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January 19, 2010

Mr. Andrew Fan
Project Manager
Technical Support Branch (3LC20)
Land and Chemicals Division
United States Environmental Protection Agency, Region III
1650 Arch Street
Philadelphia, PA 19103-2029

RE: Transmittal of Semi-Annual Progress Report: July through December 2009
Former Chevron Facility 122208
5801 Riggs Road
Chillum, Maryland

Dear Mr. Fan:

Pursuant to Section VI, Paragraph E of the Administrative Order (U.S. Environmental Protection Agency [EPA] Docket Number RCRA-03-2008-0355TH), Chevron is submitting one copy of the referenced document for your review.

All data from the September/October 2009 semi-annual sampling event are provided, including trend analysis figures, groundwater potentiometric surface maps, and groundwater concentration contour maps.

In addition, the results of the passive groundwater sampling are provided along with a request to expand the use of passive sampling for long term monitoring.

If you have any questions, please call me at 770-984-3165.

Sincerely,

FOR

Denise Dixon
Project Manager

cc: Ms. B. Corman, DC
Ms. V. North, DDOE
Mr. Herb Meade, MDE
R. Scrafford, GF

SEMI-ANNUAL PROGRESS REPORT

FORMER CHEVRON FACILITY NO. 122208
5801 RIGGS ROAD, CHILLUM, MARYLAND
JULY THROUGH DECEMBER 2009

1.0 INTRODUCTION

Pursuant to the U.S. Environmental Protection Agency (EPA) Administrative Order, Docket Number RCRA-03-2008-0355TH (AO), Chevron U.S.A. Inc. (Chevron) is conducting work at and adjacent to the former Chevron Service Station (Facility No. 122208) located at 5801 Riggs Road, Chillum, Maryland (the site). In accordance with Section VI, Paragraph E, subsection 3(c). of the AO, Chevron has prepared this Semi-Annual Progress Report (Report) to describe actions taken by Chevron pursuant to the AO. The reporting period for this report is July 2009 through December 2009.

The remainder of the Report is divided into the following seven sections and five appendices:

- Section 2.0 - Work Conducted During the Reporting Period
- Section 3.0 - Summary of Findings
- Section 4.0 - Permit Compliance
- Section 5.0 - Summary of Deviations from Approved Plans, Problems Encountered, and Corrective Actions Taken
- Section 6.0 - Summary of Meetings with Public and Government
- Section 7.0 - Changes in Key Personnel During the Reporting Period
- Section 8.0 - Projected Work for the Next Reporting Period
- Tables
  - Table 1: Comparison of Detection Results for Sampling Methods
  - Table 2: Summary of Groundwater and Soil Vapor Monitoring Program
- Figures
  - Figure 1: Cumulative Total Hydrocarbons Recovered and Groundwater Treated Since 1990
  - Figures 2-7: Groundwater Contour and Iso-Concentration Maps
  - Figures 8-25: Benzene and MTBE Trend Analyses
- Appendix A - Dual-Phase Extraction System-Groundwater Extraction Data
  - Figure: Process and Instrumentation Diagram
  - Table A-1: Total Fluids Extraction System Data
  - Table A-2: Total Fluids Extraction System Influent Analytical Results
  - Table A-3: Total Fluids Extraction System Effluent Analytical Results
- Appendix B - Dual-Phase Extraction System-Soil Vapor Extraction Data
  - Figure: Process and Instrumentation Diagram
  - Table B-1: Soil Vapor Extraction System Data
  - Table B-2: Soil Vapor Extraction System Influent Analytical Results
  - Table B-3: Soil Vapor Extraction System Effluent Analytical Results
- Appendix C - Groundwater Monitoring Data
  - Table C-1: Groundwater Monitoring Report
- Appendix D - Soil Vapor Sampling Data
  - Table D-1: Soil Vapor Monitoring Report
- Appendix E - Vapor Mitigation System Data
  - Table E-1 VMS Monitoring Data
- Appendix F - Mann Kendall Statistical Analysis

2.0 WORK CONDUCTED DURING THE REPORTING PERIOD

This section provides a summary of work conducted at the site during the reporting period.

2.1 Site Monitoring Work Conducted

The EPA-approved Interim Monitoring Sampling Plan calls for monthly gauging of ten monitoring wells, semi-annual gauging of all monitoring wells, semi-annual sampling of 72 monitoring wells, and semi-annual sampling of the four soil vapor wells (Table 1). Monthly groundwater gauging was conducted on July 27, August 24, September 14 (semi-annual), October 28, November 16, and December 22, 2009. The semi-annual groundwater sampling event was conducted from September 21 through September 29, 2009. Semi-annual soil vapor sampling was conducted on September 17, 2009.

2.2 Interim Measures Conducted

Interim measures activities were conducted during the reporting period. These activities are listed below followed by a general description:

- Continued operation and maintenance of the Interim Dual Phase Extraction System (IDPES).

Overview of the Interim Dual Phase Extraction System

The IDPES consists of total fluids extraction and treatment, and soil vapor extraction and treatment. The process and instrumentation diagram (P&ID) for the system (**Appendix A**) provides specific system information, such as equipment models and sizes, piping sizes, controls, and other technical information.

Total Fluids Recovery and Treatment

Pneumatic total fluids (i.e., groundwater and Liquid Phase Hydrocarbons [LPH], if present) pumps are installed in seven Dual Phase Extraction (DPE) wells (RW-1, RW-2, RW-3, MW-7, MW-17, PTW-A, and PTW-B). Total fluids are pumped from wells through buried piping to the total fluids manifold located in the treatment system compound, adjacent to the service station. The total fluids manifold leads to a coalescing-type oil/water separator. Level sensors in the oil/water separator control a centrifugal pump that intermittently transfers the water to an air stripper. LPH accumulate in the separator and are periodically skimmed off mechanically (if present). Air from the air stripper is treated using three granular activated carbon (GAC) vessels in parallel and then discharges to the atmosphere in accordance with MDE Air Quality General Permit to Construct Identification No. 033-9-1160. Treated water from the air stripper is pumped through two bag filters and then through six GAC vessels arranged in three parallel banks of two. Each bank is composed of two GAC vessels in series. The polished effluent flows through buried pipe to a storm drain inlet located in Riggs Road near the intersection at Eastern Avenue, N.E. in accordance with Maryland General Discharge Permit No. 2008 OGR-8514.

Soil Vapor Recovery and Treatment

Soil vapor extraction (SVE) is conducted at eight wells (i.e., the seven DPE wells plus MP-7). An individual piping leg runs from each well to a common 3-inch manifold in the remediation system compound. The manifold leads to a moisture knockout tank and then to the blower. The blower is a rotary lobe, positive displacement blower controlled by a variable frequency drive. Soil vapor is blown from the blower to a catalytic oxidizer for treatment. Treated air is discharged to the atmosphere in accordance with MDE Air Quality General Permit to Construct Identification No. 033-9-1164.

Interim DPE System Monitoring

The IDPES was visited every week during the reporting period. The following activities were conducted during each site visit:

- Recorded groundwater and air flow rates;
- Measured air influent and effluent concentrations using a flame ionization detector;
- Recorded the manifold vacuum for the SVE system; and
- Conducted equipment maintenance tasks as needed, including checking the oil level of the SVE blower and air compressor, changing out the bag filters, and skimming off LPH in the oil/water separator, if present.

The groundwater influent (SP-1) was sampled 5 times and the effluent (SP-3) was sampled 22 times for laboratory analysis (Appendix A). Effluent groundwater samples were analyzed by EPA Method 8260 for benzene, toluene, ethylbenzene, and xylenes (BTEX), methyl tert-butyl ether (MTBE), tetrachloroethene, trichloroethene, and 1,2-cis-dichloroethene. The permit limits are 100 µg/L for total BTEX and 5 µg/L for benzene. The discharge permit requires reporting of MTBE, tetrachloroethene, trichloroethene, and 1,2-cis-dichloroethene concentrations without establishing limits.

The soil vapor extraction system influent (SP-100) and effluent (SP-200) were sampled three times for laboratory analysis during the reporting period to document compliance with the air discharge permit (Appendix B). Treated effluent (treated air) sampling port (SP-200) is located in the catalytic oxidizer effluent stack before discharge to the atmosphere. Samples were analyzed by EPA Method TO-3 for BTEX and total recoverable petroleum hydrocarbons (TRPH) in the C_4 to C_{10} range. The air permit discharge limits are 20 pounds of volatile organic compounds per day and 0.02 pounds of benzene per hour.

Operations and Maintenance of Vapor Mitigation Systems (VMS)

Three VMS systems at 5818 Eastern Avenue, 5824 Eastern Avenue, and 746 Oglethorpe Street were monitored during the reporting period.

The VMS located at 5824 Eastern Avenue and 5818 Eastern Avenue were monitored in the third quarter on August 24, 2009. The VMS at 746 Oglethorpe Street was started on March 31, 2009 and was then turned off by the resident. It was restarted on October 19, 2009 and monthly monitoring was conducted on October 19, and November 16, 2009. Due to scheduling conflicts with the resident, monthly monitoring in December was not conducted.

Typical inspection and monitoring tasks included:

- Listening to the fan to ensure that it was running properly (no abnormal sounds);
- Ensuring that the knife valve was locked open;
- Ensuring that the electrical box was locked;
- Inspecting the discharge pipes for evidence of superficial damage;
- Ensuring that there were no damaged or exposed electrical wires;
- Inspecting the vent stack for proper attachment to the building wall;
- Confirming that the condensate drain was not blocked (e.g., with ice);
- Taking measurements of the air velocity and flow from the discharge stack; and
- Taking measurements of the cross-slab pressure differential.

2.3 Corrective Measures Conducted

The following Corrective Measures activities were conducted during this period:

- The final Corrective Measures Implementation Work Plan was submitted to EPA and subsequently approved. Design activities commenced.

- Area A DPE System Expansion: The design plan was submitted to EPA for review in December.

- Area B ISGR Wells: Permits were obtained for the pre-design investigation. The investigation will be conducted in January 2010. Design activities were initiated.

- Area C Oxygen Reactive Zone: The design plan was submitted to EPA for review in October. EPA conditionally approved the plan, but required removal of the vault ventilation blower. The design was in the process of being modified to remove the blower from the plans and specifications during the reporting period.

2.4 Submittal of Deliverables

Chevron submitted the following deliverables to EPA during the reporting period.

- Semi-Annual Progress Report for January through June 2009 on July 17, 2009;

- Corrective Measures Implementation Work Plan on August 14, 2009;

- Corrective Measures Implementation Design Plan: Area C Oxygen Reactive Zone on October 15, 2009; and

- Corrective Measures Implementation Design Plan: Area A Dual Phase Extraction System Expansion on December 14, 2009 Oxygen Reactive Zone on October 15, 2009.

3.0 SUMMARY OF FINDINGS

This section provides a summary of findings and results for the interim measures activities described in Section 2.2.

Ongoing Operation of the DPE System

The hour meters for both the total fluids and SVE portions of the DPE system were logged throughout the period. For the period from July 1, 2009 through December 31, 2009, the total fluids extraction portion of the system was operating 77 percent of the time (3,368 hours on and 1,021 hours off) and the SVE portion was operating 29 percent of the time (1,274 hours on and 3,082 hours off).

Table A-1 in Appendix A contains groundwater extraction system performance data including date and time, on/off status, totalizer reading, cumulative gallons of hydrocarbons, operating extraction points, maintenance information for the reporting period and the previous period (January 1, 2009 through December 31, 2009), comments on the reason for system downtime, and the type of maintenance performed . A detailed explanation of the tables is provided on the first page of **Appendix A**. A P&ID is also included in **Appendix A**.

The groundwater extraction portion of the DPE system pumped approximately 3,279,778 gallons of groundwater and recovered 40.2 equivalent gallons of dissolved hydrocarbons during the reporting period. The average system flow rate over the period was 16.2 gallons per minute (gpm) when the system was pumping (not including system down time) and 12.5 gpm for the entire period (including down time). The total volume of groundwater pumped from this site since remediation began in 1989 is approximately 48,385,322 gallons.

The analytical results for groundwater samples collected at sample points SP-1 (system influent) (Table A-2 in Appendix A) and SP-3 (treated groundwater that is discharged to the storm drain) (Table A-3 in Appendix A) indicated concentrations of benzene and BTEX in the treated groundwater were below the permit limits (5 µg/L benzene and 100 µg/L BTEX) during the reporting period.

Tables B-1, B-2, and B-3 in Appendix B contain the soil vapor extraction system performance data collected for the reporting period including date and time, manifold air flow reading, manifold vacuum reading, influent and effluent screening concentrations measured using a FID, cumulative gallons of hydrocarbons recovered, and other information. A detailed explanation of the tables is provided on the first page of **Appendix B**. The P&ID is included in **Appendix A**.

The soil vapor extraction portion of the DPE system recovered 112 equivalent gallons of hydrocarbons in the vapor phase during the reporting period. The average air flow rate was 136.4 standard cubic feet per minute (scfm) when the system was on (excluding down time) and 39.9 scfm for the entire period (including down time).

The laboratory analytical results for monthly SVE system samples collected at sample points SP-100 (soil vapor influent) (Appendix B, Table B-2) and SP-200 (treated soil vapor that is discharged to the atmosphere) (Appendix B, Table B-3) indicated concentrations of benzene and TRPH in the treated soil vapor were well below the permit limits. The permit limits are

0.02 pounds per hour of benzene and 20 pounds per day of volatile organic compounds measured as TRPH.

Hydrocarbon Recovery Summary for Period and Cumulative Total for System

Period	Liquid-Phase Hydrocarbons (gallons)	Dissolved-Phase Hydrocarbons (eq. gallons)	Vapor-Phase Hydrocarbons (eq. gallons)	Cumulative Total Hydrocarbons (eq. gallons)
07/01/09-12/31/09	0.00	40.2	112.1	152.3
Cumulative Total for System	856.5	785.8	3,982.0	5,624.3

The volume of groundwater treated and the corresponding volume of hydrocarbons collected for the entire time the system has been operating on a quarter by quarter basis continued to be tracked (Figure 1).

Groundwater Monitoring

The analytical data from the September 2009 semi-annual sampling event and the groundwater elevation data for the current period and the previous period are provided in Table C-1 in **Appendix C**. A detailed explanation of the table is provided on the first page of **Appendix C**.

Groundwater concentration maps were created using data collected during the September 2009 semi-annual sampling event (Figures 2 through 7).

***Passive Sampling Using the* HydraSleeve™**

During the September 2009 sampling event, two samples were collected at select wells. One sample was collected using the HydraSleeve passive sampler and a second sample was collected using the regular bailer sampling approach immediately following the passive sampling so that the two sampling methods could be compared (Table 2).

Based on the analytical results and field team observations during sampling, several conclusions can be drawn:

- The use of the Hydrasleeve was limited in wells with short water columns (i.e., wells with less than 3 feet of water) because the sampler would not retrieve enough water for the sample bottleware;
- HydraSleeve does not make a sampler for wells smaller than 1-inch in diameter. Therefore, the ¾ -inch wells at the site cannot be sampled using Hydrasleeve;
- HydraSleeve sampling takes approximately half the time of bailer sampling;
- The analytical results were comparable for all wells excluding MW-15 (Table 2);

- MW-15 has a 40-foot long screen that had 20 feet of water in the well at the time of sampling. The discrepancy in sampling results is likely due to water column stratification within the well. Hydrocarbons are entering the well at a different elevation in the well than where the HydraSleeve was suspended. Therefore, the HydraSleeve may not provide comparable analytical results for wells with water columns over 15 feet in length.

Based on these findings, Chevron recommends that future sampling events utilize the passive HydraSleeve sampling in place of bailer sampling at thirty-three groundwater wells that meet the following critera (Table 1).

Criteria used to select wells to be sampled using HydraSleeve samplers:

- A water column of a minimum of 4 feet so that the required sample volume can be collected;
- A water column maximum of 12 feet to prevent stratification; and
- A well diameter of 1 inch or greater.

Soil Vapor Monitoring

The soil vapor analytical results for the current period and the previous year are provided in Table D-1 in **Appendix D**. Water was present in the tubing of soil vapor well VW-4 during the September 2009 sampling event; therefore, no sample was collected.

Vapor Mitigation System Monitoring

The vapor mitigation system monitoring results for the current period and previous period are provided in Table E-1 in **Appendix E**. All cross-slab differential pressure readings during this period were sufficiently negative at all three residences, indicating that the systems were operating as designed.

Mann-Kendall Statistical Analysis

The Mann-Kendall Statistical Analysis report is provided in **Appendix F**. The results of the analysis indicated that dissolved-phase hydrocarbons were either stable or decreasing.

4.0 PERMIT COMPLIANCE

Four permits are required for activities performed at the Chillum site. Two air discharge permits have been issued by MDE covering the effluent of the groundwater air stripping equipment and the effluent of the soil vapor extraction equipment. In addition, another permit was issued by MDE for discharge of treated groundwater. Permit requirements and compliance for the above MDE permits are discussed in Sections 2 and 3. An additional permit required for work in Washington, D.C. is issued by the D.C. Department of Transportation (DCDOT) for Above Ground Public Space occupancy to perform activities such as sampling and gauging of monitoring wells.

Permit numbers 033-9-1160 Air Quality General Permit for effluent of groundwater air stripping equipment and 033-9-1164 Air Quality General Permit for effluent of soil vapor extraction equipment were issued for the site. Neither of these permits has an expiration date. Sampling and monitoring requirements include periodic effluent monitoring as described in Sections 2 and 3.

Permit number 2008-OGR-8514 General Discharge Permit was issued for treated groundwater discharge at the site. This permit became effective on January 31, 2008, and expires on December 12, 2012. The permit requires weekly effluent sampling, system monitoring, and submission of a quarterly Discharge Monitoring Report.

Permit number PA 41221-R2 for Above Ground Public Space Occupancy was issued to cover traffic control requirements for sampling and gauging. The permit was renewed on August 27, 2009, and expires March 2, 2010.

Permit number PA 52094 Public Space Subsurface for the pre-design investigation of Area B was issued by the DCDOT on January 6, 2010.

5.0 Summary of Deviations from Approved Plans, Problems Encountered, and Corrective Actions Taken

- The vapor mitigation system at 746 Oglethorpe Street was turned off by the resident after receiving a larger than normal electric bill that was not due to the vapor mitigation system. EPA and DDOE were notified of this situation in writing on April 21, 2009, after Chevron was notified by the resident. The resident resolved the billing issue with the electric company, PEPCO, in October and turned the system back on. Chevron monitored the system monthly during October and November 2009. Scheduling conflicts with the resident precluded monitoring in December 2009.

- The SVE blower motor in the IDPES started shutting down regularly in June 2009. After extensive troubleshooting over the period of approximately a month, it was determined that it was likely that the blower motor that needed to be replaced. Chevron replaced the blower motor on September 9, 2009.

6.0 SUMMARY OF MEETINGS WITH PUBLIC AND GOVERNMENT

No meetings were conducted.

7.0 CHANGES IN KEY PERSONNEL DURING THE REPORTING PERIOD

There were no changes in key Gannett Fleming or Chevron personnel.

8.0 PROJECTED WORK FOR THE NEXT REPORTING PERIOD

The following list identifies projected work to be conducted during the next reporting period, which is January through June 2010 (semi-annual reporting).

- Monthly monitoring of the IDPES including influent and effluent sampling;
- Weekly sampling of the IDPES effluent to comply with water discharge permits;
- Monthly gauging of select wells near the service station to check for the presence of LPH and to document drawdown caused by the total fluids extraction system;
- Routine operations and maintenance activities for the remediation system and the vapor mitigation systems;
- Conduct the semi-annual groundwater and soil vapor sampling event at the end of March 2010;
- Annual system monitoring sampling for the vapor mitigation systems in February 2010;
- Conduct pre-design investigation for Area B;
- Submission of Corrective Measures Design Report for Area B; and
- Permitting and bidding for construction of remediation systems in Areas A and C.

TABLES

Gannett Fleming

Table 1[1]
Summary of Groundwater Gauging Plan
Groundwater and Soil Vapor Long Term Monitoring Plan
Former Chevron Facility No. 122208, Chillum, Maryland

Well Identifier	Well Location Category	Petroleum Hydrocarbon Sampling Frequency	Current Sampling Method	Proposed Future Sampling Method	Groundwater Gauging Frequency[2]	Comment
GP-27A	Dual-Phase Extraction System	Semi-annual[3]	From pump	From pump	Monthly	
GP-30A	Dual-Phase Extraction System	Semi-annual	From pump	From pump	Monthly	
GP-35A	Dual-Phase Extraction System	Semi-annual	From pump	From pump	Monthly	
GP-38A	Dual-Phase Extraction System	Semi-annual	From pump	From pump	Monthly	
MP-7	Dual-Phase Extraction System	None	None	None	Monthly	Gauge only
MP-20	Dual-Phase Extraction System	None	None	None	Semi-annual	Gauge only
MP-30	Dual-Phase Extraction System	None	None	None	Semi-annual	Gauge only
MP-40	Dual-Phase Extraction System	None	None	None	Semi-annual	Gauge only
MW-5	Dual-Phase Extraction System	Semi-annual	From pump	From pump	Semi-annual	
MW-7	Dual-Phase Extraction System	Semi-annual	From pump	From pump	Monthly	Recovery Well
MW-15	Dual-Phase Extraction System	Semi-annual	From pump	From pump	Semi-annual	
MW-16	Dual-Phase Extraction System	Semi-annual	From pump	From pump	Monthly	
MW-17	Dual-Phase Extraction System	Semi-annual	From pump	From pump	Semi-annual	Recovery Well
MW-18	Dual-Phase Extraction System	Semi-annual	From pump	From pump	Monthly	
MW-22	Dual-Phase Extraction System	Semi-annual	From pump	From pump	Monthly	
MW-23	Dual-Phase Extraction System	Semi-annual	From pump	From pump	Semi-annual	
PTW-A	Dual-Phase Extraction System	Semi-annual	From pump	From pump	Semi-annual	Recovery Well
PTW-B	Dual-Phase Extraction System	Semi-annual	From pump	From pump	Semi-annual	Recovery Well
RW-1	Dual-Phase Extraction System	Semi-annual	From pump	From pump	Semi-annual	Recovery Well
RW-2	Dual-Phase Extraction System	Semi-annual	From pump	From pump	Semi-annual	Recovery Well
RW-3	Dual-Phase Extraction System	Semi-annual	From pump	From pump	Semi-annual	Recovery Well
GP-2E(45-50)	Dissolved Hydrocarbons	Semi-annual	Bailer	Bailer	Semi-annual	
GP-2E(55-60)	Dissolved Hydrocarbons	Semi-annual	Bailer	Bailer	Semi-annual	
GP-2F(45-50)	Dissolved Hydrocarbons	Semi-annual	Bailer	Bailer	Semi-annual	
GP-2F(50-55)	Dissolved Hydrocarbons	Semi-annual	Bailer	Bailer	Semi-annual	
GP-7A(30-35)	Dissolved Hydrocarbons	Semi-annual	Bailer	Bailer	Semi-annual	
GP-7A(35-40)	Dissolved Hydrocarbons	Semi-annual	Bailer	Bailer	Semi-annual	
GP-24A	Dissolved Hydrocarbons	Semi-annual	Bailer	HydraSleeve	Semi-annual	
GP-39A	Dissolved Hydrocarbons	Semi-annual	Bailer	HydraSleeve	Semi-annual	

Table 1 (Continued)

Well Identifier	Well Location Category	Petroleum Hydrocarbon Sampling Frequency	Current Sampling Method	Proposed Future Sampling Method	Groundwater Gauging Frequency[(2)]	Comment
GP-41A	Dissolved Hydrocarbons	Semi-annual	Bailer	HydraSleeve	Semi-annual	
GP-44A	Dissolved Hydrocarbons	Semi-annual	Bailer	Bailer	Semi-annual	
MW-24A	Dissolved Hydrocarbons	Semi-annual	Bailer	Bailer	Monthly	
MW-24B	Dissolved Hydrocarbons	Semi-annual	Bailer	HydraSleeve	Semi-annual	
MW-25A	Dissolved Hydrocarbons	Semi-annual	Bailer	Bailer	Semi-annual	
MW-25B	Dissolved Hydrocarbons	Semi-annual	Bailer	HydraSleeve	Semi-annual	
MW-26A	Dissolved Hydrocarbons	Semi-annual	Bailer	HydraSleeve	Semi-annual	
MW-26B	Dissolved Hydrocarbons	Semi-annual	Bailer	HydraSleeve	Semi-annual	
MW-27A	Dissolved Hydrocarbons	Semi-annual	Bailer	HydraSleeve	Semi-annual	
MW-27B	Dissolved Hydrocarbons	Semi-annual	Bailer	HydraSleeve	Semi-annual	
MW-33A	Dissolved Hydrocarbons	Semi-annual	Bailer	HydraSleeve	Semi-annual	Added at the request of EPA
MW-33B	Dissolved Hydrocarbons	Semi-annual	Bailer	HydraSleeve	Semi-annual	
MW-33C	Dissolved Hydrocarbons	Semi-annual	Bailer	HydraSleeve	Semi-annual	Added at the request of EPA
MW-33S	Dissolved Hydrocarbons	Semi-annual	Bailer	Bailer	Semi-annual	
MW-38	Dissolved Hydrocarbons	Semi-annual	Bailer	HydraSleeve	Semi-annual	
MW-39R	Dissolved Hydrocarbons	Semi-annual	Bailer	Bailer	Semi-annual	
MW-40	Dissolved Hydrocarbons	Semi-annual	Bailer	HydraSleeve	Semi-annual	
MW-43B	Dissolved Hydrocarbons	Semi-annual	Bailer	HydraSleeve	Semi-annual	
MW-44A	Dissolved Hydrocarbons	Semi-annual	Bailer	Bailer	Semi-annual	
MW-44B	Dissolved Hydrocarbons	Semi-annual	Bailer	HydraSleeve	Semi-annual	
MW-45	Dissolved Hydrocarbons	Semi-annual	Bailer	HydraSleeve	Semi-annual	
MW-46	Dissolved Hydrocarbons	Semi-annual	Bailer	HydraSleeve	Semi-annual	
MW-47	Dissolved Hydrocarbons	Semi-annual	Bailer	Bailer	Semi-annual	
MW-49	Dissolved Hydrocarbons	Semi-annual	Bailer	HydraSleeve	Semi-annual	
MW-50	Dissolved Hydrocarbons	Semi-annual	Bailer	Bailer	Semi-annual	
GP-7A(20-25)	Sentinel	Semi-annual	Bailer	Bailer	Semi-annual	
GP-9A(20-25)	Sentinel	Semi-annual	Bailer	Bailer	Semi-annual	
GP-11A(20-25)	Sentinel	Semi-annual	Bailer	Bailer	Semi-annual	
MW-6	Sentinel	Semi-annual	Bailer	HydraSleeve	Semi-annual	
MW-19	Sentinel	Semi-annual	Bailer	Bailer	Semi-annual	
MW-20	Sentinel	Semi-annual	Bailer	HydraSleeve	Semi-annual	Upgradient
MW-21	Sentinel	Semi-annual	Bailer	HydraSleeve	Semi-annual	

Table 1 (Continued)

Well Identifier	Well Location Category	Petroleum Hydrocarbon Sampling Frequency	Current Sampling Method	Proposed Future Sampling Method	Groundwater Gauging Frequency(2)	Comment
MW-28A	Sentinel	Semi-annual	Bailer	HydraSleeve	Semi-annual	
MW-28B	Sentinel	Semi-annual	Bailer	HydraSleeve	Semi-annual	
MW-29A	Sentinel	Semi-annual	Bailer	HydraSleeve	Semi-annual	
MW-29B	Sentinel	Semi-annual	Bailer	HydraSleeve	Semi-annual	
MW-30	Sentinel	Semi-annual	Bailer	HydraSleeve	Semi-annual	Upgradient
MW-31B	Sentinel	Semi-annual	Bailer	HydraSleeve	Semi-annual	
MW-41A	Sentinel	Semi-annual	Bailer	HydraSleeve	Semi-annual	
MW-41B	Sentinel	Semi-annual	Bailer	HydraSleeve	Semi-annual	
MW-42	Sentinel	Semi-annual	Bailer	Bailer	Semi-annual	Upgradient
MW-43A	Sentinel	Semi-annual	Bailer	HydraSleeve	Semi-annual	
MW-48	Sentinel	Semi-annual	Bailer	Bailer	Semi-annual	
MW-51	Sentinel	Semi-annual	Bailer	Bailer	Semi-annual	
MW-53	Sentinel	Semi-annual	Bailer	HydraSleeve	Semi-annual	
MW-54	Sentinel	Semi-annual	Bailer	Bailer	Semi-annual	
MW-55	Sentinel	Semi-annual	Bailer	HydraSleeve	Semi-annual	
VW-1	Soil Vapor	Semi-annual	NA	NA	Semi-annual	
VW-2	Soil Vapor	Semi-annual	NA	NA	Semi-annual	
VW-3	Soil Vapor	Semi-annual	NA	NA	Semi-annual	
VW-4	Soil Vapor	Semi-annual	NA	NA	Semi-annual	

Footnotes:
(1) This table is adapted from the Interim Measures Sampling Plan, dated April 2006.
(2) All wells will be gauged in the spring and the fall during the Semi-annual sampling events.
(3) Sampling will be conducted in the spring and fall (low and high groundwater conditions).

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Table 2. Comparison of Results for the Bailing and Passive Sampling Methods
Semi Annual Progress Report July Through December 2009
Former Chevron Facility No. 122208
5801 Riggs Road, Chillum, Maryland

Well ID	Screen Length (ft)	Water Column (ft)	Parameter	Bailer (µg/L)	HydraSleeve™ (µg/L)
MW-53	5	4	Benzene	9	11
			Toluene	<1	<2
			Ethylbenzene	<1	<2
			Xylenes	<3	<6
			MTBE	160	220
			TPH-GRO	Not Sampled	290
GP-39A	20	10	Benzene	2,800	3,100
			Toluene	1,900	2,200
			Ethylbenzene	190	240
			Xylenes	990	1,100
			MTBE	4,700	4,600
			TPH-GRO	Not Sampled	15,000
MW-25B	10	20	Benzene	170	170
			Toluene	<2	<2
			Ethylbenzene	<2	<2
			Xylenes	27	29
			MTBE	240	260
			TPH-GRO	820	790
GP-39A	20	10	Benzene	6,200	7,400
			Toluene	6,500	7,500
			Ethylbenzene	500	410
			Xylenes	3,600	3,600
			MTBE	13,000	15,000
			TPH-GRO	51,000	59,000
MW-6	15	10	Benzene	2	1
			Toluene	5	33
			Ethylbenzene	17	50
			Xylenes	51	168
			MTBE	<1	<1
			TPH-GRO	890	1,700
MW-15[1]	40	20	Benzene	7	1
			Toluene	32	<1
			Ethylbenzene	13	<1
			Xylenes	49	<3
			MTBE	<1	<1
			TPH-GRO	680	<100

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Table 2. Comparison of Results for the Bailing and Passive Sampling Methods
Semi Annual Progress Report July Through December 2009
Former Chevron Facility No. 122208
5801 Riggs Road, Chillum, Maryland

Well ID	Screen Length (ft)	Water Column (ft)	Parameter	Bailer (µg/L)	HydraSleeve™ (µg/L)
MW-22	20	12	Benzene	3,500	4,200
			Toluene	9,600	12,000
			Ethylbenzene	960	1,100
			Xylenes	8,100	9,300
			MTBE	390	420
			TPH-GRO	50,000	55,000

Notes:

1) MW-15 has a stratified water column and the HydraSleeve was not suspended at an elevation where hydrocarbons are present. HydraSleeve sampling method is not recommended for wells with long screen lengths.

FIGURES

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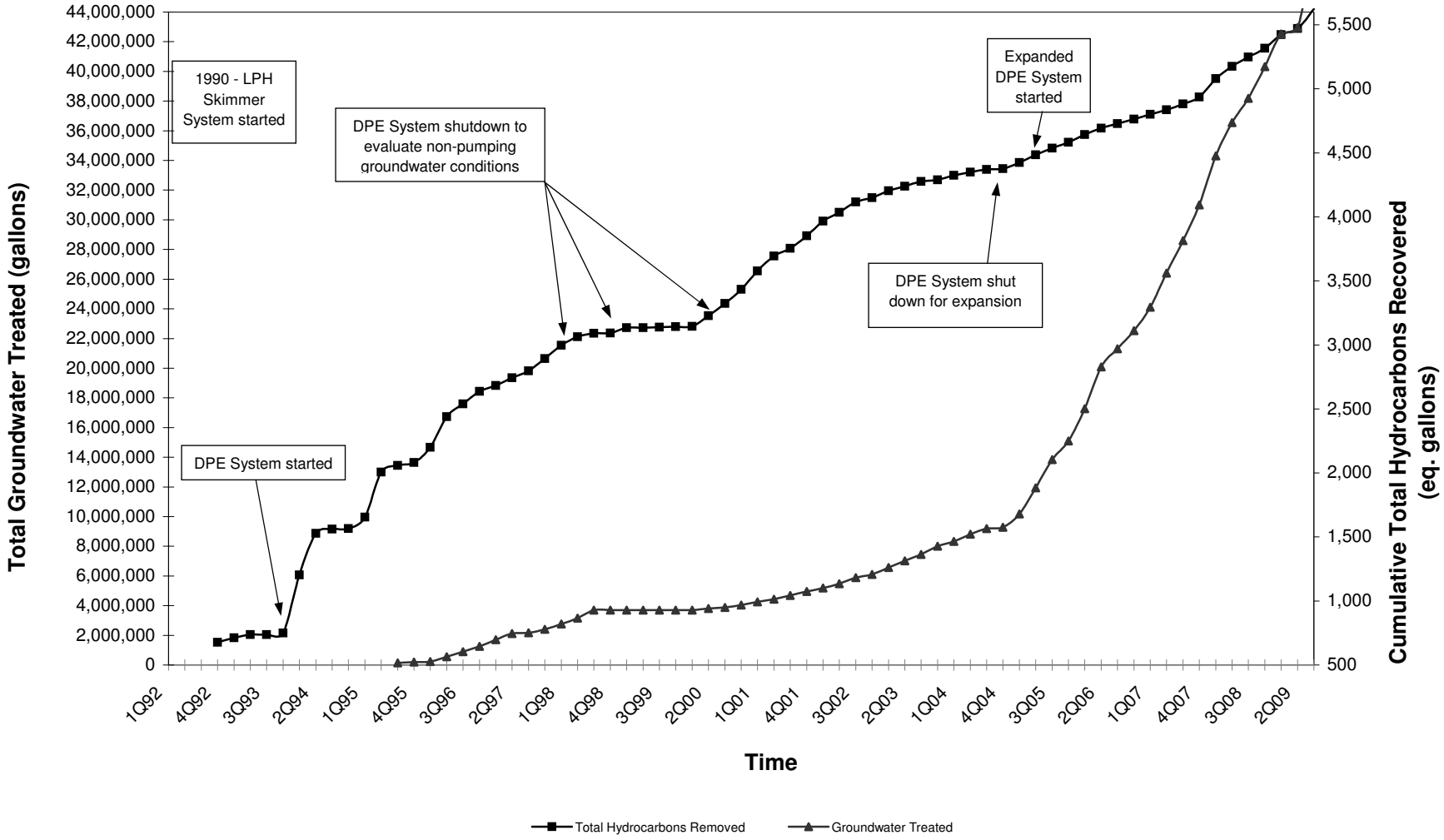
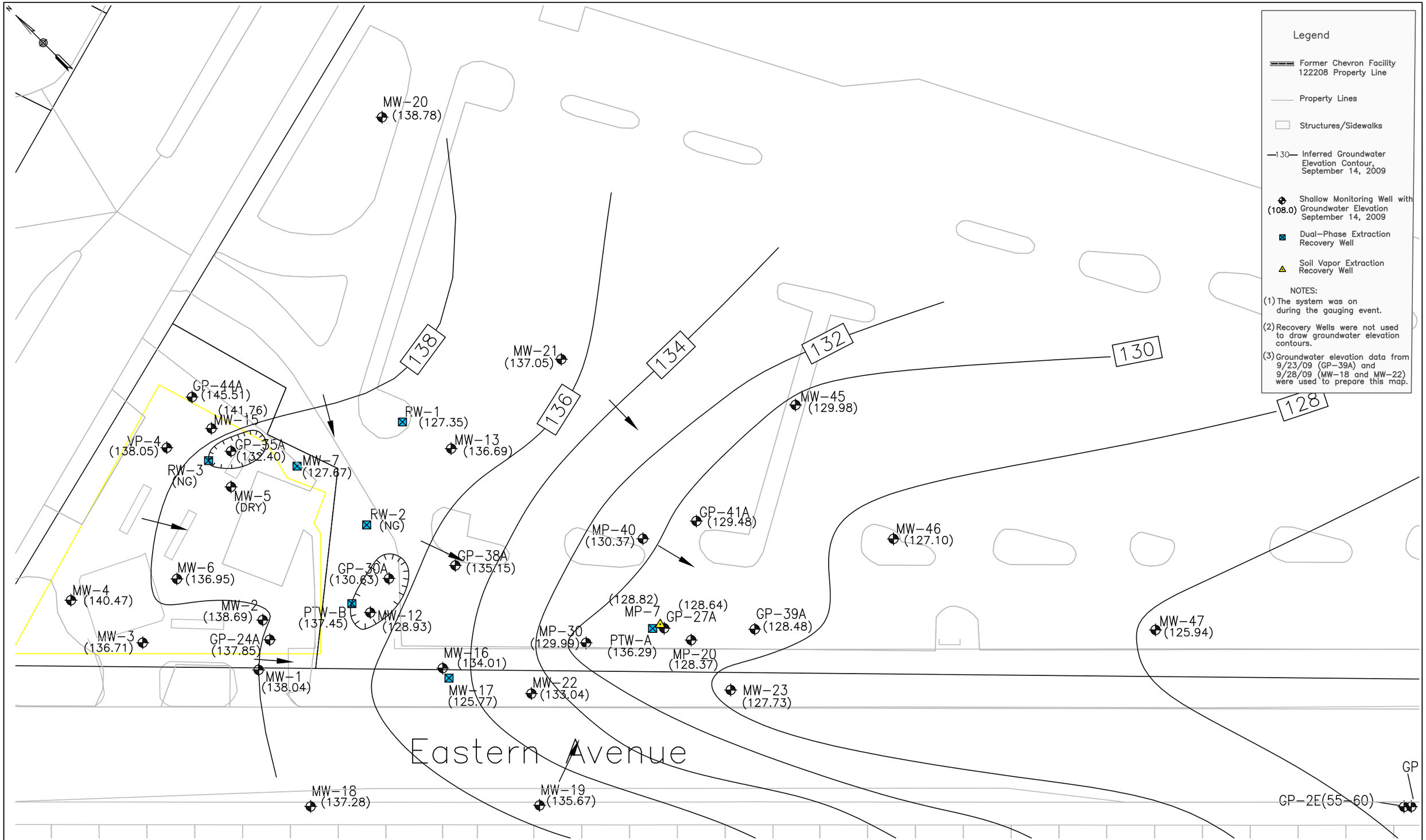
Figure 1
Cumulative Total Hydrocarbons Recovered and Groundwater Treated Since 1990
Semi-Annual Progress Report January 2009 Through December 2009
Former Chevron Facility 122208, Chillum, Maryland





0 20 40 Feet

NO.	DESCRIPTION	DATE	BY
REVISIONS			

DESIGNED	CADD	SCALE
DKB	DKB	1:40
CHECKED	APPROVED	APPROVED
JK	RWS	

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BALTIMORE, MARYLAND

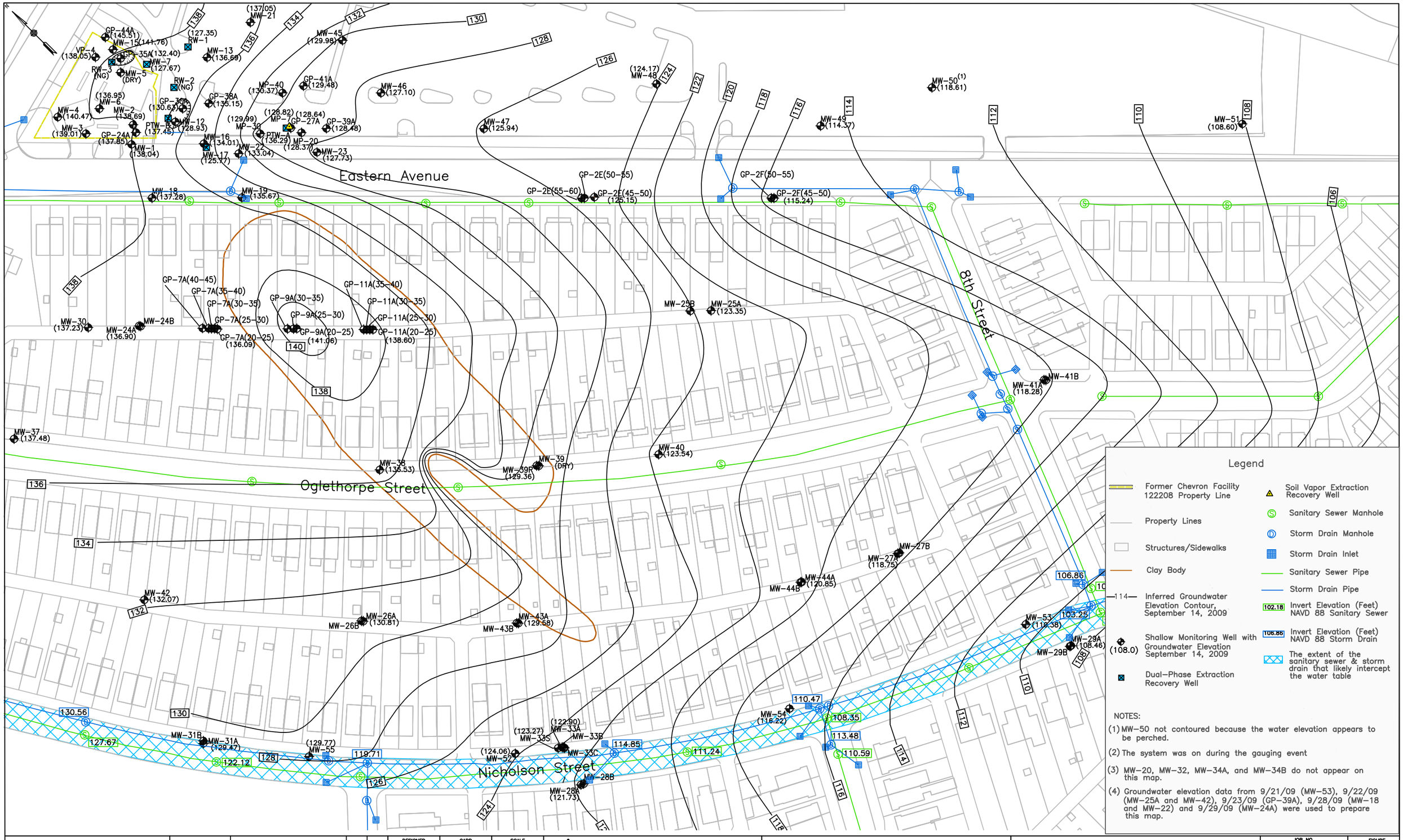
2009 SEMI ANNUAL PROGRESS REPORT

FORMER CHEVRON FACILITY NO. 122208
CHILLUM, MARYLAND

Groundwater Potentiometric Surface Map
Remediation System Area
September 14, 2009

