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Chevron Environmental Management Company

SEMI-ANNUAL PROGRESS REPORT JULY THROUGH DECEMBER 2015

Former Chevron Facility No. 122208

January 2016

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ACRONYMS AND ABBREVIATIONS

AO	Administrative Order
BTEX	Benzene, Toluene, Ethylbenzene, and Xylenes
DDOE	District Department of the Environment
DO	Dissolved Oxygen
DPE	Dual Phase Extraction
EPA	Environmental Protection Agency
FID	Flame Ionization Detector
GAC	Granular Activated Carbon
gpm	Gallons per Minute
ISGR	In-situ Groundwater Remediation
LPH	Liquid Phase Hydrocarbons
µg/L	Micrograms per Liter
MDE	Maryland Department of the Environment
mg/L	Milligrams per Liter
MTBE	Methyl Tert-Butyl Ether
NPDES	National Pollutant Discharge Elimination System
OMM	Operation, Maintenance, and Monitoring
ORZ	Oxygen Reactive Zone
psi	Pounds per Square Inch
SVE	Soil Vapor Extraction
TPH-GRO	Total Petroleum Hydrocarbons – Gas Range Organics
TRPH	Total Recoverable Petroleum Hydrocarbons
VMS	Vapor Mitigation System
VOCs	Volatile Organic Compounds

1 INTRODUCTION

Pursuant to the United States Environmental Protection Agency (EPA) Administrative Order, Docket Number RCRA-03-2008-0355TH (AO), Chevron Environmental Management Company (Chevron) is conducting remedial activities 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, ARCADIS on behalf of 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 through December 2015.

The remainder of this Report provides information on the following:

- Section 2.0 - System Overview
- Section 3.0 - Discontinue Operation and Maintenance of Vapor Mitigation Systems
- Section 4.0 - Operation, Maintenance, and Monitoring
- Section 5.0 - Submittal of Deliverables
- Section 6.0 - Summary of Findings
- Section 7.0 - Permit Compliance
- Section 8.0 - Summary of Deviations from Approved Plans, Problems Encountered, and Corrective Actions Taken
- Section 9.0 - Summary of Meetings with Public and Government
- Section 10.0 - Changes in Key Personnel During the Reporting Period
- Section 11.0 - Projected Work for the Next Reporting Period

2 SYSTEM OVERVIEW

The piping and instrumentation diagrams for the systems (Appendix G) provide specific system information, such as equipment models and sizes, piping sizes, controls, and other technical information.

2.1 Area A Dual Phase Extraction System

Area A encompasses the former Chevron service station, the existing remediation system compound adjacent to the service station, and the shopping center parking lot near the intersection of Eastern Avenue and Riggs Road in Chillum, Maryland. Duplex residential homes are present southwest of Area A, and land use is generally commercial in all other directions. The Dual Phase Extraction (DPE) System consists of total fluids extraction and treatment as well as soil vapor extraction (SVE) and treatment.

2.1.1 Total Fluids Recovery and Treatment

Pneumatic total fluids (i.e., groundwater and liquid phase hydrocarbons [LPH], if present) pumps are installed in 11 DPE wells (RW-1, RW-2, RW-3, RW-4, RW-5, MW-7, MW-17, MW-22R, GP-27R, GP-39R and PTW-B). Total fluids are pumped from the wells through buried piping to the total fluids manifold located in the remediation system trailer. 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 manually skimmed off on a periodic basis (if present). Effluent air from the air stripper is treated using two vapor phase granular activated carbon (GAC) vessels in series and then discharged to the atmosphere in accordance with Maryland Department of the Environment (MDE) Air Quality General Permit to Construct for Groundwater Air Stripping, Identification No. 033-9-1160. Treated water from the air stripper is pumped through three parallel bag filters and then through two liquid phase GAC vessels in series. The treated effluent flows through a buried pipe to a storm drain inlet located in Riggs Road near the intersection at Eastern Avenue, N.E. in accordance with MDE General Discharge Permit No. 2008-OGR-8514 (National Pollutant Discharge Elimination System [NPDES] Permit No. MDG918514).

2.1.2 Soil Vapor Recovery and Treatment

SVE is conducted at 12 wells (i.e., the 11 DPE wells plus MP-7). An individual piping leg runs from each well to a common 3-inch manifold in the remediation system trailer. 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 conveyed 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 for Soil Vapor Extraction Equipment, Identification No. 033-9-1164. Water collected in the knockout tank is pumped to the oil/water separator for treatment.

2.2 Area B In-Situ Groundwater Remediation Wells

Area B is located in the alley between Oglethorpe Street and Eastern Avenue, NE, in Washington, D.C. (Oglethorpe Alley). The area surrounding Area B is residential, with brick duplexes and triplexes lining Oglethorpe Street and Eastern Avenue.

The Area B system consists of two in-situ groundwater remediation (ISGR) wells (ISGR-1 and ISGR-2) that are installed in the Oglethorpe Alley forming a transect along the alley. ISGR-1 and ISGR-2 were started on August 28, 2013. The objective of the ISGR wells is to remove dissolved hydrocarbon mass from groundwater in Area B by adsorption to liquid phase GAC.

For each ISGR well, water enters the shallow aquifer inlet screen, which is placed at an appropriate depth to intersect dissolved hydrocarbons, and is pumped through liquid phase GAC to remove hydrocarbons to non-detect levels. The treated water is released by gravity to the deep aquifer through an outlet screen in the same well. The targeted pumping rate of each well is 1 to 2 gallons per minute (gpm), depending on aquifer response.

The submersible pump is operated by a control panel mounted on a base with the electrical power (utility) meter. The pump is driven by a controller, which controls the speed of the pump, depending on observed system performance and operator input. The pumping rate can be adjusted over a range of approximately 1 to 10 gpm.

2.3 Area C Oxygen Reactive Zone

Area C is located in the alley between Oglethorpe and Nicholson Streets, NE, in Washington, D.C. (Nicholson Alley). The area surrounding Area C is residential, with brick duplexes and triplexes lining Nicholson and Oglethorpe Streets.

The objective of the oxygen reactive zone (ORZ) is to increase the concentration of dissolved oxygen (DO) in the subsurface of the Nicholson Alley to stimulate the growth of native microbes that use oxygen to degrade dissolved petroleum hydrocarbons. The intent of the system is the reduction of dissolved hydrocarbons downgradient of Area C through the biotransformation of dissolved hydrocarbons by aerobic microbes. The Area C ORZ system was started on August 29, 2013.

Five oxygen injection wells (IW-1 through IW-5) are installed in the Nicholson Alley. The locations of the wells and vertical positions of the well screens correspond to the areas of highest petroleum hydrocarbon concentrations as determined from previous site investigation activities. Oxygen hoses are routed in and out of each well vault through polyvinyl chloride inlet and outlet conduits. An oxygen emitter is installed in each injection well within the screened interval of the wells.

Oxygen is supplied to the oxygen emitters by an oxygen cylinder housed in a non-permit required confined space pre-cast concrete vault installed below grade in the Nicholson Alley. The vault is located in line with, and centered between, injection wells IW-1 and IW-2 and is equipped with a floor sump with level sensor, a passive ventilation system, and a continuous monitoring oxygen detector to monitor for oxygen leakage.

3 DISCONTINUED OPERATION AND MONITORING OF VAPOR MITIGATION SYSTEMS

Based on Section 5.7 of the approved Interim Measures Work Plan for Vapor Sampling and Mitigation, if the data trend over three consecutive years suggests that continuous operation of any vapor mitigation system (VMS) installed is no longer necessary to protect human health, Chevron may petition EPA for system termination review.

Chevron submitted a letter dated November 7, 2013 to EPA to formally request a termination review and EPA approval that operation and maintenance of the three VMS units located at 746 Oglethorpe Street, 5818 Eastern Avenue, and 5824 Eastern Avenue Washington, D.C. be discontinued. In a letter dated January 9, 2014, the EPA approved Chevron's request to discontinue operation and maintenance of the three VMS units.

In response to the approval, the residence owners at 746 Oglethorpe Street and 5818 Eastern Avenue were contacted by Chevron in February 2014 and informed that per the 2010 Final Remedy and as detailed in the 2010 Homeowner Report (that the resident owners previously received from the District Department of the Environment [DDOE]), they were deemed eligible to receive a VMS from the DDOE and they should not remove the VMS currently installed in their home. Following confirmation of receipt of this correspondence, the DDOE was to contact the resident owners to coordinate future operation and maintenance events.

Additionally, in response to the approval, the residence owner at 5824 Eastern Avenue, who was deemed not eligible to receive a VMS from the DDOE (per the 2010 Final Remedy), was contacted (by Chevron) in February 2014 to determine whether the system will be removed from the building or left in place. No request for the removal of the system at 5824 Eastern Avenue has been received to date, therefore; the system will be left in place, and the residence owner is responsible for all costs (including electricity) associated with further maintenance and operation of the system.

Notification letters, inclusive of the EPA approval date and the information discussed above, were submitted to each resident via certified mail.

4 OPERATION, MAINTENANCE, AND MONITORING

This section provides a summary of operation, maintenance, and monitoring (OMM) activities conducted at the site during the reporting period.

4.1 System Operation

This section provides a summary of operations for Area A, B, and C systems and includes a discussion on system uptime and downtime and other related operational points of discussion. A description of the routine OMM requirements for Areas A, B, and C, are also provided in the following sections.

4.1.1 Area A Dual Phase Extraction System

Routine OMM site visits to record measurements and collect samples are performed every other week (twice per month). The reduction from weekly routine OMM visits to every other week is based on permit requirements to collect two effluent samples per month for an Area A effluent flow of less than 500,000 gallons per month to the municipal storm drain. Additional visits are made to the site each month for specific maintenance needs and to respond to system alarms as needed.

The operating hours for both the total fluids and SVE portions of the DPE system were logged regularly during the reporting period by collecting measurements from the solenoid and hour meter, respectively. For the period of July 1, 2015 through December 31, 2015, the total fluids extraction portion of the system was operating 76.6 percent of the time (3,383 hours on and 1,033 hours off). During the same time period, the SVE portion of the system was operating 75.9 percent of the time (3,352 hours on and 1,064hours off).

Table A-1 in Appendix A contains total fluids extraction system data including date and time, on/off status, totalizer reading, cumulative gallons of hydrocarbons recovered, operating extraction points, maintenance information, reasons for system downtime, and types of maintenance performed during this reporting period and the previous period (January 1 through June 30, 2015). A detailed explanation of the tables is provided on the first page of Appendix A.

Table B-1 in Appendix B contains soil vapor extraction system data including date and time, on/off status, hour meter readings, manifold air flow readings, manifold vacuum readings, influent and effluent screening concentrations measured using a flame ionization detector (FID), cumulative gallons of hydrocarbons recovered, operating extraction points, maintenance information, reasons for system downtime, and types of maintenance performed during this reporting period and the previous period. A detailed explanation of the tables is provided on the first page of Appendix B.

Optimization of the SVE system was performed on December 8, 2015. Data collected during optimization events is utilized to maximize mass removal by targeting vapor extraction on wells exhibiting higher influent concentrations. Concentration measurements from each soil vapor extraction well remained consistent with recent past optimization values and no changes to system configuration were made.

4.1.2 Area B In-Situ Groundwater Remediation Wells

Routine OMM visits to Area B are conducted monthly or as needed to check system operation status, to collect carbon performance samples, and record system data.

The operating hours for both ISGR wells were logged regularly during the reporting period by collecting measurements from the hour meters during each visit. In May of 2014 a phone line connection was installed at Area B to improve system uptime/downtime monitoring. Programming of the existing controller for each ISGR well to send notification of system shutdown was completed in June of 2014. For the period of July 1 through December 31, 2015, ISGR-1 was operating 100 percent of the time (4,440 hours on and 0 hours off). During the same time period, ISGR-2 was operating 98.93 percent of the time (4,393 hours on and 47 hours off).

Table E-1 in Appendix E contains ISGR monitoring data for each well including date and time, on/off status, hour meter reading, total gallons pumped, system flow, influent pressure, and pump operating hours.

4.1.3 Area C Oxygen Reactive Zone

Routine OMM visits to Area C are conducted monthly or as needed to check system operation status, to collect DO measurements, and record system data. DO measurements are recorded on a quarterly basis from the injection wells and specified system performance monitoring wells.

As detailed in previous reporting, frequent flooding of the Area C vault in February and March of 2015 by surface water infiltration, resulted in total submergence of all equipment, visible excessive corrosion of system piping, and frequent system leaks leading to premature oxygen cylinder depletion. The ORZ system was left off starting March 12, 2015 and remained off through the end of the reporting period as preparations and planning was conducted to replace all equipment and piping material within the vault. On January 7, 2016, the replacement of all vault equipment and piping was completed and the system was restarted. The first DO measurements, since the system was taken off line, are planned to be completed during the first quarter of 2016. A more detailed discussion related to efforts associated with the Area C system is provided in Section 8.

Table F-1 in Appendix F contains ORZ monitoring data including date and time, on/off status, oxygen cylinder pressure, cylinder regulator pressure, well regulator pressure and vault oxygen sensor reading.

4.2 System Maintenance

This section provides a summary of routine and non-routine maintenance activities performed for the Area A, B, and C systems.

4.2.1 Area A Dual Phase Extraction System

Routine maintenance is performed as specified or as needed, including checking the oil level of the SVE blower and air compressor, draining the air compressor, changing the bag filters, backwashing the carbon units, and skimming off LPH in the oil/water separator, if present.

Provided below is a description of the non-routine maintenance activities performed at Area A.

- Extraction well compressed air tubing replaced on August 4, 2015.
- System was shut down temporarily in preparation of imminent hurricane on October 2 and was restarted on October 5, 2015.
- System temporarily shut down to replace the vapor phase GAC on November 5, 2015.

4.2.2 Area B In-Situ Groundwater Remediation Wells

System maintenance is performed as needed or as specified. Routine maintenance includes checking and changing (when needed) cartridge filters and checking the top of the carbon for fouling and fouled carbon removal (top few inches) as needed. Non-routine maintenance activities, including pump maintenance, carbon replacement, and replacement/repair of system components, will be performed as needed.

There were no non-routine maintenance activities performed at Area B during this reporting period.

4.2.3 Area C Oxygen Reactive Zone

System maintenance is performed as needed or as specified. Non-routine maintenance activities that will be performed as needed, based on system inspection and monitoring, include cleaning of the oxygen emitters, replacing the oxygen cylinder, well maintenance, removing liquids contained in the oxygen vault sump by pumping, and replacement/repair of system components.

Provided below is a description of the non-routine maintenance activities performed at Area C.

- The oxygen cylinder was replaced on November 4, 2015.
- The oxygen emitters were pulled, cleaned, and reinstalled on November 4, 2015.
- The electrical components of the vault, including the oxygen sensor and sump level sensor, were replaced with identical units on November 13, 2015.
- The former oxygen distribution manifold was replaced with a stainless steel manifold on January 7, 2016.

4.3 System Monitoring

This section provides a summary of monitoring activities performed for the Area A, B, and C systems.

4.3.1 Area A Dual Phase Extraction System

Routine monitoring for the DPE system includes the following activities:

- Recording groundwater and air flow rates;
- Measuring air influent and effluent concentrations using a FID;
- Recording the manifold vacuum for the SVE system;
- Recording groundwater extraction system bag filter and air stripper differential pressure;
- Recording groundwater extraction system carbon influent pressures;
- Recording the SVE hour meter;
- Recording catalytic oxidizer temperatures; and

- Recording vacuum readings.

The total fluids influent (SP-1) was sampled 6 times and the treated effluent (SP-3) was sampled 12 times for laboratory analysis during the reporting period (Tables A-2 and A-3, respectively, Appendix A). Treated effluent samples were analyzed by EPA Method 8260 for benzene, toluene, ethylbenzene, and xylenes (BTEX), methyl tert-butyl ether (MTBE), naphthalene, tetrachloroethene, trichloroethene, and 1, 2-cis-dichloroethene. Treated effluent samples were also analyzed by EPA Method 8015 for total petroleum hydrocarbons - gasoline range organics (TPH-GRO). The discharge permit limits are 100 micrograms per liter (µg/L) for total BTEX, 5 µg/L for benzene, and 15 milligrams per liter (mg/L) for TPH-GRO. The discharge permit requires reporting of MTBE, naphthalene, tetrachloroethene, trichloroethene, and 1, 2-cis-dichloroethene concentrations without established limits. Results are documented in Section 6 of this report.

The air stripper vapor phase GAC influent (SP-50) air was sampled 5 times and the air stripper vapor phase GAC effluent (SP-52) air was sampled 6 times for laboratory analysis during the reporting period (Tables A-4 and A-5, respectively, Appendix A). Samples were analyzed for BTEX, MTBE, and total recoverable petroleum hydrocarbons (TRPH), reported as GRO in the C4 to C10 range, using EPA Method TO-15. The air stripper permit discharge limits are 20 pounds of volatile organic compounds (VOCs) per day and 0.02 pounds of benzene per hour. Results are documented in Section 6 of this report.

The SVE system influent (SP-100) air was sampled 6 times and the SVE treated effluent (SP-200) air was sampled 6 times for laboratory analysis during the reporting period (Tables B-2 and B-3, respectively, Appendix B) to document compliance with the air discharge permit. The treated effluent air sampling port is located in the catalytic oxidizer effluent stack before discharge to the atmosphere. Samples were analyzed for BTEX, MTBE, and TRPH, reported as GRO in the C4 to C10 range, using EPA Method TO-15. The SVE system permit discharge limits are 20 pounds of VOCs per day and 0.02 pounds of benzene per hour. Results are documented in Section 6 of this report.

4.3.2 Area B In-Situ Groundwater Remediation Wells

Routine monitoring for the ISGR wells includes the following activities:

- Recording the hour meter;
- Recording total volume pumped and the system flow rate;
- Recording influent pressure; and
- Recording the pump set point, temperature, speed, power input, power consumption, operating hours, and starts.

Liquid phase GAC performance samples were collected monthly during the reporting period. Since startup and throughout the reporting period, analysis of samples collected from the 50% carbon sample port of both wells have been non-detect.

Liquid phase GAC performance samples will continue to be collected on a monthly basis to determine the carbon exhaustion rate. The time between system start-up and detection of hydrocarbons at the 75% sample port will be evaluated to calculate when hydrocarbons will be detected in the 90% sample port. The carbon change out for ISGR-1 and ISGR-2 will be scheduled prior to the calculated date when the

90% sample port is expected to be impacted. Table E-2 in Appendix E provides a summary of the analysis results for the liquid phase GAC performance samples collected from ISGR-1 and ISGR-2.

4.3.3 Area C Oxygen Reactive Zone

Routine monitoring for the ORZ system includes the following activities:

- Recording oxygen cylinder pressure;
- Recording system pressure;
- Recording oxygen sensor reading; and
- Recording pressure at each well.

DO is measured in all injection wells (IW-1 through IW-5), MW-26A, MW-26B, and MW-58 on a quarterly basis. Table F-2 in Appendix F provides a summary of the DO measurements for the Area C ORZ. As previously discussed, DO measurements were not collected between March 12, 2015 and the end of the reporting period while the system was off line for equipment replacement.

Oxygen cylinder usage is tracked to evaluate system consumption and to monitor for cylinder replacement. Based on data collected to date and cylinder replacement frequency, normal cylinder life is estimated at 6 months. The oxygen cylinder was last replaced on November 4, 2015 and prior to system restart on January 7, 2016 the cylinder pressure was recorded as 1,200 pounds per square inch (psi). A new cylinder typically has a pressure of 1,800 psi with an approximate capacity of 1,700 liters or 60 cubic feet.

4.4 Site Monitoring

In a letter dated August 21, 2014 ARCADIS, on behalf of Chevron, submitted a request to the EPA for modification of the approved site groundwater sampling plan. The letter proposed a reduction in the number of wells being sampled, a modification to the frequency of sampling for specific wells, and compared the past two years of groundwater quality data to Maximum Contaminant Levels established for the site. The review also considered the location and usefulness of related monitoring wells with respect to future plume modeling. In a letter dated September 2, 2014, the EPA approved the proposed modification to the site groundwater sampling plan.

The EPA-approved Interim Monitoring Sampling Plan calls for monthly gauging of ten monitoring wells (GP-27R, GP-30A, GP-35A, MP-7, MW-7, MW-16, MW-18, MW-22R, MW-24A, and RW-4), semi-annual gauging of all monitoring wells, semi-annual sampling of 41 monitoring wells, annual sampling of 27 monitoring wells, and semi-annual sampling of the four soil vapor wells (VW-1, VW-2, VW-3, and VW-4). Table 1 provides a summary of the newly approved groundwater and soil vapor sampling plan.

4.4.1 Groundwater Monitoring

Monthly groundwater gauging of the ten specified monitoring wells was conducted on July 27, August 4, September 2, October 20, November 17, and December 8, 2015. The fall semi-annual groundwater gauging was conducted on September 2, 2015. The groundwater gauging/elevation data for the past two years is provided on Table C-1 of Appendix C. A detailed explanation of the table is provided on the first page of Appendix C. Groundwater contour maps, provided as Figures 2 and 3, were created using

gauging data collected during the fall semi-annual groundwater gauging event. Results are summarized in Section 6 of this report.

The fall semi-annual sampling event for the Maryland and D.C. monitoring wells was conducted during the period of September 30 through October 2, 2015. The analytical results for groundwater sampling events for the past two years are provided on Table C-2 of Appendix C. A detailed explanation of the table is provided on the first page of Appendix C. Groundwater iso-concentration maps, provided as Figures 4 through 7, were created using analytical results from the fall 2015 sampling event. Figures 8 through 25 present the benzene and MTBE trend analyses for select wells.

A Mann-Kendall statistical analysis was performed for the groundwater sample analysis results from the fall 2015 sampling event. Results of the Mann-Kendall statistical analysis are documented in Section 6 of this report.

4.4.1.1 In-Situ Groundwater Remediation Wells

To evaluate system performance, groundwater samples for analysis of VOCs and TPH-GRO, are collected from MW-61A, MW-61B, MW-62A, MW-62B, and the influent (shallow piezometer) and effluent (deep piezometer) of the ISGR wells during the on-going semi-annual long-term monitoring program. Analytical results for groundwater samples collected from the Area B system performance wells during the fall 2015 semi-annual sampling event are provided on Table C-2 of Appendix C.

The influent (ISGR-1 Shallow and ISGR-2 Shallow) and effluent (ISGR-1 Deep and ISGR-2 Deep) of the ISGR wells were added to Table 1 for inclusion in the long-term monitoring program.

4.4.1.2 Oxygen Reactive Zone

To evaluate system performance, groundwater samples for analysis of VOCs and TPH-GRO, are collected from wells MW-58, MW-59, MW-60, MW-26A, and MW-26B during the ongoing semi-annual long-term monitoring program. Analytical results for groundwater samples collected from the Area C system performance wells during the fall 2015 semi-annual sampling event are provided on Table C-2 of Appendix C.

4.4.2 Passive Sampling Using the HydraSeeve™

The use of HydraSleeve passive samplers was approved by DDOE and EPA for use during the fall 2015 semi-annual groundwater sampling event. Groundwater samples were collected from 10 wells (MW-21, MW-27A, MW-40, MW-45, MW-49, MW-61A, ISGR-1 Shallow, ISGR-1 Deep, ISGR-2 Shallow, and ISGR-2 Deep) using the HydraSleeve passive samplers.

4.4.3 Soil Vapor Monitoring

Semi-annual soil vapor sampling of 2 (VW-1 and VW-2) of the 4 soil vapor wells as well as an ambient sample for VW-1 was conducted on October 27, 2015. Wet weather conditions prevented sample collection (i.e., infiltration of precipitation fills soil pore spaces and inhibits soil vapor flow) from two of the soil vapor wells (VW-3 and VW-4). Analytical results for soil vapor samples collected during the October 2015 semi-annual soil vapor sampling event are provided on Table D-1 of Appendix D.

5 SUBMITTAL OF DELIVERABLES

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

- Semi-Annual Progress Report for January through June 2015 in July 2015.

6 SUMMARY OF FINDINGS

This section provides a summary of findings and results for the OMM activities performed during the reporting period.

6.1 Area A Dual Phase Extraction System

The groundwater extraction portion of the DPE system pumped approximately 1,832,231 gallons of groundwater and recovered 11.78 equivalent gallons of dissolved hydrocarbons during the reporting period. The average system flow rate over the entire period was 6.92 gpm. The total volume of groundwater pumped from this site since remediation began in 1989 is approximately 68,874,818 gallons.

The analytical results for groundwater samples collected from sample point SP-3 (treated groundwater that is discharged to the storm drain) (Table A-3 of Appendix A) indicated concentrations of benzene, BTEX, and TPH-GRO in the treated groundwater were below the permit limits (5 µg/L benzene, 100 µg/L BTEX, and 15 mg/L for TPH-GRO) during the reporting period.

The laboratory analytical results for monthly air stripper samples collected at sample points SP-50 (air stripper vapor phase GAC influent) (Table A-4 of Appendix A) and SP-52 (air stripper vapor phase GAC effluent to atmosphere) (Table A-5 of Appendix A) indicated concentrations of benzene and TRPH in the treated vapor were below the permit limits. The permit limits are 0.02 pounds per hour of benzene and 20 pounds per day of VOCs measured as TRPH.

The SVE portion of the DPE system recovered 18.0 equivalent gallons of hydrocarbons in the vapor phase during the reporting period. The average air flow rate was 138.43 standard cubic feet per minute when the system was on (excluding down time).

The laboratory analytical results for monthly SVE system samples collected at sample points SP-100 (soil vapor influent) (Table B-2 of Appendix B) and SP-200 (soil vapor effluent to atmosphere) (Table B-3 of Appendix B) indicated concentrations of benzene and TRPH in the treated soil vapor were below the permit limits. The permit limits are 0.02 pounds per hour of benzene and 20 pounds per day of VOCs measured as TRPH.

Hydrocarbon Recovery Summary for Period of Cumulative Total for System

Period	Liquid Phase Hydrocarbons (gallons)	Dissolved Phase Hydrocarbons (eq. gallons)	Vapor Phase Hydrocarbons (eq. gallons)	Cumulative Total Hydrocarbons (eq. gallons)
7/1/15 through 12/31/15	0.00	11.78	18.0	29.78
Cumulative Total for System	856.5	984.3	6,502.2	8,343.0

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).

6.2 Area B In-Situ Groundwater Remediation Wells

ISGR-1 and ISGR-2 have continued to consistently operate throughout the reporting period. The long term effects of the Area B ISGR wells on reducing the concentration of petroleum hydrocarbons in groundwater will continue to be evaluated. The carbon consumption rate for both ISGR wells has continued to be minimal with no detectable levels of petroleum hydrocarbons measured in the 50% sampling port of the liquid phase GAC of either well. System optimization will be performed as required based on observed system performance.

6.3 Area C Oxygen Reactive Zone

The long term effects of the Area C ORZ system on reducing the concentration of petroleum hydrocarbons in groundwater will require continued system operation and sample analysis evaluation over a longer period of time. System optimization will be performed as required based on observed system performance. DO measurements will continue to be collected on a quarterly basis to verify DO delivery to the subsurface. Emitter cleaning and well maintenance will be performed as required.

6.4 Mann-Kendall Statistical Analysis

A Mann-Kendall statistical analysis was performed to determine trends in dissolved-phase hydrocarbon concentrations (benzene and MTBE) for select monitoring wells located along the previously mapped east and west centerlines of the dissolved-phase hydrocarbon concentrations in groundwater. The findings of the analysis demonstrate that dissolved-phase hydrocarbon concentrations for centerline wells were either decreasing or did not indicate a statistically significant trend with the exception of MW-60, which is located along the west centerline. Benzene concentrations in monitoring well MW-60 were not detected from the inception of the monitoring program until the fall of 2013 in which concentrations have slightly increased during the last three monitoring events (April 2013: <1.0 µg/L, September 2013: 1.6 µg/L, April 2014: 1.7 µg/L, April 2015: 2.6 µg/L).

Further evaluation of the benzene concentration trend for MW-60 is required and will be performed during the first half of 2016. This will include a re-evaluation of the trend analysis upon completion of the spring 2016 sampling event to confirm if an increasing trend of benzene is occurring at monitoring well MW-60. The full Mann-Kendall statistical analysis is presented in Appendix H.

6.5 Groundwater Elevation Summary

Groundwater gauging measurements from the fall 2015 semi-annual groundwater gauging event indicate that groundwater flow direction is consistent with past observations. Groundwater contour maps representing the fall 2015 semi-annual groundwater gauging event are provided as Figures 2 and 3.

7 PERMIT COMPLIANCE

Permits required for activities during this reporting period are described below.

7.1 Permits for Operation of the Area A System

MDE Air Quality General Permit for Groundwater Air Stripping effluent, permit number 033-9-1160 and MDE Air Quality General Permit for Soil Vapor Extraction Equipment effluent, permit number 033-9-1164 were required. Neither of these permits has an expiration date. Sampling and monitoring requirements include periodic effluent monitoring as previously described.

MDE General Discharge Permit, permit number 2008-OGR-8514 (NPDES Permit No. MDG918514) was issued for discharge of treated groundwater at the site. This permit became effective on November 1, 2013 and expires on December 11, 2017. Based on current system effluent flow (less than 500,000 gallons per month), the permit requires effluent sampling twice per month, system monitoring, and submission of a quarterly Discharge Monitoring Report. Two treated groundwater effluent (SP-3) samples were collected and analyzed each month during the reporting period.

7.2 Permits for Groundwater Monitoring and Operation of Area B and C Systems

Permit number PA10197033 for Public Space Occupancy was issued by the District Department of Transportation on July 21, 2015 to cover traffic control requirements for sampling, gauging, and OMM in Areas B and C until January 8, 2016. The Public Space Occupancy permit was renewed prior to expiration and the renewed Public Space Occupancy permit is effective from January 9 to July 6, 2016. A new permit is applied for and issued on a semi-annual basis.

8 SUMMARY OF DEVIATIONS FROM APPROVED PLANS, PROBLEMS ENCOUNTERED, AND CORRECTIVE ACTIONS TAKEN

8.1 Area C Operation

As a result of significant snow fall coupled with lower temperatures leading to snow accumulation at the site during February and March 2015 and given the late March/early April 2015 thaw, a large volume of surface water infiltrated and filled the Area C equipment vault on 3 separate occasions. These three occurrences represented the first and only occurrences of this level of infiltration. Typically only the sump in the bottom of the vault has contained limited water as designed.

Due to the increased exposure to water, the equipment/piping in the Area C vault was excessively worn by corrosion leading to frequent system leaks and premature oxygen cylinder depletion. The Area C ORZ system was restarted on January 7, 2016 upon completion of cylinder replacement, emitter cleaning, electrical equipment replacement, and vault piping replacement with less corrosive prone materials (stainless steel).

As a result of the Area C system being down, the minimum quarterly DO measurements could not be taken during the reporting period. Quarterly DO measurements are planned to resume the first quarter of 2016.

8.2 System Sampling/Monitoring

Provided below are the samples not collected during the reporting period and a brief justification:

- November: Sample collected from the vapor phase GAC influent sample tap (SP-50) was not analyzed due to the sample bag being deflated upon arrival at the lab.

- July – December: Area C DO measurements were not recorded during the reporting period as the system was down awaiting equipment replacement.

9 SUMMARY OF MEETINGS WITH PUBLIC AND GOVERNMENT

No meetings with the public or government officials occurred during the reporting period.

10 CHANGES IN KEY PERSONNEL DURING THE REPORTING PERIOD

Lauren Vogel effectively assumed the role of Arcadis Project Manager of the Chillum site, Facility No. 122208, at the end of this reporting period. The EPA, DDOE, and MDE were notified of the ARCADIS project manager change in a letter dated December 29, 2015.

11 PROJECTED WORK FOR THE NEXT REPORTING PERIOD

The following list identifies projected work anticipated to be performed during the next reporting period, January through June 2016:

- Routine operations and maintenance activities for the Area A, B, and C remediation systems;
- Monthly sampling of the Area A DPE system including influent and effluent sampling;
- Sampling of the Area A DPE system effluent twice per month to comply with treated water discharge permit;
- Monthly gauging of select wells near the service station to check for the presence of LPH and to document drawdown induced by the total fluids extraction system;
- Area A liquid phase GAC replacement and lag vessel internal perforated pipe replacement;
- Area A system optimization (as needed);
- Pull, inspect, and clean (as needed) pneumatic pumps in Area A;
- Clean oil water separator (as needed);
- Continue optimization of the Area B ISGR wells to maintain uptime;
- Area B monthly liquid phase GAC performance sampling;
- Area B liquid phase GAC replacement (as warranted) planning;
- Area C oxygen cylinder change out;
- Area C oxygen emitter pulling and cleaning (as needed);
- Area C quarterly DO measurement collection;
- Semi-annual groundwater sampling and gauging event in the spring of 2016; and
- System maintenance on Area A, B, and C systems as required.

TABLES

ARCADIS Design & Consultancy for natural and built assets

Chevron

TABLE 1 SUMMARY OF GROUNDWATER AND SOIL VAPOR SAMPLING PLAN
FORMER CHEVRON FACILITY NO. 122208
5801 RIGGS ROAD, CHILLUM, MARYLAND

EXISTING WELLS TO BE SAMPLED

Well Identifier	Well Location Category	Petroleum Hydrocarbon Sampling Frequency	Current Sampling Method	Groundwater Gauging Frequency[(2)]	Comment
GP-30A	Dual-Phase Extraction System	Semi-annual	Hydrasleeve	Monthly	
GP-35A	Dual-Phase Extraction System	Semi-annual	Hydrasleeve	Monthly	
MP-7	Dual-Phase Extraction System	None	None	Monthly	Gauge Only
MW-5	Dual-Phase Extraction System	None	None	Semi-annual	Gauge Only
MW-7	Dual-Phase Extraction System	Semi-annual	From pump	Monthly	Recovery Well
MW-15	Dual-Phase Extraction System	Semi-annual	Bailer	Semi-annual	
MW-16	Dual-Phase Extraction System	Annual	Bailer	Monthly	
MW-17	Dual-Phase Extraction System	Semi-annual	From pump	Semi-annual	Recovery Well
MW-18	Dual-Phase Extraction System	Annual	Bailer	Monthly	
MW-23	Dual-Phase Extraction System	Annual	Hydrasleeve	Semi-annual	
PTW-B	Dual-Phase Extraction System	Semi-annual	From pump	Semi-annual	Recovery Well
RW-1	Dual-Phase Extraction System	Semi-annual	From pump	Semi-annual	Recovery Well
RW-2	Dual-Phase Extraction System	Semi-annual	From pump	Semi-annual	Recovery Well
RW-3	Dual-Phase Extraction System	Semi-annual	From pump	Semi-annual	Recovery Well
RW-4	Dual-Phase Extraction System	Semi-annual	From pump	Semi-annual	Recovery Well
RW-5	Dual-Phase Extraction System	Semi-annual	From pump	Semi-annual	Angled Recovery Well
GP-27R	Dual-Phase Extraction System	Semi-annual	From pump	Semi-annual	Recovery Well
MW-22R	Dual-Phase Extraction System	Semi-annual	From pump	Semi-annual	Recovery Well
GP-39R	Dual-Phase Extraction System	Semi-annual	From pump	Semi-annual	Recovery Well
GP-2E(45-50)	Dissolved Hydrocarbons	Semi-annual	Bailer	Semi-annual	
GP-2E(55-60)	Dissolved Hydrocarbons	Semi-annual	Bailer	Semi-annual	
GP-2F(45-50)	Dissolved Hydrocarbons	None	None	Semi-annual	Gauge only
GP-2F(50-55)	Dissolved Hydrocarbons	Semi-annual	Bailer	Semi-annual	

ARCADIS Design & Consultancy for natural and built assets

Chevron

TABLE 1 SUMMARY OF GROUNDWATER AND SOIL VAPOR SAMPLING PLAN
FORMER CHEVRON FACILITY NO. 122208
5801 RIGGS ROAD, CHILLUM, MARYLAND

Well Identifier	Well Location Category	Petroleum Hydrocarbon Sampling Frequency	Current Sampling Method	Groundwater Gauging Frequency[(2)]	Comment
GP-7A(30-35)	Dissolved Hydrocarbons	None	None	Semi-annual	Several wells in the area, duplicative
GP-7A(35-40)	Dissolved Hydrocarbons	Semi-annual	Bailer	Semi-annual	
GP-24A	Dissolved Hydrocarbons	None	None	Semi-annual	Several wells in the area, duplicative
GP-41A	Dissolved Hydrocarbons	Annual	HydraSleeve	Semi-annual	
GP-44A	Dissolved Hydrocarbons	Annual	Bailer	Semi-annual	
MW-24A	Dissolved Hydrocarbons	None	None	Monthly	Several wells in the area, duplicative
MW-24B	Dissolved Hydrocarbons	Annual	Bailer	Semi-annual	
MW-25A	Dissolved Hydrocarbons	Annual	Bailer	Semi-annual	
MW-25B	Dissolved Hydrocarbons	Semi-annual	Bailer	Semi-annual	
MW-26A	Dissolved Hydrocarbons	Annual	Bailer	Semi-annual	
MW-26B	Dissolved Hydrocarbons	Semi-annual	Bailer	Semi-annual	
MW-27A	Dissolved Hydrocarbons	Semi-annual	Bailer	Semi-annual	
MW-27B	Dissolved Hydrocarbons	Semi-annual	Bailer	Semi-annual	
MW-33A	Dissolved Hydrocarbons	Annual	Bailer	Semi-annual	Added at the request of EPA
MW-33B	Dissolved Hydrocarbons	Annual	Bailer	Semi-annual	
MW-33C	Dissolved Hydrocarbons	Annual	Bailer	Semi-annual	Added at the request of EPA
MW-33S	Dissolved Hydrocarbons	None	None	Semi-annual	Gauge Only
MW-38	Dissolved Hydrocarbons	None	None	Semi-annual	Located in clay body, <MCLs for past 7 events
MW-39R	Dissolved Hydrocarbons	None	None	Semi-annual	Located in clay body, ND for past 7 events

ARCADIS Design & Consultancy for natural and built assets

Chevron

TABLE 1 SUMMARY OF GROUNDWATER AND SOIL VAPOR SAMPLING PLAN
FORMER CHEVRON FACILITY NO. 122208
5801 RIGGS ROAD, CHILLUM, MARYLAND

Well Identifier	Well Location Category	Petroleum Hydrocarbon Sampling Frequency	Current Sampling Method	Groundwater Gauging Frequency[(2)]	Comment
MW-40	Dissolved Hydrocarbons	Semi-annual	Bailer	Semi-annual	
MW-43B	Dissolved Hydrocarbons	Annual	Bailer	Semi-annual	
MW-44A	Dissolved Hydrocarbons	Semi-annual	Bailer	Semi-annual	
MW-44B	Dissolved Hydrocarbons	Semi-annual	Bailer	Semi-annual	
MW-45	Dissolved Hydrocarbons	Semi-annual	Hydrasleeve	Semi-annual	
MW-46	Dissolved Hydrocarbons	Annual	Hydrasleeve	Semi-annual	
MW-47	Dissolved Hydrocarbons	Semi-annual	Bailer	Semi-annual	
MW-49	Dissolved Hydrocarbons	Semi-annual	Hydrasleeve	Semi-annual	
MW-50	Dissolved Hydrocarbons	Semi-annual	Bailer	Semi-annual	
GP-7A(20-25)	Sentinel	None	None	Semi-annual	
GP-9A(20-25)	Sentinel	None	Bailer	Semi-annual	
GP-11A(20-25)	Sentinel	Annual	Bailer	Semi-annual	
MW-6	Sentinel	Annual	Hydrasleeve	Semi-annual	
MW-19	Sentinel	Annual	Bailer	Semi-annual	
MW-20	Sentinel	Annual	Hydrasleeve	Semi-annual	Upgradient
MW-21	Sentinel	Semi-annual	Hydrasleeve	Semi-annual	
MW-28A	Sentinel	None	None	Semi-annual	
MW-28B	Sentinel	Annual	Bailer	Semi-annual	
MW-29A	Sentinel	Annual	Bailer	Semi-annual	
MW-29B	Sentinel	Semi-annual	Bailer	Semi-annual	
MW-30R	Sentinel	Annual	Hydrasleeve	Semi-annual	Replacement for MW-30
MW-31B	Sentinel	Annual	Bailer	Semi-annual	
MW-41A	Sentinel	Annual	Bailer	Semi-annual	
MW-41B	Sentinel	Annual	Bailer	Semi-annual	
MW-42	Sentinel	Annual	Bailer	Semi-annual	Upgradient

ARCADIS Design & Consultancy for natural and built assets

Chevron

TABLE 1 SUMMARY OF GROUNDWATER AND SOIL VAPOR SAMPLING PLAN
FORMER CHEVRON FACILITY NO. 122208
5801 RIGGS ROAD, CHILLUM, MARYLAND

Well Identifier	Well Location Category	Petroleum Hydrocarbon Sampling Frequency	Current Sampling Method	Groundwater Gauging Frequency(2)	Comment
MW-43A	Sentinel	Annual	Bailer	Semi-annual	
MW-48	Sentinel	Annual	Bailer	Semi-annual	
MW-51	Sentinel	Semi-annual	Bailer	Semi-annual	
MW-53	Sentinel	Semi-annual	Bailer	Semi-annual	
MW-54	Sentinel	Annual	Bailer	Semi-annual	
MW-55	Sentinel	Annual	Bailer	Semi-annual	
MW-58	Oxygen Reactive Zone	Semi-annual	Bailer	Semi-annual	
MW-59	Oxygen Reactive Zone	Semi-annual	Bailer	Semi-annual	
MW-60	Oxygen Reactive Zone	Annual	Bailer	Semi-annual	
MW-61A	ISGR System	Semi-annual	Hydrasleeve	Semi-annual	
MW-61B	ISGR System	Semi-annual	Bailer	Semi-annual	
MW-62A	ISGR System	Annual	Hydrasleeve	Semi-annual	
MW-62B	ISGR System	Semi-annual	Bailer	Semi-annual	
ISGR-1Shallow	ISGR System	Semi-annual	Hydrasleeve	Semi-annual	Also gauged as needed for OMM
ISGR-1Deep					
ISRG-2Shallow					
ISGR-2Deep					
VW-1	Soil Vapor	Semi-annual	NA	NA	
VW-2	Soil Vapor	Semi-annual	NA	NA	
VW-3	Soil Vapor	Semi-annual	NA	NA	
VW-4	Soil Vapor	Semi-annual	NA	NA	

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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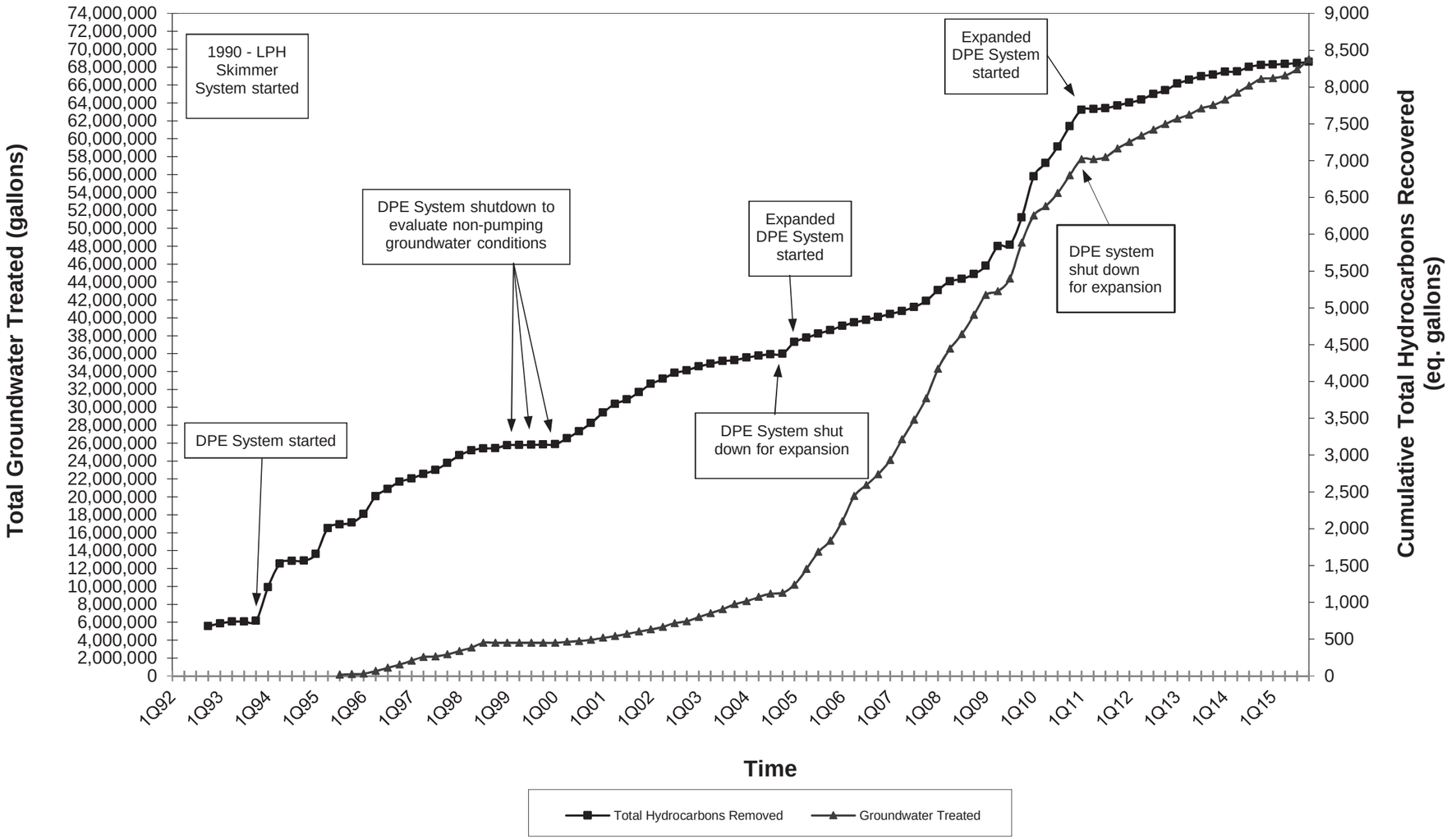
TABLE 2 STATUS OF WELLS INSTALLED AS PART OF CONSTRUCTION
FORMER CHEVRON FACILITY NO. 122208
5801 RIGGS ROAD, CHILLUM, MARYLAND

Well Identifier	Well Location Category	Petroleum Hydrocarbon Sampling Frequency	Current Sampling Method	Groundwater Gauging Frequency[(2)]	Comment
RW-5	Dual-Phase Extraction System	Semi-annual	From pump	Semi-annual	
RW-4	Dual-Phase Extraction System	Semi-annual	From pump	Semi-annual	
GP-27R	Dual-Phase Extraction System	Semi-annual	From pump	Semi-annual	
MW-22R	Dual-Phase Extraction System	Semi-annual	From pump	Semi-annual	
GP-39R	Dual-Phase Extraction System	None	None	Semi-annual	Located in clay body, ND for past 7 events
MW-30R	Sentinel	Annual	Hydrasleeve	Semi-annual	
ISGR-1	ISGR System	Monthly	As per approved OMM Plan	None	Per approved design plan, ISGR wells are not included in long term monitoring plan. Wells will be monitored as part of OMM.
ISGR-2					
ISGR-1Shallow	ISGR System	Semi-annual	Hydrasleeve	Semi-annual	Also gauged as needed for OMM
ISGR-1Deep					
ISRG-2Shallow					
ISGR-2Deep					
MW-61A	ISGR System	Semi-annual	Hydrasleeve	Semi-annual	
MW-61B	ISGR System	Semi-annual	Bailer	Semi-annual	
MW-62A	ISGR System	Annual	Hydrasleeve	Semi-annual	
MW-62B	ISGR System	Semi-annual	Bailer	Semi-annual	
MW-58	Oxygen Reactive Zone	Semi-annual	Bailer	Semi-annual	
MW-59	Oxygen Reactive Zone	Semi-annual	Bailer	Semi-annual	
MW-60	Oxygen Reactive Zone	Annual	Bailer	Semi-annual	
IW-1	Oxygen Reactive Zone	None	NA	None	Per approved design plan, oxygen injection wells are not included in long term monitoring plan. Wells will be monitored as part of OMM.
IW-2					
IW-3					
IW-4					
IW-5					

FIGURES

Figure 1
Cumulative Total Hydrocarbons Recovered and Groundwater Treated Since 1990
Semi-Annual Progress Report: July Through December 2015
Former Chevron Facility 122208, Chillum, Maryland



BASE MAP REFERENCES:

1. "GROUNDWATER POTENTIOMETRIC SURFACE MAP - REMEDIATION SYSTEM AREA - MARCH 19, 2013" BY GANNETT FLEMING, BALTIMORE MARYLAND. DATED JUNE 13, 2013.

LEGEND:

- MONITORING WELL
- DUAL-PHASE EXTRACTION RECOVERY WELL
- SOIL VAPOR EXTRACTION RECOVERY WELL
- ABANDONED WELL
- FORMER CHEVRON FACILITY #122208 PROPERTY LINE
- PROPERTY LINE
- (127.23) GROUNDWATER ELEVATION
- 140 INFERRED GROUNDWATER CONTOUR
- (NA) NOT ACCESSIBLE

RIGGS ROAD (MD 212)

EASTERN AVENUE

MW-20 (139.94)
MW-21 (135.17)
MW-45 (131.89)
GP-44A (145.22)
(141.50) MW-15
RW-1 (136.25) MW-13
VP-4
RW-3
MW-7
GP-35A (127.23)
MW-5 (DRY)
RW-2
RW-4
MW-38A
GP-41A (131.33)
MP-40
MW-46 (127.85)
MW-6 (137.29)
GP-30A (130.12)
PTW-B
MW-12
(134.94) MP-7
GP-27R
PTW-A
GP-39R
MW-47 (126.31)
MW-4 (140.98)
MW-3 (NA)
MW-2 (138.14)
GP-24A (137.58)
MW-1 (138.16)
RW-5
MW-16 (132.51)
MW-17
MW-22R
MP-30
MP-20
MW-23 (128.80)
MW-18 (137.93)
(135.23) MW-19

0 40' 80'

GRAPHIC SCALE

FORMER CHEVRON FACILITY #122208
CHILLUM, MARYLAND

POTENTIOMETRIC SURFACE MAP - SEPTEMBER 2015

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FIGURE 2

BASE MAP REFERENCES:

1. "GROUNDWATER POTENTIOMETRIC SURFACE MAP - REMEDIATION SYSTEM AREA - MARCH 19, 2013" BY GANNETT FLEMING, BALTIMORE MARYLAND. DATED JUNE 13, 2013.

LEGEND:

- MONITORING WELL
- DUAL-PHASE EXTRACTION RECOVERY WELL
- SOIL VAPOR EXTRACTION RECOVERY WELL
- INJECTION WELL VAULT
- ABANDONED WELL
- FORMER CHEVRON FACILITY #122208 PROPERTY LINE
- PROPERTY LINE
- (123.48) GROUNDWATER ELEVATION
- 138 INFERRED GROUNDWATER ELEVATION

RIGGS ROAD (MD 212)

EASTERN AVENUE

(145.22) GP-44A
(141.50) MW-15
(127.23) GP-35A
VP-4
RW-3
(DRY) MW-5
MW-4
MW-6 (137.29)
MW-3
MW-2
GP-24A (137.58)
MW-1
MW-20 (139.94)
RW-1
MW-21 (135.17)
MW-7
MW-13 (136.25)
RW-2
RW-4
MW-38A
PTW-B
GP-30A (130.12)
MW-12
RW-5
MW-17
MW-16 (132.51)
(135.23) MW-19
MW-18 (137.93)
GP-27R
PTW-A
MP-30
MW-22R
MP-7 (134.94)
MP-40
GP-41A (131.33)
GP-39R
MP-20
MW-23 (128.80)
MW-45 (131.89)
MW-46 (127.85)
MW-47 (126.31)
MW-48 (124.76)
GP-2E(45-50)
GP-2E(55-60) (125.36)
GP-2E(50-55)
MW-50 (119.67)
MW-49 (114.98)
GP-2F(45-50)
GP-2F(50-55) (115.75)
MW-51 (109.24)
GP-7A(20-25) (139.41)
GP-9A(30-35)
GP-9A(25-30)
MW-24B
GP-7A(35-40) (137.03)
MW-24A (137.43)
MW-30R
GP-7A(40-45)
GP-7A(30-35) (137.49)
GP-7A(25-30)
GP-9A(20-25) (141.13)
GP-11A(20-25) (140.16)
GP-11A(25-30)
GP-11A(30-35)
GP-11A(35-40)
MW-25A (123.90)
MW-25B (123.48)
MW-41A (118.70)
MW-41B
MW-37
MW-62A
(136.61) MW-38I
(129.66) MW-39R
MW-39
MW-40 (123.58)
(118.89) MW-27A
MW-27B
MW-44A (120.88)
MW-44B
MW-42
MW-26B
MW-26A (130.92)
MW-58
IW-1
IW-2
IW-3
IW-4
IW-5
MW-43A (129.48)
MW-43B
MW-53 (110.21)
MW-29A (108.52)
MW-29B
MW-60
MW-54 (116.03)
MW-31B (130.51)
MW-31A
MW-55
MW-52
MW-33A
MW-33B
MW-33C
MW-33S (119.53)
MW-28B
MW-28A (118.99)
MW-32

0 120' 240'
GRAPHIC SCALE

FORMER CHEVRON FACILITY #122208
CHILLUM, MARYLAND

POTENTIOMETRIC SURFACE MAP - SEPTEMBER 2015

ARCADIS Design & Consultancy for natural and built assets

FIGURE 3

BASE MAP REFERENCE:

1. "GROUNDWATER POTENTIOMETRIC SURFACE MAP - REMEDIATION SYSTEM AREA - MARCH 19, 2013" BY GANNETT FLEMING, BALTIMORE MARYLAND. DATED JUNE 13, 2013.

NOTE:

1. ALL UNITS ARE REPORTED IN MICROGRAMS PER LITER (µg/L).

LEGEND:

- MONITORING WELL
- DUAL-PHASE EXTRACTION RECOVERY WELL
- SOIL VAPOR EXTRACTION RECOVERY WELL
- IN SITU GROUNDWATER REMEDIATION WELLS
- INJECTION WELL VAULT
- ABANDONED WELL
- FORMER CHEVRON FACILITY #122208 PROPERTY LINE
- PROPERTY LINE
- (180) BENZENE CONCENTRATION
- 50 BENZENE CONCENTRATION CONTOUR (INFERRED)
- ND NON DETECT
- NS NOT SAMPLED

RIGGS ROAD (MD 212)
EASTERN AVENUE
OGLETHORPE ST NE
NICHOLSON ST NE
6TH ST NE
8TH ST NE
KENNEDY ST NE
KENSINGTON PL NE
CLAY BODY

0 120' 240'
GRAPHIC SCALE

FORMER CHEVRON FACILITY #122208
CHILLUM, MARYLAND

BENZENE CONCENTRATIONS IN SHALLOW MONITORING WELLS - SEPTEMBER / OCTOBER 2015

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FIGURE 4

CITY: SYRACUSE NY DIV/GROUP: ENV/CAD DB: E. KRAHMER LD:(Opt) PIC: K. M. ABBOTT PM: L. VOGEL TM: D. DIXON TR: C. RICHARDSON
G:\ENVCAD\SYRACUSE\ACT\B0049337\0000\0000005\DWG\49337C01.dwg LAYOUT: 4 SAVED: 1/18/2016 2:07 PM ACADVER: 19.1S (LMS TECH) PAGESETUP: ---- PLOTSTYLETABLE: PLTFULL.CTB PLOTTED: 1/18/2016 2:07 PM BY: KRAHMER, ERIC
XREFS: IMAGES: PROJECTNAME: ----
49337X01
49337XLB

BASE MAP REFERENCE:

1. "GROUNDWATER POTENTIOMETRIC SURFACE MAP - REMEDIATION SYSTEM AREA - MARCH 19, 2013" BY GANNETT FLEMING, BALTIMORE MARYLAND. DATED JUNE 13, 2013.

NOTE:

1. ALL UNITS ARE REPORTED IN MICROGRAMS PER LITER (µg/L).

LEGEND:

- MONITORING WELL
- DUAL-PHASE EXTRACTION RECOVERY WELL
- SOIL VAPOR EXTRACTION RECOVERY WELL
- IN SITU GROUNDWATER REMEDIATION WELLS
- INJECTION WELL VAULT
- ABANDONED WELL
- FORMER CHEVRON FACILITY #122208 PROPERTY LINE
- PROPERTY LINE
- (110) BENZENE CONCENTRATION
- 20 MTBE CONCENTRATION CONTOUR (INFERRED)
- ND NON DETECT
- NS NOT SAMPLED

RIGGS ROAD (MD 212)
EASTERN AVENUE
OGLETHORPE ST NE
NICHOLSON ST NE
8TH ST NE
6TH ST NE
KENNEDY ST NE
KENSINGTON PL NE
CLAY BODY

MW-20 (NS)
MW-21 (9.0)
MW-45 (ND)
MW-48 (NS)
MW-50 (ND)
MW-51 (56)
MW-47 (8.5)
MW-49 (60)
MW-46 (NS)
MW-23 (NS)
MW-22R (1,800)
MW-16 (NS)
MW-17 (2,800)
MW-18 (NS)
MW-19 (NS)
GP-2E(50-55)
GP-2E(45-50) (12)
GP-2E(55-60)
GP-2F(45-50)
GP-2F(50-55)
MW-25B
MW-25A (NS)
MW-41A (NS)
MW-41B
MW-37
MW-62A (NS)
MW-62B
MW-38
MW-39R
MW-39
MW-40 (ND)
MW-27A (ND)
MW-27B
MW-44A (1.6)
MW-44B
MW-53 (100)
MW-29B
MW-29A (NS)
MW-42 (NS)
MW-26B
MW-26A (NS)
MW-43B
MW-43A (NS)
MW-58
MW-60 (NS)
MW-59
MW-54 (NS)
MW-31B
MW-31A
MW-55 (NS)
MW-33S
MW-33A (NS)
MW-33B
MW-33C
MW-52
MW-28B
MW-28A
MW-32
MW-30R (NS)
MW-61A (ND)
MW-24A
MW-24B
MW-15 (ND)
GP-44A (NS)
GP-35A (ND)
MW-5
VP-4
RW-3 (12)
MW-7 (49)
RW-1 (81)
RW-2 (140)
MW-13
RW-4 (1,300)
MW-40
GP-41A (NS)
PTW-A
GP-27R (2.2)
MW-4
MW-6 (NS)
PTW-B (26)
MW-38A
MP-7
MP-20
GP-39R (100)
MW-2
RW-5 (48)
MW-12
MW-3
MW-1
MP-30
2,000
GP-30A (2,700)
GP-24A
ISGR-2S (ND)
ISGR-2D
ISGR-1S (ND)
ISGR-1D
GP-9A(30-35)
GP-9A(25-30)
GP-7A(20-25)
GP-11A(20-25) (NS)
GP-11A(25-30)
GP-11A(30-35)
GP-11A(35-40)
GP-9A(20-25)
GP-7A(25-30)
GP-7A(30-35)
GP-7A(35-40)
GP-7A(40-45)
IW-1
IW-2
IW-3
IW-4
IW-5
20
200
2,000

0 120' 240'
GRAPHIC SCALE

FORMER CHEVRON FACILITY #122208
CHILLUM, MARYLAND

MTBE CONCENTRATIONS IN SHALLOW MONITORING WELLS - SEPTEMBER / OCTOBER 2015

ARCADIS Design & Consultancy for natural and built assets

FIGURE 5

CITY: SYRACUSE NY DIV/GROUP: ENVCAD DB: E. KRAHMER LD:(Opt) PIC: K. M. ABBOTT PM: L. VOGEL TM: D. DIXON TR: C. RICHARDSON
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XREFS: IMAGES: PROJECTNAME: ----
49337X01
49337XLB

BASE MAP REFERENCE:

1. "GROUNDWATER POTENTIOMETRIC SURFACE MAP - REMEDIATION SYSTEM AREA - MARCH 19, 2013" BY GANNETT FLEMING, BALTIMORE MARYLAND. DATED JUNE 13, 2013.

