# Operations & Maintenance Report
# Second Quarter 2014

TOC Holdings Co.
Facility No. 01-176
24205 56th Avenue West
Mountlake Terrace WA 98043


formerly


Prepared for:
TOC Holdings Co.
2737 West Commodore Way
Seattle WA 98199

Prepared by:
Stantec Consulting Services Inc.
(formerly JBR Environmental
Consultants, Inc.)
19101 36th Avenue West, Ste. 203
Lynnwood WA 98036
Phone: 425.977.4994

**October 22, 2014**

# Sign-off Sheet

Please note that effective May 9, 2014, the employees of **JBR Environmental Consultants, Inc. (JBR)** have joined **Stantec Consulting Services Inc. (Stantec)**. You will continue to see the same people, doing business with you the same way, and with the same goal: to safely deliver the highest level of service while always striving to exceed your expectations.

This document entitled ***Operations and Maintenance Report, Second Quarter 2014***, was prepared by JBR (now Stantec) on behalf of **TOC Holdings Co. (TOC)** for specific application to TOC Facility No. 01-176 in Mountlake Terrace, Washington. Services conducted by JBR (now Stantec) for this project were conducted in accordance with the Environmental Services Contract between **HydroCon Environmental, LLC (HydroCon)** and JBR, which has been now transferred over to Stantec. Any reliance on this document by any third party is strictly prohibited. The material in it reflects Stantec's professional judgment in light of the scope, schedule and other limitations stated in the document and in the contract between JBR and HydroCon. The opinions in the document are based on conditions and information existing at the time the document was published and do not take into account any subsequent changes. In preparing the document, Stantec did not verify information supplied to it by others. Any use which a third party makes of this document is the responsibility of such third party. Such third party agrees that Stantec shall not be responsible for costs or damages of any kind, if any, suffered by it or any other third party as a result of decisions made or actions taken based on this document.

This document was prepared under the supervision and direction of the following key staff.

Prepared by: **Jeremy Fleege, PE**
**Environmental Engineer**

Reviewed by: **Rebekah Brooks, LG, LHg**
**Manager, Hydrogeology / Project Manager**

# Table of Contents

## List of Tables



## List of Figures



## List of Appendices

## Abbreviations & Acronyms

| | |
|---|---|
| µg/L | micrograms per liter |
| AO | Agreed Order |
| AWS | Air/Water Separator |
| BTEX | Benzene, Toluene, Ethylbenzene and Total Xylenes |
| CatOx | Catalytic Oxidizer |
| City | City of Mountlake Terrace, Washington |
| DMR | Discharge Monitoring Report |
| DPE | Dual-Phase Extraction |
| Ecology | Washington State Department of Ecology |
| GAC | Granular-Activated Carbon |
| gallons/day | gallons per day |
| gallons/minute | gallons per minute |
| GRPH | Gasoline-Range Petroleum Hydrocarbons |
| HydroCon | HydroCon Environmental, LLC |
| JBR | JBR Environmental Consultants, Inc. |
| lb/day | pounds per day |
| LNAPL | Light Nonaqueous-Phase Liquid |
| $mg/m^3$ | milligrams per cubic meter |
| MPE | Multi-Phase Extraction |
| MTCA | Model Toxics Control Act |
| NOC | Notice of Construction |
| O&M | Operation and Maintenance |
| OWS | Oil/Water Separator |
| ppmv | parts per million by volume |
| PSCAA | Puget Sound Clean Air Agency |
| ROW | Right-of-Way |
| SEPA | State Environmental Protection Act |
| SES | SoundEarth Strategies, Inc. |
| Stantec | Stantec Consulting Services Inc. |
| SUP | Special Use Permit |
| SVE | Soil Vapor Extraction |
| SWD | State Waste Discharge |
| TOC | TOC Holdings Co. |
| VOC | Volatile Organic Compound |

## Properties

| | |
|---|---|
| TOC Property | 24205 56th Avenue West; Mountlake Terrace WA |
| TOC/Farmasonis Property | 24225 56th Avenue West; Mountlake Terrace WA |
| Drake Property | 24309 56th Avenue West; Mountlake Terrace WA |
| ROW | 56th Avenue West; Mountlake Terrace, WA |

# Executive Summary

This report documents the **Second Quarter 2014** operation and maintenance (O&M) activities from April through June 2014 associated with interim remedial actions currently being implemented at TOC Holdings Co. (TOC) Facility No. 01-176 located in Mountlake Terrace, Washington. The interim remedial actions are being implemented within the Interim Remedial Action Project Area, which encompasses the following properties: 1) TOC Property, located at 24205 56th Avenue West, 2) TOC/Farmasonis Property, located at 24225 56th Avenue West, 3) Drake Property, located at 24309 56th Avenue West, and 4) portions of the 56th Avenue West right-of-way (ROW). As defined in the Agreed Order (AO) No. DE 8661 between the Washington Department of Ecology (Ecology) and TOC, these properties also constitute the TOC Site.

Commencing in March 2014, JBR Environmental Consultants, Inc. (now Stantec Consulting Services Inc. [Stantec]) has been hired by HydroCon Environmental LLC (HydroCon), on behalf of TOC, to take over environmental consulting responsibilities on the project. The O&M field activities were performed entirely by Stantec staff this Quarter. This Report has been prepared by Stantec to meet reporting requirements of the AO.

Three multi-phase extraction (MPE) systems have been installed within the Interim Remedial Action Project Area for remediation of petroleum hydrocarbon-contaminated groundwater, vapor and free product (where present). The Unit 1 remediation system is located on the TOC Property, and is associated with operation of remediation wells on the TOC Property. Units 2 and 3 remediation systems are located on the TOC/Farmasonis Property and are associated with operation of remediation wells on the TOC/Farmasonis and Drake Properties, respectively. This report includes a description of the MPE systems, permit compliance, performance and optimization efforts. A summary of the MPE system performance and maintenance activities during this Quarter is provided below:

- O&M consisted of routine, scheduled maintenance activities (as described in the O&M Manual), as well as the following activities:
  - routine bag filter replacements;
  - replacement of oil/water separator (OWS) transfer pumps at Unit 1 and Unit 3; and
  - replacement of pressure regulator for air compressor at Unit 2.
- A combined total of 30.3 pounds of vapor-phase hydrocarbons was removed during this reporting period, and a cumulative total of 2,832 pounds since startup in October 2012. In addition, a volume of 419,864 gallons of groundwater was extracted, treated and discharged during this period. The total volume of water processed since system startup is approximately 1,737,646 gallons.
- There was no recovered light nonaqueous-phase liquid (LNAPL) from the three MPE systems. Also, the OWS for each system was inspected, and no LNAPL was visible on the liquid contents.
- System optimization activities during this reporting period focused on balancing the flow of water through the OWS and addressing issues associated with the Granular-Activated Carbon (GAC) canisters. These activities are described in more detail in the following sections.

# 1.0 INTRODUCTION

This report documents the **Second Quarter 2014** O&M activities from April through June 2014 associated with interim remedial actions currently being implemented at TOC Facility No. 01-176 located in Mountlake Terrace, Washington (**Figure 1)**. The interim remedial actions are being implemented within the Interim Remedial Action Project Area, which encompasses the properties identified below. The following properties also constitute the TOC Site, as defined in the AO No. DE 8661 between Ecology and TOC (**Figure 2**):

1) TOC Property - located at 24205 56th Avenue West;
2) TOC/Farmasonis Property - located at 24225 56th Avenue West;
3) Drake Property - located at 24309 56th Avenue West; and
4) portions of the 56th Avenue West ROW.

This report has been prepared by Stantec to meet the reporting requirements of the AO. Previous work was conducted by SoundEarth Strategies, Inc. (SES) and concluded during the First Quarter 2014.

Three MPE systems have been installed within the Interim Remedial Action Project Area for remediation of petroleum hydrocarbon-contaminated groundwater, vapor and free product (where present). The Unit 1 remediation system is located on the TOC Property, and is associated with operation of remediation wells on the TOC Property. Units 2 and 3 remediation systems are located on the TOC/Farmasonis Property and are associated with operation of remediation wells on the TOC/ Farmasonis and Drake Properties, respectively. This report includes a description of the MPE systems, permit compliance, performance and optimization efforts.

# 2.0 SYSTEM DESCRIPTION

The following is a brief description of the remedial system history, current system configurations and a description of system modifications during this Quarter.

## 2.1 SYSTEM BACKGROUND

TOC (formerly Time Oil Co.) operated a retail gasoline station on the TOC Property between 1968 and 1990. One 8,000-gallon and two 6,000-gallon underground storage tanks were removed from the TOC Property in 1991. The TOC Property is currently vacant. A dual-phase extraction (DPE) remediation system (former DPE system) was installed at the TOC Property in 1996 and operated until October 2004. In 2006, SES confirmed that gasoline contamination extended downgradient of the TOC Property to the south and west based on groundwater monitoring results. Site investigations between 1992 and 2013 led to the installation of 107 monitoring and remediation wells into three groundwater zones on the TOC Site and two properties immediately downgradient (Herman Property and Shin/Choi Property). Of these 107 wells, 23 are installed in the shallow water-bearing zone, 71 are installed in the intermediate water-bearing zone (including seven intermediate zone wells that intersect shallow zone conditions), 7 wells are installed in the deep water-bearing zone, and six wells have been decommissioned. In October 2011, the AO between TOC and Ecology became effective. In accordance with the AO, SES initiated a remedial investigation at the TOC Site. Additionally, the former DPE system was removed and three MPE systems were installed between November 2011 and August 2012. The three MPE systems (Units 1, 2 and 3) began operating in October 2012.

MPE is an *in situ* remedial technology that simultaneously extracts multiple fluid phases from remediation wells. The phases generally include vapor phase, dissolved phase (i.e., groundwater), and LNAPL or free product.

## 2.2 CURRENT SYSTEM

Each MPE system consists of a self-contained, aboveground equipment enclosure. The MPE system for the TOC Property (Unit 1) is located within a fenced enclosure on the TOC Property. The MPE systems for the TOC/Farmasonis Property (Unit 2) and Drake Property (Unit 3) are co-located within a single fenced enclosure located on the eastern side of the TOC/Farmasonis Property. The three MPE systems are basically identical, with the exception of their orientation, mirror-image layouts, and the number of remediation wells serving each MPE system. A total of 23 remediation wells serve the three MPE systems: nine wells on the TOC Property, six wells on the TOC/Farmasonis Property, and eight wells at the Drake Property (**Figure 3**). The individual MPE equipment enclosures were custom fabricated in accordance with the Washington State Department of Labor and Industry requirements for factory-assembled structures.

Each of the remediation wells is equipped with a down-hole pneumatic pump to extract petroleum-impacted groundwater (dissolved-phase petroleum hydrocarbons) and recoverable LNAPL. In addition, each MPE system is equipped with a soil vapor extraction (SVE) blower. The SVE blowers are intended to extract soil vapors (vapor-phase petroleum hydrocarbons) from the remediation wells and surrounding soil. Process piping is utilized to convey recovered fluids (groundwater and LNAPL) and vapor from the remediation wells to the MPE system enclosures. The piping and instrumentation diagram presented on **Figure 4** illustrates the process flow and major mechanical equipment associated with treatment systems. Extracted groundwater is

conveyed to each MPE system for phase separation, treatment, and permitted discharge to the sanitary sewer in accordance with Ecology State Waste Discharge Permit No. ST0007384. The extracted groundwater is processed through an OWS, which is designed to process up to 10 gallons per minute (gpm). The effluent from the OWS is pumped through three 55-gallon GAC canisters to remove dissolved phase volatile organic compounds (VOCs) prior to being discharged to the sanitary sewer. When present, LNAPL recovered with the OWS is temporarily stored in a 55-gallon product drum prior to disposal or recycling at an offsite facility.

The SVE blower(s) creates the vacuum pressure necessary to extract soil vapors from the remediation wells. The extracted soil vapors are processed through an air/water separator (AWS) and a catalytic oxidizer (CatOx). The AWS removes particulate and liquids from the air stream to prevent damage to the SVE blower and ancillary equipment. The vapors are thermally treated by the CatOx prior to being discharged to the atmosphere, in accordance with the Puget Sound Clean Air Agency (PSCCA) Notice of Construction (NOC) No. 10384.

## 2.3 SYSTEM MODIFICATIONS

No system modifications were performed during this Quarter.

# 3.0 PERMITS

State, regional and local permit requirements apply to the interim remedial action. Pursuant to the Revised Code of Washington 70.105D.090(1), TOC's interim remedial actions under the AO are exempt from the procedural requirements of any laws requiring or authorizing local government permits or approvals; however, TOC must comply with the substantive requirements of such permits or approvals.

Local requirements for clearing, grading, and erosion control activities were addressed through review under the State Environmental Policy Act (SEPA), which included a public comment period through September 26, 2011. State and regional permit requirements beyond the jurisdiction of the AO are discussed below in Sections 3.1 (State Waste Discharge Permit), 3.2 (PSCAA Order of Approval), and 3.3 (Special Use Permit [SUP]).

## 3.1 STATE WASTE DISCHARGE PERMIT

State Waste Discharge Permit ST0007384 (SWD Permit) authorizes and regulates operation of and discharges from the three MPE systems on the TOC Site, effective July 2, 2012 through June 19, 2017.

Ecology's Water Quality Program administers the wastewater discharge permit, wastewater compliance sampling, record-keeping, and submittal schedule. Discharge Monitoring Reports (DMRs) are submitted to Ecology monthly. The DMR is a summary report which presents the monitoring data obtained during the monthly reporting period. A summary of the maximum daily effluent limits established by the permit are summarized below:

- The maximum daily volumes of water to be discharged to Outfalls 001 and 002 shall be 7,000 and 14,000 gallons per day (gallons/day), respectively.
- pH shall be between 6 and 10 Standard Units.
- Benzene concentrations shall not exceed 5 micrograms per liter (µg/L).
- Benzene, toluene, ethylbenzene and total xylene (BTEX) cumulative concentration shall not exceed 100 µg/L.
- Total petroleum hydrocarbons, gasoline range (GRPH) shall not exceed 1,000 µg/L.
- Total lead shall not exceed 1,090 µg/L.

The SWD Permit identifies two outfall locations where compliance with the maximum daily effluent limits must be attained: the MPE system for the TOC Property (Unit 1) discharges to Outfall 001; the MPE systems for the TOC/Farmasonis Property (Unit 2) and the Drake Property (Unit 3) discharge to Outfall 002. Effluent from each of the three MPE systems is sampled on a monthly basis at points adjacent to each MPE system **(Figure 5)**. Discharges from Units 2 and 3 combine after the effluent sampling points at approximately the location of Outfall 002. The minimum, maximum and average effluent concentrations are reported in the DMR submitted to Ecology.

## 3.2 PSCAA ORDER OF APPROVAL

PSCAA issued an Order of Approval for NOC 10384 on May 13, 2012, which establishes the conditions and restrictions for the operation of the CatOx units. The key conditions and restrictions are summarized below:

- All emissions from each of the three SVE blowers shall be routed through their associated CatOx.
- The flow through each CatOx shall not exceed 350 standard cubic feet per minute. The flow rate shall be monitored monthly.
- The temperature of the vapor entering the catalytic bed shall be at least 240 degrees Celsius (464 degrees Fahrenheit), and the temperature of the vapor exiting the oxidizer bed shall not exceed 620 degrees Celsius (1148 degrees Fahrenheit).
- The destruction and removal efficiency of the GRPH flowing into and out of the CatOx shall be 95 percent unless the concentration of GRPH in the vapor exiting the CatOx does not exceed 50 parts per million volume (ppmv).
- The CatOx units may be removed and SVE emissions can be vented directly to the atmosphere through a stack provided the benzene and GRPH concentrations remain below 0.5 and 50 ppmv, respectively, for a period of 3 consecutive months. The CatOx shall be reactivated if concentrations of benzene or GRPH exceed 0.5 or 50 ppmv, respectively.

## 3.3 SPECIAL USE PERMIT

The SUP executed between TOC and the City of Mountlake Terrace (City) addresses interim remedial activities that extend into city ROWs. Specifically, the SUP: (1) allows the discharge of treated wastewater to the City sanitary sewer network for conveyance to the City of Edmonds publicly owned treatment works under the State Waste Discharge Permit, and (2) retroactively administers the installation, maintenance, sampling, repair and/or decommissioning of Interim Remedial Action Project Area monitoring wells that are located within City ROWs.

# 4.0 SYSTEM PERFORMANCE

Prior to system startup, concentrations of BTEX and/or GRPH in groundwater exceeded their respective Washington State Model Toxics Control Act (MTCA) Method A cleanup levels in 17 out of 68 intermediate zone wells (including intermediate zone wells that intersect shallow zone conditions) located within the Interim Remedial Action Project Area. Thirteen of these wells are connected to one of the three remediation systems.

## 4.1 TOC PROPERTY

The following is a summary of the **Second Quarter 2014** system O&M at the TOC Property:

- The MPE operation time this Quarter was approximately 78 percent (**Table 1-1**). System down time was attributed to OWS high level conditions, mainly due to bag filter fouling.
- The vapor-phase hydrocarbon mass removal associated with the SVE system was approximately 5.4 pounds, and aqueous-phase hydrocarbon removal associated with the GAC treatment process was approximately 2.984 pounds for this reporting period. The cumulative vapor-phase and aqueous-phase hydrocarbon removal to date is approximately 2,000 pounds (**Tables 1-1, 1-2 and 1-3**).
- The volume of groundwater extracted during this reporting period was 101,082.0 gallons **(Tables 1-1 and 1-3)**. The average flow rate of groundwater recovery was 1,135.8 gallons/day **(Tables 1-1 and 1-3)**.
- No LNAPL was recovered from the OWS. Also, the OWS was inspected, and a slight sheen was visible on the liquid contents, but no LNAPL was observed.
- The SVE daily mass removal rate was 0.08 pounds per day (lb/day) during this Quarter (**Table 1-2**).
- The effluent concentration of GRPH exiting the CatOx was not detected at concentrations above the laboratory's lower reporting limit of 10 milligrams per cubic meter (mg/m$^3$; 2.329 ppmv; **Table 1-4**).
- All system operations were in compliance with Ecology's Water Quality Program and PSCAA permits (**Tables 1-4 and 1-5**).

## 4.2 TOC / FARMASONIS PROPERTY

The following is a summary of the **Second Quarter 2014** system O&M at the TOC/Farmasonis Property:

- The MPE operation time this Quarter was approximately 84 percent (**Table 2-1**). System down time was attributed to GAC canister fouling and OWS high level alarms.
- The vapor-phase hydrocarbon mass removal associated with the SVE system was approximately 19.0 pounds, and aqueous-phase hydrocarbon removal associated with the GAC treatment process was 0.047 pounds for this reporting period. The cumulative vapor-phase and aqueous-phase hydrocarbon removal to date is approximately 701.83 pounds (**Tables 2-1, 2-2 and 2-3**).
- The volume of groundwater extracted during this reporting period was approximately 112,210 gallons (**Tables 2-1 and 2-3**). The average flow rate of groundwater recovery was 1,450 gallons/day (**Tables 2-1 and 2-3**).

- No LNAPL was recovered from the OWS. Also, the OWS was inspected, and no LNAPL or sheen was visible on the liquid contents.
- The daily vapor mass removal rate ranged from 0.07 to 0.57 lb/day during this Quarter (**Table 2-2**).
- The effluent concentration of GRPH exiting the CatOx was not detected at concentrations above the laboratory's lower reporting limit of 10 mg/m3 (2.329 ppmv; **Table 2-4**).
- All system operations were in compliance with Ecology's Water Quality Program and PSCAA permits (**Tables 2-4 and 2-5**).

## 4.3 DRAKE PROPERTY

The following is a summary of the **Second Quarter 2014** system O&M at the Drake Property:

- The MPE operation time this Quarter was approximately 79 percent (**Table 3-1**). System down time was attributed to GAC canister fouling and OWS high level alarms.
- The vapor-phase hydrocarbon mass removal associated with the SVE system was approximately 5.9 pounds, and aqueous-phase hydrocarbon removal associated with the GAC treatment process was approximately 0.086 pounds for this reporting period. The cumulative vapor-phase and aqueous-phase hydrocarbon removal to date is approximately 142.54 pounds (**Tables 3-1, 3-2 and 3-3**).
- The volume of groundwater extracted during this reporting period was approximately 206,572 gallons (**Tables 3-1 and 3-3**). The average flow rate of groundwater recovery was 2,295 gallons/day (**Tables 3-1 and 3-3**).
- No LNAPL was recovered from the OWS. Also, the OWS was inspected, and no LNAPL or sheen was visible on the liquid contents.
- The average daily vapor mass removal rate was 0.1 lb/day during this Quarter (**Table 3-2**).
- The effluent concentration of GRPH exiting the CatOx was not detected at concentrations above the laboratory's lower reporting limit of 10 mg/$m^3$ (2.329 ppmv; **Table 3-4**).
- All system operations were in compliance with PSCAA and Ecology's Water Quality Program permits (**Tables 3-4 and 3-5**); with the exception of the pH from the groundwater effluent during the June sampling event. The pH for this event was 5.94 for Unit 3. This effluent is combined with the effluent from Unit 2 (with a pH of 6.91) prior to discharge, and the average pH (6.43) was within the effluent limits, as reported in the DMR.

# 5.0 SYSTEM OPTIMIZATION & FUTURE RECOMMENDATIONS

The following is a summary of the **Second Quarter 2014** system optimization and future recommendations for each of the MPE systems.

The MPE remediation systems will continue to operate until the terms and conditions of the AO have been satisfied in accordance with Section IX (Satisfaction of Order), or until the work to be performed has been amended in accordance with Section VIII.L (Amendment of Order). Specifically, "the provisions of [the Agreed] Order shall be deemed satisfied upon TOC's receipt of written notification from Ecology that TOC has completed the remedial activity required by [the Agreed] Order, as amended by any modifications, and that TOC has complied with all other provisions of [the Agreed] Order."

Operational activities during this Quarter continued to focus on dewatering the formation to optimize recovery of hydrocarbon vapors. System optimization activities during this reporting period focused on balancing the flow of water through the OWS and addressing issues associated with the OWS transfer pumps and bag filters. These activities, any system modifications, and observations are summarized below:

- Field personnel continued to optimize the system flows to balance the flow rate of the OWS. System adjustments were made to minimize high level conditions, which triggered the systems to shut down. Generally, the program adjustments stopped the flow of water to the OWS for a brief period of time while the OWS transfer pumps discharged water to the GAC canisters.
- Sand, silt, and biological byproducts continued to accumulate within the lead GAC canisters. This buildup of materials restricts the discharge of wastewater from the OWS and eventually causes the systems to shut down. The majority of this loading has been observed at the TOC Property (Unit 1) system. This loading was also observed at the Drake Property system (Unit 2) during previous quarters but has been reduced following installation of a bag filter in 2013. An additional bag filter may need to be installed in Unit 1 in the future.
- Benzene and GRPH concentrations continue to remain below thresholds for continued operation of the CatOx units. As specified in the PSCAA Order of Approval, if benzene and GRPH concentrations remain below 0.5 and 50 ppmv, respectively, for a period of three consecutive months, then the CatOx may be turned off (bypassed). Currently, the concentrations have been below the thresholds for six consecutive months at Unit 1, for 19 consecutive months at Unit 2, and for 21 consecutive months at Unit 3. Currently, the methodology (and appropriate notification) for bypassing the CatOx is being assessed for action in the near future. It is unknown why SES did not pursue the bypass previously.

# 6.0 LIMITATIONS

This document, ***Operations & Maintenance Report***, ***Second Quarter 2014,*** was prepared by Stantec Consulting Services Inc. on behalf of TOC Holdings Co. The material presented reflects Stantec's best judgment in light of the information available to it at the time of preparation. Any use which a third party makes of this document, or any reliance on or decisions made based on it, are the responsibilities of such third parties. Stantec Consulting Services Inc. accepts no responsibility for damages, if any, suffered by any third party as a result of decisions made or actions based on this document.

# Tables

# Unit 1: TOC Property (24205)

# Table 1-1
## Unit 1 - TOC Property (24205)
## Summary of System Performance
## Second Quarter 2014
TOC Holdings Facility No. 01-176

| Reporting Period | | Duration of Reporting Period (days) | System Run Time (days) | System Run Time (%) | Volume of Groundwater Discharged (gallons) | Average Groundwater Recovered Flow Rate (gallons/day) | GRPH Aqueous-Phase Removal (lb) | GRPH Vapor-Phase Removal (lb) |
|---|---|---|---|---|---|---|---|---|
| Start Date | End Date | | | | | | | |
| 10/02/12 | 12/05/12 | 64 | 30 | 46% | 35,204.9 | 550.1 | 2.522 | 917.8 |
| 12/05/12 | 03/04/13 | 89 | 36 | 40% | 7,655.9 | 86.0 | 0.918 | 42.1 |
| 03/04/13 | 06/05/13 | 93 | 29 | 31% | 4,915.8 | 52.9 | 0.609 | 6.0 |
| 06/05/13 | 09/04/13 | 91 | 69 | 76% | 83,540.3 | 918.0 | 3.121 | 138.0 |
| 09/04/13 | 12/03/13 | 90 | 90 | 100% | 75,825.2 | 842.5 | 0.836 | 698.5 |
| 12/03/13 | 01/31/14 | 59 | 26 | 44% | 1,166.2 | 19.8 | 0.064 | 151.7 |
| 01/31/14 | 03/19/14 | 47 | 29 | 63% | 29,991.7 | 638.1 | 1.235 | 28.2 |
| 03/19/14 | 06/16/14 | 89 | 70 | 78% | 101,082.0 | 1,135.8 | 2.984 | 5.4 |
| **Average System Run Time** | | | | **61%** | | | | |
| **Totals for Quarter** | | **89** | **70** | **78%** | **101,082** | **1,135.8** | **2.984** | **5.4** |

**NOTES:**

*shaded cells = data for reporting quarter*

**DEFINITIONS:**

% = percent

gallons/day = gallons per day

GRPH = gasoline-range petroleum hydrocarbons

lb = pound(s)

**Table 1-2**
**Unit 1 - TOC Property (24205)**
**Vapor Stream - System Performance Monitoring Data**
**Second Quarter 2014**
TOC Holdings Facility No. 01-176

| Site Visit | Run Time | | SVE Parameters | | Catalytic Oxidizer | | GRPH Removal | | |
|---|---|---|---|---|---|---|---|---|---|
| | SVE Hour Meter | Total Time in Operation | SVE Pre-Filter Vacuum | Air Flow Rate[1] | Catalyst Entrance Temp. | Catalyst Exit Temp. | Influent Concentration[2] | Daily Mass Recovery Rate[3] [4] | Cumulative Recovered[5] |
| Date | (hours) | (days) | (iow) | (scfm) | (°C) | (°C) | ($mg/m^3$) | (lb/day) | (lb) |
| 10/02/12 | 5.0 | 0.21 | 70 | 146.8 | 330 | 380 | 1,600 | 21.1 | 0.00 |
| 10/10/12 | 70.2 | 2.93 | 69 | 149.2 | 330 | 419 | 2,600 | 27.9 | 75.91 |
| 10/17/12 | 237.7 | 9.90 | 69 | 149.2 | 330 | 410 | 3,400 | 40.2 | 356.74 |
| 10/24/12 | 406.9 | 16.95 | 68 | 144.4 | 330 | 385 | 2,400 | 38.3 | 626.56 |
| 11/07/12 | 638.2 | 26.59 | 73 | 140.7 | 330 | 384 | 1,700 | 26.3 | 879.75 |
| 12/05/12 | 714.2 | 29.76 | 67 | 148.0 | 330 | 344 | 150 | 12.0 | 917.76 |
| 01/08/13 | 1,482.9 | 61.79 | 65 | 153.8 | 330 | 342 | 35 | 1.3 | 957.95 |
| 01/17/13 | 1,533.7 | 63.90 | 76 | 153.0 | 330 | 350 | -- | -- | -- |
| 02/05/13 | 1,537.6 | 64.07 | 64 | 148.6 | 330 | 342 | 53 | 0.60 | 959.32 |
| 03/04/13 | 1,569.4 | 65.39 | 27 | 173.0 | 330 | 342 | <10 | 0.42 | 959.87 |
| 04/03/13 | 1,587.2 | 66.13 | 60 | 157.4 | 330 | 342 | 14 | 0.14 | 959.98 |
| 05/08/13 | 1,595.4 | 66.48 | 17 | 175.2 | 330 | 341 | 22 | 0.27 | 960.07 |
| 06/05/13 | 2,267.7 | 94.49 | 36 | 166.0 | 330 | 340 | <10 | 0.21 | 965.87 |
| 07/02/13 | 2,789.8 | 116.24 | 39 | 168.0 | 330 | 340 | 26 | 0.23 | 970.93 |
| 08/06/13 | 3,227.4 | 134.48 | 47 | 162.1 | 330 | 341 | 31 | 0.42 | 978.64 |
| 08/09/13 | 3,302.8 | 137.62 | 64 | 157.1 | 330 | 345 | -- | -- | -- |
| 09/04/13 | 3,924.4 | 163.52 | 66 | 152.0 | 330 | 351 | 580 | 4.31 | 1,103.91 |
| 10/07/13 | 4,715.2 | 196.47 | 66 | 153.1 | 330 | 356 | 710 | 8.85 | 1,395.37 |
| 10/14/13 | 4,888.3 | 203.68 | 72 | 155.4 | 330 | 354 | -- | -- | -- |
| 10/15/13 | 4,913.7 | 204.74 | 70 | 154.7 | 330 | 355 | -- | -- | -- |
| 10/16/13 | 4,936.9 | 205.70 | 66 | 154.4 | 330 | 364 | -- | -- | -- |
| 11/06/13 | 5,434.8 | 226.45 | 45 | 173.7 | 330 | 349 | 240 | 6.98 | 1,604.58 |
| 11/07/13 | 5,460.5 | 227.52 | 45 | 168.1 | 330 | 346 | -- | -- | -- |
| 12/03/13 | 6,084.2 | 253.51 | 74 | 158.2 | 330 | 355 | 740 | 7.31 | 1,802.39 |
| 01/13/14 | 6,710.4 | 279.60 | 0 | 0.0 | -- | -- | -- | -- | -- |
| 01/31/14 | 6,711.6 | 279.65 | 47 | 174.0 | 330 | 342 | 37 | 5.80 | 1,954.04 |
| 02/06/14 | 6,854.2 | 285.59 | 47 | 173.4 | 330 | 343 | -- | -- | -- |
| 02/07/14 | 6,877.1 | 286.55 | 47 | 174.9 | 330 | 342 | 110 | 1.15 | 1,961.99 |
| 3/22/14[6] | 7,416.7 | 309.03 | 48 | 174.0 [1] | 330 | 340 | <10 | 0.90 | 1,982.27 |
| 04/18/14 | 7,919.8 | 329.99 | 48 | 173.1 | 330 | 340 | <10 | 0.08 | 1,983.90 |
| 05/19/14 | 8,420.1 | 350.84 | 47 | 172.8 | 330 | 345 | <10 | 0.08 | 1,985.52 |
| 06/16/14 | 9,088.9 | 378.70 | 50 | 172.2 | 330 | 345 | <10 | 0.08 | 1,987.68 |
| **PSCAA NOC-10384 Restrictions and Conditions** | | | | **max. 350** | **min. 240** | **max. 620** | | | |

**NOTES:**

*shaded cells = data for reporting quarter*

[1]Air flow rates through 02/07/14 calculated using an averaging flow sensor (Dwyer Model DS). Air flow rates after 02/07/14 calculated from data. Air flow rate from 03/22/14 is assumed value for subsequent calculations.

[2]Influent vapor-phase samples collected from SVE sample port prior to air treatment.

[3]Daily removal rate (lb/day) = ave. concentration ($mg/m^3$) x ave. flow rate (scfm) x conversion ($8.99x10^{-5}$ lb-$m^3$-min/mg-$ft^3$-day)

[4]Nondetectable influent concentrations assumed to be 50% of the laboratory's lower reporting limit.
Removal rates based upon this assumption are shown in *italics* .

[5]Cumulative mass of GRPH removed (lb) = daily removal rate (lb/day) x time in operation (days) + previous cumulative total (lb).

[6]Samples were collected on 3/19/14, while hour readings were from 3/22/14.

**DEFINITIONS:**

-- = not analyzed, measured, or calculated
< = not detected at concentration above the laboratory reporting limit
° C = degrees Celsius
ave. = average
$ft^3$ = cubic feet
GRPH = gasoline-range petroleum hydrocarbons
iow = inches of water
lb = pounds
lb/day = pounds per day
$m^3$ = cubic meter
max. = maximum
mg = milligrams
min. = minimum
NOC = Notice of Construction
PSCAA = Puget Sound Clean Air Agency
scfm = standard cubic feet per meter
SVE = soil vapor extraction
Temp. = temperature

**Table 1-3**
**Unit 1 - TOC Property (24205)**
**Liquid Stream - System Performance Monitoring Data**
**Second Quarter 2014**
TOC Holdings Facility No. 01-176

| Site Visit | Extracted Groundwater | | | Hydrocarbon Recovery - Aqueous-Phase | | |
|---|---|---|---|---|---|---|
| Date | Flow Totalizer | Treated Between Visits | Average Flow Rate | Influent GRPH Concentration | GRPH Removed[1] [2] [3] | Cumulative GRPH Removed[3] [4] |
| | (gallons) | (gallons) | (gallons/day) | (µg/L) | (lb) | (lb) |
| 10/02/12 | 636.3 | 0 | 0 | -- | -- | -- |
| 10/10/12 | 5,761.0 | 5,124.7 | 641 | 18,000 | 0.770 | 0.770 |
| 10/17/12 | 14,898.1 | 9,137.1 | 1,305 | -- | -- | -- |
| 10/24/12 | 21,888.4 | 6,990.3 | 999 | -- | -- | -- |
| 11/07/12 | 31,361.8 | 9,473.4 | 677 | 6,100 | 1.303 | 2.073 |
| 12/05/12 | 35,204.9 | 3,843.1 | 137 | 14,000 | 0.449 | 2.522 |
| 01/08/13 | 38,076.5 | 2,871.6 | 84 | 19,000 | 0.455 | 2.977 |
| 01/17/13 | 40,712.0 | 2,635.5 | 293 | -- | -- | -- |
| 02/05/13 | 41,363.4 | 651.4 | 34 | 8,200 | 0.225 | 3.202 |
| 03/04/13 | 42,860.8 | 1,497.4 | 55 | 19,000 | 0.237 | 3.439 |
| 04/03/13 | 44,190.2 | 1,329.4 | 44 | 11,000 | 0.122 | 3.561 |
| 05/08/13 | 46,979.7 | 2,789.5 | 80 | 20,000 | 0.466 | 4.027 |
| 06/05/13 | 47,776.6 | 796.9 | 28 | 3,200 | 0.021 | 4.048 |
| 07/02/13 | 63,869.9 | 16,093.3 | 596 | 17,000 | 2.283 | 6.331 |
| 08/06/13 | 89,987.5 | 26,117.6 | 746 | <100 | 0.011 | 6.342 |
| 08/09/13 | 95,562.8 | 5,575.3 | 1,858 | -- | -- | -- |
| 09/04/13 | 131,316.9 | 35,754.2 | 1,375 | 2,400 | 0.828 | 7.169 |
| 10/07/13 | 174,445.2 | 43,128.3 | 1,307 | 1,100 | 0.396 | 7.565 |
| 10/14/13 | 184,151.7 | 9,706.5 | 1,387 | -- | -- | -- |
| 10/15/13 | 184,982.4 | 830.7 | 831 | -- | -- | -- |
| 10/16/13 | 185,955.0 | 972.6 | 973 | -- | -- | -- |
| 11/06/13 | 187,065.4 | 1,110.4 | 53 | 3,800 | 0.400 | 7.965 |
| 11/07/13 | 188,072.0 | 1,006.6 | 1,007 | -- | -- | -- |
| 12/03/13 | 207,142.1 | 19,070.1 | 733 | 240 | 0.040 | 8.006 |
| 01/13/14 | 208,153.8 | 1,011.7 | 25 | -- | -- | -- |
| 01/31/14 | 208,308.3 | 154.5 | 9 | 6,600 | 0.064 | 8.070 |
| 02/06/14 | 214,154.3 | 5,846.0 | 974 | -- | -- | -- |
| 02/07/14 | 214,840.5 | 686.2 | 686 | 760 | 0.041 | 8.111 |
| 03/19/14 | 238,300 | 23,459.5 | 586 | 6,100 | 1.194 | 9.305 |
| 04/18/14 | 273,331 | 35,031.0 | 1,168 | 4,300 | 1.257 | 10.562 |
| 05/19/14 | 303,504 | 30,173.0 | 973 | 2,700 | 0.680 | 11.242 |
| 06/16/14 | 339,382 | 35,878.0 | 1,281 | 3,500 | 1.048 | 12.290 |
| **State Waste Discharge Permit Number ST0007384 Maximum Daily Limits** | | | **7,000** | | | |

**NOTES:**

*shaded cells = data for reporting quarter*

[1] Influent samples collected prior to discharging to the City of Mountlake Terrace sanitary sewer.

