi	ng							
Sample Designation:	SB-16	SB-17	SB-17	SB-18	SB-18	SB-19	SB-20	SB-20	SB-24	SB-24
Sample Date:	7/28/99	7/28/99	7/28/99	7/7.9/99	7/29/99	7/29/99	7/29/99	7/29/99	8/2/99	8/4/99
Sample Depth (It bis):	11-13	Q-0.5	11-13	0-0.5	11-13	7-9	3-4	9-11	13-15	0-0.5
Parameter	-				1					
(Concentration in µg/kg)				,						
Benzene	3000	170	1200	2000	520	26 U	91	12000	5.3U	8.7
Toluçoc	430	28	228	520	130	79	24	7500	5.3U	23
Ethylbenzene	1600	43	1200	3260	820	200	73	14000	5.3U	13
Xylenes (total)	1 800	170	2300	3400	1700	1600	250	60000	ΠU	40
TOTAL BTEX	6830	411	4920	9120	3170	1879	438	93500	• 0	84.7
1,2,4-Trimethylbenzenc	2500	350	6300	4100	8480	1660	340	95006	5.3U	100
1,3,5-Trimethylbenzene	1300	• 210	2690	52 0 0	2800	1400	180	37000	5.3U	97
Cumene	5500	53	5200	12000	3809	4100	360	12000	5.3U	79
MTBE	30U	4.7U	24U	51U	48U	26U	4.2U	320 U	12	SU
n-Butylbenzene	13000	290	6700	14000	6400	4900	400	49 00 0	5. 3U	180
n-Propylbenzene	17000	41	4700	7480	3600	1300	220	39000	5. 3U	63
Naphthalene	26000	248	280 G	26000U	7888	12080	539	31000	5.3U	316
o-Xylene	960	84	980 J	1200	1380	360	91	20000	5. 3U	73
p-Isopropyltoluene	3000U	1 20 U	610 0 U	26000U	5100	2600U	210U	11000	5.3U	88
sec-Butybenzene	8200	55	3500	8100	2700	5500	190	16000	5.3U	76
tert-Butylbenzene	4800	66	3500							
Total VOCS	79290	1890	47200	61120	45070	33039	2749	403500	12	1150.7

µg/kg - Micrograms per kilogram

- U The analyte was analyzed for, but not detected above the reported sample limit.
- J The analyte was positively identified: the associated numerical value is the approximate concentration of the analyte in the sample.
- UI The analyte was not detected above The reported quantitation limit. However The reported quantitation limit may be biased.

NA - Not analyzed

Beid - Analyte detected

.

Atea: 1	Former Lub	e Oil Buildin	ng			
Sample Designation:	SB-27	SB-27	SB-28	SB-28	SB-30	SB-30
Sample Date:	8/3/99	8/4/99	8/3/99	8/4/99	8/5/99	8/6/99
Sample Depth (ft bls):	11-13	0-0.5	11-13	0-0.5	9-11	0-0.5
Parameter						
(Concentration in µg/kg)						
Benzene	4.9U	5.4U	5 U	25Ű	5.1U	5.2U
Talwene	6.2	7.8	S U	57	5.1U	5.2U
Ethylbenzene	27	5.8	SU	390	5.1U	5.2U
Xyleues (total)	97	35	10U	4260	10U	10U
TOTAL BTEX	136.2	48.6	0	4647	0	0
1.2.4-Trimethylbenzene	186	38 2	// 5U	12000	5 111	65 U
1.3.5-Trimethylbenzene	110 .	15	SU SU	4900	5.10	5211
Cumene	350	7.5	50	2100	5.1U	520
мтве	4.9U	5.4U	5U	25U	5.IU	5.2U
n-Butylbenzeae	390	16 U	- 50	7100	5.1U	5.20
n-Propylbenzene	92	· 9.3 U	5 U	77 e	5.IU	5.2U
Nanluhalene	660	47 U	L 25U	7300	5.1U	8.6 U
o-Xylene	27	9.2	5U	338	5.1U	5.20
p-Isopropykoluenc	270	9.7	5U	1800	5.1U	5.2U
sec-Butylbenzene	296	7.1	5U	1208	5.1U	5.2U
tert-Butylbenzene						
Total VOCS	2409.2	207.4	0	42147	0	15.1

gg/kg - Micrograms per kilogram

- U The analyte was analyzed for, but not detected above the reported sample limit.
- J The analyte was positively identified: the associated numerical value is the approximate concentration of the analyte in the sample.
- UJ The analyte was not detected above The reported quantitation limit. However The reported quantitation limit may be biased.
- NA Not analyzed
- Bold Analyte detected

Ì

H

ł

1

-

P.18

Table 6. Summary of Volatile Organic Compounds Detected in Groundwater Samples, Mobil Buffalo Terminal, Buffalo, New York.

Area:	Terminal D	isposal Site				-			
Sample Designation: Sample Date:	LF-3 8/23/99	LF-3 9/28/99	LF-3 DUP 9/28/99	LF-4 8/23/99	LF-4 9/28/99	L.F-5 8/25/99	LF-5 9/28/99	LF-6 8/25/99	LF-6 9/28/99
Parameter									
(Concentrations in µg/L)									
Benzene	45	50 J	56	0.2U	0.2U	0 .2U	0.2U	83	80
Toluene	0.7	0.6	0.7	0.2U	0.2U	0.2U	0.2U	2	2.3
Ethylbenzone	0.20	0,2U	0.2U	0.2U	0.2U	0.3	0.2U	1U	0.2U
Xylenes (total)	2 U	0.5 V	0.4U	0.6U	0.4U	0.60	0.4U	3U	0 .5
TOTAL BTEX	45.7	51.1 J	56.7	0	0	0.3	0	85	\$2.\$
1,2,4-Trimethylbenzene	NA	0.2 J	●.3	NA	0.2U	NA	0.2U	NA	6.3
1,3,5-Trimethylbenzene	NA	0.2	0.2	NA	0.2U	NA	0.2U	NA	0. 2 U
Cumene	NA -	7.7	7	NA	0.2U	NA	0.2U	NA	1.8
MTBE	NA	26	24	NA	4.7	NA	5.5	NA	4.6
n-Butylbenzene	NA	11	9.3	NA	0.2U	NA	0.2U	NA	2.3
n-Propylbenzene	NA	10	9.6	, NA	0.2U	NA	0.2U	NA	2.7
Naphthalene	NA	5U	1,9 ,,,,,,,, 9	ⁿ NA	0.2U	NA	0.2U	NA	0.5
o-Xylene	NA	0.4	6.4	NA	0.2U	NA	0.2U	NA	0.2U
p-Isopropyltoluene	NA	ເບ	0.2U	NA	0.2U	NA	0.2U	NA	0.2U
sec-Butylbenzene	NA	7.2	6.5	NA	0.2U	NA	0.2U	NA	1.7
Total VOCS	45.7	113.8	5 57.3	G	4.7	0.3	5.5	85	96.7

Notes:

µg/L - Micrograms per liter

- U The analyte was analyzed for, but not detected above the reported sample limit.
- J The analyte was positively identified: the associated numerical value is the approximate concentration of the analyte in the sample.
- UJ The analyte was not detected above the reported quantitation limit. However the reported quantitation limit may be biased.
- NA Not analyzed
- Bold Analyte detected

t

P.19

Table 6. Summary of Volatile Organic Compounds Detected in Groundwater Samples, Mobil Buffalo Terminal, Buffalo, New York.

Area:		Terminal Di	sposal Site		Former Lube Bu	uilding				
Sample Designation: Sample Date:	LF-7 8/25/99	L.F-7 9/28/99	LF-8 8/25/99	LF-8 9/28/99	SB-11/LB-1 8/23/99	SR-12 8/23/99	SB-14 8/23/99	SB-14 9/28/99	SB-16 8/23/99	SB-19 9/29/ 99
Parameter										
(Concentrations in µg/L)										
Benzene	0.2U	0.2U	0 2U	0.2U	46	6	10	14	610	0.7
Toluene	0.2U	0.2U	0.2U	0.2U	17	1U	3	1.2	17	0.4
Ethylbenzene	0.2U	0.2U	0 2U	0.2U	15	1	6	1.3	7	1.6
Xylencs (total)	0.6U	0.4U	0.6U	0.4U	50U	30	5	2.6	30	5.6
TOTAL BTEX	0	0	0	0	75	7	24	19.1	664	8.3
1.2.4-Trimethylbenzene	NA	0.2U	NA	0.2U	NA	NA	NA	1.4	NA	14
1.3,5-Trimethylbenzene	NA	0 .2U	NA	0.2U	NA	NA	NA	1.9	NA	8.1
Cumene	NA	• 0.2U	NA	0.2U	NA	NΛ	ŇA	2.8	NA	6,9
MTBE	NA	1.1	NA	0.2U	NA	NA	NA	8.4	NA	1
n-Butyibenzene	NA	0.2U	NA	0.2U	NA	NA	NA	4.8	NA	5.2
n-Propylbenzene	NA	0.2U	NA	0.2U	NA	NA	NA	6.5	NA	1.7
Naphthalene	NA	0.2U	NA	0.2U	NA	NA	NA	1.7	NЛ	6.5
o-Xylene	NA	0.2U	NA	0.20	NA	NA	NA	A.6	NA	3. B
p-Isopropyltohuene	NA	0.2U	NA	0.2U	NA	NA	NA	0.4U	NA	0.5
sec-Butylbeazene	NA	0.2 U	NA	0.2U	NA	NA	NA	3.9	NA	4.1
Total VOCS	0	1.1	0	0	78	7	24	51.1	664	60.1

Notes:

µg/L - Micrograms per kilogram

U - The analyte was analyzed for, but not detected above the reported sample limit.

1- The analyte was positively identified: the associated numerical value is the approximate concentration of the analyte in the sample.

UJ - The analyte was not detected above the reported quantitation limit. However the reported quantitation limit may be biased.

NA - Not analyzed

Bold - Analyted detected

56, 50 J30

05:49PM ROUX ASSOCIATES

Цð

1

È

Table 6. Summary of Volatile Organic Compounds Detected in Groundwater Samples, Mobil Buffalo Terminal, Buffalo, New York.

Aica.		
Sample Designation.	SB-28	SB-28 DUP
Sample Date:	9/29/99	9/29/99
Parameter		
(Concentrations in µg/L)		
Benzene	2.4	2.4
Totucne	1.3	1.3
Ethyllicozene	- 10	11
Xyleues (total)	15	16
TOTAL BTEX	28.7	30.7
1,2,4-Trimethylbenzene	42 J	- 43
1,3,5-Trimethylbenzene	21	21
Cumene	3.7	• 11
MTBE	0.2U	0.2U
n-Butylbenzene	16	16
n-Propylbenzene	7.2	7 A
Naphthalene	7.1	7.2
o-Xylene	4.5	4.7
p-isopropyltolucae	2.2	2.2
sec-Butylbenzene	3	3.1
Total VOCS	135.4	115.6

ROUX ASSOCIATES, INC.

ź

ŧ

٤.