NOTE:

1. ALL UNITS ARE REPORTED IN MICROGRAMS PER LITER (µg/L).

LEGEND:

- MONITORING WELL
- DUAL-PHASE EXTRACTION RECOVERY WELL
- SOIL VAPOR EXTRACTION RECOVERY WELL
- IN SITU GROUNDWATER REMEDIATION WELLS
- INJECTION WELL VAULT
- ABANDONED WELL
- FORMER CHEVRON FACILITY #122208 PROPERTY LINE
- PROPERTY LINE
- (770) BENZENE CONCENTRATION
- 50 BENZENE CONCENTRATION CONTOUR (INFERRED)
- ND NON DETECT
- NS NOT SAMPLED

DEEP WELL DATA NOT AVAILABLE UPGRADIENT OF THIS POINT

CLAY BODY

RIGGS ROAD (MD 212)

EASTERN AVENUE

OGLETHORPE ST NE

NICHOLSON ST NE

8TH ST NE

6TH ST NE

KENNEDY ST NE

KENSINGTON PL NE

MW-20, MW-21, MW-45, MW-48, MW-50, MW-51, RW-1, MW-13, GP-44A, MW-15, GP-35A, VP-4, MW-7, RW-3, MW-5, RW-2, RW-4, MW-38A, MP-40, GP-41A, MW-46, MW-4, MW-6, PTW-B, GP-30A, MW-12, MP-7, GP-27R, PTW-A, MW-2, GP-24A, RW-5, GP-39R, MW-47, MW-49, MW-3, MW-1, MW-16, MW-17, MW-22R, MP-30, MP-20, MW-23, GP-2E(50-55), GP-2E(45-50), GP-2F(50-55) (53), GP-2F(45-50), GP-2E(55-60) (2.1), MW-18, MW-19, ISGR-1S, (ND) ISGR-1D, ISGR-2S, ISGR-2D (ND), GP-7A(20-25), GP-9A(30-35), MW-24A, (NS) MW-24B, GP-9A(25-30), GP-11A(20-25), MW-30R, MW-61B (ND), GP-11A(25-30), GP-11A(30-35), GP-11A(35-40), GP-7A(25-30), GP-7A(30-35), GP-7A(35-40) (ND), GP-7A(40-45), GP-9A(20-25), (94) MW-25B, MW-25A, MW-41A, MW-41B (NS), MW-37, MW-62A, MW-62B (8.2), MW-38, MW-39R, MW-39, MW-40, MW-26B (600), MW-26A, MW-58 (110), IW-1, IW-2, IW-3, IW-4, IW-5, MW-42, MW-43A, MW-43B (ND), MW-27A, MW-27B (ND), MW-44B (ND), MW-44A, MW-53, MW-29B (ND), MW-29A, MW-60, MW-59 (110), MW-54, (NS) MW-31B, MW-31A, MW-55, MW-52, MW-33S, MW-33A, MW-33B (NS), MW-33C (NS), MW-28B (NS), MW-28A, MW-32

-5, -50, -500

0 120' 240'

GRAPHIC SCALE

FORMER CHEVRON FACILITY #122208
CHILLUM, MARYLAND

BENZENE CONCENTRATIONS IN DEEP MONITORING WELLS - SEPTEMBER / OCTOBER 2015

ARCADIS Design & Consultancy for natural and built assets

FIGURE 6

CITY: SYRACUSE NY DIV/GROUP: ENVCAD DB: E. KRAHMER LD:(Opt) PIC: K. M. ABBOTT PM: L. VOGEL TM: D. DIXON TR: C. RICHARDSON
G:\ENVCAD\SYRACUSE\ACT\B0049337\0000\0000\DWG\49337C03.dwg LAYOUT: 6 SAVED: 1/18/2016 2:13 PM ACADVER: 19.1S (LMS TECH)
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49337XLB
PAGESETUP: ---- PLOTSTYLETABLE: PLTFULL.CTB PLOTTED: 1/18/2016 4:09 PM BY: KRAHMER, ERIC
LYR:(Opt)ON=*;OFF=*REF*

BASE MAP REFERENCE:

1. "GROUNDWATER POTENTIOMETRIC SURFACE MAP - REMEDIATION SYSTEM AREA - MARCH 19, 2013" BY GANNETT FLEMING, BALTIMORE MARYLAND. DATED JUNE 13, 2013.

NOTE:

1. ALL UNITS ARE REPORTED IN MICROGRAMS PER LITER (µg/L).

LEGEND:

- MONITORING WELL
- DUAL-PHASE EXTRACTION RECOVERY WELL
- SOIL VAPOR EXTRACTION RECOVERY WELL
- IN SITU GROUNDWATER REMEDIATION WELLS
- INJECTION WELL VAULT
- ABANDONED WELL
- FORMER CHEVRON FACILITY #122208 PROPERTY LINE
- PROPERTY LINE
- (110) BENZENE CONCENTRATION
- 20 MTBE CONCENTRATION CONTOUR (INFERRED)
- ND NON DETECT
- NS NOT SAMPLED

DEEP WELL DATA NOT AVAILABLE UPGRADIENT OF THIS POINT

RIGGS ROAD (MD 212)
EASTERN AVENUE
8TH ST NE
OGLETHORPE ST NE
NICHOLSON ST NE
6TH ST NE
KENSINGTON PL NE
KENNEDY ST NE

CLAY BODY

0 120' 240'
GRAPHIC SCALE

FORMER CHEVRON FACILITY #122208
CHILLUM, MARYLAND

MTBE CONCENTRATIONS IN DEEP MONITORING WELLS - SEPTEMBER / OCTOBER 2015

ARCADIS Design & Consultancy for natural and built assets

FIGURE 7

CITY: SYRACUSE NY DIV/GROUP: ENVCAD DB: E. KRAHMER LD:(Opt) PIC: K. M. ABBOTT PM: L. VOGEL TM: D. DIXON TR: C. RICHARDSON LYR:(Opt)ON=*;OFF=*REF*
G:\ENVCAD\SYRACUSE\ACTIVE\B0049337\0000\0000005\DWG\49337C04.dwg LAYOUT: 7 SAVED: 1/18/2016 4:08 PM ACADVER: 19.1S (LMS TECH) PAGESETUP: ---- PLOTSTYLETABLE: PLTFULL.CTB PLOTTED: 1/18/2016 4:08 PM BY: KRAHMER, ERIC
XREFS: IMAGES: PROJECTNAME: ----
49337X01
49337XLB