[2] Mass removal weight (lb) = gallons recovered x concentration (µg/L) x conversion factor (8.344E-9 lb-L/µg-gallon).

[3] Nondetectable influent concentrations assumed to be 50% of the laboratory's lower reporting limit. Removal rates based upon this assumption are shown in *italics* .

[4] Cumulative mass of GRPH removed (lb) = GRPH mass removal between sampling visits (lb) + previous cumulative total (lb).

**DEFINITIONS:**

-- = not analyzed, measured, or calculated

< = not detected at concentration exceeding the laboratory reporting limit

µg/L = micrograms per liter

µg-gallon = micrograms - gallon conversion

gallons/day = gallons per day

GRPH = gasoline-range petroleum hydrocarbons

lb = pound(s)

lb-L = pounds - liter conversion

**Table 1-4**
**Unit 1 - TOC Property (24205)**
**Vapor Stream Analytical Results**
**Second Quarter 2014**
TOC Holdings Facility No. 01-176

| Sample Date | Analytical Results ($mg/m^3$) | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Influent Vapor Samples[1] | | | | | Effluent Vapor Samples[2] | | | | | GRPH DRE [5] |
| | GRPH[3] | Benzene[4] | Toluene[4] | Ethylbenzene[4] | Total Xylenes[4] | GRPH[3] | Benzene[4] | Toluene[4] | Ethylbenzene[4] | Total Xylenes[4] | |
| | ($mg/m^3$) | ($mg/m^3$) | ($mg/m^3$) | ($mg/m^3$) | ($mg/m^3$) | ($mg/m^3$) | ($mg/m^3$) | ($mg/m^3$) | ($mg/m^3$) | ($mg/m^3$) | % |
| 10/02/12 | 1,600 | 2.0 | 10 | 5.5 | 26 | <10 | <0.1 | <0.1 | <0.1 | <0.3 | *99.7* |
| 10/10/12 | 2,600 | 2.3 | 13 | 8.7 | 37 | <10 | <0.1 | 0.20 | <0.1 | <0.3 | *99.8* |
| 10/17/12 | 3,400 | 3.0 | 9.4 | 11 | 42 | <10 | <0.1 | <0.1 | <0.1 | <0.3 | *99.9* |
| 10/24/12 | 2,400 | 1.5 | 7.0 | 9.4 | 39 | <10 | <0.1 | <0.1 | <0.1 | <0.3 | *99.8* |
| 11/07/12 | 1,700 | <0.5 | 7.0 | 7.3 | 37 | <10 | <0.1 | <0.1 | <0.1 | <0.3 | *99.7* |
| 12/05/12 | 150 | <0.1 | 0.23 | <0.1 | 3.5 | <10 | <0.1 | <0.1 | <0.1 | <0.3 | *96.7* |
| 01/08/13 | 35 | <0.1 | 0.19 | 0.18 | 0.86 | <10 | <0.1 | 0.16 | <0.1 | <0.3 | *85.7* |
| 02/05/13 | 53 | <0.1 | 0.30 | 0.13 | 0.78 | <10 | <0.1 | <0.1 | <0.1 | <0.3 | *90.6* |
| 03/04/13 | <10 | <0.1 | 0.10 | 0.10 | 0.69 | <10 | <0.1 | <0.1 | <0.1 | <0.3 | -- |
| 04/03/13 | 14 | <0.1 | 0.18 | 0.14 | 0.90 | <10 | <0.1 | <0.1 | <0.1 | <0.3 | *64.3* |
| 05/08/13 | 22 | <0.1 | 0.23 | <0.1 | 0.35 | <10 | <0.1 | <0.1 | <0.1 | <0.3 | *77.3* |
| 06/05/13 | <10 | <0.1 | <0.1 | <0.1 | <0.3 | <10 | <0.1 | <0.1 | <0.1 | <0.3 | -- |
| 07/02/13 | 26 | <0.1 | 0.24 | <0.1 | 0.48 | <10 | <0.1 | <0.1 | <0.1 | <0.3 | *80.8* |
| 08/06/13 | 31 | <0.1 | 0.21 | 0.14 | 0.79 | <10 | <0.1 | <0.1 | <0.1 | <0.3 | *83.9* |
| 09/04/13 | 580 | <0.1 | 5.0 | <0.1 | 22 | <10 | <0.1 | <0.1 | <0.1 | <0.3 | *99.1* |
| 10/07/13 | 710 | <0.1 | 5.7 | <0.1 | 22 | <10 | <0.1 | <0.1 | <0.1 | <0.3 | *99.3* |
| 11/06/13 | 240 | <0.1 | 1.6 | <0.1 | 6.4 | <10 | <0.1 | <0.1 | <0.1 | <0.3 | *97.9* |
| 12/03/13 | 740 | <0.1 | 6.3 | <0.1 | 19 | <10 | <0.1 | <0.1 | <0.1 | <0.3 | *99.3* |
| 01/31/14 | 37 | <0.1 | 0.40 | <0.1 | 0.75 | <10 | <0.1 | <0.1 | <0.1 | <0.3 | *86.5* |
| 02/07/14 | 110 | <0.1 | 0.77 | <0.1 | 2.2 | <10 | <0.1 | <0.1 | <0.1 | <0.3 | *95.5* |
| 03/19/14 | <10 | <0.1 | <0.1 | <0.1 | <0.3 | <10 | <0.1 | <0.1 | <0.1 | <0.3 | -- |
| 04/18/14 | <10 | <0.1 | <0.1 | <0.1 | <0.3 | <10 | <0.1 | <0.1 | <0.1 | <0.3 | -- |
| 05/19/14 | <10 | <0.1 | <0.1 | <0.1 | <0.3 | <10 | <0.1 | <0.1 | <0.1 | <0.3 | -- |
| 06/16/14 | <10 | <0.1 | <0.1 | <0.1 | <0.3 | <10 | <0.1 | <0.1 | <0.1 | <0.3 | -- |
| **PSCAA NOC-10384 Restrictions and Conditions** | | | | | | **min. 214.7** [5] | | | | | **95%** [5] [6] |

**NOTES:**

*shaded cells = data for reporting quarter*

[1] Influent vapor-phase samples collected from SVE sample port on the pressure side of the blower.

[2] Effluent vapor-phase samples collected from sample port on the effluent stack.

[3] Analyzed by Northwest Total Petroleum Hydrocarbon Method NWTPH-Gx.

[4] Analyzed by U.S. Environmental Protection Agency Method 8021B.

[5] DRE shall be at least 95% unless effluent GRPH vapor leaving the catox does not exceed 50 ppmv (214.7 $mg/m^3$ assuming a molecular weight of 105).

[6] DRE = $(1-[GRPH_{influent}/GRPH_{effluent}]) \times 100$; non-detected influent concentrations assumed to be 50% of the laboratory's reporting limit.

DRE % based on this assumption are shown in *italics.*

**DEFINITIONS:**

-- = not analyzed, measured, or calculated

< = not detected at a concentration exceeding the laboratory reporting limit

% = percent

catox = catalytic oxidizer

DRE = destruction and removal efficiency

GRPH = gasoline-range petroleum hydrocarbons

$mg/m^3$ = milligrams per cubic meter

min. = minimum

NOC = Notice of Construction

ppmv = part per million volume

PSCAA = Puget Sound Clean Air Agency

SVE = soil vapor extraction

**Table 1-5**
**Unit 1- TOC Property (24205)**
**Liquid Stream Analytical Results**
**Second Quarter 2014**
TOC Holdings Facility No. 01-176

| Sample Date | Groundwater Influent - Pre GAC Treatment (µg/L) | | | | | Groundwater Influent - Mid GAC Treatment (µg/L) | | | | | Groundwater Effluent - Post GAC Treatment (µg/L) | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | GAC-1 Influent Sample[1] | | | | | GAC-2 Influent Sample[2] | | | | | Effluent Discharge Sample[3] | | | | | | | |
| | GRPH[4] | Benzene[5] | Toluene[5] | Ethyl-benzene[5] | Total Xylenes[5] | GRPH[4] | Benzene[5] | Toluene[5] | Ethyl-benzene[5] | Total Xylenes[5] | GRPH[4] | Benzene[5] | Toluene[5] | Ethyl-benzene[5] | Total Xylenes[5] | Total BTEX | Total Lead[6] | pH[7] |
| 10/10/12 | 18,000 | 25 | 370 | 280 | 4,500 | <100 | <1 | <1 | <1 | <3 | <100 | <1 | <1 | <1 | <3 | <6 | -- | 7.59 |
| 11/07/12 | 6,100 | 8.4 | 99 | 24 | 1,200 | <100 | <1 | <1 | <1 | <3 | <100 | <1 | <1 | <1 | <3 | <6 | -- | 7.61 |
| 12/05/12 | 14,000 | 12 | 250 | 200 | 2,700 | <100 | <1 | <1 | <1 | <3 | <100 | <1 | <1 | <1 | <3 | <6 | 19.4 | 7.19 |
| 01/08/13 | 19,000 | 60 | 400 | 520 | 3,600 | <100 | <1 | <1 | <1 | <3 | <100 | <1 | <1 | <1 | <3 | <6 | -- | 7.71 |
| 02/05/13 | 8,200 | 11 | 83 | 61 | 1,200 | <100 | <1 | <1 | <1 | <3 | <100 | <1 | <1 | <1 | <3 | <6 | -- | 6.86 |
| 03/04/13 | 19,000 | 20 | 200 | 460 | 3,900 | <100 | <1 | <1 | <1 | <3 | <100 | <1 | <1 | <1 | <3 | <6 | -- | 7.88 |
| 04/03/13 | 11,000 | 27 | 83 | <40 | 2,500 | <100 | <1 | <1 | <1 | <3 | <100 | <1 | <1 | <1 | <3 | <6 | -- | 6.68 |
| 05/08/13 | 20,000 | 11 | 450 | <10 | 3,400 | <100 | <1 | <1 | <1 | <3 | <100 | <1 | <1 | <1 | <3 | <6 | -- | 7.06 |
| 06/05/13 | 3,200 | 4.0 | 35 | <1 | 350 | <100 | <1 | <1 | <1 | <3 | <100 | <1 | <1 | <1 | 3.1 | <6 | 3.33 | 6.8 |
| 07/02/13 | 17,000 | 9.9 | 290 | 190 | 3,200 | <100 | <1 | <1 | <1 | <3 | <100 | <1 | <1 | <1 | <3 | <6 | -- | 6.74 |
| 08/06/13 | <100 | <1 | <1 | <1 | <3 | <100 | <1 | <1 | <1 | <3 | <100 | <1 | <1 | <1 | <3 | <6 | -- | 6.89 |
| 09/04/13 | 2,400 | 1.1 | 18 | <1 | 230 | <100 | <1 | <1 | <1 | <3 | <100 | <1 | <1 | <1 | <3 | <6 | -- | 6.41 |
| 10/07/13 | 1,100 | 1.1 | 12 | <1 | 86 | <100 | <1 | <1 | <1 | <3 | <100 | <1 | <1 | <1 | <3 | <6 | -- | 6.89 |
| 11/06/13 | 3,800 | 27 | 150 | 26 | 810 | <100 | <1 | <1 | <1 | <3 | <100 | <1 | <1 | <1 | <3 | <6 | -- | 6.94 |
| 12/03/13 | 240 | <1 | 3.7 | <1 | 19 | <100 | <1 | <1 | <1 | <3 | <100 | <1 | <1 | <1 | <3 | <6 | 7.05 | 6.98 |
| 01/31/14 | 6,600 | 19 | 370 | <1 | 1,000 | <100 | <1 | <1 | <1 | <3 | <100 | <1 | <1 | <1 | <3 | <6 | -- | -- |
| 02/07/14 | 760 | 1.0 | 6.6 | <1 | 54 | <100 | <1 | <1 | <1 | <3 | <100 | <1 | <1 | <1 | <3 | <6 | -- | 6.71 |
| 03/19/14 | 6,100 | 2.9 | 160 | <1 | 1,100 | <100 | <1 | <1 | <1 | <3 | <100 | <1 | <1 | <1 | <3 | <6 | -- | 8.49 |
| 04/18/14 | 4,300 | <1 | 100 | <1 | 650 | <100 | <1 | <1 | <1 | <3 | <100 | <1 | <1 | <1 | <3 | <6 | -- | 6.65 |
| 05/19/14 | 2,700 | 2.5 | 62 | <1 | 310 | <100 | <1 | <1 | <1 | <3 | <100 | <1 | <1 | <1 | <3 | <6 | -- | 6.90 |
| 06/16/14 | 3,500 | 2.0 | 86 | <1 | 520 | <100 | <1 | <1 | <1 | <3 | <100 | <1 | <1 | <1 | <3 | <6 | 1.04 | 6.59 |
| **State Waste Discharge Permit Number ST0007384 Effluent Limits** | | | | | | | | | | | **1,000** | **5** | | | | **100** | **1,090** | **6 to 10** |

**NOTES:**

*shaded cells = data for reporting quarter*

[1]Inffluent samples collected prior to first GAC canister.

[2]Inffluent samples collected prior to second GAC canister.

[3]Effluent samples collected prior to sewer discharge.

[4]Analyzed by Method NWTPH-Gx.

[5]Analyzed by EPA Method 8021B.

[6]Analyzed by EPA Method 200.8.

[7]Field measurement

**DEFINITIONS:**

-- = not analyzed, measured, or calculated

< = not detected at a concentration exceeding the laboratory reporting limit

µg/L = micrograms per liter

BTEX = benzene, toluene, ethylbenzene and xylenes

EPA = U.S. Environmental Protection Agency

GAC = granular activated carbon

GRPH = gasoline-range petroleum hydrocarbons

NWTPH-Gx = Northwest Total Petroleum Hydrocarbons for gasoline-range organics

# Unit 2: TOC/Farmasonis Property (24225)

# Table 2-1
## Unit 2 - TOC/Farmasonis Property (24225)
## Summary of System Performance
## Second Quarter 2014
TOC Holdings Facility No. 01-176

| Reporting Period | | Duration of Reporting Period (days) | System Run Time (days) | System Run Time (%) | Volume of Groundwater Discharged (gallons) | Average Groundwater Recovered Flow Rate (gallons/day) | GRPH Aqueous-Phase Removal (lb) | GRPH Vapor-Phase Removal (lb) |
|---|---|---|---|---|---|---|---|---|
| Start Date | End Date | | | | | | | |
| 10/03/12 | 12/05/12 | 63.0 | 51.7 | 82% | 12,858 | 204 | 0.005 | 477.4 |
| 12/05/12 | 03/04/13 | 89 | 52.5 | 59% | 5,900 | 66 | 0.002 | 9.1 |
| 03/04/13 | 06/05/13 | 93 | 67.1 | 72% | 106,670 | 1,147 | 0.235 | 4.9 |
| 06/05/13 | 09/04/13 | 91 | 82.2 | 90% | 123,303 | 1,355 | 0.051 | 6.2 |
| 09/04/13 | 12/03/13 | 90 | 89.9 | 100% | 89,204 | 991 | 0.046 | 99.6 |
| 12/03/13 | 01/13/14 | 41 | 41.1 | 100% | 29,087 | 709 | 0.012 | 54.6 |
| 01/13/14 | 02/07/14 | 25 | 18.8 | 75% | 9,854 | 394 | 0.004 | 18.3 |
| 02/07/14 | 06/16/14 | 129 | 108.4 | 84% | 187,016 | 1,450 | 0.078 | 31.6 |
| **Average System Run Time** | | | | **82%** | | | | |
| **Totals for Quarter [(1)]** | | **77** | **65.1** | **84%** | **112,210** | **1,450** | **0.047** | **19.0** |

**NOTES:**

*shaded cells = data for reporting quarter*

[(1)] There was insufficeint data for the March O&M event to properly calculate values; therefore, the quartelry totals are estimated at 3/5 of the shaded value (averages were not changed).

**DEFINITIONS:**

% = percent

gallons/day = gallons per day

GRPH = gasoline-range petroleum hydrocarbons

lb = pound(s)

O&M = operations and maintenance

**Table 2-2**
**Unit 2 - TOC/Farmasonis Property (24225)**
**Vapor Stream - System Performance Monitoring Data**
**Second Quarter 2014**
TOC Holdings Facility No. 01-176

| Site Visit | Run Time | | SVE Parameters | | Catalytic Oxidizer | | GRPH Removal | | |
|---|---|---|---|---|---|---|---|---|---|
| | SVE Hour Meter | Total Time in Operation | SVE Pre-Filter Vacuum | Air Flow Rate[1] | Catalyst Entrance Temp. | Catalyst Exit Temp. | Influent Concentration[2] | Daily Mass Recovery Rate[3] [4] | Cumulative Recovered[5] |
| Date | (hours) | (days) | (iow) | (scfm) | (°C) | (°C) | ($mg/m^3$) | (lb/day) | (lb) |
| 10/03/12 | 15.6 | 0.7 | 68 | 149.1 | 330 | 350 | 340 | 4.56 | 0.00 |
| 10/10/12 | 73.7 | 3.1 | 86 | 134.1 | 330 | 363 | 1,300 | *10.44* | 25.26 |
| 10/17/12 | 242.0 | 10.1 | 76 | 135.8 | 330 | 376 | 1,300 | *15.77* | 135.86 |
| 10/24/12 | 410.7 | 17.1 | 72 | 137.2 | 330 | 355 | 1,100 | *14.73* | 239.37 |
| 10/25/12 | 434.7 | 18.1 | 73 | 139.2 | 330 | 354 | -- | -- | -- |
| 11/06/12 | 722.8 | 30.1 | 74 | 137.8 | 330 | 358 | -- | -- | -- |
| 11/07/12 | 748.2 | 31.2 | 74 | 138.6 | 330 | 352 | 660 | *10.91* | 392.78 |
| 12/05/12 | 1,257.4 | 52.4 | 74 | 124.3 | 330 | 338 | 15 | *3.99* | 477.40 |
| 12/06/12 | 1,266.4 | 52.8 | 75 | 135.6 | -- | -- | -- | -- | -- |
| 01/08/13 | 1,989.7 | 82.9 | 27 | 164.7 | 330 | 344 | 15 | 0.19 | 483.35 |
| 01/09/13 | 2,012.1 | 83.8 | 32 | 163.5 | 330 | 336 | -- | -- | -- |
| 01/17/13 | 2,037.9 | 84.9 | 27 | 166.5 | 331 | 336 | -- | -- | -- |
| 02/05/13 | 2,490.2 | 103.8 | 33 | 159.5 | 330 | 335 | <10 | *0.15* | 486.39 |
| 02/06/13 | 2,514.5 | 104.8 | 38 | 157.5 | 330 | 335 | -- | -- | -- |
| 03/04/13 | 2,517.2 | 104.9 | 31 | 162.9 | 330 | 335 | <10 | *0.07* | 486.47 |
| 03/12/13 | 2,705.4 | 112.7 | 32 | 161.7 | 330 | 335 | -- | -- | -- |
| 04/03/13 | 3,230.7 | 134.6 | 33 | 166.8 | 330 | 335 | <10 | *0.07* | 488.67 |
| 05/08/13 | 3,454.7 | 143.9 | 33 | 164.5 | 330 | 338 | <10 | *0.07* | 489.37 |
| 06/05/13 | 4,127.1 | 172.0 | 36 | 158.9 | 330 | 335 | <10 | *0.07* | 491.40 |
| 06/19/13 | 4,438.7 | 184.9 | 34 | 166.7 | 330 | 335 | -- | -- | -- |
| 07/02/13 | 4,746.1 | 197.8 | 32 | 164.2 | 330 | 335 | <10 | *0.07* | 493.28 |
| 08/06/13 | 5,403.6 | 225.2 | 10 | 175.5 | 330 | 335 | <10 | *0.08* | 495.37 |
| 08/09/13 | 5,475.4 | 228.1 | 20 | 168.6 | 330 | 335 | -- | -- | -- |
| 09/04/13 | 6,098.7 | 254.1 | 20 | 170.1 | 330 | 335 | <10 | *0.08* | 497.62 |
| 10/07/13 | 6,890.0 | 287.1 | 34 | 163.9 | 330 | 336 | 41 | *0.35* | 509.00 |
| 10/14/13 | 7,062.9 | 294.3 | 35 | 165.2 | 330 | 336 | -- | -- | -- |
| 10/15/13 | 7,088.0 | 295.3 | 74 | 146.5 | 330 | 342 | -- | -- | -- |
| 10/16/13 | 7,111.3 | 296.3 | 67 | 147.6 | 330 | 340 | -- | -- | -- |
| 11/06/13 | 7,610.8 | 317.1 | 73 | 150.7 | 330 | 338 | 140 | *1.28* | 547.44 |
| 11/07/13 | 7,635.3 | 318.1 | 65 | 148.2 | 330 | 338 | -- | -- | -- |
| 12/03/13 | 8,257.0 | 344.0 | 65 | 154.2 | 330 | 337 | 130 | *1.85* | 597.26 |
| 12/04/13 | 8,287.9 | 345.3 | 66 | 154.2 | 330 | 337 | -- | -- | -- |
| 01/13/14 | 9,242.4 | 385.1 | 71 | 147.8 | 330 | 336 | 66 | *1.33* | 651.88 |
| 01/23/14 | 9,485.7 | 395.2 | 69 | -- | -- | -- | -- | -- | -- |
| 01/31/14 | 9,675.8 | 403.2 | 68 | 147.3 | 330 | 335 | -- | -- | -- |
| 02/07/14 | 9,694.4 | 403.9 | 74 | 144.7 | 330 | 335 | 82 | *0.97* | 670.20 |
| 03/18/14 | -- | -- | 74 | -- | 330 | 334 | 26 | -- | -- |
| 04/17/14 | 10,859.0 | 452.5 | 68 | 146.6 | 330 | 336 | <10 | *0.57* | 697.84 |
| 05/20/14 | 11,645.2 | 485.2 | 72 | 146.9 | 330 | 338 | <10 | *0.07* | 700.00 |
| 06/16/14 | 12,296.4 | 512.4 | 62 | 152.4 | 330 | 338 | <10 | *0.07* | 701.83 |
| **PSCAA NOC-10384 Restrictions and Conditions** | | | | **max. 350** | **min. 240** | **max. 620** | | | |

**NOTES:**

*shaded cells = data for reporting quarter*

[1]Air flow rates through 02/07/14 calculated using an averaging flow sensor (Dwyer Model DS).
Air flow rates after 02/07/14 calculated from data.

[2]Influent vapor-phase samples collected from SVE sample port prior to air treatment.

[3]Daily removal rate (lb/day) = ave. concentration ($mg/m^3$) x ave. flow rate (scfm) x conversion ($8.99x10^{-5}$ lb-$m^3$-min/mg-$ft^3$-day)

[4]Nondetectable influent concentrations assumed to be 50% of the laboratory's lower reporting limit.
Removal rates based upon this assumption are shown in *italics* .

[5]Cumulative mass of GRPH removed (lb) = daily removal rate (lb/day) x time in operation (days) + previous cumulative total (lb).

**DEFINITIONS:**

-- = not analyzed, measured, or calculated
< = not detected at concentration above the laboratory reporting limit
° C = degrees Celsius
ave. = average
$ft^3$ = cubic feet
GRPH = gasoline-range petroleum hydrocarbons
iow = inches of water
lb = pounds
lb/day = pounds per day
$m^3$ = cubic meter
max. = maximum
mg = milligrams
min. = minimum
NOC = Notice of Construction
PSCAA = Puget Sound Clean Air Agency
scfm = standard cubic feet per meter
SVE = soil vapor extraction
Temp. = temperature

**Table 2-3**
**Unit 2 - TOC/Farmasonis Property (24225)**
**Liquid Stream - System Performance Monitoring Data**
**Second Quarter 2014**
TOC Holdings Facility No. 01-176

| Site Visit | Extracted Groundwater | | | Hydrocarbon Recovery - Aqueous-Phase | | |
|---|---|---|---|---|---|---|
| Date | Flow Totalizer | Treated Between Visits | Average Flow Rate | Influent GRPH Concentration | GRPH Removed[1] [2] [3] | Cumulative GRPH Removed[3] [4] |
| | (gallons) | (gallons) | (gallons/day) | (µg/L) | (lb) | (lb) |
| 10/03/12 | 397.8 | 0 | 0 | -- | -- | -- |
| 10/10/12 | 562.6 | 164.8 | 24 | <100 | 0.000 | 0.000 |
| 10/17/12 | 5,392.6 | 4,830.0 | 690 | -- | -- | -- |
| 10/24/12 | 8,170.9 | 2,778.3 | 397 | -- | -- | -- |
| 10/25/12 | 8,580.4 | 409.5 | 410 | -- | -- | -- |
| 11/06/12 | 10,624.2 | 2,043.8 | 170 | -- | -- | -- |
| 11/07/12 | 10,630.5 | 6.3 | 6 | <100 | 0.004 | 0.004 |
| 12/05/12 | 12,858.4 | 2,227.9 | 80 | <100 | 0.001 | 0.005 |
| 12/06/12 | 14,221.5 | 1,363.1 | 1,363 | -- | -- | -- |
| 01/08/13 | 18,643.2 | 4,421.7 | 134 | <100 | *0.002* | 0.008 |
| 01/09/13 | 18,651.6 | 8.4 | 8 | -- | -- | -- |
| 01/17/13 | 18,753.9 | 102.3 | 13 | -- | -- | -- |
| 02/05/13 | 18,753.9 | 0.0 | 0 | <100 | *0.000* | 0.008 |
| 03/12/13 | 18,758.0 | 4.1 | 0 | 1,100 | *0.000* | 0.008 |
| 03/13/14 | 18,758.0 | 0.0 | 0 | -- | -- | -- |
| 04/03/13 | 24,667.4 | 5,909.4 | -17 | 740 | *0.036* | 0.044 |
| 05/08/13 | 90,733.6 | 66,066.2 | 1,888 | <100 | *0.028* | 0.072 |
| 06/05/13 | 125,427.8 | 34,694.2 | 1,239 | 590 | *0.171* | 0.243 |
| 06/19/13 | 131,990.5 | 6,562.7 | 469 | -- | -- | -- |
| 07/02/13 | 172,454.5 | 40,464.0 | 3,113 | <100 | *0.020* | 0.262 |
| 08/06/13 | 223,496.3 | 51,041.8 | 1,458 | <100 | *0.021* | 0.283 |
| 08/09/13 | 226,651.9 | 3,155.6 | 1,052 | -- | -- | -- |
| 09/04/13 | 248,730.9 | 22,079.0 | 849 | <100 | *0.011* | 0.294 |
| 10/07/13 | 269,136.3 | 20,405.4 | 618 | <100 | *0.018* | 0.312 |
| 10/14/13 | 273,636.3 | 4,500.0 | 643 | -- | -- | -- |
| 10/15/13 | 275,837.1 | 2,200.8 | 2,201 | -- | -- | -- |
| 10/16/13 | 277,480.5 | 1,643.4 | 1,643 | -- | -- | -- |
| 11/06/13 | 308,993.4 | 31,512.9 | 1,501 | <100 | *0.017* | 0.328 |
| 11/07/13 | 310,249.2 | 1,255.8 | 1,256 | -- | -- | -- |
| 12/03/13 | 337,935.2 | 27,686.0 | 1,065 | <100 | *0.012* | 0.340 |
| 12/04/13 | 339,243.0 | 1,307.8 | 1,308 | -- | -- | -- |
| 01/13/14 | 367,022.0 | 27,779.0 | 694 | <100 | *0.012* | 0.353 |
| 01/23/14 | -- | -- | -- | -- | -- | -- |
| 01/31/14 | 376,637.4 | 9,615.4 | 534 | -- | -- | -- |
| 02/07/14 | 376,875.7 | 238.4 | 34 | <100 | *0.004* | 0.357 |
| 03/18/14 | 396,600 | 19,724.3 | 506 | <100 | *0.008* | 0.365 |
| 04/17/14 | 424,646 | 28,046 | 935 | <100 | *0.012* | 0.377 |
| 05/20/14 | 497,115 | 72,469 | 2,196 | <100 | *0.030* | 0.407 |
| 06/16/14 | 563,892 | 66,777 | 2,473 | <100 | *0.028* | 0.435 |
| **State Waste Discharge Permit Number ST0007384 Maximum Daily Limits** | | | **7,000** | | | |

**NOTES:**

*shaded cells = data for reporting quarter*

[1]Effluent samples collected prior to discharging to the City of Mountlake Terrace sanitary sewer.

[2]Mass removal weight (lb) = gallons recovered x concentration (µg/L) x conversion factor (8.344E-9 lb-L/µg-gallon).

[3]Nondetectable influent concentrations assumed to be 50% of the laboratory's lower reporting limit.
Removal rates based upon this assumption are shown in *italics* .

[4]Cumulative mass of GRPH removed (lb) = GRPH mass removal between sampling visits (lb) + previous cumulative total (lb).

**DEFINITIONS:**

-- = not analyzed, measured, or calculated

< = not detected at concentration exceeding the laboratory reporting limit

µg/L = micrograms per liter

µg-gallon = micrograms - gallon conversion

GRPH = gasoline-range petroleum hydrocarbons

gallons/day = gallons per day

lb = pound(s)

lb-L = pounds - liter conversion

**Table 2-4**
**Unit 2 - TOC/Farmasonis Property (24225)**
**Vapor Stream Analytical Results**
**Second Quarter 2014**
TOC Holdings Facility No. 01-176

| Sample Date | Analytical Results ($mg/m^3$) | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Influent Vapor Samples[1] | | | | | Effluent Vapor Samples[2] | | | | | GRPH DRE[5] |
| | GRPH[3] ($mg/m^3$) | Benzene[4] ($mg/m^3$) | Toluene[4] ($mg/m^3$) | Ethylbenzene[4] ($mg/m^3$) | Total Xylenes[4] ($mg/m^3$) | GRPH[3] ($mg/m^3$) | Benzene[4] ($mg/m^3$) | Toluene[4] ($mg/m^3$) | Ethylbenzene[4] ($mg/m^3$) | Total Xylenes[4] ($mg/m^3$) | % |
| 10/03/12 | 340 | 0.44 | 1.6 | 0.96 | 1.7 | <10 | <0.1 | 0.17 | <0.1 | <0.3 | *98.5* |
| 10/10/12 | 1,300 | 0.77 | <0.5 | 4.0 | 9.6 | <10 | <0.1 | 0.21 | <0.1 | <0.3 | *99.6* |
| 10/17/12 | 1,300 | 0.55 | <0.5 | 3.7 | 7.9 | <10 | <0.1 | <0.1 | <0.1 | <0.3 | *99.6* |
| 10/24/12 | 1,100 | 0.50 | 3.1 | <0.1 | 11 | <10 | <0.1 | <0.1 | <0.1 | <0.3 | *99.5* |
| 11/07/12 | 660 | <0.1 | 2.7 | <0.1 | 7.1 | <10 | <0.1 | <0.1 | <0.1 | <0.3 | *99.2* |
| 12/05/12 | 15 | <0.1 | <0.1 | <0.1 | <0.3 | <10 | <0.1 | <0.1 | <0.1 | <0.3 | *66.7* |
| 01/08/13 | 15 | <0.1 | <0.1 | <0.1 | <0.3 | <10 | <0.1 | 0.10 | <0.1 | <0.3 | *66.7* |
| 02/05/13 | <10 | <0.1 | <0.1 | <0.1 | <0.3 | <10 | <0.1 | <0.1 | <0.1 | <0.3 | -- |
| 03/04/13 | <10 | <0.1 | <0.1 | <0.1 | <0.3 | <10 | <0.1 | <0.1 | <0.1 | <0.3 | -- |
| 04/03/13 | <10 | <0.1 | <0.1 | <0.1 | <0.3 | <10 | <0.1 | <0.1 | <0.1 | <0.3 | -- |
| 05/08/13 | <10 | <0.1 | <0.1 | <0.1 | <0.3 | <10 | <0.1 | <0.1 | <0.1 | <0.3 | -- |
| 06/05/13 | <10 | <0.1 | <0.1 | <0.1 | <0.3 | <10 | <0.1 | <0.1 | <0.1 | <0.3 | -- |
| 07/02/13 | <10 | <0.1 | <0.1 | <0.1 | <0.3 | <10 | <0.1 | <0.1 | <0.1 | <0.3 | -- |
| 08/06/13 | <10 | <0.1 | <0.1 | <0.1 | <0.3 | <10 | <0.1 | <0.1 | <0.1 | <0.3 | -- |
| 09/04/13 | <10 | <0.1 | <0.1 | <0.1 | <0.3 | <10 | <0.1 | <0.1 | <0.1 | <0.3 | -- |
| 09/04/13 | <10 | <0.1 | <0.1 | <0.1 | <0.3 | <10 | <0.1 | <0.1 | <0.1 | <0.3 | -- |
| 10/07/13 | 41 | <0.1 | 0.19 | <0.1 | 0.4 | <10 | <0.1 | <0.1 | <0.1 | <0.3 | *87.8* |
| 11/06/13 | 140 | <0.1 | 0.52 | <0.1 | 1.4 | <10 | <0.1 | <0.1 | <0.1 | <0.3 | *96.4* |
| 12/03/13 | 130 | <0.1 | 0.44 | 0.73 | 1.3 | <10 | <0.1 | <0.1 | <0.1 | <0.3 | *96.2* |
| 01/13/14 | 66 | <0.1 | 0.31 | 0.38 | 0.51 | <10 | <0.1 | <0.1 | <0.1 | <0.3 | *92.4* |
| 02/07/14 | 82 | <0.1 | <0.1 | 0.73 | 0.65 | <10 | <0.1 | <0.1 | <0.1 | <0.3 | *93.9* |
| 03/18/14 | 26 | <0.1 | <0.1 | 0.20 | <0.3 | <10 | <0.1 | <0.1 | 0.15 | <0.3 | *80.8* |
| 04/17/14 | <10 | <0.1 | <0.1 | <0.1 | <0.3 | <10 | <0.1 | <0.1 | <0.1 | <0.3 | -- |
| 05/20/14 | <10 | <0.1 | <0.1 | <0.1 | <0.3 | <10 | <0.1 | <0.1 | <0.1 | <0.3 | -- |
| 06/16/14 | <10 | <0.1 | <0.1 | <0.1 | <0.3 | <10 | <0.1 | <0.1 | <0.1 | <0.3 | -- |
| **PSCAA NOC-10384 Restrictions and Conditions** | | | | | | **min. 214.7 [5]** | | | | | **95% [5] [6]** |

**NOTES:**

*shaded cells = data for reporting quarter*

[1]Influent vapor-phase samples collected from SVE sample port on the pressure side of the blower.