JOB NO.	DATE	CAD FILE
50641	12/21/09	GW CONTOURS 3Q 2009_blrup.dwg

FIGURE 2



0 50 100 Feet

NO.	DESCRIPTION	DATE	BY
	REVISIONS		

DESIGNED	CADD	SCALE
DKB	DKB	1:100
CHECKED	APPROVED	APPROVED
JK	RWS	

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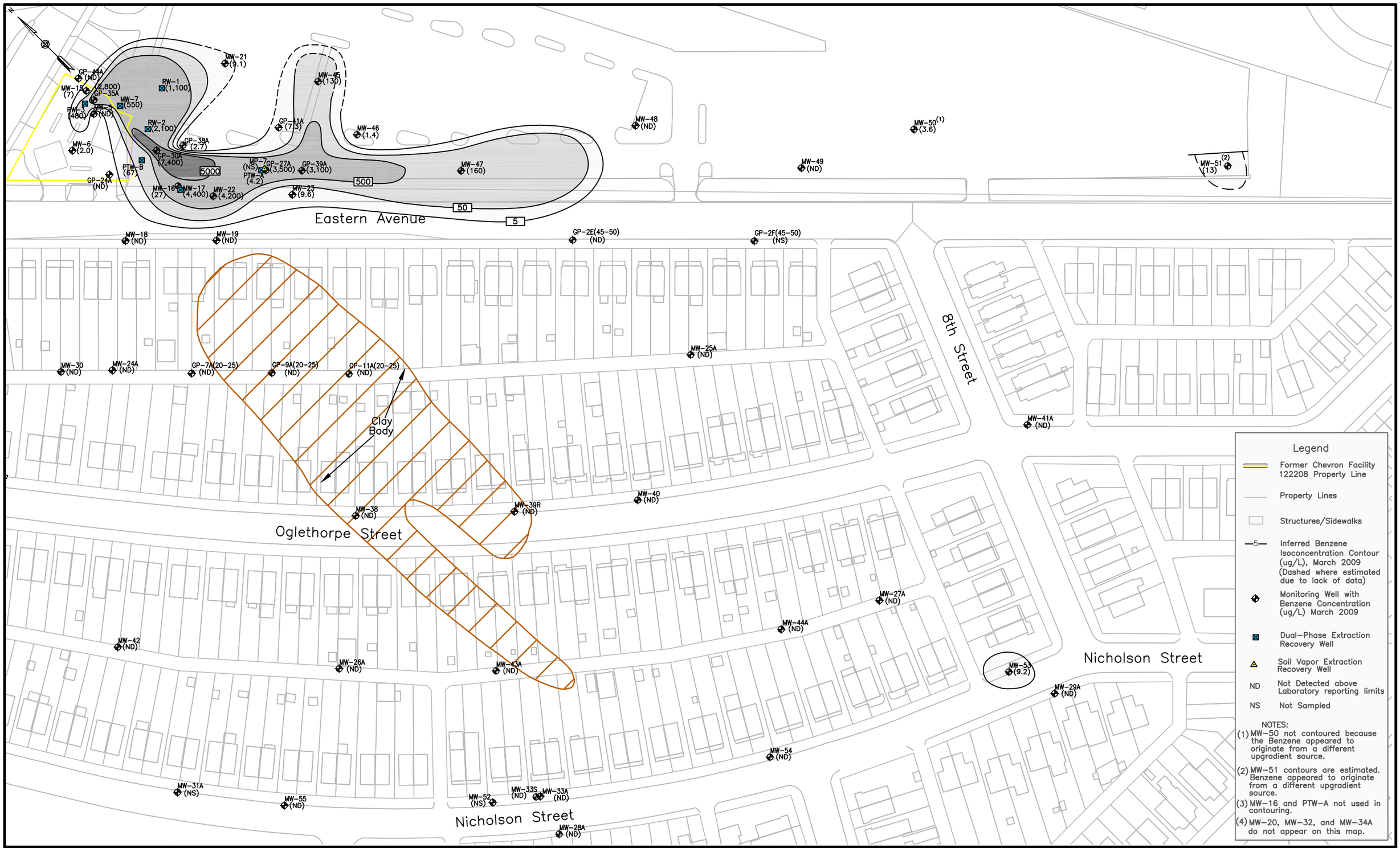
2009 SEMI-ANNUAL PROGRESS REPORT
FORMER CHEVRON FACILITY NO. 122208
CHILLUM, MARYLAND

Groundwater Potentiometric Surface Map September 14, 2009

JOB NO.	FIGURE
50641	3
DATE	
12/21/09	
CAD FILE	
GW CONTOURS 3Q 2009.dwg	



0 50 100 Feet

NO.	DESCRIPTION	DATE	BY
REVISIONS			

DESIGNED	CADD	SCALE
DKB	DKB	1:100
CHECKED	APPROVED	APPROVED
JK	RWS	

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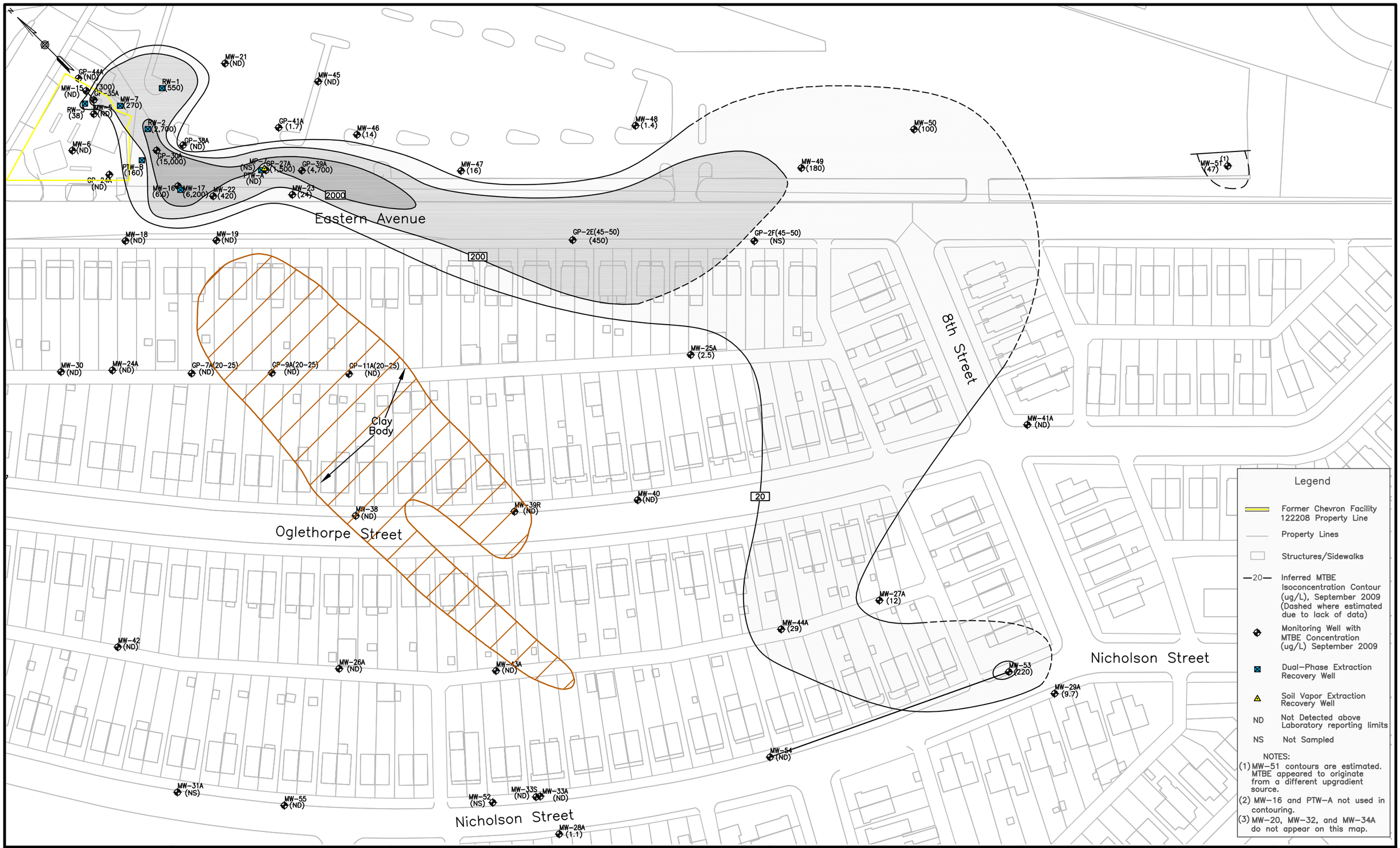
FORMER CHEVRON FACILITY NO. 122208
CHILLUM, MARYLAND

Benzene Concentrations in Shallow Monitoring Wells September 2009

JOB NO.	SHEET NO.
50641	4
DATE	
12/21/09	
CAD FILE	
Shallow Benzene	



0 50 100 Feet

NO.	DESCRIPTION	DATE	BY
	REVISIONS		

DESIGNED	CADD	SCALE
DKB	DKB	1:100
CHECKED	APPROVED	APPROVED
JK	RWS	

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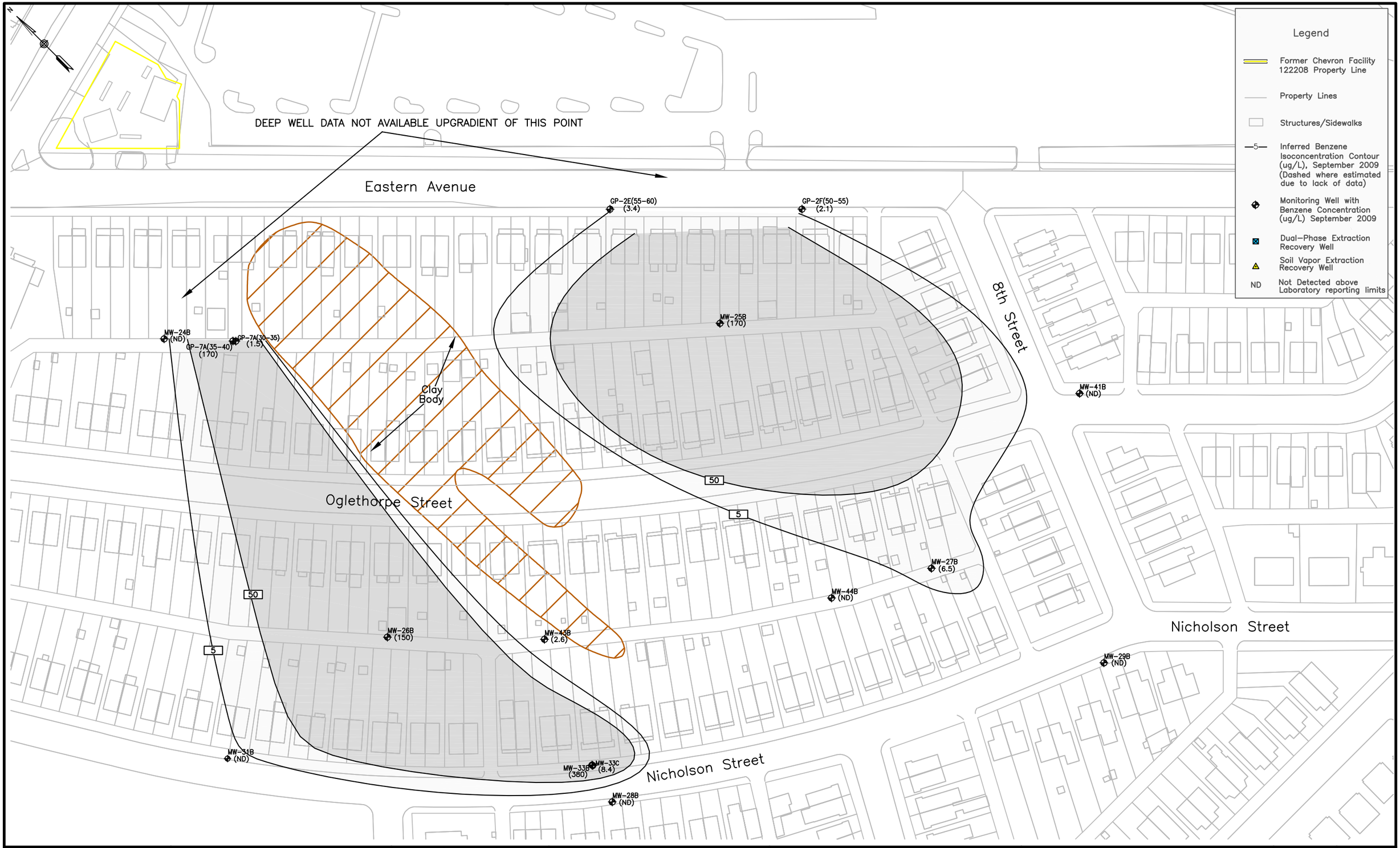
FORMER CHEVRON FACILITY NO. 122208
CHILLUM, MARYLAND

MTBE Concentrations in Shallow Monitoring Wells September 2009

JOB NO.	SHEET NO.
50641	5
DATE	
12/21/09	
CAD FILE	
Shallow MTBE	



0 50 100 Feet

NO.	DESCRIPTION	DATE	BY
	REVISIONS		

DESIGNED	CADD	SCALE
DKB	DKB	1:100
CHECKED	APPROVED	APPROVED
JK	RWS	

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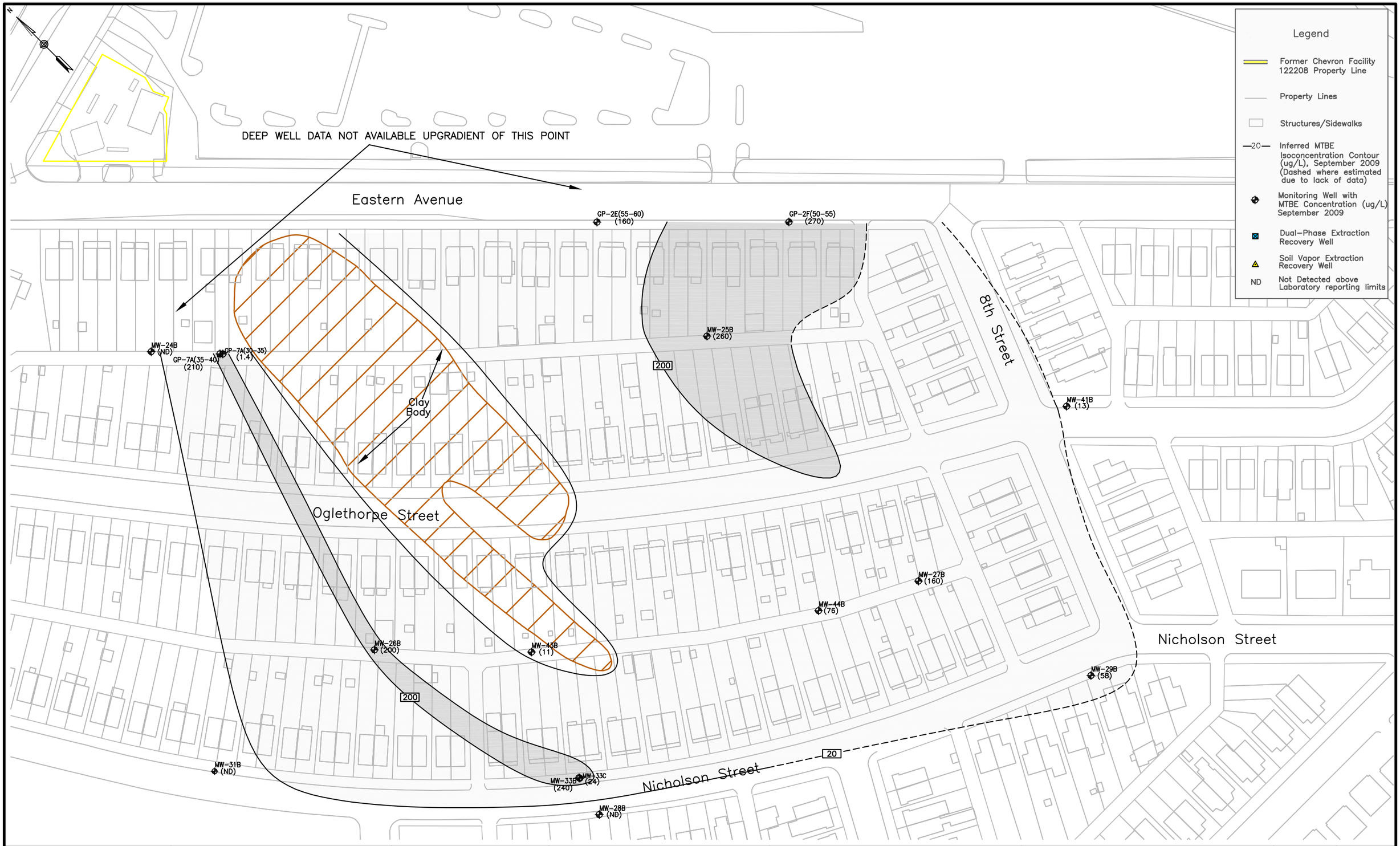
FORMER CHEVRON FACILITY NO. 122208
CHILLUM, MARYLAND

Benzene Concentrations in Deep Monitoring Wells September 2009

JOB NO.	DATE	CAD FILE
50641	12/21/09	Deep Benzene

SHEET NO. 6



0 50 100 Feet

NO.	DESCRIPTION	DATE	BY
	REVISIONS		

DESIGNED	CADD	SCALE
DKB	DKB	1:100
CHECKED	APPROVED	APPROVED
JK	RWS	

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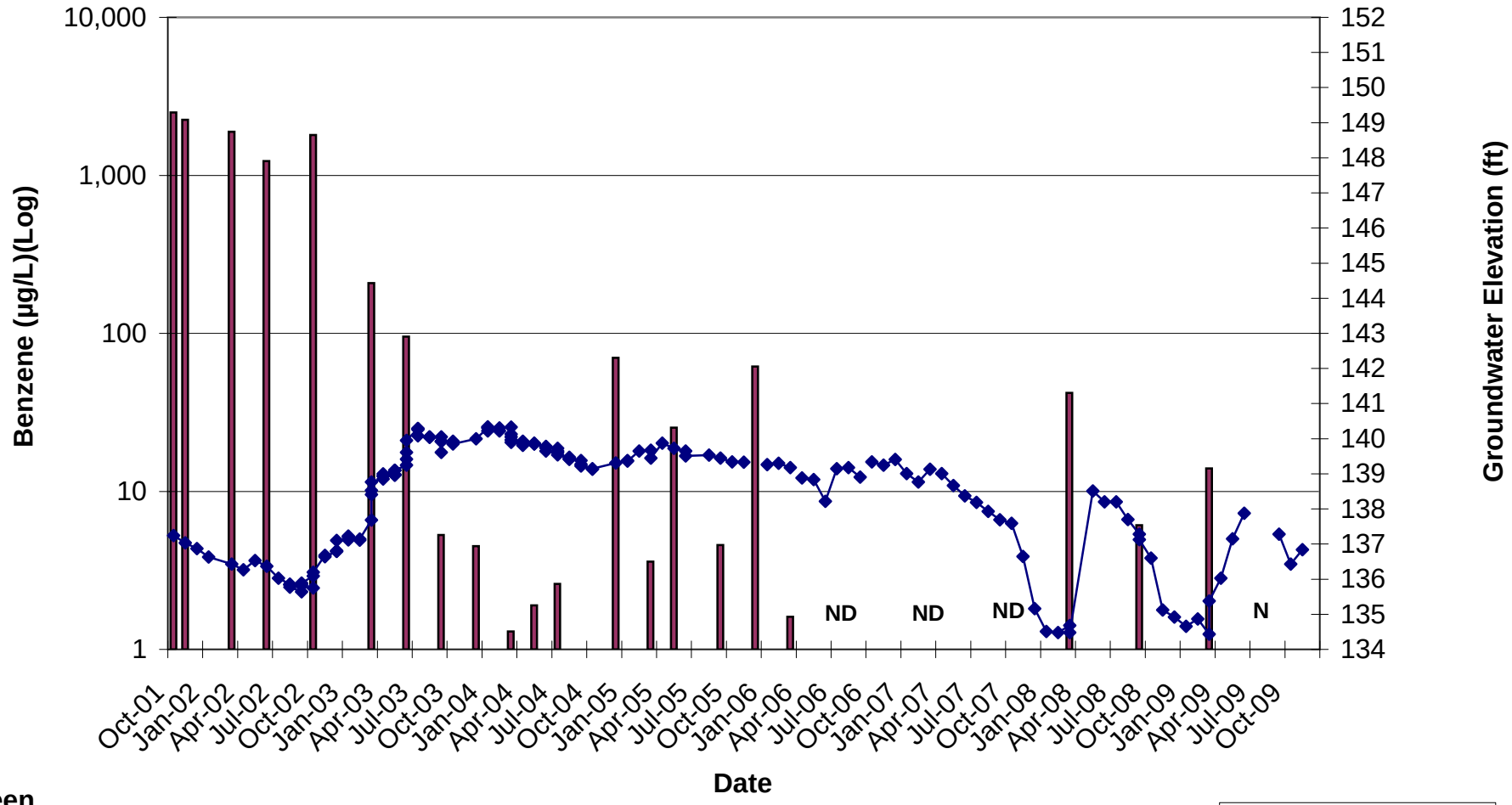
FORMER CHEVRON FACILITY NO. 122208
CHILLUM, MARYLAND

MTBE Concentrations in Deep Monitoring Wells September 2009

JOB NO.	DATE	CAD FILE
50641	12/21/09	Deep MTBE

SHEET NO. 7

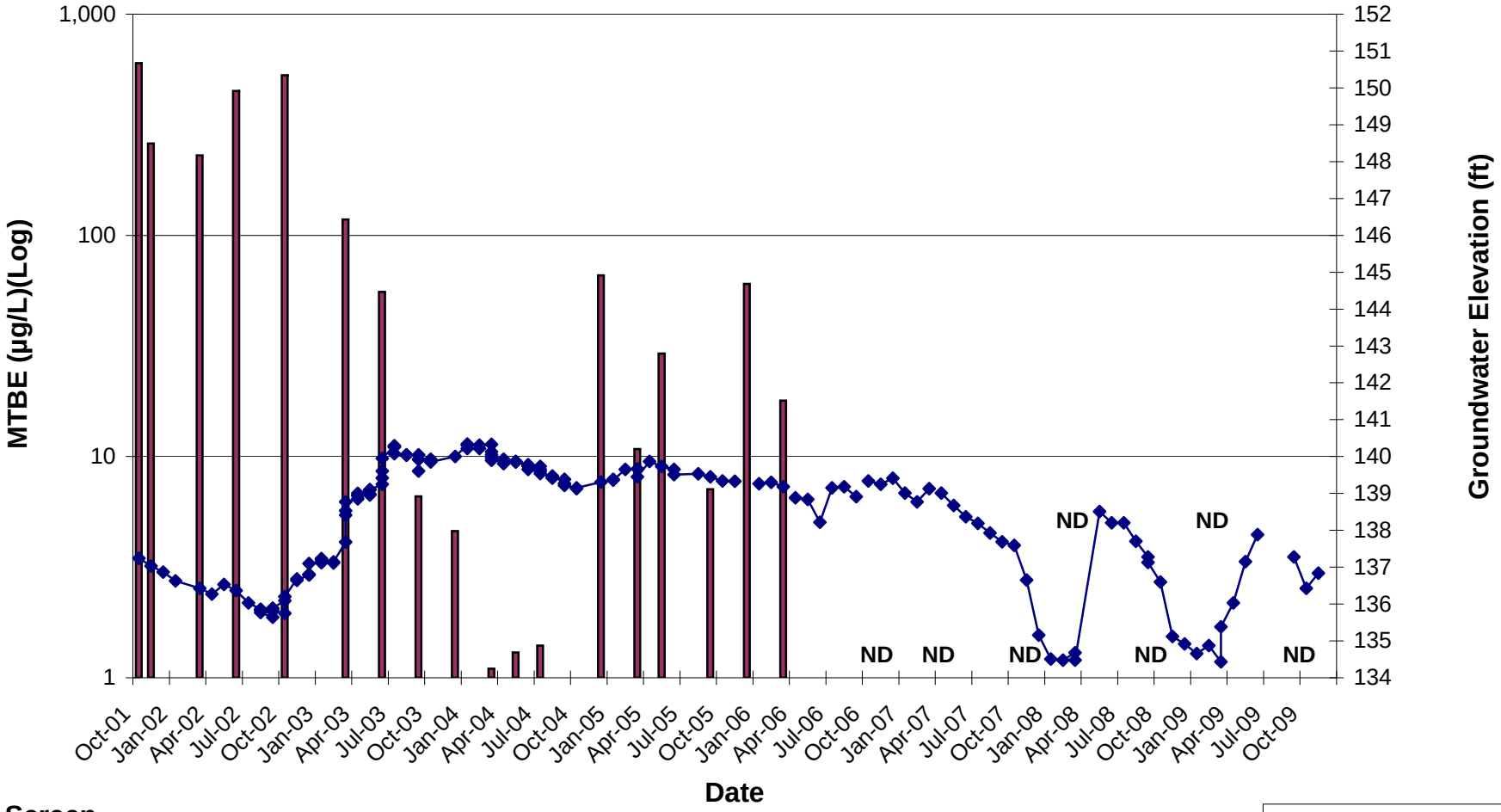
FIGURE 8: MW-18 BENZENE TREND ANALYSIS
SEMI-ANNUAL PROGRESS REPORT
JANUARY THROUGH JUNE 2009
FORMER CHEVRON FACILITY 122208
5801 RIGGS ROAD, CHILLUM, MARYLAND



Screen
29-44 ft bgs
Screen Top: 139.45 ft
Screen Bottom: 124.45 ft

ND : Not Detected above the reporting limit

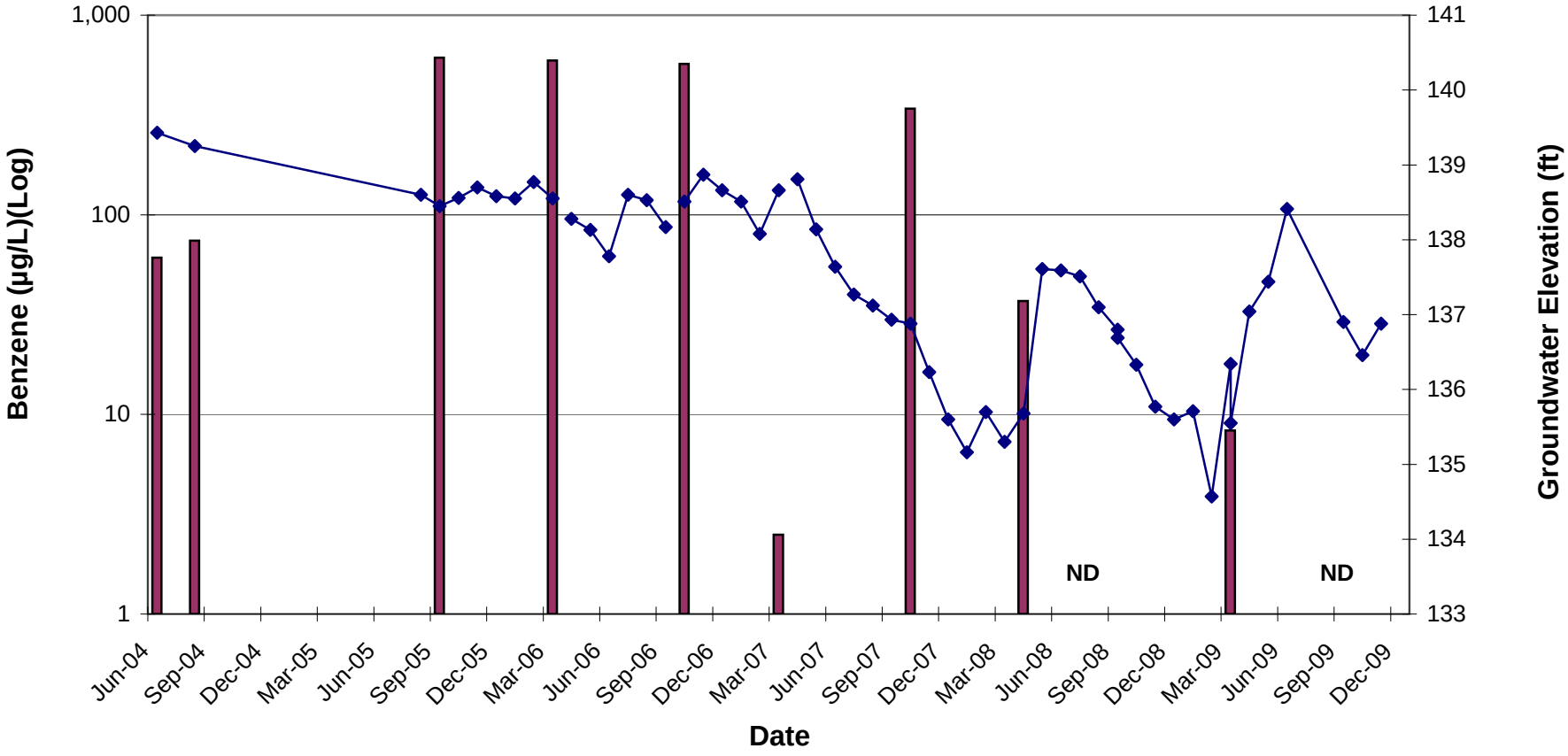
FIGURE 9: MW-18 MTBE TREND ANALYSIS
SEMI-ANNUAL PROGRESS REPORT
JANUARY THROUGH JUNE 2009
FORMER CHEVRON FACILITY 122208
5801 RIGGS ROAD, CHILLUM, MARYLAND



Screen
29-44 ft bgs
Screen Top: 139.45 ft
Screen Bottom: 124.45 ft

ND : Not Detected above the reporting limit

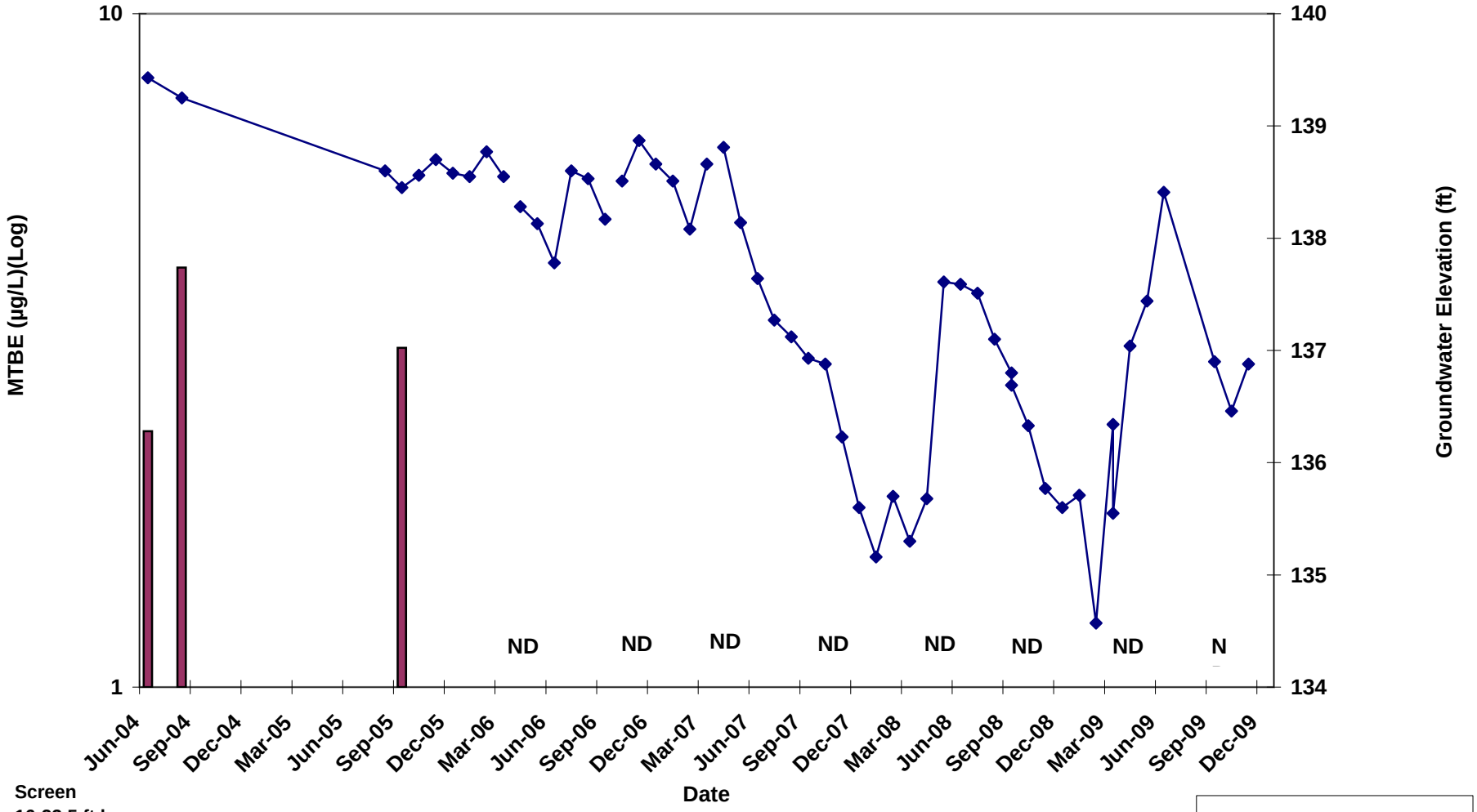
FIGURE 10: MW-24A BENZENE TREND ANALYSIS
SEMI-ANNUAL PROGRESS REPORT
JANUARY THROUGH JUNE 2009
FORMER CHEVRON FACILITY 122208
5801 RIGGS ROAD, CHILLUM, MARYLAND



Screen
16-23.5 ft bgs
Screen Top: 141.4 ft
Screen Bottom: 133.9 ft

ND : Not Detected above the reporting limit

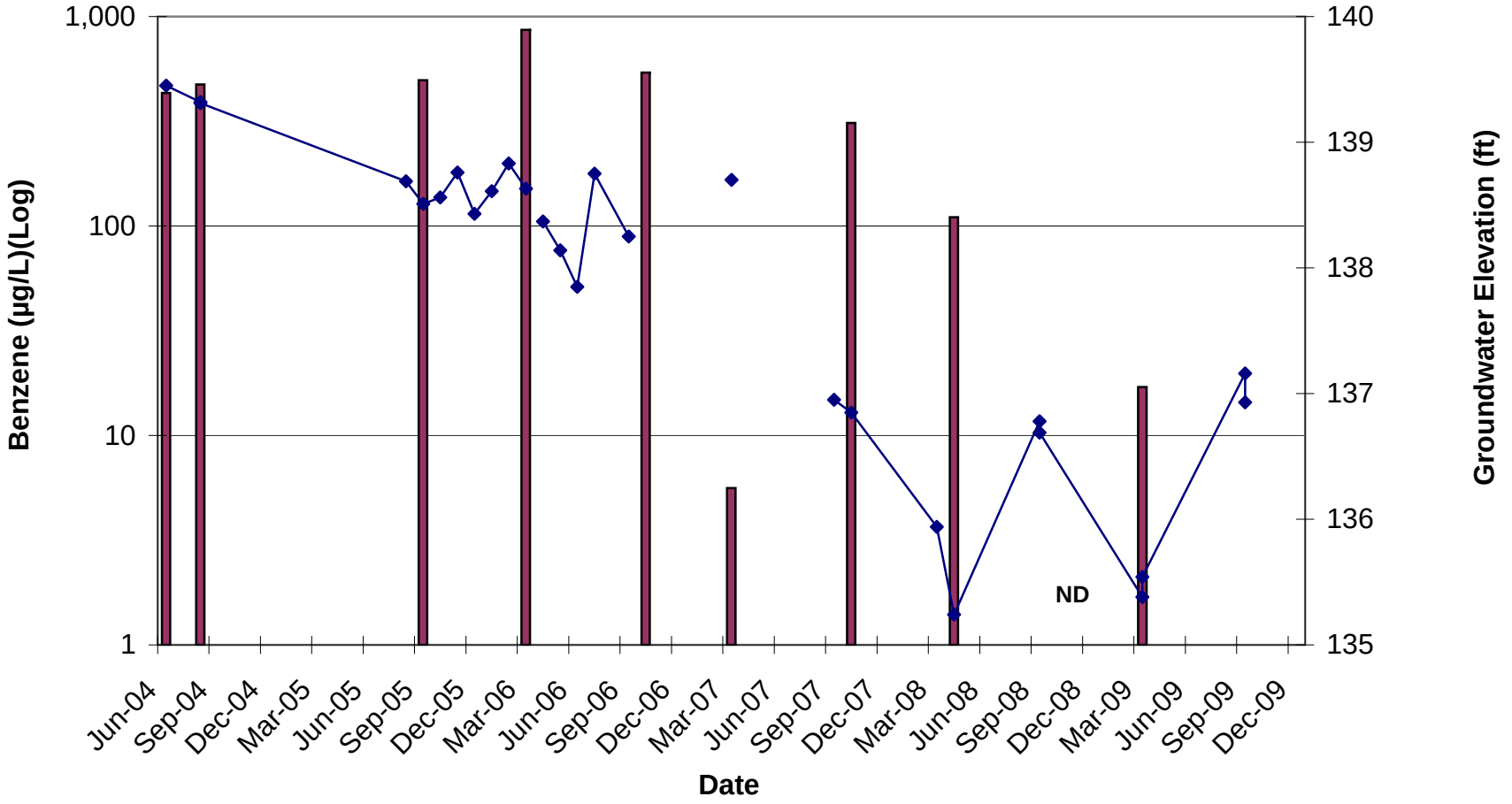
FIGURE 11: MW-24A MTBE TREND ANALYSIS
SEMI-ANNUAL PROGRESS REPORT
JANUARY THROUGH JUNE 2009
FORMER CHEVRON FACILITY 122208
5801 RIGGS ROAD, CHILLUM, MARYLAND



Screen
16-23.5 ft bgs
Screen Top: 141.4 ft
Screen Bottom: 133.9 ft

ND : Not Detected above the reporting limit

FIGURE 12: MW-24B BENZENE TREND ANALYSIS
SEMI-ANNUAL PROGRESS REPORT
JANUARY THROUGH JUNE 2009
FORMER CHEVRON FACILITY 122208
5801 RIGGS ROAD, CHILLUM, MARYLAND