Figure 8: GP-2E (45-50) Benzene Trend Analysis

Former Chevron Facility 122208

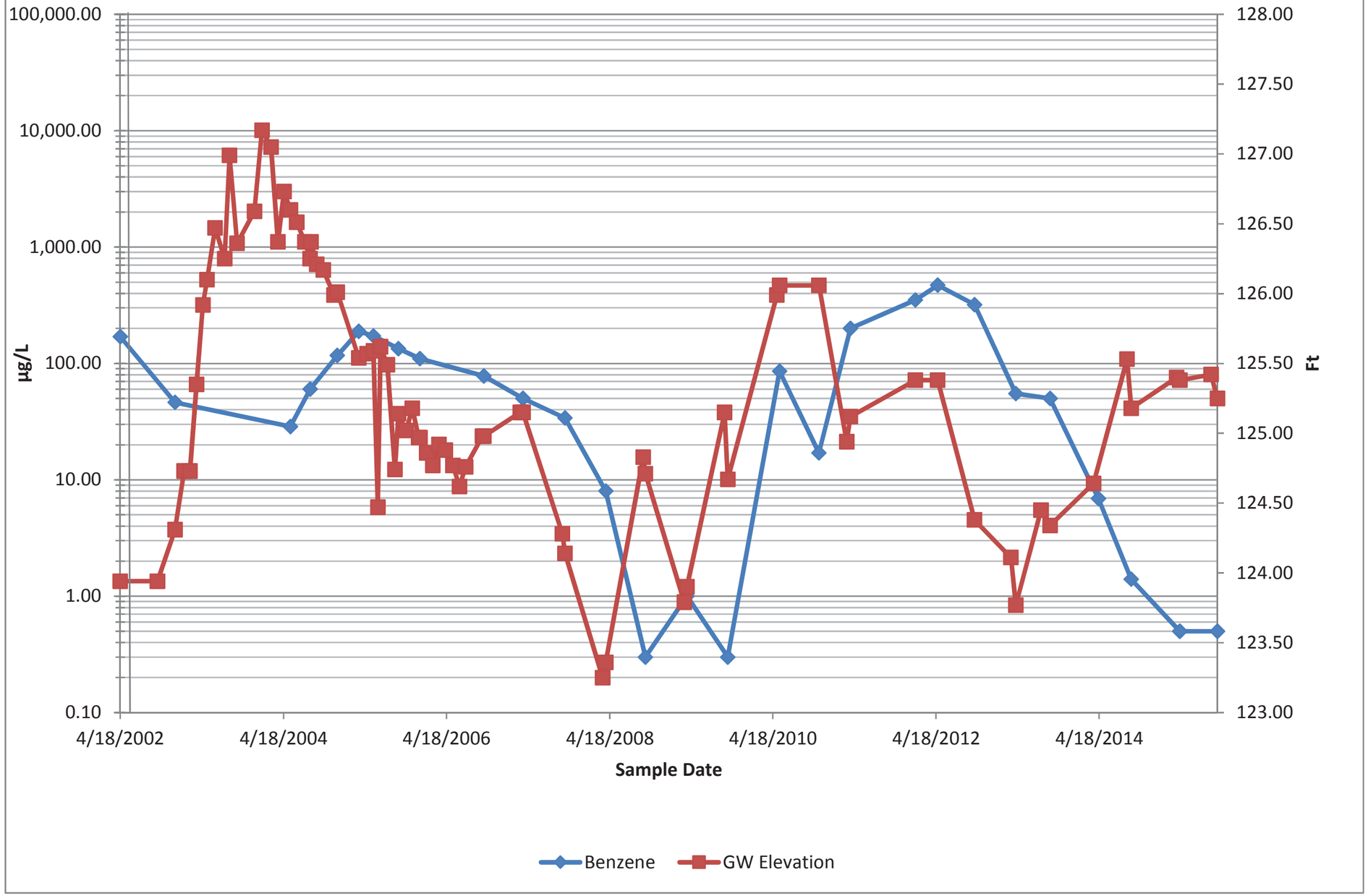


Figure 9: GP-2E (45-50) MTBE Trend Analysis

Former Chevron Facility 122208

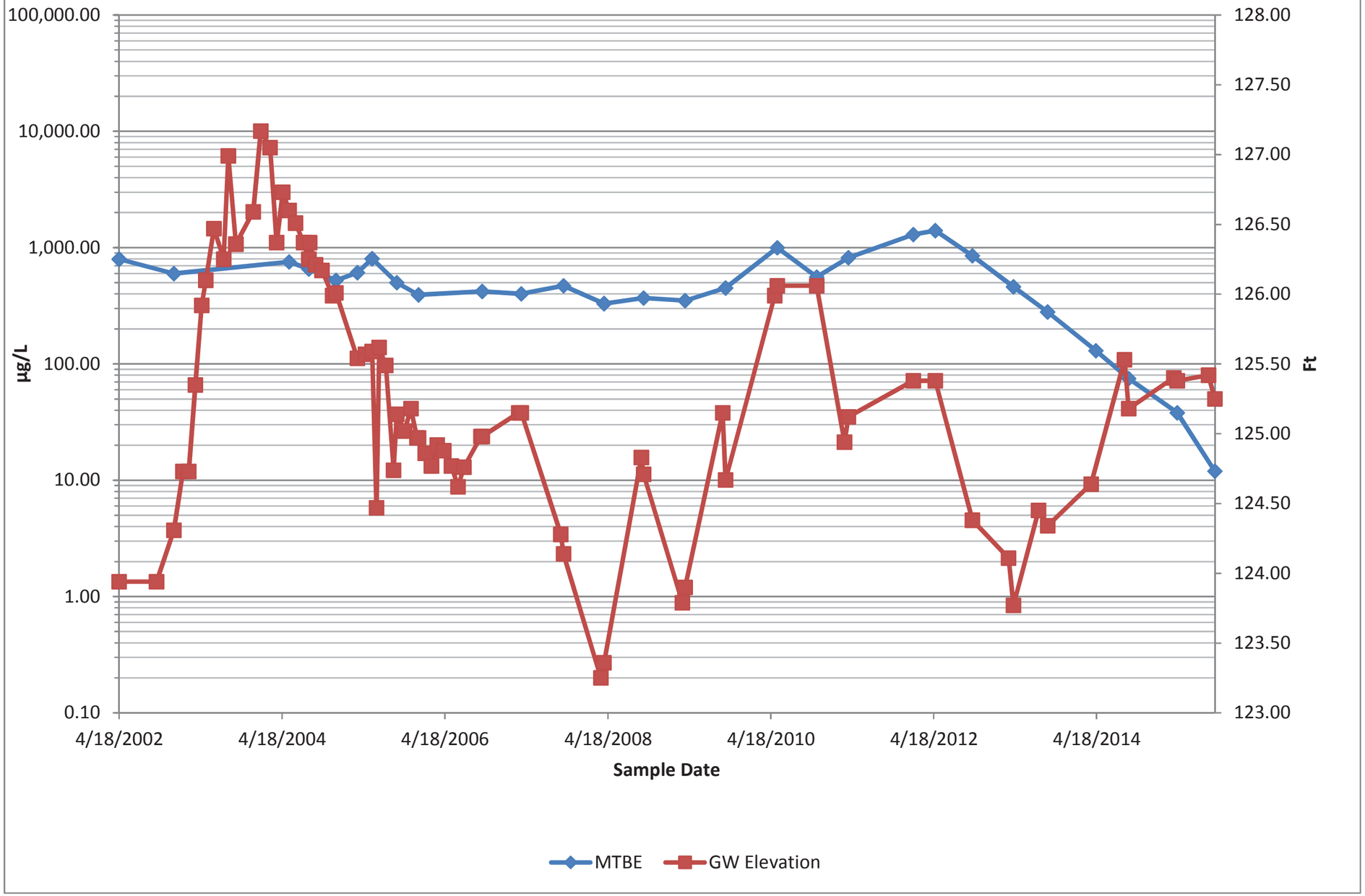


Figure 10: GP-2E (55-60) Benzene Trend Analysis

Former Chevron Facility 122208

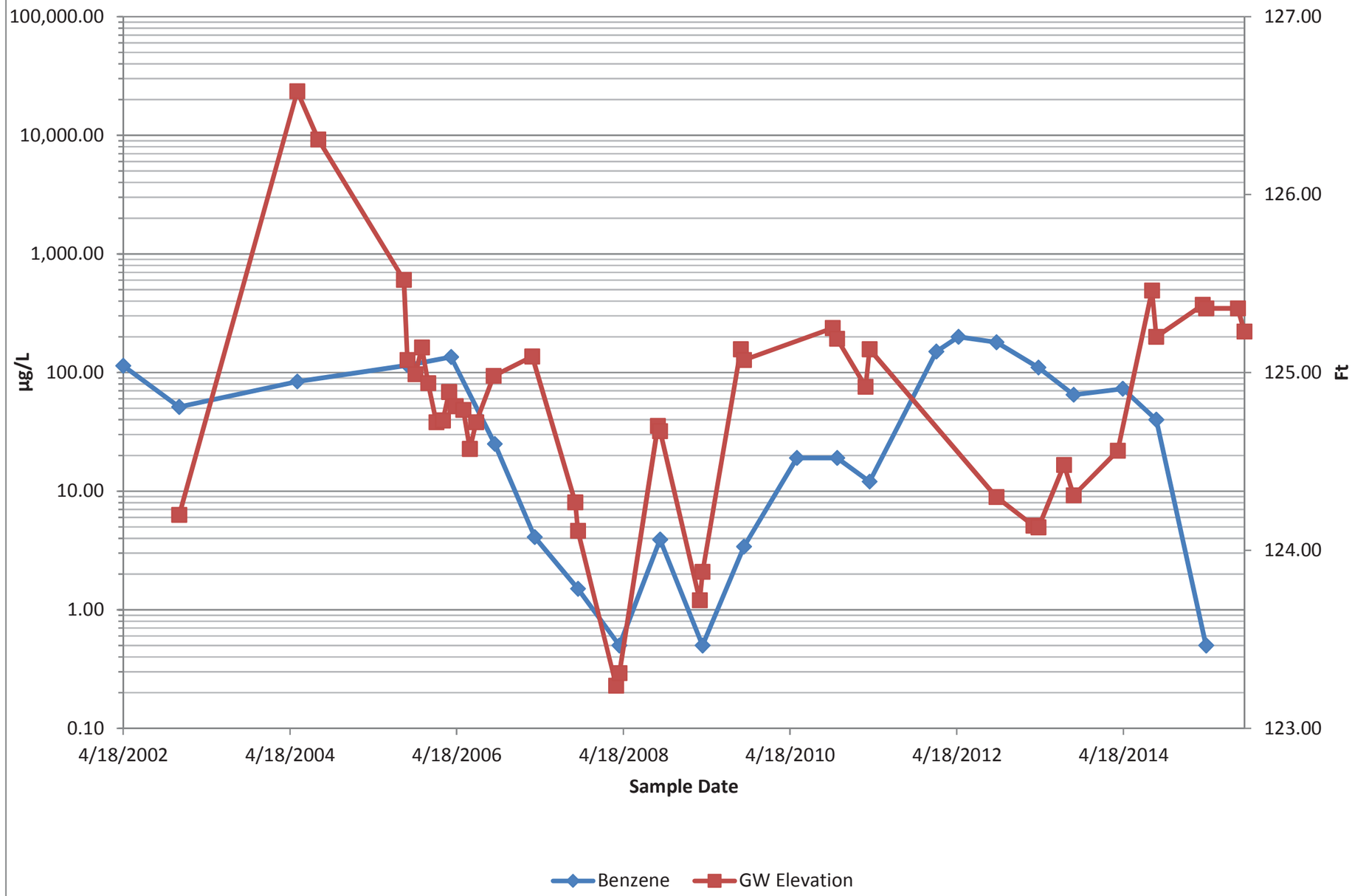


Figure 11: GP-2E (55-60) MTBE Trend Analysis

Former Chevron Facility 122208

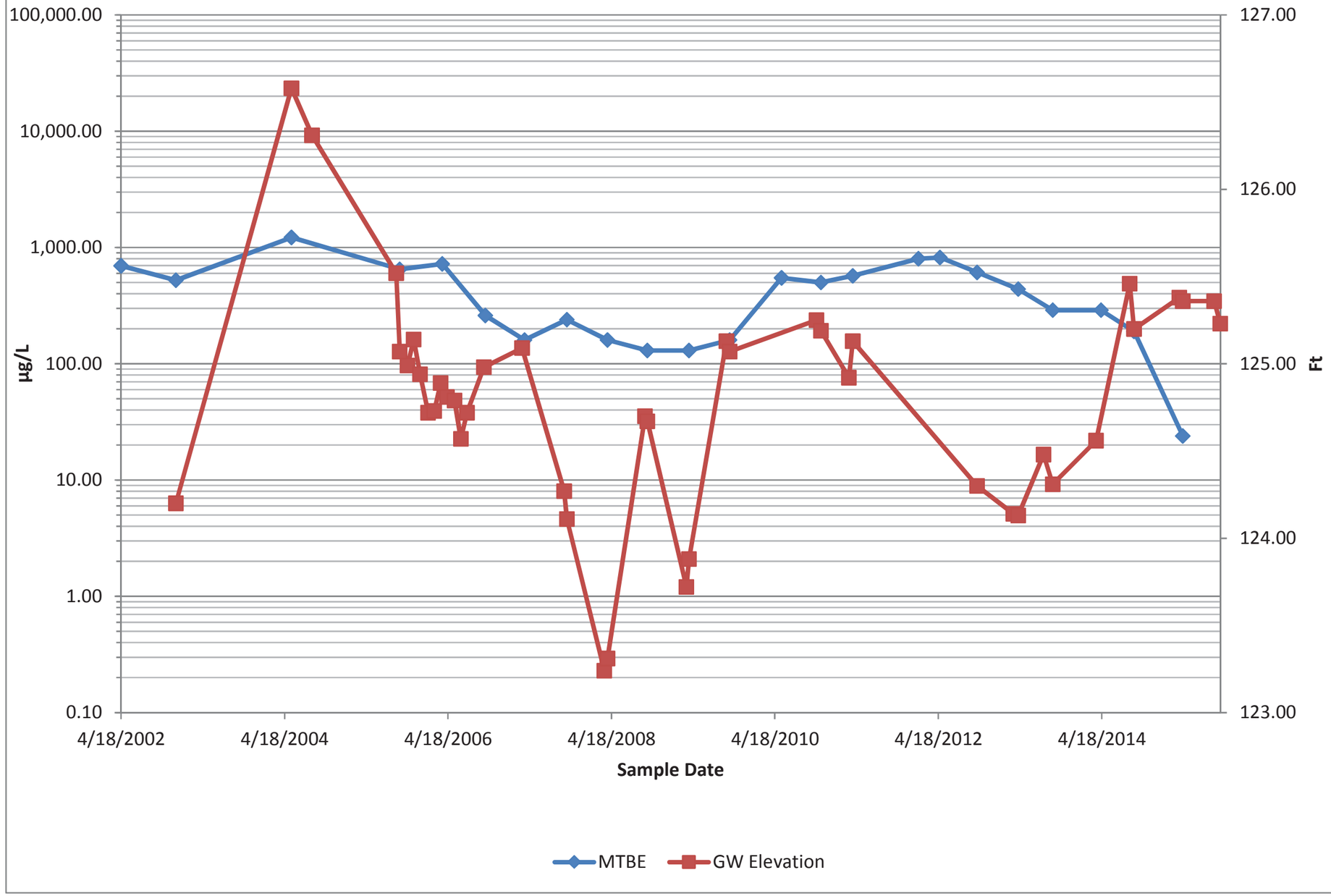


Figure 12: GP-2F (45-50) Benzene Trend Analysis

Former Chevron Facility 122208

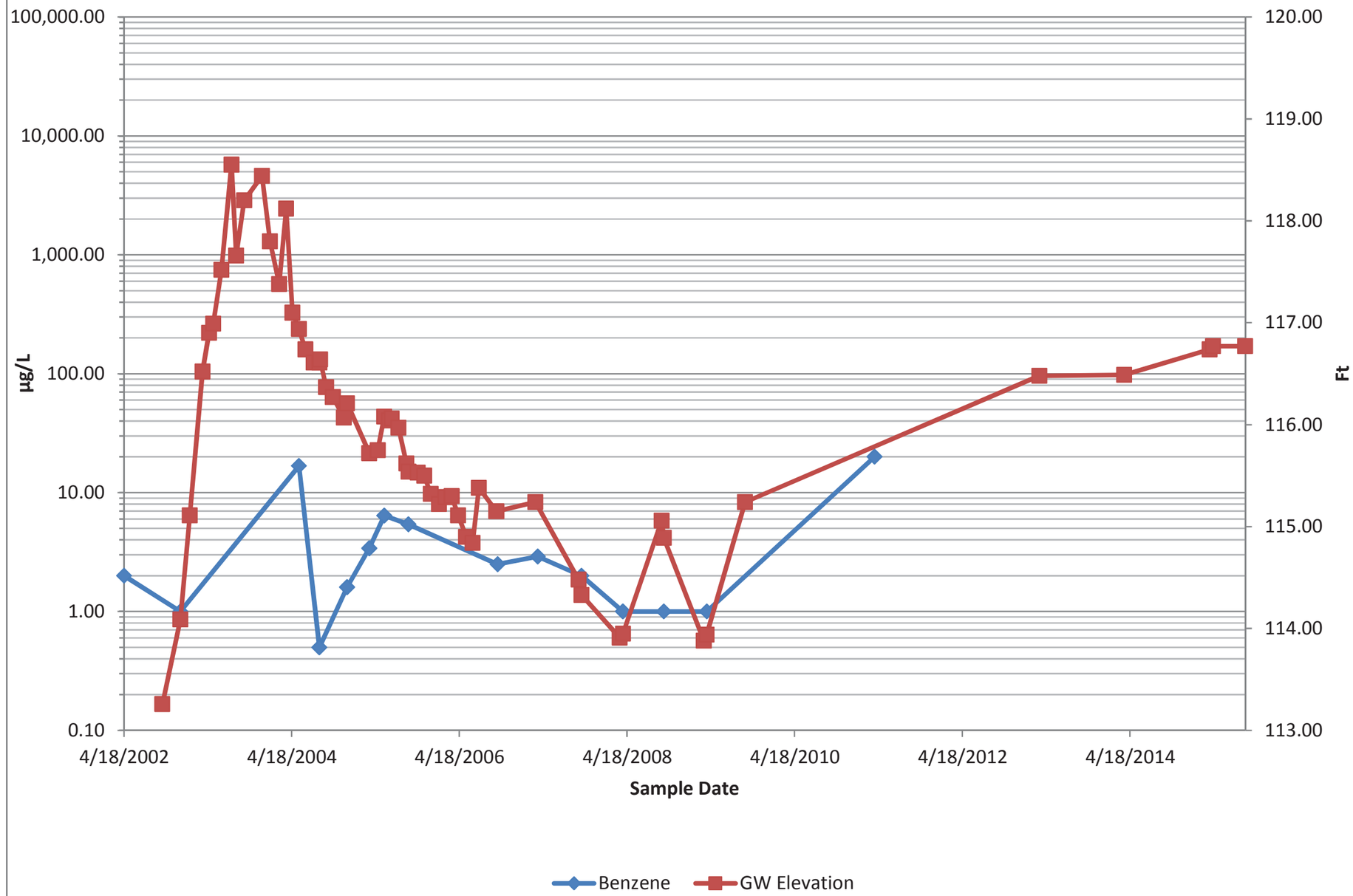


Figure 13: GP-2F (45-50) MTBE Trend Analysis

Former Chevron Facility 122208

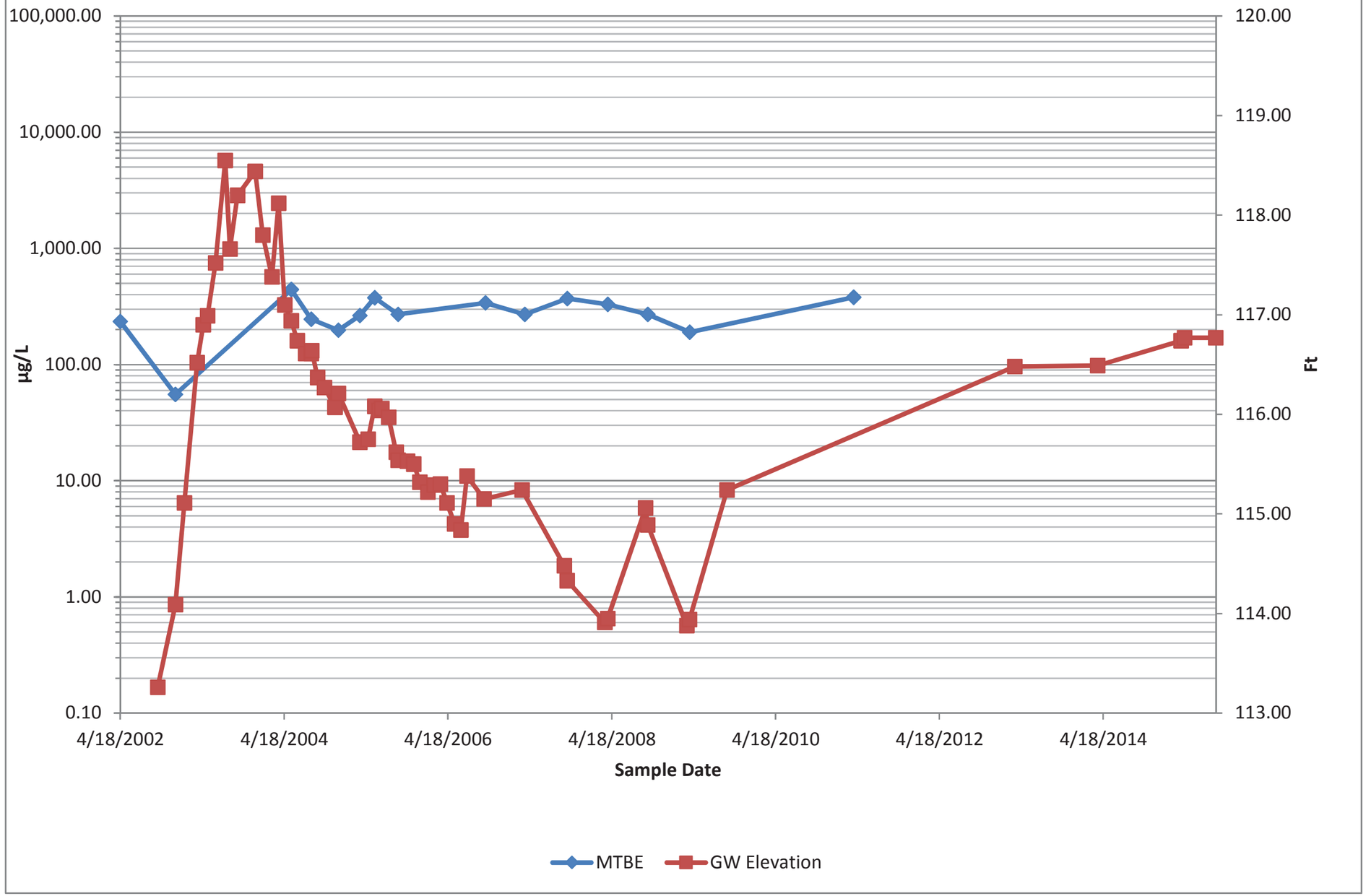


Figure 14: GP-2F (50-55) Benzene Trend Analysis

Former Chevron Facility 122208

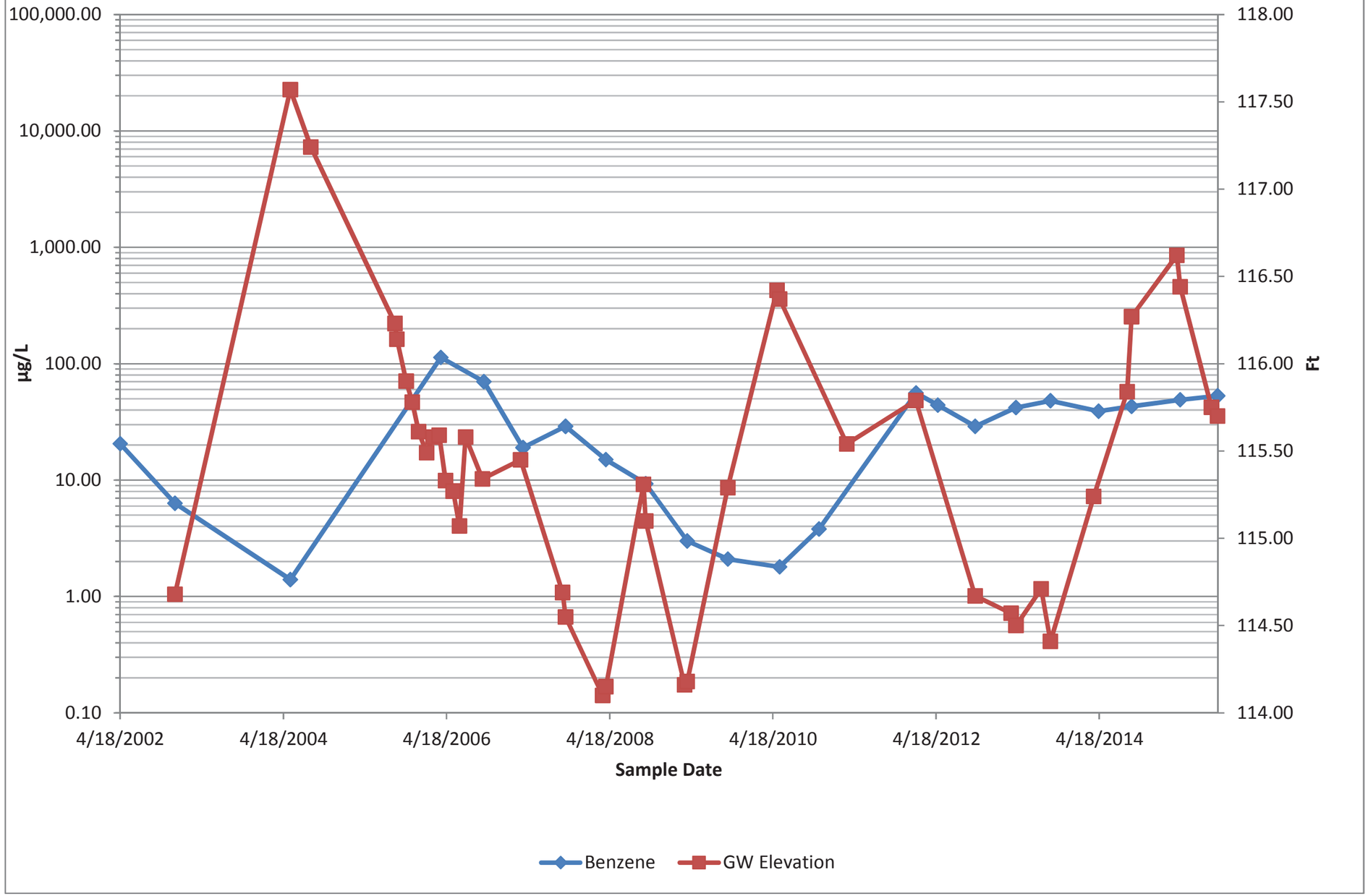


Figure 15: GP-2F (50-55) MTBE Trend Analysis

Former Chevron Facility 122208

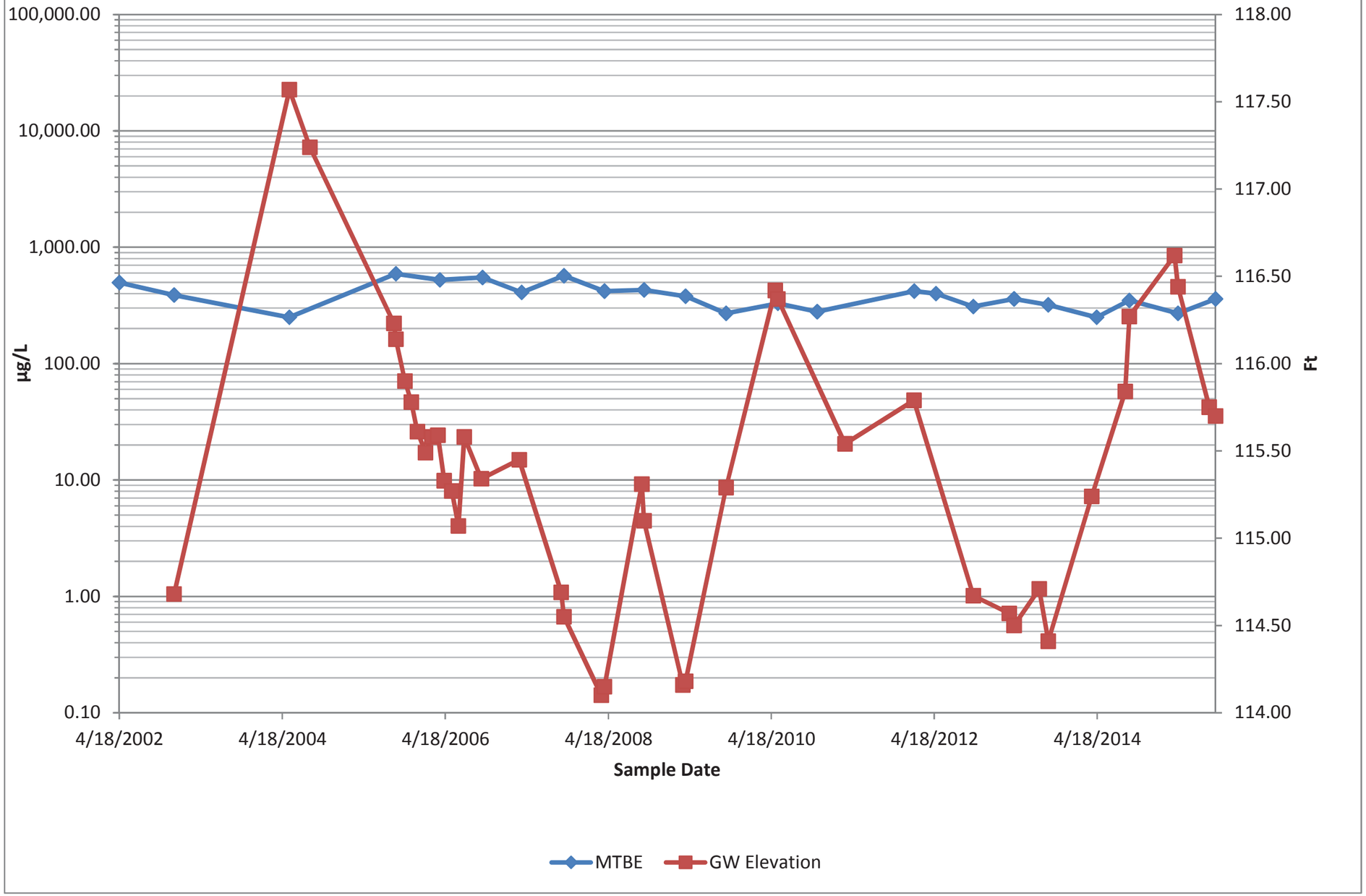


Figure 16: MW-18 Benzene Trend Analysis

Former Chevron Facility 122208

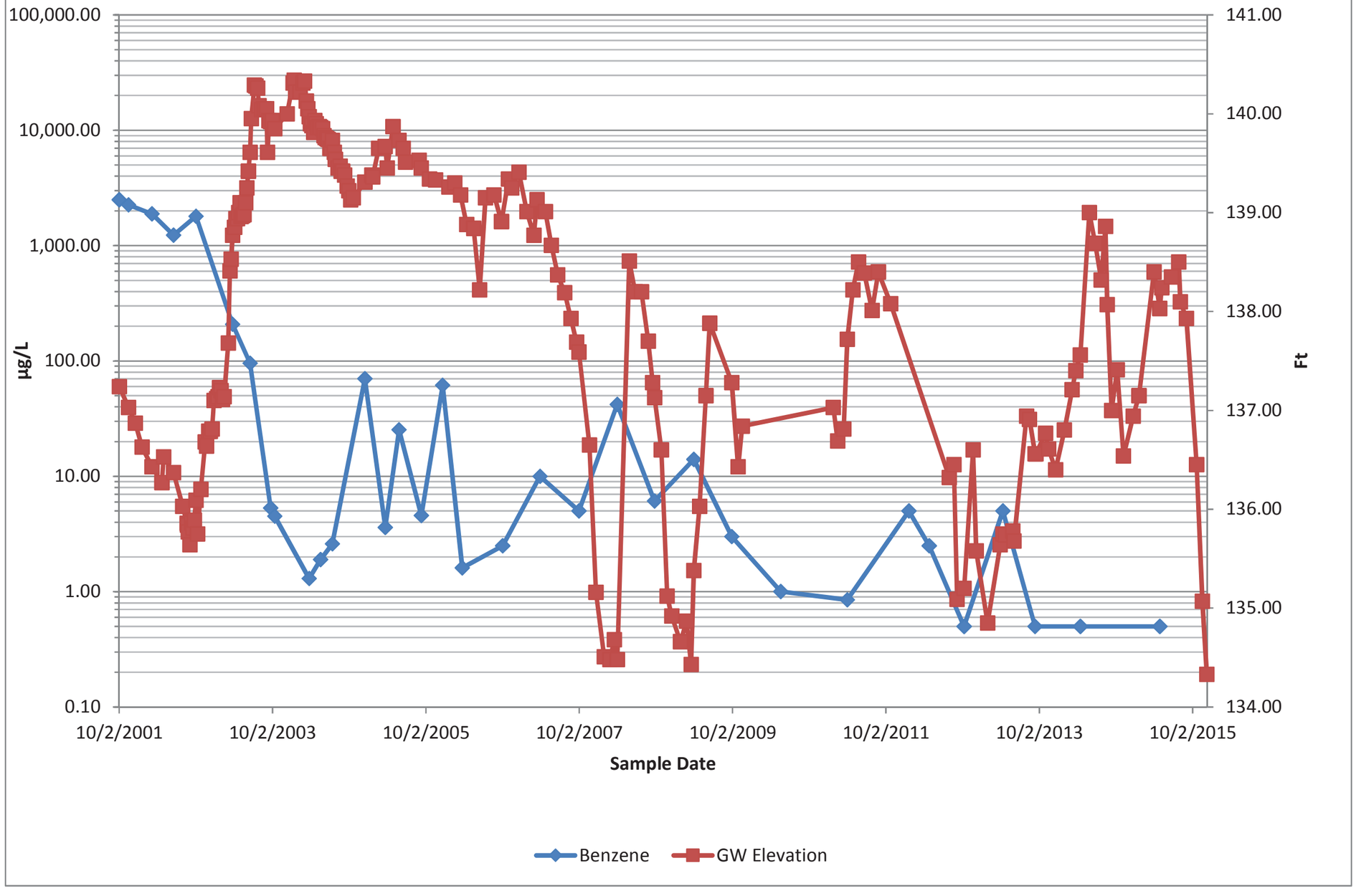


Figure 17: MW-18 MTBE Trend Analysis

Former Chevron Facility 122208

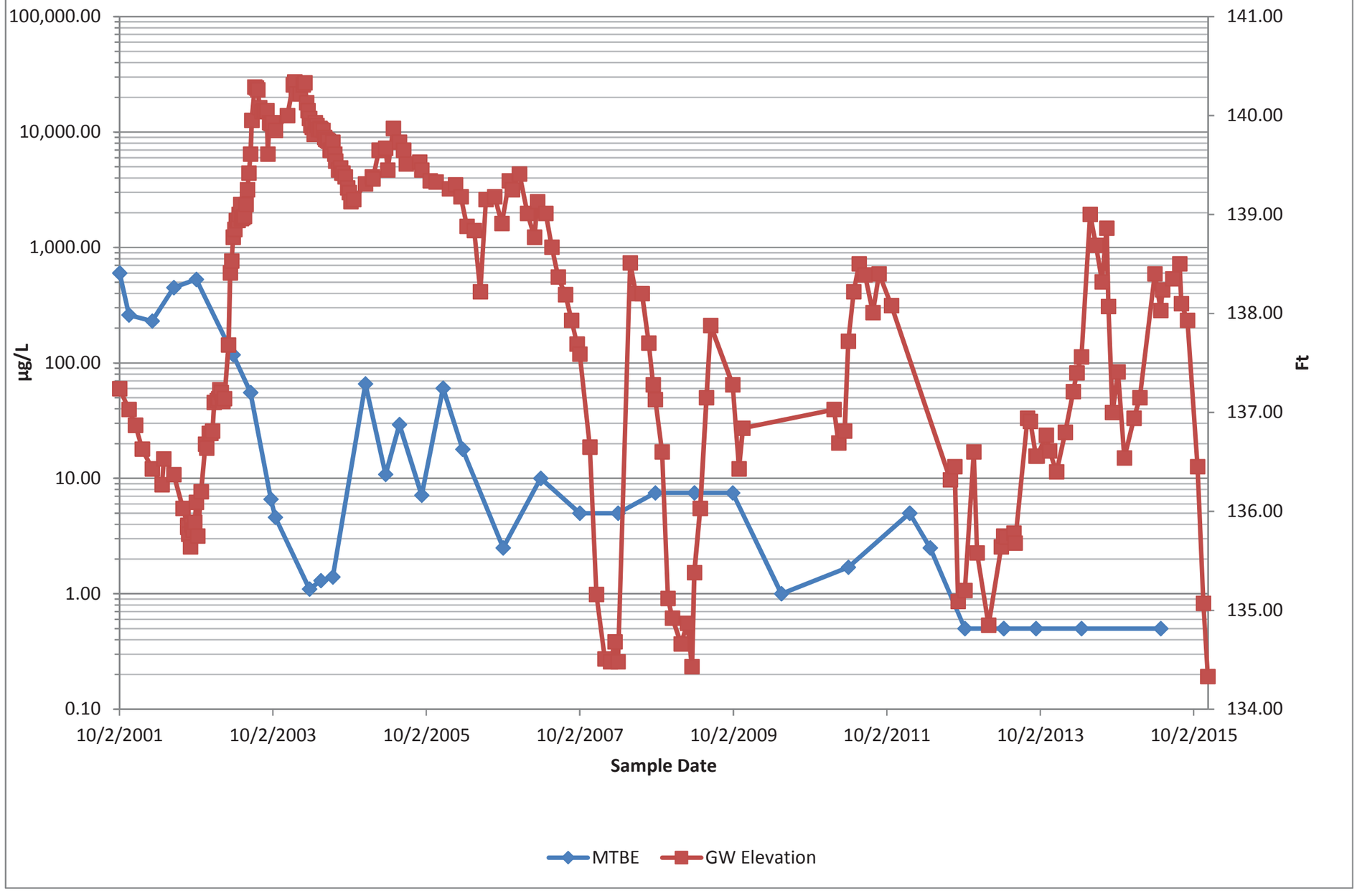


Figure 18: MW-24A Benzene Trend Analysis

Former Chevron Facility 122208

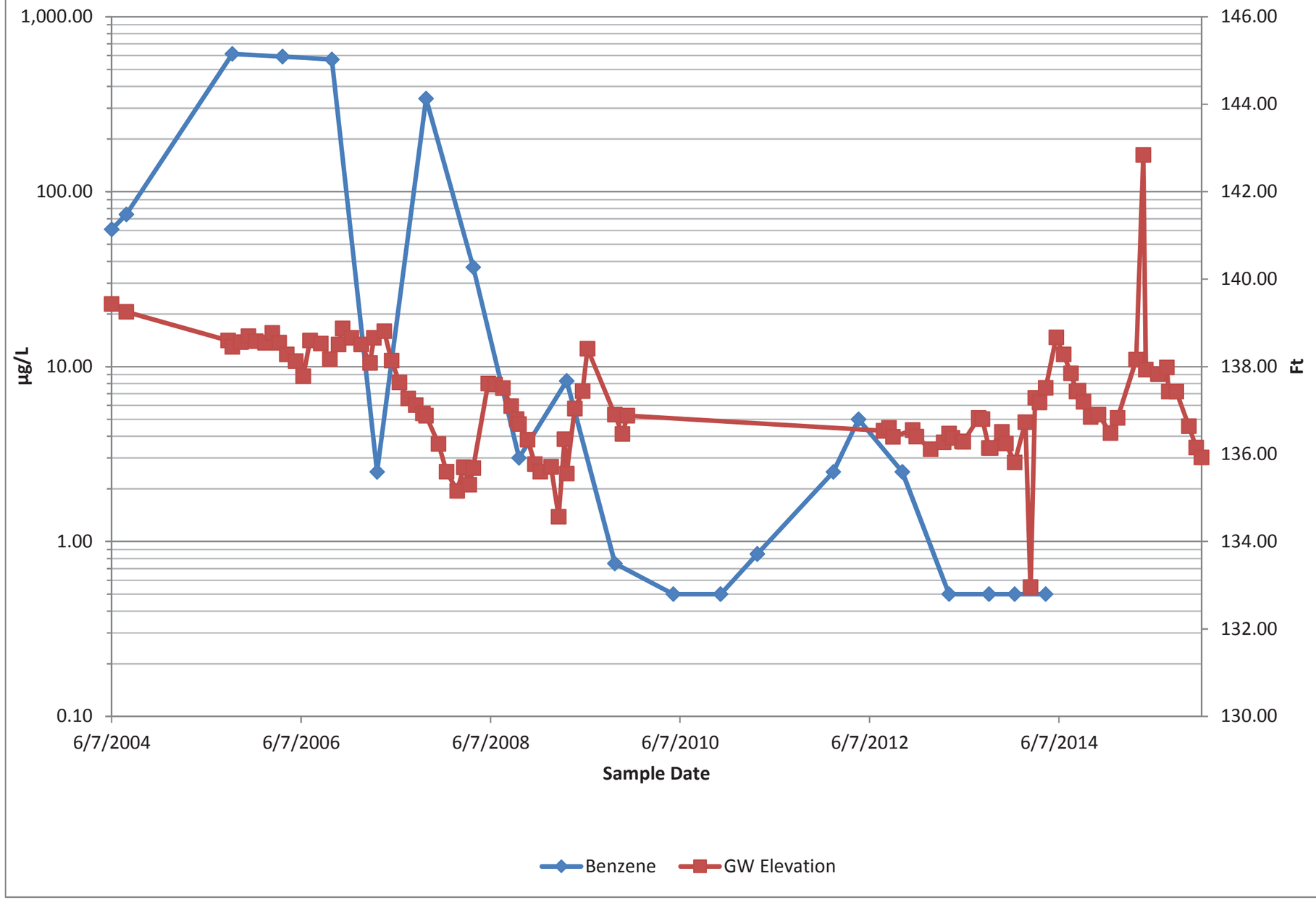


Figure 19: MW-24A MTBE Trend Analysis

Former Chevron Facility 122208

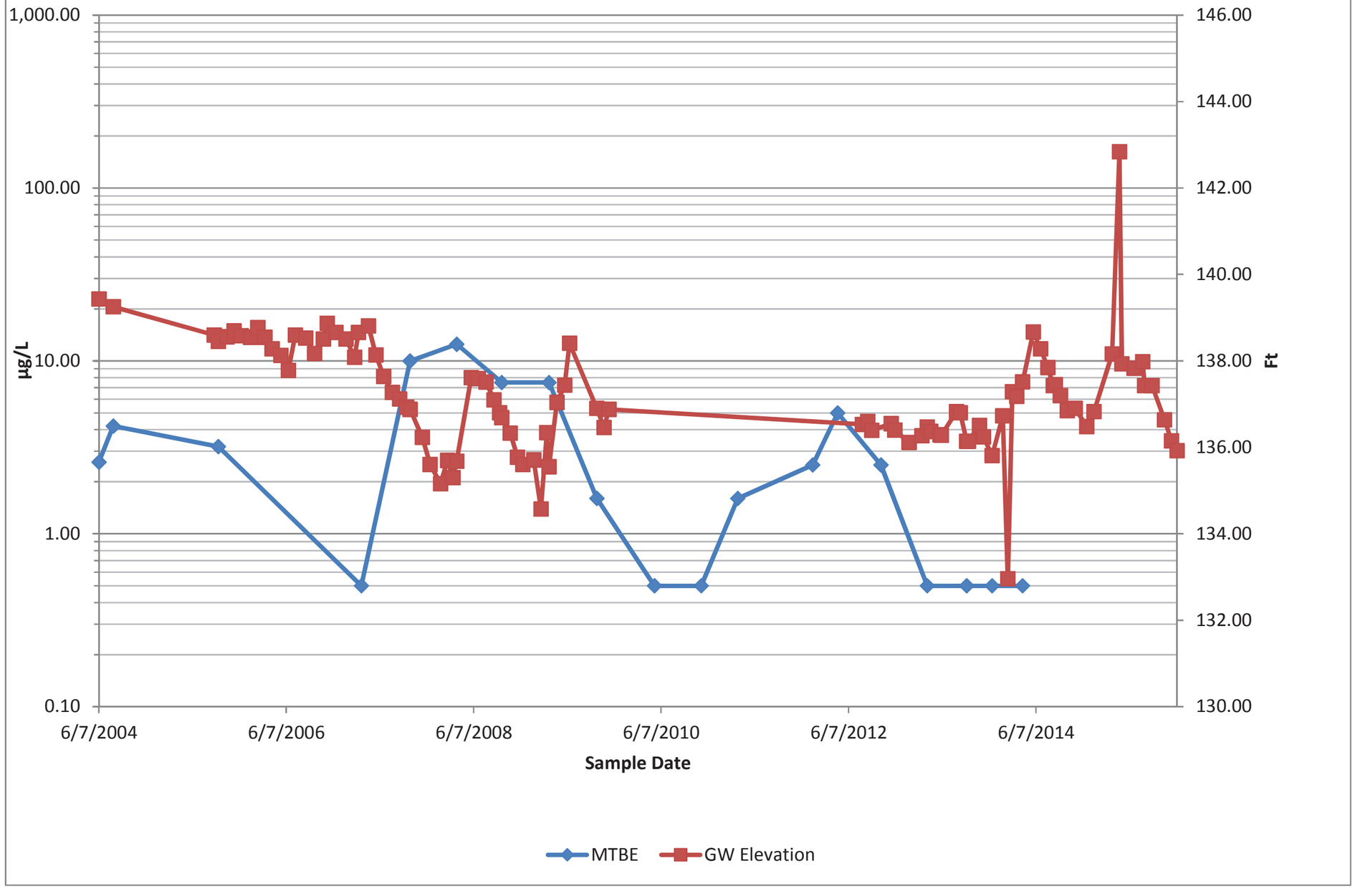


Figure 20: MW-24B Benzene Trend Analysis

Former Chevron Facility 122208

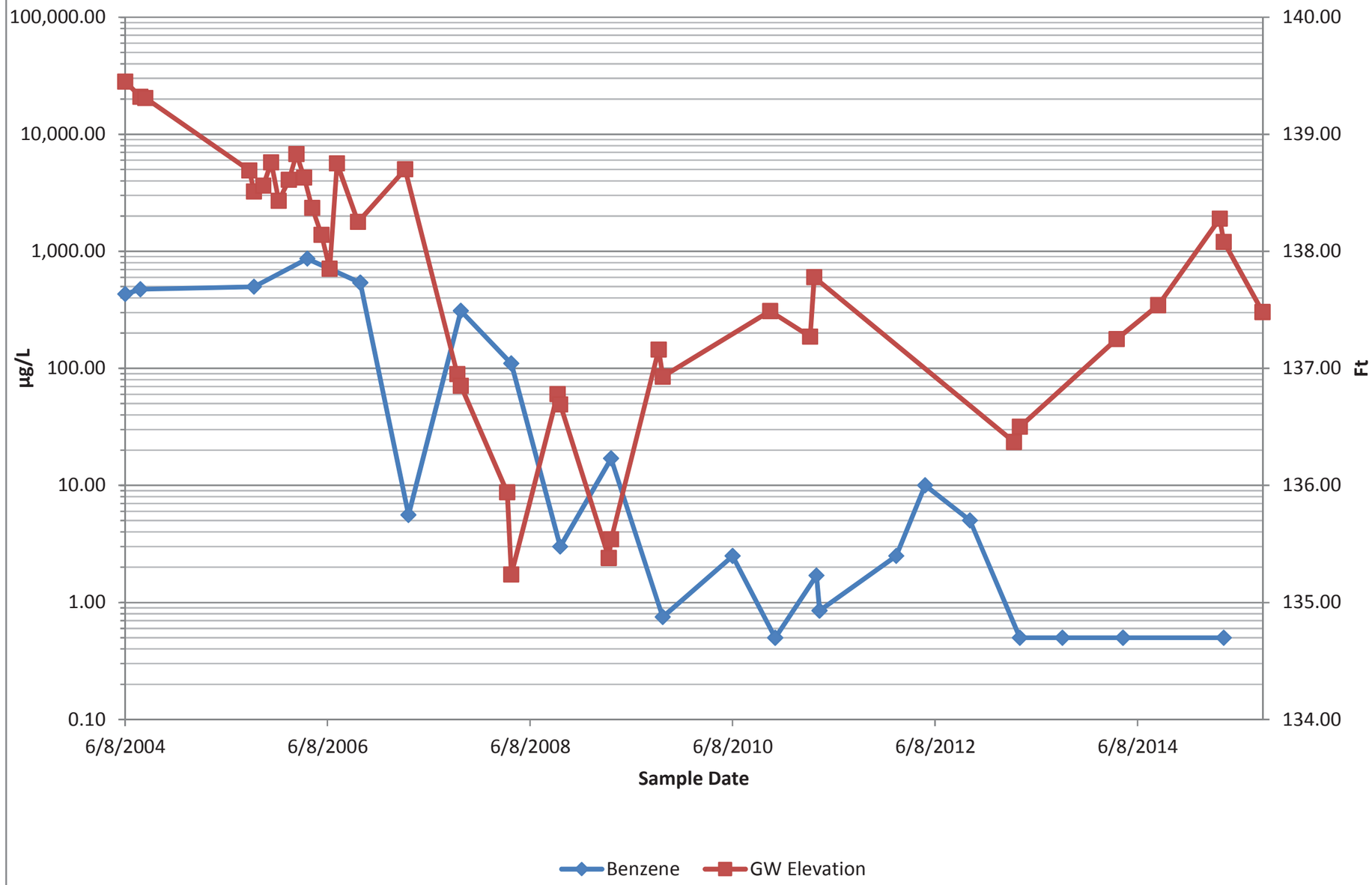


Figure 21: MW-24B MTBE Trend Analysis

Former Chevron Facility 122208

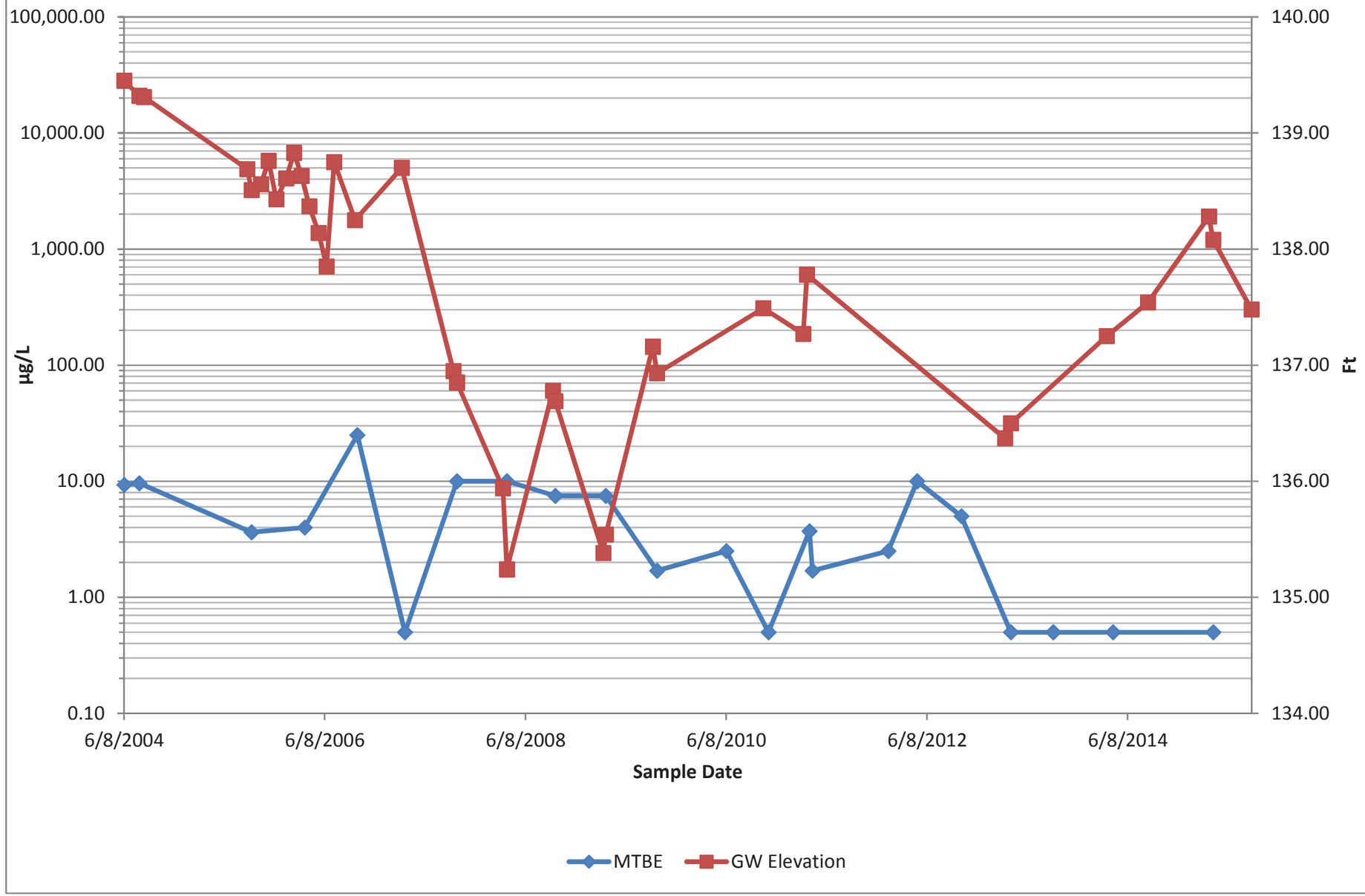


Figure 22: MW-33B Benzene Trend Analysis

Former Chevron Facility 122208

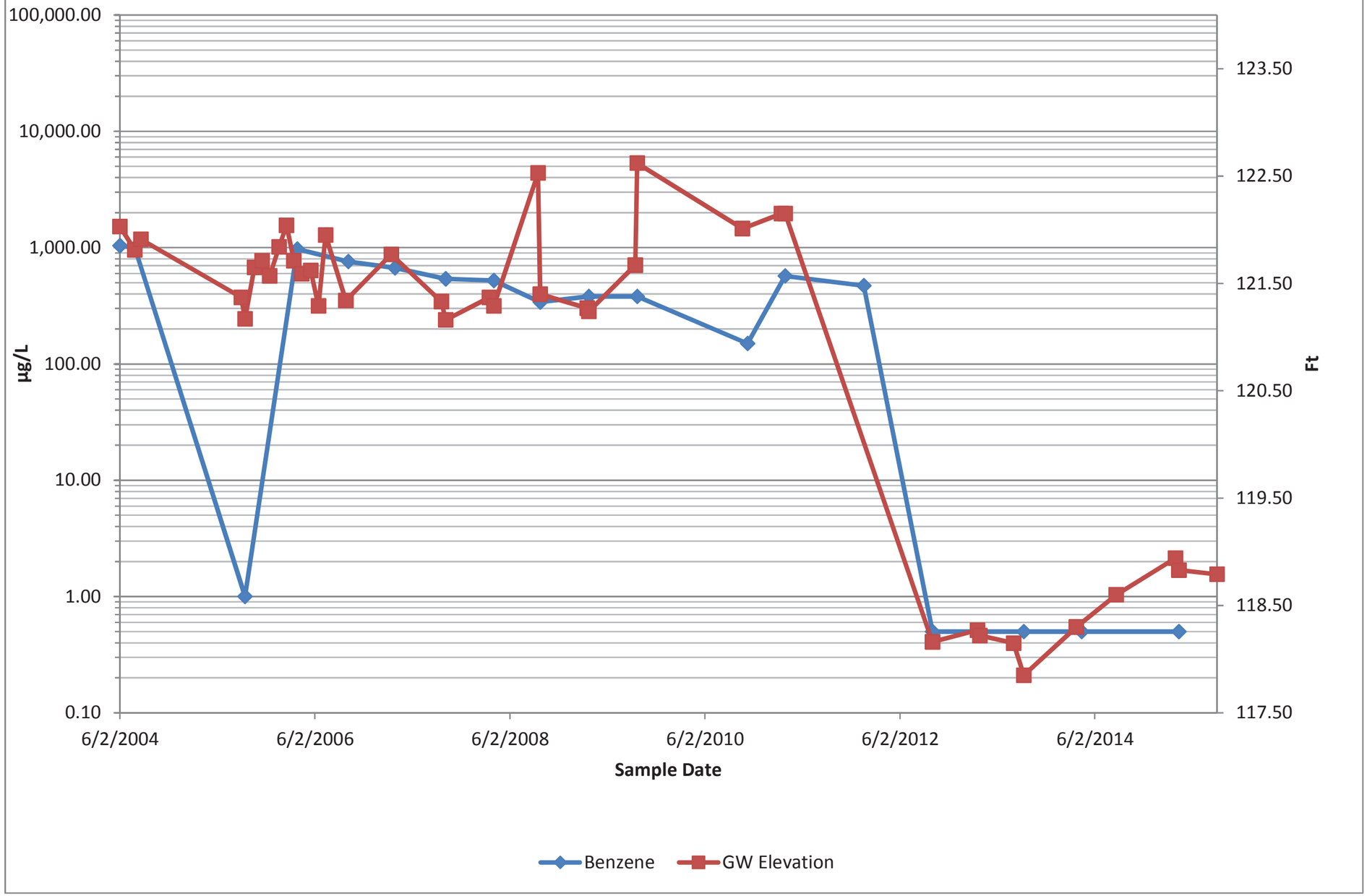


Figure 23: MW-33B MTBE Trend Analysis

Former Chevron Facility 122208

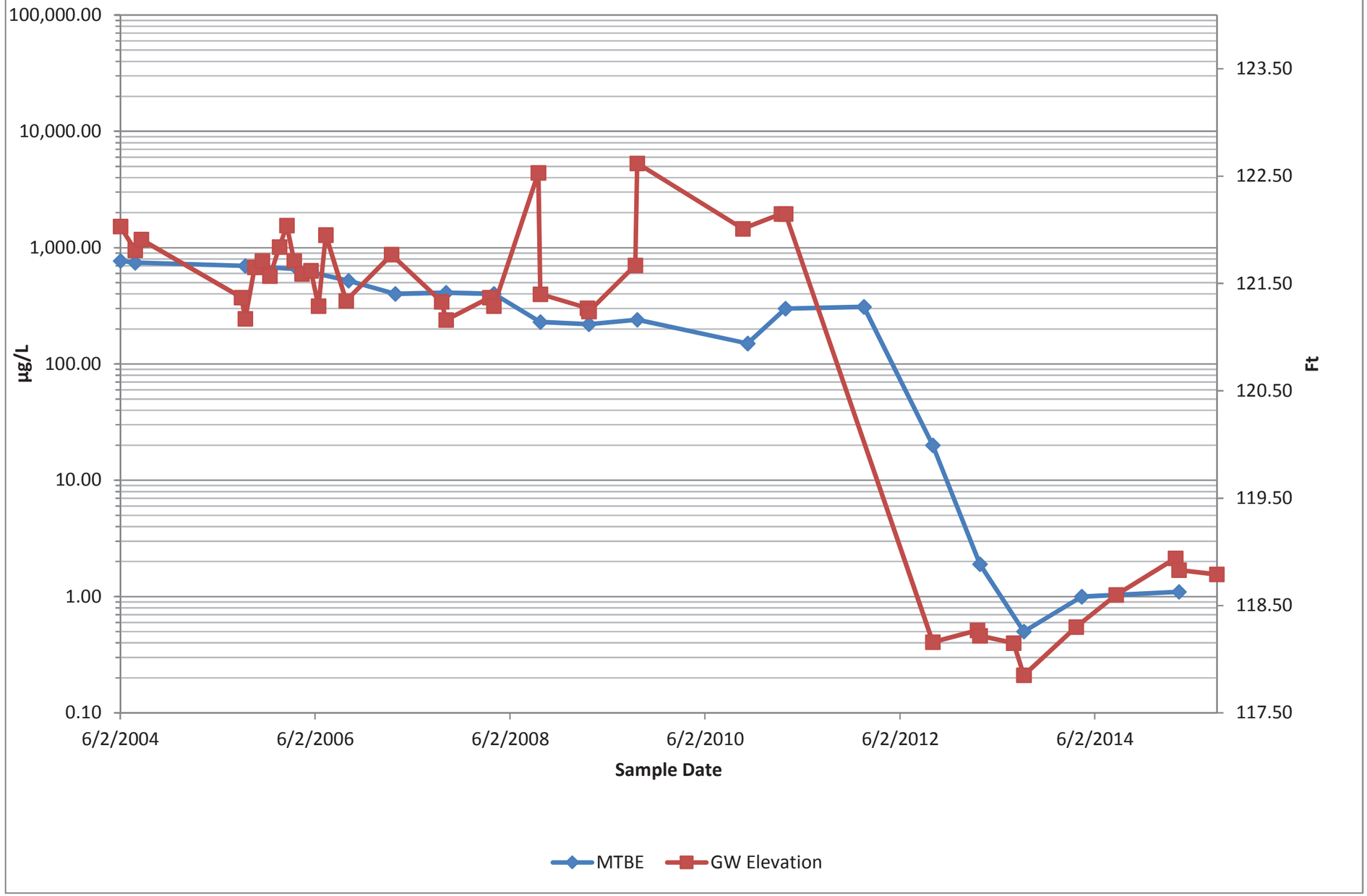


Figure 24: MW-33S Benzene Trend Analysis

Former Chevron Facility 122208

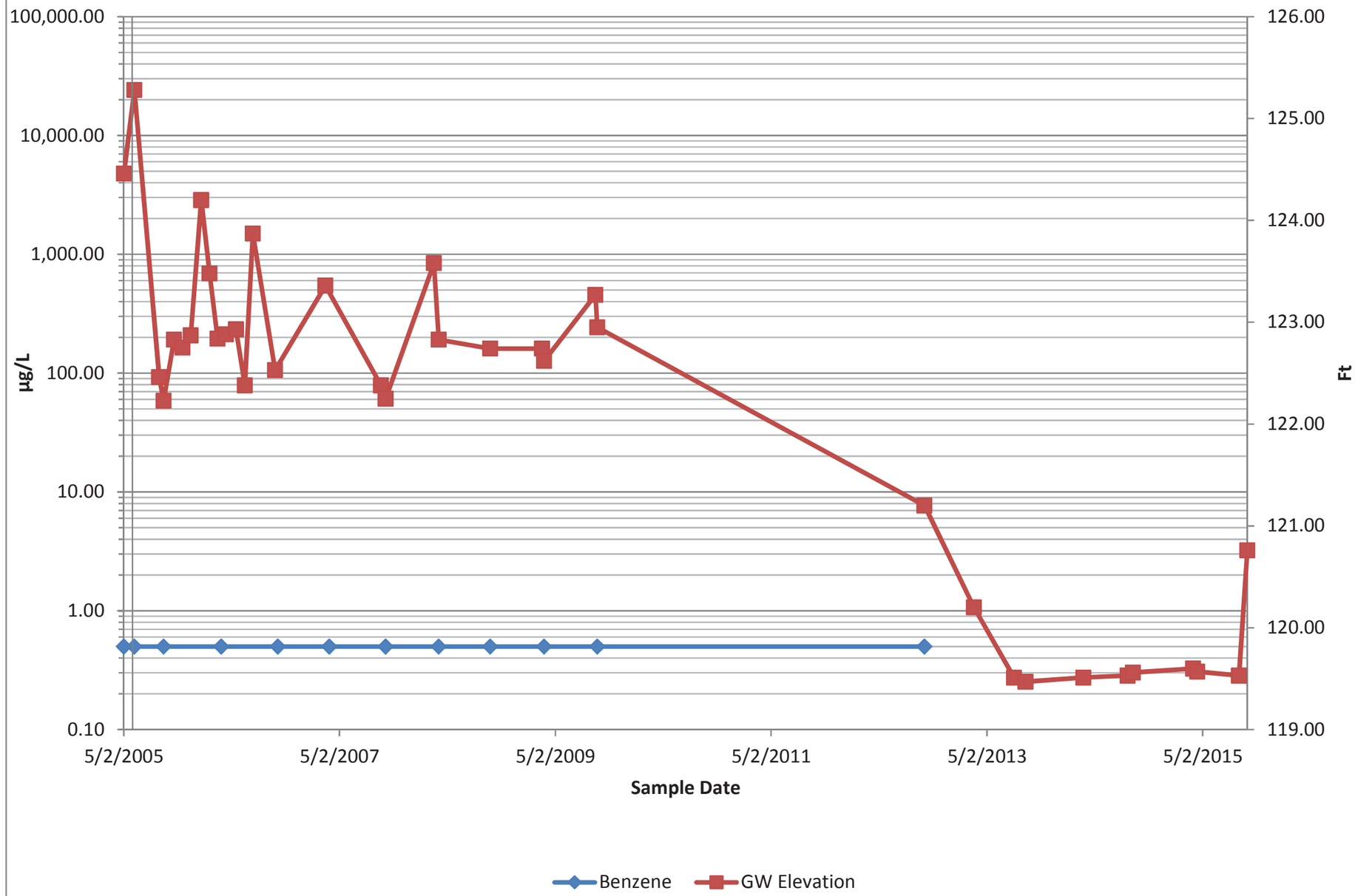
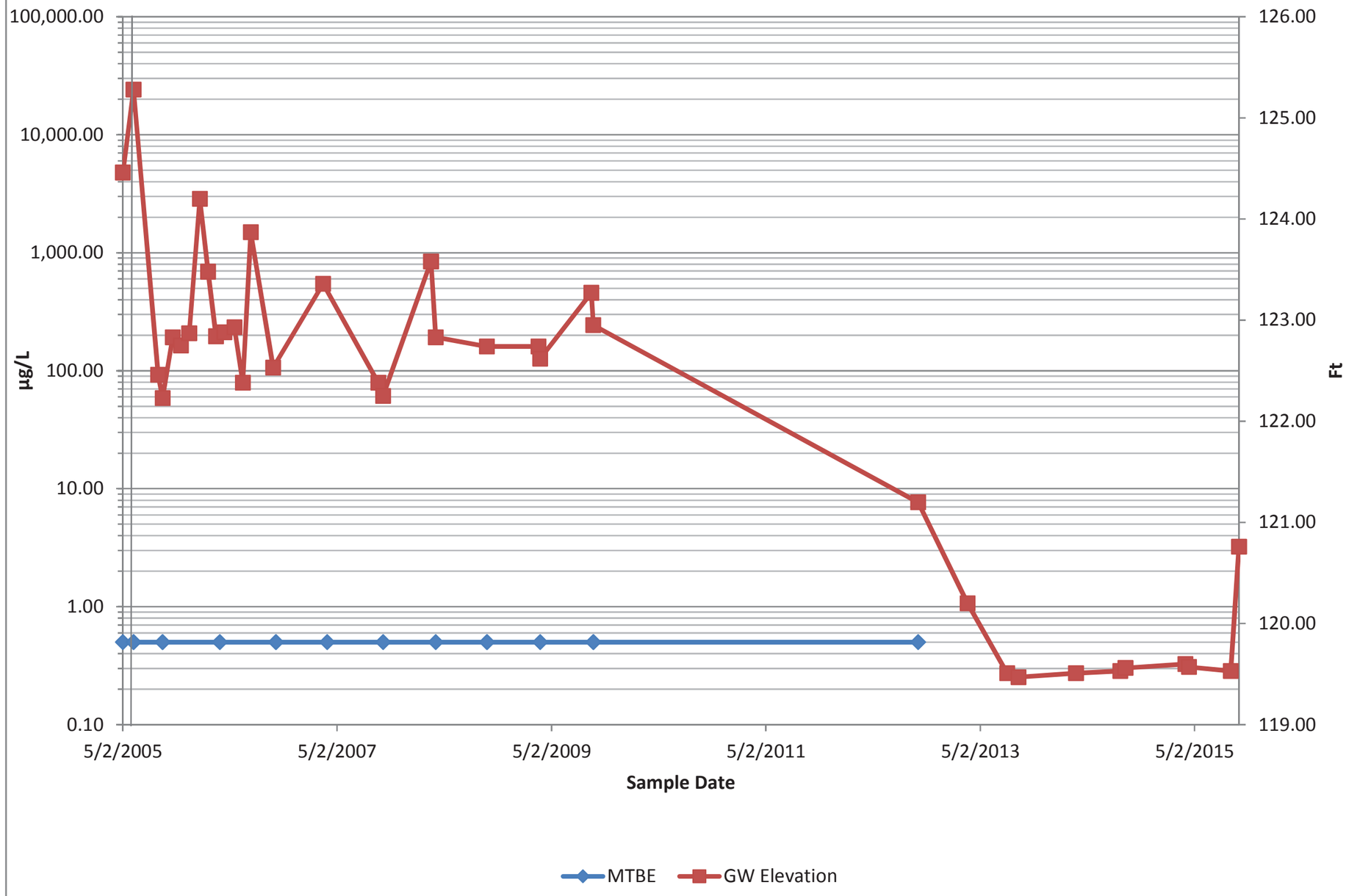


Figure 25: MW-33S MTBE Trend Analysis

Former Chevron Facility 122208



APPENDIX A

DUAL PHASE EXTRACTION SYSTEM-TOTAL FLUIDS EXTRACTION DATA

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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, A-3, A-4, and A-5 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 recent system data. Historical data collected 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 piping and instrumentation Diagram (Appendix H) 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.

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TABLE A-1: TOTAL FLUIDS EXTRACTION SYSTEM DATA
SEMI-ANNUAL PROGRESS REPORT: JULY THROUGH DECEMBER 2015
FORMER CHEVRON FACILITY 122208, 5801 RIGGS ROAD, CHILLUM, MD

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		Operating Extraction Points
									Period (gallons)	Cumulative (gallons)	
7/2/12 8:46	ON	443	0	100.0	47,767,322	60,687	60,472,244	6.10	0.47	925.09	RW1 RW2 RW3 RW-4 MW17 MW-22 PTWB GP-27R GP-39R MW-7 RW-5
7/9/12 9:56	ON	NS	0	-	47,767,819	497	60,472,741	0.05	-	925.09	Totalizer malfunctioning (not counting). Total gallons is incorrect. RW1 RW2 RW3 RW-4 MW17 MW-22 PTWB GP-27R GP-39R MW-7 RW-5
7/9/12 12:51	OFF	NS	NS	-	47,767,819	0	60,472,741	0.00	-	925.09	Off for cleaning of totalizer paddle. Total gallons is incorrect due to malfunctioning totalizer.
7/9/12 14:50	ON	NS	NS	-	47,767,819	0	60,472,741	0.00	-	925.09	RW1 RW2 RW3 RW-4 MW17 MW-22 PTWB GP-27R GP-39R MW-7 RW-5
7/16/12 11:21	ON	NS	0	-	47,820,897	53,078	60,525,819	5.38	-	925.09	RW1 RW2 RW3 RW-4 MW17 MW-22 PTWB GP-27R GP-39R MW-7 RW-5
7/16/12 12:15	OFF	NS	NS	-	47,821,181	284	60,526,103	5.26	-	925.09	Off for cleaning of view tubes on OWS and AST
7/16/12 13:19	ON	NS	0	-	47,821,181	0	60,526,103	0.00	-	925.09	RW1 RW2 RW3 RW-4 MW17 MW-22 PTWB GP-27R GP-39R MW-7 RW-5
7/23/12 12:50	ON	NS	NS	-	47,876,302	55,121	60,581,224	5.48	-	925.09	RW1 RW2 RW3 RW-4 MW17 MW-22 PTWB GP-27R GP-39R MW-7 RW-5
8/1/12 9:12	ON	NS	0	-	47,924,025	47,723	60,628,947	3.75	-	925.09	RW1 RW2 RW3 RW-4 MW17 MW-22 PTWB GP-27R GP-39R MW-7 RW-5
8/1/12 11:23	OFF	NS	NS	-	47,942,748	18,723	60,647,670	142.92	-	925.09	Off for cleaning of oil-water separator
8/6/12 13:16	ON	NS	0	-	47,942,748	0	60,647,670	0.00	-	925.09	RW1 RW2 RW3 RW-4 MW17 MW-22 PTWB GP-27R GP-39R MW-7 RW-5
8/6/12 17:10	OFF	NS	NS	-	47,943,629	881	60,648,551	3.76	-	925.09	System shut down due to malfunctioning float in AST
8/8/12 9:46	ON	NS	NS	-	47,943,629	0	60,648,551	0.00	-	925.09	RW1 RW2 RW3 RW-4 MW17 MW-22 PTWB GP-27R GP-39R MW-7 RW-5
8/15/12 8:42	OFF	NS	NS	-	47,995,950	52,321	60,700,872	5.22	-	925.09	Shut down due to leak in carbon vessel
8/20/12 9:21	ON	3,300	0	100.0	47,995,950	0	60,700,872	0.00	2.85	927.94	RW1 RW2 RW3 RW-4 MW17 MW-22 PTWB GP-27R GP-39R MW-7 RW-5
8/27/12 9:20	ON	NS	0	-	48,055,618	59,668	60,760,540	5.92	-	927.94	RW1 RW2 RW3 RW-4 MW17 MW-22 PTWB GP-27R GP-39R MW-7 RW-5
9/1/12 0:00	ON	NS	NS	-	48,081,292	25,674	60,786,214	3.87	-	927.94	RW1 RW2 RW3 RW-4 MW17 MW-22 PTWB GP-27R GP-39R MW-7 RW-5
9/4/12 8:38	ON	479	0	100.0	48,116,529	35,237	60,821,451	7.28	1.52	929.46	RW1 RW2 RW3 RW-4 MW17 MW-22 PTWB GP-27R GP-39R MW-7 RW-5
9/10/12 9:42	ON	NS	0	-	48,166,689	50,160	60,871,611	5.76	-	929.46	RW1 RW2 RW3 RW-4 MW17 MW-22 PTWB GP-27R GP-39R MW-7 RW-5
9/17/12 9:46	ON	NS	0	-	48,225,321	58,632	60,930,243	5.81	-	929.46	RW1 RW2 RW3 RW-4 MW17 MW-22 PTWB GP-27R GP-39R MW-7 RW-5
9/24/12 13:46	ON	NS	0	-	48,283,905	58,584	60,988,827	5.68	-	929.46	RW1 RW2 RW3 RW-4 MW17 MW-22 PTWB GP-27R GP-39R MW-7 RW-5
10/1/12 9:00	ON	511	0	100.0	48,337,337	53,432	61,042,259	5.46	0.73	930.19	RW1 RW2 RW3 RW-4 MW17 MW-22 PTWB GP-27R GP-39R MW-7 RW-5
10/8/12 9:43	ON	NS	0	-	48,392,693	55,356	61,097,615	5.47	-	930.19	RW1 RW2 RW3 RW-4 MW17 MW-22 PTWB GP-27R GP-39R MW-7 RW-5
10/15/12 13:00	ON	NS	3.7	-	48,457,989	65,296	61,162,911	6.35	-	930.19	Estimated
10/23/12 9:36	ON	NS	NS	-	48,517,289	59,300	61,222,211	5.24	-	930.19	RW1 RW2 RW3 RW-4 MW17 MW-22 PTWB GP-27R GP-39R MW-7 RW-5

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Chevron

TABLE A-1: TOTAL FLUIDS EXTRACTION SYSTEM DATA
SEMI-ANNUAL PROGRESS REPORT: JULY THROUGH DECEMBER 2015
FORMER CHEVRON FACILITY 122208, 5801 RIGGS ROAD, CHILLUM, MD

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		Operating Extraction Points
									Period (gallons)	Cumulative (gallons)	
10/23/12 10:20	OFF	NS	NS	-	48,517,550	261	61,222,472	5.93	-	930.19	Shut down due to oil/water separator pump leaking, air stripper tray being broken, and carbon being spent
11/9/12 11:10	ON	NS	NS	-	48,517,550	0	61,222,472	0.00	-	930.19	RW1 RW2 RW3 RW-4 MW17 MW-22 PTWB GP-27R GP-39R MW-7
11/9/12 12:45	OFF	NS	NS	-	48,517,889	339	61,222,811	3.57	-	930.19	Shut down due to pressure on carbon units and bag filters being too high
11/12/12 9:50	ON	NS	NS	-	48,517,889	0	61,222,811	0.00	-	930.19	RW1 RW2 RW3 RW-4 MW17 MW-22 PTWB GP-27R GP-39R MW-7
11/19/12 9:04	ON	391	0	100.0	48,576,018	58,129	61,280,940	5.79	0.72	930.91	RW1 RW2 RW3 RW-4 MW17 MW-22 PTWB GP-27R GP-39R MW-7
11/26/12 11:48	ON	NS	0	-	48,637,017	60,999	61,341,939	5.95	-	930.91	RW1 RW2 RW3 RW-4 MW17 MW-22 PTWB GP-27R GP-39R MW-7 RW-5
12/3/12 10:18	ON	563	0	100.0	48,695,667	58,650	61,400,589	5.87	0.38	931.29	RW1 RW2 RW3 RW-4 MW17 MW-22 PTWB GP-27R GP-39R MW-7 RW-5
12/4/12 11:59	ON	NS	NS	-	48,704,839	9,172	61,409,761	5.95	-	931.29	RW1 RW2 RW3 RW-4 MW17 MW-22 PTWB GP-27R GP-39R MW-7 RW-5
12/10/12 9:50	ON	NS	0	-	48,758,755	53,916	61,463,677	6.33	-	931.29	RW1 RW2 RW3 RW-4 MW17 MW-22 PTWB GP-27R GP-39R MW-7 RW-5
12/17/12 8:04	ON	NS	0	-	48,820,437	61,682	61,525,359	6.18	-	931.29	RW1 RW2 RW3 RW-4 MW17 MW-22 PTWB GP-27R GP-39R MW-7 RW-5
12/27/12 9:31	ON	NS	0	-	48,907,858	87,421	61,612,780	6.03	-	931.29	RW1 RW2 RW3 RW-4 MW17 MW-22 PTWB GP-27R GP-39R MW-7 RW-5
12/30/12 1:00	OFF	NS	NS	-	48,930,652	22,794	61,635,574	5.98	-	931.29	Off due to compressor fault from low oil.
1/2/13 12:30	ON	1,990	0	100.0	48,930,652	0	61,635,574	0.00	2.00	933.29	RW1 RW2 RW3 RW-4 MW17 MW-22 PTWB GP-27R GP-39R MW-7 RW-5
1/2/13 19:50	OFF	NS	NS	-	48,932,272	1,620	61,637,194	3.68	-	933.29	Off due to unknown reason
1/7/13 10:27	ON	NS	0	-	48,932,272	0	61,637,194	0.00	-	933.29	RW1 RW2 RW3 RW-4 MW17 MW-22 PTWB GP-27R GP-39R MW-7 RW-5
1/11/13 12:26	OFF	NS	NS	-	48,969,288	37,016	61,674,210	6.30	-	933.29	Off due to SVE knockout tank leaking and triggering sump alarm
1/15/13 11:30	ON	NS	0	-	48,969,288	0	61,674,210	0.00	-	933.29	RW1 RW2 RW3 RW-4 MW17 MW-22 PTWB GP-27R GP-39R MW-7 RW-5
1/16/13 16:30	OFF	NS	NS	-	48,980,806	11,518	61,685,728	6.62	-	933.29	Off due to floor sump alarm.
1/21/13 9:48	ON	NS	0	-	48,980,806	0	61,685,728	0.00	-	933.29	RW1 RW2 RW3 RW-4 MW17 MW-22 PTWB GP-27R GP-39R MW-7 RW-5
1/28/13 11:47	ON	NS	NS	-	49,044,657	63,851	61,749,579	6.26	-	933.29	RW1 RW2 RW3 RW-4 MW17 MW-22 PTWB GP-27R GP-39R MW-7 RW-5
2/1/13 0:01	ON	NS	NS	-	49,075,121	30,464	61,780,043	6.03	-	933.29	Estimated
2/4/13 11:56	ON	382	0	100.0	49,105,471	30,350	61,810,393	6.03	1.38	934.67	RW1 RW2 RW3 RW-4 MW17 MW-22 PTWB GP-27R GP-39R MW-7 RW-5
2/11/13 10:12	ON	NS	0	-	49,164,164	58,693	61,869,086	5.88	-	934.67	RW1 RW2 RW3 RW-4 MW17 MW-22 PTWB GP-27R GP-39R MW-7 RW-5
2/18/13 11:11	ON	NS	0	-	49,223,755	59,591	61,928,677	5.88	-	934.67	RW1 RW2 RW3 RW-4 MW17 MW-22 PTWB GP-27R GP-39R MW-7 RW-5

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TABLE A-1: TOTAL FLUIDS EXTRACTION SYSTEM DATA
SEMI-ANNUAL PROGRESS REPORT: JULY THROUGH DECEMBER 2015
FORMER CHEVRON FACILITY 122208, 5801 RIGGS ROAD, CHILLUM, MD

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		Operating Extraction Points
									Period (gallons)	Cumulative (gallons)	
2/25/13 9:30	ON	NS	NS	-	49,283,296	59,541	61,988,218	5.97	-	934.67	RW1 RW2 RW3 RW-4 MW17 MW-22 PTWB GP-27R GP-39R MW-7 RW-5
2/25/13 9:31	OFF	NS	NS	-	49,283,296	0	61,988,218	0.00	-	934.67	Off for Air Stripper cleaning.
2/25/13 11:30	ON	NS	0	-	49,283,296	0	61,988,218	0.00	-	934.67	RW1 RW2 RW3 RW-4 MW17 MW-22 PTWB GP-27R GP-39R MW-7 RW-5
3/1/13 0:01	ON	NS	NS	-	49,313,595	30,299	62,018,517	5.98	-	934.67	Estimated
3/4/13 9:50	ON	1,530	0	100.0	49,342,927	29,332	62,047,849	5.98	1.51	936.18	RW1 RW2 RW3 RW-4 MW17 MW-22 PTWB GP-27R GP-39R MW-7 RW-5
3/12/13 8:21	ON	NS	0	-	49,408,712	65,785	62,113,634	5.75	-	936.18	RW1 RW2 RW3 RW-4 MW17 MW-22 PTWB GP-27R GP-39R MW-7 RW-5
3/18/13 10:15	ON	NS	0	-	49,457,411	48,699	62,162,333	5.56	-	936.18	RW1 RW2 RW3 RW-4 MW17 MW-22 PTWB GP-27R GP-39R MW-7
3/26/13 10:12	ON	NS	0	-	49,519,319	61,908	62,224,241	5.38	-	936.18	RW1 RW2 RW3 RW-4 MW17 MW-22 PTWB GP-27R GP-39R MW-7
4/1/13 13:41	ON	1,243	0	100.0	49,567,190	47,871	62,272,112	5.41	2.07	938.26	RW1 RW2 RW3 RW-4 MW17 MW-22 PTWB GP-27R GP-39R MW-7
4/8/13 10:30	ON	NS	0	-	49,619,823	52,633	62,324,745	5.32	-	938.26	RW1 RW2 RW3 RW-4 MW17 MW-22 PTWB GP-27R GP-39R MW-7
4/15/13 10:00	ON	NS	0	-	49,670,966	51,143	62,375,888	5.09	-	938.26	RW1 RW2 RW3 RW-4 MW17 MW-22 PTWB GP-27R GP-39R MW-7
4/22/13 9:00	ON	NS	0	-	49,723,236	52,270	62,428,158	5.22	-	938.26	RW1 RW2 RW3 RW-4 MW17 MW-22 PTWB GP-27R GP-39R MW-7
4/30/13 13:22	ON	NS	NS	-	49,782,588	59,352	62,487,510	5.04	-	938.26	RW1 RW2 RW3 RW-4 MW17 MW-22 PTWB GP-27R GP-39R MW-7
5/1/13 0:01	ON	NS	NS	-	49,785,630	3,042	62,490,552	4.76	-	938.26	Estimated
5/6/13 9:23	ON	144	0	100.0	49,822,579	36,949	62,527,501	4.76	1.18	939.44	RW1 RW2 RW3 RW-4 MW17 MW-22 PTWB GP-27R GP-39R MW-7
5/14/13 9:54	ON	NS	0	-	49,880,363	57,784	62,585,285	5.00	-	939.44	RW1 RW2 RW3 RW-4 MW17 MW-22 PTWB GP-27R GP-39R MW-7
5/20/13 9:00	ON	NS	0	-	49,919,170	38,807	62,624,092	4.52	-	939.44	RW1 RW2 RW3 RW-4 MW17 MW-22 PTWB GP-27R GP-39R MW-7
5/28/13 11:26	ON	NS	0	-	49,970,125	50,955	62,675,047	4.37	-	939.44	RW1 RW2 RW3 RW-4 MW17 MW-22 PTWB GP-27R GP-39R MW-7
6/1/13 0:01	ON	NS	NS	-	49,985,475	15,350	62,690,397	3.02	-	939.44	Estimated
7/1/13 7:00	ON	225.20	0.00	100.00	50,127,525	142050	62,832,447	3.26	0.38	939.81	RW1 RW2 RW3 RW-4 MW-22 PTWB GP-27R GP-39R MW-7
7/7/13 20:30	OFF	NS	NS	-	50,179,749	52224	62,884,671	5.53	-	939.81	
7/8/13 8:30	ON	NS	0.00	-	50,179,749	0	62,884,671	0.00	-	939.81	RW1 RW2 RW3 RW-4 MW-22 PTWB GP-27R GP-39R MW-7
7/15/13 7:45	ON	NS	0.00	-	50,224,405	44656	62,929,327	4.45	-	939.81	RW1 RW2 RW3 RW-4 MW-22 PTWB GP-27R GP-39R MW-7
7/20/13 15:00	OFF	NS	NS	-	50,260,915	36510	62,965,837	4.78	-	939.81	
7/23/13 9:38	ON	NS	0.00	-	50,260,915	0	62,965,837	0.00	-	939.81	Down due to blown fuse in the control panel and bad battery backup

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FORMER CHEVRON FACILITY 122208, 5801 RIGGS ROAD, CHILLUM, MD

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		Operating Extraction Points
									Period (gallons)	Cumulative (gallons)	
7/29/13 7:00	ON	NS	0.00	-	50,301,088	40173	63,006,010	4.74	-	939.81	RW1 RW2 RW-4 MW-22 PTWB GP-27R GP-39R MW-7
8/5/13 7:00	ON	341.00	0.00	100.00	50,343,174	42086	63,048,096	4.18	0.41	940.22	RW1 RW2 RW-4 MW-22 GP-27R GP-39R MW-7
8/12/13 12:30	ON	NS	0.00	-	50,382,943	39769	63,087,865	3.82	-	940.22	RW1 RW2 RW3 RW-4 MW-22 PTWB GP-27R GP-39R MW-7
8/19/13 7:40	ON	NS	0.00	-	50,460,574	77631	63,165,496	7.93	-	940.22	RW1 RW2 RW3 RW-4 MW-22 PTWB GP-27R GP-39R MW-7
8/26/13 8:00	ON	NS	NS	-	50,539,228	78654	63,244,150	7.79	-	940.22	RW1 RW2 RW3 RW-4 MW-22 PTWB GP-27R GP-39R MW-7
9/1/13 13:04	OFF	NS	NS	-	50,608,831	69603	63,313,753	7.78	-	940.22	
9/4/13 10:35	OFF	NS	0.00	-	50,608,831	0	63,313,753	0.00	-	940.22	Down due to compressor fault from low oil
9/4/13 11:50	ON	NS	NS	-	50,608,831	0	63,313,753	0.00	-	940.22	RW1 RW2 RW3 RW-4 MW17 MW-22 PTWB GP-27R GP-39R MW-7
9/6/13 13:05	ON	NS	NS	-	50,627,524	18693	63,332,446	6.33	-	940.22	RW1 RW2 RW3 RW-4 MW17 MW-22 PTWB GP-27R GP-39R MW-7
9/10/13 13:59	OFF	NS	NS	-	-	-	0	-	-	940.22	
9/12/13 12:00	ON	NS	NS	-	-	-	0	-	-	940.22	RW1 RW2 RW3 RW-4 MW17 MW-22 PTWB GP-27R GP-39R MW-7
9/13/13 8:15	OFF	NS	NS	-	50,672,643	45119	63,377,565	37.13	-	940.22	
9/13/13 12:00	ON	NS	NS	-	50,672,643	0	63,377,565	0.00	-	940.22	RW1 RW2 RW3 RW-4 MW17 MW-22 PTWB GP-27R GP-39R MW-7
9/15/13 12:00	OFF	NS	NS	-	50,674,231	1588	63,379,153	0.55	-	940.22	Down due to trailer sump high level
9/17/13 9:00	OFF	NS	NS	-	50,674,231	0	63,379,153	0.00	-	940.22	Down due to pipe repair
9/19/13 8:15	ON	NS	NS	-	50,674,231	0	63,379,153	0.00	-	940.22	RW1 RW2 RW3 RW-4 MW17 MW-22 PTWB GP-27R GP-39R MW-7
9/19/13 16:00	OFF	3340.00	0.00	100.00	50,674,231	0	63,379,153	0.00	4.06	944.28	Down due to pipe repair
9/30/13 7:55	ON	NS	NS	-	50,674,231	0	63,379,153	0.00	-	944.28	RW1 RW2 RW3 RW-4 MW17 MW-22 PTWB GP-27R GP-39R MW-7
9/30/13 8:35	OFF	NS	0.00	-	50,678,184	3953	63,383,106	98.82	-	944.28	Down due to pipe repair
10/10/13 9:45	OFF	2810.00	0.00	100.00	50,678,998	814	63,383,920	0.06	0.10	944.38	Down due to pipe repair
10/11/13 12:00	ON	NS	NS	-	-	-	-	-	-	944.38	RW1 RW2 RW3 RW-4 MW17 MW-22 PTWB GP-27R GP-39R MW-7
11/7/13 13:19	ON	NS	0.00	-	50,687,283	8285	63,392,205	0.21	-	944.38	RW1 RW2 RW3 RW-4 MW17 MW-22 PTWB GP-27R GP-39R MW-7
11/13/13 8:00	ON	NS	NS	-	50,739,349	52066	63,444,271	6.26	-	944.38	RW1 RW2 RW3 RW-4 MW17 MW-22 PTWB GP-27R GP-39R MW-7
11/14/13 8:25	ON	571.00	0.00	100.00	50,747,738	8389	63,452,660	5.73	0.77	945.15	RW1 RW2 RW3 RW-4 MW17 MW-22 PTWB GP-27R GP-39R MW-7
11/21/13 0:00	ON	NS	NS	-	50,826,588	78850	63,531,510	8.23	-	945.15	RW1 RW2 RW3 RW-4 MW17 MW-22 PTWB GP-27R GP-39R MW-7
11/26/13 11:00	ON	NS	0.00	-	50,892,219	65631	63,597,141	8.35	-	945.15	RW1 RW2 RW3 RW-4 MW17 MW-22 PTWB GP-27R GP-39R MW-7
12/2/13 9:34	OFF	NS	NS	-	50,914,780	22561	63,619,702	2.64	-	945.15	Down due to engagement of exterior emergency stop button
12/6/13 12:00	OFF	NS	NS	-	50,914,780	0	63,619,702	0.00	-	945.15	Down due to engagement of exterior emergency stop button
12/18/13 0:00	ON	798.00	0.00	100.00	50,914,780	0	63,619,702	0.00	0.76	945.91	RW1 RW2 RW3 RW-4 MW17 MW-22 PTWB GP-27R GP-39R MW-7

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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		Operating Extraction Points
									Period (gallons)	Cumulative (gallons)	
12/30/13 14:00	ON	NS	0.00	-	51,046,111	131331	63,751,033	7.25	-	945.91	RW1 RW2 RW3 RW-4 MW17 MW-22 PTWB GP-27R GP-39R MW-7
1/2/14 9:34	OFF	NS	NS	-	51,075,832	29721	63,780,754	7.33	-	945.91	Down due to engagement of exterior emergency stop button
1/6/14 8:30	OFF	NS	0.00	-	51,075,832	0	63,780,754	0	-	945.91	Down due to engagement of exterior emergency stop button
1/6/14 10:00	ON	NS	NS	-	51,075,832	0	63,780,754	0	-	945.91	RW1 RW2 RW3 RW-4 MW17 MW-22 PTWB GP-27R GP-39R MW-7
1/14/14 12:30	ON	NS	NS	-	51,162,520	86688	63,867,442	7	-	945.91	RW1 RW2 RW3 RW-4 MW17 MW-22 PTWB GP-27R GP-39R MW-7
1/17/14 17:20	OFF	NS	NS	-	51,196,153	33633	63,901,075	7	-	945.91	Down due to high level in building sump due to leaking ball valve and check valve. Valves froze due to unusually low temperatures.
2/7/14 7:00	OFF	NS	NS	-	51,196,153	0	63,901,075	0	-	945.91	Down due to high level in building sump due to leaking ball valve and check valve. Valves froze due to unusually low temperatures.
2/7/14 8:50	ON	275	0	100.0	51,196,153	0	63,901,075	0	1.01	946.92	MW-7, RW-1, RW-2, RW-3, RW-4, MW-17, MW-22R, GP-39R, GP-27R, PTW-B
2/17/14 9:23	ON	NS	NS	-	51,296,448	100295	64,001,370	7	-	946.92	MW-7, RW-1, RW-2, RW-3, RW-4, MW-17, MW-22R, GP-39R, GP-27R, PTW-B
2/27/14 13:45	ON	NS	NS	-	51,396,673	100225	64,101,595	7	-	946.92	MW-7, RW-1, RW-2, RW-3, RW-4, MW-17, MW-22R, GP-39R, GP-27R, PTW-B
3/6/14 9:20	ON	79	0	100.0	51,469,106	72433	64,174,028	7	0.32	947.24	MW-7, RW-1, RW-2, RW-3, RW-4, MW-17, MW-22R, GP-39R, GP-27R, PTW-B
3/24/14 8:45	ON	NS	0	-	51,645,866	176760	64,350,788	7	-	947.24	MW-7, RW-1, RW-2, RW-3, RW-4, MW-17, MW-22R, GP-39R, GP-27R, PTW-B
4/8/14 17:00	OFF	NS	NS	-	51,814,501	168635	64,519,423	8	-	947.24	Down to await carbon replacement. Carbon replaced on 4/11/2014, systems restarted.
4/11/14 9:00	OFF	NS	NS	-	51,814,501	0	64,519,423	0	-	947.24	Down to await carbon replacement. Carbon replaced on 4/11/2014, systems restarted.
4/11/14 10:30	ON	NS	NS	-	51,814,501	0	64,519,423	0	-	947.24	MW-7, RW-1, RW-2, RW-3, RW-4, MW-17, MW-22R, GP-39R, GP-27R, PTW-B
4/17/14 10:50	ON	1150	0	100.0	51,879,432	64931	64,584,354	7	1.68	948.92	MW-7, RW-1, RW-2, RW-3, RW-4, MW-17, MW-22R, GP-39R, GP-27R, PTW-B
4/24/14 13:08	ON	NS	NS	-	51,903,104	23672	64,608,026	2	-	948.92	MW-7, RW-1, RW-2, RW-3, RW-4, MW-17, MW-22R, GP-39R, GP-27R, PTW-B
4/28/14 8:30	ON	NS	0	-	51,994,348	91244	64,699,270	17	-	948.92	MW-7, RW-1, RW-2, RW-3, RW-4, MW-17, MW-22R, GP-39R, GP-27R, PTW-B
5/4/14 17:16	OFF	NS	NS	-	52,051,990	57642	64,756,912	6	-	948.92	Down due to malfunction of OWS discharge valve.

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									Period (gallons)	Cumulative (gallons)	
5/15/14 12:33	OFF	NS	0	-	52,051,990	0	64,756,912	0	-	948.92	Down due to malfunction of OWS discharge valve.
5/15/14 14:50	ON	NS	NS	-	52,051,990	0	64,756,912	0	-	948.92	MW-7, RW-1, RW-2, RW-3, RW-4, MW-17, MW-22R, GP-39R, GP-27R, PTW-B
5/27/14 9:17	ON	1201	0	100.0	52,172,940	120950	64,877,862	7	2.30	951.22	MW-7, RW-1, RW-2, RW-3, RW-4, MW-17, MW-22R, GP-39R, GP-27R, PTW-B
6/6/14 11:35	ON	NS	NS	-	52,265,314	92374	64,970,236	6	-	951.22	MW-7, RW-1, RW-2, RW-3, RW-4, MW-17, MW-22R, GP-39R, GP-27R, PTW-B
6/12/14 15:00	ON	NS	0	100.0	-	-	-	-	-	951.22	MW-7, RW-1, RW-2, RW-3, RW-4, MW-17, MW-22R, GP-39R, GP-27R, PTW-B
6/23/14 11:39	ON	1844	0	100.0	52,428,218	162904	65,133,140	7	2.59	953.81	MW-7, RW-1, RW-2, RW-3, RW-4, RW-5, MW-17, MW-22R, GP-39R, GP-27R, PTW-B
7/11/14 11:17	ON	NS	NS	-	52,575,308	147090	65,280,230	6	-	953.81	MW-7, RW-1, RW-2, RW-3, RW-4, RW-5, MW-17, MW-22R, GP-39R, GP-27R, PTW-B
7/22/14 22:34	OFF	NS	NS	-	52,674,314	99006	65,379,236	6	-	953.81	AST HH due to clogged bag filters
7/23/14 9:30	ON	1411	0	100.0	52,674,314	0	65,379,236	0	2.67	956.48	MW-7, RW-1, RW-2, RW-3, RW-4, RW-5, MW-17, MW-22R, GP-39R, GP-27R, PTW-B
8/8/14 0:50	OFF	NS	NS	-	52,882,700	208386	65,587,622	9	-	956.48	Emergency stop button pushed
8/12/14 13:11	ON	NS	NS	-	52,882,700	0	65,587,622	0	-	956.48	MW-7, RW-1, RW-2, RW-3, RW-4, RW-5, MW-17, MW-22R, GP-39R, GP-27R, PTW-B
8/18/14 10:30	OFF	NS	NS	-	52,893,550	10850	65,598,472	1	-	956.48	Shutdown due to faulty OWS pump
8/27/14 12:00	ON	3110	0	100.0	52,893,550	0	65,598,472	0	3.30	959.78	MW-7, RW-1, RW-2, RW-3, RW-4, RW-5, MW-17, MW-22R, GP-39R, GP-27R, PTW-B
9/9/14 8:15	ON	NS	NS	-	53,057,332	163782	65,762,254	9	-	959.78	MW-7, RW-1, RW-2, RW-3, RW-4, RW-5, MW-17, MW-22R, GP-39R, GP-27R, PTW-B
9/11/14 9:00	ON	390	0	100.0	-	-	-	-	-	959.78	MW-7, RW-1, RW-2, RW-3, RW-4, RW-5, MW-17, MW-22R, GP-39R, GP-27R, PTW-B
9/22/14 2:13	OFF	NS	NS	-	53,214,324	156992	65,919,246	9	-	959.78	Air line leak drained air compressor
9/23/14 12:15	ON	NS	NS	-	53,214,324	0	65,919,246	0	-	959.78	MW-7, RW-1, RW-2, RW-3, RW-4, RW-5, MW-17, MW-22R, GP-39R, GP-27R, PTW-B
9/24/14 16:20	OFF	NS	NS	-	53,227,678	13354	65,932,600	8	-	959.78	Manually shut down to await LPGAC changeout
9/30/14 12:00	OFF	NS	NS	-	53,227,678	0	65,932,600	0	-	959.78	Manually shut down to await LPGAC changeout
10/7/14 10:00	ON	974	0	100.0	53,229,347	1669	65,934,269	0	4.57	964.35	MW-7, RW-1, RW-2, RW-3, RW-4, RW-5, MW-17, MW-22R, GP-39R, GP-27R, PTW-B
10/21/14 9:40	ON	NS	NS	-	53,410,873	181526	66,115,795	9	-	964.35	MW-7, RW-1, RW-2, RW-3, RW-4, RW-5, MW-17, MW-22R, GP-39R, GP-27R, PTW-B
10/25/14 9:04	OFF	NS	NS	-	53,452,281	41408	66,157,203	7	-	964.35	OWS transfer pump shaft coupler sheared
10/31/14 10:30	ON	NS	NS	-	53,452,281	0	66,157,203	0	-	964.35	MW-7, RW-1, RW-2, RW-3, RW-4, RW-5, MW-17, MW-22R, GP-39R, GP-27R, PTW-B
11/6/14 9:15	ON	240	0	100.0	53,527,481	75200	66,232,403	9	1.21	965.56	MW-7, RW-1, RW-2, RW-3, RW-4, RW-5, MW-17, MW-22R, GP-39R, GP-27R, PTW-B
11/21/14 13:48	OFF	NS	NS	-	53,718,945	191464	66,423,867	9	-	965.56	Low air compressor oil
11/25/14 8:45	ON	NS	NS	-	53,718,945	0	66,423,867	0	-	965.56	MW-7, RW-1, RW-2, RW-3, RW-4, RW-5, MW-17, MW-22R, GP-39R, GP-27R, PTW-B
12/5/14 9:22	OFF	NS	NS	-	53,848,433	129488	66,553,355	9	-	965.56	Shutdown caused by trailer sump level indicator due to cracked and leacking PVC pipe

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TABLE A-1: TOTAL FLUIDS EXTRACTION SYSTEM DATA
SEMI-ANNUAL PROGRESS REPORT: JULY THROUGH DECEMBER 2015
FORMER CHEVRON FACILITY 122208, 5801 RIGGS ROAD, CHILLUM, MD

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		Operating Extraction Points
									Period (gallons)	Cumulative (gallons)	
12/12/14 12:00	ON	NS	NS	-	53,848,570	137	66,553,492	0	-	965.56	MW-7, RW-1, RW-2, RW-3, RW-4, RW-5, MW-17, MW-22R, GP-39R, GP-27R, PTW-B
12/12/14 15:59	OFF	NS	NS	-	53,850,958	2388	66,555,880	10	-	965.56	CMP-LO
12/16/14 12:00	ON	NS	NS	-	53,850,958	0	66,555,880	0	-	965.56	MW-7, RW-1, RW-2, RW-3, RW-4, RW-5, MW-17, MW-22R, GP-39R, GP-27R, PTW-B
12/19/14 13:00	OFF	NS	NS	-	53,884,589	33631	66,589,511	8	-	965.56	Emergency stop button pushed
12/22/14 10:30	ON	298	0	100.0	53,884,589	0	66,589,511	0	0.64	966.20	MW-7, RW-1, RW-2, RW-3, RW-4, RW-5, MW-17, MW-22R, GP-39R, GP-27R, PTW-B
12/30/14 4:56	OFF	NS	NS	-	53,973,754	89165	66,678,676	8	-	966.20	Shutdown caused by OWS high high alarm possibly due to power outage
1/7/15 10:50	ON	NS	NS	-	53,973,754	0	66,678,676	0	-	966.20	MW-7, RW-1, RW-2, RW-3, RW-4, RW-5, MW-17, MW-22R, GP-39R, GP-27R, PTW-B
1/7/15 12:15	OFF	NS	NS	-	53,973,754	0	66,678,676	0	-	966.20	Oil water separator pump failure
1/19/15 10:30	ON	NS	NS	-	53,973,754	0	66,678,676	0	-	966.20	MW-7, RW-1, RW-2, RW-3, RW-4, RW-5, MW-17, MW-22R, GP-39R, GP-27R, PTW-B
1/22/15 6:50	OFF	NS	NS	-	54,010,854	37100	66,715,776	9	-	966.20	Compressor motor failure
1/27/15 9:26	ON	2025	0	100.0	54,010,854	0	66,715,776	0	0.98	967.18	MW-7, RW-1, RW-2, RW-3, RW-4, RW-5, MW-17, MW-22R, GP-39R, GP-27R, PTW-B
1/31/15 12:23	OFF	NS	NS	-	54,062,083	51229	66,767,005	9	-	967.18	Air compressor low oil
3/17/15 10:20	OFF	NS	NS	-	54,062,083	0	66,767,005	0	-	967.18	Broken pipe in enclosure
3/20/15 12:00	ON	NS	NS	-	54,062,083	0	66,767,005	0	-	967.18	MW-7, RW-1, RW-2, RW-3, RW-4, RW-5, MW-17, MW-22R, GP-39R, GP-27R, PTW-B
3/31/15 12:00	OFF	NS	NS	-	54,062,083	0	66,767,005	0	-	967.18	Broken bag filter repair
4/3/15 11:15	ON	NS	NS	-	54,063,781	1698	66,768,703	0	-	967.18	MW-7, RW-1, RW-2, RW-3, RW-4, RW-5, MW-17, MW-22R, GP-39R, GP-27R, PTW-B
4/6/15 10:43	OFF	NS	NS	-	54,101,423	37642	66,806,345	9	-	967.18	Air compressor low oil, breather filter release dropped oil level below set point
4/8/15 9:40	ON	2758	0	100.0	54,101,423	0	66,806,345	0	1.44	968.62	MW-7, RW-1, RW-2, RW-3, RW-4, RW-5, MW-17, MW-22R, GP-39R, GP-27R, PTW-B
4/9/15 12:00	OFF	NS	NS	-	54,115,692	14269	66,820,614	9	-	968.62	Air compressor low oil
4/13/15 10:20	ON	NS	NS	-	54,115,692	0	66,820,614	0	-	968.62	MW-7, RW-1, RW-2, RW-3, RW-4, RW-5, MW-17, MW-22R, GP-39R, GP-27R, PTW-B
4/25/15 2:41	OFF	NS	NS	-	54,257,443	141751	66,962,365	8	-	968.62	Air compressor low oil
4/28/15 9:30	ON	NS	NS	-	54,257,443	0	66,962,365	0	-	968.62	MW-7, RW-1, RW-2, RW-3, RW-4, RW-5, MW-17, MW-22R, GP-39R, GP-27R, PTW-B
5/2/15 12:00	OFF	NS	NS	-	54,296,587	39144	67,001,509	7	-	968.62	Power outage at system enclosure
5/7/15 9:30	ON	3240	0	100.0	54,296,587	0	67,001,509	0	3.90	972.52	MW-7, RW-1, RW-2, RW-3, RW-4, RW-5, MW-17, MW-22R, GP-39R, GP-27R, PTW-B
5/13/15 15:40	OFF	NS	NS	-	54,335,731	39144	67,040,653	4	-	972.52	Shutdown to await carbon change out
6/9/15 11:45	ON	NS	NS	-	54,335,731	0	67,040,653	0	-	972.52	MW-7, RW-1, RW-2, RW-3, RW-4, RW-5, MW-17, MW-22R, GP-39R, GP-27R, PTW-B
6/9/15 16:37	OFF	NS	NS	-	54,337,665	1934	67,042,587	7	-	972.52	Carbon vessel transfer pipe failure
6/30/15 9:40	ON	NS	NS	-	54,337,665	0	67,042,587	0	-	972.52	MW-7, RW-1, RW-2, RW-3, RW-4, RW-5, MW-17, MW-22R, GP-39R, GP-27R, PTW-B
7/3/15 9:32	OFF	NS	NS	-	54,373,092	35427	67,078,014	8	-	972.52	Air stripper high high pressure due to clogged bag filters
7/8/15 11:30	ON	NS	NS	-	54,373,092	0	67,078,014	0	-	972.52	MW-7, RW-1, RW-2, RW-3, RW-4, RW-5, MW-17, MW-22R, GP-39R, GP-27R, PTW-B
7/15/15 10:00	ON	NS	NS	-	54,451,608	78516	67,156,530	8	-	972.52	MW-7, RW-1, RW-2, RW-3, RW-4, RW-5, MW-17, MW-22R, GP-39R, GP-27R, PTW-B

TABLE A-1: TOTAL FLUIDS EXTRACTION SYSTEM DATA
SEMI-ANNUAL PROGRESS REPORT: JULY THROUGH DECEMBER 2015
FORMER CHEVRON FACILITY 122208, 5801 RIGGS ROAD, CHILLUM, MD

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		Operating Extraction Points
									Period (gallons)	Cumulative (gallons)	
7/17/15 5:00	OFF	NS	NS	-	54,474,484	22876	67,179,406	9	-	972.52	Air compressor low pressure
7/17/15 10:55	ON	NS	NS	-	54,474,484	0	67,179,406	0	-	972.52	MW-7, RW-1, RW-2, RW-3, RW-4, RW-5, MW-17, MW-22R, GP-39R, GP-27R, PTW-B
7/20/15 17:57	OFF	NS	NS	-	54,511,772	37288	67,216,694	8	-	972.52	Air stripper high high pressure due to clogged bag filters
7/27/15 10:30	ON	3210	0	100.0	54,511,772	0	67,216,694	0	4.63	977.15	MW-7, RW-1, RW-2, RW-3, RW-4, RW-5, MW-17, MW-22R, GP-39R, GP-27R, PTW-B
7/29/15 16:27	OFF	NS	NS	-	54,535,178	23406	67,240,100	7	-	977.15	Air compressor low pressure due to blown air line
7/31/15 12:50	ON	NS	NS	-	54,535,178	0	67,240,100	0	-	977.15	MW-7, RW-1, RW-2, RW-3, RW-4, RW-5, MW-17, MW-22R, GP-39R, GP-27R, PTW-B
7/31/15 16:07	OFF	NS	NS	-	54,537,302	2124	67,242,224	11	-	977.15	Air compressor low oil
8/4/15 9:15	ON	126.8	0	100.0	54,537,302	0	67,242,224	0	0.28	977.43	MW-7, RW-1, RW-2, RW-3, RW-4, RW-5, MW-17, MW-22R, GP-39R, GP-27R, PTW-B
8/5/15 1:51	OFF	NS	NS	-	54,554,323	17021	67,259,245	17	-	977.43	Sump high high level due to air stripper leak
8/7/15 11:30	ON	NS	NS	-	54,554,323	0	67,259,245	0	-	977.43	MW-7, RW-1, RW-2, RW-3, RW-4, RW-5, MW-17, MW-22R, GP-39R, GP-27R, PTW-B
8/19/15 0:22	OFF	NS	NS	-	54,700,625	146302	67,405,547	9	-	977.43	Air stripper high high pressure due to clogged bag filters
8/28/15 10:30	ON	NS	NS	-	54,700,625	0	67,405,547	0	-	977.43	MW-7, RW-1, RW-2, RW-3, RW-4, RW-5, MW-17, MW-22R, GP-39R, GP-27R, PTW-B
9/1/15 10:37	ON	347	0	100.0	54,750,973	50348	67,455,895	9	2.84	980.27	MW-7, RW-1, RW-2, RW-3, RW-4, RW-5, MW-17, MW-22R, GP-39R, GP-27R, PTW-B
9/3/15 11:04	OFF	NS	NS	-	54,774,970	23997	67,479,892	8	-	980.27	Air compressor low oil
9/4/15 12:50	ON	NS	NS	-	54,774,970	0	67,479,892	0	-	980.27	MW-7, RW-1, RW-2, RW-3, RW-4, RW-5, MW-17, MW-22R, GP-39R, GP-27R, PTW-B
9/27/15 16:54	OFF	NS	NS	-	55,035,944	260974	67,740,866	8	-	980.27	Air compressor low oil
9/30/15 10:05	ON	NS	NS	-	55,035,944	0	67,740,866	0	-	980.27	MW-7, RW-1, RW-2, RW-3, RW-4, RW-5, MW-17, MW-22R, GP-39R, GP-27R, PTW-B
10/2/15 15:00	OFF	NS	NS	-	55,060,700	24756	67,765,622	8	-	980.27	Planned shutdown for severe weather
10/5/15 12:00	ON	NS	NS	-	55,060,700	0	67,765,622	0	-	980.27	MW-7, RW-1, RW-2, RW-3, RW-4, RW-5, MW-17, MW-22R, GP-39R, GP-27R, PTW-B
10/12/15 12:30	ON	1049	0	100.0	55,163,479	102779	67,868,401	10	1.92	982.19	MW-7, RW-1, RW-2, RW-3, RW-4, RW-5, MW-17, MW-22R, GP-39R, GP-27R, PTW-B
10/20/15 11:50	ON	NS	NS	-	55,278,093	114614	67,983,015	10	-	982.19	MW-7, RW-1, RW-2, RW-3, RW-4, RW-5, MW-17, MW-22R, GP-39R, GP-27R, PTW-B

TABLE A-1: TOTAL FLUIDS EXTRACTION SYSTEM DATA
SEMI-ANNUAL PROGRESS REPORT: JULY THROUGH DECEMBER 2015
FORMER CHEVRON FACILITY 122208, 5801 RIGGS ROAD, CHILLUM, MD

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		Operating Extraction Points
									Period (gallons)	Cumulative (gallons)	
11/7/15 22:03	OFF	NS	NS	-	55,535,644	257551	68,240,566	10	-	982.19	Oil water separator broken float
11/13/15 9:20	ON	NS	NS	-	55,535,644	0	68,240,566	0	-	982.19	MW-7, RW-1, RW-2, RW-3, RW-4, RW-5, MW-17, MW-22R, GP-39R, GP-27R, PTW-B
11/16/15 16:21	OFF	NS	NS	-	55,581,616	45972	68,286,538	10	-	982.19	Air compressor low pressure
11/17/15 9:40	ON	234.8	0	100.0	55,581,616	0	68,286,538	0	1.79	983.97	MW-7, RW-1, RW-2, RW-3, RW-4, RW-5, MW-17, MW-22R, GP-39R, GP-27R, PTW-B
12/8/15 9:00	ON	104.2	0	100.0	55,874,571	292955	68,579,493	10	0.33	984.31	MW-7, RW-1, RW-2, RW-3, RW-4, RW-5, MW-17, MW-22R, GP-39R, GP-27R, PTW-B
12/21/15 10:38	ON	NS	NS	-	56,039,753	165182	68,744,675	9	-	984.31	MW-7, RW-1, RW-2, RW-3, RW-4, RW-5, MW-17, MW-22R, GP-39R, GP-27R, PTW-B
12/31/15 5:25	OFF	NS	NS	-	56,169,896	130143	68,874,818	9	-	984.31	Air compressor low pressure

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 2015
FORMER CHEVRON FACILITY 122208, 5801 RIGGS ROAD, CHILLUM, MD

Date/Time	Benzene (µg/L)	Toluene (µg/L)	Napthalene (µg/L)	Ethylbenzene (µg/L)	Xylenes (µg/L)	BTEX (µg/L)	MTBE (µg/L)
9/9/09 9:00	1,200	1,700	NA	150	1,010	4,060	600
10/28/09 10:00	130	200	NA	19	163	512	180
11/23/09 14:35	100	200	NA	23	187	510	130
12/22/09 13:00	410	600	NA	70	520	1,600	300
1/4/10 10:41	400	590	NA	55	400	1,445	340
2/2/10 8:50	150	300	NA	26	240	716	160
3/1/10 9:08	150	260	NA	26	206	642	210
4/27/10 12:10	460	800	NA	85	590	1,935	360
5/3/10 10:25	390	650	NA	57	470	1,567	460
6/2/10 13:55	630	1,100	NA	130	730	2,590	340
7/12/10 11:35	1,800	2,800	NA	300	1,770	6,670	900
8/9/10 14:42	550	850	NA	99	670	2,169	430
9/15/10 13:10	150	260	NA	25	228	663	160
10/4/10 13:08	550	810	NA	59	460	1,879	220
11/5/10 11:20	580	890	NA	61	490	2,021	360
12/6/10 10:36	240	380	NA	30	250	900	260
1/3/11 10:40	480	630	NA	67	370	1,547	250
2/2/11 12:03	150	230	NA	21	155	556	99
8/19/11 13:20	740	1,000	NA	110	770	2,620	480
10/3/11 9:10	470	680	NA	62	480	1,692	560
11/7/11 7:51	700	910	NA	83	680	2,373	580
12/5/11 9:00	560	860	NA	77	610	2,107	530
1/3/12 8:30	380	560	NA	56	400	1,396	440
2/2/12 13:06	320	580	NA	61	420	1,381	350
3/5/12 12:54	520	1,100	NA	150	1,020	2,790	490
4/2/12 10:35	660	1,400	NA	140	830	3,030	430
5/2/12 10:55	300	600	NA	59	410	1,369	370
6/5/12 8:57	81	140	NA	13	107	341	160
7/2/12 8:55	89	170	NA	20	164	443	170
8/20/12 11:33	780	1,300	NA	170	1,050	3,300	510
9/4/12 10:00	110	190	NA	18	161	479	160
10/1/12 9:00	120	210	NA	19	162	511	190
11/19/12 9:00	100	150	NA	14	127	391	160
12/3/12 9:30	140	220	NA	24	179	563	210
1/2/13 14:00	450	780	NA	100	660	1,990	260
2/4/13 11:00	88	150	NA	15	129	382	150
3/4/13 10:00	290	580	NA	60	600	1,530	210
4/1/13 12:30	260	480	NA	43	460	1,243	220
5/6/13 8:50	45	55	NA	4	40	144	80
7/1/13 7:00	54	87	NA	9	75	225	50
8/5/13 9:45	84	130	NA	12	115	341	130
9/19/13 8:45	920	1,300	NA	190	930	3,340	210
10/10/13 9:45	800	1,100	NA	140	770	2,810	240
11/14/13 8:25	160	230	NA	22	159	571	160
12/18/13 9:30	220	320	NA	32	226	798	200
2/7/14 10:35	69	110	NA	16	80	275	87

TABLE A-2: TOTAL FLUIDS EXTRACTION SYSTEM INFLUENT ANALYTICAL RESULTS
SEMI-ANNUAL PROGRESS REPORT: JULY THROUGH DECEMBER 2015
FORMER CHEVRON FACILITY 122208, 5801 RIGGS ROAD, CHILLUM, MD

Date/Time	Benzene (µg/L)	Toluene (µg/L)	Napthalene (µg/L)	Ethylbenzene (µg/L)	Xylenes (µg/L)	BTEX (µg/L)	MTBE (µg/L)
3/6/14 9:40	16	30	NA	4	29	79	55
4/17/14 10:35	280	460	NA	50	360	1,150	210
5/27/14 9:45	320	460	NA	51	370	1,201	140
6/23/14 11:30	400	750	NA	84	610	1,844	260
7/23/14 10:00	330	540	33	71	470	1,444	160
8/27/14 10:30	730	1,300	61	140	940	3,171	170
9/11/14 9:30	91	140	23	18	141	413	130
10/7/14 12:00	230	360	65	44	340	1,039	160
11/6/14 9:30	54	89	22	10	87	262	97
12/22/14 12:30	70	100	38	14	114	336	100
1/27/15 14:05	490	720	46	99	670	2,025	160
4/8/15 10:45	650	930	58	150	970	2,758	210
5/7/15 11:10	830	1,100	120	220	970	3,240	230
7/27/15 10:40	790	1,100	100	170	1,050	3,210	210
8/4/15 12:40	23	37	23	5	39	127	55
9/1/15 11:00	75	120	21	16	115	347	92
10/12/15 12:10	210	400	26	43	370	1,049	130
11/17/15 10:40	36	75	31	9	84	235	59
12/8/15 9:10	17	31	17	3	36	104	53

Notes:

(1) ND: Not Detected above reporting limit.