[2]Effluent vapor-phase samples collected from sample port on the effluent stack.

[3]Analyzed by Northwest Total Petroleum Hydrocarbon Method NWTPH-Gx.

[4]Analyzed by U.S. Environmental Protection Agency Method 8021B.

[5]DRE shall be at least 95% unless effluent GRPH vapor leaving the catox does not exceed 50 ppmv (214.7 $mg/m^3$ assuming a molecular weight of 105).

[6]DRE = (1-[$GRPH_{influent}$/$GRPH_{effluent}$]) x 100; non-detected influent concentrations assumed to be 50% of the laboratory's reporting limit.
DRE % based on this assumption are shown in *italics.*

**DEFINITIONS:**

-- = not analyzed, measured, or calculated
< = not detected at a concentration exceeding the laboratory reporting limit
% = percent
catox = catalytic oxidizer
DRE = destruction and removal efficiency
GRPH = gasoline-range petroleum hydrocarbons
$mg/m^3$ = milligrams per cubic meter
min. = minimum
NOC = Notice of Construction
ppmv = part per million volume
PSCAA = Puget Sound Clean Air Agency
SVE = soil vapor extraction

**Table 2-5**
**Unit 2 - TOC/Farmasonis Property (24225)**
**Liquid Stream Analytical Results**
**Second Quarter 2014**
TOC Holdings Facility No. 01-176

| Sample Date | Groundwater Influent - Pre GAC Treatment (µg/L) | | | | | Groundwater Influent - Mid GAC Treatment (µg/L) | | | | | Groundwater Effluent - Post GAC Treatment (µg/L) | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | GAC-1 Influent Sample[1] | | | | | GAC-2 Influent Sample[2] | | | | | Effluent Discharge Sample[3] | | | | | | | |
| | GRPH[4] | Benzene[5] | Toluene[5] | Ethyl-benzene[5] | Total Xylenes[5] | GRPH[4] | Benzene[5] | Toluene[5] | Ethyl-benzene[5] | Total Xylenes[5] | GRPH[4] | Benzene[5] | Toluene[5] | Ethyl-benzene[5] | Total Xylenes[5] | Total BTEX | Total Lead[6] | pH[7] |
| 10/10/12 | <100 | <1 | <1 | <1 | 3.1 | <100 | <1 | <1 | <1 | <3 | <100 | <1 | <1 | <1 | <3 | <6 | -- | 7.59 |
| 11/07/12 | <100 | <1 | <1 | <1 | <3 | <100 | <1 | <1 | <1 | <3 | <100 | <1 | <1 | <1 | <3 | <6 | -- | 7.71 |
| 12/05/12 | <100 | <1 | <1 | <1 | <3 | <100 | <1 | <1 | <1 | <3 | <100 | <1 | <1 | <1 | <3 | <6 | 76.5 | 8.05 |
| 01/08/13 | <100 | <1 | <1 | <1 | <3 | <100 | <1 | <1 | <1 | <3 | <100 | <1 | <1 | <1 | <3 | <6 | -- | 7.29 |
| 02/05/13 | <100 | <1 | <1 | <1 | <3 | <100 | <1 | <1 | <1 | <3 | <100 | <1 | <1 | <1 | <3 | <6 | -- | 7.31 |
| 03/13/13 | 1,100 | 2.9 | <1 | 14 | 27 | -- | -- | -- | -- | -- | <100 | <1 | <1 | <1 | <3 | <6 | -- | 7.59 |
| 04/03/13 | 740 | <1 | <1 | <1 | 7.9 | <100 | <1 | <1 | <1 | <3 | <100 | <1 | <1 | <1 | <3 | <6 | -- | 7.08 |
| 05/08/13 | <100 | <1 | <1 | <1 | 5.1 | <100 | <1 | <1 | <1 | <3 | <100 | <1 | <1 | <1 | <3 | <6 | -- | 7.51 |
| 06/05/13 | 590 | 2.0 | 1.8 | 14 | 120 | <100 | <1 | <1 | <1 | <3 | <100 | <1 | <1 | <1 | <3 | <6 | 4.51 | 6.68 |
| 07/02/13 | <100 | <1 | <1 | <1 | <3 | <100 | <1 | <1 | <1 | <3 | <100 | <1 | <1 | <1 | <3 | <6 | -- | 6.97 |
| 08/06/13 | <100 | <1 | <1 | <1 | 5.2 | <100 | <1 | <1 | <1 | <3 | <100 | <1 | <1 | <1 | <3 | <6 | -- | 7.10 |
| 09/04/13 | <100 | <1 | <1 | <1 | <3 | <100 | <1 | <1 | <1 | <3 | <100 | <1 | <1 | <1 | <3 | <6 | -- | 6.96 |
| 10/07/13 | <100 | <1 | <1 | <1 | <3 | <100 | <1 | <1 | <1 | <3 | <100 | <1 | <1 | <1 | <3 | <6 | -- | 7.17 |
| 11/06/13 | <100 | <1 | <1 | <1 | <3 | <100 | <1 | <1 | <1 | <3 | <100 | <1 | <1 | <1 | <3 | <6 | -- | 6.92 |
| 12/03/13 | <100 | <1 | <1 | <1 | <3 | <100 | <1 | <1 | <1 | <3 | <100 | <1 | <1 | <1 | <3 | <6 | 1.59 | 7.04 |
| 01/13/14 | <100 | <1 | <1 | <1 | <3 | <100 | <1 | <1 | <1 | <3 | <100 | <1 | <1 | <1 | <3 | <6 | -- | 7.13 |
| 02/07/14 | <100 | <1 | <1 | <1 | <3 | <100 | <1 | <1 | <1 | <3 | <100 | <1 | <1 | <1 | <3 | <6 | -- | 7.45 |
| 03/18/14 | <100 | <1 | <1 | <1 | <3 | <100 | <1 | <1 | <1 | <3 | <100 | <1 | <1 | <1 | <3 | <6 | -- | 7.86 |
| 04/17/14 | <100 | <1 | <1 | <1 | <3 | <100 | <1 | <1 | <1 | <3 | <100 | <1 | <1 | <1 | <3 | <6 | -- | 6.87 |
| 05/20/14 | <100 | <1 | <1 | <1 | <3 | <100 | <1 | <1 | <1 | <3 | <100 | <1 | <1 | <1 | <3 | <6 | -- | 7.18 |
| 06/16/14 | <100 | <1 | <1 | <1 | <3 | <100 | <1 | <1 | <1 | <3 | <100 | <1 | <1 | <1 | <3 | <6 | <1 | 6.91 |
| **State Waste Discharge Permit Number ST0007384 Effluent Limits** | | | | | | | | | | | **1,000** | **5** | | | | **100** | **1,090** | **6 to 10** |

**NOTES:**

*shaded cells = data for reporting quarter*

[1]Inffluent samples collected prior to first GAC canister.

[2]Inffluent samples collected prior to second GAC canister.

[3]Effluent samples collected prior to sewer discharge.

[4]Analyzed by Method NWTPH-Gx.

[5]Analyzed by EPA Method 8021B.

[6]Analyzed by EPA Method 200.8.

[7]Field measurement

**DEFINITIONS:**

-- = not analyzed, measured, or calculated

< = not detected at a concentration exceeding the laboratory reporting limit

µg/L = micrograms per liter

BTEX = benzene, toluene, ethylbenzene and xylenes

EPA = U.S. Environmental Protection Agency

GAC = granular activated carbon

GRPH = gasoline-range petroleum hydrocarbons

NWTPH-Gx = Northwest Total Petroleum Hydrocarbons for gasoline-range organics

# Unit 3: Drake Property (24309)

**Table 3-1**
**Unit 3 - Drake Property (24309)**
**Summary of System Performance**
**Second Quarter 2014**
TOC Holdings Facility No. 01-176

| Reporting Period | | Duration of Reporting Period (days) | System Run Time (days) | System Run Time (%) | Volume of Groundwater Discharged (gallons) | Average Groundwater Recovered Flow Rate (gallons/day) | GRPH Aqueous-Phase Removal (lb) | GRPH Vapor-Phase Removal (lb) |
|---|---|---|---|---|---|---|---|---|
| Start Date | End Date | | | | | | | |
| 10/02/12 | 12/05/12 | 64 | 58.6 | 92% | 71,160 | 1,112 | 0.029 | 31.5 |
| 12/05/12 | 03/04/13 | 89 | 73.3 | 82% | 30,268.8 | 340 | 0.258 | 37.6 |
| 03/04/13 | 06/05/13 | 93 | 39.6 | 43% | 74,015.9 | 796 | 0.491 | 2.7 |
| 06/05/13 | 09/04/13 | 91 | 58.1 | 64% | 68,178.7 | 749 | 0.158 | 4.6 |
| 09/04/13 | 12/03/13 | 90 | 75.8 | 84% | 211,042.8 | 2,345 | 0.088 | 6.3 |
| 12/03/13 | 01/13/14 | 41 | 41.0 | 100% | 40,409.7 | 986 | 0.017 | 3.4 |
| 01/13/14 | 03/18/14 | 64 | 58.0 | 91% | 132,723.9 | 2,074 | 0.055 | 50.4 |
| 03/18/14 | 06/16/14 | 90 | 71.3 | 79% | 206,572.0 | 2,295 | 0.086 | 5.9 |
| **Average System Run Time** | | | | **76%** | | | | |
| **Totals for Quarter** | | **90** | **71.3** | **79%** | **206,572.0** | **2,295** | **0.086** | **5.9** |

**NOTES:**
*shaded cells = data for reporting quarter*

**DEFINITIONS:**
% = percent
gallons/day = gallons per day
GRPH = gasoline-range petroleum hydrocarbons
lb = pound(s)

**Table 3-2**
**Unit 3 - Drake Property (24309)**
**Vapor Stream - System Performance Monitoring Data**
**Second Quarter 2014**
TOC Holdings Facility No. 01-176

| Site Visit | Run Time | | SVE Parameters | | Catalytic Oxidizer | | GRPH Removal | | |
|---|---|---|---|---|---|---|---|---|---|
| | SVE Hour Meter | Total Time in Operation | SVE Pre-Filter Vacuum | Air Flow Rate[1] | Catalyst Entrance Temp. | Catalyst Exit Temp. | Influent Concentration[2] | Daily Mass Recovery Rate[3] [4] | Cumulative Recovered[5] |
| Date | (hours) | (days) | (iow) | (scfm) | (°C) | (°C) | ($mg/m^3$) | (lb/day) | (lb) |
| 10/02/12 | 11.2 | 0.47 | 70.0 | 143.8 | 330 | 340 | 13 | *0.2* | 0.00 |
| 10/10/12 | 75.7 | 3.15 | 73.0 | 140.4 | 330 | 338 | 12 | *0.2* | 0.43 |
| 10/17/12 | 243.7 | 10.15 | 74.0 | 141.7 | 330 | 337 | <10 | *0.1* | 1.18 |
| 10/24/12 | 411.9 | 17.16 | 74.0 | 139.9 | 330 | 338 | <10 | *0.1* | 1.63 |
| 10/25/12 | 436.7 | 18.20 | 74.0 | 142.8 | 330 | 338 | -- | -- | -- |
| 11/06/12 | 724.8 | 30.20 | 77.0 | 137.6 | 330 | 337 | -- | -- | -- |
| 11/07/12 | 750.3 | 31.3 | 76 | 139.1 | 330 | 338 | <10 | *0.1* | 2.51 |
| 12/05/12 | 1,417.6 | 59.1 | 76 | 141.9 | 330 | 340 | 160 | *1.0* | 31.48 |
| 01/08/13 | 2,231.8 | 93.0 | 83 | 137.3 | 330 | 337 | <10 | *1.0* | 66.61 |
| 02/05/13 | 2,731.0 | 113.8 | 70 | 144.2 | 330 | 337 | <10 | *0.1* | 67.93 |
| 03/04/13 | 3,177.5 | 132.4 | 71 | 144.6 | 330 | 338 | <10 | *0.1* | 69.13 |
| 04/03/13 | 3,894.4 | 162.3 | 64 | 152.4 | 330 | 338 | <10 | *0.1* | 71.13 |
| 05/15/13 | 4,059.7 | 169.2 | 27 | 173.5 | 330.0 | 301.0 | <10 | *0.1* | 71.63 |
| 06/05/13 | 4,126.8 | 172.0 | 27 | 172.9 | 330.0 | 338.0 | <10 | *0.1* | 71.85 |
| 07/02/13 | 4,400.3 | 183.3 | 17 | 171.7 | 330 | 338 | <10 | *0.1* | 72.73 |
| 08/06/13 | 5,055.3 | 210.6 | 10 | 182.6 | 330 | 338 | <10 | *0.1* | 74.91 |
| 09/04/13 | 5,520.0 | 230.0 | 13 | 181.6 | 330 | 338 | <10 | *0.1* | 76.49 |
| 10/07/13 | 6,311.3 | 263.0 | 13 | 183.7 | 330 | 337 | <10 | *0.1* | 79.20 |
| 10/14/13 | 6,484.1 | 270.2 | 14 | 185.6 | 330 | 337 | -- | -- | -- |
| 10/15/13 | 6,509.2 | 271.2 | 15 | 184.9 | 330 | 337 | -- | -- | -- |
| 11/06/13 | 7,031.9 | 293.0 | 18 | 185.6 | 330 | 338 | <10 | *0.1* | 81.69 |
| 11/07/13 | 7,056.6 | 294.0 | 18 | 172.7 | 330 | 337 | -- | -- | -- |
| 12/03/13 | 7,339.5 | 305.8 | 20 | 186.4 | 330 | 338 | <10 | *0.1* | 82.76 |
| 12/04/13 | 7,368.7 | 307.0 | 25 | 185.1 | 330 | 338 | -- | -- | -- |
| 01/13/14 | 8,323.6 | 346.8 | 24 | 186.6 | 330 | 337 | <10 | *0.1* | 86.20 |
| 01/31/14 | 8,620.1 | 359.2 | 26 | 186.1 | 330 | 338 | -- | -- | -- |
| 02/06/14 | 8,786.4 | 366.1 | 20 | 186.0 | 330 | 340 | -- | -- | -- |
| 02/07/14 | 8,766.0 | 365.3 | 20 | 188.9 | 330 | 340 | 98 | *0.9* | 102.22 |
| 03/18/14 | 9,715.1 | 404.8 | 24 | 187.0 | 330 | 338 | <10 | *0.9* | 136.63 |
| 04/18/14 | 10,370.2 | 432.1 | 27 | 183.5 | 330 | 340 | <10 | *0.1* | 138.91 |
| 05/19/14 | 10,942.5 | 455.9 | 22 | 184.9 | 330 | 342 | <10 | *0.1* | 140.88 |
| 06/16/14 | 11,425.1 | 476.0 | 26 | 181.8 | 330 | 342 | <10 | *0.1* | 142.54 |
| **PSCAA NOC-10384 Restrictions and Conditions** | | | | **max. 350** | **min. 240** | **max. 620** | | | |

**NOTES:**

*shaded cells = data for reporting quarter*

[1]Air flow rates through 02/07/14 calculated using an averaging flow sensor (Dwyer Model DS). Air flow rates after 02/07/14 calculated from data. Air flow rate from 03/18/14 is assumed value for subsequent calculations.

[2]Influent vapor-phase samples collected from SVE sample port prior to air treatment.

[3]Daily removal rate (lb/day) = ave. concentration ($mg/m^3$) x ave. flow rate (scfm) x conversion ($8.99x10^{-5}$ lb-$m^3$-min/mg-$ft^3$-day)

[4]Nondetectable influent concentrations assumed to be 50% of the laboratory's lower reporting limit.
Removal rates based upon this assumption are shown in *italics* .

[5]Cumulative mass of GRPH removed (lb) = daily removal rate (lb/day) x time in operation (days) + previous cumulative total (lb).

**DEFINITIONS:**

-- = not analyzed, measured, or calculated
< = not detected at concentration above the laboratory reporting limit
° C = degrees Celsius
ave. = average
$ft^3$ = cubic feet
GRPH = gasoline-range petroleum hydrocarbons
iow = inches of water
lb = pounds
lb/day = pounds per day
$m^3$ = cubic meter
max. = maximum
mg = milligrams
min. = minimum
NOC = Notice of Construction
PSCAA = Puget Sound Clean Air Agency
scfm = standard cubic feet per meter
SVE = soil vapor extraction
Temp. = temperature

**Table 3-3**
**Unit 3 - Drake Property (24309)**
**Liquid Stream - System Performance Monitoring Data**
**Second Quarter 2014**
TOC Holdings Facility No. 01-176

| Site Visit | Extracted Groundwater | | | Hydrocarbon Recovery - Aqueous-Phase | | |
|---|---|---|---|---|---|---|
| Date | Flow Totalizer (gallons) | Treated Between Visits (gallons) | Average Flow Rate (gallons/day) | Influent GRPH Concentration (µg/L) | GRPH Removed[1] [2] [3] (lb) | Cumulative GRPH Removed[3] [4] (lb) |
| 10/02/12 | 1,178.0 | -- | -- | -- | -- | -- |
| 10/10/12 | 5,075.9 | 3,897.9 | 487 | <100 | *0.002* | *0.002* |
| 10/17/12 | 15,755.8 | 10,679.9 | 1,526 | -- | -- | -- |
| 10/24/12 | 27,288.0 | 11,532.2 | 1,647 | -- | -- | -- |
| 10/25/12 | 28,809.6 | 1,521.6 | 1,522 | -- | -- | -- |
| 11/06/12 | 36,398.8 | 7,589.2 | 632 | -- | -- | -- |
| 11/07/12 | 38,565.1 | 2,166.3 | 2,166 | <100 | *0.014* | *0.016* |
| 12/05/12 | 71,160.2 | 32,595.1 | 1,164 | <100 | *0.014* | *0.029* |
| 01/08/13 | 71,627.1 | 466.9 | 14 | <100 | *0.000* | *0.029* |
| 02/06/13 | 84,429.4 | 12,802.4 | 441 | 160 | 0.017 | 0.046 |
| 03/04/13 | 101,429.0 | 16,999.6 | 654 | 1,700 | 0.241 | 0.288 |
| 04/03/13 | 119,013.8 | 17,584.8 | 586 | <100 | *0.007* | *0.295* |
| 05/08/13 | 157,058.4 | 38,044.6 | 1,087 | 1,500 | *0.476* | *0.771* |
| 06/05/13 | 175,444.9 | 18,386.5 | 657 | <100 | *0.008* | *0.779* |
| 07/02/13 | 175,445.7 | 0.8 | 0 | -- | -- | -- |
| 08/06/13 | 181,799.7 | 6,354.0 | 182 | 2,500 | *0.133* | *0.911* |
| 09/04/13 | 243,623.6 | 61,823.9 | 2,132 | <100 | *0.026* | *0.937* |
| 10/07/13 | 333,942.9 | 90,319.3 | 2,737 | <100 | *0.038* | *0.975* |
| 10/14/13 | 355,115.5 | 21,172.6 | 3,025 | -- | -- | -- |
| 10/15/13 | 358,033.9 | 2,918.4 | 2,918 | -- | -- | -- |
| 11/06/13 | 420,282.1 | 62,248.2 | 2,829 | <100 | *0.036* | *1.011* |
| 11/07/13 | 423,365.1 | 3,083.0 | 3,083 | -- | -- | -- |
| 12/03/13 | 454,666.4 | 31,301.3 | 1,204 | <100 | *0.014* | *1.025* |
| 12/04/13 | 458,180.0 | 3,513.6 | 3,514 | -- | -- | -- |
| 01/13/14 | 495,076.1 | 36,896.1 | 922 | <100 | *0.017* | *1.042* |
| 01/31/14 | 506,528.6 | 11,452.5 | 636 | -- | -- | -- |
| 02/07/14 | 523,790.1 | 17,261.5 | 2,466 | <100 | *0.012* | *1.054* |
| 03/18/14 | 627,800 | 104,010 | 2,667 | <100 | *0.043* | *1.097* |
| 04/18/14 | 722,961 | 95,161 | 3,070 | <100 | *0.040* | *1.137* |
| 05/19/14 | 791,030 | 68,069 | 2,196 | <100 | *0.028* | *1.166* |
| 06/16/14 | 834,372 | 43,342 | 1,548 | <100 | *0.018* | *1.184* |
| **State Waste Discharge Permit Number ST0007384 Maximum Daily Limits** | | | **7,000** | | | |

**NOTES:**

*shaded cells = data for reporting quarter*

[1] Effluent samples collected prior to discharging to the City of Mountlake Terrace sanitary sewer.

[2] Mass removal weight (lb) = gallons recovered x concentration (µg/L) x conversion factor (8.344E-9 lb-L/µg-gallon).

[3] Nondetectable influent concentrations assumed to be 50% of the laboratory's lower reporting limit.
Removal rates based upon this assumption are shown in *italics* .

[4] Cumulative mass of GRPH removed (lb) = GRPH mass removal between sampling visits (lb) + previous cumulative total (lb).

**DEFINITIONS:**

-- = not analyzed, measured, or calculated
< = not detected at concentration exceeding the laboratory reporting limit
µg/L = micrograms per liter
µg-gallon = micrograms - gallon conversion
gallons/day = gallons per day
GRPH = gasoline-range petroleum hydrocarbons
lb = pound(s)
lb-L = pounds - liter conversion

**Table 3-4**
**Unit 3 - Drake Property (24309)**
**Vapor Stream Analytical Results**
**Second Quarter 2014**
TOC Holdings Facility No. 01-176

| Sample Date | Analytical Results ($mg/m^3$) | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Influent Vapor Samples[1] | | | | | Effluent Vapor Samples[2] | | | | | GRPH DRE [5] |
| | GRPH[3] ($mg/m^3$) | Benzene[4] ($mg/m^3$) | Toluene[4] ($mg/m^3$) | Ethylbenzene[4] ($mg/m^3$) | Total Xylenes[4] ($mg/m^3$) | GRPH[3] ($mg/m^3$) | Benzene[4] ($mg/m^3$) | Toluene[4] ($mg/m^3$) | Ethylbenzene[4] ($mg/m^3$) | Total Xylenes[4] ($mg/m^3$) | % |
| 10/02/12 | 13 | <0.1 | 0.13 | 0.12 | 0.35 | <10 | <0.1 | <0.1 | <0.1 | <0.3 | *61.5* |
| 10/10/12 | 12 | <0.1 | 0.10 | <0.1 | <0.3 | <10 | <0.1 | 0.18 | <0.1 | <0.3 | *58.3* |
| 10/17/12 | <10 | <0.1 | 0.17 | <0.1 | <0.3 | <10 | <0.1 | <0.1 | <0.1 | <0.3 | -- |
| 10/24/12 | <10 | <0.1 | <0.1 | <0.1 | <0.3 | <10 | <0.1 | <0.1 | <0.1 | <0.3 | -- |
| 11/07/12 | <10 | <0.1 | <0.1 | <0.1 | <0.3 | <10 | <0.1 | <0.1 | <0.1 | <0.3 | -- |
| 12/05/12 | 160 | <0.1 | <0.1 | 1.50 | 0.99 | <10 | <0.1 | <0.1 | <0.1 | <0.3 | *96.9* |
| 01/08/13 | <10 | <0.1 | <0.1 | <0.1 | <0.3 | <10 | <0.1 | 0.12 | <0.1 | <0.3 | -- |
| 02/05/13 | <10 | <0.1 | <0.1 | <0.1 | <0.3 | <10 | <0.1 | <0.1 | <0.1 | <0.3 | -- |
| 03/04/13 | <10 | <0.1 | <0.1 | <0.1 | <0.3 | <10 | <0.1 | <0.1 | <0.1 | <0.3 | -- |
| 04/03/13 | <10 | <0.1 | <0.1 | <0.1 | <0.3 | <10 | <0.1 | <0.1 | <0.1 | <0.3 | -- |
| 05/15/13 | <10 | <0.1 | <0.1 | <0.1 | <0.3 | <10 | <0.1 | <0.1 | <0.1 | <0.3 | -- |
| 06/05/13 | <10 | <0.1 | <0.1 | <0.1 | <0.3 | <10 | <0.1 | <0.1 | <0.1 | <0.3 | -- |
| 07/02/13 | <10 | <0.1 | <0.1 | <0.1 | <0.3 | <10 | <0.1 | <0.1 | <0.1 | <0.3 | -- |
| 08/06/13 | <10 | <0.1 | <0.1 | <0.1 | <0.3 | <10 | <0.1 | <0.1 | <0.1 | <0.3 | -- |
| 09/04/13 | <10 | <0.1 | <0.1 | <0.1 | <0.3 | <10 | <0.1 | <0.1 | <0.1 | <0.3 | -- |
| 10/07/13 | <10 | <0.1 | <0.1 | <0.1 | <0.3 | <10 | <0.1 | <0.1 | <0.1 | <0.3 | -- |
| 11/06/13 | <10 | <0.1 | <0.1 | <0.1 | <0.3 | <10 | <0.1 | <0.1 | <0.1 | <0.3 | -- |
| 12/03/13 | <10 | <0.1 | <0.1 | <0.1 | <0.3 | <10 | <0.1 | <0.1 | <0.1 | <0.3 | -- |
| 01/13/14 | <10 | <0.1 | <0.1 | <0.1 | <0.3 | <10 | <0.1 | <0.1 | <0.1 | <0.3 | -- |
| 02/07/14 | 98 | <0.1 | <0.1 | 0.34 | 0.65 | <10 | <0.1 | <0.1 | <0.1 | <0.3 | *94.9* |
| 03/18/14 | <10 | <0.1 | <0.1 | <0.1 | <0.3 | <10 | <0.1 | <0.1 | <0.1 | <0.3 | -- |
| 04/18/14 | <10 | <0.1 | <0.1 | <0.1 | <0.3 | <10 | <0.1 | <0.1 | <0.1 | <0.3 | -- |
| 05/19/14 | <10 | <0.1 | <0.1 | <0.1 | <0.3 | <10 | <0.1 | <0.1 | <0.1 | <0.3 | -- |
| 06/16/14 | <10 | <0.1 | <0.1 | <0.1 | <0.3 | <10 | <0.1 | <0.1 | <0.1 | <0.3 | -- |
| **PSCAA NOC-10384 Restrictions and Conditions** | | | | | | **min. 214.7** [5] | | | | | **95%** [5] [6] |

**NOTES:**

*shaded cells = data for reporting quarter*

[1] Influent vapor-phase samples collected from SVE sample port on the pressure side of the blower.

[2] Effluent vapor-phase samples collected from sample port on the effluent stack.

[3] Analyzed by Northwest Total Petroleum Hydrocarbon Method NWTPH-Gx.

[4] Analyzed by U.S. Environmental Protection Agency Method 8021B.

[5] DRE shall be at least 95% unless effluent GRPH vapor leaving the catox does not exceed 50 ppmv (214.7 $mg/m^3$ assuming a molecular weight of 105).

[6] DRE = (1-[$GRPH_{influent}$/$GRPH_{effluent}$]) x 100; non-detected influent concentrations assumed to be 50% of the laboratory's reporting limit.

DRE % based on this assumption are shown in *italics* .

**DEFINITIONS:**

-- = not analyzed, measured, or calculated

< = not detected at a concentration exceeding the laboratory reporting limit

% = percent

catox = catalytic oxidizer

DRE = destruction and removal efficiency

GRPH = gasoline-range petroleum hydrocarbons

$mg/m^3$ = milligrams per cubic meter

min. = minimum

NOC = Notice of Construction

ppmv = part per million volume

PSCAA = Puget Sound Clean Air Agency

SVE = soil vapor extraction

**Table 3-5**
**Unit 3 - Drake Property (24309)**
**Liquid Stream Analytical Results**
**Second Quarter 2014**
TOC Holdings Facility No. 01-176

| Sample Date | Groundwater Influent - Pre GAC Treatment (µg/L) | | | | | Groundwater Influent - Mid GAC Treatment (µg/L) | | | | | Groundwater Effluent - Post GAC Treatment (µg/L) | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | GAC-1 Influent Sample[1] | | | | | GAC-2 Influent Sample[2] | | | | | Effluent Discharge Sample[3] | | | | | | | |
| | GRPH[4] | Benzene[5] | Toluene[5] | Ethyl-benzene[5] | Total Xylenes[5] | GRPH[4] | Benzene[5] | Toluene[5] | Ethyl-benzene[5] | Total Xylenes[5] | GRPH[4] | Benzene[5] | Toluene[5] | Ethyl-benzene[5] | Total Xylenes[5] | Total BTEX | Total Lead[6] | pH[7] |
| 10/10/12 | <100 | <1 | <1 | <1 | <3 | <100 | <1 | <1 | <1 | <3 | <100 | <1 | <1 | <1 | <3 | <6 | -- | 7.87 |
| 11/07/12 | <100 | 1 | <1 | <1 | <3 | <100 | <1 | <1 | <1 | <3 | <100 | <1 | <1 | <1 | <3 | <6 | -- | 7.83 |
| 12/05/12 | <100 | <1 | <1 | <1 | <3 | <100 | <1 | <1 | <1 | <3 | <100 | <1 | <1 | <1 | <3 | <6 | 4.05 | 7.84 |
| 01/08/13 | <100 | <1 | <1 | <1 | <3 | <100 | <1 | <1 | <1 | <3 | <100 | <1 | <1 | <1 | <3 | <6 | -- | 7.06 |
| 02/05/13 | 160 | <1 | <1 | 1.8 | 5.8 | <100 | <1 | <1 | <1 | <3 | <100 | <1 | <1 | <1 | <3 | <6 | -- | 7.02 |
| 03/04/13 | 1,700 | <1 | 1.4 | 24 | 160 | <100 | <1 | <1 | <1 | <3 | <100 | <1 | <1 | <1 | <3 | <6 | -- | 7.64 |
| 04/03/13 | <100 | <1 | <1 | <1 | 3.7 | <100 | <1 | <1 | <1 | <3 | <100 | <1 | <1 | <1 | <3 | <6 | -- | 6.89 |
| 05/08/13 | 1,500 | <1 | <1 | 16 | 120 | <100 | <1 | <1 | <1 | <3 | <100 | <1 | <1 | <1 | <3 | <6 | -- | 7.41 |
| 06/05/13 | <100 | <1 | <1 | <1 | 4.0 | <100 | <1 | <1 | <1 | <3 | <100 | <1 | <1 | <1 | <3 | <6 | 2.99 | 7.05 |
| 07/02/13 | NM | NM | NM | NM | NM | NM | NM | NM | NM | NM | <100 | <1 | <1 | <1 | <3 | <6 | -- | 6.35 |
| 08/06/13 | 2,500 | 1 | 2.3 | 40 | 260 | <100 | <1 | <1 | <1 | <3 | <100 | <1 | <1 | <1 | <3 | <6 | -- | 8.07 |
| 09/04/13 | <100 | <1 | <1 | <1 | 3.6 | <100 | <1 | <1 | <1 | <3 | <100 | <1 | <1 | <1 | <3 | <6 | -- | 7.03 |
| 10/07/13 | <100 | <1 | <1 | <1 | <3 | <100 | <1 | <1 | <1 | <3 | <100 | <1 | <1 | <1 | <3 | <6 | -- | 7.09 |
| 11/06/13 | <100 | <1 | <1 | <1 | 5.7 | <100 | <1 | <1 | <1 | <3 | <100 | <1 | <1 | <1 | <3 | <6 | -- | 6.94 |
| 12/03/13 | <100 | <1 | <1 | <1 | 5.7 | <100 | <1 | <1 | <1 | <3 | <100 | <1 | <1 | <1 | <3 | <6 | 1.9 | 7.35 |
| 01/13/14 | <100 | <1 | <1 | <1 | <3 | <100 | <1 | <1 | <1 | <3 | <100 | <1 | <1 | <1 | <3 | <6 | -- | -- |
| 02/07/14 | <100 | <1 | <1 | <1 | 3.3 | <100 | <1 | <1 | <1 | <3 | <100 | <1 | <1 | <1 | <3 | <6 | -- | 7.36 |
| 03/18/14 | <100 | <1 | <1 | <1 | <3 | <100 | <1 | <1 | <1 | <3 | <100 | <1 | <1 | <1 | <3 | <6 | -- | 8.38 |
| 04/18/14 | <100 | <1 | <1 | <1 | <3 | <100 | <1 | <1 | <1 | <3 | <100 | <1 | <1 | <1 | <3 | <6 | -- | 7.40 |
| 05/19/14 | <100 | <1 | <1 | <1 | 5.6 | <100 | <1 | <1 | <1 | <3 | <100 | <1 | <1 | <1 | <3 | <6 | -- | 7.25 |
| 06/16/14 | <100 | <1 | <1 | <1 | <3 | <100 | <1 | <1 | <1 | <3 | <100 | <1 | <1 | <1 | <3 | <6 | 1.05 | 5.94 |
| **State Waste Discharge Permit Number ST0007384 Effluent Limits** | | | | | | | | | | | **1,000** | **5** | | | | **100** | **1,090** | **6 to 10** |

**NOTES:**

*shaded cells = data for reporting quarter*

[1]Inffluent samples collected prior to first GAC canister.

[2]Inffluent samples collected prior to second GAC canister.

[3]Effluent samples collected prior to sewer discharge.

[4]Analyzed by Method NWTPH-Gx.

[5]Analyzed by EPA Method 8021B.

[6]Analyzed by EPA Method 200.8.