3 of 3

		65							
		ý					1,		
Area:	Elk Street L	.01					<u>-</u>		
Sample Designation:	ESL-1	ESL-2	ESL-3	ESL-4	ESL-5	ESI-6	ESL-7	ESL-8/ESL-W1	ESL-8/ESL-WI
Sample Date:	6/17/98	9/2/99	6/17/98	6/17/98	6/17/98	6/17/98	6/17/98	6/17/98	6/22/98
Sample Depth (ft bls):	0- 0.5	0-0.5	0-0.5	0-0.5	0-0.5	0-0.5	0- 0 .5	0-0.5	8-10
Parameter									
(Concentrations in µg/kg)									
Acenaphthene	42J	36U	34U	64J	.36J	37U	13 0J	380	42U
Acenaphthylene	58J	51 J	68J	1 20J	190	1 60 J	254	3 8 U	42U
Anthracene	1203	96J	1 10J	320	230	180J	476	38U	42U
Benzola Janthuacene	770	389	480	1300	780	410	1700	93J	42U
Uenzo[a)pyrene	860	410	440	1204	800	400	1700	90J	420
Benzo b]fluoranthene	12 90	530 ナ	640	1600	980	570	2100	140J	42U
Benzo [g,h,i]peryleae	720	350	330	865	550	280	970	77 J	42U
Benzo [k] fluoranthene	420	210 J	230	570	370	1 80 J	760	45J	- 42U
Chrysene	850	430	450	1300	840	470	1890	110J	42U
Dibenzoja, h]anthracene	170J	12 0J	99J	280	1 76j	82J	300	38U	42U
Fluoranthene	1700	740	790	2500	1300	680	3500	120J	42U
Fluorene	38J	36U	34U	10 0 J	59J	45J	150J	38 U	42U
Indeno[1,2,3-cd]pyrene	780	340	400	900	618	300	1100	77J	42U
Naphthalene	38U	3 6U	34U	100J	35U	11 0 J	84J	160J	42 1 I
Phenanthrene	976	400	246	1400	530	430	2000	140 J	42U
Pyrene	1400	610	650	1990	1290	610	2800	<u>1305</u>	42U
TOTAL SVOCS	10098	4667	4927	14454	8645	4907	19814	1182	0

µg/kg - Micrograms per kilogram

U - The analyte was analyzed for, but not detected above the reported sample limit.

J - The analyte was positively identified, the associated numerical value is the approximate concentration of the analyte in the sample.

UJ - The analyte was not detected above the reported quantitation limit. However the reported quantitation limit may be biased.

NA - Not analyzed

Bold - Analyte detected

DEC 03

. 99

25:41PM ROUX ASSOCIATES

INO

1

ŧ

					04	-				- >
Area:	Elk Sueet I	.ot							-	
Sample Designation:	ESL-9	ESL-10	ESL-11	ESL-12	ESL-13	ESL-13	ESI-13	ESL-14	ESL-14	ESL-14
Sample Date:	6/17/98	6/17/98	6/17/98	6/17/98	9/ 2/99	9/2/99	9/2 /99	9/2/99	9/2/99	9/2/99
Sample Depth (ft bls):	0-0.5	0-0.5	0-0.5	0-0.5	0-0.5	1-2	2-3	0-0.5	1-2	2-3
Parameter										
(Concentrations in µg/kg)										
Acenaokthene	40 U	62 J	64J	5300	1700 5	2100	350	769 5	1600	61 J
Acenanhthylene	745	78.1	1 10 J	2500	940 J	1100	220	400U	480 5	42U
Anthracene	110J	270	220	21000	5500	5508	1180	2200.5	5100	146 3
Benzofalanthracene	4303	930	760	69000	16000	16000	2500	6800	7700	510
Benzofalovrene	450J	870	710	57000	13009	14000	2300	7000	6900	576
Benzolbifuoranthene	590 J	1000	940	63000	15000	17900	2900	7600	8900	740
Benzo[g,h,i]perviene	39 8 J	550	520	30000	6588	5284	1000	4500	2400	448
Benzo{k}fluoranthene	200J	410	310	26800	6389	5700	1200	3500	3800	260
Chrysene	550J	850	860	59000	16009	16600	2600	6980	7800	560
Dibenzo[a,h]anthracene	12 0 J	170J	150J	9200J	2460	1700	340	1400	990 J	130 🕽
Fluoranthene	76QJ	1700	1600	140009	29000	35660	4700	12000	1 680 0	940
Fluorene	40 U	70J	79 J	5600	2100	3100	540	830 J	3300	120 J
Indeno[1,2,3-cd]pyrene	360J	610	520	35000	8200	10000	1300	5190	3300	476
Naphthálene	40U	7 4 J	761	1200	72 8 J	2300	330	400U	1200 5	47 5
Phenanthrene	410]	890	1000	69 000	18460	26989	3800	7300	18006	530
Рутеле	67 0 J	1466	1300	120000	28000	29006	4500	12000	13000	\$2
TOTAL SVOCS	5114	9934	9159	712800	169360	189700	29680	77890	100470	6338

µg/kg - Micrograms per kilogram

U - The analyte was analyzed for, but not detected above the reported sample limit.

J - The analyte was positively identified: the associated numerical value is the approximate concentration of the analyte in the sample.

UJ - The analyte was not detected above the reported quantitation limit. However the reported quantitation limit may be biased.

NA - Not analyzed

Bold - Analyte detected

٩,

Ρ. ω

	05	υŴ		Fages 1	>	05 —	4 a.			and the second sec	>
Area	Elk Strect	Lot									
Sample Designation:	ESL-15	ESL-15	ESL-15	ESL-16	ESL-16	ESL-16	ESL-17	ESL-17	ESL-17	ESL-18	ESL-18
Sample Date:	9/2/99	9/2/99	9/2/99	9/2/ 99	9/2 /99	9/2/99	9/2 /99	9/ 2/99	9/2/99	9/2/99	9/2/99
Sample Depth (ft bls):	0-0.5	1-2	2-3	0-0.5	l-2	2-3	0-0.5	1-2	2-3	0-0.5	1-2
Parameter											
(Concentrations in µg/kg)											
Aceranbihene	3400	950	170 5	49 T	36U	37U	1105	150 J	37U	36 U	38 U
Acenaphthylene	410	500 5	110 J	110 +	53 5	37U	160 5	300	37U	36U	38 U
Anthraceae	7400	2600	580	190	110 T	37U	340	510	66 J	44.	38U
Benzolalantiwacene	18000	6700	2200	710	310	37U	1100	2000	150 J	180	110 J
Benzolaborene	13000	5500	1800	750	320	53 J	1100	1860	130 J	250	130 J
Benzo b fluoranthene	14000 J	7200	2200	1000	400	64 J	1400 J	2200 5	130 J	230 J	120 J
Benzo[g,h,c]perylene	4200	3260	918	680	290	49 J	810	1100	73 5	250	% J
Benzo(k)fluoranthene	13000 7	3760	940	330	148丁	3705	610 J	976 J	50 J	74 J	55 J
Chrysene	20000	7200	2300	9 10	390	45 丁	1340	2200	199 5	200	120 J
Dibenzo[a, h]anthracene	2500	1000	330	120	96 丁	37U	250	380	370	74 J	38U
Fluoranthene	30000	15000	3940	1400	678	65 J	2200 .	3200	260	280	150 J
Fluorene	3400	1400	1 80 J	74 J	52 J	37U	110 ブ	170 J	37U	36U	38U
Indeno[1,2,3-cd]pyrene	5200	3600	1100	630	290	43 J	940	1300	69 J	160丁	84 J
Naphthalene	1708	600 J	99 J	100 J	58.J	37U	52 J	78 J	37U	360	38U
Phenanthrene	25000	11000	1600	790	510	43 J	1460	1800	350	160 J	45 J
Ругеле	33090	13000	3500	1304	610	60 J	1900	2900	340	270	140 J
TOTAL SVOCS	194216	83150	21910	9123	42 99	422	13782	21058	1 798	2172	1850

µg/kg - Micrograms per kilogram

U - The analyte was analyzed for, but not detected above the reported sample limit.

J - The analyte was positively identified: the associated numerical value is the approximate concentration of the analyte in the sample.

- UJ The analyte was not detected above the reported quantitation limit. However the reported quantitation limit may be biased:
- NA Not analyzed
- Bold Analyte detected

ŧ

ż

66, 80 J30

05:42PM ROUX ASSOCIATES

					04	-				- >
Area:	Elk Sueet I	.ot							-	
Sample Designation:	ESL-9	ESL-10	ESL-11	ESL-12	ESL-13	ESL-13	ESI-13	ESL-14	ESL-14	ESL-14
Sample Date:	6/17/98	6/17/98	6/17/98	6/17/98	9/ 2/99	9/2/99	9/2 /99	9/2/99	9/2/99	9/2/99
Sample Depth (ft bls):	0-0.5	0-0.5	0-0.5	0-0.5	0-0.5	1-2	2-3	0-0.5	1-2	2-3
Parameter										
(Concentrations in µg/kg)										
Acenaokthene	40 U	62 J	64J	5300	1700 5	2100	350	764 5	1600	61 J
Acenanhthylene	745	78.1	1 10 J	2500	940 J	1100	220	400U	480 5	42U
Anthracene	1 10]	270	220	21000	5500	5508	1180	2200.5	5100	146 3
Benzofalanthracene	4303	930	760	69000	16000	16000	2500	6800	7700	510
Benzofalovrene	450J	870	710	57000	13009	14000	2300	7000	6900	576
Benzolbifuoranthene	590 J	1000	940	63000	15000	17900	2900	7600	8900	740
Benzo[g,h,i]perviene	398J	550	520	30000	6588	5284	1000	4500	2400	448
Benzo{k}fluoranthene	200J	410	310	26800	6389	5700	1200	3500	3800	260
Chrysene	550J	850	860	59000	16009	16600	2600	6980	7800	560
Dibenzo[a,h]anthracene	12 0 J	170J	150J	9200J	2460	1700	340	1400	990 J	130 🕽
Fluoranthene	76QJ	1700	1600	140009	29000	35660	4700	12000	1 680 0	940
Fluorene	40 U	70J	79 J	5600	2100	3100	540	830 J	3300	120 J
Indeno[1,2,3-cd]pyrene	360J	610	520	35000	8200	10000	1300	5190	3300	476
Naphthálene	40U	7 4 J	761	1200	72 8 J	2300	330	400U	1200 5	47 5
Phenanthrene	410]	890	1000	69 000	18460	26989	3800	7300	18006	530
Рутеле	67 0 J	1466	1300	120000	28000	29006	4500	12000	13000	\$2
TOTAL SVOCS	5114	9934	9159	712800	169360	189700	29680	77890	100470	6338

µg/kg - Micrograms per kilogram

U - The analyte was analyzed for, but not detected above the reported sample limit.

J - The analyte was positively identified: the associated numerical value is the approximate concentration of the analyte in the sample.

UJ - The analyte was not detected above the reported quantitation limit. However the reported quantitation limit may be biased.