(2) <##: Parameter not detected above the reporting limit.

(3) NA: Not Analyzed.

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TABLE A-3: TOTAL FLUIDS EXTRACTION SYSTEM EFFLUENT ANALYTICAL RESULTS
SEMI-ANNUAL PROGRESS REPORT: JULY THROUGH DECEMBER 2015
FORMER CHEVRON FACILITY 122208, 5801 RIGGS ROAD, CHILLUM, MD

Date/Time	Benzene (µg/L)	Toluene (µg/L)	Nathalene (µg/L)	Ethylbenzene (µg/L)	Xylenes (µg/L)	BTEX (µg/L)	MTBE (µg/L)
9/9/09 9:10	<1	<1	NA	<1	<3	0	1.5
9/17/09 15:50	<1	<1	NA	<1	<3	0	6.5
9/21/09 12:24	<1	<1	NA	<1	<3	0	8.9
10/5/09 13:01	<1	<1	NA	<1	<3	0	18
10/12/09 7:20	<1	<1	NA	<1	<3	0	14
10/19/09 12:58	<1	<1	NA	<1	<3	0	36
10/28/09 8:45	<1	<1	NA	<1	<10	0	33
11/2/09 11:55	<1	<1	NA	<1	<10	0	34
11/9/09 8:45	<1	<1	NA	<1	<10	0	36
11/23/09 14:45	<1	<1	NA	<1	<10	0	39
12/4/09 12:51	<1	<1	NA	<1	<10	0	63
12/10/09 12:15	<1	<1	NA	<1	<10	0	66
12/22/09 13:25	<1	<1	NA	<1	<10	0	<1
12/28/09 13:00	<1	<1	NA	<1	<10	0	<1
1/4/10 10:52	<1	<1	NA	<1	<10	0	<1
1/12/10 12:57	<1	<1	NA	<1	<10	0	<1
1/18/10 13:00	<1	<1	NA	<1	<10	0	1.2
1/25/10 10:00	<1	<1	NA	<1	<10	0	2.7
2/2/10 8:00	<1	<1	NA	<1	<10	0	4.9
2/16/10 13:00	<1	<1	NA	<1	<10	0	8.4
2/22/10 12:50	<1	<1	NA	<1	<10	0	9.3
3/1/10 9:14	<1	<1	NA	<1	<10	0	13
3/8/10 11:30	<1	<1	NA	<1	<10	0	12
3/15/10 9:50	<1	<1	NA	<1	<10	0	15
3/22/10 12:06	<1	<1	NA	<1	<10	0	19
4/20/10 14:30	<1	<1	NA	<1	<10	0	9
4/27/10 12:26	<1	<1	NA	<1	<10	0	15
5/3/10 10:33	<1	<1	NA	<1	<10	0	17
5/10/10 12:15	<1	<1	NA	<1	<10	0	19
5/17/10 9:00	<1	<1	NA	<1	<10	0	16
5/24/10 11:30	<1	<1	NA	<1	<10	0	19
6/2/10 14:10	<1	<1	NA	<1	<10	0	17
6/7/10 14:50	<1	<1	NA	<1	<10	0	17
6/14/10 12:00	<1	<1	NA	<1	<10	0	19
7/12/10 11:25	<1	<1	NA	<1	<10	0	20
7/19/10 12:14	<1	<1	NA	<1	<10	0	17
7/26/10 10:00	<1	<1	NA	<1	<10	0	13
8/4/10 14:02	<1	<1	NA	<1	<10	0	<1
8/9/10 14:49	<1	<1	NA	<1	<10	0	<1
8/16/10 9:50	<1	<1	NA	<1	<10	0	<1
8/23/10 8:53	<1	<1	NA	<1	<10	0	<1
9/7/10 15:10	<1	<1	NA	<1	<10	0	<1
9/15/10 13:17	<1	<1	NA	<1	<10	0	<1
9/20/10 8:55	<1	<1	NA	<1	<10	0	<1
9/27/10 15:05	<1	<1	NA	<1	<10	0	<1
10/4/10 13:12	<1	<1	NA	<1	<10	0	<1
10/11/10 13:50	<1	<1	NA	<1	<10	0	<1
10/19/10 13:30	<1	<1	NA	<1	<10	0	1.1
10/25/10 14:00	<1	<1	NA	<1	<10	0	3.4
11/5/10 11:12	<1	<1	NA	<1	<10	0	6.6
11/15/10 10:15	<1	<1	NA	<1	<10	0	7.6
11/29/10 14:27	<1	<1	NA	<1	<10	0	10
11/30/10 17:00	<1	<1	NA	<1	<10	0	8.5
12/6/10 10:25	<1	<1	NA	<1	<10	0	9.5
12/13/10 10:37	<1	<1	NA	<1	<10	0	6.7
12/20/10 10:30	<1	<1	NA	<1	<10	0	11
12/27/10 13:15	<1	<1	NA	<1	<10	0	8
1/3/11 10:45	<1	<1	NA	<1	<10	0	9.7
1/10/11 11:15	<1	<1	NA	<1	<10	0	<1
1/19/11 10:15	<1	<1	NA	<1	<10	0	3.9
1/25/11 12:32	<1	<1	NA	<1	<10	0	9.5
2/2/11 12:12	<1	<1	NA	<1	<10	0	9.7
2/7/11 10:45	<1	<1	NA	<1	<10	0	8.8
2/21/11 9:55	<1	<1	NA	<1	<5	0	12

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TABLE A-3: TOTAL FLUIDS EXTRACTION SYSTEM EFFLUENT ANALYTICAL RESULTS
SEMI-ANNUAL PROGRESS REPORT: JULY THROUGH DECEMBER 2015
FORMER CHEVRON FACILITY 122208, 5801 RIGGS ROAD, CHILLUM, MD

Date/Time	Benzene (µg/L)	Toluene (µg/L)	Nathalene (µg/L)	Ethylbenzene (µg/L)	Xylenes (µg/L)	BTEX (µg/L)	MTBE (µg/L)
2/28/11 9:00	<1	<1	NA	<1	<5	0	12
3/21/11 12:15	<1	<1	NA	<1	<5	0	16
8/19/11 13:42	<1	<1	NA	<1	<10	0	<1
9/6/11 13:50	<1	<1	NA	<1	<10	0	<1
9/19/11 9:11	<1	<1	NA	<1	<10	0	<1
9/30/11 9:30	<1	<1	NA	<1	<10	0	<1
10/3/11 9:03	<1	<1	NA	<1	<10	0	<1
10/10/11 10:57	<1	<1	NA	<1	<10	0	<1
10/17/11 10:45	<1	<1	NA	<1	<10	0	<1
10/24/11 8:51	<1	<1	NA	<1	<10	0	<1
11/7/11 8:03	<1	<1	NA	<1	<10	0	<1
11/14/11 9:07	<1	<1	NA	<1	<10	0	1.4
11/21/11 8:35	<1	<1	NA	<1	<10	0	1.8
11/28/11 7:41	<1	<1	NA	<1	<10	0	3.1
12/5/11 9:05	<1	<1	NA	<1	<10	0	4.3
12/12/11 13:10	<1	<1	NA	<1	<10	0	3.4
12/19/11 12:10	<1	<1	NA	<1	<10	0	2.2
12/27/11 12:33	<1	<1	NA	<1	<10	0	2.7
1/3/12 8:45	<1	<1	NA	<1	<10	0	2.3
1/9/12 8:19	<1	<1	NA	<1	<10	0	4.1
1/16/12 10:13	<1	<1	NA	<1	<10	0	4.6
1/23/12 8:17	<1	<1	NA	<1	<10	0	2.6
2/2/12 13:14	<1	<1	NA	<1	<10	0	5
2/13/12 11:20	<1	<1	NA	<1	<10	0	8.8
2/20/12 9:38	<1	<1	NA	<1	<10	0	7.6
2/27/12 8:10	<1	<1	NA	<1	<10	0	7.5
3/5/12 13:05	<1	<1	NA	<1	<10	0	6.6
3/12/12 8:20	<1	<1	NA	<1	<10	0	5.2
3/19/12 10:15	<1	<1	NA	<1	<10	0	4.5
3/26/12 8:25	<1	<1	NA	<1	<10	0	4.5
4/2/12 10:15	<1	<1	NA	<1	<10	0	3.2
4/9/12 9:40	<1	<1	NA	<1	<10	0	3.5
4/16/12 9:00	<1	<1	NA	<1	<10	0	3.7
4/23/12 9:15	<1	<1	NA	<1	<10	0	2.1
5/2/12/ 1045	<1	<1	NA	<1	<10	0	2.3
5/7/12 10:30	<1	<1	NA	<1	<10	0	2.3
5/14/12 10:58	<1	<1	NA	<1	<10	0	3.2
5/23/12 9:10	<1	<1	NA	<1	<10	0	2.1
6/5/12 9:10	<1	<1	NA	<1	<10	0	2
6/11/12 9:49	<1	<1	NA	<1	<10	0	2.6
6/25/12 13:50	<1	<1	NA	<1	<10	0	3.4
7/2/12 9:10	<1	<1	NA	<1	<10	0	3.8
7/9/12 11:14	<1	<1	NA	<1	<10	0	2
7/16/12 11:15	<1	<1	NA	<1	<10	0	2.3
7/23/12 13:20	<1	<1	NA	<1	<10	0	1.6
8/1/12 10:45	<1	<1	NA	<1	<10	0	1.5
8/6/12 14:40	<1	<1	NA	<1	<10	0	2.9
8/20/12 11:38	<1	<1	NA	<1	<10	0	3.4
8/27/12 8:30	<1	<1	NA	<1	<10	0	2.3
9/4/12 10:15	<1	<1	NA	<1	<10	0	1.3
9/10/12 10:35	<1	<1	NA	<1	<10	0	1.1
9/17/12 10:00	<1	<1	NA	<1	<10	0	<1
9/24/12 10:00	<1	<1	NA	<1	<10	0	<1
10/1/12 9:10	<1	<1	NA	<1	<10	0	<1
10/8/12 10:00	<1	<1	NA	<1	<10	0	<1
10/15/12 13:00	1.4	2.3	NA	<1	<10	3.7	2.8
11/19/12 9:15	<1	<1	NA	<1	<10	0	<1
11/26/12 11:50	<1	<1	NA	<1	<10	0	<1
12/3/12 9:45	<1	<1	NA	<1	<10	0	<1
12/10/12 14:20	<1	<1	NA	<1	<10	0	<1
12/17/12 8:15	<1	<1	NA	<1	<10	0	<1
12/27/12 9:30	<1	<1	NA	<1	<10	0	<1
1/2/13 14:15	<1	<1	NA	<1	<10	0	<1
1/7/13 9:30	<1	<1	NA	<1	<10	0	<1

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TABLE A-3: TOTAL FLUIDS EXTRACTION SYSTEM EFFLUENT ANALYTICAL RESULTS
SEMI-ANNUAL PROGRESS REPORT: JULY THROUGH DECEMBER 2015
FORMER CHEVRON FACILITY 122208, 5801 RIGGS ROAD, CHILLUM, MD

Date/Time	Benzene (µg/L)	Toluene (µg/L)	Nathalene (µg/L)	Ethylbenzene (µg/L)	Xylenes (µg/L)	BTEX (µg/L)	MTBE (µg/L)
1/15/13 13:00	<1	<1	NA	<1	<10	0	<1
1/21/13 12:30	<1	<1	NA	<1	<10	0	<1
2/4/13 11:15	<1	<1	NA	<1	<10	0	<1
2/11/13 12:38	<1	<1	NA	<1	<10	0	<1
2/18/13 11:00	<1	<1	NA	<1	<10	0	<1
2/25/13 12:20	<1	<1	NA	<1	<10	0	<1
3/4/13 10:15	<1	<1	NA	<1	<10	0	<1
3/12/13 9:15	<1	<1	NA	<1	<10	0	<1
3/18/13 12:00	<1	<1	NA	<1	<10	0	<1
3/26/13 11:00	<1	<1	NA	<1	<10	0	<1
4/1/13 12:45	<1	<1	NA	<1	<10	0	<1
4/11/13 14:30	<1	<1	NA	<1	<10	0	<1
4/15/13 11:00	<1	<1	NA	<1	<10	0	<1
4/22/13 11:15	<1	<1	NA	<1	<10	0	<1
5/6/13 9:05	<1	<1	NA	<1	<10	0	<1
5/14/13 10:20	<1	<1	NA	<1	<10	0	<1
5/20/13 9:00	<1	<1	NA	<1	<10	0	<1
5/28/13 14:00	<1	<1	NA	<1	<10	0	<1
7/1/13 8:05	<1	<1	NA	<1	<10	0	<1
7/8/13 11:30	<1	<1	NA	<1	<10	0	<1
7/15/13 7:45	<1	<1	NA	<1	<10	0	<1
7/23/13 11:00	<1	<1	NA	<1	<10	0	<1
7/29/13 7:00	<1	<1	NA	<1	<10	0	<1
8/5/13 9:00	<1	<1	NA	<1	<10	0	<1
8/12/13 12:30	<1	<1	NA	<1	<10	0	<1
8/19/13 7:40	<1	<1	NA	<1	<10	0	<1
9/19/13 9:20	<1	<1	NA	<1	<10	0	<1
9/30/13 8:30	<1	<1	NA	<1	<10	0	1
10/10/13 9:40	<1	<1	NA	<1	<10	0	<1
11/14/13 8:50	<1	<1	NA	<1	<10	0	<1
11/26/13 11:00	<1	<1	NA	<1	<10	0	<1
12/18/13 10:00	<1	<1	NA	<1	<10	0	<1
12/30/14:00	<1	<1	NA	<1	<10	0	<1
1/6/14 9:10	<1	<1	NA	<1	<10	0	<1
2/7/14 10:20	<1	<1	NA	<1	<10	0	<1
2/17/14 9:20	<1	<1	NA	<1	<10	0	<1
3/6/14 9:15	<1	<1	NA	<1	<10	0	<1
3/24/14 8:45	<1	<1	NA	<1	<10	0	1.6
4/17/14 10:50	<1	<1	NA	<1	<10	0	<1
4/28/14 8:30	<1	<1	NA	<1	<10	0	<1
5/15/14 15:30	<1	<1	NA	<1	<10	0	<1
5/27/14 9:15	<1	<1	NA	<1	<10	0	<1
6/12/14 15:00	<1	<1	NA	<1	<10	0	<1
6/23/14 11:00	<1	<1	NA	<1	<10	0	<1
7/11/14 11:10	<1	<1	NA	<1	<10	0	<1
7/23/14 10:15	<1	<1	<1	<1	<10	0	<1
8/13/14 12:00	<1	<1	<1	<1	<10	0	<1
8/27/14 10:45	<1	<1	<1	<1	<10	0	<1
9/11/14 9:45	<1	<1	<1	<1	<10	0	2
9/30/14 11:00	<1	<1	<1	<1	<10	0	1.7
10/7/14 12:15	<1	<1	<1	<1	<10	0	<1
10/21/14 9:40	<1	<1	<1	<1	<10	0	<1
11/6/14 10:00	<1	<1	<1	<1	<10	0	<1

TABLE A-3: TOTAL FLUIDS EXTRACTION SYSTEM EFFLUENT ANALYTICAL RESULTS
SEMI-ANNUAL PROGRESS REPORT: JULY THROUGH DECEMBER 2015
FORMER CHEVRON FACILITY 122208, 5801 RIGGS ROAD, CHILLUM, MD

Date/Time	Benzene (µg/L)	Toluene (µg/L)	Nathalene (µg/L)	Ethylbenzene (µg/L)	Xylenes (µg/L)	BTEX (µg/L)	MTBE (µg/L)
11/25/14 9:40	<1	<1	<1	<1	<10	0	<1
12/12/14 13:00	<1	<1	<1	<1	<10	0	<1
12/22/14 12:45	<1	<1	<1	<1	<10	0	<1
1/7/15 11:20	<1	<1	<1	<1	<10	0	<1
1/27/15 13:35	<1	<1	<1	<1	<10	0	<1
4/8/15 10:30	<1	<1	<1	<1	<10	0	<1
4/28/15 9:50	<1	<1	<1	<1	<10	0	2
5/7/15 10:55	<1	<1	<1	<1	<10	0	1.4
6/9/15 13:00	<1	<1	<1	<1	<10	0	<1
7/8/15 13:00	<1	<1	<1	<1	<10	0	<1
7/27/15 10:40	<1	<1	<1	<1	<10	0	<1
8/4/15 12:40	<1	<1	<1	<1	<10	0	<1
8/28/15 12:30	<1	<1	<1	<1	<10	0	<1
9/1/15 10:45	<1	<1	<1	<1	<10	0	<1
9/30/15 11:00	<1	<1	<1	<1	<10	0	<1
10/12/15 11:55	<1	<1	<1	<1	<10	0	<1
10/20/15 9:00	<1	<1	<1	<1	<10	0	<1
11/5/15 12:00	<1	<1	1.1	<1	<10	0	<1
11/17/15 10:40	<1	<1	<1	<1	<10	0	<1
12/8/15 9:10	<1	<1	<1	<1	<10	0	1.5
12/21/15 9:42	<1	<1	<1	<1	<10	0	1.9

Notes:

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

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TABLE A-4: AIR STRIPPER VAPOR CARBON INFLUENT ANALYTICAL RESULTS
SEMI-ANNUAL PROGRESS REPORT: JULY THROUGH DECEMBER 2015
FORMER CHEVRON FACILITY 122208, 5801 RIGGS ROAD, CHILLUM, MD

Date/Time	Comp ID	Benzene (ppb)	Toluene (ppb)	Ethylbenzene (ppb)	Xylenes (ppb)	TPH-GRO (ppb)	Flow (CFM)	Extraction Rate Benzene (lbs/hr)	Extraction Rate TPH-GRO (lbs/day)
11/21/2011 9:58	SP-50	1300	1500	79	610	4900	165	0.0016	0.1721
12/27/2011 12:48	SP-50	4	4	<4.0	<4.0	<1000	186	-0.0009	-0.0424
2/20/2012 10:10	SP-50	530	640	63	430	1700	181	0.0009	0.0000
3/12/2012 8:35	SP-50	16	37	<4.0	25	<1000	194	-0.0007	-0.0696
4/9/2012 13:45	SP-50	680	770	47	290	4400	184	0.0010	0.1860
5/23/2012 8:50	SP-50	8	50	<4.0	20	<1000	181	-0.0006	-0.0767
6/5/2012 10:30	SP-50	29	100	16	120	1000	181	-0.0007	-0.0472
7/2/2012 10:00	SP-50	620	740	67	400	<1800	280	0.0014	0.0000
9/4/2012 9:00	SP-50	4	8	<4.0	<4.0	<1800	280	-0.0008	0.0000
10/1/2012 10:15	SP-50	580	600	34	270	3600	280	0.0014	0.1643
11/26/2012 12:10	SP-50	57	54	4	25	<1800	280	-0.0009	0.0730
8/5/2013 10:55	SP-50	5	14	2	10	5900	280	-0.0002	0.3742
9/19/2013 9:40	SP-50	1300	1400	110	460	6400	280	0.0047	0.3377
10/10/2013 10:00	SP-50	1400	1300	120	470	7500	280	0.0046	0.2099
11/14/2013 9:30	SP-50	560	770	68	380	2500	280	0.0017	0.1369
12/19/2013 9:10	SP-50	300	330	27	150	2500	280	-0.0001	0.1369
2/27/2014 13:40	SP-50	510	800	52	290	5700	280	0.0015	0.3560
3/6/2014 10:00	SP-50	76	160	21	130	5700	280	-0.0001	0.2921
4/17/2014 10:45	SP-50	780	1100	92	520	4800	280	0.0023	0.2830
5/29/2014 9:00	SP-50	270	400	<68	240	2700	280	-0.0002	0.0183
6/23/2014 12:20	SP-50	16	35	6	35	<1800	280	-0.0010	-0.0274
7/23/2014 14:00	SP-50	940	1300	150	780	4300	280	0.0022	0.1643
8/27/2014 12:00	SP-50	2100	2700	250	1300	-	280	0.0042	-
9/30/2014 12:00	SP-50	41	50	5	33	640	280	-0.0005	-0.0876
10/21/2014 10:00	SP-50	590	630	56	370	4700	280	0.0014	0.2830
11/6/2014 10:05	SP-50	39	67	6	51	750	280	-0.0014	-0.2784
12/22/2014 12:50	SP-50	34	58	13	59	780	280	-0.0006	-0.1114
1/27/2015 14:10	SP-50	850	990	130	690	8400	280	0.0024	0.5477
4/8/2015 13:00	SP-50	22	27	3	20	520	280	-0.0006	-0.0803
5/7/2015 12:10	SP-50	110	130	17	94	1000	280	0.0001	-0.0274
7/31/2015 13:10	SP-50	78	130	15	130	<1400	280	-0.0023	-0.4655
8/28/2015 12:35	SP-50	9	20	<4.0	15	0	280	-0.0030	-0.4929
9/30/2015 12:15	SP-50	10	20	<4.0	14	0	280	-0.0011	-0.1935
10/12/2015 12:15	SP-50	230	350	29	240	0	280	0.0003	0.0274

Notes:

(1) Pursuant to permit compliance verification, flow values were assumed to be maximum possible (280 CFM) for 7/2/2012 data and thereafter. Efforts are currently being made to calculate actual flow data. Reported valves will be updated following calculation of actual flow.

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TABLE A-5: AIR STRIPPER VAPOR CARBON EFFLUENT ANALYTICAL RESULTS
SEMI-ANNUAL PROGRESS REPORT: JULY THROUGH DECEMBER 2015
FORMER CHEVRON FACILITY 122208, 5801 RIGGS ROAD, CHILLUM, MD

Date	Comp ID	Benzene (ppb)	Toluene (ppb)	Ethylbenzene (ppb)	Xylenes (ppb)	TPH-GRO (ppb)	Flow (CFM)	Discharge Rate Benzene (lbs/hr)	Discharge Rate TPH-GRO (lbs/day)
11/21/2011 10:05	SP-52	570	700	57	330	2300	165	0.0013	0.1237
12/27/2011 12:56	SP-52	360	410	26	160	1700	186	0.0009	0.1031
2/20/2012 10:20	SP-52	160	160	12	87	1700	181	0.0004	0.1003
3/12/2012 8:40	SP-52	280	390	38	240	1700	194	0.0007	0.1075
4/9/2012 13:55	SP-52	260	400	43	250	2100	184	0.0006	0.1260
5/23/2012 9:00	SP-52	270	240	17	92	1300	181	0.0007	0.0767
6/5/2012 10:20	SP-52	330	380	35	290	2300	181	0.0008	0.1357
7/2/2012 10:10	SP-52	260	300	34	230	<1800	280	0.0010	0.1643
9/4/2012 9:10	SP-52	220	230	14	77	<1800	280	0.0008	0.1643
10/1/2012 10:40	SP-52	220	310	25	140	<1800	280	0.0008	0.1643
11/26/2012 12:20	SP-52	290	140	10	58	<1800	280	0.0011	0.1643
7/1/2013 9:25	SP-52	130	220	<48	100	<1000	280	0.0005	0.0913
8/5/2013 11:05	SP-52	70	93	5.5	37	<1800	280	0.0003	0.1643
9/19/2013 9:50	SP-52	52	53	<43	<130	2700	280	0.0002	0.2465
10/10/2013 10:10	SP-52	180	150	50	<129	5200	280	0.0007	0.4747
11/14/2013 9:40	SP-52	120	130	11	70	<1000	280	0.0005	0.0913
12/19/2013 9:00	SP-52	330	240	19	110	<1000	280	0.0013	0.0913
2/27/2014 13:50	SP-52	120	160	13	78	<1800	280	0.0005	0.1643
3/6/2014 1:10	SP-52	97	120	14	80	2500	280	0.0004	0.2282
4/17/2014 10:55	SP-52	180	160	23	180	<1700	280	0.0007	0.1552
5/29/2014 9:10	SP-52	320	380	<70	240	2500	280	0.0012	0.2282
6/23/2014 12:20	SP-52	290	360	44	250	2100	280	0.0011	0.1917
7/23/2014 14:14	SP-52	360	380	41	230	2500	280	0.0014	0.2282
8/27/2014 12:10	SP-52	990	1300	210	1200	-	280	0.0038	
9/30/2014 12:10	SP-52	170	140	9.7	52	1600	280	0.0006	0.1460
10/21/2014 10:10	SP-52	210	210	17	110	1600	280	0.0008	0.1460
11/6/2014 10:15	SP-52	400	510	46	300	3800	280	0.0015	0.3469
12/22/2014 13:00	SP-52	180	220	26	160	2000	280	0.0007	0.1826
1/27/2015 14:20	SP-52	220	230	20	110	2400	280	0.0008	0.2191
4/8/2015 13:10	SP-52	180	180	12	77	1400	280	0.0007	0.1278
5/7/2015 12:20	SP-52	77	120	5.9	34	1300	280	0.0003	0.1187
7/31/2015 13:15	SP-52	670	1000	82	540	0	280	0.0025	0.5933
8/28/2015 12:45	SP-52	810	960	99	620	0	280	0.0031	0.5933
9/30/2015 12:20	SP-52	290	420	31	210	0	280	0.0011	0.2465
10/12/2015 12:20	SP-52	150	270	17	140	0	280	0.0006	0.1369
11/17/2015 11:05	SP-52	15	11	<4.0	7.1	0	280	0.0001	0.0529

Notes:

(1) Pursuant to permit compliance verification, flow values were assumed to be maximum possible (280 CFM) for 7/2/2012 data and thereafter. Efforts are currently being made to calculate actual flow data. Reported valves will be updated following calculation of actual flow.

APPENDIX B

DUAL PHASE EXTRACTION SYSTEM-SOIL VAPOR EXTRACTION DATA

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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 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 table includes recent system data. Historical data collected 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 piping and instrumentation Diagram (Appendix H) 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.

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TABLE B-1: SOIL VAPOR EXTRACTION SYSTEM DATA
SEMI-ANNUAL PROGRESS REPORT: JULY THROUGH DECEMBER 2015
FORMER CHEVRON FACILITY 122208, 5801 RIGGS ROAD, CHILLUM, MD

Date/Time	System Status	Hour Meter (Hours)	Manifold Vacuum (in. Hg)	Influent (ppmv)	Influent (SCFM)	Effluent (ppmv)	Treatment Efiiciency	Hydrocarbons Recovered (lbs/day)	Hydrocarbons Recovered Period (gallons)	Hydrocarbons Recovered Cumulative (gallons)	Operating Extraction Points
7/2/12 8:49	ON	40,146.8	12	132	134	66.1	49.9	6.0	6.6	6,084.9	GP-27R MP-7 MW-22 MW-17 PTW-B RW-3 MW-7 RW-5 *FID Readings
7/9/12 9:55	ON	40,315.9	12	149	135	65.6	56.0	6.8	7.0	6,091.9	GP-27R MP-7 MW-22 MW-17 PTW-B RW-3 MW-7 RW-5 *FID Readings
7/9/12 12:51	OFF	40,318.9	-	-	-	-	-	-	0.1	6,092.1	Off for cleaning of totalizer paddle.
7/9/12 14:50	ON	40,318.9	-	-	-	-	-	-	-	6,092.1	GP-27R MP-7 MW-22 MW-17 PTW-B RW-3 MW-7 RW-5 *FID Readings
7/16/12 12:15	OFF	40,484.6	-	-	-	-	-	-	-	6,092.1	Off for cleaning of view tubes
7/16/12 13:19	ON	40,484.6	12	37	131	36.5	1.1	1.6	-	6,092.1	GP-27R MP-7 MW-22 MW-17 PTW-B RW-3 MW-7 RW-5 *FID Readings
7/23/12 12:48	ON	40,652.8	13	75	127	30.0	60.0	3.2	2.7	6,094.7	GP-27R MP-7 MW-22 MW-17 PTW-B RW-3 MW-7 RW-5 *FID Readings
8/1/12 9:09	ON	40,865.1	12	70	127	31.0	55.4	3.0	4.3	6,099.0	GP-27R MP-7 MW-22 MW-17 PTW-B RW-3 MW-7 RW-5 *FID Readings
8/1/12 11:23	OFF	40,867.4	-	-	-	-	-	-	0.0	6,099.1	Off for system cleaning
8/6/12 13:16	ON	40,867.9	13	40	127	30.7	22.9	1.7	-	6,099.1	GP-27R MP-7 MW-22 MW-17 PTW-B RW-3 MW-7 RW-5 *FID Readings
8/6/12 17:10	OFF	40,871.8	-	-	-	-	-	-	0.0	6,099.1	System shut down due to malfunctioning float in AST
8/8/12 9:46	ON	40,871.8	13	-	126	-	-	-	-	6,099.1	GP-27R MP-7 MW-22 MW-17 PTW-B RW-3 MW-7 RW-5 *FID Readings
8/15/12 8:42	OFF	41,038.8	-	-	-	-	-	-	-	6,099.1	Shut down due to leak in carbon vessel
8/20/12 9:21	ON	41,038.8	12	59	127	19.8	66.2	2.5	-	6,099.1	GP-27R MP-7 MW-22 MW-17 PTW-B RW-3 MW-7 RW-5 *FID Readings
8/27/12 9:21	ON	41,206.8	12	64	135	25.8	59.4	2.9	3.0	6,102.1	GP-27R MP-7 MW-22 MW-17 PTW-B RW-3 MW-7 RW-5 *FID Readings
9/4/12 8:35	ON	41,398.1	12	58	131	33.7	41.5	2.6	3.4	6,105.5	GP-27R MP-7 MW-22 MW-17 PTW-B RW-3 MW-7 RW-5 *FID Readings
9/10/12 9:42	ON	41,543.2	13	64	127	34.9	45.6	2.8	2.5	6,108.0	GP-27R MP-7 MW-22 MW-17 PTW-B RW-3 MW-7 RW-5 *FID Readings
9/17/12 9:46	ON	41,711.2	12	131	133	53.6	59.2	5.9	4.7	6,112.7	GP-27R MP-7 MW-22 MW-17 PTW-B RW-3 MW-7 RW-5 *FID Readings
9/24/12 13:13	ON	41,882.7	12	126	132	57.3	54.6	5.6	6.5	6,119.2	GP-27R MP-7 MW-22 MW-17 PTW-B RW-3 MW-7 RW-5 *FID Readings
10/1/12 9:00	ON	42,046.5	12	83	127	34.8	57.9	3.5	4.9	6,124.1	GP-27R MP-7 MW-22 MW-17 PTW-B RW-3 MW-7 RW-5 *FID Readings

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TABLE B-1: SOIL VAPOR EXTRACTION SYSTEM DATA
SEMI-ANNUAL PROGRESS REPORT: JULY THROUGH DECEMBER 2015
FORMER CHEVRON FACILITY 122208, 5801 RIGGS ROAD, CHILLUM, MD

Date/Time	System Status	Hour Meter (Hours)	Manifold Vacuum (in. Hg)	Influent (ppmv)	Influent (SCFM)	Effluent (ppmv)	Treatment Efiiciency	Hydrocarbons Recovered			Operating Extraction Points
								(lbs/day)	Period (gallons)	Cumulative (gallons)	
10/8/12 9:46	ON	42,215.3	12	51	122	22.1	56.8	2.1	3.1	6,127.2	GP-27R MP-7 MW-22 MW-17 PTW-B RW-3 MW-7 RW-5 *FID Readings
10/23/12 9:35	ON	42,575.1	13	80	120	31.6	60.4	3.2	6.3	6,133.5	GP-27R MP-7 MW-22 MW-17 PTW-B RW-3 MW-7 RW-5 *FID Readings
10/23/12 10:20	OFF	42,575.8	-	-	-	-	-	-	0.0	6,133.5	Shut down due to oil/water separator pump leaking, air stripper tray being broken, and carbon being spent
11/9/12 11:45	ON	42,575.8	-	-	-	-	-	-	-	6,133.5	GP-27R MP-7 MW-22 MW-17 PTW-B RW-3 MW-7 RW-5 *FID Readings
11/9/12 12:45	OFF	42,578.5	-	-	-	-	-	-	-	6,133.5	Shut down due to pressure on carbon units and bag filters being too high
11/12/12 10:41	ON	42,578.5	13	37	125	8.1	78.3	1.6	-	6,133.5	GP-27R MP-7 MW-22 MW-17 PTW-B RW-3 MW-7 *FID Readings
11/19/12 9:08	ON	42,745.0	13	27	124	6.9	74.7	1.1	1.5	6,134.9	GP-27R MP-7 MW-22 MW-17 PTW-B RW-3 MW-7 RW-5 *FID Readings
11/26/12 0:00	ON	42,915.6	12	55	135	11.0	80.0	2.5	1.9	6,136.8	GP-27R MP-7 MW-22 MW-17 PTW-B RW-3 MW-7 RW-5 *FID Readings
12/3/12 10:17	ON	43,082.1	12	70	128	14.6	79.2	3.0	3.2	6,140.0	GP-27R MP-7 MW-22 MW-17 PTW-B RW-3 MW-7 RW-5 *FID Readings
12/4/12 12:00	ON	43,107.9	12	125	160	25.6	79.6	6.8	0.8	6,140.8	GP-27R MP-7 MW-22 MW-17 PTW-B RW-3 MW-7 RW-5 *FID Readings
12/10/12 9:53	ON	43,249.7	12	153	168	43.8	71.4	8.7	7.1	6,148.0	GP-27R MP-7 MW-22 MW-17 PTW-B RW-3 MW-7 RW-5 *FID Readings
12/17/12 8:53	ON	43,416.7	12	91	167	5.0	94.5	5.1	7.5	6,155.5	GP-27R MP-7 MW-22 MW-17 PTW-B RW-3 MW-7 RW-5 *FID Readings
12/27/12 9:29	ON	43,657.3	12	153	166	28.4	81.4	8.6	10.8	6,166.2	GP-27R MP-7 MW-22 MW-17 PTW-B RW-3 MW-7 RW-5 *FID Readings
12/30/12 1:00	OFF	43,720.9	-	-	-	-	-	-	3.5	6,169.8	Off due to compressor low
1/2/13 12:30	ON	43,720.9	12	131	176	31.5	75.9	7.8	-	6,169.8	GP-27R MP-7 MW-22 MW-17 PTW-B RW-3 MW-7 RW-5 *FID Readings
1/2/13 19:50	OFF	43,725.2	-	-	-	-	-	-	0.4	6,170.2	Off due to unknown reason
1/7/13 11:26	ON	43,725.2	12	92	177	33.8	63.4	5.5	-	6,170.2	GP-27R MP-7 MW-22 MW-17 PTW-B RW-3 MW-7 RW-5 *FID Readings
1/11/13 12:26	OFF	43,846.2	-	-	-	-	-	-	3.5	6,173.7	Off due to SVE knockout tank leaking and triggering sump alarm
1/15/13 11:44	ON	43,846.2	12	62	177	18.5	70.0	3.7	-	6,173.7	GP-27R MP-7 MW-22 MW-17 PTW-B RW-3 MW-7 RW-5 *FID Readings

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TABLE B-1: SOIL VAPOR EXTRACTION SYSTEM DATA
SEMI-ANNUAL PROGRESS REPORT: JULY THROUGH DECEMBER 2015
FORMER CHEVRON FACILITY 122208, 5801 RIGGS ROAD, CHILLUM, MD

Date/Time	System Status	Hour Meter (Hours)	Manifold Vacuum (in. Hg)	Influent (ppmv)	Influent (SCFM)	Effluent (ppmv)	Treatment Efiiciency	Hydrocarbons Recovered			Operating Extraction Points
								(lbs/day)	Period (gallons)	Cumulative (gallons)	
1/16/13 16:30	OFF	43,875.7	-	-	-	-	-	-	0.7	6,174.4	Off due to high sump alarm.
1/21/13 10:00	ON	43,875.7	12	53	174	15.5	70.6	3.1	-	6,174.4	GP-27R MP-7 MW-22 MW-17 PTW-B RW-3 MW-7 RW-5 *FID Readings
1/28/13 12:15	ON	44,046.3	12	259	172	536.7	-107.5	15.1	10.1	6,184.5	GP-27R MP-7 MW-22 MW-17 PTW-B RW-3 MW-7 RW-5 *Effluent concentrations affected by weather conditions/humidity
2/4/13 12:00	ON	44,214.1	12	86	170	34.1	60.5	5.0	10.9	6,195.4	GP-27R MP-7 MW-22 MW-17 PTW-B RW-3 MW-7 RW-5 *FID Readings
2/11/13 10:30	ON	44,380.6	12	85	170	36.3	57.0	4.9	5.3	6,200.8	GP-27R MP-7 MW-22 MW-17 PTW-B RW-3 MW-7 RW-5 *FID Readings
2/18/13 11:20	ON	44,549.7	14	232	95	63.1	72.8	7.5	7.8	6,208.6	MW-22R RW-5 RW-1 MP-7 GP-39R GP-27R MW-17 MW-7 *FID Readings
2/25/13 9:30	ON	44,715.7	14	298	106	130.6	56.1	10.6	9.8	6,218.4	MW-22R RW-5 RW-1 MP-7 GP-39R GP-27R MW-17 MW-7 *FID Readings
3/4/13 9:48	ON	44,885.4	14	259	101	88.7	65.7	8.8	10.7	6,229.0	MW-22R RW-5 RW-1 MP-7 GP-39R GP-27R MW-17 MW-7 *FID Readings
3/12/13 8:24	ON	45,075.0	14	276	95	84.9	69.3	8.8	11.0	6,240.0	MW-22R RW-5 RW-1 MP-7 GP-39R GP-27R MW-17 MW-7 *FID Readings
3/18/13 12:13	ON	45,222.9	14	116	99	52.1	55.2	3.9	6.2	6,246.2	MW-22R RW-1 MP-7 GP-39R GP-27R MW-17 MW-7 *FID Readings
3/26/13 10:20	ON	45,412.9	13	167	102	68.7	58.8	5.7	6.0	6,252.2	MW-22R RW-1 MP-7 GP-39R GP-27R MW-17 MW-7 *FID Readings
4/1/13 13:30	ON	45,560.2	14	92	100	30.2	67.2	3.1	4.3	6,256.4	MW-22R RW-1 MP-7 GP-39R GP-27R MW-17 MW-7 *FID Readings
4/8/13 10:19	ON	45,725.0	14	181	98	75.1	58.5	6.0	4.9	6,261.4	MW-22R RW-1 MP-7 GP-39R GP-27R MW-17 MW-7 *FID Readings
4/15/13 10:00	ON	45,891.8	13	170	101	66.4	60.9	5.8	6.5	6,267.8	MW-22R RW-1 MP-7 GP-39R GP-27R MW-17 MW-7 *FID Readings
4/22/13 9:05	ON	46,059.8	14	134	99	44.5	66.8	4.5	5.6	6,273.4	MW-22R RW-1 MP-7 GP-39R GP-27R MW-17 MW-7 *FID Readings
4/30/13 13:23	ON	46,256.1	14	140	100	41.6	70.3	4.7	5.9	6,279.3	MW-22R RW-1 MP-7 GP-39R GP-27R MW-17 MW-7 *FID Readings
5/6/13 9:37	ON	46,369.3	14	136	99	63.6	53.2	4.5	4.2	6,283.6	MW-22R RW-1 MP-7 GP-39R GP-27R MW-17 MW-7 *FID Readings
5/14/13 9:59	ON	46,588.6	14	155	98	59.2	61.9	5.1	6.1	6,289.7	MW-22R RW-1 MP-7 GP-39R GP-27R MW-17 MW-7 *FID Readings
5/20/13 9:00	ON	46,731.4	14	195	95	74.3	62.0	6.3	5.3	6,295.0	MW-22R RW-1 MP-7 GP-39R GP-27R MW-17 MW-7 *FID Readings

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TABLE B-1: SOIL VAPOR EXTRACTION SYSTEM DATA
SEMI-ANNUAL PROGRESS REPORT: JULY THROUGH DECEMBER 2015
FORMER CHEVRON FACILITY 122208, 5801 RIGGS ROAD, CHILLUM, MD

Date/Time	System Status	Hour Meter (Hours)	Manifold Vacuum (in. Hg)	Influent (ppmv)	Influent (SCFM)	Effluent (ppmv)	Treatment Efiiciency	Hydrocarbons Recovered (lbs/day)	Hydrocarbons Recovered Period (gallons)	Hydrocarbons Recovered Cumulative (gallons)	Operating Extraction Points
5/27/13 12:30	OFF	46,902.9	-	-	-	-	-	-	7.1	6,302.1	Shut down due to high water level inside knockout tank
5/28/13 12:00	ON	46,902.9	14	71	104	20.1	71.8	2.5	-	6,302.1	MW-22R RW-1 MP-7 GP-39R GP-27R MW-17 MW-7 *FID Readings
5/29/13 15:30	OFF	46,930.4	-	-	-	-	-	-	0.4	6,302.5	Shut down due to high water level inside knockout tank
6/3/13 9:00	OFF	46,930.4	-	-	-	-	-	-	-	6,302.5	Shut down due to high water level inside knockout tank
7/1/13 9:15	ON	46781.60	14	143.40	130.24	38.30	73.29	6.32	22.50	6325.02	RW1 RW2 RW3 RW-4 MW-22 PTWB GP-27R GP-39R MW-7
7/7/13 20:30	OFF	0.00	-	-	-	-	-	-	-	6325.02	
7/8/13 7:00	OFF	0.00	-	-	-	-	-	-	-	6325.02	
7/8/13 11:30	ON	46918.50	7	125.00	226.84	0.00	100.00	9.59	9.00	6334.02	RW1 RW2 RW3 RW-4 MW-22 PTWB GP-27R GP-39R MW-7
7/15/13 0:00	ON	47084.40	6	8.70	223.40	0.80	90.80	0.66	5.20	6339.21	RW1 RW2 RW3 RW-4 MW-22 PTWB GP-27R GP-39R MW-7
7/20/13 15:00	OFF	0.00	-	-	-	-	-	-	-	6339.21	
7/22/13 7:00	OFF	0.00	-	-	-	-	-	-	-	6339.21	
7/23/13 6:30	OFF	47215.00	13	-	131.75	-	-	-	0.68	6339.89	Down due to blown fuse in the control panel and bad battery backup
7/23/13 9:50	ON	47215.00	-	-	-	-	-	-	-	6339.89	RW1 RW2 RW3 RW-4 MW-22 PTWB GP-27R GP-39R MW-7
7/29/13 7:00	ON	47359.00	13	30.90	124.64	11.70	62.14	1.30	1.26	6341.15	RW1 RW2 RW-4 MW-22 PTWB GP-27R GP-39R MW-7
8/3/13 3:00	OFF	0.00	-	-	-	-	-	-	-	6341.15	
8/5/13 7:00	OFF	47472.90	13	14.50	138.52	7.10	51.03	0.68	1.11	6342.26	
8/5/13 9:30	ON	47472.90	-	-	-	-	-	-	-	6342.26	RW1 RW2 RW-4 MW-22 GP-27R GP-39R MW-7
8/12/13 8:45	ON	47642.90	13	-	134.56	-	-	-	0.74	6343.00	RW1 RW2 RW3 RW-4 MW-22 PTWB GP-27R GP-39R MW-7
8/19/13 7:00	ON	47808.20	8	9.10	148.02	0.00	100.00	0.46	0.47	6343.47	RW1 RW2 RW3 RW-4 MW-22 PTWB GP-27R GP-39R MW-7
8/26/13 7:00	ON	47976.10	8	19.90	148.96	9.90	50.25	1.00	0.80	6344.27	RW1 RW2 RW3 RW-4 MW-22 PTWB GP-27R GP-39R MW-7
9/1/13 13:04	OFF	48125.70	-	-	-	-	-	-	-	6344.27	
9/4/13 10:30	OFF	48125.70	11	-	141.46	-	-	-	1.40	6345.67	Down due to compressor fault from low oil
9/4/13 12:00	ON	48125.70	11	-	141.46	-	-	-	-	6345.67	RW1 RW2 RW3 RW-4 MW 17 MW-22 PTWB GP-27R GP-39R MW-7
9/6/13 13:00	ON	48175.30	10	-	143.38	-	-	-	-	6345.67	RW1 RW2 RW3 RW-4 MW 17 MW-22 PTWB GP-27R GP-39R MW-7
9/10/13 13:59	OFF	48289.50	-	-	-	-	-	-	-	6345.67	
9/13/13 7:00	OFF	48289.50	-	-	-	-	-	-	-	6345.67	

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TABLE B-1: SOIL VAPOR EXTRACTION SYSTEM DATA
SEMI-ANNUAL PROGRESS REPORT: JULY THROUGH DECEMBER 2015
FORMER CHEVRON FACILITY 122208, 5801 RIGGS ROAD, CHILLUM, MD

Date/Time	System Status	Hour Meter (Hours)	Manifold Vacuum (in. Hg)	Influent (ppmv)	Influent (SCFM)	Effluent (ppmv)	Treatment Efiiciency	Hydrocarbons Recovered (lbs/day)	Hydrocarbons Recovered Period (gallons)	Hydrocarbons Recovered Cumulative (gallons)	Operating Extraction Points
9/13/13 12:45	ON	48289.50	-	-	-	-	-	-	-	6345.67	RW1 RW2 RW3 RW-4 MW 17 MW-22 PTWB GP-27R GP-39R MW-7
9/15/13 12:00	OFF	48294.80	-	-	-	-	-	-	-	6345.67	Down due to trailer sump high level
9/17/13 9:00	OFF	48294.80	-	-	0.00	-	-	-	-	6345.67	Down due to pipe repair
9/19/13 8:00	OFF	48294.80	12	-	128.73	-	-	-	-	6345.67	Down due to pipe repair
9/19/13 8:30	ON	48294.80	-	-	-	-	-	-	-	6345.67	RW1 RW2 RW3 RW-4 MW 17 MW-22 PTWB GP-27R GP-39R MW-7
9/19/13 16:30	OFF	48302.00	-	-	-	-	-	-	-	6345.67	Down due to pipe repair
9/30/13 7:00	OFF	48302.00	-	-	-	-	-	-	-	6345.67	Down due to pipe repair
10/10/13 7:00	OFF	48302.00	-	-	-	-	-	-	-	6345.67	Down due to pipe repair
10/10/13 8:00	ON	48302.00	12	48.30	129.20	11.10	77.02	2.11	6.93	6352.59	RW1 RW2 RW3 RW-4 MW 17 MW-22 PTWB GP-27R GP-39R MW-7
10/11/13 2:27	OFF	48320.10	-	-	-	-	-	-	-	6352.59	
11/7/13 7:00	OFF	48320.10	12	-	131.81	-	-	-	9.33	6361.92	Down due to compressor fault from low oil
11/7/13 13:25	ON	48320.10	-	-	-	-	-	-	-	6361.92	RW1 RW2 RW3 RW-4 MW 17 MW-22 PTWB GP-27R GP-39R MW-7
11/13/13 8:00	ON	48458.70	-	-	-	-	-	-	-	6361.92	RW1 RW2 RW3 RW-4 MW 17 MW-22 PTWB GP-27R GP-39R MW-7
11/14/13 8:40	ON	48481.30	12	-	127.43	-	-	-	-	6361.92	RW1 RW2 RW3 RW-4 MW17 MW-22 PTWB GP-27R GP-39R MW-7
11/21/13 8:30	ON	48649.20	13	10.70	124.64	3.50	67.29	0.45	0.50	6362.42	RW1 RW2 RW3 RW-4 MW17 MW-22 PTWB GP-27R GP-39R MW-7
11/26/13 9:40	ON	48792.60	-	-	-	-	-	-	-	6362.42	RW1 RW2 RW3 RW-4 MW17 MW-22 PTWB GP-27R GP-39R MW-7
12/2/13 9:34	OFF	-	-	-	-	-	-	-	-	6362.42	Down due to engagement of exterior emergency stop button
12/16/13 12:00	ON	-	-	-	-	-	-	-	-	6362.42	RW1 RW2 RW3 RW-4 MW17 MW-22 PTWB GP-27R GP-39R MW-7
12/18/13 8:57	ON	48839.90	12	22.10	128.32	9.00	59.28	0.96	2.97	6365.39	RW1 RW2 RW3 RW-4 MW17 MW-22 PTWB GP-27R GP-39R MW-7
12/30/13 13:13	ON	49132.20	12	-	127.87	-	-	-	-	6365.39	RW1 RW2 RW3 RW-4 MW17 MW-22 PTWB GP-27R GP-39R MW-7
1/2/14 9:34	OFF	-	-	-	-	-	-	-	-	6365.39	Down due to enaggement of exterior emergency stop button
1/6/14 8:30	OFF	49200.50	12	-	167.23	-	-	-	-	6365.39	Down due to enaggement of exterior emergency stop button
1/6/14 10:00	ON	49200.50	-	-	-	-	-	-	-	6365.39	RW1 RW2 RW3 RW-4 MW17 MW-22 PTWB GP-27R GP-39R MW-7
1/14/14 12:30	ON	49,396.7	12	-	137.29	-	-	-	-	6,365.4	RW1 RW2 RW3 RW-4 MW17 MW-22 PTWB GP-27R GP-39R MW-7
1/17/14 17:20	OFF	49,474.3	-	-	-	-	-	-	-	6,365.4	Down due to high level in building sump due to leaking ball valve and check valve. Valves froze due to unusually low temperatures.

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TABLE B-1: SOIL VAPOR EXTRACTION SYSTEM DATA
SEMI-ANNUAL PROGRESS REPORT: JULY THROUGH DECEMBER 2015
FORMER CHEVRON FACILITY 122208, 5801 RIGGS ROAD, CHILLUM, MD

Date/Time	System Status	Hour Meter (Hours)	Manifold Vacuum (in. Hg)	Influent (ppmv)	Influent (SCFM)	Effluent (ppmv)	Treatment Efiiciency	Hydrocarbons Recovered (lbs/day)	Hydrocarbons Recovered Period (gallons)	Hydrocarbons Recovered Cumulative (gallons)	Operating Extraction Points
2/7/14 7:00	OFF	49,474.3	-	-	-	-	-	-	-	6,365.4	Down due to high level in building sump due to leaking ball valve and check valve. Valves froze due to unusually low temperatures.
2/17/14 9:00	OFF	-	-	-	-	-	-	-	-	6,365.4	Down due to crack found in KO tank pump on 2/7/2014.
2/27/14 7:30	OFF	49,567.4	12	-	135.18	-	-	-	-	6,365.4	Down due to crack found in KO tank pump on 2/7/2014.
2/27/14 11:50	ON	49,567.4	-	-	-	-	-	-	-	6,365.4	MW-7, RW-1, RW-2, RW-3, RW-4, MW-17, MW-22R, GP-39R, GP-27R, PTW-B
3/6/14 9:17	ON	49,731.0	12	-	133.91	-	-	-	-	6,365.4	MW-7, RW-1, RW-2, RW-3, RW-4, MW-17, MW-22R, GP-39R, GP-27R, PTW-B
3/24/14 8:35	ON	50,112.4	12	91	128.29	24.7	72.8	3.9	36.8	6,402.2	MW-7, RW-1, RW-2, RW-3, RW-4, MW-17, MW-22R, GP-39R, GP-27R, PTW-B
4/8/14 17:00	OFF	50,481.1	-	-	-	-	-	-	-	6,402.2	Down to await carbon replacement. Carbon replaced on 4/11/2014, systems restarted.
4/11/14 10:45	ON	50,481.1	-	-	-	-	-	-	-	6,402.2	MW-7, RW-1, RW-2, RW-3, RW-4, MW-17, MW-22R, GP-39R, GP-27R, PTW-B
4/17/14 10:51	ON	50,589.6	12	-	126.50	-	-	-	-	6,402.2	MW-7, RW-1, RW-2, RW-3, RW-4, MW-17, MW-22R, GP-39R, GP-27R, PTW-B
4/22/14 17:00	OFF	50,623.8	-	-	-	-	-	-	-	6,402.2	Down due to blower over amperage.
4/24/14 13:00	ON	50,623.8	12	-	139.72	-	-	-	-	6,402.2	MW-7, RW-1, RW-2, RW-3, RW-4, MW-17, MW-22R, GP-39R, GP-27R, PTW-B
4/24/14 17:00	OFF	50,629.0	-	-	-	-	-	-	-	6,402.2	Down due to over voltage on blower VFD.
4/28/14 8:00	ON	50,629.0	12	-	153.12	-	-	-	-	6,402.2	MW-7, RW-1, RW-2, RW-3, RW-4, MW-17, MW-22R, GP-39R, GP-27R, PTW-B
4/28/14 20:00	OFF	50,638.1	-	-	-	-	-	-	-	6,402.2	Down due to over voltage on blower VFD.
4/29/14 12:00	ON	50,638.1	-	-	-	-	-	-	-	6,402.2	MW-7, RW-1, RW-2, RW-3, RW-4, MW-17, MW-22R, GP-39R, GP-27R, PTW-B
4/30/14 17:45	OFF	50,667.8	-	-	-	-	-	-	-	6,402.2	Down due to over voltage on blower VFD.
5/4/14 17:16	OFF	50,667.8	-	-	-	-	-	-	-	6,402.2	Down due to over voltage on blower VFD.
5/15/14 15:00	ON	50,667.8	-	-	-	-	-	-	-	6,402.2	MW-7, RW-1, RW-2, RW-3, RW-4, MW-17, MW-22R, GP-39R, GP-27R, PTW-B
5/15/14 17:05	OFF	50,669.8	-	-	-	-	-	-	-	6,402.2	Down due to over voltage on blower VFD.
5/16/14 9:30	ON	50,669.8	-	-	-	-	-	-	-	6,402.2	MW-7, RW-1, RW-2, RW-3, RW-4, MW-17, MW-22R, GP-39R, GP-27R, PTW-B
5/17/14 18:48	OFF	50,703.9	-	-	-	-	-	-	-	6,402.2	Down due to over voltage on blower VFD.
5/23/14 10:00	ON	50,703.9	-	-	-	-	-	-	-	6,402.2	MW-7, RW-1, RW-2, RW-3, RW-4, MW-17, MW-22R, GP-39R, GP-27R, PTW-B
5/23/14 14:53	OFF	50,707.0	-	-	-	-	-	-	-	6,402.2	Down due to over voltage on blower VFD.
5/27/14 10:00	ON	50,707.0	-	-	-	-	-	-	-	6,402.2	MW-7, RW-1, RW-2, RW-3, RW-4, MW-17, MW-22R, GP-39R, GP-27R, PTW-B
5/28/14 14:53	OFF	50,735.6	-	-	-	-	-	-	-	6,402.2	Down due to over voltage on blower VFD.
5/29/14 9:15	ON	50,735.6	-	-	-	-	-	-	-	6,402.2	MW-7, RW-1, RW-2, RW-3, RW-4, MW-17, MW-22R, GP-39R, GP-27R, PTW-B
5/30/14 20:39	OFF	50,774.3	-	-	-	-	-	-	-	6,402.2	Down due to over voltage on blower VFD.