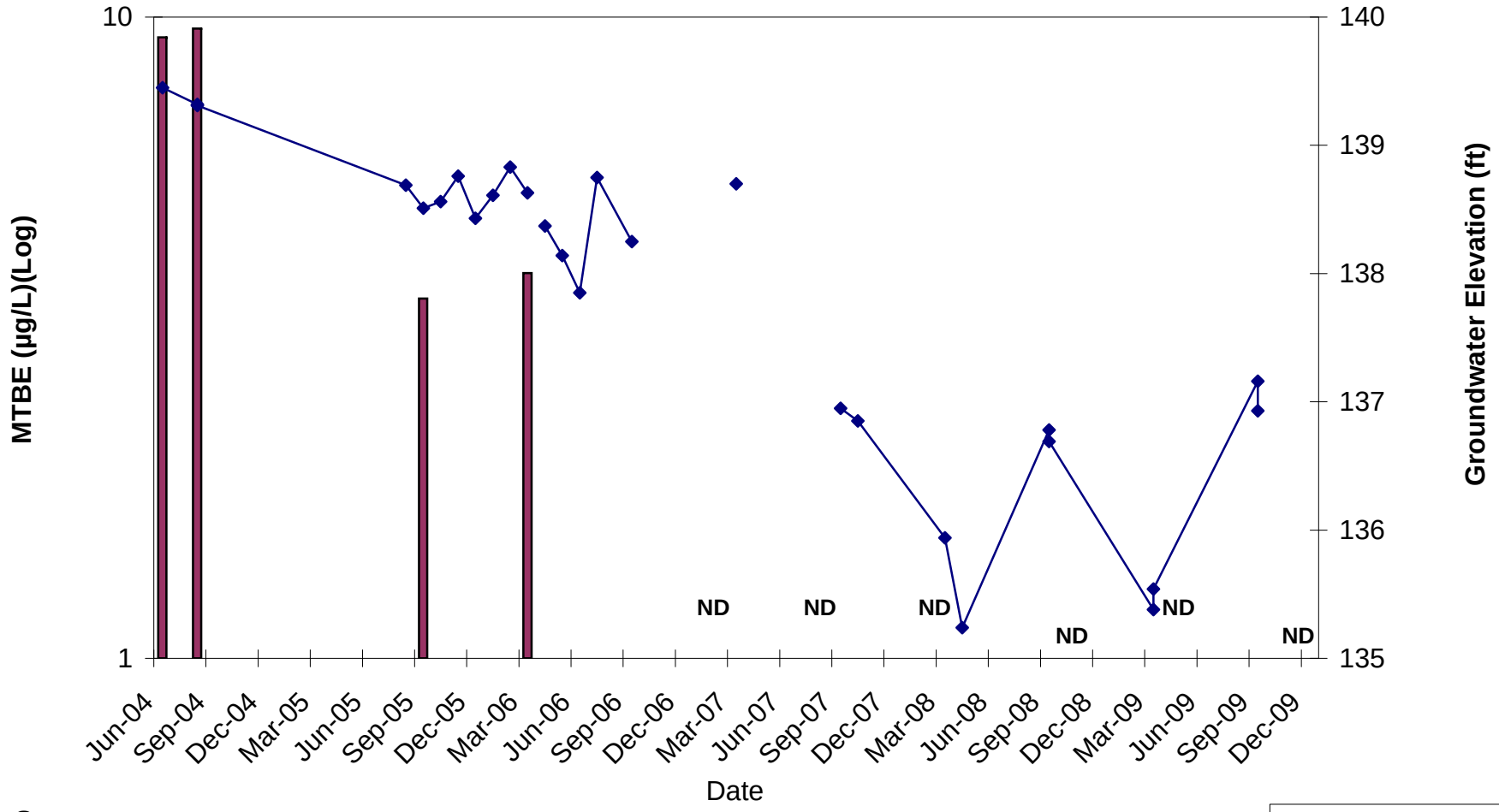


Screen
22.5-30 ft bgs
Screen Top: 134.95 ft
Screen Bottom: 127.45 ft

ND : Not Detected above the reporting limit

Benzene(µg/L)
Elevation (ft)

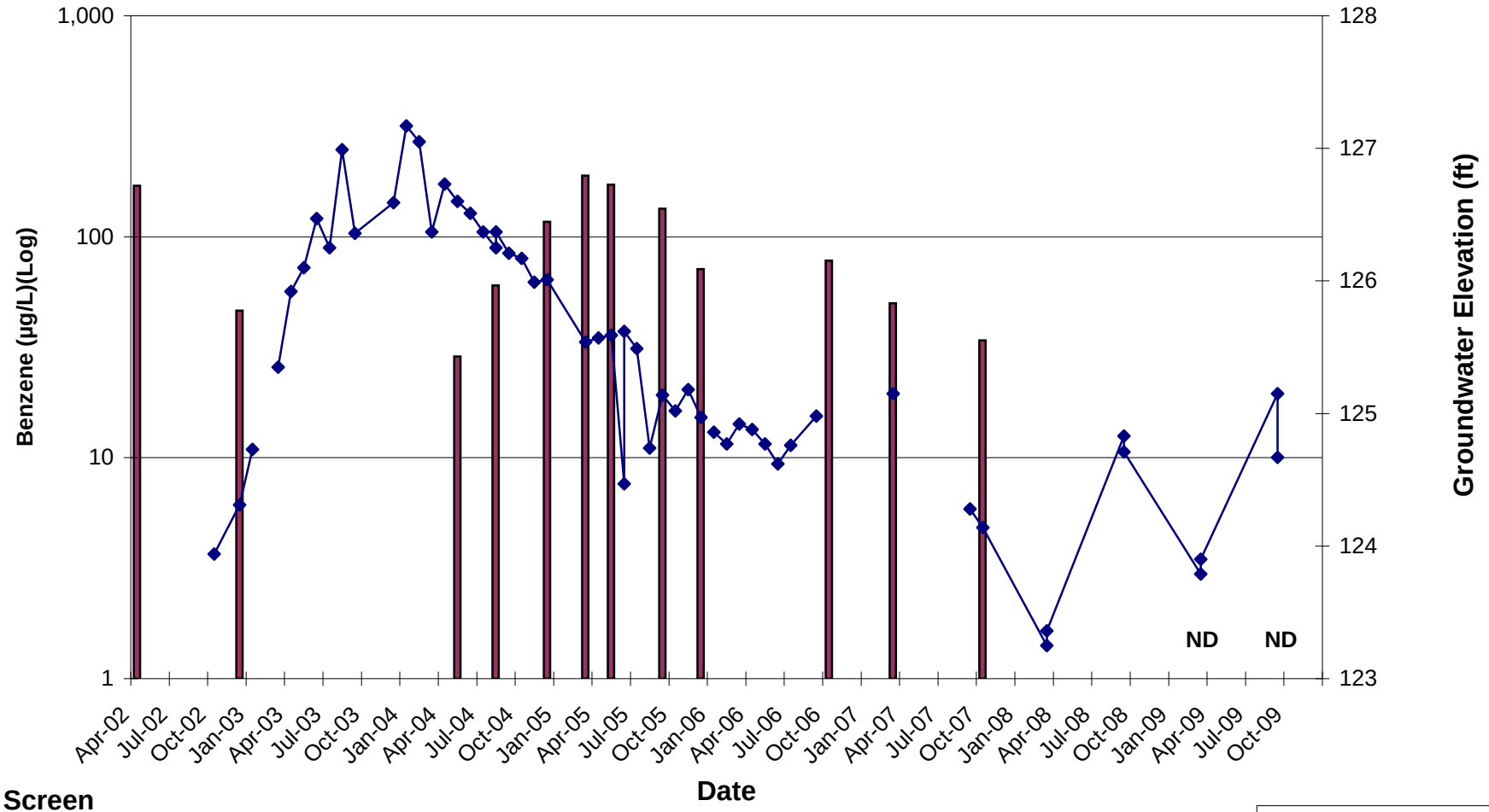
FIGURE 13: MW-24B MTBE TREND ANALYSIS
SEMI-ANNUAL PROGRESS REPORT
JANUARY THROUGH JUNE 2009
FORMER CHEVRON FACILITY 122208
5801 RIGGS ROAD, CHILLUM, MARYLAND



Screen
22.5-30 ft bgs
Screen Top: 134.95 ft
Screen Bottom: 127.45 ft

ND : Not Detected above the reporting limit

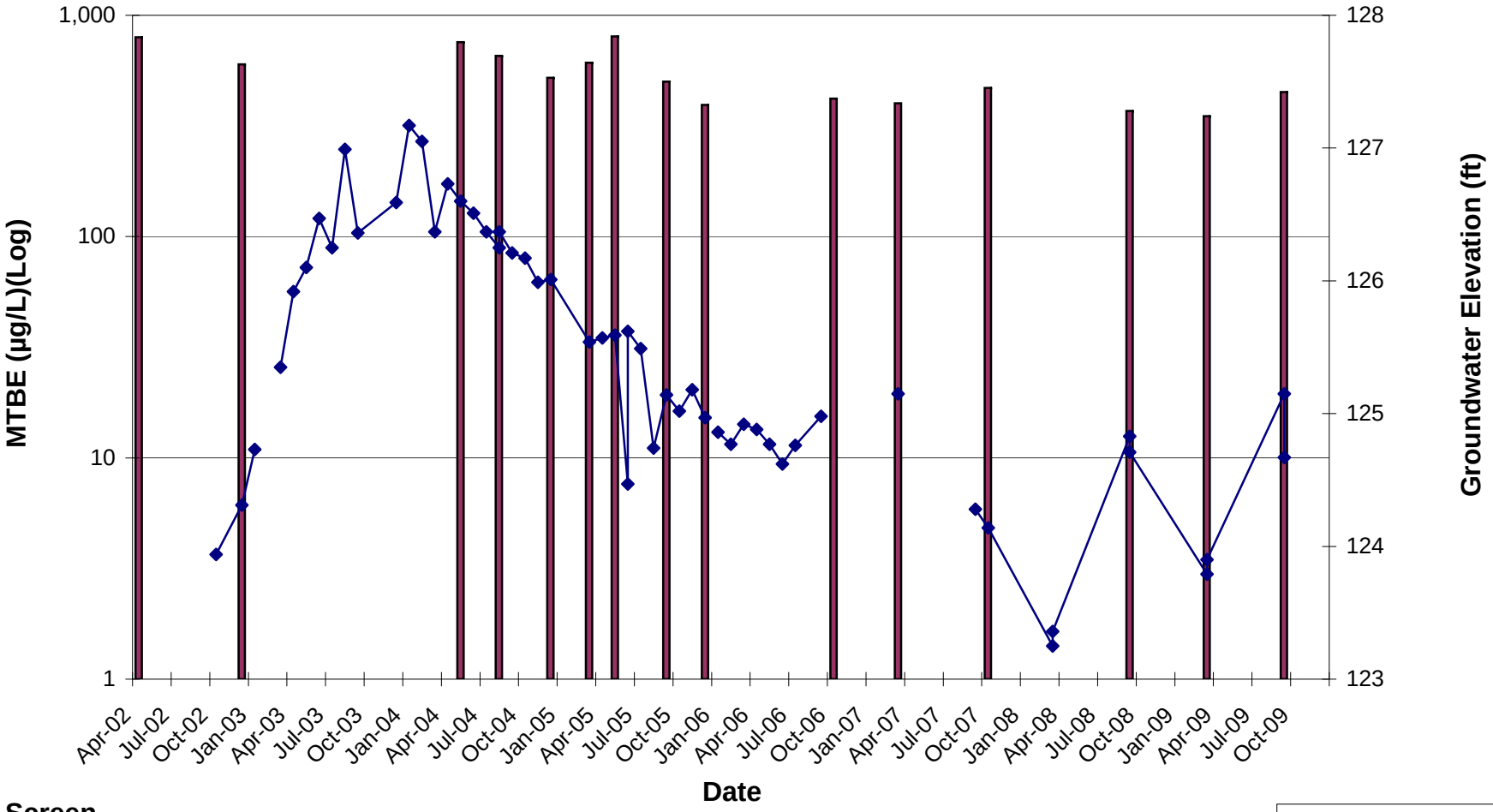
FIGURE 14: GP-2E (45-50) BENZENE TREND ANALYSIS
SEMI-ANNUAL PROGRESS REPORT
JANUARY THROUGH JUNE 2009
FORMER CHEVRON FACILITY 122208
5801 RIGGS ROAD, CHILLUM, MARYLAND



Screen
45-50 ft bgs
Screen Top: 123.17 ft
Screen Bottom: 118.17 ft

ND : Not Detected above the reporting limit

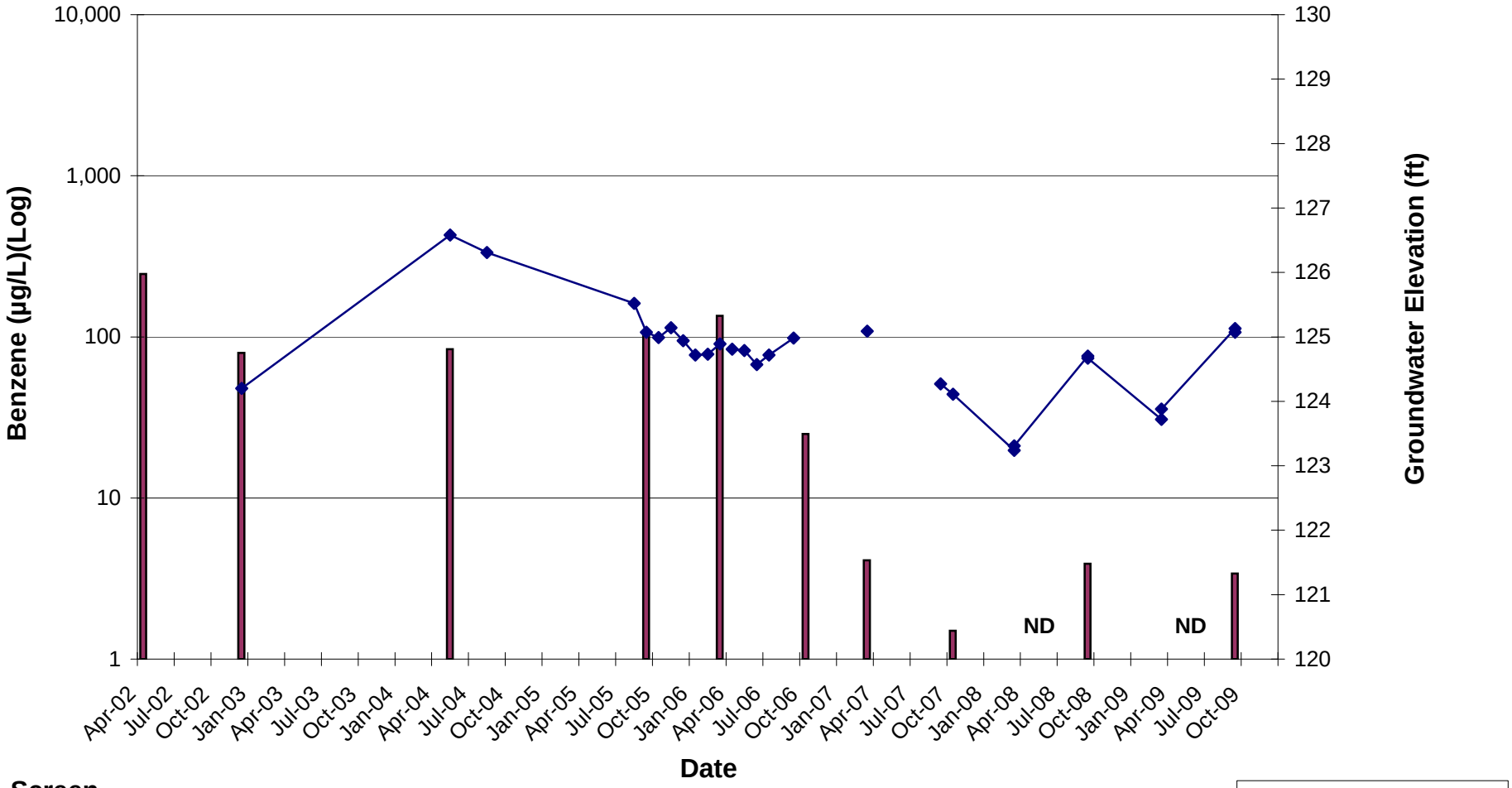
FIGURE 15: GP-2E (45-50) MTBE TREND ANALYSIS
SEMI-ANNUAL PROGRESS REPORT
JANUARY THROUGH JUNE 2009
FORMER CHEVRON FACILITY 122208
5801 RIGGS ROAD, CHILLUM, MARYLAND



Screen
45-50 ft bgs
Screen Top: 123.17 ft
Screen Bottom: 118.17 ft

ND : Not Detected above the reporting limit

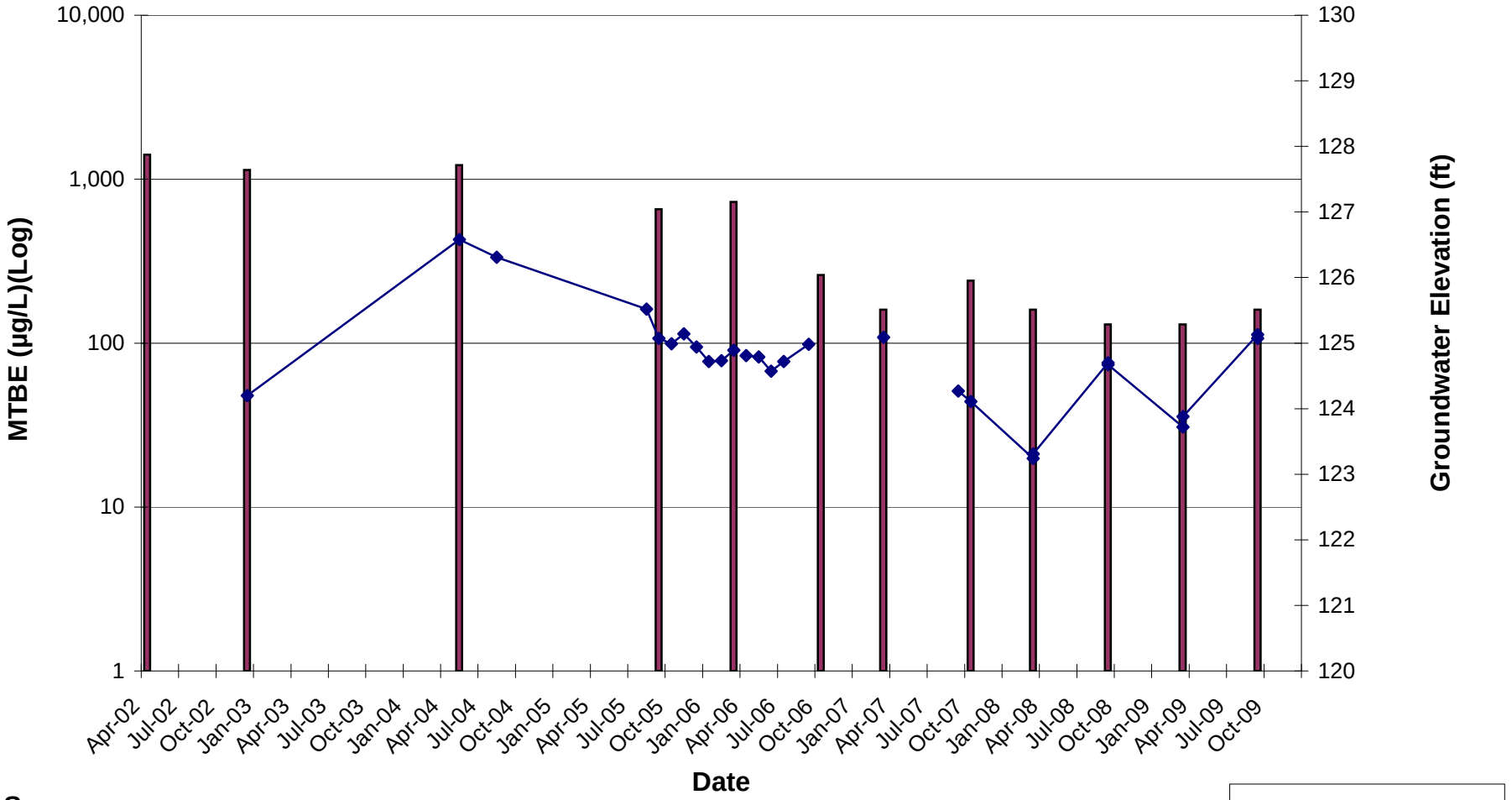
FIGURE 16: GP-2E (55-60) BENZNE TREND ANALYSIS
SEMI-ANNUAL PROGRESS REPORT
JANUARY THROUGH JUNE 2009
FORMER CHEVRON FACILITY 122208
5801 RIGGS ROAD, CHILLUM, MARYLAND



Screen
55-60 ft bgs
Screen Top: 113.53 ft
Screen Bottom: 108.53 ft

ND : Not Detected above the reporting limit

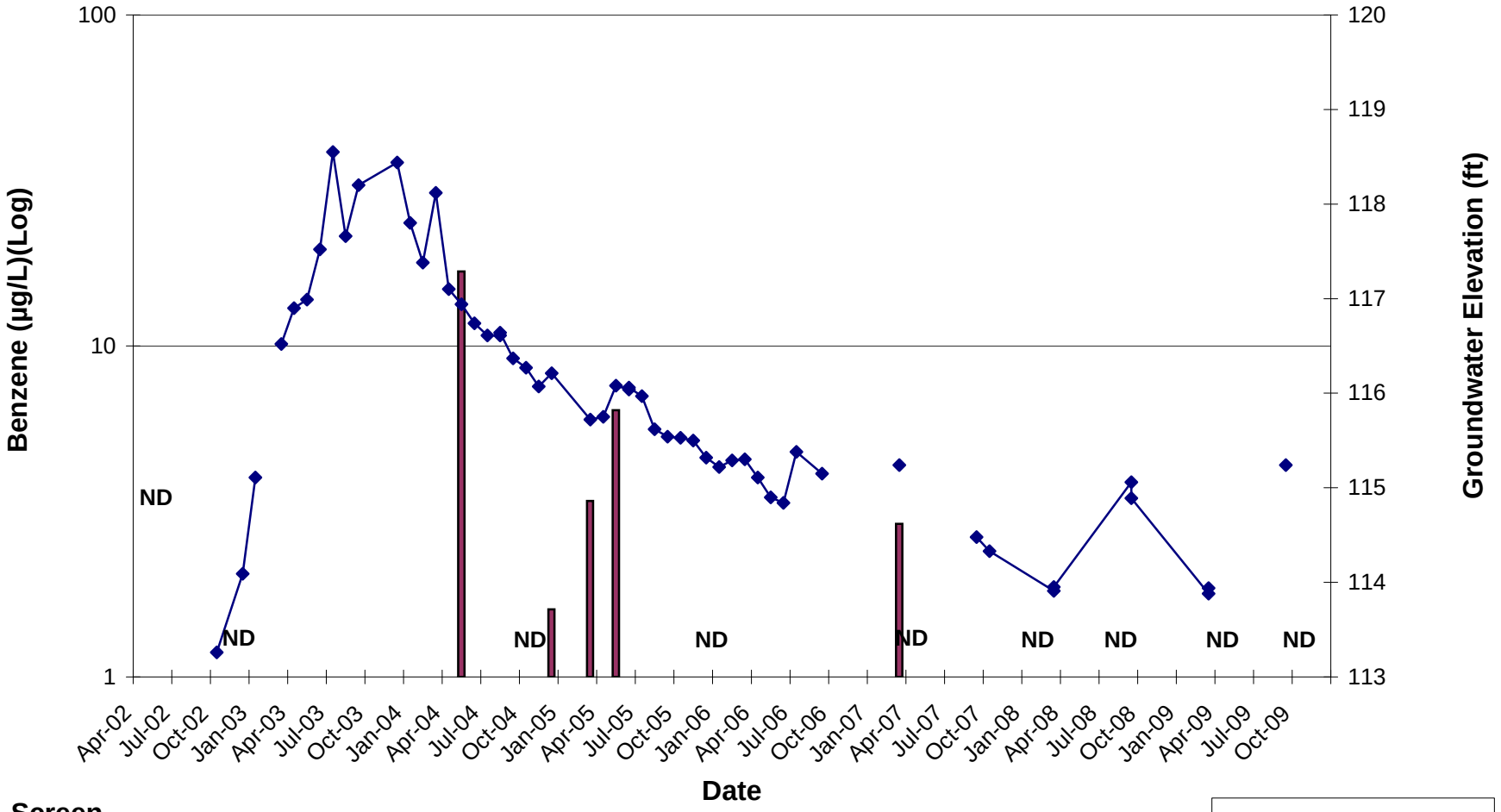
FIGURE 17: GP-2E (55-60) MTBE TREND ANALYSIS
SEMI-ANNUAL PROGRESS REPORT
JANUARY THROUGH JUNE 2009
FORMER CHEVRON FACILITY 122208
5801 RIGGS ROAD, CHILLUM, MARYLAND



Screen
55-60 ft bgs
Screen Top: 113.53 ft
Screen Bottom: 108.53 ft

ND : Not Detected above the reporting limit

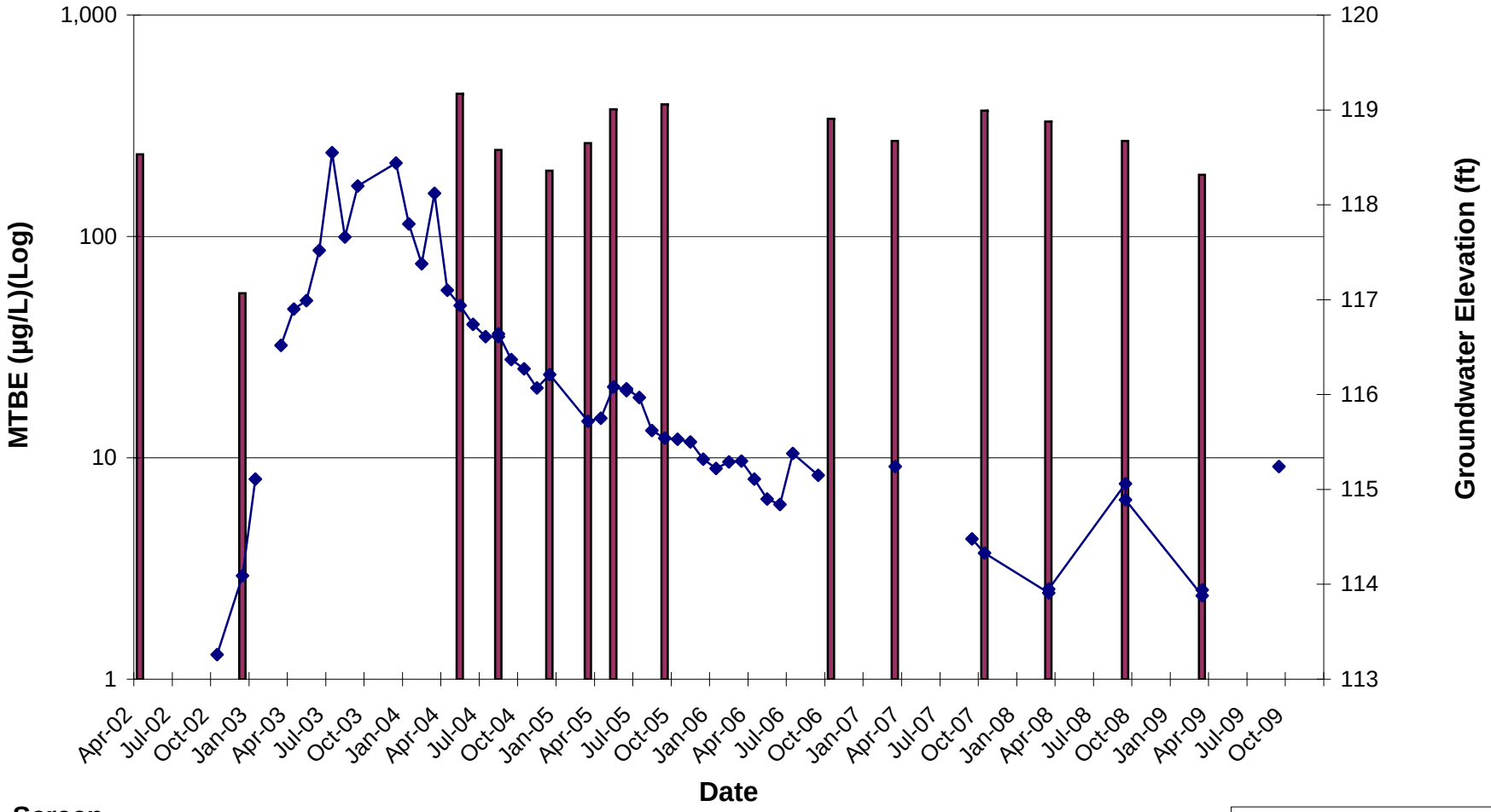
FIGURE 18: GP-2F (45-50) BENZENE TREND ANALYSIS
SEMI-ANNUAL PROGRESS REPORT
JANUARY THROUGH JUNE 2009
FORMER CHEVRON FACILITY 122208
5801 RIGGS ROAD, CHILLUM, MARYLAND



Screen
45-50 ft bgs
Screen Top: 114.59 ft
Screen Bottom: 109.59 ft

ND : Not Detected above the reporting limit

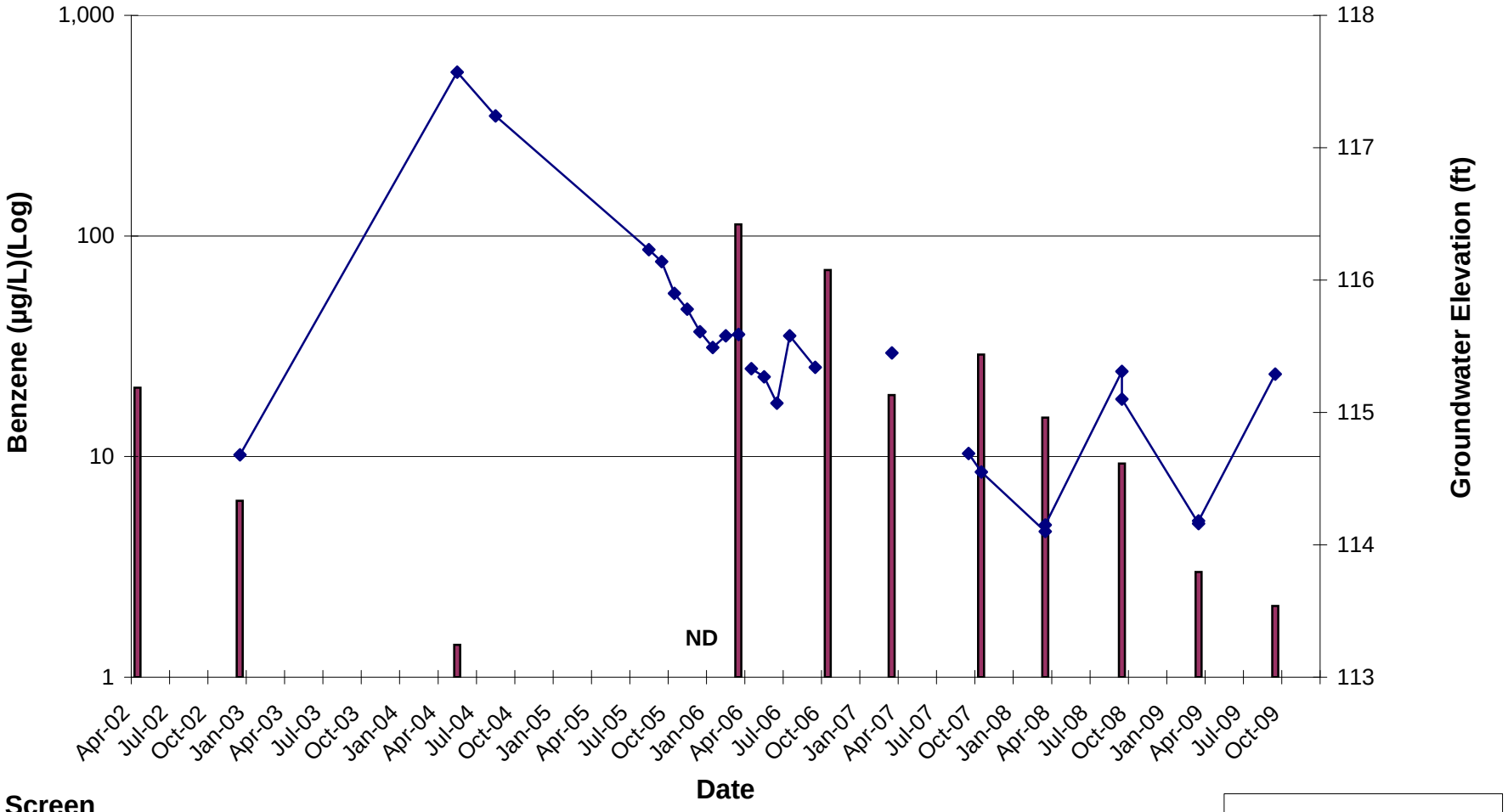
FIGURE 19: GP-2F (45-50) MTBE TREND ANALYSIS
SEMI-ANNUAL PROGRESS REPORT
JANUARY THROUGH JUNE 2009
FORMER CHEVRON FACILITY 122208
5801 RIGGS ROAD, CHILLUM, MARYLAND



Screen
45-50 ft bgs
Screen Top: 114.59 ft
Screen Bottom: 109.59 ft

ND : Not Detected above the reporting limit

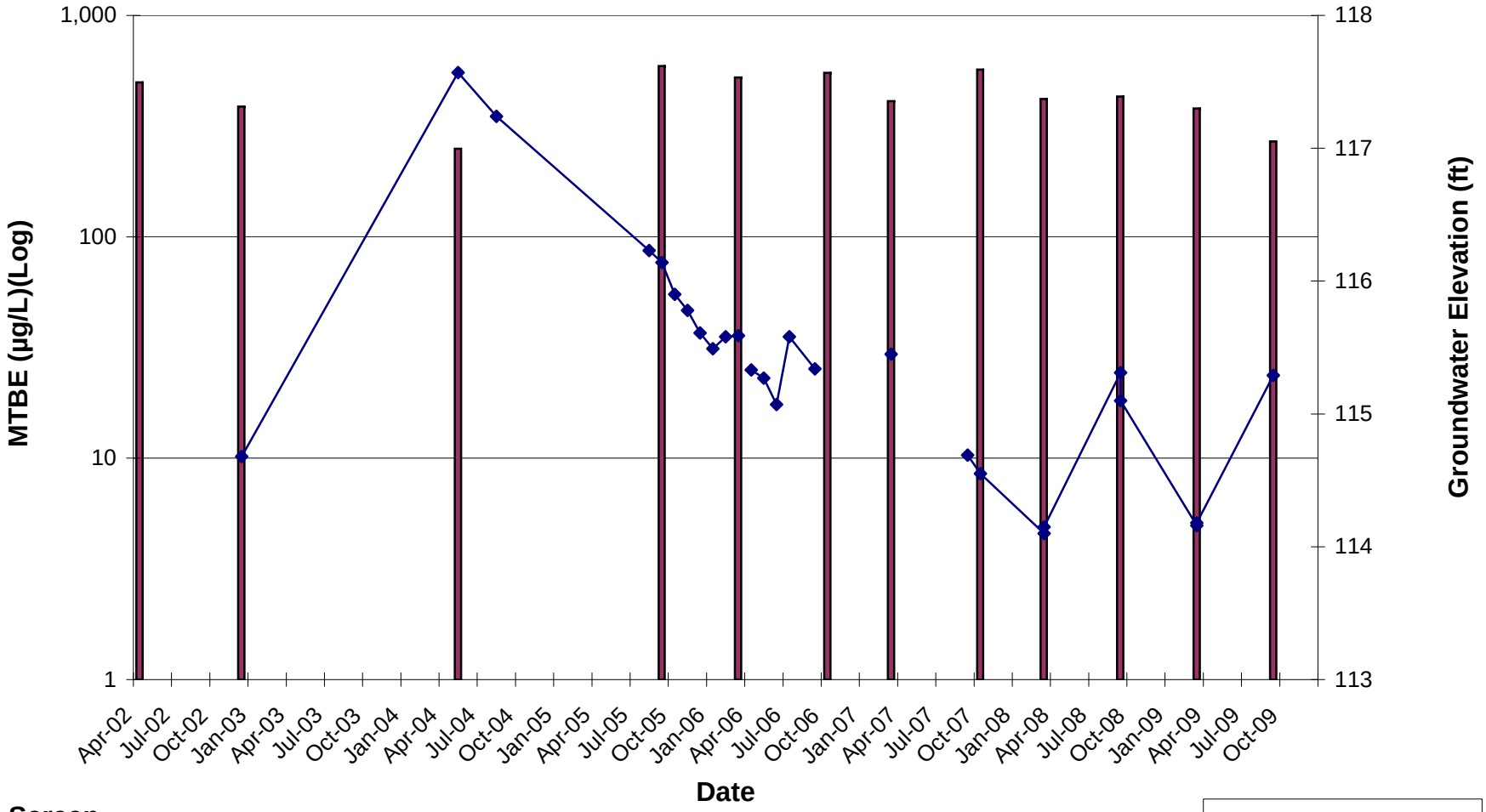
FIGURE 20: GP-2F (50-55) BENZENE TREND ANALYSIS
SEMI-ANNUAL PROGRESS REPORT
JANUARY THROUGH JUNE 2009
FORMER CHEVRON FACILITY 122208
5801 RIGGS ROAD, CHILLUM, MARYLAND



Screen
50-55 ft bgs
Screen Top: 109.59 ft
Screen Bottom: 104.59 ft

ND : Not Detected above the reporting limit

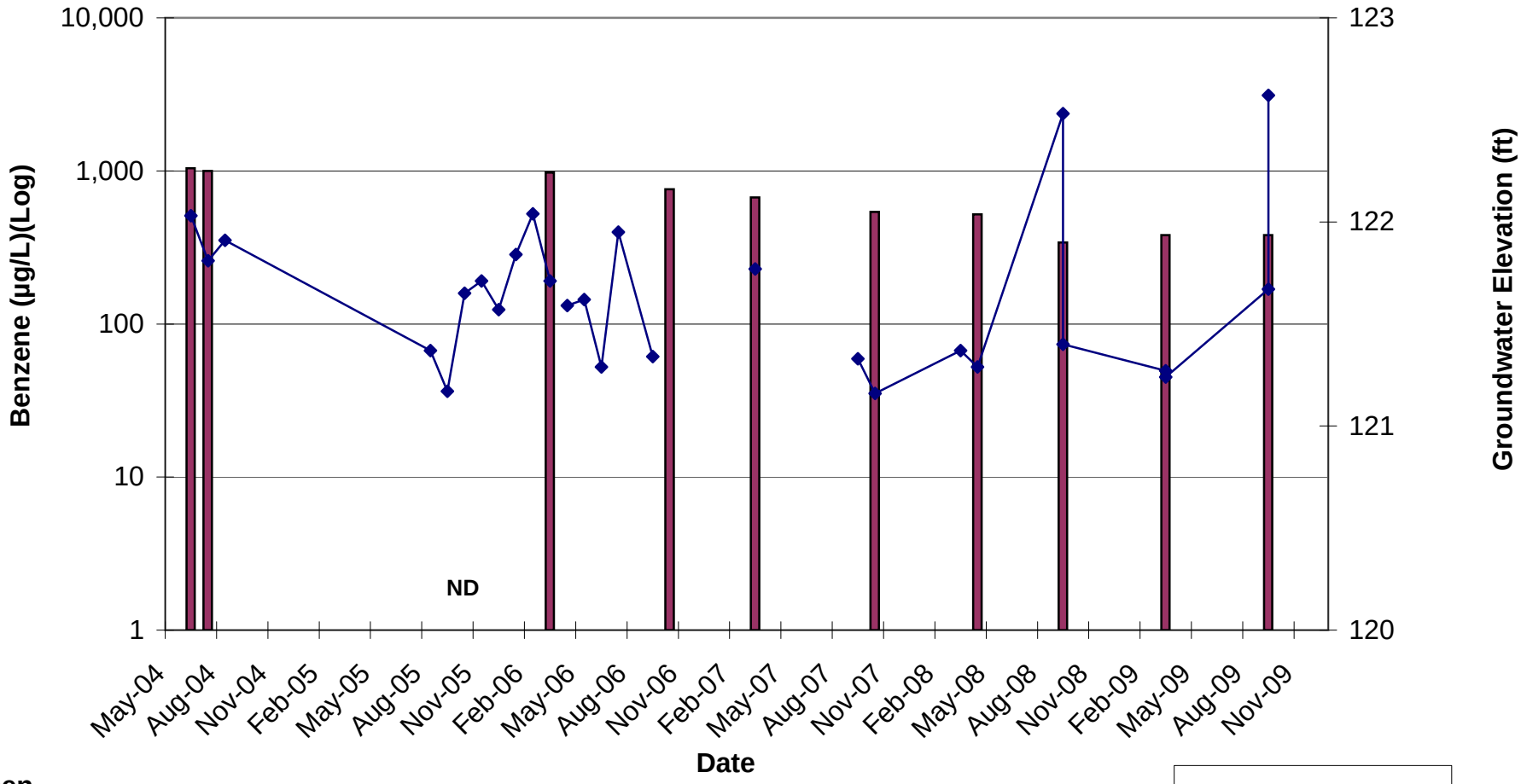
FIGURE 21: GP-2F (50-55) MTBE TREND ANALYSIS
SEMI-ANNUAL PROGRESS REPORT
JANUARY THROUGH JUNE 2009
FORMER CHEVRON FACILITY 122208
5801 RIGGS ROAD, CHILLUM, MARYLAND