NA - Not analyzed

Bold - Analyte detected

٩,

Ρ. ω

	05	υ¥		Fages 1	>	05 —	4 a.			and the second sec	>
Area	Elk Strect	Lot									
Sample Designation:	ESL-15	ESL-15	ESL-15	ESL-16	ESL-16	ESL-16	ESL-17	ESL-17	ESL-17	ESL-18	ESL-18
Sample Date:	9/2/99	9/2/99	9/2/99	9/2/ 99	9/2 /99	9/2/99	9/2 /99	9/ 2/99	9/2/99	9/2/99	9/2/99
Sample Depth (ft bls):	0-0.5	1-2	2-3	0-0.5	l-2	2-3	0-0.5	1-2	2-3	0-0.5	1-2
Parameter											
(Concentrations in µg/kg)											
Aceranbihene	3400	950	170 5	49 T	36U	37U	1105	150 J	37U	36 U	38 U
Acenaphthylene	410	500 5	110 J	110 +	53 5	37U	160 5	300	37U	36U	38 U
Anthraceae	7400	2600	580	190	110 T	37U	340	510	66 J	44.	38U
Benzolalantiwacene	18000	6700	2200	710	310	37U	1100	2000	150 J	180	110 J
Benzolaborene	13000	5500	1800	750	320	53 J	1100	1860	130 J	250	130 J
Benzo[b]fluoranthene	14000 J	7200	2200	1000	400	64 J	1400 J	2200 5	130 J	230 J	120 J
Benzo[g,h,c]perylene	4209	3260	918	680	290	49 J	810	1100	73 5	250	% J
Benzo(k)fluoranthene	13000 7	3760	940	330	148丁	3705	610 J	976 J	50 J	74 J	55 J
Chrysene	20000	7200	2300	9 10	390	45 丁	1340	2200	199 5	200	120 J
Dibenzo[a, h]anthracene	2500	1000	330	120	96 丁	37U	250	380	370	74 J	38U
Fluoranthene	30000	15000	3940	1400	678	65 J	2200 .	3200	260	280	150 J
Fluorene	3400	1400	1 80 J	74 J	52 J	37U	110 ブ	170 J	37U	36U	38U
Indeno[1,2,3-cd]pyrene	5200	3600	1100	630	290	43 J	940	1300	69 J	160丁	84 J
Naphthalene	1708	600 J	99 J	100 J	58.J	37U	52 J	78 J	37U	360	38U
Phenanthrene	25000	11000	1600	790	510	43 J	1460	1800	350	160 J	45 J
Ругеле	33090	13000	3500	1304	610	60 J	1900	2900	340	270	140 5
TOTAL SVOCS	194216	83150	21910	9123	42 99	422	13782	21058	1 798	2172	1850

µg/kg - Micrograms per kilogram

U - The analyte was analyzed for, but not detected above the reported sample limit.

J - The analyte was positively identified: the associated numerical value is the approximate concentration of the analyte in the sample.

- UJ The analyte was not detected above the reported quantitation limit. However the reported quantitation limit may be biased:
- NA Not analyzed
- Bold Analyte detected

ŧ

ż

66, 80 J30

05:42PM ROUX ASSOCIATES

	05	υ¥		Fages 1	>	05 —	4 a.			and the second sec	>
Area	Elk Strect	Lot									
Sample Designation:	ESL-15	ESL-15	ESL-15	ESL-16	ESL-16	ESL-16	ESL-17	ESL-17	ESL-17	ESL-18	ESL-18
Sample Date:	9/2/99	9/2/99	9/2/99	9/2/ 99	9/2 /99	9/2/99	9/2 /99	9/ 2/99	9/2/99	9/2/99	9/2/99
Sample Depth (ft bls):	0-0.5	1-2	2-3	0-0.5	l-2	2-3	0-0.5	1-2	2-3	0-0.5	1-2
Parameter											
(Concentrations in µg/kg)											
Aceranbihene	3400	950	170 5	49 T	36U	37U	1105	150 J	37U	36 U	38 U
Acenaphthylene	410	500 5	110 J	110 +	53 5	37U	160 5	300	37U	36U	38 U
Anthraceae	7400	2600	580	190	110 T	37U	340	510	66 J	44.	38U
Benzolalantiwacene	18000	6700	2200	710	310	37U	1100	2000	150 J	180	110 J
Benzolaborene	13000	5500	1800	750	320	53 J	1100	1860	130 J	250	130 J
Benzo b fluoranthene	14000 J	7200	2200	1000	400	64 J	1400 J	2200 5	130 J	230 J	120 J
Benzo[g,h,c]perylene	4209	3260	918	680	290	49 J	810	1100	73 5	250	% J
Benzo(k)fluoranthene	13000 7	3760	940	330	148丁	3705	610 J	976 J	50 J	74 J	55 J
Chrysene	20000	7200	2300	9 10	390	45 丁	1340	2200	199 5	200	120 J
Dibenzo[a, h]anthracene	2500	1000	330	120	96 丁	37U	250	380	370	74 J	38U
Fluoranthene	30000	15000	3940	1400	678	65 J	2200 .	3200	260	280	150 J
Fluorene	3400	1400	1 80 J	74 J	52 J	37U	110 ブ	170 J	37U	36U	38U
Indeno[1,2,3-cd]pyrene	5200	3600	1100	630	290	43 J	940	1300	69 J	160丁	84 J
Naphthalene	1708	600 J	99 J	100 J	58.J	37U	52 J	78 J	37U	360	38U
Phenanthrene	25000	11000	1600	790	510	43 J	1460	1800	350	160 J	45 J
Ругеле	33090	13000	3500	1304	610	60 J	1900	2900	340	270	140 5
TOTAL SVOCS	194216	83150	21910	9123	42 99	422	13782	21058	1 798	2172	1850

µg/kg - Micrograms per kilogram

U - The analyte was analyzed for, but not detected above the reported sample limit.

J - The analyte was positively identified: the associated numerical value is the approximate concentration of the analyte in the sample.

- UJ The analyte was not detected above the reported quantitation limit. However the reported quantitation limit may be biased:
- NA Not analyzed
- Bold Analyte detected

ŧ

ż

66, 80 J30

05:42PM ROUX ASSOCIATES

	05	υ¥		Fages 1	>	05 —	4 a.			and the second sec	>
Area	Elk Strect	Lot									
Sample Designation:	ESL-15	ESL-15	ESL-15	ESL-16	ESL-16	ESL-16	ESL-17	ESL-17	ESL-17	ESL-18	ESL-18
Sample Date:	9/2/99	9/2/99	9/2/99	9/2/ 99	9/2 /99	9/2/99	9/2 /99	9/ 2/99	9/2/99	9/2/99	9/2/99
Sample Depth (ft bls):	0-0.5	1-2	2-3	0-0.5	l-2	2-3	0-0.5	1-2	2-3	0-0.5	1-2
Parameter											
(Concentrations in µg/kg)											
Aceranbihene	3400	950	170 5	49 T	36U	37U	1105	150 J	37U	36 U	38 U
Acenaphthylene	410	500 5	110 J	110 +	53 5	37U	160 5	300	37U	36U	38 U
Anthraceae	7400	2600	580	190	110 T	37U	340	510	66 J	44.	38U
Benzolalantiwacene	18000	6700	2200	710	310	37U	1100	2000	150 J	180	110 J
Benzolaborene	13000	5500	1800	750	320	53 J	1100	1860	130 J	250	130 J
Benzo[b]fluoranthene	14000 J	7200	2200	1000	400	64 J	1400 J	2200 5	130 J	230 J	120 J
Benzo[g,h,c]perylene	4209	3260	918	680	290	49 J	810	1100	73 5	250	% J
Benzo(k)fluoranthene	13000 7	3760	940	330	148丁	3705	610 J	976 J	50 J	74 J	55 J
Chrysene	20000	7200	2300	9 10	390	45 丁	1340	2200	199 5	200	120 J
Dibenzo[a, h]anthracene	2500	1000	330	120	96 丁	37U	250	380	370	74 J	38U
Fluoranthene	30000	15000	3940	1400	678	65 J	2200 .	3200	260	280	150 J
Fluorene	3400	1400	1 80 J	74 J	52 J	37U	110 ブ	170 J	37U	36U	38U
Indeno[1,2,3-cd]pyrene	5200	3600	1100	630	290	43 J	940	1300	69 J	160丁	84 J
Naphthalene	1708	600 J	99 J	100 J	58.J	37U	52 J	78 J	37U	360	38U
Phenanthrene	25000	11000	1600	790	510	43 J	1460	1800	350	160 J	45 J
Ругеле	33090	13000	3500	1304	610	60 J	1900	2900	340	270	140 J
TOTAL SVOCS	194216	83150	21910	9123	42 99	422	13782	21058	1 798	2172	1850

µg/kg - Micrograms per kilogram

U - The analyte was analyzed for, but not detected above the reported sample limit.

J - The analyte was positively identified: the associated numerical value is the approximate concentration of the analyte in the sample.

- UJ The analyte was not detected above the reported quantitation limit. However the reported quantitation limit may be biased:
- NA Not analyzed
- Bold Analyte detected

ŧ

ż

66, 80 J30

05:42PM ROUX ASSOCIATES

	05	υŴ		Fages 1	>	05 —	4 a.			and the second sec	>
Area	Elk Strect	Lot									
Sample Designation:	ESL-15	ESL-15	ESL-15	ESL-16	ESL-16	ESL-16	ESL-17	ESL-17	ESL-17	ESL-18	ESL-18
Sample Date:	9/2/99	9/2/99	9/2/99	9/2/ 99	9/2 /99	9/2/99	9/2 /99	9/ 2/99	9/2/99	9/2/99	9/2/99
Sample Depth (ft bls):	0-0.5	1-2	2-3	0-0.5	l-2	2-3	0-0.5	1-2	2-3	0-0.5	1-2
Parameter											
(Concentrations in µg/kg)											
Aceranbihene	3400	950	170 5	49 T	36U	37U	1105	150 J	37U	36 U	38 U
Acenaphthylene	410	500 5	110 J	110 +	53 5	37U	160 5	300	37U	36U	38 U
Anthraceae	7400	2600	580	190	110 T	37U	340	510	66 J	44.	38U
Benzolalantiwacene	18000	6700	2200	710	310	37U	1100	2000	150 J	180	110 J
Benzolaborene	13000	5500	1800	750	320	53 J	1100	1860	130 J	250	130 J
Benzo b fluoranthene	14000 J	7200	2200	1000	400	64 J	1400 J	2200 5	130 J	230 J	120 J
Benzo[g,h,c]perylene	4200	3260	918	680	290	49 J	810	1100	73 5	250	% J
Benzo(k)fluoranthene	13000 7	3760	940	330	148 丁	3705	610 J	976 J	50 J	74 J	55 J
Chrysene	20000	7200	2300	9 10	390	45 丁	1340	2200	199 5	200	120 J
Dibenzo[a, h]anthracene	2500	1000	330	120	96 丁	37U	250	380	370	74 J	38U
Fluoranthene	30000	15000	3940	1400	678	65 J	2200 .	3200	260	280	150 J
Fluorene	3400	1400	1 80 J	74 J	52 J	37U	110 ブ	170 J	37U	36U	38U
Indeno[1,2,3-cd]pyrene	5200	3600	1100	630	290	43 J	940	1300	69 J	160丁	84 J
Naphthalene	1708	600 J	99 J	100 J	58.J	37U	52 J	78 J	37U	360	38U
Phenanthrene	25000	11000	1600	790	510	43 J	1460	1800	350	160 J	45 J
Ругеле	33090	13000	3500	1304	610	60 J	1900	2900	340	270	140 J
TOTAL SVOCS	194216	83150	21910	9123	42 99	422	13782	21058	1 798	2172	1850

µg/kg - Micrograms per kilogram

U - The analyte was analyzed for, but not detected above the reported sample limit.

J - The analyte was positively identified: the associated numerical value is the approximate concentration of the analyte in the sample.