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FORMER CHEVRON FACILITY 122208, 5801 RIGGS ROAD, CHILLUM, MD

Date/Time	System Status	Hour Meter (Hours)	Manifold Vacuum (in. Hg)	Influent (ppmv)	Influent (SCFM)	Effluent (ppmv)	Treatment Efiiciency	Hydrocarbons Recovered (lbs/day)	Hydrocarbons Recovered Period (gallons)	Hydrocarbons Recovered Cumulative (gallons)	Operating Extraction Points
6/6/14 14:04	OFF	50,774.3	-	-	-	-	-	-	-	6,402.2	Down due to over voltage on blower VFD.
6/18/14 14:00	ON	50,774.3	12	-	132.72	-	-	-	-	6,402.2	MW-7, RW-1, RW-2, RW-3, RW-4, RW-5, MW-17, MW-22R, GP-39R, GP-27R, PTW-B
6/23/14 12:25	ON	50,891.9	12	-	137.89	-	-	-	-	6,402.2	MW-7, RW-1, RW-2, RW-3, RW-4, RW-5, MW-17, MW-22R, GP-39R, GP-27R, PTW-B
6/24/14 14:00	ON	-	-	-	-	-	-	-	-	6,402.2	MW-7, RW-1, RW-2, RW-3, RW-4, RW-5, MW-17, MW-22R, GP-39R, GP-27R, PTW-B
6/25/14 15:12	OFF	-	-	-	-	-	-	-	-	6,402.2	Down due to malfunctioning Knockout Tank pump.
7/17/14 13:00	ON	50,931.8	12.0	17	161.57	6.4	62.4	0.9	47.6	6,449.7	MW-7, RW-1, RW-2, RW-3, RW-4, RW-5, MW-17, MW-22R, GP-39R, GP-27R, PTW-B
7/18/14 21:00	OFF	50,939.5	-	-	-	-	-	-	-	6,449.7	Unknown shutdown of CatOx
7/21/14 12:00	ON	50,939.5	12.0	-	148.77	-	-	-	-	6,449.7	MW-7, RW-1, RW-2, RW-3, RW-4, RW-5, MW-17, MW-22R, GP-39R, GP-27R, PTW-B
7/21/14 22:34	OFF	50,950.2	-	-	-	-	-	-	-	6,449.7	Air Stripper high high alarm
7/23/14 10:00	ON	50,950.2	12.0	-	152.16	-	-	-	-	6,449.7	MW-7, RW-1, RW-2, RW-3, RW-4, RW-5, MW-17, MW-22R, GP-39R, GP-27R, PTW-B
8/8/14 0:50	OFF	51,325.7	-	-	-	-	-	-	-	6,449.7	Emergency stop button pushed
8/12/14 13:30	ON	51,325.7	12.0	-	146.46	-	-	-	-	6,449.7	MW-7, RW-1, RW-2, RW-3, RW-4, RW-5, MW-17, MW-22R, GP-39R, GP-27R, PTW-B
8/14/14 2:30	OFF	51,362.3	-	-	-	-	-	-	-	6,449.7	System shut down due to water intrailer sump
8/18/14 10:45	OFF	51,362.3	-	-	-	-	-	-	-	6,449.7	Shutdown due to faulty OWS pump
8/27/14 13:00	ON	51,362.3	12.5	-	152.59	-	-	-	-	6,449.7	MW-7, RW-1, RW-2, RW-3, RW-4, RW-5, MW-17, MW-22R, GP-39R, GP-27R, PTW-B
9/9/14 8:30	ON	51,870.6	12.0	13	158.73	5.1	60.8	0.7	6.8	6,456.6	MW-7, RW-1, RW-2, RW-3, RW-4, RW-5, MW-17, MW-22R, GP-39R, GP-27R, PTW-B
9/22/14 2:13	OFF	52,176.8	-	-	-	-	-	-	-	6,456.6	Air line leak drained air compressor
9/23/14 14:00	ON	52,176.8	12.0	-	156.94	-	-	-	-	6,456.6	MW-7, RW-1, RW-2, RW-3, RW-4, RW-5, MW-17, MW-22R, GP-39R, GP-27R, PTW-B
9/24/14 16:20	OFF	52,203.1	-	-	-	-	-	-	-	6,456.6	Manually shut down to await LPGAC changeout
9/30/14 12:00	OFF	52,203.1	-	-	-	-	-	-	-	6,456.6	Manually shut down to await LPGAC changeout
10/7/14 10:45	ON	52,203.1	12.0	-	148.77	-	-	-	-	6,456.6	MW-7, RW-1, RW-2, RW-3, RW-4, RW-5, MW-17, MW-22R, GP-39R, GP-27R, PTW-B
10/21/14 9:35	ON	52,541.3	11.0	37	126.22	11.0	70.3	1.6	7.9	6,464.5	MW-7, RW-1, RW-2, RW-3, RW-4, RW-5, MW-17, MW-22R, GP-39R, GP-27R, PTW-B
10/25/14 9:04	OFF	52,601.2	-	-	-	-	-	-	-	6,464.5	OWS transfer pump shaft coupler sheared
10/31/14 10:45	ON	52,601.2	12.0	-	139.31	-	-	-	-	6,464.5	MW-7, RW-1, RW-2, RW-3, RW-4, RW-5, MW-17, MW-22R, GP-39R, GP-27R, PTW-B
11/6/14 9:15	ON	52,744.7	12.0	31	126.50	16.0	48.4	1.3	3.6	6,468.2	MW-7, RW-1, RW-2, RW-3, RW-4, RW-5, MW-17, MW-22R, GP-39R, GP-27R, PTW-B
11/21/14 13:48	OFF	53,109.6	-	-	-	-	-	-	-	6,468.2	Low air compressor oil

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FORMER CHEVRON FACILITY 122208, 5801 RIGGS ROAD, CHILLUM, MD

Date/Time	System Status	Hour Meter (Hours)	Manifold Vacuum (in. Hg)	Influent (ppmv)	Influent (SCFM)	Effluent (ppmv)	Treatment Efiiciency	Hydrocarbons Recovered			Operating Extraction Points
								(lbs/day)	Period (gallons)	Cumulative (gallons)	
11/25/14 8:45	ON	53,109.6	12.0	-	128.29	-	-	-	-	6,468.2	MW-7, RW-1, RW-2, RW-3, RW-4, RW-5, MW-17, MW-22R, GP-39R, GP-27R, PTW-B
12/9/14 9:35	OFF	53,350.8	-	-	-	-	-	-	-	6,468.2	
12/12/14 12:15	ON	53,350.8	11.0	-	147.25	-	-	-	-	6,468.2	MW-7, RW-1, RW-2, RW-3, RW-4, RW-5, MW-17, MW-22R, GP-39R, GP-27R, PTW-B
12/16/14 11:30	OFF	53,356.4	-	-	-	-	-	-	-	6,468.2	
12/22/14 10:30	ON	53,356.4	12.0	18	135.18	4.1	77.2	0.8	7.8	6,476.0	MW-7, RW-1, RW-2, RW-3, RW-4, RW-5, MW-17, MW-22R, GP-39R, GP-27R, PTW-B
12/30/14 4:56	OFF	53,365.4	-	-	-	-	-	-	-	6,476.0	Shutdown caused by OWS high high alarm possibly due to power outage
1/7/15 4:56	ON	53,365.4	-	-	-	-	-	-	-	6,476.0	MW-7, RW-1, RW-2, RW-3, RW-4, RW-5, MW-17, MW-22R, GP-39R, GP-27R, PTW-B
1/7/15 12:15	OFF	53,365.4	-	-	-	-	-	-	-	6,476.0	Oil water separator pump failure
1/19/15 10:45	ON	53,365.4	11.0	-	137.60	-	-	-	-	6,476.0	MW-7, RW-1, RW-2, RW-3, RW-4, RW-5, MW-17, MW-22R, GP-39R, GP-27R, PTW-B
1/22/15 6:50	OFF	53,434.6	-	-	-	-	-	-	-	6,476.0	Compressor motor failure
1/27/15 13:25	ON	53,434.6	11.0	13	143.15	4.1	68.5	0.6	4.1	6,480.1	MW-7, RW-1, RW-2, RW-3, RW-4, RW-5, MW-17, MW-22R, GP-39R, GP-27R, PTW-B
1/31/15 12:23	OFF	53,529.0	-	-	-	-	-	-	-	6,480.1	Air compressor low oil
3/17/15 14:30	OFF	53,529.0	-	-	-	-	-	-	-	6,480.1	Broken pipe in enclosure
3/20/15 13:10	ON	53,597.9	-	-	-	-	-	-	-	6,480.1	MW-7, RW-1, RW-2, RW-3, RW-4, RW-5, MW-17, MW-22R, GP-39R, GP-27R, PTW-B
3/31/15 12:00	OFF	53,607.9	-	-	-	-	-	-	-	6,480.1	Broken bag filter repair
4/3/15 12:30	ON	53,607.9	13.0	-	137.32	-	-	-	-	6,480.1	MW-7, RW-1, RW-2, RW-3, RW-4, RW-5, MW-17, MW-22R, GP-39R, GP-27R, PTW-B
4/6/15 10:43	OFF	53,678.2	-	-	-	-	-	-	-	6,480.1	Air compressor low oil, breather filter release dropped oil level below set point
4/8/15 10:00	ON	53,678.2	12.0	2	143.36	1.6	27.3	0.1	4.1	6,484.2	MW-7, RW-1, RW-2, RW-3, RW-4, RW-5, MW-17, MW-22R, GP-39R, GP-27R, PTW-B
4/9/15 12:00	OFF	53,704.7	-	-	-	-	-	-	-	6,484.2	Air compressor low oil
4/13/15 10:42	ON	53,704.7	-	-	-	-	-	-	-	6,484.2	MW-7, RW-1, RW-2, RW-3, RW-4, RW-5, MW-17, MW-22R, GP-39R, GP-27R, PTW-B
4/25/15 2:41	OFF	53,984.4	-	-	-	-	-	-	-	6,484.2	Air compressor low oil
4/28/15 10:00	ON	53,984.4	12.0	-	142.57	-	-	-	-	6,484.2	MW-7, RW-1, RW-2, RW-3, RW-4, RW-5, MW-17, MW-22R, GP-39R, GP-27R, PTW-B
5/2/15 12:00	OFF	54,063.3	-	-	-	-	-	-	-	6,484.2	Power outage at system enclosure
5/7/15 10:00	ON	54,063.3	-	4	-	-	-	-	-	6,484.2	MW-7, RW-1, RW-2, RW-3, RW-4, RW-5, MW-17, MW-22R, GP-39R, GP-27R, PTW-B

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TABLE B-1: SOIL VAPOR EXTRACTION SYSTEM DATA
SEMI-ANNUAL PROGRESS REPORT: JULY THROUGH DECEMBER 2015
FORMER CHEVRON FACILITY 122208, 5801 RIGGS ROAD, CHILLUM, MD

Date/Time	System Status	Hour Meter (Hours)	Manifold Vacuum (in. Hg)	Influent (ppmv)	Influent (SCFM)	Effluent (ppmv)	Treatment Efiiciency	Hydrocarbons Recovered			Operating Extraction Points
								(lbs/day)	Period (gallons)	Cumulative (gallons)	
5/13/15 15:40	OFF	54,142.2	-	-	-	-	-	-	-	6,484.2	Shutdown to await carbon change out
6/9/15 0:00	ON	54,142.2	13.0	-	140.03	-	-	-	-	6,484.2	MW-7, RW-1, RW-2, RW-3, RW-4, RW-5, MW-17, MW-22R, GP-39R, GP-27R, PTW-B
6/9/15 16:37	OFF	54,146.6	-	-	-	-	-	-	-	6,484.2	Carbon vessel transfer pipe failure
6/30/15 10:00	ON	54,146.8	-	-	-	-	-	-	-	6,484.2	MW-7, RW-1, RW-2, RW-3, RW-4, RW-5, MW-17, MW-22R, GP-39R, GP-27R, PTW-B
7/3/15 9:32	OFF	54,219.1	-	-	-	-	-	-	-	6,484.2	Air stripper high high pressure due to clogged bag filters
7/8/15 11:30	ON	54,219.1	12.0	-	150.70	-	-	-	-	6,484.2	MW-7, RW-1, RW-2, RW-3, RW-4, RW-5, MW-17, MW-22R, GP-39R, GP-27R, PTW-B
7/13/15 8:34	OFF	54,348.5	-	-	-	-	-	-	-	6,484.2	Knock Out Tank high high level
7/15/15 10:00	ON	54,348.5	12.0	-	150.32	-	-	-	-	6,484.2	MW-7, RW-1, RW-2, RW-3, RW-4, RW-5, MW-17, MW-22R, GP-39R, GP-27R, PTW-B
7/17/15 5:00	OFF	54,391.8	-	-	-	-	-	-	-	6,484.2	Air compressor low pressure
7/17/15 10:55	ON	54,391.8	12.0	-	139.75	-	-	-	-	6,484.2	MW-7, RW-1, RW-2, RW-3, RW-4, RW-5, MW-17, MW-22R, GP-39R, GP-27R, PTW-B
7/20/15 17:57	OFF	54,471.0	-	-	-	-	-	-	-	6,484.2	Air stripper high high pressure due to clogged bag filters
7/27/15 10:30	ON	54,471.0	12.5	4	136.16	1.6	60.0	0.2	2.5	6,486.7	MW-7, RW-1, RW-2, RW-3, RW-4, RW-5, MW-17, MW-22R, GP-39R, GP-27R, PTW-B
7/29/15 16:27	OFF	54,525.0	-	-	-	-	-	-	-	6,486.7	Air compressor low pressure due to blown air line
7/31/15 12:52	ON	54,525.0	-	-	-	-	-	-	-	6,486.7	MW-7, RW-1, RW-2, RW-3, RW-4, RW-5, MW-17, MW-22R, GP-39R, GP-27R, PTW-B
7/31/15 16:07	OFF	54,528.2	-	-	-	-	-	-	-	6,486.7	Air compressor low oil
8/4/15 9:15	ON	54,528.2	-	-	-	-	-	-	-	6,486.7	MW-7, RW-1, RW-2, RW-3, RW-4, RW-5, MW-17, MW-22R, GP-39R, GP-27R, PTW-B
8/5/15 1:51	OFF	54,544.3	-	-	-	-	-	-	-	6,486.7	Sump high high level due to air stripper leak
8/7/15 11:45	ON	54,544.3	-	-	-	-	-	-	-	6,486.7	MW-7, RW-1, RW-2, RW-3, RW-4, RW-5, MW-17, MW-22R, GP-39R, GP-27R, PTW-B
8/19/15 12:27	OFF	54,824.1	-	-	-	-	-	-	-	6,486.7	Air stripper high high pressure due to clogged bag filters
8/28/15 10:35	ON	54,824.1	10.0	5	148.98	2.4	52.9	0.3	1.1	6,487.8	MW-7, RW-1, RW-2, RW-3, RW-4, RW-5, MW-17, MW-22R, GP-39R, GP-27R, PTW-B
9/1/15 10:40	ON	54,918.2	10.0	8	151.08	4.4	47.0	0.4	0.2	6,488.0	MW-7, RW-1, RW-2, RW-3, RW-4, RW-5, MW-17, MW-22R, GP-39R, GP-27R, PTW-B
9/3/15 11:03	OFF	54,935.9	-	-	-	-	-	-	-	6,488.0	Air compressor low oil
9/4/15 13:00	ON	54,935.9	-	-	-	-	-	-	-	6,488.0	MW-7, RW-1, RW-2, RW-3, RW-4, RW-5, MW-17, MW-22R, GP-39R, GP-27R, PTW-B
9/27/15 16:54	OFF	55,492.4	-	-	-	-	-	-	-	6,488.0	Air compressor low oil
9/30/15 10:25	ON	55,492.4	11.0	-	143.98	-	-	-	-	6,488.0	MW-7, RW-1, RW-2, RW-3, RW-4, RW-5, MW-17, MW-22R, GP-39R, GP-27R, PTW-B
10/2/15 15:00	OFF	55,544.1	-	-	-	-	-	-	-	6,488.0	Planned shutdown for severe weather
10/5/15 12:10	ON	55,544.1	12.0	-	136.47	-	-	-	-	6,488.0	MW-7, RW-1, RW-2, RW-3, RW-4, RW-5, MW-17, MW-22R, GP-39R, GP-27R, PTW-B

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TABLE B-1: SOIL VAPOR EXTRACTION SYSTEM DATA
SEMI-ANNUAL PROGRESS REPORT: JULY THROUGH DECEMBER 2015
FORMER CHEVRON FACILITY 122208, 5801 RIGGS ROAD, CHILLUM, MD

Date/Time	System Status	Hour Meter (Hours)	Manifold Vacuum (in. Hg)	Influent (ppmv)	Influent (SCFM)	Effluent (ppmv)	Treatment Efiiciency	Hydrocarbons Recovered			Operating Extraction Points
								(lbs/day)	Period (gallons)	Cumulative (gallons)	
10/12/15 13:20	ON	55,713.4	11.0	34	130.91	14.0	58.8	1.5	6.5	6,494.5	MW-7, RW-1, RW-2, RW-3, RW-4, RW-5, MW-17, MW-22R, GP-39R, GP-27R, PTW-B
10/20/15 11:52	ON	55,903.9	11.0	-	133.62	-	-	-	-	6,494.5	MW-7, RW-1, RW-2, RW-3, RW-4, RW-5, MW-17, MW-22R, GP-39R, GP-27R, PTW-B
11/7/15 22:03	OFF	56,341.2	-	-	-	-	-	-	-	6,494.5	Oil water separator broken float
11/13/15 13:00	ON	56,341.2	11.0	-	132.72	-	-	-	-	6,494.5	MW-7, RW-1, RW-2, RW-3, RW-4, RW-5, MW-17, MW-22R, GP-39R, GP-27R, PTW-B
11/16/15 16:21	OFF	56,416.7	-	-	-	-	-	-	-	6,494.5	Air compressor low pressure
11/17/15 10:20	ON	56,416.7	12.0	27	134.79	10.0	63.0	1.2	7.7	6,502.2	MW-7, RW-1, RW-2, RW-3, RW-4, RW-5, MW-17, MW-22R, GP-39R, GP-27R, PTW-B
12/8/15 9:14	ON	56,919.5	10.5	-	136.23	-	-	-	-	6,502.2	MW-7, RW-1, RW-2, RW-3, RW-4, RW-5, MW-17, MW-22R, GP-39R, GP-27R, PTW-B
12/21/15 10:45	ON	57,233.1	12.0	-	112.27	-	-	-	-	6,502.2	MW-7, RW-1, RW-2, RW-3, RW-4, RW-5, MW-17, MW-22R, GP-39R, GP-27R, PTW-B
12/31/15 17:25	OFF	57,480.3	-	-	-	-	-	-	-	6,502.2	Air compressor low pressure

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 2015
FORMER CHEVRON FACILITY 122208, 5801 RIGGS ROAD, CHILLUM, MD

Date/Time	Benzene (µg/L)	Toluene (µg/L)	Ethylbenzene (µg/L)	Xylene (µg/L)	TPH (µg/L)	Flow (SCFM)	Extraction Rate	
							Benzene (lbs/hour)	TPH (lbs/day)
7/2/12 10:15	1.00	11.00	3.00	19.00	350	135	0.0005	4.26
8/27/12 8:34	0.30	1.90	0.40	2.80	180	135	0.0002	2.18
9/4/12 9:15	0.40	2.40	0.58	4.00	180	131	0.0002	2.13
10/1/12 10:45	1.80	6.40	1.30	7.20	320	127	0.0009	3.64
11/26/12 12:25	0.70	3.60	1.30	11.00	190	135	0.0004	2.30
12/3/12 9:50	0.14	0.79	0.30	2.60	230	128	0.0001	2.64
1/2/13 14:19	1.20	8.40	2.50	17.00	310	176	0.0008	4.92
2/4/13 11:35	1.00	6.00	1.70	12.00	300	170	0.0006	4.60
3/28/13 14:15	1.30	4.30	0.67	4.60	420	102	0.0005	3.85
4/1/13 13:15	13.00	43.00	6.30	45.00	420	100	0.0049	3.79
5/6/13 9:45	1.00	2.80	0.55	4.10	350	99	0.0004	3.11
7/1/13 9:15	<0.19	1.15	<0.19	2.26	147	130	0.0001	1.72
8/5/13 10:50	0.15	0.36	0.05	0.40	107	138	0.0001	1.33
9/19/13 10:35	<0.14	0.28	<0.19	<0.19	57	128	0.0001	0.66
10/10/13 10:15	<0.14	0.24	0.23	<0.19	43	129	0.0001	0.50
11/14/13 9:45	0.08	0.38	0.08	0.89	93	127	0.0000	1.06
12/19/13 9:15	0.05	0.25	<0.06	0.71	82	128	0.0000	0.95
2/27/14 13:55	0.28	1.90	0.44	4.20	360	135	0.0001	4.38
3/6/14 10:15	0.17	0.95	0.22	2.20	250	134	0.0001	3.01
4/17/14 11:05	1.00	3.40	0.64	4.10	390	127	0.0005	4.44
5/29/14 9:15	<0.570	1.60	<0.770	2.30	110	-	-	-
6/23/14 0:00	<0.571	1.50	0.32	2.10	120	138	0.0002	1.49
7/23/14 14:15	0.14	0.84	0.26	2.10	69	154	0.0001	0.95
8/27/14 12:10	0.11	0.41	0.08	0.59	-	150	0.0001	-
9/30/14 12:15	0.12	0.36	0.09	0.72	54	-	-	-
10/21/14 10:15	0.32	1.10	0.24	2.10	150	125	0.0001	1.68
11/6/14 10:20	0.23	0.99	0.22	1.90	130	125	0.0001	1.47
12/22/14 13:05	0.17	0.93	0.22	2.00	73	134	0.0001	0.88
1/27/15 14:25	0.12	0.61	0.14	1.20	-	143	0.0001	-

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TABLE B-2: SOIL VAPOR EXTRACTION SYSTEM INFLUENT ANALYTICAL RESULTS
SEMI-ANNUAL PROGRESS REPORT: JULY THROUGH DECEMBER 2015
FORMER CHEVRON FACILITY 122208, 5801 RIGGS ROAD, CHILLUM, MD

Date/Time	Benzene (µg/L)	Toluene (µg/L)	Ethylbenzene (µg/L)	Xylene (µg/L)	TPH (µg/L)	Flow (SCFM)	Extraction Rate	
							Benzene (lbs/hour)	TPH (lbs/day)
4/8/15 13:35	0.08	0.24	0.06	0.61	9	143	0.0000	0.12
5/7/15 12:00	0.24	0.59	0.16	0.96	19	-	-	-
7/27/15 11:00	3.90	5.00	0.67	3.90	36	136	0.0020	0.44
8/28/15 12:50	0.35	0.69	0.15	0.72	21	149	0.0002	0.28
9/1/15 11:20	0.21	0.45	0.07	0.51	34	151	0.0001	0.46
10/12/15 12:20	0.62	1.70	0.23	2.40	140	131	0.0003	1.65
11/17/15 11:15	0.41	1.90	0.28	3.10	110	135	0.0002	1.33

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.

BTEX values after 7/1/2013 were converted from ppb

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TABLE B-3: SOIL VAPOR EXTRACTION SYSTEM EFFLUENT ANALYTICAL RESULTS
SEMI-ANNUAL PROGRESS REPORT: JULY THROUGH DECEMBER 2015
FORMER CHEVRON FACILITY 122208, 5801 RIGGS ROAD, CHILLUM, MD

Date/Time	Benzene (µg/L)	Toluene (µg/L)	Ethylbenzene (µg/L)	Xylene (µg/L)	TPH (µg/L)	Flow (SCFM)	Discharge Rate	
							Benzene (lbs/hour)	TPH (lbs/day)
7/2/12 10:20	0.51	4.50	0.95	5.60	160	135	0.0003	1.95
8/27/12 8:34	0.18	0.89	0.15	0.99	85	135	0.0001	1.03
9/4/12 9:20	0.19	1.30	0.24	1.70	97	131	0.0001	1.15
10/1/12 10:50	0.76	3.00	0.74	3.90	170	127	0.0004	1.93
11/26/12 12:30	0.14	0.43	0.13	1.00	38	135	0.0001	0.46
12/3/12 9:55	0.03	0.12	0.04	0.33	39	128	0.0000	0.45
1/2/13 14:30	0.21	1.2	0.31	2.3	82	176	0.0001	1.30
2/4/13 11:40	0.19	0.81	0.2	1.4	79	170	0.0001	1.21
3/28/13 14:20	0.27	0.76	0.12	0.88	140	102	0.0001	1.28
4/1/13 13:20	0.033	0.097	<.0043	1.2	140	100	0.0000	1.26
5/6/13 9:50	-	-	-	-	110	99	-	0.98
7/1/13 7:00	<0.06	0.25	<0.06	0.14	32	130	0.0000	0.37
8/5/13 10:40	0.02	0.04	0.01	0.05	6	139	0.0000	0.07
9/19/13 10:40	<0.14	<0.14	<0.14	<0.14	18	129	0.0001	0.21
10/10/13 10:20	<0.14	<0.14	<0.14	<0.19	15	129	0.0001	0.17
11/14/13 9:50	0.01	0.04	<0.01	0.08	18	127	0.0000	0.21
12/18/13 9:20	<0.01	0.03	<0.02	0.04	27	128	0.0000	0.31
2/27/14 14:00	0.04	0.17	<0.05	0.34	90	135	0.0000	1.09
3/6/14 10:20	0.04	0.17	0.05	0.40	82	134	0.0000	0.99
4/17/14 11:00	0.073	0.25	0.08	0.61	37	127	0.0000	0.42
5/29/14 9:20	<0.280	0.40	<0.380	0.52	44	-	-	-
6/24/14 14:00	<0.281	0.20	0.04	0.310	32	138	0.0000	0.40
7/23/14 14:20	0.042	0.20	0.07	0.510	26	154	0.0000	0.36
8/27/14 12:20	0.033	0.110	0.023	0.160	-	150	0.0000	-
9/30/14 12:20	0.029	0.079	0.019	0.140	21	-	-	-
10/21/14 10:15	0.076	0.21	0.042	0.38	45	125	0.0000	0.50
11/6/14 10:20	0.087	0.410	0.090	0.810	66	125	0.0000	0.74
12/22/14 13:10	0.035	0.220	0.051	0.310	17	134	0.0000	0.21
1/27/15 14:30	0.03	0.130	0.029	0.250	-	143.15	0.0000	-

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TABLE B-3: SOIL VAPOR EXTRACTION SYSTEM EFFLUENT ANALYTICAL RESULTS
SEMI-ANNUAL PROGRESS REPORT: JULY THROUGH DECEMBER 2015
FORMER CHEVRON FACILITY 122208, 5801 RIGGS ROAD, CHILLUM, MD

Date/Time	Benzene (µg/L)	Toluene (µg/L)	Ethylbenzene (µg/L)	Xylene (µg/L)	TPH (µg/L)	Flow (SCFM)	Discharge Rate	
							Benzene (lbs/hour)	TPH (lbs/day)
4/8/15 13:20	0.038	0.099	<0.021	0.170	6.4	143.36	0.0000	0.08
7/27/15 11:15	0.078	0.140	0.025	0.150	6.7	136	0.0000	0.08
8/28/15 12:55	0.110	0.21	0.05	0.07	2	149	0.0001	0.03
9/1/15 11:25	0.077	0.14	0.02	0.180	18	151	0.0000	0.24
10/12/15 12:35	0.170	0.42	0.07	0.68	56	131	0.0001	0.66
11/17/15 11:20	0.110	0.45	0.10	1.000	42	135	0.0001	0.51

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.

(4) One Tedlar bag containing the effluent air sample collected on 5/6/13 ruptured during shipment to the laboratory. As a result, no sample was available for analysis of benzene, toluene, ethylbenzene, and xylenes.

(5) BTEX values after 7/1/2013 were converted from ppb

APPENDIX C

GROUNDWATER MONITORNIG DATA

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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 (Tables C-1 and C-2) are exported summaries of groundwater elevation data and analytical data for the past two years. 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 of Measurement	Date data were recorded.
Depth to Water (feet)	Depth to groundwater (ft)
TOC Elevation (feet)	Top of casing elevation (ft)
Water Table Elevation (feet)	Corrected water table elevation equation: (TOC) – (Depth to Water) + [(0.75)*(LPH Thickness)]
Depth to LPH (feet)	Depth to LPH (feet)
LPH Thickness (feet)	Equation: (Depth to Water-Depth to LPH)
LPH Elevation (feet)	Equation: (TOC-Depth to LPH)
Benzene (µg/L)	Laboratory reported concentration
Toluene (µg/L)	Laboratory reported concentration
Ethylbenzene (µg/L)	Laboratory reported concentration
m,p-Xylene (µg/L)	Laboratory reported concentration
o-Xylene (µg/L)	Laboratory reported concentration
Methyl-t-butyl ether (µg/L)	Laboratory reported concentration
TPH-GRO (µg/L)	Laboratory reported concentration

Table C-1: GROUNDWATER MONITORING DATA
SEMI-ANNUAL PROGRESS REPORT: JULY THROUGH DECEMBER 2015
FORMER CHEVRON FACILITY 122208, 5801 RIGGS ROAD, CHILLUM, MARYLAND

Well No.	Date of Measurement	Depth to Water (Feet BTOC)	PVC Casing Elevation (Feet MSL)	Water Table Elevation (Feet MSL)	NAPL Measurement (Feet)	NAPL Thickness (Feet)	NAPL Elevation (Feet MSL)	Comments
GP-11A(20-25)	03/24/2014	17.05	158.28	141.23				
	08/21/2014	17.80		140.48				
	03/31/2015	17.23		141.05				
	04/15/2015	17.00		141.28				
	09/02/2015	18.12		140.16				
GP-11A(25-30)	03/24/2014	19.62	158.43	138.81				
	08/21/2014	20.63		137.80				
	03/31/2015	20.26		138.17				
	09/02/2015	20.05		138.38				
GP-11A(30-35)	03/24/2014	20.72	158.38	137.66				
	08/21/2014	21.07		137.31				
	03/31/2015	21.00		137.38				
	09/02/2015	21.21		137.17				
GP-11A(35-40)	03/24/2014	20.76	158.38	137.62				
	08/21/2014	27.17		131.21				
	03/31/2015	26.85		131.53				
	09/02/2015	27.48		130.90				
GP-24A	03/24/2014	33.18	170.83	137.65				
	08/22/2014	31.96		138.87				
	03/31/2015	31.64		139.19				
	09/02/2015	33.25		137.58				
GP-27R	12/18/2013	42.50	166.21	123.71				
	01/28/2014	38.19		128.02				
	02/17/2014	49.78		116.43				
	03/07/2014	45.53		120.68				
	03/24/2014	47.41		118.80				
	04/11/2014							Top of Pump
	05/27/2014							Top of Pump
	06/24/2014	29.57		136.64				
	08/13/2014							Covered by Vehicle
	08/21/2014	37.65		128.56				
	09/10/2014							Not Gauged - Pumping
	10/07/2014							Covered by Vehicle
	11/06/2014	44.57		121.64				
	01/19/2015	36.83		129.38				Pumping
	02/24/2015							Covered by Vehicle
	03/31/2015	37.43		128.78				

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Table C-1: GROUNDWATER MONITORING DATA
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FORMER CHEVRON FACILITY 122208, 5801 RIGGS ROAD, CHILLUM, MARYLAND

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Well No.	Date of Measurement	Depth to Water (Feet BTOC)	PVC Casing Elevation (Feet MSL)	Water Table Elevation (Feet MSL)	NAPL Measurement (Feet)	NAPL Thickness (Feet)	NAPL Elevation (Feet MSL)	Comments
GP-27R Cont'd	04/28/2015	31.23	166.21	134.98				
	05/07/2015	30.87		135.34				
	06/23/2015	37.51		128.70				
	07/27/2015	40.80		125.41				
	08/4/2015							Covered by Vehicle
	09/2/2015							Top of Pump 46.15
	10/20/2015							Top of Pump 48.33
	11/17/2015							Top of Pump 45.15
	12/8/2015							Top of Pump 44.80
GP-2E(45-50)	03/24/2014	43.54	168.17	124.63				
	08/21/2014	42.65		125.52				
	09/09/2014	43.00		125.17				
	03/31/2015	42.78		125.39				
	04/15/2015	42.80		125.37				
	09/02/2015	42.75		125.42				
	09/30/2015	42.92		125.25				
GP-2E(50-55)	03/24/2014	43.67	168.27	124.60				
	08/21/2014	42.74		125.53				
	03/31/2015	42.85		125.42				
	09/02/2015	42.86		125.41				
GP-2E(55-60)	03/24/2014	43.98	168.53	124.55				
	08/21/2014	43.08		125.45				
	09/09/2014	43.34		125.19				
	03/31/2015	43.16		125.37				
	04/15/2015	43.18		125.35				
	09/02/2015	43.17		125.36				
	09/30/2015	43.30		125.23				
GP-2F(45-50)	03/24/2014	43.10	159.59	116.49				
	08/21/2014							Dry at 43.10
	09/09/2014							Dry
	03/31/2015	42.85		116.74				
	04/15/2015	42.82		116.77				
	09/02/2015							Dry at 43.20
GP-2F(50-55)	03/24/2014	44.35	159.59	115.24				
	08/21/2014	43.75		115.84				
	09/09/2014	43.32		116.27				
	03/31/2015	42.97		116.62				
	04/15/2015	43.15		116.44				
	09/02/2015	43.84		115.75				

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Table C-1: GROUNDWATER MONITORING DATA
SEMI-ANNUAL PROGRESS REPORT: JULY THROUGH DECEMBER 2015
FORMER CHEVRON FACILITY 122208, 5801 RIGGS ROAD, CHILLUM, MARYLAND

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Well No.	Date of Measurement	Depth to Water (Feet BTOC)	PVC Casing Elevation (Feet MSL)	Water Table Elevation (Feet MSL)	NAPL Measurement (Feet)	NAPL Thickness (Feet)	NAPL Elevation (Feet MSL)	Comments
GP-2F(50-55) Cont'd	09/30/2015	43.89	159.59	115.70				
GP-30A	12/18/2013	41.22	171.78	130.56				
	01/28/2014	37.20		134.58				
	02/17/2014	41.72		130.06				
	03/07/2014	41.12		130.66				
	03/24/2014	40.67		131.11				
	04/11/2014	36.18		135.60				
	05/27/2014	39.95		131.83				
	06/24/2014	40.89		130.89				
	08/13/2014	39.30		132.48				
	08/21/2014	35.95		135.83				
	09/10/2014	41.99		129.79				
	10/07/2014	34.43		137.35				
	11/06/2014	42.20		129.58				
	01/19/2015	37.68		134.10				
	02/24/2015							Covered by Ice
	03/31/2015	35.31		136.47				
	04/28/2015	36.82		134.96				
	05/07/2015	33.94		137.84				
	06/23/2015	33.36		138.42				
	07/27/2015	36.92		134.86				
	08/4/2015	37.00		134.78				
	09/02/2015	41.66		130.12				
	10/02/2015	41.60		130.18				
	10/20/2015	42.35		129.43				
	11/17/2015	38.74		133.04				
	12/8/2015	42.31		129.47				
GP-35A	12/18/2013	38.21	171.10	132.89				
	01/28/2014	34.12		136.98				
	02/17/2014	38.46		132.64				
	03/07/2014	37.81		133.29				
	03/24/2014	36.50		134.60				
	04/11/2014	34.28		136.82				
	05/27/2014	35.83		135.27				
	06/24/2014	36.64		134.46				
	08/13/2014	35.11		135.99				
	08/22/2014	33.45		137.65				
	09/08/2014	43.87		127.23				
	10/07/2014	34.47		136.63				
	11/06/2014	43.13		127.97				

Table C-1: GROUNDWATER MONITORING DATA
SEMI-ANNUAL PROGRESS REPORT: JULY THROUGH DECEMBER 2015
FORMER CHEVRON FACILITY 122208, 5801 RIGGS ROAD, CHILLUM, MARYLAND

Well No.	Date of Measurement	Depth to Water (Feet BTOC)	PVC Casing Elevation (Feet MSL)	Water Table Elevation (Feet MSL)	NAPL Measurement (Feet)	NAPL Thickness (Feet)	NAPL Elevation (Feet MSL)	Comments
GP-35A Cont'd	01/19/2015	33.82	171.10	137.28				
	02/24/2015							Covered by Snow
	03/31/2015	32.88		138.22				
	04/28/2015	39.73		131.37				
	05/07/2015	36.81		134.29				
	06/23/2015	35.35		135.75				
	07/27/2015	33.83		137.27				
	08/4/2015	33.67		137.43				
	09/02/2015	43.33		127.77				
	10/02/2015	43.40		127.70				
	10/20/2015	44.24		126.86				
	11/17/2015	36.73		134.37				
	12/8/2015	44.02		127.08				
GP-39R	03/24/2014	45.53	171.81	126.28				
	08/21/2014	41.36		130.45				
	09/10/2014							Not Gauged - Pumping
	03/31/2015	41.15		130.66				
GP-41A	03/24/2014	41.40	172.28	130.88				
	08/21/2014	40.84		131.44				
	03/31/2015	40.90		131.38				
	04/13/2015	40.98		131.30				
	09/02/2015	40.95		131.33				
GP-44A	03/24/2014	30.88	176.2	145.32				
	08/22/2014	30.48		145.72				
	03/31/2015	30.69		145.51				
	04/16/2015	30.99		145.21				
	09/02/2015	30.98		145.22				
GP-7A(20-25)	03/24/2014	18.58	158.11	139.53				
	08/21/2014	19.92		138.19				
	03/31/2015	17.80		140.31				
	09/02/2015	18.70		139.41				
GP-7A(25-30)	03/24/2014	18.90	158.08	139.18				
	08/21/2014	19.18		138.90				
	03/31/2015	18.00		140.08				
	09/02/2015	19.07		139.01				
GP-7A(30-35)	03/24/2014	20.94	158.09	137.15				
	08/21/2014	20.53		137.56				
	03/31/2015	19.75		138.34				
	09/02/2015	20.60		137.49				

Table C-1: GROUNDWATER MONITORING DATA
SEMI-ANNUAL PROGRESS REPORT: JULY THROUGH DECEMBER 2015
FORMER CHEVRON FACILITY 122208, 5801 RIGGS ROAD, CHILLUM, MARYLAND

Well No.	Date of Measurement	Depth to Water (Feet BTOC)	PVC Casing Elevation (Feet MSL)	Water Table Elevation (Feet MSL)	NAPL Measurement (Feet)	NAPL Thickness (Feet)	NAPL Elevation (Feet MSL)	Comments
GP-7A(35-40)	03/24/2014	21.31	158.09	136.78				
	08/21/2014	20.84		137.25				
	09/10/2014	21.33		136.76				
	03/31/2015	20.36		137.73				
	04/15/2015	20.81		137.28				
	09/02/2015	21.06		137.03				
	10/01/2015	20.76		137.33				
GP-7A(40-45)	03/24/2014	21.13	158.11	136.98				
	08/21/2014	21.00		137.11				
	03/31/2015	20.40		137.71				
	09/02/2015	21.18		136.93				
GP-9A(20-25)	03/24/2014	16.50	158.86	142.36				
	08/21/2014	17.94		140.92				
	03/31/2015	16.28		142.58				
	09/02/2015	17.73		141.13				
GP-9A(25-30)	03/24/2014	20.03	158.81	138.78				
	08/21/2014	19.73		139.08				
	03/31/2015	20.06		138.75				
	09/02/2015	19.51		139.30				
GP-9A(30-35)	03/24/2014	21.70	158.76	137.06				
	08/21/2014	21.22		137.54				
	03/31/2015	21.67		137.09				
	09/02/2015	21.11		137.65				
MP-7	12/18/2013	38.07	172.17	134.10				
	01/28/2014	41.52		130.65				DTP 41.51 0.01' Product
	02/17/2014	42.99		129.18				
	03/07/2014	37.83		134.34				
	03/24/2014	37.80		134.37				
	04/11/2014	38.82		133.35				
	05/27/2014	37.67		134.50				
	06/24/2014	37.23		134.94				
	08/13/2014	37.65		134.52				
	08/21/2014	40.31		131.86				
	09/10/2014	37.72		134.45				
	10/07/2014	37.51		134.66				
	11/06/2014	37.92		134.25				
	01/19/2015	37.65		134.52				
	02/24/2015	40.64		131.53				
	03/31/2015	40.15		132.02				LPH 40.14' BTOC
	04/16/2015	37.82		134.35				

Table C-1: GROUNDWATER MONITORING DATA
SEMI-ANNUAL PROGRESS REPORT: JULY THROUGH DECEMBER 2015
FORMER CHEVRON FACILITY 122208, 5801 RIGGS ROAD, CHILLUM, MARYLAND

Well No.	Date of Measurement	Depth to Water (Feet BTOC)	PVC Casing Elevation (Feet MSL)	Water Table Elevation (Feet MSL)	NAPL Measurement (Feet)	NAPL Thickness (Feet)	NAPL Elevation (Feet MSL)	Comments
MP-7 Cont'd	04/28/2015	37.41	172.17	134.76				
	05/07/2015	37.60		134.57				
	06/23/2015	40.04		132.13				
	07/27/2015	37.60		134.57				
	08/4/2015	36.84		135.33				
	09/02/2015	37.23		134.94				
	10/20/2015	37.95		134.22				
	11/17/2015	37.87		134.30				
	12/8/2015	38.18		133.99				
MW-1	03/24/2014	32.25	170.46	138.21				
	08/22/2014	31.63		138.83				
	03/31/2015	31.41		139.05				
	09/02/2015	32.30		138.16				
MW-2	03/24/2014	32.20	171.41	139.21				
	08/22/2014	31.64		139.77				
	03/31/2015	31.57		139.84				
	09/02/2015	33.27		138.14				
MW-3	03/24/2014	29.26	171.41	142.15				
	08/22/2014							Dry at 29.05
	03/31/2015	28.52		142.89				
	09/02/2015							Covered by Dirt; Well Cap Missing
MW-4	03/24/2014	30.54	171.14	140.60				
	08/22/2014	29.64		141.50				
	03/31/2015	29.86		141.28				
	09/02/2015	30.16		140.98				
MW-5	03/24/2014	33.52	172.31	138.79				
	08/22/2014	31.36		140.95				
	09/10/2014							Dry at 33.7
	03/31/2015	30.94		141.37				
	04/13/2015	32.44		139.87				
	09/02/2015							Dry at 33.7
	10/02/2015							Dry at 33.4
MW-6	03/24/2014	33.55	171.12	137.57				
	08/22/2014	31.99		139.13				
	03/31/2015	31.64		139.48				
	04/16/2015	33.67		137.45				
	09/02/2015	33.83		137.29				

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SEMI-ANNUAL PROGRESS REPORT: JULY THROUGH DECEMBER 2015
FORMER CHEVRON FACILITY 122208, 5801 RIGGS ROAD, CHILLUM, MARYLAND

Well No.	Date of Measurement	Depth to Water (Feet BTOC)	PVC Casing Elevation (Feet MSL)	Water Table Elevation (Feet MSL)	NAPL Measurement (Feet)	NAPL Thickness (Feet)	NAPL Elevation (Feet MSL)	Comments
MW-7	01/28/2014	42.04	177.11	135.07				
	02/17/2014	52.31		124.80				
	03/07/2014	56.60		120.51				
	03/24/2014	54.85		122.26				
	04/11/2014	51.96		125.15				
	05/27/2014	51.81		125.30				
	06/24/2014	52.15		124.96				
	08/13/2014	56.95		120.16				
	08/21/2014	40.61		136.50				
	09/10/2014							Not Gauged - Pumping
	10/07/2014	56.98		120.13				
	11/06/2014	56.93		120.18				
	01/19/2015	55.38		121.73				Pumping
	02/24/2015	40.49		136.62				
	03/31/2015	39.89		137.22				
	04/28/2015	57.00		120.11				
	05/07/2015	57.18		119.93				
	06/23/2015	40.07		137.04				
	07/27/2015	57.11		120.00				
	08/4/2015	57.32		119.79				
	09/2/2015	56.98		120.13				
	10/20/2015	57.15		119.96				
	11/17/2015	56.63		120.48				
	12/8/2015							To of Pump 55.35
MW-12	12/18/2013	52.05	177.11	125.06				
	03/24/2014	40.88		136.23				
	08/21/2014	35.41		141.70				
	03/31/2015	35.13		141.98				
	09/02/2015	41.90		135.21				
MW-13	03/24/2014	36.23	172.47	136.24				
	08/22/2014	35.42		137.05				
	03/31/2015	35.12		137.35				
	09/02/2015	36.22		136.25				
MW-15	03/24/2014	30.72	172.34	141.62				
	08/22/2014	30.36		141.98				
	09/10/2014	30.73		141.61				
	03/31/2015							Covered by Vehicle
	04/13/2015	30.67		141.67				
	09/02/2015	30.84		141.50				
	10/02/2015	30.74		141.60				

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Table C-1: GROUNDWATER MONITORING DATA
SEMI-ANNUAL PROGRESS REPORT: JULY THROUGH DECEMBER 2015
FORMER CHEVRON FACILITY 122208, 5801 RIGGS ROAD, CHILLUM, MARYLAND

Chevron

Well No.	Date of Measurement	Depth to Water (Feet BTOC)	PVC Casing Elevation (Feet MSL)	Water Table Elevation (Feet MSL)	NAPL Measurement (Feet)	NAPL Thickness (Feet)	NAPL Elevation (Feet MSL)	Comments
MW-16	12/18/2013	37.88	171.05	133.17				
	01/28/2014	37.65		133.40				
	02/17/2014	38.38		132.67				
	03/07/2014	40.09		130.96				
	03/24/2014	40.42		130.63				
	04/11/2014	38.23		132.82				
	05/27/2014	36.37		134.68				
	06/24/2014	38.35		132.70				
	08/13/2014	38.31		132.74				
	08/21/2014	37.37		133.68				
	10/07/2014	37.40		133.65				
	11/06/2014	39.60		131.45				
	01/19/2015	37.03		134.02				Pumping
	02/24/2015	35.88		135.17				
	03/31/2015	34.92		136.13				
	04/16/2015	37.24		133.81				
	04/28/2015	36.82		134.23				
	05/07/2015	35.68		135.37				
	06/23/2015	35.00		136.05				
	07/27/2015	36.54		134.51				
	08/4/2015	36.55		134.50				
	09/02/2015	38.54		132.51				
	10/20/2015	40.25		130.80				
	11/17/2015	39.67		131.38				
	12/8/2015	40.43		130.62				
MW-17	03/24/2014	44.39	170.67	126.28				
	08/21/2014	35.96		134.71				
	09/10/2014							Not Gauged - Pumping
	03/31/2015	34.77		135.90				
MW-18	12/18/2013	32.05	168.45	136.40				
	01/28/2014	31.65		136.80				
	03/07/2014	31.24		137.21				
	03/24/2014	31.05		137.40				
	04/11/2014	30.89		137.56				
	05/27/2014	29.45		139.00				
	06/24/2014	29.76		138.69				
	08/13/2014	30.59		137.86				
	08/21/2014	30.38		138.07				
	10/07/2014	31.04		137.41				
	11/06/2014	31.91		136.54				

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Table C-1: GROUNDWATER MONITORING DATA
SEMI-ANNUAL PROGRESS REPORT: JULY THROUGH DECEMBER 2015
FORMER CHEVRON FACILITY 122208, 5801 RIGGS ROAD, CHILLUM, MARYLAND

Chevron

Well No.	Date of Measurement	Depth to Water (Feet BTOC)	PVC Casing Elevation (Feet MSL)	Water Table Elevation (Feet MSL)	NAPL Measurement (Feet)	NAPL Thickness (Feet)	NAPL Elevation (Feet MSL)	Comments
MW-18 Cont'd	01/19/2015	31.30	168.45	137.15				
	02/24/2015							Covered by Snow
	03/31/2015	30.05		138.40				
	04/15/2015	30.23		138.22				
	04/28/2015	30.42		138.03				
	05/07/2015	30.21		138.24				
	06/23/2015	30.10		138.35				
	07/27/2015	29.95		138.50				
	08/4/2015	30.35		138.10				
	09/02/2015	30.52		137.93				
	10/20/2015	32.00		136.45				
	11/17/2015	33.38		135.07				
	12/8/2015	34.12		134.33				
MW-19	03/24/2014	35.54	169.56	134.02				
	08/21/2014	33.85		135.71				
	03/31/2015	33.58		135.98				
	04/15/2015	34.23		135.33				
	09/02/2015	34.33		135.23				
MW-20	03/24/2014	37.90	176.27	138.37				
	08/22/2014	36.57		139.70				
	03/31/2015	36.53		139.74				
	04/16/2015	36.72		139.55				
	09/02/2015	36.33		139.94				
MW-21	03/24/2014	36.58	173.37	136.79				
	08/22/2014	35.25		138.12				
	09/10/2014	35.48		137.89				
	03/31/2015	34.98		138.39				
	04/16/2015	35.48		137.89				
	09/02/2015	38.20		135.17				
	09/30/2015	34.90		138.47				
MW-22R	12/18/2013	40.60	165.08	124.48				
	01/28/2014	39.15		125.93				
	02/17/2014	34.77		130.31				
	03/07/2014	40.00		125.08				"Top of Pump Measurement, dry"
	03/24/2014	39.77		125.31				TOP
	04/11/2014							Top of Pump
	05/27/2014							Top of Pump
	06/24/2014	40.10		124.98				
	08/13/2014	40.20		124.88				Depth to Pump

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Table C-1: GROUNDWATER MONITORING DATA
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FORMER CHEVRON FACILITY 122208, 5801 RIGGS ROAD, CHILLUM, MARYLAND

Chevron

Well No.	Date of Measurement	Depth to Water (Feet BTOC)	PVC Casing Elevation (Feet MSL)	Water Table Elevation (Feet MSL)	NAPL Measurement (Feet)	NAPL Thickness (Feet)	NAPL Elevation (Feet MSL)	Comments
MW-22R Cont'd	08/21/2014	37.02	165.08	128.06				
	09/10/2014							Not Gauged - Pumping
	10/07/2014	40.41		124.67				
	11/06/2014	35.15		129.93				Top of Pump
	01/19/2015	40.30		124.78				
	02/24/2015	36.95		128.13				
	03/31/2015	36.33		128.75				
	04/28/2015							Top of Pump 41.20
	05/07/2015	40.10		124.98				Top of Pump
	06/23/2015	36.34		128.74				
	07/27/2015	39.25		125.83				Top of Pump
	08/4/2015							Top of Pump 41.25
	09/2/2015							Top of Pump 40.32
	10/20/2015	40.21		124.87				
	11/17/2015							Top of Pump 40.30
	12/8/2015							Top of Pump 39.85
MW-23	03/24/2014	43.08	171.31	128.23				
	08/21/2014	41.97		129.34				
	03/31/2015	41.98		129.33				
	04/13/2015	41.97		129.34				
	09/02/2015	42.51		128.80				
MW-24A	12/18/2013	21.57	157.38	135.81				
	01/28/2014	20.65		136.73				
	02/17/2014	24.42		132.96				
	03/07/2014	20.09		137.29				
	03/24/2014	20.20		137.18				
	04/11/2014	19.86		137.52				
	05/27/2014	18.71		138.67				
	06/24/2014	19.10		138.28				
	08/13/2014	19.95		137.43				
	08/21/2014	19.93		137.45				
	10/07/2014	20.53		136.85				
	11/06/2014	20.48		136.90				
	01/19/2015	20.55		136.83				
	02/24/2015							Covered by Snow
	03/31/2015	19.22		138.16				
	04/28/2015	19.54		137.84				
	05/07/2015	19.45		137.93				
	06/23/2015	19.55		137.83				
	07/27/2015	19.40		137.98				

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Table C-1: GROUNDWATER MONITORING DATA
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FORMER CHEVRON FACILITY 122208, 5801 RIGGS ROAD, CHILLUM, MARYLAND

Chevron

Well No.	Date of Measurement	Depth to Water (Feet BTOC)	PVC Casing Elevation (Feet MSL)	Water Table Elevation (Feet MSL)	NAPL Measurement (Feet)	NAPL Thickness (Feet)	NAPL Elevation (Feet MSL)	Comments
MW-24A Cont'd	08/4/2015	19.95	157.38	137.43				
	09/02/2015	19.95		137.43				
	10/20/2015	20.74		136.64				
	11/17/2015	21.23		136.15				
	12/8/2015	21.46		135.92				
MW-24B	03/24/2014	20.20	157.45	137.25				
	08/21/2014	19.91		137.54				
	03/31/2015	19.17		138.28				
	04/15/2015	19.37		138.08				
	09/02/2015	19.97		137.48				
MW-25A	03/24/2014	26.47	149.99	123.52				
	08/21/2014	26.04		123.95				
	03/31/2015	26.19		123.80				
	04/15/2015	26.14		123.85				
	09/02/2015	26.09		123.90				
MW-25B	03/24/2014	26.87	150.95	124.08				
	08/21/2014	26.94		124.01				
	09/10/2014	26.87		124.08				
	03/31/2015	26.51		124.44				
	04/15/2015	26.33		124.62				
	09/02/2015	27.47		123.48				
	10/01/2015	26.58		124.37				
MW-26A	03/24/2014	3.15	135.62	132.47				
	08/21/2014	4.60		131.02				
	03/31/2015	2.27		133.35				
	04/14/2015	2.84		132.78				
	09/02/2015	4.70		130.92				
MW-26B	03/24/2014	6.80	135.74	128.94				
	08/21/2014	11.18		124.56				
	09/08/2014	9.40		126.34				
	03/31/2015	7.65		128.09				
	04/14/2015	7.01		128.73				
	09/02/2015	7.80		127.94				
	10/01/2015	7.80		127.94				
MW-27A	03/24/2014	10.41	128.92	118.51				
	08/21/2014	9.96		118.96				
	09/08/2014	10.14		118.78				
	03/31/2015	9.84		119.08				
	04/15/2015	9.87		119.05				
	09/02/2015	10.03		118.89				

Table C-1: GROUNDWATER MONITORING DATA
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FORMER CHEVRON FACILITY 122208, 5801 RIGGS ROAD, CHILLUM, MARYLAND

Well No.	Date of Measurement	Depth to Water (Feet BTOC)	PVC Casing Elevation (Feet MSL)	Water Table Elevation (Feet MSL)	NAPL Measurement (Feet)	NAPL Thickness (Feet)	NAPL Elevation (Feet MSL)	Comments
MW-27A Cont'd	10/01/2015	10.19	128.92	118.73				
MW-27B	03/24/2014	13.25	128.92	115.67				
	08/21/2014	12.54		116.38				
	09/08/2014	12.86		116.06				
	03/31/2015	12.90		116.02				
	04/15/2015	12.69		116.23				
	09/02/2015	12.95		115.97				
	10/01/2015	12.91		116.01				
MW-28A	03/24/2014	7.34	126.13	118.79				
	08/21/2014	7.25		118.88				
	03/31/2015	6.72		119.41				
	09/02/2015	7.14		118.99				
MW-28B	03/24/2014	7.22	125.49	118.27				
	08/21/2014	6.94		118.55				
	03/31/2015	6.67		118.82				
	04/13/2015	6.70		118.79				
	09/02/2015	6.79		118.70				
MW-29A	03/24/2014	7.15	115.7	108.55				
	08/21/2014	7.18		108.52				
	03/31/2015	6.52		109.18				
	04/13/2015	6.68		109.02				
	09/02/2015	7.18		108.52				
MW-29B	03/24/2014	6.13	115.54	109.41				
	08/21/2014	6.00		109.54				
	09/08/2014	6.02		109.52				
	03/31/2015	5.60		109.94				
	04/13/2015	5.60		109.94				
	09/02/2015	5.95		109.59				
	09/30/2015	5.95		109.59				
MW-30R	03/24/2014	19.67	156.75	137.08				
	08/21/2014	19.29		137.46				
	03/31/2015	18.79		137.96				
	04/13/2015	18.70		138.05				
	09/02/2015	19.31		137.44				
MW-31A	03/24/2014	5.74	135.19	129.45				
	08/21/2014	6.12		129.07				
	03/31/2015	4.59		130.60				
	09/02/2015	5.79		129.40				

Table C-1: GROUNDWATER MONITORING DATA
SEMI-ANNUAL PROGRESS REPORT: JULY THROUGH DECEMBER 2015
FORMER CHEVRON FACILITY 122208, 5801 RIGGS ROAD, CHILLUM, MARYLAND

Well No.	Date of Measurement	Depth to Water (Feet BTOC)	PVC Casing Elevation (Feet MSL)	Water Table Elevation (Feet MSL)	NAPL Measurement (Feet)	NAPL Thickness (Feet)	NAPL Elevation (Feet MSL)	Comments
MW-31B	03/24/2014	5.60	135.81	130.21				
	08/21/2014	5.63		130.18				
	03/31/2015	4.41		131.40				
	04/13/2015	4.58		131.23				
	09/02/2015	5.30		130.51				
MW-32	03/24/2014	8.28	128.47	120.19				
	08/21/2014	8.92		119.55				
	03/31/2015	8.00		120.47				
	09/02/2015	9.06		119.41				
MW-33A	03/24/2014	6.23	126.35	120.12				
	08/21/2014	7.86		118.49				
	03/31/2015	7.02		119.33				
	04/13/2015	7.53		118.82				
	09/02/2015	7.51		118.84				
MW-33B	03/24/2014	7.80	126.1	118.30				
	08/21/2014	7.50		118.60				
	03/31/2015	7.16		118.94				
	04/13/2015	7.27		118.83				
	09/02/2015	7.31		118.79				
MW-33C	03/24/2014	7.28	125.84	118.56				
	08/21/2014	7.06		118.78				
	03/31/2015	6.75		119.09				
	04/13/2015	6.81		119.03				
	09/02/2015	6.90		118.94				
MW-33S	03/24/2014	7.07	126.58	119.51				
	08/21/2014	7.05		119.53				
	09/08/2014	7.02		119.56				
	03/31/2015	6.98		119.60				
	04/13/2015	7.01		119.57				
	09/02/2015	7.05		119.53				
	09/30/2015	5.82		120.76				
MW-34A	03/24/2014	8.95	126.58	117.63				
	08/21/2014	9.10		117.48				
	03/31/2015	8.76		117.82				
	09/02/2015	8.93		117.65				
MW-34B	03/24/2014	8.95	107.41	98.46				
	08/21/2014	8.55		98.86				
	03/31/2015	9.00		98.41				
	09/02/2015	8.58		98.83				

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FORMER CHEVRON FACILITY 122208, 5801 RIGGS ROAD, CHILLUM, MARYLAND

Well No.	Date of Measurement	Depth to Water (Feet BTOC)	PVC Casing Elevation (Feet MSL)	Water Table Elevation (Feet MSL)	NAPL Measurement (Feet)	NAPL Thickness (Feet)	NAPL Elevation (Feet MSL)	Comments
MW-37	03/24/2014	15.10	152.61	137.51				
	08/21/2014							Dry at 15.08
	03/31/2015	14.82		137.79				
	09/02/2015							Dry at 15.14
MW-38	03/24/2014	9.45	146.91	137.46				
	08/21/2014	10.28		136.63				
	03/31/2015	9.33		137.58				
	09/02/2015	10.30		136.61				
MW-39R	03/24/2014	15.92	146.01	130.09				
	08/21/2014	16.28		129.73				
	03/31/2015	15.94		130.07				
	09/02/2015	16.35		129.66				
MW-40	03/24/2014	22.45	145.18	122.73				
	08/21/2014	21.54		123.64				
	09/10/2014	21.76		123.42				
	03/31/2015	21.45		123.73				
	04/14/2015	21.91		123.27				
	09/02/2015	21.60		123.58				
	10/01/2015	21.90		123.28				
MW-41A	03/24/2014	19.30	136.96	117.66				
	08/21/2014	18.26		118.70				
	03/31/2015	18.32		118.64				
	04/14/2015	18.40		118.56				
	09/02/2015	18.26		118.70				
MW-41B	03/24/2014	19.67	136.82	117.15				
	08/21/2014	18.73		118.09				
	03/31/2015	18.80		118.02				
	04/14/2015	18.88		117.94				
	09/02/2015	18.75		118.07				
MW-42	03/24/2014	7.95	140.03	132.08				
	08/21/2014	7.84		132.19				
	03/31/2015	6.69		133.34				
	04/14/2015	6.94		133.09				
	09/02/2015	7.74		132.29				
MW-43A	03/24/2014	2.91	133.98	131.07				
	08/21/2014	4.29		129.69				
	03/31/2015	2.35		131.63				
	04/14/2015	2.80		131.18				
	09/02/2015	4.50		129.48				

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Table C-1: GROUNDWATER MONITORING DATA
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FORMER CHEVRON FACILITY 122208, 5801 RIGGS ROAD, CHILLUM, MARYLAND

Chevron

Well No.	Date of Measurement	Depth to Water (Feet BTOC)	PVC Casing Elevation (Feet MSL)	Water Table Elevation (Feet MSL)	NAPL Measurement (Feet)	NAPL Thickness (Feet)	NAPL Elevation (Feet MSL)	Comments
MW-43B	03/24/2014	9.34	134.09	124.75				
	08/21/2014	9.20		124.89				
	09/08/2014	9.53		124.56				
	03/31/2015	8.40		125.69				
	04/14/2015	8.55		125.54				
	09/02/2015	9.20		124.89				
	10/01/2015	9.34		124.75				
MW-44A	03/24/2014	9.42	130.22	120.80				
	08/21/2014	9.27		120.95				
	09/08/2014	9.47		120.75				
	03/31/2015	8.90		121.32				
	04/14/2015	8.96		121.26				
	09/02/2015	9.34		120.88				
	10/01/2015	9.61		120.61				
MW-44B	03/24/2014	11.70	130.24	118.54				
	08/21/2014	11.86		118.38				
	09/08/2014	11.99		118.25				
	03/31/2015	12.00		118.24				
	04/14/2015	11.75		118.49				
	09/02/2015	11.91		118.33				
	10/01/2015	12.00		118.24				
MW-45	03/24/2014	43.02	173.89	130.87				
	08/21/2014	41.39		132.50				
	09/10/2014	42.64		131.25				
	03/31/2015	41.27		132.62				
	04/16/2015	42.21		131.68				
	09/02/2015	42.00		131.89				
	09/30/2015	41.33		132.56				
MW-46	03/24/2014	46.91	174.12	127.21				
	08/21/2014	46.07		128.05				
	03/31/2015	46.15		127.97				
	04/13/2015	46.11		128.01				
	09/02/2015	46.27		127.85				
MW-47	03/24/2014	46.03	171.5	125.47				
	08/21/2014	45.08		126.42				
	09/09/2014	45.38		126.12				
	03/31/2015	45.24		126.26				
	04/15/2015	45.27		126.23				
	09/02/2015	45.19		126.31				
	10/02/2015	45.44		126.06				

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FORMER CHEVRON FACILITY 122208, 5801 RIGGS ROAD, CHILLUM, MARYLAND

Chevron

Well No.	Date of Measurement	Depth to Water (Feet BTOC)	PVC Casing Elevation (Feet MSL)	Water Table Elevation (Feet MSL)	NAPL Measurement (Feet)	NAPL Thickness (Feet)	NAPL Elevation (Feet MSL)	Comments
MW-48	03/24/2014	41.95	165.96	124.01				
	08/21/2014	40.98		124.98				
	03/31/2015	41.00		124.96				
	04/15/2015	41.18		124.78				
	09/02/2015	41.20		124.76				
MW-49	03/24/2014	44.70	159.15	114.45				
	08/21/2014	44.11		115.04				
	09/08/2014	44.32		114.83				
	03/31/2015	43.26		115.89				
	04/13/2015	45.39		113.76				
	09/02/2015	44.17		114.98				
	09/30/2015	44.30		113.71				
MW-50	03/24/2014	37.55	156.12	118.57				
	08/21/2014	36.68		119.44				
	09/09/2014	36.77		119.35				
	03/31/2015	36.54		119.58				
	04/15/2015	36.52		119.60				
	09/02/2015	36.45		119.67				
	10/02/2015	36.54		119.58				
MW-51	03/24/2014	49.71	158.12	108.41				
	08/21/2014	49.00		109.12				
	09/09/2014	49.11		109.01				
	03/31/2015	48.85		109.27				
	04/15/2015	48.91		109.21				
	09/02/2015	48.88		109.24				
	10/02/2015	49.05		109.07				
MW-52	03/24/2014	3.80	127.58	123.78				
	08/21/2014	4.60		122.98				
	03/31/2015	3.56		124.02				
	09/02/2015	4.96		122.62				
MW-53	03/24/2014	6.33	116.18	109.85				
	08/21/2014	5.77		110.41				
	09/08/2014	5.95		110.23				
	03/31/2015	5.68		110.50				
	04/13/2015	5.67		110.51				
	09/02/2015	5.97		110.21				
	09/30/2015	5.75		110.36				

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FORMER CHEVRON FACILITY 122208, 5801 RIGGS ROAD, CHILLUM, MARYLAND

Well No.	Date of Measurement	Depth to Water (Feet BTOC)	PVC Casing Elevation (Feet MSL)	Water Table Elevation (Feet MSL)	NAPL Measurement (Feet)	NAPL Thickness (Feet)	NAPL Elevation (Feet MSL)	Comments
MW-54	03/24/2014	5.04	121.76	116.72				
	08/21/2014	5.50		116.26				
	03/31/2015	4.64		117.12				
	04/13/2015	4.95		116.81				
	09/02/2015	5.73		116.03				
MW-55	03/24/2014	1.95	131.49	129.54				
	08/22/2014	1.97		129.52				
	03/31/2015	1.30		130.19				
	04/13/2015	1.74		129.75				
MW-58	03/24/2014	7.19	134.97	127.78				
	08/21/2014	6.46		128.51				
	09/08/2014	6.93		128.04				
	03/31/2015	6.57		128.40				
	04/14/2015	6.51		128.46				
	09/02/2015	7.56		127.41				
	10/01/2015	6.82		128.15				
MW-59	03/24/2014	10.35	131.10	120.75				
	08/21/2014	10.31		120.79				
	09/08/2014	10.61		120.49				
	03/31/2015	9.78		121.32				
	04/14/2015	9.93		121.17				
	09/02/2015	10.11		120.99				
	10/01/2015	10.18		120.92				
MW-60	03/24/2014	13.50	131.08	117.58				
	08/21/2014	14.06		117.02				
	03/31/2015	11.68		119.40				
	04/14/2015	10.71		120.37				
	09/02/2015	13.40		117.68				
MW-61A	03/24/2014	20.42	158.49	138.07				
	08/21/2014	20.21		138.28				
	09/10/2014	20.59		137.90				
	03/31/2015	19.90		138.59				
	04/13/2015	20.31		138.18				
	09/02/2015	20.27		138.22				
	09/30/2015	20.50		137.99				
MW-61B	03/24/2014	23.05	157.54	134.49				
	08/21/2014	21.45		136.09				
	09/10/2014	23.14		134.40				
	03/31/2015	21.27		136.27				
	04/15/2015	22.54		135.00				