Screen
50-55 ft bgs
Screen Top: 109.59 ft
Screen Bottom: 104.59 ft

ND : Not Detected above the reporting limit

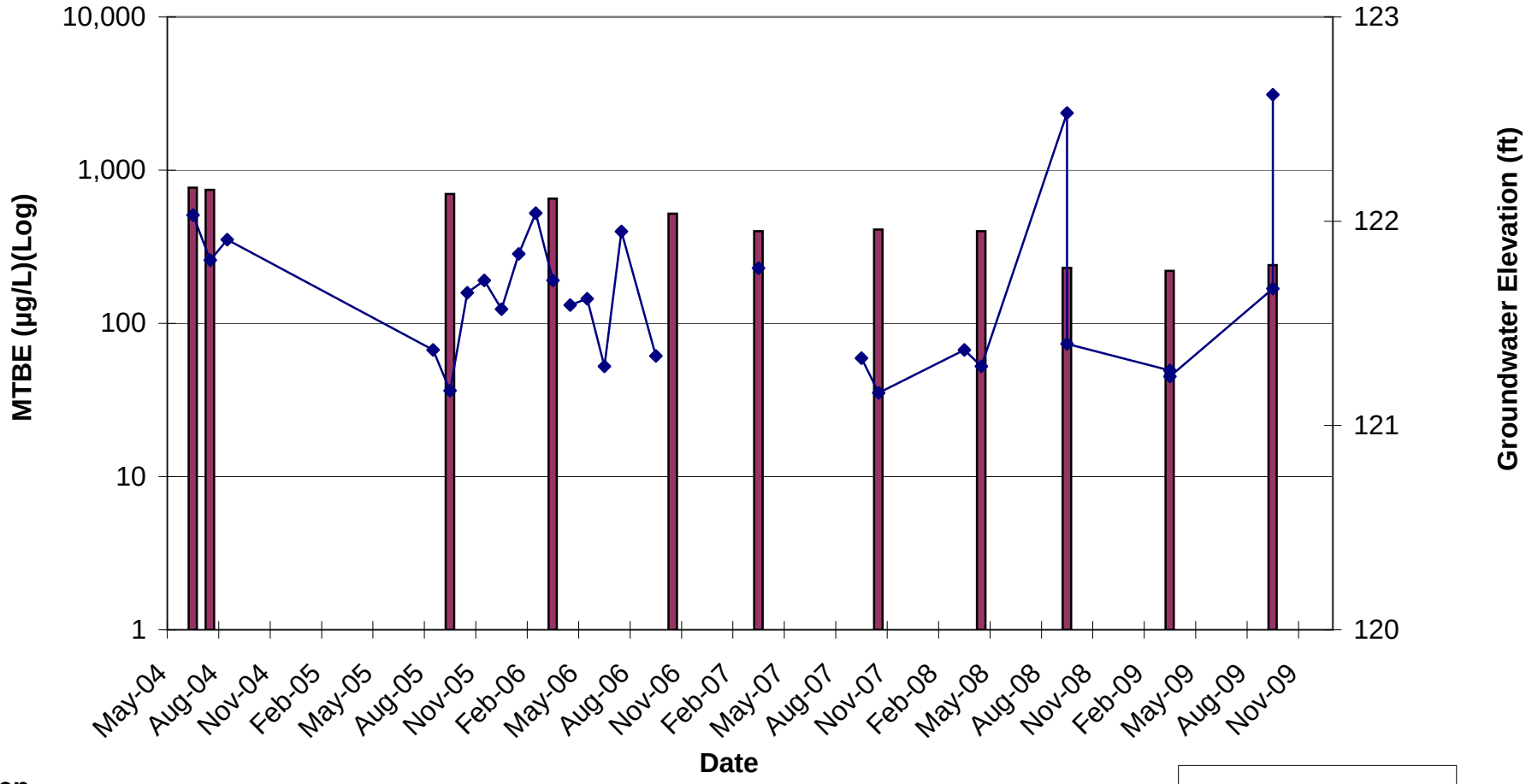
FIGURE 22: MW-33B BENZENE TREND ANALYSIS
SEMI-ANNUAL PROGRESS REPORT
JANUARY THROUGH JUNE 2009
FORMER CHEVRON FACILITY 122208
5801 RIGGS ROAD, CHILLUM, MARYLAND



Screen
13-23 ft bgs
Screen Top: 113.16 ft
Screen Bottom: 103.13 ft

ND : Not Detected above the reporting limit

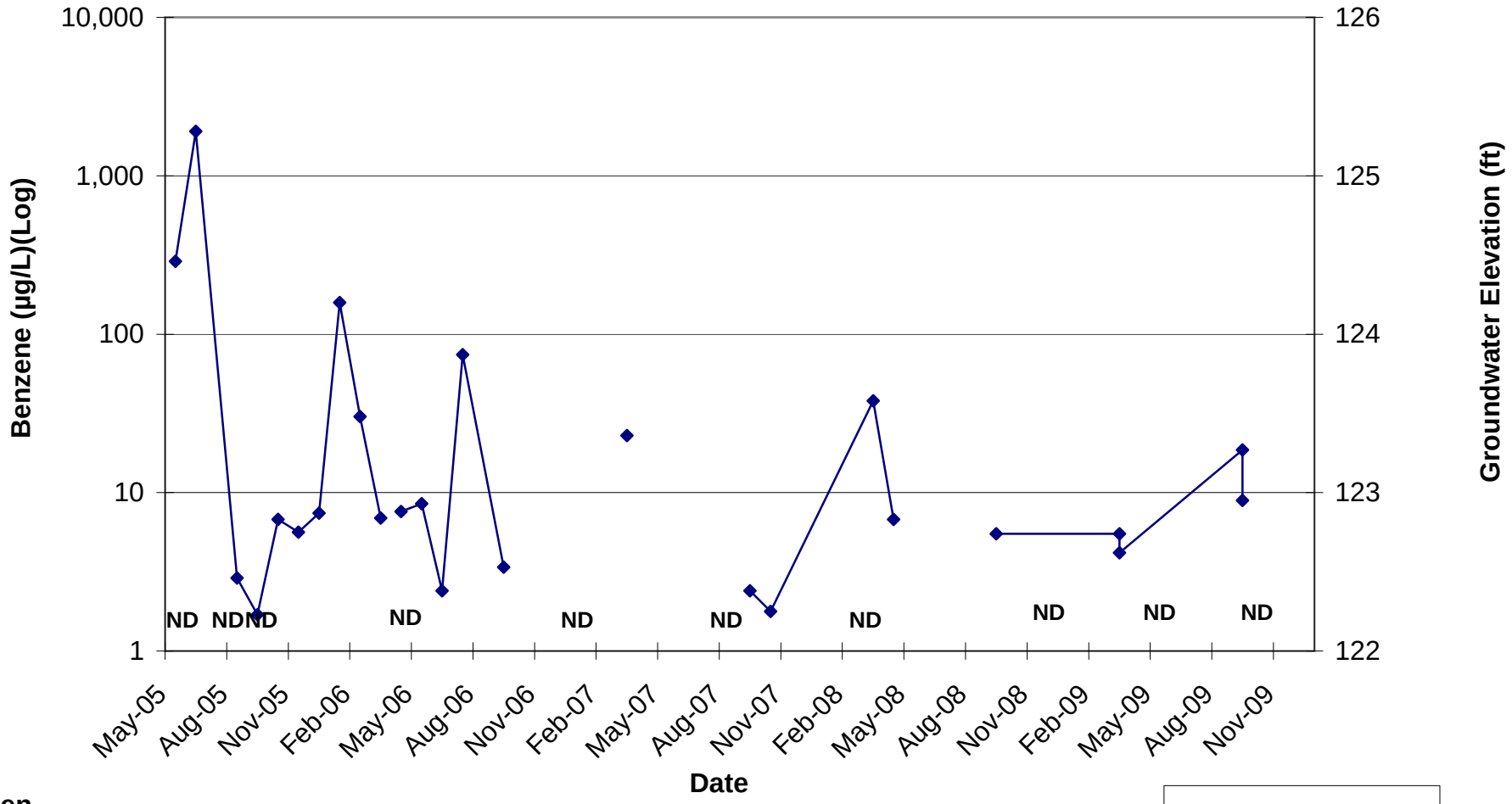
FIGURE 23: MW-33B MTBE TREND ANALYSIS
SEMI-ANNUAL PROGRESS REPORT
JANUARY THROUGH JUNE 2009
FORMER CHEVRON FACILITY 122208
5801 RIGGS ROAD, CHILLUM, MARYLAND



Screen
13-23 ft bgs
Screen Top: 113.16 ft
Screen Bottom: 103.13 ft

ND : Not Detected above the reporting limit

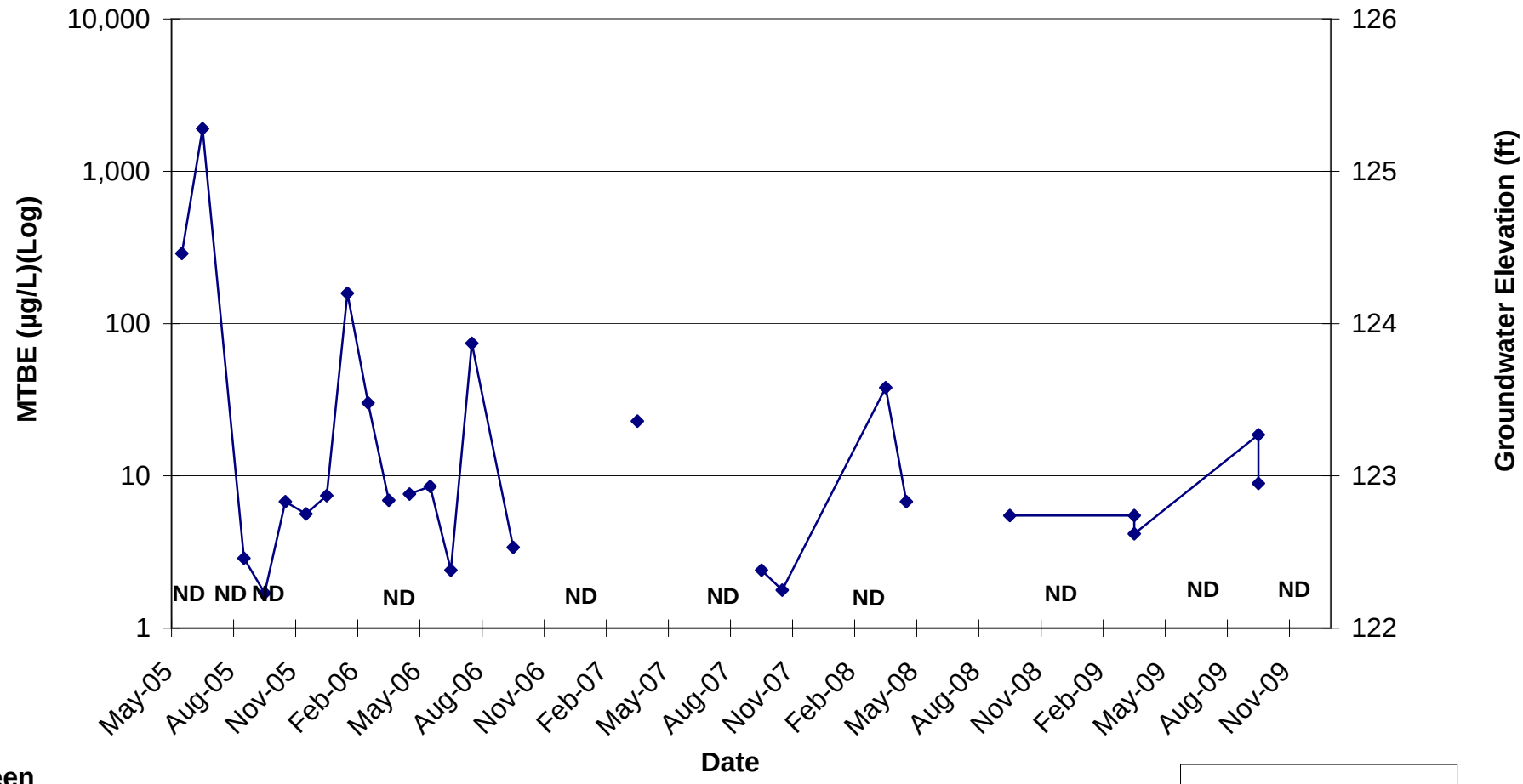
FIGURE 24: MW-33S BENZENE TREND ANALYSIS
SEMI-ANNUAL PROGRESS REPORT
JANUARY THROUGH JUNE 2009
FORMER CHEVRON FACILITY 122208
5801 RIGGS ROAD, CHILLUM, MARYLAND



Screen
2-7 ft bgs
Screen Top: 124.58 ft
Screen Bottom: 117.58 ft

ND : Not Detected above the reporting limit

FIGURE 25: MW-33S MTBE TREND ANALYSIS
SEMI-ANNUAL PROGRESS REPORT
JANUARY THROUGH JUNE 2009
FORMER CHEVRON FACILITY 122208
5801 RIGGS ROAD, CHILLUM, MARYLAND



Screen
2-7 ft bgs
Screen Top: 124.58 ft
Screen Bottom: 117.58 ft

ND : Not Detected above the reporting limit

APPENDIX A

DUAL-PHASE EXTRACTION SYSTEM – TOTAL FLUIDS EXTRACTION DATA

APPENDIX A

DUAL-PHASE EXTRACTION SYSTEM – TOTAL FLUIDS EXTRACTION DATA

DESCRIPTION OF DATA TABLES

Chevron uses a central database to store remediation system data and laboratory analytical data. The tabulated data in Tables A-1, A-2, and A-3 is an exported summary of the total fluids extraction system data from the database. These data were recorded by the field technician during site visits. The analytical data for influent samples collected for laboratory analysis (Table A-2) are used to calculate the mass (and to estimate the volume) of hydrocarbons recovered in the dissolved phase. Effluent sample data are included in Table A-3 for comparison with permit limits.

The data table includes all system data collected since January 1, 2009. Data collected prior to this date are available in previous progress reports.

The following table lists the column headings in the table with a brief description of each. Please refer to the Process and Instrumentation Diagram (next page) for a schematic of equipment and sample ports.

Column Heading	Description
Date / Time	Date and time data were recorded.
System Status	System ON or OFF when technician recorded the data.
Influent BTEX (µg/L)	Sum of benzene, toluene, ethylbenzene, and total xylenes from influent sample port SP-1.
Effluent BTEX (µg/L)	Sum of benzene, toluene, ethylbenzene, and total xylenes from effluent sample port SP-3.
Treatment Efficiency (%)	Equation: (Influent-Effluent) / (Influent).
Totalizer Reading (gallons)	Reading on the totalizing flow meter.
Pumped Period (gallons)	Equation: (current totalizer reading) – (previous totalizer reading).
Pumped Total (gallons)	Cumulative total gallons of groundwater recovered.
Period Average (GPM)	Equation: (Gallons Pumped During Period) / (current Date-Time – previous Date-Time)
Hydrocarbons Recovered Period (gallons)[1]	Equation: [Avg. Influent BTEX (ug/L)] * e^6 * (1/0.2) * (3.785 L/gal) * (1 lb/453.6 g) * (gallons pumped) * (1 gal/6.26 lbs). NOTE: Formula assumes BTEX equals 20% of gasoline.
Hydrocarbons Recovered Cumulative (gallons)	Equation: (Hydrocarbons Recovered During Period) + (Previous Cumulative)
Operating Extraction Points	Wells in operation during the reporting period.

Notes

(1) Assumptions: BTEX is 20% of hydrocarbon product by volume; density of hydrocarbon product is 6.26 pounds/gallon. The Average (Avg.) Influent BTEX concentration is defined as the mean of the influent concentration for the current and previous sampling events.

SERVER LOCATION K:\411\Instr\Jobs\44738_Chevron

GRS CONTROL PANEL
EOS CONTROLER

CAT OXIDIZER RUNNING (1)
CAT OXIDIZER INLET TEMP T-1 (2)
CAT OXIDIZER OUTLET TEMP T-2 (3)
SVE AIR FLOW
KO TANK VACUUM
RUN/STOP KO PUMP P-1 (HS, XA) (4)
KO TANK LEVEL HI/HI
KO TANK LEVEL HI
KO TANK LEVEL LO
OIL/WATER SEPERATOR LEVEL HI/HI (5)
OIL/WATER SEPERATOR LEVEL HI (6)
OIL/WATER SEPERATOR LEVEL LO (7)
RUN/STOP OIL/WATER SEPERATOR PUMP P-2 (HS, XA) (8)
SVE BLOWER RPM (9)
SVE BLOWER SPEED SET POINT (10)
RUN/STOP SVE BLOWER B-1 (HS, XA) (11)
RUN/STOP AST BLOWER B-2 (HS, XA) (12)
AST BLOWER DISCHARGE FLOW SWITCH (13)
AST LEVEL HI/HI (14)
AST LEVEL HI (15)
AST LEVEL LO (16)
RUN/STOP AST PUMP P-3 (HS, XA) (17)
NOT USED (18)
3-WAY COMPRESSED AIR SOLENOID VALVE (XA) (19)
RUN/STOP COMPRESSER C-1 (HS, XA) (20)
AST EFFLUENT FLOW PULSE (21)

RTU-02
CONTROL PANEL

NON-CLASSIFIED ATMOSPHERE
CLASSIFIED ATMOSPHERE (CLASS 1, DIV 2)

DETAIL A: 2" PVC, TUBING

2" PVC 40 (TYP)
SVE PIPE FROM WELL: SPARE, PTW-A, MW-7, MP-7, RW-3, SPARE, RW-1, SPARE, RW-2, MW-17, PTW-B
FROM ATMOSPHERE
DILUTION VALVE (PI)
TO ATMOSPHERE
XA 006, TIT 006A, TIT 006B, M, PSL, TI
CATALITIC OXIDIZER- FALCO 300 FALMOUTH PRODUCTS
FLAME ARRESTER
ST-200, ST-100
3" CS 40

3/4" HOSE (TYP) TO WELL RW-1, RW-2, RW-3, MW-7, MW-17, PTW-B, PTW-A
1" PVC BALL VALVE (TYP)
TUBING (TYP)
3/4" HOSE (TYP)
SPARE (x5)

WELL PUMPS: QED MOD# AP4T

FT 003, FE 003, TI, PI 003, ST
PIT 003
SILENCER
3" PVC 40
KO TANK
LSHH 003, LSH 003, LSL 003
2" GLOBE VALVE
V1
VFD
STARTER
SVE B-1 BLOWER TUTHILL MOD# 4009-46L3 25 HP
1" HOSE
P-1 KO PUMP MOYNO MOD #33201 2 HP
3/4" CS
DRAIN
3" CS 40
1" PVC 80
2" PVC 80
LSHH 001, LSH 001, LSL 001
OIL/WATER SEPARATOR HYDRO QUIP MOD #AGM-2SS-60V 30 GPM
2" CS 40
P-2 OIL/WATER SEPARATOR PUMP AMT MOD #3694-97 1.5 HP
B-2 AST BLOWER NEW YORK BLOWER CO 5 HP
FSL 002
4" PVC 40
AS-1 AIR STRIPPER QED MOD #E-Z STACKER 4.4 P
2" PVC 40
P-3 AST PUMP GRUNDFOS CRB 5 HP (42 gpm @ 230 FT. TDH)
1 1/2" PVC 80
2" PVC 80
F-1B BAG FILTER
F-1A BAG FILTER
DRAIN (TYP.)
ROSEDALE PRODUCTS MODEL #L0618112P125CBPB (125 PSI)
PSH 004, FE 004, FQI 004
LSH
TRAILER FLOOR SUMP

4" PVC 40
VAPOR OFF GAS
VAPOR PHASE GAC FILTERS: TIGG MOD# N-500 400-800 CFM
ACTIVATED CARBON GAC-5
ACTIVATED CARBON GAC-4
ACTIVATED CARBON GAC-3 (SPARE)
ST-50, ST-51a, ST-51b
TO ATMOSPHERE
4" PVC 40

LIQUID PHASE GAC FILTERS: SIEMENS MOD# LP-61P 150 PSIG MAX
GAC FILTER
1" PVC, 1" HOSE, 1" GS
2" PVC 80
ST-2, ST-3
INSIDE CARBON SHED
SHED FLOOR SUMP
TO STORM DRAIN IN RIGGS ROAD

PSH 005, PSL 005, I
80 GAL RECEIVING TANK MAX 200 PSI
3/4" CS 40 AIR LINE
C-1 AIR COMPRESSOR SPEEDAIRE MOD #1WD67 10 HP 34.8 CFM @ 175 PSI
TSH
CONTROL ROOM

FILE NAME: D:\44738_CHEVRON\44738_J&C_I02.DWG
CURR DATE: 02/18/05 CURR TIME: 3:04:50 pm

No.	DESCRIPTION	DATE	BY
1	RE-DRAWN PER AS-BUILT CONDITIONS	12/20	RTC

REVISIONS

DESIGNED	CADD	SCALE
F.S.K.	J.A.W.	AS NOTED
CHECKED	APPROVED	APPROVED
F.S.K.	F.S.K.	K.G.

Gannett Fleming
BALTIMORE, MARYLAND

CHEVRON PRODUCTS COMPANY
ATLANTA, GEORGIA

FORMER CHEVRON FACILITY NO. 122208
CHILLUM, MARYLAND

INSTRUMENTATION
PROCESS AND INSTRUMENTATION DIAGRAM

JOB No. 44738
DATE 12/20/07
SHEET No. 10
10 of 15

Gannett Fleming

TABLE A-1: TOTAL FLUIDS EXTRACTION SYSTEM DATA
SEMI-ANNUAL PROGRESS REPORT: JULY THROUGH DECEMBER 2009
FORMER CHEVRON FACILITY 122208, 5801 RIGGS ROAD, CHILLUM, MD
PERIOD: JANUARY 2009 - DECEMBER 2009

Chevron

Date/Time	System Status	Influent BTEX (µg/L)	Effluent BTEX (µg/L)	Treatment Efficiency (%)	Totalizer Reading (gallons)	Period Pumped (gallons)	Total Pumped (gallons)	Period Average (GPM)	Hydrocarbons Recovered Period (gallons)	Hydrocarbons Recovered Cumul. (gallons)	Operating Extraction Points
1/5/09 11:25	ON	511	0	100.0	30,000,500	87,300	40,533,222	12.38	3.62	727.48	RW1 RW2 RW3 MW7 MW17 PTWA PTWB
1/12/09 14:15	ON	NS	0	-	30,221,700	221,200	40,754,422	21.58	-	727.48	RW1 RW2 RW3 MW7 MW17 PTWA PTWB
1/19/09 10:15	ON	NS	0	-	30,435,700	214,000	40,968,422	21.75	-	727.48	RW1 RW2 RW3 MW7 MW17 PTWA PTWB
1/26/09 12:05	ON	NS	0	-	30,656,700	221,000	41,189,422	21.69	-	727.48	RW1 RW2 RW3 MW7 MW17 PTWA PTWB
2/2/09 7:55	ON	948	0	100.0	30,866,200	209,500	41,398,922	21.31	4.21	731.69	RW1 RW2 RW3 MW17 PTWA PTWB
2/9/09 8:20	OFF	NS	NS	-	31,005,700	139,500	41,538,422	13.81	-	731.69	Off to troubleshoot leaking well vault
2/9/09 8:50	ON	NS	0	-	31,005,700	0	41,538,422	0.00	-	731.69	RW1 RW2 RW3 MW17 PTWB
2/16/09 10:10	OFF	NS	NS	-	31,099,500	93,800	41,632,222	9.23	-	731.69	Off for routine maintenance
2/16/09 16:10	ON	NS	0	-	31,099,500	0	41,632,222	0.00	-	731.69	RW1 RW2 RW3 MW7 MW17 PTWA PTWB
2/23/09 18:22	OFF	NS	NS	-	31,315,600	216,100	41,848,322	21.16	-	731.69	Low pressure air compressor - tripped motor starter
2/24/09 10:00	ON	NS	0	-	31,315,600	0	41,848,322	0.00	-	731.69	RW1 RW2 RW3 MW7 MW17 PTWA PTWB
3/2/09 8:55	ON	550	0	100.0	31,506,300	190,700	42,039,022	22.24	3.20	734.89	RW1 RW2 RW3 MW7 MW17 PTWA PTWB
3/4/09 6:45	OFF	NS	NS	-	31,563,800	57,500	42,096,522	20.91	-	734.89	Low pressure air compressor - tripped motor starter
3/5/09 12:40	ON	NS	NS	-	31,563,800	0	42,096,522	0.00	-	734.89	RW1 RW2 RW3 MW7 MW17 PTWA PTWB
3/9/09 10:32	ON	NS	0	-	31,680,500	116,700	42,213,222	20.72	-	734.89	RW1 RW2 RW3 MW7 MW17 PTWA PTWB
3/12/09 11:20	OFF	NS	NS	-	31,772,100	91,600	42,304,822	20.97	-	734.89	Off on OWS-HH
3/12/09 15:20	ON	NS	NS	-	31,772,100	0	42,304,822	0.00	-	734.89	RW1 RW2 RW3 MW7 MW17 PTWA PTWB
3/16/09 8:25	OFF	NS	NS	-	31,884,900	112,800	42,417,622	21.10	-	734.89	Off to clean air stripper
3/16/09 12:15	ON	NS	NS	-	31,884,900	0	42,417,622	0.00	-	734.89	RW1 RW2 RW3 MW7 MW17 PTWA PTWB
3/16/09 13:30	OFF	NS	NS	-	31,886,100	1,200	42,418,822	16.00	-	734.89	Off on AST_HH (clogged bag filters)
3/16/09 13:50	ON	NS	0	-	31,886,100	0	42,418,822	0.00	-	734.89	RW1 RW2 RW3 MW7 MW17 PTWA PTWB
3/19/09 15:40	OFF	NS	NS	-	31,977,800	91,700	42,510,522	20.70	-	734.89	AST-HH (clogged bag filters)
3/23/09 10:50	ON	NS	0	-	31,977,800	0	42,510,522	0.00	-	734.89	RW1 RW2 RW3 MW7 MW17 PTWA PTWB
3/24/09 8:30	OFF	NS	NS	-	31,994,900	17,100	42,527,622	13.15	-	734.89	Comp-Lo Compressor Needs to be Replaced
5/5/09 12:15	ON	NS	NS	-	31,994,900	0	42,527,622	0.00	-	734.89	RW1 RW2 RW3 MW7 MW17 PTWA PTWB
5/11/09 7:00	OFF	NS	NS	-	32,055,600	60,700	42,588,322	7.29	-	734.89	Comp_Lo - Auto drain on compressor Replaced
5/11/09 12:30	ON	3,120	0	100.0	32,055,600	0	42,588,322	0.00	6.72	741.60	RW1 RW2 RW3 MW7 MW17 PTWA PTWB
5/18/09 9:30	OFF	NS	NS	-	32,059,900	4,300	42,592,622	0.43	-	741.60	Comp_Lo
5/18/09 15:15	ON	NS	NS	-	32,059,900	0	42,592,622	0.00	-	741.60	RW1 RW2 RW3 MW7 MW17 PTWA PTWB
5/20/09 10:28	OFF	NS	NS	-	32,075,500	15,600	42,608,222	6.02	-	741.60	SUMP - Off for OWS plumbing repairs
5/20/09 14:42	ON	NS	NS	-	32,075,500	0	42,608,222	0.00	-	741.60	RW1 RW2 RW3 MW7 MW17 PTWA PTWB
5/26/09 7:30	OFF	NS	NS	-	32,079,700	4,200	42,612,422	0.51	-	741.60	VFD High AMP fault
5/26/09 7:59	ON	NS	0	-	32,079,700	0	42,612,422	0.00	-	741.60	RW1 RW2 RW3 MW7 MW17 PTWA PTWB
5/30/09 23:59	ON	NS	NS	-	32,134,938	55,238	42,667,660	8.22	-	741.60	Estimated
6/3/09 9:00	ON	NS	NS	-	32,211,300	76,362	42,744,022	15.71	-	741.60	RW1 RW2 RW3 MW7 MW17 PTWA PTWB
6/3/09 10:30	OFF	NS	NS	-	32,212,000	700	42,744,722	7.78	-	741.60	Off to replace fitting on OWS pump
6/3/09 11:10	ON	NS	0	-	32,212,000	0	42,744,722	0.00	-	741.60	RW1 RW2 RW3 MW7 MW17 PTWA PTWB
6/8/09 7:59	OFF	NS	NS	-	32,262,000	50,000	42,794,722	7.13	-	741.60	SUMP - Off for OWS plumbing repairs

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TABLE A-1: TOTAL FLUIDS EXTRACTION SYSTEM DATA
SEMI-ANNUAL PROGRESS REPORT: JULY THROUGH DECEMBER 2009
FORMER CHEVRON FACILITY 122208, 5801 RIGGS ROAD, CHILLUM, MD
PERIOD: JANUARY 2009 - DECEMBER 2009

Chevron

Date/Time	System Status	Influent BTEX (µg/L)	Effluent BTEX (µg/L)	Treatment Efficiency (%)	Totalizer Reading (gallons)	Period Pumped (gallons)	Total Pumped (gallons)	Period Average (GPM)	Hydrocarbons Recovered Period (gallons)	Hydrocarbons Recovered Cumul. (gallons)	Operating Extraction Points
6/8/09 10:20	ON	NS	0	-	32,262,000	0	42,794,722	0.00	-	741.60	RW1 RW2 RW3 MW7 MW17 PTWA PTWB
6/15/09 9:39	ON	975	0	100.0	32,353,000	91,000	42,885,722	9.06	4.06	745.66	RW1 RW2 RW3 MW7 MW17 PTWA PTWB
6/22/09 7:15	ON	NS	0	-	32,434,800	81,800	42,967,522	8.23	-	745.66	RW1 RW2 RW3 MW7 MW17 PTWA PTWB
6/29/09 10:45	ON	NS	0	-	32,520,000	85,200	43,052,722	8.28	-	745.66	RW1 RW2 RW3 MW7 MW17 PTWA PTWB
7/1/09 16:20	ON	NS	NS	-	32,553,122	33,122	43,085,844	10.30	-	745.66	estimated
7/6/09 7:35	ON	0	0	-	32,600,600	47,478	43,133,322	7.11	0.00	745.66	RW1 RW2 RW3 MW7 MW17 PTWA PTWB
7/6/09 7:41	OFF	NS	NS	-	32,600,800	200	43,133,522	33.33	-	745.66	OFF to clean air stripper
7/6/09 11:33	ON	NS	NS	-	32,600,800	0	43,133,522	0.00	-	745.66	RW1 RW2 RW3 MW7 MW17 PTWA PTWB
7/14/09 11:42	ON	NS	0	-	32,695,900	95,100	43,228,622	8.25	-	745.66	RW1 RW2 RW3 MW7 MW17 PTWA PTWB
7/20/09 7:10	ON	NS	NS	-	32,764,900	69,000	43,297,622	8.25	-	745.66	RW1 RW2 RW3 MW7 MW17 PTWA PTWB
7/20/09 7:22	OFF	NS	NS	-	32,764,900	0	43,297,622	0.00	-	745.66	Shutdown for GAC changeout
7/20/09 11:14	ON	NS	0	-	32,764,900	0	43,297,622	0.00	-	745.66	RW1 RW2 RW3 MW7 MW17 PTWA PTWB
7/27/09 10:35	ON	NS	0	-	32,847,900	83,000	43,380,622	8.27	-	745.66	RW1 RW2 RW3 MW7 MW17 PTWA PTWB
8/3/09 12:10	OFF	NS	NS	-	32,929,000	81,100	43,461,722	7.97	-	745.66	Shut Down to change Air Compressor Oil
8/3/09 12:25	ON	NS	0	-	32,929,000	0	43,461,722	0.00	-	745.66	RW1 RW2 RW3 MW7 MW17 PTWA PTWB
8/17/09 8:18	OFF	NS	NS	-	33,009,500	80,500	43,542,222	4.04	-	745.66	Shut down on Compressor Low
8/17/09 10:30	ON	NS	0	-	33,009,500	0	43,542,222	0.00	-	745.66	RW1 RW2 RW3 MW7 MW17 PTWA PTWB
8/24/09 10:40	ON	4,790	0	100.0	33,093,600	84,100	43,626,322	8.33	7.87	753.53	RW1 RW2 RW3 MW7 MW17 PTWA PTWB
9/1/09 0:00	ON	NS	NS	-	33,216,196	122,596	43,748,918	11.27	-	753.53	Estimated
9/2/09 8:15	ON	NS	0	-	33,238,000	21,804	43,770,722	11.27	-	753.53	RW1 RW2 RW3 MW7 MW17 PTWA PTWB
9/9/09 8:36	OFF	4,060	0	100.0	33,408,500	170,500	43,941,222	16.88	9.29	762.82	Off on AST_HH (clogged bag filters)
9/9/09 8:49	ON	NS	NS	-	33,408,500	0	43,941,222	0.00	-	762.82	RW1 RW2 RW3 MW7 MW17 PTWA PTWB
9/17/09 15:40	ON	NS	0	-	33,651,300	242,800	44,184,022	20.35	-	762.82	RW1 RW2 RW3 MW7 MW17 PTWA PTWB
9/21/09 11:53	ON	NS	0	-	33,742,400	91,100	44,275,122	16.46	-	762.82	RW2 RW3 MW7 MW17 PTWA PTWB(RW-1 Pump Removed to be sent to QED for Service)
9/28/09 7:00	OFF	NS	NS	-	33,807,100	64,700	44,339,822	6.61	-	762.82	Off due to tripped AC breaker
9/28/09 10:30	ON	NS	NS	-	33,807,100	0	44,339,822	0.00	-	762.82	RW2 RW3 MW7 MW17 PTWA PTWB
9/29/09 8:40	OFF	NS	NS	-	33,834,300	27,200	44,367,022	20.45	-	762.82	Off due to clogged bag filters
9/29/09 11:13	ON	NS	NS	-	33,834,300	0	44,367,022	0.00	-	762.82	RW2 RW3 MW7 MW17 PTWA PTWB
10/1/09 0:00	ON	NS	NS	-	33,853,483	19,183	44,386,205	8.69	-	762.82	Estimated
10/5/09 10:30	ON	NS	0	-	34,013,300	159,817	44,546,022	25.01	-	762.82	RW2 RW3 MW7 MW17 PTWA PTWB
10/7/09 12:50	ON	NS	NS	-	34,077,500	64,200	44,610,222	21.26	-	762.82	RW2 RW3 MW7 MW17 PTWA PTWB
10/12/09 7:01	OFF	NS	NS	-	34,087,800	10,300	44,620,522	1.50	-	762.82	Off Due to ASTHH
10/12/09 7:20	ON	NS	0	-	34,087,800	0	44,620,522	0.00	-	762.82	RW2 RW3 MW7 MW17 PTWA PTWB
10/19/09 12:57	ON	NS	0	-	34,327,900	240,100	44,860,622	23.05	-	762.82	RW2 RW3 MW7 MW17 PTWA PTWB
10/19/09 15:16	ON	NS	NS	-	34,331,100	3,200	44,863,822	23.02	-	762.82	RW2 RW3 MW7 MW17 PTWA PTWB
10/28/09 7:35	ON	512	0	100.0	34,616,800	285,700	45,149,522	22.86	18.41	781.23	RW1 RW2 RW3 MW7 MW17 PTWA PTWB
11/2/09 11:23	ON	NS	0	-	34,727,300	110,500	45,260,022	14.88	-	781.23	RW1 RW3 MW7 MW17 PTWA PTWB (RW2 Removed because not exhausting)
11/9/09 7:30	ON	NS	0	-	34,646,300	29,500	45,289,522	3.00	-	781.23	RW1 RW3 MW7 MW17 PTWA PTWB

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TABLE A-1: TOTAL FLUIDS EXTRACTION SYSTEM DATA
SEMI-ANNUAL PROGRESS REPORT: JULY THROUGH DECEMBER 2009
FORMER CHEVRON FACILITY 122208, 5801 RIGGS ROAD, CHILLUM, MD
PERIOD: JANUARY 2009 - DECEMBER 2009

Chevron

Date/Time	System Status	Influent BTEX (µg/L)	Effluent BTEX (µg/L)	Treatment Efficiency (%)	Totalizer Reading (gallons)	Period Pumped (gallons)	Total Pumped (gallons)	Period Average (GPM)	Hydrocarbons Recovered Period (gallons)	Hydrocarbons Recovered Cumul. (gallons)	Operating Extraction Points
11/9/09 12:00	OFF	NS	NS	-	34,849,900	203,600	45,493,122	754.07	-	781.23	Off for O+M activities(See Field Sheet for Details)
11/9/09 12:33	ON	NS	NS	-	34,849,900	0	45,493,122	0.00	-	781.23	RW1 RW3 MW7 MW17 PTWA PTWB
11/10/09 13:00	OFF	NS	NS	-	34,888,600	38,700	45,531,822	26.38	-	781.23	Off On ASTHH
11/16/09 10:45	ON	NS	NS	-	34,888,600	0	45,531,822	0.00	-	781.23	RW1 RW3 MW7 MW17 PTWA PTWB
11/23/09 8:00	OFF	NS	NS	-	34,975,700	87,100	45,618,922	8.78	-	781.23	Off on ASTHH
11/23/09 11:54	ON	510	0	100.0	34,975,700	0	45,618,922	0.00	1.22	782.45	RW1 RW2 RW3 MW7 MW17 PTWA PTWB
12/2/09 12:15	OFF	NS	NS	-	35,155,300	179,600	45,798,522	13.84	-	782.45	Off on ASTHH
12/4/09 10:45	ON	NS	0	-	35,155,300	0	45,798,522	0.00	-	782.45	RW1 RW2 RW3 MW7 MW17 PTWA PTWB
12/5/09 23:00	OFF	NS	NS	-	35,216,100	60,800	45,859,322	27.95	-	782.45	OFF on OWSHH
12/7/09 8:17	ON	NS	NS	-	35,216,100	0	45,859,322	0.00	-	782.45	RW1 RW2 RW3 MW7 MW17 PTWA PTWB
12/7/09 8:41	OFF	NS	NS	-	35,216,700	600	45,859,922	25.00	-	782.45	Off for O+M activities(See Field Sheet for Details)
12/10/09 11:46	ON	NS	0	-	35,216,700	0	45,859,922	0.00	-	782.45	RW1 RW2 RW3 MW7 MW17 PTWA PTWB
12/15/09 12:54	OFF	NS	NS	-	35,417,000	200,300	46,060,222	27.56	-	782.45	Down on ASTHH will leave off until Friday 12/18/09 (GAC changeout)
12/18/09 11:30	ON	NS	NS	-	35,417,000	0	46,060,222	0.00	-	782.45	RW1 RW2 RW3 MW7 MW17 PTWA PTWB
12/22/09 8:07	OFF	NS	NS	-	35,454,100	37,100	46,097,322	6.68	-	782.45	Off On OWSHH
12/22/09 11:57	ON	1,600	0	100.0	35,454,100	0	46,097,322	0.00	3.36	785.81	RW1 RW2 RW3 MW7 MW17 PTWA PTWB
12/23/09 12:02	OFF	NS	NS	-	35,483,300	29,200	46,126,522	20.21	-	785.81	Off On ASTHH
12/23/09 12:34	ON	NS	NS	-	35,483,300	0	46,126,522	0.00	-	785.81	RW1 RW2 RW3 MW7 MW17 PTWA PTWB
12/28/09 11:29	ON	NS	0	-	35,680,400	197,100	46,323,622	27.62	-	785.81	RW1 RW2 RW3 MW7 MW17 PTWA PTWB

Notes:
(1) Hydrocarbons Recovered Period (gallons) = (avg. inf. conc.) x (e-6) x (1/0.2) x (3.785 L/gal) x (1 lb/453.6 g) x (gallons pumped) x (1 gal/6.26 lbs).

(2) Formula assumes BTEX equals 20% of gasoline.

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TABLE A-2: TOTAL FLUIDS EXTRACTION SYSTEM INFLUENT ANALYTICAL RESULTS
SEMI-ANNUAL PROGRESS REPORT: JULY THROUGH DECEMBER 2009
FORMER CHEVRON FACILITY 122208, 5801 RIGGS ROAD, CHILLUM, MD
PERIOD: JANUARY 2009 - DECEMBER 2009

Date/Time	Benzene (µg/L)	Toluene (µg/L)	E. Benzene (µg/L)	Xylenes (µg/L)	BTEX (µg/L)	MTBE (µg/L)
1/5/09 12:40	130	210	18	153	511	210
2/2/09 15:25	220	380	38	310	948	300
3/2/09 9:45	120	220	19	191	550	210
5/11/09 13:05	810	1,300	130	880	3,120	500
6/15/09 12:03	240	390	35	310	975	410
8/24/09 14:16	1,600	1,900	240	1,050	4,790	670
09/9/2009 0900	1,200	1,700	150	1,010	4,060	600
10/28/09 10:00	130	200	19	163	512	180
11/23/09 14:35	100	200	23	187	510	130
12/22/09 13:00	410	600	70	520	1,600	300

Notes:
(1) ND: Not Detected above reporting limit.
(2) <##: Parameter not detected above the reporting limit.

Gannett Fleming

Chevron

TABLE A-3: TOTAL FLUIDS EXTRACTION SYSTEM EFFLUENT ANALYTICAL RESULTS
SEMI-ANNUAL PROGRESS REPORT: JULY THROUGH DECEMBER 2009
FORMER CHEVRON FACILITY 122208, 5801 RIGGS ROAD, CHILLUM, MD
PERIOD: JANUARY 2009 - DECEMBER 2009

Date/Time	Benzene (µg/L)	Toluene (µg/L)	Ethylbenzene (µg/L)	Xylene (µg/L)	BTEX (µg/L)	MTBE (µg/L)
1/5/09 12:15	<1	<1	<1	<3	0	<1
1/12/09 14:35	<1	<1	<1	<3	0	<1
1/19/09 11:35	<1	<1	<1	<3	0	<1
1/26/09 12:00	<1	<1	<1	<3	0	1.7
2/2/09 15:00	<1	<1	<1	<3	0	2.1
2/9/09 14:25	<1	<1	<1	<3	0	2.1
2/16/09 17:10	<1	<1	<1	<3	0	2.1
2/24/09 13:05	<1	<1	<1	<3	0	3.1
3/2/09 9:20	<1	<1	<1	<3	0	4.6
3/9/09 11:10	<1	<1	<1	<3	0	4.5
3/16/09 13:10	<1	<1	<1	<3	0	4.7
3/23/09 11:40	<1	<1	<1	<3	0	3.8
5/11/09 13:09	<1	<1	<1	<3	0	8.4
5/26/09 12:22	<1	<1	<1	<3	0	6.1
6/3/09 11:37	<1	<1	<1	<3	0	11
6/8/09 15:27	<1	<1	<1	<3	0	9.6
6/15/09 0:00	<1	<1	<1	<3	0	9.6
6/22/09 9:22	<1	<1	<1	<3	0	7.8
6/29/09 12:02	<1	<1	<1	<3	0	6.9
7/6/09 0:00	<1	<1	<1	<3	0	7.9
7/14/09 12:39	<1	<1	<1	<3	0	11
7/20/09 13:01	<1	<1	<1	<3	0	<1
7/27/09 12:05	<1	<1	<1	<3	0	<1
8/3/09 8:01	<1	<1	<1	<3	0	<1
8/17/09 12:30	<1	<1	<1	<3	0	<1
8/24/09 14:11	<1	<1	<1	<3	0	<1
9/2/09 12:15	<1	<1	<1	<3	0	<1
9/9/2009 0910	<1	<1	<1	<3	0	1.5
9/17/09 15:50	<1	<1	<1	<3	0	6.5
9/21/09 12:24	<1	<1	<1	<3	0	8.9
10/5/09 13:01	<1	<1	<1	<3	0	18
10/12/09 7:20	<1	<1	<1	<3	0	14
10/19/09 12:58	<1	<1	<1	<3	0	36
10/28/09 8:45	<1	<1	<1	<10	0	33
11/2/09 11:55	<1	<1	<1	<10	0	34
11/9/09 8:45	<1	<1	<1	<10	0	36
11/23/2009 14:45:00	<1	<1	<1	<10	0	39
12/4/09 12:51	<1	<1	<1	<10	0	63
12/10/09 12:15	<1	<1	<1	<10	0	66
12/22/09 13:25	<1	<1	<1	<10	0	<1
12/28/09 13:00	<1	<1	<1	<10	0	<1

Notes:
(1) ND: Not Detected above reporting limit.
(2) <##: Parameter not detected above the reporting limit.