[7]Field measurement

**DEFINITIONS:**

-- = not analyzed, measured, or calculated

< = not detected at a concentration exceeding the laboratory reporting limit

µg/L = micrograms per liter

BTEX = benzene, toluene, ethylbenzene and xylenes

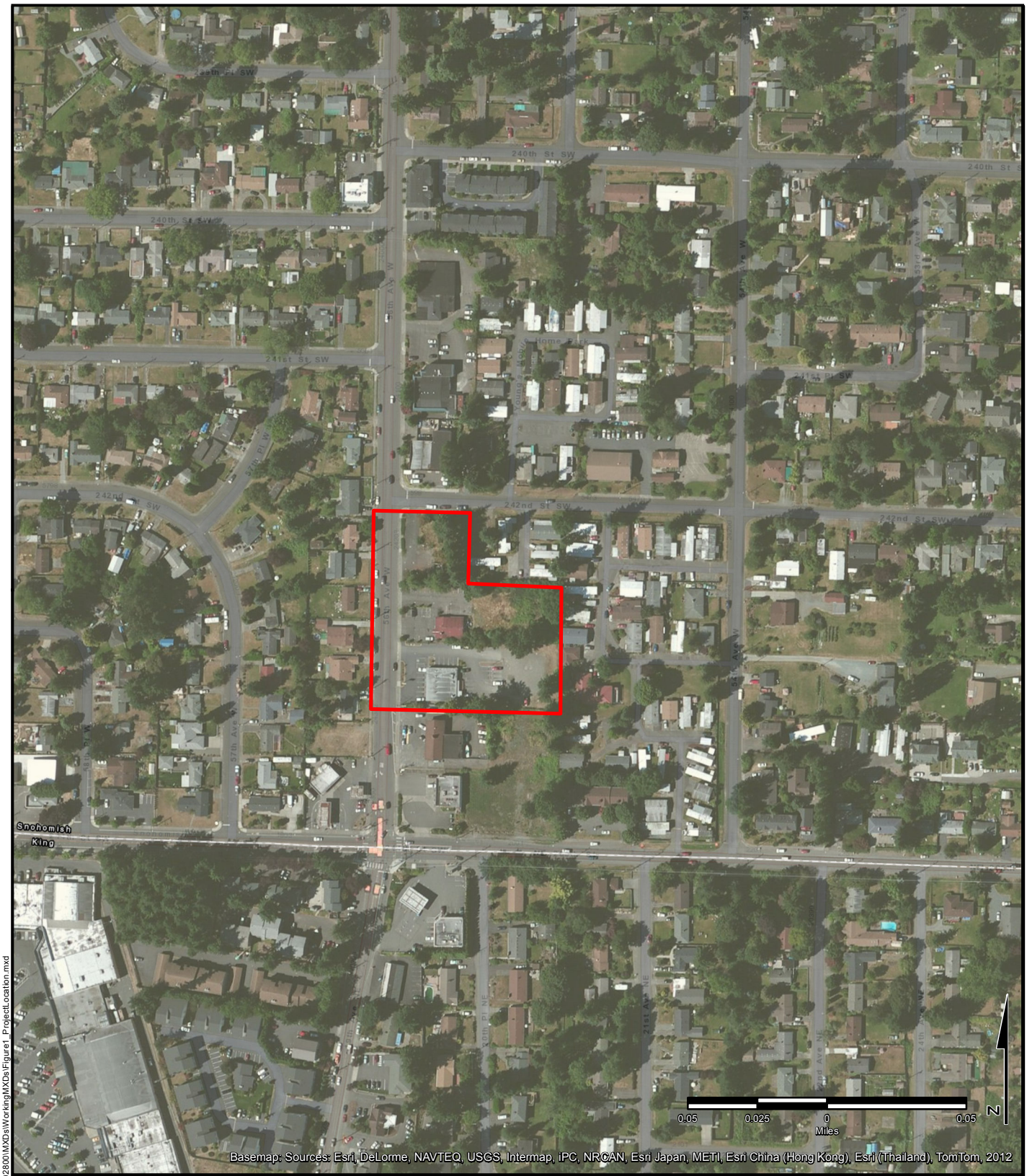
EPA = U.S. Environmental Protection Agency

GAC = granular activated carbon

GRPH = gasoline-range petroleum hydrocarbons

NWTPH-Gx = Northwest Total Petroleum Hydrocarbons for gasoline-range organics

# Figures




## Legend

Site Boundary

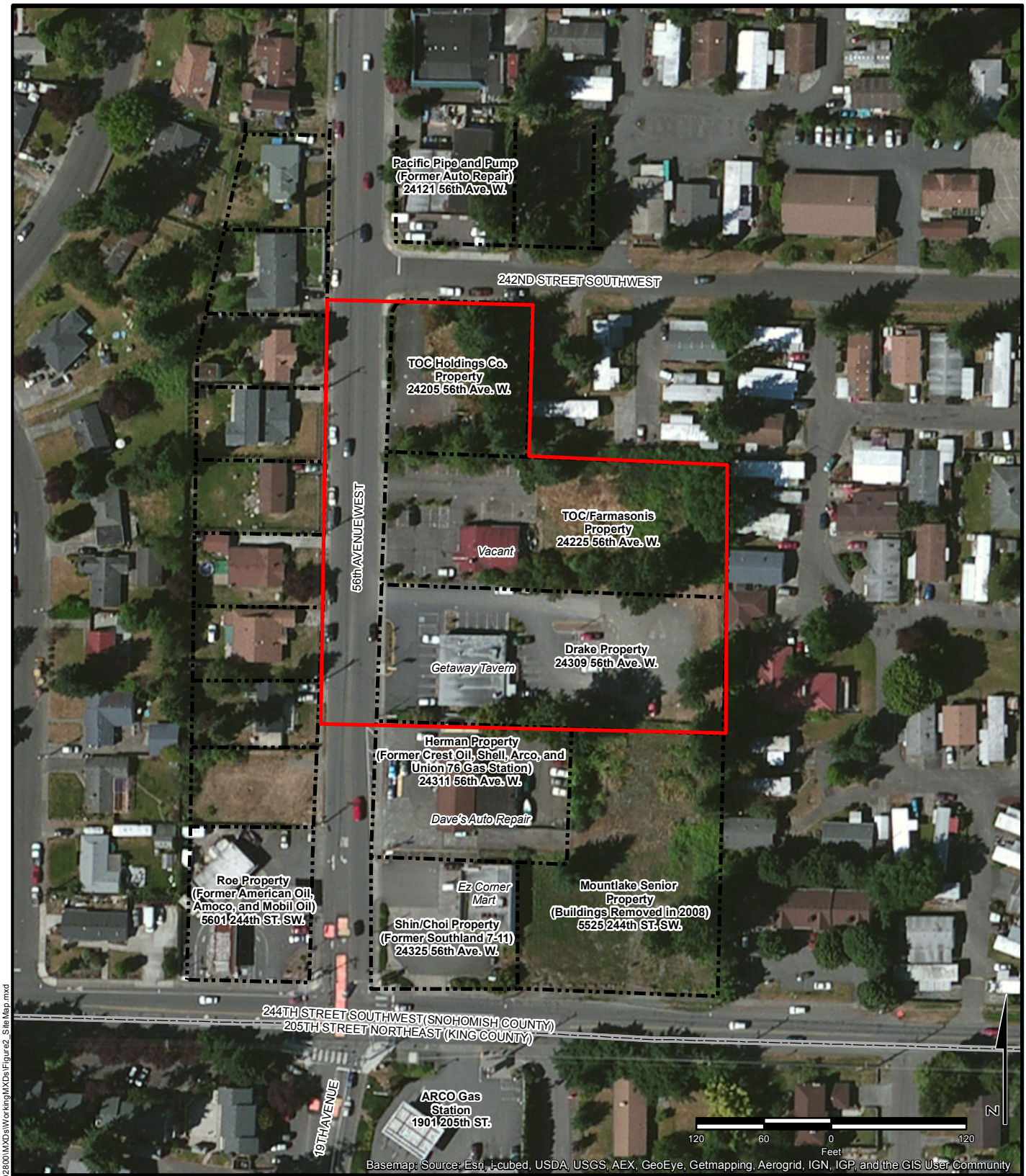

TOC Holdings Co. Facility 01-176
24205 56th Avenue West
Mountlake Terrace, Washington

**FIGURE 1: PROJECT LOCATION**

Stantec JBR

| | | | |
|---|---|---|---|
| DRAWN BY | D.H. | DATE DRAWN | 8/27/2014 |
| SCALE | 1 in = 0.05 miles | | |
| PROJECT | 203714085 | | |

X:\WA\Clients\Time_Oil\TOC-MountlakeTerrace_BA1402800\MXDs\WorkingMXDs\Figure1_ProjectLocation.mxd




## Legend

Site Boundary

PARCELS


TOC Holdings Co. Facility 01-176
24205 56th Avenue West
Mountlake Terrace, Washington

**FIGURE 2: SITE MAP**

Stantec JBR

| | | | |
|---|---|---|---|
| DRAWN BY | D.H. | DATE DRAWN | 8/27/2014 |
| SCALE | 1 in = 120 feet | | |
| PROJECT | 203714085 | | |

X:\WA\Clients\Time_Oil\TOC-MountlakeTerrace_BA1402800\MXDs\WorkingMXDs\Figure2_SiteMap.mxd

## LEGEND

- MW77 — GROUNDWATER REMEDIATION WELL (INTERMEDIATE SCREEN)
- CATCH BASIN
- SURVEY BENCHMARK
- PROPERTY BOUNDARY
- FO — FIBER OPTIC
- GAS — NATURAL GAS
- SI — STORM SEWER INFILTRATION PIPE
- SD — STORM SEWER DRAIN
- SS — SANITARY SEWER
- W — WATER
- OP — OVERHEAD POWER
- E1 — PRIMARY ELECTRICAL
- E2 — SECONDARY ELECTRICAL
- SANITARY SEWER MANHOLE
- OX — CATALYTIC OXIDIZER
- ELECTRICAL JUNCTION BOX
- ELECTRICAL VAULT
- PAD-MOUNTED TRANSFORMER
- C.O. — SANITARY SEWER CLEAN OUT
- UST — UNDERGROUND STORAGE TANK

**DATUM/BASIS OF BEARINGS**
HELD A BEARING OF N00°03'34"E ALONG THE MONUMENTED CENTERLINE OF 56TH AVE W BETWEEN 244TH ST SW AND 240TH ST SW PER PLAT OF LAKE FOREST CREST V.10 / P.107

**BASIS OF POSITION:** CITY OF MONTLAKE TERRACE CONTROL POINT DESIGNATION MTLK127.

**ORIGINATING BENCHMARK:**
TOP OF MAG NAIL IN CURB AT NORTHWEST CORNER OF SITE PER SITE PLAN BY CPS ENGINEERING PROVIDED TO AXIS BY CLIENT

**COORDINATE SYSTEM:** NAD 1983 STATEPLANE WASHINGTON NORTH FIPS 4601 (US FEET)

**VERTICAL DATUM:** NAVD '88

**ELEVATION:** 363.62'

**TEMPORARY BENCHMARKS:**

**TBM 'A'** SET 'X' ON NORTH BONNETT BOLT FOR FIRE HYDRANT.

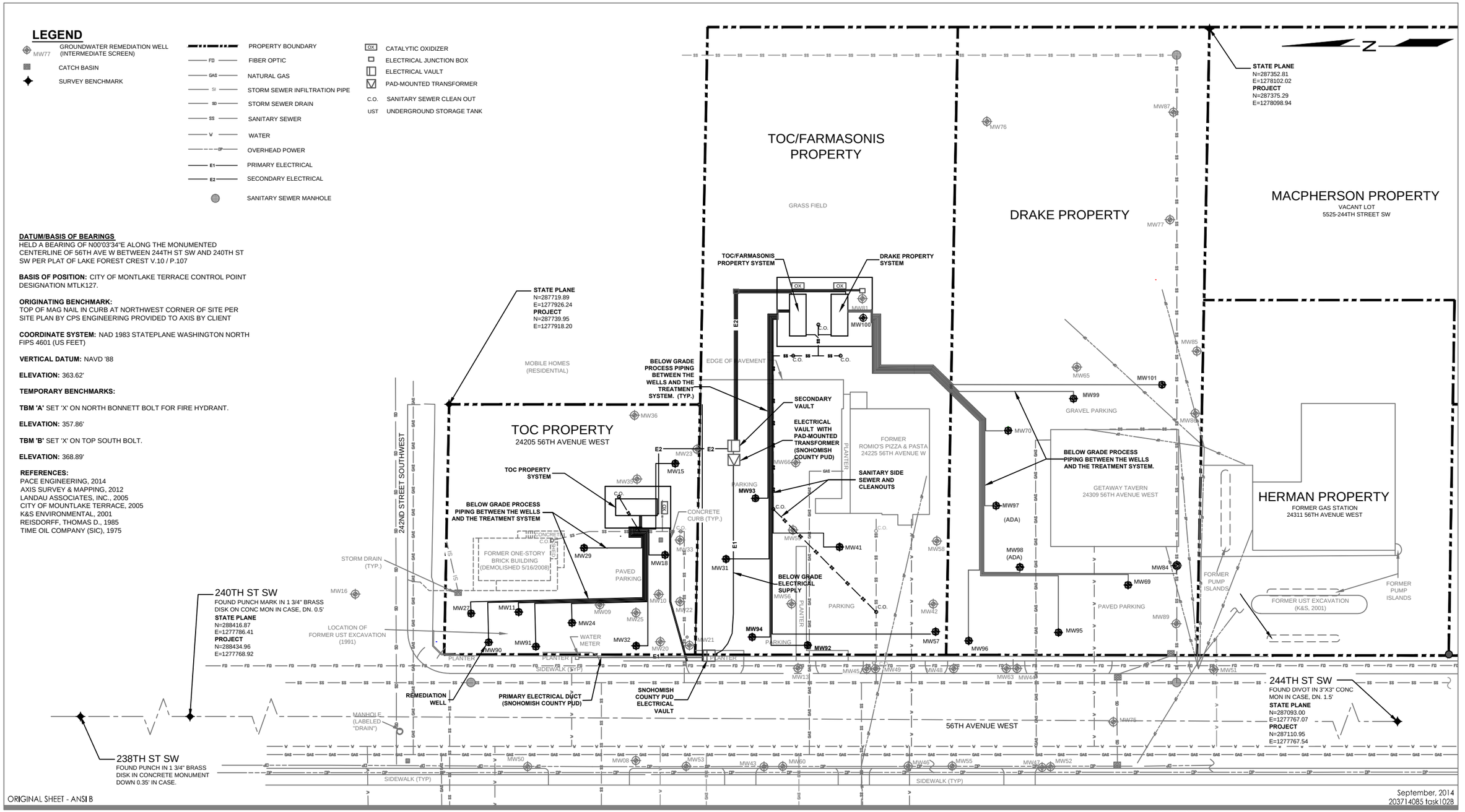
**ELEVATION:** 357.86'

**TBM 'B'** SET 'X' ON TOP SOUTH BOLT.

**ELEVATION:** 368.89'

**REFERENCES:**

PACE ENGINEERING, 2014
AXIS SURVEY & MAPPING, 2012
LANDAU ASSOCIATES, INC., 2005
CITY OF MOUNTLAKE TERRACE, 2005
K&S ENVIRONMENTAL, 2001
REISDORFF, THOMAS D., 1985
TIME OIL COMPANY (SIC), 1975


ORIGINAL SHEET - ANSI B

September, 2014
203714085 task102B

Z:\WA\TOC_Holdings_Co 203714085\Figure 3 Remediation Systems And Site Details Map.dwg
2014/10/16 10:07 AM By: Pixton, Connie


Stantec
10101 36th Ave. W, Ste. 203
Lynnwood, Washington 98036

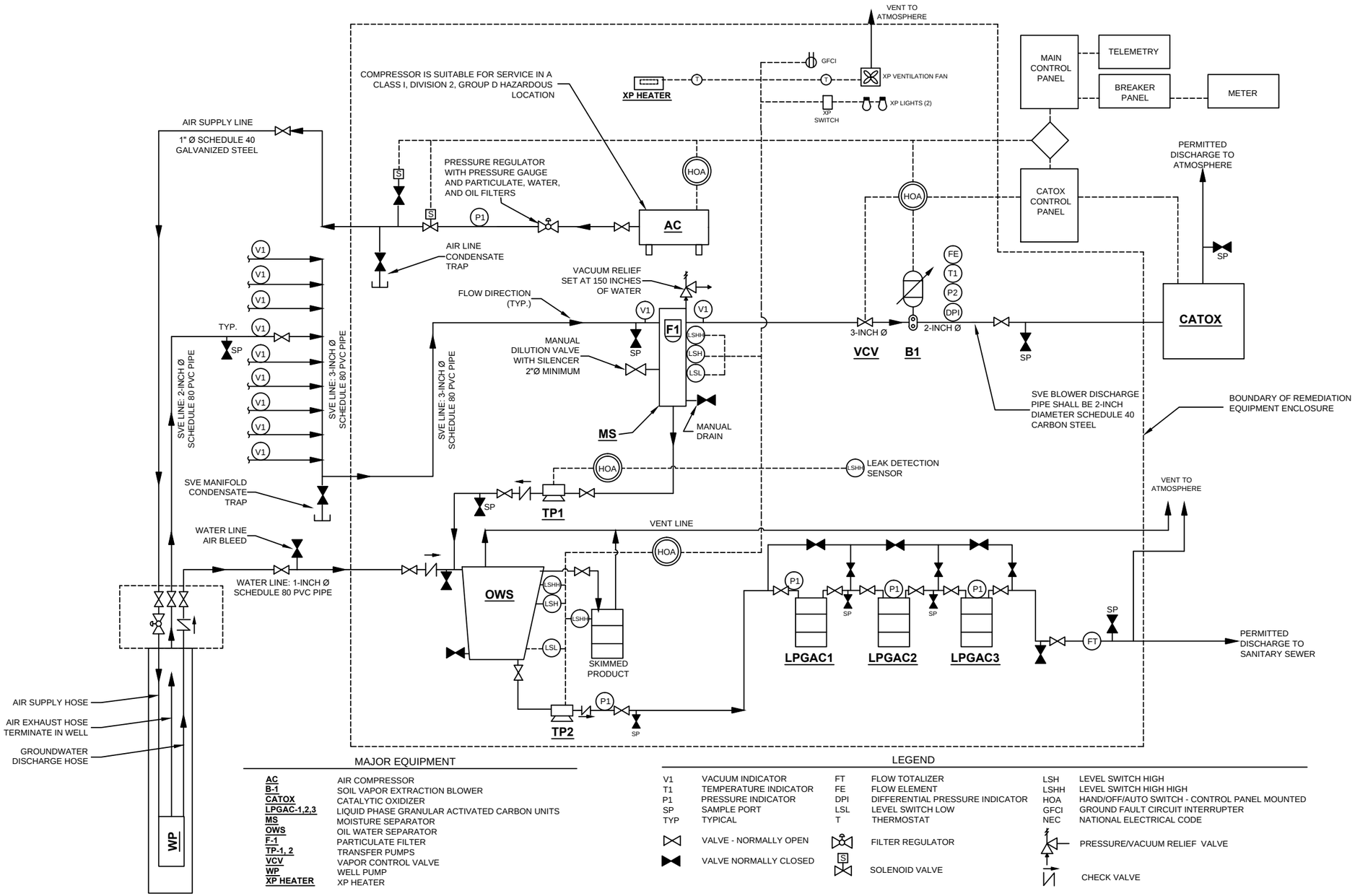

## Notes

**SOURCE:**
SOUNDEARTH STRATEGIES, 2013
(WWW.SOUNDEARTHINC.COM)
Date: 09/30/2013
Drawn By: BLR
Checked By: DHG/TSM
CadFile: 01-176_2012Q4_O&MI_FIG01

Client/Project
TOC HOLDINGS COMPANY
Facility 01-176
Mountlake Terrace, Washington

Figure No.
3

Title
Remediation Systems and Site Details Map




## MAJOR EQUIPMENT

| | |
|---|---|
| **AC** | AIR COMPRESSOR |
| **B-1** | SOIL VAPOR EXTRACTION BLOWER |
| **CATOX** | CATALYTIC OXIDIZER |
| **LPGAC-1,2,3** | LIQUID PHASE GRANULAR ACTIVATED CARBON UNITS |
| **MS** | MOISTURE SEPARATOR |
| **OWS** | OIL WATER SEPARATOR |
| **F-1** | PARTICULATE FILTER |
| **TP-1, 2** | TRANSFER PUMPS |
| **VCV** | VAPOR CONTROL VALVE |
| **WP** | WELL PUMP |
| **XP HEATER** | XP HEATER |

## LEGEND

| | | | | | |
|---|---|---|---|---|---|
| V1 | VACUUM INDICATOR | FT | FLOW TOTALIZER | LSH | LEVEL SWITCH HIGH |
| T1 | TEMPERATURE INDICATOR | FE | FLOW ELEMENT | LSHH | LEVEL SWITCH HIGH HIGH |
| P1 | PRESSURE INDICATOR | DPI | DIFFERENTIAL PRESSURE INDICATOR | HOA | HAND/OFF/AUTO SWITCH - CONTROL PANEL MOUNTED |
| SP | SAMPLE PORT | LSL | LEVEL SWITCH LOW | GFCI | GROUND FAULT CIRCUIT INTERRUPTER |
| TYP | TYPICAL | T | THERMOSTAT | NEC | NATIONAL ELECTRICAL CODE |
| | VALVE - NORMALLY OPEN | | FILTER REGULATOR | | PRESSURE/VACUUM RELIEF VALVE |
| | VALVE NORMALLY CLOSED | S | SOLENOID VALVE | | CHECK VALVE |

September, 2014
203714085 task102B

Z:\WA\TOC_Holdings_Co 203714085\Figure 4 Piping And Instrumentation Diagram.dwg
2014/10/16 10:11 AM By: Pixton, Connie

Stantec
10101 36th Ave. W, Ste. 203
Lynnwood, Washington 98036

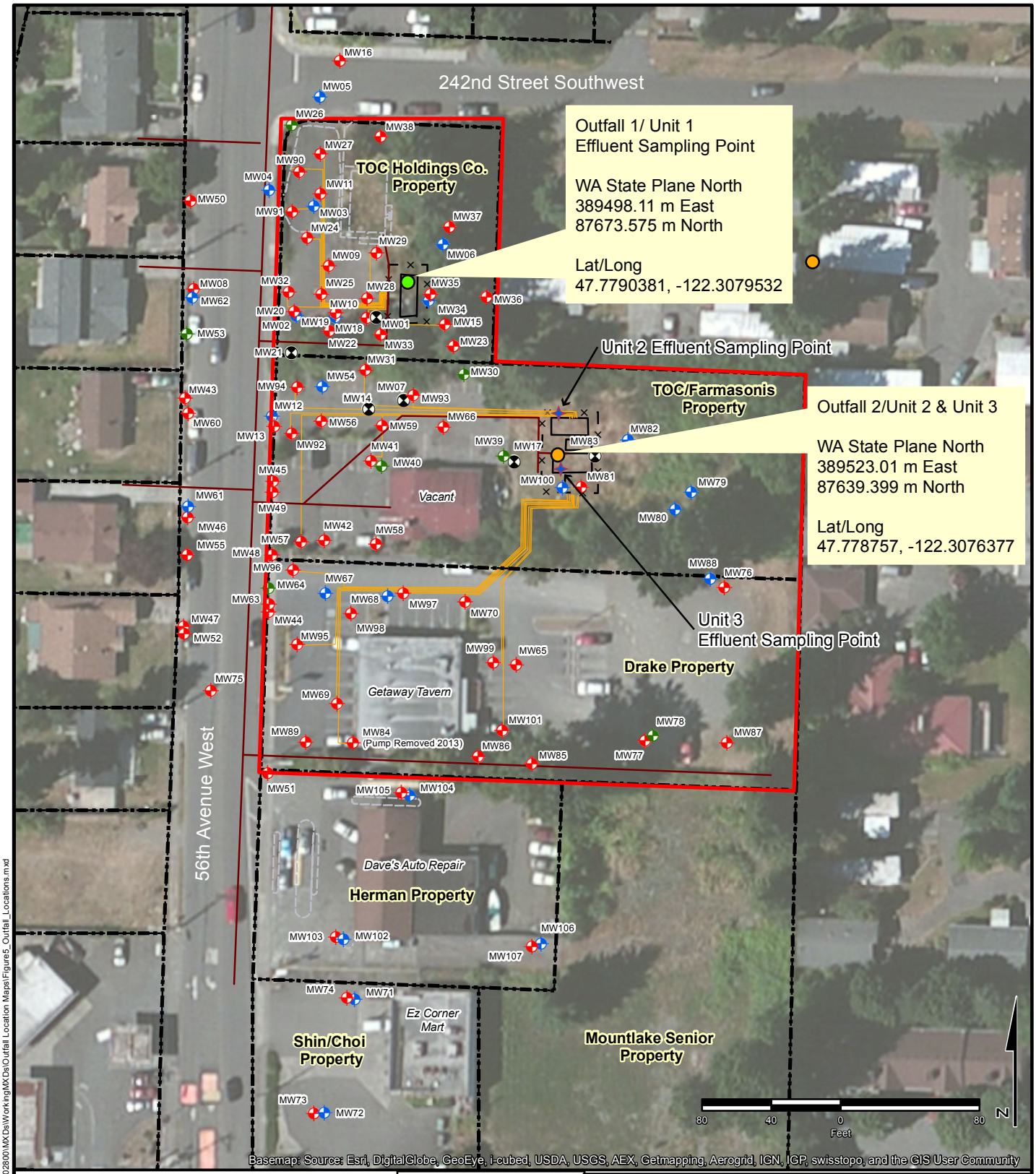
## Notes

**SOURCE:**
SOUNDEARTH STRATEGIES, 2013
(WWW.SOUNDEARTHINC.COM)
Date: 12/03/2012
Drawn By: EAM/BLR
Checked By: MES/TSM
CadFile: 01-176_2013Q3_PID

Client/Project
TOC HOLDINGS COMPANY
Facility 01-176
Mountlake Terrace, Washington

Figure No.
4

Title
Piping and Instrumentation Diagram




## Legend

- Project Boundary
- Discharge Permit Outfall Locations
- Corrected Outfall Location
- Effluent Sampling Point
- Abandoned Well
- Deep Well
- Intermediate Well
- Shallow Well
- Sewer Line


TOC Holdings Co. Facility 01-176
24205 56th Avenue West
Mountlake Terrace, Washington

FIGURE 5: STATE WASTE DISCHARGE PERMIT ST0007384-
OUTFALL SAMPLING LOCATIONS

Stantec

| | | | |
|---|---|---|---|
| DRAWN BY | D.H. | DATE DRAWN | 10/14/2014 |
| SCALE | 1 in = 80 feet | | |
| PROJECT | 203714085 | | |

X:\WA\Clients\Time_OIN\TOC-MountlakeTerrace_BA1402800\MXDs\WorkingMXDs\Outfall Location Maps\Figure5_Outfall_Locations.mxd

# Appendix A

## Laboratory Analytical Reports – Vapor

# Unit 1: TOC Property (24205)

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

James E. Bruya, Ph.D.
Yelena Aravkina, M.S.
Michael Erdahl, B.S.
Kurt Johnson, B.S.
Eric Young, B.S.

3012 16th Avenue West
Seattle, WA 98119-2029
(206) 285-8282
fbi@isomedia.com
www.friedmanandbruya.com

April 23, 2014

Rebekah Brooks, Project Manager
JBR Environmental Consultants
19101 36th Ave W, Suite 203
Lynnwood, WA 98036

Dear Ms. Brooks:

Included are the results from the testing of material submitted on April 18, 2014 from the TOC_01-176_MLT, WORFDB8 F&BI 404372 project. There are 4 pages included in this report. Any samples that may remain are currently scheduled for disposal in 30 days. If you would like us to return your samples or arrange for long term storage at our offices, please contact us as soon as possible.

We appreciate this opportunity to be of service to you and hope you will call if you should have any questions.

Sincerely,

FRIEDMAN & BRUYA, INC.

Michael Erdahl
Project Manager

Enclosures
c: Kim Vik
JBR0423R.DOC

## CASE NARRATIVE

This case narrative encompasses samples received on April 18, 2014 by Friedman & Bruya, Inc. from the JBR Environmental Consultants TOC_01-176_MLT, WORFDB8 F&BI 404372 project. Samples were logged in under the laboratory ID's listed below.

| Laboratory ID | JBR Environmental Consultants |
|---|---|
| 404372-01 | 1VINF |
| 404372-02 | 1VEFF |

All quality control requirements were acceptable.

Date of Report: 04/23/14
Date Received: 04/18/14
Project: TOC_01-176_MLT, WORFDB8 F&BI 404372
Date Extracted: 04/21/14
Date Analyzed: 04/21/14

**RESULTS FROM THE ANALYSIS OF VAPOR SAMPLES FOR BENZENE, TOLUENE, ETHYLBENZENE, XYLENES AND TPH AS GASOLINE USING MODIFIED METHODS 8021B AND NWTPH-Gx**

Results Reported as $mg/m^3$

| Sample ID<br>Laboratory ID | Benzene | Toluene | Ethyl Benzene | Total Xylenes | Gasoline Range | Surrogate (% Recovery)<br>(Limit 50-150) |
|---|---|---|---|---|---|---|
| 1VINF<br>404372-01 | <0.1 | <0.1 | <0.1 | <0.3 | <10 | 84 |
| 1VEFF<br>404372-02 | <0.1 | <0.1 | <0.1 | <0.3 | <10 | 87 |
| Method Blank<br>04-0763 MB | <0.1 | <0.1 | <0.1 | <0.3 | <10 | 87 |

Date of Report: 04/23/14
Date Received: 04/18/14
Project: TOC_01-176_MLT, WORFDB8 F&BI 404372

## QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF VAPOR SAMPLES FOR BENZENE, TOLUENE, ETHYLBENZENE, XYLENES, AND TPH AS GASOLINE USING MODIFIED EPA METHOD 8021B AND NWTPH-Gx

Laboratory Code: 404372-02 (Duplicate)

| Analyte | Reporting Units | Sample Result | Duplicate Result | RPD (Limit 20) |
|---|---|---|---|---|
| Benzene | mg/m$^3$ | <0.1 | <0.1 | nm |
| Toluene | mg/m$^3$ | <0.1 | <0.1 | nm |
| Ethylbenzene | mg/m$^3$ | <0.1 | <0.1 | nm |
| Xylenes | mg/m$^3$ | <0.3 | <0.3 | nm |
| Gasoline | mg/m$^3$ | <10 | <10 | nm |

Laboratory Code: Laboratory Control Sample

| Analyte | Reporting Units | Spike Level | Percent Recovery LCS | Acceptance Criteria |
|---|---|---|---|---|
| Benzene | mg/m$^3$ | 5.0 | 83 | 70-130 |
| Toluene | mg/m$^3$ | 5.0 | 83 | 70-130 |
| Ethylbenzene | mg/m$^3$ | 5.0 | 86 | 70-130 |
| Xylenes | mg/m$^3$ | 15 | 86 | 70-130 |
| Gasoline | mg/m$^3$ | 100 | 110 | 70-130 |

# Data Qualifiers & Definitions

a - The analyte was detected at a level less than five times the reporting limit. The RPD results may not provide reliable information on the variability of the analysis.

A1 – More than one compound of similar molecule structure was identified with equal probability.

b - The analyte was spiked at a level that was less than five times that present in the sample. Matrix spike recoveries may not be meaningful.

ca - The calibration results for this range fell outside of acceptance criteria. The value reported is an estimate.

c - The presence of the analyte indicated may be due to carryover from previous sample injections.

d - The sample was diluted. Detection limits may be raised due to dilution.

ds - The sample was diluted. Detection limits are raised due to dilution and surrogate recoveries may not be meaningful.

dv - Insufficient sample was available to achieve normal reporting limits and limits are raised accordingly.

fb - Analyte present in the blank and the sample.

fc – The compound is a common laboratory and field contaminant.

hr - The sample and duplicate were reextracted and reanalyzed. RPD results were still outside of control limits. The variability is attributed to sample inhomogeneity.

ht - Analysis performed outside the method or client-specified holding time requirement.

ip - Recovery fell outside of normal control limits. Compounds in the sample matrix interfered with the quantitation of the analyte.

j – The result is below normal reporting limits. The value reported is an estimate.

J - The internal standard associated with the analyte is out of control limits. The reported concentration is an estimate.

jl - The analyte result in the laboratory control sample is out of control limits. The reported concentration should be considered an estimate.

jr - The rpd result in laboratory control sample associated with the analyte is out of control limits. The reported concentration should be considered an estimate.

js - The surrogate associated with the analyte is out of control limits. The reported concentration should be considered an estimate.

lc - The presence of the compound indicated is likely due to laboratory contamination.

L - The reported concentration was generated from a library search.

nm - The analyte was not detected in one or more of the duplicate analyses. Therefore, calculation of the RPD is not applicable.

pc – The sample was received in a container not approved by the method. The value reported should be considered an estimate.

pr – The sample was received with incorrect preservation. The value reported should be considered an estimate.

ve - Estimated concentration calculated for an analyte response above the valid instrument calibration range. A dilution is required to obtain an accurate quantification of the analyte.

vo - The value reported fell outside the control limits established for this analyte.

x - The sample chromatographic pattern does not resemble the fuel standard used for quantitation.

404372

# SAMPLE CHAIN OF CUSTODY

ME 04-18-14

Send Report To Rebekah Brooks
Company JBR Environmental Con.
Address 19101 36th Ave. West, Ste 203
City, State, ZIP Lynnwood, Wa, 98036
Phone # 425-977-4994 Fax # 425-449-4097

SAMPLERS (signature) Dana Hutchins
PROJECT NAME/NO. TOC-MLT
PO# B.A1408S.00
REMARKS



TURNAROUND TIME
☑ Standard (2 Weeks)
☐ RUSH
Rush charges authorized by

SAMPLE DISPOSAL
☒ Dispose after 30 days
☐ Return samples
☐ Will call with instructions

| Sample ID | Lab ID | Date Sampled | Time Sampled | Sample Type | # of containers | ANALYSES REQUESTED: TPH-Diesel | TPH-Gasoline | BTEX by 8021B | VOCs by8260 | SVOCs by 8270 | HFS | | | | | | | Notes |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| IVINF | 01A-B | 4-18-14 | 0945 | Air | 2 | | X | X | | | | | | | | | | |
| IVEFF | 02T | 4-18-14 | 0950 | Air | 2 | | X | X | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | Samples received at 20° | |
| | | | | | | | | | | | | | | | | | | |

| SIGNATURE | PRINT NAME | COMPANY | DATE | TIME |
|---|---|---|---|---|
| Relinquished by: Dana Hutchins | Dana Hutchins | JBR | 4-18-14 | 1400 |
| Received by: Dana | Dana | F&BI | 11 | 16.00 |
| Relinquished by: | | | | |
| Received by: | | | | |

*Friedman & Bruya, Inc.*
*3012 16th Avenue West*
*Seattle, WA 98119-2029*
*Ph. (206) 285-8282*
*Fax (206) 283-5044*

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

James E. Bruya, Ph.D.
Yelena Aravkina, M.S.
Michael Erdahl, B.S.
Kurt Johnson, B.S.
Eric Young, B.S.

3012 16th Avenue West
Seattle, WA 98119-2029
(206) 285-8282
fbi@isomedia.com
www.friedmanandbruya.com

May 27, 2014

Rebekah Brooks, Project Manager
JBR Environmental Consultants
19101 36th Ave W, Suite 203
Lynnwood, WA 98036

Dear Ms. Brooks:

Included are the results from the testing of material submitted on May 20, 2014 from the TOC_01-176, WORFDB8 F&BI 405381 project. There are 4 pages included in this report. Any samples that may remain are currently scheduled for disposal in 30 days. If you would like us to return your samples or arrange for long term storage at our offices, please contact us as soon as possible.

We appreciate this opportunity to be of service to you and hope you will call if you should have any questions.

Sincerely,

FRIEDMAN & BRUYA, INC.

Michael Erdahl
Project Manager

Enclosures
c: Kim Vik
JBR0527R.DOC

## CASE NARRATIVE

This case narrative encompasses samples received on May 20, 2014 by Friedman & Bruya, Inc. from the JBR Environmental Consultants TOC_01-176, WORFDB8 F&BI 405381 project. Samples were logged in under the laboratory ID's listed below.

| Laboratory ID | JBR Environmental Consultants |
|---|---|
| 405381-01 | 1VINF |
| 405381-02 | 1VEFF |

All quality control requirements were acceptable.