- UJ The analyte was not detected above the reported quantitation limit. However the reported quantitation limit may be biased:
- NA Not analyzed
- Bold Analyte detected

ŧ

ż

66, 80 J30

05:42PM ROUX ASSOCIATES

	05	• • • • • • • • • • • • • • • • • • •	•••	····				03	
Area:	Elk Street	Lut						crminal Dispos	sal Site
Sample Designation:	ESL-18	ESI-19	ESL-19	ESL-19	ESL-20	ESL-20	ESL-20	LF-5	LF-7
Sample Date:	9/2/99	9/2/99	9/2/99	9/2/99	9/2/99	9/2/99	9/2/99	8/6/99	8/16/99
Sample Depth (ft bis):	2-3	0-0.5	1-2	2-3	0-0.5	1-2	2-3	21-23	21-23
Parameter									
(Concentrations in µg/kg)									
Accaphtheae	38U	55 J	39 U	39U	4IU	42U	40U	42 U	43U
Acenaphthylene	38U	130 丁	39U	39U	53 J	42U	40U	NA	NA 43 LC
Anthracene	381)	300	39U	39U	110 J	4 2U	40U	42U	43U
Benzo [a] anthracene	38U	1400	39U	39U	490	120 J	40U	42U プ	44 J
Benzoja pyrene	38U	1300	39U "	39U m	420	170 J	40U	42 U	43U
Benzo[b]fluoranthene	38U	1500 J	39U F	39U 🖉	560 J	130 J	50 J	42U	53 J
Benzo(g,h,i)perylene	38U	1000	390	39U	406	150 J	40U	42 U	43U
Benzo[k]tluoranthene	38U	1200 5	39U	39U	410 J	100 5	40U J	42 U	43U
Chrysenc	38U	1800	39U	390	630	170 J	40U	42U J	46 0
Dibenzo[a,b]anthracene	38 U	530	39 U	39U	190 丁	42 丁	400	42U	43U
Fluoranthene	38U	2100	40 J	39U	650	110 🕁	40U	42 U	91 J
Fluorenc	38U	100 J	39U	39U	41U	42U	40U	42 U	43U
Jadeno[1,2,3-cd]pyrene	38U	910	39U	39 U	350	93 J	40U	42U	43U
Naphthalene	38U	42 J	39U	39U	41U	42 U	40U	42 U	43U
Phenantheene	38U	1400	3 9U	39U	450	79 J	40U	420	66 J
Ругенс	<u>38U</u>	2508	42 J	39U	1008	200 5	45 J	42U J	74 J
TOTAL SVOCS	0	16267	82	0	5713	1364	95	•	374

µg/kg - Micrograms per kilogram

U - The analyte was analyzed for, but not detected above the reported sample limit.

J - The analyte was positively identified: the associated numerical value is the approximate concentration of the analyte in the sample.

UI - The analyte was not detected above the reported quantitation limit. However the reported quantitation limit may be biased.

NA - Not analyzed

Bold - Analyte detected

1

4

ŧ

Ì.

-

1

1

р.5

										• •	
Arca: F	Former Lube	Building									
Sample Designation:	SB-7	SB-7	SB-8	SB-8	SB-9	SB-9	SB-10	SB-10	SB	-11/LB-1	
Sample Date:	6/26/98	6/26/98	6/26/98	6/26/98	6/26/98	6/26/98	6/26/98	6/26/98		7/1/99	
Sample Depth (ft bis):	0-2	8-10	0-2	10-12	0-2	10-12	0-2	8-10		18-20	
Parameter											
(Concentrations in µg/kg)											
Acenaphthene	5300	24960	35U	90J	190J	44 U	210 0 U	2000		130 5	ſ
Acenaphthylenc	71 0 U	4300	35U	45U	39U	44U	2100U	580	38	NTW	1
Authracene	10000	46000	47J	230	300	44U	3 20 0.J	750		100	
Benzo[a]anthracene	12000	45000	1 86 J	160 J	890	44U	13000	920		100	
Benzo[a]pyrene	19600	41000	220	66J	1306	44U	20000	1100		38U	1
Benzo[b]fluoranthene	12600	42000	31 0 J	45U	1204	44U	13000	560		38U	1
Benzo (g, h, i) perylene	4400	1 800 0	93J	45U	1780	44U	2100U	680		38U	1
Benzo[k]fluoranthene	4000	17000	93J	45U	360	44U	366GJ	95J		38U	
Chrysene	11000	41000	300	270	1164	44U	17006	1400		120	l I
Dibenzo[a,h]anthracene	1500J	5000	35UJ	45U	550	44U	2100U	240		38U	
Fluoranthene	25008	130000	350	1 00J	1800	44U	14000	\$10		180	
Fluorene	7400	39000	35U	14 0J	1 30J	44U	29 06 J	2500		370	
Indeno[1,2,3-cd]pyrcne	5100	21000	60.1	45U	1000	44U	66 0 9 J	320		38U	
Naphthalene	3100J	37000	35U	45U	1 70J	44U	2100U	778		38U	
Phenanthrene	27909	180000	289	130J	1700	44U	13000	7500		190	
Pyrene	22000	110000	410	600	1800	44U	36000	2890		310	<u>/</u>
TOTAL SVOCS	159800	800340	2343	1786	14190	Q	142388	23025		1586	5

µg/kg - Micrograms per kilogram

U- The analyte was analyzed for, but not detected above the reported sample limit.

I - The analyte was positively identified: the associated numerical value is the approximate concentration of the analyte in the sample.

UI - The analyte was not detected above the reported quantitation limit. However the reported quantitation limit may be biased.

NA - Not analyzed

Bold - Analyte detected

ŧ

ъ. 6

03

	02							944 11	$\sim $ $> \cdot' -$	>
Ares-1	Former Lube	Building								
Samule Designation:	SB-13	SB-14	SB-15	SB-16	SB-17	SB-17	SB-18	SB-18	SB-19	SB-20
Sample Date:	7/27/99	7/26/99	7/27/99	7/28/99	7/28/99	7/28/99	7/29/99	7/29/99	7/29/99	7/29/49
Sample Depth (ft bls):	11-13	13-15	11-13	11-13	0-0.5	11-13	0-0.5	11-13	7-9	3-4
arameter										
Concentrations in µg/kg)										
			15	W J	i	20	1800 5	240 5	2400 7	
Acenaphthene	3000	290	1680	(1780	61J ¹²	·1400	5200	350)	8100	450
Acenaphthylene	210U	NA 510	HAJ	MAC	NA H	CU Mil OI	NAT	JAK	Dial	NK 100
Anthracene	16000	250	1200	1500	180 14	00 1500	2200	640	6200	94 J
Benzofalanthracene	1290	170 K	500	880	510 5	40 M	1209	268 UL	4400	140 (L
Benzo(a)pyrene	470 U	140 U	220 U	370 U	510 2	10,260	1700	140 ()	3866	160 4
Benzo b fluor anthene	310 UL	170 U	190 U	270 Ú	4904 1	70 .168 I U	L 1780	89 U	3460	189 以
Jenzo[g,h,i]perylene	298 U.	130 U	146 U	260U	440)	70 350 T V	4300	40U	430U	350
Benzo[k]fluoranthene	210U	68 U	120U	260U	190 U	43 IU	L 530	40 U	1000	52 UL
Chrysene	1700 5	220 ():	720 J	1200 J	490K 9	100 M J	2400	440	6500	170 U
Dibenzofa,b]anthraceae	21 0U	48 J	120U	260U	150 4	13 75 1	t 430U	40U	916	350
luoranthene	21 0U	360 U	748 U	780 UL	7004 6	80 705 UL	.3900	290 (L	5500	280 LL
Ivorene	5300	480 U	2700	2800	210 23	0°-2400-	6800	1244	17060	650 U
ndeno[1,2,3-cd]pyrene	21 0 U	140 U.	1 20 U	260U	340U	10 98 54	1106	40U	2100	\$7 U
Naphthalene	3500	72 J	1700	990	310	1560	4700	340	1200	146 5
Phenanthrene	210U	998 (L	9000	10000	580 V	8000	16000	4560	27000	1600
Pyrene	3100 J	380 U	1500 丁	2600 J	9404/9	60 1700 J	5600	1100 XM	16000	700 U
						1000				· · · · · · · · · · · · · · · · · · ·
ICTAL SVOCS	34870	3998	20240	23890	0101	19818	23430	9849	107010	4703

µg/kg - Micrograms per kilogram

- U The analyte was analyzed for, but not detected above the reported sample limit.
- J The analyte was positively identified: the associated numerical value is the approximate concentration of the analyte in the sample.
- UJ The analyte was not detected above the reported quantitation limit. However the reported quantilation limit may be biased.
- NA Not analyzed
- Bold Analyte detected

ŧ

۶,

Т ,

	02								نشر
Area	Former Lub	e Building							
Sample Designation:	SB-20	SB-24	SB-24	SB-27	SB-27	SB-28	SB-28	SH-30	SB-30
Sample Date:	7/29/99	8/4/99	8/2/99	8/4/99	8/3/99	8/4/99	8/3/99	8/6/99	8/5/99
Sample Depth (ft bls):	9-11	0-0.5	13-15	0-0.5	11-13	0-0.5	11-13	0-0.5	9-11
Parameter									
(Concentrations in µg/kg)									
Acensaltificate	16608	98 J	44U	99 5	280	3000	42U	43U	42U
Acenaphilikene 2400 J	Na	NA	NA	NA	NA	NA	NA	NA	NA
Authracent	4000	230	44U	350	570	5000	62 J	43U	42U
Renandalanthracene	2780	670	44U	1100	560 U.	9900	42U	-43U	42U
Benzola invene	1789	860	44U	1100	280 U	10060	42U	43U	42U
Benzofblfturrantheae	920	1300	44U	1690	190 U	13000	42 U	4 3U	42U
Benzole h. iperviene	1000	670	44 U	849	180 U	5600	42 U	43U	42U
Benzofklfhioranthene	540U	420	44U	660	41U	5200	42U	43U	42U
Chrysene	5300	810	47 VL	1400	550 U	12000	55 U.	43U	42U
Dihenzola blaothracene	540U	298	44U	260	99 T	1784	42 U	43U	42U
Fluoranthene	2400	77 6 J	44U	2400	4 90 V.	19000	57 (L	43U	42U
Fluorene	13000	140 J	44U	138 U.	470 U	4400	50 U.	43U	42U
Indeno[1.2.3-cd]nyrenc	540U	530	44U	910	82 U	6500	42U	43U	42U
Nanbihalene	22000	300	44U	180	41U	3800	42U	43U	42 U
Phenanthrene	41000	130 J	61 U	1604	669 Vy	20000	200 U	> 55 U	42 U
Ругере	9360	1700	190 U	2409	1700	26600	140 U	50 U	<u>, 42U</u>
TOTAL SVOCS	113320	9611	391	15029	610 T	139100	564	105	0

~

µg/kg - Miccograms per kilogram

U . The analyte was analyzed for, but not detected above the reported sample limit

J - The analyte was positively identified: the associated numerical value is the approximate concentration of the analyte in the sample.

- UI The analyte was not detected above the reported quantitation limit. However the reported quantitation limit may be biased.
- NA Not analyzed

. :

Bold - Analyte detected

թ. Ծ

2

DEC 08 '59 05:50PM ROUX ASSOCIATES INC

	\mathcal{O}^{+}	01		·D1			- 01 _			- >
Area:	Terminal D	isposal Site	/				Former Lube Bu	nilding		
Sample Designation:	LF-3	LF-4	LF-4	LF-6	LF-7	LF-8	SB-11/LB-1 SB	-11/LB-1 DUP	SB-12	SB-14
Sample Date:	8/23/99	8/23/99	8/2.3/99	8/25/99	8/25/99	8/25 /99	8/23/99	8/23/99	8/23/99	8/23/99
Parameters			•							
(Concentrations in µg/L)										<u>'-</u>
Acenaphthene	,	IU	IU	45	w	IU	6	7	37	3 J
Accnaphthylene	NA	NA	NA	NA	NA	NA	3NJ	JNJ	IU	10
Anthracene	10	เบ	10	30	ານ	เบ	2 J	3 J	3 J	15
Benzo[a]anthracene	10	IU	IU	N	10	IV	25	2 J	4 J	IU
Benzo(a)pyrene	1U	1U	IU	រប	1U	1U	1 J	1 J	2 5	1U
Benzo [b] fluoranthene	IU	1U	1U	JU	1U	1U	1 5	1 丁	2 J	IU
Benzo[g,h,i]perylene	າບ	1U	បេ	10	1U	1U	ÎU	1U	U	IU
Benzo[k]fluoranthene	10	IU	٤U	1U	IU	1U	າບ	1U	1 U	1U
Ctacysene	1U	1U	łU	IU	IU	IU	37	3 J	6	1U
Dibenzo[a,h]anthracene	. IU	1U	าบ	ເບ	10	1U	10	IŬ	រប	IU
Fluorantheac	1U	1U	IU	បេ	IU	1U	4 5	5	7	1 5
Fluorene	7	1U	IU	3 J	1U	1U	10	IU	5	5
Indexo[1,2,3-cd]pyrene	IU	1 0	IU	1U	10	1 U	IU	IU	IU	IU
Naphthalene	10	1U	IU	បេ	1U	1U	6 NJ	INJ	1U	2 🔾
Pheasnthrene	8	1U	U	9	IU	1U	10	12	6	2 J
Рутепе	1U	1U	1U	10	<u>1U</u>	10	9	10	11	<u>3</u> J
TOTAL SVOCS	24	0	0	16	0	0	57	54	49	17

Table 7. Summary of Semivolatile Organic Compounds Detected in Groundwater Samples, Mobil Buffalo Terminal, Buffalo, New York.