APPENDIX B

DUAL-PHASE EXTRACTION SYSTEM – SOIL VAPOR EXTRACTION DATA

APPENDIX B

DUAL-PHASE EXTRACTION SYSTEM – SOIL VAPOR EXTRACTION DATA

DESCRIPTION OF DATA TABLES

Overview

Chevron uses a central database to store remediation system data and laboratory analytical data. The tabulated data in Tables B-1, B-2 and B-3 is an exported summary of soil vapor extraction ("SVE") system data from the database. These data were recorded by the field technician during site visits. Analytical data for influent samples collected for laboratory analysis are included in Table B-2 to calculate the mass recovery rates of total petroleum hydrocarbons and benzene. Effluent sample data are included in Table B-3 for comparison with permit limits.

The data tables include all system data collected since January 1, 2009. Data collected prior to this date are available in previous progress reports.

The following table lists the column headings in the table with a brief description of each. Please refer to the Process and Instrumentation Diagram (Appendix A) for a schematic of equipment and sample ports.

Column Heading	Description
Date / Time	Date and time data were recorded.
System Status	System ON or OFF when technician recorded the data.
Hour Meter (hours)	Field measurement of the hour meter.
Manifold Vacuum (in Hg)	Field measurement of vacuum in manifold.
Influent (ppmv)	Field measurement of vapor concentration prior to treatment using a photoionization detector.
Influent (cfm)	Field measurement of total vapor flow in manifold.
Effluent (ppmv)	Field measurement of vapor concentration after treatment using a photoionization detector.
Treatment Efficiency (%)	Equation: (Influent-Effluent) / (Influent).
Hydrocarbons Recovered (lbs/day) [1]	Equation: [(Influent) / (10^{-6})] * [Manifold Extraction-Flow Rate] * CV1
Hydrocarbons Recovered Period (gal)	Equation: [(Avg. Influent) x (10^{-6})] * [Avg. Manifold Extraction-Flow Rate]
Hydrocarbons Recovered Cumulative (gal)	Equation: (Avg. Influent BTEX) * (1 L / 0.26 gal) * (lb/454x10^{6} µg) * (current Total Gallons Pumped – previous Total Gallons Pumped on last sampling date) * (gal hydrocarbons / 6.48 lbs hydrocarbons) * (0.2 gal BTEX / gal hydrocarbons).
Operating Extraction Points	Wells in operation during the reporting period.

Notes

(1) Assumptions: Hydrocarbon molecular weight is 92 grams/mole; vapor behaves like an ideal gas; Average (Avg.) Influent (ppmv) and flow rate (Manifold Extraction in the table) are averages between the current and last events. Unit conversion factors (CV) equations are:

CV1 = (92 grams/mole) * (1 mol/24.45 L) * (28.32 L/ft^3) * (1440 min/day) * (1 lb/454 grams) = 338 min*lbs/day.

CV2 = (92 grams/mole) * (1 mol/24.45 L) * (28.32 L/ft^3) * (Runtime in minutes) * (1 lb/454 grams) = 0.235 min*lbs.

SERVER LOCATION K:\411\Instr\Jobs\44738_Chevron

GRS CONTROL PANEL
EOS CONTROLER

CAT OXIDIZER RUNNING (1)
CAT OXIDIZER INLET TEMP T-1 (2)
CAT OXIDIZER OUTLET TEMP T-2 (3)
SVE AIR FLOW
KO TANK VACUUM
RUN/STOP KO PUMP P-1 (HS, XA) (4)
KO TANK LEVEL HI/HI
KO TANK LEVEL HI
KO TANK LEVEL LO
OIL/WATER SEPERATOR LEVEL HI/HI (5)
OIL/WATER SEPERATOR LEVEL HI (6)
OIL/WATER SEPERATOR LEVEL LO (7)
RUN/STOP OIL/WATER SEPERATOR PUMP P-2 (HS, XA) (8)
SVE BLOWER RPM (9)
SVE BLOWER SPEED SET POINT (10)
RUN/STOP SVE BLOWER B-1 (HS, XA) (11)
RUN/STOP AST BLOWER B-2 (HS, XA) (12)
AST BLOWER DISCHARGE FLOW SWITCH (13)
AST LEVEL HI/HI (14)
AST LEVEL HI (15)
AST LEVEL LO (16)
RUN/STOP AST PUMP P-3 (HS, XA) (17)
NOT USED (18)
3-WAY COMPRESSED AIR SOLENOID VALVE (XA) (19)
RUN/STOP COMPRESSER C-1 (HS, XA) (20)
AST EFFLUENT FLOW PULSE (21)

RTU-02
CONTROL PANEL

NON-CLASSIFIED ATMOSPHERE
CLASSIFIED ATMOSPHERE (CLASS 1, DIV 2)

DETAIL A: 2" PVC, TUBING

2" PVC 40 (TYP)
SVE PIPE FROM WELL: SPARE, PTW-A, MW-7, MP-7, RW-3, SPARE, RW-1, SPARE, RW-2, MW-17, PTW-B
FROM ATMOSPHERE
DILUTION VALVE (PI)
TO ATMOSPHERE
XA 006, TIT 006A, TIT 006B, M, PSL, TI
CATALITIC OXIDIZER- FALCO 300 FALMOUTH PRODUCTS
FLAME ARRESTER
ST-200, ST-100
3" CS 40

3/4" HOSE (TYP) TO WELL RW-1, RW-2, RW-3, MW-7, MW-17, PTW-B, PTW-A
1" PVC BALL VALVE (TYP)
TUBING (TYP)
3/4" HOSE (TYP)
SPARE (x5)

WELL PUMPS: QED MOD# AP4T

FT 003, FE 003, TI, PI 003, ST
PIT 003
SILENCER
3" PVC 40
KO TANK
LSHH 003, LSH 003, LSL 003
2" GLOBE VALVE
V1
VFD
STARTER
SVE B-1 BLOWER TUTHILL MOD# 4009-46L3 25 HP
1" HOSE
P-1 KO PUMP MOYNO MOD #33201 2 HP
3/4" CS
DRAIN
3" CS 40
1" PVC 80
2" PVC 80
LSHH 001, LSH 001, LSL 001
OIL/WATER SEPARATOR HYDRO QUIP MOD #AGM-2SS-60V 30 GPM
2" CS 40
P-2 OIL/WATER SEPARATOR PUMP AMT MOD #3694-97 1.5 HP
B-2 AST BLOWER NEW YORK BLOWER CO 5 HP
FSL 002
4" PVC 40
AS-1 AIR STRIPPER QED MOD #E-Z STACKER 4.4 P
2" PVC 40
P-3 AST PUMP GRUNDFOS CRB 5 HP (42 gpm @ 230 FT. TDH)
1 1/2" PVC 80
2" PVC 80
F-1B BAG FILTER
F-1A BAG FILTER
DRAIN (TYP.)
ROSEDALE PRODUCTS MODEL #L0618112P125CBPB (125 PSI)
PSH 004, FE 004, FQI 004
LSH
TRAILER FLOOR SUMP

4" PVC 40
VAPOR OFF GAS
VAPOR PHASE GAC FILTERS: TIGG MOD# N-500 400-800 CFM
ACTIVATED CARBON GAC-5
ACTIVATED CARBON GAC-4
ACTIVATED CARBON GAC-3 (SPARE)
ST-50, ST-51a, ST-51b
TO ATMOSPHERE
4" PVC 40

LIQUID PHASE GAC FILTERS: SIEMENS MOD# LP-61P 150 PSIG MAX
GAC FILTER
1" PVC, 1" HOSE, 1" GS
2" PVC 80
ST-2, ST-3
INSIDE CARBON SHED
SHED FLOOR SUMP
TO STORM DRAIN IN RIGGS ROAD

PSH 005, PSL 005, I
80 GAL RECEIVING TANK MAX 200 PSI
3/4" CS 40 AIR LINE
C-1 AIR COMPRESSOR SPEEDAIRE MOD #1WD67 10 HP 34.8 CFM @ 175 PSI
TSH
CONTROL ROOM

FILE NAME: D:\44738_CHEVRON\44738_J&C_I02.DWG
CURR DATE: 02/18/05 CURR TIME: 3:04:50 pm

No.	DESCRIPTION	DATE	BY
1	RE-DRAWN PER AS-BUILT CONDITIONS	12/20	RTC

REVISIONS

DESIGNED	CADD	SCALE
F.S.K.	J.A.W.	AS NOTED
CHECKED	APPROVED	APPROVED
F.S.K.	F.S.K.	K.G.

Gannett Fleming
BALTIMORE, MARYLAND

CHEVRON PRODUCTS COMPANY
ATLANTA, GEORGIA

FORMER CHEVRON FACILITY NO. 122208
CHILLUM, MARYLAND

INSTRUMENTATION
PROCESS AND INSTRUMENTATION DIAGRAM

JOB No. 44738
DATE 12/20/07
SHEET No. 10
10 of 15

Gannett Fleming

TABLE B-1: SOIL VAPOR EXTRACTION SYSTEM DATA
SEMI-ANNUAL PROGRESS REPORT: JULY THROUGH DECEMBER 2009
FORMER CHEVRON FACILITY 122208, 5801 RIGGS ROAD, CHILLUM, MD
PERIOD: JANUARY 2009 - DECEMBER 2009

Chevron

Date/Time	System Status	Hour Meter (hours)	Manifold Vacuum (in. H2O)	Influent (ppmv)	Influent (SCFM)	Effluent (ppmv)	Treatment Efficiency	Hydrocarbons Recovered (lbs/day)	Period (gallons)	Cumul. (gallons)	Operating Extraction Points
1/5/09 11:25	ON	26,365.1	12	107	132	49.0	54.2	4.8	6.1	3,742.9	RW1 RW2 RW3 MW7 MW17 PTWA PTWB MP7
1/12/09 14:15	ON	26,536.0	14	175	141	73.0	58.3	8.3	7.3	3,750.2	RW1 RW2 RW3 MW7 MW17 PTWA PTWB MP7
1/19/09 10:15	ON	26,699.9	14	210	130	89.0	57.6	9.2	9.4	3,759.6	RW1 RW2 RW3 MW7 MW17 PTWA PTWB MP7
1/26/09 12:05	ON	26,869.6	14	326	142	144.0	55.8	15.6	13.6	3,773.2	RW1 RW2 RW3 MW7 MW17 PTWA PTWB MP7
2/2/09 7:55	ON	27,033.4	14	241	139	133.0	44.8	11.3	14.4	3,787.6	RW1 RW2 RW3 MW7 MW17 PTWA PTWB MP7
2/9/09 8:20	OFF	27,202.3	-	-	-	-	-	-	-	3,787.6	Off to repair well vault plumbing
2/9/09 10:20	ON	27,202.3	14	109	144	49.0	55.0	5.3	9.2	3,796.8	RW1 RW2 RW3 MW7 MW17 PTWB MP7
2/16/09 10:10	OFF	27,371.6	-	-	-	-	-	-	-	3,796.8	Off for routine maintenance
2/16/09 16:10	ON	27,371.6	14	137	128	75.0	45.3	5.9	6.2	3,803.1	RW1 RW2 RW3 MW7 MW17 PTWA PTWB MP7
2/23/09 18:22	OFF	27,540.1	-	-	-	-	-	-	-	3,803.1	Low pressure air compressor - tripped motor starter
2/24/09 10:45	ON	27,540.1	14	136	133	62.0	54.4	6.1	6.6	3,809.7	RW1 RW2 RW3 MW7 MW17 PTWA PTWB MP7
3/2/09 8:55	ON	27,682.3	14	375	135	162.0	56.8	17.1	10.7	3,820.4	RW1 RW2 RW3 MW7 MW17 PTWA PTWB MP7
3/4/09 6:45	OFF	27,728.5	-	-	-	-	-	-	-	3,820.4	Low pressure air compressor - tripped motor starter
3/5/09 12:50	ON	27,728.5	14	123	133	64.0	48.0	5.5	3.4	3,823.8	RW1 RW2 RW3 MW7 MW17 PTWA PTWB MP7
3/9/09 10:30	ON	27,821.2	14	108	133	55.0	49.1	4.9	3.1	3,827.0	RW1 RW2 RW3 MW7 MW17 PTWA PTWB MP7
3/12/09 11:20	OFF	27,894.4	-	-	-	-	-	-	-	3,827.0	Off on OWS-HH
3/12/09 15:50	ON	27,894.4	15	124	131	66.0	46.8	5.5	2.5	3,829.4	RW1 RW2 RW3 MW7 MW17 PTWA PTWB MP7
3/16/09 8:25	OFF	27,982.7	-	-	-	-	-	-	-	3,829.4	Off to clean air stripper
3/16/09 13:00	ON	27,982.7	-	-	-	-	-	-	-	3,829.4	RW1 RW2 RW3 MW7 MW17 PTWA PTWB MP7
3/16/09 13:30	OFF	27,984.1	-	-	-	-	-	-	-	3,829.4	Off on AST_HH (clogged bag filters)
3/16/09 14:04	ON	27,984.1	14	-	129	-	-	-	-	3,829.4	RW1 RW2 RW3 MW7 MW17 PTWA PTWB MP7
3/19/09 15:40	OFF	28,058.4	-	-	-	-	-	-	-	3,829.4	Off on AST-HH (clogged bag filters)
3/23/09 10:52	ON	28,058.4	14	118	134	60.0	49.2	5.3	2.5	3,832.0	RW1 RW2 RW3 MW7 MW17 PTWA PTWB MP7
3/24/09 8:30	OFF	28,074.7	-	-	-	-	-	-	-	3,832.0	Off on Comp_Lo - Compressor Needs to be Replaced
5/5/09 12:18	ON	28,074.7	14	370	139	272.0	26.5	17.4	1.2	3,833.2	RW1 RW2 RW3 MW7 MW17 PTWA PTWB MP7
5/11/09 7:00	OFF	28,141.5	-	-	-	-	-	-	-	3,833.2	Off on Comp_Lo - Auto drain on compressor Replaced
5/11/09 12:30	ON	28,141.5	14	32	138	16.9	46.9	1.5	4.1	3,837.3	RW1 RW2 RW3 MW7 MW17 PTWA PTWB MP7
5/18/09 9:30	OFF	28,311.2	-	-	-	-	-	-	-	3,837.3	Off on Comp_Lo
5/18/09 15:18	ON	28,311.2	-	-	-	-	-	-	-	3,837.3	RW1 RW2 RW3 MW7 MW17 PTWA PTWB MP7 (readings not taken)
5/20/09 10:28	OFF	28,329.5	-	-	-	-	-	-	-	3,837.3	Off for plumbing repairs to OWS pump
5/20/09 14:42	ON	28,329.5	14	-	149	-	-	-	-	3,837.3	RW1 RW2 RW3 MW7 MW17 PTWA PTWB MP7(Concentration readings out of range for FID)
5/26/09 7:30	OFF	28,342.1	-	-	-	-	-	-	-	3,837.3	Off on VFD High AMP fault
5/26/09 8:02	ON	28,342.1	13	2,250	152	2,000.0	11.1	115.6	9.4	3,846.7	RW1 RW2 RW3 MW7 MW17 PTWA PTWB MP7

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TABLE B-1: SOIL VAPOR EXTRACTION SYSTEM DATA
SEMI-ANNUAL PROGRESS REPORT: JULY THROUGH DECEMBER 2009
FORMER CHEVRON FACILITY 122208, 5801 RIGGS ROAD, CHILLUM, MD
PERIOD: JANUARY 2009 - DECEMBER 2009

Chevron

Date/Time	System Status	Hour Meter (hours)	Manifold Vacuum (in. H2O)	Influent (ppmv)	Influent (SCFM)	Effluent (ppmv)	Treatment Efficiency	Hydrocarbons Recovered (lbs/day)	Period (gallons)	Cumul. (gallons)	Operating Extraction Points
6/3/09 9:00	OFF	28,371.9	-	-	-	-	-	-	-	3,846.7	Off on VFD High AMP fault
6/3/09 11:03	ON	28,371.9	12	2,320	157	2,050.0	11.6	123.1	23.2	3,869.9	RW1 RW2 RW3 MW7 MW17 PTWA PTWB MP7
6/8/09 7:00	OFF	28,380.7	-	-	-	-	-	-	-	3,869.9	Off on VFD High AMP fault
6/8/09 13:12	ON	28,380.7	-	-	-	-	-	-	-	3,869.9	RW1 RW2 RW3 MW7 MW17 PTWA PTWB MP7
6/8/09 14:22	OFF	28,385.4	-	-	-	-	-	-	-	3,869.9	Off on VFD High AMP fault
6/15/09 12:07	OFF	28,552.3	-	-	-	-	-	-	-	3,869.9	Off on VFD High AMP fault (Still counting hours because CATOX will not Turn Off)
6/22/09 7:20	ON	28,552.3	-	-	-	-	-	-	-	3,869.9	RW1 RW2 RW3 MW7 MW17 PTWA PTWB MP7 (on to troubleshoot blower)
6/22/09 7:20	OFF	28,723.0	-	-	-	-	-	-	-	3,869.9	Off on VFD High AMP fault (Off time is an estimate)
6/29/09 10:45	OFF	28,723.0	-	-	-	-	-	-	-	3,869.9	Off on VFD High AMP fault (Off time is an estimate)
7/6/09 7:00	OFF	28,886.8	-	-	-	-	-	-	-	3,869.9	Off on VFD High AMP fault (Off time is an estimate)
7/14/09 11:41	OFF	29,083.1	-	-	-	-	-	-	-	3,869.9	Off on VFD High AMP fault, while system was off Catox Hour Meter was still counting. Hour Meter power cut at 1150 on 7/14/09
8/3/09 7:41	OFF	29,083.1	-	-	-	-	-	-	-	3,869.9	Off on VFD High AMP fault
8/3/09 9:48	ON	29,083.1	-	-	-	-	-	-	-	3,869.9	On temporarily to troubleshoot blower motor
8/3/09 11:53	OFF	29,085.2	-	-	-	-	-	-	-	3,869.9	Off on VFD High AMP fault
8/17/09 8:18	OFF	29,085.2	-	-	-	-	-	-	-	3,869.9	Off on VFD High AMP fault
8/24/09 10:39	OFF	29,085.2	-	-	-	-	-	-	-	3,869.9	Off on VFD High AMP fault
9/2/09 8:15	OFF	29,085.2	-	-	-	-	-	-	-	3,869.9	Off on VFD High AMP fault
10/7/09 12:00	ON	29,085.2	1	45	130	20.7	54.1	2.0	0.0	3,869.9	RW1 RW2 RW3 MW7 MW17 PTWA PTWB MP7
10/12/09 7:01	OFF	29,100.0	-	-	-	-	-	-	-	3,869.9	Off due to AST HH
10/12/09 7:20	ON	29,100.0	12	27	97	9.2	65.3	0.9	0.1	3,870.0	RW1 RW2 RW3 MW7 MW17 PTWA PTWB MP7
10/19/09 12:58	ON	29,275.9	13	1,489	108	1,417.0	4.8	54.4	30.2	3,900.2	RW1 RW2 RW3 MW7 MW17 PTWA PTWB MP7
10/19/09 15:16	ON	29,276.2	-	-	-	-	-	-	-	3,900.2	RW1 RW2 RW3 MW7 MW17 PTWA PTWB MP7
10/28/09 7:35	ON	29,485.6	-	-	-	-	-	-	-	3,900.2	RW1 RW2 RW3 MW7 MW17 PTWA PTWB MP7 (Readings Inadvertently not Recorded)
11/2/09 11:23	ON	29,609.4	14	56	98	26.9	52.0	1.9	1.5	3,901.7	RW1 RW2 RW3 MW7 MW17 PTWA PTWB MP7
11/5/09 7:30	OFF	29,653.3	-	-	-	-	-	-	-	3,901.7	Off on VFD High AMP fault
11/5/09 13:57	ON	29,653.3	14	-	-	-	-	-	-	3,901.7	On temporarily to troubleshoot
11/5/09 14:39	OFF	29,654.0	-	-	-	-	-	-	-	3,901.7	Off on VFD High AMP fault
11/9/09 12:40	ON	29,654.0	10	69	96	35.1	48.9	2.2	0.0	3,901.7	RW1 RW3 MW7 MW17 PTWA PTWB MP7 (RW2 Removed from well to repair)
11/10/09 13:00	OFF	29,679.2	-	-	-	-	-	-	-	3,901.7	Off On ASTHH
11/16/09 10:45	ON	29,679.2	14	30	109	12.7	57.9	1.1	0.3	3,902.0	RW1 RW3 MW7 MW17 PTWA PTWB MP7 (RW2 Removed from well to repair)
11/23/09 0800	OFF	29,751.3	-	-	-	-	-	-	-	3,902.0	Off On ASTHH

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TABLE B-1: SOIL VAPOR EXTRACTION SYSTEM DATA
SEMI-ANNUAL PROGRESS REPORT: JULY THROUGH DECEMBER 2009
FORMER CHEVRON FACILITY 122208, 5801 RIGGS ROAD, CHILLUM, MD
PERIOD: JANUARY 2009 - DECEMBER 2009

Chevron

Date/Time	System Status	Hour Meter (hours)	Manifold Vacuum (in. H2O)	Influent (ppmv)	Influent (SCFM)	Effluent (ppmv)	Treatment Efficiency	Hydrocarbons Recovered (lbs/day)	Period (gallons)	Cumul. (gallons)	Operating Extraction Points
11/23/09 11:54	ON	29,751.3	14	24	95	11.2	53.5	0.8	0.4	3,902.4	RW1 RW2 RW3 MW7 MW17 PTWA PTWB MP7
12/2/09 12:15	OFF	29,896.1	-	-	-	-	-	-	-	3,902.4	Off On ASTHH
12/4/09 10:45	ON	29,896.1	14	700	103	300.0	57.1	24.3	11.4	3,913.8	RW1 RW2 RW3 MW7 MW17 PTWA PTWB MP7 (*FID Readings)
12/5/09 23:00	OFF	29,979.3	-	-	-	-	-	-	-	3,913.8	Off On OWSHH
12/7/09 8:17	ON	29,979.3	-	-	-	-	-	-	-	3,913.8	RW1 RW2 RW3 MW7 MW17 PTWA PTWB MP7 (System on briefly, readings not taken)
12/7/09 8:41	OFF	29,985.5	-	-	-	-	-	-	-	3,913.8	Off for O+M activities(See Field Sheet for Details)
12/10/09 11:46	ON	29,985.5	13	2,343	166	1,729.0	26.2	131.1	5.3	3,919.2	RW1 RW2 RW3 MW7 MW17 PTWA PTWB MP7 (*FID Readings)
12/15/09 12:54	OFF	30,106.2	-	-	-	-	-	-	-	3,919.2	Down on ASTHH will leave off until Friday 12/18/09 (GAC changeout)
12/18/09 11:30	ON	30,106.2	13	250	167	132.0	47.2	14.1	57.4	3,976.5	RW1 RW2 RW3 MW7 MW17 PTWA PTWB MP7 (*FID Readings)
12/22/09 8:07	OFF	30,128.0	-	-	-	-	-	-	-	3,976.5	Off On OWSHH
12/22/09 11:57	ON	30,128.0	12	1,024	162	912.0	10.9	55.9	5.0	3,981.5	RW1 RW2 RW3 MW7 MW17 PTWA PTWB MP7 (*FID Readings)
12/23/09 12:02	OFF	30,145.2	-	-	-	-	-	-	-	3,981.5	Off On ASTHH
12/23/09 12:34	ON	30,145.2	13	-	162	-	-	-	-	3,981.5	RW1 RW2 RW3 MW7 MW17 PTWA PTWB MP7
12/28/09 11:29	ON	30,264.1	13	2,492	158	1,512.0	39.3	132.7	104.3	4,085.8	RW1 RW2 RW3 MW7 MW17 PTWA PTWB MP7(Hour Meters Estimated)

Notes:
(1) Hydrocarbons recovered are expressed as toluene (MW = 92 g/mol @ 77F).
(2) Hydrocarbons Recovered (lbs/day) = (inf. conc.) x (92 g/mol) x (mol/24.45 L) x (e-6) x (inf. flow) x (28.32 L/ft3) x (1440 min/day) x (1 lb/453.6 g).
(3) Hydrocarbons Recovered Period (gallons) = (avg. inf. conc.) x (92 g/mol) x (mol/24.45 L) x (e-6) x (avg. inf. flow) x (28.32 L/ft3) x (runtime in minutes) x (1 lb/453.6 g) x (gal/6.39 lb).

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TABLE B-2: SOIL VAPOR EXTRACTION SYSTEM INFLUENT ANALYTICAL RESULTS
SEMI-ANNUAL PROGRESS REPORT: JULY THROUGH DECEMBER 2009
FORMER CHEVRON FACILITY 122208, 5801 RIGGS ROAD, CHILLUM, MD
PERIOD: JANUARY 2009 - DECEMBER 2009

							Extraction Rate	
Date/Time	Benzene (µg/L)	Toluene (µg/L)	Ethylbenzene (µg/L)	Xylene (µg/L)	TPH (µg/L)	Flow (SCFM)	Benzene (lbs/hr)	TPH (lbs/day)
1/5/09 12:10	3.00	13.00	2.00	21.00	1,100	132	0.0015	13.05
2/2/09 11:45	2.00	14.00	3.00	23.00	1,300	139	0.0010	16.25
3/2/09 9:55	3.00	15.00	3.00	29.00	1,400	133	0.0015	16.74
5/11/09 13:45	0.90	4.00	0.80	5.00	620	138	0.0005	7.69
10/28/09 9:40	1.60	7.00	1.30	11.00	580	105	0.0006	5.47
11/16/09 14:00	0.70	3.10	0.50	3.90	220	109	0.0003	2.15
12/22/09 13:20	0.39	1.60	0.30	2.10	260	162	0.0002	3.78

Notes:
(1) Benzene (lbs/h) = (benzene conc.) x (e-6) x (1 lb/453.6 g) x (flow) x (28.32 L/ft3) x (60 min/hr).
(2) TPH (lbs/day) = (TPH conc.) x (e-6) x (1 lb/453.6 g) x (flow) x (28.32 L/ft3) x (1440 min/day).
(3) ug/L = (ppmv) x (MW g/mol) x (mol/24.45 L), where MW benzene = 78 and MW TPH = 92.

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TABLE B-3: SOIL VAPOR EXTRACTION SYSTEM EFFLUENT ANALYTICAL RESULTS
SEMI-ANNUAL PROGRESS REPORT: JULY THROUGH DECEMBER 2009
FORMER CHEVRON FACILITY 122208, 5801 RIGGS ROAD, CHILLUM, MD
PERIOD: JANUARY 2009 - DECEMBER 2009

							Discharge Rate	
Date/Time	Benzene (µg/L)	Toluene (µg/L)	Ethylbenzene (µg/L)	Xylene (µg/L)	TPH (µg/L)	Flow (SCFM)	Benzene (lbs/hr)	TPH (lbs/day)
1/5/09 12:05	0.8	4	0.6	5	510	131	0.0004	6.03
2/2/09 11:40	1	5	0.8	6	530	139	0.0005	6.64
3/2/09 9:50	0.2	2	0.3	3	150	133	0.0001	1.79
5/11/09 13:40	0.400	2	0.300	2	370	138	0.0002	4.59
10/28/09 9:35	0.6	2.4	0.4	3.6	290	105	0.0002	2.73
11/16/09 14:05	0.40	1.6	0.3	2.1	170	109	0.0002	1.66
12/22/09 13:21	0.16	.66	.12	.84	170	162	0.0001	2.47

Notes:
(1) Benzene (lbs/h) = (benzene conc.) x (e-6) x (1 lb/453.6 g) x (flow) x (28.32 L/ft3) x (60 min/hr).
(2) TPH (lbs/day) = (TPH conc.) x (e-6) x (1 lb/453.6 g) x (flow) x (28.32 L/ft3) x (1440 min/day).
(3) ug/L = (ppmv) x (MW g/mol) x (mol/24.45 L), where MW benzene = 78 and MW TPH = 92.

APPENDIX C

GROUNDWATER MONITORING DATA

APPENDIX C

GROUNDWATER MONITORING DATA

DESCRIPTION OF DATA TABLE

Overview

Chevron uses a central database to store groundwater monitoring data including laboratory analytical data. The tabulated data in **Appendix C** (Table C-1) is an exported summary of groundwater elevation data and analytical data for the period beginning on January 1, 2009, and ending on December 31, 2009 (reporting period plus previous two quarters). Groundwater elevation data were measured using an interface probe in wells near the Service Station and a water level indicator at all other locations.

The following table lists the column headings in the table with a brief description of each.

Column Heading	Description
Date	Date data were recorded.
DTL (ft)	Depth to LPH (ft)
DTW (ft)	Depth to groundwater (ft)
LPH Thick. (ft)	Equation: (DTW-DTL)
GW Elev. (ft)	Corrected water table elevation equation: (TOC) – (DTW) + [(0.75)*(LPH Thickness)]
LPH Recovery	Liquid Phase Hydrocarbons Recovery
Benzene (µg/L)	Laboratory reported concentration
Toluene (µg/L)	Laboratory reported concentration
Ethylbenzene (µg/L)	Laboratory reported concentration
Total Xylenes (µg/L)	Laboratory reported concentration
MTBE (µg/L)	Laboratory reported concentration
TPH-GRO (µg/L)	Laboratory reported concentration

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TABLE C-1. GROUNDWATER MONITORING DATA
SEMI-ANNUAL PROGRESS REPORT: JULY THROUGH DECEMBER 2009
FORMER CHEVRON FACILITY 122208
5801 RIGGS ROAD, CHILLUM, MARYLAND

Chevron

PERIOD: 1/1/2009 - 12/31/2009

Date	DTL (ft)	DTW (ft)	LPH Thick. (ft)	GW Elev (ft)	LPH Recov. (gal)	Benzene (µg/l)	Toluene (µg/l)	Ethyl-benzene (µg/l)	Total Xylenes (µg/l)	BTEX (µg/l)	MTBE (µg/l)	TPH-GRO (µg/l)
GP-2E(45-50)	Screen: 45.0-50.0 ft bgs			TOC: 168.17 ft								
03/18/09	---	44.38	---	123.79		No Analytical Results						
03/30/09	---	44.27	---	123.90		ND (2)	ND (2)	ND (6)	ND (2)	ND	350.0 (2)	240.0 (100)
09/14/09	---	43.02	---	125.15		No Analytical Results						
09/28/09	---	43.50	---	124.67		ND (2)	ND (2)	ND (6)	ND (2)	ND	450.0 (2)	410.0 (100)
GP-2E(50-55)	Screen: 50.0-55.0 ft bgs			TOC: 168.27 ft								
03/18/09	---	44.49	---	123.78		No Analytical Results						
09/14/09	---	43.14	---	125.13		No Analytical Results						
GP-2E(55-60)	Screen: 55.0-60.0 ft bgs			TOC: 168.53 ft								
03/18/09	---	44.81	---	123.72		No Analytical Results						
03/30/09	---	44.65	---	123.88		ND (1)	ND (1)	ND (3)	ND (1)	ND	130.0 (1)	140.0 (100)
09/14/09	---	43.40	---	125.13		No Analytical Results						
09/28/09	---	43.46	---	125.07		3.4 (1)	ND (1)	ND (3)	ND (1)	3.4	160.0 (1)	210.0 (100)
GP-2F(45-50)	Screen: 45.0-50.0 ft bgs			TOC: 159.59 ft								
03/18/09	---	45.71	---	113.88		No Analytical Results						
03/30/09	---	45.65	---	113.94		No Analytical Results						
03/31/09						ND (1)	ND (1)	ND (3)	ND (1)	ND	190.0 (1)	190.0 (100)
09/14/09	---	44.35	---	115.24		No Analytical Results						
09/28/09	Obstructed at 43.03											
GP-2F(50-55)	Screen: 50.0-55.0 ft bgs			TOC: 159.59 ft								
03/18/09	---	45.43	---	114.16		No Analytical Results						
03/30/09	---	45.41	---	114.18		3.0 (2)	ND (2)	ND (6)	ND (2)	3.0	380.0 (2)	340.0 (100)
09/14/09	Well obstructed											
09/28/09	---	44.30	---	115.29		2.1 (2)	ND (2)	ND (6)	ND (2)	2.1	270.0 (2)	250.0 (100)
GP-7A(20-25)	Screen: 20.0-25.0 ft bgs			TOC: 158.11 ft								
03/18/09	---	20.98	---	137.13		No Analytical Results						

Notes:

1) Reporting limit shown in parenthesis.
2) Groundwater elevation corrected for presence of LPH.
3) Analytical and LPH Recovery results were rounded.
4) BTEX summed before rounding.

Abbreviations:

DTL: Depth to LPH
DTW: Depth to Water
LPH: Liquid Phase Hydrocarbons
GW Elev: Groundwater Elevation
TOC: Top of Casing
ND: Not Detected above reporting limit
NA: Not Analyzed
UNK: Unknown

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TABLE C-1. GROUNDWATER MONITORING DATA
SEMI-ANNUAL PROGRESS REPORT: JULY THROUGH DECEMBER 2009
FORMER CHEVRON FACILITY 122208
5801 RIGGS ROAD, CHILLUM, MARYLAND

Chevron

PERIOD: 1/1/2009 - 12/31/2009

Date	DTL (ft)	DTW (ft)	LPH Thick. (ft)	GW Elev (ft)	LPH Recov. (gal)	Benzene (µg/l)	Toluene (µg/l)	Ethyl-benzene (µg/l)	Total Xylenes (µg/l)	BTEX (µg/l)	MTBE (µg/l)	TPH-GRO (µg/l)
GP-7A(20-25)	Screen: 20.0-25.0 ft bgs				TOC: 158.11 ft							
03/27/09	---	20.51	---	137.60		ND (1)	ND (1)	ND (3)	ND (1)	ND	1.3 (1)	ND (100)
09/14/09	---	22.02	---	136.09		No Analytical Results						
09/29/09	---	21.18	---	136.93		ND (1)	ND (1)	ND (3)	ND (1)	ND	ND (1)	ND (100)
GP-7A(25-30)	Screen: 25.0-30.0 ft bgs				TOC: 158.08 ft							
03/18/09	---	20.37	---	137.71		No Analytical Results						
09/14/09	---	18.93	---	139.15		No Analytical Results						
GP-7A(30-35)	Screen: 30.0-35.0 ft bgs				TOC: 158.09 ft							
03/18/09	---	22.58	---	135.51		No Analytical Results						
03/27/09	---	22.58	---	135.51		1.4 (1)	ND (1)	ND (3)	ND (1)	1.4	1.1 (1)	ND (100)
09/14/09	---	22.47	---	135.62		No Analytical Results						
09/29/09	---	21.80	---	136.29		1.5 (1)	ND (1)	ND (3)	ND (1)	1.5	1.4 (1)	ND (100)
GP-7A(35-40)	Screen: 35.0-40.0 ft bgs				TOC: 158.09 ft							
03/18/09	---	23.14	---	134.95		No Analytical Results						
03/27/09	---	22.79	---	135.30		440.0 (2)	69.0 (2)	55.0 (6)	6.2 (2)	570.2	240.0 (2)	2,200.0 (100)
09/14/09	---	21.44	---	136.65		No Analytical Results						
09/29/09	---	21.57	---	136.52		170.0 (1)	23.0 (1)	15.7 (3)	1.9 (1)	210.6	210.0 (1)	1,400.0 (100)
GP-7A(40-45)	Screen: 40.0-45.0 ft bgs				TOC: 158.11 ft							
03/18/09	---	23.05	---	135.06		No Analytical Results						
09/14/09	---	21.49	---	136.62		No Analytical Results						
GP-9A(20-25)	Screen: 20.0-25.0 ft bgs				TOC: 158.86 ft							
03/18/09	---	18.99	---	139.87		No Analytical Results						
03/27/09	---	19.11	---	139.75		ND (1)	ND (1)	ND (3)	ND (1)	ND	ND (1)	ND (100)
09/14/09	---	17.80	---	141.06		No Analytical Results						
09/29/09	---	18.23	---	140.63		ND (1)	ND (1)	ND (3)	ND (1)	ND	ND (1)	ND (100)

Notes:
1) Reporting limit shown in parenthesis.
2) Groundwater elevation corrected for presence of LPH.
3) Analytical and LPH Recovery results were rounded.
4) BTEX summed before rounding.

Abbreviations:
DTL: Depth to LPH
DTW: Depth to Water
LPH: Liquid Phase Hydrocarbons
GW Elev: Groundwater Elevation
TOC: Top of Casing
ND: Not Detected above reporting limit
NA: Not Analyzed
UNK: Unknown

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TABLE C-1. GROUNDWATER MONITORING DATA
SEMI-ANNUAL PROGRESS REPORT: JULY THROUGH DECEMBER 2009
FORMER CHEVRON FACILITY 122208
5801 RIGGS ROAD, CHILLUM, MARYLAND

Chevron

PERIOD: 1/1/2009 - 12/31/2009

Date	DTL (ft)	DTW (ft)	LPH Thick. (ft)	GW Elev (ft)	LPH Recov. (gal)	Benzene (µg/l)	Toluene (µg/l)	Ethyl-benzene (µg/l)	Total Xylenes (µg/l)	BTEX (µg/l)	MTBE (µg/l)	TPH-GRO (µg/l)
GP-9A(25-30)	Screen: 25.0-30.0 ft bgs				TOC: 158.81 ft							
03/18/09	---	21.35	---	137.46				No Analytical Results				
09/14/09	---	19.62	---	139.19				No Analytical Results				
GP-9A(30-35)	Screen: 30.0-35.0 ft bgs				TOC: 158.76 ft							
03/18/09	---	21.89	---	136.87				No Analytical Results				
09/14/09	---	21.32	---	137.44				No Analytical Results				
GP-11A(20-25)	Screen: 20.0-25.0 ft bgs				TOC: 158.28 ft							
03/18/09	---	16.59	---	141.69				No Analytical Results				
03/27/09	---	17.35	---	140.93				No Analytical Results				
03/30/09						ND (1)	ND (1)	ND (3)	ND (1)	ND	ND (1)	ND (100)
09/14/09	---	19.68	---	138.60				No Analytical Results				
09/29/09	---	18.48	---	139.80		ND (1)	ND (1)	ND (3)	ND (1)	ND	ND (1)	ND (100)
GP-11A(25-30)	Screen: 25.0-30.0 ft bgs				TOC: 158.43 ft							
03/18/09	Cannot remove well cap											
09/14/09	---	19.89	---	138.54				No Analytical Results				
GP-11A(30-35)	Screen: 30.0-35.0 ft bgs				TOC: 158.38 ft							
03/18/09	---	21.31	---	137.07				No Analytical Results				
09/14/09	---	20.76	---	137.62				No Analytical Results				
GP-11A(35-40)	Screen: 35.0-40.0 ft bgs				TOC: 158.38 ft							
03/18/09	---	29.36	---	129.02				No Analytical Results				
09/14/09	---	26.88	---	131.50				No Analytical Results				
GP-24A	Screen: 24.0-44.0 ft bgs				TOC: 170.83 ft							
03/18/09	---	35.52	---	135.31				No Analytical Results				
04/01/09	---	34.25	---	136.58		ND (1)	1.3 (1)	12.1 (3)	ND (1)	13.4	ND (1)	270.0 (100)
09/14/09	---	32.98	---	137.85				No Analytical Results				
09/24/09	---	32.61	---	138.22		ND (1)	1.6 (1)	19.1 (3)	ND (1)	20.7	ND (1)	350.0 (100)

Notes:

1) Reporting limit shown in parenthesis.
2) Groundwater elevation corrected for presence of LPH.
3) Analytical and LPH Recovery results were rounded.
4) BTEX summed before rounding.