Date of Report: 05/27/14
Date Received: 05/20/14
Project: TOC_01-176, WORFDB8 F&BI 405381
Date Extracted: 05/22/14
Date Analyzed: 05/22/14

**RESULTS FROM THE ANALYSIS OF VAPOR SAMPLES FOR BENZENE, TOLUENE, ETHYLBENZENE, XYLENES AND TPH AS GASOLINE USING MODIFIED METHODS 8021B AND NWTPH-Gx**

Results Reported as $mg/m^3$

| Sample ID<br>Laboratory ID | Benzene | Toluene | Ethyl Benzene | Total Xylenes | Gasoline Range | Surrogate (% Recovery)<br>(Limit 50-150) |
|---|---|---|---|---|---|---|
| 1VINF<br>405381-01 | <0.1 | <0.1 | <0.1 | <0.3 | <10 | 84 |
| 1VEFF<br>405381-02 | <0.1 | <0.1 | <0.1 | <0.3 | <10 | 83 |
| Method Blank<br>04-1019 MB | <0.1 | <0.1 | <0.1 | <0.3 | <10 | 82 |

Date of Report: 05/27/14
Date Received: 05/20/14
Project: TOC_01-176, WORFDB8 F&BI 405381

## QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF VAPOR SAMPLES FOR BENZENE, TOLUENE, ETHYLBENZENE, XYLENES, AND TPH AS GASOLINE USING MODIFIED EPA METHOD 8021B AND NWTPH-Gx

Laboratory Code: 405381-02 (Duplicate)

| Analyte | Reporting Units | Sample Result | Duplicate Result | RPD (Limit 20) |
|---|---|---|---|---|
| Benzene | mg/m$^3$ | <0.1 | <0.1 | nm |
| Toluene | mg/m$^3$ | <0.1 | <0.1 | nm |
| Ethylbenzene | mg/m$^3$ | <0.1 | <0.1 | nm |
| Xylenes | mg/m$^3$ | <0.3 | <0.3 | nm |
| Gasoline | mg/m$^3$ | <10 | <10 | nm |

Laboratory Code: Laboratory Control Sample

| Analyte | Reporting Units | Spike Level | Percent Recovery LCS | Acceptance Criteria |
|---|---|---|---|---|
| Benzene | mg/m$^3$ | 5.0 | 84 | 70-130 |
| Toluene | mg/m$^3$ | 5.0 | 85 | 70-130 |
| Ethylbenzene | mg/m$^3$ | 5.0 | 83 | 70-130 |
| Xylenes | mg/m$^3$ | 15 | 87 | 70-130 |
| Gasoline | mg/m$^3$ | 100 | 103 | 70-130 |

# Data Qualifiers & Definitions

a - The analyte was detected at a level less than five times the reporting limit. The RPD results may not provide reliable information on the variability of the analysis.

b - The analyte was spiked at a level that was less than five times that present in the sample. Matrix spike recoveries may not be meaningful.

ca - The calibration results for the analyte were outside of acceptance criteria. The value reported is an estimate.

c - The presence of the analyte may be due to carryover from previous sample injections.

cf - The sample was centrifuged prior to analysis.

d - The sample was diluted. Detection limits were raised and surrogate recoveries may not be meaningful.

dv - Insufficient sample volume was available to achieve normal reporting limits.

f - The sample was laboratory filtered prior to analysis.

fb - The analyte was detected in the method blank.

fc - The compound is a common laboratory and field contaminant.

hr - The sample and duplicate were reextracted and reanalyzed. RPD results were still outside of control limits. Variability is attributed to sample inhomogeneity.

hs - Headspace was present in the container used for analysis.

ht – The analysis was performed outside the method or client-specified holding time requirement.

ip - Recovery fell outside of control limits. Compounds in the sample matrix interfered with the quantitation of the analyte.

j - The analyte concentration is reported below the lowest calibration standard. The value reported is an estimate.

J - The internal standard associated with the analyte is out of control limits. The reported concentration is an estimate.

jl - The laboratory control sample(s) percent recovery and/or RPD were out of control limits. The reported concentration should be considered an estimate.

js - The surrogate associated with the analyte is out of control limits. The reported concentration should be considered an estimate.

lc - The presence of the analyte is likely due to laboratory contamination.

L - The reported concentration was generated from a library search.

nm - The analyte was not detected in one or more of the duplicate analyses. Therefore, calculation of the RPD is not applicable.

pc - The sample was received with incorrect preservation or in a container not approved by the method. The value reported should be considered an estimate.

ve - The analyte response exceeded the valid instrument calibration range. The value reported is an estimate.

vo - The value reported fell outside the control limits established for this analyte.

x - The sample chromatographic pattern does not resemble the fuel standard used for quantitation.

405381

# SAMPLE CHAIN OF CUSTODY

ME 05-20-14

Send Report To Rebekah Brooks
Company JBR/Stantec
Address 19101 36th Ave West, Suite 203
City, State, ZIP Lynnwood WA 98036
Phone # 425-977-4994 Fax # 425-499-4097

SAMPLERS (signature) A Vadon

PROJECT NAME/NO. TOC-MLT

PO # B.A14085.00

REMARKS

Page # _____ of _____

TURNAROUND TIME
☒ Standard (2 Weeks)
☐ RUSH _____
Rush charges authorized by: _____

SAMPLE DISPOSAL
☒ Dispose after 30 days
☐ Return samples
☐ Will call with instructions

| Sample ID | Lab ID | Date Sampled | Time Sampled | Sample Type | # of containers | TPH-Diesel | TPH-Gasoline | BTEX by 8021B | VOCs by 8260 | SVOCs by 8270 | HFS | | | | | | Notes |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | ANALYSES REQUESTED | | | | | | | | | | | |
| 1V INF | 01A-B | 5-19-14 | 1230 | Air | 2 | | X | X | | | | | | | | | |
| 1V EFF | 02T | 5.19.14 | 1240 | Air | 2 | | X | X | | | | | | | | | |
| | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | |

| SIGNATURE | PRINT NAME | COMPANY | DATE | TIME |
|---|---|---|---|---|
| Relinquished by: A Vadon | Antonela Vadon | JBR/Stantec | 5-2014 | 1230 |
| Received by: Demo | DO UO | F&BI | 11 | 15:45 |
| Relinquished by: | | | | |
| Received by: | | Samples received at 23 °C | | |

*Friedman & Bruya, Inc.*
*3012 16th Avenue West*
*Seattle, WA 98119-2029*
*Ph. (206) 285-8282*
*Fax (206) 283-5044*

FORMS\COC\COC.DOC

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

James E. Bruya, Ph.D.
Yelena Aravkina, M.S.
Michael Erdahl, B.S.
Kurt Johnson, B.S.
Eric Young, B.S.

3012 16th Avenue West
Seattle, WA 98119-2029
(206) 285-8282
fbi@isomedia.com
www.friedmanandbruya.com

June 24, 2014

Rebekah Brooks, Project Manager
Stantec
19101 36th Ave W, Suite 203
Lynnwood, WA 98036

Dear Ms. Brooks:

Included are the results from the testing of material submitted on June 19, 2014 from the TOC_01-176, WORFDB8 F&BI 406343 project. There are 4 pages included in this report. Any samples that may remain are currently scheduled for disposal in 30 days. If you would like us to return your samples or arrange for long term storage at our offices, please contact us as soon as possible.

We appreciate this opportunity to be of service to you and hope you will call if you should have any questions.

Sincerely,

FRIEDMAN & BRUYA, INC.

Michael Erdahl
Project Manager

Enclosures
c: Kim Vik
STN0624R.DOC

CASE NARRATIVE

This case narrative encompasses samples received on June 19, 2014 by Friedman & Bruya, Inc. from the Stantec TOC_01-176, WORFDB8 F&BI 406343 project. Samples were logged in under the laboratory ID's listed below.

| Laboratory ID | Stantec |
|---|---|
| 406343 -01 | 1VINF |
| 406343 -02 | 1VEFF |

All quality control requirements were acceptable.

Date of Report: 06/24/14
Date Received: 06/19/14
Project: TOC_01-176, WORFDB8 F&BI 406343
Date Extracted: 06/19/14
Date Analyzed: 06/19/14

**RESULTS FROM THE ANALYSIS OF VAPOR SAMPLES FOR BENZENE, TOLUENE, ETHYLBENZENE, XYLENES AND TPH AS GASOLINE USING MODIFIED METHODS 8021B AND NWTPH-Gx**

Results Reported as $mg/m^3$

| Sample ID<br>Laboratory ID | Benzene | Toluene | Ethyl Benzene | Total Xylenes | Gasoline Range | Surrogate (% Recovery)<br>(Limit 50-150) |
|---|---|---|---|---|---|---|
| 1VINF<br>406343-01 | <0.1 | <0.1 | <0.1 | <0.3 | <10 | 87 |
| 1VEFF<br>406343-02 | <0.1 | <0.1 | <0.1 | <0.3 | <10 | 86 |
| Method Blank<br>04-1224 MB | <0.1 | <0.1 | <0.1 | <0.3 | <10 | 93 |

Date of Report: 06/24/14
Date Received: 06/19/14
Project: TOC_01-176, WORFDB8 F&BI 406343

## QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF VAPOR SAMPLES FOR BENZENE, TOLUENE, ETHYLBENZENE, XYLENES, AND TPH AS GASOLINE USING MODIFIED EPA METHOD 8021B AND NWTPH-Gx

Laboratory Code: 406311-01 (Duplicate)

| Analyte | Reporting Units | Sample Result | Duplicate Result | RPD (Limit 20) |
|---|---|---|---|---|
| Benzene | mg/m$^3$ | <0.1 | <0.1 | nm |
| Toluene | mg/m$^3$ | 0.37 | 0.34 | 6 |
| Ethylbenzene | mg/m$^3$ | <0.1 | <0.1 | nm |
| Xylenes | mg/m$^3$ | 0.96 | 0.98 | 2 |
| Gasoline | mg/m$^3$ | 28 | 27 | 4 |

Laboratory Code: Laboratory Control Sample

| Analyte | Reporting Units | Spike Level | Percent Recovery LCS | Acceptance Criteria |
|---|---|---|---|---|
| Benzene | mg/m$^3$ | 5.0 | 85 | 70-130 |
| Toluene | mg/m$^3$ | 5.0 | 86 | 70-130 |
| Ethylbenzene | mg/m$^3$ | 5.0 | 87 | 70-130 |
| Xylenes | mg/m$^3$ | 15 | 88 | 70-130 |
| Gasoline | mg/m$^3$ | 100 | 108 | 70-130 |

# Data Qualifiers & Definitions

a - The analyte was detected at a level less than five times the reporting limit. The RPD results may not provide reliable information on the variability of the analysis.

b - The analyte was spiked at a level that was less than five times that present in the sample. Matrix spike recoveries may not be meaningful.

ca - The calibration results for the analyte were outside of acceptance criteria. The value reported is an estimate.

c - The presence of the analyte may be due to carryover from previous sample injections.

cf - The sample was centrifuged prior to analysis.

d - The sample was diluted. Detection limits were raised and surrogate recoveries may not be meaningful.

dv - Insufficient sample volume was available to achieve normal reporting limits.

f - The sample was laboratory filtered prior to analysis.

fb - The analyte was detected in the method blank.

fc - The compound is a common laboratory and field contaminant.

hr - The sample and duplicate were reextracted and reanalyzed. RPD results were still outside of control limits. Variability is attributed to sample inhomogeneity.

hs - Headspace was present in the container used for analysis.

ht – The analysis was performed outside the method or client-specified holding time requirement.

ip - Recovery fell outside of control limits. Compounds in the sample matrix interfered with the quantitation of the analyte.

j - The analyte concentration is reported below the lowest calibration standard. The value reported is an estimate.

J - The internal standard associated with the analyte is out of control limits. The reported concentration is an estimate.

jl - The laboratory control sample(s) percent recovery and/or RPD were out of control limits. The reported concentration should be considered an estimate.

js - The surrogate associated with the analyte is out of control limits. The reported concentration should be considered an estimate.

lc - The presence of the analyte is likely due to laboratory contamination.

L - The reported concentration was generated from a library search.

nm - The analyte was not detected in one or more of the duplicate analyses. Therefore, calculation of the RPD is not applicable.

pc - The sample was received with incorrect preservation or in a container not approved by the method. The value reported should be considered an estimate.

ve - The analyte response exceeded the valid instrument calibration range. The value reported is an estimate.

vo - The value reported fell outside the control limits established for this analyte.

x - The sample chromatographic pattern does not resemble the fuel standard used for quantitation.

406343

# SAMPLE CHAIN OF CUSTODY ME 06/19/14

Page # 1 of 1

Send Report To Rebekah Brooks
Company Stantec
Address 19101 36th Ave. W, Suite 203
City, State, ZIP Lynnwood, WA 98036
Phone # 425-977-4994 Fax # 425-449-4097

SAMPLERS (signature) AVadon
PROJECT NAME/NO. TOC-MLT
PO# 203714085
REMARKS

TURNAROUND TIME
☒ Standard (2 Weeks)
☐ RUSH
Rush charges authorized by

SAMPLE DISPOSAL
☒ Dispose after 30 days
☐ Return samples
☐ Will call with instructions

| Sample ID | Lab ID | Date Sampled | Time Sampled | Sample Type | # of containers | TPH-Diesel | TPH-Gasoline | BTEX by 8021B | VOCs by8260 | SVOCs by 8270 | HFS | | | | | | | Notes |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1VINF | 01 A B | 6.16.14 | 1000 | Air | 2 | | X | X | | | | | | | | | | |
| 1VEFF | 02 A B | 6.16.14 | 1010 | Air | 2 | | X | X | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | received at 24 °C |
| | | | | | | | | | | | | | | | | | | |

*Friedman & Bruya, Inc.*
*3012 16th Avenue West*
*Seattle, WA 98119-2029*
*Ph. (206) 285-8282*
*Fax (206) 283-5044*

FORMS\COC\COC.DOC

| | SIGNATURE | PRINT NAME | COMPANY | DATE | TIME |
|---|---|---|---|---|---|
| Relinquished by: | AVadon | Antonella Vadon | Stantec | 6-16-14 | |
| Received by: | | | | | |
| Relinquished by: | AVadon | Antonella Vadon | Stantec | 6.19.14 | 10 00 |
| Received by: | | Khan Phan | FedEx | 6-19-14 | 1215 |

# Unit 2: TOC/Farmasonis Property (24225)

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

James E. Bruya, Ph.D.
Yelena Aravkina, M.S.
Michael Erdahl, B.S.
Kurt Johnson, B.S.
Eric Young, B.S.

3012 16th Avenue West
Seattle, WA 98119-2029
(206) 285-8282
fbi@isomedia.com
www.friedmanandbruya.com

April 23, 2014

Rebekah Brooks, Project Manager
JBR Environmental Consultants
19101 36th Ave W, Suite 203
Lynnwood, WA 98036

Dear Ms. Brooks:

Included are the results from the testing of material submitted on April 18, 2014 from the TOC_01-176_MLT, WORFDB8 F&BI 404371 project. There are 4 pages included in this report. Any samples that may remain are currently scheduled for disposal in 30 days. If you would like us to return your samples or arrange for long term storage at our offices, please contact us as soon as possible.

We appreciate this opportunity to be of service to you and hope you will call if you should have any questions.

Sincerely,

FRIEDMAN & BRUYA, INC.

Michael Erdahl
Project Manager

Enclosures
c: Kim Vik
JBR0423R.DOC

## CASE NARRATIVE

This case narrative encompasses samples received on April 18, 2014 by Friedman & Bruya, Inc. from the JBR Environmental Consultants TOC_01-176_MLT, WORFDB8 F&BI 404371 project. Samples were logged in under the laboratory ID's listed below.

| Laboratory ID | JBR Environmental Consultants |
|---|---|
| 404371-01 | 2VINF |
| 404371-02 | 2VEFF |

All quality control requirements were acceptable.

Date of Report: 04/23/14
Date Received: 04/18/14
Project: TOC_01-176_MLT, WORFDB8 F&BI 404371
Date Extracted: 04/18/14
Date Analyzed: 04/18/14

**RESULTS FROM THE ANALYSIS OF VAPOR SAMPLES FOR BENZENE, TOLUENE, ETHYLBENZENE, XYLENES AND TPH AS GASOLINE USING MODIFIED METHODS 8021B AND NWTPH-Gx**

Results Reported as $mg/m^3$

| Sample ID<br>Laboratory ID | Benzene | Toluene | Ethyl Benzene | Total Xylenes | Gasoline Range | Surrogate (% Recovery)<br>(Limit 50-150) |
|---|---|---|---|---|---|---|
| 2VINF<br>404371-01 | <0.1 | <0.1 | <0.1 | <0.3 | <10 | 77 |
| 2VEFF<br>404371-02 | <0.1 | <0.1 | <0.1 | <0.3 | <10 | 77 |
| Method Blank<br>04-0705 MB | <0.1 | <0.1 | <0.1 | <0.3 | <10 | 87 |

Date of Report: 04/23/14
Date Received: 04/18/14
Project: TOC_01-176_MLT, WORFDB8 F&BI 404371

## QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF VAPOR SAMPLES FOR BENZENE, TOLUENE, ETHYLBENZENE, XYLENES, AND TPH AS GASOLINE USING MODIFIED EPA METHOD 8021B AND NWTPH-Gx

Laboratory Code: 404296-01 (Duplicate)

| Analyte | Reporting Units | Sample Result | Duplicate Result | RPD (Limit 20) |
|---|---|---|---|---|
| Benzene | mg/m$^3$ | <0.1 | <0.1 | nm |
| Toluene | mg/m$^3$ | <0.1 | <0.1 | nm |
| Ethylbenzene | mg/m$^3$ | <0.1 | <0.1 | nm |
| Xylenes | mg/m$^3$ | <0.3 | <0.3 | nm |
| Gasoline | mg/m$^3$ | <10 | <10 | nm |

Laboratory Code: Laboratory Control Sample

| Analyte | Reporting Units | Spike Level | Percent Recovery LCS | Acceptance Criteria |
|---|---|---|---|---|
| Benzene | mg/m$^3$ | 5.0 | 82 | 70-130 |
| Toluene | mg/m$^3$ | 5.0 | 84 | 70-130 |
| Ethylbenzene | mg/m$^3$ | 5.0 | 88 | 70-130 |
| Xylenes | mg/m$^3$ | 15 | 88 | 70-130 |
| Gasoline | mg/m$^3$ | 100 | 108 | 70-130 |

# Data Qualifiers & Definitions

a - The analyte was detected at a level less than five times the reporting limit. The RPD results may not provide reliable information on the variability of the analysis.

A1 – More than one compound of similar molecule structure was identified with equal probability.

b - The analyte was spiked at a level that was less than five times that present in the sample. Matrix spike recoveries may not be meaningful.

ca - The calibration results for this range fell outside of acceptance criteria. The value reported is an estimate.

c - The presence of the analyte indicated may be due to carryover from previous sample injections.

d - The sample was diluted. Detection limits may be raised due to dilution.

ds - The sample was diluted. Detection limits are raised due to dilution and surrogate recoveries may not be meaningful.

dv - Insufficient sample was available to achieve normal reporting limits and limits are raised accordingly.

fb - Analyte present in the blank and the sample.

fc – The compound is a common laboratory and field contaminant.

hr - The sample and duplicate were reextracted and reanalyzed. RPD results were still outside of control limits. The variability is attributed to sample inhomogeneity.

ht - Analysis performed outside the method or client-specified holding time requirement.

ip - Recovery fell outside of normal control limits. Compounds in the sample matrix interfered with the quantitation of the analyte.

j – The result is below normal reporting limits. The value reported is an estimate.

J - The internal standard associated with the analyte is out of control limits. The reported concentration is an estimate.

jl - The analyte result in the laboratory control sample is out of control limits. The reported concentration should be considered an estimate.

jr - The rpd result in laboratory control sample associated with the analyte is out of control limits. The reported concentration should be considered an estimate.

js - The surrogate associated with the analyte is out of control limits. The reported concentration should be considered an estimate.

lc - The presence of the compound indicated is likely due to laboratory contamination.

L - The reported concentration was generated from a library search.

nm - The analyte was not detected in one or more of the duplicate analyses. Therefore, calculation of the RPD is not applicable.

pc – The sample was received in a container not approved by the method. The value reported should be considered an estimate.

pr – The sample was received with incorrect preservation. The value reported should be considered an estimate.

ve - Estimated concentration calculated for an analyte response above the valid instrument calibration range. A dilution is required to obtain an accurate quantification of the analyte.

vo - The value reported fell outside the control limits established for this analyte.

x - The sample chromatographic pattern does not resemble the fuel standard used for quantitation.

404371

# SAMPLE CHAIN OF CUSTODY

ME 04-18-14

Page # 1 of 1

Send Report To Rebekah Brooks
Company JBR Environmental Con.
Address 19101 36th Ave, West, Ste 203
City, State, ZIP Lynnwood, Wa, 98036
Phone # 425-977-4994 Fax # 425-449-4097

SAMPLERS (signature) Dana Hutchins

PROJECT NAME/NO. TOC-MLT

PO# B.A140B5.00

REMARKS

TURNAROUND TIME
- [x] Standard (2 Weeks)
- [ ] RUSH
- Rush charges authorized by

SAMPLE DISPOSAL
- [x] Dispose after 30 days
- [ ] Return samples
- [ ] Will call with instructions

| Sample ID | Lab ID | Date Sampled | Time Sampled | Sample Type | # of containers | ANALYSES REQUESTED: TPH-Diesel | TPH-Gasoline | BTEX by 8021B | VOCs by8260 | SVOCs by 8270 | HFS | | | | | | | Notes |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 2VINF | 01A-B | 4-17-14 | 1445 | Air | 2 | | X | X | | | | | | | | | | |
| 2VEFF | 02T | 4-17-14 | 1450 | Air | 2 | | X | X | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | |

Samples received at 20 °C

*Friedman & Bruya, Inc.*
*3012 16th Avenue West*
*Seattle, WA 98119-2029*
*Ph. (206) 285-8282*
*Fax (206) 283-5044*

FORMS\COC\COC.DOC

| | SIGNATURE | PRINT NAME | COMPANY | DATE | TIME |
|---|---|---|---|---|---|
| Relinquished by: | Dana Hutchins | Dana Hutchins | JBR | 4-18-14 | 1400 |
| Received by: | | | | | |
| Relinquished by: | | | | | |
| Received by: | | | | | |

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

James E. Bruya, Ph.D.
Yelena Aravkina, M.S.
Michael Erdahl, B.S.
Kurt Johnson, B.S.
Eric Young, B.S.

3012 16th Avenue West
Seattle, WA 98119-2029
(206) 285-8282
fbi@isomedia.com
www.friedmanandbruya.com

May 27, 2014

Rebekah Brooks, Project Manager
JBR Environmental Consultants
19101 36th Ave W, Suite 203
Lynnwood, WA 98036

Dear Ms. Brooks:

Included are the results from the testing of material submitted on May 20, 2014 from the TOC 01-176, WORFDB8 F&BI 405382 project. There are 4 pages included in this report. Any samples that may remain are currently scheduled for disposal in 30 days. If you would like us to return your samples or arrange for long term storage at our offices, please contact us as soon as possible.

We appreciate this opportunity to be of service to you and hope you will call if you should have any questions.

Sincerely,

FRIEDMAN & BRUYA, INC.

Michael Erdahl
Project Manager

Enclosures
c: Kim Vik
JBR0527R.DOC

## CASE NARRATIVE

This case narrative encompasses samples received on May 20, 2014 by Friedman & Bruya, Inc. from the JBR Environmental Consultants TOC 01-176, WORFDB8 F&BI 405382 project. Samples were logged in under the laboratory ID's listed below.

| Laboratory ID | JBR Environmental Consultants |
|---|---|
| 405382-01 | 2VINF |
| 405382-02 | 2VEFF |

All quality control requirements were acceptable.

Date of Report: 05/27/14
Date Received: 05/20/14
Project: TOC 01-176, WORFDB8 F&BI 405382
Date Extracted: 05/22/14
Date Analyzed: 05/22/14

**RESULTS FROM THE ANALYSIS OF VAPOR SAMPLES FOR BENZENE, TOLUENE, ETHYLBENZENE, XYLENES AND TPH AS GASOLINE USING MODIFIED METHODS 8021B AND NWTPH-Gx**

Results Reported as $mg/m^3$

| Sample ID<br>Laboratory ID | Benzene | Toluene | Ethyl Benzene | Total Xylenes | Gasoline Range | Surrogate (% Recovery)<br>(Limit 50-150) |
|---|---|---|---|---|---|---|
| 2VINF<br>405382-01 | <0.1 | <0.1 | <0.1 | <0.3 | <10 | 87 |
| 2VEFF<br>405382-02 | <0.1 | <0.1 | <0.1 | <0.3 | <10 | 85 |
| Method Blank<br>04-1019 MB | <0.1 | <0.1 | <0.1 | <0.3 | <10 | 82 |

Date of Report: 05/27/14
Date Received: 05/20/14
Project: TOC 01-176, WORFDB8 F&BI 405382

## QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF VAPOR SAMPLES FOR BENZENE, TOLUENE, ETHYLBENZENE, XYLENES, AND TPH AS GASOLINE USING MODIFIED EPA METHOD 8021B AND NWTPH-Gx

Laboratory Code: 405381-02 (Duplicate)

| Analyte | Reporting Units | Sample Result | Duplicate Result | RPD (Limit 20) |
|---|---|---|---|---|
| Benzene | mg/m$^3$ | <0.1 | <0.1 | nm |
| Toluene | mg/m$^3$ | <0.1 | <0.1 | nm |
| Ethylbenzene | mg/m$^3$ | <0.1 | <0.1 | nm |
| Xylenes | mg/m$^3$ | <0.3 | <0.3 | nm |
| Gasoline | mg/m$^3$ | <10 | <10 | nm |

Laboratory Code: Laboratory Control Sample

| Analyte | Reporting Units | Spike Level | Percent Recovery LCS | Acceptance Criteria |
|---|---|---|---|---|
| Benzene | mg/m$^3$ | 5.0 | 84 | 70-130 |
| Toluene | mg/m$^3$ | 5.0 | 85 | 70-130 |
| Ethylbenzene | mg/m$^3$ | 5.0 | 83 | 70-130 |
| Xylenes | mg/m$^3$ | 15 | 87 | 70-130 |
| Gasoline | mg/m$^3$ | 100 | 103 | 70-130 |

# Data Qualifiers & Definitions

a - The analyte was detected at a level less than five times the reporting limit. The RPD results may not provide reliable information on the variability of the analysis.

b - The analyte was spiked at a level that was less than five times that present in the sample. Matrix spike recoveries may not be meaningful.

ca - The calibration results for the analyte were outside of acceptance criteria. The value reported is an estimate.

c - The presence of the analyte may be due to carryover from previous sample injections.

cf - The sample was centrifuged prior to analysis.

d - The sample was diluted. Detection limits were raised and surrogate recoveries may not be meaningful.

dv - Insufficient sample volume was available to achieve normal reporting limits.

f - The sample was laboratory filtered prior to analysis.

fb - The analyte was detected in the method blank.

fc - The compound is a common laboratory and field contaminant.

hr - The sample and duplicate were reextracted and reanalyzed. RPD results were still outside of control limits. Variability is attributed to sample inhomogeneity.

hs - Headspace was present in the container used for analysis.

ht – The analysis was performed outside the method or client-specified holding time requirement.

ip - Recovery fell outside of control limits. Compounds in the sample matrix interfered with the quantitation of the analyte.

j - The analyte concentration is reported below the lowest calibration standard. The value reported is an estimate.

J - The internal standard associated with the analyte is out of control limits. The reported concentration is an estimate.

jl - The laboratory control sample(s) percent recovery and/or RPD were out of control limits. The reported concentration should be considered an estimate.

js - The surrogate associated with the analyte is out of control limits. The reported concentration should be considered an estimate.

lc - The presence of the analyte is likely due to laboratory contamination.

L - The reported concentration was generated from a library search.

nm - The analyte was not detected in one or more of the duplicate analyses. Therefore, calculation of the RPD is not applicable.

pc - The sample was received with incorrect preservation or in a container not approved by the method. The value reported should be considered an estimate.

ve - The analyte response exceeded the valid instrument calibration range. The value reported is an estimate.

vo - The value reported fell outside the control limits established for this analyte.

x - The sample chromatographic pattern does not resemble the fuel standard used for quantitation.

405382

# SAMPLE CHAIN OF CUSTODY

ME 05-20-14

Page # _____ of _____

Send Report To Rebekah Brooks
Company JBR | Stantec
Address 19101 36th Ave West, Suite 203
City, State, ZIP Lynnwood, WA 98036
Phone # 425.977.4994 Fax # 425.499.4097

SAMPLERS *(signature)* AVadon

PROJECT NAME/NO. TOC-MLT

PO # BA14085.00

REMARKS

TURNAROUND TIME
☒ Standard (2 Weeks)
☐ RUSH _____
Rush charges authorized by: _____

SAMPLE DISPOSAL
☒ Dispose after 30 days
☐ Return samples
☐ Will call with instructions

| Sample ID | Lab ID | Date Sampled | Time Sampled | Sample Type | # of containers | ANALYSES REQUESTED: TPH-Diesel | TPH-Gasoline | BTEX by 8021B | VOCs by 8260 | SVOCs by 8270 | HFS | | | | | | Notes |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 2VINF | 01A-B | 5-20-14 | 1055 | Air | 2 | | X | X | | | | | | | | | |
| 2VEFF | 02T | 5.20.14 | 1100 | Air | 2 | | X | X | | | | | | | | | |
| | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | |

| SIGNATURE | PRINT NAME | COMPANY | DATE | TIME |
|---|---|---|---|---|
| Relinquished by: AVadon | Antonela Vadon | JBR/Stantec | 5-20-14 | 1232 |
| Received by: | DO VO | F&BI | 11 | 15:45 |
| Relinquished by: | | | | |
| Received by: | | | Samples received at | 23 °C |

*Friedman & Bruya, Inc.*
*3012 16th Avenue West*
*Seattle, WA 98119-2029*
*Ph. (206) 285-8282*
*Fax (206) 283-5044*

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

James E. Bruya, Ph.D.
Yelena Aravkina, M.S.
Michael Erdahl, B.S.
Kurt Johnson, B.S.
Eric Young, B.S.

3012 16th Avenue West
Seattle, WA 98119-2029
(206) 285-8282
fbi@isomedia.com
www.friedmanandbruya.com

June 24, 2014

Rebekah Brooks, Project Manager
Stantec
19101 36th Ave W, Suite 203
Lynnwood, WA 98036

Dear Ms. Brooks:

Included are the results from the testing of material submitted on June 19, 2014 from the TOC_01-176, WORFDB8 F&BI 406344 project. There are 4 pages included in this report. Any samples that may remain are currently scheduled for disposal in 30 days. If you would like us to return your samples or arrange for long term storage at our offices, please contact us as soon as possible.

We appreciate this opportunity to be of service to you and hope you will call if you should have any questions.

Sincerely,

FRIEDMAN & BRUYA, INC.

Michael Erdahl
Project Manager

Enclosures
c: Kim Vik
STN0624R.DOC

## CASE NARRATIVE

This case narrative encompasses samples received on June 19, 2014 by Friedman & Bruya, Inc. from the Stantec TOC_01-176, WORFDB8 F&BI 406344 project. Samples were logged in under the laboratory ID's listed below.

| Laboratory ID | Stantec |
|---|---|
| 406344 -01 | 2VINF |
| 406344 -02 | 2VEFF |

All quality control requirements were acceptable.

Date of Report: 06/24/14
Date Received: 06/19/14
Project: TOC_01-176, WORFDB8 F&BI 406344
Date Extracted: 06/19/14
Date Analyzed: 06/19/14

**RESULTS FROM THE ANALYSIS OF VAPOR SAMPLES FOR BENZENE, TOLUENE, ETHYLBENZENE, XYLENES AND TPH AS GASOLINE USING MODIFIED METHODS 8021B AND NWTPH-Gx**

Results Reported as $mg/m^3$

| Sample ID<br>Laboratory ID | Benzene | Toluene | Ethyl Benzene | Total Xylenes | Gasoline Range | Surrogate (% Recovery)<br>(Limit 50-150) |
|---|---|---|---|---|---|---|
| 2VINF<br>406344-01 | <0.1 | <0.1 | <0.1 | <0.3 | <10 | 87 |
| 2VEFF<br>406344-02 | <0.1 | <0.1 | <0.1 | <0.3 | <10 | 87 |
| Method Blank<br>04-1224 MB | <0.1 | <0.1 | <0.1 | <0.3 | <10 | 93 |

Date of Report: 06/24/14
Date Received: 06/19/14
Project: TOC_01-176, WORFDB8 F&BI 406344

## QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF VAPOR SAMPLES FOR BENZENE, TOLUENE, ETHYLBENZENE, XYLENES, AND TPH AS GASOLINE USING MODIFIED EPA METHOD 8021B AND NWTPH-Gx

Laboratory Code: 406311-01 (Duplicate)

| Analyte | Reporting Units | Sample Result | Duplicate Result | RPD (Limit 20) |
|---|---|---|---|---|
| Benzene | mg/m$^3$ | <0.1 | <0.1 | nm |
| Toluene | mg/m$^3$ | 0.37 | 0.34 | 6 |
| Ethylbenzene | mg/m$^3$ | <0.1 | <0.1 | nm |
| Xylenes | mg/m$^3$ | 0.96 | 0.98 | 2 |
| Gasoline | mg/m$^3$ | 28 | 27 | 4 |

Laboratory Code: Laboratory Control Sample

| Analyte | Reporting Units | Spike Level | Percent Recovery LCS | Acceptance Criteria |
|---|---|---|---|---|
| Benzene | mg/m$^3$ | 5.0 | 85 | 70-130 |
| Toluene | mg/m$^3$ | 5.0 | 86 | 70-130 |
| Ethylbenzene | mg/m$^3$ | 5.0 | 87 | 70-130 |
| Xylenes | mg/m$^3$ | 15 | 88 | 70-130 |
| Gasoline | mg/m$^3$ | 100 | 108 | 70-130 |

# Data Qualifiers & Definitions

a - The analyte was detected at a level less than five times the reporting limit. The RPD results may not provide reliable information on the variability of the analysis.

b - The analyte was spiked at a level that was less than five times that present in the sample. Matrix spike recoveries may not be meaningful.

ca - The calibration results for the analyte were outside of acceptance criteria. The value reported is an estimate.

c - The presence of the analyte may be due to carryover from previous sample injections.

cf - The sample was centrifuged prior to analysis.

d - The sample was diluted. Detection limits were raised and surrogate recoveries may not be meaningful.

dv - Insufficient sample volume was available to achieve normal reporting limits.

f - The sample was laboratory filtered prior to analysis.

fb - The analyte was detected in the method blank.

fc - The compound is a common laboratory and field contaminant.

hr - The sample and duplicate were reextracted and reanalyzed. RPD results were still outside of control limits. Variability is attributed to sample inhomogeneity.

hs - Headspace was present in the container used for analysis.

ht – The analysis was performed outside the method or client-specified holding time requirement.

ip - Recovery fell outside of control limits. Compounds in the sample matrix interfered with the quantitation of the analyte.

j - The analyte concentration is reported below the lowest calibration standard. The value reported is an estimate.

J - The internal standard associated with the analyte is out of control limits. The reported concentration is an estimate.

jl - The laboratory control sample(s) percent recovery and/or RPD were out of control limits. The reported concentration should be considered an estimate.

js - The surrogate associated with the analyte is out of control limits. The reported concentration should be considered an estimate.

lc - The presence of the analyte is likely due to laboratory contamination.

L - The reported concentration was generated from a library search.

nm - The analyte was not detected in one or more of the duplicate analyses. Therefore, calculation of the RPD is not applicable.

pc - The sample was received with incorrect preservation or in a container not approved by the method. The value reported should be considered an estimate.

ve - The analyte response exceeded the valid instrument calibration range. The value reported is an estimate.

vo - The value reported fell outside the control limits established for this analyte.

x - The sample chromatographic pattern does not resemble the fuel standard used for quantitation.

~~4034~~: 406344

# SAMPLE CHAIN OF CUSTODY ME 06/19/14

Page # 1 of 1

Send Report To Rebekah Brooks
Company Stantec
Address 19101 36th Ave. W, Suite 203
City, State, ZIP Lynnwood, WA 98036
Phone # 425-977-4994 Fax # 425-449-4097

SAMPLERS (signature) AVadon

PROJECT NAME/NO.: TOC-MLT

PO#: 2037114085

REMARKS:

TURNAROUND TIME
- [x] Standard (2 Weeks)
- [ ] RUSH
Rush charges authorized by

SAMPLE DISPOSAL
- [x] Dispose after 30 days
- [ ] Return samples
- [ ] Will call with instructions

| Sample ID | Lab ID | Date Sampled | Time Sampled | Sample Type | # of containers | TPH-Diesel | TPH-Gasoline | BTEX by 8021B | VOCs by8260 | SVOCs by 8270 | HFS | | | | | | | Notes |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 2 VINF | 01 A-B | 6.16.14 | 1320 | Air | 2 | | X | X | | | | | | | | | | |
| 2 VEFF | 02 | 6.16.14 | 1320 | Air | 2 | | X | X | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | Samples received at 24 °C |
| | | | | | | | | | | | | | | | | | | |


*Friedman & Bruya, Inc.*
*3012 16th Avenue West*
*Seattle, WA 98119-2029*
*Ph. (206) 285-8282*
*Fax (206) 283-5044*


FORMS\COC\COC.DOC

| | SIGNATURE | PRINT NAME | COMPANY | DATE | TIME |
|---|---|---|---|---|---|
| Relinquished by: | AVadon | Antonela Vadon | ~~JBR~~ Stantec | 6.16.14 | |
| Received by: | | | | | |
| Relinquished by: | AVadon | Antonela Vadon | Stantec | 6.19.14 | 10 00 |
| Received by: | | Nhan Phan | test | 6-19-14 | 1215 |

# Unit 3: Drake Property (24309)

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

James E. Bruya, Ph.D.
Yelena Aravkina, M.S.
Michael Erdahl, B.S.
Kurt Johnson, B.S.
Eric Young, B.S.