1

Notes:

ng/L - Micrograms per liter

U - The analyte was analyzed for, but not detected above the reported sample limit.

I - The analyte was positively identified: the associated numerical value is the approximate concentration of the analyte in the sample.

UJ - The analyte was not detected above the reported quantitation limit. However the reported quantitation limit may be biased.

NA - Not analyzed

Bold - Analyte detected

P.22

		A 73		
	61	0.1	07	67
: Area				
Sample Designation:	SB-16	SB-19	SB-28	SB-28 DUP
Sample Date:	8/23/99	9/29/99	9/29/99	9/29/99
Parameters				
(Concentrations in µg/L)				
Aconomitions	E	2 10		171
			10	10
Acenaphinykine		U.9U	10	10
Anthracene	3]	2 5	10	เข
Benzo(a)anthracene	3 5	17	10	10
Benzo[a]pyrene	15	0.9U	10	1U
Benzo[b]fluoranthene	1U	0.9U	IU	10
Benzo[g,h,i]perylene	1U	0.9U	IU	1U
Benzo[k]fluoranthene	Uf	0.90	IU	10
Chrysene	\ 4 J	2 J	JU	ເບ
Dibenzo[a,h]anthracene	1U	0.9U	1U	10
Fluoranthene	2 J	3 J	IU	1 U
Fluorene	10	4J	IU	١U
Indeno[1,2,3-cd]ovrene	IU	0.9U	iU	JU
Naphthalene	35	4.5	10	IU
Phenanthrene	21	7	IU	10
Pyrene	7	3 5	IŪ	2 J
۲۰۰ <u>کے طور میں میں میں میں میں میں میں میں میں میں</u>				
TOTAL SVOCS	50	29	Û	2

Notes:

µg/L - Micrograms per liter

- U The analyte was analyzed for, but not detected above the reported sample limit.
- 1 The analyte was positively identified: the associated numerical value is the approximate concentration of the analyte in the sample.
- UI- The analyte was not detected above the reported quantitation limit. However the reported quantitation limit may be biased.
- NA Not analyzed
- Bold Analyte detected

P.23

ROUX ASSOCIATES, INC.

ŧ

4

1

ŧ

-

ż

÷

• • •

Table 4. Summary of Metals Detected in Soil Samples, Mobil Buffalo Terminal, Buffalo, New York.

Arca.	Elk Street I	ol								
Sample Designation:	ESL-1	ESL-2	ESL-3	ESL-4	ESL-5	ESL-6	ESL-7	ESL-8/ESL-W1	ESL-8/ESL-WI	ESL-9
Sample Date:	6/17/98	6/17/98	6/17/98	6/17/98	6/17/98	6/17/98	6/17/98	6/17/98	6/22/98	6/17/98
Sample Depth (ft bls):	0-0.5	0-0 .5	0-0.5	0-0.5	0-0.5	0-0.5	0-0.5	0-0.5	8-10	0-0.5
Parameters										
(Concentrations in mg/kg)										
Cadmium	1.81	1.04	9.36	0.96	0.92	1.31	2.7	1.76	3.8J	1.36
Chromium	838	15.9	73.7	15.3	35.5	24.8	32.6	26.6	1 9.4 J	14.9
Lead	\$5.6	129	25.7	333	130	232	723	324	11.9EJ	169
Mercury	0.0755	0.33	0.0381	8.38	0.18	0.0257	1.38	0.0658	8.9292	0.31
Nickel	12	20.1	7.8	13.1	16.9	12.4	27	15.7	35.6	16.6
Selenium	1.4	0.41	0.37U	1.2	0.39U	1.02	1.8	1.7	0.46UJ	1.2
Thallium	12.9	1.39	1.94	1.1	1.43	1.97	1.77	1.54	2.01	0.92
Vanadium	300	15.3	27.7	15.5	22.7	18.9	28.4	27.6	21.7	18.2

Notes:

mg/kg - Milligrams per kilogram

U - The analyte was analyzed for, but not detected above the reported sample limit.

1 of 6

J - The analyte was positively identified: the associated numerical value is the approximate concentration of the analyte in the sample.

U) - The analyte was not detected above the reported quantitation limit. However the reported quantitation limit may be biased.

NA - Not analyzed

Bold - Analyte detected

Р.9

0EC 08 '99

05:44PM

ROUX

ASSOCIATES

INC

Table 4. Summary of Metals Detected in Soil Samples, Mobil Buffalo Terminal, Buffalo, New York.

							/	2	/	1	/	<u></u>	\checkmark
	Arca:	Elk Street I	ot										
	Sample Designation:	ESL-10	ESL-11	ESL-12	ESL-13	ESL-13	ESI-13	ESL-14	ESL-14	ESL-14	ESL-15	ESL-15	ES115
	Sample Date:	6/17/98	6/17/98	6/17/98	9/2 /99	9/2/99	9/2/99	9/2/99	9/2/99	9/2/99	9/2/99	9/2/99	9/2/99
	Sample Depth (ft bls):	0-0.5	0-0.5	0-0.5	0-0.5	1-2	2-3	0-0.5	1-2	2-3	0-0.5	1-2	2-3
Parameters	• • • •												
(Concentratio	ons in mg/kg)								<u> </u>		,		t
Cadmium		1.49	9. 7	2.6	0.056U	0.0 6 U	0.057U	0.061U	0.065U	0.52	2.64	0.06U	0.05 8U
Chromium		22.6	32.7	21.1	31.2	22.8	30.1	28.1	24.4	14.7	27.1	24.7	14.9
Lead		214	625	164	1410	533	44.2	652	1620	491	704	514	324
Meicury		0.57	2.04	0.6	2.54	6.41	0.0998	1.56	0.83	0.098 3	1.59	1.09	0.13
Nickel		22.8	31.8	29.6	23.6	18.2	35	24.3	23.3	13	18	20.5	16.5
Selenium		9.47	2.1	0.6	5.2	2.8	0.46U	1.4	3.6	8.5U	0.47	2.9	0.47U
Thallium		2.6	2.3	4.2	0.75U	2.4	2.3	0.81 U	3.6	0.83U	0.75U	1.96	1.37
Vanadium		37.8	26.4	18.3	32	29 <i>.</i> 4	34	58.6	35.5	17.9	41.6	29.3	25.5

Notes:

mg/kg - Milligrams per kilogram

•

U - The analyte was analyzed for, but not detected above the reported sample limit.

J - The analyte was positively identified: the associated numerical value is the approximate concentration of the analyte in the sample.

UI - The analyte was not detected above the reported quantitation limit. However the reported quantitation limit may be biased.

NA - Not analyzed

Beld - Analyte detected

Ъ.

٠,

Table 4. Summary of Metals Detected in Seil Samples, Mobil Buffalo Terminal, Buffalo, New York

]											
	Aica:	Elk Street	Lot										
	Sample Designation:	ESL-16	ESL-16	ESL-16	ESL-17	ESL-17	ESL-17	ESL-18	ESL-18	ESL-18	ESL-19	ESL-19	ESI-19
	Sample Date:	9/2/99	9/2/99	9/2/99	9/2/9 9	9 /2/99	9/2/99	9/2/99	9/2/99	9/2/99	9/2/99	9/2/99	9/2/99
	Sample Depth (ft bis):	0-0.5	1-2	2-3	0-0.5	1-2	2-3	0-0.5	1-2	2-3	0-0.5	1-2	2-3
Parameters													
(Concentratio	ons in mg/kg)										<u>`</u>		
Cadmium		4.94	0.056U	0.054U	0.28U	0.058U	0.055U	2.3	0.058U	0.057U	6.89	0.058U	0.0 59 U
Chromium		26.7	16.1	18.2	\$7.3	32.8	14.7	14.5	19.4	20.1	119	24.6	25.4
Lead		449	261	30.3	552	294	16.5	112	33.5	31.1	1610	27.1	34
Mercury		0.71	0.92	0.06 76	0.82	0.45	0.025	8.12	0.8589	0.0339	1.41	0.0778	0.0391
Nickel		36.4	16.3	27.8	41	31.5	23.4	17.2	22.8	33.6	24.2	27.2	35.1
Sclenium		1.5	1.2	0.44U	10.2	4.4	0.44U	0.5	1.12	0.46U	2	0.47U	0.47U
Thallium		0.74U	1.68	1.6	36	4.8	1.02	0.73U	1.51	0.76U	0.80	0.96	1.5
Vanadium		32.9	20.3	24.5	88	30.6	18.7	19.1	27.2	24.4	47.1	26.6	27.9

Notes:

mg/kg - Milligrams per kilogram

U - The analyte was analyzed for, but not detected above the reported sample limit.

J - The analyte was positively identified: the associated numerical value is the approximate concentration of the analyte in the sample.

UI - The analyte was not detected above the reported quantitation limit. However the reported quantitation limit may be biased.

NA - Not analyzed

Bold - Analyte detected

Table 4. Summary of Metals Detected in Soil Samples, Mobil Buffalo Terminal, Buffalo, New York.

		t				/					
	Aica:	Elk Street	Lot		Terminal Disposal Site	Former Lu	be Building				
	Sample Designation:	ESL-20	ESL-20	ESL-20	L.F7	SB-7	SB-7	SB-8	SB-8	SB-9	SB-9
	Sample Date:	9/2/9 9	9/2/99	9/2/9 9	8/16/99	6/26/98	6/26/98	6/26/98	6/26/98	6/26/98	6/2 6/98
	Sample Depth (ft bls):	Q-0.5	1-2	2-3	21-23	0-2	8-10	0-2	10-12	0-2	10-12
Parameters	· ·								•.		
(Concentratio	ms in mg/kg)	•									
Cadmium		0.62U	0.64	0. 062 U	0.0 66U	6.91	0.38	0.24	0.35	0.44	0.36
Chromium		985	197	57.2	15 J	14.3J	11.1J	10.4J	15.1J	13.9J	16.2J
Lead		676	134	48.1	18.1	48.9	12.1	70.6	12.1	73.7	12
Mercury	1	0.91	0.27	0.0356	0.0384	0.17	0.0381U	0.0365U	0.053U	0.0697	0.0304U
Nickel	•	28.7	21.4	35.8	22.6	11.SU	16. 6 U	12.9U	29.3U	24.6U	29.4U
Selenium		5U	1.3	0.5U	0.53U T	0.39U	0.45U	0.38U	0.49U	0.44U	0.49U
Thallium		13.5	3	2.04	4.1	0.79U	0.9U	0.77U	IU	0.94	1U
Vanadium		266	72.1	38.7	23.2	11.7	17.3	18	19	28.8	21.1

Notes:

mg/kg - Milligrams per kilogram

U - The analyte was analyzed for, but not detected above the reported sample limit.