Abbreviations:

DTL: Depth to LPH
DTW: Depth to Water
LPH: Liquid Phase Hydrocarbons
GW Elev: Groundwater Elevation
TOC: Top of Casing
ND: Not Detected above reporting limit
NA: Not Analyzed
UNK: Unknown

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TABLE C-1. GROUNDWATER MONITORING DATA
SEMI-ANNUAL PROGRESS REPORT: JULY THROUGH DECEMBER 2009
FORMER CHEVRON FACILITY 122208
5801 RIGGS ROAD, CHILLUM, MARYLAND

Chevron

PERIOD: 1/1/2009 - 12/31/2009

Date	DTL (ft)	DTW (ft)	LPH Thick. (ft)	GW Elev (ft)	LPH Recov. (gal)	Benzene (µg/l)	Toluene (µg/l)	Ethyl-benzene (µg/l)	Total Xylenes (µg/l)	BTEX (µg/l)	MTBE (µg/l)	TPH-GRO (µg/l)
GP-27A		Screen: 41.0-51.0 ft bgs		TOC: 172.06 ft								
01/26/09	---	41.79	---	130.27				No Analytical Results				
02/24/09	---	41.86	---	130.20				No Analytical Results				
03/18/09	---	42.69	---	129.37				No Analytical Results				
04/07/09	---	40.86	---	131.20		3,400.0 (50)	1,900.0 (50)	11,100.0 (150)	8,400.0 (50)	24,800.0	3,500.0 (50)	67,000.0 (10000)
04/27/09	---	40.97	---	131.09				No Analytical Results				
05/27/09	---	41.21	---	130.85				No Analytical Results				
06/15/09	---	40.97	---	131.09				No Analytical Results				
07/27/09	---	40.42	---	131.64				No Analytical Results				
08/24/09	---	40.38	---	131.68				No Analytical Results				
09/14/09	---	43.42	---	128.64				No Analytical Results				
09/23/09	---	42.39	---	129.67		3,500.0 (50)	1,700.0 (50)	10,300.0 (150)	8,900.0 (50)	24,400.0	1,500.0 (50)	49,000.0 (20000)
10/28/09	---	41.83	---	130.23				No Analytical Results				
11/16/09	---	41.37	---	130.69				No Analytical Results				
12/22/09		Covered by snow										
GP-30A		Screen: 29.0-49.0 ft bgs		TOC: 171.78 ft								
01/26/09	---	43.10	---	128.68				No Analytical Results				
02/24/09	---	41.15	---	130.63				No Analytical Results				
03/18/09	---	42.86	---	128.92				No Analytical Results				
04/07/09	---	37.06	---	134.72		5,200.0 (100)	400.0 (100)	3,800.0 (300)	4,700.0 (100)	14,100.0	22,000.0 (100)	52,000.0 (5000)
04/27/09	---	36.71	---	135.07				No Analytical Results				
05/27/09	---	40.81	---	130.97				No Analytical Results				
06/15/09	---	39.56	---	132.22				No Analytical Results				
07/27/09	---	39.52	---	132.26				No Analytical Results				
08/24/09	---	39.74	---	132.04				No Analytical Results				
09/14/09	---	41.15	---	130.63				No Analytical Results				
09/24/09	---	37.27	---	134.51		7,400.0 (100)	500.0 (100)	3,800.0 (300)	7,500.0 (100)	19,200.0	15,000.0 (100)	59,000.0 (5000)
10/28/09	---	42.10	---	129.68				No Analytical Results				
11/16/09	---	38.23	---	133.55				No Analytical Results				
12/22/09	---	36.43	---	135.35				No Analytical Results				

Notes:
1) Reporting limit shown in parenthesis.
2) Groundwater elevation corrected for presence of LPH.
3) Analytical and LPH Recovery results were rounded.
4) BTEX summed before rounding.

Abbreviations:
DTL: Depth to LPH
DTW: Depth to Water
LPH: Liquid Phase Hydrocarbons
GW Elev: Groundwater Elevation
TOC: Top of Casing
ND: Not Detected above reporting limit
NA: Not Analyzed
UNK: Unknown

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TABLE C-1. GROUNDWATER MONITORING DATA
SEMI-ANNUAL PROGRESS REPORT: JULY THROUGH DECEMBER 2009
FORMER CHEVRON FACILITY 122208
5801 RIGGS ROAD, CHILLUM, MARYLAND

Chevron

PERIOD: 1/1/2009 - 12/31/2009

Date	DTL (ft)	DTW (ft)	LPH Thick. (ft)	GW Elev (ft)	LPH Recov. (gal)	Benzene (µg/l)	Toluene (µg/l)	Ethyl-benzene (µg/l)	Total Xylenes (µg/l)	BTEX (µg/l)	MTBE (µg/l)	TPH-GRO (µg/l)
GP-35A		Screen: 25.0-45.0 ft bgs		TOC: 171.96 ft								
01/26/09	---	43.92	---	128.04				No Analytical Results				
02/24/09	---	38.94	---	133.02				No Analytical Results				
03/18/09	---	43.70	---	128.26				No Analytical Results				
04/01/09	---	35.70	---	136.26		1,800.0 (20)	250.0 (20)	2,010.0 (60)	3,700.0 (20)	7,760.0	290.0 (20)	16,000.0 (2000)
04/27/09	---	34.65	---	137.31				No Analytical Results				
05/27/09	---	43.17	---	128.79				No Analytical Results				
06/15/09	---	37.15	---	134.81				No Analytical Results				
07/27/09	---	35.51	---	136.45				No Analytical Results				
08/24/09	---	35.36	---	136.60				No Analytical Results				
09/14/09	---	39.56	---	132.40				No Analytical Results				
09/24/09	---	35.83	---	136.13		2,800.0 (50)	890.0 (50)	5,600.0 (150)	5,800.0 (50)	15,090.0	300.0 (50)	26,000.0 (1000)
10/28/09	---	44.80	---	127.16				No Analytical Results				
11/16/09	---	35.63	---	136.33				No Analytical Results				
12/22/09		Covered by snow										
GP-38A		Screen: 29.0-49.0 ft bgs		TOC: 171.22 ft								
01/26/09	---	40.99	---	130.23				No Analytical Results				
02/24/09	---	39.40	---	131.82				No Analytical Results				
03/18/09	---	40.16	---	131.06				No Analytical Results				
04/07/09	---	35.11	---	136.11		44.0 (2)	4.6 (2)	144.0 (6)	6.8 (2)	199.4	ND (2)	4,700.0 (1000)
04/27/09	---	35.00	---	136.22				No Analytical Results				
05/27/09	---	35.55	---	135.67				No Analytical Results				
06/15/09	---	35.16	---	136.06				No Analytical Results				
07/27/09	---	35.09	---	136.13				No Analytical Results				
08/24/09	---	35.25	---	135.97				No Analytical Results				
09/14/09	---	36.07	---	135.15				No Analytical Results				
09/24/09	---	35.28	---	135.94		2.7 (1)	3.4 (1)	124.0 (3)	1.5 (1)	131.6	ND (1)	3,400.0 (100)
10/28/09	---	39.02	---	132.20				No Analytical Results				
11/16/09	---	34.36	---	136.86				No Analytical Results				
12/22/09	---	35.09	---	136.13				No Analytical Results				

Notes:
1) Reporting limit shown in parenthesis.
2) Groundwater elevation corrected for presence of LPH.
3) Analytical and LPH Recovery results were rounded.
4) BTEX summed before rounding.

Abbreviations:
DTL: Depth to LPH
DTW: Depth to Water
LPH: Liquid Phase Hydrocarbons
GW Elev: Groundwater Elevation
TOC: Top of Casing
ND: Not Detected above reporting limit
NA: Not Analyzed
UNK: Unknown

Gannett Fleming

TABLE C-1. GROUNDWATER MONITORING DATA
SEMI-ANNUAL PROGRESS REPORT: JULY THROUGH DECEMBER 2009
FORMER CHEVRON FACILITY 122208
5801 RIGGS ROAD, CHILLUM, MARYLAND

Chevron

PERIOD: 1/1/2009 - 12/31/2009

Date	DTL (ft)	DTW (ft)	LPH Thick. (ft)	GW Elev (ft)	LPH Recov. (gal)	Benzene (µg/l)	Toluene (µg/l)	Ethyl-benzene (µg/l)	Total Xylenes (µg/l)	BTEX (µg/l)	MTBE (µg/l)	TPH-GRO (µg/l)
GP-39A		Screen: 35.0-55.0 ft bgs			TOC: 172.46 ft							
03/18/09	---	45.29	---	127.17		No Analytical Results						
03/31/09	---	44.32	---	128.14		2,200.0 (25)	90.0 (25)	820.0 (75)	820.0 (25)	3,930.0	4,900.0 (25)	11,000.0 (2000)
09/14/09		Obstructed by sampler at 44.43ft										
09/23/09	---	43.98	---	128.48		3,100.0 (25)	240.0 (25)	1,660.0 (75)	2,200.0 (25)	7,200.0	4,700.0 (25)	15,000.0 (1000)
GP-41A		Screen: 32.0-52.0 ft bgs			TOC: 172.28 ft							
03/18/09	---	43.09	---	129.19		No Analytical Results						
03/31/09	---	42.55	---	129.73		7.8 (1)	ND (1)	11.0 (3)	ND (1)	18.8	29.0 (1)	280.0 (200)
09/14/09	---	42.80	---	129.48		No Analytical Results						
09/23/09	---	42.39	---	129.89		7.3 (1)	ND (1)	13.0 (3)	ND (1)	20.3	1.7 (1)	160.0 (100)
GP-44A		Screen: 26.0-46.0 ft bgs			TOC: 176.20 ft							
03/18/09	---	31.59	---	144.61		No Analytical Results						
04/01/09	---	31.01	---	145.19		ND (10)	230.0 (10)	1,430.0 (30)	54.0 (10)	1,714.0	ND (10)	7,700.0 (500)
09/14/09	---	30.69	---	145.51		No Analytical Results						
09/24/09	---	29.66	---	146.54		ND (2)	110.0 (2)	700.0 (6)	22.0 (2)	832.0	ND (2)	7,700.0 (200)
MP-7		Screen: 35.0-55.0 ft bgs			TOC: 172.17 ft							
01/26/09	---	39.74	---	132.43		No Analytical Results						
02/24/09	---	39.71	---	132.46		No Analytical Results						
03/18/09	---	42.55	---	129.66		No Analytical Results						
04/27/09	---	41.02	---	131.15		No Analytical Results						
05/27/09	---	40.90	---	131.32		No Analytical Results						
06/15/09	---	41.16	---	131.01		No Analytical Results						
07/27/09	---	40.61	---	131.56		No Analytical Results						
08/24/09	---	40.65	---	131.52		No Analytical Results						
09/14/09	43.27	43.83	0.56	128.82		No Analytical Results						
10/28/09	---	37.90	---	134.27		No Analytical Results						
11/16/09	---	37.92	---	134.25		No Analytical Results						
12/22/09		Covered by snow										

Notes:
1) Reporting limit shown in parenthesis.
2) Groundwater elevation corrected for presence of LPH.
3) Analytical and LPH Recovery results were rounded.
4) BTEX summed before rounding.

Abbreviations:
DTL: Depth to LPH
DTW: Depth to Water
LPH: Liquid Phase Hydrocarbons
GW Elev: Groundwater Elevation
TOC: Top of Casing
ND: Not Detected above reporting limit
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TABLE C-1. GROUNDWATER MONITORING DATA
SEMI-ANNUAL PROGRESS REPORT: JULY THROUGH DECEMBER 2009
FORMER CHEVRON FACILITY 122208
5801 RIGGS ROAD, CHILLUM, MARYLAND

Chevron

PERIOD: 1/1/2009 - 12/31/2009

Date	DTL (ft)	DTW (ft)	LPH Thick. (ft)	GW Elev (ft)	LPH Recov. (gal)	Benzene (µg/l)	Toluene (µg/l)	Ethyl-benzene (µg/l)	Total Xylenes (µg/l)	BTEX (µg/l)	MTBE (µg/l)	TPH-GRO (µg/l)
MP-20		Screen: 40.0-55.0 ft bgs			TOC: 172.16 ft							
03/18/09	---	44.00	---	128.16				No Analytical Results				
09/14/09	---	43.79	---	128.37				No Analytical Results				
MP-30		Screen: 40.0-55.0 ft bgs			TOC: 171.57 ft							
03/18/09	---	41.93	---	129.64				No Analytical Results				
09/14/09	---	41.58	---	129.99				No Analytical Results				
MP-40		Screen: 40.0-55.0 ft bgs			TOC: 172.11 ft							
03/18/09	---	41.93	---	130.18				No Analytical Results				
09/14/09	---	41.74	---	130.37				No Analytical Results				
MW-1		Screen: 20.0-35.0 ft bgs			TOC: 170.46 ft							
03/18/09	---	34.99	---	135.47				No Analytical Results				
09/14/09	---	32.42	---	138.04				No Analytical Results				
MW-2		Screen: 20.0-35.0 ft bgs			TOC: 171.41 ft							
03/18/09			Dry									
09/14/09	---	32.72	---	138.69				No Analytical Results				
MW-3		Screen: 20.0-35.0 ft bgs			TOC: 170.41 ft							
03/18/09	---	33.70	---	136.71				No Analytical Results				
09/14/09	---	31.40	---	139.01				No Analytical Results				
MW-4		Screen: 20.0-35.0 ft bgs			TOC: 171.14 ft							
03/18/09	---	32.40	---	138.74				No Analytical Results				
09/14/09	---	30.67	---	140.47				No Analytical Results				
MW-5		Screen: 20.0-35.0 ft bgs			TOC: 172.31 ft							
03/18/09			Dry									
04/01/09	---	32.46	---	139.85		ND (1)	ND (1)	ND (3)	ND (1)	ND	ND (1)	ND (100)

Notes:
1) Reporting limit shown in parenthesis.
2) Groundwater elevation corrected for presence of LPH.
3) Analytical and LPH Recovery results were rounded.
4) BTEX summed before rounding.

Abbreviations:
DTL: Depth to LPH
DTW: Depth to Water
LPH: Liquid Phase Hydrocarbons
GW Elev: Groundwater Elevation
TOC: Top of Casing
ND: Not Detected above reporting limit
NA: Not Analyzed
UNK: Unknown

Gannett Fleming

TABLE C-1. GROUNDWATER MONITORING DATA
SEMI-ANNUAL PROGRESS REPORT: JULY THROUGH DECEMBER 2009
FORMER CHEVRON FACILITY 122208
5801 RIGGS ROAD, CHILLUM, MARYLAND

Chevron

PERIOD: 1/1/2009 - 12/31/2009

Date	DTL (ft)	DTW (ft)	LPH Thick. (ft)	GW Elev (ft)	LPH Recov. (gal)	Benzene (µg/l)	Toluene (µg/l)	Ethyl-benzene (µg/l)	Total Xylenes (µg/l)	BTEX (µg/l)	MTBE (µg/l)	TPH-GRO (µg/l)
MW-5		Screen: 20.0-35.0 ft bgs			TOC: 172.31 ft							
09/14/09			Dry									
09/24/09			DRY									
MW-6		Screen: 30.0-45.0 ft bgs			TOC: 171.12 ft							
03/18/09	---	35.91	---	135.21				No Analytical Results				
04/01/09	---	34.25	---	136.87				No Analytical Results				
04/02/09						3.5 (2)	100.0 (2)	166.0 (6)	12.0 (2)	281.5	ND (2)	2,300.0 (100)
09/14/09	---	34.17	---	136.95				No Analytical Results				
09/24/09	---	33.30	---	137.82		2.0 (1)	50.0 (1)	100.0 (3)	5.1 (1)	157.1	ND (1)	890.0 (100)
MW-7		Screen: 20.0-68.0 ft bgs			TOC: 177.11 ft							
01/26/09	---	57.20	---	119.91				No Analytical Results				
02/24/09	---	57.20	---	119.91				No Analytical Results				
03/18/09	---	52.92	---	124.19				No Analytical Results				
04/01/09	---	43.71	---	133.40		3,400.0 (25)	670.0 (25)	2,770.0 (75)	5,300.0 (25)	12,140.0	1,300.0 (25)	23,000.0 (5000)
04/27/09	---	42.04	---	135.07				No Analytical Results				
05/27/09	---	48.50	---	128.61				No Analytical Results				
06/15/09	---	43.35	---	133.76				No Analytical Results				
09/14/09	---	49.44	---	127.67				No Analytical Results				
09/29/09			System			550.0 (5)	72.0 (5)	430.0 (15)	640.0 (5)	1,692.0	270.0 (5)	3,300.0 (200)
10/28/09	---	35.00	---	142.11				No Analytical Results				
11/16/09	---	37.96	---	139.15				No Analytical Results				
12/22/09	---	41.38	---	135.73				No Analytical Results				
MW-12		Screen: 25.0-55.0 ft bgs			TOC: 171.50 ft							
03/18/09	---	43.85	---	127.65				No Analytical Results				
09/14/09	---	42.57	---	128.93				No Analytical Results				
MW-13		Screen: 25.0-40.0 ft bgs			TOC: 172.47 ft							
03/18/09	---	36.60	---	135.87				No Analytical Results				
09/14/09	---	35.78	---	136.69				No Analytical Results				

Notes:
1) Reporting limit shown in parenthesis.
2) Groundwater elevation corrected for presence of LPH.
3) Analytical and LPH Recovery results were rounded.
4) BTEX summed before rounding.

Abbreviations:
DTL: Depth to LPH
DTW: Depth to Water
LPH: Liquid Phase Hydrocarbons
GW Elev: Groundwater Elevation
TOC: Top of Casing
ND: Not Detected above reporting limit
NA: Not Analyzed
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TABLE C-1. GROUNDWATER MONITORING DATA
SEMI-ANNUAL PROGRESS REPORT: JULY THROUGH DECEMBER 2009
FORMER CHEVRON FACILITY 122208
5801 RIGGS ROAD, CHILLUM, MARYLAND

Chevron

PERIOD: 1/1/2009 - 12/31/2009

Date	DTL (ft)	DTW (ft)	LPH Thick. (ft)	GW Elev (ft)	LPH Recov. (gal)	Benzene (µg/l)	Toluene (µg/l)	Ethyl-benzene (µg/l)	Total Xylenes (µg/l)	BTEX (µg/l)	MTBE (µg/l)	TPH-GRO (µg/l)
MW-15		Screen: 10.0-50.0 ft bgs			TOC: 172.34 ft							
03/18/09	---	31.11	---	141.23				No Analytical Results				
04/01/09	---	30.80	---	141.54		10.0 (1)	16.0 (1)	57.0 (3)	38.0 (1)	121.0	ND (1)	830.0 (100)
09/14/09	---	30.58	---	141.76				No Analytical Results				
09/24/09	---	30.55	---	141.79		7.0 (1)	ND (1)	ND (3)	ND (1)	7.0	ND (1)	ND (100)
MW-16		Screen: UNK			TOC: 171.05 ft							
01/26/09	---	40.30	---	130.75				No Analytical Results				
02/24/09			Dry									
03/18/09	---	39.89	---	131.16				No Analytical Results				
03/30/09	---	39.03	---	132.02		27.0 (2)	ND (2)	ND (6)	6.4 (2)	33.4	480.0 (2)	490.0 (100)
04/27/09	---	37.56	---	133.49				No Analytical Results				
05/27/09	---	37.28	---	133.77				No Analytical Results				
06/15/09	---	37.95	---	133.10				No Analytical Results				
07/27/09	---	38.09	---	132.96				No Analytical Results				
08/24/09	---	37.52	---	133.53				No Analytical Results				
09/14/09	---	37.04	---	134.01				No Analytical Results				
09/28/09	---	37.21	---	133.84		27.0 (1)	2.9 (1)	38.0 (3)	20.0 (1)	87.9	6.0 (1)	350.0 (100)
10/28/09	---	39.48	---	131.57				No Analytical Results				
11/16/09	---	37.83	---	133.22				No Analytical Results				
12/22/09	---	36.93	---	134.12				No Analytical Results				
MW-17		Screen: 30.0-50.0 ft bgs			TOC: 170.67 ft							
03/18/09	---	45.29	---	125.38				No Analytical Results				
04/07/09	---	38.16	---	132.51		5,600.0 (50)	1,600.0 (50)	7,700.0 (150)	10,000.0 (50)	24,900.0	6,000.0 (50)	40,000.0 (10000)
09/14/09	---	44.90	---	125.77				No Analytical Results				
09/29/09			System			4,400.0 (50)	820.0 (50)	5,300.0 (150)	8,300.0 (50)	18,820.0	6,200.0 (50)	31,000.0 (1000)
MW-18		Screen: 29.0-44.0 ft bgs			TOC: 168.45 ft							
01/26/09	---	33.79	---	134.66				No Analytical Results				
02/24/09	---	33.58	---	134.87				No Analytical Results				

Notes:
1) Reporting limit shown in parenthesis.
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4) BTEX summed before rounding.

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LPH: Liquid Phase Hydrocarbons
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TOC: Top of Casing
ND: Not Detected above reporting limit
NA: Not Analyzed
UNK: Unknown

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TABLE C-1. GROUNDWATER MONITORING DATA
SEMI-ANNUAL PROGRESS REPORT: JULY THROUGH DECEMBER 2009
FORMER CHEVRON FACILITY 122208
5801 RIGGS ROAD, CHILLUM, MARYLAND

Chevron

PERIOD: 1/1/2009 - 12/31/2009

Date	DTL (ft)	DTW (ft)	LPH Thick. (ft)	GW Elev (ft)	LPH Recov. (gal)	Benzene (µg/l)	Toluene (µg/l)	Ethyl-benzene (µg/l)	Total Xylenes (µg/l)	BTEX (µg/l)	MTBE (µg/l)	TPH-GRO (µg/l)
MW-18		Screen: 29.0-44.0 ft bgs			TOC: 168.45 ft							
03/18/09	---	34.02	---	134.43				No Analytical Results				
03/30/09	---	33.07	---	135.38		14.0 (20)	380.0 (20)	5,000.0 (60)	810.0 (20)	6,204.0	ND (20)	30,000.0 (5000)
04/27/09	---	32.42	---	136.03				No Analytical Results				
05/27/09	---	31.30	---	137.15				No Analytical Results				
06/15/09	---	30.57	---	137.88				No Analytical Results				
07/27/09	---	30.12	---	138.33				No Analytical Results				
08/24/09	---	30.45	---	138.00				No Analytical Results				
09/14/09	---	16.74	---	151.71				No Analytical Results				
09/28/09	---	31.17	---	137.28		ND (20)	19.0 (20)	3,500.0 (60)	140.0 (20)	3,659.0	ND (20)	26,000.0 (2000)
10/28/09	---	32.02	---	136.43				No Analytical Results				
11/16/09	---	31.61	---	136.84				No Analytical Results				
12/22/09		Covered by snow										
MW-19		Screen: 30.0-45.0 ft bgs			TOC: 169.56 ft							
03/18/09	---	37.98	---	131.58				No Analytical Results				
03/30/09	---	37.22	---	132.34		ND (1)	ND (1)	ND (3)	ND (1)	ND	ND (1)	ND (100)
09/14/09	---	33.89	---	135.67				No Analytical Results				
09/28/09	---	35.48	---	134.08		ND (1)	ND (1)	ND (3)	ND (1)	ND	ND (1)	ND (100)
MW-20		Screen: 30.0-50.0 ft bgs			TOC: 176.27 ft							
03/18/09	---	38.19	---	138.08				No Analytical Results				
04/02/09	---	38.10	---	138.17		2.3 (1)	ND (1)	ND (3)	ND (1)	2.3	ND (1)	250.0 (100)
09/14/09	---	37.49	---	138.78				No Analytical Results				
09/24/09	---	37.41	---	138.86		1.7 (1)	ND (1)	ND (3)	ND (1)	1.7	ND (1)	300.0 (100)
MW-21		Screen: 28.0-48.0 ft bgs			TOC: 173.37 ft							
03/18/09	---	36.97	---	136.39				No Analytical Results				
04/02/09	---	36.20	---	137.17		10.0 (1)	ND (1)	8.7 (3)	ND (1)	18.7	17.0 (1)	260.0 (100)
09/14/09	---	36.31	---	137.05				No Analytical Results				
09/24/09	---	36.04	---	137.33		9.1 (1)	ND (1)	8.6 (3)	ND (1)	17.7	ND (1)	230.0 (100)

Notes:

1) Reporting limit shown in parenthesis.
2) Groundwater elevation corrected for presence of LPH.
3) Analytical and LPH Recovery results were rounded.
4) BTEX summed before rounding.

Abbreviations:

DTL: Depth to LPH
DTW: Depth to Water
LPH: Liquid Phase Hydrocarbons
GW Elev: Groundwater Elevation
TOC: Top of Casing
ND: Not Detected above reporting limit
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Gannett Fleming

TABLE C-1. GROUNDWATER MONITORING DATA
SEMI-ANNUAL PROGRESS REPORT: JULY THROUGH DECEMBER 2009
FORMER CHEVRON FACILITY 122208
5801 RIGGS ROAD, CHILLUM, MARYLAND

Chevron

PERIOD: 1/1/2009 - 12/31/2009

Date	DTL (ft)	DTW (ft)	LPH Thick. (ft)	GW Elev (ft)	LPH Recov. (gal)	Benzene (µg/l)	Toluene (µg/l)	Ethyl-benzene (µg/l)	Total Xylenes (µg/l)	BTEX (µg/l)	MTBE (µg/l)	TPH-GRO (µg/l)
MW-22		Screen: 31.5-51.5 ft bgs			TOC: 171.23 ft							
01/26/09	---	42.15	---	129.08				No Analytical Results				
02/24/09	---	41.58	---	129.65				No Analytical Results				
03/18/09	---	42.15	---	129.08				No Analytical Results				
03/30/09	---	39.48	---	131.75		5,900.0 (100)	1,500.0 (100)	10,100.0 (300)	16,000.0 (100)	33,500.0	680.0 (100)	55,000.0 (10000)
04/27/09	---	38.72	---	132.51				No Analytical Results				
05/27/09	---	39.76	---	131.47				No Analytical Results				
06/15/09	---	39.45	---	131.78				No Analytical Results				
07/27/09	---	39.07	---	132.16				No Analytical Results				
08/24/09	---	39.05	---	132.18				No Analytical Results				
09/14/09	Obstructed by Hydrasleeve sampler											
09/28/09	---	38.19	---	133.04		4,200.0 (100)	960.0 (100)	9,300.0 (300)	9,600.0 (100)	24,060.0	420.0 (100)	55,000.0 (2000)
10/28/09	---	43.26	---	127.97				No Analytical Results				
11/16/09	---	39.46	---	131.77				No Analytical Results				
12/22/09	---	38.94	---	132.29				No Analytical Results				
MW-23		Screen: 32.0-52.0 ft bgs			TOC: 171.31 ft							
03/18/09	---	44.34	---	126.96				No Analytical Results				
03/30/09	---	43.53	---	127.78		2.3 (1)	ND (1)	ND (3)	ND (1)	2.3	6.8 (1)	ND (100)
09/14/09	---	43.57	---	127.73				No Analytical Results				
09/28/09	---	42.50	---	128.81		9.6 (1)	ND (1)	ND (3)	ND (1)	9.6	24.0 (1)	ND (100)
MW-24A		Screen: 16.0-23.5 ft bgs			TOC: 157.38 ft							
01/26/09	---	21.67	---	135.71				No Analytical Results				
02/24/09	---	22.81	---	134.57				No Analytical Results				
03/18/09	---	21.04	---	136.34				No Analytical Results				
03/27/09	---	21.83	---	135.55		8.3 (20)	610.0 (20)	3,290.0 (60)	52.0 (20)	3,960.3	ND (20)	46,000.0 (2500)
04/27/09	---	20.34	---	137.04				No Analytical Results				
05/27/09	---	19.94	---	137.44				No Analytical Results				
06/15/09	---	18.97	---	138.41				No Analytical Results				
07/27/09	---	19.39	---	137.99				No Analytical Results				
08/24/09	---	19.76	---	137.62				No Analytical Results				

Notes:

1) Reporting limit shown in parenthesis.
2) Groundwater elevation corrected for presence of LPH.
3) Analytical and LPH Recovery results were rounded.
4) BTEX summed before rounding.

Abbreviations:

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DTW: Depth to Water
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GW Elev: Groundwater Elevation
TOC: Top of Casing
ND: Not Detected above reporting limit
NA: Not Analyzed
UNK: Unknown

Gannett Fleming

TABLE C-1. GROUNDWATER MONITORING DATA
SEMI-ANNUAL PROGRESS REPORT: JULY THROUGH DECEMBER 2009
FORMER CHEVRON FACILITY 122208
5801 RIGGS ROAD, CHILLUM, MARYLAND

Chevron

PERIOD: 1/1/2009 - 12/31/2009

Date	DTL (ft)	DTW (ft)	LPH Thick. (ft)	GW Elev (ft)	LPH Recov. (gal)	Benzene (µg/l)	Toluene (µg/l)	Ethyl-benzene (µg/l)	Total Xylenes (µg/l)	BTEX (µg/l)	MTBE (µg/l)	TPH-GRO (µg/l)
MW-24A	Screen: 16.0-23.5 ft bgs				TOC: 157.38 ft							
09/14/09	Obstructed by Hydrasleeve sampler											
09/29/09	---	20.48	---	136.90		ND (5)	250.0 (5)	1,750.0 (15)	23.0 (5)	2,023.0	ND (5)	14,000.0 (2000)
10/28/09	---	20.92	---	136.46		No Analytical Results						
11/16/09	---	20.50	---	136.88		No Analytical Results						
12/22/09	Covered by snow											
MW-24B	Screen: 22.5-30.0 ft bgs				TOC: 157.45 ft							
03/18/09	---	22.07	---	135.38		No Analytical Results						
03/27/09	---	21.91	---	135.54		17.0 (20)	290.0 (20)	2,150.0 (60)	190.0 (20)	2,647.0	ND (20)	12,000.0 (2500)
09/14/09	---	20.29	---	137.16		No Analytical Results						
09/29/09	---	20.52	---	136.93		ND (5)	20.0 (5)	890.0 (15)	6.8 (5)	916.8	ND (5)	12,000.0 (500)
MW-25A	Screen: 22.0-29.5 ft bgs				TOC: 149.99 ft							
03/18/09	---	26.96	---	123.03		No Analytical Results						
03/27/09	---	27.01	---	122.98		No Analytical Results						
03/30/09						ND (1)	ND (1)	ND (3)	ND (1)	ND	ND (1)	ND (100)
09/14/09	Obstructed by Hydrasleeve sampler											
09/22/09	---	26.64	---	123.35		ND (1)	ND (1)	ND (3)	ND (1)	ND	2.5 (1)	ND (100)
MW-25B	Screen: 45.0-55.0 ft bgs				TOC: 150.95 ft							
03/18/09	---	27.36	---	123.58		No Analytical Results						
03/27/09	---	27.72	---	123.23		450.0 (2)	ND (2)	83.0 (6)	ND (2)	533.0	410.0 (2)	1,800.0 (100)
09/14/09	Obstructed by Hydrasleeve sampler											
09/22/09	---	26.15	---	124.80		170.0 (2)	ND (2)	29.0 (6)	ND (2)	199.0	260.0 (2)	820.0 (200)
MW-26A	Screen: 2.0-9.5 ft bgs				TOC: 135.62 ft							
03/18/09	---	4.91	---	130.70		No Analytical Results						
03/25/09	---	4.97	---	130.65		ND (1)	ND (1)	ND (3)	ND (1)	ND	ND (1)	ND (100)
09/14/09	---	4.80	---	130.81		No Analytical Results						
09/22/09	---	4.94	---	130.68		ND (1)	ND (1)	ND (3)	ND (1)	ND	ND (1)	ND (100)

Notes:
1) Reporting limit shown in parenthesis.
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Gannett Fleming

TABLE C-1. GROUNDWATER MONITORING DATA
SEMI-ANNUAL PROGRESS REPORT: JULY THROUGH DECEMBER 2009
FORMER CHEVRON FACILITY 122208
5801 RIGGS ROAD, CHILLUM, MARYLAND

Chevron

PERIOD: 1/1/2009 - 12/31/2009

Date	DTL (ft)	DTW (ft)	LPH Thick. (ft)	GW Elev (ft)	LPH Recov. (gal)	Benzene (µg/l)	Toluene (µg/l)	Ethyl-benzene (µg/l)	Total Xylenes (µg/l)	BTEX (µg/l)	MTBE (µg/l)	TPH-GRO (µg/l)
MW-26B		Screen: 21.5-26.5 ft bgs			TOC: 135.74 ft							
03/18/09	---	6.44	---	129.30				No Analytical Results				
03/25/09	---	6.46	---	129.28		130.0 (1)	ND (1)	8.5 (3)	ND (1)	138.5	230.0 (1)	430.0 (100)
09/14/09	---	6.02	---	129.72				No Analytical Results				
09/22/09	---	6.00	---	129.74		150.0 (1)	ND (1)	9.1 (3)	ND (1)	159.1	200.0 (1)	570.0 (100)
MW-27A		Screen: 8.0-15.5 ft bgs			TOC: 128.92 ft							
03/18/09	---	11.22	---	117.69				No Analytical Results				
03/25/09	---	11.27	---	117.65		ND (1)	ND (1)	ND (3)	ND (1)	ND	32.0 (1)	ND (100)
09/14/09	---	10.16	---	118.75				No Analytical Results				
09/21/09	---	10.24	---	118.68		ND (1)	ND (1)	ND (3)	ND (1)	ND	12.0 (1)	ND (100)
MW-27B		Screen: 30.5-40.5 ft bgs			TOC: 128.92 ft							
03/18/09	---	13.56	---	115.35				No Analytical Results				
03/25/09	---	13.60	---	115.32		19.0 (1)	ND (1)	3.1 (3)	ND (1)	22.1	240.0 (1)	280.0 (100)
09/14/09	---	12.69	---	116.22				No Analytical Results				
09/22/09	---	12.73	---	116.19		6.5 (1)	ND (1)	ND (3)	ND (1)	6.5	160.0 (1)	250.0 (100)
MW-28A		Screen: 3.0-10.5 ft bgs			TOC: 126.13 ft							
03/18/09	---	4.74	---	121.39				No Analytical Results				
03/23/09	---	4.76	---	121.37		ND (1)	ND (1)	ND (3)	ND (1)	ND	1.8 (1)	ND (100)
09/14/09	---	4.40	---	121.73				No Analytical Results				
09/21/09	---	4.48	---	121.65		ND (1)	ND (1)	ND (3)	ND (1)	ND	1.1 (1)	ND (100)
MW-28B		Screen: 15.5-25.5 ft bgs			TOC: 125.49 ft							
03/18/09	---	4.71	---	120.78				No Analytical Results				
03/23/09	---	4.70	---	120.79		ND (1)	ND (1)	ND (3)	ND (1)	ND	ND (1)	ND (100)
09/14/09	---	4.23	---	121.26				No Analytical Results				
09/21/09	---	4.32	---	121.17		ND (1)	ND (1)	ND (3)	ND (1)	ND	ND (1)	ND (100)
MW-29A		Screen: 5.0-12.5 ft bgs			TOC: 115.70 ft							
03/18/09	---	8.00	---	107.69				No Analytical Results				

Notes:
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Abbreviations:
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Gannett Fleming

TABLE C-1. GROUNDWATER MONITORING DATA
SEMI-ANNUAL PROGRESS REPORT: JULY THROUGH DECEMBER 2009
FORMER CHEVRON FACILITY 122208
5801 RIGGS ROAD, CHILLUM, MARYLAND

Chevron

PERIOD: 1/1/2009 - 12/31/2009

Date	DTL (ft)	DTW (ft)	LPH Thick. (ft)	GW Elev (ft)	LPH Recov. (gal)	Benzene (µg/l)	Toluene (µg/l)	Ethyl-benzene (µg/l)	Total Xylenes (µg/l)	BTEX (µg/l)	MTBE (µg/l)	TPH-GRO (µg/l)
MW-29A		Screen: 5.0-12.5 ft bgs			TOC: 115.70 ft							
03/23/09	---	8.07	---	107.63		ND (1)	ND (1)	ND (3)	ND (1)	ND	7.4 (1)	ND (100)
09/14/09	---	7.23	---	108.46		No Analytical Results						
09/21/09	---	7.22	---	108.48		ND (1)	ND (1)	ND (3)	ND (1)	ND	9.7 (1)	ND (100)
MW-29B		Screen: 19.0-29.0 ft bgs			TOC: 115.54 ft							
03/18/09	---	6.83	---	108.70		No Analytical Results						
03/23/09	---	6.97	---	108.57		ND (1)	ND (1)	ND (3)	ND (1)	ND	72.0 (1)	ND (100)
09/14/09	---	6.79	---	108.74		No Analytical Results						
09/21/09	---	6.03	---	109.51		ND (1)	ND (1)	ND (3)	ND (1)	ND	58.0 (1)	150.0 (100)
MW-30		Screen: 15.0-30.0 ft bgs			TOC: 156.87 ft							
03/18/09	---	21.66	---	135.21		No Analytical Results						
03/27/09	---	21.38	---	135.49		ND (1)	ND (1)	ND (3)	ND (1)	ND	ND (1)	ND (100)
09/14/09	---	19.64	---	137.23		No Analytical Results						
09/29/09	---	19.91	---	136.96		ND (1)	ND (1)	ND (3)	ND (1)	ND	ND (1)	ND (100)
MW-31A		Screen: 4.0-11.5 ft bgs			TOC: 135.19 ft							
03/18/09	---	6.04	---	129.15		No Analytical Results						
09/14/09	---	5.72	---	129.47		No Analytical Results						
MW-31B		Screen: 11.5-21.5 ft bgs			TOC: 135.81 ft							
03/18/09	---	5.69	---	130.12		No Analytical Results						
03/24/09	---	5.60	---	130.21		ND (1)	ND (1)	ND (3)	ND (1)	ND	ND (1)	ND (100)
09/14/09	---	5.25	---	130.56		No Analytical Results						
09/21/09	---	5.38	---	130.43		ND (1)	ND (1)	ND (3)	ND (1)	ND	ND (1)	ND (100)
MW-32		Screen: 5.0-15.0 ft bgs			TOC: 128.47 ft							
03/18/09	---	8.64	---	119.83		No Analytical Results						
09/14/09	---	8.75	---	119.72		No Analytical Results						

Notes:
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TABLE C-1. GROUNDWATER MONITORING DATA
SEMI-ANNUAL PROGRESS REPORT: JULY THROUGH DECEMBER 2009
FORMER CHEVRON FACILITY 122208
5801 RIGGS ROAD, CHILLUM, MARYLAND

Chevron

PERIOD: 1/1/2009 - 12/31/2009

Date	DTL (ft)	DTW (ft)	LPH Thick. (ft)	GW Elev (ft)	LPH Recov. (gal)	Benzene (µg/l)	Toluene (µg/l)	Ethyl-benzene (µg/l)	Total Xylenes (µg/l)	BTEX (µg/l)	MTBE (µg/l)	TPH-GRO (µg/l)
MW-33A		Screen: 2.0-9.5 ft bgs			TOC: 126.35 ft							
03/18/09	---	3.89	---	122.46				No Analytical Results				
03/24/09	---	4.00	---	122.35		ND (1)	ND (1)	ND (3)	ND (1)	ND	ND (1)	ND (100)
09/14/09	---	3.45	---	122.90				No Analytical Results				
09/21/09	---	3.70	---	122.65		ND (1)	ND (1)	ND (3)	ND (1)	ND	ND (1)	ND (100)
MW-33B		Screen: 13.0-23.0 ft bgs			TOC: 126.16 ft							
03/18/09	---	4.89	---	121.27				No Analytical Results				
03/24/09	---	4.92	---	121.24		380.0 (2)	ND (2)	13.0 (6)	ND (2)	393.0	220.0 (2)	950.0 (100)
09/14/09	---	4.49	---	121.67				No Analytical Results				
09/21/09	---	3.54	---	122.62		380.0 (2)	ND (2)	11.4 (6)	ND (2)	391.4	240.0 (2)	1,100.0 (200)
MW-33C		Screen: 23.0-33.0 ft bgs			TOC: 125.84 ft							
03/18/09	---	4.87	---	120.96				No Analytical Results				
03/24/09	---	4.94	---	120.90		4.4 (1)	ND (1)	ND (3)	ND (1)	4.4	26.0 (1)	ND (100)
09/14/09	---	4.39	---	121.44				No Analytical Results				
09/21/09	---	4.50	---	121.34		8.4 (1)	ND (1)	ND (3)	ND (1)	8.4	24.0 (1)	ND (100)
MW-33S		Screen: 2.0-7.0 ft bgs			TOC: 126.58 ft							
03/18/09	---	3.83	---	122.74				No Analytical Results				
03/24/09	---	3.96	---	122.62		ND (1)	ND (1)	ND (3)	ND (1)	ND	ND (1)	ND (100)
09/14/09	---	3.30	---	123.27				No Analytical Results				
09/21/09	---	3.63	---	122.95		ND (1)	ND (1)	ND (3)	ND (1)	ND	ND (1)	ND (100)
MW-34A		Screen: 7.0-14.5 ft bgs			TOC: 107.41 ft							
03/18/09	---	8.99	---	98.42				No Analytical Results				
09/14/09	---	9.05	---	98.36				No Analytical Results				
MW-34B		Screen: 14.5-24.5 ft bgs			TOC: 107.40 ft							
03/18/09	---	9.29	---	98.11				No Analytical Results				
09/14/09	---	9.28	---	98.12				No Analytical Results				

Notes:
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SEMI-ANNUAL PROGRESS REPORT: JULY THROUGH DECEMBER 2009
FORMER CHEVRON FACILITY 122208
5801 RIGGS ROAD, CHILLUM, MARYLAND

Chevron

PERIOD: 1/1/2009 - 12/31/2009

Date	DTL (ft)	DTW (ft)	LPH Thick. (ft)	GW Elev (ft)	LPH Recov. (gal)	Benzene (µg/l)	Toluene (µg/l)	Ethyl-benzene (µg/l)	Total Xylenes (µg/l)	BTEX (µg/l)	MTBE (µg/l)	TPH-GRO (µg/l)
MW-37		Screen: 8.0-15.5 ft bgs			TOC: 152.61 ft							
03/18/09			Dry									
09/14/09	---	15.13	---	137.48				No Analytical Results				
MW-38		Screen: 8.0-15.5 ft bgs			TOC: 146.91 ft							
03/18/09	---	11.04	---	135.86				No Analytical Results				
03/27/09	---	11.02	---	135.89		ND (1)	ND (1)	ND (3)	ND (1)	ND	ND (1)	ND (100)
09/14/09	---	10.37	---	136.53				No Analytical Results				
09/22/09	---	10.45	---	136.46				No Analytical Results				
09/23/09						ND (1)	ND (1)	ND (3)	ND (1)	ND	ND (1)	ND (100)
MW-39		Screen: 6.0-13.5 ft bgs			TOC: 146.01 ft							
03/18/09			Dry									
09/14/09			Dry									
MW-39R		Screen: 13.0-20.5 ft bgs			TOC: 146.01 ft							
03/18/09	---	17.31	---	128.70				No Analytical Results				
03/27/09	---	17.32	---	128.69		ND (1)	ND (1)	ND (3)	ND (1)	ND	ND (1)	ND (100)
09/14/09	---	16.65	---	129.36				No Analytical Results				
09/22/09	---	16.81	---	129.20		ND (1)	ND (1)	ND (3)	ND (1)	ND	ND (1)	ND (100)
MW-40		Screen: 20.0-27.5 ft bgs			TOC: 145.18 ft							
03/18/09	---	23.38	---	121.79				No Analytical Results				
03/27/09	---	23.36	---	121.82		ND (1)	ND (1)	ND (3)	ND (1)	ND	1.9 (1)	ND (100)
09/14/09	---	21.63	---	123.54				No Analytical Results				
09/22/09	---	32.28	---	112.90		ND (1)	ND (1)	ND (3)	ND (1)	ND	ND (1)	ND (100)
MW-41A		Screen: 17.0-24.5 ft bgs			TOC: 136.96 ft							
03/18/09	---	20.17	---	116.78				No Analytical Results				
03/25/09	---	20.21	---	116.75		ND (1)	ND (1)	ND (3)	ND (1)	ND	ND (1)	ND (100)
09/14/09	---	18.67	---	118.28				No Analytical Results				
09/22/09	---	18.75	---	118.21		ND (1)	ND (1)	ND (3)	ND (1)	ND	ND (1)	ND (100)

Notes:
1) Reporting limit shown in parenthesis.
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4) BTEX summed before rounding.