3012 16th Avenue West
Seattle, WA 98119-2029
(206) 285-8282
fbi@isomedia.com
www.friedmanandbruya.com

April 23, 2014

Rebekah Brooks, Project Manager
JBR Environmental Consultants
19101 36th Ave W, Suite 203
Lynnwood, WA 98036

Dear Ms. Brooks:

Included are the results from the testing of material submitted on April 18, 2014 from the TOC_01-176_MLT, WORFDB8 F&BI 404373 project. There are 4 pages included in this report. Any samples that may remain are currently scheduled for disposal in 30 days. If you would like us to return your samples or arrange for long term storage at our offices, please contact us as soon as possible.

We appreciate this opportunity to be of service to you and hope you will call if you should have any questions.

Sincerely,

FRIEDMAN & BRUYA, INC.

Michael Erdahl
Project Manager

Enclosures
c: Kim Vik
JBR0423R.DOC

## CASE NARRATIVE

This case narrative encompasses samples received on April 18, 2014 by Friedman & Bruya, Inc. from the JBR Environmental Consultants TOC_01-176_MLT, WORFDB8 F&BI 404373 project. Samples were logged in under the laboratory ID's listed below.

| Laboratory ID | JBR Environmental Consultants |
|---|---|
| 404373-01 | 3VINF |
| 404373-02 | 3VEFF |

All quality control requirements were acceptable.

Date of Report: 04/23/14
Date Received: 04/18/14
Project: TOC_01-176_MLT, WORFDB8 F&BI 404373
Date Extracted: 04/21/14
Date Analyzed: 04/21/14

**RESULTS FROM THE ANALYSIS OF VAPOR SAMPLES FOR BENZENE, TOLUENE, ETHYLBENZENE, XYLENES AND TPH AS GASOLINE USING MODIFIED METHODS 8021B AND NWTPH-Gx**

Results Reported as $mg/m^3$

| Sample ID<br>Laboratory ID | Benzene | Toluene | Ethyl Benzene | Total Xylenes | Gasoline Range | Surrogate (% Recovery)<br>(Limit 50-150) |
|---|---|---|---|---|---|---|
| 3VINF<br>404373-01 | <0.1 | <0.1 | <0.1 | <0.3 | <10 | 87 |
| 3VEFF<br>404373-02 | <0.1 | <0.1 | <0.1 | <0.3 | <10 | 84 |
| Method Blank<br>04-0763 MB | <0.1 | <0.1 | <0.1 | <0.3 | <10 | 87 |

Date of Report: 04/23/14
Date Received: 04/18/14
Project: TOC_01-176_MLT, WORFDB8 F&BI 404373

## QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF VAPOR SAMPLES FOR BENZENE, TOLUENE, ETHYLBENZENE, XYLENES, AND TPH AS GASOLINE USING MODIFIED EPA METHOD 8021B AND NWTPH-Gx

Laboratory Code: 404372-02 (Duplicate)

| Analyte | Reporting Units | Sample Result | Duplicate Result | RPD (Limit 20) |
|---|---|---|---|---|
| Benzene | mg/m$^3$ | <0.1 | <0.1 | nm |
| Toluene | mg/m$^3$ | <0.1 | <0.1 | nm |
| Ethylbenzene | mg/m$^3$ | <0.1 | <0.1 | nm |
| Xylenes | mg/m$^3$ | <0.3 | <0.3 | nm |
| Gasoline | mg/m$^3$ | <10 | <10 | nm |

Laboratory Code: Laboratory Control Sample

| Analyte | Reporting Units | Spike Level | Percent Recovery LCS | Acceptance Criteria |
|---|---|---|---|---|
| Benzene | mg/m$^3$ | 5.0 | 83 | 70-130 |
| Toluene | mg/m$^3$ | 5.0 | 83 | 70-130 |
| Ethylbenzene | mg/m$^3$ | 5.0 | 86 | 70-130 |
| Xylenes | mg/m$^3$ | 15 | 86 | 70-130 |
| Gasoline | mg/m$^3$ | 100 | 110 | 70-130 |

# Data Qualifiers & Definitions

a - The analyte was detected at a level less than five times the reporting limit. The RPD results may not provide reliable information on the variability of the analysis.

A1 – More than one compound of similar molecule structure was identified with equal probability.

b - The analyte was spiked at a level that was less than five times that present in the sample. Matrix spike recoveries may not be meaningful.

ca - The calibration results for this range fell outside of acceptance criteria. The value reported is an estimate.

c - The presence of the analyte indicated may be due to carryover from previous sample injections.

d - The sample was diluted. Detection limits may be raised due to dilution.

ds - The sample was diluted. Detection limits are raised due to dilution and surrogate recoveries may not be meaningful.

dv - Insufficient sample was available to achieve normal reporting limits and limits are raised accordingly.

fb - Analyte present in the blank and the sample.

fc – The compound is a common laboratory and field contaminant.

hr - The sample and duplicate were reextracted and reanalyzed. RPD results were still outside of control limits. The variability is attributed to sample inhomogeneity.

ht - Analysis performed outside the method or client-specified holding time requirement.

ip - Recovery fell outside of normal control limits. Compounds in the sample matrix interfered with the quantitation of the analyte.

j – The result is below normal reporting limits. The value reported is an estimate.

J - The internal standard associated with the analyte is out of control limits. The reported concentration is an estimate.

jl - The analyte result in the laboratory control sample is out of control limits. The reported concentration should be considered an estimate.

jr - The rpd result in laboratory control sample associated with the analyte is out of control limits. The reported concentration should be considered an estimate.

js - The surrogate associated with the analyte is out of control limits. The reported concentration should be considered an estimate.

lc - The presence of the compound indicated is likely due to laboratory contamination.

L - The reported concentration was generated from a library search.

nm - The analyte was not detected in one or more of the duplicate analyses. Therefore, calculation of the RPD is not applicable.

pc – The sample was received in a container not approved by the method. The value reported should be considered an estimate.

pr – The sample was received with incorrect preservation. The value reported should be considered an estimate.

ve - Estimated concentration calculated for an analyte response above the valid instrument calibration range. A dilution is required to obtain an accurate quantification of the analyte.

vo - The value reported fell outside the control limits established for this analyte.

x - The sample chromatographic pattern does not resemble the fuel standard used for quantitation.

404373

# SAMPLE CHAIN OF CUSTODY

ME 04-18-14

Page # 1 of 1

Send Report To Rebekah Brooks
Company JBR Environmental Con.
Address 19101 36Th. Ave, West, Ste 203
City, State, ZIP Lynnwood, Wa, 98036
Phone # 425-977-4994 Fax # 425-977-4994

SAMPLERS (*signature*) Dana Hutchins
PROJECT NAME/NO. TOC-MLT
PO# B.A14085.00
REMARKS

TURNAROUND TIME
- [x] Standard (2 Weeks)
- [ ] RUSH
Rush charges authorized by

SAMPLE DISPOSAL
- [x] Dispose after 30 days
- [ ] Return samples
- [ ] Will call with instructions

| Sample ID | Lab ID | Date Sampled | Time Sampled | Sample Type | # of containers | TPH-Diesel | TPH-Gasoline | BTEX by 8021B | VOCs by8260 | SVOCs by 8270 | HFS | | | | | | | Notes |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 3 VINF | 01A-B | 4-18-14 | 1200 | Air | 2 | | X | X | | | | | | | | | | |
| 3 VEFF | 02 T | 4-18-14 | 1210 | Air | 2 | | X | X | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | Samples Received at 10 | |

| SIGNATURE | PRINT NAME | COMPANY | DATE | TIME |
|---|---|---|---|---|
| Relinquished by: Dana Hutchins | Dana Hutchins | JBR | 4-18-14 | 1400 |
| Received by: Dana | Dana | FedEx | 4/ | 16:40 |
| Relinquished by: | | | | |
| Received by: | | | | |

*Friedman & Bruya, Inc.*
*3012 16th Avenue West*
*Seattle, WA 98119-2029*
*Ph. (206) 285-8282*
*Fax (206) 283-5044*

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

James E. Bruya, Ph.D.
Yelena Aravkina, M.S.
Michael Erdahl, B.S.
Kurt Johnson, B.S.
Eric Young, B.S.

3012 16th Avenue West
Seattle, WA 98119-2029
(206) 285-8282
fbi@isomedia.com
www.friedmanandbruya.com

May 27, 2014

Rebekah Brooks, Project Manager
JBR Environmental Consultants
19101 36th Ave W, Suite 203
Lynnwood, WA 98036

Dear Ms. Brooks:

Included are the results from the testing of material submitted on May 20, 2014 from the TOC 01-176, WORFDB8 F&BI 405383 project. There are 4 pages included in this report. Any samples that may remain are currently scheduled for disposal in 30 days. If you would like us to return your samples or arrange for long term storage at our offices, please contact us as soon as possible.

We appreciate this opportunity to be of service to you and hope you will call if you should have any questions.

Sincerely,

FRIEDMAN & BRUYA, INC.

Michael Erdahl
Project Manager

Enclosures
c: Kim Vik
JBR0527R.DOC

## CASE NARRATIVE

This case narrative encompasses samples received on May 20, 2014 by Friedman & Bruya, Inc. from the JBR Environmental Consultants TOC 01-176, WORFDB8 F&BI 405383 project. Samples were logged in under the laboratory ID's listed below.

| Laboratory ID | JBR Environmental Consultants |
|---|---|
| 405383-01 | 3VINF |
| 405383-02 | 3VEFF |

All quality control requirements were acceptable.

Date of Report: 05/27/14
Date Received: 05/20/14
Project: TOC 01-176, WORFDB8 F&BI 405383
Date Extracted: 05/22/14
Date Analyzed: 05/22/14

**RESULTS FROM THE ANALYSIS OF VAPOR SAMPLES FOR BENZENE, TOLUENE, ETHYLBENZENE, XYLENES AND TPH AS GASOLINE USING MODIFIED METHODS 8021B AND NWTPH-Gx**

Results Reported as $mg/m^3$

| Sample ID<br>Laboratory ID | Benzene | Toluene | Ethyl Benzene | Total Xylenes | Gasoline Range | Surrogate (% Recovery)<br>(Limit 50-150) |
|---|---|---|---|---|---|---|
| 3VINF<br>405383-01 | <0.1 | <0.1 | <0.1 | <0.3 | <10 | 83 |
| 3VEFF<br>405383-02 | <0.1 | <0.1 | <0.1 | <0.3 | <10 | 84 |
| Method Blank<br>04-1019 MB | <0.1 | <0.1 | <0.1 | <0.3 | <10 | 82 |

Date of Report: 05/27/14
Date Received: 05/20/14
Project: TOC 01-176, WORFDB8 F&BI 405383

## QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF VAPOR SAMPLES FOR BENZENE, TOLUENE, ETHYLBENZENE, XYLENES, AND TPH AS GASOLINE USING MODIFIED EPA METHOD 8021B AND NWTPH-Gx

Laboratory Code: 405381-02 (Duplicate)

| Analyte | Reporting Units | Sample Result | Duplicate Result | RPD (Limit 20) |
|---|---|---|---|---|
| Benzene | mg/m$^3$ | <0.1 | <0.1 | nm |
| Toluene | mg/m$^3$ | <0.1 | <0.1 | nm |
| Ethylbenzene | mg/m$^3$ | <0.1 | <0.1 | nm |
| Xylenes | mg/m$^3$ | <0.3 | <0.3 | nm |
| Gasoline | mg/m$^3$ | <10 | <10 | nm |

Laboratory Code: Laboratory Control Sample

| Analyte | Reporting Units | Spike Level | Percent Recovery LCS | Acceptance Criteria |
|---|---|---|---|---|
| Benzene | mg/m$^3$ | 5.0 | 84 | 70-130 |
| Toluene | mg/m$^3$ | 5.0 | 85 | 70-130 |
| Ethylbenzene | mg/m$^3$ | 5.0 | 83 | 70-130 |
| Xylenes | mg/m$^3$ | 15 | 87 | 70-130 |
| Gasoline | mg/m$^3$ | 100 | 103 | 70-130 |

# Data Qualifiers & Definitions

a - The analyte was detected at a level less than five times the reporting limit. The RPD results may not provide reliable information on the variability of the analysis.

b - The analyte was spiked at a level that was less than five times that present in the sample. Matrix spike recoveries may not be meaningful.

ca - The calibration results for the analyte were outside of acceptance criteria. The value reported is an estimate.

c - The presence of the analyte may be due to carryover from previous sample injections.

cf - The sample was centrifuged prior to analysis.

d - The sample was diluted. Detection limits were raised and surrogate recoveries may not be meaningful.

dv - Insufficient sample volume was available to achieve normal reporting limits.

f - The sample was laboratory filtered prior to analysis.

fb - The analyte was detected in the method blank.

fc - The compound is a common laboratory and field contaminant.

hr - The sample and duplicate were reextracted and reanalyzed. RPD results were still outside of control limits. Variability is attributed to sample inhomogeneity.

hs - Headspace was present in the container used for analysis.

ht – The analysis was performed outside the method or client-specified holding time requirement.

ip - Recovery fell outside of control limits. Compounds in the sample matrix interfered with the quantitation of the analyte.

j - The analyte concentration is reported below the lowest calibration standard. The value reported is an estimate.

J - The internal standard associated with the analyte is out of control limits. The reported concentration is an estimate.

jl - The laboratory control sample(s) percent recovery and/or RPD were out of control limits. The reported concentration should be considered an estimate.

js - The surrogate associated with the analyte is out of control limits. The reported concentration should be considered an estimate.

lc - The presence of the analyte is likely due to laboratory contamination.

L - The reported concentration was generated from a library search.

nm - The analyte was not detected in one or more of the duplicate analyses. Therefore, calculation of the RPD is not applicable.

pc - The sample was received with incorrect preservation or in a container not approved by the method. The value reported should be considered an estimate.

ve - The analyte response exceeded the valid instrument calibration range. The value reported is an estimate.

vo - The value reported fell outside the control limits established for this analyte.

x - The sample chromatographic pattern does not resemble the fuel standard used for quantitation.

DV

405382 ~~405382~~ 405383 **SAMPLE CHAIN OF CUSTODY** ME 05-20-14

Send Report To Rebekah Brooks
Company JBR | Stantec
Address 9101 36th Ave. West Suite 203
City, State, ZIP Lynnwood WA 98036
Phone # 425 977-4994 Fax # 425-499-4091

SAMPLERS *(signature)* A Vaden

PROJECT NAME/NO. TOC-MLT

PO # BA408500

REMARKS

Page # _____ of _____

TURNAROUND TIME
☒ Standard (2 Weeks)
☐ RUSH _____
Rush charges authorized by: _____

SAMPLE DISPOSAL
☒ Dispose after 30 days
☐ Return samples
☐ Will call with instructions

| Sample ID | Lab ID | Date Sampled | Time Sampled | Sample Type | # of containers | ANALYSES REQUESTED: TPH-Diesel | TPH-Gasoline | BTEX by 8021B | VOCs by 8260 | SVOCs by 8270 | HFS | | | | | | Notes |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 3V INF | 01+B | 5-19-14 | 1545 | Air | 2 | | X | X | | | | | | | | | |
| 3V EFF | 02T | 5.19.14 | 1550 | Air | 2 | | X | X | | | | | | | | | |
| | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | |

| SIGNATURE | PRINT NAME | COMPANY | DATE | TIME |
|---|---|---|---|---|
| Relinquished by: A Vaden | Antonde Vaden | JBR/Stantec | 5.20.14 | 1445 |
| Received by: Dan | Dave | F&BZ | 11 | 15:45 |
| Relinquished by: | | | | |
| Received by: | | Samples received at 23 °C | | |

*Friedman & Bruya, Inc.*
*3012 16th Avenue West*
*Seattle, WA 98119-2029*
*Ph. (206) 285-8282*
*Fax (206) 283-5044*

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

James E. Bruya, Ph.D.
Yelena Aravkina, M.S.
Michael Erdahl, B.S.
Kurt Johnson, B.S.
Eric Young, B.S.

3012 16th Avenue West
Seattle, WA 98119-2029
(206) 285-8282
fbi@isomedia.com
www.friedmanandbruya.com

June 24, 2014

Rebekah Brooks, Project Manager
Stantec
19101 36th Ave W, Suite 203
Lynnwood, WA 98036

Dear Ms. Brooks:

Included are the results from the testing of material submitted on June 19, 2014 from the TOC_01-176, WORFDB8 F&BI 406345 project. There are 4 pages included in this report. Any samples that may remain are currently scheduled for disposal in 30 days. If you would like us to return your samples or arrange for long term storage at our offices, please contact us as soon as possible.

We appreciate this opportunity to be of service to you and hope you will call if you should have any questions.

Sincerely,

FRIEDMAN & BRUYA, INC.

Michael Erdahl
Project Manager

Enclosures
c: Kim Vik
STN0624R.DOC

## CASE NARRATIVE

This case narrative encompasses samples received on June 19, 2014 by Friedman & Bruya, Inc. from the Stantec TOC_01-176, WORFDB8 F&BI 406345 project. Samples were logged in under the laboratory ID's listed below.

| Laboratory ID | Stantec |
|---|---|
| 406345 -01 | 3VINF |
| 406345 -02 | 3VEFF |

All quality control requirements were acceptable.

Date of Report: 06/24/14
Date Received: 06/19/14
Project: TOC_01-176, WORFDB8 F&BI 406345
Date Extracted: 06/19/14
Date Analyzed: 06/19/14

**RESULTS FROM THE ANALYSIS OF VAPOR SAMPLES FOR BENZENE, TOLUENE, ETHYLBENZENE, XYLENES AND TPH AS GASOLINE USING MODIFIED METHODS 8021B AND NWTPH-Gx**

Results Reported as $mg/m^3$

| Sample ID<br>Laboratory ID | Benzene | Toluene | Ethyl Benzene | Total Xylenes | Gasoline Range | Surrogate (% Recovery)<br>(Limit 50-150) |
|---|---|---|---|---|---|---|
| 3VINF<br>406345-01 | <0.1 | <0.1 | <0.1 | <0.3 | <10 | 88 |
| 3VEFF<br>406345-02 | <0.1 | <0.1 | <0.1 | <0.3 | <10 | 87 |
| Method Blank<br>04-1224 MB | <0.1 | <0.1 | <0.1 | <0.3 | <10 | 93 |

Date of Report: 06/24/14
Date Received: 06/19/14
Project: TOC_01-176, WORFDB8 F&BI 406345

## QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF VAPOR SAMPLES FOR BENZENE, TOLUENE, ETHYLBENZENE, XYLENES, AND TPH AS GASOLINE USING MODIFIED EPA METHOD 8021B AND NWTPH-Gx

Laboratory Code: 406311-01 (Duplicate)

| Analyte | Reporting Units | Sample Result | Duplicate Result | RPD (Limit 20) |
|---|---|---|---|---|
| Benzene | mg/m$^3$ | <0.1 | <0.1 | nm |
| Toluene | mg/m$^3$ | 0.37 | 0.34 | 6 |
| Ethylbenzene | mg/m$^3$ | <0.1 | <0.1 | nm |
| Xylenes | mg/m$^3$ | 0.96 | 0.98 | 2 |
| Gasoline | mg/m$^3$ | 28 | 27 | 4 |

Laboratory Code: Laboratory Control Sample

| Analyte | Reporting Units | Spike Level | Percent Recovery LCS | Acceptance Criteria |
|---|---|---|---|---|
| Benzene | mg/m$^3$ | 5.0 | 85 | 70-130 |
| Toluene | mg/m$^3$ | 5.0 | 86 | 70-130 |
| Ethylbenzene | mg/m$^3$ | 5.0 | 87 | 70-130 |
| Xylenes | mg/m$^3$ | 15 | 88 | 70-130 |
| Gasoline | mg/m$^3$ | 100 | 108 | 70-130 |

# Data Qualifiers & Definitions

a - The analyte was detected at a level less than five times the reporting limit. The RPD results may not provide reliable information on the variability of the analysis.

b - The analyte was spiked at a level that was less than five times that present in the sample. Matrix spike recoveries may not be meaningful.

ca - The calibration results for the analyte were outside of acceptance criteria. The value reported is an estimate.

c - The presence of the analyte may be due to carryover from previous sample injections.

cf - The sample was centrifuged prior to analysis.

d - The sample was diluted. Detection limits were raised and surrogate recoveries may not be meaningful.

dv - Insufficient sample volume was available to achieve normal reporting limits.

f - The sample was laboratory filtered prior to analysis.

fb - The analyte was detected in the method blank.

fc - The compound is a common laboratory and field contaminant.

hr - The sample and duplicate were reextracted and reanalyzed. RPD results were still outside of control limits. Variability is attributed to sample inhomogeneity.

hs - Headspace was present in the container used for analysis.

ht – The analysis was performed outside the method or client-specified holding time requirement.

ip - Recovery fell outside of control limits. Compounds in the sample matrix interfered with the quantitation of the analyte.

j - The analyte concentration is reported below the lowest calibration standard. The value reported is an estimate.

J - The internal standard associated with the analyte is out of control limits. The reported concentration is an estimate.

jl - The laboratory control sample(s) percent recovery and/or RPD were out of control limits. The reported concentration should be considered an estimate.

js - The surrogate associated with the analyte is out of control limits. The reported concentration should be considered an estimate.

lc - The presence of the analyte is likely due to laboratory contamination.

L - The reported concentration was generated from a library search.

nm - The analyte was not detected in one or more of the duplicate analyses. Therefore, calculation of the RPD is not applicable.

pc - The sample was received with incorrect preservation or in a container not approved by the method. The value reported should be considered an estimate.

ve - The analyte response exceeded the valid instrument calibration range. The value reported is an estimate.

vo - The value reported fell outside the control limits established for this analyte.

x - The sample chromatographic pattern does not resemble the fuel standard used for quantitation.

406345

# SAMPLE CHAIN OF CUSTODY ME 06/19/14

Page # 1 of 1

Send Report To Rebekah Brooks
Company Stantec
Address 1919 36th Ave. W, Suite 203
City, State, ZIP Lynnwood, WA 98036
Phone # 425-977-4994 Fax # 425-449-4097

SAMPLERS (signature) [signature]
PROJECT NAME/NO. TOC-MLT
PO# 203714085
REMARKS

TURNAROUND TIME
☒ Standard (2 Weeks)
☐ RUSH
Rush charges authorized by

SAMPLE DISPOSAL
☒ Dispose after 30 days
☐ Return samples
☐ Will call with instructions

| Sample ID | Lab ID | Date Sampled | Time Sampled | Sample Type | # of containers | TPH-Diesel | TPH-Gasoline | BTEX by 8021B | VOCs by8260 | SVOCs by 8270 | HFS | | | | | | | Notes |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 3V INF | 01A-S | 6.16.14 | 1650 | Air | 2 | | X | X | | | | | | | | | | |
| 3V EFF | 02A | 6.16.14 | 1655 | Air | 2 | | X | X | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | Samples received at 24 °C |

*Friedman & Bruya, Inc.*
*3012 16th Avenue West*
*Seattle, WA 98119-2029*
*Ph. (206) 285-8282*
*Fax (206) 283-5044*

FORMS\COC\COC.DOC

| | SIGNATURE | PRINT NAME | COMPANY | DATE | TIME |
|---|---|---|---|---|---|
| Relinquished by: | [signature] | Antonela Vadon | Stantec | 6/16/14 | |
| Received by: | | | | | |
| Relinquished by: | [signature] | Antonela Vadon | Stantec | 6-19-14 | 10 00 |
| Received by: | [signature] | Khan Phan | FEBT | 6/19/14 | 1215 |

# Appendix B

## Laboratory Analytical Reports – Water

# Unit 1: TOC Property (24205)

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

James E. Bruya, Ph.D.
Yelena Aravkina, M.S.
Michael Erdahl, B.S.
Kurt Johnson, B.S.
Eric Young, B.S.

3012 16th Avenue West
Seattle, WA 98119-2029
(206) 285-8282
fbi@isomedia.com
www.friedmanandbruya.com

April 25, 2014

Rebekah Brooks, Project Manager
JBR Environmental Consultants
19101 36th Ave W, Suite 203
Lynnwood, WA 98036

Dear Ms. Brooks:

Included are the results from the testing of material submitted on April 18, 2014 from the TOC_01-176_MLT, WORFDB8 F&BI 404376 project. There are 4 pages included in this report. Any samples that may remain are currently scheduled for disposal in 30 days. If you would like us to return your samples or arrange for long term storage at our offices, please contact us as soon as possible.

We appreciate this opportunity to be of service to you and hope you will call if you should have any questions.

Sincerely,

FRIEDMAN & BRUYA, INC.

Michael Erdahl
Project Manager

Enclosures
c: Kim Vik
JBR0425R.DOC

## CASE NARRATIVE

This case narrative encompasses samples received on April 18, 2014 by Friedman & Bruya, Inc. from the JBR Environmental Consultants TOC_01-176_MLT, WORFDB8 F&BI 404376 project. Samples were logged in under the laboratory ID's listed below.

| Laboratory ID | JBR Environmental Consultants |
|---|---|
| 404376-01 | 1WINF |
| 404376-02 | 1WEFF |
| 404376-03 | 1GAC1 |
| 404376-04 | 1GAC2 |
| 404376-05 | TB-041814 |

The field pH of sample of 1WEFF was 6.65.

All quality control requirements were acceptable.

Date of Report: 04/25/14
Date Received: 04/18/14
Project: TOC_01-176_MLT, WORFDB8 F&BI 404376
Date Extracted: 04/21/14
Date Analyzed: 04/21/14 and 04/22/14

**RESULTS FROM THE ANALYSIS OF WATER SAMPLES FOR BENZENE, TOLUENE, ETHYLBENZENE, XYLENES AND TPH AS GASOLINE USING METHODS 8021B AND NWTPH-Gx**

Results Reported as ug/L (ppb)

| Sample ID<br>Laboratory ID | Benzene | Toluene | Ethyl Benzene | Total Xylenes | Gasoline Range | Surrogate (% Recovery)<br>(Limit 52-124) |
|---|---|---|---|---|---|---|
| 1WINF<br>404376-01 | <1 | 100 | <1 | 650 | 4,300 | 97 |
| 1WEFF<br>404376-02 | <1 | <1 | <1 | <3 | <100 | 85 |
| 1GAC1<br>404376-03 | <1 | <1 | <1 | <3 | <100 | 88 |
| 1GAC2<br>404376-04 | <1 | <1 | <1 | <3 | <100 | 87 |
| TB-041814<br>404376-05 | <1 | <1 | <1 | <3 | <100 | 86 |
| Method Blank<br>04-0765 MB | <1 | <1 | <1 | <3 | <100 | 87 |

Date of Report: 04/25/14
Date Received: 04/18/14
Project: TOC_01-176_MLT, WORFDB8 F&BI 404376

## QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF WATER SAMPLES FOR BENZENE, TOLUENE, ETHYLBENZENE, XYLENES, AND TPH AS GASOLINE USING METHOD 8021B AND NWTPH-Gx

Laboratory Code: 404376-02 (Duplicate)

| Analyte | Reporting Units | Sample Result | Duplicate Result | RPD (Limit 20) |
|---|---|---|---|---|
| Benzene | ug/L (ppb) | <1 | <1 | nm |
| Toluene | ug/L (ppb) | <1 | <1 | nm |
| Ethylbenzene | ug/L (ppb) | <1 | <1 | nm |
| Xylenes | ug/L (ppb) | <3 | <3 | nm |
| Gasoline | ug/L (ppb) | <100 | <100 | nm |

Laboratory Code: Laboratory Control Sample

| Analyte | Reporting Units | Spike Level | Percent Recovery LCS | Acceptance Criteria |
|---|---|---|---|---|
| Benzene | ug/L (ppb) | 50 | 88 | 65-118 |
| Toluene | ug/L (ppb) | 50 | 94 | 72-122 |
| Ethylbenzene | ug/L (ppb) | 50 | 97 | 73-126 |
| Xylenes | ug/L (ppb) | 150 | 95 | 74-118 |
| Gasoline | ug/L (ppb) | 1,000 | 98 | 69-134 |

# Data Qualifiers & Definitions

a - The analyte was detected at a level less than five times the reporting limit. The RPD results may not provide reliable information on the variability of the analysis.

A1 – More than one compound of similar molecule structure was identified with equal probability.

b - The analyte was spiked at a level that was less than five times that present in the sample. Matrix spike recoveries may not be meaningful.

ca - The calibration results for this range fell outside of acceptance criteria. The value reported is an estimate.

c - The presence of the analyte indicated may be due to carryover from previous sample injections.

d - The sample was diluted. Detection limits may be raised due to dilution.

ds - The sample was diluted. Detection limits are raised due to dilution and surrogate recoveries may not be meaningful.

dv - Insufficient sample was available to achieve normal reporting limits and limits are raised accordingly.

fb - Analyte present in the blank and the sample.

fc – The compound is a common laboratory and field contaminant.

hr - The sample and duplicate were reextracted and reanalyzed. RPD results were still outside of control limits. The variability is attributed to sample inhomogeneity.

ht - Analysis performed outside the method or client-specified holding time requirement.

ip - Recovery fell outside of normal control limits. Compounds in the sample matrix interfered with the quantitation of the analyte.

j – The result is below normal reporting limits. The value reported is an estimate.

J - The internal standard associated with the analyte is out of control limits. The reported concentration is an estimate.

jl - The analyte result in the laboratory control sample is out of control limits. The reported concentration should be considered an estimate.

jr - The rpd result in laboratory control sample associated with the analyte is out of control limits. The reported concentration should be considered an estimate.

js - The surrogate associated with the analyte is out of control limits. The reported concentration should be considered an estimate.

lc - The presence of the compound indicated is likely due to laboratory contamination.

L - The reported concentration was generated from a library search.

nm - The analyte was not detected in one or more of the duplicate analyses. Therefore, calculation of the RPD is not applicable.

pc – The sample was received in a container not approved by the method. The value reported should be considered an estimate.

pr – The sample was received with incorrect preservation. The value reported should be considered an estimate.

ve - Estimated concentration calculated for an analyte response above the valid instrument calibration range. A dilution is required to obtain an accurate quantification of the analyte.

vo - The value reported fell outside the control limits established for this analyte.

x - The sample chromatographic pattern does not resemble the fuel standard used for quantitation.

464376

# SAMPLE CHAIN OF CUSTODY

ME 04-18-14

V3

Page # 1 of 1

Send Report To Rebekah Brooks
Company JBR Environmental Con
Address 19101 36th Ave West, Ste 203
City, State, ZIP Lynnwood, Wa, 98036
Phone # 425-977-4994 Fax # 425-449-4097

SAMPLERS (signature) Dana Hutchins
PROJECT NAME/NO. TOC-MLT
PO# B.# 14085.00
REMARKS *Ph Taken In Field Add to Report

TURNAROUND TIME
☒ Standard (2 Weeks)
☐ RUSH
Rush charges authorized by

SAMPLE DISPOSAL
☒ Dispose after 30 days
☐ Return samples
☐ Will call with instructions

| Sample ID | Lab ID | Date Sampled | Time Sampled | Sample Type | # of containers | TPH-Diesel | TPH-Gasoline | BTEX by 8021B | VOCs by8260 | SVOCs by 8270 | HFS | *Field PH 5.9 6.65 | | | | | | Notes |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| IWINF | 01A-C | 4-18-14 | 1000 | W | 3 | | X | X | | | | | | | | | | |
| IWEFF | 02 | 4-18-14 | 1015 | W | 3 | | X | X | | | | X | | | | | | |
| IGAC1 | 03 | 4-18-14 | 1005 | W | 3 | | X | X | | | | | | | | | | |
| IGAC2 | 04 | 4-18-14 | 1010 | W | 3 | | X | X | | | | | | | | | | |
| TB-041814 | 05 | 4 | - | W | 1 | | X | X | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | Samples received at 2 °C |
| | | | | | | | | | | | | | | | | | | |

| SIGNATURE | PRINT NAME | COMPANY | DATE | TIME |
|---|---|---|---|---|
| Relinquished by: Dana Hutchins | Dana Hutchins | JBR | 4-18-14 | 1400 |
| Received by: Dana | Dana | FCBI | 11 | 16:00 |
| Relinquished by: | | | | |
| Received by: | | | | |

*Friedman & Bruya, Inc.*
*3012 16th Avenue West*
*Seattle, WA 98119-2029*
*Ph. (206) 285-8282*
*Fax (206) 283-5044*

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

James E. Bruya, Ph.D.
Yelena Aravkina, M.S.
Michael Erdahl, B.S.
Kurt Johnson, B.S.
Eric Young, B.S.

3012 16th Avenue West
Seattle, WA 98119-2029
(206) 285-8282
fbi@isomedia.com
www.friedmanandbruya.com

June 3, 2014

Rebekah Brooks, Project Manager
JBR Environmental Consultants
19101 36th Ave W, Suite 203
Lynnwood, WA 98036

Dear Ms. Brooks:

Included are the results from the testing of material submitted on May 20, 2014 from the TOC-01-176 MLT, WORFDB8 F&BI 405384 project. There are 4 pages included in this report. Any samples that may remain are currently scheduled for disposal in 30 days. If you would like us to return your samples or arrange for long term storage at our offices, please contact us as soon as possible.

We appreciate this opportunity to be of service to you and hope you will call if you should have any questions.

Sincerely,

FRIEDMAN & BRUYA, INC.

Michael Erdahl
Project Manager

Enclosures
c: Kim Vik
JBR0603R.DOC

## CASE NARRATIVE

This case narrative encompasses samples received on May 20, 2014 by Friedman & Bruya, Inc. from the JBR Environmental Consultants TOC-01-176 MLT, WORFDB8 F&BI 405384 project. Samples were logged in under the laboratory ID's listed below.

| Laboratory ID | JBR Environmental Consultants |
|---|---|
| 405384-01 | 1WEFF |
| 405384-02 | 1WINF |
| 405384-03 | 1WGAC1 |
| 405384-04 | 1WGAC2 |
| 405384-05 | TB-052014 |

All quality control requirements were acceptable.