J - The analyte was positively identified: the associated numerical value is the approximate concentration of the analyte in the sample.

UJ - The analyte was not detected above the reported quantitation limit. However the reported quantitation limit may be biased.

NA Not analyzed

Bohi - Analyte detected

12

ъ.

Table 4. Summary of Metals Detected in Soil Samples, Mobil Buffalo Tenninal, Buffalo, New York.

				V								
]								
	Area:	Former La	be Building									
San	nple Designation:	SB-10	SB-10	SB-11/LB-1	SB-1 3	SB-14	SB-15	SB-16	SB-17	SB-17	SB-18	SB-18
	Sample Date:	6/26/98	6/26/98	7/1/99	7/27/99	7/26/99	7/27/99	7/28/99	7/28/99	7/28/99	7/29/99	7/29/99
Sam	ple Depth (ft bls):	0-2	8-10	16-18	11-13	13-15	11-13	11-13	0-0.5	11-13	0-0.5	11-13
Parameters								•				
(Concentrations in	mg/kg)											
Cadmium		1.01	0.34	0.6 5	0.062U	0 .13	0.058U	0.6	0.26	0.061U	0.065U	0.06U
Chromium		12.AJ	13.1J	63 5	11.7	11.8	14.3	21.4	14.9	18.1	18.3	16.5
Lead	•	2380	34.9	10.2	20.2	16	10.3	584	77.2	10.5	57.5	9.1
Mercury		9.46	0.0417U	0.0089	0.0113	0.0156	0.0233	3.33	0.18	0.03	0.0343	0.0112
Nickel		14.8U	22.1U	11.2	14.3	19	17.7	20.6	22 .1	22.6	31.2	19.5
Selenium		0.46U	0.47U	0.48U	0. SU	0.53U	0.47U	16.9	0.76	0.49U	1.03	0.49U
Thallium		0.91U	Q.94U	0.79U	0.82U	0.88U	0.77U	10	0.79U	0.82U	0.87U	0.8)U
Vanadium		14.6	20.6	8.5	17.4	16.1	17.2	36.8	24.5	24.8	35.3	22.7

Notes:

mg/kg - Milligrams per kilogram

U - The analyte was analyzed for, but not detected above the reported sample limit.

J - The analyte was positively identified: the associated numerical value is the approximate concentration of the analyte in the sample.

UJ - The analyte was not detected above the reported quantitation limit. However the reported quantitation limit may be biased.

NA - Not analyzed

Boid - Analyte detected

Table 4. Summary of Metals Detected in Soil Samples, Mobil Buffalo Tenninal, Buffalo, New York.

				V								
]								
	Area:	Former La	be Building									
San	nple Designation:	SB-10	SB-10	SB-11/LB-1	SB-1 3	SB-14	SB-15	SB-16	SB-17	SB-17	SB-18	SB-18
	Sample Date:	6/26/98	6/26/98	7/1/99	7/27/99	7/26/99	7/27/99	7/28/99	7/28/99	7/28/99	7/29/99	7/29/99
Sam	ple Depth (ft bls):	0-2	8-10	16-18	11-13	13-15	11-13	11-13	0-0.5	11-13	0-0.5	11-13
Parameters								•				
(Concentrations in	mg/kg)											
Cadmium		1.01	0.34	0.6 5	0.062U	0 .13	0.058U	0.6	0.26	0.061U	0.065U	0.06U
Chromium		12.AJ	13.1J	63 T	11.7	11.8	14.3	21.4	14.9	18.1	18.3	16.5
Lead	•	2380	34.9	10.2	20.2	16	10.3	584	77.2	10.5	57.5	9.1
Mercury		9.46	0.0417U	0.0089	0.0113	0.0156	0.0233	3.33	0.18	0.03	0.0343	0.0112
Nickel		14.8U	22.1U	11.2	14.3	19	17.7	20.6	22 .1	22.6	31.2	19.5
Selenium		0.46U	0.47U	0.48U	0. SU	0.53U	0.47U	16.9	0.76	0.49U	1.03	0.49U
Thallium		0.91U	Q.94U	0.79U	0.82U	0.88U	0.77U	10	0.79U	0.82U	0.87U	0.8)U
Vanadium		14.6	20.6	8.5	17.4	16.1	17.2	36.8	24.5	24.8	35.3	22.7

Notes:

mg/kg - Milligrams per kilogram

U - The analyte was analyzed for, but not detected above the reported sample limit.

J - The analyte was positively identified: the associated numerical value is the approximate concentration of the analyte in the sample.

UJ - The analyte was not detected above the reported quantitation limit. However the reported quantitation limit may be biased.

NA - Not analyzed

Boid - Analyte detected

	-	DEC
	·····	88
i2	SB-14	ĝ
/99	8/23/99	
		8
		រដ្ឋ រដ្ឋ
		Ţ
7U	0.6643	
37	0.0062	ĝ
١	NA	ž
69	0.02	B
01	0.000121	S S
44	0.0242	្ព
47	0.0016U	AT
A	NA	S
97U	0.049	ij
	A 016	ర

Table 8. Summary of Metals Detected in Groundwater Samples, Mobil Buffalo Terminal, Buffalo, New York.

Former Lube Building Area: Terminal Disposal Site LF-3 LF-4 1F-5 1.F-6 **LF-7** 1.F-8 SB-11/LB-1 SG-11/LB-1 DUP SB-Sample Designation: 8/25/99 8/25/99 8/25/99 8/25/99 8/23/99 8/23/99 8/23 Sample Date: 8/23/99 8/23/99 Parameter 2 (Concentrations in mg/L) 0.0042 0.0019 0.0035 0.001 0.0017U 0.0017U 0.0017U Cadmium 0.0017U 0.0043 0.213 0.03 0.0197 0.0017U 0.0017U 8.022 0.0163 0.0955 0.0389 Chromium NA NA NA NA NA NA NA N/ NA Hexavalent Chromium 0.051 0.04 0.0019U 8.044 0.18 0.19 0.06 0.0137 0.16 Lead 8.000g52 9.0001 6.80 0.000042U 0.000152 0.000045 0.00006 0.000042U 0.000042U Mercury 0.051 0.051 0.03 0.0398 0.0054U 0.0054U 8.016 **0.18**G 0.07 Nickel 0.0016U 0.0016U 0.0016U 0.0035 0.0044 8.66 0.0022 0.0016U 0.0016U Selenium NA NA NA NA NA NA NA **NA** NA Tetra Ethyl Lead 0.0097U 0.0097U 0.0097U 0.0097U 0.0097U 8110.0 0.0097U 6.0113 0.0097U Thallium 4.443 0.025 0.043 0.024 0.0028U 0.0028U 0.036 0.034 0.026 Vanadium 0.0082 6.123

Notes:

mg/L - Milligrams per liter

U - The analyte was analyzed for, but not detected above the reported sample limit.

J - The analyte was positively identified: the associated numerical value is the approximate concentration of the analyte in the sample.

US - The analyte was not detected above the reported quantitation limit. However the reported quantitation limit may be biased.

NA - Not analyzed

Bold - Analyte detected

Table 4. Summary of Metals Detected in Soil Samples, Mobil Buffalo Terminal, Buffalo, New York.

	1										
Arca:	Former Lul	be Building									
Sample Designation:	SB-19	SB-20	SB-20 .	SB-24	SB-24	SB-27	SB 27	SB-28	SB 28	SB-30	SB 30
Sample Date:	7/29/99	7/29/99	7/29/99	8/2/99	8/4/99	8/3/99	8/4/99	8/3/99	8/4/99	8/5/99	8/6/99
Sample Depth (ft bls):	7 -9	3-4	9-11	13-15	0-0.5	11-13	0-0.5	11-13	0-0.5	9-11	0-0.5
Parameters											
(Concentrations in mg/kg)											white the same state in the same state of the sa
Cadmium	0.066U	0.053U	0.081U	1.05	0.063U	0.062U	0.66	0.064U	0.062U	0.064U	0.58
Chromium	14.1	7.7	15.8	14.6	28	10.8	34.7	23.6	114	15.8	23.4
Lead	46.1	20.1	5800	12.5	188	34.1	377	14.8	299	15.6	38.1
Mercury	0.0909	0.0313	0.17	0.00621	3.9	0.0607	0.8	0. 8226	6.32	9.0879	0.64
Nickel	26.8	9.3	30	39.1	21.8	42.6	16.3	35.1	30.2	29.3	39.5
Selenium	1.3	0.43U	1.36	0.53U	6.5	0.5U	2.8U	0.54	2.9	0.51U	3
Thallium	0.881)	0.71U	1.10	0.88U	1. 86	0.83U	4.6U	0.85U	1.26	0.85U	1.31
Vaqadium	27.5	13.8	27.1	19.4	47.8	16.7	46	30.4	47.5	21.3	35

Notes:

mg/kg - Milligrams per kilogram

•

U - The analyte was analyzed for, but not detected above the reported sample limit.

J - The analyte was positively identified: the associated numerical value is the approximate concentration of the analyte in the sample.

U3 - The analyte was not detected above the reported quantitation limit. However the reported quantitation limit may be biased.

NA - Not analyzed

Bold - Analyic detected

P.14

DEC 03 '99 05:51P

Table 8. Summary of Metals Detected in Groundwater Samples, Mobil Buffalo Terminal, Buffalo, New York.

Area:		Former Lube 1	Building	Resampling	Locations			
Sample Designation:	SB-16	SB-19	SB-28	BTC-4	BTC-5	MW-IURS	MW-IURS DUP	NTY-T60
Sample Date:	8/23/99	9/29/99	9/29/99	8/24/99	8/24/99	8/24/99	8/24/99	8/24/99
Parameter			•		ζ,			
(Concentrations in mg/L)				~				
Cadmium	0. 0 01.70	0.0017U	0.0017U	NA	NA	NA	NA	NA
Chronum	0.0123	0.0059	0.0131	NA	NA	NA	NA	NA
Hexavalent Chromium	NA	NA	NA	NA	NA	NA	NA	0.02U
Lead	0.51	0.0263	0.0115	0.013	0.167	6.019	810.0	0.997
Mercury	0.00381	8.906047	0.000042U	NA	NA	NA	NA	NA
Nickel	0.0172	0.0136	0.0232	ŃA	NA	NA	NA	NA
Selenium	0.0056	0.0016U J	0.0024)	NA	NA	NA ·	NA	NA
Tetra Ethyl Lead	NA	NA	NA	0. 0 01U	0.00117	0.001U	0.001U	NA
Thallium	0.0097U	0.0097U	Q.0097U	NΛ	NA	NA	NA	NA
Vanadium	Q. Q2	0.0074	0.021	NA	NA	NA	NA	NA

Notes:

mg/L - Milligrams per liter

- U The analyte was analyzed for, but not detected above the reported sample limit.
- J The analyte was positively identified: the associated numerical value is the approximate concentration of the analyte in the sample.
- UJ The analyte was not detected above the reported quantitation limit. However the reported quantitation limit may be biased.

NA - Not analyzed

Bold - Analyte detected

P.25

ROUX ASSOCIATES, INC.