Abbreviations:
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TABLE C-1. GROUNDWATER MONITORING DATA
SEMI-ANNUAL PROGRESS REPORT: JULY THROUGH DECEMBER 2009
FORMER CHEVRON FACILITY 122208
5801 RIGGS ROAD, CHILLUM, MARYLAND

Chevron

PERIOD: 1/1/2009 - 12/31/2009

Date	DTL (ft)	DTW (ft)	LPH Thick. (ft)	GW Elev (ft)	LPH Recov. (gal)	Benzene (µg/l)	Toluene (µg/l)	Ethyl-benzene (µg/l)	Total Xylenes (µg/l)	BTEX (µg/l)	MTBE (µg/l)	TPH-GRO (µg/l)
MW-41B		Screen: 28.0-38.0 ft bgs			TOC: 136.82 ft							
03/18/09	---	20.53	---	116.29				No Analytical Results				
03/25/09	---	20.59	---	116.23		ND (1)	ND (1)	ND (3)	ND (1)	ND	16.0 (1)	ND (100)
09/14/09	---	19.13	---	117.69				No Analytical Results				
09/22/09	---	19.22	---	117.60		ND (1)	ND (1)	ND (3)	ND (1)	ND	13.0 (1)	ND (100)
MW-42		Screen: 2.0-9.5 ft bgs			TOC: 140.03 ft							
03/18/09	---	8.67	---	131.35				No Analytical Results				
03/25/09	---	8.48	---	131.55		ND (1)	ND (1)	ND (3)	ND (1)	ND	ND (1)	ND (100)
09/14/09	Obstructed by Hydrasleeve sampler											
09/22/09	---	7.96	---	132.07		ND (1)	ND (1)	ND (3)	ND (1)	ND	ND (1)	ND (100)
MW-43A		Screen: 2.0-9.5 ft bgs			TOC: 133.98 ft							
03/18/09	---	4.19	---	129.79				No Analytical Results				
03/25/09	---	4.35	---	129.63		ND (1)	ND (1)	ND (3)	ND (1)	ND	ND (1)	ND (100)
09/14/09	---	4.40	---	129.58				No Analytical Results				
09/22/09	---	4.52	---	129.46		ND (1)	ND (1)	ND (3)	ND (1)	ND	ND (1)	ND (100)
MW-43B		Screen: 21.0-31.0 ft bgs			TOC: 134.09 ft							
03/18/09	---	9.53	---	124.56				No Analytical Results				
03/25/09	---	9.43	---	124.66		4.3 (1)	ND (1)	ND (3)	ND (1)	4.3	17.0 (1)	ND (100)
09/14/09	---	8.58	---	125.51				No Analytical Results				
09/22/09	---	8.68	---	125.41		2.6 (1)	ND (1)	ND (3)	ND (1)	2.6	11.0 (1)	ND (100)
MW-44A		Screen: 6.0-13.5 ft bgs			TOC: 130.22 ft							
03/18/09	---	10.18	---	120.04				No Analytical Results				
03/25/09	---	12.56	---	117.66		ND (1)	ND (1)	ND (3)	ND (1)	ND	17.0 (1)	ND (100)
09/14/09	---	9.37	---	120.85				No Analytical Results				
09/21/09	---	9.42	---	120.80		ND (1)	ND (1)	ND (3)	ND (1)	ND	29.0 (1)	ND (100)

Notes:
1) Reporting limit shown in parenthesis.
2) Groundwater elevation corrected for presence of LPH.
3) Analytical and LPH Recovery results were rounded.
4) BTEX summed before rounding.

Abbreviations:
DTL: Depth to LPH
DTW: Depth to Water
LPH: Liquid Phase Hydrocarbons
GW Elev: Groundwater Elevation
TOC: Top of Casing
ND: Not Detected above reporting limit
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UNK: Unknown

Gannett Fleming

TABLE C-1. GROUNDWATER MONITORING DATA
SEMI-ANNUAL PROGRESS REPORT: JULY THROUGH DECEMBER 2009
FORMER CHEVRON FACILITY 122208
5801 RIGGS ROAD, CHILLUM, MARYLAND

Chevron

PERIOD: 1/1/2009 - 12/31/2009

Date	DTL (ft)	DTW (ft)	LPH Thick. (ft)	GW Elev (ft)	LPH Recov. (gal)	Benzene (µg/l)	Toluene (µg/l)	Ethyl-benzene (µg/l)	Total Xylenes (µg/l)	BTEX (µg/l)	MTBE (µg/l)	TPH-GRO (µg/l)
MW-44B		Screen: 29.0-39.0 ft bgs			TOC: 130.24 ft							
03/18/09	---	12.49	---	117.75				No Analytical Results				
03/25/09	---	10.18	---	120.06		ND (1)	ND (1)	ND (3)	ND (1)	ND	94.0 (1)	100.0 (100)
09/14/09	---	11.62	---	118.62				No Analytical Results				
09/21/09	---	11.67	---	118.57		ND (1)	ND (1)	ND (3)	ND (1)	ND	76.0 (1)	120.0 (100)
MW-45		Screen: 35.0-55.0 ft bgs			TOC: 173.89 ft							
03/18/09	---	44.80	---	129.09				No Analytical Results				
03/31/09	---	43.02	---	130.87		21.0 (1)	ND (1)	29.5 (3)	2.7 (1)	53.2	ND (1)	740.0 (500)
09/14/09	---	43.91	---	129.98				No Analytical Results				
09/23/09	---	47.67	---	126.22		130.0 (1)	1.2 (1)	103.0 (3)	6.5 (1)	240.7	ND (1)	920.0 (100)
MW-46		Screen: 38.0-58.0 ft bgs			TOC: 174.12 ft							
03/18/09	---	48.12	---	125.99				No Analytical Results				
03/31/09	---	47.63	---	126.49		ND (1)	ND (1)	ND (3)	ND (1)	ND	6.2 (1)	ND (100)
09/14/09	---	47.01	---	127.10				No Analytical Results				
09/23/09	---	47.07	---	127.05		1.4 (1)	ND (1)	ND (3)	ND (1)	1.4	14.0 (1)	ND (100)
MW-47		Screen: 40.0-60.0 ft bgs			TOC: 171.50 ft							
03/18/09	---	46.90	---	124.59				No Analytical Results				
03/31/09	---	46.65	---	124.85		250.0 (2)	ND (1)	77.5 (3)	63.0 (1)	390.5	19.0 (1)	1,600.0 (500)
09/14/09	---	45.55	---	125.94				No Analytical Results				
09/23/09	---	45.61	---	125.89		160.0 (1)	ND (1)	46.1 (3)	34.0 (1)	240.1	16.0 (1)	680.0 (100)
MW-48		Screen: 38.0-58.0 ft bgs			TOC: 165.96 ft							
03/18/09	---	42.91	---	123.04				No Analytical Results				
03/31/09	---	42.52	---	123.44		ND (1)	ND (1)	ND (3)	ND (1)	ND	4.2 (1)	ND (100)
09/14/09	---	41.78	---	124.17				No Analytical Results				
09/23/09	---	41.81	---	124.15		ND (1)	ND (1)	ND (3)	ND (1)	ND	1.4 (1)	ND (100)
MW-49		Screen: 33.0-53.0 ft bgs			TOC: 159.15 ft							
03/18/09	---	45.81	---	113.34				No Analytical Results				

Notes:
1) Reporting limit shown in parenthesis.
2) Groundwater elevation corrected for presence of LPH.
3) Analytical and LPH Recovery results were rounded.
4) BTEX summed before rounding.

Abbreviations:
DTL: Depth to LPH
DTW: Depth to Water
LPH: Liquid Phase Hydrocarbons
GW Elev: Groundwater Elevation
TOC: Top of Casing
ND: Not Detected above reporting limit
NA: Not Analyzed
UNK: Unknown

Gannett Fleming

TABLE C-1. GROUNDWATER MONITORING DATA
SEMI-ANNUAL PROGRESS REPORT: JULY THROUGH DECEMBER 2009
FORMER CHEVRON FACILITY 122208
5801 RIGGS ROAD, CHILLUM, MARYLAND

Chevron

PERIOD: 1/1/2009 - 12/31/2009

Date	DTL (ft)	DTW (ft)	LPH Thick. (ft)	GW Elev (ft)	LPH Recov. (gal)	Benzene (µg/l)	Toluene (µg/l)	Ethyl-benzene (µg/l)	Total Xylenes (µg/l)	BTEX (µg/l)	MTBE (µg/l)	TPH-GRO (µg/l)
MW-49		Screen: 33.0-53.0 ft bgs			TOC: 159.15 ft							
03/31/09	---	45.78	---	113.37		ND (2)	ND (2)	ND (6)	ND (2)	ND	250.0 (2)	210.0 (100)
09/14/09	---	44.78	---	114.37		No Analytical Results						
09/23/09	---	44.82	---	114.33		ND (1)	ND (1)	ND (3)	ND (1)	ND	180.0 (1)	250.0 (100)
MW-50		Screen: 31.0-51.0 ft bgs			TOC: 156.12 ft							
03/18/09	---	38.45	---	117.67		No Analytical Results						
03/31/09	---	38.44	---	117.68		4.1 (1)	ND (1)	ND (3)	ND (1)	4.1	110.0 (1)	230.0 (100)
09/14/09	---	37.51	---	118.61		No Analytical Results						
09/23/09	---	37.51	---	118.61		3.6 (1)	ND (1)	ND (3)	ND (1)	3.6	100.0 (1)	190.0 (100)
MW-51		Screen: 44.0-64.0 ft bgs			TOC: 158.12 ft							
03/18/09	---	50.35	---	107.76		No Analytical Results						
03/31/09	---	55.30	---	102.82		21.0 (1)	ND (1)	ND (3)	ND (1)	21.0	76.0 (1)	240.0 (100)
09/14/09	---	49.51	---	108.60		No Analytical Results						
09/23/09	---	49.46	---	108.66		13.0 (1)	ND (1)	ND (3)	ND (1)	13.0	47.0 (1)	160.0 (100)
MW-52		Screen: 2.0-7.0 ft bgs			TOC: 127.58 ft							
03/18/09	---	3.46	---	124.12		No Analytical Results						
09/14/09	---	3.52	---	124.06		No Analytical Results						
MW-53		Screen: 5.5-10.5 ft bgs			TOC: 116.18 ft							
03/18/09	---	6.56	---	109.62		No Analytical Results						
03/23/09	---	6.54	---	109.64		7.8 (1)	ND (1)	3.9 (3)	ND (1)	11.7	150.0 (1)	150.0 (100)
09/14/09		Obstructed by Hydrasleeve sampler										
09/21/09	---	5.80	---	110.38		9.2 (1)	ND (2)	ND (6)	ND (2)	9.2	220.0 (2)	290.0 (100)
MW-54		Screen: 2.0-7.0 ft bgs			TOC: 121.76 ft							
03/18/09	---	5.12	---	116.63		No Analytical Results						
03/23/09	---	5.19	---	116.57		ND (1)	ND (1)	ND (3)	ND (1)	ND	ND (1)	ND (100)
09/14/09	---	5.53	---	116.22		No Analytical Results						
09/21/09	---	5.39	---	116.37		ND (1)	ND (1)	ND (3)	ND (1)	ND	ND (1)	ND (100)

Notes:

1) Reporting limit shown in parenthesis.
2) Groundwater elevation corrected for presence of LPH.
3) Analytical and LPH Recovery results were rounded.
4) BTEX summed before rounding.

Abbreviations:

DTL: Depth to LPH
DTW: Depth to Water
LPH: Liquid Phase Hydrocarbons
GW Elev: Groundwater Elevation
TOC: Top of Casing
ND: Not Detected above reporting limit
NA: Not Analyzed
UNK: Unknown

Gannett Fleming

TABLE C-1. GROUNDWATER MONITORING DATA
SEMI-ANNUAL PROGRESS REPORT: JULY THROUGH DECEMBER 2009
FORMER CHEVRON FACILITY 122208
5801 RIGGS ROAD, CHILLUM, MARYLAND

Chevron

PERIOD: 1/1/2009 - 12/31/2009

Date	DTL (ft)	DTW (ft)	LPH Thick. (ft)	GW Elev (ft)	LPH Recov. (gal)	Benzene (µg/l)	Toluene (µg/l)	Ethyl-benzene (µg/l)	Total Xylenes (µg/l)	BTEX (µg/l)	MTBE (µg/l)	TPH-GRO (µg/l)
MW-55		Screen: 3.5-8.5 ft bgs			TOC: 131.49 ft							
03/18/09	---	2.16	---	129.32				No Analytical Results				
03/24/09	---	2.32	---	129.17		ND (1)	ND (1)	ND (3)	ND (1)	ND	ND (1)	ND (100)
09/14/09	---	1.71	---	129.77				No Analytical Results				
09/21/09	---	1.87	---	129.62		ND (1)	ND (1)	ND (3)	ND (1)	ND	ND (1)	ND (100)
PTW-A		Screen: 40.0-65.0 ft bgs			TOC: 172.28 ft							
03/18/09	---	41.81	---	130.46				No Analytical Results				
04/07/09	---	38.77	---	133.51		2.7 (1)	ND (1)	9.4 (3)	ND (1)	12.1	5.2 (1)	ND (100)
09/14/09	---	35.98	---	136.29				No Analytical Results				
09/29/09			System			4.2 (1)	ND (1)	6.3 (3)	ND (1)	10.5	ND (1)	ND (100)
PTW-B		Screen: 34.0-54.0 ft bgs			TOC: 171.75 ft							
03/18/09	---	41.90	---	129.85				No Analytical Results				
04/02/09	---	37.50	---	134.25		200.0 (2)	57.0 (2)	600.0 (6)	460.0 (2)	1,317.0	140.0 (2)	2,700.0 (100)
09/14/09	---	34.30	---	137.45				No Analytical Results				
09/29/09			System			67.0 (1)	9.7 (1)	73.0 (3)	55.0 (1)	204.7	160.0 (1)	600.0 (100)
RW-1		Screen: 34.0-54.0 ft bgs			TOC: 173.36 ft							
03/18/09	---	47.86	---	125.50				No Analytical Results				
04/01/09	---	42.78	---	130.58		890.0 (5)	38.0 (5)	700.0 (15)	640.0 (5)	2,268.0	700.0 (5)	4,100.0 (100)
09/14/09	---	46.01	---	127.35				No Analytical Results				
09/29/09	---	41.30	---	132.06		1,100.0 (5)	64.0 (5)	860.0 (15)	820.0 (5)	2,844.0	550.0 (5)	4,300.0 (500)
RW-2		Screen: 30.0-55.0 ft bgs			TOC: 172.21 ft							
03/18/09	---	56.51	---	115.70				No Analytical Results				
04/02/09	---	40.72	---	131.49		1,500.0 (20)	330.0 (20)	2,800.0 (60)	3,200.0 (20)	7,830.0	850.0 (20)	12,000.0 (500)
09/14/09		Top of pump at 43.40 ft										
09/29/09			System			2,100.0 (20)	280.0 (20)	1,750.0 (60)	2,500.0 (20)	6,630.0	2,700.0 (20)	10,000.0 (1000)

Notes:
1) Reporting limit shown in parenthesis.
2) Groundwater elevation corrected for presence of LPH.
3) Analytical and LPH Recovery results were rounded.
4) BTEX summed before rounding.

Abbreviations:
DTL: Depth to LPH
DTW: Depth to Water
LPH: Liquid Phase Hydrocarbons
GW Elev: Groundwater Elevation
TOC: Top of Casing
ND: Not Detected above reporting limit
NA: Not Analyzed
UNK: Unknown

Gannett Fleming

TABLE C-1. GROUNDWATER MONITORING DATA
SEMI-ANNUAL PROGRESS REPORT: JULY THROUGH DECEMBER 2009
FORMER CHEVRON FACILITY 122208
5801 RIGGS ROAD, CHILLUM, MARYLAND

Chevron

PERIOD: 1/1/2009 - 12/31/2009

Date	DTL (ft)	DTW (ft)	LPH Thick. (ft)	GW Elev (ft)	LPH Recov. (gal)	Benzene (µg/l)	Toluene (µg/l)	Ethyl-benzene (µg/l)	Total Xylenes (µg/l)	BTEX (µg/l)	MTBE (µg/l)	TPH-GRO (µg/l)
RW-3		Screen: 28.0-48.0 ft bgs			TOC: 171.62 ft							
03/18/09	---	49.95	---	121.67		No Analytical Results						
04/01/09	---	38.71	---	132.91		580.0 (10)	280.0 (10)	1,820.0 (30)	2,300.0 (10)	4,980.0	200.0 (10)	8,800.0 (1000)
09/14/09		Top of pump at 23.99 ft										
09/29/09		System				480.0 (20)	350.0 (20)	2,360.0 (60)	3,600.0 (20)	6,790.0	38.0 (20)	9,100.0 (500)
VP-4		Screen: UNK			TOC: 172.58 ft							
09/14/09	---	34.53	---	138.05		No Analytical Results						

Notes:

1) Reporting limit shown in parenthesis.
2) Groundwater elevation corrected for presence of LPH.
3) Analytical and LPH Recovery results were rounded.
4) BTEX summed before rounding.

Abbreviations:

DTL: Depth to LPH
DTW: Depth to Water
LPH: Liquid Phase Hydrocarbons
GW Elev: Groundwater Elevation
TOC: Top of Casing
ND: Not Detected above reporting limit
NA: Not Analyzed
UNK: Unknown

APPENDIX D

SOIL VAPOR MONITORING DATA

Gannett Fleming

TABLE D-1. SOIL VAPOR MONITORING REPORT
SEMI-ANNUAL PROGRESS REPORT: JULY THROUGH DECEMBER 2009
FORMER CHEVRON FACILITY 122208
5801 RIGGS ROAD CHILLUM, MARYLAND

PERIOD: 7/1/2008 - 12/31/2009

Date	Benzene µg/m³	Toluene µg/m³	Ethyl-benzene µg/m³	m,p-Xylene µg/m³	o-Xylene µg/m³	MTBE µg/m³	Difluoroethane µg/m³	Oxygen Percent	Carbon Dioxide Percent	Methane Percent
VW-1										
09/18/08	ND (3.9)	ND (4.6)	ND (5.4)	ND (5.4)	ND (5.4)	ND (4.4)	ND (13)	5.7	15.3	0.0
03/19/09	ND (4)	ND (4.8)	ND (5.5)	ND (5.5)	ND (5.5)	ND (4.6)	38 (14)	6.6	8.2	0.0
09/17/09	ND (3.9)	ND (4.6)	ND (5.4)	ND (5.4)	ND (5.4)	ND (4.4)	ND (13)	1.0	13.3	0.0
VW-2										
09/18/08	ND (7.7)	ND (9.1)	ND (10)	ND (10)	ND (10)	49 (8.7)	ND (26)	12.1	9.5	0.0
03/19/09	25 (4)	ND (4.7)	ND (5.4)	ND (5.4)	ND (5.4)	62.0 (4.5)	ND (14)	12.5	5.3	3.6
09/17/09	14 (8.2)	ND (9.7)	ND (11)	ND (11)	ND (11)	31.0 (9.3)	ND (28)	11.4	9.7	0.3
VW-03										
09/18/08	6.6 (3.7)	27 (4.4)	41 (5.0)	69 (5.0)	65 (5.0)	5.2 (4.2)	540 (12)	13.5	6.8	0.0
03/19/09	ND (3.9)	ND (4.6)	ND (5.2)	ND (5.2)	ND (5.2)	ND (4.4)	34 (13)	17.0	2.6	0.0
09/17/09	ND (3.9)	ND (4.6)	ND (5.4)	ND (5.4)	ND (5.4)	ND (4.4)	16 (13)	17.9	3.4	0.0

Notes:

1) Reporting limit shown in parenthesis.
2) Analytical results were rounded.
3) ND: Not Detected above reporting limit.
4) NS: Analyte was not sampled.
5) Well VW-03 was reinstalled in February 2008.
6) Well VW-04 was not sampled during the reporting period due to the presence of water.

APPENDIX E

VAPOR MITIGATION SYSTEM DATA

Gannett Fleming

Table E-1. Vapor Mitigation System Measurements
Semi-Annual Progress Report: January through June 2009
Former Chevron Facility No. 122208
5801 Riggs Road, Chillum, Maryland

Address	Date	Average Flow Velocity (ft/min)	Air Flow Rate (standard ft^3/min)	Cross-Slab Differential Pressure (in. H_2O)
5818 Eastern Avenue[2]	03/26/09	144	13	-0.007
	04/27/09	182	16	0.000
	05/07/09	228	20	-0.006
	06/29/09	150	3	-0.011
	07/27/09	217	4	-0.004
	08/24/09	180[4]	3[4]	-0.006
5824 Eastern Avenue	01/06/09	97	8	-0.015
	02/09/09	530 [1]	46 [1]	-0.030
	03/26/09	195	17	-0.045
	04/24/09	551	48	-0.030
	08/24/09	243[4]	6[4]	-0.003
746 Oglethorpe Street[3]	03/31/09	99	9	-0.039
	10/19/2009	176.5	15	NM[5]
	11/16/2009	243	4	-0.004
EPA Sub-Slab Depressurization Goal				-0.016
ASTM Sub-Slab Depressurization Goal				-0.025

Notes:

1. The average flow velocity appears erroneous. The instrument reading was taken too close to the wall of the discharge pipe, creating turbulence and a falsely high reading.
2. Initial readings collected immediately following vapor mitigation system start-up.
3. The resident at 746 Oglethorpe Street turned the system off shortly after start up.
4. Weekend preceeding 8/24/09 readings (8/22, 23) was a large rainstorm producing 1.4 inches of precipitation.
5. NM: Not measured due to equipment malfunction.

APPENDIX F

MANN KENDALL STATISTICAL ANALYSIS

Mann-Kendall Statistical Analysis
Former Chevron Facility 122208
5801 Riggs Road, Chillum, Maryland
December 2009

The Mann-Kendall statistical analysis was used to determine trends in dissolved-phase hydrocarbon concentrations at the Chillum site. These data will be used to support the site-wide groundwater remedial strategy of monitored natural attenuation (MNA).

SITE-WIDE GROUNDWATER REMEDIAL OBJECTIVE

The approved Corrective Measures Study (CMS) (Gannett Fleming, 2007) presents a site-wide groundwater remediation strategy that includes MNA. One method to demonstrate that MNA is effective at decreasing hydrocarbon concentrations is the statistical evaluation of sampling results. The Mann-Kendall statistical analysis was selected as an industry-accepted method to provide evidence that dissolved-phase hydrocarbon concentrations are stable and/or decreasing over time.

MANN-KENDALL BACKGROUND

The Mann-Kendall statistical analysis is used to determine if dissolved-phase hydrocarbon concentrations in groundwater are increasing, decreasing, or stable over time. The technique requires that individual wells with the highest concentrations along the centerline of mapped dissolved-phase hydrocarbons in the groundwater be used to identify trends in dissolved-phase hydrocarbon concentrations over time.

The Mann-Kendall statistical analysis compares every data point (e.g., semi-annual sampling event results) in a data set to every other data point (sampling result) for a particular well along the centerline of mapped dissolved-phase hydrocarbons. A value of 1 or -1 is assigned as each data point is compared based on whether it is higher or lower than the previous. As few as 5 and as many as 10 data points may be used in the analysis; however, the greater the number of data points used, the more reliable the trend analysis becomes.

The output of the analysis is a Mann-Kendall S statistic for the data set for each well. The S statistic shows: 1) the confidence level in the data; 2) the strength of the data trend; and 3) the variability in the data (Wiedemeier, 1999). The absolute value of S is then compared to the 95 percent confidence level in the trend. A positive S suggests an increasing trend and a negative S suggests a decreasing tend. An S outside of the 95 percent confidence level is considered to have no trend (e.g., a stable trend). The 95 percent confidence interval is used as a conservative guide to establishing trends.

The analysis is robust because missing values are allowed and the data set need not conform to any particular distribution. Also, laboratory data reported as below the laboratory detection limit can be used and are reported as half the laboratory detection limit (US EPA, 1998). This approach can be used because the Mann-Kendall methodology uses only the relative magnitudes of the laboratory data rather than actual measured values (Gilbert, 1987).

METHODS

A Geoprobe® was used to obtain an exhaustive profile of groundwater at the site during 2001 and 2002. The Geoprobe groundwater data were used to map the centerline of dissolved-phase hydrocarbon concentrations in groundwater and subsequently install monitoring wells along the centerline of dissolved-phase hydrocarbons (Gannett Fleming, 2006).

The presence of a mappable clay body in the subsurface (as evidenced from the Geoprobe soil investigation) splits the dissolved-phase hydrocarbons in groundwater into two separate centerlines. As a result, these two centerlines are identified as the west centerline and the east centerline (Figure 1). Wells used to define the centerlines are as follows:

West Centerline	East Centerline
MW-22	MW-22
MW-24B	GP-39A
MW-26B	MW-47
MW-33B	GP-2E(45-50)
	MW-25B
	MW-27B
	MW-53

The Mann-Kendall statistical analysis was performed using benzene and methyl tert butyl ether (MTBE) for each well within the centerlines. Mann-Kendall trend analysis tables for each well along the west and east centerlines are presented in Attachment A and B, respectively. The 10 most recent groundwater sampling results were used in the analysis. Values that were reported as below the laboratory detection limit were assigned a value of half of the detection limit.

RESULTS OF MANN-KENDALL ANALYSES

Tables 1 and 2 provide groundwater sampling results for individual wells along the west and east centerlines. Table 3 provides a general summary of the Mann-Kendall statistical analyses performed for both benzene and MTBE. Several trends were noted that are provided below.

Results of the analysis for the west centerline are as follows:

- Benzene and MTBE concentrations in MW-22 were decreasing;
- Benzene concentrations in MW-24B were decreasing and MTBE concentrations were stable;
- Benzene and MTBE concentrations in MW-26B were stable; and
- Benzene and MTBE concentrations in MW-33B were decreasing.

Results of the analysis for the east centerline are as follows:

- Benzene and MTBE concentrations in MW-22 were decreasing;

- Benzene concentrations in GP-39A were increasing, which may be a result of an extended period in 2004 and 2005 when the remediation system was turned off for construction. The range of benzene concentrations since March 2007 has only varied from 2,100 to 3,100µg/L, therefore the recent data trend over the last 2.5 years is stable. This well will be over drilled and added to the expanded Dual Phase Extraction (DPE) system. MTBE concentrations were stable;

- Benzene and MTBE concentrations in MW-47 were stable;

- Benzene concentrations in GP-2E(45-50) were decreasing and MTBE concentrations were stable;

- Benzene concentrations in MW-25B were stable and MTBE concentrations were decreasing;

- Benzene and MTBE concentrations in MW-27B were decreasing; and

- Benzene concentrations in MW-53 were stable and MTBE concentrations were increasing. However, the range of MTBE concentrations since October 2006 has only varied from 110 to 270µg/L, therefore the recent data trend over the last 3 years is stable. This well is also the farthest from the service station. It will take a long time for remediation efforts at the service station to affect this area.

SUMMARY AND CONCLUSIONS

Dissolved-phase hydrocarbon concentrations for centerline wells were either stable or decreasing based on long and short-term sampling data. Therefore, the overall trend for each centerline was stable. This is to be expected because active remediation is not complete near the service station. Based on this line of evidence, MNA was working to decrease dissolved-phase hydrocarbon concentrations at the site.

Based on ten sampling events conducted since 2004, benzene and MTBE concentrations along the west centerline were stable or decreasing for all wells. The east centerline wells show a similar tendency. All wells were either stable or decreasing except benzene in GP-39A and MTBE in MW-53. However, based on short term sampling data from the last 3 years, the trend in these wells is stable.

RECOMMENDATION

The following corrective measures will be implemented at the site:

- Area A - an expanded DPE system, to include the addition of four vertical recovery wells and one angle recovery well;
- Area B - Two In-Situ Groundwater Remediation (ISGR) Wells to be installed in the residential neighborhood (Oglethorpe Alley); and
- Area C - an Oxygen Reactive Zone in the residential neighborhood (Nicholson Alley), to include a series of in-situ oxygen emitting probes.

As part of the corrective measures, wells MW-22 and GP-39A will be over drilled and added to the expanded DPE system in Area A. MW-24B will be near or within the radius of influence of the ISGR Well system in Area B. MW-26B will be adjacent to and down gradient of the Oxygen Reactive Zone in Area C.

The Mann Kendall statistical analysis will continue to be performed on an annual basis using the semi-annual groundwater monitoring data for wells along the west and east centerlines to confirm that hydrocarbon concentrations are continuing to decrease or remain stable. The next Mann Kendall update will be submitted in January 2011.

REFERENCES

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TABLES

Table 1. Groundwater Monitoring Results - West Centerline
Mann-Kendall Statistical Analysis
Former Chevron Facility 122208
5801 Riggs Road, Chillum, Maryland

PERIOD: June 2004 - September 2009

Date	Benzene µg/l	Methyl-t-butyl ether µg/l
MW-22		
06/08/04	5,620.0 (100)	866.0 (20)
08/03/04	7,960.0 (200)	1,620.0 (10)
09/07/05	8,790.0 (50)	1,780.0 (50)
03/23/06	6,860.0 (100)	2,020.0 (100)
10/02/06	7,900.0 (100)	1,100.0 (100)
03/26/07	2,400.0 (100)	570.0 (100)
10/01/07	7,000.0 (100)	1,000.0 (100)
03/31/08	4,900.0 (100)	710.0 (100)
09/25/08	1,100.0 (5)	1,100.0 (5)
03/30/09	5,900.0 (100)	680.0 (100)
09/28/09	4,200.0 (100)	420.0 (100)
MW-24B		
06/08/04	431.0 (10)	9.3 (1)
08/02/04	474.0 (10)	9.6 (1)
09/15/05	497.0 (10)	3.6 (1)
03/27/06	864.0 (20)	4.0 (1)
10/04/06	540.0 (50)	ND (50)
03/27/07	5.6 (1)	ND (1)
10/02/07	310.0 (20)	ND (20)
04/01/08	110.0 (20)	ND (20)
09/24/08	ND (20)	ND (20)
03/27/09	17.0 (20)	ND (20)
09/29/09	ND (5)	ND (5)
MW-26B		
06/07/04	30.5 (1)	112.0 (1)
07/30/04	34.4 (1)	114.0 (1)
09/16/05	24.9 (1)	168.0 (1)
03/28/06	144.0 (1)	221.0 (10)
10/05/06	100.0 (1)	210.0 (1)
03/28/07	140.0 (1)	270.0 (1)
10/04/07	110.0 (1)	230.0 (1)
04/02/08	94.0 (1)	170.0 (1)
09/23/08	110.0 (1)	200.0 (1)
03/25/09	130.0 (1)	230.0 (1)
09/22/09	150.0 (1)	200.0 (1)
MW-33B		
06/02/04	1,040.0 (20)	770.0 (20)
07/27/04	1,000.0 (20)	744.0 (20)
09/13/05	ND (1)	698.0 (10)
03/28/06	974.0 (10)	653.0 (10)
10/05/06	760.0 (5)	520.0 (5)
03/29/07	670.0 (5)	400.0 (5)
10/05/07	540.0 (2)	410.0 (2)
04/02/08	520.0 (5)	400.0 (2)
09/23/08	340.0 (2)	230.0 (2)
03/24/09	380.0 (2)	220.0 (2)
09/21/09	380.0 (2)	240.0 (2)

Notes:
1) Reporting limit shown in parenthesis.
2) Analytical results were rounded.
3) ND: Not Detected above reporting limit.
4) BTEX summed before rounding.

Gannett Fleming

Chevron

Table 2. Groundwater Monitoring Results - East Centerline
Mann-Kendall Statistical Analysis
Former Chevron Facility 122208
5801 Riggs Road, Chillum, Maryland

PERIOD: April 2002 - September 2009

Date	Benzene µg/l	Methyl-t-butyl ether µg/l
GP-2E(45-50)		
04/18/02	170.0 (2)	795.0 (20)
12/19/02	46.3 (1)	600.0 (10)
05/19/04	28.7 (1)	756.0 (10)
08/16/04	60.2 (1)	656.0 (5)
12/15/04	117.0 (1)	522.0 (10)
03/21/05	189.0 (1)	610.0 (10)
05/26/05	172.0 (1)	803.0 (10)
09/14/05	134.0 (1)	501.0 (5)
12/20/05	71.4 (1)	394.0 (10)
10/02/06	78.0 (5)	420.0 (5)
03/26/07	50.0 (5)	400.0 (5)
10/01/07	34.0 (2)	470.0 (2)
03/31/08	8.0 (2)	330.0 (2)
09/25/08	ND (2)	370.0 (2)
03/30/09	ND (2)	350.0 (2)
09/28/09	ND (2)	450.0 (2)
GP-39A		
10/02/02	ND (1)	ND (1)
03/26/03	ND (1)	1.1 (1)
06/17/03	ND (1)	1.1 (1)
09/23/03	ND (1)	2.1 (1)
12/10/03	535.0 (10)	1,770.0 (10)
03/24/04	570.0 (20)	1,940.0 (20)
05/18/04	473.0 (10)	1,680.0 (10)
08/16/04	476.0 (20)	2,060.0 (20)
12/16/04	725.0 (50)	2,520.0 (50)
03/21/05	7.1 (1)	3,200.0 (20)
05/26/05	905.0 (50)	3,550.0 (50)
09/08/05	721.0 (10)	2,490.0 (100)
12/19/05	995.0 (25)	3,360.0 (25)
03/22/06	1,570.0 (50)	5,960.0 (50)
09/28/06	2,500.0 (25)	6,500.0 (25)
03/22/07	2,600.0 (20)	5,800.0 (20)
09/24/07	2,300.0 (25)	5,200.0 (25)
03/27/08	2,100.0 (20)	5,400.0 (20)
09/30/08	2,100.0 (25)	4,800.0 (25)
03/31/09	2,200.0 (25)	4,900.0 (25)
09/23/09	3,100.0 (25)	4,700.0 (25)
MW-22		
06/08/04	5,620.0 (100)	866.0 (20)
08/03/04	7,960.0 (200)	1,620.0 (10)
09/07/05	8,790.0 (50)	1,780.0 (50)
03/23/06	6,860.0 (100)	2,020.0 (100)
10/02/06	7,900.0 (100)	1,100.0 (100)
03/26/07	2,400.0 (100)	570.0 (100)
10/01/07	7,000.0 (100)	1,000.0 (100)
03/31/08	4,900.0 (100)	710.0 (100)
09/25/08	1,100.0 (5)	1,100.0 (5)
03/30/09	5,900.0 (100)	680.0 (100)
09/28/09	4,200.0 (100)	420.0 (100)
MW-25B		
11/22/04	456.0 (10)	502.0 (10)

Notes:
1) Reporting limit shown in parenthesis.
2) Analytical results were rounded.
3) ND: Not Detected above reporting limit.
4) BTEX summed before rounding.

Gannett Fleming

Chevron

Table 2. Groundwater Monitoring Results - East Centerline
Mann-Kendall Statistical Analysis
Former Chevron Facility 122208
5801 Riggs Road, Chillum, Maryland

PERIOD: April 2002 - September 2009

Date	Benzene µg/l	Methyl-t-butyl ether µg/l
MW-25B		
09/15/05	ND (1)	386.0 (10)
03/24/06	403.0 (10)	461.0 (10)
10/04/06	470.0 (5)	550.0 (5)
03/27/07	320.0 (2)	370.0 (2)
10/03/07	340.0 (2)	490.0 (2)
04/01/08	180.0 (2)	310.0 (2)
09/24/08	240.0 (2)	350.0 (2)
03/27/09	450.0 (2)	410.0 (2)
09/22/09	170.0 (2)	260.0 (2)
MW-27B		
06/02/04	193.0 (1)	534.0 (10)
07/28/04	142.0 (1)	507.0 (10)
09/16/05	146.0 (1)	417.0 (20)
03/28/06	168.0 (1)	451.0 (10)
10/05/06	150.0 (5)	370.0 (5)
03/28/07	200.0 (2)	530.0 (2)
10/04/07	82.0 (2)	310.0 (2)
04/02/08	34.0 (1)	240.0 (2)
09/23/08	37.0 (1)	240.0 (1)
03/25/09	19.0 (1)	240.0 (1)
09/22/09	6.5 (1)	160.0 (1)
MW-47		
11/19/04	116.0 (1)	27.2 (1)
09/06/05	315.0 (5)	17.6 (1)
03/22/06	459.0 (10)	13.3 (1)
09/28/06	380.0 (2)	22.0 (2)
03/22/07	240.0 (2)	58.0 (2)
09/24/07	260.0 (1)	ND (1)
03/27/08	360.0 (2)	ND (2)
09/29/08	230.0 (2)	15.0 (2)
03/31/09	250.0 (2)	19.0 (1)
09/23/09	160.0 (1)	16.0 (1)
MW-53		
05/03/05	ND (1)	66.4 (1)
06/08/05	ND (1)	97.0 (1)
09/14/05	ND (1)	88.1 (1)
03/28/06	4.0 (1)	103.0 (1)
10/06/06	54.0 (1)	240.0 (1)
03/29/07	15.0 (1)	110.0 (1)
10/05/07	61.0 (2)	270.0 (2)
04/03/08	17.0 (1)	160.0 (1)
09/22/08	23.0 (1)	160.0 (1)
03/23/09	7.8 (1)	150.0 (1)
09/21/09	9.2 (1)	220.0 (2)

Notes:
1) Reporting limit shown in parenthesis.
2) Analytical results were rounded.
3) ND: Not Detected above reporting limit.
4) BTEX summed before rounding.