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FORMER CHEVRON FACILITY 122208, 5801 RIGGS ROAD, CHILLUM, MARYLAND

Chevron

Well No.	Date of Measurement	Depth to Water (Feet BTOC)	PVC Casing Elevation (Feet MSL)	Water Table Elevation (Feet MSL)	NAPL Measurement (Feet)	NAPL Thickness (Feet)	NAPL Elevation (Feet MSL)	Comments
MW-61B Cont'd	09/02/2015	23.00	157.54	134.54				
	10/01/2015	23.05		134.49				
MW-62A	03/24/2014	10.50	148.58	138.08				
	08/21/2014	11.38		137.20				
	03/31/2015	9.90		138.68				
	04/13/2015	10.38		138.20				
	09/02/2015	11.36		137.22				
MW-62B	03/24/2014	13.08	148.50	135.42				
	08/21/2014	12.82		135.68				
	09/10/2014	13.85		134.65				
	03/31/2015	12.47		136.03				
	04/14/2015	12.56		135.94				
	09/02/2015	13.25		135.25				
	10/01/2015	13.65		134.85				
PTW-B	03/24/2014	43.68	171.75	128.07				
	08/21/2014	35.14		136.61				
	09/10/2014							Not Gauged - Pumping
	03/31/2015	34.89		136.86				
RW-1	03/24/2014	34.90	173.36	138.46				
	08/22/2014	37.51		135.85				
	09/10/2014							Not Gauged - Pumping
	03/31/2015	36.95		136.41				
RW-2	03/24/2014	45.51	172.21	126.70				
	08/21/2014	35.69		136.52				
	09/10/2014							Not Gauged - Pumping
	03/31/2015	34.96		137.25				
RW-3	03/24/2014	36.72	171.62	134.90				
	08/22/2014	32.07		139.55				
	09/10/2014							Not Gauged - Pumping
	03/31/2015	32.05		139.57				
RW-4	12/18/2013	44.90	171.62	126.72				
	01/28/2014	40.05		131.57				
	02/17/2014	41.09		130.53				
	03/07/2014	49.00		122.62				"Top of Pump Measurement, dry"
	03/24/2014	50.80		120.82				
	04/11/2014							Top of Pump
	05/27/2014							Top of Pump
	06/24/2014	41.00		130.62				
	08/13/2014	40.61		131.01				Depth to Pump

Table C-1: GROUNDWATER MONITORING DATA
SEMI-ANNUAL PROGRESS REPORT: JULY THROUGH DECEMBER 2015
FORMER CHEVRON FACILITY 122208, 5801 RIGGS ROAD, CHILLUM, MARYLAND

Well No.	Date of Measurement	Depth to Water (Feet BTOC)	PVC Casing Elevation (Feet MSL)	Water Table Elevation (Feet MSL)	NAPL Measurement (Feet)	NAPL Thickness (Feet)	NAPL Elevation (Feet MSL)	Comments
RW-4 Cont'd	08/21/2014	35.92	171.62	135.70				
	09/10/2014							Not Gauged - Pumping
	10/07/2014	44.58		127.04				Depth to Pump
	11/06/2014	42.33		129.29				Top of Pump
	01/19/2015	41.75		129.87				Top of pump; pumping
	02/24/2015	36.32		135.30				
	03/31/2015	36.11		135.51				
	04/28/2015							Top of pump 47.90
	05/07/2015	41.35		130.27				Top of Pump
	06/23/2015	36.23		135.39				
	07/27/2015	50.25		121.37				Top of Pump
	08/4/2015							Top of Pump 42.41
	09/2/2015							Top of Pump 50.36
	10/20/2015							Top of Pump 41.54
	11/17/2015	50.45		121.17				
	12/8/2015							Top of Pump 42.81
RW-5	09/10/2014		171.75	171.75				Not Gauged - Pumping

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Table C-2: GROUNDWATER ANALYTICAL DATA
SEMI-ANNUAL PROGRESS REPORT: JULY THROUGH DECEMBER 2015
FORMER CHEVRON FACILITY 122208, 5801 RIGGS ROAD, CHILLUM, MARYLAND

Chevron

Well No.	Sample Date	Benzene (µg/L)	Toluene (µg/L)	Ethylbenzene (µg/L)	m+p-Xylene (µg/L)	o-Xylene (µg/L)	Total Xylenes (µg/L)	Methyl-t-butyl ether (µg/L)	TPH-GRO (µg/L)
GP-11A(20-25)	04/16/2014	<1.0	<1.0	<1.0	--	<5.0	--	<1.0	<100
	04/15/2015	<1.0	<1.0	<1.0	--	--	<5.0	<1.0	<100
GP-24A	04/17/2014	<1.0	<1.0	<1.0	--	<5.0	--	<1.0	<100
GP-27R	04/15/2014	76	35	3.6	10	10	--	68	350
	09/10/2014	35	10	1.9	--	--	<10	57	210
	04/16/2015	3.2	11	3.1	--	--	31	9.8	470
	10/05/2015	<1.0	<1.0	<1.0	--	--	<5.0	2.2	<100
GP-2E(45-50)	04/15/2014	6.9	<1.0	<1.0	<5.0	<5.0	--	130	120
	09/09/2014	1.4	<1.0	<1.0	--	<5.0	--	75	<100
	04/15/2015	<1.0	<1.0	<1.0	--	--	<5.0	38	<100
	09/30/2015	<1.0	<1.0	<1.0	--	--	<5.0	12	<100
GP-2E(55-60)	04/15/2014	73	3.6	<2.0	<10	<10	--	290	500
	09/09/2014	40	<1.0	<1.0	--	<5.0	--	190	300
	04/15/2015	<1.0	<1.0	<1.0	--	--	<5.0	24	<100
	09/30/2015	2.1	<1.0	<1.0	--	--	<5.0	34	<100
GP-2F(50-55)	04/15/2014	39	<2.0	<2.0	<10	15	--	250	300
	09/09/2014	43	<2.0	<2.0	--	21	--	350	420
	04/15/2015	49	<2.0	<2.0	--	--	<10	270	580
	09/30/2015	53	<1.0	<1.0	--	--	<5.0	360	530
GP-30A	04/17/2014	8500	10000	750	--	2600	--	3500	57000
	09/10/2014	4900	6400	720	--	--	5600	4900	65000
	04/16/2015	2900	3600	360	--	--	2600	970	24000
	10/02/2015	5900	6100	440	--	--	3800	2700	34000
GP-35A	04/17/2014	770	3300	380	--	2200	--	13	27000
	09/10/2014	230	460	91	--	--	1000	13	7200
	04/16/2015	400	1400	530	--	--	3000	11	27000
	10/02/2015	390	720	200	--	--	1300	<5.0	7900
GP-39R	04/15/2014	130	59	4.9	16	21	--	160	640
	09/10/2014	120	62	5.9	--	--	48	220	850
	04/16/2015	1.8	<1.0	<1.0	--	--	<5.0	65	130
	10/02/2015	27	1.4	<1.0	--	--	5.7	100	160
GP-41A	04/17/2014	2.1	<1.0	<1.0	--	<5.0	--	<1.0	<100
	04/16/2015	<1.0	<1.0	<1.0	--	--	<5.0	<1.0	<100
	04/16/2014	<2.0	21	92	--	190	--	<2.0	9500
	04/16/2015	<1.0	2.1	34	--	--	240	<1.0	8200
GP-7A(20-25)	04/16/2014	<1.0	<1.0	<1.0	--	<5.0	--	<1.0	<100
GP-7A(30-35)	04/16/2014	<1.0	<1.0	<1.0	--	<5.0	--	<1.0	<100

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Table C-2: GROUNDWATER ANALYTICAL DATA
SEMI-ANNUAL PROGRESS REPORT: JULY THROUGH DECEMBER 2015
FORMER CHEVRON FACILITY 122208, 5801 RIGGS ROAD, CHILLUM, MARYLAND

Chevron

Well No.	Sample Date	Benzene (µg/L)	Toluene (µg/L)	Ethylbenzene (µg/L)	m+p-Xylene (µg/L)	o-Xylene (µg/L)	Total Xylenes (µg/L)	Methyl-t-butyl ether (µg/L)	TPH-GRO (µg/L)
GP-7A(35-40)	04/16/2014	31	<1.0	40	--	<5.0	--	240	1200
	09/09/2014	25	<1.0	18	--	<5.0	--	220	820
	04/15/2015	5.3	<1.0	2.4	--	--	<5.0	23	130
	10/01/2015	<1.0	<1.0	<1.0	--	--	<5.0	<1.0	<100
GP-9A(20-25)	04/16/2014	<1.0	<1.0	<1.0	--	<5.0	--	<1.0	<100
ISGR-1 DEEP	04/17/2014	<1.0	<1.0	<1.0	--	<5.0	--	5.4	<100
	09/10/2014	<1.0	<1.0	<1.0	--	<5.0	--	6.9	<100
	04/16/2015	<1.0	<1.0	<1.0	--	--	<5.0	4.3	<100
	10/05/2015	<1.0	<1.0	<1.0	--	--	<5.0	1.3	<100
ISGR-1 SHALLOW	04/17/2014	<1.0	<1.0	<1.0	--	<5.0	--	<1.0	<100
	09/10/2014	<1.0	<1.0	<1.0	--	6.1	--	<1.0	890
	04/16/2015	<1.0	<1.0	<1.0	--	--	<5.0	<1.0	180
	10/05/2015	<1.0	1	1	--	--	10	<1.0	<100
ISGR-2 DEEP	04/17/2014	<1.0	<1.0	<1.0	--	<5.0	--	2.5	<100
	09/10/2014	<1.0	<1.0	<1.0	--	<5.0	--	2.8	<100
	04/16/2015	<1.0	<1.0	<1.0	--	--	<5.0	2.4	<100
	10/05/2015	<1.0	<1.0	<1.0	--	--	<5.0	4.6	<100
ISGR-2 SHALLOW	04/17/2014	<1.0	<1.0	<1.0	--	<5.0	--	<1.0	<100
	09/10/2014	<1.0	<1.0	<1.0	--	<5.0	--	<1.0	<100
	04/16/2015	<1.0	<1.0	<1.0	--	--	<5.0	<1.0	<100
	10/05/2015	<1.0	<1.0	<1.0	--	--	<5.0	<1.0	<100
MP-7	04/16/2014	3200	3500	820	--	1600	--	2200	220000
	09/10/2014	1700	1200	320	--	--	2100	1300	28000
MW-15	04/16/2014	2.2	6.6	1.2	--	<5.0	--	<1.0	<100
	09/10/2014	4.2	22	5.7	--	--	30	<1.0	240
	04/16/2015	<1.0	<1.0	<1.0	--	--	<5.0	<1.0	<100
	10/02/2015	4.4	8.1	2.2	--	--	6.4	<1.0	<100
MW-16	04/16/2014	<1.0	<1.0	<1.0	--	<5.0	--	<1.0	<100
	04/16/2015	<1.0	<1.0	<1.0	--	--	<5.0	1.3	<100
MW-17	04/15/2014	4700	8600	950	4100	2100	--	3700	43000
	09/10/2014	3100	7100	760	--	--	5300	2800	43000
	04/16/2015	2700	4400	640	--	--	3700	1900	34000
	10/02/2015	3000	4600	620	--	--	3800	2800	37000
MW-18	04/15/2014	<1.0	<1.0	<1.0	<5.0	<5.0	--	<1.0	15000
	04/15/2015	<1.0	<1.0	<1.0	--	--	<5.0	<1.0	270
MW-19	04/15/2014	<1.0	<1.0	<1.0	<5.0	<5.0	--	<1.0	<100
	04/15/2015	<1.0	<1.0	<1.0	--	--	<5.0	<1.0	<100
MW-20	04/17/2014	<1.0	<1.0	<1.0	--	<5.0	--	<1.0	360
	04/16/2015	<1.0	<1.0	<1.0	--	--	<5.0	<1.0	430

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Table C-2: GROUNDWATER ANALYTICAL DATA
SEMI-ANNUAL PROGRESS REPORT: JULY THROUGH DECEMBER 2015
FORMER CHEVRON FACILITY 122208, 5801 RIGGS ROAD, CHILLUM, MARYLAND

Chevron

Well No.	Sample Date	Benzene (µg/L)	Toluene (µg/L)	Ethylbenzene (µg/L)	m+p-Xylene (µg/L)	o-Xylene (µg/L)	Total Xylenes (µg/L)	Methyl-t-butyl ether (µg/L)	TPH-GRO (µg/L)
MW-21	04/17/2014	7.5	<1.0	<1.0	--	<5.0	--	12	430
	09/10/2014	7.8	<1.0	<1.0	--	--	<10	15	380
	04/16/2015	4.7	<1.0	<1.0	--	--	6.7	13	400
	10/05/2015	4	1.2	<1.0	--	--	<5.0	9	230
MW-22R	04/15/2014	3300	6500	700	3000	1600	--	1500	37000
	09/10/2014	2000	5000	550	--	--	3800	1500	30000
	04/16/2015	2200	4400	630	--	--	3800	1500	32000
	10/02/2015	2500	4000	570	--	--	3200	1800	32000
MW-23	04/17/2014	<1.0	<1.0	<1.0	--	<5.0	--	1.9	<100
	04/16/2015	<1.0	<1.0	<1.0	--	--	<5.0	1.2	<100
MW-24A	04/16/2014	<1.0	<1.0	22	--	7.3	--	<1.0	6900
MW-24B	04/16/2014	<1.0	<1.0	5.1	--	<5.0	--	<1.0	3000
	04/15/2015	<1.0	<1.0	9.1	--	--	<5.0	<1.0	1600
MW-25A	04/16/2014	<1.0	<1.0	<1.0	--	<5.0	--	<1.0	<100
	04/15/2015	<1.0	<1.0	<1.0	--	--	<5.0	<1.0	<100
MW-25B	04/16/2014	23	<1.0	<1.0	--	<5.0	--	25	<100
	09/09/2014	430	<2.0	<2.0	--	33	--	430	1200
	04/15/2015	150	<2.0	<2.0	--	--	<10	230	580
	10/01/2015	94	<1.0	<1.0	--	--	<5.0	190	300
MW-26A	04/14/2014	<1.0	<1.0	<1.0	--	<5.0	--	<1.0	<100
	04/14/2015	<1.0	<1.0	<1.0	--	--	<5.0	<1.0	<100
MW-26B	04/14/2014	340	<2.0	<2.0	--	31	--	140	870
	09/08/2014	520	<5.0	<5.0	--	36	--	230	1300
	04/14/2015	320	<1.0	<1.0	--	--	41	150	1300
	10/01/2015	600	<5.0	<5.0	--	--	38	320	1200
MW-27A	04/14/2014	<1.0	<1.0	<1.0	--	<5.0	--	13	<100
	09/08/2014	<1.0	<1.0	<1.0	--	<5.0	--	1.7	<100
	04/15/2015	<1.0	<1.0	<1.0	--	--	<5.0	<1.0	<100
	10/01/2015	<1.0	<1.0	<1.0	--	--	<5.0	<1.0	<100
MW-27B	04/14/2014	<1.0	<1.0	<1.0	--	<5.0	--	71	<100
	09/08/2014	<1.0	<1.0	<1.0	--	<5.0	--	72	<100
	04/15/2015	<1.0	<1.0	<1.0	--	--	<5.0	68	<100
	10/01/2015	<1.0	<1.0	<1.0	--	--	<5.0	91	<100
MW-28A	04/14/2014	<1.0	<1.0	<1.0	--	<5.0	--	<1.0	<100
MW-28B	04/14/2014	<1.0	<1.0	<1.0	--	<5.0	--	2.1	<100
	04/13/2015	<1.0	<1.0	<1.0	--	--	<5.0	5.7	<100
MW-29A	04/14/2014	<1.0	<1.0	<1.0	--	<5.0	--	<1.0	<100
	04/13/2015	<1.0	<1.0	<1.0	--	--	<5.0	1.1	<100
MW-29B	04/14/2014	<1.0	<1.0	<1.0	--	<5.0	--	58	<100
	09/08/2014	<1.0	<1.0	<1.0	--	<5.0	--	80	<100
	04/13/2015	<1.0	<1.0	<1.0	--	--	<5.0	120	<100
	09/30/2015	<1.0	<1.0	<1.0	--	--	<5.0	77	100

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Table C-2: GROUNDWATER ANALYTICAL DATA
SEMI-ANNUAL PROGRESS REPORT: JULY THROUGH DECEMBER 2015
FORMER CHEVRON FACILITY 122208, 5801 RIGGS ROAD, CHILLUM, MARYLAND

Chevron

Well No.	Sample Date	Benzene (µg/L)	Toluene (µg/L)	Ethylbenzene (µg/L)	m+p-Xylene (µg/L)	o-Xylene (µg/L)	Total Xylenes (µg/L)	Methyl-t-butyl ether (µg/L)	TPH-GRO (µg/L)
MW-30R	04/17/2014	<1.0	<1.0	<1.0	--	<5.0	--	<1.0	<100
	04/16/2015	<1.0	<1.0	<1.0	--	--	<5.0	<1.0	<100
MW-31B	04/14/2014	<1.0	<1.0	<1.0	--	<5.0	--	<1.0	<100
	04/13/2015	<1.0	<1.0	<1.0	--	--	<5.0	<1.0	<100
MW-33A	04/14/2014	<1.0	<1.0	<1.0	--	<5.0	--	<1.0	<100
	04/13/2015	<1.0	<1.0	<1.0	--	--	<5.0	<1.0	<100
MW-33B	04/14/2014	<1.0	<1.0	<1.0	--	<5.0	--	1	<100
	04/13/2015	<1.0	<1.0	<1.0	--	--	<5.0	1.1	<100
MW-33C	04/14/2014	<1.0	<1.0	<1.0	--	<5.0	--	<1.0	<100
	04/13/2015	<1.0	<1.0	<1.0	--	--	<5.0	1.2	<100
MW-38	04/14/2014	<1.0	<1.0	<1.0	--	<5.0	--	<1.0	<100
MW-39R	04/14/2014	<1.0	<1.0	<1.0	--	<5.0	--	<1.0	<100
MW-40	04/14/2014	<1.0	<1.0	<1.0	--	<5.0	--	1.8	<100
	09/09/2014	<1.0	<1.0	<1.0	--	<5.0	--	1.9	<100
	04/14/2015	<1.0	<1.0	<1.0	--	--	<5.0	11	<100
	10/01/2015	<1.0	<1.0	<1.0	--	--	<5.0	<1.0	<100
MW-41A	04/14/2014	<1.0	<1.0	<1.0	--	<5.0	--	<1.0	<100
	04/14/2015	<1.0	<1.0	<1.0	--	--	<5.0	<1.0	<100
MW-41B	04/14/2014	<1.0	<1.0	<1.0	--	<5.0	--	12	<100
	04/14/2015	<1.0	<1.0	<1.0	--	--	<5.0	12	<100
MW-42	04/14/2014	<1.0	<1.0	<1.0	--	<5.0	--	2.3	<100
	04/14/2015	<1.0	<1.0	<1.0	--	--	<5.0	<1.0	<100
MW-43A	04/14/2014	<1.0	<1.0	<1.0	--	<5.0	--	<1.0	<100
	04/14/2015	<1.0	<1.0	<1.0	--	--	<5.0	<1.0	<100
MW-43B	04/14/2014	<1.0	<1.0	<1.0	--	<5.0	--	3.8	<100
	09/08/2014	<1.0	<1.0	<1.0	--	<5.0	--	2.1	<100
	04/14/2015	<1.0	<1.0	<1.0	--	--	<5.0	2.3	<100
	10/01/2015	<1.0	<1.0	<1.0	--	--	<5.0	<1.0	<100
MW-44A	04/14/2014	<1.0	<1.0	<1.0	--	<5.0	--	7.1	<100
	09/08/2014	<1.0	<1.0	<1.0	--	<5.0	--	6.2	<100
	04/14/2015	<1.0	<1.0	<1.0	--	--	<5.0	8	<100
	10/01/2015	<1.0	<1.0	<1.0	--	--	<5.0	1.6	<100
MW-44B	04/14/2014	<1.0	<1.0	<1.0	--	<5.0	--	51	<100
	09/08/2014	<1.0	<1.0	<1.0	--	<5.0	--	42	<100
	04/14/2015	<1.0	<1.0	<1.0	--	--	<5.0	37	<100
	10/01/2015	<1.0	<1.0	<1.0	--	--	<5.0	42	<100
MW-45	04/17/2014	19	1.9	<1.0	--	27	--	2	640
	09/10/2014	6.4	<1.0	<1.0	--	--	<10	<1.0	220
	04/16/2015	16	<1.0	<1.0	--	--	31	2.9	660
	10/05/2015	22	2.5	<1.0	--	--	57	<1.0	1100
MW-46	04/17/2014	<1.0	<1.0	<1.0	--	<5.0	--	4.7	<100
	04/16/2015	<1.0	<1.0	<1.0	--	--	<5.0	3	<100

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SEMI-ANNUAL PROGRESS REPORT: JULY THROUGH DECEMBER 2015
FORMER CHEVRON FACILITY 122208, 5801 RIGGS ROAD, CHILLUM, MARYLAND

Chevron

Well No.	Sample Date	Benzene (µg/L)	Toluene (µg/L)	Ethylbenzene (µg/L)	m+p-Xylene (µg/L)	o-Xylene (µg/L)	Total Xylenes (µg/L)	Methyl-t-butyl ether (µg/L)	TPH-GRO (µg/L)
MW-47	04/16/2014	280	49	3.5	--	150	--	43	2300
	09/09/2014	210	27	1.6	--	140	--	<1.0	1300
	04/15/2015	94	16	1.3	--	--	67	24	1400
	10/02/2015	180	24	2.3	--	--	110	8.5	1900
MW-48	04/16/2014	<1.0	1	<1.0	--	<5.0	--	2	<100
	04/15/2015	<1.0	<1.0	<1.0	--	--	<5.0	1.4	<100
MW-49	04/17/2014	<1.0	<1.0	<1.0	--	<5.0	--	200	130
	09/10/2014	<1.0	<1.0	<1.0	--	--	<10	110	120
	04/16/2015	<1.0	<1.0	<1.0	--	--	<5.0	73	<100
	10/05/2015	<1.0	<1.0	<1.0	--	--	<5.0	60	<100
MW-50	04/16/2014	2.5	<1.0	<1.0	--	<5.0	--	74	<100
	09/09/2014	2	<1.0	<1.0	--	<5.0	--	43	<100
	04/15/2015	<1.0	<1.0	<1.0	--	--	<5.0	5	<100
	10/02/2015	<1.0	<1.0	<1.0	--	--	<5.0	<1.0	<100
MW-51	04/16/2014	2.6	1.1	<1.0	--	<5.0	--	62	<100
	09/09/2014	<1.0	<1.0	<1.0	--	<5.0	--	49	<100
	04/15/2015	1.5	<1.0	<1.0	--	--	<5.0	45	<100
	10/02/2015	1.1	<1.0	<1.0	--	--	<5.0	56	<100
MW-53	04/14/2014	5	<1.0	<1.0	--	<5.0	--	76	<100
	09/08/2014	3.1	<1.0	<1.0	--	<5.0	--	110	130
	04/13/2015	9.3	<1.0	<1.0	--	--	<5.0	82	150
	09/30/2015	2.8	<1.0	<1.0	--	--	<5.0	100	<100
MW-54	04/14/2014	<1.0	<1.0	<1.0	--	<5.0	--	<1.0	<100
	04/13/2015	<1.0	<1.0	<1.0	--	--	<5.0	<1.0	<100
MW-55	04/14/2014	<1.0	<1.0	<1.0	--	<5.0	--	<1.0	<100
	04/13/2015	<1.0	<1.0	<1.0	--	--	<5.0	<1.0	<100
MW-58	04/14/2014	72	<1.0	<1.0	--	5.1	--	81	280
	09/08/2014	120	<1.0	<1.0	--	10	--	82	380
	04/14/2015	57	<1.0	<1.0	--	--	<5.0	51	240
	10/01/2015	110	<1.0	<1.0	--	--	5.9	140	630
MW-59	04/14/2014	73	<1.0	<1.0	--	<5.0	--	140	320
	09/08/2014	120	<2.0	<2.0	--	<10	--	170	580
	04/14/2015	120	<1.0	<1.0	--	--	5.3	160	660
	10/01/2015	110	<1.0	<1.0	--	--	<5.0	200	510
MW-6	04/17/2014	<1.0	26	7.8	--	64	--	<1.0	780
	04/16/2015	<1.0	2	2	--	--	11	<1.0	280
MW-60	04/14/2014	1.7	<1.0	<1.0	--	<5.0	--	12	<100
	04/14/2015	2.6	<1.0	<1.0	--	--	<5.0	9.8	<100
MW-61A	04/17/2014	1.5	<1.0	<1.0	--	<5.0	--	2	<100
	09/10/2014	<1.0	<1.0	<1.0	--	--	<10	1.1	<100
	04/16/2015	1.9	14	160	--	--	120	<1.0	2600
	10/01/2015	1.2	<1.0	<1.0	--	--	<5.0	<1.0	<100

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Table C-2: GROUNDWATER ANALYTICAL DATA
SEMI-ANNUAL PROGRESS REPORT: JULY THROUGH DECEMBER 2015
FORMER CHEVRON FACILITY 122208, 5801 RIGGS ROAD, CHILLUM, MARYLAND

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Well No.	Sample Date	Benzene (µg/L)	Toluene (µg/L)	Ethylbenzene (µg/L)	m+p-Xylene (µg/L)	o-Xylene (µg/L)	Total Xylenes (µg/L)	Methyl-t-butyl ether (µg/L)	TPH-GRO (µg/L)
MW-61B	04/16/2014	<1.0	1.8	<1.0	--	<5.0	--	29	<100
	09/09/2014	<1.0	<1.0	<1.0	--	<5.0	--	31	<100
	04/15/2015	<1.0	<1.0	<1.0	--	--	<5.0	15	<100
	10/01/2015	<1.0	<1.0	<1.0	--	--	<5.0	10	<100
MW-62A	04/17/2014	<1.0	<1.0	<1.0	--	<5.0	--	<1.0	<100
	04/16/2015	<1.0	<1.0	<1.0	--	--	<5.0	<1.0	<100
MW-62B	04/14/2014	3.3	<1.0	2.1	--	<5.0	--	17	260
	09/09/2014	40	<1.0	3.8	--	<5.0	--	71	660
	04/14/2015	9.6	<1.0	4	--	--	<5.0	30	770
	10/01/2015	8.2	<1.0	2.5	--	--	<5.0	36	310
MW-7	04/15/2014	460	570	48	280	170	--	73	3500
	09/10/2014	340	530	54	--	--	400	62	3500
	04/16/2015	510	580	88	--	--	500	89	3500
	10/02/2015	270	300	35	--	--	290	49	1400
PTW-B	04/15/2014	15	14	2.6	7.7	<5.0	--	17	150
	09/10/2014	23	26	4.8	--	--	26	33	370
	04/16/2015	18	19	5.5	--	--	33	20	320
	10/02/2015	22	17	3.9	--	--	17	26	220
RW-1	04/15/2014	350	290	41	130	84	--	90	2100
	09/10/2014	210	230	38	--	--	190	87	1600
	04/16/2015	290	120	30	--	--	130	110	1400
	10/02/2015	170	68	10	--	--	60	81	670
RW-2	04/15/2014	250	240	20	170	150	--	170	1700
	09/10/2014	180	140	11	--	--	210	130	1200
	04/16/2015	270	300	29	--	--	280	140	2300
	10/02/2015	140	91	9.6	--	--	97	140	820
RW-3	04/15/2014	6.5	11	<1.0	<5.0	<5.0	--	6.6	200
	09/10/2014	44	590	80	--	--	970	21	5400
	04/16/2015	73	730	130	--	--	1200	33	7200
	10/02/2015	53	350	55	--	--	510	12	2000
RW-4	04/15/2014	3200	5100	600	2400	1300	--	1600	19000
	09/10/2014	2400	3000	420	--	--	2300	1400	19000
	04/16/2015	1700	1700	370	--	--	1400	930	25000
	10/02/2015	1900	2200	320	--	--	1600	1300	13000
RW-5	04/15/2014	13	11	5.5	21	25	--	3.2	800
	09/10/2014	160	390	140	--	--	680	48	6500
	04/16/2015	160	280	130	--	--	400	37	4600
	10/02/2015	190	250	100	--	--	320	48	1800

APPENDIX D

SOIL VAPOR MONITORING

TABLE D-1 SOIL VAPOR MONITORING ANALYTICAL RESULTS
SEMI-ANNUAL PROGRESS REPORT: JULY THROUGH DECEMBER 2015
FORMER CHEVRON FACILITY 122208, 5801 RIGGS ROAD, CHILLUM, MARYLAND

Location	Sample Date	1,1-Difluoroethane (µg/m3)	Benzene (µg/m3)	Ethylbenzene (µg/m3)	m+p-Xylene (µg/m3)	Methyl-t-butyl ether (µg/m3)	o-Xylene (µg/m3)	Toluene (µg/m3)
VW-1	01/23/2012	23	ND 3.3	ND 4.4	ND 4.4	ND 3.7	ND 4.4	ND 3.9
	05/10/2012	840	ND 3.9	ND 5.4	ND 5.4	ND 4.4	ND 5.4	13
	10/18/2012	3,700 E	ND 3.8	ND 5.1	ND 5.1	ND 4.2	ND 5.1	ND 4.4
	12/19/2013	ND 13	ND 3.8	ND 5.1	ND 5.1	ND 4.3	ND 5.1	ND 4.5
	5/27/2014	ND 14	ND 4.1	ND 5.6	ND 5.6	ND 4.6	ND 5.6	ND 4.9
	10/23/2014	ND 12	ND 3.7	ND 5.0	ND 5.0	ND 4.2	ND 5.0	4.6
	4/28/2015	ND 14	ND 4.0	ND 5.5	6.2	ND 4.5	ND 5.5	4.9
	10/27/2015	ND 12	ND 3.5	ND 4.8	ND 4.8	ND 4.0	ND 4.8	ND 4.2
VW-1 (Ambient)	12/19/2013	ND 8.1	ND 2.4	ND 3.2	ND 3.2	ND 2.7	ND 3.2	3.6
	5/27/2014	ND 9.2	ND 2.7	ND 3.7	ND 3.7	ND 3.1	ND 3.7	ND 3.2
	10/23/2014	ND 10	ND 3.0	ND 4.1	ND 4.1	ND 3.4	ND 4.1	ND 3.6
	4/28/2015	ND 8.4	ND 2.5	ND 3.4	ND 3.4	ND 2.8	ND 3.4	ND 2.9
	10/27/2015	ND 12	ND 3.4	ND 4.7	ND 4.7	ND 3.9	ND 4.7	7.0
VW-2	05/10/2012	96	25	7.9	7.6	25	ND 5.4	5.1
	10/18/2012	ND 12	ND 3.7	ND 5.0	ND 5.0	ND 4.2	ND 5.0	ND 4.4
	12/19/2013	ND 14	6.2	ND 5.5	ND 5.5	ND 4.6	ND 5.5	ND 4.8
	5/27/2014	ND 14	20	ND 5.6	7.1	ND 4.6	ND 5.6	9.0
	10/23/2014	ND 13	5.6	ND 5.2	6.3	ND 4.4	ND 5.2	5.5
	4/28/2015	ND 13	ND 3.9	ND 5.2	5.7	ND 4.4	ND 5.2	5.1
	10/27/2015	ND 12	ND 3.4	ND 4.6	ND 4.6	ND 3.8	ND 4.6	ND 4.0
VW-03	10/18/2012	1,200	ND 6.8	ND 9.2	14	ND 7.6	ND 9.2	ND 8.0
VW-2(Ambient)	10/18/2012	--	ND 2.3	ND 3.1	ND 3.1	ND 2.6	ND 3.1	ND 2.7
VW-04(Ambient)	01/23/2012	--	ND 2.8	ND 3.8	ND 3.8	ND 3.2	ND 3.8	ND 3.3

Notes:
1) J - Estimated value
2) ND - Not detected at the minimum reported quantification limit
3) Wells VW-03 and VW-04 were not sampled during the reporting period due to the presence of water.
4) E - Exeeds instrument calibration range

APPENDIX E

IN-SITU GROUNDWATER REMEDIATION WELLS

TABLE E-1: IN-SITU GROUNDWATER REMEDIATION WELLS MONITORING DATA
SEMI-ANNUAL PROGRESS REPORT: JULY THROUGH DECEMBER 2015
FORMER CHEVRON FACILITY 122208, 5801 RIGGS ROAD, CHILLUM, MD

ID	Date	On/Off Status	Hour Meter	Totalizer Reading	Flow Rate (GPM)	Influent Pressure (PSI)	Pump Set Point (%)	Pump Temp. (°C)	Pump Speed (RPM)	Power Input (W)	Power Consump. (kWh)	Sensor #1 (%)	# of Starts	Operating Hours
ISGR-1	9/30/2013 12:19	ON	813.3	-	2	8	21	41	5800	90	80	67.9	280	-
	10/30/2013 7:00	ON	1533.5	554574	0.4	8.9	21	40	5800	90	150	21.3	730	1532
	11/21/2013 11:30	OFF	2061.4	598433	0.8	3.6	28	42	6200	100	208	36.1	1175	2060
	11/21/2013 13:00	ON	-	-	1.8	9.3	45	29	7500	170	208	58.7	1179	2060
	11/26/2013 11:30	OFF	2181.5	-	1	17.5	45	31	7400	190	230	30.7	1243	2178
	12/12/2013 9:10	OFF	2310.3	-	1	0.7	60	23	0	0	266	31	1245	2308
	12/18/2013 11:35	ON	2456.2	-	1.5	14.9	60	29	7400	200	298	43.3	1251	2454
	2/7/2014 12:45	ON	3679.8	-	0.7	4.9	70	51	8200	190	514	24.7	1257	3678
	2/17/2014 13:00	ON	-	-	-	-	-	-	-	-	-	-	-	-
	3/6/2014 13:00	ON	4329.5	-	0.6	3.8	70	51	8100	180	640	24.4	1257	4328
	3/24/2014 9:15	YES	4756.8	-	0.6	3.6	70	51	8200	180	722	41.1	1257	4756
	4/11/2014 11:45	YES	5143.2	-	1.5	3.8	70	51	8200	180	796	38.3	1257	5144
	4/25/2014 10:15	YES	5597.7	-	1.4	4.0	73	50	8100	180	884	41.7	1257	5598
	5/12/2014 10:46	YES	5934.2	-	1.7	4.3	73	50	8100	180	948	54	1257	5936
	5/20/2014 12:34	YES	6126.9	-	1.8	3.7	73	38	8200	180	986	58.7	1262	6128
	6/23/2014 14:02	NO	6399.2	-	1.9	3.5	73	30	8200	180	1038	65.4	1264	6402
	7/23/2014 11:00	YES	7116.3	-	1.9	3.7	73	46	8200	180	1174	62.5	1266	7120
	8/13/2014 13:00	YES	7742.1	-	1.5	3.3	73	51	8100	180	1298	44.6	1268	7746
	9/8/2014 8:00	YES	-	-	1.3	0.6	80	31	8400	180	1338	38	1270	7982
	10/7/2014 10:35	YES	-	-	1.2	2.2	83	41	8400	180	1479	-	1272	-
	11/6/2014 12:10	YES	-	-	1.3	2.4	86	47	8400	180	1607	43	1273	-
	12/9/2014 11:00	YES	10139.3	-	1.5	2.6	90	53	8400	180	1772	48.9	1274	10146
	1/27/2015 10:06	YES	11312	-	1.3	2.9	90	54	8400	190	2006	37.3	1274	11322
	3/4/2015 10:30	NO	11939.4	-	1.3	1.9	90	26	8400	190	2132	21.6	1275	11950
	4/28/2015 12:00	YES	13260.2	-	1.6	3.5	90	50	8400	190	5400	48	1280	13272
	5/7/2015 9:00	YES	-	-	1.6	3.6	90	48	8400	190	2444	50.6	1280	13490
	6/23/2015 11:05	NO	14285.5	-	1.6	2.8	90	29	8400	200	2608	49.6	1285	14300
	7/27/2015 12:50	YES	15103.13	-	1.9	3.9	90	49	8400	190	2774	59.1	1285	15118
	8/28/2015 11:23	YES	15869.7	-	1.9	3.6	90	53	8400	190	2930	48	1285	15886
	9/1/2015 12:41	YES	15967	-	1.9	3.5	90	53	8400	190	2948	61.9	1304	15984
	10/20/2015 13:45	YES	17144.1	-	1.4	2.7	95	51	8700	210	3188	43.3	1305	17164
	11/17/2015 12:30	YES	17815.8	-	1.4	4.2	95	52	8700	210	3338	47.7	1305	17836
	12/21/2015 11:42	YES	18631	-	1.5	4.1	95	56	8700	210	3522	47.4	1307	18652

TABLE E-1: IN-SITU GROUNDWATER REMEDIATION WELLS MONITORING DATA
SEMI-ANNUAL PROGRESS REPORT: JULY THROUGH DECEMBER 2015
FORMER CHEVRON FACILITY 122208, 5801 RIGGS ROAD, CHILLUM, MD

ID	Date	On/Off Status	Hour Meter	Totalizer Reading	Flow Rate (GPM)	Influent Pressure (PSI)	Pump Set Point (%)	Pump Temp. (°C)	Pump Speed (RPM)	Power Input (W)	Power Consump. (kWh)	Sensor #1 (%)	# of Starts	Operating Hours
ISGR-2	9/30/2013 12:21	OFF	828.5	-	0	0.1	22	25	0	0	50	20	4342	528
	10/30/2013 7:00	OFF	1068.3	21663	0	0.1	STOP	22	0	0	76	20	4344	768
	11/21/2013 11:30	ON	1595.1	21663	0	0.1	42	31	7200	160	142	20	4348	1294
	11/21/2013 13:00	ON	2063.5	-	0	8.2	55	32	8000	210	144	20	4350	1296
	11/26/2013 12:20	ON	17159	-	0	10.9	50	33	8000	210	170	-	4350	1416
	12/12/2013 9:30	OFF	1727.8	-	0	0.7	50	22	0	0	172	20	4351	1428
	12/18/2013 9:00	OFF	1728.5	-	2.4	1.6	50	34	8000	230	172	90.9	4357	1428
	2/7/2014 12:50	NO	-	-	-	-	-	-	-	-	-	-	-	-
	2/17/2014 13:00	OFF	1982.1	-	2.5	0.8	50	22	0	0	194	100	4470	1682
	3/6/2014 14:00	OFF	2005.3	-	2.5	3.8	70	29	8100	230	196	100	4497	1706
	3/24/2014 9:20	NO	2279.1	-	-	-	-	-	-	-	-	-	-	-
	4/11/2014 12:37	YES	2279.4	-	1.8	6.5	70	31	8300	240	262	58.7	4511	1980
	4/25/2014 10:50	NO	2429.8	-	2.4	6.7	80	31	8300	230	274	88.3	4524	2130.4
	5/12/2014 10:48	YES	2466.1	-	1.6	4.0	80	31	8300	230	284	22.5	4525	2166.7
	5/20/2014 12:36	NO	2559.5	-	0	0.1	80	27	8300	240	306	20	4534	2260
	6/23/2014 14:05	NO	2628	-	2.5	4.1	83	26	8300	230	310	20.1	-	2328.5
	7/23/2014 12:00	NO	3174.0	-	2.5	3.6	90	29	8100	230	330	100	4550	2876
	8/13/2014 13:02	YES	3799.8	-	2.5	4.0	90	26	2400	10	338	100	4556	3502
	9/8/2014 8:20	NO	-	-	0	0.8	93	31	8300	230	340	20	4558	3738
	10/7/2014 11:30	YES	-	-	0	0.5	93	35	8300	230	275	20	4568	-
	11/6/2014 11:45	YES	-	-	2.5	6.5	93	50	8300	220	310	20	4577	-
	12/9/2014 11:05	YES	5500.0	-	2.5	7.5	93	38	6600	120	56	100	4595	5204
	1/27/2015 10:06	YES	6672.7	-	2.5	7.5	93	39	6600	120	710	100	4595	6378
	3/4/2015 10:00	YES	7536.5	-	2.5	10.8	93	41	8000	190	862	100	4601	7242
	4/28/2015 12:05	YES	8594.2	-	2.5	11.2	95	30	6800	130	1006	100	4887	8302
	5/7/2015 9:00	YES	8811.3	-	2.5	10.7	95	31	6800	140	1038	100	4887	8518
	6/23/2015 11:07	NO	9619.6	-	0	0.1	90	31	8700	260	1252	20	4893	9328
	7/27/2015 12:55	YES	10389	-	2.5	6.4	90	27	2400	10	1310	100	4900	10098
	8/28/2015 11:25	YES	11155.5	-	2.5	6.1	90	27	2400	10	1318	100	4900	10866
	9/1/2015 12:40	YES	11252.8	-	2.5	6	90	27	2400	10	1320	100	4900	10962
	10/20/2015 13:47	YES	12429.9	-	2.5	5.1	90	27	2400	10	1332	100	4900	12142
	11/17/2015 12:30	YES	13101.6	-	2.5	5.3	90	28	2400	280	1340	100	4902	12814
	12/21/2015 11:45	YES	13916.8	-	2.5	11.6	90	43	8100	210	1522	100	4904	13630

TABLE E-2: CARBON PERFORMANCE ANALYTICAL RESULTS
SEMI-ANNUAL PROGRESS REPORT: JULY THROUGH DECEMBER 2015
FORMER CHEVRON FACILITY 122208, 5801 RIGGS ROAD, CHILLUM, MD

ID	Date	Benzene (µg/L)	Toluene (µg/L)	Ethylbenzene (µg/L)	Total Xylenes (µg/L)	Naphthalene (µg/L)	MTBE (µg/L)	TPH-GRO (µg/L)
ISGR-1 Influent	9/30/2013	4.2	89	210	392	NA	<2	3,000
	10/30/2013	5.9	74	320	498	NA	<5	9,200
	11/26/2013	8.8	20	67	126	NA	5.9	2,300
	12/18/2013	11	19	72	122	NA	9.9	1,800
	2/7/2014	2.0	6.9	4.1	68	NA	1.5	2,100
	3/6/2014	<1	3.1	7.1	33.4	NA	1.4	820
	4/9/2014	<1	<1	1.3	<10	NA	1.6	230
	5/12/2014	<1	<1	<1	<10	NA	1.7	<100
	6/23/2014	<1	<1	<1	<10	NA	1.4	120
	7/23/2014	<1	5.4	21	50	10	<1	2,400
	8/18/2014	<1	<1	<1	<10	<1	<1	120
	9/11/2014	<1	12	29	58	NA	<1	1,100
	10/7/2014	<1	3.1	22	8.5	7	<1	520
	11/6/2014	<1	13	56	24	17	<1	940
	12/9/2014	<1	4.1	110	30	31	<1	1,500
	1/27/2015	<1	4.2	67	10.6	4.5	<1	670
	3/4/2015	<1	17	36	43	50	<1	2,200
	4/28/2015	<1	<1	1.9	<10	5.4	<1	520
	5/7/2015	<1	<1	3.6	<10	14	<1	1200
	6/23/2015	<1	1.6	15	<10	11	<1	510
	7/27/2015	<1	<1	3.1	<10	10	<1	910
	8/28/2015	<1	<1	<1	<10	<1	<1	<100
	9/1/2015	<1	<1	<1	<10	<1	<1	<100
	10/20/2015	<1	1.7	15	<10	2.7	<1	260
	11/17/2015	<1	11	23	105	22	<1	1600
	12/21/2015	<1	4.6	2.4	61	2	<1	1100

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TABLE E-2: CARBON PERFORMANCE ANALYTICAL RESULTS
SEMI-ANNUAL PROGRESS REPORT: JULY THROUGH DECEMBER 2015
FORMER CHEVRON FACILITY 122208, 5801 RIGGS ROAD, CHILLUM, MD

ID	Date	Benzene (µg/L)	Toluene (µg/L)	Ethylbenzene (µg/L)	Total Xylenes (µg/L)	Naphthalene (µg/L)	MTBE (µg/L)	TPH-GRO (µg/L)
ISGR-1 -50%	9/30/2013	<1	<1	<1	<10	NA	<1	<100
	10/30/2013	<1	<1	<1	<10	NA	<1	<100
	11/26/2013	<1	<1	<1	<10	NA	<1	<100
	12/18/2013	<1	<1	<1	<10	NA	<1	<100
	2/7/2014	<1	<1	<1	<10	NA	<1	<100
	3/6/2014	<1	<1	<1	<10	NA	<1	<100
	4/9/2014	<1	<1	<1	<10	NA	<1	<100
	5/12/2014	<1	<1	<1	<10	NA	<1	<100
	6/23/2014	<1	<1	<1	<10	NA	<1	<100
	7/23/2014	<1	<1	<1	<10	<1	<1	<100
	8/18/2014	<1	<1	<1	<10	<1	<1	<100
	9/11/2014	<1	<1	<1	<10	NA	<1	<100
	10/7/2014	<1	<1	<1	<10	<1	<1	<100
	11/6/2014	<1	<1	<1	<10	<1	<1	<100
	12/9/2014	<1	<1	<1	<10	<1	<1	<100
	1/27/2015	<1	<1	<1	<10	<1	<1	<100
	3/4/2015	<1	<1	<1	<10	<1	<1	<100
	4/28/2015	<1	<1	<1	<10	<1	<1	<100
	5/7/2015	<1	<1	<1	<10	<1	<1	<100
	6/23/2015	<1	<1	<1	<10	<1	<1	<100
	7/27/2015	<1	<1	<1	<10	<1	<1	<100
	8/28/2015	<1	<1	<1	<10	<1	<1	<100
	9/1/2015	<1	<1	<1	<10	<1	<1	<100
	10/20/2015	<1	<1	<1	<10	<1	<1	<100
	11/17/2015	<1	<1	<1	<10	<1	<1	<100
	12/21/2015	<1	<1	<1	<10	<1	<1	<100

TABLE E-2: CARBON PERFORMANCE ANALYTICAL RESULTS
SEMI-ANNUAL PROGRESS REPORT: JULY THROUGH DECEMBER 2015
FORMER CHEVRON FACILITY 122208, 5801 RIGGS ROAD, CHILLUM, MD

ID	Date	Benzene (µg/L)	Toluene (µg/L)	Ethylbenzene (µg/L)	Total Xylenes (µg/L)	Naphthalene (µg/L)	MTBE (µg/L)	TPH-GRO (µg/L)
ISGR-1 -75%	9/30/2013	<1	<1	<1	<10	NA	<1	<100
	10/30/2013	<1	<1	<1	<10	NA	<1	<100
	11/26/2013	<1	<1	<1	<10	NA	<1	<100
	12/18/2013	<1	<1	<1	<10	NA	<1	<100
	2/7/2014	<1	<1	<1	<10	NA	<1	<100
	3/6/2014	<1	<1	<1	<10	NA	<1	<100
	4/9/2014	<1	<1	<1	<10	NA	<1	<100
	5/12/2014	<1	<1	<1	<10	NA	<1	<100
	6/23/2014	<1	<1	<1	<10	NA	<1	<100
	7/23/2014	<1	<1	<1	<10	<1	<1	<100
	8/18/2014	<1	<1	<1	<10	<1	<1	<100
	9/11/2014	<1	<1	<1	<10	NA	<1	<100
	10/7/2014	<1	<1	<1	<10	<1	<1	<100
	11/6/2014	<1	<1	<1	<10	<1	<1	<100
	12/9/2014	<1	<1	<1	<10	<1	<1	<100
	1/27/2015	<1	<1	<1	<10	<1	<1	<100
	3/4/2015	<1	<1	<1	<10	<1	<1	<100
	4/28/2015	<1	<1	<1	<10	<1	<1	<100
	5/7/2015	<1	<1	<1	<10	<1	<1	<100
	6/23/2015	<1	<1	<1	<10	<1	<1	<100
	7/27/2015	<1	<1	<1	<10	<1	<1	<100
	8/28/2015	<1	<1	<1	<10	<1	<1	<100
	9/1/2015	<1	<1	<1	<10	<1	<1	<100
	10/20/2015	<1	<1	<1	<10	<1	<1	<100
	11/17/2015	<1	<1	<1	<10	<1	<1	<100
	12/21/2015	<1	<1	<1	<10	<1	<1	<100

ARCADIS Design & Consultancy for natural and built assets

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TABLE E-2: CARBON PERFORMANCE ANALYTICAL RESULTS
SEMI-ANNUAL PROGRESS REPORT: JULY THROUGH DECEMBER 2015
FORMER CHEVRON FACILITY 122208, 5801 RIGGS ROAD, CHILLUM, MD

ID	Date	Benzene (µg/L)	Toluene (µg/L)	Ethylbenzene (µg/L)	Total Xylenes (µg/L)	Naphthalene (µg/L)	MTBE (µg/L)	TPH-GRO (µg/L)
ISGR-1 -90%	9/30/2013	<1	<1	<1	<10	NA	<1	<100
	10/30/2013	<1	<1	<1	<10	NA	<1	<100
	11/26/2013	<1	<1	<1	<10	NA	<1	<100
	12/18/2013	<1	<1	<1	<10	NA	<1	<100
	2/7/2014	<1	<1	<1	<10	NA	<1	<100
	3/6/2014	<1	<1	<1	<10	NA	<1	<100
	4/9/2014	<1	<1	<1	<10	NA	<1	<100
	5/12/2014	<1	<1	<1	<10	NA	<1	<100
	6/23/2014	<1	<1	<1	<10	NA	<1	<100
	7/23/2014	<1	<1	<1	<10	<1	<1	<100
	8/18/2014	<1	<1	<1	<10	<1	<1	<100
	9/11/2014	<1	<1	<1	<10	NA	<1	<100
	10/7/2014	<1	<1	<1	<10	<1	<1	<100
	11/6/2014	<1	<1	<1	<10	<1	<1	<100
	12/9/2014	<1	<1	<1	<10	<1	<1	<100
	1/27/2015	<1	<1	<1	<10	<1	<1	<100
	3/4/2015	<1	<1	<1	<10	<1	<1	<100
	4/28/2015	<1	<1	<1	<10	<1	<1	<100
	5/7/2015	<1	<1	<1	<10	<1	<1	<100
	6/23/2015	<1	<1	<1	<10	<1	<1	<100
	7/27/2015	<1	<1	<1	<10	<1	<1	<100
	8/28/2015	<1	<1	<1	<10	<1	<1	<100
	9/1/2015	<1	<1	<1	<10	<1	<1	<100
	10/20/2015	<1	<1	<1	<10	<1	<1	<100
	11/17/2015	<1	<1	<1	<10	<1	<1	<100
	12/21/2015	<1	<1	<1	<10	<1	<1	<100

TABLE E-2: CARBON PERFORMANCE ANALYTICAL RESULTS
SEMI-ANNUAL PROGRESS REPORT: JULY THROUGH DECEMBER 2015
FORMER CHEVRON FACILITY 122208, 5801 RIGGS ROAD, CHILLUM, MD

ID	Date	Benzene (µg/L)	Toluene (µg/L)	Ethylbenzene (µg/L)	Total Xylenes (µg/L)	Naphthalene (µg/L)	MTBE (µg/L)	TPH-GRO (µg/L)
ISGR-2 Influent	9/30/2013	44	5.2	30	17.2	NA	69	480
	10/30/2013	3.9	1.1	5.8	<10	NA	43	170
	11/26/2013	34	2.3	16	12.8	NA	64	500
	12/19/2013	3	<1	<1	<10	NA	6.9	<100
	2/17/2014	1.3	<1	<1	<10	NA	2.8	<100
	3/6/2014	1.0	<1	<1	<10	NA	1.8	<100
	4/9/2014	<1	<1	<1	<10	NA	7.8	<100
	5/12/2014	<1	<1	<1	<10	NA	1.9	<100
	6/23/2014	5.9	<1	<1	<10	NA	5.7	<100
	7/23/2014	4.1	<1	<1	<10	<1	3.9	<100
	8/18/2014	<1	<1	<1	<10	<1	3.0	<100
	9/11/2014	5.9	<1	<1	<10	NA	15	<100
	10/7/2014	<1	<1	<1	<10	<1	1.8	<100
	11/6/2014	2.3	<1	<1	<10	<1	6.4	<100
	12/9/2014	5.2	<1	<1	<10	<1	20	<100
	1/27/2015	<1	<1	<1	<10	<1	1.7	<100
	3/4/2015	<1	<1	<1	<10	<1	23	<100
	3/20/2015	<1	<1	<1	<10	<1	<1	<100
	4/28/2015	6.8	<1	1.2	<10	1.2	57	150
	5/7/2015	7.0	<1	2.7	<10	<1	41	170
	6/23/2015	<1	<1	<1	<10	<1	7.9	<100
	7/27/2015	<1	<1	<1	<10	<1	13	<100
	8/28/2015	<1	<1	<1	<10	<1	22	<100
	9/1/2015	<1	<1	<1	<10	<1	13	<100
	10/20/2015	<1	<1	<1	<10	<1	16	<100
	11/17/2015	<1	<1	<1	<10	<1	<1	<100
	12/21/2015	1.1	<1	<1	<10	<1	24	<100

TABLE E-2: CARBON PERFORMANCE ANALYTICAL RESULTS
SEMI-ANNUAL PROGRESS REPORT: JULY THROUGH DECEMBER 2015
FORMER CHEVRON FACILITY 122208, 5801 RIGGS ROAD, CHILLUM, MD

ID	Date	Benzene (µg/L)	Toluene (µg/L)	Ethylbenzene (µg/L)	Total Xylenes (µg/L)	Naphthalene (µg/L)	MTBE (µg/L)	TPH-GRO (µg/L)
ISGR-2 -50%	9/30/2013	<1	<1	<1	<10	NA	<1	<100
	10/30/2013	<1	<1	<1	<10	NA	<1	<100
	11/26/2013	<1	<1	<1	<10	NA	<1	<100
	12/19/2013	<1	<1	<1	<10	NA	<1	<100
	2/17/2014	<1	<1	<1	<10	NA	<1	<100
	3/6/2014	<1	<1	<1	<10	NA	<1	<100
	4/9/2014	<1	<1	<1	<10	NA	<1	<100
	5/12/2014	<1	<1	<1	<10	NA	<1	<100
	6/23/2014	<1	<1	<1	<10	NA	<1	<100
	7/23/2014	<1	<1	<1	<10	<1	<1	<100
	8/18/2014	<1	<1	<1	<10	<1	<1	<100
	9/11/2014	<1	<1	<1	<10	NA	<1	<100
	10/7/2014	<1	<1	<1	<10	<1	<1	<100
	11/6/2014	<1	<1	<1	<10	<1	<1	<100
	12/9/2014	<1	<1	<1	<10	<1	<1	<100
	1/27/2015	<1	<1	<1	<10	<1	<1	<100
	3/4/2015	<1	<1	<1	<10	<1	<1	<100
	3/20/2015	<1	<1	<1	<10	<1	<1	<100
	4/28/2015	<1	<1	<1	<10	<1	<1	<100
	5/7/2015	<1	<1	<1	<10	<1	<1	<100
	6/23/2015	<1	<1	<1	<10	<1	<1	<100
	7/27/2015	<1	<1	<1	<10	<1	<1	<100
	8/28/2015	<1	<1	<1	<10	<1	<1	<100
	9/1/2015	<1	<1	<1	<10	<1	<1	<100
	10/20/2015	<1	<1	<1	<10	<1	<1	<100
	11/17/2015	<1	<1	<1	<10	<1	<1	<100
	12/21/2015	<1	<1	<1	<10	<1	<1	<100

TABLE E-2: CARBON PERFORMANCE ANALYTICAL RESULTS
SEMI-ANNUAL PROGRESS REPORT: JULY THROUGH DECEMBER 2015
FORMER CHEVRON FACILITY 122208, 5801 RIGGS ROAD, CHILLUM, MD

ID	Date	Benzene (µg/L)	Toluene (µg/L)	Ethylbenzene (µg/L)	Total Xylenes (µg/L)	Naphthalene (µg/L)	MTBE (µg/L)	TPH-GRO (µg/L)
ISGR-2 -75%	9/30/2013	<1	<1	<1	<10	NA	<1	<100
	10/30/2013	<1	<1	<1	<10	NA	<1	<100
	11/26/2013	<1	<1	<1	<10	NA	<1	<100
	12/19/2013	<1	<1	<1	<10	NA	<1	<100
	2/17/2014	<1	<1	<1	<10	NA	<1	<100
	3/6/2014	<1	<1	<1	<10	NA	<1	<100
	4/9/2014	<1	<1	<1	<10	NA	<1	<100
	5/12/2014	<1	<1	<1	<10	NA	<1	<100
	6/23/2014	<1	<1	<1	<10	NA	<1	<100
	7/23/2014	<1	<1	<1	<10	<1	<1	<100
	8/18/2014	<1	<1	<1	<10	<1	<1	<100
	9/11/2014	<1	<1	<1	<10	NA	<1	<100
	10/7/2014	<1	<1	<1	<10	<1	<1	<100
	11/6/2014	<1	<1	<1	<10	<1	<1	<100
	12/9/2014	<1	<1	<1	<10	<1	<1	<100
	1/27/2015	<1	<1	<1	<10	<1	<1	<100
	3/4/2015	<1	<1	<1	<10	<1	<1	<100
	3/20/2015	<1	<1	<1	<10	<1	<1	<100
	4/28/2015	<1	<1	<1	<10	<1	<1	<100
	5/7/2015	<1	<1	<1	<10	<1	<1	<100
	6/23/2015	<1	<1	<1	<10	<1	<1	<100
	7/27/2015	<1	<1	<1	<10	<1	<1	<100
	8/28/2015	<1	<1	<1	<10	<1	<1	<100
	9/1/2015	<1	<1	<1	<10	<1	<1	<100
	10/20/2015	<1	<1	<1	<10	<1	<1	<100
	11/17/2015	<1	<1	<1	<10	<1	<1	<100
	12/21/2015	<1	<1	<1	<10	<1	<1	<100

TABLE E-2: CARBON PERFORMANCE ANALYTICAL RESULTS
SEMI-ANNUAL PROGRESS REPORT: JULY THROUGH DECEMBER 2015
FORMER CHEVRON FACILITY 122208, 5801 RIGGS ROAD, CHILLUM, MD

ID	Date	Benzene (µg/L)	Toluene (µg/L)	Ethylbenzene (µg/L)	Total Xylenes (µg/L)	Naphthalene (µg/L)	MTBE (µg/L)	TPH-GRO (µg/L)
ISGR-2 -90%	9/30/2013	<1	<1	<1	<10	NA	<1	<100
	10/30/2013	<1	<1	<1	<10	NA	<1	<100
	11/26/2013	<1	<1	<1	<10	NA	<1	<100
	12/19/2013	<1	<1	<1	<10	NA	<1	<100
	2/17/2014	<1	<1	<1	<10	NA	<1	<100
	3/6/2014	<1	<1	<1	<10	NA	<1	<100
	4/9/2014	<1	<1	<1	<10	NA	<1	<100
	5/12/2014	<1	<1	<1	<10	NA	<1	<100
	6/23/2014	<1	<1	<1	<10	NA	<1	<100
	7/23/2014	<1	<1	<1	<10	<1	<1	<100
	8/18/2014	<1	<1	<1	<10	<1	<1	<100
	9/11/2014	<1	<1	<1	<10	NA	<1	<100
	10/7/2014	<1	<1	<1	<10	<1	<1	<100
	11/6/2014	<1	<1	<1	<10	<1	<1	<100
	12/9/2014	<1	<1	<1	<10	<1	<1	<100
	1/27/2015	<1	<1	<1	<10	<1	<1	<100
	3/4/2015	<1	<1	<1	<10	2.7	<1	<100
	3/20/2015	<1	<1	<1	<10	<1	<1	<100
	4/28/2015	<1	<1	<1	<10	<1	<1	<100
	5/7/2015	<1	<1	<1	<10	<1	<1	<100
	6/23/2015	<1	<1	<1	<10	<1	<1	<100
	7/27/2015	<1	<1	<1	<10	<1	<1	<100
	8/28/2015	<1	<1	<1	<10	<1	<1	<100
	9/1/2015	<1	<1	<1	<10	<1	<1	<100
	10/20/2015	<1	<1	<1	<10	<1	<1	<100
	11/17/2015	<1	<1	<1	<10	<1	<1	<100
	12/21/2015	<1	<1	<1	<10	<1	<1	<100

Notes

1. Non-detect concentration values were represented as half of the respective Minimum Detection Level as identified in the laboratory analytical reports (5 µg/l) for the Total Xylenes concentration calculation
2. NA = Not Analyzed

APPENDIX F

OXYGEN REACTIVE ZONE

TABLE F-1: OXYGEN REACTIVE ZONE MONITORING DATA
SEMI-ANNUAL PROGRESS REPORT: JULY THROUGH DECEMBER 2015
FORMER CHEVRON FACILITY 122208, 5801 RIGGS ROAD, CHILLUM, MD

Date	Time	Tank Pressure (PSI)	Tank Regulator Pressure (PSI)	Well Regulator Pressure (PSI)	Oxygen Sensor (%)
9/17/2013	1230	1,850	60	10	20.9
10/30/2013	1300	1,600	60	10	20.9
11/14/2013	1500	1,000	60	12	20.9
11/21/2013	1300	1,300	80	12	20.9
12/12/2013	1300	950	15	15	20.9
1/28/2014	1620	0	0	0	20.9
2/27/2014	0700	2,200	15	15	20.9
3/6/2014	1500	1800	13	14	20.9
3/24/2014	-	1700	90	15	20.9
4/11/2014	1400	1600	80	14	20.9
5/27/2014	0850	1300	80	15	20.9
6/23/2014	1530	1050	100	15	20.9
7/23/2014	1500	800	18	18	20.9
8/27/2014	1430	400	20	20	20.9
9/8/2014	1300	200	20	18	20.9
9/22/2014	1000	0	0	0	20.9
10/21/2014	1545	1550	18	18	20.9
11/6/2014	1430	1400	18	18	20.9
12/22/2014	1200	1000	18	18	20.9
1/27/2015	1300	0	18	18	20.9
2/24/2015	1400	1500	18	18	20.9
3/12/2015	0800	0	0	0	20.9

TABLE F-2: DISSOLVED OXYGEN MEASUREMENTS
SEMI-ANNUAL PROGRESS REPORT: JULY THROUGH DECEMBER 2015
FORMER CHEVRON FACILITY 122208, 5801 RIGGS ROAD, CHILLUM, MD