Case Narrative for Sample Delivery Group No. 082599 - Water

The following data package contains all analytical results corresponding to 9 samples collected on August 24, 1999 and received at Expresslab, Inc. on August 25, 1999. The samples were assigned to sample delivery group (SDG) 082599. Laboratory accession numbers were assigned to each of the 9 samples (I.D. No. 28262 – 28270). The samples were analyzed according to the requirements of USEPA method 8270B following liquid-liquid extraction according to USEPA method 3510. Samples were extracted as per the attached sample preparation log. Results were reported according to the requirements of NYSDEC 12/95 ASP. All results are reported as ug/L wet weight.

The samples were analyzed for tetraethyl lead (TEL) and tentatively identified compounds (TICs) with special attention to the following potential TEL metabolites and related organic lead compounds:

Ethyltrimethyl lead	CAS No. 001762-26-1
Diethyldimethyl lead	CAS No. 001762-27-2
Trimethyl [{methylsulfinyl)oxy] - lead	CAS No. 044657-41-2
Triethylmethyl - lead	CAS No. 001762-28-3
Tetramethyl – lead	CAS No. 000075-74-1

QC Remarks

Fresh MDL determinations were performed as per protocol. Seven repeat extracted spiked samples at 1 PPB resulted in a statistically verifiable MDL of 0.307 PPB with a standard deviation of 0.10 PPB. All QC parameters were within normal limits; however, it should be noted that the internal standard concentrations of the samples and blank were higher than expected by as much as a factor of two. This anomaly is due to a slightly higher baseline background in the extracted samples. MS & MSD spiked recoveries of the samples were 50% and 46%, respectively, within the QC limits range.

In summary, all other quality control samples, ICVs, CCVs, preparation blanks, calibrations, tunes and other parameters including the MS/MSD were within acceptable limits. It should be understood that the requested detection limit of 2 PPB was exceeded (1 PPB actual detection limit) with a MDL of 0.307 PPB. Therefore, the potential error inflicted by the abnormally high internal standard peak area is offset by the lower than requested detection limits.

DFTPP Tune: The tune for this run was acceptable and achieved all NYS ASP requirements as displayed in the raw data.

I certify that this data package is in compliance with the terms and conditions of the contract, both technically and for completeness, for other than the conditions detailed above. I, William R. Sawyer, Ph.D., Laboratory Director for Expressiab, Inc. hereby release the data contained within this hardcopy data package as accurate and within the specifications of the specified USEPA methods.

Signature: Name: William R. Sawver, Ph.D.

Date:

<u>09-13-99</u>

Title: Laboratory Director

CASE NARRATIVE FOR SDG # 082499

Prepared for:

Groundwater and Environmental Services, Inc. 70 Pearce Avenue Buffalo, NY 14150

The following package contains the analytical results for 8 aqueous samples received at ExpressLabs on 8/25/99. The samples that required lead analysis were then sent to Lozier Laboratories, Inc. on 8/25/99. The samples were assigned to sample delivery group (SDG) 082499, and to Lab sample number 4825. The samples were analyzed according to the requirements of EPA method 6010B and reported according to the requirements of the NYSDEC 12/95 ASP.

The samples received required analysis for total lead (except for one sample that required analysis for both total lead and hexavalent chromium. The hexavalent chromium is reported on the standard Lozier report which is included in this package). The samples were digested for total lead on 8/26/99 using EPA method 3010A. The samples were analyzed by the TJA 61E Trace on 8/26/99 using EPA method 6010B.

All quality control samples (i.e. - ICV's, CCV's, ICSA's, ICSAB's, ICB's, CCB's, Prep blanks, LCSW, and LCSS) associated with the analytical run were compliant.

The matrix duplicate, the matrix spike, and the matrix spike duplicate were within the required limits.



INTERNAL MEMORANDUM

To: File From: Marc Falzone Date: 14 December, 1999

Subject: MBT- Continuation of SFI Investigation, Lab Sample Refrigeration

During the continuation of the Site Facility Investigation completed at the Mobil Terminal located at 625 Elk St., Buffalo, NY it was important to cool the collected soil and groundwater samples between sampling at individual boring/well locations as well as prior to shipment. The samples were therefore stored in a cooler with ice immediately after collection, and then each afternoon and evening the samples were removed from the cooler and placed into a refrigerator (designated for site samples only).

APPENDIX E

•

.

Containment Loading Evaluation Results

յուն ու անցերությունների է են է հետում
a a company and a company and a company

Table E-1. Detections of Constituents of Concern in Groundwater at Terminal Disposal Site, Mobil Buffalo Terminal, Buffalo, New York.

.

.....

	-	<u> </u>			· · · · ·	_			.			r	r		r—		_							· · · ·				-		_	_	, , , , , , , , , , , , , , , , , , ,		
Class C Ambient Water Quality (1) Guidance (ug/L)	33.00	33.00		-	5.30	210.00	210.00	210.00			1		1			13.00	1					65.00	65.00	5.00			100.00	100.00	100.00		65.00	65.00		1
Class C Ambient Water Quality (1) Standard (ug/L)		-		-	20.00	10.00	10.00	10.00			-	0.54		-	-	-				-	-	-					6000.00	6000.00	6000.00	14.00				1
Concentration (ug/L)	0.2	0.3	0.2	0.2	6	45	50	56	0.0103	7.7	L	7	0.0137	26	24	1.9	11	9.3	0.016	10	9.6	0.4	0.4	8	7.2	6.5	0.7	0.6	0.7	0.0082	0.5	0.4	0.0043	0.0955
Analyte	l,2,4-Trimethylbenzene	1,2,4-Trimethylbenzene	l,3,5-Trimethylbenzene	l,3,5-Trimethylbenzene	Acenaphthene	Benzene	Benzene	Benzene	Chromium	Cumene	Cumene	fluorene	cead	MTBE	MTBE	Vaphthalene	1-Butylbenzene	1-Butylbenzene	Nickel	1-Propylbenzene	1-Propylbenzene	-Xylene	-Xylene	Phenanthrene	sec-Butylbenzene	sec-Butylbenzene	loluene	[] Intere	[oluene	Vanadium	Kylenes (total)	Xylenes (total)	Cadmium	Chromium
Date Sampled	28-Sep-1999	28-Sep-1999	28-Sep-1999	28-Sep-1999	23-Aug-1999	23-Aug-1999]	28-Sep-1999]	28-Sep-1999]	23-Aug-1999 (28-Sep-1999 (28-Sep-1999 (23-Aug-1999	23-Aug-1999]	28-Sep-1999]	28-Sep-1999]	28-Sep-1999]	28-Sep-1999	28-Sep-1999	23-Aug-1999]	28-Sep-1999	28-Sep-1999	28-Sep-1999 (28-Sep-1999 (23-Aug-1999	28-Sep-1999 s	28-Sep-1999 s	23-Aug-1999	28-Sep-1999	28-Sep-1999	23-Aug-1999	28-Sep-1999	28-Sep-1999	23-Aug-1999 (23-Aug-1999
Designation	LF-3	LF-3	LF-3	LF-3	LF-3	LF-3	LF-3	LF-3	LF-3	LF-3	LF-3	LF-3	LF-3	LF-3	LF-3	LF-3	LF-3	LF-3	LF-3	LF-3	LF-3	LF-3	LF-3	LF-3	LF-3	LF-3	LF-3	LF-3	LF-3	LF-3	LF-3	LF-3	LF-4	LF-4

•*

....

-

1 of 3

Table E-1. Detections of Constituents of Concern in Groundwater at Terminal Disposal Site, Mobil Buffalo Terminal, Buffalo, New York.

Designation	Date Sampled	Analyte	Concentration	Class C Ambient Water	Class C Ambient Water
_				Quality (1) Standard	Quality (1) Guidance
			(µg/L)	(µg/L)	(µg/L)
LF-4	23-Aug-1999	Lead	0.16		
LF-4	23-Aug-1999	Mercury	0.000152	0.00	
LF-4	28-Sep-1999	MTBE	4.7		
LF-4	23-Aug-1999	Nickel	0.186		
LF-4	23-Aug-1999	Selenium	0.0022	4.60	
LF-4	23-Aug-1999	Thallium	0.0113	8.00	
LF-4	23-Aug-1999	Vanadium	0.123	14.00	
LF-5	25-Aug-1999	Chromium	0.0389		
LF-5	25-Aug-1999	Ethylbenzene	0.3		17.00
LF-5	25-Aug-1999	Lead	0.051		
LF-5	25-Aug-1999	Mercury	0.000045	0.00	
LF-5	28-Sep-1999	MTBE	5.5		
LF-5	25-Aug-1999	Nickel	0.07		
LF-5	25-Aug-1999	Vanadium	0.043	14.00	
LF-6	28-Sep-1999	1,2,4-Trimethylbenzene	0.3		33.00
LF-6	25-Aug-1999	Acenaphthene	4	20.00	5.30
LF-6	25-Aug-1999	Benzene	83	10.00	210.00
LF-6	28-Sep-1999	Benzene	80	10.00	210.00
LF-6	25-Aug-1999	Chromium	0.0197		
LF-6	28-Sep-1999	Cumene	1.8		
LF-6	25-Aug-1999	Fluorene	3	0.54	
LF-6	25-Aug-1999	Lead	0.04		
LF-6	25-Aug-1999	Mercury	0.00006	0.00	
LF-6	28-Sep-1999	MTBE	4.6		
LF-6	28-Sep-1999	Naphthalene	0.5		13.00
LF-6	28-Sep-1999	n-Butylbenzene	2.3		
LF-6	25-Aug-1999	Nickel	0.0398		
LF-6	28-Sep-1999	n-Propylbenzene	2.7		
LF-6	25-Aug-1999	Phenanthrene	9		5.00
LF-6	28-Sep-1999	sec-Butylbenzene	1.7		
LF-6	25-Aug-1999	Toluene	2	6000.00	100.00
LF-6	28-Sep-1999	Toluene	2.3	6000.00	100.00
LF-6	25-Aug-1999	Vanadium	0.024	14.00	
LF-6	28-Sep-1999	Xylenes (total)	0.5		65.00

İ

1

Ì

4

ż

Ì

1

ţ

1
Table E-1. Detections of Constituents of Concern in Groundwater at Terminal Disposal Site, Mobil Buffalo Terminal, Buffalo, New York.

Designation	Date Sampled	Analyte	Concentration	Class C Ambient Water	Class C Ambient Water
-				Quality (1) Standard	Quality (1) Guidance
			(µg/L)	(µg/L)	(µg/L)
LF-7	28-Sep-1999	MTBE	1.1		
LF-8	25-Aug-1999	Cadmium	0.0042		
LF-8	25-Aug-1999	Lead	0.044		
MW-1URS	08-Jul-1998	1,2,4-Trimethylbenzene	0.3		33.00
MW-1URS	08-Jul-1998	Chromium	0.0097		
MW-1URS	08-Jul-1998	Lead	313		
MW-1URS	24-Aug-1999	Lead	0.019		
MW-1URS	24-Aug-1999	Lead	0.018		
MW-1URS	08-Jul-1998	MTBE	0.5		
MW-1URS	08-Jul-1998	p-Isopropyltoluene	0.2		
MW-1URS	08-Jul-1998	sec-Butylbenzene	0.4		
MW-1URS	08-Jul-1998	tert-Butylbenzene	0.3		
MW-4URS	07-Jul-1998	1,2,4-Trimethylbenzene	0.6		33.00
MW-4URS	07-Jul-1998	Cumene	0.5		
MW-4URS	07-Jul-1998	Lead	4.8		
MW-4URS	07-Jul-1998	o-Xylene	0.2		65.00
MW-4URS	07-Jul-1998	p-Isopropyltoluene	0.2		
MW-4URS	07-Jul-1998	sec-Butylbenzene	0.2		

(1) - NYSDEC Division of Water Technical and Operational Guidance Series (1.1.1) Ambient Water-Quality Standards and Guidance Values, June 1998

Bold - Data Highlighted in Bold Represent Detections that Exceed the NYSDEC Ambient Water Quality Standards and Guidance Values for Class C Waters

-- No NYSDEC Ambient Water-Quality Standards or Guidance Values Available for Class C Waters

μg/L - Micrograms per liter

Ì

4

4

Table E-1. Detections of Constituents of Concern in Groundwater at Terminal Disposal Site, Mobil Buffalo Terminal, Buffalo, New York.