Date of Report: 06/03/14
Date Received: 05/20/14
Project: TOC-01-176 MLT, WORFDB8 F&BI 405384
Date Extracted: 05/21/14
Date Analyzed: 05/21/14 and 05/23/14

**RESULTS FROM THE ANALYSIS OF WATER SAMPLES FOR BENZENE, TOLUENE, ETHYLBENZENE, XYLENES AND TPH AS GASOLINE USING METHODS 8021B AND NWTPH-Gx**

Results Reported as ug/L (ppb)

| Sample ID<br>Laboratory ID | Benzene | Toluene | Ethyl Benzene | Total Xylenes | Gasoline Range | Surrogate (% Recovery)<br>(Limit 52-124) |
|---|---|---|---|---|---|---|
| 1WEFF<br>405384-01 | <1 | <1 | <1 | <3 | <100 | 87 |
| 1WINF<br>405384-02 | 2.5 | 62 | <1 | 310 | 2,700 | 98 |
| 1WGAC1<br>405384-03 | <1 | <1 | <1 | <3 | <100 | 85 |
| 1WGAC2<br>405384-04 | <1 | <1 | <1 | <3 | <100 | 89 |
| TB-052014<br>405384-05 | <1 | <1 | <1 | <3 | <100 | 89 |
| Method Blank<br>04-1018 MB | <1 | <1 | <1 | <3 | <100 | 89 |

Date of Report: 06/03/14
Date Received: 05/20/14
Project: TOC-01-176 MLT, WORFDB8 F&BI 405384

## QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF WATER SAMPLES FOR BENZENE, TOLUENE, ETHYLBENZENE, XYLENES, AND TPH AS GASOLINE USING EPA METHOD 8021B AND NWTPH-Gx

Laboratory Code: 405384-01 (Duplicate)

| Analyte | Reporting Units | Sample Result | Duplicate Result | RPD (Limit 20) |
|---|---|---|---|---|
| Benzene | ug/L (ppb) | <1 | <1 | nm |
| Toluene | ug/L (ppb) | <1 | <1 | nm |
| Ethylbenzene | ug/L (ppb) | <1 | <1 | nm |
| Xylenes | ug/L (ppb) | <3 | <3 | nm |
| Gasoline | ug/L (ppb) | <100 | <100 | nm |

Laboratory Code: Laboratory Control Sample

| Analyte | Reporting Units | Spike Level | Percent Recovery LCS | Acceptance Criteria |
|---|---|---|---|---|
| Benzene | ug/L (ppb) | 50 | 94 | 65-118 |
| Toluene | ug/L (ppb) | 50 | 94 | 72-122 |
| Ethylbenzene | ug/L (ppb) | 50 | 90 | 73-126 |
| Xylenes | ug/L (ppb) | 150 | 94 | 74-118 |
| Gasoline | ug/L (ppb) | 1,000 | 96 | 69-134 |

# Data Qualifiers & Definitions

a - The analyte was detected at a level less than five times the reporting limit. The RPD results may not provide reliable information on the variability of the analysis.

b - The analyte was spiked at a level that was less than five times that present in the sample. Matrix spike recoveries may not be meaningful.

ca - The calibration results for the analyte were outside of acceptance criteria. The value reported is an estimate.

c - The presence of the analyte may be due to carryover from previous sample injections.

cf - The sample was centrifuged prior to analysis.

d - The sample was diluted. Detection limits were raised and surrogate recoveries may not be meaningful.

dv - Insufficient sample volume was available to achieve normal reporting limits.

f - The sample was laboratory filtered prior to analysis.

fb - The analyte was detected in the method blank.

fc - The compound is a common laboratory and field contaminant.

hr - The sample and duplicate were reextracted and reanalyzed. RPD results were still outside of control limits. Variability is attributed to sample inhomogeneity.

hs - Headspace was present in the container used for analysis.

ht – The analysis was performed outside the method or client-specified holding time requirement.

ip - Recovery fell outside of control limits. Compounds in the sample matrix interfered with the quantitation of the analyte.

j - The analyte concentration is reported below the lowest calibration standard. The value reported is an estimate.

J - The internal standard associated with the analyte is out of control limits. The reported concentration is an estimate.

jl - The laboratory control sample(s) percent recovery and/or RPD were out of control limits. The reported concentration should be considered an estimate.

js - The surrogate associated with the analyte is out of control limits. The reported concentration should be considered an estimate.

lc - The presence of the analyte is likely due to laboratory contamination.

L - The reported concentration was generated from a library search.

nm - The analyte was not detected in one or more of the duplicate analyses. Therefore, calculation of the RPD is not applicable.

pc - The sample was received with incorrect preservation or in a container not approved by the method. The value reported should be considered an estimate.

ve - The analyte response exceeded the valid instrument calibration range. The value reported is an estimate.

vo - The value reported fell outside the control limits established for this analyte.

x - The sample chromatographic pattern does not resemble the fuel standard used for quantitation.

405384

# SAMPLE CHAIN OF CUSTODY ME 05-20-14

v3

Page # _____ of _____

Send Report To Rebekah Brooks
Company JBR / Stantec
Address 19101 36th Ave. West #203
City, State, ZIP Lynwood WA 98036
Phone # 425.977.4994 Fax # 425-499.4097

SAMPLERS (signature) AVadon

PROJECT NAME/NO. TOC-MLT

PO# BA14085.00

REMARKS field measured pH for 1WEFF = 6.90

TURNAROUND TIME
☒ Standard (2 Weeks)
☐ RUSH _____
Rush charges authorized by _____

SAMPLE DISPOSAL
☒ Dispose after 30 days
☐ Return samples
☐ Will call with instructions

| Sample ID | Lab ID | Date Sampled | Time Sampled | Sample Type | # of containers | ANALYSES REQUESTED: TPH-Diesel | TPH-Gasoline | BTEX by 8021B | VOCs by8260 | SVOCs by 8270 | HFS | | | | | | | Notes |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1WEFF | 01 | 5-19-14 | 1120 | W | 3 | | X | X | | | | | | | | | | |
| 1WINF | 02 | 5-19-14 | 1115 | W | 3 | | X | X | | | | | | | | | | |
| 1WGAC1 | 03 | 5-19-14 | 1125 | W | 3 | | X | X | | | | | | | | | | |
| 1WGAC2 | 04 | 5-19-14 | 1130 | W | 3 | | X | X | | | | | | | | | | |
| TB-052014 | 05 | – | – | W | 1 | | X | X | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | |

| SIGNATURE | PRINT NAME | COMPANY | DATE | TIME |
|---|---|---|---|---|
| Relinquished by: AVadon | Antonelo Vadon | JBR / Stantec | 5-20-14 | 1225 |
| Received by: Duo | DO VO | F&BI | 11 | 15:45 |
| Relinquished by: | | | | |
| Received by: | | | Samples received at | 4 °C |

*Friedman & Bruya, Inc.*
*3012 16th Avenue West*
*Seattle, WA 98119-2029*
*Ph. (206) 285-8282*
*Fax (206) 283-5044*

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

James E. Bruya, Ph.D.
Yelena Aravkina, M.S.
Michael Erdahl, B.S.
Kurt Johnson, B.S.
Eric Young, B.S.

3012 16th Avenue West
Seattle, WA 98119-2029
(206) 285-8282
fbi@isomedia.com
www.friedmanandbruya.com

July 1, 2014

Rebekah Brooks, Project Manager
Stantec
19101 36th Ave W, Suite 203
Lynnwood, WA 98036

Dear Ms. Brooks:

Included are the results from the testing of material submitted on June 19, 2014 from the TOC_01-176, WORFDB8 F&BI 406349 project. There are 7 pages included in this report. Any samples that may remain are currently scheduled for disposal in 30 days. If you would like us to return your samples or arrange for long term storage at our offices, please contact us as soon as possible.

We appreciate this opportunity to be of service to you and hope you will call if you should have any questions.

Sincerely,

FRIEDMAN & BRUYA, INC.

Michael Erdahl
Project Manager

Enclosures
c: Kim Vik
STN0701R.DOC

## CASE NARRATIVE

This case narrative encompasses samples received on June 19, 2014 by Friedman & Bruya, Inc. from the Stantec TOC_01-176, WORFDB8 F&BI 406349 project. Samples were logged in under the laboratory ID's listed below.

| Laboratory ID | Stantec |
|---|---|
| 406349 -01 | 1WINF |
| 406349 -02 | 1WEFF |
| 406349 -03 | 1GAC1 |
| 406349 -04 | 1GAC2 |
| 406349 -05 | TB-061614-4 |

All quality control requirements were acceptable.

Date of Report: 07/01/14
Date Received: 06/19/14
Project: TOC_01-176, WORFDB8 F&BI 406349
Date Extracted: 06/20/14
Date Analyzed: 06/20/14 and 06/24/14

**RESULTS FROM THE ANALYSIS OF WATER SAMPLES FOR BENZENE, TOLUENE, ETHYLBENZENE, XYLENES AND TPH AS GASOLINE USING METHODS 8021B AND NWTPH-Gx**

Results Reported as ug/L (ppb)

| Sample ID<br>Laboratory ID | Benzene | Toluene | Ethyl Benzene | Total Xylenes | Gasoline Range | Surrogate (% Recovery)<br>(Limit 50-150) |
|---|---|---|---|---|---|---|
| 1WINF<br>406349-01 | 2.0 | 86 | <1 | 520 | 3,500 | 90 |
| 1WEFF<br>406349-02 | <1 | <1 | <1 | <3 | <100 | 90 |
| 1GAC1<br>406349-03 | <1 | <1 | <1 | <3 | <100 | 91 |
| 1GAC2<br>406349-04 | <1 | <1 | <1 | <3 | <100 | 90 |
| TB-061614-4<br>406349-05 | <1 | <1 | <1 | <3 | <100 | 90 |
| Method Blank<br>04-1226 MB | <1 | <1 | <1 | <3 | <100 | 91 |

## Analysis For Total Metals By EPA Method 200.8

| | | | |
|---|---|---|---|
| Client ID: | 1WEFF | Client: | Stantec |
| Date Received: | 06/19/14 | Project: | TOC_01-176, WORFDB8 F&BI 406349 |
| Date Extracted: | 06/24/14 | Lab ID: | 406349-02 |
| Date Analyzed: | 06/24/14 | Data File: | 406349-02.050 |
| Matrix: | Water | Instrument: | ICPMS1 |
| Units: | ug/L (ppb) | Operator: | AP |

| Internal Standard: | % Recovery: | Lower Limit: | Upper Limit: |
|---|---|---|---|
| Holmium | 101 | 60 | 125 |

| Analyte: | Concentration ug/L (ppb) |
|---|---|
| Lead | 1.04 |

## Analysis For Total Metals By EPA Method 200.8

| | | | |
|---|---|---|---|
| Client ID: | Method Blank | Client: | Stantec |
| Date Received: | NA | Project: | TOC_01-176, WORFDB8 F&BI 406349 |
| Date Extracted: | 06/24/14 | Lab ID: | I4-394 mb |
| Date Analyzed: | 06/24/14 | Data File: | I4-394 mb.032 |
| Matrix: | Water | Instrument: | ICPMS1 |
| Units: | ug/L (ppb) | Operator: | AP |

| Internal Standard: | % Recovery: | Lower Limit: | Upper Limit: |
|---|---|---|---|
| Holmium | 95 | 60 | 125 |

| Analyte: | Concentration ug/L (ppb) |
|---|---|
| Lead | <1 |

Date of Report: 07/01/14
Date Received: 06/19/14
Project: TOC_01-176, WORFDB8 F&BI 406349

## QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF WATER SAMPLES FOR BENZENE, TOLUENE, ETHYLBENZENE, XYLENES, AND TPH AS GASOLINE USING METHOD 8021B AND NWTPH-Gx

Laboratory Code: 406349-04 (Duplicate)

| Analyte | Reporting Units | Sample Result | Duplicate Result | RPD (Limit 20) |
|---|---|---|---|---|
| Benzene | ug/L (ppb) | <1 | <1 | nm |
| Toluene | ug/L (ppb) | <1 | <1 | nm |
| Ethylbenzene | ug/L (ppb) | <1 | <1 | nm |
| Xylenes | ug/L (ppb) | <3 | <3 | nm |
| Gasoline | ug/L (ppb) | <100 | <100 | nm |

Laboratory Code: Laboratory Control Sample

| Analyte | Reporting Units | Spike Level | Percent Recovery LCS | Acceptance Criteria |
|---|---|---|---|---|
| Benzene | ug/L (ppb) | 50 | 95 | 72-119 |
| Toluene | ug/L (ppb) | 50 | 101 | 71-113 |
| Ethylbenzene | ug/L (ppb) | 50 | 102 | 72-114 |
| Xylenes | ug/L (ppb) | 150 | 90 | 72-113 |
| Gasoline | ug/L (ppb) | 1,000 | 104 | 70-119 |

Date of Report: 07/01/14
Date Received: 06/19/14
Project: TOC_01-176, WORFDB8 F&BI 406349

## QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF WATER SAMPLES FOR TOTAL METALS USING EPA METHOD 200.8

Laboratory Code: 406396-07 (Matrix Spike)

| Analyte | Reporting Units | Spike Level | Sample Result | Percent Recovery MS | Percent Recovery MSD | Acceptance Criteria | RPD (Limit 20) |
|---|---|---|---|---|---|---|---|
| Lead | ug/L (ppb) | 10 | <1 | 107 | 103 | 79-121 | 4 |

Laboratory Code: Laboratory Control Sample

| Analyte | Reporting Units | Spike Level | Percent Recovery LCS | Acceptance Criteria |
|---|---|---|---|---|
| Lead | ug/L (ppb) | 10 | 109 | 83-115 |

# Data Qualifiers & Definitions

a - The analyte was detected at a level less than five times the reporting limit. The RPD results may not provide reliable information on the variability of the analysis.

b - The analyte was spiked at a level that was less than five times that present in the sample. Matrix spike recoveries may not be meaningful.

ca - The calibration results for the analyte were outside of acceptance criteria. The value reported is an estimate.

c - The presence of the analyte may be due to carryover from previous sample injections.

cf - The sample was centrifuged prior to analysis.

d - The sample was diluted. Detection limits were raised and surrogate recoveries may not be meaningful.

dv - Insufficient sample volume was available to achieve normal reporting limits.

f - The sample was laboratory filtered prior to analysis.

fb - The analyte was detected in the method blank.

fc - The compound is a common laboratory and field contaminant.

hr - The sample and duplicate were reextracted and reanalyzed. RPD results were still outside of control limits. Variability is attributed to sample inhomogeneity.

hs - Headspace was present in the container used for analysis.

ht – The analysis was performed outside the method or client-specified holding time requirement.

ip - Recovery fell outside of control limits. Compounds in the sample matrix interfered with the quantitation of the analyte.

j - The analyte concentration is reported below the lowest calibration standard. The value reported is an estimate.

J - The internal standard associated with the analyte is out of control limits. The reported concentration is an estimate.

jl - The laboratory control sample(s) percent recovery and/or RPD were out of control limits. The reported concentration should be considered an estimate.

js - The surrogate associated with the analyte is out of control limits. The reported concentration should be considered an estimate.

lc - The presence of the analyte is likely due to laboratory contamination.

L - The reported concentration was generated from a library search.

nm - The analyte was not detected in one or more of the duplicate analyses. Therefore, calculation of the RPD is not applicable.

pc - The sample was received with incorrect preservation or in a container not approved by the method. The value reported should be considered an estimate.

ve - The analyte response exceeded the valid instrument calibration range. The value reported is an estimate.

vo - The value reported fell outside the control limits established for this analyte.

x - The sample chromatographic pattern does not resemble the fuel standard used for quantitation.

406349

# SAMPLE CHAIN OF CUSTODY

ME 06-19-14 AI2/V2

Page # 1 of 1

Send Report To Rebekah Brooks
Company Stantec
Address 19101 36th Ave. West Suite 203
City, State, ZIP Lynnwood, WA 98036
Phone # 425-977-4994 Fax # 425-~~977~~-4097

SAMPLERS (signature) AVadon
PROJECT NAME/NO. TOC-MLT
PO# 203714085
REMARKS

TURNAROUND TIME
☒ Standard (2 Weeks)
☐ RUSH
Rush charges authorized by

SAMPLE DISPOSAL
☒ Dispose after 30 days
☐ Return samples
☐ Will call with instructions

| Sample ID | Lab ID | Date Sampled | Time Sampled | Sample Type | # of containers | ANALYSES REQUESTED: TPH-Diesel | TPH-Gasoline | BTEX by 8021B | VOCs by8260 | SVOCs by 8270 | HFS | TOTAL LEAD | | | | | | Notes |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1WINF | 01A-C | 6-16-14 | 0930 | W | 3 | | X | X | | | | | | | | | | |
| 1WEFI | 02A-D | 6-16-14 | 0940 | W | 4 | | X | X | | | | X | | | | | | |
| 1GAC1 | 03A-C | 6-16-14 | 0950 | W | 3 | | X | X | | | | | | | | | | |
| 1GAC2 | 04 T | 6-16-14 | 1000 | W | 3 | | X | X | | | | | | | | | | |
| TB-061614-4 | 05 | | | W | 1 | | X | X | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | Samples received at 0 °C |

| SIGNATURE | PRINT NAME | COMPANY | DATE | TIME |
|---|---|---|---|---|
| Relinquished by: AVadon | Antonela Vadon | Stantec | 6-16-14 | |
| Received by: | | | | |
| Relinquished by: AVadon | Antonela Vadon | Stantec | 6-19-14 | 1000 |
| Received by: Dave | Dave | FedEx | " | 1245 |

*Friedman & Bruya, Inc.*
*3012 16th Avenue West*
*Seattle, WA 98119-2029*
*Ph. (206) 285-8282*
*Fax (206) 283-5044*

# Unit 2: TOC/Farmasonis Property (24225)

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

James E. Bruya, Ph.D.
Yelena Aravkina, M.S.
Michael Erdahl, B.S.
Kurt Johnson, B.S.
Eric Young, B.S.

3012 16th Avenue West
Seattle, WA 98119-2029
(206) 285-8282
fbi@isomedia.com
www.friedmanandbruya.com

April 25, 2014

Rebekah Brooks, Project Manager
JBR Environmental Consultants
19101 36th Ave W, Suite 203
Lynnwood, WA 98036

Dear Ms. Brooks:

Included are the results from the testing of material submitted on April 18, 2014 from the TOC_01-176_MLT, WORFDB8 F&BI 404377 project. There are 4 pages included in this report. Any samples that may remain are currently scheduled for disposal in 30 days. If you would like us to return your samples or arrange for long term storage at our offices, please contact us as soon as possible.

We appreciate this opportunity to be of service to you and hope you will call if you should have any questions.

Sincerely,

FRIEDMAN & BRUYA, INC.

Michael Erdahl
Project Manager

Enclosures
c: Kim Vik
JBR0425R.DOC

## CASE NARRATIVE

This case narrative encompasses samples received on April 18, 2014 by Friedman & Bruya, Inc. from the JBR Environmental Consultants TOC_01-176_MLT, WORFDB8 F&BI 404377 project. Samples were logged in under the laboratory ID's listed below.

| Laboratory ID | JBR Environmental Consultants |
|---|---|
| 404377-01 | 2WINF |
| 404377-02 | 2WEFF |
| 404377-03 | 2GAC1 |
| 404377-04 | 2GAC2 |

The field pH of sample of 2WEFF was 6.87.

All quality control requirements were acceptable.

Date of Report: 04/25/14
Date Received: 04/18/14
Project: TOC_01-176_MLT, WORFDB8 F&BI 404377
Date Extracted: 04/22/14
Date Analyzed: 04/22/14

**RESULTS FROM THE ANALYSIS OF WATER SAMPLES FOR BENZENE, TOLUENE, ETHYLBENZENE, XYLENES AND TPH AS GASOLINE USING METHODS 8021B AND NWTPH-Gx**

Results Reported as ug/L (ppb)

| Sample ID<br>Laboratory ID | Benzene | Toluene | Ethyl Benzene | Total Xylenes | Gasoline Range | Surrogate (% Recovery)<br>(Limit 52-124) |
|---|---|---|---|---|---|---|
| 2WINF<br>404377-01 | <1 | <1 | <1 | <3 | <100 | 86 |
| 2WEFF<br>404377-02 | <1 | <1 | <1 | <3 | <100 | 85 |
| 2GAC1<br>404377-03 | <1 | <1 | <1 | <3 | <100 | 89 |
| 2GAC2<br>404377-04 | <1 | <1 | <1 | <3 | <100 | 89 |
| Method Blank<br>04-0766 MB | <1 | <1 | <1 | <3 | <100 | 83 |

Date of Report: 04/25/14
Date Received: 04/18/14
Project: TOC_01-176_MLT, WORFDB8 F&BI 404377

## QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF WATER SAMPLES FOR BENZENE, TOLUENE, ETHYLBENZENE, XYLENES, AND TPH AS GASOLINE USING METHOD 8021B AND NWTPH-Gx

Laboratory Code: 404375-02 (Duplicate)

| Analyte | Reporting Units | Sample Result | Duplicate Result | RPD (Limit 20) |
|---|---|---|---|---|
| Benzene | ug/L (ppb) | <1 | <1 | nm |
| Toluene | ug/L (ppb) | <1 | <1 | nm |
| Ethylbenzene | ug/L (ppb) | <1 | <1 | nm |
| Xylenes | ug/L (ppb) | <3 | <3 | nm |
| Gasoline | ug/L (ppb) | <100 | <100 | nm |

Laboratory Code: Laboratory Control Sample

| Analyte | Reporting Units | Spike Level | Percent Recovery LCS | Acceptance Criteria |
|---|---|---|---|---|
| Benzene | ug/L (ppb) | 50 | 88 | 65-118 |
| Toluene | ug/L (ppb) | 50 | 91 | 72-122 |
| Ethylbenzene | ug/L (ppb) | 50 | 91 | 73-126 |
| Xylenes | ug/L (ppb) | 150 | 91 | 74-118 |
| Gasoline | ug/L (ppb) | 1,000 | 97 | 69-134 |

# Data Qualifiers & Definitions

a - The analyte was detected at a level less than five times the reporting limit. The RPD results may not provide reliable information on the variability of the analysis.

A1 – More than one compound of similar molecule structure was identified with equal probability.

b - The analyte was spiked at a level that was less than five times that present in the sample. Matrix spike recoveries may not be meaningful.

ca - The calibration results for this range fell outside of acceptance criteria. The value reported is an estimate.

c - The presence of the analyte indicated may be due to carryover from previous sample injections.

d - The sample was diluted. Detection limits may be raised due to dilution.

ds - The sample was diluted. Detection limits are raised due to dilution and surrogate recoveries may not be meaningful.

dv - Insufficient sample was available to achieve normal reporting limits and limits are raised accordingly.

fb - Analyte present in the blank and the sample.

fc – The compound is a common laboratory and field contaminant.

hr - The sample and duplicate were reextracted and reanalyzed. RPD results were still outside of control limits. The variability is attributed to sample inhomogeneity.

ht - Analysis performed outside the method or client-specified holding time requirement.

ip - Recovery fell outside of normal control limits. Compounds in the sample matrix interfered with the quantitation of the analyte.

j – The result is below normal reporting limits. The value reported is an estimate.

J - The internal standard associated with the analyte is out of control limits. The reported concentration is an estimate.

jl - The analyte result in the laboratory control sample is out of control limits. The reported concentration should be considered an estimate.

jr - The rpd result in laboratory control sample associated with the analyte is out of control limits. The reported concentration should be considered an estimate.

js - The surrogate associated with the analyte is out of control limits. The reported concentration should be considered an estimate.

lc - The presence of the compound indicated is likely due to laboratory contamination.

L - The reported concentration was generated from a library search.

nm - The analyte was not detected in one or more of the duplicate analyses. Therefore, calculation of the RPD is not applicable.

pc – The sample was received in a container not approved by the method. The value reported should be considered an estimate.

pr – The sample was received with incorrect preservation. The value reported should be considered an estimate.

ve - Estimated concentration calculated for an analyte response above the valid instrument calibration range. A dilution is required to obtain an accurate quantification of the analyte.

vo - The value reported fell outside the control limits established for this analyte.

x - The sample chromatographic pattern does not resemble the fuel standard used for quantitation.

404377

# SAMPLE CHAIN OF CUSTODY

ME 04-18-14 V3

Page # 1 of 1

Send Report To Rebekah Brooks
Company JBR Environmental Con.
Address 19101 36th Ave, West, Ste 203
City, State, ZIP Lynnwood, Wa, 98036
Phone # 425-977-4994 Fax # 425-449-4097

SAMPLERS (signature) Dana Hutchins

PROJECT NAME/NO. TOC - MLT

PO# BA14085.00

REMARKS
* Ph Taken in Field add to Report

TURNAROUND TIME
☐ Standard (2 Weeks)
☐ RUSH
Rush charges authorized by

SAMPLE DISPOSAL
☐ Dispose after 30 days
☐ Return samples
☐ Will call with instructions

| Sample ID | Lab ID | Date Sampled | Time Sampled | Sample Type | # of containers | TPH-Diesel | TPH-Gasoline | BTEX by 8021B | VOCs by8260 | SVOCs by 8270 | HFS | * Field pH 6.97 | | | | | | Notes |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 2WINF | 01 | 4-17-14 | 1500 | W | 3 | | X | X | | | | | | | | | | |
| 2WEFF | 02 | 4-17-14 | 1505 | W | 3 | | X | X | | | | X | | | | | | |
| 2GAC1 | 03 | 4-17-14 | 1510 | W | 3 | | X | X | | | | | | | | | | |
| 2GAC2 | 04 | 4-17-14 | 1515 | W | 3 | | X | X | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | Samples received at 2 °C |
| | | | | | | | | | | | | | | | | | | |

ANALYSES REQUESTED


*Friedman & Bruya, Inc.*
*3012 16th Avenue West*
*Seattle, WA 98119-2029*
*Ph. (206) 285-8282*
*Fax (206) 283-5044*


| SIGNATURE | PRINT NAME | COMPANY | DATE | TIME |
|---|---|---|---|---|
| Relinquished by: Dana Hutchins | Dana Hutchins | JBR | 4-18-14 | 1400 |
| Received by: Dana | DO UB | F+BI | 11 | 1600 |
| Relinquished by: | | | | |
| Received by: | | | | |

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

James E. Bruya, Ph.D.
Yelena Aravkina, M.S.
Michael Erdahl, B.S.
Kurt Johnson, B.S.
Eric Young, B.S.

3012 16th Avenue West
Seattle, WA 98119-2029
(206) 285-8282
fbi@isomedia.com
www.friedmanandbruya.com

May 23, 2014

Rebekah Brooks, Project Manager
JBR Environmental Consultants
19101 36th Ave W, Suite 203
Lynnwood, WA 98036

Dear Ms. Brooks:

Included are the results from the testing of material submitted on May 20, 2014 from the TOC 01-176, WORFDB8 F&BI 405385 project. There are 4 pages included in this report. Any samples that may remain are currently scheduled for disposal in 30 days. If you would like us to return your samples or arrange for long term storage at our offices, please contact us as soon as possible.

We appreciate this opportunity to be of service to you and hope you will call if you should have any questions.

Sincerely,

FRIEDMAN & BRUYA, INC.

Michael Erdahl
Project Manager

Enclosures
c: Kim Vik
JBR0523R.DOC

## CASE NARRATIVE

This case narrative encompasses samples received on May 20, 2014 by Friedman & Bruya, Inc. from the JBR Environmental Consultants TOC 01-176, WORFDB8 F&BI 405385 project. Samples were logged in under the laboratory ID's listed below.

| Laboratory ID | JBR Environmental Consultants |
|---|---|
| 405385-01 | 2WEFF |
| 405385-02 | 2WINF |
| 405385-03 | 2WGAC1 |
| 405385-04 | 2WGAC2 |

All quality control requirements were acceptable.

Date of Report: 05/23/14
Date Received: 05/20/14
Project: TOC 01-176, WORFDB8 F&BI 405385
Date Extracted: 05/21/14
Date Analyzed: 05/21/14

**RESULTS FROM THE ANALYSIS OF WATER SAMPLES FOR BENZENE, TOLUENE, ETHYLBENZENE, XYLENES AND TPH AS GASOLINE USING METHODS 8021B AND NWTPH-Gx**

Results Reported as ug/L (ppb)

| Sample ID<br>Laboratory ID | Benzene | Toluene | Ethyl Benzene | Total Xylenes | Gasoline Range | Surrogate (% Recovery)<br>(Limit 52-124) |
|---|---|---|---|---|---|---|
| 2WEFF<br>405385-01 | <1 | <1 | <1 | <3 | <100 | 88 |
| 2WINF<br>405385-02 | <1 | <1 | <1 | <3 | <100 | 88 |
| 2WGAC1<br>405385-03 | <1 | <1 | <1 | <3 | <100 | 88 |
| 2WGAC2<br>405385-04 | <1 | <1 | <1 | <3 | <100 | 91 |
| Method Blank<br>04-1018 MB | <1 | <1 | <1 | <3 | <100 | 89 |

Date of Report: 05/23/14
Date Received: 05/20/14
Project: TOC 01-176, WORFDB8 F&BI 405385

## QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF WATER SAMPLES FOR BENZENE, TOLUENE, ETHYLBENZENE, XYLENES, AND TPH AS GASOLINE USING EPA METHOD 8021B AND NWTPH-Gx

Laboratory Code: 405384-01 (Duplicate)

| Analyte | Reporting Units | Sample Result | Duplicate Result | RPD (Limit 20) |
|---|---|---|---|---|
| Benzene | ug/L (ppb) | <1 | <1 | nm |
| Toluene | ug/L (ppb) | <1 | <1 | nm |
| Ethylbenzene | ug/L (ppb) | <1 | <1 | nm |
| Xylenes | ug/L (ppb) | <3 | <3 | nm |
| Gasoline | ug/L (ppb) | <100 | <100 | nm |

Laboratory Code: Laboratory Control Sample

| Analyte | Reporting Units | Spike Level | Percent Recovery LCS | Acceptance Criteria |
|---|---|---|---|---|
| Benzene | ug/L (ppb) | 50 | 94 | 65-118 |
| Toluene | ug/L (ppb) | 50 | 94 | 72-122 |
| Ethylbenzene | ug/L (ppb) | 50 | 90 | 73-126 |
| Xylenes | ug/L (ppb) | 150 | 94 | 74-118 |
| Gasoline | ug/L (ppb) | 1,000 | 96 | 69-134 |

# Data Qualifiers & Definitions

a - The analyte was detected at a level less than five times the reporting limit. The RPD results may not provide reliable information on the variability of the analysis.

b - The analyte was spiked at a level that was less than five times that present in the sample. Matrix spike recoveries may not be meaningful.

ca - The calibration results for the analyte were outside of acceptance criteria. The value reported is an estimate.

c - The presence of the analyte may be due to carryover from previous sample injections.

cf - The sample was centrifuged prior to analysis.

d - The sample was diluted. Detection limits were raised and surrogate recoveries may not be meaningful.

dv - Insufficient sample volume was available to achieve normal reporting limits.

f - The sample was laboratory filtered prior to analysis.

fb - The analyte was detected in the method blank.

fc - The compound is a common laboratory and field contaminant.

hr - The sample and duplicate were reextracted and reanalyzed. RPD results were still outside of control limits. Variability is attributed to sample inhomogeneity.

hs - Headspace was present in the container used for analysis.

ht – The analysis was performed outside the method or client-specified holding time requirement.

ip - Recovery fell outside of control limits. Compounds in the sample matrix interfered with the quantitation of the analyte.

j - The analyte concentration is reported below the lowest calibration standard. The value reported is an estimate.

J - The internal standard associated with the analyte is out of control limits. The reported concentration is an estimate.

jl - The laboratory control sample(s) percent recovery and/or RPD were out of control limits. The reported concentration should be considered an estimate.

js - The surrogate associated with the analyte is out of control limits. The reported concentration should be considered an estimate.

lc - The presence of the analyte is likely due to laboratory contamination.

L - The reported concentration was generated from a library search.

nm - The analyte was not detected in one or more of the duplicate analyses. Therefore, calculation of the RPD is not applicable.

pc - The sample was received with incorrect preservation or in a container not approved by the method. The value reported should be considered an estimate.

ve - The analyte response exceeded the valid instrument calibration range. The value reported is an estimate.

vo - The value reported fell outside the control limits established for this analyte.

x - The sample chromatographic pattern does not resemble the fuel standard used for quantitation.

405385

# SAMPLE CHAIN OF CUSTODY

ME 05-20-14

V3

Send Report To Rebekah Brooks
Company JBR | Stantec
Address 19101 36th Ave. West #203
City, State, ZIP Lynnwood, WA 98036
Phone # 425.977.4994 Fax # 425.499.4097

SAMPLERS (signature) AVadon

PROJECT NAME/NO. ~~MLE~~ TOC-MLT

PO # B.14085.00

REMARKS 2WEFF pH = 7.18

Page # _____ of _____

TURNAROUND TIME
- [x] Standard (2 Weeks)
- [ ] RUSH
Rush charges authorized by: _____

SAMPLE DISPOSAL
- [x] Dispose after 30 days
- [ ] Return samples
- [ ] Will call with instructions

| Sample ID | Lab ID | Date Sampled | Time Sampled | Sample Type | # of containers | TPH-Diesel | TPH-Gasoline | BTEX by 8021B | VOCs by 8260 | SVOCs by 8270 | HFS | | | | | | Notes |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 2WEFF | 01 | 5-20-14 | 0905 | W | 3 | | X | X | | | | | | | | | |
| 2W INF | 02 | 5-20-14 | 0920 | W | 3 | | X | X | | | | | | | | | |
| 2W GAC1 | 03 | 5.20.14 | 0915 | W | 3 | | X | X | | | | | | | | | |
| 2W GAC2 | 04 | 5.20.14 | 0910 | W | 3 | | X | X | | | | | | | | | |
| | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | |

ANALYSES REQUESTED

*Friedman & Bruya, Inc.*
*3012 16th Avenue West*
*Seattle, WA 98119-2029*
*Ph. (206) 285-8282*
*Fax (206) 283-5044*

| SIGNATURE | PRINT NAME | COMPANY | DATE | TIME |
|---|---|---|---|---|
| Relinquished by: AVadon | Antonela Vadon | JBR/Stantec | 5.20.14 | 1235 |
| Received by: Dave | D Cvo | F&BI | 11 | 15:45 |
| Relinquished by: | | | | |
| Received by: | | Samples received at 4 °C | | |

FORMS\COC\COC.DOC

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

James E. Bruya, Ph.D.
Yelena Aravkina, M.S.
Michael Erdahl, B.S.
Kurt Johnson, B.S.
Eric Young, B.S.

3012 16th Avenue West
Seattle, WA 98119-2029
(206) 285-8282
fbi@isomedia.com
www.friedmanandbruya.com

July 1, 2014

Rebekah Brooks, Project Manager
Stantec
19101 36th Ave W, Suite 203
Lynnwood, WA 98036

Dear Ms. Brooks:

Included are the results from the testing of material submitted on June 19, 2014 from the TOC_01-176, WORFDB8 F&BI 406348 project. There are 7 pages included in this report. Any samples that may remain are currently scheduled for disposal in 30 days. If you would like us to return your samples or arrange for long term storage at our offices, please contact us as soon as possible.

We appreciate this opportunity to be of service to you and hope you will call if you should have any questions.

Sincerely,

FRIEDMAN & BRUYA, INC.

Michael Erdahl
Project Manager

Enclosures
c: Kim Vik
STN0701R.DOC

## CASE NARRATIVE

This case narrative encompasses samples received on June 19, 2014 by Friedman & Bruya, Inc. from the Stantec TOC_01-176, WORFDB8 F&BI 406348 project. Samples were logged in under the laboratory ID's listed below.

| Laboratory ID | Stantec |
|---|---|
| 406348 -01 | 2WINF |
| 406348 -02 | 2WEFF |
| 406348 -03 | 2GAC1 |
| 406348 -04 | 2GAC2 |

All quality control requirements were acceptable.