Date	IW-1	IW-2	IW-3	IW-4	IW-5	MW-26A	MW-26B	MW-58
	Dissovled Oxygen (mg/L)							
9/30/2013	4.02	7.72	5.27	3.04	8.92	1.24	0.92	3.33
10/30/2013	4.92	5.59	5.42	8.45	0.27	0.75	1.09	0.51
11/27/2013	12.69	11.21	11.09	5.82	4.19	0.92	1.21	1.69
1/29/2014	0.43	0.75	1.39	1.23	1.71	1.62	1.39	2.29
4/26/2014	8.5	6.12	6.51	6.3	1.8	0.4	0.78	1.71
8/27/2014	32.71	14.98	20.21	24.29	1.64	1.15	1.94	1.35
10/23/2014	11.98	8.3	6.96	3.71	2.03	0.56	0.5	3.03

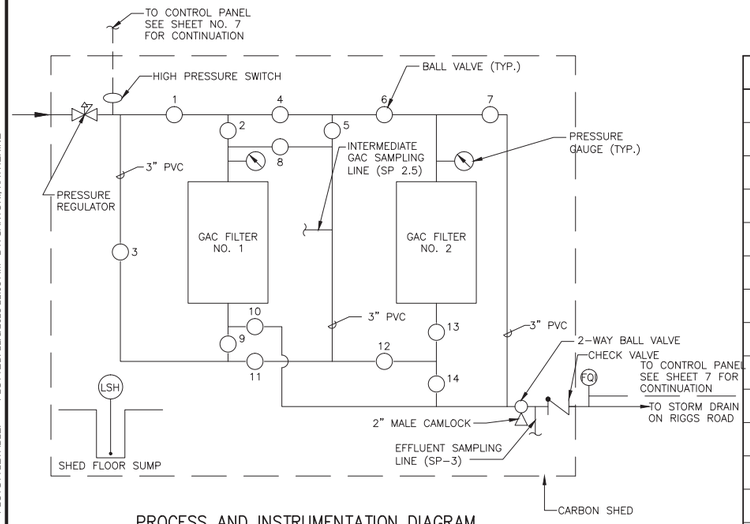
APPENDIX G

AREA A, B, AND C PIPING AND INSTRUMENTATION DIAGRAMS

ARCADIS Design & Consultancy for natural and built assets

Area A: Dual Phase Extraction System

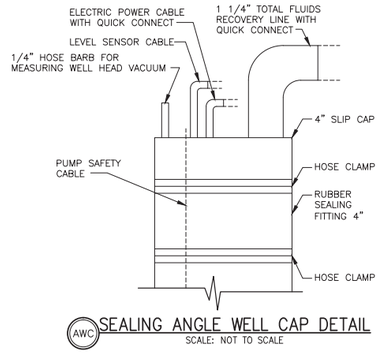
Piping and Instrumentation Diagrams



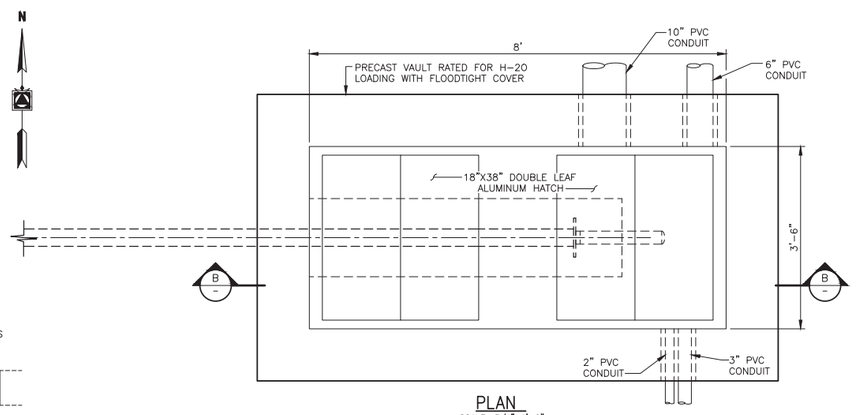
PROCESS AND INSTRUMENTATION DIAGRAM
SCALE: NOT TO SCALE

VALVE	SYSTEM OPERATING MODE						
	SERIES 1→2	SERIES 2→1	GAC 1	GAC 2	BW 1→2	BW 1	BW 2
1	O	O	O	O	C	C	C
2	O	C	O	C	C	C	–
3	C	C	C	C	O	O	O
4	C	O	C	O	–	–	–
5	O	C	–	C	C	C	C
6	O	O	–	O	C	–	C
7	C	C	C	C	O	C	O
8	C	O	C	–	O	O	C
9	O	C	C	–	O	O	C
10	C	O	O	C	C	C	–
11	O	C	–	–	C	C	O
12	C	O	–	C	O	O	O
13	O	O	–	O	O	C	O
14	O	C	C	O	C	O	C

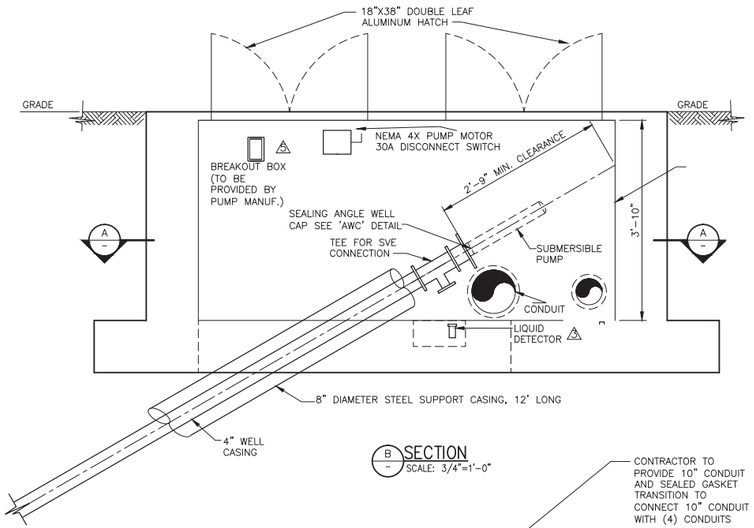
O = OPEN
C = CLOSED
– = IRRELEVANT
BW = BACKWASH



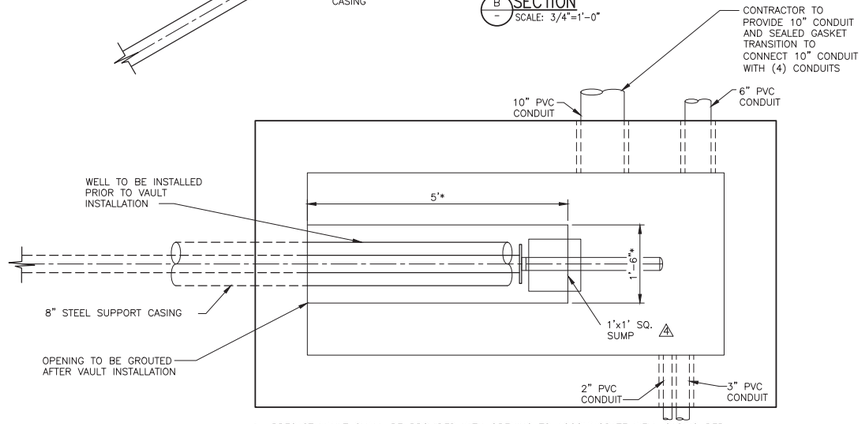
AWC SEALING ANGLE WELL CAP DETAIL
SCALE: NOT TO SCALE



PLAN
SCALE: 3/4"=1'-0"



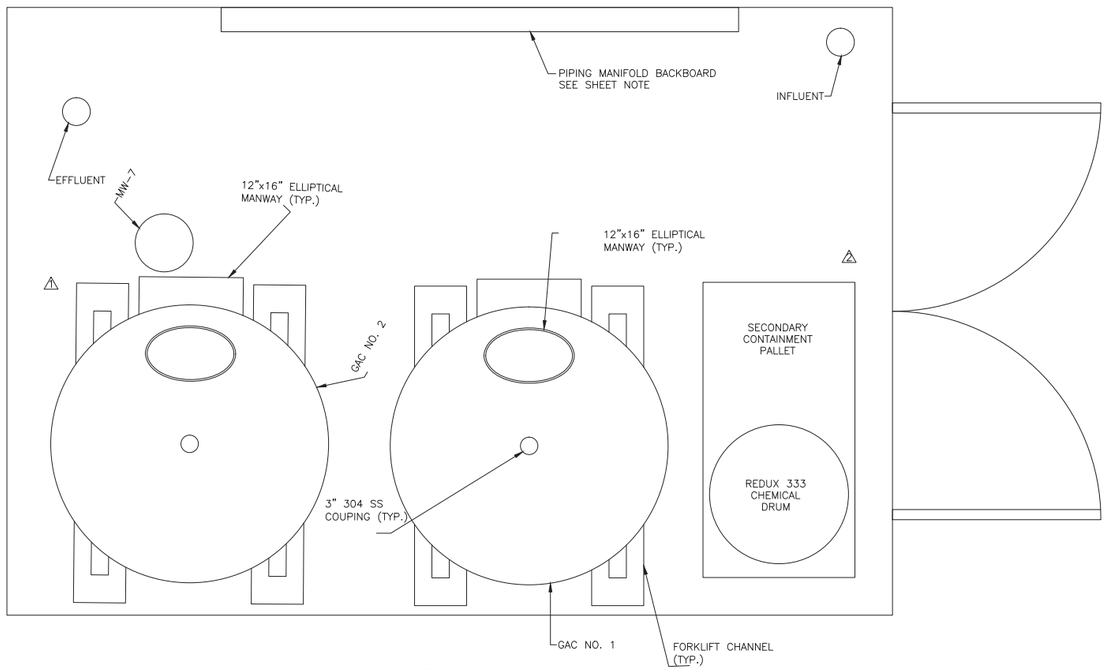
B SECTION
SCALE: 3/4"=1'-0"



* PRECAST VAULT SHALL BE PROVIDED WITH OPENING TO ACCOMMODATE WELL CASING PER THE FOLLOWING NOTES.
1. CONTRACTOR SHALL VERIFY OPENING DIMENSIONS AND LOCATIONS PRIOR TO CASTING THE VAULT.
2. CONTRACTOR SHALL DOWEL BARS, CAST CONCRETE IN PLACE AND CLOSE OPENING WATERTIGHT WITH NON-SHRINK GROUT TO LEVEL WITH BOTTOM OF THE PRECAST VAULT, PER THE PRECAST VAULT MANUFACTURER'S RECOMMENDATIONS.
3. CONTRACTOR SHALL PROTECT WELL CASING FROM CONCRETE IN ALL CONTACT AREAS PER THE PRECAST VAULT MANUFACTURER'S RECOMMENDATIONS.

A SECTION A-A
SCALE: 3/4"=1'-0"

ANGLE WELL VAULT



GAC SHED PLAN VIEW
SCALE: 1" = 1'

SHEET NOTE:
PIPING SHALL NOT BLOCK ACCESS TO GAC MANWAYS OR RUN ACROSS THE FLOOR.

NOTE:
BEGINNING OCTOBER 2013, THIS DRAWING HAS BEEN MODIFIED BY ARCADIS U.S. TO SHOW AS-BUILT CONDITIONS.

AS-BUILT DRAWINGS

SEAL

DATE:

PROFESSIONAL CERTIFICATION
I HEREBY CERTIFY THAT THESE DOCUMENTS WERE PREPARED OR APPROVED BY ME AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MARYLAND
LICENSE NO. 33568
EXP DATE 09/12/12
ENGINEER: ROBERT W. SCRAFFORD
GANNETT FLEMING, INC.

NO.	DESCRIPTION	DATE	BY
1	GAC NO. 2 ALIGNED PARALLEL WITH GAC NO. 1	6/11/12	ET
2	SECONDARY CONTAINMENT PALLET MOVED NEXT TO GAC NO. 1	6/11/12	ET
3	AS-BUILT LIQUID DETECTOR LOCATION	6/11/12	ET
4	AS-BUILT SUMP LOCATION	6/11/12	ET
5	AS-BUILT BREAKOUT BOX LOCATION	6/11/12	ET

REVISIONS

DESIGNED	CADD	SCALE
EL	SJM	NONE
CHECKED	APPROVED	APPROVED
RWS	RWS	X

Gannett Fleming
BALTIMORE, MARYLAND

CHEVRON PRODUCTS COMPANY
HOUSTON, TEXAS

FORMER CHEVRON FACILITY NO.122208-AREA A
CHILLUM, MARYLAND

DUAL PHASE EXTRACTION SYSTEM
GAC SYSTEM AND ANGLE WELL VAULT

JOB NO.	SHEET NO.
55588	4
DATE	
JUNE 2012	
CAD FILE	
122208AA GAC	4 OF 10

CITY: SYRACUSE-NY DIV/GROUP: 141/ENV DB: K.SARTORI PIC: PM: TM: JOHN.MARRS LYR:ON=*;OFF=*REF*
G:\ENVCAD\SYRACUSE\ACT\B0048971\0000\0001\DWG\CONTRACT\AREA_A\48971G04.dwg LAYOUT: 4 SAVED: 11/8/2013 11:04 AM ACADVER: 18.1S (LMS TECH) PAGESETUP: ---- PLOTSTYLETABLE: ---- PLOTTED: 11/8/2013 11:05 AM BY: SARTORI, KATHERINE
XREFS: IMAGES:
122208-TB2 ANGLED WELL VAULT.JPG

CITY: SYRACUSE-NY DIV/GROUP: 141/ENV DB: K.SARTORI PIC: PM: TM: JOHN MARRS LYR:ON=*;OFF=*REF* G:\ENVCAD\SYRACUSE\ACT\B0048971\0000\00001\DWG\CONTRACT\AREA_A\48971G06.dwg LAYOUT: 6 SAVED: 10/29/2013 5:19 PM ACADVER: 18.1S (LMS TECH) PAGESETUP: ---- PLOTSTYLETABLE: ---- PLOTTED: 10/30/2013 8:00 AM BY: SARTORI, KATHERINE

XREFS: 122208-TB2 IMAGES:

PRIMARY ELEMENT:

FLOW

- ELECTROMAGNETIC
- CORIOLIS
- THERMAL DISPERSION
- ULTRASONIC TRANSIT–TIME OR DOPPLER
- VENTURI
- ORIFICE PLATE
- PROPELLER OR TURBINE
- VORTEX
- ROTAMETER
- FLUME
- FLOW SWITCH
- WEIR

LEVEL

- BUBBLER TUBE
- ULTRASONIC
- CAPACITANCE
- ELECTRODES (W/HOLDER)
- FLOAT
- OPTICAL

TEMPERATURE

- TEMPERATURE ELEMENT WITH WELL

ACTUATORS:

- CYLINDER
- MOTOR
- ELECTROPNEUMATIC
- ELECTROHYDRAULIC
- MANUAL (SHOWN ONLY FOR CERTAIN HAND OPERATED VALVES)
- SOLENOID
- DIAPHRAM (SPRING OPPOSED)
- DIAPHRAM (PRESSURE BALANCED)
- PRESSURE OR VACUUM RELIEF SPRING OR WEIGHT LOADED

NOTE: ON LOSS OF PRIMARY POWER (PNEUMATIC OR ELECTRICAL)

XX DENOTES ONE OF THE FOLLOWING:
FO = FAIL OPEN
FC = FAIL CLOSED
FI = FAIL TO INTERMEDIATE POSITION
BLANK = FAIL TO LAST POSITION

EQUIPMENT TAGGING:

X–NNN

X DENOTES ONE OF THE FOLLOWING:
M=MECHANICAL EQUIPMENT
P=PUMP
T=TANK
V=VALVE
CFD=CHEMICAL FEEDER

NNN = LOOP NUMBER

INSTRUMENT & FUNCTION TAGGING:

XXX=FUNCTIONAL INSTRUMENT IDENTIFICATION LETTERS FROM INSTRUMENT IDENTIFICATION TABLE.

X=LETTER SUFFIX TO DISTINGUISH BETWEEN INSTRUMENTS IN LOOP WITH SAME FUNCTIONAL IDENTIFICATION. (USED AS REQ'D)

NNN=LOOP NUMBER

EQUIPMENT:

- CENTRIFUGAL PUMP (DRY PIT)
- CENTRIFUGAL PUMP (WET PIT)
- EJECTOR, EDUCTOR
- METERING PUMP–CHEMICAL
- CENTRIFUGAL COMPRESSOR OR BLOWER
- RECIPROCATING COMPRESSOR (PD)
- ROTARY COMPRESSOR (PD) OR BLOWER
- MOTOR
- MIXER
- VERTCAL TURBINE PUMP

XX DENOTES ONE OF THE FOLLOWING:
CS = CONSTANT SPEED
2S = TWO SPEED
VS = VARIABLE SPEED

- POSITIVE DISPLACEMENT PUMP

VALVE STATES:

- TWO–WAY VALVE, NORMALLY OPEN
- TWO–WAY VALVE, NORMALLY CLOSED
- THREE–WAY VALVE, TOTALLY–FILLED PORT BLOCKED AND PARTIALLY–FILLED PORT OPENED WHEN DEACTIVATED. PORT STATES REVERSE WHEN ACTIVATED.

EXPLANATORY NOTATIONS:

- NN/XX — FLOW STREAM No NN TO SHEET No XX
- FLOW STREAM TO OR FROM EQUIPMENT NOT SHOWN ON OTHER P&ID DRAWINGS

HAND SWITCHES

- HS XX — SELECTOR SWITCH (MAINTAINED CONTACTS)
- HMS XX — SPRING RETURN SWITCH OR PUSHBUTTONS (MOMENTARY CONTACTS)

XX DENOTES ONE OF THE FOLLOWING:
AM=AUTO/MANUAL
CAM=COMPUTER/AUTO/MANUAL
CL=COMPUTER/LOCAL
CM=COMPUTER/MANUAL
DOB=DRIVE/OFF/BYPASS
FOS=FAST/OFF/SLOW
FOR=FORWARD/OFF/REVERSE
FR=FORWARD/REVERSE
FS=FAST/SLOW
HOA=HAND/OFF/AUTO
KEY=KEYPAD
LOR=LOCAL/OFF/REMOTE
LOS=LOCKOUT/STOP
MFS=MODULATE FASTER/SLOWER
MOC=MODULATE OPEN/CLOSE
OC=OPEN/CLOSE
OO=ON/OFF
OSC=OPEN/STOP/CLOSE
SS=START/STOP
PB=PUSH BUTTON

SIGNAL CONVERTERS

X/X — SMALL CIRCLE SIGNIFIES LOGICAL INVERSION OF SIGNAL

X DENOTES ONE OF THE FOLLOWING:

A=ANALOG	O=ELECTROMAGNETIC, SONIC
B=BINIARY	P=PNEUMATIC
D=DIGITAL	PF=PULSE FREQUENCY
E=VOLTAGE	PD=PULSE DURATION
F=FREQUENCY	R=RESISTANCE
H=HYDRAULIC	
I=CURRENT	

MISCELLANEOUS:

- DIAPHRAGM SEAL
- ANNULAR DIAPHRAGM
- RUPTURE DISK (PRESSURE RELIEF)
- RUPTURE DISK (VACCUUM RELIEF)
- (REGULATED SIDE) PRESSURE REGULATOR
- VENT TO ATMOSPHERE
- AIR GAP
- TWO WAY VALVE FAIL OPEN
- TWO WAY VALVE FAIL CLOSE
- ANY VALVE, FAIL LOCKED (POSITION DOES NOT CHANGE)
- PINCH VALVE
- XP — PURGE SET X DENOTES: W=WATER A=AIR
- FLOW STRAIGHTENER
- X — EQUIPMENT CONNECTION WITH ELECTRICAL INTERLOCK
- XG — SIGHT GLASS X DENOTES: F=FLOW L=LEVEL
- PRESSURE GAUGE
- SYSTEM/EQUIPMENT GROUND
- ISOLATED GROUND
- OMNIDIRECTIONAL ANTENNA
- DIRECTIONAL ANTENNA

VALVES & GATES:

- BALL VALVE
- BUTTERFLY VALVE
- CHECK VALVE GLOBE, GATE, PINCH OR OTHER IN–LINE VALVE
- ROTARY VALVE
- DIAPHRAM VALVE
- PLUG VALVE
- THREE WAY VALVE (ARROW IF SHOWN INDICATES FAIL OPEN PATH)
- TELESCOPING VALVE
- SLUICE GATE
- PREFABRICATED SLIDE GATE
- UNCLASSIFIED GATE (SEE SPECIFICATIONS)
- KNIFE GATE VALVE

INSTRUMENT/FUNCTION & LOCATION SYMBOLS

	FIELD (LOCAL) MOUNTED	PANEL MOUNTED		MOTOR CONTROL CENTER MOUNTED	
		ACCESSIBLE OR EXTERIOR	INACCESSIBLE OR INTERIOR	ACCESSIBLE OR EXTERIOR	INACCESSIBLE OR INTERIOR
DISCRETE INSTRUMENT					
SHARED DISPLAY/CONTROL					
COMPUTER FUNCTION					
PROGRAMMABLE LOGIC CONTROL					
PILOT LIGHT					
HAND SWITCH MAINTAINED CONTACTS	HS	HS	HS	HS	HS
HAND SWITCH MOMENTARY CONTACTS	HMS	HMS	HMS	HMS	HMS
COMPOUND INSTRUMENTS (SHARE COMMON HOUSING)					

INSTRUMENT IDENTIFICATION TABLE ISA–S5.1–1984

LETTER	FIRST LETTER		SUCCEEDING LETTERS		
	MEASURED OR INITIATING VARIABLE	MODIFIER	READOUT OR PASSIVE FUNCTION	OUTPUT FUNCTION	MODIFIER
A	ANALYSIS (2)		ALARM		
B	BURNER, COMBUSTION			CLOSE, STOP, DECREASE (1)	OFF (1)
C				CONTROL	
D		DIFFERENTIAL		OPEN, START, INCREASE (1)	
E	VOLTAGE		SENSOR (PRIMARY ELEMENT)		ENABLED (1)
F	FLOW RATE	RATIO (FRACTION)			FAIL (1)
G			GLASS, VIEWING DEVICE		
H	HAND				HIGH (OPENED)
I	CURRENT (ELECTRICAL)		INDICATE		
J	POWER	SCAN			
K	TIME, TIME SCHEDULE	TIME RATE OF CHANGE		CONTROL STATION	
L	LEVEL		LIGHT		LOW (CLOSED)
M	MOTOR, MOTION (1)	MOMENTARY		MOTOR (1)	MIDDLE OR INTERMEDIATE
N					ON OR OPERATE (1)
O			ORIFICE, RESTRICTION		OVERLOAD (1)
P	PRESSURE, VACUUM		POINT (TEST) CONNECTION	PUMP (1)	
Q	QUANTITY (2)	INTEGRATE, TOTALIZE			
R	RADIATION		RECORD		
S	SPEED, FREQUENCY	SAFETY OR SOLENOID		SWITCH	
T	TEMPERATURE			TRANSMIT	
U	MULTIVARIABLE (2)		MULTIFUNCTION (2)	MULTIFUNCTION (2)	MULTIFUNCTION (2)
V	VIBRATION, MECHANICAL ANALYSIS			VALVE, DAMPER, LOUVER	
W	WEIGHT, FORCE		WELL		
X	UNCLASSIFIED, (2)		UNCLASSIFIED (2)	UNCLASSIFIED (2)	UNCLASSIFIED (2)
Y	EVENT, STATE, PRESENCE			RELAY, COMPUTE, CONVERT	
Z	POSITION, DIMENSION			DRIVER, ACTUATOR, UNCLASSIFIED FINAL CONTROL ELEMENT	

(1) USER'S CHOICE
(2) WHEN USED, SYMBOL OR SIGNAL LINE IS INDICATED.

INPUTS & OUTPUTS INTERFACED WITH COMPUTER DATA ACQUISITION & CONTROL SYSTEM:

- ANALOG INPUT
- ANALOG OUTPUT
- DIGITAL INPUT
- DIGITAL OUTPUT
- SERIAL (INPUT/OUTPUT)

RTU1 X–XX — ALPHANUMERIC CHARACTERS TO IDENTIFY CONTROL PANEL

IF USED, NUMBER OF POINTS. (SINGLE POINT IF NOT USED)

XX DENOTES ONE OF THE FOLLOWING:
AO=ANALOG OUTPUT
AI=ANALOG INPUT
DI=DISCRETE INPUT
DO=DISCRETE OUTPUT
SC=SERIAL COMMUNICATIONS

EQUIPMENT POWER:

XXX — 120VAC POWER FROM POWER PANEL CIRCUIT BREAKER, UNLESS OTHERWISE NOTED, REQUIRED TO INSTRUMENT (TYP)

XXX DENOTES ONE OF THE FOLLOWING:

UPS=120VAC FROM UPS VIA FUSEBLOCK

208/3=208V, 3 PHASE FROM POWER PANEL CIRCUIT BREAKER

ANALYSIS INSTRUMENTS:

- AE XX — EXPOSED PROBE OR GAS DETECTION
- AE XX — TAPPED OR SAMPLED
- AE XX — IN–LINE

XX DENOTES ONE OF THE FOLLOWING:
CLG=CHLORINE GAS
CLR–CHLORINE RESIDUAL
PH=PH
T=TURBIDITY
FLR=FLOURIDE
SCD=STREAMING CURRENT
PM=PARTICLE MONITOR
PC=PARTICLE COUNTER
TOC=TOTAL ORGANIC CARBON

ABBREVIATIONS:

A or AMP	AMPERE
AC	ALTERNATING CURRENT
AFF	ABOVE FINISHED FLOOR
AFG	ABOVE FINISHED GRADE
AIC	AMPERE INTERRUPTING CAPACITY
AS	AMMETER SELECTOR SWITCH
ATS	AUTO TRANSFER SWITCH
AUTO	AUTOMATIC
AWG	AMERICAN WIRE GAUGE
BLDG	BUILDING
C	CONDUIT
CP	CONTROL PANEL
DIV	DIVISION
EC	ELECTRICAL CONTRACTOR
EMT	ELECTRICAL METALLIC TUBING (CONDUIT)
EF	EXHAUST FAN
EP	EXPLOSION PROOF
F/T	FEED THROUGH
FU	FUSE
FO	FIBER OPTIC
GFI	GROUND FAULT INTERRUPTER
GRD	GROUND
HP	HORSEPOWER
IG	ISOLATED GROUND
KV	KILOVOLT
KVA	KILOVOLT AMPERE
KW	KILOWATT
MTD	MOUNTED
N/A	NOT APPLICABLE
NC	NORMALLY CLOSED
NO	NORMALLY OPEN
No	NUMBER
PNL	PANEL
PVC	POLYVINYL CHLORIDE (CONDUIT)
RECP	RECEPTACLES
RGS	RIGID GALVANIZED STEEL (CONDUIT)
RVAT	REDUCED VOLTAGE AUTOTRANSFORMER
RVSS	REDUCED VOLTAGE SOLID STATE
TVSS	TRANSIENT VOLTAGE SURGE SUPPRESSION
TYP	TYPICAL
UL	UNDERWRITER LABORATORIES
UON	UNLESS OTHERWISE NOTED
UPS	UNINTERRUPTIBLE POWER SUPPLY
V	VOLT
VS	VOLTMETER SELECTOR SWITCH
W	WIRE
WP	WEATHERPROOF
WS	WATER SUPPLY
XFMR	TRANSFORMER
1–PH	SINGLE PHASE
3–PH	THREE PHASE

NOTE:
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AS-BUILT DRAWINGS

SEAL

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LICENSE NO. 33568

EXP DATE 09/12/12

ENGINEER: ROBERT W. SCRAFFORD GANNETT FLEMING, INC.

DATE:

NO.	DESCRIPTION	DATE	BY

REVISIONS

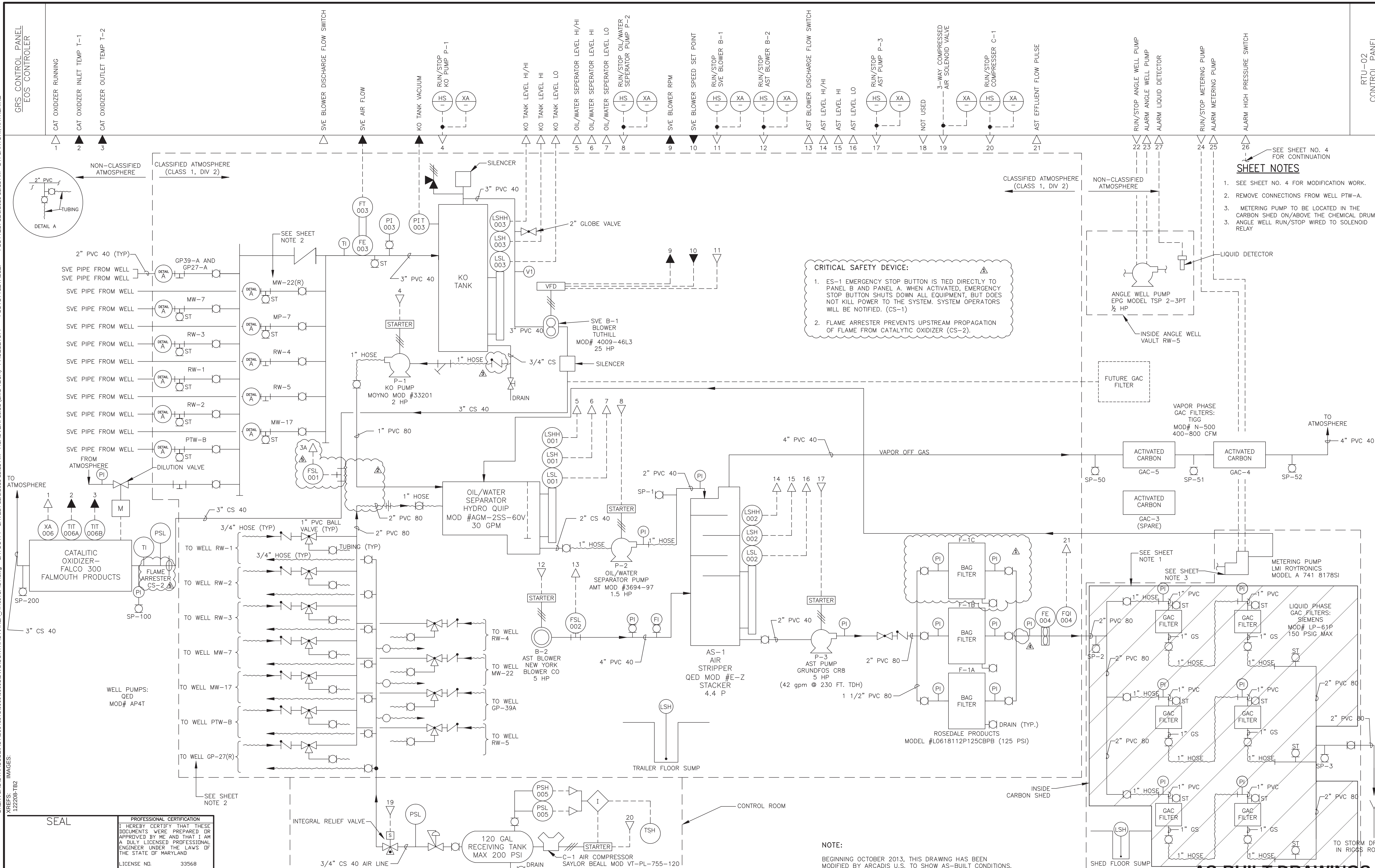
DESIGNED	CADD	SCALE
EL	SJM	NONE
CHECKED	APPROVED	APPROVED
RWS	RWS	X

Gannett Fleming
BALTIMORE, MARYLAND

CHEVRON PRODUCTS COMPANY
HOUSTON, TEXAS
FORMER CHEVRON FACILITY NO.122208–AREA A
CHILLUM, MARYLAND

DUAL PHASE EXTRACTION SYSTEM
INSTRUMENTATION LEGEND
ABBREVIATIONS AND GENERAL NOTES

JOB NO. 55588
DATE JUNE 2012
CAD FILE 122208AA LEG
SHEET NO. 6
6 of 10


GRS CONTROL PANEL
EOS CONTROLER
CAT OXIDIZER RUNNING
CAT OXIDIZER INLET TEMP T-1
CAT OXIDIZER OUTLET TEMP T-2
SVE BLOWER DISCHARGE FLOW SWITCH
SVE AIR FLOW
KO TANK VACUUM
RUN/STOP KO PUMP P-1
KO TANK LEVEL HI/HI
KO TANK LEVEL HI
KO TANK LEVEL LO
OIL/WATER SEPERATOR LEVEL HI/HI
OIL/WATER SEPERATOR LEVEL HI
OIL/WATER SEPERATOR LEVEL LO
RUN/STOP OIL/WATER SEPERATOR PUMP P-2
SVE BLOWER RPM
SVE BLOWER SPEED SET POINT
RUN/STOP SVE BLOWER B-1
RUN/STOP AST BLOWER B-2
AST BLOWER DISCHARGE FLOW SWITCH
AST LEVEL HI/HI
AST LEVEL HI
AST LEVEL LO
RUN/STOP AST PUMP P-3
NOT USED
3-WAY COMPRESSED AIR SOLENOID VALVE
RUN/STOP COMPRESSER C-1
AST EFFLUENT FLOW PULSE
RUN/STOP ANGLE WELL PUMP
ALARM ANGLE WELL PUMP
ALARM LIQUID DETECTOR
RUN/STOP METERING PUMP
ALARM METERING PUMP
ALARM HIGH PRESSURE SWITCH
RTU-02 CONTROL PANEL
SEE SHEET NO. 4 FOR CONTINUATION
SHEET NOTES
1. SEE SHEET NO. 4 FOR MODIFICATION WORK.
2. REMOVE CONNECTIONS FROM WELL PTW-A.
3. METERING PUMP TO BE LOCATED IN THE CARBON SHED ON/ABOVE THE CHEMICAL DRUM
3. ANGLE WELL RUN/STOP WIRED TO SOLENOID RELAY
NON-CLASSIFIED ATMOSPHERE
CLASSIFIED ATMOSPHERE (CLASS 1, DIV 2)
DETAIL A
SILENCER
3" PVC 40
2" GLOBE VALVE
KO TANK
SEE SHEET NOTE 2
2" PVC 40 (TYP)
GP39-A AND GP27-A
SVE PIPE FROM WELL
MW-22(R)
MW-7
MP-7
RW-3
RW-4
RW-1
RW-5
RW-2
MW-17
PTW-B
FROM ATMOSPHERE
DILUTION VALVE
VFD
SVE B-1 BLOWER TUTHILL MOD# 4009-46L3 25 HP
STARTER
1" HOSE
P-1 KO PUMP MOYNO MOD #33201 2 HP
3/4" CS
SILENCER
DRAIN
3" CS 40
1" PVC 80
CRITICAL SAFETY DEVICE:
1. ES-1 EMERGENCY STOP BUTTON IS TIED DIRECTLY TO PANEL B AND PANEL A. WHEN ACTIVATED, EMERGENCY STOP BUTTON SHUTS DOWN ALL EQUIPMENT, BUT DOES NOT KILL POWER TO THE SYSTEM. SYSTEM OPERATORS WILL BE NOTIFIED. (CS-1)
2. FLAME ARRESTER PREVENTS UPSTREAM PROPAGATION OF FLAME FROM CATALYTIC OXIDIZER (CS-2).
LIQUID DETECTOR
ANGLE WELL PUMP EPG MODEL TSP 2-3PT ½ HP
INSIDE ANGLE WELL VAULT RW-5
FUTURE GAC FILTER
VAPOR PHASE GAC FILTERS: TIGG MOD# N-500 400-800 CFM
TO ATMOSPHERE
4" PVC 40
VAPOR OFF GAS
ACTIVATED CARBON GAC-5
ACTIVATED CARBON GAC-4
ACTIVATED CARBON GAC-3 (SPARE)
SP-50
SP-51
SP-52
TO ATMOSPHERE
CATALYTIC OXIDIZER- FALCO 300 FALMOUTH PRODUCTS
FLAME ARRESTER CS-2
SP-200
SP-100
3" CS 40
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
3/4" HOSE (TYP)
1" PVC BALL VALVE (TYP)
TUBING (TYP)
TO WELL RW-1
TO WELL RW-2
TO WELL RW-3
TO WELL MW-7
TO WELL MW-17
TO WELL PTW-B
TO WELL GP-27(R)
TO WELL RW-4
TO WELL MW-22
TO WELL GP-39A
TO WELL RW-5
WELL PUMPS: QED MOD# AP4T
B-2 AST BLOWER NEW YORK BLOWER CO 5 HP
4" PVC 40
AS-1 AIR STRIPPER QED MOD #E-Z STACKER 4.4 P
P-3 AST PUMP GRUNDFOS CR8 5 HP (42 gpm @ 230 FT. TDH)
1 1/2" PVC 80
BAG FILTER
F-1C
F-1B
F-1A
DRAIN (TYP.)
ROSEDALE PRODUCTS MODEL #L0618112P125CBPB (125 PSI)
SEE SHEET NOTE 1
SEE SHEET NOTE 3
METERING PUMP LMI ROYTRONICS MODEL A 741 8178SI
LIQUID PHASE GAC FILTERS: SIEMENS MOD# LP-61P 150 PSIG MAX
GAC FILTER
INSIDE CARBON SHED
SHED FLOOR SUMP
TO STORM DRAIN IN RIGGS ROAD
TRAILER FLOOR SUMP
SEE SHEET NOTE 2
CONTROL ROOM
INTEGRAL RELIEF VALVE
120 GAL RECEIVING TANK MAX 200 PSI
C-1 AIR COMPRESSOR SAYLOR BEALL MOD VT-PL-755-120 10 HP 34.4 CFM @ 175 PSI
3/4" CS 40 AIR LINE
DRAIN
NOTE:
BEGINNING OCTOBER 2013, THIS DRAWING HAS BEEN MODIFIED BY ARCADIS U.S. TO SHOW AS-BUILT CONDITIONS.

CITY: SYRACUSE-NY DIV/GROUP: 141/ENV DB: K.SARTORI PIC: PM: TM: JOHN MARRS LYR:ON=*;OFF=*REF* G:\ENVCAD\SYRACUSE\ACT\B0048971\0000\00001\DWG\CONTRACT\AREA_A\48971PID7.dwg LAYOUT: 7 SAVED: 11/8/2013 11:11 AM ACADVER: 18.1S (LMS TECH) PAGESETUP: ---- PLOTSTYLETABLE: ---- PLOTTED: 11/8/2013 11:11 AM BY: SARTORI, KATHERINE

XREFS: 122208-TB2 IMAGES:

AS-BUILT DRAWINGS

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LICENSE NO. 33568

EXP DATE 09/12/12

ENGINEER: ROBERT W. SCRAFFORD GANNETT FLEMING, INC.

NO.	DESCRIPTION	DATE	BY
1	ADDED BAG FILTER F-1C, ADDED NOTE.	10/25/13	
2	RE-ROUTED PIPE PER AS-BUILT CONDITIONS	10/29/13	
3	ADDED CHECK VALVE	10/29/13	
4	REMOVED BALL VALVE	10/29/13	
5	ADDED CS-2 AND FSL-100	11/08/13	

REVISIONS

DESIGNED	CADD	SCALE
EL	SJM	NONE
CHECKED	APPROVED	APPROVED
RWS	RWS	X

Gannett Fleming

BALTIMORE, MARYLAND

CHEVRON PRODUCTS COMPANY
HOUSTON, TEXAS

FORMER CHEVRON FACILITY NO.122208-AREA A
CHILLUM, MARYLAND

DUAL PHASE EXTRACTION SYSTEM
PROCESS AND INSTRUMENTATION DIAGRAM

JOB NO. 55588

DATE JUNE 2012

CAD FILE 122208AA PID

SHEET NO. 7

7 OF 10

ARCADIS Design & Consultancy for natural and built assets

Area B: In-Situ Groundwater Remediation Wells

Piping and Instrumentation Diagrams

PRIMARY ELEMENT:

FLOW

- M — ELECTROMAGNETIC
- CORIOLIS
- THERMAL DISPERSION
- ULTRASONIC TRANSIT–TIME OR DOPPLER
- VENTURI
- ORIFICE PLATE
- PROPELLER OR TURBINE
- VORTEX
- FI — ROTAMETER
- FLUME
- FS — FLOW SWITCH
- WEIR

LEVEL

- BUBBLER TUBE
- ULTRASONIC
- CAPACITANCE
- ELECTRODES (W/HOLDER)
- FLOAT
- OPTICAL

TEMPERATURE

- TE — TEMPERATURE ELEMENT WITH WELL

ACTUATORS:

- XX — CYLINDER
- M XX — MOTOR
- E/P — ELECTROPNEUMATIC
- E/H — ELECTROHYDRAULIC
- MANUAL (SHOWN ONLY FOR CERTAIN HAND OPERATED VALVES)
- S XX — SOLENOID
- XX — DIAPHRAM (SPRING OPPOSED)
- XX — DIAPHRAM (PRESSURE BALANCED)
- PRESSURE OR VACUUM RELIEF SPRING OR WEIGHT LOADED

NOTE: ON LOSS OF PRIMARY POWER (PNEUMATIC OR ELECTRICAL)

XX DENOTES ONE OF THE FOLLOWING:
FO = FAIL OPEN
FC = FAIL CLOSED
FI = FAIL TO INTERMEDIATE POSITION
BLANK = FAIL TO LAST POSITION

EQUIPMENT TAGGING:

X–NNN

X DENOTES ONE OF THE FOLLOWING:
M=MECHANICAL EQUIPMENT
P=PUMP
T=TANK
V=VALVE
CFD=CHEMICAL FEEDER

NNN = LOOP NUMBER

INSTRUMENT & FUNCTION TAGGING:

XXX

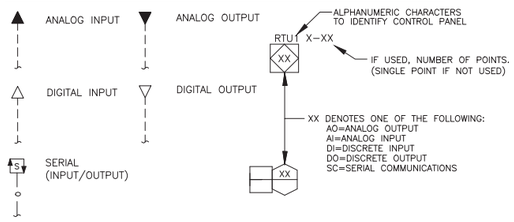
NNNX

XXX=FUNCTIONAL INSTRUMENT IDENTIFICATION LETTERS FROM INSTRUMENT IDENTIFICATION TABLE.

X=LETTER SUFFIX TO DISTINGUISH BETWEEN INSTRUMENTS IN LOOP WITH SAME FUNCTIONAL IDENTIFICATION. (USED AS REQ'D)

NNN=LOOP NUMBER

INPUTS & OUTPUTS INTERFACED WITH COMPUTER DATA ACQUISITION & CONTROL SYSTEM:



EQUIPMENT POWER:

XXX

120VAC POWER FROM POWER PANEL CIRCUIT BREAKER, UNLESS OTHERWISE NOTED, REQUIRED TO INSTRUMENT (TYP)

XXX DENOTES ONE OF THE FOLLOWING:

UPS=120VAC FROM UPS VIA FUSEBLOCK

208/3=208V, 3 PHASE FROM POWER PANEL CIRCUIT BREAKER

ANALYSIS INSTRUMENTS:

AE XX — EXPOSED PROBE OR GAS DETECTION

AE XX — TAPPED OR SAMPLED

AE XX — IN–LINE

XX DENOTES ONE OF THE FOLLOWING:
CLG=CHLORINE GAS
CLR=CHLORINE RESIDUAL
PH=PH
T=TURBIDITY
FLR=FLOURIDE
SCD=STREAMING CURRENT
PM=PARTICLE MONITOR
PC=PARTICLE COUNTER
TOC=TOTAL ORGANIC CARBON

EQUIPMENT:

- XX — CENTRIFUGAL PUMP (DRY PIT)
- XX — CENTRIFUGAL PUMP (WET PIT)
- EJECTOR, EDUCTOR
- METERING PUMP–CHEMICAL
- XX — CENTRIFUGAL COMPRESSOR OR BLOWER
- XX — RECIPROCATING COMPRESSOR (PD)
- XX — ROTARY COMPRESSOR (PD) OR BLOWER
- M XX — MOTOR
- XX — MIXER
- VERTCAL TURBINE PUMP

XX DENOTES ONE OF THE FOLLOWING:
CS = CONSTANT SPEED
2S = TWO SPEED
VS = VARIABLE SPEED

- POSITIVE DISPLACEMENT PUMP

VALVE STATES:

- TWO–WAY VALVE, NORMALLY OPEN
- TWO–WAY VALVE, NORMALLY CLOSED
- THREE–WAY VALVE, TOTALLY–FILLED PORT BLOCKED AND PARTIALLY–FILLED PORT OPENED WHEN DEACTIVATED. PORT STATES REVERSE WHEN ACTIVATED.

EXPLANATORY NOTATIONS:

NN/XX — FLOW STREAM No NN TO SHEET No XX

FLOW STREAM TO OR FROM EQUIPMENT NOT SHOWN ON OTHER P&ID DRAWINGS

HAND SWITCHES

HS XX — SELECTOR SWITCH (MAINTAINED CONTACTS)

HMS XX — SPRING RETURN SWITCH OR PUSHBUTTONS (MOMENTARY CONTACTS)

XX DENOTES ONE OF THE FOLLOWING:
AM=AUTO/MANUAL
CAM=COMPUTER/AUTO/MANUAL
CL=COMPUTER/LOCAL
CM=COMPUTER/MANUAL
DOB=DRIVE/OFF/BYPASS
FOS=FAST/OFF/SLOW
FOR=FORWARD/OFF/REVERSE
FR=FORWARD/REVERSE
FS=FAST/SLOW
HOA=HAND/OFF/AUTO
KEY=KEYPAD
LOR=LOCAL/OFF/REMOTE
LOS=LOCKOUT/STOP
MFS=MODULATE FASTER/SLOWER
MOC=MODULATE OPEN/CLOSE
OC=OPEN/CLOSE
OO=ON/OFF
OSC=OPEN/STOP/CLOSE
SS=START/STOP
PB=PUSH BUTTON

SIGNAL CONVERTERS

X/X — SMALL CIRCLE SIGNIFIES LOGICAL INVERSION OF SIGNAL

X DENOTES ONE OF THE FOLLOWING:

A=ANALOG	O=ELECTROMAGNETIC, SONIC
B=BINIARY	P=PNEUMATIC
D=DIGITAL	PF=PULSE FREQUENCY
E=VOLTAGE	PD=PULSE DURATION
F=FREQUENCY	R=RESISTANCE
H=HYDRAULIC	
I=CURRENT	

MISCELLANEOUS:

- DIAPHRAGM SEAL
- ANNULAR DIAPHRAGM
- RUPTURE DISK (PRESSURE RELIEF)
- RUPTURE DISK (VACCUUM RELIEF)
- (REGULATED SIDE) PRESSURE REGULATOR
- VENT TO ATMOSPHERE
- AIR GAP
- TWO WAY VALVE FAIL OPEN
- TWO WAY VALVE FAIL CLOSE
- ANY VALVE, FAIL LOCKED (POSITION DOES NOT CHANGE)
- PINCH VALVE
- XP — PURGE SET X DENOTES: W=WATER A=AIR
- FLOW STRAIGHTENER
- X — EQUIPMENT CONNECTION WITH ELECTRICAL INTERLOCK
- XG — SIGHT GLASS X DENOTES: F=FLOW L=LEVEL
- PI — PRESSURE GAUGE
- SYSTEM/EQUIPMENT GROUND
- ISOLATED GROUND
- OMNIDIRECTIONAL ANTENNA
- DIRECTIONAL ANTENNA

ABBREVIATIONS:

A or AMP	AMPERE		
AC	ALTERNATING CURRENT	KW	KILOWATT
AFF	ABOVE FINISHED FLOOR	MTD	MOUNTED
AFG	ABOVE FINISHED GRADE	N/A	NOT APPLICABLE
AIC	AMPERE INTERRUPTING CAPACITY	NC	NORMALLY CLOSED
AS	AMMETER SELECTOR SWITCH	NO	NORMALLY OPEN
ATS	AUTO TRANSFER SWITCH	No	NUMBER
AUTO	AUTOMATIC	PNL	PANEL
AWG	AMERICAN WIRE GAUGE	PVC	POLYVINYL CHLORIDE (CONDUIT)
BLDG	BUILDING	RECP	RECEPTACLES
C	CONDUIT	RGS	RIGID GALVANIZED STEEL (CONDUIT)
CP	CONTROL PANEL	RVAT	REDUCED VOLTAGE AUTOTRANSFORMER
DIV	DIVISION	RVSS	REDUCED VOLTAGE SOLID STATE
EC	ELECTRICAL CONTRACTOR	TVSS	TRANSIENT VOLTAGE SURGE SUPPRESSION
EMT	ELECTRICAL METALLIC TUBING (CONDUIT)	TYP	TYPICAL
EF	EXHAUST FAN	UL	UNDERWRITER LABORATORIES
EP	EXPLOSION PROOF	UON	UNLESS OTHERWISE NOTED
F/T	FEED THROUGH	UPS	UNINTERRUPTIBLE POWER SUPPLY
FU	FUSE	V	VOLT
FO	FIBER OPTIC	VS	VOLTMETER SELECTOR SWITCH
GFI	GROUND FAULT INTERRUPTER	W	WIRE
GRD	GROUND	WP	WEATHERPROOF
HP	HORSEPOWER	WS	WATER SUPPLY
IG	ISOLATED GROUND	XFMR	TRANSFORMER
KV	KILOVOLT	1–PH	SINGLE PHASE
KVA	KILOVOLT AMPERE	3–PH	THREE PHASE

VALVES & GATES:

- BALL VALVE
- BUTTERFLY VALVE
- CHECK VALVE GLOBE, GATE, PINCH OR OTHER IN–LINE VALVE
- ROTARY VALVE
- DIAPHRAM VALVE
- PLUG VALVE
- THREE WAY VALVE (ARROW IF SHOWN INDICATES FAIL OPEN PATH)
- TELESCOPING VALVE
- SLUICE GATE
- PREFABRICATED SLIDE GATE
- UNCLASSIFIED GATE (SEE SPECIFICATIONS)
- KNIFE GATE VALVE

INSTRUMENT/FUNCTION & LOCATION SYMBOLS

	FIELD (LOCAL) MOUNTED	PANEL MOUNTED		MOTOR CONTROL CENTER MOUNTED	
		ACCESSIBLE OR EXTERIOR	INACCESSIBLE OR INTERIOR	ACCESSIBLE OR EXTERIOR	INACCESSIBLE OR INTERIOR
DISCRETE INSTRUMENT	◯	◯	◯	◯	◯
SHARED DISPLAY/CONTROL	▢	▢	▢	▢	▢
COMPUTER FUNCTION	⬡	⬡	⬡	⬡	⬡
PROGRAMMABLE LOGIC CONTROL	◇	◇	◇	◇	◇
PILOT LIGHT	◯	◯	◯	◯	◯
HAND SWITCH MAINTAINED CONTACTS	HS	HS	HS	HS	HS
HAND SWITCH MOMENTARY CONTACTS	HMS	HMS	HMS	HMS	HMS
COMPOUND INSTRUMENTS (SHARE COMMON HOUSING)	◯◯	◯◯	◯◯	◯◯	◯◯

INSTRUMENT IDENTIFICATION TABLE ISA–S5.1–1984

LETTER	FIRST LETTER		SUCCEEDING LETTERS		
	MEASURED OR INITIATING VARIABLE	MODIFIER	READOUT OR PASSIVE FUNCTION	OUTPUT FUNCTION	MODIFIER
A	ANALYSIS (2)		ALARM		
B	BURNER, COMBUSTION			CLOSE, STOP, DECREASE (1) CONTROL	OFF (1)
C					
D		DIFFERENTIAL		OPEN, START, INCREASE (1)	
E	VOLTAGE		SENSOR (PRIMARY ELEMENT)		ENABLED (1)
F	FLOW RATE	RATIO (FRACTION)			FAIL (1)
G			GLASS, VIEWING DEVICE		
H	HAND				HIGH (OPENED)
I	CURRENT (ELECTRICAL)		INDICATE		
J	POWER	SCAN			
K	TIME, TIME SCHEDULE	TIME RATE OF CHANGE		CONTROL STATION	
L	LEVEL		LIGHT		LOW (CLOSED)
M	MOTOR, MOTION (1)	MOMENTARY		MOTOR (1)	MIDDLE OR INTERMEDIATE
N					ON OR OPERATE (1)
O			ORIFICE, RESTRICTION		OVERLOAD (1)
P	PRESSURE, VACUUM		POINT (TEST) CONNECTION	PUMP (1)	
Q	QUANTITY (2)	INTEGRATE, TOTALIZE			
R	RADIATION		RECORD		
S	SPEED, FREQUENCY	SAFETY OR SOLENOID		SWITCH	
T	TEMPERATURE			TRANSMIT	
U	MULTIVARIABLE (2)		MULTIFUNCTION (2)	MULTIFUNCTION (2)	MULTIFUNCTION (2)
V	VIBRATION, MECHANICAL ANALYSIS			VALVE, DAMPER, LOUVER	
W	WEIGHT, FORCE		WELL		
X	UNCLASSIFIED, (2)		UNCLASSIFIED (2)	UNCLASSIFIED (2)	UNCLASSIFIED (2)
Y	EVENT, STATE, PRESENCE			RELAY, COMPUTE, CONVERT	
Z	POSITION, DIMENSION			DRIVER, ACTUATOR, UNCLASSIFIED FINAL CONTROL ELEMENT	

(1) USER'S CHOICE
(2) WHEN USED, SYMBOL OR SIGNAL LINE IS INDICATED.

NOTE:
BEGINNING OCTOBER 2013, THIS DRAWING HAS BEEN MODIFIED BY ARCADIS U.S. TO SHOW AS–BUILT CONDITIONS.

AS-BUILT DRAWINGS

NO.	DESCRIPTION	DATE	BY
	REVISIONS		

DESIGNED	CADD	SCALE
CME	SJM	NONE
CHECKED	APPROVED	APPROVED
EL	RWS	X

Gannett Fleming
BALTIMORE, MARYLAND
AGWR

CHEVRON PRODUCTS COMPANY
ATLANTA, GEORGIA

FORMER CHEVRON FACILITY NO. 122208
CHILLUM, MARYLAND

AREA B
INSTRUMENTATION LEGEND, ABBREVIATIONS, AND GENERAL NOTES

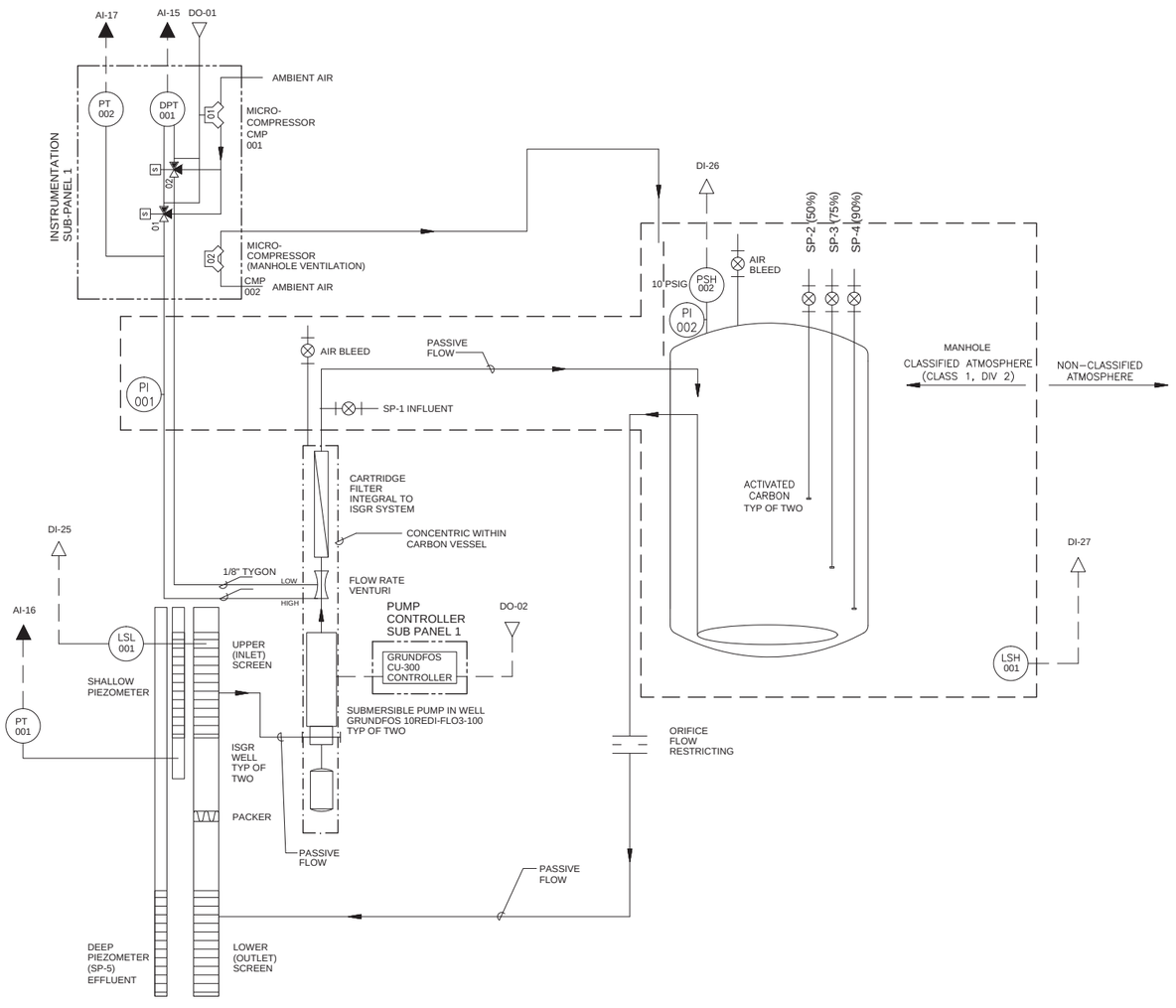
JOB NO.	SHEET NO.
50641	5
DATE	
JUNE 2013	
CAD FILE	
AB–LEG	5 OF 12

CPC CONTROL PANEL
EOS CONTROLER

WATER LEVEL IN WELL - PRES. TRANSDUCER
LOW WATER IN WELL - LEVEL LO
PRE-FILTER PRESSURE - TRANSMITTER
WATER FLOW RATE DIFF PRESSURE TRANSMITTER
VENTURI TUBE CLEARANCE
PID CONTROL - SUBMERSIBLE PUMP
HIGH PRESSURE - GAC VESSEL
HIGH WATER IN MANHOLE - LEVEL HI

ISGR-B1
CONTROL PANEL

AI-16 DI-25 AI-17 AI-15 DO-01 DO-02 DI-26 DI-27



LEGEND

- DISCRETE INPUT
- DISTRETE OUTPUT
- ANALOG INPUT
- ANALOG OUTPUT
- PSH — PRESSURE SWITCH HIGH
- LSH — LEVEL SWITCH HIGH
- LSL — LEVEL SWITCH LOW
- PT — PRESSURE TRANSMITTER
- PI — PRESSURE INDICATOR
- S / XX — SOLENOID
- XX — COMPRESSOR FROM LEGEND PAGE

NOTE: PIPING AND INSTRUMENTATION SHOWN IS FOR ONE OF TWO ESSENTIALLY IDENTICAL SYSTEM.

NOTE:
BEGINNING OCTOBER 2013, THIS DRAWING HAS BEEN MODIFIED BY ARCADIS U.S. TO SHOW AS-BUILT CONDITIONS.