Designation	Date Sampled	Analyte	Concentration	Class C Ambient Water	Class C Ambient Water
-				Quality (1) Standard	Quality (1) Guidance
			(µg/L)	(µg/L)	(µg/L)
LF-7	28-Sep-1999	MTBE	1.1		
LF-8	25-Aug-1999	Cadmium	0.0042		
LF-8	25-Aug-1999	Lead	0.044		
MW-1URS	08-Jul-1998	1,2,4-Trimethylbenzene	0.3		33.00
MW-1URS	08-Jul-1998	Chromium	0.0097		
MW-1URS	08-Jul-1998	Lead	313		
MW-1URS	24-Aug-1999	Lead	0.019		
MW-1URS	24-Aug-1999	Lead	0.018		
MW-1URS	08-Jul-1998	MTBE	0.5		
MW-1URS	08-Jul-1998	p-Isopropyltoluene	0.2		
MW-1URS	08-Jul-1998	sec-Butylbenzene	0.4		
MW-1URS	08-Jul-1998	tert-Butylbenzene	0.3		
MW-4URS	07-Jul-1998	1,2,4-Trimethylbenzene	0.6		33.00
MW-4URS	07-Jul-1998	Cumene	0.5		
MW-4URS	07-Jul-1998	Lead	4.8		
MW-4URS	07-Jul-1998	o-Xylene	0.2		65.00
MW-4URS	07-Jul-1998	p-Isopropyltoluene	0.2		
MW-4URS	07-Jul-1998	sec-Butylbenzene	0.2		

(1) - NYSDEC Division of Water Technical and Operational Guidance Series (1.1.1) Ambient Water-Quality Standards and Guidance Values, June 1998

Bold - Data Highlighted in Bold Represent Detections that Exceed the NYSDEC Ambient Water Quality Standards and Guidance Values for Class C Waters

-- No NYSDEC Ambient Water-Quality Standards or Guidance Values Available for Class C Waters

μg/L - Micrograms per liter

Ì

4

4

		•	• • •	
Conceptual Basis :				
•	1 - Mass Flux is Equal to the Groundwater Discha	rge Multiplied by the Concent	ration of the Analyte	
	2 - Concentration of Analyte in the River is Equal	to the Mass Flux Divided by t	he River Discharge	
Assumptions :				
	1 - The maximum concentration in groundwater w	vill discharge into the Buffalo	River (i.e. no attenuation or degradation)	
	2 - The maximum concentration occurs throughout	it the contaminant plume		
	3 - The groundwater discharge zone is 350 ft base	d on groundwater flow maps.		
<u>Equations :</u>			Values :	
	a. $Q = KIA$		K =	53.5 (ft/day)
	b. $A = WS$		I =	0.026 (ft/ft)
<u>Variables :</u>			A =	4,151 (ft ²)
	Q = Groundwater Discharge	ft³/day	W =	350 (ft)
	K = Hydraulic Conductivity	(ft/day)	S =	11.86 (ft)
	I = Hydraulic Gradient	(ft/ft)	Q =	5,774 ft ³ /day
	A = Cross Sectional Area	(ft^2)	or $Q =$	163,478 L/day
	W = Width of the area	(ft)	Stream Flow =	44,161,632 ft ³ /day
	S = Saturated Thickness	(ft)	or Stream Flow =	1,250,657,418 L/day

Table E-2. Calculation of Mass Flux in Groundwater Disposal, Mobil Buffalo Terminal, Terminal Disposal Area, Buffalo, New York

Mass Flux of COCs that Exceed their Respective Class C Standards or Guidance Values

Mass Flux = (Concentration * Q)

ş

ţ

4

1

٠

ł.

1

ł

Well Designation	Date Sampled	Analyte	Maximum	Class C Ambient Water	Class C Ambient Water	Mass
			Concentration	Quality (1) Standard	Quality (1) Guidance	Flux
			(µg/L)	(µg/L)	(µg/L)	(μg/day)
LF-3	8/23/1999	Acenaphthene	9	20	5.3	1,471,302
LF-3	8/23/1999	Fluorene	7	0.54		1,144,346
LF-6	8/23/1999	Phenanthrene	9		5	1,471,302
LF-6	8/25/1999	Benzene	83	10	210	13,568,669

Contaminant Loading of COCs in the Buffalo River

Concentration in River = (Mass Flux / Stream Flow)

Analyte	Mass Flux	Concentration in River	Concentration in River	Concentration in River	Concentration in River	Concentration in River
		Assumed 100 % of Stream Flow	Assumed 50 % of Stream Flow	Assumed 1 % of Stream Flow	Assumed 0.1 % of Stream Flow	Assumed 0.05 % of Stream Flow
	(µg/day)	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)
Acenaphthene	1,471,302	0.001176	0.002353	0.117642	1.176422	2.352845
Fluorene	1,144,346	0.000915	0.001830	0.091500	0.914995	1.829991
Phenanthrene	1,471,302	0.001176	0.002353	0.117642	1.176422	2.352845
Benzene	13,568,669	0.010849	0.021698	1.084923	10.849230	21.698459

(1)- NYSDEC Division of Water Technical and Operational Guidance Series (1.1.1) Ambient Water-Quality Standards and Guidance Values, June 1998

Bold - Data Highlighted in Bold Represent Detections that Exceed the NYSDEC Ambient Water Quality Standards and Guidance Values for Class C Waters

µg/L - Micrograms per liter

 $\mu g/day$ - Micrograms per day

ROUX ASSOCIATES, INC.

		•	• • •	
Conceptual Basis :				
•	1 - Mass Flux is Equal to the Groundwater Discha	rge Multiplied by the Concent	ration of the Analyte	
	2 - Concentration of Analyte in the River is Equal	to the Mass Flux Divided by t	he River Discharge	
Assumptions :				
	1 - The maximum concentration in groundwater w	vill discharge into the Buffalo	River (i.e. no attenuation or degradation)	
	2 - The maximum concentration occurs throughout	it the contaminant plume		
	3 - The groundwater discharge zone is 350 ft base	d on groundwater flow maps.		
<u>Equations :</u>			Values :	
	a. $Q = KIA$		K =	53.5 (ft/day)
	b. $A = WS$		I =	0.026 (ft/ft)
<u>Variables :</u>			A =	4,151 (ft ²)
	Q = Groundwater Discharge	ft³/day	W =	350 (ft)
	K = Hydraulic Conductivity	(ft/day)	S =	11.86 (ft)
	I = Hydraulic Gradient	(ft/ft)	Q =	5,774 ft ³ /day
	A = Cross Sectional Area	(ft^2)	or $Q =$	163,478 L/day
	W = Width of the area	(ft)	Stream Flow =	44,161,632 ft ³ /day
	S = Saturated Thickness	(ft)	or Stream Flow =	1,250,657,418 L/day

Table E-2. Calculation of Mass Flux in Groundwater Disposal, Mobil Buffalo Terminal, Terminal Disposal Area, Buffalo, New York

Mass Flux of COCs that Exceed their Respective Class C Standards or Guidance Values

Mass Flux = (Concentration * Q)

ş

ţ

4

1

٠

ł.

1

ł

Well Designation	Date Sampled	Analyte	Maximum	Class C Ambient Water	Class C Ambient Water	Mass
			Concentration	Quality (1) Standard	Quality (1) Guidance	Flux
			(µg/L)	(µg/L)	(µg/L)	(μg/day)
LF-3	8/23/1999	Acenaphthene	9	20	5.3	1,471,302
LF-3	8/23/1999	Fluorene	7	0.54		1,144,346
LF-6	8/23/1999	Phenanthrene	9		5	1,471,302
LF-6	8/25/1999	Benzene	83	10	210	13,568,669

Contaminant Loading of COCs in the Buffalo River

Concentration in River = (Mass Flux / Stream Flow)

Analyte	Mass Flux	Concentration in River	Concentration in River	Concentration in River	Concentration in River	Concentration in River
		Assumed 100 % of Stream Flow	Assumed 50 % of Stream Flow	Assumed 1 % of Stream Flow	Assumed 0.1 % of Stream Flow	Assumed 0.05 % of Stream Flow
	(µg/day)	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)
Acenaphthene	1,471,302	0.001176	0.002353	0.117642	1.176422	2.352845
Fluorene	1,144,346	0.000915	0.001830	0.091500	0.914995	1.829991
Phenanthrene	1,471,302	0.001176	0.002353	0.117642	1.176422	2.352845
Benzene	13,568,669	0.010849	0.021698	1.084923	10.849230	21.698459

(1)- NYSDEC Division of Water Technical and Operational Guidance Series (1.1.1) Ambient Water-Quality Standards and Guidance Values, June 1998

Bold - Data Highlighted in Bold Represent Detections that Exceed the NYSDEC Ambient Water Quality Standards and Guidance Values for Class C Waters

µg/L - Micrograms per liter

 $\mu g/day$ - Micrograms per day

ROUX ASSOCIATES, INC.



LEGEND:

90	EXISTING STORAGE TANK
(88)	FORMER STORAGE TANK
- X X	FENCE
MW−9 ф	LOCATION AND DESIGNATION OF MONITORING WELL
RW−1 <u>563.39</u> 1.86	LOCATION AND DESIGNATION OF RECOVERY WELL
	- GROUNDWATER ELEVATION, MEASURED IN FEET ABOVE MEAN SEA LEVEL
	- PRODUCT THICKNESS IN FEET. ABSENCE OF NUMBER INDICATES NO PRODUCT PRESENT.
NM	NOT MEASURED
80—	LINE OF EQUAL GROUNDWATER ELEVATION, MEASURED IN FEET ABOVE MEAN SEA LEVEL (DASHED WHERE INFERRED)
	APPROXIMATE GROUNDWATER FLOW DIRECTION
••••	WELL POINT SYSTEM
	LATERAL EXTENT OF PRODUCT PLUME
	WELL AVERAGE FLOW RATE FOR MAY 1998

WELL DESIGNATION	FOR MAY 1998 (GALLONS PER MINUTE)
RW-1 RW-2 RW-3 RW-4 RW-5 RW-6 WELL POINT SYSTEM	20 7.5 5.5 10 6 0 67.6

572

* LF-2D NOT USED; SCREENED AT DEEPER INTERVAL

- * SB-10 NOT USED; ANOMOUSLY READING
- * RW-6 GROUNDWATER ELEVATION NOT USED FOR CONTOURING DUE TO ANOMOUSLY HIGH READING
- * SB-7, MW-4 AND MW-5 GROUND WATER ELEVATIONS NOT USED FOR CONTOURING DUE TO SUSPECTED PERCHED ZONE.

GROUNDWATER POTENTIOMETRIC MAP OCTOBER 7, 1999	
MOBIL BUFFALO TERMINAL BUFFALO, NEW YORK	

MOBIL OIL CORPORATION

Prepared For:

	41		2
	Compiled by: S.S.	Date: 11/99	PLATE
RUUA	Prepared by: G.M.	Scale: AS SHOWN	
ROUX ASSOCIATES, INC.	Project Mgr: A.B.	Office: NY	1
& Management	File No: MC5211107	Project: 17252Y	2