Gannett Fleming

Chevron

Table 3. Mann-Kendall Results Summary
Mann-Kendall Statistical Analysis
Former Chevron Facility 122208
5801 Riggs Road, Chillum, Maryland

West Centerline - Benzene

Well ID	Distance from MW-22 (ft)	Trend	Date Range	Number of Data Points
MW-22	0	Decreasing	8/3/2004 - 9/28/2009	10
MW-24B	232	Decreasing	8/2/2004 - 9/29/2009	10
MW-26B	666	Stable	7/30/2004 - 9/22/2009	10
MW-33B	944	Decreasing	7/27/2004 - 9/21/2009	10

West Centerline - MTBE

Well ID	Distance from MW-22 (ft)	Trend	Date Range	Number of Data Points
MW-22	0	Decreasing	8/3/2004 - 9/28/2009	10
MW-24B[1]	232	Stable	6/8/2004 - 9/29/2009	10
MW-26B	666	Stable	7/30/2004 - 9/22/2009	10
MW-33B	944	Decreasing	7/27/2004 - 9/21/2009	10

East Centerline - Benzene

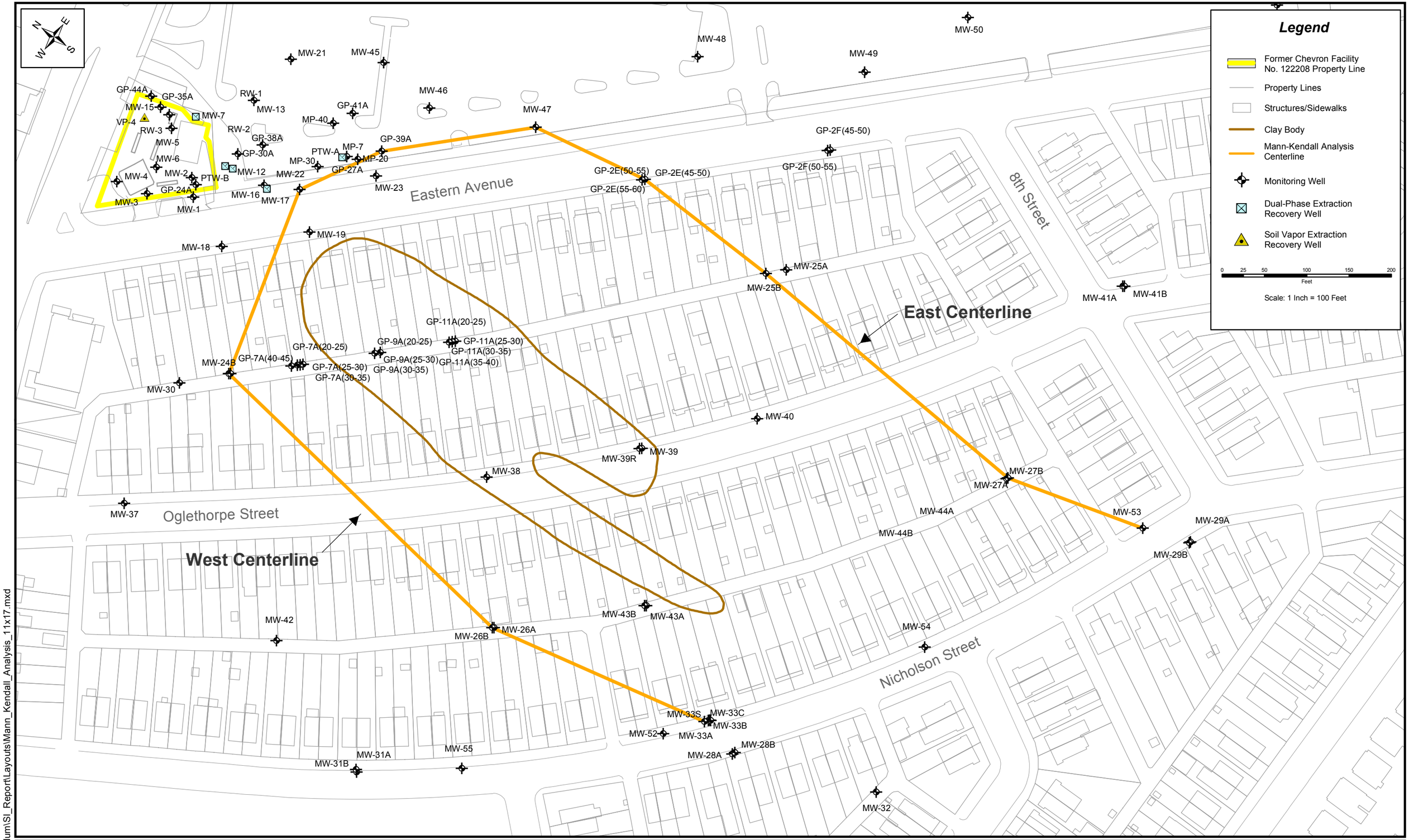
Well ID	Distance from MW-22 (ft)	Trend	Date Range	Number of Data Points
MW-22	0	Decreasing	8/3/2004 - 9/28/2009	10
GP-39A	109	Increasing	9/8/2005 - 9/23/2009	10
MW-47	292	Stable	11/19/2004 - 9/23/2009	10
GP-2E (45-50)	445	Decreasing	5/26/2005 - 9/28/2009	10
MW-25B	618	Stable	11/22/2004 - 9/22/2009	10
MW-27B	991	Decreasing	7/28/2004 - 9/22/2009	10
MW-53	1163	Stable	6/8/2005 - 9/21/2009	10

East Centerline - MTBE

Well ID	Distance from MW-22 (ft)	Trend	Date Range	Number of Data Points
MW-22	0	Decreasing	8/3/2004 - 9/28/2009	10
GP-39A	109	Stable	9/8/2005 - 9/23/2009	10
MW-47	292	Stable	11/19/2004 - 9/23/2009	10
GP-2E (45-50)	445	Stable	5/26/2005 - 9/28/2009	10
MW-25B	618	Decreasing	11/22/2004 - 9/22/2009	10
MW-27B	991	Decreasing	7/28/2004 - 9/22/2009	10
MW-53	1163	Increasing	6/8/2005 - 9/21/2009	10

Note:
1. MTBE data collected from MW-24B on 10/04/06 were excluded from the data set because the value was reported below a laboratory detection limit of 50 µg/L.

FIGURES



J:\44738_Chillum\SI_Report\Layouts\Mann_Kendall_Analysis_11x17.mxd

NO.	REVISIONS	DATE	BY	DESIGNED	GIS	SCALE		FORMER CHEVRON FACILITY NO. 122208 CHILLUM, MARYLAND	Centerlines for Mann-Kendall Analysis	GF PROJECT NO.	SHEET NO.
	DESCRIPTION			RWS	CER	AS NOTED	Gannett Fleming			44738	1
				CHECKED	APPROVED		BALTIMORE, MARYLAND			DATE 07-17-08	
				RWS						GIS FILE Mann_Kendall_Analysis_11x17.mxd	

ATTACHMENT A

Mann-Kendall Analysis Tables – West Centerline

WEST CENTERLINE - MW-22 - BENZENE

Mann-Kendall Statistical Method Worksheet

Site-- Chillum
Compound-- Benzene
Well-- MW-22

	Event 1	Event 2	Event 3	Event 4	Event 5	Event 6	Event 7	Event 8	Event 9	Event 10	Events
Concentration	7,960	8,790	6,860	7,900	2,400	7,000	4,900	1,100	5,900	4,200	10
	--	--	--	--	--	--	--	--	--	--	**Sum**
Compared to Event 1	*****	1	-1	-1	-1	-1	-1	-1	-1	-1	-7
Compared to Event 2	*****	*****	-1	-1	-1	-1	-1	-1	-1	-1	-8
Compared to Event 3	*****	*****	*****	1	-1	1	-1	-1	-1	-1	-3
Compared to Event 4	*****	*****	*****	*****	-1	-1	-1	-1	-1	-1	-6
Compared to Event 5	*****	*****	*****	*****	*****	1	1	-1	1	1	3
Compared to Event 6	*****	*****	*****	*****	*****	*****	-1	-1	-1	-1	-4
Compared to Event 7	*****	*****	*****	*****	*****	*****	*****	-1	1	-1	-1
Compared to Event 8	*****	*****	*****	*****	*****	*****	*****	*****	1	1	2
Compared to Event 9	*****	*****	*****	*****	*****	*****	*****	*****	*****	-1	-1

Mann-Kendall Statistic 'S' = -25

Statistical Confidence Level

>90% Confidence

I S I ≥ 15

Result Decreasing Trend

>95% Confidence

I S I ≥ 20

Result Decreasing Trend

WEST CENTERLINE - MW-22 - MTBE

Mann-Kendall Statistical Method Worksheet

Site-- Chillum
Compound-- MTBE
Well-- MW-22

	Event 1	Event 2	Event 3	Event 4	Event 5	Event 6	Event 7	Event 8	Event 9	Event 10	Events
Concentration	1,620	1,780	2,020	1,100	570	1,000	710	1,100	680	420	10
	--	--	--	--	--	--	--	--	--	--	**Sum**
Compared to Event 1	*****	1	1	-1	-1	-1	-1	-1	-1	-1	-5
Compared to Event 2	*****	*****	1	-1	-1	-1	-1	-1	-1	-1	-6
Compared to Event 3	*****	*****	*****	-1	-1	-1	-1	-1	-1	-1	-7
Compared to Event 4	*****	*****	*****	*****	-1	-1	-1	0	-1	-1	-5
Compared to Event 5	*****	*****	*****	*****	*****	1	1	1	1	-1	3
Compared to Event 6	*****	*****	*****	*****	*****	*****	-1	1	-1	-1	-2
Compared to Event 7	*****	*****	*****	*****	*****	*****	*****	1	-1	-1	-1
Compared to Event 8	*****	*****	*****	*****	*****	*****	*****	*****	-1	-1	-2
Compared to Event 9	*****	*****	*****	*****	*****	*****	*****	*****	*****	-1	-1

Mann-Kendall Statistic 'S' = -26

Statistical Confidence Level

>90% Confidence

I S I ≥ 15

Result Decreasing Trend

>95% Confidence

I S I ≥ 20

Result Decreasing Trend

WEST CENTERLINE - MW-24B - BENZENE

Mann-Kendall Statistical Method Worksheet

Site-- Chillum
Compound-- Benzene
Well-- MW-24B

	Event 1	Event 2	Event 3	Event 4	Event 5	Event 6	Event 7	Event 8	Event 9	Event 10	Events
Concentration	474	497	864	540	6	310	110	10	17	3	10
	--	--	--	--	--	--	--	--	--	--	**Sum**
Compared to Event 1	*****	1	1	1	-1	-1	-1	-1	-1	-1	-3
Compared to Event 2	*****	*****	1	1	-1	-1	-1	-1	-1	-1	-4
Compared to Event 3	*****	*****	*****	-1	-1	-1	-1	-1	-1	-1	-7
Compared to Event 4	*****	*****	*****	*****	-1	-1	-1	-1	-1	-1	-6
Compared to Event 5	*****	*****	*****	*****	*****	1	1	1	1	-1	3
Compared to Event 6	*****	*****	*****	*****	*****	*****	-1	-1	-1	-1	-4
Compared to Event 7	*****	*****	*****	*****	*****	*****	*****	-1	-1	-1	-3
Compared to Event 8	*****	*****	*****	*****	*****	*****	*****	*****	1	-1	
Compared to Event 9	*****	*****	*****	*****	*****	*****	*****	*****	*****	-1	-1

Mann-Kendall Statistic 'S' = -25

Statistical Confidence Level

>90% Confidence

I S I ≥ 15

Result Decreasing Trend

>95% Confidence

I S I ≥ 20

Result Decreasing Trend

WEST CENTERLINE - MW-24B - MTBE

Mann-Kendall Statistical Method Worksheet

Site-- Chillum
Compound-- MTBE
Well-- MW-24B

	Event 1	Event 2	Event 3	Event 4	Event 5	Event 6	Event 7	Event 8	Event 9	Event 10	Events
Concentration	9	10	4	4	1	10	10	10	10	3	10
	--	--	--	--	--	--	--	--	--	--	**Sum**
Compared to Event 1	*****	1	-1	-1	-1	1	1	1	1	-1	1
Compared to Event 2	*****	*****	-1	-1	-1	1	1	1	1	-1	0
Compared to Event 3	*****	*****	*****	1	-1	1	1	1	1	-1	3
Compared to Event 4	*****	*****	*****	*****	-1	1	1	1	1	-1	2
Compared to Event 5	*****	*****	*****	*****	*****	1	1	1	1	1	5
Compared to Event 6	*****	*****	*****	*****	*****	*****	0	0	0	-1	-1
Compared to Event 7	*****	*****	*****	*****	*****	*****	*****	0	0	-1	-1
Compared to Event 8	*****	*****	*****	*****	*****	*****	*****	*****	0	-1	-1
Compared to Event 9	*****	*****	*****	*****	*****	*****	*****	*****	*****	-1	-1

Mann-Kendall Statistic 'S' = 7

Statistical Confidence Level

>90% Confidence

I S I ≥ 15

Result No Trend

>95% Confidence

I S I ≥ 20

Result No Trend

WEST CENTERLINE - MW-26B - BENZENE

Mann-Kendall Statistical Method Worksheet

Site-- Chillum
Compound-- Benzene
Well-- MW-26B

	Event 1	Event 2	Event 3	Event 4	Event 5	Event 6	Event 7	Event 8	Event 9	Event 10	Events
Concentration	34	25	144	100	140	110	94	110	130	150	10
	--	--	--	--	--	--	--	--	--	--	**Sum**
Compared to Event 1	*****	-1	1	1	1	1	1	1	1	1	7
Compared to Event 2	*****	*****	1	1	1	1	1	1	1	1	8
Compared to Event 3	*****	*****	*****	-1	-1	-1	-1	-1	-1	1	-5
Compared to Event 4	*****	*****	*****	*****	1	1	-1	1	1	1	4
Compared to Event 5	*****	*****	*****	*****	*****	-1	-1	-1	-1	1	-3
Compared to Event 6	*****	*****	*****	*****	*****	*****	-1	0	1	1	1
Compared to Event 7	*****	*****	*****	*****	*****	*****	*****	1	1	1	3
Compared to Event 8	*****	*****	*****	*****	*****	*****	*****	*****	1	1	2
Compared to Event 9	*****	*****	*****	*****	*****	*****	*****	*****	*****	1	1

Mann-Kendall Statistic 'S' = 18

Statistical Confidence Level

>90% Confidence

I S I ≥ 15

Result Increasing Trend

>95% Confidence

I S I ≥ 20

Result No Trend

WEST CENTERLINE - MW-26B - MTBE

Mann-Kendall Statistical Method Worksheet

Site-- Chillum
Compound-- MTBE
Well-- MW-26B

	Event 1	Event 2	Event 3	Event 4	Event 5	Event 6	Event 7	Event 8	Event 9	Event 10	Events
Concentration	114	168	221	210	270	230	170	200	230	200	10
	--	--	--	--	--	--	--	--	--	--	**Sum**
Compared to Event 1	*****	1	1	1	1	1	1	1	1	1	9
Compared to Event 2	*****	*****	1	1	1	1	1	1	1	1	8
Compared to Event 3	*****	*****	*****	-1	1	1	-1	-1	1	-1	-1
Compared to Event 4	*****	*****	*****	*****	1	1	-1	-1	1	-1	
Compared to Event 5	*****	*****	*****	*****	*****	-1	-1	-1	-1	-1	-5
Compared to Event 6	*****	*****	*****	*****	*****	*****	-1	-1	0	-1	-3
Compared to Event 7	*****	*****	*****	*****	*****	*****	*****	1	1	1	3
Compared to Event 8	*****	*****	*****	*****	*****	*****	*****	*****	1	0	1
Compared to Event 9	*****	*****	*****	*****	*****	*****	*****	*****	*****	-1	-1

Mann-Kendall Statistic 'S' = 11

Statistical Confidence Level

>90% Confidence

I S I ≥ 15

Result No Trend

>95% Confidence

I S I ≥ 20

Result No Trend

WEST CENTERLINE - MW-33B - BENZENE

Mann-Kendall Statistical Method Worksheet

Site-- Chillum
Compound-- Benzene
Well-- MW-33B

	Event 1	Event 2	Event 3	Event 4	Event 5	Event 6	Event 7	Event 8	Event 9	Event 10	Events
Concentration	1,000	1	974	760	670	540	520	340	380	380	10
	--	--	--	--	--	--	--	--	--	--	**Sum**
Compared to Event 1	*****	-1	-1	-1	-1	-1	-1	-1	-1	-1	-9
Compared to Event 2	*****	*****	1	1	1	1	1	1	1	1	8
Compared to Event 3	*****	*****	*****	-1	-1	-1	-1	-1	-1	-1	-7
Compared to Event 4	*****	*****	*****	*****	-1	-1	-1	-1	-1	-1	-6
Compared to Event 5	*****	*****	*****	*****	*****	-1	-1	-1	-1	-1	-5
Compared to Event 6	*****	*****	*****	*****	*****	*****	-1	-1	-1	-1	-4
Compared to Event 7	*****	*****	*****	*****	*****	*****	*****	-1	-1	-1	-3
Compared to Event 8	*****	*****	*****	*****	*****	*****	*****	*****	1	1	2
Compared to Event 9	*****	*****	*****	*****	*****	*****	*****	*****	*****	0	

Mann-Kendall Statistic 'S' = -24

Statistical Confidence Level

>90% Confidence

I S I ≥ 15

Result Decreasing Trend

>95% Confidence

I S I ≥ 20

Result Decreasing Trend

WEST CENTERLINE - MW-33B - MTBE

Mann-Kendall Statistical Method Worksheet

Site-- Chillum
Compound-- MTBE
Well-- MW-33B

	Event 1	Event 2	Event 3	Event 4	Event 5	Event 6	Event 7	Event 8	Event 9	Event 10	Events
Concentration	744	698	653	520	400	410	400	230	220	240	10
	--	--	--	--	--	--	--	--	--	--	**Sum**
Compared to Event 1	*****	-1	-1	-1	-1	-1	-1	-1	-1	-1	-9
Compared to Event 2	*****	*****	-1	-1	-1	-1	-1	-1	-1	-1	-8
Compared to Event 3	*****	*****	*****	-1	-1	-1	-1	-1	-1	-1	-7
Compared to Event 4	*****	*****	*****	*****	-1	-1	-1	-1	-1	-1	-6
Compared to Event 5	*****	*****	*****	*****	*****	1	0	-1	-1	-1	-2
Compared to Event 6	*****	*****	*****	*****	*****	*****	-1	-1	-1	-1	-4
Compared to Event 7	*****	*****	*****	*****	*****	*****	*****	-1	-1	-1	-3
Compared to Event 8	*****	*****	*****	*****	*****	*****	*****	*****	-1	1	
Compared to Event 9	*****	*****	*****	*****	*****	*****	*****	*****	*****	1	1

Mann-Kendall Statistic 'S' = -38

Statistical Confidence Level

>90% Confidence

I S I ≥ 15

Result Decreasing Trend

>95% Confidence

I S I ≥ 20

Result Decreasing Trend

Mann-Kendall Statistical Method Worksheet

Site-- Smallville
Compound-- Benzene
Well-- MW-12

Input data from four to ten sampling events in Row 10.

	Event 1	Event 2	Event 3	Event 4	Event 5	Event 6	Event 7	Event 8	Event 9	Event 10	Events
Concentration	3,780	1,810	2,630	2,800	2,600	2,000	1,800	130	1,500	140	10
	--	--	--	--	--	--	--	--	--	--	**Sum**
Compared to Event 1	*****	-1	-1	-1	-1	-1	-1	-1	-1	-1	-9
Compared to Event 2	*****	*****	1	1	1	1	-1	-1	-1	-1	
Compared to Event 3	*****	*****	*****	1	-1	-1	-1	-1	-1	-1	-5
Compared to Event 4	*****	*****	*****	*****	-1	-1	-1	-1	-1	-1	-6
Compared to Event 5	*****	*****	*****	*****	*****	-1	-1	-1	-1	-1	-5
Compared to Event 6	*****	*****	*****	*****	*****	*****	-1	-1	-1	-1	-4
Compared to Event 7	*****	*****	*****	*****	*****	*****	*****	-1	-1	-1	-3
Compared to Event 8	*****	*****	*****	*****	*****	*****	*****	*****	1	1	2
Compared to Event 9	*****	*****	*****	*****	*****	*****	*****	*****	*****	-1	-1

Mann-Kendall Statistic 'S' = -31

Statistical Confidence Level

>90% Confidence

I S I ≥ 15

Result Decreasing Trend

>95% Confidence

I S I ≥ 20

Result Decreasing Trend

ATTACHMENT B

Mann-Kendall Analysis Tables – East Centerline

EAST CENTERLINE - MW-22 - BENZENE

Mann-Kendall Statistical Method Worksheet

Site-- Chillum
Compound-- Benzene
Well-- MW-22

	Event 1	Event 2	Event 3	Event 4	Event 5	Event 6	Event 7	Event 8	Event 9	Event 10	Events
Concentration	7,960	8,790	6,860	7,900	2,400	7,000	4,900	1,100	5,900	4,200	10
	--	--	--	--	--	--	--	--	--	--	**Sum**
Compared to Event 1	*****	1	-1	-1	-1	-1	-1	-1	-1	-1	-7
Compared to Event 2	*****	*****	-1	-1	-1	-1	-1	-1	-1	-1	-8
Compared to Event 3	*****	*****	*****	1	-1	1	-1	-1	-1	-1	-3
Compared to Event 4	*****	*****	*****	*****	-1	-1	-1	-1	-1	-1	-6
Compared to Event 5	*****	*****	*****	*****	*****	1	1	-1	1	1	3
Compared to Event 6	*****	*****	*****	*****	*****	*****	-1	-1	-1	-1	-4
Compared to Event 7	*****	*****	*****	*****	*****	*****	*****	-1	1	-1	-1
Compared to Event 8	*****	*****	*****	*****	*****	*****	*****	*****	1	1	2
Compared to Event 9	*****	*****	*****	*****	*****	*****	*****	*****	*****	-1	-1

Mann-Kendall Statistic 'S' = -25

Statistical Confidence Level

>90% Confidence

I S I ≥ 15

Result Decreasing Trend

>95% Confidence

I S I ≥ 20

Result Decreasing Trend

EAST CENTERLINE - MW-22 - MTBE

Mann-Kendall Statistical Method Worksheet

Site-- Chillum
Compound-- MTBE
Well-- MW-22

	Event 1	Event 2	Event 3	Event 4	Event 5	Event 6	Event 7	Event 8	Event 9	Event 10	Events
Concentration	1,620	1,780	2,020	1,100	570	1,000	710	1,100	680	420	10
	--	--	--	--	--	--	--	--	--	--	**Sum**
Compared to Event 1	*****	1	1	-1	-1	-1	-1	-1	-1	-1	-5
Compared to Event 2	*****	*****	1	-1	-1	-1	-1	-1	-1	-1	-6
Compared to Event 3	*****	*****	*****	-1	-1	-1	-1	-1	-1	-1	-7
Compared to Event 4	*****	*****	*****	*****	-1	-1	-1	0	-1	-1	-5
Compared to Event 5	*****	*****	*****	*****	*****	1	1	1	1	-1	3
Compared to Event 6	*****	*****	*****	*****	*****	*****	-1	1	-1	-1	-2
Compared to Event 7	*****	*****	*****	*****	*****	*****	*****	1	-1	-1	-1
Compared to Event 8	*****	*****	*****	*****	*****	*****	*****	*****	-1	-1	-2
Compared to Event 9	*****	*****	*****	*****	*****	*****	*****	*****	*****	-1	-1

Mann-Kendall Statistic 'S' = -26

Statistical Confidence Level

>90% Confidence

I S I ≥ 15

Result Decreasing Trend

>95% Confidence

I S I ≥ 20

Result Decreasing Trend

EAST CENTERLINE - GP-39A - BENZENE

Mann-Kendall Statistical Method Worksheet

Site-- Chillum
Compound-- Benzene
Well-- GP-39A

	Event 1	Event 2	Event 3	Event 4	Event 5	Event 6	Event 7	Event 8	Event 9	Event 10	Events
Concentration	721	995	1,570	2,500	2,600	2,300	2,100	2,100	2,200	3,100	10
	--	--	--	--	--	--	--	--	--		**Sum**
Compared to Event 1	*****	1	1	1	1	1	1	1	1	1	9
Compared to Event 2	*****	*****	1	1	1	1	1	1	1	1	8
Compared to Event 3	*****	*****	*****	1	1	1	1	1	1	1	7
Compared to Event 4	*****	*****	*****	*****	1	-1	-1	-1	-1	1	-2
Compared to Event 5	*****	*****	*****	*****	*****	-1	-1	-1	-1	1	-3
Compared to Event 6	*****	*****	*****	*****	*****	*****	-1	-1	-1	1	-2
Compared to Event 7	*****	*****	*****	*****	*****	*****	*****	0	1	1	2
Compared to Event 8	*****	*****	*****	*****	*****	*****	*****	*****	1	1	2
Compared to Event 9	*****	*****	*****	*****	*****	*****	*****	*****	*****	1	1

Mann-Kendall Statistic 'S' = 22

Statistical Confidence Level

>90% Confidence

I S I ≥ 15

Result Increasing Trend

>95% Confidence

I S I ≥ 20

Result Increasing Trend

EAST CENTERLINE - GP-39A - MTBE

Mann-Kendall Statistical Method Worksheet

Site-- Chillum
Compound-- MTBE
Well-- GP-39A

	Event 1	Event 2	Event 3	Event 4	Event 5	Event 6	Event 7	Event 8	Event 9	Event 10	Events
Concentration	2,490	3,360	5,960	6,500	5,800	5,200	5,400	4,800	4,900	4,700	10
	--	--	--	--	--	--	--	--	--	--	**Sum**
Compared to Event 1	*****	1	1	1	1	1	1	1	1	1	9
Compared to Event 2	*****	*****	1	1	1	1	1	1	1	1	8
Compared to Event 3	*****	*****	*****	1	-1	-1	-1	-1	-1	-1	-5
Compared to Event 4	*****	*****	*****	*****	-1	-1	-1	-1	-1	-1	-6
Compared to Event 5	*****	*****	*****	*****	*****	-1	-1	-1	-1	-1	-5
Compared to Event 6	*****	*****	*****	*****	*****	*****	1	-1	-1	-1	-2
Compared to Event 7	*****	*****	*****	*****	*****	*****	*****	-1	-1	-1	-3
Compared to Event 8	*****	*****	*****	*****	*****	*****	*****	*****	1	-1	0
Compared to Event 9	*****	*****	*****	*****	*****	*****	*****	*****	*****	-1	-1

Mann-Kendall Statistic 'S' = -5

Statistical Confidence Level

>90% Confidence

I S I ≥ 15

Result No Trend

>95% Confidence

I S I ≥ 20

Result No Trend

EAST CENTERLINE - MW-47 - BENZENE

Mann-Kendall Statistical Method Worksheet

Site-- Chillum
Compound-- Benzene
Well-- MW-47

	Event 1	Event 2	Event 3	Event 4	Event 5	Event 6	Event 7	Event 8	Event 9	Event 10	Events
Concentration	116	315	459	380	240	260	360	230	250	160	10
	--	--	--	--	--	--	--	--	--	--	**Sum**
Compared to Event 1	*****	1	1	1	1	1	1	1	1	1	9
Compared to Event 2	*****	*****	1	1	-1	-1	1	-1	-1	-1	-2
Compared to Event 3	*****	*****	*****	-1	-1	-1	-1	-1	-1	-1	-7
Compared to Event 4	*****	*****	*****	*****	-1	-1	-1	-1	-1	-1	-6
Compared to Event 5	*****	*****	*****	*****	*****	1	1	-1	1	-1	1
Compared to Event 6	*****	*****	*****	*****	*****	*****	1	-1	-1	-1	-2
Compared to Event 7	*****	*****	*****	*****	*****	*****	*****	-1	-1	-1	-3
Compared to Event 8	*****	*****	*****	*****	*****	*****	*****	*****	1	-1	
Compared to Event 9	*****	*****	*****	*****	*****	*****	*****	*****	*****	-1	-1

Mann-Kendall Statistic 'S' = -11

Statistical Confidence Level

>90% Confidence

I S I ≥ 15

Result No Trend

>95% Confidence

I S I ≥ 20

Result No Trend

EAST CENTERLINE - MW-47 - MTBE

Mann-Kendall Statistical Method Worksheet

Site-- Chillum
Compound-- MTBE
Well-- MW-47

	Event 1	Event 2	Event 3	Event 4	Event 5	Event 6	Event 7	Event 8	Event 9	Event 10	Events
Concentration	27	18	13	22	58	1	1	15	19	16	10
	--	--	--	--	--	--	--	--	--	--	**Sum**
Compared to Event 1	*****	-1	-1	-1	1	-1	-1	-1	-1	-1	-7
Compared to Event 2	*****	*****	-1	1	1	-1	-1	-1	1	-1	-2
Compared to Event 3	*****	*****	*****	1	1	-1	-1	1	1	1	3
Compared to Event 4	*****	*****	*****	*****	1	-1	-1	-1	-1	-1	-4
Compared to Event 5	*****	*****	*****	*****	*****	-1	-1	-1	-1	-1	-5
Compared to Event 6	*****	*****	*****	*****	*****	*****	0	1	1	1	3
Compared to Event 7	*****	*****	*****	*****	*****	*****	*****	1	1	1	3
Compared to Event 8	*****	*****	*****	*****	*****	*****	*****	*****	1	1	2
Compared to Event 9	*****	*****	*****	*****	*****	*****	*****	*****	*****	-1	-1

Mann-Kendall Statistic 'S' = -8

Statistical Confidence Level

>90% Confidence

I S I ≥ 15

Result No Trend

>95% Confidence

I S I ≥ 20

Result No Trend

EAST CENTERLINE - GP-2E(45-50) - BENZENE

Mann-Kendall Statistical Method Worksheet

Site-- Chillum
Compound-- Benzene
Well-- GP-2E(45-50)

	Event 1	Event 2	Event 3	Event 4	Event 5	Event 6	Event 7	Event 8	Event 9	Event 10	Events
Concentration	172	134	71	78	50	34	8	1	1	1	10
	--	--	--	--	--	--	--	--	--	--	**Sum**
Compared to Event 1	*****	-1	-1	-1	-1	-1	-1	-1	-1	-1	-9
Compared to Event 2	*****	*****	-1	-1	-1	-1	-1	-1	-1	-1	-8
Compared to Event 3	*****	*****	*****	1	-1	-1	-1	-1	-1	-1	-5
Compared to Event 4	*****	*****	*****	*****	-1	-1	-1	-1	-1	-1	-6
Compared to Event 5	*****	*****	*****	*****	*****	-1	-1	-1	-1	-1	-5
Compared to Event 6	*****	*****	*****	*****	*****	*****	-1	-1	-1	-1	-4
Compared to Event 7	*****	*****	*****	*****	*****	*****	*****	-1	-1	-1	-3
Compared to Event 8	*****	*****	*****	*****	*****	*****	*****	*****	0	0	
Compared to Event 9	*****	*****	*****	*****	*****	*****	*****	*****	*****	0	

Mann-Kendall Statistic 'S' = -40

Statistical Confidence Level

>90% Confidence

I S I ≥ 15

Result Decreasing Trend

>95% Confidence

I S I ≥ 20

Result Decreasing Trend

EAST CENTERLINE - GP-2E(45-50) - MTBE

Mann-Kendall Statistical Method Worksheet

Site-- Chillum
Compound-- MTBE
Well-- GP-2E(45-50)

	Event 1	Event 2	Event 3	Event 4	Event 5	Event 6	Event 7	Event 8	Event 9	Event 10	Events
Concentration	803	501	394	420	400	470	330	370	350	450	10
	--	--	--	--	--	--	--	--	--	--	**Sum**
Compared to Event 1	*****	-1	-1	-1	-1	-1	-1	-1	-1	-1	-9
Compared to Event 2	*****	*****	-1	-1	-1	-1	-1	-1	-1	-1	-8
Compared to Event 3	*****	*****	*****	1	1	1	-1	-1	-1	1	1
Compared to Event 4	*****	*****	*****	*****	-1	1	-1	-1	-1	1	-2
Compared to Event 5	*****	*****	*****	*****	*****	1	-1	-1	-1	1	-1
Compared to Event 6	*****	*****	*****	*****	*****	*****	-1	-1	-1	-1	-4
Compared to Event 7	*****	*****	*****	*****	*****	*****	*****	1	1	1	3
Compared to Event 8	*****	*****	*****	*****	*****	*****	*****	*****	-1	1	
Compared to Event 9	*****	*****	*****	*****	*****	*****	*****	*****	*****	1	1

Mann-Kendall Statistic 'S' = -19

Statistical Confidence Level

>90% Confidence

I S I ≥ 15

Result Decreasing Trend

>95% Confidence

I S I ≥ 20

Result No Trend

EAST CENTERLINE - MW-25B - BENZENE

Mann-Kendall Statistical Method Worksheet

Site-- Chillum
Compound-- Benzene
Well-- MW-25B

	Event 1	Event 2	Event 3	Event 4	Event 5	Event 6	Event 7	Event 8	Event 9	Event 10	Events
Concentration	456	1	403	470	320	340	180	240	450	170	10
	--	--	--	--	--	--	--	--	--	--	**Sum**
Compared to Event 1	*****	-1	-1	1	-1	-1	-1	-1	-1	-1	-7
Compared to Event 2	*****	*****	1	1	1	1	1	1	1	1	8
Compared to Event 3	*****	*****	*****	1	-1	-1	-1	-1	1	-1	-3
Compared to Event 4	*****	*****	*****	*****	-1	-1	-1	-1	-1	-1	-6
Compared to Event 5	*****	*****	*****	*****	*****	1	-1	-1	1	-1	-1
Compared to Event 6	*****	*****	*****	*****	*****	*****	-1	-1	1	-1	-2
Compared to Event 7	*****	*****	*****	*****	*****	*****	*****	1	1	-1	1
Compared to Event 8	*****	*****	*****	*****	*****	*****	*****	*****	1	-1	
Compared to Event 9	*****	*****	*****	*****	*****	*****	*****	*****	*****	-1	-1

Mann-Kendall Statistic 'S' = -11

Statistical Confidence Level

>90% Confidence

I S I ≥ 15

Result No Trend

>95% Confidence

I S I ≥ 20

Result No Trend

EAST CENTERLINE - MW-25B - MTBE

Mann-Kendall Statistical Method Worksheet

Site-- Chillum
Compound-- MTBE
Well-- MW-25B

	Event 1	Event 2	Event 3	Event 4	Event 5	Event 6	Event 7	Event 8	Event 9	Event 10	Events
Concentration	502	386	461	550	370	490	310	350	410	260	10
	--	--	--	--	--	--	--	--	--	--	**Sum**
Compared to Event 1	*****	-1	-1	1	-1	-1	-1	-1	-1	-1	-7
Compared to Event 2	*****	*****	1	1	-1	1	-1	-1	1	-1	0
Compared to Event 3	*****	*****	*****	1	-1	1	-1	-1	-1	-1	-3
Compared to Event 4	*****	*****	*****	*****	-1	-1	-1	-1	-1	-1	-6
Compared to Event 5	*****	*****	*****	*****	*****	1	-1	-1	1	-1	-1
Compared to Event 6	*****	*****	*****	*****	*****	*****	-1	-1	-1	-1	-4
Compared to Event 7	*****	*****	*****	*****	*****	*****	*****	1	1	-1	1
Compared to Event 8	*****	*****	*****	*****	*****	*****	*****	*****	1	-1	
Compared to Event 9	*****	*****	*****	*****	*****	*****	*****	*****	*****	-1	-1

Mann-Kendall Statistic 'S' = -21

Statistical Confidence Level

>90% Confidence

I S I ≥ 15

Result Decreasing Trend

>95% Confidence

I S I ≥ 20

Result Decreasing Trend

EAST CENTERLINE - MW-27B - BENZENE

Mann-Kendall Statistical Method Worksheet

Site-- Chillum
Compound-- Benzene
Well-- MW-27B

	Event 1	Event 2	Event 3	Event 4	Event 5	Event 6	Event 7	Event 8	Event 9	Event 10	Events
Concentration	142	146	168	150	200	82	34	37	19	7	10
	--	--	--	--	--	--	--	--	--	--	**Sum**
Compared to Event 1	*****	1	1	1	1	-1	-1	-1	-1	-1	-1
Compared to Event 2	*****	*****	1	1	1	-1	-1	-1	-1	-1	-2
Compared to Event 3	*****	*****	*****	-1	1	-1	-1	-1	-1	-1	-5
Compared to Event 4	*****	*****	*****	*****	1	-1	-1	-1	-1	-1	-4
Compared to Event 5	*****	*****	*****	*****	*****	-1	-1	-1	-1	-1	-5
Compared to Event 6	*****	*****	*****	*****	*****	*****	-1	-1	-1	-1	-4
Compared to Event 7	*****	*****	*****	*****	*****	*****	*****	1	-1	-1	-1
Compared to Event 8	*****	*****	*****	*****	*****	*****	*****	*****	-1	-1	-2
Compared to Event 9	*****	*****	*****	*****	*****	*****	*****	*****	*****	-1	-1

Mann-Kendall Statistic 'S' = -25

Statistical Confidence Level

>90% Confidence

I S I ≥ 15

Result Decreasing Trend

>95% Confidence

I S I ≥ 20

Result Decreasing Trend

EAST CENTERLINE - MW-27B - MTBE

Mann-Kendall Statistical Method Worksheet

Site-- Chillum
Compound-- MTBE
Well-- MW-27B

	Event 1	Event 2	Event 3	Event 4	Event 5	Event 6	Event 7	Event 8	Event 9	Event 10	Events
Concentration	507	417	451	370	530	310	240	240	240	160	10
	--	--	--	--	--	--	--	--	--	--	**Sum**
Compared to Event 1	*****	-1	-1	-1	1	-1	-1	-1	-1	-1	-7
Compared to Event 2	*****	*****	1	-1	1	-1	-1	-1	-1	-1	-4
Compared to Event 3	*****	*****	*****	-1	1	-1	-1	-1	-1	-1	-5
Compared to Event 4	*****	*****	*****	*****	1	-1	-1	-1	-1	-1	-4
Compared to Event 5	*****	*****	*****	*****	*****	-1	-1	-1	-1	-1	-5
Compared to Event 6	*****	*****	*****	*****	*****	*****	-1	-1	-1	-1	-4
Compared to Event 7	*****	*****	*****	*****	*****	*****	*****	0	0	-1	-1
Compared to Event 8	*****	*****	*****	*****	*****	*****	*****	*****	0	-1	-1
Compared to Event 9	*****	*****	*****	*****	*****	*****	*****	*****	*****	-1	-1

Mann-Kendall Statistic 'S' = -32

Statistical Confidence Level

>90% Confidence

I S I ≥ 15

Result Decreasing Trend

>95% Confidence

I S I ≥ 20

Result Decreasing Trend

EAST CENTERLINE - MW-53 - BENZENE

Mann-Kendall Statistical Method Worksheet

Site-- Chillum
Compound-- Benzene
Well-- MW-53

	Event 1	Event 2	Event 3	Event 4	Event 5	Event 6	Event 7	Event 8	Event 9	Event 10	Events
Concentration	1	1	4	54	15	61	17	23	8	9	10
	--	--	--	--	--	--	--	--	--	--	**Sum**
Compared to Event 1	*****	0	1	1	1	1	1	1	1	1	8
Compared to Event 2	*****	*****	1	1	1	1	1	1	1	1	8
Compared to Event 3	*****	*****	*****	1	1	1	1	1	1	1	7
Compared to Event 4	*****	*****	*****	*****	-1	1	-1	-1	-1	-1	-4
Compared to Event 5	*****	*****	*****	*****	*****	1	1	1	-1	-1	1
Compared to Event 6	*****	*****	*****	*****	*****	*****	-1	-1	-1	-1	-4
Compared to Event 7	*****	*****	*****	*****	*****	*****	*****	1	-1	-1	-1
Compared to Event 8	*****	*****	*****	*****	*****	*****	*****	*****	-1	-1	-2
Compared to Event 9	*****	*****	*****	*****	*****	*****	*****	*****	*****	1	1

Mann-Kendall Statistic 'S' = 14

Statistical Confidence Level

>90% Confidence

I S I ≥ 15

Result No Trend

>95% Confidence

I S I ≥ 20

Result No Trend

EAST CENTERLINE - MW-53 - MTBE

Mann-Kendall Statistical Method Worksheet

Site-- Chillum
Compound-- MTBE
Well-- MW-53

	Event 1	Event 2	Event 3	Event 4	Event 5	Event 6	Event 7	Event 8	Event 9	Event 10	Events
Concentration	97	88	103	240	110	270	160	160	150	220	10
	--	--	--	--	--	--	--	--	--	--	**Sum**
Compared to Event 1	*****	-1	1	1	1	1	1	1	1	1	7
Compared to Event 2	*****	*****	1	1	1	1	1	1	1	1	8
Compared to Event 3	*****	*****	*****	1	1	1	1	1	1	1	7
Compared to Event 4	*****	*****	*****	*****	-1	1	-1	-1	-1	-1	-4
Compared to Event 5	*****	*****	*****	*****	*****	1	1	1	1	1	5
Compared to Event 6	*****	*****	*****	*****	*****	*****	-1	-1	-1	-1	-4
Compared to Event 7	*****	*****	*****	*****	*****	*****	*****	0	-1	1	
Compared to Event 8	*****	*****	*****	*****	*****	*****	*****	*****	-1	1	0
Compared to Event 9	*****	*****	*****	*****	*****	*****	*****	*****	*****	1	1

Mann-Kendall Statistic 'S' = 20

Statistical Confidence Level

>90% Confidence

I S I ≥ 15

Result Increasing Trend

>95% Confidence

I S I ≥ 20

Result Increasing Trend

Mann-Kendall Statistical Method Worksheet

Site-- Smallville
Compound-- Benzene
Well-- MW-12

Input data from four to ten sampling events in Row 10.

	Event 1	Event 2	Event 3	Event 4	Event 5	Event 6	Event 7	Event 8	Event 9	Event 10	Events
Concentration	3,780	1,810	2,630	2,800	2,600	2,000	1,800	130	1,500	140	10
	--	--	--	--	--	--	--	--	--	--	**Sum**
Compared to Event 1	*****	-1	-1	-1	-1	-1	-1	-1	-1	-1	-9
Compared to Event 2	*****	*****	1	1	1	1	-1	-1	-1	-1	
Compared to Event 3	*****	*****	*****	1	-1	-1	-1	-1	-1	-1	-5
Compared to Event 4	*****	*****	*****	*****	-1	-1	-1	-1	-1	-1	-6
Compared to Event 5	*****	*****	*****	*****	*****	-1	-1	-1	-1	-1	-5
Compared to Event 6	*****	*****	*****	*****	*****	*****	-1	-1	-1	-1	-4
Compared to Event 7	*****	*****	*****	*****	*****	*****	*****	-1	-1	-1	-3
Compared to Event 8	*****	*****	*****	*****	*****	*****	*****	*****	1	1	2
Compared to Event 9	*****	*****	*****	*****	*****	*****	*****	*****	*****	-1	-1

Mann-Kendall Statistic 'S' = -31

Statistical Confidence Level

>90% Confidence

I S I ≥ 15

Result Decreasing Trend

>95% Confidence

I S I ≥ 20

Result Decreasing Trend