AS-BUILT DRAWINGS

NO.	DESCRIPTION	DATE	BY
	REVISIONS		

DESIGNED	CADD	SCALE
SW	SJM	1"=10'
CHECKED	APPROVED	APPROVED
EL	RWS	X

Gannett Fleming
BALTIMORE, MARYLAND
AGWR

CHEVRON PRODUCTS COMPANY
ATLANTA, GEORGIA

FORMER CHEVRON FACILITY NO. 122208
CHILLUM, MARYLAND

AREA B
P&ID WITH PLC – ISGR SYSTEMS

JOB NO.	SHEET NO.
50641	6
DATE	
JUNE 2013	
CAD FILE	
AB P&ID	6 OF 12

CITY: SYRACUSE-NY DIV/GROUP: 14/ENV DB: K.SARTORI PIC: PM: TM: JOHN.MARRS LYR:ON=*;OFF=*REF*
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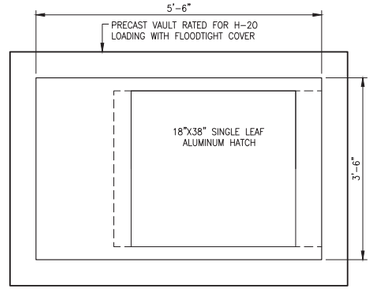
XREFS:
IMAGES:
122208-TB3 AGWR Flowing Logo 2-7-07.jpg

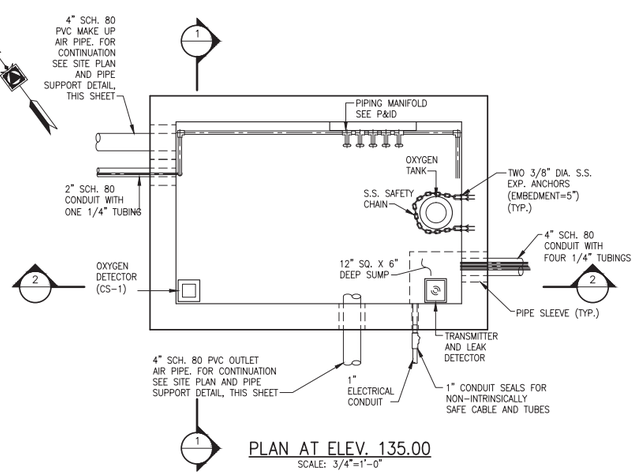
ARCADIS Design & Consultancy for natural and built assets

Area C: Oxygen Reactive Zone

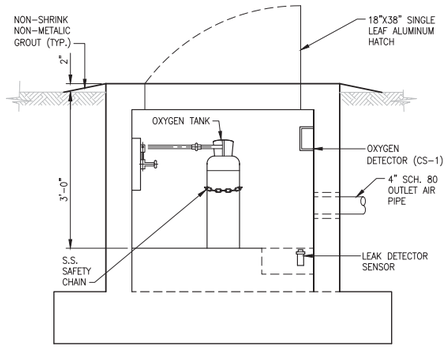
Piping and Instrumentation Diagrams



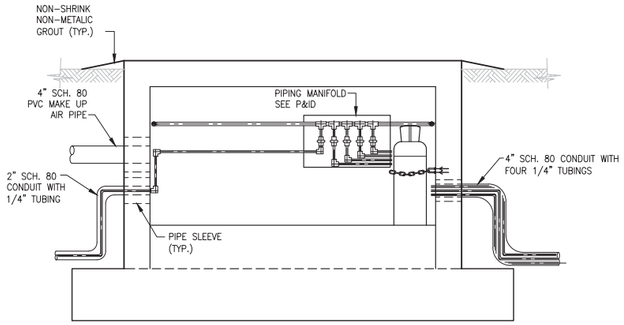
PLAN AT ELEV. 138.00
SCALE: 3/4"=1'-0"



PLAN AT ELEV. 135.00
SCALE: 3/4"=1'-0"



1 SECTION
SCALE: 3/4"=1'-0"



2 SECTION
SCALE: 3/4"=1'-0"

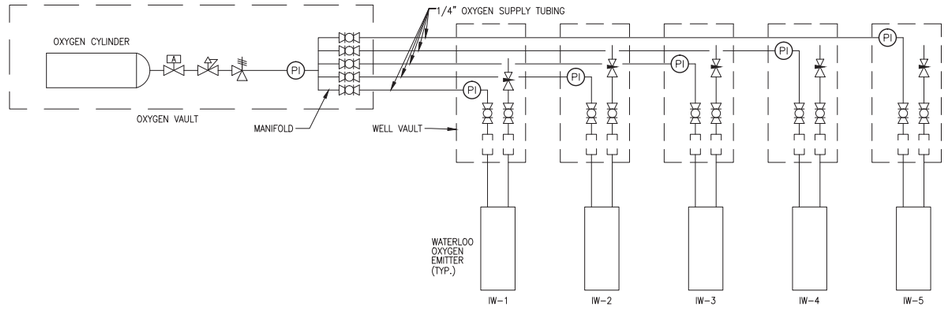
OXYGEN VAULT

CRITICAL SAFETY DEVICE:

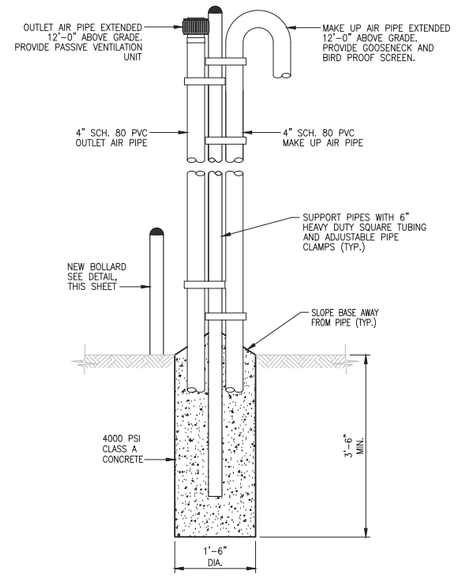
1. OXYGEN DETECTOR MONITORS OXYGEN LEVELS IN THE OXYGEN VAULT AND TRIGGERS ALARM WHEN CONDITIONS IN THE VAULT ARE UNSAFE (CS-1).

LEGEND

- FQI — FLOW TOTALIZING INDICATOR
- PI — PRESSURE INDICATING GAUGE
- (REGULATED SIDE) PRESSURE REGULATOR
- CYLINDER VALVE
- RELIEF VALVE
- BALL VALVE
- QUICK CONNECT
- NEEDLE VALVE



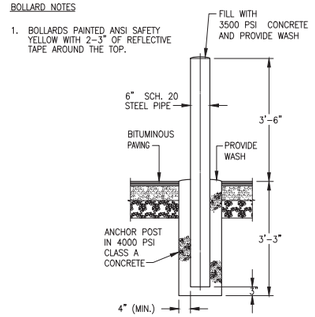
PROCESS AND INSTRUMENTATION DIAGRAM
SCALE: NOT TO SCALE



VENT PIPE SUPPORT SYSTEM
SCALE: NOT TO SCALE

BOLLARD NOTES

1. BOLLARDS PAINTED ANSI SAFETY YELLOW WITH 2-3" OF REFLECTIVE TAPE AROUND THE TOP.



SECTIONAL ELEVATION

BOLLARD
SCALE: NOT TO SCALE

NOTE:
BEGINNING OCTOBER 2013, THIS DRAWING HAS BEEN MODIFIED BY ARCADIS U.S. TO SHOW AS-BUILT CONDITIONS.

AS-BUILT DRAWINGS

1' 6" 0 1' 2' 3'
3/4" = 1'-0"

SEAL

DATE:

PROFESSIONAL CERTIFICATION

I HEREBY CERTIFY THAT THESE DOCUMENTS WERE PREPARED OR APPROVED BY ME AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MARYLAND

LICENSE NO. 33568

EXP DATE 09/12/12

ENGINEER: ROBERT W. SCRAFFORD
GANNETT FLEMING, INC.

NO.	DESCRIPTION	DATE	BY
1	ADDED NOTE	11/22/13	

REVISIONS

DESIGNED	CADD	SCALE
EL	EL	AS SHOWN
CHECKED	APPROVED	APPROVED
RWS	RWS	

Gannett Fleming
BALTIMORE, MARYLAND

CHEVRON PRODUCTS COMPANY
HOUSTON, TEXAS

FORMER CHEVRON FACILITY NO.122208-AREA C
CHILLUM, MARYLAND

AREA C
VAULT SECTIONS AND DETAILS
AND PROCESS AND INSTRUMENTATION DIAGRAM

JOB NO.	SHEET NO.
55588	4
DATE	
JUNE 2013	
CAD FILE	
AC VAULTDET	4 OF 7

CITY: SYRACUSE-NY DIVGROUP: 141JENV DB: K.SARTORI PIC: PM: TM: JOHN MARRS LYR:ON=*;OFF=*REF* G:\ENVCAD\SYRACUSE\ACT\B0048971\0000000011DWG\CONTRACTVAREA_C\48971G04_AC.dwg LAYOUT: 4 SAVED: 11/21/2013 9:51 AM ACADVER: 18.1S (LMS TECH) PAGESETUP: ---- PLOTSTYLETABLE: ---- PLOTTED: 11/21/2013 9:51 AM BY: SARTORI, KATHERINE
XREFS:
IMAGES:
12208-TB2 xx-av-6rf.JPG

APPENDIX H

MANN-KENDALL STATISTICAL ANALYSIS

Mann-Kendall Statistical Analysis
Former Chevron Facility 122208
5801 Riggs Road, Chillum, Maryland
December 2015

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) presented a site-wide groundwater remediation strategy that included MNA. One method to demonstrate that MNA is effective at decreasing hydrocarbon concentrations is the statistical evaluation of trends in the sampling results. The Mann-Kendall trend test was selected as an industry-accepted method to provide evidence as to whether dissolved-phase hydrocarbon concentrations are stable or decreasing over time.

MANN-KENDALL TREND TEST

The Mann-Kendall trend test is a non-parametric test for linear trends based upon the concept that a series of data points without a trend should fluctuate randomly around a constant mean. If an increasing trend were to exist, one would expect an earlier point to have a lower value than a later point. The converse would be true if a decreasing trend were present. A Mann-Kendall statistic S is computed by comparing each pair of data points in a data set and assigning a value of +1 or -1 if the earlier data point is less than the later data point or greater than the later one, respectively. If the two data points are equal, the pair is assigned a zero. The values assigned to the pairs are summed. If the total is positive, it implies that the majority of the differences between the points are positive, indicating a positive trend. Likewise, a negative sum indicates a decreasing trend. A value at or near zero indicates that the differences are roughly equal, implying that there is no trend. A critical value of S is determined based on the number of points in the data set and the level of significance (α) of the test. If the Mann-Kendall statistic S exceeds the critical S, then an upward trend is statistically significant. Conversely, if the Mann-Kendall S is negative and its absolute value is greater than the critical S, then there is a statistically significant downward trend. If the absolute value of S is less than the critical value of S, then the data is considered to have no trend.

The Mann-Kendall Test 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 (USEPA, 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). This test is described in detail in the unified guidance provided by the United States Environmental Protection Agency for the analysis of groundwater statistics (USEPA, 2009, p. 17:30-34).

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-22R	MW-22R
MW-24B	GP-39A/GP-39R
MW-26B	MW-47
MW-33B	GP-2E(45-50)
MW-58	MW-25B
MW-59	MW-27B
MW-60	MW-53
MW-62A	
MW-62B	

The Mann-Kendall test was performed for benzene and methyl tert butyl ether (MTBE) for each well within the east and west centerlines. Mann-Kendall trend analysis tables for each well along the centerlines are presented in Attachments 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 tests performed for both benzene and MTBE. The tests were run in a two-tailed mode at two levels of confidence, 90% (with α = 0.05 per tail) and 95% (with α = 0.025 per tail). Several trends were noted that are provided below.

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

- No statistically significant trends were identified for benzene or MTBE concentrations in monitoring wells MW-22R, MW-24B, MW-59, MW-62A, or MW-62B. Additionally, MTBE concentrations in monitoring well MW-60 were not found to be statistically significant.

- A statistically significant decreasing trend was identified for benzene and MTBE concentrations in monitoring well MW-33B. Statistically significant decreasing trends were identified for benzene concentrations in monitoring wells MW-26B and MW-58.

Statistically significant decreasing trends were identified for MTBE concentrations in monitoring wells MW-26B and MW-58 but only at 90% confidence.

- A statistically significant increasing trend was identified for benzene at monitoring well MW-60 at 90% confidence.

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

- No statistically significant trends were identified for benzene or MTBE concentrations in monitoring wells MW-22R, MW-47, MW-25B or MW-53. No statistically significant trends for benzene concentrations in monitoring well MW-27B were identified.

- Statistically significant decreasing trends were identified for benzene and MTBE concentrations in monitoring wells GP-39A/GP-39R and GP-2E (45-50). A decreasing trend for MTBE concentrations in monitoring well MW-27B was found to be statistically significant.

CONCLUSIONS AND RECOMMENDATIONS

Dissolved-phase hydrocarbon concentrations for centerline wells were either decreasing or did not indicate a statistically significant trend with the exception of benzene concentrations in monitoring well MW-60 located in the west centerline.

Since the inception of the monitoring program at well MW-60, benzene was not detected until the fall of 2013 in which concentrations have slightly increased during the last three monitoring events. This trend was only statistically significant at 90% confidence.

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 2017.

REFERENCES

Gannett Fleming, 2006, *Site Investigation Report*, Former Chevron Facility 122208, 5801 Riggs Road, Chillum Maryland, dated January 2006.

Gannett Fleming, 2007, *Corrective Measures Study (CMS),* Former Chevron Facility 122208, 5801 Riggs Road, Chillum Maryland, dated July 2007.

Gilbert, Richard O., 1987, *Statistical Methods for Environmental Pollution Monitoring*, Van Nostrand Reinhold, NY, NY, 319 pages.

U.S. Environmental Protection Agency (USEPA), 1998, *Guidance for Data Quality Assessment*, EPA/600/R-96/084.

U.S. Environmental Protection Agency (USEPA), 2009, *Statistical Analysis of Groundwater Monitoring Data at RCRA Facilities, Unified Guidance*, EPA/530/R-09/007, March 2009.

TABLES

TABLE 1. GROUNDWATER MONITORING RESULTS - WEST CENTERLINE
MANN KENDALL SUMMARY
SEMI-ANNUAL PROGRESS REPORT: JULY THROUGH DECEMBER 2015
FORMER CHEVRON FACILITY 122208, 5801 RIGGS ROAD, CHILLUM, MARYLAND

Location	Sample Date	Benzene (µg/L)	Methyl-t-butyl ether (µg/L)
MW-22R	06/08/2004	5,620	866
	08/03/2004	7,960	1,620
	09/07/2005	8,790	1,780
	03/23/2006	6,860	2,020
	10/02/2006	7,900	1,100
	03/26/2007	2,400	570
	10/01/2007	7,000	1000
	03/31/2008	4,900	710
	09/25/2008	1,100	1,100
	03/30/2009	5,900	680
	09/28/2009	4,200	420
	05/10/2010	1,300	200
	11/10/2010	950	120
	03/17/2011	1,200	110
	11/14/2011	5,500	5,700
	04/26/2012	3,900	3,600
	10/10/2012	3,100	2,400
	04/15/2013	2,300	2,200
	09/12/2013	3,200	3,000
	04/15/2014	3,300	1,500
	09/10/2014	2,000	1,500
	04/16/2015	2,200	1,500
	10/2/2015	2,500	1,800
MW-24B	06/08/2004	431	9.3
	08/02/2004	474	9.6
	09/15/2005	497	3.64
	03/27/2006	864	3.99
	10/04/2006	540	ND 50
	03/27/2007	5.6	ND 1.0
	10/02/2007	310	ND 20
	04/01/2008	110	ND 20
	09/24/2008	ND 20	ND 20
	03/27/2009	17 J	ND 20
	09/29/2009	ND 5.0	ND 5.0
	06/08/2010	ND 5.0	ND 5.0
	11/09/2010	ND 1.0	ND 1.0
	04/07/2011	ND 10	ND 10
	04/18/2011	ND 5.0	ND 5.0
	01/19/2012	ND 5.0	ND 5.0
	05/03/2012	ND 20	ND 20
	10/11/2012	ND 10	ND 10
	04/09/2013	ND 1.0	ND 1.0
	09/10/2013	ND 1.0	ND 1.0
	04/16/2014	ND 1.0	ND 1.0
	04/15/2015	ND 1.0	ND 1.0
MW-26B	06/07/2004	30.5	112
	07/30/2004	34.4	114
	09/16/2005	24.9	168
	03/28/2006	144	221
	10/05/2006	100	210
	03/28/2007	140	270
	10/04/2007	110	230
	04/02/2008	94	170
	09/23/2008	110	200
	03/25/2009	130	230
	09/22/2009	150	200
	05/11/2010	190	280
	11/09/2010	36	220
	03/03/2011	380	280
	03/30/2011	1,100	560
	01/18/2012	520	290
	04/30/2012	850	510
	10/03/2012	720	330
	04/02/2013	710	390

TABLE 1. GROUNDWATER MONITORING RESULTS - WEST CENTERLINE
MANN KENDALL SUMMARY
SEMI-ANNUAL PROGRESS REPORT: JULY THROUGH DECEMBER 2015
FORMER CHEVRON FACILITY 122208, 5801 RIGGS ROAD, CHILLUM, MARYLAND

Location	Sample Date	Benzene (µg/L)	Methyl-t-butyl ether (µg/L)
MW-26B	09/09/2013	570	240
	04/14/2014	340	140
	09/8/2014	520	230
	04/14/2015	320	150
	10/1/2015	600	320
MW-33B	06/02/2004	1,040	770
	07/27/2004	1000	744
	09/13/2005	ND 1	698
	03/28/2006	974	653
	10/05/2006	760	520
	03/29/2007	670	400
	10/05/2007	540	410
	04/02/2008	520	400
	09/23/2008	340	230
	03/24/2009	380	220
	09/21/2009	380	240
	05/11/2010	470	380
	11/09/2010	150	150
	03/30/2011	570	300
	01/18/2012	470	310
	05/08/2012	380	300
	10/02/2012	ND 1.0	20
	03/28/2013	ND 1.0	1.9
	09/09/2013	ND 1.0	ND 1.0
	04/14/2014	ND 1.0	1.0
	04/13/2015	ND 1.0	1.1
MW-58	04/21/2011	180	110
	01/19/2012	390	220
	05/04/2012	240	190
	10/03/2012	380	170
	04/02/2013	180	140
	09/09/2013	250	110
	04/14/2014	72	81
	09/8/2014	120	82
	04/14/2015	57	51
	10/1/2015	110	140
MW-59	03/02/2011	140	140
	01/19/2012	220	220
	05/04/2012	140	160
	10/03/2012	240	210
	04/02/2013	260	250
	09/09/2013	240	220
	04/14/2014	73	140
	09/8/2014	120	170
	04/14/2015	120	160
	10/1/2015	110	200
MW-60	01/19/2012	ND 1.0	16
	05/04/2012	ND 1.0	18
	10/03/2012	ND 1.0	10
	04/02/2013	ND 1.0	14
	09/09/2013	1.6	12
	04/14/2014	1.7	12
	04/14/2015	2.6	9.8
MW-62A	10/04/2012	ND 1.0	ND 1.0
	04/05/2013	ND 1.0	ND 1.0
	09/10/2013	ND 1.0	ND 1.0
	04/17/2014	ND 1.0	ND 1.0
	04/16/2015	ND 1.0	ND 1.0

TABLE 1. GROUNDWATER MONITORING RESULTS - WEST CENTERLINE
MANN KENDALL SUMMARY
SEMI-ANNUAL PROGRESS REPORT: JULY THROUGH DECEMBER 2015
FORMER CHEVRON FACILITY 122208, 5801 RIGGS ROAD, CHILLUM, MARYLAND

Location	Sample Date	Benzene (µg/L)	Methyl-t-butyl ether (µg/L)
MW-62B	10/04/2012	94	97
	04/05/2013	61	77
	09/10/2013	34	66
	04/14/2014	3.3	17
	09/9/2014	40	71
	04/14/2015	9.6	30
	10/1/2015	8.2	36

Notes:

1) Reporting limit shown beside not detected (ND) values.
2) Analytical results were rounded.
3) ND: Not detected above reporting limit.
4) µg/L: Microgram per liter.

TABLE 2. GROUNDWATER MONITORING RESULTS - EAST CENTERLINE
MANN KENDALL SUMMARY
SEMI-ANNUAL PROGRESS REPORT: JULY THROUGH DECEMBER 2015
FORMER CHEVRON FACILITY 122208, 5801 RIGGS ROAD, CHILLUM, MARYLAND

Location	Sample Date	Benzene (µg/L)	Methyl-t-butyl ether (µg/L)
GP-2E(45-50)	08/16/2004	60.2	656
	12/15/2004	117	522
	03/21/2005	189	610
	05/26/2005	172	803
	09/14/2005	134	501
	12/20/2005	110	393
	10/02/2006	78	420
	03/26/2007	50	400
	10/01/2007	34	470
	03/31/2008	8	330
	09/25/2008	ND 2.0	370
	03/30/2009	ND 2.0	350
	09/28/2009	ND 2.0	450
	05/18/2010	86	1000
	11/10/2010	17	560
	04/01/2011	200	820
	01/19/2012	350	1,300
	04/25/2012	470	1,400
	10/08/2012	320	850
	04/10/2013	55 H	460 H
	09/11/2013	50	280
	04/15/2014	6.9	130
	09/9/2014	1.4	75
	04/15/2015	ND 1.0	38
	09/30/2015	ND 1.0	12
GP-39A/GP-39R	08/16/2004	476	2,060
	12/16/2004	725	2,520
	03/21/2005	7.1	3,200
	05/26/2005	905	3,550
	09/08/2005	721	2,490
	12/19/2005	995	3,360
	03/22/2006	1,570	5,960
	09/28/2006	2,500	6,500
	03/22/2007	2,600	5,800
	09/24/2007	2,300	5,200
	03/27/2008	2,100	5,400
	09/30/2008	2,100	4,800
	03/31/2009	2,200	4,900
	09/23/2009	3,100	4,600
	05/17/2010	3,100	5,500
	11/10/2010	3,400	4,200
	03/28/2011	4,100	5,100
	11/14/2011	340	680
	04/26/2012	150	400
	10/10/2012	280	350
	04/15/2013	210	310
	09/12/2013	27	24
	04/15/2014	130	160
	09/10/2014	120	220
	04/16/2015	1.8	65
	10/2/2015	27	100
MW-22R	06/08/2004	5,620	866
	08/03/2004	7,960	1,620
	09/07/2005	8,790	1,780
	03/23/2006	6,860	2,020
	10/02/2006	7,900	1,100
	03/26/2007	2,400	570
	10/01/2007	7,000	1000
	03/31/2008	4,900	710
	09/25/2008	1,100	1,100
	03/30/2009	5,900	680
	09/28/2009	4,200	420
	05/10/2010	1,300	200
	11/10/2010	950	120
	03/17/2011	1,200	110

TABLE 2. GROUNDWATER MONITORING RESULTS - EAST CENTERLINE
MANN KENDALL SUMMARY
SEMI-ANNUAL PROGRESS REPORT: JULY THROUGH DECEMBER 2015
FORMER CHEVRON FACILITY 122208, 5801 RIGGS ROAD, CHILLUM, MARYLAND

Location	Sample Date	Benzene (µg/L)	Methyl-t-butyl ether (µg/L)
MW-22R	11/14/2011	5,500	5,700
	04/26/2012	3,900	3,600
	10/10/2012	3,100	2,400
	04/15/2013	2,300	2,200
	09/12/2013	3,200	3,000
	04/15/2014	3,300	1,500
	09/10/2014	2,000	1,500
	04/16/2015	2,200	1,500
	10/2/2015	2,500	1,800
MW-25B	11/22/2004	456	502
	09/15/2005	ND 1	386
	03/24/2006	403	461
	10/04/2006	470	550
	03/27/2007	320	370
	10/03/2007	340	490
	04/01/2008	180	310
	09/24/2008	240	350
	03/27/2009	450	410
	09/22/2009	170	260
	05/18/2010	220	310
	11/09/2010	99	260
	04/01/2011	120	200
	01/19/2012	200	390
	04/25/2012	120	250
	10/04/2012	140	230
	04/09/2013	160	250
	09/10/2013	260	320
	04/16/2014	23	25
	09/9/2014	430	430
	04/15/2015	150	230
	10/1/2015	94	190
MW-27B	06/02/2004	193	534
	07/28/2004	142	507
	09/16/2005	146	417
	03/28/2006	168	451
	10/05/2006	150	370
	03/28/2007	200	530
	10/04/2007	82	310
	04/02/2008	34	240
	09/23/2008	37	240
	03/25/2009	19	240
	09/22/2009	6.5	160
	06/08/2010	ND 2.0	200
	11/09/2010	ND 1.0	170
	03/30/2011	ND 5.0	140
	04/30/2012	ND 1.0	140
	10/03/2012	ND 1.0	3.4
	04/02/2013	ND 1.0	120
	09/09/2013	ND 1.0	96
	04/14/2014	ND 1.0	71
	09/8/2014	ND 1.0	72
	04/15/2015	ND 1.0	68
	10/1/2015	ND 1.0	91
MW-47	11/19/2004	116	27.2
	09/06/2005	315	17.6
	03/22/2006	459	13.3
	09/28/2006	380	22
	03/22/2007	240	58
	09/24/2007	260	ND 1.0
	03/27/2008	360	ND 2.0
	09/29/2008	230	15
	03/31/2009	250	19
	09/23/2009	160	16
	05/17/2010	170	59
	11/05/2010	650	15

TABLE 2. GROUNDWATER MONITORING RESULTS - EAST CENTERLINE
MANN KENDALL SUMMARY
SEMI-ANNUAL PROGRESS REPORT: JULY THROUGH DECEMBER 2015
FORMER CHEVRON FACILITY 122208, 5801 RIGGS ROAD, CHILLUM, MARYLAND

Location	Sample Date	Benzene (µg/L)	Methyl-t-butyl ether (µg/L)
MW-47	03/28/2011	260	50
	11/15/2011	330	52
	04/24/2012	380	40
	10/09/2012	430	ND 1.0
	04/03/2013	510	16
	09/11/2013	250	ND 1.0
	04/16/2014	280	43
	09/9/2014	210	ND 1.0
	04/15/2015	94	24
	10/2/2015	180	8.5
MW-53	05/03/2005	ND 1.0	66.4
	06/08/2005	ND 1.0	97
	09/14/2005	ND 1.0	88.1
	03/28/2006	4	103
	10/06/2006	54	240
	03/29/2007	15	110
	10/05/2007	61	270
	04/03/2008	17	160
	09/22/2008	23	160
	03/23/2009	7.8	150
	09/21/2009	11	220
	06/08/2010	28	310
	11/09/2010	16	300
	04/07/2011	6.6	140
	01/18/2012	5.1	180
	05/04/2012	6.5	140
	10/02/2012	4.1	100
	03/28/2013	2.7	73
	09/09/2013	2.8	110
	04/14/2014	5.0	76
	09/8/2014	3.1	110
	04/13/2015	9.3	82
	09/30/2015	2.8	100

Notes:

1) Reporting limit shown beside not detected (ND) values.
2) Analytical results were rounded.
3) ND: Not detected above reporting limit.
4) µg/L: Microgram per liter.
5) H: Sample analyzed outside of holding time.

TABLE 3. MANN-KENDALL RESULTS SUMMARY
MANN KENDALL SUMMARY
SEMI-ANNUAL PROGRESS REPORT: JULY THROUGH DECEMBER 2015
FORMER CHEVRON FACILITY 122208, 5801 RIGGS ROAD, CHILLUM, MARYLAND

West Centerline - Benzene

Well ID	Distance from MW-22 (ft)	90% Confidence Trend Result	95% Confidence Trend Result	Date Range	Number of Data Points
MW-22R	0	No Trend	No Trend	03/17/2011 - 10/2/2015	10
MW-24B	232	No Trend	No Trend	11/09/2010 - 04/15/2015	10
MW-26B	666	Decreasing Trend	Decreasing Trend	03/30/2011 - 10/01/2015	10
MW-33B	944	Decreasing Trend	Decreasing Trend	05/11/2010 - 04/13/2015	10
MW-58	573.9875	Decreasing Trend	Decreasing Trend	04/21/2011 - 10/01/2015	10
MW-59	691.2099	No Trend	No Trend	03/02/2011 - 10/01/2015	10
MW-60	689.4315	Increasing Trend	No Trend	01/19/2012 - 04/14/2015	7
MW-62A	350.6566	No Trend	No Trend	10/04/2012 - 04/16/2015	5
MW-62B	350.2294	No Trend	No Trend	10/04/2012 - 10/01/2015	7

West Centerline - MTBE

Well ID	Distance from MW-22 (ft)	90% Confidence Trend Result	95% Confidence Trend Result	Date Range	Number of Data Points
MW-22R	0	No Trend	No Trend	03/17/2011 - 10/2/2015	10
MW-24B	232	No Trend	No Trend	11/09/2010 - 04/15/2015	10
MW-26B	666	Decreasing Trend	No Trend	03/30/2011 - 10/01/2015	10
MW-33B	944	Decreasing Trend	Decreasing Trend	05/11/2010 - 04/13/2015	10
MW-58	573.9875	Decreasing Trend	No Trend	04/21/2011 - 10/01/2015	10
MW-59	691.2099	No Trend	No Trend	03/02/2011 - 10/01/2015	10
MW-60	689.4315	No Trend	No Trend	01/19/2012 - 04/14/2015	7
MW-62A	350.6566	No Trend	No Trend	10/04/2012 - 04/16/2015	5
MW-62B	350.2294	No Trend	No Trend	10/04/2012 - 10/01/2015	7

East Centerline - Benzene

Well ID	Distance from MW-22 (ft)	90% Confidence Trend Result	95% Confidence Trend Result	Date Range	Number of Data Points
MW-22R	0	No Trend	No Trend	03/17/2011 - 10/2/2015	10
GP-39A/GP-39R	109	Decreasing Trend	Decreasing Trend	03/28/2011 - 10/2/2015	10
MW-47	292	No Trend	No Trend	03/28/2011 - 10/2/2015	10
GP-2E (45-50)	445	Decreasing Trend	Decreasing Trend	04/01/2011 - 09/30/2015	10
MW-25B	618	No Trend	No Trend	04/01/2011 - 10/01/2015	10
MW-27B	991	No Trend	No Trend	11/09/2010 - 10/01/2015	10
MW-53	1163	No Trend	No Trend	04/07/2011 - 09/30/2015	10

East Centerline - MTBE

Well ID	Distance from MW-22 (ft)	90% Confidence Trend Result	95% Confidence Trend Result	Date Range	Number of Data Points
MW-22R	0	No Trend	No Trend	03/17/2011 - 10/2/2015	10
GP-39A/GP-39R	109	Decreasing Trend	Decreasing Trend	03/28/2011 - 10/2/2015	10
MW-47	292	No Trend	No Trend	03/28/2011 - 10/2/2015	10
GP-2E (45-50)	445	Decreasing Trend	Decreasing Trend	04/01/2011 - 09/30/2015	10
MW-25B	618	No Trend	No Trend	04/01/2011 - 10/01/2015	10
MW-27B	991	Decreasing Trend	Decreasing Trend	11/09/2010 - 10/01/2015	10
MW-53	1163	No Trend	No Trend	04/07/2011 - 09/30/2015	10

FIGURES

BASE MAP REFERENCE:

1. "GROUNDWATER POTENTIOMETRIC SURFACE MAP - REMEDIATION SYSTEM AREA - MARCH 19, 2013" BY GANNETT FLEMING, BALTIMORE MARYLAND. DATED JUNE 13, 2013.

LEGEND:

- MONITORING WELL
- DUAL-PHASE EXTRACTION RECOVERY WELL
- SOIL VAPOR EXTRACTION RECOVERY WELL
- IN SITU GROUNDWATER REMEDIATION WELLS
- INJECTION WELL VAULT
- ABANDONED WELL
- FORMER CHEVRON FACILITY #122208 PROPERTY LINE
- PROPERTY LINE
- MANN-KENDALL ANALYSIS CENTERLINE

RIGGS ROAD (MD 212)
EASTERN AVENUE
OGLETHORPE ST NE
NICHOLSON ST NE
8TH ST NE
6TH ST NE
KENNEDY ST NE
KENSINGTON PL NE
CLAY BODY
MW-20 MW-21 MW-45 GP-44A GP-35A MW-15 MW-5 RW-1 MW-13 VP-4 RW-3 MW-7 RW-2 RW-4 MP-40 GP-41A PTW-A MW-46 MW-48 MW-50 MW-4 MW-6 PTW-B MW-38A MP-7 MP-20 GP-27R MW-2 RW-5 MW-47 MW-49 MW-51 MW-3 MW-1 MW-12 MP-30 GP-39R GP-30A GP-24A MW-16 MW-17 MW-22R MW-23
MW-18 MW-19 GP-2E(50-55) GP-2E(45-50) GP-2F(45-50) GP-2E(55-60) GP-2F(50-55) ISGR-2S ISGR-2D ISGR-1S ISGR-1D GP-9A(30-35) GP-9A(25-30) GP-7A(20-25) GP-11A(20-25) MW-24A MW-25B MW-25A MW-30R MW-24B MW-61A GP-11A(25-30) GP-11A(30-35) GP-11A(35-40) GP-7A(25-30) GP-9A(20-25) GP-7A(30-35) GP-7A(35-40) GP-7A(40-45)
MW-41A MW-41B
MW-37 MW-62A MW-62B MW-38 MW-39R MW-39 MW-40
MW-27B MW-27A MW-44A MW-44B MW-42 MW-26B MW-26A MW-43B MW-43A MW-58 IW-1 IW-2 IW-3 IW-4 IW-5 MW-53 MW-29B MW-29A
MW-60 MW-59 MW-33S MW-33A MW-33B MW-33C MW-54 MW-31B MW-31A MW-55 MW-52 MW-28B MW-28A MW-32

0 120' 240'
GRAPHIC SCALE

FORMER CHEVRON FACILITY #122208
CHILLUM, MARYLAND

CENTERLINES FOR MANN-KENDALL ANALYSIS

ARCADIS Design & Consultancy for natural and built assets

FIGURE 1

CITY: SYRACUSE NY DIV/GROUP: ENVCAD DB: E. KRAHMER LD:(Opt) PIC: K. M. ABBOTT PM: L. VOGEL TM: D. DIXON TR: C. RICHARDSON
G:\ENVCAD\SYRACUSE\ACTIVE\B0049337\0000\0000005\DWG\49337C06.dwg LAYOUT: 1 SAVED: 1/19/2016 12:14 PM ACADVER: 19.1S (LMS TECH) PAGESETUP: --- PLOTSTYLETABLE: PLTFULL.CTB PLOTTED: 1/19/2016 12:18 PM BY: KRAHMER, ERIC
XREFS: IMAGES: PROJECTNAME: ---
49337X01
49337XLB

ATTACHMENT A

Mann-Kendall Analysis Tables – West Centerline

WEST CENTERLINE - MW-22R - BENZENE

Mann-Kendall Statistical Method Worksheet

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

	Event 1	Event 2	Event 3	Event 4	Event 5	Event 6	Event 7	Event 8	Event 9	Event 10	Events
Concentration	1,200	5,500	3,900	3,100	2,300	3,200	3,300	2,000	2,200	2,500	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	1
Compared to Event 6	*****	*****	*****	*****	*****	*****	1	-1	-1	-1	-2
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' = -9

Statistical Confidence Level

90% Confidence [a]		**95% Confidence [b]**	
I S I >	20	**I S I >**	23
Result	No Trend	**Result**	No Trend

Notes
[a] 90% confidence level assuming an alpha of 0.05 per tail.
[b] 95% confidence level assuming an alpha of 0.025 per tail.

WEST CENTERLINE - MW-22R - MTBE

Mann-Kendall Statistical Method Worksheet

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

	Event 1	Event 2	Event 3	Event 4	Event 5	Event 6	Event 7	Event 8	Event 9	Event 10	Events
Concentration	110	5,700	3,600	2,400	2,200	3,000	1,500	1,500	1,500	1,800	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	-4
Compared to Event 5	*****	*****	*****	*****	*****	1	-1	-1	-1	-1	-3
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' = -14

Statistical Confidence Level

90% Confidence [a]		**95% Confidence [b]**	
I S I >	20	**I S I >**	23
Result	No Trend	**Result**	No Trend

Notes
[a] 90% confidence level assuming an alpha of 0.05 per tail.
[b] 95% confidence level assuming an alpha of 0.025 per tail.

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	0.5	5	2.5	2.5	10	5	0.5	0.5	0.5	0.5	10
	--	--	--	--	--	--	--	--	--	--	**Sum**
Compared to Event 1	*****	1	1	1	1	1	0	0	0	0	5
Compared to Event 2	*****	*****	-1	-1	1	0	-1	-1	-1	-1	-5
Compared to Event 3	*****	*****	*****	0	1	1	-1	-1	-1	-1	-2
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	*****	*****	*****	*****	*****	*****	-1	-1	-1	-1	-4
Compared to Event 7	*****	*****	*****	*****	*****	*****	*****	0	0	0	
Compared to Event 8	*****	*****	*****	*****	*****	*****	*****	*****	0	0	
Compared to Event 9	*****	*****	*****	*****	*****	*****	*****	*****	*****	0	

Mann-Kendall Statistic 'S' = -13

Statistical Confidence Level

90% Confidence [a]		**95% Confidence [b]**	
I S I >	20	**I S I >**	23
Result	No Trend	**Result**	No Trend

Notes
[a] 90% confidence level assuming an alpha of 0.05 per tail.
[b] 95% confidence level assuming an alpha of 0.025 per tail.

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	0.5	5	2.5	2.5	10	5	0.5	0.5	0.5	0.5	10
	--	--	--	--	--	--	--	--	--	--	**Sum**
Compared to Event 1	*****	1	1	1	1	1	0	0	0	0	5
Compared to Event 2	*****	*****	-1	-1	1	0	-1	-1	-1	-1	-5
Compared to Event 3	*****	*****	*****	0	1	1	-1	-1	-1	-1	-2
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	*****	*****	*****	*****	*****	*****	-1	-1	-1	-1	-4
Compared to Event 7	*****	*****	*****	*****	*****	*****	*****	0	0	0	
Compared to Event 8	*****	*****	*****	*****	*****	*****	*****	*****	0	0	
Compared to Event 9	*****	*****	*****	*****	*****	*****	*****	*****	*****	0	

Mann-Kendall Statistic 'S' = -13

Statistical Confidence Level

90% Confidence [a]		**95% Confidence [b]**	
I S I >	20	**I S I >**	23
Result	No Trend	**Result**	No Trend

Notes
[a] 90% confidence level assuming an alpha of 0.05 per tail.
[b] 95% confidence level assuming an alpha of 0.025 per tail.

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	1,100	520	850	720	710	570	340	520	320	600	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	0	-1	1	3
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	-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' = -24

Statistical Confidence Level

90% Confidence [a]		**95% Confidence [b]**	
I S I >	20	**I S I >**	23
Result	Decreasing Trend	**Result**	Decreasing Trend

Notes
[a] 90% confidence level assuming an alpha of 0.05 per tail.
[b] 95% confidence level assuming an alpha of 0.025 per tail.

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	560	290	510	330	390	240	140	230	150	320	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	-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	-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' = -23

Statistical Confidence Level

90% Confidence [a]

I S I > 20

Result Decreasing Trend

95% Confidence [b]

I S I > 23

Result No Trend

Notes
[a] 90% confidence level assuming an alpha of 0.05 per tail.
[b] 95% confidence level assuming an alpha of 0.025 per tail.

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	470	150	570	470	380	0.5	0.5	0.5	0.5	0.5	10
	--	--	--	--	--	--	--	--	--	--	**Sum**
Compared to Event 1	*****	-1	1	0	-1	-1	-1	-1	-1	-1	-6
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	-5
Compared to Event 6	*****	*****	*****	*****	*****	*****	0	0	0	0	
Compared to Event 7	*****	*****	*****	*****	*****	*****	*****	0	0	0	
Compared to Event 8	*****	*****	*****	*****	*****	*****	*****	*****	0	0	
Compared to Event 9	*****	*****	*****	*****	*****	*****	*****	*****	*****	0	

Mann-Kendall Statistic 'S' = -26

Statistical Confidence Level

90% Confidence [a]		**95% Confidence [b]**	
I S I >	20	**I S I >**	23
Result	Decreasing Trend	**Result**	Decreasing Trend

Notes
[a] 90% confidence level assuming an alpha of 0.05 per tail.
[b] 95% confidence level assuming an alpha of 0.025 per tail.

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	380	150	300	310	300	20	1.9	0.5	1.0	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	-2
Compared to Event 3	*****	*****	*****	1	0	-1	-1	-1	-1	-1	-4
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' = -30

Statistical Confidence Level

90% Confidence [a]

I S I > 20

Result Decreasing Trend

95% Confidence [b]

I S I > 23

Result Decreasing Trend

Notes

[a] 90% confidence level assuming an alpha of 0.05 per tail.

[b] 95% confidence level assuming an alpha of 0.025 per tail.

WEST CENTERLINE - MW-58 - BENZENE

Mann-Kendall Statistical Method Worksheet

Site-- Chillum
Compound-- Benzene
Well-- MW-58

	Event 1	Event 2	Event 3	Event 4	Event 5	Event 6	Event 7	Event 8	Event 9	Event 10	Events
Concentration	180	390	240	380	180	250	72	120	57	110	10
	--	--	--	--	--	--	--	--	--	--	**Sum**
Compared to Event 1	*****	1	1	1	0	1	-1	-1	-1	-1	
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' = -24

Statistical Confidence Level

90% Confidence [a]		**95% Confidence [b]**	
I S I >	20	**I S I >**	23
Result	Decreasing Trend	**Result**	Decreasing Trend

Notes
[a] 90% confidence level assuming an alpha of 0.05 per tail.
[b] 95% confidence level assuming an alpha of 0.025 per tail.

WEST CENTERLINE - MW-58 - MTBE

Mann-Kendall Statistical Method Worksheet

Site-- Chillum
Compound-- MTBE
Well-- MW-58

	Event 1	Event 2	Event 3	Event 4	Event 5	Event 6	Event 7	Event 8	Event 9	Event 10	Events
Concentration	110	220	190	170	140	110	81	82	51	140	10
	--	--	--	--	--	--	--	--	--	--	**Sum**
Compared to Event 1	*****	1	1	1	1	0	-1	-1	-1	1	2
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	0	-4
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' = -23

Statistical Confidence Level

90% Confidence [a]		**95% Confidence [b]**	
I S I >	20	**I S I >**	23
Result	Decreasing Trend	**Result**	No Trend

Notes
[a] 90% confidence level assuming an alpha of 0.05 per tail.
[b] 95% confidence level assuming an alpha of 0.025 per tail.

WEST CENTERLINE - MW- 59 - BENZENE

Mann-Kendall Statistical Method Worksheet

Site-- Chillum
Compound-- Benzene
Well-- MW-59

	Event 1	Event 2	Event 3	Event 4	Event 5	Event 6	Event 7	Event 8	Event 9	Event 10	Events
Concentration	140	220	140	240	260	240	73	120	120	110	10
	--	--	--	--	--	--	--	--	--	--	**Sum**
Compared to Event 1	*****	1	0	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	-1
Compared to Event 4	*****	*****	*****	*****	1	0	-1	-1	-1	-1	-3
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	-1	-1
Compared to Event 9	*****	*****	*****	*****	*****	*****	*****	*****	*****	-1	-1

Mann-Kendall Statistic 'S' = -14

Statistical Confidence Level

90% Confidence [a]		**95% Confidence [b]**	
I S I >	20	**I S I >**	23
Result	No Trend	**Result**	No Trend

Notes
[a] 90% confidence level assuming an alpha of 0.05 per tail.
[b] 95% confidence level assuming an alpha of 0.025 per tail.

WEST CENTERLINE - MW-59 - MTBE

Mann-Kendall Statistical Method Worksheet

Site-- Chillum
Compound-- MTBE
Well-- MW-59

	Event 1	Event 2	Event 3	Event 4	Event 5	Event 6	Event 7	Event 8	Event 9	Event 10	Events
Concentration	140	220	160	210	250	220	140	170	160	200	10
	--	--	--	--	--	--	--	--	--	--	**Sum**
Compared to Event 1	*****	1	1	1	1	1	0	1	1	1	8
Compared to Event 2	*****	*****	-1	-1	1	0	-1	-1	-1	-1	-5
Compared to Event 3	*****	*****	*****	1	1	1	-1	1	0	1	4
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	*****	*****	*****	*****	*****	*****	-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' = 0

Statistical Confidence Level

90% Confidence [a]		**95% Confidence [b]**	
I S I >	20	**I S I >**	23
Result	No Trend	**Result**	No Trend

Notes
[a] 90% confidence level assuming an alpha of 0.05 per tail.
[b] 95% confidence level assuming an alpha of 0.025 per tail.

WEST CENTERLINE - MW-60 - BENZENE

Mann-Kendall Statistical Method Worksheet

Site-- Chillum
Compound-- Benzene
Well-- MW-60

	Event 1	Event 2	Event 3	Event 4	Event 5	Event 6	Event 7	Event 8	Event 9	Event 10	Events
Concentration	0.5	0.5	0.5	0.5	1.6	1.7	2.6				7
	--	--	--	--	--	--	--	--	--	--	**Sum**
Compared to Event 1	*****	0	0	0	1	1	1				3
Compared to Event 2	*****	*****	0	0	1	1	1				3
Compared to Event 3	*****	*****	*****	0	1	1	1				3
Compared to Event 4	*****	*****	*****	*****	1	1	1				3
Compared to Event 5	*****	*****	*****	*****	*****	1	1				2
Compared to Event 6	*****	*****	*****	*****	*****	*****	1				1
Compared to Event 7	*****	*****	*****	*****	*****	*****	*****				
Compared to Event 8	*****	*****	*****	*****	*****	*****	*****	*****			
Compared to Event 9	*****	*****	*****	*****	*****	*****	*****	*****	*****		

Mann-Kendall Statistic 'S' = 15

Statistical Confidence Level

90% Confidence [a]		**95% Confidence [b]**	
I S I >	13	**I S I >**	15
Result	Increasing Trend	**Result**	No Trend

Notes
[a] 90% confidence level assuming an alpha of 0.05 per tail.
[b] 95% confidence level assuming an alpha of 0.025 per tail.

WEST CENTERLINE - MW-60 - MTBE

Mann-Kendall Statistical Method Worksheet

Site-- Chillum
Compound-- MTBE
Well-- MW-60

	Event 1	Event 2	Event 3	Event 4	Event 5	Event 6	Event 7	Event 8	Event 9	Event 10	Events
Concentration	16	18	10	14	12	12	9.8				7
	--	--	--	--	--	--	--	--	--	--	**Sum**
Compared to Event 1	*****	1	-1	-1	-1	-1	-1				-4
Compared to Event 2	*****	*****	-1	-1	-1	-1	-1				-5
Compared to Event 3	*****	*****	*****	1	1	1	-1				2
Compared to Event 4	*****	*****	*****	*****	-1	-1	-1				-3
Compared to Event 5	*****	*****	*****	*****	*****	0	-1				-1
Compared to Event 6	*****	*****	*****	*****	*****	*****	-1				-1
Compared to Event 7	*****	*****	*****	*****	*****	*****	*****				
Compared to Event 8	*****	*****	*****	*****	*****	*****	*****	*****			
Compared to Event 9	*****	*****	*****	*****	*****	*****	*****	*****	*****		

Mann-Kendall Statistic 'S' = -12

Statistical Confidence Level

90% Confidence [a]		**95% Confidence [b]**	
I S I >	13	**I S I >**	15
Result	No Trend	**Result**	No Trend

Notes
[a] 90% confidence level assuming an alpha of 0.05 per tail.
[b] 95% confidence level assuming an alpha of 0.025 per tail.

WEST CENTERLINE - MW-62A - BENZENE

Mann-Kendall Statistical Method Worksheet

Site-- Chillum
Compound-- Benzene
Well-- MW-62A

	Event 1	Event 2	Event 3	Event 4	Event 5	Event 6	Event 7	Event 8	Event 9	Event 10	Events
Concentration	0.5	0.5	0.5	0.5	0.5						5
	--	--	--	--	--	--	--	--	--	--	**Sum**
Compared to Event 1	*****	0	0	0	0						
Compared to Event 2	*****	*****	0	0	0						
Compared to Event 3	*****	*****	*****	0	0						
Compared to Event 4	*****	*****	*****	*****	0						
Compared to Event 5	*****	*****	*****	*****	*****						
Compared to Event 6	*****	*****	*****	*****	*****	*****					
Compared to Event 7	*****	*****	*****	*****	*****	*****	*****				
Compared to Event 8	*****	*****	*****	*****	*****	*****	*****	*****			
Compared to Event 9	*****	*****	*****	*****	*****	*****	*****	*****	*****		

Mann-Kendall Statistic 'S' = 0

Statistical Confidence Level

90% Confidence [a]		**95% Confidence [b]**	
I S I >	8	**I S I >**	10
Result	No Trend	**Result**	No Trend

Notes
[a] 90% confidence level assuming an alpha of 0.05 per tail.
[b] 95% confidence level assuming an alpha of 0.025 per tail.

WEST CENTERLINE - MW-62A - MTBE

Mann-Kendall Statistical Method Worksheet

Site-- Chillum
Compound-- MTBE
Well-- MW-62A

	Event 1	Event 2	Event 3	Event 4	Event 5	Event 6	Event 7	Event 8	Event 9	Event 10	Events
Concentration	0.5	0.5	0.5	0.5	0.5						5
	--	--	--	--	--	--	--	--	--	--	**Sum**
Compared to Event 1	*****	0	0	0	0						
Compared to Event 2	*****	*****	0	0	0						
Compared to Event 3	*****	*****	*****	0	0						
Compared to Event 4	*****	*****	*****	*****	0						
Compared to Event 5	*****	*****	*****	*****	*****						
Compared to Event 6	*****	*****	*****	*****	*****	*****					
Compared to Event 7	*****	*****	*****	*****	*****	*****	*****				
Compared to Event 8	*****	*****	*****	*****	*****	*****	*****	*****			
Compared to Event 9	*****	*****	*****	*****	*****	*****	*****	*****	*****		

Mann-Kendall Statistic 'S' = 0

Statistical Confidence Level

90% Confidence [a]		**95% Confidence [b]**	
I S I >	8	**I S I >**	10
Result	No Trend	**Result**	No Trend

Notes
[a] 90% confidence level assuming an alpha of 0.05 per tail.
[b] 95% confidence level assuming an alpha of 0.025 per tail.

WEST CENTERLINE - MW-62B - BENZENE

Mann-Kendall Statistical Method Worksheet

Site-- Chillum
Compound-- Benzene
Well-- MW-62B

	Event 1	Event 2	Event 3	Event 4	Event 5	Event 6	Event 7	Event 8	Event 9	Event 10	Events
Concentration	94	61	34	3.3	40	9.6	8.2				7
	--	--	--	--	--	--	--	--	--	--	**Sum**
Compared to Event 1	*****	-1	-1	-1	-1	-1	-1				-6
Compared to Event 2	*****	*****	-1	-1	-1	-1	-1				-5
Compared to Event 3	*****	*****	*****	-1	1	-1	-1				-2
Compared to Event 4	*****	*****	*****	*****	1	1	1				3
Compared to Event 5	*****	*****	*****	*****	*****	-1	-1				-2
Compared to Event 6	*****	*****	*****	*****	*****	*****	-1				-1
Compared to Event 7	*****	*****	*****	*****	*****	*****	*****				
Compared to Event 8	*****	*****	*****	*****	*****	*****	*****	*****			
Compared to Event 9	*****	*****	*****	*****	*****	*****	*****	*****	*****		

Mann-Kendall Statistic 'S' = -13

Statistical Confidence Level

90% Confidence [a]		**95% Confidence [b]**	
I S I >	13	**I S I >**	15
Result	No Trend	**Result**	No Trend

Notes
[a] 90% confidence level assuming an alpha of 0.05 per tail.
[b] 95% confidence level assuming an alpha of 0.025 per tail.

WEST CENTERLINE - MW-62B - MTBE

Mann-Kendall Statistical Method Worksheet

Site-- Chillum
Compound-- MTBE
Well-- MW-62B

	Event 1	Event 2	Event 3	Event 4	Event 5	Event 6	Event 7	Event 8	Event 9	Event 10	Events
Concentration	97	77	66	17	71	30	36				7
	--	--	--	--	--	--	--	--	--	--	**Sum**
Compared to Event 1	*****	-1	-1	-1	-1	-1	-1				-6
Compared to Event 2	*****	*****	-1	-1	-1	-1	-1				-5
Compared to Event 3	*****	*****	*****	-1	1	-1	-1				-2
Compared to Event 4	*****	*****	*****	*****	1	1	1				3
Compared to Event 5	*****	*****	*****	*****	*****	-1	-1				-2
Compared to Event 6	*****	*****	*****	*****	*****	*****	1				1
Compared to Event 7	*****	*****	*****	*****	*****	*****	*****				
Compared to Event 8	*****	*****	*****	*****	*****	*****	*****	*****			
Compared to Event 9	*****	*****	*****	*****	*****	*****	*****	*****	*****		

Mann-Kendall Statistic 'S' = -11

Statistical Confidence Level

90% Confidence [a]		**95% Confidence [b]**	
I S I >	13	**I S I >**	15
Result	No Trend	**Result**	No Trend

Notes
[a] 90% confidence level assuming an alpha of 0.05 per tail.
[b] 95% confidence level assuming an alpha of 0.025 per tail.

ATTACHMENT B

Mann-Kendall Analysis Tables – East Centerline

EAST CENTERLINE - MW-22R - BENZENE

Mann-Kendall Statistical Method Worksheet

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

	Event 1	Event 2	Event 3	Event 4	Event 5	Event 6	Event 7	Event 8	Event 9	Event 10	Events
Concentration	1,200	5,500	3,900	3,100	2,300	3,200	3,300	2,000	2,200	2,500	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	1
Compared to Event 6	*****	*****	*****	*****	*****	*****	1	-1	-1	-1	-2
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' = -9

Statistical Confidence Level

90% Confidence [a]		**95% Confidence [b]**	
I S I >	20	**I S I >**	23
Result	No Trend	**Result**	No Trend

Notes
[a] 90% confidence level assuming an alpha of 0.05 per tail.
[b] 95% confidence level assuming an alpha of 0.025 per tail.

EAST CENTERLINE - MW-22R - MTBE

Mann-Kendall Statistical Method Worksheet

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

	Event 1	Event 2	Event 3	Event 4	Event 5	Event 6	Event 7	Event 8	Event 9	Event 10	Events
Concentration	110	5,700	3,600	2,400	2,200	3,000	1,500	1,500	1,500	1,800	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	-4
Compared to Event 5	*****	*****	*****	*****	*****	1	-1	-1	-1	-1	-3
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' = -14

Statistical Confidence Level

90% Confidence [a]		**95% Confidence [b]**	
I S I >	20	**I S I >**	23
Result	No Trend	**Result**	No Trend

Notes
[a] 90% confidence level assuming an alpha of 0.05 per tail.
[b] 95% confidence level assuming an alpha of 0.025 per tail.

EAST CENTERLINE - GP-39R - BENZENE

Mann-Kendall Statistical Method Worksheet

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

	Event 1	Event 2	Event 3	Event 4	Event 5	Event 6	Event 7	Event 8	Event 9	Event 10	Events
Concentration	4100	340	150	280	210	27	130	120	1.8	27	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	-3
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	0	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' = -34

Statistical Confidence Level

90% Confidence [a]

I S I > 20

Result Decreasing Trend

95% Confidence [b]

I S I > 23

Result Decreasing Trend

Notes

[a] 90% confidence level assuming an alpha of 0.05 per tail.

[b] 95% confidence level assuming an alpha of 0.025 per tail.

EAST CENTERLINE - GP-39R - MTBE

Mann-Kendall Statistical Method Worksheet

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

	Event 1	Event 2	Event 3	Event 4	Event 5	Event 6	Event 7	Event 8	Event 9	Event 10	Events
Concentration	5100	680	400	350	310	24	160	220	65	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	-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	-1
Compared to Event 8	*****	*****	*****	*****	*****	*****	*****	*****	-1	-1	-2
Compared to Event 9	*****	*****	*****	*****	*****	*****	*****	*****	*****	1	1

Mann-Kendall Statistic 'S' = -33

Statistical Confidence Level

90% Confidence [a]		**95% Confidence [b]**	
I S I >	20	**I S I >**	23
Result	Decreasing Trend	**Result**	Decreasing Trend

Notes
[a] 90% confidence level assuming an alpha of 0.05 per tail.
[b] 95% confidence level assuming an alpha of 0.025 per tail.

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	260	330	380	430	510	250	280	210	94	180	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	-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	*****	*****	*****	*****	*****	*****	1	-1	-1	-1	-2
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' = -19

Statistical Confidence Level

90% Confidence [a]		**95% Confidence [b]**	
I S I >	20	**I S I >**	23
Result	No Trend	**Result**	No Trend

Notes
[a] 90% confidence level assuming an alpha of 0.05 per tail.
[b] 95% confidence level assuming an alpha of 0.025 per tail.

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	50	52	40	0.5	16	0.5	43	0.5	24	8.5	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	0	1	0	1	1	4
Compared to Event 5	*****	*****	*****	*****	*****	-1	1	-1	1	-1	-1
Compared to Event 6	*****	*****	*****	*****	*****	*****	1	0	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' = -16

Statistical Confidence Level

90% Confidence [a]		**95% Confidence [b]**	
I S I >	20	**I S I >**	23
Result	No Trend	**Result**	No Trend

Notes
[a] 90% confidence level assuming an alpha of 0.05 per tail.
[b] 95% confidence level assuming an alpha of 0.025 per tail.

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	200	350	470	320	55	50	6.9	1.4	0.5	0.5	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	-6
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' = -36

Statistical Confidence Level

90% Confidence [a]		**95% Confidence [b]**	
I S I >	20	**I S I >**	23
Result	Decreasing Trend	**Result**	Decreasing Trend

Notes
[a] 90% confidence level assuming an alpha of 0.05 per tail.
[b] 95% confidence level assuming an alpha of 0.025 per tail.

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	820	1300	1400	850	460	280	130	75	38	12	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	-6
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	*****	*****	*****	*****	*****	*****	*****	*****	*****	-1	-1

Mann-Kendall Statistic 'S' = -37

Statistical Confidence Level

90% Confidence [a]		**95% Confidence [b]**	
I S I >	20	**I S I >**	23
Result	Decreasing Trend	**Result**	Decreasing Trend

Notes
[a] 90% confidence level assuming an alpha of 0.05 per tail.
[b] 95% confidence level assuming an alpha of 0.025 per tail.

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	120	200	120	140	160	260	23	430	150	94	10
	--	--	--	--	--	--	--	--	--	--	**Sum**
Compared to Event 1	*****	1	0	1	1	1	-1	1	1	-1	4
Compared to Event 2	*****	*****	-1	-1	-1	1	-1	1	-1	-1	-4
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	-1
Compared to Event 6	*****	*****	*****	*****	*****	*****	-1	1	-1	-1	-2
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' = 2

Statistical Confidence Level

90% Confidence [a]		**95% Confidence [b]**	
I S I >	20	**I S I >**	23
Result	No Trend	**Result**	No Trend

Notes
[a] 90% confidence level assuming an alpha of 0.05 per tail.
[b] 95% confidence level assuming an alpha of 0.025 per tail.

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	200	390	250	230	250	320	25	430	230	190	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	0	1	-1	1	-1	-1	-2
Compared to Event 4	*****	*****	*****	*****	1	1	-1	1	0	-1	1
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	-2
Compared to Event 9	*****	*****	*****	*****	*****	*****	*****	*****	*****	-1	-1

Mann-Kendall Statistic 'S' = -5

Statistical Confidence Level

90% Confidence [a]		**95% Confidence [b]**	
I S I >	20	**I S I >**	23
Result	No Trend	**Result**	No Trend

Notes
[a] 90% confidence level assuming an alpha of 0.05 per tail.
[b] 95% confidence level assuming an alpha of 0.025 per tail.

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	0.5	2.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	10
	--	--	--	--	--	--	--	--	--	--	**Sum**
Compared to Event 1	*****	1	0	0	0	0	0	0	0	0	1
Compared to Event 2	*****	*****	-1	-1	-1	-1	-1	-1	-1	-1	-8
Compared to Event 3	*****	*****	*****	0	0	0	0	0	0	0	
Compared to Event 4	*****	*****	*****	*****	0	0	0	0	0	0	
Compared to Event 5	*****	*****	*****	*****	*****	0	0	0	0	0	
Compared to Event 6	*****	*****	*****	*****	*****	*****	0	0	0	0	
Compared to Event 7	*****	*****	*****	*****	*****	*****	*****	0	0	0	
Compared to Event 8	*****	*****	*****	*****	*****	*****	*****	*****	0	0	
Compared to Event 9	*****	*****	*****	*****	*****	*****	*****	*****	*****	0	

Mann-Kendall Statistic 'S' = -7

Statistical Confidence Level

90% Confidence [a]		**95% Confidence [b]**	
I S I >	20	**I S I >**	23
Result	No Trend	**Result**	No Trend

Notes
[a] 90% confidence level assuming an alpha of 0.05 per tail.
[b] 95% confidence level assuming an alpha of 0.025 per tail.

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	170	140	140	3.4	120	96	71	72	68	91	10
	--	--	--	--	--	--	--	--	--	--	**Sum**
Compared to Event 1	*****	-1	-1	-1	-1	-1	-1	-1	-1	-1	-9
Compared to Event 2	*****	*****	0	-1	-1	-1	-1	-1	-1	-1	-7
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	1
Compared to Event 8	*****	*****	*****	*****	*****	*****	*****	*****	-1	1	
Compared to Event 9	*****	*****	*****	*****	*****	*****	*****	*****	*****	1	1

Mann-Kendall Statistic 'S' = -24

Statistical Confidence Level

90% Confidence [a]		**95% Confidence [b]**	
I S I >	20	**I S I >**	23
Result	Decreasing Trend	**Result**	Decreasing Trend

Notes
[a] 90% confidence level assuming an alpha of 0.05 per tail.
[b] 95% confidence level assuming an alpha of 0.025 per tail.

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	6.6	5.1	6.5	4.1	2.7	2.8	5	3.1	9.3	2.8	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	-2
Compared to Event 5	*****	*****	*****	*****	*****	1	1	1	1	1	5
Compared to Event 6	*****	*****	*****	*****	*****	*****	1	1	1	0	3
Compared to Event 7	*****	*****	*****	*****	*****	*****	*****	-1	1	-1	-1
Compared to Event 8	*****	*****	*****	*****	*****	*****	*****	*****	1	-1	
Compared to Event 9	*****	*****	*****	*****	*****	*****	*****	*****	*****	-1	-1

Mann-Kendall Statistic 'S' = -12

Statistical Confidence Level

90% Confidence [a]		**95% Confidence [b]**	
I S I >	20	**I S I >**	23
Result	No Trend	**Result**	No Trend

Notes
[a] 90% confidence level assuming an alpha of 0.05 per tail.
[b] 95% confidence level assuming an alpha of 0.025 per tail.

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	140	180	140	100	73	110	76	110	82	100	10
	--	--	--	--	--	--	--	--	--	--	**Sum**
Compared to Event 1	*****	1	0	-1	-1	-1	-1	-1	-1	-1	-6
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	0	-1
Compared to Event 5	*****	*****	*****	*****	*****	1	1	1	1	1	5
Compared to Event 6	*****	*****	*****	*****	*****	*****	-1	0	-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' = -18

Statistical Confidence Level

90% Confidence [a]		**95% Confidence [b]**	
I S I >	20	**I S I >**	23
Result	No Trend	**Result**	No Trend

Notes
[a] 90% confidence level assuming an alpha of 0.05 per tail.
[b] 95% confidence level assuming an alpha of 0.025 per tail.