Date of Report: 07/01/14
Date Received: 06/19/14
Project: TOC_01-176, WORFDB8 F&BI 406348
Date Extracted: 06/20/14
Date Analyzed: 06/20/14

**RESULTS FROM THE ANALYSIS OF WATER SAMPLES FOR BENZENE, TOLUENE, ETHYLBENZENE, XYLENES AND TPH AS GASOLINE USING METHODS 8021B AND NWTPH-Gx**

Results Reported as ug/L (ppb)

| Sample ID<br>Laboratory ID | Benzene | Toluene | Ethyl Benzene | Total Xylenes | Gasoline Range | Surrogate (% Recovery)<br>(Limit 50-150) |
|---|---|---|---|---|---|---|
| 2WINF<br>406348-01 | <1 | <1 | <1 | <3 | <100 | 89 |
| 2WEFF<br>406348-02 | <1 | <1 | <1 | <3 | <100 | 86 |
| 2GAC1<br>406348-03 | <1 | <1 | <1 | <3 | <100 | 86 |
| 2GAC2<br>406348-04 | <1 | <1 | <1 | <3 | <100 | 87 |
| Method Blank<br>04-1226 MB | <1 | <1 | <1 | <3 | <100 | 91 |

## Analysis For Total Metals By EPA Method 200.8

| | | | |
|---|---|---|---|
| Client ID: | 2WEFF | Client: | Stantec |
| Date Received: | 06/19/14 | Project: | TOC_01-176, WORFDB8 F&BI 406348 |
| Date Extracted: | 06/24/14 | Lab ID: | 406348-02 |
| Date Analyzed: | 06/24/14 | Data File: | 406348-02.049 |
| Matrix: | Water | Instrument: | ICPMS1 |
| Units: | ug/L (ppb) | Operator: | AP |

| Internal Standard: | % Recovery: | Lower Limit: | Upper Limit: |
|---|---|---|---|
| Holmium | 98 | 60 | 125 |

| Analyte: | Concentration ug/L (ppb) |
|---|---|
| Lead | <1 |

## Analysis For Total Metals By EPA Method 200.8

| | | | |
|---|---|---|---|
| Client ID: | Method Blank | Client: | Stantec |
| Date Received: | NA | Project: | TOC_01-176, WORFDB8 F&BI 406348 |
| Date Extracted: | 06/24/14 | Lab ID: | I4-394 mb |
| Date Analyzed: | 06/24/14 | Data File: | I4-394 mb.032 |
| Matrix: | Water | Instrument: | ICPMS1 |
| Units: | ug/L (ppb) | Operator: | AP |

| Internal Standard: | % Recovery: | Lower Limit: | Upper Limit: |
|---|---|---|---|
| Holmium | 95 | 60 | 125 |

| Analyte: | Concentration ug/L (ppb) |
|---|---|
| Lead | <1 |

Date of Report: 07/01/14
Date Received: 06/19/14
Project: TOC_01-176, WORFDB8 F&BI 406348

## QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF WATER SAMPLES FOR BENZENE, TOLUENE, ETHYLBENZENE, XYLENES, AND TPH AS GASOLINE USING EPA METHOD 8021B AND NWTPH-Gx

Laboratory Code: 406349-04 (Duplicate)

| Analyte | Reporting Units | Sample Result | Duplicate Result | RPD (Limit 20) |
|---|---|---|---|---|
| Benzene | ug/L (ppb) | <1 | <1 | nm |
| Toluene | ug/L (ppb) | <1 | <1 | nm |
| Ethylbenzene | ug/L (ppb) | <1 | <1 | nm |
| Xylenes | ug/L (ppb) | <3 | <3 | nm |
| Gasoline | ug/L (ppb) | <100 | <100 | nm |

Laboratory Code: Laboratory Control Sample

| Analyte | Reporting Units | Spike Level | Percent Recovery LCS | Acceptance Criteria |
|---|---|---|---|---|
| Benzene | ug/L (ppb) | 50 | 95 | 72-119 |
| Toluene | ug/L (ppb) | 50 | 101 | 71-113 |
| Ethylbenzene | ug/L (ppb) | 50 | 102 | 72-114 |
| Xylenes | ug/L (ppb) | 150 | 90 | 72-113 |
| Gasoline | ug/L (ppb) | 1,000 | 104 | 70-119 |

Date of Report: 07/01/14
Date Received: 06/19/14
Project: TOC_01-176, WORFDB8 F&BI 406348

## QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF WATER SAMPLES FOR TOTAL METALS USING EPA METHOD 200.8

Laboratory Code: 406396-07 (Matrix Spike)

| Analyte | Reporting Units | Spike Level | Sample Result | Percent Recovery MS | Percent Recovery MSD | Acceptance Criteria | RPD (Limit 20) |
|---|---|---|---|---|---|---|---|
| Lead | ug/L (ppb) | 10 | <1 | 107 | 103 | 79-121 | 4 |

Laboratory Code: Laboratory Control Sample

| Analyte | Reporting Units | Spike Level | Percent Recovery LCS | Acceptance Criteria |
|---|---|---|---|---|
| Lead | ug/L (ppb) | 10 | 109 | 83-115 |

# Data Qualifiers & Definitions

a - The analyte was detected at a level less than five times the reporting limit. The RPD results may not provide reliable information on the variability of the analysis.

b - The analyte was spiked at a level that was less than five times that present in the sample. Matrix spike recoveries may not be meaningful.

ca - The calibration results for the analyte were outside of acceptance criteria. The value reported is an estimate.

c - The presence of the analyte may be due to carryover from previous sample injections.

cf - The sample was centrifuged prior to analysis.

d - The sample was diluted. Detection limits were raised and surrogate recoveries may not be meaningful.

dv - Insufficient sample volume was available to achieve normal reporting limits.

f - The sample was laboratory filtered prior to analysis.

fb - The analyte was detected in the method blank.

fc - The compound is a common laboratory and field contaminant.

hr - The sample and duplicate were reextracted and reanalyzed. RPD results were still outside of control limits. Variability is attributed to sample inhomogeneity.

hs - Headspace was present in the container used for analysis.

ht – The analysis was performed outside the method or client-specified holding time requirement.

ip - Recovery fell outside of control limits. Compounds in the sample matrix interfered with the quantitation of the analyte.

j - The analyte concentration is reported below the lowest calibration standard. The value reported is an estimate.

J - The internal standard associated with the analyte is out of control limits. The reported concentration is an estimate.

jl - The laboratory control sample(s) percent recovery and/or RPD were out of control limits. The reported concentration should be considered an estimate.

js - The surrogate associated with the analyte is out of control limits. The reported concentration should be considered an estimate.

lc - The presence of the analyte is likely due to laboratory contamination.

L - The reported concentration was generated from a library search.

nm - The analyte was not detected in one or more of the duplicate analyses. Therefore, calculation of the RPD is not applicable.

pc - The sample was received with incorrect preservation or in a container not approved by the method. The value reported should be considered an estimate.

ve - The analyte response exceeded the valid instrument calibration range. The value reported is an estimate.

vo - The value reported fell outside the control limits established for this analyte.

x - The sample chromatographic pattern does not resemble the fuel standard used for quantitation.

406348

# SAMPLE CHAIN OF CUSTODY ME 06-19-14

AI2 / V2

Page # 1 of 1

Send Report To Rebekah Brooks

Company Stantec

Address 9101 36th Ave. W, Suite 203

City, State, ZIP Lynnwood, WA 98036

Phone # 425 977-4994 Fax # 425 449-4097

SAMPLERS (signature) AVadon

PROJECT NAME/NO. TOC-MLT

PO# 2037114085

REMARKS

TURNAROUND TIME
- [x] Standard (2 Weeks)
- [ ] RUSH
- Rush charges authorized by

SAMPLE DISPOSAL
- [x] Dispose after 30 days
- [ ] Return samples
- [ ] Will call with instructions

| Sample ID | Lab ID | Date Sampled | Time Sampled | Sample Type | # of containers | TPH-Diesel | TPH-Gasoline | BTEX by 8021B | VOCs by8260 | SVOCs by 8270 | HFS | Total Lead | | | | | | Notes |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 2WINF | 01A-C | 6.16.14 | 1310 | W | 3 | | X | X | | | | | | | | | | |
| 2WEFF | 02A-D | 6.16.14 | 1240 | W | 3 4 | | X | X | | | | X | | | | | | |
| 2GAC1 | 03A-C | 6.16.14 | 1300 | W | 3 | | X | X | | | | | | | | | | |
| 2GAC2 | 04T | 6.16.14 | 1250 | W | 3 | | X | X | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | Samples received at 4 °C | | | |
| | | | | | | | | | | | | | | | | | | |


*Friedman & Bruya, Inc.*
*3012 16th Avenue West*
*Seattle, WA 98119-2029*
*Ph. (206) 285-8282*
*Fax (206) 283-5044*


FORMS\COC\COC.DOC

| | SIGNATURE | PRINT NAME | COMPANY | DATE | TIME |
|---|---|---|---|---|---|
| Relinquished by: | AVadon | Antonela Vadon | Stantec | 6.16.14 | |
| Received by: | | | | | |
| Relinquished by: | AVadon | Antonela Vadon | Stantec | 6.19.14 | 1000 |
| Received by: | | | FedEx | " | 1215 |

# Unit 3: Drake Property (24309)

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

James E. Bruya, Ph.D.
Yelena Aravkina, M.S.
Michael Erdahl, B.S.
Kurt Johnson, B.S.
Eric Young, B.S.

3012 16th Avenue West
Seattle, WA 98119-2029
(206) 285-8282
fbi@isomedia.com
www.friedmanandbruya.com

April 25, 2014

Rebekah Brooks, Project Manager
JBR Environmental Consultants
19101 36th Ave W, Suite 203
Lynnwood, WA 98036

Dear Ms. Brooks:

Included are the results from the testing of material submitted on April 18, 2014 from the TOC_01-176_MLT, WORFDB8 F&BI 404375 project. There are 4 pages included in this report. Any samples that may remain are currently scheduled for disposal in 30 days. If you would like us to return your samples or arrange for long term storage at our offices, please contact us as soon as possible.

We appreciate this opportunity to be of service to you and hope you will call if you should have any questions.

Sincerely,

FRIEDMAN & BRUYA, INC.

Michael Erdahl
Project Manager

Enclosures
c: Kim Vik
JBR0425R.DOC

## CASE NARRATIVE

This case narrative encompasses samples received on April 18, 2014 by Friedman & Bruya, Inc. from the JBR Environmental Consultants TOC_01-176_MLT, WORFDB8 F&BI 404375 project. Samples were logged in under the laboratory ID's listed below.

| Laboratory ID | JBR Environmental Consultants |
|---|---|
| 404375-01 | 3WINF |
| 404375-02 | 3WEFF |
| 404375-03 | 3GAC1 |
| 404375-04 | 3GAC2 |

The field pH of sample of 3WEFF was 7.40.

All quality control requirements were acceptable.

Date of Report: 04/25/14
Date Received: 04/18/14
Project: TOC_01-176_MLT, WORFDB8 F&BI 404375
Date Extracted: 04/22/14
Date Analyzed: 04/22/14

**RESULTS FROM THE ANALYSIS OF WATER SAMPLES FOR BENZENE, TOLUENE, ETHYLBENZENE, XYLENES AND TPH AS GASOLINE USING METHODS 8021B AND NWTPH-Gx**

Results Reported as ug/L (ppb)

| Sample ID<br>Laboratory ID | Benzene | Toluene | Ethyl Benzene | Total Xylenes | Gasoline Range | Surrogate (% Recovery)<br>(Limit 52-124) |
|---|---|---|---|---|---|---|
| 3WINF<br>404375-01 | <1 | <1 | <1 | <3 | <100 | 87 |
| 3WEFF<br>404375-02 | <1 | <1 | <1 | <3 | <100 | 86 |
| 3GAC1<br>404375-03 | <1 | <1 | <1 | <3 | <100 | 87 |
| 3GAC2<br>404375-04 | <1 | <1 | <1 | <3 | <100 | 89 |
| Method Blank<br>04-0766 MB | <1 | <1 | <1 | <3 | <100 | 83 |

Date of Report: 04/25/14
Date Received: 04/18/14
Project: TOC_01-176_MLT, WORFDB8 F&BI 404375

## QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF WATER SAMPLES FOR BENZENE, TOLUENE, ETHYLBENZENE, XYLENES, AND TPH AS GASOLINE USING METHOD 8021B AND NWTPH-Gx

Laboratory Code: 404375-02 (Duplicate)

| Analyte | Reporting Units | Sample Result | Duplicate Result | RPD (Limit 20) |
|---|---|---|---|---|
| Benzene | ug/L (ppb) | <1 | <1 | nm |
| Toluene | ug/L (ppb) | <1 | <1 | nm |
| Ethylbenzene | ug/L (ppb) | <1 | <1 | nm |
| Xylenes | ug/L (ppb) | <3 | <3 | nm |
| Gasoline | ug/L (ppb) | <100 | <100 | nm |

Laboratory Code: Laboratory Control Sample

| Analyte | Reporting Units | Spike Level | Percent Recovery LCS | Acceptance Criteria |
|---|---|---|---|---|
| Benzene | ug/L (ppb) | 50 | 88 | 65-118 |
| Toluene | ug/L (ppb) | 50 | 91 | 72-122 |
| Ethylbenzene | ug/L (ppb) | 50 | 91 | 73-126 |
| Xylenes | ug/L (ppb) | 150 | 91 | 74-118 |
| Gasoline | ug/L (ppb) | 1,000 | 97 | 69-134 |

# Data Qualifiers & Definitions

a - The analyte was detected at a level less than five times the reporting limit. The RPD results may not provide reliable information on the variability of the analysis.

A1 – More than one compound of similar molecule structure was identified with equal probability.

b - The analyte was spiked at a level that was less than five times that present in the sample. Matrix spike recoveries may not be meaningful.

ca - The calibration results for this range fell outside of acceptance criteria. The value reported is an estimate.

c - The presence of the analyte indicated may be due to carryover from previous sample injections.

d - The sample was diluted. Detection limits may be raised due to dilution.

ds - The sample was diluted. Detection limits are raised due to dilution and surrogate recoveries may not be meaningful.

dv - Insufficient sample was available to achieve normal reporting limits and limits are raised accordingly.

fb - Analyte present in the blank and the sample.

fc – The compound is a common laboratory and field contaminant.

hr - The sample and duplicate were reextracted and reanalyzed. RPD results were still outside of control limits. The variability is attributed to sample inhomogeneity.

ht - Analysis performed outside the method or client-specified holding time requirement.

ip - Recovery fell outside of normal control limits. Compounds in the sample matrix interfered with the quantitation of the analyte.

j – The result is below normal reporting limits. The value reported is an estimate.

J - The internal standard associated with the analyte is out of control limits. The reported concentration is an estimate.

jl - The analyte result in the laboratory control sample is out of control limits. The reported concentration should be considered an estimate.

jr - The rpd result in laboratory control sample associated with the analyte is out of control limits. The reported concentration should be considered an estimate.

js - The surrogate associated with the analyte is out of control limits. The reported concentration should be considered an estimate.

lc - The presence of the compound indicated is likely due to laboratory contamination.

L - The reported concentration was generated from a library search.

nm - The analyte was not detected in one or more of the duplicate analyses. Therefore, calculation of the RPD is not applicable.

pc – The sample was received in a container not approved by the method. The value reported should be considered an estimate.

pr – The sample was received with incorrect preservation. The value reported should be considered an estimate.

ve - Estimated concentration calculated for an analyte response above the valid instrument calibration range. A dilution is required to obtain an accurate quantification of the analyte.

vo - The value reported fell outside the control limits established for this analyte.

x - The sample chromatographic pattern does not resemble the fuel standard used for quantitation.

404375

# SAMPLE CHAIN OF CUSTODY

ME 04-18-14 V3

Page # 1 of 1

Send Report To Rebekah Brooks
Company JBR Environmental Con
Address 19101 36th Ave, West, Ste 203
City, State, ZIP Lynnwood, Wa, 98036
Phone # 425-977-4994 Fax # 425-449-4097

SAMPLERS (signature) Dana Hutchins
PROJECT NAME/NO. TOC-MLT
PO# B-A14085:06
REMARKS * Ph Taken in Field add To Report

TURNAROUND TIME
☒ Standard (2 Weeks)
☐ RUSH
Rush charges authorized by

SAMPLE DISPOSAL
☒ Dispose after 30 days
☐ Return samples
☐ Will call with instructions

| Sample ID | Lab ID | Date Sampled | Time Sampled | Sample Type | # of containers | TPH-Diesel | TPH-Gasoline | BTEX by 8021B | VOCs by8260 | SVOCs by 8270 | HFS | * Field pH 7.40 | | | | | | Notes |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 3WINF | 01A-C | 4-18-14 | 1230 | W | 3 | | X | X | | | | | | | | | | |
| 3WEFF | 02 | 4-18-14 | 1215 | W | 3 | | X | X | | | | X | | | | | | |
| 3GAC1 | 03 | 4-18-14 | 1225 | W | 3 | | X | X | | | | | | | | | | |
| 3GAC2 | 04 | 4-18-14 | 1220 | W | 3 | | X | X | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | Samples received at 2 °C | |

| SIGNATURE | PRINT NAME | COMPANY | DATE | TIME |
|---|---|---|---|---|
| Relinquished by: Dana Hutchins | Dana Hutchins | JBR | 4-18-14 | 1400 |
| Received by: Dave | Dave | F+BI | 11 | 1600 |
| Relinquished by: | | | | |
| Received by: | | | | |

*Friedman & Bruya, Inc.*
*3012 16th Avenue West*
*Seattle, WA 98119-2029*
*Ph. (206) 285-8282*
*Fax (206) 283-5044*

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

James E. Bruya, Ph.D.
Yelena Aravkina, M.S.
Michael Erdahl, B.S.
Kurt Johnson, B.S.
Eric Young, B.S.

3012 16th Avenue West
Seattle, WA 98119-2029
(206) 285-8282
fbi@isomedia.com
www.friedmanandbruya.com

May 23, 2014

Rebekah Brooks, Project Manager
JBR Environmental Consultants
19101 36th Ave W, Suite 203
Lynnwood, WA 98036

Dear Ms. Brooks:

Included are the results from the testing of material submitted on May 20, 2014 from the TOC 01-176, WORFDB8 F&BI 405386 project. There are 4 pages included in this report. Any samples that may remain are currently scheduled for disposal in 30 days. If you would like us to return your samples or arrange for long term storage at our offices, please contact us as soon as possible.

We appreciate this opportunity to be of service to you and hope you will call if you should have any questions.

Sincerely,

FRIEDMAN & BRUYA, INC.

Michael Erdahl
Project Manager

Enclosures
c: Kim Vik
JBR0523R.DOC

## CASE NARRATIVE

This case narrative encompasses samples received on May 20, 2014 by Friedman & Bruya, Inc. from the JBR Environmental Consultants TOC 01-176, WORFDB8 F&BI 405386 project. Samples were logged in under the laboratory ID's listed below.

| Laboratory ID | JBR Environmental Consultants |
|---|---|
| 405386-01 | 3WEFF |
| 405386-02 | 3WINF |
| 405386-03 | 3WGAC1 |
| 405386-04 | 3WGAC2 |

All quality control requirements were acceptable.

Date of Report: 05/23/14
Date Received: 05/20/14
Project: TOC 01-176, WORFDB8 F&BI 405386
Date Extracted: 05/21/14
Date Analyzed: 05/21/14

**RESULTS FROM THE ANALYSIS OF WATER SAMPLES FOR BENZENE, TOLUENE, ETHYLBENZENE, XYLENES AND TPH AS GASOLINE USING METHODS 8021B AND NWTPH-Gx**

Results Reported as ug/L (ppb)

| Sample ID<br>Laboratory ID | Benzene | Toluene | Ethyl Benzene | Total Xylenes | Gasoline Range | Surrogate (% Recovery)<br>(Limit 52-124) |
|---|---|---|---|---|---|---|
| 3WEFF<br>405386-01 | <1 | <1 | <1 | <3 | <100 | 89 |
| 3WINF<br>405386-02 | <1 | <1 | <1 | 5.6 | <100 | 90 |
| 3WGAC1<br>405386-03 | <1 | <1 | <1 | <3 | <100 | 89 |
| 3WGAC2<br>405386-04 | <1 | <1 | <1 | <3 | <100 | 89 |
| Method Blank<br>04-1018 MB | <1 | <1 | <1 | <3 | <100 | 89 |

Date of Report: 05/23/14
Date Received: 05/20/14
Project: TOC 01-176, WORFDB8 F&BI 405386

## QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF WATER SAMPLES FOR BENZENE, TOLUENE, ETHYLBENZENE, XYLENES, AND TPH AS GASOLINE USING EPA METHOD 8021B AND NWTPH-Gx

Laboratory Code: 405384-01 (Duplicate)

| Analyte | Reporting Units | Sample Result | Duplicate Result | RPD (Limit 20) |
|---|---|---|---|---|
| Benzene | ug/L (ppb) | <1 | <1 | nm |
| Toluene | ug/L (ppb) | <1 | <1 | nm |
| Ethylbenzene | ug/L (ppb) | <1 | <1 | nm |
| Xylenes | ug/L (ppb) | <3 | <3 | nm |
| Gasoline | ug/L (ppb) | <100 | <100 | nm |

Laboratory Code: Laboratory Control Sample

| Analyte | Reporting Units | Spike Level | Percent Recovery LCS | Acceptance Criteria |
|---|---|---|---|---|
| Benzene | ug/L (ppb) | 50 | 94 | 65-118 |
| Toluene | ug/L (ppb) | 50 | 94 | 72-122 |
| Ethylbenzene | ug/L (ppb) | 50 | 90 | 73-126 |
| Xylenes | ug/L (ppb) | 150 | 94 | 74-118 |
| Gasoline | ug/L (ppb) | 1,000 | 96 | 69-134 |

# Data Qualifiers & Definitions

a - The analyte was detected at a level less than five times the reporting limit. The RPD results may not provide reliable information on the variability of the analysis.

b - The analyte was spiked at a level that was less than five times that present in the sample. Matrix spike recoveries may not be meaningful.

ca - The calibration results for the analyte were outside of acceptance criteria. The value reported is an estimate.

c - The presence of the analyte may be due to carryover from previous sample injections.

cf - The sample was centrifuged prior to analysis.

d - The sample was diluted. Detection limits were raised and surrogate recoveries may not be meaningful.

dv - Insufficient sample volume was available to achieve normal reporting limits.

f - The sample was laboratory filtered prior to analysis.

fb - The analyte was detected in the method blank.

fc - The compound is a common laboratory and field contaminant.

hr - The sample and duplicate were reextracted and reanalyzed. RPD results were still outside of control limits. Variability is attributed to sample inhomogeneity.

hs - Headspace was present in the container used for analysis.

ht – The analysis was performed outside the method or client-specified holding time requirement.

ip - Recovery fell outside of control limits. Compounds in the sample matrix interfered with the quantitation of the analyte.

j - The analyte concentration is reported below the lowest calibration standard. The value reported is an estimate.

J - The internal standard associated with the analyte is out of control limits. The reported concentration is an estimate.

jl - The laboratory control sample(s) percent recovery and/or RPD were out of control limits. The reported concentration should be considered an estimate.

js - The surrogate associated with the analyte is out of control limits. The reported concentration should be considered an estimate.

lc - The presence of the analyte is likely due to laboratory contamination.

L - The reported concentration was generated from a library search.

nm - The analyte was not detected in one or more of the duplicate analyses. Therefore, calculation of the RPD is not applicable.

pc - The sample was received with incorrect preservation or in a container not approved by the method. The value reported should be considered an estimate.

ve - The analyte response exceeded the valid instrument calibration range. The value reported is an estimate.

vo - The value reported fell outside the control limits established for this analyte.

x - The sample chromatographic pattern does not resemble the fuel standard used for quantitation.

405386

# SAMPLE CHAIN OF CUSTODY

ME 05-20-14

V3

Send Report To Rebekah Brooks
Company JBR / Stantec
Address 19101 36th Ave. West, Suite 203
City, State, ZIP Lynnwood WA 98036
Phone # 425.977.4994 Fax # 425-499-4097

SAMPLERS *(signature)* AVadan

PROJECT NAME/NO. TOC - MLT

PO # B:A1405T.00

REMARKS 3WEFF pH = 7.25

Page # _____ of _____

TURNAROUND TIME
☒ Standard (2 Weeks)
☐ RUSH _____
Rush charges authorized by: _____

SAMPLE DISPOSAL
☒ Dispose after 30 days
☐ Return samples
☐ Will call with instructions

| Sample ID | Lab ID | Date Sampled | Time Sampled | Sample Type | # of containers | ANALYSES REQUESTED: TPH-Diesel | TPH-Gasoline | BTEX by 8021B | VOCs by 8260 | SVOCs by 8270 | HFS | | | | | | Notes |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 3W EFF | 01 | 5.19.14 | 1525 | W | 3 | | X | X | | | | | | | | | |
| 3W INF | 02 | 5.19.14 | 1540 | W | 3 | | X | X | | | | | | | | | |
| 3W GAC1 | 03 | 5.19.14 | 1530 | W | 3 | | X | X | | | | | | | | | |
| 3W GAC2 | 04 | 5.19.14 | 1535 | W | 3 | | X | X | | | | | | | | | |
| | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | |

*Friedman & Bruya, Inc.*
*3012 16th Avenue West*
*Seattle, WA 98119-2029*
*Ph. (206) 285-8282*
*Fax (206) 283-5044*

| SIGNATURE | PRINT NAME | COMPANY | DATE | TIME |
|---|---|---|---|---|
| Relinquished by: AVadan | Antonela Vadan | JBR/Stantec | 5.20.14 | 1240 |
| Received by: Dave | Dave | F&B | 11 | 15:45 |
| Relinquished by: | | | | |
| Received by: | | Samples received at 4 °C | | |

FORMS\COC\COC.DOC

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

James E. Bruya, Ph.D.
Yelena Aravkina, M.S.
Michael Erdahl, B.S.
Kurt Johnson, B.S.
Eric Young, B.S.

3012 16th Avenue West
Seattle, WA 98119-2029
(206) 285-8282
fbi@isomedia.com
www.friedmanandbruya.com

July 1, 2014

Rebekah Brooks, Project Manager
Stantec
19101 36th Ave W, Suite 203
Lynnwood, WA 98036

Dear Ms. Brooks:

Included are the results from the testing of material submitted on June 19, 2014 from the TOC_01-176, WORFDB8 F&BI 406347 project. There are 7 pages included in this report. Any samples that may remain are currently scheduled for disposal in 30 days. If you would like us to return your samples or arrange for long term storage at our offices, please contact us as soon as possible.

We appreciate this opportunity to be of service to you and hope you will call if you should have any questions.

Sincerely,

FRIEDMAN & BRUYA, INC.

Michael Erdahl
Project Manager

Enclosures
c: Kim Vik
STN0701R.DOC

## CASE NARRATIVE

This case narrative encompasses samples received on June 19, 2014 by Friedman & Bruya, Inc. from the Stantec TOC_01-176, WORFDB8 F&BI 406347 project. Samples were logged in under the laboratory ID's listed below.

| Laboratory ID | Stantec |
|---|---|
| 406347 -01 | 3WINF |
| 406347 -02 | 3WEFF |
| 406347 -03 | 3GAC1 |
| 406347 -04 | 3GAC2 |

All quality control requirements were acceptable.

Date of Report: 07/01/14
Date Received: 06/19/14
Project: TOC_01-176, WORFDB8 F&BI 406347
Date Extracted: 06/19/14
Date Analyzed: 06/19/14

**RESULTS FROM THE ANALYSIS OF WATER SAMPLES FOR BENZENE, TOLUENE, ETHYLBENZENE, XYLENES AND TPH AS GASOLINE USING METHODS 8021B AND NWTPH-Gx**

Results Reported as ug/L (ppb)

| Sample ID<br>Laboratory ID | Benzene | Toluene | Ethyl Benzene | Total Xylenes | Gasoline Range | Surrogate (% Recovery)<br>(Limit 52-124) |
|---|---|---|---|---|---|---|
| 3WINF<br>406347-01 | <1 | <1 | <1 | <3 | <100 | 91 |
| 3WEFF<br>406347-02 | <1 | <1 | <1 | <3 | <100 | 92 |
| 3GAC1<br>406347-03 | <1 | <1 | <1 | <3 | <100 | 93 |
| 3GAC2<br>406347-04 | <1 | <1 | <1 | <3 | <100 | 94 |
| Method Blank<br>04-1225 MB | <1 | <1 | <1 | <3 | <100 | 86 |

# FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

## Analysis For Total Metals By EPA Method 200.8

| | | | |
|---|---|---|---|
| Client ID: | 3WEFF | Client: | Stantec |
| Date Received: | 06/19/14 | Project: | TOC_01-176, WORFDB8 F&BI 406347 |
| Date Extracted: | 06/24/14 | Lab ID: | 406347-02 |
| Date Analyzed: | 06/24/14 | Data File: | 406347-02.048 |
| Matrix: | Water | Instrument: | ICPMS1 |
| Units: | ug/L (ppb) | Operator: | AP |

| Internal Standard: | % Recovery: | Lower Limit: | Upper Limit: |
|---|---|---|---|
| Holmium | 101 | 60 | 125 |

| Analyte: | Concentration ug/L (ppb) |
|---|---|
| Lead | 1.05 |

## Analysis For Total Metals By EPA Method 200.8

| | | | |
|---|---|---|---|
| Client ID: | Method Blank | Client: | Stantec |
| Date Received: | NA | Project: | TOC_01-176, WORFDB8 F&BI 406347 |
| Date Extracted: | 06/24/14 | Lab ID: | I4-394 mb |
| Date Analyzed: | 06/24/14 | Data File: | I4-394 mb.032 |
| Matrix: | Water | Instrument: | ICPMS1 |
| Units: | ug/L (ppb) | Operator: | AP |

| Internal Standard: | % Recovery: | Lower Limit: | Upper Limit: |
|---|---|---|---|
| Holmium | 95 | 60 | 125 |

| Analyte: | Concentration ug/L (ppb) |
|---|---|
| Lead | <1 |

Date of Report: 07/01/14
Date Received: 06/19/14
Project: TOC_01-176, WORFDB8 F&BI 406347

## QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF WATER SAMPLES FOR BENZENE, TOLUENE, ETHYLBENZENE, XYLENES, AND TPH AS GASOLINE USING EPA METHOD 8021B AND NWTPH-Gx

Laboratory Code: 406308-03 (Duplicate)

| Analyte | Reporting Units | Sample Result | Duplicate Result | RPD (Limit 20) |
|---|---|---|---|---|
| Benzene | ug/L (ppb) | <1 | <1 | nm |
| Toluene | ug/L (ppb) | <1 | <1 | nm |
| Ethylbenzene | ug/L (ppb) | <1 | <1 | nm |
| Xylenes | ug/L (ppb) | <3 | <3 | nm |
| Gasoline | ug/L (ppb) | <100 | <100 | nm |

Laboratory Code: Laboratory Control Sample

| Analyte | Reporting Units | Spike Level | Percent Recovery LCS | Acceptance Criteria |
|---|---|---|---|---|
| Benzene | ug/L (ppb) | 50 | 92 | 65-118 |
| Toluene | ug/L (ppb) | 50 | 95 | 72-122 |
| Ethylbenzene | ug/L (ppb) | 50 | 93 | 73-126 |
| Xylenes | ug/L (ppb) | 150 | 94 | 74-118 |
| Gasoline | ug/L (ppb) | 1,000 | 99 | 69-134 |

Date of Report: 07/01/14
Date Received: 06/19/14
Project: TOC_01-176, WORFDB8 F&BI 406347

## QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF WATER SAMPLES FOR TOTAL METALS USING EPA METHOD 200.8

Laboratory Code: 406396-07 (Matrix Spike)

| Analyte | Reporting Units | Spike Level | Sample Result | Percent Recovery MS | Percent Recovery MSD | Acceptance Criteria | RPD (Limit 20) |
|---|---|---|---|---|---|---|---|
| Lead | ug/L (ppb) | 10 | <1 | 107 | 103 | 79-121 | 4 |

Laboratory Code: Laboratory Control Sample

| Analyte | Reporting Units | Spike Level | Percent Recovery LCS | Acceptance Criteria |
|---|---|---|---|---|
| Lead | ug/L (ppb) | 10 | 109 | 83-115 |

# Data Qualifiers & Definitions

a - The analyte was detected at a level less than five times the reporting limit. The RPD results may not provide reliable information on the variability of the analysis.

b - The analyte was spiked at a level that was less than five times that present in the sample. Matrix spike recoveries may not be meaningful.

ca - The calibration results for the analyte were outside of acceptance criteria. The value reported is an estimate.

c - The presence of the analyte may be due to carryover from previous sample injections.

cf - The sample was centrifuged prior to analysis.

d - The sample was diluted. Detection limits were raised and surrogate recoveries may not be meaningful.

dv - Insufficient sample volume was available to achieve normal reporting limits.

f - The sample was laboratory filtered prior to analysis.

fb - The analyte was detected in the method blank.

fc - The compound is a common laboratory and field contaminant.

hr - The sample and duplicate were reextracted and reanalyzed. RPD results were still outside of control limits. Variability is attributed to sample inhomogeneity.

hs - Headspace was present in the container used for analysis.

ht – The analysis was performed outside the method or client-specified holding time requirement.

ip - Recovery fell outside of control limits. Compounds in the sample matrix interfered with the quantitation of the analyte.

j - The analyte concentration is reported below the lowest calibration standard. The value reported is an estimate.

J - The internal standard associated with the analyte is out of control limits. The reported concentration is an estimate.

jl - The laboratory control sample(s) percent recovery and/or RPD were out of control limits. The reported concentration should be considered an estimate.

js - The surrogate associated with the analyte is out of control limits. The reported concentration should be considered an estimate.

lc - The presence of the analyte is likely due to laboratory contamination.

L - The reported concentration was generated from a library search.

nm - The analyte was not detected in one or more of the duplicate analyses. Therefore, calculation of the RPD is not applicable.

pc - The sample was received with incorrect preservation or in a container not approved by the method. The value reported should be considered an estimate.

ve - The analyte response exceeded the valid instrument calibration range. The value reported is an estimate.

vo - The value reported fell outside the control limits established for this analyte.

x - The sample chromatographic pattern does not resemble the fuel standard used for quantitation.

406347

# SAMPLE CHAIN OF CUSTODY

ME 06-19-14

VI / AI 2

Page # ____ of ____

Send Report To Rebekah Brooks

Company Stantec

Address 19101 36th Ave. W, Suite 203

City, State, ZIP Lynnwood, WA 98036

Phone # 425-477-4994 Fax # 425-449-4097

SAMPLERS (signature) Avadon

PROJECT NAME/NO. TOC-MLT

PO# 203714085

REMARKS

TURNAROUND TIME
- [x] Standard (2 Weeks)
- [ ] RUSH
- Rush charges authorized by

SAMPLE DISPOSAL
- [x] Dispose after 30 days
- [ ] Return samples
- [ ] Will call with instructions

| Sample ID | Lab ID | Date Sampled | Time Sampled | Sample Type | # of containers | TPH-Diesel | TPH-Gasoline | BTEX by 8021B | VOCs by8260 | SVOCs by 8270 | HFS | Total Lead | | | | | | Notes |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 3WINT | 01A-C | 6.16.14 | 1640 | W | 3 | | X | X | | | | | | | | | | |
| 3WEFF | 02A-D | 6.16.14 | 1610 | W | 4 | | X | X | | | | X | | | | | | |
| 3 GAC1 | 03A-C | 6.16.14 | 1630 | W | 3 | | X | X | | | | | | | | | | |
| 3 GAC2 | 04 T | 6.16.14 | 1620 | W | 3 | | X | X | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | Sample received at 6 °C | | | | | |

| SIGNATURE | PRINT NAME | COMPANY | DATE | TIME |
|---|---|---|---|---|
| Relinquished by: Avadon | Antonela Vadon | Stantec | 6.16.14 | |
| Received by: | | | | |
| Relinquished by: Avadon | Antonela Vadon | Stantec | 6.19.14 | 1000 |
| Received by: [redacted] | [redacted] | FedEx | " | 1215 |

*Friedman & Bruya, Inc.*
*3012 16th Avenue West*
*Seattle, WA 98119-2029*
*Ph. (206) 285-8282*
*Fax (206) 283-5044*